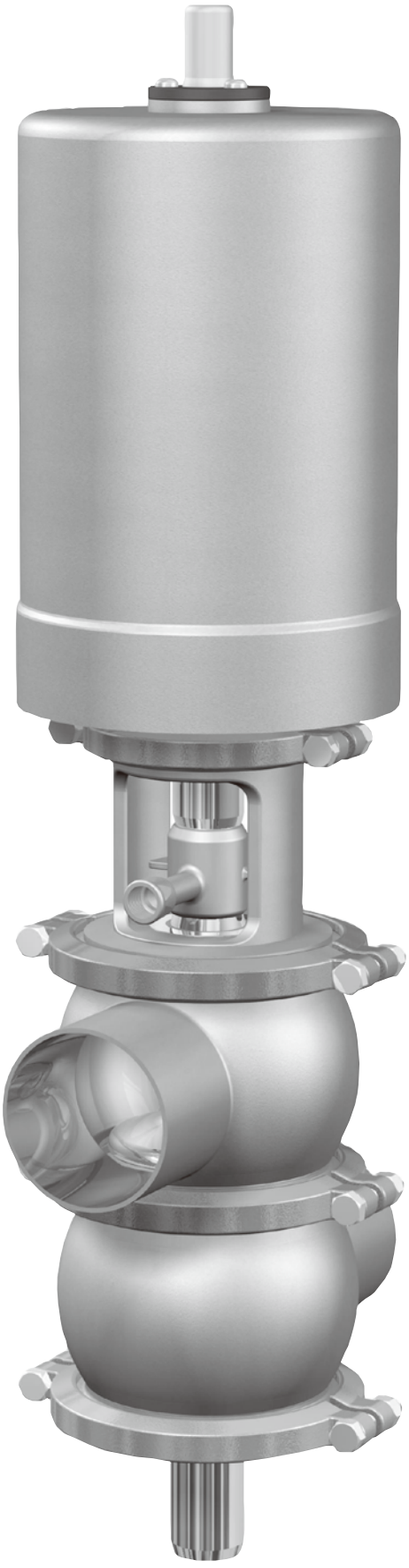
Hygienic

Double Seal Sequence Valves

1

High reliability products derived from advanced technologies



Recently, the importance of quality control in the field of food, brewing, dairy, pharmaceutical has been increasing. In addition, those facilities are getting larger and larger in line with increasing demand. And it has become difficult to sterilize and clean them fully with conventional disassembly cleaning methods. In order to solve this problem, CIP (cleaning in-place) has been applied and swing bend, butterfly valve, etc. are used to separate cleaning liquids from product liquid. Furthermore, labor saving by automation and semiautomation has been strongly promoted and contamination control requirements have been keenly raised; as a result, it has become and important to completely separate CIP cleaning liquid from and product liquid. The double-seal sequence valves have been developed to solve this issue. Our sequence valves have significant advantages in labor saving, facility space efficiency, quality control, running cost, etc. comparing with swing bend systems.

Material

SUS-304 (or equivalent)
SUS-316L (or equivalent)

Production standard

Surface finish	Internal: #320 to #400 buff polishing External: Beads shot blast
Dimensional tolerance	Surface-to-surface length: ±1.5mm Squareness: ±0.5°
Main body max pressure	1MPa (fluid pressure, normal temperature)
Valve seat max pressure	As shown in selection table on page 20 (fluid pressure, normal temperature)
Operating air pressure	As shown in selection table on page 20 (fluid pressure, normal temperature)
Operating air connection hole	Rc1/4
Heat resistance	Depending on packing materials. (As shown in characteristics table on page 20)

► Valve selection and ordering

Please use valves according to respective valve specifications. If an application exceeds the range of specifications, higher safety design is required.

► Ordering

○ If there is any request of surface finish, please specify both internal and external surface.

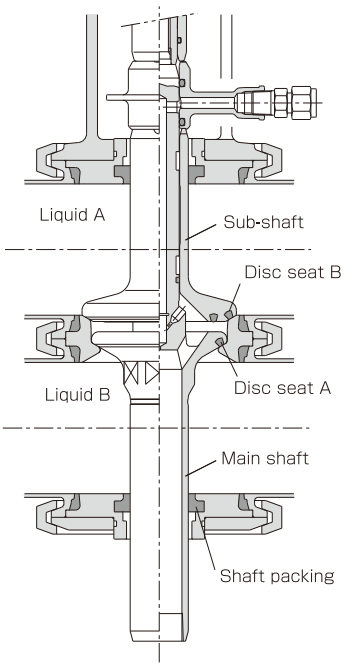
○ For further details, refer to the sequence valve type details on Page 21 to 22.

► Features of sequence valve

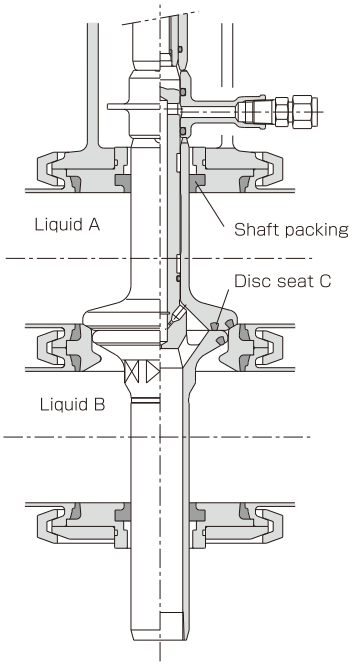
- ●A valve consists of a main shaft assembly and sub-shaft assembly. A space is provided between the main shaft seal part and the sub-shaft seal part to form a double-seal structure, If the seal packing is broken, the liquid will be discharged to the outside through the space. As a result, there is no risk of mixing two types of liquid.
- ●There is no pocket of liquid and air.
- ●Cylinders are selectable according to fluid pressure and operating pressure.
- ●Freedback switch which is small and light has high reliability.
- ●The packings which have high strength with excellent heat and chemical resistance and durability confirm to Food Sanitation Law.
- ●If the valve is used in condition such as liquid including slurry or dry operation, please pay attention to the maintenance cycle of the shaft packing.

► Operation illustration diagram (From closed to open)

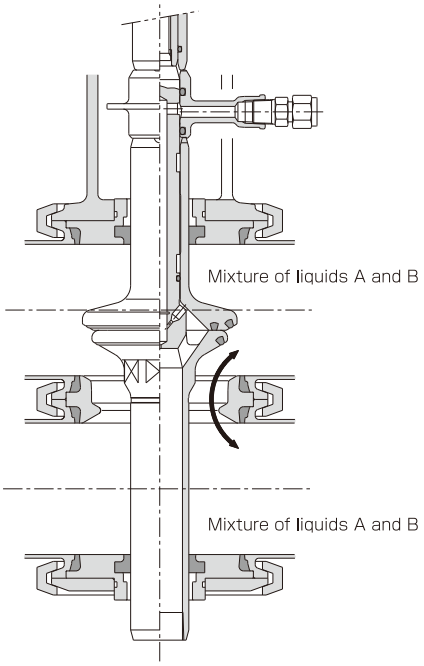
ON/OFF valve



The above diagram shows that valve fully closed and liquid A and B are double-sealed by disc seats A and B.



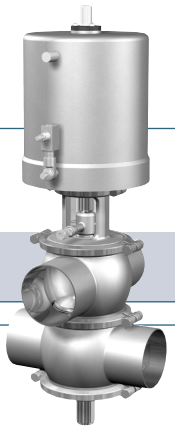
The above diagram shows the valve starts to open and the main shaft starts to move toward the upper part and the sub-shaft comes in close contact with the main shaft at disc seat C.



The above diagram shows the valve fully opened and the liquid can exchange between the lines.

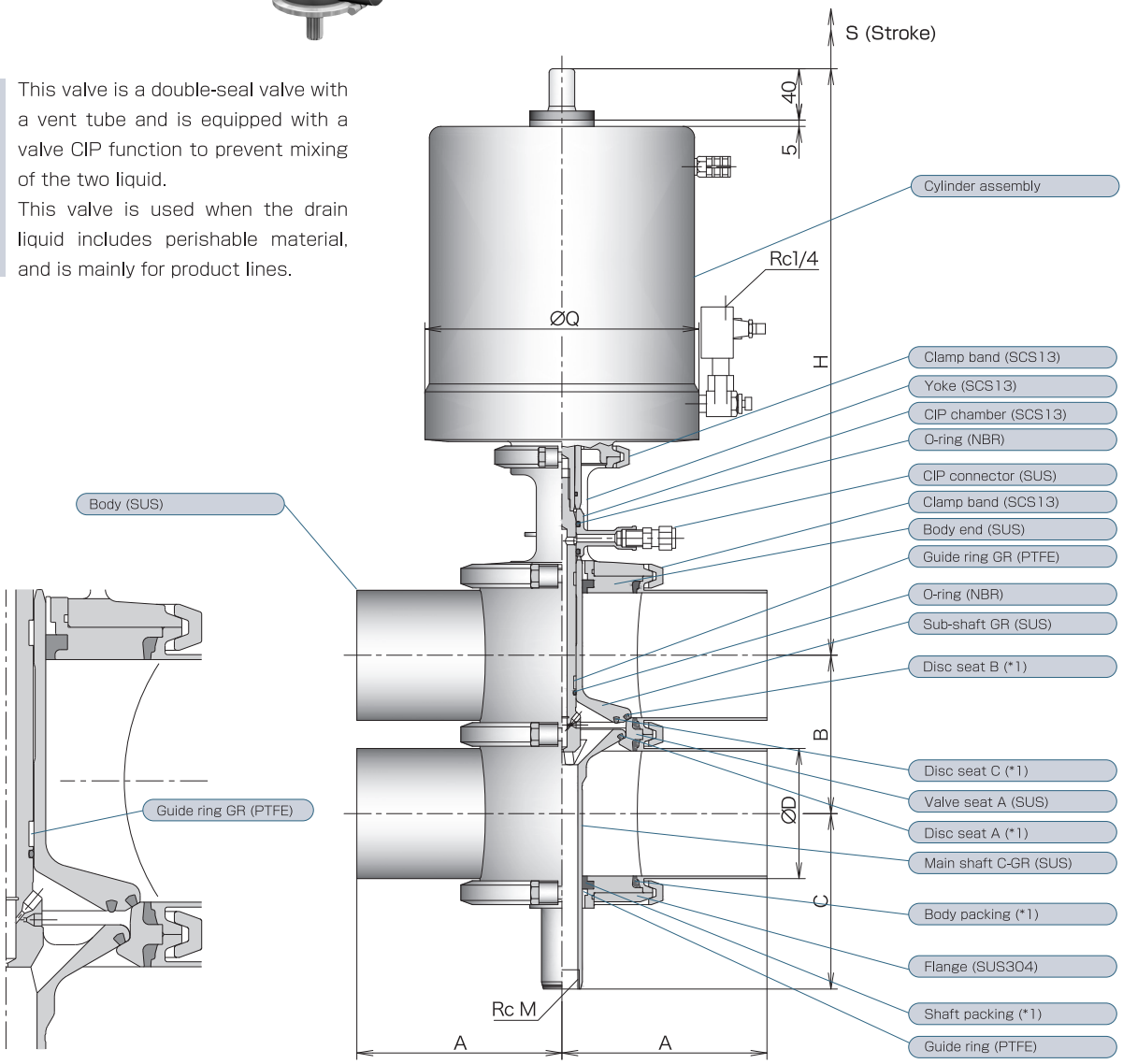
Double-seal valve

DU type



- ON/OFF valve
- Bottom-up type

This valve is a double-seal valve with a vent tube and is equipped with a valve CIP function to prevent mixing of the two liquid.
This valve is used when the drain liquid includes perishable material, and is mainly for product lines.



