



EXCELLENCE THROUGH HYDRODYNAMICS

# GENERAL CATALOG

Valves & Actuator Selection Guide



TOMOE VALVE CO., LTD.



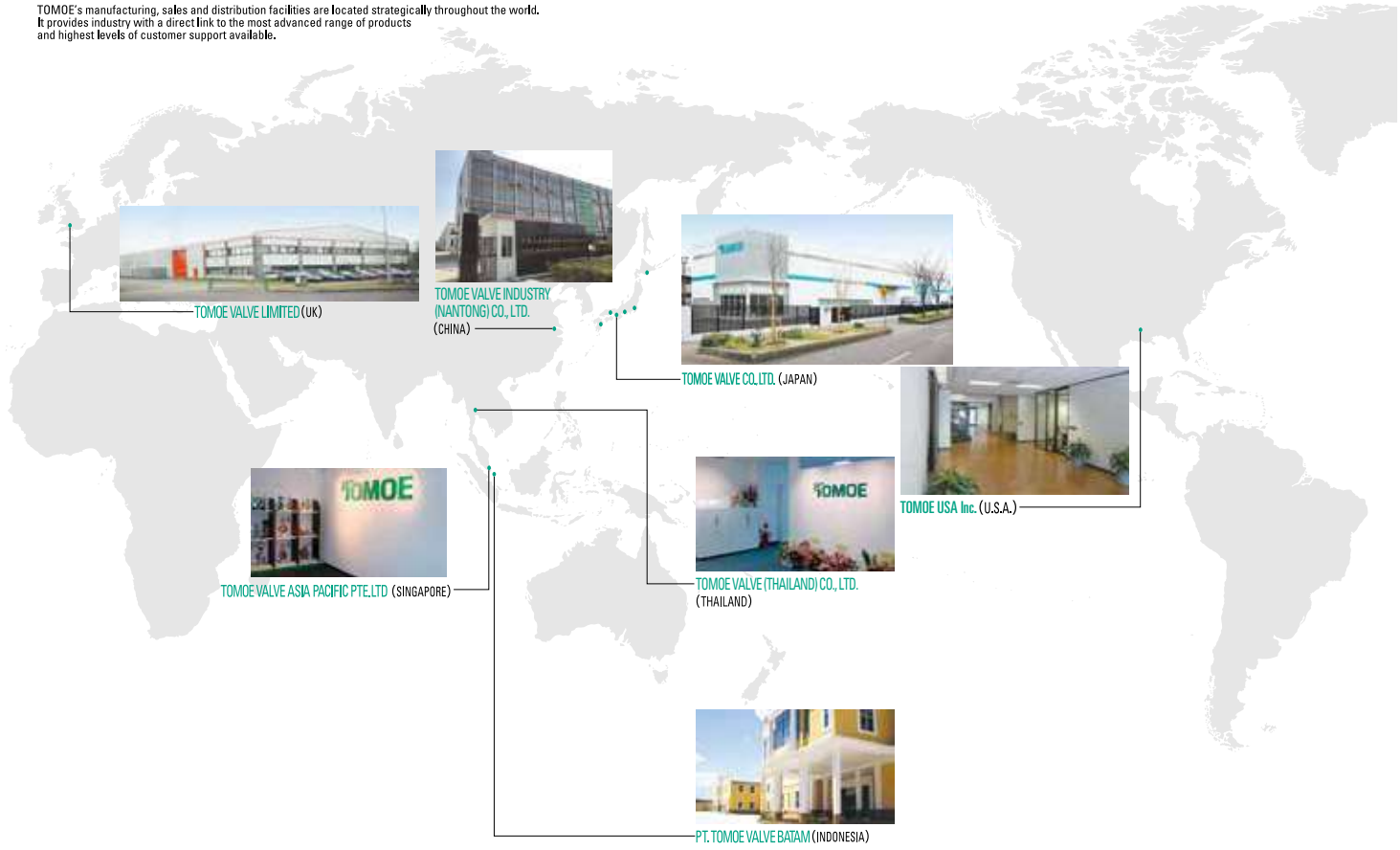
EXCELLENCE THROUGH HYDRODYNAMICS

TOMOE VALVE WebSite

www.tomoevalve.com

### STRATEGIC, GLOBAL AND LOCAL RESOURCES

TOMOE's manufacturing, sales and distribution facilities are located strategically throughout the world. It provides industry with a direct link to the most advanced range of products and highest levels of customer support available.



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# Standard Specifications

## Standard Specifications

	Pressure (MPa)	Temperature (°C)						Valve Nominal size (mm)	Standard Materials			Approvals / Complies <sup>※4</sup>			
		-196	-100	※1 -46	0	100	200		300	400	500		600	700	Body
The Ultimate Process Valves	Tritec	25.5							700	80 to 1650	C.S. S.S.	C.S. S.S.	S.S.+GRAPHITE	FS CE	
	TT2	5.1							600	80 to 600	C.S. S.S.	C.S. S.S.	S.S.+GRAPHITE	FS CE NK ABS	
High Performance Butterfly Valves	334A	5.1							232	50, 80 to 600	C.S. S.S.	S.S.	RPTFE	FS	
	344Q	2.0							232	80 to 600	Ni-Al-Br.	Ni-Al-Br.	RPTFE	FS	
	302A	2.0							600	80 to 600	C.S. S.S.	S.S.	S.S.	FS CE NK ABS	
	303Q	2.0							600	80 to 600	C.S. S.S.	S.S.	S.S.	FS CE	
	304A	2.0							232	80 to 600	C.S. S.S.	S.S.	RPTFE	CE NK ABS	
	304Q	2.0							232	80 to 600	C.S. S.S.	S.S.	RPTFE	CE	
	304YA	1.0							200	40 to 300	D.I. S.S.	S.S.	RPTFE	NK	
	302Y	2.0							250	40 to 300	D.I. S.S.	S.S.	S.S.	CE NK ABS	
	304Y	2.0							200	40 to 300	D.I. S.S.	S.S.	RPTFE	CE NK ABS	
	304M (HLV)	0.7							230	650 to 1000	C.S. S.S.	C.S. S.S.	RPTFE		
	Rotary Control Valves	507V	1.6							400	50 to 400	C.S. S.S.	S.S.		
508V		1.6							120	50 to 200	D.I.	S.S.	EPDM <sup>※2</sup> (OPTION: NBR CORE-Reinforced)		
		1.0							120	250 to 600	D.I.	S.S.	EPDM <sup>※2</sup> (OPTION: NBR CORE-Reinforced)		
DTM		5.1							400	80 to 300	C.S. S.S.	S.S.	RPTFE S.S. <sup>※3</sup>		
Chemically Resistant Butterfly Valves	846T	1.0							200	65 to 300	D.I.	S.S. PPS	PFA PTFE	CE	
	847T / 847Q	1.0							200	50 to 300	D.I.	PFA PTFE	PFA PTFE	CE	
	841T	0.7							100	350 to 600	D.I.	S.S.	PTFE		
	842T	0.7							100	350 to 600	D.I.	PTFE	PTFE	CE	
Rubber Seated Valves	700Z	1.0							120	40 to 300	ALLOY DIE-CAST	S.S. PPS (40~200mm)	EPDM <sup>※2</sup>	JIS	
	700G	1.0							120	40 to 600	D.I. (40~300mm) C.I. (350~600mm)	S.S. D.I. (80~300mm) PPS (40~200mm)	NBR EPDM <sup>※2</sup>	JIS NK	
	704G Full Lugged	1.0							120	50 to 600	D.I.	S.S. D.I. PPS (50~200mm)	NBR EPDM <sup>※2</sup>	JIS CE NK LR ABS	
	705G	1.0							120	50 to 600	D.I. (40~300mm) C.I. (350~600mm)	S.S. D.I. PPS (50~200mm)	NBR EPDM <sup>※2</sup>	JIS CE NK LR ABS	
	72WG / 72SG / 72LG	1.6							120	40 to 600	D.I.	S.S.	NBR EPDM <sup>※2</sup>		
	731P	1.6							120	50 to 600	D.I.	S.S.	NBR EPDM <sup>※2</sup>	JIS CE	
	732P	2.0							120	50 to 600	D.I.	S.S.	NBR EPDM <sup>※2</sup>	CE	
	731R	1.6							120	350 to 600	D.I.	S.S.	EPDM <sup>※2</sup>	JIS	
	700E	1.0							120	650 to 1350	C.I.	(HARD CHROME PLATING) S.S.	NBR EPDM <sup>※2</sup>	NK	
	700K	1.0							120	650 to 1350	C.I. D.I. C.S.	(HARD CHROME PLATING) S.S.	NBR EPDM <sup>※2</sup>	NK	
	700S	1.0							120	650 to 900	C.I. D.I. C.S.	(HARD CHROME PLATING) S.S.	NBR EPDM <sup>※2</sup>	NK	
	722F	1.0							120	125 to 800	C.S. (OPTION : D.I.)	S.S. D.I.	NBR EPDM <sup>※2</sup>	NK LR ABS	
	720F	1.0							120	850 to 1350	C.S. (OPTION : D.I.)	S.S. D.I.	NBR EPDM <sup>※2</sup>	NK ABS	
	227P	1.6							120	650 to 2400	D.I. C.S.	S.S. AlBr	NBR EPDM <sup>※2</sup>		
	Check Valves	907T / 908H	1.0							120	50 to 300	D.I. S.S.	S.S.	NBR EPDM <sup>※2</sup>	
		907L	1.0							100	50 to 300	C.I.	S.S.	NBR EPDM <sup>※2</sup>	NK
		903L	1.0							100	50 to 300	C.I.	S.S.	NBR <sup>※2</sup> (OPTION: EPDM EKM )	NK
901C		3.0							100	350 to 450	C.I.	AlBr	NBR <sup>※2</sup> (OPTION: EPDM EKM )	NK	
905C									100	50 to 400	C.S.	S.S.	EPDM		

■Remarks: JIS JIS B 2032 FS Fire Safe Approvals(API607 4th Edition) CE CE Marking NK Nippon Kaiji Kyokai (NK) LR Lloyd's Register of Shipping ABS American Bureau of Shipping

※Please contact us if needed any detailed information.

※1 -46°C service for Tritac is available with suitable material. Please consult our sales for the service condition lower than -46°C.  
 ※2 EPDM/NBR: If the fluid contains chlorine, the seat ring could be corroded early by combined factors such as concentration and temperature. For further information please contact our sales staff. In case of chlorine-containing fluid, 846T or 847T (containing fluorine resin) is recommended depending on combined factors such as concentration.  
 ※3 In case of RPTFE, maximum operating temperature should not exceed 230°C.  
 ※4 Approvals and compliances are not obtained depending on the material and nominal size. If any approval or compliances is required, please consult sales staff. JIS B 2032 is a reference standard for the design and quality of wafer type rubber seat butterfly valves.

# Approvals

## ISO 9001

Due to our highly-evaluated quality system throughout all processes across the entire company, from designing and development to order acceptance, procurement, manufacturing, inspection and shipment, registration of the ISO9001 international standard for quality management systems has been approved.



※The certification authority :

Tomoe Valve Co., Ltd. (Japan) .....JIC  
 Tomoe Valve Industry (Nantong) Co., Ltd. (China) .....Lloyd's  
 Tomoe Valve Limited (UK) .....Lloyd's  
 PT. Tomoe Valve Batam (Indonesia) .....Lloyd's

<b>Certifying authority</b>	Certifying authority accredited by JICQA (JIC Quality Assurance Ltd.), and Japan Accreditation Board
<b>Date of registration</b>	September 11, 1995
<b>Registration number</b>	No.0091
<b>Scope of registration</b>	Designing, development and servicing of butterfly valves, actuators, and accessories

ISO9001 is a standard for a quality system for the entire company, whose scope ranges from quality policy of managers and clarification of responsibility to development, designing, order acceptance, procurement, manufacturing, inspection, shipment, servicing and even education and training. This standard requires systems that supply high-quality products trusted by users.

## Waterworks approvals

700ZJ

◇Registration number E-306  
 Certified by Japan Water Works Association



## Fire safe approvals

302A · 334A

◇API Std 607 4th Edition

TOMOE TRITEC

◇BS 6755 Part 2/API 6FA and API Std 607 4th/5th Edition

TT2

◇API Std 607 4th/5th Edition

## For fire safety



The symbol on the left indicates that the product is certified by the Fire Equipment and Safety Center of Japan; it is displayed on each product.

Note: When you contact us, please ask our sales staff for "fire-fighting" products.

700ZF

◇Certification Number VA-115

302Y

◇Certification Number VA-070

700G

◇Certification Number VA-065-1

334A

◇Certification Number VA-103

702G

◇Certification Number VA-066-1  
 VA-067-1

907H

◇Certification Number VA-011

731P (50~300mm)

◇Certification Number VA-068-1

903LF

◇Certification Number VA-127

732P (50~300mm)

◇Certification Number VA-069-1

● Dry models other than 302Y cannot be used in places where products are exposed to flame or in environments where pipes are constantly filled with gas.

However, these models can be used if covered with fire-resistant material such as Rockwool<sup>\*1</sup>, of thickness more than 50 mm, to avoid direct flame.

\*1 For selection of Rockwool, please inquire with fire authorities in your district.

● In environments such as above, please use 302Y (dry model).

● Rubber seated valves whose certification numbers have no suffixed numbers after hyphens are certified as wet models.

## Marine approvals

Nippon Kaiji Kyokai (NK)	704G, 722F
	700S, 700E, 720F
	700G, 731P, 901C
	705G
	302Y, 304Y, 304YA, 302A, 304A, TT2AFR
Lloyd's Register of Shipping	907T, 908H
	704G, 722F
American Bureau of Shipping	705G
	705G, 704G, 704R, 705R, 722F, 720F
	302Y, 304Y, 302A, 304A, TT2AFR
Bureau Veritas (France)	720F
	704G
	722F

# Handling Precautions

## Butterfly Valves (common to all models)

For improvement of the product, dimensions or material may be changed without notice.  
Please contact us for up-to-date information

### Storage Conditions

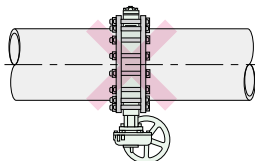
- To protect the seat rings, do not unpack valves until you are ready to install them. If a valve remains unpacked for a long period of time, dust or other particles may enter the valve and cause seat leakage.
- For temporary storage before installing or for long-term storage, keep valves in the vinyl bag in which they came and store them indoors in a cool, well-ventilated location (temperature of -10 to 60C and humidity of 70% or less). Keep the valve away from dusty locations and take care in protecting the valve and actuator from bearing excessive weights.

### Installing Valves

- Valves can be installed in any orientation, to allow for the easiest possible operation of the valve. However, be careful of the orientation of the stem when your pipe layout is one of those covered on next page.

### Piping Instructions

- Verify the materials of the seat ring and disc of the valve before installation.
- When installing a butterfly valve directly to a check valve or pump, install an extension or spacer to prevent the disc of the butterfly valve from contacting the check valve or pump.
- Install the valve only after completing all welding operations around the valve to prevent damage caused by the solder and other welding materials.
- After welding is performed on a flange, wait until it has sufficiently cooled before installing the valve. Never perform welding on a flange with the valve installed.
- In the surrounding piping, make sure that no welding residue, pipe waste, scaling, or dust remain in the pipe. Clean the inside of the pipes if necessary prior to installation.
- Before blowing air to remove any foreign matter in the piping, install an extension tube with face-to-face dimensions equal to that of the valve in place of the valve. Do not blow air with the valve installed in the pipe, for this may damage the seat ring.
- Clean the mating surface of the flange with compressed air before installation. Remove rust or foreign particles with cleaning alcohol or a neutral detergent.
- With a zinc plated flange, attention must be paid to avoid flange leakage due to an uneven surface of the flange.
- Make sure that there is no warpage in the flange, misalignment, or damage to the mating surface of the flange.
- Be sure to properly align the valve and mounting flanges.
- Install the jack bolts taking care not to damage the seat ring of the valve and adjust the face-to-face dimensions. The face-to-face dimensions should be such that the piping is spread open 3 to 5mm to allow the valve to be inserted.
- If possible, avoid mounting the actuator with it facing downward. Especially for valve sizes of 350mm or larger, where the lower portion of the valve stem bears thrust loads, never install the actuator facing downward.
- Use the centering rib of the valve body as a guide and visually adjust so that the gap between the piping bolt and the valve is even, and align the flange and the center of the valve. Inaccurate centering can cause external leaks and seat leaks.
- After centering the pipes, insert bolts at the proper locations so that the bottom of the valve can rest upon them to prevent the valve from falling through.



- Before tightening the installation bolts, make sure that the disc of the valve does not contact any portion of the flange when it is fully opened.
- The installation bolts should be tightened evenly and in the proper sequence. Tighten one bolt a small amount, and then proceed to another bolt that is located on the other side. Proceed tightening each bolt a little at a time by crisscrossing across the flange to insure well-balanced tightening.
- Make sure that the piping flanges are parallel and that there is no misalignment or inclination.
- Upon completion of installation, fully open and close the valve once again to make sure that the disc does not touch the piping or gasket.
- If it is expected that the actuator will be directly exposed to corrosive liquid, the seal part of the actuator will corrode and the waterproof performance will be reduced. Install a protective cover to protect the actuator.  
e.g. When using in an atmosphere where a chemical liquid (a liquid containing hypochlorous acid) is applied, such as on the side of a cooling cabinet.

### Operational Instructions

- Prior to operation, clean the outside of the piping with compressed air, and the inside of the piping with running water.
- If the valve is to be used at an opening angle of 30 or under for flow constriction, consult us beforehand.

### Also...

- After installation, open and close the valve once every two weeks if the valve is not used for a long period of time, and open and close the valve a few times before starting actual operation.
- For pressure tests of the piping (where pressures exceed the rated pressure), always keep the valve fully open. Never fully close the valve or use it as a blind flange.
- If the actuator is a manual gear, pneumatic cylinder, electric motor, diaphragm or other similar type, and the ambient temperature is extremely high, it may be necessary to change the O-rings and other rubber components using special materials, or change the motor or solenoids to those with higher insulation levels, so be sure to consult us beforehand.
- Always operate lock lever, worm gear, or center handle type actuators by hand. Never use an extension bar on the lever or a wheel key on the gear handle, for they might damage the handle or lever. Unlike gate valves or globe valves, tightening with a high torque is unnecessary.
- Do not loosen the installation bolts or other bolted components before relieving the system pressure.
- To avoid any damage, which may be caused by vibration of piping to a valve, provide a 3D to 5D straight distance from any nozzle orifice or control valve which may be installed at the upper stream of the piping line. (See correct example of a combination of control valve and stop a valve on the right.)
- A valve 350mm or over may have a nut and bolt on the center of the bottom cover to support the weight of disc. Please do not touch it.
- Do not touch any open/close adjusting bolts and screws on any actuators (gear/pneumatic cylinder/electric motor) as these were pre-adjusted.

**CAUTION**

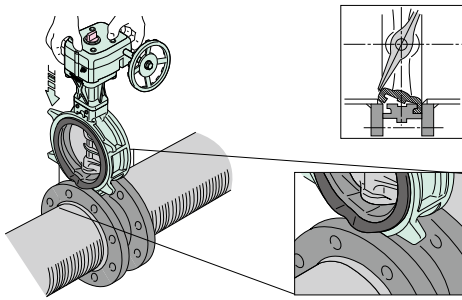
We will indicate "level" of danger caused by neglecting these cautions as the following:

**CAUTION** this mark indicates "possibility of serious injury to persons or damage to components"

We will indicate following marks for your attention.

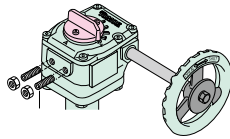
**No** this mark indicates that "you must not"

**No** Forcing the valve between the pipe flanges may cause the seat ring to peel off and cause a leak.



**No** Do not touch the stopper bolts of the gear box.

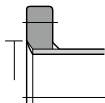
The closed position for the valve will change and result in leaking.



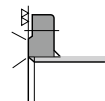
**No** Do not throw or mishandle the valve. Do not stand on or put objects on the actuator.

**No** Below are causes of damage to the valve seat or leakage from the flanges.

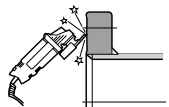
• **Excessive Weld**  
The resulting oversized inner pipe diameter may cause a flange leak.



• **Sharp Edges**  
May cause damage to the seat ring.

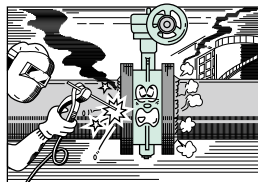


• **Rough Surface from Grinding**  
May cause a flange leak.



Do not install a valve to a flange that has just been welded.

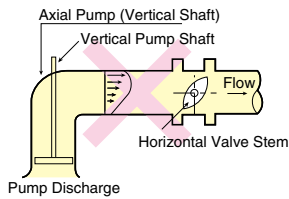
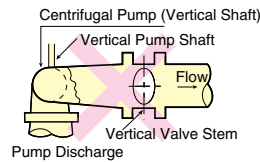
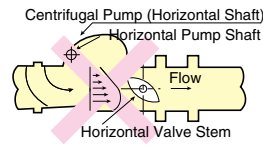
**No** Wait until it has sufficiently cooled before installing the valve. Never perform welding on a flange with the valve installed.



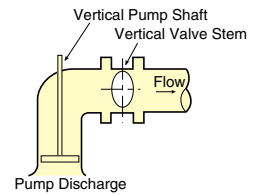
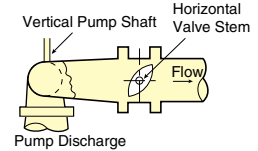
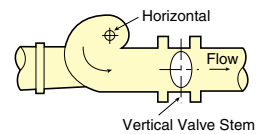
**No** Do not install near the pump discharge part, on the secondary side of the curved pipe (elbow), on the downstream side of the reducer, or on the secondary side of the control valve. If it is unavoidable to install it in these places, keep it about 5 times the nominal diameter of the valve. If it is less than 5 times, the life of the valve may be shortened.

**Installing a valve at a pump outlet**

• **Incorrect Installation**

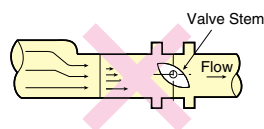
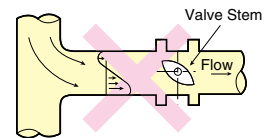
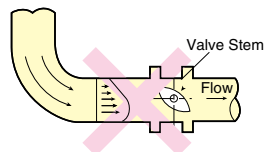


• **Correct Installation**

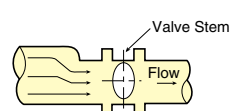
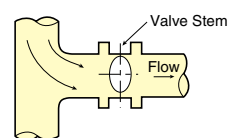
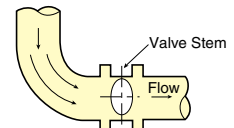


**Installing at an elbow or a reducer**

• **Incorrect Installation**

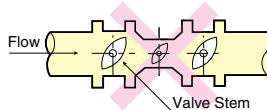


• **Correct Installation**



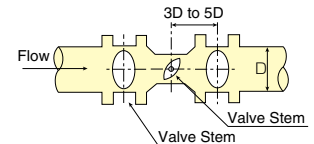
**Combination of a control valve and stop valve**

• **Incorrect Installation**



All the valve stems have the same orientation.

• **Correct Installation**



The orientation of the valve stems is alternating.

# Handling Precautions

## High Performance Butterfly Valves

TT2

334A

Tom Disco 302A/304A

Tom Disco 302Y/304Y/304YA

304M(HLV)

### Storage Conditions

- Since the PTFE used in the seat rings is easily damaged, do not remove the protective covers on both sides of the valves until you are ready to install the valve (dust or other foreign particles may enter the valve and cause leakage).

### Precautions Regarding Piping

- If valve models 337Y/336Y are used in temperatures exceeding 300C, use the specified spiral-wound gaskets.
- The gaskets must be properly aligned with the pipe flanges and the valve.
- Do not use PTFE-covered gaskets or soft gaskets such as rubber gaskets.
- If the actuator is installed so that its weight falls on the piping (e.g. when horizontally installed), install supports for the actuator and bonnet (especially in the case of extension bonnet and fin bonnet types).
- When fluids over 100C are being used, install insulating materials to the valve body where possible.

### Installation Instructions

- Check the direction of flow prior to installation.
- Do not apply pressure to or lean on the lever or gear handle during installation.
- Do not use plastic pipes and loose flanges.
- When installing or removing the valve, keep the disc fully closed.
- Before installation, clean the inside of the pipe and flange surface. Make sure that no welding residue, rust, scaling, or dust remain in the pipe. If possible, install an extension tube with face-to-face dimensions equal to that of the valve in place of the valve and blow the inside of the piping clean with compressed air. Then clean the flanges and re-install the valve.
- Never weld on the up-or down-stream pipes while the valve is installed.
- To prevent stress concentration during the installation process, fix the up-and down-stream flanges after installing the valve in the flange.
- The piping direction of 304M and TT2 should be the horizontal direction of the valve stem.

### Operation Instructions

- If leakage from the gland occurs during operation, immediately retighten the gland nuts. The nuts should be tightened alternately and evenly in a diagonal pattern, to avoid imbalance.
- For room temperature or cold to hot heat cycles, or batch flow such as form the base valve of a steam header, be sure to insulate the valve body. Also, warm up the valve before starting operation.

### Rearrangement of Actuator

- When removing and remounting the actuator to change its orientation at the job site, align the marks (punch marking) on the top of the valve and the top of the valve stem to ensure proper positioning for the fully-closed position.

### Replacement of Packing

- When replacing gland packing or seat ring, close the base valve and remove the valve from the piping.

### Also...

- Before using a valve after it has not been used for a long period of time, open and close the handle once or twice.
- If a slight gas leak (100ppm or less) is a problem, please contact our sales staff as it will be a special specification.
- It is possible that seat leakage occur when fluid (e.g. powder and/or liquid) is solidified by working temperature and other cause. Consult us. Please note that use with vertical line such as bottom area of discharge spout of hopper, and tank.

## Rotary Control Valves

### Installation Instructions

- For rotary control valves (including butterfly valves), basically the rotation of the disc alters the area of the flow path and thereby controls the flow. Therefore, unlike globe valves, if an elbow or tee is placed upstream from the valve, the valve is directly affected by the disturbed flow and cavitation, noise, vibration, or other problems result. In the worst case, this may cause an imbalance of torque on the valve and result in rendering the actuator ineffective. To avoid these problems, install a straight pipe of a sufficient length (at least 6 to 8D) in the valve up-and down-stream side, and carefully consider the orientation of the valve to minimize the affect of drift. In addition, when installing stop valves in front of and behind the valve, leave a space of at least 6D in between.
- The concave side of the disc (the side with the stem exposed) must face upstream.
- Do not use plastic pipes and loose flanges.
- When installing or removing the valve, keep the disc fully closed.

507V

### Installation Instructions

- Use a gasket when installing the valve.
- If using a diaphragm actuator, the actuator must be installed vertically.

### Operation Instructions

- If leakage from the gland occurs during operation, immediately retighten the gland nuts. The nuts should be tightened alternately and evenly in a diagonal pattern, to avoid imbalance.
- The pressure rating of the valve body is ASME Class 300 (50 to 200mm) and ASME Class 150 (250 to 400mm). However, since the pressure rating for the valve disc and stem is lower, be sure to have the valve in the open position when performing hydraulic pressure testing of the piping.

508V

If the fluid contains chlorine, EPDM and NBR seat ring may deteriorate early due to combined factors including density and temperature. In this case, 846T/847T(PTFE seated) is recommended. For details consult us.

Do not use an EPDM seat ring if the fluid contains even a slight amount of oil.

### Installation Instructions

- Since no gasket is required, do not install one.
- Valves can be installed in any orientation, to allow for the easiest possible operation of the valve. However, be careful of the orientation of the stem. Also, for valve sizes of 350mm or larger, never install the actuator facing downward. (Refer to "a Handling Precautions".

### Operation Instructions

- The pressure rating of the valve body is ASME Class 300 (50 to 200mm) and ASME Class 150 (250 to 400mm). However, since the pressure rating for the valve disc and stem is lower, be sure to have the valve in the open position when performing hydraulic pressure testing of the piping.

### Other

- Before using a valve after it has not been used for a long period of time, open and close the handle once or twice.
- If a slight gas leak (100ppm or less) is a problem, please contact our sales staff as it will be a special specification.



## Rotary Control Valves

# DTM

### Storage Conditions

- Do not remove the protective covers on both sides of the valves until you are ready to install the valve (dust or other foreign particles may enter the valve and cause leakage).

### Installation Instructions

- Please use spiral wound gasket if spiral wound gasket is used for JIS10K pipe.
- In case of double flanged body, flange outside diameter and thickness may not be in accordance with the flange spec.
- Check the direction of flow prior to installation.
- Do not apply pressure to or lean on the lever or gear handle during installation.
- Do not use plastic flanges.
- When installing or removing the valve, keep the disc fully closed.
- Before installation, clean the inside of the pipe and flange surface. Make sure that no welding residue, rust, scaling, or dust remain in the pipe. If possible, install an extension tube with face-to-face dimensions equal to that of the valve in place of the valve and blow the inside of the piping clean with compressed air. Then clean the flanges and re-install the valve.
- Never weld on the up-or down-stream pipes while the valve is installed.
- To prevent stress concentration during the installation process, fix the up-and down-stream flanges after installing the valve in the flange.

### Operation Instructions

- If leakage from the gland occurs during operation, immediately retighten the gland nuts. The nuts should be tightened alternately and evenly in a diagonal pattern, to avoid imbalance.
- For room temperature or cold to hot heat cycles, or batch flow such as form the base valve of a steam header, be sure to insulate the valve body. Also, warm up the valve before starting operation.

### Rearrangement of Actuator

- When removing and remounting the actuator to change its orientation at the job site, (1) Fully close the valve (2) Remove the actuator from the column without moving the valve stem position (3) Attach the actuator to the column in a new orientation without moving the valve stem position (4) Tighten the bolt
- Mark the valve stem and top flange to check if the valve stem is moving.
- If the valve stem position is moved, re-inspect the valve seat leak.
- If the actuator is a diaphragm, replace it by referring to the instruction manual.

### Replacement of Packing

- When replacing the seat ring, cavitation breaker, erosion protector, or gland packing, close the basevalve and remove the valve from the piping.

### Other

- Before using a valve after it has not been used for a long period of time, open and close the handle once or twice.
- It is possible that seat leakage occur when fluid (e.g. powder and/or liquid) is solidified by working temperature and other cause. Consult us. Please note that use with vertical line such as bottom area of discharge spout of hopper, and tank.

## Chemically Resistant Butterfly Valves

### Storage Conditions

- Since PFA•PTFE is easily damaged, do not unpack the valves until you are ready to install it in the piping.

### Installation Instructions

- Except for Models 846T and 847T, a butterfly valve should be installed on a pipeline with gaskets in between piping flanges. For the gasket sizes, adhere to the recommended gasket sizes listed in this catalog and always use a gasket sealer to assure reliable sealing.
- Never use a soft gasket such as rubber gaskets. Doing so may cause malfunctions.
- When installing or removing the valve, keep the valve disc opened to an approximate 10 angle.

### Other

- Before using a valve after it has not been used for a long period of time, open and close the handle once or twice.
- If a slight gas leak (100ppm or less) is a problem, please contact our sales staff as it will be a special specification.

## 846T/847T

### Installation Instructions

- As a rule, these valves do not require a gasket for the pipe flanges. However, if a flange surface is not flat due to scratches, dents, or other such reasons, install a commercially-available gasket. However, do not use rubber or other soft gaskets. Doing so may cause malfunctions.

## 841T/842T

### Installation Instructions

- Insert a gasket between the valve and flange. For the gasket size, adhere to the recommended gasket sizes listed in this catalog.
- Do not use rubber or other soft gaskets. Doing so may cause malfunctions.
- After centering the pipes, insert bolts at the proper locations so that the bottom of the valve can rest upon them to prevent the valve from falling through.

# Handling Precautions

## Rubber Seated Valves

If the fluid contains chlorine, EPDM and NBR seat ring may deteriorate early due to combined factors including density and temperature. In this case, 846T/847T(PTFE seated) is recommended. For details consult us.

Do not use an EPDM seat ring if the fluid contains even a slight amount of oil.

### Using an impact wrench

Please be careful when using a high-output impact wrench for installation and tightening piping bolts of rubber seated butterfly valves. Doing so can deform or damage parts such as the valve body, seat ring, piping flange (especially the resin lining pipe) and bolts, depending on the type of impact wrench and how it is used. If you wish to use an impact wrench, use one with a maximum output that is no more than the values (piping bolt strength) given in the table below.

Table1. Use of Metal Flange (Nm)

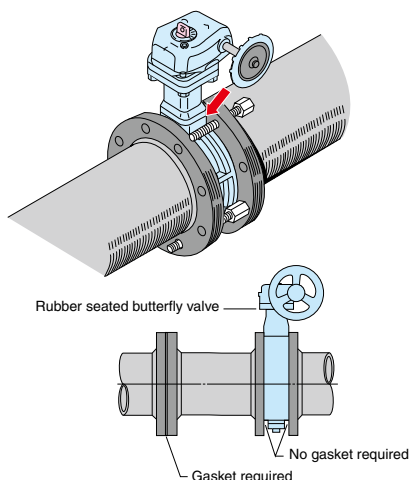
Bolt dia.	M12	M16	M20	M22	M24	M30	M36
Max. impact wrench output (Nm)	64 or less	150 or less	300 or less	400 or less	640 or less	1,260 or less	2,200 or less

Table2. Use of Resin Flange / Resin Lining Flange (Nm)

Valve port dia.	Bolt dia.	Recommended torque
40 to 100 mm	M16	40
125 to 200 mm	M20	80
250 to 350 mm	M22	100
400 to 500 mm	M24	130
550 to 600 mm	M30	250

### Installation Instructions

- Align the pipes and insert the valve between them.
- Since no gasket is required, do not install one. Installing one may cause malfunctions.
- When installing or removing the valve, keep the valve disc opened to an approximate 10 angle.
- Do not install a butterfly valve with a rubber seat directly to a rubber flexible joint. The direct connection will result in the improper functioning of the valve. In this case, place a spacer or a mating flange on both sides of the valve between the valve and the rubber flexible joints. Even when piping to polyethylene lining pipes, rubber lining pipes, or PVC lining pipes, avoid direct piping. It may cause malfunction. Insert a metal spacer on the valve side and a gasket on the lining pipe side.

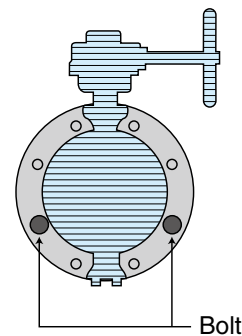


## 700Z

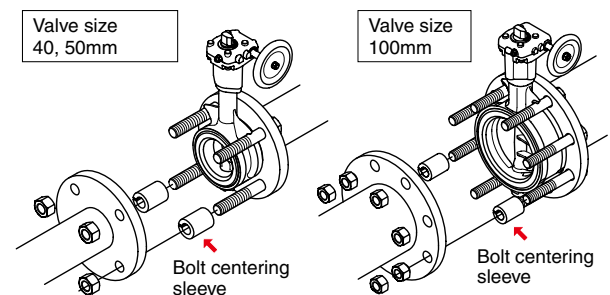
### Installation Instructions

- After fixing center of both flanges, insert piping bolts and put the valve. (Fig.1)
- To center the piping for JIS 10K flange, insert centering sleeves on the bolts and install the bolts to support the valve at the bottom and prevent it from falling through (only for 40, 50 and 100mm sizes). (Fig.2)

\*Use the provided centering sleeves to facilitate the operation.



[Fig.1]



[Fig.2]

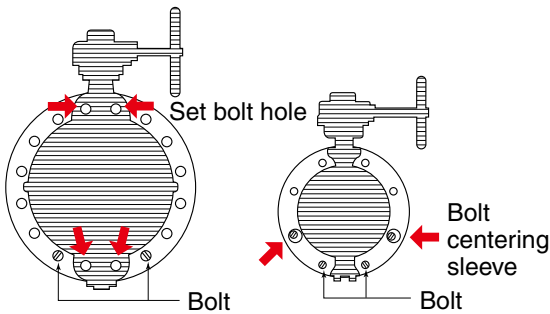
### Other

- When the valve is closed at lever actuator, fully close until the lever hits the stopper of the indicator.

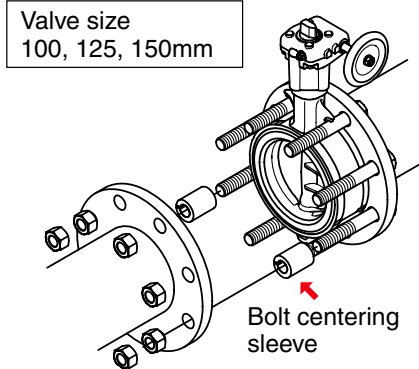
## 700G

### Installation Instructions

- After fixing center of both flanges, insert piping bolts and put the valve. (Fig.1)
  - To center the piping for JIS 10K flange, insert centering sleeves on the bolts and install the bolts to support the valve at the bottom and prevent it from falling through (only for 100, 125 and 150mm sizes). (Fig.2)
- \*Use the provided centering sleeves to facilitate the operation.



[Fig.1]



[Fig.2]

## 72WG/72SG/72LG

## 731P/732P/731R/732Q/752W

## 700E/700K/700S

## 704G/705G/722F/720F

## 227P

### Storage Conditions

- When stored for a long period of time, the FCD disc (ductile cast iron) and other plated parts (opening/closing board, bolts, nuts, worm shaft, etc.) should be coated with the specified "Ferro Guard" rust preventative once a year.

### Installation Instructions

- Avoid solvents from touching the seat ring. Attention must be paid to prevent all materials other than NBR and Viton from being exposed to machine oil.

# Handling Precautions

## Anti-Vibration Check Valve

### MKT

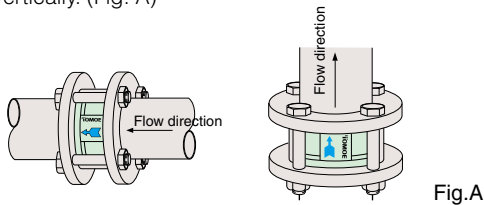
If the fluid contains chlorine, EPDM and NBR seat ring may deteriorate early due to combined factors including density and temperature. For details consult us.

Do not use an EPDM seat ring if the fluid contains even a slight amount of oil.

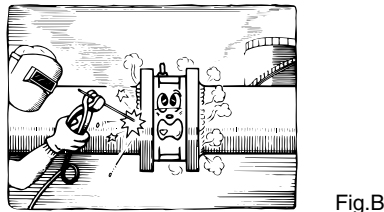
In the pipe lines where chemicals containing calcium are supplied, it is recommended to use an EPDM rubber seat ring to protect pipes.

#### Installation Instructions

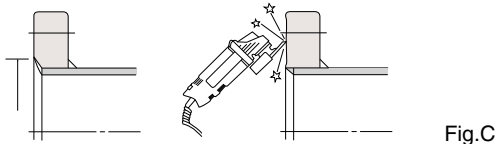
- Piping should be done so that the flow direction of the fluid and the casting direction of the MKT body match. It can also be installed vertically. (Fig. A)



- Installation of the MKT immediately after welding the pipe flange will lead to adverse consequences, such as damage to the seating. Make sure that the temperature has cooled sufficiently and that you have removed weld spatter before installing the MKT. Never weld when the MKT is in the piping. (Fig. B)



- The flange may leak if the flange face that contacts the MKT is as shown in Fig. C. Also, please confirm that there is no deformation to the flange or that there is no damage, such as scratches, on the flange surface.



- Excessive weld**  
The resulting oversized inner pipe diameter may cause a flange leak.
- Rough surface from grinding**  
May cause a flange leak.
- Always be sure to use a piping gasket. The piping gasket will enter the piping inside and cause malfunction if a rubber or similar soft gasket is used. Therefore, make sure that the piping gasket does not enter the radius of MKT plate operation. (Fig. D)
- Be sure to put the gasket on both sides.  
Material: Non-asbestos, fluororesin, rubber  
Shape: Ring gasket (flat gasket), full-face seat gasket (with bolt holes), cushion gasket, spiral gasket, etc.

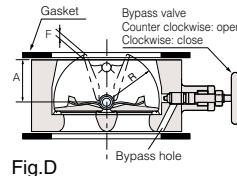


Fig.D

(Table 1) Plate operation radii

Nominal size	907T/908H			907L			
	mm	inch	F#1	R	A	F#1	
50	2	29	29	0	29	29	0
65	2 1/2	36	28	6	36	36	6
80	3	42	31	9	42	42	9
100	4	52	33	16	52	52	16
125	5	66	35	27	66	66	27
150	6	78	38	36	78	78	36
200	8	102	48	45	102	102	45
250	10	126	54	60	126	126	60
300	12	152	79	58	152	152	58

※1. "0" when disk does not fly out.

- If the fluid remaining in the pipe is to escape when the pump is stopped, operate the bypass valve manually.  
[Caution] As shown in Fig. 4, use a gasket with the standard inner diameter so that the bypass hole is not blocked by the gasket. In particular, when using a soft gasket such as rubber or fluororesin for 907T and 908H, it may deform and block the bypass hole, so pay particular attention to the inner diameter.
- Align the MKT to the flanges accurately. Malfunction can occur if the pipe edge or piping gasket enters the radius of MKT plate operation.
- Do not apply strong shock such as by throwing the MKT.
- When installing butterfly valve and MKT, always insert a short pipe in between. Not doing so will cause the disc to hit during operation and lead to faulty operation. (Fig. E)

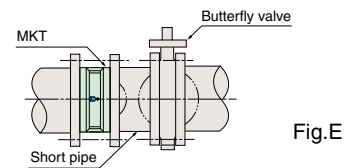


Fig.E

- Direct installation on the pump is possible, but please be sure to follow the cautions below.
  - <907T / 908H>
    - 907T / 908H can be directly attached to the pump.
    - An average pump exit flow rate as a using condition must be 10 m/sec or less (fresh water).
  - <907L>
    - 907L cannot be directly attached to the pump.
    - An average flow velocity must be 6 m / s or less (fresh water).
  - <Common matters>
    - Since cavitation may occur from the check valve, install the valve and equipment on the secondary side at least 2D away.
    - Pay attention to the pressure loss of the check valve. (Refer to the Head loss vs. Flow table.)
    - If the flow rate distribution is uneven immediately after the spiral pump, etc., make the flow rate distribution that is received by both plates of the check valve equal by installing so that the changing direction in the flow rate distribution is parallel to the hinge pin direction, as shown in (Fig. F)

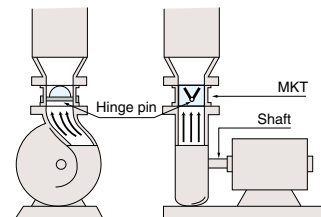


Fig.F

- Please consult us when the velocity flow by liquid exceeds 10 m/sec.
- Seat leakage may occur if the difference pressure is less than 0.04 MPa.
- Make sure no solvent gets onto the seat ring. If EPDM rubber is used, always keep the seat ring away from any machine oil. (The rubber material shows on the name plate).

- When installing the check valve, the installation direction should be in accordance with the following.

① For a horizontal installation make sure the check valve hinge pin is vertical. (Fig. G)

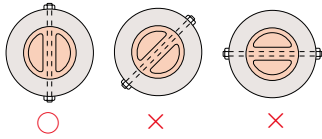


Fig.G

② For elbow or pump exit installations, make sure the influence of the flow rate on the plate to be well balanced. (Fig. H)

③ For installations on the downstream side of butterfly valves, make sure the valve shaft of the butterfly valve and the hinge pin of the check valve crosses alternately.

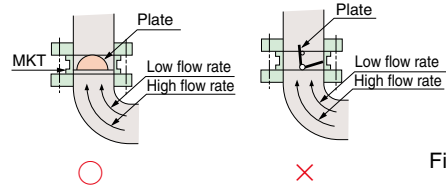


Fig.H

Although vibration caused by the pump and fluid will not affect MKT series valves, please install flexible piping or similar one in order to prevent any downstream piping and devices from vibration affecting.

## Wafer Check Valves

# 901C/903L/905L

If the fluid contains chlorine, EPDM and NBR seat ring may deteriorate early due to combined factors including density and temperature. For details consult us.

Do not use an EPDM seat ring if the fluid contains even a slight amount of oil.

### Installation Instructions

- Install the valve so that the cast marking on the body of the Bata-Check corresponds with the flow direction. (Fig. 1)
- Vertical installation is also possible.

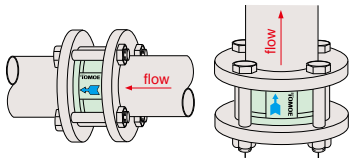


Fig.1

- For horizontal installation, have the rib of the Bata-Check aligned vertically. (Fig. 2)

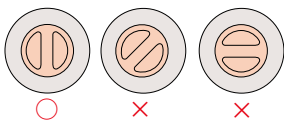


Fig.2

- Always place an extension pipe between a Bata-Check valve and butterfly valve. Never connect the two valves directly together. (Fig. 3)

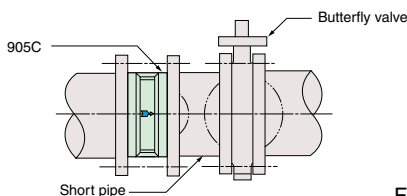


Fig.3

- Make sure that the end of a pipe or gasket does not come within the operating radius of the plate of the Bata-Check valve. (Fig. 4)

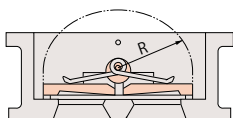


Fig.4

- When mounting a reducer in front of a Bata-Check valve, have a space of 5 times the valve diameter (5D) or more, or at least 2 to 3D between the valve and reducer. (Fig. 5)

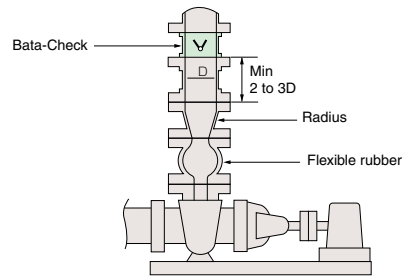


Fig.5

- When installing a Bata-Check valve near an elbow, have as large a space as possible between the elbow and the Bata-Check valve. Also, make sure that both plates are stressed evenly by the flow. (Fig. 6)

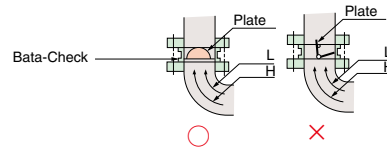


Fig.6

- When installing a Bata-Check valve at the outlet from a pump, leave a space of at least 6 times the valve diameter (6D) between the valve and pump. Also, make sure that both plates are stressed evenly by the flow. (Fig. 7)

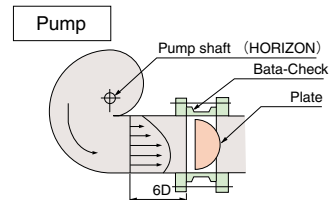


Fig.7

- Consult us when the liquid velocity flow exceeds 3m/sec.
- Seat leakage may occur if the pressure difference is less than 0.02Mpa(903L/901C) or 0.05Mpa(905C).
- If the fluid remaining in the pipe is to escape when the pump is stopped, operate the bypass valve manually. (Fig. 8)

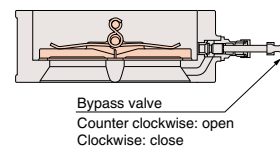


Fig.8

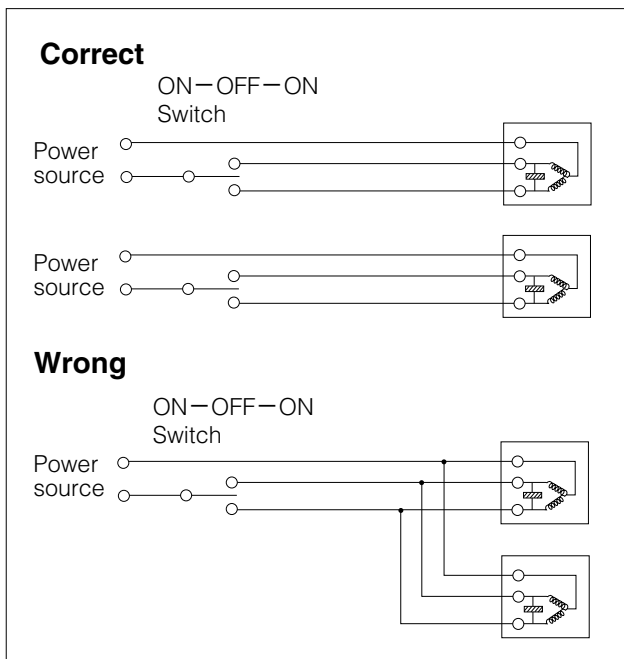
# Handling Precautions

## Actuators

### Motorized Actuators

#### Handling Precautions

- The built-in spare limit switch for the fully opened and closed positions of the motorized actuator (non-voltage output switches for the fully opened and closed positions) is adjusted at the factory to output approximately 2% ahead of the position for actual sealing at the rated pressure. This is done to activate the limit switches with different cams. Since the positioning switch and opening angle detection switch must not activate simultaneously, the spare limit switch is set to always activate first. Therefore, if this output is used to stop the motor or signals, the valve will stop at that position and the sealing ability will be compromised. If your control requirements or other factors require that valve positioning be determined by the spare limit switches, be sure to inform us at the time of ordering. We will then adjust the output position for the spare limit switch to correspond to the fully closed position.
- Each electric motor actuator should be operated by an independent circuit breaker or relay. If more than two electric motor actuators are operated by one circuit, erroneous operation may result due to a loop circuit.



- Prepare a protection cover for the electric motor actuator to protect it from any corrosive fluid, such as cooling water with hypochlorous acid that spreads out from a cooling tower directly. If no protection is provided, the sealing parts and actuator housing may become damaged.
- Prevent hunting of electric motor actuator with proper PID adjustment when employing it for proportional control purposes. Otherwise, the life of the valve and actuator will shorten due to wearing of the friction and connection parts.

### New ELMY

#### Handling Precautions

- Perform the wiring in accordance with the diagram on the inside of the casing cover. After completing the wiring, verify the wiring connections carefully to make sure there are no mistakes.
- To prevent rainwater and the like from entering the unit at the two wiring outlets (G1/2), take the appropriate measures to assure a watertight seal.
- Every cover of the actuator is sealed with an O-ring sealing gasket. Take care not to damage the gaskets during disassembly or assembly of the actuator.
- Except for the top cover, all the screws for the covers have a sealing agent applied to them to prevent the screws from working loose. When removing a screw, take care not to strip the head of the screw with the screwdriver. Also, when installing a screw, apply a sealing agent to the screw and then install it.
- Make a 0.5 second interval when reversing the electric motor actuator from intermediate position utilizing a potentiometer. Surge current generated from a motor may create some damage to the switching relay when reversing it. Modifications to the reduction gear or upgrading of the actuator may be required. Consult us.
- Each electric motor actuator should be operated by an independent circuit breaker or relay. Erroneous operation may be caused by a loop circuit if more than two motor actuators are operated by one circuit breaker or relay.
- Manual operation unit should be used after the power supply is cut. It may suddenly turn if the power is supplied.

## New MICOM ELMY III



The “WARNING” mark indicates the possibility of death or serious injury.

- Before wiring the actuator, make sure that the power supply matches that listed on the specifications plate on the actuator. If the wrong voltage is supplied, it may cause the actuator to burn out.
- Be sure to connect the earth terminal to avoid electrical shocks.
- To prevent rainwater and the like from entering the unit at the two wiring outlets (G1/2), take the appropriate measures to assure a watertight seal. If moisture enters the unit, it may damage the actuator or cause it to burn out.
- If you need to touch a dip switch or reset a switch for adjustment or inspection, do not touch any other components or terminals on the circuit board. Careless touching of components or terminals may cause electrical shocks.
- When operating manually, turn off the actuator power. If you perform manual operation with the actuator powered on, the manual handle may suddenly turn.



The “CAUTION” mark indicates the possibility of serious injury or damage to equipment.

- All necessary settings are completed prior to shipment from our factory. If any modifications or adjustments are required, follow the directions given in the instruction manual. Incorrect procedures may cause improper operation or damage to the components.
- When wiring the actuator, be sure to follow the circuit diagram. Be sure to then verify that there are no mistakes before supplying power to the actuator.
- The input and output signal wires in the unit built into the actuator are not insulated. If insulation is required, install a converter on the outside of the unit. Not doing so may cause improper operation.
- When setting the dip switches, do not apply excessive force as this could damage the switches.
- The input signal has preference over the contact input of a 4 to 20mA signal. If the 4 to 20mA signal is used for control, then be sure to eliminate the contact signal. Failure to do so may cause improper operation.
- When two actuators are controlled by one input signal, make sure that the signal is within the allowable load resistance of the output side. Failure to do so may cause improper operation.
- Do not apply loads over the capacity of output contacts for the opening angle, alarms, or stop signals.
- There are times when the surface of the actuator becomes hot during operation. This is caused by the heat from the internal motor and not due to a malfunction. However, if valve operation is more frequent than the allowable amount, the temperature alarm may sound and cause a compulsory stop.
- Every cover of the actuator is sealed with an O-ring sealing gasket. Take care not to damage the gaskets during wiring or inspecting of the actuator. The sealing properties will decrease, which may lead to malfunction.
- Except for the top cover, all the screws for the covers have a sealing agent applied to them to prevent the screws from working loose. When removing a screw, take care not to strip the head of the screw with the screwdriver.
- Do not apply vibration or impact to the actuator above the rated value (2G for less than 70Hz, 1.5G for 70-120Hz). If abnormal vibration or impact is applied, not only malfunction but also deformation or damage of internal parts may cause malfunction. Install it in a place that is not affected by equipment that generates vibration such as a pump.

## Pneumatic Actuators



The “WARNING” mark indicates the possibility of death or serious injury.

**This unit should be handled by well-versed and experienced technicians only.**

- Compressed air is hazardous if wrongly handled. A machine or a unit utilizing compressed air should be handled by a well-trained professional technicians only.

**Handling or dismantling of the unit should not be carried out before confirming the safety precautions.**

- Inspection and maintenance should commence only after acknowledgment of safety precautions such as preventions against falling of parts or material or other accidental happenings.
- The unit should only be dismantled after confirmation of the above safety precautions and after removal of the air supply and power sources.
- Before restarting of the unit, ensure that the action of the movements are in a safe and normal position.
- Even after the supply of compressed air to the actuator is stopped, the residual pressure in the actuator may cause the compressed air to blow out or cause unexpected operation. Remove the residual pressure in the actuator before performing installation work or maintenance.

### Handling Precautions

- During installation, make sure that no dust or any foreign matter enters through the air port.
- When attaching joints to taper screws on the air port, make sure that you screw them in properly and straightly. Do not overtighten as you may damage the threads. Also, be careful during the initial threading to ensure the proper catching of the threads.
- Use a speed controller to control rotating speed. Use a pressure reducing valve for speed adjustment.
- In the airline, install an air filter to remove any moisture or dust from the air. Moisture or dust will deteriorate the valve and shorten its operating life.
- Avoid use in ambient temperatures over 80C. Use in such high temperatures may cause malfunctions.
- Do not subject the cylinder or peripheral components to excessive forces such shocks or impacts with other objects.
- This cylinder is a non-lubricated type, however, you may provide lubrication for the protection of peripheral equipment. (Use JISK-2213 turbine additive oil No.1, No.2, or similar oil. Never use spindle oil or machine oil, as they deteriorate the O-rings and other rubber components.)
- Periodically check and retighten the bolts.
- Check and clean the actuator once a year even if it is not or has not been in use.
- If an external or internal air leak occurs during operation, inspect the actuator and check the condition of the O-rings and look for abrasion of the moving parts. If any component is damaged, replace it with a new one right away.
- Dummy plugs are attached to the piping airports and intake / exhaust ports to prevent foreign matter from entering. When using, remove all.
- To prevent damage during transportation, resin silencers, etc. may be shipped together without being attached to the actuator. When using, screw it into the intake / exhaust port.

# Handling Precautions



## Handling Precautions

- On single acting types, removal of the cover will cause the spring to eject out, due to its tensile strength impact and may cause injury or damage. In case of abnormal operation of the unit, customers are requested to contact our sales department.
- Do not loosen the bolts while compressed air is being supplied or when this product or valve may operate. There is a risk of compressed air ejection and unexpected operation.

## Condition Monitoring Unit

## Tom Probe Series



The "WARNING" sign indicates possibility of death or serious injury.

- This product is not explosion-proof, and cannot be used in an explosion-prone area.



The "CAUTION" sign indicates the possibility of serious injury or damage to components.

## Wiring Precautions

- Wiring should be performed by experienced technicians with electrical knowledge and only in accordance with local laws and regulations and each company's wiring and electrical work codes.
- Perform the wiring while the power is off. Otherwise electrical shocks may be caused.
- Before commencing the wiring, make sure that the power supply matches that listed on the specifications plate on the product. If the wrong voltage is supplied, the product may burn out.
- Do not use force to pull on the cables emerging from the cable gland. Otherwise, the interior of the main unit will be damaged, which may cause malfunctions.
- Before commencing the wiring, remove shavings, cutting oil, dust, etc. from the inside of the conduit.
- When performing the wiring, be sure to follow the circuit diagram. On completion, be sure to verify that there are no errors before supplying power to the product.
- Each cover is sealed with waterproof packing. Be careful not to damage the waterproof packing during wiring and inspection. Otherwise, sealing capability may be degraded, which may cause malfunctions.
- For electrical wiring from the power source, the voltage required for the device may be insufficient due to a drop in voltage caused by current fluctuation or power line resistance. Please design appropriate wiring at the planning phase to ensure correct supply voltage to the product.
- Ensure that each unused wire is insulated. If multiple wires are insulated together or an unused wire is not insulated properly, it may cause electrical shocks or a fire.
- If the switching contact output is at or below the minimum operating load, it may not overcome the oxide film, etc. which forms on the surface of the relay contact, and this may cause contact failure.
- As in the case of general relays, when an inductive load such as a DC motor and a DC solenoid is connected, the contact should be protected with a diode which absorbs surges, etc.

- In the case of single acting actuators being installed outdoors, a rain-prevention precaution is required: the elbows on the air inlet/outlet ports should be oriented downwards, for example.
- Refer to the specifications for the ambient temperature of the installation location of this product. If used outside the temperature range, it may cause thermal deterioration and hardening of the O-ring, and malfunction due to differences in thermal expansion and contraction of parts.

## Precautions Regarding Initial Setting

- The valve opening/closing position depends on valve installation and piping design, and the full opening/closing position after installation may differ from the full opening/closing position before installation. To set the opening/closing position correctly, be sure to utilize the opening/closing position learning function after the valve is connected to the piping. This function opens/closes the valve automatically to detect the valve's full opening and closing positions. Before commencing this function, ensure that the valve opening/closing will not cause injury or impact on the system.
- For the communication network, communication is performed using our company's dedicated protocol via RS485.
- For the RS485 node network, configure the network in the daisy chain or bus topology. Design the wiring to keep the length of the branch lines from the trunk line as short as possible.
- For TPro1100 and TPro1700, a termination resistor is included in the interior of the device. For those devices which are located at the end of the daisy chain network, the terminator should be effective (ON side).
- If there are two or more nodes on the same communication network whose local network ID is the same, communication cannot be established correctly.
- If 0 is selected for the local network ID, communication is established with no devices.
- All of the data is recorded using information from the built-in calendar and clock in TPro1100. Thus the date and time must be set correctly.

## Precautions After Starting Operation

- Improper attachment of the USB waterproof cap may allow entry of rainwater into the interior of the unit or allow corrosion inside the connector, which may lead to malfunction.

## Maintenance Precautions

- Before commencing maintenance, ensure that the valve opening/closing will not cause injury or impact on the system. In particular, ASF performs a partial stroke test where the valve is automatically opened/closed slightly, based on the calendar in TPro1100. Perform maintenance after ensuring that ASF operation cannot cause injury or impact on the system.
- Before sending the product for repair, be sure to disable ASF. If this function is not disabled, a repair engineer may be injured when the valve is automatically opened/closed slightly, based on the calendar in the main unit.
- Before commencing disassembly, be sure to turn off the power to the unit, and take necessary precautions so that the valve cannot be operated. Otherwise, electrical shocks or malfunctions may be caused.



## Guideline for Inspection of Our Products

### ■ Concentric rubber seated butterfly valves (valve bodies)

Rubber seated valves are based on JISB2032 (wafer type rubber seated butterfly valves).

"After maximum operating hydraulic pressure is applied using clean water with the valve fully closed at room temperature and then repeating full opening/closing operation of the valve 10,000 times, no leakage shall be observed from the seat at 1.1 times the maximum operating pressure." (Excerpt from JISB2032-2009)

The life of the valve may be shortened if the ambient temperature is 50°C or higher, if the fluid is corrosive, viscous and adherent, or if the fluid contains foreign or solid substances. [Table 1] [Table 2]

[Table 1]

Inspection interval if valve seat ring cannot be replaced	700Z series (Note 1)	High pressure valves with vulcanized seat	Check valves
	NAV series (Note 1)	731P, 732P, 733P 731Q, 738Q	901C, 903C, 905C, 906C, 907H, 908H, 903L, 907L, 907T
Initial performance retention life (inspection interval) (Note 2)	Inspection interval is one year or 10,000 cycles of opening/closing, whichever comes first. Check for external leakage, loose bolts, valve seat leakage and abnormal operation. If any abnormality is found, detach the valve from the piping and check for corrosion of the valve body and wear of the seat ring. If any abnormality is found in these parts, replace the valve.		

[Table 2]

Rubber seated valves other than those above
Inspection interval is one year or 10,000 cycles of opening/closing, whichever comes first. Check for external leakage, loose bolts, valve seat leakage and abnormal operation. If any abnormality is found, detach the valve from the piping and check for corrosion of the valve body and wear of the seat ring. If any abnormality is found in these parts, replace consumables such as seat ring and packing. Performing the above maintenance can extend the valve's life to more than 10,000 cycles.

### ■ Double eccentric valves (soft seated valves)

The level of performance and functionality at the time of shipment can be maintained until 3,000 cycles of opening/closing. However, this designed lifetime could become shortened depending on temperature conditions and type of fluid (corrosiveness, viscosity, solid matter and deposit).

Inspection interval is one year or 3,000 cycles of opening/closing, whichever comes first. Check for external leakage, loose bolts, valve seat leakage and abnormal operation. If any abnormality is found, detach the valve from the piping and check for corrosion of the valve body and wear of the seat ring. If necessary, replace consumables such as seat ring and packing.

Retighten gland packing, bottom cover bolts and piping bolts if needed.

### ■ Double/triple eccentric butterfly valves (metal seated valves)

Regulations on seat leakage described in the valve specification are inspection standards at the time of shipment.

Leakage rate may increase depending on ambient temperature, pressure condition and type of fluid. Perform maintenance on sealing parts: their life is 3,000 cycles of opening/closing at most. (Replace them if needed.)

Inspection interval is one year or 3,000 cycles of opening/closing, whichever comes first. Check for external leakage, loose bolts, valve

seat leakage and abnormal operation. If any abnormality is found, detach the valve from the piping and check for corrosion of the valve body and wear of the seat ring. If necessary, replace consumables such as seat ring and packing.

Retighten gland packing, bottom cover bolts and piping bolts if needed.

### ■ Actuators (gears, levers) 1L, 1T, 1G, 1J, 2U, 2K, 2S, 2E

These parts are basically maintenance-free, but if the valve is frequently opened and closed (more than 10,000 cycles per year) or used in a bad environment (saline or moist environment), check for corrosion and loose bolts every 10,000 cycles or one year by visual inspection. If any abnormality is found, follow the instruction described in "All actuators" below.

### ■ Actuators (cylinders) 7E, 7G, 7F, 3A, 3K, 3U

Inspection interval is 50,000 cycles of opening/closing or one year. If any abnormality is found, follow the instruction described in "All actuators" below.

### ■ Actuators (motorized actuators) 4I

For other motorized actuators, please contact us.

Inspection interval is 30,000 cycles of opening/closing or one year. If any abnormality is found, follow the instruction described in "All actuators" below.

### ■ All actuators

If any abnormality is found, open the lid of the actuator's reducer and check for ingress of water, discoloration of grease and damage to gears. If needed, perform maintenance such as greasing. If water ingress or gear damage is found, replace the actuator. For further information, refer to the instruction manual of each model. [Table 3]

### ■ Status Monitoring Unit (Tom Probe) TPro1100, TPro1700

At least once a year, check for loosening of the mounting bolts for the main unit. If loose bolts are found, retighten them.

Check for loosening of the cable gland where the wires exit.

If the cable gland has loosened, retighten it.

# Handling Precautions

## Guideline for Inspection of Our Products

[Table 3]

Type of products	Inspection interval and initial performance retention life (cycles of opening/closing or usable years)	Type of maintenance
700Z series NAV series (Note 1)	10,000 cycles or 1 year	Appearance check Replacement of valve
Valves whose seats cannot be replaced (Note 2)	10,000 cycles or 1 year	Appearance check Replacement of valve
Concentric rubber seated butterfly valves (other than the above types)	10,000 cycles or 1 year	Appearance check Replacement of consumables
Double eccentric valves (soft seated)	3,000 cycles or 1 year	Appearance check Replacement of consumables
Double/triple eccentric valves (metal seated)	3,000 cycles or 1 year	Appearance check Replacement of consumables
Manual actuators (gears, levers)	10,000 cycles or 1 year	Appearance check Greasing, etc.
Automatic actuators (cylinders)	50,000 cycles or 1 year	Appearance check Replacement of consumables Greasing, etc.
Automatic actuators (motorized)	30,000 cycles or 1 year Predetermined inspection needed	Regular inspection Check for abnormality Greasing, etc.

Life of valves is based on the extent of their use with clean water at room temperature and below rated pressure.

Usage condition of actuators, such as the ambient environment, should be within the range described in each specification and should not be in corrosive atmosphere (Note 3) (including installation near the shore).

If you need to use the product outside the above range, please check with us before placing your order.

Note 1) 700Z series: 700Z, 700ZK, 700ZH, 700ZS, 700ZJ, 700ZY, 700YJ  
NAV series: 763Z, 773Z, 775Z, 775J, 776Z, 778Z, 778J, 779Z, 779J, 783Z, 785J, 788J

Note 2) Models whose rubber seats cannot be replaced are the following:

700Z series: 700Z, 700ZK, 700ZS, 700ZJ, 700ZY, 700YJ  
NAV series: 763Z, 773Z, 775Z, 775J, 776Z, 778Z, 778J, 779Z, 779J, 783Z, 785J, 788J

731P series: 731P, 732P, 732X, 731Q, 738Q (vulcanized seat)

Check valves: 901C, 903C, 905C, 906C, 907H, 908H, 903L, 907L, 907T

Note 3) Corrosive atmosphere means an external environment that includes gases that corrode metal, rubber and resin (e.g. chlorine, saline air, etc.) or an environment in which the products are constantly exposed to water.

Note) For further information on inspection and disassembly, please refer to the instruction manual.

Note) The cycle described above means a repetition of opening/closing of a valve including full closing. The cycle does not include repetition of slight controlling movements with the valve half open. In such a case, each usage needs to be considered.

# Information on discontinued models

Information on discontinued models is provided below.  
For further information on standard specifications,  
please refer to the catalog before use.

## Information on discontinued models

Discontinued model	Nominal size	Date of sale discontinuation	Date of discontinuation of parts supply	Recommended alternative model
<b>&lt;High Performance Butterfly Valve &gt;</b>				
<b>336Y</b>	350~600mm	2000.05.01	2005.04.30	<b>302A</b>
<b>331Y</b>	80~300mm	2000.05.01	2005.04.30	<b>304A</b>
<b>&lt;Chemically Resistant Butterfly Valves &gt;</b>				
<b>841T</b>	250~300mm	2012.10.31	2017.10.31	<b>846T</b>
<b>842T</b>	250~300mm	2004.05.01	2009.04.30	<b>847T</b>
<b>841T</b>	50~200mm	2001.06.01	2006.05.31	<b>50mm:847T 65~200mm:846T</b>
<b>842T</b>	50~200mm	1999.12.01	2004.11.30	<b>847T</b>
<b>&lt;Rubber Seated Valves &gt;</b>				
<b>700G/705G</b> Only FCD450 disc	350~600mm	2019.12.31	2019.12.31	<b>700G/705G</b> SCS13 disc
<b>700S</b> <sup>*</sup>	550mm	2019.12.31	2019.12.31	<b>700G/705G</b>
<b>KRV</b>	1400~2000mm	2018.12.31	2018.12.31	Consult us
<b>773Z</b>	40~300mm	2014.04.01	—	<b>NEW 700Z</b>
<b>731X • 732X</b>	350~600mm	2013.09.03	—	<b>731P • 732P</b> Model names integrated, but no change in product specification
<b>SF490A</b> Dacrotized Disc (700G•705G•704G)	65mm	2008.11	2009.10	<b>SCS14</b> (Ribbed) valve disc
<b>702Z</b>	40~300mm	2004.05.01	2009.04.30	<b>NEW 700Z</b>
<b>700S</b> <sup>*</sup>	50~600mm (except for 550mm)	2004.05.01	2009.04.30	<b>700G 705G</b>
<b>732X</b>	50~300mm	2000.10.01	2005.09.30	<b>731P•732P</b>
<b>731X</b>	50~300mm	1999.01.05	2003.12.31	<b>731P•732P</b>
<b>641B</b>	50~200mm	1999.06.01	2004.05.31	—
<b>720F</b>	50~800mm	1999.06.01	2004.06.01	<b>50~100mm:704G 125~800mm:722F</b>
<b>731X</b>	350~400mm	1999.01.05	2003.12.31	<b>732X</b>
<b>OLD 700Z</b>	40~200mm	1998.09.01	2003.08.31	<b>NEW 700Z</b>
<b>700E</b>	50~600mm	1998.04.01	2003.03.31	<b>700G / 700S (500mm only)</b>
<b>&lt;Check Valves &gt;</b>				
<b>903C</b>	50~300mm	2019.05.31	—	<b>903L</b>
<b>907H</b>	50~400mm	2018.12.31	—	<b>907T</b>
<b>906C</b>	50~300mm	2018.06.30	—	<b>907T</b>
<b>904C</b>		2010.07.31	2010.07.31	<b>908H</b>
Discontinued model		Date of sale discontinuation	Date of discontinuation of parts supply	Recommended alternative model
<b>&lt;Motorized Actuator &gt;</b>				
<b>PMK080SRM</b>		2009.06.30	2010.06.30	<b>PMK-100CR</b>
<b>SRE</b>		2005.12.31	2010.12.30	<b>SRJ</b>
<b>PMK030SRM</b>		2003.07.31	2006.07.31	<b>PMK-030CR</b>
<b>MICOM ELMY</b>		1997.03.01	2002.02.28	<b>New MICOM ELMY</b>
<b>&lt;Pneumatic Actuator &gt;</b>				
<b>T-DYNAMO</b> (3E/3F/3G)		2013.11.30	2018.11.30	<b>NEW T-DYNAMO</b> (7E/7F/7G)
<b>T-matic</b>		2006.10.31	2011.10.30	<b>NEW T-DYNAMO</b> (7E/7F/7G)
<b>Z cylinder</b>		2000.07.01	2005.06.30	<b>NEW T-DYNAMO</b> (7E/7F/7G)
<b>6A, 6B</b>		2017.12.31	2019.12.31	<b>3U, 3K, 7F, 7G</b>
<b>&lt;Manual Actuator &gt;</b>				
<b>2C gear</b>		2017.12.31	2017.12.31	<b>2G gear</b>
<b>1G lever</b>		2004.06.01	2009.05.31	<b>1T lever</b>
<b>2M gear</b>		2000.09.01	2000.09.01	<b>2U gear</b>
<b>1M lever</b>		1997.10.01	2002.09.30	<b>1T lever</b>

\* Following material combination is continued production; Body FC250 / Disc SCS13 / Stem SUS403 / Seating NBR or EPDM  
Spare parts seating set (NBR or EPDM).  
Please contact the sales office for further information.

# General Product Warranty

## General Product Warranty

Tomoe warrants that the product is free from defects in material and workmanship under normal use and operation.

The warranty period is 12 months from the commencement of the use (including the test use) of the product, or for 18 months from the shipment of the product from Tomoe's factory, whichever expires earlier.

Tomoe will, without charge, repair or replace, in its sole discretion, such product that, in the opinion of Tomoe, is found to be defective within the warranty period.

This warranty only applies to the Tomoe products delivered from Tomoe or its authorized subsidiaries and distributors. Except as explicitly provided herein, Tomoe neither provides any warranty, whether express or implied, with respect to the products (including, but not limited to, warranties of merchantability or fitness for a particular purpose and non-infringement of any third party's intellectual property rights), nor provides any remedy with respect to a defective product including, but not limited to, any compensation of damages resulting from the defect of the product or malfunction of the equipment or machinery that uses the product. In no event shall Tomoe be liable for any incidental, indirect, special or consequential damage of any nature whatsoever.

This warranty does not cover the normal wear and tear of any expendable parts, such as seat rings and gland packing, that occurs through the normal use of the product, or any defect in the products that occurs under any of the following circumstances. In such cases, Tomoe may, subject to its consent, repair or replace the defective product for a fee.

1. The defect is caused by the product being used or handled under conditions, or in an environment, or in a manner, or by means other than in strict accordance with the instructions in the catalog, product specifications and operating instructions.
2. The defect is caused by the product or any part thereof being altered, adjusted, dismantled, modified or repaired, or any part of the product being removed or replaced, by any person not authorized by Tomoe to do so.
3. The defect is caused by products which are not supplied by Tomoe.
4. The defect is caused wholly or partly by any drawings or specifications supplied or approved by you (the purchaser) or by any materials, parts or components supplied by you or bought at your instruction.
5. The defect is caused by inadequate or inappropriate inspection or maintenance of the product or the equipment or machinery that uses the product (including, without limitation, poor replenishment of consumables such as lubricant).
6. The defect is caused by high frequency of use or operation of the product or the equipment or machinery that uses the product (including, without limitation, high frequency opening and closing thereof).
7. The defect is caused by any problem or trouble related to power or air supply to the equipment or machinery that uses the product.
8. The defect is caused by inflow of foreign matter, such as dust, into the product.
9. The defect is caused by the product being stored in an inadequate or inappropriate condition, such as open-air storage.
10. The defect is caused by any reason that is beyond the control of Tomoe, including, without limitation, an act of war, act of public enemy, revolution, riot, act of god, flood, fire, earthquake, and so on.
11. The defect is caused by any other reason not attributable to Tomoe.

## Paid Repair, Replacement and Supply of Parts for Discontinued Products

Tomoe reserves the right to change the design, or discontinue the production, of any products, without notice. Neither paid repair nor replacement of the products, nor supply of their parts, may be available after 5 years have passed from the change of design or discontinuance of production of such products. However, please note that paid repair or replacement of the products and/or supply of their parts may not be available during such 5 year period.

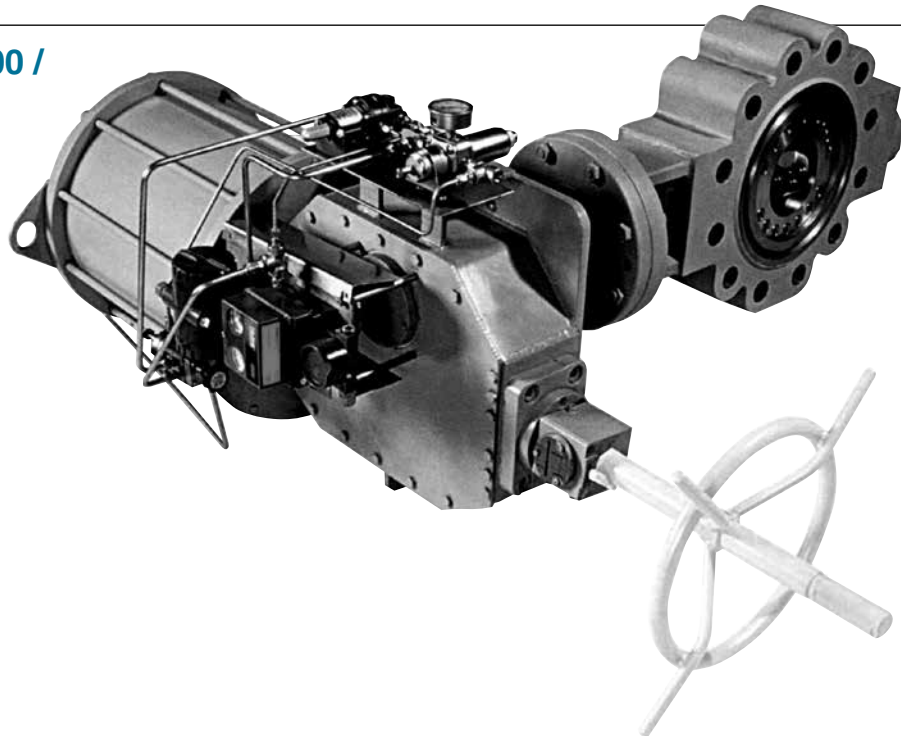
# BUTTERFLY VALVES SELECTION GUIDE

## Butterfly Valves Selection Guide

Triple Offset Butterfly Valves	<b>TRITEC</b>	19
	<b>TT2</b>	27
High Performance Butterfly Valves	<b>334A</b>	57
	<b>344Q</b>	77
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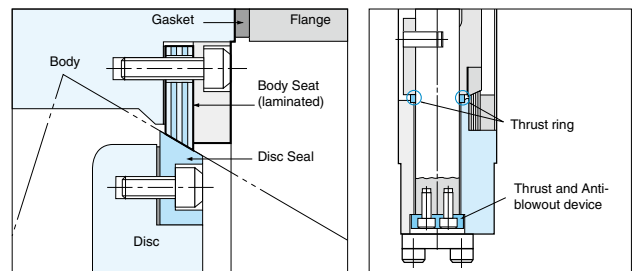
# TRITEC

class 150 / 300 / 600 /  
900 / 1500 /  
2500

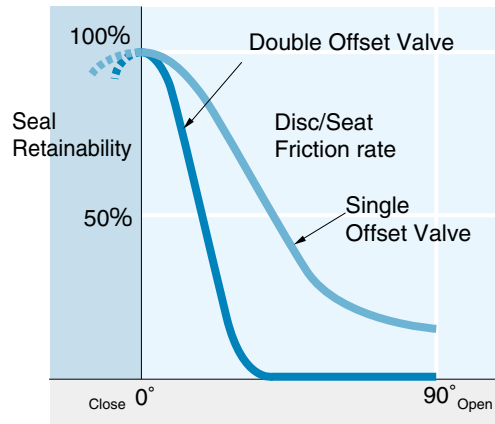
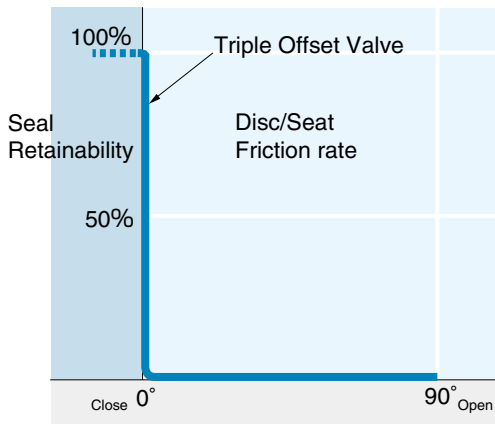


## Features and Benefits

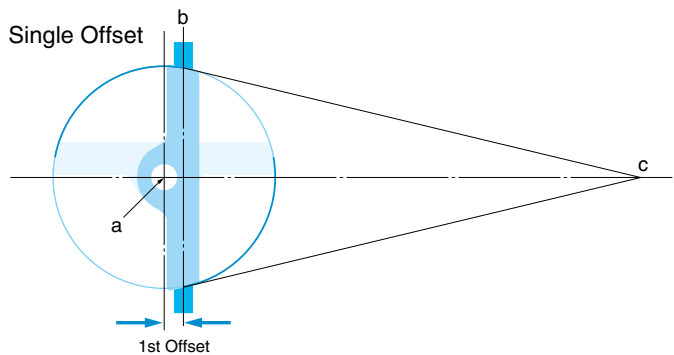
- Triple offset and ellipsoidal sealing Geometry
- Bi-directional bubble tight shut-off
- Inherently Firesafe
- Developed Geometry results in
  - Zero Seat/Seal Friction
  - Low Torques
  - Extended Service Life
  - Continued Seal through Thermal Cycling
  - Torque Seating
- Excellent flow and throttling characteristics covering services from Cryogenic to high temperature
- Excellent control of Fugitive Emission by virtue of Rotary stem movement and advanced packing materials
  - Less than 50ppm on Fugitive Emission Test to cover EPA21
  - Other tests available on request
- Firesafe meet API Std 607 4th / 5th Edition and BS 6755 part 2 / API 6FA
- Available Fully Rated to Class 2500
- Fully rated for end of line duty
- Standard materials conform to NACE, all exotic materials also available
- Laminated seat is mounted in the body, removing it from the erosive effects of the flowing media
- Seat is self centering "floating" design
- Both Seat and Seal are field replaceable without special tools
- Unique elliptical bolting pattern allows foolproof replacement of seat and seal
- Gasket Sealing Face is completely uninterrupted by fixings
- Suitable for use with Spiral Wound gaskets and all flange finishes including RTJ
- Antiblowout device on shaft with both internal and external retaining systems according to API Std 609
- ISO mounting flange allows easy fitting and changing of operators
- Operator is bolted and doweled to prevent radial movement and subsequent loss of seating torque
- Body counterbore and seat bolting arranged elliptically to ensure equal support, gasket land and gasket loading all around the elliptical edge of the laminated body seat
- Inboard and outboard thrust mechanisms prevent decentralising of disc, even under high temperature and line pressure
- By eliminating seat-seal friction on unseating, Tritec removes the "Blind Zone" and increases the rangeability or controllable range to the full 90° of movement. The rotation geometry and inboard bearing design reduce the effect of dynamic torque and mechanical noise-vibration, increasing midrange control accuracy. Cavitation and Noise reducers are available to complement the Tritec valve under high pressure drop process situations



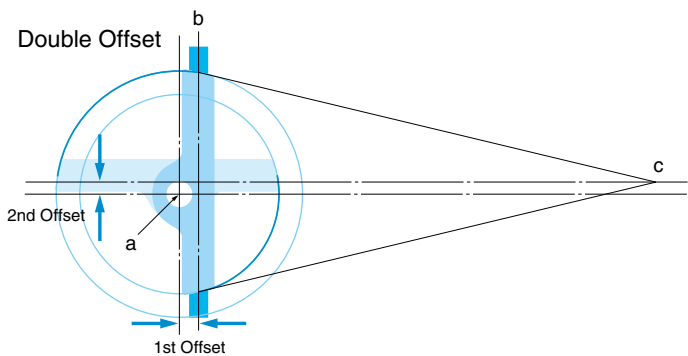
## Offset Valve-Disc / Seat Friction



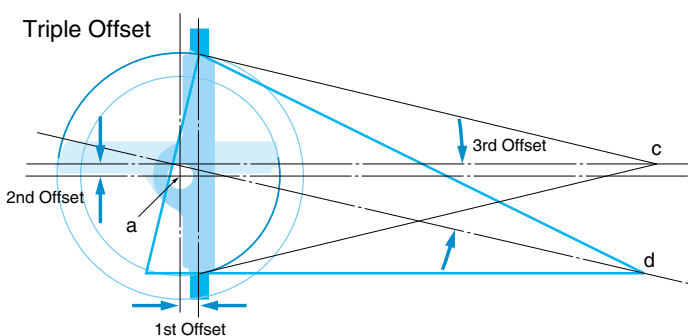
## Tracing the evolution of Triple Offset design



The centre of rotation is moved back from the centreline of the valve disc. The seat and seal are designed conically and on centre. This design relies on a frictional interference seal and so is applicable only to soft seated valves.



The centre of rotation is moved from the centerline of the valve body. The seat and seal design remains conical and on centre. This design again relies on a frictional interference seal, but the length of rotation over which this friction occurs is reduced, allowing a larger range of process resistant seat materials to be used. However, these materials must be relatively soft or highly elastic to prevent "jamping".



The centreline of the cone is rotated away from the valve centreline resulting in an ellipsoidal profile and providing the third offset. With this geometry, seat seal interference is completely eliminated ensuring long sealing life. The result is a torque seated, process-pressure-aided FRICTIONLESS seal. The geometry allows the body seat to be used as the closed limit stop, aiding operator adjustment. The Triple Offset design is ideally suited to metal seated valves providing bubble-tight performance in high temperature, high pressure and firesafe applications.

## Standard Specifications

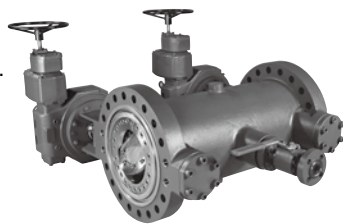
Design	API Std 609, BS 5155, ASME B16.34, ASME SEC VIII	
Valve Sizes <sup>※1</sup>	2"(50mm) — 66"(1650mm)	
Pressure Classes	Class 150, 300, 600, 900, 1500	
Body Styles	Lugged, Wafer Flangeless, Double Flanged, Butt Weld End	
Flange Accommodation <sup>※2</sup>	ASME B16.5:DN50 — DN600 ASME B16.47 Series A&B : DN700 — DN1650	
Face to Face <sup>※3</sup> Dimensions	LUG and WAFER Type API Std 609 Table 2 : DN 80 — DN600 API Std 609 Table 1 : DN750, 900, 1050, 1200 ISO 5752 Wafer Short : DN700, 800, 1000 DOUBLE FLANGED Type ISO 5752 / BS 5155 Double Flange Short	
Pressure- Temperature Ratings	ASME B16.34 : for Steel ASME B16.24 : for Bronze Working Temperature Range as Standard -29°C (-20°F) to +538°C (1000°F) With selection of suitable materials -46°C (-51°F) to +700°C (1292°F)	
Pressure Tests	Shell Test, Seat Test : API Std 598 Seat Leakage Rate API Std 598, ISO 5208 Rate A, ASME B16.104 (ASME / FCI 70-2) Class VI	
Firesafe	Certified Firesafe to BS 6775 Part2, API 6FA and API 607 4th/5th	
Marking	API Std 609 MSS SP-25	
Operators	Manual Gear, Electric, Pneumatic, Hydraulic	
Standard materials	Body	A216 WCB, BS EN 10025 (Carbon Steel), A351 CF8M
	Disc	A216 WCB, A351 CF8M
	Stem <sup>※4</sup>	A564 type 630 H1150+1150
	Body seat	316SS / Graphite
	Disc seal <sup>※5</sup>	316SS

- ※1. Please contact the sales office for larger sizes.  
 ※2. JIS 10K, 20K, 30K MSS, API, BS, DIN, PN, ISO also available on request.  
 ※3. ISO 5752 Gate Valve Short (Basic series 3) on request.  
 ※4. Use Inconel 718 for over 315 degrees C.  
 ※5. Titanium nitride hardened, Stellite #6 Coating is available as an option.  
 ※6. Please consult our sales for the service condition lower than -46°C.

## Design Options

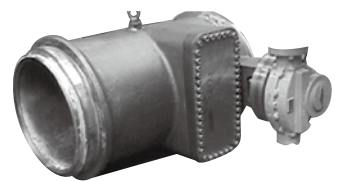
### DOUBLE BLOCK & BLEED VALVES.(DBB2)

To allow verifiable, maintainable shut-off in critical isolation applications.



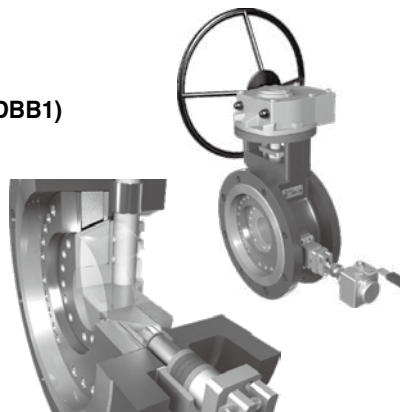
### BUTT WELD WITH TOP ENTRY.

Allowing complete maintainability on valves which are welded into line.



### DOUBLE BLOCK & BLEED VALVES COMPACT VERSION (DBB1)

One valve with a unique double seat assembly and integral bleed port.

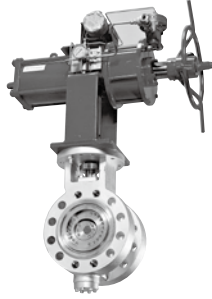




## Design Options

### CONTROL VALVES.

Frictionless seating means increased rangeability, allowing the Tritec valve to perform in both control and isolation application.



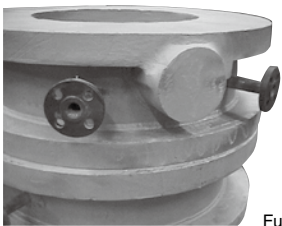
### FIRE SAFE DESIGN.

Fire safe approval to BS 6775 Part2, API 6FA and API 607 4th/5th.



### STEAM JACKETED VALVES.

To maintain process temperature ensuring media remains liquid. Disc and shaft steam tracing as an option.



Full-Jacket type



Semi-Jacket type

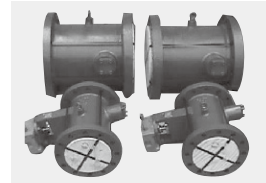
### VALVES TO REDUCE FUGITIVE EMISSION.

Designed to reduce fugitive emission, testing is available to all international standards plus customer specific requirements.



### GATE VALVE FACE TO FACE.

For the direct replacement of gate valves, all dimensions are exactly as per the standard Double Flanged valve with the exception of the face to face dimension which is shown below. (in accordance with ISO 5752 gate valve short).



(Unit: mm)

Valve Size		class 150	class 300	class 600	class 900	class 1500
mm	inch	Flanged	Flanged	Flanged	Flanged	Flanged
		Gate F-F	Gate F-F	Gate F-F	Gate F-F	Gate F-F
50	2	178	216	—	—	—
80	3	203	282	356	—	—
100	4	229	305	432	457	—
150	6	267	403	559	610	705
200	8	292	419	660	838	832
250	10	330	457	787	838	991
300	12	356	502	838	965	1130
350	14	381	762	889	1029	1257
400	16	406	838	991	1130	1384
450	18	432	914	1092	1219	1537
500	20	457	991	1194	1321	1664
600	24	508	1143	1397	1549	1943

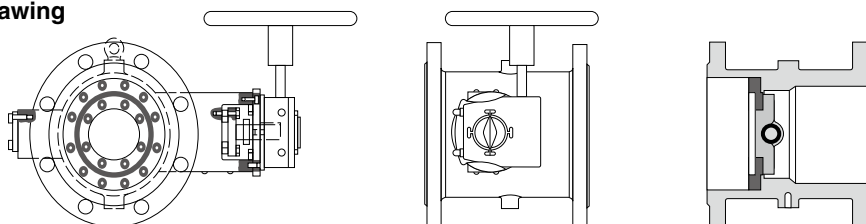
Allows direct replacement of existing gate valves without modification of pipework.

Disc remains within the body face to face in the fully open position to allow removal of the valve from pipework even when the valve is open.

Reduction of fugitive emission due to quarter turn rather than linear shaft movement.

Reduced operator costs due to quarter turn rather than multi turn / linear.

### Referential Drawing



## Pressure-Temperature Ratings

Body	A216	Gr. WCB
Disc	A216	Gr. WCB
Shaft	A564	Type 630

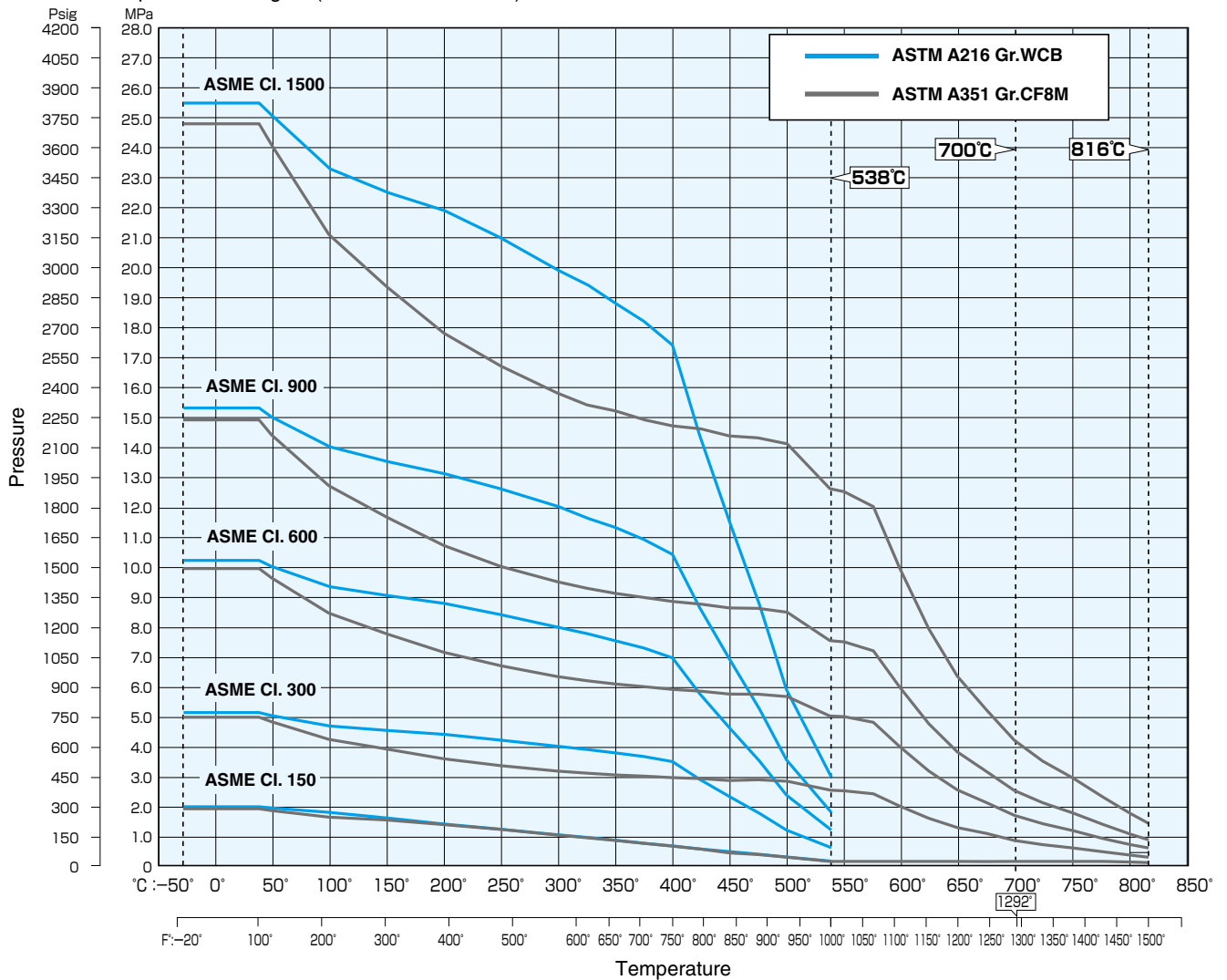
Body	A351	Gr. CF8M
Disc	A351	Gr. CF8M
Shaft	A564	Type 630

Temperature		Working Pressure (MPa)				
(°F)	(°C)	150	300	600	900	1500
-20	-29	1.96	5.11	10.2	15.3	25.5
100	38	1.96	5.11	10.2	15.3	25.5
122	50	1.92	5.01	10.0	15.0	25.1
212	100	1.77	4.66	9.32	14.0	23.3
302	150	1.58	4.51	9.02	13.5	22.5
392	200	1.38	4.38	8.76	13.1	21.9
482	250	1.21	4.19	8.39	12.6	21.0
572	300	1.02	3.98	7.96	12.0	19.9
617	325	0.930	3.87	7.74	11.6	19.4
662	350	0.840	3.76	7.51	11.3	18.8
707	375	0.740	3.64	7.27	10.9	18.2
752	400	0.650	3.47	6.94	10.4	17.4
797	425	0.550	2.88	5.75	8.63	14.4
842	450	0.460 <sup>*1</sup>	2.30 <sup>*1</sup>	4.60	6.90	11.5
887	475	0.370 <sup>*1</sup>	1.74 <sup>*1</sup>	3.49	5.23	8.72
932	500	0.280 <sup>*1</sup>	1.18 <sup>*1</sup>	2.35	3.53	5.88
1000	538	0.140 <sup>*1</sup>	0.590 <sup>*1</sup>	1.18	1.77	2.95

Temperature		Working Pressure (MPa)				
(°F)	(°C)	150	300	600	900	1500
-20	-29	1.90	4.96	9.93	14.9	24.8
100	38	1.90	4.96	9.93	14.9	24.8
122	50	1.84	4.81	9.62	14.4	24.1
212	100	1.62	4.22	8.44	12.7	21.1
302	150	1.48	3.85	7.70	11.6	19.3
392	200	1.37	3.57	7.13	10.7	17.8
482	250	1.21	3.34	6.68	10.0	16.7
572	300	1.02	3.16	6.32	9.49	15.8
617	325	0.930	3.09	6.18	9.27	15.4
662	350	0.840	3.03	6.07	9.10	15.2
707	375	0.740	2.99	5.98	8.96	14.9
752	400	0.650	2.94	5.89	8.83	14.7
797	425	0.550	2.91	5.83	8.74	14.6
842	450	0.460	2.88	5.77	8.65	14.4
887	475	0.370	2.87	5.73	8.60	14.3
932	500	0.280	2.82	5.65	8.47	14.1
1000	538	0.140	2.52	5.00	7.52	12.6

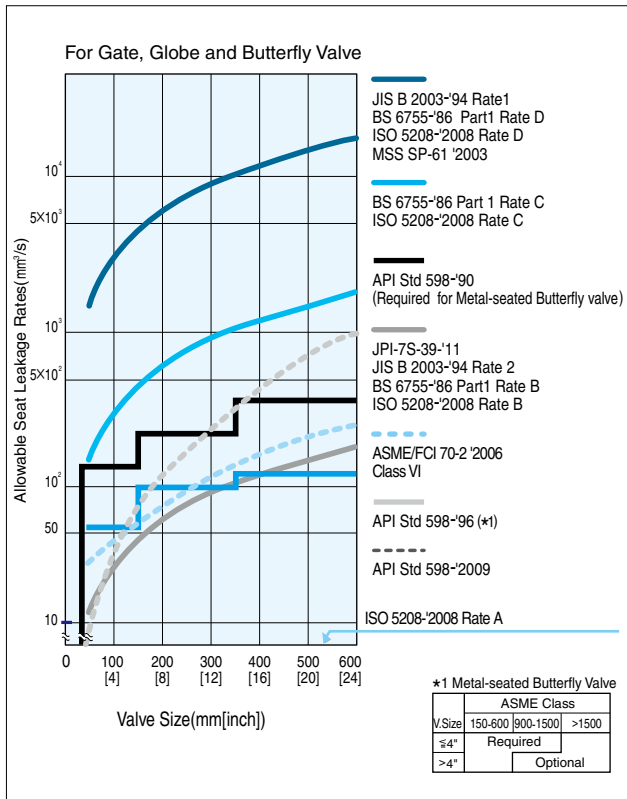
(Notes) \*1. Permissible, but not recommended for prolonged use above 800°F (427 degree C).  
Please contact a sales office for temperatures outside of standard temperature range as detailed in the above table.

### Pressure-Temperature Ratings (ASME B 16.34-2004)

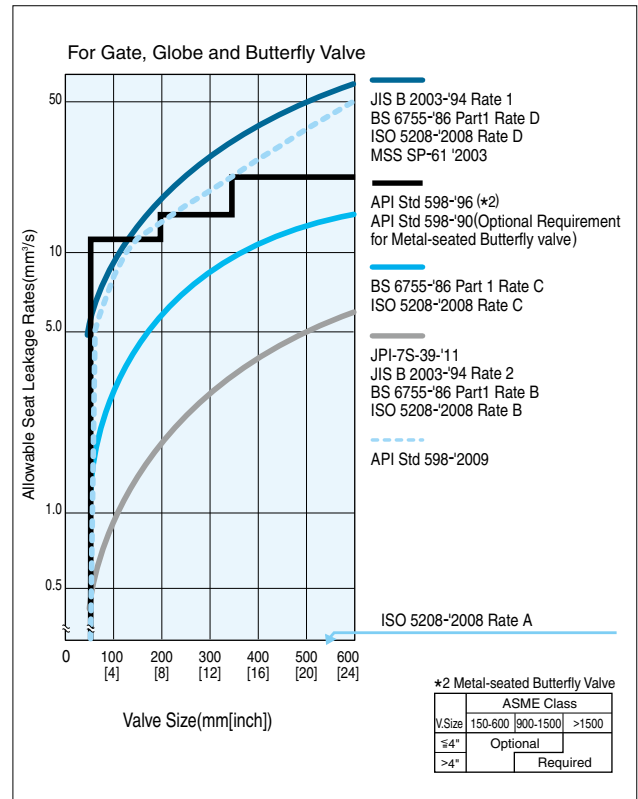


## Allowable Seat Leakage Rates by Standard

### Gas Test

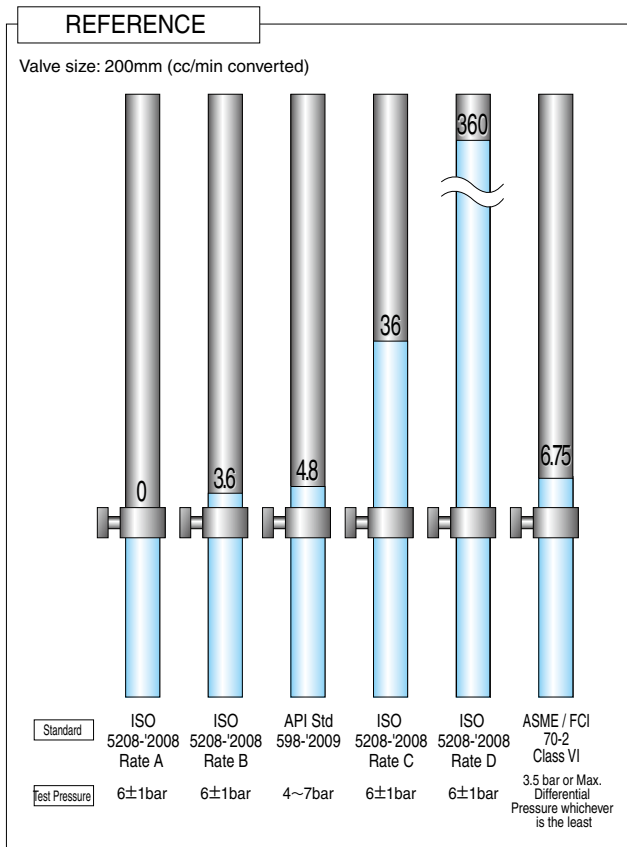


### Hydrostatic Test

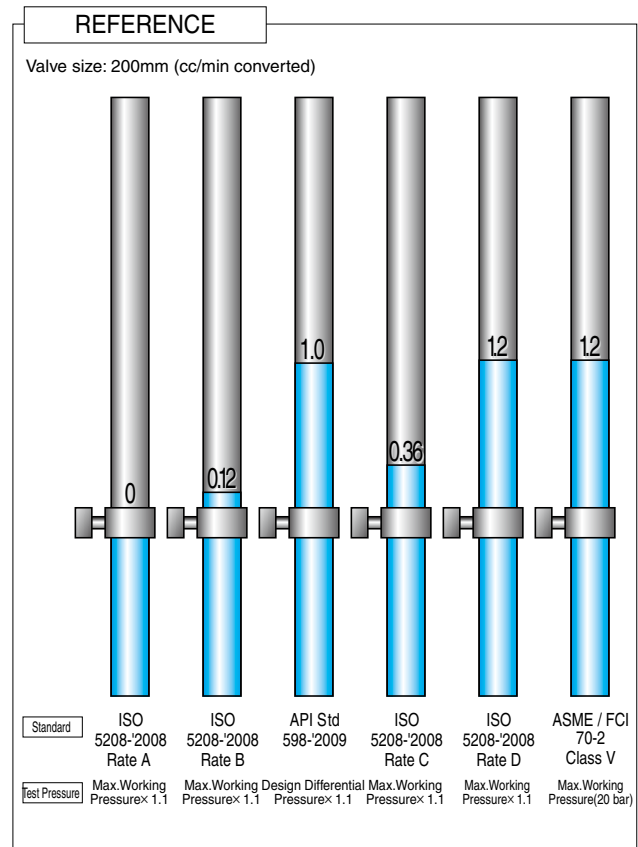


## Allowable Seat Leakage Rates by Standard

### Gas Test



### Hydrostatic Test



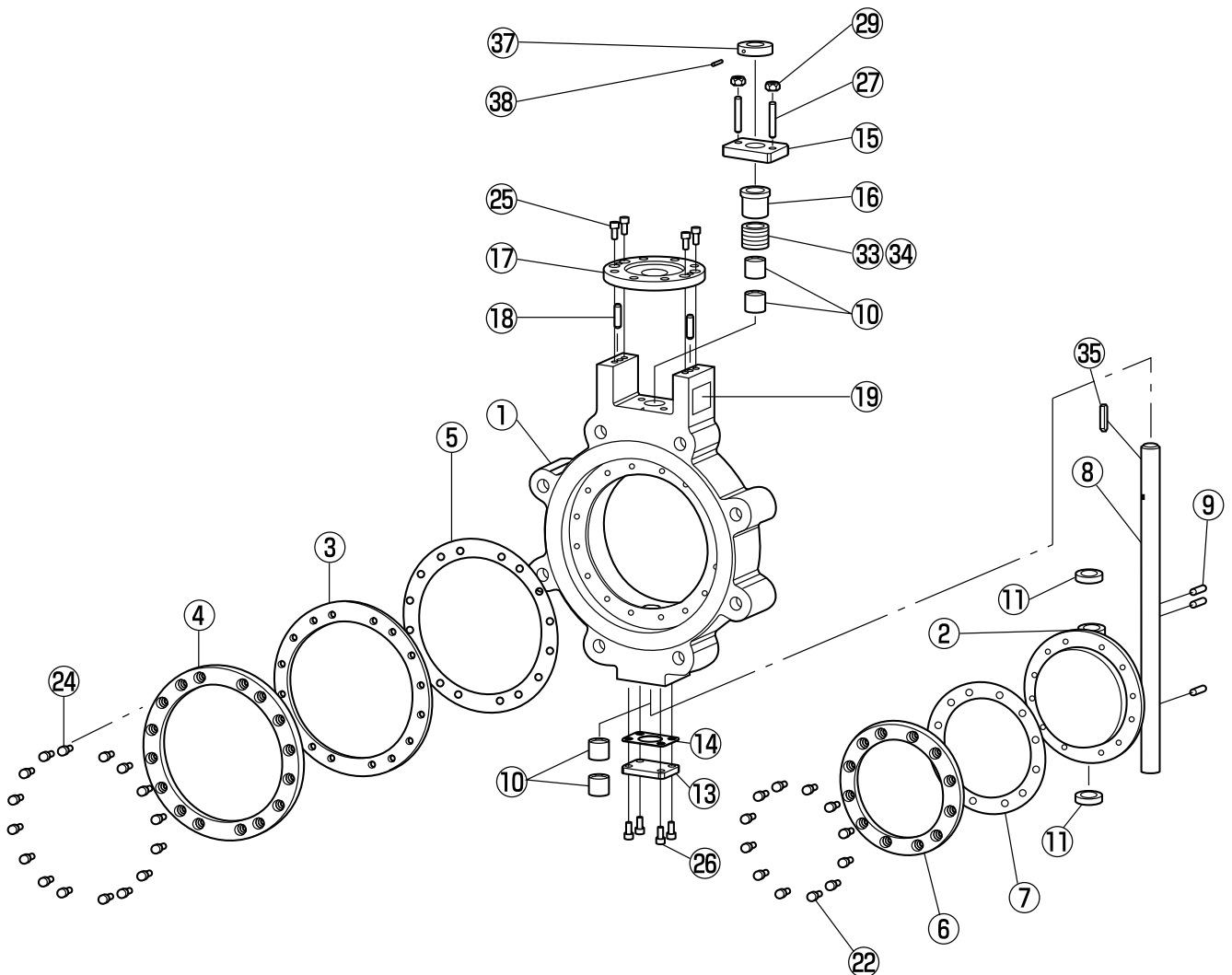
## Operating and Maintenance Instructions

No	Description	Q'ty
1	Body	1
2	Disc	1
★ 3	Body Seat	1
4	Body Seat Retaining Ring	1
★ 5	Body Seat Gasket	1
6	Disc Seal	1
7	Disc Seal Gasket	1
8	Shaft	1
9	Shaft pin	2-4
10	Bearing	4
11	Thrust Ring	2
13	End Cover	1
14	End Cover Gasket	1
15	Gland Plate	1
16	Gland Plate Spigot	1

No	Description	Q'ty
17	Mounting Plate	1
18	Dowel Pin	2-4
19	Nameplate	1-2
22	Disc Seal Screw	1set
24	Body Seat Screw	1set
25	Mounting Plate Screw	4-6
26	End Cover Screw	4
27	Gland Stud	2
29	Gland Nut	2
33	Gland Packing	3
★ 34	Gland Packing	2
★ 35	Key	1
37	Anti-blowout Collar	1
38	Anti-blowout Device	1-2

★ : Recommended Spare Parts

© : Please refer to specific drawings



## Operating and Maintenance Instructions

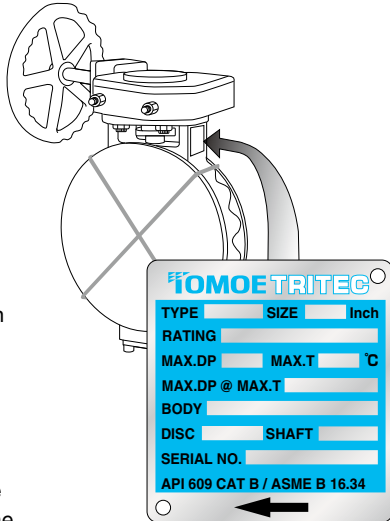
### INTRODUCTION

This instruction provides general information on the operation, installation and maintenance of the Tritec triple offset valve. The Tritec valves have been designed and manufactured to operate in an aggressive environment under extremes of temperature and pressure for long periods and with minimal maintenance.

### INSTRUCTIONS

#### PACKING

1. All valves will be despatched with protective covers attached to the flange faces to protect the gasket sealing surfaces and internal trim.
2. The valve disc is cracked off the seat in the almost closed position.
3. The Tritec nameplate shown in the picture contains information such as size, pressure class, materials and the unique serial number.



#### SPARE PARTS

1. When ordering spare parts or discussing matters concerning this valve with the sales office, it is essential to quote the unique Serial Number of the valve which is to be found on the stainless steel nameplate attached to the valve body adjacent to the operator.

#### TRANSPORTATION

1. Use crates or packing cases for ocean transportation.
2. For overland transportation, a covered vehicle is recommended with protective sheets covering the valves.

#### STORAGE

1. Store the valves indoors in a cool temperature between  $-10^{\circ}$  and  $+60^{\circ}\text{C}$ , humidity at 70% or less.
2. Do not remove the protective covers until ready to install valves.
3. Machined ferrous surfaces are protected with an approved rust preventative. For long periods of storage, apply the rust preventative once a year to the unpainted surfaces.
4. When storing valves unpacked, take care in protecting valves and actuators from excessive loads. Do not stack unpacked valves.
5. If the valve is for clean gas duty and is being supplied "DEGREASED", a label is attached stating this and the valve sealed in a polythene covering. It is suggested that the valve is kept packed until it is to be installed in the pipeline.

#### UNPACKING

1. Unpack valves just before installation.

### INSTALLATION

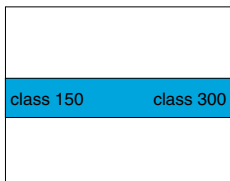
- a) The valve is designed to seal against bidirectional flow and can therefore be installed with flow in either direction. However enhanced sealing life will be obtained with upstream flow against the shaft side of the disc. This preferred flow direction is shown on the nameplate attached to the valve body adjacent to the operator and also on the GA drawing. The valve may be installed in the pipeline with the valve shaft in a horizontal, vertical or intermediate position.
- b) Prior to installation, the pipeline must be cleaned from dirt and welding residues to avoid damage to the valve during operation.
- c) Ensure that the valve is closed prior to installation to avoid the risk of damage to the sealing surfaces.
- d) The valve must be lifted by the eyebolt or lifting eyes provided with the valve.
- e) The valve must not be lifted by the operator or handwheel.
- f) The valve must not be used for pipework alignment.
- g) The Lugged or Double flanged type valve is suitable for dead end service ie. end of line duty, in either direction (in case of the valve specified both directions) to the full rating pressure of the piping system.

# TT2

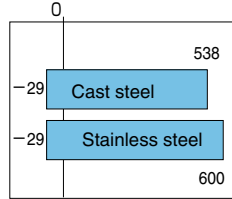
Valve nominal size

**80 to 600mm**

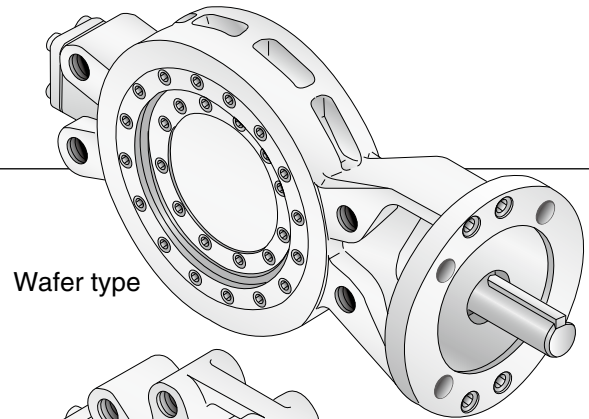
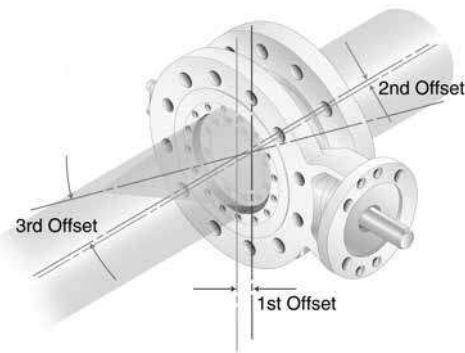
Max. working pressure MPa



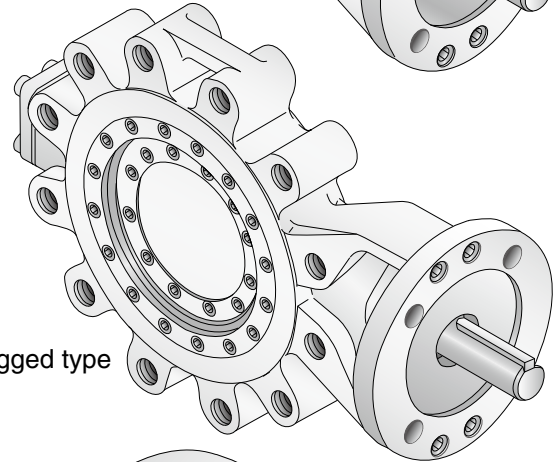
Working temperature range °C



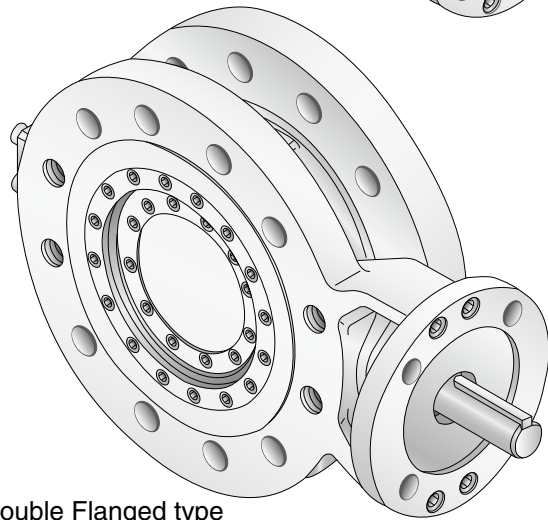
**FS** Fire safe certification to API607 4th/ 5th Edition



Wafer type



Lugged type



Double Flanged type

## Always at the leading edge

Through an extensive commitment to Research & Development, TOMOE has remained at the leading edge of valve design for more than 50 years. The TT2 Triple Offset process valve is the result of advanced technology design and stringent testing to develop a valve that meets the high performance demands of applications where long life and positive shut-off under arduous conditions is essential.

The TT2 inherits the torque sealing, friction-free sealing design of other valves in the TT series and the unique triple offset and ellipsoidal sealing geometry guarantees zero leakage and bubble-tight shut-off.

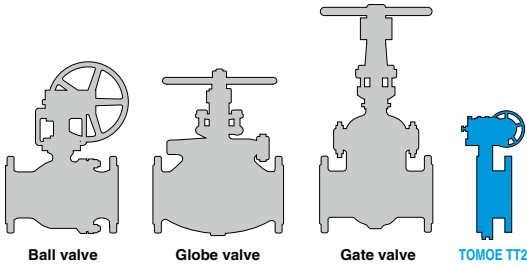
In addition, the compact, lightweight design of the TT2 triple offset valve has revolutionised design and maintenance of piping systems in the OPC industry.

Smaller and lighter than traditional ball, globe and gate valves, the TT2 features a fully field-replaceable seat and seal design for increased plant efficiency and reduced cost of ownership.

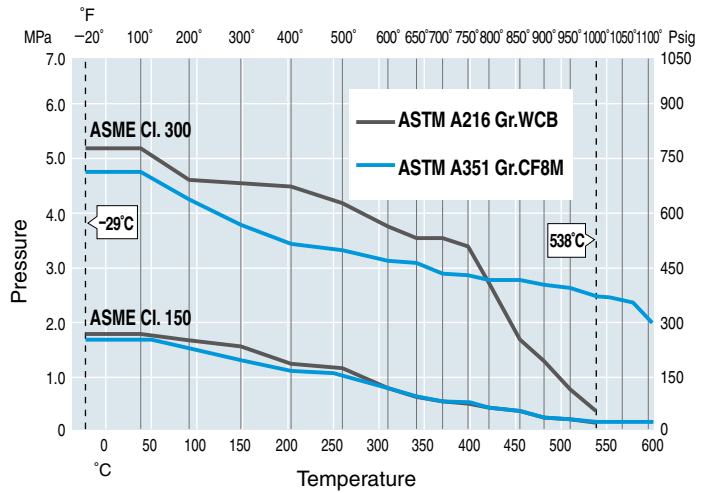
Available in Wafer, Lugged and Double Flanged type body styles to class 150/300 pressure ratings, the TT2 triple offset valve has fire safe certification to API607 5th Edition, making it inherently safe in high risk industry applications.

## Features and Benefits

- Zero leakage with metal seat
- Compact, lightweight design
- Fully field replaceable seat and seal design
- Longer life cycle
- Fire Safe Certification to API607 4th/5th Edition



## Pressure-Temperature Ratings



## Standard Specifications

Design	API 609 Cat. B, ASME B16.34	
Nominal diameter <sup>*1</sup>	3" (80mm) to 24" (600mm)	
Pressure rating	Class 150, Class 300	
Body style	Wafer, Lugged and double flanged, short and long	
Flange accommodation <sup>*2</sup>	ASME /JPI Class 150/300 JIS 10/16/20/30K BS4504 (DIN) PN10/16/25/40	
Face-to-face dimensions <sup>*3</sup>	Wafer, Lugged : API609 Category B Class 150/300. Double flanged : ISO 5752/API 609 Category B, double flanged short pattern Class 150/300	
Pressure-temperature rating <sup>*4</sup>	ASME B16.34 Class 150/300, API609 Class 150/300. Operating temperature (standard specifications): -29 to 538 degrees C (A216-WCB), -29 to 600 degrees C (A351 CF8M)	
Pressure test <sup>*5</sup>	Main body pressure and seat leakage test: API598. Allowable seat leakage: Preferred; API 598, ISO 5208 rate A, ASME/FCI 70-2 Class VI.	
Fire safe	Fire Safe Certification based on API 607 4th / 5th Edition	
Actuator	Manual Gear, Electric, Pneumatic, Hydraulic	
Flow direction <sup>*5</sup>	Bi-directional (However, the standard pressure direction is for high pressure at the stem side. Selection of the drive section will differ depending on the pressure direction.)	
Applicable gaskets	Use a spiral gasket. ASME /JPI Class 150/300 commercial products may be used. Please consult us regarding JIN, BS and DIN.	
Standard materials	Body	A216 WCB or A351 CF8M
	Disc	A216 WCB or A351 CF8M
	Stem <sup>*6</sup>	A564 type 630 H1150+H1150
	Body seat	316SS / Graphite
	Disc seal <sup>*7</sup>	316SS
Coating	Silicon resin coating (Grey N7) for 200 degrees C and lower. Heat resistant silver coating for over 200 degrees C. No painting for stainless steel.	

\*1 Except for 5" (125mm), 22" (550mm)

\*2 Please consult us regarding JIN, BS and DIN lugs and double flange types

\*3 Long-pattern types can be manufactured to your desired specifications

\*4 400 degrees C or less in an oxidized atmosphere

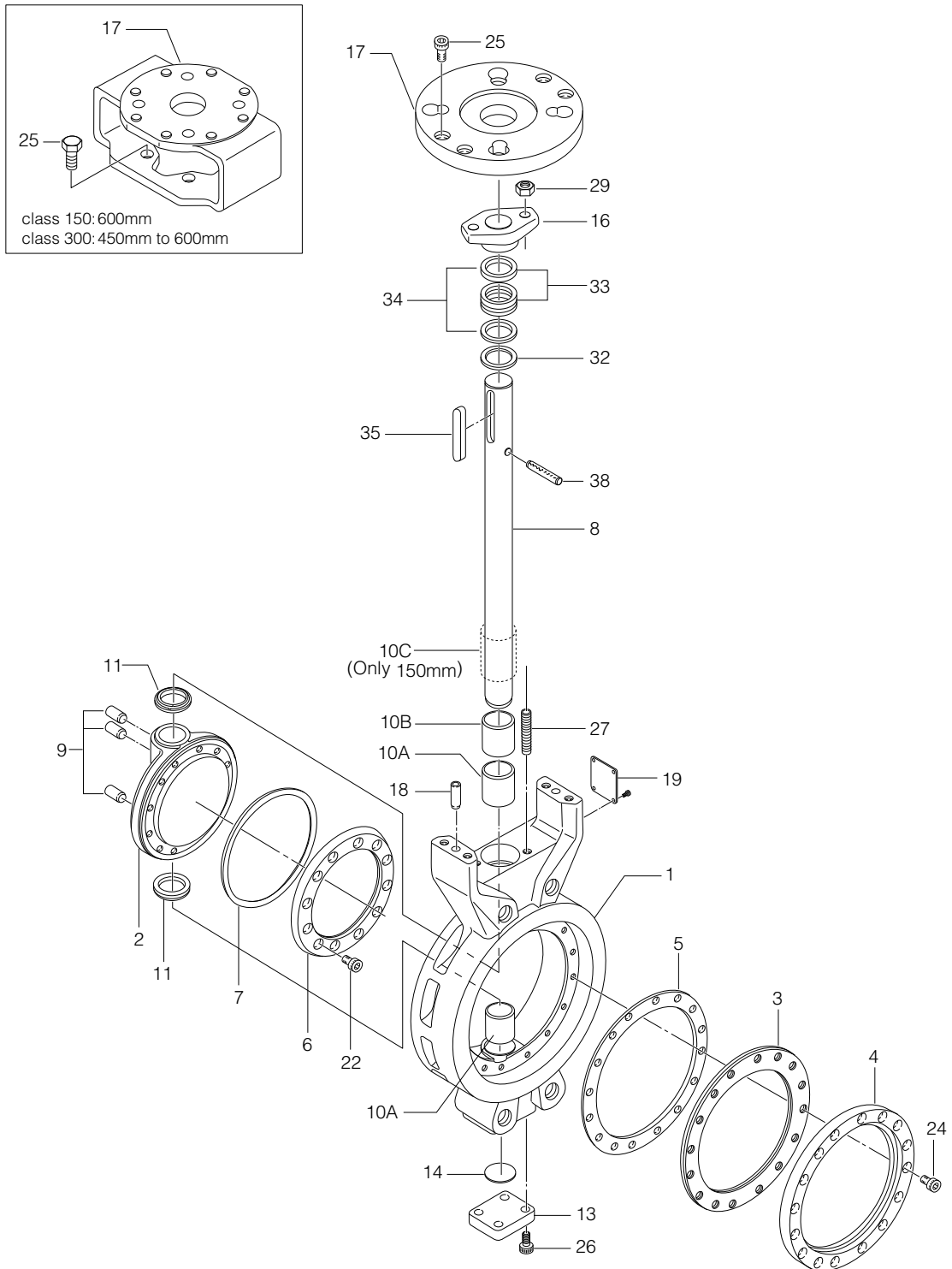
\*5 In the case of inverted pressure, the amount of leakage varies depending on the pressure. Please contact our sales.

\*6 Use Inconel 718 for over 400 degrees C.

\*7 Titanium nitride hardened, Stellite #6 welding is available as an option

\* Valve stem position : horizontal position.

## TT2 Expanded view of components





**TT2 Parts list**

**■ TT2 Parts list (class 150:80mm to 500mm)  
(class 300:80mm to 400mm)**

No.	Description	Q'ty	Remarks	
1	Body	1		
2	Disc	1		
3	Body seat	1		
4	Retainer	1		
5	Body seat gasket	1		
6	Disc seal	1		
7	Disc seal gasket	1		
8	Stem	1		
9	Shaft pin	3		
10A	Bearing A	2		
10B	Bearing B	0 or 1	class 150:80,100mm: 1 150mm over: 0 class 300: 1	
10C	Bearing spacer	0 or 1	class 150:150mm over: 1 class 300:150mm: 1	
11	Thrust ring	2		
13	Bottom cover	1		
14	Bottom gasket	1		
16	Glandplate spigot	1		
17	Mounting plate	1		
18	Dowel pin	2		
19	Nameplate	1		
22	Hexagon hole bolt	80mm to 200mm	4	80mm
			6	100mm
			8	150mm
			12	200mm
		250mm to 400mm	8	250mm
			12	300mm, 350mm
16	400mm			
24	Hexagon hole bolt	80mm to 200mm	8	80mm
			12	100mm, 150mm
			16	200mm
		250mm to 400mm	20	250mm
			24	300mm
			28	350mm
32	400mm			
25	Hexagon hole bolt	4		
26	Hexagon hole bolt	4		
27	Gland bolt	2		
29	Hexagon nut	2		
32	Packing retainer	1		
33	Gland packing	3		
34	Gland packing	2		
35	Key	1		
38	Spring pin	1		

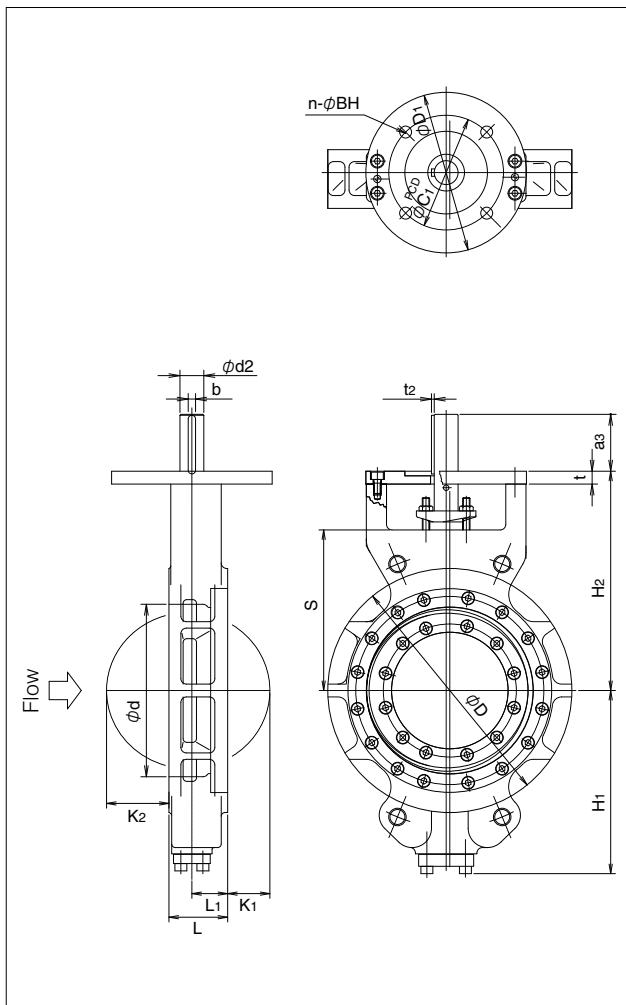
**■ TT2 Parts list (class 150:600mm)  
(class 300:450mm to 600mm)**

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Body seat	1	
4	Retainer	1	
5	Body seat gasket	1	
6	Disc seal	1	
7	Disc seal gasket	1	
8	Stem	1	
9	Shaft pin	3	
10A	BearingA	2	
10B	BearingB	1	class 300
10C	Bearing spacer	1	class 150
11	Thrust ring	2	
13	Bottom cover	1	
14	Bottom gasket	1	
16	Glandplate spigot	1	
17	Bracket	1	
19	Nameplate	1	
22	Hexagon hole bolt	16	450mm, 600mm
		12	500mm
24	Hexagon hole bolt	20	450mm, 500mm
		28	600mm
25	Hexagon hole bolt	4	
26	Hexagon hole bolt	4	
27	Gland bolt	2	
29	Hexagon nut	2	
32	Packing retainer	1	
33	Gland packing	3	
34	Gland packing	2	
35	Key	1	
38	Spring pin	1	

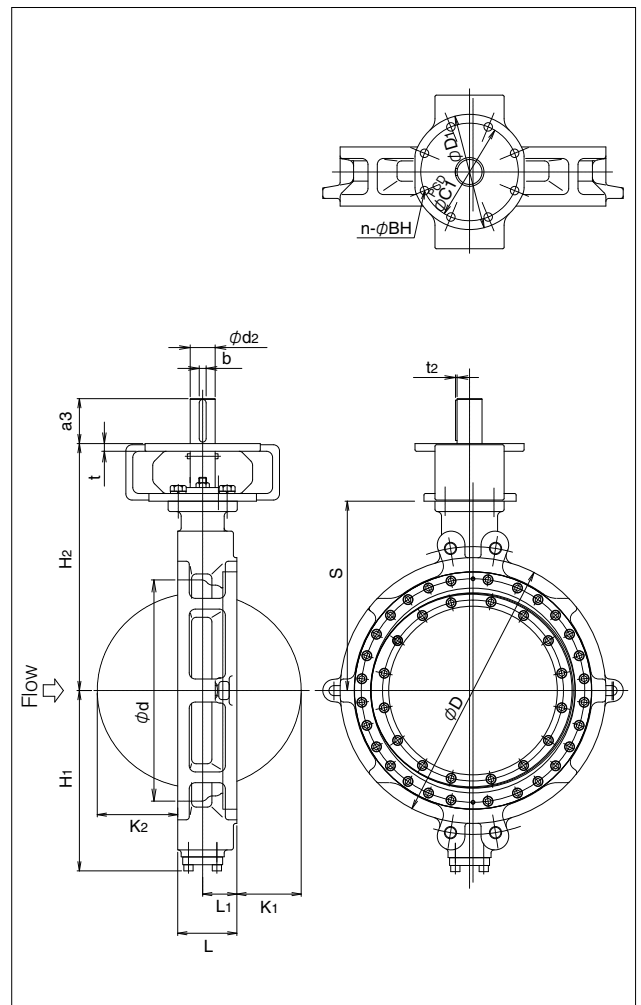
## TT2-class 150 Bare shaft (Wafer type)

Nominal size		Dimension (mm)																		Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	S	a <sub>3</sub>	t	$\phi D_1$	n	BH	$\phi C_1$	$\phi d_2$	b	t <sub>2</sub>	
80	3	82	127	48	29	3	23.1	120.6	159	110	34	12	125	4	11	102	18	6	2.5	7
100	4	108	154	54	31.5	9	27.0	144.6	194	132	34	12	125	4	11	102	20	6	2.5	11
150	6	159	215	57	35	25.5	45.5	189.6	242	180	34	12	125	4	11	102	22	6	2.5	18
200	8	202	266	64	39	46.7	67.4	199.6	248	180	64	14	175	4	11	102	26	8	3	27
250	10	235	324	71	43	63.5	86.5	245.6	326	252	64	14	175	4	13	125	30	8	3	45
300	12	290	373	81	48.5	84	109	281.6	376	281	79	20	210	4	22	165	37	10	3	66
350	14	329	413	92	52	95.5	117.5	307.6	400	305	79	20	210	4	22	165	37	10	3	82
400	16	370	470	102	63	108.3	144.3	345.6	470	355	79	25	226	4	22	165	45	14	3.5	107
450	18	432	534	114	68	120.6	158.4	383.6	510	395	79	25	226	4	22	165	52	16	4	160
500	20	488	585	127	79	131.3	178.3	410.6	531	416	79	25	226	4	22	165	52	16	4	188
600	24	576	692	154	89	167.5	209.5	469.6	643	493	117	20	300	8	18	254	65	18	4	306

### class 150 Wafer type 80mm to 500mm



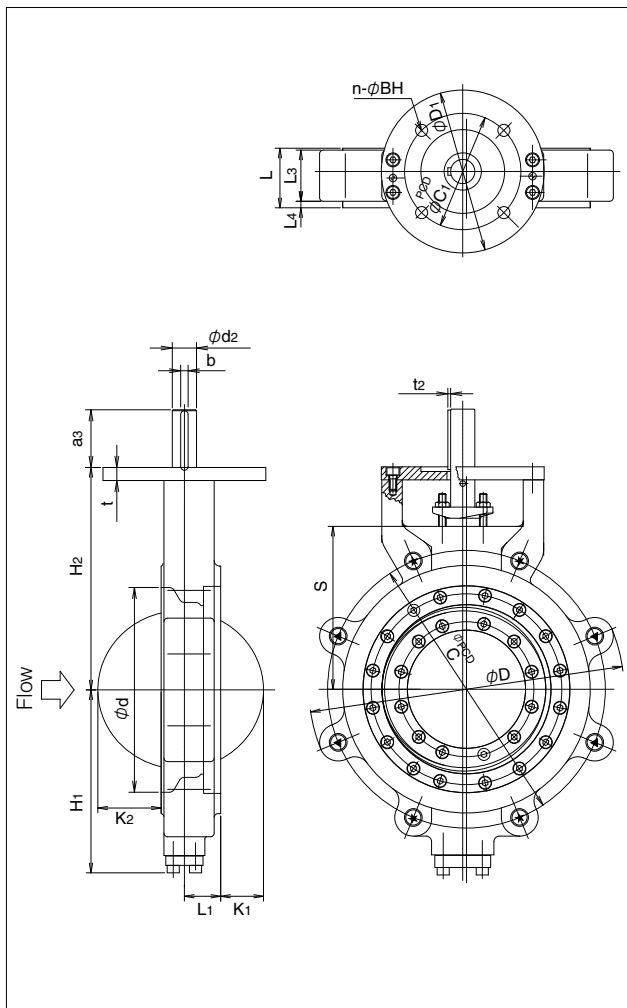
### class 150 Wafer type 600mm



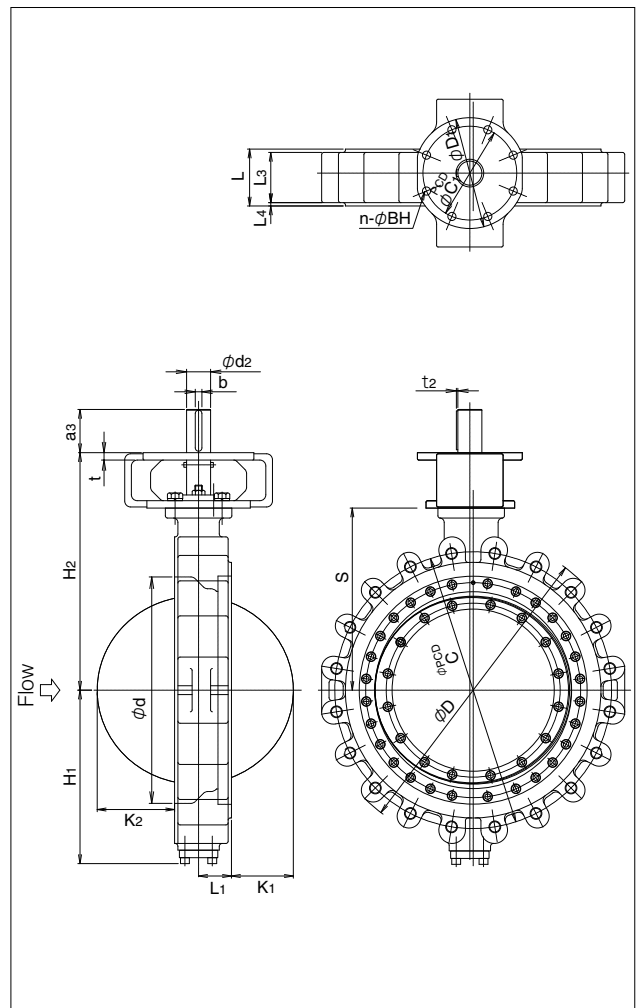
TT2-class 150 Bare shaft (Full Lugged type)

Nominal size		Dimension (mm)																			Approx. Mass (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>1</sub>	L <sub>3</sub>	L <sub>4</sub>	K <sub>1</sub>	K <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	S	a <sub>3</sub>	t	$\phi D_1$	n	BH	$\phi C_1$	$\phi d_2$	b		t <sub>2</sub>
80	3	100	185	48	29	42	4	3	23.1	120.6	159	110	34	12	125	4	11	102	18	6	2.5	7
100	4	117	238	54	31.5	46.5	5	9	27	144.6	194	132	34	12	125	4	11	102	20	6	2.5	13
150	6	167	281	57	35	51.5	3.5	25.5	45.5	189.6	242	180	34	12	125	4	11	102	22	6	2.5	21
200	8	218	338	64	39	55	7	46.7	67.4	199.6	248	180	64	14	175	4	11	102	26	8	3	29
250	10	270	424	71	43	63	4	63.5	86.5	245.6	326	252	64	14	175	4	13	125	30	8	3	52
300	12	320	478	81	48.5	71	5	84	109	281.6	376	281	79	20	210	4	22	165	37	10	3	76
350	14	350	526	92	52	79	6.5	95.5	117.5	307.6	400	305	79	20	210	4	22	165	37	10	3	91
400	16	410	592	102	63	92	5	108.3	144.3	345.6	470	355	79	25	226	4	22	165	45	14	3.5	134
450	18	460	634	114	68	98	10	120.6	158.4	383.6	510	395	79	25	226	4	22	165	52	16	4	185
500	20	510	714	127	79	107	10	131.3	178.3	410.6	531	416	79	25	226	4	22	165	52	16	4	225
600	24	614	830	154	89	136	9	167.5	209.5	469.6	643	493	117	20	300	8	19	254	65	18	4	393

■ class 150 Full Lugged 80mm to 500mm



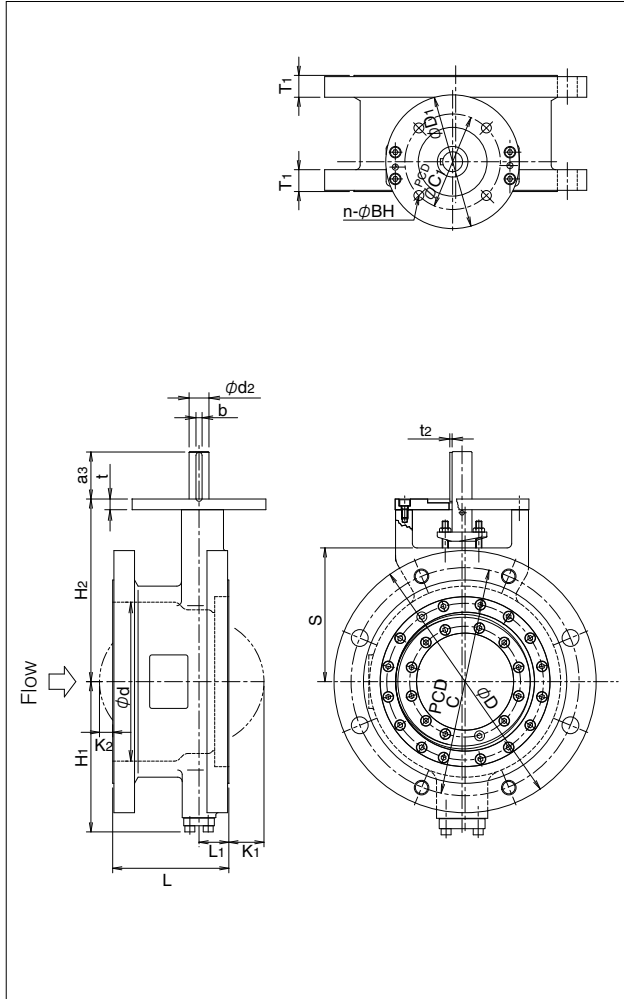
■ class 150 Full Lugged 600mm



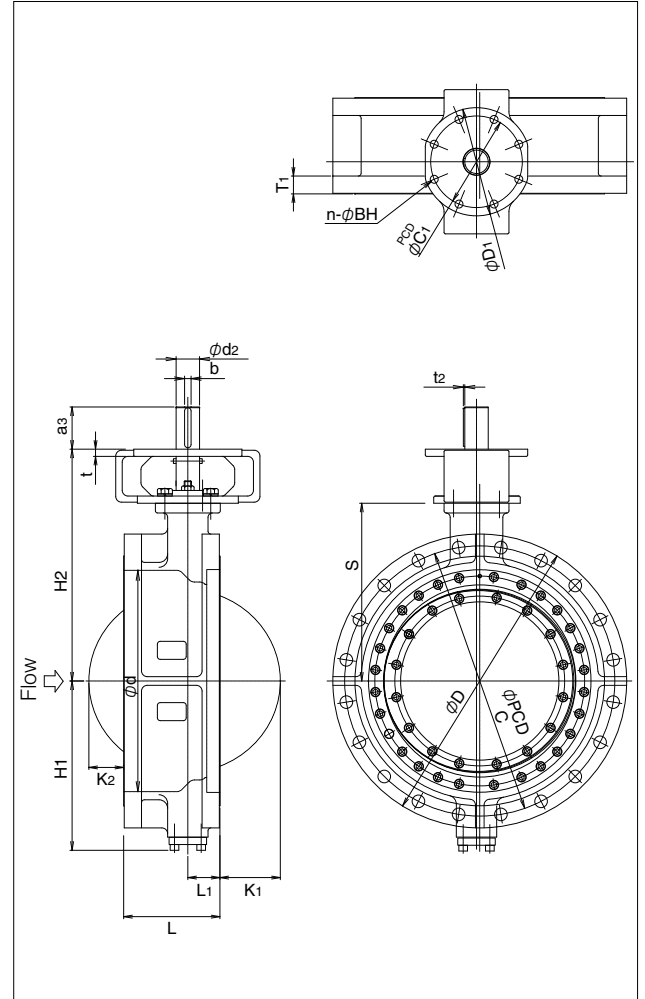
## TT2-class 150 Bare shaft (Flanged type)

Nominal size		Dimension (mm)																			Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	T <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	S	a <sub>3</sub>	t	$\phi D_1$	n	BH	$\phi C_1$	$\phi d_2$	b	t <sub>2</sub>	
80	3	90	190	114	29	3	0	24	120.6	159	110	34	12	125	4	11	102	18	6	2.5	15
100	4	117	229	127	31.5	9	0	24	144.6	194	132	34	12	125	4	11	102	20	6	2.5	21
150	6	167	279	140	35	25.5	0	26	189.6	242	180	34	12	125	4	11	102	22	6	2.5	35
200	8	218	343	152	39	46.7	0	29	199.6	248	180	64	14	175	4	11	102	26	8	3	49
250	10	270	406	165	43	63.5	0	31	245.6	326	252	64	14	175	4	13	125	30	8	3	77
300	12	320	483	178	48.5	84	12	32	281.6	376	281	79	20	210	4	22	165	37	10	3	117
350	14	350	535	190	52	95.5	19.5	35	307.6	400	305	79	20	210	4	22	165	37	10	3	155
400	16	410	595	216	63	108.3	30.3	37	345.6	470	355	79	25	226	4	22	165	45	14	3.5	194
450	18	458	635	222	68	120.6	50.4	40	383.6	510	395	79	25	226	4	22	165	52	16	4	237
500	20	510	700	229	79	131.3	76.3	43	410.6	531	416	79	25	226	4	22	165	52	16	4	312
600	24	614	815	267	89	167.5	96.5	48	469.6	643	493	117	20	300	8	18	254	65	18	4	432

### ■class 150 Flanged 80mm to 500mm



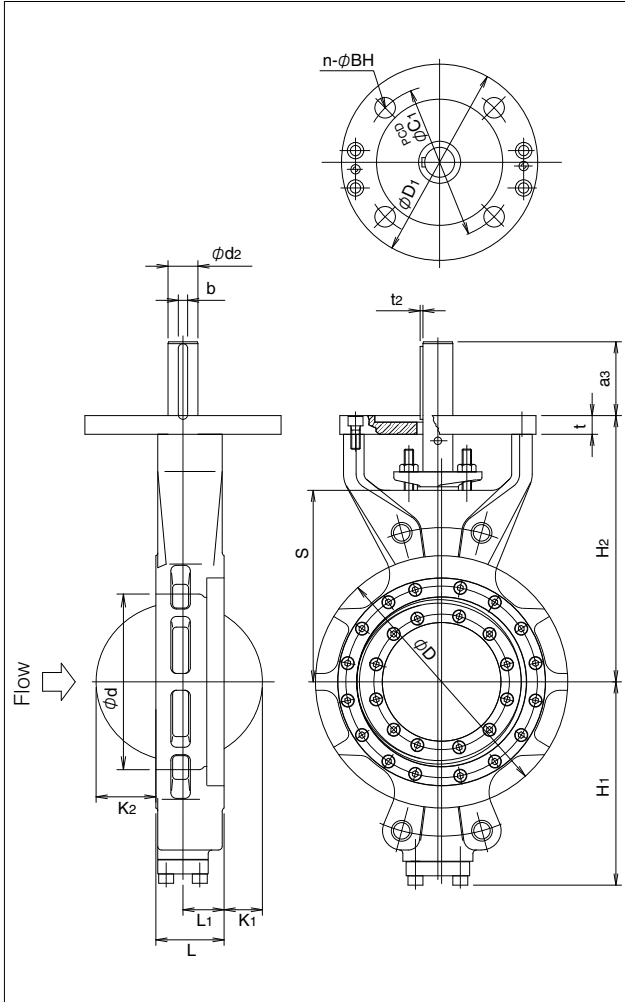
### ■class 150 Flanged 600mm



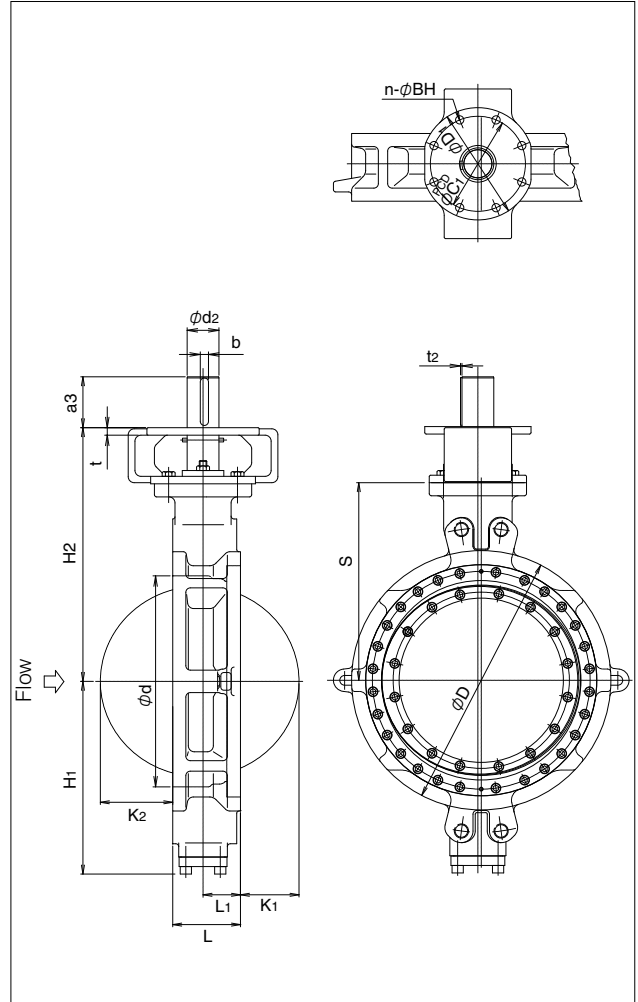
## TT2-class 300 Bare shaft (Wafer type)

Nominal size		Dimension (mm)																		Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	S	a <sub>3</sub>	t	$\phi D_1$	n	BH	$\phi C_1$	$\phi d_2$	b	t <sub>2</sub>	
80	3	82	127	48	29	3	23.1	120.6	159	110	34	12	125	4	11	102	18	6	2.5	7
100	4	108	154	54	31.5	9	27	144.6	194	132	34	12	125	4	11	102	20	6	2.5	11
150	6	153	215	59	36.5	24	45	188.6	276	212	64	14	175	4	11	102	26	8	3	23
200	8	188	270	73	44	41.7	63.4	217.6	285	205	79	20	210	4	18	140	32	10	3	37
250	10	235	324	83	47.5	59	79	259.6	355	260	79	20	210	4	22	165	37	10	3	59
300	12	290	381	92	53	79.5	102.5	305.6	428	313	79	25	226	4	22	165	45	14	3.5	89
350	14	329	413	117	60.5	87	101	340.6	460	345	79	25	226	4	22	165	52	16	4	113
400	16	370	470	133	71	100.3	121.3	373.6	518	388	109	32	300	8	18	254	60	18	4	166
450	18	426	534	149	79	109.6	134.4	400.6	574	424	117	20	300	8	22	254	70	20	4.5	231
500	20	476	592	159	85	125.3	152.3	441.6	602	452	136	20	300	8	22	254	75	20	4.5	292
600	24	564	693	181	100	156.5	193.5	514.6	678	528	136	20	300	8	22	254	85	22	5	416

### ■ class 300 Wafer 80mm to 400mm



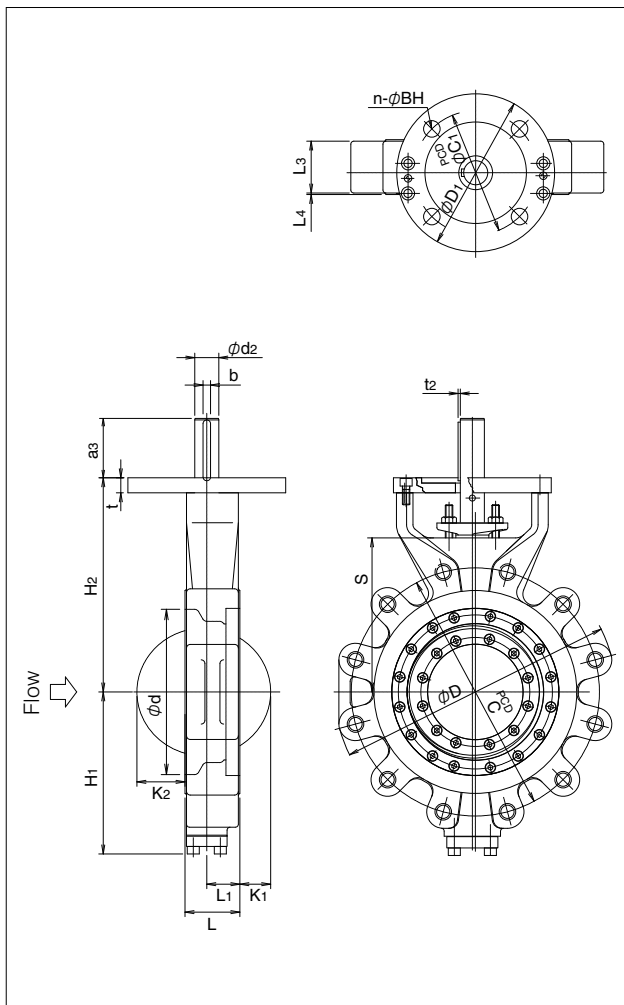
### ■ class 300 Wafer 450mm to 600mm



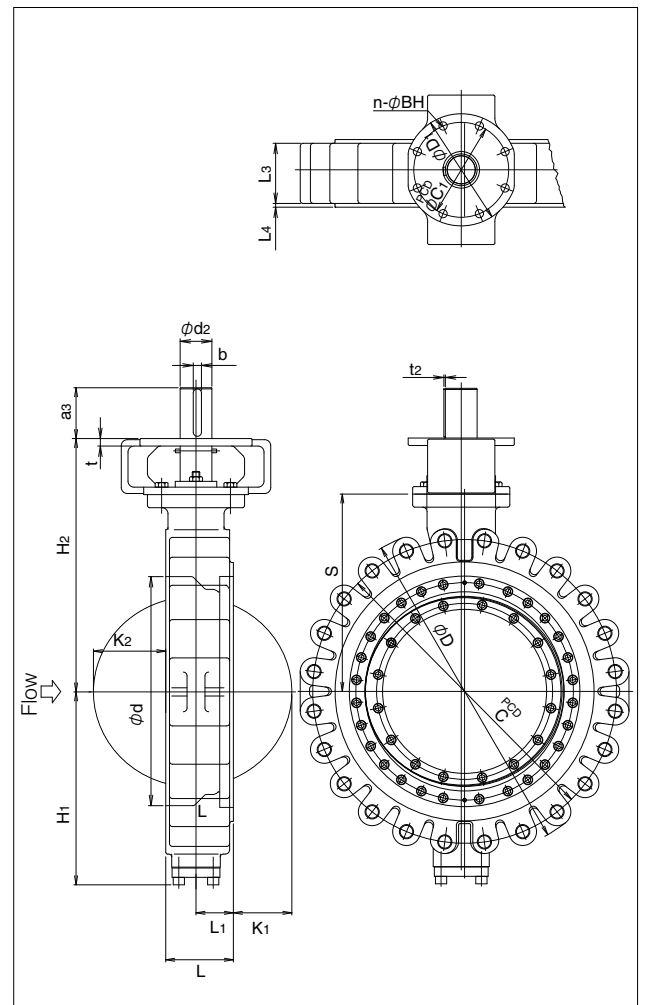
## TT2-class 300 Bare shaft (Full Lugged type)

Nominal size		Dimension (mm)																				Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>1</sub>	L <sub>3</sub>	L <sub>4</sub>	K <sub>1</sub>	K <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	S	a <sub>3</sub>	t	$\phi D_1$	n	BH	$\phi C_1$	$\phi d_2$	b	t <sub>2</sub>	
80	3	82	204	48	29	42	4	3	23.1	120.6	159	110	34	12	125	4	11	102	18	6	2.5	8.4
100	4	117	238	54	31.5	47	5	9	27	144.6	194	132	34	12	125	4	11	102	20	6	2.5	13
150	6	166	312	59	36.5	52	5	24	45	188.6	276	212	64	14	175	4	11	102	26	8	3	24
200	8	220	374	73	44	69	2	41.7	63.4	217.6	285	205	79	20	210	4	18	140	32	10	3	44
250	10	275	435	83	47.5	75	4	59	79	259.6	355	260	79	20	210	4	22	165	37	10	3	71
300	12	320	503	92	53	82	5	79.5	102.5	305.6	428	313	79	25	226	4	22	165	45	14	3.5	105
350	14	360	570	117	60.5	109	4	87	101	340.6	460	345	79	25	226	4	22	165	52	16	4	163
400	16	400	630	133	71	125	4	100.3	121.3	373.6	518	388	109	32	300	8	18	254	60	18	4	225
450	18	460	690	149	79	137	6	109.6	134.4	400.6	574	424	127	20	300	8	22	254	70	20	4.5	327
500	20	513	748	159	85	141	8	125.3	152.3	441.6	602	452	136	20	300	8	22	254	75	20	4.5	375
600	24	613	887	181	100	161	10	156.5	193.5	514.6	678	528	136	20	300	8	22	254	85	22	5	560

### ■class 300 Full Lugged 80mm to 400mm



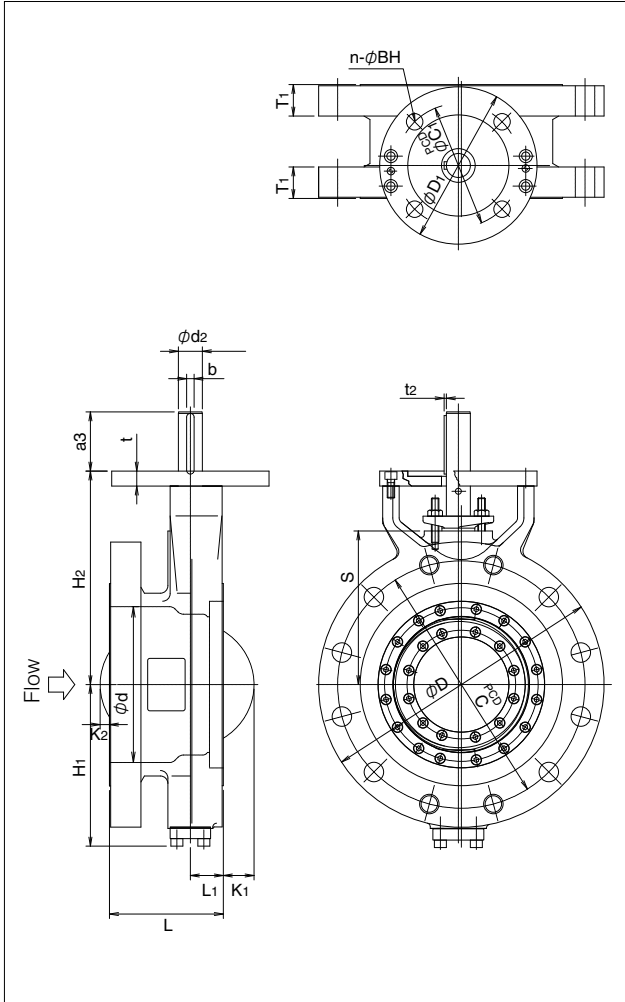
### ■class 300 Full Lugged 450mm to 600mm



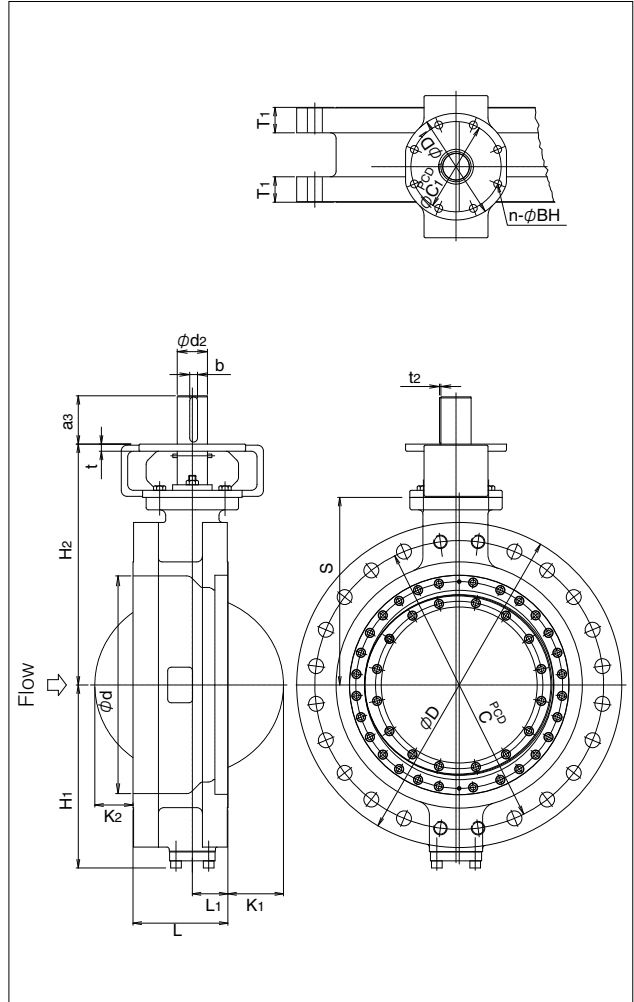
TT2-class 300 Bare shaft (Flanged type)

Nominal size		Dimension (mm)																			Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	T <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	S	a <sub>3</sub>	t	$\phi D_1$	n	BH	$\phi C_1$	$\phi d_2$	b	t <sub>2</sub>	
80	3	90	210	114	29	3	0	29	120.6	159	110	34	12	125	4	11	102	18	6	2.5	17
100	4	117	254	127	31.5	9	0	32	144.6	194	132	34	12	125	4	11	102	20	6	2.5	28
150	6	166	318	140	36.5	24	0	37	188.6	276	212	64	14	175	4	11	102	26	8	3	48
200	8	208	381	152	44	41.7	0	42	217.6	285	205	79	20	210	4	18	140	32	10	3	78
250	10	275	444	165	47.5	59	0	48	259.6	355	260	79	20	210	4	22	165	37	10	3	114
300	12	310	520	178	53	79.5	16.5	51	305.6	428	313	79	25	226	4	22	165	45	14	3.5	175
350	14	360	585	190	60.5	87	28	54	340.6	460	345	79	25	226	4	22	165	52	16	4	235
400	16	410	648	216	71	100.3	38.3	58	373.6	518	388	109	32	300	8	18	254	60	18	4	302
450	18	460	710	222	79	109.6	61.4	61	400.6	574	424	127	20	300	8	22	254	70	20	4.5	407
500	20	513	775	229	85	125.3	82.3	64	441.6	602	452	136	20	300	8	22	254	75	20	4.5	491
600	24	613	915	267	100	156.5	107.5	70	514.6	678	528	136	20	300	8	22	254	85	22	5	724

■ class 300 Flanged 80mm to 400mm



■ class 300 Flanged 450mm to 600mm



## TT2 Actuator Selection Chart

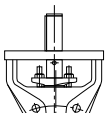
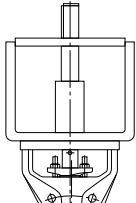
### ■Class150/300 Manual Gear

Nominal size		Class 150 (Max. working pressure 2.0MPa)		Class 300 (Max. working pressure 5.1MPa)	
mm	inch	Gear	Diameter of handle wheel	Gear	Diameter of handle wheel
80	3	2U-3	200	2U-3	200
100	4				
150	6	2U-4	280	SBWG-01	370
200	8			SBWG-02	450
250	10	SBWG-02	450	SBWG-03	550
300	12			SBWG-03-1S	710
350	14	SBWG-03	550	SBWG-04-1S	710
400	16			SBWG-05-1S	
450	18	SBWG-03-1S	550	SBWG-05-1SD	900
500	20			SBWG-06-1SD	
600	24	SBWG-04-1S	710		

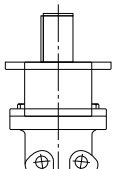
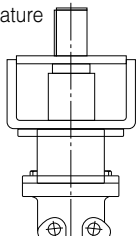
※For other actuator selections such as cylinders, please consult us.

## TT2 Actuator Mounting Standard

### ■Class 300 80mm to 400mm, Class 150 80mm to 500mm

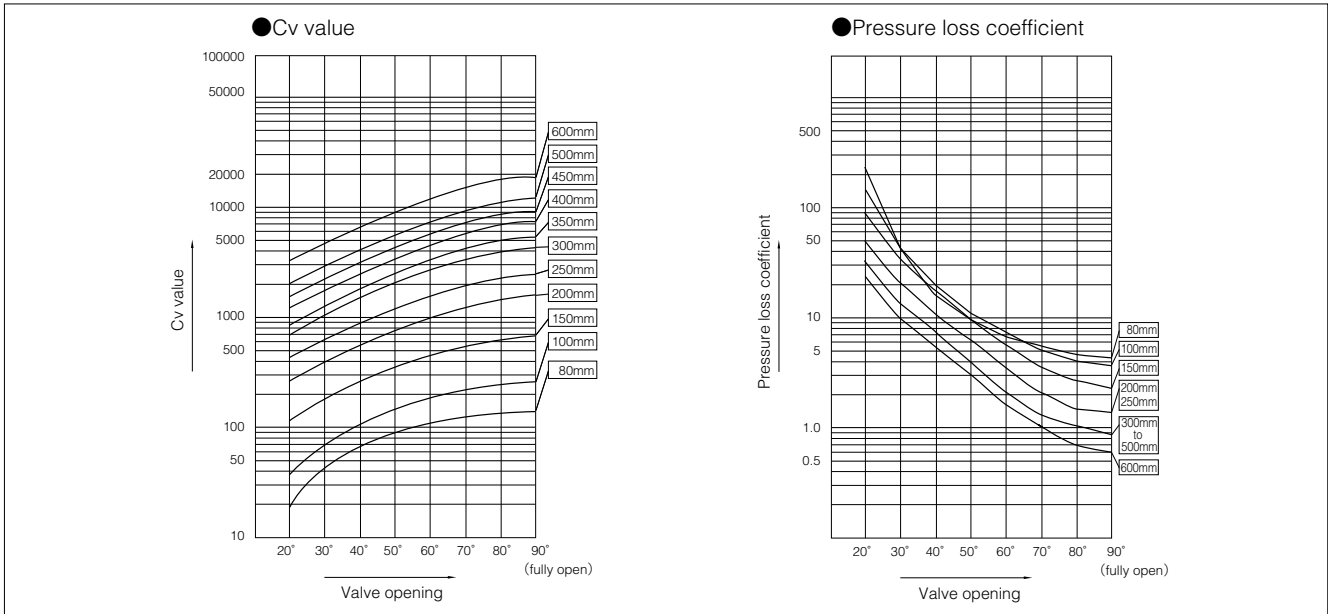
Standard		High temperature	
			
Less than 400 degrees C		400 to 600 degrees C	
Body / Disc	A216 WCB (-29°C~538°C) A351 CF8M (-29°C~600°C)		
Disc seal	316SS		
Stem	A564-630(H1150x2)	Inconel 718	
Body seat	316SS + Graphite		

### ■Class 300 450mm to 600mm, Class 150 600mm

Standard		High temperature	
			
Less than 400 degrees C		400 to 600 degrees C	
Body / Disc	A216 WCB (-29°C~538°C) A351 CF8M (-29°C~600°C)		
Disc seal	316SS		
Stem	A564-630(H1150x2)	Inconel 718	
Body seat	316SS + Graphite		



### TT2 class 150 Cv value/pressure loss coefficient



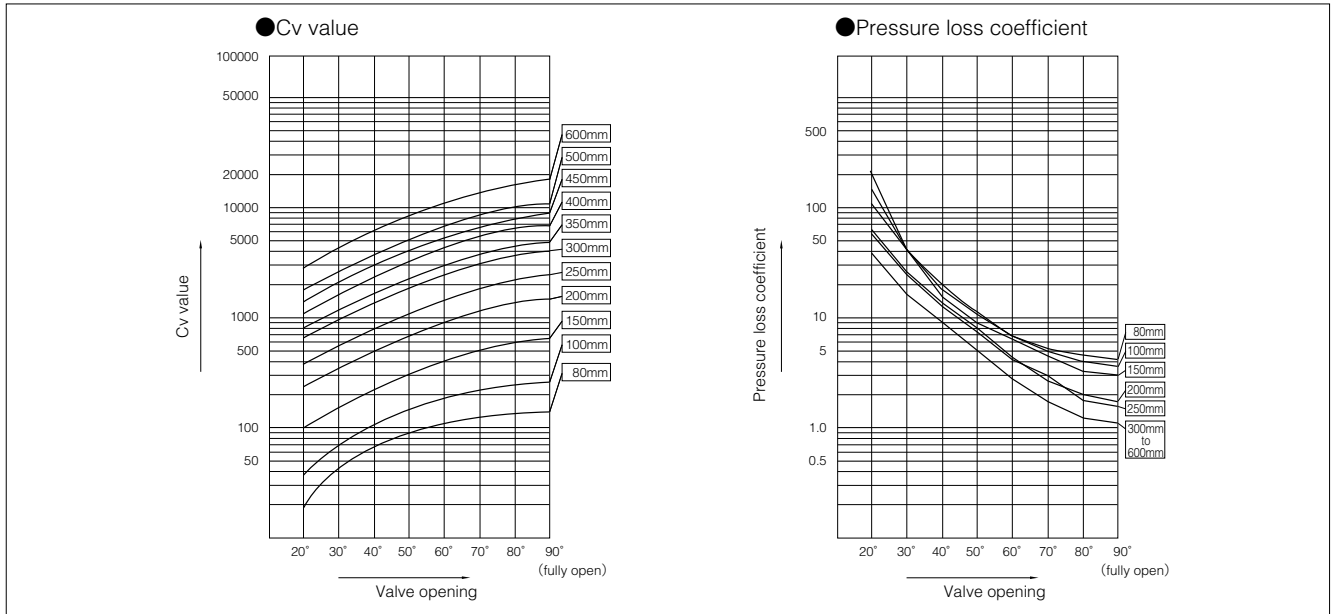
### TT2 class 150 Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	18.5	42.9	69.8	92.5	109	121	130	134
100	4	38.9	73.1	109	146	182	217	244	255
150	6	111	181	253	340	446	559	650	686
200	8	259	400	542	730	980	1260	1480	1570
250	10	411	635	859	1160	1550	1990	2340	2480
300	12	697	1080	1460	1960	2630	3370	3970	4210
350	14	861	1330	1800	2420	3250	4170	4910	5200
400	16	1200	1850	2510	3370	4530	5810	6840	7250
450	18	1500	2310	3130	4220	5670	7270	8550	9060
500	20	1930	2980	4040	5440	7310	9360	11000	11700
600	24	3110	4800	6500	8750	11800	15100	17700	18800

### TT2 class 150 Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	233	43.2	16.3	9.29	6.71	5.47	4.69	4.45
100	4	155	43.9	19.5	11.0	7.04	4.99	3.92	3.6
150	6	90.4	33.9	17.3	9.6	5.58	3.56	2.63	2.36
200	8	50.8	21.3	11.6	6.41	3.55	2.16	1.56	1.39
250	10	48.5	20.3	11.1	6.12	3.39	2.07	1.49	1.33
300	12	34.7	14.6	7.95	4.38	2.43	1.48	1.07	0.95
350	14	35.7	15	8.17	4.5	2.50	1.52	1.1	0.976
400	16	31.3	13.2	7.18	3.96	2.19	1.34	0.964	0.858
450	18	32.1	13.5	7.35	4.05	2.24	1.37	0.987	0.878
500	20	29.8	12.5	6.83	3.76	2.09	1.27	0.917	0.817
600	24	24.1	10.1	5.52	3.04	1.69	1.03	0.741	0.66

## TT2 class 300 Cv value/pressure loss coefficient



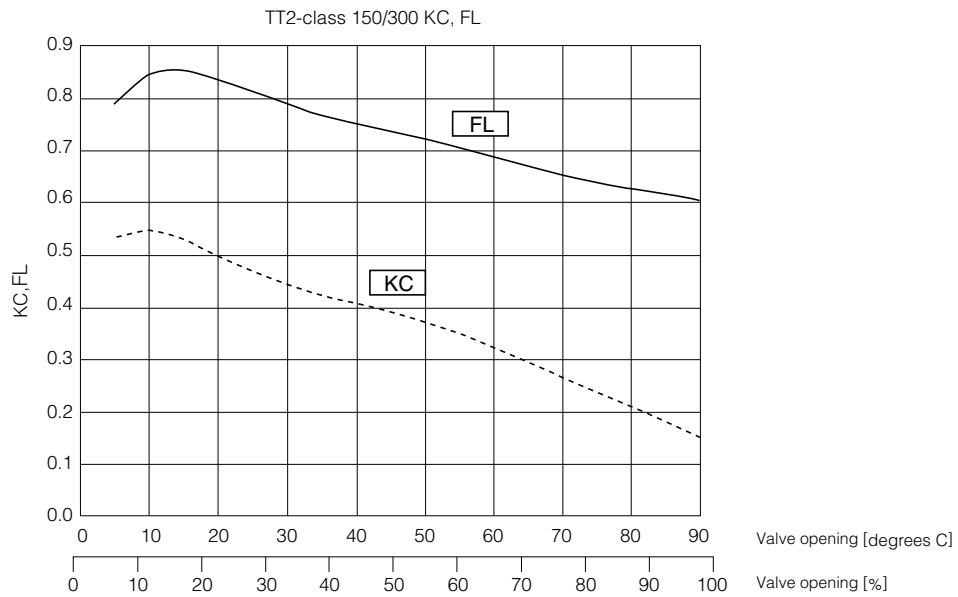
### TT2 class 300 Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	18.5	42.9	69.8	92.5	109	121	130	134
100	4	38.9	73.1	109	146	182	217	244	255
150	6	99	162	226	304	399	499	580	612
200	8	232	357	484	652	875	1120	1320	1400
250	10	367	567	767	1030	1390	1780	2090	2220
300	12	622	960	1300	1750	2350	3010	3550	3760
350	14	768	1190	1610	2160	2910	3270	4380	4640
400	16	1070	1650	2240	3010	4050	5190	6100	6470
450	18	1340	2070	2800	3770	5060	6490	7630	8090
500	20	1730	2660	3610	4860	6520	8360	9840	10400
600	24	2780	4290	5800	7820	10500	13500	15800	16800

### TT2 class 300 Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	233	43.2	16.3	9.29	6.71	5.47	4.69	4.45
100	4	155	43.9	19.5	11.0	7.04	4.99	3.92	3.6
150	6	113	42.5	21.7	12.0	7.00	4.46	3.3	2.97
200	8	63.7	26.7	14.6	8.04	4.46	2.71	1.96	1.74
250	10	60.8	25.5	13.9	7.67	4.25	2.59	1.87	1.66
300	12	43.5	18.3	9.97	5.49	3.05	1.85	1.34	1.19
350	14	44.7	18.8	10.2	5.65	3.13	1.91	1.38	1.22
400	16	39.3	16.5	9	4.96	2.75	1.67	1.21	1.08
450	18	40.3	16.9	9.22	5.08	2.82	1.71	1.24	1.1
500	20	37.4	15.7	8.57	4.72	2.62	1.59	1.15	1.02
600	24	30.2	12.7	6.92	3.81	2.11	1.29	0.929	0.827

## TT2 KC, FL

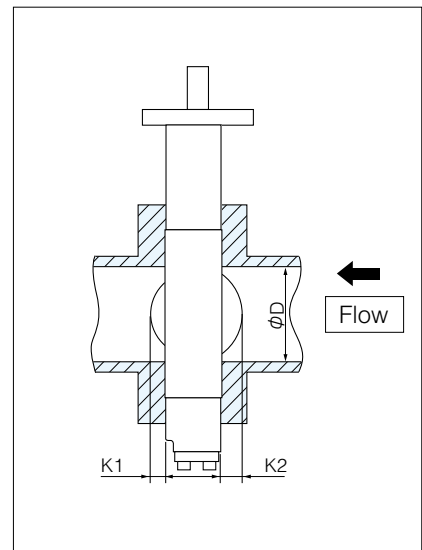


### ■ class 150/300

mm	Valve opening							
	20°	30°	40°	50°	60°	70°	80°	90°
KC	0.498	0.443	0.407	0.372	0.324	0.265	0.209	0.151
FL	0.838	0.788	0.752	0.724	0.691	0.654	0.626	0.604

### TT2 Minimum internal diameters of piping

Nominal size		Minimum internal diameters of piping	
mm	inch	class 150	class 300
80	3	73	73
100	4	87	87
150	6	129	128
200	8	185	181
250	10	227	221
300	12	281	275
350	14	313	301
400	16	363	349
450	18	395	385
500	20	446	430
600	24	538	534



Worm gear type TT2-2U(80mm to 250mm) / TT2-2K(300mm to 600mm)

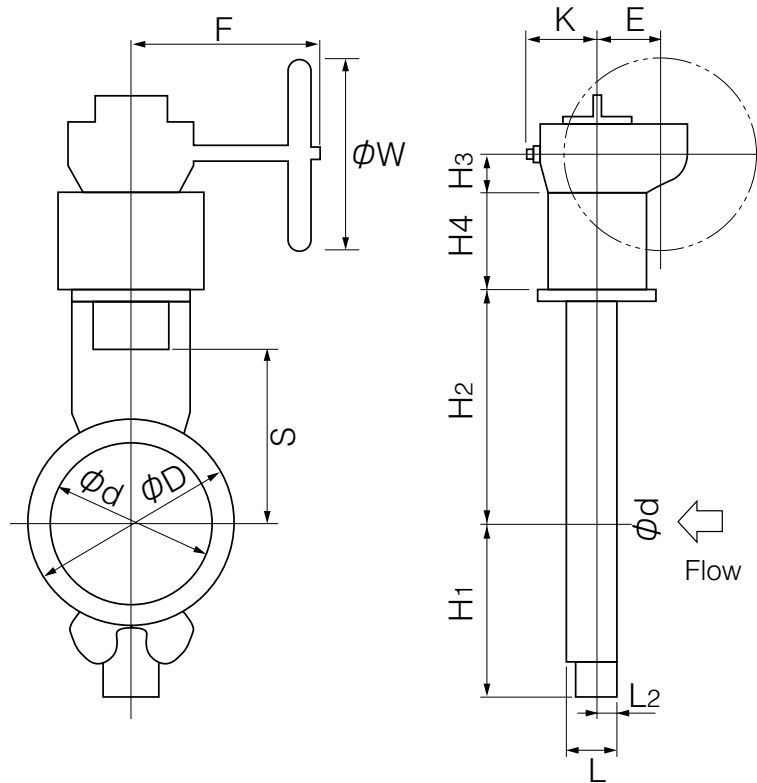
■class 150 Wafer type High temperature specification

Nominal size		Dimension (mm)													Gear type	Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	S	H <sub>3</sub>	H <sub>4</sub>	E	K	F	$\phi W$			
80	3	82	127	48	19	120.6	159	110	42	100	67	75	198	200	2U	2U-3	19 (15)
100	4	108	154	54	22.5	144.6	194	132	42	100	67	75	198	200		2U-3	23 (19)
150	6	159	215	57	22	189.6	242	180	42	100	67	75	198	200		2U-3	30 (26)
200	8	202	266	64	25	199.6	248	180	42	100	67	88	198	200		2U-3	39 (35)
250	10	235	324	71	28	245.6	326	252	48	150	88	90	223	280		2U-4	67 (61)
300	12	290	373	81	32.5	281.6	376	281	63	150	91.5	127	310	400	2K	SBWG-02	103 (87)
350	14	329	413	92	40	307.6	400	305	63	150	91.5	127	310	400		SBWG-02	119 (103)
400	16	370	470	102	39	345.6	470	355	63	180	113	156	343	560		SBWG-03	155 (135)
450	18	432	534	114	46	383.6	510	395	63	180	31.5	156	363	560		SBWG-03-1S	214 (194)
500	20	488	585	127	48	410.6	531	416	63	180	31.5	156	363	500		SBWG-03-1S	241 (221)
600	24	576	692	154	65	469.6	643	493	85	200	32.7	200	422	630		SBWG-04-1S	411 (381)

Standard is H4=0. Approx. Mass is shown in ( ).

■TT2-2U/2K

80 to 250mm



■2U/2K Installation direction

<p>Stem side</p> <p>Retainer side</p> <p>2UA / 2KA</p>	<p>Stem side</p> <p>Retainer side</p> <p>2UB / 2KB</p>	<p>Stem side</p> <p>Retainer side</p> <p>2UC / 2KC</p>	<p>Stem side</p> <p>Retainer side</p> <p>2UD / 2KD</p>
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## Worm Gear Type TT2-2U(80mm to 250m) / TT2-2K(300mm to 600mm)

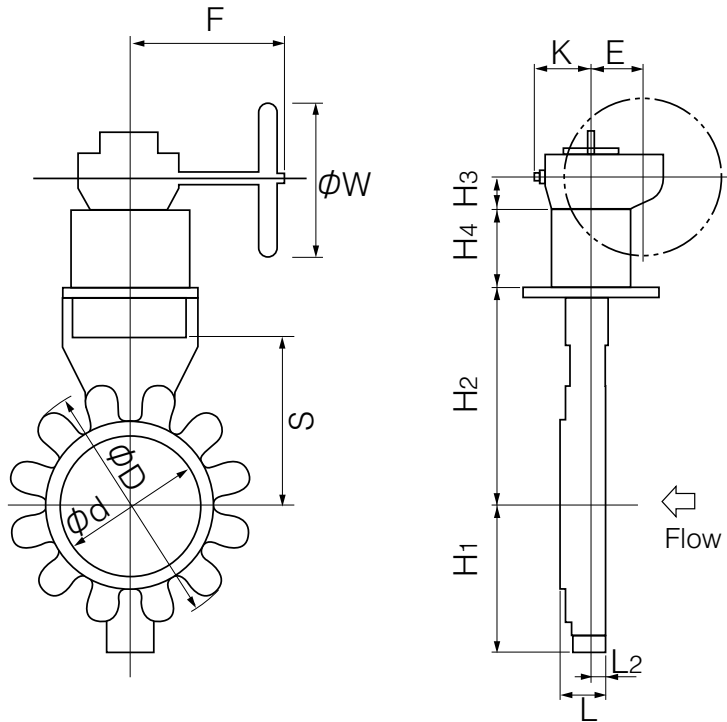
### ■class 150 Full Lugged Type in High Temperature Specification

Nominal size		Dimension (mm)													Gear type	Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	$L_2$	$H_1$	$H_2$	S	$H_3$	$H_4$	E	K	F	$\phi W$			
80	3	100	185	48	19	120.6	159	110	42	100	67	75	198	200	2U	2U-3	19 (15)
100	4	117	238	54	22.5	144.6	194	132	42	100	67	75	198	200		2U-3	25 (21)
150	6	167	281	57	22	189.6	242	180	42	100	67	75	198	200		2U-3	32 (28)
200	8	218	338	64	25	199.6	248	180	42	100	67	88	198	200		2U-3	40 (36)
250	10	270	424	71	28	245.6	326	252	48	150	88	90	222.5	280		2U-4	74 (68)
300	12	320	478	81	32.5	281.6	376	281	63	150	91.5	127	310	400	2K	SBWG-02	113 (97)
350	14	350	526	92	40	307.6	400	305	63	150	91.5	127	310	400		SBWG-02	128 (112)
400	16	410	592	102	39	345.6	470	355	63	180	113	156	343	560		SBWG-03	182 (162)
450	18	460	634	114	46	383.6	510	395	63	180	31.5	156	363	560		SBWG-03-1S	238 (218)
500	20	510	714	127	48	410.6	531	416	63	180	31.5	156	363	500		SBWG-03-1S	278 (258)
600	24	614	830	154	65	469.6	643	493	85	200	32.7	200	422	630		SBWG-04-1S	498 (468)

Standard is  $H_4=0$ . Approx. Mass is shown in ( ).

### ■TT2-2U/2K

80 to 250mm



### ■2U/2K Installation Direction

<p>Stem Side</p> <p>Retainer Side</p>	<p>Stem Side</p> <p>Retainer Side</p>	<p>Stem Side</p> <p>Retainer Side</p>	<p>Stem Side</p> <p>Retainer Side</p>
2UA / 2KA	2UB / 2KB	2UC / 2KC	2UD / 2KD

## Worm Gear Type TT2-2U (80mm to 250mm) / TT2-2K (300mm to 600mm)

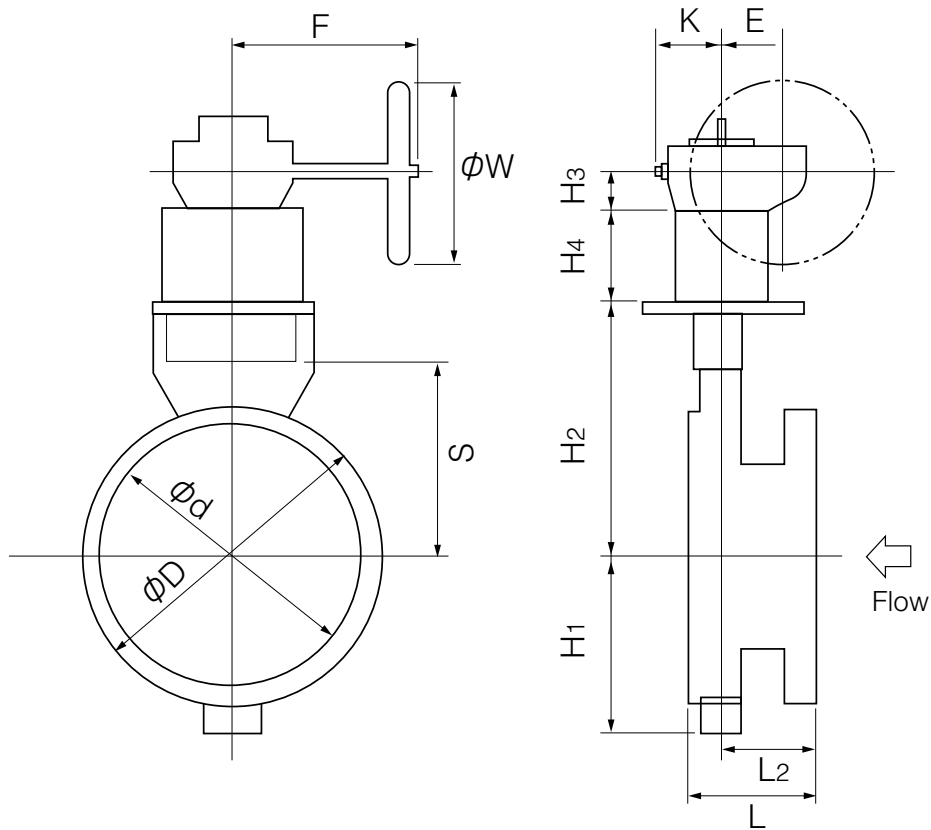
### Class 150 Flanged Type in High Temperature Specification

Nominal size		Dimension (mm)													Gear type	Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	S	H <sub>3</sub>	H <sub>4</sub>	E	K	F	$\phi W$			
80	3	90	190	114	85	120.6	159	110	42	100	67	75	198	200	2U	2U-3	26 (22)
100	4	117	229	127	95.5	144.6	194	132	42	100	67	75	198	200		2U-3	33 (29)
150	6	167	279	140	105	189.6	242	180	42	100	67	75	198	200		2U-3	46 (42)
200	8	218	343	152	113	199.6	248	180	42	100	67	88	198	200		2U-3	60 (56)
250	10	270	406	165	122	245.6	326	252	48	150	88	90	222.5	280		2U-4	99 (93)
300	12	320	483	178	129.5	281.6	376	281	63	150	91.5	127	310	400	2K	SBWG-02	154 (138)
350	14	350	535	190	138	307.6	400	305	63	150	91.5	127	310	400		SBWG-02	192 (176)
400	16	410	595	216	153	345.6	470	355	63	180	113	156	343	560		SBWG-03	242 (222)
450	18	458	635	222	154	383.6	510	395	63	180	31.5	156	363	560		SBWG-03-1S	290 (270)
500	20	510	700	229	150	410.6	531	416	63	180	31.5	156	363	500		SBWG-03-1S	365 (345)
600	24	614	815	267	178	469.6	643	493	85	200	32.7	200	422	630		SBWG-04-1S	537 (507)

Standard is H4=0. Approx. Mass is shown in ( ).

### TT2-2U/2K

80 to 250mm



### 2U/2K Installation Direction

<p>Stem Side</p> <p>Retainer Side</p> <p>2UA / 2KA</p>	<p>Stem Side</p> <p>Retainer Side</p> <p>2UB / 2KB</p>	<p>Stem Side</p> <p>Retainer Side</p> <p>2UC / 2KC</p>	<p>Stem Side</p> <p>Retainer Side</p> <p>2UD / 2KD</p>
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## Worm Gear Type TT2-2U(80mm to 150mm) / TT2-2K(200mm to 600mm)

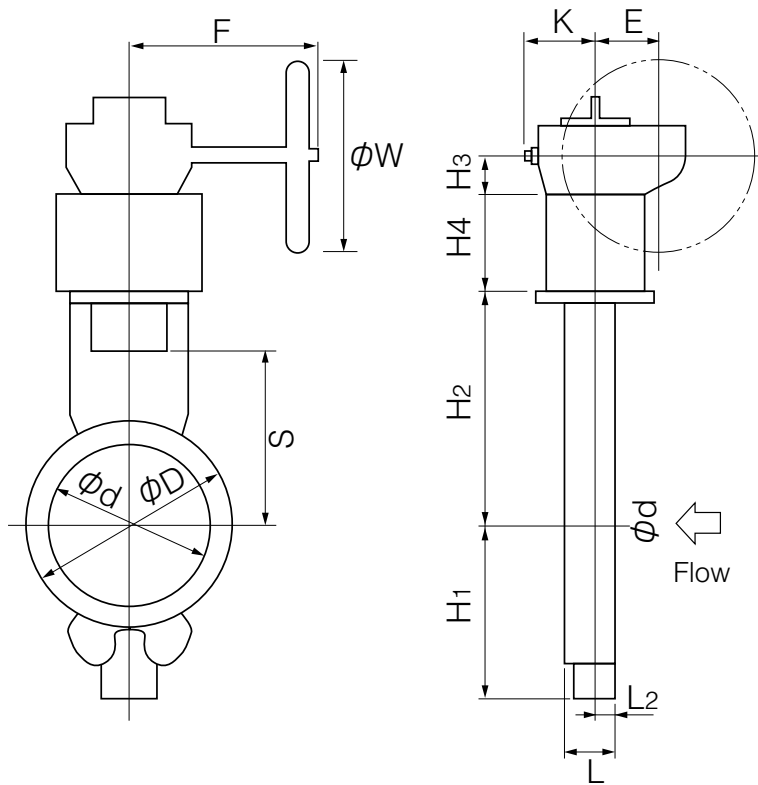
### ■class 300 Wafer Type in High Temperature Specification

Nominal size		Dimension (mm)													Gear type	Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	$L_2$	$H_1$	$H_2$	S	$H_3$	$H_4$	E	K	F	$\phi W$			
80	3	82	127	48	19	120.6	159	110	42	100	67	75	198	200	2U	2U-3	19 (15)
100	4	108	154	54	22.5	144.6	194	132	42	100	67	75	198	200		2U-3	23 (19)
150	6	153	215	59	22.5	188.6	276	212	42	100	67	88	198	200		2U-3	35 (31)
200	8	188	270	73	29	217.6	285	205	52	150	75	110	252	300	2K	SBWG-01	61 (49)
250	10	235	324	83	35.5	259.6	355	260	63	150	91.5	127	310	400		SBWG-02	96 (80)
300	12	290	381	92	39	305.6	428	313	63	180	113	156	343	560		SBWG-03	137 (117)
350	14	329	413	117	56.5	340.6	460	345	63	180	31.5	156	363	560		SBWG-03-1S	166 (146)
400	16	370	470	133	62	373.6	518	388	85	200	32.7	180	422	630		SBWG-04-1S	268 (238)
450	18	426	534	149	70	400.6	574	424	87	200	72.7	216	476	710		SBWG-05-1S	366 (329)
500	20	476	592	159	74	441.6	602	452	87	200	184.5	218	508	710	SBWG-05-1SD	436 (399)	
600	24	564	693	181	81	514.6	678	528	110	200	230	290	648	800	SBWG-06-1SD	673 (636)	

Standard is  $H_4=0$ . Approx. Mass is shown in ( ).

### ■TT2-2U/2K

80 to 150mm



### ■2U/2K Installation Direction

<p>Stem Side</p> <p>Retainer Side</p>	<p>Stem Side</p> <p>Retainer Side</p>	<p>Stem Side</p> <p>Retainer Side</p>	<p>Stem Side</p> <p>Retainer Side</p>
2UA / 2KA	2UB / 2KB	2UC / 2KC	2UD / 2KD

## Worm Gear Type TT2-2U(80mm to 150mm) / TT2-2K(200mm to 600mm)

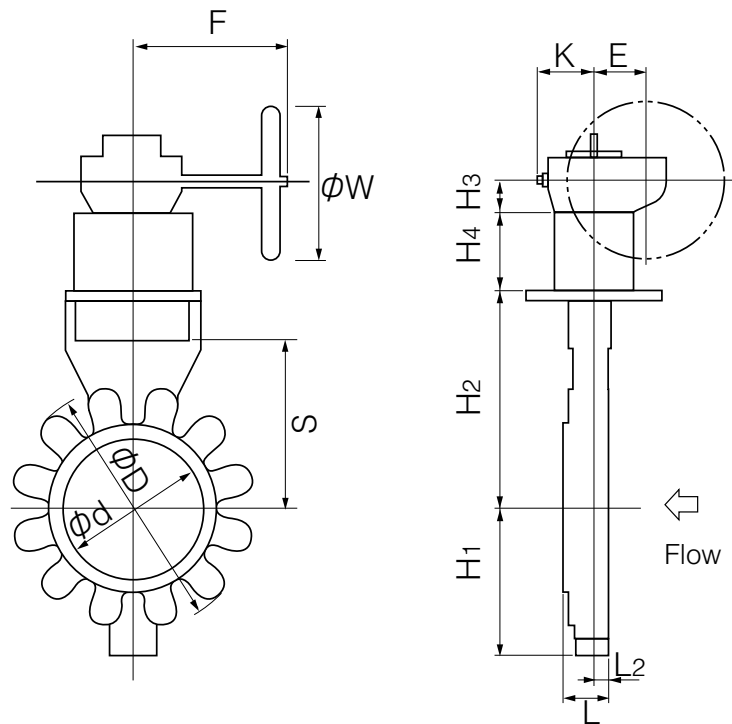
### Class 300 Full Lugged Type in High Temperature Specification

Nominal size		Dimension (mm)													Gear type	Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	$L_2$	$H_1$	$H_2$	S	$H_3$	$H_4$	E	K	F	$\phi W$			
80	3	82	204	48	19	120.6	159	110	42	100	67	75	198	200	2U	2U-3	20 (16)
100	4	177	238	54	22.5	144.6	194	132	42	100	67	75	198	200		2U-3	25 (21)
150	6	166	312	59	22.5	188.6	276	212	42	100	67	88	198	200		2U-3	36 (32)
200	8	208	374	73	29	217.6	285	205	52	150	75	110	252	300	2K	SBWG-01	72 (56)
250	10	275	435	83	35.5	259.6	355	260	63	150	91.5	127	310	400		SBWG-02	108 (92)
300	12	320	503	92	39	305.6	428	313	63	180	113	156	343	560		SBWG-03	153 (133)
350	14	360	570	117	56.5	340.6	460	345	63	180	31.5	156	363	560		SBWG-03-1S	216 (196)
400	16	400	630	133	62	373.6	518	388	85	200	32.7	180	422	630		SBWG-04-1S	327 (297)
450	18	460	690	149	70	400.6	574	424	87	200	72.7	216	476	710		SBWG-05-1S	462 (425)
500	20	513	748	159	74	441.6	602	452	87	200	184.5	218	508	710	SBWG-05-1SD	519 (482)	
600	24	613	887	181	81	514.6	678	528	110	200	230	290	648	800	SBWG-06-1SD	817 (780)	

Standard is  $H_4=0$ . Approx. Mass is shown in ( ).

### TT2-2U/2K

80 to 150mm



### 2U/2K Installation Direction

<p>Stem Side</p> <p>Retainer Side</p> <p>2UA / 2KA</p>	<p>Stem Side</p> <p>Retainer Side</p> <p>2UB / 2KB</p>	<p>Stem Side</p> <p>Retainer Side</p> <p>2UC / 2KC</p>	<p>Stem Side</p> <p>Retainer Side</p> <p>2UD / 2KD</p>
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**Worm Gear Type TT2-2U(80mm to 150mm) / TT2-2K(200mm to 600mm)**

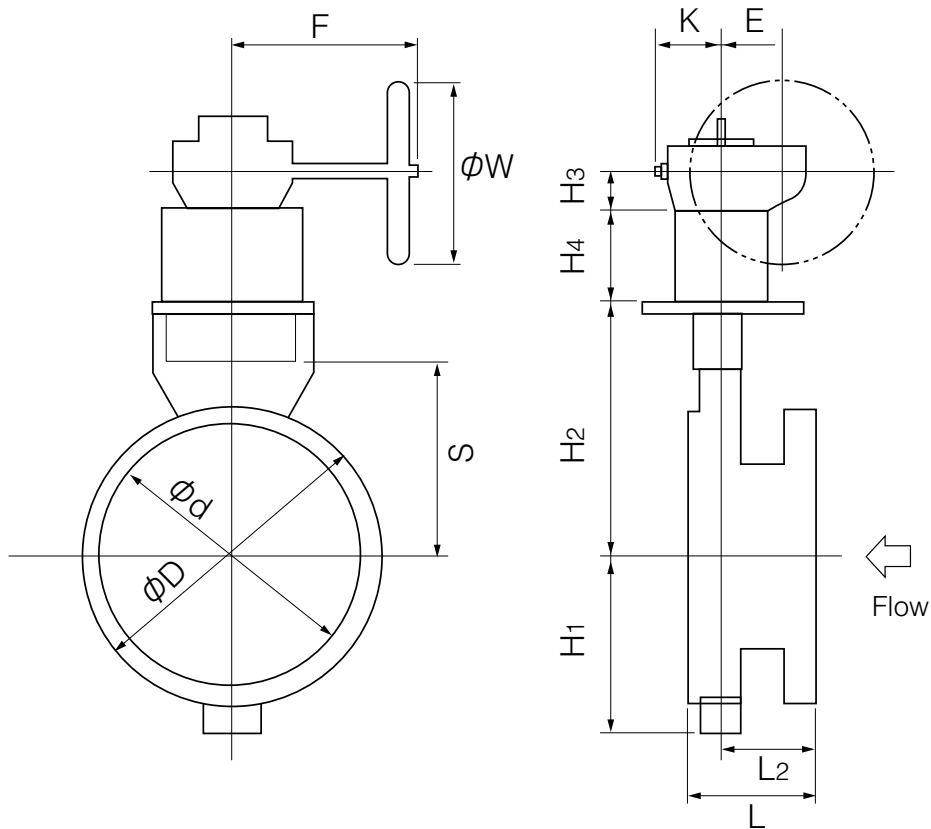
**■class 300 Flanged Type in High Temperature Specification**

Nominal size		Dimension (mm)													Gear type	Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	S	H <sub>3</sub>	H <sub>4</sub>	E	K	F	$\phi W$			
80	3	90	210	114	85	120.6	159	110	42	100	67	75	198	200	2U	2U-3	29 (25)
100	4	117	254	127	95.5	144.6	194	132	42	100	67	75	198	200		2U-3	40 (36)
150	6	166	318	140	103.5	188.6	276	212	42	100	67	88	198	200		2U-3	60 (56)
200	8	208	381	152	108	217.6	285	205	52	150	75	110	252	300	2K	SBWG-01	102 (90)
250	10	275	444	165	117.5	259.6	355	260	63	150	91.5	127	310	400		SBWG-02	151 (135)
300	12	310	520	178	125	305.6	428	313	63	180	113	156	343	560		SBWG-03	223 (203)
350	14	360	585	190	129.5	340.6	460	345	63	180	31.5	156	363	560		SBWG-03-1S	288 (268)
400	16	410	648	216	145	373.6	518	388	85	200	32.7	180	422	630		SBWG-04-1S	404 (374)
450	18	460	710	222	143	400.6	574	424	87	200	72.7	216	476	710		SBWG-05-1S	542 (505)
500	20	513	775	229	144	441.6	602	452	87	200	184.5	218	508	710	SBWG-05-1SD	635 (598)	
600	24	613	915	267	167	514.6	678	528	110	200	230	290	648	800	SBWG-06-1SD	981 (944)	

Standard is H<sub>4</sub>=0. Approx. Mass is shown in ( ).

**■TT2-2U/2K**

80 to 150mm



**■2U/2K Installation Direction**

<p>Stem Side</p> <p>Retainer Side</p> <p align="center"><b>2UA / 2KA</b></p>	<p>Stem Side</p> <p>Retainer Side</p> <p align="center"><b>2UB / 2KB</b></p>	<p>Stem Side</p> <p>Retainer Side</p> <p align="center"><b>2UC / 2KC</b></p>	<p>Stem Side</p> <p>Retainer Side</p> <p align="center"><b>2UD / 2KD</b></p>
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## TT2 Flange accommodation

### ■class 150 Wafer

Nominal size		ASME, API/JPI		JIS			BS4504, DIN, ISO			
mm	inch	class 300	class 150	10K	16K, 20K	30K	PN10(NP10)	PN16(NP16)	PN25(NP25)	PN40(NP40)
80	3	T (D)	—	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)
100	4	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)
150	6	×	T (D)	T (D)	T (D)	×	T (D)	T (D)	×	×
200	8	×	T (D)	T (D)	T (D)	×	T (D)	T (D)	×	×
250	10	×	T (D)	T (D)	T (D)	×	T (D)	T (D)	×	×
300	12	×	T (D)	T	T	×	T (D)	T (D)	×	×
350	14	×	T (D)	T (D)	T (D)	×	T (D)	T (D)	×	×
400	16	×	T (D)	T (D)	T (D)	×	T (D)	T (D)	×	×
450	18	×	T	T	T	×	T	T	×	×
500	20	×	T	T	T	×	T	T	×	×
600	24	×	T	T	T	×	T	T	×	×

### ■class 300 Wafer

Nominal size		ASME, API/JPI		JIS			BS4504, DIN, ISO			
mm	inch	class 300	class 150	10K	16K, 20K	30K	PN10(NP10)	PN16(NP16)	PN25(NP25)	PN40(NP40)
80	3	T (D)	—	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)
100	4	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)
150	6	T (D)	×	×	T (D)	T (D)	×	T (D)	T (D)	T (D)
200	8	T (D)	×	×	T (D)	T (D)	×	T (D)	T (D)	T (D)
250	10	T	×	×	T (D)	T (D)	×	T (D)	T (D)	T (D)
300	12	T	×	×	T	T	×	T (D)	T	T
350	14	T	×	×	T	T	×	T	T	T
400	16	T	×	×	T	T	×	T	T	T
450	18	T	×	×	T	×	×	T	T	T
500	20	T	×	×	T	×	×	T	T	T
600	24	T	×	×	T	×	×	T	T	T

T(D): With drill hole or tapping.  
 T : With flange tapping  
 — : No nominal diameter.  
 × : Not applicable

## TT2 Flange accommodation

### ■class 150 Lugged

Nominal size		ASME, API/JPI		JIS			BS4504, DIN, ISO			
mm	inch	class 300	class 150	10K	16K, 20K	30K	PN10(NP10)	PN16(NP16)	PN25(NP25)	PN40(NP40)
80	3	×	T (D)	×	×	×	×	×	×	×
100	4	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)
150	6	×	T (D)	T (D)	×	×	T (D)	T (D)	×	×
200	8	×	T (D)	×	×	×	T (D)	×	×	×
250	10	×	T (D)	T (D)	T (D)	×	T (D)	T (D)	×	×
300	12	×	T (D)	×	×	×	T (D)	T (D)	×	×
350	14	×	T (D)	×	×	×	×	×	×	×
400	16	×	T (D)	T (D)	T (D)	×	T (D)	T (D)	×	×
450	18	×	T	×	×	×	×	×	×	×
500	20	×	T	T	T	×	T	T	×	×
600	24	×	T	×	×	×	T	T	×	×

### ■class 300 Lugged

Nominal size		ASME, API/JPI		JIS			BS4504, DIN, ISO			
mm	inch	class 300	class 150	10K	16K, 20K	30K	PN10(NP10)	PN16(NP16)	PN25(NP25)	PN40(NP40)
80	3	T (D)	×	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)
100	4	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)	T (D)
150	6	T (D)	×	×	T (D)	T (D)	×	×	×	×
200	8	T (D)	×	×	T (D)	T (D)	×	T (D)	T (D)	T (D)
250	10	T	×	×	×	×	×	×	×	×
300	12	T	×	×	T	T	×	×	T	T
350	14	T	×	×	×	×	×	×	×	×
400	16	T	×	×	×	×	×	×	×	×
450	18	T	×	×	×	×	×	×	×	×
500	20	T	×	×	×	×	×	×	×	×
600	24	T	×	×	×	×	×	×	×	×

T(D) : With drill hole or tapping.

T : With flange tapping

×

× : Not applicable

## TT2 Flange accommodation

### ■class 150 DFSP

Nominal size		ASME, API/JPI		JIS			BS4504, DIN, ISO			
mm	inch	class 300	class 150	10K	16K, 20K	30K	PN10(NP10)	PN16(NP16)	PN25(NP25)	PN40(NP40)
80	3	×	D	×	×	×	×	×	×	×
100	4	×	T	×	×	×	×	×	×	×
150	6	×	T	×	×	×	×	×	×	×
200	8	×	T	×	×	×	×	×	×	×
250	10	×	T	×	×	×	×	×	×	×
300	12	×	T	×	×	×	×	×	×	×
350	14	×	T	×	×	×	×	×	×	×
400	16	×	T	×	×	×	×	×	×	×
450	18	×	T	×	×	×	×	×	×	×
500	20	×	T	×	×	×	×	×	×	×
600	24	×	T	×	×	×	×	×	×	×

### ■class 300 DFSP

Nominal size		ASME, API/JPI		JIS			BS4504, DIN, ISO			
mm	inch	class 300	class 150	10K	16K, 20K	30K	PN10(NP10)	PN16(NP16)	PN25(NP25)	PN40(NP40)
80	3	T	×	×	×	×	×	×	×	×
100	4	T	×	×	×	×	×	×	×	×
150	6	T	×	×	×	×	×	×	×	×
200	8	T	×	×	×	×	×	×	×	×
250	10	T	×	×	×	×	×	×	×	×
300	12	T	×	×	×	×	×	×	×	×
350	14	T	×	×	×	×	×	×	×	×
400	16	T	×	×	×	×	×	×	×	×
450	18	T	×	×	×	×	×	×	×	×
500	20	T	×	×	×	×	×	×	×	×
600	24	T	×	×	×	×	×	×	×	×

D : With flange drilling  
 T : With flange tapping  
 × : Not applicable

\* JIS, BS, DIN double-flange type main body not available.  
 Please consult with us regarding the appropriateness of JIS, BS and DIN piping in an ASME or API/JPI main body.

## TT2 Wafer Type Piping Bolts and Nuts Sizes

### ■ Wafer Type class 150

Nominal size		ASME B16.5 class 150, JPI-7S-15 class 150			10K		
mm	inch	Setting Bolts	Long Bolts	No. of Nuts	Setting Bolts	Long Bolts	No. of Nuts
80	3	—	4-5/8-11UNC×160	8	8-M16× 75(13× 8)	4-M16×145	16
100	4	8-5/8-11UNC× 85(13× 8)	4-5/8-11UNC×160	16	8-M16× 75(13× 8)	4-M16×145	16
150	6	8-3/4-10UNC× 95(17×11)	4-3/4-10UNC×175	16	8-M20× 85(17×11)	4-M20×170	16
200	8	8-3/4-10UNC× 95(17×11)	4-3/4-10UNC×185	16	8-M20× 85(17×11)	8-M20×180	24
250	10	8-7/8- 9UNC×100(19×12)	8-7/8- 9UNC×205	24	8-M22× 95(19×12)	8-M22×190	24
300	12	8-7/8- 9UNC×100(19×12)	8-7/8- 9UNC×220	24	8-M22× 95(19×12)	12-M22×200	32
350	14	8- 1-8UNC×115(21×14)	8- 1-8UNC×245	24	8-M22× 95(19×12)	12-M22×215	32
400	16	8- 1-8UNC×125(21×14)	12- 1-8UNC×260	32	8-M24×120(21×14)	12-M24×240	32
450	18	8- 1 1/8-8UN×135(24×16)	12-1 1/8-8UN×285	32	8-M24×110(21×14)	16-M24×250	40
500	20	8- 1 1/8-8UN×135(24×16)	16-1 1/8-8UN×300	40	8-M24×110(21×14)	16-M24×260	40
600	24	8- 1 1/4-8UN×145(24×16)	16-1 1/4-8UN×345	40	8-M30×125(24×16)	20-M30×320	48

Nominal size		16K			20K		
mm	inch	Setting Bolts	Long Bolts	No. of Nuts	Setting Bolts	Long Bolts	No. of Nuts
80	3	8-M20× 85(17×11)	4-M20×160	16	8-M20× 85(17×11)	4-M20×160	16
100	4	8-M20× 85(17×11)	4-M20×170	16	8-M20× 85(17×11)	4-M20×170	16
150	6	8-M22× 95(19×12)	8-M22×175	24	8-M22× 95(19×12)	8-M22×190	24
200	8	8-M22×105(19×12)	8-M22×190	24	8-M22×105(19×12)	8-M22×200	24
250	10	8-M24×110(21×14)	8-M24×210	24	8-M24×110(21×14)	8-M24×220	24
300	12	8-M24×120(21×14)	12-M24×220	32	8-M24×110(21×14)	12-M24×230	32
350	14	8-M30(P3)×125(24×16)	12-M30(P3)×250	32	8-M30(P3)×135(24×16)	12-M30(P3)×260	32
400	16	8-M30(P3)×135(24×16)	12-M30(P3)×275	32	8-M30(P3)×145(24×16)	12-M30(P3)×285	32
450	18	8-M30(P3)×135(24×16)	16-M30(P3)×285	40	8-M30(P3)×145(24×16)	16-M30(P3)×300	40
500	20	8-M30(P3)×135(24×16)	16-M30(P3)×300	40	8-M30(P3)×145(24×16)	16-M30(P3)×315	40
600	24	8-M36(P3)×155(30×20)	20-M36(P3)×355	48	8-M36(P3)×165(30×20)	20-M36(P3)×365	48

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

The bold length calculation is based on use of a 4.5 mm thick spiral gasket.

The flange thickness calculation is based on the standard steel flange thickness.

Quantities shown are for one valve.

#### Examples

Setting bolts: 8 - M16 × 75 (13 × 8)

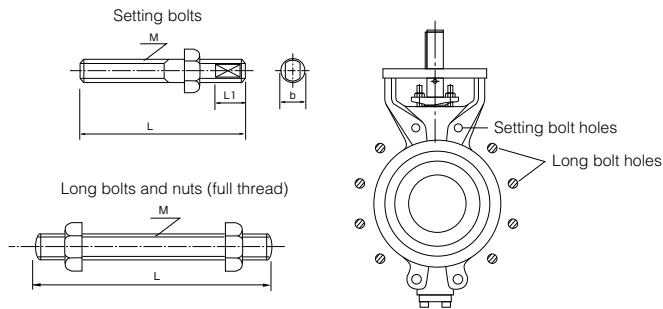
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L1

Long bolts: 4 - M16 × 145

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M
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## TT2 Wafer Type Piping Bolts and Nuts Sizes

### ■ Wafer Type class 150

Nominal size		DIN NP10, BS4504 PN10, ISO7005-1 PN10			DIN NP16, BS4504 PN16, ISO7005-1 PN16		
mm	inch	Setting Bolts	Long Bolts	No. of Nuts	Setting Bolts	Long Bolts	No. of Nuts
80	3	8-M16× 75(13× 8)	4-M16×145	16	8-M16× 75(13× 8)	4-M16×145	16
100	4	8-M16× 75(13× 8)	4-M16×155	16	8-M16× 75(13× 8)	4-M16×155	16
150	6	8-M20× 85(17×11)	4-M20×170	16	8-M20× 85(17×11)	4-M20×170	16
200	8	8-M20× 85(17×11)	4-M20×180	16	8-M20× 85(17×11)	8-M20×180	24
250	10	8-M20× 95(17×11)	8-M20×190	24	8-M24×100(21×14)	8-M24×200	24
300	12	8-M20× 95(17×11)	8-M20×210	24	8-M24×100(21×14)	8-M24×220	24
350	14	8-M20× 95(17×11)	12-M20×210	32	8-M24×110(21×14)	12-M24×230	32
400	16	8-M24×110(21×14)	12-M24×230	32	8-M27×125(22×14)	12-M27×250	32
450	18	8-M24×110(21×14)	16-M24×250	40	8-M27×125(22×14)	16-M27×265	40
500	20	8-M24×110(21×14)	16-M24×260	40	8-M30×125(24×16)	16-M30×285	40
600	24	8-M27×125(22×14)	16-M27×310	40	8-M33×145(27×18)	16-M33×350	40

### ■ Wafer Type class 300

Nominal size		ASME B16.5 class 300, JPI-7S-15 class 300			JIS20K		
mm	inch	Setting Bolts	Long Bolts	No. of Nuts	Setting Bolts	Long Bolts	No. of Nuts
80	3	8-3/4-10UNC×95(17×11)	4-3/4-10UNC×175	16	8-M20× 85(17×11)	4-M20×160	16
100	4	8-3/4-10UNC×95(17×11)	4-3/4-10UNC×185	16	8-M20× 85(17×11)	4-M20×170	16
150	6	8-3/4-10UNC×95(17×11)	8-3/4-10UNC×200	24	8-M22× 95(19×12)	8-M22×190	24
200	8	8-7/8-9UNC×115(19×12)	8- 7/8-9UNC×235	24	8-M22×105(19×12)	8-M22×200	24
250	10	8- 1-8UNC×125(21×14)	12- 1-8UNC×260	32	8-M24×110(21×14)	8-M24×230	24
300	12	8-1 1/8-8UN×135(24×16)	12-1 1/8-8UN×285	32	8-M24×120(21×14)	12-M24×240	32
350	14	8-1 1/8-8UN×135(24×16)	16-1 1/8-8UN×315	40	8-M30(P3)×125(24×16)	12-M30(P3)×285	32
400	16	8-1 1/4-8UN×145(24×16)	16-1 1/4-8UN×345	40	8-M30(P3)×135(24×16)	12-M30(P3)×315	32
450	18	8-1 1/4-8UN×145(24×16)	20-1 1/4-8UN×365	48	8-M30(P3)×135(24×16)	16-M30(P3)×335	40
500	20	8-1 1/4-8UN×155(24×16)	20-1 1/4-8UN×380	48	8-M30(P3)×135(24×16)	16-M30(P3)×350	40
600	24	8-1 1/2-8UN×185(30×20)	20-1 1/2-8UN×430	48	8-M36(P3)×165(30×20)	20-M36(P3)×385	48

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

The bold length calculation is based on use of a 4.5 mm thick spiral gasket.

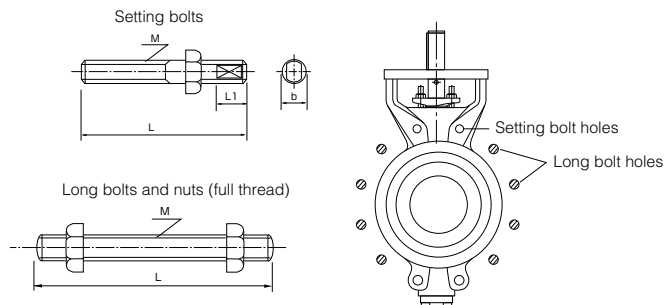
The flange thickness calculation is based on the standard steel flange thickness.

Quantities shown are for one valve.

Examples

Setting bolts: 8 - M16 × 75 (13 × 8)  
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 N       M       L       b       L1

Long bolts: 4 - M16 × 145  
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 N       M       L



## TT2 Wafer Type Piping Bolts and Nuts Sizes

### ■ Wafer Type class 300

Nominal size		JIS30K			DIN NP25, BS4504 PN25, ISO7005-1 PN25		
mm	inch	Setting Bolts	Long Bolts	No. of Nuts	Setting Bolts	Long Bolts	No. of Nuts
80	3	8-M20× 85(17×11)	4-M20×170	16	8-M16× 75(13× 8)	4-M16×155	16
100	4	8-M22×105(19×12)	4-M22×190	16	8-M20× 85(17×11)	4-M20×170	16
150	6	8-M24×100(21×14)	8-M24×210	24	8-M24×100(21×14)	4-M24×190	16
200	8	8-M24×120(21×14)	8-M24×240	24	8-M24×110(21×14)	8-M24×210	24
250	10	8-M30(P3)×135(24×16)	8-M30(P3)×275	24	8-M27×115(22×14)	8-M27×230	24
300	12	8-M30(P3)×145(24×16)	12-M30(P3)×285	32	8-M27×115(22×14)	12-M27×250	32
350	14	8-M30(P3)×145(24×16)	12-M30(P3)×315	32	8-M30×125(24×16)	12-M30×285	32
400	16	8-M36(P3)×155(30×20)	12-M36(P3)×355	32	8-M33×135(27×18)	12-M33×310	32
450	18	—	—	—	8-M33×135(27×18)	16-M33×330	40
500	20	—	—	—	8-M33×135(27×18)	16-M33×350	40
600	24	—	—	—	8-M36×150(30×20)	16-M36×380	40

### ■ Wafer Type class 300

Nominal size		DIN NP40, BS4504 PN40, ISO7005-1 PN40		
mm	inch	Setting Bolts	Long Bolts	No. of Nuts
80	3	8-M16× 75(13× 8)	4-M16×155	16
100	4	8-M20× 85(17×11)	4-M20×170	16
150	6	8-M24×100(21×14)	4-M24×190	16
200	8	8-M27×115(22×14)	8-M27×230	24
250	10	8-M30×125(24×16)	8-M30×250	24
300	12	8-M30×125(24×16)	12-M30×270	32
350	14	8-M33×145(27×18)	12-M33×310	32
400	16	8-M36×150(30×20)	12-M36×340	32
450	18	8-M36×150(30×20)	16-M36×355	40
500	20	8-M39×160(32×21)	16-M39×375	40
600	24	8-M45×185(36×24)	16-M45×430	40

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

The bold length calculation is based on use of a 4.5 mm thick spiral gasket.

The flange thickness calculation is based on the standard steel flange thickness.

Quantities shown are for one valve.

#### Examples

Setting bolts: 8 - M16 × 75 (13 × 8)

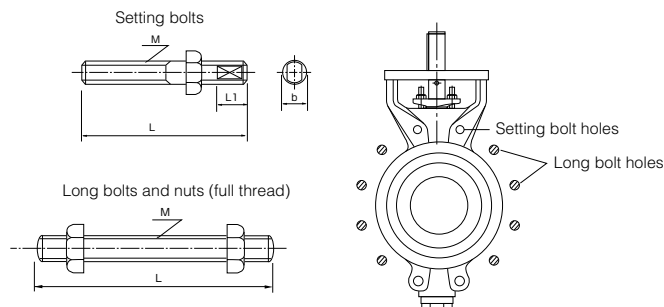
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Long bolts: 4 - M16 × 145

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## TT2 Full-lugged (fully-tapped) Piping Bolts and Nuts Sizes

### ■ Lugged Type class 150

Nominal size		ASME B16.5 class 150, JPI-7S-15 class 150		JIS10K		JIS16K	
mm	inch	Setting Bolts	No. of Nuts	Setting Bolts	No. of Nuts	Setting Bolts	No. of Nuts
80	3	8- 5/8-11UNC×85(13× 8)	8	—	—	—	—
100	4	16-5/8-11UNC×85(13× 8)	16	16-M16× 75(13× 8)	16	16 -M20×85(17×11)	16
150	6	16-3/4-10UNC×95(17×11)	16	16-M20× 85(17×11)	16	—	—
200	8	16-3/4-10UNC×95(17×11)	16	—	—	—	—
250	10	24-7/8-9UNC×100(19×12)	24	24-M22× 95(19×12)	24	24-M24×100(21×14)	24
300	12	24-7/8-9UNC×100(19×12)	24	—	—	—	—
350	14	24- 1-8UNC×115(21×14)	24	—	—	—	—
400	16	32- 1-8UNC×115(21×14)	32	32-M24×110(21×14)	32	32-M30(P3)×125(24×16)	32
450	18	32-1 1/8-8UN×135(24×16)	32	—	—	—	—
500	20	40-1 1/8-8UN×135(24×16)	40	40-M24×110(21×14)	40	40-M30(P3)×135(24×16)	40
600	24	40-1 1/4-8UN×145(24×16)	40	—	—	—	—

Nominal size		JIS20K		DIN NP10 BS4504 PN10, ISO7005-1 PN10		DIN NP16, BS4504 PN16, ISO7005-1 PN16	
mm	inch	Setting Bolts	No. of Nuts	Setting Bolts	No. of Nuts	Setting Bolts	No. of Nuts
80	3	—	—	—	—	—	—
100	4	16-M20× 85(17×11)	16	16-M16× 75(13× 8)	16	16-M16× 75(13× 8)	16
150	6	—	—	16-M20× 85(17×11)	16	16-M20× 85(17×11)	16
200	8	—	—	16-M20× 85(17×11)	16	—	—
250	10	24-M24×110(21×14)	24	24-M20× 95(17×11)	24	24-M24×100(21×14)	24
300	12	—	—	24-M20× 95(17×11)	24	24-M24×100(21×14)	24
350	14	—	—	—	—	—	—
400	16	32-M30(P3)×135(24×16)	32	32-M24×110(21×14)	32	32-M27×115(22×14)	32
450	18	—	—	—	—	—	—
500	20	40-M30(P3)×145(24×16)	40	40-M24×110(21×14)	40	40-M30×125(24×16)	40
600	24	—	—	40-M27×115(22×14)	40	40-M33×145(27×18)	40

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

The bold length calculation is based on use of a 4.5 mm thick spiral gasket.

The flange thickness calculation is based on the standard steel flange thickness.

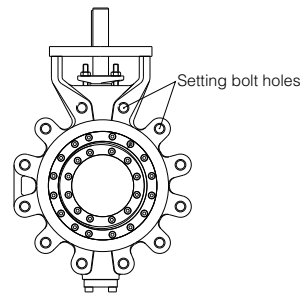
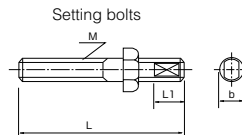
Quantities shown are for one valve.

Examples

Setting bolts: 8 - M16 × 75 (13 × 8)

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## TT2 Full-lugged (fully-tapped) Piping Bolts and Nuts Sizes

### ■ Lugged Type class 300

Nominal size		ASME B16.5 class 300, JPI-7S-15 class 300		JIS20K		JIS30K	
mm	inch	Setting Bolts	No. of Nuts	Hexagon Bolts	No. of Nuts	Hexagon Bolts	No. of Nuts
80	3	16-3/4-10UNC× 95(17×11)	16	16-M20× 75(17×11)	16	16-M20× 85(17×11)	16
100	4	16-3/4-10UNC× 95(17×11)	16	16-M20× 85(17×11)	16	16-M22× 95(19×12)	16
150	6	24-3/4-10UNC× 95(17×11)	24	24-M22× 95(19×12)	24	24-M24×110(21×14)	24
200	8	24- 7/8-9UNC×115(19×12)	24	24-M22×105(19×12)	24	24-M24×120(21×14)	24
250	10	32- 1-8UNC×125(21×14)	32	—	—	—	—
300	12	32- 1 1/8-8UN×135(24×16)	32	32-M24×120(21×14)	32	32-M30(P3)×135(24×16)	32
350	14	40- 1 1/8-8UN×135(24×16)	40	—	—	—	—
400	16	40- 1 1/4-8UN×145(24×16)	40	—	—	—	—
450	18	48- 1 1/4-8UN×145(24×16)	48	—	—	—	—
500	20	48- 1 1/4-8UN×155(24×16)	48	—	—	—	—
600	24	48- 1 1/2-8UN×185(30×20)	48	—	—	—	—

Nominal size		DIN NP25, BS4504 PN25, ISO7005-5 PN25		DIN NP40, BS4504 PN40, ISO7005-5 PN40	
mm	inch	Setting Bolts	No. of Nuts	Hexagon Bolts	No. of Nuts
80	3	16-M16× 75(13× 8)	16	16-M16× 75(13× 8)	16
100	4	16-M20× 85(17×11)	16	16-M20× 85(17×11)	16
150	6	—	—	—	—
200	8	24-M24×110(21×14)	24	24-M27×115(22×14)	24
250	10	—	—	—	—
300	12	32-M27×115(22×14)	32	32-M30×125(24×16)	32
350	14	—	—	—	—
400	16	—	—	—	—
450	18	—	—	—	—
500	20	—	—	—	—
600	24	—	—	—	—

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

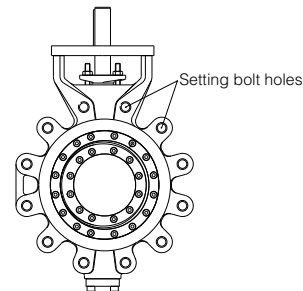
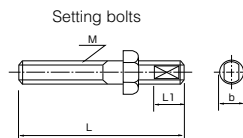
The bold length calculation is based on use of a 4.5 mm thick spiral gasket.

The flange thickness calculation is based on the standard steel flange thickness.

Quantities shown are for one valve.

Examples

Setting bolts: 8 - M16 × 75 (13 × 8)



## TT2 Double-flanged (short-pattern) Piping Bolts and Nuts Sizes

### ■class 150, Double-flanged, Short-pattern Type

Nominal size		ASME B16.5 class 150, JPI-7S-15 class 150		
mm	inch	Setting Bolts	Hexagon Bolts	No. of Nuts
80	3	—	8-5/8-11UNC× 80	8
100	4	4-5/8-11UNC×70(13× 8)	12-5/8-11UNC× 80	16
150	6	4-3/4-10UNC×85(17×11)	12-3/4-10UNC× 95	16
200	8	4-3/4-10UNC×85(17×11)	12-3/4-10UNC× 95	16
250	10	4-7/8-9UNC×100(19×12)	20-7/8-9UNC×100	24
300	12	4-7/8-9UNC×100(19×12)	20-7/8-9UNC×100	24
350	14	4- 1-8UNC×115(21×14)	20- 1-8UNC×115	24
400	16	4- 1-8UNC×115(21×14)	28- 1-8UNC×115	32
450	18	4-1 1/8-8UN×125(24×16)	28-1 1/8-8UN×130	32
500	20	4-1 1/8-8UN×125(24×16)	36-1 1/8-8UN×130	40
600	24	4-1 1/4-8UN×135(24×16)	36-1 1/4-8UN×145	40

### ■class 300, Double-flanged, Short-pattern Type

Nominal size		ASME B16.5 class 300, JPI-7S-15 class 300		
mm	inch	Setting Bolts	Hexagon Bolts	No. of Nuts
80	3	4-3/4-10UNC×85(17×11)	12-3/4-10UNC× 95	16
100	4	4-3/4-10UNC×85(17×11)	12-3/4-10UNC× 95	16
150	6	4-3/4-10UNC×95(17×11)	20-3/4-10UNC×105	24
200	8	4-7/8-9UNC×100(19×12)	20-7/8-9UNC×120	24
250	10	4- 1-8UNC×125(21×14)	28- 1-8UNC×140	32
300	12	4-1 1/8-8UN×135(24×16)	28-1 1/8-8UN×150	32
350	14	8-1 1/8-8UN×135(24×16)	32-1 1/8-8UN×150	40
400	16	8-1 1/4-8UN×145(24×16)	32-1 1/4-8UN×165	40
450	18	8-1 1/4-8UN×145(24×16)	40-1 1/4-8UN×165	48
500	20	8-1 1/4-8UN×145(24×16)	40-1 1/4-8UN×175	48
600	24	8-1 1/2-8UN×175(30×20)	40-1 1/2-8UN×195	48

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

The bold length calculation is based on use of a 4.5 mm thick spiral gasket.

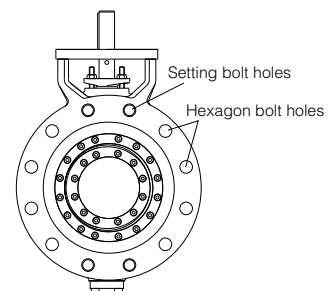
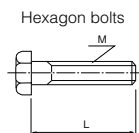
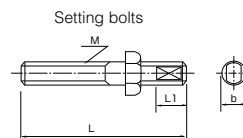
The flange thickness calculation is based on the standard steel flange thickness.

Quantities shown are for one valve.

Examples

Setting bolts: 8 - M16 × 75 (13 × 8)

Hexagon bolts : 4 - M30 × 95



## TT2 Piping gasket

\* In case of spiral gasket

For API, JPI, ASME flange ..... Any standard gaskets with inner/outer ring can be used.

For JIS, BS, DIN flange ..... Use special spiral gasket shown below.

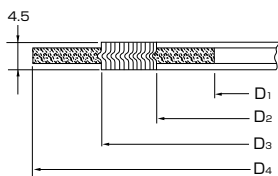
### ●TT2 Commercially available spiral gasket conformity chart (with inner and outer ring)

Nominal size		ASME/JPI		JIS			BS4504			
mm	inch	class 150	class 300	10K	16/20K	30K	PN10	PN16	PN25	PN40
80	3	○	○	×	×	×	×	×	×	×
100	4	○	○	×	×	×	×	×	×	×
150	6	○	○	○	○	×	○	○	○	○
200	8	○	○	○	○	×	○	○	○	○
250	10	○	○	○	×	×	○	○	○	○
300	12	○	○	○	×	×	○	○	○	○
350	14	○	○	○	×	×	○	○	○	○
400	16	○	○	○	×	×	○	○	○	○
450	18	○	○	○	○	—	○	○	○	○
500	20	○	○	○	○	—	○	○	○	○
600	24	○	○	○	○	—	○	○	○	○

\* Please use the following special spiral gaskets for the portions marked in "X" in the conformity chart above.