Close-up drawing of guide ring

Standard type

*1 Refer to "Characteristics of packings, etc." on Page 20.

(mm)

SIZE	φD	A Note)	B	C	H	M	Q	S
1 1/2	38.1	100	61.7	77	358.1	1/2	110.8	25
2	50.8	120	73.8	94	370.4	1/2	110.8	30
2 1/2	63.5	125	85.5	98	419.8	3/4	135.5	35
3	76.3	140	98.3	116	475.2	3/4	160.5	35
4	101.6	160	123.6	131	500.8	3/4	214.0	40
5	139.8	200	169.8	165	569.9	1	263.5	45
6	165.2	220	195.2	178	595.6	1	263.5	45

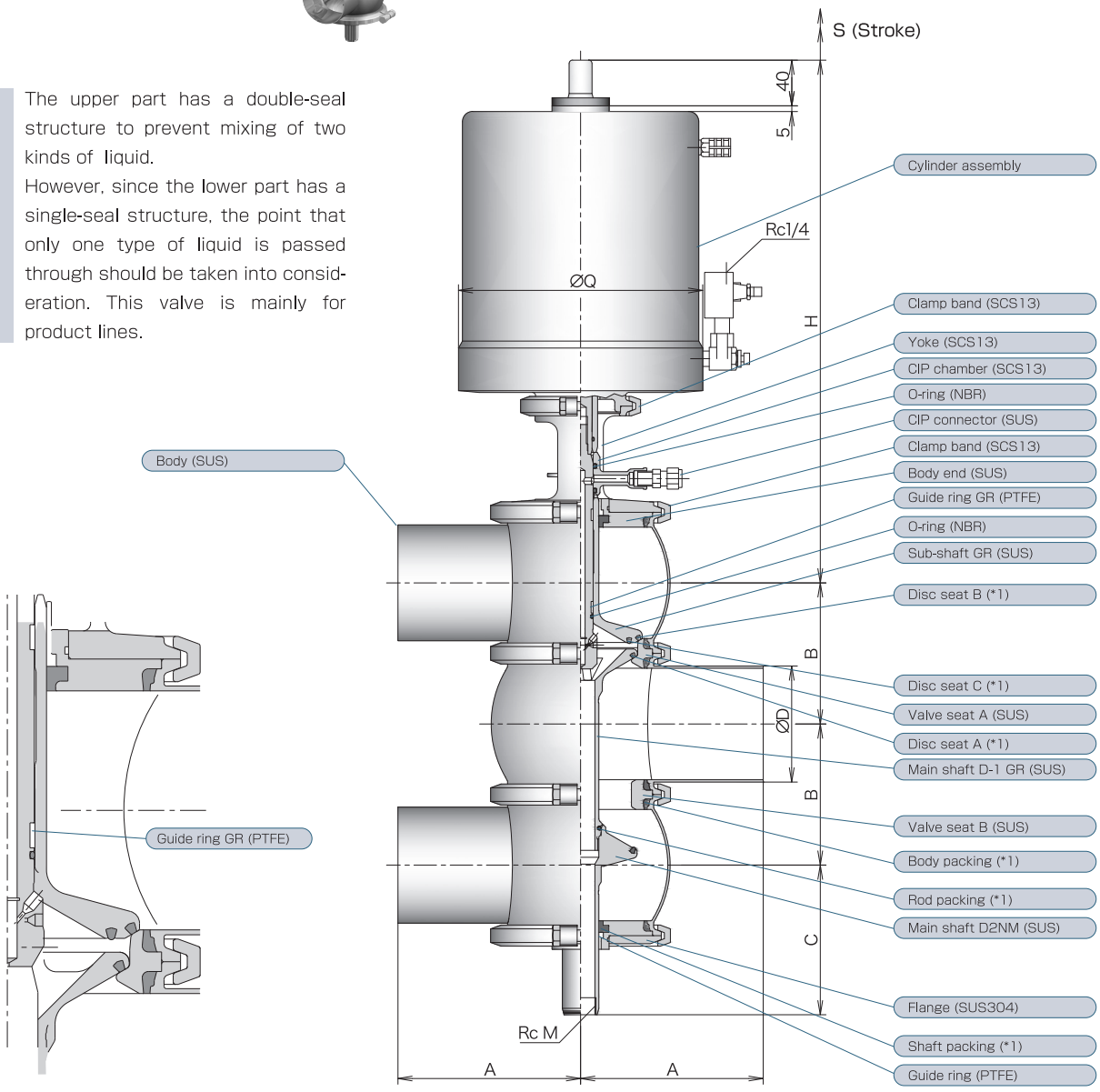
Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.

Double-seal valve

DU type

- Branch valve
- Bottom-up type

The upper part has a double-seal structure to prevent mixing of two kinds of liquid.
However, since the lower part has a single-seal structure, the point that only one type of liquid is passed through should be taken into consideration. This valve is mainly for product lines.



Close-up drawing of guide ring

Standard type

*1 Refer to "Characteristics of packings, etc." on Page 20

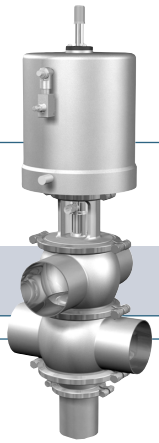
(mm)

SIZE	φD	A Note)	B	C	H	M	Q	S
1 1/2	38.1	100	61.7	77	358.1	1/2	110.8	20
2	50.8	120	73.8	94	370.4	1/2	110.8	25
2 1/2	63.5	125	85.5	98	419.8	3/4	135.5	30
3	76.3	140	98.3	116	475.2	3/4	160.5	30
4	101.6	160	123.6	131	500.8	3/4	214.0	35
5	139.8	200	169.8	165	569.9	1	263.5	38
6	165.2	220	195.2	178	595.6	1	263.5	38

Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.

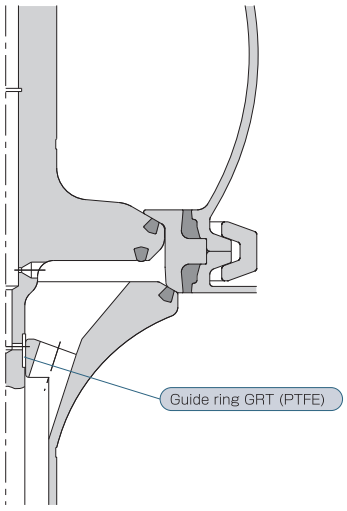
Double-seal valve

DD type

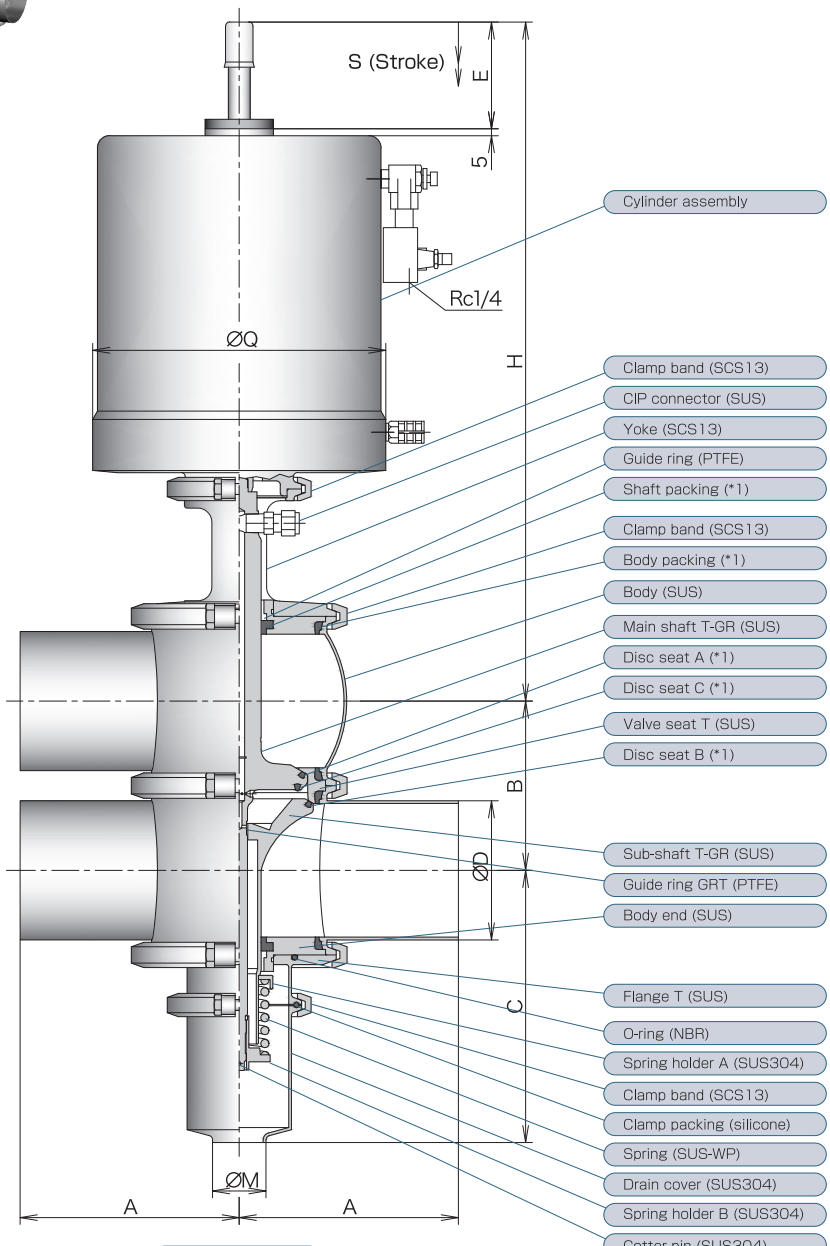


- ON/OFF valve
- Top-down type

This valve is a double-seal valve with a vent tube and is equipped with a valve CIP function to prevent mixing of the two liquid.
This valve is used when the drain liquid includes perishable material, and is mainly for product lines. This valve operates by top-down stroke.



Close-up drawing of guide ring



Standard type

*1 Refer to "Characteristics of packings, etc." on Page 20.

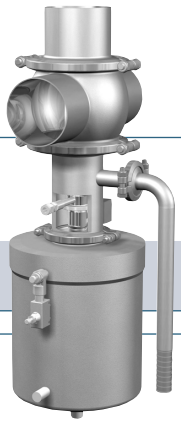
(mm)

SIZE	φD	A Note)	B	C	H	E	φM	Q	S
1 1/2	38.1	100	61.7	162	383.1	65	34	135.5	25
2	50.8	120	73.8	168	400.4	70	34	135.5	30
2 1/2	63.5	125	85.5	174	454.8	75	39	135.5	35
3	76.3	140	98.3	180	510.2	75	39	160.5	35
4	101.6	160	123.6	193	540.8	80	39	214.0	40
5	139.8	200	169.8	238	614.9	80	39	263.5	40
6	165.2	220	195.2	251	640.6	80	39	263.5	40

Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.

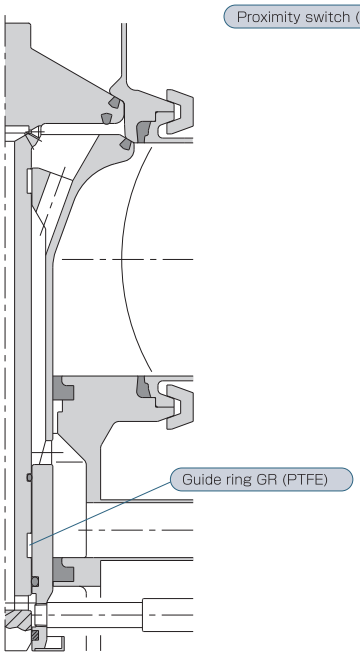
Double-seal valve

KU type

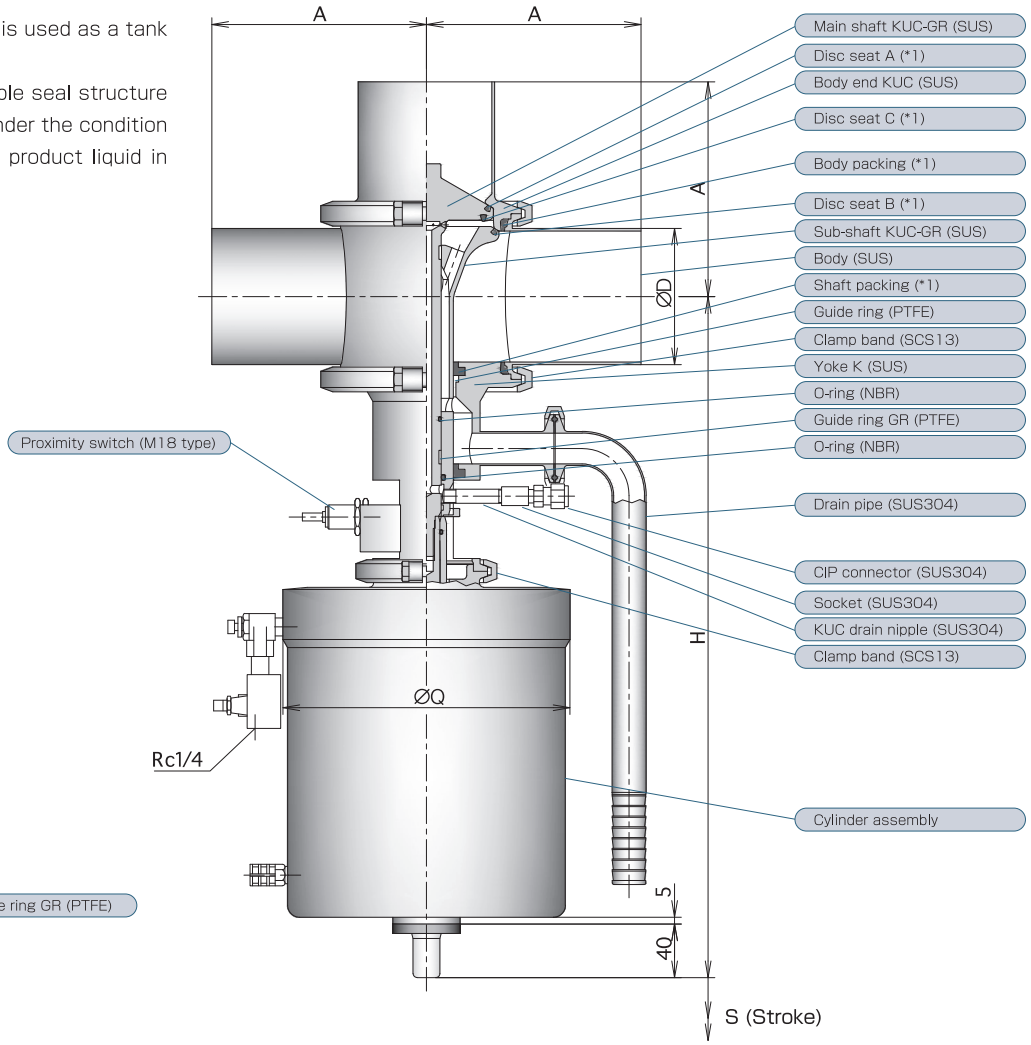


● Double-seal valve for tank bottom valve

This KU type valve is used as a tank bottom valve.
This valve has double seal structure and it allows CIP under the condition of being contained product liquid in the tank.



Close-up drawing of guide ring



Standard type

*1 Refer to "Characteristics of packings, etc." on Page 20.

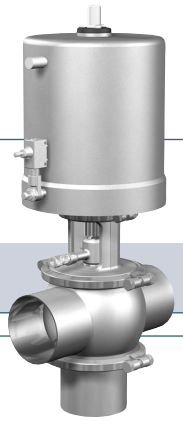
(mm)

SIZE	ϕD	A Note)	H	Q	S
1 1/2	38.1	100	369	110.8	25
2	50.8	120	395	110.8	30
2 1/2	63.5	125	438	135.5	35
3	76.3	140	487	160.5	35
4	101.6	160	500	214.0	40
5	139.8	200	554	263.5	45
6	165.2	220	567	263.5	45

Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.

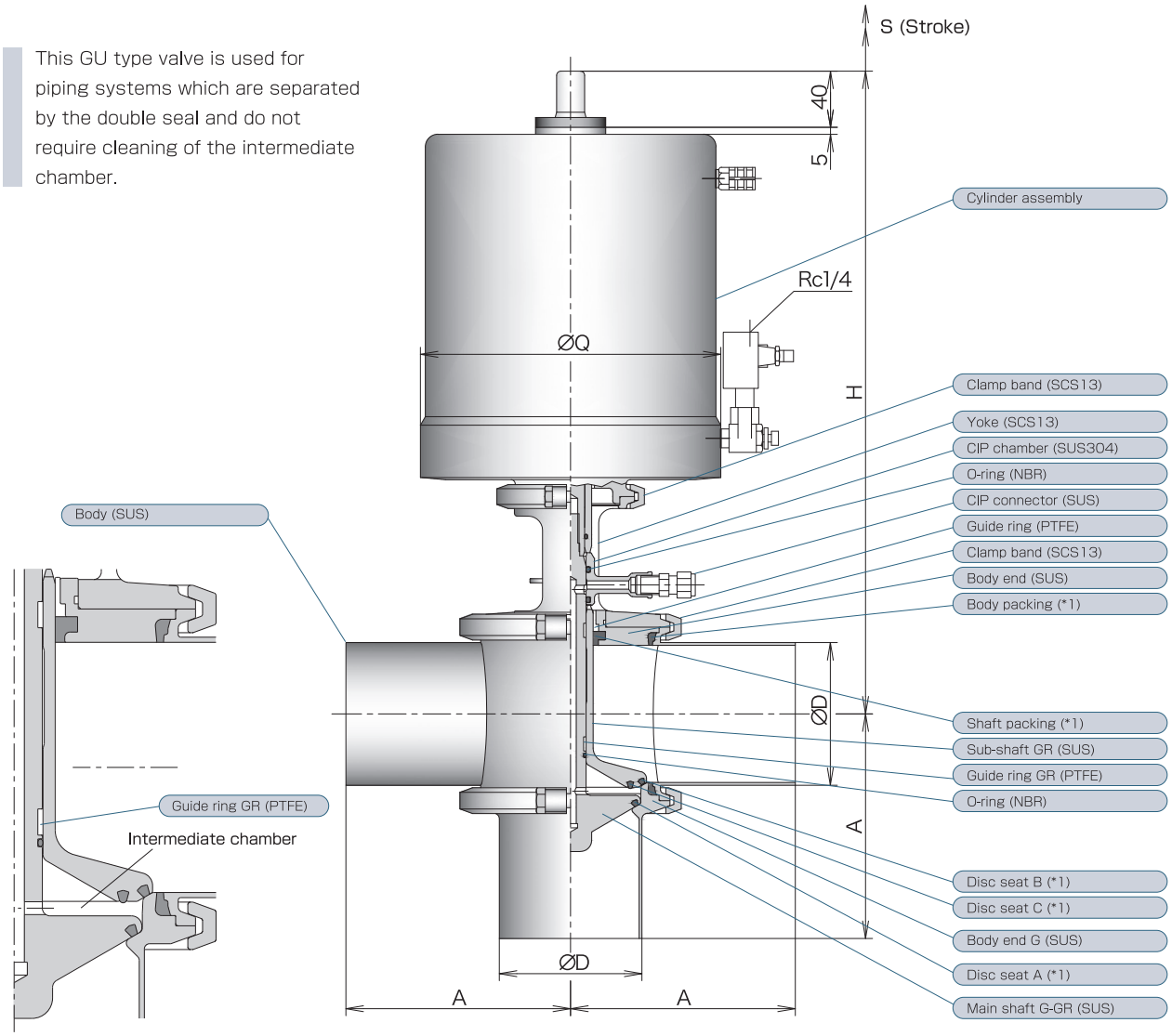
Double-seal valve

GU type



● Double-seal valve for gas

This GU type valve is used for piping systems which are separated by the double seal and do not require cleaning of the intermediate chamber.



Close-up drawing of guide ring

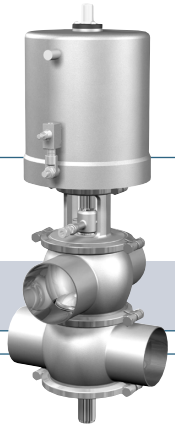
Standard type

(9) *1 Refer to "Characteristics of packings, etc." on Page 20.

(mm)

SIZE	φD	A Note)	H	Q	S
1 1/2	38.1	100	395.6	135.5	25
2	50.8	120	407.9	135.5	30
2 1/2	63.5	125	462.3	160.5	35
3	76.3	140	475.2	214.0	35
4	101.6	160	500.8	214.0	40
5	139.8	200	569.9	263.5	45
6	165.2	220	595.6	263.5	45

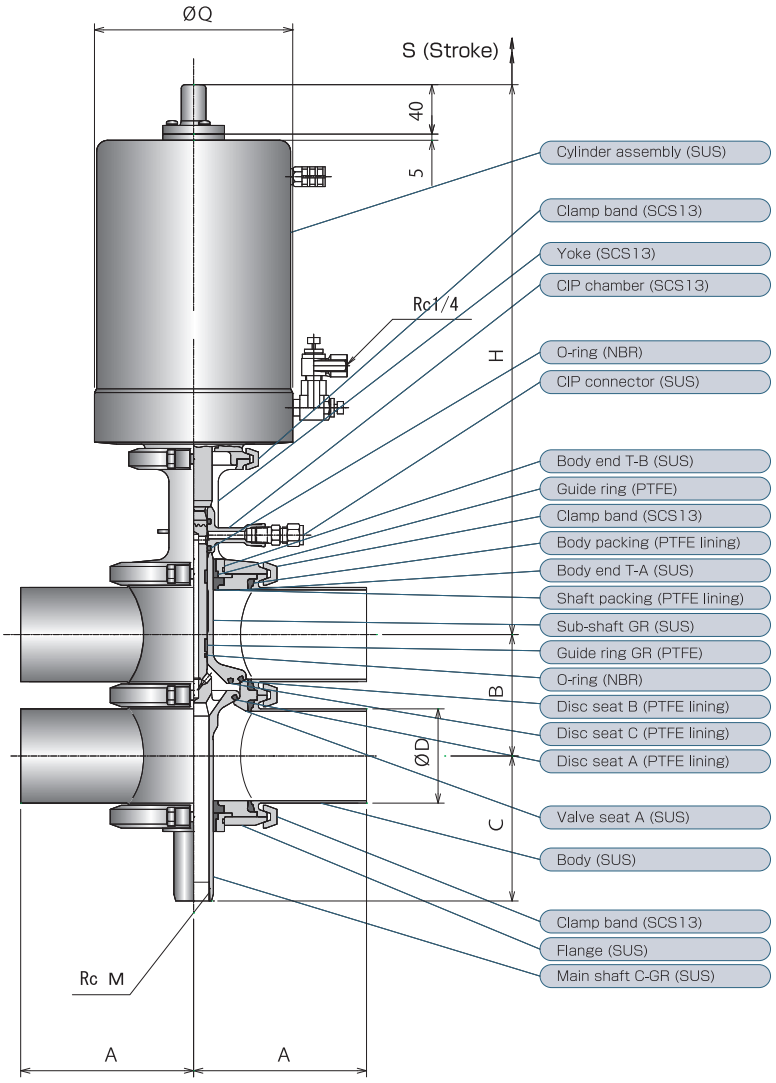
Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.