### ●TT2 Special spiral gasket flange size

Nominal size		JIS10K				JIS16/20K				JIS30K				BS4504							
		D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>				
																	BS4504				
mm	inch																				
80	3	91	111	125	134	89	111	126	140	80	111	126	150	84	111	126	144	144	144	144	
100	4	115	130	146	159	115	130	153	165	104	130	153	172	108	130	153	164	164	170	170	
150	6	—	—	—	—	—	—	—	—	153	176	202	249	—	—	—	—	—	—	—	
200	8	—	—	—	—	—	—	—	—	202	227	259	294	—	—	—	—	—	—	—	
250	10	—	—	—	—	268	281	321	354	251	282	322	360	—	—	—	—	—	—	—	
300	12	—	—	—	—	319	333	372	404	300	334	374	418	—	—	—	—	—	—	—	
350	14	—	—	—	—	356	370	410	450	336	367	407	463	—	—	—	—	—	—	—	
400	16	—	—	—	—	407	417	467	508	383	418	468	524	—	—	—	—	—	—	—	



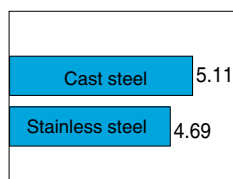
# High Performance Butterfly Valves to suit API standard class 150/300 Rating

## 334A

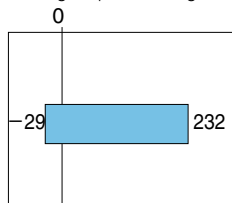
Valve nominal size

50 to 600mm

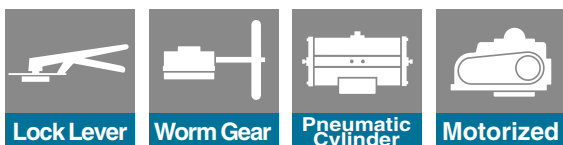
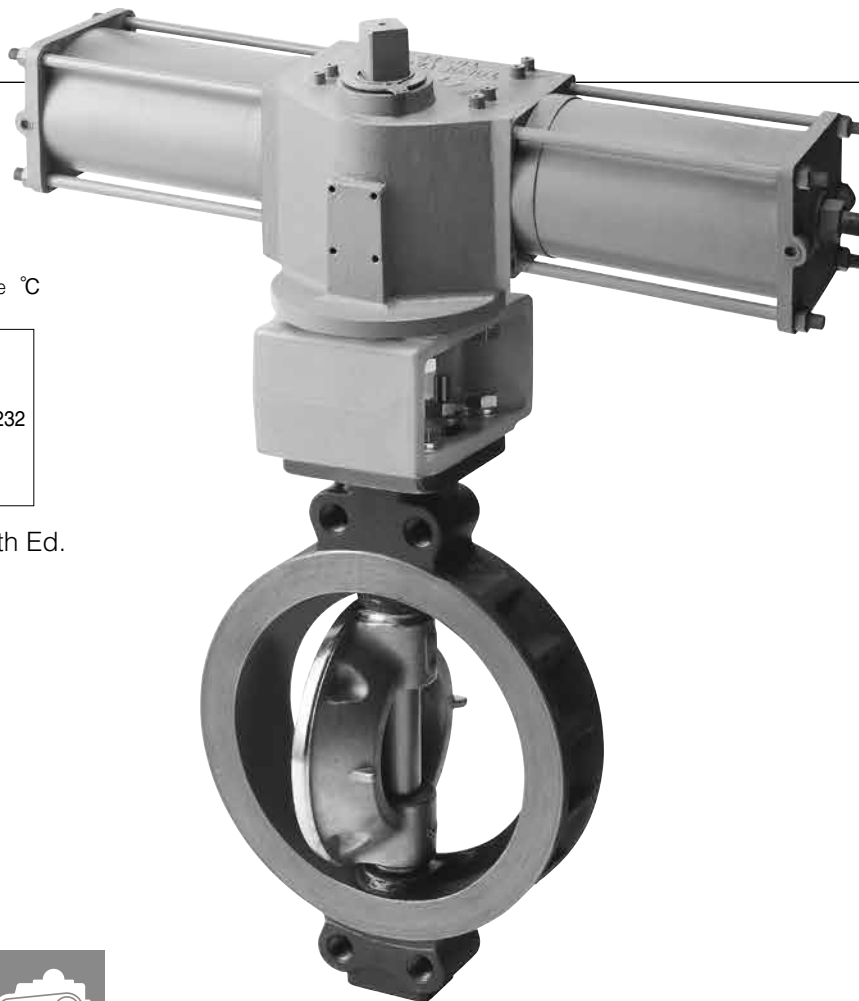
Max. working pressure MPa



Working temperature range °C



**FS** Fire safe certification to API607 4th Ed.



### Features and Benefits

Double Offset PTFE Seated  
High Performance Butterfly Valve to Suit API  
Standard Fire Safe Certification As Optional

#### General description

Designed to suit those severe conditions such as high temperature, high pressure or high velocity which disallow the use of soft resilient seated butterfly valves. Ideal for use including chemical processes, and applications with low pressure steam and high temperature gas. The valve is available for class 150/300 .

#### Double offset geometry

The design exhibits tight shut off, reduced torques, chemical resistance, excellent throttling capabilities, and the ability to operate with relatively high pressure drops.

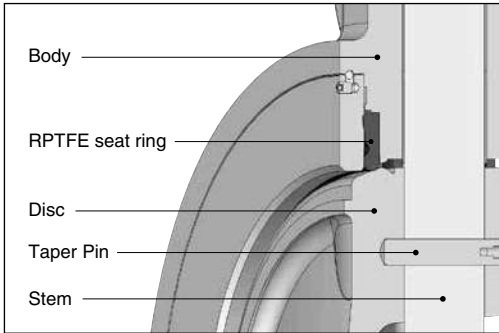
#### Characteristics

Fire safe certification to API607 4th Ed.

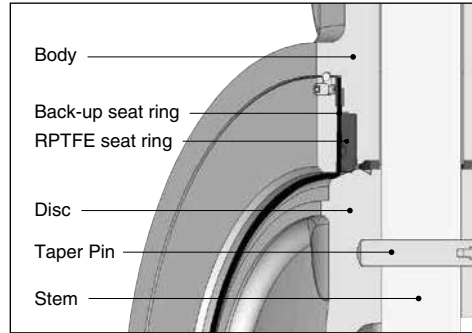
50mm : API607-5th edition Fire safe  
80~600mm : API607-4th edition Fire safe ※

※ class 300-150mm/water body which standard is JIS16K/20K not be Applicable Fire safe. (it can not have necessary thickness.)

### RPTFE as standard



### 334A Fire Safe Seat (API607 4th Ed.)



### Standard Specifications

Product characteristics		Double offset soft seated butterfly valve	
Conection		Wafer type / Lugged type	
Nominal valve size ※1		50, 80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600mm	
Applicable standards	Face-to-face dimensions	80~600mm: API609 Class150/300 Category B 50mm: API609 Category A, ISO5752 Wafer butterfly valve	
	Flange accommodation (Wafer)※2	class 150: ASME/JPI Class150, JIS 10K/16K/20K, BS 4504 PN10/16, DIN PN10/16 class 300: ASME/JPI Class300, JIS 20K/30K, BS 4504 PN25/40, DIN PN25/40	
	Actuator attachment	ISO5211/1 (other than class 300-600mm)	
	P-T rating	ASME B16.34 / API609	
Applicable fluid		General hydrocarbon, Chemical process, steam, gas etc.	
Max.working pressure		class 150: 2.0MPa (Body material : Both WCB and CF8M) class 300: 5.1MPa (Body material : WCB), 4.96MPa (Body material : CF8M)	
Working temperature range		-29 degree C to 232 degree C	
Pressure direction		Standard pressure direction : Pressure on retainer side	
Test Pressure	Shell test	Working pressure x 1.5 times (Hydrostatic pressure)	
	Seat leakage	0.7MPa(Air pressure) Based on API598-8thEdition Option : Working pressure x 1.1 times (Hydrostatic pressure)	
Standard Materials ※3	Body	ASTM A216 WCB	ASTM A351 CF8M
	Disc	ASTM A351 CF8M with hard chrome plating	
	Shaft	SUS420J2 ※4	630SS H1150 ※4
	Seat ring	RPTFE(Carbon graphite contained)	
	Retainer	S35C ※4	316SS ※4
	Gland Packing	Graphite	
Shaft shape for actuator conection	class 150: 50mm to 250mm : Square / 300mm to 600mm : Key class 300: 50mm to 150mm : Square / 200mm to 600mm : Key		
Actuator	Lock lever, Worm gear, Pneumatic cylinder, Electric motor		
Coating	Silicon resin coating (Grey N7) for 200 degrees C and lower Heat resistant silver coating for over 200 degrees C. No coating for stainless steel.		
Usable Gasket	Sheet gasket : Marketed products available Spiral wound gasket : Marketed products (with inner & outer ring) available only for ASME/JPI Class 150 and 300 For other flange standards, special gasket for TOMOE is required.		
Option	50mm : API607-5th edition Fire safe 80~600mm : API607-4th edition Fire safe ※5		

※1 Please contact us for the requirement of 125mm.

※2 Please contact us for the detail of flange accommodation including lugged type.

※3 Special specification with aluminium bronze is also available. When materials other than standard are selected, the working pressure might be limited. Please consult us for the details.

※4 In case of Body material is WCB : Shaft /SUS420J2, Retainer/S35C In case of Body materials is CF8M : Shaft/630SS+H1150, Retainer/316SS

※5 300Lb-150mm/wafer body with flange standard JIS16K/20K is not applicable to fire-safe duties.

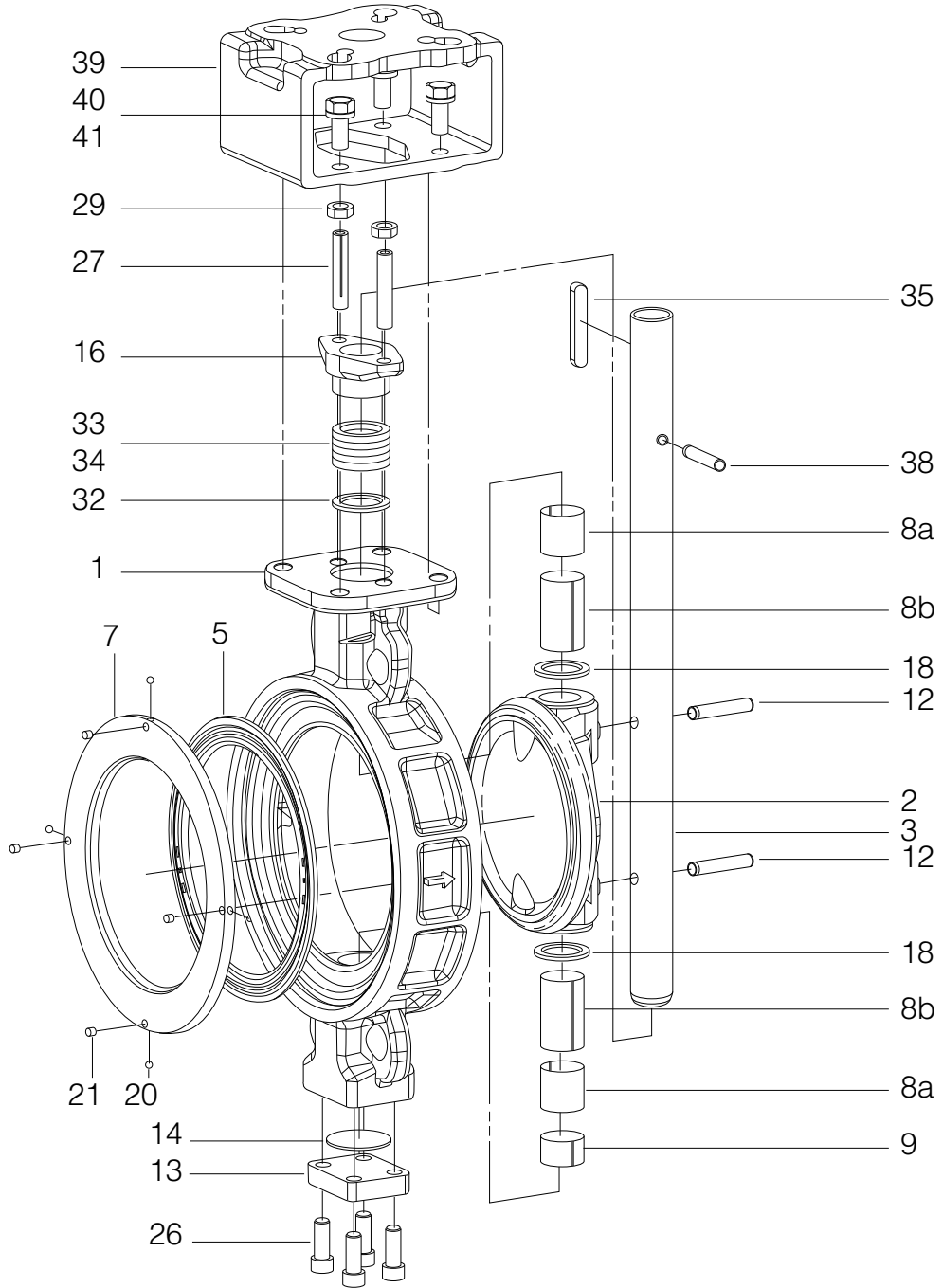
※There is possibility of seat leakage when fluid (powder/liquid) is solidified by working temperature and other cause, especially the valve is in a vertical position(e.g. at the bottom area of discharge spout of hopper and tank). Please consult us.

### Model type

Type	Wafer type		Lugged type	
	class 150	class 300	class 150	class 300
Standard	324A	334A	324Q	334Q
Fire safe	344A	354A	344Q	354Q

# 334A

## 334A Expanded view of bare shaft



### 334A Bare shaft parts list

#### ■334A Bare shaft parts list-class 150

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
5	Seat ring	1	
7	Seat ring retainer	1	
8a	Bearing a	0	600mm
		1	300mm
		2	80mm to 150mm, 500mm
		3	50mm, 200mm
		4	250mm, 350mm
		6	400mm, 450mm
8b	Bearing b	0	400mm, 450mm
		1	80mm, 100mm, 200mm, 250mm, 350mm
		2	50mm, 150mm, 500mm
		3	300mm
		4	600mm
9	Bearing spacer	1	
12	Taper pin	2	50mm to 300mm
		3	350mm to 600mm
13	Bottom cover	1	
14	Bottom gasket	1	
16	Gland plate spigot	1	
18	Space ring	2	
20	Ball	2	50mm, 100mm
		4	150mm to 600mm
21	Set screw	2	50mm, 100mm
		4	150mm to 600mm
26	Hexagon hole bolt	4	
27	Gland bolt	2	
29	Hexagon nut	2	
32	Packing retainer	1	
33	Gland packing a	3	
34	Gland packing b	2	
35	Key	0	50mm to 150mm
		1	200mm to 600mm
38	Spring pin	1	
39	Column	1	
40	Hexagon bolt	4	
41	Spring washer	4	

#### ■334A Bare shaft parts list-class 300

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
5	Seat ring	1	
7	Seat ring retainer	1	
8a	Bearing a	2	50mm:3
8b	Bearing b	1	80mm to 150mm
		2	50mm, 200mm to 600mm
9	Bearing spacer	1	
12	Taper pin	2	50mm to 200mm
		3	250mm to 600mm
13	Bottom cover	1	
14	Bottom gasket	1	
16	Gland plate spigot	1	
18	Space ring	2	
20	Ball	2	50mm to 100mm
		4	150mm to 600mm
21	Set screw	2	50mm to 100mm
		4	150mm to 600mm
26	Hexagon hole bolt	4	
27	Gland bolt	2	
29	Hexagon nut	2	
32	Packing retainer	1	
33	Gland packing a	3	
34	Gland packing b	2	
35	Key	0	50mm to 150mm
		1	200mm to 600mm
38	Spring pin	1	
39	Column	1	
40	Hexagon bolt	4	
41	Spring washer	4	

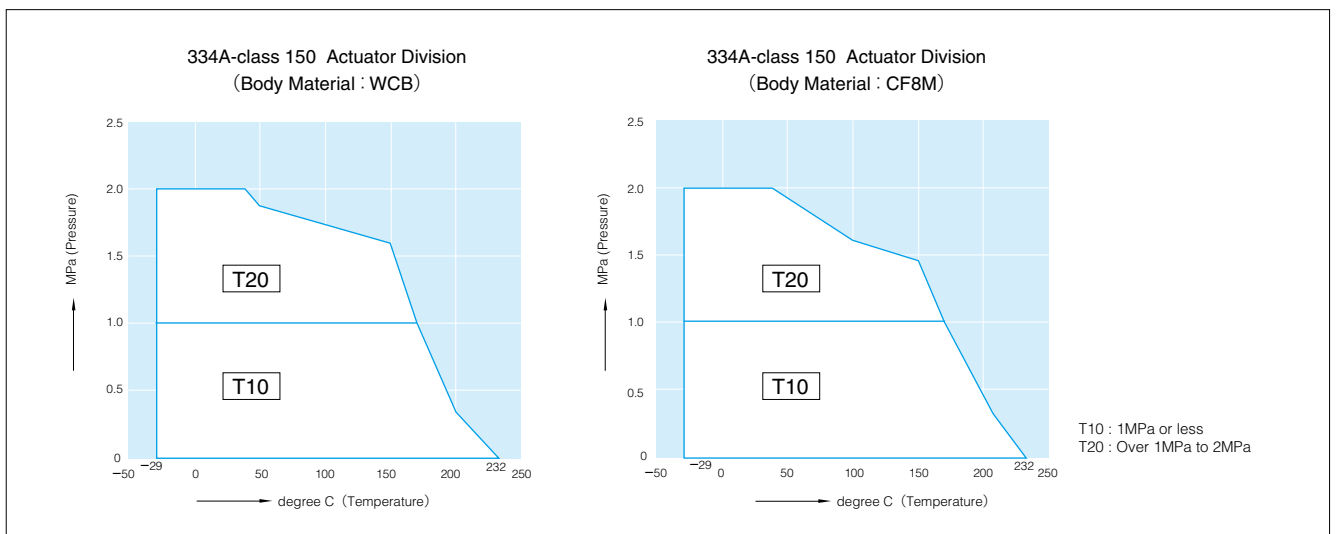
# 334A

## 334A Actuator Selection Chart

### 334A-class 150

Type	Model	Category	Size ( $\frac{mm}{inch}$ )											
			50	80	100	150	200	250	300	350	400	450	500	600
			2	3	4	6	8	10	12	14	16	18	20	24
Lock lever	1T	T10	1T-1	1T-2										
		T20												
Worm gear	2U,2K	T10	2U-1	2U-2	2U-3	2U-4	2K (SBWG-01)	2K (SBWG-02)	2K (SBWG-03)	2K (SBWG-04-1S)				
		T20												
Double-action pneumatic	7E,3A	T10	T85	T200	T380	T750	TGA-125	TGA-140	TGA-160	TGA-180				
		T20									TGA-140	TGA-160	TGA-180	TGA-200
Single-action pneumatic	7G,7F 3U,3K	T10	T200S	T380S	T750S	TG-12S	TG-14S	TG-20S						
		T20												
Single phase motor	4I	T10	4I-0	4I-1	4I-2	4I-2.5	4I-3	4I-4						
		T20												

## 334A Pressure - Temperature



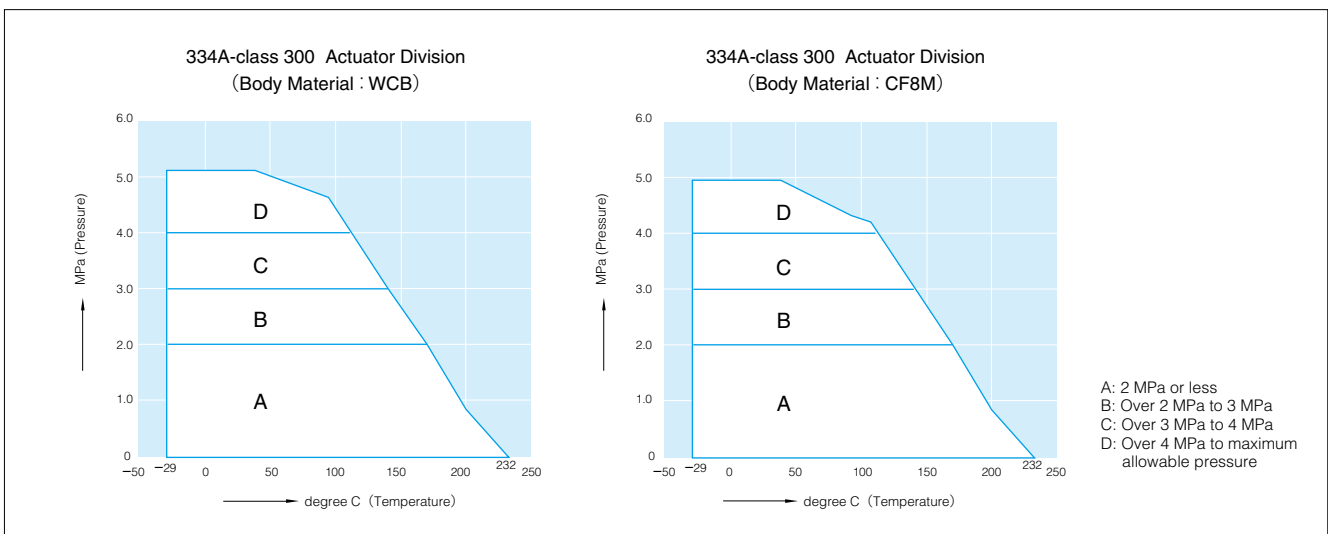


## 334A Actuator Selection Chart

### 334A-class 300

Type	Model	Category	Size $\left(\frac{\text{mm}}{\text{inch}}\right)$											
			50	80	100	150	200	250	300	350	400	450	500	600
			2	3	4	6	8	10	12	14	16	18	20	24
Lock lever	1T	A	1T-1	1T-2										
		B												
		C												
		D												
Worm gear	2U,2K	A	2U-1	2U-2										
		B												
		C												
		D												
Double-action pneumatic	7E,3A	A	T85	T200										
		B												
		C												
		D												
Single-action pneumatic	7G,7F 3U,3K	A	T200S	T380S										
		B												
		C												
		D												
Single phase motor	4I	A	4I-0	4I-1										
		B												
		C												
		D												

## 334A Pressure Rating



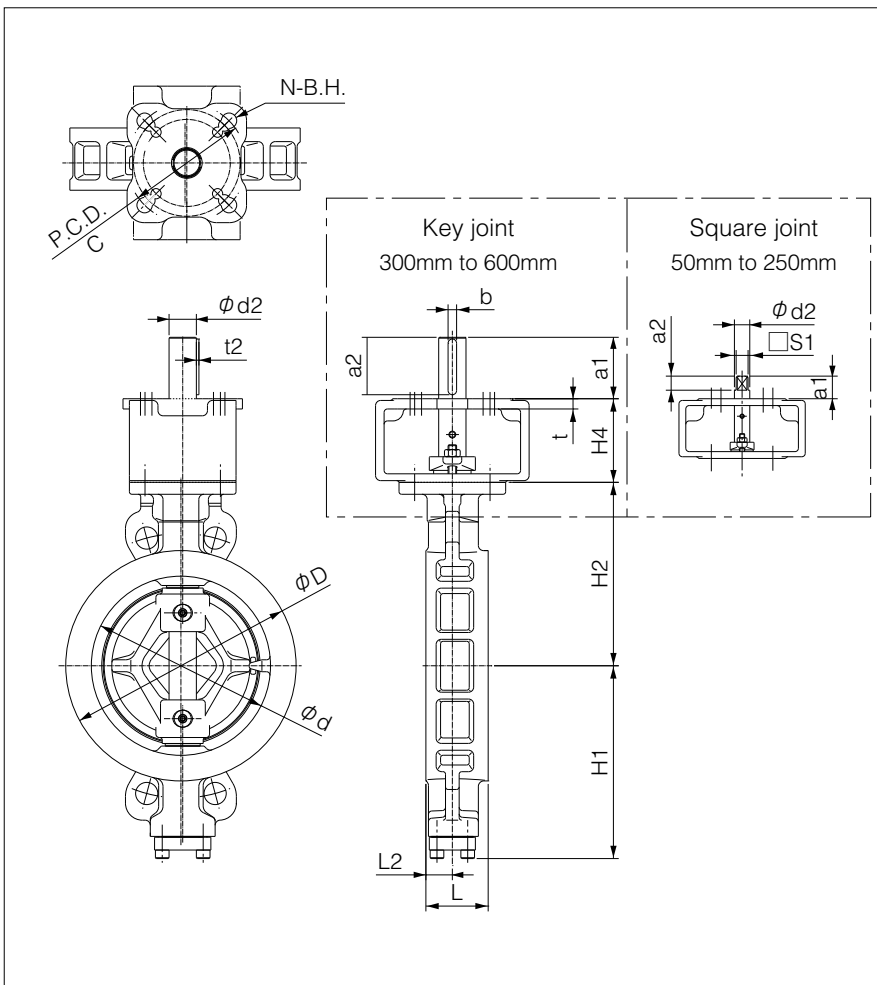
# 334A

## 334A Bare Shaft Dimension

### class 150

Nominal size		Dimension (mm)														Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S1	$\phi d_2$	b	t <sub>2</sub>	H <sub>4</sub>	t		Top Flange type
50	2	60	97	43	17.5	102.5	102.5	22.5	11.5	12	14	—	—	70	8	F07, F10	5.7
80	3	86.5	128	48	20	118	127	26.5	16.5	14	18	—	—	70	8	F07, F10	8
100	4	112	158	54	22	147	149	26.5	20	16	20	—	—	70	8	F07, F10	10.7
150	6	160	216	57	23	186	190	26.5	20	18	22	—	—	98	12	F10, F12, F14	18.9
200	8	210	270	64	26.5	201	209.2	37	30	22	26	—	—	98	12	F10, F12, F14	25.6
250	10	260	324	71	29	254	253	37	34	24	30	—	—	98	12	F10, F12, F14	39
300	12	310	382	81	36	283	280.5	72	67	—	32	10	3	98	12	F10, F12, F14	49
350	14	347	415	92	37	313	301	72	67	—	37	10	3	125	16	F14, F16	73
400	16	402	473	102	40	348	350	86	81	—	42	12	3	125	16	F14, F16	101
450	18	446	534	114	46	394	383.6	86	81	—	45	14	3.5	125	16	F14, F16	145
500	20	497	586	127	55	421	409.2	86	81	—	52	16	4	125	16	F14, F16	179
600	24	600	694	154	70	481	473	116	111	—	60	18	4	150	20	F25, Special A	304

### class 150 80mm to 600mm



### Top Flange Type Dimension List

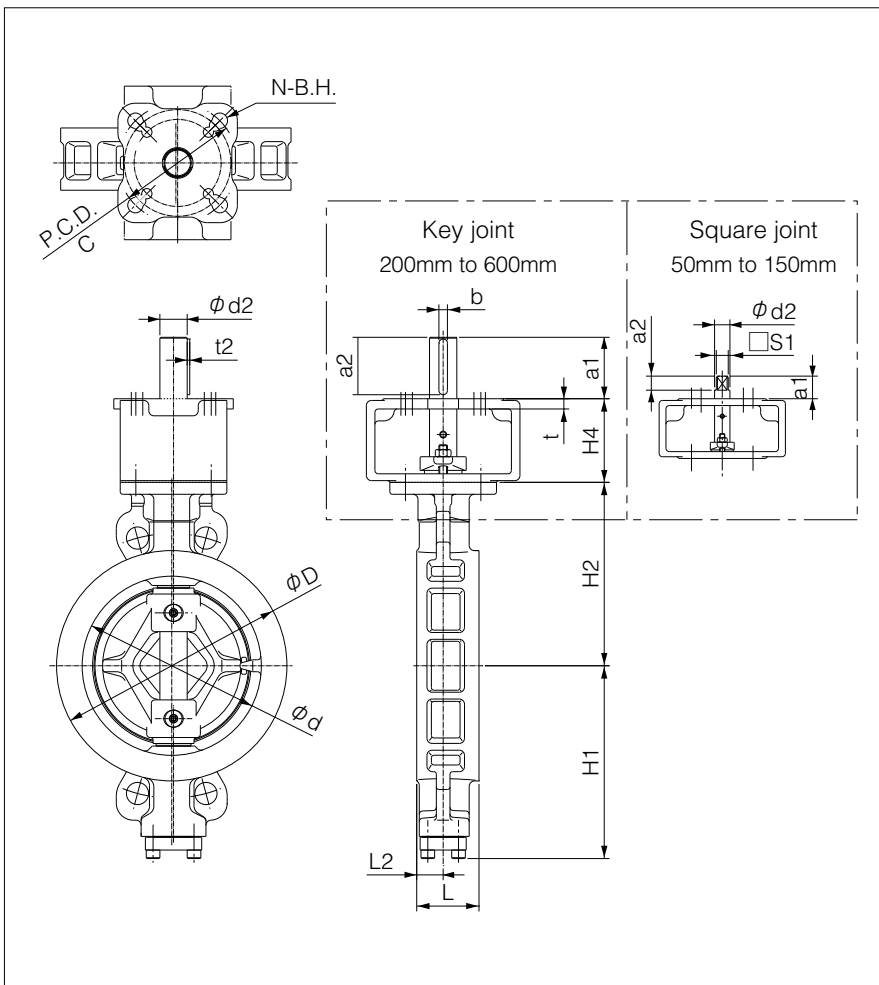
Flange type	P.C.D. C	N	B.H.
F07	70	4	10
F10	102	4	12
F12	125	4	14
F14	140	4	18
F16	165	4	22
F25	254	8	18
Special A	220	4	22

### 334A Bare Shaft Dimension

#### ■class 300

Nominal size		Dimension (mm)														Approx. Weight (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S <sub>1</sub>	$\phi d_2$	b	t <sub>2</sub>	H <sub>4</sub>	t		Top Flange type
50	2	60	97	43	17.5	102.5	102.5	22.5	11.5	12	14	—	—	70	8	F07, F10	5.7
80	3	86.5	128	48	20	118	127	26.5	16.5	14	18	—	—	70	8	F07, F10	8
100	4	112	158	54	22	147	149	26.5	20	16	20	—	—	70	8	F07, F10	10.7
150	6	160	216	59	24	192	187	37	30	22	26	—	—	98	12	F10, F12, F14	21.4
200	8	210	270	73	31	226	215	72	67	—	32	10	3	98	12	F10, F12, F14	32
250	10	260	326	83	36	260	253	72	67	—	37	10	3	125	16	F14, F16	60
300	12	310	385	92	42	292	294.5	86	81	—	42	12	3	125	16	F14, F16	83
350	14	347	420	117	52	338	326	86	81	—	45	14	3.5	125	16	F14, F16	113
400	16	402	476	133	61.5	376	364	86	81	—	52	16	4	125	16	F14, F16	157
450	18	446	536	149	70	402	394.5	116	111	—	60	18	4	150	20	F25, Special A	231
500	20	497	590	159	75	431	426.5	116	111	—	65	18	4	150	20	F25, Special A	283
600	24	600	701	181	84	504	496	136	131	—	70	20	4.5	150	20	Special A, Special B	433

#### ■class 300 80mm to 600mm



#### ■Top Flange Type Dimension List

Flange type	P.C.D. C	N	B.H.
F07	70	4	10
F10	102	4	12
F12	125	4	14
F14	140	4	18
F16	165	4	22
F25	254	8	18
Special A	220	4	22
Special B	254	8	22

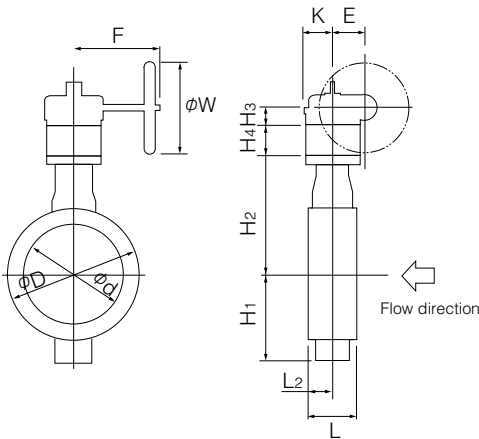
# 334A

## Worm Gear Type-150Lb 334A-2U(50 to 300mm) / 334A-2K(350 to 600mm)

### class 150

Nominal size		Dimension (mm)												Gear type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	E	K	F	$\phi W$		
50	2	60	97	43	17.5	102.5	102.5	29.5	70	36	74	160	100	2U-1	8
80	3	86.5	128	48	20	118	127	34.5	70	44	74	173.5	160	2U-2	12.5
100	4	112	158	54	22	147	149	34.5	70	44	74	173.5	160	2U-2	15
150	6	160	216	57	23	186	190	41.5	98	67	90	198	200	2U-3	27
200	8	210	270	64	26.5	201	209.2	41.5	98	67	90	198	200	2U-3	34
250	10	260	324	71	29	254	253	48	98	87.5	90	222.5	280	2U-4	55
300	12	310	382	81	36	283	280.5	48	98	87.5	90	222.5	280	2U-4	65
350	14	347	415	92	37	313	301	52	125	75	113	252	370	SBWG-01	79
400	16	402	473	102	40	348	350	63	125	91.5	113	310	450	SBWG-02	123
450	18	446	534	114	46	394	384	63	125	113	113	343	550	SBWG-03	173
500	20	497	586	127	55	421	409	63	125	113	113	343	550	SBWG-03	207
600	24	600	694	154	70	481	473	85	150	32.7	200	422	710	SBWG-04-1S	363

### 334A-2U/2K



### 2U/2K Installation Direction

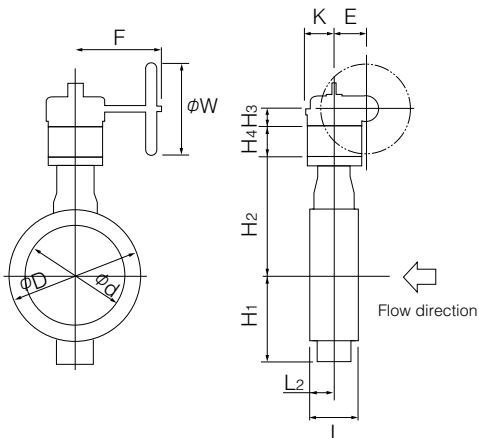
2UA / 2KA	2UB / 2KB	2UC / 2KC	2UD / 2KD

**Worm Gear Type-300Lb 334A-2U (50 to 200mm) / 334A-2K(250 to 600mm)**

**class 300**

Nominal size		Dimension (mm)												Gear type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	E	K	F	$\phi W$		
50	2	60	97	43	17.5	102.5	102.5	29.5	70	36	74	160	100	2U-1	8.0
80	3	86.5	128	48	20	118	127	34.5	70	44	74	173.5	160	2U-2	12.5
100	4	112	158	54	22	147	149	34.5	70	44	74	173.5	160	2U-2	15
150	6	160	216	59	24	192	187	41.5	98	67	90	198	200	2U-3	29
200	8	210	270	73	31	226	215	48	98	87.5	90	222.5	280	2U-4	48
250	10	260	326	83	36	260	253	52	125	75	113	360	400	SBWG-01	72
300	12	310	385	92	42	292	294.5	63	125	91.5	113	418.5	500	SBWG-02	104
350	14	347	420	117	52	338	326	63	125	113	113	452	560	SBWG-03	141
400	16	402	476	133	61.5	376	364	63	125	31.5	113	481	560	SBWG-03-1S	190
450	18	446	536	149	70	402	394.5	85	150	32.7	200	550	630	SBWG-04-1S	306
500	20	497	590	159	75	431	426.5	85	150	32.7	200	550	630	SBWG-04-1S	358
600	24	600	701	181	84	504	496	87	150	72.7	200	599.5	710	SBWG-05-1S	531

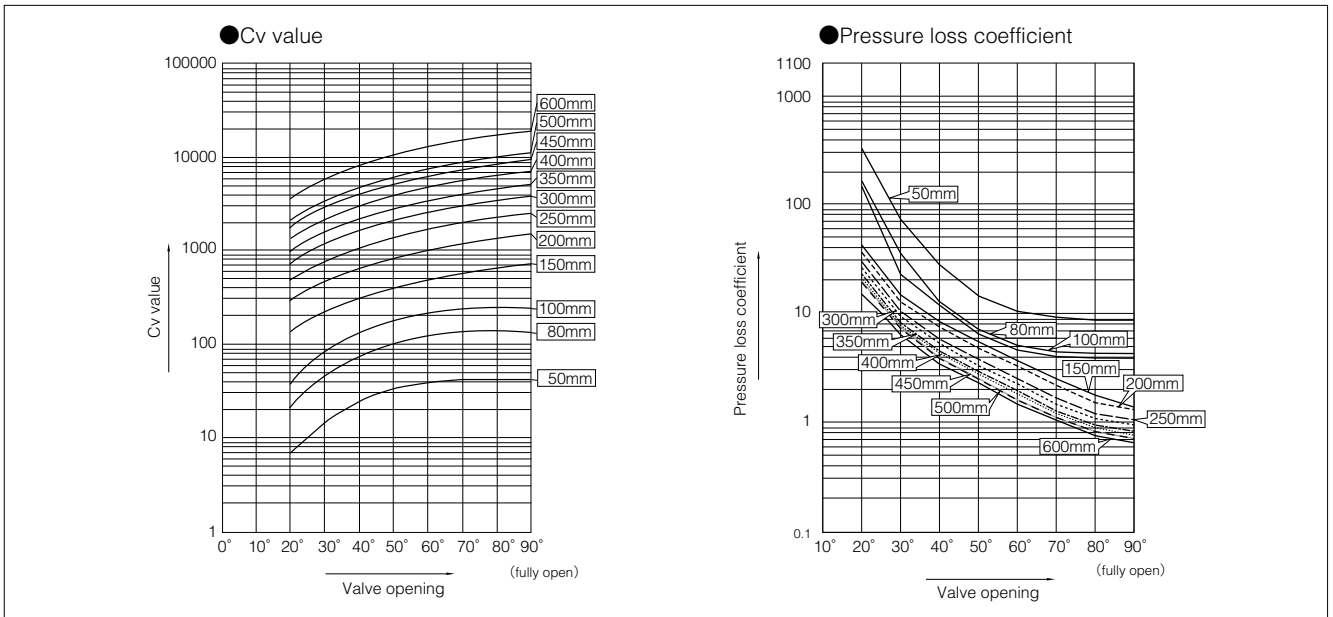
**334A-2U/2K**



**2U/2K Installation Direction**

<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>
<b>2UA/2KA</b>	<b>2UB/2KB</b>	<b>2UC/2KC</b>	<b>2UD/2KD</b>

## 334A-class 150 Cv value and pressure loss coefficient



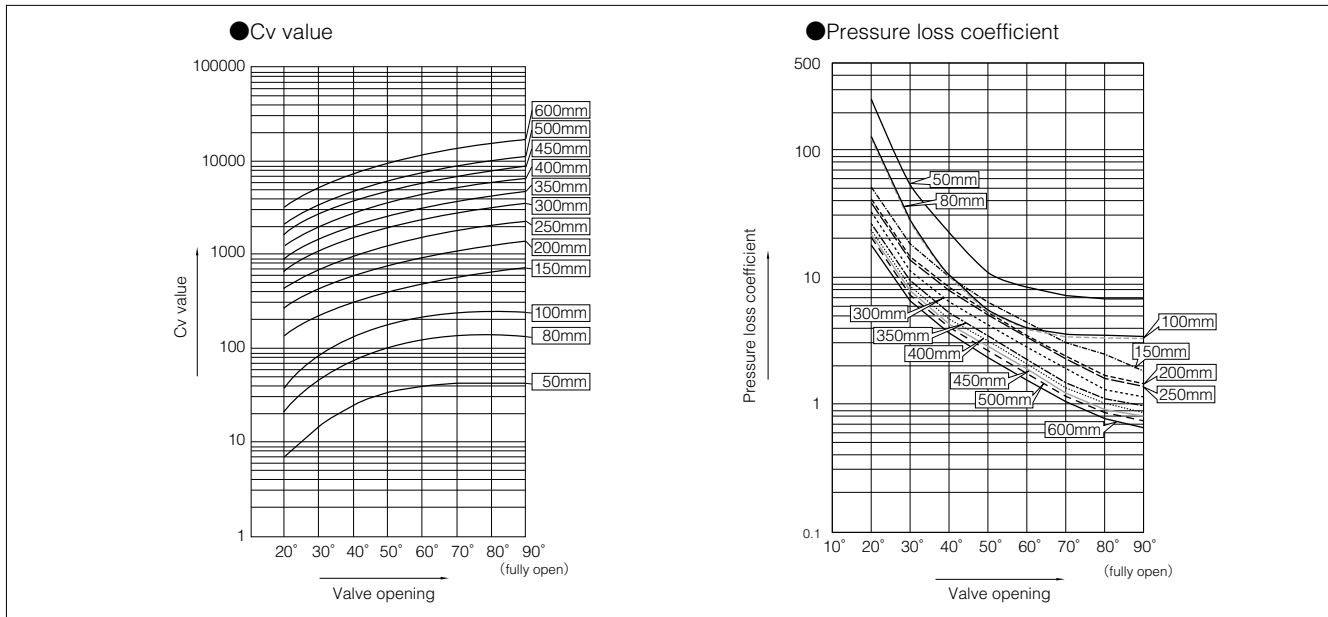
### 334A -class 150 Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
50	2	7	15	24	33	39	42	43	43
80	3	22	47	77	104	124	134	135	136
100	4	38	83	135	184	219	236	238	240
150	6	140	231	310	385	471	573	677	729
200	8	295	488	655	814	995	1211	1430	1540
250	10	479	792	1063	1321	1615	1966	2321	2500
300	12	747	1236	1659	2061	2519	3066	3621	3900
350	14	1002	1657	2225	2765	3378	4112	4856	5230
400	16	1379	2281	3063	3806	4651	5661	6685	7200
450	18	1835	3035	4075	5064	6188	7533	8895	9580
500	20	2146	3549	4764	5920	7235	8806	10399	11200
600	24	3583	5925	7955	9885	12080	14703	17362	18700

### 334A -class 150 Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
50	2	33.6	73.3	28.6	15.1	10.8	9.4	8.9	8.9
80	3	171.9	36.3	13.5	7.3	5.2	4.4	4.4	4.3
100	4	156.9	33.2	12.3	6.7	4.7	4.1	4.0	3.9
150	6	42.5	15.6	8.6	5.6	3.7	2.5	1.8	1.6
200	8	37.5	13.7	7.6	4.9	3.3	2.2	1.6	1.4
250	10	29.3	10.7	5.9	3.8	2.6	1.7	1.3	1.1
300	12	25.8	9.4	5.2	3.4	2.3	1.5	1.1	1.0
350	14	22.2	8.1	4.5	2.9	2.0	1.3	1.0	0.8
400	16	21.2	7.8	4.3	2.8	1.9	1.3	0.9	0.8
450	18	19.3	7.1	3.9	2.5	1.7	1.1	0.8	0.7
500	20	19.2	7.0	3.9	2.5	2.1	1.1	0.8	0.7
600	24	18.0	6.6	3.6	2.4	1.6	1.1	0.8	0.7

### 334A-class 300 Cv value and pressure loss coefficient



### 334A -class 300 Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
50	2	7	15	24	33	39	42	43	43
80	3	22	47	77	104	124	134	135	136
100	4	38	83	135	184	219	236	238	240
150	6	139	230	309	384	470	572	675	727
200	8	270	446	599	744	909	1106	1306	1407
250	10	436	720	967	1202	1469	1787	2111	2273
300	12	677	1120	1503	1868	2283	2778	3281	3533
350	14	909	1503	2018	2508	3065	3730	4405	4744
400	16	1249	2065	2773	3445	4210	5125	6052	6518
450	18	1664	2751	3694	4590	5609	6828	8062	8683
500	20	2122	3510	4712	5855	7155	8710	10285	11077
600	24	3245	5366	7205	8953	10941	13317	15725	16937

### 334A -class 300 Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
50	2	262.0	57.1	22.3	11.8	8.4	7.3	6.9	6.9
80	3	136.3	28.8	10.7	5.8	4.1	3.5	3.5	3.4
100	4	132.5	28.0	10.4	5.6	4.0	3.4	3.4	3.3
150	6	50.6	18.5	10.3	6.7	4.5	3.0	2.2	1.9
200	8	41.4	15.1	8.4	5.4	3.6	2.5	1.8	1.5
250	10	39.2	14.3	8.0	5.2	3.5	2.3	1.7	1.4
300	12	32.5	11.9	6.6	4.3	2.9	1.9	1.4	1.2
350	14	26.3	9.6	5.3	3.5	2.3	1.6	1.1	1.0
400	16	23.9	8.8	4.9	3.1	2.1	1.4	1.0	0.9
450	18	21.7	7.9	4.4	2.9	1.9	1.3	0.9	0.8
500	20	20.5	7.5	4.2	2.7	1.8	1.2	0.9	0.8
600	24	18.3	6.7	3.7	2.4	1.6	1.1	0.8	0.7

## 334A Flange accommodation

### ■class 150 Wafer Type

Nominal size		ASME/JPI class 150	JIS 10K	JIS 16/20K	BS4504(DIN) PN 10	BS4504(DIN) PN 16
mm	inch					
50	2	○ <sup>*1</sup>	○ <sup>*1</sup>	D <sup>*2</sup>	○ <sup>*1</sup>	○ <sup>*1</sup>
80	3	○ <sup>*1</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
100	4	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
150	6	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
200	8	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
250	10	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
300	12	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
350	14	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
400	16	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
450	18	T	T	T	T	T
500	20	T	T	T	T	T
600	24	T	T	T	T	T

\*1 : Can be used without flange drilling.

\*2 : There are 2 upper drilling holes for 50mm and 80mm to 250mm types, and a total of 4 drilling holes, 2 upper and 2 lower, for 300mm to 400mm types.

D: With flange drilling

T: With flange tapping

○: Can be used without flange drilling.

### ■class 150 Lugged Type

Nominal size		ASME/JPI class 150	JIS 10K	JIS 16/20K	BS4504(DIN) PN 10	BS4504(DIN) PN 16
mm	inch					
50	2	T	T	T <sup>*1</sup>	T	T
80	3	T	T <sup>*1</sup>	T <sup>*1</sup>	T <sup>*1</sup>	T <sup>*1</sup>
100	4	T <sup>*1</sup>	T <sup>*1</sup>	T <sup>*1</sup>	T <sup>*1</sup>	T <sup>*1</sup>
150	6	T	T	T <sup>*1</sup>	T	T
200	8	T	×	T <sup>*1</sup>	T	T <sup>*1</sup>
250	10	T	T	T	T	T
300	12	T	×	T <sup>*1</sup>	T	T
350	14	T	×	×	×	×
400	16	T	T	T	T	T
450	18	T	×	×	×	×
500	20	T	T	T	T	T
600	24	T	×	T <sup>*1</sup>	T	T

\*1 : Use 300Lb body. In this case, class 300 body of 150mm or more in the nominal size must note that the face-to-face dimensions are different.

\* : Please consult with us regarding drilling holes for the lugged type.

T: With flange tapping

×: A special wooden form is required.



## 334A Flange accommodation

### ■class 300 Wafer type

Nominal size		ASME/JPI class 300	JIS20K	JIS30K	BS4504(DIN) PN25	BS4504(DIN) PN40
mm	inch					
50	2	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	○ <sup>*1</sup>	○ <sup>*1</sup>
80	3	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
100	4	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
150	6	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
200	8	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>	D <sup>*2</sup>
250	10	T	D <sup>*2</sup> /T	D <sup>*2</sup> /T	D <sup>*2</sup> /T	D <sup>*2</sup> (T)
300	12	T	T	T	T	T
350	14	T	T	T	T	T
400	16	T	T	T	T	T
450	18	T	T	X	T	T
500	20	T	T		T	T
600	24	T	T		T	T

\*1 : Can be used without flange drilling.

\*2 : There are 2 upper drilling holes for 50mm and 80mm to 250mm types, and a total of 4 drilling holes, 2 upper and 2 lower, for 300mm to 400mm types.

D/T : With drill hole or tapping.

D : With flange drilling

T : With flange tapping

### ■class 300 Lugged type

Nominal size		ASME/JPI class 300	JIS20K	JIS30K	BS4504(DIN) PN25	BS4504(DIN) PN40
mm	inch					
50	2	T	T	T	T <sup>*1</sup>	T <sup>*1</sup>
80	3	T	T	T	T	T
100	4	T	T	T	T	T
150	6	T	T	T	X	X
200	8	T	T	T	T	T
250	10	T	X	X	X	X
300	12	T	T	T	T	T
350	14	T	X	X	X	X
400	16	T	X	X	X	X
450	18	T	X	X	X	X
500	20	T	X		X	X
600	24	T	T		X	X

\* Please consult with us regarding drilling holes for the lugged type.

\*1 Use class 150 body.

T : With flange tapping

X : A special wooden form is required.

## 334A-class 150/300 Applicable Pipe List in Case

Nominal size		JIS (STPG)			ASME B36.1		
mm	inch	Sch#40	Sch#60	Sch#80	Sch#40	Sch#60	Sch#80
50	2	○	○	○	○	X	○
80	3	○	○	○	○		○
100	4	○	○	○	○		○
150	6	○	○	○	○		○
200	8	○	○	○	○	○	○
250	10	○	○	○	○	○	○
300	12	○	○	○	○	○	○
350	14	○	○	○	○	○	○
400	16	○	○	○	○	○	○
450	18	○	○	○	○	○	○
500	20	○	○	○	○	○	○
600	24	○	○	○	○	○	○

※ Determine the appropriateness of using other pipes according to the minimum internal pipe diameter indicated in the following table.

## 334A Minimum Internal Diameters of Piping

Nominal size		Minimum internal diameters of piping	
mm	inch	class 150	class 300
50	2	45	45
80	3	73	73
100	4	93	93
150	6	138	138
200	8	186	185
250	10	226	225
300	12	268	267
350	14	310	306
400	16	354	347
450	18	402	394
500	20	444	438
600	24	535	533

※ The gap between the disc edge and the pipe is smallest at the stem side flange face when all nominal sizes are fully open.

※ Because the above gap is calculated with the pipe considered as extending up to the flange end, the value will differ depending on the way the pipe and flange are welded.

## 334A Piping Gasket

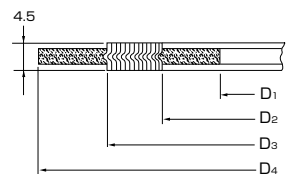
- \* In case of sheet gasket ..... Any standard can be used.
- \* In case of spiral gasket
  - For ASME, API, JPI flange ..... Any standard gaskets with inner/outer ring can be used.
  - For JIS flange ..... Use special spiral gasket shown below.

### ● 334A Special Spiral Gasket Flange Size

Nominal size		D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>								
					ASME JPI		JIS			BS4504			
					Class 150	Class 300	10K	16/20K	30K	PN10	PN16	PN25	PN40
50	2	61	69	88	104	111	104	104	114	109	109	109	109
80	3	89	97	120	136	149	134	140	150	144	144	144	144
100	4	115	124	145	174	181	159	165	172	164	164	170	170
150	6	166	178	207	222	250	220	237	249	220	220	226	226
200	8	217	227	257	279	308	270	282	294	275	275	286	293
250	10	268	282	318	339	362	332	354	360	330	331	343	355
300	12	319	339	370	409	422	377	404	418	380	386	403	420
350	14	356	369	403	450	485	422	450	463	440	446	460	477
400	16	406	420	457	514	539	484	508	524	491	498	517	549
450	18	458	472	517	549	596	539	573	—	541	558	567	574
500	20	508	523	567	606	654	594	628	—	596	620	627	631
600	24	610	626	672	717	774	700	734	—	698	737	734	750

※ Using 334A gasket for size 300, 350mm.  
Using TOMOE 300 series for other.

Remark : In case a minute leakage of gas (less than 100PPm) becomes a problem, please inquire of our business charge.



●Commercially Available Spiral Gaskets (with inner and outer ring)

Nominal size		ASME/JPI	JIS			BS4504
mm	inch	class 150/300	10K	16K/20K	30K	PN10, 16, 25, 40
50	2	○	○	○	○	○
80	3	○	○	○	×	○
100	4	○	×	○	×	○
150	6	○	×	×	×	×
200	8	○	×	×	×	×
250	10	○	×	×	×	×
300	12	○	×	○	×	×
350	14	○	×	×	×	○
400	16	○	×	×	○	○
450	18	○	×	×	—	○
500	20	○	×	×	—	○
600	24	○	×	×	—	○

○: Can be used, ×: Can not be used, —: No Standard

334A Applicable Gasket Standard Table for Piping

Nominal size		Joint sheet and RPTFE solid gasket (t≤2mm)				*PTFE mold type gasket VALQUA or NICHIASU	
		ASME/JPI	JIS		BS4504	ASME/JPI	JIS
mm	inch	class 150/300	10K, 16K, 20K	30K	PN10,16,25,40	class 150/300	10K, 16K, 20K
50	2	○	○	○	○	○	○
80	3	○	○	○	○	○	○
100	4	○	○	○	○	○	○
150	6	○	○	○	○	○	○
200	8	○	○	○	○	○	○
250	10	○	○	○	○	○	○
300	12	○	○	○	○	○	○
350	14	○	○	○	○	○	○
400	16	○	○	○	○	○	○
450	18	○	○	—	○	○	○
500	20	○	○	—	○	○	○
600	24	○	○	—	○	○	○

\*All standard joint seats and PTFE cut gaskets can be used.

\*Only VALQUA flawless gaskets (Part No.: 7030/7031/7035) and NICHIAS PTFE cushion gaskets (Part No.: 9010/9011) can be used.  
(Products from other manufacturers cannot be used due to their dimensions.)

## 334A Piping Bolts and Nuts Sizes

### ■class 150 Wafer Type

Nominal size		ASME/JPI class150			JIS10K		
mm	inch	Setting Bolts	Long Bolts	No.of Nuts	Setting Bolts	Long Bolts	No.of Nuts
50	2	—	4- 5/8-11UNC×140	8	—	4-M16×135	8
80	3	—	4- 5/8-11UNC×160	8	—	8-M16×145	16
100	4	—	8- 5/8-11UNC×160	16	—	8-M16×145	16
150	6	—	8- 3/4-10UNC×175	16	—	8-M20×170	16
200	8	—	8- 3/4-10UNC×185	16	—	12-M20×180	24
250	10	—	12- 7/8-9UNC×205	24	—	12-M22×190	24
300	12	—	12- 7/8-9UNC×220	24	—	16-M22×200	32
350	14	—	12- 1-8UNC ×245	24	—	16-M22×215	32
400	16	—	16- 1-8UNC ×260	32	—	16-M24×240	32
450	18	8-1 1/8-8UN×140(24×16)	12-1 1/8-8UN ×285	32	8-M24×120(21×14)	16-M24×250	40
500	20	8-1 1-8-8UN×145(24×16)	16-1 1-8-8UN ×300	40	8-M24×120(21×14)	16-M24×260	40
600	24	8-1 1/4-8UN×150(24×16)	16-1 1/4-8UN ×345	40	8-M30×135(24×16)	20-M30×310	48

Nominal size		JIS16K			JIS20K		
mm	inch	Setting Bolts	Long Bolts	No.of Nuts	Setting Bolts	Long Bolts	No.of Nuts
50	2	—	8-M16 ×135	16	—	8-M16 ×135	16
80	3	—	8-M20 ×160	16	—	8-M20 ×160	16
100	4	—	8-M20 ×170	16	—	8-M20 ×170	16
150	6	—	12-M22 ×175	24	—	12-M22 ×190	24
200	8	—	12-M22 ×190	24	—	12-M22 ×200	24
250	10	—	12-M24 ×210	24	—	12-M24 ×220	24
300	12	—	16-M24 ×220	32	—	16-M24 ×230	32
350	14	—	16-M30(P3)×250	32	—	16-M30(P3)×260	32
400	16	—	16-M30(P3)×275	32	—	16-M30(P3)×285	32
450	18	8-M30(P3)×140(24×16)	16-M30(P3)×285	40	8-M30(P3)×150(24×16)	16-M30(P3)×300	40
500	20	8-M30(P3)×145(24×16)	16-M30(P3)×300	40	8-M30(P3)×155(24×16)	16-M30(P3)×315	40
600	24	8-M36(P3)×160(30×20)	20-M36(P3)×355	48	8-M36(P3)×170(30×20)	20-M36(P3)×365	48

Nominal size		BS4504 PN10*			BS4504 PN16*		
mm	inch	Setting Bolts	Long Bolts	No.of Nuts	Setting Bolts	Long Bolts	No.of Nuts
50	2	—	4-M16×135	8	—	4-M16×135	8
80	3	—	8-M16×145	16	—	8-M16×145	16
100	4	—	8-M16×155	16	—	8-M16×155	16
150	6	—	8-M20×170	16	—	8-M20×170	16
200	8	—	8-M20×180	16	—	12-M20×180	24
250	10	—	12-M20×190	24	—	12-M24×200	24
300	12	—	12-M20×200	24	—	12-M24×220	24
350	14	—	16-M20×210	32	—	16-M24×230	32
400	16	—	16-M24×230	32	—	16-M27×250	32
450	18	8-M24×115(21×14)	16-M24×250	40	8-M27×125(22×14)	16-M27×265	40
500	20	8-M24×115(21×14)	16-M24×260	40	8-M30×140(24×16)	16-M30×285	40
600	24	8-M27×120(22×14)	16-M27×310	40	8-M33×150(27×18)	16-M33×330	40

## 334A Piping Bolts and Nuts Sizes

### ■class 150 Lugged Type (All taps)

Nominal size		ASME/JPI class 150		JIS10K		JIS16K	
mm	inch	Setting Bolts	No.of Nuts	Setting Bolts	No.of Nuts	Setting Bolts	No.of Nuts
50	2	8- 5/8-11UNC× 75(13× 8)	8	8-M16×75(13× 8)	8	8-M16× 75(13× 8)	8
80	3	8- 5/8-11UNC× 85(13× 8)	8	16-M16×75(13× 8)	16	16-M20× 85(17×11)	16
100	4	16- 5/8-11UNC× 85(13× 8)	16	16-M16×75(13× 8)	16	16-M20× 90(17×11)	16
150	6	16- 3/4-10UNC× 95(17×11)	16	16-M20×90(17×11)	16	—	—
200	8	16- 3/4-10UNC×100(17×11)	16	—	—	—	—
250	10	24- 7/8- 9UNC×115(19×12)	24	24-M22×105(19×12)	24	24-M24×115(21×14)	24
300	12	24- 7/8- 9UNC×115(19×12)	24	—	—	—	—
350	14	24- 1-8UNC×125(21×14)	24	—	—	—	—
400	16	32- 1-8UNC×125(21×14)	32	32-M24×115(21×14)	32	32-M30(P3)×140(24×16)	32
450	18	32-1 1/8-8UN ×140(24×16)	32	—	—	—	—
500	20	40-1 1/8-8UN ×145(24×16)	40	40-M24×125(21×14)	40	40-M30(P3)×150(24×16)	40
600	24	40-1 1/4-8UN ×160(24×16)	40	—	—	—	—

Nominal size		JIS20K		BS4504 PN10**		BS4504 PN16**	
mm	inch	Setting Bolts	No.of Nuts	Setting Bolts	No.of Nuts	Setting Bolts	No.of Nuts
50	2	8-M16× 75(13× 8)	8	8-M16× 75(13× 8)	8	8-M16× 75(13× 8)	8
80	3	16-M20× 85(17×11)	16	16-M16× 75(17×11)	16	16-M16× 75(13× 8)	16
100	4	16-M20× 90(17×11)	16	16-M16× 75(17×11)	16	16-M16× 75(13× 8)	16
150	6	—	—	16-M20× 90(17×11)	16	16-M20× 90(17×11)	16
200	8	—	—	16-M20× 95(17×11)	16	—	—
250	10	24-M24×125(21×14)	24	24-M20×105(17×11)	24	24-M24×115(21×14)	24
300	12	—	—	24-M20×105(17×11)	24	24-M24×115(21×14)	24
350	14	—	—	—	—	—	—
400	16	32-M30(P3)×145(24×16)	32	32-M24×115(21×14)	32	32-M27×125(22×14)	32
450	18	—	—	—	—	—	—
500	20	40-M30(P3)×155(24×16)	40	40-M24×120(21×14)	40	40-M30×140(24×16)	40
600	24	—	—	40-M27×125(22×14)	40	40-M33×150(27×18)	40

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

The bolt length calculation is based on use of a 4.5 mm thick spiral gasket.

The flange thickness calculation is based on the standard steel flange thickness.

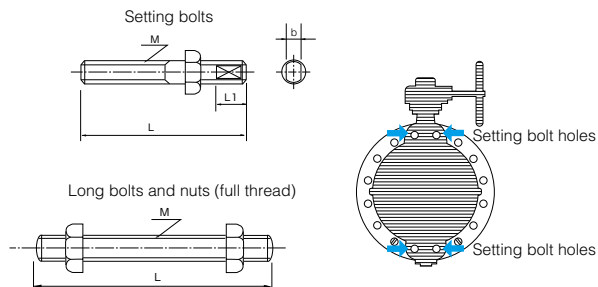
\*\* Mark: The flange thickness calculation is based on the welding neck flange thickness.

Quantities shown are for one valve.

#### Examples

Setting bolts: 8 - M16 × 75 (13 × 8)

Long bolts: 4 - M16 × 145



## 334A Piping Bolts and Nuts Sizes

### ■class 300 Wafer

Nominal size		ASME/JPI class300			JIS20K		
mm	inch	Setting Bolts	Long Bolts	No.of Nuts	Setting Bolts	Long Bolts	No.of Nuts
50	2	—	8- 5/8-11UNC×140	16	—	8-M16 ×135	16
80	3	—	8- 3/4-10UNC×175	16	—	8-M20 ×160	16
100	4	—	8- 3/4-10UNC×185	16	—	8-M20 ×170	16
150	6	—	12- 3/4-10UNC×200	24	—	12-M22 ×190	24
200	8	—	12- 7/8-9UNC×235	24	—	12-M22 ×200	24
250	10	8-1-8UNC×130(21×14)	12- 1-8UNC×260	32	8(0)-M24 ×110(21×14)	8(12)-M24 ×230	24
300	12	8-1 1/8-8UN×130(24×16)	12-1 1/8-8UN ×285	32	8-M24 ×120(21×14)	12-M24 ×240	32
350	14	8-1 1/8-8UN×145(24×16)	16-1 1/8-8UN ×315	40	8-M30(P3)×140(24×16)	12-M30(P3)×285	32
400	16	8-1 1/4-8UN×155(24×16)	16-1 1/4-8UN ×345	40	8-M30(P3)×140(24×16)	12-M30(P3)×315	32
450	18	8-1 1/4-8UN×155(24×16)	20-1 1/4-8UN ×365	48	8-M30(P3)×145(24×16)	16-M30(P3)×335	40
500	20	8-1 1/4-8UN×160(24×16)	20-1 1/4-8UN ×380	48	8-M30(P3)×150(24×16)	16-M30(P3)×350	40
600	24	8-1 1/2-8UN×190(30×20)	20-1 1/2-8UN ×430	48	8-M36(P3)×175(30×20)	20-M36(P3)×385	48

Nominal size		JIS30K		
mm	inch	Setting Bolts	Long Bolts	No.of Nuts
50	2	—	8-M16 ×145	16
80	3	—	8-M20 ×170	16
100	4	—	8-M22 ×190	16
150	6	—	12-M24 ×210	24
200	8	—	12-M24 ×240	24
250	10	8(0)-M30(P3)×135(24×16)	8(12)-M30(P3)×275	24
300	12	8-M30(P3)×145(24×16)	12-M30(P3)×285	32
350	14	8-M30(P3)×155(24×16)	12-M30(P3)×315	32
400	16	8-M36(P3)×170(30×20)	12-M36(P3)×355	32

Nominal size		BS4504(DIN)NP25			BS4504(DIN)NP40		
mm	inch	Setting Bolts	Long Bolts	No.of Nuts	Setting Bolts	Long Bolts	No.of Nuts
50	2	—	4-M16×145	8	—	4-M16 ×145	8
80	3	—	8-M16×155	16	—	8-M16 ×155	16
100	4	—	8-M20×170	16	—	8-M20 ×170	16
150	6	—	8-M24×190	16	—	8- M24×190	16
200	8	—	12-M24×210	24	—	12-M27×230	24
250	10	8(0)-M27×115(22×14)	8(12)-M27×230	24	8(0)-M30×125(24×16)	8(12)-M30×250	24
300	12	8-M27×115(22×14)	12-M27×250	32	8-M30×125(24×16)	12-M30×270	32
350	14	8-M30×135(24×16)	12-M30×285	32	8-M33×150(27×18)	12-M33×310	32
400	16	8-M33×145(27×18)	12-M33×310	32	8-M36×160(30×20)	12-M36×340	32
450	18	8-M33×145(27×18)	16-M33×330	40	8-M36×160(30×20)	16-M36×355	40
500	20	8-M33×150(27×18)	16-M33×350	40	8-M39×170(32×21)	16-M39×375	40
600	24	8-M36×170(30×20)	16-M36×380	40	8-M45×200(36×24)	16-M45×430	40

## 334A Piping Bolts and Nuts Sizes

### ■class 300 Lugged (fully-tapped)

Nominal size		ASME/JPI class300		JIS20K		JIS30K	
mm	inch	Setting Bolts	No.of Nuts	Setting Bolts	No.of Nuts	Setting Bolts	No.of Nuts
50	2	16-5/8-11UNC×75(13× 8)	16	16-M16× 75(13× 8)	16	—	—
80	3	16-3/4-10UNC×95(17×11)	16	16-M20× 85(17×11)	16	16-M20× 90(17×11)	16
100	4	16-3/4-10UNC×95(17×11)	16	16-M20× 90(17×11)	16	16-M22×105(19×12)	16
150	6	24-3/4-10UNC×100(17×11)	24	24-M22×100(19×12)	24	24-M24×115(21×14)	24
200	8	24-7/8-9UNC×115(19×12)	24	24-M22×105(19×12)	24	24-M24×120(21×14)	24
250	10	32- 1-8UNC×130(21×14)	32	—	—	—	—
300	12	32-1 1/8-8UN×145(24×16)	32	32-M24×120(21×14)	32	32-M30(P3)×145(24×16)	32
350	14	40-1 1/8-8UN×155(24×16)	40	—	—	—	—
400	16	40-1 1/4-8UN×160(24×16)	40	—	—	—	—
450	18	48-1 1/4-8UN×165(24×16)	48	—	—	—	—
500	20	48-1 1/4-8UN×170(24×16)	48	—	—	—	—
600	24	48-1 1/2-8UN×200(30×20)	48	48-M36(P3)×180(30×20)	48	—	—

Nominal size		BS4504(DIN)NP25 <sup>**</sup>		BS4504(DIN)NP40 <sup>**</sup>	
mm	inch	Setting Bolts	No.of Nuts	Setting Bolts	No.of Nuts
50	2	8-M16× 75(13× 8)	8	8-M16× 75(13× 8)	8
80	3	16-M16× 75(13× 8)	16	16-M16× 75(13× 8)	16
100	4	16-M20× 90(17×11)	16	16-M20× 90(17×11)	16
150	6	—	—	—	—
200	8	24-M24×115(21×14)	24	24-M27×120(22×14)	24
250	10	—	—	—	—
300	12	32-M27×120(24×14)	32	32-M30×140(24×16)	32
350	14	—	—	—	—
400	16	—	—	—	—
450	18	—	—	—	—
500	20	—	—	—	—
600	24	—	—	—	—

Note: Bolt/Nut material: SNB7/S45C

Please use a nut with a height that is 100% of the screw diameter.

The bolt length calculation is based on use of a 4.5 mm thick spiral gasket.

The flange thickness calculation is based on the standard steel flange thickness.

Quantities shown are for one valve.

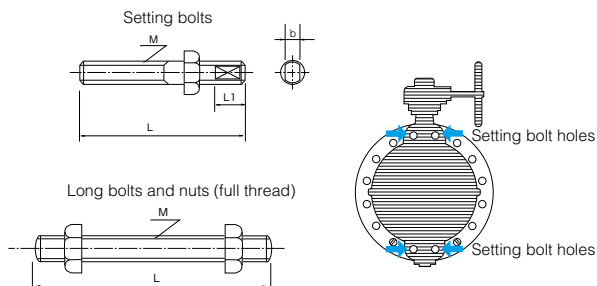
250 mm bolt quantities are indicated as follows: The quantity outside the brackets applies when the setting bolt holes are tapped and the values inside the brackets apply when the setting bolt holes are drilled.

※ The flange thickness calculation is based on the welding neck flange thickness. Quantities shown are for one valve.

#### Examples

Setting bolts: 8 - M16 × 75 (13 × 8)  
                   |      |      |      |      |  
                   N      M      L      b     L1

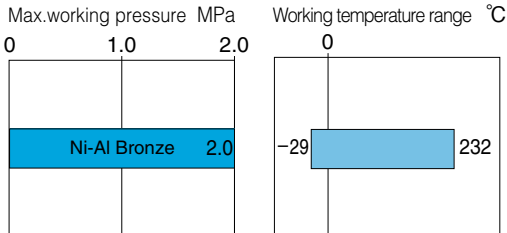
Long bolts: 4 - M16 × 145  
               |      |      |  
               N      M      L



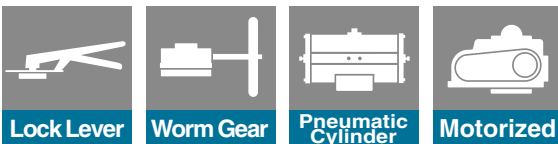
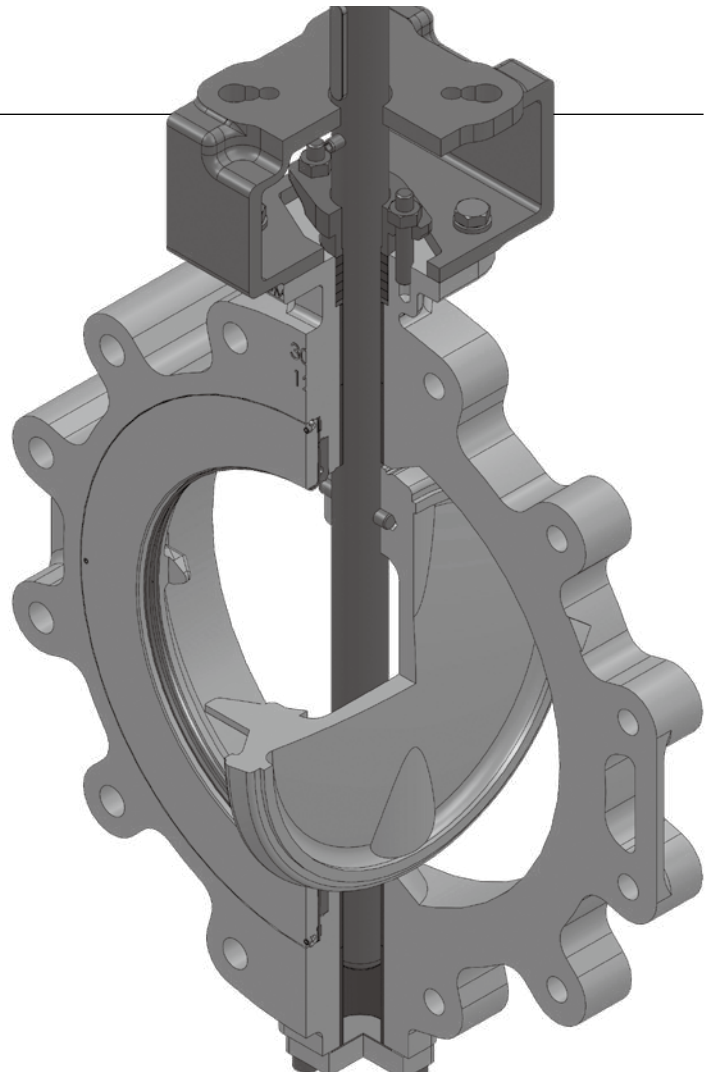
# 344Q

Valve nominal size

80 to 600mm



**FS** Fire safe certification to API607 7th Ed. / ISO10497 3rd Ed.



## Features and Benefits

Double Offset PTFE Seated High Performance Butterfly Valve to Suit API Standard Fire Safe Certification

### General description

Designed to suit those severe conditions such as high temperature, high pressure or high velocity which disallow the use of soft resilient seated butterfly valves. Ideal for use for seawater fire fighting.

### Double offset geometry

The design exhibits tight shut off, reduced torques, chemical resistance, excellent throttling capabilities, and the ability to operate with relatively high pressure drops.

### Seawater service application

Designed to suit seawater service application such as fire fighting line for FPSO.

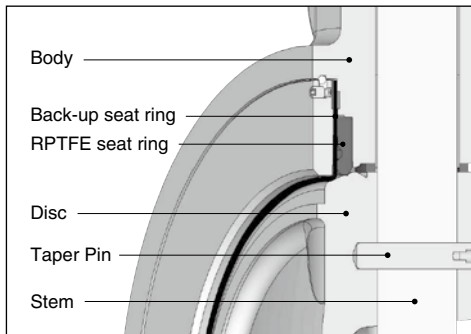
### Characteristics

Fire safe certification to API607 7th Ed.

API607-7th edition Fire safe / ISO10497 3rd Ed.



## 344Q Fire Safe Seat



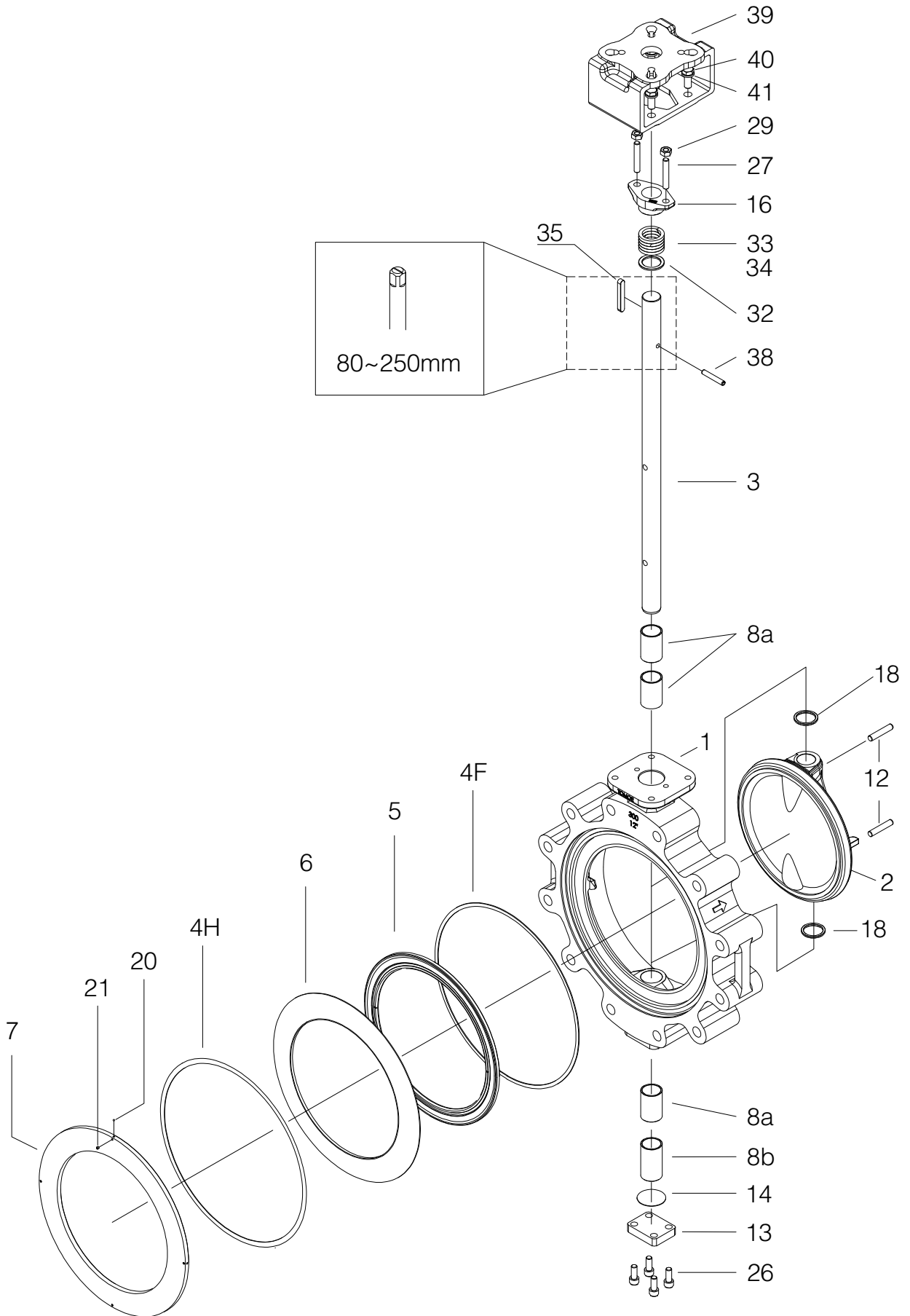
### Standard Specifications

Product characteristics		Double offset soft seated butterfly valve
Conection		Lugged type
Nominal valve size		80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600mm
Applicable standards	Face-to-face dimensions	API609 Class150 Category B
	Flange accommodation	ASME/JPI Class150, Flat Face
	Actuator attachment	ISO5211/1
	P-T rating	ASME B16.34 / API 609
Applicable fluid		Seawater
Max.working pressure		2.0MPa
Working temperature range		-29 degree C to 232 degree C
Pressure direction		Standard pressure direction : Pressure on retainer side
Test Pressure	Shell test	Working pressure x 1.5 times (Hydrostatic pressure)
	Seat leakage	0.7MPa(Air pressure) Based on API598-9th Ed. Option : Working pressure x 1.1 times (Hydrostatic pressure)
Standard Materials	Body	ASTM B148 C95800
	Disc	ASTM B148 C95800
	Shaft	MONEL K-500
	Seat ring	RPTFE(Carbon graphite contained) / Inconel 625
	Retainer	ASTM B148 C95800
	Gland Packing	Graphite
Shaft shape for actuator conection		150Lb: 80mm to 250mm : Square / 300mm to 600mm : Key
Actuator		Lock lever, Worm gear, Pneumatic cylinder, Electric motor
Coating		No coating.
Usable Gasket		Sheet gasket : Marketed products available Spiral wound gasket : Marketed products (with inner & outer ring) available
Fire safe		API607-7th edition, ISO10497 3rd edition

※It is possible that seat leakage occur when fluid (e.g. powder and/or liquid) is solidified by working temperature and other cause. Consult us.

# 344Q

## 344Q Expanded view of bare shaft



### 344Q Parts List

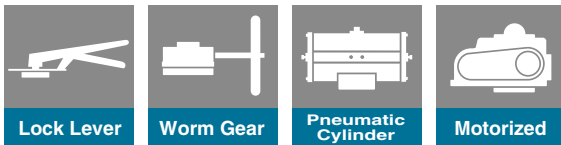
No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4F	Gasket (Body)	1	
4H	Gasket (Retainer)	1	
5	Seat ring	1	
6	Backup Seating	1	
7	Seat ring retainer	1	
8a	Bearing a	3	100mm, 150mm, 250mm to 600mm
		4	80mm, 200mm
8b	Bearing b	0	80mm, 200mm
		1	100mm, 150mm, 250mm to 600mm
12	Taper pin	2	80mm to 300mm
		3	350mm to 600mm
13	Bottom cover	1	
14	Bottom gasket	1	
16	Gland plate spigot	1	
18	Space ring	2	
20	Ball	2	80mm, 100mm
		4	150mm to 600mm
21	Set screw	2	80mm, 100mm
		4	150mm to 600mm
26	Cap screw bolt	4	
27	Gland bolt	2	
29	Hexagon nut	2	
32	Packing retainer	1	
33	Gland packing a	3	
34	Gland packing b	2	
35	Key	0	80mm to 250mm
		1	300mm to 600mm
38	Spring pin	1	
39	Bracket	1	
40	Hexagon bolt	4	
41	Spring washer	4	

Double offset metal seat high performance butterfly valves to suit API standards class 150 Rating

Tom Disco

302A Wafer

303Q Lugged



Lock Lever

Worm Gear

Pneumatic Cylinder

Motorized

## Features and Benefits

### Fire safe design

Designed as an inherently fire safe metal seated butterfly valve. Certified to Fire Safe Test as per API 607 4th Edition.

### Bi-directional flow

Seals flow in both directions. The valves can be used even if the flow changes direction. (There are pressure limitations for each direction of flow. See chart for recommended specifications).

### Disc with reinforced rib

Discs up to 300mm have a thin cross section but feature a reinforcing rib. As for 350mm to 600mm, the disc rib has a convex figuration. These designs successfully reduce thermal expansion and provide a constant sealing performance against any change in temperature or pressure of the fluid.

### Double offset geometry

The axis of disc rotation is double offset to the seat ring. When the disc rotates, it unseats at a small turning angle by its cam effect. This prevents seat wear and provides reliable sealing performance over long periods.

### Metal Seat

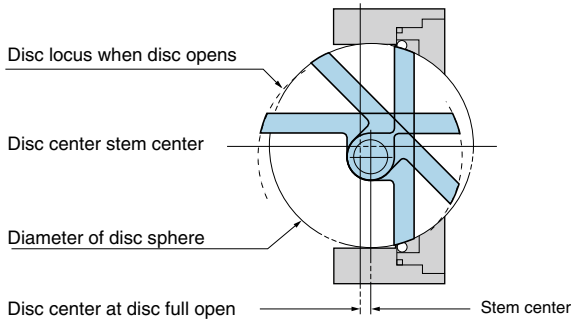
The resilient metal seat ring with coil spring compensates for thermal expansion or contraction of the body or disc. The ball lock method is adopted to facilitate replacement of the seat ring.

### Improved reliability

By minimising the effect of friction and the special hard facing of the seating, the reliability of this metal seat butterfly valve is dramatically improved. The key connection of the disc and stem will prevent the direct effect of heat transaction from the stem to the disc as well as provide an anti-blow-out facility on the stem.

## General description

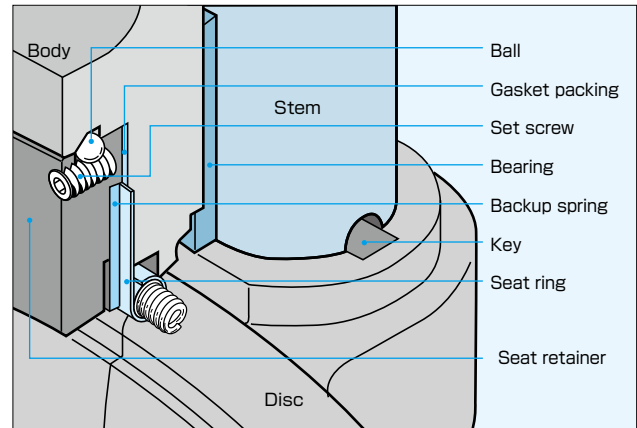
Inherent fire safe design with carbon steel or stainless steel body with ASME B16.34 Class 150 rating and API 609 pressure temperature rating. Ideal for use in general hydrocarbon, chemical process, low pressure steam and gas applications.



### Double-Eccentric Disc

The axis of disc rotation is double eccentric to the seat rings. When the disc rotates, it unseats at a small turning angle by its cam effect. This prevents seat wear and provides a perfect seal for long periods.

## Fire Safe Seat Design



## Standard Specifications

Valve nominal size <sup>*1</sup>	80, 100, 125, 150, 200, 250, 300mm		350, 400, 450, 500, 600mm	
Flange accommodation	JIS 10K/16K/20K ASME Class 125/150 API/JPI Class 150 BS10 Table F BS 4504 PN 10/16 DIN PN10/16		JIS 5K/10K/16K/20K ASME Class 125/150 API/JPI Class 150 BS10 Table E BS 4504 PN 10/16 DIN PN10/16	
Face-to-face dimensions	API 609(class 150, category B), JPI-7S-83(class 150) ※125mm is as per JIS B 2002 (series 46)/ISO 5752 (series 20)			
Seat leakage	API 598-7th Edition (1996) <sup>*</sup>			
Connection	Double Offset Wafer Type (Option: Flanged, Lugged)			
Pressure-temperature-rating <sup>*2</sup>	API 609 class 150 category B, ASME B16.34 Class 150			
Fire safe	API 607 4th Edition			
Max. working pressure <sup>*2</sup>	2.0MPa			
Working temperature range <sup>*3</sup>	-29 to 600 degrees C (Ext. bonnet is required at 400 degrees C and or over)			
Flow direction	Bi-directional flow (Flow to disc side is recommended.) ┌ Flow to disc side (2.0 MPa) └ Flow to stem side (1.0 MPa) <sup>*4</sup>			
Pressure test	Body shell	3.1 MPa (API 598 7th Edition) by hydraulic		
	Seat leak	7 bar (API 598 7th Edition) by air		
Standard materials	Body	SCPH2/WCB, SCS 14A/CF8M		SCPH2/WCB, SCS 13A/CF8, SCS 14A/CF8M
	Disc	80mm to 150mm	200mm to 300mm	350mm to 600mm
		SCS 16A (hard chrome plating)	SCS 14A (hard chrome plating)	SCS 13A (hard chrome plating), SCS 14A (hard chrome plating)
	Stem	SUS 420J2, SUS 329J1, SUS 316, SUS 329J4L		SUS 420J2, SUS 304, SUS 630
	Seat ring	SUS316L		
Gland packing	Exfoliated graphite			
Top flange	ISO 5211/1			
Antistatic structure	Optional			
Coating	Silicon resin coating (Grey N7) for under 200 degrees C Heat resistant silver coating for 200 degrees C and over. No coating for stainless steel.			

<sup>\*1</sup> Please use 302Y or 337Y if using a nominal valve diameter of 50mm and 65mm.

<sup>\*2</sup> Refer to pressure – temperature rating chart on page 302A/303Q-05.

<sup>\*3</sup> Contact us at 400 degrees C and or over for oxidizing atmosphere.

<sup>\*4</sup> Contact us regarding 350~600mm flowing to stem side.

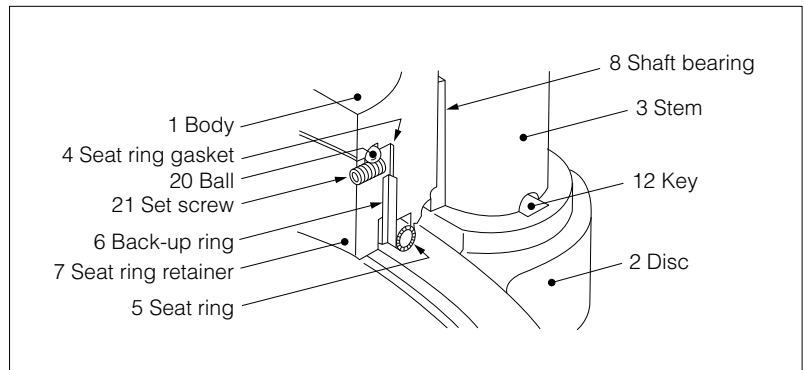
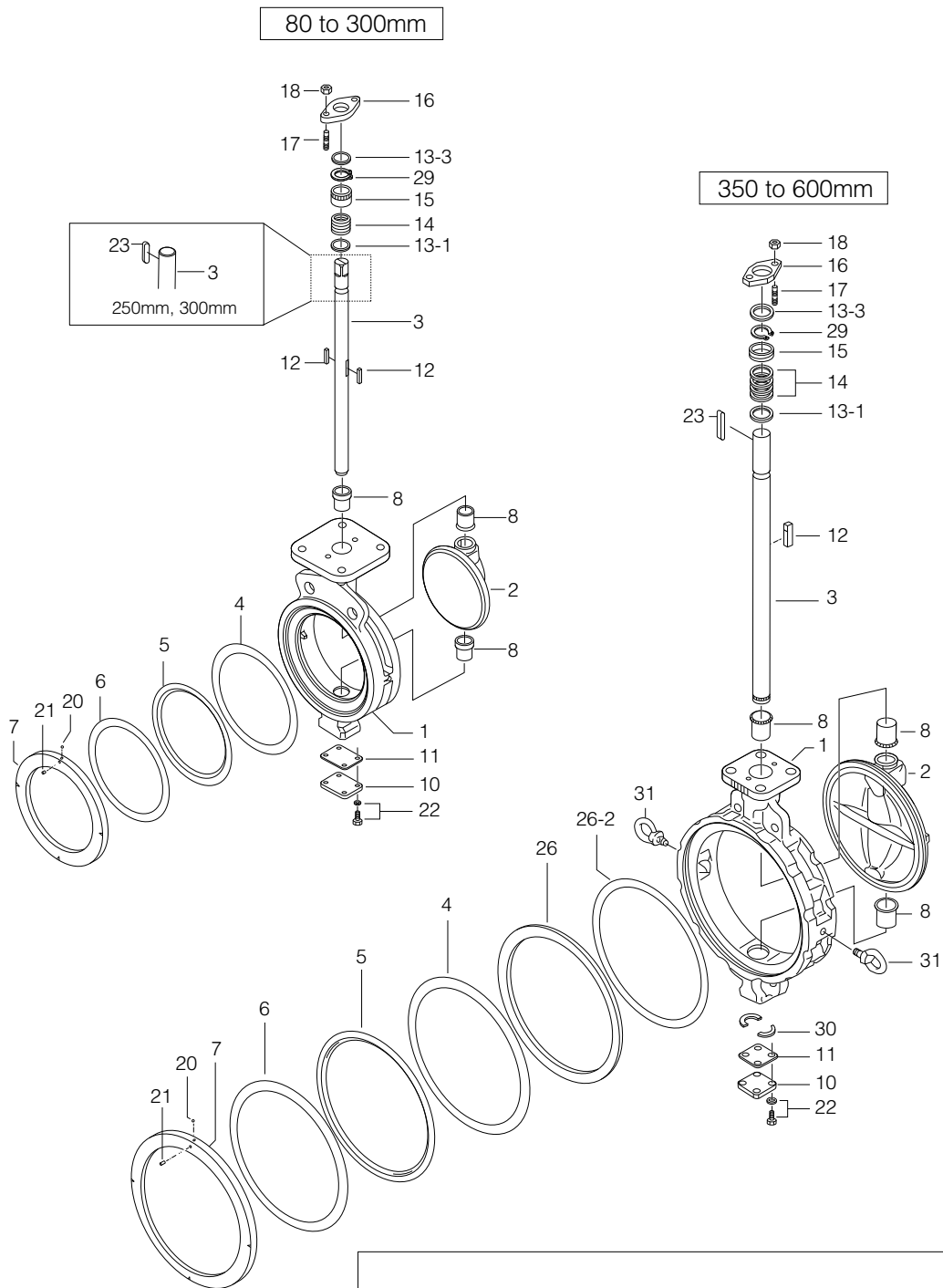
※ It is possible that seat leakage occur when fluid (e.g. powder and/or liquid) is solidified by working temperature and other cause. Consult us. Please note that use with vertical line such as bottom area of discharge spout of hopper, and tank.

## Allowable leakage rate for closure test (API 598-7th Edition 1996)

Nominal size	Duration	Fluid	Allowable rate
80mm~150mm	1min	air	24bubbles / min or less (approx.3.6cc / min)
200mm~300mm	2min		40bubbles / min or less (approx.6.0cc / min)
350mm~600mm	2min		56bubbles / min or less (approx.8.4cc / min)

# Tom Disco 302A(Wafer)/303Q (Lugged)

## 302A Expanded view of components



## 302A Parts List

### ■ 302A Parts List (80mm to 300mm: -29 to 400 degrees C)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
★ 4	Seat ring gasket	1	
★ 5	Seat ring	1	
★ 6	Back-up ring	1	
7	Seat ring retainer	1	
8	Shaft bearing	3	※1
10	Bottom cover	1	
★ 11	Bottom gasket	1	
12	Key	2	
13-1	Packing retainer	1	
13-3	Ring	1	
★ 14	Gland packing	1 set	
15	Gland bush	1	
16	Gland flange	1	
17	Gland bolt	2	80mm to 125mm
18	Gland nut	2	150mm to 300mm
★ 20	Ball	2	80mm to 125mm
		4	150mm to 300mm
★ 21	Set screw	2	
		4	Only 250mm, 300mm
22	Hexagon bolt, Spring washer	4 sets	
23	Stem key	1	
29	C-ring	1	

### ■ 302A Parts List (350mm to 600mm: -29 to 400 degrees C)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
★ 4	Seat ring gasket	1	
★ 5	Seat ring	1	
★ 6	Back-up ring	1	
7	Seat ring retainer	1	
8	Shaft bearing	3	※1
10	Bottom cover	1	
★ 11	Bottom gasket	1	
12	Key	1	
13-1	Packing retainer	1	
13-3	Ring	1	
★ 14	Gland packing	1 set	
15	Gland bush	1	
16	Gland flange	1	
17	Gland bolt	2	
18	Gland nut	2	
★ 20	Ball	4	
★ 21	Set screw	4	
22	Hexagon bolt, Spring washer	4 sets	
23	Stem key	1	
26	Sub-retainer	1	
26-2	Seat spacer	1	Only 350mm
29	C-ring	1	
30	Thrust ring	2	
31	Eye bolt	2	Only 450mm to 600mm

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove set screws (Part #21 set screw).

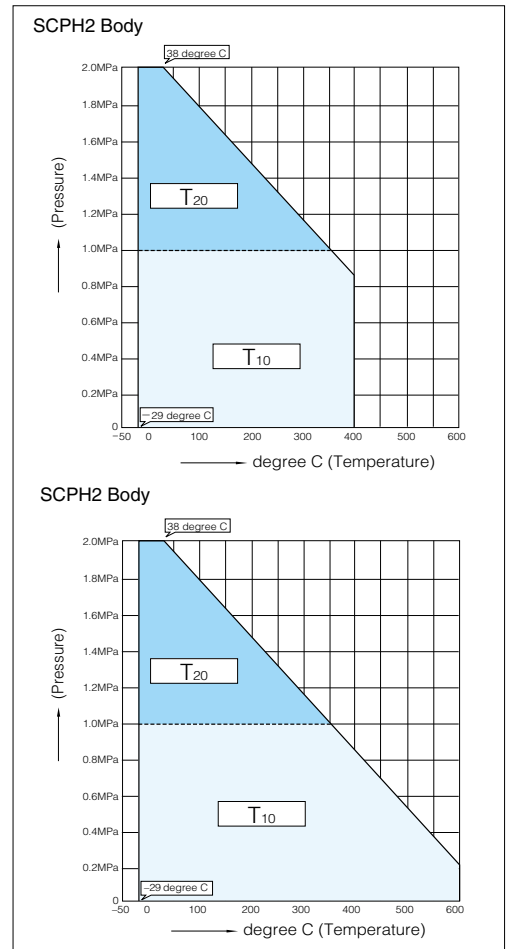
※1 The carbon bearing has a two-piece structure separated from the space ring.

## 302A Actuator Selection Chart

### 80mm to 300mm

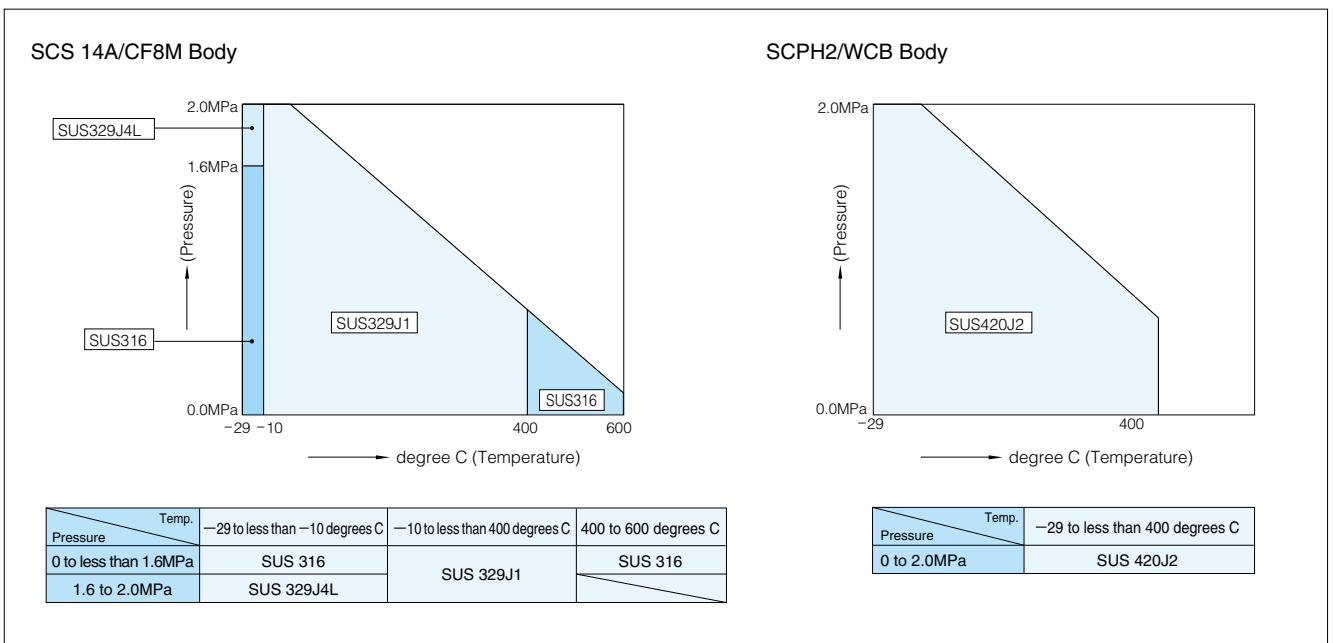
Model	Category	Size (mm / inch)						
		80	100	125	150	200	250	300
		3	4	5	6	8	10	12
1T	T <sub>10</sub>	1T-2			1T-3			
	T <sub>20</sub>	1T-2			1T-3			
2U,2S	T <sub>10</sub>	2U-2			2U-4		DGH-2	DGH-3
	T <sub>20</sub>	2U-2			2U-4		DGH-2	DGH-3
7E,3A	T <sub>10</sub>	T85	T200		T380		T750	TGA-125
	T <sub>20</sub>	T85	T200		T380		T750	TGA-125
7G,7F 3U,3K	T <sub>10</sub>	T200S	T380S	T750S		TG-12S		
	T <sub>20</sub>	T380S	T750S		TG-10S		TG-14S	
4I	T <sub>10</sub>	4I-0	4I-1	4I-2		4I-2.5		4I-3
	T <sub>20</sub>	4I-1	4I-2		4I-2.5		4I-3	
4J,4L	T <sub>10</sub>	SRJ-010	SRJ-020		SRJ-060		SRJ-060	LTKD-01 0.2kW/DGH-3
	T <sub>20</sub>	SRJ-010	SRJ-020		SRJ-060		SRJ-060	LTKD-01 0.2kW/DGH-3

### 302A Pressure Rating



## 302A Standard Stem Material

### 80mm to 300mm



※ 1 Framed description shows stem material.  
 ※ 2 Refer to Pressure - Temperature chart.  
 ※ 3 Consult us regarding other materials.

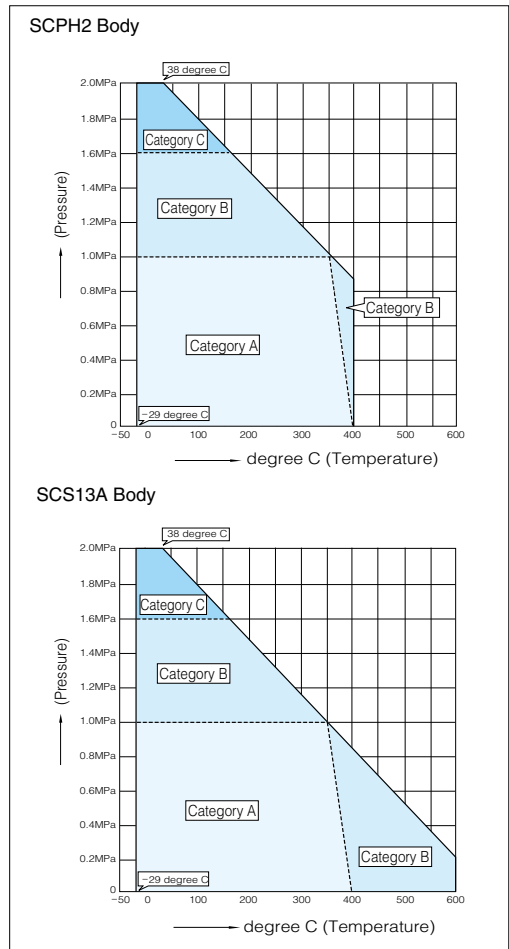


## 302A Actuator Selection Chart

### 350mm to 600mm

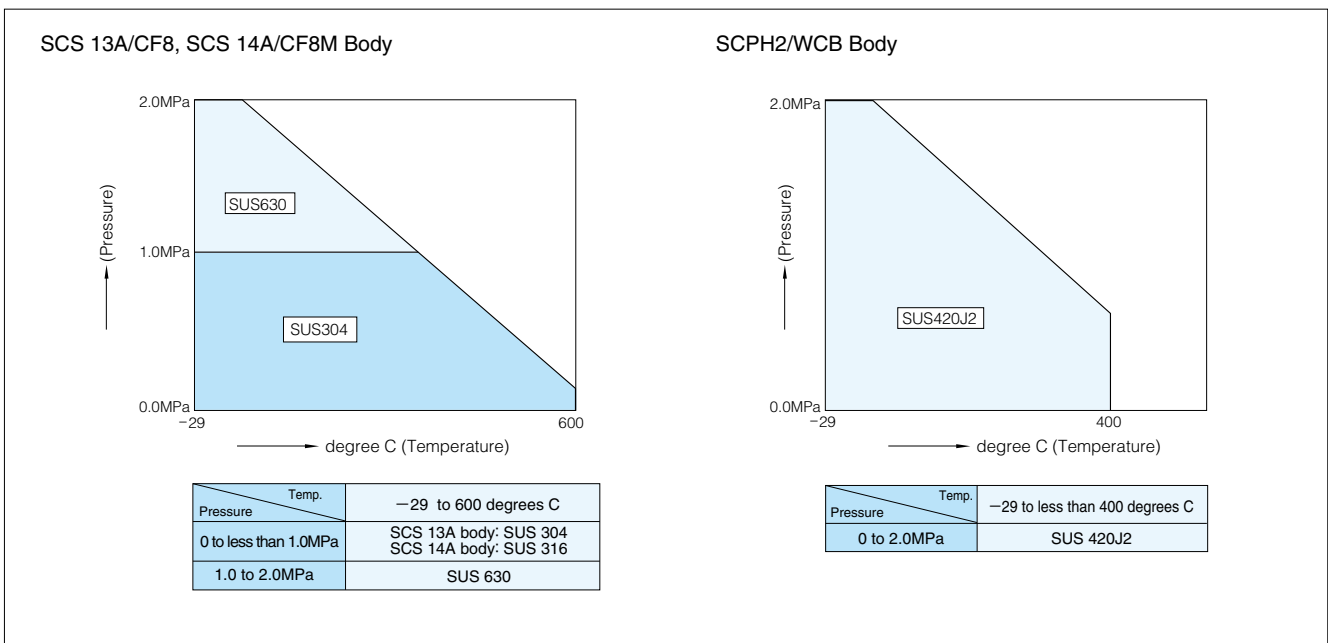
Model	Category	Size (mm / inch)				
		350	400	450	500	600
		14	16	18	20	24
2S	A	DGH-3		DGH-4	DGH-4+R/G5	
	B	DGH-3		DGH-4	DGH-4.5 +R/G5	
	C	DGH-3		DGH-4+R/G5	DGH-4.5 +R/G5	
3A	A	TGA-125	TGA-140		TGA-160	TGA-180
	B	TGA-140		TGA-160	TGA-180	TGA-200
	C	TGA-160		TGA-180	TGA-220	
3U,3K	A	TG-14S		TG-20S		
	B	TG-14S		TG-20S		
	C	TG-14S		TG-20S		
4I	A	4I-4				
	B	4I-4				
	C	4I-4				
4L	A	LTKD-01 0.2kW/DGH-3	LTKD-02 0.4kW/DGH-4	LTKD-02 1.5kW/DGH-4		LTKD-02 1.5kW/DGH-5
	B	LTKD-02 0.4kW/DGH-4	LTKD-02 0.75kW/DGH-4	LTKD-02 1.5kW/DGH-5		LTKD-05 1.5kW/DGH-5
	C	LTKD-02 0.4kW/DGH-4	LTKD-02 1.5kW/DGH-4	LTKD-05 1.5kW/DGH-5		LTKD-05 1.5kW/DGH-5

### 302A Pressure Rating



## 302A Standard Stem Material

### 350mm to 600mm



※1 Framed description shows stem material.  
 ※2 Refer to Pressure - Temperature chart.  
 ※3 Consult us regarding other materials.

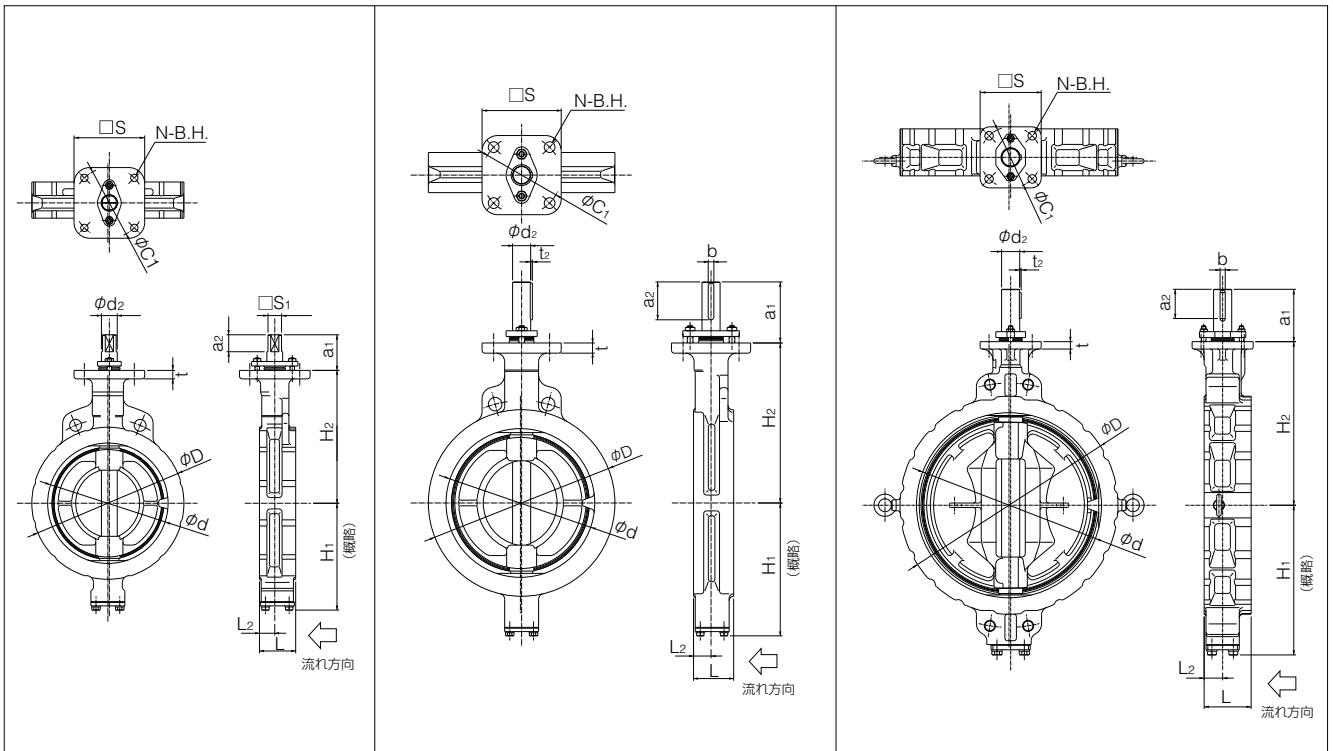
# Tom Disco 302A(Wafer)/303Q (Lugged)

## Dimension List

### 302A 80mm~200mm

### 302A 250mm~400mm

### 302A 450mm~600mm



### -29 to less than 400 degrees C

Stem shape	Nominal size		Dimension (mm)													Approx. Weight (kg)	
	mm	inch	$\phi d$	$\phi 1$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\square S_1$	$\phi d_2$	b	t <sub>2</sub>	t		ISO 5211 Top Flange
01	80	3	89	127	48	22	95	147	52.5	16.5	14	16	-	-	15	F10	5
	100	4	112	156	54	24	110	170	52.5	16.5	14	16	-	-	15	F10	6.2
	125	5	137	185	56	23	139	185	52.5	16.5	16	20	-	-	15	F10	9.3
	150	6	163	216	57	23.5	164	205	55.5	20	18	22	-	-	15	F12	12.5
	200	8	213	269	64	27	190	235	63	30	24	28	-	-	15	F12	19
02	250	10	263	330	71	31	236	283	108	67.3	-	32	10	3	18	F14	33
	300	12	315	381	81	35	246	310	113	72.3	-	35	10	3	18	F14	42
	350	14	350	416	92	39.5	308	340	113	72	-	38	10	3	18	F14	61
	400	16	400	475	102	39	348	372	113	72	-	42	12	3.5	18	F14	88
	450	18	450	534	114	43	366	406	141.5	68	-	45	12	3.5	20	F16	135
	500	20	500	589	127	50	405	442	141.5	79	-	49	14	4	20	F16	173
	600	24	600	693	154	64	461	493	141.5	80	-	59	16	5	20	F16	272

### Top Flange Dimension

ISO 5211 Top Flange	$\square S$	$\phi C_1$	N	B.H.
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

Stem shape	01 : square 02 : round with key
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302A Bare Shaft (01: 80mm to 200mm, 02: 250mm to 600mm)

■ 302A 80mm~200mm

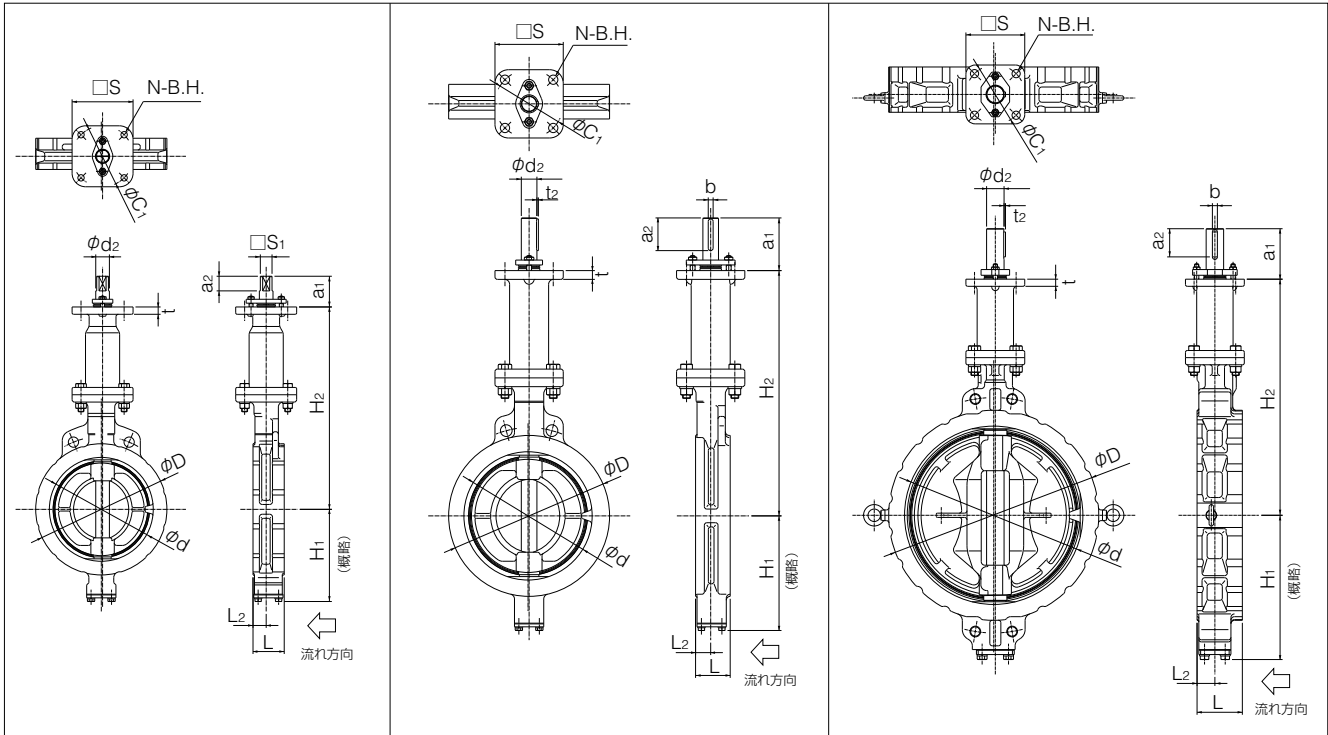
(High-Temperature Extension Bonnets)

■ 302A 250mm~400mm

(High-Temperature Extension Bonnets)

■ 302A 450mm~600mm

(High-Temperature Extension Bonnets)



■ 400 to less than 600 degrees C (High-Temperature Extension Bonnets)

Stem shape	Nominal size		Dimension (mm)													Approx. Weight (kg)	
	mm	inch	φd	φD	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S <sub>1</sub>	φd <sub>2</sub>	b	t <sub>2</sub>	t		ISO 5211 Top Flange
01	80	3	89	127	48	22	95	297	52.5	16.5	14	16	—	—	15	F10	10.3
	100	4	112	156	54	24	110	320	52.5	16.5	14	16	—	—	15	F10	11.5
	125	5	137	185	56	23	139	335	52.5	16.5	16	20	—	—	15	F10	14.7
	150	6	163	216	57	23.5	164	385	55.5	20	18	22	—	—	15	F12	20
	200	8	213	269	64	27	190	415	63	30	24	28	—	—	15	F12	27
02	250	10	263	330	71	31	236	503	108	67.3	—	32	10	3	18	F14	46
	300	12	315	381	81	35	246	530	113	72.3	—	35	10	3	18	F14	55
	350	14	350	416	92	39.5	308	560	113	72	—	38	10	3	18	F14	76
	400	16	400	475	102	39	348	592	113	72	—	42	12	3.5	18	F14	104
	450	18	450	534	114	43	366	626	141.5	68	—	45	12	3.5	20	F16	152
	500	20	500	589	127	50	405	662	141.5	79	—	49	14	4	20	F16	191
	600	24	600	693	154	64	461	713	141.5	80	—	59	16	5	20	F16	291

■ Top Flange Dimension

ISO 5211 Top Flange	□S	φC <sub>1</sub>	N	B.H.
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

Stem shape	01 : square 02 : round with key
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# Tom Disco 302A(Wafer)/303Q (Lugged)

## Lock Lever Type 302A-1T (80mm to 150mm)

### ■ -29 to less than 250 degrees C

Nominal size		Dimension (mm)									Lever type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	W		
80	3	89	127	48	22	95	147	T <sub>10</sub> , T <sub>20</sub>	117	300	1T-2	7.1
100	4	112	156	54	24	110	170	T <sub>10</sub> , T <sub>20</sub>	117	300	1T-2	8.3
125	5	137	185	56	23	139	185	T <sub>10</sub> , T <sub>20</sub>	117	300	1T-2	11.4
150	6	163	216	57	23.5	164	205	T <sub>10</sub> , T <sub>20</sub>	125	350	1T-3	14.6

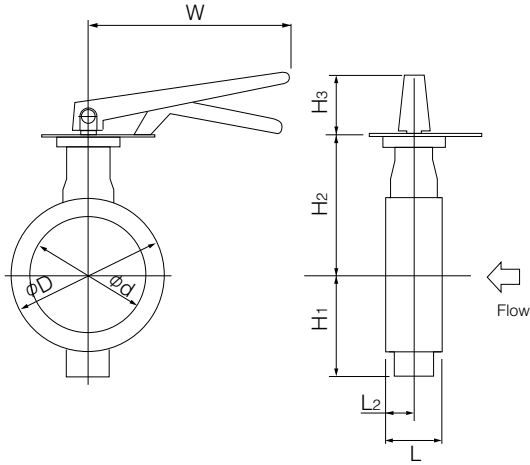
### ■ 250 to less than 400 degrees C

Nominal size		Dimension (mm)									Lever type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	W		
80	3	89	127	48	22	95	147	T <sub>10</sub> , T <sub>20</sub>	217	300	1T-2	9.7
100	4	112	156	54	24	110	170	T <sub>10</sub> , T <sub>20</sub>	217	300	1T-2	10.9
125	5	137	185	56	23	139	185	T <sub>10</sub> , T <sub>20</sub>	217	300	1T-2	14.2
150	6	163	216	57	23.5	164	205	T <sub>10</sub> , T <sub>20</sub>	297	350	1T-3	21.3

### ■ 400 to 600 degrees C

Nominal size		Dimension (mm)									Lever type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	W		
80	3	89	127	48	22	95	297	T <sub>10</sub>	217	300	1T-2	15
100	4	112	156	54	24	110	320	T <sub>10</sub>	217	300	1T-2	16.2
125	5	137	185	56	23	139	335	T <sub>10</sub>	217	300	1T-2	19.6
150	6	163	216	57	23.5	164	385	T <sub>10</sub>	297	350	1T-3	28.8

### ■302A-1T



### ■302A-1T Actuator Mounting Finish by Temperature

Temp.range	-29 to less than 250 degrees C	250 to less than 400 degrees C	400 to 600 degrees C
Body	80mm to 150mm	SCS14A SCPH2	SCS14A

### ■1T Installation Direction

<p>Retainer Side</p> <p>Stem Side</p> <p>1TA</p>	<p>Retainer Side</p> <p>Stem Side</p> <p>1TB</p>	<p>Retainer Side</p> <p>Stem Side</p> <p>1TC</p>	<p>Retainer Side</p> <p>Stem Side</p> <p>1TD</p>
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# Tom Disco 302A(Wafer)/303Q (Lugged)

## Worm Gear Type 302A-2U (80mm to 150m) / 302A-2S(200mm to 600mm)

### ■-29 to less than 250 degrees C

Nominal size		Dimension (mm)												Gear type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	$\phi W$		
80	3	89	127	48	22	95	147	T <sub>10</sub> ,T <sub>20</sub>	61	44	53	173.5	160	2U-2	7.9
100	4	112	156	54	24	110	170	T <sub>10</sub> ,T <sub>20</sub>	61	44	53	173.5	160	2U-2	9.1
125	5	137	185	56	23	139	185	T <sub>10</sub> ,T <sub>20</sub>	61	44	53	173.5	160	2U-2	13.2
150	6	163	216	57	23.5	164	205	T <sub>10</sub> ,T <sub>20</sub>	77.5	87.5	90	222.5	200	2U-4	29
200	8	213	269	64	27	190	235	T <sub>10</sub> ,T <sub>20</sub>	72	85	126	246	280	DGH-2	33
250	10	263	330	71	31	236	283	T <sub>10</sub> ,T <sub>20</sub>	97	117	164	335	355	DGH-3	62
300	12	315	381	81	35	246	310	T <sub>10</sub> ,T <sub>20</sub>	97	117	164	335	355	DGH-3	72
350	14	350	416	92	39.5	308	340	A,B,C	97	117	164	335	355	DGH-3	99
400	16	400	475	102	39	348	372	A	97	117	164	335	355	DGH-3	124
								B,C	215	140	198	402	450	DGH-4	162
450	18	450	534	114	43	366	406	A,B	127	140	198	402	450	DGH-4	198
								C	127	140	198	432	355	DGH-4+R/G5	200
500	20	500	589	127	50	405	442	A	127	140	198	402	450	DGH-4	236
								B,C	127	140	198	432	355	DGH-4+R/G5	238
600	24	600	693	154	64	461	493	A	127	140	198	432	355	DGH-4+R/G5	338
								B,C	245	185	264	497	355	DGH-4.5+R/G5	413

### ■250 to less than 400 degrees C

Nominal size		Dimension (mm)												Gear type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	$\phi W$		
80	3	89	127	48	22	95	147	T <sub>10</sub> ,T <sub>20</sub>	134.5	44	53	173.5	160	2U-2	10.5
100	4	112	156	54	24	110	170	T <sub>10</sub> ,T <sub>20</sub>	134.5	44	53	173.5	160	2U-2	11.7
125	5	137	185	56	23	139	185	T <sub>10</sub> ,T <sub>20</sub>	134.5	44	53	173.5	160	2U-2	17.2
150	6	163	216	57	23.5	164	205	T <sub>10</sub> ,T <sub>20</sub>	223	87.5	90	222.5	200	2U-4	35
200	8	213	269	64	27	190	235	T <sub>10</sub> ,T <sub>20</sub>	217	85	126	246	280	DGH-2	39
250	10	263	330	71	31	236	283	T <sub>10</sub> ,T <sub>20</sub>	205	117	164	335	355	DGH-3	75
300	12	315	381	81	35	246	310	T <sub>10</sub> ,T <sub>20</sub>	205	117	164	335	355	DGH-3	85
350	14	350	416	92	39.5	308	340	A, B	205	117	164	335	355	DGH-3	108
400	16	400	475	102	39	348	372	A	205	117	164	335	355	DGH-3	134
								B	215	140	198	402	450	DGH-4	162
450	18	450	534	114	43	366	406	A, B	245	140	198	402	450	DGH-4	212
500	20	500	589	127	50	405	442	A	245	140	198	402	450	DGH-4	250
								B	245	140	198	432	355	DGH-4+R/G5	252
600	24	600	693	154	64	461	493	A	245	140	198	432	355	DGH-4+R/G5	354
								B	245	185	264	497	355	DGH-4.5+R/G5	413

### ■2U/2S Installation Direction

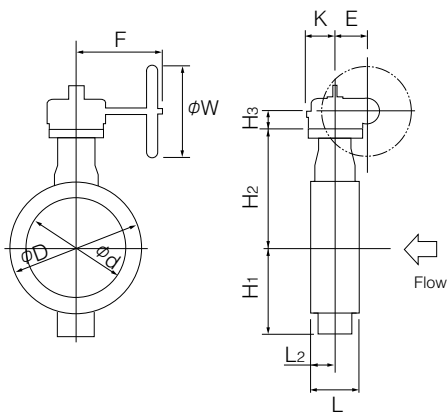
<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p>
2UA/2SA	2UB/2SB	2UC/2SC	2UD/2SD

**Worm Gear Type 302A-2U(80mm to 150m) / 302A-2S(200mm to 600mm)**

**400 to 600 degrees C**

Nominal size		Dimension (mm)												Gear type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	$\phi W$		
80	3	89	127	48	22	95	297	T <sub>10</sub>	134.5	44	53	173.5	160	2U-2	16
100	4	112	156	54	24	110	320	T <sub>10</sub>	134.5	44	53	173.5	160	2U-2	17.2
125	5	137	185	56	23	139	335	T <sub>10</sub>	134.5	44	53	173.5	160	2U-2	22.7
150	6	163	216	57	23.5	164	385	T <sub>10</sub>	223	87.5	90	222.5	200	2U-4	42.5
200	8	213	269	64	27	190	415	T <sub>10</sub>	217	85	126	246	280	DGH-2	47
250	10	263	330	71	31	236	503	T <sub>10</sub>	205	117	164	335	355	DGH-3	88
300	12	315	381	81	35	246	530	T <sub>10</sub>	205	117	164	335	355	DGH-3	98
350	14	350	416	92	39.5	308	560	B	205	117	164	335	355	DGH-3	124
400	16	400	475	102	39	348	592	B	215	140	198	402	450	DGH-4	178
450	18	450	534	114	43	366	626	B	245	140	198	402	450	DGH-4	228
500	20	500	589	127	50	405	662	B	245	140	198	432	355	DGH-4+R/G5	270
600	24	600	693	154	64	461	713	B	245	185	264	497	355	DGH-4.5+R/G5	432

**302A-2U/2S**



**302A-2U/2S Actuator Mounting Finish by Temperature**

Temp.range	-29 to less than 250 degrees C		250 to less than 400 degrees C		400 to 600 degrees C	
	Body	80mm to 300mm	SCS14A SCPH2	SCS14A	Ext. Bonnet	SCS14A
	350mm to 600mm	SCS13A SCPH2	SCS13A		SCS13A	

Temp.range	-29 to less than 400 degrees C		400 to 600 degrees C	
	Body	400mm (DGH-4)	SCS13A SCPH2	SCS13A
	600mm (DGH-4.5 +R/G5)		SCS13A	

# Tom Disco 302A(Wafer)/303Q (Lugged)

## Double-acting Pneumatic Cylinder Type 302A-7E (80mm to 300mm)

■ -29 to less than 250 degrees C

Less than 1.0 MPa

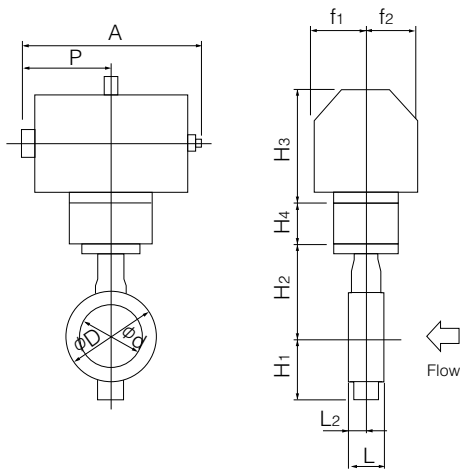
Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
80	3	89	127	48	22	95	147	168	26.5	276	142	75	47	T85	11
100	4	112	156	54	24	110	170	203	26.5	346	176	79	57	T200	16
125	5	137	185	56	23	139	185	203	26.5	346	176	79	57	T200	19
150	6	163	216	57	23.5	164	205	231	29.5	423	214	91	69	T380	29
200	8	213	269	64	27	190	235	269	29.5	546	270	118	85	T750	45
250	10	263	330	71	31	236	283	269	190	546	270	118	87.5	T750	73
300	12	315	381	81	35	246	310	269	190	546	270	118	87.5	T750	82

1.0 MPa to 2.0 MPa

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
80	3	89	127	48	22	95	147	203	26.5	346	176	79	57	T200	12
100	4	112	156	54	24	110	170	203	26.5	346	176	79	57	T200	16
125	5	137	185	56	23	139	185	231	26.5	423	214	91	69	T380	20
150	6	163	216	57	23.5	164	205	231	29.5	423	214	91	69	T380	29
200	8	213	269	64	27	190	235	269	29.5	546	270	118	85	T750	45



### 302A-7E



### 302A-7E Actuator Mounting Finish by Temperature

Temp.range	-29 to less than 250 degrees C	250 to less than 400 degrees C	400 to 600 degrees C
Body	80mm to 200mm	SCS14A SCPH2	SCS14A

Temp.range	-29 to less than 400 degrees C	400 to 600 degrees C
Body	250mm 300mm	SCS14A SCPH2
	350mm	SCS13A SCPH2

### 7E Installation Direction

<p>7EA</p>	<p>7EB</p>	<p>7EC</p>	<p>7ED</p>
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# Tom Disco 302A(Wafer)/303Q (Lugged)

## Double-acting Pneumatic Cylinder Type 302A-3A (250mm to 600mm)

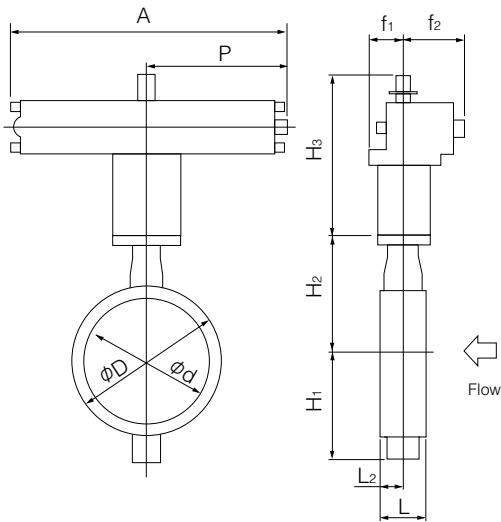
### ■-29 to less than 400 degrees C

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi$ d	$\phi$ D	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	263	330	71	31	236	283	T <sub>20</sub>	424	754	381	100	164	TGA-125	79
300	12	315	381	81	35	246	310	T <sub>20</sub>	424	754	381	100	164	TGA-125	88
350	14	350	416	92	39.5	308	340	A	424	754	381	100	164	TGA-125	110
								B, C	472	840	432	100	180	TGA-140	121
400	16	400	475	102	39	348	372	A, B	472	840	432	100	180	TGA-140	147
								C	510	954	483	130	203	TGA-160	214
450	18	450	534	114	43	366	406	A	502	840	417	100	180	TGA-140	207
								B, C	530	954	483	130	202	TGA-160	263
500	20	500	589	127	50	405	442	A	530	954	483	130	203	TGA-160	302
								B, C	543	1069	543	130	221	TGA-180	330
600	24	600	693	154	64	461	493	A	543	1069	543	130	221	TGA-180	431
								B	610	1175	599	160	254	TGA-200	475
								C	640	1263	642	160	271	TGA-220	535

### ■400 to 600 degrees C

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi$ d	$\phi$ D	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	350	416	92	39.5	308	560	B	472	840	432	100	180	TGA-140	136
400	16	400	475	102	39	348	592	B	472	840	432	100	180	TGA-140	163
450	18	450	534	114	43	366	626	B	530	954	483	130	203	TGA-160	280
500	20	500	589	127	50	405	662	B	543	1069	543	130	221	TGA-180	348
600	24	600	693	154	64	461	713	B	610	1175	599	160	254	TGA-200	494

■ 302A-3A



■ 302A-3A

Actuator Mounting Finish by Temperature

Temp.range	-29 to less than 400 degrees C	400 to 600 degrees C
Body	350mm to 600mm SCS13A SCPH2	SCS13A

■ 3A Installation Direction

<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>3 A A</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>3 A B</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>3 A C</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>3 A D</p>
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# Tom Disco 302A(Wafer)/303Q (Lugged)

Single-acting Pneumatic Cylinder Type 302A-7G (Air to open: 80mm to 150mm) / 302A-7F (Air to close: 80mm to 150mm)

■ -29 to less than 250 degrees C

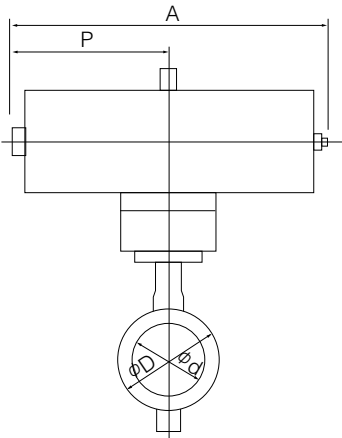
Less than 1.0 MPa

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
80	3	89	127	48	22	95	147	203	26.5	449	226	79	57	T200S	17
100	4	112	156	54	24	110	170	231	26.5	550	276	91	69	T380S	27
125	5	137	185	56	23	139	185	269	26.5	723	360	118	85	T750S	43
150	6	163	216	57	23.5	164	205	269	29.5	723	360	118	85	T750S	47

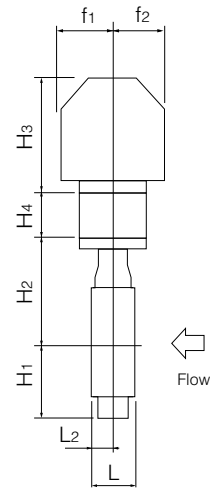
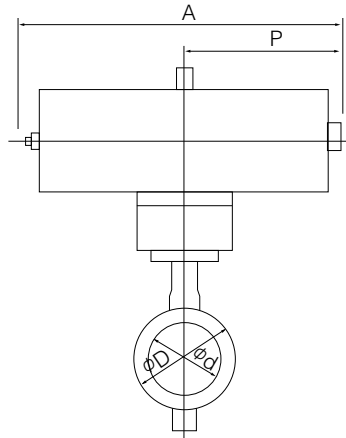
1.0 MPa to 2.0 MPa

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
80	3	89	127	48	22	95	147	231	26.5	550	276	91	69	T380S	26
100	4	112	156	54	24	110	170	269	26.5	723	360	118	85	T750S	40
125	5	137	185	56	23	139	185	269	26.5	723	360	118	85	T750S	43

■ 302A-7F



■ 302A-7G



■ 302A-7F/7G Actuator Mounting Finish by Temperature

Temp.range	-29 to less than 250 degrees C	250 to less than 400 degrees C	400 to 600 degrees C
Body	80mm to 150mm	SCS14A SCPH2	SCS14A

■ 7F/7G Installation Direction

<p>Retainer Side</p> <p>Air port side</p> <p>Stem Side</p> <p>Flow</p>	<p>Retainer Side</p> <p>Air port side</p> <p>Stem Side</p> <p>Flow</p>	<p>Retainer Side</p> <p>Air port side</p> <p>Stem Side</p> <p>Flow</p>	<p>Retainer Side</p> <p>Air port side</p> <p>Stem Side</p> <p>Flow</p>
7FA/7GA	7FB/7GB	7FC/7GC	7FD/7GD

# Tom Disco 302A(Wafer)/303Q (Lugged)

Single-acting Pneumatic Cylinder Type 302A-3U(Air to open: 150mm to 600mm) / 302A-3K(Air to close: 150mm to 600mm)

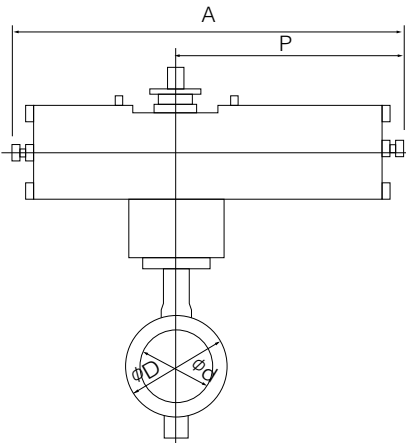
## ■-29 to 400 less than degrees C

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi$ d	$\phi$ D	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
150	6	163	216	57	23.5	164	205	T <sub>20</sub>	377	945	585	70	165	TG-10S	72
200	8	213	269	64	27	190	235	T <sub>10</sub> ,T <sub>20</sub>	377	1080	720	94	206	TG-12S	122
250	10	263	330	71	31	236	283	T <sub>10</sub>	417	1080	720	94	206	TG-12S	141
								T <sub>20</sub>	450	1255	865	131	257	TG-14S	239
300	12	315	381	81	35	246	310	T <sub>10</sub>	417	1080	720	94	206	TG-12S	150
								T <sub>20</sub>	450	1255	865	131	257	TG-14S	248
350	14	350	416	92	39.5	308	340	A	450	1255	865	131	257	TG-14S	264
								B,C	602	1655	1095	164	348	TG-20S	485
400	16	400	475	102	39	348	372	A	450	1255	865	131	257	TG-14S	292
								B,C	602	1655	1095	164	348	TG-20S	512
450	18	450	534	114	43	366	406	A,B,C	624	1655	1095	164	348	TG-20S	564
500	20	500	589	127	50	405	442	A,B	624	1655	1095	164	348	TG-20S	602
600	24	600	693	154	64	461	493	A	624	1655	1095	164	348	TG-20S	701

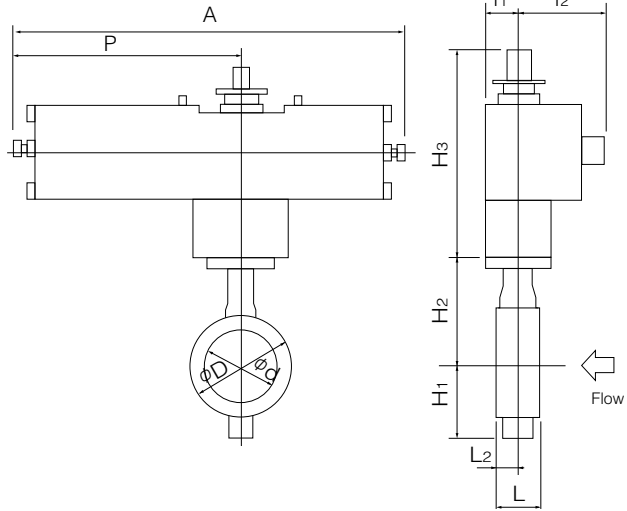
## ■400 to 600 degrees C

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi$ d	$\phi$ D	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	213	269	64	27	190	415	T <sub>10</sub>	377	1080	720	94	206	TG-12S	130
250	10	263	330	71	31	236	503	T <sub>10</sub>	417	1080	720	94	206	TG-12S	154
300	12	315	381	81	35	246	530	T <sub>10</sub>	417	1080	720	94	206	TG-12S	164
350	14	350	416	92	39.5	308	560	B	602	1655	1095	164	348	TG-20S	500
400	16	400	475	102	39	348	592	B	602	1655	1095	164	348	TG-20S	528
450	18	450	534	114	43	366	626	B	624	1655	1095	164	348	TG-20S	582
500	20	500	589	127	50	405	662	B	624	1655	1095	164	348	TG-20S	620

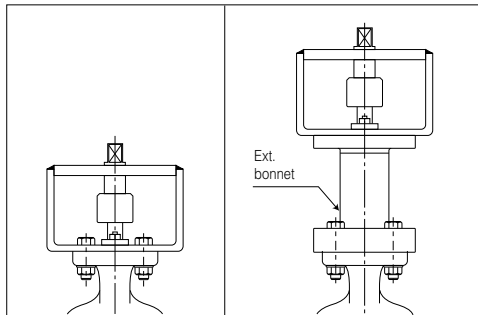
■ 302A-3K



■ 302A-3U

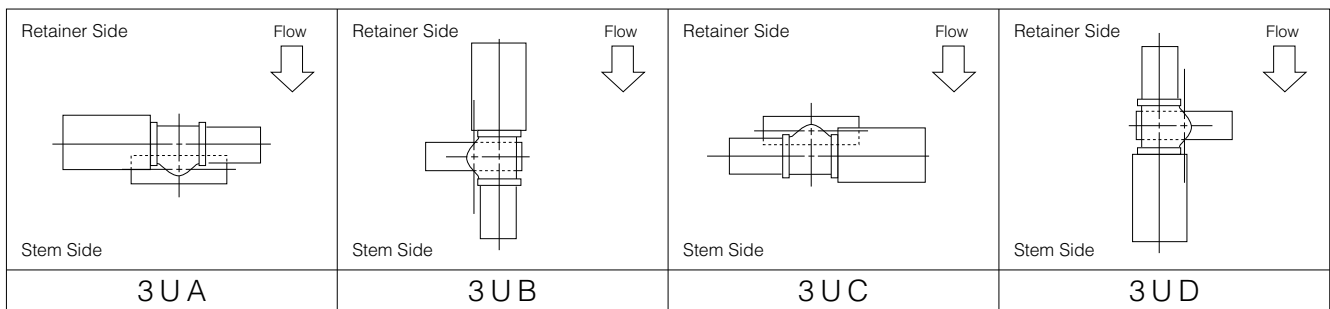


■ 302A 3U/3K Actuator Mounting Finish by Temperature

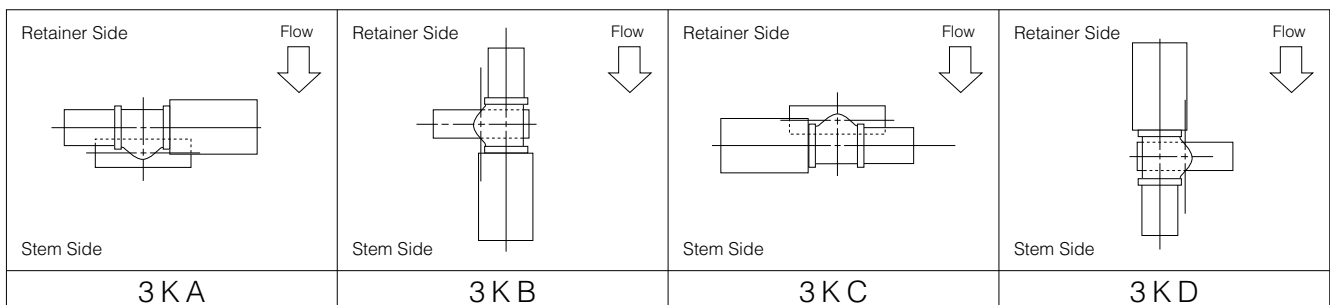


Temp.range	-29 to less than 400 degrees C	400 to 600 degrees C
Body	150mm to 300mm	SCS14A SCPH2
	350mm to 600mm	SCS13A SCPH2
		SCS14A
		SCS13A

■ 3U Installation Direction



■ 3K Installation Direction



# Tom Disco 302A(Wafer)/303Q (Lugged)

## Single Phase Electric Motor Type 302A-4 I (80mm to 400mm)

### ■-29 to less than 400 degrees C

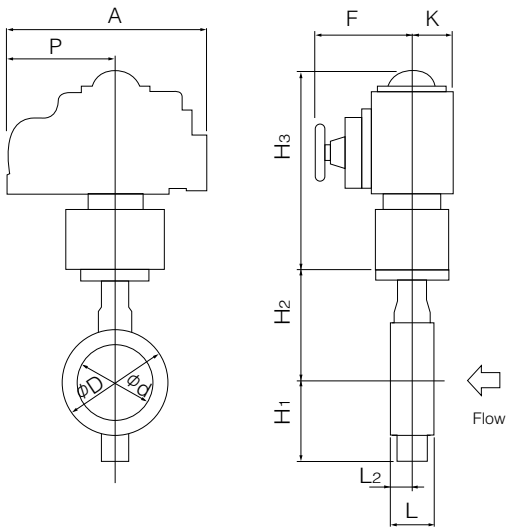
Nominal size		Dimension (mm)												Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	F	K		
80	3	89	127	48	22	95	147	T <sub>10</sub>	250	202	100	85	54	4 I-0	12.1
								T <sub>20</sub>	265	252	138	126	65	4 I-1	14.3
100	4	112	156	54	24	110	170	T <sub>10</sub>	265	252	138	126	65	4 I-1	15.5
								T <sub>20</sub>	298	310	167	154	85	4 I-2	21.5
125	5	137	185	56	23	139	185	T <sub>10,T20</sub>	298	310	167	154	85	4 I-2	24.5
150	6	163	216	57	23.5	164	205	T <sub>10</sub>	373	310	167	154	85	4 I-2	29.5
								T <sub>20</sub>	373	310	167	154	85	4 I-2.5	31
200	8	213	269	64	27	190	235	T <sub>10</sub>	373	310	167	154	85	4 I-2.5	39
								T <sub>20</sub>	405	388	223	246	136	4 I-3	49
250	10	263	330	71	31	236	283	T <sub>10,T20</sub>	420	388	223	246	136	4 I-3	66
300	12	315	381	81	35	246	310	T <sub>10,T20</sub>	420	388	223	246	136	4 I-3	75
350	14	350	416	92	39.5	308	340	A,B	423	388	223	246	136	4 I-4	96
400	16	400	475	102	39	348	372	A	423	388	223	246	136	4 I-4	123

### ■400 to 600 degrees C

Nominal size		Dimension (mm)												Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	F	K		
80	3	89	127	48	22	95	297	T <sub>10</sub>	250	202	100	85	54	4 I-0	17.6
100	4	112	156	54	24	110	320	T <sub>10</sub>	265	252	138	126	65	4 I-1	21
125	5	137	185	56	23	139	335	T <sub>10</sub>	298	310	167	154	85	4 I-2	30
150	6	163	216	57	23.5	164	385	T <sub>10</sub>	373	310	167	154	85	4 I-2	37.5
200	8	213	269	64	27	190	415	T <sub>10</sub>	373	310	167	154	85	4 I-2.5	47
250	10	263	330	71	31	236	503	T <sub>10</sub>	420	388	223	246	136	4 I-3	79
300	12	315	381	81	35	246	530	T <sub>10</sub>	420	388	223	246	136	4 I-3	88
350	14	350	416	92	39.5	308	560	B	423	388	223	246	136	4 I-4	138



■ 302A-4 I



■ 302A-4 I

Actuator Mounting Finish by Temperature

Temp. range		-29 to less than 400 degrees C	400 to 600 degrees C
Body	80mm to 300mm	SCS14A SCPH2	SCS14A
	350mm 400mm	SCS13A SCPH2	SCS13A

■ 4I Installation Direction

<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>4 I A</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>4 I B</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>4 I C</p>	<p>Retainer Side</p> <p>Flow</p> <p>Stem Side</p> <p>4 I D</p>
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# Tom Disco 302A(Wafer)/303Q (Lugged)

## Three Phase Motor Actuator Type 302A-4L (250mm to 600mm)

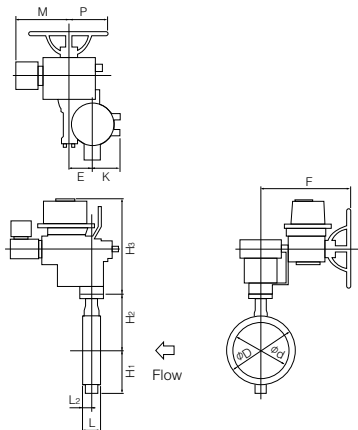
### ■ -29 to less than 400 degrees C

Nominal size		Dimension (mm)													Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	M	P		
250	10	263	330	71	31	236	283	T <sub>10</sub>	548	117	164	533	357	230	LTKD-01 0.2kW/DGH-3	125
300	12	315	381	81	35	246	310	T <sub>10</sub> , T <sub>20</sub>	548	117	164	533	357	230	LTKD-01 0.2kW/DGH-3	133
350	14	350	416	92	39.5	308	340	A, B	548	117	164	533	357	230	LTKD-01 0.2kW/DGH-3	171
								C	593	140	198	593	373	230	LTKD-02 0.4kW/DGH-4	221
400	16	400	475	102	39	348	372	A	548	117	164	533	357	230	LTKD-01 0.2kW/DGH-3	197
								B	593	140	198	593	373	230	LTKD-02 0.4kW/DGH-4	247
								C	593	140	198	593	400	230	LTKD-02 0.75kW/DGH-4	258
450	18	450	534	114	43	366	406	A	643	140	198	593	373	230	LTKD-01 0.2kW/DGH-3	308
								B, C	643	140	198	593	400	230	LTKD-02 0.75kW/DGH-4	319
500	20	500	589	127	50	405	442	A, B	643	140	198	594	372	230	LTKD-02 0.75kW/DGH-4	357
								C	643	140	198	594	431	230	LTKD-02 1.5kW/DGH-4	362
600	24	600	693	154	64	461	493	A	643	140	198	593	403	230	LTKD-02 1.5kW/DGH-4	465
								B	718	210	300	698	403	230	LTKD-02 1.5kW/DGH-5	564
								C	749	210	300	748	403	360	LTKD-05 1.5kW/DGH-5	605

### ■ 400 to 600 degrees C

Nominal size		Dimension (mm)													Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	M	P		
300	12	315	381	81	35	246	530	T <sub>10</sub>	548	117	164	533	357	230	LTKD-01 0.2kW/DGH-3	146
350	14	350	416	92	39.5	308	560	B	548	117	164	533	357	230	LTKD-01 0.2kW/DGH-3	186
400	16	400	475	102	39	348	592	B	593	140	198	594	373	230	LTKD-02 0.4kW/DGH-4	263
450	18	450	534	114	43	366	626	B	643	140	198	594	372	230	LTKD-02 0.75kW/DGH-4	336
500	20	500	589	127	50	405	662	B	643	140	198	594	372	230	LTKD-02 0.75kW/DGH-4	375
600	24	600	693	154	64	461	713	B	718	210	300	698	400	360	LTKD-02 1.5kW/DGH-5	584

### ■ 302A-4L



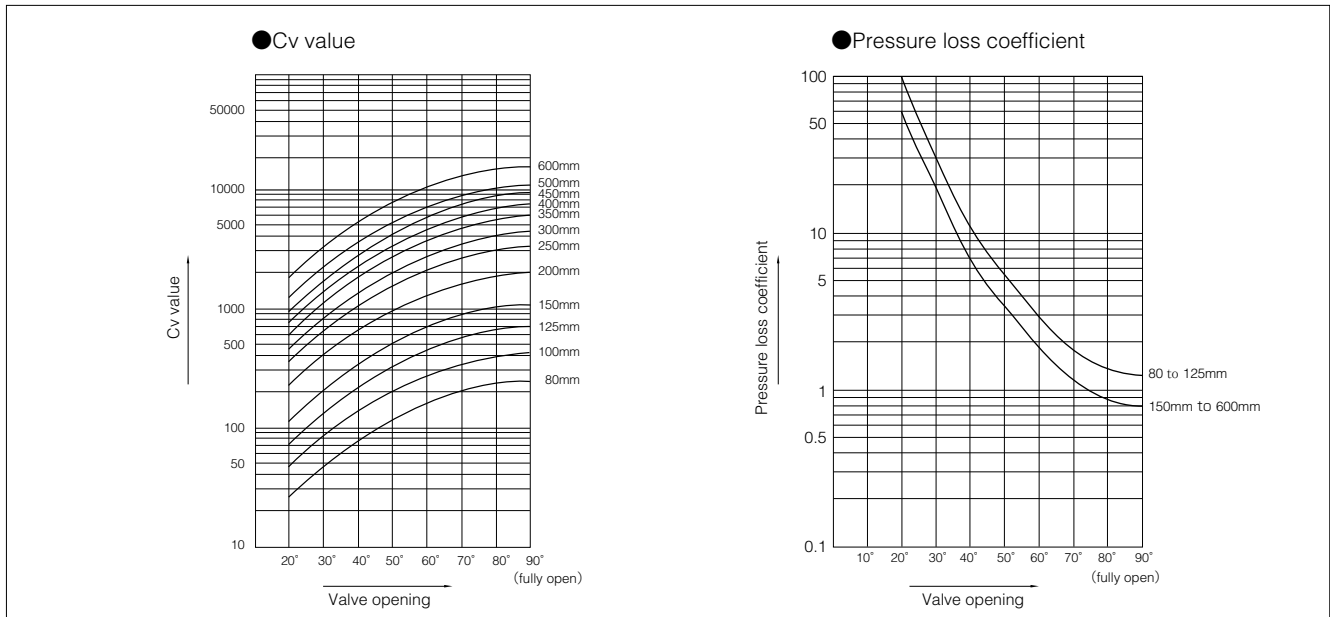
### ■ 302A-4L Actuator Mounting Finish by Temperature

Temp. range	-29 to less than 400 degrees C	400 to 600 degrees C
Body	SCS14A SCPH2	SCS14A
350mm to 600mm	SCS13A SCPH2	SCS13A

### ■ 4L Installation Direction

<p>Retainer Side</p> <p>Stem Side</p> <p>4 L A</p>	<p>Retainer Side</p> <p>Stem Side</p> <p>4 L B</p>	<p>Retainer Side</p> <p>Stem Side</p> <p>4 L C</p>	<p>Retainer Side</p> <p>Stem Side</p> <p>4 L D</p>
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### 302A Cv value/pressure loss coefficient



### 302A Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	29	52	85	122	162	207	243	252
100	4	49	88	144	207	279	351	414	432
125	5	77	140	230	333	441	549	648	684
150	6	126	225	369	531	720	900	1080	1116
200	8	234	423	693	990	1350	1710	1980	2070
250	10	390	703	1148	1648	2240	2857	3300	3443
300	12	492	888	1454	2081	2838	3612	4172	4354
350	14	648	1170	1915	2741	3739	4758	5496	5736
400	16	829	1496	2449	3505	4780	6084	7027	7334
450	18	1041	1879	3076	4403	6004	7642	8827	9212
500	20	1323	2387	3909	5595	7630	9710	11216	11705
600	24	1929	3481	5700	8159	11126	14161	16356	17070

### 302A Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	95	29	11	5.3	3.0	1.9	1.4	1.3
100	4	98	30	11	5.4	3.0	1.9	1.4	1.3
125	5	93	28	10	5.0	2.9	1.8	1.3	1.2
150	6	70	22	8.1	4.0	2.1	1.4	1.0	0.9
200	8	62	19	7.2	3.5	1.9	1.2	0.9	0.8
250	10	54	17	6.2	3.1	1.7	1.0	0.8	0.7
300	12	70	21	8.0	3.9	2.1	1.3	0.7	0.7
350	14	68	21	7.8	3.8	2.0	1.3	1.0	0.9
400	16	73	22	8.3	4.1	2.2	1.3	1.0	0.9
450	18	75	23	8.6	4.1	2.2	1.4	1.0	0.9
500	20	72	22	8.2	4.0	2.2	1.3	1.0	0.9
600	24	70	22	8.2	4.0	2.2	1.3	1.0	0.9

# Tom Disco 302A(Wafer)/303Q (Lugged)

## 302A Flange accommodation

Nominal size		JIS				ASME/API/JPI	BS4504		DIN		BS10
mm	inch	5K	10K	16K	20K	class 150	PN10	PN16	NP10	NP16	Table E
80	3	×	D	D	D	○	D	D	D	D	×
100	4	×	D	D	D	D	D	D	D	D	×
125	5	×	D	D	D	D	D	D	D	D	×
150	6	×	D	D	D	D	D	D	D	D	×
200	8	×	D	D	D	D	D	D	D	D	×
250	10	×	D	D	D	D	D	D	D	D	×
300	12	×	D	D	D	D	D	D	D	D	×
350	14	D	D	D	D	D	D	D	D	D	D
400	16	D	D	D	D	D	D	D	D	D	D
450	18	D	T	T	T	D	T	T	T	T	D(T)
500	20	T	T	T	T	T	T	T	T	T	D(T)
600	24	T	T	T	T	T	T	T	T	T	D(T)

○ : Can be used without flange drilling.  
D : With flange drilling  
T : With flange tapping  
× : Not applicable

### 302A Applicable Pipe List in Case of **A**

Nominal size		SGP		Sch20		Sch40		Sch60		Sch80		Sch10S		Sch20S		Minimum internal diameters of piping (mm)
mm	inch	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	
80	3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	72.5
100	4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	93.8
125	5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	119.4
150	6	○	○	○	○	○	○	○	×	○	×	○	○	○	○	147.5
200	8	○	○	○	○	○	○	○	×	○	×	○	○	○	○	197.5
250	10	○	○	○	○	○	○	○	×	○	×	○	○	○	○	248.1
300	12	○	○	○	○	○	○	○	×	×	×	○	○	○	○	297.6
350	14	○	○	○	○	○	○	○	×	×	×	—	—	—	—	330.0
400	16	○	○	○	○	○	○	○	×	○	×	—	—	—	—	377.0
450	18	○	○	○	○	○	○	○	×	○	×	—	—	—	—	424.0
500	20	○	○	○	○	○	○	○	×	○	×	—	—	—	—	470.0
600	24	—	—	○	○	○	○	○	×	×	×	—	—	—	—	564.0

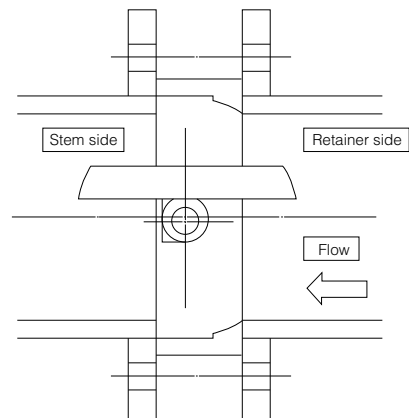
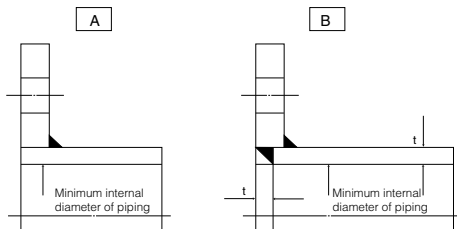
### 302A Applicable Pipe List in Case of **B**

Nominal size		SGP		Sch20		Sch40		Sch60		Sch80		Sch10S		Sch20S	
mm	inch	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)
80	3	○	○	○	○	○	○	○	○	○	○	○	○	○	○
100	4	○	○	○	○	○	○	○	○	○	○	○	○	○	○
125	5	○	○	○	○	○	○	○	○	○	○	○	○	○	○
150	6	○	○	○	○	○	○	○	○	○	○	○	○	○	○
200	8	○	○	○	○	○	○	○	×	○	×	○	○	○	○
250	10	○	○	○	○	○	○	○	×	○	×	○	○	○	○
300	12	○	○	○	○	○	○	○	×	○	×	○	○	○	○
350	14	○	○	○	○	○	○	○	×	○	×	—	—	—	—
400	16	○	○	○	○	○	○	○	×	○	×	—	—	—	—
450	18	○	○	○	○	○	○	○	×	○	×	—	—	—	—
500	20	○	○	○	○	○	○	○	×	○	×	—	—	—	—
600	24	—	—	○	○	○	○	○	×	○	×	—	—	—	—

Remark 1: ○=Applicable ×=Not applicable

Remark 2: The clearance between the disc and the pipe is based on API 609 and MSS SP-67.  
80mm to 150mm: 1.5mm; 200mm to 500mm: 3.0mm, and 600mm: 6.4mm

Remark 3: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.  
In cases where there is an "X" in the chart above or you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.



# Tom Disco 302A(Wafer)/303Q (Lugged)

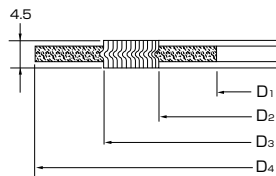
## 302A Piping gasket

- In case of sheet gasket ..... Any standard can be used.
- In case of spiral gasket
  - For ASME / API / JPI flange ..... Any standard gaskets with inner/outer ring can be used.
  - For JIS flange ..... Use special spiral gasket shown below.

### Special spiral gasket for JIS flange size

Nominal size		JIS flange					
		5K, 10K, 16K, 20K			5K	10K	16K, 20K
mm	inch	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>4</sub>	D <sub>4</sub>
80	3	89	97	120	×	134	140
100	4	115	124	145	×	159	165
125	5	140	151	177	×	190	202
150	6	166	178	207	×	220	237
200	8	217	227	257	×	270	282
250	10	268	282	318	×	332	354
300	12	319	331	362	×	377	404
350	14	356	369	399	412	422	450
400	16	406	420	457	472	484	508
450	18	458	472	517	532	539	573
500	20	508	532	567	582	594	628
600	24	610	626	672	689	700	734

Remark; X: Not applicable



### Applicable standard for spiral gasket

Nominal size		Tomoe special			Standard gasket		
		JIS 10K	JIS 16K JIS 20K	ASME class 125/150	JIS 10K	JIS 16K JIS 20K	ASME class 125/150
mm	inch						
80	3	○	○	○	×	×	○
100	4	○	○	○	×	×	○
125	5	○	○	○	×	×	○
150	6	○	○	○	×	×	○
200	8	○	○	○	×	×	○
250	10	○	○	○	×	×	○
300	12	○	○	○	×	×	○
350	14	○	○	○	×	×	○
400	16	○	○	○	×	×	○
450	18	○	○	○	×	×	○
500	20	○	○	○	×	×	○
600	24	○	○	○	×	×	○

Remark 1: ○: Applicable, X: Not applicable

Remark 2: In case a minute leakage of gas (less than 100PPm) becomes a problem, please inquire of our business charge.

## 302A Applicable standard for standard piping gasket

Nominal size		Max. allowable inside diameter (D)	Joint sheet or RPTFE solid gasket (t≤2mm)					PTFE mold type gasket VALQUA or NICHIAS				
			JIS 5K	JIS 10K	JIS 16K JIS 20K	ASME class 125/150	JPI 150Lb	JIS 5K	JIS 10K	JIS 16K JIS 20K	ASME class 125/150	JPI 150Lb
mm	inch											
80	3	97	×	○	○	○	○	×	○	○	○	○
100	4	124	×	○	○	○	○	×	○	○	○	○
125	5	151	×	○	○	○	○	×	○	○	○	○
150	6	178	×	○	○	○	○	×	○	○	○	○
200	8	227	×	○	○	○	○	×	○	○	○	○
250	10	282	×	○	○	○	○	×	○	○	○	○
300	12	331	×	○	○	○	○	×	○	○	○	○
350	14	362	○	○	○	○	○	○	○	○	○	○
400	16	414	○	○	○	○	○	○	○	○	○	○
450	18	468	○	○	○	○	○	○	○	○	○	○
500	20	518	○	○	○	○	○	○	○	○	○	○
600	24	619	○	○	○	○	○	○	○	○	○	○

Remark; ○: Applicable, X: Not applicable

※ All standard joint seats and PTFE cut gaskets can be used.

※ Only VALQUA flawless gaskets (Part No.: 7030/7031/7035) and NICHIAS PTFE cushion gaskets (Part No.: 9010/9011) can be used. (Products from other manufacturers cannot be used due to their dimensions.)

### 302A Piping Bolts and Nuts Sizes

Nominal size		JIS5K		JIS10K		JIS16K	
mm	inch	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts
80	3	—	—	8-M16×145	—	8-M20×170	—
100	4	—	—	8-M16×145	—	8-M20×170	—
125	5	—	—	8-M20×170	—	8-M22×190	—
150	6	—	—	8-M20×170	—	12-M22×190	—
200	8	—	—	12-M20×170	—	12-M22×190	—
250	10	—	—	12-M22×190	—	12-M24×210	—
300	12	—	—	16-M22×190	—	16-M24×225	—
350	14	12-M22×210	—	16-M22×210	—	16-M30(P3)×245	—
400	16	16-M22×220	—	16-M24×235	—	16-M30(P3)×265	—
450	18	16-M22×230	— ※1	16-M24×250	4-M24×84×60	16-M30(P3)×280	4-M30(P3)× 95×65
					4-M24×58×50		4-M30(P3)× 73×50
500	20	16-M22×245	4-M22×80×50	16-M24×260	4-M24×90×60	16-M30(P3)×300	4-M30(P3)×105×65
			4-M22×60×50		4-M24×70×60		4-M30(P3)× 81×50
600	24	16-M24×280	4-M24×84×60	20-M30(P3)×300	4-M30(P3)×81×50	20-M36(P3)×345	4-M36(P3)×100×60
			4-M24×65×50		4-M30(P3)×65×50		4-M36(P3)× 82×50

Nominal size		JIS20K		ASME / API / JPI class 150	
mm	inch	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts
80	3	8-M20×170	—	4-U5/8-11UNC×155	—
100	4	8-M20×170	—	8-U5/8-11UNC×155	—
125	5	8-M22×190	—	8-U3/4-10UNC×175	—
150	6	12-M22×190	—	8-U3/4-10UNC×175	—
200	8	12-M22×190	—	8-U3/4-10UNC×205	—
250	10	12-M24×210	—	12-U7/8- 9UNC×215	—
300	12	16-M24×225	—	12-U7/8- 9UNC×215	—
350	14	16-M30(P3)×260	—	12-U1 - 8UNC×240	—
400	16	16-M30(P3)×280	—	16-U1 - 8UNC×255	—
450	18	16-M30(P3)×300	4-M30(P3)×105×65	16-U1 1/8- 8UN×280	—
			4-M30(P3)× 81×50		
500	20	16-M30(P3)×315	4-M30(P3)×110×60	16-U1 1/8- 8UN×295	4-U1 1/8- 8UN×105×50
			4-M30(P3)× 90×65		4-U1 1/8- 8UN× 80×50
600	24	20-M36(P3)×360	4-M36(P3)×108×60	16-U1 1/4- 8UN×340	4-U1 1/4- 8UN×100×50
			4-M36(P3)× 90×50		4-U1 1/4- 8UN× 90×50

※1 Flange tapping is applicable. Please consult us for the further information.

Remark: Use SNB 7/S45C (A193 B7/A, 194 2H) SUS304/SUS304

For long bolt, use full thread bolt.

For hexagon nut, use heavy nut.

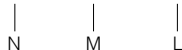
A metric screw should have 3 pitches if its nominal diameter exceeds M30.

A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

Hexagon bolts (set bolts) are indicated with the retainer side on the up side and the stem side on down side.

Examples

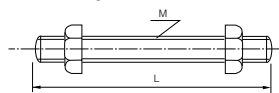
Long bolts: 12 - M22 × 185



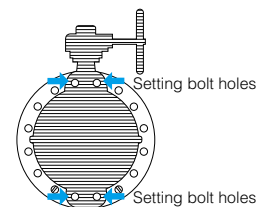
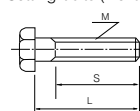
Setting bolts: 4 - M30 × 95 × 65  
(Hexagon bolts)



Long bolts and nuts (full thread)



Setting bolts (Hexagon bolts)

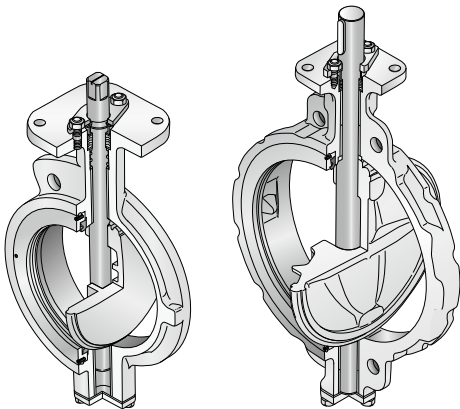
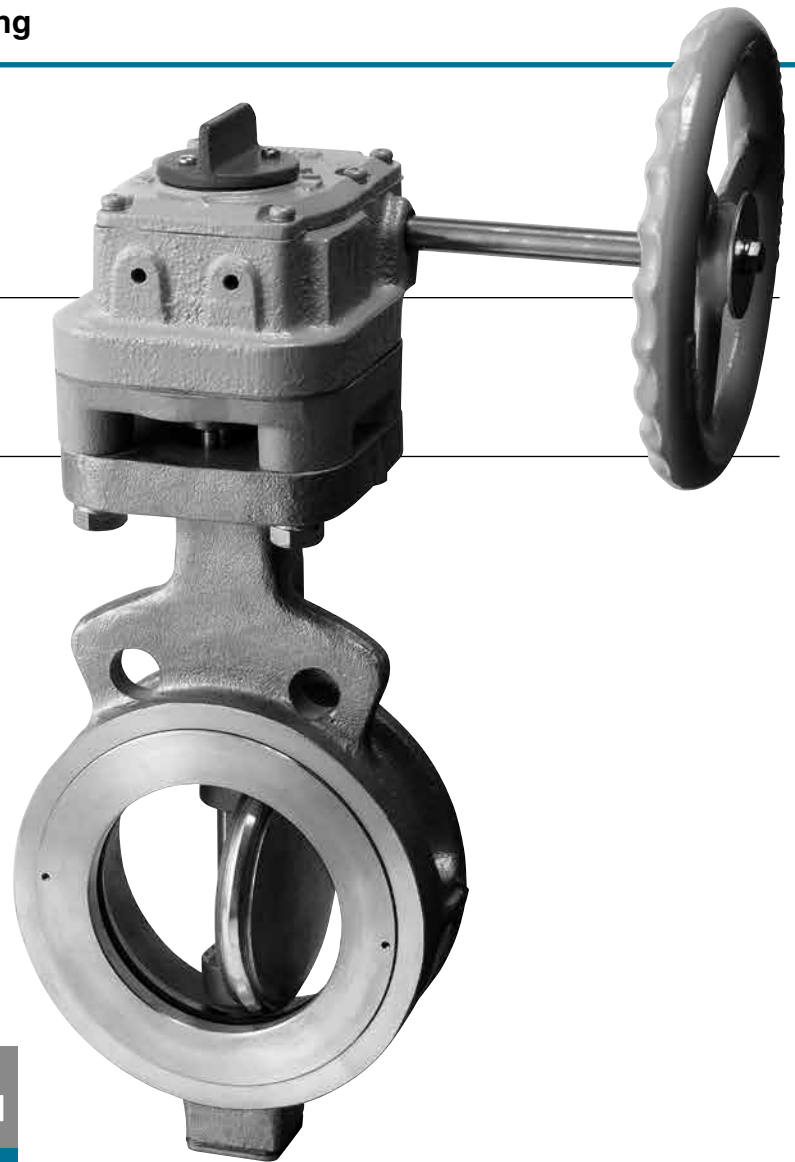


High Performance Butterfly Valves  
to Suit API Standard class 150 Rating

Tom Disco

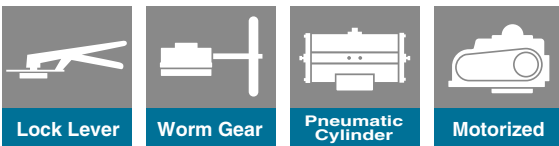
304A Wafer

304Q Lugged



80mm to 300mm

350mm to 600mm



Lock Lever

Worm Gear

Pneumatic Cylinder

Motorized

## Features and Benefits

### Unique stopper structure

For the 80 to 300mm models, automatic aligning and disc overrun prevention are ensured by the special spherical design of the inner surface of the body disc hub edge. As for the 350 to 600mm models, a spacer ring is provided between the mating surfaces of the disc hub edge and inner surface of the body for disc alignment.

Disc overrun is prevented by a protrusion on the inner surface of the body.

### Double eccentric geometry

The axis of disc rotation is double offset to the seat ring. When the disc rotates, it unseats at a small turning angle by its cam effect. The design exhibits tight shut-off, reduced torques, chemical resistance, excellent throttling capabilities and the ability to operate with relatively high pressure drops. It also prevents seat abrasion and provides reliable sealing performance over long periods.

### Bi-directional flow

Seals flow in both directions. The valves can be used even if the flow changes direction. (There are pressure limitations for each direction of flow. See chart for recommended specifications).

### Easy replacement of the seat ring

The ball lock method is used to simplify replacement of the seat ring.

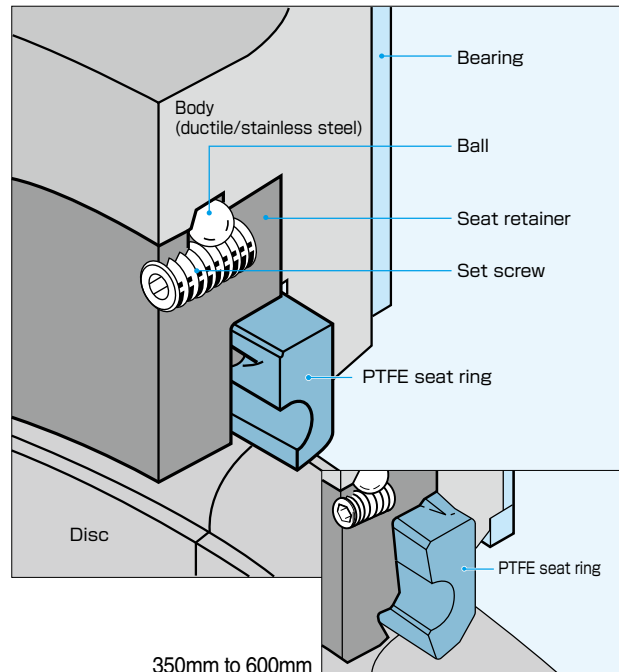
### General Description

Designed to suit those severe conditions such as high temperature, high pressure or high velocity, which disallow the use of soft resilient seated butterfly valves. Ideal for use in chemical processes and applications with low pressure steam and high temperature gas.



## Seat Structure

80mm to 300mm



## Standard Specifications

Valve nominal size**1	80mm to 300mm		350mm to 600mm (5 sizes)		
Face-to-face dimensions	API 609 (class 150) JPI-7S-83(class 150) ※125mm is as per JIS B 2002(series 46)/ISO 5752(series 20)		API 609 (class 150), JPI-7S-83(class 150) ISO 5752 (25 series), JIS B 2002 (47 series)		
Connection	Wafer type / Lugged type (option: flanged type)				
Pressure rating	ASME B16.34 Class 150 (350mm and over: Seat rating is designed to suit API 609 Class 150 above zero degree C				
Flange accommodation	JIS 10K/16K/20K, ASME Class 125/150, API/JPI Class 150, BS 10 Table F, BS 4504 PN 10/16, DIN PN 10/16		JIS 5K/10K/16K/20K, ASME Class 125/150, API/JPI Class 150, BS 10 Table F, BS 4504 PN 10/16, DIN PN 10/16		
Body shell test	Max 3.1MPa as per API 598 by hydraulic				
Seat leak test	0.7MPa as per API 598 by Air. High pressure closure test is available upon request.				
Max. working pressure**2	2.0MPa				
	Bi-directional flow (Flow to disc side is recommended.)				
	Max. working pressure at reverse flow: 2.0MPa (80mm to 200mm) 1.6MPa (250mm and 300mm)		Max. working pressure at reverse flow:Please consult us.		
Working temperature range	-29 to 232 degrees C (RPTFE)		-20 to 232 degrees C (RPTFE)		
Seat leakage	-20 to 200 degrees C (White PTFE as option)				
Standard materials**3	ISO 5208 rate A, API 598-1996				
	Body	SCPH2/WCB	SCS 14A/CF8M	SCPH 2/WCB	SCS 13A/CF8
	Disc	SCS 13A/CF8 (Hard chrome plating)	SCS 16A/CF3M (Hard chrome plating)	SCS13A/CF8 (Hard chrome plating)	
	Stem	SUS 420 J2	SUS 329 J1 SUS 316 L SUS 329 J4 L	SUS 420 J2 SUS 630	SUS 304 SUS 630
	Seat ring	RPTFE as standard, White PTFE as an option			
Gland packing	RPTFE		Graphite		
Top flange	ISO 5211				
Bonnet type	Open bonnet				
Actuators	Lock lever	80 to 150mm			
	Worm gear				
	Pneumatic cylinder	80 to 600mm			
	Motorized				
Coating	Silicon resin coating (grey N7) for less than 200 degrees C. Heat resistant silver coating for 200 degrees C and over. No painting for stainless steel.				

※1 304Y is available for 50mm and 65mm.

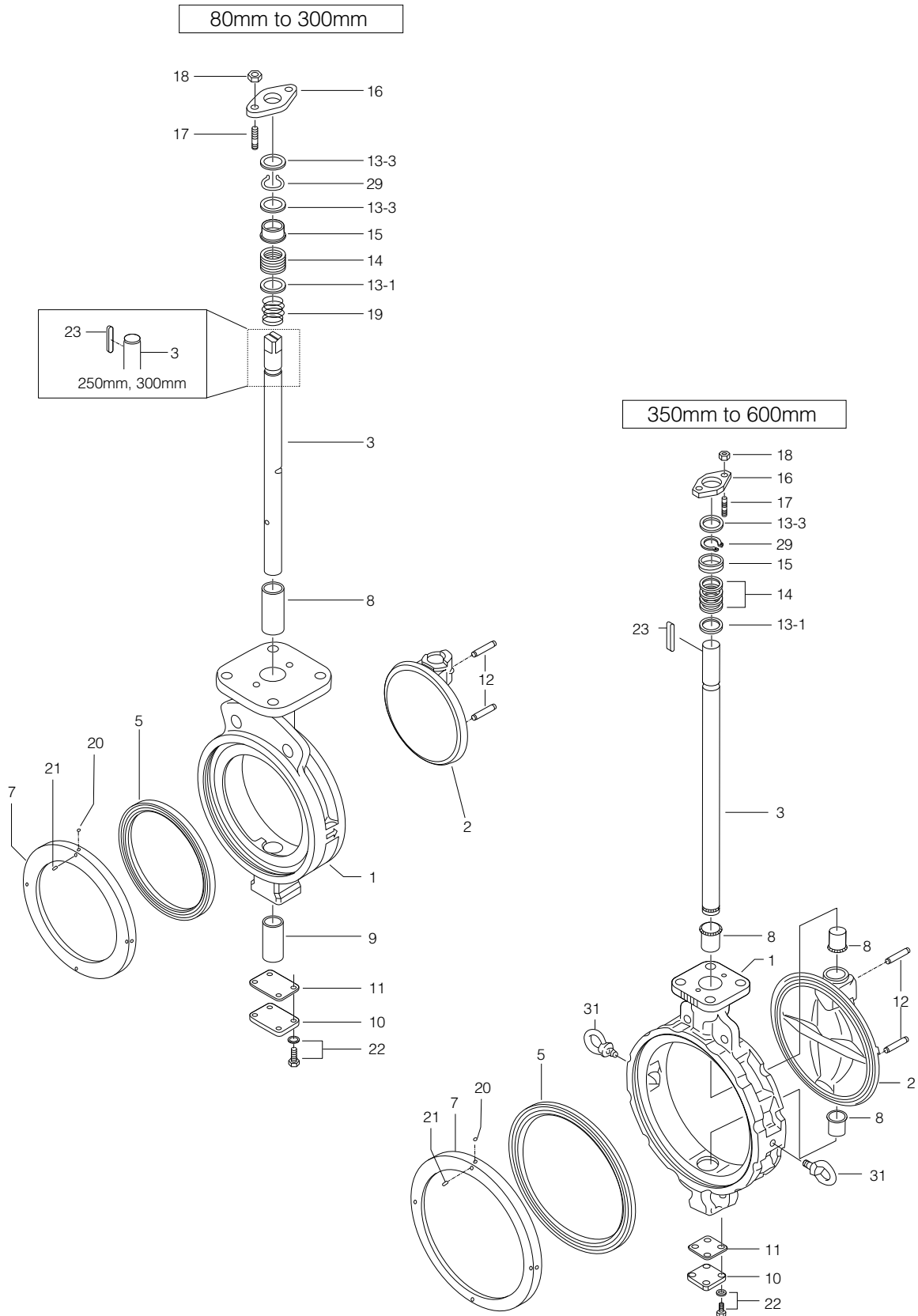
※2 Please consult us if the pressure exceeds 1.6MPa.

※3 Please refer to the pressure rating chart and stem material chart in the following pages. Other materials are available. Please consult us.

※It is possible that seat leakage occur when fluid (e.g. powder and/or liquid) is solidified by working temperature and other cause. Consult us.  
Please note that use with vertical line such as bottom area of discharge spout of hopper, and tank.

# Tom Disco 304A (Wafer) / 304Q (Lugged)

## 304A Expanded view of components



## 304A Parts List

### ■ 304A Parts List (80mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
★ 5	Seat ring	1	
7	Seat ring retainer	1	
8	Top shaft bearing	1	
9	Bottom shaft bearing	1	
10	Bottom cover	1	
★ 11	Bottom gasket	1	
12	Taper pin	2	
13-1	Packing retainer	1	
13-3	Ring	2	
★ 14	Gland packing	1 set	
15	Gland bush	1	
16	Gland flange	1	
17	Gland bolt	2	
18	Gland nut	2	
19	Gland coil	1	Only 80mm to 150mm
★ 20	Ball	2	80mm to 125mm
		4	150mm to 300mm
★ 21	Set screw	2	80mm to 125mm
		4	150mm to 300mm
22	Hexagon bolt, Spring washer	4 sets	
23	Stem key	1	Only 250mm, 300mm
29	C-ring	1	

### ■ 304A Parts List (350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
★ 5	Seat ring	1	
7	Seat ring retainer	1	
8	Shaft bearing	3	
10	Bottom cover	1	
★ 11	Bottom gasket	1	
12	Taper pin	1	
13-1	Packing retainer	1	
13-3	Ring	1	
★ 14	Gland packing	1 set	
15	Gland bush	1	
16	Gland flange	1	
17	Gland bolt	2	
18	Gland nut	2	
★ 20	Ball	4	
★ 21	Set screw	4	
22	Hexagon bolt, Spring washer	4 sets	
23	Stem key	1	
29	C-ring	1	
31	Eye bolt	2	Only 450mm to 600mm

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove set screws (Part #21 Set screw).

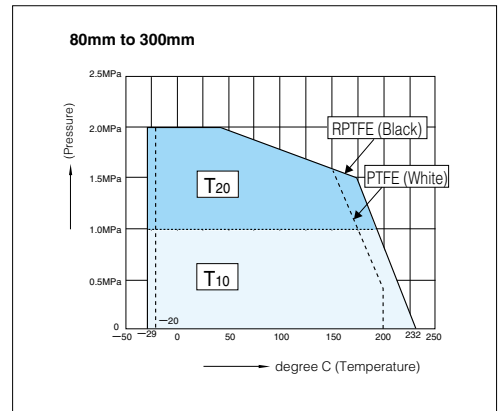
# Tom Disco 304A (Wafer)/304Q (Lugged)

## 304A Actuator selection chart

### 80mm to 300mm

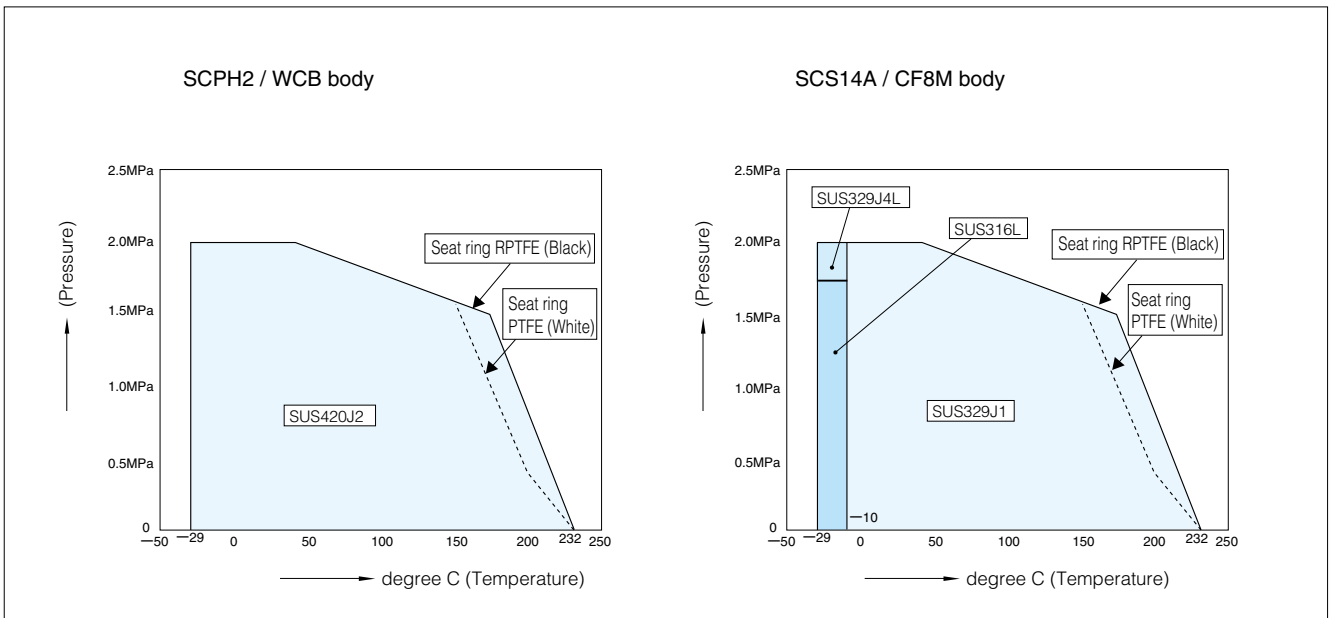
Model	Category	Size (mm/inch)						
		80	100	125	150	200	250	300
		3	4	5	6	8	10	12
1T	T10	1T-2			1T-3			
	T20	1T-2			1T-3			
2U	T10	2U-2			2U-4		2U-5	
	T20	2U-2			2U-4		2U-5	
7E	T10	T85	T200		T380	T750		
	T20	T85	T200		T380	T750		
7G,7F 3U,3K	T10	T200S	T380S		T750S	TG-12S		
	T20	T200S	T380S		T750S	TG-12S		
4I	T10	4I-0	4I-1	4I-2		4I-2.5	4I-3	
	T20	4I-0	4I-1	4I-2		4I-2.5	4I-3	
4J	T10	SRJ-010		SRJ-020		SRJ-060		
	T20	SRJ-010		SRJ-020		SRJ-060		

### 304A Pressure rating



## 304A Standard stem material

### 80mm to 300mm

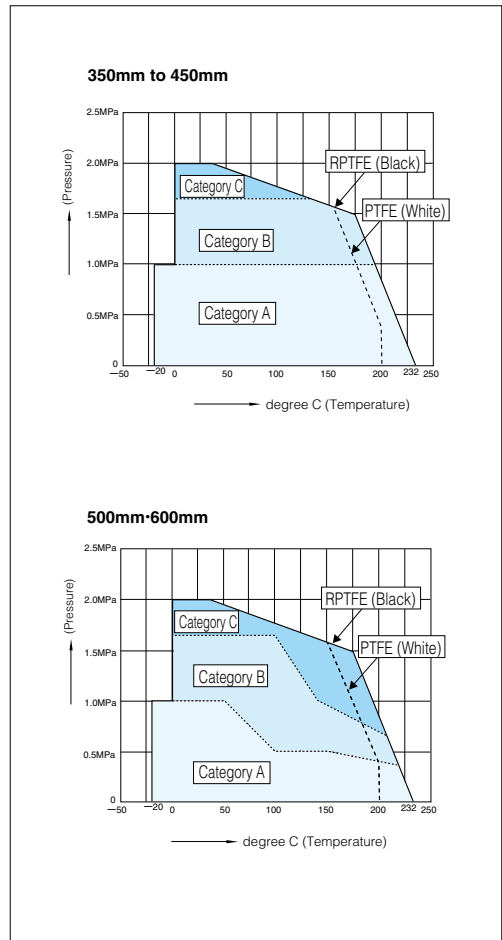


## 304A Actuator selection chart

### 350mm to 600mm

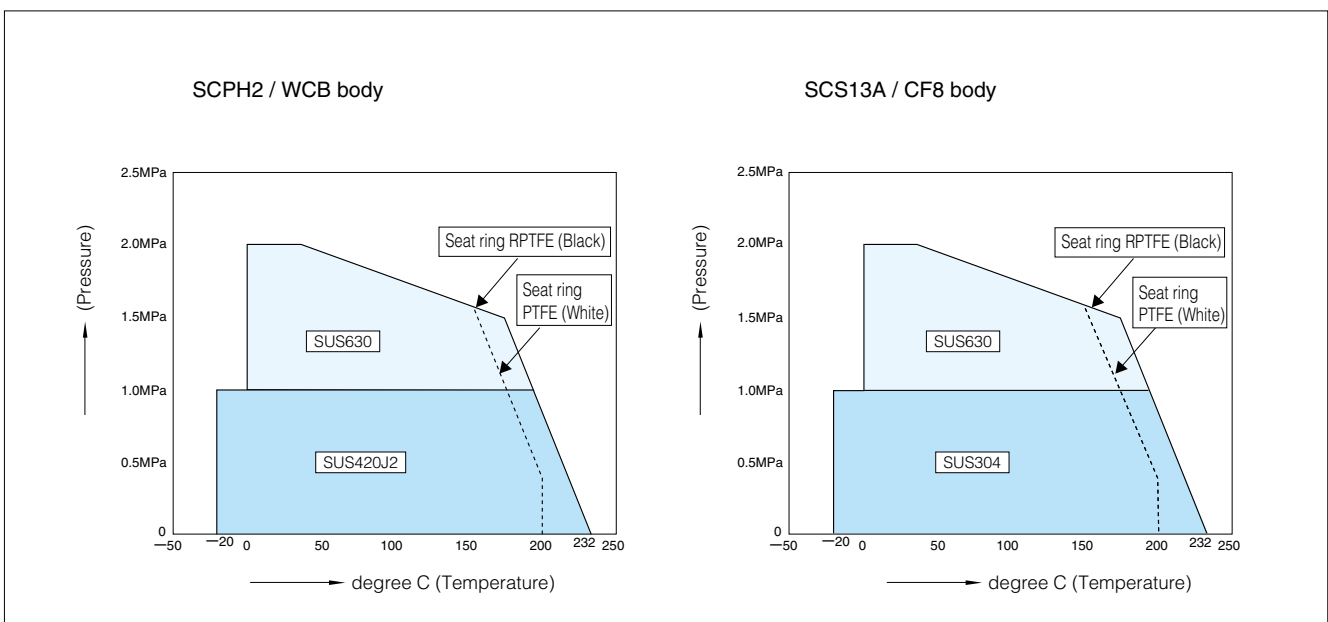
Model	Category	Size (mm / inch)				
		350	400	450	500	600
		14	16	18	20	24
2S	A	DGH-3		DGH-4	DGH-4+R/G5	
	B				DGH-4.5+R/G5	
	C			DGH-4+R/G5		
3A	A	TGA-125	TGA-140		TGA-180	
	B	TGA-140		TGA-160	TGA-200	
	C		TGA-160	TGA-180	TGA-220	
3U,3K	A	TG-14S		TG-20S		
	B					
	C					
4I	A	4I-4				
	B					
	C					
4L	A	LTKD-01 0.2kW/DGH-3	LTKD-02 0.4kW/DGH-4	LTKD-02 1.5kW/DGH-4		
	B		LTKD-02 0.4kW/DGH-4	LTKD-02 1.5kW/DGH-4	LTKD-05 1.5kW/DGH-5	
	C	LTKD-02 0.4kW/DGH-4	LTKD-02 0.75kW/DGH-4			

### 304A Pressure rating



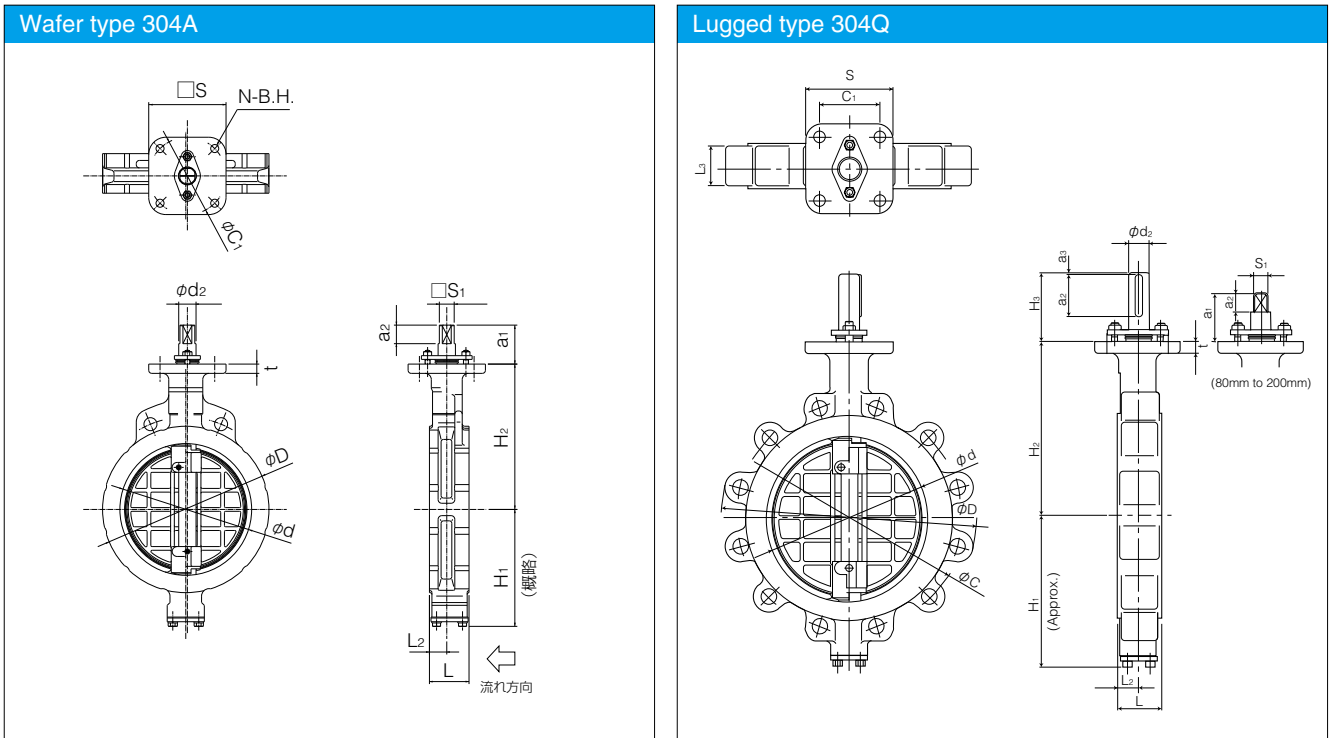
## 304A Standard stem material

### 350mm to 600mm



# Tom Disco 304A (Wafer)/304Q (Lugged)

## Dimension List



### 304A Dimension List

Stem shape	Nominal size		Dimension (mm)													Approx. Weight (kg)	
	mm	inch	$\phi d$	$\phi D$	L	$L_2$	$H_1$	$H_2$	$a_1$	$a_2$	$\square S_1$	$\phi d_2$	b	$t_2$	t		ISO 5211 Top Flange
01	80	3	89	127	48	23	95	147	52.5	16.5	14	16	—	—	15	F10	5
	100	4	112	156	54	24	110	170	52.5	16.5	14	16	—	—	15	F10	6.2
	125	5	137	185	56	24	139	185	52.5	16.5	16	20	—	—	15	F10	9.3
	150	6	163	216	57	23	164	205	55.5	20	18	22	—	—	15	F12	12.5
	200	8	213	269	64	28	190	235	63	30	24	28	—	—	15	F12	19
02	250	10	263	330	71	31	236	283	108	65.3	—	32	10	3	18	F14	33
	300	12	315	381	81	35	246	310	111	70.3	—	35	10	3	18	F14	42
	350	14	350	416	92	39.5	308	340	113	70	—	38	10	3	18	F14	61
	400	16	400	475	102	39	348	372	113	70	—	42	12	3.5	18	F14	88
	450	18	450	534	114	43	366	406	141.5	60	—	45	12	3.5	20	F16	135
	500	20	500	589	127	50	405	442	141.5	70	—	49	14	4	20	F16	173
	600	24	600	693	154	64	461	493	141.5	70	—	59	16	5	20	F16	272

### Top Flange Dimension

ISO 5211 Top Flange	$\square S$	$\phi C_1$	N	B.H.
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

Stem shape	01 : square 02 : round with key
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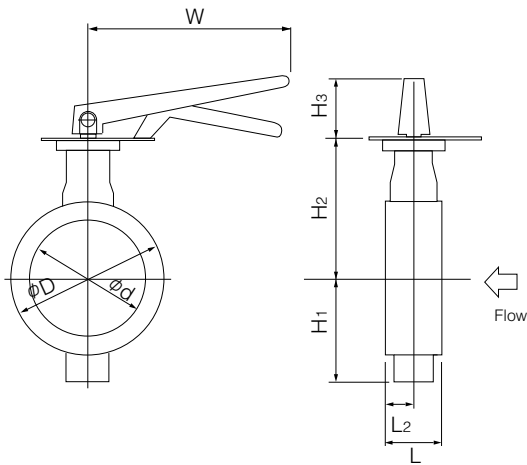
### 304Q Dimension List

Nominal size		Dimension (mm)														Approx. Weight (kg)		
mm	inch	$\phi d$	$\phi D$	L	$L_2$	$L_3$	$H_1$	$H_2$	$H_3$	$\phi d_2$	$a_2$	$a_3$	$S_1$	S	t		$C_1$	$\phi C$
80	3	89	189	48	23	38	95	147	52.5	16	16.5	—	14	102	15	72	152.5	6
100	4	112	227	54	24	46	120	170	52.5	16	16.5	—	14	102	15	72	190.5	9.5
125	5	137	256	56	24	48	139	185	52.5	20	16.5	—	16	102	15	72	216	14
150	6	163	282	57	23	49	164	205	55.5	22	20	—	18	125	15	88.4	241.5	16
200	8	213	343	64	28	54	190	235	63	28	30	—	24	125	15	88.4	298.5	24
250	10	263	412	71	31	61	236	283	108	32	65	2	—	140	18	99	362	41
300	12	315	482	81	35	71	246	310	111	35	70	2	—	140	18	99	432	56
350	14	350	536	92	39.5	70	308	340	113	38	70	2	—	140	18	99	476.2	85
400	16	400	600	102	39	75	348	372	113	42	70	2	—	140	18	99	539.7	125
450	18	450	636	114	43	83	366	406	141.5	45	60	8	—	165	20	116.7	577.8	170
500	20	500	720	127	50	90	405	442	141.5	49	70	9	—	165	20	116.7	635	225
600	24	600	814	154	64	131	461	493	141.5	59	70	10	—	165	20	116.7	749.3	350

## Lock lever type 304A-1T(80mm to 150mm)

Nominal size		Dimension (mm)									Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	W		
80	3	89	127	48	23	95	147	T <sub>10</sub> , T <sub>20</sub>	117	300	1T-2	7.1
100	4	112	156	54	24	110	170	T <sub>10</sub> , T <sub>20</sub>	117	300	1T-2	8.3
125	5	137	185	56	24	139	185	T <sub>10</sub> , T <sub>20</sub>	117	300	1T-2	11.4
150	6	163	216	57	23	164	205	T <sub>10</sub> , T <sub>20</sub>	125	350	1T-3	14.6

### ■ 304A-1T



### ■ 1T Installation direction

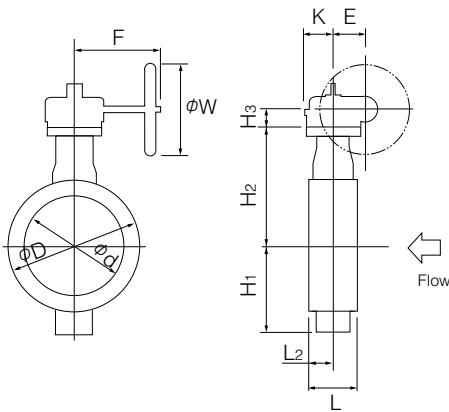
<p>Retainer side</p> <p>Flow ↓</p> <p>Stem side</p> <p><b>1TA</b></p>	<p>Retainer side</p> <p>Flow ↓</p> <p>Stem side</p> <p><b>1TB</b></p>	<p>Retainer side</p> <p>Flow ↓</p> <p>Stem side</p> <p><b>1TC</b></p>	<p>Retainer side</p> <p>Flow ↓</p> <p>Stem side</p> <p><b>1TD</b></p>
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# Tom Disco 304A (Wafer)/304Q (Lugged)

Worm gear type 304A-2U (80mm to 300mm)/ 304A-2S (350mm to 600mm)

Nominal size		Dimension (mm)												Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	$\phi W$		
80	3	89	127	48	23	95	147	T <sub>10</sub> , T <sub>20</sub>	61	44	53	173.5	160	2U-2	7.9
100	4	112	156	54	24	110	170	T <sub>10</sub> , T <sub>20</sub>	61	44	53	173.5	160	2U-2	9.1
125	5	137	185	56	24	139	185	T <sub>10</sub> , T <sub>20</sub>	61	44	53	173.5	160	2U-2	12.4
150	6	163	216	57	23	164	205	T <sub>10</sub> , T <sub>20</sub>	77.5	87.5	90	222.5	200	2U-4	29
200	8	213	269	64	28	190	235	T <sub>10</sub> , T <sub>20</sub>	77.5	87.5	90	222.5	200	2U-4	35.5
250	10	263	330	71	31	236	283	T <sub>10</sub> , T <sub>20</sub>	90	87.5	90	222.5	280	2U-4	49.5
300	12	315	381	81	35	246	310	T <sub>10</sub> , T <sub>20</sub>	92	90	105	266	280	2U-5	64
350	14	350	416	92	39.5	308	340	A, B, C	97	117	164	335	355	DGH-3	99
400	16	400	475	102	39	348	372	A	97	117	164	335	355	DGH-3	124
								B, C	215	140	198	402	450	DGH-4	162
450	18	450	534	114	43	366	406	A, B	127	140	198	402	450	DGH-4	198
								C	127	140	198	432	355	DGH-4+R/G5	200
500	20	500	589	127	50	405	442	A, B	127	140	198	402	450	DGH-4	236
								C	127	140	198	432	355	DGH-4+R/G5	238
600	24	600	693	154	64	461	493	A	127	140	198	432	355	DGH-4+R/G5	338
								B, C	245	185	264	497	355	DGH-4.5+R/G5	413

## 304A-2U/2S



## 2U/2S Installation direction

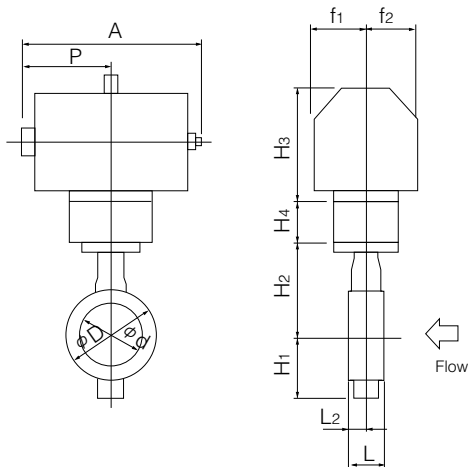
<p>Retainer side</p> <p>Flow</p> <p>Stem side</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p>
2UA/2SA	2UB/2SB	2UC/2SC	2UD/2SD



## Double-acting pneumatic cylinder type 304A-7E (80mm to 300mm)

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
80	3	89	127	48	23	95	147	T <sub>10</sub> ,T <sub>20</sub>	168	26.5	276	142	75	47	T85	11
100	4	112	156	54	24	110	170	T <sub>10</sub>	168	26.5	276	142	75	47	T85	12
								T <sub>20</sub>	203	26.5	346	176	79	57	T200	16
125	5	137	185	56	24	139	185	T <sub>10</sub> ,T <sub>20</sub>	203	26.5	346	176	79	57	T200	19
150	6	163	216	57	23	164	205	T <sub>10</sub> ,T <sub>20</sub>	203	29.5	346	176	79	57	T200	23
200	8	213	269	64	28	190	235	T <sub>10</sub> ,T <sub>20</sub>	231	29.5	423	214	91	69	T380	35
250	10	263	330	71	31	236	283	T <sub>10</sub>	231	190	423	214	91	87.5	T380	63
								T <sub>20</sub>	269	190	546	270	118	87.5	T750	73
300	12	315	381	81	35	246	310	T <sub>10</sub> ,T <sub>20</sub>	269	190	546	270	118	87.5	T750	82

### 304A-7E



### 7E Installation direction

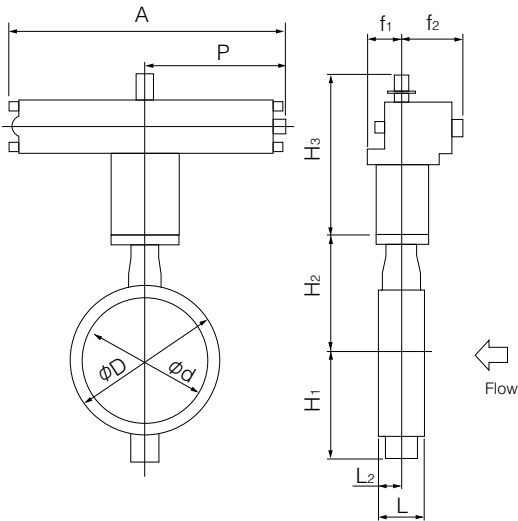
<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p> <p>7EA</p>	<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p> <p>7EB</p>	<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p> <p>7EC</p>	<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p> <p>7ED</p>
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# Tom Disco 304A (Wafer) / 304Q (Lugged)

## Double-acting pneumatic cylinder type 304A-3A (350mm to 600mm)

Nominal size		Dimension (mm)												Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	350	416	92	39.5	308	340	A	424	743	381	100	164	TGA-125	110
								B,C	472	810	432	100	180	TGA-140	121
400	16	400	475	102	39	348	372	A	424	743	381	100	164	TGA-125	136
								B	472	810	432	100	180	TGA-140	147
								C	510	939	483	130	202	TGA-160	214
450	18	450	534	114	43	366	406	A	502	810	432	100	180	TGA-140	207
								B,C	530	939	483	130	202	TGA-160	263
500	20	500	589	127	50	405	442	A	502	810	432	100	180	TGA-140	246
								B	530	939	483	130	202	TGA-160	302
								C	543	1069	543	130	218	TGA-180	330
600	24	600	693	154	64	461	493	A	543	1069	543	130	218	TGA-180	431
								B	610	1175	599	160	253	TGA-200	475
								C	640	1263	642	160	270	TGA-220	535

### 304A-3A



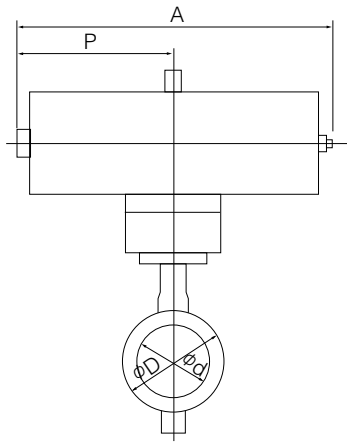
### 3A Installation direction

<p>Retainer side</p> <p>Stem side</p> <p>3 A A</p>	<p>Retainer side</p> <p>Stem side</p> <p>3 A B</p>	<p>Retainer side</p> <p>Stem side</p> <p>3 A C</p>	<p>Retainer side</p> <p>Stem side</p> <p>3 A D</p>
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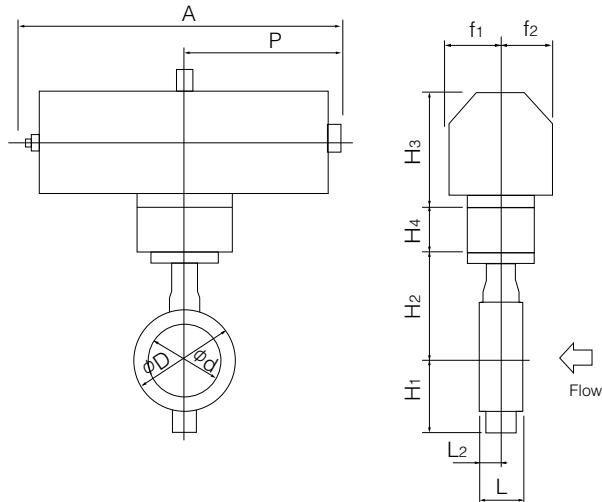
Single-acting pneumatic cylinder type 304A-7G (Air to open: 80mm to 200mm) / 304A-7F (Air to close: 80mm to 200mm)

Nominal size		Dimension (mm)												Cylinder type	Approx. Mass (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>			f <sub>2</sub>
80	3	89	127	48	23	95	147	T <sub>10</sub> , T <sub>20</sub>	203	26.5	449	226	79	57	T200S	17
100	4	112	156	54	24	110	170	T <sub>10</sub>	203	26.5	449	226	79	57	T200S	18
								T <sub>20</sub>	231	26.5	550	276	91	69	T380S	27
125	5	137	185	56	24	139	185	T <sub>10</sub>	231	26.5	550	276	91	69	T380S	30
								T <sub>20</sub>	269	26.5	723	360	118	85	T750S	43
150	6	163	216	57	23	164	205	T <sub>10</sub> , T <sub>20</sub>	269	29.5	723	360	118	85	T750S	47
200	8	213	269	64	28	190	235	T <sub>10</sub>	269	29.5	723	360	118	85	T750S	54

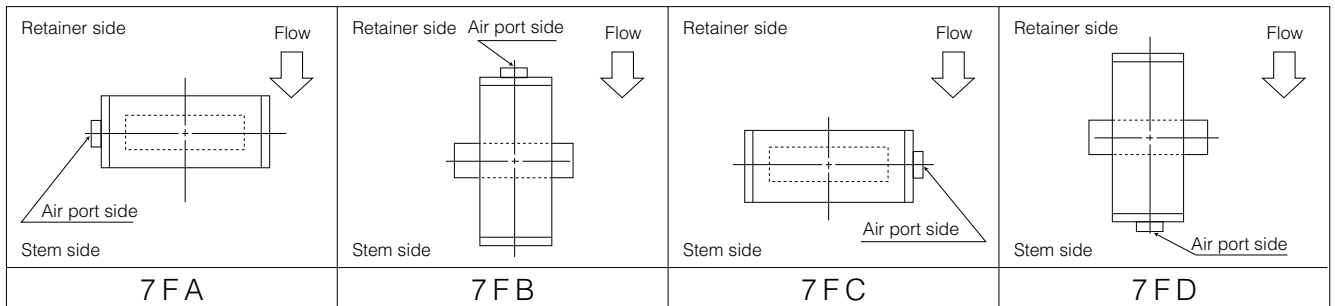
304A-7F



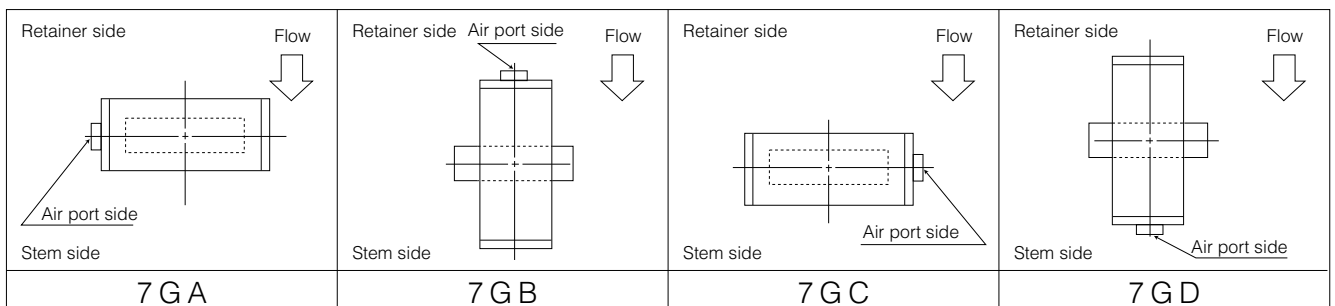
304A-7G



7F Installation direction



7G Installation direction

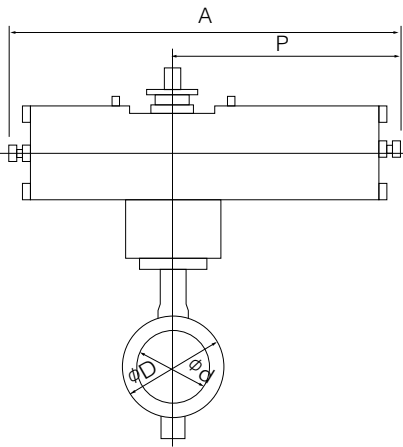


# Tom Disco 304A (Wafer) / 304Q (Lugged)

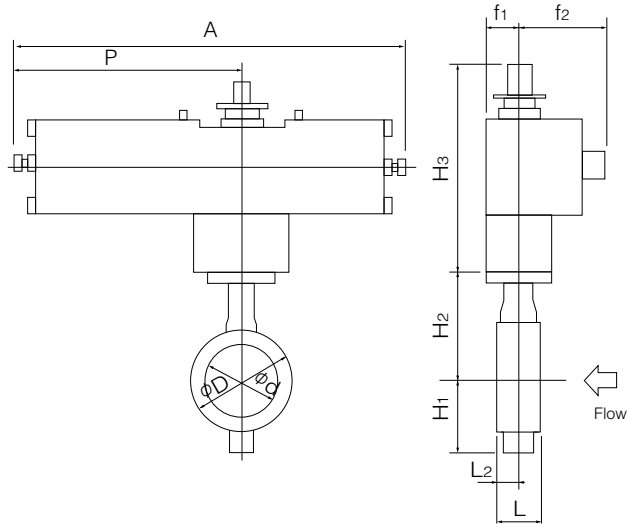
Single-acting pneumatic cylinder type 304A-3U (Air to open: 200mm to 600mm) / 304A-3K (Air to close: 200mm to 600mm)

Nominal size		Dimension (mm)												Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	213	269	64	28	190	235	T <sub>10</sub>	377	945	585	75	165	TG-10S	78
								T <sub>20</sub>	377	1080	720	94	206	TG-12S	123
250	10	263	330	71	31	236	283	T <sub>10</sub> , T <sub>20</sub>	417	1080	720	94	206	TG-12S	138
300	12	315	381	81	35	246	310	T <sub>10</sub> , T <sub>20</sub>	417	1080	720	94	206	TG-12S	147
350	14	350	416	92	39.5	308	340	A	450	1255	865	131	257	TG-14S	264
								B, C	602	1655	1095	164	348	TG-20S	485
400	16	400	475	102	39	348	372	A	450	1255	865	131	257	TG-14S	292
								B, C	602	1655	1095	164	348	TG-20S	512
450	18	450	534	114	43	366	406	A, B, C	624	1655	1095	164	348	TG-20S	564
500	20	500	589	127	50	405	442	A, B, C	624	1655	1095	164	348	TG-20S	602
600	24	600	693	154	64	461	493	A	624	1655	1095	164	348	TG-20S	701

## 304A-3K



## 304A-3U



## 3K Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K A</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K B</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K C</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K D</p>
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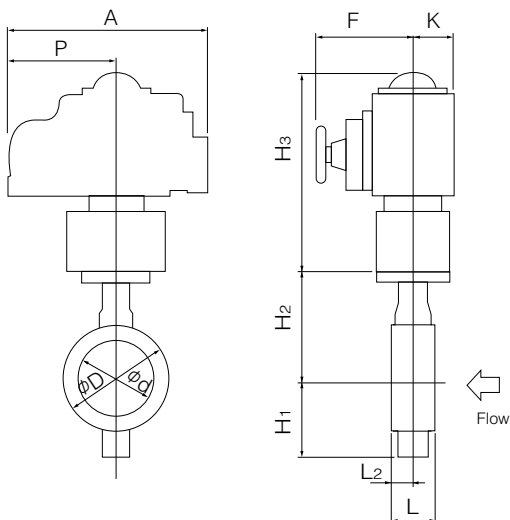
## 3U Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U A</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U B</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U C</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U D</p>
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Single phase electric motor type 304A-4 I (80mm to 400mm)

Nominal size		Dimension (mm)												Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	F	K		
80	3	89	127	48	23	95	147	T <sub>10</sub> , T <sub>20</sub>	276	202	100	85	54	4 I-0	12.1
100	4	112	156	54	24	110	170	T <sub>10</sub>	265	252	138	126	65	4 I-1	15.5
								T <sub>20</sub>	298	310	167	154	85	4 I-2	21.5
125	5	137	185	56	24	139	185	T <sub>10</sub> , T <sub>20</sub>	298	310	167	154	85	4 I-2	24.5
150	6	163	216	57	23	164	205	T <sub>10</sub> , T <sub>20</sub>	373	310	167	154	85	4 I-2	29.5
200	8	213	269	64	28	190	235	T <sub>10</sub> , T <sub>20</sub>	373	310	167	154	85	4 I-2.5	39
250	10	263	330	71	31	236	283	T <sub>10</sub>	411	310	167	154	85	4 I-2.5	56.5
								T <sub>20</sub>	420	388	223	246	136	4 I-3	66
300	12	315	381	81	35	246	310	T <sub>10</sub> , T <sub>20</sub>	420	388	223	246	136	4 I-3	75
350	14	350	416	92	39.5	308	340	A, B	448	388	223	246	136	4 I-4	96
400	16	400	475	102	39	348	372	A	448	388	223	246	136	4 I-4	123

■ 304A-4 I



■ 4I Installation direction

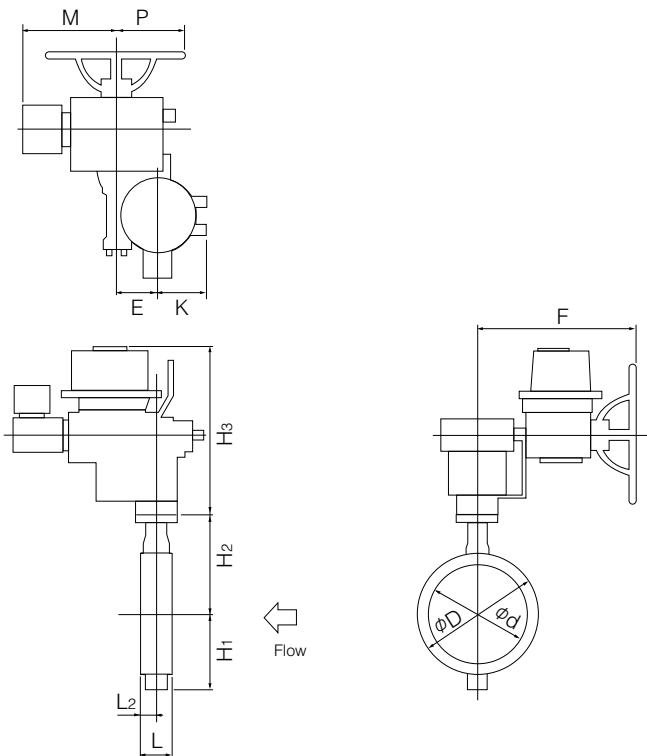
<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 I A</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 I B</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 I C</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 I D</p>
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# Tom Disco 304A (Wafer) / 304Q (Lugged)

## Three phase motor actuator type 304A-4L (350mm to 600mm)

Nominal size		Dimension (mm)													Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	M	P		
350	14	350	416	92	39.5	308	340	A, B	547	117	164	533	363	230	LTKD-01 0.2kW /DGH-3	171
								C	592	140	198	593	373	230	LTKD-02 0.4kW /DGH-4	221
400	16	400	475	102	39	348	372	A	547	117	164	533	363	230	LTKD-01 0.2kW /DGH-3	197
								B	592	140	198	593	373	230	LTKD-02 0.4kW /DGH-4	247
								C	592	140	198	593	400	230	LTKD-02 0.75kW /DGH-4	258
450	18	450	534	114	43	366	406	A	642	140	198	593	373	230	LTKD-02 0.4kW /DGH-4	308
								B, C	642	140	198	593	400	230	LTKD-02 0.75kW /DGH-4	319
500	20	500	589	127	50	405	442	A	642	140	198	593	373	230	LTKD-02 0.4kW /DGH-4	350
								B, C	642	140	198	593	400	230	LTKD-02 0.75kW /DGH-4	357
600	24	600	693	154	64	461	493	A	642	140	198	593	400	230	LTKD-02 0.75kW /DGH-4	460
								B, C	749	210	300	748	477	360	LTKD-05 1.5kW /DGH-5	605

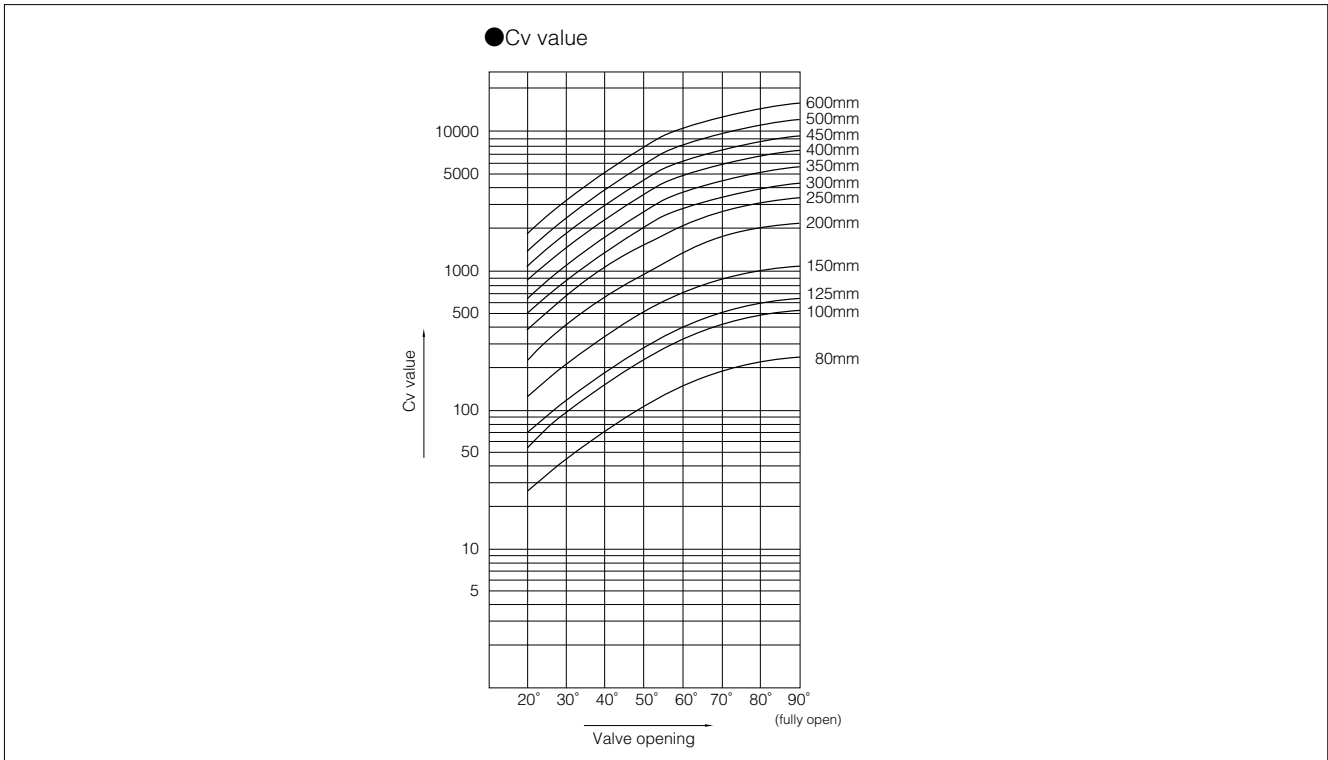
### 304A-4L



### 4L Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L A</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L B</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L C</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L D</p>
--	--	--	--

### 304A Cv value

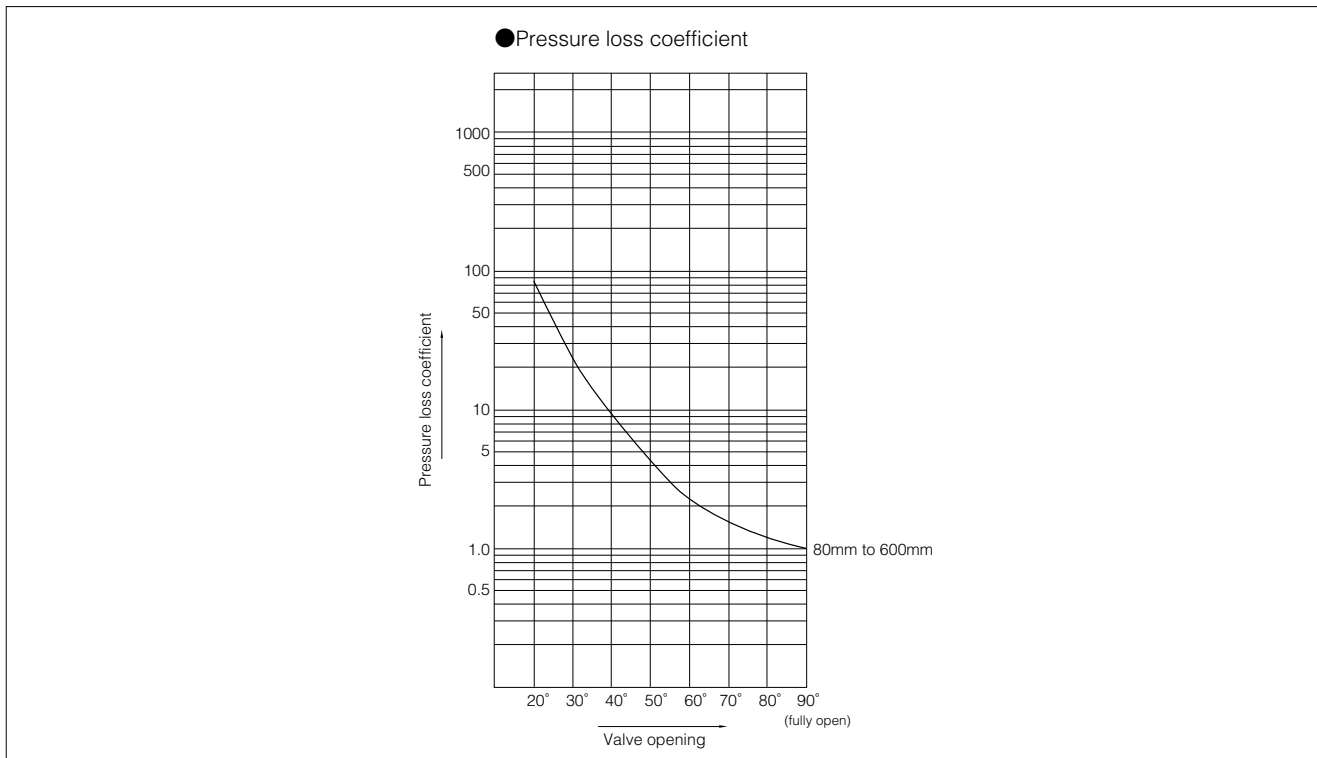


### 304A Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	29	52	85	122	162	207	243	252
100	4	49	88	144	207	279	351	414	432
125	5	77	140	230	333	441	549	648	684
150	6	126	225	369	531	720	900	1080	1116
200	8	234	423	693	990	1350	1710	1980	2070
250	10	390	703	1148	1648	2240	2857	3300	3443
300	12	492	888	1454	2081	2838	3612	4172	4354
350	14	648	1170	1915	2741	3739	4758	5496	5736
400	16	829	1496	2449	3505	4780	6084	7027	7334
450	18	1041	1879	3076	4403	6004	7642	8827	9212
500	20	1323	2387	3909	5595	7630	9710	11216	11705
600	24	1929	3481	5700	8159	11126	14161	16356	17070

# Tom Disco 304A (Wafer)/304Q (Lugged)

## 304A pressure loss coefficient



## 304A Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
80	3	95	29	11	5	3	2	1	1
100	4	98	30	11	5	3	2	1	1
125	5	93	28	10	5	3	2	1	1
150	6	70	22	8	4	2	1	1	1
200	8	62	19	7	3	2	1	1	1
250	10	54	17	6	3	2	1	1	1
300	12	70	21	8	4	2	1	1	1
350	14	68	21	8	4	2	1	1	1
400	16	73	22	8	4	2	1	1	1
450	18	75	23	9	4	2	1	1	1
500	20	72	22	8	4	2	1	1	1
600	24	70	22	8	4	2	1	1	1



### 304A Flange accommodation

Nominal size		JIS				ASME/API/JPI Class 150	BS4504		DIN		BS10 Table E
mm	inch	5K	10K	16K	20K		PN10	PN16	NP10	NP16	
80	3	×	D	D	D	○	D	D	D	D	×
100	4	×	D	D	D	D	D	D	D	D	×
125	5	×	D	D	D	D	D	D	D	D	×
150	6	×	D	D	D	D	D	D	D	D	×
200	8	×	D	D	D	D	D	D	D	D	×
250	10	×	D	D	D	D	D	D	D	D	×
300	12	×	D	D	D	D	D	D	D	D	×
350	14	D	D	D	D	D	D	D	D	D	D
400	16	D	D	D	D	D	D	D	D	D	D
450	18	D	T	T	T	D	T	T	T	T	D
500	20	T	T	T	T	T	T	T	T	T	T
600	24	T	T	T	T	T	T	T	T	T	T

- : Can be used without flange drilling.
- D : With flange drilling
- T : With flange tapping
- ×

# Tom Disco 304A (Wafer)/304Q (Lugged)

## 304A Applicable pipe list in case of **A**

Nominal size		SGP		Sch20		Sch40		Sch60		Sch80		Sch10S		Sch20S		Minimum internal diameters of piping (mm)
		Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	
mm	inch															
80	3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	72.5
100	4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	93.8
125	5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	119.4
150	6	○	○	○	○	○	○	○	○	×	○	×	○	○	○	147.5
200	8	○	○	○	○	○	○	○	○	×	○	×	○	○	○	197.5
250	10	○	○	○	○	○	○	○	○	×	○	×	○	○	○	248.1
300	12	○	○	○	○	○	○	○	○	×	×	×	○	○	○	297.6
350	14	○	○	○	○	○	○	○	○	×	×	×	—	—	—	330
400	16	○	○	○	○	○	○	○	○	×	○	×	—	—	—	377
450	18	○	○	○	○	○	○	○	○	×	○	×	—	—	—	424
500	20	○	○	○	○	○	○	○	○	×	○	×	—	—	—	470
600	24	—	—	○	○	○	○	○	○	×	×	×	—	—	—	564

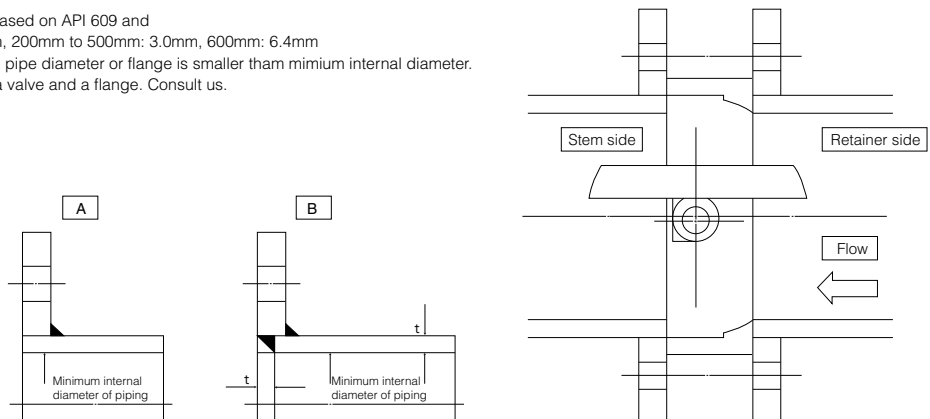
## 304A Applicable pipe list in case of **B**

Nominal size		SGP		Sch20		Sch40		Sch60		Sch80		Sch10S		Sch20S		Minimum internal diameters of piping (mm)
		Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	
mm	inch															
80	3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	63.6
100	4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	87.0
125	5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	112.8
150	6	○	○	○	○	○	○	○	○	○	○	○	○	○	○	142.5
200	8	○	○	○	○	○	○	○	○	×	○	×	○	○	○	193.3
250	10	○	○	○	○	○	○	○	○	×	○	×	○	○	○	248.1
300	12	○	○	○	○	○	○	○	○	×	○	×	○	○	○	297.6
350	14	○	○	○	○	○	○	○	○	○	×	—	—	—	—	323.0
400	16	○	○	○	○	○	○	○	○	○	×	—	—	—	—	371.0
450	18	○	○	○	○	○	○	○	○	○	×	—	—	—	—	418.0
500	20	○	○	○	○	○	○	○	○	○	×	—	—	—	—	464.0
600	24	—	—	○	○	○	○	○	○	○	×	—	—	—	—	557.0

Remark 1: ○=Applicable X=Not applicable

Remark 2: The clearance of disc and pipe is based on API 609 and MSS SP67 80mm to 150mm: 1.5mm, 200mm to 500mm: 3.0mm, 600mm: 6.4mm

Remark 3: In case of "X" shown above, internal pipe diameter or flange is smaller than minimum internal diameter. Consider to put a spacer between a valve and a flange. Consult us.



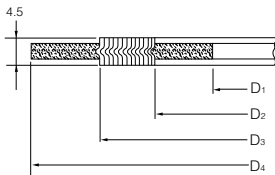
### 304A Piping gasket

- In case of sheet gasket ..... Any standard can be used.
- In case of spiral gasket
  - For ASME / API / JPI flange ..... Any standard gaskets with inner/outer ring can be used.
  - For JIS flange ..... Use special spiral gasket shown below.

#### ■ Special spiral gasket for JIS flange size

Nominal size		JIS flange					
		5K, 10K, 16K, 20K			5K	10K	16K, 20K
mm	inch	D1	D2	D3	D4	D4	D4
80	3	89	97	120	×	134	140
100	4	115	124	146	×	159	165
125	5	140	151	177	×	190	202
150	6	166	178	207	×	220	237
200	8	217	227	257	×	270	282
250	10	268	282	318	×	332	354
300	12	319	331	362	×	377	404
350	14	356	369	399	412	422	450
400	16	406	420	457	472	484	508
450	18	458	472	517	532	539	573
500	20	508	532	567	582	594	628
600	24	610	626	672	689	700	734

Remark1; X: Not applicable



#### ■ Applicable standard for spiral gasket

Nominal size		Tomoe special			Standard gasket		
		JIS 10K	JIS 16K JIS 20K	ASME Class 125/150	JIS 10K	JIS 16K JIS 20K	ASME Class 125/150
mm	inch						
80	3	○	○	○	×	×	○
100	4	○	○	○	×	×	○
125	5	○	○	○	×	×	○
150	6	○	○	○	×	×	○
200	8	○	○	○	×	×	○
250	10	○	○	○	×	×	○
300	12	○	○	○	×	×	○
350	14	○	○	○	×	×	○
400	16	○	○	○	×	×	○
450	18	○	○	○	×	×	○
500	20	○	○	○	×	×	○
600	24	○	○	○	×	×	○

Remark 1: ○: Applicable, X: Not applicable

Remark 2: In case a minute leakage of gas (less than 100PPm) becomes a problem, please inquire of our business charge.

### 304A Applicable standard for standard piping gasket

Nominal size		Max. allowable inside diameter (D)	Joint sheet or RPTFE solid gasket (t≤2mm)					PTFE mold type gasket VALQUA or NICHIAS				
			JIS 5K	JIS 10K	JIS 16K JIS 20K	ASME Class 125/150	JPI 150Lb	JIS 5K	JIS 10K	JIS 16K JIS 20K	ASME Class 125/150	JPI 150Lb
mm	inch											
80	3	97	×	○	○	○	○	×	○	○	○	○
100	4	124	×	○	○	○	○	×	○	○	○	○
125	5	151	×	○	○	○	○	×	○	○	○	○
150	6	178	×	○	○	○	○	×	○	○	○	○
200	8	227	×	○	○	○	○	×	○	○	○	○
250	10	282	×	○	○	○	○	×	○	○	○	○
300	12	331	×	○	○	○	○	×	○	○	○	○
350	14	362	○	○	○	○	○	○	○	○	○	○
400	16	414	○	○	○	○	○	○	○	○	○	○
450	18	468	○	○	○	○	○	○	○	○	○	○
500	20	518	○	○	○	○	○	○	○	○	○	○
600	24	619	○	○	○	○	○	○	○	○	○	○

Remark; ○: Applicable, X: Not applicable

※ All standard joint seats and PTFE cut gaskets can be used.

※ Only VALQUA flawless gaskets (Part No.: 7030/7031/7035) and NICHIAS PTFE cushion gaskets (Part No.: 9010/9011) can be used. (Products from other manufacturers cannot be used due to their dimensions.)

# Tom Disco 304A (Wafer) / 304Q (Lugged)

## 304A Piping Bolts and Nuts Sizes

Nominal size		JIS5K		JIS10K		JIS16K	
mm	inch	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts
80	3	—	—	8-M16×145	—	8-M20×170	—
100	4	—	—	8-M16×145	—	8-M20×170	—
125	5	—	—	8-M20×170	—	8-M22×190	—
150	6	—	—	8-M20×170	—	12-M22×190	—
200	8	—	—	12-M20×170	—	12-M22×190	—
250	10	—	—	12-M22×190	—	12-M24×210	—
300	12	—	—	16-M22×190	—	16-M24×225	—
350	14	12-M22×210	—	16-M22×210	—	16-M30(P3)×245	—
400	16	16-M22×220	—	16-M24×235	—	16-M30(P3)×265	—
450	18	16-M22×230	※ 1	16-M24×250	4-M24×84×60	16-M30(P3)×280	4-M30(P3)× 95×65
					4-M24×58×50		4-M30(P3)× 73×50
500	20	16-M22×245	4-M22×80×50	16-M24×260	4-M24×90×60	16-M30(P3)×300	4-M30(P3)×105×65
			4-M22×60×50		4-M24×70×60		4-M30(P3)× 81×50
600	24	16-M24×280	4-M24×84×60	20-M30(P3)×300	4-M30(P3)×81×50	20-M36(P3)×345	4-M36(P3)×100×60
			4-M24×65×50		4-M30(P3)×65×50		4-M36(P3)× 82×50

Nominal size		JIS20K		ASME / API / JPI Class 150	
mm	inch	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts
80	3	8-M20×170	—	4-U5/8-11UNC×155	—
100	4	8-M20×170	—	8-U5/8-11UNC×155	—
125	5	8-M22×190	—	8-U3/4-10UNC×175	—
150	6	12-M22×190	—	8-U3/4-10UNC×175	—
200	8	12-M22×190	—	8-U3/4-10UNC×205	—
250	10	12-M24×210	—	12-U7/8- 9UNC×215	—
300	12	16-M24×225	—	12-U7/8- 9UNC×215	—
350	14	16-M30(P3)×260	—	12-U1 - 8UNC×240	—
400	16	16-M30(P3)×280	—	16-U1 - 8UNC×255	—
450	18	16-M30(P3)×300	4-M30(P3)×105×65	16-U1 1/8- 8UN×280	—
			4-M30(P3)× 81×50		
500	20	16-M30(P3)×315	4-M30(P3)×110×60	16-U1 1/8- 8UN×295	4-U1 1/8- 8UN×105×50
			4-M30(P3)× 90×65		4-U1 1/8- 8UN× 80×50
600	24	20-M36(P3)×360	4-M36(P3)×108×60	16-U1 1/4- 8UN×340	4-U1 1/4- 8UN×100×50
			4-M36(P3)× 90×50		4-U1 1/4- 8UN× 90×50

※ 1 Tapped drilling is also applicable.

Remark: Use SNB 7/S45C (A193 B7/A, 194 2H) SUS304/SUS304

For long bolt, use full thread bolt.

For hexagon nut, use heavy nut.

A metric screw should have 3 pitches if its nominal diameter exceeds M30.

A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

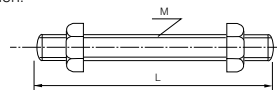
Hexagon bolts (set bolts) are indicated with the retainer side on the up side and the stem side on down side.

### Examples

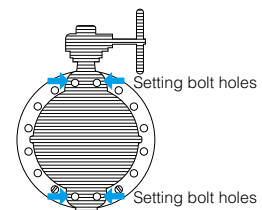
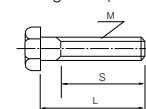
Long bolts: 12 - M22 × 185  
 N M L

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts) N M L S

Long bolts and nuts (full thread)

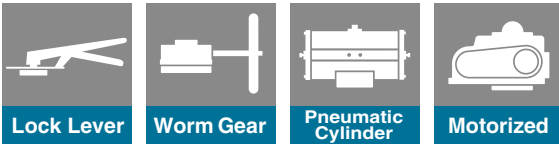
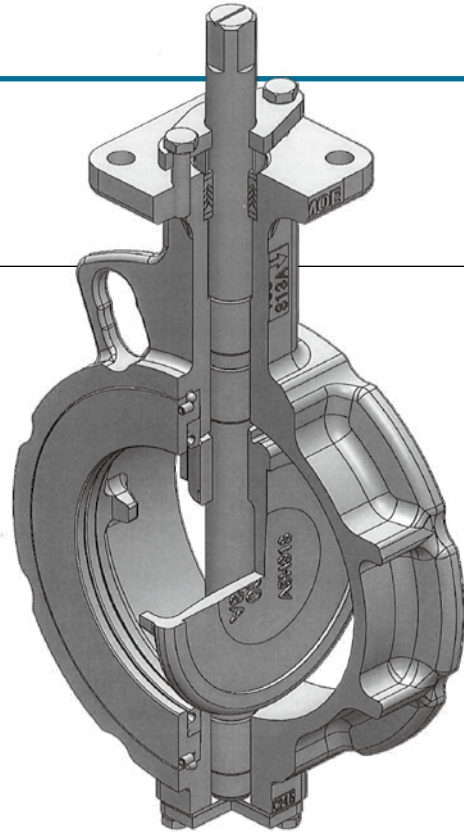


Setting bolts (Hexagon bolts)





# 304YA Wafer



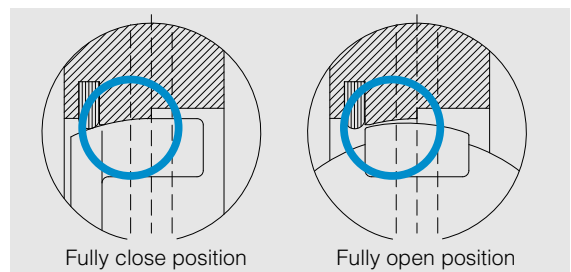
## Features and Benefits

### Weight saving

30% weight saving with suitable design of 1.0MPa  
(compared with existing 304Y 300mm)

### Self aligning disc design

Contact area of the body and the disc is spherical.  
These spherical centers are displaced. When valve position is fully close, these surfaces are attached. When valve position is fully open, there is a clearance between the body and the disc. It can get both of smooth rotation and seal performance.



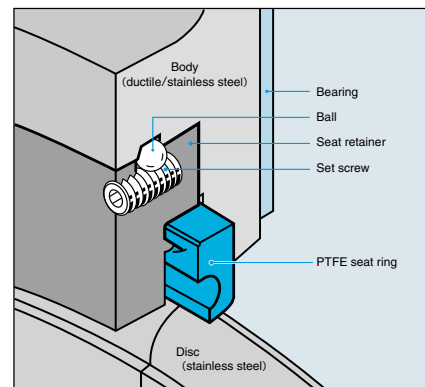
### Applicable for hot/cold water supply

### Low temperature range expansion

Change from -20 degrees C to -29 degrees C

### Easy replacement of the seat ring

The ball lock method is used to simplify replacement of the seat ring.



## Standard Specifications

Valve Model		304YA	
Valve type		Double eccentric (Water)	
Valve nominal size		40, 50, 65, 80, 100, 125, 150, 200, 250, 300mm 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 8, 10, 12inch	
Max. allowable working pressure		1.0MPa	
Allowable seat leakage		ISO 5208 leakage A (Tight shut off)	
Flow direction		Bi-directional Standard direction of pressurization : Retainer side Maximum pressure on shaft side (200mm to 300mm) : 0.6MPa	
Applicable standards	Face to face dimensions	JIS B 2002 (Series46) / ISO 5752 (Series20)	
	Flange accommodation	JIS 5K / 10K / ASME Class 150	
	Top flange	In compliance with ISO 5211	
Standard Materials <sup>*1</sup>	Body	FCD450	SCS13A
	Disc	SCS13A	
	Shaft	SUS420J2	SUS630 (H1150)
	Seating	RPTFE (Carbon and graphite contained)	
	Seating retainer	SF490A <sup>*2</sup> or S25C or S45C	SCS13A <sup>*2</sup> or SUS304
	Shaft bearing	PTFE+ SS400	PTFE+ SUS316L
	Bottom gasket	#8121 or T#1215-A Expanded graphite (Low temperature : -29°C~200°C V#7020)	
Gland packing	RPTFE (Graphite contained)		
Maximum Temperature Range		FCD450 body: -20°C or over ~ less than 200°C	SCS13A body: -29°C or over ~ less than 200°C
Test pressure	Body Shell	working pressure × 1.5 (Hydraulic pressure)	
	Seat leak	working pressure × 1.1 (Pneumatic pressure)	
Actuators	Lock lever	1T	40 to 150mm (1 1/2 to 6inch)
	Worm gear	2U	40 to 300mm (1 1/2 to 12inch)
		7E	40 to 300mm (1 1/2 to 12inch)
		7F, 7G	40 to 200mm (1 1/2 to 8inch)
	Pneumatic cylinder	3U, 3K	250, 300mm (10, 12inch)
		4I	40 to 300mm (1 1/2 to 12inch)
Motorized	4J	40 to 300mm (1 1/2 to 12inch)	
Fluid types		Air Gas, Hot air, Water, Chemical solution, Steam	
Surface treatment	Body	FCD450 only : nitriding treatment	
	Disc	Hard chrome plating	
	Seating retainer	SF490A <sup>*2</sup> or S25C or S45C : Alkaline blackening	
Coating		FCD450-body only : Modified silicon resin coating (Munsell N7)	

\*1. The parts that use properly by body material and specification, please refer to the Following table.

\*2. In case of 40mm

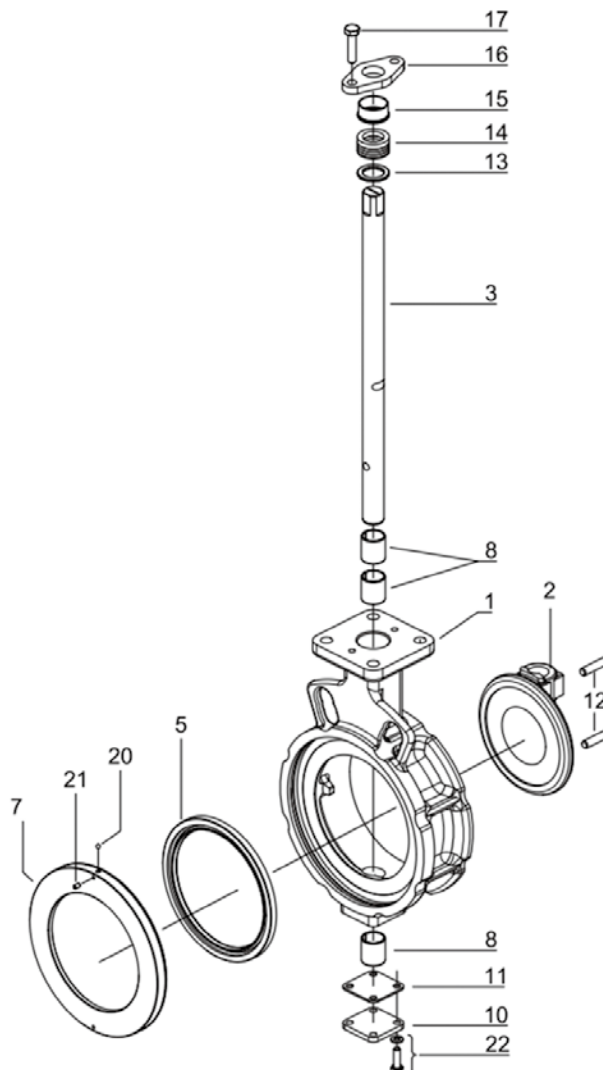
Case of SCS body : Material is SCS13A only. (Common parts is 304Y)

Case of FCD body : Material is SF490A only. (Common parts is 304Y)

\* There is possibility of seat leakage when fluid (powder/liquid) is solidified by working temperature and other cause, especially the valve is in a vertical position(e.g. at the bottom area of discharge spout of hopper and tank). Please consult us.

Specification	Body's Material	Temperature range	Parts material			
			Shaft	Seating	Bottom gasket	Grand packing
for Standard	SCS13A	0°C to 200°C	SUS630	RPTFE: (Carbon and graphite contained)	#8121 or T#1215-A	RPTFE: (Graphite contained)
	FCD450		SUS420J2			
for Low Temperature	SCS13A	-29°C to 200°C	SUS630			
	FCD450	-20°C to 200°C	SUS420J2		V#7020	

## 304YA Expanded view of components



## 304YA Parts list

### 304YA Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Shaft	1	
★ 5	Seatring	1	
7	Seatring retainer	1	
8	Shaft bearing	3	
10	Bottom cover	1	
★ 11	Bottom gasket	1	
12	Taper pin	2	
13	Packing retainer	1	
★ 14	Gland packing	1 set	
15	Rough gland	1 set	
16	Gland flange	1	
17	Hxagon bolt	2	
★ 20	Ball	2	40mm to 100mm
		3	125mm to 300mm
★ 21	Hexagon socket set screw	2	40mm to 100mm
		3	125mm to 300mm
22	Hexagon bolt, Spring washer	4	

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove set screws (Part #21 Set screw).

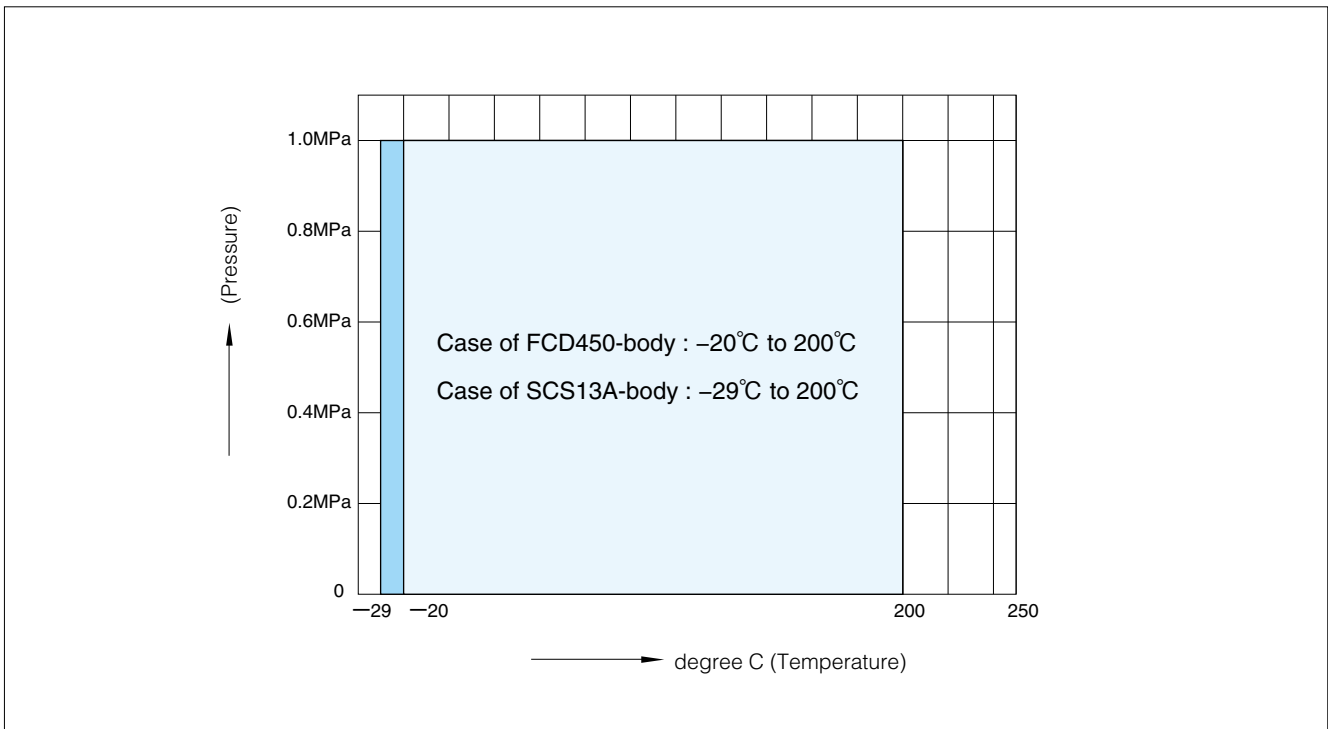


### 304YA Actuator selection chart

#### ■ 304YA

Model	Size $\left(\frac{\text{mm}}{\text{inch}}\right)$									
	40	50	65	80	100	125	150	200	250	300
	1 1/2	2	2 1/2	3	4	5	6	8	10	12
1T	1T-1					1T-2				
2U	2U-0	2U-1		2U-2			2U-3	2U-4		
7E	T35		T85		T200		T380		T750	
7G,7F	T85S		T200S		T380S	T750S				
3U,3K									TG-12S	
4I	4I-0			4I-1	4I-2		4I-2.5		4I-3	
4J	SRJ-010					SRJ-020	SRJ-060			

### 304YA Pressure and temperature rating



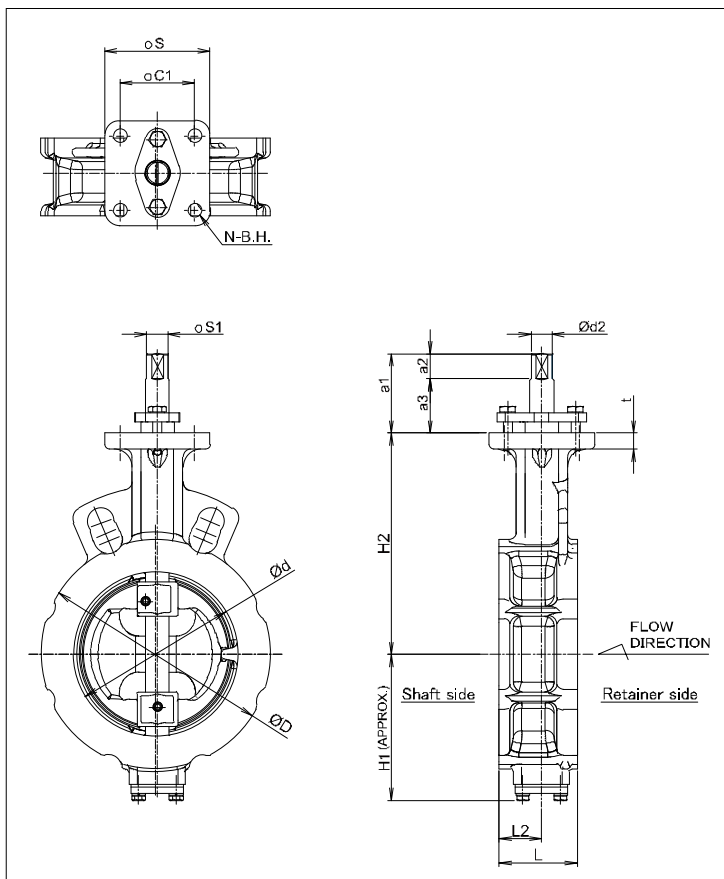
# Tom Disco® 304YA

## 304YA Bare shaft

### ■304YA-01

Nominal size		Dimension (mm)													Approx. Mass (kg)	
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>	$\phi d_2$	$\square S_1$	t	Flange type	SCS-body	FCD-body
40	1 1/2	48	81	33	15	57	106	46.5	10.5	36	10	8	11	F07	1.7	1.6
50	2	59	96	43	25.4	67	114	46.5	10.5	36	10	8	11	F07	2.3	2.1
65	2 1/2	73	115	46	27.4	75	125	46.5	10.5	36	12	10	11	F07	3.0	2.8
80	3	87	127	46	24.5	83	132	47.5	11.5	36	14	12	11	F07	3.5	3.2
100	4	109	152	52	28.3	97	147	52.5	16.5	36	16	14	11	F07	4.6	4.3
125	5	137	183	56	30.1	111	166	52.5	16.5	36	18	14	13	F10	7.1	6.7
150	6	163	211	57	28.9	129	181	52.5	16.5	36	20	16	13	F10	8.9	8.4
200	8	213	257	62	30.8	156	212	55	20	35	22	18	13	F10	12.3	11.6
250	10	263	322	70	33.3	184	243	60	30	30	28	24	13	F10	21.0	19.9
300	12	315	367	80	40.8	213	290	63	30	33	30	24	16	F12	28.2	26.8

### ■304YA-01



### ■Top flange

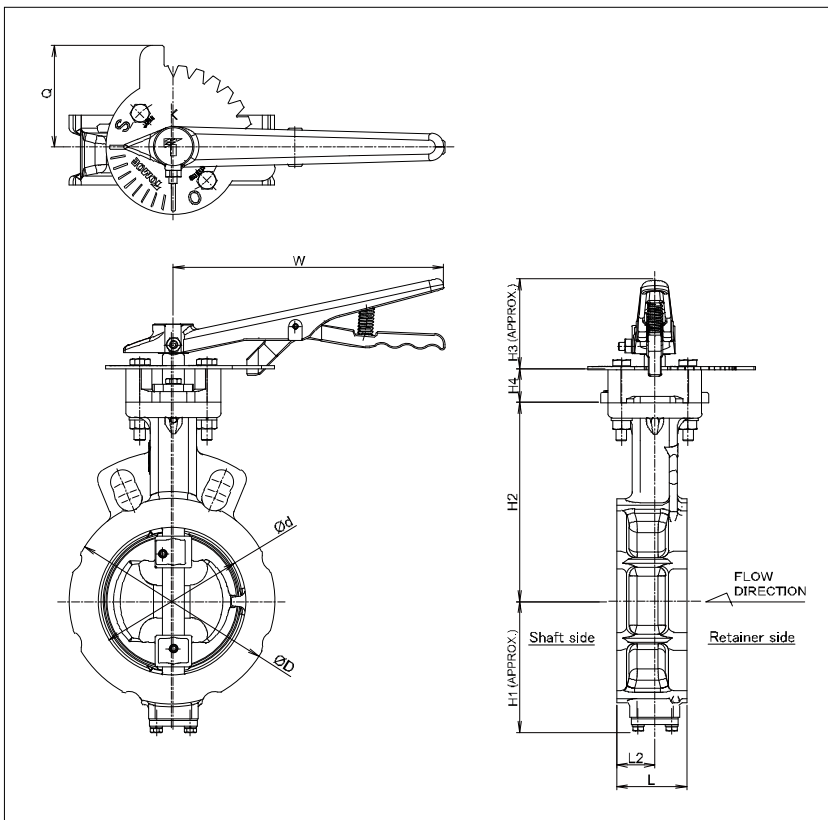
Flange type	$\square S$	$\phi C_1$	N	B.H.
F07	70	49.5	4	9
F10	102	72.1	4	11
F12	125	88.4	4	13

Lock lever type 304YA-1T (40mm to 150mm)

■304YA-1T

Nominal size		Dimension (mm)										Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	Q	W		
40	1 1/2	48	81	33	15	57	106	66	25	75	200	1T-1	2.8
50	2	59	96	43	25.4	67	114	66	25	75	200	1T-1	3.3
65	2 1/2	73	115	46	27.4	75	125	66	25	75	200	1T-1	4.1
80	3	87	127	46	24.5	83	132	66	25	75	200	1T-1	4.5
100	4	109	152	52	28.3	97	147	66	25	75	200	1T-1	5.7
125	5	137	183	56	30.1	111	166	92	25	87.5	300	1T-2	9.3
150	6	163	211	57	28.9	129	181	92	25	87.5	300	1T-2	11.1

■304YA-1T



■1T Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p>
<b>1TA</b>	<b>1TB</b>	<b>1TC</b>	<b>1TD</b>

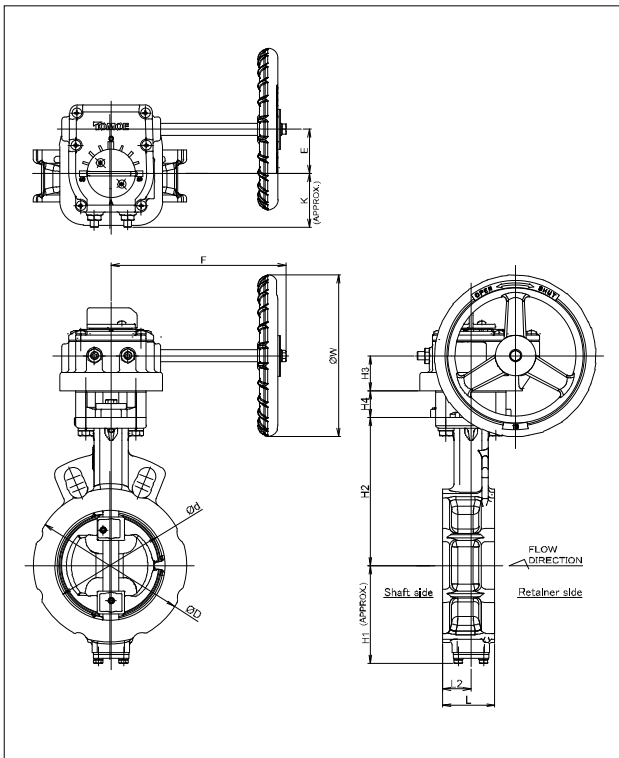
# Tom Disco® 304YA

## Worm gear type 304YA-2U(40mm to 300mm)

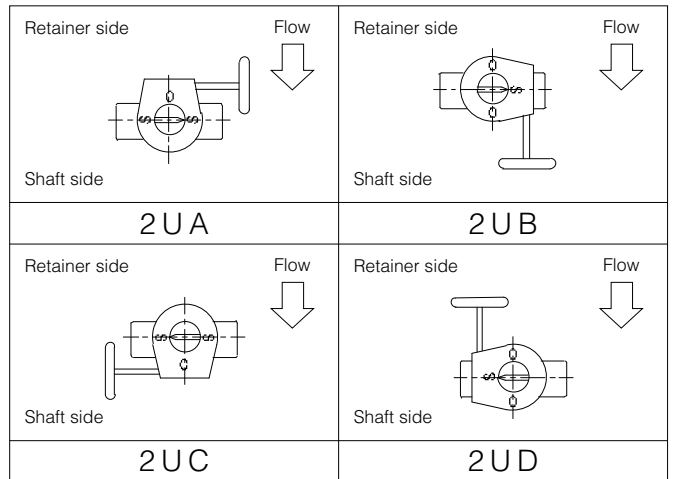
### ■304YA-2U (40mm to 300mm)

Nominal size		Dimension (mm)												Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	E	K	F	$\phi W$		
40	1 1/2	48	81	33	15	57	106	29.5	26.5	36	46	160	100	2U-0	4.3
50	2	59	96	43	25.4	67	114	29.5	26.5	36	46	160	100	2U-0	4.9
65	2 1/2	73	115	46	27.4	75	125	29.5	26.5	36	46	160	100	2U-1	5.6
80	3	87	127	46	24.5	83	132	29.5	26.5	36	46	160	100	2U-1	6.1
100	4	109	152	52	28.3	97	147	34.5	26.5	44	53	173.5	160	2U-2	9.1
125	5	137	183	56	30.1	111	166	34.5	26.5	44	53	173.5	160	2U-2	12.0
150	6	163	211	57	28.9	129	181	34.5	26.5	44	53	173.5	160	2U-2	13.8
200	8	213	257	62	30.8	156	212	41.5	26.5	67	75	198	200	2U-3	20.8
250	10	263	322	70	33.3	184	243	41.5	26.5	67	75	198	200	2U-3	29.5
300	12	315	367	80	40.8	213	290	48.0	29.5	87.5	90	222.5	200	2U-4	45.6

### ■304YA-2U



### ■2U Installation direction

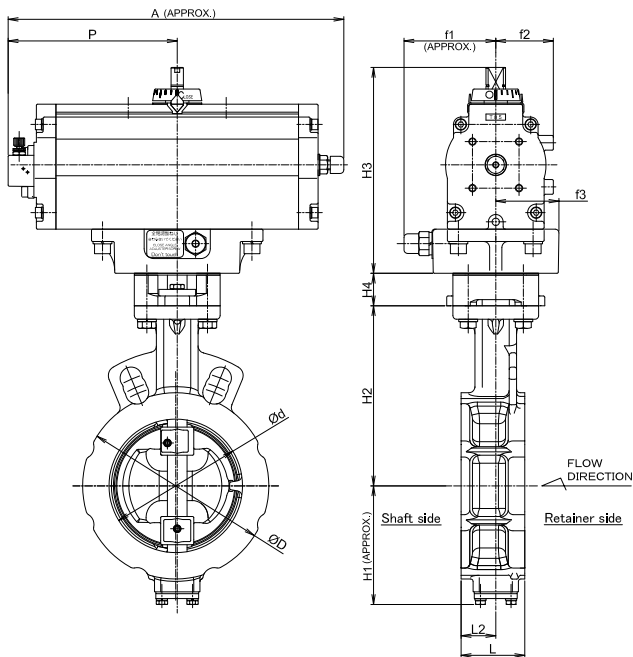


## Double-acting pneumatic cylinder type 304YA-7E (40mm to 300mm)

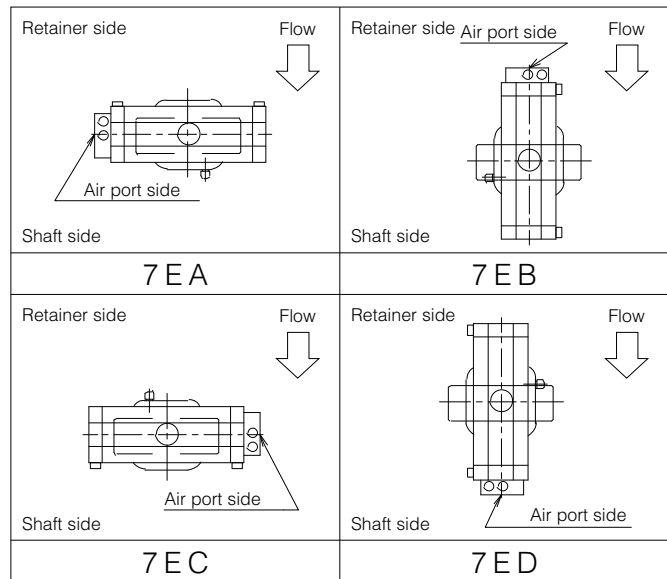
### 304YA-7E

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>		
40	1 1/2	48	81	33	15	57	106	125	26.5	228	116	57	29	35	T35	3.8
50	2	59	96	43	25.4	67	114	125	26.5	228	116	57	29	35	T35	4.4
65	2 1/2	73	115	46	27.4	75	125	125	26.5	228	116	57	29	35	T35	5.1
80	3	87	127	46	24.5	83	132	168	26.5	276	142	75	47	51	T85	8.5
100	4	109	152	52	28.3	97	147	168	26.5	276	142	75	47	51	T85	9.6
125	5	137	183	56	30.1	111	166	203	26.5	346	176	79	57	51	T200	15.8
150	6	163	211	57	28.9	129	181	203	26.5	346	176	79	57	51	T200	17.6
200	8	213	257	62	30.8	156	212	231	26.5	426	214	91	69	62.5	T380	27.1
250	10	263	322	70	33.3	184	243	231	26.5	426	214	91	69	62.5	T380	35.8
300	12	315	367	80	40.8	213	290	269	29.5	546	270	118	85	70	T750	53.6

### 304YA-7E



### 7E Installation direction



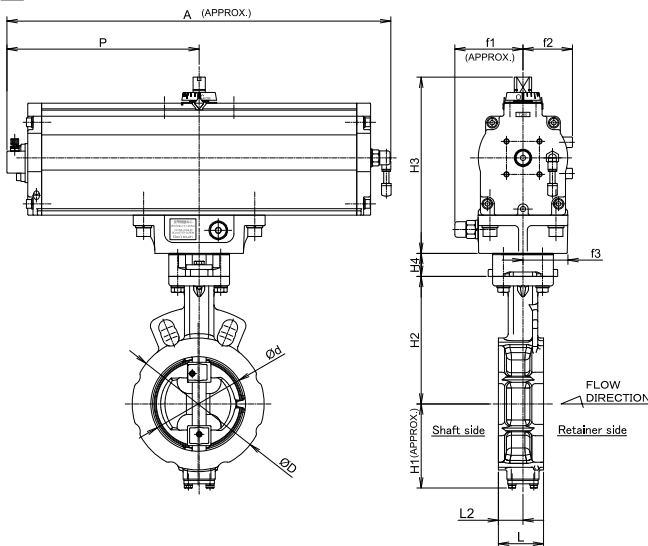
# Tom Disco® 304YA

Single-acting pneumatic cylinder type 304YA-7G (Air to open: 40mm to 200mm) / 304YA-7F (Air to close: 40mm to 200mm)

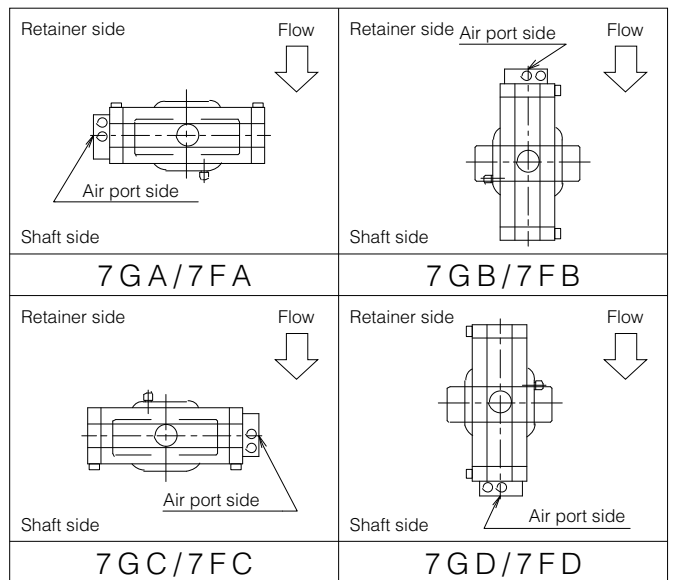
## 304YA-7G/7F

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>		
40	1 1/2	48	81	33	15	57	106	168	26.5	363.5	182.5	75	47	51	T85S	8.3
50	2	59	96	43	25.4	67	114	168	26.5	363.5	182.5	75	47	51	T85S	8.9
65	2 1/2	73	115	46	27.4	75	125	168	26.5	363.5	182.5	75	47	51	T85S	9.6
80	3	87	127	46	24.5	83	132	203	26.5	448.5	225.5	79	57	51	T200S	14.6
100	4	109	152	52	28.3	97	147	203	26.5	448.5	225.5	79	57	51	T200S	15.7
125	5	137	183	56	30.1	111	166	231	26.5	549.5	276	91	69	62.5	T380S	26.8
150	6	163	211	57	28.9	129	181	269	26.5	722.5	359.5	118	85	70	T750S	42.1
200	8	213	257	62	30.8	156	212	269	26.5	722.5	359.5	118	85	70	T750S	45.5

## 304YA-7G/7F



## 7G/7F Installation direction

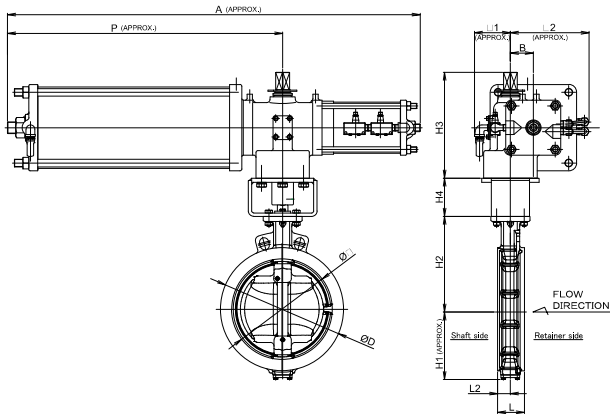


Single-acting pneumatic cylinder type 304YA-3U (Air to open: 250mm to 300mm) / 304YA-3K (Air to close: 250mm to 300mm)

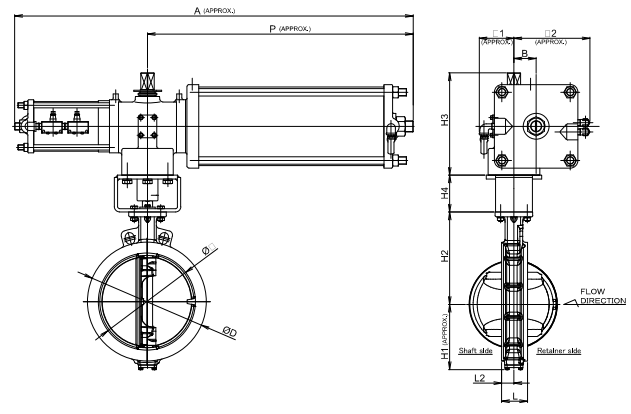
■ 304YA-3U/3K

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	B	f <sub>1</sub>	f <sub>2</sub>		
250	10	263	322	70	33.3	184	243	277	100	1080	720	60	94	206	TG-12S	122
300	12	315	367	80	40.8	213	290	277	100	1080	720	60	94	206	TG-12S	130

■ 304YA-3U



■ 304YA-3K



■ 3U Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 U A</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 U B</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 U C</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 U D</p>
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■ 3K Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 K A</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 K B</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 K C</p>	<p>Retainer side</p> <p>Flow</p> <p>Shaft side</p> <p>3 K D</p>
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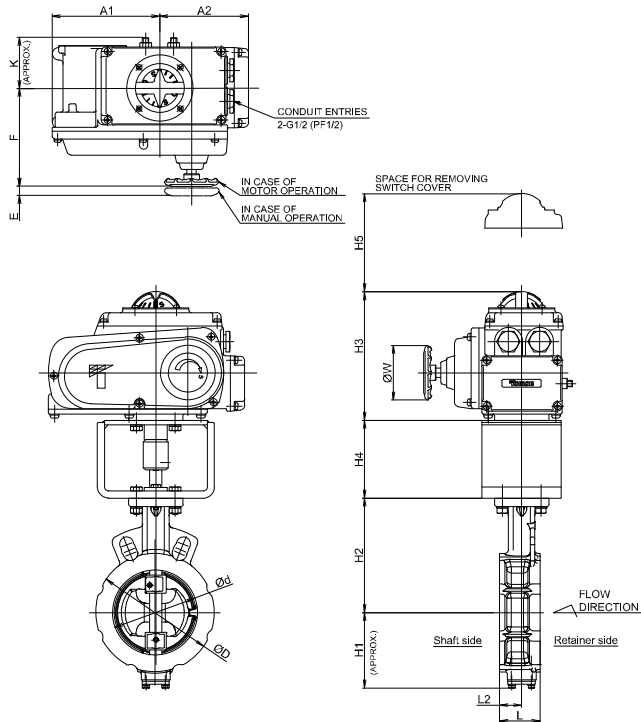
# Tom Disco® 304YA

## Single phase electric motor type 304YA-4 I (40mm to 300mm)

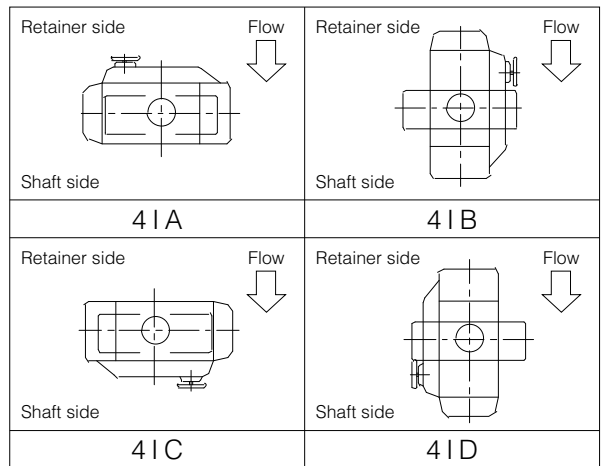
### ■304YA-4 I

Nominal size		Dimension (mm)															Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	A <sub>1</sub>	A <sub>2</sub>	F	K	E	$\phi W$		
40	1 1/2	48	81	33	15	57	106	150	100	100	100	102	85	53.8	43	—	NEL-0	9.3
50	2	59	96	43	25.4	67	114	150	100	100	100	102	85	53.8	43	—	NEL-0	9.9
65	2 1/2	73	115	46	27.4	75	125	150	100	100	100	102	85	53.8	43	—	NEL-0	10.6
80	3	87	127	46	24.5	83	132	150	100	100	100	102	85	53.8	43	—	NEL-0	11.1
100	4	109	152	52	28.3	97	147	165	100	100	138	114	126	65	12	70	NEL-1	14.4
125	5	137	183	56	30.1	111	166	198	100	100	167	143	154	85	14	100	NEL-2	22.3
150	6	163	211	57	28.9	129	181	198	100	100	167	143	154	85	14	100	NEL-2	24.6
200	8	213	257	62	30.8	156	212	198	175	100	167	143	154	85	14	100	NEL-2.5	33.6
250	10	263	322	70	33.3	184	243	198	175	100	167	143	154	85	14	100	NEL-2.5	42.3
300	12	315	367	80	40.8	213	290	230	175	100	223	98.5	245.5	136	22.5	200	NEL-3	59.9

### ■304YA-4 I



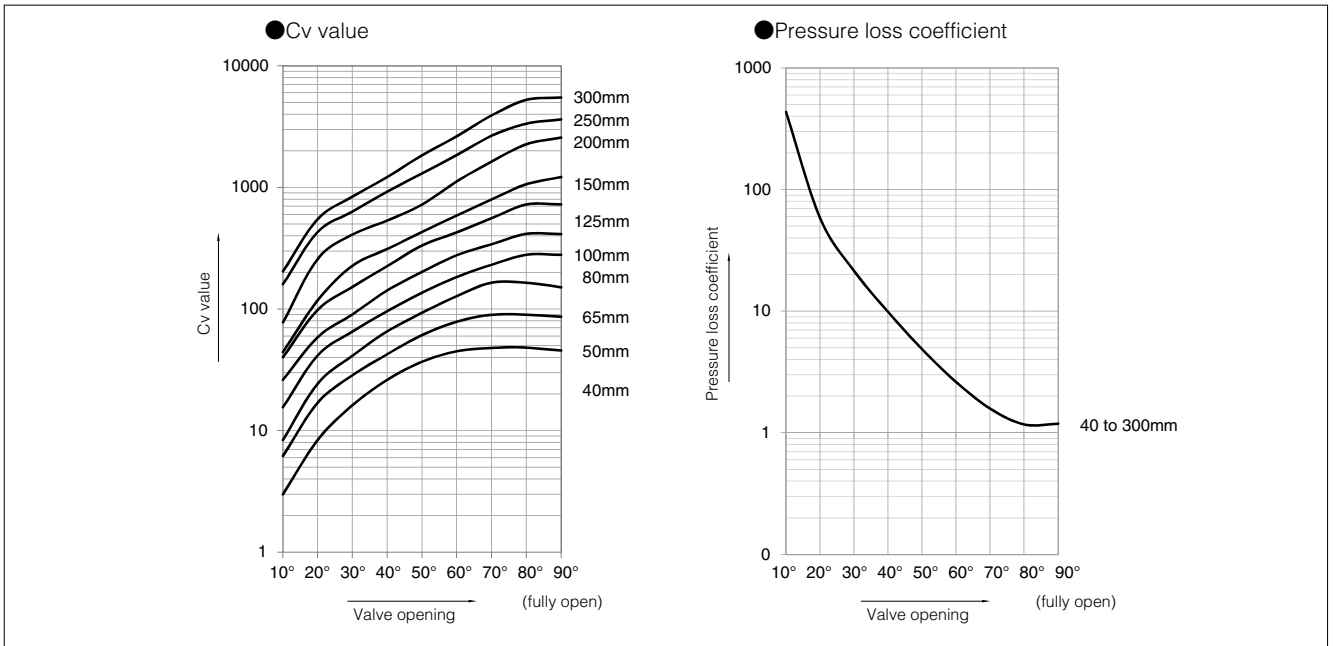
### ■4I Installation direction







## 304YA Cv value/pressure loss coefficient



### 304YA Cv value

Nominal size		Valve opening								
mm	inch	10°	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	3	8	16	26	37	45	48	48	46
50	2	6	17	29	43	61	79	90	90	87
65	2 1/2	8	24	41	66	93	128	165	165	151
80	3	16	42	65	96	137	184	232	280	280
100	4	26	59	91	142	202	277	342	416	414
125	5	40	99	152	226	334	428	559	725	725
150	6	44	118	227	312	431	589	799	1065	1219
200	8	78	259	410	535	725	1123	1632	2272	2570
250	10	160	431	634	926	1306	1848	2662	3352	3628
300	12	204	550	840	1220	1840	2636	3920	5260	5498

### 304YA Pressure loss coefficient

Nominal size		Valve opening								
mm	inch	10°	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	608	78	21	8	4	3	2	2	3
50	2	348	46	16	7	4	2	2	2	2
65	2 1/2	541	64	22	9	4	2	1	1	2
80	3	360	51	20	10	5	3	2	1	1
100	4	311	62	26	11	5	3	2	1	1
125	5	323	54	23	10	5	3	2	1	1
150	6	554	77	21	11	6	3	2	1	1
200	8	565	51	20	12	7	3	1	1	1
250	10	326	45	21	10	5	2	1	1	1
300	12	416	57	25	12	5	2	1	1	1

304YA Applicable pipe list in case of **A**, **B**

Figure A

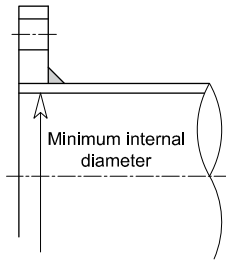
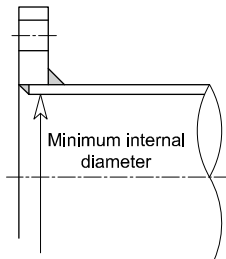


Figure B



Nominal size		JISG3452	JISG3454		JISG3459 (Stainless)	
mm	inch	SGP	Sch20	Sch40	Sch10S	Sch20S
40	1 1/2	○	—	○	○	○
50	2	○	○	○	○	○
65	2 1/2	○	○	○	○	○
80	3	○	○	○	○	○
100	4	○	○	○	○	○
125	5	○	○	○	○	○
150	6	○	○	○	○	○
200	8	○	○	○	○	○
250	10	○	○	○	○	○
300	12	○	○	○	○	○

Remark 1: ○=Applicable ×=Not applicable

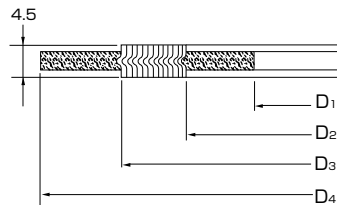
## 304YA Piping gasket

- In case of sheet gasket ..... Any standard can be used excluding 65mm-JIS flange. For 65mm-JIS flange, use the sheet gasket that followed old JIS Standard: JIS B 2404\_1999 for inner diameter. For other size, JIS standard products can be used.
- In case of spiral gasket ..... Use special spiral gasket shown below.

### ■ Special spiral gasket

Nominal size		JIS 10K				ASME Class 150			
mm	inch	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>
40	1 1/2	48	54	73	89	48	54	73	85
50	2	61	69	88	104	61	69	88	104
65	2 1/2	73	81	100	124	73	81	100	123
80	3	89	97	120	134	89	97	120	136
100	4	115	124	146	159	115	124	146	174
125	5	140	151	177	190	140	151	177	196
150	6	166	178	207	220	166	178	207	222
200	8	217	227	257	270	217	229	257	279
250	10	268	282	318	332	268	285	318	333
300	12	319	331	362	377	319	335	362	409

Remark : In case a minute leakage of gas (less than 100PPm) becomes a problem, please consult to engineers.



### ■ Available punching gasket and PTFE envelope gasket

Nominal size		Max. allowable inner diameter	Joint sheet and PTFE punching gasket (t≤2mm)			PTFE mold type gasket (NIPPON VALQUA products: 7030, 7031, 7035 series)		
mm	inch		D	JIS 5K	JIS 10K	ASME Class 150	JIS 5K	JIS 10K
40	1 1/2	55	○	○	○	○	○	○
50	2	69	○	○	○	○	○	○
65	2 1/2	77	×	×	○	×	×	○
80	3	97	○	○	○	○	○	○
100	4	124	○	○	○	○	○	○
125	5	151	○	○	○	○	○	○
150	6	178	○	○	○	○	○	○
200	8	227	○	○	○	○	○	○
250	10	282	○	○	○	○	○	○
300	12	331	○	○	○	○	○	○

Remarks : The above gaskets is not applicable to JIS piping 65mm. When using a gasket for JIS piping 65mm, make sure that the inner diameter of the gasket is 77 mm. PTFE mold type gasket made by NIPPON VALQUA is only available. (Other manufacturer's gasket is not applicable due to product size.)

### 304YA Flange accommodation

Nominal size		JIS		ASME B16.1 ASME B16.5		BS4504 DIN2632,DIN2633 GB/T9113.1	
mm	inch	5K	10K	Class125	Class150	PN10 PN1.0	PN16 PN1.6
40	1 1/2	○	○	○	○	○	△
50	2	○	○	○	○	○	△
65	2 1/2	○	○	○	○	○	△
80	3	○	○	○	○	○	○
100	4	○	○	○	○	○	○
125	5	○	○	○	○	○	○
150	6	○	○	○	○	○	○
200	8	○	○	○	○	○	○
250	10	○	○	○	○	○	△
300	12	○	○	○	○	○	○

○ : Possible to connect.

△ : Allows connection by additional machining.

### 304YA Piping bolts and nuts sizes

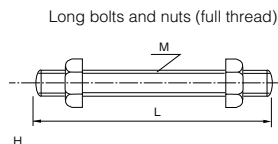
Nominal size		JIS 5K	JIS 10K	ASME Class 150
mm	inch			
40	1 1/2	4-M12×100×12	4-M16×120×16	4-U1/2×115×16
50	2	4-M12×120×12	4-M16×130×16	4-U5/8×140×16
65	2 1/2	4-M12×120×12	4-M16×145×16	4-U5/8×155×16
80	3	4-M16×130×16	8-M16×145×16	4-U5/8×155×20
100	4	8-M16×145×16	8-M16×145×16	8-U5/8×155×20
125	5	8-M16×145×16	8-M20×170×20	8-U3/4×175×22
150	6	8-M16×145×16	8-M20×170×20	8-U3/4×175×22
200	8	8-M20×170×20	12-M20×170×20	8-U3/4×205×22
250	10	12-M20×190×20	12-M22×190×22	12-U7/8×215×24
300	12	12-M20×190×20	16-M22×190×22	12-U7/8×215×24

Remark: Bolt / nut material: SNB7 / S45C (manufacturer standard product), SUS304 / SUS304 (order-made product) Spiral gasket cannot be used. Use full-thread bolts for long bolts and heavy nuts for hexagon nuts.

Example

Long bolts: 8 - M16 × 145 × 16

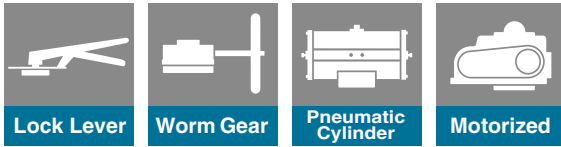
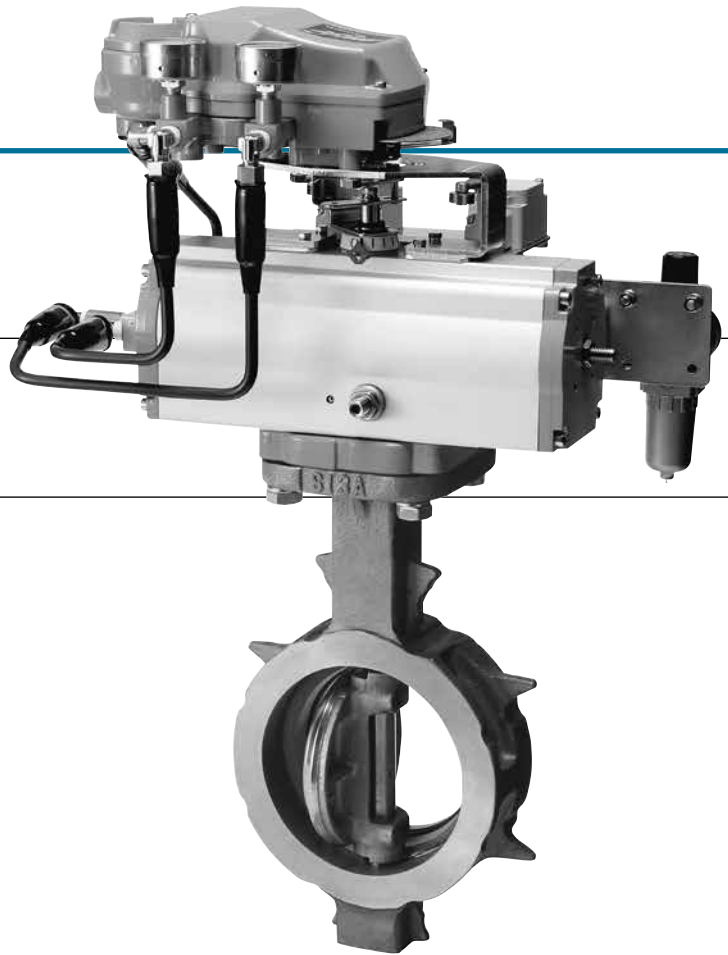
N
M
L
H



# General Purpose High Temperature and High Pressure Service Valves

## 302Y Wafer

## 304Y Wafer



### Features and Benefits

Ideal shut-off with new stopper mechanism. Two types of seat – metal and PTFE – for optimum performance in your application.

#### Unique stopper structure

For the 40 to 300mm models, automatic aligning and disc overrun prevention are ensured by the special spherical design of the inner surface of the body disc hub edge. Disc overrun is prevented by a protrusion on the inner surface of the body.

#### Double eccentric structure

The disc is rotated easily by minimal torque and unseats after turning only a small angle. Moreover, seat abrasion is prevented for a long life of reliable sealing.

#### Thin disc with a rigid construction

The disc is thin but ribbed for extra rigidity. The disc reduces thermal expansion and provides consistent sealing even in changing temperature or pressure situations.

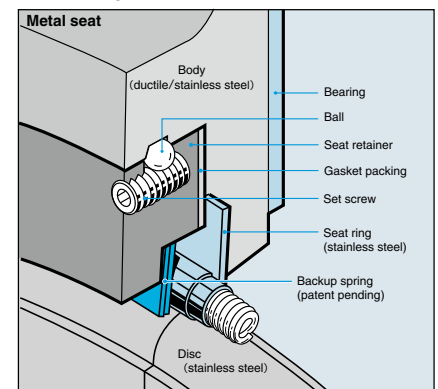
#### Seal the flow from both directions

Seals flow in both directions. Valve can be used as is, even if the flow changes direction. (There are pressure limitations for each direction of flow. See Pressure-temperature leakage chart for recommended specifications.)

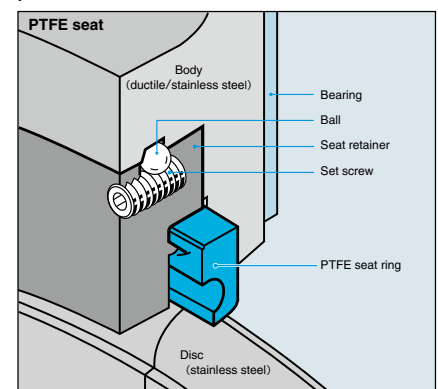
#### Easy replacement of the seat ring

The ball lock method is used to simplify replacement of the seat ring.

#### 302Y Resilient metal seat ring with original coil spring



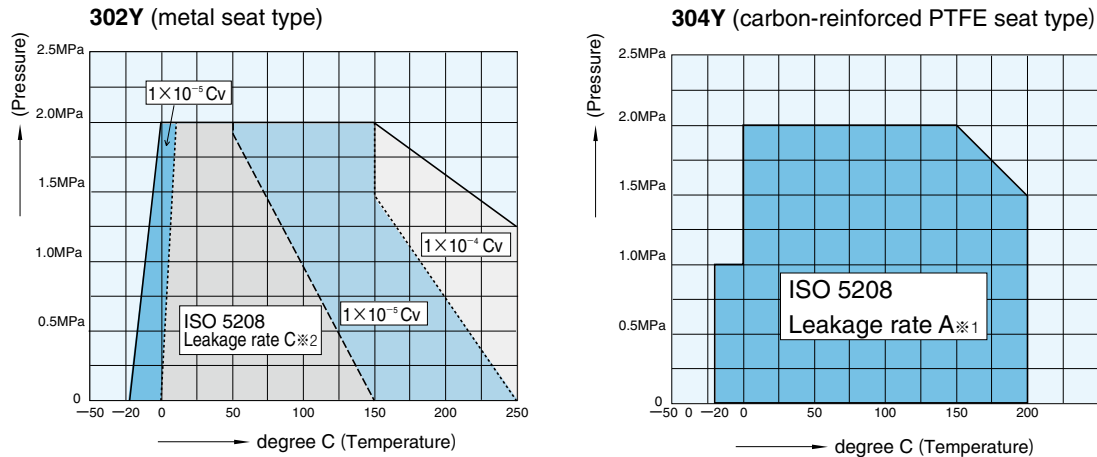
#### 304Y PTFE seat ring is inert to most chemical products and solvents



## General Description

The 300 series is optimal for applications that cannot be handled by valves with rubber seats because of the temperature, pressure, fluid velocity or fluid itself. Two types are available: the 302Y with a metal seat for steam line applications and the 304Y with a PTFE seat for chemical line applications.

### Pressure-Temperature Leakage Chart



※ The operating range is the area within the thick lines

■ ISO 5208 pressure test (To calculate leak rate, refer to "Formula for leak rate" on Data-05 at the end of the catalog.)

※1 Leakage rate A : 0 leakage(tight shut-off)

※2 Leakage rate C : 0.03mm<sup>2</sup>/s X nominal size(mm) (fluid)  
3Nmm<sup>3</sup>/s X nominal size(mm) (gas)

### Standard Specifications

Valve type	302Y		304Y	
Seat type	Metal seat type		PTFE seat type	
Valve nominal size	40mm to 300mm		40mm to 300mm	
Flange accommodation ※1	JIS 5K/10K/16K/20K, ASME class 150, BS10 Table E, BS4504 PN 6/10/16, DIN PN 6/10/16 etc			
Face-to-face dimensions	JIS B 2002 (46 series) / ISO 5752 (20 series)			
Actuator mounting flange	ISO 5211/1			
Pressure rating	ASME (B16.34, B16.42) Class 150			
Max. working pressure	2.0MPa (250, 300mm: 1.6MPa)		2.0 MPa	
Body shell test	working pressure×1.5(hydraulic) (Max. 3.0MPa)			
Seat leak test	working pressure×1.1(pneumatic) (Max. 2.2MPa)			
Flow direction	Bi -directional (Standard direction of pressurization: Retainer side) On the valve disc side: 2.0MPa On the valve stem side: 1.0MPa The max. pressure on the valve disc side for 250mm and 300mm valves is 1.6MPa		Bi -directional (Standard direction of pressurization: Retainer side) On the valve disc side: 2.0MPa	
Seat leakage	ISO 5208 leakage rate C		ISO 5208 leakage rate A (tight shut-off)	
Working temperature range	-20 to 250 degrees C		-20 to 200 degrees C	
Standard materials	Body ※2	FCD450 (Tuffride treated) OR SCS13A		
	Disc	SCS13A (HdCr plating)		
	Stem ※3	SUS420J2 or SUS329J1		
	Seat ring	SUS316	RPTFE (with carbon graphite) or the optional specification PFA + PTFE (white)	
	Gland packing	PTFE with carbon graphite		
Bonnet type	Open bonnet			
Actuators	Lock lever	40 to 150mm		
	Worm gear	40 to 300mm		
	Pneumatic cylinder	40 to 300mm		
	Motorised	40 to 300mm		
Coating	Under 200 degrees C: Modified silicon resin coating (Munsell N7). 200 degrees C and over: Heat resistant painting (silver). No painting for stainless steel.			

※1. 65mm is not applicable for BS 10 Table E.

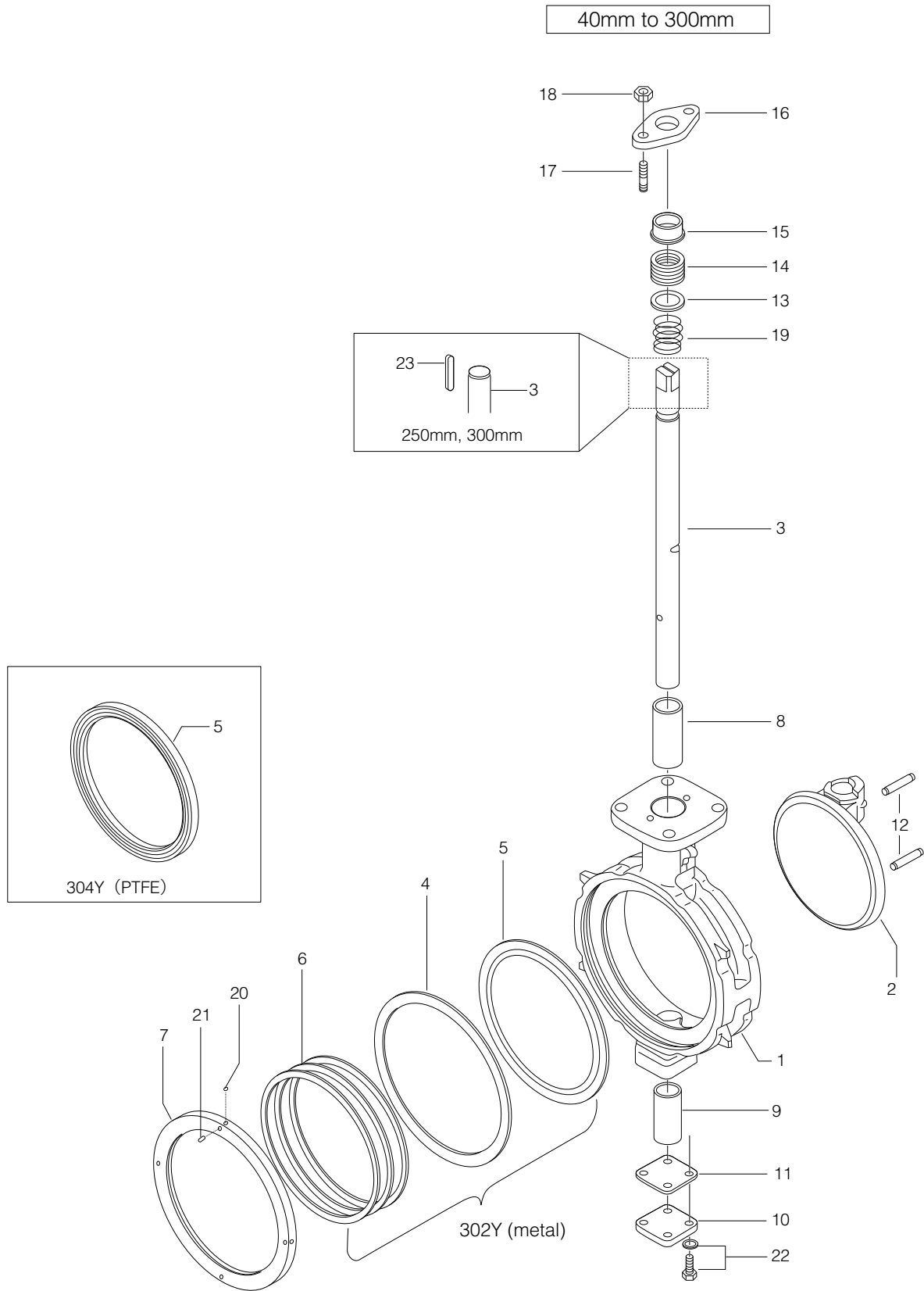
※2. For size 40mm, only SCS13A is available for the body material.

※3. For size 40mm, only SUS329J1 is available for the stem material.

※There is possibility of seat leakage when fluid (powder/liquid) is solidified by working temperature and other cause, especially the valve is in a vertical position(e.g. at the bottom area of discharge spout of hopper and tank). Please consult us.

# Tom Disco 302Y/304Y

## 302Y/304Y Expanded view of components





## 302Y/304Y Parts list

### ■ 302Y Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
★ 4	Seat ring gasket	1	
★ 5	Seat ring	1	
★ 6	Back-up spring	2	40mm to 100mm
		3	125mm to 200mm
		4	250mm, 300mm
7	Seat ring retainer	1	
8	Top shaft bearing	1	
9	Bottom shaft bearing	1	
10	Bottom cover	1	
★ 11	Bottom gasket	1	
12	Taper pin	2	
13	Packing retainer	1	
★ 14	Gland packing	1 sets	
15	Rough gland	1	
16	Gland flange	1	
17	Gland bolt	2	
18	Gland nut	2	
19	Gland coil	1	Only 40mm to 150mm
★ 20	Ball	2	40mm to 125mm
		4	150mm to 300mm
★ 21	Set screw	2	40mm to 125mm
		4	150mm to 300mm
22	Hexagon bolt, Spring washer	4 sets	
23	Key	1	Only 250mm, 300mm

### ■ 304Y Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
★ 5	Seat ring	1	
7	Seat ring retainer	1	
8	Top shaft bearing	1	
9	Bottom shaft bearing	1	
10	Bottom cover	1	
★ 11	Bottom gasket	1	
12	Taper pin	2	
13	Packing retainer	1	
★ 14	Gland packing	1 sets	
15	Gland bush	1	
16	Gland flange	1	
17	Gland bolt	2	
18	Gland nut	2	
19	Gland coil	1	Only 40mm to 150mm
★ 20	Ball	2	40mm to 125mm
		4	150mm to 300mm
★ 21	Set screw	2	40mm to 125mm
		4	150mm to 300mm
22	Hexagon bolt, Spring washer	4 sets	
23	Key	1	Only 250mm, 300mm

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove set screws (Part #21 Set screw).

# Tom Disco 302Y/304Y

## 302Y Actuator selection chart

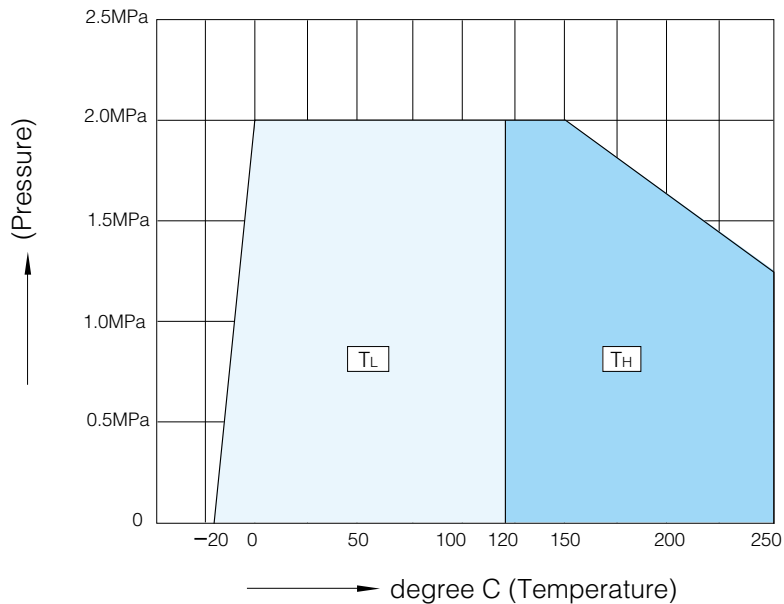
### 302Y

Model	Category	Size $\left(\frac{\text{mm}}{\text{inch}}\right)$									
		40 1 1/2	50 2	65 2 1/2	80 3	100 4	125 5	150 6	200 8	250 10	300 12
1T	T <sub>L</sub>	1T-1			1T-2			1T-3			
	T <sub>H</sub>	1T-1			1T-2			1T-3			
2U,2S	T <sub>L</sub>	2U-0	2U-1	2U-2	2U-3	2U-4	DGH-2	DGH-3			
	T <sub>H</sub>	2U-0	2U-1	2U-2	2U-3	2U-4	DGH-2	DGH-3			
7E,3A	T <sub>L</sub>	T85			T200		T380	T750	TGA-125		
	T <sub>H</sub>	T85			T200		T380	T750	TGA-125		
7G,7F 3U,3K	T <sub>L</sub>	T200S	T380S		T750S		TG-12S	TG-14S			
	T <sub>H</sub>	T200S	T380S		T750S		TG-12S	TG-14S			
4I	T <sub>L</sub>	4I-0		4I-2			4I-2.5	4I-3	4I-4 (control)		
	T <sub>H</sub>	4I-0		4I-2			4I-2.5	4I-3	4I-4		
4J,4L	T <sub>L</sub>	SRJ-010				SRJ-020		SRJ-060	LTKD-01 0.2kW/ DGH-3		
	T <sub>H</sub>	SRJ-010				SRJ-020		SRJ-060	LTKD-01 0.2kW/ DGH-3		

Remark: For the 300mm model with the accessories below (for control), type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

## 302Y Pressure rating

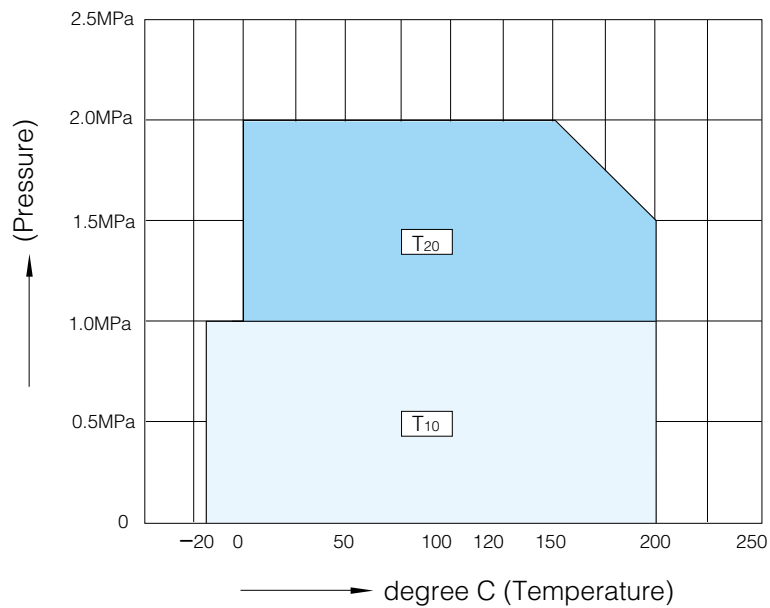


### 304Y Actuator selection chart

#### 304Y

Model	Category	Size <small>(mm / inch)</small>									
		40 1 1/2	50 2	65 2 1/2	80 3	100 4	125 5	150 6	200 8	250 10	300 12
1T	T <sub>10</sub>	1T-1			1T-2			1T-3			
	T <sub>20</sub>	1T-1			1T-2			1T-3			
2U	T <sub>10</sub>	2U-0	2U-1	2U-2			2U-4		2U-5		
	T <sub>20</sub>	2U-0	2U-1	2U-2			2U-4		2U-5		
7E	T <sub>10</sub>	T35		T85		T200		T380		T750	
	T <sub>20</sub>	T35		T85		T200		T380		T750	
7G,7F 3U,3K	T <sub>10</sub>	T85S		T200S		T380S		T750S		TG-12S	
	T <sub>20</sub>	T85S		T200S		T380S		T750S		TG-12S	
4I	T <sub>10</sub>	4I-0			4I-1		4I-2		4I-2.5		4I-3
	T <sub>20</sub>	4I-0			4I-1		4I-2		4I-2.5		4I-3
4J	T <sub>10</sub>	SRJ-010				SRJ-020		SRJ-060			
	T <sub>20</sub>	SRJ-010				SRJ-020		SRJ-060			

### 304Y Pressure rating



# Tom Disco 302Y/304Y

302Y/304Y Bare shaft (01: 40mm to 200mm, 02: 250mm, 300mm)

## 302Y-01/02, 304Y-01/02

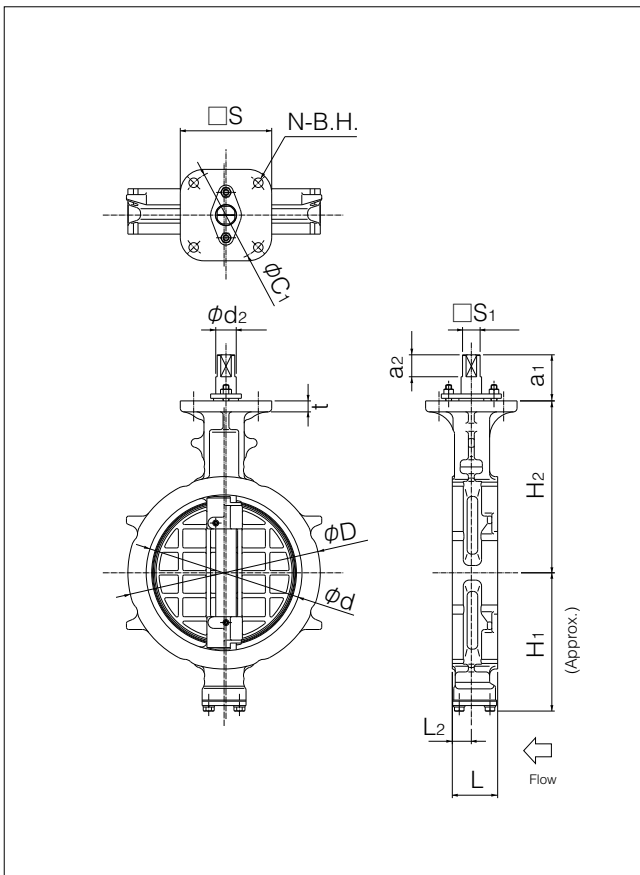
Stem design	Nominal size		Dimension (mm)														Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\square S_1$	$\phi d_2$	b	t <sub>2</sub>	t	Flange type	
01	40	1 1/2	48	81	33	15	64	118	47.5	11.5	8	10	—	—	12	F07	2.1
	50	2	60	97	43	21	74	125	47.5	11.5	10	12	—	—	12	F07	2.5
	65	2 1/2	74	117	46	22	85	138	47.5	11.5	12	14	—	—	12	F07	3.6
	80	3	89	127	46	21	95	147	52.5	16.5	14	16	—	—	15	F10	4.7
	100	4	112	152	52	22	110	170	52.5	16.5	14	16	—	—	15	F10	5.7
	125	5	137	183	56	24	139	185	52.5	16.5	16	20	—	—	15	F10	8.8
	150	6	163	213	57	23	164	205	55.5	20	18	22	—	—	15	F12	12
02	200	8	213	263	62	26	190	235	63.0	30	24	28	—	—	15	F12	18
	250	10	263	325	70	30	236	283	108.0	65	—	32	10	3	18	F14	32
	300	12	315	368	80	34	246	310	113.0	70	—	35	10	3	18	F14	39

Stem design	01 : Square
	02 : Round with key

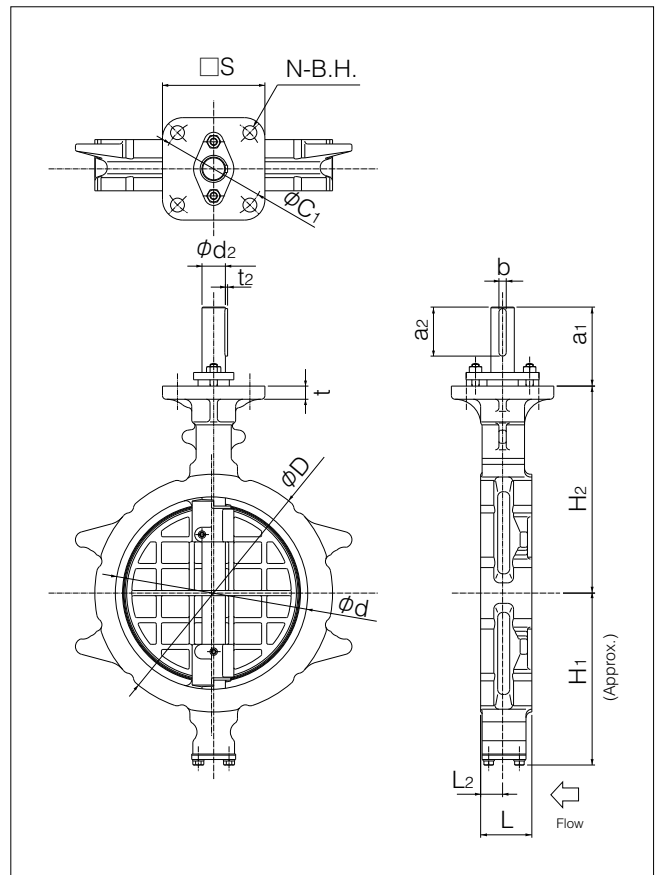
## Top flange

Flange type	$\square S$	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19

## 302Y/304Y 40mm to 200mm



## 302Y/304Y 250mm, 300mm

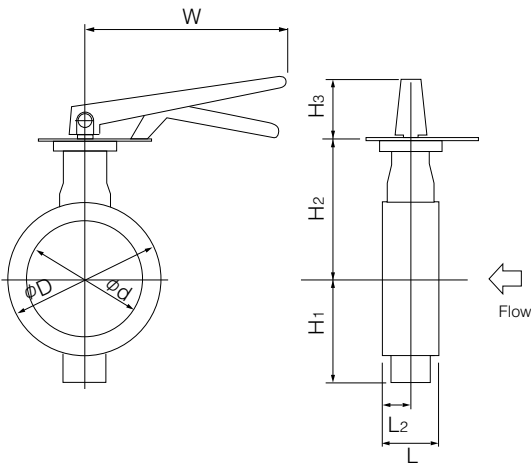


**Lock lever type 302Y/304Y-1T (40mm to 150mm)**

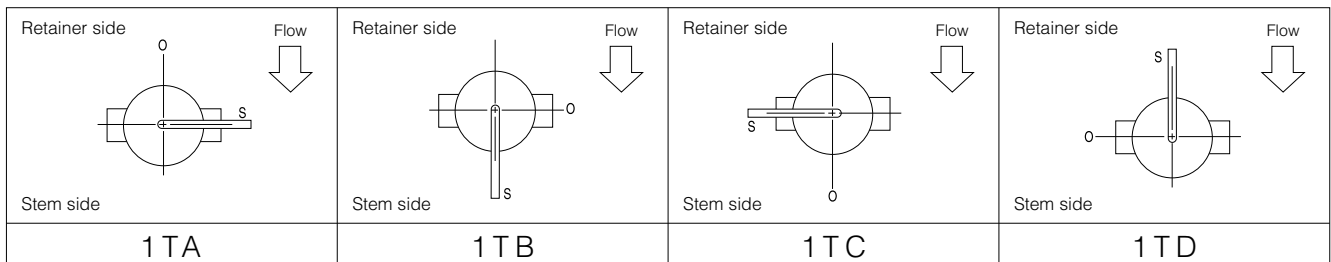
**302Y-1T, 304Y-1T**

Nominal size		Dimension (mm)								Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
40	1 1/2	48	81	33	15	64	118	91	200	1T-1	3.1
50	2	60	97	43	21	74	125	91	200	1T-1	3.5
65	2 1/2	74	117	46	22	85	138	91	200	1T-1	4.6
80	3	89	127	46	21	95	147	117	300	1T-2	6.9
100	4	112	152	52	22	110	170	117	300	1T-2	7.8
125	5	137	183	56	24	139	185	117	300	1T-2	10.9
150	6	163	213	57	23	164	205	125	350	1T-3	14.1

**302Y-1T, 304Y-1T**



**1T Installation direction**



# Tom Disco 302Y/304Y

Worm gear type 302Y-2U (40mm to 150mm) / 302Y-2S (200mm to 300mm) / 304Y-2U (40mm to 300mm)

## 302Y-2U (40mm to 150mm) / 2S (200mm to 300mm)

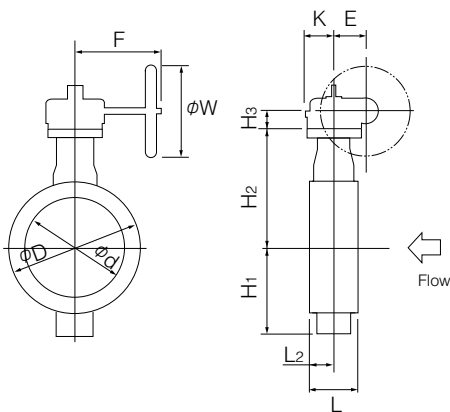
Nominal size		Dimension (mm)											Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	$\phi W$		
40	1 1/2	48	81	33	15	64	118	56	36	46	160	100	2U-0	5
50	2	60	97	43	21	74	125	56	36	46	160	100	2U-1	5.4
65	2 1/2	74	117	46	22	85	138	56	36	46	160	100	2U-1	6.5
80	3	89	127	46	21	95	147	61	44	53	173.5	160	2U-2	7.6
100	4	112	152	52	22	110	170	61	44	53	173.5	160	2U-2	8.6
125	5	137	183	56	24	139	185	61	44	53	173.5	160	2U-3	11.9
150	6	163	213	57	23	164	205	77.5	87.5	90	222.5	200	2U-4	28.5
200	8	213	263	62	26	190	235	72	85	126	246	280	DGH-2	38
250	10	263	325	70	30	236	283	97	117	164	335	355	DGH-3	69
300	12	315	368	80	34	246	310	97	117	164	335	355	DGH-3	76

## 304Y-2U

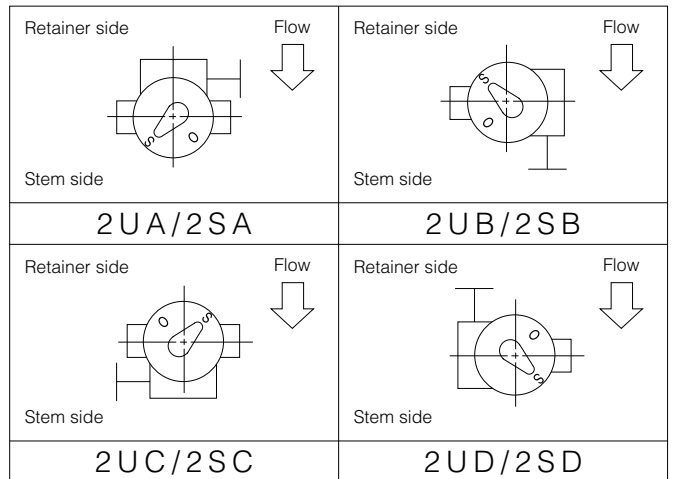
Nominal size		Dimension (mm)											Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	$\phi W$		
40	1 1/2	48	81	33	15	64	118	56	36	46	160	100	2U-0	5
50	2	60	97	43	21	74	125	56	36	46	160	100	2U-1	5.4
65	2 1/2	74	117	46	22	85	138	56	36	46	160	100	2U-1	6.5
80	3	89	127	46	21	95	147	61	44	53	173.5	160	2U-2	7.6
100	4	112	152	52	22	110	170	61	44	53	173.5	160	2U-2	8.6
125	5	137	183	56	24	139	185	61	44	53	173.5	160	2U-2	11.9
150	6	163	213	57	23	164	205	77.5	87.5	90	222.5	200	2U-4	28.5
200	8	213	263	62	26	190	235	77.5	87.5	90	222.5	200	2U-4	34.5
250	10	263	325	70	30	236	283	90	87.5	90	222.5	280	2U-4	49.7
300	12	315	368	80	34	246	310	92	90	105	266	280	2U-5	61

## 302Y-2U/2S

## 304Y-2U



## 2U/2S Installation direction



Double-acting pneumatic cylinder type 302Y-7E (40mm to 200mm) / 304Y-7E (40mm to 300mm)

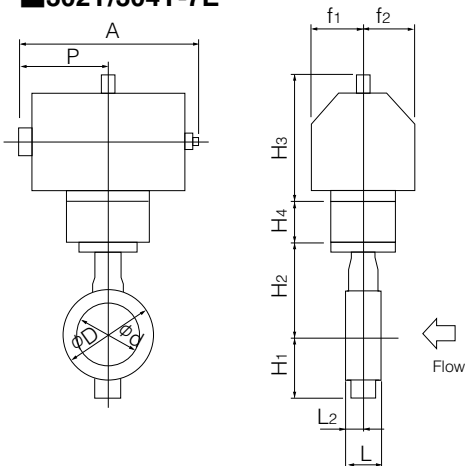
■ 302Y-7E

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	48	81	33	15	64	118	T <sub>L</sub> ,T <sub>H</sub>	168	26.5	276	142	75	47	T85	8
50	2	60	97	43	21	74	125	T <sub>L</sub> ,T <sub>H</sub>	168	26.5	276	142	75	47	T85	8
65	2 1/2	74	117	46	22	85	138	T <sub>L</sub>	168	26.5	276	142	75	47	T85	9
								T <sub>H</sub>	203	26.5	346	176	79	57	T200	13
80	3	89	127	46	21	95	147	T <sub>L</sub>	168	26.5	276	142	75	47	T85	11
								T <sub>H</sub>	203	26.5	346	176	79	57	T200	14
100	4	112	152	52	22	110	170	T <sub>L</sub>	203	26.5	346	176	79	57	T200	15
								T <sub>H</sub>	231	26.5	423	214	91	69	T380	21
125	5	137	183	56	24	139	185	T <sub>L</sub>	203	26.5	346	176	79	57	T200	18
								T <sub>H</sub>	231	26.5	423	214	91	69	T380	24
150	6	163	213	57	23	164	205	T <sub>L</sub>	231	29.5	423	214	91	69	T380	28
								T <sub>H</sub>	269	29.5	546	270	118	85	T750	38
200	8	213	263	62	26	190	235	T <sub>L</sub> ,T <sub>H</sub>	269	29.5	546	270	118	85	T750	44

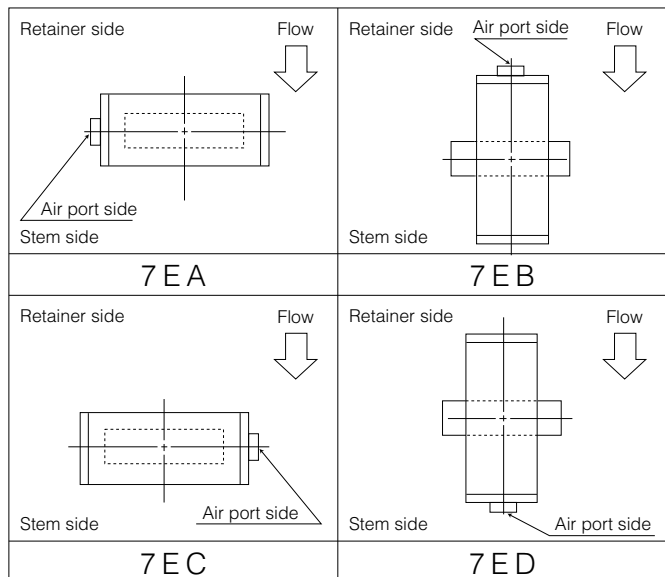
■ 304Y-7E

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	48	81	33	15	64	118	T <sub>10</sub> ,T <sub>20</sub>	125	26.5	228	116	57	29	T35	5
50	2	60	97	43	21	74	125	T <sub>10</sub> ,T <sub>20</sub>	125	26.5	228	116	57	29	T35	5
65	2 1/2	74	117	46	22	85	138	T <sub>10</sub>	125	26.5	228	116	57	29	T35	6
								T <sub>20</sub>	168	26.5	276	142	75	47	T85	9
80	3	89	127	46	21	95	147	T <sub>10</sub> ,T <sub>20</sub>	168	26.5	276	142	75	47	T85	11
100	4	112	152	52	22	110	170	T <sub>10</sub>	168	26.5	276	142	75	47	T85	12
								T <sub>20</sub>	203	26.5	346	176	79	57	T200	15
125	5	137	183	56	24	139	185	T <sub>10</sub> ,T <sub>20</sub>	203	26.5	346	176	79	57	T200	18
150	6	163	213	57	23	164	205	T <sub>10</sub> ,T <sub>20</sub>	203	29.5	346	176	79	57	T200	22
200	8	213	263	62	26	190	235	T <sub>10</sub> ,T <sub>20</sub>	231	29.5	423	214	91	69	T380	34
250	10	263	325	70	30	236	283	T <sub>10</sub>	231	190	423	214	91	87.5	T380	62
								T <sub>20</sub>	269	190	546	270	118	87.5	T750	72
300	12	315	368	80	34	246	310	T <sub>10</sub> ,T <sub>20</sub>	269	190	546	270	118	87.5	T750	79

■ 302Y/304Y-7E



■ 7E Installation direction



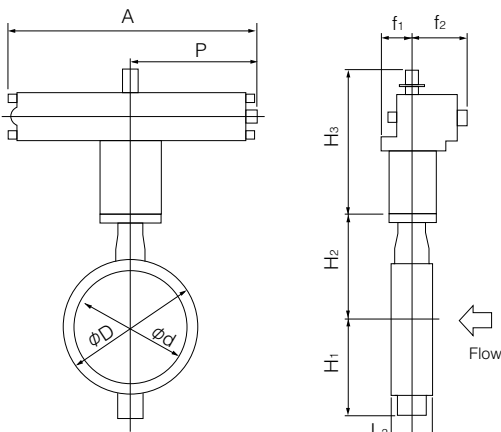
# Tom Disco 302Y/304Y

## Double-acting pneumatic cylinder type 302Y-3A (250, 300mm)

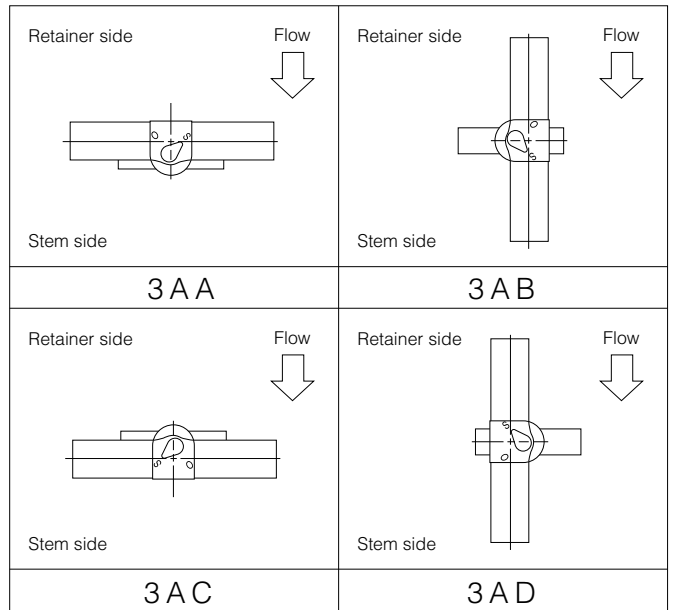
### 302Y-3A

Nominal size		Dimension (mm)												Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	263	325	70	30	236	283	T <sub>L</sub> ,T <sub>H</sub>	424	754	381	71	167	TGA-125	78
300	12	315	368	80	34	246	310	T <sub>L</sub> ,T <sub>H</sub>	424	754	381	71	167	TGA-125	85

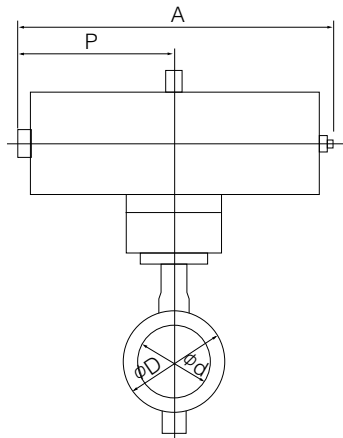
### 302Y-3A



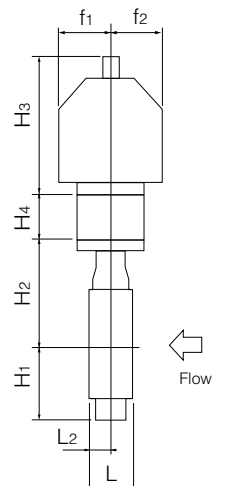
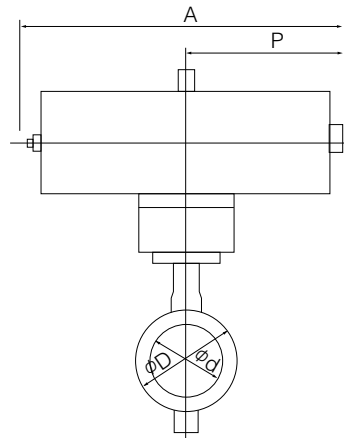
### 3A Installation direction



### 304A-7F



### 304A-7G





Single-acting pneumatic cylinder type 302Y-7G (Air to open: 40mm to 150mm) / 302Y-7F (Air to close: 40mm to 150mm)  
 304Y-7G (Air to open: 40mm to 200mm) / 304Y-7F (Air to close: 40mm to 200mm)

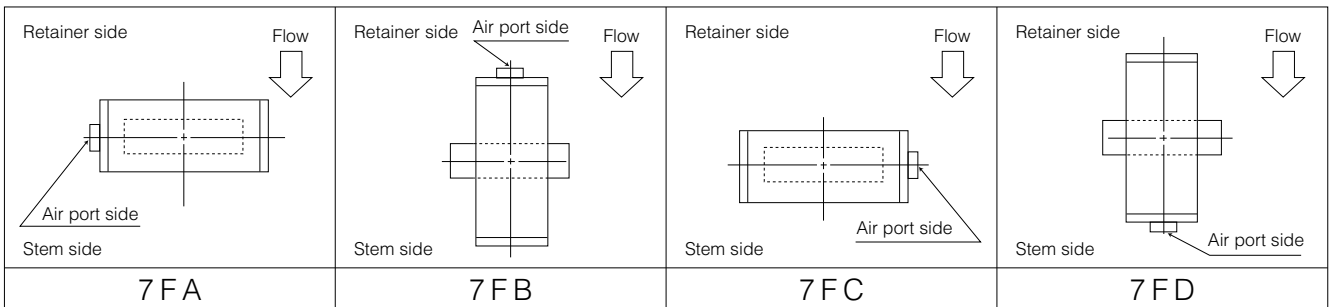
■ 302Y-7G/7F

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	48	81	33	15	64	118	T <sub>L</sub> , T <sub>H</sub>	203	26.5	449	226	79	57	T200S	14
50	2	60	97	43	21	74	125	T <sub>L</sub>	203	26.5	449	226	79	57	T200S	14
								T <sub>H</sub>	231	26.5	550	276	91	69	T380S	23
65	2 1/2	74	117	46	22	85	138	T <sub>L</sub>	203	26.5	449	226	79	57	T200S	15
								T <sub>H</sub>	231	26.5	550	276	91	69	T380S	24
80	3	89	127	46	21	95	147	T <sub>L</sub> , T <sub>H</sub>	231	26.5	550	276	91	69	T380S	25
100	4	112	152	52	22	110	170	T <sub>L</sub>	231	26.5	550	276	91	69	T380S	26
								T <sub>H</sub>	269	26.5	723	360	118	85	T750S	40
125	5	137	183	56	24	139	185	T <sub>L</sub> , T <sub>H</sub>	269	26.5	723	360	118	85	T750S	43
150	6	163	213	57	23	164	205	T <sub>L</sub>	269	29.5	723	360	118	85	T750S	47

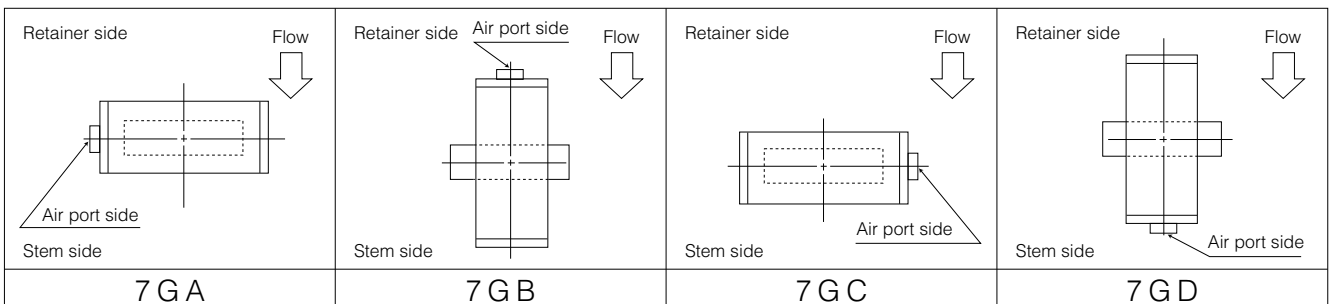
■ 304Y-7G/7F

Nominal size		Dimension (mm)													Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	48	81	33	15	64	118	T <sub>10</sub> , T <sub>20</sub>	168	26.5	364	183	75	47	T85S	10
50	2	60	97	43	21	74	125	T <sub>10</sub> , T <sub>20</sub>	168	26.5	364	183	75	47	T85S	10
65	2 1/2	74	117	46	22	85	138	T <sub>10</sub>	168	26.5	364	183	75	47	T85S	11
								T <sub>20</sub>	203	26.5	449	226	79	57	T200S	15
80	3	89	127	46	21	95	147	T <sub>10</sub> , T <sub>20</sub>	203	26.5	449	226	79	57	T200S	17
100	4	112	152	52	22	110	170	T <sub>10</sub>	203	26.5	449	226	79	57	T200S	18
								T <sub>20</sub>	231	26.5	550	276	91	69	T380S	26
125	5	137	183	56	24	139	185	T <sub>10</sub>	231	26.5	550	276	91	69	T380S	29
								T <sub>20</sub>	269	26.5	723	360	118	85	T750S	43
150	6	163	213	57	23	164	205	T <sub>10</sub> , T <sub>20</sub>	269	29.5	723	360	118	85	T750S	47
200	8	213	263	62	26	190	235	T <sub>10</sub>	269	29.5	723	360	118	85	T750S	53

■ 7F Installation direction



■ 7G Installation direction



# Tom Disco 302Y/304Y

Single-acting pneumatic cylinder type 302Y-3U (Air to open: 150mm to 300mm) / 302Y-3K (Air to close: 150mm to 300mm)  
 304Y-3U (Air to open: 200mm to 300mm) / 304Y-3K (Air to close: 200mm to 300mm)

## 302Y-3U/3K

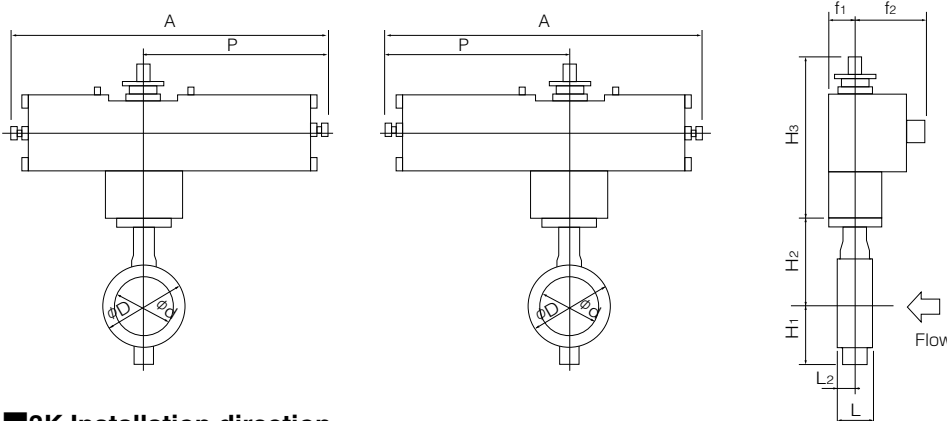
Nominal size		Dimension (mm)												Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
150	6	163	213	57	23	164	205	T <sub>L</sub>	377	945	585	75	165	TG-10S	70
								T <sub>H</sub>	377	1080	720	94	206	TG-12S	116
200	8	213	263	62	26	190	235	T <sub>L</sub> , T <sub>H</sub>	377	1080	720	94	206	TG-12S	122
250	10	263	325	70	30	236	283	T <sub>L</sub> , T <sub>H</sub>	450	1255	865	131	257	TG-14S	238
300	12	315	368	80	34	246	310	T <sub>L</sub> , T <sub>H</sub>	450	1255	865	131	257	TG-14S	245

## 304Y-3U/3K

Nominal size		Dimension (mm)												Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	213	263	62	26	190	235	T <sub>10</sub>	377	945	585	75	165	TG-10S	77
								T <sub>20</sub>	377	1080	720	94	206	TG-12S	122
250	10	263	325	70	30	236	283	T <sub>10</sub> , T <sub>20</sub>	417	1080	720	94	206	TG-12S	137
300	12	315	368	80	34	246	310	T <sub>10</sub> , T <sub>20</sub>	417	1080	720	94	206	TG-12S	144

## 302Y/304Y-3K

## 302Y/304Y-3U



## 3K Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K A</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K B</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K C</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 K D</p>
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## 3U Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U A</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U B</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U C</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>3 U D</p>
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Single phase electric motor type 302Y/304Y-4 I (40mm to 300mm)

■ 302Y-4 I

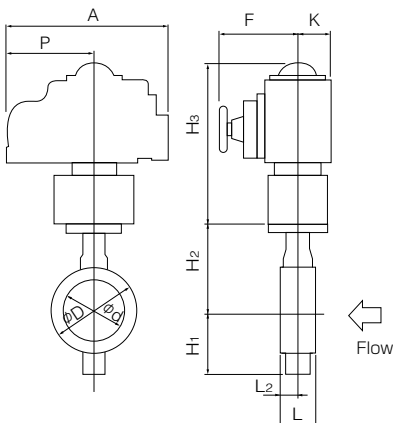
Nominal size		Dimension (mm)												Motor type	Approx. Mass (kg)
mm	inch	φd	φD	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	F	K		
40	1 1/2	48	81	33	15	64	118	T <sub>L</sub> ,T <sub>H</sub>	250	202	100	85	54	4I-0	9.4
50	2	60	97	43	21	74	125	T <sub>L</sub> ,T <sub>H</sub>	250	202	100	85	54	4I-0	9.8
65	2 1/2	74	117	46	22	85	138	T <sub>L</sub>	250	202	100	85	54	4I-0	10.8
								T <sub>H</sub>	265	252	138	126	65	4I-1	13
80	3	89	127	46	21	95	147	T <sub>L</sub> ,T <sub>H</sub>	298	310	167	154	85	4I-2	20
100	4	112	152	52	22	110	170	T <sub>L</sub> ,T <sub>H</sub>	298	310	167	154	85	4I-2	21
125	5	137	183	56	24	139	185	T <sub>L</sub> ,T <sub>H</sub>	298	310	167	154	85	4I-2	24
150	6	163	213	57	23	164	205	T <sub>L</sub> ,T <sub>H</sub>	373	310	167	154	85	4I-2.5	31
200	8	213	263	62	26	190	235	T <sub>L</sub> ,T <sub>H</sub>	405	421.5	223	246	136	4I-3	48
250	10	263	325	70	30	236	283	T <sub>L</sub> ,T <sub>H</sub>	420	421.5	223	246	136	4I-3	65
300	12	315	368	80	34	246	310	T <sub>L</sub> (Remark)	420	421.5	223	246	136	4I-3	72
								T <sub>H</sub>	423	421.5	223	246	136	4I-4	77

Remark: For the 300mm model with the accessories on the right (for control) type 4I-4 should be selected. ● Microm unit ● Servo unit ● Speed control unit ● Potentiometer

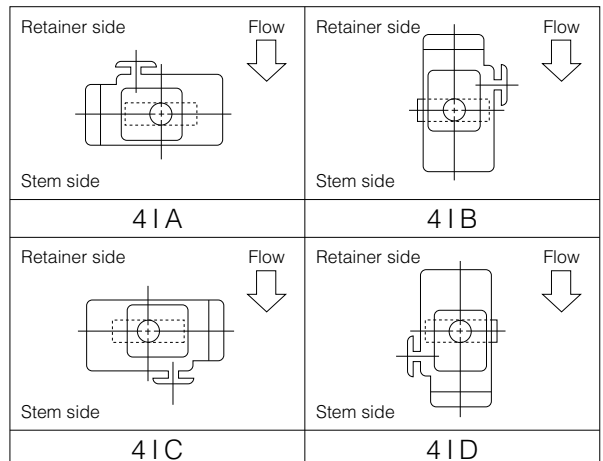
■ 304Y-4 I

Nominal size		Dimension (mm)												Motor type	Approx. Mass (kg)
mm	inch	φd	φD	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	A	P	F	K		
40	1 1/2	48	81	33	15	64	118	T <sub>10</sub> ,T <sub>20</sub>	250	202	100	85	54	4I-0	9.4
50	2	60	97	43	21	74	125	T <sub>10</sub> ,T <sub>20</sub>	250	202	100	85	54	4I-0	9.8
65	2 1/2	74	117	46	22	85	138	T <sub>10</sub> ,T <sub>20</sub>	250	202	100	85	54	4I-0	10.8
80	3	89	127	46	21	95	147	T <sub>10</sub> ,T <sub>20</sub>	250	202	100	85	54	4I-0	11.8
100	4	112	152	52	22	110	170	T <sub>10</sub>	265	252	138	126	65	4I-1	15
								T <sub>20</sub>	298	310	167	154	85	4I-2	21
125	5	137	183	56	24	139	185	T <sub>10</sub> ,T <sub>20</sub>	298	310	167	154	85	4I-2	24
150	6	163	213	57	23	164	205	T <sub>10</sub> ,T <sub>20</sub>	373	310	167	154	85	4I-2	29
200	8	213	263	62	26	190	235	T <sub>10</sub> ,T <sub>20</sub>	373	310	167	154	85	4I-2.5	38
250	10	263	325	70	30	236	283	T <sub>10</sub>	411	310	167	154	85	4I-2.5	55.5
								T <sub>20</sub>	420	421.5	223	246	136	4I-3	65
300	12	315	368	80	34	246	310	T <sub>10</sub> ,T <sub>20</sub>	420	421.5	223	246	136	4I-3	72

■ 302Y/304Y-4 I



■ 4I Installation direction



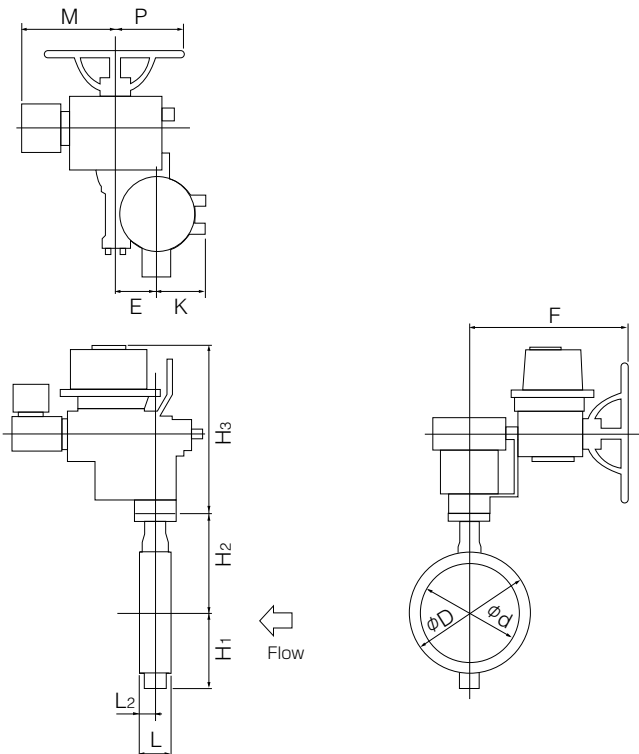
# Tom Disco 302Y/304Y

## Three phase motor actuator type 302Y-4L (250mm, 300mm)

### 302Y-4L

Nominal size		Dimension (mm)													Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	Category	H <sub>3</sub>	E	K	F	M	P		
250	10	263	325	70	30	236	283	T <sub>L</sub> ,T <sub>H</sub>	547	117	164	533	357	230	LTKD-01 0.2kW/ DGH-3	123
300	12	315	368	80	34	246	310	T <sub>L</sub> ,T <sub>H</sub>	547	117	164	533	357	230	LTKD-01 0.2kW/ DGH-3	130

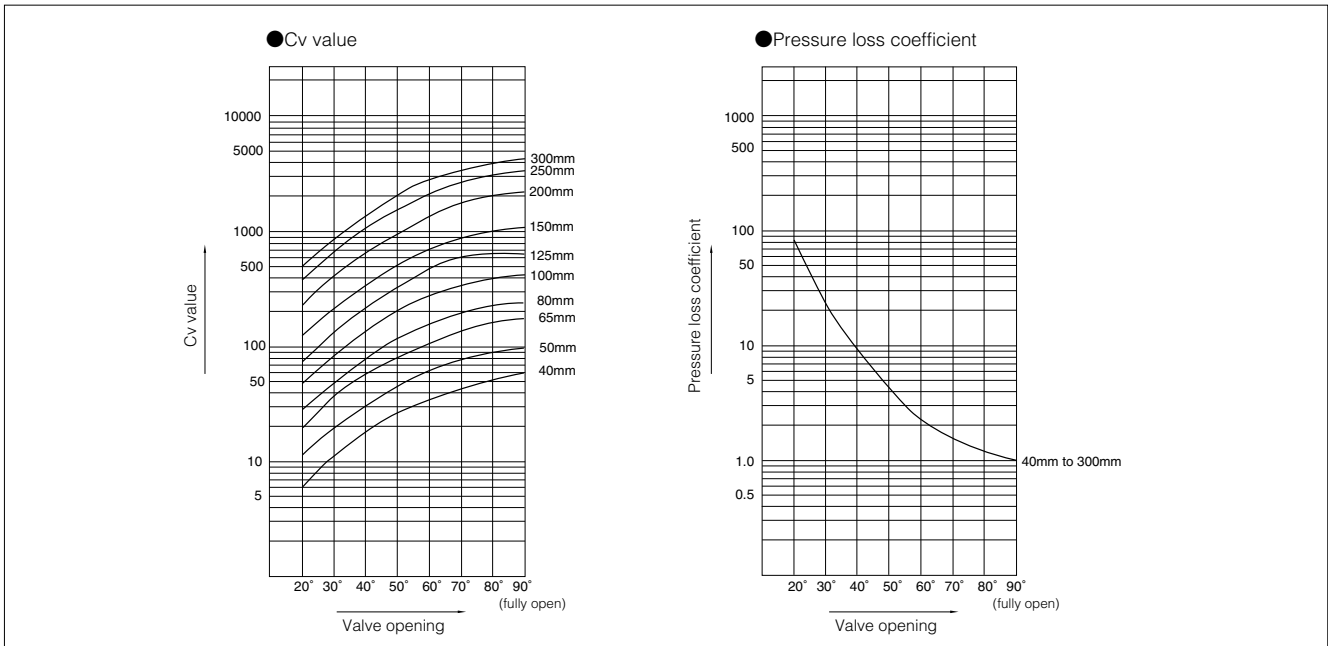
### 302Y-4L



### 4L Installation direction

<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L A</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L B</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L C</p>	<p>Retainer side</p> <p>Flow</p> <p>Stem side</p> <p>4 L D</p>
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### 302Y/304Y Cv value/pressure loss coefficient



### 302Y/304Y Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	6	12	20	30	39	49	57	60
50	2	11	21	33	49	64	80	95	99
65	2 1/2	20	36	59	85	113	140	167	176
80	3	29	52	85	122	162	207	243	252
100	4	49	88	144	207	279	351	414	432
125	5	77	140	230	333	441	549	648	684
150	6	126	225	369	531	720	900	1080	1116
200	8	234	423	693	990	1350	1710	1982	2070
250	10	390	703	1148	1648	2244	2857	3300	3443
300	12	492	888	1454	2081	2838	3612	4172	4354

### 302Y/304Y Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	178	44	16	7	4	3	2	2
50	2	138	42	15	7	4	3	2	2
65	2 1/2	114	35	13	6	4	2	2	1
80	3	108	34	13	6	3	2	2	1
100	4	109	34	13	6	3	2	2	1
125	5	106	32	12	6	3	2	1	1
150	6	78	25	9	4	2	2	1	1
200	8	69	21	8	4	2	1	1	1
250	10	59	18	7	3	2	1	1	1
300	12	76	23	9	4	2	1	1	1

# Tom Disco 302Y/304Y

302Y/304Y Applicable pipe list in case of **A**

Nominal size		SGP		Sch20		Sch40		Sch60		Sch80		Sch10S		Sch20S		Minimum internal diameters of piping (mm)
		Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	
mm	inch															
40	1 1/2	○	○	—	—	○	○	○	○	○	○	○	○	○	○	32.7
50	2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	34.6
65	2 1/2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	53.6
80	3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	72.5
100	4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	93.8
125	5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	119.4
150	6	○	○	○	○	○	○	○	×	○	×	○	○	○	○	147.5
200	8	○	○	○	○	○	○	○	×	○	×	○	○	○	○	197.5
250	10	○	○	○	○	○	○	○	×	○	×	○	○	○	○	248.1
300	12	○	○	○	○	○	○	○	×	×	×	○	○	○	○	297.6

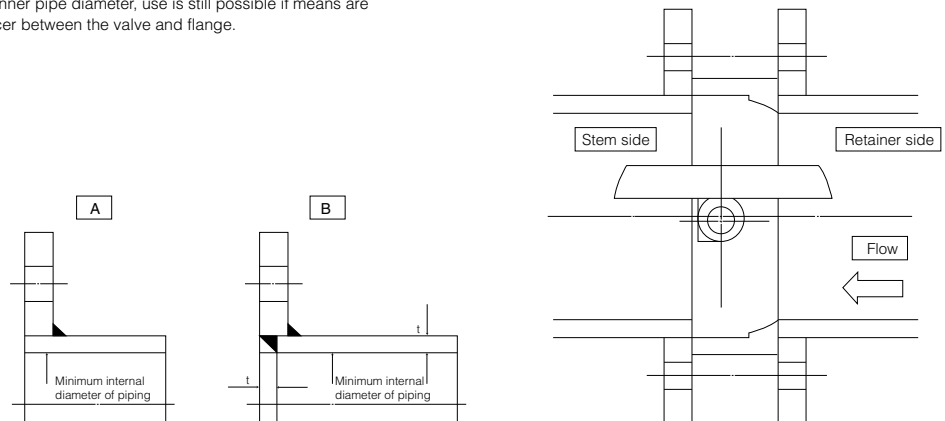
302Y/304Y Applicable pipe list in case of **B**

Nominal size		SGP		Sch20		Sch40		Sch60		Sch80		Sch10S		Sch20S		Minimum internal diameters of piping (mm)
		Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	Retainer (up stream)	Stem Side (down stream)	
mm	inch															
40	1 1/2	○	○	—	—	○	○	○	○	○	○	○	○	○	○	20.0
50	2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	25.0
65	2 1/2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	40.0
80	3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	63.6
100	4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	87.0
125	5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	112.8
150	6	○	○	○	○	○	○	○	○	○	○	○	○	○	○	142.5
200	8	○	○	○	○	○	○	○	×	○	×	○	○	○	○	193.3
250	10	○	○	○	○	○	○	○	×	○	×	○	○	○	○	244.1
300	12	○	○	○	○	○	○	○	×	○	×	○	○	○	○	293.9

Remark 1: ○=Applicable ×=Not applicable

Remark 2: The clearance between the disc and the pipe is based on API 609 and MSS SP-67.  
40mm to 150mm: 1.5mm; 200mm to 300mm: 3.0mm

Remark 3: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.  
In cases where there is an "X" in the chart above or you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.  
For details, please consult us.



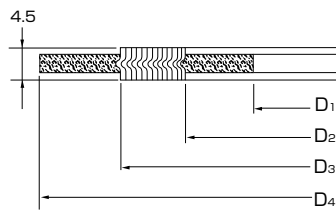
## 302Y/304Y Piping gasket

- In case of sheet gasket ..... Any standard can be used excluding 65mm-JIS flange. For 65mm-JIS flange, use the sheet gasket that followed old JIS Standard: JIS B 2404\_1999 for inner diameter. For other size, JIS standard products can be used.
- In case of spiral gasket ..... Use special spiral gasket shown below.

### ■ Special spiral gasket for JIS flange size

Nominal size		JIS flange					ASME flange				
		10K, 16K, 20K			10K	16K, 20K	class 150/300			class 150	class 300
mm	inch	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>4</sub>
40	1 1/2	48	54	73	89	89	48	54	73	85	95
50	2	61	69	88	104	104	61	69	88	104	111
65	2 1/2	73	81	100	124	124	73	81	100	123	129
80	3	89	97	120	134	140	89	97	120	136	148
100	4	115	124	146	159	165	115	124	146	174	180
125	5	140	151	177	190	203	140	151	177	196	215
150	6	166	178	207	220	237	166	178	207	222	250
200	8	217	227	257	270	282	217	229	257	279	307
250	10	268	282	318	332	354	268	285	318	339	362
300	12	319	331	362	377	404	319	335	362	409	422

Remark : In case a minute leakage of gas (less than 100PPm) becomes a problem, please consult our sales staff.



### ■ Applicable standard for standard piping gasket

Nominal size		Max. allowable inner diameter (D)	Joint sheet or RPTFE solid gasket (t≤2mm)					PTFE mold type gasket				
			Valqua: 7030, 7031or 7035									
mm	inch		JIS 5K	JIS 10K	JIS 16K JIS 20K	ASME class 150/300	JPI class 150/300	JIS 5K	JIS 10K	JIS 16K JIS 20K	ASME class 150/300	JPI class 150/300
40	1 1/2	55	○	○	○	○	○	○	○	○	○	○
50	2	69	○	○	○	○	○	○	○	○	○	○
65	2 1/2	77	×	×	×	○	○	×	×	×	○	○
80	3	97	○	○	○	○	○	○	○	○	○	○
100	4	124	○	○	○	○	○	○	○	○	○	○
125	5	151	○	○	○	○	○	○	○	○	○	○
150	6	178	○	○	○	○	○	○	○	○	○	○
200	8	227	○	○	○	○	○	○	○	○	○	○
250	10	282	○	○	○	○	○	○	○	○	○	○
300	12	331	○	○	○	○	○	○	○	○	○	○

Remark; ○: Applicable, ×: Not applicable

Remark : The above gaskets is not applicable to JIS piping 65mm. When using a gasket for JIS piping 65mm, make sure that the inner diameter of the gasket is 77 mm. PTFE mold type gasket made by NIPPON VALQUA is only available. (Other manufacturer's gasket is not applicable due to product size.)

# Tom Disco 302Y/304Y

## 302Y/304Y Flange accommodation

Nominal size		JIS				ASME class 150	BS4504		DIN		BS10 Table E
mm	inch	5K	10K	16K	20K		PN10	PN16	NP10	NP16	
40	1 1/2	○	○	○	○	○	○	○	○	○	
50	2	○	○	○	○	○	○	○	○	○	
65	2 1/2	○	○	○	○	○	○	○	○	×	
80	3	○	○	○	○	○	○	○	○	○	
100	4	○	○	○	○	○	○	○	○	○	
125	5	○	○	○	○	○	○	○	○	○	
150	6	○	○	○	○	○	○	○	○	○	
200	8	○	○	○	○	○	○	○	○	○	
250	10	○	○	○	○	○	○	○	○	○	
300	12	○	○	○	○	○	○	○	○	○	

○ : Can be used without flange drilling.  
 × : Not applicable

## 302Y/304Y Piping bolts and nuts sizes

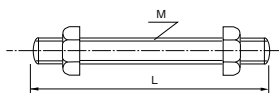
Nominal size		JIS5K	JIS10K	JIS16K/20K	ASME class150
mm	inch	Long bolts and nuts	Long bolts and nuts	Long bolts and nuts	Long bolts and nuts
40	1 1/2	4-M12×100	4-M16×120	4-M16×120	4-U1/2-13UNC×115
50	2	4-M12×120	4-M16×130	8-M16×130	4-U5/8-11UNC×140
65	2 1/2	4-M12×120	4-M16×145	8-M16×145	4-U5/8-11UNC×155
80	3	4-M16×130	8-M16×145	8-M20×170	4-U5/8-11UNC×155
100	4	8-M16×145	8-M16×145	8-M20×170	8-U5/8-11UNC×155
125	5	8-M16×145	8-M20×170	8-M22×190	8-U3/4-10UNC×175
150	6	8-M16×145	8-M20×170	12-M22×190	8-U3/4-10UNC×175
200	8	8-M20×170	12-M20×170	12-M22×190	8-U3/4-10UNC×205
250	10	12-M20×190	12-M22×190	12-M24×210	12-U7/8- 9UNC×215
300	12	12-M20×190	16-M22×190	16-M24×225	12-U7/8- 9UNC×215

Remark: Bolt / nut material: SNB7 / S45C (manufacturer standard product), SUS304 / SUS304 (order-made product) Spiral gasket cannot be used. Use full-thread bolts for long bolts and heavy nuts for hexagon nuts.

Example

Long bolts: 12 - M22 × 185  
 |        |        |  
 N        M        L

Long bolts and nuts (full thread)



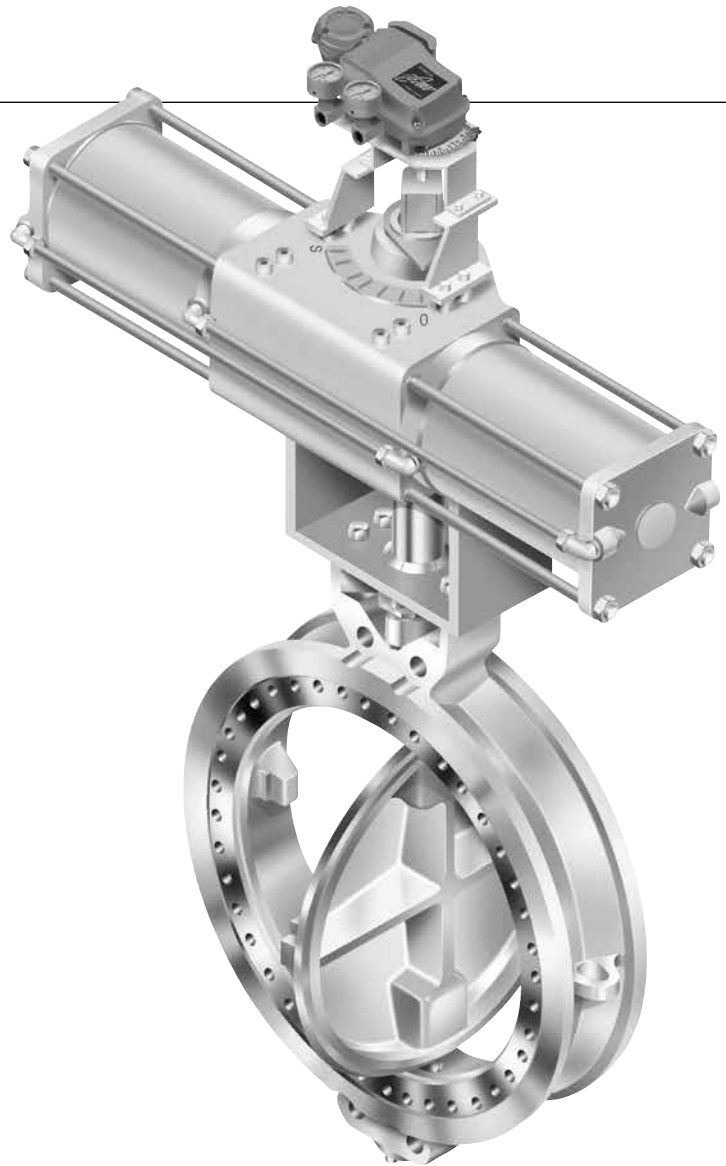




Large Diameter Double Offset  
High-Performance Butterfly Valves  
for Medium/Light Duty Service

# HLV304M

**Custom-made  
design  
available!**



## Characteristics

Suitable for high-temperature, medium-to low- pressure service, such as in hot air, exhaust gas, steam, chemical fluids, and solvents.

### Compact Design

Short pattern face to face dimensions. The body and disc design contributed to a valve that is lower in weight and more compact than other valves of this type.

### Double Offset Geometry

The axis of disc rotation is double offset to the seat. When the disc rotates, it unseats at a small turning angle by its cam effect. This prevents seat wear and provides reliable sealing performance over a long period.

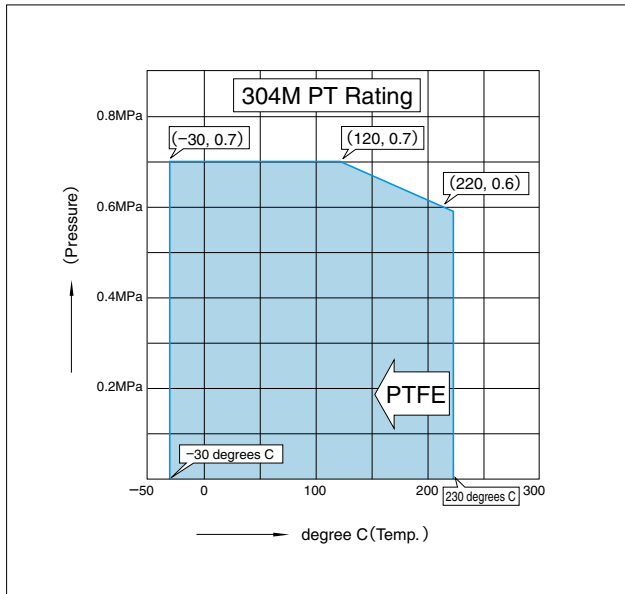
### Simple Sealing Design/Reliable Performance

The simple sealing design with a minimal number of parts allows easy maintenance without special tools. Tight shut off with an RPTFE seat is available. See PT rating chart.

### Custom-Made Design

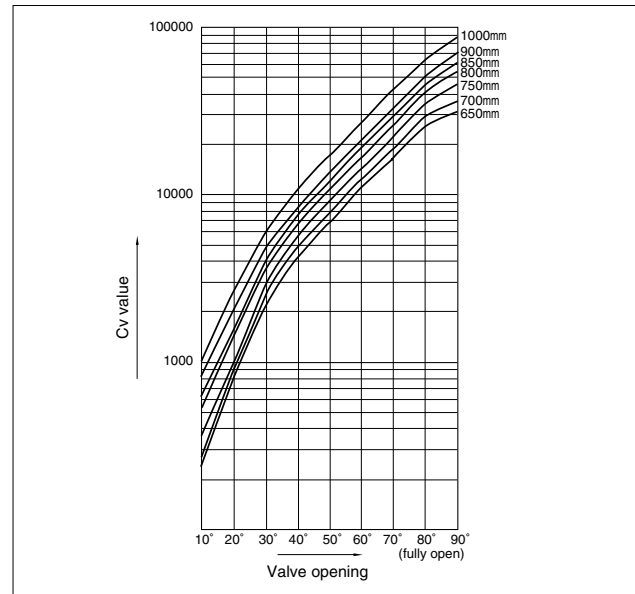
Custom made designs, including the use of special materials, a double flanged body or special face to face dimensions are available upon request. A metal seat type is also available.

### 304M PT Rating (RTFE SEAT)



※No actuator extension bonnet is required.

### 304M Cv Value



### Standard Specifications

Product characteristics	Double offset wafer type		
Valve size	650, 700, 750, 800, 850, 900, 1000mm		
Face to face dimensions	JIS 5K, 10K, ASME Class150 Series A or B, DIN/BS PN10		
Max.working pressure ※1	Manufacturer's standard		
Seat leakage	0.7MPa		
Flow direction	ISO 5208 leakage rate A (tight shut-off)		
Test Pressure	Shell test	Flow to shaft side. (Max. 0.2MPa on non-preferred direction)	
	Seat leakage	Working pressure x 1.5 times (Max 1.1Mpa)	
Working temperature range ※2	Working pressure x 1.1 times (Max 0.8Mpa)		
Standard materials	Body	Carbon steel casting SCPH2/WCB with Mn3 (PO4) 2 treatment	Stainless steel SCS13A/CF8, SCS14A/CF8M
	Disc	Stainless steel SCS13A/CF8 with Cr.plating, SCS14A/CF8M with Cr. Plating	Stainless steel SCS13A/CF8 with Cr.plating, SCS14A/CF8M with Cr. Plating
	Stem	Stainless steel 431, 630, 316	
	Seat	RPTFE	
	Gland packing	Carbon graphite	
Velocity range	Average velocity: 80m/s (air), 30m/s (steam), 2m/s (water) ※3		
Marking	API609, MSS-SP25, JIS B 2004		
Piping flange gasket	Serrated spiral 45 to 55 groove/inch for gasket face finish, unless otherwise specified		
Coating	Lacquer Primer (Munsell N7)		
	No painting for stainless steel.		

※1 Recommended piping position: shaft horizontal position

※2 Max. working pressure & temperature range are subject to change depending on customized specifications.

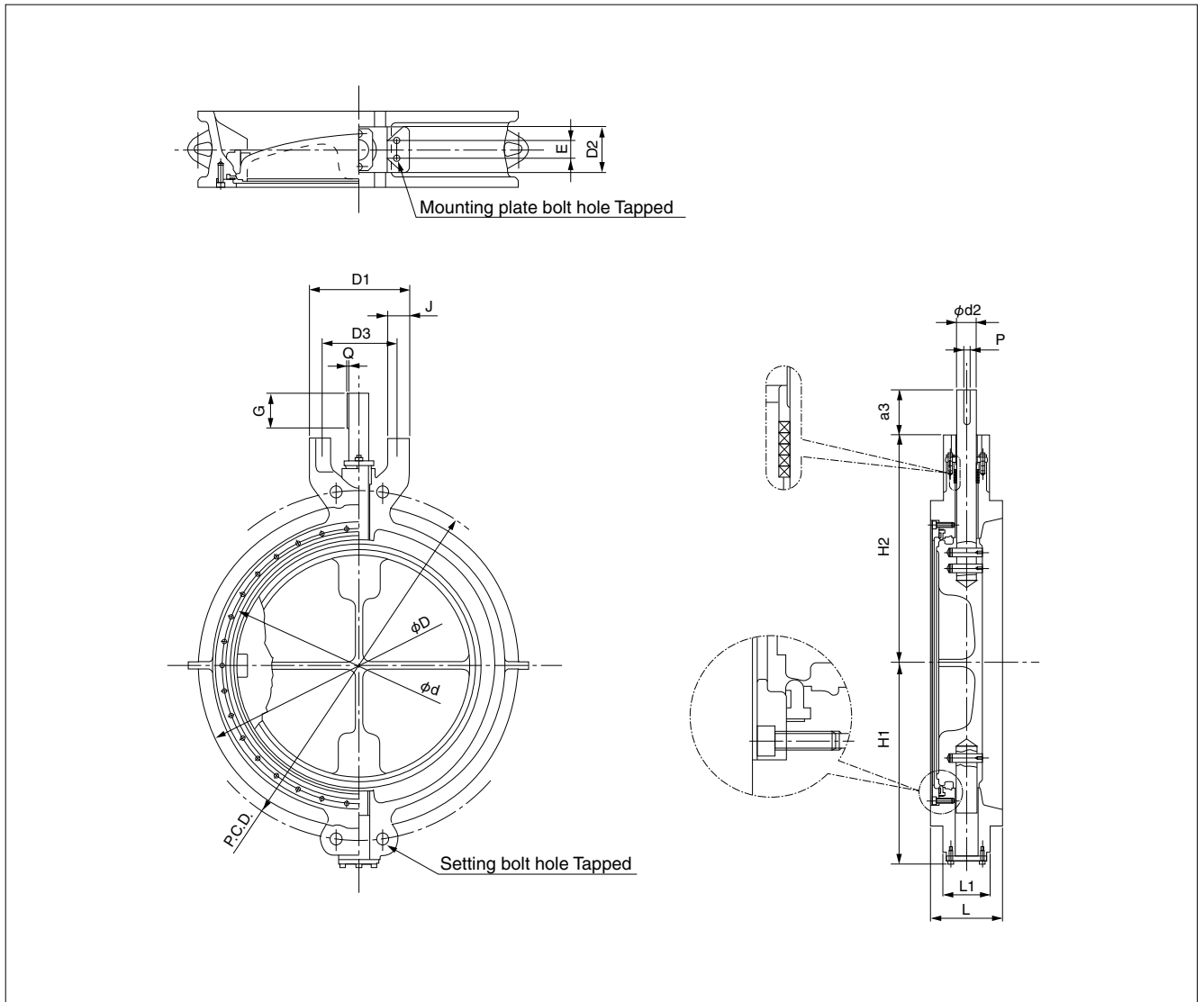
※3 Consider according to individual specifications.

※It is possible that seat leakage occur when fluid (e.g. powder and/or liquid) is solidified by working temperature and other cause. Consult us.

Please note that use with vertical line such as bottom area of discharge spout of hopper, and tank.

# HLV 304M

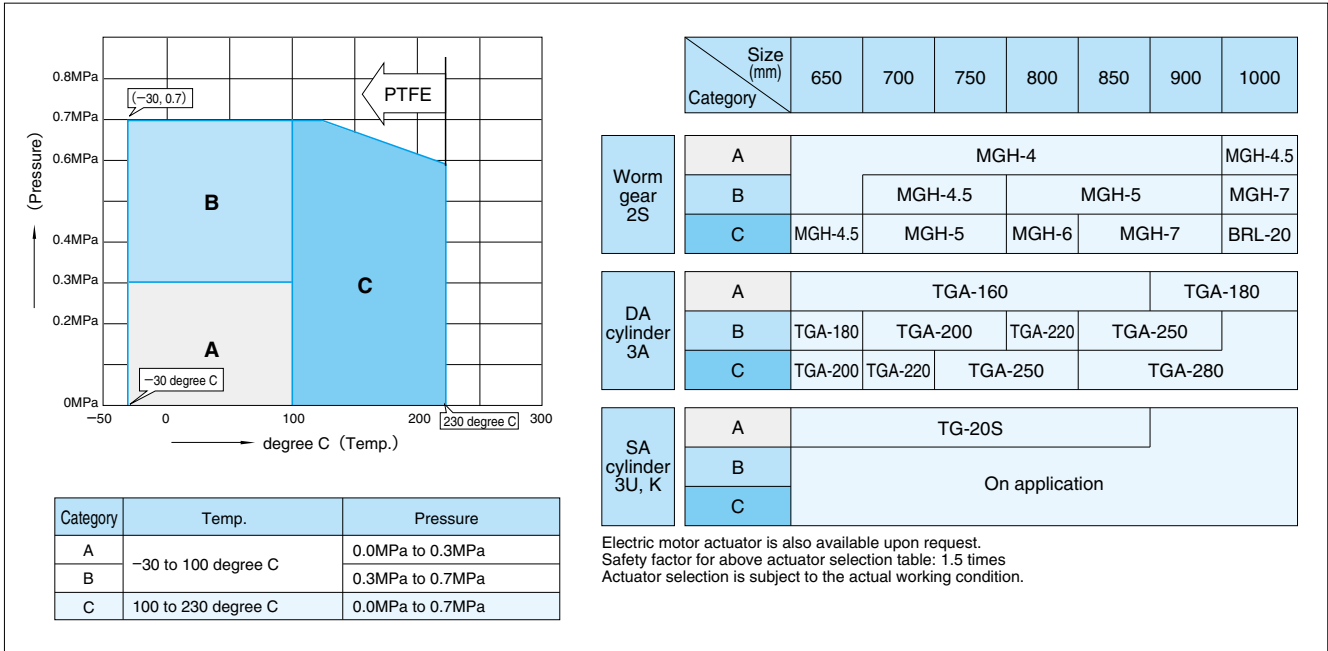
## HLV 304M Principal dimensions



Nominal size		Dimension (mm)																Approx. Mass (kg)
mm	inch	d	D* <sup>1</sup>	L	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	a <sub>3</sub>	d <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	E	J	G	P	Q	
650	26	653	739	165	105	459	520	117	45	230	105	175	40	50	79	14	3.5	218
700	28	702	770	165	132	531	655	145	55	430	132	380	90	55	121	16	4	285
750	30	754	843	180	132	546	690	145	60	430	132	380	90	55	121	18	4	365
800	32	801	893	190	132	579	705	145	60	430	132	380	90	55	121	18	4	407
850	34	853	943	203	143	591	720	175	65	430	143	380	90	55	151	20	4.5	460
900	36	903	993	203	137	621	750	175	65	430	137	380	90	55	151	20	4.5	505
1000	40	1000	1093	216	148	676	800	175	70	430	148	380	90	55	151	20	4.5	730

\* Indicates JIS 5K value.

## HLV 304M Typical Actuator Selection Chart



## HLV 304M Flange accommodation

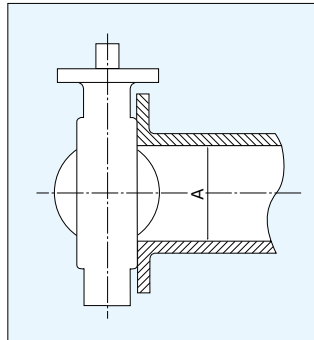
Nominal size		Flange Standard									
mm	inch	JIS5K	JIS10K	ASME A	ASME B	DIN 10	BS	TAYLOR	LADISH	G5524	BS 10
650	26	○	○	○	○	—	—	△	△	×	×
700	28	○	○	○	○	○	○	△	△	△	×
750	30	○	○	○	○	—	○	△	△	×	△
800	32	○	○	○	○	○	○	△	△	△	×
850	34	○	○	○	○	—	—	△	△	×	×
900	36	○	○	○	○	○	○	△	△	△	△
950	38	—	—	○	○	—	—	△	△	×	×
1000	40	○	○	○	○	○	○	△	△	△	×

JIS5: JIS B2238(1996)  
 JIS10: JIS B2238(1996)  
 ASME A: ASME B16.47-1990 table5 dimensions of class 150 series A flanges  
 ASME B: ASME B16.47-1990 table11 dimensions of class 150 series A flanges  
 DIN 10: DIN3532 PN10  
 BS: BS4504 NP10  
 TAYLOR: TAYLOR FORGE 125, 150Lb  
 LADISH: LADISH150  
 G5524: JIS G 5524  
 BS 10: BS10 TABLE E

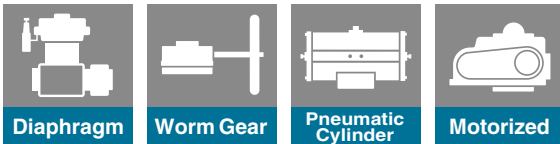
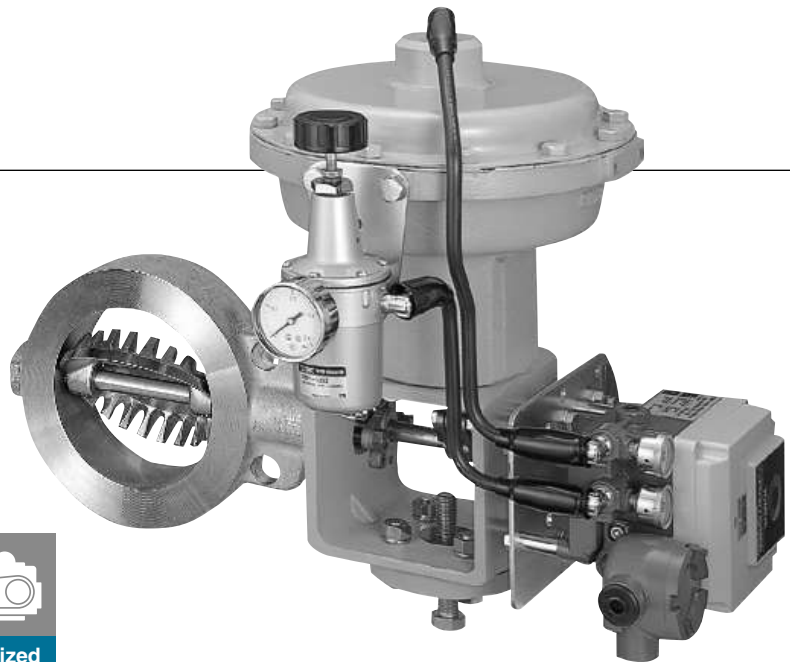
○ : Applicable  
 △ : Applicable subject to conditions  
 — : Not standard  
 × : Not applicable

## HLV 304M Minimum Internal Diameters of Piping

Nominal size		Minimum internal diameters of piping A (mm)
mm	inch	
650	26	612
700	28	653
750	30	705
800	32	754
850	34	803
900	36	834
1000	40	950



# 507V



### Features and Benefits

For various applications such as air conditioning systems, pulp and paper mills, steel mills, chemical plants, food processing and many other process industries, the 507V rotary control valve will support your fluid control requirements.

#### Flexible control over a wide range

The 507V allows complete control over the full range from the open to the closed position. The valve can also handle high temperatures of up to 400 degrees C such as in steam lines and it will respond quickly and flexibly to any changes within the operating parameters of the process line. The 507V therefore is the optimum valve for any control system processing multiple products where the operating conditions change from time to time in accordance with process requirements.

**Model 507V is the high temperature version of our rotary control valve designed for exclusive use in the regulation of fluids.**

#### Cost-effective rotary control valve

In spite of its compact size and light weight, the 507V has a large valve capacity that minimises the energy loss of fluid at the fully open position.

This compact design reduces the required size of the actuator, installation space and piping supports. It also minimises vibration of control systems and increases the operating life.

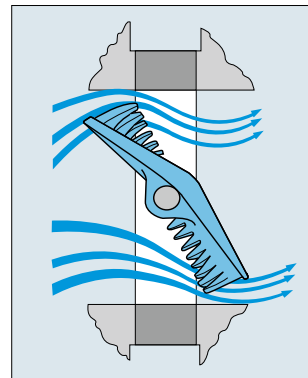
These features provide the benefit of reducing the total operating cost of your plant.

### General Description

The high performance characteristics of this model originate from its unique design with a teeth and gull-wing shaped disc that touches the seat at a certain angle (Fig.1). The teeth are arranged on the circumference of the disc towards either direction of flow. The 'touch-at-an-angle' disc assists the reduction of seating and unseating torque and facilitates smooth control of the valve.

Other benefits include high rangeability, low noise level and anticavitation.

This model covers a wide temperature range in the fluid control of air conditioning systems, pulp and paper mills, chemical plants, steel mills and food processing applications.



## General

With guide-vane-like teeth around the disc edge, and the disc touching the seat at a certain angle, this product is a compact, lightweight and highly cost-effective, high-performance rotary control valve that exhibits outstanding control characteristics. The valve provides steady control over a wide range with higher rangeability, better cavitation resistance, lower dynamic torque, lower noise level, and a better leakage rate than any other rotary control valve.

Two models, the 507V and 508V, are available for a range of severe applications. The 507V is the optimum type for fluid control of high pressure, high temperature systems. The 508V is characterized by its rubber seat ring, and eliminates the need for any additional stop valve because of its complete sealing capability.

## Fundamental Structure

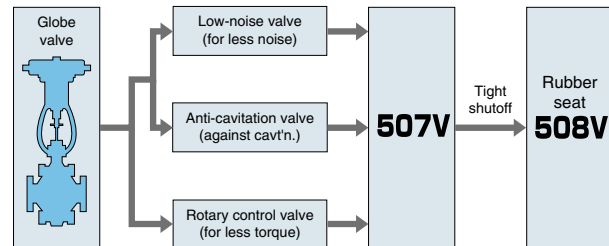
This product has two basic design features that are responsible for the outstanding performance. One is the teeth around the disc and

the other is the gull-wing-like design of the disc.

The teeth on the circumference of the disc break up the fluid energy acting on it with a resultant reduction of pressure recovery.

Unlike conventional flat discs, the gull-wing-like disc of the product touches the seat at a certain angle for reduced seating/unseating torque. This results in steady control of the valve.

## Recent trend toward rotary type control valves



## Standard Specifications

Product characteristics		Wafer type	
Valve size	50, 80, 100, 150, 200mm	250, 300, 350, 400mm	
Applicable flange standard	JIS 10K/16K/20K, ASME Class150/300, DIN NP10, BS 4504 PN10	JIS 10K, ASME Class150, DIN NP10, BS 4504 PN10	
Face to face dimensions	Manufacturer's standard		
Max.working pressure	Refer to "Allowable differential pressure"		
Seat leakage ※1	FCI 70-2 Class II		
Flow direction	One way (Flow direction marked on body)		
Test Pressure	Body shell	Working pressure x 1.5 times (Max 1.5Mpa)	
	Seat leak	Measure clearance between body and disc at fully closed position	
Working temperature range ※2	Cast steel	-10 to 400 degrees C Following materials are used for 200 degrees C and over; Bearings :Carbon Packing: exfoliated graphite	
	Stainless steel	-50 to 400 degrees C Following materials are used for 200 degrees C and over; Bearings :Carbon Packing: exfoliated graphite	
Standard Materials	Body	Cast steel SCPH2 (A216 WCB)	Stainless steel SCS14
	Disc ※3	Stainless steel SCS14 (A351 CF8M)	
	Stem ※4	Stainless steel SUS630 (SUS316) ※4	
	Bearings	Reinforced PTFE, Carbon graphite (200 degrees C and over)	
	Packings	Exfoliated graphite	
Rangeability	100:1		
Valve opening	Max. 70°		
Flow characteristics	Equal percent		
Top flange	Manufacturer's standard		
Piping flange gasket	Required		
Coating	Under 200 degrees C: Silicone resin coating (Munsell N7), no painting for stainless steel 200 degrees C and over: Heat resistance paint (Silver)		

※1 The disc is gull wing shaped and touches the metal seat at an angle. This design minimises leakage to a level less than 0.5% of the rated Cv which is equal to or lower than the leakage permitted on a double-seat globe control valve.

※2 Please consult us if the application is in the range of 400 to 600 degrees C.

※3 The disc is electroless plated with nickel.

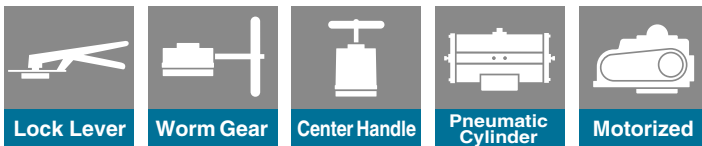
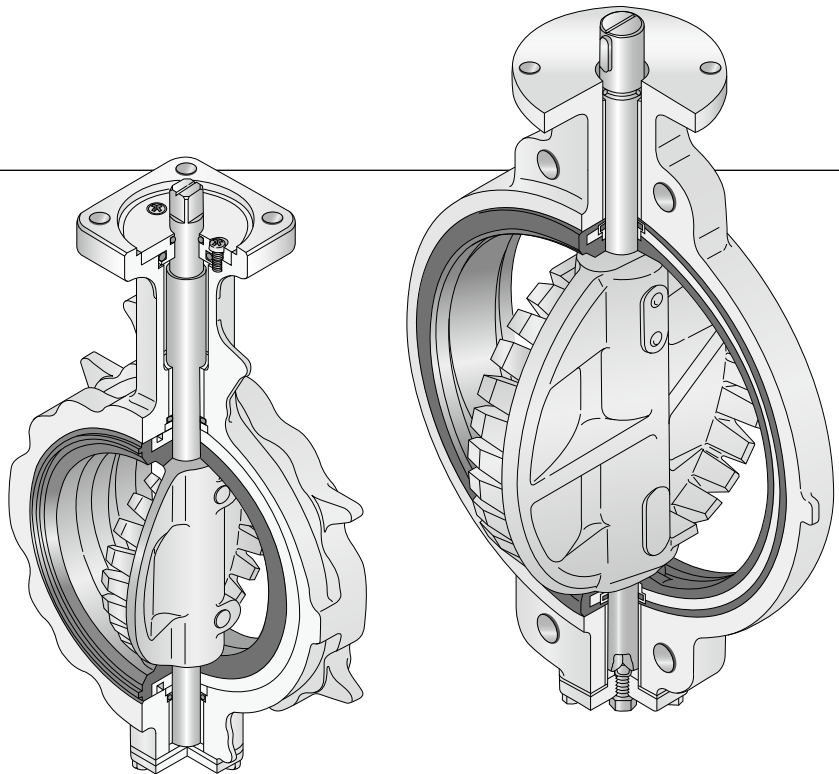
※4 Please consult us if an SUS316 stem is required.

## 507V Seat leakage

### ■ FCI 70-2, under Class II (Cv rating 0.5%)

Nominal size		% of Max.Cv
mm	inch	
50	2	0.5
80	3	0.5
100	4	0.5
150	6	0.5
200	8	0.5
250	10	0.5
300	12	0.5
350	14	0.5
400	16	0.5

# 508V



## Features and Benefits

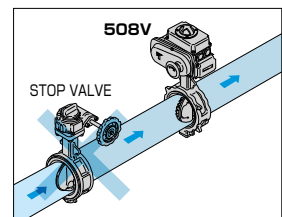
Except for the rubber seat ring, the 508V has the same design principle as the 507V. Excellent controllability is achieved by having the innovative teething disc seating at a certain angle. The 508V has a reinforced core rubber seat ring allowing it to be used for high pressure service up to 1.6MPa with complete tight shut-off.

### Rubber seat ring with a "control cosine curve" profile

Taking into consideration the cosine curve profile rubber seat ring incorporated into our models 700G and 773Z, we developed a new type of seat ring for exclusive use in the 508V. The 508V has a reinforced core rubber seat ring incorporated with a "control cosine curve" profile for sizes between 50mm and 200mm. This seat ring design ensures a tight shut-off up to a working pressure of 1.6MPa. The 508V available in sizes between 250mm and 350mm has a similar seat ring design and profile, but the seat ring is backed up by a precisely formed metal core which is encapsulated inside the rubber. This design enables the control valve to function under severe conditions of high velocity, a large differential pressure or a high vacuum. (The maximum allowable shut-off pressure is 1.0MPa).

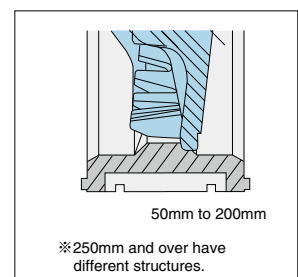
### No additional stop valve, less installation space and less cost

Because of its reliable sealing effect against a high differential pressure, the 508V does not require an additional stop valve. You save on installation space and benefit from the excellent cost effective features of our rotary control valve.



### Satisfies both JIS and ISO standards for extended applications

The 508V is available in different flange specifications. Also, its face-to-face dimension meets both JIS and ISO requirements. Therefore this model is applicable for various industrial applications worldwide.





## General

With guide-vane-like teeth around the disc edge, and the disc touching the seat at a certain angle, this product is a compact, lightweight and highly cost-effective, high-performance rotary control valve that exhibits outstanding control characteristics. The valve provides steady control over a wide range with higher rangeability, better cavitation resistance, lower dynamic torque, lower noise level, and a better leakage rate than any other rotary control valve.

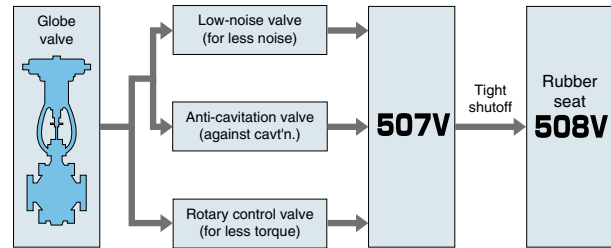
Two models, the 507V and 508V, are available for a range of severe applications. The 507V is the optimum type for fluid control of high pressure, high temperature systems. The 508V is characterized by its rubber seat ring, and eliminates the need for any additional stop valve because of its complete sealing capability.

## Fundamental Structure

This product has two basic design features that are responsible for the outstanding performance. One is the teeth around the disc and the other is the gull-wing-like design of the disc.

The teeth on the circumference of the disc break up the fluid energy acting on it with a resultant reduction of pressure recovery. Unlike conventional flat discs, the gull-wing-like disc of the product touches the seat at a certain angle for reduced seating/unseating torque. This results in steady control of the valve.

## Recent trend toward rotary type control valves

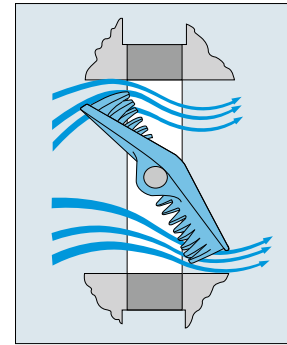


## General Description

With a specially designed rubber seat ring, Model 508V ensures tight shut-off and eliminates the need for any additional stop valve required by conventional control valves.

The high performance characteristics of this model originate from its unique design with a teeth and gull-wing shaped disc that touches the seat at a certain angle (Fig.1). The teeth are arranged on the circumference of the disc towards either direction of flow. The 'touch-at-an-angle' disc assists the reduction of seating and unseating torque and facilitates smooth control of the valve. Other benefits include high rangeability, low noise level and anti-cavitation.

The face-to-face dimension meets both JIS and ISO standards so the 508V is applicable for various industrial fields including air conditioning systems.



## Standard Specifications

Type	Wafer type		
Valve size ※1	50, 80, 100, 150, 200mm	250, 300, 350mm	400, 450, 500, 600mm
Applicable flange standard	JIS 5K/10K/16K/20K, ASME Class150, DIN PN 10/16, BS 4504 PN 10/16, BS10 'E', 'F', JIS G 5524, 5527	JIS 10K/16K, ASME Class150, DIN PN 10/16, BS 4504 PN 10/16, BS10 'E', 'F', JIS G 5524, 5527	JIS 10K/16K, ANSME Class150, DIN PN 10/16, BS 4504 PN 10/16, BS10 'E', 'F', JIS G 7.5, 5527
Face to face dimensions ※2	JIS B 2002 Series 46 / ISO 5752 Basic Series 20 Wafer butterfly valve (short)		
Max.working pressure	1.6MPa	1.0MPa	
Seat leakage	Tight-shutoff		
Flow direction	One way (Flow direction marked on body)		
Test Pressure	Shell test	Nominal pressure x 1.5 times 10K: 1.5MPa 16K: 2.4MPa 20K: 3.0MPa	
	Seat leakage	Working pressure x 1.1 times 50 to 200mm: Max. 1.8MPa 250 to 600mm: Max. 1.1MPa (In case of NBR seat, Max. pressure is 1.1MPa for all size.)	
Working temperature range ※3	-20 to 120 degrees C (NBR: -10 to 80 degrees C)		
Working temperature in continuous use ※2	0 to 70 degrees C (NBR : 0 to 60 degrees C)		
Standard Materials	Body	FCD450 (No fluid exposure)	
	Disc	SCS14	SCS13
	Stem	SUS420J2 (No fluid exposure)	
	Seating ring ※4	*EPDM core-reinforced (Option - NBR core-reinforced)	NBR core-reinforced (Option- *EPDM core-reinforced)
Rangeability ※5	100:1		
Valve opening	Max. 70°		
Flow characteristics	Nearly Equal percent		
Top flange	ISO5211/1	Manufacturer's standard	
Condensation prevention structure	Optional (Condensation prevention resin column)		
Piping flange gasket	Not required		
Coating	Silicon resin coating (Munsell N7)		Lacquer Primer (Munsell N7)

※1 As for 65mm and 125mm, please consult us.

※2 350mm only : JIS B 2002 Series 47 / ISO Basic Series 25 (Medium)

※3 'Working temperature in continuous use' stands for the temperature continuously kept exceeding on hour.

※4 If the fluid contains chlorine, EPDM and NBR seat ring may deteriorate early due to combined factors including density and temperature.

In this case, 846T/847T(PTFE seated) is recommended. For details consult us.

Do not use an EPDM seat ring if the fluid contains even a slight amount of oil.

※5 Rengeability of 65mm and 125mm is 50:1.

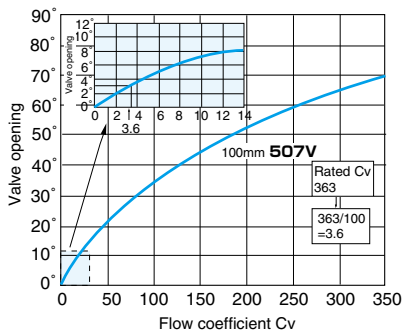
# 507V/508V

## Multiple merits for multiple applications

### Controllability

#### High rangeability

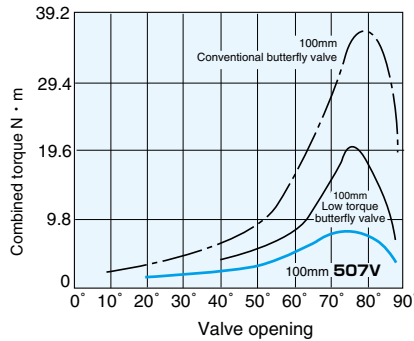
- \*The wide range of controllability permits flexible adjustment to any changes in the process conditions of production lines. This merit is especially beneficial to multifold productions.
- \*The conventional "split range control" with twin valves is no longer required. One product is enough to cover the whole range.



With its nearly "equal percent" flow characteristics and its very low leakage rate, the product offers an extremely high rangeability of 100:1.

#### Low dynamic torque

- \*The steady performance ensures more precise control.
- \*The compact actuator saves space and energy.

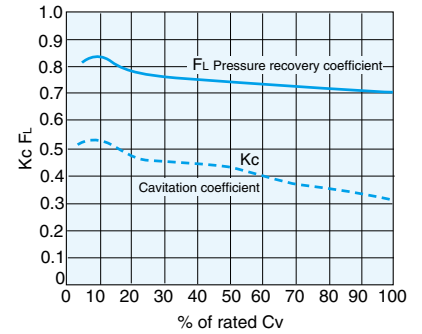


The above graph shows a comparison of the product with other typical valves. The patented disc has remarkably reduces the dynamic torque.

### Reliability

#### Excellent cavitation resistance

- \*The outstanding cavitation resistance increases the operational life of the valve and pipeline, and improves the reliability of the system.
- \*This model is works in more severe requirements than ever.

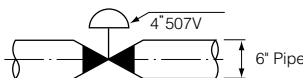


A high coefficient of initial cavitation (Kc), and a high pressure recovery coefficient (FL), inhibit the occurrence of cavitation.

### Cv value

Size		Opening angle							
mm	inch	10°	20°	30°	40°	50°	60°	70°	
50	2	Cv	3	11	22	38	53	69	85
		CvFp	3	11	22	37	50	63	74
80	3	Cv	14	33	58	88	120	140	176
		CvFp	14	33	58	86	115	133	158
100	4	Cv	17	43	80	127	179	250	363
		CvFp	17	43	80	126	175	238	323
150	6	Cv	55	120	210	320	450	590	825
		CvFp	55	120	208	315	441	560	730
200	8	Cv	70	175	350	620	1025	1265	1595
		CvFp	70	174	345	608	974	1151	1388
250	10	Cv	96	245	455	718	1135	1470	2515
		CvFp	96	244	450	710	1115	1396	2188
300	12	Cv	160	410	760	1200	1730	2460	3610
		CvFp	160	405	750	1175	1644	2238	3130
350	14	Cv	200	500	900	1500	2200	3200	4440
		CvFp	198	495	891	1470	2090	2910	3640
400	16	Cv	210	550	1020	1614	2327	3310	5650
		CvFp	210	548	1015	1598	2280	3145	5090

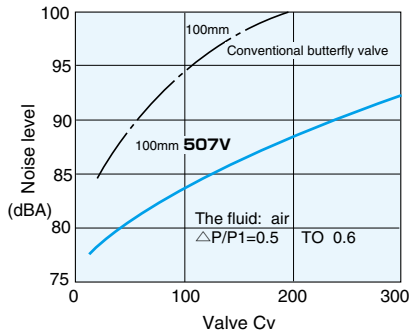
Remarks:  
CvFp : Pipe size=1.5×Valve size  
EX:



## Environmental considerations

### Low noise level

- \*Provides better work environment.
- \*Especially in air and gas applications, this product has a lower noise level by 5 to 10dBA and meets and exceeds noise regulations



The teeth on the disc cut the flow into fine jet streams.  
 This is the most effective device for lowering the noise level when the valve is half open.

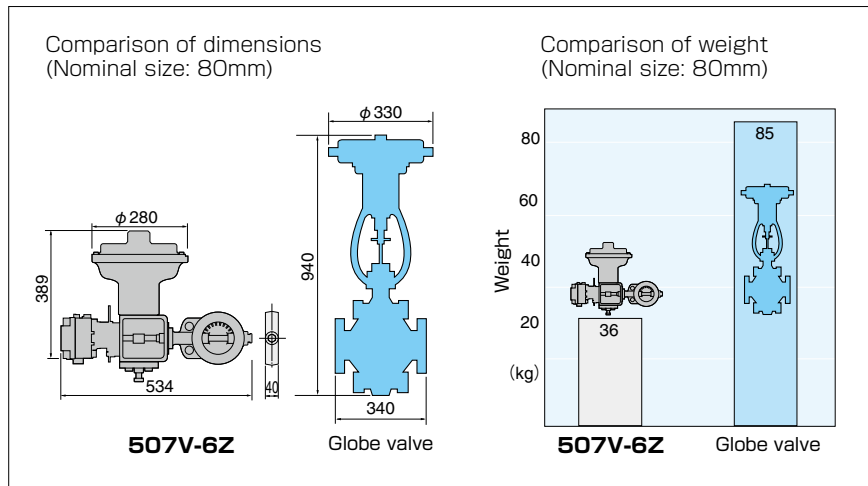
## Cost merit

### Larger valve capacity

- \*Reduces loss of energy at the fully open position.
- \*Allows one to two sizes of valve reduction in comparison with a conventional valve.

### Compact and lightweight design

- \*Permits compact piping arrangement.
- \*Allows the use of a portable remote controller unit.
- \*Eliminates vibration problems of the piping system, and improves operational life.



### Simple design

- \*Permits easy control of spare parts.
- \*Facilitates easy maintenance.
- \*Has a reduced number of parts and improved reliability.

## Pressure recovery factor (FL), coefficient of incipient cavitation (Kc)

Opening angle	10°	20°	30°	40°	50°	60°	70°
Pressure recovery factor (FL)	0.85	0.80	0.78	0.76	0.73	0.71	0.70
Coefficient of incipient cavitation (Kc)	0.55	0.50	0.47	0.45	0.40	0.37	0.32

# 507V

## 507V Actuator selection chart

### 507V

型番	Size <small>(<math>\frac{mm}{inch}</math>)</small>								
	50	80	100	150	200	250	300	350	400
	2	3	4	6	8	10	12	14	16
2S	DGH-1				DGH-2				
7E,3A	T85		T200	T380	T750		TGA-100		
7G,7F 3K,3U	T200S		T380S		TG-12S				
4I	4I-1		4I-2		4I-2.5	4I-3			
6Z	280H				400H				

Note: The selection of actuator may change depending on the differential pressure and temperature. Please contact our sales staff for details.

## 507V Allowable differential pressure for 7E

### Double-action Cylinder (Stem 630ss)

(MPa)

Nominal size			Cv % (Cv/Rated Cv)					
			0	20	40	60	80	100
			Valve opening %					
mm	inch	Cylinder	0	41	57	69	86	100
50	2	T85	4.9	1.54	3.33	2.94	2.94	2.94
80	3	T85	4.9	1.01	2.25	1.86	1.86	1.86
100	4	T85	3.43	1.37	0.97	0.78	0.78	0.78
150	6	T200	1.37	0.48	0.34	0.29	0.29	0.29
200	8	T380	1.17	0.30	0.20	0.14	0.14	0.14
250	10	T380	1.47	0.42	0.28	0.19	0.19	0.19
300	12	T750	0.98	0.25	0.16	0.12	0.12	0.12
350	14	T750	0.64	0.16	0.10	0.08	0.08	0.08
400	16	T750	0.59	0.11	0.07	0.06	0.06	0.06

507V Allowable differential pressure for 7G, 7F

■ Single-action Cylinder (Stem 630ss)

(MPa)

Nominal size			Cv % (Cv/Rated Cv)					
			0	20	40	60	80	100
			Valve opening %					
mm	inch	Cylinder	0	41	57	69	86	100
50	2	T200S	4.90	1.28	3.33	2.94	2.94	2.94
80	3	T200S	4.90	0.85	2.25	1.86	1.86	1.86
100	4	T380S	3.43	1.06	0.79	0.75	0.78	0.78
150	6	T380S	1.37	0.36	0.26	0.24	0.29	0.29
200	8	T380S	1.17	0.30	0.20	0.14	0.14	0.14

507V Allowable differential pressure for 6Z

■ Diaphragm Actuator (Stem 630ss)

(MPa)

Nominal size		Model	Supply pressure (MPa)	Spring range (kPa)	Cv % (Cv/Rated Cv)					
					Close	20	40	60	80	100
		Valve opening %								
mm	inch				0	41	57	69	86	100
50	2	280H	0.27	60 to 220	4.90	4.90	3.33	2.94	2.94	2.94
80	3	280H	0.27	60 to 220	4.90	3.13	2.25	1.86	1.86	1.86
100	4	280H	0.27	60 to 220	3.43	1.37	0.97	0.78	0.78	0.78
150	6	280H	0.27	60 to 220	1.37	0.48	0.34	0.29	0.29	0.29
200	8	280H	0.27	60 to 220	1.21	0.30	0.20	0.14	0.14	0.14
250	10	400H	0.27	60 to 190	1.50	0.36	0.25	0.21	0.20	0.20
300	12	400H	0.27	60 to 190	1.03	0.22	0.14	0.12	0.12	0.12
350	14	400H	0.27	60 to 190	0.64	0.15	0.10	0.09	0.08	0.08
400	16	400H	0.27	60 to 190	0.59	0.10	0.07	0.06	0.05	0.05

# 507V

## 507V Allowable differential pressure on stem

### ■SUS630

(MPa)

Nominal size		Cv % (Cv/Rated Cv)					
		0	20	40	60	80	100
		Valve opening %					
mm	inch	0	41	57	69	86	100
50	2	4.90	4.90	3.33	2.94	2.94	2.94
80	3	4.90	3.13	2.25	1.86	1.86	1.86
100	4	3.43	1.37	0.97	0.78	0.78	0.78
150	6	1.37	0.48	0.34	0.29	0.29	0.29
200	8	1.17	0.30	0.20	0.14	0.14	0.14
250	10	1.47	0.42	0.28	0.19	0.20	0.20
300	12	0.98	0.25	0.16	0.12	0.12	0.12
350	14	0.64	0.16	0.10	0.08	0.08	0.08
400	16	0.59	0.11	0.07	0.06	0.06	0.06

### ■SUS316

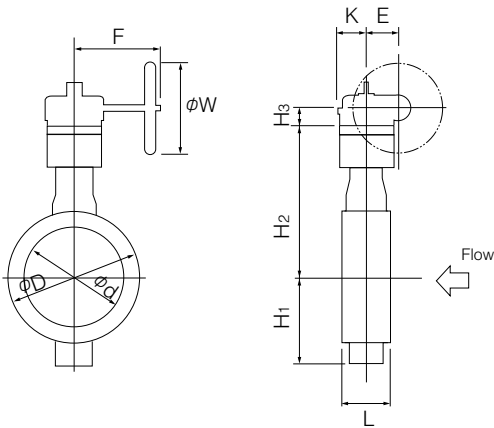
(MPa)

Nominal size		Cv % (Cv/Rated Cv)					
		0	20	40	60	80	100
		Valve opening %					
mm	inch	0	41	57	69	86	100
50	2	4.90	2.45	1.76	1.57	1.57	1.57
80	3	3.13	1.56	1.17	0.98	0.98	0.98
100	4	1.66	0.70	0.53	0.39	0.39	0.39
150	6	0.78	0.24	0.16	0.13	0.13	0.13
200	8	0.54	0.15	0.10	0.08	0.08	0.08
250	10	0.73	0.21	0.14	0.12	0.12	0.12
300	12	0.51	0.12	0.08	0.06	0.06	0.06
350	14	0.38	0.08	0.06	0.05	0.05	0.05
400	16	0.32	0.06	0.04	0.03	0.03	0.03

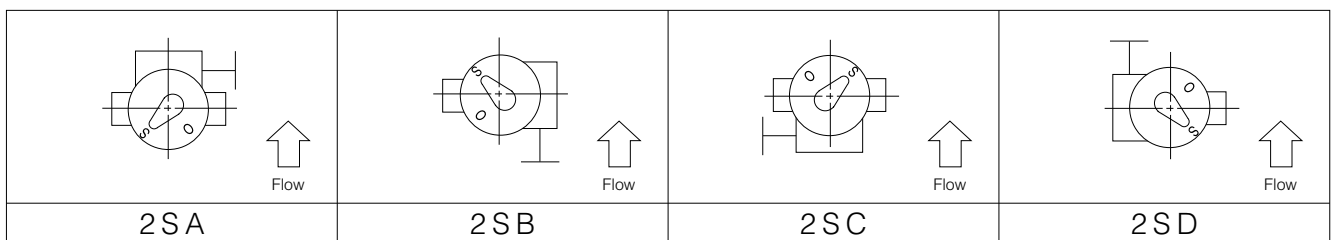
**Worm gear type 507V-2S (50mm to 400mm)**

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	$\phi W$		
50	2	49	92	40	63	183	32	58	93	156	160	DGH-1	13
80	3	73	127	40	86	201	32	58	93	156	160	DGH-1	15
100	4	97	155	40	98	224	32	58	93	156	160	DGH-1	16
150	6	146	216	52	129	262	32	58	93	156	160	DGH-1	23
200	8	194	265	62	184	283	32	58	93	161	200	DGH-1	32
250	10	241	324	89	196	393	42	85	126	246	280	DGH-2	60
300	12	289	370	89	230	446	42	85	126	246	280	DGH-2	70
350	14	318	415	89	256	431	42	85	126	246	280	DGH-2	86
400	16	364	470	108	296	453	42	85	126	246	280	DGH-2	100

**507V-2S**



**2S Installation direction**



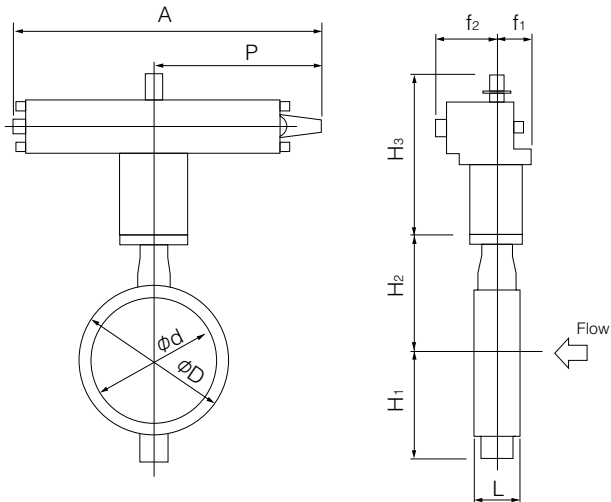
# 507V

## Double-acting Pneumatic Cylinder Type 507V-3A (350mm, 400mm)

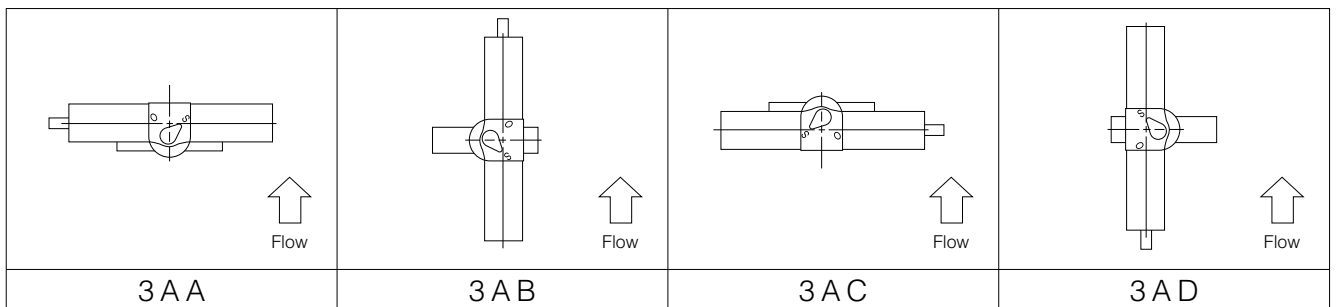
Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	318	415	89	256	316	404	783	433	77.5	133	TGA-100	95
400	16	364	470	108	296	338	404	783	433	77.5	133	TGA-100	110

• A free angle adjuster comes with the pneumatic cylinder.

### 507V-3A



### 3A Installation Direction

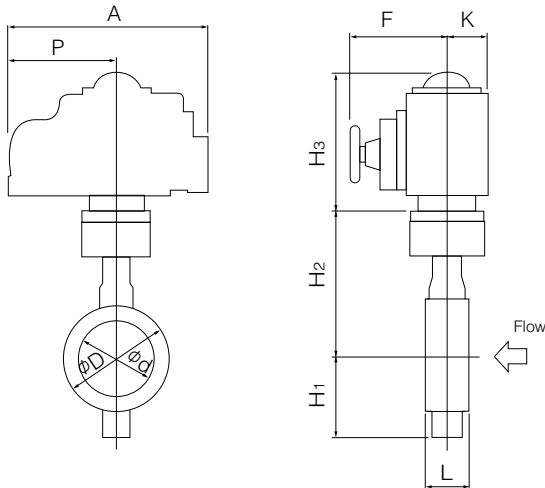




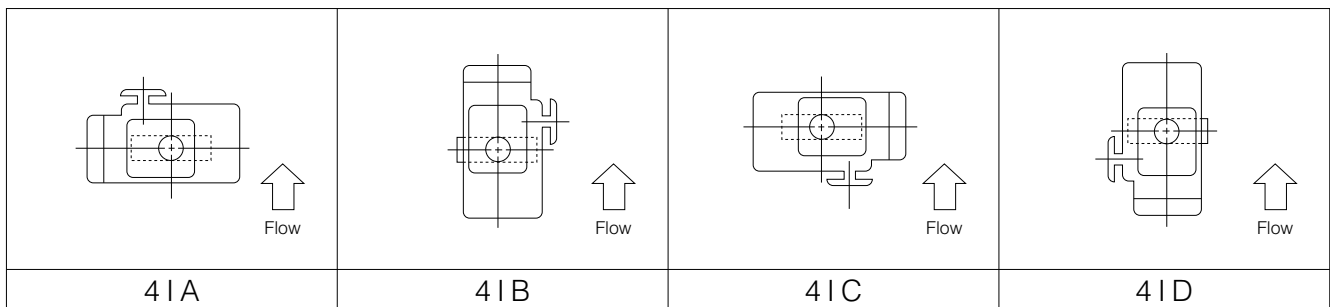
Single Phase Electric Motor Type 507V-4I (50mm to 400mm)

Nominal size		Dimension (mm)										Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	49	92	40	63	198	191	252	138	126	65	4 I-1	18.3
80	3	73	127	40	86	216	191	252	138	126	65	4 I-1	19.3
100	4	97	155	40	98	239	191	252	138	126	65	4 I-1	20.3
150	6	146	216	52	129	262	224	310	167	154	85	4 I-2	24
200	8	194	265	62	184	283	224	310	167	154	85	4 I-2	34
250	10	241	324	89	196	413	227	310	167	154	85	4 I-2.5	51
300	12	289	370	89	230	446	255	388	223	246	136	4 I-3	70
350	14	318	415	89	256	431	255	388	223	246	136	4 I-3	86
400	16	364	470	108	296	453	255	388	223	246	136	4 I-3	100

■ 507V-4I



■ 4I Installation Direction



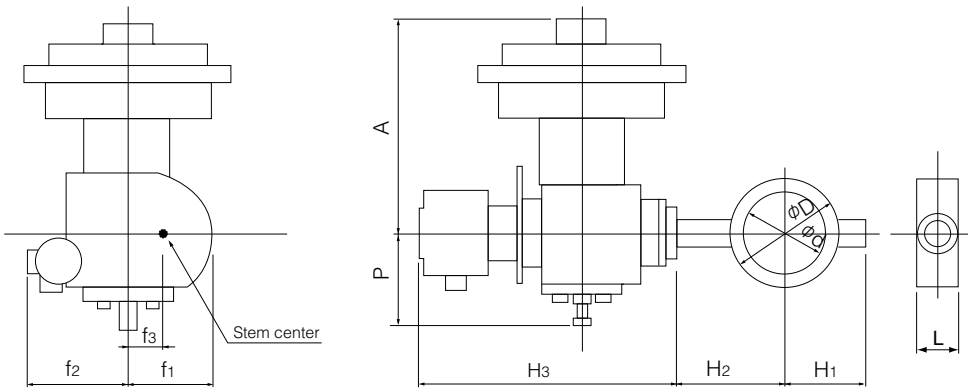
# 507V

## 507V-6Z (50mm to 400mm) with diaphragm actuator

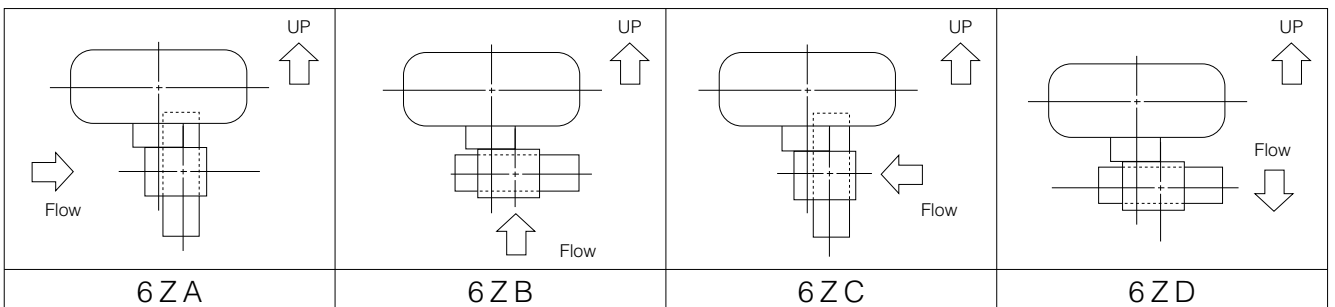
Nominal size		Dimension (mm)											Diaphragm type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>		
50	2	49	92	40	63	108	333	310	126	124	164	36	280H-M	35
80	3	73	127	40	86	126	333	310	126	124	164	36	280H-M	37
100	4	97	155	40	98	149	333	310	126	124	164	36	280H-M	38
150	6	146	216	52	129	187	333	310	126	124	164	36	280H-M	45
200	8	194	265	62	184	208	333	310	126	124	164	36	280H-M	54
250	10	241	324	89	196	278	379	440	185	124	164	50	400HP	90
300	12	289	370	89	230	331	379	440	185	124	164	50	400HP	100
350	14	318	415	89	256	316	379	440	185	124	164	50	400HP	115
400	16	364	470	108	296	338	379	440	185	124	164	50	400HP	130

Remarks: H<sub>3</sub> shows the dimension when the positioner (TCE2000) is installed.  
The H<sub>3</sub> dimension will change depending on the positioner type.

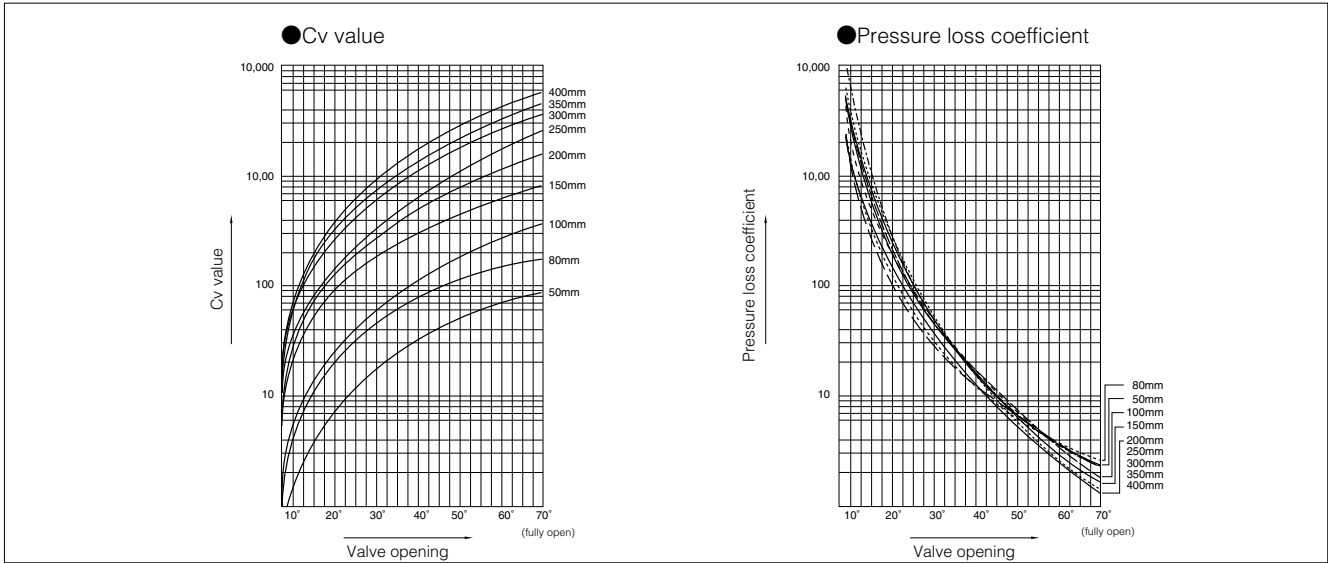
### 507V-6Z



### 6Z Installation direction



### 507V Cv value/pressure loss coefficient



### 507V Cv value

Nominal size		Valve opening						
mm	inch	10°	20°	30°	40°	50°	60°	70°
50	2	3	11	22	38	53	69	85
80	3	14	33	58	88	120	140	176
100	4	17	43	80	127	179	250	363
150	6	55	120	210	320	450	590	825
200	8	70	175	350	620	1020	1265	1595
250	10	96	245	455	718	1135	1470	2515
300	12	160	410	760	1200	1730	2460	3610
350	14	200	500	900	1500	2200	3200	4440
400	16	210	550	1020	1614	2329	3310	5650

### 507V Pressure loss coefficient

Nominal size		Valve opening						
mm	inch	10°	20°	30°	40°	50°	60°	70°
50	2	1832	136	34.1	11.4	5.9	3.5	2.3
80	3	406	73	23.6	10.3	5.5	4.1	2.6
100	4	810	127	36.6	14.5	6.5	3.1	1.8
150	6	367	77	25.2	10.9	5.5	2.8	1.7
200	8	697	111	31.3	11.3	4.6	2.1	1.4
250	10	889	136	39.6	14.2	5.4	2.5	1.3
300	12	748	100	30.7	11.0	4.7	2.3	1.3
350	14	815	115	32.6	11.7	5.0	2.4	1.4
400	16	1126	149	37.2	12.5	5.0	2.3	1.4

### 507V Pressure recovery coefficient (FL) and Cavitation coefficient (Kc)

Valve opening	10°	20°	30°	40°	50°	60°	70°
Pressure recovery coefficient (FL)	0.85	0.80	0.78	0.76	0.73	0.71	0.70
Cavitation coefficient (Kc)	0.55	0.50	0.47	0.45	0.40	0.37	0.32

# 507V

## 507V Applicable pipe list in case of **A**

Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S	Minimum internal diameters of piping (mm)
mm	inch							
50	2	○	—	○	○	○	○	36
80	3	○	—	○	○	○	○	71
100	4	○	—	○	○	○	○	98
150	6	○	—	○	○	○	○	148
200	8	○	—	○	○	○	○	199
250	10	○	—	○	○	○	○	241
300	12	○	—	○	○	○	○	293
350	14	○	○	○	○	—	—	321
400	16	○	○	○	○	—	—	367

## 507V Applicable pipe list in case of **B**

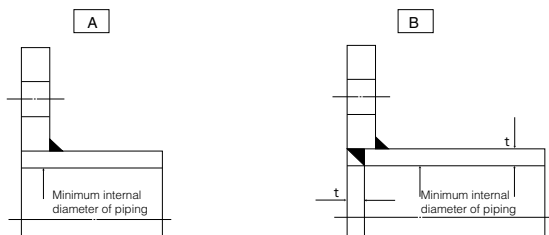
Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
mm	inch						
50	2	○	—	○	○	○	○
80	3	○	—	○	○	○	○
100	4	○	—	○	○	○	○
150	6	○	—	○	○	○	○
200	8	○	—	○	○	○	○
250	10	○	—	○	○	○	○
300	12	○	—	○	○	○	○
350	14	○	○	○	○	—	—
400	16	○	○	○	○	—	—

Remark1: ○=Applicable ×=Not applicable

Remark2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.

For details, please consult us.



### 507V Flange accommodation

Nominal size		JIS			ASME		BS4504 PN10	DIN NP10
mm	inch	10K	16K	20K	class 150	class 300		
50	2	○	D	D	○	D	○	○
80	3	D	D	D	○	D	D	D
100	4	D	D	D	D	D	D	D
150	6	D	D	D	D	D	D	D
200	8	D	D	D	D	D	D	D
250	10	D	×	×	D	×	D	D
300	12	D	×	×	D	×	D	D
350	14	D	×	×	D	×	D	D
400	16	D	×	×	D	×	D	D

○ : Can be used without flange drilling.  
 D : With flange drilling  
 × : Not applicable

### 507V Piping bolt and nut sizes

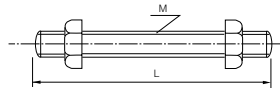
Nominal size		JIS 10K	JIS 20K	ASME Class 150	ASME Class 300
mm	inch	Long bolts and nuts		Long bolts and nuts	
50	2	4-M16×130	8-M16×130	4-U 5/8×140	8-U 5/8×140
80	3	8-M16×130	8-M20×170	4-U 5/8×150	8-U 3/4×175
100	4	8-M16×130	8-M20×170	8-U 5/8×150	8-U 3/4×175
150	6	8-M20×170	12-M22×190	8-U 3/4×175	12-U 3/4×190
200	8	12-M20×170	12-M22×210	8-U 3/4×190	12-U 7/8×230
250	10	12-M22×210	—	12-U 7/8×230	—
300	12	16-M22×210	—	12-U 7/8×230	—
350	14	16-M22×210	—	12-U 1 ×260	—
400	16	16-M24×240	—	16-U 1 ×260	—

Material Long bolt: SNB7  
 Nut: S45C

Example

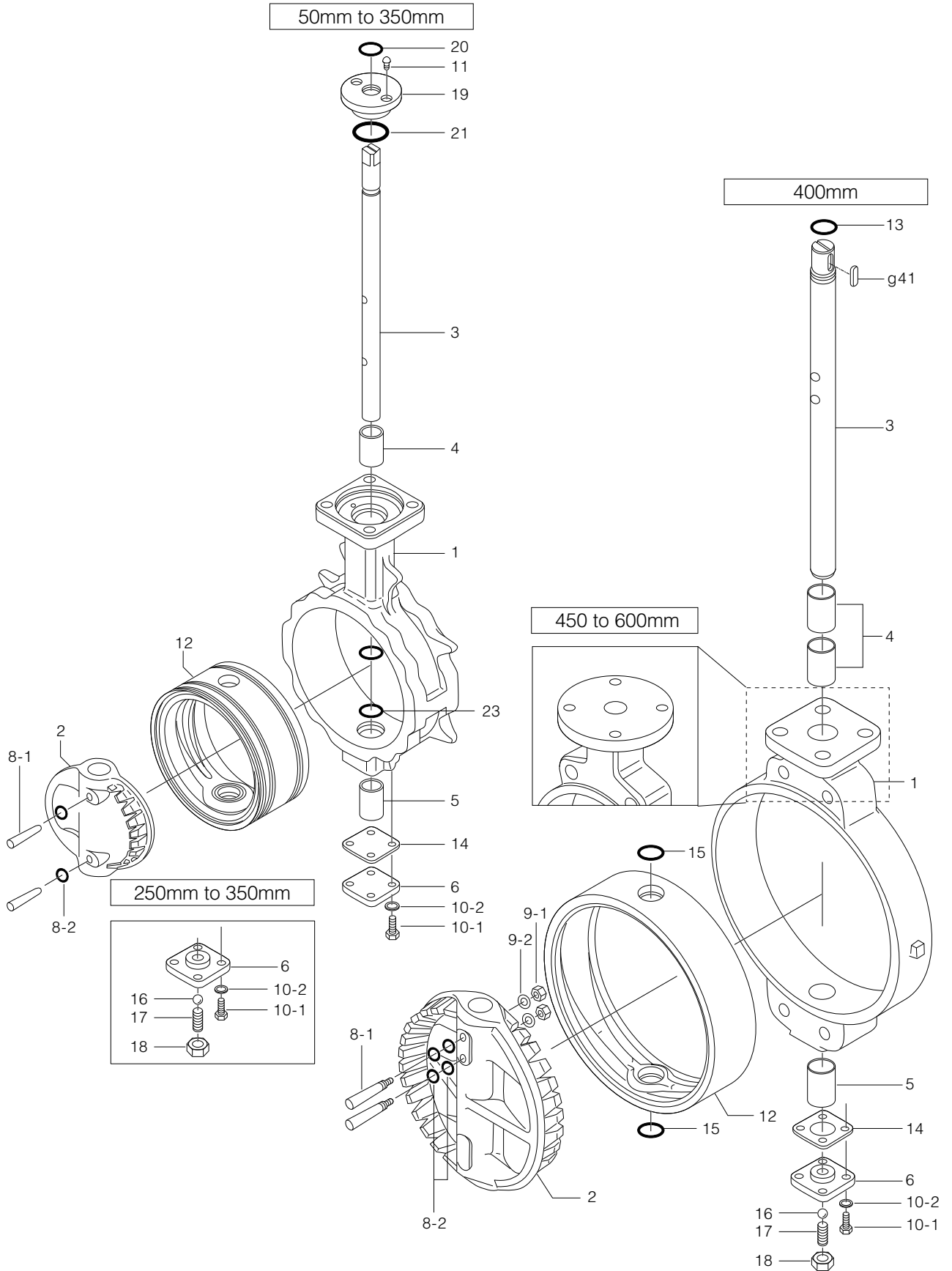
Long bolts: 12 - M22 × 185  
 |        |        |  
 N        M        L

Long bolts and nuts (full thread)



# 508V

## 508V Expanded view of components



## 508V Parts list

### ■ 508V Parts list (50mm to 350mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bearing	1	50mm to 250mm
		2	300mm, 350mm
5	Bearing	1	
6	Bottom cover	1	
★ 8-1	Taper pin	2	
★ 8-2	O-ring	4	Only 250mm to 350mm
10-1	Hexagon bolt	4	
10-2	Spring washer	4	
11	Machine screw	2	50mm to 200mm
		4	250mm to 350mm
★ 12	Seat ring	1	
★ 14	Gasket	1	
16	Ball	1	Only 250mm to 300mm
17	Hollow bolt	1	Only 250mm to 300mm
18	Lock nut	1	Only 250mm to 300mm
19	Dust seal	1	
★ 20	O-ring	1	
★ 21	O-ring	1	
★ 23	O-ring	2	

### ■ 508V Parts list (400mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bearing	2	400mm, 500mm
		3	450mm, 600mm
5	Bearing	1	400mm
		2	450mm to 600mm
6	Bottom cover	1	
★ 8-1	Taper pin	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon bolt	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	4	
10-2	Spring washer	4	
★ 12	Seat ring	1	
★ 13	O-ring	1	
★ 14	Gasket	1	
★ 15	O-ring	2	
16	Ball	1	
17	Hollow bolt	1	
18	Lock nut	1	
g41	Key	1	

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

# 508V

## 508V Actuator Selection Chart

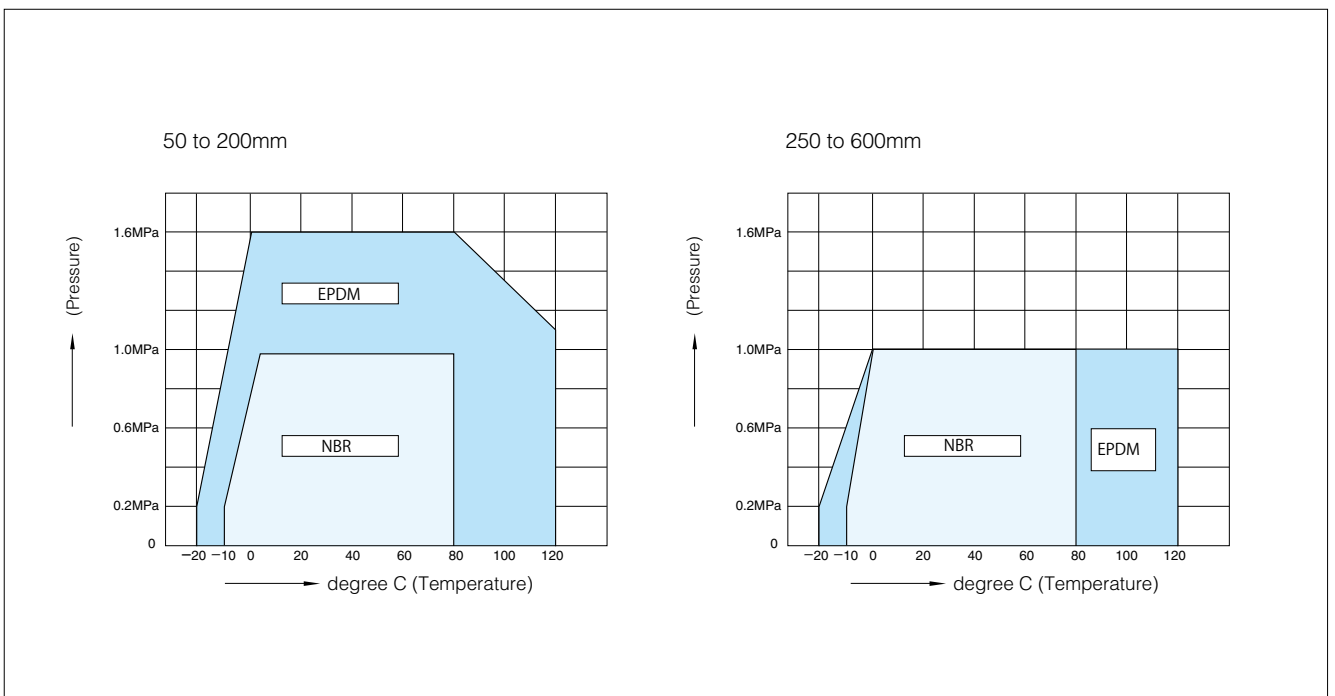
### 508V

Model	Category	Size (mm / inch)											
		50	80	100	150	200	250	300	350	400	450	500	600
		2	3	4	6	8	10	12	14	16	18	20	24
2U,2S	Standard	2U-0	2U-1	2U-2	2U-3	2U-4	2U-5	MGH-3	MGH-4				
7E,3A	Standard	T35	T85	T200	T380	T750	TGA-125	TGA-140	TGA-160	TGA-200			
7G,7F 3U,3K	Standard	T85S	T200S	T380S	T750S	TG-10S	TG-12S	TG-14S	TG-20S				
4I	ON-OFF Control	4I-0	4I-1	4I-2.5	4I-3		4I-4						
4J,4L	Standard	SRJ-010		SRJ-020	SRJ-060	LTKD-01 0.2kW/ DGH-2	LTKD-01 0.2kW/ MGH-3	LTKD-01 0.4kW/ MGH-3	LTKD-02 0.75kW/ MGH-4	LTKD-05 0.75kW/ MGH-5			
6X,6W	Standard	280H		400H									

Remark: In case of 350mm type with accessories below for control type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

## 508V Pressure-Temperature Rating





### 508V Allowable differential pressure for 6X and 6W

(kPa)

Nominal size		Valve opening							
mm	inch	0°	10°	20°	30°	40°	50°	60°	70°
50	2	1600	685	334	148	86	59	45	40
80	3	1400	694	475	308	176	116	69	47
100	4	800	765	575	315	204	133	69	37
150	6	1600	783	546	360	219	152	90	44
200	8	1600	676	453	287	178	124	79	44

### 508V Allowable differential pressure on stem

(kPa)

Nominal size		Valve opening							
mm	inch	0°	10°	20°	30°	40°	50°	60°	70°
50	2	1600	685	334	148	86	59	45	40
80	3	1600	694	475	308	176	116	69	47
100	4	1600	765	575	315	204	133	69	37
150	6	1600	783	546	360	219	152	90	44
200	8	1600	676	453	287	178	124	79	44
250	10	1000	562	233	149	84	58	37	21
300	12	1000	220	232	149	84	58	37	21
350	14	1000	367	222	116	65	45	29	16
400	16	1000	209	118	58	52	46	33	25
450	18	1000	223	197	115	56	48	33	26
500	20	1000	162	143	97	55	44	30	23
600	24	1000	246	171	110	54	49	41	27

The above is based on the result at our test plant. The test was conducted with fresh water at ambient temperature. Therefore, please use the data for reference only. Consult us if you have a question or doubt.

### 508V Maximum velocity

Fresh water	Short period	10m/s
	Continuous	7m/s
Sea water	Short period	10m/s
	Continuous	5m/s
Air (ambient temp.)	Short period	80m/s
	Continuous	30m/s

The maximum velocity shown is estimated as an average in the fully open state.

Remark: "Short period" means a few minutes creating high velocity until the disc angle reaches the designated position.

# 508V

508V Bare shaft (01: 50mm to 350mm, 02: 400mm to 600mm)

## 508V-01 (50mm to 350mm) / 508V-02 (400mm)

Nominal size		Dimension (mm)													Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\square S_1$	$\phi d_2$	b	t <sub>2</sub>	t	Flanges	
50	2	48	101	43	76	142	22	10.5	8	10	—	—	14	F07	2.5
80	3	75	131	46	95	158	23	11.5	12	14	—	—	14	F07	4.0
100	4	96	156	52	110	169	23	11.5	12	14	—	—	14	F07	5.3
150	6	143	217	56	160	202	28	16.5	14	18	—	—	14	F10	10.8
200	8	188	268	60	182	227	30	20	18	22	—	—	14	F10	15
250	10	248	322	68	255	280	35	30	24	28	—	—	14	F10	29
300	12	296	375	78	284	312	35	30	24	32	—	—	16	F12	42
350	14	332	420	92	320	360	35	30	24	32	—	—	16	F12	62
400	16	390	477	102	343	380	65	59	—	46	14	3.5	20	F14	112

### Flange dimensions

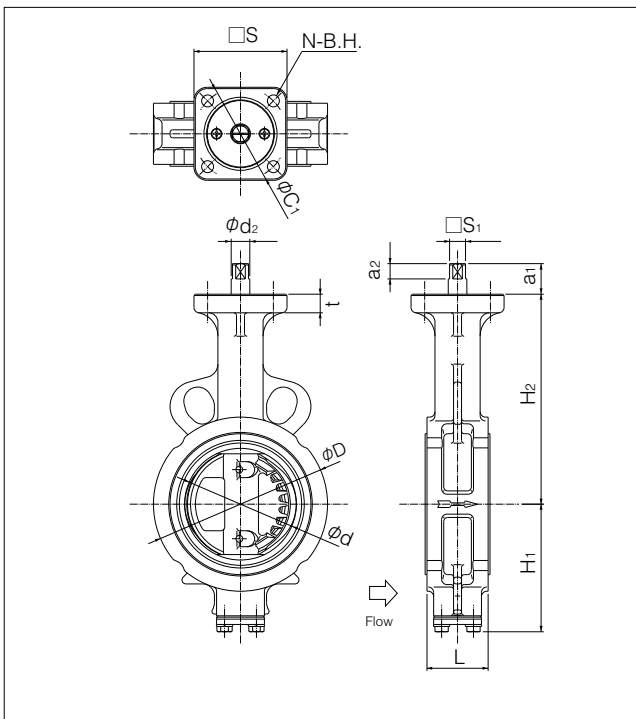
Flanges	$\square S$	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

**Stem design**  
 01: Square  
 02: Round with key

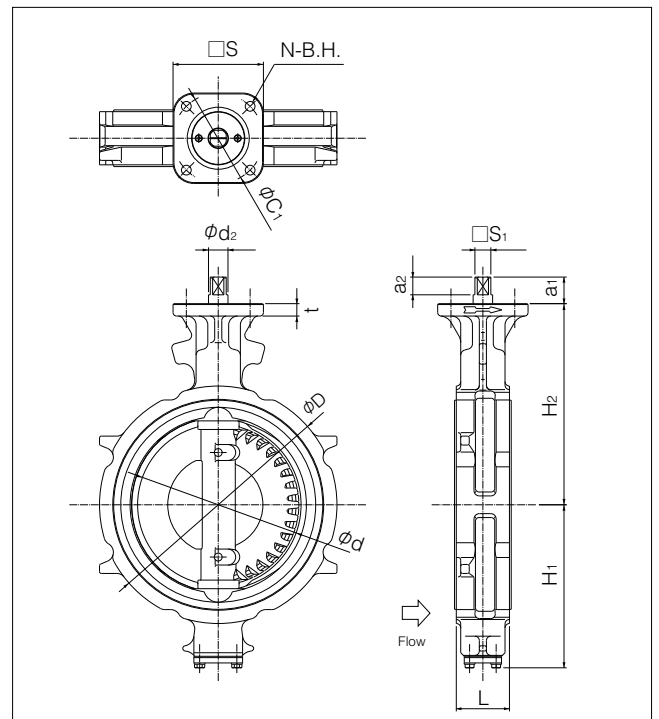
## 508V-02 (450mm to 600mm)

Nominal size		Dimension (mm)															Approx. Mass (kg)	
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\phi d_2$	b	t <sub>2</sub>	t	D <sub>1</sub>	C <sub>1</sub>	N		B.H.
450	18	439	JIS10K 532	JIS16K 532	114	379	420	60	53	47	12	3.5	20	200	170	4	19	143
500	20	490	610	610	127	422	450	60	53	47	12	3.5	20	200	170	4	19	196
600	24	583	826	720	154	494	530	75	65	65	18	6	25	260	220	4	23	333 (318)

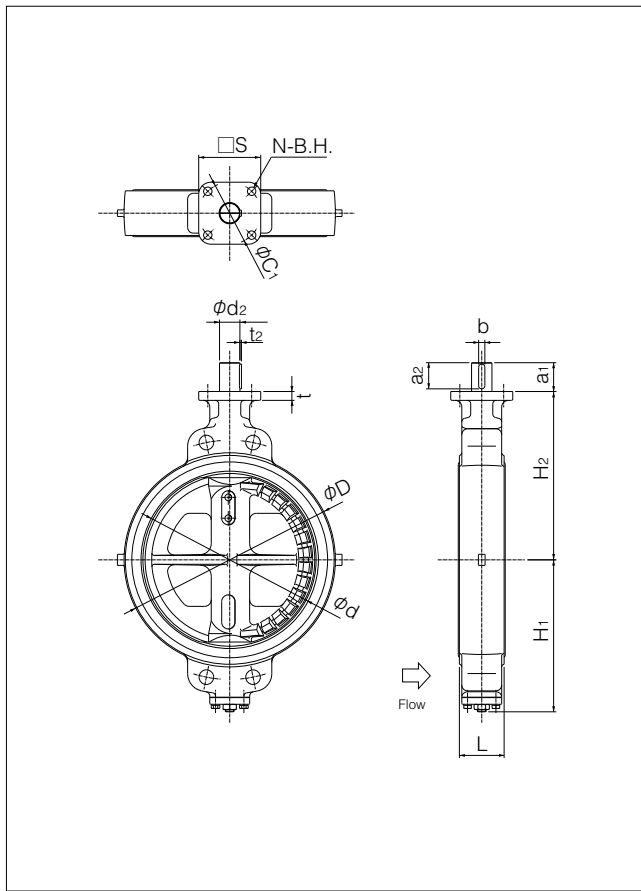
### 508V 50mm, 80mm



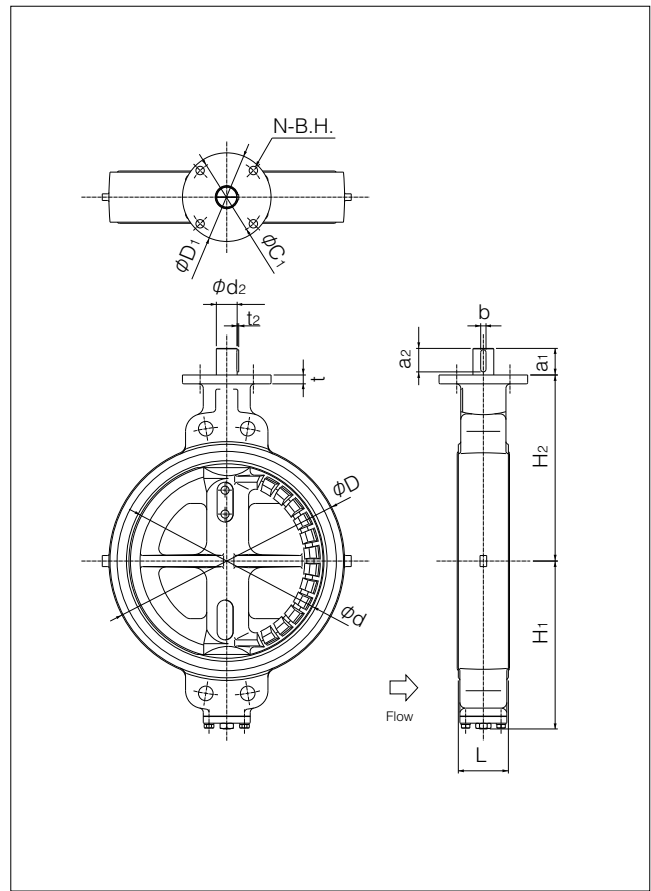
### 508V 100mm to 350mm



■508V 400mm

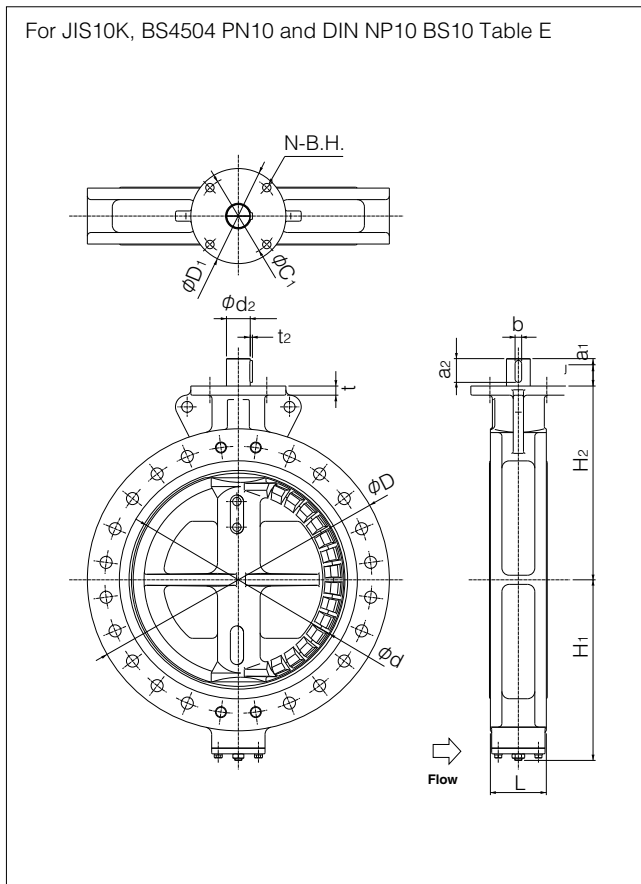


■508V 450mm, 500mm



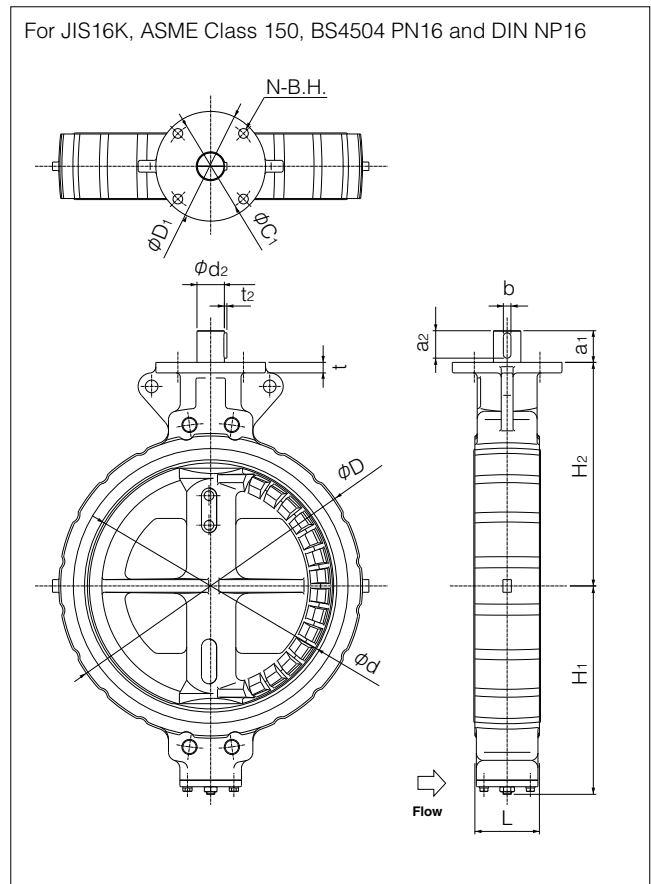
■508V 600mm

For JIS10K, BS4504 PN10 and DIN NP10 BS10 Table E



■508V 600mm

For JIS16K, ASME Class 150, BS4504 PN16 and DIN NP16



# 508V

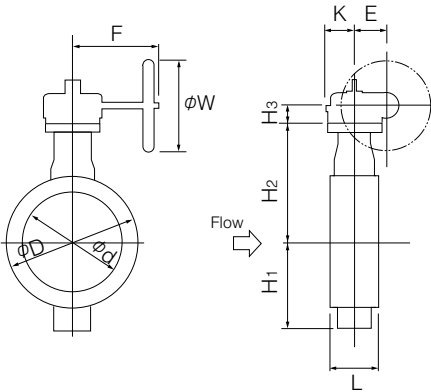
## Worm gear type 508V-2U (50mm to 400mm) / 508V-2S (450mm to 600mm)

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	$\phi W$		
50	2	48	101	43	76	142	29.5	36	46	160	100	2U-0	4.9
80	3	75	131	46	95	158	29.5	36	46	160	100	2U-1	6.4
100	4	96	156	52	110	169	29.5	36	46	160	100	2U-1	7.7
150	6	143	217	56	160	202	34.5	44	53	173.5	160	2U-2	15.1
200	8	188	268	60	182	227	41.5	67	75	198	200	2U-3	22.8
250	10	248	322	68	255	280	41.5	67	75	198	200	2U-3	37
300	12	296	375	78	284	312	48	87.5	90	222.5	200	2U-4	57
350	14	332	420	92	320	360	48	87.5	90	222.5	200	2U-4	77
400	16	390	477	102	343	380	50	90	105	266	280	2U-5	126
450	18	439	532	114	379	420	55	117	164	335	355	MGH-3	178
500	20	490	610	127	422	450	55	117	164	335	355	MGH-3	230
600	24	583	826 (720)	154	494	530	65	140	198	400	450	MGH-4	393 (363)

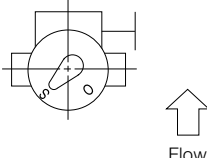
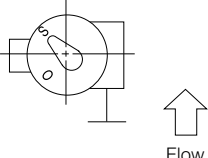
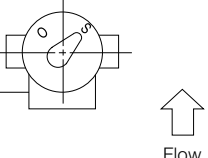
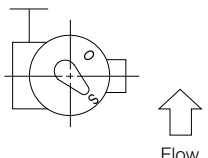
※A handle lock is attached for manual gear.

※( ) shows the data for JIS 16K 600mm.

### 508V-2U/2S



### 2U/2S Installation direction

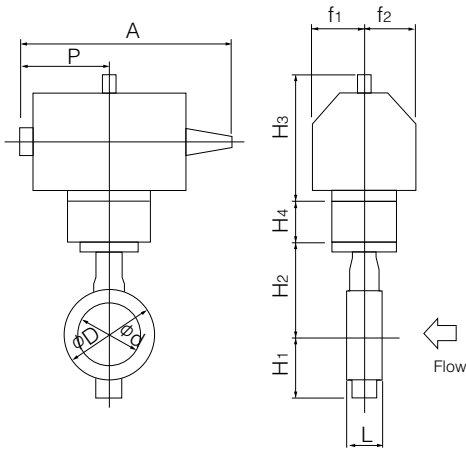
			
2UA/2SA	2UB/2SB	2UC/2SC	2UD/2SD

## Double-acting pneumatic cylinder type 508V-7E (50mm to 300mm)

Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	48	101	43	76	142	125	—	274	116	57	29	T35	5
80	3	75	131	46	95	158	168	—	325	142	75	47	T85	9
100	4	96	156	52	110	169	168	—	325	142	75	47	T85	10
150	6	143	217	56	160	202	203	—	434	176	79	57	T200	19
200	8	188	268	60	182	227	231	—	511	214	91	69	T380	29
250	10	248	322	68	255	280	269	—	668	270	118	85	T750	54
300	12	296	375	78	284	312	269	—	668	270	118	85	T750	67

● A free angle adjuster comes with the cylinder.

### 508V-7E



### 7E Installation direction

<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p>	<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p>	<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p>	<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p>
<b>7EA</b>	<b>7EB</b>	<b>7EC</b>	<b>7ED</b>

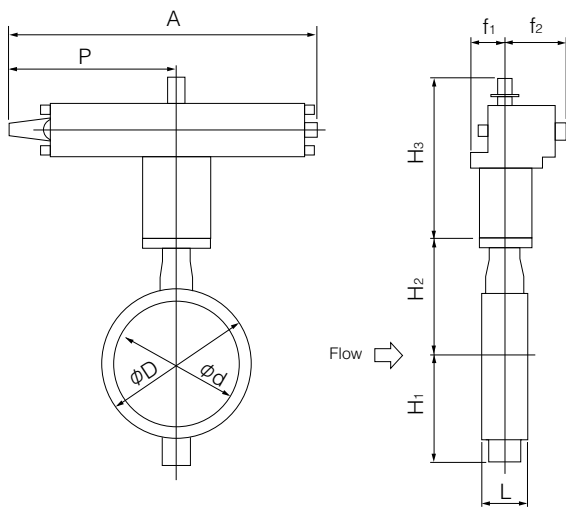
# 508V

## Double-acting pneumatic cylinder type 508V-3A (350mm to 600mm)

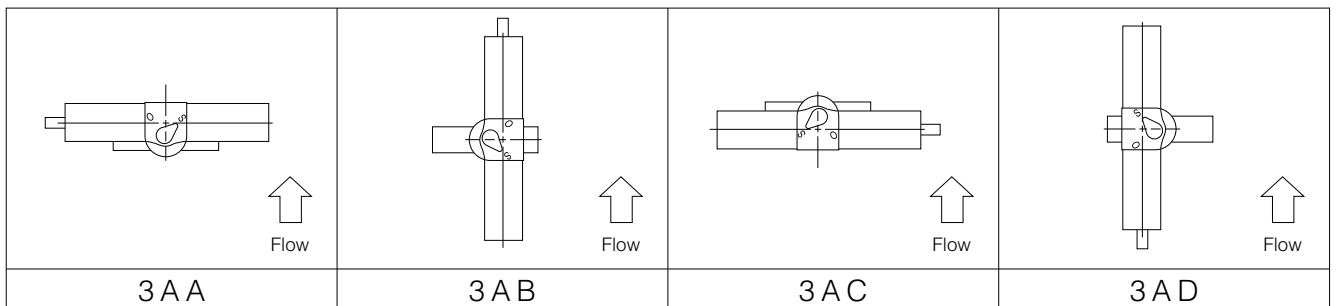
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	332	420	92	320	360	359	868	487	100	164	TGA-125	112
400	16	390	477	102	343	380	359	868	487	100	164	TGA-125	156
450	18	439	532	114	379	420	407	966	534	100	180	TGA-140	201
500	20	490	610	127	422	450	435	1092	609	130	202	TGA-160	299
600	24	583	826(720)	154	494	530	570	1349	740	160	253	TGA-200	552(522)

Remark: Value in brackets indicates 3Q (air to close).  
 ● A free angle adjuster comes with the pneumatic cylinder.

### 508V-3A



### 3A Installation direction



Single-acting pneumatic cylinder type 508V-7G (Air to open: 50mm TO 150mm) / 302A-7F (Air to close: 50mm to 150mm)

■ 508V-7G

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	48	101	43	76	142	168	406	183	75	47	T85S	9
80	3	75	131	46	95	158	203	534	226	79	57	T200S	15
100	4	96	156	52	110	169	231	635	276	91	69	T380S	25
150	6	143	217	56	160	202	269	848	360	118	85	T750S	44

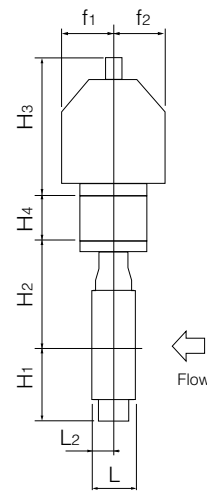
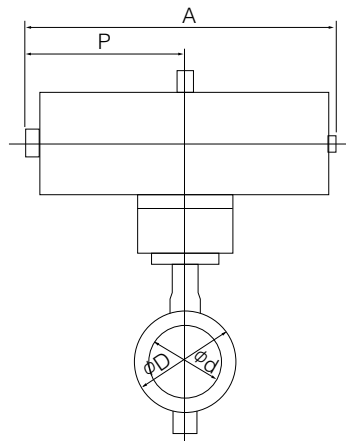
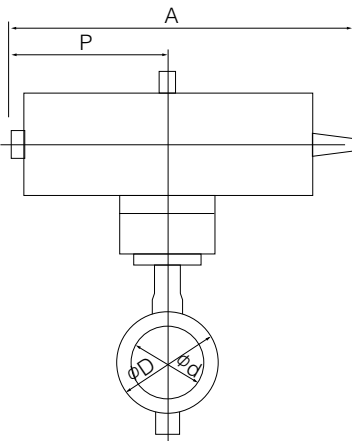
■ 508V-7F

Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	48	101	43	76	142	168	66	439	183	75	47	T85S	9
80	3	75	131	46	95	158	203	84	539	226	79	57	T200S	15
100	4	96	156	52	110	169	231	92	665	276	91	69	T380S	25
150	6	143	217	56	160	202	269	104	853	360	118	85	T750S	44

● A free angle adjuster comes with the cylinder.

■ 508V-7G

■ 508V-7F



■ 7F Installation direction

<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p> <p>7FA</p>	<p>Retainer side</p> <p>Air port side</p> <p>Stem side</p> <p>7FB</p>	<p>Retainer side</p> <p>Stem side</p> <p>Air port side</p> <p>7FC</p>	<p>Retainer side</p> <p>Stem side</p> <p>Air port side</p> <p>7FD</p>
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# 508V

Single-acting pneumatic cylinder type 508V-3U (Air to open: 200mm to 600mm) / 508V-3K (Air to close: 200mm to 600mm)

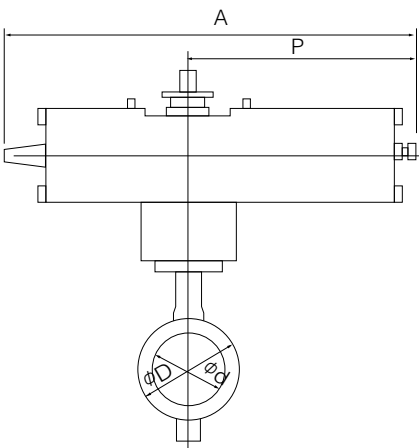
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	188	268	60	182	227	307	1030	670 (585)	70	165	TG-10S	66
250	10	248	322	68	255	280	307	1180	820 (720)	94	206	TG-12S	125
300	12	296	375	78	284	312	307	1180	820 (720)	94	206	TG-12S	143
350	14	332	420	92	320	360	340	1355	965 (865)	131	257	TG-14S	259
400	16	390	477	102	343	380	340	1355	965 (865)	131	257	TG-14S	313
450	18	439	532	114	379	420	474	1790	1230 (1095)	164	348	TG-20S	562
500	20	490	610	127	422	450	474	1790	1230 (1095)	164	348	TG-20S	614
600	24	583	826[720]	154	494	530	474	1790	1230 (1095)	164	348	TG-20S	751[720]

Remark: Value in brackets indicates 3Q (air to close).

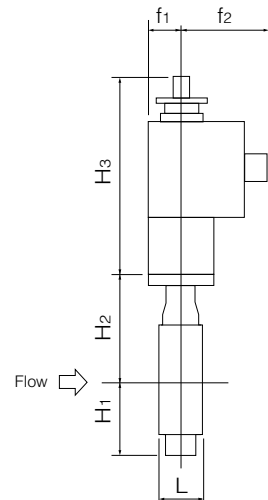
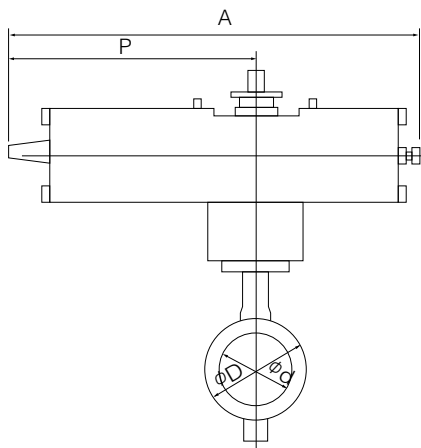
※ Brackets indicates the data for JIS 16K 600mm.

● A free angle adjuster comes with the pneumatic cylinder.

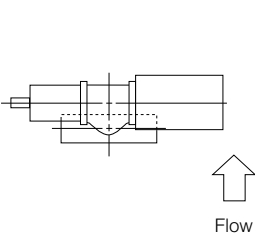
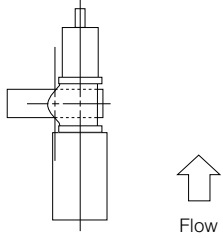
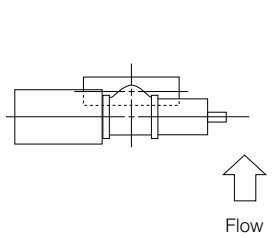
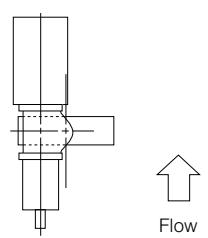
## 508V-3K



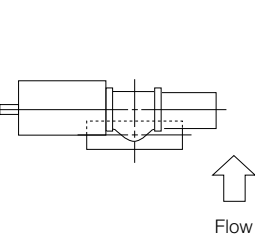
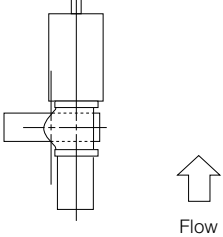
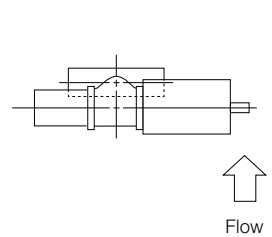
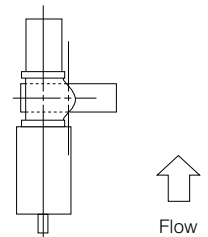
## 508V-3U



## 3K Installation direction

 3 K A	 3 K B	 3 K C	 3 K D
--	--	---	--

## 3U Installation direction

 3 U A	 3 U B	 3 U C	 3 U D
--	--	---	--



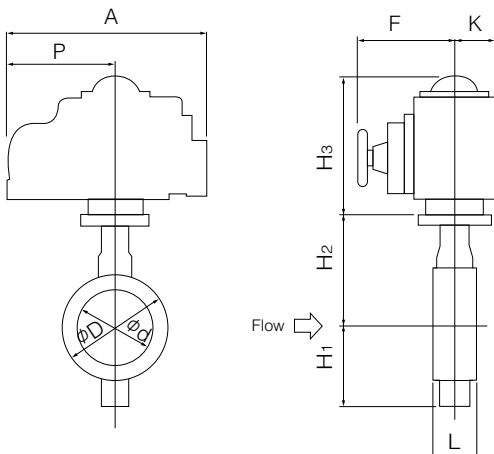
## Single phase electric motor type 508V-4 I (50mm to 400mm)

Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	48	101	43	76	142	176	202	100	85	54	4 I-0	6.7
80	3	75	131	46	95	158	176	202	100	85	54	4 I-0	8.2
100	4	96	156	52	110	169	191	252	138	126	65	4 I-1	11.7
150	6	143	217	56	160	202	224	310	167	154	85	4 I-2.5	23.6
200	8	188	268	60	182	227	224	310	167	154	85	4 I-2.5	28.6
250	10	248	322	68	255	280	255	388	223	246	136	4 I-3	55
300	12	296	375	78	284	312	255	388	223	246	136	4 I-3	68
350	14	332	420	92	320	360	255	388	223	246	136	4 I-3	81
							255	388	223	246	136	4 I-4	91
400	16	390	477	102	343	380	255	388	223	246	136	4 I-4	131

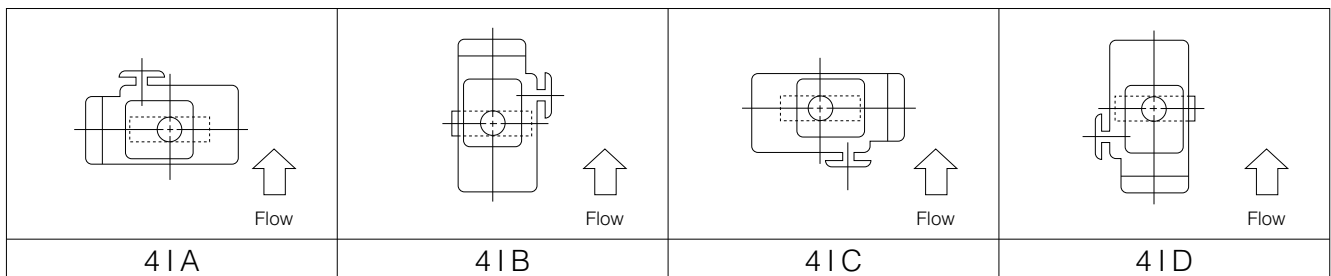
Remark: For 350mm type with accessories below for control type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

### ■ 508V-4 I



### ■ 4I Installation direction



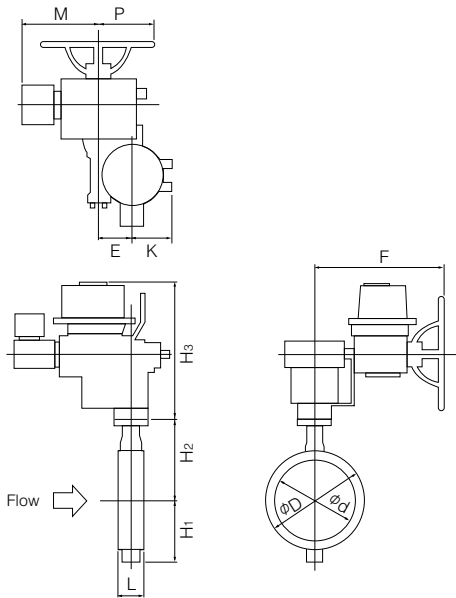
# 508V

## Three phase motor actuator type 508V-4L (300mm to 600mm)

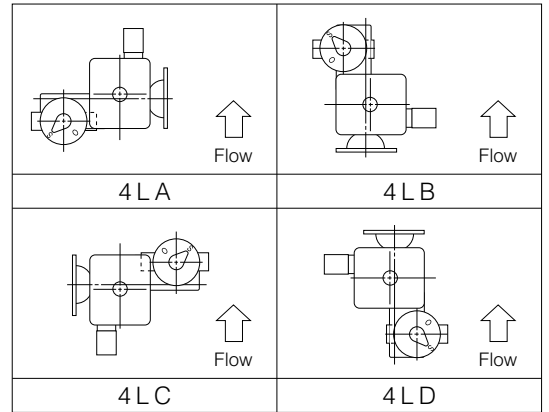
Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
300	12	296	375	78	284	312	415	85	126	498	364	230	LTKD-01 0.2kW/ DGH-2	117
350	14	332	420	92	320	360	428	117	164	533	364	230	LTKD-01 0.2kW/ MGH-3	201
400	16	390	477	102	343	380	458	117	164	533	357	230	LTKD-01 0.4kW/ MGH-3	226
450	18	439	532	114	379	420	538	140	198	594	375	230	LTKD-02 0.75kW/ MGH-4	310
500	20	490	610	127	422	450	538	140	198	594	375	230	LTKD-02 0.75kW/ MGH-4	363
600	24	583	826(720)	154	494	530	604	210	293	748	415	360	LTKD-05 0.75kW/ MGH-5	660(630)

※Brackets indicate the data for JIS 16K 600mm.