Double-seal valve

DU type

● Teflon lining specification
● ON/OFF valve ● Bottom-up type



(mm)

SIZE	φD	A Note)	B	C	H	M	Q	S
1 1/2	38.1	100	61.7	77	358.1	1/2	110.8	25
2	50.8	120	73.8	94	370.4	1/2	110.8	30
2 1/2	63.5	125	85.5	98	419.8	3/4	135.5	35
3	76.3	140	98.3	116	475.2	3/4	160.5	35

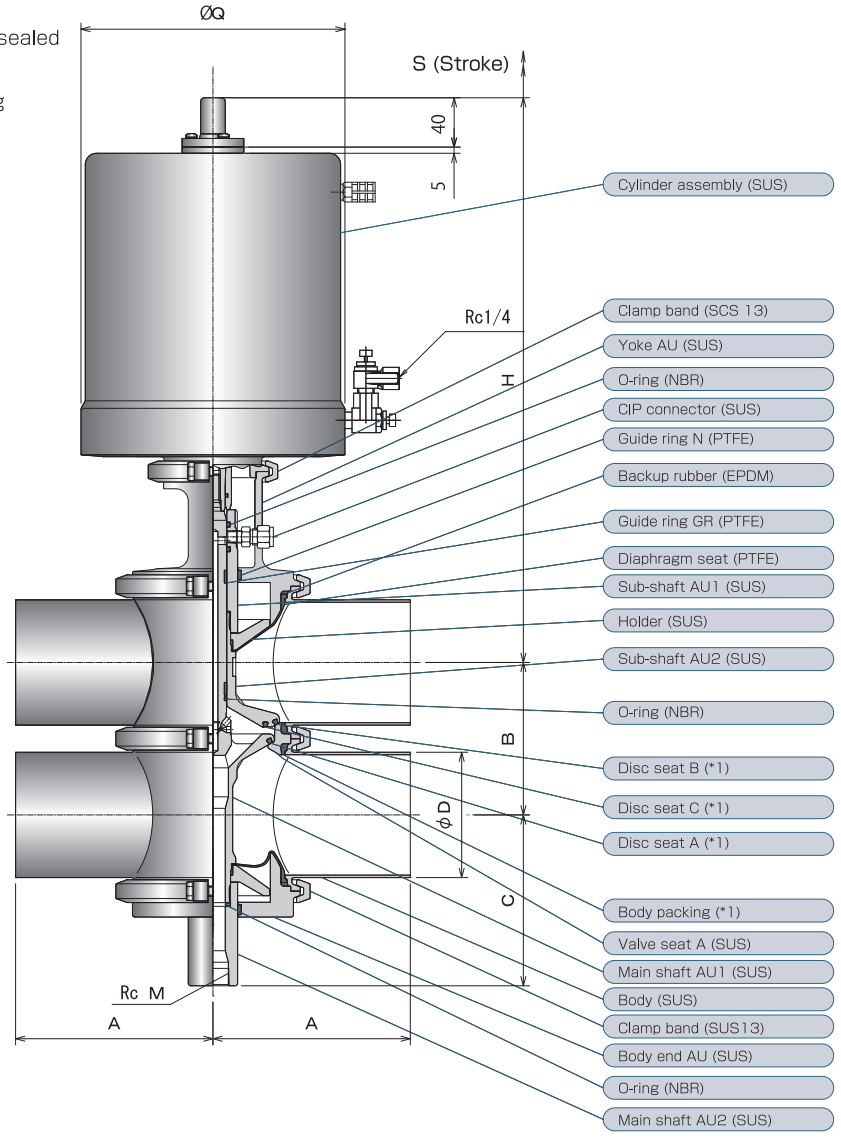
Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.

Double-seal valve

MUtype

- Diaphragm type ON/OFF valve
- Bottom-up type

This MU-type valve is a valve sealed with a PTFE diaphragm, which prevents contamination during operation of the valve.



(mm)

SIZE	ϕD	A Note)	B	C	H	M	Q	S
1 1/2	38.1	100	61.7	91.3	346.9	1/2	110.8	17
2	50.8	120	73.8	97.4	352.9	1/2	110.8	17
2 1/2	63.5	125	85.5	103.6	396.3	3/4	135.5	20
3	76.3	140	98.3	114.5	445.1	3/4	160.5	23
4	101.6	160	123.6	138.5	457.8	3/4	214.0	30
5	139.8	200	169.8	184.5	507.9	1	263.5	45
6	165.2	220	195.2	197.2	520.6	1	263.5	45

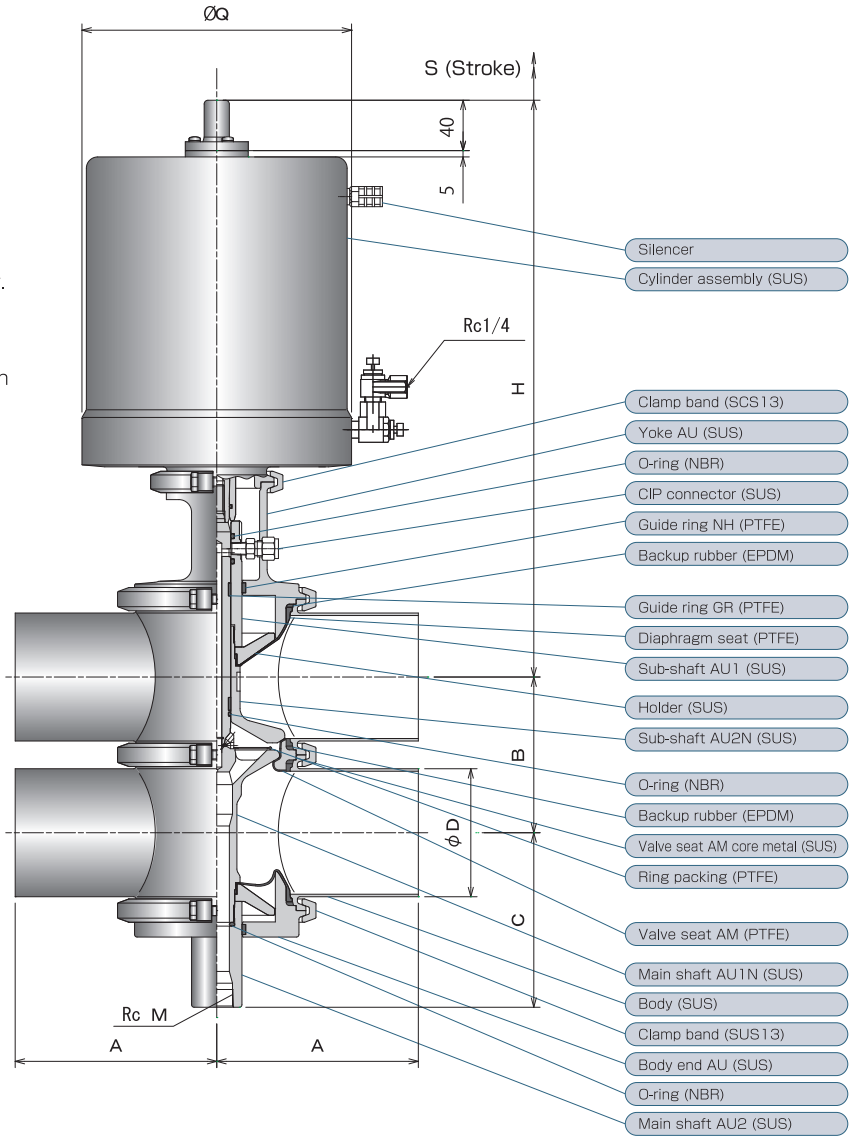
Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.

Disc-seat-less double-seal valve

NU type

- Disc-seat-less diaphragm type ON/OFF valve
- Bottom-up type

By omitting the disc seat groove, there is no seeping behind and this NU type valve does not need disc seat mounting work, which not only allows you to perform maintenance work to be performed more easily but also allows the maintenance interval to be extended significantly. Furthermore, shafts are sealed with PTFE diaphragm to prevent contamination even during operation of valves.
* This valve cannot be used for liquid containing hard solids.



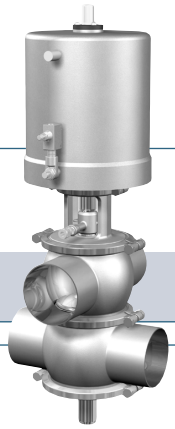
(mm)

SIZE	φD	A Note)	B	C	H	M	φQ	S
1 1/2	38.1	100	61.7	91.3	346.9	1/2	110.8	17
2	50.8	120	73.8	97.4	352.9	1/2	110.8	17
2 1/2	63.5	125	85.5	103.6	396.3	3/4	135.5	20
3	76.3	140	98.3	114.5	445.1	3/4	160.5	23
4	101.6	160	123.6	138.5	457.8	3/4	214.0	30

Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.
● For NU type, only same diameter sizes of 1 1/2 to 4S are available.