### 508V-4L



### 4L Installation direction

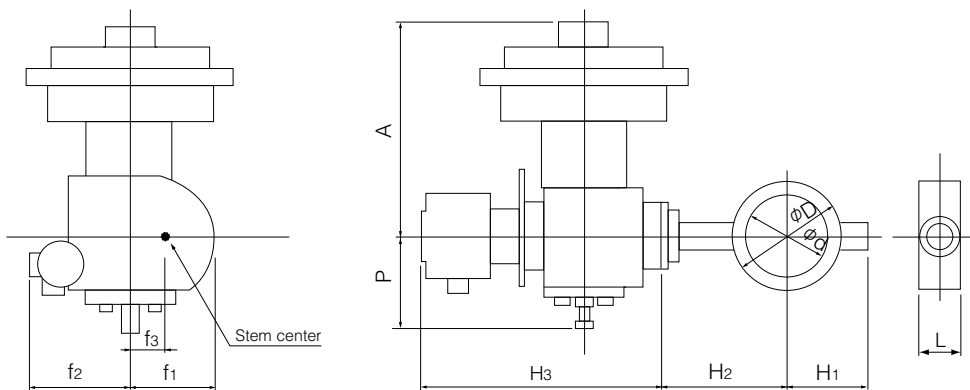


**508V-6X (Air to open: 50mm to 200mm) / 508V-6W (Air to close: 50mm to 200mm) with diaphragm actuator**

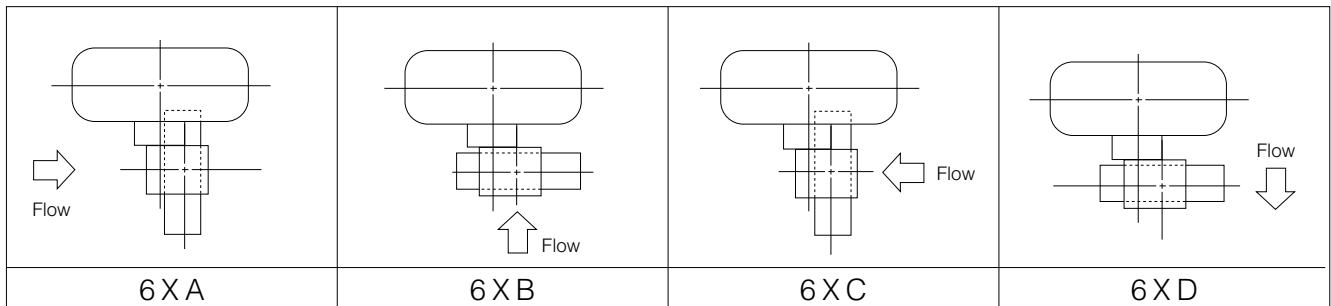
Nominal size		Dimension (mm)											Diaphragm type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>		
50	2	48	101	43	76	142	333	310	126	124	164	36	280H-M	37
80	3	75	131	46	95	158	333	310	126	124	164	36	280H-M	38
100	4	96	156	52	110	169	333	310	126	124	164	36	280H-M	39
150	6	143	217	56	160	202	381	440	185	124	164	50	400HP	75
200	8	188	268	60	182	227	381	440	185	124	164	50	400HP	79

Remarks: H<sub>3</sub> shows the dimension when the positioner (TCE2000) is installed.  
The H<sub>3</sub> dimension will change depending on the positioner type.

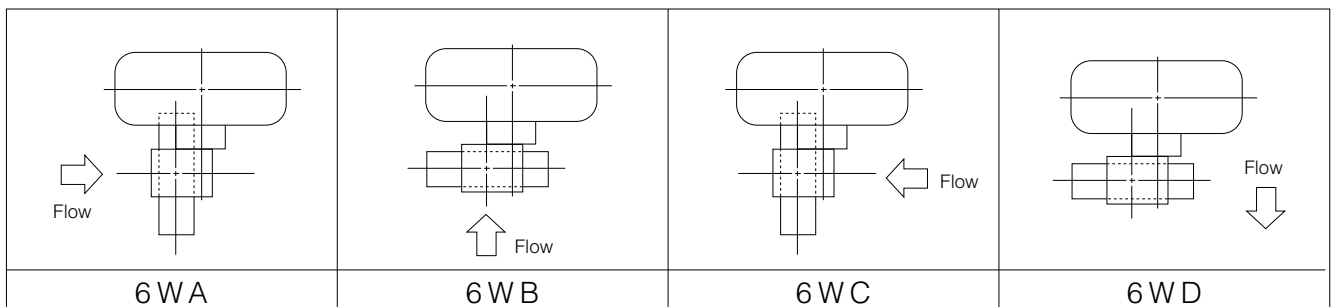
**508V-6X/6W**



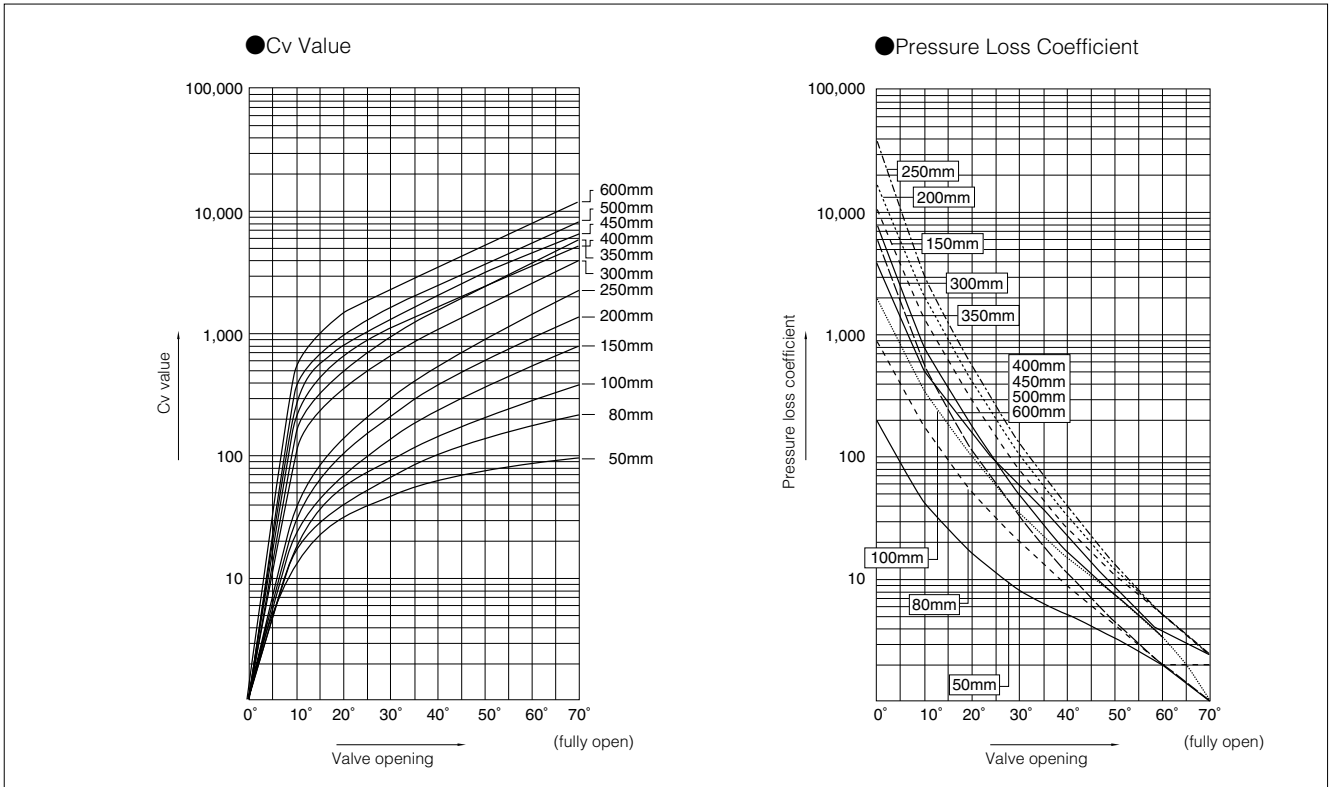
**6X Installation direction**



**6W Installation direction**



## 508V Cv Value/Pressure Loss Coefficient



## 508V Cv Value

Nominal size		Valve opening						
mm	inch	10°	20°	30°	40°	50°	60°	70°
50	2	16	32	48	63	76	87	94
80	3	19	41	68	101	139	180	218
100	4	24	55	94	143	203	281	383
150	6	26	72	140	239	375	555	790
200	8	38	105	215	380	600	920	1380
250	10	42	145	300	550	910	1480	2260
300	12	118	350	670	1120	1700	2580	4000
350	14	160	500	980	1600	2450	3800	5800
400	16	249	670	1080	1650	2510	3650	5230
450	18	316	848	1370	2090	3180	4620	6620
500	20	390	1050	1690	2590	3920	5710	8170
600	24	561	1500	2430	3720	5640	8220	11800

### 508V Pressure Loss Coefficient

Nominal size		Valve opening						
mm	inch	10°	20°	30°	40°	50°	60°	70°
50	2	65	16	7	4	3	2	2
80	3	223	48	17	8	4	2	2
100	4	420	78	27	11	6	3	2
150	6	1640	219	57	19	8	4	2
200	8	2360	310	74	24	9	4	2
250	10	4640	390	91	27	10	4	2
300	12	1210	138	38	13	6	3	1
350	14	1030	106	28	10	4	2	1
400	16	727	100	39	17	7	3	2
450	18	723	100	38	17	7	3	2
500	20	733	101	39	17	7	3	2
600	24	741	104	39	17	7	3	2

### 508V Pressure Recovery Coefficient (FL) and Cavitation Coefficient (Kc)

Valve opening	10°	20°	30°	40°	50°	60°	70°
Pressure recovery coefficient (FL)	0.85	0.80	0.78	0.76	0.73	0.71	0.70
Cavitation coefficient (Kc)	0.55	0.50	0.47	0.45	0.40	0.37	0.32

# 508V

## 508V Applicable pipe list in case of **A**

Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S	Minimum internal diameters of piping (mm)
mm	inch							
50	2	○	—	○	○	○	○	34
80	3	○	—	○	○	○	○	70
100	4	○	—	○	○	○	○	91
150	6	○	—	○	○	○	○	144
200	8	○	—	○	○	○	○	194
250	10	○	—	○	○	○	○	246
300	12	○	—	○	○	○	○	294
350	14	○	○	○	○	—	—	327
400	16	○	○	○	×	—	—	387
450	18	○	○	○	×	—	—	434
500	20	○	○	○	×	—	—	484
600	24	—	○	○	×	—	—	581

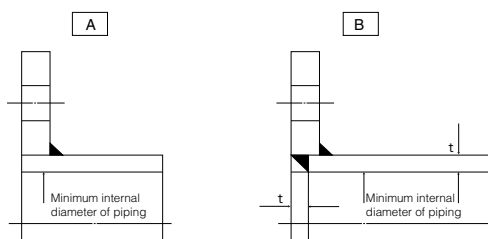
## 508V Applicable pipe list in case of **B**

Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
mm	inch						
50	2	○	—	○	○	○	○
80	3	○	—	○	○	○	○
100	4	○	—	○	○	○	○
150	6	○	—	○	○	○	○
200	8	○	—	○	○	○	○
250	10	○	—	○	○	○	○
300	12	○	—	○	○	○	○
350	14	○	○	○	○	—	—
400	16	○	○	○	○	—	—
450	18	○	○	○	○	—	—
500	20	○	○	○	○	—	—
600	24	—	○	○	○	—	—

Remark 1: ○=Applicable ×=Not applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.



## 508V Flange accommodation

Nominal size		JIS				ASME	BS4504		DIN		BS10
mm	inch	5K	10K	16K	20K	class 150	PN10	PN16	NP10	NP16	Table E
50	2	D	○	○	○	○	○	○	○	○	○
80	3	○	○	○	○	○	○	○	○	○	○
100	4	○	○	○	○	○	○	○	○	○	○
150	6	○	○	○	○	○	○	○	○	○	○
200	8	○	○	○	○	○	○	○	○	○	○
250	10	×	○	○	×	○	○	○	○	○	○
300	12	×	○	○	×	○	○	○	○	○	○
350	14	×	○	○	×	○	○	○	○	○	○
400	16	×	D	D	×	D	D	D	D	D	D
450	18	×	D	D	×	D	D	D	D	D	D
500	20	×	D	D	×	D	D	D	D	D	D
600	24	×	T	T	×	T	T	T	T	T	T

○ : Can be used without flange drilling.  
 D : With flange drilling  
 T : With flange tapping  
 × : Not applicable

## 508V Piping Bolt and Nut Sizes

Nominal size		JIS5K		JIS10K		JIS16K		ASME class150	
mm	inch	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts
50	2	4-M12×105	—	4-M16×120	—	8-M16×125	—	4-U5/8-11UNC×130	—
80	3	4-M16×120	—	8-M16×125	—	8-M20×135	—	4-U5/8-11UNC×145	—
100	4	8-M16×130	—	8-M16×130	—	8-M20×150	—	8-U5/8-11UNC×150	—
150	6	8-M16×130	—	8-M20×155	—	12-M22×165	—	8-U3/4-10UNC×165	—
200	8	8-M20×150	—	12-M20×155	—	12-M22×170	—	8-U3/4-10UNC×180	—
250	10	—	—	12-M22×175	—	12-M24×190	—	12-U7/8-9UNC×195	—
300	12	—	—	16-M22×185	—	16-M24×210	—	12-U7/8-9UNC×210	—
350	14	—	—	16-M22×195	—	16-M30(P3)×225	—	12-U1-8UNC×240	—
400	16	—	—	16-M24×220	—	—	—	16-U1-8UNC×255	—
450	18	—	—	20-M24×230	—	—	—	16-U1 1/8-8UN×280	—
500	20	—	—	20-M24×250	—	—	—	20-U1 1/8-8UN×295	—
600	24	—	—	20-M30×290	8-M30×65	—	—	16-U1 1/4-8UN×340	8-U1 1/4-8UN×85

Remark: Bold and nut material: SS400/SS400 and SUS 304/SUS04.

Long bolt uses full threaded bolt.

Use thin hexagon nut. (Use heavy hexagon nut for ASME class 150.)

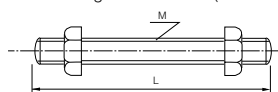
A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

Example

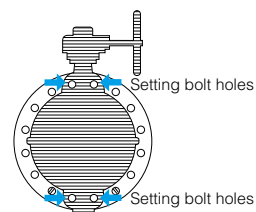
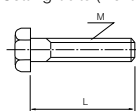
Long bolts: 12 - M22 × 185  
                   |      |      |  
                   N      M      L

Setting bolts: 4 - M30 × 95  
 (Hexagon bolts) |      |      |  
                           N      M      L

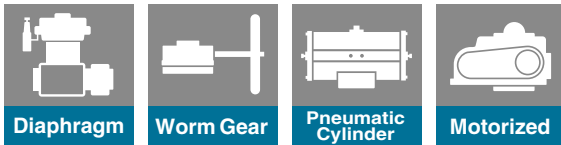
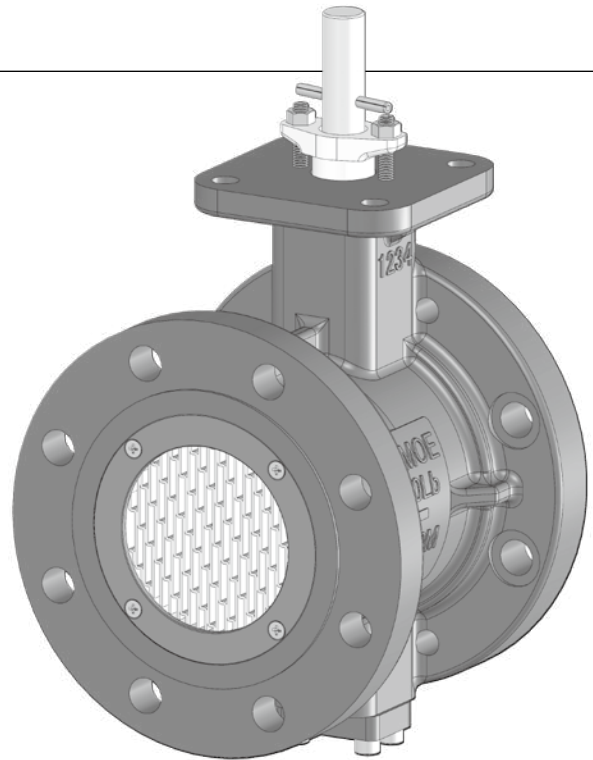
Long bolts and nuts (full thread)



Setting bolts (Hexagon bolts)

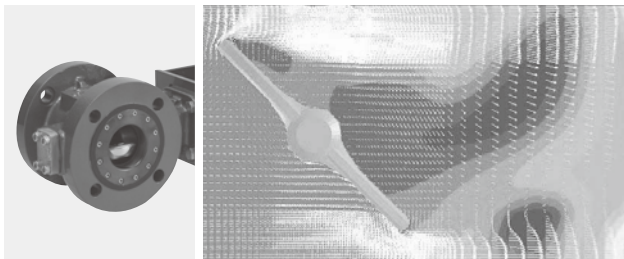


# DTM



## General Description

The Ultimate Rotary Control DTM provides high accurate control under most critical process conditions including higher pressure drop liquid/gas applications. DTM series valves can be supplied with or without integrated cavitation breaker in order to reduce noise level by max. 30 dB. Valves in this series also exhibit higher anti-cavitation capability.

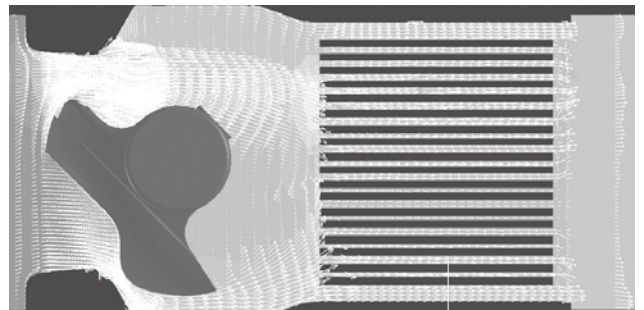
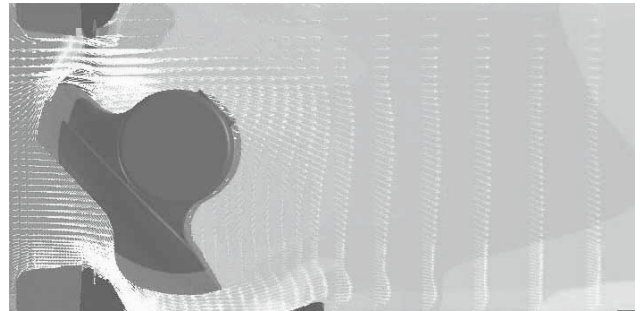


### Conventional Butterfly Valve

Local static pressure drop and quick pressure recovery causes cavitation



## DTM Series



### Cavitation breaker

(Note) Colors show the pressure distribution. Red means a high pressure and blue means a low pressure.



## Features and Benefits

The ultimate rotary control DTM valve provides accurate control and low noise levels, even at high velocities.

### Wide rangeability, 125:1

Improves flow control with a wide range of control from closed to fully open.

### Noise reduction by 20dB or more

Features the latest anti-cavitation technology pioneered by TOMOE that delivers superior control and low turbulence in the line. As a result, there is a 20dB reduction in flow induced valve noise and associated damage to piping and equipment compared to conventional valves.

### Can handle high differential pressure

Capable of handling extremely high differential pressure with control in the opening range of 0 – 30% and differential pressures greater than 2MPa.

### High performance seat structure

Excellent durability and high performance characteristics achieved with metal seat design. Seat leakage of Class V and Rate A for a soft seal.

### Ease of maintenance

Designed for easy maintenance – for example, seat and cavitation breaker can be replaced simply and quickly.

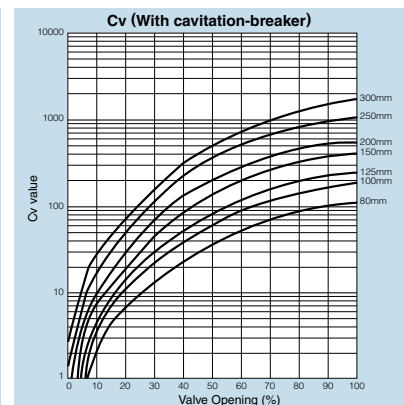
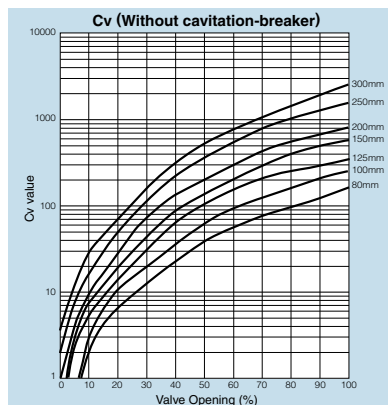
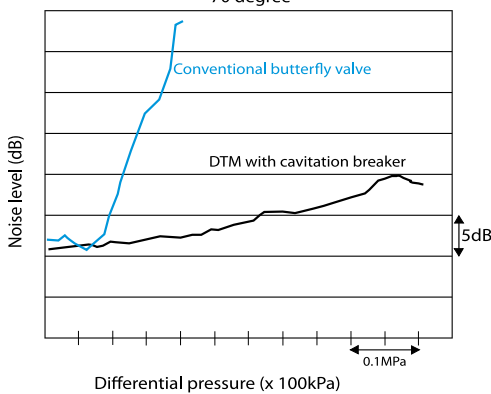
### High performance diaphragm actuator

A new high performance diaphragm pneumatic actuator that is compact, highly accurate and has proven long life in the field has been designed to manage the DTM valve actuation process with optimum efficiency.

### Optional RPTFE seat

The DTM is also available with an RPTFE seat which provides zero leakage to ISO 5208 Rate A.

Noise comparison in valve opening  
70 degree



### Standard Specifications

Valve type	Rotary control butterfly valve (with low noise characteristics)		
Valve nominal size	80, 100, 125, 150, 200, 250, 300mm		
Pressure rating	ASME B 16.5 Class 150, 300		
Flange accommodation	JIS10, 16, 20, 30K, ASME B 16.5 CLASS 150, 300		
Body Style	Double flanged		
Face-to-face dimensions	IEC 60534-3-2 (JIS B 2005-3-2)		
Flow characteristics	Equal percent, CV linear (option)		
Rangeability	With cavitation breaker 100:1 Without cavitation breaker 125:1		
Flow direction	Flow to retainer side		
Max. working pressure / Closed	Class 150 : 2MPa / Class 300 : 5.1MPa		
Max. differential pressure / Open by 30%	Class 150 : 0.8MPa / Class 300 : 2MPa		
Seat leakage	ASME B 16.104 / FCI 70 - 2 Class V	ISO 5208 Rate A (Zero leakage)	
Temperature range	-29 to 400 degrees C	-10 to 230 degrees C	
Standard materials	Body	WCB or CF8M	
	Disc	CF8M	
	Stem	Stainless steel 630	
	Seat ring	Stainless steel 316	RPTFE
	Grand packing	Graphite	
Applicable gaskets	-Seat gasket Any standard seat gasket is applicable. -Spiral gasket ASME flange: Standard spiral gasket with inner & outer lings is applicable. JIS flange: Tomoe original spiral gasket is applicable.		
Actuator	Manual gear, diaphragm actuator, pneumatic cylinder, motorised		

\*It is possible that seat leakage occur when fluid (e.g. powder and/or liquid) is solidified by working temperature and other cause. Consult us.  
Please note that use with vertical line such as bottom area of discharge spout of hopper, and tank.

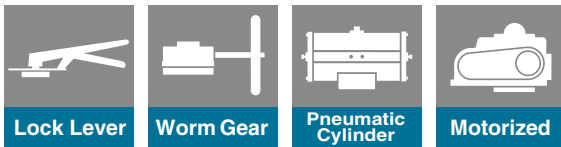
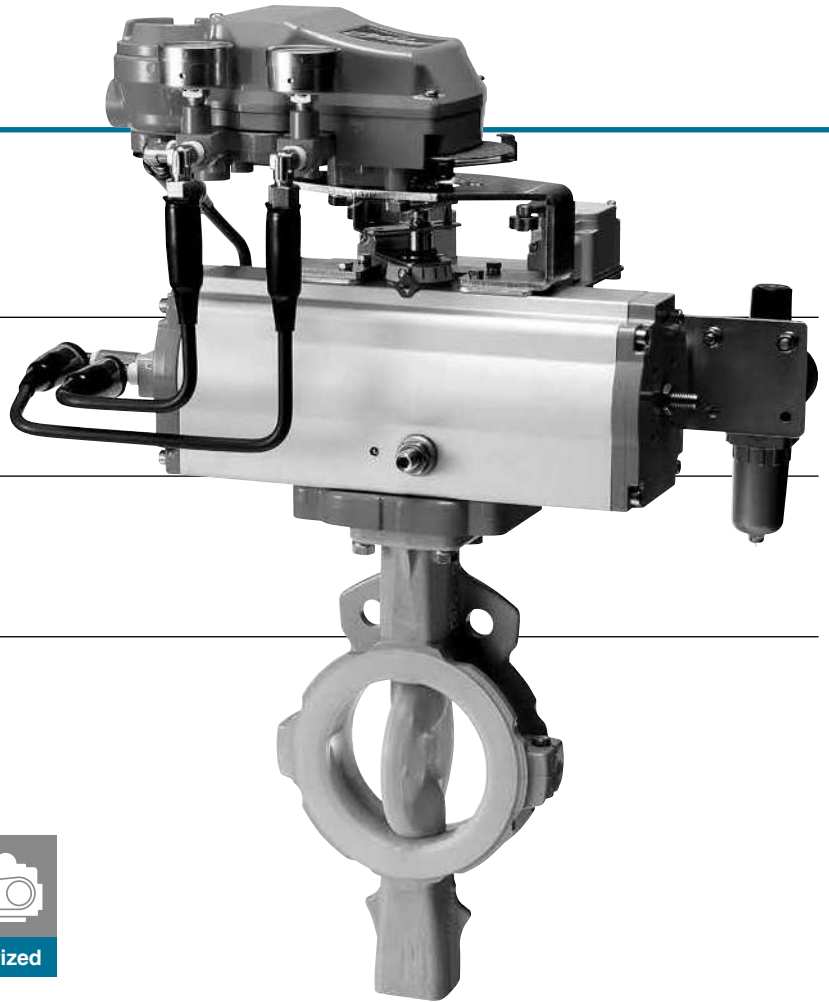
\*Flange outer diameter and thickness may differ from standard dimensions.

## Chemically Resistant Butterfly Valves

# 846T Wafer

# 847T Wafer

# 847Q Lugged



### Features and Benefits

New design features of the TOMOE 847 series result in vastly improved sealing performance in applications where conditions are potentially hazardous.

#### High tension coil spring

(250, 300mm: coned disc spring)  
Ensures a stable seal at both the upper and lower gland even at extreme temperatures or when thermal shock occurs.

#### Minimum 3mm PFA thickness

(250, 300mm: PTFE)  
Seamfree PFA injection moulding (PTFE compression moulding) on the seat and disc to a minimum thickness of 3mm prevents permeation of dangerous fluids or gases.

#### No special gasket needed

Stable flange sealing performance is ensured by concentric circular grooves on the flange faces thereby eliminating the need for a special gasket when operating under specified temperatures.  
The wider sealing area also ensures minimum "creep" at high temperatures.  
Flange sealing mechanism is independent of the seating and gland seals which ensures there is no loss of line fluid.  
Soft gaskets can be used when fitting the valve in the pipeline.

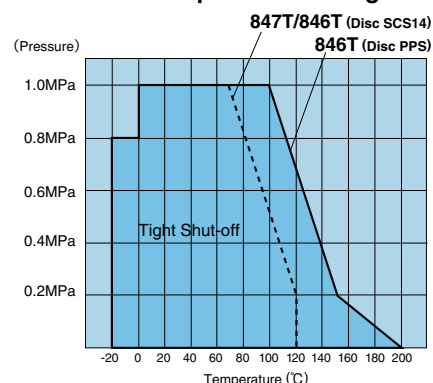
#### Total sealing

Valve structure includes primary, secondary and independent tertiary seal, ie. gland packing. There is also a fourth seal of O-rings on the top/bottom stems, ie. dust seal.

#### Lining

(50~200mm: PFA, 250~300mm: PTFE)  
Seamless construction of the valve lining of the 847 Series ensures complete stability in all conditions.  
Design and construction of conventional valves often means permeation of fluids or gases, particularly at high temperatures. By employing an injection moulding method and utilising the properties of PFA, PTFE at a minimum thickness of 3mm, the 847 Series is able to eliminate faults common to PTFE-lined valves of conventional design.

#### Pressure-Temperature Leakage Chart



## General Description

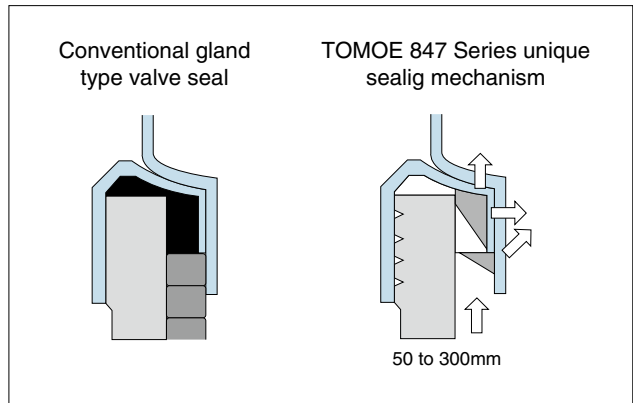
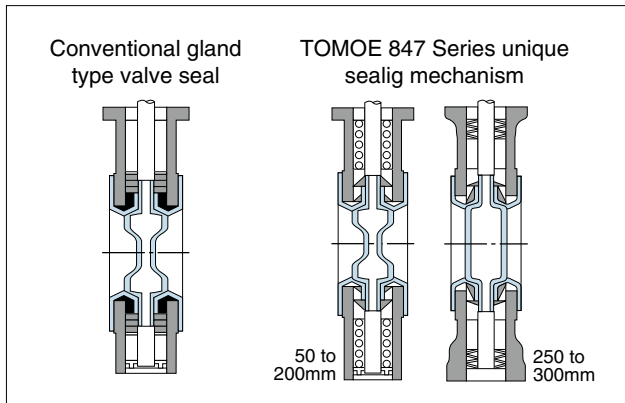
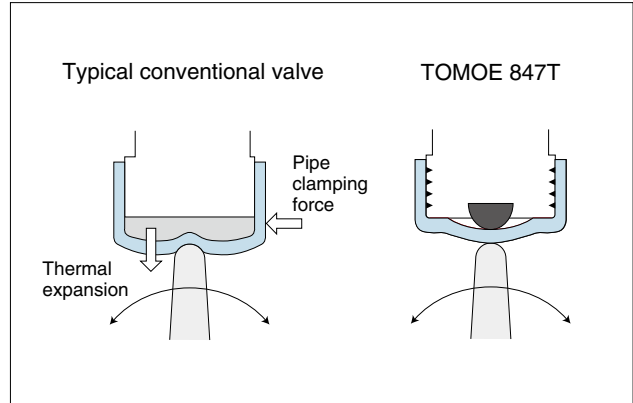
Chemically resistant butterfly valves. The unique construction of the TOMOE 847 Series provides superior strength and sealing properties essential in applications where conditions are potentially hazardous.

### Sealing Properties

The upper and lower stem housings of the 847 Series valve have the same length high tension coil springs which provide stable sealing performance in cases of temperature change. Conventional valves usually employ a shorter spring in the lower stem housing. This can lead to a loading imbalance on the seat making it difficult to maintain consistent sealing performance.

The sealing design features a triple acting sealing mechanism controlled by the balanced spring forces. (250, 300mm: Coned disc springs).

In addition, stem seal leakage caused by excessive pipe flange damping forces is eliminated because the stem seal arrangement and the pipe flange seal are totally independent.



### Standard Specifications

Type	846T	847T	
Valve nominal size	65 to 300mm (8 sizes)	50 to 300mm (9 sizes)	
Flange accommodation	JIS 5K/10K, ASME Class 125/150, ISO 7005-1 PN 6/10/16, BS10 Table E, DIN 2632 PN 6/10/16, BS 4504 PN 6/10/16		
Face-to-face dimensions	JIS B 2002 46 series/ ISO 5752 wafer butterfly valves (short)		
Max. working pressure ※1	1.0 MPa		
Body shell test	1.5MPa(hydraulic)	JIS 5K: 0.75MPa(hydraulic)	
Seat leak test	1.1MPa(pneumatic)	JIS 5K: 0.55MPa(pneumatic)	
Working temperature range ※1	PPS disc: -20 to 120 degrees C Stainless disc: -20 to 200 degrees C	-20 to 200 degrees C	
Working temperature in continuous use ※1 ※2	PPS disc: 0 to 80 degrees C Stainless disc: 0 to 150 degrees C	0 to 150 degrees C	
Standard materials	Body	Ductile iron, FCD-S (A395)	
	Disc	SCS14, PPS (65 to 200mm)	50 to 200mm: SCS13(CF8) with PFA lining 250, 300mm: SCS 13 (CF8) with PTFE lining
	Stem	SUS329J1	SUS420J2 with PFA/PTFE lining ※3
	Seat ring	65 to 200mm: PFA / 250, 300mm: PTFE (Backup rubber: Fluorocarbon rubber)	50 to 200mm: PFA/250, 300mm: PTFE (Backup rubber: Fluorocarbon rubber)
Top flange	ISO5211/1		
Coating	Up to 200mm : Epoxy resin coating (Munsell N7) 250 and 300mm : Polyester powder baking finish (Munsell N7)		

※ Export license by Japanese Ministry is required 847T for all sizes and 846T up to 100mm. Please consult us the detail.

※1 Refert to "846T/847T Pressure-temperature rating" for detail.

※2 "Woking temperature in continuous use" stands for the temperature continuously kept exceeding one hour.

※3 Sealing part is covered with PFA lining(200mm and under) or PTFE lining(250mm and 300mm).



## 846T/847T Parts list

### ■ 846T/847T Parts list (846T: 65 to 200mm, 847T: 50 to 200mm)

No.	Description	Q'ty	Remarks
1	Body	1	
★	2	1	See Remark 2.
★	3	1	See Remark 2.
★	4	1	See Remark 2.
☆★	5	1	See Remark 2.
☆★	6	1	See Remark 2.
7	Bearing	1	50mm
		2	65mm to 200mm
8	Secondary ring	1	50mm
		2	65mm to 200mm
9	Spring	1	50mm
		2	65mm to 200mm
☆★ 10	Gland packing	1	50mm
		2	65mm to 200mm
11	Dust seal	1	50mm
		2	65mm to 200mm
12	Retaining spring	1	
13	Bottom cover	1	65mm to 200mm
14	Plate	4	Attached on seat ring
16	C- ring	1	50mm
		2	65mm to 200mm
☆★ 17	O-ring	1	50mm
		2	65mm to 200mm
☆★ 18	O-ring	1	
		2	50mm to 150mm
19	Hexagon hole bolt	4	200mm
		1	50mm
20	Bearing	2	65mm to 200mm

### ■ 846T / 847T Parts list (250mm, 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
★	2	1	See Remark 3.
3	Upper stem	1	
4	Lower stem	1	
☆★	5	1	
☆★	6	1	
7	Bearing	2	
8	Secondary ring	2	
9	Spring	8	
☆★ 10	Gland packing	2	
11	Dust seal	1	
12	Bearing	2	
13	Bottom cover	1	
14	Plate	4	Attached on seat ring
16	C-ring	2	
☆★ 17	O-ring	2	
☆★ 18	O-ring	1	
19	Hexagon hole bolt	2	250mm
		4	300mm
20	Bearing	2	
21	Bearing	2	

Remark 1: The ☆ indicates recommended spare parts for 846T. The ★ indicates recommended spare parts for 847T. They are supplied as "Seat ring set".

Remark 2: Item number 5 (seating) and 6 (Back-up rubber) are supplied as a set. For 847T type, item number 2 (disc), 3 (upper stem) and 4 (lower stem) are supplied as an assembled unit.

Remark 3: Item number 5 (seating) and 6 (Back-up rubber) are supplied as a set. For 847T type, item number 2 (disc) is supplied as an assembled unit.

# 846T/847T (Wafer)/847Q (Lugged)

## 847T Actuator selection chart

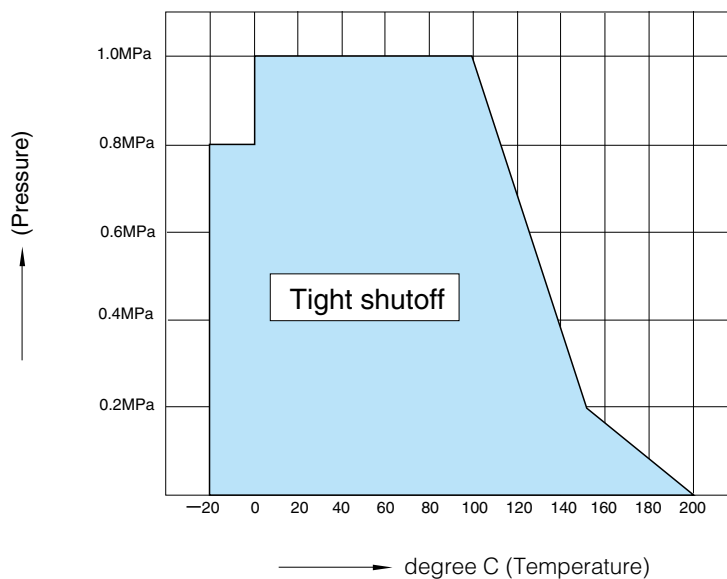
### 847T

Model	Category	Size ( $\frac{mm}{inch}$ )								
		50	65	80	100	125	150	200	250	300
		2	2 1/2	3	4	5	6	8	10	12
1T	Standard	1T-1		1T-2	1T-3					
	Heavy duty	1T-1		1T-2	1T-3					
2U	Standard	2U-1		2U-2		2U-3		2U-4		
	Heavy duty	2U-1		2U-2		2U-3		2U-4		
7E, 3A	Standard	T85		T200		T380		T750		TGA-125
	Heavy duty	T85		T200		T380		T750		TGA-125
7G,7F 3U,3K	Standard	T200S		T380S		T750S		TG-10S		TG-12S TG-14S
	Heavy duty	T200S		T380S		T750S		TG-10S		TG-12S TG-14S
4 I	Standard	4 I-0		4 I-1		4 I-2		4 I-2.5		4 I-3
	Heavy duty	4 I-0		4 I-1		4 I-2		4 I-2.5		4 I-3
4J	Standard	SRJ-010			SRJ-020		SRJ-060			
	Heavy duty	SRJ-010			SRJ-020		SRJ-060			

<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Working temperature is over 60 degrees C ② Powder or high viscosity fluids (consult us) ③ Velocity more than 3 m/s ④ Throttling ⑤ Slow travelling time of valve: more than 30 sec. ⑥ Dead end, pump outlet, emergency open

## 846T/847T Pressure-temperature rating

### 846T/847T (SCS14)



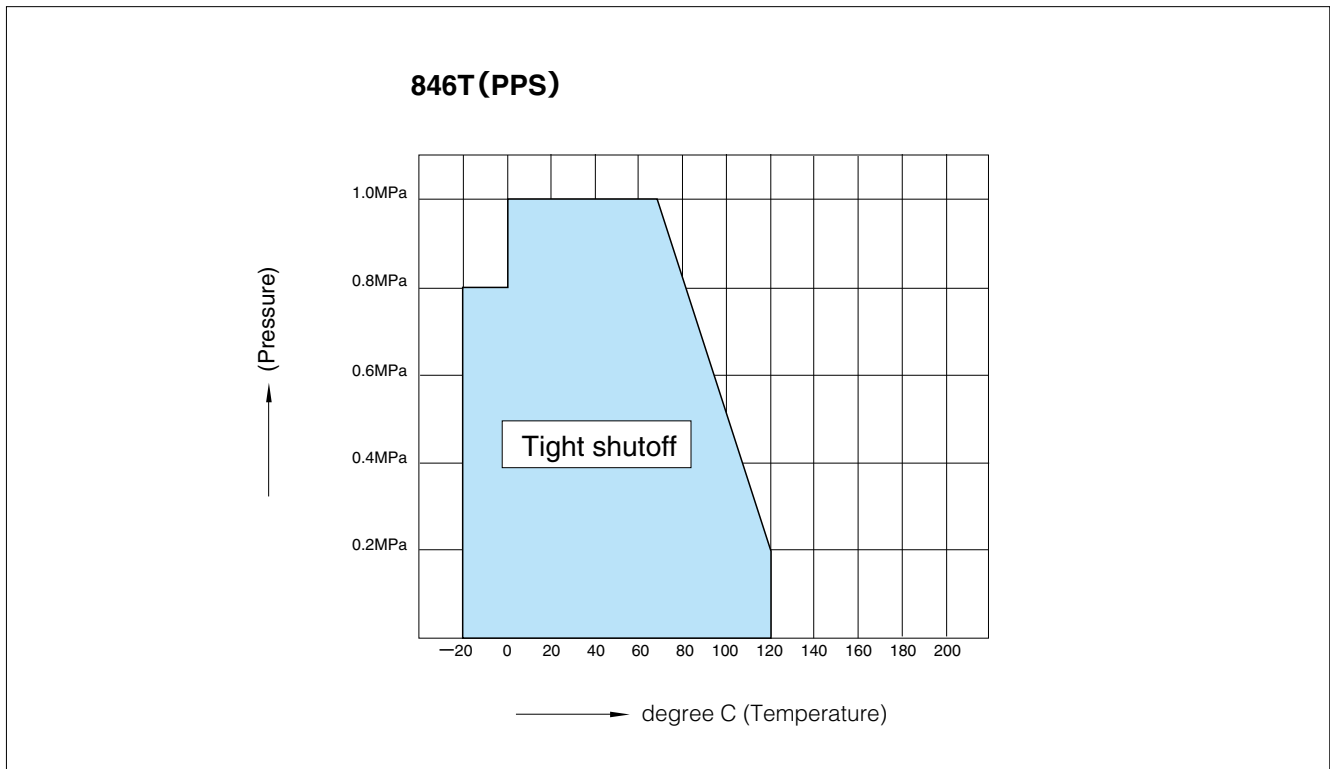
## 846T Actuator selection chart

### 846T

Model	Category	Size ( $\frac{mm}{inch}$ )							
		65	80	100	125	150	200	250	300
		2 1/2	3	4	5	6	8	10	12
1T	Standard	1T-1		1T-2	1T-3				
	Heavy duty								
2U	Standard	2U-1		2U-2		2U-3		2U-4	
	Heavy duty								
7E	Standard	T85		T200		T380		T750	
	Heavy duty							TGA-125	
7G, 7F 3U, 3K	Standard	T200S		T380S		T750S		TG-12S	
	Heavy duty							TG-10S TG-14S	
4I	Standard	4I-0		4I-1		4I-2		4I-2.5	
	Heavy duty							4I-3	
4J	Standard	SRJ-010			SRJ-020		SRJ-060		
	Heavy duty								

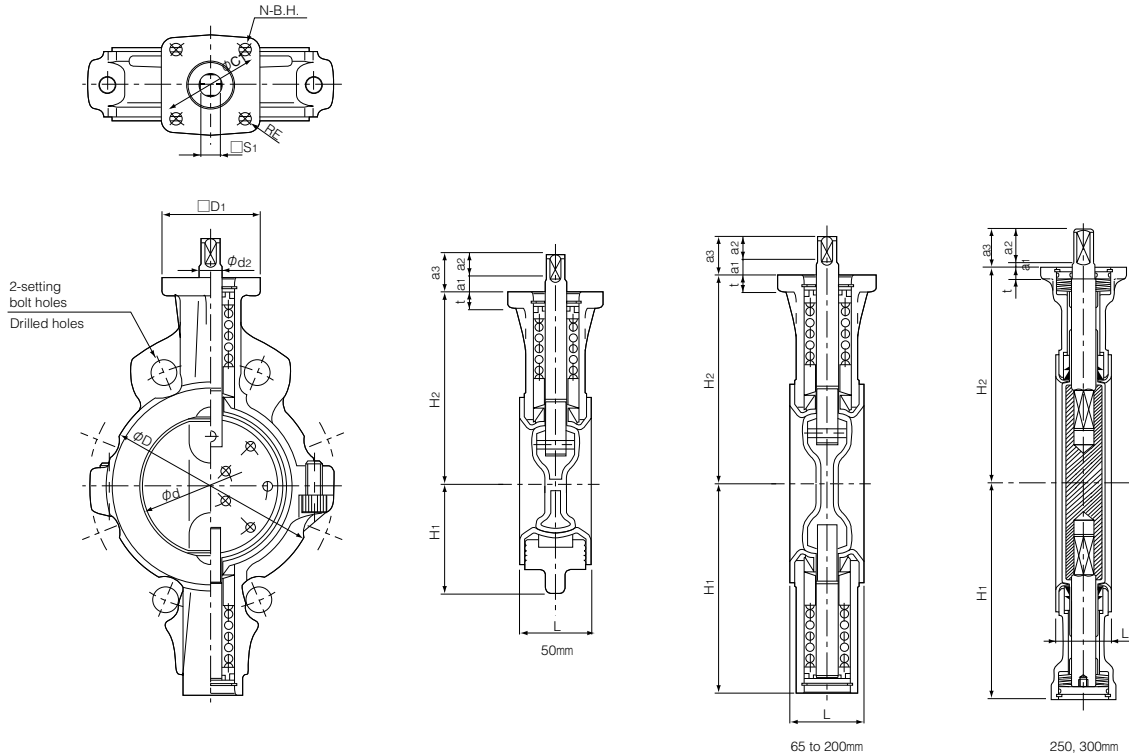
<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Working temperature is over 60 degrees C ② Powder or high viscosity fluids (consult us) ③ Velocity more than 3 m/s ④ Throttling ⑤ Slow travelling time of valve: more than 30 sec. ⑥ Dead end, pump outlet, emergency open

## 846T Pressure-temperature rating



# 846T/847T (Wafer)/847Q (Lugged)

## 847T Wafer type

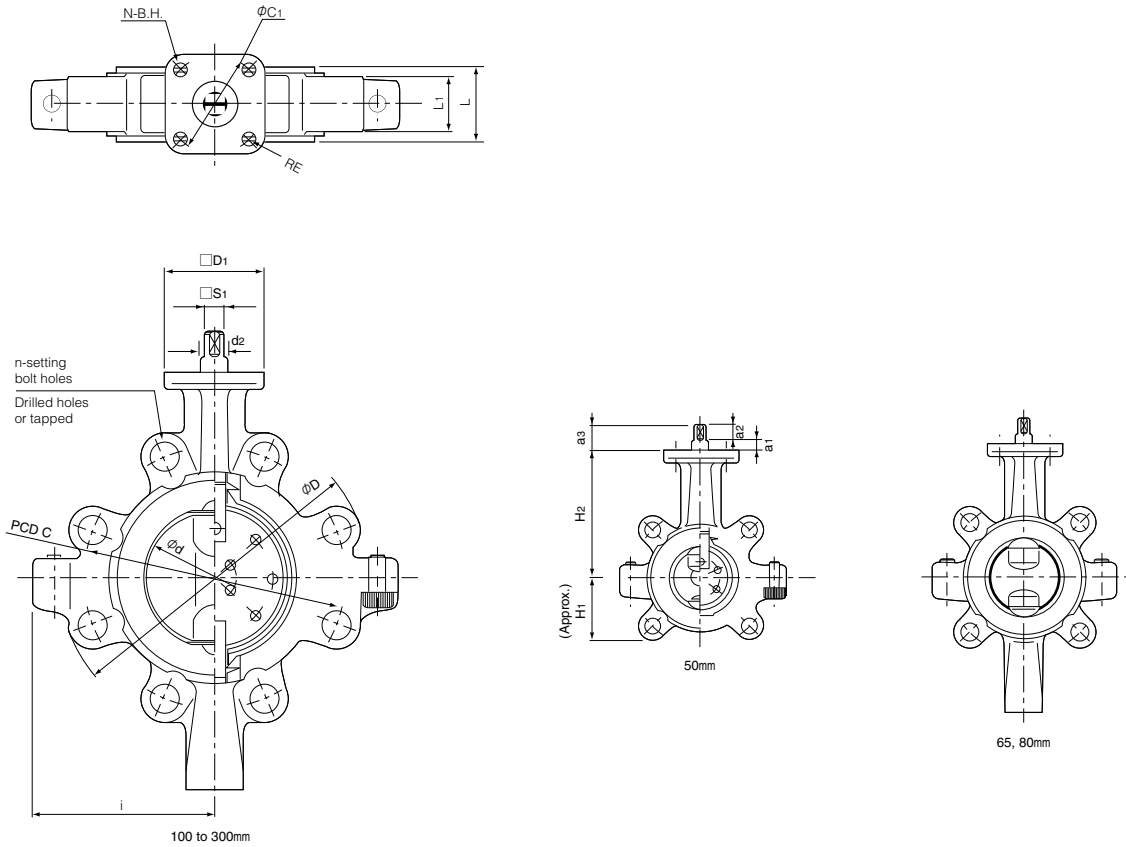


### ■ Dimensions

Nominal size		Dimension (mm)																Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	$H_1$	$H_2$	$d_2$	$a_1$	$a_2$	$a_3$	$S_1$	$D_1$	t	RE	$\phi C_1$	N	B.H.	
50	2	53.4	96	43	62	118.5	14	11	12	23	12	70	12	10	70	4	9	2.2
65	2 1/2	67	115	46	125	125	14	11	12	23	12	70	12	10	70	4	9	3.3
80	3	82	131	46	132.5	132.5	14	11	12	23	12	70	12	10	70	4	9	3.6
100	4	102	152	52	148	148	16	11	17	28	14	70	12	10	70	4	9	5
125	5	127.6	190	56	171	171	18	11	17	28	14	102	14	23.5	102	4	11	8.5
150	6	151.6	217	56	183	183	18	11	17	28	14	102	14	23.5	102	4	11	10.1
200	8	197	266	60	220	220	22	10	21	31	18	102	14	23.5	102	4	11	14.6
250	10	247.5	320	68	260	260	28	5	30	35	24	102	14	24	102	4	11	28
300	12	296.4	374	78	297	297	30	5	30	35	24	125	16	32	125	4	13	38



## 847Q Lugged type



### ■ Dimensions

Nominal size		Dimension (mm)																		Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	$L_1$	$H_1$	$H_2$	i	$d_2$	$a_1$	$a_2$	$a_3$	$S_1$	$D_1$	t	RE	$\phi C_1$	N	B.H.	
50	2	150.6	53.4	43	32	58	118.5	80	14	11	12	23	12	70	12	10	70	4	9	3.3
65	2 1/2	175	67	46	34	125	125	86	14	11	12	23	12	70	12	10	70	4	9	4.4
80	3	184	82	46	34	132.5	132.5	90	14	11	12	23	12	70	12	10	70	4	9	4.7
100	4	223	102	52	40	148	148	130	16	11	17	28	14	70	12	10	70	4	9	8.6
125	5	252	127.6	56	43	171	171	150	18	11	17	28	14	102	14	23.5	102	4	11	12.6
150	6	276	151.6	56	44	183	183	163	18	11	17	28	14	102	14	23.5	102	4	11	13.3
200	8	331	197	60	50	220	220	180	22	10	21	31	18	102	14	23.5	102	4	11	21.3
250	10	406	247.5	68	52	260	260	242	28	5	30	35	24	102	14	24	102	4	11	32.8
300	12	483	296.4	78	66	297	297	278	30	5	30	35	24	125	16	32	125	4	13	47.1

# 846T/847T (Wafer)/847Q (Lugged)

Lock lever type 847T-1T(50mm to 150mm) / 846T-1T(65mm to 150mm)

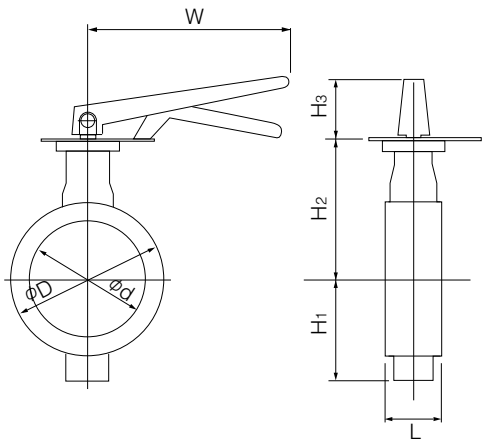
## 847T-1T

Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
50	2	53.4	96	43	62	118.5	66	200	1T-1	2.8
65	2 1/2	67	115	46	125	125	66	200	1T-1	3.9
80	3	82	131	46	132.5	132.5	66	200	1T-1	4.2
100	4	102	152	52	148	148	92	300	1T-2	6.3
125	5	127.6	190	56	171	171	97	350	1T-3	10.2
150	6	151.6	217	56	183	183	97	350	1T-3	11.8

## 846T-1T

Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
65	2 1/2	67	115	46	125	125	66	200	1T-1	3.9
80	3	82	131	46	132.5	132.5	66	200	1T-1	4.3
100	4	102	152	52	148	148	92	300	1T-2	6.4
125	5	127.6	190	56	171	171	97	350	1T-3	10.2
150	6	151.6	217	56	183	183	97	350	1T-3	11.8

## 846T/847T-1T



**Worm gear type 847T-2U(50mm to 300mm) / 846T-2U(65mm to 300mm)**

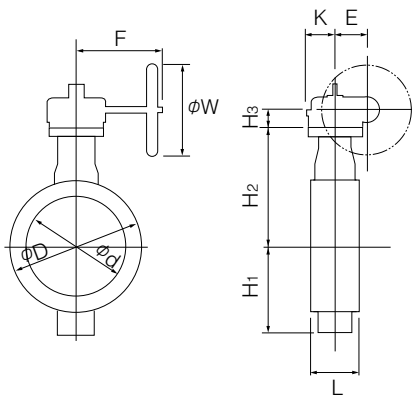
**847T-2U**

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
50	2	53.4	96	43	62	118.5	29.5	36	46	160	100	2U-1	4.5
65	2 1/2	67	115	46	125	125	29.5	36	46	160	100	2U-1	5.6
80	3	82	131	46	132.5	132.5	29.5	36	46	160	100	2U-1	5.9
100	4	102	152	52	148	148	34.5	44	53	173.5	160	2U-2	9.2
125	5	127.6	190	56	171	171	34.5	44	53	173.5	160	2U-2	12.7
150	6	151.6	217	56	183	183	34.5	44	53	173.5	160	2U-2	14.3
200	8	197	266	60	220	220	41.5	67	75	198	200	2U-3	22.2
250	10	247.5	320	68	260	260	41.5	67	75	198	200	2U-3	36
300	12	296.4	374	78	297	297	48	87.5	90	222.5	200	2U-4	52

**846T-2U**

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
65	2 1/2	67	115	46	125	125	29.5	36	46	160	100	2U-1	5.6
80	3	82	131	46	132.5	132.5	29.5	36	46	160	100	2U-1	6
100	4	102	152	52	148	148	34.5	44	53	173.5	160	2U-2	9.3
125	5	127.6	190	56	171	171	34.5	44	53	173.5	160	2U-2	12.7
150	6	151.6	217	56	183	183	34.5	44	53	173.5	160	2U-2	14.3
200	8	197	266	60	220	220	41.5	67	75	198	200	2U-3	21.9
250	10	247.5	320	68	260	260	41.5	67	75	198	200	2U-3	36
300	12	296.4	374	78	297	297	48	87.5	90	222.5	200	2U-4	52

**846T/847T-2U**



**2U Installation direction**

2UA (standard)	2UAR	2UB	2UBR

# 846T/847T (Wafer)/847Q (Lugged)

## Double-acting pneumatic cylinder type 847T-7E (50mm to 300mm)

### 847T-7E Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	53.4	96	43	62	118.5	168	276	142	75	47	T85	8
65	2 1/2	67	115	46	125	125	168	276	142	75	47	T85	9
80	3	82	131	46	132.5	132.5	168	276	142	75	47	T85	9
100	4	102	152	52	148	148	203	346	176	79	57	T200	14
125	5	127.6	190	56	171	171	203	346	176	79	57	T200	17
150	6	151.6	217	56	183	183	203	346	176	79	57	T200	19
200	8	197	266	60	220	220	231	423	214	91	69	T380	30
250	10	247.5	320	68	260	260	269	546	270	118	85	T750	52
300	12	296.4	374	78	297	297	269	546	270	118	85	T750	62

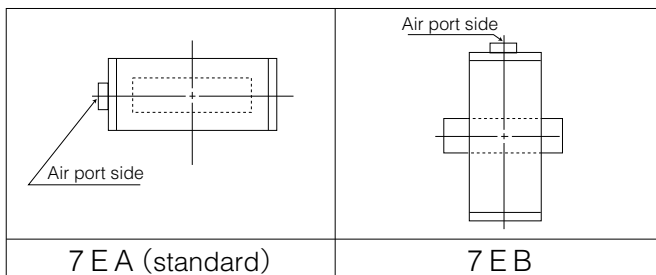
### 847T-7E, 3A Heavy duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	53.4	96	43	62	118.5	168	276	142	75	47	T85	8
65	2 1/2	67	115	46	125	125	168	276	142	75	47	T85	9
80	3	82	131	46	132.5	132.5	168	276	142	75	47	T85	9
100	4	102	152	52	148	148	203	346	176	79	57	T200	14
125	5	127.6	190	56	171	171	203	346	176	79	57	T200	17
150	6	151.6	217	56	183	183	231	423	214	91	69	T380	25
200	8	197	266	60	220	220	231	423	214	91	69	T380	30
250	10	247.5	320	68	260	260	269	546	270	118	85	T750	52
300	12	296.4	374	78	297	297	269	754	373	167	100	TGA-125	81

### 847T-7E, 3A High Temperature Specification (For fluids over 100 degrees C)

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	53.4	96	43	62	118.5	243	276	142	75	47	T85	8
65	2 1/2	67	115	46	125	125	243	276	142	75	47	T85	9
80	3	82	131	46	132.5	132.5	243	276	142	75	47	T85	9
100	4	102	152	52	148	148	278	346	176	79	57	T200	14
125	5	127.6	190	56	171	171	278	346	176	79	57	T200	17
150	6	151.6	217	56	183	183	306	423	214	91	69	T380	25
200	8	197	266	60	220	220	331	423	214	91	69	T380	30
250	10	247.5	320	68	260	260	369	546	270	118	85	T750	52
300	12	296.4	374	78	297	297	359	754	373	167	100	TGA-125	81

### 7E,3A Installation direction



Selection criteria	Standard	Select when none of the following heavy duty items apply.
		Heavy duty

## Double-acting pneumatic cylinder type 846T-7E / 3A (65mm to 300mm)

### ■846T-7E Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
65	2 1/2	67	115	46	125	125	168	276	142	75	47	T85	9
80	3	82	131	46	132.5	132.5	168	276	142	75	47	T85	9
100	4	102	152	52	148	148	203	346	176	79	57	T200	14
125	5	127.6	190	56	171	171	203	346	176	79	57	T200	17
150	6	151.6	217	56	183	183	203	346	176	79	57	T200	19
200	8	197	266	60	220	220	231	423	214	91	69	T380	29
250	10	247.5	320	68	260	260	269	546	270	118	85	T750	52
300	12	296.4	374	78	297	297	269	546	270	118	85	T750	62

### ■846T-7E/3A Heavy duty

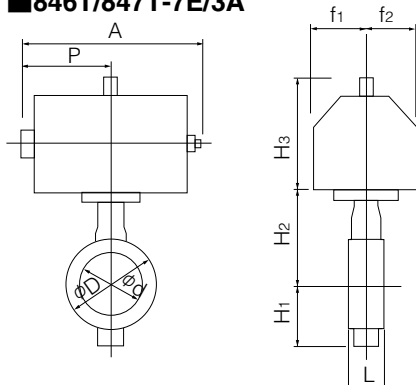
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
65	2 1/2	67	115	46	125	125	168	276	142	75	47	T85	9
80	3	82	131	46	132.5	132.5	168	276	142	75	47	T85	9
100	4	102	152	52	148	148	203	346	176	79	57	T200	14
125	5	127.6	190	56	171	171	203	346	176	79	57	T200	17
150	6	151.6	217	56	183	183	231	423	214	91	69	T380	23
200	8	197	266	60	220	220	231	423	214	91	69	T380	29
250	10	247.5	320	68	260	260	269	546	270	118	85	T750	52
300	12	296.4	374	78	297	297	359	754	373	167	100	TGA-125	81

### ■846T-7E/3A High Temperature Specification (For fluids over 100 degrees C)

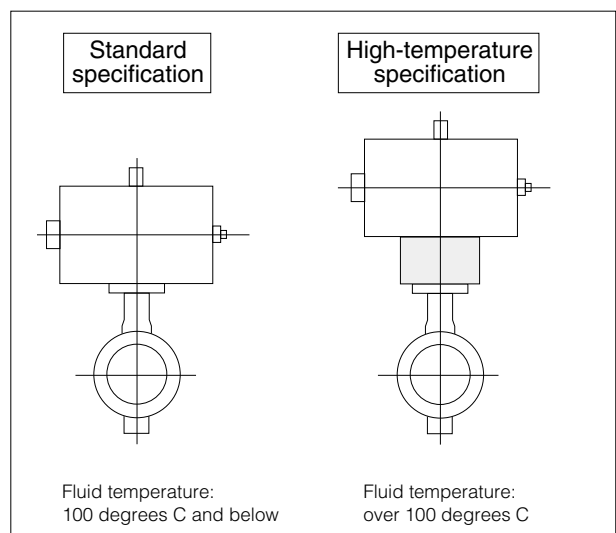
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
65	2 1/2	67	115	46	125	125	243	276	142	75	47	T85	9
80	3	82	131	46	132.5	132.5	243	276	142	75	47	T85	9
100	4	102	152	52	148	148	278	346	176	79	57	T200	14
125	5	127.6	190	56	171	171	278	346	176	79	57	T200	17
150	6	151.6	217	56	183	183	306	423	214	81	69	T380	23
200	8	197	266	60	220	220	331	423	214	81	69	T380	29
250	10	247.5	320	68	260	260	369	546	270	118	85	T750	52
300	12	296.4	374	78	297	297	369	754	373	167	100	TGA-125	81

<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Working temperature is over 60 degrees C ② Powder or high viscosity fluids (consult us) ③ Velocity more than 3 m/s ④ Throttling ⑤ Slow travelling time of valve: more than 30 sec. ⑥ Dead end, pump outlet, emergency open

### ■846T/847T-7E/3A



### ■Caution for actuator mounting



# 846T/847T (Wafer)/847Q (Lugged)

Single-acting pneumatic cylinder type 847T-7G (Air to open: 50mm to 200mm) / 847T-7F (Air to close: 50mm to 200mm)

## ■847T-7G/7F Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	53.4	96	43	62	118.5	203	449	226	79	57	T200S	13
65	2 1/2	67	115	46	125	125	203	449	226	79	57	T200S	14
80	3	82	131	46	132.5	132.5	203	449	226	79	57	T200S	15
100	4	102	152	52	148	148	231	550	276	91	69	T380S	24
125	5	127.6	190	56	171	171	231	550	276	91	69	T380S	28
150	6	151.6	217	56	183	183	269	723	360	118	85	T750S	43
200	8	197	266	60	220	220	269	723	360	118	85	T750S	47

## ■847T-7G/7F Heavy duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	53.4	96	43	62	118.5	203	449	226	79	57	T200S	13
65	2 1/2	67	115	46	125	125	203	449	226	79	57	T200S	14
80	3	82	131	46	132.5	132.5	231	550	276	91	69	T380S	23
100	4	102	152	52	148	148	231	550	276	91	69	T380S	24
125	5	127.6	190	56	171	171	269	723	360	118	85	T750S	41
150	6	151.6	217	56	183	183	269	723	360	118	85	T750S	43

## ■847T-7G/7F High Temperature Specification (For fluids over 100 degrees C)

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	53.4	96	43	62	118.5	278	449	226	79	57	T200S	13
65	2 1/2	67	115	46	125	125	278	449	226	79	57	T200S	16
80	3	82	131	46	132.5	132.5	306	550	276	91	69	T380S	24
100	4	102	152	52	148	148	306	550	276	91	69	T380S	26
125	5	127.6	190	56	171	171	344	723	360	118	85	T750S	45
150	6	151.6	217	56	183	183	344	723	360	118	85	T750S	46

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Working temperature is over 60 degrees C ② Powder or high viscosity fluids (consult us) ③ Velocity more than 3 m/s ④ Throttling ⑤ Slow travelling time of valve: more than 30 sec. ⑥ Dead end, pump outlet, emergency open

Single-acting Pneumatic Cylinder Type 846T-7G (Air to open: 65mm to 200mm) / 846T-7F (Air to close: 65mm to 200mm)

■846T-7G/7F Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
65	2 1/2	67	115	46	125	125	203	449	226	79	57	T200S	14
80	3	82	131	46	132.5	132.5	203	449	226	79	57	T200S	15
100	4	102	152	52	148	148	231	550	276	91	69	T380S	24
125	5	127.6	190	56	171	171	231	550	276	91	69	T380S	28
150	6	151.6	217	56	183	183	269	723	360	118	85	T750S	43
200	8	197	266	60	220	220	269	723	360	118	85	T750S	47

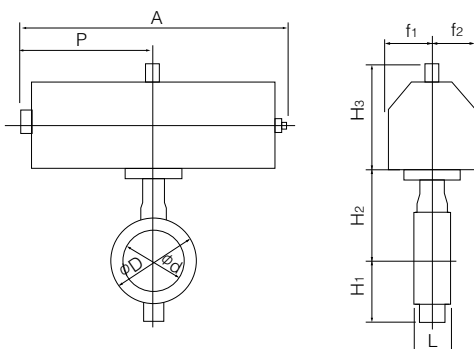
■846T-7G/7F Heavy Duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
65	2 1/2	67	115	46	125	125	203	449	226	79	57	T200S	14
80	3	82	131	46	132.5	132.5	231	550	276	91	69	T380S	23
100	4	102	152	52	148	148	231	550	276	91	69	T380S	24
125	5	127.6	190	56	171	171	269	723	360	118	85	T750S	41
150	6	151.6	217	56	183	183	269	723	360	118	85	T750S	43

■846T-7G/7F High Temperature Specification (SCS14 Disc: For fluids over 100 degrees C)

Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
65	2 1/2	67	115	46	125	125	278	449	226	79	57	T200S	16
80	3	82	131	46	132.5	132.5	306	550	276	91	69	T380S	24
100	4	102	152	52	148	148	306	550	276	91	69	T380S	26
125	5	127.6	190	56	171	171	344	723	360	118	85	T750S	45
150	6	151.6	217	56	183	183	344	723	360	118	85	T750S	46

■846T/847T-7F/7G



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Working temperature is over 60 degrees C ② Powder or high viscosity fluids (consult us) ③ Velocity more than 3 m/s ④ Throttling ⑤ Slow travelling time of valve: more than 30 sec. ⑥ Dead end, pump outlet, emergency open

■7F/7G Installation Direction

7FA/7GA (standard)	7FB/7GB

■Caution for Actuator Mounting

Fluid temperature: 100 degrees C and below	Fluid temperature: over 100 degrees C

# 846T/847T (Wafer)/847Q (Lugged)

Single-acting Pneumatic Cylinder Type 847T-3U (Air to open: 200mm to 300mm) / 847T-3K (Air to close: 200mm to 300mm)  
846T-3U (Air to open: 200mm to 300mm) / 846T-3K (Air to close: 200mm to 300mm)

## ■847T-3U/3K Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	247.5	320	68	260	260	307	1080	720	94	206	TG-12S	123
300	12	296.4	374	78	297	297	307	1080	720	94	206	TG-12S	133

## ■847T-3U/3K Heavy Duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	197	266	60	220	220	307	945	585	70	165	TG-10S	66
250	10	247.5	320	68	260	260	340	1255	865	131	257	TG-14S	219
300	12	296.4	374	78	297	297	340	1255	865	131	257	TG-14S	229

## ■846T-3U/3K Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	247.5	320	68	260	260	307	1080	720	94	206	TG-12S	122
300	12	296.4	374	78	297	297	307	1080	720	94	206	TG-12S	132

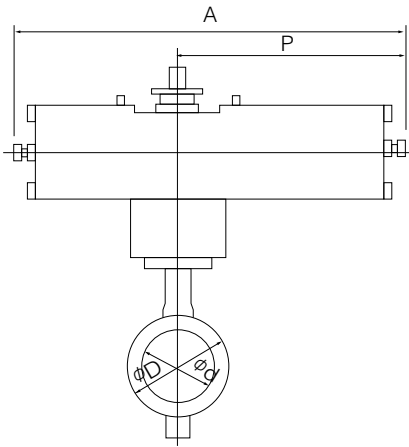
## ■846T-3U/3K Heavy Duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	197	266	60	220	220	307	945	585	70	165	TG-10S	66
250	10	247.5	320	68	260	260	340	1255	865	131	257	TG-14S	218
300	12	296.4	374	78	297	297	340	1255	865	131	257	TG-14S	228

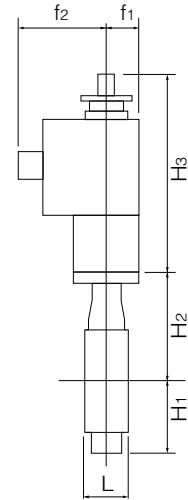
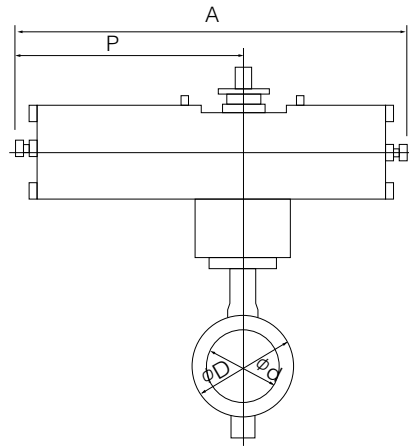
<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ①Working temperature is over 60 degrees C ②Powder or high viscosity fluids (consult us) ③Velocity more than 3 m/s ④Throttling ⑤Slow travelling time of valve: more than 30 sec. ⑥Dead end, pump outlet, emergency open



■846T/847T-3U



■846T/847T-3K



■3U Installation direction

<p>3 U A (standard)</p>	<p>3 U B</p>

■3K Installation direction

<p>3 K A (standard)</p>	<p>3 K B</p>

# 846T/847T (Wafer)/847Q (Lugged)

Single phase electric motor type 847T-4I (50mm to 300mm) / 846T-4I (65mm to 300mm)

## ■847T-4I Standard

Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	53.4	96	43	62	118.5	150	202	100	85	54	4 I-0	6.4
65	2 1/2	67	115	46	125	125	150	202	100	85	54	4 I-0	7.5
80	3	82	131	46	132.5	132.5	165	252	138	126	65	4 I-1	10
100	4	102	152	52	148	148	165	252	138	126	65	4 I-1	11.4
125	5	127.6	190	56	171	171	198	310	167	154	85	4 I-2	20.3
150	6	151.6	217	56	183	183	198	310	167	154	85	4 I-2	22
200	8	197	266	60	220	220	198	310	167	154	85	4 I-2.5	27
250	10	247.5	320	68	260	260	230	388	223	246	136	4 I-3	52
300	12	296.4	374	78	297	297	230	388	223	246	136	4 I-3	62

## ■847T-4I High temperature specification (SCS14 Disc: For fluids over 100 degrees C)

Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	53.4	96	43	62	118.5	225	202	100	85	54	4 I-0	7.5
65	2 1/2	67	115	46	125	125	225	202	100	85	54	4 I-0	8.6
80	3	82	131	46	132.5	132.5	240	252	138	126	65	4 I-1	11.1
100	4	102	152	52	148	148	240	252	138	126	65	4 I-1	12.7
125	5	127.6	190	56	171	171	273	310	167	154	85	4 I-2	21.5
150	6	151.6	217	56	183	183	273	310	167	154	85	4 I-2	23.1
200	8	197	266	60	220	220	273	310	167	154	85	4 I-2.5	29.2
250	10	247.5	320	68	260	260	305	388	223	246	136	4 I-3	54
300	12	296.4	374	78	297	297	305	388	223	246	136	4 I-3	64

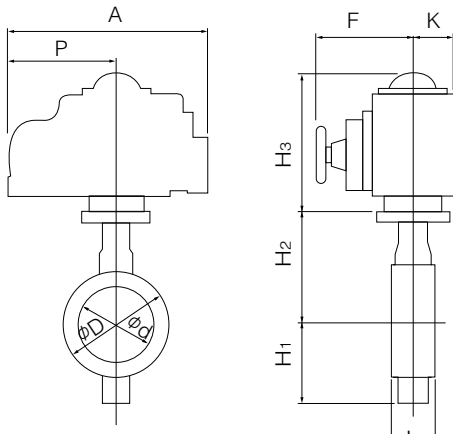
## ■846T-4I Standard

Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
65	2 1/2	67	115	46	125	125	150	202	100	85	54	4 I-0	7.5
80	3	82	131	46	132.5	132.5	165	252	138	126	65	4 I-1	10.1
100	4	102	152	52	148	148	165	252	138	126	65	4 I-1	11.5
125	5	127.6	190	56	171	171	198	310	167	154	85	4 I-2	20.3
150	6	151.6	217	56	183	183	198	310	167	154	85	4 I-2	22
200	8	197	266	60	220	220	198	310	167	154	85	4 I-2.5	27.6
250	10	247.5	320	68	260	260	230	388	223	246	136	4 I-3	52
300	12	296.4	374	78	297	297	230	388	223	246	136	4 I-3	62

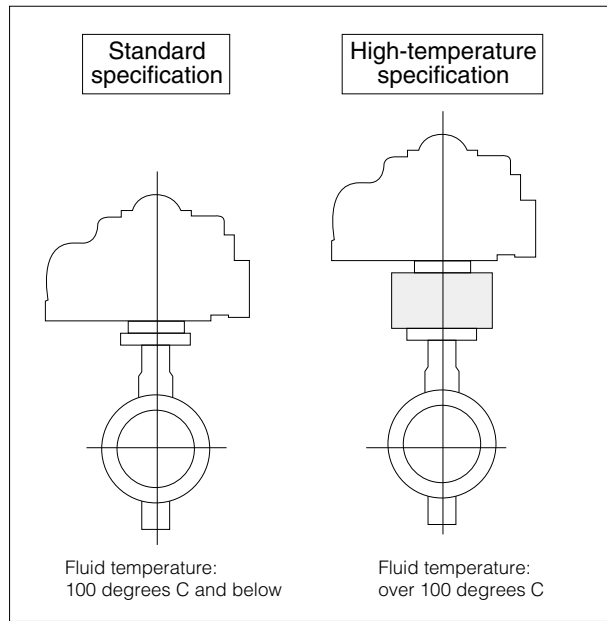
## ■846T-4I High temperature specification (SCS14 Disc: For fluids over 100 degrees C)

Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
65	2 1/2	67	115	46	125	125	225	202	100	85	54	4 I-0	8.6
80	3	82	131	46	132.5	132.5	240	252	138	126	65	4 I-1	11.2
100	4	102	152	52	148	148	240	252	138	126	65	4 I-1	12.8
125	5	127.6	190	56	171	171	273	310	167	154	85	4 I-2	21.5
150	6	151.6	217	56	183	183	273	310	167	154	85	4 I-2	23.1
200	8	197	266	60	220	220	273	310	167	154	85	4 I-2.5	28.9
250	10	247.5	320	68	260	260	305	388	223	246	136	4 I-3	54
300	12	296.4	374	78	297	297	305	388	223	246	136	4 I-3	64

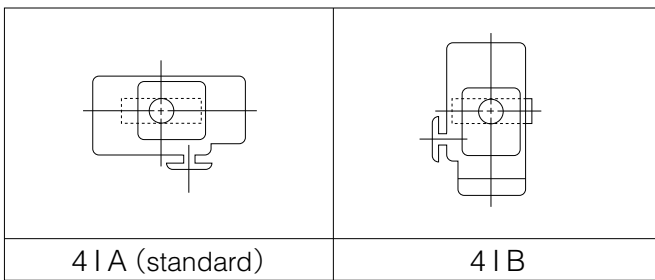
■ 846T/847T-4 I



■ Caution for actuator mounting

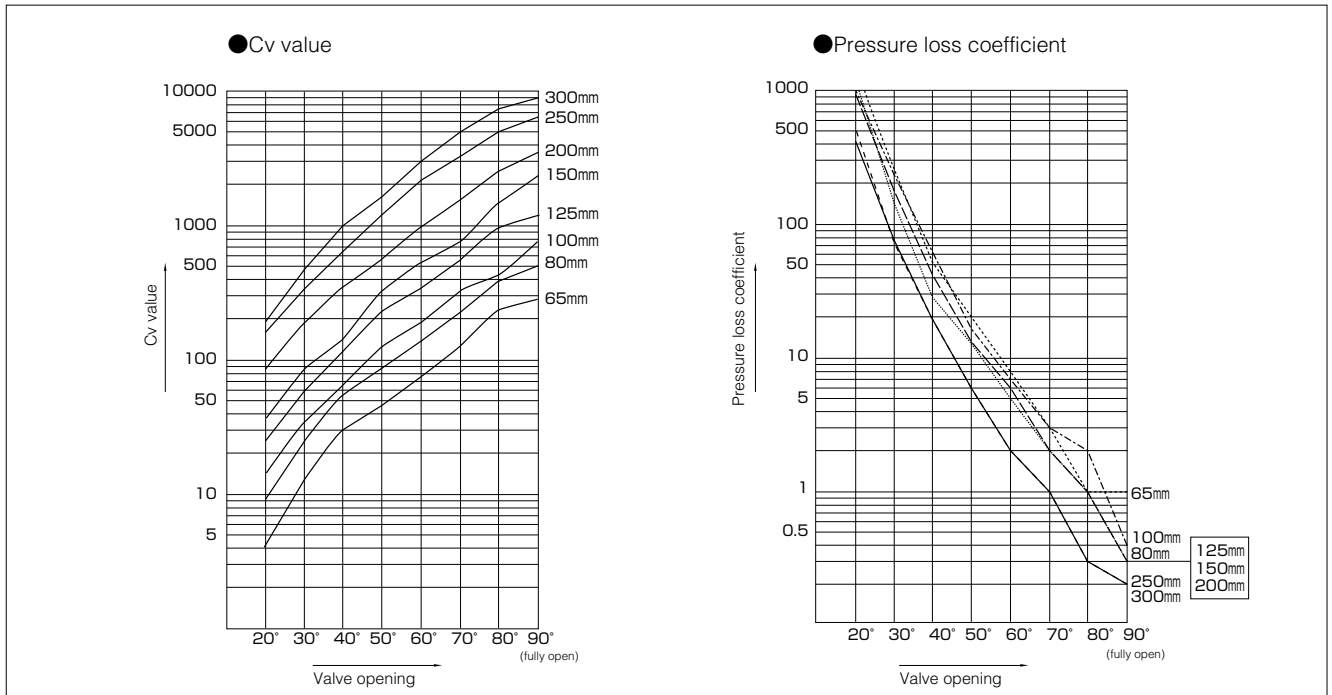


■ 4I Installation direction



# 846T/847T (Wafer)/847Q (Lugged)

## 846T Cv value/pressure loss coefficient



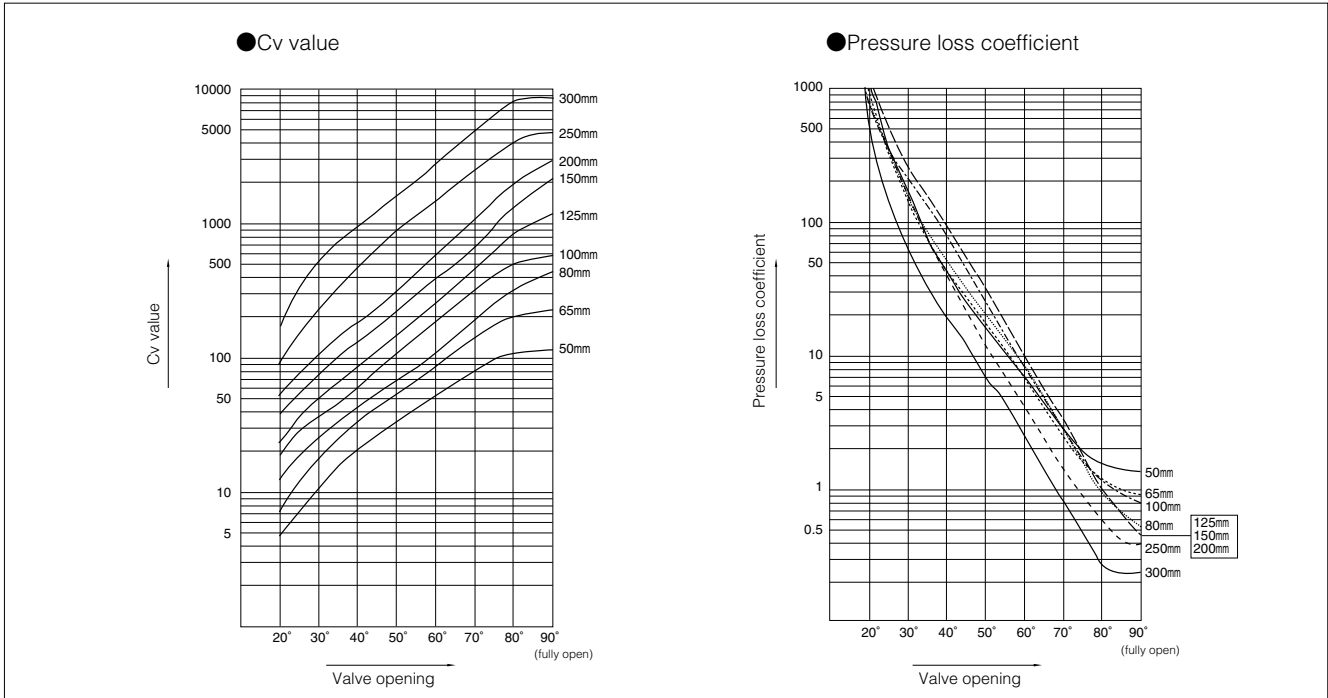
## 846T Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
65	2 1/2	5	13	30	48	74	129	220	293
80	3	9	25	56	85	130	225	396	500
100	4	16	33	65	125	198	311	405	772
125	5	26	59	122	211	338	555	951	1295
150	6	37	77	145	303	507	767	1400	2166
200	8	83	178	355	592	906	1557	2573	3248
250	10	130	351	675	1225	2125	3375	5091	6200
300	12	194	487	972	1764	3011	4966	7412	8900

## 846T Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
65	2 1/2	1829	270	51	20	8	3	1	1
80	3	1136	147	29	13	5	2	1	0.3
100	4	1015	239	62	17	7	3	2	0.4
125	5	931	181	42	14	6	2	1	0.3
150	6	901	208	59	13	5	2	1	0.2
200	8	548	119	30	11	5	2	1	0.3
250	10	528	72	20	6	2	1	0.3	0.2
300	12	488	78	20	6	2	1	0.3	0.2

## 847T Cv value/pressure loss coefficient



### 847T Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
50	2	5	10	20	32	50	78	107	114
65	2 1/2	7	18	33	51	83	140	202	229
80	3	12	25	43	67	106	184	318	428
100	4	19	35	58	103	178	309	493	585
125	5	23	49	83	141	250	441	808	1170
150	6	38	75	127	218	383	621	1260	2080
200	8	52	105	177	305	547	995	1890	2910
250	10	75	210	415	745	1250	2200	3520	4270
300	12	140	475	850	1420	2400	4190	6780	7780

### 847T Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
50	2	675	169	42	16	7	3	1	1
65	2 1/2	933	141	42	18	7	2	1	1
80	3	639	147	50	21	8	3	1	1
100	4	720	212	77	24	8	3	1	1
125	5	1190	262	91	32	10	3	1	0.4
150	6	855	219	77	26	8	3	1	0.3
200	8	1396	342	121	41	13	4	1	0.4
250	10	1485	189	49	15	5	2	1	0.5
300	12	860	75	23	8	3	1	0.4	0.3

# 846T/847T (Wafer)/847Q (Lugged)

## 847T/846T Applicable pipe list in case of **A**

### 847T

Nominal size		SGP	Sch20	Sch40	VP (TS flange)	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
mm	inch							
50	2	○	○	○	○	○	○	34
65	2 1/2	○	○	○	○	○	○	51
80	3	○	○	○	○	○	○	70
100	4	○	○	○	○	○	○	91
125	5	○	○	○	○	○	○	118
150	6	○	○	○	○	○	○	144
200	8	○	○	○	○	○	○	194
250	10	○	○	○	○	○	○	246
300	12	○	○	○	○	○	○	294

### 846T

Nominal size		SGP	Sch20	Sch40	VP (TS flange)	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
mm	inch							
65	2 1/2	○	○	○	○	○	○	51
80	3	○	○	○	○	○	○	70
100	4	○	○	○	○	○	○	91
125	5	○	○	○	○	○	○	118
150	6	○	○	○	○	○	○	144
200	8	○	○	○	○	○	○	194
250	10	○	○	○	○	○	○	246
300	12	○	○	○	○	○	○	294

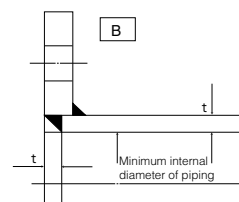
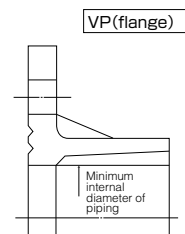
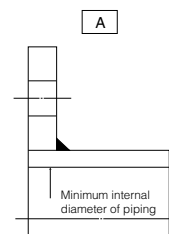
## 847T/846T Applicable pipe list in case of **B**

### 847T

Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
mm	inch					
50	2	○	○	○	○	○
65	2 1/2	○	○	○	○	○
80	3	○	○	○	○	○
100	4	○	○	○	○	○
125	5	○	○	○	○	○
150	6	○	○	○	○	○
200	8	○	○	○	○	○
250	10	○	○	○	○	○
300	12	○	○	○	○	○

### 846T

Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
mm	inch					
65	2 1/2	○	○	○	○	○
80	3	○	○	○	○	○
100	4	○	○	○	○	○
125	5	○	○	○	○	○
150	6	○	○	○	○	○
200	8	○	○	○	○	○
250	10	○	○	○	○	○
300	12	○	○	○	○	○



Remark 1: ○=Applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.

### 847T Flange accommodation

Nominal size		JIS		ASME		BS4504 PN10	DIN NP10	BS10 Table E
mm	inch	5K	10K	class 125	class 150			
50	2	○	○	○	○	○	○	○
65	2 1/2	○	○	○	○	○	○	○
80	3	○	D	○	○	D	D	○
100	4	D	D	D	D	D	D	D
125	5	D	D	D	D	D	D	D
150	6	D	D	D	D	D	D	D
200	8	D	D	D	D	D	D	D
250	10	D	D	D	D	D	D	D
300	12	D	D	D	D	D	D	D

○ : Can be used without flange drilling  
D : With flange drilling

### 846T Flange accommodation

Nominal size		JIS		ASME		BS4504 PN10	DIN NP10	BS10 Table E
mm	inch	5K	10K	class 125	class 150			
65	2 1/2	○	○	○	○	○	○	○
80	3	○	D	○	○	D	D	○
100	4	D	D	D	D	D	D	D
125	5	D	D	D	D	D	D	D
150	6	D	D	D	D	D	D	D
200	8	D	D	D	D	D	D	D
250	10	D	D	D	D	D	D	D
300	12	D	D	D	D	D	D	D

○ : Can be used without flange drilling  
D : With flange drilling

### 847T/ 846T Piping bolt and nut sizes

#### ■ Piping bolts sizes

Nominal size		JIS 5K	JIS 10K	ASME class 125/150	DIN NP10, BS4504 PN10
mm	inch	Hexagon bolts and nuts	Hexagon bolts and nuts	Long bolts and nuts	Long bolts and nuts
50	2	4-M12× 90×30	4-M16×105×40	4-5/8-11UNC×145×45	4-M16×125×30
65	2 1/2	4-M12× 90×30	4-M16×105×40	4-5/8-11UNC×155×50	4-M16×125×30
80	3	4-M16×105×40	8-M16×110×40	4-5/8-11UNC×155×50	8-M16×130×30
100	4	8-M16×110×40	8-M16×110×40	8-5/8-11UNC×165×50	8-M16×140×35
125	5	8-M16×110×40	8-M20×120×50	8-3/4-10UNC×175×55	8-M16×140×35
150	6	8-M16×120×40	8-M20×130×50	8-3/4-10UNC×175×55	8-M20×155×40
200	8	8-M20×130×50	12-M20×135×50	8-3/4-10UNC×175×55	8-M20×160×40
250	10	12-M20×135×50	12-M22×150×60	12-7/8- 9UNC×215×55	12-M20×175×40
300	12	12-M20×150×50	16-M22×160×60	12-7/8- 9UNC×215×55	12-M20×185×40

●The bolt lengths fit the JIS or steel flanges.

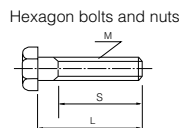
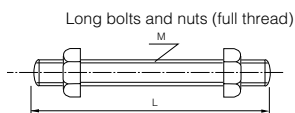
Remark: ※ Use thin hexagon nuts for hexagon bolts.(Except for ASME : nuts for ASME is heavy nut)

※ Material: Consult us when other than SS400 (Mild steel)

Example

Long bolts: 12 - M22 × 185 × 45  
N M L S

Hexagon bolts: 4 - M30 × 95 × 65  
N M L S



**841T** Wafer

**842T** Wafer

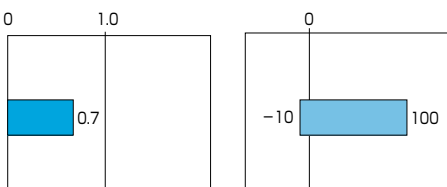


Valve nominal size

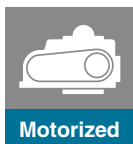
841T 350 to 600mm

842T 350 to 600mm

Max. Working pressure MPa Working temperature range, degrees C



**CE** CE Marking (842T)



## Features and Benefits

### Bubble tight seal and no leakage

PTFE does not react to most of the chemicals used in modern chemical processing – even at high temperatures and high pressures. It is recognised as an ideal material for industrial valves that handle highly corrosive fluids. PTFE has a low friction coefficient and excellent lubricity when used in contact with metal surfaces.

TOMOE's 841T and 842T butterfly valves take full advantage of the superior qualities of PTFE: it protects all wetted parts and guides all stems. The 841T and 842T valves have a proven record of excellent performance and long life in heavy duty applications requiring tight shut-off, low torque and smooth operation.

### Triple seal prevents leakage

The special feature of TOMOE butterfly valves is the seat ring design. The interference between the disc and the raised central area of the seat ring shuts off the flow completely. The resilient elastomer seat cushion ensures reliable shut off for the life of the valve.

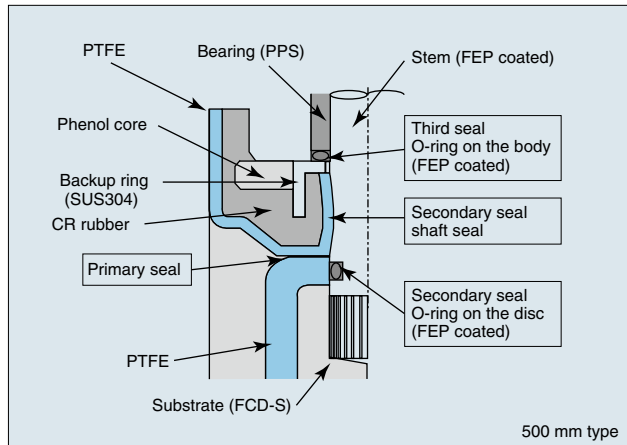
TOMOE butterfly valves are bi-directional and withstand pressures to 0.7 MPa from either direction.

The upper and lower positions of the seat ring, where the stem passes through, use a triple seal design to prevent leakage to the atmosphere as shown in the illustration.



## General Description

Chemically resistant butterfly valves with a proven record of excellent performance and long life in heavy duty applications.



## Where you can see advantages over other types of valves

- In corrosion resistant pipelines requiring mechanical strength as well as heat resistance.  
Chemical Industry: Chlorine gas, acetic acid, sulfuric acid, hydrochloric acid, and other highly corrosive fluids.
- In non-toxic environments where the fluid must not contact any metallic or organic materials.  
Food Industry: Cooking oil, seasoning, syrup, and other food products.
- In reduced pressure or high temperature pipelines where conventional valves cannot be used because of piping space requirements and valve weight.  
General Industry: Steam lines, hot air, special process gases, dyes, and so on.
- In processes involving hazardous fluids that require clean pipelines free from machining burrs, scales, and grease.  
Piping: Pipelines for oxygen and other highly oxidizing agents.
- In processes requiring sanitation or vacuum service.  
vacuum service.  
Handling: Processing food, transporting powder or granular solids.
- In low temperature processes where low heat gain is an advantage.  
Cooling: Cooling air, chilled water, and brine.

## Standard Specifications

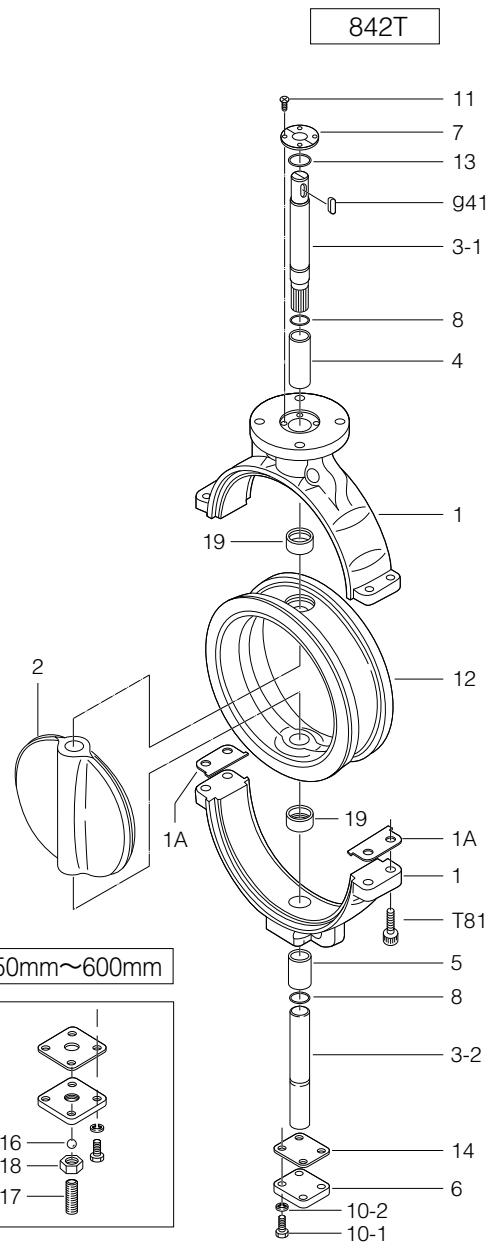
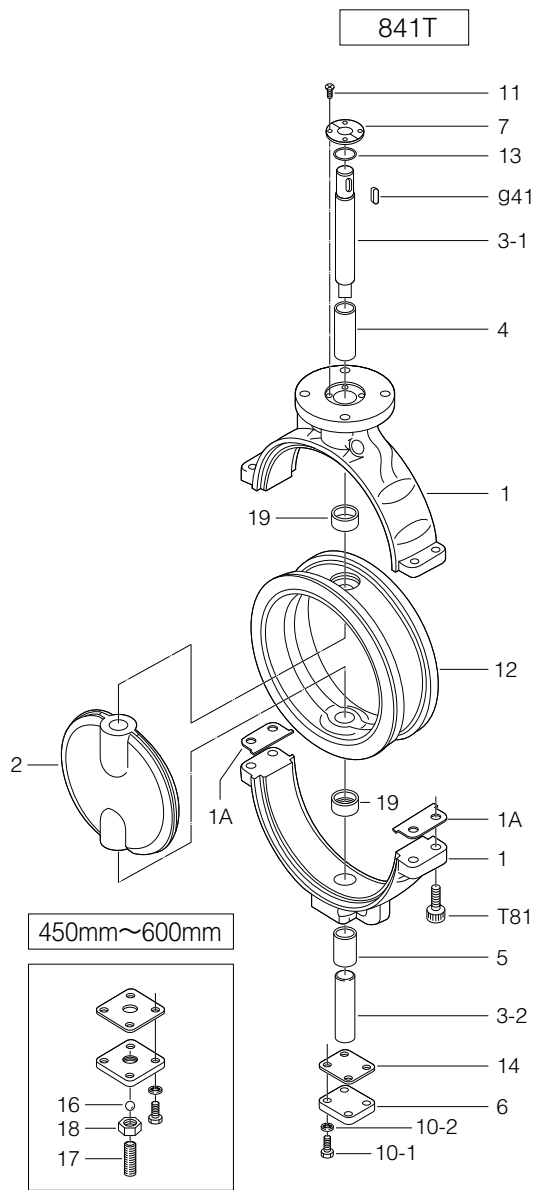
Type	841T	842T	
Body shape (centring method)	Concentric design, wafer type		
Valve nominal size	350, 400, 450, 500, 600mm	350, 400, 450, 500, 600mm	
Flange accommodation	JIS 10K, ASME Class 125/150, DIN PN10, BS 4504 PN10, BS 10Table E		
Face-to-face dimensions	Manufacturer standard		
Max. working pressure	0.7 MPa		
Seat leakage	Tight shut-off		
Flow direction	Bi-directional		
Pressure test	Body shell	1.05 MPa (Hydraulic)	
	Seat leakage	0.7 MPa (Hydraulic)	
Working temperature range	- 10 to 100 degrees C		
Working temperature in continuous use ※1	0 to 90 degrees C		
Standard materials	Body	FCD-S	
	Disc	SCS14	FCD-S+ PTFE lining
	Stem	SUS316	S45C+FEP coating
	Seat ring	PTFE (back-up rubber: CR)	
Top flange	Manufacturer standard		
Applicable gaskets	Rubber gasket cannot be used. Moulded gaskets require special dimensions (refer to dimension chart). Off-the-shelf seat gaskets can be used for 250 to 400mm. 450 to 600mm require special inner diameter dimensions (refer to dimension chart).		
Coating	350mm and larger: Lacquer primer (Munsell N7)		

※1 "Working temperature in continuous use" stands for the temperature continuously kept exceeding one hour.

※2 Export license by Japanese Ministry is required 842T for all sizes. Please consult us the detail.

# 841T/842T

## 841T / 842T Expanded View of Components



## 841T / 842T Parts list

### ■ 841T Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
★ 1A	Packing	2	
2	Disc	1	
3-1	Upper stem	1	
3-2	Lower stem	1	
★ 4	Bushing	1	
★ 5	Bushing	1	
6	Bottom cover	1	
7	Retainer plate	1 Set	
10-1	Hexagon bolt	4	
10-2	Spring washer	4	
11	Machine screw	4	
★ 12	Seat ring	1	
★ 13	O-ring	1	
14	Gasket	1	
16	Ball	1	Only 450mm to 600mm
17	Hollow bolt	1	Only 450mm to 600mm
18	Lock nut	1	Only 450mm to 600mm
19	Back-up rubber	2	
T81	Hexagon hole bolt	4	
g41	Key	1	

### ■ 842T Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
★ 1A	Packing	2	
2	Disc	1	
3-1	Upper stem	1	
3-2	Lower stem	1	
★ 4	Bushing	1	
★ 5	Bushing	1	
6	Bottom cover	1	
7	Retainer plate	1 Set	
★ 8	O-ring	2	
10-1	Hexagon bolt	4	
10-2	Spring washer	4	
11	Machine screw	4	
★ 12	Seat ring	1	
★ 13	O-ring	1	
14	Gasket	1	
16	Ball	1	Only 450mm to 600mm
17	Hollow bolt	1	Only 450mm to 600mm
18	Lock nut	1	Only 450mm to 600mm
19	Back-up ring	2	
T81	Hexagon hole bolt	4	
g41	Key	1	

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

# 841T/842T

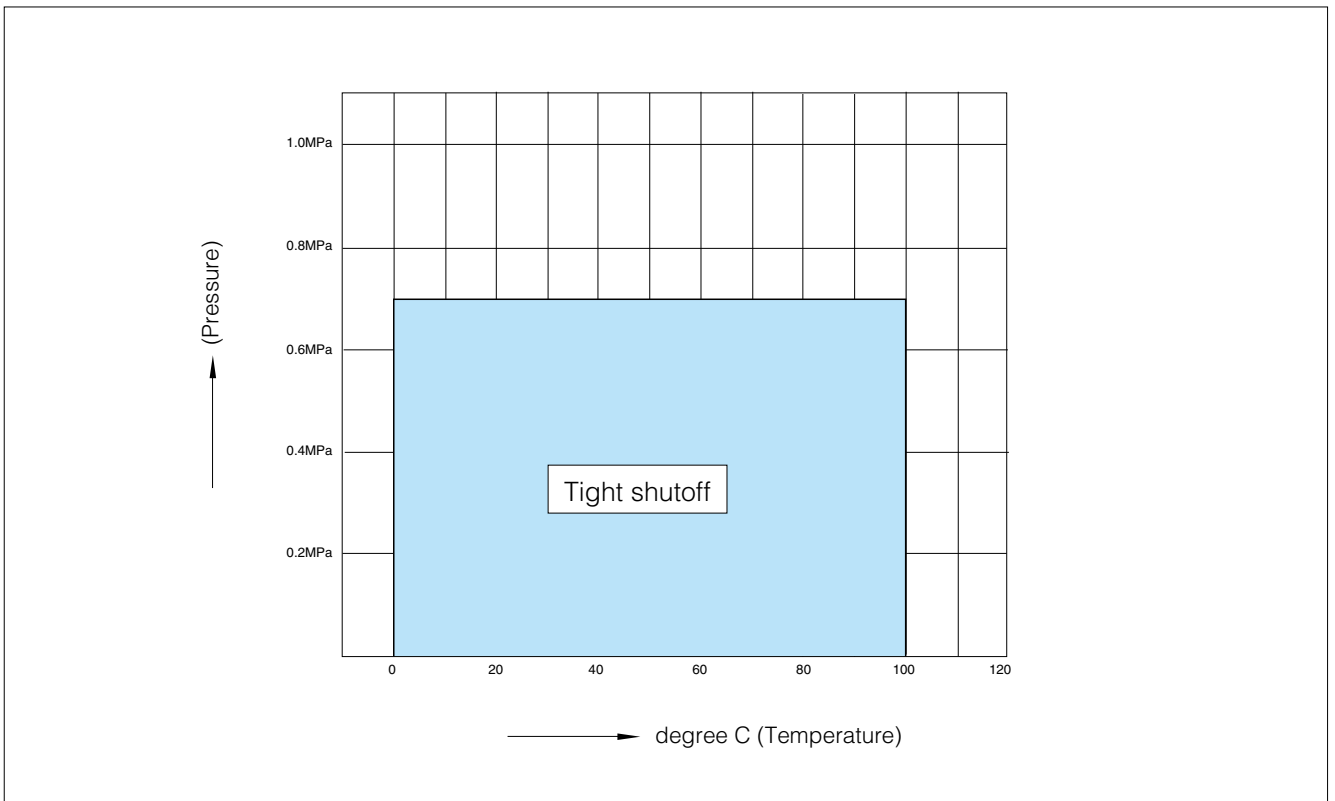
## 841T/842T Actuator selection chart

### 841T/842T

Model	Category	Size (mm / inch)				
		350	400	450	500	600
		14	16	18	20	24
2S	Standard	MGH-3			MGH-4	
	Heavy duty	MGH-3			MGH-4	
3A	Standard	TGA-125	TGA-140	TGA-160	TGA-200	
	Heavy duty	TGA-140	TGA-160	TGA-180	TGA-200	
3U,3K	Standard	TG-14S		TG-20S		
	Heavy duty	TG-14S		TG-20S		
4 I	ON-OFF	4 I-4				
	Control	4 I-4				
4L	Standard	LTKD-01 0.4kW/MGH-3		LTKD-02 0.75kW/MGH-3	LTKD-05 0.75kW/MGH-4	
	Heavy duty	LTKD-01 0.4kW/MGH-3		LTKD-02 0.75kW/MGH-3	LTKD-05 0.75kW/MGH-4	

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

## 841T/842T Pressure-temperature rating

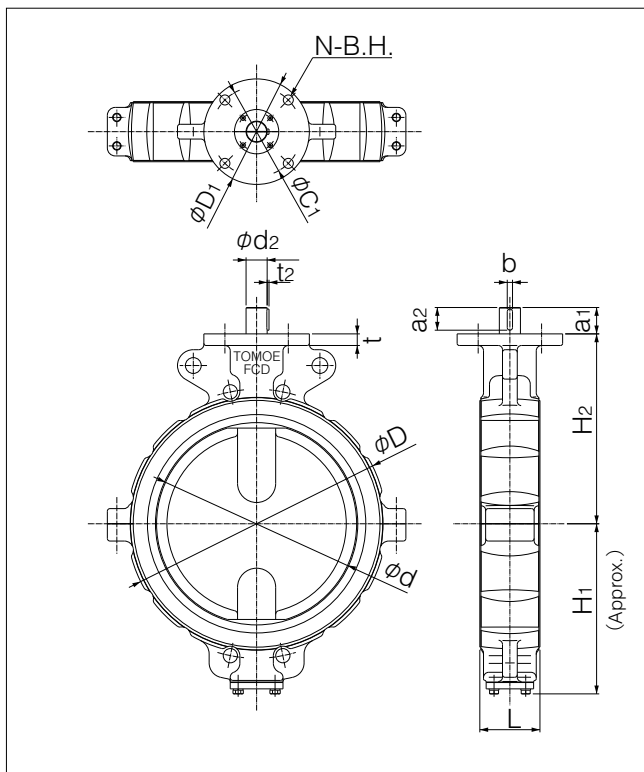


Bare shaft 841T-02(350mm to 600mm) / 842T-02(350mm to 600mm)

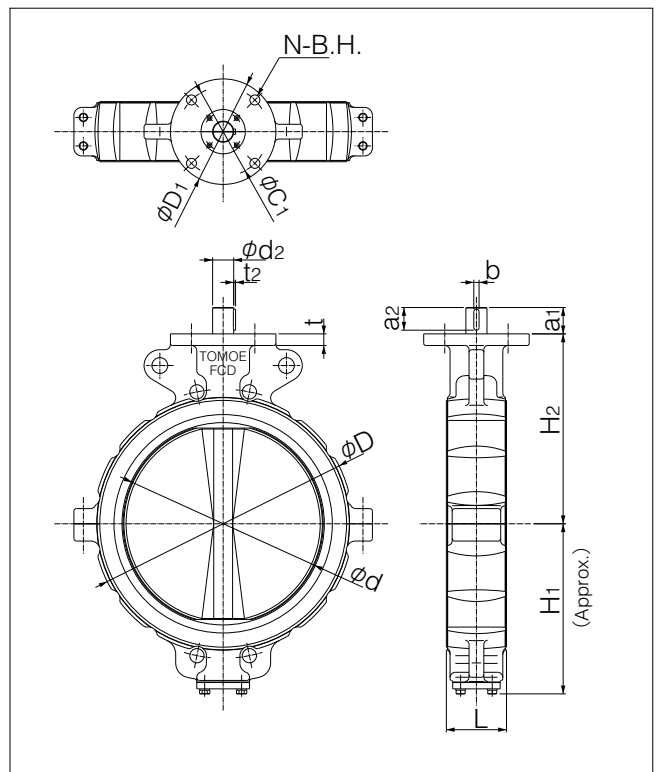
■841T/842T

Nominal size		Dimension (mm)														Approx. Mass (kg)	
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\phi d_2$	b	t <sub>2</sub>	t	D <sub>1</sub>	C <sub>1</sub>	N		B.H.
350	14	332	428	100	293	320	50	43	40	10	3.5	20	200	170	4	19	60
400	16	383	491	110	323	360	50	43	40	10	3.5	20	200	170	4	19	80
450	18	435	540	120	367	390	60	53	47	12	3.5	20	200	170	4	19	123
500	20	482	595	140	383	420	60	53	47	12	3.5	20	200	170	4	19	188
600	24	581	700	160	478	490	75	65	65	18	6	25	260	220	4	23	266

■841 T 350mm to 600mm



■842 T 350mm to 600mm



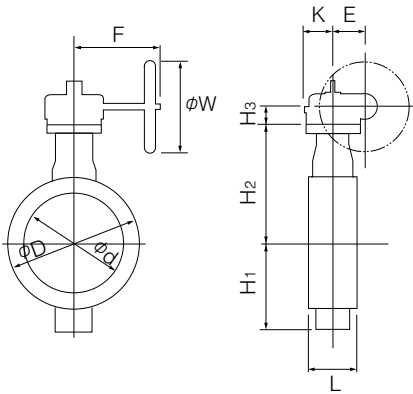
# 841T/842T

Worm gear type 841T-2S (350mm to 600mm) / 842T-2S (350mm to 600mm)

## 841T/842T

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
350	14	332	428	100	293	320	55	117	164	325	280	MGH-3	93
400	16	383	491	110	323	360	55	117	164	325	280	MGH-3	113
450	18	435	540	120	367	390	55	117	164	335	355	MGH-3	155
500	20	482	595	140	383	420	55	117	164	335	355	MGH-3	220
600	24	581	700	160	478	490	65	140	198	400	450	MGH-4	320

## 841T/842T-2S



## 2S Installation direction

2SA (standard)	2SAR	2SB	2SBR

Double-acting pneumatic cylinder type 841T-3A (350mm to 600mm) / 842T-3A (350mm to 600mm)

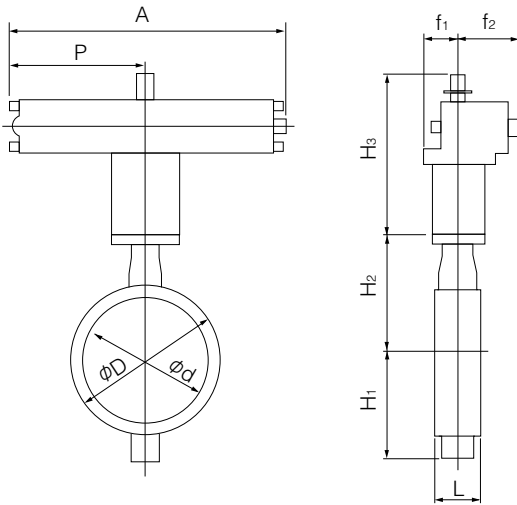
■ Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	332	428	100	293	320	359	754	381	100	167	TGA-125	106
400	16	383	491	110	323	360	407	840	432	100	183	TGA-140	139
450	18	435	540	120	367	390	435	954	471	130	205	TGA-160	220
500	20	482	595	140	383	420	435	954	471	130	250	TGA-160	260
600	24	581	700	160	478	490	570	1175	576	160	254	TGA-200	450

■ Heavy duty

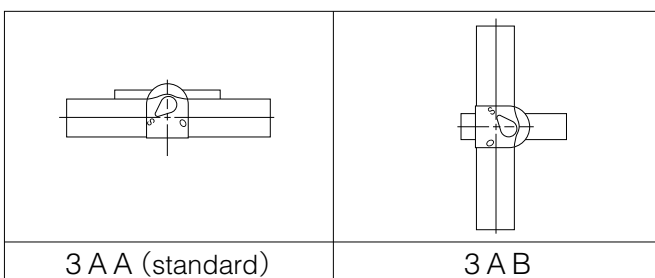
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	332	428	100	293	320	407	754	381	100	167	TGA-140	106
400	16	383	491	110	323	360	435	840	432	130	183	TGA-160	190
450	18	435	540	120	367	390	478	954	471	130	205	TGA-180	252
500	20	482	595	140	383	420	478	954	471	130	250	TGA-180	292
600	24	581	700	160	478	490	570	1175	576	160	254	TGA-200	450

■ 841T/842T-3A



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

■ 3A Installation direction



# 841T/842T

Single-acting pneumatic cylinder type 841T-3U (Air to open: 250mm to 600mm) / 841T-3K (Air to close: 250mm to 600mm)  
 842T-3U (Air to open: 350mm to 600mm) / 842T-3K (Air to close: 350mm to 600mm)

## Standard

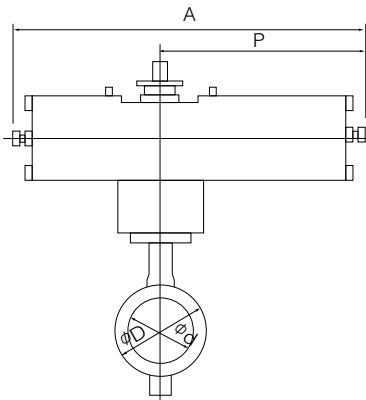
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	332	428	100	293	320	340	1255	865	131	257	TG-14S	259
400	16	383	491	110	323	360	340	1255	865	131	257	TG-14S	279
450	18	435	540	120	367	390	340	1255	865	131	257	TG-14S	312
500	20	482	595	140	383	420	474	1655	1095	164	348	TG-20S	588
600	24	581	700	160	478	490	474	1655	1095	164	348	TG-20S	665

## Heavy duty

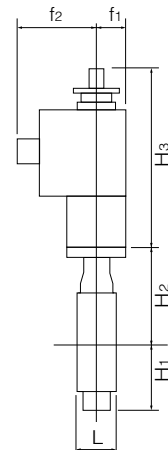
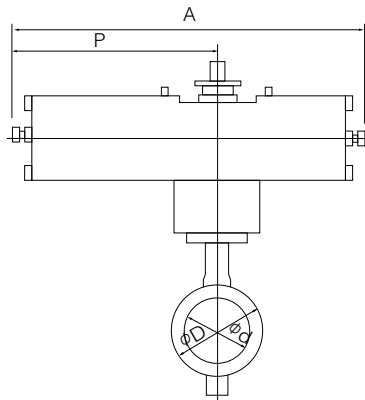
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	332	428	100	293	320	340	1255	865	131	257	TG-14S	259
400	16	383	491	110	323	360	474	1655	1095	164	348	TG-20S	483
450	18	435	540	120	367	390	474	1655	1095	164	348	TG-20S	523
500	20	482	595	140	383	420	474	1655	1095	164	348	TG-20S	588
600	24	581	700	160	478	490	474	1655	1095	164	348	TG-20S	655

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

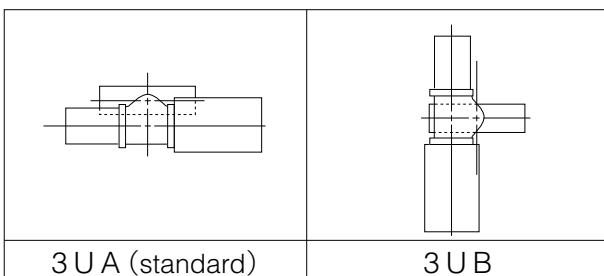
## 841T/842T-3U



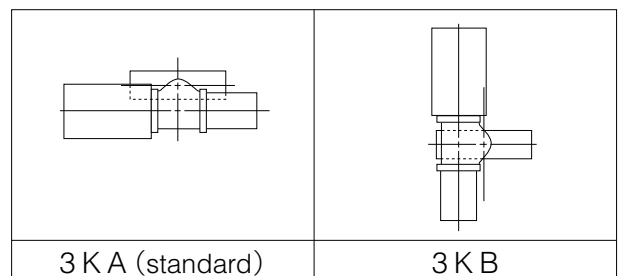
## 841T/842T-3K



## 3U Installation direction



## 3K Installation direction



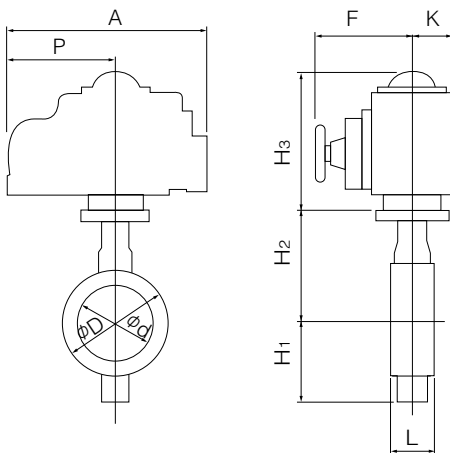


Single phase electric motor type 841T-4I (350mm to 450mm) / 842T-4I (350mm to 450mm)

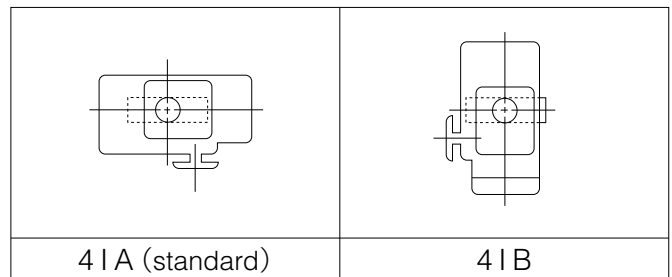
■841T/842T

Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
350	14	332	428	100	293	320	233	388	223	246	136	4I-4	89
400	16	383	491	110	323	360	233	388	223	246	136	4I-4	109
450	18	435	540	120	367	390	233	388	223	246	136	4I-4	158

■841T/842T-4I



■4I Installation direction



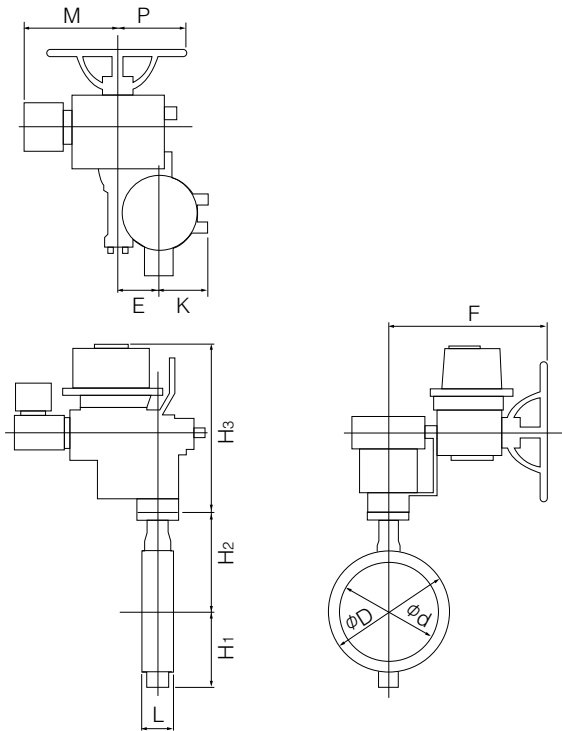
# 841T/842T

Three phase motor actuator type 841T-4L (350mm to 600mm) / 842T-4L (350mm to 600mm)

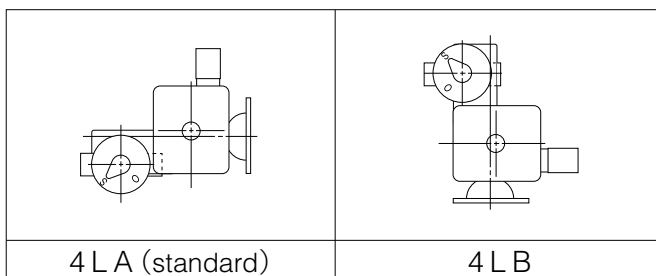
## 841T/842T

Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
350	14	332	428	100	293	320	458	117	164	533	373	230	LTKD-01 0.4kW /MGH-3	189
400	16	383	491	110	323	360	458	117	164	533	373	230	LTKD-01 0.4kW /MGH-3	209
450	18	435	540	120	367	390	458	117	164	533	373	230	LTKD-01 0.4kW /MGH-3	252
500	20	482	595	140	383	420	492	117	164	567	370	230	LTKD-02 0.75kW /MGH-3	337
600	24	581	700	160	478	490	570	140	198	637	440	230	LTKD-05 0.75kW /MGH-4	505

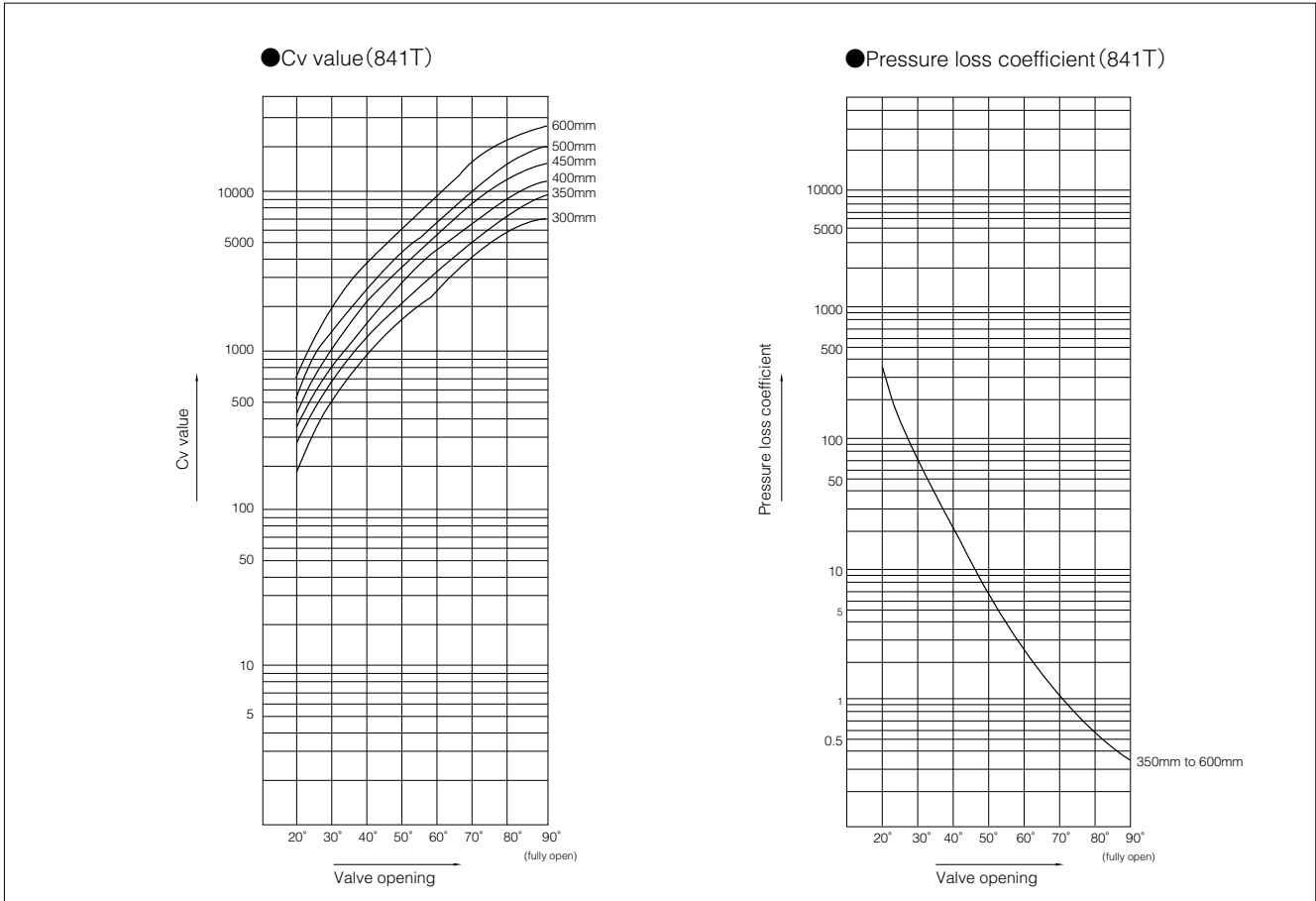
## 841T/842T-4L



## 4L Installation direction



## 841T Cv value/pressure loss coefficient



### 841T Cv value

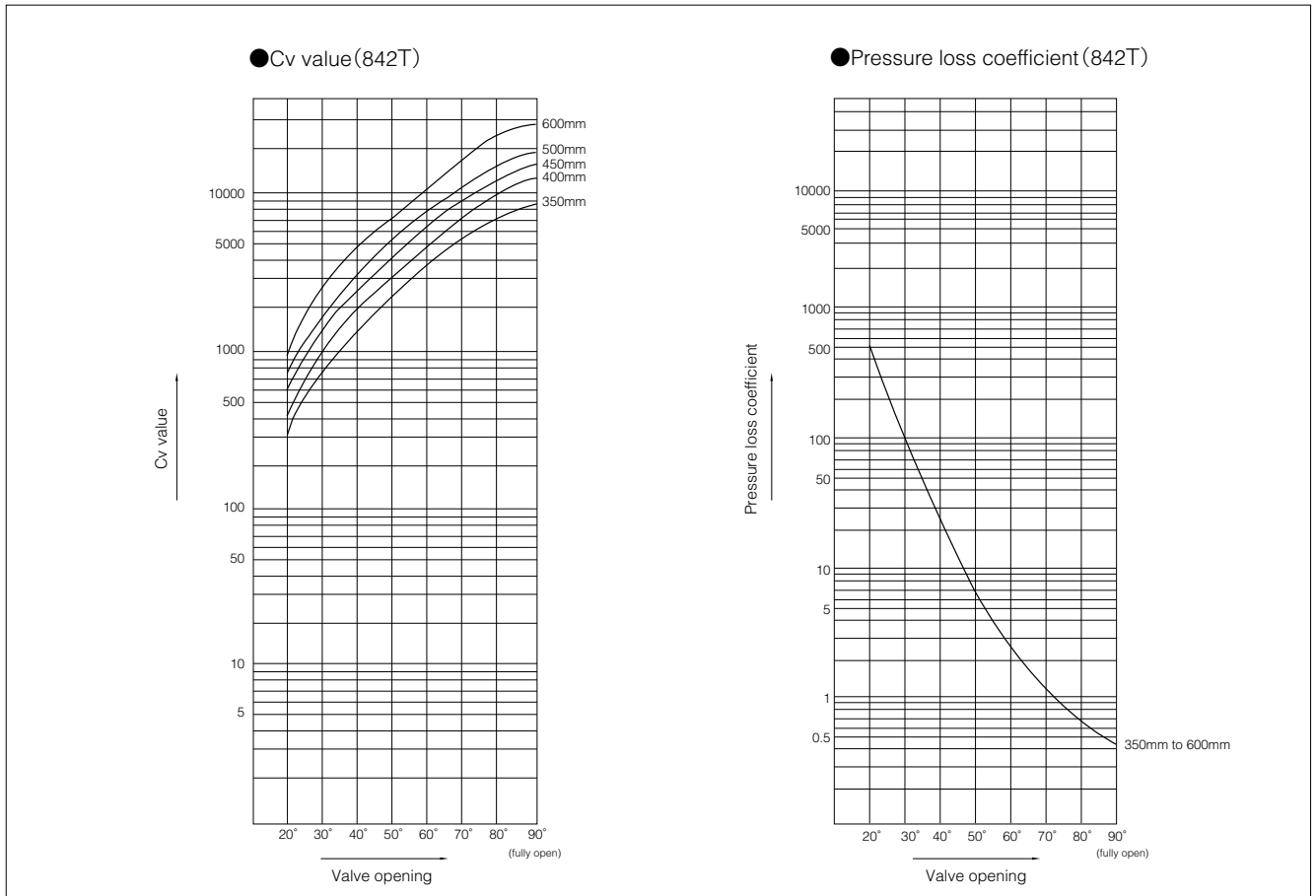
Nominal size		Valve opening							
		20°	30°	40°	50°	60°	70°	80°	90°
mm	inch								
350	14	220	640	1235	2100	3350	5300	7800	9200
400	16	302	860	1643	2700	4300	6800	10300	12000
450	18	390	1140	2120	3400	5500	9100	13100	15500
500	20	478	1395	2600	4200	6800	11000	16000	19000
600	24	695	2080	3780	6100	9900	16000	23000	27600

### 841T Pressure loss coefficient

Nominal size		Valve opening							
		20°	30°	40°	50°	60°	70°	80°	90°
mm	inch								
350	14	600	68	19	7	3	1	0.4	0.3
400	16	606	66	19	7	3	1	0.4	0.3
450	18	611	61	18	7	3	1	0.4	0.3
500	20	619	64	19	7	3	1	0.4	0.3
600	24	618	63	18	7	3	1	1	0.3

# 841T/842T

## 842T Cv value/pressure loss coefficient



### 842T Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
350	14	270	800	1450	2300	3600	5400	7400	8800
400	16	360	1100	1950	3000	4300	7400	11000	12000
450	18	460	1400	2500	4000	6200	9500	13000	15000
500	20	560	1700	3200	4800	7600	11500	15500	18000
600	24	820	2500	4500	7000	11500	17000	23000	26000

### 842T Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
350	14	354	49	13	6	2	1	1	0.3
400	16	337	44	13	5	2	1	1	0.3
450	18	261	48	15	5	2	1	1	0.3
500	20	365	49	13	6	2	1	1	0.3
600	24	345	46	13	6	2	1	1	0.3

### 841T/842T Flange accommodation

Nominal size		JIS 10K	ASME		BS4504 PN10	DIN NP10	BS10 Table E
mm	inch		class 125	class 150			
350	14	D	D	D	D	D	D
400	16	D	D	D	D	D	D
450	18	T	T	T	T	T	T
500	20	T	T	T	T	T	X
600	24	T	T	T	T	T	X

D: With flange drilling  
T: With flange tapping  
X: Not applicable

### 841T/842T Applicable pipe list in case of **A**

Nominal size		SGP	Sch20	Sch40	VP (TS Flange)	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
mm	inch							
350	14	○	○	○	○	—	—	322
400	16	○	○	○	—	—	—	372
450	18	○	○	○	—	—	—	421
500	20	○	○	○	—	—	—	463
600	24	—	○	○	—	—	—	566

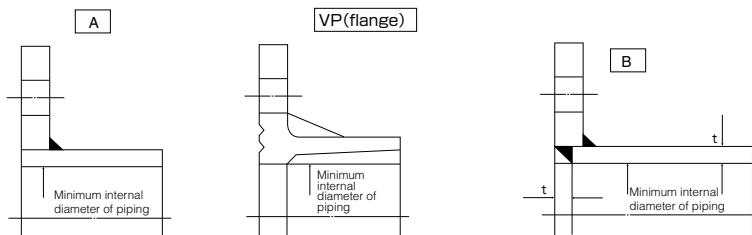
### 841T/842T Applicable pipe list in case of **B**

Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
mm	inch					
350	14	○	○	○	—	—
400	16	○	○	○	—	—
450	18	○	○	○	—	—
500	20	○	○	○	—	—
600	24	—	○	—	—	—

Remark 1: ○=Applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

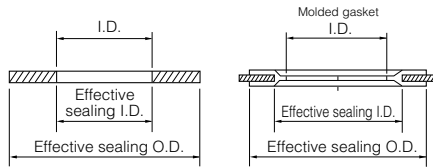
In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.



# 841T/842T

## 841T/842T Applicable gasket dimensions

Nominal size		841T/842T			
mm	inch	Recommended effective sealing I.D. (mm)	Max. effective sealing I.D. (mm)	Minimum I.D. (mm)	Min. effective sealing I.D. (mm)
350	14	359	359	332	416
400	16	410	410	383	479
450	18	457	457	435	533
500	20	508	508	482	590
600	24	610	610	581	693



## 841T/842T Applicable standard for piping gasket list

Nominal size		Recommended effective sealing I.D. (mm)	Sheet gasket		PTFE molded gasket	
mm	inch		JIS10K	ASME class 125/150	JIS10K	ASME class 125/150
350	14	359	○	○	×	×
400	16	410	○	○	×	×
450	18	457	×	×	×	×
500	20	508	×	×	×	×
600	24	610	×	×	×	×

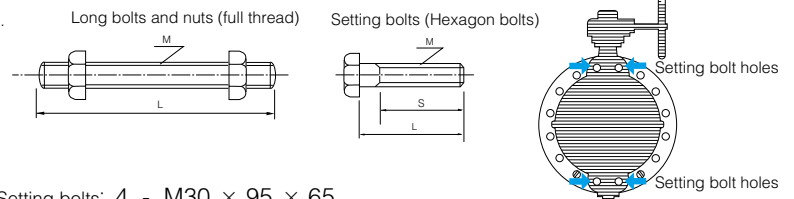
- : Standard gasket can be used  
 × : Standard gasket cannot be used. Use one with special dimensions.

## 841T/842T Piping bolt and nut sizes

### ■ Piping bolts sizes

Nominal size		JIS 10K		ASME class 125 / 150	
mm	inch	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts
350	14	16-M22×215×45	—	12-U1 ×260×60	—
400	16	16-M24×230×50	—	16-U1 ×260×60	—
450	18	16-M24×245×50	8-M24×70×54	12-U1 1/8×285×65	8-U1 1/8× 85×70
500	20	16-M24×265×50	8-M24×70×54	16-U1 1/8×310×65	8-U1 1/8× 90×70
600	24	20-M30×300×60	8-M30×80×66	16-U1 1/4×345×70	8-U1 1/4×100×70

- Remarks:  
 1. Use thin hexagon nuts. For ASME class 125/150, use heavy hexagon nuts.  
 2. If the nominal diameter of the unified screw exceeds 1 inch, make the threading 8 threads per inch.  
 3. The table above does not apply if the material used is a special material which is not SS400.



Example

Long bolts: 12 - M22 × 185 × 46  
 |        |        |        |  
 N        M        L        S

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts) |        |        |        |  
 N        M        L        S

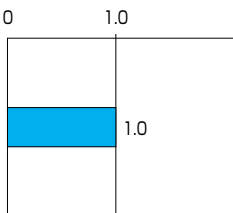


# 700Z

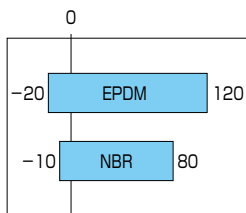
Valve nominal size

40 to 300mm

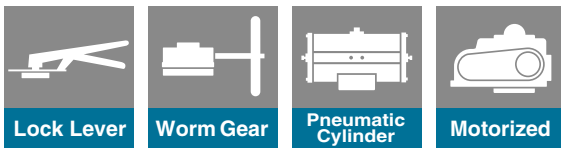
Max. working pressure MPa



Working temperature range °C

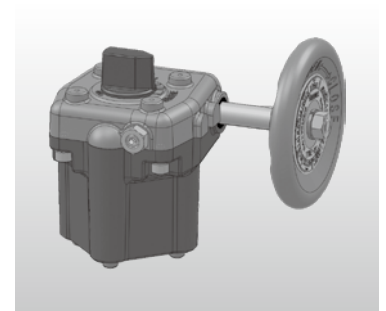


**JIS** JIS B 2032 Compliant  
 (This product conforms to General Specifications for Machinery and Equipment of the Ministry of Land, Infrastructure, Transport and Tourism.)



## Evolution of Long Sellers Sealing performance and Durability Improved!

- Gears and lever have been integrated with valve body to achieve both functionality and downsizing.
- Resin-aluminum hybrid gearbox improves the strength and durability of valves with anti-condensation performance added.
- High anti-condensation performance of the Z series has been inherited. (Gear valves)
- New lightweight valve disc with optimized seal shape improves the sealing performance and operability of valves.
- Modified rubber seat structure stabilizes the sealing performance of valve seat.
- Strong bearings have been adopted to significantly improve the durability of valve opening/closing. (Automatic valves)
- Special valve body has been developed for automatic valves to improve their strength and durability.



**\*Note : These valves are different in face-to-face dimensions from the first 700Z (Coating color: Light blue; Munsell 10BG-6/4) developed in 1980 and discontinued in August 2003.**



## Standard Specifications

Body type(Connection)		Concentric rubber seated butterfly valve, flangeless(wafer) type
Valve nominal size		40, 50, 65, 80, 100, 125, 150, 200, 250, 300mm
Flange accommodation		JIS5K/10K, ASME Class 125/150, DIN PN10, BS4504 PN10, GB/T 9113.1 1MPa
Face-to-face dimensions		JIS B 2002 <sup>1987</sup> Series 46(ISO 5752 table5/BS5155/API609)
Max. working pressure		1.0 MPa
Allowable seat leakage rate		JIS B 2003 <sup>2013</sup> Rate A(Tight shut-off)
Flow direction		Bi-directional
Test	Body shell test	1.5 MPa(Hydraulic pressure)
	Seat leak test	1.1 MPa(Pneumatic pressure)
Working temperature range		EPDM: -20 ~ 120°C(Option:NBR: -10 ~ 80°C)
Working temperature in continuous use <sup>*1</sup>		EPDM: 0 ~ 70°C(Option:NBR: 0 ~ 60°C)
Standard materials	Body	Aluminum die cast alloy ADC12
	Disc <sup>*2</sup>	SCS13(A351 CF8), SCS14(A351 CF8M), PPS(40~200mm)
	Stem <sup>*2</sup>	SUS420J2(AISI420)
	Seat ring	EPDM <sup>*3,4</sup> (Option:NBR)
Top flange		Lever/Gear type: Valve integrated type, Cylinder/ Electric motor type: In accordance with ISO 5211
Actuator <sup>*5</sup>		Manual, pneumatic, electric
Pipe flow velocity(limit value)		Up to 3 m/s(Valve fully-open, continuous operation, ambient temp. and fresh water)
Coating		Urethane coating(Tomoe green)
Condensation property		No condensation in the upper part of gears at ambient temperature 30°C and humidity 80% with cold water at 5°C <sup>*6</sup>

※1 'Working temperature in continuous use' stands for the temperature continuously kept exceeding on hour.

※2 Materials shown in ( ): equivalent materials in ASTM/AISI standard.

※3 If the fluid contains even a slight amount of oil, never use an EPDM rubber seat ring. If the fluid contains chlorine, the seat ring may deteriorate early due to combined factors including density and temperature. For details consult our sales office.

※4 In the pipe lines where chemicals containing calcium are supplied, it is recommended to use an EPDM rubber seat ring to protect pipes.

※5 The actuator of the product cannot be replaced.

※6 These values are based on data obtained in a laboratory and may vary if the temperature and humidity distributions in the field are not uniform. Even in an environment having these values, condensation can occur if ambient or water temperature changes suddenly.

## 700Z Actuator Selection Chart

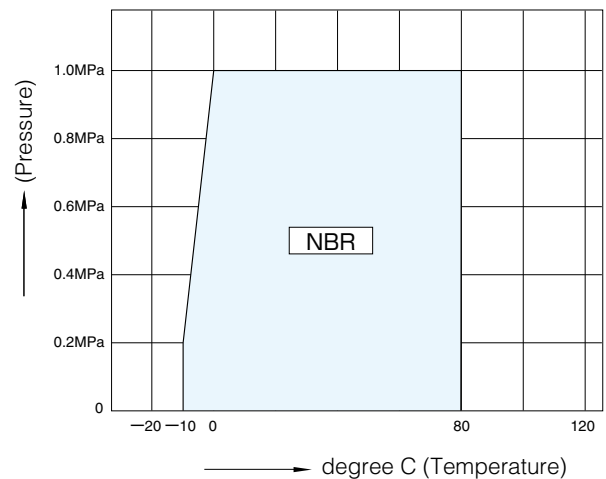
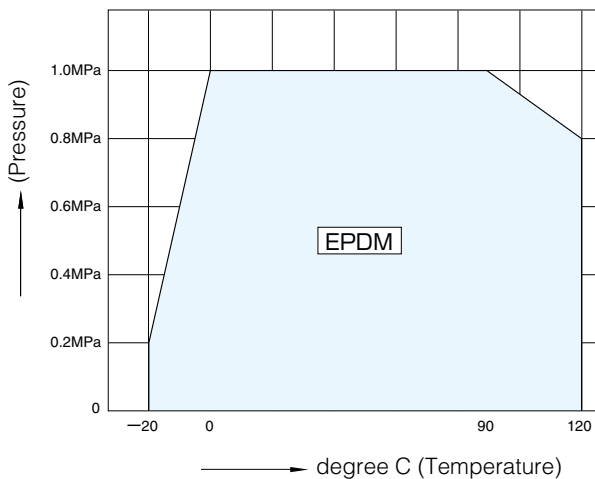
Type	Model	Category	Size (mm/inch)									
			40	50	65	80	100	125	150	200	250	300
			1 1/2	2	2 1/2	3	4	5	6	8	10	12
Lock lever	1J,1T	Standard	1J-1			1J-2		1T-2				
		Heavy duty										
Worm gear	2F	Standard	2F-G0Z		2F-G00		2F-G01		2F-G02		2F-G03	
		Heavy duty										
Double-action pneumatic	7E	Standard	T35		T85		T200		T380		T750	
		Heavy duty										
Single-action pneumatic	7G,7F 3K,3U	Standard	T85S		T200S		T380S		T750S		TG-12S	
		Heavy duty										
Single phase motor	4I	ON-OFF	4I-00		4I-0		4I-1	4I-2		4I-2.5	4I-3	
		Control										

Note) In case of the single-phase motorized actuator 4I that has the following optional equipment, "Control" specification is applied.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Gas, powder or high viscosity slurry (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

## 700Z Pressure-Temperature Rating

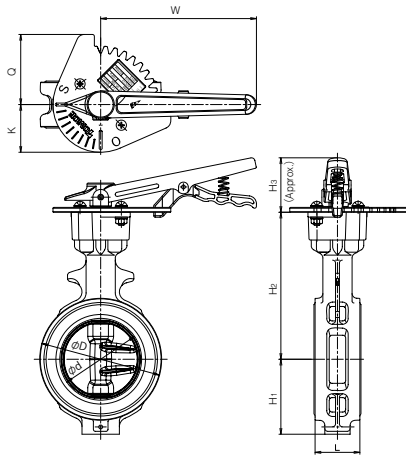


※Prolonged use in high temperature may deteriorate sealing ability or durability.

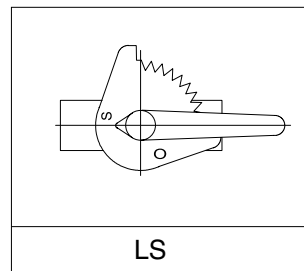
**Lock Lever Type 700Z-1J(40mm to 125m) 、1T(150m)**

Nominalsize		Dimension (mm)									Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	Q	K	W	
40	1 1/2	45	80	35	47	144	56	72	49	160	0.8
50	2	56	91	43	57	150	56	72	49	160	0.9
65	2 1/2	69	111	46	64	163	56	72	49	160	1.1
80	3	84	125	46	77	151	56	72	49	160	1.4
100	4	104	147	52	94	162	70	72	49	200	1.9
125	5	130	180	56	108	190	70	72	49	200	3.0
150	6	153.5	210	56	125	201	96	88	63	300	5.0

**700Z-1J/1T**



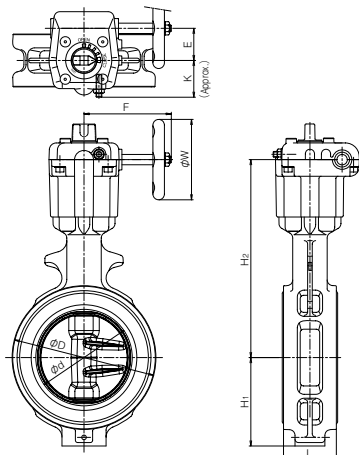
**1J Installation direction**



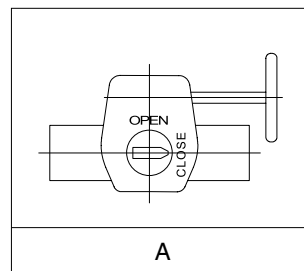
**Worm Gear Type 700Z-2F(40mm to 300mm)**

Nominalsize		Dimension (mm)									Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	E	K	F	$\phi W$	
40	1 1/2	45	80	35	47	160	22.5	26	85	70	0.8
50	2	56	91	43	57	166	22.5	26	85	70	1.0
65	2 1/2	69	111	46	64	179	22.5	26	85	70	1.2
80	3	84	125	46	77	172	28	31	110	70	1.7
100	4	104	147	52	94	183	28	31	110	70	2.2
125	5	130	180	56	108	211	46	42	133	100	3.8
150	6	153.5	210	56	125	222	46	42	133	100	4.7
200	8	199	255	60	167	257	53	40	162	125	7.2
250	10	253	322	68	186	316	71	54	206	200	13
300	12	302	375	78	216	348	71	54	206	200	18

**700Z-2F**



**2F Installation direction**



# 700Z

## Double-acting Pneumatic Cylinder Type 700Z-7E (40mm to 300mm)

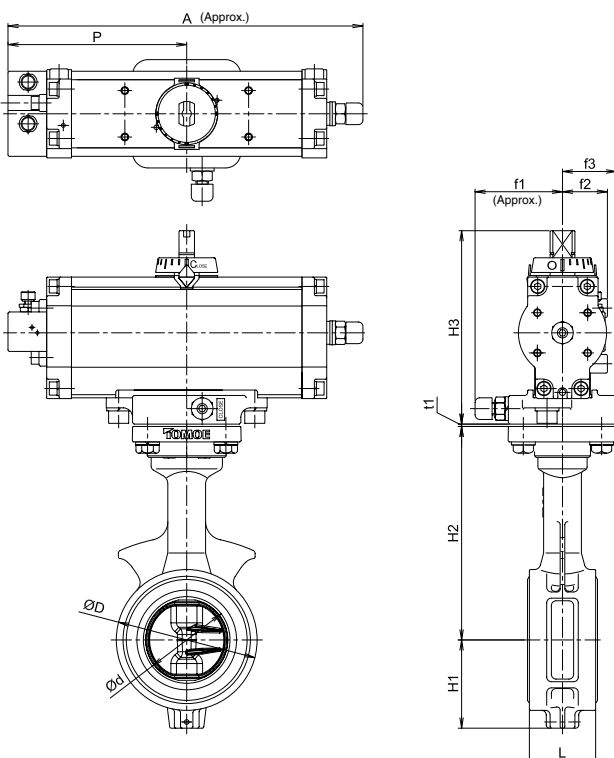
### Standard

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>	t <sub>1</sub>		
40	1 1/2	45	80	35	47	132	125	228	116	57	29	35	1	T35	2.6
50	2	56	91	43	57	138	125	228	116	57	29	35	1	T35	2.7
65	2 1/2	69	111	46	64	151	125	228	116	57	29	35	1	T35	2.9
80	3	84	125	46	77	156	125	228	116	57	29	35	1	T35	3.4
100	4	104	147	52	94	167	168	276	142	75	47	51	1	T85	6.8
125	5	130	180	56	108	191	168	276	142	75	47	51	1.5	T85	8.1
150	6	153.5	210	56	125	202	203	346	176	79	57	51	1.5	T200	12.3
200	8	199	255	60	167	227	203	346	176	79	57	51	1.5	T200	14.5
250	10	253	322	68	186	280	231	423	214	91	69	63	1.5	T380	25.5
300	12	302	375	78	216	312	269	546	270	118	85	70	1.5	T750	39.6

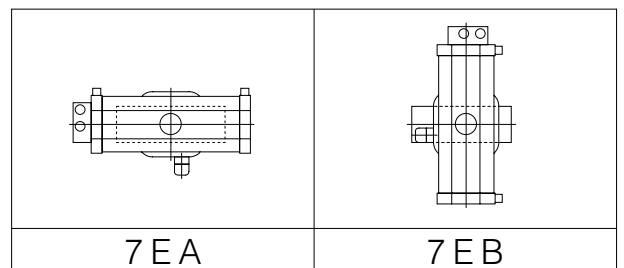
### Heavy Duty

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>	t <sub>1</sub>		
40	1 1/2	45	80	35	47	132	125	228	116	57	29	35	1	T35	2.6
50	2	56	91	43	57	138	125	228	116	57	29	35	1	T35	2.7
65	2 1/2	69	111	46	64	151	125	228	116	57	29	35	1	T35	2.9
80	3	84	125	46	77	156	168	276	142	75	47	51	1	T85	6.4
100	4	104	147	52	94	167	168	276	142	75	47	51	1	T85	6.8
125	5	130	180	56	108	191	203	346	176	79	57	51	1.5	T200	11.4
150	6	153.5	210	56	125	202	203	346	176	79	57	51	1.5	T200	12.3
200	8	199	255	60	167	227	231	423	214	91	69	63	1.5	T380	20.7
250	10	253	322	68	186	280	231	423	214	91	69	63	1.5	T380	25.5
300	12	302	375	78	216	312	269	546	270	118	85	70	1.5	T750	39.6

### 700Z-7E



### 7E Installation Direction



Single-acting Pneumatic Cylinder Type 700Z-7G(40mm to 200mm)/700Z-7F(40mm to 200mm)

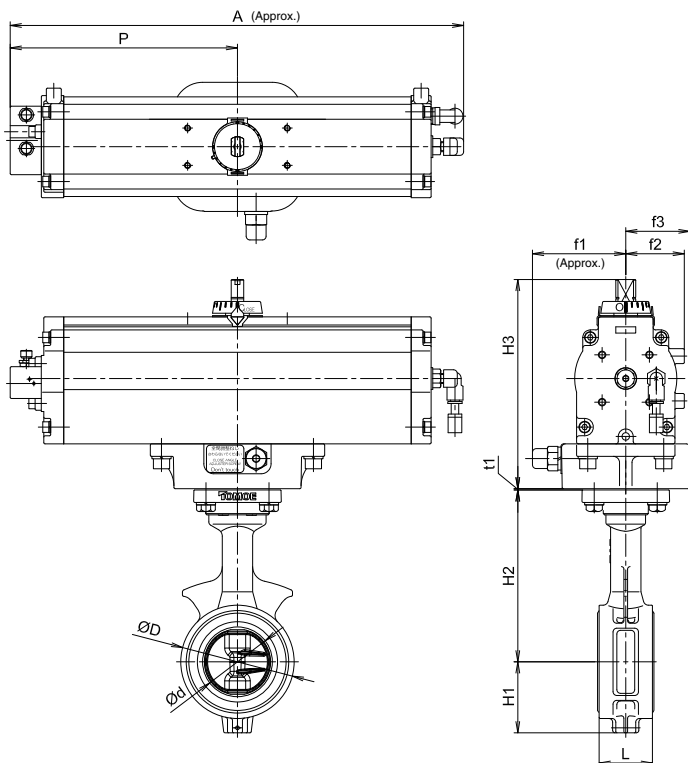
■ Standard

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>	t <sub>1</sub>		
40	1 1/2	45	80	35	47	132	168	364	183	75	47	51	1	T85S	7.2
50	2	56	91	43	57	138	168	364	183	75	47	51	1	T85S	7.3
65	2 1/2	69	111	46	64	151	168	364	183	75	47	51	1	T85S	7.5
80	3	84	125	46	77	156	203	449	226	79	57	51	1	T200S	12.5
100	4	104	147	52	94	167	203	449	226	79	57	51	1	T200S	12.9
125	5	130	180	56	108	191	231	550	276	91	69	63	1.5	T380S	22.5
150	6	153.5	210	56	125	202	231	550	276	91	69	63	1.5	T380S	23.4
200	8	199	255	60	167	227	269	723	360	118	85	70	1.5	T750S	39.2
250	10	253	322	68	186	280	269	723	360	118	85	70	1.5	T750S	43.8

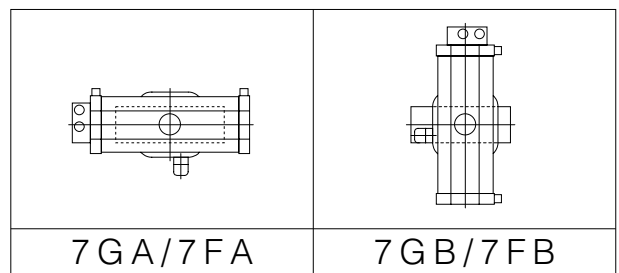
■ Heavy Duty

Nominal size		Dimension (mm)												Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>	t <sub>1</sub>		
40	1 1/2	45	80	35	47	132	168	364	183	75	47	51	1	T85S	7.2
50	2	56	91	43	57	138	168	364	183	75	47	51	1	T85S	7.3
65	2 1/2	69	111	46	64	151	203	449	226	79	57	51	1	T200S	12.0
80	3	84	125	46	77	156	203	449	226	79	57	51	1	T200S	12.5
100	4	104	147	52	94	167	231	550	276	91	69	63	1	T380S	21.2
125	5	130	180	56	108	191	231	550	276	91	69	63	1.5	T380S	22.5
150	6	153.5	210	56	125	202	269	723	360	118	85	70	1.5	T750S	37.0
200	8	199	255	60	167	227	269	723	360	118	85	70	1.5	T750S	39.2

■ 700Z-7G/7F



■ 7G/7F Installation Direction



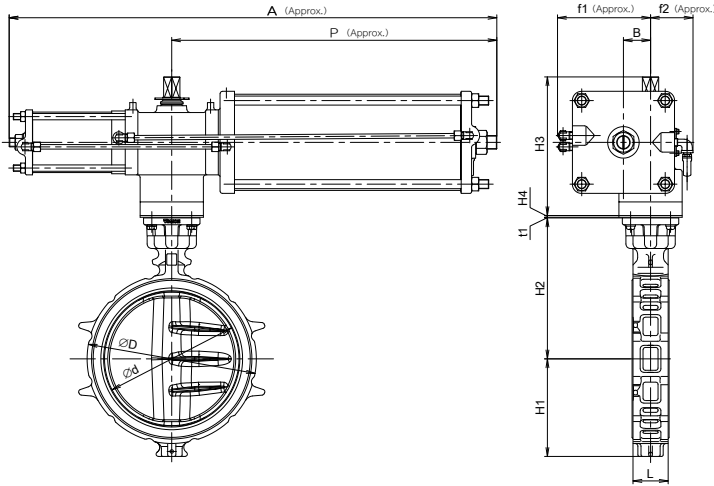
# 700Z

## Single-acting Pneumatic Cylinder Type 700Z-3U (250mm to 300mm)

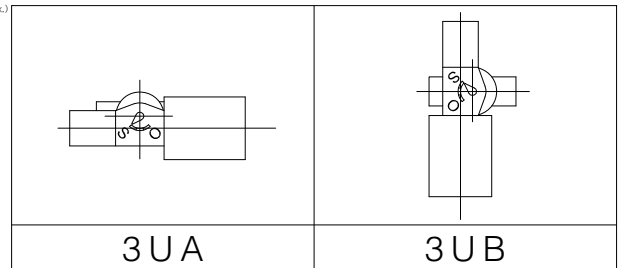
### Standard/Heavy Duty

Nominal size		Dimension (mm)													Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	B	f <sub>1</sub>	f <sub>2</sub>	t <sub>1</sub>		
250	10	253	322	68	186	280	307	4	1080	720	60	206	94	1.5	TG-12S	110.8
300	12	302	375	78	216	312	307	4	1080	720	60	206	94	1.5	TG-12S	115.3

### 700Z-3U



### 3U Installation Direction

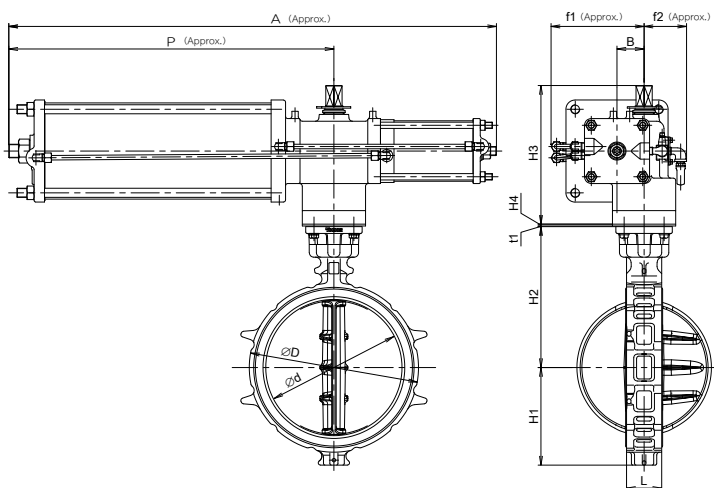


## Single-acting Pneumatic Cylinder Type 700Z-3K (250mm to 300mm)

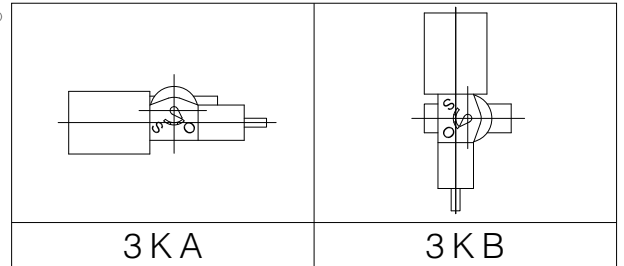
### Standard/Heavy Duty

Nominal size		Dimension (mm)													Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	B	f <sub>1</sub>	f <sub>2</sub>	t <sub>1</sub>		
250	10	253	322	68	186	280	307	4	1080	720	60	206	94	1.5	TG-12S	110.8
300	12	302	375	78	216	312	307	4	1080	720	60	206	94	1.5	TG-12S	115.3

### 700Z-3K



### 3K Installation Direction

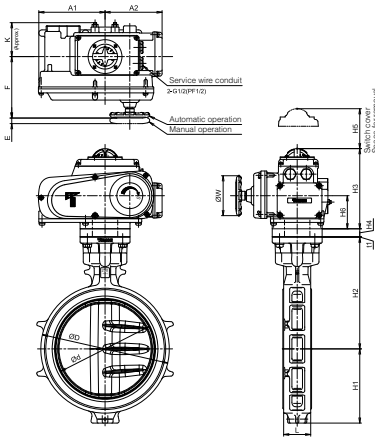


## Single Phase Electric Motor Type 700Z-4 I (40mm to 300mm)

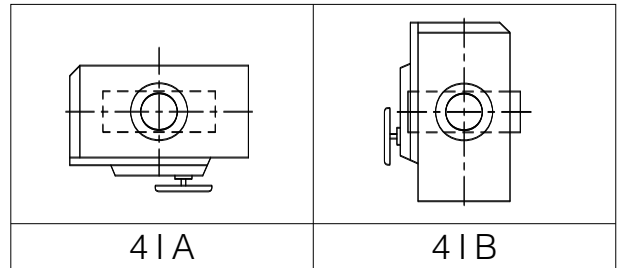
### ■ ON-OFF

Nominal size		Dimension (mm)																Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	H <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	E	F	K	$\phi W$	t <sub>1</sub>		
40	1 1/2	45	80	35	47	132	121	—	100	57	84	77	39	58	45	80	1	4I-00	3.0
50	2	56	91	43	57	138	121	—	100	57	84	77	39	58	45	80	1	4I-00	3.1
65	2 1/2	69	111	46	64	151	121	—	100	57	84	77	39	58	45	80	1	4I-00	3.3
80	3	84	125	46	77	156	150	—	100	43	100	102	43	85	54	80	1	4I-0	6.1
100	4	104	147	52	94	167	150	—	100	43	100	102	43	85	54	80	1	4I-0	6.5
125	5	130	180	56	108	191	165	14	100	61	138	114	12	126	65	70	1.5	4I-1	10.3
150	6	153.5	210	56	125	202	198	—	100	80	167	143	14	154	85	100	1.5	4I-2	16.2
200	8	199	255	60	167	227	198	—	100	80	167	143	14	154	85	100	1.5	4I-2	18.4
250	10	253	322	68	186	280	201	20	100	80	167	143	14	154	85	100	1.5	4I-2.5	26.3
300	12	302	375	78	216	312	230	4	100	98	223	165	23	246	136	200	1.5	4I-3	41.0

### ■ 700Z-4 I (ON-OFF)



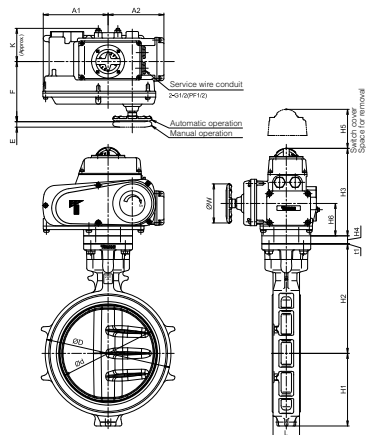
### ■ 4 I Installation Direction



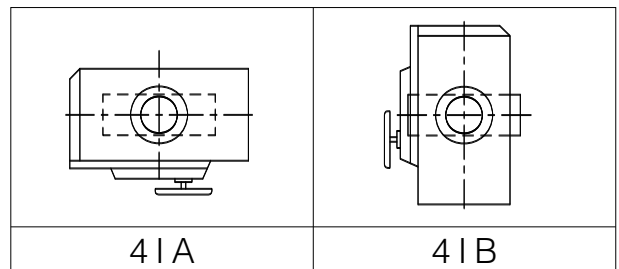
### ■ Control

Nominal size		Dimension (mm)																Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	H <sub>6</sub>	A <sub>1</sub>	A <sub>2</sub>	E	F	K	$\phi W$	t <sub>1</sub>		
40	1 1/2	45	80	35	47	132	176	—	100	43	100	102	43	85	54	80	1	4I-0	5.3
50	2	56	91	43	57	138	176	—	100	43	100	102	43	85	54	80	1	4I-0	5.4
65	2 1/2	69	111	46	64	151	176	—	100	43	100	102	43	85	54	80	1	4I-0	5.6
80	3	84	125	46	77	156	176	—	100	43	100	102	43	85	54	80	1	4I-0	6.1
100	4	104	147	52	94	167	176	—	100	43	100	102	43	85	54	80	1	4I-0	6.5
125	5	130	180	56	108	191	191	14	100	61	138	114	12	126	65	70	1	4I-1	10.3
150	6	153.5	210	56	125	202	224	—	100	80	167	143	14	154	85	100	1	4I-2	16.2
200	8	199	255	60	167	227	224	—	100	80	167	143	14	154	85	100	1	4I-2.5	20.0
250	10	253	322	68	186	280	227	20	100	80	167	143	14	154	85	100	1.5	4I-2.5	26.3
300	12	302	375	78	216	312	255	4	100	98	223	165	23	246	136	200	1.5	4I-3	41.0

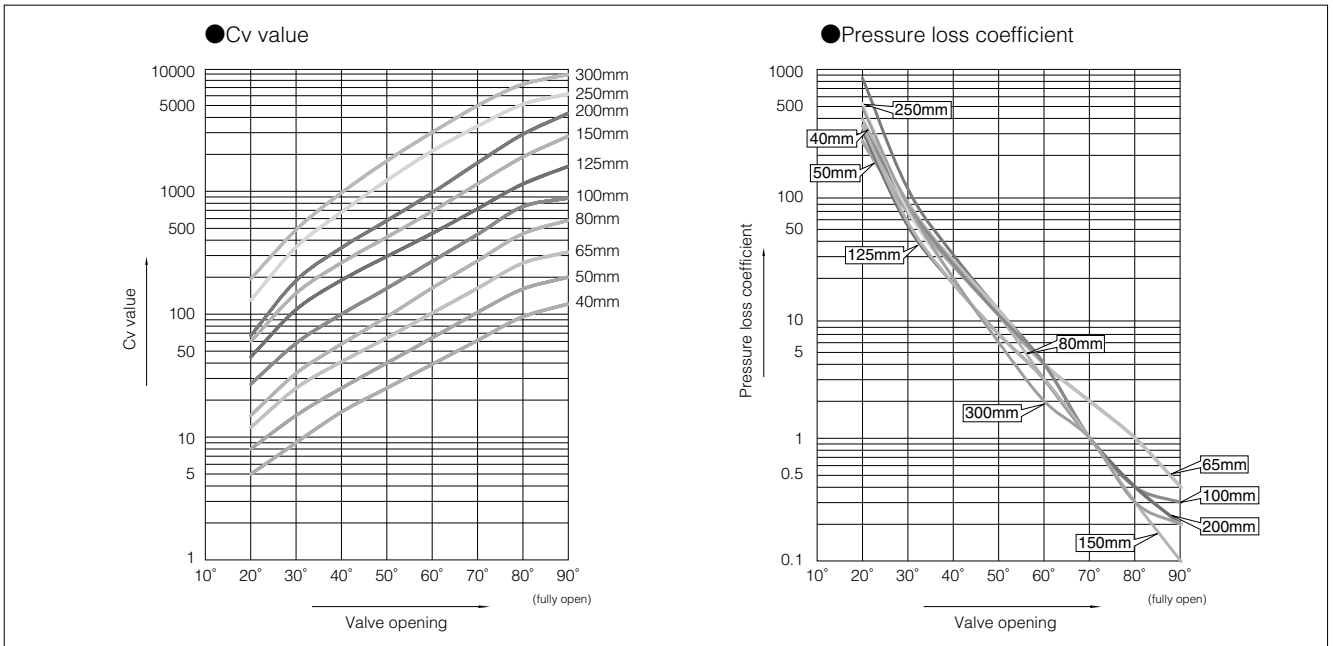
### ■ 700Z-4 I (Control)



### ■ 4 I Installation Direction



## 700Z Cv value / pressure loss coefficient



### 700Z Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	5	9	16	25	39	61	95	121
50	2	8	15	25	40	64	103	160	200
65	2 1/2	12	25	41	64	102	162	260	320
80	3	15	33	57	95	163	271	450	580
100	4	27	58	100	162	269	444	749	880
125	5	45	109	189	295	453	719	1144	1590
150	6	60	148	262	423	685	1147	1897	2800
200	8	67	188	347	576	969	1698	2902	4300
250	10	130	351	675	1225	2125	3375	5091	6200
300	12	194	487	972	1764	3011	4966	7412	8900

### 700Z Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	264	72	26	10	4	2	1	0.4
50	2	257	68	25	10	4	2	1	0.4
65	2 1/2	310	75	28	11	4	2	1	0.4
80	3	394	83	27	10	3	1	0.4	0.2
100	4	350	78	26	10	4	1	0.4	0.3
125	5	316	53	18	7	3	1	0.4	0.2
150	6	348	57	18	7	3	1	0.3	0.1
200	8	849	106	31	11	4	1	0.4	0.2
250	10	528	72	20	6	2	1	0.3	0.2
300	12	488	78	20	6	2	1	0.3	0.2



700Z Applicable pipe list in case of **A**, **B**

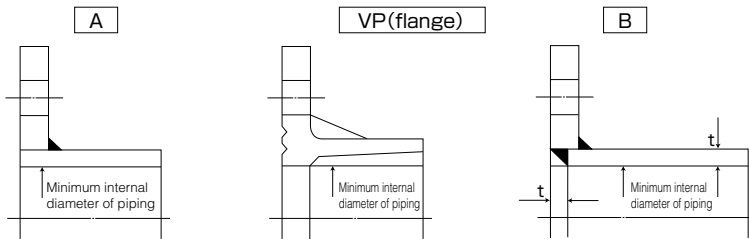
Nominal size		SGP	Sch20	Sch40	VP (TS flange)	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
mm	inch							
40	1 1/2	○	—	○	○	○	○	29
50	2	○	○	○	○	○	○	38
65	2 1/2	○	○	○	○	○	○	54
80	3	○	○	○	○	○	○	72
100	4	○	○	○	○	○	○	92
125	5	○	○	○	○	○	○	119
150	6	○	○	○	○	○	○	145
200	8	○	○	○	○	○	○	194
250	10	○	○	○	○	○	○	247
300	12	○	○	○	○	○	○	295

Remark 1: The symbols above mean the following.

○: Piping possible —: Not standardized

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.



## 700Z Piping bolt and nut sizes

### Hexagon bolt & nut

Nominal size		JIS 5K	JIS 10K
mm	inch	Hexagon bolts and nuts	Hexagon bolts and nuts
40	1 1/2	4-M12× 75×30	4-M16× 90×38
50	2	4-M12× 90×30	4-M16×100×38
65	2 1/2	4-M12× 90×30	4-M16×105×38
80	3	4-M16× 95×38	8-M16×105×38
100	4	8-M16×105×38	8-M16×110×38
125	5	8-M16×110×38	8-M20×125×46
150	6	8-M16×115×38	8-M20×130×52
200	8	8-M20×130×52	12-M20×130×52
250	10	12-M20×140×52	12-M22×150×60
300	12	12-M20×150×52	16-M22×160×60

### Long bolt & nut

Nominal size		JIS 5K	JIS 10K	ASME Class 125/150
mm	inch	Long bolts and nuts	Long bolts and nuts	Long bolts and nuts
40	1 1/2	4-M12× 95×25	4-M16×110×25	4-U1/2 ×110×32
50	2	4-M12×105×25	4-M16×120×30	4-U5/8 ×140×38
65	2 1/2	4-M12×110×25	4-M16×125×30	4-U5/8 ×140×38
80	3	4-M16×120×30	8-M16×125×30	4-U5/8 ×140×38
100	4	8-M16×130×30	8-M16×130×30	8-U5/8 ×150×38
125	5	8-M16×130×30	8-M20×150×40	8-U3/4 ×160×51
150	6	8-M16×140×35	8-M20×155×40	8-U3/4 ×165×51
200	8	8-M20×155×40	12-M20×155×40	8-U3/4 ×175×51
250	10	12-M20×165×40	12-M22×175×45	12-U7/8 ×195×58
300	12	12-M20×175×40	16-M22×185×45	12-U7/8 ×205×58

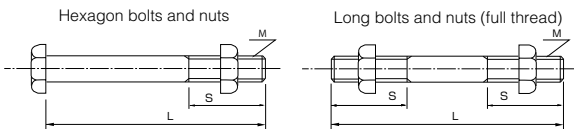
Remark: Please use a hexagon nut with 80% threading. (For ASME, use heavy nut.)

Example

Long bolts : 12 - M22 × 185 × 45      Hexagon bolts : 12 - M22 × 60 × 50

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**700G** Wafer

**704G** Full lugged

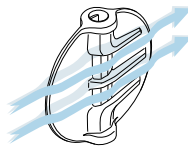
**705G** Semi lugged



### Features and Benefits

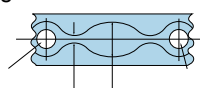
#### Rib disc

The 316 stainless steel (JIS SCS14) rib disc comes standard from 50mm to 300mm. Thin profile disc reinforced by ribs (patent pending) provides larger Cv compared to our conventional design. It also reduces weight while maintaining mechanical strength. A flat face disc is also available on request.



#### Patented cosine curve seat ring

The cosine curve seat ring reduces valve operating torque substantially and allows the torque to be adjusted according to the working pressure.



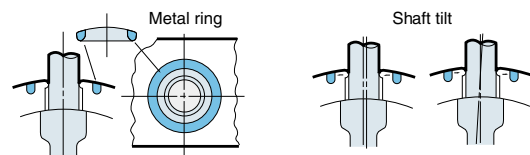
#### Much longer life with spherical design

Similar to a spherical body rotating inside a spherical area, the operation of the disc is smooth and unhindered. Torque is reduced and the valve life is lengthened by 300%.



#### Self-aligning stem seal through backup ring

The stem seal is the primary and secondary seal system. The backup ring functions as the self-aligning stem seal.



#### Long bonnet

The long neck shape allows insulation of up to 50mm after the valve is installed. 701G: Nylon coated body is also available (50 to 300mm).

Please contact us for more information.

#### Two aligning methods (350 to 600mm)

Two valve models are available: the casted hole type (700G) and the tapped and drilled hole type (705G). They accommodate all the applicable flange standards.

## Discs and seats come in various materials to meet a wide range of needs. These are the ultimate general purpose valves and they provide excellent cost performance.

### General Description

Handling, durability and longevity are the basic aspects by which valve performance can be improved. TOMOE have now developed the 700G series, a superior, pressure-proof, general purpose valve, with the addition of a wide range of features to offer improved performance and better cost efficiency.

The 700G series is designed to satisfy many international flange standards for use worldwide.

### Structure

The body is available in various designs such as wafer, semi-lugged and full-lugged, with various materials such as ductile iron, carbon steel, etc. The disc is also available with high-grade stainless steel, type 316, nylon coating, aluminium, bronze or PPS. The patented cosine-curve structure is adopted for the seat ring. The 700G series is superior to conventional models in all respects.

### Standard Specifications

Model	700G (Wafer)			704G (Fully lugged)		705G (Semi lugged)	
Valve nominal size	40 to 300mm	350 to 550mm	600mm	50 to 300mm	350 to 600mm	40 to 300mm	350 to 600mm
Flange accommodation	JIS 5K/10K, ASME Class 125/150, DIN PN10/PN16, BS 4504 PN10/PN16, BS 10' E'	JIS 5K/10K	JIS 5K/10K, ASME Class 125/150, DIN PN10, BS4504 PN10	JIS 5K/10K, ASME Class 125/150, DIN PN10/PN16, BS4504 PN10/PN16, BS 10' E'	JIS 5K/10K, ASME Class 125/150, DIN PN10, BS4504 PN10	JIS 5K/10K, ASME Class 125/150, DIN PN10/PN16, BS4504 PN10/PN16, BS10' E'	JIS 5K/10K, ASME Class 125/150, DIN PN10, BS4504 PN10 550mm:JIS 5K/10K only
Face-to-face dimensions	700G JIS B 2002 46 series/ISO 5752 wafer butterfly valve(short) 550mm: JIS B 2002 44series						
Max. working pressure	1.0 MPa						
Seat leakage	Tight-shutoff						
Flow direction	One way (Flow direction marked on body)						
Body shell test (hydraulic)	1.5MPa(hydraulic) JIS5K: 0.75MPa						
Seat leak test (pneumatic) ※1	1.1MPa(40 to 300mm: pneumatic 350 to 600mm: hydraulic) JIS5K: 0.55MPa						
Working temperature range ※2,※3	NBR : -10 to 80 degrees C, *EPDM : -20 to 120 degrees C						
Working temperature in continuous use ※4	NBR : 0 to 60 degrees C, *EPDM : 0 to 70 degrees C						
Standard materials	Body ※5	Ductile iron, JIS FCD450	Cast iron, JIS FC 250	Ductile iron, JIS FCD450		Ductile iron, JIS FCD 450	Cast iron, JIS FC250, Ductile iron, JIS FCD450
	Disc	316 stainless steel, JIS SCS14 ※6	304 stainless steel, JIS SCS13 316 stainless steel, JIS SCS14	316 stainless steel, JIS SCS14 ※6	304 stainless steel, JIS SCS 13, 316 stainless steel, JIS SCS14	316 stainless steel, JIS SCS 14 ※6	304 stainless steel, JIS SCS 13, 316 stainless steel, JIS SCS 14
		PPS (40 to 200mm) Aluminium bronze JIS CAC702 (50 to 600mm)	Aluminium bronze JIS CAC702	PPS (50 to 200mm) Aluminium bronze JIS CAC702 (50 to 600mm)	Aluminium bronze JIS CAC702	PPS (40 to 200mm) Aluminium bronze JIS CAC702 (50 to 600mm)	Aluminium bronze JIS CAC702
		Ductile iron, JIS FCD 450		Ductile iron, JIS FCD 450	Ductile iron, JIS FCD 450 with hard chrome plating	Ductile iron, JIS FCD 450	
	Stem	SUS420J2 / SUS329J1 as an option (550mm: SUS403)					
Seat ring ※7	NBR, *EPDM ※7						
Top flange	ISO5211/1						
Condensation prevention structure	Optional (Condensation prevention resin column)						
Piping flange gasket	Not required						
Coating ※8	40 to 300mm : Epoxy primer(Munsell N7)			350 to 600mm : Lacquer primer (Munsell N7)			

※1 16bar finish is also available subject to working conditions.

※2 Working temperature range varies depending on combination of disc materials and seating. Please consult us.

※3 Please consult us when using NBR and EPDM seating continuously above 60 degrees C and 70 degrees C respectively.

※4 "Working temperature in continuous use" stands for the temperature continuously kept exceeding one hour.

※5 Cast steel body or stainless steel body is also available.

※6 Rib disc: standard. Flat face disc: optional.

※7 Heat resistant EPDM (to 150 degrees C), FKM, SEP, CR and white-NBR seats are also available. See below table.

※8 Polyester powder backed finish (V-Pet #4000) for 700G size 40 to 300mm. Epoxy resin coating for 705G size 50 to 300mm.

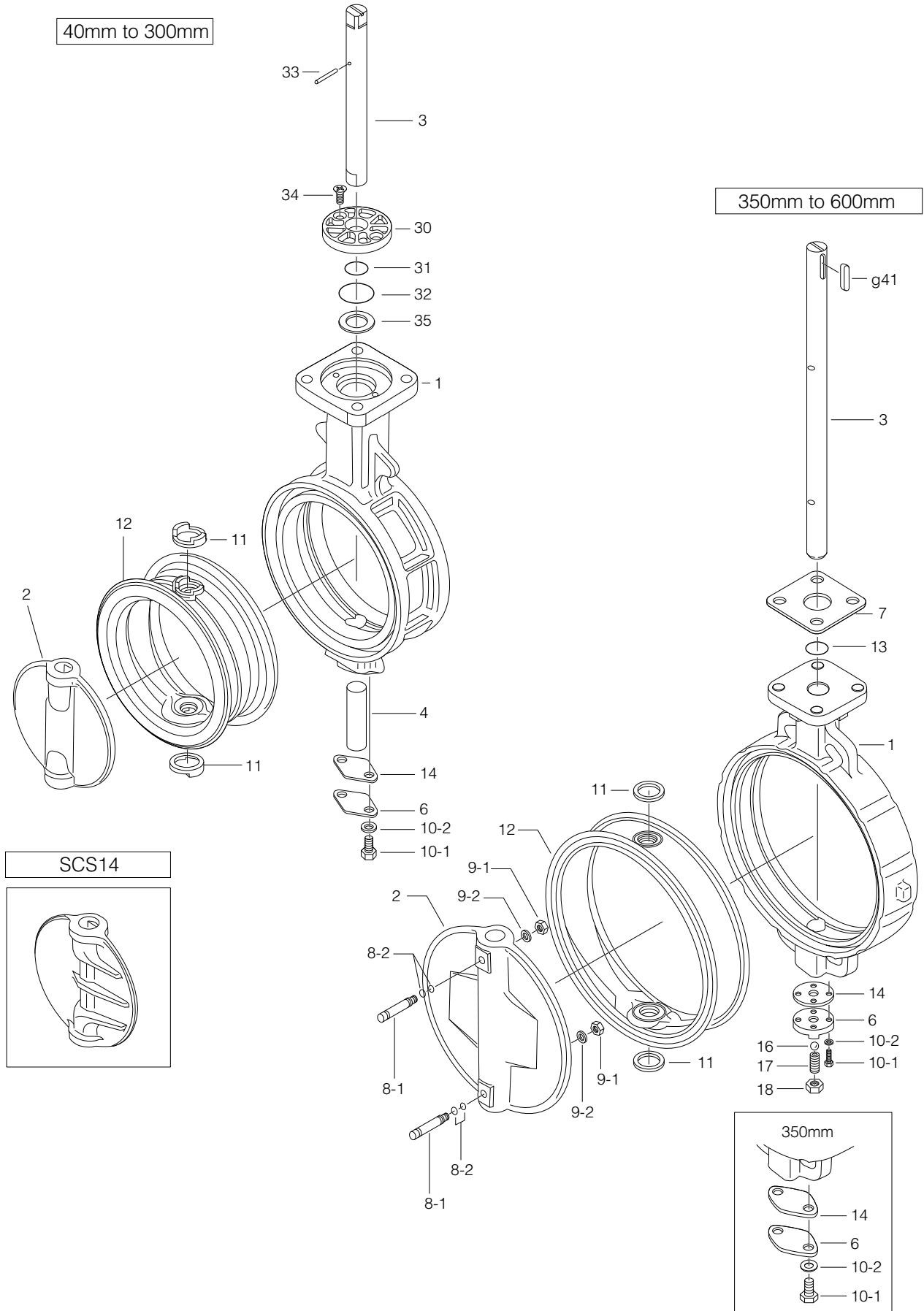
※9 Export license by Japanese Ministry is required up to 100mm with FKM seating. Please consult us the detail.

\* Never use an EPDM rubber seat ring if the valve is being used for oil or for a fluid containing even a slight amount of oil.

### Seat ring material table

Material	Standard		On request						
	EPDM	NBR	Food Grade EPDM	Heat resistant EPDM	HI-NBR	W-NBR	FKM	CR	SEP
Working temperature range (degrees C)	-20~120	-10~80	-20~120	-10~150	-5~80	-10~70	-10~60	-10~80	-10~60
Working temperature in continuous use (degrees C)	0~70	0~60	0~70	0~130	0~60	0~60	0~50	0~60	0~50
Max. working pressure (MPa)	1.0	1.0	1.0	0.5	1.0	0.5	0.5	1.0	0.5

700G Expanded view of components



## 700G Parts list

### ■ 700G Parts list (40mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Upper stem	1	
4	Lower stem	1	See Remark 2.
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
★ 11	Secondary ring	2	Only 50mm to 300mm
★ 12	Seat ring	1	
★ 14	Gasket	1	
★ 30	Bushing	1	
★ 31	O-ring	1	
★ 32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

### ■ 700G Parts list (350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
★ 8-1	Taper bolt	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon nut	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
★ 11	Secondary ring	2	350mm
11	Secondary ring	2	400mm to 600mm
★ 12	Seat ring	1	
★ 13	O-ring	1	
★ 14	Gasket	1	
16	Ball	1	Only 400mm to 600mm
17	Hollow bolt	1	Only 400mm to 600mm
18	Lock nut	1	Only 400mm to 600mm
g41	Key	1	

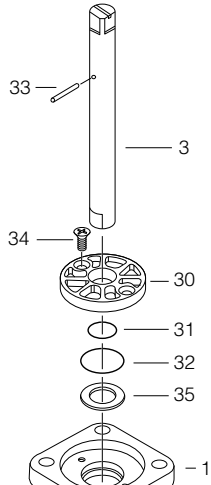
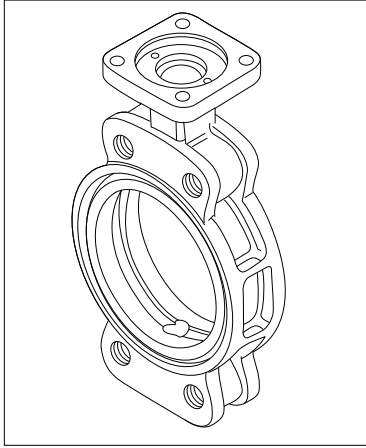
Remark 1: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

Remark 2: When the disc material is PPS, the lower stem length of types 50mm to 100mm is different from standard.

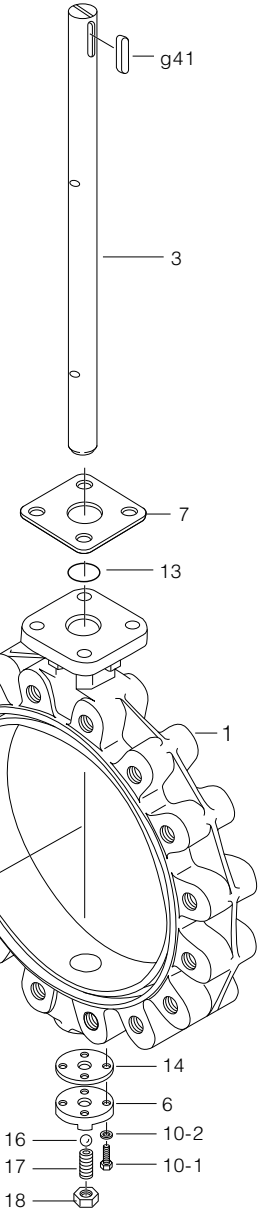
**704G Expanded View of Components**

50mm to 300mm

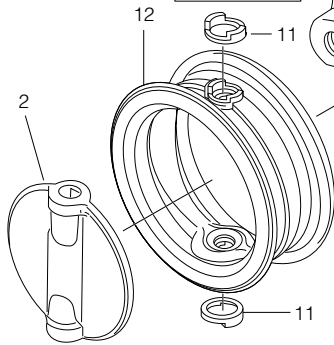
50mm,65mm,80mm (JIS 5K)



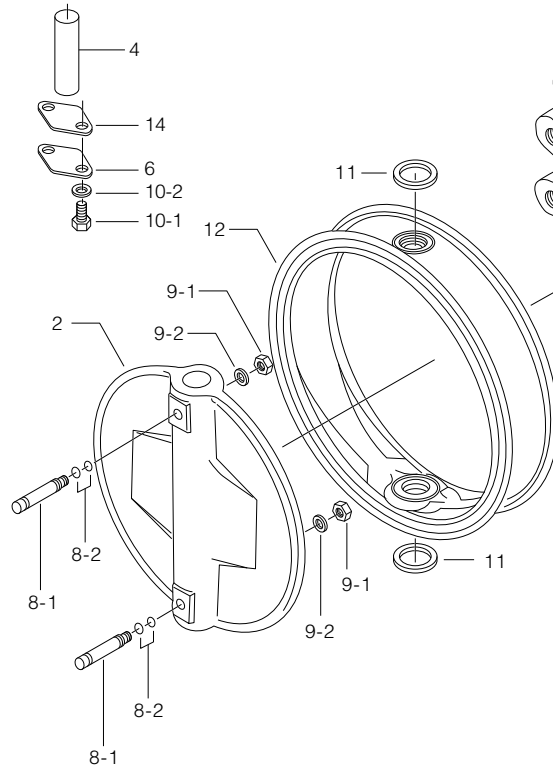
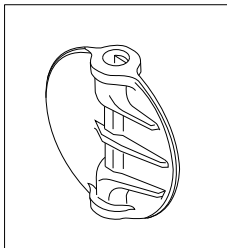
350mm to 600mm



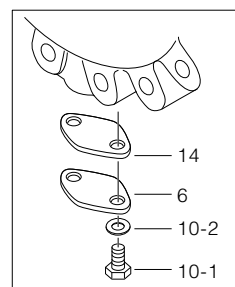
80mm  
11



SCS14



350mm





## 704G Parts list

### ■ 704G Parts list (50mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Upper stem	1	
4	Lower stem	1	See Remark 2.
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
★ 11	Secondary ring	2	
★ 12	Seat ring	1	
★ 14	Gasket	1	
★ 30	Bushing	1	
★ 31	O-ring	1	
★ 32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

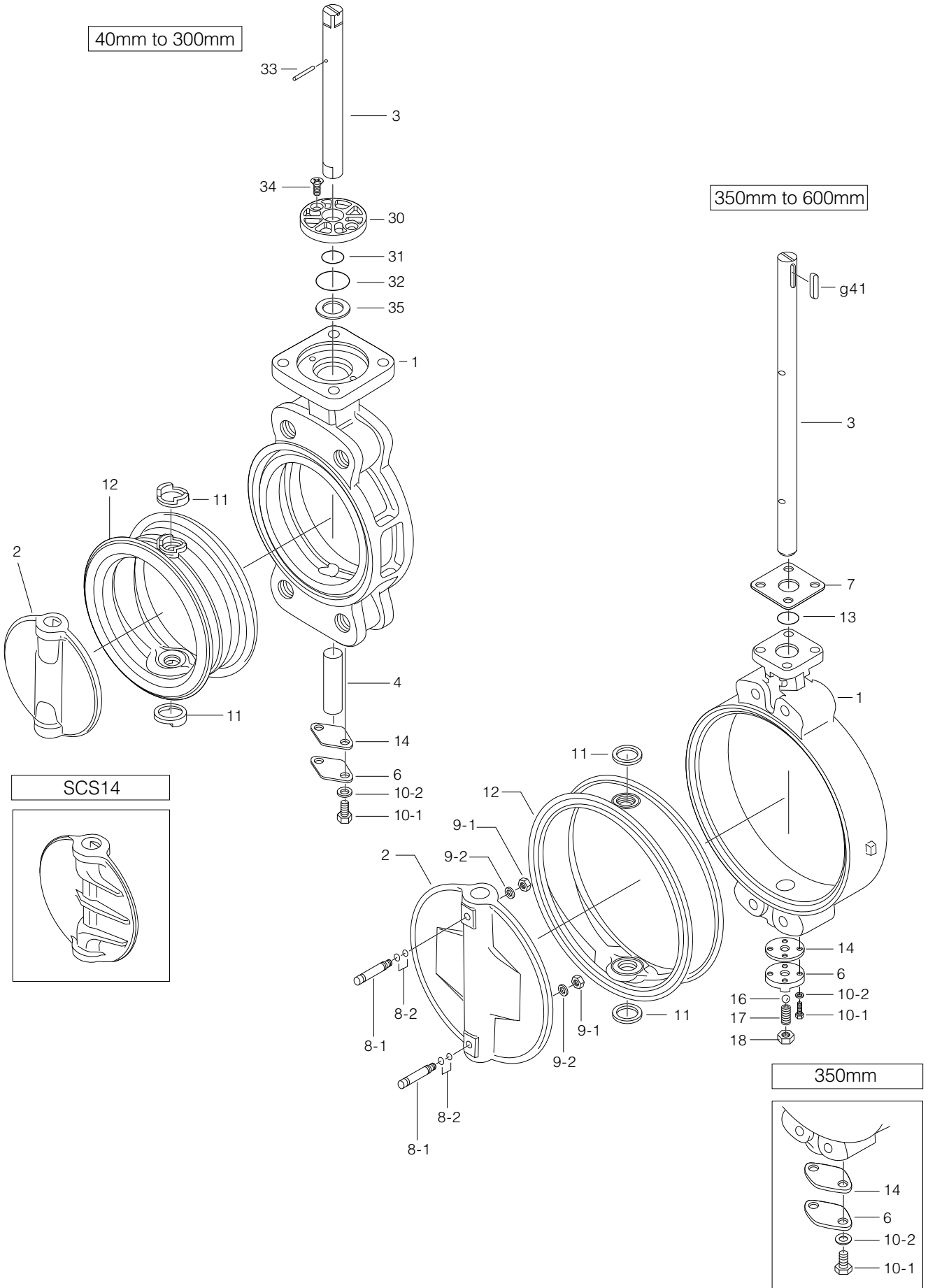
### ■ 704G Parts list (350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
★ 8-1	Taper bolt	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon nut	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
★ 11	Secondary ring	2	350mm
11	Secondary ring	2	400mm to 600mm
★ 12	Seat ring	1	
★ 13	O-ring	1	
★ 14	Gasket	1	
16	Ball	1	Only 400mm to 600mm
17	Hollow bolt	1	Only 400mm to 600mm
18	Lock nut	1	Only 400mm to 600mm
g41	Key	1	

Remark 1: The ★ indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt.

Remark 2: When the disc material is PPS, the lower stem length of types 50mm to 100mm is different from standard.

705G Expanded view of components



## 705G Parts list

### ■ 705G Parts list (40mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Upper stem	1	
4	Lower stem	1	See Remark 2.
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
★ 11	Secondary ring	2	
★ 12	Seat ring	1	
★ 14	Gasket	1	
★ 30	Bushing	1	
★ 31	O-ring	1	
★ 32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

### ■ 705G Parts list (350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
★ 8-1	Taper bolt	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon nut	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
★ 11	Secondary ring	2	350mm
11	Secondary ring	2	400mm to 600mm
★ 12	Seat ring	1	
★ 13	O-ring	1	
★ 14	Gasket	1	
16	Ball	1	Only 400mm to 600mm
17	Hollow bolt	1	Only 400mm to 600mm
18	Lock nut	1	Only 400mm to 600mm
g41	Key	1	

Remark 1: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

Remark 2: When the disc material is PPS, the lower stem length of types 40mm to 100mm is different from standard.

**700G / 704G / 705G Actuator Selection Chart**

**700G/704G/705G**

Model	Category	Size (mm / inch)															
		40	50	65	80	100	125	150	200	250	300	350	400	450	500	550 <sup>**1</sup>	600
		1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	22	24
1T	Standard	1T-1			1T-2			1T-3									
	Heavy duty	1T-1			1T-2			1T-3									
2U	Standard	2U-0		2U-1		2U-2		2U-3		2U-4		2U-5		2U-6			
	Heavy duty	2U-0		2U-1		2U-2		2U-3		2U-4		2U-5		2U-6			
2G,2R	Standard	2G-1				2G-2			2G-3		2G-4	2R-3			2R-4		
	Heavy duty	2G-1				2G-2			2G-3		2G-4	2R-3			2R-4		
7E,3A	Standard	T35		T85			T200		T380		T750		TGA-125	TGA-140	TGA-160	TGA-180	
	Heavy duty	T35		T85			T200		T380		T750		TGA-125	TGA-140	TGA-160	TGA-180	
7G,7F 3U,3K	Standard	T85S	T200S		T380S			T750S		TG-10S			TG-12S	TG-14S	TG-20S		
	Heavy duty	T85S	T200S		T380S			T750S		TG-10S			TG-12S	TG-14S	TG-20S		
4I <sup>**</sup>	ON-OFF	4I-00		4I-0		4I-1	4I-2	4I-2.5		4I-3		4I-4					
	Control	4I-00		4I-0		4I-1	4I-2	4I-2.5		4I-3		4I-4					
4J,4L	Standard	SRJ-010				SRJ-020			SRJ-060			LTKD-01 0.2kW /MGH-3	LTKD-01 0.4kW /MGH-3	LTKD-02 0.75kW /MGH-4	LTKD-05 0.75kW /MGH-4		
	Heavy duty	SRJ-010				SRJ-020			SRJ-060			LTKD-01 0.2kW /MGH-3	LTKD-01 0.4kW /MGH-3	LTKD-02 0.75kW /MGH-4	LTKD-05 0.75kW /MGH-4		

Remark<sup>\*\*</sup>: For 400mm with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

<sup>\*\*1</sup> 550mm is available for 700G and 705G only.

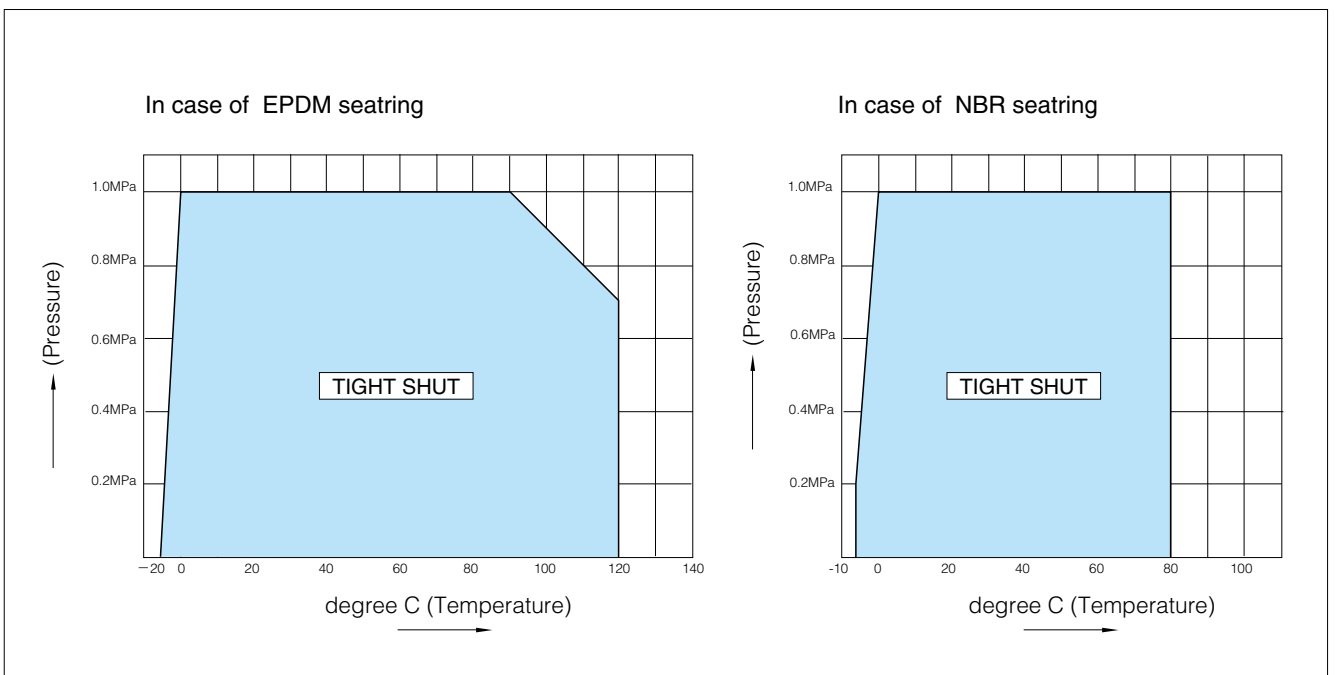
Selection criteria	Standard
	Heavy duty

Select when none of the following heavy duty items apply.

Select when any of the following items apply.

- ① Powder or high viscosity fluid (crude oil, etc.)
- ② Control specification (with positioner)
- ③ Emergency open valve or pipe dead end valve

**700G / 704G / 705G Pressure-Temperature Rating**



700G Bare shaft (01: 40mm to 300mm, 02: 350mm to 600mm)

700G

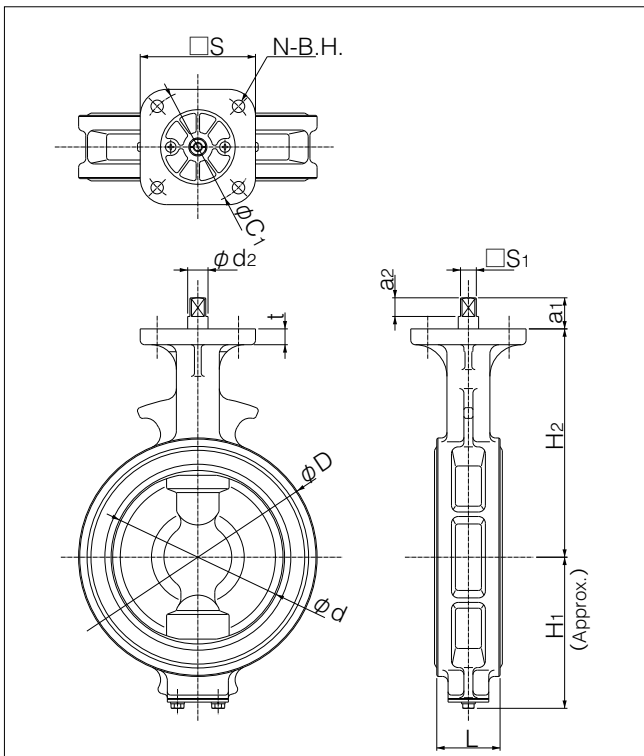
Shaft type	Nominal size		Dimension (mm)													Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S <sub>1</sub>	$\phi d_2$	b	t <sub>2</sub>	t	Top flange	
01	40	1 1/2	45	80	35	61	132	21.5	10.5	8	10	—	—	12	F07	1.5
	50	2	56	90	43	68	138	21.5	10.5	8	10	—	—	12	F07	1.8
	65	2 1/2	69	115	46	79	151	21.5	10.5	8	10	—	—	12	F07	2.5
	80	3	84	126	46	86	156	22.5	11.5	10	12	—	—	12	F07	2.6
	100	4	104	146	52	103	167	22.5	11.5	12	14	—	—	12	F07	3.4
	125	5	130	181	56	118	191	27.5	16.5	14	16	—	—	14	F10	5.4
	150	6	153.5	211	56	135	202	27.5	16.5	14	18	—	—	14	F10	7
	200	8	199	256	60	177	227	30	20	18	22	—	—	14	F10	10.4
	250	10	253	322	68	215	280	35	30	24	28	—	—	14	F10	18
300	12	302	367	78	253	312	35	30	24	32	—	—	16	F12	25	
02	350	14	337	410	78	276	348	48	43	—	32	10	3	23	F14	42
	400	16	394	467	102	338	383	54	48	—	40	12	3	23	F14	64
	450	18	441	525	114	368	413	65	59	—	46	14	3.5	23	F14	87
	500	20	492	580	127	403	453	79	73	—	50	14	3.5	28	F14	114
	550	22	524.2	633	150	416	460	79	73	—	55	16	4	25	F16	178.6
	600	24	584	682	154	458	528	79	73	—	55	16	4	28	F16	191

Top flange dimension list

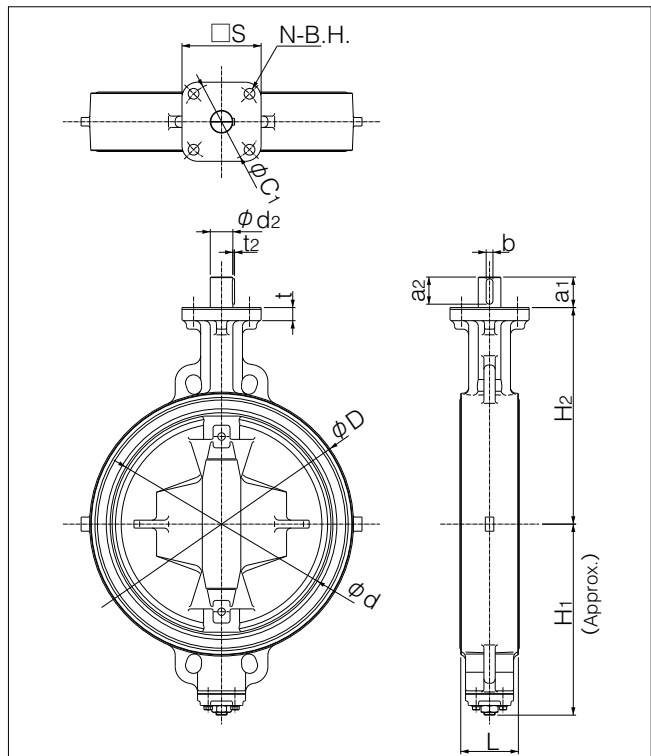
Flange type	□S	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

Shaft type	01 : Square
	02 : Round (Key way)

700G 40mm~300mm



700G 350mm~500mm



## 704G Bare shaft (01: 50mm to 300mm, 02: 350mm to 600mm)

### 704G

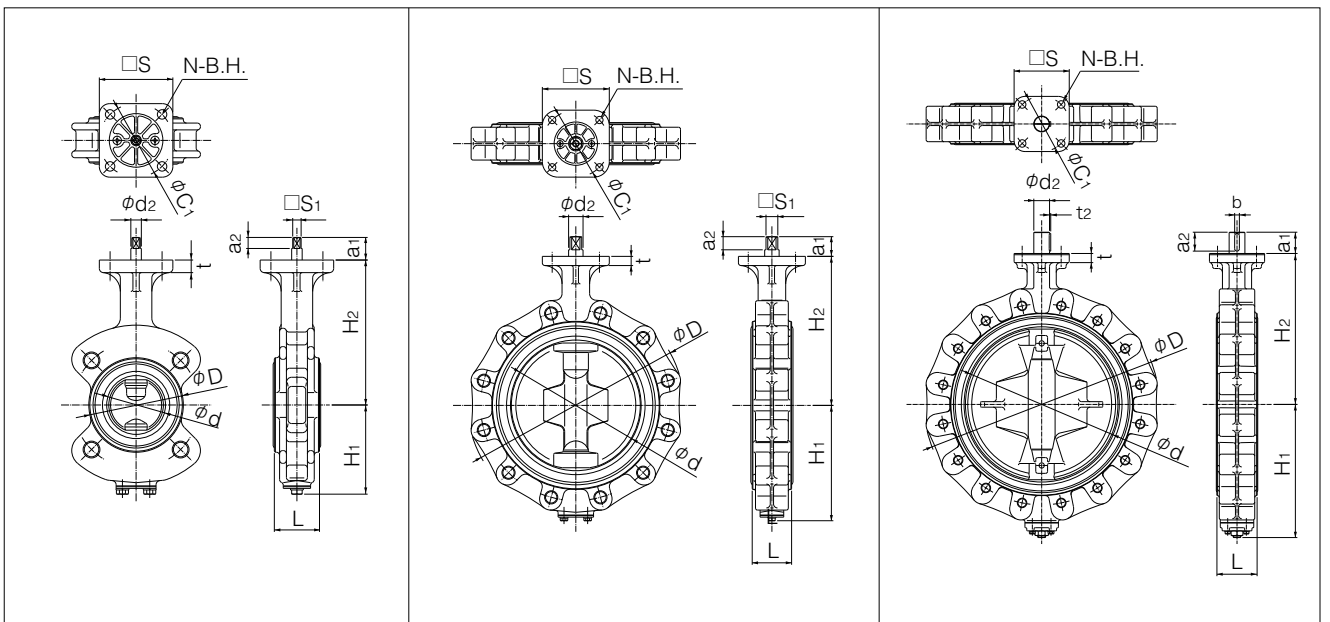
Shaft type	Nominal size		Dimension (mm)													Approx. Mass (kg)	
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\square S_1$	$\phi d_2$	b	t <sub>2</sub>	t		Top flange
				JIS5K	JIS10K												
01	50	2	56	90	90	43	85	138	21.5	10.5	8	10	—	—	12	F07	2.5
	65	2 1/2	69	115	115	46	94	151	21.5	10.5	8	10	—	—	12	F07	3.5
	80	3	84	126	190	46	109	156	22.5	11.5	10	12	—	—	12	F07	4 (4.8)
	100	4	104	223	223	52	117	167	22.5	11.5	12	14	—	—	12	F07	6.7
	125	5	130	250	250	56	143	191	27.5	16.5	14	16	—	—	14	F10	8.8
	150	6	153.5	276	276	56	164	202	27.5	16.5	14	18	—	—	14	F10	10.4
	200	8	199	334	329	60	176	227	30	20	18	22	—	—	14	F10	16.3
	250	10	253	402	402	68	215	280	35	30	24	28	—	—	14	F10	27
	300	12	302	472	438	78	253	312	35	30	24	32	—	—	16	F12	39
02	350	14	337	533	505	78	276	348	48	43	—	32	10	3	23	F14	66
	400	16	394	597	597	102	338	383	54	48	—	40	12	3	23	F14	107
	450	18	441	634	626	114	368	413	65	59	—	46	14	3.5	23	F14	128
	500	20	492	696	696	127	403	453	79	73	—	50	14	3.5	28	F14	170
	600	24	584	820	795	154	458	528	79	73	—	55	16	4	28	F16	275 (269)

Remark: In case of JIS10K the mass with round bracket.

### Top flange dimension list

Flange type	$\square S$	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

<b>Shaft type</b>	01 : Square
	02 : Round (Key way)



705G Bare shaft(01: 40mm to 300mm, 02: 350mm to 600mm)

■705G

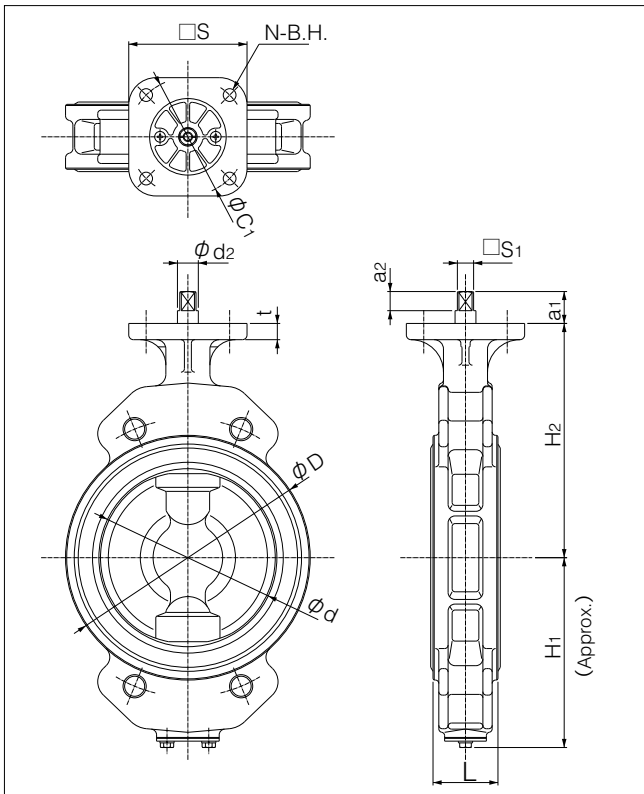
Shaft type	Nominal size		Dimension (mm)													Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S <sub>1</sub>	$\phi d_2$	b	t <sub>2</sub>	t	Top flange	
01	40	1 1/2	45	80	35	61	132	21.5	10.5	8	10	—	—	12	F07	2.0
	50	2	56	90	43	85	138	21.5	10.5	8	10	—	—	12	F07	2.5
	65	2 1/2	69	115	46	94	151	21.5	10.5	8	10	—	—	12	F07	3.5
	80	3	84	126	46	109	156	22.5	11.5	10	12	—	—	12	F07	4
	100	4	104	146	52	117	167	22.5	11.5	12	14	—	—	12	F07	5
	125	5	130	181	56	143	191	27.5	16.5	14	16	—	—	14	F10	8
	150	6	153.5	211	56	164	202	27.5	16.5	14	18	—	—	14	F10	11
	200	8	199	256	60	186	227	30	20	18	22	—	—	14	F10	15
	250	10	253	322	68	215	280	35	30	24	28	—	—	14	F10	24
300	12	302	367	78	253	312	35	30	24	32	—	—	16	F12	31	
02	350	14	337	410	78	276	348	48	43	—	32	10	3	23	F14	47
	400	16	394	467	102	338	383	54	48	—	40	12	3	23	F14	72
	450	18	441	525	114	368	413	65	59	—	46	14	3.5	23	F14	96
	500	20	492	580	127	403	453	79	73	—	50	14	3.5	28	F14	127
	550	22	524.2	633	150	416	460	79	73	—	55	16	4	25	F16	178.6
	600	24	584	682	154	458	528	79	73	—	55	16	4	28	F16	191

■Top flange dimension list

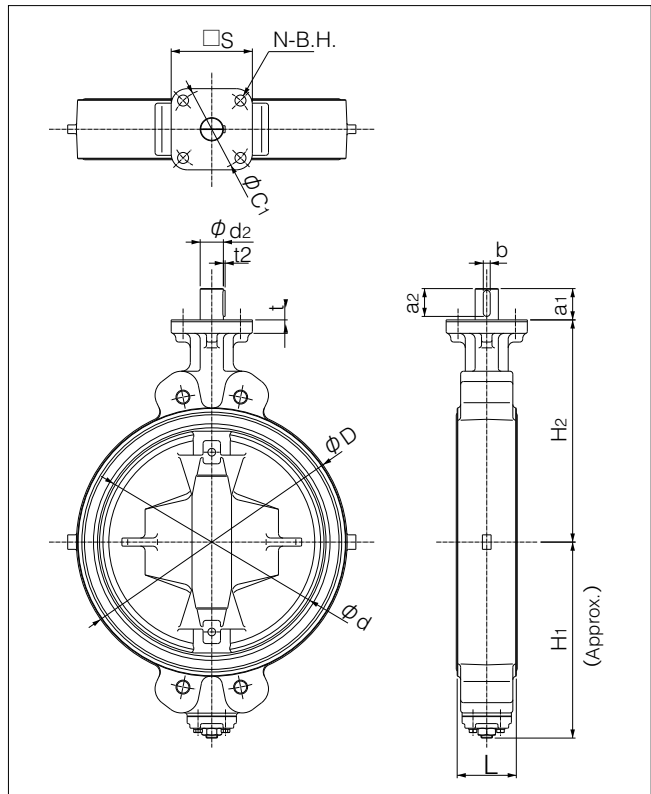
Flange type	□S	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

Shaft type	
01	Square
02	Round (Key way)

■705G 40mm~300mm



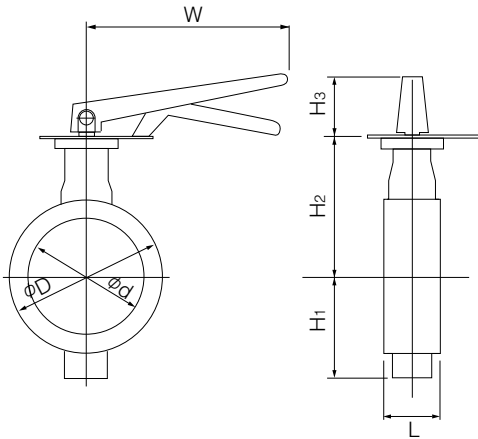
■705G 350mm~600mm



Lock lever type 700G-1T (40mm to 200mm)

Nominal size		Dimension (mm)							Lever type	Approx.Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
40	1 1/2	45	80	35	61	132	66	200	1T-1	2.1
50	2	56	90	43	68	138	66	200	1T-1	2.4
65	2 1/2	69	115	46	79	151	66	200	1T-1	3.1
80	3	84	126	46	86	156	66	200	1T-1	3.2
100	4	104	146	52	103	167	66	200	1T-1	4
125	5	130	181	56	118	191	92	300	1T-2	6.7
150	6	153.5	211	56	135	202	92	300	1T-2	8.3
200	8	199	256	60	177	227	97	350	1T-3	12.1

■700G-1T



■1T Installation direction

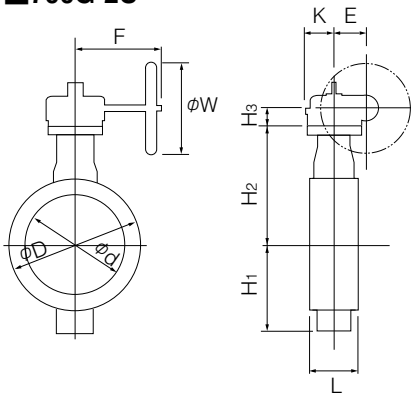
1TLS (standard)	1TLR	1TRS	1TRR
1TXS	1TXR	1TVS	1TVR



**Worm gear type 700G-2U (40mm to 600mm)**

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
40	1 1/2	45	80	35	61	132	29.5	36	46	160	100	2U-0	3.8
50	2	56	90	43	68	138	29.5	36	46	160	100	2U-0	4.1
65	2 1/2	69	115	46	79	151	29.5	36	46	160	100	2U-0	4.8
80	3	84	126	46	86	156	29.5	36	46	160	100	2U-1	4.9
100	4	104	146	52	103	167	29.5	36	46	160	100	2U-1	5.7
125	5	130	181	56	118	191	34.5	44	53	173.5	160	2U-2	9.6
150	6	153.5	211	56	135	202	34.5	44	53	173.5	160	2U-2	11.2
200	8	199	256	60	177	227	41.5	67	75	198	200	2U-3	18
250	10	253	322	68	215	280	41.5	67	75	198	200	2U-3	26
300	12	302	367	78	253	312	48	87.5	90	222.5	200	2U-4	39
350	14	337	410	78	276	348	48	87.5	90	222.5	280	2U-4	58
400	16	394	467	102	338	383	50	90	105	266	280	2U-5	80
450	18	441	525	114	368	413	50	90	105	266	280	2U-5	103
500	20	492	580	127	403	453	50	90	105	266	280	2U-5	130
550	22	524.2	633	150	416	460	61	113	140	352	400	2U-6	210
600	24	584	682	154	458	528	61	113	140	352	400	2U-6	222

**700G-2U**



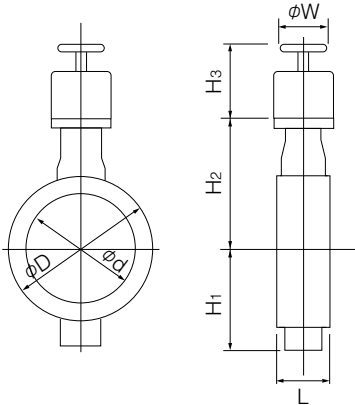
**2U Installation direction**

2U A (standard)	2U AR	2U B	2U BR

## Center handle type 700G-2G (40mm to 300mm) / 700G-2R (350mm to 600mm)

Nominal size		Dimension (mm)							Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
40	1 1/2	45	80	35	61	132	136	100	2G-1	4.4
50	2	56	90	43	68	138	136	100	2G-1	4.7
65	2 1/2	69	115	46	79	151	136	100	2G-1	5.4
80	3	84	126	46	86	156	136	100	2G-1	5.5
100	4	104	146	52	103	167	136	100	2G-1	6.3
125	5	130	181	56	118	191	133	100	2G-2	9.2
150	6	153.5	211	56	135	202	133	100	2G-2	10.8
200	8	199	256	60	177	227	151	200	2G-3	17.5
250	10	253	322	68	215	280	151	200	2G-3	25.1
300	12	302	367	78	253	312	161	200	2G-4	32.1
350	14	337	410	78	276	348	409	355	2R-3	75
400	16	394	467	102	338	383	409	355	2R-3	97
450	18	441	525	114	368	413	409	355	2R-3	121
500	20	492	580	127	403	453	409	355	2R-3	148
550	22	524.2	633	150	416	460	498	450	2R-4	262
600	24	584	682	154	458	528	498	450	2R-4	244

### 700G-2G/2R



## Double-acting pneumatic cylinder type 700G-7E (40mm to 350mm)

### Standard

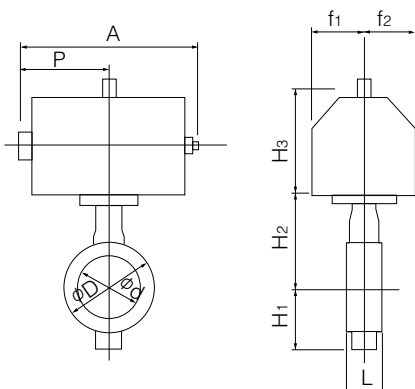
Nominal size		Dimension (mm)										Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	125	228	116	57	29	T35	4
50	2	56	90	43	68	138	125	228	116	57	29	T35	4
65	2 1/2	69	115	46	79	151	125	228	116	57	29	T35	5
80	3	84	126	46	86	156	168	276	142	75	47	T85	8
100	4	104	146	52	103	167	168	276	142	75	47	T85	8
125	5	130	181	56	118	191	168	276	142	75	47	T85	10
150	6	153.5	211	56	135	202	203	346	176	79	57	T200	15
200	8	199	256	60	177	227	231	423	214	91	69	T380	25
250	10	253	322	68	215	280	231	423	214	91	69	T380	32
300	12	302	367	78	253	312	269	546	270	118	85	T750	49
350	14	337	410	78	276	348	269	546	270	118	85	T750	74

### Heavy duty

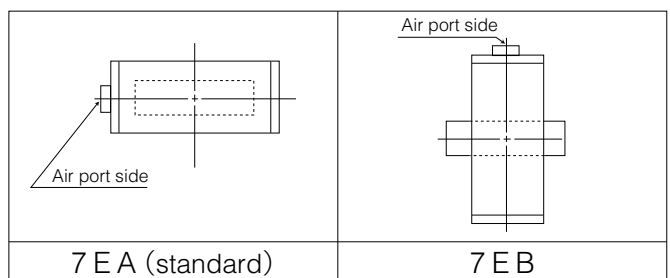
Nominal size		Dimension (mm)										Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	125	228	116	57	29	T35	4
50	2	56	90	43	68	138	125	228	116	57	29	T35	4
65	2 1/2	69	115	46	79	151	125	228	116	57	29	T35	5
80	3	84	126	46	86	156	168	276	142	75	47	T85	8
100	4	104	146	52	103	167	203	346	176	79	57	T200	12
125	5	130	181	56	118	191	203	346	176	79	57	T200	14
150	6	153.5	211	56	135	202	203	346	176	79	57	T200	15
200	8	199	256	60	177	227	231	423	214	91	69	T380	25
250	10	253	322	68	215	280	231	423	214	91	69	T380	32
300	12	302	367	78	253	312	269	546	270	118	85	T750	49

<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 700G-7E



### 7E Installation direction



## Double-acting pneumatic cylinder type 700G-3A (350mm to 600mm)

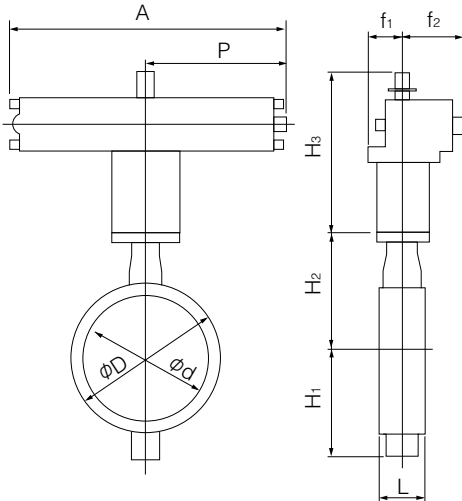
### Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
400	16	394	467	102	338	383	364	754	381	100	164	TGA-125	101
450	18	441	525	114	368	413	412	840	432	100	180	TGA-140	138
500	20	492	580	127	403	453	465	954	483	130	202	TGA-160	204
550	22	524.2	633	150	416	460	465	954	483	130	203	TGA-160	287
600	24	584	682	154	458	528	478	1069	543	130	218	TGA-180	330

### Heavy duty

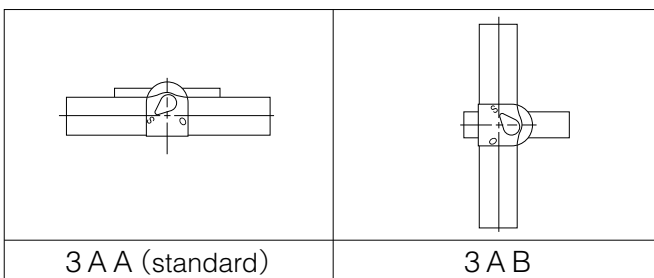
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	337	410	78	276	348	364	754	381	100	164	TGA-125	80
400	16	394	467	102	338	383	412	840	432	100	180	TGA-140	116
450	18	441	525	114	368	413	465	954	483	130	202	TGA-160	188
500	20	492	580	127	403	453	465	954	483	130	202	TGA-160	204
550	22	524.2	633	150	416	460	478	1069	543	130	221	TGA-180	328
600	24	584	682	154	458	528	525	1175	599	160	253	TGA-200	390

### 700G-3A



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 3A Installation direction



Single-acting pneumatic cylinder type 700G-7G (Air to open: 40mm to 250mm) / 700G-7F (Air to close: 40mm to 250mm)

■ Standard

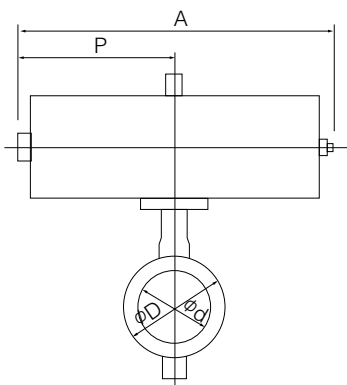
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	168	364	183	75	47	T85S	8
50	2	56	90	43	68	138	168	364	183	75	47	T85S	8
65	2 1/2	69	115	46	79	151	203	449	226	79	57	T200S	14
80	3	84	126	46	86	156	203	449	226	79	57	T200S	14
100	4	104	146	52	103	167	203	449	226	79	57	T200S	15
125	5	130	181	56	118	191	231	550	276	91	69	T380S	25
150	6	153.5	211	56	135	202	231	550	276	91	69	T380S	26
200	8	199	256	60	177	227	269	723	360	118	85	T750S	43
250	10	253	322	68	215	280	269	723	360	118	85	T750S	51

■ Heavy duty

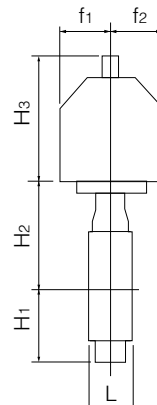
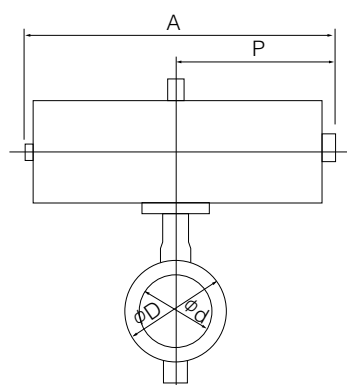
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	168	364	183	75	47	T85S	8
50	2	56	90	43	68	138	168	364	183	75	47	T85S	8
65	2 1/2	69	115	46	79	151	203	449	226	79	57	T200S	14
80	3	84	126	46	86	156	203	449	226	79	57	T200S	14
100	4	104	146	52	103	167	231	550	276	91	69	T380S	23
125	5	130	181	56	118	191	231	550	276	91	69	T380S	25
150	6	153.5	211	56	135	202	269	723	360	118	85	T750S	40

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

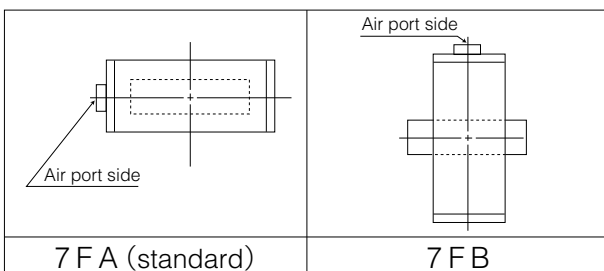
■ 700G-7F



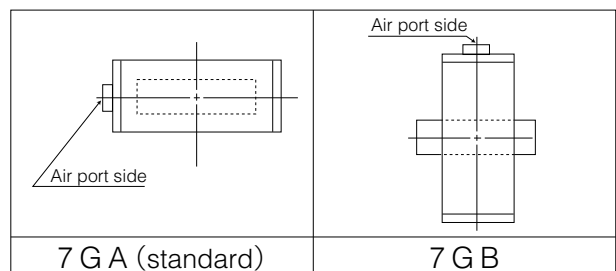
■ 700G-7G



■ 7F Installation direction



■ 7G Installation direction



Single-acting pneumatic cylinder type 700G-3U (Air to open: 200mm to 600mm) / 700G-3K (Air to close: 200mm to 600mm)

## Standard

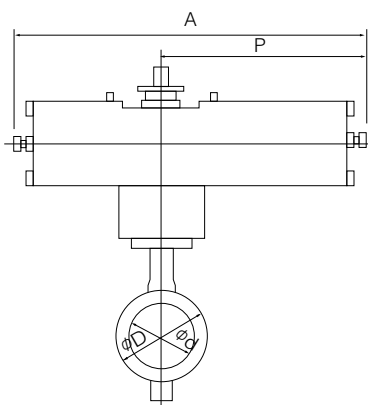
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	253	322	68	215	280	307	945	585	70	165	TG-10S	81
300	12	302	367	78	253	312	307	1080	720	94	206	TG-12S	126
350	14	337	410	78	276	348	307	1080	720	94	206	TG-12S	143
400	16	394	467	102	338	383	340	1255	865	131	257	TG-14S	262
450	18	441	525	114	368	413	340	1255	865	131	257	TG-14S	285
500	20	492	580	127	403	453	474	1655	1095	164	348	TG-20S	525
550	22	524.2	633	150	416	460	474	1655	1095	164	348	TG-20S	594
600	24	584	682	154	458	528	474	1655	1095	164	348	TG-20S	602

## Heavy duty

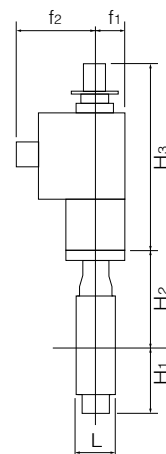
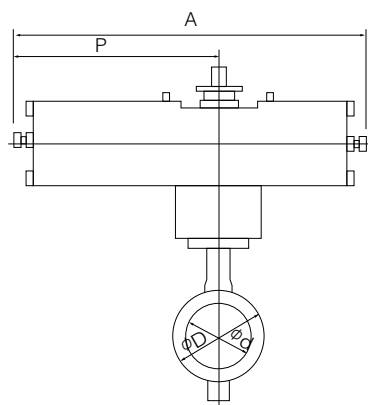
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	199	256	60	177	227	307	945	585	70	165	TG-10S	73
250	10	253	322	68	215	280	307	1080	720	94	206	TG-12S	119
300	12	302	367	78	253	312	307	1080	720	94	206	TG-12S	126
350	14	337	410	78	276	348	340	1255	865	131	257	TG-14S	239
400	16	394	467	102	338	383	340	1255	865	131	257	TG-14S	262
450	18	441	525	114	368	413	474	1655	1095	164	348	TG-20S	498
500	20	492	580	127	403	453	474	1655	1095	164	348	TG-20S	525
550	22	524.2	633	150	416	460	474	1655	1095	164	348	TG-20S	594
600	24	584	682	154	458	528	474	1655	1095	164	348	TG-20S	602

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

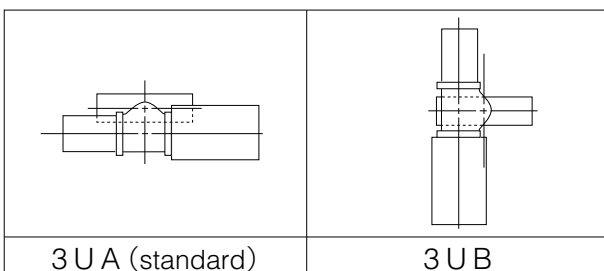
## 700G-3U



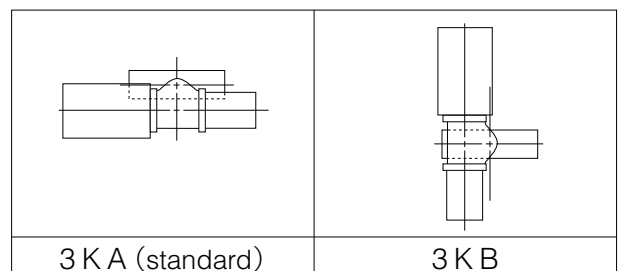
## 700G-3K



## 3U Installation direction



## 3K Installation direction



## Single phase electric motor type 700G-4I (40mm to 500mm)

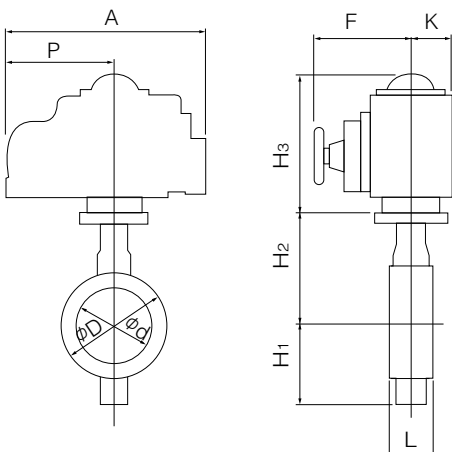
Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
40	1 1/2	45	80	35	61	132	120	161	84	58	45	4 I-00	4
							176	202	100	85	54	4 I-0	5.7
50	2	56	90	43	68	138	120	161	84	58	45	4 I-00	4.3
							176	202	100	85	54	4 I-0	6
65	2 1/2	69	115	46	79	151	150	202	100	85	54	4 I-0	6.7
80	3	84	126	46	86	156	150	202	100	85	54	4 I-0	6.8
100	4	104	146	52	103	167	165	252	138	126	65	4 I-1	9.8
125	5	130	181	56	118	191	198	310	167	154	85	4 I-2	16.6
150	6	153.5	211	56	135	202	198	310	167	154	85	4 I-2	18.2
200	8	199	256	60	177	227	198	310	167	154	85	4 I-2.5	21.6
250	10	253	322	68	215	280	198	310	167	154	85	4 I-2.5	30.8
300	12	302	367	78	253	312	230	388	223	246	136	4 I-3	48.2
350	14	337	410	78	276	348	230	388	223	246	136	4 I-3	65
400	16	394	467	102	338	383	230	388	223	246	136	4 I-3	87
							255	388	223	246	136	4 I-4	93
450	18	441	525	114	368	413	230	388	223	246	136	4 I-4	116
500	20	492	580	127	403	453	230	388	223	246	136	4 I-4	143

Note 1: For nominal size 40, 50 mm type (for control), the 4I-0 type should be selected. (The 4I-00 type is only designed for ON-OFF operation.)

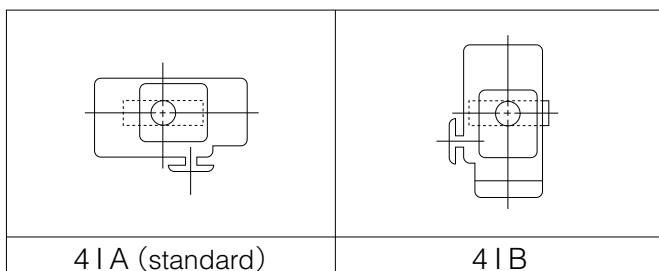
Remark: For 400mm type with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

### 700G-4 I



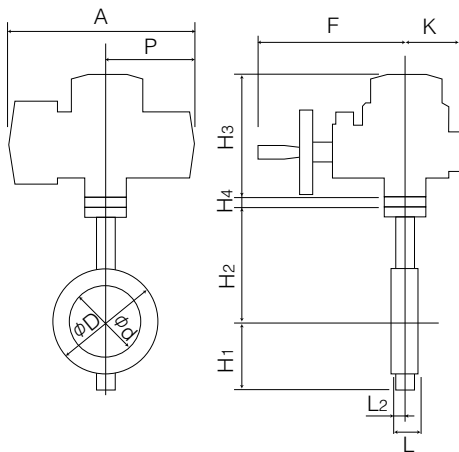
### 4 I Installation direction



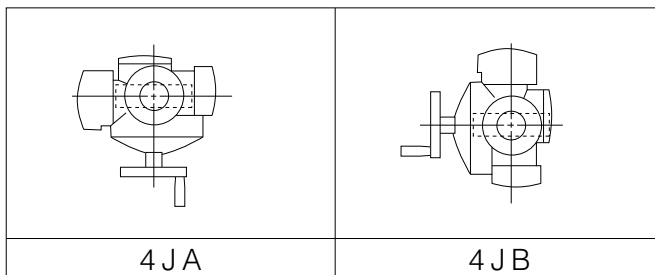
## Three phase motor actuator type 700G-4J (40mm to 300mm)

Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	F	K		
40	1 1/2	45	80	35	61	132	218	3.2	353	167	286	104	SRJ-010	15.2
50	2	56	90	43	68	138	218	3.2	353	167	286	104	SRJ-010	15.5
65	2 1/2	69	115	46	79	151	218	3.2	353	167	286	104	SRJ-010	16.2
80	3	84	126	46	86	156	218	3.2	353	167	286	104	SRJ-010	16.3
100	4	104	146	52	103	167	218	3.2	353	167	286	104	SRJ-010	16.9
125	5	130	181	56	118	191	218	15	353	167	286	104	SRJ-020	19.6
150	6	153.5	211	56	135	202	218	15	353	167	286	104	SRJ-020	21
200	8	199	256	60	177	227	235	3.2	393	191	330	130	SRJ-060	38
250	10	253	322	68	215	280	235	3.2	393	191	330	130	SRJ-060	50
300	12	302	367	78	253	312	235	20	393	191	330	130	SRJ-060	61

### 700G-4J



### 4J Installation direction

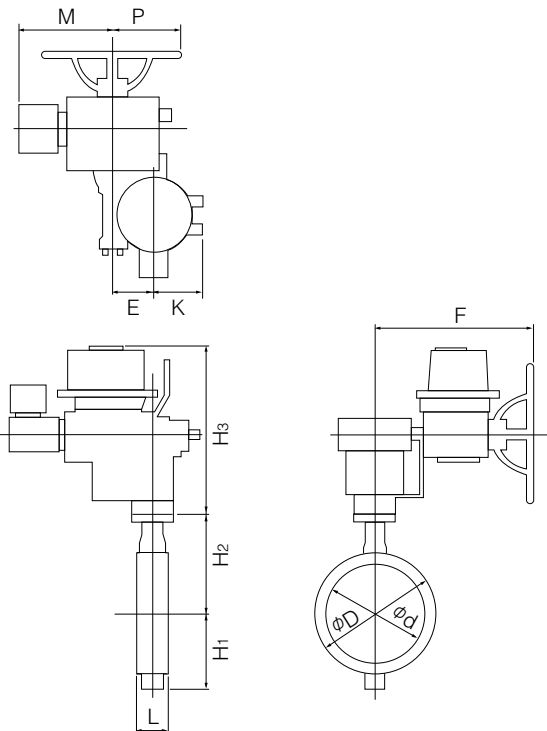




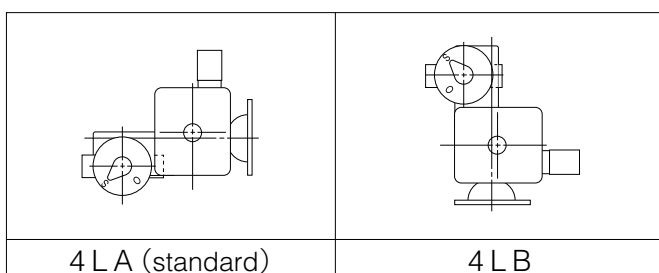
Three phase motor actuator type 700G-4L (350mm to 600mm)

Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
350	14	337	410	78	276	348	487	117	164	533	364	230	LTKD-01 0.2kW /MGH-3	143
400	16	394	467	102	338	383	487	117	164	533	364	230	LTKD-01 0.2kW /MGH-3	165
450	18	441	525	114	368	413	487	117	164	533	357	230	LTKD-01 0.4kW /MGH-3	192
500	20	492	580	127	403	453	487	117	164	533	357	230	LTKD-01 0.4kW /MGH-3	219
550	22	524.2	633	150	416	460	558	140	198	594	375	230	LTKD-20 0.75kW /MGH-1	325
600	24	584	682	154	458	528	590	140	198	637	415	360	LTKD-05 0.75kW /MGH-4	398

■ 700G-4L



■ 4L Installation direction



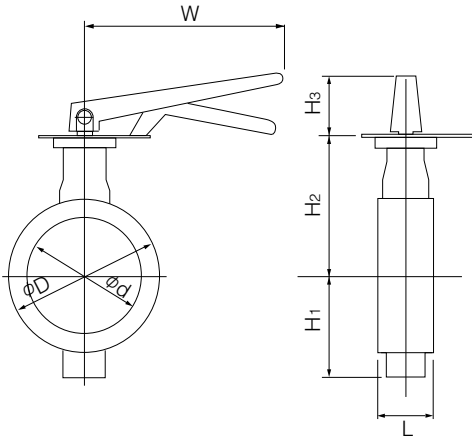
# 704G (Full lugged)

## Lock lever type 704G-1T (50mm to 200mm)

Nominal size		Dimension (mm)								Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
			JIS5K	JIS10K							
50	2	56	90	90	43	85	138	66	200	1T-1	3.1
65	2 1/2	69	115	115	46	94	151	66	200	1T-1	4.1
80	3	84	126	190	46	109	156	66	200	1T-1	4.6 (5.4)
100	4	104	223	223	52	117	167	66	200	1T-1	7.3
125	5	130	250	250	56	143	191	92	300	1T-2	10.1
150	6	153.5	276	276	56	164	202	92	300	1T-2	11.7
200	8	199	334	329	60	186	227	97	350	1T-3	18

Remark: Value in brackets is for JIS 10K flanges.

### 704G-1T



### 1T Installation direction

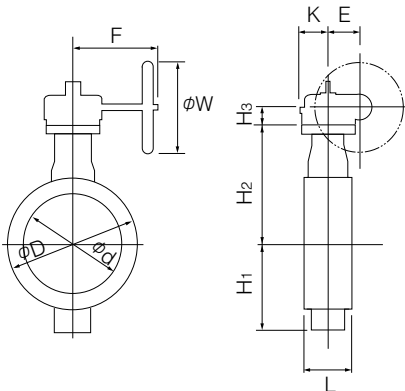
1TSL (standard)	1TLR	1TRS	1TRR
1TXS	1TXR	1TVS	1TVR

## Worm gear type 704G-2U (50mm to 600mm)

Nominal size		Dimension (mm)											Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
			JIS5K	JIS10K										
50	2	56	90	90	43	85	138	29.5	36	46	160	100	2U-0	4.8
65	2 1/2	69	115	115	46	94	151	29.5	36	46	160	100	2U-0	5.8
80	3	84	126	190	46	109	156	29.5	36	46	160	100	2U-1	6.3 (7.1)
100	4	104	223	223	52	117	167	29.5	36	46	160	100	2U-1	9.0
125	5	130	250	250	56	143	191	34.5	44	53	173.5	160	2U-2	13.0
150	6	153.5	276	276	56	164	202	34.5	44	53	173.5	160	2U-2	14.6
200	8	199	334	329	60	176	227	41.5	67	75	198	200	2U-3	22.5 (24)
250	10	253	402	402	68	215	280	41.5	67	75	198	200	2U-3	35
300	12	302	472	438	78	253	312	48	87.5	90	222.5	200	2U-4	53
350	14	337	533	505	78	276	348	48	87.5	90	222.5	280	2U-4	82
400	16	394	597	597	102	338	383	50	90	105	266	280	2U-5	123
450	18	441	634	626	114	368	413	50	90	105	266	280	2U-5	144
500	20	492	696	696	127	403	453	50	90	105	266	280	2U-5	183
600	24	584	820	795	154	458	528	61	113	140	352	400	2U-6	306 (300)

Remark: Value in brackets is for JIS 10K flanges.

### 704G-2U



### 2U Installation direction

2UA (standard)	2UAR	2UB	2UBR

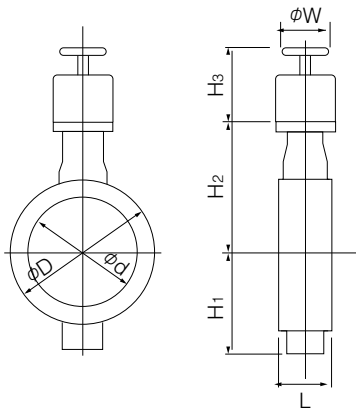
# 704G (Full lugged)

## Center handle type 704G-2G (50mm to 300mm) / 704G-2R (350mm to 600mm)

Nominal size		Dimension (mm)								Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
			JIS5K	JIS10K							
50	2	56	90	90	43	85	138	136	100	2G-1	5.4
65	2 1/2	69	115	115	46	94	151	136	100	2G-1	6.4
80	3	84	126	190	46	109	156	136	100	2G-1	6.9 (7.7)
100	4	104	223	223	52	117	167	136	100	2G-1	9.6
125	5	130	250	250	56	143	191	133	100	2G-2	12.6
150	6	153.5	276	276	56	164	202	133	100	2G-2	14.2
200	8	199	334	329	60	176	227	151	200	2G-3	23.4
250	10	253	402	402	68	215	280	151	200	2G-3	40
300	12	302	472	438	78	253	312	161	200	2G-4	52 (50)
350	14	337	533	505	78	276	348	409	355	2R-3	103 (103)
400	16	394	597	597	102	338	383	409	355	2R-3	140
450	18	441	634	626	114	368	413	409	355	2R-3	166 (169)
500	20	492	696	696	127	403	453	409	355	2R-3	213
600	24	584	820	795	154	458	528	498	450	2R-4	328 (322)

Remark: Value in brackets is for JIS 10K flanges.

### 704G-2G/2R



## Double-acting pneumatic cylinder type 704G-7E (50mm to 350mm)

### Standard

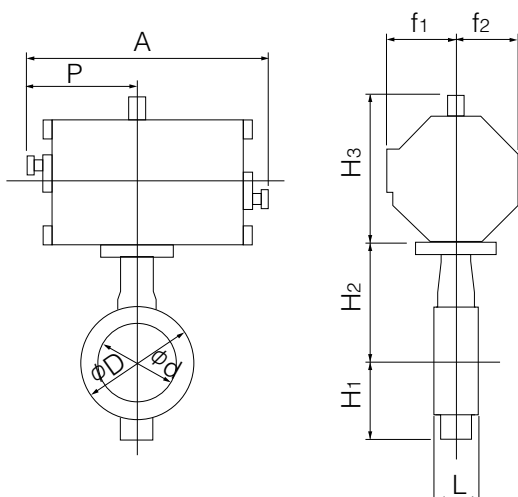
Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
50	2	56	90	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	115	46	94	151	125	228	116	57	29	T35	6
80	3	84	126	190	46	109	156	168	276	142	75	47	T85	11 (10)
100	4	104	223	223	52	117	167	168	276	142	75	47	T85	12
125	5	130	250	250	56	143	191	168	276	142	75	47	T85	14
150	6	153.5	276	276	56	164	202	203	346	176	79	57	T200	19
200	8	199	334	329	60	176	227	231	423	214	91	69	T380	29 (31)
250	10	253	402	402	68	215	280	231	423	214	91	69	T380	41
300	12	302	472	438	78	253	312	269	546	270	118	85	T750	63
350	14	337	533	505	78	276	348	269	546	270	118	85	T750	94

### Heavy duty

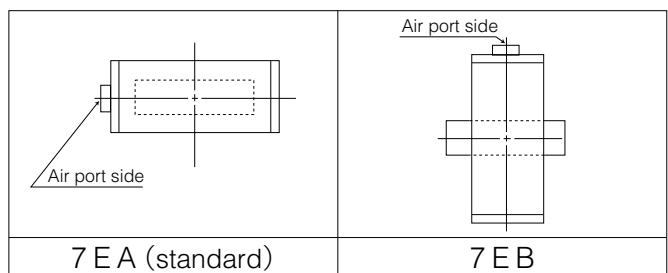
Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
50	2	56	90	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	115	46	94	151	125	228	116	57	29	T35	6
80	3	84	126	190	46	109	156	168	276	142	75	47	T85	11 (10)
100	4	104	223	223	52	117	167	203	346	176	79	57	T200	15
125	5	130	250	250	56	143	191	203	346	176	79	57	T200	17
150	6	153.5	276	276	56	164	202	203	346	176	79	57	T200	19
200	8	199	334	329	60	176	227	231	423	214	91	69	T380	29 (31)
250	10	253	402	402	68	215	280	231	423	214	91	69	T380	41
300	12	302	472	438	78	253	312	269	546	270	118	85	T750	63

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 704G-7E



### 7E Installation direction



# 704G (Full lugged)

## Double-acting pneumatic cylinder type 704G-3A (350mm to 600mm)

### Standard

Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
400	16	394	597	597	102	338	383	364	754	381	100	164	TGA-125	153
450	18	441	634	626	114	368	413	412	840	432	100	180	TGA-140	191
500	20	492	696	696	127	403	453	465	954	483	130	202	TGA-160	276
600	24	584	820	795	154	458	528	478	1069	543	130	218	TGA-180	414 (408)

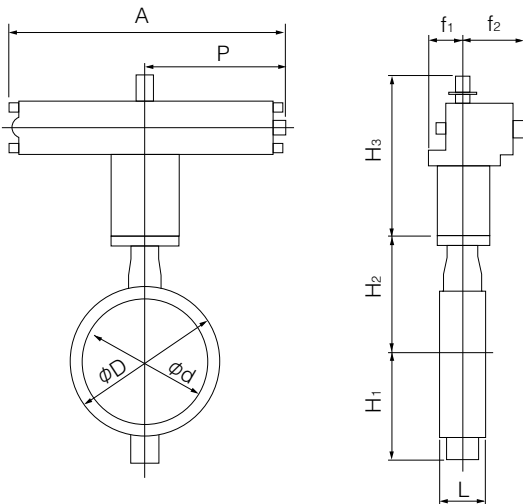
### Heavy duty

Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
350	14	337	533	505	78	276	348	364	754	381	100	164	TGA-125	109
400	16	394	597	597	102	338	383	412	840	432	100	180	TGA-140	168
450	18	441	634	626	114	368	413	465	954	483	130	202	TGA-160	241
500	20	492	696	696	127	403	453	465	954	483	130	202	TGA-160	276
600	24	584	820	795	154	458	528	525	1175	599	160	253	TGA-200	474 (468)

Remark: Value in brackets is for JIS 10K flanges.

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 704G-3A



### 3A Installation direction

3 A A (standard)	3 A B

Single-acting pneumatic cylinder type 704G-7G (Air to open: 50mm to 250mm) / 704G-7F (Air to close: 50mm to 250mm)

■ Standard

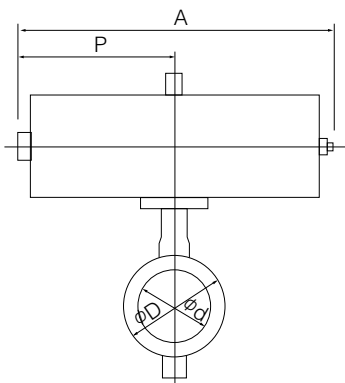
Nominal size			Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	φd	φD		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
50	2	56	90	90	43	85	138	168	364	183	75	47	T85S	9
65	2 1/2	69	115	115	46	94	151	203	449	226	79	57	T200S	15
80	3	84	126	190	46	109	156	203	449	226	79	57	T200S	15 (16)
100	4	104	223	223	52	117	167	203	449	226	79	57	T200S	19
125	5	130	250	250	56	143	191	231	550	276	91	69	T380S	30
150	6	153.5	276	276	56	164	202	231	550	276	91	69	T380S	33
200	8	199	334	329	60	176	227	269	723	360	118	85	T750S	52 (53)
250	10	253	402	402	68	215	280	269	723	360	118	85	T750S	65

■ Heavy duty

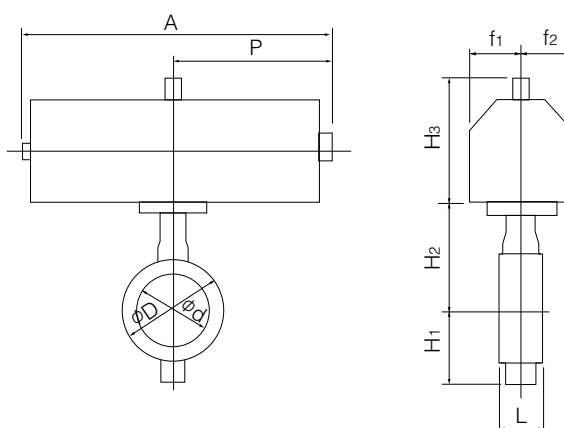
Nominal size			Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	φd	φD		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
50	2	56	90	90	43	85	138	168	364	183	75	47	T85S	9
65	2 1/2	69	115	115	46	94	151	203	449	226	79	57	T200S	15
80	3	84	126	190	46	109	156	203	449	226	79	57	T200S	15 (16)
100	4	104	223	223	52	117	167	231	550	276	91	69	T380S	27
125	5	130	250	250	56	143	191	231	550	276	91	69	T380S	30
150	6	153.5	276	276	56	164	202	269	723	360	118	85	T750S	47

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

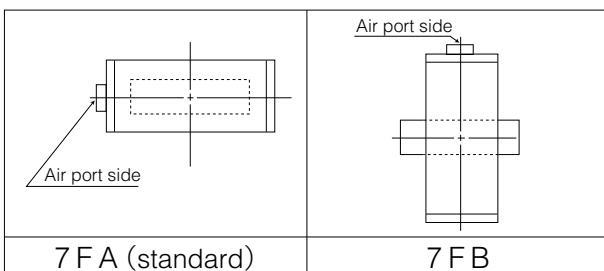
■ 704G-7F



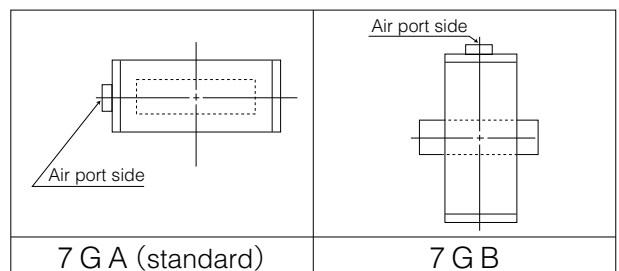
■ 704G-7G



■ 7F Installation direction



■ 7G Installation direction



# 704G (Full lugged)

Single-acting pneumatic cylinder type 704G-3U (Air to open: 200mm to 600mm) / 704G-3K (Air to close: 200mm to 600mm)

## Standard

Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
250	10	253	402	402	68	215	280	307	945	585	70	165	TG-10S	88
300	12	302	472	438	78	253	312	307	1080	720	94	206	TG-12S	145 (143)
350	14	337	533	505	78	276	348	307	1080	720	94	206	TG-12S	167
400	16	394	597	597	102	338	383	340	1255	865	131	257	TG-14S	305
450	18	441	634	626	114	368	413	340	1255	865	131	257	TG-14S	330 (333)
500	20	492	696	696	127	403	453	474	1655	1095	164	348	TG-20S	590
600	24	584	820	795	154	458	528	474	1655	1095	164	348	TG-20S	686 (680)

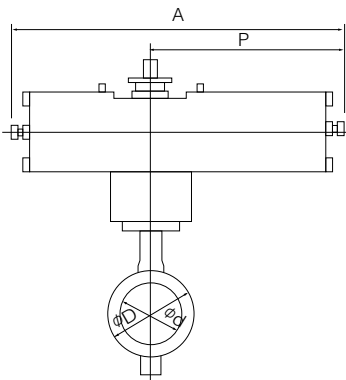
## Heavy duty

Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS5K	JIS10K										
200	8	199	334	329	60	176	227	307	945	585	70	165	TG-10S	75 (77)
250	10	253	402	402	68	215	280	307	1080	720	94	206	TG-12S	133
300	12	302	472	438	78	253	312	307	1080	720	94	206	TG-12S	145 (143)
350	14	337	533	505	78	276	348	340	1255	865	131	257	TG-14S	267 (267)
400	16	394	597	597	102	338	383	340	1255	865	131	257	TG-14S	305
450	18	441	634	626	114	368	413	474	1655	1095	164	348	TG-20S	543 (546)
500	20	492	696	696	127	403	453	474	1655	1095	164	348	TG-20S	590
600	24	584	820	795	154	458	528	474	1655	1095	164	348	TG-20S	686 (680)

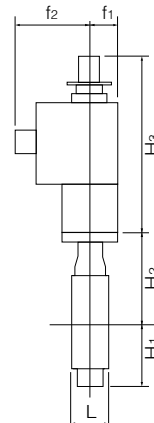
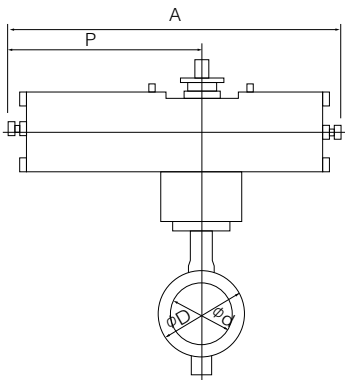
Remark: Value in brackets is for JIS 10K flanges.

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

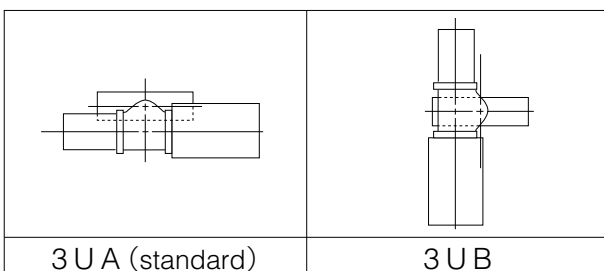
## 704G-3U



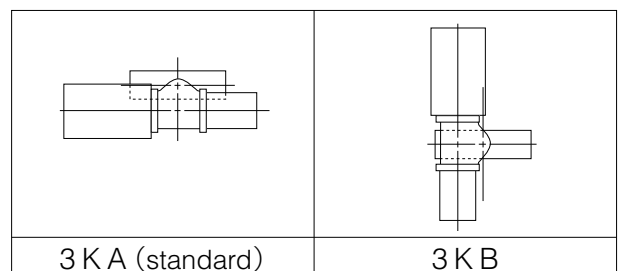
## 704G-3K



## 3U Installation direction



## 3K Installation direction





## Single phase electric motor type 704G-4I (50mm to 500mm)

Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
			JIS5K	JIS10K										
50	2	56	90	90	43	85	138	120	161	84	58	45	4I-00	5.0
								150	202	100	85	54	4I-0	6.7
65	2 1/2	69	115	115	46	94	151	150	202	100	85	54	4I-0	7.7 (9)
80	3	84	126	190	46	109	156	150	202	100	85	54	4I-0	8.2
100	4	104	223	223	52	117	167	165	252	138	126	65	4I-1	13.1
125	5	130	250	250	56	143	191	198	310	167	154	85	4I-2	20.0
150	6	153.5	276	276	56	164	202	198	310	167	154	85	4I-2	21.6
200	8	199	334	329	60	176	227	198	310	167	154	85	4I-2.5	26.0
250	10	253	402	402	68	215	280	198	310	167	154	85	4I-2.5	27.5
300	12	302	472	438	78	253	312	230	388	223	246	136	4I-3	62
350	14	337	533	505	78	276	348	230	388	223	246	136	4I-3	89
400	16	394	597	597	102	338	383	230	388	223	246	136	4I-3	127
								255	388	223	246	136	4I-4	136
450	18	441	634	626	114	368	413	230	388	223	246	136	4I-4	157
500	20	492	696	696	127	403	453	230	388	223	246	136	4I-4	199

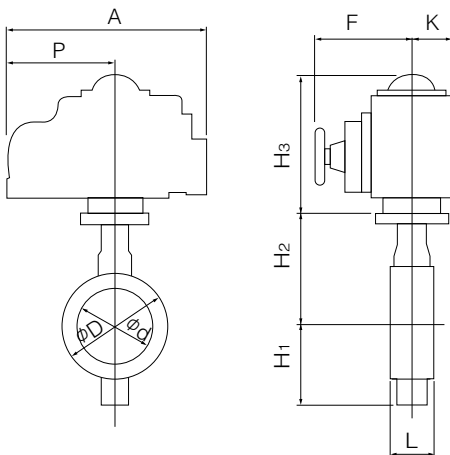
Note 1: For nominal size 50 mm (for control), the 4I-0 type should be selected. (The 4I-00 type is only designed for ON-OFF operation.)

Remark: Value in brackets is for JIS 10K flanges.

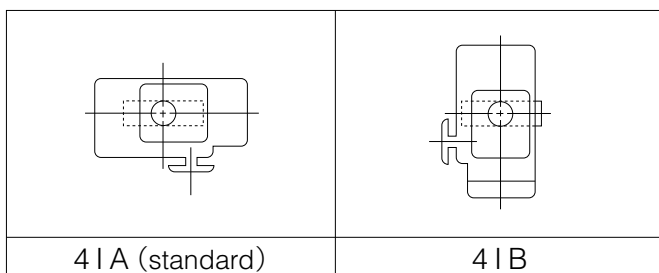
Remark: For 300mm with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

### 704G-4I



### 4I Installation direction

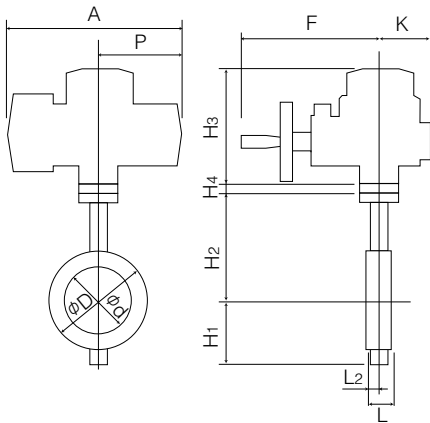


## Three phase motor actuator type 704G-4J (50mm to 300mm)

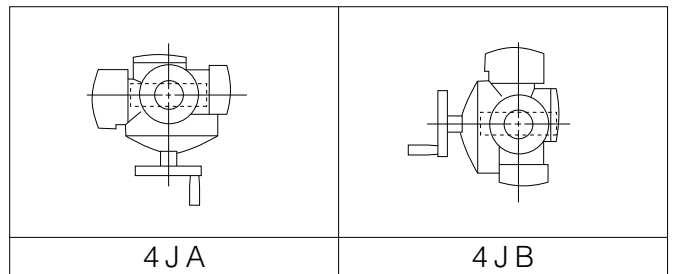
Nominal size		Dimension (mm)												Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	F	K		
			JIS5K	JIS10K											
50	2	56	90	90	43	85	138	218	3.2	353	167	272	104	SRJ-010	15.2
65	2 1/2	69	115	115	46	94	151	218	3.2	353	167	272	104	SRJ-010	16.5 (17.8)
80	3	84	126	190	46	109	156	218	3.2	353	167	272	104	SRJ-010	17.8
100	4	104	223	223	52	117	167	218	3.2	353	167	272	104	SRJ-010	19.7
125	5	130	250	250	56	143	191	218	15	353	167	272	104	SRJ-020	21.8
150	6	153.5	276	276	56	164	202	218	15	353	167	272	104	SRJ-020	23.4
200	8	199	334	329	60	176	227	235	3.2	393	191	316	130	SRJ-060	38
250	10	253	402	402	68	215	280	235	3.2	393	191	316	130	SRJ-060	50
300	12	302	472	438	78	253	312	235	20	393	191	316	130	SRJ-060	61

Remark: Value in brackets is for JIS 10K flanges.

### 704G-4J



### 4J Installation direction

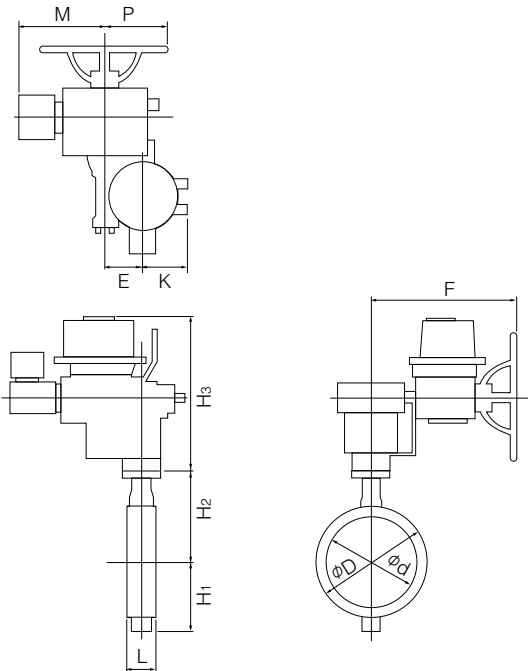


### Three phase motor actuator type 704G-4L (350mm to 600mm)

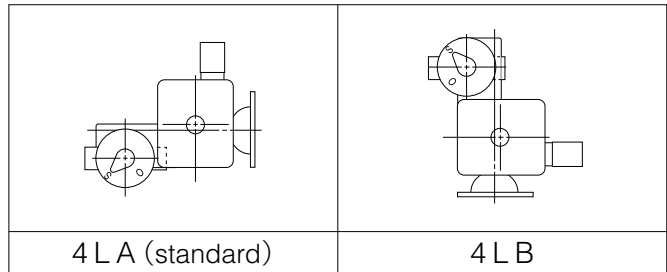
Nominal size		Dimension (mm)												Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
			JIS5K	JIS10K											
350	14	337	533	505	78	276	348	487	117	164	533	364	230	LTKD-01 0.2kW /MGH-3	209
400	16	394	597	597	102	338	383	487	117	164	533	364	230	LTKD-01 0.2kW /MGH-3	244
450	18	441	634	626	114	368	413	487	117	164	533	357	230	LTKD-01 0.4kW /MGH-3	264
500	20	492	696	696	127	403	453	487	117	164	533	357	230	LTKD-01 0.4kW /MGH-3	291
600	24	584	820	795	154	458	528	590	140	198	637	415	375	LTKD-05 0.75kW /MGH-4	504 (498)

Remark: Value in brackets is for JIS 10K flanges.

#### 704G-4L



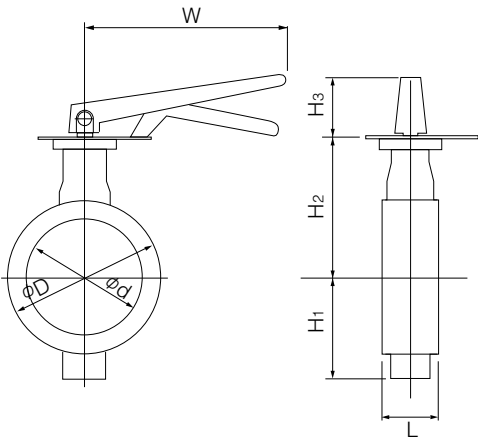
#### 4L Installation direction



## Lock lever type 705G-1T (40mm to 200mm)

Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
40	1 1/2	45	80	35	61	132	66	200	1T-1	2.6
50	2	56	90	43	85	138	66	200	1T-1	3.1
65	2 1/2	69	115	46	94	151	66	200	1T-1	4.1
80	3	84	126	46	109	156	66	200	1T-1	4.6
100	4	104	146	52	117	167	66	200	1T-1	5.6
125	5	130	181	56	143	191	92	300	1T-2	9.3
150	6	153	211	56	164	202	92	300	1T-2	12.3
200	8	199.0	256	60	186	227	97	350	1T-3	16.7

### 705G-1T



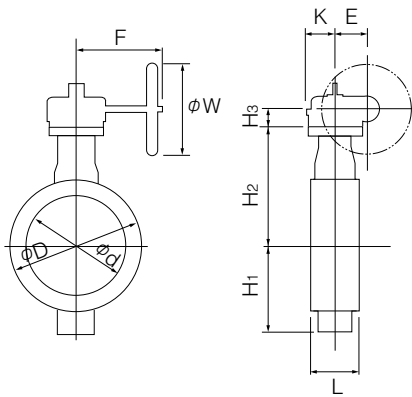
### 1T Installation direction

1TSL (standard)	1TLR	1TRS	1TRR
1TXS	1TXR	1TVS	1TVR

**Worm gear type 705G-2U (40mm to 600mm)**

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
40	1 1/2	45	80	35	61	132	29.5	36	46	160	100	2U-0	4.3
50	2	56	90	43	85	138	29.5	36	46	160	100	2U-0	4.8
65	2 1/2	69	115	46	94	151	29.5	36	46	160	100	2U-0	5.8
80	3	84	126	46	109	156	29.5	36	46	160	100	2U-1	6.3
100	4	104	146	52	117	167	29.5	36	46	160	100	2U-1	7.3
125	5	130	181	56	143	191	34.5	44	53	173.5	160	2U-2	12.2
150	6	153.5	211	56	164	202	34.5	44	53	173.5	160	2U-2	16
200	8	199	256	60	186	227	41.5	67	75	198	200	2U-3	23
250	10	253	322	68	215	280	41.5	67	75	198	200	2U-3	32
300	12	302	367	78	253	312	48	87.5	90	222.5	200	2U-4	45
350	14	337	410	78	276	348	48	87.5	90	222.5	280	2U-4	63
400	16	394	467	102	338	383	50	90	105	266	280	2U-5	91
450	18	441	525	114	368	413	50	90	105	266	280	2U-5	115
500	20	492	580	127	403	453	50	90	105	266	280	2U-5	145
550	22	524.2	633	150	416	460	61	113	140	352	400	2U-6	210
600	24	584	682	154	458	528	61	113	140	352	400	2U-6	225

**705G-2U**



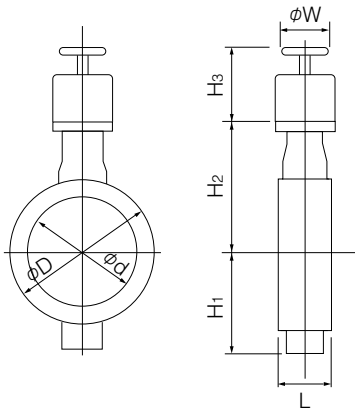
**2U Installation direction**

2UA (standard)	2UAR	2UB	2UBR

## Center handle type 705G-2G (40mm to 300mm) / 705G-2R (350mm to 600mm)

Nominal size		Dimension (mm)							Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
40	1 1/2	45	80	35	61	132	136	100	2G-1	4.9
50	2	56	90	43	85	138	136	100	2G-1	5.4
65	2 1/2	69	115	46	94	151	136	100	2G-1	6.4
80	3	84	126	46	109	156	136	100	2G-1	6.9
100	4	104	146	52	117	167	136	100	2G-1	7.9
125	5	130	181	56	143	191	133	100	2G-2	11.8
150	6	153.5	211	56	164	202	133	100	2G-2	14.8
200	8	199	256	60	186	227	151	200	2G-3	22.1
250	10	253	322	68	215	280	151	200	2G-3	32
300	12	302	367	78	253	312	161	200	2G-4	39
350	14	337	410	78	276	348	409	355	2R-3	82
400	16	394	467	102	338	383	409	355	2R-3	105
450	18	441	525	114	368	413	409	355	2R-3	130
500	20	492	580	127	403	453	409	355	2R-3	161
550	22	524.2	633	150	416	460	498	450	2R-4	262
600	24	584	682	154	458	528	498	450	2R-4	244

### 705G-2G/2R



## Double-acting pneumatic cylinder type 705G-7E (40mm to 350mm)

### Standard

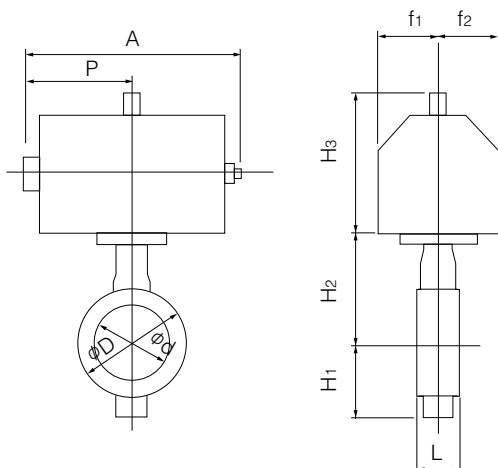
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	125	228	116	57	29	T35	4
50	2	56	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	46	94	151	125	228	116	57	29	T35	6
80	3	84	126	46	109	156	168	276	142	75	47	T85	9
100	4	104	146	52	117	167	168	276	142	75	47	T85	10
125	5	130	181	56	143	191	168	276	142	75	47	T85	13
150	6	153.5	211	56	164	202	203	346	176	79	57	T200	19
200	8	199	256	60	186	227	231	423	214	91	69	T380	29
250	10	253	322	68	215	280	231	423	214	91	69	T380	38
300	12	302	367	78	253	312	269	546	270	118	85	T750	55
350	14	337	410	78	276	348	324	546	270	118	85	T750	79

### Heavy duty

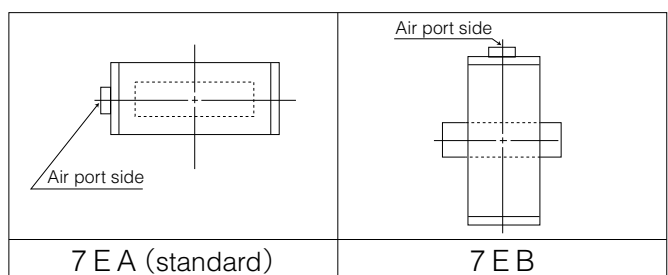
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	125	228	116	57	29	T35	4
50	2	56	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	46	94	151	125	228	116	57	29	T35	6
80	3	84	126	46	109	156	168	276	142	75	47	T85	9
100	4	104	146	52	117	167	203	346	176	79	57	T200	13
125	5	130	181	56	143	191	203	346	176	79	57	T200	16
150	6	153.5	211	56	164	202	203	346	176	79	57	T200	19
200	8	199	256	60	186	227	231	423	214	91	69	T380	29
250	10	253	322	68	215	280	231	423	214	91	69	T380	38
300	12	302	367	78	253	312	269	546	270	118	85	T750	55

<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 705G-7E



### 7E Installation direction



## Double-acting pneumatic cylinder type 705G-3A (400mm to 600mm)

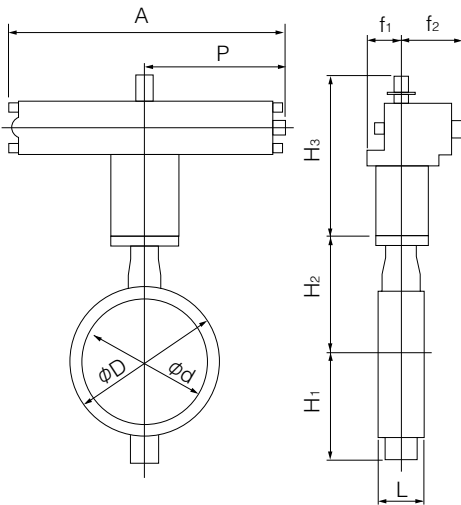
### Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
400	16	394	467	102	338	383	364	754	381	100	164	TGA-125	110
450	18	441	525	114	368	413	412	840	432	100	180	TGA-140	150
500	20	492	580	127	403	453	465	954	483	130	202	TGA-160	220
550	22	524.2	633	150	416	460	465	954	483	130	203	TGA-160	287
600	24	584	682	154	458	528	478	1069	543	130	218	TGA-180	330

### Heavy duty

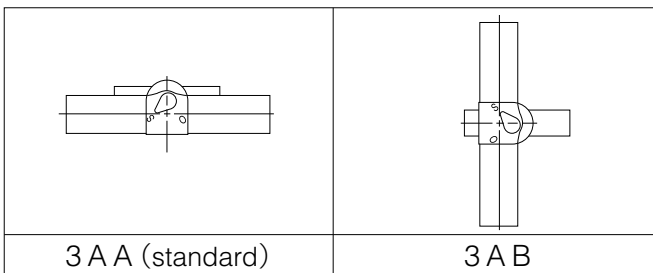
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	337	410	78	276	348	364	754	381	100	164	TGA-125	85
400	16	394	467	102	338	383	412	840	432	100	180	TGA-140	124
450	18	441	525	114	368	413	465	854	483	130	202	TGA-160	200
500	20	492	580	127	403	453	465	854	483	130	202	TGA-160	220
550	24	524.2	633	150	416	460	478	1069	543	130	221	TGA-200	328
600	24	584	682	154	458	528	525	1175	599	160	253	TGA-200	390

### 705G-3A



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 3A Installation direction





Single-acting pneumatic cylinder type 705G-7G (Air to open: 40mm to 250mm) / 705G-7F (Air to close: 40mm to 250mm)

■ Standard

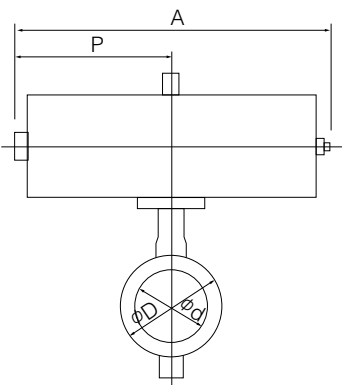
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	168	364	183	75	47	T85S	8
50	2	56	90	43	85	138	168	364	183	75	47	T85S	9
65	2 1/2	69	115	46	94	151	203	449	226	79	57	T200S	14
80	3	84	126	46	109	156	203	449	226	79	57	T200S	15
100	4	104	146	52	117	167	203	449	226	79	57	T200S	16
125	5	130	181	56	143	191	231	550	276	91	69	T380S	27
150	6	153.5	211	56	164	202	231	550	276	91	69	T380S	30
200	8	199	256	60	186	227	269	723	360	118	85	T750S	48
250	10	253	322	68	215	280	269	723	360	118	85	T750S	57

■ Heavy duty

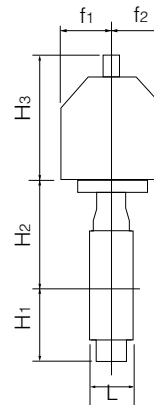
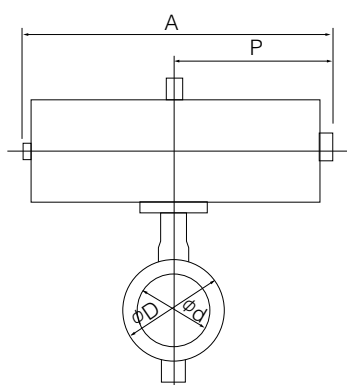
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	168	364	183	75	47	T85S	8
50	2	56	90	43	85	138	168	364	183	75	47	T85S	9
65	2 1/2	69	115	46	94	151	203	449	226	79	57	T200S	14
80	3	84	126	46	109	156	203	449	226	79	57	T200S	15
100	4	104	146	52	117	167	231	550	276	91	69	T380S	24
125	5	130	181	56	143	191	231	550	276	91	69	T380S	27
150	6	153.5	211	56	164	202	269	723	360	118	85	T750S	44

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

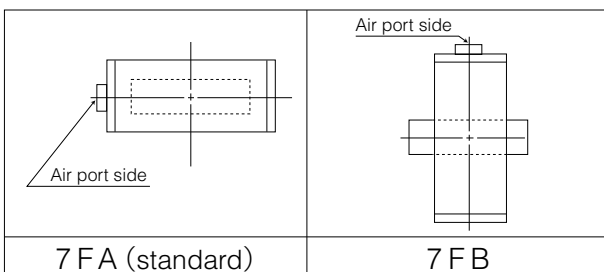
■ 705G-7F



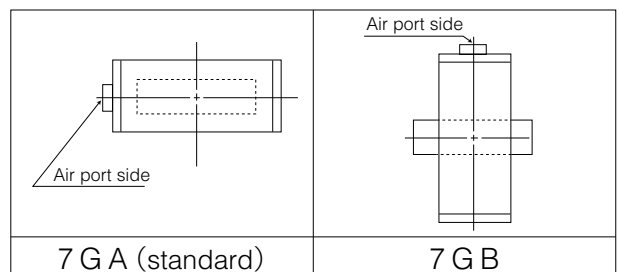
■ 705G-7G



■ 7F Installation direction



■ 7G Installation direction



# 705G (Semi lugged)

Single-acting pneumatic cylinder type 705G-3U (Air to open: 200mm to 600mm) / 705G-3K (Air to close: 200mm to 600mm)

## Standard

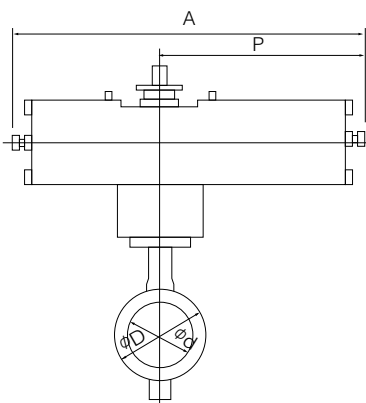
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	253	322	68	215	280	307	945	585	70	165	TG-10S	87
300	12	302	367	78	253	312	307	1080	720	94	206	TG-12S	132
350	14	337	410	78	276	348	307	1080	720	94	206	TG-12S	148
400	16	394	467	102	338	383	340	1255	865	131	257	TG-14S	270
450	18	441	525	114	368	413	340	1255	865	131	257	TG-14S	294
500	20	492	580	127	403	453	474	1655	1095	164	348	TG-20S	538
550	22	524.2	633	150	416	460	474	1655	1095	164	348	TG-20S	594
600	24	584	682	154	458	528	474	1655	1095	164	348	TG-20S	602

## Heavy duty

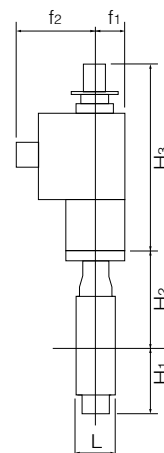
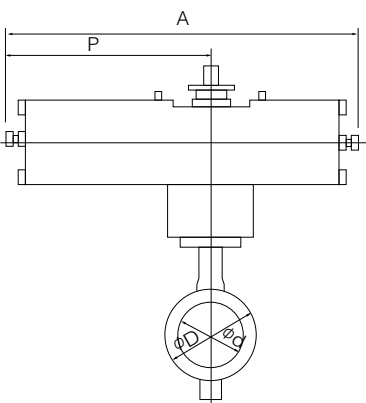
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	199	256	60	186	227	307	945	585	70	165	TG-10S	77
250	10	253	322	68	215	280	307	1080	720	94	206	TG-12S	125
300	12	302	367	78	253	312	307	1080	720	94	206	TG-12S	132
350	14	337	410	78	276	348	340	1255	865	131	257	TG-14S	244
400	16	394	467	102	338	383	340	1255	865	131	257	TG-14S	270
450	18	441	525	114	368	413	474	1655	1095	164	348	TG-20S	507
500	20	492	580	127	403	453	474	1655	1095	164	348	TG-20S	538
550	22	524.2	633	150	416	460	474	1655	1095	164	348	TG-20S	594
600	24	584	682	154	458	528	474	1655	1095	164	348	TG-20S	602

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

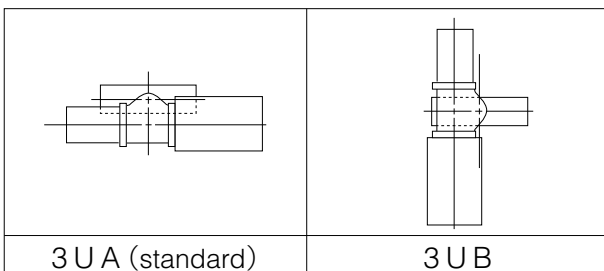
## 705G-3U



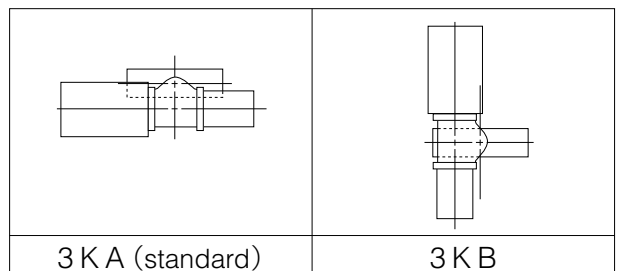
## 705G-3K



## 3U Installation direction



## 3K Installation direction



## Single phase electric motor type 705G-4I (40mm to 500mm)

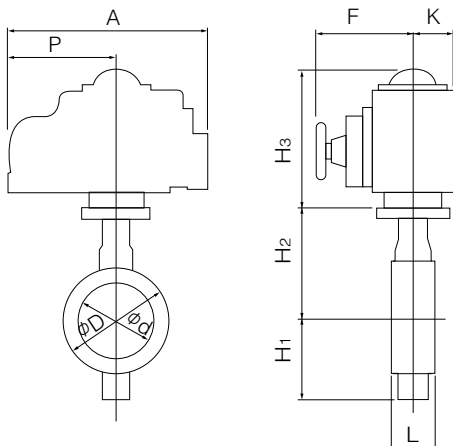
Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
40	1 1/2	45	80	35	61	132	120	161	84	58	45	4 I-00	4.8
							176	202	100	85	54	4 I-0	6.2
50	2	56	90	43	85	138	120	161	84	58	45	4 I-00	5.3
							176	202	100	85	54	4 I-0	7.0
65	2 1/2	69	115	46	94	151	150	202	100	85	54	4 I-0	8.0
80	3	84	126	46	109	156	150	202	100	85	54	4 I-0	8.5
100	4	104	146	52	117	167	165	252	138	126	65	4 I-1	11.4
125	5	130	181	56	143	191	198	310	167	154	85	4 I-2	19.2
150	6	153.5	211	56	164	202	198	310	167	154	85	4 I-2	22.2
200	8	199	256	60	186	227	198	310	167	154	85	4 I-2.5	26.2
250	10	253	322	68	215	280	198	310	167	154	85	4 I-2.5	37
300	12	302	367	78	253	312	230	388	223	246	136	4 I-3	55
350	14	337	410	78	276	348	230	388	223	246	136	4 I-3	70
400	16	394	467	102	338	383	230	388	223	246	136	4 I-3	95
							255	388	223	246	136	4 I-4	101
450	18	441	525	114	368	413	230	388	223	246	136	4 I-4	125
500	20	492	580	127	403	453	230	388	223	246	136	4 I-4	156

Note 1: For nominal size 40mm and 50 mm type (for control), the 4I-0 type should be selected. (The 4I-00 type is only designed for ON-OFF operation.)

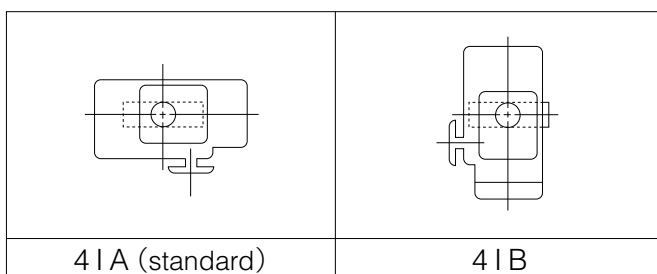
Remark: For 400mm type with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

### 705G-4 I



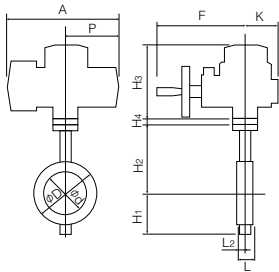
### 4 I Installation direction



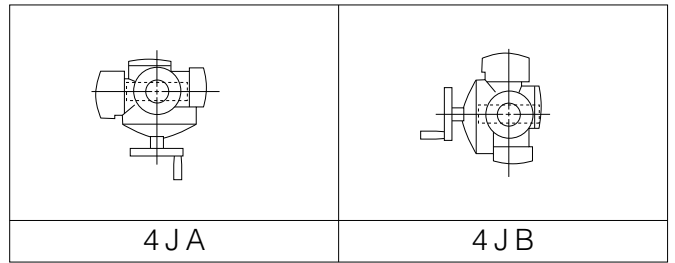
**Three phase motor actuator type 705G-4J(40mm to 300mm)**

Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	φd	φD	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	F	K		
40	1 1/2	45	80	35	61	132	218	3.2	353	167	286	104	SRJ-010	15.7
50	2	56	90	43	85	138	218	3.2	353	167	272	104	SRJ-010	16.2
65	2 1/2	69	115	46	94	151	218	3.2	353	167	272	104	SRJ-010	17.2
80	3	84	126	46	109	156	218	3.2	353	167	272	104	SRJ-010	17.7
100	4	104	146	52	117	167	218	3.2	353	167	272	104	SRJ-010	18.5
125	5	130	181	56	143	191	218	15	353	167	272	104	SRJ-020	22.2
150	6	153.5	211	56	164	202	218	15	353	167	272	104	SRJ-020	25
200	8	199	256	60	186	227	235	3.2	393	191	316	130	SRJ-060	43
250	10	253	322	68	215	280	235	3.2	393	191	316	130	SRJ-060	56
300	12	302	367	78	253	312	235	20	393	191	316	130	SRJ-060	67

**705G-4J**



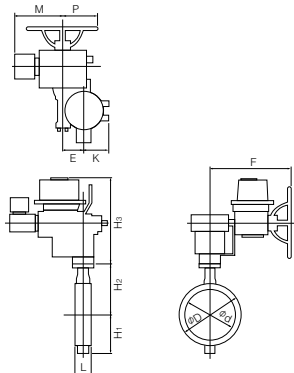
**4J Installation direction**



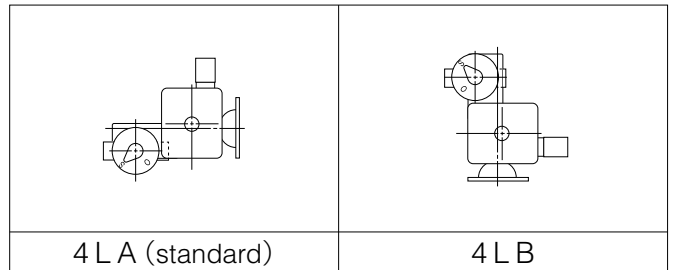
**Three phase motor actuator type 705G-4L(350mm to 600mm)**

Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	φd	φD	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
350	14	337	410	78	276	348	487	117	164	533	364	230	LTKD-01 0.2kW /MGH-3	148
400	16	394	467	102	338	383	487	117	164	533	364	230	LTKD-01 0.2kW /MGH-3	173
450	18	441	525	114	368	413	487	117	164	533	357	230	LTKD-01 0.4kW /MGH-3	201
500	20	492	580	127	403	453	487	117	164	533	357	230	LTKD-01 0.4kW /MGH-3	232
550	22	524.2	633	150	416	460	558	140	198	594	375	230	LTKD-02 0.75kW /MGH-4	325
600	24	584	682	154	458	528	590	140	198	637	415	360	LTKD-05 0.75kW /MGH-4	398

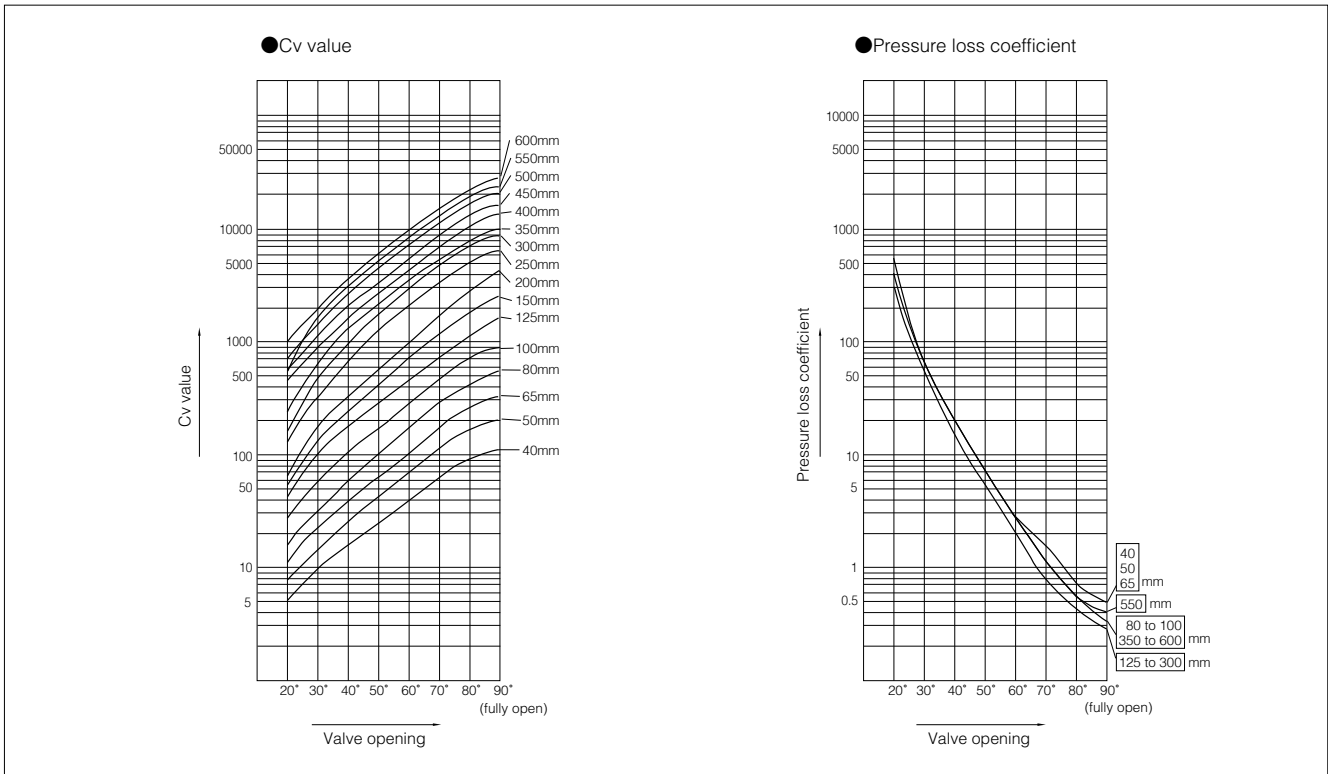
**705G-4L**



**4L Installation direction**



## 700G/704G/705G Cv value/pressure loss coefficient



## 700G/704G/705G Cv value

Nominal size		Valve opening							
		20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	5	9	16	25	39	61	95	121
50	2	8	15	25	40	64	103	160	200
65	2 1/2	12	25	41	64	102	162	260	320
80	3	15	33	57	95	163	271	450	580
100	4	27	58	100	162	269	444	749	880
125	5	45	109	189	295	453	719	1144	1590
150	6	60	148	262	423	685	1147	1897	2800
200	8	67	188	347	576	969	1698	2902	4300
250	10	130	351	675	1225	2125	3375	5091	6200
300	12	194	487	972	1764	3011	4966	7412	8900
350	14	232	662	1350	2030	3294	5167	7832	9620
400	16	468	964	1648	2724	4529	6815	10553	12700
450	18	583	1202	2068	3448	5692	8384	13116	15500
500	20	758	1555	2656	4379	7214	10845	17100	19800
550	22	571	1765	3234	5141	7833	12066	17999	22500
600	24	1037	2141	3681	6129	10106	14911	22827	27300

# 700G(Wafer)/704G(Full lugged)/705G(Semi lugged)

## 700G / 704G / 705G Pressure Loss Coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	264	72	26	10	4	2	1	0.4
50	2	257	68	25	10	4	2	1	0.4
65	2 1/2	310	75	28	11	4	2	1	0.4
80	3	394	83	27	10	3	1	0.4	0.2
100	4	350	78	26	10	4	1	0.4	0.3
125	5	316	53	18	7	3	1	0.4	0.2
150	6	348	57	18	7	3	1	0.3	0.1
200	8	849	106	31	11	4	1	0.4	0.2
250	10	528	72	20	6	2	1	0.3	0.2
300	12	488	78	20	6	2	1	0.3	0.2
350	14	531	65	16	7	3	1	0.4	0.3
400	16	227	54	18	7	2	1	0.4	0.3
450	18	239	56	19	7	3	1	0.4	0.3
500	20	218	52	18	7	2	1	0.4	0.3
550	22	571	60	18	7	3	1	0.6	0.4
600	24	247	58	20	7	3	1	1	0.3

## 700G Flange accommodation

Nominal size		JIS		ASME		BS4504		DIN		BS10
mm	inch	5K	10K	Class 125	Class 150	PN10	PN16	NP10	NP16	Table E
40	1 1/2	○	○	○	○	○	○	○	○	○
50	2	○	○	○	○	○	○	○	○	○
65	2 1/2	○	○	○	○	○	○	○	○	△
80	3	○	○	◎	◎	◎	◎	◎	◎	○
100	4	○	○	◎	◎	◎	◎	◎	◎	○
125	5	○	○	◎	◎	◎	◎	◎	◎	○
150	6	○	○	○	○	○	○	○	○	○
200	8	○	○	◎	◎	◎	◎	◎	◎	○
250	10	○	○	○	○	○	○	○	○	○
300	12	○	○	◎	◎	◎	◎	◎	◎	○
350	14	○	○	×	×	×	×	×	×	×
400	16	○	○	×	×	×	×	×	×	×
450	18	○	○	×	×	×	×	×	×	×
500	20	○	○	×	×	×	×	×	×	×
550	22	T	T	×	×	×	×	×	×	×
600	24	T	T	△	△	△	△	△	△	△

○ : Can be used without flange drilling.

◎ : Can be used without flange drilling. (Use ASME body.)

△ : With additional flange drilling.

T : With flange tapping.

× : Not applicable.

### 704G Flange accommodation

Nominal size		JIS		ASME		BS4504		DIN		BS10
mm	inch	5K	10K	Class 125	Class 150	PN10	PN16	NP10	NP16	Table E
50	2	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T
65	2 1/2	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T
80	3	◎D/T	○D/T	◎D/T	◎D/T	○D/T	○D/T	○D/T	○D/T	◎D/T
100	4	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T
125	5	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T
150	6	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T
200	8	◎D/T	○D/T	◎D/T	◎D/T	◎D/T	○D/T	◎D/T	○D/T	◎D/T
250	10	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T
300	12	◎D/T	○D/T	◎D/T	◎D/T	◎D/T	◎D/T	◎D/T	◎D/T	◎D/T
350	14	◎D/T	○D/T	◎D/T	◎D/T	○D/T	○D/T	○D/T	○D/T	◎D/T
400	16	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	△D/T
450	18	◎D/T	○D/T	◎D/T	◎D/T	○D/T	○D/T	○D/T	○D/T	○D/T
500	20	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	○D/T	△D/T
600	24	◎T	○T	◎T	◎T	◎T	◎T	◎T	◎T	△T

○D/T: Drilled or tapped hole  
 ◎D/T: Drilled or tapped hole (JIS 5K / ASME body used)  
 △D/T: Drilled or tapped hole (DIN body used)  
 ○T: Tapped hole only  
 ◎T: Tapped hole only (JIS 5K / ASME body used)  
 △T: Tapped hole only (DIN body used)  
 ×: Not applicable.

### 705G Flange accommodation

Nominal size		JIS		ASME		BS4504		DIN		BS10
mm	inch	5K	10K	Class 125	Class 150	PN10	PN16	NP10	NP16	Table E
40	1 1/2	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
50	2	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
65	2 1/2	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
80	3	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
100	4	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
125	5	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
150	6	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
200	8	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
250	10	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
300	12	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
350	14	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
400	16	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
450	18	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
500	20	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T	D/T
550	22	T	T	×	×	×	×	×	×	×
600	24	T	T	T	T	T	T	T	T	T

D/T: Drilled or tapped hole  
 T: Tapped hole only  
 ×: Not applicable.

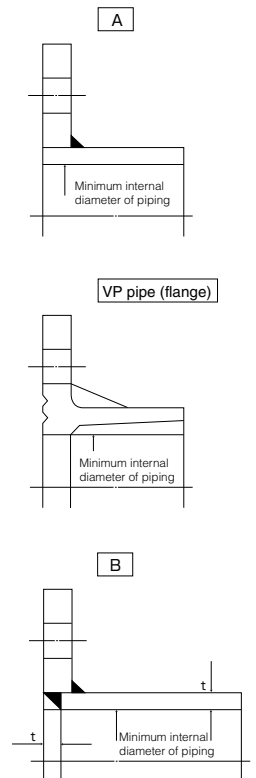
# 700G (Wafer) / 704G (Full lugged) / 705G (Semi lugged)

700G / 704G / 705G Applicable Pipe List in Case of **A**

Nominal size		SGP	STPY	Sch20	Sch40	VP (TS flange)	Sch10S	Sch20S	Minimum internal diameters of piping (mm)
mm	inch								
40	1 1/2	○	—	—	○	○	○	○	29
50	2	○	—	○	○	○	○	○	38
65	2 1/2	○	—	○	○	○	○	○	54
80	3	○	—	○	○	○	○	○	72
100	4	○	—	○	○	○	○	○	92
125	5	○	—	○	○	○	○	○	119
150	6	○	—	○	○	○	○	○	145
200	8	○	—	○	○	○	○	○	194
250	10	○	—	○	○	○	○	○	247
300	12	○	—	○	○	○	○	○	295
350	14	○	○	○	○	○	—	—	333
400	16	○	○	○	○	—	—	—	382
450	18	○	○	○	○	—	—	—	427
500	20	○	○	○	○	—	—	—	477
550	22	—	○	○	○	—	—	—	509
600	24	—	○	○	○	—	—	—	567

700G / 704G / 705G Applicable Pipe List in Case of **B**

Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
mm	inch						
40	1 1/2	○	—	—	○	○	○
50	2	○	—	○	○	○	○
65	2 1/2	○	—	○	○	○	○
80	3	○	—	○	○	○	○
100	4	○	—	○	○	○	○
125	5	○	—	○	○	○	○
150	6	○	—	○	○	○	○
200	8	○	—	○	○	○	○
250	10	○	—	○	○	○	○
300	12	○	—	○	○	○	○
350	14	○	○	○	○	—	—
400	16	○	○	○	○	—	—
450	18	○	○	○	○	—	—
500	20	○	○	○	○	—	—
550	22	—	○	○	○	—	—
600	24	—	○	○	○	—	—



Remark 1: The symbols above mean the following.

○: Piping possible —: Not standardized

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.

For details, please consult us.



## 700G Piping Bolts and Nuts Sizes

### ■ For Hexagon Bolts and Nuts

Nominal size		JIS 5K		JIS 10K	
mm	inch	Hexagon Bolts and Nuts	Setting Bolts	Hexagon Bolts and Nuts	Setting Bolts
40	1 1/2	4-M12× 75×30	—	4-M16× 90×38	—
50	2	4-M12× 90×30	—	4-M16×100×38	—
65	2 1/2	4-M12× 90×30	—	4-M16×105×38	—
80	3	4-M16× 95×38	—	8-M16×105×38	—
100	4	8-M16×105×38	—	8-M16×110×38	—
125	5	8-M16×110×38	—	8-M20×125×46	—
150	6	8-M16×115×38	—	8-M20×130×52	—
200	8	8-M20×130×52	—	12-M20×130×52	—
250	10	12-M20×140×52	—	12-M22×150×60	—
300	12	12-M20×150×52	—	16-M22×160×60	—
350	14	12-M22×155×45	—	16-M22×160×45	—
400	16	16-M22×180×45	—	16-M24×190×45	—
450	18	16-M22×190×45	—	20-M24×205×45	—
500	20	20-M22×205×45	—	20-M24×215×45	—
550	22	16-M24×235×50	8-M24× 65×54	16-M30×255×60	8-M30× 80×66
600	24	16-M24×235×50	8-M24× 70×54	20-M30×255×60	8-M30× 75×60

### ■ For Long Bolts and Nuts

Nominal size		JIS 5K		JIS 10K		ASME Class 125/150	
mm	inch	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts
40	1 1/2	4-M12× 95×25	—	4-M16×110×25	—	4-U1/2 ×110×32	—
50	2	4-M12×105×25	—	4-M16×120×30	—	4-U5/8 ×140×38	—
65	2 1/2	4-M12×110×25	—	4-M16×125×30	—	4-U5/8 ×140×38	—
80	3	4-M16×120×30	—	8-M16×125×30	—	4-U5/8 ×140×38	—
100	4	8-M16×130×30	—	8-M16×130×30	—	8-U5/8 ×150×38	—
125	5	8-M16×130×30	—	8-M20×150×40	—	8-U3/4 ×160×51	—
150	6	8-M16×140×35	—	8-M20×155×40	—	8-U3/4 ×165×51	—
200	8	8-M20×155×40	—	12-M20×165×40	—	8-U3/4 ×175×51	—
250	10	12-M20×165×40	—	12-M22×175×45	—	12-U7/8 ×195×58	—
300	12	12-M20×175×40	—	16-M22×185×45	—	12-U7/8 ×205×58	—
350	14	12-M22×185×45	—	16-M22×185×45	—	12-U1 ×225	—
400	16	16-M22×205×45	—	16-M24×220×50	—	16-U1 ×255	—
450	18	16-M22×225×45	—	20-M24×245×50	—	16-U1 1/8 ×280	—
500	20	20-M22×230×45	—	20-M24×265×50	—	20-U1 1/8 ×295	—
550	22	16-M24×265×50	8-M24× 65×54	16-M30×290×60	8-M30× 80×66	—	—
600	24	16-M24×275×50	8-M24× 70×54	20-M30×300×60	8-M30× 75×60	16-U1 1/4 ×340	8-U1 1/4×95×70

**Remarks:**

1. Please use a hexagon nut with 80% threading. (For ASME, use heavy nut.)
2. A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

\* Nominal size "600 mm" requires hexagon bolt for setting.

**Example**

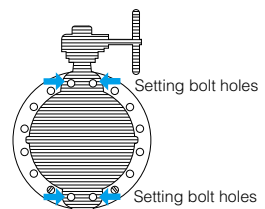
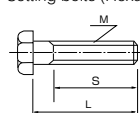
Long bolts: 12 - M22 × 185 × 45  
 Quantity    Nominal size (M)    Length of bolt (L)    Effective screw length (S)

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts)    Quantity    Nominal size (M)    Length of bolt (L)    Effective screw length (S)

Long bolts and nuts



Setting bolts (Hexagon bolts)



**704G Piping Bolts and Nuts Sizes**

\* Dimensions on the table show when the piping flange hole are tapped. For drilled holes, please consult us.

Nominal size		JIS 5K	JIS 10K	ASME Class 150	DIN NP10 BS 4504 PN10
mm	inch				
50	2	8-M12×30×28	8-M16×35×33	8-5/8-11UNC×38	8-M16×35×33
65	2 1/2	8-M12×35×33	8-M16×35×33	8-5/8-11UNC×40	8-M16×35×33
80	3	8-M16×35×33	16-M16×35×33	8-5/8-11UNC×45	16-M16×40×38
100	4	16-M16×40×38	16-M16×40×38	16-5/8-11UNC×45	16-M16×40×38
125	5	16-M16×40×38	16-M20×45×41	16-3/4-10UNC×50	16-M16×40×38
150	6	16-M16×40×38	16-M20×45×41	16-3/4-10UNC×50	16-M20×45×41
200	8	16-M20×45×41	24-M20×50×46	16-3/4-10UNC×55	16-M20×50×46
250	10	24-M20×50×46	24-M22×50×46	24-7/8- 9UNC×60	24-M20×55×50
300	12	24-M20×55×51	32-M22×55×51	24-7/8- 9UNC×60	24-M20×55×50
350	14	24-M22×60×50	32-M22×60×50	24-1- 8UNC×70	32-M20×60×46
400	16	32-M22×60×50	32-M24×70×50	32-1- 8UNC×70	32-M24×70×50
450	18	32-M22×60×50	40-M24×70×50	32-1· 1/8-8UN ×80	40-M24×70×50
500	20	40-M22×60×50	40-M24×70×50	40-1· 1/8-8UN ×80	40-M24×70×50
600	24	40-M24×70×50	48-M30×75×60	40-1· 1/4-8UN ×90	40-M27×80×60

Remarks:

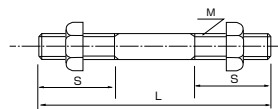
1. The bolt lengths are in accordance with thickness of steel flanges.
2. A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.
3. The list is exclusively for standard material "SS400".

Example

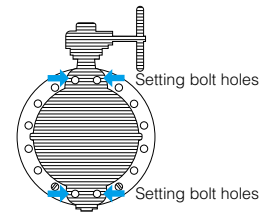
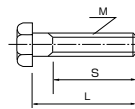
Long bolts: 12 - M22 × 185 × 45  
 Quantity    Nominal size (M)    Length of bolt (L)    Effective screw length (S)

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts)    Quantity    Nominal size (M)    Length of bolt (L)    Effective screw length (S)

Long bolts and nuts



Setting bolts (Hexagon bolts)



## 705G Piping Bolts and Nuts Sizes

### ■ For Hexagon Bolts and Nuts (Flange Bolt Hole: Drilled Holes)

Nominal size		JIS 5K	JIS 10K
mm	inch	Hexagon Bolts and Nuts	Hexagon Bolts and Nuts
40	1 1/2	4-M12× 75×30	4-M16× 90×38
50	2	4-M12× 90×30	4-M16×105×40
65	2 1/2	4-M12× 90×30	4-M16×105×40
80	3	4-M16×105×40	8-M16×110×40
100	4	8-M16×110×40	8-M16×110×40
125	5	8-M16×110×40	8-M20×120×50
150	6	8-M16×120×40	8-M20×130×50
200	8	8-M20×130×50	12-M20×135×50
250	10	12-M20×135×50	12-M22×150×60
300	12	12-M20×150×50	16-M22×160×60
350	14	12-M22×160×60	16-M22×160×60
400	16	16-M22×175×45	16-M24×190×45
450	18	16-M22×185×45	20-M24×205×45
500	20	20-M22×205×45	20-M24×215×45

### ■ For Long Bolts and Nuts (Flange Bolt Hole: Drilled Holes)

Nominal size		JIS5K	JIS10K	ASME class 125/150
mm	inch	Long Bolts and Nuts	Long Bolts and Nuts	Long Bolts and Nuts
40	1 1/2	4-M12× 95×25	4-M16×110×25	4-U1/2×110×32
50	2	4-M12×105×25	4-M16×120×30	4-U5/8-11UNC×145×45
65	2 1/2	4-M12×110×25	4-M16×125×30	4-U5/8-11UNC×155×50
80	3	4-M16×120×30	8-M16×125×30	4-U5/8-11UNC×155×50
100	4	8-M16×130×30	8-M16×130×30	8-U5/8-11UNC×165×50
125	5	8-M16×130×30	8-M20×150×40	8-U3/4-10UNC×175×55
150	6	8-M16×140×35	8-M20×155×40	8-U3/4-10UNC×175×55
200	8	8-M20×155×40	12-M20×155×40	8-U3/4-10UNC×175×55
250	10	12-M20×165×40	12-M22×175×45	12-U7/8- 9UNC×215×55
300	12	12-M20×175×40	16-M22×185×45	12-U7/8- 9UNC×215×55
350	14	12-M22×185×45	16-M22×185×45	12-U1 - 8UNC×225
400	16	16-M22×205×45	16-M24×220×50	16-U1 - 8UNC×255
450	18	16-M22×225×45	20-M24×230×50	16-U1 1/8- 8UN×280
500	20	20-M22×230×45	20-M24×245×50	20-U1 1/8- 8UN×295

**705G Piping Bolts and Nuts Sizes**

**■For Hexagon Bolts and Nuts (Flange Bolt Hole: Tapped Holes)**

Nominal size		JIS 5K		JIS 10K	
mm	inch	Hexagon Bolts and Nuts	Setting Bolts	Hexagon Bolts and Nuts	Setting Bolts
40	1 1/2	—	8-M12× 25×23	—	8-M16× 30×28
50	2	—	8-M12× 30×28	—	8-M16× 35×32
65	2 1/2	—	8-M12× 35×33	—	8-M16× 35×32
80	3	—	8-M16× 35×33	4-M16×110×40	8-M16× 35×32
100	4	4-M16×110×40	8-M16× 40×38	4-M16×110×40	8-M16× 40×38
125	5	4-M16×110×40	8-M16× 40×38	4-M20×120×50	8-M20× 45×41
150	6	4-M16×120×40	8-M16× 40×38	4-M20×130×50	8-M20× 45×41
200	8	4-M20×130×50	8-M20× 45×41	8-M20×135×50	8-M20× 50×46
250	10	8-M20×135×50	8-M20× 50×46	8-M22×150×60	8-M22× 55×50
300	12	8-M20×150×50	8-M20× 55×51	12-M22×160×60	8-M22× 60×55
350	14	8-M22×160×60	8-M22× 60×50	12-M22×160×40	8-M22× 60×50
400	16	12-M22×175×45	8-M22× 60×50	12-M24×190×45	8-M24× 70×50
450	18	12-M22×185×45	8-M22× 60×50	16-M24×205×45	8-M24× 70×50
500	20	16-M22×205×45	8-M22× 60×50	16-M24×215×45	8-M24× 70×50
550	22	16-M24×235×50	8-M24× 65×54	16-M30×255×60	8-M30× 80×66
600	24	16-M24×230×50	8-M24× 70×54	20-M30×255×50	8-M30× 70×60

**■For Long Bolts and Nuts (Flange Bolt Hole: Tapped Holes)**

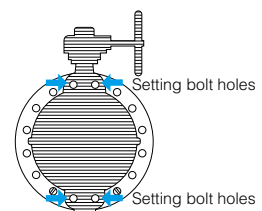
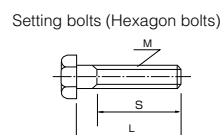
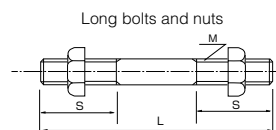
Nominal size		JIS5K		JIS10K		ASME class 125/150	
mm	inch	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts	Long Bolts and Nuts	Setting Bolts
40	1 1/2	—	8-M12× 25×23	—	8-M16× 30×28	—	8-U1/2×30×25
50	2	—	8-M12× 30×28	—	8-M16× 35×33	—	8-U5/8-11UNC×35×30
65	2 1/2	—	8-M12× 35×33	—	8-M16× 35×33	—	8-U5/8-11UNC×40×30 (8-U5/8-11UNC×35×30)
80	3	—	8-M16× 35×33	4-M16×125×30	8-M16× 35×33	—	8-U5/8-11UNC×45×38 (8-U5/8-11UNC×40×30)
100	4	4-M16×130×30	8-M16× 40×38	4-M16×130×30	8-M16× 40×38	4-U5/8-11UNC×165×50	8-U5/8-11UNC×45×38
125	5	4-M16×130×30	8-M16× 40×38	4-M20×150×40	8-M20× 45×41	4-U3/4-10UNC×175×55	8-U3/4-10UNC×50×44
150	6	4-M16×140×35	8-M16× 40×38	4-M20×155×40	8-M20× 45×41	4-U3/4-10UNC×175×55	8-U3/4-10UNC×50×44
200	8	4-M20×155×40	8-M20× 45×41	8-M20×155×40	8-M20× 50×46	4-U3/4-10UNC×175×55	8-U3/4-10UNC×55×44
250	10	8-M20×165×40	8-M20× 50×46	8-M22×175×45	8-M22× 55×50	8-U7/8- 9UNC×215×55	8-U7/8- 9UNC×60×50
300	12	8-M20×175×40	8-M20× 55×51	12-M22×185×45	8-M22× 60×55	8-U7/8- 9UNC×215×55	8-U7/8- 9UNC×60×50
350	14	8-M22×185×45	8-M22× 60×50	12-M22×185×45	8-M22× 60×50	8-U1 - 8UNC×225	8-U1 - 8UNC×70×57
400	16	12-M22×205×45	8-M22× 60×50	12-M24×220×50	8-M24× 70×50	12-U1 - 8UNC×255	8-U1 - 8UNC×75×57
450	18	12-M22×225×45	8-M22× 60×50	16-M24×230×50	8-M24× 70×50	12-U1 1/8- 8UNC×280	8-U1 1/8-8UNC×85×63
500	20	16-M22×230×45	8-M22× 60×50	16-M24×245×50	8-M24× 70×50	16-U1 1/8- 8UNC×295	8-U1 1/8-8UNC×85×63
550	22	16-M24×265×50	8-M24× 65×54	16-M30×290×60	8-M30× 80×66	—	—
600	24	16-M24×275×50	8-M24× 70×54	20-M30×290×60	8-M30× 75×60	16-U1 1/4- 8UNC×340	8-U1 1/4-8UNC×95×70

Remarks:  
 Bolt/Nut material: SS400/SS400, SUS304/SUS304  
 The dimensions in parenthesis show ASME class 125. (for 65 mm and 80 mm)  
 Heavy nut shall be used for ASME class 125/150 hexagon nuts.  
 A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

Example

Long bolts: 12 - M22 × 185 × 45  
 Quantity    Nominal size (M)    Length of bolt (L)    Effective screw length (S)

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts)    Quantity    Nominal size (M)    Length of bolt (L)    Effective screw length (S)



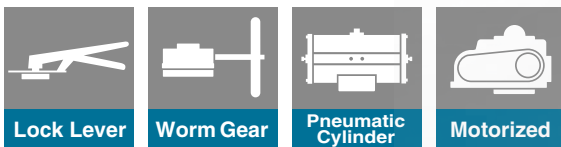
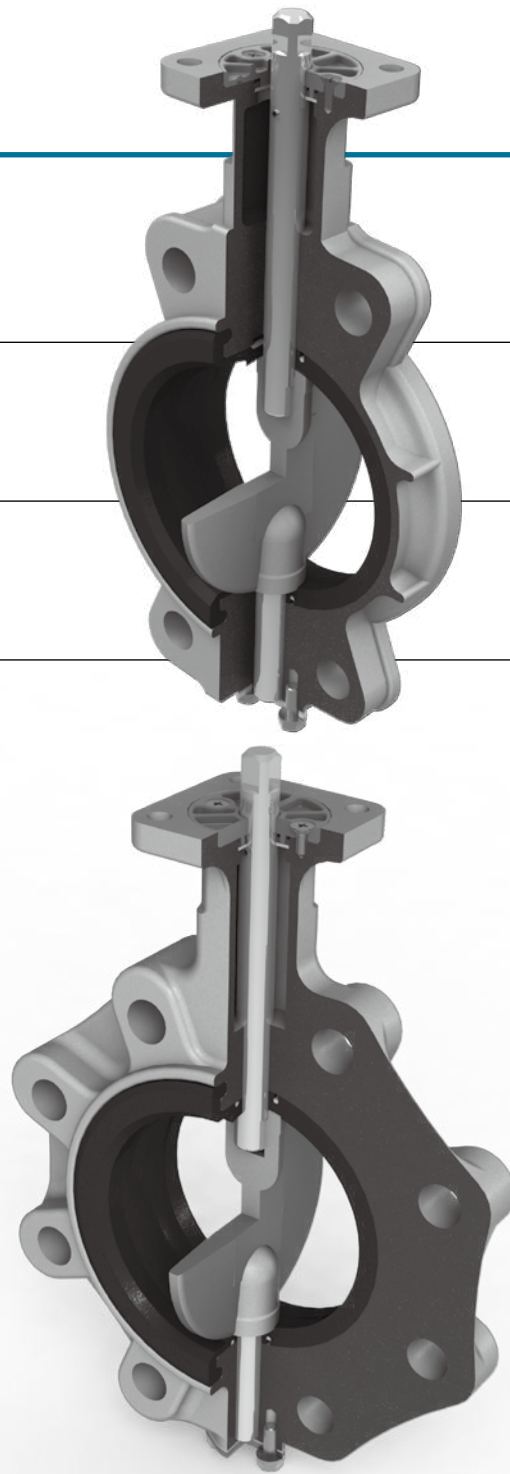


Rubber seated Butterfly Valves for High Pressure Applications

**72WG** Wafer

**72SG** Semi lugged

**72LG** Full lugged



### Features and Benefits

#### New cosine-curve seat

The new cosine-curve seat (patent pending) allows better performance in reducing friction, torque and wear than the previous design.

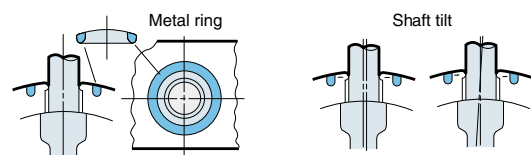
#### Much longer life with spherical design

Similar to a spherical body rotating inside a spherical area, the operation of the disc is smooth and unhindered. Torque is reduced and the valve life is lengthened.



#### Self-aligning stem seal through backup ring

The stem seal is the primary and secondary seal system. The backup ring functions as the self-aligning stem seal.



#### Ease of maintenance

The field replaceable seat ring makes maintenance easy and reduces maintenance costs.

## Standard Specifications

Model	72WG (Wafer)	72SG (Semi lugged)	72LG (Lugged)
Valve nominal size	40 to 200mm	50 to 600mm	50 to 600mm
Flange accommodation	DIN PN16, GB PN16, ASME Class 150, BS4504 PN16	DIN PN16, GB PN16, ASME Class 150, BS4504 PN16	DIN PN16, GB PN16, ASME Class 150, BS4504 PN16
Face-to-face dimensions	JIS B 2002 / ISO 5752 / API 609		
Max. working pressure	1.6Mpa		
Body shell test (hydraulic)	2.4Mpa		
Seat leak test (pneumatic)	1.76Mpa		
Working temperature range ※1	NBR : -10 to 80 degrees C, *EPDM : -20 to 120 degrees C		
Working temperature in continuous use ※2	NBR : 0 to 60 degrees C, *EPDM : 0 to 70 degrees C		
Standard materials	Body	Ductile iron, JIS FCD450	
	Disc	304 stainless steel, JIS SCS13 316 stainless steel, JIS SCS14	
	Stem	SUS420J2	
	Seat ring	NBR, *EPDM	
Actuators	Lock lever	Manual, pneumatic, electric	
Coating ※8	Powder coat paint (Munsell N7)		

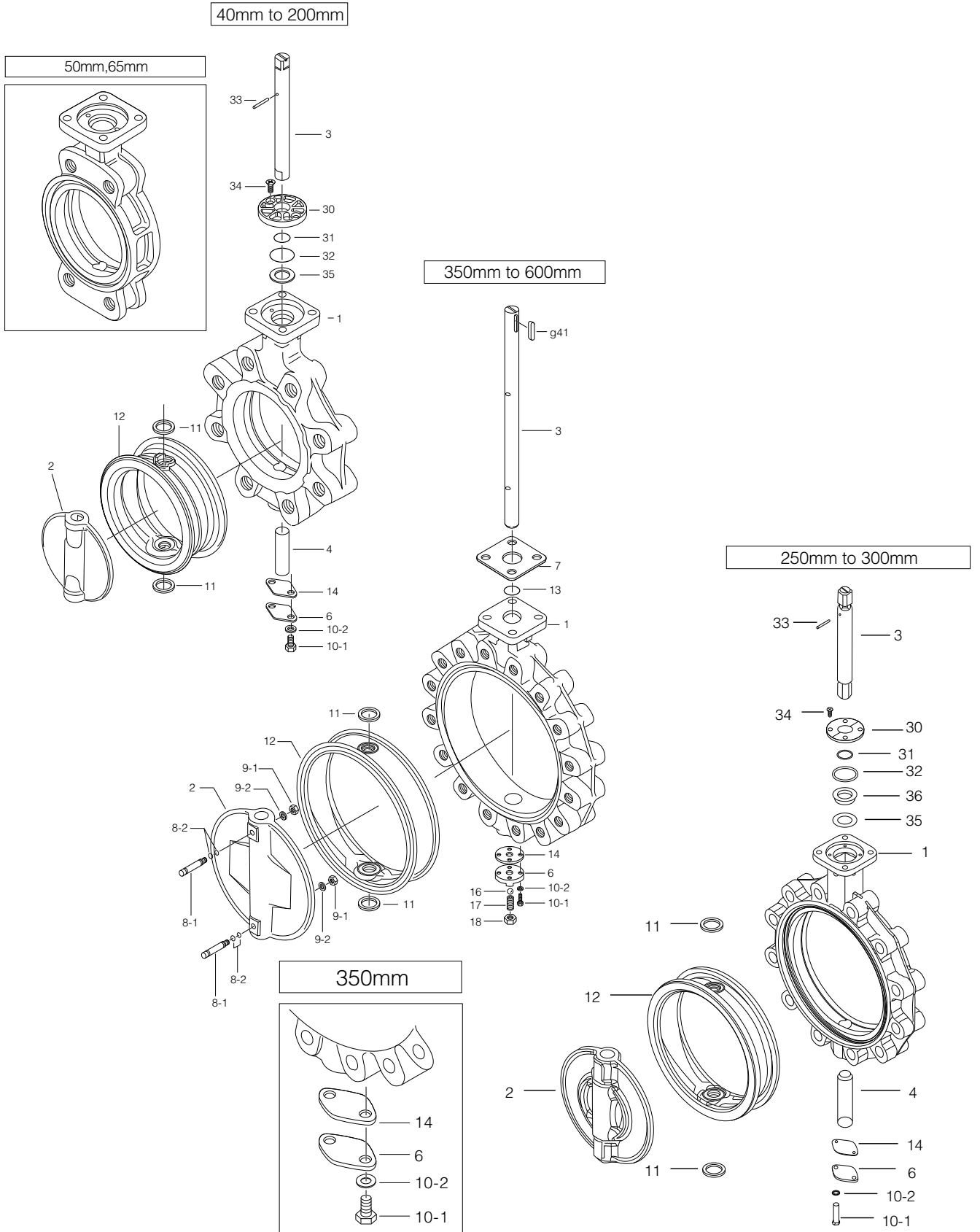
※1 Please consult us when using NBR and EPDM seating continuously above 60 degrees C and 70 degrees C respectively.

※2 "Working temperature in continuous use" stands for the temperature continuously kept exceeding one hour.

\* Never use an EPDM rubber seat ring if the valve is being used for oil or for a fluid containing even a slight amount of oil.

# 72WG (Wafer) / 72SG (Semi lugged) / 72LG (Lugged)

## 72WG / 72SG / 72LG Expanded view of components



※The drawing above is 72LG series.  
The components of 72WG and 72SG series are the same.



## 72WG/72SG/72LG Parts list

### ■ 72WG/72SG/72LG Parts list (40mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Upper stem	1	
4	Lower stem	1	
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
★ 11	Secondary ring	2	Only 50mm to 300mm
★ 12	Seat ring	1	
★ 14	Gasket	1	
★ 30	Bushing	1	
★ 31	O-ring	1	
★ 32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	
36	Seal seat	1	Only 250mm to 300mm

### ■ 72WG/72SG/72LG Parts list (350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
★ 8-1	Taper bolt	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon nut	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
★ 11	Secondary ring	2	350mm
11	Secondary ring	2	400mm to 600mm
★ 12	Seat ring	1	
★ 13	O-ring	1	
★ 14	Gasket	1	
16	Ball	1	Only 400mm to 600mm
17	Hollow bolt	1	Only 400mm to 600mm
18	Lock nut	1	Only 400mm to 600mm
g41	Key	1	

Remark 1: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

**72WG Actuator Selection Chart**

**72WG**

Model	Category	Size ( $\frac{mm}{inch}$ )														
		40 1 1/2	50 2	65 2 1/2	80 3	100 4	125 5	150 6	200 8	250 10	300 12	350 14	400 16	450 18	500 20	600 24
1T	Standard Heavy duty	1T-1			1T-2			1T-3								
2U	Standard Heavy duty	2U-0		2U-1		2U-2		2U-3		2U-4		2U-5		2U-6		
7E,3A	Standard Heavy duty	T35		T85		T200		T380		T750		TGA-140		TGA-180		
7G,7F 3U,3K	Standard Heavy duty	T85S		T200S		T380S		T750S		TG-12S		TG-14S		TG-20S		
4I*	ON-OFF Control	4I-00		4I-0		4I-1		4I-2		4I-2.5		4I-3		4I-4		

Remark\*: For 350mm with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

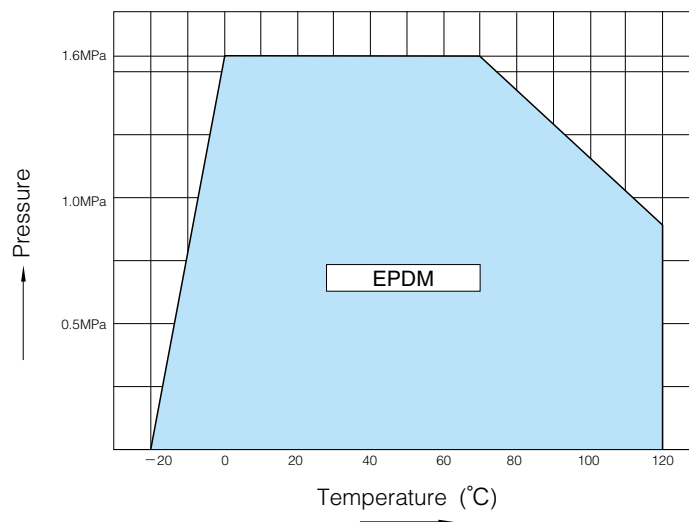
Selection criteria	Standard
	Heavy duty

Select when none of the following heavy duty items apply.

Select when any of the following items apply.

- ① Powder or high viscosity fluid (crude oil, etc.)
- ② Control specification (with positioner)
- ③ Emergency open valve or pipe dead end valve

**72WG / 72SG / 72LG Pressure-Temperature Rating**



## 72SG / 72LG Actuator Selection Chart

### 72SG / 72LG

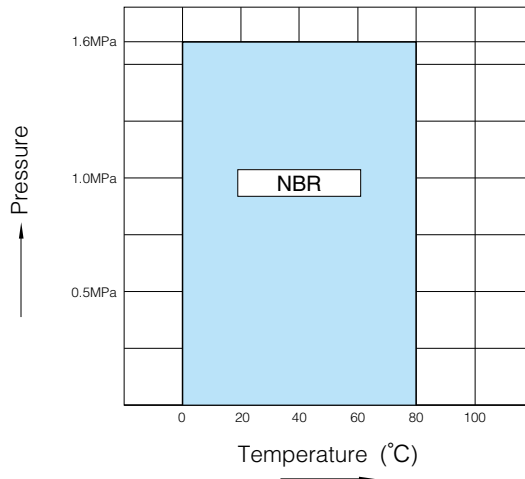
Model	Category	Size (mm / inch)													
		50	65	80	100	125	150	200	250	300	350	400	450	500	600
		2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
1T	Standard	1T-1			1T-2			1T-3							
	Heavy duty														
2U	Standard	2U-0	2U-1	2U-2	2U-3	2U-4	2U-5		2U-6						
	Heavy duty														
7E,3A	Standard	T35	T85	T200		T380	T750	TGA-140		TGA-180					
	Heavy duty														
7G,7F 3U,3K	Standard	T85S	T200S		T380S	T750S	TG-10S	TG-12S	TG-14S	TG-20S					
	Heavy duty														
4I*	ON-OFF	4I-00	4I-0	4I-1	4I-2	4I-2.5	4I-3		4I-4						
	Control														

Remark\*: For 350mm with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

## 72WG / 72SG / 72LG Pressure-Temperature Rating



# 72WG (Wafer) / 72SG (Semi lugged) / 72LG (Lugged)

## 72WG Bare shaft

### 72WG

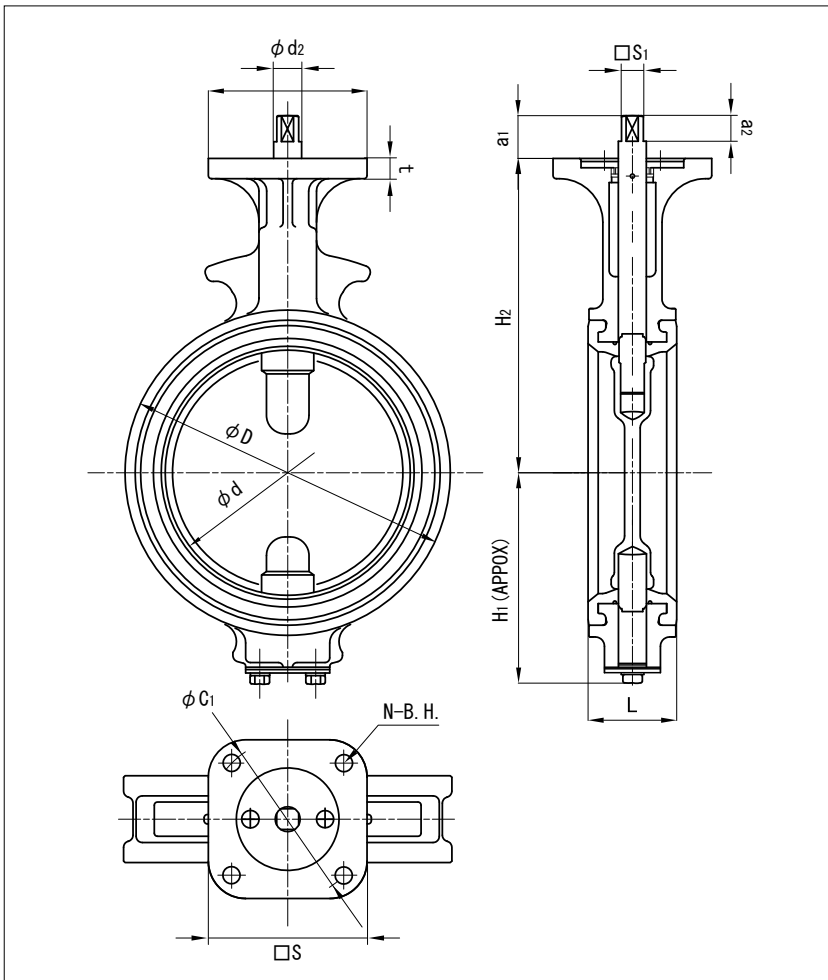
Shaft type	Nominal size		Dimension (mm)													Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\square S_1$	$\phi d_2$	b	t <sub>2</sub>	t	Top flange	
01	40	1 1/2	45	80	35	61	132	21.5	10.5	8	10	—	—	12	F07	1.5
	50	2	56	90	43	68	138	21.5	10.5	8	10	—	—	12	F07	1.8
	65	2 1/2	69	115	46	79	151	21.5	10.5	8	10	—	—	12	F07	2.5
	80	3	84	126	46	86	156	22.5	11.5	10	12	—	—	12	F07	2.6
	100	4	104	146	52	103	167	22.5	11.5	12	14	—	—	12	F07	3.4
	125	5	130	181	56	118	191	27.5	16.5	14	16	—	—	14	F10	5.4
	150	6	153.5	211	56	135	202	27.5	16.5	14	18	—	—	14	F10	7
200	8	199	256	60	177	227	30	20	18	22	—	—	14	F10	10.4	

### Top flange dimension list

Flange type	$\square S$	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

Shaft type	01 : Square

### 72WG 40mm~200mm



72S G Bare shaft (01: 50mm to 300mm, 02: 350mm to 600mm)

72SG

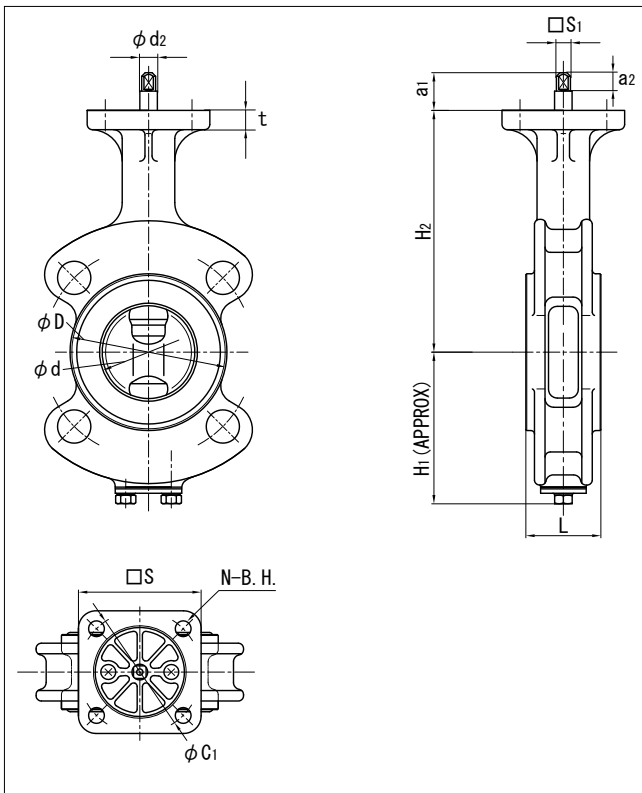
Shaft type	Nominal size		Dimension (mm)													Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S <sub>1</sub>	$\phi d_2$	b	t <sub>2</sub>	t	Top flange	
01	50	2	56	90	43	85	138	21.5	10.5	8	10	—	—	12	F07	2.8
	65	2 1/2	69	115	46	94	151	21.5	10.5	8	10	—	—	12	F07	4
	80	3	84	126	46	109	156	22.5	11.5	10	12	—	—	12	F07	4
	100	4	104	146	52	117	167	22.5	11.5	12	14	—	—	12	F07	5
	125	5	130	181	56	143	191	27.5	16.5	14	16	—	—	14	F10	8
	150	6	153.5	211	56	164	202	27.5	16.5	14	18	—	—	14	F10	11
	200	8	199	256	60	186	227	30	20	18	22	—	—	14	F10	15
	250	10	253	322	68	215	280	35	30	24	28	—	—	14	F10	27
02	300	12	302	367	78	253	312	35	30	24	32	—	—	16	F12	35
	350	14	337	410	78	276	348	48	40	—	32	10	3	23	F14	47
	400	16	394	469	102	338	383	54	45	—	40	12	3	23	F14	71.5
	450	18	441	525	114	368	413	65	56	—	46	14	3.5	23	F14	94.5
	500	20	492	580	127	403	453	79	70	—	50	14	3.5	28	F14	126
	600	24	584	682	154	458	528	79	70	—	55	16	4	28	F16	190

Top flange dimension list

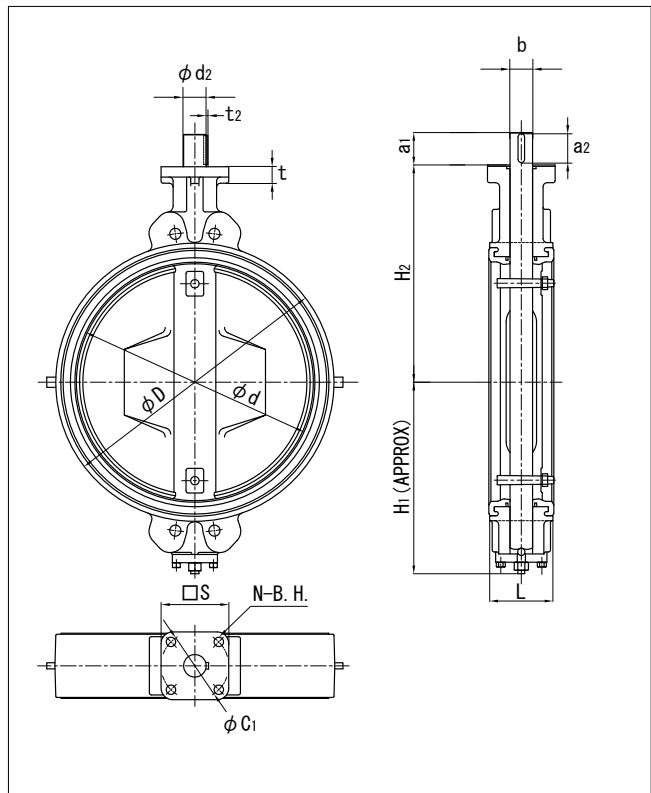
Flange type	□S	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

<b>Shaft type</b>	01 : Square
	02 : Round (Key way)

72SG 50mm~300mm



72SG 350mm~600mm



## 72LG Bare shaft (01: 40mm to 300mm, 02: 350mm to 600mm)

### 72LG

Shaft type	Nominal size		Dimension (mm)													Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\square S_1$	$\phi d_2$	b	t <sub>2</sub>	t	Top flange	
01	50	2	56	90	43	85	138	21.5	10.5	8	10	—	—	12	F07	2.8
	65	2 1/2	69	115	46	94	151	21.5	10.5	8	10	—	—	12	F07	4
	80	3	84	190	46	109	156	22.5	11.5	10	12	—	—	12	F07	5.6
	100	4	104	223	52	117	167	22.5	11.5	12	14	—	—	12	F07	7.9
	125	5	130	250	56	143	191	27.5	16.5	14	16	—	—	14	F10	9.8
	150	6	153.5	276	56	164	202	27.5	16.5	14	18	—	—	14	F10	11.5
	200	8	199	334	60	177	227	30	20	18	22	—	—	14	F10	17.5
	250	10	253	402	68	215	280	35	30	24	28	—	—	14	F10	30
02	350	14	337	$\frac{533}{520}$	78	276	348	48	40	—	32	10	3	23	F14	65
	400	16	394	597	102	338	383	54	45	—	40	12	3	23	F14	106
	450	18	441	$\frac{640}{634}$	114	368	413	65	56	—	46	14	3.5	23	F14	127
	500	20	492	$\frac{730}{696}$	127	403	453	79	70	—	50	14	3.5	28	F14	168
	600	24	584	$\frac{840}{820}$	154	458	528	79	70	—	55	16	4	28	F16	270

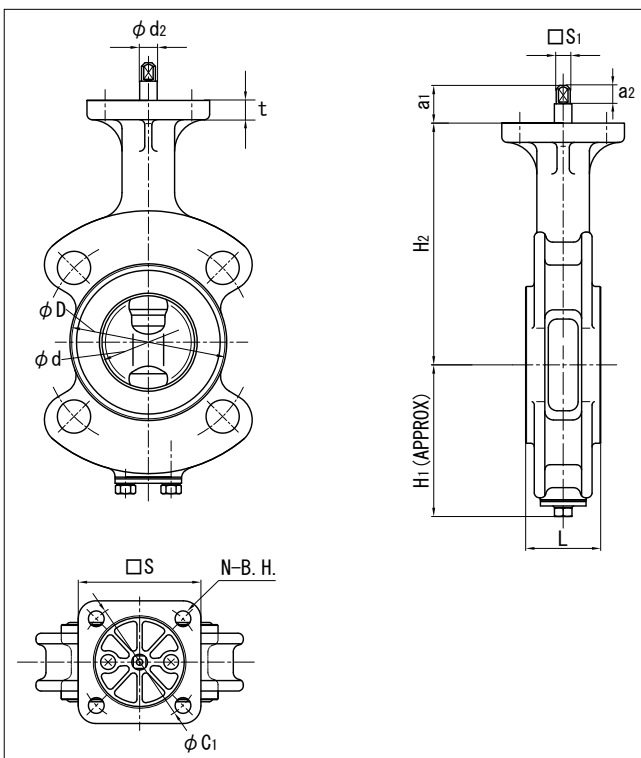
\* Upper : DIN PN16 Lower : ASME class 150

### Top flange dimension list

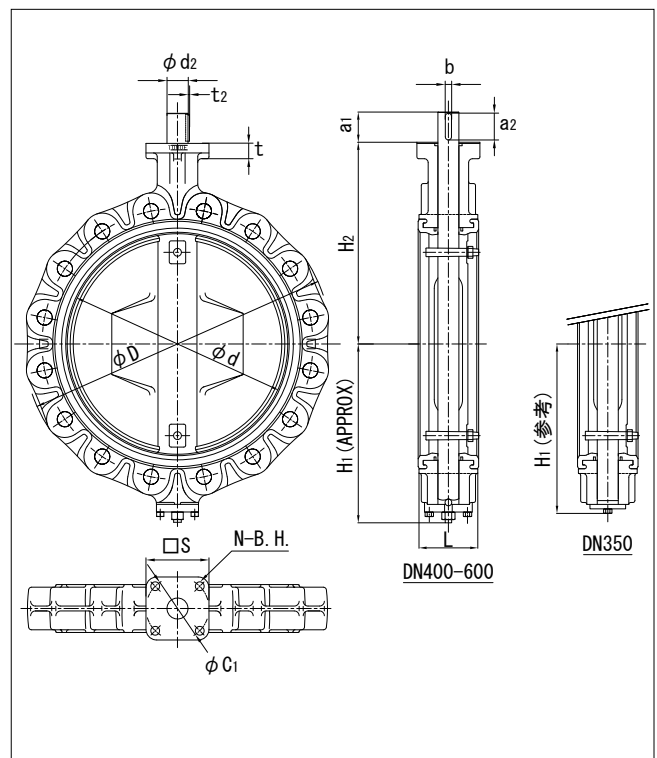
Flange type	$\square S$	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19
F16	165	165	4	23

<b>Shaft type</b>	01 : Square
	02 : Round (Key way)

### 72LG 50mm~300mm



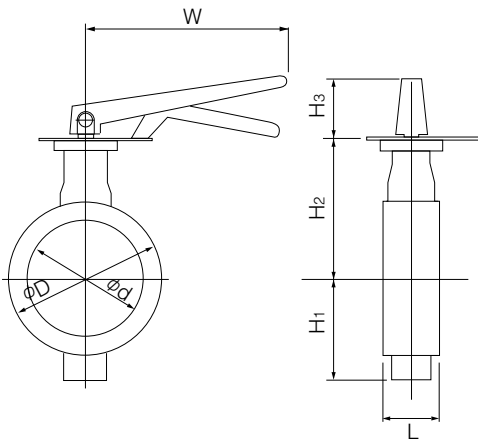
### 72LG 350mm~600mm



Lock lever type 72WG-1T (40mm to 200mm)

Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
40	1 1/2	45	80	35	61	132	66	200	1T-1	2.1
50	2	56	90	43	68	138	66	200	1T-1	2.4
65	2 1/2	69	115	46	79	151	66	200	1T-1	3.1
80	3	84	126	46	86	156	66	200	1T-1	3.2
100	4	104	146	52	103	167	66	200	1T-1	4
125	5	130	181	56	118	191	92	300	1T-2	6.7
150	6	153.5	211	56	135	202	92	300	1T-2	8.3
200	8	199	256	60	177	227	97	350	1T-3	12.1

■ 72WG-1T



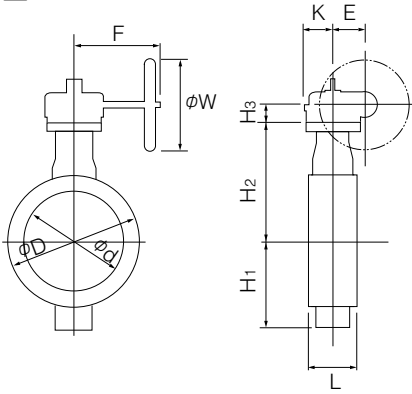
■ 1T Installation direction

1 T L S (standard)	1 T L R	1 T R S	1 T R R
1 T X S	1 T X R	1 T V S	1 T V R

**Worm gear type 72WG-2U (40mm to 200mm)**

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
40	1 1/2	45	80	35	61	132	29.5	36	46	160	100	2U-0	3.8
50	2	56	90	43	68	138	29.5	36	46	160	100	2U-0	4.1
65	2 1/2	69	115	46	79	151	29.5	36	46	160	100	2U-0	4.8
80	3	84	126	46	86	156	29.5	36	46	160	100	2U-1	4.9
100	4	104	146	52	103	167	29.5	36	46	160	100	2U-1	5.7
125	5	130	181	56	118	191	34.5	44	53	173.5	160	2U-2	9.6
150	6	153.5	211	56	135	202	34.5	44	53	173.5	160	2U-2	11.2
200	8	199	256	60	177	227	41.5	67	75	198	200	2U-3	18

**72WG-2U**



**2U Installation direction**

2 U A (standard)	2 U A R	2 U B	2 U B R



## Double-acting pneumatic cylinder type 72WG-7E (40mm to 200mm)

### Standard

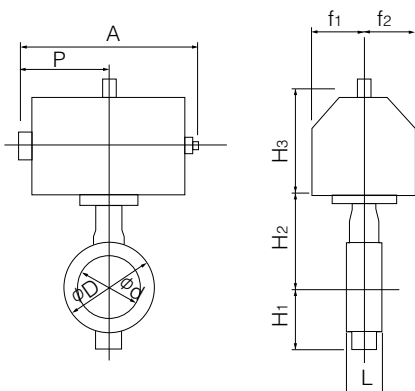
Nominal size		Dimension (mm)										Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	125	228	116	57	29	T35	4
50	2	56	90	43	68	138	125	228	116	57	29	T35	4
65	2 1/2	69	115	46	79	151	125	228	116	57	29	T35	5
80	3	84	126	46	86	156	168	276	142	75	47	T85	8
100	4	104	146	52	103	167	168	276	142	75	47	T85	8
125	5	130	181	56	118	191	168	276	142	75	47	T85	10
150	6	153.5	211	56	135	202	203	346	176	79	57	T200	15
200	8	199	256	60	177	227	231	423	214	91	69	T380	25

### Heavy duty

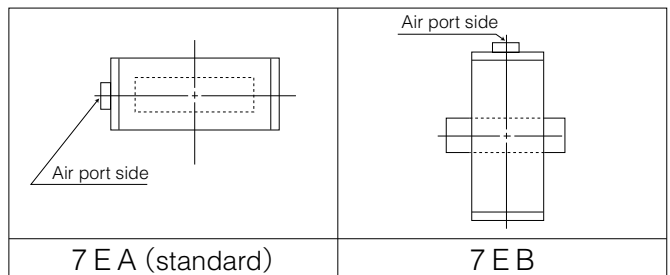
Nominal size		Dimension (mm)										Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	125	228	116	57	29	T35	4
50	2	56	90	43	68	138	125	228	116	57	29	T35	4
65	2 1/2	69	115	46	79	151	125	228	116	57	29	T35	5
80	3	84	126	46	86	156	168	276	142	75	47	T85	8
100	4	104	146	52	103	167	203	346	176	79	57	T200	12
125	5	130	181	56	118	191	203	346	176	79	57	T200	14
150	6	153.5	211	56	135	202	203	346	176	79	57	T200	15
200	8	199	256	60	177	227	231	423	214	91	69	T380	25

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 72WG-7E



### 7E Installation direction



# 72WG (Wafer) / 72SG (Semi lugged) / 72LG (Lugged)

Single-acting pneumatic cylinder type 72WG-7G (Air to open: 40mm to 200mm) / 72WG-7F (Air to close: 40mm to 200mm)

## Standard

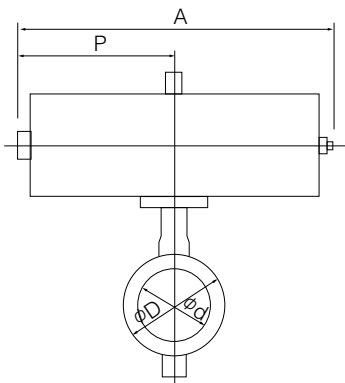
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	168	364	183	75	47	T85S	8
50	2	56	90	43	68	138	168	364	183	75	47	T85S	8
65	2 1/2	69	115	46	79	151	168	364	183	75	47	T85S	9
80	3	84	126	46	86	156	203	449	226	79	57	T200S	14
100	4	104	146	52	103	167	231	550	276	91	69	T380S	23
125	5	130	181	56	118	191	231	550	276	91	69	T380S	25
150	6	153.5	211	56	135	202	269	723	360	118	85	T750S	40
200	8	199	256	60	177	227	269	723	360	118	85	T750S	43

## Heavy duty

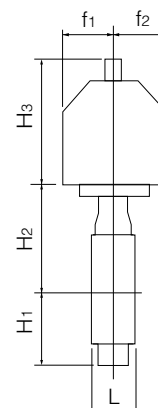
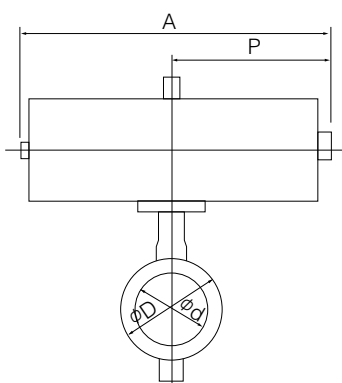
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	168	364	183	75	47	T85S	8
50	2	56	90	43	68	138	168	364	183	75	47	T85S	8
65	2 1/2	69	115	46	79	151	203	449	226	79	57	T200S	14
80	3	84	126	46	86	156	203	449	226	79	57	T200S	14
100	4	104	146	52	103	167	231	550	276	91	69	T380S	23
125	5	130	181	56	118	191	231	550	276	91	69	T380S	25
150	6	153.5	211	56	135	202	269	723	360	118	85	T750S	40

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

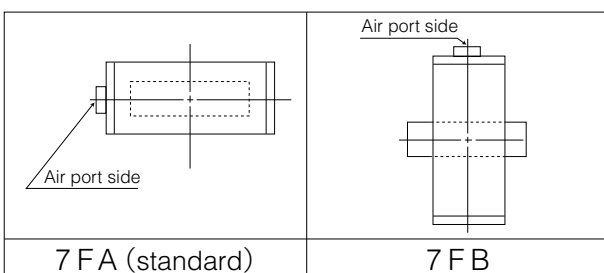
## 72WG-7F



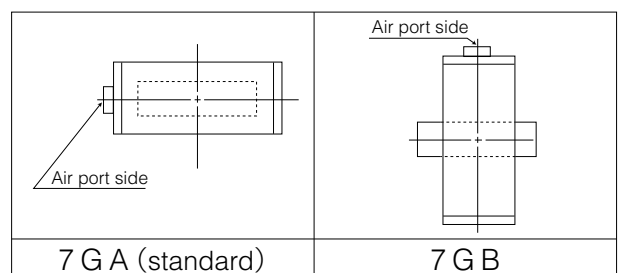
## 72WG-7G



## 7F Installation direction



## 7G Installation direction



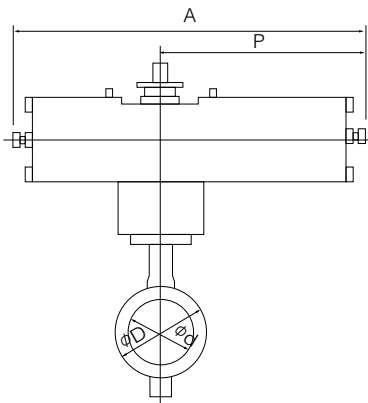
Single-acting pneumatic cylinder type 72WG-3U (Air to open: 200mm) / 72WG-3K (Air to close: 200mm)

■ Heavy duty

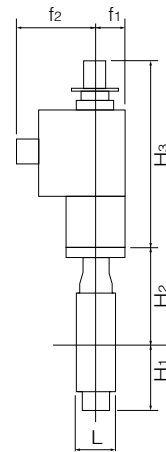
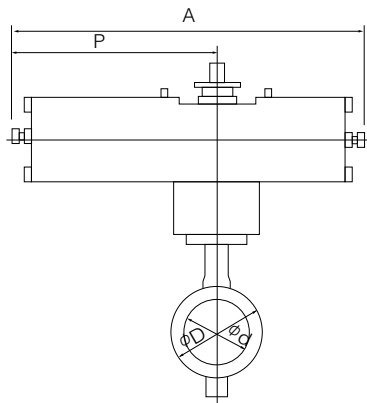
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	199	256	60	177	227	307	945	585	70	165	TG-10S	66

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

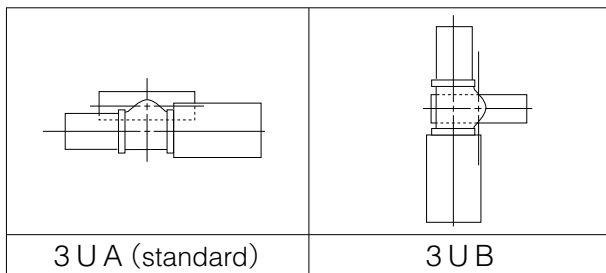
■ 72WG-3U



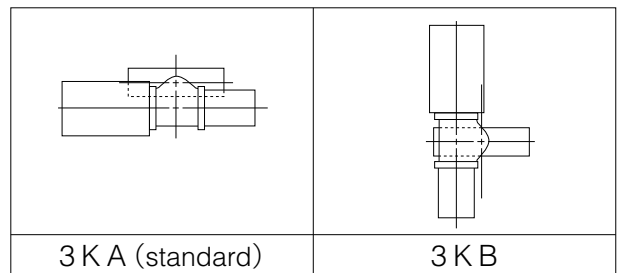
■ 72WG-3K



■ 3U Installation direction



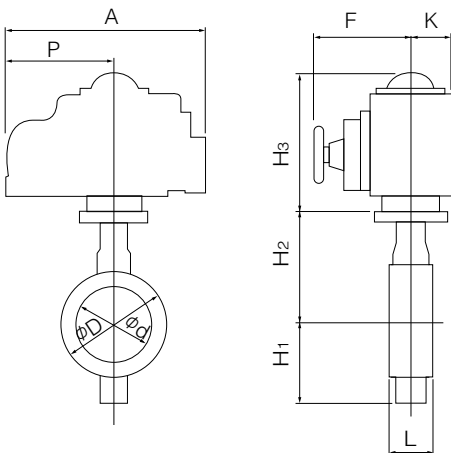
■ 3K Installation direction



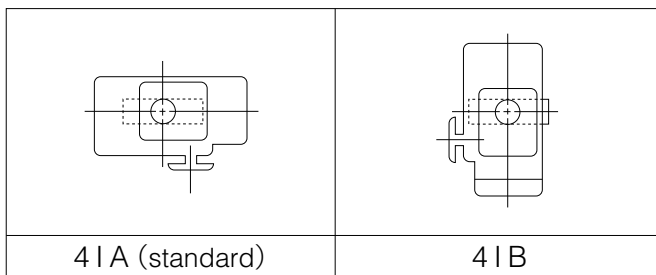
Single phase electric motor type 72WG-4I (40mm to 200mm)

Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
40	1 1/2	45	80	35	61	132	120	161	84	58	45	4 I-00	4
50	2	56	90	43	68	138	120	161	84	58	45	4 I-00	4.3
65	2 1/2	69	115	46	79	151	150	202	100	85	54	4 I-0	6.7
80	3	84	126	46	86	156	150	202	100	85	54	4 I-0	6.8
100	4	104	146	52	103	167	165	252	138	126	65	4 I-1	9.8
125	5	130	181	56	118	191	198	310	167	154	85	4 I-2	16.6
150	6	153.5	211	56	135	202	198	310	167	154	85	4 I-2	18.2
200	8	199	256	60	177	227	198	310	167	154	85	4 I-2.5	21.6

■ 72WG-4 I



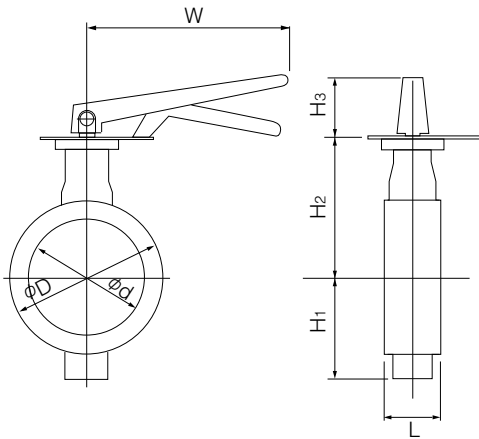
■ 4I Installation direction



Lock lever type 72SG-1T (50mm to 200mm)

Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
50	2	56	90	43	85	138	66	200	1T-1	3.1
65	2 1/2	69	115	46	94	151	66	200	1T-1	4.1
80	3	84	126	46	109	156	66	200	1T-1	4.6
100	4	104	146	52	117	167	66	200	1T-1	5.6
125	5	130	181	56	143	191	92	300	1T-2	9.3
150	6	153	211	56	164	202	92	300	1T-2	12.3
200	8	199.0	256	60	186	227	97	350	1T-3	16.7

72SG-1T



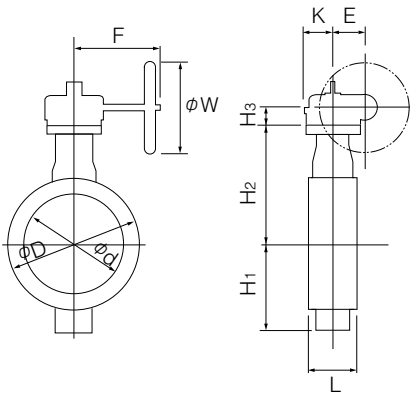
1T Installation direction

1TLS (standard)	1TLR	1TRS	1TRR
1TXS	1TXR	1TVS	1TVR

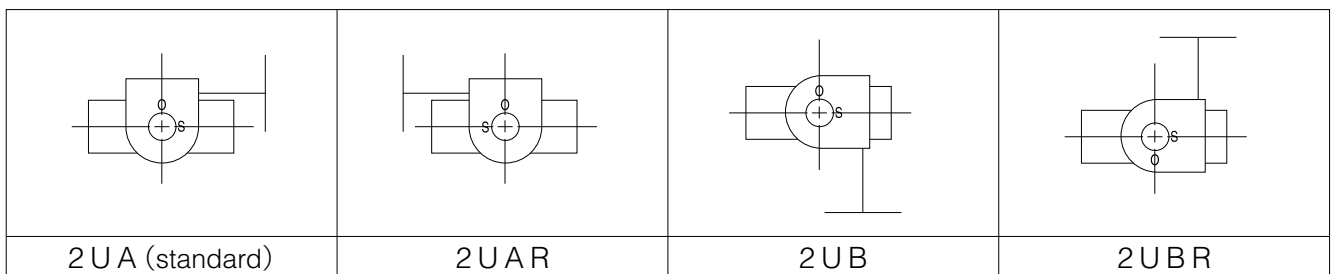
**Worm gear type 72SG-2U (50mm to 600mm)**

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
50	2	56	90	43	85	138	29.5	36	46	160	100	2U-0	4.8
65	2 1/2	69	115	46	94	151	29.5	36	46	160	100	2U-0	5.8
80	3	84	126	46	109	156	29.5	36	46	160	100	2U-1	6.3
100	4	104	146	52	117	167	29.5	36	46	160	100	2U-1	7.3
125	5	130	181	56	143	191	34.5	44	53	173.5	160	2U-2	12.2
150	6	153.5	211	56	164	202	34.5	44	53	173.5	160	2U-2	16
200	8	199	256	60	186	227	41.5	67	75	198	200	2U-3	23
250	10	253	322	68	215	280	41.5	67	75	198	200	2U-3	38
300	12	302	367	78	253	312	48	87	90	222.5	200	2U-4	53
350	14	337	410	78	276	348	48	87.5	90	222.5	280	2U-4	63
400	16	394	469	102	338	383	50	90	105	266	280	2U-5	88
450	18	441	525	114	368	413	50	90	105	266	280	2U-5	112
500	20	492	580	127	403	453	50	90	105	266	280	2U-5	143
600	24	584	682	154	458	528	61	113	140	352	400	2U-6	222

**72SG-2U**



**2U Installation direction**



## Double-acting pneumatic cylinder type 72SG-7E (50mm to 300mm)

### Standard

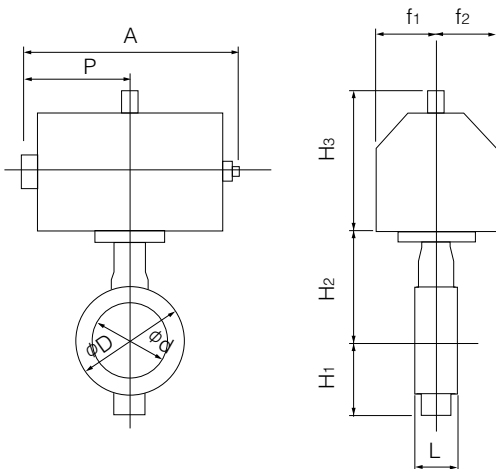
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	46	94	151	125	228	116	57	29	T35	6
80	3	84	126	46	109	156	168	276	142	75	47	T85	9
100	4	104	146	52	117	167	168	276	142	75	47	T85	10
125	5	130	181	56	143	191	168	276	142	75	47	T85	13
150	6	153.5	211	56	164	202	203	346	176	79	57	T200	19
200	8	199	256	60	186	227	231	423	214	91	69	T380	29
250	10	253	322	68	215	280	231	423	214	91	69	T380	44
300	12	302	367	78	253	312	269	546	270	118	85	T750	63

### Heavy duty

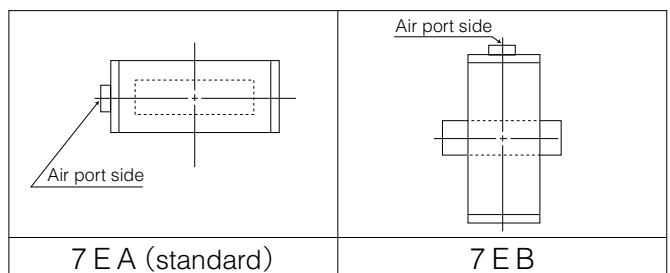
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	46	94	151	125	228	116	57	47	T35	6
80	3	84	126	46	109	156	168	276	142	75	57	T85	9
100	4	104	146	52	117	167	203	346	176	79	57	T200	13
125	5	130	181	56	143	191	203	346	176	79	57	T200	16
150	6	153.5	211	56	164	202	203	346	176	79	69	T200	19
200	8	199	256	60	186	227	231	423	214	91	69	T380	29
250	10	253	322	68	215	280	269	546	270	118	85	T750	53

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 72SG-7E



### 7E Installation direction



**Double-acting pneumatic cylinder type 72SG-3A (300mm to 600mm)**

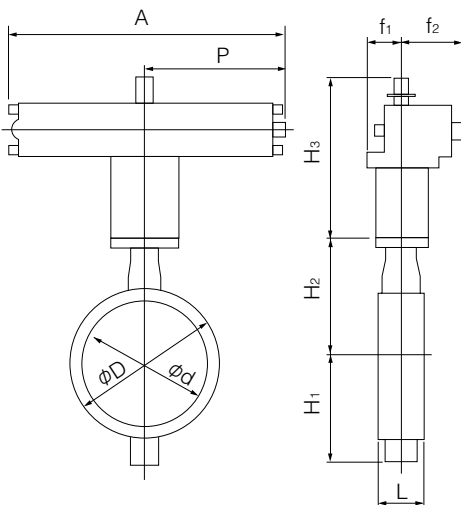
■ **Standard**

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
350	14	337	410	78	276	348	364	743	381	100	164	TGA-125	85
400	16	394	469	102	338	383	412	810	417	100	180	TGA-140	124
450	18	441	525	114	368	413	412	810	417	100	180	TGA-140	150
500	20	492	580	127	403	453	465	939	483	130	202	TGA-160	217
600	24	584	682	154	458	528	478	1053	543	130	218	TGA-180	330

■ **Heavy duty**

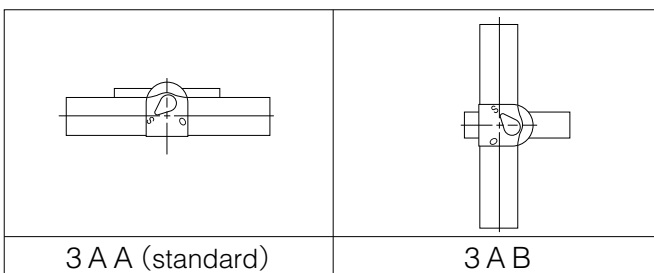
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
300	12	302	367	78	253	312	364	743	381	100	164	TGA-125	71
350	14	337	410	78	276	348	364	743	381	100	164	TGA-125	85
400	16	394	469	102	338	383	412	810	417	100	180	TGA-140	124
450	18	441	525	114	368	413	465	939	483	130	202	TGA-160	197
500	20	492	580	127	403	453	465	939	483	130	202	TGA-160	217
600	24	584	682	154	458	528	525	1163	599	160	253	TGA-200	390

■ **72SG-3A**



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

■ **3A Installation direction**





Single-acting pneumatic cylinder type 72SG-7G (Air to open: 50mm to 200mm) / 72SG-7F (Air to close: 50mm to 200mm)

■ Standard

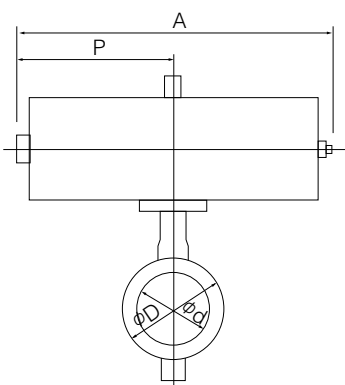
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	168	364	183	75	47	T85S	9
65	2 1/2	69	115	46	94	151	168	364	183	75	47	T85S	10
80	3	84	126	46	109	156	203	449	226	79	57	T200S	15
100	4	104	146	52	117	167	231	550	276	91	69	T380S	24
125	5	130	181	56	143	191	231	550	276	91	69	T380S	27
150	6	153.5	211	56	164	202	269	723	360	118	85	T750S	44
200	8	199	256	60	186	227	269	723	360	118	85	T750S	48

■ Heavy duty

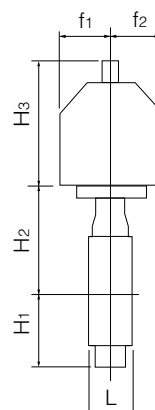
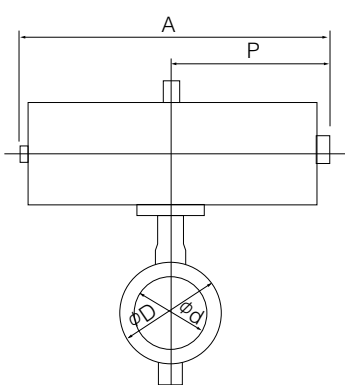
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	168	369	183	75	47	T85S	9
65	2 1/2	69	115	46	94	151	203	449	226	79	57	T200S	14
80	3	84	126	46	109	156	203	449	226	79	57	T200S	15
100	4	104	146	52	117	167	231	550	276	91	69	T380S	24
125	5	130	181	56	143	191	231	550	276	91	69	T380S	27
150	6	153.5	211	56	164	202	269	723	360	118	85	T750S	44

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

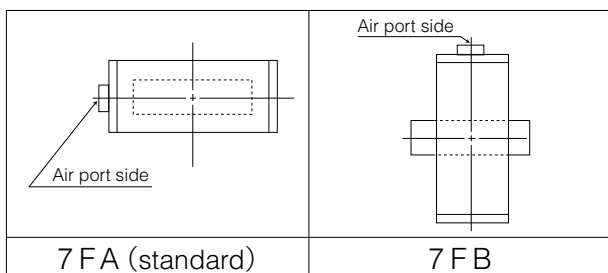
■ 72SG-7F



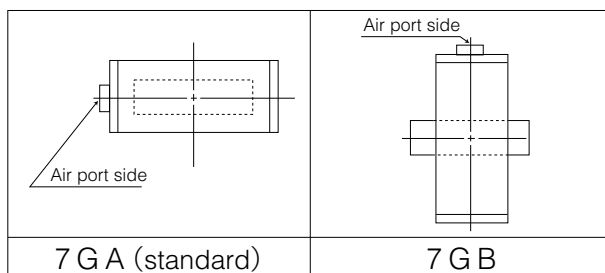
■ 72SG-7G



■ 7F Installation direction



■ 7G Installation direction



# 72WG (Wafer) / 72SG (Semi lugged) / 72LG (Lugged)

Single-acting pneumatic cylinder type 72SG-3U (Air to open: 200mm to 600mm) / 72SG-3K (Air to close: 200mm to 600mm)

## Standard

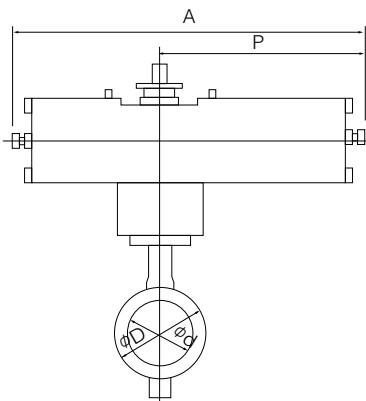
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	253	322	68	215	280	307	1080	720	94	206	TG-12S	125
300	12	302	367	78	253	312	307	1080	720	94	206	TG-12S	134
350	14	337	410	78	276	348	340	1255	865	131	257	TG-14S	244
400	16	394	469	102	338	383	340	1255	865	131	257	TG-14S	270
450	18	441	525	114	368	413	474	1655	1095	164	348	TG-20S	507
500	20	492	580	127	403	453	474	1655	1095	164	348	TG-20S	538
600	24	584	682	154	458	528	474	1655	1095	164	348	TG-20S	602

## Heavy duty

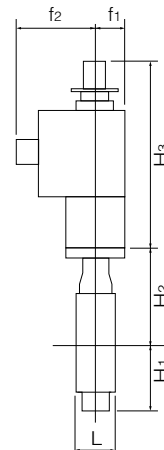
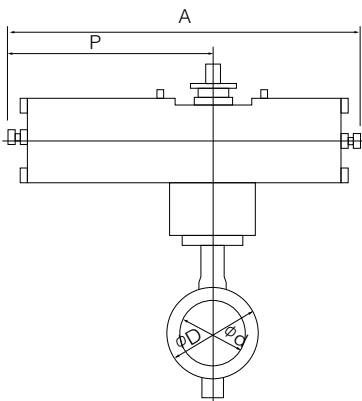
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	199	256	60	186	227	307	945	585	70	165	TG-10S	71
250	10	253	322	68	215	280	307	1080	720	94	206	TG-12S	125
300	12	302	367	78	253	312	340	1255	865	131	257	TG-14S	232
350	14	337	410	78	276	348	340	1255	865	131	257	TG-14S	244
400	16	394	469	102	338	383	474	1655	1095	164	348	TG-20S	474
450	18	441	525	114	368	413	474	1655	1095	164	348	TG-20S	507
500	20	492	580	127	403	453	474	1655	1095	164	348	TG-20S	538

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

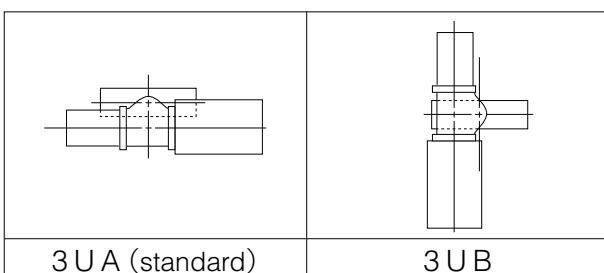
## 72SG-3U



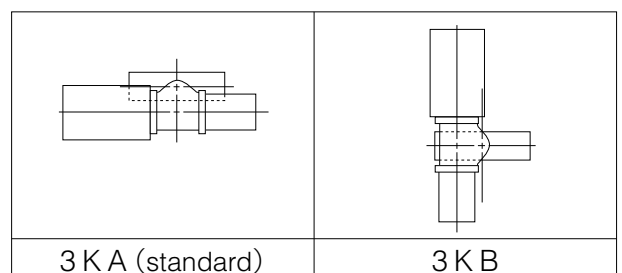
## 72SG-3K



## 3U Installation direction



## 3K Installation direction



## Single phase electric motor type 72SG-4I (50mm to 500mm)

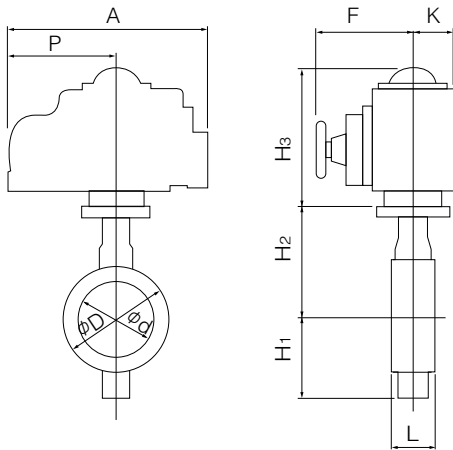
Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	56	90	43	85	138	120	161	84	58	45	4 I-00	5.3
65	2 1/2	69	115	46	94	151	150	202	100	85	54	4 I-0	7.7
80	3	84	126	46	109	156	150	202	100	85	54	4 I-0	8.2
100	4	104	146	52	117	167	165	252	138	126	65	4 I-1	11.4
125	5	130	181	56	143	191	198	310	167	154	85	4 I-2	19.2
150	6	153.5	211	56	164	202	198	310	167	154	85	4 I-2	22.2
200	8	199	256	60	186	227	198	310	167	154	85	4 I-2.5	26.2
250	10	253	322	68	215	280	230	388	223	246	136	4 I-3	50
300	12	302	367	78	253	312	230	388	223	246	136	4 I-3	63
350	14	337	410	78	276	348	230	388	223	246	136	4 I-3	70
							255	338	223	246	136	4 I-4	76
400	16	394	469	102	338	383	255	388	223	246	136	4 I-4	101
450	18	441	525	114	368	413	230	388	223	246	136	4 I-4	125
500	20	492	580	127	403	453	230	388	223	246	136	4 I-4	156

Note 1: For nominal size 50 mm type (for control), the 4I-0 type should be selected. (The 4I-00 type is only designed for ON-OFF operation.)

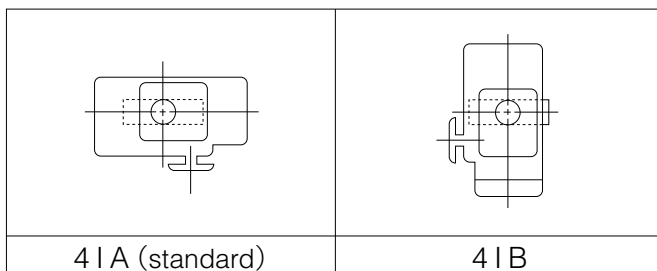
Remark: For 350mm type with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

### 72SG-4 I



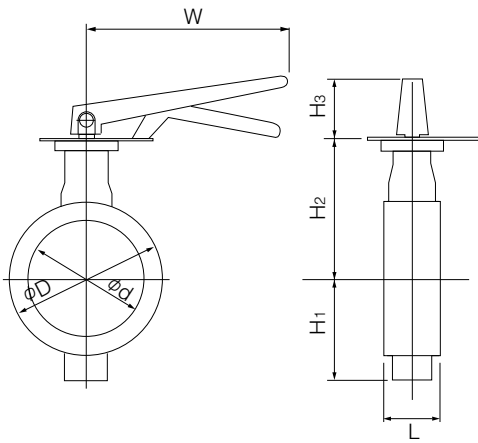
### 4 I Installation direction



## Lock lever type 72LG-1T (50mm to 200mm)

Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
50	2	56	90	43	85	138	66	200	1T-1	3.1
65	2 1/2	69	115	46	94	151	66	200	1T-1	4.1
80	3	84	126	46	109	156	66	200	1T-1	5.4
100	4	104	146	52	117	167	66	200	1T-1	8
125	5	130	181	56	143	191	92	300	1T-2	11.9
150	6	153.5	211	56	164	202	92	300	1T-2	15.1
200	8	199	256	60	186	227	97	350	1T-3	22.2

### 72LG-1T



### 1T Installation direction

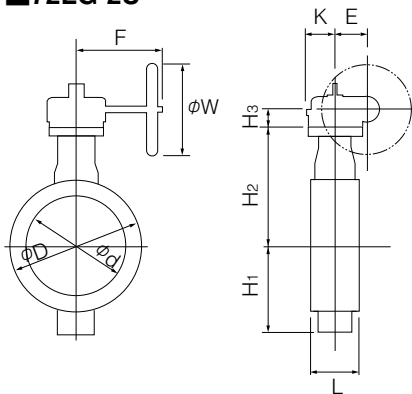
1TSL (standard)	1TLR	1TRS	1TRR
1TXS	1TXR	1TVS	1TVR

## Worm gear type 72LG-2U (50mm to 600mm)

Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
50	2	56	90	43	68	138	29.5	36	46	160	100	2U-0	4.8
65	2 1/2	69	115	46	79	151	29.5	36	46	160	100	2U-0	5.8
80	3	84	126	46	86	156	29.5	36	46	160	100	2U-1	7.1
100	4	104	146	52	103	167	29.5	36	46	160	100	2U-1	9.7
125	5	130	181	56	118	191	34.5	44	53	173.5	160	2U-2	14.8
150	6	153.5	211	56	135	202	34.5	44	53	173.5	160	2U-2	18.8
200	8	199	256	60	177	227	41.5	67	75	198	200	2U-3	27
250	10	253	322	68	215	280	41.5	67	75	198	200	2U-3	52
300	12	302	367	78	253	312	48	87.5	90	222.5	200	2U-4	76
* 350	14	337	533 520	78	276	348	48	87.5	90	222.5	280	2U-4	86
400	16	394	597	102	338	383	50	90	105	266	280	2U-5	123
* 450	18	441	640 634	114	368	413	50	90	105	266	280	2U-5	148
* 500	20	492	730 696	127	403	453	50	90	105	266	280	2U-5	195
* 600	24	584	840 820	154	458	528	61	113	140	352	400	2U-6	306

\*Upper : DIN PN16 Lower : ASME class 150

### 72LG-2U



### 2U Installation direction

2UA (standard)	2UAR	2UB	2UBR

## Double-acting pneumatic cylinder type 72LG-7E (50mm to 300mm)

### Standard

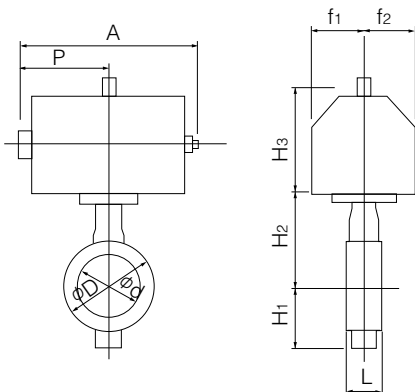
Nominal size		Dimension (mm)										Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	46	94	151	125	228	116	57	29	T35	6
80	3	84	126	46	109	156	168	276	142	75	47	T85	11
100	4	104	146	52	117	167	168	276	142	75	47	T85	12
125	5	130	181	56	143	191	168	276	142	75	47	T85	14
150	6	153.5	211	56	164	202	203	346	176	79	57	T200	19
200	8	199	256	60	177	227	231	423	214	91	69	T380	31
250	10	253	322	68	215	280	231	423	214	91	69	T380	58
300	12	302	367	78	253	312	269	546	270	118	85	T750	88

### Heavy duty

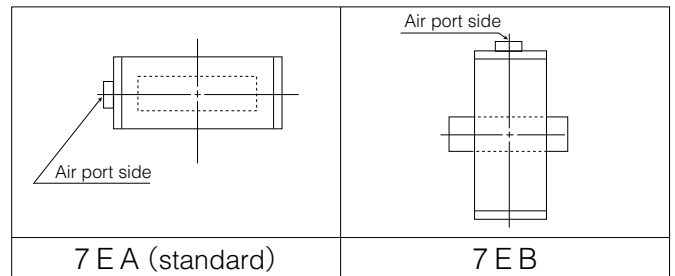
Nominal size		Dimension (mm)										Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	125	228	116	57	29	T35	5
65	2 1/2	69	115	46	94	151	125	228	116	57	29	T35	6
80	3	84	126	46	109	156	168	276	142	75	47	T85	11
100	4	104	146	52	117	167	203	346	176	79	57	T200	15
125	5	130	181	56	143	191	203	346	176	79	57	T200	17
150	6	153.5	211	56	164	202	203	346	176	79	57	T200	19
200	8	199	256	60	177	227	231	423	214	91	69	T380	31
250	10	253	322	68	215	280	269	546	270	118	85	T750	68

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 72LG-7E



### 7E Installation direction



## Double-acting pneumatic cylinder type 72LG-3A (300mm to 600mm)

### Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
* 350	14	337	533 520	78	276	348	364	743	381	100	164	TGA-125	85
400	16	394	597	102	338	383	364	743	381	100	164	TGA-140	124
* 450	18	441	640 634	114	368	413	412	810	417	100	180	TGA-140	191
* 500	20	492	730 696	127	403	453	465	939	483	130	202	TGA-160	269
* 600	24	584	840 820	154	458	528	478	1053	543	218	69	TGA-180	414

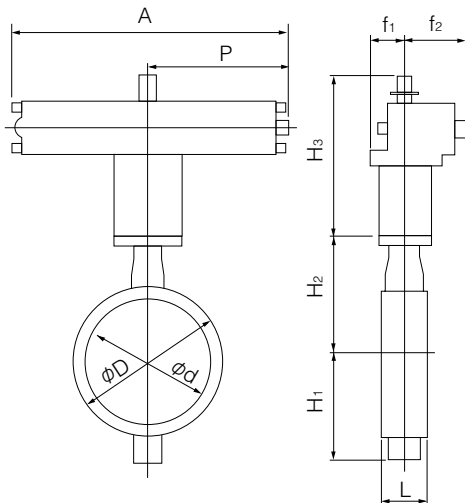
\*Upper : DIN PN16 Lower : ASME class 150

### Heavy duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
300	12	302	367	78	253	312	364	743	381	100	164	TGA-125	75
* 350	14	337	533 520	78	276	348	364	743	381	100	164	TGA-125	85
400	16	394	597	102	338	383	412	810	417	100	180	TGA-140	124
* 450	18	441	640 634	114	368	413	465	939	483	130	202	TGA-160	233
* 500	20	492	730 696	127	403	453	465	939	483	130	202	TGA-160	269
* 600	24	584	840 820	154	458	528	525	1163	599	160	253	TGA-200	474

\*Upper : DIN PN16 Lower : ASME class 150

### 72LG-3A



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 3A Installation direction

3 A A (standard)	3 A B

# 72LG (Lugged)

Single-acting pneumatic cylinder type 72LG-7G (Air to open: 50mm to 200mm) / 700G-7F (Air to close: 50mm to 200mm)

## Standard

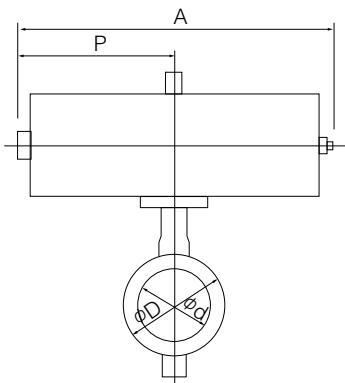
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	168	364	183	75	47	T85S	9
65	2 1/2	69	115	46	94	151	168	364	183	75	47	T85S	10
80	3	84	126	46	109	156	203	449	226	79	57	T200S	16
100	4	104	146	52	117	167	231	550	276	91	69	T380S	25.6
125	5	130	181	56	143	191	231	550	276	91	69	T380S	30
150	6	153.5	211	56	164	202	269	723	360	118	85	T750S	47
200	8	199	256	60	177	227	269	723	360	118	85	T750S	53

## Heavy duty

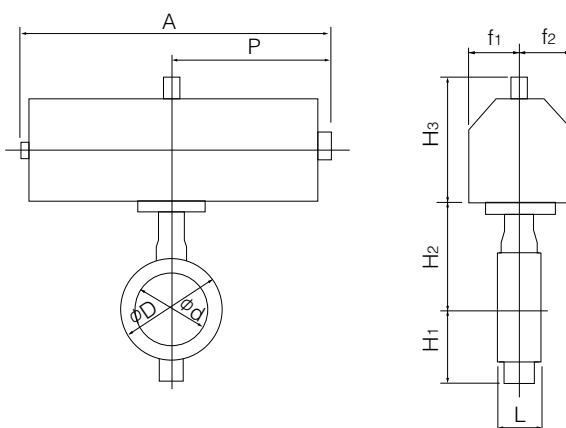
Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
50	2	56	90	43	85	138	168	364	183	75	47	T85S	9
65	2 1/2	69	115	46	94	151	203	449	226	79	57	T200S	14
80	3	84	126	46	109	156	203	449	226	79	57	T200S	16
100	4	104	146	52	117	167	231	550	276	91	69	T380S	25.6
125	5	130	181	56	143	191	231	550	276	91	69	T380S	30
150	6	153.5	211	56	164	202	269	723	360	118	85	T750S	47

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

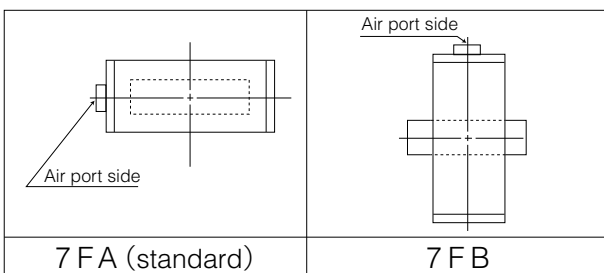
## 72LG-7F



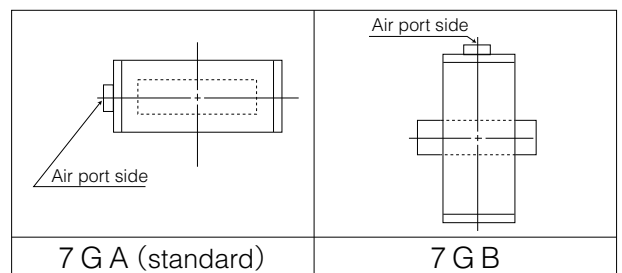
## 72LG-7G



## 7F Installation direction



## 7G Installation direction





Single-acting pneumatic cylinder type 72LG-3U (Air to open: 200mm to 600mm) / 72LG-3K (Air to close: 200mm to 600mm)

■ Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	253	322	68	215	280	307	1080	720	94	206	TG-12S	139
300	12	302	367	78	253	312	307	1080	720	94	206	TG-12S	158
* 350	14	337	533 520	78	276	348	340	1255	865	131	257	TG-14S	267
400	16	394	597	102	338	383	340	1255	865	131	257	TG-14S	305
* 450	18	441	640 634	114	368	413	474	1655	1095	164	348	TG-20S	543
* 500	20	492	730 696	127	403	453	474	1655	1095	164	348	TG-20S	590
* 600	24	584	840 820	154	458	528	474	1655	1095	164	348	TG-20S	686

\* Upper : DIN PN16 Lower : ASME class 150

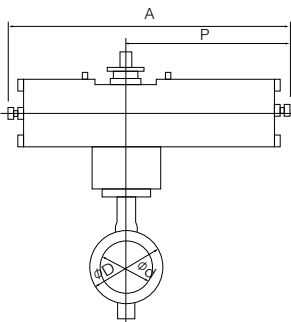
■ Heavy duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	199	256	60	177	227	307	945	585	70	165	TG-10S	77
250	10	253	322	68	215	280	307	1080	720	94	206	TG-12S	139
300	12	302	367	78	253	312	340	1255	865	131	257	TG-14S	254
* 350	14	337	533 520	78	276	348	340	1255	865	131	257	TG-14S	267
400	16	394	597	102	338	383	474	1655	1095	164	348	TG-20S	508
* 450	18	441	640 634	114	368	413	474	1655	1095	164	348	TG-20S	543
* 500	20	492	730 696	127	403	453	474	1655	1095	164	348	TG-20S	590

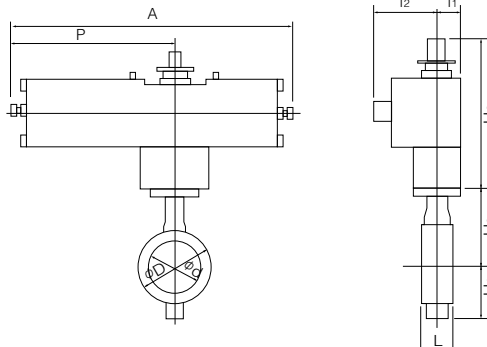
\* Upper : DIN PN16 Lower : ASME class 150

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

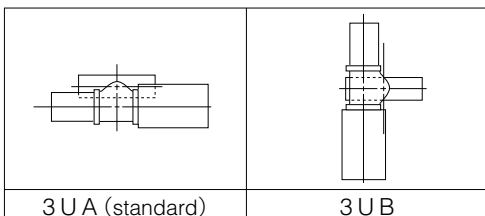
■ 72LG-3U



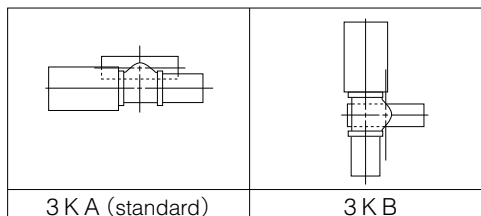
■ 72LG-3K



■ 3U Installation direction



■ 3K Installation direction



## Single phase electric motor type 72LG-4I (40mm to 500mm)

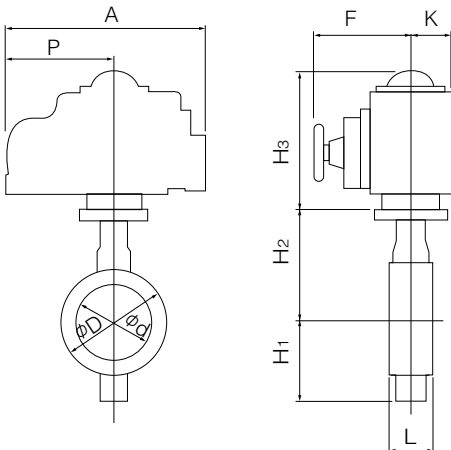
Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	56	90	43	68	138	120	161	84	58	45	4I-00	5.3
65	2 1/2	69	115	46	79	151	150	202	100	85	54	4I-0	7.7
80	3	84	126	46	86	156	150	202	100	85	54	4I-0	8.2
100	4	104	146	52	103	167	165	252	138	126	65	4I-1	13.8
125	5	130	181	56	118	191	198	310	167	154	85	4I-2	21.8
150	6	153.5	211	56	135	202	198	310	167	154	85	4I-2	25
200	8	199	256	60	177	227	198	310	167	154	85	4I-2.5	30.2
250	10	253	322	68	215	280	230	388	223	246	136	4I-3	56.8
300	12	302	367	78	253	312	230	388	223	246	136	4I-3	86.2
*	350	337	533	78	276	348	230	388	223	246	136	4I-3	93
			520				255					4I-4	
	400	394	597	102	338	383	255	388	223	246	136	4I-4	136
*	450	441	640	114	368	413	230	388	223	246	136	4I-4	161
			634										
*	500	492	730	127	403	453	230	388	223	246	136	4I-4	208
			696										

Remark: For 350mm type with the accessories below, type 4I-4 should be selected.

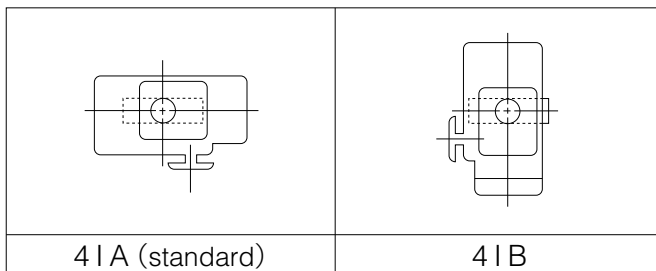
- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

\* Upper : DIN PN16 Lower : ASME class 150

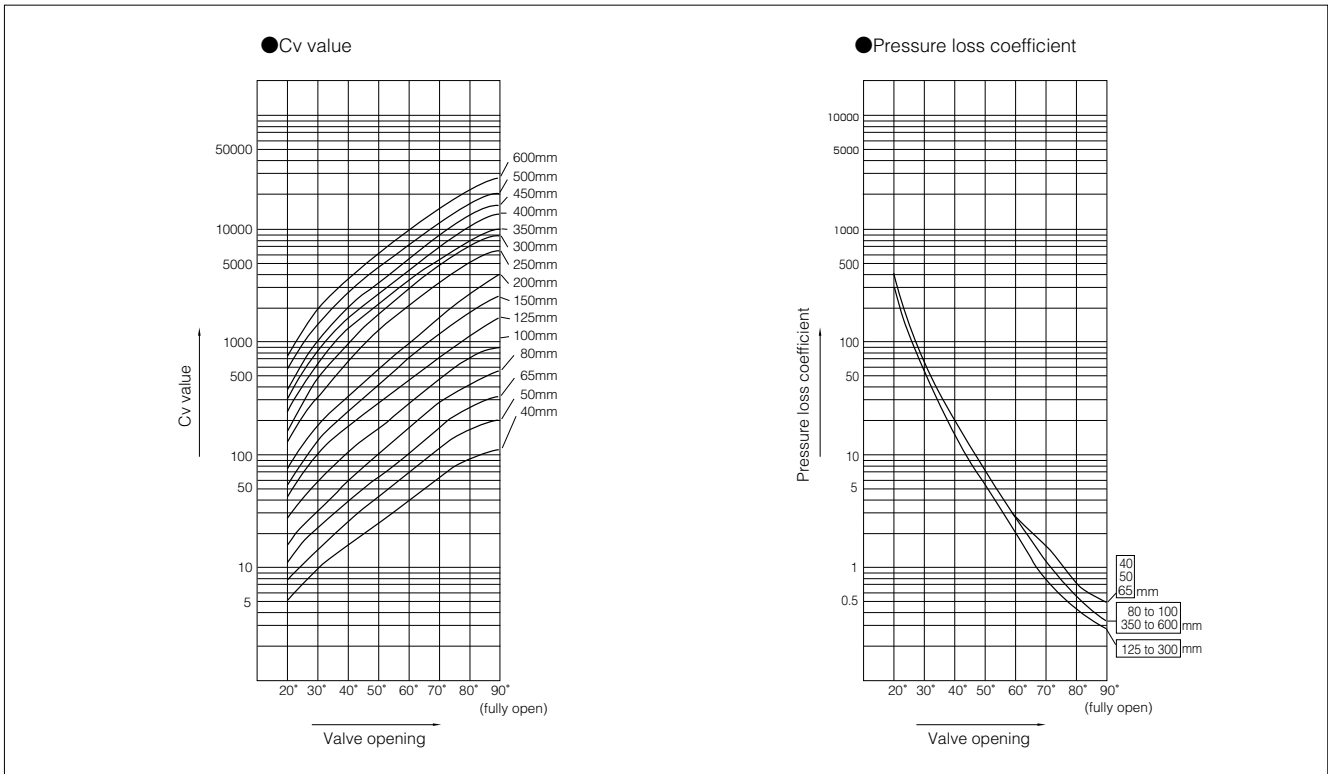
### 72LG-4I



### 4I Installation direction



## 700G/704G/705G Cv value/pressure loss coefficient



## 72WG / 72SG / 72LG Cv value

Nominal size		Valve opening							
		20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	5	9	16	25	39	61	95	121
50	2	8	15	25	40	64	103	160	200
65	2 1/2	12	25	41	64	102	162	260	320
80	3	15	33	57	95	163	271	450	580
100	4	27	58	100	162	269	444	749	880
125	5	45	109	189	295	453	719	1144	1590
150	6	60	148	262	423	685	1147	1897	2800
200	8	67	188	347	576	969	1698	2902	4300
250	10	130	351	675	1225	2125	3375	5091	6200
300	12	194	487	972	1764	3011	4966	7412	8900
350	14	232	662	1350	2030	3294	5167	7832	9620
400	16	468	964	1648	2724	4529	6815	10553	12700
450	18	583	1202	2068	3448	5692	8384	13116	15500
500	20	758	1555	2656	4379	7214	10845	17100	19800
600	24	1037	2141	3681	6129	10106	14911	22827	27300

# 72WG (Wafer) / 72SG (Semi lugged) / 72LG (Lugged)

## 72WG / 72SG / 72LG Pressure Loss Coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	264	72	26	10	4	2	1	0.4
50	2	257	68	25	10	4	2	1	0.4
65	2 1/2	310	75	28	11	4	2	1	0.4
80	3	394	83	27	10	3	1	0.4	0.3
100	4	350	78	26	10	4	1	0.4	0.3
125	5	316	53	18	7	3	1	0.4	0.2
150	6	348	57	18	7	3	1	0.35	0.2
200	8	849	106	31	11	4	1	0.3	0.2
250	10	528	72	20	6	2	1	0.35	0.25
300	12	488	78	20	6	2	1	0.35	0.25
350	14	531	65	16	7	3	1	0.4	0.3
400	16	227	54	18	7	2	1	0.4	0.3
450	18	239	56	19	7	3	1	0.4	0.3
500	20	218	52	18	7	2	1	0.4	0.3
600	24	247	58	20	7	3	1	0.4	0.3

## 72WG / 72SG / 72LG Flange accommodation

Nominal size		ASME	BS4504	DIN
mm	inch	class 150	NP16	NP16
40	1 1/2	○	○	○
50	2	○	○	○
65	2 1/2	○	○	○
80	3	○	○	○
100	4	○	○	○
125	5	○	○	○
150	6	○	○	○
200	8	○	○	○
250	10	○	○	○
300	12	○	○	○
350	14	○	○	○
400	16	○	○	○
450	18	○	○	○
500	20	○	○	○
600	24	○	○	○

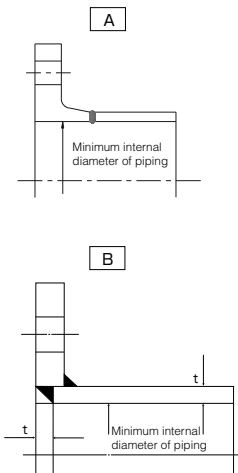
○ : Can be used without flange drilling.

72WG / 72SG / 72LG Applicable Pipe List in Case of **A**

Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S	Minimum internal diameters of piping (mm)
mm	inch						
40	1 1/2	○	—	○	○	○	26
50	2	○	○	○	○	○	31
65	2 1/2	○	○	○	○	○	48
80	3	○	○	○	○	○	67
100	4	○	○	○	○	○	87
125	5	○	○	○	○	○	115
150	6	○	○	○	○	○	140
200	8	○	○	○	○	○	188
250	10	○	○	○	○	○	243
300	12	○	○	○	○	○	292
350	14	○	○	○	—	—	324
400	16	○	○	○	—	—	375
450	18	○	○	○	—	—	421
500	20	○	○	○	—	—	471
600	24	—	○	○	—	—	557

72WG / 72SG / 72LG Applicable Pipe List in Case of **B**

Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
mm	inch						
40	1 1/2	○	—	—	○	○	○
50	2	○	—	○	○	○	○
65	2 1/2	○	—	○	○	○	○
80	3	○	—	○	○	○	○
100	4	○	—	○	○	○	○
125	5	○	—	○	○	○	○
150	6	○	—	○	○	○	○
200	8	○	—	○	○	○	○
250	10	○	—	○	○	○	○
300	12	○	—	○	○	○	○
350	14	○	○	○	○	—	—
400	16	○	○	○	○	—	—
450	18	○	○	○	○	—	—
500	20	○	○	○	○	—	—
600	24	—	○	○	○	—	—



Remark 1: The symbols above mean the following.

○: Piping possible —: Not standardized

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.

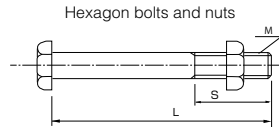
**72WG Piping Bolts and Nuts Sizes**

**■ For Hexagon Bolts and Nuts**

Nominal size		DIN PN16	GB PN16	BS PN16	ASME class 150
mm	inch	Hex. bolt & nuts	Hex. bolt & nuts	Hex. bolt & nuts	Hex. bolt & nuts
40	1 1/2	4-M16× 90×30	4-M16× 90×30	4-M16× 90×30	4-1/2-13UNC× 90×38
50	2	4-M16×105×30	4-M16×105×30	4-M16×105×30	4-5/8-11UNC×105×38
65	2 1/2	4-M16×105×30	4-M16×105×30	4-M16×105×30	4-5/8-11UNC×110×38
80	3	8-M16×105×30	8-M16×105×30	8-M16×105×30	4-5/8-11UNC×120×38
100	4	8-M16×115×30	8-M16×115×30	8-M16×115×30	8-5/8-11UNC×125×38
125	5	8-M16×120×35	8-M16×120×35	8-M16×120×35	8-3/4-10UNC×130×45
150	6	8-M20×130×40	8-M20×130×40	8-M20×130×40	8-3/4-10UNC×135×45
200	8	12-M20×140×40	12-M20×140×40	12-M20×140×40	8-3/4-10UNC×145×50

Example

Hexagon bolts : 12 - M22 × 60 × 50  
                   |      |      |      |  
                   N      M      L      S



## 72SG/72LG Piping Bolts and Nuts Sizes

### ■ For Hexagon Bolts and Nuts (Flange Bolt Hole: Drilled Holes)

Size		DIN PN16	GB PN16	BS PN16	ASME class 150
mm	inch	Hex. bolt & nuts	Hex. bolt & nuts	Hex. bolt & nuts	Hex. bolt & nuts
50	2	4-M16×105×30	4-M16×105×30	4-M16×105×30	4-5/8-11UNC×105×38
65	2 1/2	4-M16×105×30	4-M16×105×30	4-M16×105×30	4-5/8-11UNC×110×38
80	3	8-M16×105×30	8-M16×105×30	8-M16×105×30	4-5/8-11UNC×120×38
100	4	8-M16×115×35	8-M16×115×35	8-M16×115×35	8-5/8-11UNC×125×38
125	5	8-M16×120×35	8-M16×120×35	8-M16×120×35	8-3/4-10UNC×130×45
150	6	8-M20×130×40	8-M20×130×40	8-M20×130×40	8-3/4-10UNC×135×45
200	8	12-M20×140×40	12-M20×140×40	12-M20×140×40	8-3/4-10UNC×145×50
250	10	12-M20×160×45	12-M20×160×45	12-M20×160×45	12-7/8- 9UNC×155×50
300	12	12-M20×180×45	12-M20×180×45	12-M20×180×45	12-7/8- 9UNC×170×50
350	14	16-M20×180×45	16-M20×180×45	16-M20×180×45	12-1- 8UNC×180×55
400	16	16-M24×210×50	16-M24×210×50	16-M24×210×50	16-1- 8UNC×205×55
450	18	20-M24×230×55	20-M24×230×55	20-M24×230×55	16-1 1/8-8UN×225×60
500	20	20-M24×250×55	20-M24×250×55	20-M24×250×55	20-1 1/8-8UN×245×60
600	24	20-M27×290×60	20-M27×290×60	20-M27×290×60	20-1 1/4-8UN×290×65

### ■ For Hexagon Bolts and Nuts (Flange Bolt Hole: Tapped Holes)

Size		DIN PN16	GB PN16	BS PN16	ASME class 150
mm	inch	Hex. bolt	Hex. bolt	Hex. bolt	Hex. bolt
50	2	8-M16×40×25	8-M16×40×25	8-M16×40×25	8-5/8-11UNC×35×20
65	2 1/2	8-M16×40×25	8-M16×40×25	8-M16×40×25	8-5/8-11UNC×40×25
80	3	16-M16×40×25	16-M16×40×25	16-M16×40×25	8-5/8-11UNC×40×25
100	4	16-M16×40×25	16-M16×40×25	16-M16×40×25	16-5/8-11UNC×40×25
125	5	16-M16×40×25	16-M16×40×25	16-M16×40×25	16-3/4-10UNC×45×30
150	6	16-M20×45×25	16-M20×45×25	16-M20×45×25	16-3/4-10UNC×45×30
200	8	24-M20×50×30	24-M20×50×30	24-M20×50×30	16-3/4-10UNC×50×30
250	10	24-M20×55×35	24-M20×55×35	24-M20×55×35	24-7/8- 9UNC×60×35
300	12	24-M20×60×40	24-M20×60×40	24-M20×60×40	24-7/8- 9UNC×65×35
350	14	32-M20×60×40	32-M20×60×40	32-M20×60×40	24-1- 8UNC×65×35
400	16	32-M24×65×45	32-M24×65×45	32-M24×65×45	32-1- 8UNC×70×40
450	18	40-M24×70×45	40-M24×70×45	40-M24×70×45	32-1 1/8-8UN×75×45
500	20	40-M24×75×50	40-M24×75×50	40-M24×75×50	40-1 1/8-8UN×75×45
600	24	40-M27×85×55	40-M27×85×55	40-M27×85×55	40-1 1/4-8UN×85×50

**Remarks:**

Bolt/Nut material: SS400/SS400, SUS304/SUS304

The dimensions in parenthesis show ASME class 125. (for 65 mm and 80 mm)

Heavy nut shall be used for ASME class 125/150 hexagon nuts.

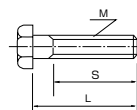
A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

**Example**

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts)

Quantity    Nominal size (M)    Length of bolt (L)    Effective screw length (S)

Setting bolts (Hexagon bolts)

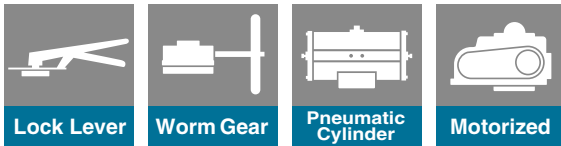
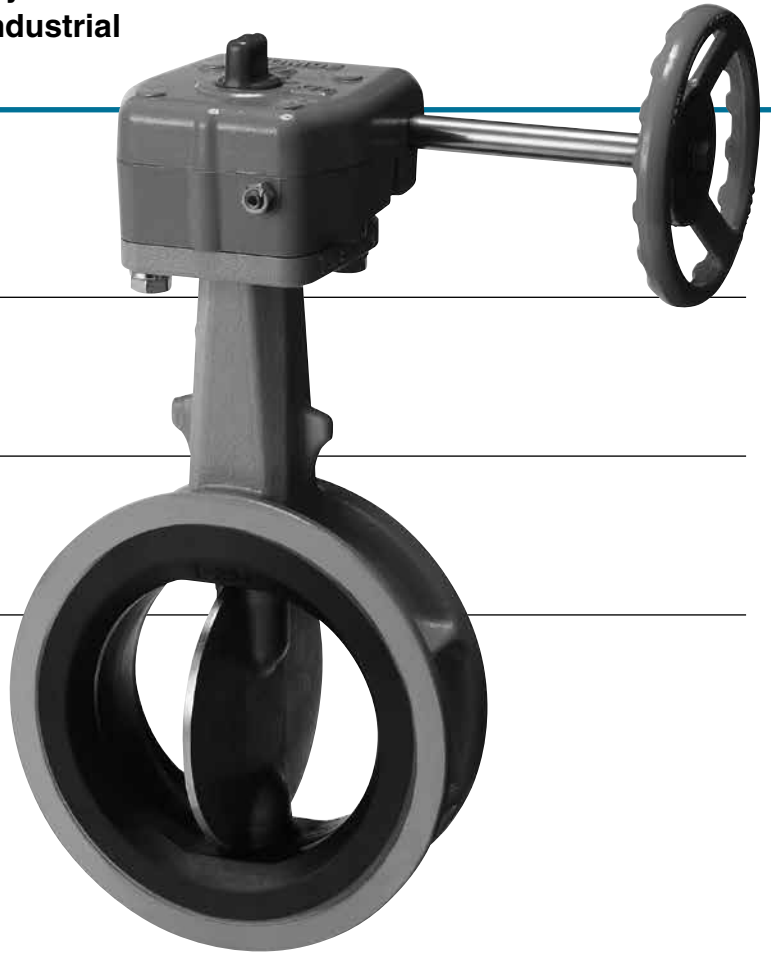


Vulcanized Rubber Lining on The Body for Use in High Pressure, High Velocity and Industrial Vacuum Applications

**731P** Wafer

**732P** Wafer

**732Q** Lugged



Features and Benefits

**Vulcanized rubber lining on the body**

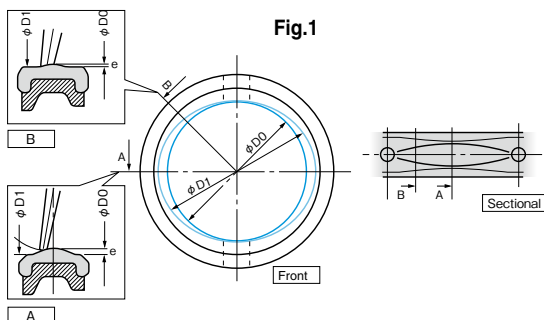
The seat is vulcanized to the body which ensures correct rubber compression and greater strength of the rubber seat. This design is much more effective in high velocity and industrial vacuum applications than soft resilient seated valves.

**New cosine-curve seat**

The new cosine-curve seat (patent pending) allows better performance in reducing friction, torque and wear than the previous design.

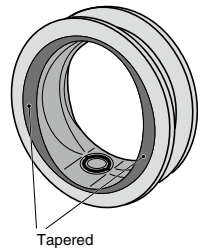
**Cubical shape by lowering height**

The height of the raised part of the seat in the narrow area is lower. It provides strength and sealing performance by preventing the movement of the raised portion of the seat in high pressure applications.



**Tapered finish**

To make the flow characteristic at small valve opening as close to linear as possible, the edge of the seat is tapered. This makes for a smoother flow and better performance in high velocity working conditions. The taper is narrow around the stem area and wide around the wing of the disc area to provide strength and sealing performance for the rubber seat.



**New streamlined shape around stem hole**

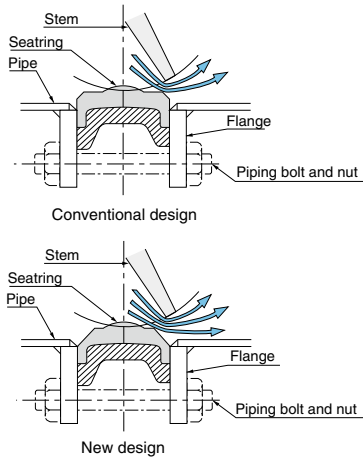
Although the spherical disc provides good sealing performance and extended life for our rubber lined valves, it still produces relatively high forces around the stem hole area where a large contact surface exists. In order to produce greater pressure at this point of contact with less friction, we incorporate a labyrinth effect where six small raised lines are moulded around the stem hole.



Features a concentric design with tight 100% bi-directional shut-off, low torque and a maximum working pressure of 1.6MPa to 2.0MPa.

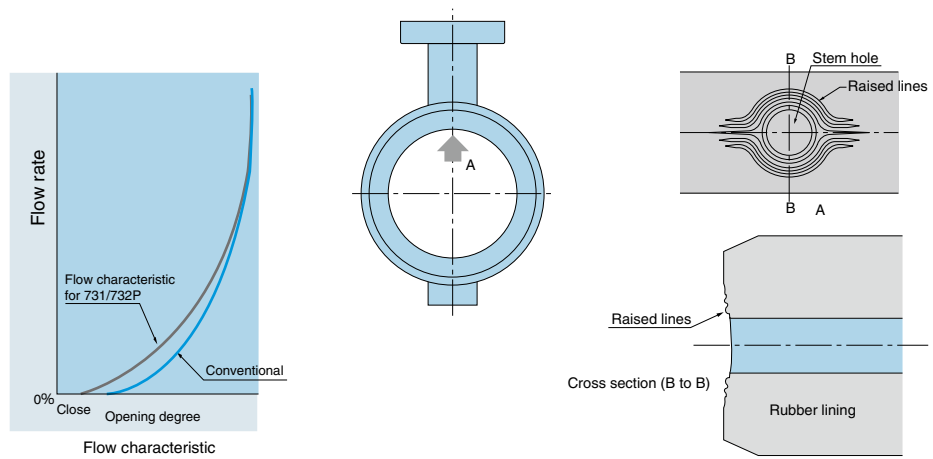
### Tapered Finish

Fig. 2



### New streamline shape around stem hole

Fig. 3



### Standard Specifications

Type	1.6MPa (16K) type	2.0MPa (20K) type	1.6MPa (16K) type	2.0MPa (20K) type
	731P (Wafer)	732P (Wafer)	732X (Wafer), 732Q (Lugged)	
Valve nominal size	50mm to 300mm			
Flange accommodation	JIS 10K/16K/20K, ASME Class125/150, DIN PN 10/16/25, BS 4504 PN 10/16/25			
Face-to-face dimensions	JIS B 2002 (2032) 46 series / ISO 5752 (20 series)			
Max. working pressure	1.6MPa	2.0MPa	1.6MPa	2.0MPa
Seat leakage	Tight-shutoff			
Flow direction	Bi-direction			
Body shell test	JIS16K/20K, ASME Class150, DIN NP16, BS 4504 PN16: 2.4MPa Others: 1.5MPa (hydraulic)	3.0MPa (hydraulic)	JIS16K/20K, ASME Class150, DIN NP16, BS 4504 PN16: 2.4MPa Others: 1.5MPa(hydraulic)	3.0MPa (hydraulic)
Seat leak test	JIS16K/20K, ASME Class150, DIN NP16, BS 4504 PN16: 1.76MPa Others: 1.1MPa (pneumatic)	2.2MPa (pneumatic)	JIS16K/20K, ASME Class150, DIN NP16, BS 4504 PN16: 1.76MPa Others: 1.1MPa (pneumatic)	2.2MPa (pneumatic)
Velocity range	Max. 6Max. 6m/sec (when fully open)			
Working temperature range	NBR : -10 to 80 degrees C, EPDM : -20 to 120 degrees C			
Working temperature in continuous use ※1	NBR : 0 to 60 degrees C, EPDM : 0 to 70 degrees C			
Standard materials	Body	FCD450	FCD450, SCPH2	
	Disc	SCS14	SCS14/CAC702, CAC703	
	Stem	420J2 S.S	420J2 S.S, MONEL K-500	630 S.S, MONEL K-500
	Seat ring ※2	NBR, *EPDM		
Top flange	ISO 5211			
Condensation prevention structure	Optional (Condensation prevention resin column)			
Piping flange gasket	Not required			
Coating	Epoxy primer (Munsell N7)		Lacquer primer (Munsell N7)	

Note) If the following specifications are required, please consult our sales office.

- (1) High durability required because the number of opening/closing times exceeds 100,000.
  - (2) Continuous operation required with a valve opening angle of 30 degrees or less.
  - (3) Control operation which requires 3% or lower hysteresis accuracy of the valve itself.
- ※1 'Working temperature in continuous use' stands for the temperature continuously kept exceeding one hour.  
 ※2 Never use an EPDM rubber seat ring if the valve is being used for oil or for a fluid containing even a slight amount of oil.  
 \* Disc with pin finish is also available upon request for 732P.

Ideal, Cost Effective Valve for Use in High Velocity,  
High Pressure and Industrial Vacuum Applications

**731P** Wafer

**732P** Wafer

**732Q** Lugged

**752W** Lugged



Worm Gear

Pneumatic  
Cylinder

Motorized

#### Features and Benefits

#### Perfect sealing against high pressure to 2.0MPa

By employing a cosine-curve design seat ring, the disc contacts simultaneously around the entire seat during closure which enables perfect sealing against pressures up to 1.96MPa. Perfect sealing is assured in high differential pressure, high velocity and vacuum applications. The operation torque for the valve is substantially reduced. Also, since the body is covered with the seat ring, it is never exposed to fluid.

#### No restrictions in direction of flow even for high differential pressures

With a concentric design and low operating torque, 731P/732P can perfectly seal pressures up to 2.0MPa or 1.6MPa for both directions.

#### Face-to-face dimensions satisfy ISO standards

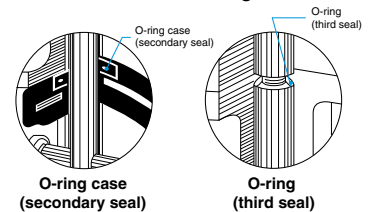
The face-to-face dimensions satisfy BS 5155 and ISO 5752. It is also adaptable to many international flange standards.

#### Long neck

The long neck enables insulation of up to 50mm after installation of the valve.

#### O-ring case with self-aligning stem seal function

The stainless steel O-ring case (utility model) counteracts any stem displacement and shaft tilt caused during the operation of the valve under fluid pressure. Because this O-ring is never exposed to the fluid, it never erodes.



#### The rubber seat is reinforced with a metallic core

Since this reinforced seat ring is clamped in position by the flanges, it is much more effective in high velocity and industrial vacuum applications than a soft resilient seat without a metallic core. Moreover, the seat ring can easily be replaced (350 to 600mm types). The vulcanized seat to the body is used in sizes 50 to 80mm.



#### Stainless steel disc as a standard material

Stainless steel disc provides excellent corrosion resistance in various applications.

## General Description

With applications for high pressure service valves increasing, TOMOE have developed a new 20K type in addition to the traditional 16K type. The 20K type is designed to seal high pressures up to 2.0MPa, while the 16K type can seal up to 1.6MPa. This concentric butterfly valve incorporates a cosine-curve design seat ring reinforced with a metallic core and provides excellent cost advantages.

No.	Parts	Materials
1	Body	Ductile cast Iron
2	Disc	Stainless steel casting
3	Stem	Stainless steel
4	Bush	METALOPLAST
5		
6	Mild steel / ductile cast iron	Bottom cover
8	Taper bolt	Stainless steel
10	Bolt & SP. washer	Mild steel / high carbon steel
12	Seat ring	Elastomer
13	O-ring	Elastomer
14	Packing	Asbestos
15	O-ring	Elastomer
16	Ball	Steel
17	Bolt	Carbon steel
18	Lock nut	Mild steel
22	Core	Mild steel

## Standard Specifications

Type	1.6MPa (16K) type			2.0MPa (20K) type		
	731P (Wafer)	732Q (Lugged)	752W (Lugged)	732P (Wafer)	732Q (Wafer)	752W (Lugged)
Valve nominal size	350mm to 600mm	350mm to 400mm	450mm to 600mm	350mm to 600mm	350mm to 400mm	450mm to 600mm
Flange accommodation	JIS 10K/16K/20K, ASME Class125/150, DIN PN 10/16, BS 4504 PN 10/16					
Face-to-face dimensions	JIS B 2002 (2032) 46 series / ISO 5752 (20 series)					
Max. working pressure	1.6MPa			2.0MPa		
Seat leakage	Tight-shutoff					
Flow direction	Bi-direction					
Body shell test	JIS16K/20K, ASME Class150, DIN PN16, BS 4504 PN16: 2.4MPa Others: 1.5MPa (hydraulic)			3.0MPa (hydraulic)		
Seat leak test	JIS16K/20K, ASME Class150, DIN PN16, BS 4504 PN16: 1.76MPa Others: 1.2MPa (hydraulic)			2.2MPa (hydraulic)		
Velocity range	Max. 6m/sec (when fully open)					
Working temperature range	NBR : -10 to 80 degrees C, EPDM : -20 to 120 degrees C					
Working temperature in continuous use ※1	NBR : 0 to 60 degrees C, EPDM : 0 to 70 degrees C					
Standard materials	Body	FCD450 (SCPH2 as an option)	FCD450, SCPH2	FCD450 (SCPH2 as an option)	FCD450, SCPH2	
	Disc	SCS13 (SCS14 as an option)	SCS13 (SCS14 as an option), CAC702, CAC703	SCS13 (SCS14 as an option)	SCS13 (SCS14 as an option), CAC702, CAC703	
	Stem	420J2 S.S	420J2 S.S, MONEL K-500	630 S.S	420J2 S.S, MONEL K-500	
	Seat ring ※2	NBR, EPDM				
Top flange	ISO 5211					
Condensation prevention structure	Optional (Condensation prevention resin column)					
Piping flange gasket	Not required					
Coating	Lacquer primer (Munsell N7)					

Note) If the following specifications are required, please consult our sales office.

(1) High durability required because the number of opening/closing times exceeds 100,000.

(2) Continuous operation required with a valve opening angle of 30 degrees or less.

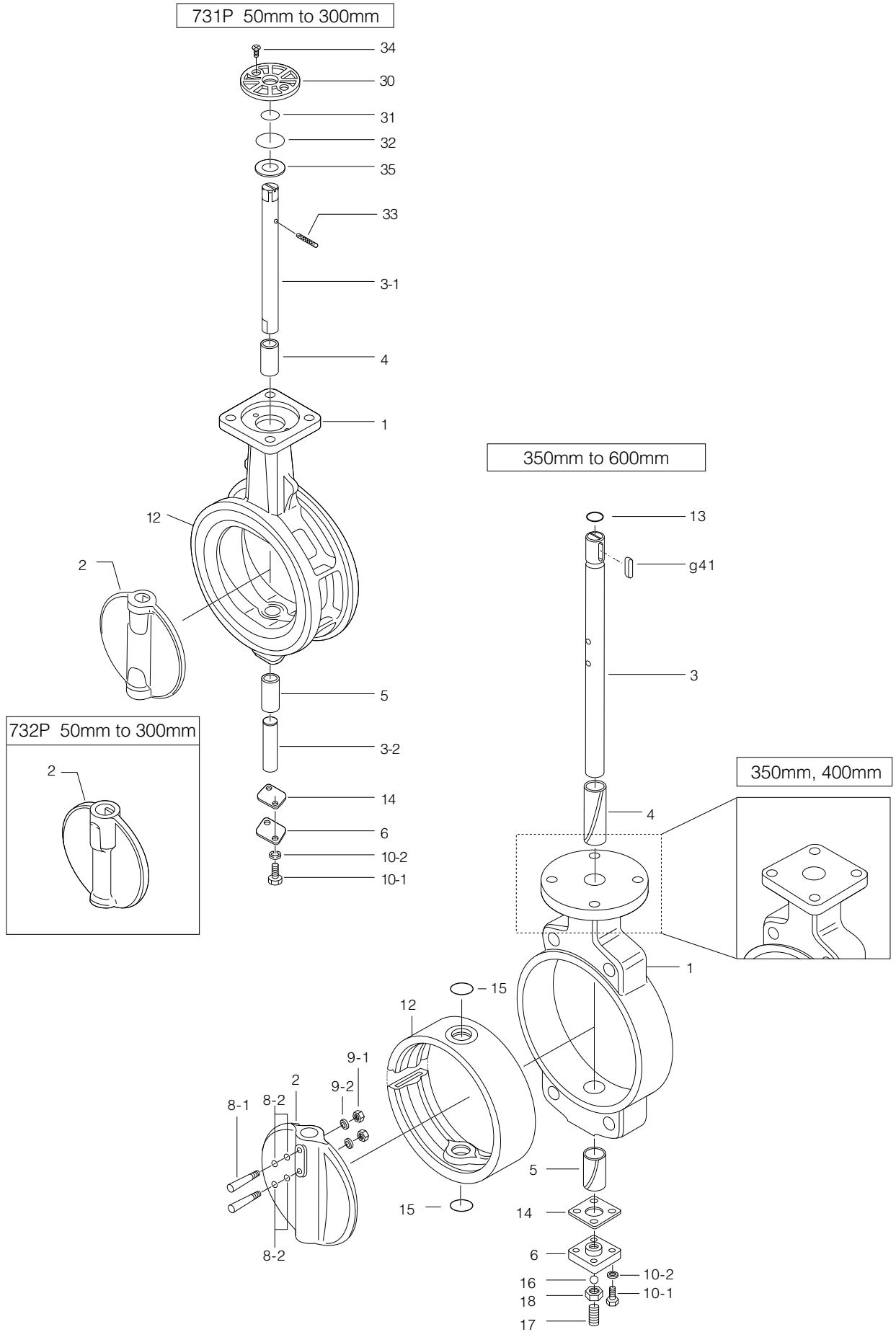
(3) Control operation which requires 3% or lower hysteresis accuracy of the valve itself.

※1 'Working temperature in continuous use' stands for the temperature continuously kept exceeding one hour.

※2 Never use an EPDM rubber seat ring if the valve is being used for oil or for a fluid containing even a slight amount of oil.

# 731P/732P (Wafer) 732Q/752W (Lugged)

## 731P/732P Expanded view of components



## 731P/732P Parts list

### ■ 731P/732P Parts list(50mm to 300mm)

No.	Description	Q'ty	Remarks
★ 1	Body	1	
2	Disc	1	
3-1	Upper stem	1	
3-2	Lower stem	1	
★ 4	Bearing	1	
★ 5	Bearing	1	
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
★ 12	Seat ring	1	Vulcanized to body
★ 14	Gasket	1	
★ 30	Bushing	1	
★ 31	O-ring	1	
★ 32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

### ■ 731P/732P Parts list(350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
★ 4	Bushing	1	
★ 5	Bushing	1	
6	Bottom cover	1	
★ 8-1	Taper bolt	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon nut	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	4	
10-2	Stem key	4	
★ 12	Seat ring	1	
★ 13	O-ring	1	
14	Gasket	1	
★ 15	O-ring	2	
16	Ball	1	
17	Hollow bolt	1	
18	Lock nut	1	
g41	Key	1	

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

# 731P/732P (Wafer) 732Q/752W (Lugged)

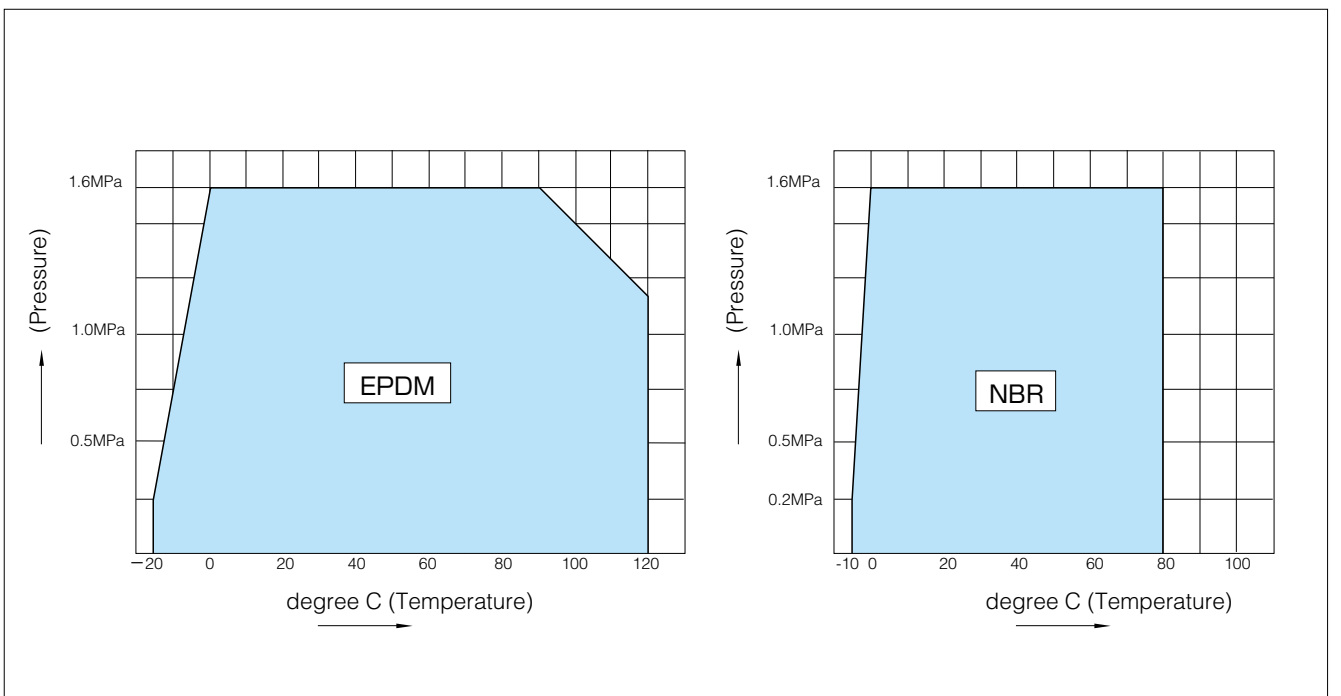
## 731P Actuator selection chart

### 731P

Model	Category	Size (mm / inch)																
		50	65	80	100	125	150	200	250	300	350	400	450	500	600			
1T	Standard Heavy duty	1T-1			1T-2			1T-3										
2I,2U 2S	Standard Heavy duty	2I-0	2I-1	2I-2	2I-3	2I-4	2U-5	MGH-3	MGH-4									
7E,3A	Standard Heavy duty	T35	T85	T200	T380	T750	TGA-125	TGA-140	TGA-160	TGA-200								
7G,7F 3U,3K	Standard Heavy duty	T85S	T200S	T380S	T750S	TG-12S	TG-14S	TG-20S										
4I	Standard Heavy duty	4I-00 4I-0	4I-1	4I-2	4I-2.5	4I-3	4I-4											
4J,4L	Standard Heavy duty	SRJ-010			SRJ-020		SRJ-060	LTKD-01 0.2kW /MGH-2	LTKD-01 0.4kW /MGH-3	LTKD-02 0.75kW /MGH-4	LTKD-05 0.75kW /MGH-5							

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

## 731P Pressure-temperature rating



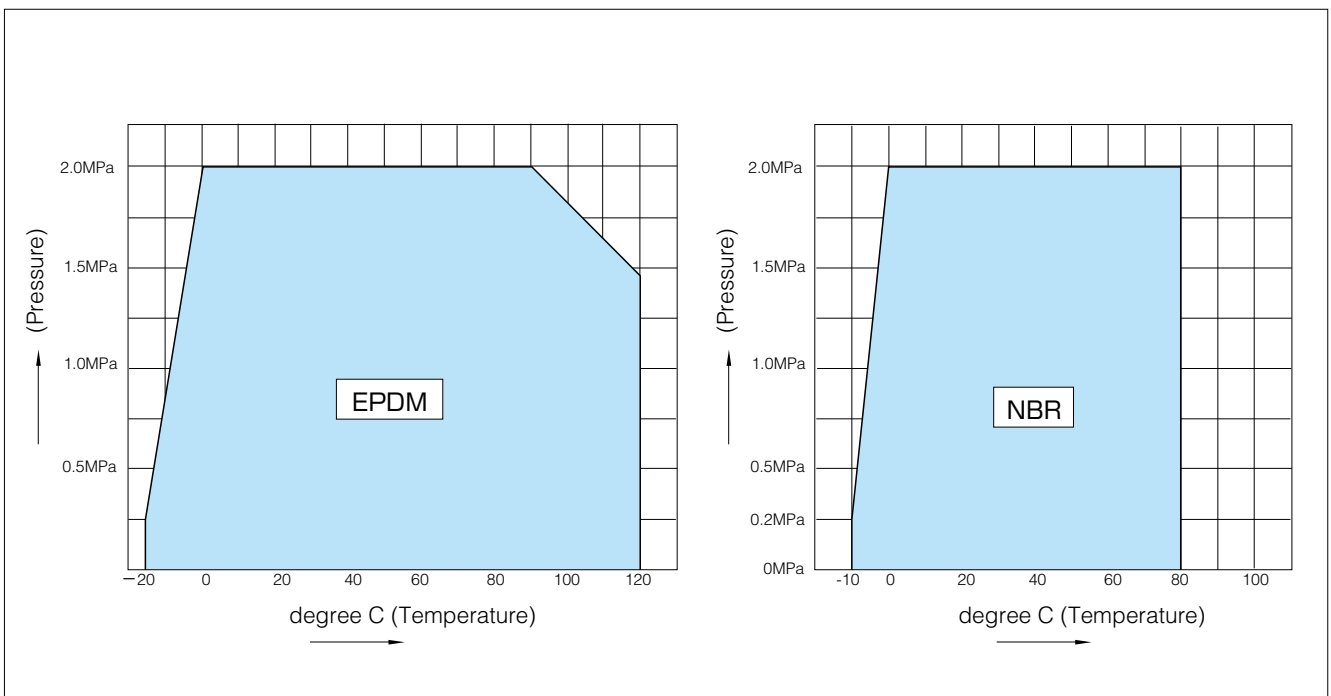
## 732P Actuator selection chart

### 732P

Model	Category	Size <small>(<math>\frac{mm}{inch}</math>)</small>														
		50	65	80	100	125	150	200	250	300	350	400	450	500	600	
		2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	
1T	Standard	1T-1			1T-2			1T-3								
	Heavy duty	1T-1			1T-2			1T-3								
2I, 2U 2S	Standard	2I-0		2I-1		2I-2		2I-3		2I-4		2U-5		MGH-3	MGH-4	
	Heavy duty	2I-0		2I-1		2I-2		2I-3		2I-4		2U-5		MGH-3	MGH-4	
7E, 3A	Standard	T35		T85		T200		T380	T750		Please consult us regarding selection of drive parts for 350mm and higher.					
	Heavy duty	T35		T85		T200		T380	T750							
7G, 7F 3U, 3K	Standard	T85S	T200S			T380S		T750S		TG-10S					TG-12S	
	Heavy duty	T85S	T200S			T380S		T750S		TG-12S					TG-14S	
4I	Standard	4I-00	4I-0	4I-1	4I-2		4I-3									
	Heavy duty	4I-00	4I-0	4I-1	4I-2		4I-3									
4J, 4L	Standard	SRJ-010			SRJ-020			SRJ-060	LTKD-01 0.2kW /MGH-2							
	Heavy duty	SRJ-010			SRJ-020			SRJ-060	LTKD-01 0.2kW /MGH-2							

<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

## 732P Pressure-temperature rating



# 731P/732P (Wafer) 732Q/752W (Lugged)

Bare shaft 731P-01 (50mm to 300mm) / 731P-02 (350mm, 400mm)

## 731P-01 (50mm to 300mm) / 731P-02 (350mm, 400mm)

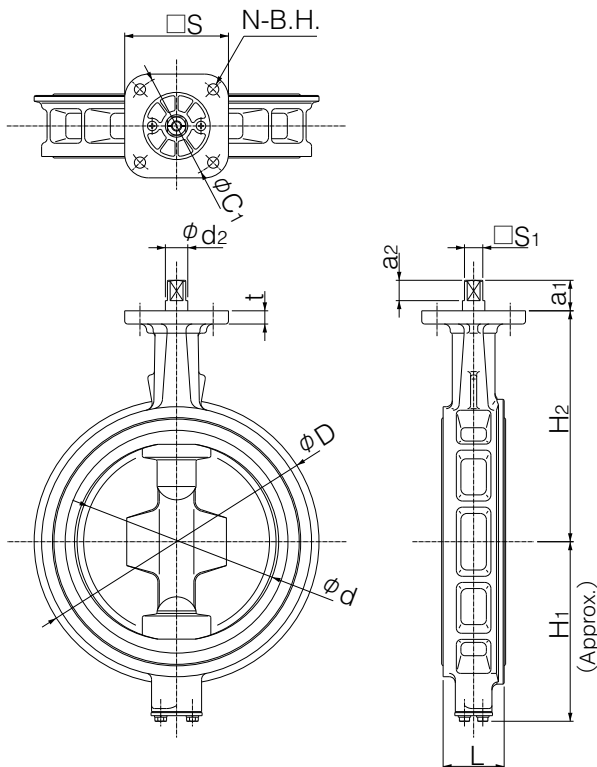
Type	Nominal size		Dimension (mm)													Approx. Mass (kg)	
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S <sub>1</sub>	$\phi d_2$	b	t <sub>2</sub>	t		Flan ges
				JIS10K	JIS16K												
731P	50	2	54	102	102	43	68	138	21.5	10.5	8	10	—	—	11	F07	1.8
	65	2 1/2	67	122	122	46	79	151	21.5	10.5	8	10	—	—	11	F07	2.2
	80	3	82	132	138	46	86	156	22.5	11.5	10	12	—	—	11	F07	2.8
	100	4	103	157	163	52	103	167	22.5	11.5	12	14	—	—	11	F07	3.6
	125	5	129	188	200	56	118	191	27.5	16.5	14	16	—	—	13	F10	5.8
	150	6	152	218	235	56	135	202	27.5	16.5	14	18	—	—	13	F10	7.8
	200	8	198	267	280	60	177	227	29	20	18	22	—	—	13	F10	11.5
	250	10	251	330	353	68	216	280	34	30	24	28	—	—	14	F10	20.3
	300	12	300	375	403	78	254	312	35	30	24	32	—	—	16	F12	28.9
	350	14	336	415	415	78	304	340	54	48	—	40	12	3	20	F14	71
400	16	390	477	477	102	343	380	65	59	—	46	14	3.5	20	F14	107	

### Flange dimensions

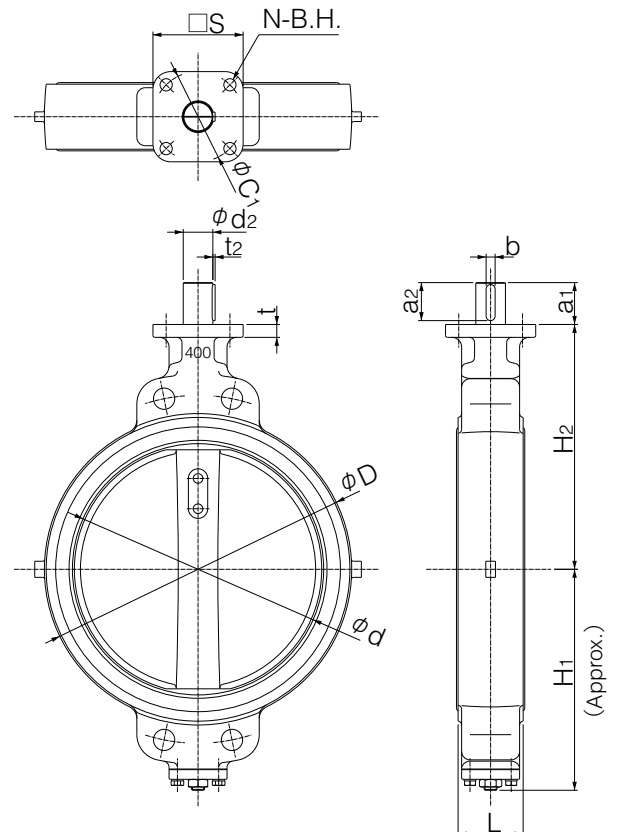
Flange	□S	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19

Stem design	01: Square
	02: Round with key

### 731P (16K) 50mm to 300mm

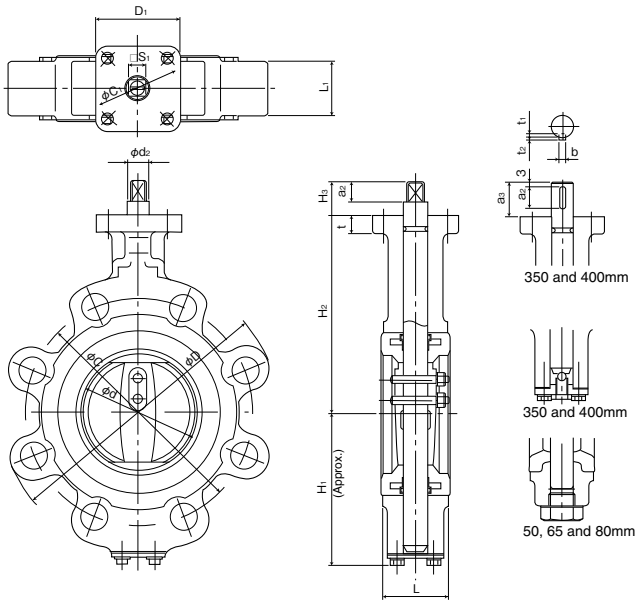


### 731P (16K) 350mm, 400mm





## 732Q Lugged type



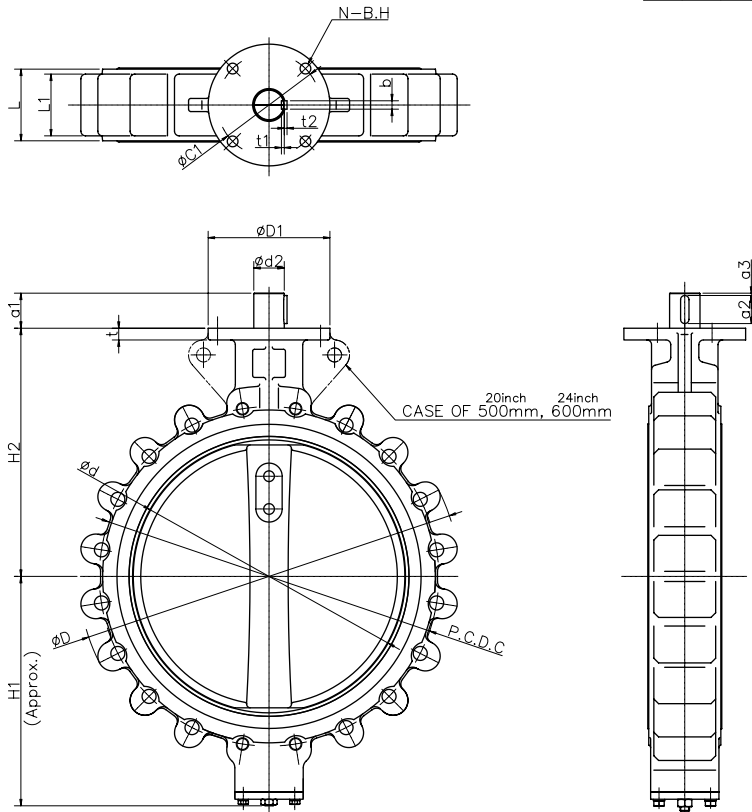
### ■ Dimensions

Nominal size		Dimension (mm)															Approx. Mass (kg)	
mm	inch	$\phi d$	$\phi D$	L	$L_1$	$H_1$	$H_2$	$H_3$	$\phi d_2$	$a_2$	$S_1$	b	$t_1$	$t_2$	$D_1$	t		$\phi C_1$
50	2	55	152	43	32	76	120	23	14	12	12	—	—	—	70	12	70	4
65	2 1/2	70	178	46	36	85	130	23	14	12	12	—	—	—	70	12	70	4.5
80	3	80	190	46	36	94	140	23	14	12	12	—	—	—	70	12	70	5.5
100	4	98	229	52	42	125	165	28	18	17	14	—	—	—	70	12	70	12
125	5	123	254	56	46	148	180	28	18	17	14	—	—	—	102	14	102	15
150	6	150	279	56	46	166	205	28	18	17	14	—	—	—	102	14	102	17
200	8	202	343	60	50	190	230	35	28	30	24	—	—	—	102	14	102	24.5
250	10	254	406	68	58	232	270	35	32	30	24	—	—	—	125	14	125	41
300	12	304	483	78	68	259	300	35	32	30	24	—	—	—	125	16	125	69.5
350	14	336	555	78	70	304	340	54	40	45	—	12	5	3	140	20	140	95
400	16	390	597	102	86	343	380	65	46	56	—	14	5.5	3.5	140	20	140	131

## 752W Lugged type

### ■ Dimensions (ASME Class 125/150)

Nominal size		Dimension (mm)																	Approx. Mass (kg)	
mm	inch	$\phi d$	$\phi D$	L	$L_1$	$H_1$	$H_2$	$\phi d_2$	$a_1$	$a_2$	$a_3$	b	$t_1$	$t_2$	t	$\phi D_1$	$\phi C_1$	N		B.H.
450	18	439	635	113	94	379	420	47	60	50	3	12	4.5	3.5	20	200	170	4	19	120
500	20	490	698	126	109	422	450	47	60	50	3	12	4.5	3.5	20	200	170	4	19	170
600	24	583	813	153	132	494	530	65	75	60	5	12	6	6	25	260	220	4	23	255



# 731P/732P (Wafer) 732Q/752W (Lugged)

## Bare shaft 731P-02 (450mm to 600mm)

### 731P-02 (450mm to 600mm)

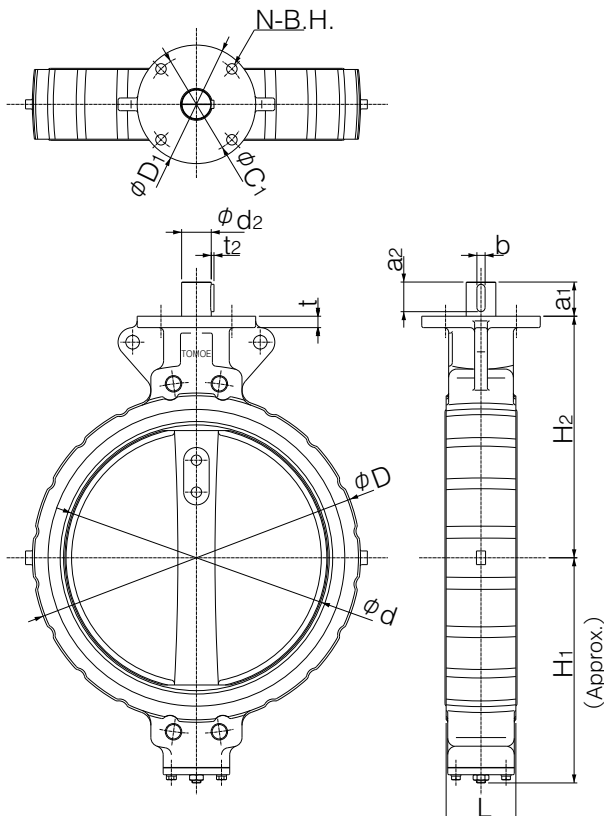
Type	Nominal size		Dimension (mm)															Approx. Mass (kg)	
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\phi d_2$	b	t <sub>2</sub>	t	D <sub>1</sub>	C <sub>1</sub>	N		B.H.
				JIS10K	JIS16K														
731P	450	18	439	532	532	114	379	420	60	53	47	12	3.5	20	200	170	4	19	137
	500	20	490	610	610	127	422	450	60	53	47	12	3.5	20	200	170	4	19	188
	600	24	583	826	720	154	494	530	75	65	65	18	6	25	260	220	4	23	318(348)

Remark: Value in brackets is for JIS 10K flanges.

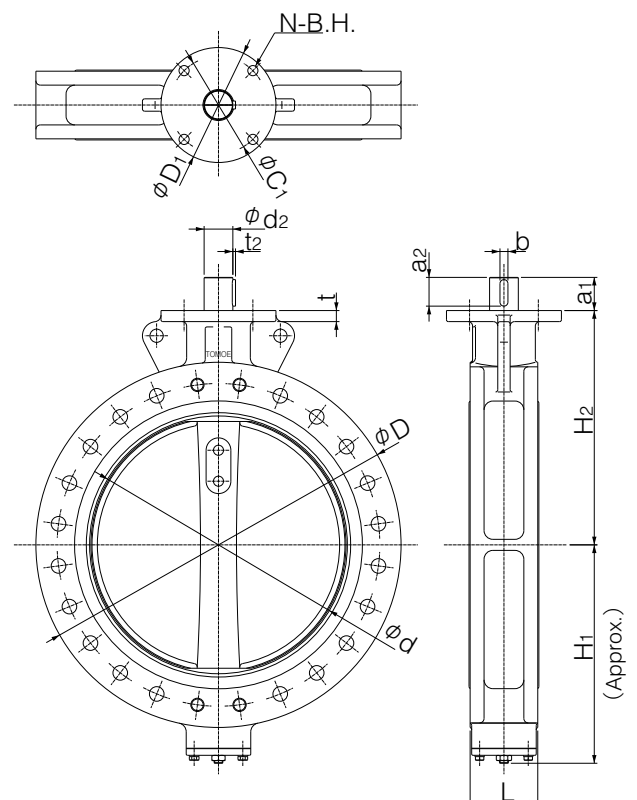
### Flange dimensions

Flange	□S	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19

### 731P (16K) 450mm to 600mm



### 731P (10K) 600mm



Bare shaft 732P-01 (50mm to 300mm) / 732P-02 (350mm, 400mm) / 732P-02(450mm to 600mm)

■ 732P-01 (50mm to 300mm) / 732P-02 (350mm, 400mm)

Type	Nominal size		Dimension (mm)													Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	□S <sub>1</sub>	$\phi d_2$	b	t <sub>2</sub>	t	Flange	
732P	50	2	54	102	43	68	138	21.5	10.5	8	10	—	—	11	F07	1.9
	65	2 1/2	67	122	46	79	151	21.5	10.5	8	10	—	—	11	F07	2.3
	80	3	82	138	46	86	156	22.5	11.5	10	12	—	—	11	F07	3
	100	4	103	163	52	103	167	22.5	11.5	12	14	—	—	11	F07	3.8
	125	5	129	200	56	118	191	27.5	16.5	14	16	—	—	13	F10	6.1
	150	6	152	235	56	135	202	27.5	16.5	14	18	—	—	13	F10	7.7
	200	8	198	280	60	177	227	29	20	18	22	—	—	13	F10	12.1
	250	10	251	353	68	216	280	34	30	24	28	—	—	14	F10	21
	300	12	300	403	78	254	312	35	30	24	32	—	—	16	F12	29
	350	14	336	415	78	304	340	54	48	—	40	12	3	20	F14	71
400	16	390	477	102	343	380	65	59	—	46	14	3.5	20	F14	107	

■ Flange dimensions

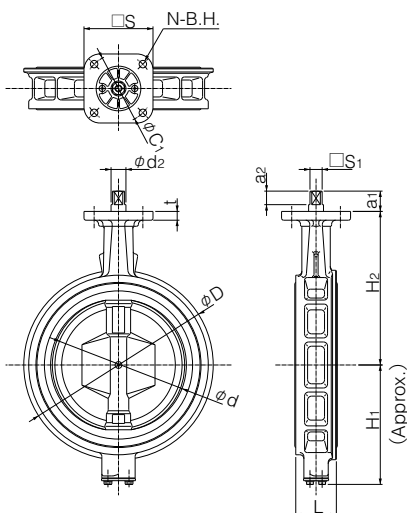
Flange	□S	$\phi C_1$	N	B.H.
F07	70	70	4	9
F10	102	102	4	11
F12	125	125	4	13
F14	140	140	4	19

Stem design	01: Square
	02: Round with key

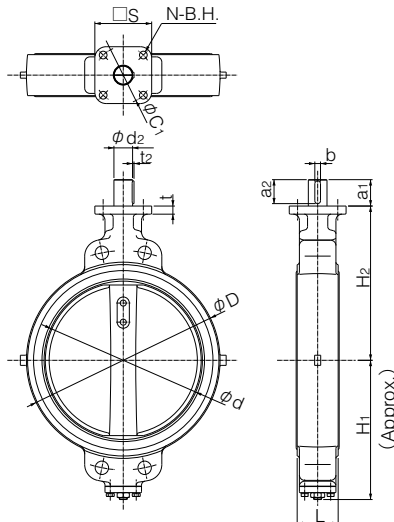
■ 732P-02 (450mm to 600mm)

Type	Nominal size		Dimension (mm)														Approx. Mass (kg)	
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	$\phi d_2$	b	t <sub>2</sub>	t	D <sub>1</sub>	C <sub>1</sub>	N		B.H.
732P	450	18	439	532	114	379	420	60	53	47	12	3.5	20	200	170	4	19	137
	500	20	490	610	127	422	450	60	53	47	12	3.5	20	200	170	4	19	188
	600	24	583	720	154	494	530	75	65	65	18	6	25	260	220	4	23	318

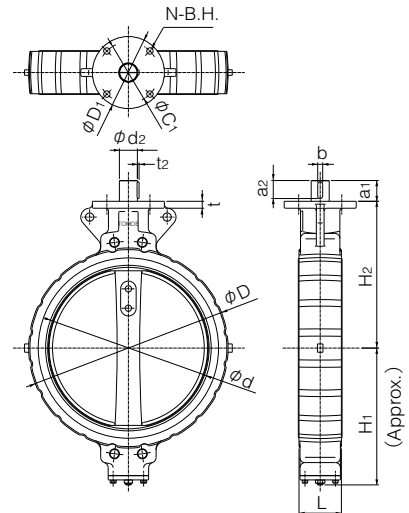
■ 732P (20K)  
50mm to 300mm



■ 732P (20K)  
350mm, 400mm



■ 732P (20K)  
450mm to 600mm



# 731P/732P (Wafer) 732Q/752W (Lugged)

## Lock lever type 731P-1T (50mm to 200mm)

### 731P-1T

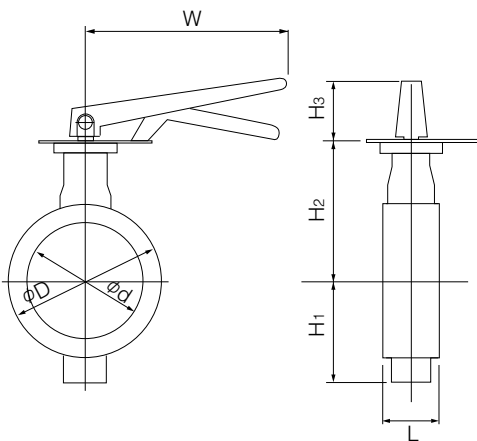
Nominal size		Dimension (mm)								Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
			JIS10K	JIS16K							
50	2	54	102	102	43	68	138	66	200	1T-1	2.4
65	2 1/2	67	122	122	46	79	151	66	200	1T-1	2.8
80	3	82	132	138	46	86	156	66	200	1T-1	3.4
100	4	103	157	163	52	103	167	66	200	1T-1	4.2
125	5	129	188	200	56	118	191	92	300	1T-2	7.1
150	6	152	218	235	56	135	202	92	300	1T-2	9.1
200	8	198	267	280	60	177	227	97	350	1T-3	13.2

## Lock lever type 732P-1T (50mm to 200mm)

### 732P-1T

Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
50	2	54	102	43	68	138	66	200	1T-1	2.5
65	2 1/2	67	122	46	79	151	66	200	1T-1	2.9
80	3	82	138	46	86	156	66	200	1T-1	3.6
100	4	103	163	52	103	167	66	200	1T-1	4.4
125	5	129	200	56	118	191	92	300	1T-2	7.4
150	6	152	235	56	135	202	92	300	1T-2	9
200	8	198	280	60	177	227	97	350	1T-3	13.8

### 731P/732P-1T



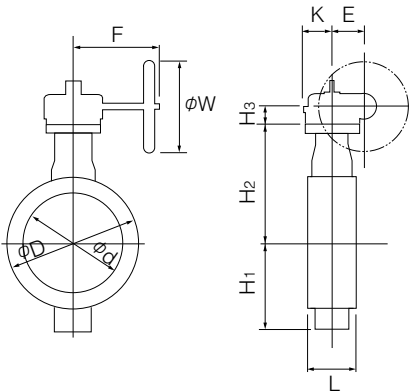
Worm gear type 731P-2I (50mm to 300mm)/731P-2U (350mm, 400mm)/731P-2S (450mm to 600mm)

■ 731P

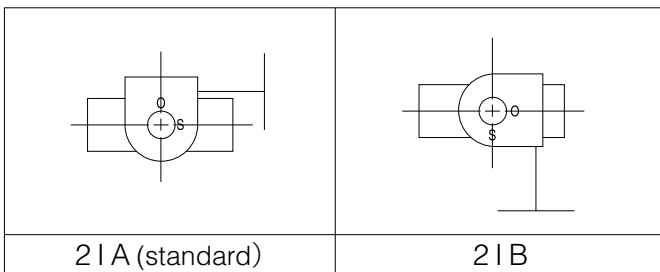
Type	Nominal size		Dimension (mm)											Gear type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
				JIS10K	JIS16K										
731P	50	2	54	102	102	43	68	138	24	28	35	83	70	21-0	2.4
	65	2 1/2	67	122	122	46	79	151	24	28	35	83	70	21-0	2.8
	80	3	82	132	138	46	86	156	27	46	48	145	100	21-1	4.1
	100	4	103	157	163	52	103	167	27	46	48	145	100	21-1	4.8
	125	5	129	188	200	56	118	191	30	53	51	160	125	21-2	7.7
	150	6	152	218	235	56	135	202	30	53	51	160	125	21-2	9.7
	200	8	198	267	280	60	177	227	36	71	65	208	200	21-3	15.5
	250	10	251	330	353	68	216	280	36	71	65	193	200	21-3	24.3
	300	12	300	375	403	78	254	312	38.5	71	65	193	200	21-4	34.1
	350	14	336	415	415	78	304	340	50	90	105	266	280	2U-5	90
	400	16	390	477	477	102	343	380	50	90	105	266	280	2U-5	126
	450	18	439	532	532	114	379	420	55	117	164	335	355	MGH-3	172
	500	20	490	610	610	127	422	450	55	117	164	335	355	MGH-3	222
	600	24	583	826	720	154	494	530	65	140	198	400	450	MGH-4	378(408)

Remark: Value in brackets is for JIS 10K flanges.