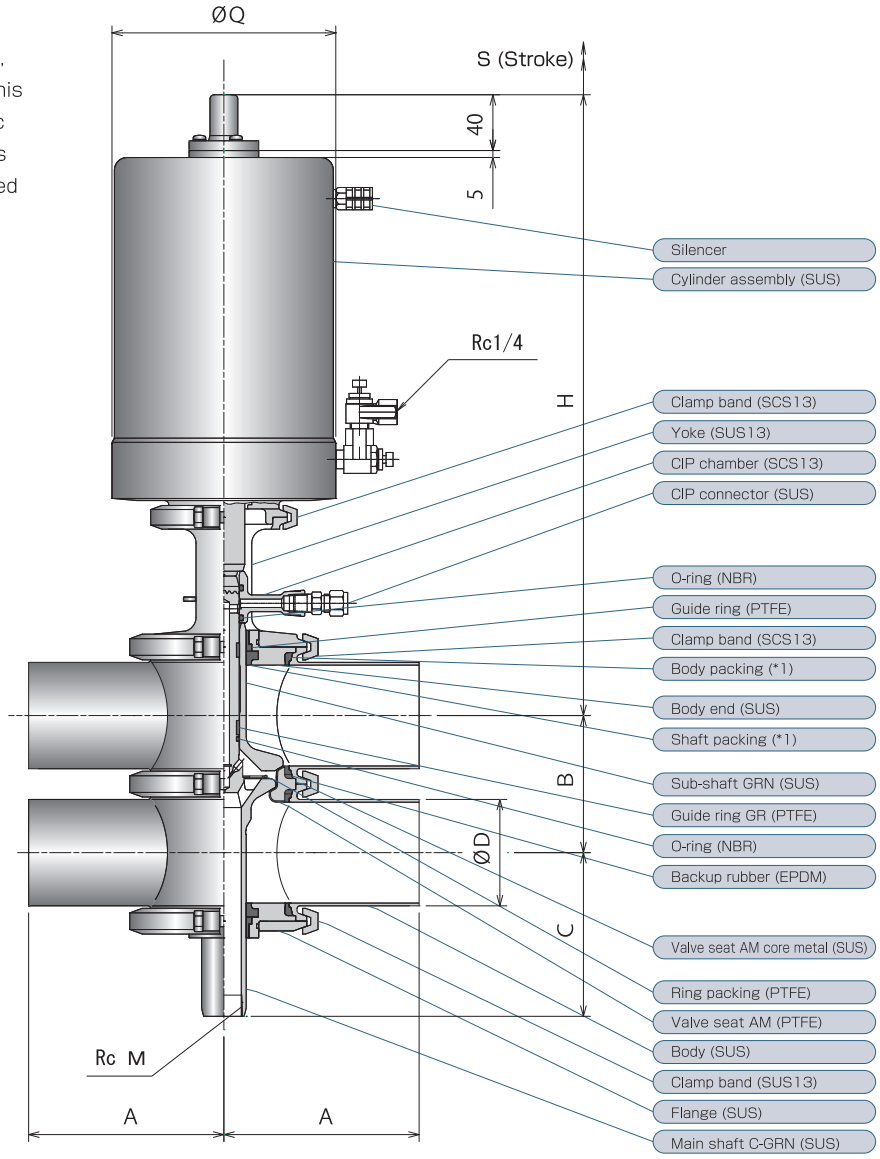
Disc-seat-less double-seal valve

LU type



- Disc-seat-less ON/OFF valve
- Bottom-up type

By omitting the disc seat groove, there is no seeping behind and this LU type valve does not need disc seat mounting work, which allows maintenance work to be performed more easily.
* This valve cannot be used for liquid containing hard solids.



*1 Refer to "Characteristics of packings, etc." on Page 20.

(mm)

SIZE	φD	A Note)	B	C	H	M	φQ	S
1 1/2	38.1	100	61.7	77	358.1	1/2	110.8	25
2	50.8	120	73.8	94	370.4	1/2	110.8	30
2 1/2	63.5	125	85.5	98	419.8	3/4	135.5	35
3	76.3	140	98.3	116	475.2	3/4	160.5	35
4	101.6	160	123.6	131	500.8	3/4	214.0	40

Note) ● When tube end is male, nut, clamp (1 1/2 to 4S), and sanitary flange (1 1/2 to 6S)
● Q and H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.
● For LU type, only same diameter sizes of 1 1/2 to 4S are available.

Option

Disc lifter

● Option symbol

L

This unit is attached and used for liquid including slurry, fiber components or highly viscous liquid. The seat surface can be cleaned directly with CIP liquid in the line. This unit is useful when CIP liquid will be flowed into only one line with the valve closed for long periods of time. The main shaft and sub-shaft can be independently lifted a few millimeters.

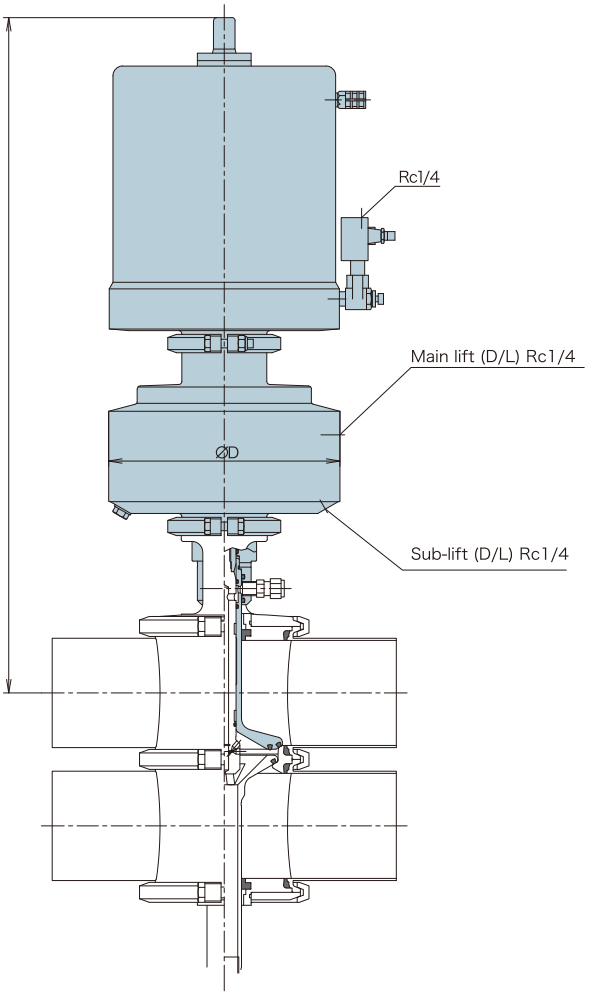
NOTE

- Lifting should be performed within 3 seconds.
- Only normal close (NC) type can be used.

(mm)

SIZE	φD	H
1 1/2	113	477
2	113	483
2 1/2	162	551
3	162	630
4	215	671
5	263	740
6	263	766

● H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.



Shaft lock

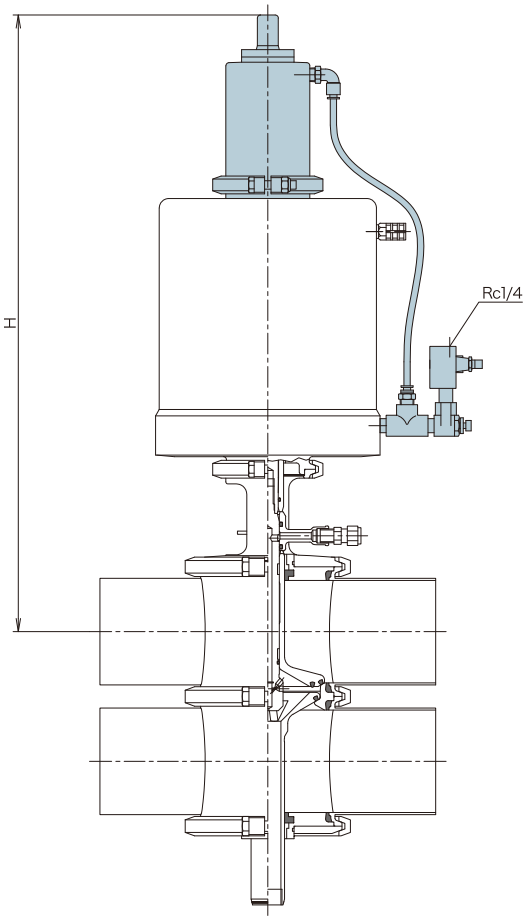
● Option symbol

S

If water hammer occurs in the downstream line, attaching a shaft lock prevents cross contamination. The hammer withstand pressure is 3MPa. It locks the main shaft mechanically.

(mm)

SIZE	H
1 1/2	493
2	509
2 1/2	555
3	610
4	636
5	705
6	730



Option

Shaft quenching

● Option symbol

C

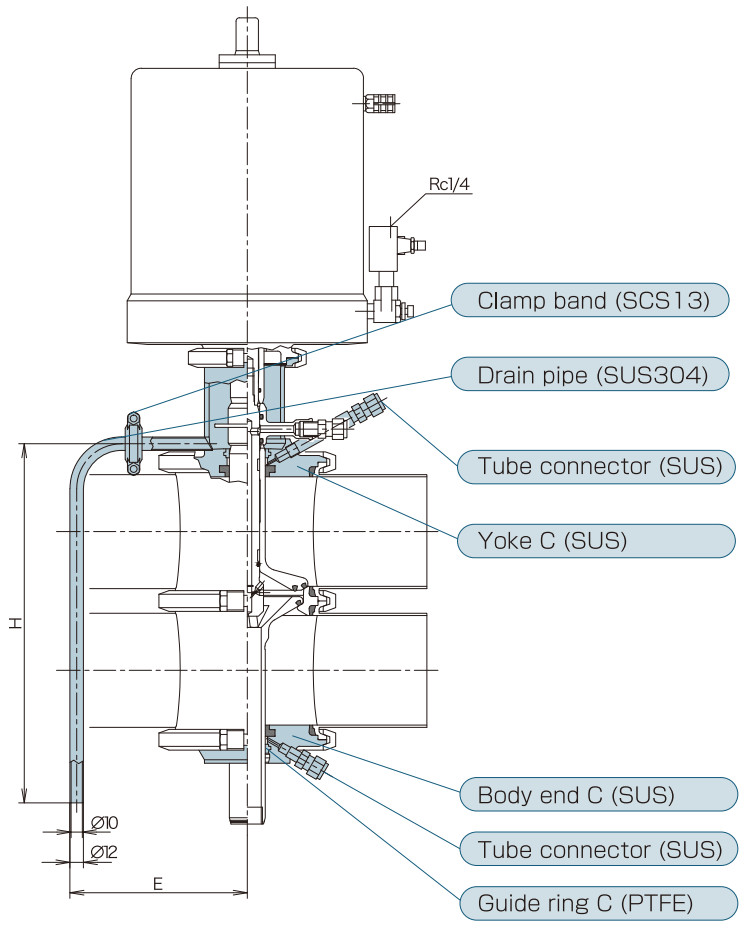
When valve surrounding condition is contaminated, cleaning the shaft before and after valve operation prevents contaminated materials .

NOTE

● Quenching should be supplied by a separate line from valve CIP (water and hot water). Set a pressure to around 0.05MPa.

(mm)

SIZE	E	H
1½	101	240
2	121	250
2½	126	260
3	141	280
4	161	320
5	201	430
6	221	480



Oil damper

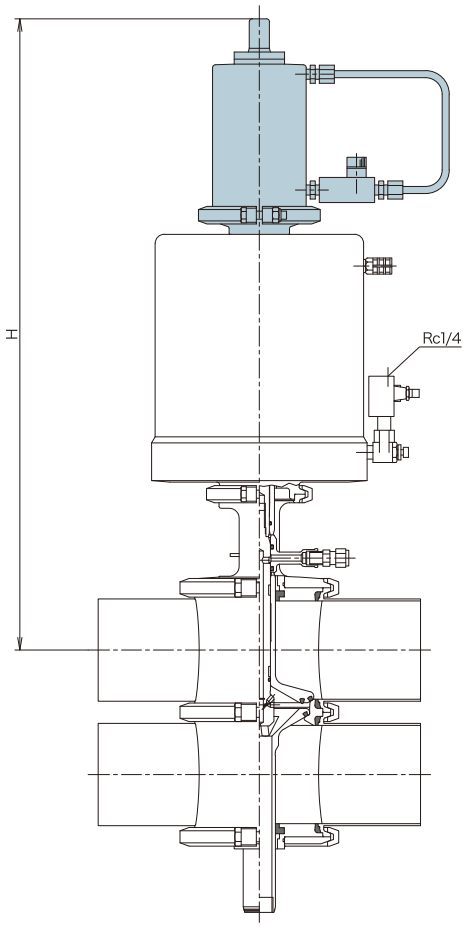
● Option symbol

D

If the flow direction flows backward, water hammer may occur. Attaching this oil damper enables valves to be opened and closed smoothly and prevents occurrence of water hammer.