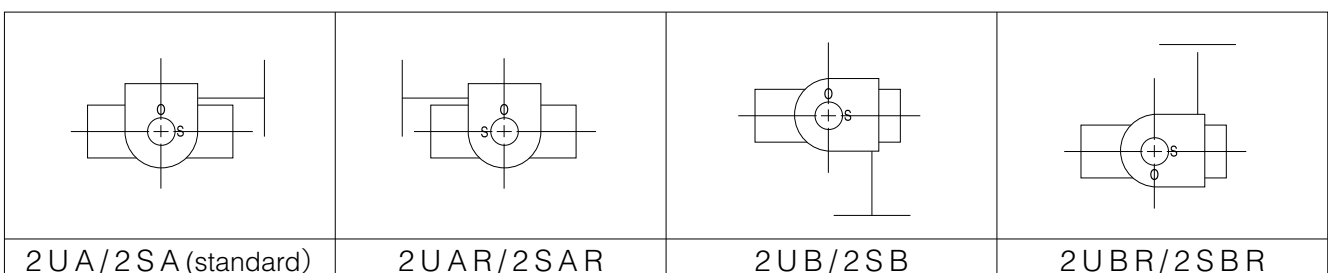
■ 731P-2 I/2U/2S



■ 2I Installation direction



■ 2U/2S Installation direction



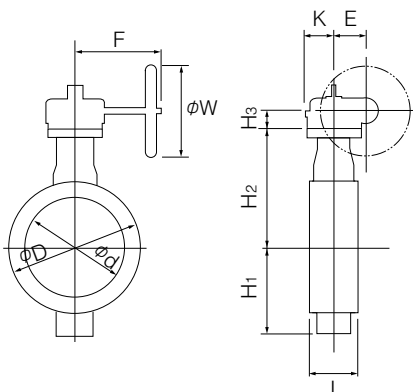
# 731P/732P (Wafer) 732Q/752W (Lugged)

Worm gear type 732P-2I (50mm to 300mm) / 732P-2U (350mm, 400mm) / 732P-2S (450mm to 600mm)

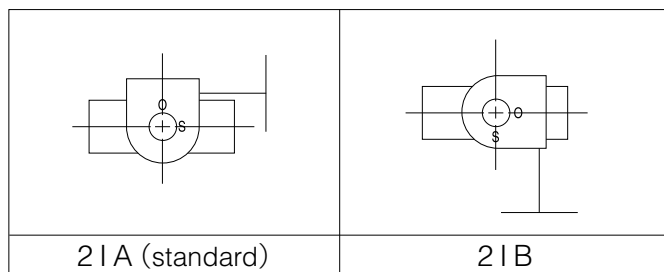
## 732P

Type	Nominal size		Dimension (mm)										Gear type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
732P	50	2	54	102	43	68	138	24	28	35	83	70	2I-0	2.4
	65	2 1/2	67	122	46	79	151	24	28	35	83	70	2I-0	2.9
	80	3	82	138	46	86	156	27	46	48	145	100	2I-1	4.2
	100	4	103	163	52	103	167	27	46	48	145	100	2I-1	5
	125	5	129	200	56	118	191	30	53	51	160	125	2I-2	8
	150	6	152	235	56	135	202	30	53	51	160	125	2I-2	9.6
	200	8	198	280	60	177	227	36	71	65	208	200	2I-3	16
	250	10	251	353	68	216	280	36	71	65	193	200	2I-3	25
	300	12	300	403	78	254	312	38.5	71	65	193	200	2I-4	34
	350	14	336	415	78	304	340	50	90	105	266	280	2U-5	90
	400	16	390	477	102	343	380	50	90	105	266	280	2U-5	126
	450	18	439	532	114	379	420	55	117	164	335	355	MGH-3	172
500	20	490	610	127	422	450	55	117	164	335	355	MGH-3	222	
600	24	583	720	154	494	530	65	140	198	400	450	MGH-4	378	

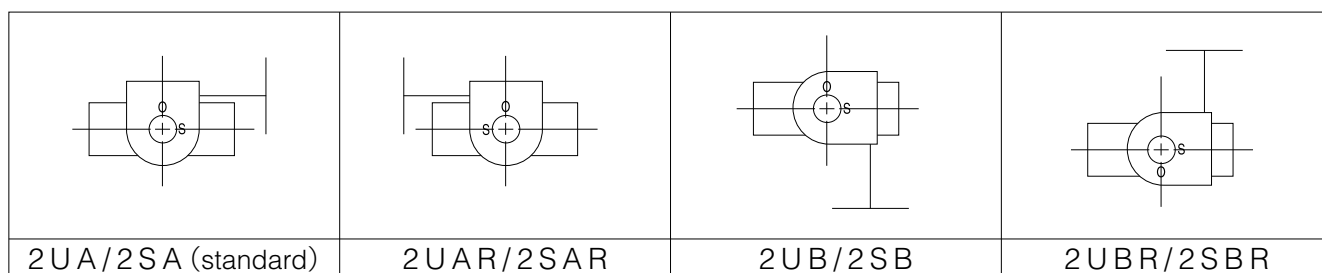
## 732P-2I/2U/2S



## 2I Installation direction



## 2U/2S Installation direction



## Double-acting pneumatic cylinder type 731P-7E (50mm to 300mm)

### ■ Standard

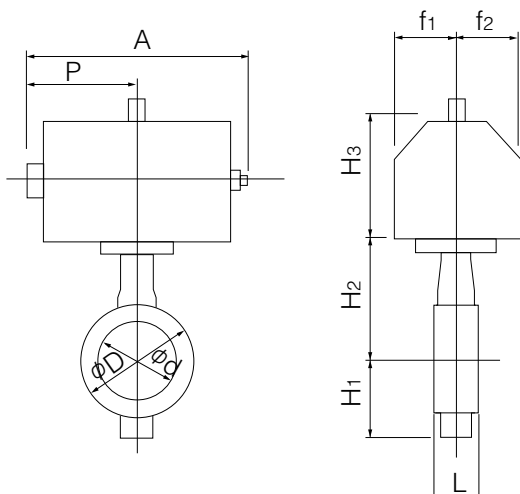
Type	Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
				JIS10K	JIS16K										
731P	50	2	54	102	102	43	68	138	125	228	116	57	29	T35	4
	65	2 1/2	67	122	122	46	79	151	125	228	116	57	29	T35	4
	80	3	82	132	138	46	86	156	125	228	116	57	29	T35	5
	100	4	103	157	163	52	103	167	168	276	142	75	47	T85	9
	125	5	129	188	200	56	118	191	203	346	176	79	57	T200	14
	150	6	152	218	235	56	135	202	203	346	176	79	57	T200	16
	200	8	198	267	280	60	177	227	231	423	214	91	69	T380	26
	250	10	251	360	353	68	216	280	231	423	214	91	69	T380	35
300	12	300	375	403	78	254	312	269	546	270	118	85	T750	53	

### ■ Heavy duty

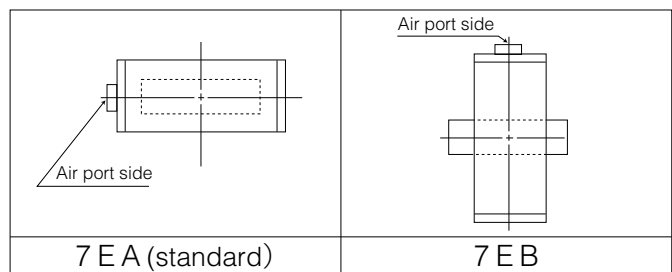
Type	Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
				JIS10K	JIS16K										
731P	50	2	54	102	102	43	68	138	125	228	116	57	29	T35	4
	65	2 1/2	67	122	122	46	79	151	168	276	142	75	47	T85	7
	80	3	82	132	138	46	86	156	168	276	142	75	47	T85	8
	100	4	103	157	163	52	103	167	168	276	142	75	47	T85	9
	125	5	129	188	200	56	118	191	203	346	176	79	57	T200	14
	150	6	152	218	235	56	135	202	231	423	214	91	69	T380	22
	200	8	198	267	280	60	177	227	231	423	214	91	69	T380	26
	250	10	251	330	353	68	216	280	269	546	270	118	85	T750	45

Selection criteria	Standard	Heavy duty
	Select when none of the following heavy duty items apply.	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### ■ 731P-7E



### ■ 7E Installation direction



# 731P/732P (Wafer) 732Q/752W (Lugged)

## Double-acting pneumatic cylinder type 732P-7E (50mm to 300mm)

### Standard

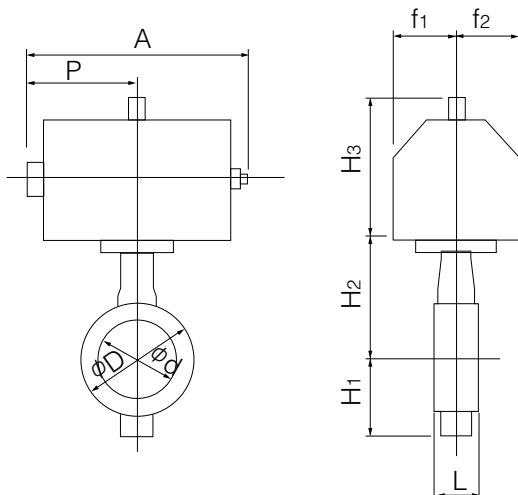
Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
732P	50	2	54	102	43	68	138	125	228	116	57	29	T35	4
	65	2 1/2	67	122	46	79	151	125	228	116	57	29	T35	4
	80	3	82	138	46	86	156	168	276	142	75	47	T85	8
	100	4	103	163	52	103	167	168	276	142	75	47	T85	9
	125	5	129	200	56	118	191	203	346	176	79	57	T200	14
	150	6	152	235	56	135	202	203	346	176	79	57	T200	16
	200	8	198	280	60	177	227	231	423	214	91	69	T380	27
	250	10	251	353	68	216	280	269	546	270	118	85	T750	45
	300	12	300	403	78	254	312	269	546	270	118	85	T750	53

### Heavy duty

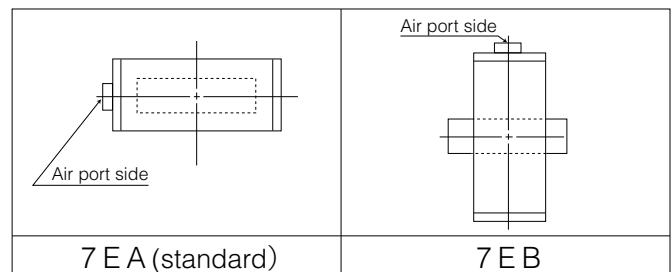
Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
732P	50	2	54	102	43	68	138	125	228	116	57	29	T35	4
	65	2 1/2	67	122	46	79	151	168	276	142	75	47	T85	7
	80	3	82	138	46	86	156	168	276	142	75	47	T85	8
	100	4	103	163	52	103	167	203	346	176	79	57	T200	12
	125	5	129	200	56	118	191	203	346	176	79	57	T200	14
	150	6	152	235	56	135	202	231	423	214	91	69	T380	22
	200	8	198	280	60	177	227	269	546	270	118	85	T750	37

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 732P-7E



### 7E Installation direction





## Double-acting pneumatic cylinder type 731P-3A (300mm to 600mm)

### Standard

Type	Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
				JIS10K	JIS16K										
731P	350	14	336	415	415	78	304	340	364	754	381	100	164	TGA-125	108
	400	16	390	477	477	102	343	380	364	754	381	100	164	TGA-125	144
	450	18	439	532	532	114	379	420	407	840	432	100	180	TGA-140	194
	500	20	490	610	610	127	422	450	435	954	483	130	202	TGA-160	294
	600	24	583	826	720	154	494	530	570	1175	599	160	253	TGA-200	537(567)

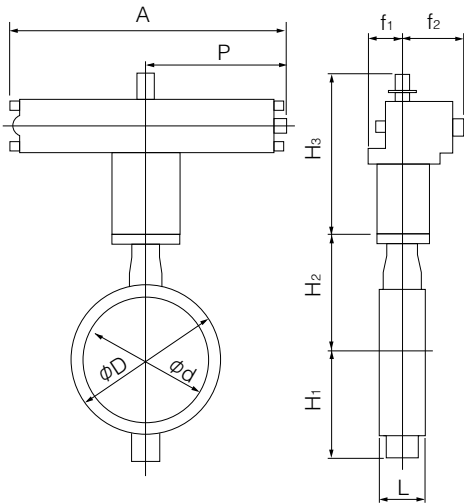
Remark: Value in brackets is for JIS 10K flanges.

### Heavy duty

Type	Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
				JIS10K	JIS16K										
731P	300	12	300	375	403	78	254	312	359	754	381	100	164	TGA-125	74
	350	14	336	415	415	78	304	340	412	840	432	100	180	TGA-140	128
	400	16	390	477	477	102	343	380	465	954	483	130	202	TGA-160	214
	450	18	439	532	532	114	379	420	478	1069	543	130	218	TGA-180	289
	500	20	490	610	610	127	422	450	570	1175	599	160	253	TGA-200	402
	600	24	583	826	720	154	494	530	633	1394	707	160	299	TGA-250	635(665)

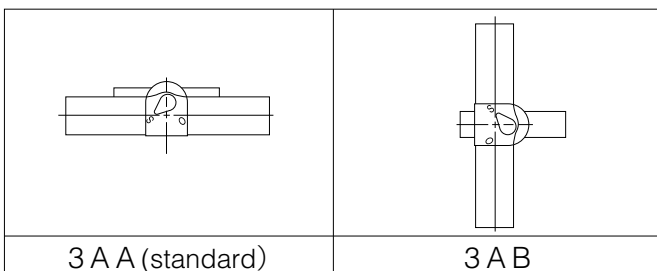
Remark: Value in brackets is for JIS 10K flanges.

### 731P-3A



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 3A Installation direction



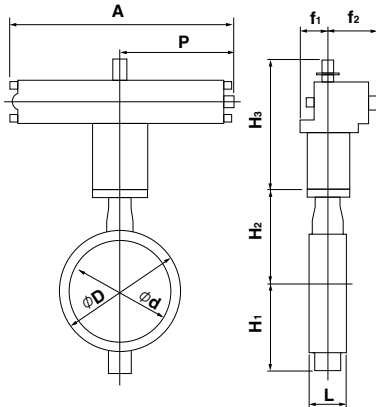
# 731P/732P (Wafer) 732Q/752W (Lugged)

## Double-acting pneumatic cylinder type 732P-3A (250mm, 300mm)

### Heavy duty

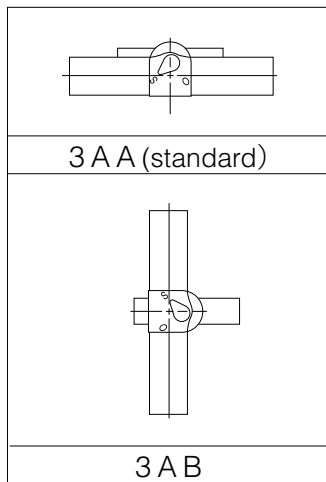
Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
732P	250	10	251	353	68	216	280	234	742.5	362	100	164	TGA-125	60
	300	12	300	403	78	254	312	234	742.5	362	100	164	TGA-125	74

### 732P-3A



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 3A Installation direction



Single-acting pneumatic cylinder type 731P-7G (Air to open: 50mm to 200mm) / 731P-7F (Air to close: 50mm to 200mm)

■ Standard

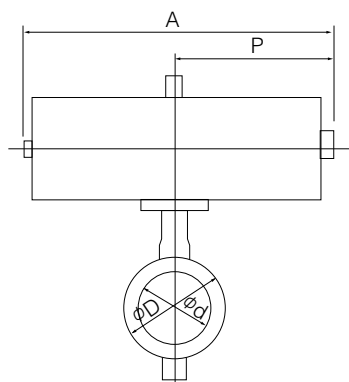
Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS10K	JIS16K										
50	2	54	102	102	43	68	138	168	364	183	75	47	T85S	8
65	2 1/2	67	122	122	46	79	151	168	364	183	75	47	T85S	9
80	3	82	132	138	46	86	156	168	364	183	75	47	T85S	9
100	4	103	157	163	52	103	167	203	449	226	79	57	T200S	15
125	5	129	188	200	56	118	191	231	550	276	91	69	T380S	25
150	6	152	218	235	56	135	202	269	723	360	118	85	T750S	41
200	8	198	267	280	60	177	227	269	723	360	118	85	T750S	44

■ Heavy duty

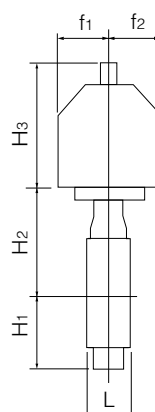
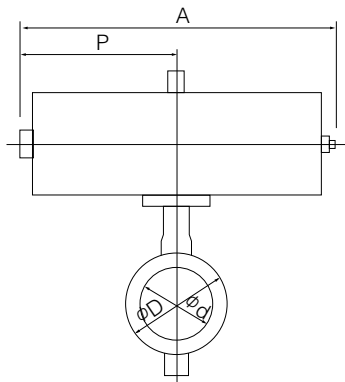
Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
			JIS10K	JIS16K										
50	2	54	102	102	43	68	138	168	364	183	75	47	T85S	8
65	2 1/2	67	122	122	46	79	151	203	449	226	79	57	T200S	13
80	3	82	132	138	46	86	156	203	449	226	79	57	T200S	14
100	4	103	157	163	52	103	167	231	550	276	91	69	T380S	23
125	5	129	188	200	56	118	191	269	723	360	118	85	T750S	39
150	6	152	218	235	56	135	202	269	723	360	118	85	T750S	41

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

■ 731P-7G



■ 731P-7F



■ 7G/7F Installation direction

 7GA/7FA (standard)	 7GB/7FB
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# 731P/732P (Wafer) 732Q/752W (Lugged)

Single-acting pneumatic cylinder type 732P-7G (Air to open: 50mm to 150mm) / 732P-7F (Air to close: 50mm to 150mm)

## Standard

Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
732P	50	2	54	102	43	68	138	168	364	183	75	47	T85S	8
	65	2 1/2	67	122	46	79	151	203	449	226	79	57	T200S	13
	80	3	82	138	46	86	156	203	449	226	79	57	T200S	14
	100	4	103	163	52	103	167	231	550	276	91	69	T380S	23
	125	5	129	200	56	118	191	231	550	276	91	69	T380S	25
150	6	152	235	56	135	202	269	723	360	118	85	T750S	40	

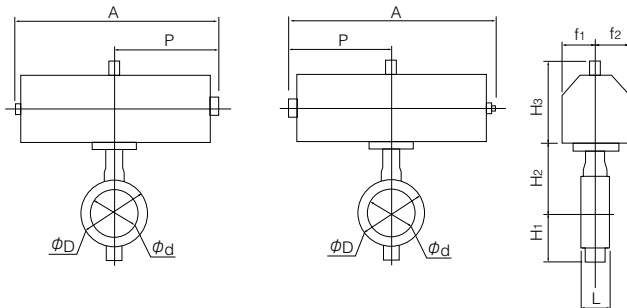
## Heavy duty

型式	呼び径		主要寸法 (mm)										シリンダ型式	概算質量 (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
732P	50	2	54	102	43	68	138	203	449	226	79	57	T200S	13
	65	2 1/2	67	122	46	79	151	203	449	226	79	57	T200S	13
	80	3	82	138	46	86	156	203	449	226	79	57	T200S	14
	100	4	103	163	52	103	167	231	550	276	91	69	T380S	23
	125	5	129	200	56	118	191	269	723	360	118	85	T750S	39
150	6	152	235	56	135	202	269	723	360	118	85	T750S	41	

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

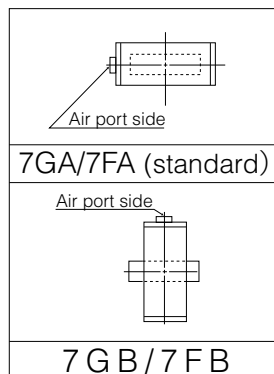
## 732P-7G

## 732P-7F



## 7G/7F

### Installation direction



Single-acting pneumatic cylinder type 731P-3U (Air to open: 200mm to 600mm) / 731P-3K (Air to close: 200mm to 600mm)

■ Standard

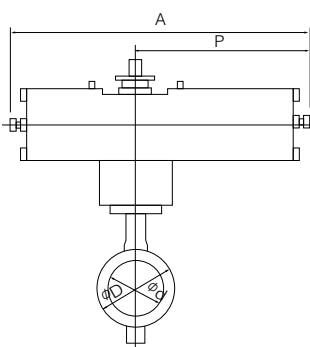
Type	Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
	mm	inch	φd	φD		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
				JIS10K	JIS16K										
731P	200	8	198	267	280	60	177	227	307	945	585	70	165	TG-10S	62
	250	10	251	330	353	68	216	280	307	1080	720	94	206	TG-12S	116
	300	12	300	375	403	78	254	312	307	1080	720	94	206	TG-12S	125
	350	14	336	415	415	78	304	340	340	1255	865	131	257	TG-14S	264
	400	16	390	477	477	102	343	380	340	1255	865	131	257	TG-14S	300
	450	18	439	532	532	114	379	420	474	1655	1095	164	348	TG-20S	555
	500	20	490	610	610	127	422	450	474	1655	1095	164	348	TG-20S	606
600	24	583	826	720	154	494	530	474	1655	1095	164	348	TG-20S	736 (766)	

Remark: Value in brackets is for JIS 10K flanges.

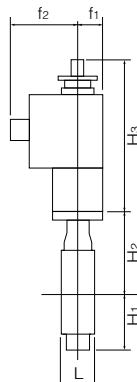
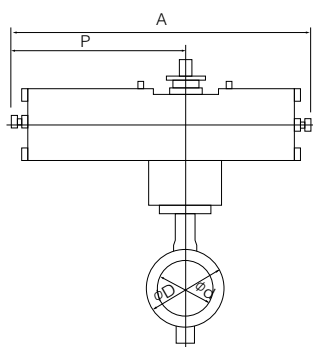
■ Heavy duty

Type	Nominal size		Dimension (mm)											Cylinder type	Approx. Mass (kg)
	mm	inch	φd	φD		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
				JIS10K	JIS16K										
731P	200	8	198	267	280	60	177	227	307	1080	720	94	206	TG-12S	107
	250	10	251	330	353	68	216	280	307	1080	720	94	206	TG-12S	116
	300	12	300	375	403	78	254	312	340	1255	865	131	257	TG-14S	226
	350	14	336	415	415	78	304	340	340	1255	865	131	257	TG-14S	264
	400	16	390	477	477	102	343	380	474	1655	1095	164	348	TG-20S	513
	450	18	439	532	532	114	379	420	474	1655	1095	164	348	TG-20S	555
	500	20	490	610	610	127	422	450	474	1655	1095	164	348	TG-20S	606

■ 731P-3U

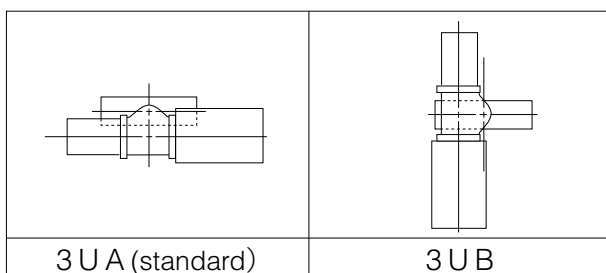


■ 731P-3K

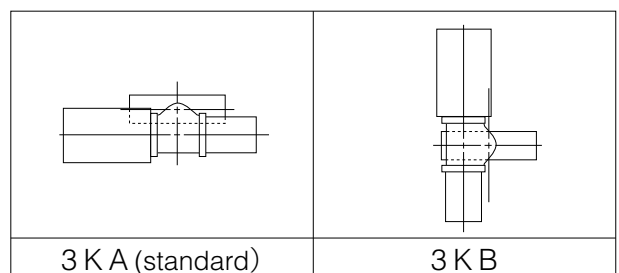


Selection criteria	Standard
	Select when none of the following heavy duty items apply.  Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

■ 3U Installation direction



■ 3K Installation direction



# 731P/732P (Wafer) 732Q/752W (Lugged)

Single-acting pneumatic cylinder type 732P-3U (Air to open: 200mm to 300mm) / 732P-3K (Air to close: 200mm to 300mm)

## Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	198	280	60	177	227	307	945	585	70	165	TG-10S	68
250	10	251	353	68	216	280	307	1080	720	94	206	TG-12S	122
300	12	300	403	78	254	312	307	1080	720	94	206	TG-12S	130

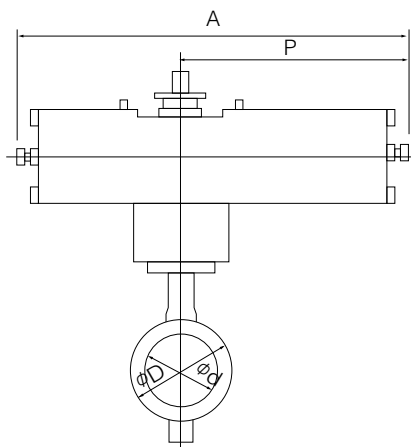
## Heavy duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	198	280	60	177	227	307	1080	720	94	206	TG-12S	112
250	10	251	353	68	216	280	340	1255	865	131	257	TG-14S	218
300	12	300	403	78	254	312	340	1255	865	131	257	TG-14S	226

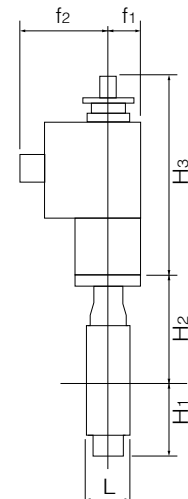
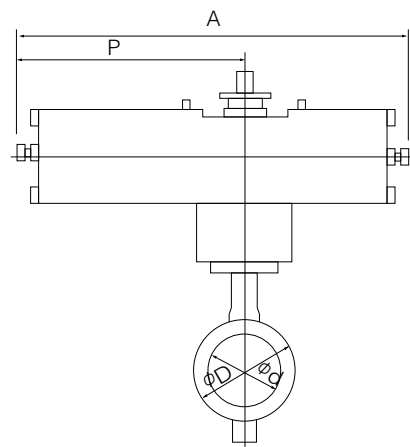
Please consult us regarding selection of drive parts for 350mm and higher.

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

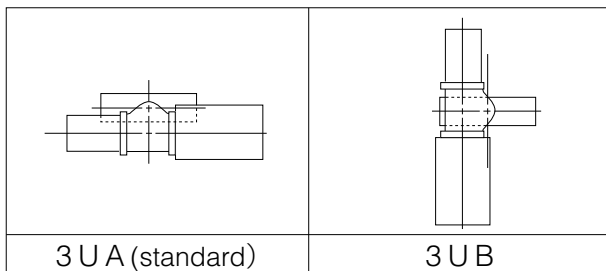
## 732P-3U



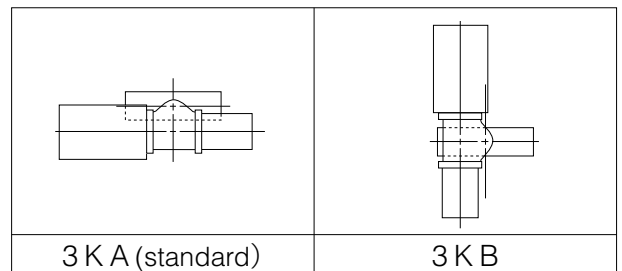
## 732P-3K



## 3U Installation direction



## 3K Installation direction

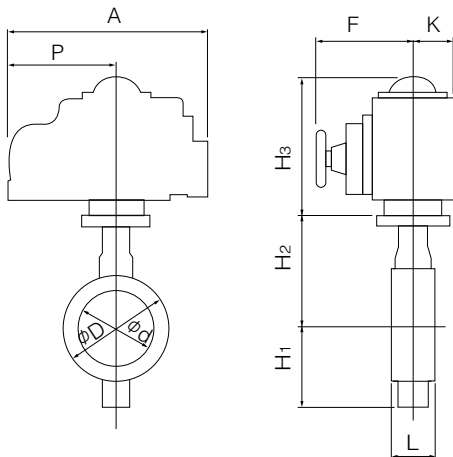


## Single phase electric motor type 731P-4I(50mm to 400mm)

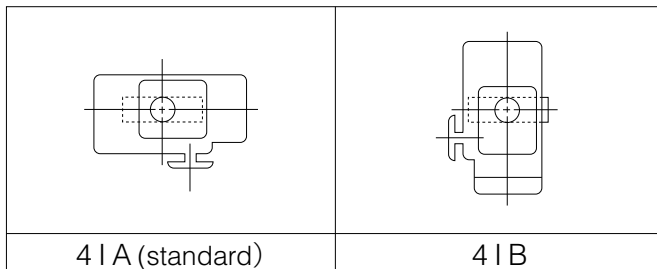
Type	Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
				JIS10K	JIS16K										
731P	50	2	54	102	102	43	68	138	120	161	84	58	45	4I-00	4.3
									150	202	100	85	54	4I-0	6
	65	2 1/2	67	122	122	46	79	151	150	202	100	85	54	4I-0	6.4
	80	3	82	132	138	46	86	156	150	202	100	85	54	4I-0	7
	100	4	103	157	163	52	103	167	165	252	138	126	65	4I-1	10
	125	5	129	188	200	56	118	191	198	310	167	154	85	4I-2	17
	150	6	152	218	235	56	135	202	198	310	167	154	85	4I-2	19
	200	8	198	267	280	60	177	227	198	310	167	154	85	4I-2.5	24.3
	250	10	251	330	353	68	216	280	230	388	223	246	136	4I-3	43.5
	300	12	300	375	403	78	254	312	230	388	223	246	136	4I-3	52.1
	350	14	336	415	415	78	304	340	230	388	223	246	136	4I-4	100
400	16	390	477	477	102	343	380	230	388	223	246	136	4I-4	136	

Note 1: For nominal size 50 mm type (for control), the 4I-0 type should be selected. (The 4I-00 type is only designed for ON-OFF operation.)

### 731P-4I



### 4I Installation direction



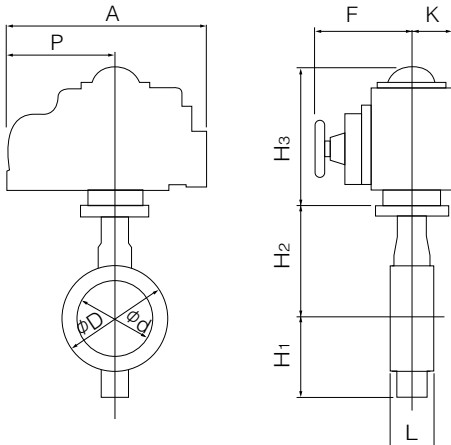
# 731P/732P (Wafer) 732Q/752W (Lugged)

## Single phase electric motor type 732P-4I (50mm to 300mm)

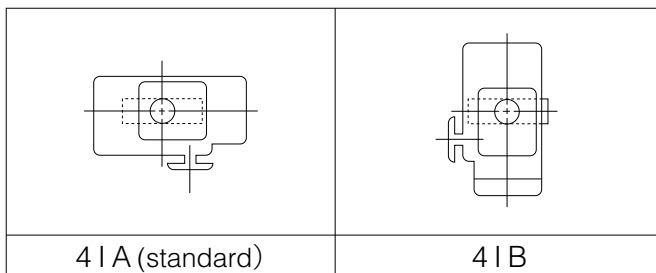
Nominal size		Dimension (mm)										Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	54	102	43	68	138	120	161	84	58	45	4I-00	4.4
							150	202	100	85	54	4I-0	6.1
65	2 1/2	67	122	46	79	151	150	202	100	85	54	4I-0	6.5
80	3	82	138	46	86	156	150	202	100	85	54	4I-0	7.2
100	4	103	163	52	103	167	165	252	138	126	65	4I-1	10.2
125	5	129	200	56	118	191	198	310	167	154	85	4I-2	17.3
150	6	152	235	56	135	202	198	310	167	154	85	4I-2	19.1
200	8	198	280	60	177	227	230	388	223	246	136	4I-3	35.3
250	10	251	353	68	216	280	230	388	223	246	136	4I-3	44.2
300	12	300	403	78	254	312	230	388	223	246	136	4I-3	52.2

Note 1: For nominal size 50 mm type (for control), the 4I-0 type should be selected. (The 4I-00 type is only designed for ON-OFF operation.)  
Please consult us regarding selection of drive parts for 350mm and higher.

### 732P-4I



### 4I Installation direction



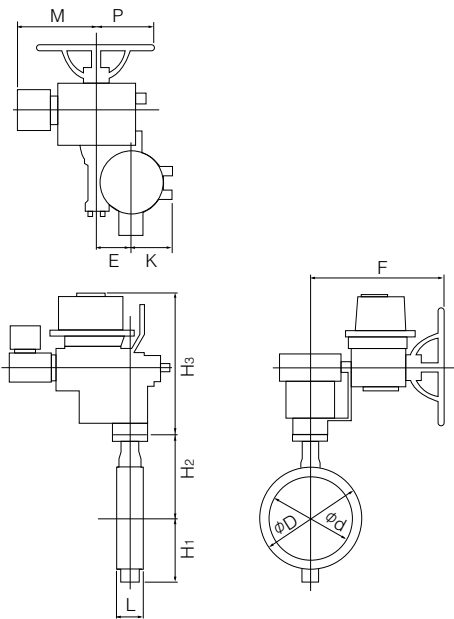


### Three phase motor actuator type 731P-4L (300mm to 600mm)

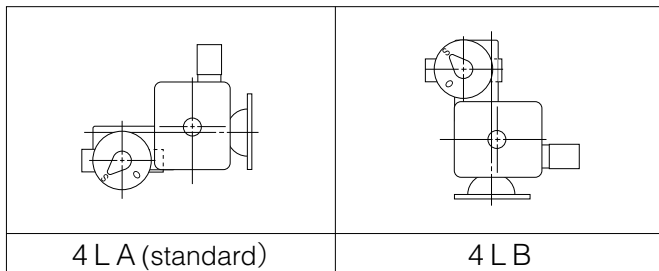
Type	Nominal size		Dimension (mm)												Motor type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$		L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
				JIS10K	JIS16K											
731P	300	12	300	375	403	78	254	312	435	85	126	498	357	230	LTKD-01 0.2kW /MGH-2	112
	350	14	336	415	415	78	304	340	487	117	164	533	373	230	LTKD-01 0.4kW /MGH-3	178
	400	16	390	477	477	102	343	380	487	117	164	533	373	230	LTKD-01 0.4kW /MGH-3	215
	450	18	439	532	532	114	379	420	538	140	198	594	400	230	LTKD-02 0.75kW /MGH-4	297
	500	20	490	610	610	127	422	450	538	140	198	594	400	230	LTKD-02 0.75kW /MGH-4	348
	600	24	583	826	720	154	494	530	604	210	293	748	440	360	LTKD-05 0.75kW /MGH-5	645 (675)

Remark: Value in brackets is for JIS 10K flanges.

#### 731P-4L



#### 4L Installation direction



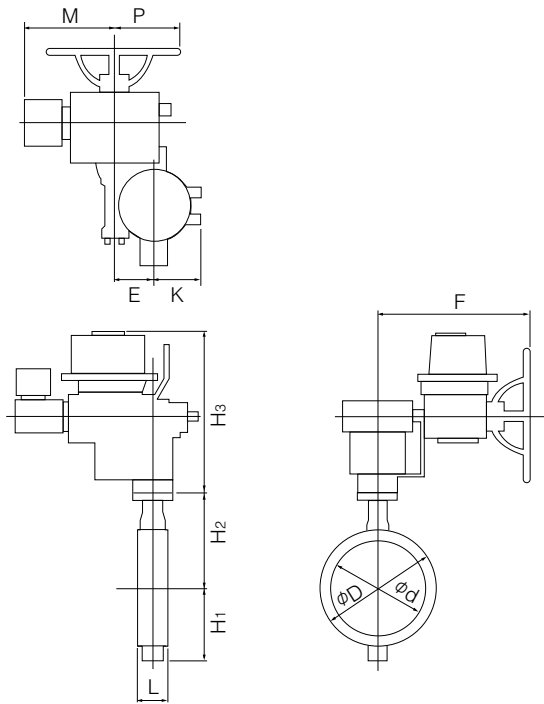
# 731P/732P (Wafer) 732Q/752W (Lugged)

## Three phase motor actuator type 732P-4L (250mm, 300mm)

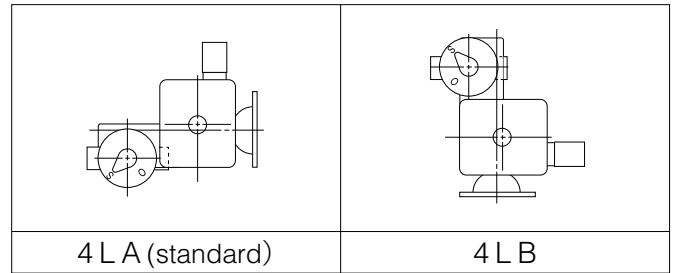
Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
250	10	251	353	68	216	280	435	85	126	498	357	230	LTKD-01 0.2kW /MGH-2	99
300	12	300	403	78	254	312	435	85	126	498	357	230	LTKD-01 0.2kW /MGH-2	110

Please consult us regarding selection of drive parts for 350mm and higher.

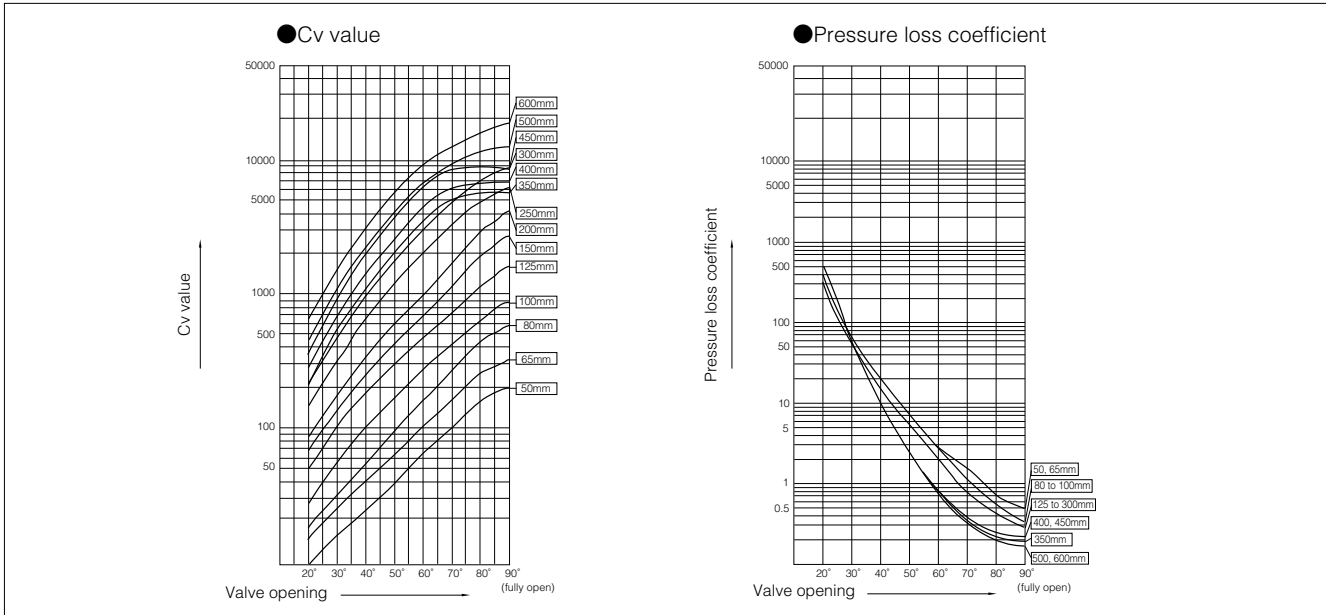
### 732P-4L



### 4L Installation direction



### 731P Cv value/Pressure loss coefficient



### 731P(50mm~600mm) Cv value

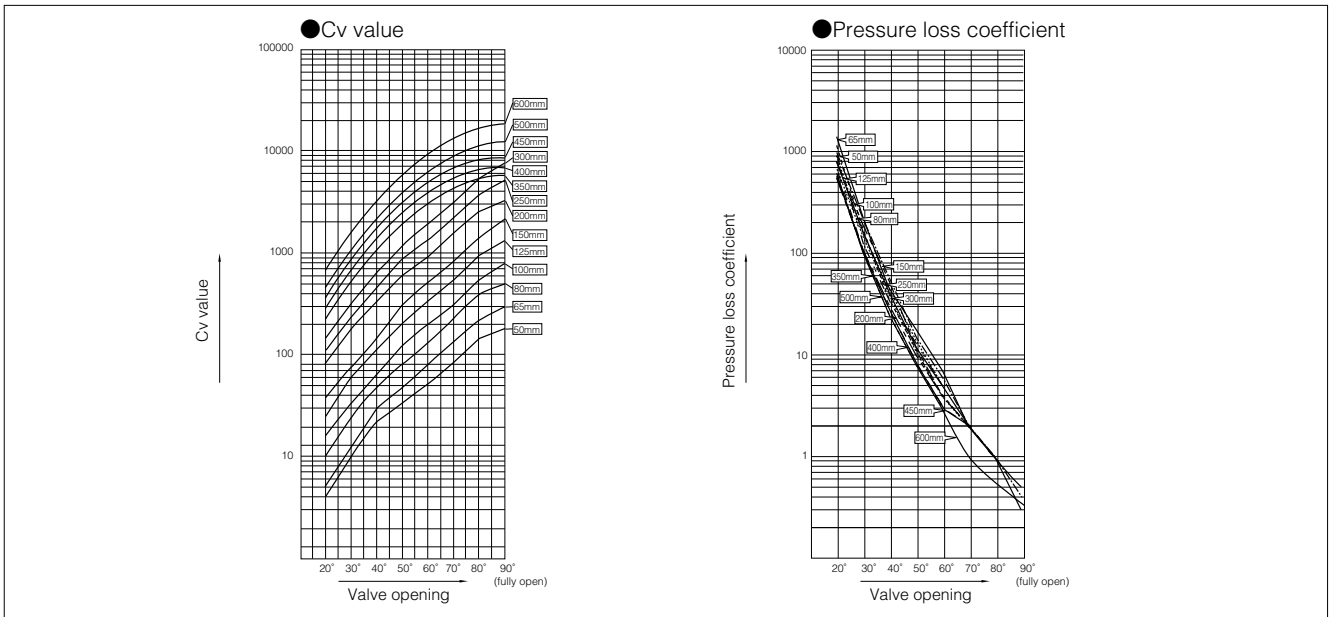
Type	Nominal size		Valve opening							
	mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
731P	50	2	10	17	25	37	66	102	159	200
	65	2 1/2	16	27	41	64	103	162	260	320
	80	3	20	35	57	97	162	272	450	580
	100	4	32	62	103	164	276	431	628	880
	125	5	55	107	193	297	450	727	1150	1590
	150	6	71	145	264	439	671	1170	1910	2800
	200	8	96	189	344	606	957	1730	2940	4300
	250	10	174	340	707	1240	2160	3330	4880	6200
	300	12	254	491	1000	1780	3020	4910	7180	8900
	350	14	222	548	1101	1930	3080	4431	5451	5770
	400	16	289	717	1429	2515	3924	5482	6586	6920
	450	18	365	911	1807	3182	4953	6896	8262	8670
	500	20	457	1123	2265	3975	6395	9311	11571	12300
600	24	664	1614	3307	5797	9328	13698	17243	18400	

### 731P(50mm~600mm) Pressure loss coefficient

Type	Nominal size		Valve opening							
	mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
731P	50	2	165	61	26	13	4	2	1	0.4
	65	2 1/2	162	58	24	10	4	2	1	0.4
	80	3	196	67	25	9	3	1	0.4	0.2
	100	4	233	61	22	9	3	1	0.6	0.3
	125	5	181	48	15	6	3	1	0.4	0.2
	150	6	222	53	16	6	2	1	0.3	0.1
	200	8	373	96	29	9	4	1	0.4	0.2
	250	10	270	71	16	5	2	1	0.3	0.2
	300	12	262	70	17	5	2	1	0.3	0.2
	350	14	579	95	24	8	3	1	1	1
	400	16	596	97	24	8	3	2	1	1
	450	18	609	98	25	8	3	2	1	1
	500	20	600	99	24	8	3	1	1	1
600	24	603	102	24	8	3	1	1	1	

# 731P/732P (Wafer) 732Q/752W (Lugged)

## 732P Cv value/Pressure loss coefficient



### 732P (50mm~600mm) Cv value

Type	Nominal size		Valve opening							
	mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
731P	50	2	4	10	22	33	51	85	145	179
	65	2 1/2	5	13	30	48	79	129	220	293
	80	3	10	25	49	80	130	225	396	500
	100	4	16	33	65	125	200	311	539	772
	125	5	25	60	112	201	338	535	951	1295
	150	6	37	77	145	303	517	807	1400	2166
	200	8	79	178	335	592	906	1557	2573	3248
	250	10	110	238	460	876	1359	2217	3763	5153
	300	12	146	321	640	1192	1910	3147	5379	7546
	350	14	222	548	1101	1930	3080	4431	5451	5770
	400	16	289	717	1429	2515	3924	5482	6586	6920
	450	18	365	911	1807	3182	4953	6896	8262	8670
	500	20	457	1123	2265	3975	6395	9311	11571	12300
600	24	664	1614	3307	5797	9328	13698	17243	18400	

### 732P (50mm~600mm) Pressure loss coefficient

Type	Nominal size		Valve opening							
	mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
731P	50	2	1132	170	35	15	6	2	1	0.5
	65	2 1/2	1389	225	45	18	7	2	1	0.5
	80	3	896	124	33	13	5	2	1	0.3
	100	4	971	214	56	15	6	2	1	0.4
	125	5	887	154	44	14	5	2	1	0.3
	150	6	801	189	53	12	4	2	1	0.3
	200	8	549	108	31	10	4	2	1	0.3
	250	10	675	145	39	11	4	2	1	0.3
	300	12	790	164	41	12	5	2	1	0.3
	350	14	579	95	24	8	3	1	1	1
	400	16	596	97	24	8	3	2	1	1
	450	18	609	98	25	8	3	2	1	1
	500	20	600	99	24	8	3	1	1	1
600	24	603	102	24	8	3	1	1	1	

### 731P Flange accommodation

Type	Nominal size		JIS		ASME	BS4504		DIN	
	mm	inch	10K	16K	class 150	PN10	PN16	NP10	NP16
731P	50	2	○	○	○	○	○	○	○
	65	2 1/2	○	○	○	○	○	○	○
	80	3	△	○	△	○	○	○	○
	100	4	△	○	○	○	○	○	○
	125	5	△	○	△	△	△	△	△
	150	6	△	○	△	△	△	△	△
	200	8	△	○	△	△	△	△	△
	250	10	△	○	△	△	△	△	△
	300	12	△	○	○	△	△	△	△
	350	14	D	D	D	D	D	D	D
	400	16	D	D	D	D	D	D	D
	450	18	D	D	D	D	D	D	D
	500	20	D	D	D	D	D	D	D
	600	24	T	T	T	D	T	D	T

○ : Can be used without flange drilling.  
 △ : With additional flange drilling.  
 D : With flange drilling.  
 T : With flange tapping.

### 732P Flange accommodation

Type	Nominal size		JIS 20K	DIN NP25
	mm	inch		
732P	50	2	○	○
	65	2 1/2	○	○
	80	3	○	○
	100	4	○	○
	125	5	○	○
	150	6	○	△
	200	8	○	○
	250	10	○	△
	300	12	○	△
	350	14	D	D
	400	16	D	D
	450	18	D	D
	500	20	D	D
	600	24	T	T

○ : Can be used without flange drilling.  
 △ : With additional flange drilling.  
 D : With flange drilling.  
 T : With flange tapping.

# 731P/732P (Wafer) 732Q/752W (Lugged)

731P Applicable pipe list in case of **A**

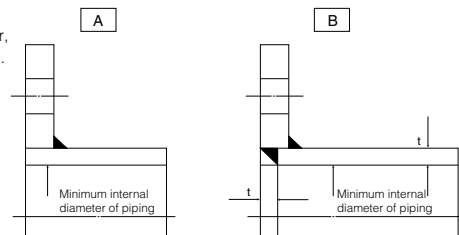
Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
	mm	inch							
731P	50	2	○	—	○	○	○	○	34
	65	2 1/2	○	—	○	○	○	○	51
	80	3	○	—	○	○	○	○	70
	100	4	○	—	○	○	○	○	91
	125	5	○	—	○	○	○	○	118
	150	6	○	—	○	○	○	○	144
	200	8	○	—	○	○	○	○	194
	250	10	○	—	○	○	○	○	246
	300	12	○	—	○	○	○	○	294
	350	14	○	○	○	○	—	—	332
	400	16	○	○	○	○	—	—	379
	450	18	○	○	○	○	—	—	428
	500	20	○	○	○	○	—	—	477
600	24	—	○	○	○	—	—	567	

731P Applicable pipe list in case of **B**

Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
	mm	inch						
731P	50	2	○	—	○	○	○	○
	65	2 1/2	○	—	○	○	○	○
	80	3	○	—	○	○	○	○
	100	4	○	—	○	○	○	○
	125	5	○	—	○	○	○	○
	150	6	○	—	○	○	○	○
	200	8	○	—	○	○	○	○
	250	10	○	—	○	○	○	○
	300	12	○	—	○	○	○	○
	350	14	○	○	○	○	—	—
	400	16	○	○	○	○	—	—
	450	18	○	○	○	○	—	—
	500	20	○	○	○	○	—	—
600	24	—	○	○	○	—	—	

Remark 1: ○=Applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.  
 In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.  
 For details, please consult us.



732P Applicable pipe list in case of **A**

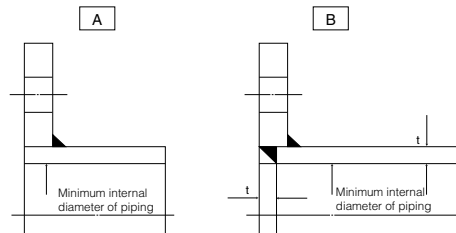
Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch20S	Minimum internal diameter of piping (mm)
	mm	inch						
732P	50	2	○	—	○	○	○	34
	65	2 1/2	○	—	○	○	○	51
	80	3	○	—	○	○	○	70
	100	4	○	—	○	○	○	91
	125	5	○	—	○	○	○	118
	150	6	○	—	○	○	○	144
	200	8	○	—	○	○	○	194
	250	10	○	—	○	○	○	246
	300	12	○	—	○	○	○	294
	350	14	○	○	○	○	—	332
	400	16	○	○	○	○	—	379
	450	18	○	○	○	○	—	428
	500	20	○	○	○	○	—	477
	600	24	—	○	○	○	—	569

732P Applicable pipe list in case of **B**

Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch20S
	mm	inch					
732P	50	2	○	—	○	○	○
	65	2 1/2	○	—	○	○	○
	80	3	○	—	○	○	○
	100	4	○	—	○	○	○
	125	5	○	—	○	○	○
	150	6	○	—	○	○	○
	200	8	○	—	○	○	○
	250	10	○	—	○	○	○
	300	12	○	—	○	○	○
	350	14	○	○	○	○	—
	400	16	○	○	○	○	—
	450	18	○	○	○	○	—
	500	20	○	○	○	○	—
	600	24	—	○	○	○	—

Remark 1: ○=Applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.  
 In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.  
 For details, please consult us.



# 731P/732P (Wafer) 732Q/752W (Lugged)

## 731P Piping bolt and nut sizes

### Hexagon bolt & nut

Type	Nominal size		JIS 10K		JIS 16K	
	mm	inch	Hexagon bolts	Setting bolts	Hexagon bolts	Setting bolts
731P	50	2	4-M16×105×40	—	8-M16× 95×35	—
	65	2 1/2	4-M16×105×40	—	8-M16×105×35	—
	80	3	8-M16×110×40	—	8-M20×110×35	—
	100	4	8-M16×110×40	—	8-M20×120×35	—
	125	5	8-M20×120×50	—	8-M22×130×40	—
	150	6	8-M20×130×50	—	12-M22×130×40	—
	200	8	12-M20×135×50	—	12-M22×140×40	—
	250	10	12-M22×150×60	—	12-M24×155×50	—
	300	12	16-M22×160×60	—	16-M24×170×50	—
	350	14	16-M22×160×60	—	16-M30(P3)×180×55	—
	400	16	16-M24×190×45	—	16-M30(P3)×215×55	—
	450	18	20-M24×205×45	—	20-M30(P3)×230×55	—
	500	20	20-M24×215×45	—	20-M30(P3)×245×55	—
600	24	20-M30×260×50	8-M30× 70×60	20-M36(P3)×285×65	8-M36(P3)×85	

### Long bolt & nut

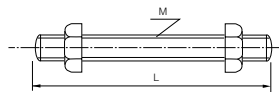
Type	Nominal size		JIS 10K		JIS 16K	
	mm	inch	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts
731P	50	2	4-M16×120×30	—	8-M16×125	—
	65	2 1/2	4-M16×125×30	—	8-M16×125	—
	80	3	8-M16×125×30	—	8-M20×135	—
	100	4	8-M16×130×30	—	8-M20×150	—
	125	5	8-M20×150×40	—	8-M22×165	—
	150	6	8-M20×150×40	—	12-M22×165	—
	200	8	12-M20×160×40	—	12-M22×170	—
	250	10	12-M22×170×45	—	12-M24×190	—
	300	12	16-M22×185×45	—	16-M24×210	—
	350	14	16-M22×185×45	—	16-M30(P3)×225	—
	400	16	16-M24×220×50	—	16-M30(P3)×260	—
	450	18	20-M24×235×50	—	20-M30(P3)×280	—
	500	20	20-M24×250×50	—	20-M30(P3)×295	—
600	24	20-M30×300×60	8-M30×70×65	20-M36(P3)×340	8-M36(P3)×85	

Example

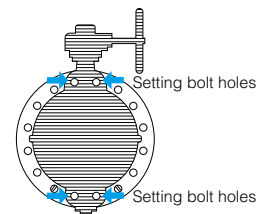
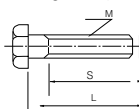
Long bolts: 12 - M22 × 185 × 45  
 |           |           |           |  
 N        M        L        S

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts) |           |           |           |  
 N        M        L        S

Long bolts and nuts (full thread)



Setting bolts (Hexagon bolts)





## 732P Piping bolt and nut sizes

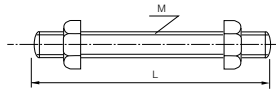
Type	Nominal size		JIS 20K	
	mm	inch	Long bolts and nuts	Setting bolts
732P	50	2	8-M16×125	—
	65	2 1/2	8-M16×125	—
	80	3	8-M20×135	—
	100	4	8-M20×150	—
	125	5	8-M22×165	—
	150	6	12-M22×165	—
	200	8	12-M22×170	—
	250	10	12-M24×190	—
	300	12	16-M24×210	—
	350	14	16-M30 (P3)×225	—
	400	16	16-M30 (P3)×260	—
	450	18	20-M30 (P3)×280	—
	500	20	20-M30 (P3)×295	—
	600	24	20-M36 (P3)×340	8-M36 (P3)×90

Example

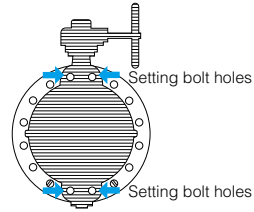
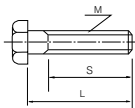
Long bolts: 12 - M22 × 185  
                   |          |          |  
                   M          L          S

Setting bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts) |          |          |          |  
                           N          M          L          S

Long bolts and nuts (full thread)



Setting bolts (Hexagon bolts)

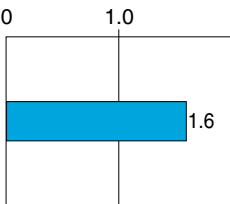


# 731R

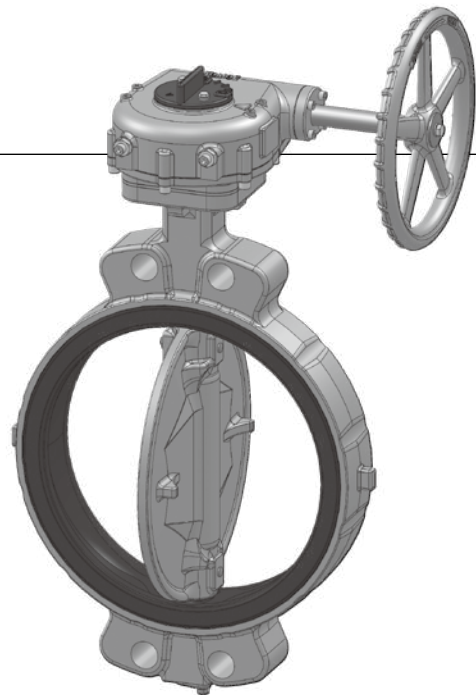
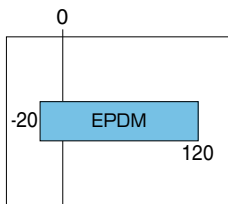
Valve nominal size

**350 to 600mm**

Max. working pressure MPa



Working temperature range °C



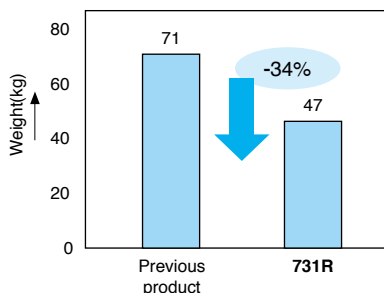
## Features and Benefits

**Adaptable for Building Services for Super High-rise Buildings and High-pressure Lines for Utilities Facilities.**  
**Concentric Butterfly Valve for High Pressure Service with Excellent Cost Performance.**

- New lineup of models from 350 mm to 600 mm (1.6 Mpa)
- In compliance with JIS and ISO face-to-face dimensions
- Globally-patented cosine curve seat ring
- Significantly improved durability thanks to spherical disc
- Self-aligning stem seal through secondary seal ring

### Light and compact

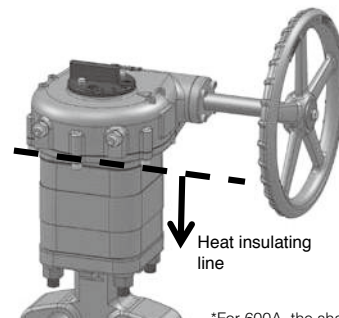
Weight reduced by 34% compared to the previous product\*1



\*1 In comparison with the previous 350 mm bore-size product Model 731P

### Condensation protection measures \*Optional

No condensation in the gear at ambient temperature 34°C and humidity 75% with cold water at 5°C.



\*For 600A, the shape is different.

## Standard Specifications

Valve model	731R	
Body type (centering method)	Concentric design, wafer type	
Valve nominal size	350mm to 600mm	
Face-to-face dimensions	JIS B 2002 46 series / ISO5752 wafer butterfly valve (short)	
Flange accommodation	JIS 16K, ASME Class 150	
Max. working pressure *3	1.6 MPa	
Allowable valve seat leakage standard	Tight shut-off	
Pressure application direction (flow direction)	Bi-direction	
Test pressure	Body shell test	JIS 16K, ASME Class 150: 2.4 MPa
	Seat leakage	JIS 16K, ASME Class 150: 1.76 MPa Hydraulic
Working temperature range	EPDM: -20 to 120°C (Please consult us when using the product in the temperature range -20°C to 0°C.)	
Working temperature in continuous use *2	EPDM: 0 - 70°C	
Allowable average pipe flow velocity (limit value)	3 m/s or less (At full valve open, continuous operation)	
Standard materials	Body	FCD450
	Disc	SCS13
	Stem	SUS420J2
	Seat ring *1	EPDM
Top flange	In compliance with ISO5211/1	
Condensation prevention structure	Optional (Condensation prevention resin column)	
Piping gasket	Not necessary	
Coating	Epoxy primer (Munsell N7)	
Actuator	Worm gear type (Automatic valves are not supported.)	

Note) If the following specifications are required, please consult our sales office.

- (1) High durability required because the number of opening/closing times exceeds 100,000.  
 (2) Continuous operation required with a valve opening angle of 30 degrees or less.  
 (3) Control operation which requires 3% or lower hysteresis accuracy of the valve itself.

\*1 If the fluid contains chlorine, the seat ring may deteriorate early due to combined factors including concentration and temperature. For details consult our sales office.

\*2 "Working temperature in continuous use" is the temperature range when the valve is operated continuously over one hour. If the valve is operated continuously at a temperature above 70°C and there is no problem, we advise that the valve can be used in that environment.

\*3 Negative pressure range is not allowable.

## Standard Specifications

Material Name	EPDM	
Temperature range	Allowable (°C)	-20~120
	Continuous (°C)	0~70
Max. working pressure(Mpa)	1.6	
Color	Black	
Features	Corrosion resistance	○
	Heat resistance	○
	Grease resistance	×
	Abrasion resistance	△

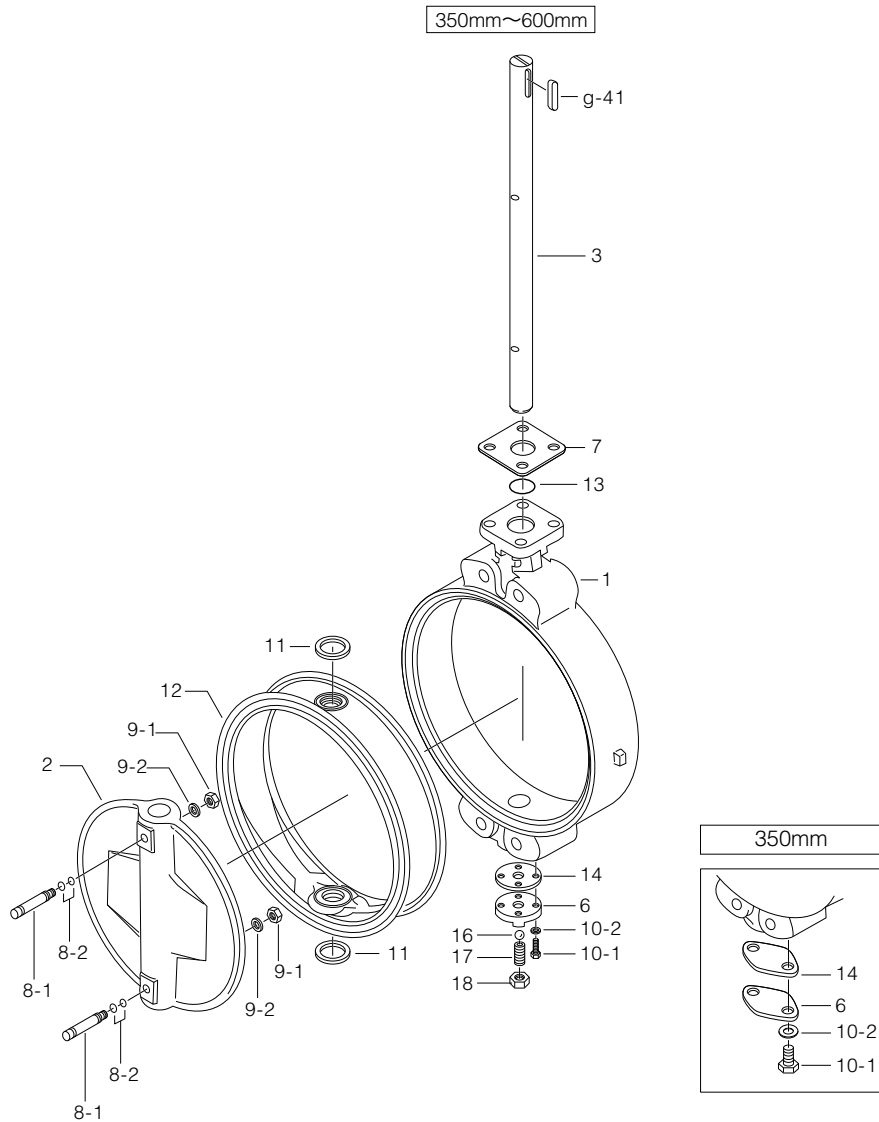
Key to symbols ○………… Good - Fit for use  
 △………… Acceptable for use  
 ×………… Not fit for use

Note 1) If the fluid contains oil, never use EPDM.

Note 2) ○,△ and × in the above features show typical characteristics.  
 The characteristics depend on fluid and temperature conditions.  
 Please consult us.

# 731R

## 731R Expanded view of components / 731R Parts list



### 731R Parts list (350mm – 600mm)

No.	Description	Q'ty	Remarks
★ 1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
★ 8-1	Taper bolt	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon nut	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
★ 11	Secondary seal ring	2	350mm to 600mm assembled in Body
★ 12	Seat ring	1	Vulcanized to body
★ 13	O-ring	1	
★ 14	Gasket	1	
16	Ball	1	400mm to 600mm
17	Hollow bolt	1	400mm to 600mm
18	Lock nut	1	400mm to 600mm
g41	Key	1	

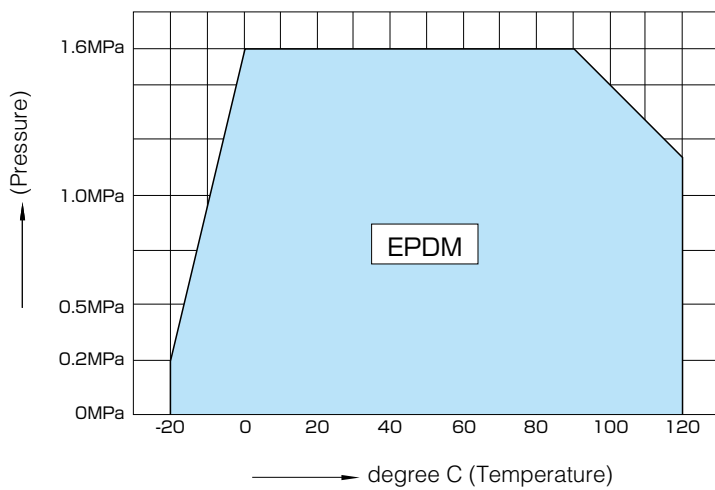
Note) The ★ indicates recommended spare parts. They are supplied as a "Seat ring set".

### 731R Actuator selection chart

Type	Model	Category	Size <small>(mm / inch)</small>				
			350	400	450	500	600
			14	16	18	20	24
Worm Gear	2U, 2H	Standard	2 U-5	2H *			

\* The gear size of 400 and 450 is different from that of 500 and 600.

### 731R Pressure – temperature rating

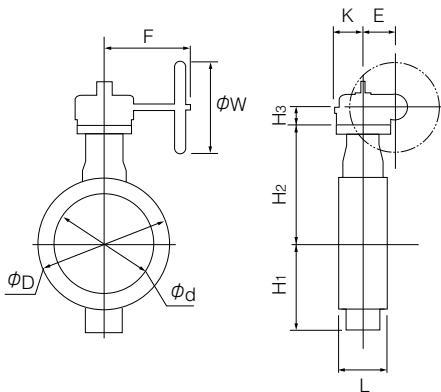


# 731R

## Worm gear type 731R-2U, 2H (350mm to 600mm)

Nominal size		Dimension (mm)										Gear type	Approx. mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
350	14	337	410	78	276	348	50	90	105	266	280	2U-5	66
400	16	394	467	102	338	383	48	105	110	311	300	2H	98
450	18	441	525	114	368	413	48	105	110	316	350	2H	124
500	20	492	580	127	403	453	56	53	111	328	400	2H	158
600	24	584	682	154	458	528	56	53	111	328	400	2H	222

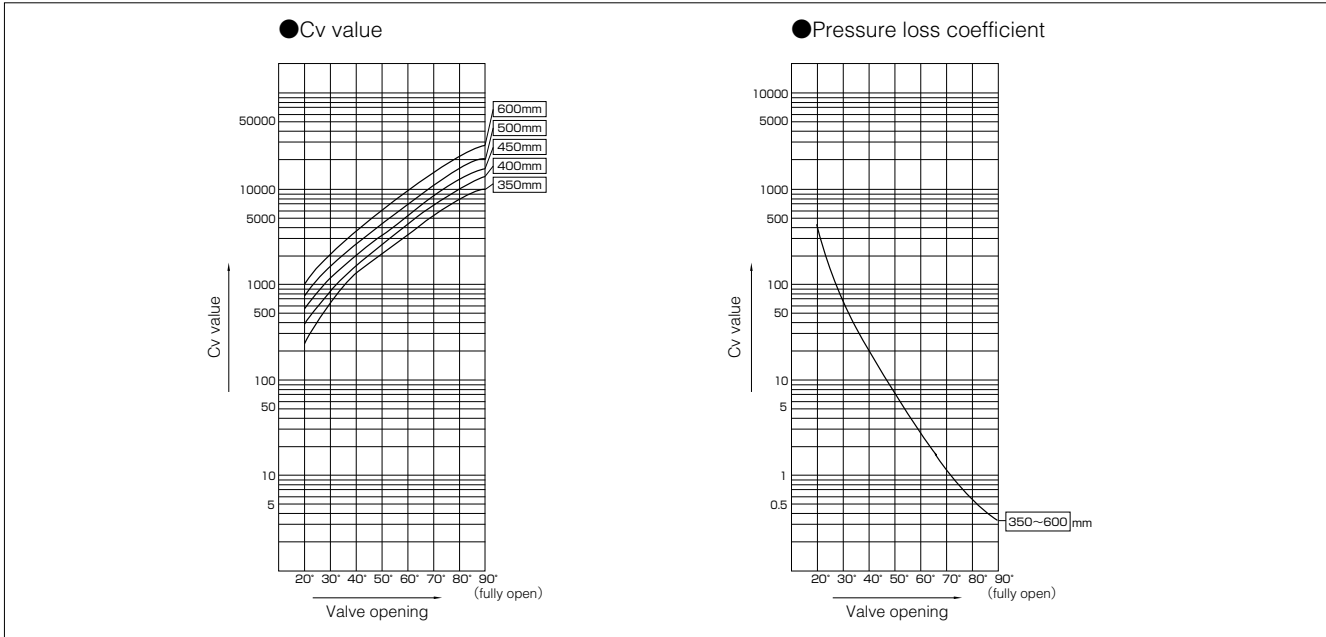
### 731R-2U • 2H



### 2U/2H Installation direction

2UA/2HA (standard)	2UAR/2HAR
2UB	2UBR
2HB	2HBR

### 731R Cv value/Pressure loss coefficient



### 731R Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
350	14	232	662	1350	2030	3294	5167	7832	9620
400	16	468	964	1648	2724	4529	6815	10553	12700
450	18	583	1202	2068	3448	5692	8384	13116	15500
500	20	758	1555	2656	4379	7214	10845	17100	19800
600	24	1037	2141	3681	6129	10106	14911	22827	27300

### 731R Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
350	14	531	65	16	7	3	1	0.4	0.3
400	16	227	54	18	7	2	1	0.4	0.3
450	18	239	56	19	7	3	1	0.4	0.3
500	20	218	52	18	7	2	1	0.4	0.3
600	24	247	58	20	7	3	1	1	0.3

# 731R

## 731R Flange accommodation

Nominal size		JIS	ASME
mm	inch	16K	Class 150
350	14	D	D
400	16	D	D
450	18	D	D
500	20	D	D
600	24	T	T

D: With flange drilling  
T: With flange tapping

## 731R Applicable pipe list in case of A

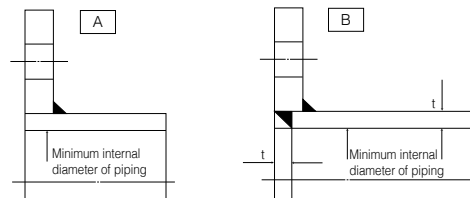
Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
mm	inch							
350	14	○	○	○	○	—	—	330
400	16	○	○	○	○	—	—	381
450	18	○	○	○	○	—	—	427
500	20	○	○	○	○	—	—	477
600	24	—	○	○	○	—	—	567

## 731R Applicable pipe list in case of B

Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
mm	inch						
350	14	○	○	○	○	—	—
400	16	○	○	○	○	—	—
450	18	○	○	○	○	—	—
500	20	○	○	○	○	—	—
600	24	—	○	○	○	—	—

Note 1) ○ = Applicable, - = No standard

Note 2) Butterfly valves are inserted into a pipe that has been fitted with the disc fully open. It is still possible to use a pipe or a flange that is less than the minimum inner pipe diameter, with extra adaptation, such as insertion of a spacer between the valve and the flange. For details, please consult our sales office.





## 731R Piping bolt and nut sizes

### ■ Hexagon bolts and nuts

Nominal size		JIS 16K	
mm	inch	Hexagon bolt and nuts	Setting bolts
350	14	16-M30(P3)×180	—
400	16	16-M30(P3)×215	—
450	18	20-M30(P3)×230	—
500	20	20-M30(P3)×245	—
600	24	20-M36(P3)×285	8-M36(P3)×85

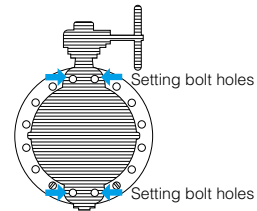
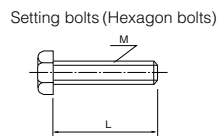
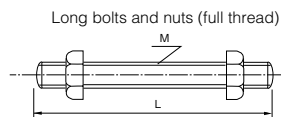
### ■ Long bolts and nuts

Nominal size		JIS 16K	
mm	inch	Long bolt and nuts	Setting bolts
350	14	16-M30(P3)×225	—
400	16	16-M30(P3)×260	—
450	18	20-M30(P3)×280	—
500	20	20-M30(P3)×295	—
600	24	20-M36(P3)×340	8-M36(P3)×85

Examples

Setting bolts: 12 - M22 × 185 × 45  
                   |      |      |      |  
                   N      M      L      S

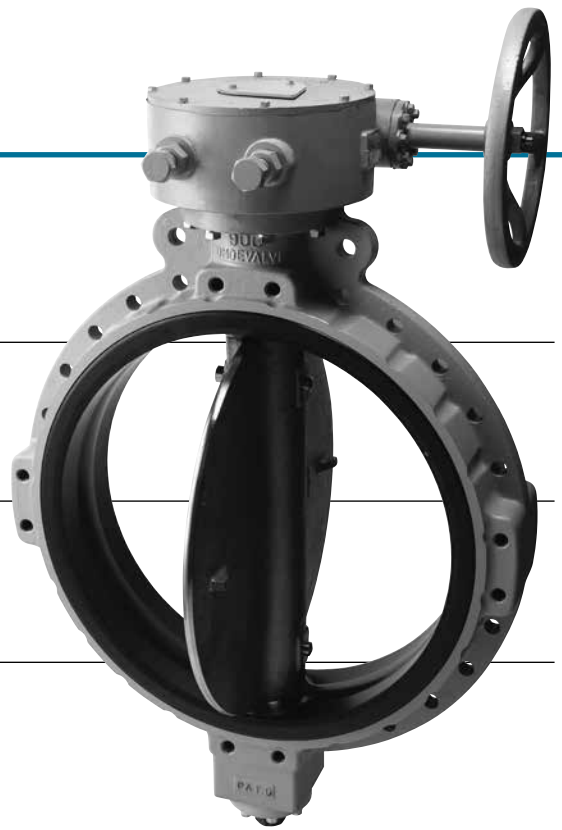
Long bolts: 4 - M30 × 95 × 65  
 (Hexagon bolts) |      |      |      |  
                       N      M      L      S



**700E** Wafer with support lugs

**700K** Wafer with support lugs

**700S** Wafer with support lugs



### Features and Benefits

Simple structure and low cost. Many years of proven reliable performance in various industries.

#### Concentric design raised center seat

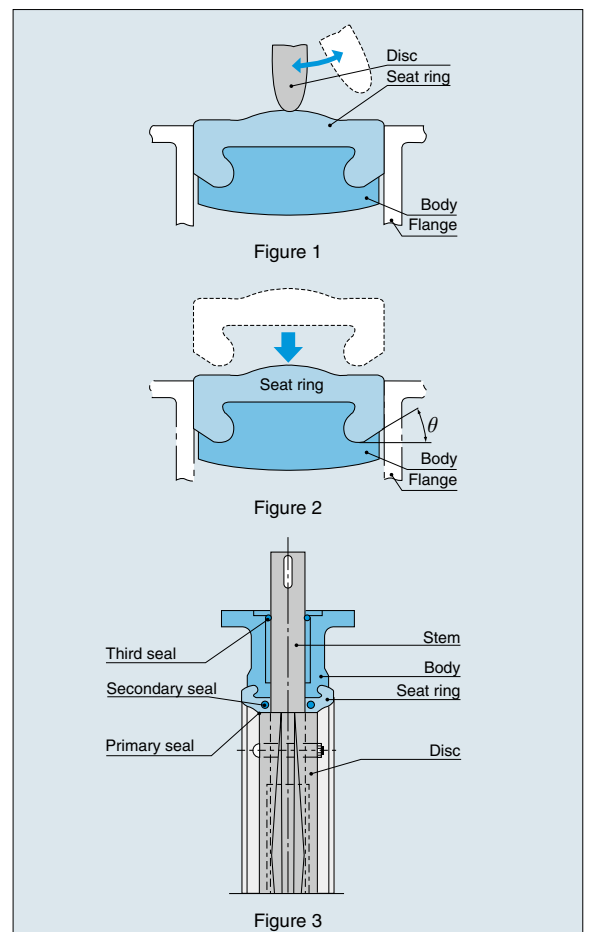
Figure 1 shows the TOMOE sealing design between the disc and seat. The raised section of the seat reduces and minimises the operating torque while ensuring a tight seal between disc and seat.

#### Rounded dove-tail design

Figure 2 shows the self-gripping seat ring design firmly in place inside the body. This design ensures the seat cannot be displaced during the bolting up of the adjoining flange. The seat also acts as the gasket between the valve and the pipe flange.

#### Triple-sealing system

Figure 3 shows the triple stem seal. The primary seal is created from the initial compression between the flat surface of the seat and the flat hub of the disc. When the valve is subject to normal operating conditions this seals the shaft and body from any contact with the flowing medium. The secondary seal is accomplished by an O-ring fitted into a stainless steel cartridge which is moulded into the seat ring. There is a secondary seal at each end of the stem where it penetrates the seat. The third seal is to prevent dirt and other foreign materials within the environment from getting into any of the working valve parts.



**Discs and seats come in various materials to meet a wide range of needs. These are the ultimate general purpose valves and they provide excellent cost performance.**

### General Description

TOMOE butterfly valves are used worldwide for various applications in water treatment, shipbuilding, air conditioning, petrochemical, power generation and other industries. Among the various types of TOMOE rubber seated butterfly valves, there are three types – 700E, 700K and 700S – that are particularly suitable for large diameter applications.

### Standard Specifications

Type	700E	700K	700S
Size	650mm to 1350mm		
Max. Working Pressure MPa	1.0MPa		
Body shell test	1.5MPa (hydraulic) JIS5K:0.75MPa		
Seat leak test	1.1MPa (hydraulic) JIS5K:0.55MPa		
Flange accommodation ※1	JIS 5K/10K	ASME Class 125/150, ISO PN10	ASME Class 150, API Class 150
Face-to-face dimensions	Manufacturer's standard		
Seat leakage	Tight-shutoff		
Flow direction	Bi-direction		
Working temperature range	NBR : -10 to 80 degrees C, *EPDM : -20 to 120 degrees C		
Working temperature in continuous use ※3	NBR : 0 to 60 degrees C, *EPDM : 0 to 70 degrees C		
Standard materials	Body	Cast iron	Cast iron, Ductile iron, Carbon steel
	Disc	Stainless steel Ductile iron with hard Cr plated stainless steel casting Aluminium bronze	
	Stem	Stainless steel, K-MONEL	
	Seat ring ※2	NBR, *EPDM	
Top flange	Manufacturer's standard		
Piping flange gasket	Not required		
Coating	Lacquer Primer (Munsell N7)		

※1 Other flange standards may be available on request. Consult us.

※2 The seat ring of 1000mm and over for 700E/S/K and 720F are vulcanized to the body.

※3 'Working temperature in continuous use' stands for the temperature continuously kept exceeding one hour.

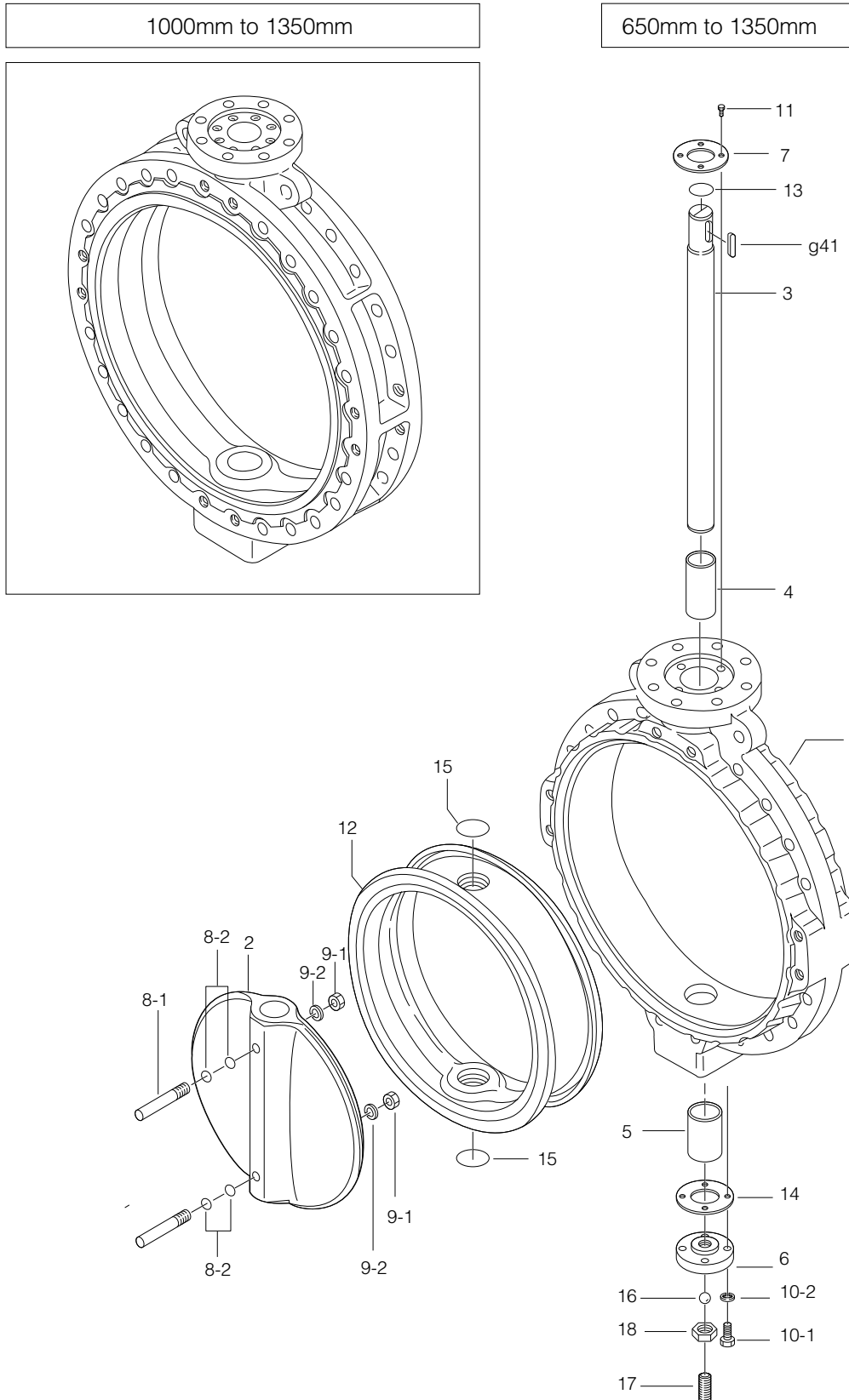
※ Clean face disc (2 shaft design) is available for 700E/S/K and 720F.

※ Please refer to 700G, 704G, 705G in case of 600mm or below.

\* Never use an EPDM rubber seat ring if the valve is being used for oil or for a fluid containing even a slight amount of oil.

# 700E/700K/700S

## 700E / 700K / 700S Expanded View of Component



## 700E / 700K / 700S Parts List

### ■ 700E / 700K / 700S Parts List (650mm to 1350mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
7	Retainer plate	1	
★ 8-1	Taper bolt	2	650mm to 900mm
		4	1000mm to 1350mm
★ 8-2	O-ring	4	650mm to 900mm
		8	1000mm to 1350mm
★ 9-1	Hexagon nut	2	650mm to 900mm
		4	1000mm to 1350mm
★ 9-2	Spring washer	2	650mm to 900mm
		4	1000mm to 1350mm
10-1	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
10-2	Spring washer	4	650mm to 850mm
		8	900mm to 1350mm
11	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
★ 12	Seat ring	1	1000mm to 1350mm:Vulcanized to the body
★ 13	O-ring	1	See Remark 2.
★ 14	Sheet packing	1	
★ 15	O-ring	2	See Remark 2.
16	Ball	1	
17	Hollow bolt	1	
18	Lock nut	1	
g41	Key	1	

Remark 1: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

Consult us when repairing the seating on 1000 to 1350mm types as it is vulcanized to the body.

Remark 2: The O-ring material (item numbers 13 and 15) should be the same as the seating (item number 12).

# 700E/700K/700S

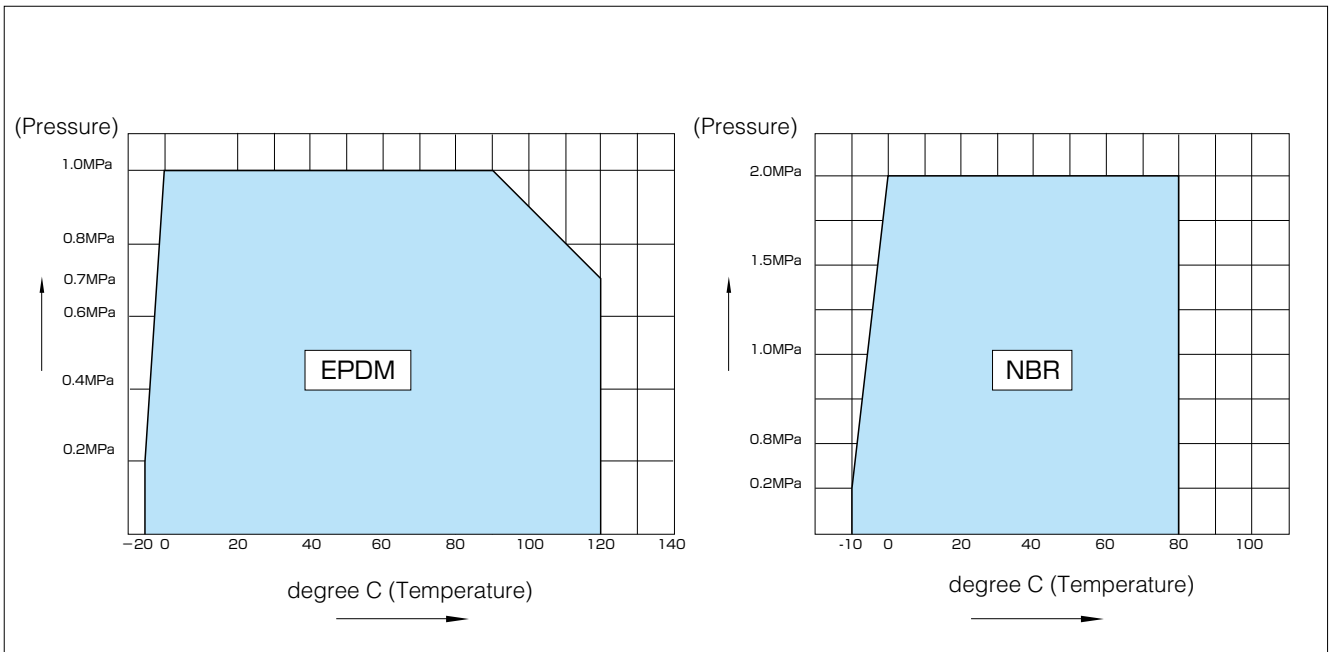
## 700E / 700K / 700S Actuator Selection Chart

### 700E / 700K / 700S

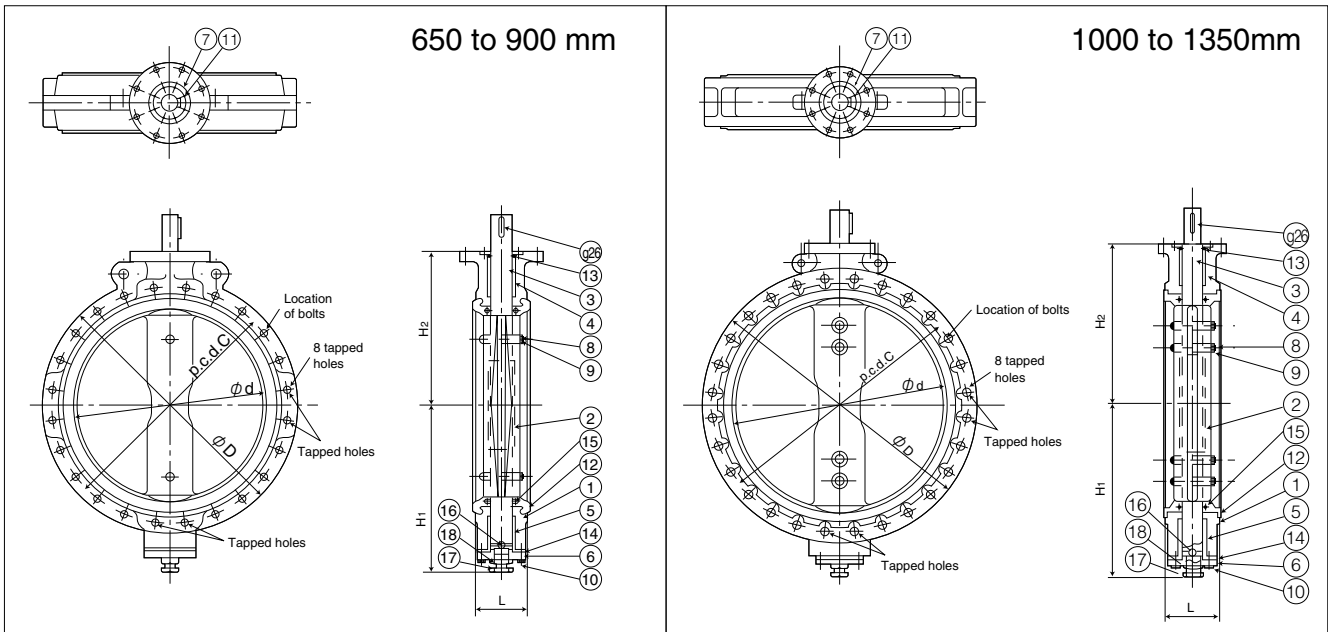
Model	Category	Size ( $\frac{mm}{inch}$ )									
		650	700	750	800	850	900	1000	1100	1200	1350
		26	28	30	32	34	36	40	44	48	54
2S	Standard	MGH-4	MGH-4 1/2		MGH-5		MGH-6			MGH-7	
	Heavy duty										
3A	Standard	TGA-180	TGA-200	TGA-220	TGA-250						
	Heavy duty	TGA-220		TGA-250							
4L	Standard	LTKD-05 0.75kW /MGH-4	LTKD-05 0.75kW /MGH-5	LTKD-05 1.5kW /MGH-5	LTKD-1 1.5kW /MGH-5	LTKD-1 2.2kW /MGH-5	LTKD-1 1.5kW /MGH-6		LTKD-1 2.2kW /MGH-7		
	Heavy duty										

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

## 700E / 700K / 700S Pressure-Temperature Rating



## Wafer with Support Lugs



### ■ Dimensions (700E / 700K / 700S)

Nominal size		Dimension (mm)					Weight (kg)	Flange Rating*1							
								JIS 5K*2		JIS 10K*2		ASME B 16.47 Series A		BS 4504 NP10, DIN PN10	
mm	inch	$\phi d$	$\phi D^{*1}$	L	H <sub>1</sub>	H <sub>2</sub>	Long bolts & Nuts	Hex. bolts	Long bolts & Nuts	Hex. bolts	Long bolts & Nuts	Hex. bolts	Long bolts & Nuts	Hex. bolts	
650	26	627	845	170	558	510	305	16-M24×285×50	16-M24×65×54	16-M30×310×60	16-M30×80×66	16-U1 1/4×390×70	16-U1 1/4×110×70	16-M20×200×45	—
700	28	670	905	180	629	560	380	16-M24×295×50	16-M24×65×54	16-M30×320×60	16-M30×80×66	20-U1 1/4×410×70	16-U1 1/4×110×70	16-M24×210×50	—
750	30	723	970	190	659	590	440	16-M30×320×60	16-M30×75×66	16-M30×335×60	16-M30×80×66	20-U1 1/4×425×70	16-U1 1/4×125×70	20-M24×250×50	—
800	32	772	1020	200	679	620	510	16-M30×335×60	16-M30×75×66	20-M30×345×60	16-M30×80×66	20-U1 1/2×460×80	16-U1 1/4×125×70	16-M27×280×60	8-M27×60×50
850	34	822	1070	210	709	650	630	16-M30×345×60	16-M30×75×66	20-M30×360×60	16-M30×80×66	24-U1 1/2×475×80	16-U1 1/4×135×80	16-M27×305×60	16-M27×65×54
900	36	858	1120	230	759	685	705	16-M30×360×60	16-M30×75×66	20-M30×385×65	16-M30×85×66	24-U1 1/2×510×80	16-U1 1/4×145×80	16-M30×335×60	16-M30×65×54
1000	40	975	1235	250	819	745	1200	20-M30×385×65	16-M30×85×66	20-M36×420×75	16-M36×100×78	28-U1 1/2×530×80	16-U1 1/4×145×80	20-M30×370×65	16-M30×75×66
1100	44	1070	1345	280	874	820	1400	20-M30×420×65	16-M30×85×66	20-M36×450×80	16-M36×100×78	32-U1 1/2×580×80	16-U1 1/4×155×80	20-M33×400×65	16-M33×90×72
1200	48	1170	1465	300	949	880	1800	24-M30×445×65	16-M30×85×66	24-M36×475×80	16-M36×100×78	36-U1 1/2×615×80	16-U1 1/4×160×80	24-M36×475×80	16-M36×100×78
1350	54	1314	1630	330	1030	960	2100	24-M30×475×65	16-M30×85×66	28-M42×525×80	16-M42×100×90	—	—	—	—

\*700S dimensions for ASME B16-47, series B class finish are available upon request.

\*1 "D" dimension shows for 700E, JIS 10 K.

\*2 Nut is 80% of bolt diameter.

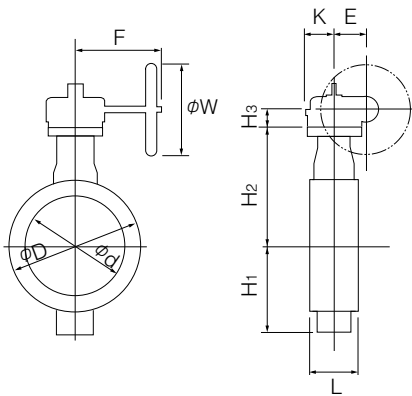
# 700E/700K/700S

Worm Gear Type 700E / 700K / 700S-2S (650mm to 1350mm)

## 700E / 700K / 700S-2S

Nominal size		Dimension (mm)										Gear type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
650	26	627	845	170	558	510	65	140	198	400	450	MGH-4	363
700	28	670	905	180	629	560	75	185	267	457	500	MGH-41/2	487
750	30	723	970	190	659	590	75	185	267	457	500	MGH-41/2	547
800	32	772	1020	200	679	620	75	185	267	457	500	MGH-41/2	617
850	34	822	1070	210	709	650	100	210	293	490	500	MGH-5	780
900	36	858	1120	230	759	685	100	210	293	490	500	MGH-5	855
1000	40	975	1235	250	819	745	100	210	293	490	500	MGH-6	1384
1100	44	1070	1345	280	874	820	100	210	293	490	500	MGH-6	1584
1200	48	1170	1465	300	948	880	100	210	293	490	500	MGH-6	1984
1350	54	1314	1630	330	1030	960	151	280	293	675	600	MGH-7	2436

## 700E / 700K / 700S-2S



## 2S Installation Direction

2SA (standard)	2SAR
2SB	2SBR



## Double-acting Pneumatic Cylinder Type 700E / 700K / 700S-3A (650mm to 900mm)

### Standard

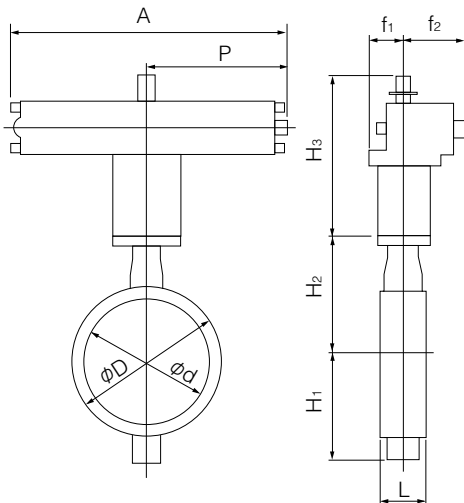
Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
650	26	627	845	170	558	510	478	1069	543	130	218	TGA-180	456
700	28	670	905	180	629	560	570	1175	599	160	253	TGA-200	607
750	30	723	970	190	659	590	570	1175	599	160	253	TGA-200	667
800	32	772	1020	200	679	620	600	1263	642	160	270	TGA-220	761
850	34	822	1070	210	709	650	600	1263	642	160	270	TGA-220	881
900	36	858	1120	230	759	685	633	1394	707	160	299	TGA-250	1022

### Heavy Duty

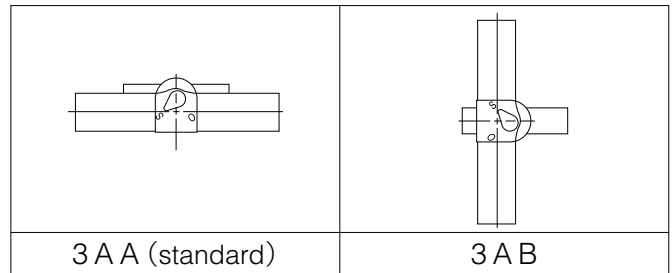
Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
650	26	627	845	170	558	510	600	1263	642	160	270	TGA-220	562
700	28	670	905	180	629	560	600	1263	642	160	270	TGA-220	637
750	30	723	970	190	659	590	633	1394	707	160	299	TGA-250	756
800	32	772	1020	200	679	620	633	1394	707	160	299	TGA-250	826

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve ④ Air or Gas

### 700E / 700K / 700S-3A



### 3A Installation Direction

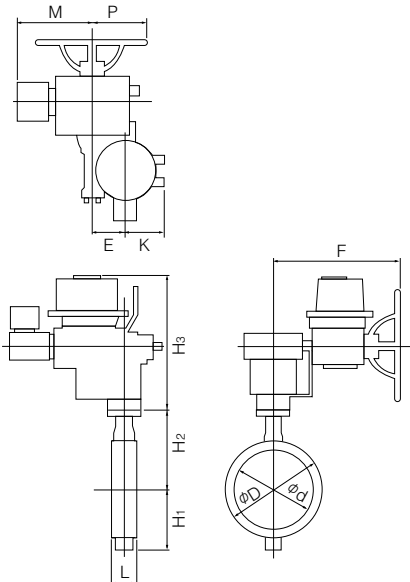


# 700E/700K/700S

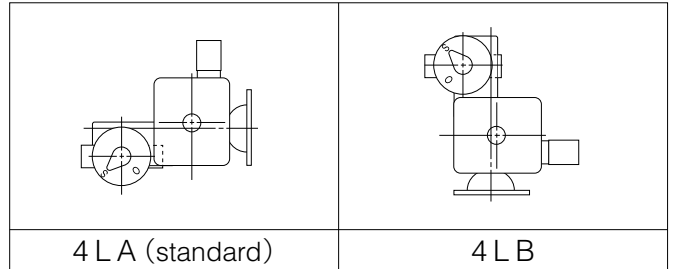
## Three Phase Motor Actuator Type 700E / 700K / 700S-4L (650mm to 1350mm)

Nominal size		Dimension (mm)											Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	M	P		
650	26	627	845	170	558	510	569	140	198	638	415	360	LTKD-05 0.75kW /MGH-4	632
700	28	670	905	180	629	560	639	210	293	748	415	360	LTKD-05 0.75kW /MGH-5	707
750	30	723	970	190	659	590	639	210	293	748	443	360	LTKD-05 1.5kW /MGH-5	772
800	32	772	1020	200	679	620	379	210	293	799	503	410	LTKD-1 1.5kW /MGH-5	997
850	34	822	1070	210	709	650	379	210	293	799	503	410	LTKD-1 1.5kW /MGH-5	1027
900	36	858	1120	230	759	685	379	210	293	799	524	410	LTKD-1 2.2kW /MGH-5	1064
1000	40	975	1235	250	819	745	699	—	293	762	503	410	LTKD-1 1.5kW /MGH-6	1635
1100	44	1070	1345	280	874	820	699	—	293	762	503	410	LTKD-1 1.5kW /MGH-6	1835
1200	48	1170	1465	300	948	880	699	—	293	762	503	410	LTKD-1 1.5kW /MGH-6	2235
1350	54	1314	1630	330	1030	960	699	—	293	1094	524	410	LTKD-1 2.2kW /MGH-7	2546

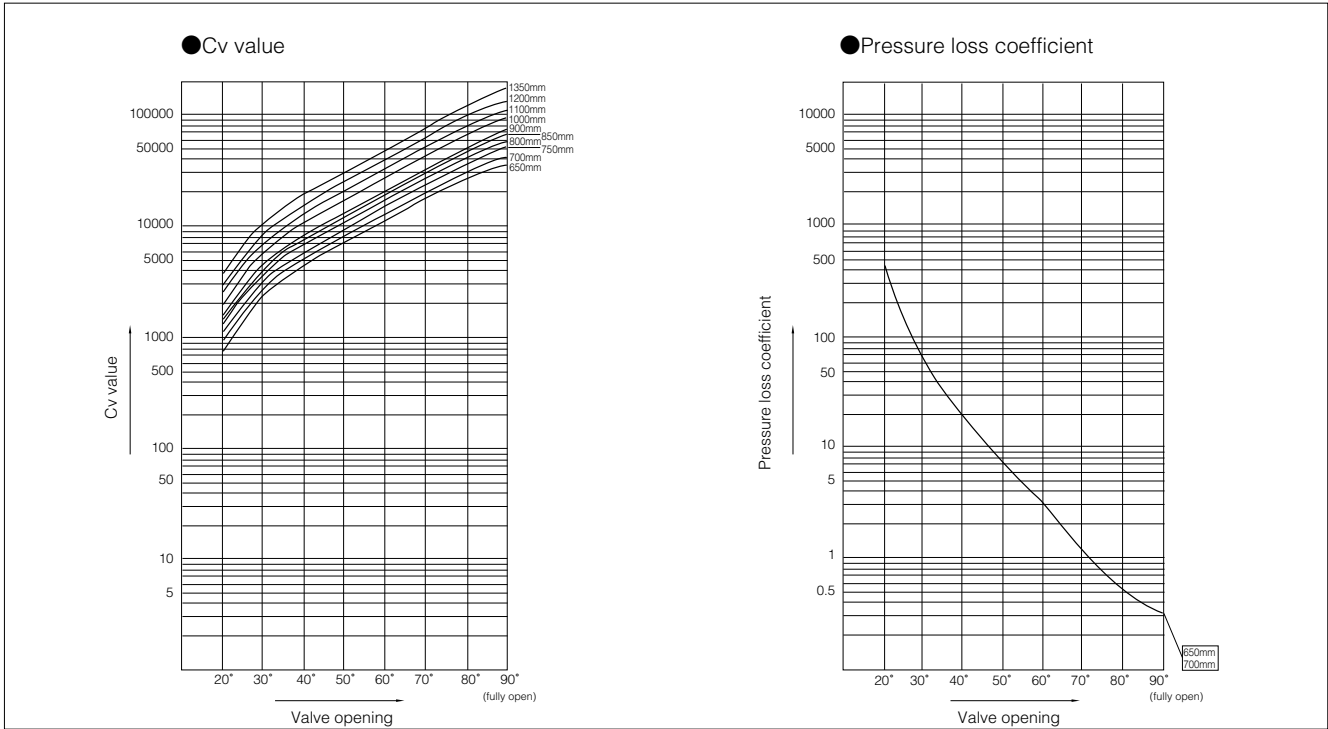
### 700E / 700K / 700S-4L



### 4L Installation Direction



## 700E / 700K / 700S Cv Value/Pressure Loss Coefficient



### 700E / 700K / 700S Cv Value

Nominal size		Valve opening							
		20°	30°	40°	50°	60°	70°	80°	90°
650	26	817	2441	4473	7159	11013	17254	26972	32500
700	28	934	2807	5122	8152	12511	19728	30929	39000
750	30	935	3220	5965	9450	14328	22687	38260	52000
800	32	1200	3721	6791	10771	16553	26976	43316	59000
850	34	1164	4018	7516	12063	18567	29284	46350	66000
900	36	1358	4497	8298	13177	20139	32362	53126	73000
1000	40	1784	5835	10740	17060	26110	42070	68860	95000
1100	44	2075	7030	13020	20680	31530	50420	83340	114000
1200	48	2570	8520	15710	24900	37930	60280	98640	138000
1350	54	3385	10180	18810	30490	47840	75750	119000	173000

### 700E / 700K / 700S Pressure Loss Coefficient

Nominal size		Valve opening							
		20°	30°	40°	50°	60°	70°	80°	90°
650	26	566	63	19	7	3	1	0.5	0.4
700	28	586	65	19	8	3	1	0.5	0.3
750	30	771	65	19	8	3	1	0.5	0.2
800	32	608	63	19	8	3	1	0.5	0.3
850	34	815	68	20	8	3	1	0.5	0.3
900	36	756	69	20	8	3	1	0.5	0.3
1000	40	672	63	19	7	3	1	0.5	0.2
1100	44	723	63	18	7	3	1	0.4	0.2
1200	48	672	61	18	7	3	1	0.5	0.2
1350	54	616	68	20	8	3	1	0.5	0.2

# 700E/700K/700S

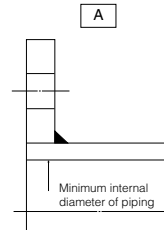
## 700E / 700K / 700S Flange accommodation

Nominal size		JIS			ASME		BS4504	DIN	BS10
mm	inch	5K	10K	G5527	class 125	class 150	PN10	NP10	Table E
650	26	T	T	Consult us if flange standard is not JIS 5K/10K.					
700	28	T	T						
750	30	T	T						
800	32	T	T						
850	34	T	T						
900	36	T	T						
1000	40	T	T						
1100	44	T	T						
1200	48	T	T						
1350	54	T	T						

○ : Can be used without flange drilling.  
 D/T : With drill hole or tapping.  
 T : With flange tapping.  
 - : No nominal diameter.

## 700E / 700K / 700S Applicable Pipe List in Case of **A**

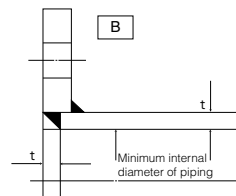
Nominal size		STPY	Sch20	Sch40	Minimum internal diameter of piping (mm)
mm	inch				
650	26	○	○	○	612
700	28	○	-	-	653
750	30	○	-	-	705
800	32	○	-	-	754
850	34	○	-	-	803
900	36	○	-	-	834
1000	40	○	-	-	950
1100	44	○	-	-	1040
1200	48	○	-	-	1138
1350	54	○	-	-	1277



Remark 1: ○=Applicable  
 Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.  
 In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.  
 For details, please consult us.

## 700E / 700K / 700S Applicable Pipe List in Case of **B**

Nominal size		STPY	Sch20	Sch40
mm	inch			
650	26	○	○	○
700	28	○	-	-
750	30	○	-	-
800	32	○	-	-
850	34	○	-	-
900	36	○	-	-
1000	40	○	-	-
1100	44	○	-	-
1200	48	○	-	-
1350	54	○	-	-



Remark 1: ○=Applicable  
 Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.  
 In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.  
 For details, please consult us.

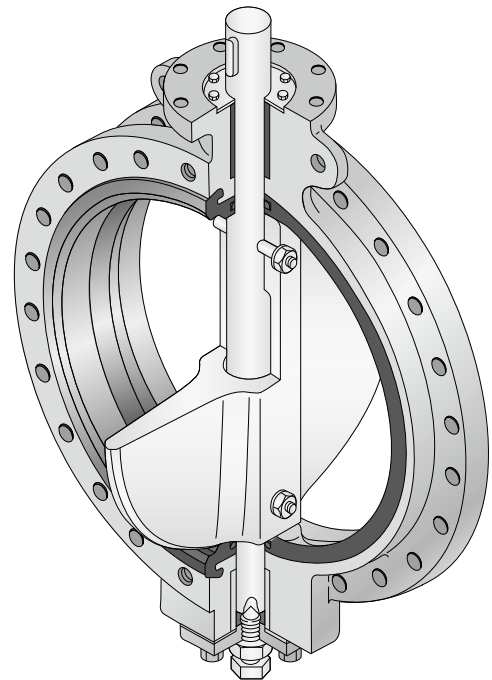
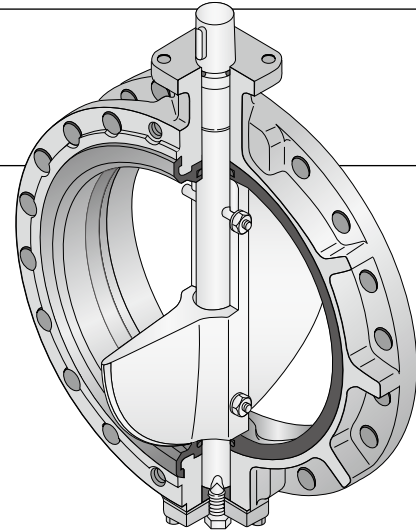
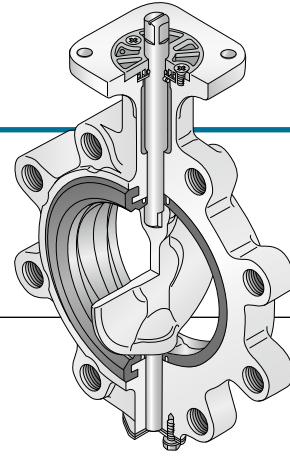


10 BAR Rated Butterfly Valve for General & Marine Use

**704G** Lugged

**722F** Double flanged

**720F** Double flanged



Today's ships have to work hard. With the extensive use of automated systems, minimum manning levels, extended journeys and quick turn round times, maintenance time is at a premium. Equipment must be ultra reliable and also meet the latest standards.

### Features and Benefits

#### Long life and leak tight

The 704G/722F/720F are designed to meet all of these requirements. They are tough valves made to international standards with worldwide marine approvals. Long term leak tightness was achieved through attention to detail in the spindle sealing and seat design.

#### Low cost maintenance

The seat and disc can easily be replaced under a planned maintenance schedule. This ease of replacement does not affect the valve's function as the seat is positively located in machined grooves in the valve body.

## Certification/Approval

Satisfies requirements of the major certification/approval bodies such as:

- Lloyd's Register of Shipping (LR)
- American Bureau of Shipping (ABS)
- Nippon Kaiji Kyokai (NK)
- Bureau Veritas (BV)

## Standard Specifications

Type	704G	722F	720F
		Lugged type	Flanged type
Valve nominal size	50mm to 100mm ※1	125mm to 800mm	850mm to 1350mm
Flange accommodation ※2	JIS 10K, (JIS 5K, ASME Class 125/150, BS 4504 PN10)		
Max. working pressure	1.0MPa		
Body shell test	1.5MPa		
Seat leak test	1.1MPa		
Working temperature range	NBR : -10 to 80 degrees C, *EPDM : -20 to 120 degrees C		
Working temperature in continuous use ※3	NBR : 0 to 60 degrees C, *EPDM : 0 to 70 degrees C		
Standard materials ※4	Body	Cast steel, SCPH2	
	Disc	SCS 14 (316SS)	SCS 13 (304SS)
	Stem	SUS 420J2	SUS 403
	Seat ring ※5	NBR, *EPDM	
Coating	Lacquer primer (Munsell N7)		

※1 Available up to 600mm.

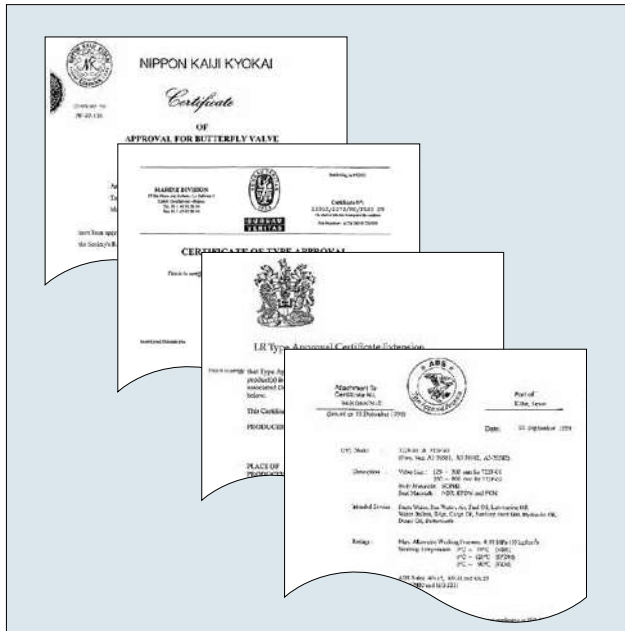
※2 Not all flange standards is applicable to all sizes. See "Flange accommodation" on p.414 for detail.

※3 'Working temperature in continuous use' stands for the temperature continuously kept exceeding one hour.

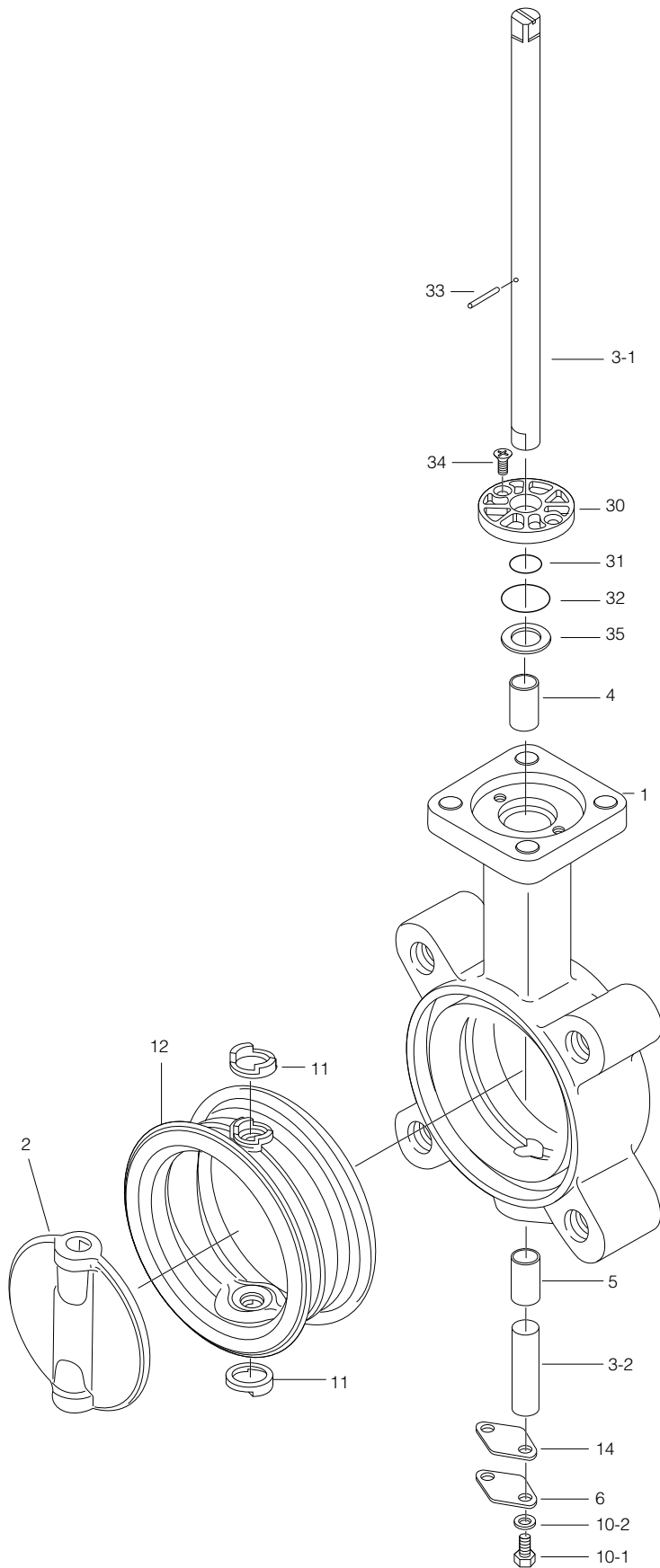
※4 Other materials, such as ductile iron body, aluminium bronze disc, etc, are also available. Consult us.

※5 Seating on 1000mm types and above are vulcanized to the body.

\* Never use an EPDM rubber seat ring if the valve is being used for oil or for a fluid containing even a slight amount of oil.



704G Expanded View of Components





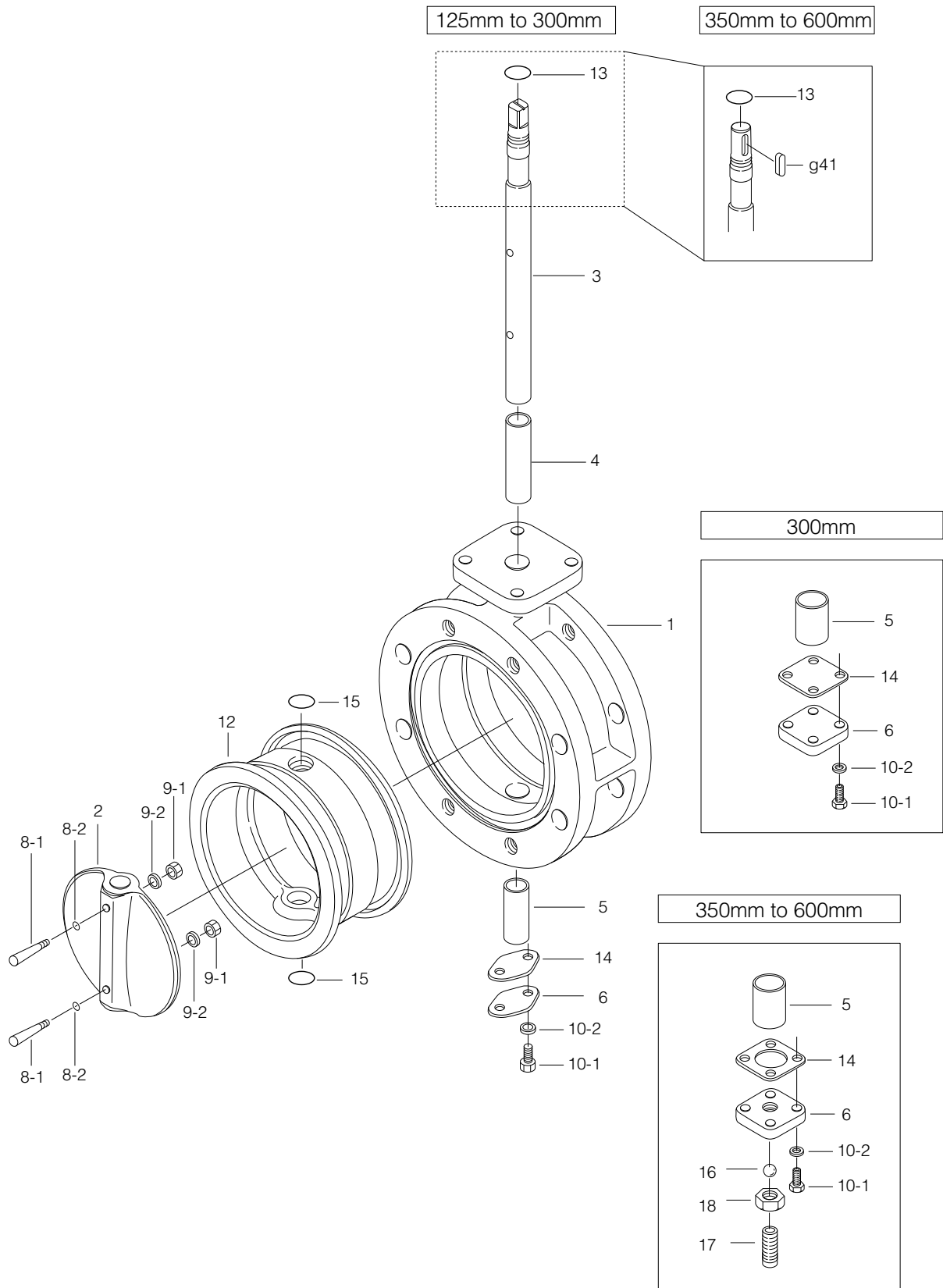
## 704G Parts list

### ■ 704G Parts list (50mm to 100mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3-1	Upper stem	1	
3-2	Lower stem	1	
4	Bearing	1	
5	Bearing	1	
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
★ 11	Secondary ring	2	
★ 12	Seat ring	1	
★ 14	Gasket	1	
★ 30	Bushing	1	
★ 31	O-ring	1	
★ 32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

Remark: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

**722F Expanded View of Components**



## 722F Parts list

### ■ 722F Parts list (125mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
★ 8-1	Taper bolt	1	125mm
		2	150mm to 300mm
★ 8-2	O-ring	4	Only 300mm
★ 9-1	Hexagon nut	1	125mm
		2	150mm to 300mm
★ 9-2	Spring washer	1	125mm
		2	150mm to 300mm
10-1	Hexagon bolt	2	125mm to 250mm
		4	300mm
10-2	Spring washer	2	125mm to 250mm
		4	300mm
★ 12	Seat ring	1	
★ 13	O-ring	1	
★ 14	Sheet packing	1	
★ 15	O-ring	2	See Remark 2.

### ■ 722F Parts list (350mm to 600mm)

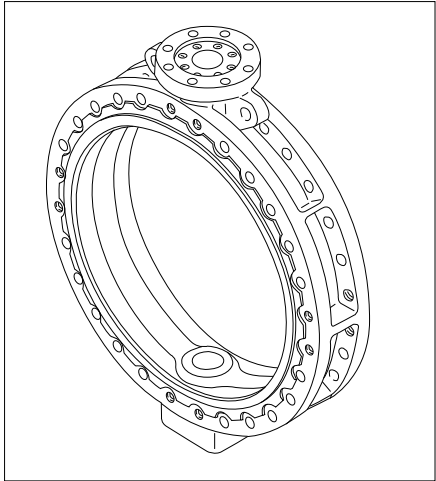
No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
★ 8-1	Taper bolt	2	
★ 8-2	O-ring	4	
★ 9-1	Hexagon nut	2	
★ 9-2	Spring washer	2	
10-1	Hexagon bolt	4	
10-2	Spring washer	4	
★ 12	Seat ring	1	
★ 13	O-ring	1	
★ 14	Sheet packing	1	
★ 15	O-ring	2	See Remark 2.
16	Ball	1	
17	Hollow bolt	1	
18	Lock nut	1	
g41	Key	1	

Remark 1: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

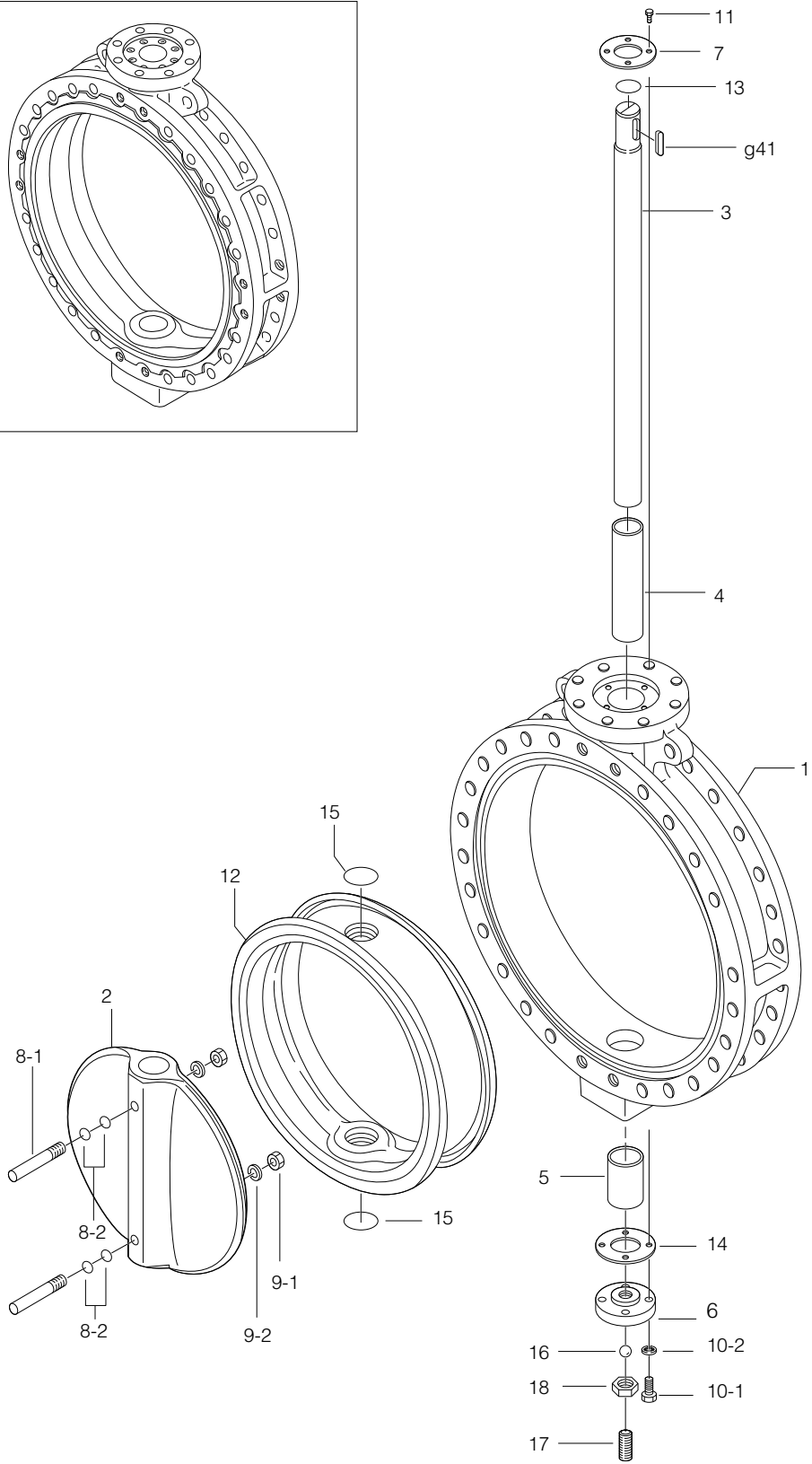
Remark 2: The O-ring material (item number 15) should be the same as the sea ring (item number 12).

722F·720F Expanded View of Components

1000mm to 1350mm



722F and 720F, 650mm to 1350mm



## 722F・720F Parts list

### ■ 722F and 720F Parts list (722F: 650mm to 800mm / 720F: 850mm to 1350mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
7	Retainer plate	1	
★ 8-1	Taper bolt	2	650mm to 900mm
		4	1000mm to 1350mm
★ 8-2	O-ring	4	650mm to 900mm
		8	1000mm to 1350mm
★ 9-1	Hexagon nut	2	650mm to 900mm
		4	1000mm to 1350mm
★ 9-2	Spring washer	2	650mm to 900mm
		4	1000mm to 1350mm
10-1	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
10-2	Spring washer	4	650mm to 850mm
		8	900mm to 1350mm
11	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
★ 12	Seat ring	1	1000mm to 1350mm:Vulcanized to the body
★ 13	O-ring	1	See Remark 2.
★ 14	Sheet packing	1	
★ 15	O-ring	2	See Remark 2.
16	Ball	1	
17	Hollow bolt	1	
18	Lock nut	1	
g41	Key	1	

Remark 1: The ★ indicates recommended spare parts. They are supplied as "Seat ring set".

Since the seat ring is vulcanized to the body of types 1000mm to 1350mm, please consult us if you wish to replace it.

Remark 2: The O-ring material (item numbers 13 and 15) should be the same as the seatring (item number 12).

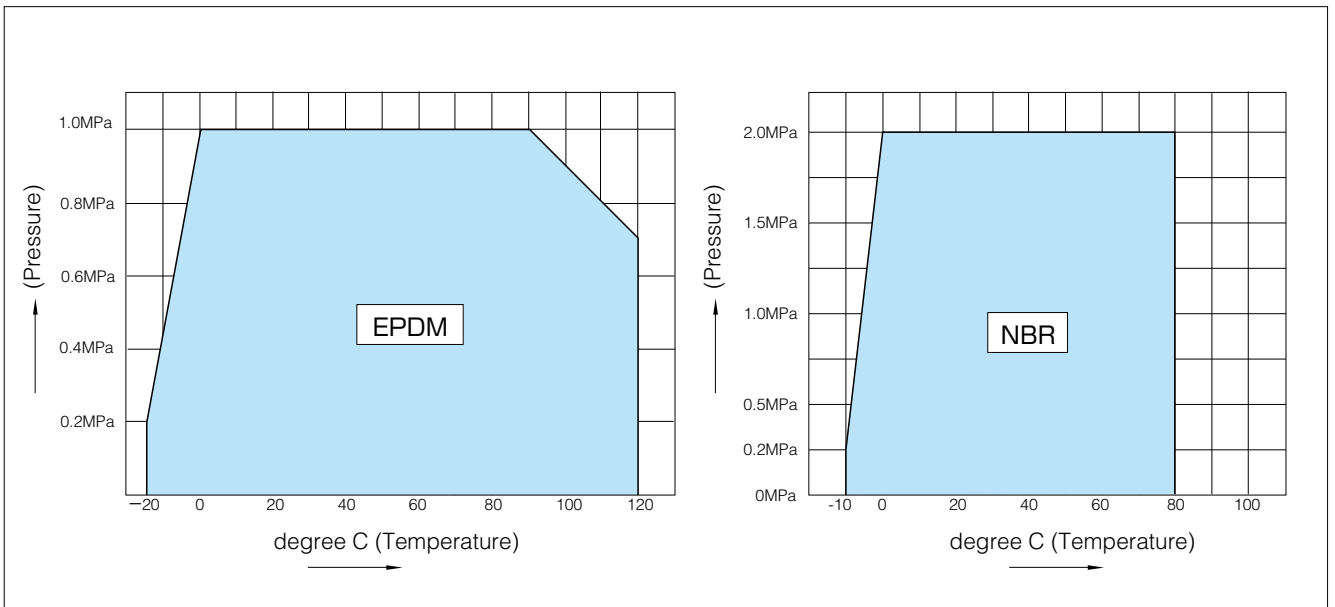
**704G Actuator Selection Chart**

**704G**

Model	Category	Size <small>(<math>\frac{mm}{inch}</math>)</small>			
		50	65	80	100
1T	Standard Heavy duty	1T-1			
2U	Standard Heavy duty	2U-0	2U-1		
2G	Standard Heavy duty	2G-1			
7E	Standard Heavy duty	T35	T85	T200	
7G,7F	Standard Heavy duty	T85S	T200S	T380S	
4 I	ON-OFF Control	4 I-00	4 I-0	4 I-1	
4J	Standard Heavy duty	SRJ-010			

<b>Selection criteria</b>	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

**704G/722F/720F Pressure-Temperature Rating**



## 722F Actuator selection chart

### 722F

Model	Category	Size $\left(\frac{\text{mm}}{\text{inch}}\right)$																	
		125	150	200	250	300	350	400	450	500	550	600	650	700	750	800			
		5	6	8	10	12	14	16	18	20	22	24	26	28	30	32			
1T	Standard	1T-2		1T-3															
	Heavy duty	1T-2		1T-3															
2U,2S	Standard	2U-2		2U-3		2U-4		2U-5			2U-6		MGH-4	MGH-4 1/2					
	Heavy duty	2U-2		2U-3		2U-4		2U-5			2U-6		MGH-4	MGH-4 1/2					
2G,2R	Standard	2G-2		2G-3		2G-4		2R-3			2R-4								
	Heavy duty	2G-2		2G-3		2G-4		2R-3			2R-4								
7E,3A	Standard	T200		T380		T750		TGA-125		TGA-140		TGA-180		TGA-200		TGA-220			
	Heavy duty	T200		T380		T750		TGA-125		TGA-140		TGA-160		TGA-180		TGA-200		TGA-220	TGA-250
7G,7F 3U,3K	Standard	T380S		T750S		TG-10S		TG-12S			TG-14S		TG-20S						
	Heavy duty	T380S		T750S		TG-10S		TG-12S			TG-14S		TG-20S						
4I	ON-OFF	4I-2		4I-2.5		4I-3			4I-4										
	Control	4I-2		4I-2.5		4I-3			4I-4										
4J,4L	Standard	SRJ-020			SRJ-060			LTKD-01 0.2kW/MGH-3		LTKD-01 0.4kW/MGH-3		LTKD-02 0.75kW/MGH-4	LTKD-05 0.75kW/MGH-4		LTKD-05 0.75kW/MGH-5	LTKD-05 1.5kW/MGH-5	LTKD-1 1.5kW/MGH-5		
	Heavy duty	SRJ-020			SRJ-060			LTKD-01 0.2kW/MGH-3		LTKD-01 0.4kW/MGH-3		LTKD-02 0.75kW/MGH-4	LTKD-05 0.75kW/MGH-4		LTKD-05 0.75kW/MGH-5	LTKD-05 1.5kW/MGH-5	LTKD-1 1.5kW/MGH-5		

Remark: For the 400mm type with the accessories below, type 4I-4 should be selected.

- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

## 720F Actuator selection chart

### 720F

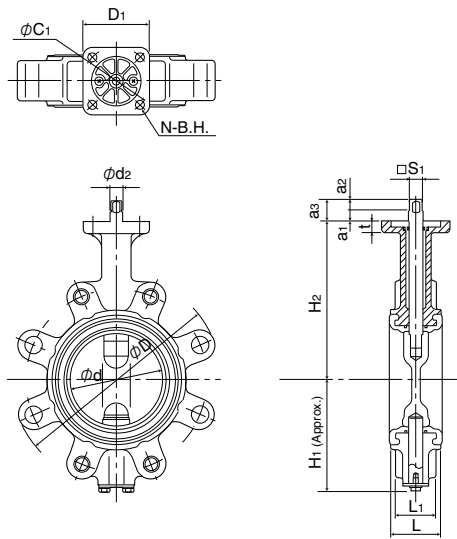
Model	Category	Size $\left(\frac{\text{mm}}{\text{inch}}\right)$						
		850	900	1000	1100	1200	1350	
		34	36	40	44	48	54	
2S	Standard	MGH-5		MGH-6			MGH-7	
	Heavy duty	MGH-5		MGH-6			MGH-7	
3A	Standard	TGA-220		TGA-250				
	Heavy duty	TGA-220		TGA-250				
4L	Standard	LTKD-1 1.5kW/MGH-5		LTKD-1 2.2kW/MGH-5		LTKD-1 1.5kW/MGH-6		LTKD-1 2.2kW/MGH-7
	Heavy duty	LTKD-1 1.5kW/MGH-5		LTKD-1 2.2kW/MGH-5		LTKD-1 1.5kW/MGH-6		LTKD-1 2.2kW/MGH-7

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

# 704G (Lugged) 722F (Double Flanged) / 720F (Double Flanged)

## 704G / 722F / 720F Dimension List

### 704G

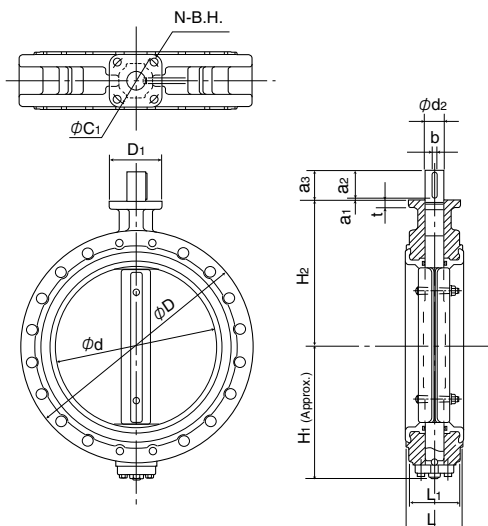


### 704G Dimensions

Nominal size		Dimension (mm)															Approx. Weight (kg)	
mm	inch	φd	L	L <sub>1</sub>	φD	H <sub>1</sub>	H <sub>2</sub>	d <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>	S <sub>1</sub>	D <sub>1</sub>	t	φC <sub>1</sub>	N		BH
50	2	56	43	33	155	67	138	10	11	10.5	21.5	8	70	12	70	4	9	3.4
65	2 1/2	69	46	36	175	78	151	10	11	10.5	21.5	8	70	12	70	4	9	4.4
80	3	84	46	36	187	85(109)	156	12	11	11.5	22.5	10	70	12	70	4	9	5(5.5)
100	4	104	52	42	220	117	167	14	11	11.5	22.5	12	70	12	70	4	9	7.7

Remark: Value in brackets is for JIS 10K flanges.

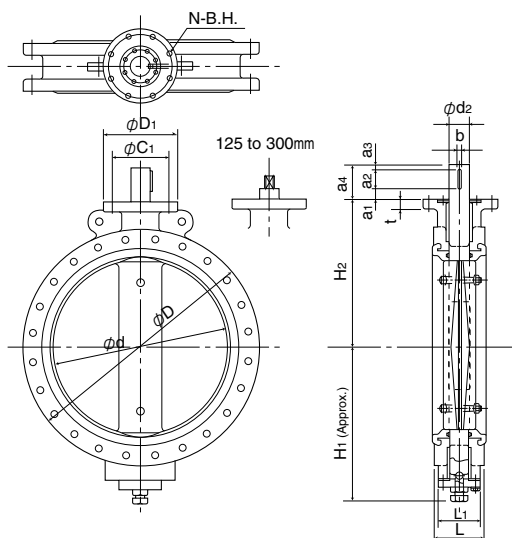
### 722F



### 722F Dimensions

Nominal size		Dimension (mm)																	Approx. Weight (kg)
mm	inch	φd	L	L <sub>1</sub>	φD	H <sub>1</sub>	H <sub>2</sub>	φd <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>	S <sub>1</sub>	b	D <sub>1</sub>	t	φC <sub>1</sub>	N	BH	
125	5	129	100	—	250	139	165	18	11	16.5	27.5	14	—	102	14	102	4	11	18
150	6	154	100	—	280	157	180	18	11	16.5	27.5	14	—	102	14	102	4	11	19
200	8	194	100	—	330	181	210	22	10	20	30	18	—	102	14	102	4	11	37
250	10	250	110	—	400	221	250	30	5	30	35	24	—	102	14	102	4	11	43
300	12	296	110	—	445	251	280	32	5	30	35	24	—	125	16	125	4	13	52
350	14	334	120	110	490	298	320	40	6	45	54	—	12	140	20	140	4	19	70
400	16	384	130	116	560	334	360	46	6	56	65	—	14	140	20	140	4	19	93
450	18	435	150	134	620	356	390	50	6	70	79	—	14	140	20	140	4	19	132
500	20	482	160	140	675	382	420	50	6	70	79	—	14	140	25	140	4	19	182
550	22	531	170	156	745	418	460	55	6	70	79	—	16	165	25	165	4	23	225
600	24	581	170	156	795	476	490	55	6	70	79	—	16	165	25	165	4	23	270
650	26	627	170	150	845	586	510	65	10	60	75	—	18	260	32	220	4	23	415
700	28	670	180	160	905	629	560	75	10	80	95	—	20	320	35	280	8	23	585
750	30	723	190	170	970	659	590	75	10	80	95	—	20	320	35	280	8	23	680
800	32	772	200	180	1020	679	620	75	10	80	95	—	20	320	35	280	8	23	810

### 720F



### 720F Dimensions

Nominal size		Dimension (mm)																	Approx. Weight (kg)
mm	inch	φd	L	L <sub>1</sub>	φD	H <sub>1</sub>	H <sub>2</sub>	φd <sub>2</sub>	a <sub>1</sub>	a <sub>2</sub>	a <sub>3</sub>	a <sub>4</sub>	b	φD <sub>1</sub>	t	φC <sub>1</sub>	N	BH	
850	34	822	210	—	1070	709	650	75	10	80	5	95	20	320	40	280	8	23	※
900	36	858	230	—	1120	759	685	75	10	80	5	95	20	320	40	280	8	23	※
1000	40	975	250	210	1235	819	745	95	10	100	10	120	24	320	45	280	8	23	※
1100	44	1070	280	210	1345	874	820	95	10	100	10	120	24	320	45	280	8	23	※
1200	48	1170	300	225	1465	948	880	95	10	100	10	120	24	320	45	280	8	23	※
1350	54	1314	330	300	1630	1030	960	120	60	140	10	210	32	320	45	280	8	23	※

※Please consult us.

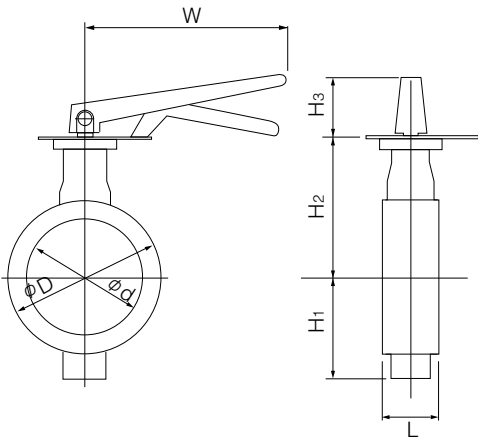


**Lock lever type 704G-1T(50mm to 100mm) / 722F-1T(125mm to 200mm)**

Type	Nominal size		Dimension (mm)							Lever type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
704G	50	2	56	155	43	67	138	66	200	1T-1	4
	65	2 1/2	69	175	46	78	151	66	200	1T-1	5
	80	3	84	187	46	85 (109)	156	66	200	1T-1	5.6 (6.1)
	100	4	104	220	52	117	167	66	200	1T-1	8.3
722F	125	5	129	250	100	139	165	92	300	1T-2	19.3
	150	6	154	280	100	157	180	92	300	1T-2	20.3
	200	8	194	330	100	181	210	97	350	1T-3	38.7

Remark: Value in brackets is for JIS 10K flanges.

**704G / 722F-1T**



**1T Installation direction**

1TLS (standard)	1TLR	1TRS	1TRR
1TXS	1TXR	1TVS	1TVR

# 704G (Lugged) / 722F (Double Flanged) / 720F (Double Flanged)

Worm Gear Type 704G-2U (50mm to 100mm) / 722F-2U (125mm to 600mm) / 722F-2S (650mm to 800mm) / 720F-2S (850mm to 1350mm)

## 704G-2U (50mm to 100mm)

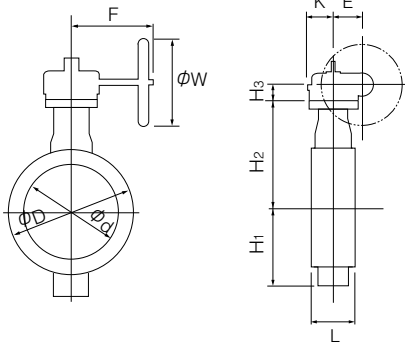
Type	Nominal size		Dimension (mm)										Gear type	Approx. Weight (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	$\phi W$		
704G	50	2	56	155	43	67	138	29.5	36	46	160	100	2U-0	5.7
	65	2 1/2	69	175	46	78	151	29.5	36	46	160	100	2U-0	6.7
	80	3	84	187	46	85 (109)	156	29.5	36	46	160	100	2U-1	7.3(7.8)
	100	4	104	220	52	117	167	29.5	36	46	160	100	2U-1	10

Remark: Value in brackets is for JIS 10K flanges.

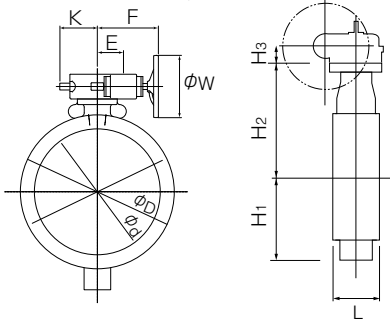
## 722F-2U (125mm to 600mm) / 722F-2S (650mm to 800mm) / 720F-2S (850mm to 1350mm)

Type	Nominal size		Dimension (mm)											Gear type	Approx. Weight (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	G	F	$\phi W$		
722F	125	5	129	250	100	139	165	34.5	44	53	—	173.5	160	2U-2	22.2
	150	6	154	280	100	157	180	34.5	44	53	—	173.5	160	2U-2	23.2
	200	8	194	330	100	181	210	41.5	67	75	—	198	200	2U-3	45
	250	10	250	400	110	221	250	41.5	67	75	—	198	200	2U-3	51
	300	12	296	445	110	251	280	48	87.5	90	—	222.5	200	2U-4	66
	350	14	334	490	120	298	320	50	90	105	—	266	280	2U-5	84
	400	16	384	560	130	334	360	50	90	105	—	266	280	2U-5	107
	450	18	435	620	150	356	390	50	90	105	—	266	280	2U-5	146
	500	20	482	675	160	382	420	50	90	105	—	266	280	2U-5	196
	550	22	531	745	170	418	460	61	113	140	—	352	400	2U-6	256
	600	24	581	795	170	476	490	61	113	140	—	352	400	2U-6	301
	650	26	627	845	170	586	510	65	140	198	—	400	450	MGH-4	463
	700	28	670	905	180	629	560	75	185	267	—	457	500	MGH-4 1/2	692
	750	30	723	970	190	659	590	75	185	267	—	457	500	MGH-4 1/2	782
800	32	772	1020	200	679	620	75	185	267	—	457	500	MGH-4 1/2	907	
720F	850	34	822	1070	210	709	650	100	210	293	—	490	500	MGH-5	1050
	900	36	858	1120	230	759	685	100	210	293	—	490	500	MGH-5	1150
	1000	40	975	1235	250	819	745	100	210	293	350	490	500	MGH-6	1384
	1100	44	1070	1345	280	874	820	100	210	293	350	490	500	MGH-6	1584
	1200	48	1168	1465	300	949	880	100	210	293	350	490	500	MGH-6	1984
1350	54	1314	1630	330	1030	960	151	280	293	310	675	600	MGH-7	2436	

**704G/722F/720F-2U/2S**  
(125mm to 900mm)



**720F-2S**  
(1000mm to 1350mm)

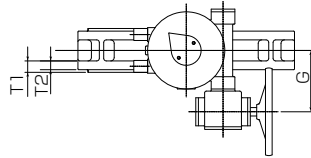


**2U / 2S Installation Direction**  
(125mm to 900mm)

2UA/2SA(standard)	2UAR/2SAR	2UB/2SB	2UBR/2SBR

**2S Installation Direction**  
(1000mm to 1350mm)

2SA(standard)	2SAR	2SB	2SBR



# 704G (Lugged) / 722F (Double Flanged) / 720F (Double Flanged)

Center handle type 704G-2G (50mm to 100mm) / 722F-2G (125mm to 300mm) / 722F-2R (350mm to 600mm)

## 704G-2G (50mm to 100mm)

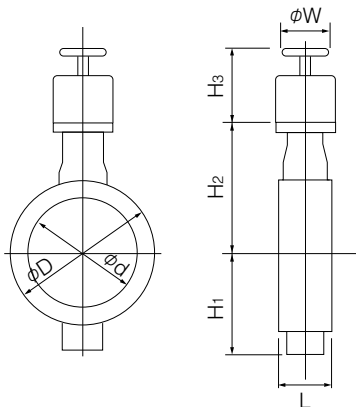
Nominal size		Dimension (mm)							Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	$\phi W$		
50	2	56	155	43	67	138	136	100	2G-1	6.3
65	2 1/2	69	175	46	78	151	136	100	2G-1	7.3
80	3	84	187	46	85 (109)	156	136	100	2G-1	7.9(8.4)
100	4	104	220	52	117	167	136	100	2G-1	10.6

Remark: Value in brackets is for JIS 10K flanges.

## 722F-2G (125mm to 300mm) / 722F-2R (350mm to 600mm)

Nominal size		Dimension (mm)							Center handle type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	$\phi W$		
125	5	129	250	100	139	165	136	100	2G-2	22
150	6	154	280	100	157	180	136	100	2G-2	23
200	8	194	330	100	181	210	151	200	2G-3	45
250	10	250	400	110	221	250	151	200	2G-3	51
300	12	296	445	110	251	280	161	200	2G-4	60
350	14	334	490	120	298	320	409	355	2R-3	106
400	16	384	560	130	334	360	409	355	2R-3	128
450	18	435	620	150	356	390	409	355	2R-3	168
500	20	482	675	160	382	420	409	355	2R-3	218
550	22	531	745	170	418	460	498	450	2R-4	283
600	24	581	795	170	476	490	498	450	2R-4	328

## 704G / 722F-2G / 2R



## Double-acting Pneumatic Cylinder Type 704G-7E (50mm to 100mm) / 722F-7E (125mm to 350mm)

### Standard

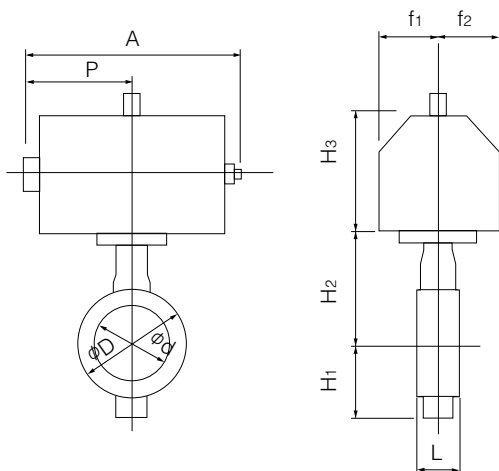
Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
704G	50	2	56	155	43	67	138	125	228	116	57	29	T35	5
	65	2 1/2	69	175	46	78	151	125	228	116	57	29	T35	6
	80	3	84	187	46	85 (109)	156	168	276	142	75	47	T85	10 (11)
	100	4	104	220	52	117	167	168	276	142	75	47	T85	13
722F	125	5	129	250	100	139	165	203	346	176	79	57	T200	27
	150	6	154	280	100	157	180	203	346	176	79	57	T200	28
	200	8	194	330	100	181	210	203	346	176	79	57	T200	46
	250	10	250	400	110	221	250	231	423	214	91	69	T380	58
	300	12	296	445	110	251	280	269	546	270	118	85	T750	77
	350	14	334	490	120	298	320	269	546	270	118	85	T750	103

Remark: Value in brackets is for JIS 10K flanges.

### Heavy duty

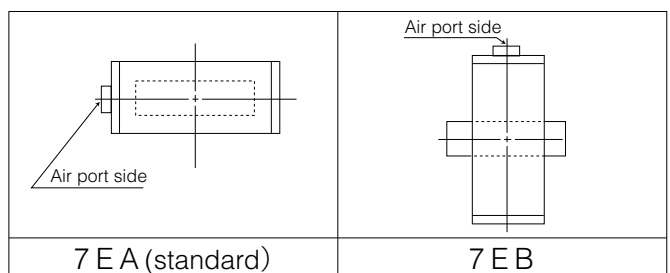
Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
704G	50	2	56	155	43	67	138	125	228	116	57	29	T35	5
	65	2 1/2	69	175	46	78	151	125	228	116	57	29	T35	6
	80	3	84	187	46	85 (109)	156	168	276	142	75	47	T85	10 (11)
	100	4	104	220	52	117	167	203	346	176	79	57	T200	16
722F	125	5	129	250	100	139	165	203	346	176	79	57	T200	27
	150	6	154	280	100	157	180	203	346	176	79	57	T200	28
	200	8	194	330	100	181	210	231	423	214	91	69	T380	52
	250	10	250	400	110	221	250	269	546	270	118	85	T750	68
	300	12	296	445	110	251	280	269	546	270	118	85	T750	77

### 704G / 722F-7E



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

### 7E Installation Direction



# 704G (Lugged) 722F (Double Flanged) / 720F (Double Flanged)

Double-acting pneumatic cylinder type 722F-3A (400mm to 800mm) / 720F-3A (850mm, 900mm)

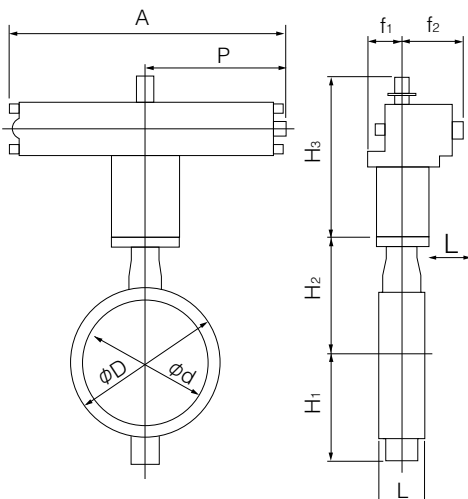
## Standard

Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
722F	400	16	384	560	130	334	360	364	754	381	100	164	TGA-125	134
	450	18	435	620	150	356	390	437	840	432	100	180	TGA-140	192
	500	20	482	675	160	382	420	465	954	483	130	203	TGA-160	289
	550	22	531	745	170	418	460	465	954	483	130	203	TGA-160	339
	600	24	581	795	170	476	490	478	1069	543	130	221	TGA-180	408
	650	26	627	845	170	586	510	478	1069	543	130	221	TGA-180	566
	700	28	670	905	180	629	560	570	1175	599	160	254	TGA-200	812
	750	30	723	970	190	659	590	570	1175	599	160	254	TGA-200	907
720F	850	34	822	1070	210	709	650	600	1263	642	160	271	TGA-220	1151
	900	36	858	1120	230	759	685	633	1394	707	160	302	TGA-250	1317

## Heavy duty

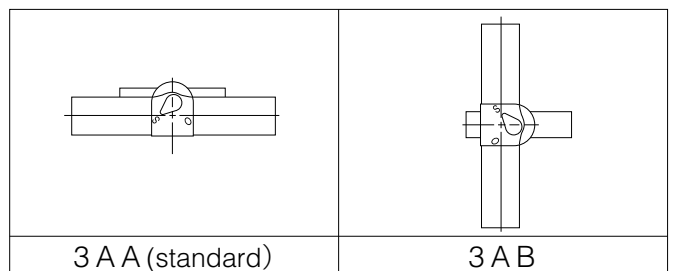
Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
722F	350	14	334	490	120	298	320	364	754	381	100	164	TGA-125	111
	400	16	384	560	130	334	360	412	840	432	100	180	TGA-140	147
	450	18	435	620	150	356	390	465	954	483	130	203	TGA-160	239
	500	20	482	675	160	382	420	465	954	483	130	203	TGA-160	289
	550	22	531	745	170	418	460	478	1069	543	130	221	TGA-180	363
	600	24	581	795	170	476	490	525	1175	599	160	254	TGA-200	464
	650	26	627	845	170	586	510	600	1263	642	160	271	TGA-220	672
	700	28	670	905	180	629	560	600	1263	642	160	271	TGA-220	842
	750	30	723	970	190	659	590	633	1394	707	160	302	TGA-250	996
	800	32	772	1020	200	679	620	633	1394	707	160	302	TGA-250	1126

## 722F / 720F-3A



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

## 3A Installation direction



Single-acting Pneumatic Cylinder Type 704G-7G (Air to open: 50mm to 100mm) / 722F-7G (Air to open: 125mm to 200mm)  
 704G-7F (Air to close: 50mm to 100mm) / 722F-7F (Air to close: 125mm to 200mm)

■ Standard

Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
704G	50	2	56	155	43	67	138	168	364	183	75	47	T85S	10
	65	2 1/2	69	175	46	78	151	203	449	226	79	57	T200S	16
	80	3	84	187	46	85 (109)	156	203	449	226	79	57	T200S	16 (17)
	100	4	104	220	52	117	167	203	449	226	79	57	T200S	19
722F	125	5	129	250	100	139	165	231	550	276	91	69	T380S	38
	150	6	154	280	100	157	180	231	550	276	91	69	T380S	39
	200	8	194	330	100	181	210	269	723	360	118	85	T750S	70

Remark: Value in brackets is for JIS 10K flanges.

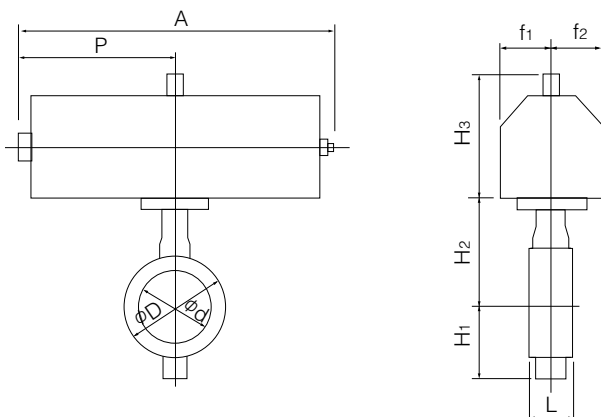
■ Heavy Duty

Type	Nominal size		Dimension (mm)										Cylinder type	Approx. Weight (kg)
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
704G	50	2	56	155	43	67	138	168	364	183	75	47	T85S	10
	65	2 1/2	69	175	46	78	151	203	449	226	79	57	T200S	16
	80	3	84	187	46	85 (109)	156	203	449	226	79	57	T200S	16 (17)
	100	4	104	220	52	117	167	231	550	276	91	69	T380S	27
722F	125	5	129	250	100	139	165	231	550	276	91	69	T380S	38
	150	6	154	280	100	157	180	231	550	276	91	69	T380S	39
	200	8	194	330	100	181	210	269	723	360	118	85	T750S	70

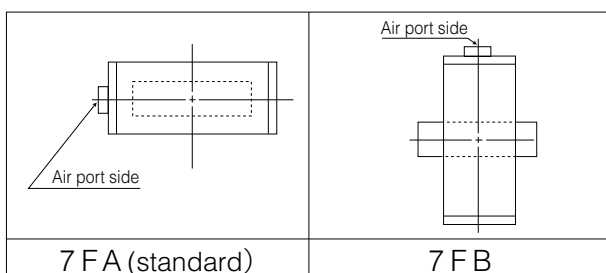
Remark: Value in brackets is for JIS 10K flanges.

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

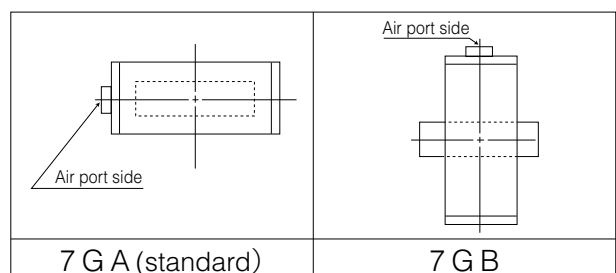
■ 704G / 722F-7G / 7F



■ 7F Installation Direction



■ 7G Installation Direction



# 704G (Lugged) 722F (Double Flanged) / 720F (Double Flanged)

Single-acting pneumatic cylinder type 722F-3U (Air to open: 200mm to 600mm) / 722F-3K (Air to close: 200mm to 600mm)

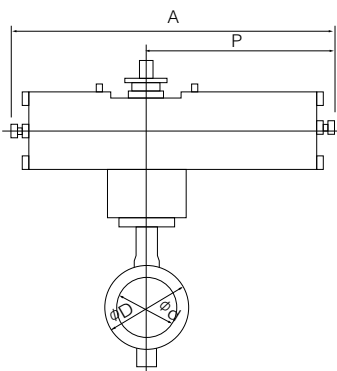
## Standard

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
250	10	250	400	110	221	250	307	945	585	70	165	TG-10S	99
300	12	296	445	110	251	280	307	1080	720	94	206	TG-12S	153
350	14	334	490	120	298	320	307	1080	720	94	206	TG-12S	171
400	16	384	560	130	334	360	340	1255	865	131	257	TG-14S	291
450	18	435	620	150	356	390	340	1255	865	131	257	TG-14S	330
500	20	482	675	160	382	420	474	1655	1095	164	348	TG-20S	593
550	22	531	745	170	418	460	474	1655	1095	164	348	TG-20S	636
600	24	581	795	170	476	490	474	1655	1095	164	348	TG-20S	681

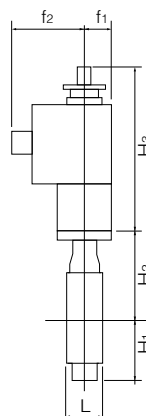
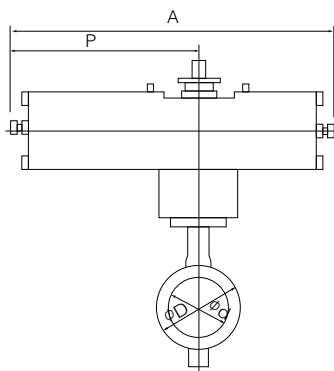
## Heavy duty

Nominal size		Dimension (mm)										Cylinder type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
200	8	194	330	100	181	210	307	945	585	70	165	TG-10S	93
250	10	250	400	110	221	250	307	1080	720	94	206	TG-12S	144
300	12	296	445	110	251	280	307	1080	720	94	206	TG-12S	153
350	14	334	490	120	298	320	340	1255	865	131	257	TG-14S	267
400	16	384	560	130	334	360	340	1255	865	131	257	TG-14S	291
450	18	435	620	150	356	390	474	1655	1095	164	348	TG-20S	543
500	20	482	675	160	382	420	474	1655	1095	164	348	TG-20S	593
550	22	531	745	170	418	460	474	1655	1095	164	348	TG-20S	636
600	24	581	795	170	476	490	474	1655	1095	164	348	TG-20S	681

### 722F-3U

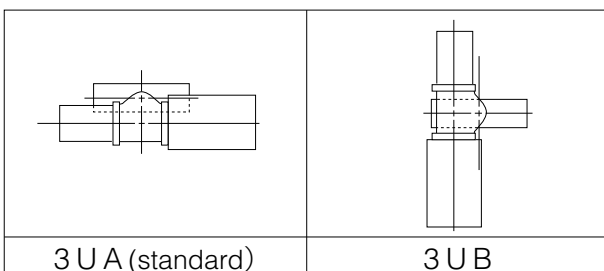


### 722F-3K

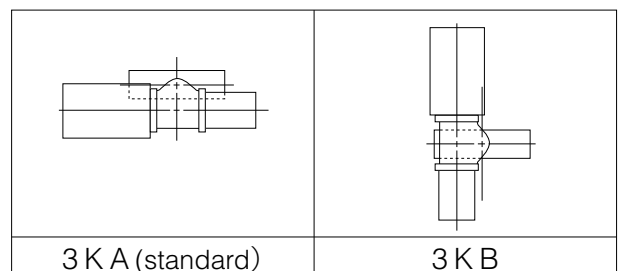


Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

### 3U Installation direction



### 3K Installation direction





**Single Phase Motor Type 704G-4 I (50mm to 100mm) / 722F-4 I (125mm to 500mm)**

**704G-4 I**

Nominal size		Dimension (mm)										Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
50	2	56	155	43	67	138	121	161	84	58	45	4 I-00	5.9
							150	202	100	85	54	4 I-0	7.6
65	2 1/2	69	175	46	78	151	150	202	100	85	54	4 I-0	8.6
80	3	84	187	46	85 (109)	156	150	202	100	85	54	4 I-0	9.2(11.9)
100	4	104	220	52	117	167	165	252	138	126	65	4 I-1	14.1

Remark: Value in brackets is for JIS 10K flanges.

**722F-4 I**

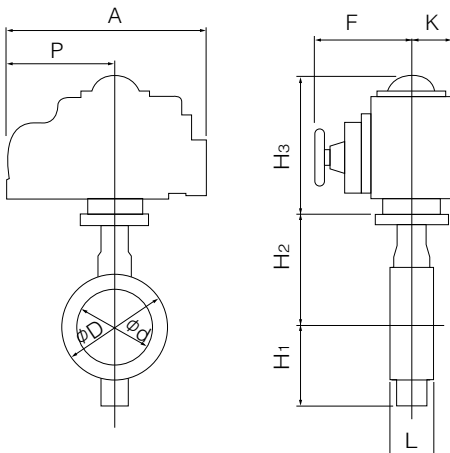
Nominal size		Dimension (mm)										Motor type	Approx. Weight (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	F	K		
125	5	129	250	100	139	165	198	310	167	154	85	4 I-2	30
150	6	154	280	100	157	180	198	310	167	154	85	4 I-2	31
200	8	194	330	100	181	210	198	310	167	154	85	4 I-2.5	51
250	10	250	400	110	221	250	230	388	223	246	136	4 I-3	67
300	12	296	445	110	251	280	230	388	223	246	136	4 I-3	76
350	14	334	490	120	298	320	230	388	223	246	136	4 I-3	93
400	16	384	560	130	334	360	230	388	223	246	136	4 I-3	116
							255	388	223	246	136	4 I-4	122
450	18	435	620	150	356	390	230	388	223	246	136	4 I-4	161
500	20	482	675	160	382	420	230	388	223	246	136	4 I-4	211

Remark: For the 400mm type with the accessories below, type 4I-4 should be selected.

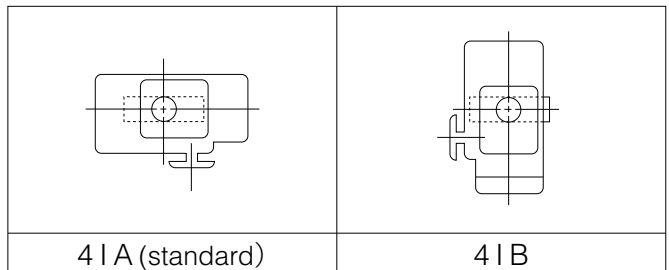
- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.), slurry ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

**704G / 722F-4 I**



**4 I Installation Direction**



# 704G (Lugged) 722F (Double Flanged) / 720F (Double Flanged)

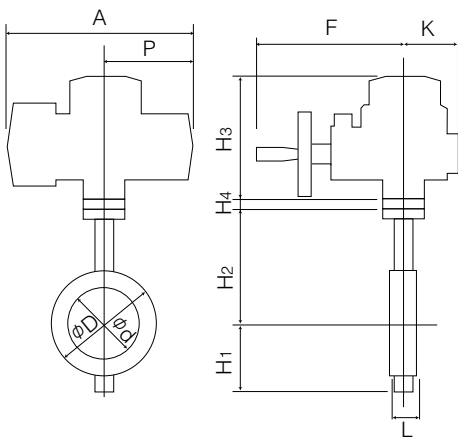
## Three phase motor actuator type 704G-4J (50mm to 100mm)

### 704G-4J

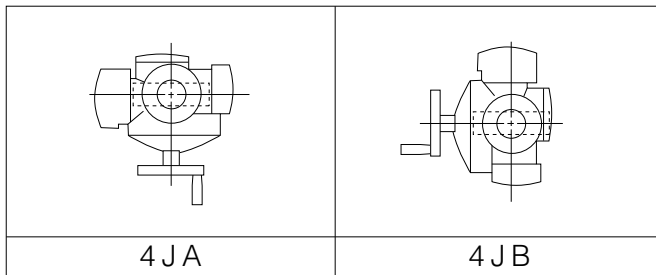
Nominal size		Dimension (mm)											Motor type	Approx. Mass (kg)
mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>4</sub>	A	P	F	K		
50	2	56	155	43	67	138	218	3.2	353	167	272	104	SRJ-010	17.1
65	2 1/2	69	175	46	78	151	218	3.2	353	167	272	104	SRJ-010	18.1
80	3	84	187	46	85 (109)	156	218	3.2	353	167	272	104	SRJ-010	18.7(19.2)
100	4	104	220	52	117	167	218	3.2	353	167	272	104	SRJ-010	21.2

Remark: Value in brackets is for JIS 10K flanges.

### 704G-4J



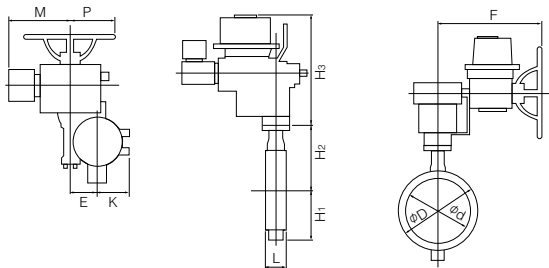
### 4J Installation direction



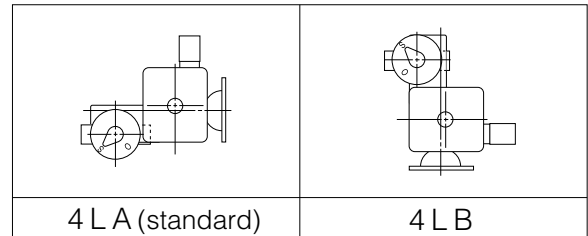
Three Phase Motor Actuator Type 722F-4L (350mm to 800mm) / 720F-4L (850mm to 1350mm)

Type	Nominal size		Dimension (mm)											Cylinder type	Approx. Weight (kg)	
	mm	inch	$\phi d$	$\phi D$	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	G	K	F	M			P
722F	350	14	334	490	120	298	320	488	117	—	164	533	364	230	LTKD-01 0.2kW/ MGH-3	213
	400	16	384	560	130	334	360	488	117	—	164	533	364	230	LTKD-01 0.2kW/ MGH-3	230
	450	18	435	620	150	356	390	488	117	—	164	533	357	230	LTKD-01 0.4kW/ MGH-3	268
	500	20	482	675	160	382	420	488	117	—	164	533	357	230	LTKD-01 0.4kW/ MGH-3	303
	550	22	531	745	170	418	460	558	140	—	198	592	375	230	LTKD-02 0.75kW/ MGH-4	411
	600	24	581	795	170	476	490	590	140	—	198	638	415	360	LTKD-05 0.75kW/ MGH-4	500
	650	26	627	845	170	586	510	569	140	—	198	638	415	360	LTKD-05 0.75kW/ MGH-4	600
	700	28	670	905	180	629	560	639	210	—	293	748	415	360	LTKD-05 0.75kW/ MGH-5	885
	750	30	723	970	190	659	590	639	210	—	293	748	443	360	LTKD-05 1.5kW/ MGH-5	980
	800	32	772	1020	200	679	620	679	210	—	293	799	503	410	LTKD-1 1.5kW/ MGH-5	1180
720F	850	34	822	1070	210	709	650	680	210	—	293	799	503	410	LTKD-1 1.5kW/ MGH-5	1192
	900	36	858	1120	230	759	685	680	210	—	293	799	524	410	LTKD-1 2.2kW/ MGH-5	1269
	1000	40	975	1235	250	819	745	699	—	350	293	972	503	410	LTKD-1 1.5kW/ MGH-6	1670
	1100	44	1070	1345	280	874	820	699	—	350	293	972	503	410	LTKD-1 1.5kW/ MGH-6	1870
	1200	48	1170	1465	300	948	880	699	—	350	293	972	503	410	LTKD-1 1.5kW/ MGH-6	2270
	1350	54	1314	1630	330	1030	960	699	—	310	293	1090	524	410	LTKD-1 2.2kW/ MGH-7	2650

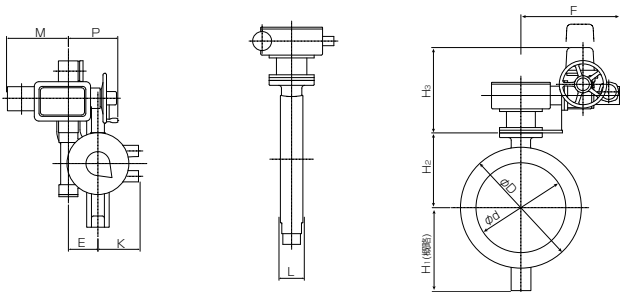
722F/720F-4L (350mm to 600mm)



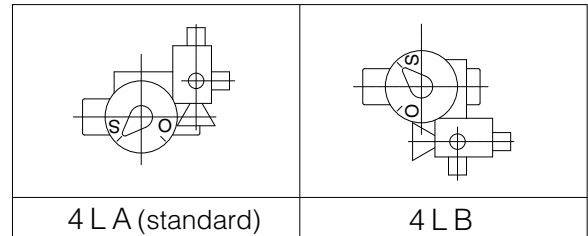
4L Installation Direction (350mm to 600mm)



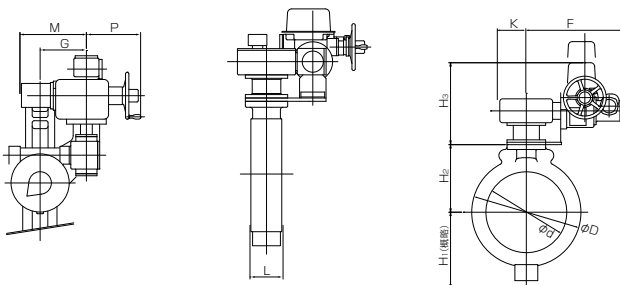
722F/720F-4L (650mm to 900mm)



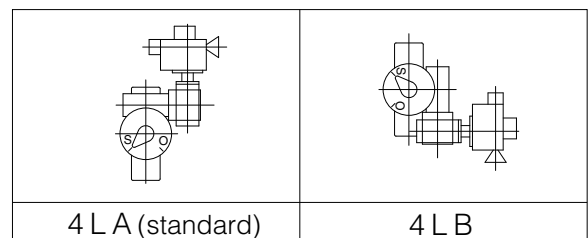
4L Installation Direction (650mm to 900mm)



722F/720F-4L (1000mm to 1350mm)

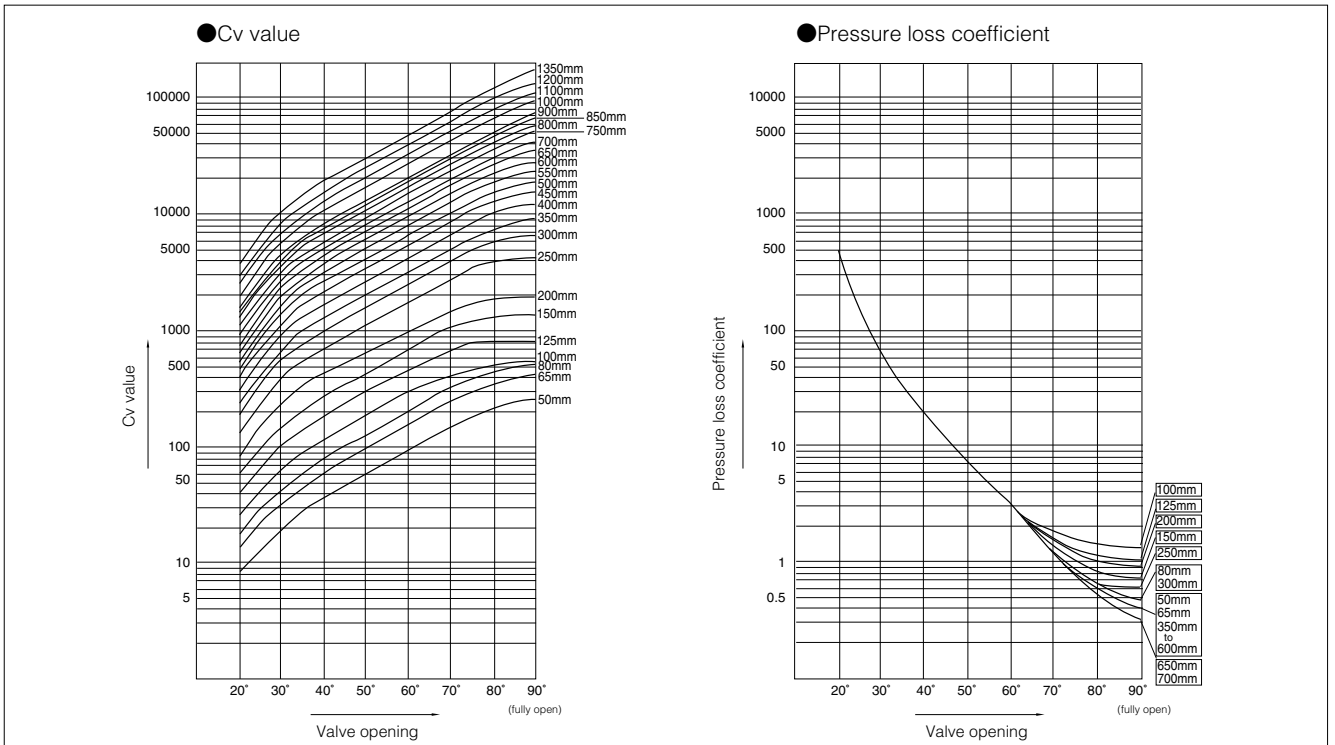


4L Installation Direction (1000mm to 1350mm)



# 704G (Lugged) 722F (Double Flanged) / 720F (Double Flanged)

## 704G / 722F / 720F Cv value / Pressure loss coefficient



## 704G / 722F / 720F Cv value

Nominal size	Nominal size		Valve opening							
	mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
704G	50	2	8	15	25	40	64	103	160	200
	65	2 1/2	12	25	41	64	102	162	260	320
	80	3	15	33	57	95	163	271	450	580
	100	4	27	58	100	162	269	444	749	880
722F	125	5	40	102	180	297	457	692	767	800
	150	6	61	146	272	429	710	1039	1295	1350
	200	8	71	239	417	646	969	1457	1836	1950
	250	10	139	375	693	1135	1746	2724	3855	4200
	300	12	184	544	995	1593	2461	3909	5571	6400
	350	14	215	678	1248	1982	3028	4827	7054	9000
	400	16	304	905	1656	2649	4094	6460	9782	12000
	450	18	381	1158	2136	3433	5274	8120	12430	15000
	500	20	496	1440	2631	4209	6434	10085	15436	17500
	550	22	571	1765	3234	5141	7833	12066	17999	22500
	600	24	688	2074	3815	6126	9433	14595	21897	26500
	650	26	817	2441	4473	7159	11013	17254	26972	32500
	700	28	934	2807	5122	8152	12511	19728	30929	39000
750	30	935	3220	5965	9450	14328	22687	38260	52000	
800	32	1200	3721	6791	10771	16553	26976	43316	59000	
720F	850	34	1164	4018	7516	12063	18567	29284	46350	66000
	900	36	1358	4497	8298	13177	20139	32362	53126	73000
	1000	40	1784	5835	10740	17060	26110	42070	68860	95000
	1100	44	2075	7030	13020	20680	31530	50420	83340	114000
	1200	48	2570	8520	15710	24900	37930	60280	98640	138000
1350	54	3385	10180	18810	30490	47840	75750	119000	173000	

**704G / 722F / 720F Pressure Loss Coefficient**

Nominal size	Nominal size		Valve opening							
	mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
704G	50	2	257	68	25	10	4	2	1	0.4
	65	2 1/2	310	75	28	11	4	2	1	0.4
	80	3	394	83	27	10	3	1	0.4	0.2
	100	4	350	78	26	10	4	1	0.4	0.3
722F	125	5	399	61	19	7	3	1	1	1
	150	6	336	58	17	7	2	1	1	1
	200	8	745	65	22	9	4	2	1	1
	250	10	464	63	19	7	3	1	1	1
	300	12	545	62	19	7	3	1	1	0.4
	350	14	615	62	18	7	3	1	1	0.3
	400	16	540	61	18	7	3	1	1	0.3
	450	18	560	61	18	7	3	1	1	0.3
	500	20	510	61	18	7	3	1	1	0.4
	550	22	571	60	18	7	3	1	1	0.3
	600	24	561	62	18	7	3	1	1	0.3
	650	26	553	62	18	7	3	1	1	0.4
	700	28	573	63	19	8	3	1	1	0.3
	750	30	758	64	19	7	3	1	0.5	0.3
800	32	599	62	19	7	3	1	0.5	0.3	
720F	850	34	815	68	20	8	3	1	0.5	0.3
	900	36	756	69	20	8	3	1	0.5	0.3
	1000	40	645	60	18	7	3	1	0.4	0.2
	1100	44	701	61	18	7	3	1	0.4	0.2
	1200	48	658	60	18	7	3	1	0.4	0.2
	1350	54	611	68	20	8	3	1	0.5	0.2

# 704G (Lugged) 722F (Double Flanged) / 720F (Double Flanged)

## 704G / 722F / 720F Flange accommodation

Type	Nominal size		JIS		ASME		BS4504 PN10	DIN NP10
	mm	inch	5K	10K	class 125	class 150		
704G	50	2	○	○	○	○	○	○
	65	2 1/2	○	○	○	○	○	○
	80	3	◎	○	◎	◎	○	○
	100	4	○	○	○	○	○	○
722F	125	5	○	○	◎	◎		
	150	6	○	○	◎	◎		
	200	8	○	○	◎	◎		
	250	10	○	○	◎	◎		
	300	12	○	○	◎	◎		
	350	14	○	○	◎	◎		
	400	16	○	○	◎	◎		
	450	18	○	○	◎	◎		
	500	20	○	○	◎	◎		
	550	22	○	○	—	—		
	600	24	○	○	◎	◎		
	650	26	○	○	Consult us if the flange standard is not JIS 5K/10K in 650mm type and over.			
	700	28	○	○				
750	30	○	○					
800	32	○	○					
720F	850	34	○	○				
	900	36	○	○				
	1000	40	○	○				
	1100	44	○	○				
	1200	48	○	○				
	1350	54	○	○				

○ : Can be used without flange drilling.  
 ◎ : Tapped holes only. (ASME body only)

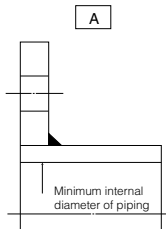
704G / 722F / 720F Applicable Pipe List in Case of **A**

Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
	mm	inch							
704G	50	2	○	—	○	○	○	○	38
	65	2 1/2	○	—	○	○	○	○	54
	80	3	○	—	○	○	○	○	72
	100	4	○	—	○	○	○	○	92
722F	125	5	○	—	○	○	○	○	85
	150	6	○	—	○	○	○	○	121
	200	8	○	—	○	○	○	○	173
	250	10	○	—	○	○	○	○	230
	300	12	○	—	○	○	○	○	281
	350	14	○	○	○	○	—	—	317
	400	16	○	○	○	○	—	—	368
	450	18	○	○	○	○	—	—	414
	500	20	○	○	○	○	—	—	459
	550	22	—	○	○	○	—	—	505
	600	24	—	○	○	○	—	—	559
	650	26	—	○	○	○	—	—	612
	700	28	—	○	—	—	—	—	653
	750	30	—	○	—	—	—	—	705
720F	800	32	—	○	—	—	—	—	754
	850	34	—	○	—	—	—	—	803
	900	36	—	○	—	—	—	—	834
	1000	40	—	○	—	—	—	—	950
	1100	44	—	○	—	—	—	—	1040
	1200	48	—	○	—	—	—	—	1138
	1350	54	—	○	—	—	—	1277	

Remark 1: ○=Applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.



# 704G (Lugged) 722F (Double Flanged) / 720F (Double Flanged)

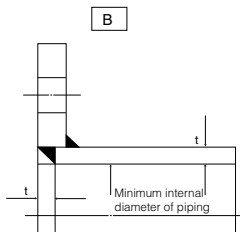
704G / 722F / 720F Applicable pipe list in case of **B**

Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
	mm	inch						
704G	50	2	○	—	○	○	○	○
	65	2 1/2	○	—	○	○	○	○
	80	3	○	—	○	○	○	○
	100	4	○	—	○	○	○	○
722F	125	5	○	—	○	○	○	○
	150	6	○	—	○	○	○	○
	200	8	○	—	○	○	○	○
	250	10	○	—	○	○	○	○
	300	12	○	—	○	○	○	○
	350	14	○	○	○	○	—	—
	400	16	○	○	○	○	—	—
	450	18	○	○	○	○	—	—
	500	20	○	○	○	○	—	—
	550	22	—	○	○	○	—	—
	600	24	—	○	○	○	—	—
	650	26	—	○	○	○	—	—
	700	28	—	○	—	—	—	—
	750	30	—	○	—	—	—	—
800	32	—	○	—	—	—	—	
720F	850	34	—	○	—	—	—	—
	900	36	—	○	—	—	—	—
	1000	40	—	○	—	—	—	—
	1100	44	—	○	—	—	—	—
	1200	48	—	○	—	—	—	—
	1350	54	—	○	—	—	—	—

Remark 1: ○=Applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.





704G / 722F / 720F Piping Bolts Sizes

Type	Nominal size		JIS 5K		JIS 10K	
	mm	inch	Hexagon Bolts and Nuts	Hexagon Bolts	Hexagon Bolts and Nuts	Hexagon Bolts
704G	50	2	—	8-M12×30×25	—	8-M16×35×30
	65	2 1/2	—	8-M12×35×30	—	8-M16×35×30
	80	3	—	8-M16×35×30	—	16-M16×35×30
	100	4	—	16-M16×40×35	—	16-M16×40×35
722F	125	5	8-M16×60×38	8-M16×40×35	8-M20×65×46	8-M20×45×37
	150	6	8-M16×60×38	8-M16×40×35	8-M20×70×46	8-M20×50×42
	200	8	8-M20×65×46	8-M20×50×42	16-M20×70×46	8-M20×50×42
	250	10	16-M20×70×46	8-M20×50×42	16-M22×75×50	8-M22×50×42
	300	12	16-M20×70×46	8-M20×50×42	24-M22×75×50	8-M22×50×42
	350	14	16-M22×80×50	8-M22×55×47	24-M22×80×50	8-M22×55×47
	400	16	24-M22×85×50	8-M22×55×47	24-M24×90×54	8-M24×60×50
	450	18	24-M22×90×50	8-M22×60×50	32-M24×100×54	8-M24×65×54
	500	20	32-M22×90×50	8-M22×60×50	32-M24×100×54	8-M24×70×54
	550	22	32-M24×100×54	8-M24×65×54	32-M30×110×66	8-M30×70×54
	600	24	32-M24×100×54	8-M24×65×54	40-M30×110×66	8-M30×70×54
	650	26	40-M24×100×54	8-M24×70×54	40-M30×110×66	8-M30×80×66
	700	28	40-M24×100×54	8-M24×70×54	40-M30×110×66	8-M30×80×66
	750	30	40-M30×110×66	8-M30×80×66	40-M30×115×66	8-M30×80×66
720F	850	34	40-M30×110×66	8-M30×80×66	48-M30×115×66	8-M30×80×66
	900	36	32-M30×115×66	16-M30×75×66	40-M30×120×66	16-M30×80×66
	1000	40	40-M30×130×72	16-M30×90×66	40-M36×145×84	16-M36×110×78
	1100	44	40-M30×130×72	16-M30×90×66	40-M36×145×84	16-M36×110×78
	1200	48	48-M30×130×72	16-M30×90×66	48-M36×150×84	16-M36×110×78
	1350	54	56-M30×135×72	16-M30×90×66	56-M42×165×96	16-M42×110×90

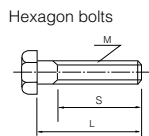
Remarks:

1. The bolt for valve positioning uses the screw hole.
2. The hexagon bolt is used in the screw hole part for valve positioning.
3. Please use a hexagon nut with 80% threading.
4. For uses other than marine, use SS400 as the bolt (and nut) material.

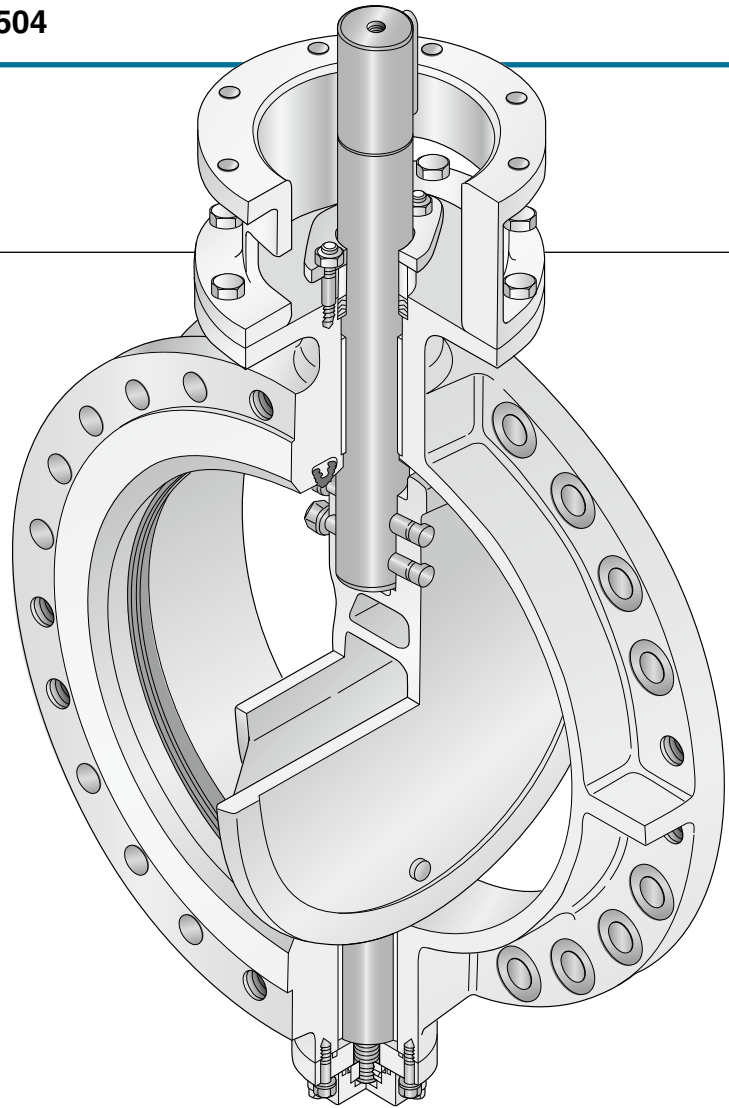
Example

Hexagon bolts: 4 - M30 × 95 × 65

N
  M
  L
  S



# 227P



## Features and Benefits

**A unique structure and low cost with proven reliability in water works, power generation, desalination plants and other industrial applications.**

### Unique seat ring

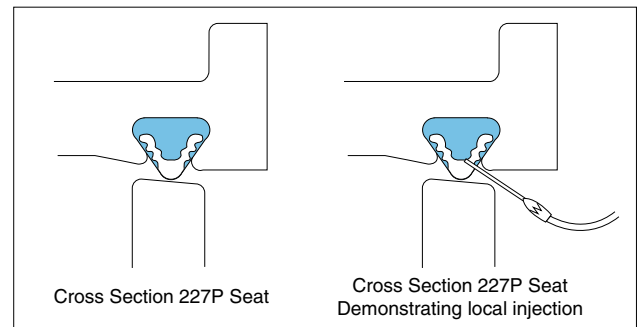
Unique seat ring structure provides low torque and long life. Grooves are molded on the sealing surface of the seat to reduce operating torque. An original retaining method is adopted. Plastic resin is injected from behind the seat ring to stiffen it. The resin-reinforced seat ring keeps constant compression through the entire disc to assure tight shut off.

### Arch-shaped disc

A light weight and highly rigid arch-shaped disc allows fluid to pass through it when a valve opens. The valve opening area (Cv value) increases by approximately 15% compared to conventional designs. The pressure drop is also minimized.

### Easy seat repair

Generally, the seat ring can be used for over 10 years without replacement. If any leakage is found, it can be easily repaired using an injection kit to inject resin into the seat ring surface at the point of leakage. The seat can also be replaced by a new seat with the injection kit.



### Custom-Mode Design

Custom mode desing, including the use of special materials, special face to face dimentions are aviable upon request.

## Standard Specifications

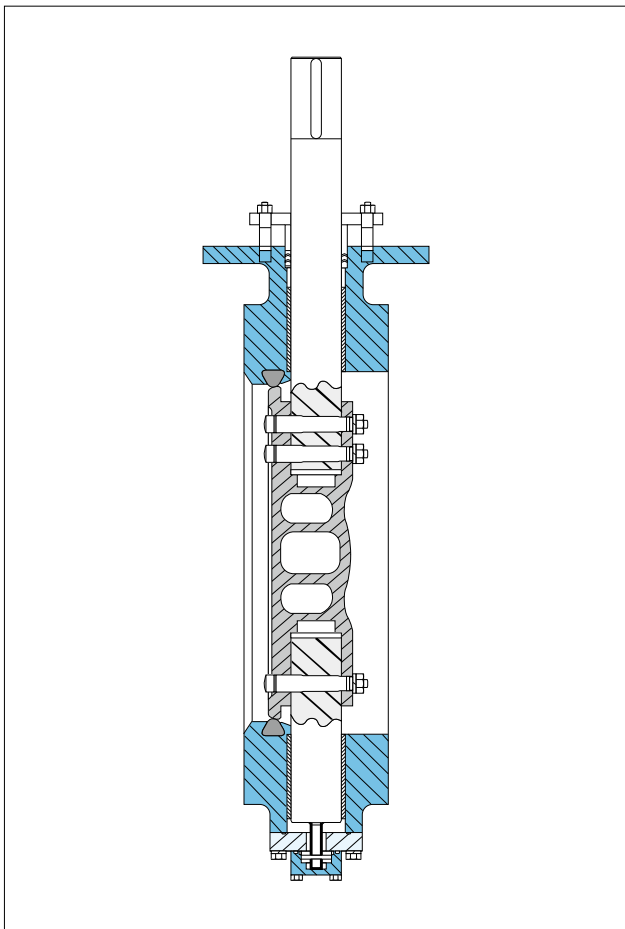
Valve nominal size		650mm to 2400mm
Flange accommodation		JIS 5K/10K, DIN PN10/PN16, JPI Class 150, ASME Class 125/150, AWWA
Max. Working pressure		1.6MPa
Pressure test	Body shell	2.4MPa (Hydraulic, Max.)
	Seat leak	1.8MPa (Hydraulic, Max.)
Working temperature range		-10 to 80 degrees C (NBR)
Working temperature in continuous use ※ 1		0 to 60 degrees C (NBR)
Standard materials	Body	FCD450, SCPH2
	Disc	SCS13, CAC702
	Stem	SUS304, SUS630, Monel K-500
	Seat ring	NBR, *EPDM
Special specification		Rubber lined body interior
Coating		Primer (Munsell N7)

※ Consult us with specifications if dimensions for actuator are required.

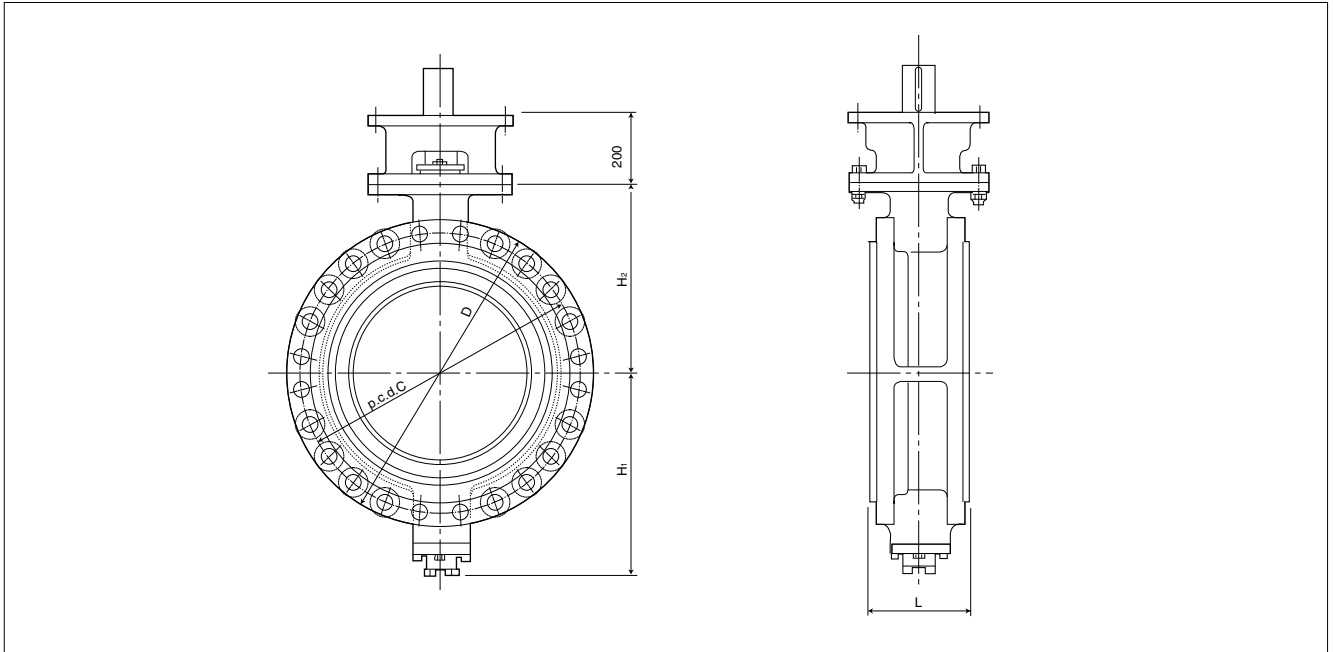
※ Actuators such as manual, pneumatic, electric and hydraulic ones can be selected upon adapt of detailed specifications.

※ 1. "Working temperature in continuous use" stands for the temperature continuously kept exceeding one hour.

\*No EPDM seat can be used for fluid containing any oil.



## Large diameter / AWWA C504



### ■ Dimensions

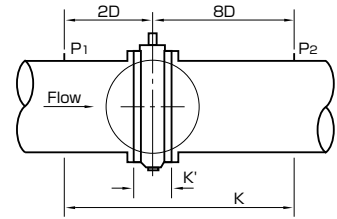
Nominal size		Dimension (mm)				
mm	inch	H <sub>2</sub>	H <sub>1</sub>	D	L	C
650	26	505	535	845	254	780
750	30	543	613	984	305	914
900	36	648	727	1168	305	1086
1050	42	737	815	1346	305	1257
1200	48	819	905	1511	381	1422
1350	54	905	991	1683	381	1594
1500	60	991	1108	1854	381	1759
1650	66	1092	1192	2032	457	1930
1800	72	1175	1299	2197	457	2096
1950	78	1320	1387	2362	457	2254
2100	84	1404	1514	2534	457	2426
2250	90	1495	1610	2705	533	2597
2400	96	1610	1715	2877	610	2756

- Use the gasket size that complies with flange standard when installing.
- Body flange thickness may not comply with the standard. Consult with us.
- 227P has two versions, AWWA type and general purpose type.

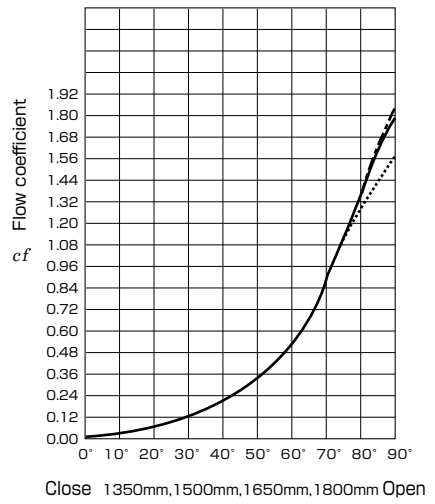
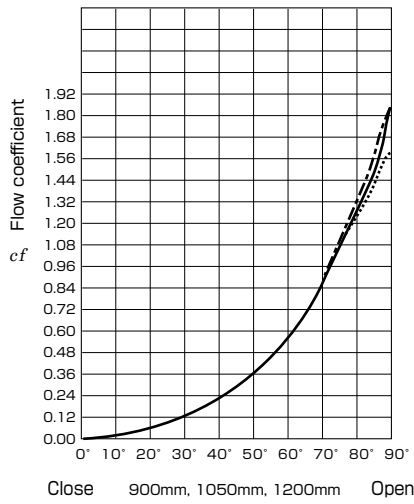
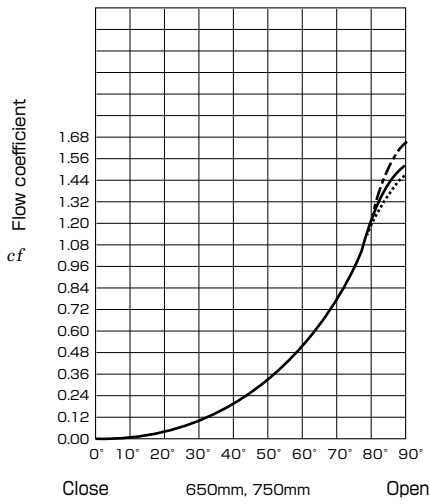
## Technical data

227P 650-1,800mm (26-72") pressure classification  
(Pipe inlet-pipe outlet)

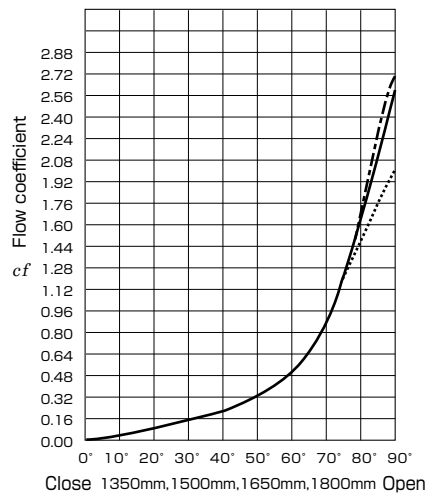
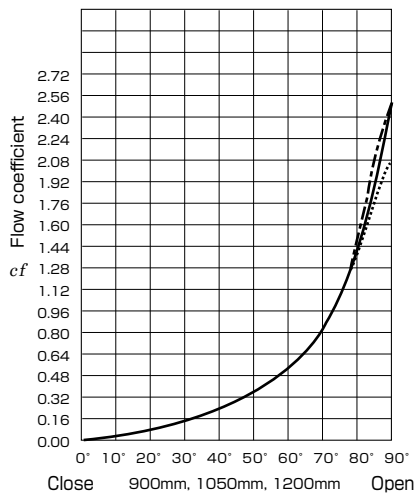
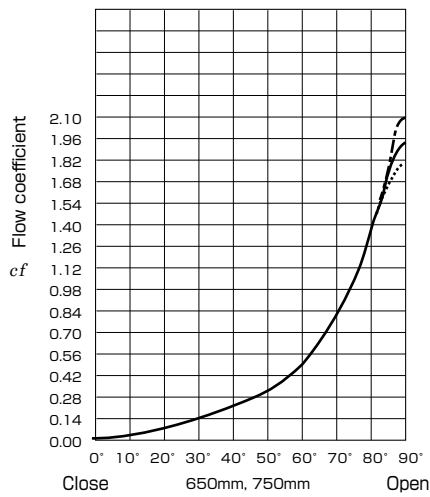
25A, 25B    - - - - -  
75A, 75B    —————  
150A, 150B  .....



Flow coefficient based on K'



Flow coefficient based on K



$$\Delta H = \frac{V^2}{cf^2 \cdot 2g}$$

$\Delta H$  = Head loss (feet of water)  
 $V$  = Flow velocity through piping (feet/sec.)  
 $cf$  = Flow coefficient for piping, whose length is 10 times that of the pipe diameter, and that for valve  
 $cf$  = Flow coefficient of valve only  
 $g$  = 32.17 feet/sec<sup>2</sup>.

Cv value:  
 $Cv = 4294 \, cf \times D^2$     D: Internal diameter of pipe (feet)

# MKT Series

## 907L/907T/908H

Valve nominal size

**907L  
908H** 50 to 300mm

**907T** 50 to 400mm

Max. working pressure MPa

0 1.0 2.0

907L	1.0
907T 908H	2.0

Working temperature range °C

0 100

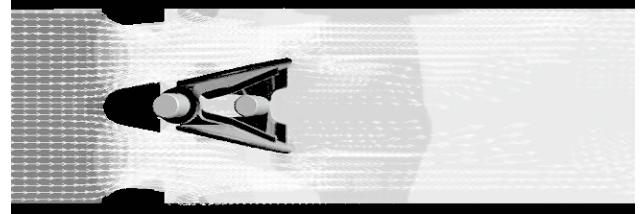
907L 907T 908H	NBR	80
907L	EPDM	100
907T 908H	EPDM	120

**NK** Nippon Kaiji Kyokai (907L)

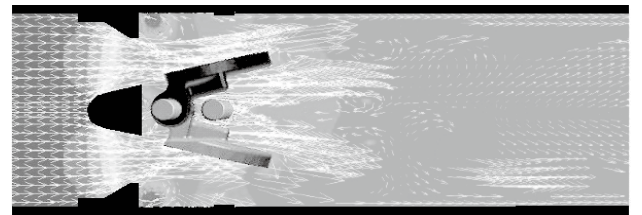
Pressure distribution is indicated by colors. Flow speed is indicated by arrow size.

High pressure ← → Low pressure

MKT series



Conventional Model



### Prevention of chattering.

Check valve of a new generation that reduce piping space and allow direct attachment to a pump.

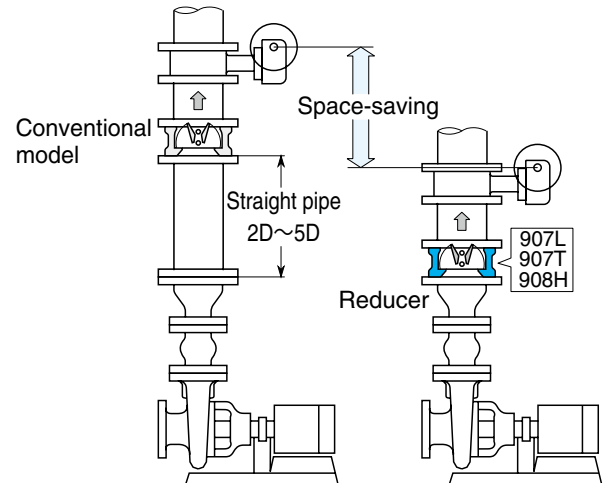
### Features and Benefits

#### Prevents water hammer

The combination of a light, compact plates with a small moment of inertia and an optimized spring quickly stops the flow when the pump is turned off, preventing water hammer.

#### Direct installation to a reducer

Preventing chattering caused by fluid turbulence enables installing a check valve behind a reducer and a curved pipe. Straight pipe at upstream side is not necessary. Durability improved by decreasing vibration and noise.



**Bearing**

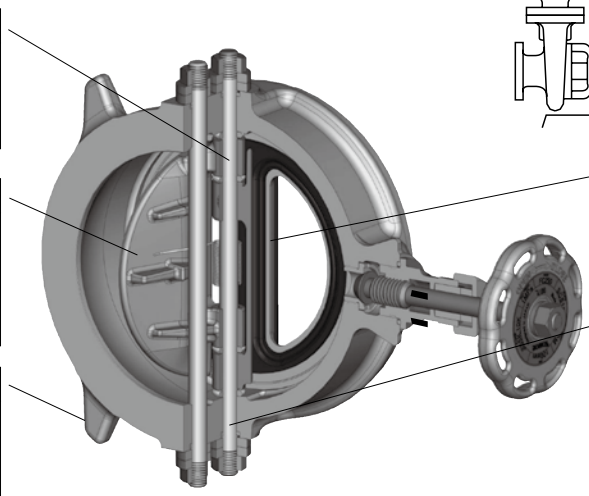
Raised resonance frequency by optimizing the clearance of bearing, in order to decrease sympathetic vibration of plates while operating

**Wing shaped plates with rib**

Lightweight plates reduce moment of inertia, improving performance of preventing water hammer. Wing shaped plates reduce eddy, reducing vibration of plate.

**Centering**

Centering of valve body and flange can be performed among all applicable flanges, simplifying piping work.



**Rubber seat**

Lip seal improved sealing performance of back pressure at low hydraulic head.

**Shaft pins**

Either side of shaft pin is fixed with nuts and plugs in order to prevent vibration. Washers absorb expanded/contracted shaft pins caused by pressure and temperature fluctuation, also mitigate loosen nuts and overstressed pins, improving durability (907L).

\*1 These are common features of 907L, 907T and 908H in case of any specific model is not indicated.

\*2 Drawing shows 907L. Structure of bypass differs from 907T and 908H.

## Standard Specifications

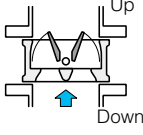
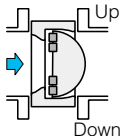
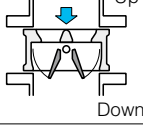
		907L	907T	908H
Valve nominal size <sup>※1</sup>		50mm to 300mm	50mm to 400mm <sup>※1</sup>	50mm to 300mm <sup>※1</sup>
Face-to-face dimensions		Manufacturer standard Refer to dimension "L".	JV8-1, SAS358	
Flange accommodation		JIS 5K, 10K	JIS 10K, 16K, 20K ASME Class125, Class150	
Max. working pressure <sup>※2</sup>		1.0 MPa	2.0 MPa	
Seat leakage		Tight shut ( JIS B 2003:2013 Rate A ) Pressure more than "Required differential pressure" is needed.		
Required differential pressure <sup>※3</sup>		0.04 MPa ( Hydraulic head 4 m ) or more		
Average velocity inside pipe		6 m/s	10 m/s	
Chattering prevention		YES Directly installable to a reducer and a curved pipe	YES Directly installable to a reducer, a curved pipe and a pump	
Working temperature range		EPDM : -20 ~ 100 °C NBR : -10 ~ 80 °C	EPDM : -20 ~ 120 °C NBR : -10 ~ 80 °C	
Working temperature in continuous use		EPDM : 0 ~ 70 °C NBR : 0 ~ 60 °C	EPDM : 0 ~ 100 °C NBR : 0 ~ 60 °C	
Standard materials	Body <sup>※5</sup>	FC250 Cast iron	A536 Gr.65-45-12 Ductile iron	A351 CF8 Stainless steel
	Plate	SCS13 Stainless steel	A351 CF8 stainless steel	
	Seat ring <sup>※6,7</sup>	EPDM (Option: NBR) Vulcanized to valve body		
	Shaft pins	304 stainless steel		
	Spring	304 stainless steel		
Test pressure	Body shell test	1.5 MPa (hydraulic)	3.0 MPa (hydraulic)	
	Seat leakage High pressure Low pressure	1.1 MPa (pneumatic) 0.04 MPa (pneumatic)	2.2 MPa (hydraulic) 0.04 MPa (pneumatic)	
Accessories <sup>※1,8</sup>		Standard : Bypass valve (Except for 350 and 400mm) Option : High torque spring, low torque type (standard spring installed unless otherwise specified )		
Pipe gasket		<b>Required</b> Use two commercially available gaskets per valve, which is appropriate for flange standard and fluid condition.		
Fluid types <sup>※7,8,9,10</sup>		Water	Water, air	
Coating		Urethane coating (Tomoe green)		—

- ※1 907T 350mm and 400mm are made to order. (Bypass valve is not installed.)  
A rubber sleeve is inserted to 907T/908T 250mm and upper size. Pressure loss increases compared to the one without a rubber sleeve.
- ※2 MKT Series cannot be used under negative pressure. Do not install it underwater or underground.
- ※3 In case of 907L, required differential pressure differs depending on installing condition and spring selection. Please refer to spring selection table.
- ※4 "Working temperature in continuous use" stands for the temperature continuously kept for over one hour, provided that a fluid is not frozen inside.
- ※5 Chemical treatment for rust prevention is applied to non-coated part of 907L/907T. This treatment may cause discoloration of surface to white or reddish brown. This does not affect product quality.
- ※6 EPDM seat ring is recommended in case of using a chemical containing calcium for maintenance. In case a fluid containing solid and adhesive material, 903L, 901C and 906C is recommended.
- ※7 EPDM seat ring can not be used for oil or a fluid containing oil. A fluid containing chlorine can accelerate damage to rubber seat ring, depending on density and temperature of a fluid. Please consult us for detail.
- ※8 As parts of bypass for 907L are made of copper alloy, a fluid which corrodes copper alloy such as acetylene, ammonia and sulfur can not be used. Copper alloy is not used for components of 907H/908H which a fluid contacts.
- ※9 A fluid containing alkali and acid can weaken bond of seat ring, please consult us for detail.
- ※10 MKT Series can not be used for a viscous fluid or a fluid containing powder. In case of gas, please check spring selection table for installing condition.

Select valve according to fluid and installing condition. Incorrect valve selection can cause vibration and abnormal noise.  
Please refer to spring selection table and instruction manual before use.

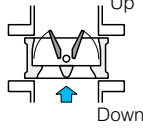
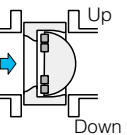
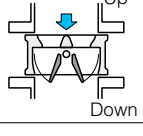
**MKT Selection Criteria**

**1.0MPa 907L**

Flow Direction	Fluid	Condition	Min. differential pressure (MPa)	Size (mm)	Spring
Up flow 	Liquid (Clean water)	The valve should be installed directly after the following: - a reducer which is 3 sizes smaller than a valve - a curved pipe - a straight pipe	0.02	50~300	High torque
			0.04		Standard
	Gas	Forward direction, inlet pressure 0.1MPa or more	0.04		Low torque specification (no spring)
Horizontal layout 	Liquid (Clean water)	The valve should be installed directly after the following: - a reducer which is 2 sizes smaller than a valve - a curved pipe - a straight pipe	0.04	50~300	High torque
			0.06	50~200	Standard
Down flow <sup>※1</sup> 			0.1	50~150	High torque

※ Equivalent or more pressure shown in the table is needed for sealing performance. When inlet pressure remains, differential pressure may not be maintained. Especially in case of down flow, inlet pressure easily remains.  
 ※ Inlet pressure in a forward direction needs to be higher than cracking pressure and lower than max. working pressure.  
 ※ Do not use under the condition other than above to avoid vibration, abnormal noise, damage, and leakage.

**2.0MPa 907T/908H**

Flow Direction	Fluid	Condition	Min. differential pressure (MPa)	Size (mm)	Spring
Up flow 	Liquid (Clean water)	The valve should be installed directly after the following: - a reducer which is 3 sizes smaller than a valve - a curved pipe - a straight pipe	See Table A	50~400	Low torque
			0.5~2.0		Standard
	2.0~10	Low torque			
	Gas	Differential pressure 0.1~2.0 Mpa	10~50		Low torque
Horizontal layout 	Liquid (Clean water)	The valve should be installed directly after the following: - a reducer which is 2 sizes smaller than a valve - a curved pipe - a straight pipe	2.0~10	50~200	Standard
				250~400	High torque
Down flow <sup>※1</sup> 			0.1~5.0	50~200	High torque

**Table A Allowed velocity range**

Nominal size	Allowed velocity
50A	1.2~10 m/s
65A	
80A	
100A	
125A	1.6~10 m/s
150A	
200A	
250A	2.2~10 m/s
300A	

※ In case of down flow, there is possibility of leakage depending on condition when checking.  
 ※ If possible, avoid installing directly after a reducer. Install before a reducer.  
 ※ Do not use under the condition other than above to avoid vibration, abnormal noise, damage, and leakage.  
 ※ All 907T/908H over 250mm will be attached rubber sleeve.

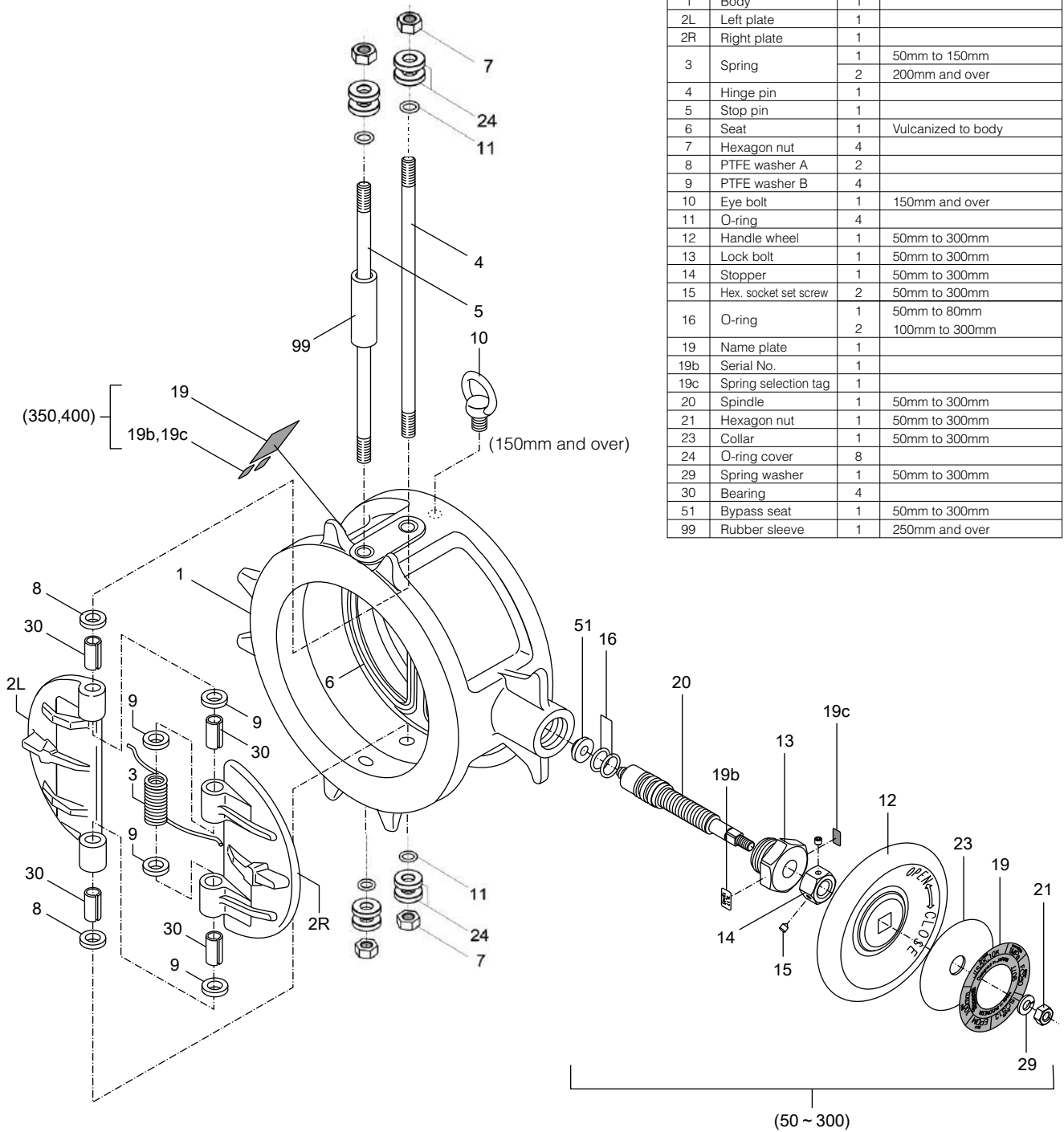




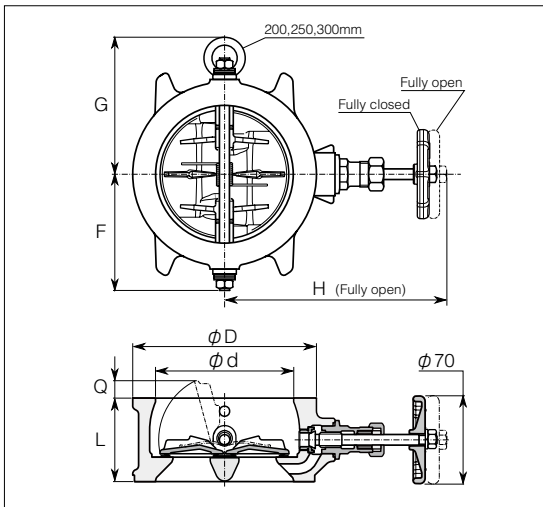
907T/908H Expanded view of components

■ 907T/908H Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
2L	Left plate	1	
2R	Right plate	1	
3	Spring	1	50mm to 150mm
		2	200mm and over
4	Hinge pin	1	
5	Stop pin	1	
6	Seat	1	Vulcanized to body
7	Hexagon nut	4	
8	PTFE washer A	2	
9	PTFE washer B	4	
10	Eye bolt	1	150mm and over
11	O-ring	4	
12	Handle wheel	1	50mm to 300mm
13	Lock bolt	1	50mm to 300mm
14	Stopper	1	50mm to 300mm
15	Hex. socket set screw	2	50mm to 300mm
16	O-ring	1	50mm to 80mm
		2	100mm to 300mm
19	Name plate	1	
19b	Serial No.	1	
19c	Spring selection tag	1	
20	Spindle	1	50mm to 300mm
21	Hexagon nut	1	50mm to 300mm
23	Collar	1	50mm to 300mm
24	O-ring cover	8	
29	Spring washer	1	50mm to 300mm
30	Bearing	4	
51	Bypass seat	1	50mm to 300mm
99	Rubber sleeve	1	250mm and over



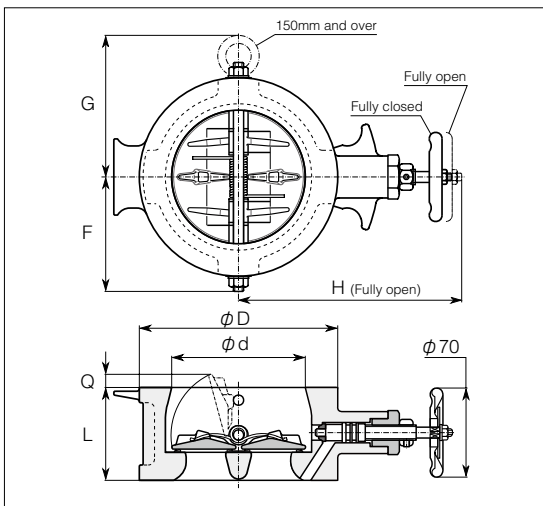
## MKT Dimension



### 907L

Nominal size		Dimension(mm)							Approx. Mass (kg)	
mm	inch	$\phi d$	L	$\phi D$	H	F	G	Q		
50	2	61	56	90	149	59	—	0	1.8	
65	2 1/2	74	56	114	157	72	—	6	2.5	
80	3	87	60	130	163	84	—	9	3.2	
100	4	109	66	145	176	92	—	16	4.0	
125	5	140	70	180	190	110	—	27	5.8	
150	6	163	76	210	204	125	—	36	8.3	
200	8	214	95	265	230	160	169	45	15	
250	10	268	108	320	285	187	197	60	24	
300	12	316	144	373	310	221	232	58	39	

※ The drawing on the left is representative example. For detail, please refer to specifications.



### 907T/908H

Nominal size		Dimension(mm)							Approx. Mass (kg)	
mm	inch	$\phi d$	L	$\phi D$	H	F	G	Q	907T	908H
50	2	58	60	101	131	66	—	0	2.5	2.7
65	2 1/2	74	67	121	138	76	—	0	3.5	3.7
80	3	87	73	131	145	84	—	0	4.4	4.7
100	4	105	73	156	176	97	—	10.5	5.9	6.2
125	5	134	86	187	189	112	—	13.5	8.7	9.2
150	6	160	98	217	202	130	142	20	12	13
200	8	210	127	267	228	160	167	24.5	22	23
250	10	256	146	330	272	194	198	30	36	38
300	12	306	181	375	298	217	229	23	53	56
350 <sup>※1</sup>	14	341	184	420	255 <sup>※2</sup>	245	252	38	72	—
400 <sup>※1</sup>	16	391	191	483	282 <sup>※2</sup>	277	283	55	100	—

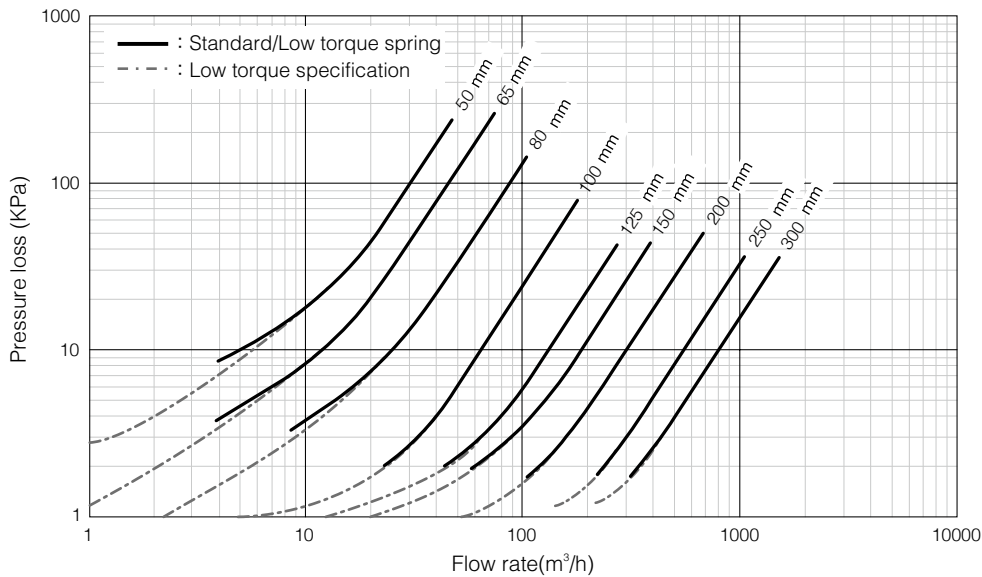
※ The drawing on the left is representative example. For detail, please refer to specifications.

※1 907T 350mm and 400mm are made to order.

※2 Bypass valve is not installed.

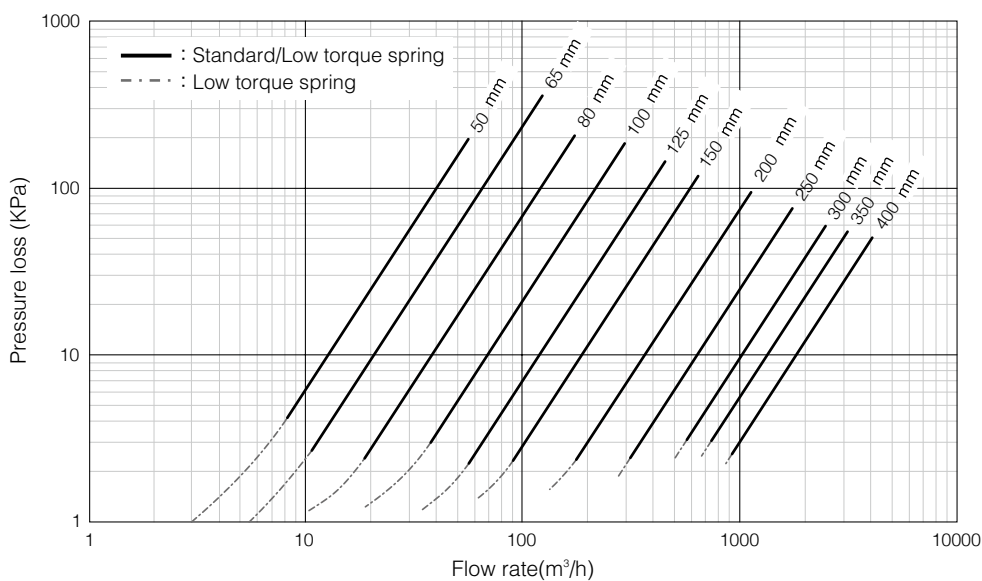
**MKT Pressure loss vs. Flow rate**

**907L**



Nominal size (mm)	Cv value ( - )	Resistance coefficient ζ ( - )
50	35	14
65	52	15
80	101	7.8
100	235	4.3
125	485	2.4
150	684	2.4
200	1100	2.9
250	2030	2.0
300	2930	2.0

**907T/908H**



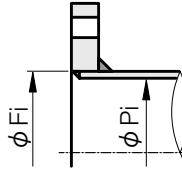
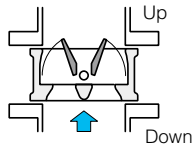
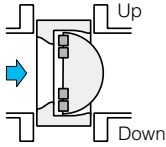
Nominal size (mm)	Cv value ( - )	Resistance coefficient ζ ( - )
50	50	6.6
65	73	7.6
80	138	4.2
100	251	3.8
125	435	3.0
150	685	2.4
200	1340	2.0
250	2097	1.9
300	3572	1.4
350	4900	1.2
400	6700	1.1

※ Both two tables above show values in case of standard/low torque spring. In case of high torque spring and low torque spring, please consult our sales staff.

## MKT Cracking pressure (opening pressure) & Diameter of piping

### 907L Cracking pressure

Flow direction	Horizontal		Vertical(up flow)		
Spring Nominal size	Standard spring	High torque spring	Low torque specification	Standard spring	High torque spring
mm	KPa	KPa	KPa	KPa	KPa
50	5.7	5.7	0.61	6.8	6.8
65	2.8	5.1	0.66	3.8	6.1
80	2.7	3.2	0.62	3.3	3.9
100	1.3	2.9	0.69	2.1	3.7
125	1.4	2.9	0.76	2.0	3.7
150	1.1	2.9	0.82	2.0	3.7
200	0.70	2.8	0.94	1.8	3.7
250	—	2.1	1.2	1.8	3.2
300	—	2.0	1.3	1.8	3.2



### 907L Internal diameter of piping

Nominal size	Minimum internal diameter of piping	Maximum internal diameter
	Pi	Fi
mm	mm	mm
50	41	63
65	55	86
80	67	98
100	91	117
125	121	144
150	145	171
200	190	227
250	239	274
300	286	332

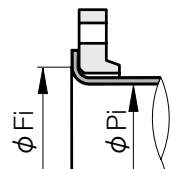
### 907T/908H Cracking pressure

Flow direction	Horizontal		Vertical(up flow)		
Spring Nominal size	Standard spring	High torque spring	Low torque spring	Standard spring	High torque spring
mm	KPa	KPa	KPa	KPa	KPa
50	3.0	5.1	0.88	4.2	6.8
65	1.8	3.8	0.74	2.7	5.1
80	1.5	3.2	1.2	2.4	4.5
100	1.8	3.2	1.3	3.0	4.7
125	1.1	2.2	1.3	2.3	3.5
150	1.1	2.1	1.4	2.4	3.6
200	0.75	1.4	1.6	2.4	3.1
250	—	1.4	1.9	2.4	3.4
300	—	1.2	2.5	3.1	3.7
350	—	0.95	2.6	3.1	3.5
400	—	0.95	2.3	2.5	3.2

### 907T/908H Internal diameter of piping

Nominal size	Minimum internal diameter of piping	Maximum internal diameter
	Pi	Fi
mm	mm	mm
50	35	63
65	46	86
80	56	98
100	81	117
125	99	144
150	123	171
200	157	227
250	205	274
300	223	332
350	259	367
400	311	413

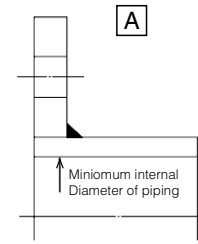
- Cracking pressure (opening pressure) is minimum pressure that allows a fluid to flow stably in a forward direction. Flow would not be stable even a fluid flows under this pressure.
- Internal diameter of piping shall be equal to Pi or over. In case of lined pipe, take lining into accounts when you check internal diameter. JIS G3452 SGP, JIS G3454 Sch60 and under, JIS G3459 Sch40 and under and VP pipe are applicable. In addition, JIS G3454, JIS G3459 "Sch80" are also applicable in case of 907T/908H.
- Internal diameter of gaskets contact part needs to be smaller than maximum internal diameter (Fi). JIS B2220 SOP, SOH, WN, IT, SW and TS (resin pipe) are applicable.
- In case of loose flange, internal diameter of flat collar (except for the rounded part) needs to be smaller than maximum internal diameter (Fi). JIS B2309 and SAS 363:2018 are applicable.