(mm)

SIZE	H
1½	527
2	540
2½	589
3	644
4	670
5	754
6	780



Option

3-position cylinder

● Option symbol

T

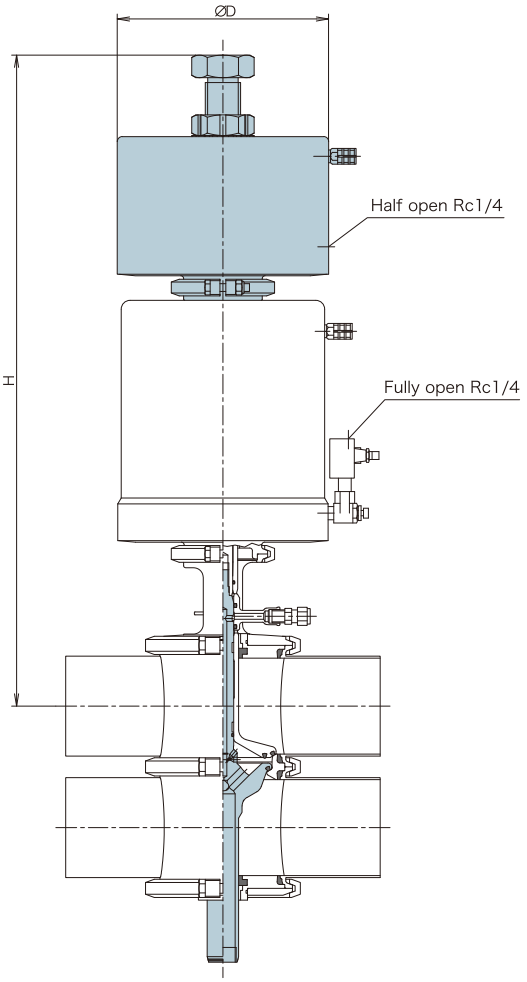
Attaching this unit enables control at 3 positions: fully closed, fully open, and arbitrary intermediate position. For example, it is possible to perform 3-stage flow rate control by flowing product liquid with the valve fully closed and half-open and flowing CIP liquid with the valve fully open. (Fully open – Half open – Fully closed)

The intermediate position is set by adjusting the upper adjustment bolt.
(Although this figure shows a normally closed type, a normally open type is also available.)

(mm)

SIZE	φD	H
1 1/2	φ125	479
2	φ125	492
2 1/2	φ162	565
3	φ162	620
4	φ215	698
5	φ265	767
6	φ265	992

● H dimensions are when a standard cylinder with air pressure of 0.4MPa is used.



► Switch assembly with cover (proximity and micro switches)

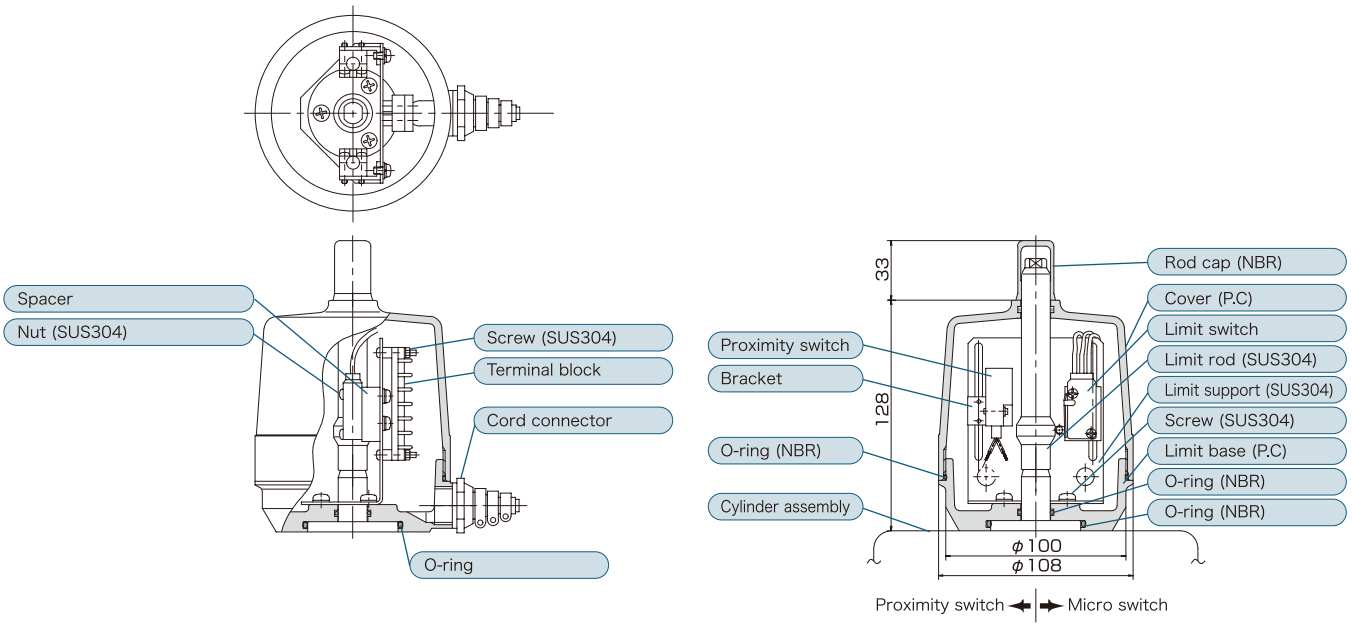
A polycarbonate-resin-based limit base made by injection molding and a watertight micro switch are incorporated in the cover, which enhances the insulation withstand characteristics. Furthermore, in order to simplify instrumentation, a terminal block is provided. Perform adjustment by loosening the limit switch attachment screw and moving it up and down.

● Proximity switch
2-wire DC24V 100mA

● Limit switch
NC, No. 250V 4A

● Cord connector PF1/2

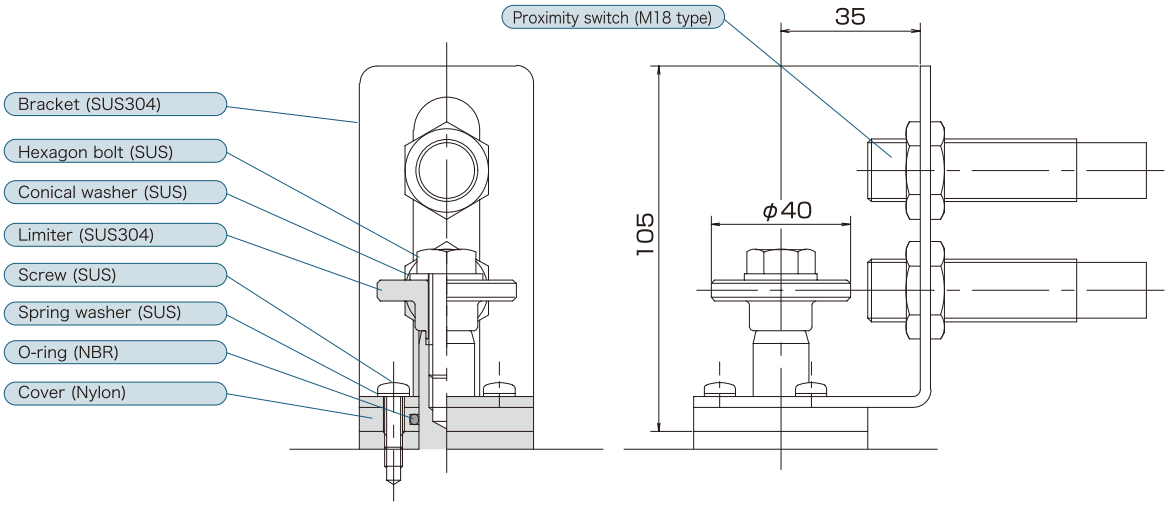
● Terminal block 6P



○ CF/AF type with compact cover is also available as an option. For further details, refer to the catalog of No. 18 valve control head.

Option and maintenance jig

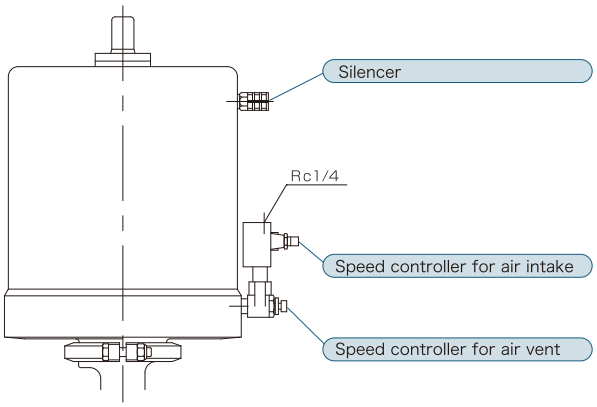
► Proximity switch assembly (Bracket attachment type)



● Accurate detection (feedback response) during disc lifter operation is not possible. Please avoid it with the control software.

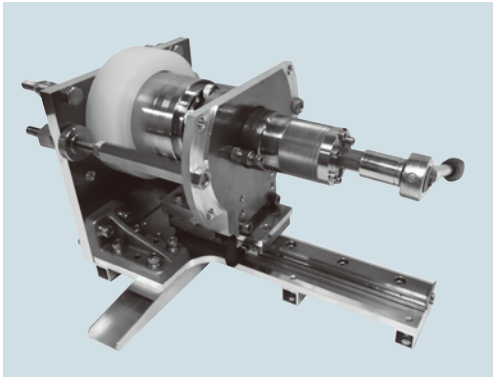
► Speed controller

● Speed controller unit can adjust the opening and closing speed of valve.



► Maintenance jig (option)

Disc seat press-in machine



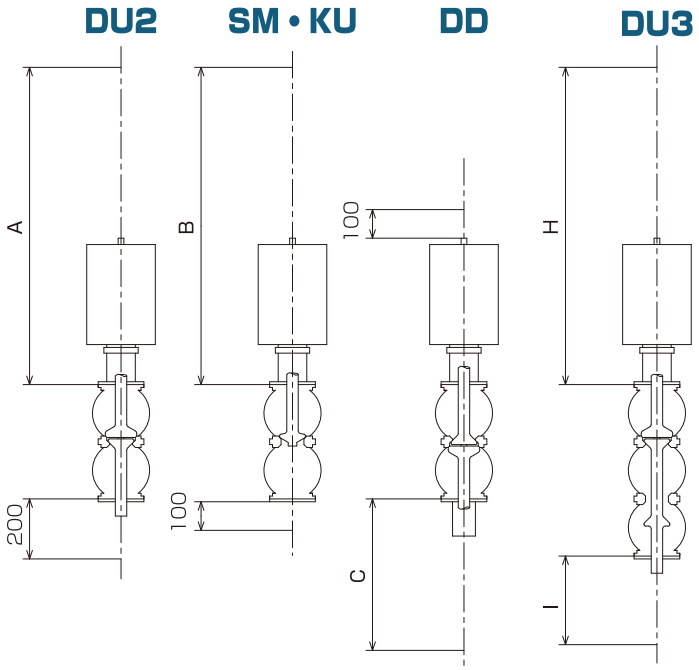
Disc seat press-in jig

● These items are used for inserting a disc seat to a valve shaft.

Technical material

► Valve maintenance space

The maintenance space required for each valve type is shown in the following table.
Consider each required space when designing.

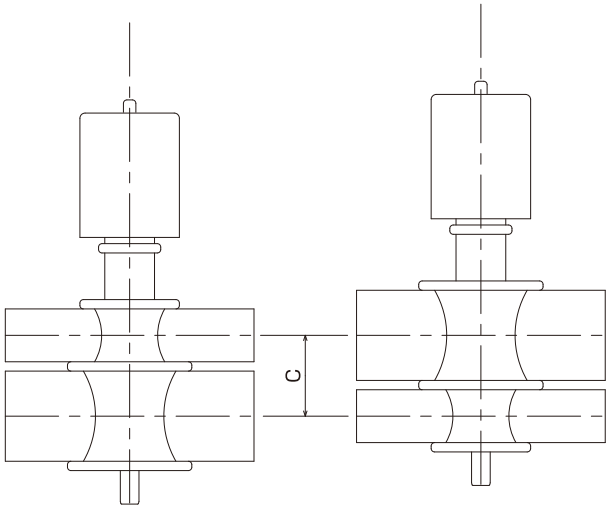


(mm)

SIZE	A	B	C	H	I
1½	630	510	310	650	200
2	680	530	320	670	200
2½	740	570	350	750	200
3	810	630	360	800	300
4	900	660	440	910	300
5	1040	700	540	1060	300
6	1110	730	580	1130	300

► Different diameter size

For valve main body type 2A to 2T, the sizes of the upper body and lower body can be changed.
Of course there is no liquid pocket, etc.



Dimension C

The values in the shaded part of the table at right shows the same diameter and different diameter.

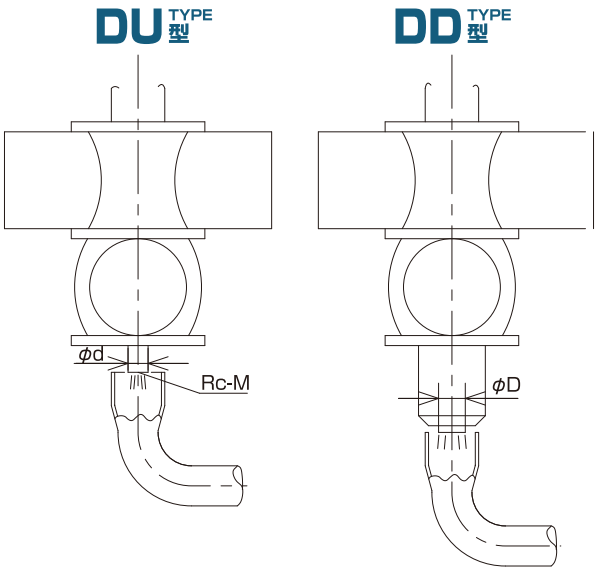
(mm)

SIZE		Upper body size						
		1½	2	2½	3	4	5	6
Lower body size	1½	——	67.75	73.6	80.0	92.65	120.75	133.45
	2	67.75	——	79.65	86.05	98.7	126.8	139.5
	2½	73.6	79.65	——	91.9	104.55	132.65	145.35
	3	80.0	86.05	91.9	——	110.95	139.05	151.75
	4	92.65	98.7	104.55	110.95	——	151.7	164.4
	5	120.75	126.8	132.65	139.05	151.7	——	182.5
	6	133.45	139.5	145.35	151.75	164.4	182.5	——

Technical material

► Drain piping

- For valve blocks, please attach a collecting drain pipe or a drain pan.
- For different diameter body, smaller diameter size is as standard.



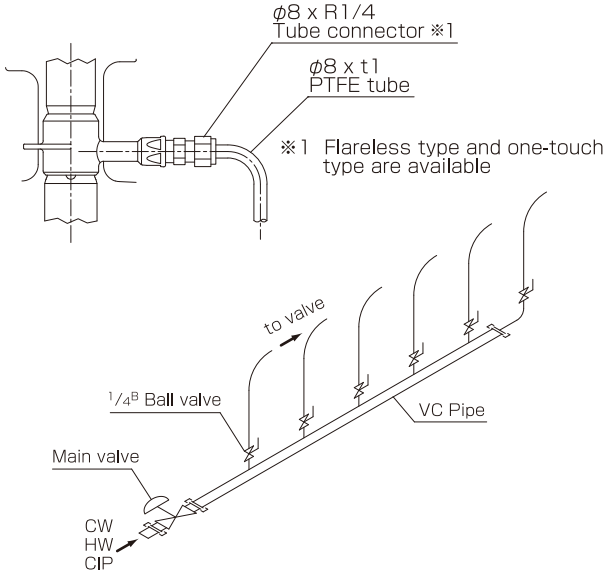
(mm)

SIZE	φd	Rc-M	φD
1 1/2 ~ 2	25	1/2	38
2 1/2 ~ 4	30	3/4	
5 ~ 6	40	1	

※ In the case of collecting drain pipes

► Valve CIP

- Valve CIP should be performed at the same time as line CIP.
- Piping between the CIP chamber and header pipe should be done by using a φ8 x 1mm PTFE tube



Valve CIP flow rate as a standard (L/min)

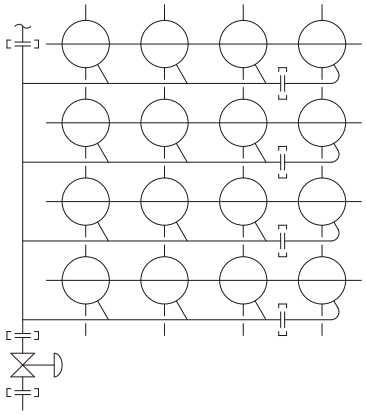
SIZE	1 1/2 ~ 2 1/2 S	3 ~ 6S
Flow rate (L/min)	4~6	6~8

※ Please adjust flow rate with ball valve depending on degree of dirtiness.

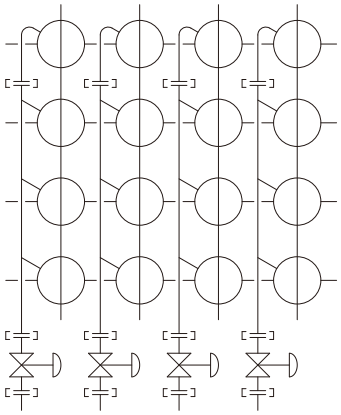
► Valve block cleaning method

There are 3 methods as shown below

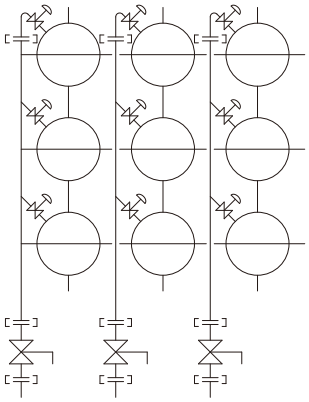
Simultaneous batch cleaning



Independent line cleaning



Individual cleaning

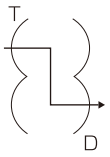
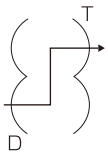
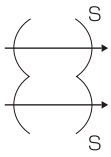


Please select the optimum method depending on line system, cleaning system, cost, etc.
For the cleaning flow rate (pressure), please adjust individually with ball valve.

Technical material

► Pressure loss and Cv value

Cv value

SIZE \ Flow	T→D		D→T		S	
	DU、LU	MU、NU	DU、LU	MU、NU	DU、LU	MU、NU※1
1 1/2	27	26	32	29	100	52/65
2	30	26	35	29	160	152/157
2 1/2	65	60	75	56	270	162/168
3	100	88	115	86	360	281/291
4	185	183	220	185	630	476/485
5	320	—	360	—	—	—
6	350	—	400	—	—	—
Flow channel						

※1 The value of MU and NU type shows Cv value of passing through "Upper part / Bottom part"

Calculation of pressure loss

$$\triangle P = 98 \times \left(\frac{1.167 \times Q}{Cv} \right)^2$$

△P : Pressure loss (kPa)

Q : Flow rate (m^3/h)

Cv : Cv value at the left table

This calculation applies only to clean water at room temperature.

► Amount of drain of DU, LU, MU, NU type when opening and closing valve

Line pressure MPa / SIZE		0.1		0.2		0.3		0.4		0.5	
		Leakage amount	Operation	Leakage amount	Operation	Leakage amount	Operation	Leakage amount	Operation	Leakage amount	Operation
		mℓ	sec	mℓ	sec	mℓ	sec	mℓ	sec	mℓ	sec
1 1/2～2	Open→Closed	300	7	420	7	520	7	600	7	670	7
1 1/2～2	Closed→Open	150	7	210	7	260	7	300	7	340	7
2 1/2	Open→Closed	370	7	520	7	640	7	740	7	830	7
2 1/2	Closed→Open	190	7	270	7	330	7	380	7	420	7
3	Open→Closed	400	7	570	7	690	7	800	7	890	7
3	Closed→Open	240	7	340	7	420	7	480	7	540	7
4	Open→Closed	420	7	590	7	730	7	840	7	940	7
4	Closed→Open	260	7	370	7	450	7	520	7	580	7
5～6	Open→Closed	460	11	650	11	800	11	920	11	1030	11
5～6	Closed→Open	290	10	410	10	500	10	580	10	650	10

Note) ● Air tube: 10m, φ6 xφ4 ● Operating air pressure: 0.5MPa

► Consumable parts list for DU, DD, KU type

Code / Size	Disc seat A SQPA	Disc seat B SQPB	Disc seat C SQPC	Shaft packing SQPS/SQPSD		Body packing SQBP	Shaft O-ring O-RING	Chamber O-ring O-RING	Guide ring SQPGR		Guide ring (for quenching) SQPGRC		Guide ring GR		
													SQPGRGR		SQPGRGRT
				D	KU				D	KU	D	KU	D	KU	DD
1 1/2	15—20	15—20	※15—20	15—20	25—40	15—20	P—12	P—16	15—20	25—40	15—20	25—40	15—20	15—20	15—20
2	15—20	15—20	※15—20	15—20	25—40	15—20	P—12	P—16	15—20	25—40	15—20	25—40	15—20	15—20	15—20
2 1/2	25	25	25	25—40	50—60	25	P—18	P—22A	25—40	25—40KU	25—40	50—60	25—40	25—40	25—60
3	30	30	30	25—40	50—60	30	P—18	P—22A	25—40	25—40KU	25—40	50—60	25—40	25—40	25—60
4	40	40	40	25—40	50—60	40	P—18	P—22A	25—40	25—40KU	25—40	50—60	25—40	25—40	25—60
5	50—60	50—60	50—60	50—60	50—60	50—60	P—24	P—30	50—60	50—60	50—60	50—60	50—60	25—40	25—60
6	50—60	50—60	50—60	50—60	50—60	50—60	P—24	P—30	50—60	50—60	50—60	50—60	50—60	25—40	25—60
Remarks		Double seal valve only	Double seal valve only	Except for KU	For KU		Double-seal valve only	Double-seal valve only One set of 2 pcs.	Except for KU	For KU	Except for KU	For KU	Except for KU and DU	For KU	For DD

※ For DD and KU type, use the disc seat D.