Loose flange

**MKT Applicable pipe list in case of A**

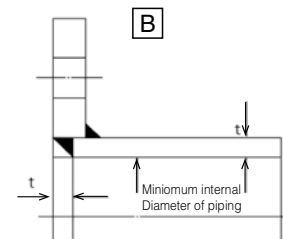
Type	Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
	mm	inch					
907L 907T 908H	50	2	○	○	○	○	○
	65	2 1/2	○	○	○	○	○
	80	3	○	○	○	○	○
	100	4	○	○	○	○	○
	125	5	○	○	○	○	○
	150	6	○	○	○	○	○
	200	8	○	○	○	○	○
	250	10	○	○	○	○	○
907T	300	12	○	○	○	○	○
	350	14	○	○	○	○	○
	400	16	○	○	○	○	○



Remark : ○ : Installation possible, — : No standard

**MKT Applicable pipe list in case of B**

Type	Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
	mm	inch					
907L 907T 908H	50	2	○	○	○	○	○
	65	2 1/2	○	○	○	○	○
	80	3	○	○	○	○	○
	100	4	○	○	○	○	○
	125	5	○	○	○	○	○
	150	6	○	○	○	○	○
	200	8	○	○	○	○	○
	250	10	○	○	○	○	○
907T	300	12	○	○	○	○	○
	350	14	○	○	○	○	○
	400	16	○	○	○	○	○



Remark : ○ : Installation possible, — : No standard

## MKT Piping bolt and nut sizes

Type	Nominal size		JIS 5K	JIS 10K
	mm	inch		
907L	50	2	4-M12×110×40	4-M16×120×40
	65	2 1/2	4-M12×110×40	4-M16×120×40
	80	3	4-M16×115×40	8-M16×120×40
	100	4	8-M16×125×40	8-M16×130×40
	125	5	8-M16×130×50	8-M20×140×50
	150	6	8-M16×140×50	8-M20×150×50
	200	8	8-M20×170×50	12-M20×170×50
	250	10	12-M20×190×50	12-M22×190×50
	300	12	12-M20×220×50	16-M22×230×50

Type	Nominal size		JIS 10K	JIS 16K/20K	ASME class 125/150
	mm	inch			
907T 908H	50	2	4-M16×120×35	8-M16×120×35	4-U5/8-11×125×35
	65	2 1/2	4-M16×130×40	8-M16×130×40	4-U5/8-11×140×40
	80	3	8-M16×135×40	8-M20×150×50	4-U5/8-11×150×50
	100	4	8-M16×135×40	8-M20×150×50	8-U5/8-11×150×50
	125	5	8-M20×160×50	8-M22×170×50	8-U3/4-10×165×50
	150	6	8-M20×175×50	12-M22×185×50	8-U3/4-10×180×50
	200	8	12-M20×205×50	12-M22×220×50	8-U3/4-10×215×50
	250	10	12-M22×225×50	12-M24×245×60	12-U7/8- 9×240×60
	300	12	16-M22×265×50	16-M24×285×60	12-U7/8- 9×280×60
	350	14	16-M22×265×50	16-M30 <sub>(P3)</sub> ×305×60	—————
	400	16	16-M24×280×60	16-M30 <sub>(P3)</sub> ×320×60	—————

- ※ Material: SS400 unichrome plating
- ※ Length of bolt is calculated based on thickness of JIS B 2220:2012 steel pipe flange (except for 10K thin type), size of JIS B1181:2014 style 1 hexagon nut and 3mm thickness of gaskets.
- ※ Do not use rusted, damaged or deformed bolt or nut. Lubricate screws enough.
- ※ Number of bolt shown above is needed for one piece of valve.

Setting bolts: 4 - M30 × 95 × 65  
(Hexagon bolts)

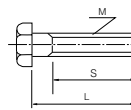
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S

Setting bolts (Hexagon bolts)

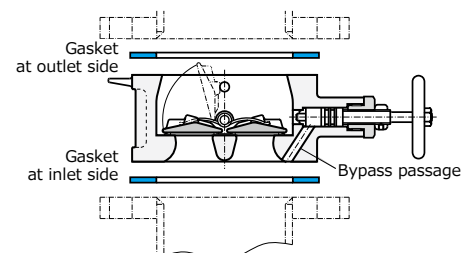


## MKT Gasket

Commercially available gaskets which are appropriate for flange standard and fluid condition can be used. Our recommendation is as follows:

- Size : JIS B 2404 (size of flange used)
- Type : Seat gaskets (Non-metal flat gasket)
- Shape : Ring gaskets
- Material : JIS R 3453 joint sheet / Reinforced rubber / RPTFE
- Thickness : 1.5 to 3mm (3mm is recommended.)
- Quantity : 2 pieces/valve

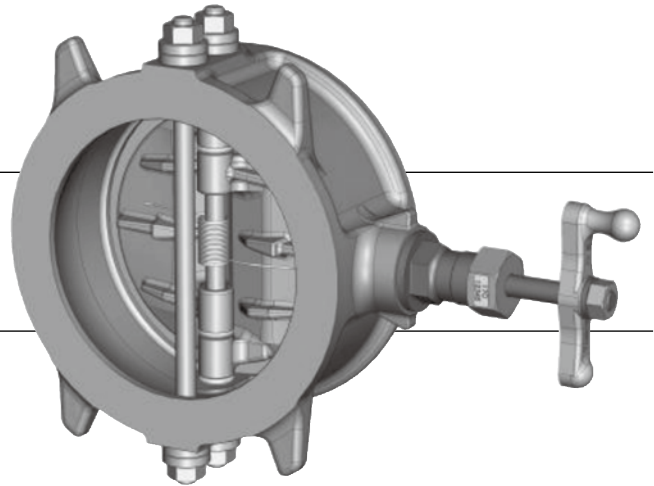
- ※ In case of resin flange, use gaskets which is recommended by flange manufacturer.
- ※ 907T/908H: Perform centering appropriately so that a gasket does not distract the bypass passage. 907L: The bypass passage runs inside of valve body; a gasket does not distract the bypass passage. Perform centering appropriately so that a gasket at outlet side does not distract plates. Gaskets tend to protrude inner side due to pressure; especially they are made of rubber. Internal diameter of gaskets shall be the same as seat gasket shown in JIS B 2404.
- ※ 65A suits both new and old JIS.



903L

901C

905C



Valve nominal size

903L 50 to 300mm

901C 350 to 400mm

905C 50 to 400mm

Max. working pressure	MPa		
	0	1.0	2.0
903L 901C		1.0	
905C			3.0

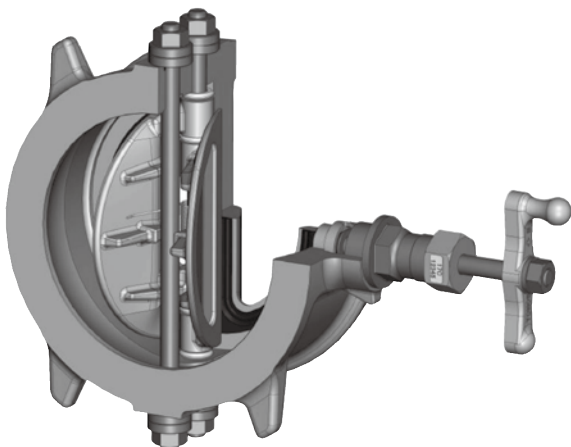
Working temperature range	°C	
	0	100
903L 901C	-10	80
903L 905C	-20	100
901C	-5	120

**NK** Nippon Kaiji Kyokai (903L, 901C)

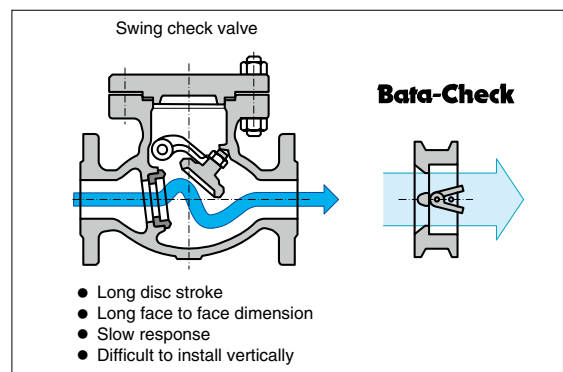
### Features and Benefits

**Lightweight and compact Check Valve protects piping lines from water hammer with its instant response**

- Dual plates quickly shut when water flow stops, prevent water hammer and backflow.
- Improved durability by reducing chattering caused by water turbulence (903L).
- Light weight, compact, user friendly and easy care
- Bypass valve standardly installed enables to simplify piping work and save space (903L, 905C 65mm to 400mm).



Comparison between swing check valve and Bata-Check 903L



\*1 These are common features of 903L, 901C, 905C and 906C unless otherwise specified.

\*2 Above drawing is an example. Shape of each part differs depending on model and size.



## Standard Specifications

		903L	901C	905C
Valve nominal size		50mm to 300mm	350mm to 450mm	50mm to 400mm
Face-to-face dimensions		Manufacturer standard		API 594 Class300 125A: Manufacturer standard
Flange accommodation <sup>※1</sup>		JIS 5K, 10K	JIS 10K (Option: 5K <sup>※1</sup> )	JIS 30K
Max. working pressure <sup>※2</sup>		1.0 MPa		3.0 MPa
Seat leakage (when checking)		Tight shut-off ( JIS B 2003: <sup>2013</sup> Rate A ) Equivalent or more differential pressure shown below is required.		
Required differential pressure <sup>※3</sup>		0.02 MPa <sup>※3</sup>	0.02 MPa	0.05MPa
Average velocity inside pipe		4 m/s	3 m/s	
Chattering prevention		No 2D or longer straight pipe which is the same in nominal size is required before valve		No 3D or longer straight pipe which is the same in nominal size is required before valve.
Working temperature range	NBR	-10 ~ 80 °C	-10 ~ 80 °C	—
	EPDM	-20 ~100 °C	-20 ~120 °C	-5 ~100 °C
	FKM	0 ~100 °C	0 ~120 °C	—
Working temperature in continuous use <sup>※4</sup>	NBR	0 ~ 60 °C	0 ~ 60 °C	—
	EPDM	0 ~ 70 °C	0 ~100 °C	-5 ~100 °C
	FKM	5 ~ 80 °C	5 ~100 °C	—
Standard materials	Body	FC250		SCPH2
	Plate <sup>※5</sup>	SCS13	CAC702 <sup>※5</sup>	SCS13
	Seat ring <sup>※6,7,8</sup>	NBR (option: EPDM, FKM) (Vulcanized to valve body)		EPDM(standard) (Vulcanized to valve body)
	Shaft pins	SUS304		
	Spring	SUS304		SUS316
Test pressure	Body shell test	1.5 MPa (hydraulic)		4.5 MPa (hydraulic)
	Seat leakage	High pressure 1.1MPa(pneumatic) 0.02MPa(pneumatic)	1.1MPa(hydraulic) 0.02MPa(hydraulic)	0.6 MPa (pneumatic)
Accessories <sup>※5</sup>	Bypass valve (standard)		No bypass valve	Bypass valve(standard) (Except for 50mm)
	High torque spring Low torque specification <sup>※10 ※11</sup>		High torque spring Low torque spring <sup>※11</sup>	
Pipe gasket	Required			
Fluid types <sup>※5,7,8,9</sup>	Water, air			
Coating	Urethane coating (Tomoe green)	Etching primer (Dark green)	Phthalic acid resin coating (Munsell 5PB 3/9 Dark blue)	

※1 901C JIS5K is special specifications. Please consult us.

※2 Bata-check cannot be used under negative pressure. Do not install underwater or underground.

※3 Required differential pressure of 903L differs depending on installing condition and spring selection. Please refer to spring selection table.

※4 "Working temperature in continuous use" stands for the temperature continuously kept for over one hour. Provided that fluid is not frozen inside.

※5 As parts of plate and bypass are made of copper alloy, a fluid which corrodes copper alloy such as acetylene and ammonia can not be used.

※6 EPDM seat ring is recommended in case of using chemical containing calcium for maintenance.

※7 EPDM seat ring can not be used for oil or a fluid containing oil. A fluid containing chlorine can accelerate damage to rubber seat ring, depending on density and temperature of fluid. Please consult us for detail.

※8 A fluid containing alkali and acid can weaken bond of seat ring. Please consult us for detail.

※9 Bata-check can not be used for viscous fluid or a fluid containing powder. In case of gas, please refer to spring selection table for installing condition.

※10 Spring is not supplied with 903L low torque specification.

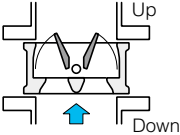
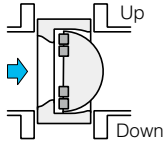
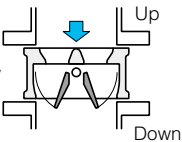
※11 Standard spring will be supplied unless otherwise specified.

Select valve according to fluid and installing condition. Incorrect valve selection can cause vibration and abnormal noise.  
Please refer to spring selection table and manual before use.

# Bata-Check Series Dual plate wafer check valve

## Bata-Check Selection Criteria

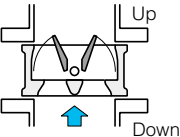
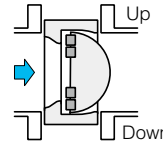
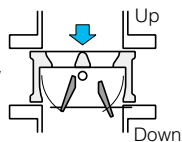
### 903L

Flow Direction	Fluid	Condition	Min. differential pressure (MPa)	Size (mm)	Spring
Up flow 	Liquid	Installed directly after the same size, 2D or longer straight pipe	0.01	50~300	High torque
			0.02		Standard
	Gas	Forward direction, primary pressure 0.1MPa or more	0.04		Low torque specification (no spring)
Horizontal layout 	Liquid	Installed directly after the same size, 2D or longer straight pipe	0.02	50~300	High torque
			0.04	50~200	Standard
	Gas	Forward direction, primary pressure 0.15MPa or more	0.04	50~200	Standard
Down flow 	Liquid	Installed directly after the same size, 2D or longer straight pipe	0.06	50~150	High torque

※ Equivalent or more pressure shown in the table is needed for sealing performance. When inlet pressure remains, differential pressure may not be maintained. Especially in case of down flow, inlet pressure easily remains.

※ In case of liquid, inlet pressure of forward direction needs to be higher than cracking pressure and lower than max. working pressure.

### 901C

Flow Direction	Fluid	Condition	Min. differential pressure (MPa)		Size (mm)	Spring
			Min	Max		
Up flow 	Liquid	Installed directly after the same size, 2D or longer straight pipe	0.7	~ 1.0	350~450	High torque
			0.1	~ 0.7		Standard
			0.05	~ 0.1		Low torque
	Gas		0.05	~ 0.1		Low torque
Horizontal layout 	Liquid	Installed directly after the same size, 2D or longer straight pipe	0.7	~ 1.0	350~450	High torque
			0.1	~ 0.7		Standard
			0.05	~ 0.1		Low torque
	Gas		0.05	~ 0.1		Low torque
Down flow 	Liquid Gas	Installed directly after the same size, 2D or longer straight pipe	0	~ 1.0	350~450	High torque

※ When inlet pressure remains, there is possibility of leakage. 0.02 MPa or more is needed to seal. Especially in case of down flow, inlet pressure easily remains.

※ When check valve is installed at the outlet of the pump, spring needs to be high torque spring regardless of pressure.

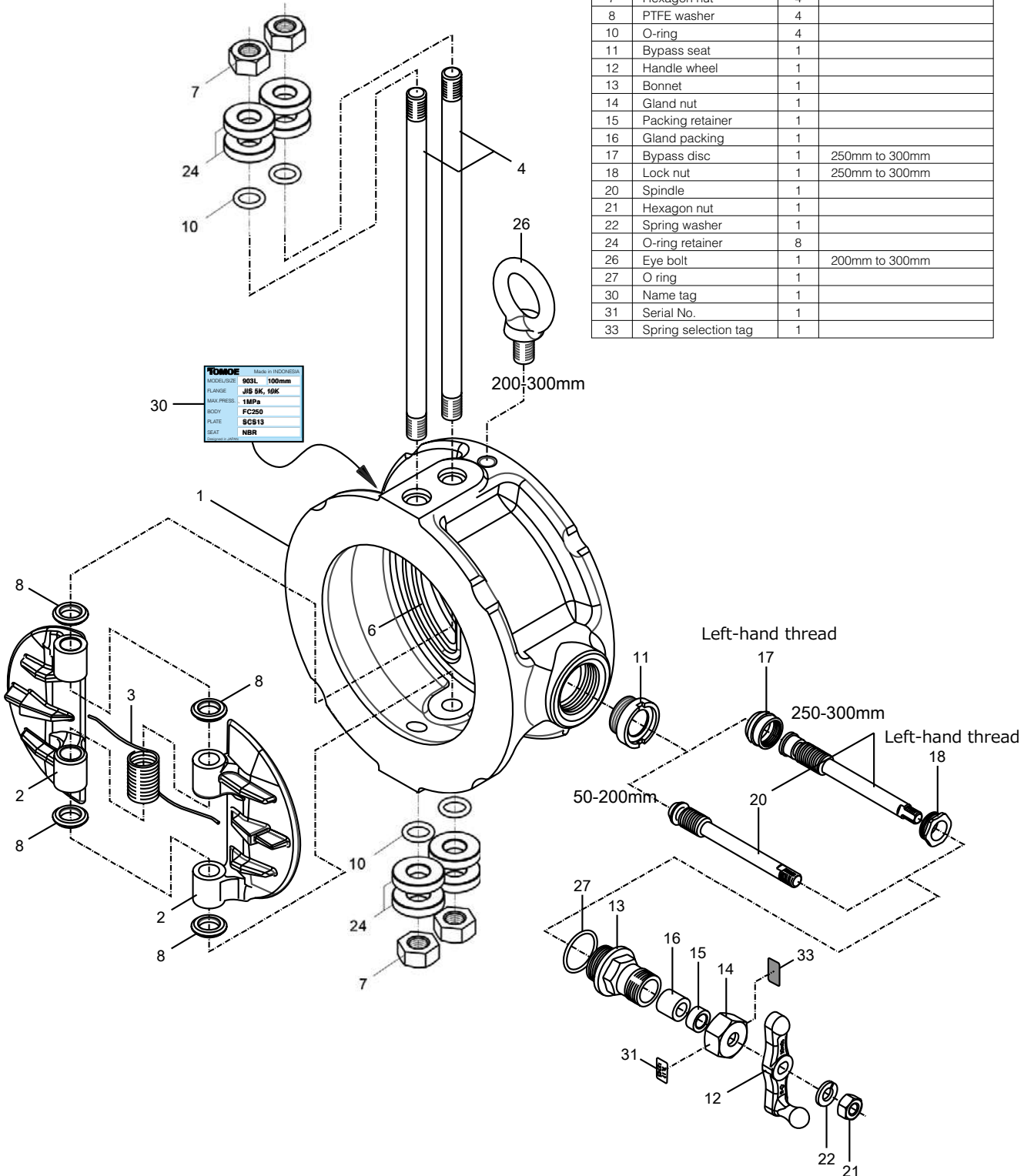
● 905C is supplied with standard spring only. It can not be used for dawn flow.

● 905C requires 3D or longer straight pipe upstream.

## 903L Expanded view of components

### 903L Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
2	Plate	2	
3	Spring	1	Under 150mm
4	Shaft pin	2	200mm to 300mm
6	Seat	1	Vulcanized to body
7	Hexagon nut	4	
8	PTFE washer	4	
10	O-ring	4	
11	Bypass seat	1	
12	Handle wheel	1	
13	Bonnet	1	
14	Gland nut	1	
15	Packing retainer	1	
16	Gland packing	1	
17	Bypass disc	1	250mm to 300mm
18	Lock nut	1	250mm to 300mm
20	Spindle	1	
21	Hexagon nut	1	
22	Spring washer	1	
24	O-ring retainer	8	
26	Eye bolt	1	200mm to 300mm
27	O ring	1	
30	Name tag	1	
31	Serial No.	1	
33	Spring selection tag	1	

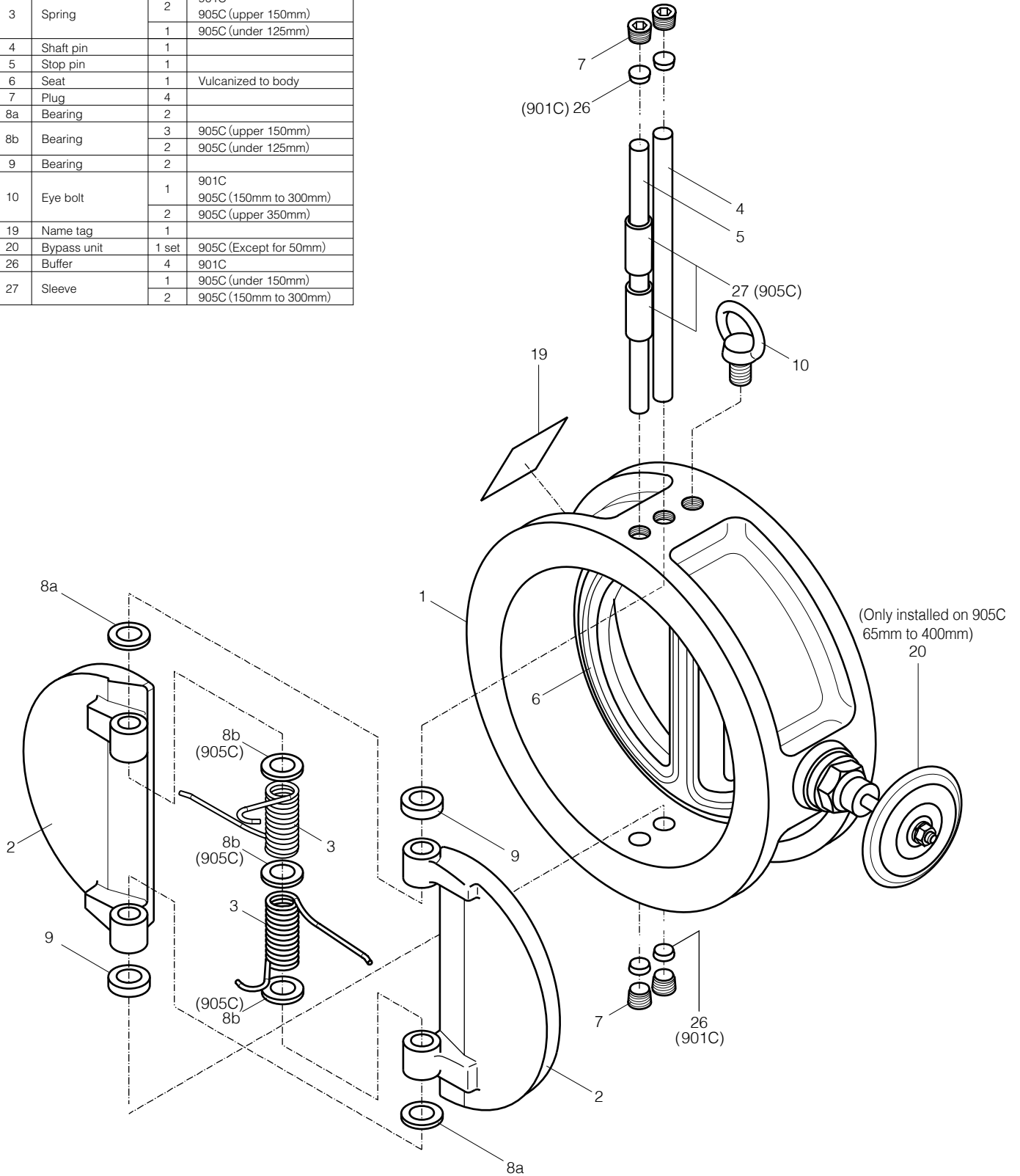


# Bata-Check Series Dual plate wafer check valve

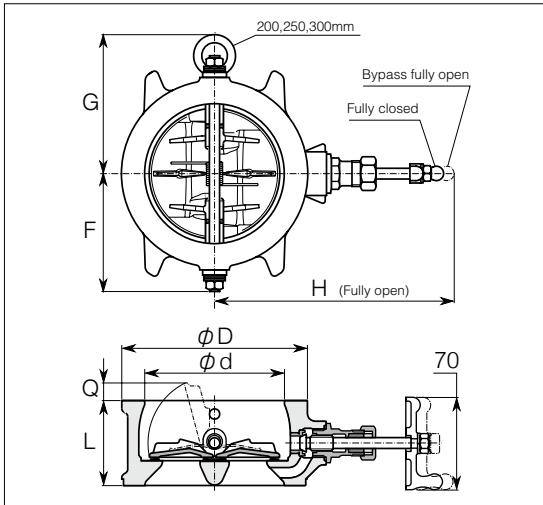
## 901C / 905C Expanded view of components

### 901C,905C Parts list

No.	Description	Q'ty	Remarks
1	Body	1	
2	Plate	2	
3	Spring	2	901C
		1	905C (upper 150mm)
4	Shaft pin	1	905C (under 125mm)
		1	
5	Stop pin	1	
6	Seat	1	Vulcanized to body
7	Plug	4	
8a	Bearing	2	
8b	Bearing	3	905C (upper 150mm)
		2	905C (under 125mm)
9	Bearing	2	
10	Eye bolt	1	901C
		2	905C (150mm to 300mm)
19	Name tag	1	
20	Bypass unit	1 set	905C (Except for 50mm)
26	Buffer	4	901C
27	Sleeve	1	905C (under 150mm)
		2	905C (150mm to 300mm)



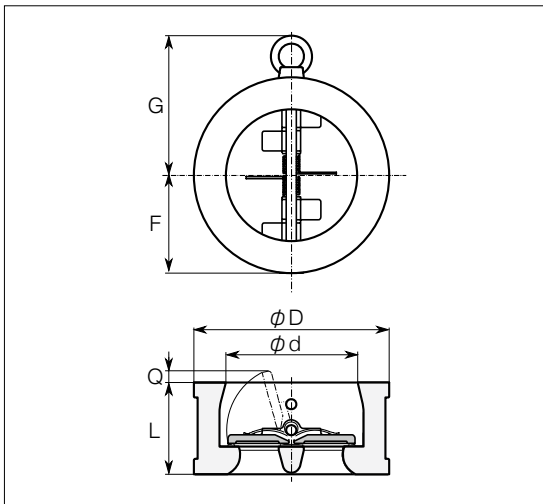
## Bata-Check Dimension



### 903L

Nominal size		Dimension(mm)							Approx. Mass (kg)
mm	inch	$\phi d$	L	$\phi D$	H	F	G	Q	
50	2	61	56	90	159	59	—	0	1.8
65	2 1/2	74	56	114	167	72	—	6	2.5
80	3	87	60	130	173	84	—	9	3.2
100	4	109	66	145	186	92	—	16	4.0
125	5	140	70	180	200	110	—	27	5.8
150	6	163	76	210	214	125	—	36	8.3
200	8	214	95	265	240	160	169	45	15
250	10	268	108	320	295	187	197	60	24
300	12	316	144	373	320	221	232	58	39

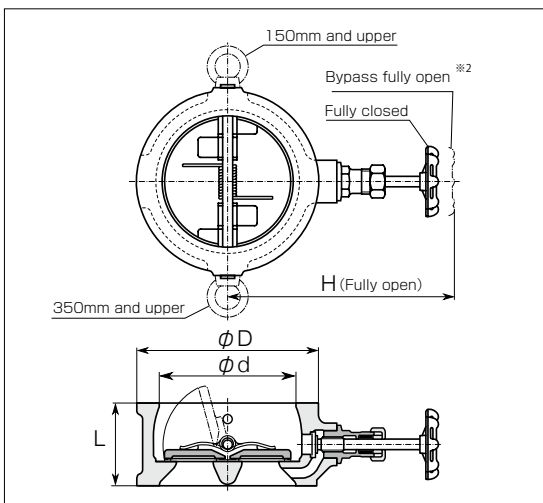
※ The drawing on the left is representative example. For detail, please refer to specifications.



### 901C

Nominal size		Dimension(mm)							Approx. Mass (kg)
mm	inch	$\phi d$	L	$\phi D$	H	F	G	Q	
350	14	356	184	420	—	212	252	60	60
400	16	406	190	483	—	244	293	89	76
450	18	458	200	538	—	271	320	112	93

※ The drawing on the left is representative example. For detail, please refer to specifications.



### 905C

Nominal size		Dimension(mm)				Approx. Mass (kg)
mm	inch	$\phi d$	L	$\phi D$	H <sup>※1</sup>	
50	2	60	60	111	※2	5.0
65	2 1/2	73	67	137	180	6.0
80	3	89	73	147	200	7.0
100	4	114	73	170	200	9.5
125	5	141	86	205	230	16
150	6	168	98	248	250	30
200	8	219	127	293	280	46
250	10	273	146	357	300	70
300	12	324	181	417	330	130
350	14	356	222	462	350	185
400	16	406	232	521	380	200

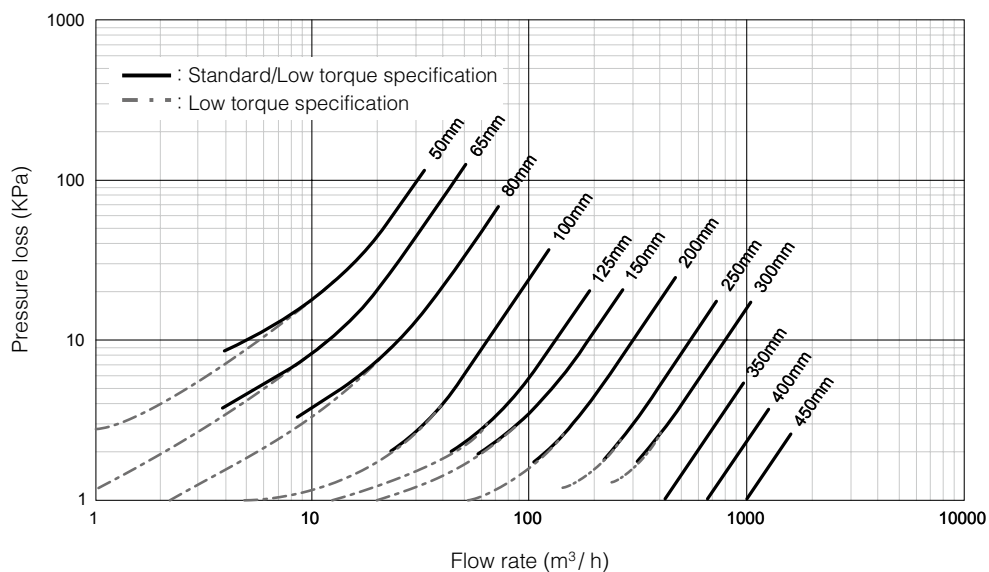
※1 H includes space to operate.

※2 Bypass valve is not installed on 905C 50A.

※ The drawing on the left is representative example. For detail, please refer to specifications.

## Bata-Check Pressure loss vs. Flow rate

### 903L (50 to 300mm) / 901C (350 to 450mm)



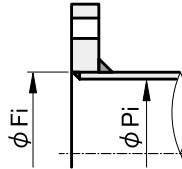
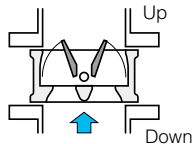
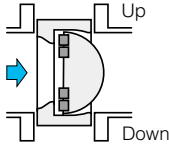
Nominal size (mm)	Cv value (—)	Resistance coefficient ζ (—)
50	35	14
65	52	15
80	101	7.8
100	235	4.3
125	485	2.4
150	684	2.4
200	1100	2.9
250	2030	2.0
300	2930	2.0
350	4780	1.1
400	7500	0.81
450	11400	0.56

※ For high torque spring and 905C, please consult our sales staff.

## Bata-Check Cracking pressure (opening pressure) & Diameter of piping

### ■ 903L Cracking pressure

Flow direction	Horizontal		Vertical(up flow)		
Spring Nominal size	Standard spring	High torque spring	Low torque spring	Standard spring	High torque spring
mm	KPa	KPa	KPa	KPa	KPa
50	5.7	5.7	0.61	6.8	6.8
65	2.8	5.1	0.66	3.8	6.1
80	2.7	3.2	0.62	3.3	3.9
100	1.3	2.9	0.69	2.1	3.7
125	1.4	2.9	0.76	2.0	3.7
150	1.1	2.9	0.82	2.0	3.7
200	0.70	2.8	0.94	1.8	3.7
250	—	2.1	1.2	1.8	3.2
300	—	2.0	1.3	1.8	3.2

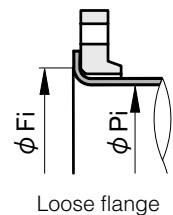


### ■ 901C Cracking pressure

Flow direction	Horizontal	Vertical (Upwards direction)	
Spring size	Standard spring	Low torque spring	Standard spring
mm	KPa	KPa	KPa
350	0.41	2.6	2.9
400	0.39	2.7	3.0
450	0.33	2.7	2.9

※ For 905C, please consult sales staff.

- Cracking pressure (opening pressure) is minimum pressure that allows a fluid to flow stably in a forward direction. Flow would not be stable even a fluid flows under this pressure.
- Internal diameter of piping shall be equal to Pi or over. In case of lined pipe, take lining into accounts when you check internal diameter. JIS G3452 SGP, JIS G3454 Sch60 and under, JIS G3459 Sch40 and under and VP pipe are applicable. In addition, JIS G3454, JIS G3459 "Sch80" are also applicable in case of 905C.
- Internal diameter of gaskets contact part needs to be smaller than maximum internal diameter (Fi). JIS B2220 SOP, SOH, WN, IT, SW and TS (resin pipe) are applicable.
- In case of loose flange, internal diameter of flat collar (except for the rounded part) needs to be smaller than maximum internal diameter (Fi). JIS B2309 and SAS 363(type 2) are applicable.



### ■ 903L Internal diameter of piping

Nominal size	Minimum internal diameter of piping	Maximum internal diameter
	Pi	Fi
mm	mm	mm
50	41	63
65	55	86
80	67	98
100	91	117
125	121	144
150	145	171
200	190	227
250	239	274
300	286	332

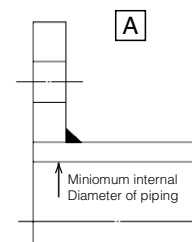
### ■ 901C Internal diameter of piping

size	Minimum internal diameter	Maximum internal diameter
	Pi	Fi
mm	mm	mm
350	270	367
400	340	413
450	405	470

# Bata-Check Series Dual plate wafer check valve

## Bata-Check Applicable pipe list in case of A

Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
	mm	inch						
903L	50	2	○	—	○	○	○	○
	65	2 1/2	○	—	○	○	○	○
	80	3	○	—	○	○	○	○
	100	4	○	—	○	○	○	○
	125	5	○	—	○	○	○	○
	150	6	○	—	○	○	○	○
	200	8	○	—	○	○	○	○
	250	10	○	—	○	○	○	○
	300	12	○	—	○	○	○	○
901C	350	14	○	○	○	○	—	—
	400	16	○	○	○	○	—	—
	450	18	○	○	○	○	—	—

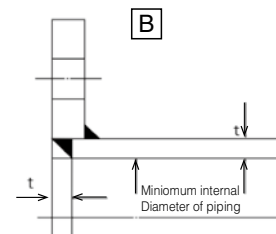


Remark : ○ : Installation possible, — : No standard

※ For 905C, please consult sales staff.

## Bata-Check Applicable pipe list in case of B

Type	Nominal size		SGP	STPY	Sch20	Sch40	Sch10S	Sch20S
	mm	inch						
903L	50	2	○	—	○	○	○	○
	65	2 1/2	○	—	○	○	○	○
	80	3	○	—	○	○	○	○
	100	4	○	—	○	○	○	○
	125	5	○	—	○	○	○	○
	150	6	○	—	○	○	○	○
	200	8	○	—	○	○	○	○
	250	10	○	—	○	○	○	○
	300	12	○	—	○	○	○	○
901C	350	14	○	○	○	○	—	—
	400	16	○	○	○	○	—	—
	450	18	○	○	○	○	—	—



Remark : ○ : Installation possible, — : No standard

※ For 905C, please consult sales staff.



## Bata-Check Piping bolt and nut sizes

Type		903L		901C	905C
Nominal size		JIS 5K	JIS 10K	JIS 10K	JIS 30K
mm	inch	Hexagon bolts and nuts		Long Bolts and nuts	Long Bolts and nuts
50	2	4-M12X110X40	4-M16X120X40	—	8-M16X155X40
65	2 1/2	4-M12X110X40	4-M16X120X40	—	8-M20X180X40
80	3	4-M16X115X40	8-M16X120X40	—	8-M20X190X50
100	4	8-M16X125X40	8-M16X130X40	—	8-M22X200X50
125	5	8-M16X130X50	8-M20X140X50	—	8-M22X220X50
150	6	8-M16X140X50	8-M20X150X50	—	12-M24X250X50
200	8	8-M20X170X50	12-M20X170X50	—	12-M24X280X60
250	10	12-M20X190X50	12-M22X190X50	—	12-M30X320X60 <sup>※1</sup>
300	12	12-M20X220X50	16-M22X230X50	—	16-M30X365X60 <sup>※1</sup>
350	14	—	—	16-M22X300X45	16-M30X540X80 <sup>※1</sup>
400	16	—	—	16-M24X320X50	16-M36X590X80 <sup>※1</sup>
450	18	—	—	20-M24X320X50	—

- ※1 Bolt pitch for M30 and over is 3.
- ※ Material: SS400 unichrome plating
- ※ Length of bolt is calculated based on thickness of JIS B 2220:<sup>2012</sup> steel pipe flange (except for 10K thin type), size of JIS B 1181:<sup>2014</sup> style 1 hexagon nut and 3mm thickness of gaskets.
- ※ Do not use rusted, damaged or deformed bolt or nut. Lubricate screws enough.
- ※ Number of bolt shown above is needed for one piece of valve.

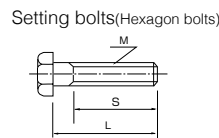
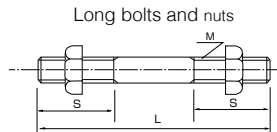
### Example

Long bolts : 12 - M22 × 185 × 45

Quantity    Nominal size(M)    Length of bolt(L)    Effective screw length(S)

Setting bolts (Hexagon bolts) : 4 - M30 × 95 × 65

Quantity    Nominal size(M)    Length of bolt(L)    Effective screw length(S)

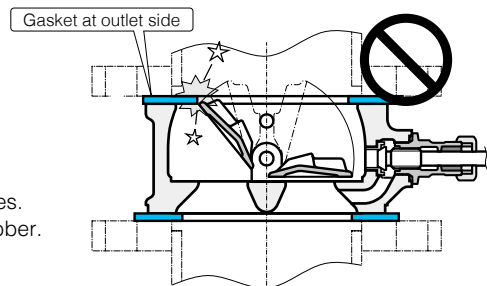


## Bata-Check Gasket

Commercially available gaskets which are appropriate for flange standard and fluid condition can be used. Our recommendation is as follows:

- Size : JIS B 2404 (size of flange used)
- Type : Seat gaskets (Non-metal flat gasket)
- Shape : Ring gaskets
- Material : JIS R 3453 joint sheet / Reinforced rubber / RPTFE
- Thickness : 1.5 to 3mm (3mm is recommended.)
- Quantity : 2 pieces/valve

- ※ In case of resin flange, use gaskets which is recommended by flange manufacturer.
- ※ Perform centering appropriately so that a gasket at outlet side does not distract plates. Gaskets tend to protrude inner side due to pressure; especially they are made of rubber.



Misalignment of gaskets causes malfunction.



# ACTUATOR SELECTION GUIDE

## Actuator Selection Guide

Motorized Actuators	<b>New ELMY 4I</b>	449
	<b>New MICOM ELMY III 4I</b>	461
	<b>PMK-SRF 4K</b>	469
	<b>SRJ 4J</b>	471
	<b>LTKD 4L</b>	479
Pneumatic Actuators	<b>New T-DYNAMO 7E/7F/7G</b>	483
	<b>TGA 3A</b>	505
	<b>TG-S 3K/3U 3C</b>	525
	<b>3C</b>	539
	<b>Diaphragm 6X/6W/6Z</b>	540
Hydraulic Cylinder	<b>Hydraulic cylinder</b>	541
Manual Actuators	<b>Manual Actuators</b>	542

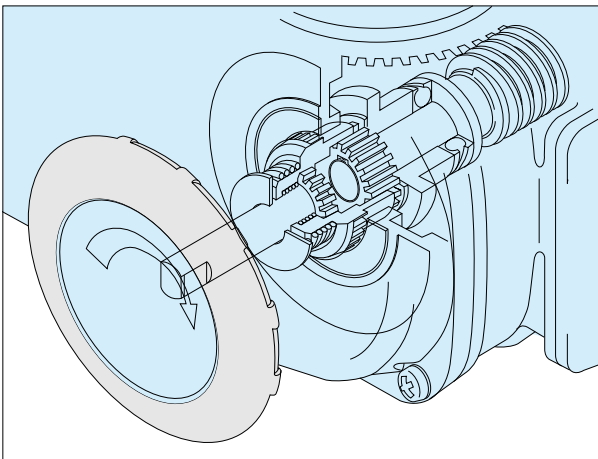
Using the superior characteristics of the best selling ELMY butterfly valve actuator, we developed an improved successor, the **New ELMY**. With a replaceable control circuit board, tough metal gears, new limit cam mechanism, a new clutch mechanism, and an improved watertight design, the **New ELMY** actuator is even better than before.



**Features**

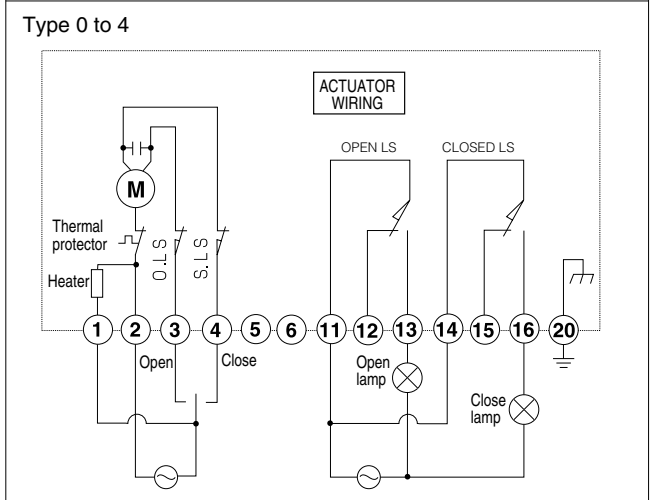
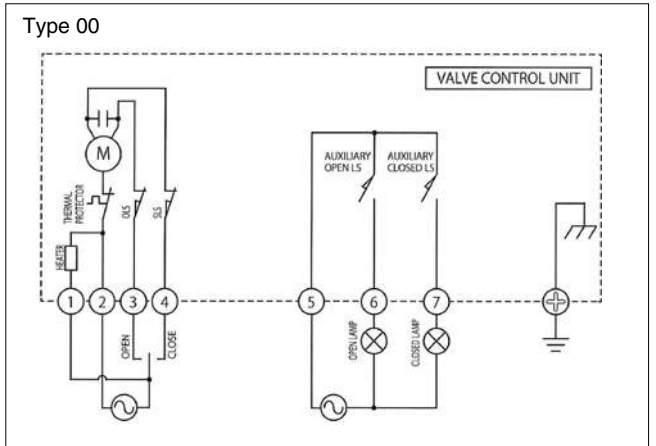
- Circuit board is easily replaceable to meet different requirements.
- New adjustable limit switch cam plate.
- Waterproof design protects against rain water or condensation
- Declutchable handwheel for ease of operation and maximum safety.
- High output torque and compact in size.

New ELMY Structure figure



Types 1 to 4

New ELMY Wiring diagrams Standard (With extra position limit switch non-voltage)



New ELMY Specifications							
Type	Type 00	Type 0	Type 1	Type 2	Type 2.5	Type 3	Type 4
Output torque (N · m)	25	70	98	196	333	981	2000
Power source (V)	AC 100V, 200V, 220V		AC 100V, 200V, 220V, 240V, 50/60Hz <sup>**1</sup>				
Motor capacity (W)	8		20	30		90	
Travel time (50/60Hz) (sec)	10/8	25/20 (180/150) <sup>**2</sup>			37/30 (260/210) <sup>**2</sup>	55/50 (500/440) <sup>**2</sup>	125/105 (1100/900) <sup>**2</sup>
Electric power consumption (only as a rough standard)	60W		100W	160W		200W	
Rating (min)	30						
Insulation	Class E						
Type of motor and its protective device	Reversible motor with built-in thermal protector						
Space heater	Supplied under the standard specifications						
Position limit switch	One each at fully opened and closed positions, contact capacity: AC250V-5A (Can be used with minimum load down to 100mA.)	One each at fully opened and closed positions, contact capacity: AC250V-10A (Can be used with minimum load down to 100mA.)					
Torque limit switch	None						
Mechanical limit stop	End of travel positioning bolt built-in						
Conduit connections	G 1/2 (PF 1/2) 1 ports	G 1/2 (PF 1/2) 2 ports					
Enclosure	JIS C 0920 (IP 65), Class 5, dust and water-jet proof type						
Manual operation	Detachable handle			Declutchable handwheel			
Number of turns for handle/handwheel	7.5 turns	6.7 turns	16.5 turns				
Working temperature range	-10 to 60 degreesC						
Storage temperature range	-20 to 80 degreesC						
Paint finish	Epoxy-melanin baked (Tomoe green)						
Options	1) Space heater	1) Potentiometer: 135Ω and 500Ω 2) Intermediate limit switch (no voltage) 3) Extra position limit switch contact capacity for minute-load: 30V-100mA (Can be used with minimum load down to 1mA.) 4) Servounit (DC 4-20mA, DC1-5V, 0-10V) 5) Speed controller unit					

※1 Servounit, speed controller unit not support 240V, space heater as an option. Ambient temperature shall be up to 50 degrees C.

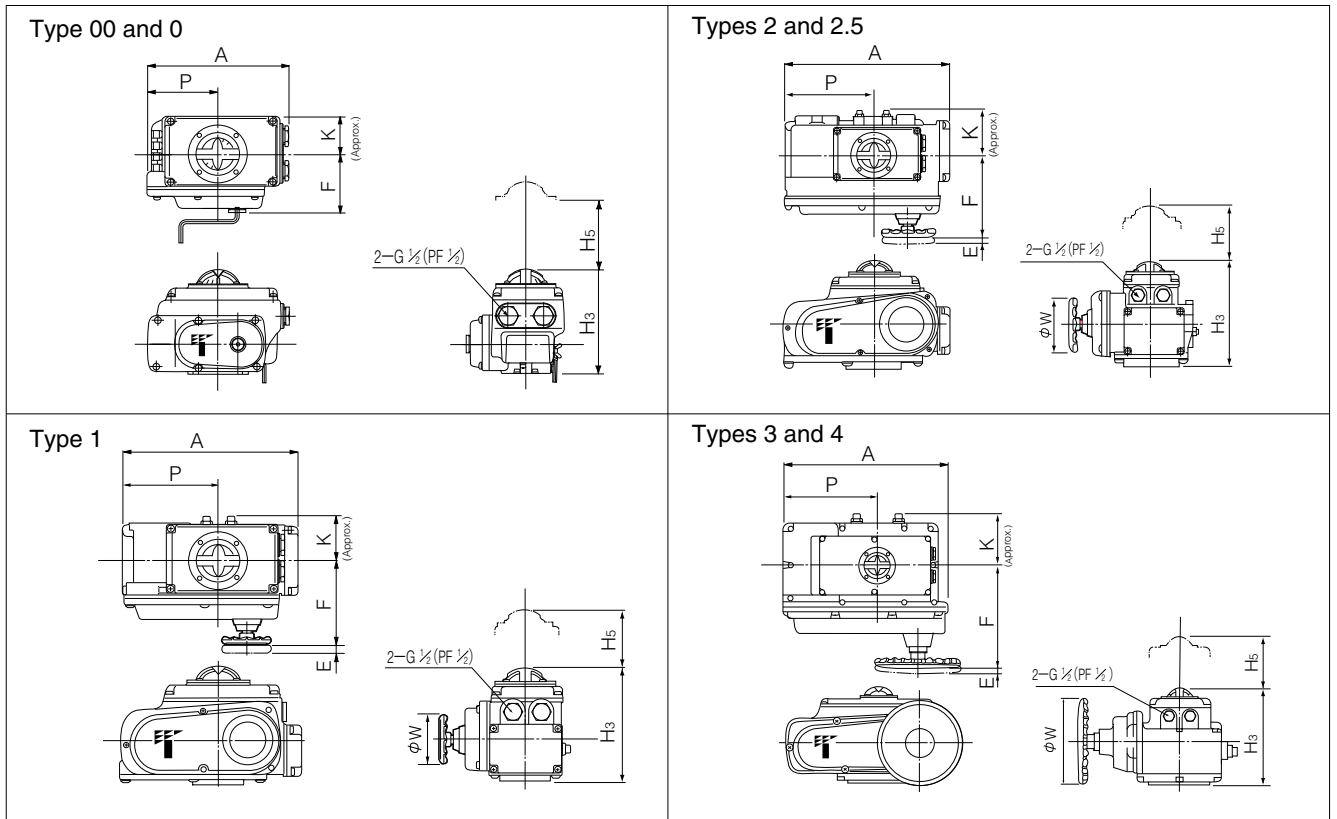
※2 With speed controller unit

### New ELMY Tabel Actuator Selection

Nominal size (mm)	700Z	700G 705G 704G	700S 720F	731P	732P	847T 846T	508V		
40	Type 00	Type 00	—	—	—	—	—		
50			Type 0	Type 00	Type 00	Type 0	Type 0		
65		Type 0		Type 0	Type 0	—			
80	Type 0	Type 1	Type 1	Type 1	Type 1	Type 1			
100			Type 1	Type 1	Type 1	Type 1			
125	Type 1	Type 2	Type 2	Type 2	Type 2	Type 2			
150	Type 2		Type 2	Type 2	Type 2	Type 2			
200		Type 2.5	Type 2.5	Type 2.5	Type 2.5	Type 2.5	Type 2.5		
250	Type 2.5			Type 3	Type 3	Type 3	Type 3		
300	Type 3	Type 3	Type 3	Type 3	Type 3	Type 3			
350	X			Type 3	Type 4	X	X	Type 3	
400		Type 4	X	Type 4	Type 4				
450		Type 4		Type 4	X			X	X
500									

※ For on-off Selection

**New ELMY Dimensions**

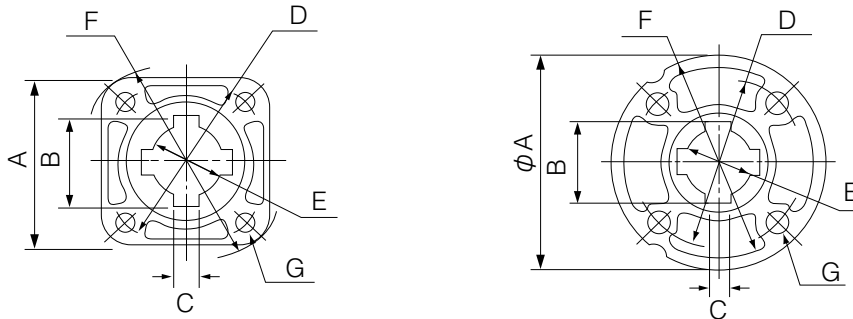


**New ELMY Dimensions / Weight**

Motor type	Dimension (mm)								Approx. Weight (kg)
	H <sub>3</sub>	H <sub>5</sub>	P	A	E	F	K	φW	
Type 00	100	100	84	161	—	58	43	—	2.1
Type 0	150(185)	100	100	202	—	85	54	—	4.2
Type 1	165(191)	100	138	252	12	126	65	70	6.4
Type 2	198(224)	100	167	310	14	154	85	100	11.2
Type 2.5	198(224)	100	167	310	14	154	85	100	12.8
Type 3	230(255)	100	223	388	23	243	136	200	23.2
Type 4	230(255)	100	223	388	23	246	136	280	28.3

( ): Dimension with servounit

### New ELMY Mounting details



### New ELMY Mounting flange details

Actuator type		A	B	C	D (φ)	E (φ)	F (φ)	G			
								Qty	M	P	Dep.
Type 00	ISO F05/F07	□70	—	—	50/70	12	90	4	6/8	1.0/1.25	10/13
Type 0	ISO F07	□70	—	—	70	12	90	4	8	1.25	13
Type 1	ISO F07	□70	34.6	8	70	28	90	4	8	1.25	13
	Tomoe Original	φ100	34.6	8	80	28	100	4	10	1.5	12
Type 2	ISO F10	□102	52.6	14	102	45	125	4	10	1.5	15
	Tomoe Original	φ125	52.6	14	95	45	125	4	12	1.75	15
Type 2.5	ISO F10	□102	52.6	14	102	45	125	4	10	1.5	15
	ISO F12	□125	52.6	14	125	45	155	4	12	1.75	20
	Tomoe Original	φ125	52.6	14	95	45	125	4	12	1.75	15
Type 3	ISO F10	□140	57.6	14	102	50	175	4	10	1.5	15
	ISO F12	□140	57.6	14	125	50	175	4	12	1.75	18
		□140	38.6	10	140	32	175	4	12	1.75	18
	ISO F14	□140	46.6	12	140	40	175	4	16	2.0	24
	Tomoe Original	φ200	43.1	10	125	35.5	200	4	12	1.75	24
φ200		47.6	10	170	40	200	4	16	2.0	30	
Type 4	ISO F12	□140	57.6	14	125	50	175	4	12	1.75	18
	ISO F14	□140	46.6	12	140	40	175	4	16	2.0	24
		□140	53.6	14	140	46	175	4	16	2.0	24
		□140	57.6	14	140	50	175	4	16	2.0	24
	Tomoe Original	φ200	47.6	10	170	40	200	4	16	2.0	30
φ200		54.6	12	170	47	200	4	16	2.0	30	

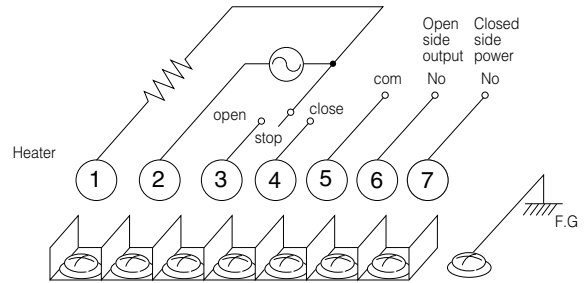
**New ELMY Terminal board connection diagram (Type 00)**

**Notes:**

1. The FG terminal should be grounded.
2. If a space heater is used, the round terminal should be connected to terminals 1, and 2.

Terminal block screw size: M3 (with angular washer)

**Wiring diagram**



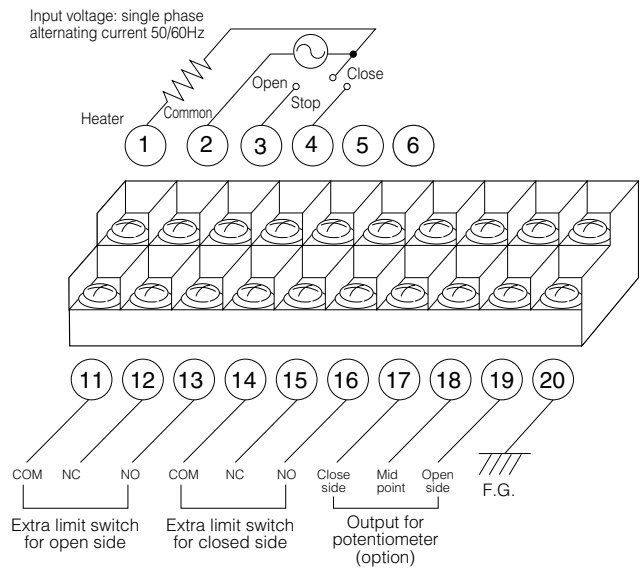
**New ELMY Terminal board connection diagram (Type 0 to 4) with potentiometer and extra limit switch**

**Notes:**

1. The FG terminal should be grounded.
2. If a space heater(option) is used, the round terminal should be connected to terminals 1 and 2.

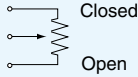
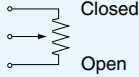
Terminal block screw size: M3 (with angular washer)

**Wiring diagram**





## New ELMY Terminal board (Type 0 to 4)

Terminal No.	Specification	Standard with extra position limit switches	With intermediate limit switches	With a potentiometer and extra position limit switches	With a potentiometer and intermediate limit switches
①	Heater	○	○	○	○
②	COMMON	○	○	○	○
③	Open switch	○	○	○	○
④	Close switch	○	○	○	○
⑪	Extra position limit switch, open end (intermediate limit switch 1) COMMON	○	○	○	○
⑫	(intermediate limit switch 1) NC	○	○	○	○
⑬	(intermediate limit switch 1) NO	○	○	○	○
⑭	Extra position limit switch, close end (intermediate limit switch 2) COMMON	○	○	○	○
⑮	(intermediate limit switch 2) NC	○	○	○	○
⑯	(intermediate limit switch 2) NO	○	○	○	○
⑰	Potentiometer	-	-		
⑱	Potentiometer	-	-		
⑲	Potentiometer	-	-		
⑳	Earth (F.G.)	○	○	○	○

7, 8 and 9 are out of use.  
 ○ : wired  
 - : not wired

## New ELMY Recommended fuse and non-fuse breaker

### 1. On-off type

with extra limit switch (as standard)  
 with intermediate limit switch (as option)

Type	Power source and frequency	Recommended capacity for fuse	Recommended capacity for non-fuse breaker
00, 1	100V/110V (50Hz/60Hz)	2A	2A
	200V/220V (50Hz/60Hz)	1A	1A
2, 2.5	100V/110V (50Hz/60Hz)	3A	3A
	200V/220V (50Hz/60Hz)	2A	2A
3, 4	100V/110V (50Hz/60Hz)	7A	7A
	200V/220V (50Hz/60Hz)	5A	5A

### 2. Control type

with speed control unit (as option)  
 with servo unit (as option)

Type	Power source and frequency	Recommended capacity for fuse	Recommended capacity for non-fuse breaker
0, 1	100V/110V (50Hz/60Hz)	3A	3A
	200V/220V (50Hz/60Hz)	2A	2A
2, 2.5	100V/110V (50Hz/60Hz)	5A	5A
	200V/220V (50Hz/60Hz)	3A	3A
3, 4	100V/110V (50Hz/60Hz)	10A	10A
	200V/220V (50Hz/60Hz)	7A	7A

**New ELMY Wiring diagrams (Control options) (Type 00)**

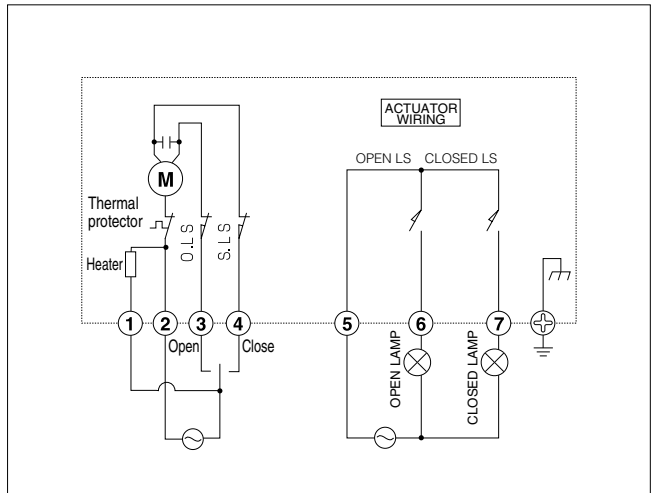
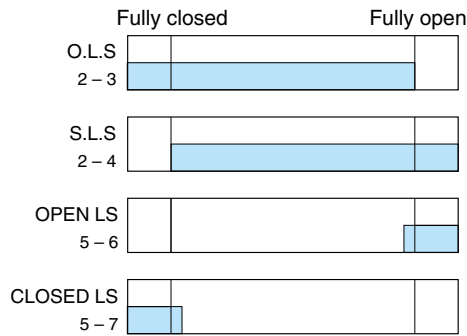
**Standard**

**With extra position limit switch (non-voltage)**

• **Purpose**

To send non-voltage full-open and full-closed signals by switching on and off.

**Limit switch contact development**



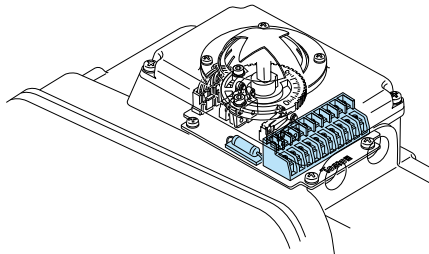
**New ELMY Wiring diagrams (Control options) (Type 0 to 4)**

**Standard**

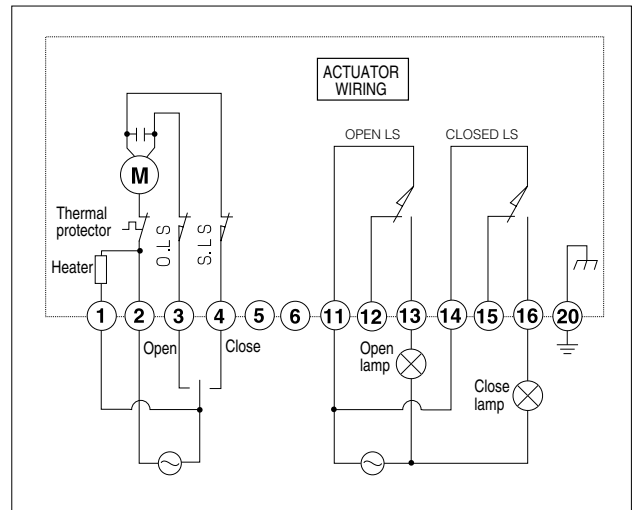
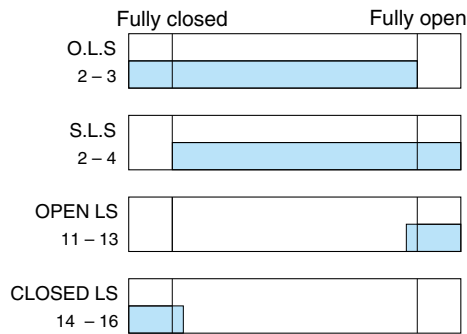
**With extra position limit switch (non-voltage)**

• **Purpose**

To send non-voltage full-open and full-closed signals by switching on and off.



**Limit switch contact development**



**Notes**

1. Each actuators should be controlled by one operation switch. If two or more actuators are controlled by one operation switch, there is a risk of causing a erroneous actuate by due to a loop circuit.
2. OLS/SLS break contact at fully open/closed position. Auxiliary limit switch is output in front of the position of fully open/closed. Should not stop the valve operation by auxiliary limit switch output until it reaches fully open/closed position.
3. Capacity of standard auxiliary limit switch is AC250V-10A (minimum voltage: 30V- minimum current 0.1A). In the case of this less than the minimum voltage or current, we will provide the lower current specification auxiliary limit switch upon request.

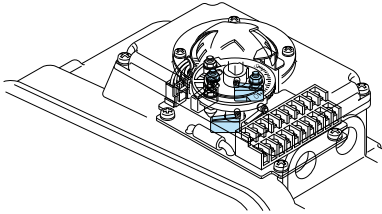
## With intermediate limit switch

### • Purpose

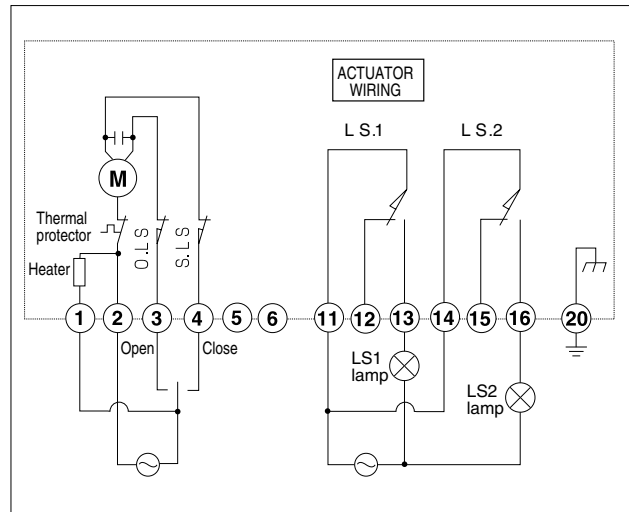
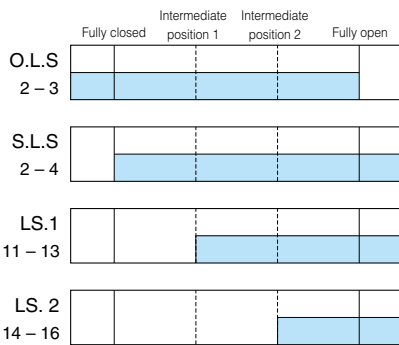
To send intermediate open and close signals by switching on and off, and to stop the valve at intermediate positions.

### • Options

Intermediate limit switches (two, non-voltage)



### Limit switch contact development



### Notes

- Do not use a switch for two or more motor actuators, as the voltage will be transmitted to the other motor through the capacitor and cause malfunction.
- The contact capacity of the extra limit switch is 250 VAC-10 A (min. 0.1 A). For anything below this contact capacity (1 mA to 100 mA, 5 to 30 V), please use specifications for minute loads.

## New ELMY Wiring diagrams (Control options) (Type 0 to 4)

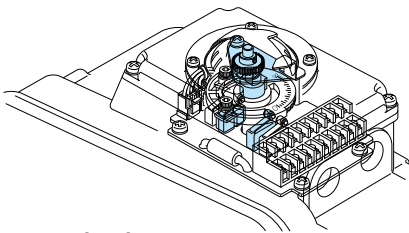
## With potentiometer and extra position limit switch (non-voltage)

### • Purpose

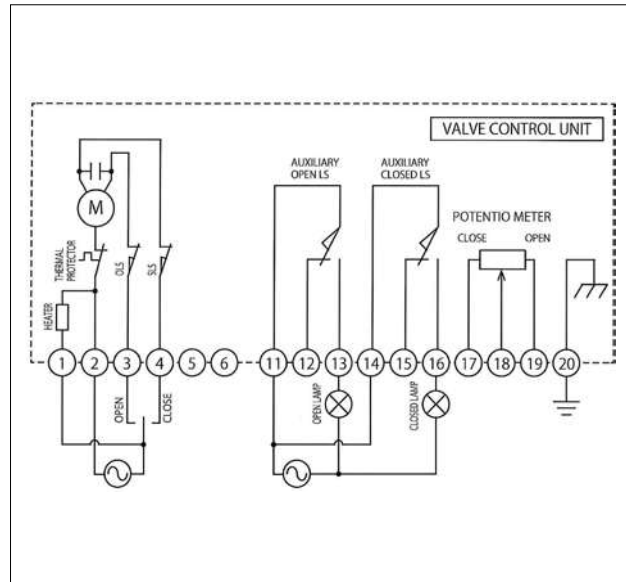
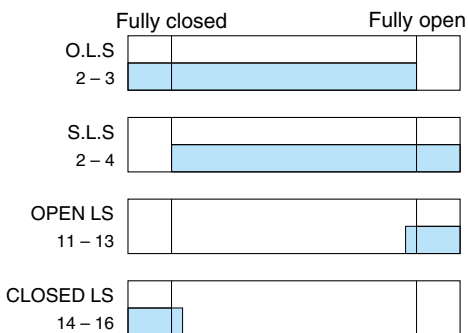
To control valve opening by resistance variations and send non-voltage full-open and full-closed signals by switching on and off.

### • Options

135Ω or 500Ω potentiometer



### Limit switch contact development



### Notes

- Each actuators should be controlled by one operation switch. If two or more actuators are controlled by one operation switch, there is a risk of causing a erroneous actuate by due to a loop circuit.
- OLS/SLS break contact at fully open/closed position. Auxialiry limit switch is output in front of the position of fully open/closed. Should not stop the valve operation by auxiliary limit switch output until it reaches fully open/closed position.
- Capacity of standard auxiliary limit switch is AC250V-10A (minimum voltage: 30V- minimum current 0.1A). In the case of this less than the minimum voltage or current, we will provide the lower current specification auxiliary limit switch upon request.

**New ELMY Wiring diagrams (Control options) (Type 0 to 4)**

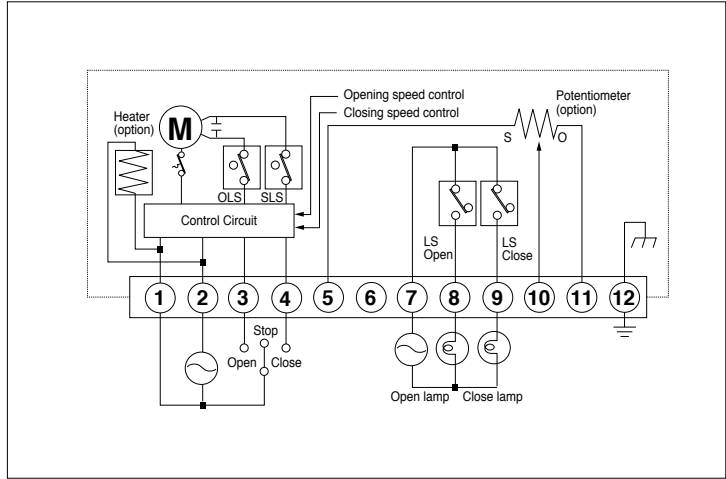
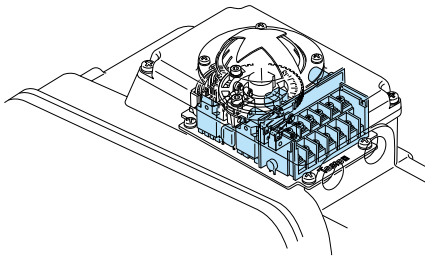
**With speed controller unit**

● Purpose

Set the valve open and close time.

● Options

135Ω or 500Ω potentiometer, heater



Notes

1. Do not use a switch for two or more motor actuators, as the voltage will be transmitted to the other motor through the capacitor and cause malfunction.
2. Extra limit switches work ahead of each opening and closing position of the valve. Therefore, if you stop the valve using signals from an extra limit switch, leakage may occur.

Type	0, 1, 2	2.5	3	4	
Opening degree	0 to 90 degrees C				
Open and close time	50Hz	25 / 180sec	37 / 260sec	55 / 500sec	125 / 1100sec
	60Hz	20 / 150sec	30 / 210sec	50 / 440sec	105 / 900sec
Adjustment method	Adjustment trimmer				

**With servo unit**

**Potentiometer and extra position limit switch (non-voltage)**

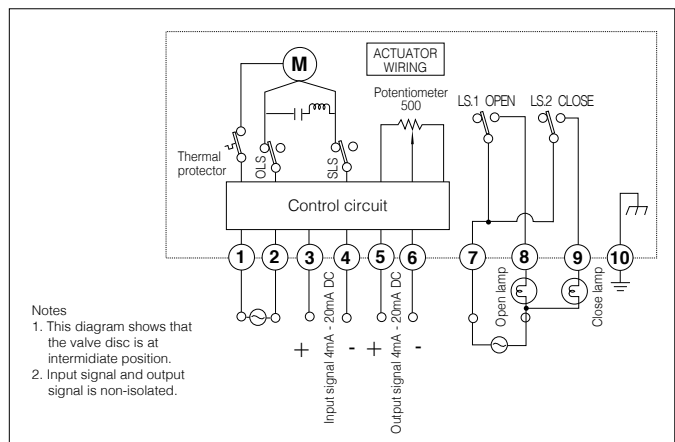
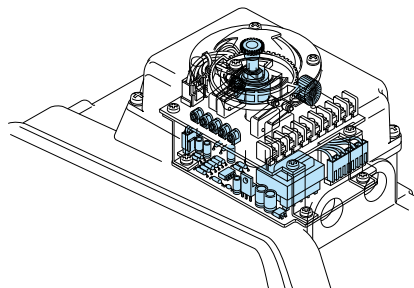
● Purpose

Control the valve opening degree proportionally  
 Input signal : 4 to 20mA DC (1 to 5V DC, 0 to 10V DC as option)  
 Output signal : 4 to 20mA DC

For full-open / full-close : contact output

● Option

Servo unit 500Ω potentiometer



Notes

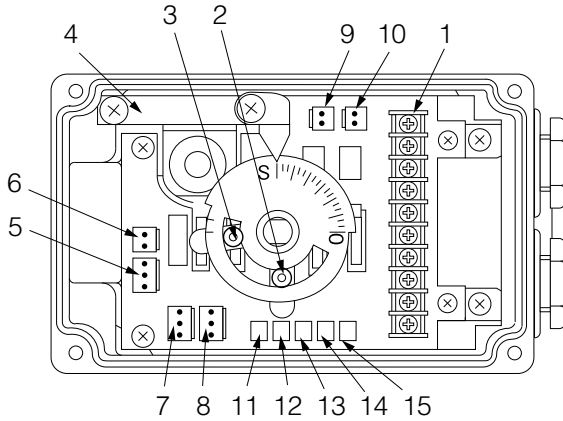
1. This diagram shows that the valve disc is at intermediate position.
2. Input signal and output signal is non-isolated.

Notes

1. The contact capacity of the extra limit switch is 250 VAC-10 A (min. 0.1 A). For anything below this contact capacity (1 mA to 100 mA, 5 to 30 V), please use specifications for minute loads.

## Parts list for New ELMY (Type 0 to 4)

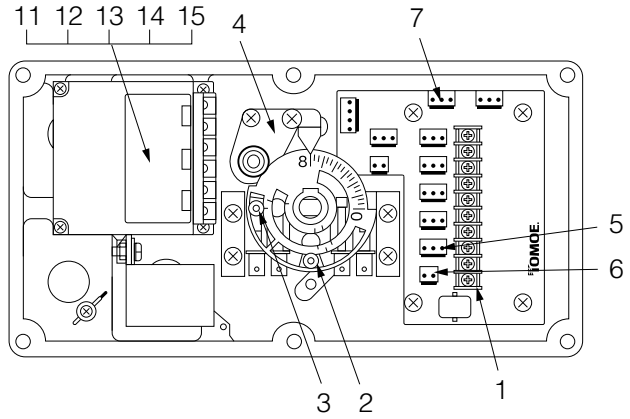
### With servo unit inside of types 0, 1, 2 and 2.5



1 Terminal	9 RA: wiring connector
2 Dog for open position	10 DA: wiring connector
3 Dog for closed position	11 Trimmer for hysteresis adjustment
4 Potentiometer	12 Trimmer for zero adjustment
5 Connector for motor	13 Trimmer for span adjustment
6 Connector for motor capacitor	14 Trimmer for output zero adjustment
7 RA: connector for potentiometer	15 Trimmer for output span adjustment
8 DA: connector for potentiometer	

Remarks: When Z1 is adjusted, then please adjust S1 too.  
When Z2 is adjusted, then please adjust S2 too.

### With servo unit inside of types 3 and 4

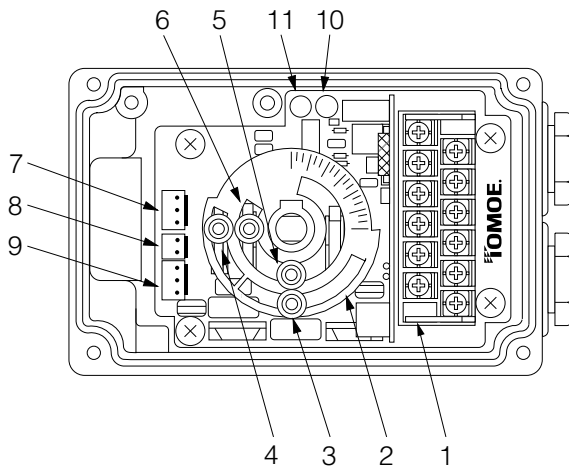


1 Terminal	7 RA: connector for potentiometer
2 Dog for open position	11 Trimmer for hysteresis adjustment
3 Dog for closed position	12 Trimmer for zero adjustment
4 Potentiometer	13 Trimmer for span adjustment
5 Connector for motor	14 Trimmer for output zero adjustment
6 Connector for motor capacitor	15 Trimmer for output span adjustment

Remarks: When Z1 is adjusted, then please adjust S1 too.  
When Z2 is adjusted, then please adjust S2 too.

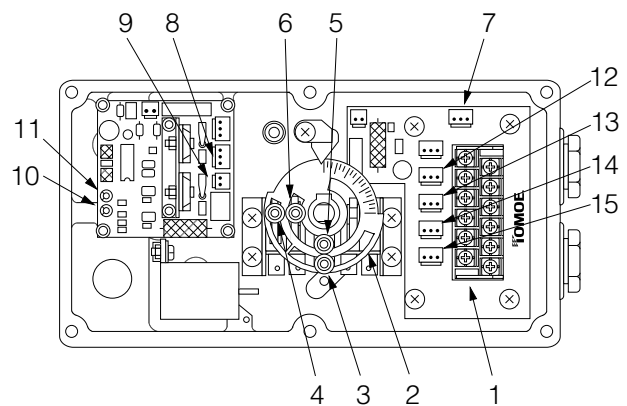
## Parts list for New ELMY with speed controller unit (Type 0 to 4)

### Inside of types 0, 1, 2 and 2.5



1 Terminal	7 Connector for potentiometer
2 Limit switch cam	8 Connector for motor capacitor
3 Dog for open position	9 Connector for motor
4 Dog for closed position	10 Trimmer for closed position
5 Dog for open signal	11 Trimmer for open position
6 Dog for closed signal	

### Inside of types 3 and 4





1 Terminal	9 Connector for motor
2 Limit switch cam	10 Trimmer for closed position
3 Dog for open position	11 Trimmer for open position
4 Dog for closed position	12 Connector for open signal
5 Dog for open signal	13 Connector for closed signal
6 Dog for closed signal	14 Connector for open limit switch
7 Connector for potentiometer	15 Connector for closed limit switch
8 Connector for motor capacitor	

**New ELMY Adjustable operating speed (Type 0 to 4)**

Stroke time for open to close and close to open can be set independently.  
See the trimmer position for operating speed adjustment.

**Trimmer position and stroke time**

Position		Type 0, 1 and 2		Type 2.5		Type 3		Type 4	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
1		25 sec	20 sec	37 sec	30 sec	55 sec	50 sec	120 sec	105 sec
		Tolerance 5 sec				Tolerance 5 sec			
2		90 sec	70 sec	130 sec	110 sec	250 sec	220 sec	500 sec	450 sec
		Tolerance 20 sec				Tolerance 40 sec			
3		180 sec	150 sec	260 sec	210 sec	500 sec	440 sec	1100 sec	900 sec
		Tolerance 40 sec				Tolerance 80 sec			
4		360 sec	300 sec	520 sec	440 sec	1000 sec	880 sec	2000 sec	1800 sec
		Tolerance 100 sec				Tolerance 200 sec			

- (1) Carry out the procedure after the limit switch and stopper bolt are set.
- (2) Adjust the trimmer with a screwdriver following the table above.
- (3) Standard stroke time can be set by turning the trimmer fully in the clockwise direction.
- (4) Stroke time can be adjusted by turning the trimmer counterclockwise.
- (5) The above stroke time is just criteria. Please confirm actual operation time.

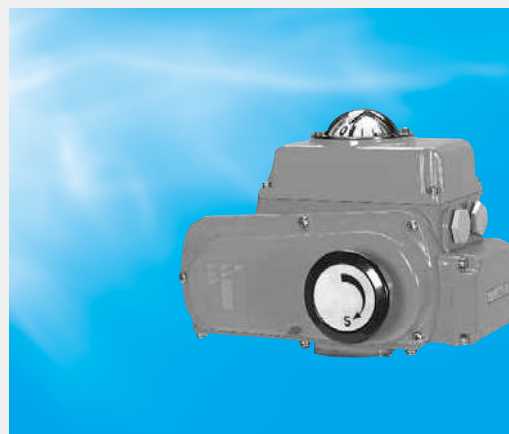
### New ELMY Rated current

Type	Motor voltage (V)	Impressed voltage (V)	Frequency (Hz)	Starting current (A)	Rated current (A)	Note
00	100	100	50	0.8	0.40	
			60	0.8	0.40	
	110		50	1.0	0.50	
			60	1.0	0.50	
	200	200	50	0.5	0.25	
			60	0.5	0.25	
220	50		0.7	0.30		
	60		0.7	0.30		
0	100	100	50	1.2	0.50	
			60	1.2	0.50	
	110		50	1.4	0.60	
			60	1.4	0.60	
	200	200	50	0.5	0.25	
			60	0.5	0.25	
220	50		0.7	0.30		
	60		0.7	0.30		
1	100	100	50	1.6	0.70	
			60	1.4	0.60	
	110		50	1.7	0.90	
			60	1.7	0.70	
	200	200	50	0.7	0.40	
			60	0.7	0.30	
	220		50	0.8	0.50	※
			60	0.9	0.40	※
	220	220	50	0.7	0.40	
			60	0.7	0.30	
240	240	50	0.6	0.30		
		60	0.6	0.30		
2 2.5	100	100	50	2.4	0.90	
			60	2.4	1.20	
	110		50	2.5	1.00	
			60	2.5	1.20	
	200	200	50	1.1	0.50	
			60	1.1	0.80	
	220		50	1.2	0.60	※
			60	1.2	0.80	※
	220	220	50	1.1	0.50	
			60	1.0	0.50	
240	240	50	0.9	0.50		
		60	0.9	0.60		
3 4	100	100	50	5.1	1.60	
			60	4.8	1.70	
	110		50	6.1	1.70	
			60	6.6	1.80	
	200	200	50	2.6	0.80	
			60	2.4	1.00	
	220		50	3.1	0.90	※
			60	3.0	1.00	※
	220	220	50	2.3	0.70	
			60	2.3	0.80	
240	240	50	2.1	0.60		
		60	2.2	0.60		

\*※\* means not available as standard specification. Values are provided as reference.

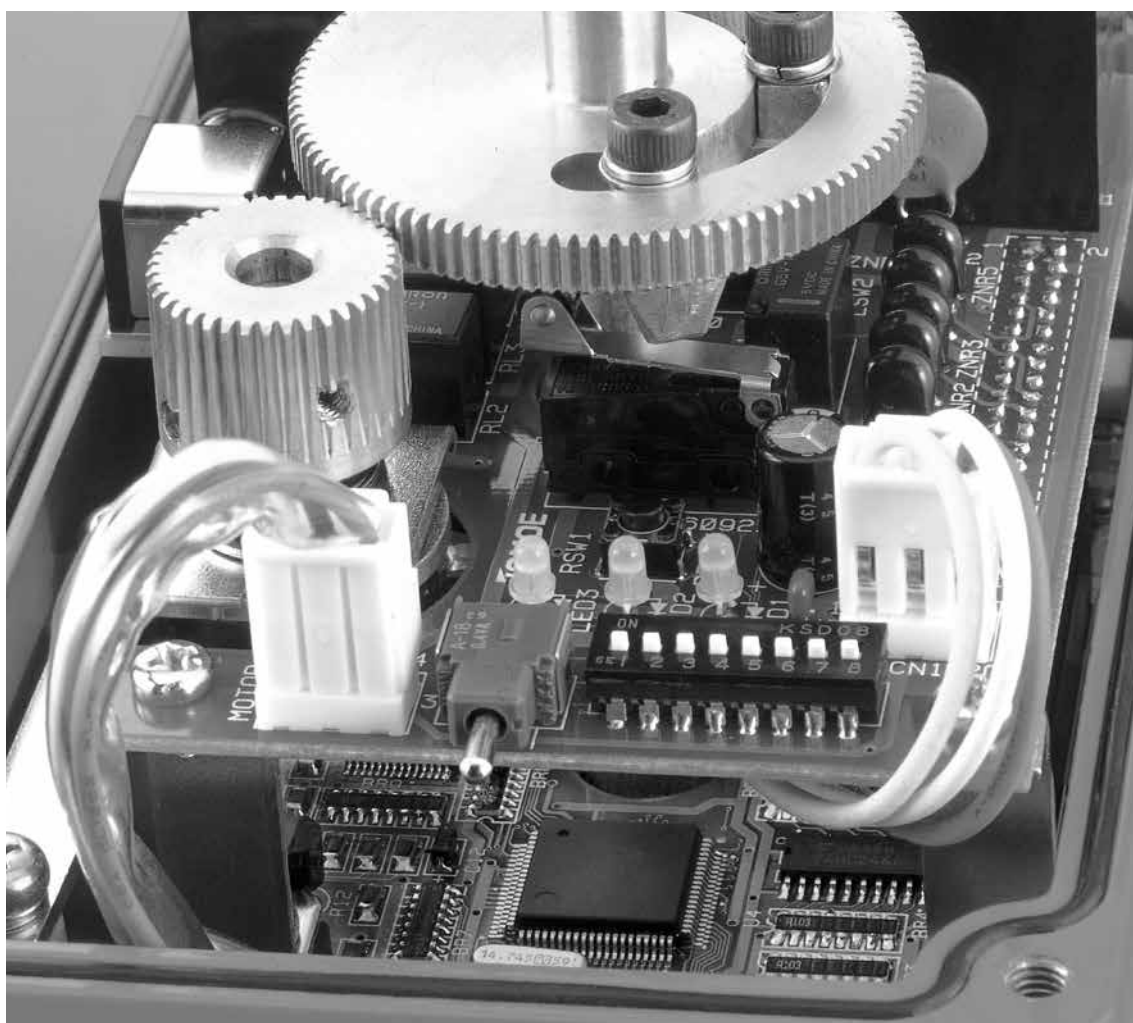
# New MICOM ELMY III

The New MICOM ELMY III offers highly accurate controllability, and its various functions are easily set via communication with a personal computer.



## ■ Controller features

- Flow characteristics can be set at work site with PC.
- High reliability
- Adjustable operating speed
- Multiple functions
- Compact



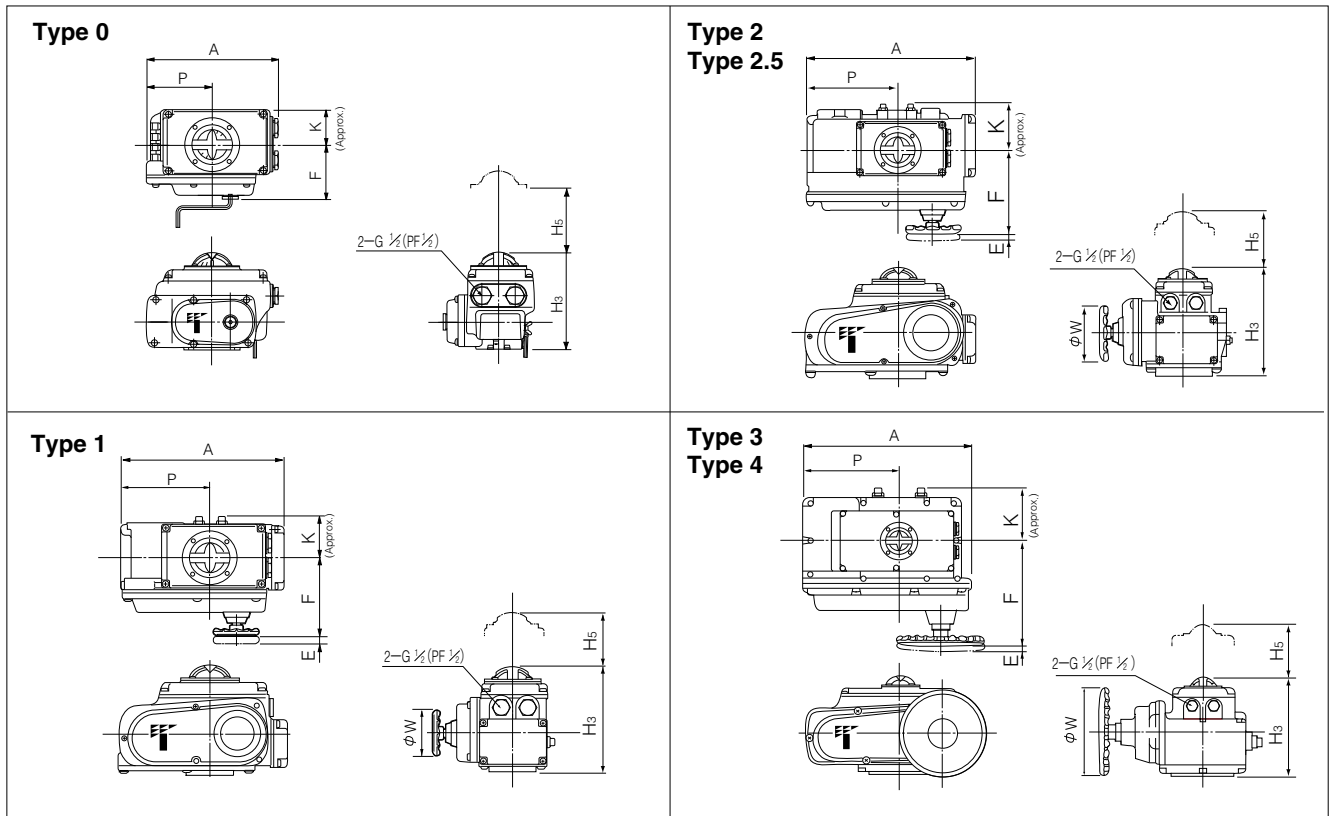


New MICOM ELMY III Specifications (Controller)	
<b>Model</b>	New MICOM ELMY II
<b>Input signal</b>	4 to 20 mA DC (Internal impedance 250Ω) or 1-5V DC. 0-5V, 0-10V, 1-10V, input to the potentiometer (option)
<b>Non-voltage contact input</b>	Open/close signal (a contact)
<b>Output signal</b>	4 to 20mA DC (load resistance 300 Ω)
<b>Non-voltage contact output</b>	Open/close contact signal (Capacity AC220V-0.3A, DC24V-1A) Alarm output for hunching and thermal rising (Capacity AC220V-0.3A, DC24V-1A) Power off output for excessive torque and thermal rising (Capacity AC220V-0.3A, DC24V-1A)
<b>Hunting interval setting function</b>	When high frequency operation is detected, the operation is avoided through automatic input signal hysteresis adjustment. 2 hours later, the input signal hysteresis is automatically restored to the value at the time of shipment.
<b>Positioning accuracy</b>	± 1% (For operation range of 90 degrees, input signal amplitude of 16mA during linear operation.)
<b>Resolution</b>	1/200 (For operation range of 90 degrees, input signal amplitude of 16mA during linear operation.)
<b>Flow characteristic variation</b>	- CV linear characteristic settings CV linear data for concentric valve (The data is built into the main body.) CV linear data for control valve (The data is built into the main body.) CV linear data for three-way valve (The data is built into the main body.) - Flow linear characteristic data (Configurable with the setting program.)
<b>Input signal mode</b>	Direct, reverse
<b>Input signal failure mode</b>	Enters when DC is 1 mA or less for 5 seconds Movement to full-close position, movement to full-open position (Selectable with the main body dip switch) Movement to specified opening (Configurable with the setting program)
<b>Output signal mode</b>	Direct, reverse
<b>Analog input signal hysteresis adjustment</b>	4% (±0.2%) Configurable from 1% (±0.5%) to 8% (±4.0%) in increments of 0.5% using the rotary switch on the circuit board.
<b>Opening/Closing speed adjustment</b>	Configuration of control range and opening/closing speed (5 levels) is available. (Configurable with the setting program)
<b>Protection function</b>	Mechanical stopper: Full-close/Full-open adjusting bolt system
<b>Ambient temperature/humidity</b>	-10°C to 50°C / 95%RH (Without air frost)
<b>Storage temperature/Humidity</b>	-20°C to 60°C / 95%RH (Without air frost)
<b>Vibration environment</b>	Vibration frequency: Less than 70Hz The acceleration should be 2G or less. Vibration frequency: 70Hz - 120Hz The acceleration should be 1.5G or less.

Resolution is set at 1/100 at the time of shipment. If any other resolution is required, please contact us.

New MICOM ELMY III Specifications (Actuator)						
Type	Type 0	Type 1	Type 2	Type 2.5	Type 3	Type 4
<b>Output torque (N·m)</b>	70	98	196	333	981	2000
<b>Power source (V)</b>	AC 100V, 200V, 220V (Voltage regulation ±10%) Single phase 50/60Hz					
<b>Motor capacity (W)</b>	8W	20W	30W		90W	
<b>Operating range</b>	0 to 90 degrees					
<b>Travel time (50/60Hz) (sec)</b>	25/20 sec(0 to 90 degrees)			37/30 sec (0 to 90 degrees)	55/50 sec (0 to 90 degrees)	125/105 sec (0 to 90 degrees)
<b>Insulation</b>	Class E					
<b>Enclosure</b>	JIS C 0920 (IP 65), Class 5, dust and water-jet proof type					
<b>Motor protection</b>	Thermal protector					
<b>Conduit connections</b>	G1/2(PF1/2)2 port					
<b>Manual operation</b>	Detachable handle	Declutchable handwheel				
<b>Motor protection</b>	Built-in thermal protector					
<b>Mechanical stopper</b>	End of travel positioning bolt					
<b>Paint finish</b>	Epoxy-melanin baked (Tomoe green)					

New MICOM ELMY III Dimensions diagram

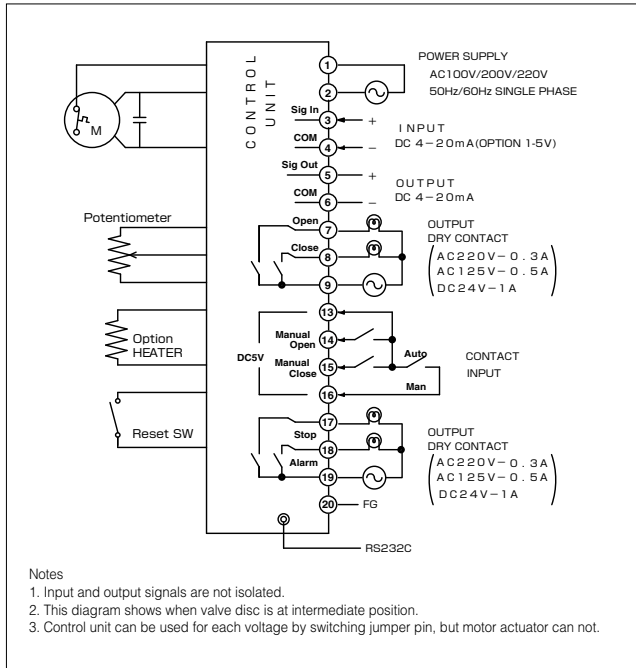


New MICOM ELMY III Dimensions

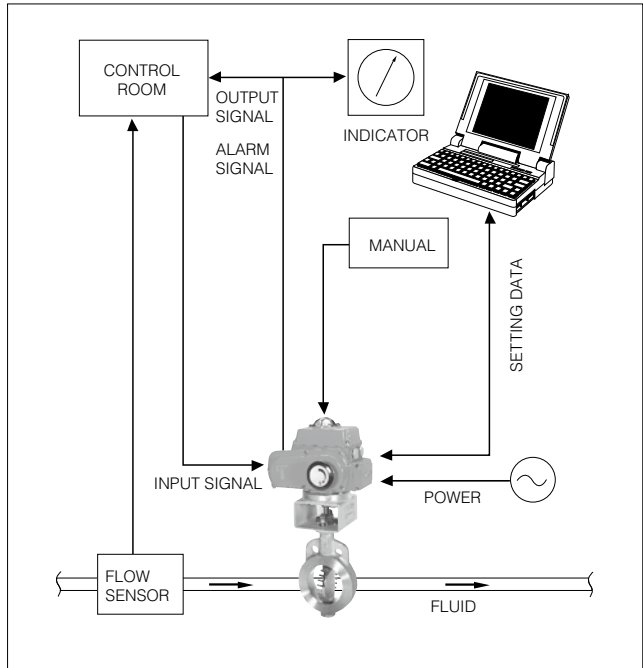
Motor type	Dimensions (mm)								Approx. Mass (kg)
	H <sub>3</sub>	H <sub>5</sub>	P	A	E	F	K	φW	
Type 0	185	100	100	202	43	85	54	—	4.2
Type 1	191(193)	100	138	252	12	126	65	70	6.4
Type 2	224(227)	100	167	310	14	154	85	100	11.2
Type 2.5	224(227)	100	167	310	14	154	85	100	12.8
Type 3	255(258)	100	223	388	23	246	136	200	23.2
Type 4	255(258)	100	223	388	23	246	136	280	28.3

( ) shows non-ISO top dimension  
 The figure in ( ) is for other than 700G.

## New MICOM ELMY III Wiring diagram



## New MICOM ELMY III Operation



## New MICOM ELMY III Control functions

Setting function	Setting Method		Standard Factory Settings
	PC Software	Main Body DIP Switch	
Valve opening zero-span setting	×	○	0 to 90 or 0 to 70 degrees
Analog input signal zero-span setting	×	○	4-20 mA
Analog output signal zero-span setting	×	○	4-20 mA
Analog input signal off operation designation (Action at the time of abnormal situation)	Setting of any given opening	Emergency stop/ Full close/Full open	Emergency stop
Signal off setting value change	○	×	1mA or less continues for 5 seconds
Angle processing hysteresis setting	○	×	1% (±0.5%)
Flow correction setting	○	Signal linear, CV linear for concentric valve, CV linear for eccentric valve, CV linear for special use	No correction (Signal linear)
High frequency operation condition	○	×	Time for judgement: 180 seconds Frequency of operation: 70 Operation angle range: 1% to 10%
High frequency operation avoidance condition	○	×	Signal hysteresis transition 1%(±0.5%) Interval limit hysteresis 8%(±4%) Automatically returns to input signal hysteresis specified with the rotary dip switch after 2 hours
High frequency operation judgment condition	○	×	When signal hysteresis exceeds 8% (±4%) for hunting interval
Abnormal output shaft judgment condition	○	×	90 seconds
Temperature monitoring judgment condition	○	×	Alarm 50°C
Logging data transmittance	○	×	—
Display of setting data	○	×	—

## New MICOM ELMY III Initial setting mode at the time of shipment

Input signal	Reverse action
Output signal	Reverse action
Flow rate adjustment	No adjustment
Action at the time of abnormal situation	Emergency stop
Analog input signal hysteresis adjustment	4%(±2%)

## New MICOM ELMY III Operating system

Usage environment	RS232C interface (Connector: D-sub 9-pin) PC that can run Windows XP, Vista, Windows 7
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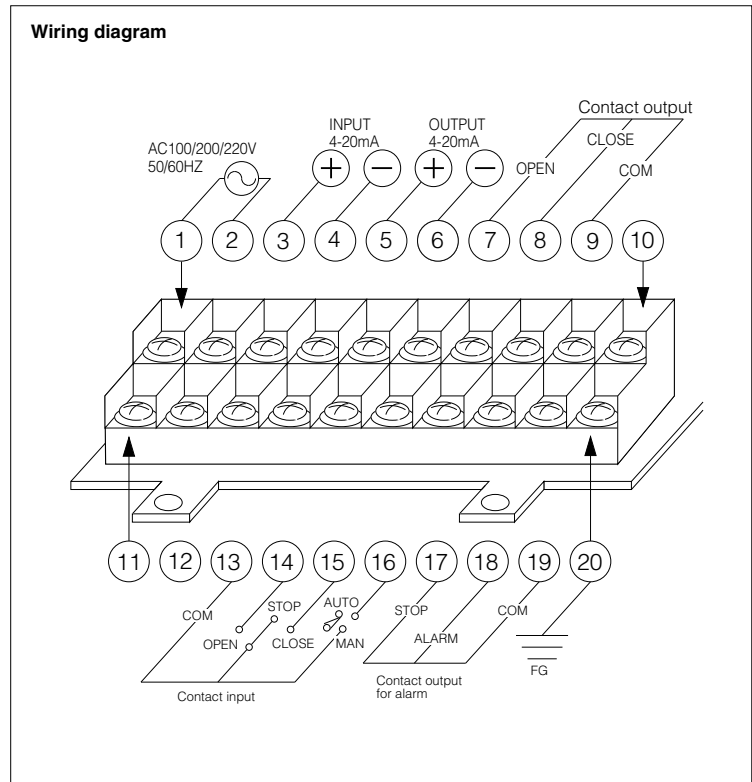
New MICOM ELMY III Terminal board

Notes

1. Input and output signals are not insulated.
2. Use FG terminal for earth.
3. At insulation test, note that a varistor is mounted on the control circuit board.

Terminal block screw size: M3 (with washer)

Wiring diagram



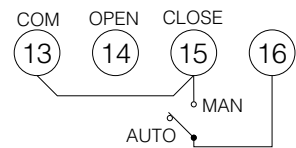
New MICOM ELMY III Contacts

Terminals

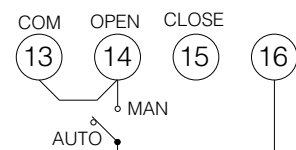
	Terminal No.	Purpose	Capacity
Contact output	No. 7 (OPEN)	Outputs at full open position	AC220V-0.3A DC125V-0.5A DC24V-1A
	No. 8 (CLOSE)	Outputs at full closed position	
	No. 9 (COM)	COM for No. 7 and 8 terminals	
	No. 17 (STOP)	Outputs when abnormally stopped <sup>1</sup>	
	No. 18 (ALARM)	Outputs when alarm signal transmitted <sup>2</sup>	
	No. 19 (COM)	COM for No. 17 and 18 terminals	
Contact input	No. 13 (COM)	COM for No. 14, 15 and 16 terminals	
	No. 14 (OPEN)	Connect No. 13 when valve moves toward open direction	
	No. 15 (CLOSE)	Connect No. 13 when valve moves toward closed direction	
	No. 16 (AUTO/MAN)	Switching of auto and manual operation.	

\*1: No. 17 works during signal failure, abnormal torque or temperature increase.  
\*2: No. 18 works during hunting or abnormal temperature increase.

Wiring diagram example for combination of auto and manual Operation by 4-20 mA signal. Closed during manual operation.



Operation by 4-20 mA signal. Open during manual operation.



## New MICOM ELMY III Function and dip switch position

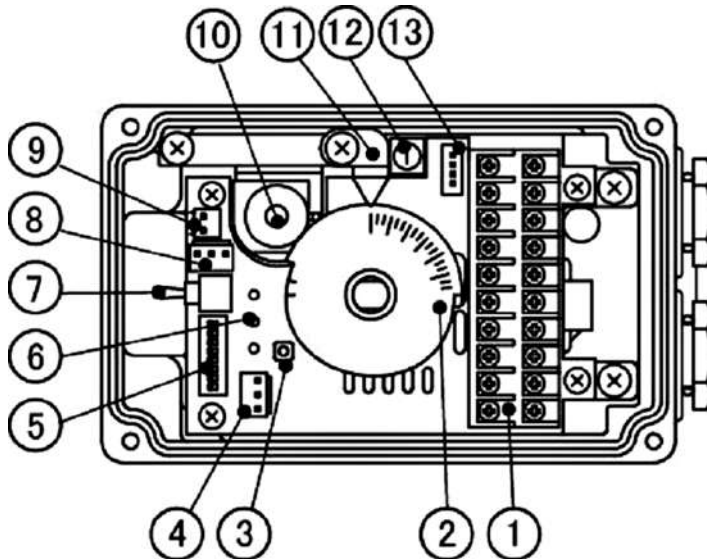
Setting item	Setting of dip switch								
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	
<b>Input signal</b>									
Reverse action	OFF							OFF	OFF
Direct action	ON							OFF	OFF
<b>Output (feedback) signal</b>									
Reverse action		OFF						OFF	OFF
Direct action		ON						OFF	OFF
<b>Opening degree adjustment</b>									
None(Linear in accordance with signal)			OFF	OFF				OFF	OFF
Cv linear for concentric valve			OFF	ON				OFF	OFF
Cv linear for eccentric valve			ON	OFF				OFF	OFF
For customer use			ON	ON				OFF	OFF
<b>Signal failure mode</b>									
Stop					OFF	OFF	OFF	OFF	OFF
Fully open					ON	OFF	OFF	OFF	OFF
Fully close					OFF	ON	OFF	OFF	OFF
Memorized opening degree					ON	ON	OFF	OFF	OFF

### Notes

1. Reset is necessary after switching.
2. An asterisk means all setting data (such as valve opening degree, input signal, zero span of output single, etc.) will be initialized.
3. Input signal: Reverse action: signal increase open  
Direct action: signal increase close
4. Output signal: Reverse action: valve open signal increase  
Direct action: valve close signal increase
5. Shaded areas mean initial setting mode at the time of shipment.

New MICOM ELMY III Parts list

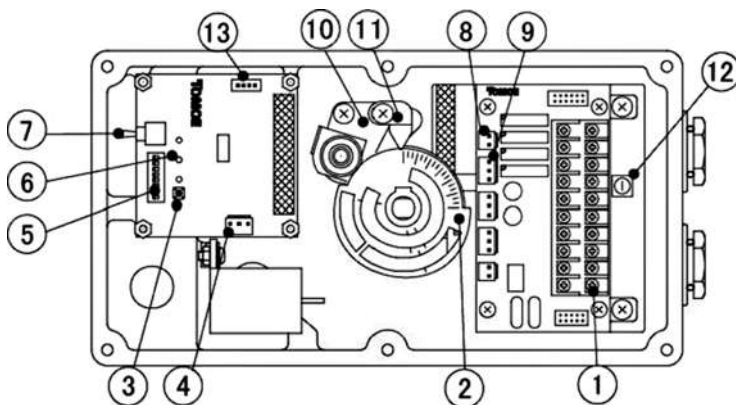
Types 0, 1, 2 and 2.5



1	Terminal
2	Limit switch cam
3	Reset switch
4	Connector for potentiometer
5	Dip switch
6	LED
7	Toggle switch
8	Connector for motor
9	Connector for motor capacitor
10	Potentiometer
11	Sub-indicator
12	Rotary dip switch
13	Connector for interface

New MICOM ELMY III Parts list

Types 3 and 4



1	Terminal
2	Limit switch cam
3	Reset switch
4	Connector for potentiometer
5	Dip switch
6	LED
7	Toggle switch
8	Connector for motor
9	Connector for motor capacitor
10	Potentiometer
11	Sub-indicator
12	Rotary dip switch
13	Connector for interface

**New MICOM ELMY III Recommended fuse and non-fuse breaker**

Type	Power source and frequency	Recommended capacity for fuse	Recommended capacity for non-fuse breaker
0, 1	100V/110V (50Hz/60Hz)	3A	3A
	200V/220V (50Hz/60Hz)	2A	2A
2, 2.5	100V/110V (50Hz/60Hz)	5A	5A
	200V/220V (50Hz/60Hz)	3A	3A
3, 4	100V/110V (50Hz/60Hz)	10A	10A
	200V/220V (50Hz/60Hz)	7A	7A

# PMK-SRF

The PMK-SRF is an electrical spring return type actuator that does not require a power supply unit and protects your piping from damage during emergencies. It serves as a safety countermeasure for various fluid lines, from water, sewage and steam lines, to chemical and powder lines.



## ■ Features

- Reliable motorized spring return system
- Does not require a power supply unit
- On and off operations, proportional control, and emergency shut-off all in one device

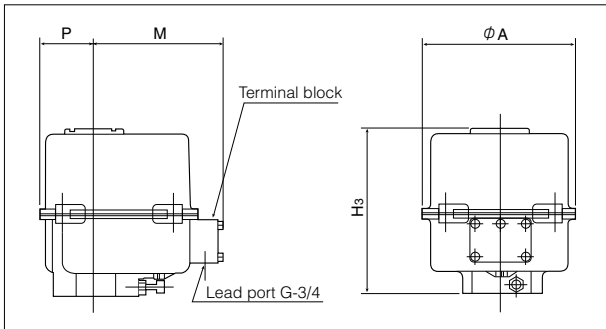
PMK-SRF Type Standard Specifications

Type	PMK-005SRF		PMK-010SRF		PMK-030SRF		
Output torque	49N·m		98N·m		294N·m		
Motor power source	AC100V 50/60Hz	AC200V 50/60Hz	AC100V 50/60Hz	AC200V 50/60Hz	AC100V 50/60Hz	AC200V 50/60Hz	
Current value (A)	Rated	0.5	0.25	0.5	0.25	1.0	0.5
	Startup	1.2	0.6	1.2	0.6	4.0	2.0
Travel time (50/60Hz) (sec)	Opening and closing	18/15		36/30		66/55	
	Emergency shut-off (return)	Max. 3		Max. 5		Max. 10	
Power consumption (VA)	Rated	50	50	50	50	100	100
	Startup	120	120	120	120	400	400
Time rating	30 minutes						
No. of poles	4						
Insulation	Class E						
Motor protection	Thermal protector						
Space heater	Option						
Position limit switch	One each for fully open and fully closed (contact capacity: AC250V, 10A)						
Torque limit switch	None						
Mechanical limit stop	End of travel positioning bolt built-in						
Conduit connections	G3/4 at two ports						
Enclosure	JIS C 0920, Class 4, dust and water-jet proof type (Equivalent IP54)						
Manual operation	None						
Ambient temperature	- 10 to 50 degrees C						
Coating	Silver hammer net (Munsell N7)						
Position	Horizontal/vertical 180° range (Do not install upside down.)						
Options	① Potentiometer (135 Ω, 500 Ω) ② Electro-electro Positioner (4 to 20 mA DC I/O)						

Note: A sun cover is required if you will be using this product outdoors. For details please consult us.



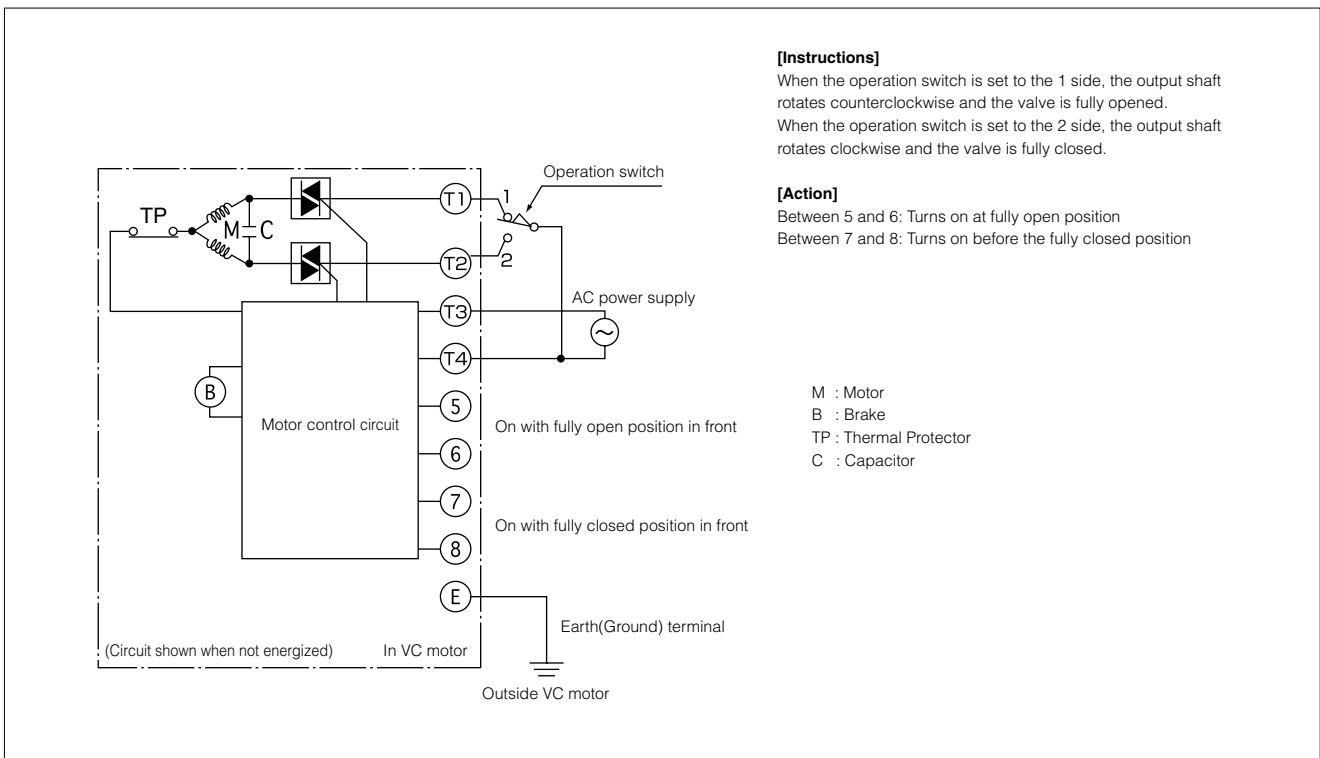
### PMK-SRF Dimensions



### PMK-SRF Dimensions / Weight

Type	Dimension (mm)				Approx. Mass (kg)
	A	M	P	H <sub>3</sub>	
PMK-005SRF	205	191	70.5	221	9
PMK-010SRF	205	191	70.5	284	10
PMK-030SRF	240	215	88	342	23

### PMK-SRF Circuit and Explanation of Operation



# SRJ

SRJ is an electric actuator that can use AC110V/220V single-phase and 220V/440V three-phase current, and is mainly suitable for valve sizes of 300A or less.

It is a completely waterproof type actuator for small rotary valves that rotate 90°. Equipped with a limit switch and torque switch as standard. It is also compatible with Exd II BT4 pressure-resistant, explosion-proof configuration.

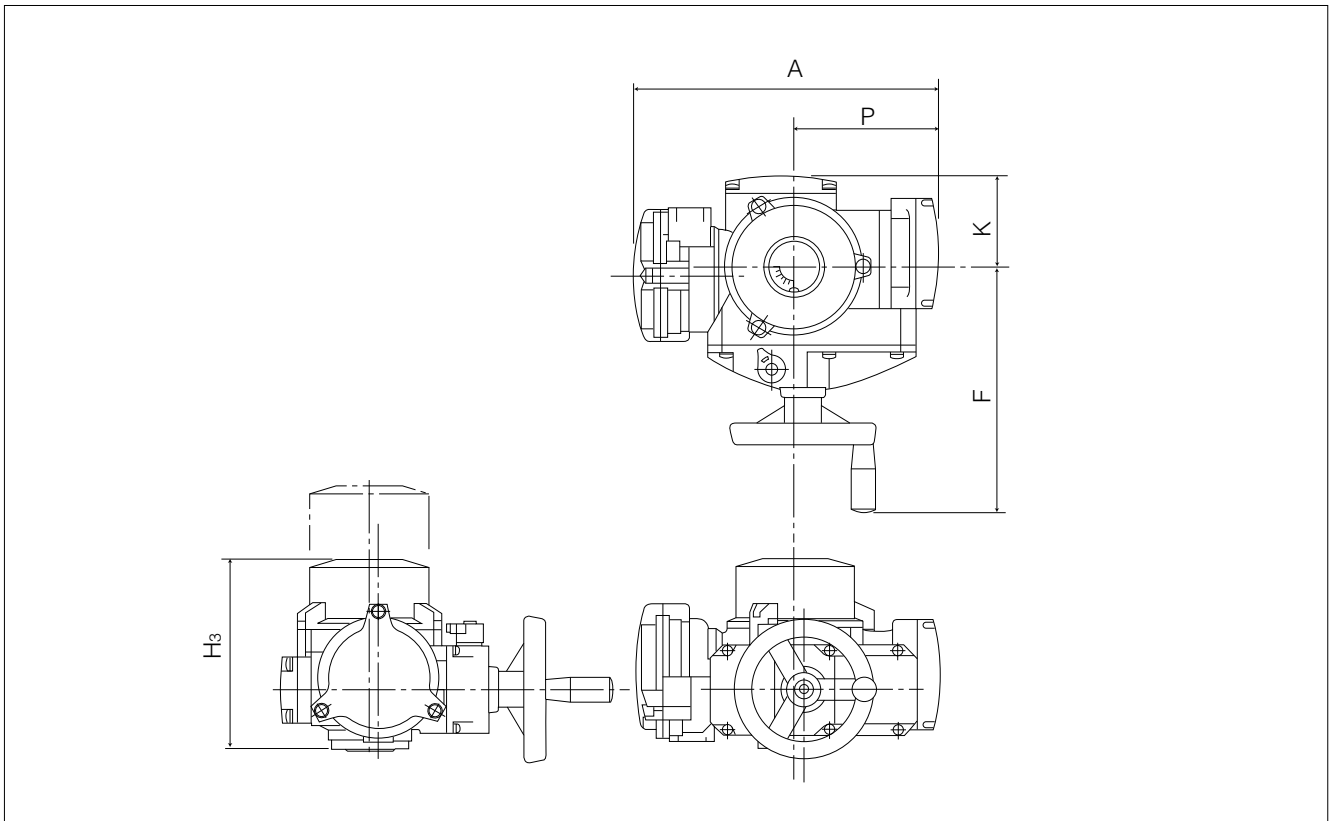


## ■ Features

- Valve opening and closing driven by an electric motor
- Equipped with open / close torque switch as standard
- Equipped with fully closed and fully open position contact output as standard
- Completely waterproof

SRJ Specifications					
Type	SRJ-010	SRJ-020	SRJ-060	SRJ-1	SRJ-2
Output torque (Nm)	125	250	600	1000	2000
Power source	AC100V/110V, 200V/220V 50/60Hz Single-phase AC200V/220V, AC400V/440V 50/60Hz Triple-phase				
Motor capacity (W)	40		100	200	
Travel time (50/60 Hz) (sec.)	Standard time	18/15	36/30		72/60
	Setting at time of order	9/7.5	18/15		36/30
Mass (kg)	13		18	40	
Rating (min.)			15		
Insulation	B				
Motor protection	Thermal protector				
Stopper	Mechanical (full-closure/opening positioning bolt type)				
Position limit switch	Full-closure/opening, torque switch: one each (1a1b non-voltage)				
Torque limit switch	Contact capacity: AC250V-2A (at induction load), Contact capacity: DC125V-0.4A				
Conduit connections	G1, 3 ports				
Enclosure	IP68				
Manual operation	Reserve (round handle switching lever type auto return)				
Handle revolutions (to 90°)	20.8		26	79.4	
Coating	Lacquer primer (Munsell N7)				
Options	① Pressure-resistant, explosion-proof (ExII BT4): Except SRJ-1 and SRJ-2 ② Potentiometer (135Ω, 200Ω and 500Ω) ③ Seimitter (R/I converter) ④ Intermediate valve opening output ⑤ Intermediate valve opening seimitter (Intermediate valve opening output, Seimitter R/I converter) ⑥ Seitroller (Power: single phase only)				

## SRJ Dimensions



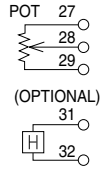
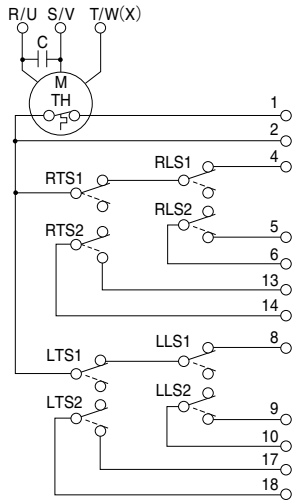
## SRJ Dimensions and Weight

Type	Dimensions (mm)					Approx. Mass (kg)
	H <sub>3</sub>	A	P	F	K	
SRJ-010	218	353	167	272	104	13
SRJ-020	218	353	167	272	104	13
SRJ-060	235	393	191	316	130	18
SRJ-1	296	507	267	354	191	40
SRJ-2	296	507	267	354	191	40

**SRJ Motor Rated Current**

Type	Power source (V)	Frequency (Hz)	Single-phase motor		Three-phase motor	
			Starting current (A)	Rated current (A)	Starting current (A)	Rated current (A)
SRJ-010 SRJ-020	100	50	2.31	1.40	—	—
		60	2.34	1.44	—	—
	110	50	2.61	1.73	—	—
		60	2.59	1.50	—	—
	200	50	1.20	0.72	1.27	0.53
		60	1.19	0.78	1.19	0.45
	220	50	1.34	0.88	1.40	0.59
		60	1.33	0.80	1.28	0.48
	400	50	—	—	0.63	0.26
		60	—	—	0.58	0.22
	440	50	—	—	0.68	0.29
		60	—	—	0.63	0.23
SRJ-060	100	50	3.25	2.44	—	—
		60	3.38	2.48	—	—
	110	50	3.60	2.74	—	—
		60	3.71	2.50	—	—
	200	50	1.86	1.56	1.89	0.74
		60	1.82	1.13	1.77	0.67
	220	50	2.04	1.84	2.00	0.76
		60	2.01	1.27	1.92	0.67
	400	50	—	—	0.94	0.37
		60	—	—	0.90	0.34
	440	50	—	—	0.99	0.39
		60	—	—	0.97	0.34
SRJ-1 SRJ-2	100	50	9.33	4.98	—	—
		60	9.63	7.43	—	—
	110	50	10.27	5.15	—	—
		60	10.56	7.43	—	—
	200	50	4.34	2.18	4.57	1.10
		60	4.45	3.00	4.31	0.99
	220	50	4.87	2.28	5.07	1.06
		60	4.91	2.99	4.76	0.96
	400	50	—	—	2.35	0.53
		60	—	—	2.24	0.48
	440	50	—	—	2.48	0.52
		60	—	—	2.48	0.47

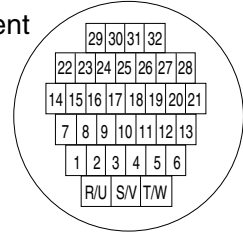
## SRJ Wiring Diagram (Single-phase)



Switch	Terminal No.	Degree of valve opening	
		Left limit	Right limit
RLS1	1-4	—————	—————
RLS2	5-6	—————	—————
LLS1	1-8	—————	—————
LLS2	9-10	—————	—————

————— : Contact ON    - - - - - : Contact OFF

### Terminal arrangement



13-14 : ON at right limit direction over-torque  
 1-4 : OFF at right limit direction over-torque  
 17-18 : ON at left limit direction over-torque  
 1-8 : OFF at left limit direction over-torque  
 31-32 : Heater power terminal

### Direction of rotation

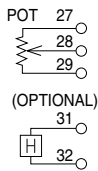
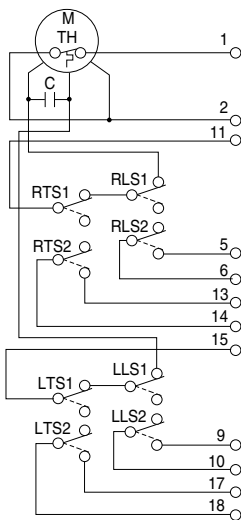
Single phase: Clockwise at R - (U), T - (X)  
 Single phase: Counterclockwise at R - (V), T - (X)  
 Direction of rotation refers to direction from the valve controller to the valve

Comment from Tomoe Valve:  
 If the control power supply is DC, please refrain from using the thermal protector as the contacts may be fused. (Terminal No. 1)

### Definition of codes

RLS1, RLS2 : Right directional rotation limit switch  
 LLS1, LLS2 : Left directional rotation limit switch  
 RTS1, RTS2 : Right directional rotation torque switch  
 LTS1, LTS2 : Left directional rotation torque switch  
 M : Motor  
 TH : Thermal protector  
 H : Heater  
 C : Condenser  
 POT : Potentiometer (option)

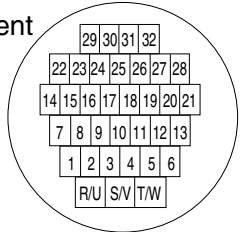
## SRJ Wiring Diagram (Single-phase 3-wire)



Switch	Terminal No.	Degree of valve opening	
		Left limit	Right limit
RLS1	1-11	—————	—————
RLS2	5-6	—————	—————
LLS1	1-15	—————	—————
LLS2	9-10	—————	—————

————— : Contact ON    - - - - - : Contact OFF

### Terminal arrangement



13-14 : ON at right limit direction over-torque  
 1-11 : OFF at right limit direction over-torque  
 17-18 : ON at left limit direction over-torque  
 1-15 : OFF at left limit direction over-torque  
 31-32 : Heater power terminal  
 27,28,29 : Potentiometer terminal

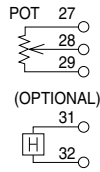
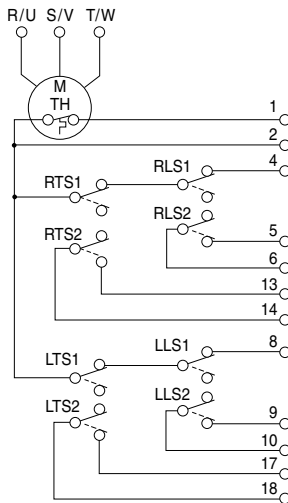
### Direction of rotation

Single phase: Clockwise at R - 1, T - 11  
 Single phase: Counterclockwise at R - 1, T - 15  
 Direction of rotation refers to direction from the valve controller to the valve

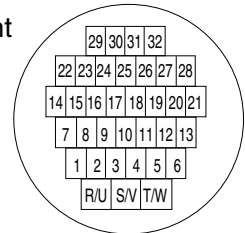
### Definition of codes

RLS1, RLS2 : Right directional rotation limit switch  
 LLS1, LLS2 : Left directional rotation limit switch  
 RTS1, RTS2 : Right directional rotation torque switch  
 LTS1, LTS2 : Left directional rotation torque switch  
 M : Motor  
 TH : Thermal protector  
 H : Heater  
 C : Condenser  
 POT : Potentiometer (option)

SRJ Wiring Diagram (Three-phase)



Terminal arrangement



Switch	Terminal No.	Degree of valve opening	
		Left limit	Right limit
RLS1	1-4	-----	-----
RLS2	5-6	-----	-----
LLS1	1-8	-----	-----
LLS2	9-10	-----	-----

13-14 : ON at right limit direction over-torque  
 1-4 : OFF at right limit direction over-torque  
 17-18 : ON at left limit direction over-torque  
 1-8 : OFF at left limit direction over-torque  
 31-32 : Heater power terminal

———— : Contact ON    - - - - : Contact OFF

Direction of rotation

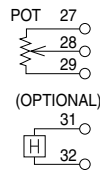
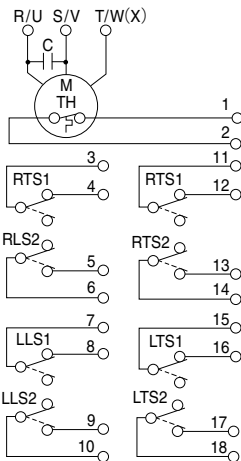
Three-phase: Clockwise at R - (W), S - (V), T - (U)  
 Three-phase: Counterclockwise at R - (U), S - (V), T - (W)  
 Direction of rotation refers to direction from the valve controller to the valve

Comment from Tomoe Valve:  
 If the control power supply is DC, please refrain from using the thermal protector as the contacts may be fused. (Terminal No. 1 )

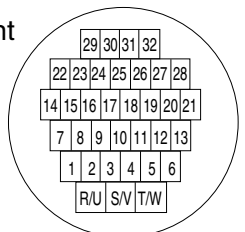
Definition of codes

RLS1, RLS2 : Right directional rotation limit switch  
 LLS1, LLS2 : Left directional rotation limit switch  
 RTS1, RTS2 : Right directional rotation torque switch  
 LTS1, LTS2 : Left directional rotation torque switch  
 M : Motor  
 TH : TH: Thermal protector  
 H : Heater  
 C : C: Condenser  
 POT : POT: Potentiometer (option)

SRJ Wiring Diagram (Single-phase All terminals independent contact)



Terminal arrangement



Switch	Terminal No.	Degree of valve opening	
		Left limit	Right limit
RLS1	3-4	-----	-----
RLS2	5-6	-----	-----
LLS1	7-8	-----	-----
LLS2	9-10	-----	-----

13-14 : ON at right limit direction over-torque  
 11-12 : OFF at right limit direction over-torque  
 17-18 : ON at left limit direction over-torque  
 15-16 : OFF at left limit direction over-torque  
 31-32 : Heater power terminal

———— : Contact ON    - - - - : Contact OFF

Direction of rotation

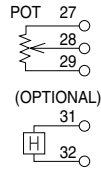
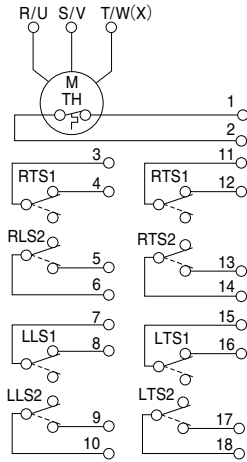
Single phase: Clockwise at R - (U), T - (X),  
 Single phase: Counterclockwise at R - (V), T - (X),  
 Direction of rotation refers to direction from the valve controller to the valve

Comment from Tomoe Valve:  
 If the control power supply is DC, please refrain from using the thermal protector as the contacts may be fused. (Terminal No. 1 )

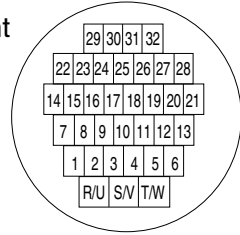
Definition of codes

RLS1, RLS2 : Right directional rotation limit switch  
 LLS1, LLS2 : Left directional rotation limit switch  
 RTS1, RTS2 : Right directional rotation torque switch  
 LTS1, LTS2 : Left directional rotation torque switch  
 M : Motor  
 TH : Thermal protector  
 H : Heater  
 C : Condenser  
 POT : Potentiometer (option)

## SRJ Wiring Diagram (Three-phase, All terminals independent contact)



### Terminal arrangement



Switch	Terminal No.	Degree of valve opening	
		Left limit	Right limit
RLS1	3-4	—	---
RLS2	5-6	---	—
LLS1	7-8	---	—
LLS2	9-10	---	—

13-14 : ON at right limit direction over-torque  
 11-12 : OFF at right limit direction over-torque  
 17-18 : ON at left limit direction over-torque  
 15-16 : OFF at left limit direction over-torque  
 31-32 : Heater power terminal

— : Contact ON    --- : Contact OFF

### Direction of rotation

Three-phase: Clockwise at R - (W), S - (V), T - (U)

Three-phase: Counterclockwise at R - (U), S - (V), T - (W)

Direction of rotation refers to direction from the valve controller to the valve

#### Comment from Tomoe Valve:

If the control power supply is DC, please refrain from using the thermal protector as the contacts may be fused. (Terminal No. 1)

#### Definition of codes

RLS1, RLS2 : Right directional rotation limit switch  
 LLS1, LLS2 : Left directional rotation limit switch  
 RTS1, RTS2 : Right directional rotation torque switch  
 LTS1, LTS2 : Left directional rotation torque switch

M : Motor  
 TH : Thermal protector  
 H : Heater  
 C : Condenser  
 POT : Potentiometer (option)

# SRJ

## SRJ Selection Chart

### 700 Series

Nominal size	mm	40	50	65	80	100	125	150	200	250	300	350	400	450	
	inch	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	
700G		SRJ-010					SRJ-020		SRJ-060			SRJ-1	SRJ-2		
704G / 722F		SRJ-010					SRJ-020		SRJ-060			SRJ-1	SRJ-2		
700S / 720F		SRJ-010					SRJ-020		SRJ-060			SRJ-1	SRJ-2		
732X												SRJ-2			
731P		SRJ-010					SRJ-020		SRJ-060		SRJ-1				
732P		SRJ-010					SRJ-020		SRJ-060	SRJ-1					

### 500 Series

Nominal size	mm	40	50	65	80	100	125	150	200	250	300	350	400	450
	inch	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18
508V			SRJ-010		SRJ-010			SRJ-020	SRJ-060		SRJ-1	SRJ-2		
507V			SRJ-010		SRJ-010			SRJ-020		SRJ-060				

### 300 Series

Nominal size	mm	40	50	65	80	100	125	150	200	250	300	350	400	Nominal size	
	inch	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16		
302Y	TL	SRJ-010					SRJ-020		SRJ-060		SRJ-1	SRJ-2			TL
	TH	SRJ-010			SRJ-020			SRJ-060			SRJ-2				TH
302A	T10				SRJ-010		SRJ-020		SRJ-060		SRJ-1	SRJ-2			Category A
	T20				SRJ-010	SRJ-020		SRJ-060		SRJ-1	SRJ-2				Category B
304Y	T10	SRJ-010					SRJ-020		SRJ-060						T10
	T20	SRJ-010				SRJ-020			SRJ-060						T20
304A	T10				SRJ-010		SRJ-020		SRJ-060				SRJ-2		Category A
	T20				SRJ-010		SRJ-020		SRJ-060				SRJ-2		Category B
					SRJ-010		SRJ-020		SRJ-060						Category C





The LTKD type is a motorized actuator suitable mainly for valve sizes 350A and larger, and uses three-phase 200 V and 400 V power supplies. In addition to on-off control, it can be used for slotting control because of its built-in electric positioner (seitroller). It also supports special specification requirements.



## ■ Features

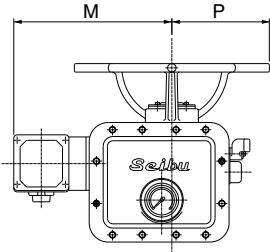
- Utilizes dedicated high-torque motor.
- Highly reliable counter-gear-type cam limit switch
- Output shaft dual sleeve system
- Supports wide range of output torques and open-close times by combining motors of differing capacities.

LTKD Specifications								
Type	LTKD-01		LTKD-02			LTKD-05		LTKD-1
Motor capacity (kW)	0.2	0.4	0.4	0.75	1.5	0.75	1.5	1.5
Weight (kg)	54	56	71	74	79	74	120	176
Power source (V)	AC200, AC220, AC400V, AC440 50/60Hz Three phase							
Rating (min)	15 min. (With brake: 30 min.)							
Number of poles	4							
Insulation	Class B (option class F and H)							
Motor protection	None (Please provide thermal relay separately.)							
Space heater	Supplied as standard specification (Rated power: 15W)							
Position limit switch	1 each for fully open and fully closed (contact capacity: AC250V, 5A)							
Torque limit switch	1 each for fully open and fully closed (contact capacity: AC250V, 15A)							
Brake	Optional (Will not be supplied as standard.)							
Conduit connection	G1 at two locations (for control) and G3/4 (for motor)							
Enclosure	JIS C 0920 (IP 55), class 5, dust and water-jet proof type							
Manual operation	Always (round handle and built-in manual return clutch)							
Ambient temperature	- 10 to 50 degrees C							
Coating	Lacquer primer (Munsell N7)							
Options	①Potentiometer 500Ω, 1kΩ ②Intermediate limit switch (no voltage) ③Synchro receiver, transmitter ④Seimitter (R/I converter) ⑤Seitroller (DC4 to 20mA I/O) ⑥Withstand pressure anti-explosion type (d2G4)							

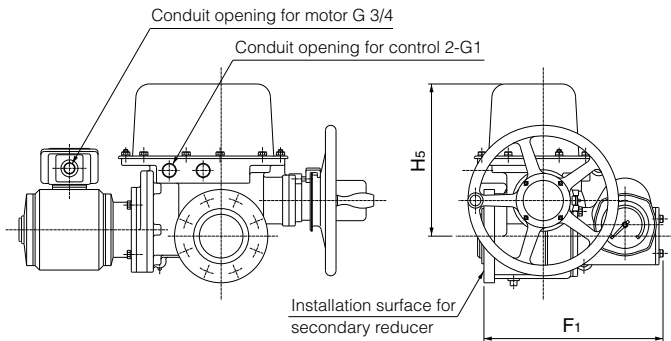
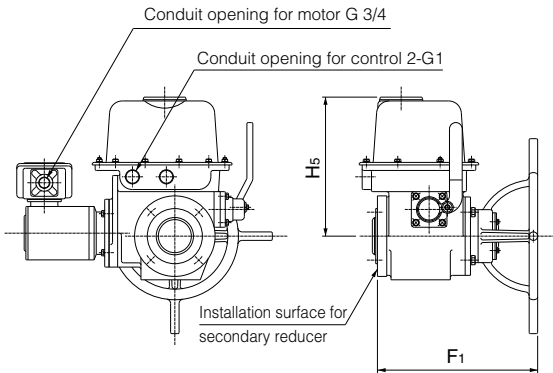
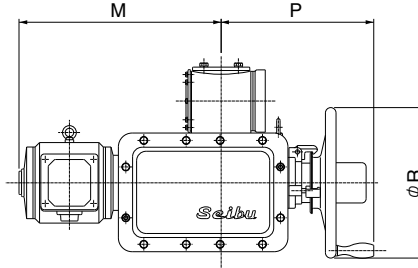
Remark: Open and close time differs depending on motor gear ratio (number of sleeve rotations) and type of secondary reducer.

## LTKD Dimensions

**LTKD-01, 02**



**LTKD-05, 1**



## LTKD Dimensions and Weight

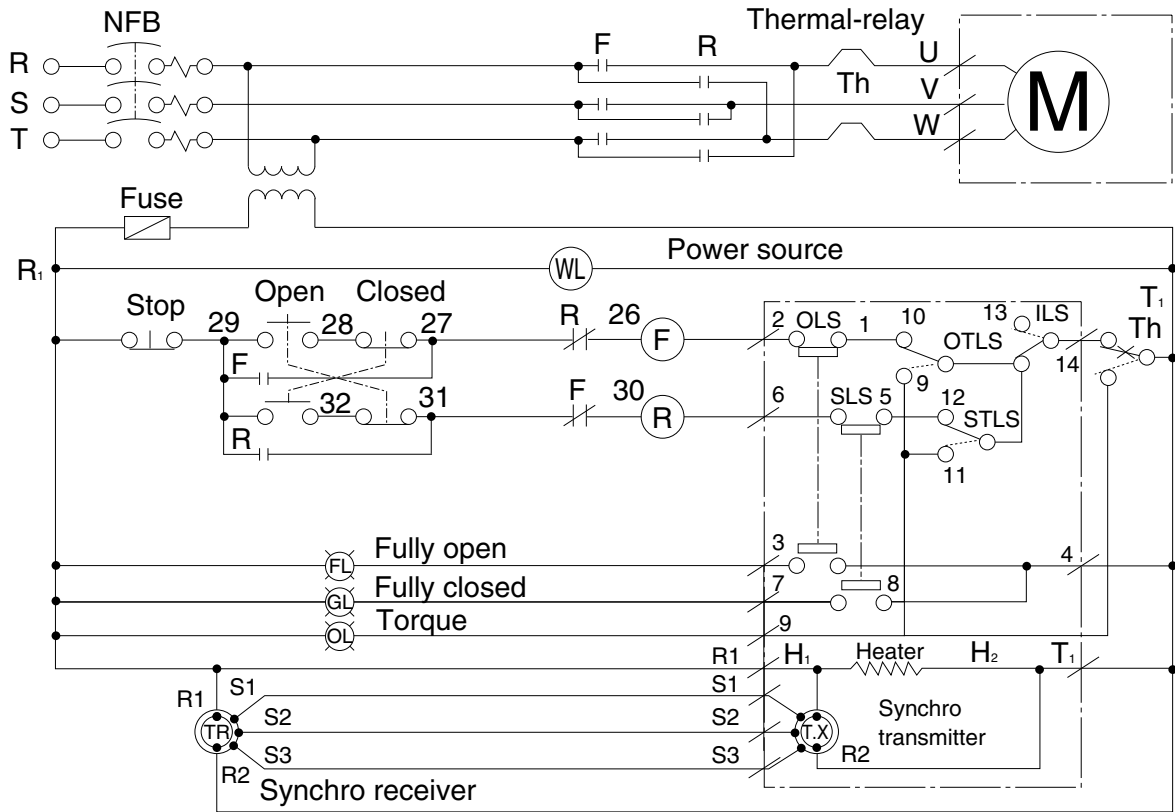
Type	Motor capacity	Dimensions (mm)					Approx. Mass (kg)
		M	P	F <sub>1</sub>	H <sub>5</sub>	R	
LTKD-01	0.2kW	364	230	342	293	—	54
	0.4kW	357	230	342	293	—	56
LTKD-02	0.4kW	357	230	378	328	—	71
	0.75kW	375	230	378	328	—	74
LTKD-05	1.5kW	403	230	378	328	—	79
	0.75kW	443	360	422	359	160	115
LTKD-1	1.5kW	464	360	422	359	160	120
	1.5kW	503	410	488	399	160	170

Remark: The table above shows dimensions for an actuator with a motor without brake.

**LTKD Motor currents**

Type	Impressed voltage (V)	Frequency (Hz)	No brake (Type B and Standard)		With brake (Type B and Option)	
			Rated current (A)	Starting current (A)	Rated current (A)	Starting current (A)
0.2kW	200	50	1.8	7.6	1.8	7.6
	200	60	1.4	6.9	1.4	6.9
	220	50	—	—	—	—
	220	60	1.5	7.6	1.5	7.6
	400	50	0.91	3.9	0.91	3.9
	400	60	0.75	3.6	0.75	3.6
	440	50	—	—	—	—
	440	60	0.78	4.0	0.78	4.0
0.4kW	200	50	2.5	10.2	2.5	10.2
	200	60	2.2	9.6	2.2	9.6
	220	50	—	—	—	—
	220	60	2.2	9.6	2.2	10.6
	400	50	1.2	4.6	1.2	4.6
	400	60	0.99	4.4	0.99	4.4
	440	50	—	—	—	—
	440	60	1.1	4.9	1.1	4.9
0.75kW	200	50	3.9	18.9	3.9	18.9
	200	60	3.5	17.3	3.5	17.3
	220	50	—	—	—	—
	220	60	3.4	19.4	3.4	19.4
	400	50	1.9	9.0	1.9	9.0
	400	60	1.8	8.4	1.8	8.4
	440	50	—	—	—	—
	440	60	1.8	9.5	1.8	9.5
1.5kW	200	50	7.7	38.0	7.7	38.0
	200	60	6.9	35.0	6.9	35.0
	220	50	—	—	—	—
	220	60	6.6	39.5	6.6	39.5
	400	50	3.9	19.0	3.9	19.0
	400	60	3.5	17.5	3.5	17.5
	440	50	—	—	—	—
	440	60	3.3	19.8	3.3	19.8

## LTKD Wiring diagram



### Outside terminals

R	S	T	U	V	W	R <sub>1</sub>	T <sub>1</sub>	2	3	4	6	7	9	14	S1	S2	S3			
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: LTKD unit

- OLS: Limit switch at open
- SLS: Limit switch at close
- OTLS: Torque switch at open
- STLS: Torque switch at close
- ILS: Interlock switch

# Pneumatic Cylinder

## New T-DYNAMO (7E/7F/7G)

We have pursued top-level performance that carries on the excellence of the T-matic cylinder, our top-selling pneumatic actuator for butterfly valves. Employing an NAMUR mount, this unit is compact and lightweight, and offers high output and further heightened perfection as a complete system.



### ■ Features

- Direct valve installation with bottom ISO mounting.
- Completely direct mounting of valve installation section.
- NAMUR mount at pneumatic port connections and accessories interface.

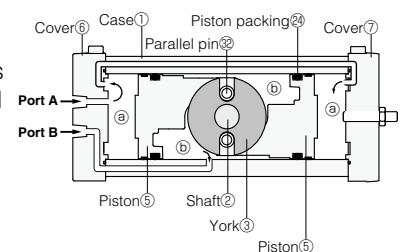
New T-DYNAMO Standard specifications									
Type Torque (N·m)(When supply pressure is 0.4MPa and rotation angle is 0°)	Double-acting type (7E)					Single-acting type (7F / 7G)			
	T35	T85	T200	T380	T750	T85S	T200S	T380S	T750S
Supply air pressure condition/temperature	-10 to 60 degrees C								
Air Supply Pressure	0.4 to 0.7MPa								
Body shell max (MPa)	1.05MPa								
Air connection (Rc)	Rc (PT) 1/4								
Rotating angle	90°								
Ambient temperature	-10 to 60 degrees C								
Travel time(sec) with speed controller	1 to 15 sec	2 to 15 sec	3 to 15 sec	7 to 20 sec	12 to 25 sec	2 to 15 sec	6 to 15 sec	8 to 20 sec	15 to 25 sec

※The opening and closing times are the times in the case of a single unit of a cylinder with a standard speed controller (SP-K017-Z03-006) and a solenoid valve (PCS2408-03-100MC) when the air supply pressure is 0.4MPa. The opening and closing times depend on pneumatic piping system, etc.

### New T-DYNAMO Principle of operation

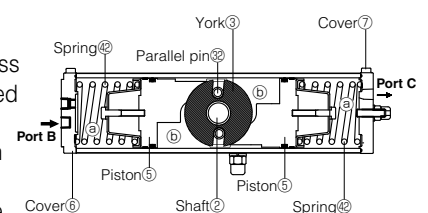
#### ■ Double-acting type cylinder

- (1) The cylinder space which is enclosed by the case ① and the covers ⑥ and ⑦ is divided into airtight chambers ③ and ④ by the pistons ⑤ and the piston packing ②.
- (2) The shaft ② penetrates the chamber ④ of the case. The yoke ③ is fitted in the hole across the shaft in such a way that it allows it to slide in the hole. The top of the yoke is connected with the parallel pins ④ so it rotates in accordance with the movement of the pistons.
- (3) The compressed air enters chamber ③ through port A and pushes the pistons. The air in chamber ④ is exhausted through port B as the pistons move due to a pressure difference between the two chambers. Integrated with these pistons, the parallel pins ④ also move and torque in the shaft is generated.



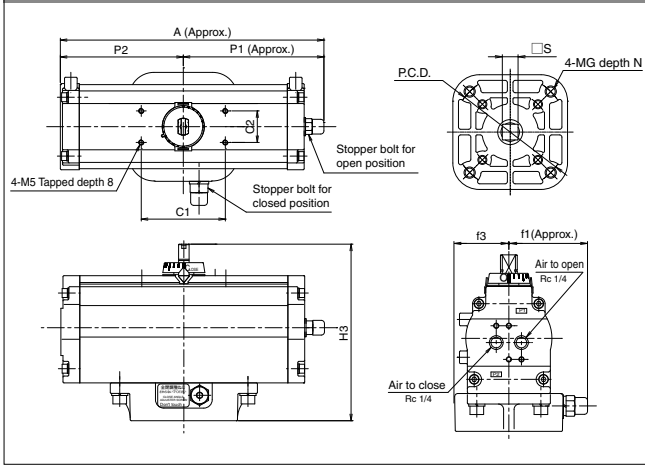
#### ■ Single-acting type cylinder

- (1) The cylinder space which is enclosed by the case ① and the covers ⑥ and ⑦ is divided into airtight chambers ③ and ④ by the pistons ⑤ and the piston packing ②.
- (2) The shaft ② penetrates the chamber ④ of the case. The yoke ③ is fitted in the hole across the shaft in such a way that it allows it to slide in the hole. The top of the yoke is connected with the parallel pins ④ so it rotates in accordance with the movement of the pistons.
- (3) The compressed air enters chamber ④ through port B and pushes the pistons. The air in chamber ③ is exhausted through port C as the pistons ⑤ move and the spring ④ is squeezed due to a pressure difference between the two chambers. Integrated with these pistons ⑤, the parallel pins ④ also move and torque in the shaft is generated.
- (4) When air supply to Port B is stopped, the pistons are pushed back due to the force of the spring ④ and torque in the shaft is generated.

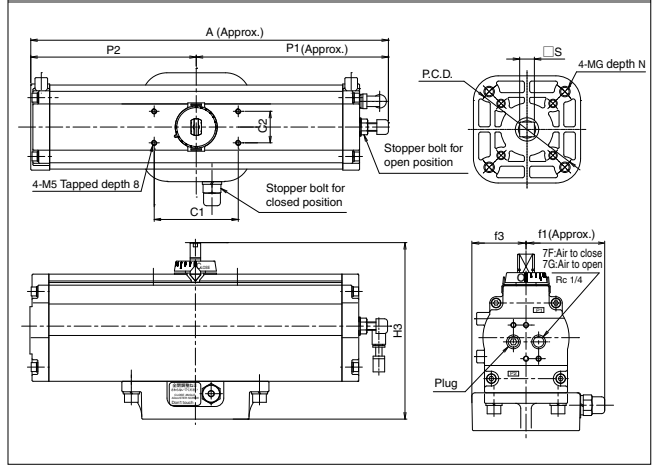


## New T-DYNAMO Dimensions

### Double-acting type



### Single-acting type



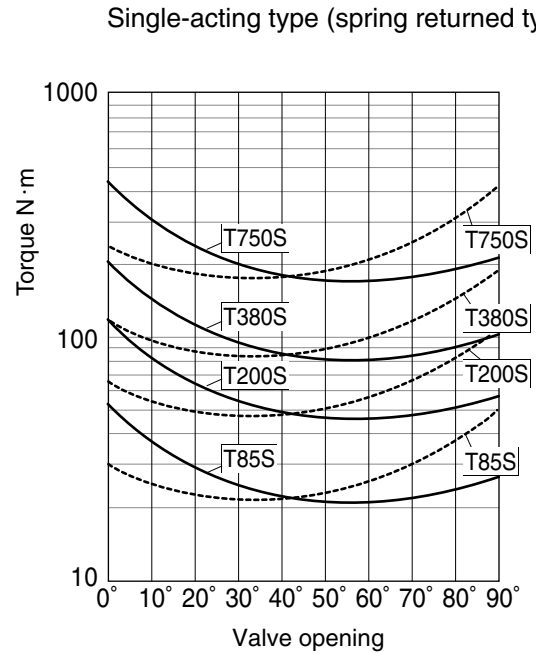
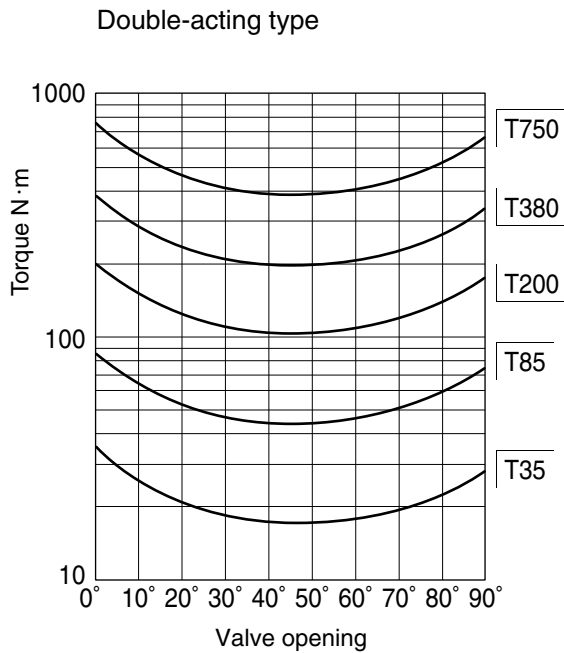
### New T-DYNAMO Dimension list

Cylinder type		Dimension (mm)											Cylinder capacity (liter/ft <sup>3</sup> )	Approx. Mass (kg)
		A	P1	P2	H3	C1	C2	f1	f3	S	MG	N		
T35	P.C.D.70	202.5	112	90.5	125	80	30	57	35	12	M8	13	0.2	1.7
T85	P.C.D.70	251	134	117	168	80	30	75	51	14	M8	17	0.5	4.6
	P.C.D.102										M10	20		
T200	P.C.D.70	320.5	170	150.5	203	80	30	79	51	18	M8	15	1.1	7.9
	P.C.D.102										M10	20		
T380	P.C.D.70	397.5	208.5	189	231	80	30	91	62.5	24	M8	15	2.1	14
	P.C.D.102										M10	18.5		
	P.C.D.125										M12	20		
T750	P.C.D.102	520.5	276	244.5	269	80	30	118	70	24	M10	18.5	4.6	24
	P.C.D.125										M12	23		
	P.C.D.140										M16	28		

### New T-DYNAMO Dimension list

Cylinder type		Dimension (mm)											Cylinder capacity (liter/ft <sup>3</sup> )	Approx. Mass (kg)
		A	P1	P2	H3	C1	C2	f1	f3	S	MG	N		
T85S	P.C.D.70	338.5	181	157.5	168	80	30	75	51	14	M8	17	0.5	6.2
	P.C.D.102										M10	20		
T200S	P.C.D.70	423.5	223	200.5	203	80	30	79	51	18	M8	15	1.1	10.7
	P.C.D.102										M10	20		
T380S	P.C.D.70	524.5	273.5	251	231	80	30	91	62.5	24	M8	15	2.1	18.9
	P.C.D.102										M10	18.5		
	P.C.D.125										M12	20		
T750S	P.C.D.102	697.5	363	334.5	269	80	30	118	70	24	M10	18.5	4.6	32.4
	P.C.D.125										M12	23		
	P.C.D.140										M16	28		

New T-DYNAMO Output torque curves



- ① The table shows the torque at an operating air pressure of 0.4 MPa.
- ② Output torque for an operating air pressure of P MPa is given by : = P x (torque value obtained from the table)/0.4. (Only double-acting type cylinder)
- ③ In the case of single-acting type cylinders, the spring force does not change even if the operating air pressure is changed. Thus the torque indicated by the dotted lines is constant regardless of the operating air pressure.
- ④ In the case of single-acting type cylinders, the output torque value at open→close is different from that at close→open. The continuous lines and dotted lines indicate the torques respectively.

	7G (Open with pressure)	7F (Close with pressure)
Continuous line	Torque at close→open with air pressure	Torque at close→open with spring
Dotted line	Torque at open→close with spring	Torque at open→close with air pressure

- ⑤ A valve for the single-acting type cylinder should be selected referring to the torque indicated with a dotted line.

New T-DYNAMO Output torque

Double-acting type

(N·m)

Type	Supply pressure (MPa)			
	0.4	0.5	0.6	0.7
T35	35	43	52	61
T85	85	106	127	148
T200	200	250	300	350
T380	380	475	570	665
T750	750	937	1125	1312

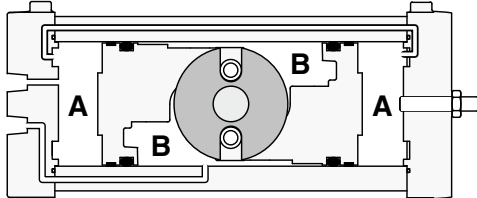
Single-acting type (spring returned type)

(N·m)

Type	Supply pressure (MPa)								Spring	
	0.4		0.5		0.6		0.7			
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
T85S	55	30	76	51	97	72	118	93	30	55
T200S	135	65	185	115	235	165	285	215	65	135
T380S	264	116	359	211	454	306	549	401	116	264
T750S	510	240	697	427	885	615	1072	802	240	510



## New T-DYNAMO Air Consumption



### (1) Required air consumption

Double-acting type

$$VD = (A+B) \left( \frac{P+0.1013}{0.1013} \right) N$$

Single-acting type

$$VS = (B) \left( \frac{P+0.1013}{0.1013} \right) N$$

VD : Double-acting type cylinder air consumption (Nℓ)

VS : Single-acting type cylinder air consumption (Nℓ)

A,B : Cylinder capacity (ℓ)

P : Working pressure (MPa)

N : Operating frequencies in a given time (1 round trip=1)

### (2) Air consumption within a unit time

Double-acting type  $CD = \frac{VD}{t}$

Single-acting type  $CS = \frac{VS}{t}$

CD : Double-acting type cylinder air consumption (Nℓ/sec)

CS : Single-acting type cylinder air consumption (Nℓ/sec)

t : Unit time (sec)

(Note) The compressor should have a larger capacity than air consumption calculated in above (1) and (2).

### •Double-acting type

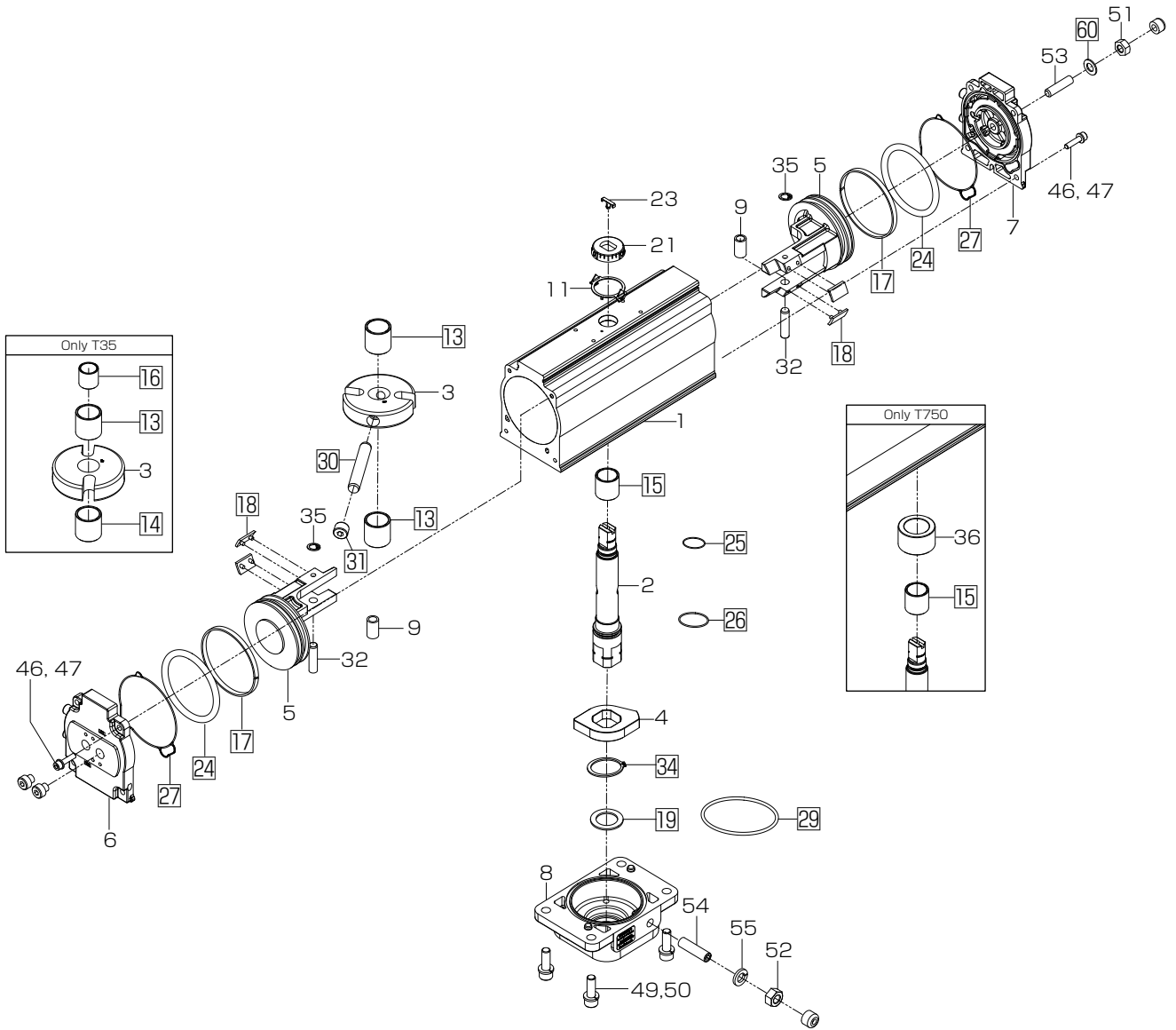
type	Cylinder capacity (ℓ)	
	A	B
T35	0.2	0.2
T85	0.4	0.5
T200	0.8	1.1
T380	1.8	2.1
T750	3.2	4.6

### •Single-acting type

type	Cylinder capacity (ℓ)
	B
T85S	0.5
T200S	1.1
T380S	2.1
T750S	4.6

New T-DYNAMO Expanded view of component T35 to T750 (double-acting type)

Note: The parts numbers marked with □ indicate "O-ring set".  
Please exchange all the parts included in the set.



## New T-DYNAMO Parts list T35 to T750(double-acting type)

### ■ Double-acting type

No.	Description	Q'ty	Remarks
1	Case	1	
2	Shaft	1	
3	Yoke	1	
4	Stopper	1	
5	Piston	2	
6	Cover 1	1	
7	Cover 2	1	
8	Base plate	1	
9	Bearing	2	
11	Indicator plate	1	
★ 13	Bearing 1	2	T35:1pc
★ 14	Bearing 2	1	Only T35
★ 15	Bearing 3	1	
★ 16	Bearing 4	1	Only T35
★ 17	Wear ring	2	
★ 18	Piston support	4	
★ 19	Thrust plate	1	
21	Position indicator	1	
23	Slit cover	1	
★ 24	Piston packing	2	
★ 25	O-ring (Upper Side)	1	
★ 26	O-ring (Lower Side)	1	
★ 27	Cover packing	2	
★ 29	O-ring (base plate)	1	
★ 30	Connecting pin	1	
★ 31	Plug	1	
32	Parallel pin	2	
★ 34	C-retainer (lower shaft)	1	Only T85~T750
35	C-retainer (piston)	2	Only T85~T750
36	Bearing housing	1	Only T750
46	Spring washer (cover 1,2)	8	
47	Hexagon bolt (cover: double-acting)	8	
49	Hexagon bolt (base plate)	4	T35:2pcs
50	Spring washer (base plate)	4	T35:2pcs
51	Hexagon stop screw	1	
52	Hexagon stop screw	1	
53	Hexagon socket set screw (open-side)	1	
54	Hexagon socket set screw (close-side)	1	
55	Spring washer (close-side stopper)	1	
★ 60	Sealing washer	1	

Note: Recommended maintenance parts are indicated by "★" before the part number.  
To order a set of recommended maintenance parts, please specify "O-ring set".



## New T-DYNAMO Expanded view of component T85S to T750S (single-acting type)

### ■ Single-acting type

No.	Description	Q'ty	Remarks
1	Case	1	
2	Shaft	1	
3	Yoke	1	
4	Stopper	1	
5	Piston	2	
6	Cover 1	1	
7	Cover 2	1	
8	Base plate	1	
9	Bearing	2	
11	Indicator plate	1	
★ 13	Bearing 1 (shaft-piston)	2	
★ 15	Bearing 3 (lower shaft)	1	
★ 17	Wear ring	2	
★ 18	Piston support	4	
★ 19	Thrust plate	1	
21	Position indicator	1	
23	Slit cover	1	
★ 24	Piston packing	2	
★ 25	O-ring (upper)	1	
★ 26	O-ring (lower)	1	
★ 27	Cover packing	2	
★ 29	O-ring (base plate)	1	
★ 30	Connecting pin	1	
★ 31	Plug	1	
32	Parallel pin	2	
★ 34	C-retainer (lower shaft)	1	
35	C-retainer (piston)	2	
36	Bearing housing	1	Only T750S
37	Stopper bolt	1	Only T750S
42	Spring	2	
43	Spring guide	2	
44	Hexagon bolt (spring guide)	2	
45	Spring washer (spring guide)	2	
46	Spring washer (cover 1,2)	8	
48	Hexagon socket bolt (cover 1,2)	8	
49	Hexagon socket bolt (base plate)	4	
50	Spring washer (base plate)	4	
51	Hexagon nut (cover 2)	1	
52	Hexagon nut (base plate)	1	
53	Hexagon socket set screw (cover 2)	1	
54	Hexagon socket set screw (base plate)	1	
55	Spring washer (base plate)	1	
★ 60	Sealing washer (cover 2)	1	
62	Hexagon socket tapered plug (cover 1)	1	

Note: Recommended maintenance parts are indicated by "★" before the part number.  
To order a set of recommended maintenance parts, please specify "O-ring set".









## New T-DYNAMO Solenoid valves

### ■ Purpose

The purpose of a solenoid valve is to use electrical signals to remotely change the air flow to operate the valves.

### ■ Standard specifications

Type	Five-port/2-position non explosion-proof solenoid valve (single solenoid)	Five-port/2-position non explosion-proof solenoid valve (double solenoid)	Five-port/2-position explosion-proof solenoid valve (single solenoid)	Five-port/2-position explosion-proof solenoid valve (double solenoid)
Item	PCS2406-K090-Z03-132-**	PCD2406-K090-Z04-120-**	MK15G-8-※-DMI	MK15DG-8-※-DMI
Manufacturer	TAIYO	TAIYO	Kaneko	Kaneko
JIS symbol				
Applicable cylinder type	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S
Mounting method	Direct mounting	Direct mounting	Direct mounting	Direct mounting
Air connection port size	Rc1/4 (IN, EXH)	Rc1/4 (IN, EXH)	Rc1/4 (IN, OUT, EXH)	Rc1/4 (IN, OUT, EXH)
Effective sectional area	10mm <sup>2</sup>	10mm <sup>2</sup>	20mm <sup>2</sup>	20mm <sup>2</sup>
Rated voltage	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V 50/60Hz AC110V/200V 50Hz AC220V 60Hz DC24, 100, 110, 125V	AC100V 50/60Hz AC100V, 200V 50Hz AC220V 60Hz DC24, 100, 110, 125V
Class of insulation	—	—	d2G4	d2G4
Wiring method	Conduit terminal	Conduit terminal	Conduit terminal	Conduit terminal
Conduit entry	G1/2	G1/2	G1/2	G1/2
Manual operating	Non lock bush type	Non lock bush type	Manual bottom lock type	Manual bottom lock type
Operating temperature	−5 to 50 degrees C	−5 to 50 degrees C	−20 to 60 degrees C	−20 to 60 degrees C
Weight	0.2kg	0.27kg	1.2kg	1.7kg

Remark: The above are standard TOMOE-compatible solenoid valves. It is also possible to install solenoid valves other than those listed above such as a double solenoid or 3-port solenoid valve. For details, please consult us.

## New T-DYNAMO Filter regulators (Pressure reducer with filter)

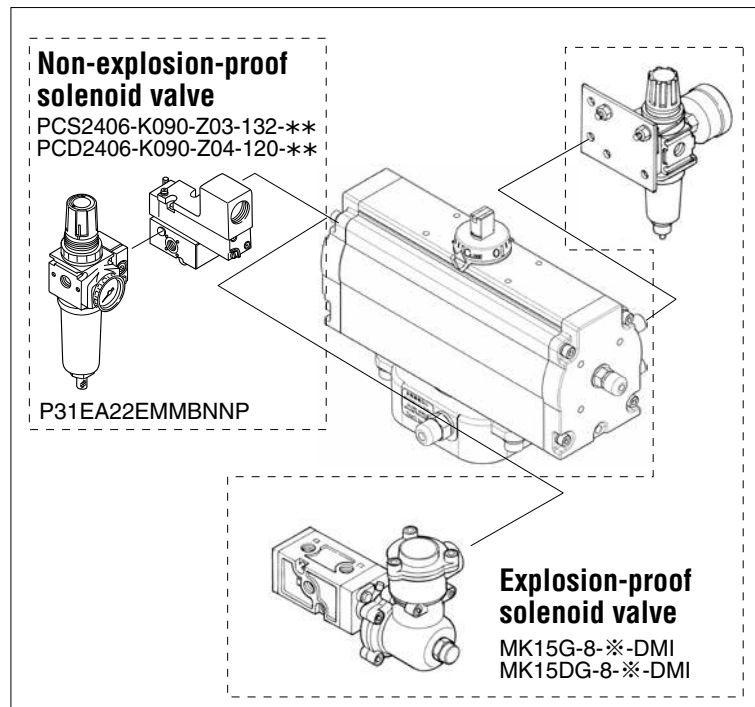
### ■ Purpose

Filter regulators are used to eliminate oil, water, and dust from the operating air in order to protect pneumatic accessories (solenoid valve and cylinder, etc.) and to keep operating pressure at an adequate and constant level (about 4 to 5 K).

### ■ Standard specifications

Type	P31EA22EMMBNNP
Manufacturer	TAIYO
JIS symbol	
Applicable cylinder type	T35 to T750/T85S to T750S
Set pressure range	0.03 to 0.85MPa
Pressure gauge connection port	Rc1/8
Operating temperature	−5 to 60 degrees C
Air connection port size	Rc1/4
Filtration	5μm
Attachment	Direct mounting
Option	—
Weight	0.19kg

Remark: The above are standard TOMOE-compatible filter regulators. It is also possible to install filter regulators other than those listed above. For details, please consult us.

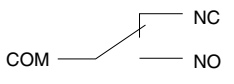
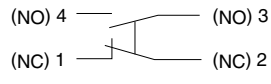
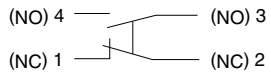
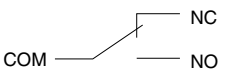


**New T-DYNAMO Limit switches**

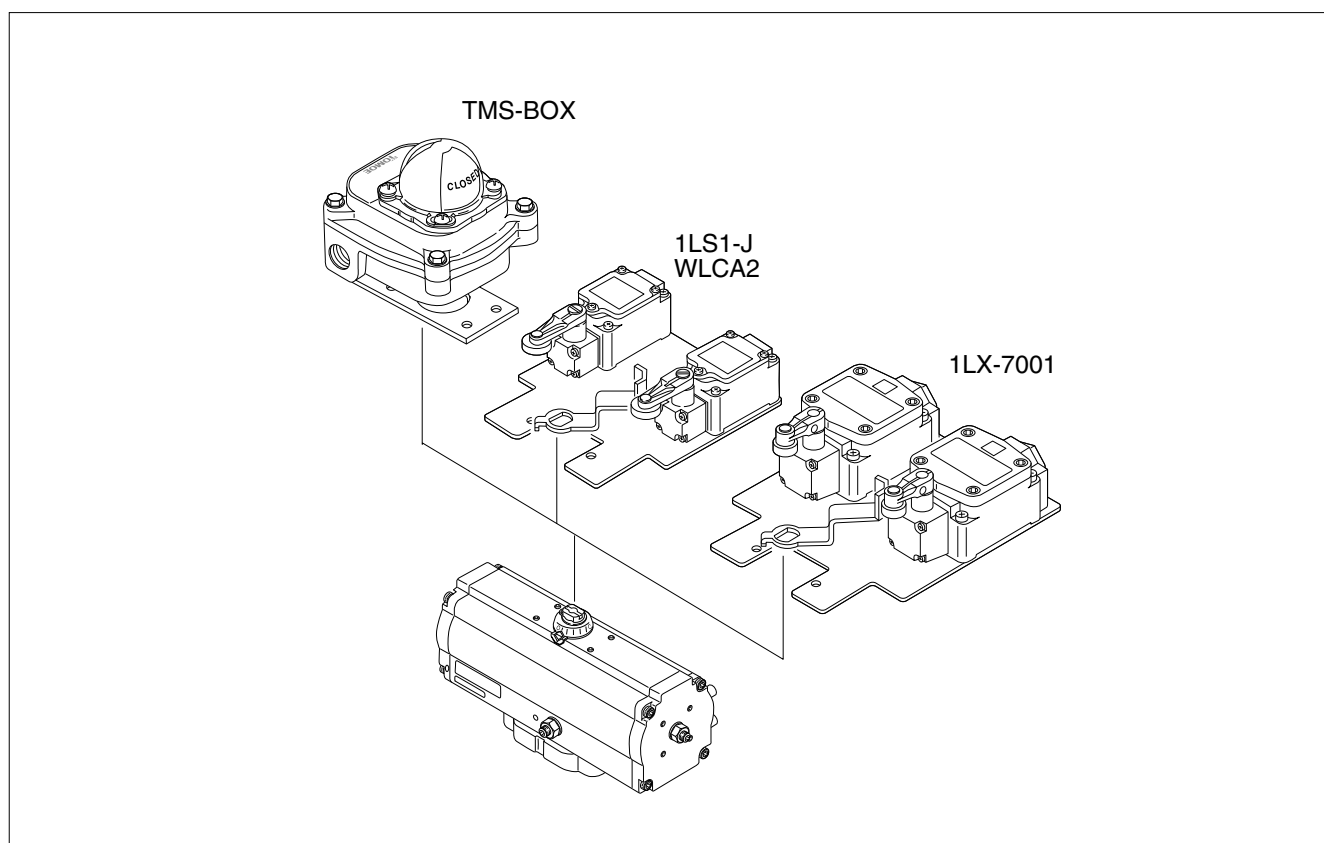
**■ Purpose**

Limit switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

**■ Standard specifications**

Type	TMS-BOX	1LS1-J WLCA2	1LX-7001	VCX-7003
Manufacturer	Tomoe	Azbil (1LS1-J) OMRON (WLCA2)	Azbil	Azbil
Circuit	Monopolar double-throw (1C, SPDT) X2 	Bipolar double interruption (1A1B, 2CKT-DB) 	Bipolar double interruption (1A1B, 2CKT-DB) 	Monopolar double-throw (1C, SPDT) X2 
Actuator	Hinge roller lever type	Roller lever type	Roller lever type	Adjustable roller lever type
Class of insulation	IP67 (Option: Exd IIBT6)	IP67	IP67, Exde IIC T6	IP67, Exde IIC T6
Rated voltage (resistance load)	Standard	Micro load specifications		
	AC250v-1.6A DC125V-0.6A	AC125V-0.1A DC30V-0.1A	AC125V-10A AC250V-10A AC480V-10A DC125V-0.8A DC250V-0.4A	AC125V-5A AC250V-5A DC125V-0.8A DC250V-0.4A
Minimum applicable load (reference value)	DC30V 100mA	DC5V 1mA	DC24V 10mA(1LS1-J) DC5V 160mA(WLCA2)	DC24V 10mA
Operating temperature	-10 to 80 degrees C	1LS1-J: -10~70°C WLCA2: -10~80°C	-10 to 60 degrees C	-10 to 60 degrees C
Conduit entry	2-G1/2	G1/2	G1/2	G3/4
Option	-	Heat, cold and corrosion resistant	Hydrogen anti-explosion (1LX7001)	Waterproof (VCL-5003)
Contacts	Switch detection with one (2 switches inside)	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection	Switch detection with one (2 switches inside)
Weight	0.98kg	0.28kg	0.74kg	0.77kg

Remark: The above are standard TOMOE-compatible limit switches. It is also possible to install limit switches other than those listed above. For details, please consult us. Since the rated load of the TMS-BOX micro load specification is smaller than that of the standard specification, a failure may occur if a current exceeding the rating is applied.



## New T-DYNAMO Proximity switches

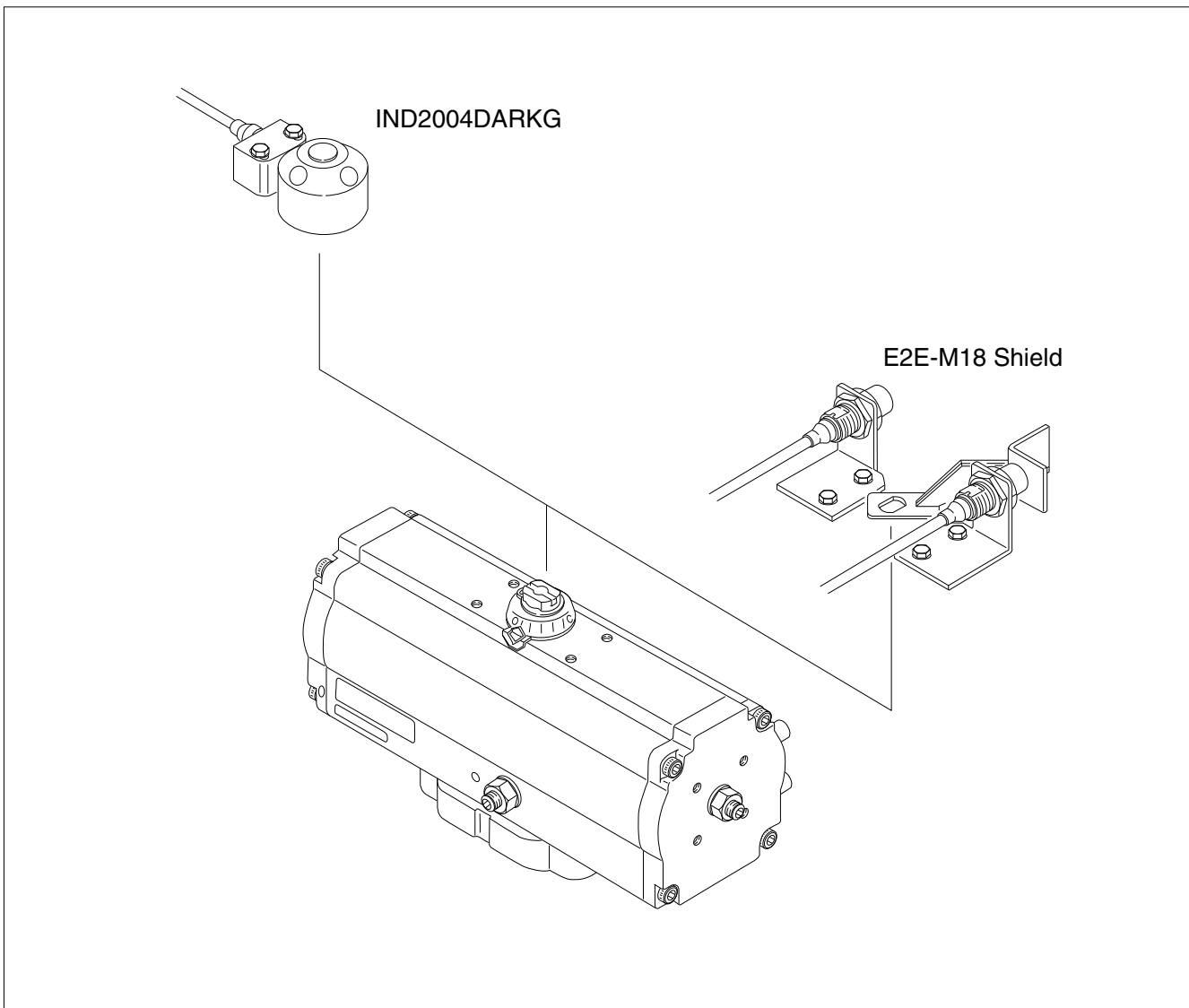
### ■ Purpose

Proximity switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

### ■ Standard specifications

Product	M18 shielded type (Can be embedded in metal.)	Direct-mounting proximity switch
Type	E2E-X7D1-N	IND2004DARKG
Manufacturer	OMRON	efector
With power source	DC 2-wire system	DC 2-wire system
Motion mode	NO	NO
Detecting distance	0 to 5.6mm	4mm±10%
Object to be detected	Magnetic metal (stainless steel possible)	Dedicated target
Power source voltage	DC12 to 24V	DC10 to 36V
Current consumption	3 to 100mA	min 4mA
Class of insulation	IP67	IP67
Operating temperature	-25 to 70 degrees C	-25 to 80 degrees C
Connection	Cord draw type (2m)	Cord draw type (2m)
Contacts	On or off detection with one Two for both on and off detection	2-point switch detection possible with a single unit
Weight	0.43 kg (including mounting plate): 1 piece	0.23 kg (including mounting plate): 1 piece

Remark: The above are standard TOMOE-compatible proximity switches. It is also possible to install limit switches other than those listed above such as a DC 3-wire, AC 2-wire, AC/DC 2-wire or connector-type proximity switch. For details, please consult us.



**New T-DYNAMO Positioners**

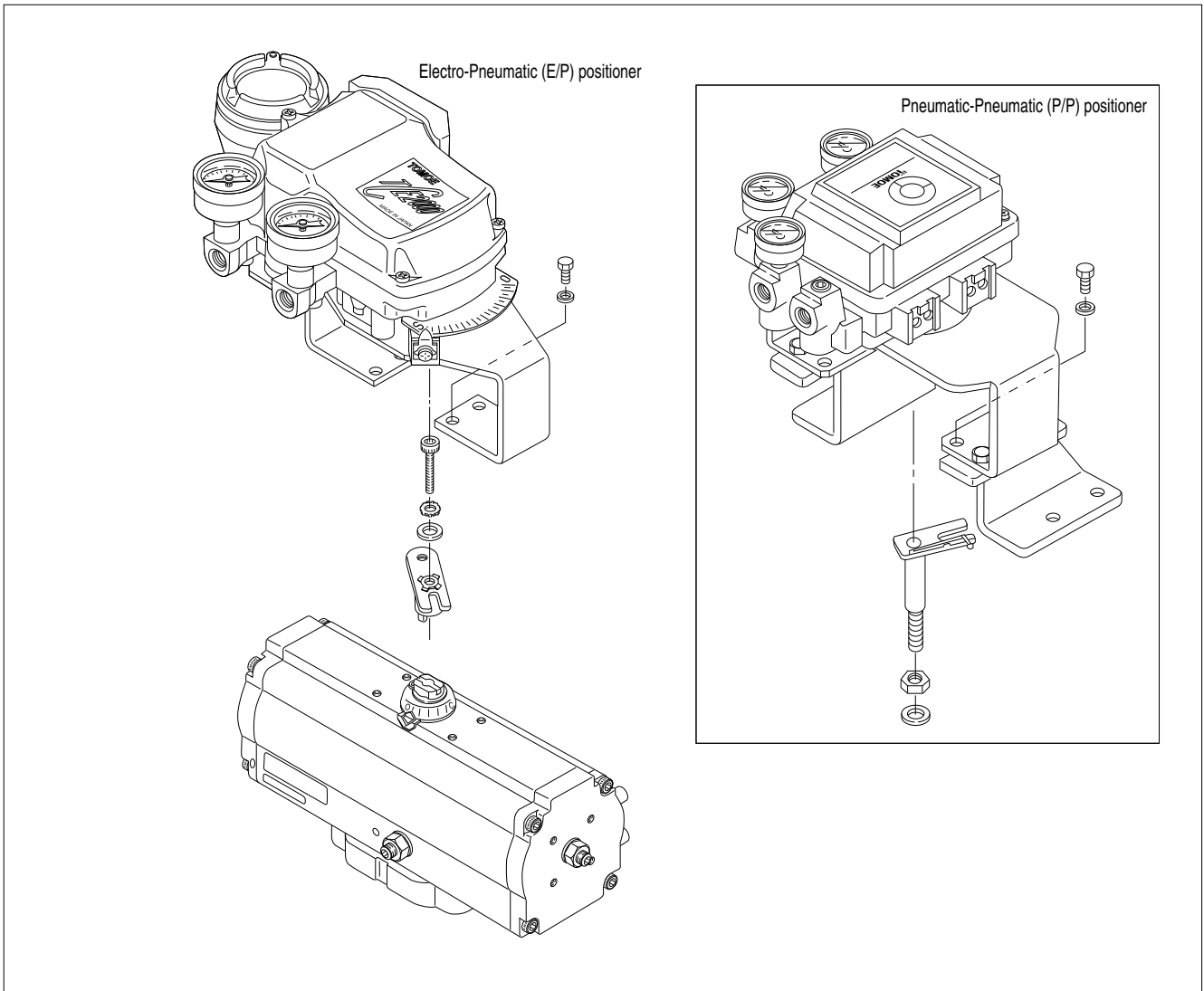
**■ Purpose**

A positioners are used for quick and accurate control of the valve opening angle with pneumatic signals or 4-20mA DC input signals from a control room or controller unit.

**■ Standard specifications**

	Electro-Pneumatic, analog	Electro-Pneumatic, analog	Pneumatic-Pneumatic
Type	TCE2000	TP8100	IP5100
Manufacturer	Tomoe	Tomoe	SMC
Input signal	4 to 20mA	4 to 20mA	0.02 to 0.1MPa
Resistance	250Ω (4 to 20mADC)	235±15Ω (4 to 20mADC)	—
Supply air	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa
Output flow rate	180L/min.(ANR) or more (SUP=0.4MPa)	200L/min.(ANR) or more (SUP=0.4MPa)	200L/min.(ANR) or more (SUP=0.4MPa)
Air consumption	Within 11L/min.(ANR) (SUP=0.4MPa)	Within 11L/min.(ANR) (SUP=0.4MPa)	Within 11L/min.(ANR) (SUP=0.4MPa)
Operating temperature	-20 to 83 degrees C (Non explosion-proof) -20 to 60degrees C (Explosion-proof type d2G4)	-20 to 8 degrees C (Non explosion-proof) -20 to 60 degrees C (Explosion-proof)	-20 to 80 degrees C
Class of insulation	IP65, ExdIIBT6X	IP65, ExdIIBT5	—
Air connection port size	Rc1/4	Rc1/4	Rc1/4
Conduit entry	2-G1/2	2-G1/2	—
Sensitivity	Within 0.5%FS	Within 0.5%FS	Within 0.5%FS
Linearity	Within ±1.5%FS	Within ±2%FS	Within ±2%FS
Hysteresis	Within 1%FS	Within 1%FS	Within 1%FS
Option	—	—	—
Weight	2.3kg	2.6kg	1.2kg

Remark: The above are standard TOMOE-compatible positioners. It is also possible to install positioners other than those listed above. For details, please consult us.



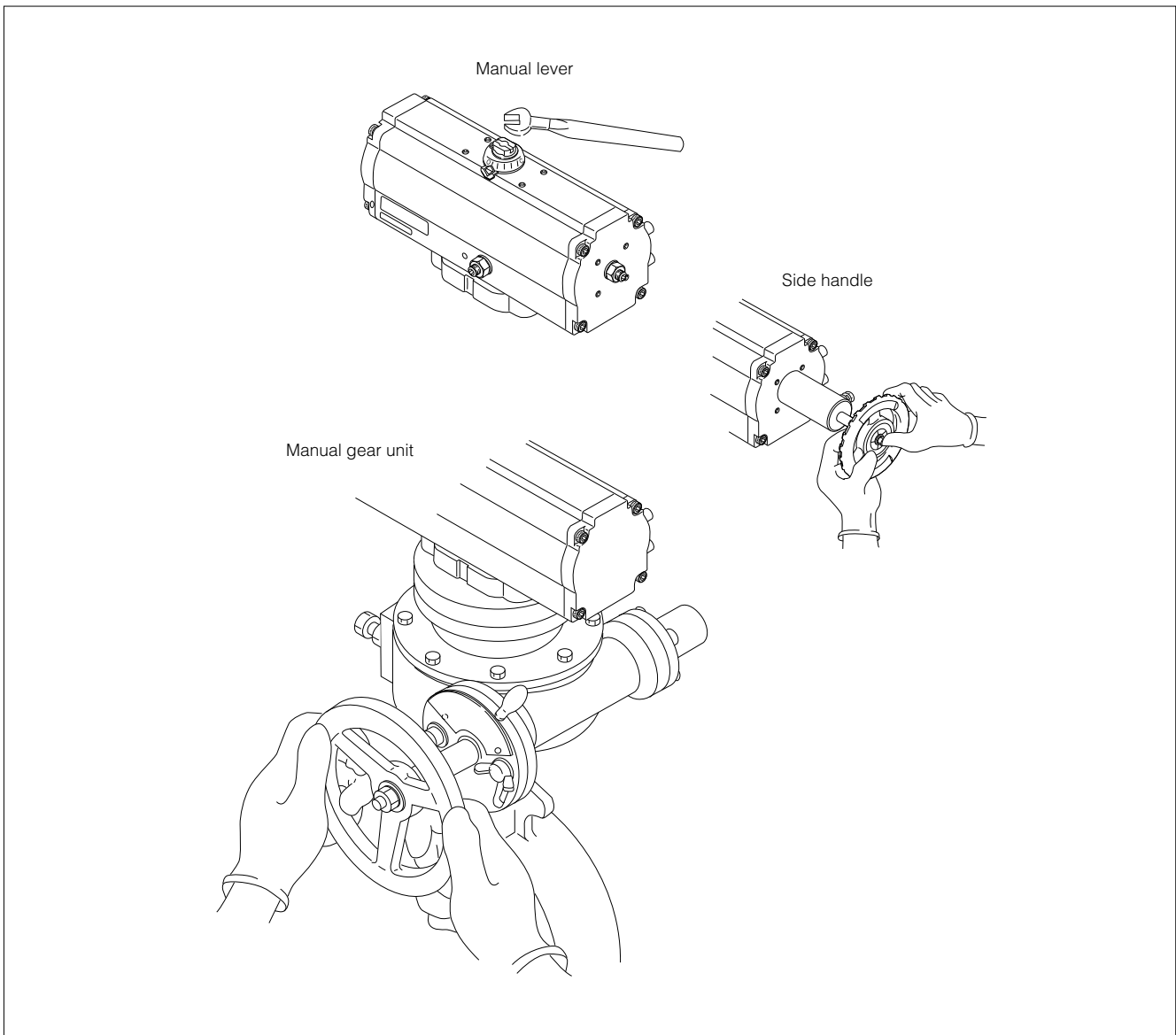
## New T-DYNAMO Manual operation unit

### ■ Purpose

The operation unit is for manual operation of the pneumatic cylinder when air supply fails.

### ■ Standard specifications

	Function	Type	Applicable cylinder	Manual Operation Procedure	Remarks
1	Manual lever	Lever	T35, T85, T200, T380 (Double-acting)	(1) Open the bypass valve. (2) Turn the center axis using a spanner.	(1) Never use for any single acting type cylinder. (2) Do not input signal to the solenoid valve or positioner during operation.
2	Side handle	Screw handle	T85S, T200S, T380S, T750S (Single-acting)	(1) Open the bypass valve. (2) Turn the handwheel in accordance with the direction indicated on the nameplate located in the middle of the manual screw handle to open and close the valve.	(1) Do not input signal to the solenoid valve or positioner during operation. (2) Restore the valve angle in the position air supply shutted off when restarting the automatic operation.
3	Manual gear unit	Worm gear	T200, T380, T750 (Double-acting)	(1) Remove residual pressure from the cylinder. (2) Turn the handwheel.	(1) Do not input signal to the solenoid valve or positioner during operation. (2) Restore the valve angle in the position air supply shutted off when restarting the automatic operation.



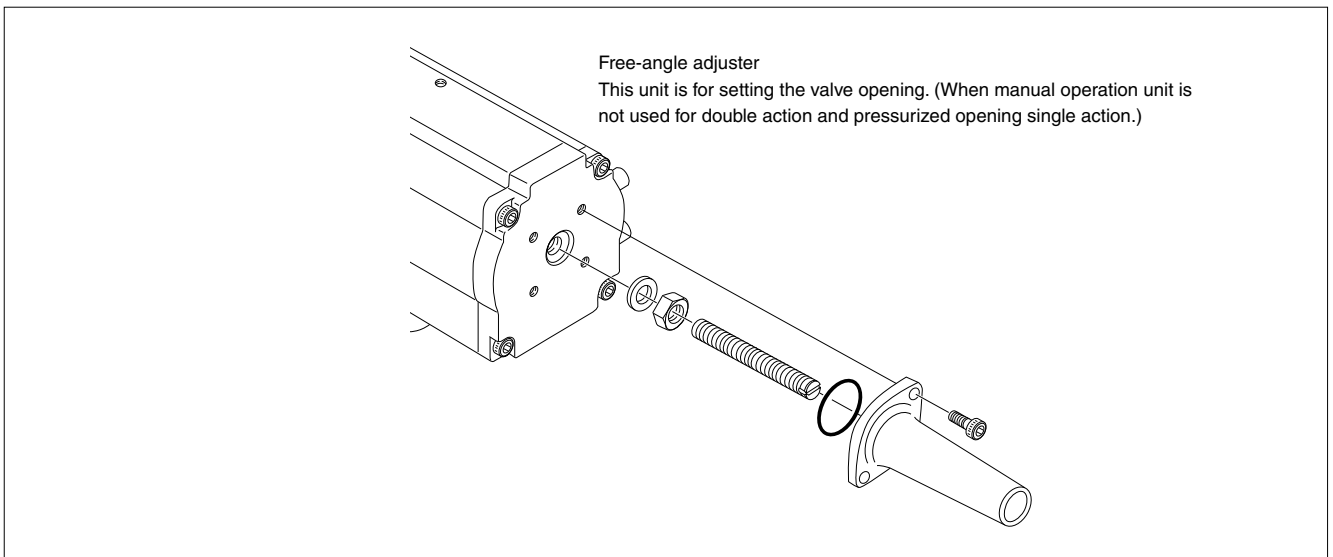
**New T-DYNAMO Free-angle adjuster**

**■ Purpose**

Free-angle adjuster enables to set open/close angle depending on users' demand.

**■ Standard specifications**

Function	Type	Applicable cylinder	Remarks
Free-angle adjuster	Side adjust screw	T35 to T750/T85S to T750S (Air to open)	Remove the cylinder cover, loosen the lock nut and insert the bolt to adjust the stroke angle. Tighten the lock nut and attach the cylinder cover in position.



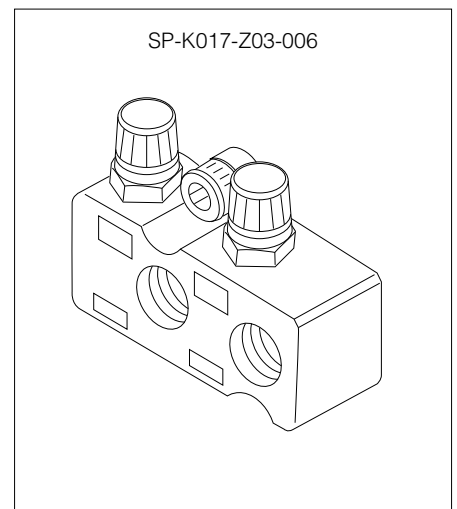
**New T-DYNAMO Speed controllers**

**■ Purpose**

For double-acting cylinders, the speed controller is used as meter out (exhaust throttle) and for single-acting cylinders, it is used as meter in (suction throttle).

**■ Standard specifications**

Type	MV-2-Z03-017	SP-K017-Z03-006
Manufacturer	TAIYO	TAIYO
JIS symbol		
Applicable cylinder type	With PCS 2406-K090-Z132 solenoid valve mounted	Other than indicated at left
Function	With silencer	—
Needle revolution	10 rotations	11 rotations
Adjustable range	5 to 15 secs.	5 to 15 secs.
Air connection port size	—	Rc1/4
Attachement	Screw into solenoid valve exhaust port (Rc 1/4)	Install to cylinder
Weight	0.06kg	0.095kg



Remark: The above are standard TOMOE-compatible speed controllers. It is also possible to install speed controllers other than those listed above. For details, please consult us.



Remark: In case of Single-action (spring open, type 7F), speed controller type is SP-K017-Z12-003-F.

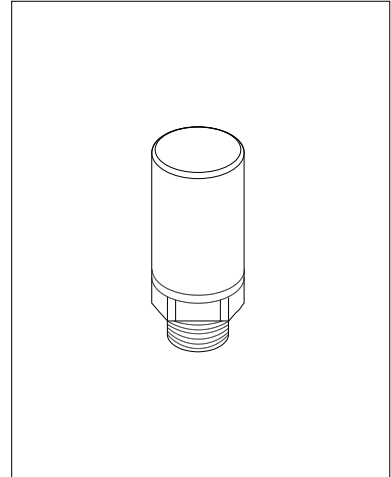
## New T-DYNAMO Silencers

### ■ Purpose

Silencers eliminate noise at the exhaust ports on various kinds of pneumatic accessories.

### ■ Standard specifications

Type	AN10-C06	AN20-02
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	T35 to T750/T85S to T750S	T35 to T750/T85S to T750S
Effect of muffing	25dB (A)	30dB (A)
Operating temperature	5 to 60 degrees C	5 to 60 degrees C
Port size	φ6	Rc1/4
Attachment	Install to exhaust port together with one-touch pipe coupler.	Screw into exhaust port.
Weight	0.02kg	0.02kg



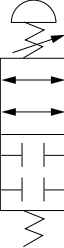
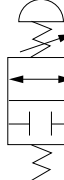
Remark: The above are standard TOMOE-compatible silencers. It is also possible to install silencers other than those listed above. For details, please consult us.

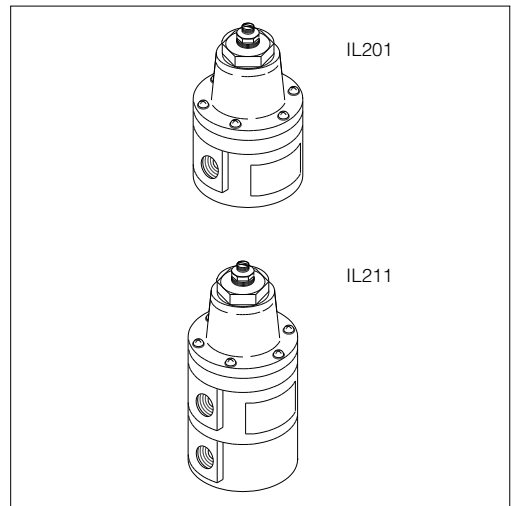
## New T-DYNAMO Lock-up valves

### ■ Purpose

When air supply fails, the lock-up valve automatically stops the line until pressure is restored and keeps the operating unit of the cylinder at the stay-put position.

### ■ Standard specifications

Type	IL211-02	IL201-02
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	T35 to T750	T85S to T750S
Effective sectional area	17mm <sup>2</sup>	17mm <sup>2</sup>
Operating temperature	-5 to 60 degrees C	-5 to 60 degrees C
Air connection port size	Rc1/4	Rc1/4
Signal pressure connection port	Rc1/4	Rc1/4
Weight	0.64kg	0.43kg



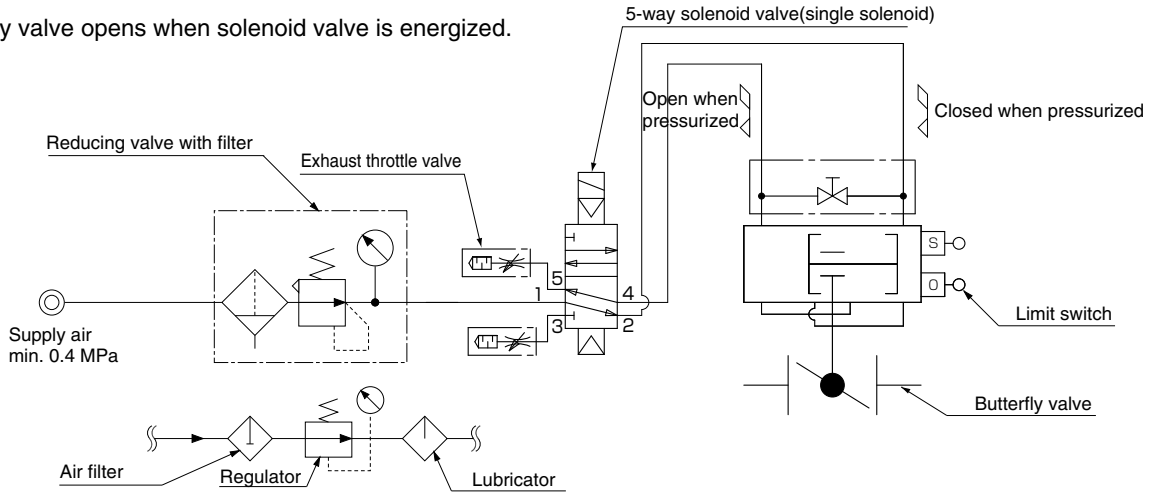
Remark: The above are standard TOMOE-compatible lock-up valves. It is also possible to install lock-up valves other than those listed above. For details, please consult us.

New T-DYNAMO Examples of standard air circuits for pneumatic actuators

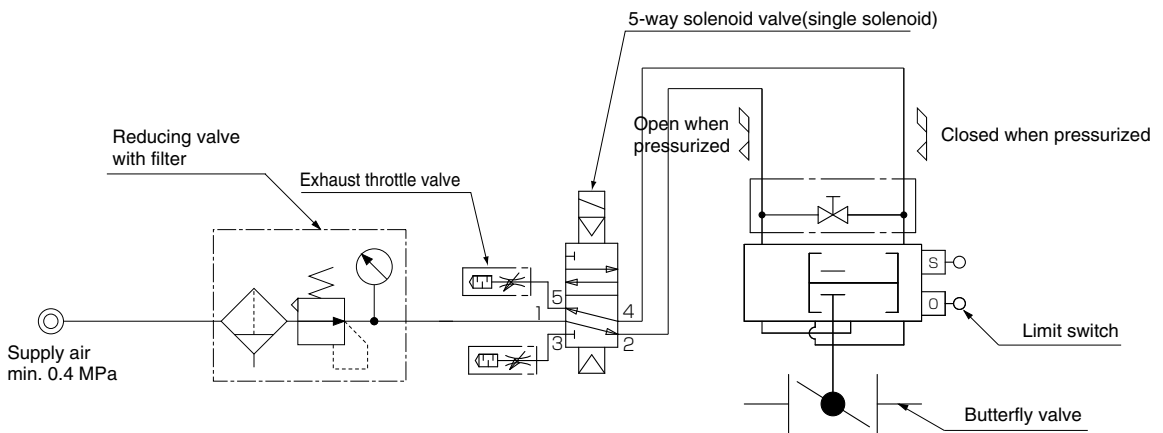
Standard and semi-standard accessories and their use  
 Example of standard air circuit for on/off operation (double-acting type)

Shown below are standard circuits to open and close a butterfly valve driven by a double-acting air cylinder while transmitting electrical signals from a remote control room. Switching of the flow of operation air is performed by the solenoid valve, and detection of the open/close position of the valve is performed by a limit switch, with feedback of the electrical signals to the control room.

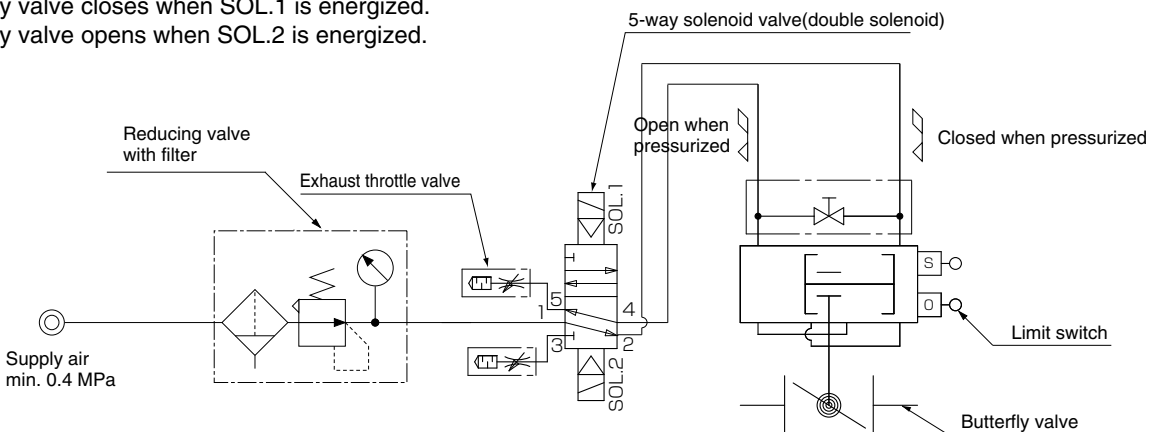
1 Butterfly valve opens when solenoid valve is energized.



2 Butterfly valve closes when solenoid valve is energized.



3 Butterfly valve closes when SOL.1 is energized.  
 Butterfly valve opens when SOL.2 is energized.



→Once SOL.1 is energized, the condition is maintained even after it is de-energized unless SOL.2 is energized.

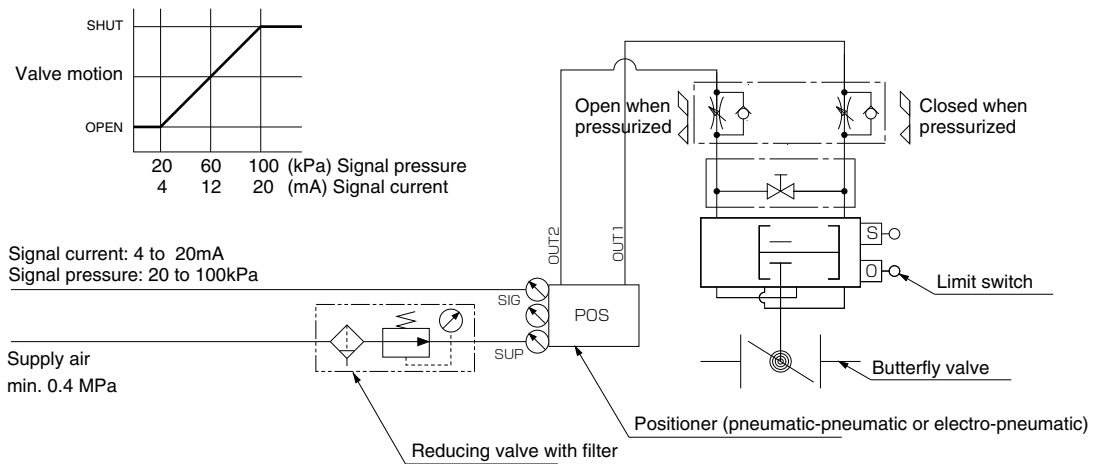


### Example of standard air circuit for control operation (double-acting type)

Shown below are examples of standard circuits in which a P/P or E/P positioner is attached to the butterfly valve driven by a double-acting pneumatic cylinder to give instruction signals from a remote control room to the positioner. This adjusts the valve opening exactly and quickly in proportion to the signals, and also detects the open/close position of the valve by a limit switch which sends feedback of the electrical signals to the control room.

#### 4 Direct action

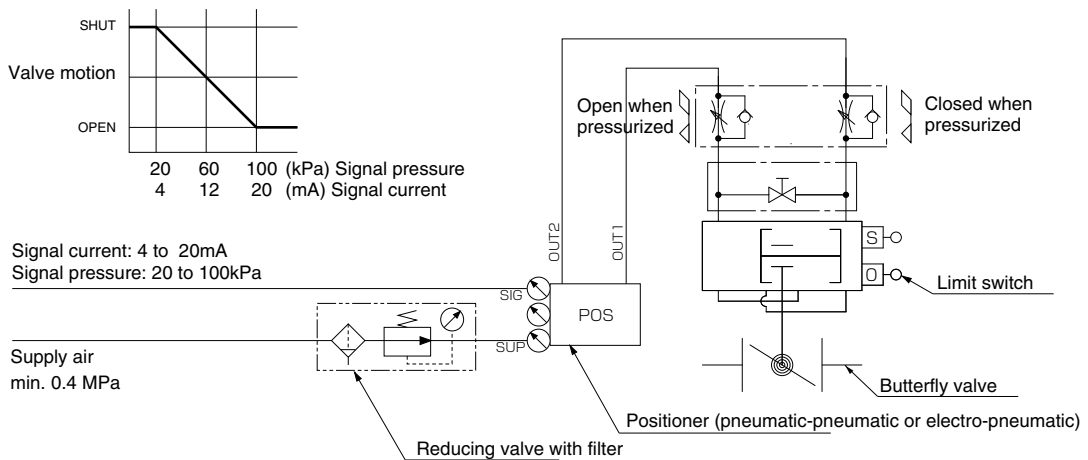
- Butterfly valve closes when signal increases.
- Butterfly valve opens when signal decreases.



→The butterfly valve opens fully when the input signal goes off under a state of assured air supply.

#### 5 Reverse action

- Butterfly valve opens when signal increases.
- Butterfly valve closes when signal decreases.



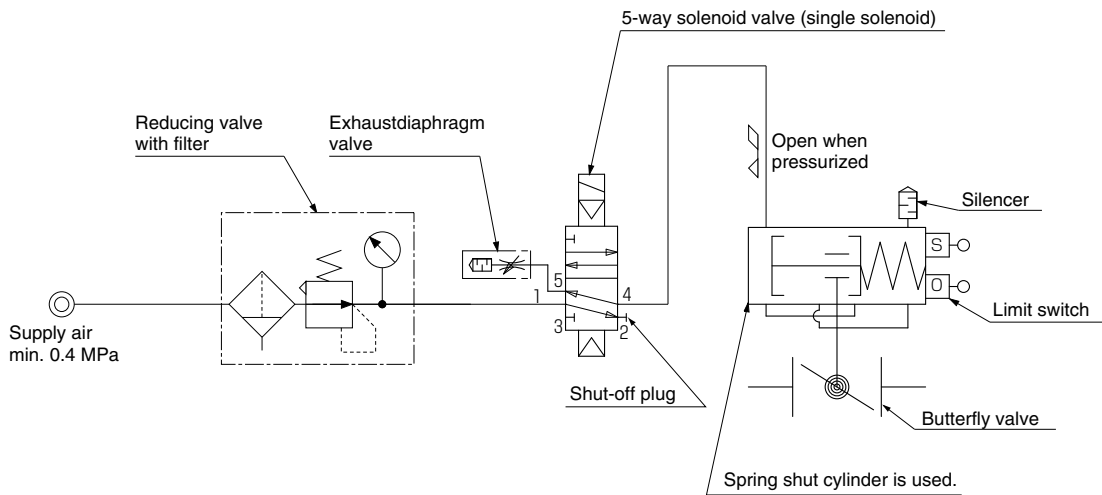
→The butterfly valve closes fully when input signal goes off under a state of assured air supply.

New T-DYNAMO Example of standard air circuits for pneumatic actuators

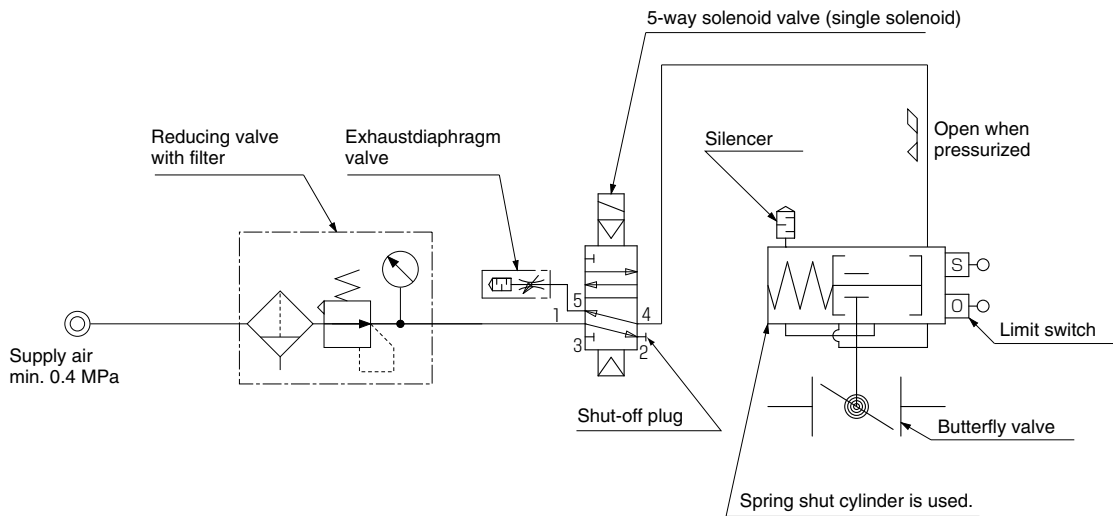
Example of standard air circuit for on/off operation (single-acting type)

Shown below are examples of standard circuits to operate the valve automatically to the safe side of open or close when the operating air supply or power supply fails in the middle of operation.

- 1 Butterfly valve closes when air supply falls.  
(Opened by pressure when solenoid valve is energized.)  
Butterfly valve closes when power supply falls.  
(Opened by pressure when solenoid valve is energized.)



- 2 Butterfly valve opens when power supply falls.  
(Closed by pressure when solenoid valve is energized.)  
Butterfly valve opens when air supply falls.  
(Closed by pressure when solenoid valve is energized.)

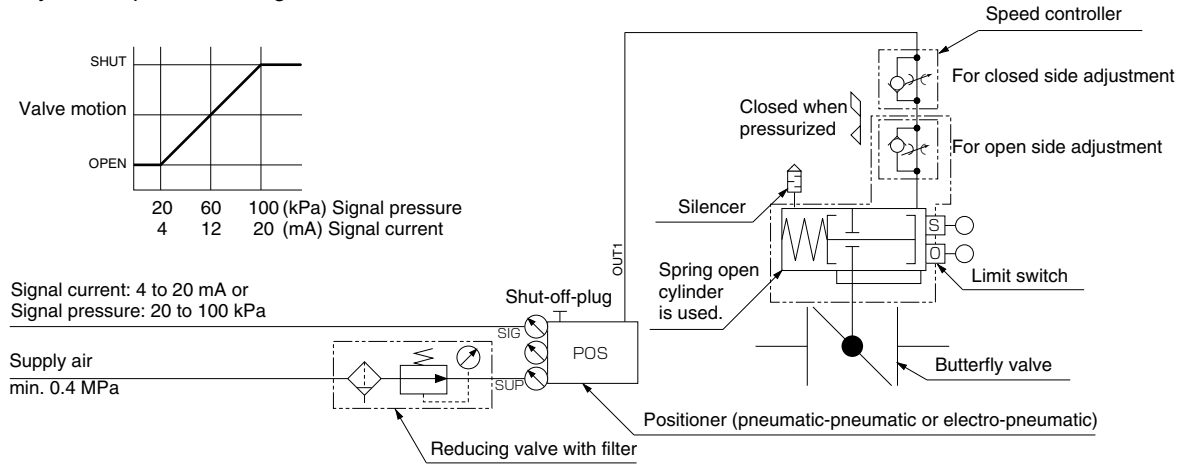


### Example of standard air circuit for control operation (single-acting type)

Shown below are examples of standard circuits in which the P/P or E/P positioner is attached to the butterfly valve driven by a single-acting pneumatic cylinder to adjust valve opening exactly and quickly in proportion to the signals transmitted by a local controller or from a remote control room. This will also detect the open/close position of the valve by a limit switch which sends feedback of the electric signals to the control room. When the operating air supply or power supply fails, the valve is automatically operated to the safe side of open or close.

#### 3 Direct action

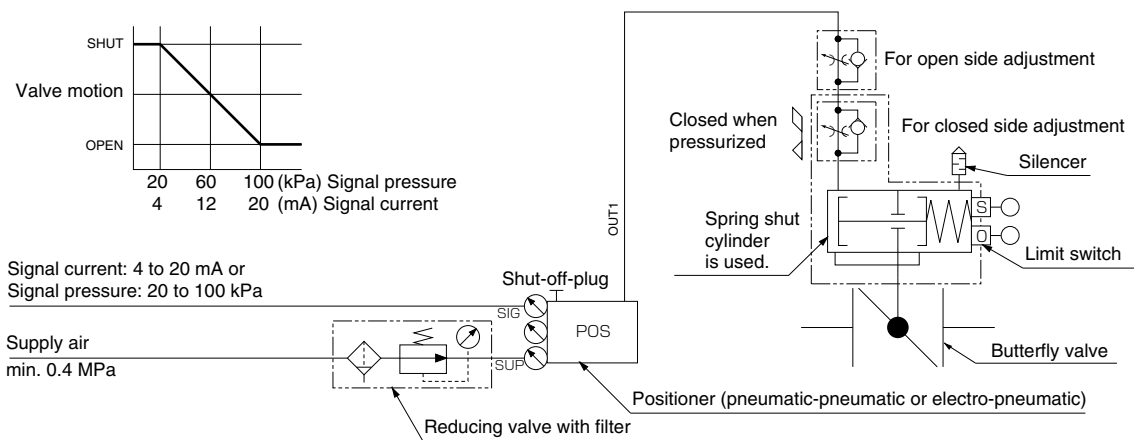
- Butterfly valve closes when signal increases.
- Butterfly valve opens when signal decreases.



→Butterfly valve opens when air supply fails.

#### 4 Reverse action

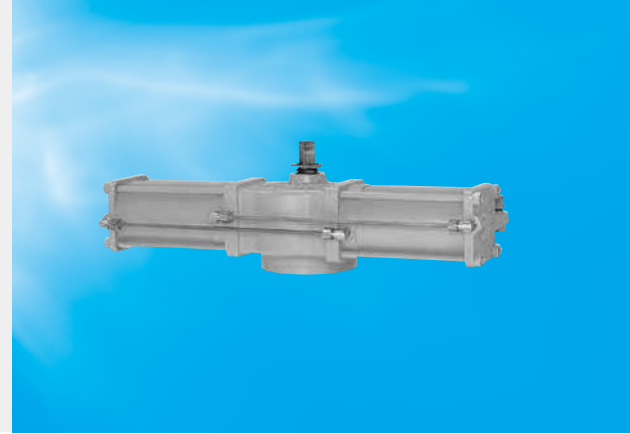
- Butterfly valve opens when signal increases.
- Butterfly valve closes when signal decreases.



→Butterfly valve closes when air supply fails.

# TGA

The TGA model is a double-action pneumatic actuator perfect for on/off control of the various types of butterfly valves. With an optional positioner, it can also be used for flow rate control. It mainly used for the medium to large-sized valves of size 350mm or more. The operation principle is that air pressure forces the piston inside the cylinder into a linear reciprocating motion, causing the trunnion coupled to the rod to drive the arm and rotate the output shaft.

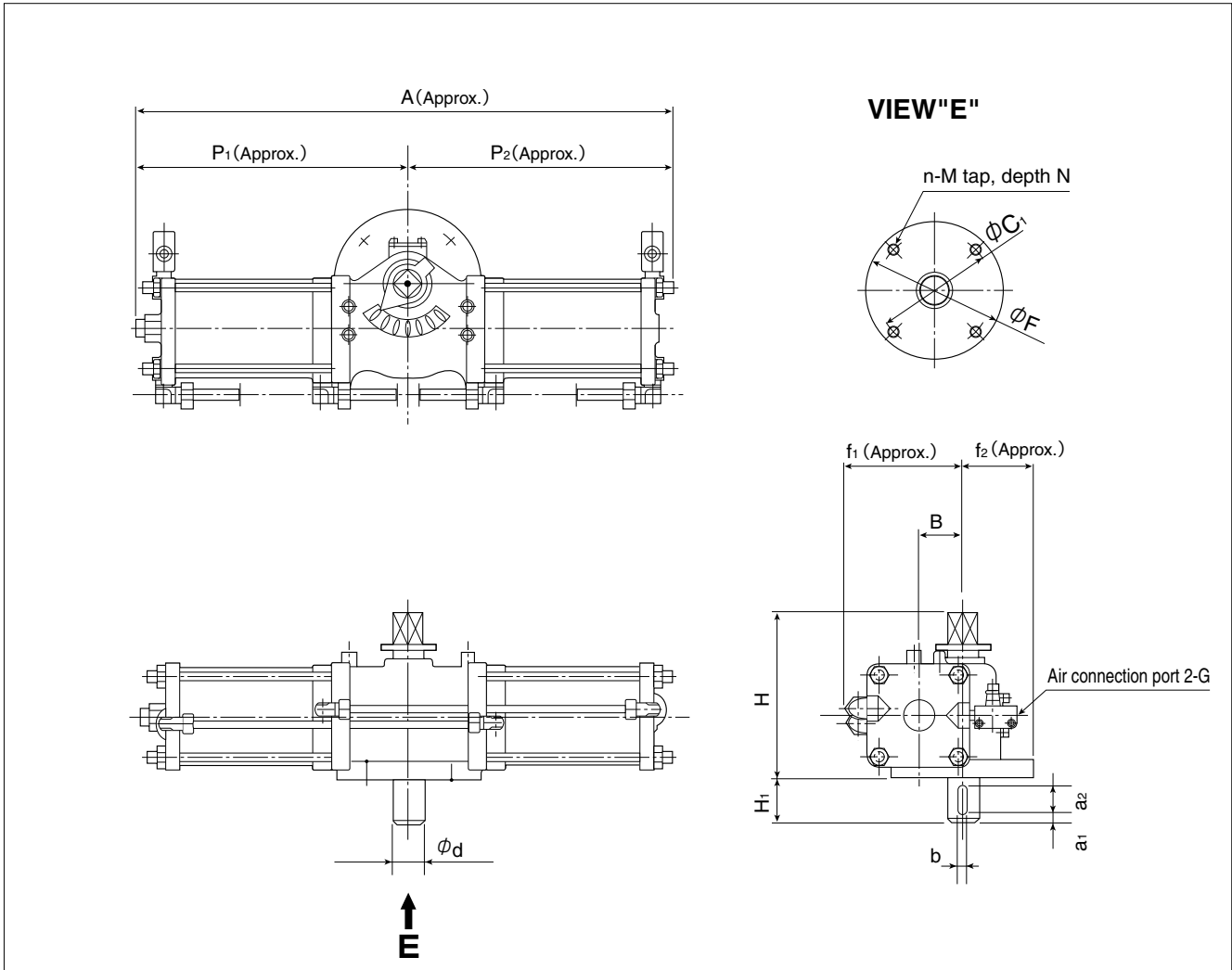


TGA Specifications								
	TGA-100	TGA-125	TGA-140	TGA-160	TGA-180	TGA-200	TGA-220	TGA-250
Output torque (N·m) (When supply pressure is 0.4 MPa and rotation angle is 0° or 90°)	585	1069	1510	2274	3194	4339	5976	8619
Supply pressure (MPa)	0.4~0.7* <sup>1</sup>							
Body shell max (MPa)	1.0							
Rotating angle	0 to +90°							
Port size	Rc1/4	Rc3/8				Rc1/2		
Operating fluid	Dry air							
Ambient temperature / supply air temperature	0 to 80 degree C* <sup>2</sup>							
Rotating speed range (sec.)	5 to 15							
Coating	Epoxy primer finish (Munsell N7)							

※1 If used for the TRITEC(TT1, TT2) with over 0.5MPa supply pressure, and forecasting over 10,000 times operation. Please ask us about cylinder specifications.

※2 Please ask us when used at working temperature of more than 60 degree C.

## TGA Outer Dimensions

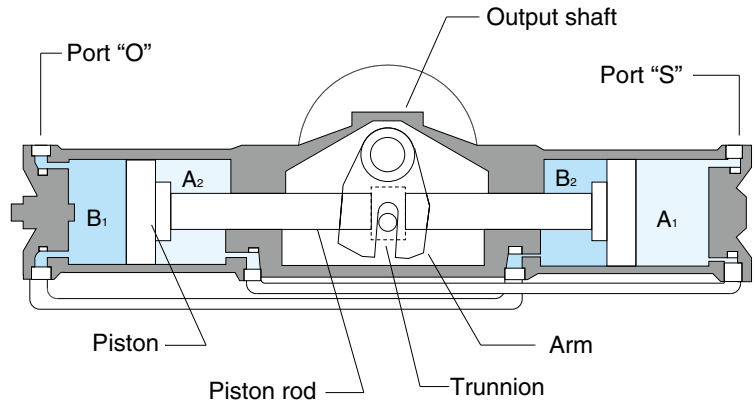


## TGA Dimensions

Type	Dimension (mm)																	Approx. Mass (kg)	
	A	P <sub>1</sub>	P <sub>2</sub>	f <sub>1</sub>	f <sub>2</sub>	B	H	H <sub>1</sub>	$\phi_d$	b	a <sub>1</sub>	a <sub>2</sub>	$\phi F$	C <sub>1</sub>	n	M	N		G
TGA-100	682	350	332	133	77.5	50	189	45	30	10	2	40	155	125	4	M12	15	Rc1/4	18
TGA-125	754	381	373	164	100	62	234	45	40	12	2	40	200	170	4	M16	20	Rc3/8	31
TGA-140	840	432	408	180	100	70	282	60	45	12	2	55	200	170	4	M16	20	Rc3/8	40
TGA-160	964	483	471	202	130	80	310	61	60	15	2	55	260	220	4	M20	25	Rc3/8	84
TGA-180	1069	543	526	221	130	90	323	65	65	18	2	60	260	220	4	M20	25	Rc3/8	115
TGA-200	1175	599	576	254	160	100	370	70	75	20	2	65	320	280	8	M20	25	Rc1/2	164
TGA-220	1263	642	621	271	160	110	400	85	75	20	2	80	320	280	8	M20	25	Rc1/2	188
TGA-250	1392	707	687	302	160	125	433	100	75	20	2	95	320	280	8	M20	25	Rc1/2	254

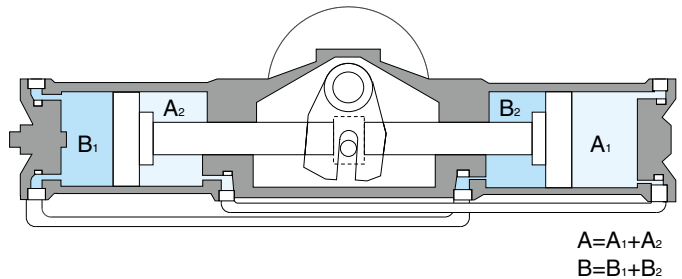
TGA Operation principle

As chambers A1 - A2 and B1 - B2 are connected through copper tubes as shown in the figure at left (single-acting cylinder is provided only with chambers A2 and B1), feeding air into port "S" will generate a thrust to push the piston toward the left. The linear motion of the piston is converted to a clockwise rotary motion of the output shaft through the trunnion. Residual air in chamber B is exhausted through port "O". Feeding air to port "O" causes the reverse of the action described above, rotating the output shaft counter-clockwise.



TGA Air consumption

Type	Cylinder capacity ( ℓ )	
	A (O→S)	B (S→O)
TGA-100	1.980	1.980
TGA-125	3.629	3.629
TGA-140	5.113	5.113
TGA-160	7.713	7.713
TGA-180	10.847	10.847
TGA-200	14.730	14.730
TGA-220	20.229	20.229
TGA-250	29.278	29.278



(1) Required air consumption

Double-acting type

$$VD = (A+B) \left( \frac{P-0.1013}{0.1013} \right) N$$

VD : Double-acting type cylinder air consumption (N ℓ)  
 A, B : Cylinder capacity ( ℓ )  
 P : Working pressure (Mpa)  
 N : Operating frequencies in a given time (1 round trip=1)

(2) Air consumption within a unit time

Double-acting type

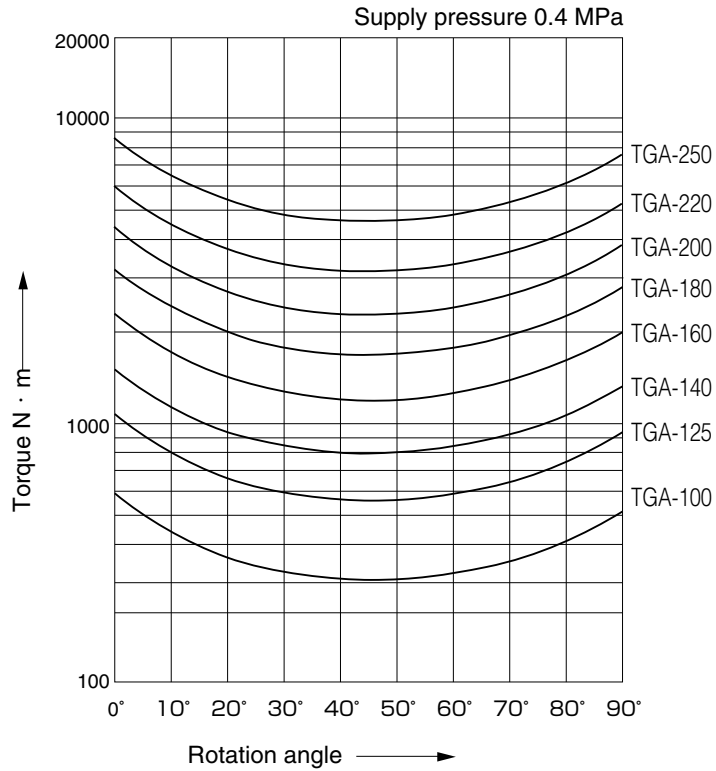
$$CD = \frac{VD}{t}$$

CD : Double-acting type cylinder air consumption (Nℓ/sec)  
 t : Unit time (sec)

Remark: The compressor should have a larger capacity than the air consumption calculated above in (1) and (2).

## TGA Output Torque Curve

### Double-acting type (TGA)



Notes :

- — Lines show output torque curve by actuator
- The table shows the torque at an operating air pressure of 0.4 Mpa.

## TGA Output Torque

Type	Rotation angle (°)									
	0	10	20	30	40	50	60	70	80	90
TGA-100	585	447	367	325	310	311	324	355	413	507
TGA-125	1069	815	669	593	565	567	591	648	754	926
TGA-140	1510	1153	946	838	799	801	836	916	1065	1308
TGA-160	2274	1735	1423	1262	1203	1206	1259	1379	1604	1969
TGA-180	3194	2437	1999	1771	1689	1693	1767	1936	2253	2766
TGA-200	4339	3311	2716	2406	2295	2301	2401	2630	3060	3758
TGA-220	5977	4561	3742	3317	3163	3172	3309	3625	4216	5176
TGA-250	8620	6579	5398	4784	4562	4574	4773	5228	6081	7466





## TGA Parts list

### ■ TGA-100 to 160 parts list (double-acting type)

No.	Description	Q'ty	Remarks
1	Body	1	
2	End cover	2	
3	Piston	2	
4	Rod cover	2	
5	Arm	1	
6	Piston rod	1	
7	Case	2	
8	Trunnion	1	
9	Shaft	1	
11	Rings	Set of 2	
12	Tie rod	8	
13	Bush	1	※1
14	Bush	2	
★ 15	V-ring	1	
16	Cover	1	
★ 17	O-ring	2	
★ 18	O-ring	2	
★ 19	O-ring	2	
★ 20	O-ring	2	
★ 21	O-ring	2	
★ 22	O-ring	2	
★ 23	Seal washer	1	Only TGA-100,125,140
	O-ring		Only TGA-160
24	Hexagon bolt	4	
25	Spring washer	4	
26	Hexagon nut	8	
27	Lock nut	1	
28	Screws	2	
29	Gasket	1	
30	C-retainer	2	
32	Stopper bolt	1	
33	Spring pin	2	
34	Copper pipe	2	
35	Pipe coupler	4	
36	Indicator	1	
45	C-retainer	1	
★ 46	Oil seal	1	※1
47	Bush	1	※1

Remark: Parts with a "star" before the part number are recommended replacement parts. To order as a set, please specify O-ring set.