Technical material

► Cylinder selection table

When using cylinders at higher pressure than the values shown below, contact our company.

Operation air pressure MPa	Fluid pressure MPa	DU type Size					G.K type Size				
		1 1/2~2※2	2 1/2	3	4	5~6	1 1/2~2	2 1/2	3	4	5~6
0.4	0.3	100M	100M	150M	200M	200M	100M	125M	125M	200M	200M
	0.4	100M	125M	150M	200M	250M	125M	125M	150M	200M	250M
	0.5	100M	125M	150M	200M	250M	125M	150M	200M	200M	—
	0.6	125M	150M	200M	250M	—	125M	150M	200M	250M	—
	0.7	125M	150M	200M	250M	—	125M	150M	200M	250M	—
	0.8 ※1	125M	150M	200M	250M	—	150M	200M	250M	250M	—
0.7	0.3	80H	80H	125H	150H	150H	100H	100H	100H	150H	150H
	0.4	80H	100H	125H	150H	200H	100H	100H	125H	150H	200H
	0.5	80H	100H	125H	150H	200H	100H	125H	150H	150H	250H
	0.6	100H	100H	150H	200H	250H	100H	125H	150H	200H	250H
	0.7	100H	125H	150H	200H	250H	100H	125H	150H	200H	250H
	0.8 ※1	100H	125H	150H	200H	250H	125H	150H	200H	200H	—

※1 If the fluid pressure is higher than 0.8MPa, consult our company separately. ※ 2 For 1 1/2 to 2 of DD type, only 125M is available.

► Cylinder capacity

Bore diameter (mm)	80	100	125	150	200	250
Volume (l)	0.24~0.31	0.38~0.50	0.60~0.77	0.95~1.21	1.56~2.02	2.51~3.24

► Characteristics of packings

Item		Standard					Option
Packing material		EPDM (Ethylene propylene rubber)	FKM (Fluororubber)	UC rubber (High-function fluororubber)	VMQ (Silicon rubber)	HNBR (Hydrogenated nitrile rubber)	PTFE lining (Fluororesin lining)
Material code		E81	F8	F802	SE72	Z85	TL□
Color		Black	Black	Black	Gray	Black	White
Resistance to liquid	Steam	◎	△	○	△	○	○
	Caustic soda	◎	△	○	△	◎	◎
	Nitric acid	○	◎	◎	△	△	◎
	Acetic acid	○	○	◎	△	△	◎
	Sodium hypochlorite	○	○	◎	○	○	◎
	Peroxyacetic acid	△	×	○	○	×	◎
	Fragrance (limonene, etc.)	×	○	○	×	△	◎
	Animal and vegetable oil	×	○	◎	○	○	◎
General characteristics	Resistance to heat	130℃	120℃	130℃	120℃	120℃	130℃
	Elasticity	○	○	○	○	○	△
	Intensity	○	△	○	△	◎	○
Applicable size		1 1/2~6S	1 1/2~6S	1 1/2~6S	1 1/2~6S	1 1/2~6S	1 1/2~3S
Remarks	Part name	Disc seat	Disc seat	Disc seat	—	Disc seat	Disc seat
		Body packing	Body packing	Body packing	Body packing	—	Body packing
		Shaft packing	Shaft packing	Shaft packing	Shaft packing	—	Shaft packing
	Note	—	—	—	Combination where no packing material is designated as valve product symbol		•A special part is required. (Yoke, body end) •Material code and core rubber material: TLX: VMQ (Silicone) TLE: EPDM (Ethylene propylene rubber) TLZ: NHBR (Nitrile rubber)
The Food Sanitation Law conformity test		Acceptable					

◎ Very good, ○ Good, △ Possible, × Impossible

Lubricant application specifications

Application specifications	Application range	Note
Standard specifications	Sliding seal part	—
Wetted surface lubrication prohibited area	O-ring part	Be sure to make the sliding packing area smooth with fresh water, etc.
Lubricant	NOK Kluber PARALIQ GTE 703*1 (NSF category H1)	

*1 Conforming to the Food Sanitation Law

Fluororesin lining packing type

1) Use for preventing smell from adhering.
2) From the standpoints of mounting mechanism of shaft packing, the body end part is separate as a special part.

Sequence valve type symbols

Name	JIS material classification	Finish classification	Pipe end classification	Size classification	Product name/type
Symbol		(G R)	× ×	× ×	

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

① Material classification (main body)

Category	Symbol	Material			
		Metal part	Body packing	Disc seat	Shaft packing
Standard	**304**	SUS 304 (or equivalent)	SE72 silicone rubber	Z85 HNBR	SE72 silicone rubber
	304-E9D	SUS 304 (or equivalent)	E81 EPDM	E81 EPDM	E81 EPDM
	304-F	SUS 304 (or equivalent)	F8 fluororubber	F8 fluororubber	F8 fluororubber
	304-FU	SUS 304 (or equivalent)	F802 UC rubber	F802 UC rubber	F802 UC rubber
Option	**316L**	SUS 316L (or equivalent)	SE72 silicone rubber	Z85 HNBR	SE72 silicone rubber
	316L-E9D	SUS 316L (or equivalent)	E81 EPDM	E81 EPDM	E81 EPDM
	316L-F	SUS 316L (or equivalent)	F8 fluororubber	F8 fluororubber	F8 fluororubber
	316L-FU	SUS 316L (or equivalent)	F802 UC rubber	F802 UC rubber	F802 UC rubber
	304-TL*1	SUS 316L (or equivalent)	VMQ + PTFE lining	VMQ + PTFE lining	HNBR + PTFE lining
	316L-TL*1	SUS 316L (or equivalent)	VMQ + PTFE lining	VMQ + PTFE lining	HNBR + PTFE lining

* For lining packing, only 1.5 to 3S are provided.

② Surface finish (main body)

Category	Symbol	Finish	
		Internal finish	External finish
Standard	**0P**	Pickling	Pickling or beads shot blasting
	1P	#320 to #400 buff polishing	Pickling or beads shot blasting
Option	**XP**	Other	Other

③ Shaft surface specifications

Category	Symbol	Details
Standard	**(GR)**	Guide ring is attached to the main shaft. (Refer to Page 4–12.)

④ Connection

Category	Symbol	Details
Standard	**M**	ISO male
	C	ISO clamp
	T	Sanitary flange (fixed)
	R	Sanitary flange (loose)
Option	**N**	ISO nut
	W	Weld
	X	Other

⑤ Size

Symbol	Size
15	1 1/2S
20	2S
25	2 1/2S
30	3S
40	4S
50	5S
60	6S

⑥ Valve type

Symbol	No. of seals	Valve operation	No. of main bodies	Drain pipe	Remarks
DU	Double	Bottom up	2・3	With	On-off valve, branch valve
DD		Top down	2	With	On-off valve
KU		Bottom up	2	With	On-off tank valve
GU		Bottom up	2	Without	On-off valve
MU		Bottom up	2	With	Diaphragm type on-off valve
NU		Bottom up	2	With	Disc-seat-less diaphragm type on-off valve
LU		Bottom up	2	With	Disc-seat-less on-off valve

⑦ Valve operation

Category	Symbol	Details
Standard	**C**	Automatic normally closed
Option	**M**	Manual
Special	**X**	——

Sequence valve type symbols

⑧ Main body quantity and type

Symbol	2A	2B	2C	2D	2L	2T
Sketch						
Symbol	3A	3B	3C	3D		
Sketch						
Symbol	3E	3F	3G	3H		
Sketch						

Number in sketch shows number of ports.

⑨ Actuator type (Refer to the cylinder selection table.)

Symbol	Type	Symbol	Type
08M	80M	**08H**	80H
10M	100M	**10H**	100H
13M	125M	**13H**	125H
15M	150M	**15H**	150H
20M	200M	**20H**	200H
25M	250M	**25H**	250H

⑩ Feedback switches classification

In case of valve control system, different types are used for ⑩ and ⑪. Please contact us separately.

Category	Symbol	Type/manufacturer	Usable power voltage range	Maximum switching current	Operation style	Type or attachment
Standard	**D**	No feedback switch	—	—	—	—
	C	D2VW-5L2A-1M Limit switch made by OMRON	AC／DC<250V	4A	NO,NC	With cover
	A	FL2R-4J6SD Proximity switch made by Azbil	DC10～30V	100mA	NO	With cover
	J	IGC2005-ARKG/UP Proximity switch made by Efector	DC10～36V	100mA	NO	With M18 bracket
	U	FL7M-7J6HD Proximity switch made by Azbil	DC10～30V	100mA	NO	With M18 bracket
	R	FL7M-7K6H Proximity switch made by Azbil	DC10～30V	100mA	NC	With M18 bracket
Special	**Z**	Non-standard specifications and/or proximity switch supplied				With cover
	P					With bracket
	B	In case of Asi, uni-wire system, and solenoid valve : For the detail, please refer to catalog No.18 “Valve control head”.				

Note) In case of model change by switch manufacturer, the above parts may be changed to substitution or equivalent parts. Please select a standard model as much as possible.

⑪ Quantity of feed back switches used

Symbol	Details
0	No switch
1	One on closed side
2	Two on open and closed side
3	One on open side
X	Other

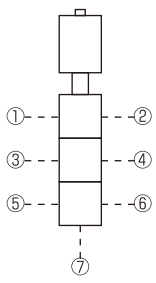
⑫ Main body options

Symbol	Details
0	No option
C	With shaft quenching
G	Shaft to pass through solid object

⑬ Actuator options

Symbol	Details
L	Disc lifter
T	3-position
P	Positioner
S	Shaft lock
D	Oil damper
K	Disc lifter + shaft lock

Section for entry of special parts



No.	Required ports	Size	Coupling
①			
②			
③			
④			
⑤			
⑥			
⑦			

Section for entry of special notes

- ○ If using nonstandard specification except for lubricant application specifications on Page 20, please designate them.
- ○ If the specification is not specified, lubricant is applied as standard.
- ○ Safety of lubricant to be applied:
  - ○ NSF category H1
  - ○ Conforming to the Food Sanitation Law

TOSTE Co.,Ltd.

Headquarters:
1-32, Honden 2-chome, Nishi-ku, Osaka 550-0022
TEL: +81-6-6585-0700　FAX: +81-6-6586-0708

Trade Department:
TEL: +81-6-6585-2277　FAX: +81-6-6586-0708

TOSTE VIETNAM CO.,LTD
Rental Factory 5-1, Road N3-2, Long Duc IP,
Long Duc Ward, Long Thanh district,
Dong Nai province, Vietnam
TEL: +84-251-368-1800　FAX: +84-251-368-1881

肇慶東洋新島不銹鋼工程有限公司
〒526072 肇慶市鼎湖区蓮花鎮７区蓮信路
TEL: +86-758-2619887
FAX: +86-758-261978