※1 For products manufactured before May 2012, 2 pieces of parts no.13 are used, and parts no.46 to 47 are not used.



## TGA Parts list

### ■ TGA-180 to 250 parts list (double-acting type)

No.	Description	Q'ty	Remarks
1	Body	1	
2	End cover	2	
3	Piston	2	
4	Rod cover	2	
5	Arm	1	
6	Piston rod	1	
7	Case	2	
8	Trunnion	1	
9	Shaft	1	
11	Rings	Set of 2	
12	Tie rod	8	
13	Bush	1	
14	Bush	2	
15	Bush	1	
★ 17	O-ring	2	
★ 18	O-ring	2	
★ 19	O-ring	2	
★ 20	O-ring	2	
★ 21	O-ring	2	
★ 22	O-ring	2	
★ 23	O-ring	1	
26	Hexagon bolt	8	
27	Lock nut	1	
28	Screws	2	
30	C-retainer	2	
31	C-retainer	1	
32	Stopper bolt	1	
34	Copper pipe	2	
35	Pipe coupler	4	
36	Indicator	1	
37	Bush	1	
★ 38	Oil seal	1	
39	Key	1	
45	C-retainer	1	
46	Stop ring	Set of 1	

Remark: Parts with a "star" before the part number are recommended replacement parts. To order as a set, please specify O-ring set.

## TGA Accessories

Accessory	Type	Manufacturer	Part No.	Double-acting type								
				TGA-100	TGA-125	TGA-140	TGA-160	TGA-180	TGA-200	TGA-220	TGA-250	
Five-port/2-position, non explosion-proof, solenoid valve	Single solenoid	TAIYO	PCS2406-MC	○	—	—	—	—	—	—	—	—
		TAIYO	PCS2408-MC	—	○	○	○	○	○	○	—	—
		TAIYO	PCS2415-MC	—	—	—	—	—	○	○	○	○
	Double solenoid	TAIYO	PCD2406-MC	○	—	—	—	—	—	—	—	—
		TAIYO	PCD2408-MC	—	○	○	○	○	—	—	—	—
		TAIYO	PCD2415-MC	—	—	—	—	—	○	○	○	○
Five-port/2-position, explosion-proof, solenoid valve	Single solenoid	Kaneko	MB15G-8AE12PU-TMS	○	—	—	—	—	—	—	—	—
		Kaneko	MB15G-10AE12PU-TMS	—	○	○	○	○	○	○	○	○
	Double solenoid	Kaneko	MB15DG-8AE12PRS-M-TMS	○	—	—	—	—	—	—	—	—
		Kaneko	MB15DG-10AE12PRS-M-TMS	—	○	○	○	○	○	○	○	○
Filter regulator		SMC	AW20-02B-2-B-X490	○	—	—	—	—	—	—	—	—
		SMC	AW30-03B-2-B-X490	—	○	○	○	○	—	—	—	—
		SMC	AW40-04B-2	—	—	—	—	—	○	○	○	○
Limit switch	Non explosion-proof	Tomoe	TMS-BOX	○	○	○	○	○	○	○	○	○
		Azbil	1LS1-J	○	○	○	○	○	○	○	○	○
		OMRON	WLCA2	○	○	○	○	○	○	○	○	○
	Explosion-proof	Azbil	1LX7001	○	○	○	○	○	○	○	○	○
		Azbil	VCX-7003	○	○	○	○	○	○	○	○	○
Proximity switch	M18 shielded	OMRON	E2E-X7D1-N	○	○	○	○	○	○	○	○	○
	M18 non-shielded	OMRON	E2E-X14MD1	○	○	○	○	○	○	○	○	○
	M30 shielded	OMRON	E2E-X10D1-N	○	○	○	○	○	○	○	○	○
Positioner	Electro-pneumatic	SSS	TCE2000	○	○	○	○	○	○	○	○	○
		SMC	TP8100	○	○	○	○	○	○	○	○	○
		Azbil	AVP300	○	○	○	○	○	○	○	○	○
	Pneumatic-pneumatic	SMC	IP5100	○	○	○	○	○	○	○	○	○
Manual operating	Manual gear unit	Tomoe	MGC	○	○	○	○	○	○	○	○	
Stroke adjuster		Tomoe	—	○	○	○	○	○	○	○	○	
Bypass unit		—	—	○	○	○	○	○	○	○	○	
Speed controller		SMC	AS2000-02	★	—	—	—	—	—	—	—	—
		SMC	AS3000-03	—	★	★	★	★	—	—	—	—
Silencer		SMC	AS4000-04	—	—	—	—	—	★	★	★	—
		SMC	AN20-02	○	○	○	○	○	○	○	○	○
		SMC	AN30-03	○	○	○	○	○	○	○	○	○
		SMC	AN40-04	—	—	—	—	—	○	○	○	○
Lock-up valve Quick exhaust valve		SMC	IL211-02	○	○	○	○	○	○	○	○	○
		SMC	AQ2000-02	○	—	—	—	—	—	—	—	—
		SMC	AQ3000-03	—	○	○	○	○	—	—	—	—
Booster relay		SMC	AQ5000-04	—	—	—	—	—	○	○	○	○
		SMC	IL100-02	○	—	—	—	—	—	—	—	—
Bypass valve (Ball valve)		SMC	IL100-03	—	○	○	○	○	○	○	○	○
		TOA	BK-8A	○	—	—	—	—	—	—	—	—
		TOA	BK-10A	—	○	○	○	○	—	—	—	—
Operation recording unit		KKD	651-001-13	—	—	—	—	—	○	○	○	○
		Tomoe	TPro1100	○	○	○	○	○	○	○	○	○

**Remarks:**

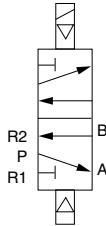
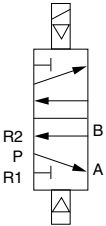
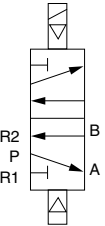
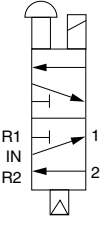
1. Symbols in table mean the following: ★: Standard accessory, ○: Installable, —: Un-installable
2. This table shows typical accessory combinations. Accessories not shown in this table can also be installed. For details, please consult us.

## TGA Solenoid valves

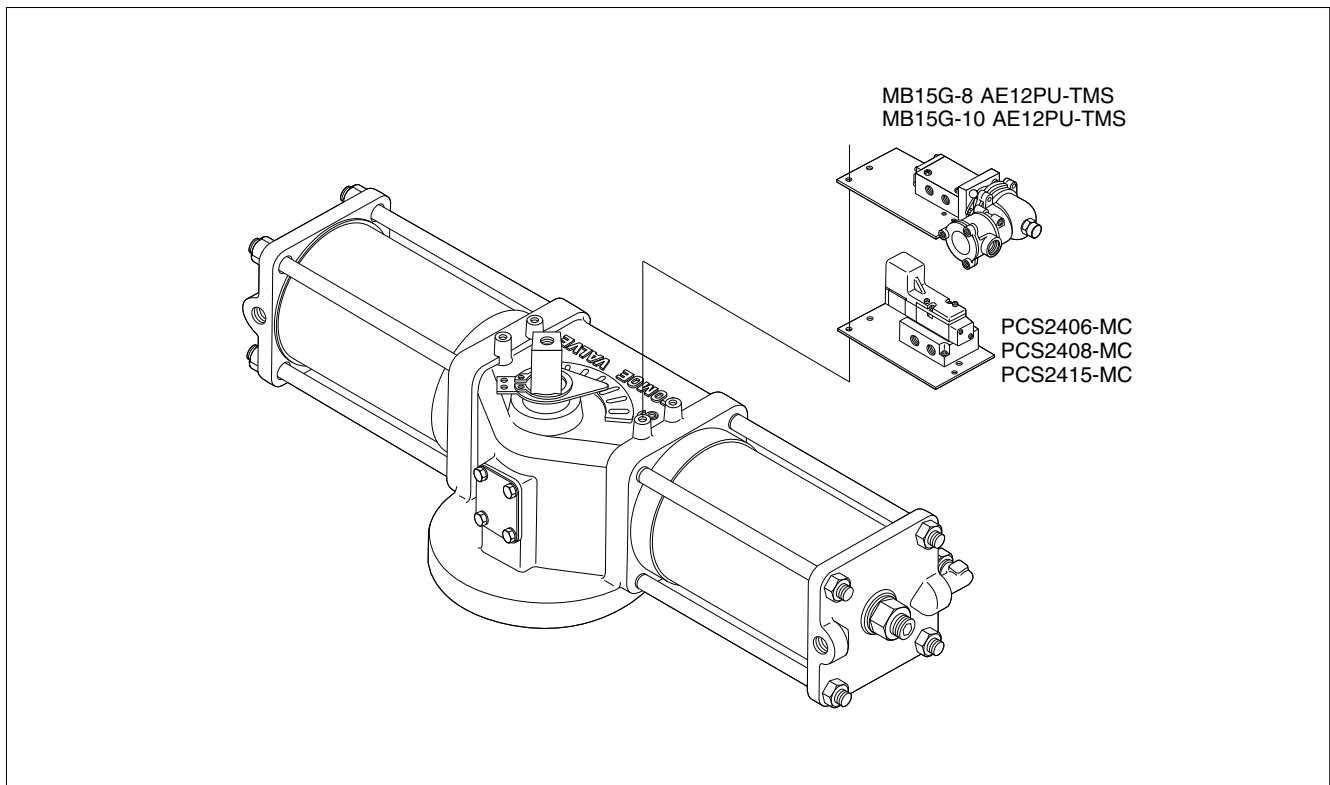
### ■ Purpose

The purpose of a solenoid valve is to use electrical signals to remotely change the air flow to operate the valves.

### ■ Standard specifications

Item	Five-port/2-position, non explosion-proof, solenoid valve (single solenoid)	Five-port/2-position, non explosion-proof, solenoid valve (single solenoid)	Five-port/2-position, non explosion-proof, solenoid valve (single solenoid)	Five-port/2-position, explosion-proof, solenoid valve (single solenoid)
Type	PCS2406-MC	PCS2408-MC	PCS2415-MC	MB15G-10AE12PU-TMS
Manufacturer	TAIYO	TAIYO	TAIYO	Kaneko
JIS symbol				
Applicable cylinder type	TGA-100	TGA-125 to 180	TGA-200 to 250	TGA-125 to 250
Air connection port size	Rc1/4 (IN, OUT, EXH)	Rc3/8 (IN, OUT) Rc1/4 (EXH)	Rc1/2 (IN, OUT) Rc3/8 (EXH)	Rc3/8 (IN, OUT) Rc1/4 (EXH)
Effective sectional area	10mm <sup>2</sup>	30mm <sup>2</sup>	70mm <sup>2</sup>	11mm <sup>2</sup>
Rated voltage	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V, AC200V 50/60Hz AC110V, AC220V 60Hz DC24V
Explosion-proof construction	-	-	-	d2G4
Wiring method	Conduit terminal	Conduit terminal	Conduit terminal	Conduit terminal
Conduit entry	G1/2	G1/2	G1/2	G1/2
Manual operating	Non lock bush type	Non lock bush type	Non lock bush type	Manual button lock type
Operating temperature	-5 to 50 degrees C	-5 to 50 degrees C	-5 to 50 degrees C	-20 to 60 degrees C
Weight	0.3kg	0.46kg	0.85kg	1.24kg

Remark: The above are standard TOMOE-compatible solenoid valves. It is also possible to install solenoid valves other than those listed above such as a double solenoid or 3-port solenoid valve. For details, please consult us.

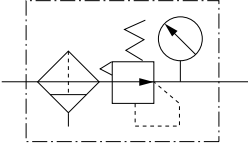
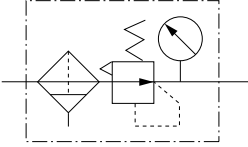
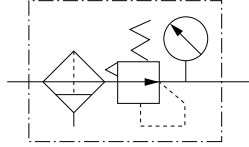


## TGA Filter regulator (Pressure reducer with filter)

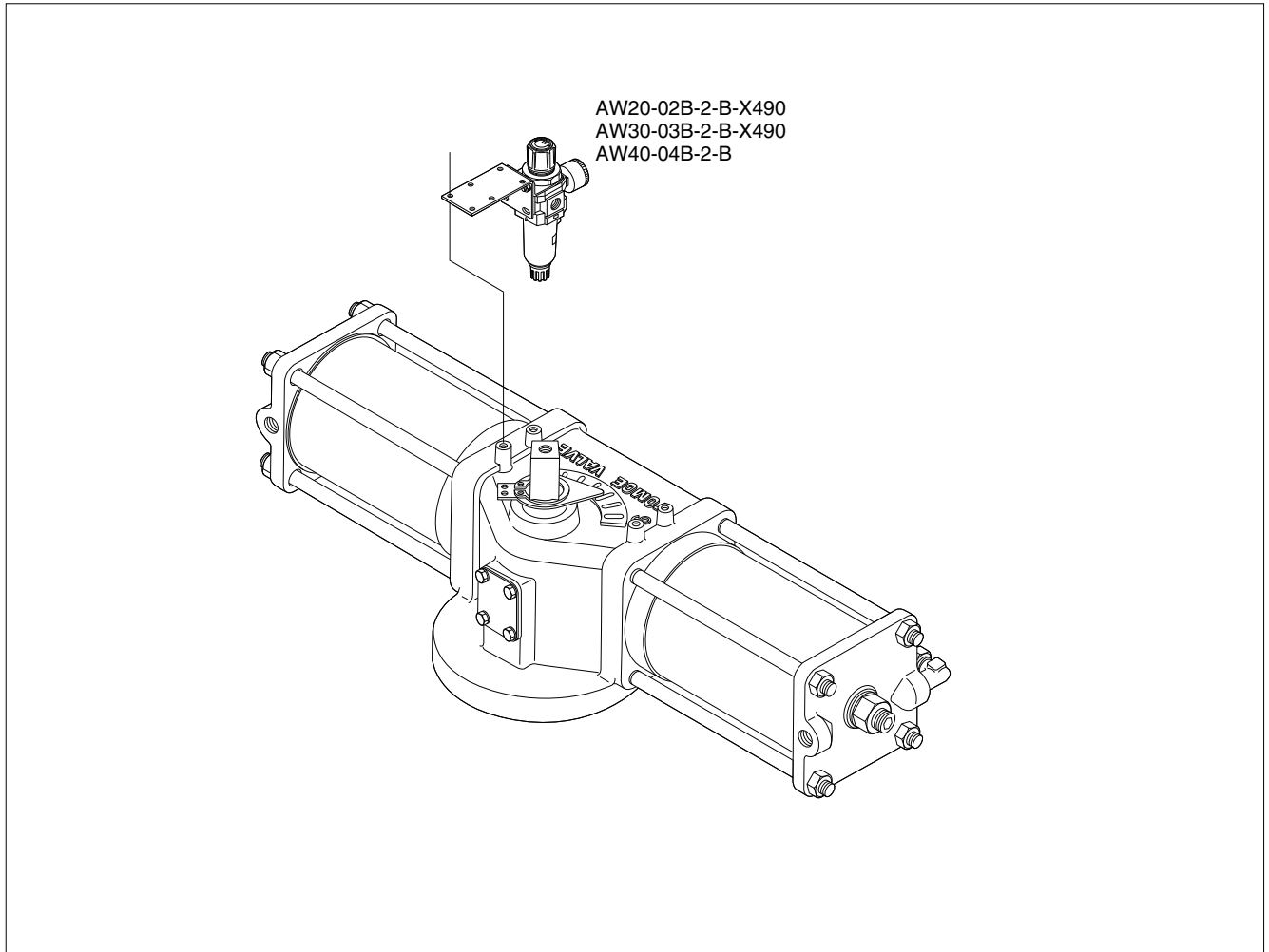
### ■ Purpose

Filter regulators are used to eliminate oil, water, and dust from the operating air in order to protect pneumatic accessories (solenoid valve and cylinder, etc.) and to keep operating pressure at an adequate and constant level (about 4 to 5 K).

### ■ Standard specifications

Type	AW20-02B-2-B-X490	AW30-03B-2-B-X490	AW40-04B-2-B
Manufacturer	SMC	SMC	SMC
JIS symbol			
Applicable cylinder type	TGA-100	TGA-125 to 180	TGA-200 to 250
Set pressure range	0.05 to 0.85MPa	0.05 to 0.85MPa	0.05 to 0.85MPa
Pressure gauge connection port	Rc1/4	Rc1/8	Rc1/4
Operating temperature	-5 to 60 degrees C	-5 to 60 degrees C	-5 to 60 degrees C
Air connection port size	Rc1/4	Rc3/8	Rc1/2
Filtration	5μm	5μm	5μm
Option	Auto drain, low and high temperatures	Auto drain, low and high temperatures	Auto drain, low and high temperatures
Weight	0.5kg	0.79kg	1.52kg

Remark: The above are standard TOMOE-compatible filter regulators. It is also possible to install filter regulators other than those listed above. For details, please consult us.

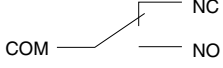
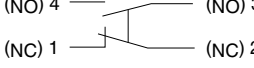
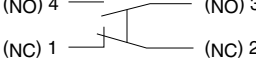
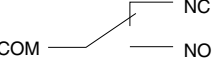


## TGA Limit switches

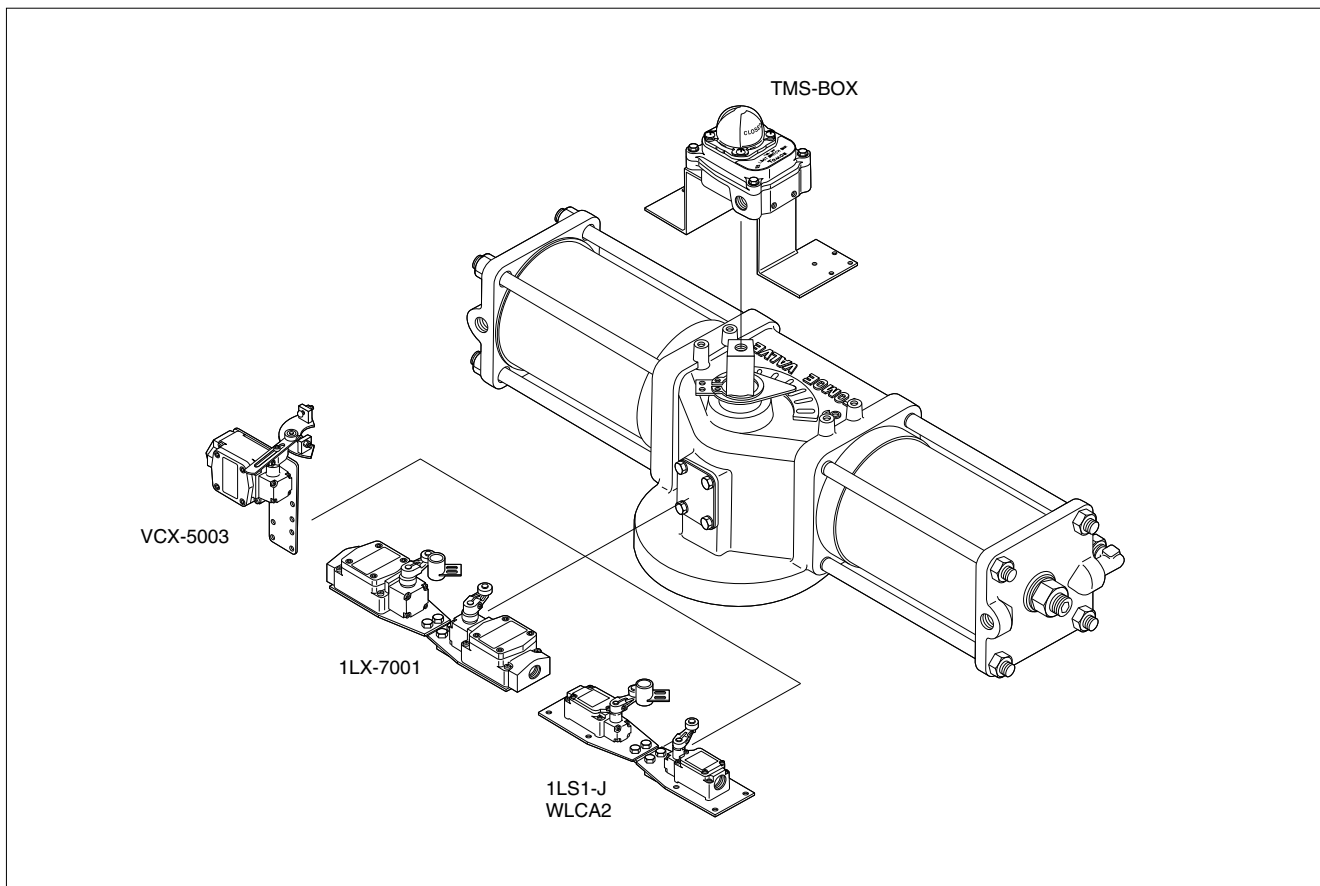
### ■ Purpose

Limit switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

### ■ Standard specifications

Type	TMS-BOX	1LS1-J WLCA2	1LX-7001	VCX-7003
Manufacturer	Tomoe	Azbil (1LS1-J) OMRON (WLCA2)	Azbil	Azbil
Circuit	Monopolar double-throw (1C, SPDT) X2 	Bipolar double interruption (1A1B, 2CKT-DB) 	Bipolar double interruption (1A1B, 2CKT-DB) 	Monopolar double-throw (1C, SPDT) X2 
Actuator	Hinge roller lever type	Roller lever type	Roller lever type	Adjustable roller lever type
Class of insulation	IP67 (Option: ExdIIIBT6)	IP67	IP67, Exde IIC T6	IP67, Exde IIC T6
Rated voltage (resistance load)	Standard	AC125V-10A AC250V-10A AC480V-10A DC125V-0.8A DC250V-0.4A	AC125V-5A AC250V-5A DC125V-0.8A DC250V-0.4A	AC250V-5A DC125V-0.8A DC250V-0.4A
	Micro load specifications			
Minimum applicable load (reference value)	DC30V 100mA	DC5V 1mA	DC24V 10mA	DC24V 10mA
Operating temperature	-10 to 80 degrees C	1LS1-J: -10 to 70 degrees C WLCA2: -10 to 80 degrees C	-10 to 60 degrees C	-10 to 60 degrees C
Conduit entry	2-G1/2	G1/2	G1/2	G3/4
Option	—	Heat, cold and corrosion resistant	Hydrogen anti-explosion (1LX5701)	Waterproof (VCL-5003)
Contacts	Switch detection with one (2 switches inside)	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection	Switch detection with one (2 switches inside)
Weight	0.98kg	0.28kg	0.74kg	0.77kg

Remark: The above are standard TOMOE-compatible limit switches. It is also possible to install limit switches other than those listed above. For details, please consult us. Since the rated load of the TMS-BOX micro load specification is smaller than that of the standard specification, a failure may occur if a current exceeding the rating is applied.



**TGA Proximity Switches**

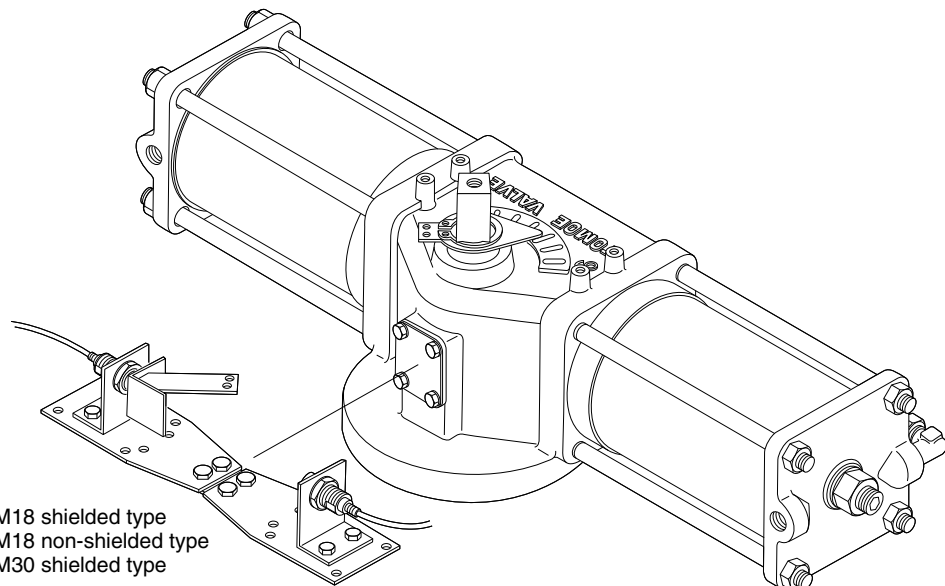
**■ Purpose**

Proximity switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

**■ Standard Specifications**

Product	M18 shielded type (Can be embedded in metal.)	M18 non-shielded type (Cannot be embedded in metal.)	M30 shielded type (Can be embedded in metal.)
Type	E2E-X7D1-N	E2E-X14MD1	E2E-X10D1-N
Manufacturer	OMRON	OMRON	OMRON
With power source	DC 2-wire system	DC 2-wire system	DC 2-wire system
Motion mode	NO	NO	NO
Detecting distance	0 to 5.6mm	0 to 11.2mm	0 to 8mm
Object to be detected	Magnetic metal (stainless steel possible)	Magnetic metal (stainless steel possible)	Magnetic metal (stainless steel possible)
Power source voltage	DC12 to 24V	DC12 to 24V	DC12 to 24V
Current consumption	3 to 100mA	3 to 100mA	3 to 100mA
Class of insulation	IP67	IP67	IP67
Operating temperature	-25 to 70 degrees C	-25 to 70 degrees C	-25 to 70 degrees C
Connection	Cord draw type (2m)	Cord draw type (2m)	Cord draw type (2m)
Contacts	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection
Weight	0.13kg	0.13kg	0.18kg

Remark: The above are standard TOMOE-compatible proximity switches. It is also possible to install limit switches other than those listed above such as a DC 3-wire, AC 2-wire, AC/DC 2-wire or connector-type proximity switch. For details, please consult us.



M18 shielded type  
M18 non-shielded type  
M30 shielded type



## TGA Positioners

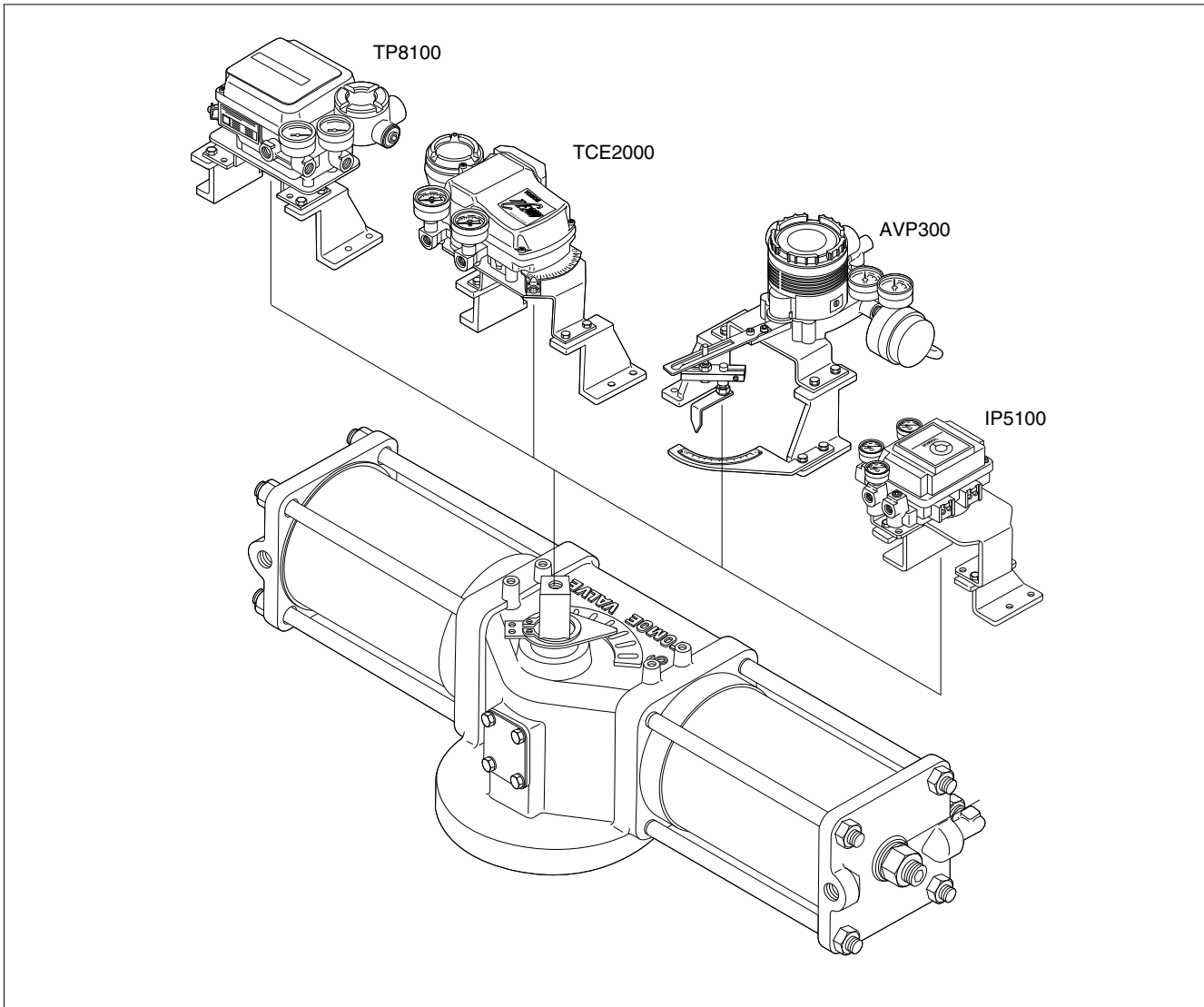
### ■ Purpose

A positioners are used for quick and accurate control of the valve opening angle with pneumatic signals or 4-20mA DC input signals from a control room or controller unit.

### ■ Standard specifications

	Electro-Pneumatic, analog	Electro-Pneumatic, analog	Electro-Pneumatic, digital (smart)	Pneumatic-Pneumatic
Type	TCE2000	TP8100	AVP300	IP5100
Manufacturer	Tomoe	Tomoe	Azbil	SMC
Input signal	4 to 20mA	4 to 20mA	4 to 20mA	0.02 to 0.1MPa
Resistance	250Ω (4 to 20mADC)	235±15Ω (4 to 20mADC)	300Ω (4 to 20mADC)	—
Supply air	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa
Output flow rate	180L/min. or more (SUP=0.4MPa)	200L/min. or more (SUP=0.4MPa)	250L/min. or more (SUP=0.4MPa)	200L/min. or more (SUP=0.4MPa)
Air consumption	Within 11L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)	Within 10L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)
Operating temperature	-20 to 83 degrees C (Non explosion-proof) -20 to 60 degrees C (Explosion-proof type d2G4)	-20 to 8 degrees C (Non explosion-proof) -20 to 60 degrees C (Explosion-proof type d2G4)	-40 to 80 degrees C (Non explosion-proof) -20 to 60 degrees C (Explosion-proof type d2G4)	-20 to 80 degrees C
Class of insulation	IP65, ExdII BT6X	IP67, ExdII BT5	IP65 (option: Exd2CT6X)	—
Air connection port size	Rc1/4	Rc1/4	Rc1/4	Rc1/4
Conduit entry	2-G1/2	2-G1/2	2-G1/2	—
Sensitivity	Within 0.5%FS	Within 0.5%FS	Within 1%FS	Within 0.5%FS
Linearity	Within ±1.5%FS	Within ±2%FS	Within ±1%FS	Within ±2%FS
Hysterisis	Within 1%FS	Within 1%FS	Within 1%FS	Within 1%FS
Option	—	—	Analog signal (4 to 20 mA) output Any special opening setting Supports field bus.	—
Weight	2.3kg	2.6kg	2.8kg	1.2kg

Remark: The above are standard TOMOE-compatible positioners. It is also possible to install positioners other than those listed above. For details, please consult us.



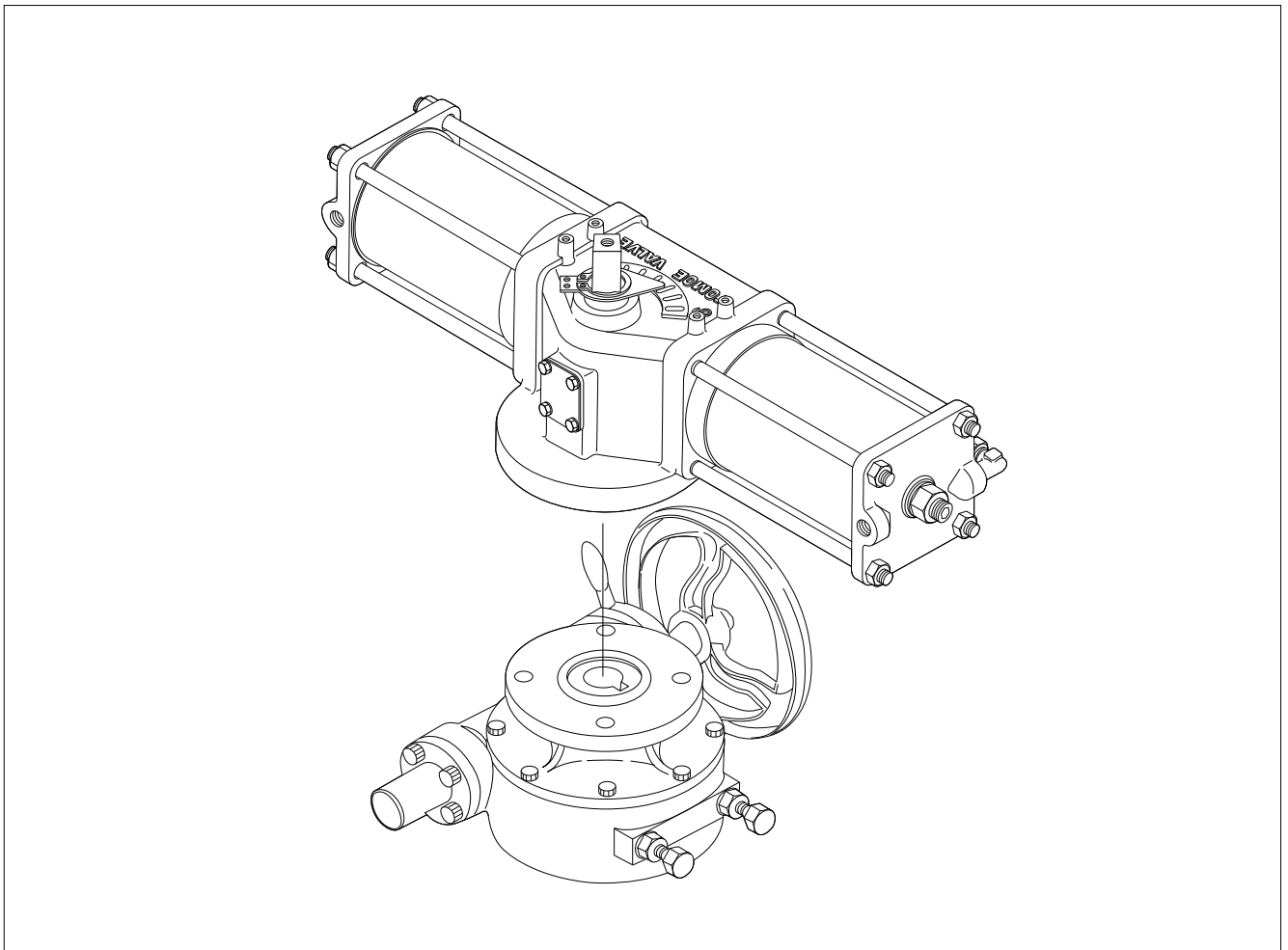
## TGA Manual operation unit

### ■ Purpose

The operation unit is for manual operation of the pneumatic cylinder when air supply fails.

### ■ Standard specifications

	Function	Type	Applicable cylinder	Remarks
1	Manual gear unit	Worm gear	Double acting type TGA-100 to 250	(1) Be sure to open the bypass valve. (2) Refer to seal plate for operation when operate.



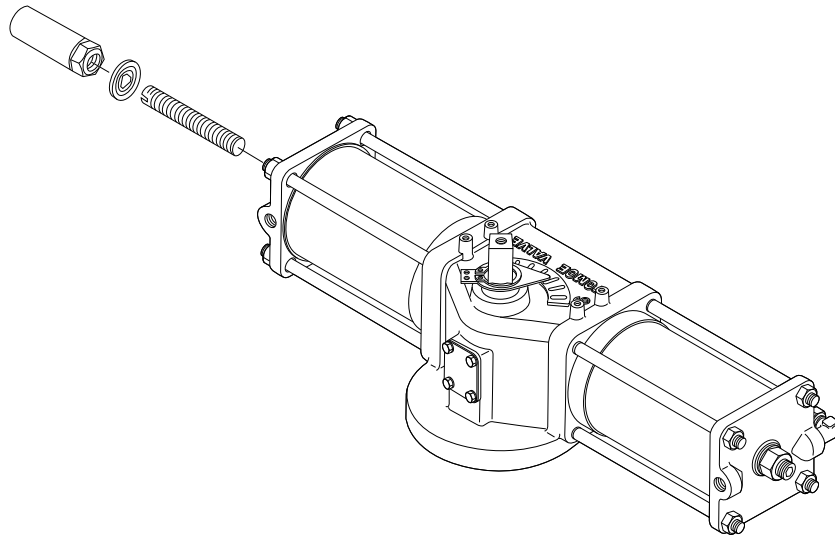
## TGA Stroke adjuster

### ■ Purpose

The stroke adjuster sets the valve opening freely from the outside.

### ■ Standard specifications

Function	Type	Applicable cylinder	Remarks
Adjust screw	Side adjust screw	Double acting type TGA-100 to 250	(1) Loose protecting cover. (2) Tighten bolt to adjust the stroke angle. (3) Fasten protecting cover.

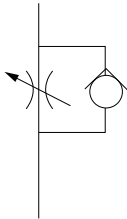
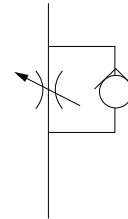
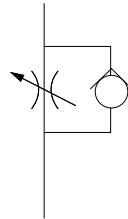


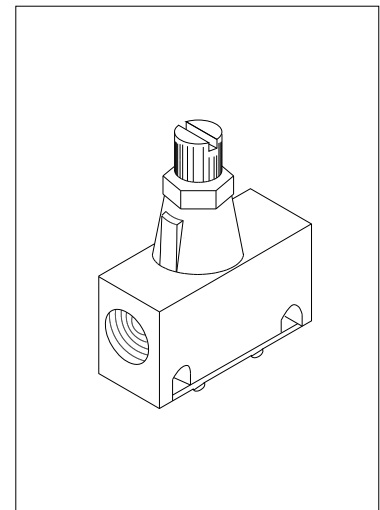
## TGA Speed controllers

### ■ Purpose

Speed controller is used to adjust time of opening or closing.

### ■ Standard specifications

Type	AS2000-02	AS3000-03	AS4000-04
Manufacturer	SMC	SMC	SMC
JIS symbol			
Applicable cylinder type	TGA-100	TGA-125 to 180	TGA-200 to 250
Needle revolution	8 rotations.	8 rotations.	8 rotations.
Adjustable range	5 to 15 secs	5 to 15 secs	5 to 15 secs
Operating temperature	-5 to 60 degrees C	-5 to 60 degrees C	-5 to 60 degrees C
Air connection port size	Rc1/4	Rc3/8	Rc1/2
Attachement	Install to cylinder air connect port	Install to cylinder air connect port	Install to cylinder air connect port
Weight	0.12kg	0.13kg	0.21kg






Remark: The above are standard TOMOE-compatible speed controllers. It is also possible to install speed controllers other than those listed above. For details, please consult us.

## TGA Silencers

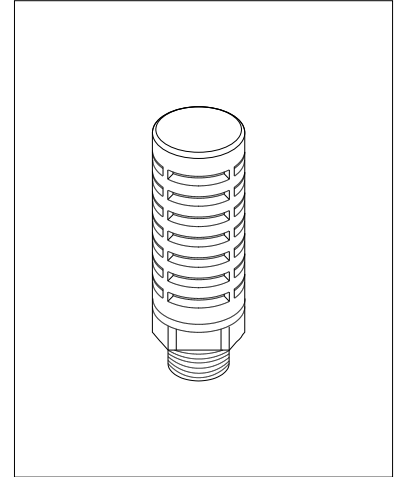
### ■ Purpose

Silencers eliminate noise at the exhaust ports on various kinds of pneumatic accessories.

### ■ Standard specifications

Type	AN20-02	AN30-03	AN40-04
Manufacturer	SMC	SMC	SMC
JIS symbol			
Effect of muffling	30dB (A)	30dB (A)	30dB (A)
Operating temperature	5 to 60 degrees C	5 to 60 degrees C	5 to 60 degrees C
Port size	Rc1/4	Rc3/8	Rc1/2
Attachment	Screw into exhaust port of solenoid valve.	Screw into exhaust port of solenoid valve.	Screw into exhaust port of solenoid valve.
Weight	0.02kg	0.03kg	0.04kg

Remark: The above are standard TOMOE-compatible silencers. It is also possible to install silencers other than those listed above. For details, please consult us.

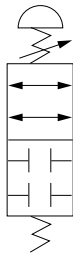


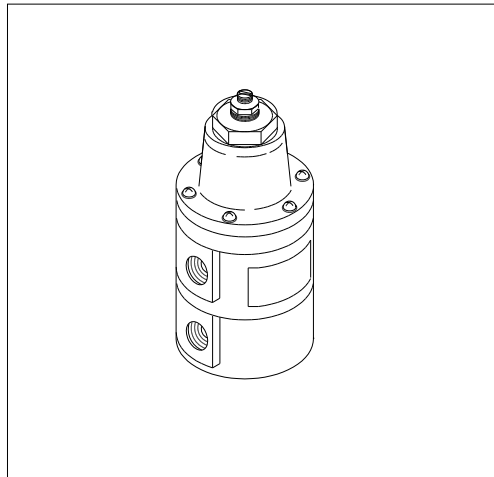
## TGA Lock-up valves

### ■ Purpose

When air supply fails, the lock-up valve automatically stops the line until pressure is restored and keeps the operating unit of the cylinder at the stay-put position.

### ■ Standard specifications

Type	IL211-02
Manufacturer	SMC
JIS symbol	
Effective sectional area	17mm <sup>2</sup>
Operating temperature	-5 to 60 degrees C
Air connection port size	Rc1/4
Signal pressure connection port	Rc1/4
Weight	0.64kg



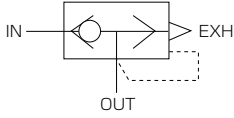
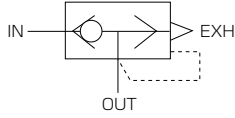
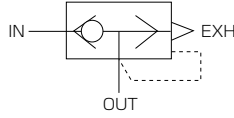
Remark: The above are standard TOMOE-compatible lock-up valves. It is also possible to install lock-up valves other than those listed above. For details, please consult us.

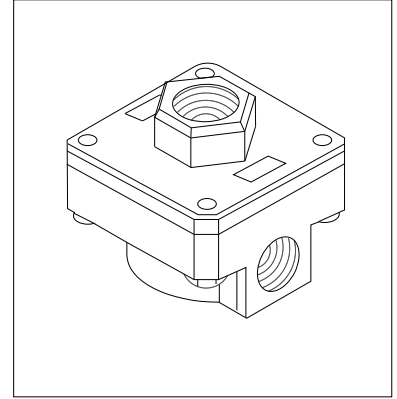
## TGA Quick exhaust valve

### ■ Purpose

Quick exhaust valves act in the reverse way to a speed controller. The valve shortens the open/close operation time by improving the exhaust efficiency of the cylinder.

### ■ Standard specifications

Type	AQ2000-02	AQ3000-03	AQ5000-04
Manufacturer	SMC	SMC	SMC
JIS symbol			
Operating temperature	-5 to 60 degrees C	-5 to 60 degrees C	-5 to 60 degrees C
Air connection port size	Rc1/4	Rc3/8	Rc1/2
Weight	0.1kg	0.21kg	0.69kg



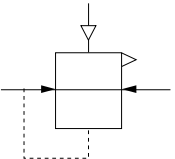
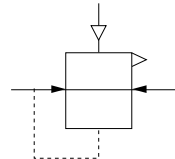
Remark: The above are standard TOMOE-compatible quick exhaust valves. It is also possible to install quick exhaust valves other than those listed above. For details, please consult us.

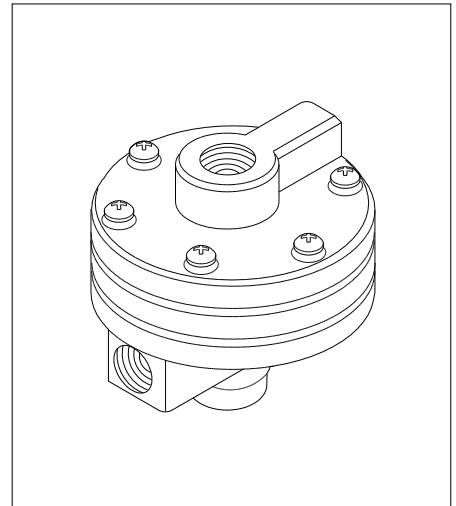
## TGA Booster relay

### ■ Purpose

Booster relay is used to shorten time of opening or closing, and to improve switching in case pneumatic cylinder with poisoner. Quick exhaust valve is used together for on-off purpose.

### ■ Standard specifications

Type	IL100-02	IL100-03
Manufacturer	SMC	SMC
JIS symbol		
Output flow rate	600L/min (SUP=0.5MPa)	600L/min (SUP=0.5MPa)
Air consumption	Within 3L/min. (OUT=0.1MPa)	Within 3L/min. (OUT=0.1MPa)
Operating temperature	-5 to 60 degrees C	-5 to 60 degrees C
Repeatability	Within ±1%FS	Within ±1%FS
Hysteresis	Within 1%FS	Within 1%FS
Air connection port size	Rc1/4	Rc3/8
Signal pressure connection port	Rc1/4	Rc1/4
Weight	0.56kg	0.56kg



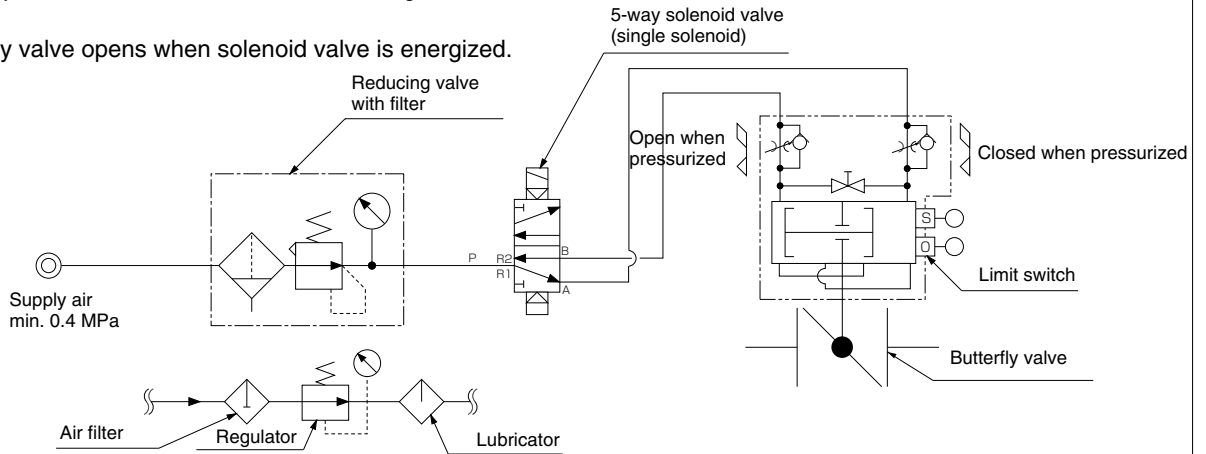
Remark: The above is a standard TOMOE-compatible booster relay.  
It is also possible to install booster relays other than that listed above.  
For details, please consult us.

Standard and semi-standard accessories and their use

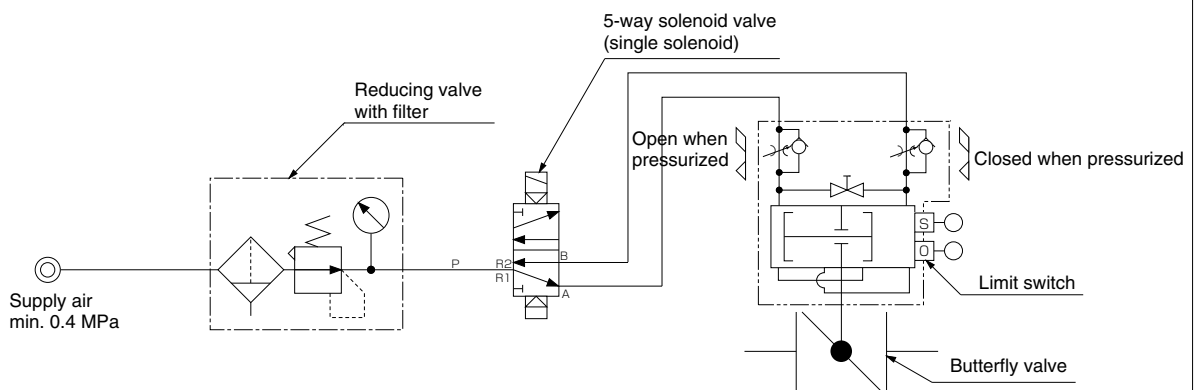
Example of standard air circuit for on/off operation (double-acting type)

Shown below are standard circuits to open and close a butterfly valve driven by a double-acting air cylinder while transmitting electrical signals from a remote control room. Switching of the flow of operation air is performed by the solenoid valve, and detection of the open/close position of the valve is performed by a limit switch, with feedback of the electrical signals to the control room.

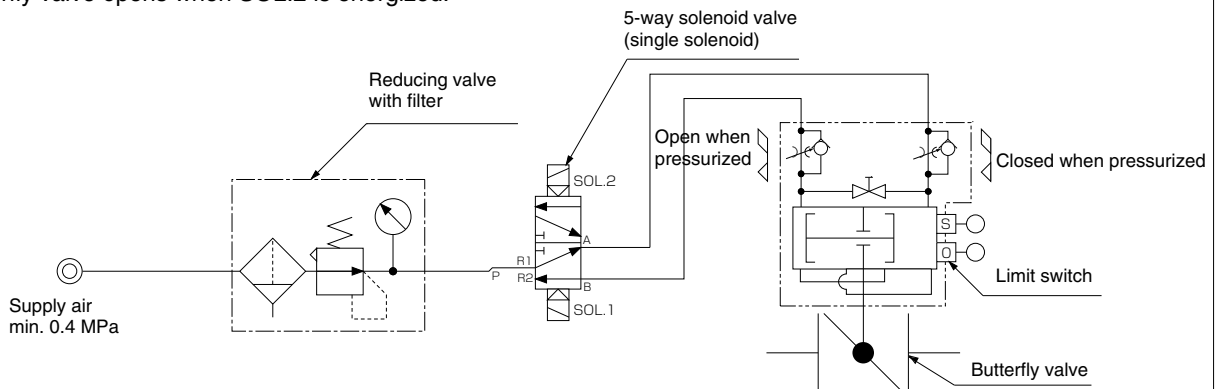
1 Butterfly valve opens when solenoid valve is energized.



2 Butterfly valve closes when solenoid valve is energized.



3 Butterfly valve closes when SOL.1 is energized.  
Butterfly valve opens when SOL.2 is energized.



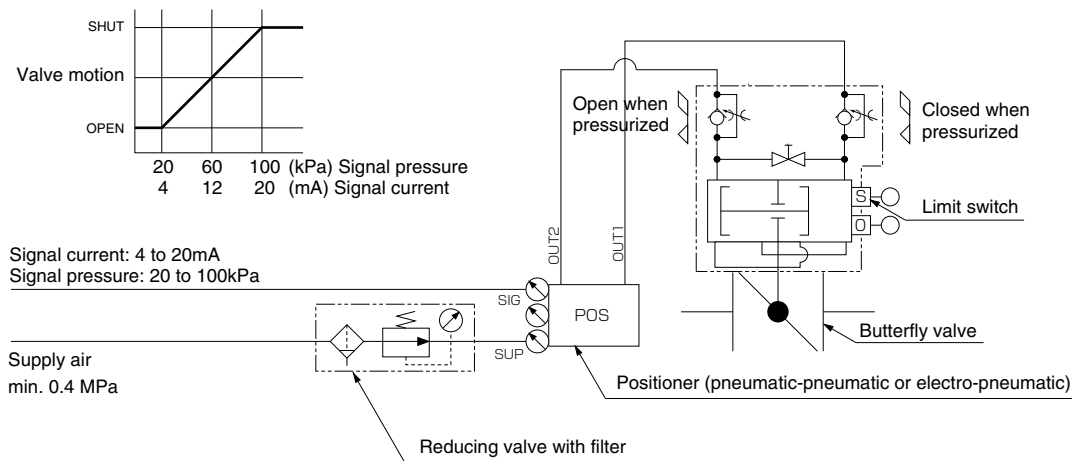
→Once SOL.1 is energized, the condition is maintained even after it is de-energized unless SOL.2 is energized.

### Example of standard air circuit for control operation (double-acting type)

Shown below are examples of standard circuits in which a P/P or E/P positioner is attached to the butterfly valve driven by a double-acting pneumatic cylinder to give instruction signals from a remote control room to the positioner. This adjusts the valve opening exactly and quickly in proportion to the signals, and also detects the open/close position of the valve by a limit switch which sends feedback of the electrical signals to the control room.

#### 4 Direct action

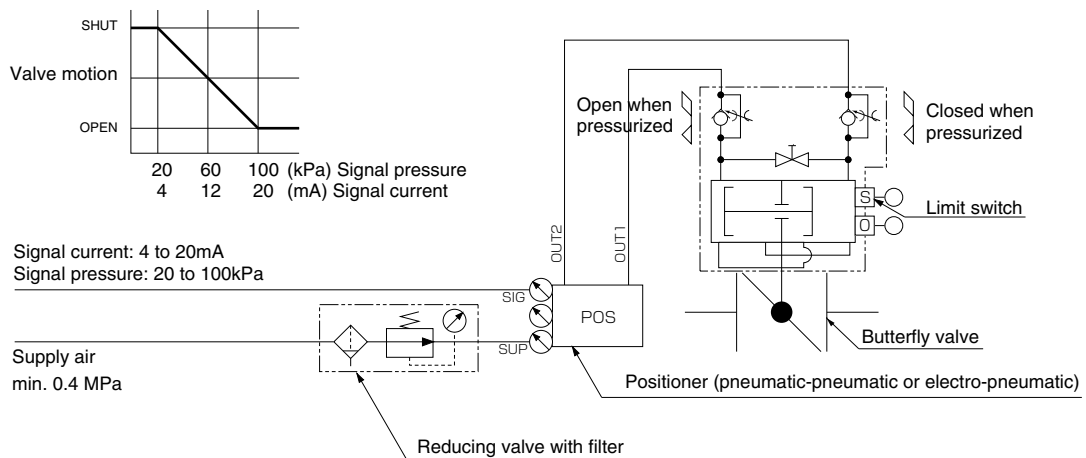
- Butterfly valve closes when signal increases.
- Butterfly valve opens when signal decreases.



→The butterfly valve opens fully when the input signal goes off under a state of assured air supply.

#### 5 Reverse action

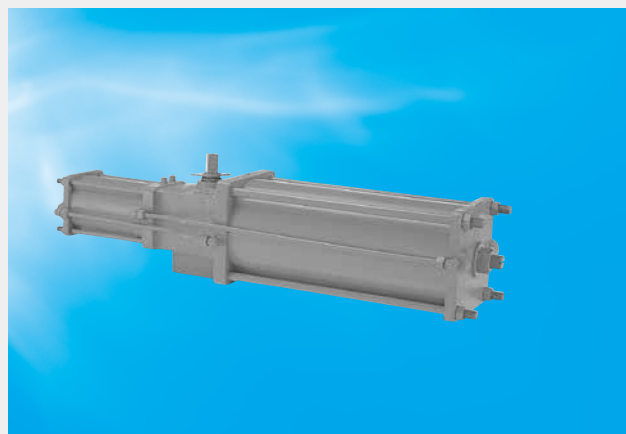
- Butterfly valve opens when signal increases.
- Butterfly valve closes when signal decreases.



→The butterfly valve closes fully when input signal goes off under a state of assured air supply.

# TG-S

The TG-S type spring return pneumatic actuator is suitable for on/off control for medium and large sized valves. Air pressure and the spring force the piston inside the cylinder into a linear reciprocating motion, causing the pin coupled to the piston rod to rotate the output shaft.



TG-S Specifications				
	TG-10S	TG-12S	TG-14S	TG-20S
Torque (N·m) (0.4MPa)	260	600	1250	3250
Supply pressure (MPa)	0.4~0.7 <sup>*1</sup>			
Body shell max (MPa)	1.0			
Port size	Rc3/8			Rc1/2
Rotating angle	-3 to +93°			
Operating fluid	Dry air			
Working temperature range (degrees)	0 to 80 degree C <sup>*2</sup>			
Rotating speed range (sec.)	4 to 20	6 to 20	11 to 20	18 to 40
Painting	Epoxy primer finish (Munsell N7)			

※ Supply pressure: 0.4MPa, without accessories

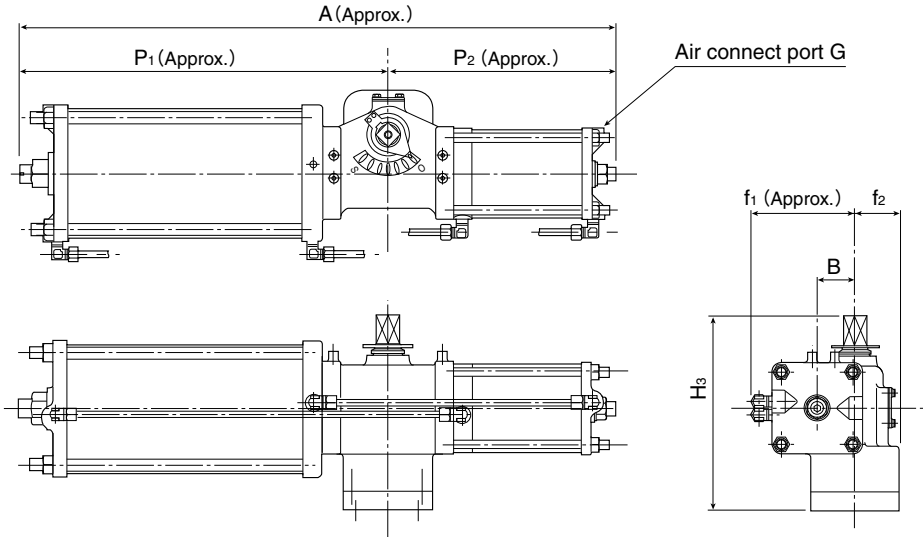
※1 If used for the TRITEC(TT1, TT2) with over 0.5MPa supply pressure. Please ask us about cylinder specifications.

※2 Please ask us when used at working temperature of more than 60 degree C.

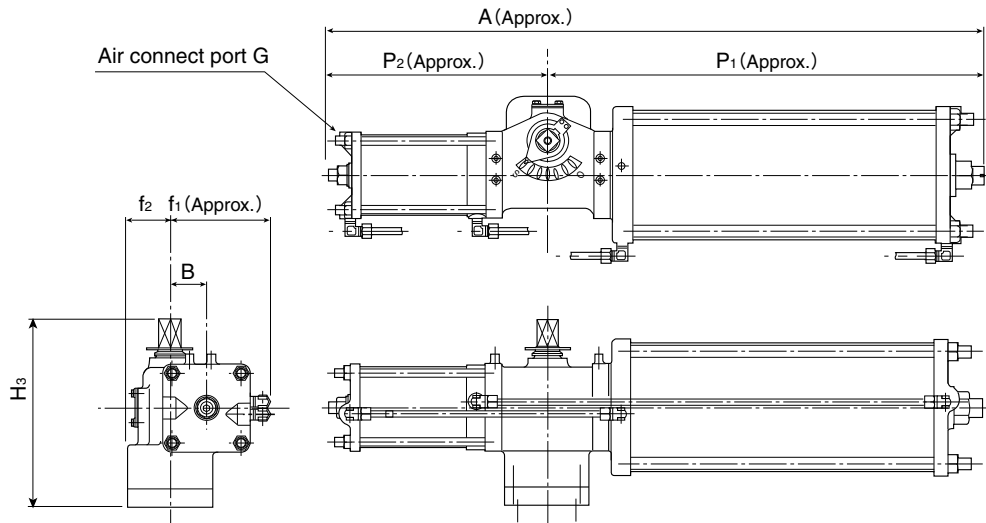


## TG-S Outer Dimensions

### 3K (Spring open)



### 3U (Spring shut)

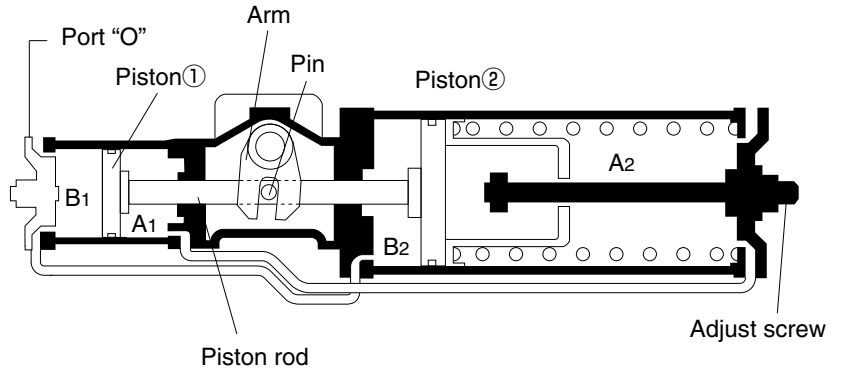


## TG-S Dimensions

Type	Dimension (mm)								Approx. Mass (kg)
	A	P <sub>1</sub>	P <sub>2</sub>	H	f <sub>1</sub>	f <sub>2</sub>	B	G	
TG-10S	945	585	360	307	165	70	60	Rc3/8	50
TG-12S	1080	720	360	307	206	70	60	Rc3/8	95
TG-14S	1255	865	390	340	257	70	67	Rc3/8	191
TG-20S	1655	1095	560	474	348	83	95	Rc1/2	402

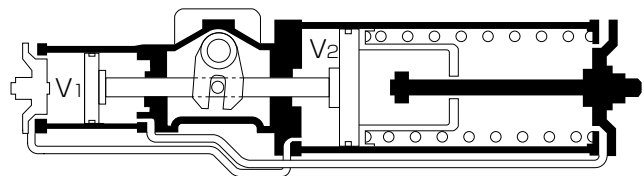
TG-S Operation principle

As shown in the picture on the right, the chamber A<sub>1</sub> is connected to the chamber A<sub>2</sub> with copper tubes. The same is true for chamber B<sub>1</sub> and B<sub>2</sub>. Operating air is supplied through port "O" and fills chambers B<sub>1</sub> and B<sub>2</sub>. The air moves pistons ① and ② to the right, so that the spring is tensed. when thrust is transmitted to the pin on the piston rod to give the output shaft a force to produce counter-clockwise rotation through the arm, which rotates the shaft counter-clockwise. Residual air in chambers A<sub>1</sub> and A<sub>2</sub> is exhausted through port "S". During air failure mode, the spring forces the piston ② to move left, when thrust is transmitted to the pin on the piston rod to give an output shaft a force to produce clockwise rotation through the arm, which rotates the shaft clockwise.



TG-S Air consumption

Type	Cylinder capacity ( ℓ )
TG-10S	3.59
TG-12S	6.36
TG-14S	12.56
TG-20S	36.29



(1) Required air consumption

Single-acting type

$$VS = V \left( \frac{P + 0.1013}{0.1013} \right) N$$

V S : Single-acting type cylinder air consumption (Nℓ)  
 V : Cylinder capacity(ℓ)(V<sub>1</sub>+V<sub>2</sub>)  
 P : Working pressure (Mpa)  
 N : Operating frequencies in a given time (1 round trip=1)

(2) Air consumption within a unit time

Single-acting type

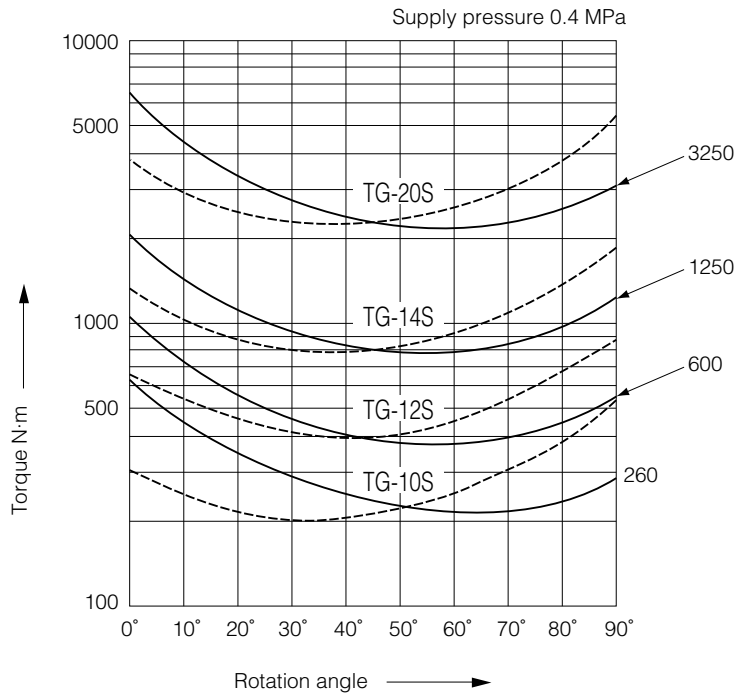
$$CS = \frac{VS}{t}$$

C S : Single-acting type cylinder air consumption (Nℓ/sec)  
 t : Unit time (sec)

Remark: The compressor should have a larger capacity than the air consumption calculated in above in (1) and (2).

## TGS Output Torque Curve

### ● Single-acting type (spring returned type)



**Notes :**

- This table shows 3U (spring shut). In the case of 3K (spring open), the rotation angle is reversed.
- ——— Lines show output torque curve by actuator
- - - - - Lines show output torque for spring force(air less)
- The table shows the torque at an operating air pressure of 0.4 Mpa.
- It can be used with an operating pressure between 0.4MPa and 0.7MPa.
- When the operating pressure is increased from 0.4MPa, the output at air fail does not change.

## TG-S Output Torque

(N·m)

Type	Supply pressure (0.4 MPa)		Spring power	
	0°	90°	0°	90°
TG-10S	600	260	260	600
TG-12S	1050	600	600	1050
TG-14S	2000	1250	1250	2000
TG-20S	6500	3250	3250	6500

## TG-S Accessories

Accessory	Type	Manu- facture	Part No.	Double-acting type			
				TG-10S	TG-12S	TG-14S	TG-20S
Five-port/2-position, non explosion-proof, solenoid valve	Single solenoid	TAIYO	PCS2408-MC	○	○	○	—
		TAIYO	PCS2415-MC	—	—	—	○
Five-port/2-position, explosion-proof, solenoid valve	Single solenoid	Kaneko	MB15G-10AE12PU-TMS	○	○	○	○
Filter regulator		SMC	AW30-03B-X490	○	○	○	—
		SMC	AW40-04B-2	—	—	—	○
Limit switch	Non explosion-proof	Tomoe	TMS-BOX	○	○	○	○
		Azbil	1LS1-J	○	○	○	○
		OMRON	WLCA2	○	○	○	○
	Explosion-proof	Azbil	1LX7001	○	○	○	○
Azbil		VCX-7003	○	○	○	○	
Proximity switch	M18 shielded	OMRON	E2E-X7D1-N	○	○	○	○
	M18 non-shielded	OMRON	E2E-X14MD1	○	○	○	○
	M30 shielded	OMRON	E2E-X10D1-N	○	○	○	○
Positioner	Electro-pneumatic	SSS	TCE2000	○	○	○	○
		SMC	TP8100	○	○	○	○
		Azbil	AVP300	○	○	○	○
	Pneumatic-pneumatic	SMC	IP5100	○	○	○	○
Manual operating unit	Manual gear unit	Tomoe	—	○	○	○	
Speed controller		SMC	AS3000-03	★	★	★	—
		SMC	AS4000-04	—	—	—	★
Silencer		SMC	AN20-02	○	○	○	○
		SMC	AN30-03	★	★	★	○
		SMC	AN40-04	—	—	—	★
Lock-up valve		SMC	IL201-02	○	○	○	○
Operation recording unit		Tomoe	TPro1100	○	○	○	○

### Remarks:

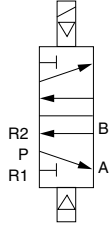
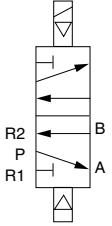
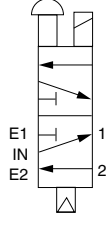
1. Symbols in table mean the following: ★: Standard accessory, ○: Installable, —: Un-installable
2. This table shows typical accessory combinations. Accessories not shown in this table can also be installed.  
For details please consult us.

## TG-S Solenoid valves

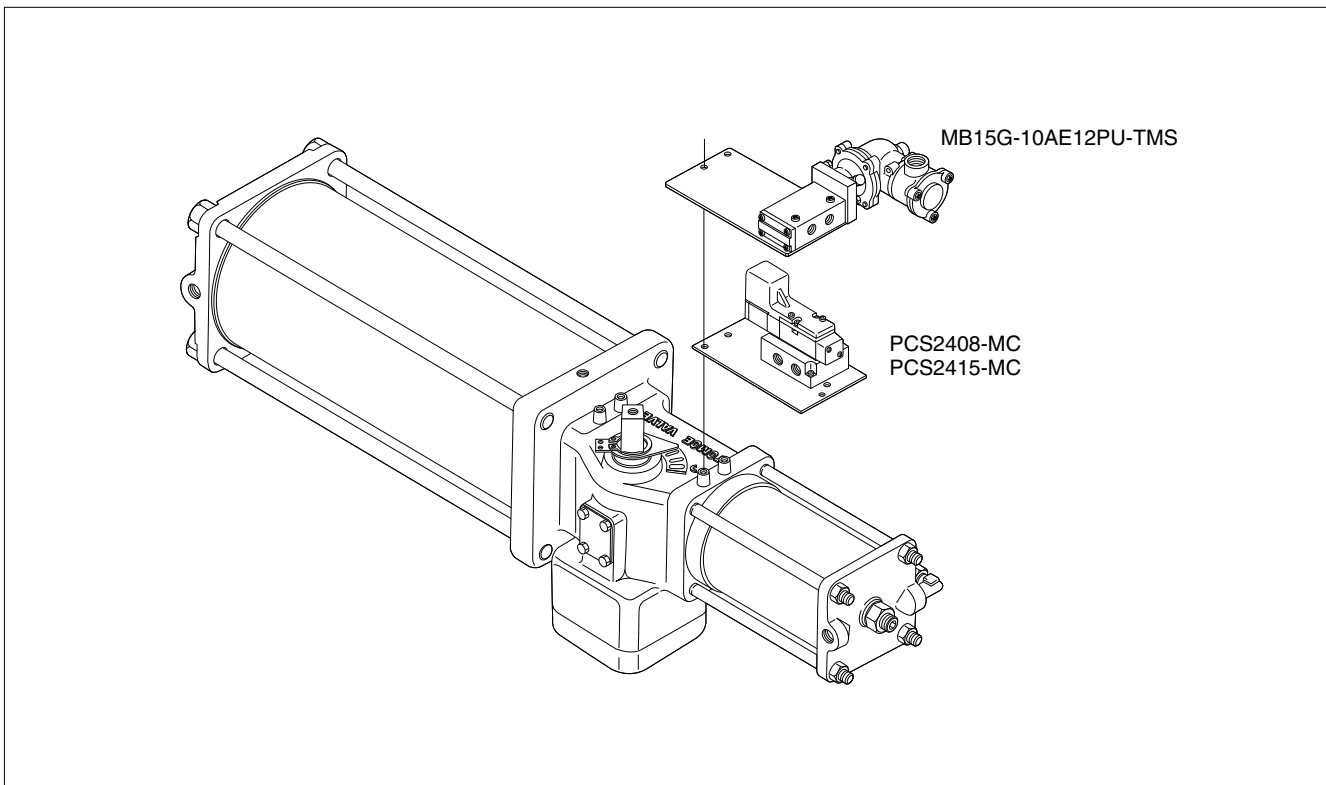
### ■ Purpose

The purpose of a solenoid valve is to use electrical signals to remotely change the air flow to operate the valves.

### ■ Standard specifications

Item	Five-port/2-position, non explosion-proof, solenoid valve (single solenoid)	Five-port/2-position, non explosion-proof, solenoid valve (single solenoid)	Five-port/2-position, explosion-proof, solenoid valve (single solenoid)
Type	PCS2408-MC	PCS2415-MC	MB15G-10AE12PU-TMS
Manufacturer	TAIYO	TAIYO	Kaneko
JIS symbol			
Applicable cylinder type	TG-10S to 14S	TG-20S	TG-10S to 20S
Air connection port size	Rc3/8 (IN,OUT) Rc1/4 (EXH)	Rc1/2 (IN,OUT) Rc3/8 (EXH)	Rc3/8 (IN,OUT) Rc1/4 (EXH)
Effective sectional area	30mm <sup>2</sup>	70mm <sup>2</sup>	11mm <sup>2</sup>
Rated voltage	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V/110V 50/60Hz AC200V/220V 50/60Hz DC24V	AC100V, AC200V 50/60Hz AC110V, AC220V 60Hz DC24V
Class of insulation	—	—	d2G4
Wiring method	Conduit terminal	Conduit terminal	Conduit terminal
Conduit entry	G1/2	G1/2	G1/2
Manual operating	Non lock bush type	Non lock bush type	Manual button lock type
Operating temperature	5 to 50 degrees C	5 to 50 degrees C	-20 to 60 degrees C
Weight	0.46kg	0.85kg	1.24kg

Remark: The above are standard TOMOE-compatible solenoid valves. It is also possible to install solenoid valves other than those listed above such as a port solenoid valve. For details, please consult us.

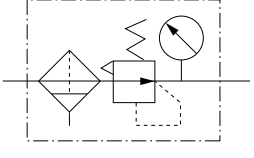
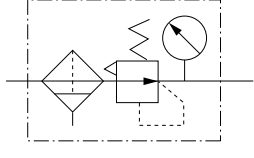


## TG-S Filter regulator (Decompression valve with filter)

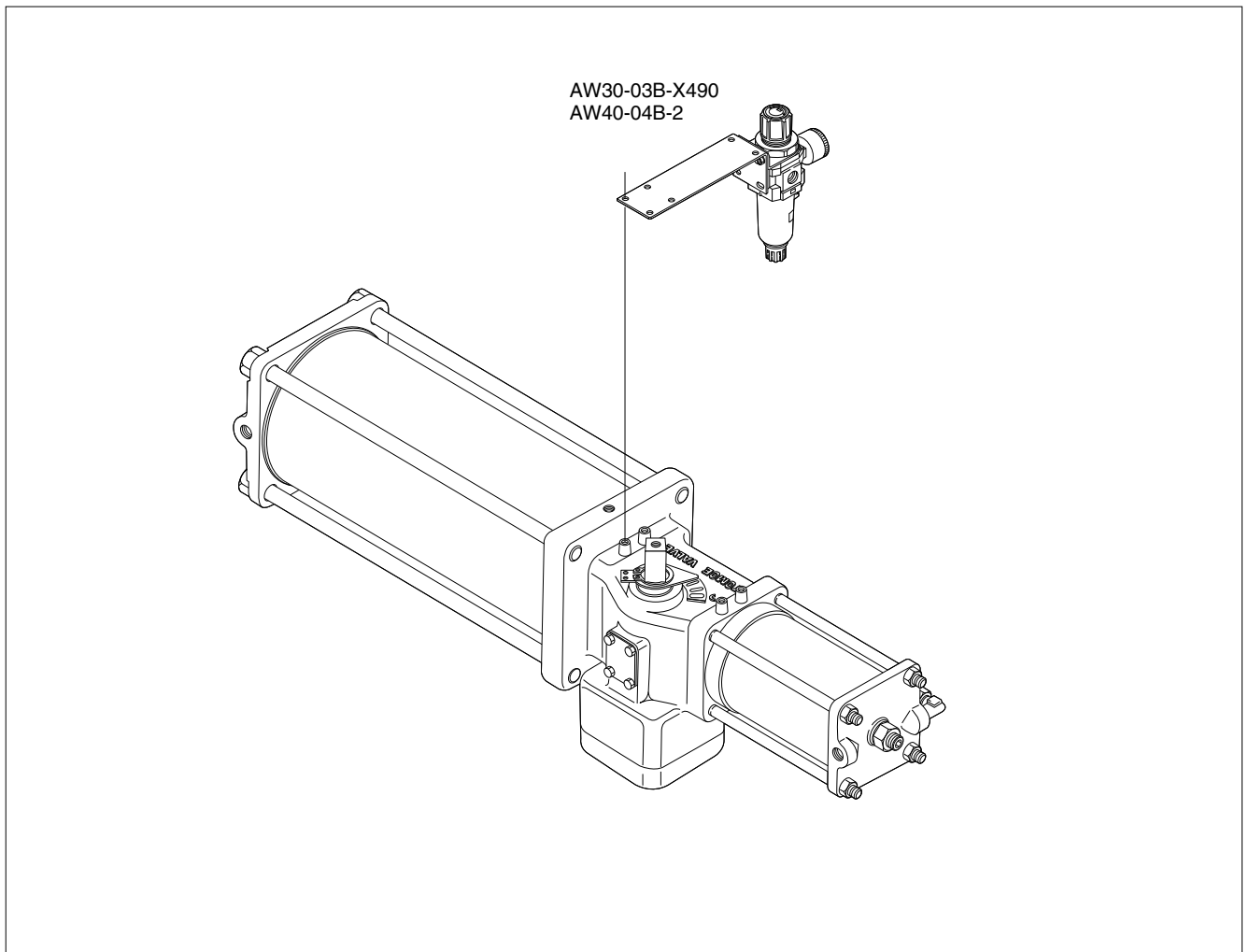
### ■ Purpose

Filter regulators are used to eliminate oil, water, and dust from the operating air in order to protect pneumatic accessories (solenoid valve and cylinder, etc.) and to keep operating pressure at an adequate and constant level.

### ■ Standard specifications

Type	AW30-03B-X490	AW40-04B-2
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	TG-10S to 14S	TG-20S
Set pressure range	0.05 to 0.85MPa	0.05 to 0.85MPa
Pressure gauge connection port	Rc1/8	Rc1/4
Operating temperature	-5 to 60 degrees	-5 to 60 degrees
Air connection port size	Rc3/8	Rc1/2
Attachment	5 $\mu$ m	5 $\mu$ m
Option	Auto drain for low and high temperatures	Auto drain for low and high temperatures
Weight	0.79kg	1.52k

Remark: The above are standard TOMOE-compatible filter regulators. It is also possible to install filter regulators other than those listed above. For details, please consult us.

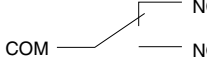
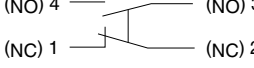
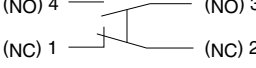
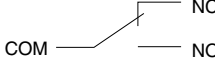


## TG-S Limit switches

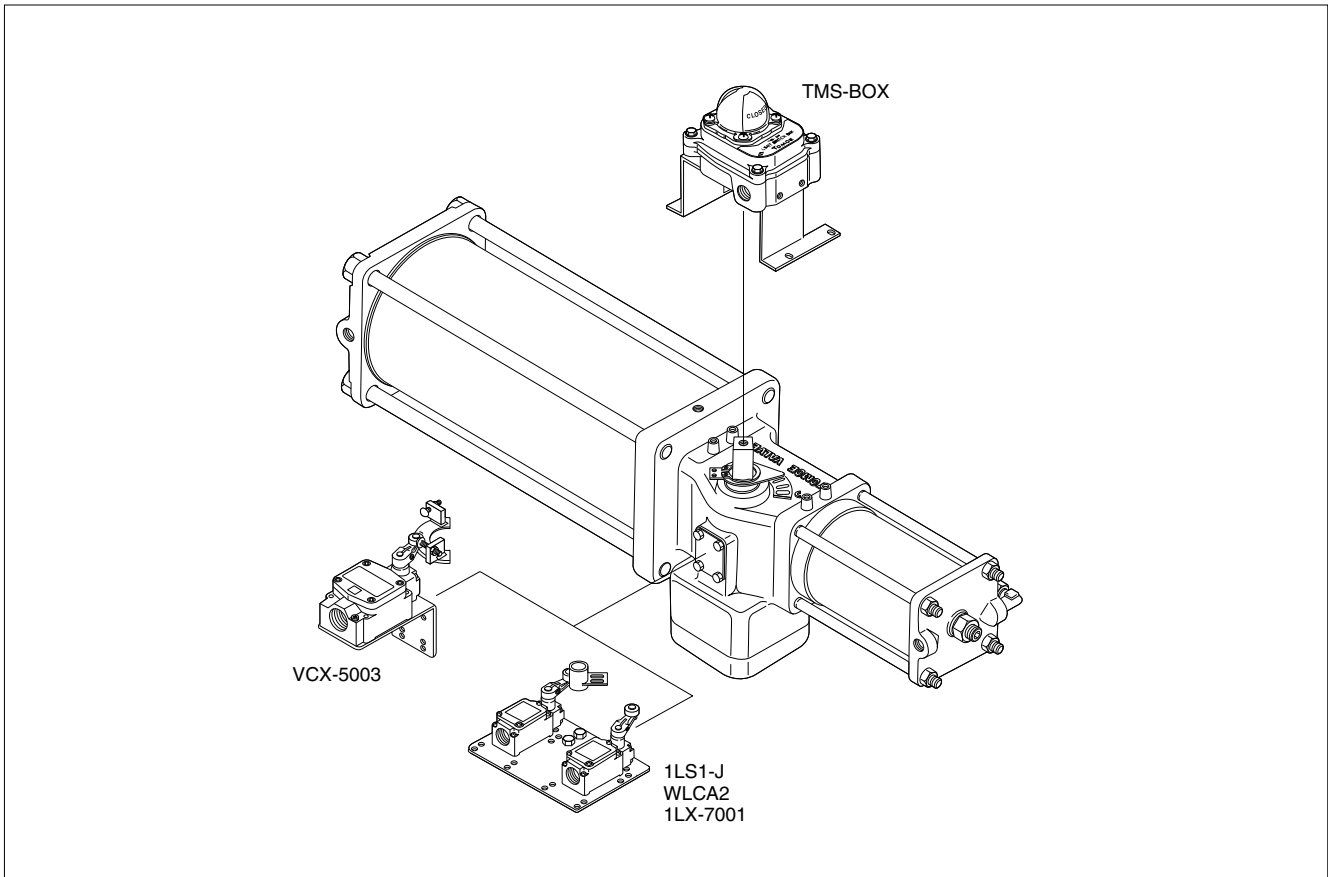
### ■ Purpose

Limit switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

### ■ Standard specifications

Type	TMS-BOX		1LS1-J WLCA2	1LX-7001	VCX-7003
Manufacturer	Tomoe		Azbil (1LS1-J) OMRON (WLCA2)	Azbil	Azbil
Circuit	Monopolar double-throw (1C, SPDT) X2 		Bipolar double interruption (1A1B, DPDT) 	Bipolar double interruption (1A1B, DPDT) 	Monopolar double-throw (1C, SPDT) X2 
Actuator	Hinge roller lever type		Roller lever type	Roller lever type	Adjustable roller lever type
Class of insulation	IP67 (Option: Exd IIBT6)		IP67	IP67, Exde IIC T6	IP67, Exde IIC T6
Rated voltage (resistance load)	Standard	Micro load specifications	AC125V-10A AC250V-10A AC480V-10A DC125V-0.8A DC250V-0.4A	AC125V-5A AC250V-5A DC125V-0.8A DC250V-0.4A	AC250V-5A DC125V-0.8A DC250V-0.4A
	AC250V-1.6A DC125V-0.6A	AC125V-0.1A DC30V-0.1A			
Minimum applicable load (reference value)	DC30V 100mA		DC24V 10mA(1LS1-J) DC5V 160mA(WLCA2)	DC24V 10mA	DC24V 10mA
Operating temperature	-10 to 80 degrees C		1LS1-J: -10 to 70 degrees C WLCA2: -10 to 80 degrees C	-10 to 60 degrees C	-10 to 60 degrees C
Conduit entry	2-G1/2		G1/2	G1/2	G3/4
Option	-		Heat, cold and corrosion resistant	Hydrogen anti-explosion (1LX5701)	Waterproof (VCL-5003)
Contacts	Switch detection with one (2 switches inside)		On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection	Switch detection with one (2 switches inside)
Weight	0.98kg		0.28kg	0.74kg	0.77kg

Remark: The above are standard TOMOE-compatible limit switches. It is also possible to install limit switches other than those listed above. For details, please consult us. Since the rated load of the TMS-BOX micro load specification is smaller than that of the standard specification, a failure may occur if a current exceeding the rating is applied.



## TG-S Proximity switches

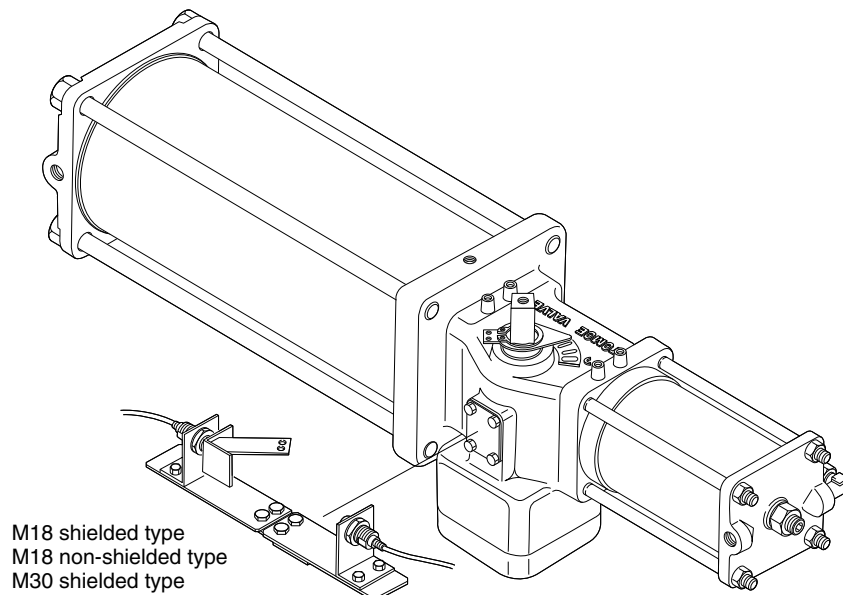
### ■ Purpose

Proximity switches are used to convert the valve position (full close, full open, half open) into electric signals for lamp indication at a remote location.

### ■ Standard specifications

Product	M18 shielded type (Can be embedded in metal.)	M18 non-shielded type (Cannot be embedded in metal.)	M30 shielded type (Can be embedded in metal.)
Type	E2E-X7D1-N	E2E-X14MD1	E2E-X10D1-N
Manufacturer	OMRON	OMRON	OMRON
With power source	DC 2-wire system	DC 2-wire system	DC 2-wire system
Motion mode	NO	NO	NO
Detecting distance	0 to 5.6mm	0 to 11.2mm	0 to 8mm
Object to be detected	Magnetic metal (stainless steel possible)	Magnetic metal (stainless steel possible)	Magnetic metal (stainless steel possible)
Power source voltage	DC12 to 24V	DC12 to 24V	DC12 to 24V
Current consumption	3 to 100mA	3 to 100mA	3 to 100mA
Class of insulation	IP67	IP67	IP67
Operating temperature	-25 to 70 degrees C	-25 to 70 degrees C	-25 to 70 degrees C
Connection	Cord draw type (2m)	Cord draw type (2m)	Cord draw type (2m)
Contacts	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection	On or off detection with one Two for both on and off detection
Weight	0.13kg	0.13kg	0.18kg

Remark: The above are standard TOMOE-compatible proximity switches. It is also possible to install limit switches other than those listed above such as a DC 3-wire, AC 2-wire, AC/DC 2-wire or connector-type proximity switch. For details, please consult us.





## TG-S Positioners

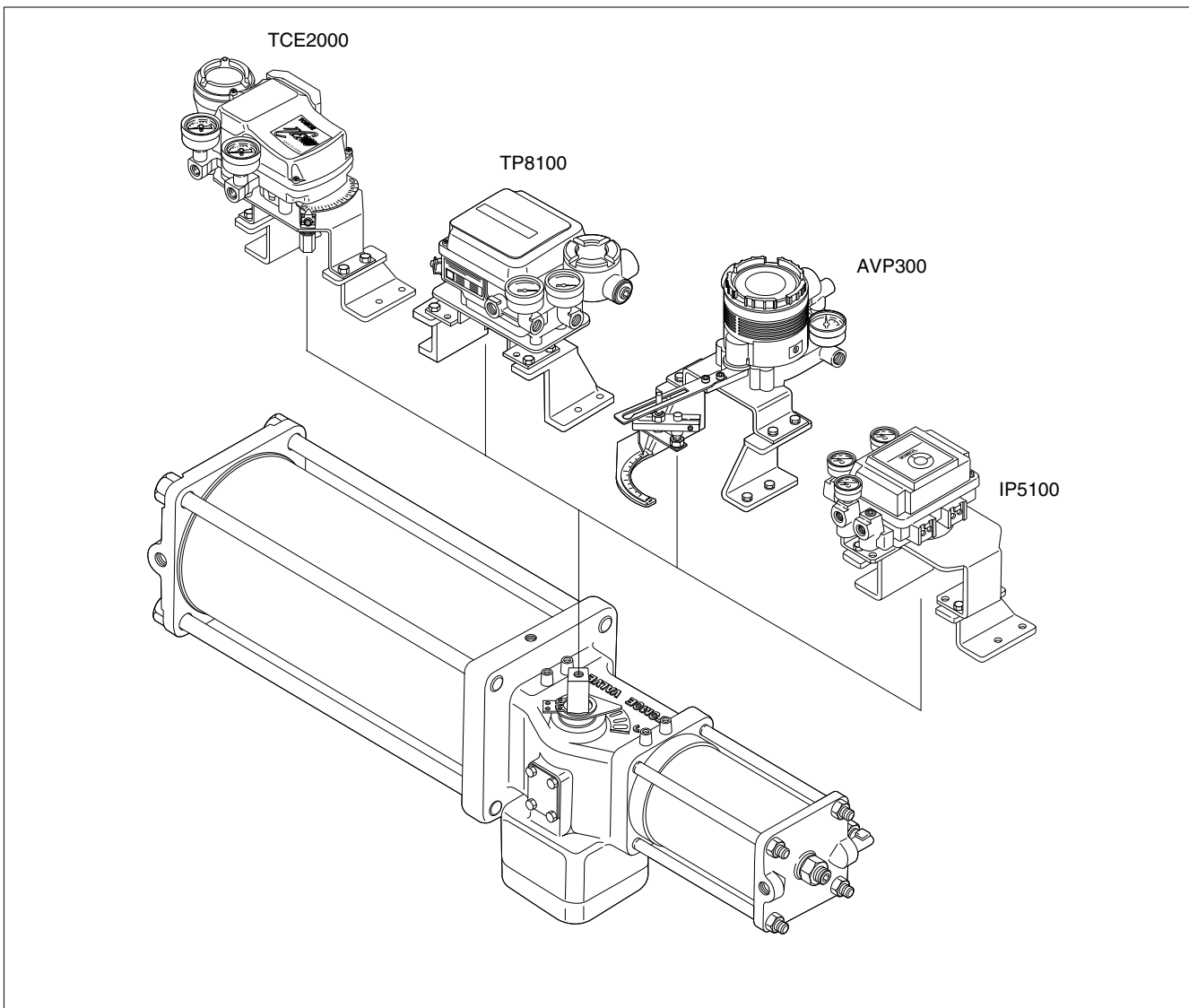
### ■ Purpose

A positioners are used for quick and accurate control of the valve opening angle with pneumatic signals or 4-20mA DC input signals from a control room or controller unit.

### ■ Standard specifications

	Electro-Pneumatic, analog	Electro-Pneumatic, analog	Electro-Pneumatic, digital (smart)	Pneumatic-Pneumatic
Type	TCE2000	TP8100	AVP300	IP5100
Manufacturer	Tornoe	Tornoe	Azbil	SMC
Input signal	4 to 20mA	4 to 20mA	4 to 20mA	0.02 to 0.1MPa
Resistance	250Ω (4 to 20mADC)	235±15Ω (4 to 20mADC)	300Ω (4 to 20mADC)	—
Supply air	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa	0.14 to 0.7MPa
Output flow rate	180L/min. or more (SUP=0.4MPa)	200L/min. or more (SUP=0.4MPa)	250L/min. or more (SUP=0.4MPa)	200L/min. or more (SUP=0.4MPa)
Air consumption	Within 11L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)	Within 10L/min. (SUP=0.4MPa)	Within 11L/min. (SUP=0.4MPa)
Operating temperature	-20 to 83 degrees C (Non explosion-proof) -20 to 60 degrees C (Explosion-proof type d2G4)	-20 to 8 degrees C (Non explosion-proof) -20 to 60 degrees C (Explosion-proof type d2G4)	-40 to 80 degrees C (Non explosion-proof) -20 to 60 degrees C (Explosion-proof type d2G4)	-20 to 80 degrees C
Class of insulation	IP65, ExdII BT6X	IP67, ExdII BT5	IP65 (option: Exd2CT6X)	—
Air connection port size	Rc1/4	Rc1/4	Rc1/4	Rc1/4
Conduit entry	2-G1/2	2-G1/2	2-G1/2	—
Sensitivity	Within 0.5%FS	Within 0.5%FS	Within 1%FS	Within 0.5%FS
Linearity	Within ±1.5%FS	Within ±2%FS	Within ±1%FS	Within ±2%FS
Hysteresis	Within 1%FS	Within 1%FS	Within 1%FS	Within 1%FS
Option	—	—	Analog signal (4 to 20 mA) output Any special opening setting Supports field bus.	—
Weight	2.3kg	2.6kg	2.8kg	1.2kg

Remark: The above are standard TOMOE-compatible positioners. It is also possible to install positioners other than those listed above. For details, please consult us.



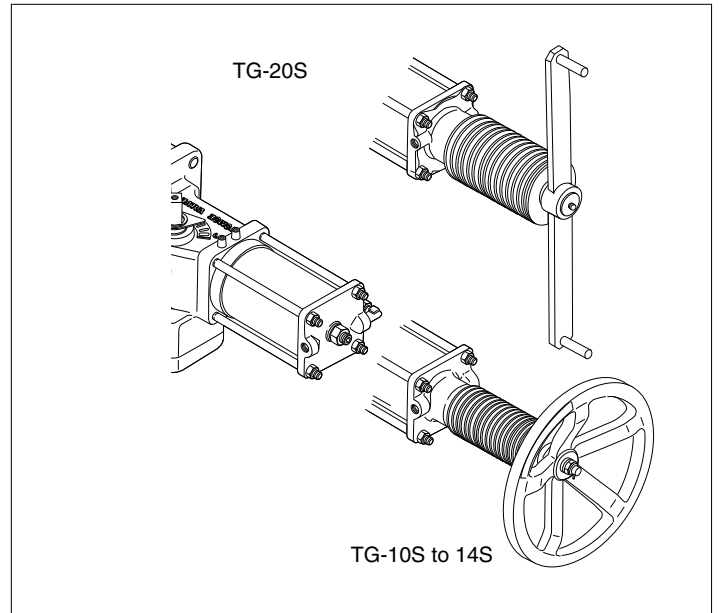
## TG-S Manual operation unit

### ■ Purpose

The operation unit is for manual operation of the pneumatic cylinder when air supply fails.

### ■ Standard specifications

	Function	Type	Applicable cylinder	Remarks
1	Manual operation unit	Screw handle	Single acting type TG-10S to 20S	(1) Turn off the signal from solenoid valve and positioner when operation. (2) Return position when restart automatic operation.



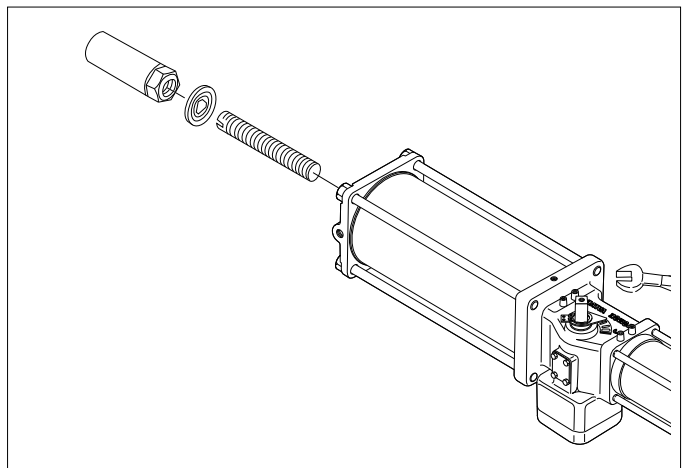
## TG-S Stroke adjusters

### ■ Purpose

The stroke adjuster sets the valve opening freely from the outside.

### ■ Standard specifications

Function	Type	Applicable cylinder	Remarks
Adjust screw	Side adjust screw	Single acting type TG-10S to 20S	(1) Loose protecting cover. (2) Tighten bolt to adjust the stroke angle. (3) Fasten protecting cover.

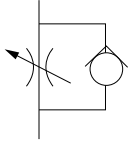
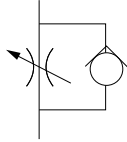


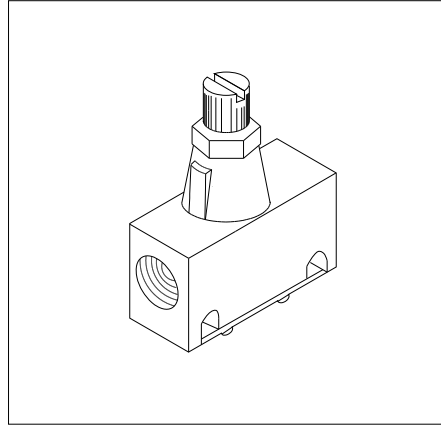
## TG-S Speed controllers

### ■ Purpose

Speed controller is used to adjust time of opening or closing.

### ■ Standard specifications

Type	AS3000-03	AS4000-04
Manufacturer	SMC	SMC
JIS symbol		
Applicable cylinder type	TG-10S to 14S	TG-20S
Needle revolution	8 rotations	8 rotations
Adjustable range	5 to 15 secs.	5 to 15 secs.
Operating temperature	-5 to 60 degrees C	-5 to 60 degrees C
Air connection port size	Rc3/8	Rc1/2
Attachment	Install to cylinder air connect port	Install to cylinder air connect port
Weight	0.13kg	0.21kg



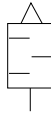


Remark: The above are standard TOMOE-compatible speed controllers. It is also possible to install speed controllers other than those listed above. For details, please consult us.

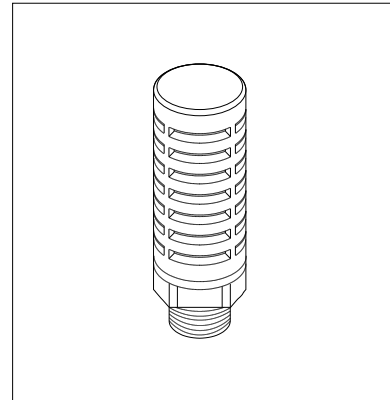
## TG-S Silencers

### ■ Purpose

Silencers eliminate noise at the exhaust ports on various kinds of pneumatic accessories.

### ■ Standard specifications

Type	AN20-02	AN30-03	AN40-04
Manufacturer	SMC	SMC	SMC
JIS symbol			
Effect of muffing	30dB (A)	30dB (A)	30dB (A)
Operating temperature	5 to 60 degrees C	5 to 6 degrees C	5 to 60 degrees C
Port size	Rc1/4	Rc3/8	Rc1/2
Attachment	Screw into exhaust port of solenoid valve.	Screw into exhaust port of cylinder and solenoid valve.	Screw into exhaust port of cylinder and solenoid valve.
Weight	0.04kg	0.06kg	0.09kg



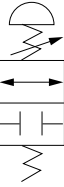
Remark: The above are standard TOMOE-compatible silencers. It is also possible to install silencers other than those listed above. For details, please consult us.

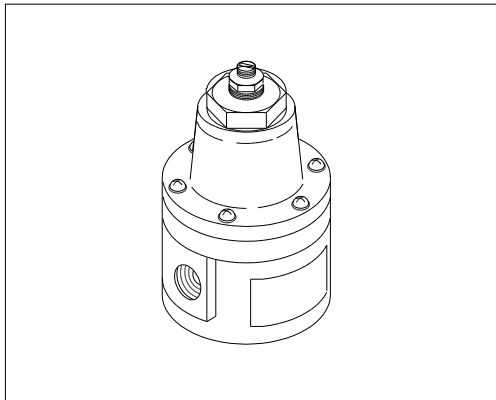
## TG-S Lock-up valves

### ■ Purpose

When air supply fails, the lock-up valve automatically stops the line until pressure is restored and keeps the operating unit of the cylinder at the stay-put position.

### ■ Standard specifications

Type	IL201-02
Manufacturer	SMC
JIS symbol	
Effective sectional area	17mm <sup>2</sup>
Operating temperature	-5 to 60 degrees C
Air connection port size	Rc1/4
Signal pressure connection port	Rc1/4
Weight	0.43kg

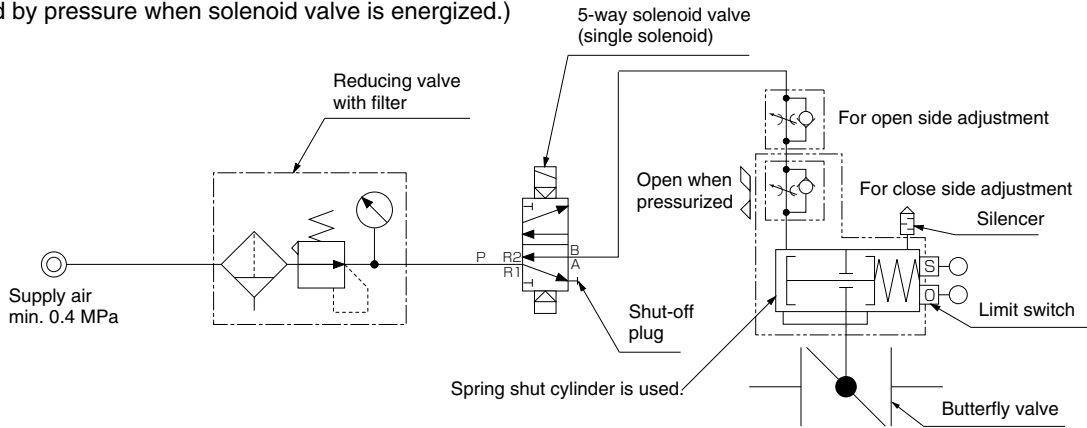


Remark: The above are standard TOMOE-compatible lock-up valves. It is also possible to install lock-up valves other than those listed above. For details, please consult us.

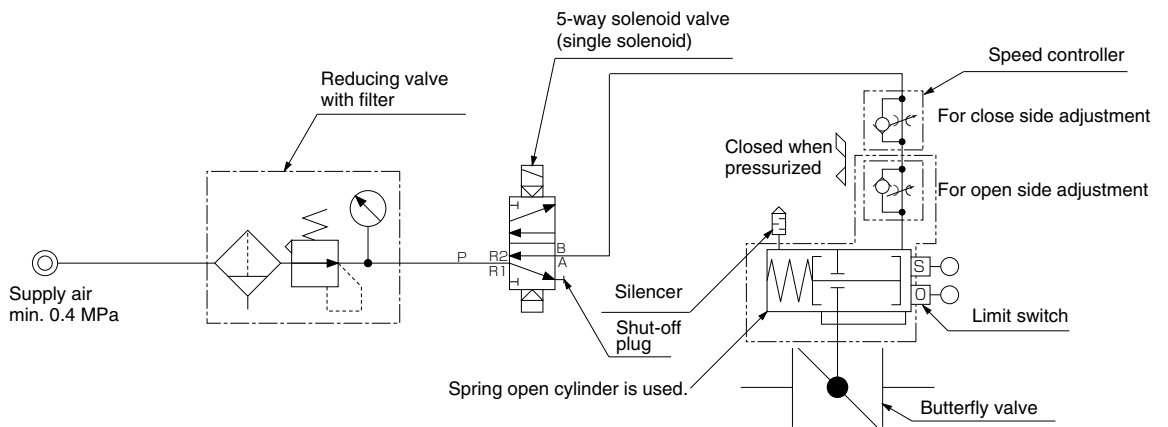
**Example of standard air circuit for on/off operation (single-acting type)**

Shown below are examples of standard circuits to operate the valve automatically to the safe side of open or close when the operating air supply or power supply fails in the middle of operation.

- 1 Butterfly valve closes when air supply falls.**  
 (Opened by pressure when solenoid valve is energized.)  
 Butterfly valve closes when power supply falls.  
 (Opened by pressure when solenoid valve is energized.)



- 2 Butterfly valve opens when power supply falls.**  
 (Closed by pressure when solenoid valve is energized.)  
 Butterfly valve opens when air supply falls.  
 (Closed by pressure when solenoid valve is energized.)

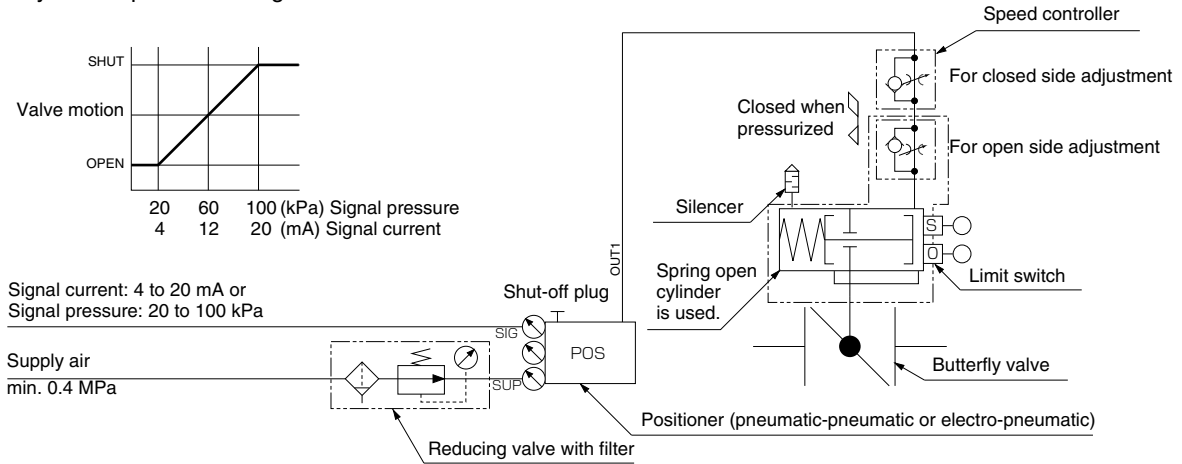


### Example of standard air circuit for control operation (single-acting type)

Shown below are examples of standard circuits in which the P/P or E/P positioner is attached to the butterfly valve driven by a single-acting pneumatic cylinder to adjust valve opening exactly and quickly in proportion to the signals transmitted by a local controller or from a remote control room. This will also detect the open/close position of the valve by a limit switch which sends feedback of the electric signals to the control room. When the operating air supply or power supply fails, the valve is automatically operated to the safe side of open or close.

#### 3 Direct action

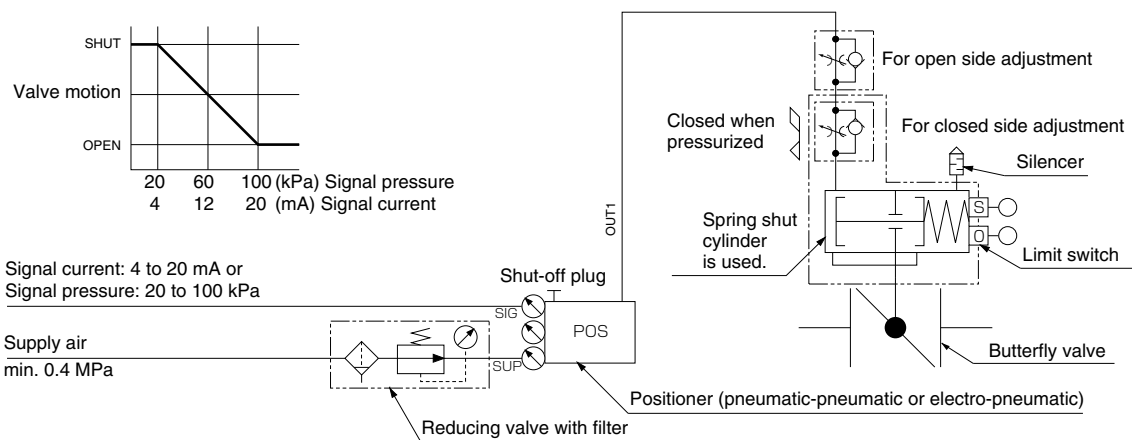
Butterfly valve closes when signal increases.  
Butterfly valve opens when signal decreases.



→Butterfly valve opens when air supply fails.

#### 4 Reverse action

Butterfly valve opens when signal increases.  
Butterfly valve closes when signal decreases.



→Butterfly valve closes when air supply fails.

# 3C

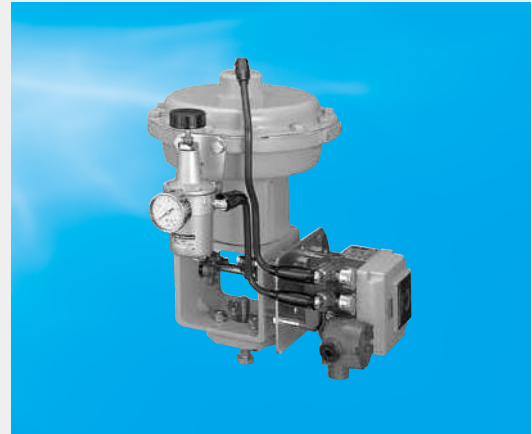
The 3C actuator is a vertical cylinder suitable for installations where space is limited. The piston rotates while moving vertically which causes the output shaft to rotate at the same time to open and close the valve. Air control devices such as limit switches and solenoid valves, and manual devices can be installed.



3C Specifications							
	AT5-80	AT5-100	AT5-120	AT5-150	AT5-180	AT5-220	AT5-250
Torque (N·m) (when 0.4MPa)	52	125	180	350	580	1320	1650
Supply pressure (MPa)	0.4 to 0.7						
Body shell max (MPa)	1.0						
Port size	Rc1/4			Rc3/8		Rc1/2	
Rotating angle	90°						
Operating fluid	Dry air						
Working temperature range (degrees)	-15 to 80						
Rotating speed range	5 to 15 secs.						10 to 20 secs.
Weight (kg)	3.3	5.5	8.7	15.4	28.0	47.0	70.0
Painting	Epoxy primer finish (Munsell N7)						

# Diaphragm

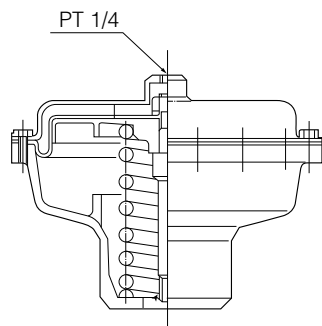
This type of actuator is used exclusively for rotary valves. The edge of the diaphragm is free, and by attaching a link, the linear motion of the actuator is converted to a smooth rotational motion in the valve stem. Diaphragm features friction-free operation, excellent efficiency, and high output.



Diaphragm Specifications		
Type	280H	400HP
Structure	Floating system	
Diaphragm area (cm <sup>2</sup> )	350	725
Max. supply pressure (KPa)	280	
Spring range (KPa)	60 to 220	80 to 200
Max. stroke (mm)	40.8	58.3
Applicable valve size (kg)	28.0 (Without top handle) (including bracket)	57.1 (Without top handle) (including bracket)

Remark: For both types 280 and 400, the manual handle (top handle) is available as an option.

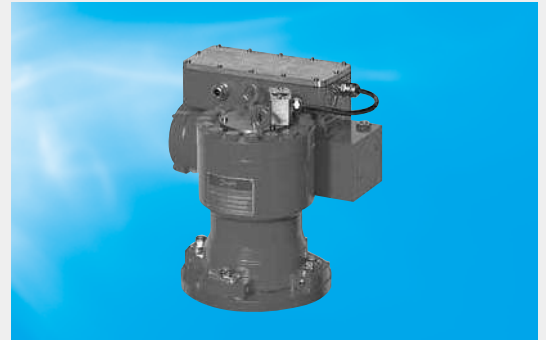
## Diaphragm Operation principle



This type is exclusively used for rotary valves. The nose of the diaphragm is free, and by attaching a link, linear motion of the actuator is smoothly converted to rotational motion of the valve stem. Diaphragm features friction-free operation, excellent efficiency, and high output.

# Hydraulic Cylinder

This type of cylinder is compatible with hydraulic systems used, for example, in marine vessels. While compact, it outputs by converting hydraulic energy into a high torque that is proportional to the pressure.



Hydraulic Cylinder Specifications

Hydraulic Cylinder Specifications	
Standard allowable pressure	105bar
Maximum allowable pressure	210bar
Test pressure	1.5 x operation pressure
Torque range	5.1 to 5418.4 kgfm (for 210bar)
Working temperature range	-20 to 80 degrees C
Operating oil viscosity	15 to 200cst
Rotating angle	90 degrees



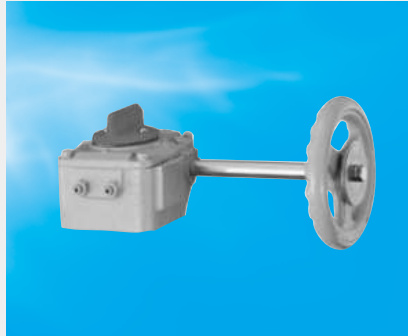
# Manual Actuators

Manual actuators consist of three types: the lock lever, the worm gear and the center handle type. The design depends on the model of valve that it will be used with.



### Lock lever type

Opening and closing operations are conducted by merely turning the lever 90 degrees. The 10-stage locking mechanism allows flow rate control.



### Worm gear type

The worm wheel works as a gear reducer to greatly reduce the torque required for extremely light open and close operations. The valve opening angle can be set as desired for completely stepless control of the flow rate.



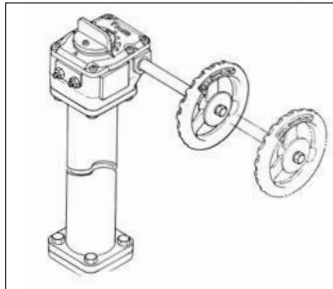
### Center handle type

The planetary gear works as a gear reducer to greatly reduce the torque required for extremely light open and close operations. The valve opening angle can be set as desired for completely stepless control of the flow rate.

## Options

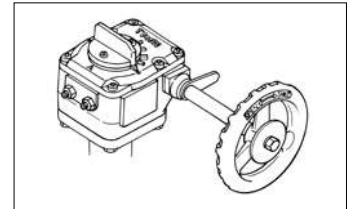
### Long-neck and long handle shaft

Installs to gear boxes or extends handle shafts.



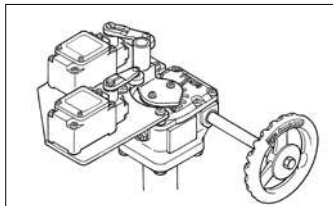
### Handle lock

Prevents handle rotation caused by vibration and can maintain a mid-way open position.



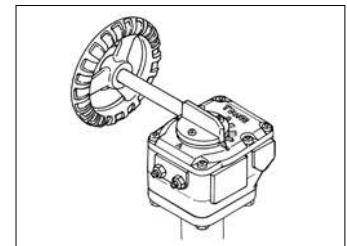
### Degree of open output

By installing a limit switch, a fully open or fully closed signal is output.



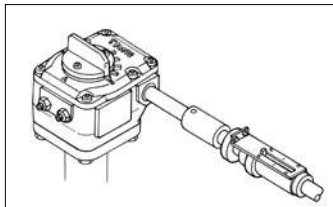
### Reverse operator

Enables operation with the handle shaft placed on the opposite side.



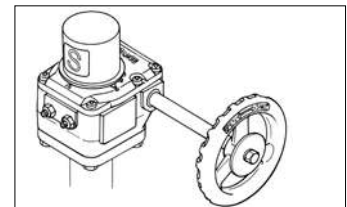
### Screw indicator

Enables to check, how open it is even if the handle shaft is extended.



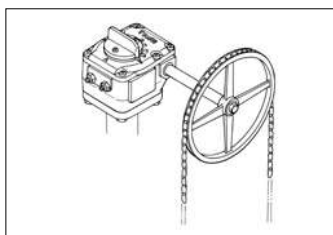
### Post indicator

Degree of opening can be verified at a glance.



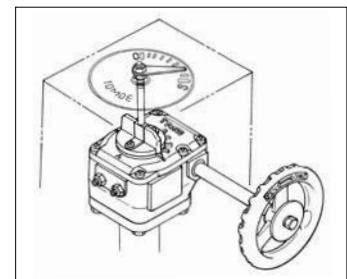
### Chain wheel

Valves in high or difficult to reach places can be operated by a chain.



### Indicator for thermal retention enclosures

Indicator allows verification even if the gear box is enclosed for thermal insulation.

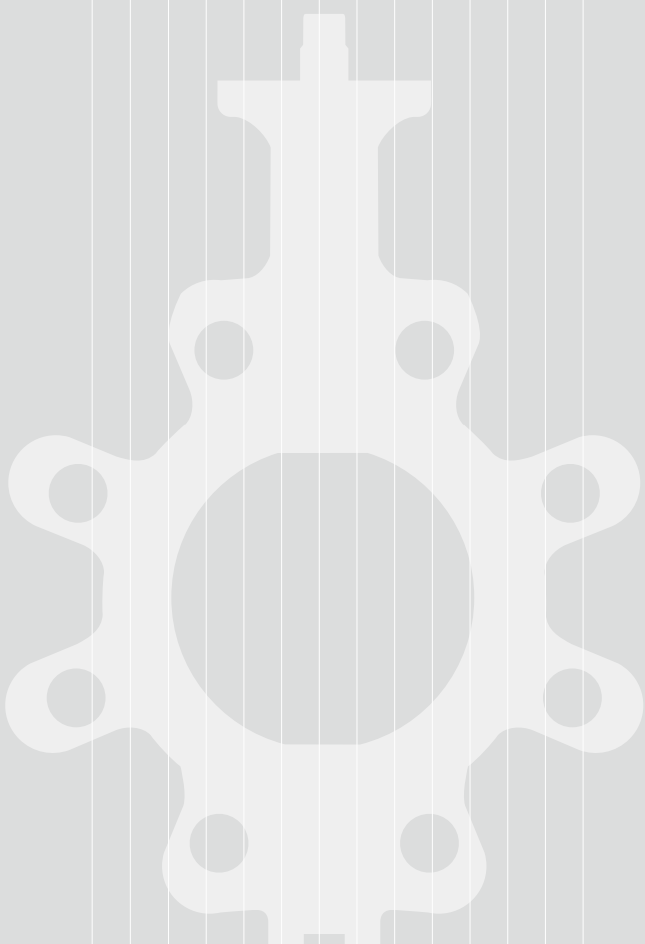


Options in the diagrams above are shown with the 2U worm gear. For details, please consult us.





## **CONDITION MONITORING UNIT & CLOUD SERVICE**



**Condition Monitoring Unit & Cloud Service**

**Tom Probe series**

**TPro1100,1700,1900,TPC 545**

# Tom Probe Series

The **Tom Probe Series** consists of new devices which record the operational status of quarter-turn valves automatically, 24 hours a day, 365 days a year. The unit quickly detects abnormalities and defects in the valves, and notifies these externally, via various interfaces.

The Tom Probe Series can perform a partial stroke test. The units also have a new function, the ASF (Active Safety Function), which performs partial stroke tests periodically based on the calendar in the **TPro1100**.



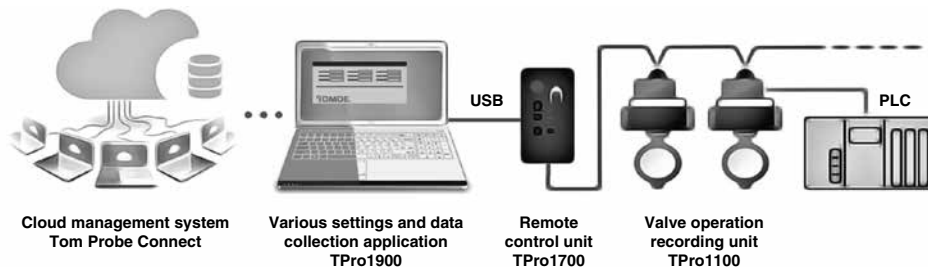
The unit supports the whole range of applications, from status monitoring to maintenance work in general.

The unit manages centrally the data required for valve maintenance work.

The support contents can be selected as necessary.

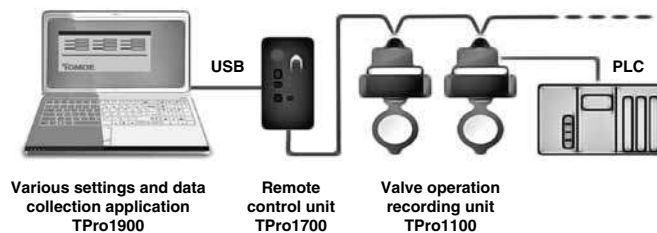
## (1) Total support

Valve operational status is uploaded to the cloud server, and the status can be checked from anywhere. Email notification of an alarm occurrence is also available.



## (2) Remote status monitoring

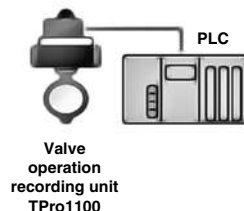
The status of valves in a remote location, such as a plant, can be monitored remotely via a PC.



## (3) Data collection

Valve status data required for maintenance can be stored in the TPro1100, and the data can be transferred to a PC as necessary.

The unit can easily be installed to an existing valve, and can be used as a data logger immediately.



## **TPro1100** <Unit main body>

Operation recording unit for quarter-turn valves.

The unit records the operation of a valve driven by an air cylinder, 24 hours a day, 365 days a year.

The unit records the valve operational data continuously and sends the data to other devices. The unit can perform a partial stroke test (PST). The unit also has a new function, ASF (Active Safety Function), which performs a partial stroke test automatically, based on the calendar in the TPro1100.



## **TPro1700** <Remote control unit>

A remote control unit providing centralized control and status display of the TPro1100.

A maximum of 15 TPro1100 units in a dedicated communication network can be controlled.

The unit has a function for creating a communication network, connecting the TPro1100 to a PC with the data collection application TPro1900 installed.



## **TPro1900** <Application>

A freeware program which allows configuration of various settings and data collection for the TPro1100 via a PC.

Through the dedicated communication network, the application allows checking of open/close status, trend evaluation results, lists partial stroke test results for a maximum of 15 TPro1100 units, and saves the operational data from the TPro1100 to a PC.

The application also has the "Angle profile" function, which retrieves and displays the motion of the disc during valve operation in real time.



## **Tom Probe Connect** <Cloud service>

Valve operational data collected by the TPro1900 is uploaded to a cloud server through the Internet.

The data is accumulated on the cloud server, which allows a check of the valve status from anywhere at any time.

The operational data history including valve opening/closing is visualized, and a variety of device errors can be checked from anywhere.

# TPro1100 <Unit main body> Quarter-turn valve operation starting unit

## Features

### Operation and Setting Mode

Control recording	Operation mode for recording the open/close control of a valve and the operational status of a valve in order to perform open/close control and various tests
Data logger	Operation mode for recording the operational status of a valve which is controlled by devices other than this unit
Setting	Mode for creating settings for various kinds of operation recording

### Power Supply Specifications

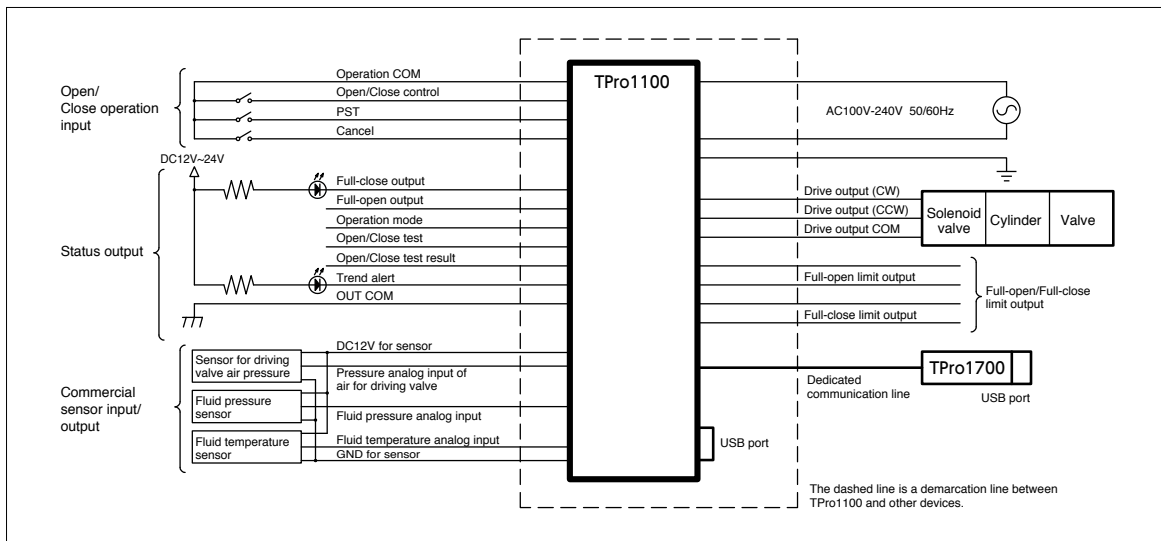
Input power supply is AC100-240V, 50Hz/60Hz. The unit can be used in many overseas countries.

### Status Output

The unit outputs open/close status, operation mode, abnormal status, etc. of a unit to be monitored to external control devices, such as sequencers. The status of the devices can be transmitted in detail by altering settings on the main body.

Full-close output	Full-open output	Operation mode output	Open/Close test output	Open/Close test result output	Trend alert output
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### Various Control and Output Interfaces



### Error Notification

The unit continuously records the operational status of the valve. If any abnormal value is detected, the unit provides notification of the abnormality through external output or communication.

### Test Items

- Open/Close +50% over error
- Open/Close -50% over error
- Open/Close + over error
- Open/Close - over error
- TA open time over
- TA close time over
- PST/ASF not reached set angle
- PST/ASF timeout

### Data Save Mode

8000 or more units of data can be saved. Values including opening/closing time, and values of commercial sensors (up to three) can be recorded. The unit has three recording modes for various tests.

Continuous Mode	When the memory is full, the oldest data is overwritten by new data.
One Shot Mode	When the memory is full, recording stops.
Accumulation Mode	When the memory is full, old data is reduced, and new data is saved. This is an original recording system where new data is accumulated while old data is kept.

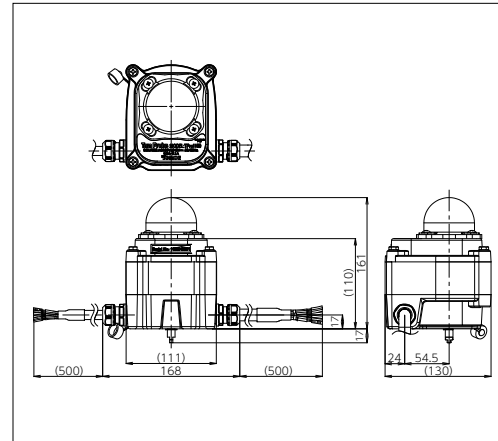
## Valve Partial Stroke Test Function

Partial stroke test (PST) is a test method to check the operational status by opening and closing a valve a little. The test can be performed by combining a solenoid valve for driving a cylinder with the TPro1100. Additionally, the ASF (Active Safety Function) which performs the partial stroke test automatically based on the calendar in the TPro1100 is inbuilt. The opening/closing test interval can be selected as every day, every week, or every month.

### Product Specifications

Attachment shape	VDI / VDE3845 Rotary Actuators (Quarter-turn) and Auxiliary Equipment
Dust-proof and waterproof	IP65 equivalent
Conduit tube connection	500 mm length for both power supply cable and communication cable
Main material of body	Aluminum die-casting
Display function	Open/Close indicator
Power supply voltage	AC100V-AC240V Single-phase 50/60Hz
Ambient operating temperature	-20°C to 80°C (No condensation)
Ambient storage temperature	-20°C to 80°C (No condensation)
Interface specifications	<ul style="list-style-type: none"> <li>◆ I/O contact input/output (Open/close instruction, PST instruction, status output)</li> <li>◆ Analog input (3 points for sensors)</li> <li>◆ TOMOE's dedicated communication (RS485)</li> </ul>
Functions	<ul style="list-style-type: none"> <li>◆ Direct drive function of solenoid valve</li> <li>◆ PST function (One mode out of 13 modes is selected.)</li> <li>◆ ASF function (One mode out of 13 modes is selected.)</li> <li>◆ Trend data logging function (8000 data for each Open, Close, PST and ASF are held in the main body.)</li> </ul>

### External Dimensions



# TPro1700 <Remote control unit/Option>

## Achieving Centralized Control and Status Display

### Features

#### Relay Function

The unit has a function for creating a communication network, connecting the TPro1100 main body unit to a PC with the TPro1900 application installed. A maximum of 15 TPro1100 units can be controlled.

#### Saving on Wiring

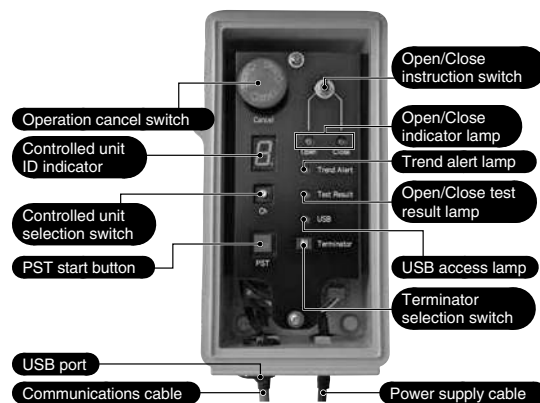
Installation requires only two communications cables and a power supply cable to the unit.

#### Reduced Installation Costs

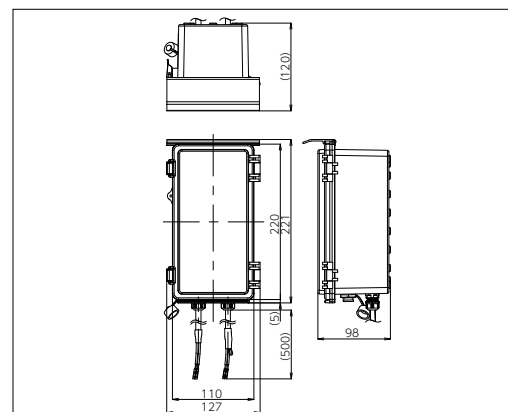
Since the unit is equipped with control switches and LED status display lamps, no separate control board is required.

### Product Specifications

Attachment shape	Attachment with various stays
Dust-proof and waterproof	IP65 equivalent
Conduit tube connection	500 mm length for both power supply cable and communication cable
Main material of body	Main body: ABS resin
Display function	LED open/close indication, power indicator lamp, test result indication, controlled unit ID 7-segment indication
Power supply voltage	AC100V-AC240V Single-phase 50/60Hz
Ambient operating temperature	-20°C to 50°C (No condensation)
Ambient storage temperature	-20°C to 60°C (No condensation)
Interface specifications	<ul style="list-style-type: none"> <li>◆ Switch input (Open/close instruction, PST instruction)</li> <li>◆ Compliance with USB standards</li> <li>◆ TOMOE's dedicated communication (RS485)</li> </ul>
Functions	<ul style="list-style-type: none"> <li>◆ Communication gateway function (USB-RS485)</li> <li>◆ Operation instruction to a selected unit</li> </ul>



### External Dimensions



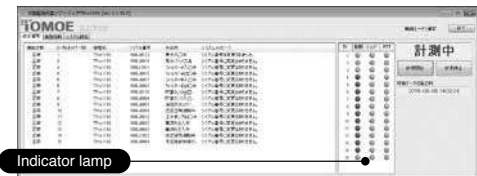
# TPro1900 <Application>

## Various Settings and Data Collection Controlled with a PC

### Features

#### Integrated Management Function

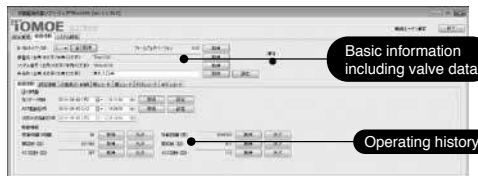
The application displays information from all TPro1100 units in the network in a list form. The indicator lamps on the screen also allow checking of open/close status, trend evaluation results, and open/close test results for the managed valves.



Indicator lamp

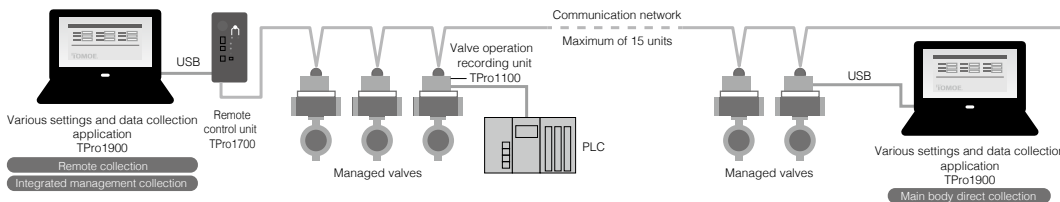
#### Device Information

Valve name, date and time in the main body, etc. are settable. Additional information is also available, including total operating time and the number of openings/closings, which is required for planning maintenance.



Basic information including valve data

Operating history data



#### Setting Information

Checks can be made on good-status standard values learned by the TPro1100, and various settings. Conditions can be configured for the partial stroke test and the adhesion prevention test. In addition, it is easy to check at a glance the TPro1100 status and settings, such as the presence of the sensor connected to the TPro1100, data accumulation mode, detail of outputs to external devices, easily preventing incorrect settings being used.

#### Remote Data Collection

The valve operation data accumulated in the TPro1100 can be collected from a remote location when used in conjunction with the TPro1700 (Remote control unit/Option). The status of valves located in difficult-to-access areas can be tracked easily.

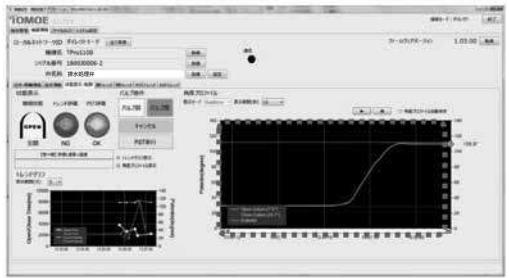
#### "Angle Profile" Function

- Function for real-time retrieval and display of disc motions during valve operation.
- The retrieved information can be displayed in graph form and the data can be saved.
  - Valve motion during operation can be checked.
  - Motion can be displayed in graph form in real time.
    - Y-axis: Angle / X-axis: Time
    - You can scroll or cease scrolling freely.
  - Sharing the valve operational data
    - Data can be saved in a CSV format.
    - Data can be saved manually at any time. When operation is detected, the data can be saved automatically also.

#### Trend Data Collection

The trend data accumulated by the TPro1100 can be collected in three ways.

Main body direct collection	Data is collected directly through the USB port on the TPro1100.
Remote collection	Data from any designated TPro1100 in the communication network is collected via TPro1700.
Integrated management collection	Data from each TPro1100 in the communication network is collected via TPro1700.



Display disc motions in real time



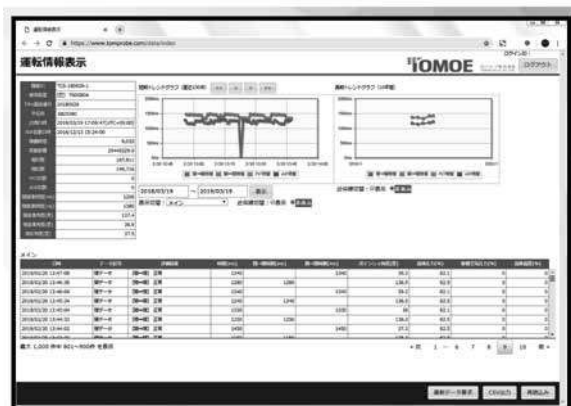
# Tom Probe Connect <Cloud service>

## Centralized management of valve information on website

### Features

#### High-precision Monitoring System

Data is accumulated on a cloud server.  
Comparison with past operational data is available.



#### No need for continuous monitoring

The e-mail error notification system notifies you of valve operation problems.  
Thus, continuous monitoring of equipment by personnel on-site is not necessary.

#### Checks available at any time

Valve status can be checked from anywhere, at any time, because data is accumulated on the Internet.  
This enables you to obtain advice from experienced personnel in remote locations. You can also use the cloud service as a tool to check the past problem history on-site at inspection.

#### Ease of introduction

Thanks to a cloud server, the initial investment is small and server management is not required.  
In comparison with a software purchase, service is more easily available because you need only sign up for the necessary service period. In addition, the web application is updated with the latest functions.  
Preventive maintenance has been attracting attention as the latest maintenance method. If preventive maintenance is preferred, "CBM\*" can be started with minimum investment.

\*CBR (Condition Based Maintenance) = "CBM" is a preventive maintenance method: "Maintenance (such as routine device replacement) is not performed while equipment is operating stably, but only when maintenance is judged to be required."

#### Communication tool

It has a function to manage a series of information necessary to support the product life cycle, such as inspection, arrangement of repair parts, and maintenance. By utilizing this tool, it is possible to keep a communication record with all parties concerned such as valve operation and maintenance.



#### Security

In order to provide users with safe access to the Tom Probe Connect site, the system uses TLS1.2, which is the global standard for internet encryption communication systems. Use of TLS1.2 is also strongly recommended in global security standards (PCI DSS) in the credit card industry. This cloud service uses data centers in Japan which are fully secured.



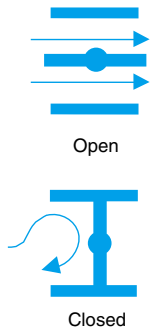
# Data

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# Valve Types and Features

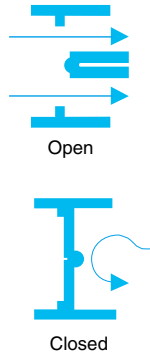
The three basic functions of valves are: 1. to stop flow, 2. to keep a constant direction of flow, and 3. to regulate the flow rate and pressure. To select the correct valve to fulfill these functions properly, an outline of the different types of valves and their features is given below.

## Butterfly valve



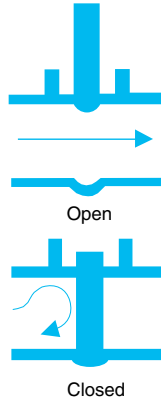
- Valve shaped like a butterfly.
- Tight shut-off and can be used as a control valve.
- Little resistance to flow (allows smooth flow).
- Optimal for automated operation with a low operating torque and 90 degrees operating angle.
- Lightweight and compact (large diameter models are also available).

## Check valve



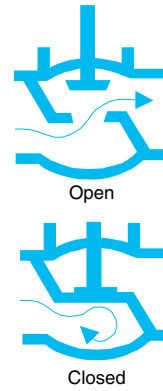
- For use when flow is only in one direction.
- Lightweight disc allows vertical installation.
- High operating speed prevents water hammer.

## Gate valve



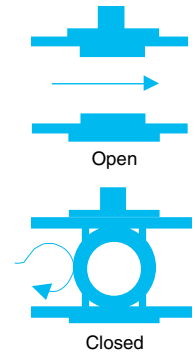
- Like its name implies, the gate is lowered to cut off the path of flow.
- For use as an on/off valve (not suitable as a control valve).
- Little resistance to flow when fully open (allows smooth flow).
- Long stroke requires time to open and close; not suitable for quick operation.

## Globe valve



- The globe-shaped body controls the fluid into a S-shaped flow.
- Tight shut-off and can be used as a control valve.
- Large resistance to flow (does not allow smooth flow).
- Much power is required to open and close the valve (not suitable for large sizes).

## Ball valve



- Valve stopper is ball-shaped.
- For use as an on/off valve (not suitable as a control valve).
- Little resistance to flow when fully open (allows smooth flow).
- Optimal for automated operation with a 90 degrees operating angle.
- Advanced technology is required to manufacture ball.

Comparison of butterfly valves with other valves (using 100mm diameter TOMOE 700G model valve)

### Butterfly valve and globe valve

Item	Butterfly valve	Globe valve
Pressure loss ( $\xi$ )	0.3	1.5
Flow characteristics	Equal %	Equal %
Rangeability	10:1	30:1

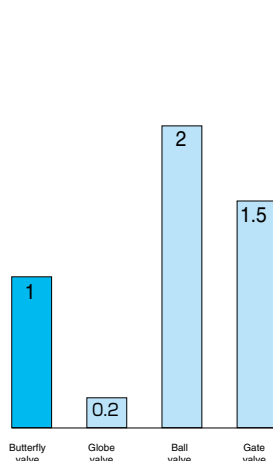
### Butterfly valve and ball valve

Item	Butterfly valve	Ball valve
Pressure loss ( $\xi$ )	0.3	0.05
Flow characteristics	Equal %	Quick open
Rangeability	10:1	3:1

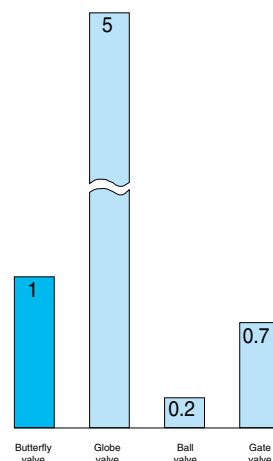
### Butterfly valve and gate valve

Item	Butterfly valve	Gate valve
Pressure loss ( $\xi$ )	0.3	0.2
Flow characteristics	Equal %	Quick open

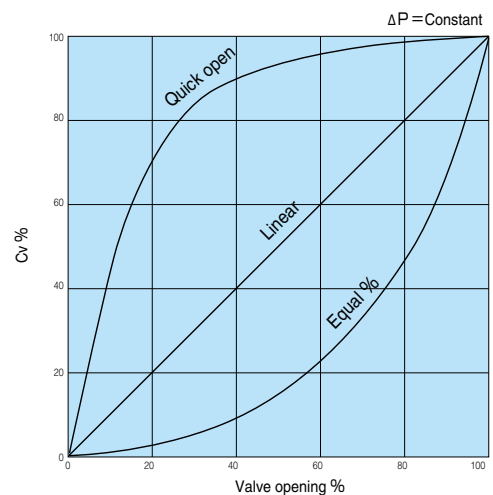
Comparison of Cv value (Butterfly valve=1)



Comparison of pressure loss (Butterfly valve=1)



Inherent flow characteristics



# Valve Sizing Procedures

It is essential to understand the valve sizing formula and selection procedure when determining the size of a valve. The following is the proper selection procedure. The valve sizing calculation is based on ISA.

1. Judge if the flow condition is subcritical or critical based on the given flow condition.
2. Calculate the Cv value by putting the data into an appropriate formula.
3. Select the size of the valve using the Cv value chart. Consider the following points when sizing the valve.
  - ① A proper adjustment of the Cv calculation should be made based on the piping adjustment coefficient  $F_p$  if a valve is located between reducers.
  - ② If the result of the Cv calculation is over 80% compared to the full Cv value, select a valve one size larger.  
Example: For fresh water with  $P_1 = 0.3$  MPa,  $P_2 = 0.25$  MPa, flow rate = 100 m<sup>3</sup>/h, the calculated Cv will be 164. If 80 mm, 507V is selected, the rated Cv is 176. The calculated Cv (164) is over 80% of rated the Cv (176) in this case. We recommend 100 mm, 507V.
  - ③ If no  $\Delta P$  is given, 5 to 10% of the pump outlet pressure should be used as the assumed  $\Delta P$  for valve sizing.

# Cv Value Calculation

Cv value calculation

Fluid		Pressure conditions	Formula
Liquid	Volume flow rate	Sub critical $\Delta P < F_L^2 (\Delta PS)$	$C_v = 11.6q \sqrt{\frac{Gf}{\Delta P}}$
		Critical $\Delta P \geq F_L^2 (\Delta PS)$	$C_v = 11.6 \frac{q}{F_L} \sqrt{\frac{Gf}{\Delta PS}}$
	Mass flow	Sub critical $\Delta P < F_L^2 (\Delta PS)$	$C_v = \frac{11.6W}{\sqrt{Gf\Delta P}}$
		Critical $\Delta P \geq F_L^2 (\Delta PS)$	$C_v = \frac{11.6W}{F_L \sqrt{Gf\Delta PS}}$
Gas	Volume flow rate	Sub critical $\Delta P < F_L^2 \frac{P_1}{2}$	$C_v = \frac{Q}{3.01} \sqrt{\frac{GT}{\Delta P (P_1 + P_2)}}$
		Critical $\Delta P \geq F_L^2 \frac{P_1}{2}$	$C_v = \frac{Q\sqrt{GT}}{2.62 F_L \cdot P_1}$
	Mass flow	Sub critical $\Delta P < F_L^2 \frac{P_1}{2}$	$C_v = \frac{4627W}{\sqrt{\Delta P (P_1 + P_2) Gf}}$
		Critical $\Delta P \geq F_L^2 \frac{P_1}{2}$	$C_v = \frac{5343W}{F_L \cdot P_1 \sqrt{Gf}}$
Saturated vapour	Mass flow	Sub critical $\Delta P < F_L^2 \frac{P_1}{2}$	$C_v = \frac{7098W}{\sqrt{\Delta P (P_1 + P_2)}}$
		Critical $\Delta P \geq F_L^2 \frac{P_1}{2}$	$C_v = \frac{8206W}{F_L \cdot P_1}$
Super-heated vapour	Mass flow	Sub critical $\Delta P < F_L^2 \frac{P_1}{2}$	$C_v = \frac{7098W (1 + 0.00126Tsh)}{\sqrt{\Delta P (P_1 + P_2)}}$
		Critical $\Delta P \geq F_L^2 \frac{P_1}{2}$	$C_v = \frac{8206W (1 + 0.00126Tsh)}{F_L \cdot P_1}$

## Symbol Legend

### Symbol

Cv: Valve flow coefficient	
FL: Pressure recovery coefficient	
G: Specific gravity	(Air=1 at 15 degree C)
Gf: Specific gravity at valve-inlet temperature	(Water = 1 at 15 degrees C)
P1: Valve-inlet pressure	(kPaA)
P2: Valve-outlet pressure	(kPaA)
ΔP: Pressure difference across valve [P1 – P2]	(kPa)
Pc: Critical pressure	(kPaA)
Pv: Saturated vapour pressure of liquid at valve-inlet temperature	(kPaA)
ΔPS: Max. DP for sizing	
<ul style="list-style-type: none"> <li>• Working conditions: Outlet pressure is higher than vapour pressure.</li> </ul>	
$\Delta PS = P_1 - P_v$	(kPa)
<ul style="list-style-type: none"> <li>• Working conditions: Outlet pressure is equal to or lower than vapour pressure.</li> </ul>	
$\Delta PS = P_1 - \left( 0.96 - 0.28 \sqrt{\frac{P_v}{P_c}} \right) P_v$	(kPa)
q: Volume flow rate of liquid	(m <sup>3</sup> / h)
Q: Volume flow rate of gas [At 15 degrees C, 1 atm]	(m <sup>3</sup> / h)
$= \text{Nm}^3/\text{h} \times \frac{288}{273}$	
T: Fluid temperature [273 + degrees C]	(K)
Tsh: Degree of superheat	(degrees C)
$= T - T_c$	
Tc: Saturated vapour temperature at valve-inlet pressure	(K)
W: Mass flow rate (T / h) = (1,000 kg / h)	

## Calculation for piping geometry factor

$$F_p = \left\{ 1 + \frac{\left\{ 0.5 \left( 1 - \left( \frac{d}{D_1} \right)^2 \right)^2 + 1.0 \left( 1 - \left( \frac{d}{D_2} \right)^2 \right)^2 \right\} \times \left( \frac{C_v}{d^2} \right)^2}{0.00214} \right\}^{-\frac{1}{2}}$$

Fp: Piping geometry factor  
 Cv: Valve flow coefficient  
 d: Valve size (mm)  
 D1: Inlet pipe size (mm)  
 D2: Outlet pipe size (mm)

## Calculation for modified Cv value

$$CvR = F_p \quad Cv$$

CvR : Revised Cv value

# Conversion Formula for Reference

## Pressure loss coefficient $\zeta \leftrightarrow$ Cv value

$$\zeta = 21.38 \times \frac{D^4}{Cv^2}$$

$$Cv = 4.624 \times \frac{D^2}{\sqrt{\zeta}}$$

D: Inside diameter of pipe (cm)

## Cv value $\rightarrow$ Kv value

Kv value is used in Germany.  
It shows the flow rate (m<sup>3</sup>/h) of drinking water at a pressure of 1 bar and temperature of 5–30 degrees C.

$$Kv = \frac{Cv}{1.167}$$

## Pressure loss coefficient $\zeta \rightarrow$ Kv value

$$Kv = 4.0 \times \frac{D^2}{\sqrt{\zeta}}$$

D: Inside diameter of pipe (cm)

## Cv value $\rightarrow$ Av value

Expressing the Cv value in SI units (international units) is the Av value.

$$Av = \frac{24}{10^6} \times Cv$$

## Equivalent pipe length

$$L = 8.5 \times \frac{D^{4.87}}{Q^{1.85}} \times \Delta P$$

D: Inside diameter of pipe (cm)

Q: Flow rate (ℓ/min)

$\Delta P$ : Pressure difference (kPaA)

Reference: For performance appraisal of fire safety and disaster prevention equipment, the equivalent pipe length is measured based on the flow rates in the table below.

Nominal dia.	Flow rate (ℓ/min)
50mm	800
65mm	900
80mm	1350
100mm	2100
125mm	3300
150mm	4800
200mm	8500
250mm	13000
300mm	19000

## Pressure difference

$$\Delta P = \frac{1}{102} \cdot \zeta \cdot \frac{V^2}{2g} \gamma$$

$\zeta$ : Pressure loss coefficient

$\Delta P$ : Pressure difference (kPa)

g: Acceleration of gravity 9.8 m/sec<sup>2</sup>

$\gamma$ : Specific gravity (water = 1000) (kg/m<sup>3</sup>)

V: Flow velocity (m/sec)

# Formula for leak rate

In the "Allowable valve seat leak standard" graph of 302Y and 337Y, the calculation method of the leak amount in the case of  $[1 \times 10^{-5}Cv]$  and  $[1 \times 10^{-4}Cv]$  is calculated back from the following Cv calculation formula.

① Find leak rate for seat leakage from the graph for the allowable seat leak standard by model

② Find flow conditions for:

P1: valve inlet pressure (kPaA)

P2: valve outlet pressure (kPaA)

$\Delta P$ : differential pressure, P1-P2 (kPa)

Gf: density at inlet side (density for water in case of liquid, for air in case of gas)

G: density

T: fluid temperature (K)

Cv: factor for valve at full open

③ Calculate leak rate by following formula.

In case of liquid

$$q = \frac{A}{11.6} \times \frac{1}{\sqrt{\frac{Gf}{\Delta P}}}$$

In case of gas

$$Q = \frac{3.01A}{\sqrt{\frac{GT}{\Delta P (P_1 + P_2)}}}$$

q = calculated leak rate for liquid (m<sup>3</sup>/h)

Q = calculated leak rate for gas (m<sup>3</sup>/h)

$\rightarrow$  (sample) Cv value for 302Y 100mm = 432  
Seat leak rate standard at temperature 150°C  
and valve inlet press 1.0Mpa =  $1 \times 10^{-5}$   
A =  $1 \times 10^{-5} \times 432 = 0.00432$



# Guidance for Vacuum Use

Valve type	Nominal dia. range (mm)	Usable vacuum (kPaA)			Valve seat leak (kPa · ℓ/h)	Remark
		10 to 50 degrees C	50 to 80 degrees C	80 to 100 degrees C		
302A	80-200	1.33	1.33	2.66	8.0	Special gland structure required.
	250-300	1.33	3.99	5.32	14.0	
	350-600	2.66	3.99	5.32		
304A	80-200	0.133	0.133	1.33	1.0	
	250-300	1.33	1.33	2.66	8.0	
	350-600	2.66	3.99	5.32		
302Y	40-200	1.33	1.33	2.66	14.0	
	250-300	2.66	3.99	5.32		
304Y	40-200	1.33	1.33	2.66	1.0	
	250-300	2.66	3.99	5.32	8.0	
304YA	40-200	1.33	1.33	2.66	1.1	
	250-300	2.66	3.99	5.32	8.3	
337Y	50-200	1.33	1.33	2.66	14.0	
846T	65-200	0.133	1.33	2.66	0.3	Leakage increases if heat cycle and open/close frequency is high.
	250-300	0.133	1.33	2.66	3.0	
847T	50-200	0.133	1.33	2.66	0.3	
	250-300	0.133	1.33	2.66	3.0	
841T	350-400	39.9	66.5	N.A.	5.0	
	450-600	39.9	66.5	N.A.		
842T	350-400	39.9	66.5	N.A.	5.0	
	450-600	39.9	66.5	N.A.		
700G	40-200	13.3	26.6	N.A.	3.0	
	250-300	26.6	53.2	N.A.	5.0	
	350-600	39.9	66.5	N.A.		
705G 704G	50-200	13.3	26.6	N.A.	3.0	
	250-300	26.6	53.2	N.A.	5.0	
	350-600	39.9	66.5	N.A.		
731P 732P	50-200	0.133	1.33	N.A.	0.3	
	250-300	0.133	2.66	N.A.	3.0	
	350-400	2.66	13.3	N.A.	5.0	
	450-600				7.0	
722F	125-300	26.6	53.2	N.A.	5.0	
	350-600	39.9	66.5	N.A.		

Leak amounts are predicted values based on testing at room temperature with new valves. If you will be using in a range that exceeds the above table, please consult us.

# Velocity Calculation

## Velocity limitation

Velocity limitations are shown below:

Type of fluid		Velocity limitation (continuous operation)
Liquid	Replaceable rubber seat	3 m/s
	Vulcanized rubber seat	5 to 6 m/s
Gas, vapour		120 to 200 m/s
Steam	Saturated steam	50 to 80 m/s
	Superheated steam	80 to 120 m/s

\* Velocity limitation varies depending on the valve models. Please consult us for further information.

\* Velocity shall be different from above in case of detailed sizing calculation.

## Pipe line velocity calculation

### For liquids

$$V=354 \times \frac{Q}{D^2}$$

### For gases and vapours

$$V=124.5 \times \frac{Q(T+273)}{D^2 \cdot P_2}$$

### For steam

$$V=354 \times \frac{Q \cdot U}{D^2}$$

Where:

V: Flow velocity (m/sec)

Q: Flow rate

Liquid (m<sup>3</sup>/h)

Gas [At 15 degrees C, 101325 Pa] (m<sup>3</sup>/h)

$$= Nm^3/h \times \frac{288}{273}$$

Steam (kg/h)

U: Specific volume of valve-outlet (m<sup>3</sup>/kg)

D: Nominal size (mm)

P2: Valve-outlet pressure (kPaA)

T: Temperature (degrees C)

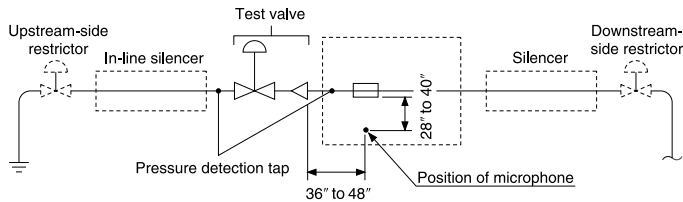
# Noise Prediction Methods and Countermeasures

## Noise measuring method

The following are methods recommended by ISA.

36-48 inches (0.9-1.2 m) downstream from the valve outlet

28-40 inches (0.7-1.0 m) from the pipe surface



Note: Parts surrounded by dotted lines are optional.

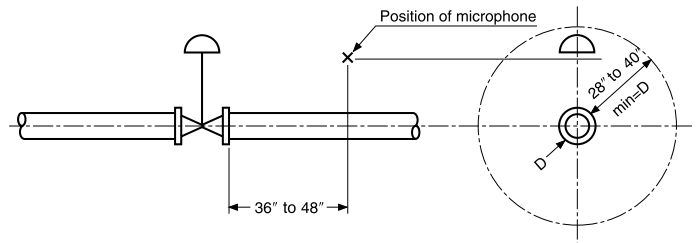


Fig. 1 Laboratory test unit by ISA-RP59.1

Fig. 2 Position of microphone in plant by ISA-RP59.2

## Noise calculation formula for 507V and 508V Types

### For gases

$$SP = -10.7 + 10 \log(C_v \cdot FL \cdot P_1 \cdot P_2) + 18.5 \log(D) - 30 \log(t/t_{40}) + 12 \log(P_1/P_2 - 1.05) - 10 \log(\text{no}) + SG$$

### For liquids

$$SP = 10 \log(C_v) + 12 \log(0.0102 \times (P_{2crit} - P_2)) + 16 \log(P_2 - P_v) - 10 \log(\text{no}) + 18.5 \log(D) - 30 \log(t) + *26.5$$

Notes regarding liquids:

1. When the pressure difference across the valve  $\Delta P (= P_1 - P_2)$  is smaller than 5% of  $P_1$ , the formula above cannot be applied.
2. For  $0.7P_1 - P_2 \leq 6.86$ , substitute 0 dBA for  $12 \log(0.0102 \times (P_{2crit} - P_2))$  in the formula above, and also 12.7 for 26.5, the coefficient with \* mark.

Where:

SP:	Noise value [sound pressure level at 91 cm]	(dBA)
$C_v$ :	Flow coefficient in actual conditions	
$P_1$ :	Valve upstream pressure	(kPaA)
$P_2$ :	Valve downstream pressure	(kPaA)
FL:	Pressure recovery coefficient (507V: 0.72)	
D:	Nominal pipe diameter	(mm)
t:	Pipe wall thickness	(mm)
t 40:	Pipe wall thickness of Sch #40	(mm)

no: Apparent valve orifice coefficient

50mm = 10	150mm = 18
80mm = 14	200mm to 400mm = 30
100mm = 16	

SG: Gas component modification coefficient

(Saturated vapour = -2, overheated vapour = -3)
(Natural gas = -1, air = 0)

$P_{2crit}$ :	$P_1 - 0.3 (P_1 - P_v)$	(kPaA)
$P_v$ :	Vapour pressure of liquid	(kPaA)

## Noise calculation formula for valves other than 507V and 508V Types

Formulas are in accordance with those introduced by ISA.

### For gases

$$SP = 10 \log (X \cdot \eta \cdot 10^9 \cdot C_v \cdot F_L \cdot 2.105 \cdot P_1 \cdot P_2) - TL + SG + 3$$

### When liquid cavitation is generated

$$SP = 10 \log (C_v \cdot F_L) + 8 \log (0.1451 \times (P_{2crit} - P_2)) + 20 \log (0.1451 \times (P_2 - P_v)) + 33$$

Where:

- SP: Noise value [sound pressure level at 91cm] (dBA)
- C<sub>v</sub>: Flow coefficient in actual conditions
- F<sub>L</sub>: Pressure recovery coefficient
- P<sub>1</sub>: Valve upstream pressure (kPaA)
- P<sub>2</sub>: Valve downstream pressure (kPaA)
- m: Weight of pipe wall (kg/m<sup>2</sup>)
- η: Apparent valve orifice coefficient (butterfly valve: n = 1.4)
- TL: Transmission loss → Except for valves releasing directly into the air.

$$= 17 \log_{10} \left( \frac{3.072 \times 1.4m}{\sqrt{C_v \cdot F_L}} \right) - 36 \text{ (dBA)}$$

$$*P_{2crit}: P_1 - F_L^2 (P_1 - P_v) \text{ (kPaA)}$$

$$P_v: \text{Vapour pressure of liquid (kPaA)}$$

X: Conversion fraction of mechanical output

$$= \frac{P_1 - P_2}{0.47 P_1} \quad X = 1 \text{ even if } X \text{ is bigger than } 1.$$

SG: Gas property factor

η: Acoustical efficiency coefficient (Refer to page Data-11.)

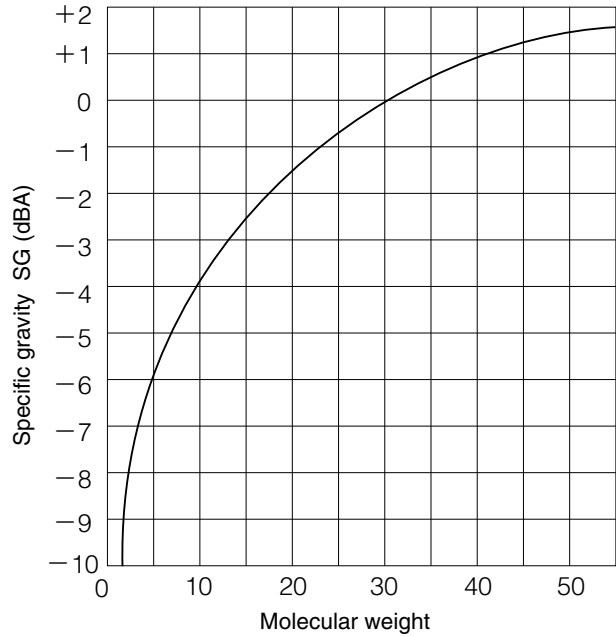
Note: When the difference between K<sub>c</sub> and F<sub>L</sub><sup>2</sup> exceeds 10% of K<sub>c</sub>, substitute K<sub>c</sub> for F<sub>L</sub><sup>2</sup>.

### Specific Gravity SG

Saturated steam	-2
Superheated steam	-3
Natural gas	-1
Hydrogen	-10
Oxygen	+0.5
Ammonia	-2
Air	0
Acetylene	-1
Carbon dioxide	+1
Carbon monoxide gas	0
Helium	-6.5
Methane liquid	-1
Nitrogen	0
Propane	+1
Ethylene	-1
Ethane	-1

Refer to the graph on left for fluids other than those above.

### Specific Gravity SG



### Weight of Pipe (m)

$$m = A \times t$$

\*A: Basic weight (kg/mm·m<sup>2</sup>)

[Steel pipe: 7.85, stainless steel pipe: 7.93]

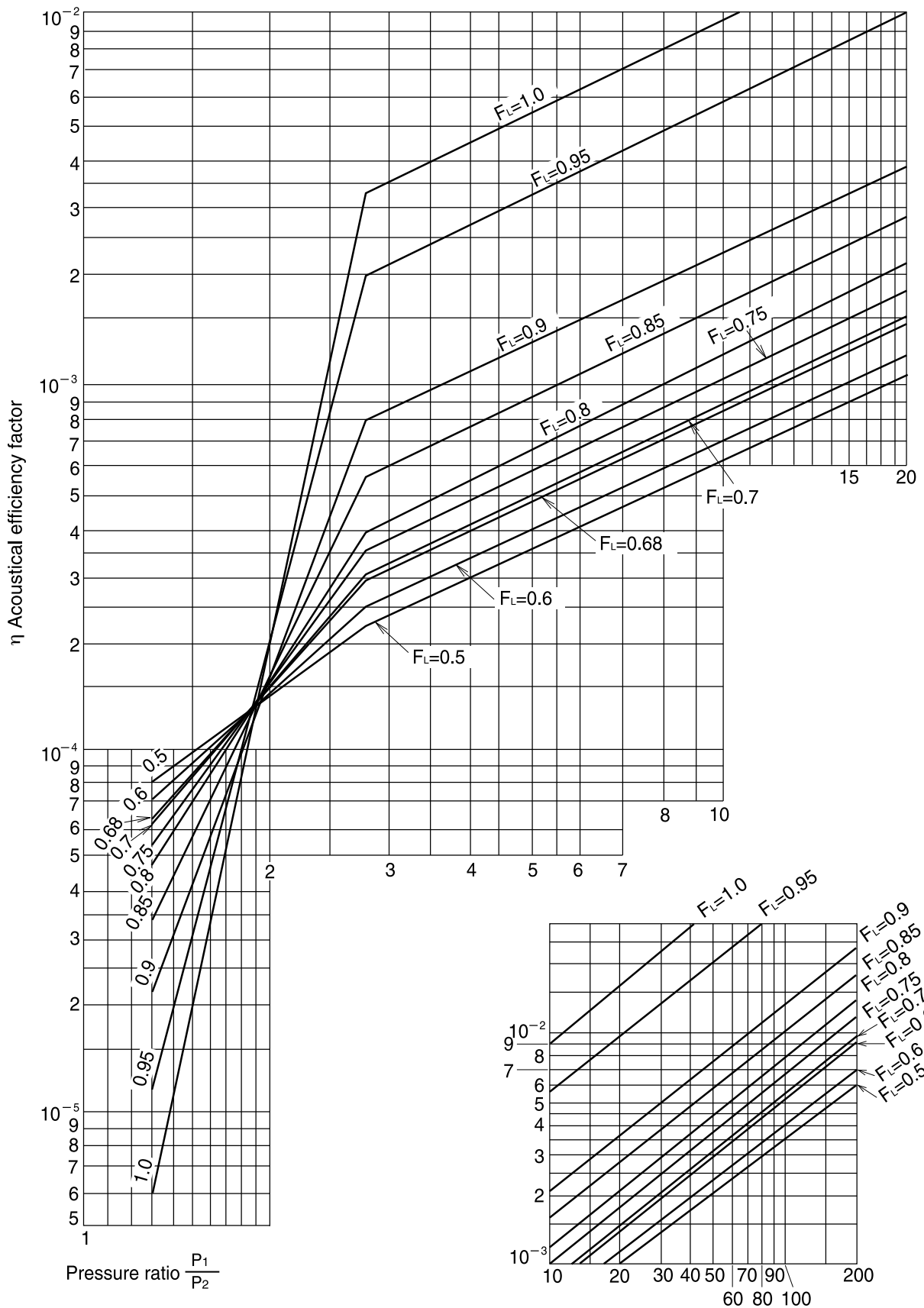
t: Pipe thickness (mm)

(kg/m<sup>2</sup>)

Nominal dia.		outer diameter (mm)	SGP		STPY		Sch20		Sch40		Sch60		Sch80		Sch10S		Sch20S	
mm	inch	(mm)	thickness (mm)	m (kg/m <sup>2</sup> )	thickness (mm)	m (kg/m <sup>2</sup> )	thickness (mm)	m (kg/m <sup>2</sup> )	thickness (mm)	m (kg/m <sup>2</sup> )	thickness (mm)	m (kg/m <sup>2</sup> )	thickness (mm)	m (kg/m <sup>2</sup> )	thickness (mm)	m (kg/m <sup>2</sup> )	thickness (mm)	m (kg/m <sup>2</sup> )
40	1 1/2	48.6	3.5	27.5	—	—	—	—	3.7	29.0	4.5	35.3	5.1	40.0	2.8	22.0	3.0	23.6
50	2	60.5	3.8	29.8	—	—	3.2	25.1	3.9	30.6	4.9	38.5	5.5	43.2	2.8	22.0	3.5	27.5
65	2 1/2	76.3	4.2	33.0	—	—	4.5	35.3	5.2	40.8	6.0	47.1	7.0	55.0	3.0	23.6	3.5	27.5
80	3	89.1	4.2	33.0	—	—	4.5	35.3	5.5	43.2	6.6	51.8	7.6	59.7	3.0	23.6	4.0	31.4
100	4	114.3	4.5	35.3	—	—	4.9	38.5	6.0	47.1	7.1	55.7	8.6	67.5	3.0	23.6	4.0	31.4
125	5	139.8	4.5	35.3	—	—	5.1	40.0	6.6	51.8	8.1	63.6	9.5	74.6	3.4	26.7	5.0	39.3
150	6	165.2	5.0	39.3	—	—	5.5	43.2	7.1	55.7	9.3	73.0	11.0	86.4	3.4	26.7	5.0	39.3
200	8	216.3	5.8	45.5	—	—	6.4	50.2	8.2	64.4	10.3	80.9	12.7	99.7	4.0	31.4	6.5	51.0
250	10	267.4	6.6	51.8	—	—	6.4	50.2	9.3	73.0	12.7	99.7	15.1	118.5	4.0	31.4	6.5	51.0
300	12	318.5	6.9	54.2	—	—	6.4	50.2	10.3	80.9	14.3	112.3	17.4	136.6	4.5	35.3	6.5	51.0
350	14	355.6	7.9	62.0	7.9	62.0	7.9	62.0	11.1	87.1	15.1	118.5	19.0	149.2	—	—	—	—
400	16	406.4	7.9	62.0	7.9	62.0	7.9	62.0	12.7	99.7	16.7	131.1	21.4	168.0	—	—	—	—
450	18	457.2	7.9	62.0	7.9	62.0	7.9	62.0	14.3	112.3	19.0	149.2	23.8	186.8	—	—	—	—
500	20	508.0	7.9	62.0	9.5	74.6	9.5	74.6	15.1	118.5	20.6	161.7	26.2	205.7	—	—	—	—
550	22	558.8	—	—	9.5	74.6	9.5	74.6	15.9	124.8	22.2	174.3	28.6	224.5	—	—	—	—
600	24	609.6	—	—	9.5	74.6	9.5	74.6	17.5	137.4	24.6	193.1	31.0	243.4	—	—	—	—
650	26	660.4	—	—	12.7	99.7	12.7	99.7	18.9	148.4	26.4	207.2	34.0	266.9	—	—	—	—
700	28	711.2	—	—	12.7	99.7	—	—	—	—	—	—	—	—	—	—	—	—
750	30	762.0	—	—	12.7	99.7	—	—	—	—	—	—	—	—	—	—	—	—
800	32	812.8	—	—	12.7	99.7	—	—	—	—	—	—	—	—	—	—	—	—
850	34	863.6	—	—	12.7	99.7	—	—	—	—	—	—	—	—	—	—	—	—
900	36	914.4	—	—	12.7	99.7	—	—	—	—	—	—	—	—	—	—	—	—
1000	40	1016.0	—	—	15.9	124.8	—	—	—	—	—	—	—	—	—	—	—	—
1100	44	1117.6	—	—	15.9	124.8	—	—	—	—	—	—	—	—	—	—	—	—
1200	48	1219.2	—	—	15.9	124.8	—	—	—	—	—	—	—	—	—	—	—	—
1350	54	1371.6	—	—	15.9	124.8	—	—	—	—	—	—	—	—	—	—	—	—

Note: The STPY tube shows the representative thickness.

$\eta$ .....Acoustical efficiency factor



## Valve noise reduction countermeasures

Aerodynamic noise is discussed here.  
Noise can be reduced at the following points:

- 1 Noise source**
- 2 Sound insulation**

When selecting a countermeasure, controllability of process, initial cost and maintenance cost should be considered along with noise evaluation and noise type.

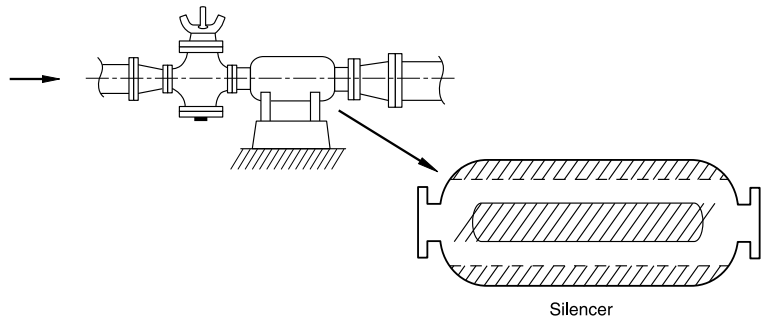
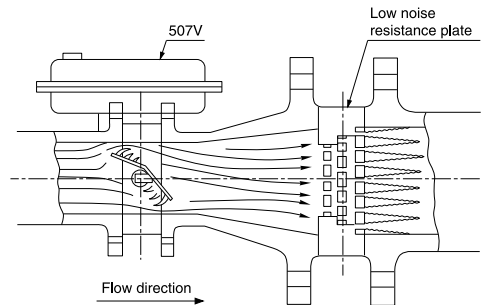
Various factors should be discussed between the customer and manufacturer. Please refer to the section "Calculation of Estimated Cavitation" and its countermeasure to reduce and prevent cavitation noise.

### Countermeasures for noise source

There are two countermeasures for noise source.

- (1) Adoption of low noise valve**  
507V and 508V types: Max. possible reduction is 10 dBA.
- (2) Countermeasure at valve downstream side**
  - ① Insert resistance plate: Max. possible reduction is 15 dBA.
  - ② Insert silencer
    - Downstream Possible reduction is 10 to 15 dBA
    - Upstream and Downstream Possible reduction is 20 to 25 dBA

### Example of low noise unit

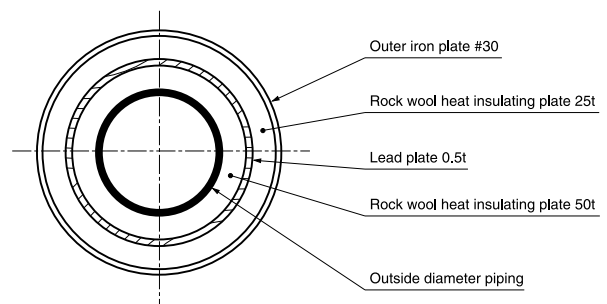


### Sound insulation

This countermeasure does not reduce sound generation itself.

- ① Increase of pipe wall thickness (pipe schedule)  
If it doubles, 5 dBA can be reduced.
- ② Soundproof lagging  
In this countermeasure, piping is covered with layers of heat insulating materials (rock wool), lead plates, or iron plates, etc.
- ③ Prepare sound insulating box or wall  
In order to reduce noise effectively, combine the various methods mentioned above.

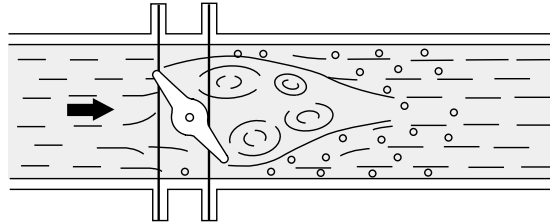
### Example: Pipe lagging materials



# Calculation of Estimated Cavitation

## Cavitation generation in butterfly valves

Cavitation is caused by low pressure areas in fluids. There are four causes of low pressure areas:



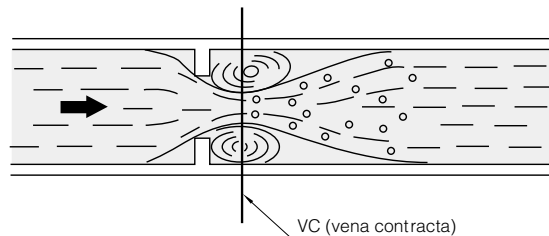
**Fig. 1 Butterfly valves in nearly closed position**

- (1) Fluid is compressed, contraction flow exists, and flow velocity is increased. Then, pressure reduces.
- (2) Low pressure area inside vortices at valve-outlet side.
- (3) Low pressure area is produced at the boundary between the fluid flowing at high velocity and objects such as the protruding portion of the valve-moulded surface, heads of taper pins, and hubs, etc.
- (4) When the valve body or disc is vibrating at high frequency, the flow is disturbed and air bubbles form in the fluid.

The main causes of cavitation generation in butterfly valves are (1) and (2).

Thus, when the valve is nearly closed, the flow passes over the upper and lower edges of the disc as shown in figure. 1. The low pressure area can be caused when high flow velocity is created.

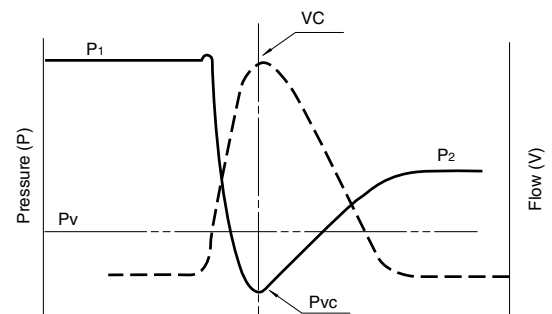
Here, the valve flow can be approximated to the orifice flow as shown in Fig. 2. The condensate in the figure is commonly called Vena Contracta.



**Fig. 2 Orifice flow**

Figure 2 shows orifice flow corresponding to valve flow. The contracted part is called vena contracta. The relation between pressure and flow rate is shown in figure 3.

When fluids flow at high velocity and pressure drops below the saturated vapour pressure, air bubbles are produced. They are carried away toward the valve downstream side, and then, as surrounding water recovers its original pressure, air bubbles break instantaneously (approx. 1/1000 sec) and produce a strong impact force (200 to 500 atm). If air bubbles break near a substance, the impact applies great stress on both the outside and inside of the substance, and causes damage to the surface.

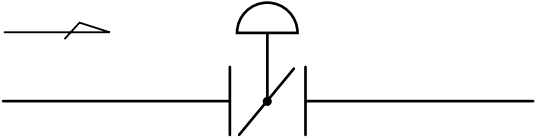
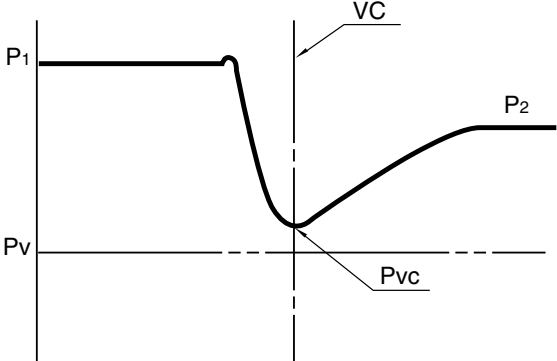
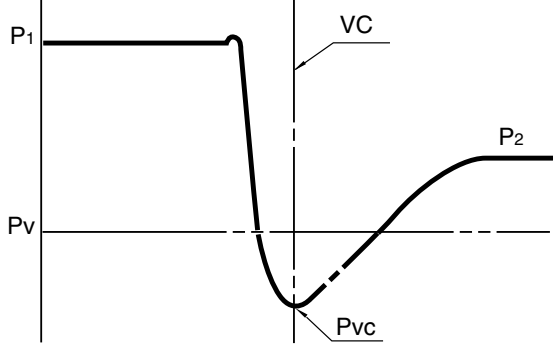
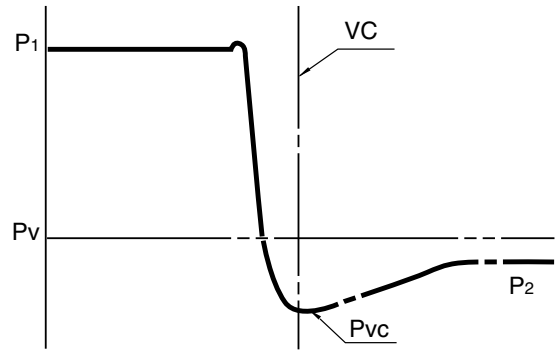


**Fig. 3 Pressure and flow rate relation**



## Cavitation Generation Process in Butterfly Valves and Formula for Estimation

There are many stages in cavitation generation, as follows.

Flow conditions	Pressure conditions	Explanation
 <p style="text-align: center;"><b>Fig. 4 Normal flow</b></p> 	$P_2 > P_v$  $P_{vc} > P_v$	<ul style="list-style-type: none"> <li>• Normal flow means turbulent flow.</li> <li>• In this stage, valve flow rate increases in proportion to the square root of the differential pressure.</li> </ul>
<p style="text-align: center;"><b>Fig. 5 Cavitation flow</b></p> 	$P_2 > P_v$  $P_{vc} \leq P_v$	<ul style="list-style-type: none"> <li>• Cavitation flow has three stages corresponding to the increase in differential pressure.                             <ol style="list-style-type: none"> <li>a. Incipient cavitation stage</li> <li>b. Critical cavitation stage</li> <li>c. Full cavitation stage</li> </ol> </li> <li>• Noise and oscillation may cause damage to the valve and downstream-side piping.</li> </ul>
<p style="text-align: center;"><b>Fig. 6 Flashing flow</b></p> 	$P_2 \leq P_v$  $P_{vc} < P_v$	<ul style="list-style-type: none"> <li>• This occurs when pressure on the valve downstream side drops below the vapour pressure of the liquid. The fluid changes from liquid to gas, bringing rapid velocity change and volume expansion. These two factors are the main causes of a flashing noise. Flashing noise is of lower level than cavitation noise because gas acts as a cushion.</li> <li>• Attention must be paid to materials of the valve body (e.g., upgrading to stainless steel or chromium molybdenum steel) or the type of downstream-side piping.</li> </ul>

## Cavitation prediction

### No cavitation

$$\Delta P < K_c (P_1 - P_v)$$

### Incipient cavitation

$$\Delta P = K_c (P_1 - P_v)$$

### Critical cavitation

$$FL^2 (P_1 - P_v) > \Delta P > K_c (P_1 - P_v)$$

### Full cavitation

$$\Delta P \geq FL^2 (P_1 - P_v)$$

### Flashing

$$P_2 < P_v$$

$$FL^2 (P_1 - P_v) > \Delta P$$

$\Delta P$ : Pressure difference across valve [ $P_1 - P_2$ ] (kPa)

$K_c$ : Cavitation coefficient

$P_1$ : Valve-inlet pressure (kPaA)

$P_2$ : Valve-outlet pressure (kPaA)

$P_v$ : Vapour pressure of liquid (kPaA)

$FL$ : Pressure recovery coefficient

## Cavitation level and availability

Type of valve Cavitation level	Rubber seated (700G, 702Z)	Double offset PTFE metal (302A, 304A)	507V 508V
		731P	
No cavitation	○	○	○
Incipient cavitation	○	○	○
Critical cavitation	△	○	○
Full cavitation	×	×	△ (Countermeasure is necessary)
Flashing	×	×	△ (Countermeasure is necessary)

- — Suitable
- △ — Consult us regarding usage.
- × — Unsuitable

**Note:**  
Normal operation material is stainless steel except when critical cavitation is determined.

## Cavitation reduction treatment

The following are the main methods for reducing or preventing cavitation damage to control valves.

- (1) Install valves in series and control them. This method is for reducing the pressure load on each valve. In this case, space valves out at least 4D (4 times the pipe diameter). The total  $K_c$  or  $FL$  will be improved. In order to avoid full cavitation  $FL$  should satisfy the following condition:

$$FL > \sqrt{\frac{P_1 - P_2}{P_1 - P_v}}$$

In this case, however, valve control balance may be difficult.

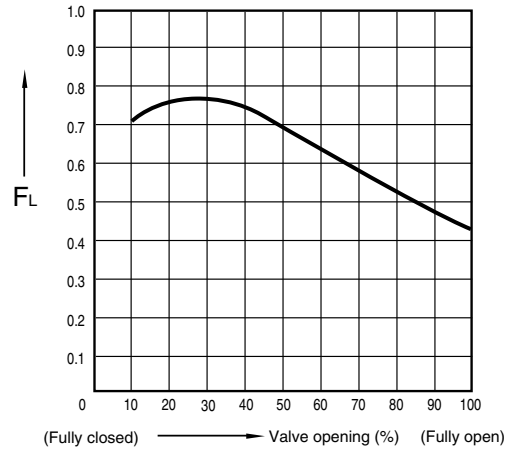
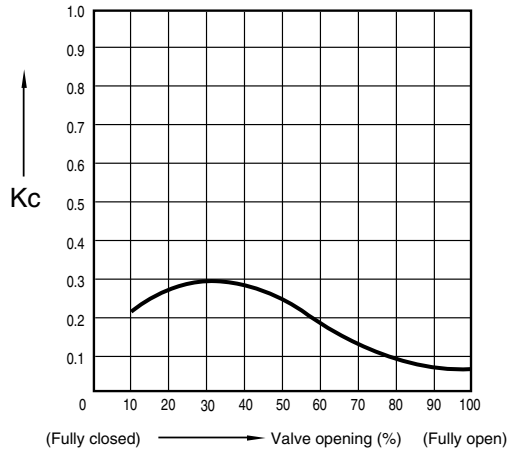
Example:

When 507V and 508V types are nearly fully opened,  $FL$  is 0.72. When 507V and 508V types are installed in series, the combined  $FL$  is  $0.72 = 0.84$  and the permissible pressure difference across the valve is increased by 36%. However, both valves should be operated under exactly the same conditions.

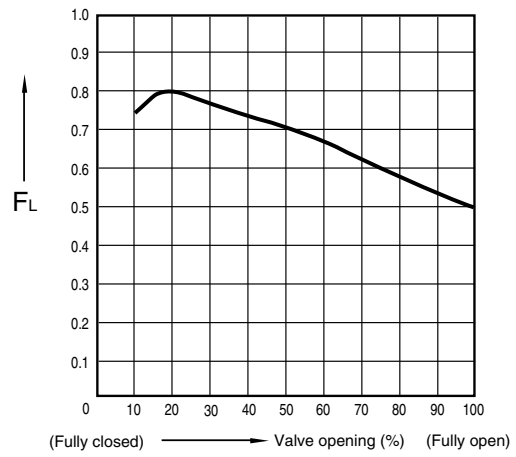
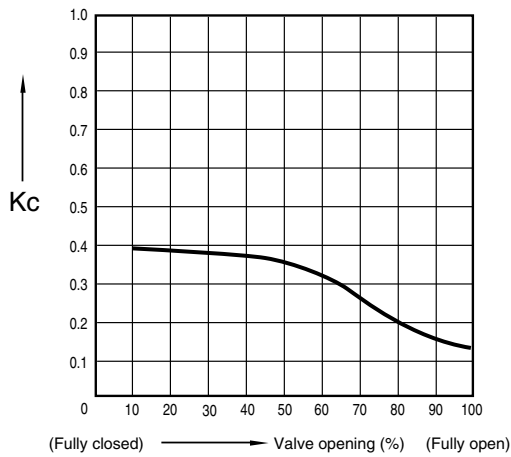
- (2) Use a resistance plate (perforated orifice for pressure reduction) at the same time. If the flow rate fluctuates heavily, a good result cannot be expected.
- (3) Use a valve with higher  $K_c$  or  $FL$ .
- (4) Lower the installation position of the valve; that is, lower the secondary pressure. However, this method is hard to adopt in existing piping installations.
- (5) Rectify the turbulent flow by using a rectifier grid.

Cavitation coefficient  $K_c$  and pressure recovery coefficient  $FL$

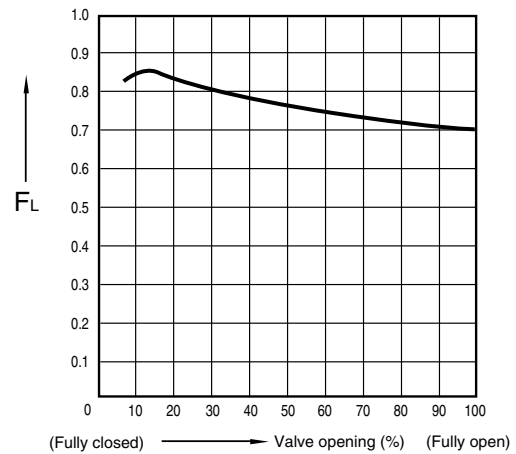
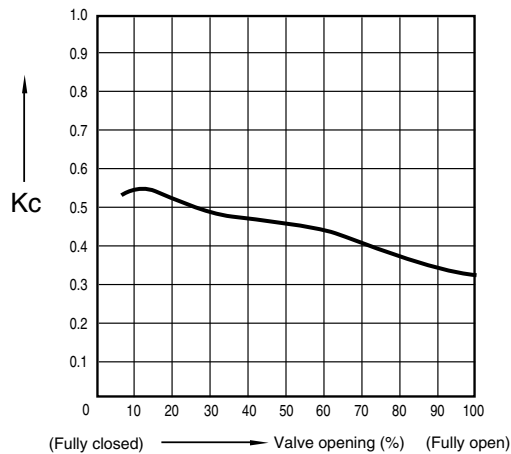
**Concentric type butterfly valve  
700 and 800 series**



**High performance butterfly valve  
300 series**



**Rotary control valve  
507V and 508V types**



# Face to Face Dimensions

## Face to face Dimensions

Unit: mm

Series Diameter	JIS B 2002				API594 Class150	API609 Category B		JV-8	(Reference: Maker's face-to-face dimension)									
	Wafer shape for standard equipment		Wafer shape for ships			Class150	Class300											
	46	47	123															
40	33	35	—	—	—	—	—	—	—	—	—	—	—	—	35	—	—	
50	43	43	—	—	54	—	—	60	56	—	40	40	45	45	35	—	43	
65	46	46	—	—	60	—	—	67	56	—	46	—	45	45	35	—	46	
80	46	46	—	—	67	48	48	73	60	—	56	40	50	50	40	—	64	
100	52	52	—	—	67	54	54	73	66	—	56	40	50	50	40	—	64	
125	56	56	—	100	83	—	—	86	70	—	62	—	55	55	45	—	70	
150	56	56	—	100	95	57	59	98	76	—	76	52	60	60	50	90	76	
200	60	60	—	100	127	64	73	127	95	—	85	62	65	65	60	100	89	
250	68	68	—	110	140	71	83	146	108	—	96	89	90	80	—	110	114	
300	78	78	—	110	181	81	92	181	144	—	120	89	90	90	—	110	114	
350	78	78	92	120	—	92	117	—	—	184	—	89	100	100	—	120	—	
400	102	102	102	130	—	102	133	—	—	190	—	108	110	110	—	130	—	
450	114	114	114	150	—	114	149	—	—	200	—	—	120	120	—	150	—	
500	127	127	127	160	—	127	159	—	—	—	—	—	140	140	—	160	—	
600	154	154	154	170	—	154	181	—	—	—	—	—	160	160	—	200	—	
Tomoe applicable types	302A (125mm)	773Z (discontinued)	302A (350 to 600mm)	722F	906C (discontinued)	302A (80 to 100mm 150 to 600mm)	334A (80 to 600mm class300)	MKT	903C (discontinued)	901C	337Y	507V	841T/ 842T	700S (discontinued)	700Z (discontinued)	107H (discontinued)	337Y (discontinued)	
	304A (125mm)	775Z (discontinued)	304A (350 to 600mm)			304A (80 to 100mm 150 to 600mm)			904C (discontinued)							108H (discontinued)	338Y (discontinued)	
	302Y	700G							907L									
	304Y	704G							903L									
	304YA	705G																
	508V	700Z					334A (80 to 600mm class150)											
	846T	731R																
	847T																	
	731P																	
	732P																	
	732X																	
	731X																	
	702Z (discontinued)																	

Remark: For detailed dimensions, please refer to the individual dimensional drawings.

# Unit Conversion

## Cavitation prediction

Conversion from flow rate unit for each type to m<sup>3</sup>/h

	m <sup>3</sup> /h	Gas m <sup>3</sup> /h (at 15°C 101kPa)
Gas m <sup>3</sup> /h	—	× <b>[A]</b>
Gas m <sup>3</sup> /h (at 15°C 101kPa)	× <b>[B]</b>	—
kg/h (at 0°C 101kPa)	÷ SG × 0.001	× 23.63 ÷ MW
kℓ/h	—	× <b>[A]</b>
t/h (at 0°C 101kPa)	÷ SG	× 1000 × 23.63 ÷ MW
ℓ/h	× 0.001	÷ 0.001 × <b>[A]</b>
ℓ/min.	× 0.06	× 0.06 × <b>[A]</b>
t/min. (at 0°C 101kPa)	÷ SG × 60	× 60 × 1000 × 23.63 ÷ MW
Lb/h (at 0°C 101kPa)	× 0.4536 ÷ SG × 0.001	× 0.4536 × 23.63 ÷ MW
CFH (ft <sup>3</sup> /h)	× 0.02832	× 0.02832 × <b>[A]</b>
SCFH (Nft <sup>3</sup> /h)	× 0.02832 × <b>[B]</b>	× 0.02832
BBL/h (barrel)	× 0.159	× 0.159 × <b>[A]</b>
BBL/min.	× 0.159 × 60	× 0.159 × 60 × <b>[A]</b>
GPM (gallon/min.)	× 0.2271	× 0.2271 × <b>[A]</b>
CFM (ft <sup>3</sup> /min.)	× 1.699	× 1.699 × <b>[A]</b>
SCFM	× 1.699 × <b>[B]</b>	× 1.699
Nm <sup>3</sup> /h (at 0°C 101kPa)	× T <sub>1</sub> × 0.1013 ÷ (P <sub>1</sub> × 273)	× 288 ÷ 273

**[A]** = P<sub>1</sub> × 288 ÷ (T<sub>1</sub> × 0.1013) P<sub>1</sub> = Valve inlet pressure (MPaA)

**[B]** = T<sub>1</sub> × 0.1013 ÷ (P<sub>1</sub> × 288) T<sub>1</sub> = Temperature (°K)

SG = Specific gravity MW = Molecular weight

## Pressure unit conversion

Conversion from pressure unit for each type to MPaA

	MPa A
kgf/cm <sup>2</sup> G	× 9.807 × 10 <sup>-2</sup> + 0.1013
Bar G	× 1 × 10 <sup>-1</sup> + 0.1013
Bar A	× 1 × 10 <sup>-1</sup>
mmH <sub>2</sub> O or mmAq	× 9.807 × 10 <sup>-6</sup> + 0.1013
cmH <sub>2</sub> O or cmAq	× 9.807 × 10 <sup>-5</sup> + 0.1013
mH <sub>2</sub> O or mAq	× 9.807 × 10 <sup>-3</sup> + 0.1013
mmHg or Torr	× 1.333 × 10 <sup>-4</sup>
cmHg	× 1.333 × 10 <sup>-3</sup>
atm	× 1.013 × 10 <sup>-1</sup>
atg	× 9.807 × 10 <sup>-2</sup> + 0.1013
Pa G	× 1 × 10 <sup>-6</sup> + 0.1013
kPa G	× 1 × 10 <sup>-3</sup> + 0.1013
kPa A	× 1 × 10 <sup>-3</sup>
MPa G	+ 0.1013
MPa A	-
Lb/in <sup>2</sup> G (psi G)	× 6.895 × 10 <sup>-3</sup> + 0.1013
Lb/in <sup>2</sup> A (psi A)	× 6.895 × 10 <sup>-3</sup>
in Hg	× 3.386 × 10 <sup>-3</sup>

## Temp. conversion table

Temperature conversion

$$^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32)$$

$$^{\circ}\text{F} = \frac{9}{5} ^{\circ}\text{C} + 32$$

°C	← °F	°C	→ °F
-28.9	-20	-4.5	
-26.1	-15	-5.0	
-23.3	-10	14.0	
-20.6	-5	23.0	
-17.8	0	32.0	
-15.0	5	41.0	
-12.2	10	50.0	
-9.4	15	59.0	
-6.7	20	68.0	
-3.9	25	77.0	
-1.1	30	86.0	
1.7	35	95.0	
4.4	40	104.0	
7.2	45	113.0	
10.0	50	122.0	
12.8	55	131.0	
15.6	60	140.0	
18.3	65	149.0	
21.1	70	158.0	
23.9	75	167.0	
26.7	80	176.0	
29.4	85	185.0	
32.2	90	194.0	
35.0	95	203.0	
37.8	100	212.0	
43.3	110	230.0	
48.9	120	248.0	
54.4	130	266.0	
60.0	140	284.0	
65.6	150	302.0	
71.1	160	320.0	
76.7	170	338.0	
82.2	180	356.0	
87.8	190	374.0	
93.3	200	392.0	
98.9	210	410.0	
104.4	220	428.0	
110.0	230	446.0	
121.1	250	482.0	
148.9	300	572.0	
176.7	350	662.0	
204.4	400	752.0	
232.2	450	842.0	
260.0	500	932.0	
315.6	600	1112.0	
317.0	700	1292.0	

## Pressure conversion table

Pa	kPa	MPa	bar	kgf/cm <sup>2</sup>	atm	mH <sub>2</sub> O	mHg	Lb/in <sup>2</sup>
1	1 × 10 <sup>-3</sup>	1 × 10 <sup>-6</sup>	1 × 10 <sup>-5</sup>	1.02 × 10 <sup>-5</sup>	9.87 × 10 <sup>-6</sup>	1.02 × 10 <sup>-4</sup>	7.5 × 10 <sup>-6</sup>	1.45 × 10 <sup>-4</sup>
1 × 10 <sup>3</sup>	1	1 × 10 <sup>-3</sup>	1 × 10 <sup>-2</sup>	1.02 × 10 <sup>-2</sup>	9.87 × 10 <sup>-3</sup>	1.02 × 10 <sup>-1</sup>	7.5 × 10 <sup>-3</sup>	1.45 × 10 <sup>-1</sup>
1 × 10 <sup>6</sup>	1 × 10 <sup>3</sup>	1	1 × 10	1.02 × 10	9.87	1.02 × 10 <sup>2</sup>	7.5	1.45 × 10 <sup>2</sup>
1 × 10 <sup>5</sup>	1 × 10 <sup>2</sup>	1 × 10 <sup>-1</sup>	1	1.02	9.87 × 10 <sup>-1</sup>	1.02 × 10	7.52 × 10 <sup>-1</sup>	1.45 × 10
9.81 × 10 <sup>4</sup>	9.81 × 10	9.81 × 10 <sup>-2</sup>	9.81 × 10 <sup>-1</sup>	1	9.68 × 10 <sup>-1</sup>	1 × 10	7.7 × 10 <sup>-1</sup>	1.42 × 10
1.01 × 10 <sup>5</sup>	1.01 × 10 <sup>2</sup>	1.01 × 10 <sup>-1</sup>	1.01	1.03	1	1.03 × 10	7.6 × 10 <sup>-1</sup>	1.47 × 10
9.81 × 10 <sup>3</sup>	9.81	9.81 × 10 <sup>-3</sup>	9.81 × 10 <sup>-2</sup>	1 × 10 <sup>-1</sup>	9.68 × 10 <sup>-2</sup>	1	7.36 × 10 <sup>-2</sup>	1.42
1.33 × 10 <sup>5</sup>	1.33 × 10 <sup>2</sup>	1.33 × 10 <sup>-1</sup>	1.33	1.3	1.32	1.36 × 10	1	1.93 × 10
6.89 × 10 <sup>3</sup>	6.89	6.89 × 10 <sup>-3</sup>	6.89 × 10 <sup>-2</sup>	7.03 × 10 <sup>-2</sup>	6.8 × 10 <sup>-2</sup>	7.03 × 10 <sup>-1</sup>	5.17 × 10 <sup>-2</sup>	1

## Torque conversion table

oz·in	Lb·in	Lb·ft	kg·cm	kg·m	N·cm	N·m
1	0.0625	0.005	0.072	0.0007	0.706	0.007
16	1	0.083	1.152	0.0115	11.3	0.113
192	12	1	13.83	0.138	135.6	1.356
13.89	0.868	0.072	1	0.01	9.807	0.098
1389	86.8	7.233	100	1	980.7	9.807
14.16	0.088	0.007	0.102	0.001	1	0.01
141.6	8.851	0.738	10.20	0.102	100	1

## Specific gravity conversion

	Condition	Specific gravity G
kg/Nm <sup>3</sup>	0 degrees C 1013mmbar	÷ 1.293
	15 degrees C 1013mmbar	÷ 1.225

# Physical Properties

## Physical properties of liquids

Fluid	Boiling point when air pressure is 1		Gravity			Molecular weight
			Temp.		Water = 1 at 4°C	
	°C	°F	°C	°F		
Acetaldehyde	20.6	69	20	68	.782	44.05
Acetic acid	118.3	245	20	68	1.049	60.05
Acetone	56.1	133	20	68	.79	58.08
Aero motor oil (typical)	—	—	15.6	60	.895	—
	—	—	—	—	—	—
Alcohol, allyl-n	97.2	207	20	68	.855	58.05
Alcohol, butyl-n	117.2	243	20	68	.81	74.12
	117.2	243	70	158	.78	—
Alcohol, ethyl-n (grain)	77.8	172	20	68	.789	46.07
Alcohol, methy-n (wood)	66.1	151	20	68	.79	102.17
Alcohol, propyl-n	97.2	207	- 17.8	0	.804	60.09
Ammonia (liquid)	- 33.3	- 28	20	68	.662	17.31
Aniline	183.9	363	20	68	1.022	93.12
Automobile crankcase oils,						
SAE 10	—	—	15.6	60	.88 – .94	—
SAE 20	—	—	15.6	60	.88 – .94	—
SAE 30	—	—	15.6	60	.88 – .94	—
SAE 40	—	—	15.6	60	.88 – .94	—
SAE 50	—	—	15.6	60	.88 – .94	—
SAE 60	—	—	15.6	60	.88 – .94	—
SAE 70	—	—	15.6	60	.88 – .94	—
Automobile transmission lub,						
SAE 80	—	—	15.6	60	.88 – .94	—
SAE 90	—	—	15.6	60	.88 – .94	—
SAE 140	—	—	15.6	60	.88 – .94	—
SAE 250	—	—	15.6	60	.88 – .94	—
Beer	—	—	15.6	60	1.01	—
Benzol (Benzene)	80	176	20	68	.879	78.11
Brine, calcium chloride, 25%	—	—	15.6	60	1.23	—
Brine, sodium chloride, 25%	—	—	15.6	60	1.19	—
Bromine	61.1	142	20	68	2.9	159.83
Butyric acid-n	157.8	316	20	68	.959	88.10
Carbolic acid (phenol)	182.2	360	18.3	65	1.08	94.11
Carbon disulphide	46.1	115	20	68	1.263	76.14
Carbon tetrachloride	76.7	170	20	68	1.594	153.84
Castor oil	—	—	20	68	.96	—
Chloroform	61.1	142	20	68	1.489	119.39
Compounded steam cyl oil (5% tal, ow)	—	—	15.6	60	.90	—
	—	—	—	—	—	—
Decane-n	172.8	343	20	68	.73	142.28
Diethyl ether	34.7	94.4	20	68	.714	74.12
Ethyl acetate	77.2	171	20	68	.90	88.10
Ethyl biomide	38.3	101	15	59	1.45	108.98
Ethylene btomide	131.7	269	20	68	2.18	187.88
Ethylene chloride	83.9	183	20	68	1.246	98.97
Formic acid	100.6	213	20	68	1.221	46.03

Physical properties of liquids

Fluid	Boiling point when air pressure is 1		Gravity			Molecular weight
			Temp.		Water = 1 at 4°C	
	°C	°F	°C	°F		
Freon 11	—	—	21.1	70	1.49	—
Freon 12	—	—	26.1	79	1.33	—
Freon 21	—	—	21.1	70	1.37	—
Fuel oil, No.1	—	—	15.6	60	.82 – .95	—
No.2	—	—	15.6	60	.82 – .95	—
No.3	—	—	15.6	60	.82 – .95	—
No.5	—	—	15.6	60	.82 – .95	—
No.6	—	—	15.6	60	.82 – .95	—
Gasoline, typical (a)	—	—	- 14.4	6	.74	—
(b)	—	—	- 14.4	6	.72	—
(c)	—	—	- 14.4	6	.68	—
Glycerine, 100%	290	554	20	68	1.26	92.03
Glycerine and water. 50%	—	—	20	68	1.13	—
Glycol, Ethylene	—	—	20	68	1.125	62.07
Heptane-n	98.3	209	20	68	.684	100.20
Hexane-n	68.9	156	20	68	.66	86.17
Hydrochloric acid, 31.5%	—	—	20	68	1.05	—
Kerosene	—	—	15.6	60	.78 – .82	—
Lard oil	—	—	15.6	60	.91 – .92	—
Linseed oil (raw)	28.1	538	15.6	60	.92 – .94	—
Marine engine oil (20% blown rape)	—	—	15.6	60	.94	—
Methy acetate	57.2	135	20	68	.93	58.08
Methy iodide	42.2	108	20	68	2.28	141.94
Milk	—	—	20	68	1.02 – 1.04	—
Naphthelene	217.8	424	20	68	1.145	—
Neatsfoot oil	—	—	15.6	60	.91 – .92	—
Nitric acid, 60%	—	—	20	68	1.37	—
Nitrobenzene	211.1	412	20	68	1.203	—
Nonane-n	150	302	20	68	.718	128.6
Octane-n	125.6	258	20	68	.70	—
Olive oil	(298.9)	(570)	20	68	.91	—
Pentane-n	36.1	97	20	68	.63	123.11
Petroleum ether (benzine)	—	—	15.6	60	.64	128.25
Propionic acid	141.1	286	20	68	.99	114.22
Quenching oil (typical)	—	—	15.6	60	.86 – .89	—
Rapeseed oil	—	—	20	68	.91	72.09
Soya bean oil	—	—	15.6	60	.924	—
Sperm oil	(98.3)	(209)	25	77	.88	74.08
Sugar, 20%	—	—	20	68	1.08	—
40%	—	—	20	68	1.18	—
60%	—	—	20	68	1.29	—
Sulfuric acid, 100%	337.8	640	20	68	1.83	98.08
95%	—	—	20	68	1.83	—
60%	—	—	20	68	1.50	—
Turbine oil (typical medium)	—	—	15.6	60	.91	—
Turpentine	160	320	15.6	60	.86 – .87	136.23
Water (fresh)	100	212	15.6	60	1.0	—
Water (sea)	—	—	15.6	60	1.03	—
Xyolene-o	141.7	287	20	68	.87	—

## Density of fluids

Fluid	Density g/cm <sup>3</sup>	Density	Temp. °C
Acetone	0.792	49.4	20
Alcohol, ethyl	0.791	49.4	20
Alcohol, methyl	0.810	50.5	0
Benzene	0.899	56.1	0
Carbolic acid	0.950 – 0.965	59.2 – 60.2	15
Carbon disulfide	1.293	80.7	0
Carbon tetrachloride	1.595	99.6	20
Chloroform	1.489	93.0	20
Ether	0.736	45.9	0
Gasoline	0.66 – 0.69	41.0 – 43.0	—
Glycerin	1.260	78.6	0
Kerosene	0.82	51.2	—
Mercury	13.6	849.0	—
Milk	1.028 – 1.035	64.2 – 64.6	—
Naphtha, petroleum ether	0.665	41.5	15
Wood	0.848 – 0.810	52.9 – 50.5	0
Oils:			
Castor	0.969	60.5	15
Coconut	0.925	57.7	15
Cotton seed	0.926	57.8	16
Creosote	1.040 – 1.100	64.9 – 68.6	15
Linseed, boiled	0.942	58.8	15
Olive	0.918	57.3	15
Sea water	1.025	63.99	15
Turpentine (spirits)	0.87	54.3	—
Water	1.00	62.43	4



### Critical pressures and temperatures

Fluid	Critical pressure Pc		Critical temperature Tc	
	kPaA	Bars (abs.)	°F	°C
Acetic acid	5798	58.0	612	322
Acetone	4764	47.6	455	235
Acetylene	6280	62.9	97	36
Air	3771	37.8	- 222	- 141
Ammonia	11297	113.0	270	132
Argon	4860	48.6	- 188	- 122
Benzene	4833	48.4	552	289
Butane	3647	36.5	307	153
Carbon dioxide	7390	74.0	88	31
Carbon monoxide	3543	35.5	- 218	- 139
Carbon tetrachloride	4557	45.6	541	283
Chlorine	7708	77.0	291	144
Ethane	4944	49.5	90	32
Ethyl alcohol	6391	64.0	469	243
Ethylene	5115	51.2	50	10
Ethyl ether	3599	36.0	383	195
Fluorine	2530	25.3	- 247	- 155
Helium	228.9	2.29	- 450	- 268
Heptane	2716	27.2	513	267
Hydrogen	1296	13.0	- 400	- 240
Hydrogen chloride	8266	82.6	124	51
Isobutane	3750	37.5	273	134
Isopropyl alcohol	5370	53.7	455	235
Methane	4640	46.4	- 117	- 83
Methyl alcohol	7970	79.6	464	240
Nitrogen	3392	34.0	- 233	- 147
Nitrous oxide	7267	72.7	99	37
Octane	2496	25.0	565	296
Oxygen	5033	50.4	- 182	- 119
Pentane	3344	33.5	387	197
Phenol	6129	61.3	786	419
Phosgene	5674	56.7	360	182
Propane	4254	42.6	207	97
Propylene	4557	45.6	198	92
Refrigerant 12	4012	40.1	234	112
Refrigerant 22	4915	49.2	207	97
Sulfur dioxide	7873	78.8	315	157
Water	22104	221.0	705	374

Physical properties of gases

Fluid	Density kg·m <sup>-3</sup> (0°C, 101325 Pa)	Gravity Air = 1	Gravity Oxygen = 1	Molecular weight
Acetylene	1.173	0.9073	0.8208	26.04
Air	1.2929	1.0000	.9047	28.97
Ammonia	.7710	.5963	.5395	17.03
Argon	1.7837	1.3796	1.2482	39.944
Arsenic fluoride	7.71*	5.96*	5.40*	169.91
Arsenic hydride	3.484*	2.695*	2.438*	76.93
Boron fluoride	2.99*	2.31*	2.09*	61.82
Butane (n)	2.5190*	2.0854*	1.8868*	58.12
Butane, iso	2.673	2.067	1.870	58.12
Carbon dioxide	1.9769	1.5290	1.3834	44.01
Carbon monoxide	1.2504	.9671	.8750	28.01
Carbon oxysulfide	2.72	2.10	1.90	60.07
Chlorine	3.214	2.486	2.249	70.91
Chlorine dioxide	3.0911	2.3911	2.1611	67.46
Chlorine monoxide	3.89	3.01	2.72	86.91
Cyanogen	2.335*	1.806	1.634*	52.04
Dimethylamine	1.96617	1.52117	1.37617	45.08
Ethane	1.3566	1.0493	.9493	30.07
Ethylene	1.2604	.9749	.8820	28.05
Fluorine	1.696	1.312	1.187	38.00
Germanium hydride (digermane)	6.7420	5.2120	4.7220	151.25
Germanium tetrahydride	3.420	2.645	2.393	76.63
Helium	.17847	.13804	.12489	4.003
Hydrogen	.08988	.06952	.06290	2.016
Hydrogen bromide	3.6445	2.8189	2.5503	80.92
Hydrogen chloride	1.6392	1.2678	1.1471	36.47
Hydrogen iodide	5.7891	4.4776	4.0510	127.93
Hydrogen selenide	3.670	2.839	2.568	80.98
Hydrogen sulfide	1.539	1.190	1.077	34.08
Hydrogen telluride	5.81	4.49	4.07	129.63
Krypton	3.708	2.868	2.595	83.70
Methane	.7168	.5544	.5016	16.04
Methylamine	1.396	1.080	.9769	31.06
Methyl chloride	2.3076	1.7848	1.6148	50.49
Methyl ether	2.1098	1.6318	1.4764	46.07
Methyl fluoride	1.5452	1.1951	1.0813	34.03
Neon	.90036	.69638	.63004	20.18
Nitric oxide	1.3402	1.0366	.9378	30.01

Physical properties of gases

Fluid	Density kg·m <sup>-3</sup> (0°C, 101325 Pa)	Gravity Air = 1	Gravity Oxygen = 1	Molecular weight
Nitrogen	1.25055	.96724	.87510	28.02
Nitrogen (atm.)	1.2568	.9721	.8795	—
Nitrosyl chloride	2.992	2.314	2.094	65.47
Nitrosyl fluoride	2.176*	1.683*	1.523*	49.01
Nitrous oxide	1.9778	1.5297	1.3840	44.02
Nitroxyl chloride	2.57*	1.99*	1.798*	81.47
Nitroxyl fluoride	2.90	2.24	2.03	65.01
Oxygen	1.42904	1.10527	1.0000	32.00
Ozone	2.144	1.658	1.500	48.00
Phosphine	1.5294	1.1829	1.0702	34.00
Phosphorus fluoride	3.907*	3.022*	2.734*	87.98
Phosphorus oxyfluoride	4.8	3.7	3.4	103.98
Phosphorus pentafluoride	5.81	4.494	4.066	125.98
Propane	2.0096	1.554	1.407	44.09
Radon	9.73	7.526	6.809	222.00
Silicane, chloro-	3.03	2.34	2.12	66.54
Silicane, chloromethyl	3.64	2.82	2.55	80.60
Silicane, dichloromethyl	5.3	4.1	3.7	115.02
Silicane, dimethyl	2.73	2.11	1.91	60.14
Silicane, methyl	2.08	1.61	1.46	46.12
Silicane, trifluoro-	3.86	2.99	2.70	86.07
Silicon fluoride	4.684	3.623	3.278	104.06
Silicon hexahydride	2.85	2.204	1.994	62.17
Silicon tetrahydride	1.44	1.114	1.008	32.09
Stibine (15° C, 754A)	5.30	4.10	3.71	125.00
Sulfur dioxide	2.9269	2.2638	2.0482	64.07
Sulfur fluoride	6.50*	5.03*	4.55*	146.07
Sulfuric oxyfluoride	3.72*	2.88*	2.60*	102.07
Trimethylamine	2.580	1.996	1.085	59.11
Trimethyl boron	2.52	1.95	1.76	55.92
Tungsten fluoride	12.9	9.98	9.03	297.92
Xenon	5.851	4.525	4.094	131.30

\* Density at 20°C.

Physical properties of water

Water temperature		Vapour pressure	Gravitational weight	Gravity
°C	°F	kPaA	kgf/m <sup>3</sup>	
0	32	0.6107	999.87	1.00
4	40	0.8385	1000.1	1.00
10	50	1.2268	999.81	1.00
16	60	1.7656	999.18	1.00
21	70	2.5020	998.13	1.00
27	80	3.4353	996.76	1.00
32	90	4.8129	995.10	1.00
38	100	6.5440	993.18	.99
43	110	8.7899	991.03	.99
49	120	11.6699	988.65	.99
54	130	15.3258	986.03	.99
60	140	19.9183	983.24	.98
66	150	25.6346	980.23	.98
71	160	32.6875	977.12	.98
77	170	41.3135	973.81	.97
82	180	51.7811	971.32	.97
88	190	64.3905	966.69	.97
93	200	79.4613	962.91	.96
99	210	97.3653	959.00	.96
100	212	101.313	958.19	.96
104	220	117.994	955.00	.96
116	240	172.136	946.48	.95
127	260	244.235	937.44	.94
138	280	339.192	927.94	.93
149	300	461.942	918.06	.92
177	350	927.974	890.49	.89
204	400	1704.59	859.44	.86
232	450	2913.07	824.50	.82
260	500	4694.25	784.15	.78
288	550	7207.3	736.22	.74
316	600	10639.2	677.66	.68
343	650	15224.8	599.04	.60
371	700	21332.4	437.46	.44

Saturated steam (Based on temperature)

Temp. °C	Pressure P		Specific volume m³/kg	
	kPaA	mmHg	V'	V''
0	0.61	4.6	0.00100022	206.305
2	0.71	5.3	0.00100009	179.923
4	0.81	6.1	0.00100003	157.272
6	0.93	7.0	0.00100004	137.780
8	1.07	8.0	0.00100011	120.966
10	1.23	9.2	0.00100025	106.430
12	1.40	10.5	0.00100044	93.8354
14	1.60	12.0	0.00100069	82.8998
16	1.82	13.6	0.00100099	73.3843
18	2.06	15.5	0.00100133	65.0873
20	2.34	17.5	0.00100172	57.8383
22	2.64	19.8	0.00100216	51.4923
24	2.98	22.4	0.00100263	45.9260
26	3.36	25.2	0.00100315	41.0343
28	3.78	28.3	0.00100371	36.7276
30	4.24	31.8	0.00100431	32.9288
32	4.26	35.7	0.00100493	29.5724
34	5.32	39.9	0.00100560	26.6014
36	5.94	44.6	0.00100631	23.9671
38	6.62	49.7	0.00100704	21.6274
40	7.37	55.3	0.00100781	19.5461
42	8.20	61.1	0.00100861	17.6916
44	9.10	68.3	0.00100943	16.0365
46	10.09	75.6	0.00101030	14.5572
48	11.16	83.7	0.00101119	13.2329
50	12.33	92.5	0.00101211	12.0547
55	15.74	118.1	0.00101454	9.57887
60	19.92	149.4	0.00101714	7.67854
65	25.01	187.6	0.00101991	6.20228
70	31.16	233.7	0.00102285	5.04627
75	38.55	289.1	0.00102594	4.13410
80	47.36	355.2	0.00102919	3.40909
85	57.80	433.6	0.00103259	2.82881
90	70.10	525.9	0.00103614	2.36130
95	84.52	634.0	0.00103985	1.98222
100	101.32	760.0	0.00104371	1.67300
105	120.79	906.1	0.00104771	1.41928
110	143.26	1074.6	0.00105187	1.20994
120	198.53	1489.2	0.00106063	0.891524
130	270.12	2026.2	0.00107002	0.668136
140	361.35	2710.6	0.00108006	0.508494
150	475.96		0.00109078	0.392447
160	618.02		0.00110222	0.306756
170	791.97		0.00111445	0.242553
180	1002.57		0.00112752	0.193800
190	1255.07		0.00114150	0.156316
200	1554.74		0.00115649	0.127160
210	1907.66		0.00117260	0.104239
220	2319.71		0.00118995	0.0860378
230	2797.46		0.00120872	0.0714498
240	3347.57		0.00122908	0.0596544
250	3977.31		0.00125129	0.0500374
260	4694.03		0.00127563	0.0421338
270	5505.48		0.00130250	0.0355880
280	6419.79		0.00133239	0.0301260
290	7445.60		0.00136594	0.0255351
300	8592.12		0.00140406	0.0216487
310	9869.74		0.00144797	0.0183339
320	11288.67		0.00149950	0.0154798
330	12861.55		0.00156147	0.0129894
340	14604.08		0.00163871	0.0107804
350	16533.90		0.00174112	0.0087991
360	18673.57		0.0018959	0.0069398
370	21052.50		0.0022136	0.0049727
374.15	22118.41		0.0031700	0.0031700

Saturated steam (Based on pressure)

Pressure P		Temp. °C	Specific volume m³/kg	
kPaA	mmHg		V'	V''
0.98	7.4	6.699	0.00100006	131.62401
1.96	14.7	17.204	0.00100119	68.2556
3.92	29.4	28.645	0.00100390	35.4496
5.88	44.1	35.83	0.00100625	24.1820
7.84	58.8	41.16	0.00100872	18.4405
9.81	73.6	45.45	0.00101006	14.9467
19.61	147.1	59.66	0.00101696	7.79127
29.42	220.7	68.68	0.00102206	5.32592
39.22	294.2	75.42	0.00102621	4.06715
49.03	367.8	80.86	0.00102976	3.30001
58.84	441.3	85.45	0.00103291	2.78214
78.45	588.4	92.99	0.00103834	2.12544
98.06	735.6	99.09	0.00104299	1.72495
101.32	760.0	100.00	0.00104371	1.67300
147.09	1103.3	110.79	0.00105253	1.18041
196.12	1471.1	119.61	0.00106028	0.901776
294.18	2206.7	132.88	0.00107284	0.616754
392.24	2942.2	142.92	0.00108312	0.470785
490.30	3677.8	151.11	0.00109202	0.381632
588.36	4413.4	158.08	0.00109997	0.321345
686.42		164.17	0.00110723	0.277768
784.48		169.61	0.00111396	0.244751
882.54		174.53	0.00112026	0.218840
980.60		179.04	0.00112622	0.197945
1176.72		187.08	0.00113732	0.166284
1372.84		194.13	0.00114757	0.143394
1568.96		200.43	0.00115717	0.126047
1765.08		206.15	0.00116525	0.112434
1961.20		211.39	0.00117493	0.101455
2157.32		216.24	0.00118327	0.0924081
2353.44		220.76	0.00119133	0.0848196
2549.56		224.9	0.00119913	0.0783601
2745.68		228.98	0.00120674	0.0727929
2941.80		232.76	0.00121417	0.0679431
3137.92		236.35	0.00122145	0.0636793
3334.04		239.77	0.00122859	0.0599001
3530.16		243.04	0.00123562	0.0565266
3726.28		246.17	0.00124255	0.0534959
3922.40		249.18	0.00124938	0.0507578
4118.52		252.07	0.00125615	0.0482713
4314.64		254.86	0.00126284	0.0460028
4510.76		257.56	0.00126947	0.0439246
4706.88		260.17	0.00127606	0.0420132
4903.0		262.69	0.00128260	0.0402491
5393.3		268.69	0.00129882	0.0363798
5883.6		274.28	0.00131489	0.0331317
6373.9		279.53	0.00133089	0.0303641
6864.2		284.47	0.00134689	0.0279761
7844.8		293.61	0.00137912	0.0240593
8825.4		301.91	0.00141194	0.0209758
9806.0		309.53	0.00144575	0.0184791
10786.6		316.58	0.00148088	0.0164099
11767.2		323.15	0.00151774	0.0146594
12747.8		329.31	0.00155677	0.0131514
13728.4		335.10	0.00159853	0.0118316
14709.0		340.57	0.00164374	0.0106617
15689.6		345.75	0.00169345	0.0096151
16670.2		350.67	0.0017491	0.0086722
17650.8		355.35	0.0018139	0.0077945
18631.4		359.81	0.0018921	0.0069743
19612.0		364.07	0.0019902	0.0061872
20592.6		368.15	0.0021242	0.0053845
21573.2		372.05	0.0023668	0.0044231
22118.41		374.15	0.0031700	0.0031700

This data is provided by the Japan Mechanical Society.

# Flange Standards

Nominal pressure 5K steel flange reference dimensions (JIS B2238-1996)

Nominal diameter		Flange outer diameter (mm)	Thickness (mm)	Bolt hole			Bolt nominal screw designation
mm	inch			Center diameter (mm)	Number	Diameter (mm)	
40	1 1/2	120	12	95	4	15	M12
50	2	130	14	105	4	15	M12
65	2 1/2	155	14	130	4	15	M12
80	3	180	14	145	4	19	M16
100	4	200	16	165	8	19	M16
125	5	235	16	200	8	19	M16
150	6	265	18	230	8	19	M16
200	8	320	20	280	8	23	M20
250	10	385	22	345	12	23	M20
300	12	430	22	390	12	23	M20
350	14	480	24	435	12	25	M22
400	16	540	24	495	16	25	M22
450	18	605	24	555	16	25	M22
500	20	655	24	605	20	25	M22
550	22	720	26	665	20	27	M24
600	24	770	26	715	20	27	M24
650	26	825	26	770	24	27	M24
700	28	875	26	820	24	27	M24
750	30	945	28	880	24	33	M30
800	32	995	28	930	24	33	M30
850	34	1045	28	980	24	33	M30
900	36	1095	30	1030	24	33	M30
1000	40	1195	32	1130	28	33	M30
1100	44	1305	32	1240	28	33	M30
1200	48	1420	34	1350	32	33	M30
1350	54	1575	34	1505	32	33	M30

Nominal pressure 10K steel flange reference dimensions (JIS B2238-1996)

Nominal diameter		Flange outer diameter (mm)	Thickness (mm)	Bolt hole			Bolt nominal screw designation
mm	inch			Center diameter (mm)	Number	Diameter (mm)	
40	1 1/2	140	16	105	4	19	M16
50	2	155	16	120	4	19	M16
65	2 1/2	175	18	140	4	19	M16
80	3	185	18	150	8	19	M16
100	4	210	18	175	8	19	M16
125	5	250	20	210	8	23	M20
150	6	280	22	240	8	23	M20
200	8	330	22	290	12	23	M20
250	10	400	24	355	12	25	M22
300	12	445	24	400	16	25	M22
350	14	490	26	445	16	25	M22
400	16	560	28	510	16	27	M24
450	18	620	30	565	20	27	M24
500	20	675	30	620	20	27	M24
550	22	745	32	680	20	33	M30
600	24	795	32	730	24	33	M30
650	26	845	34	780	24	33	M30
700	28	905	34	840	24	33	M30
750	30	970	36	900	24	33	M30
800	32	1020	36	950	28	33	M30
850	34	1070	36	1000	28	33	M30
900	36	1120	38	1050	28	33	M30
1000	40	1235	40	1160	28	39	M36
1100	44	1345	42	1270	28	39	M36
1200	48	1465	44	1380	32	39	M36
1350	54	1630	48	1540	36	45	M42

**Nominal pressure 16K steel flange reference dimensions (JIS B2238-1996)**

Nominal diameter		Flange outer diameter (mm)	Thickness (mm)	Bolt hole			Bolt nominal screw designation
mm	inch			Center diameter (mm)	Number	Diameter (mm)	
40	1 1/2	140	16	105	4	19	M16
50	2	155	16	120	8	19	M16
65	2 1/2	175	18	140	8	19	M16
80	3	200	20	160	8	23	M20
100	4	225	22	185	8	23	M20
125	5	270	22	225	8	25	M22
150	6	305	24	260	12	25	M22
200	8	350	26	305	12	25	M22
250	10	430	28	380	12	27	M24
300	12	480	30	430	16	27	M24
350	14	540	34	480	16	33	M30×3
400	16	605	38	540	16	33	M30×3
450	18	675	40	605	20	33	M30×3
500	20	730	42	660	20	33	M30×3
600	24	845	46	770	24	39	M36×3

**Nominal pressure 20K steel flange reference dimensions (JIS B2238-1996)**

Nominal diameter		Flange outer diameter (mm)	Thickness (mm)	Bolt hole			Bolt nominal screw designation
mm	inch			Center diameter (mm)	Number	Diameter (mm)	
40	1 1/2	140	18	105	4	19	M16
50	2	155	18	120	8	19	M16
65	2 1/2	175	20	140	8	19	M16
80	3	200	22	160	8	23	M20
100	4	225	24	185	8	23	M20
125	5	270	26	225	8	25	M22
150	6	305	28	260	12	25	M22
200	8	350	30	305	12	25	M22
250	10	430	34	380	12	27	M24
300	12	480	36	430	16	27	M24
350	14	540	40	480	16	33	M30×3
400	16	605	46	540	16	33	M30×3
450	18	675	48	605	20	33	M30×3
500	20	730	50	660	20	33	M30×3
600	24	845	54	770	24	39	M36×3

**Nominal pressure 30K steel flange reference dimensions (JIS B2238-1996)**

Nominal diameter		Flange outer diameter (mm)	Thickness (mm)	Bolt hole			Bolt nominal screw designation
mm	inch			Center diameter (mm)	Number	Diameter (mm)	
50	2	165	22	130	8	19	M16
65	2 1/2	200	26	160	8	23	M20
80	3	210	28	170	8	23	M20
100	4	240	32	195	8	25	M22
125	5	275	36	230	8	25	M22
150	6	325	38	275	12	27	M24
200	8	370	42	320	12	27	M24
250	10	450	48	390	12	33	M30×3
300	12	515	52	450	16	33	M30×3

**ASME class 150 steel flange reference dimensions (ASME B16.5-2009)**

Nominal diameter		Flange outer diameter (mm)	Thickness (mm)	Bolt hole			Bolt nominal screw designation
mm	inch			Center diameter (mm)	Number	Diameter (mm)	
40	1 1/2	125	17.5	98.4	4	16	U1/2-13UNC
50	2	150	19.1	120.7	4	20	U5/8-11UNC
65	2 1/2	180	22.3	139.7	4	20	U5/8-11UNC
80	3	190	23.9	152.4	4	20	U5/8-11UNC
100	4	230	23.9	190.5	8	20	U5/8-11UNC
125	5	255	23.9	215.9	8	23	U3/4-10UNC
150	6	280	25.4	241.3	8	23	U3/4-10UNC
200	8	345	28.6	298.5	8	23	U3/4-10UNC
250	10	405	30.2	362.0	12	26	U7/8- 9UNC
300	12	485	31.8	431.8	12	26	U7/8- 9UNC
350	14	535	35.0	476.2	12	29	U1 - 8UNC
400	16	595	36.6	539.8	16	29	U1 - 8UNC
450	18	635	39.7	577.9	16	32	U1 1/8-8UN
500	20	700	42.9	635.0	20	32	U1 1/8-8UN
600	24	815	47.7	749.3	20	35	U1 1/4-8UN

**ASME class 150 steel flange reference dimensions (ASME B16.5-2009)**

Nominal diameter		Flange outer diameter (mm)	Thickness (mm)	Bolt hole			Bolt nominal screw designation
mm	inch			Center diameter (mm)	Number	Diameter (mm)	
50	2	165	22.3	127.0	8	20	U5/8-11UNC
65	2 1/2	190	25.4	149.2	8	23	U3/4-10UNC
80	3	210	28.6	168.3	8	23	U3/4-10UNC
100	4	255	31.8	200.0	8	23	U3/4-10UNC
125	5	280	35.0	235.0	8	23	U3/4-10UNC
150	6	320	36.6	269.9	12	23	U3/4-10UNC
200	8	380	41.3	330.2	12	26	U7/8- 9UNC
250	10	445	47.7	387.4	16	29	U1 - 8UNC
300	12	520	50.8	450.8	16	32	U1 1/8-8UN





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