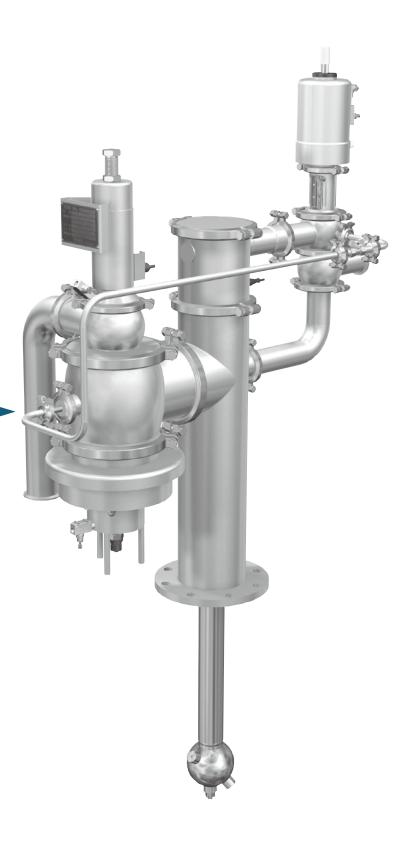




Hygienic

# Tank Safety Equipment

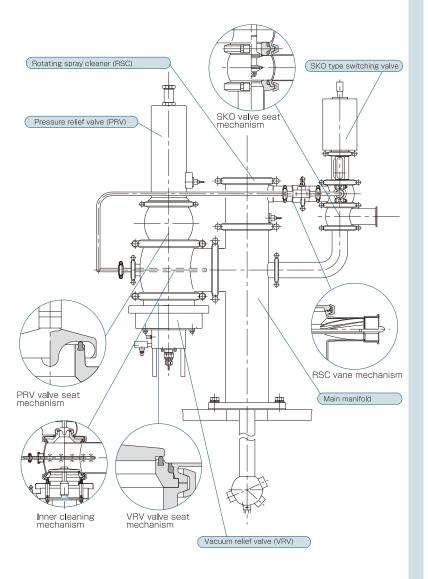
Wide-margin products derived from advanced technologies



#### Tank safety unit

## $\mathsf{TSU}_{\mathsf{type}}$

Configuration diagram



Our sanitary tank safety units are units for tank protection based on technologies and experience cultivated over many years. These units can respond quickly to abnormal fluctuations in pressure which would occur during supply of feed liquid to the tank or tank CIP to relieve the abnormal pressure, and also have a tank cleaning mechanism.

The unit inside is equipped with a nozzle to allow you to clean at the same time, providing sanitary conditions.

For unit combination selection, inform us of the various tank conditions.

We offer you safer combination products. If spray balls, nozzles, etc. are specified, inform us of the connection dimensions.

#### Manufacturable range

- VRV vacuum relief valve Size: 5S, 4S, 3S (-150mmAq)
- O PRV pressure relief valve Size: 4S, 3S, 2S, 1S 0.02 to 0.17MPa
- O RSC rotating spray cleaner Size: 2S, 10 to 30m³/Hr 0.2 to 0.3MPa
- O SBE spray ball Size: 1S, 2S, 5 to 30m³/Hr 0.2 to 0.3MPa
- O CIP-GAS switching type SKO sequence switching valve
- O Main manifold 125A, 200A

#### Material

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

#### Production standard

External finish	Beads shot blast or #180 to #400 buff polished finish
Internal finish	Within #320 to #400 buff polished finish
In-between surfaces tolerance	±2mm or less
End surface parallelism	±1°
Squareness	±1
Positive pressure performance	As per specifications (pneumatic pressure, normal temperature)
Negative pressure performance	As per specifications (pneumatic pressure, normal temperature)

#### ► Valve selection and ordering

When using our valves, be sure to use them within the respective valve specifications. If valves will be used outside the scope of specifications, a design with higher safety taking into consideration various conditions is required. We would be pleased to offer consultation if you provide us with information.

#### ▶ Ordering

When ordering, specify the material, product name, size, pipe end shape, quantity and use conditions. If a specific finish roughness is required, specify the finish roughness of the internal and external.

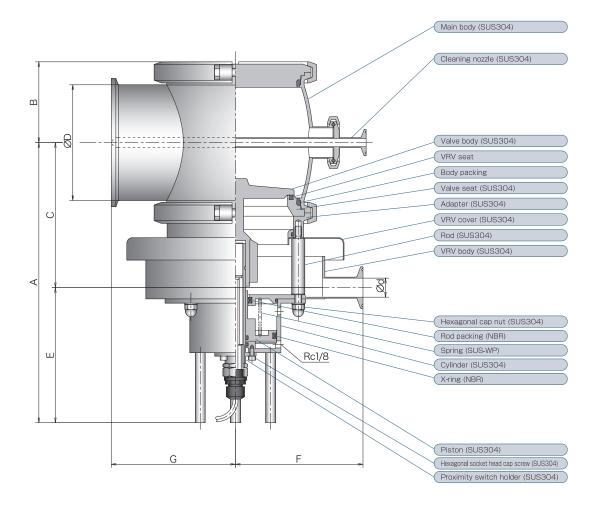
#### Sanitary tank safety equipment

## **VRV**type

Vacuum relief valve



The vacuum relief valve is sealed by the valve body own weight.
Set pressure: -150mmAq (standard)



								(mm)
SIZE	А	В	С	<b>φ</b> D	φd	E	F	G
38	288.1	58.4	140.4	76.3	23.0	148	125	140
48	305.8	79.6	157.8	101.6	23.0	148	150	150
5S	323.9	97.7	175.9	139.8	23.0	148	150	150

3

Adjustment bolt (SUS304)

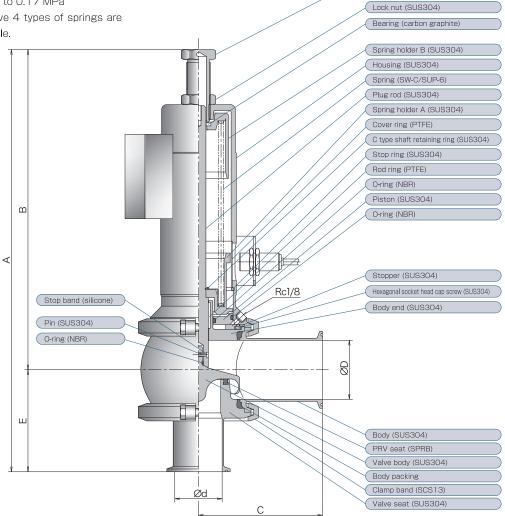
#### Sanitary tank safety equipment

#### Pressure relief valve

The pressure relief valve is sealed by the spring load

- (A) 0.02 to 0.05MPa ··· 2S or more
- (B) 0.05 to 0.1MPa
- (C) 0.1 to 0.15MPa
- (D) 0.15 to 0.17 MPa

The above 4 types of springs are selectable.



-7			١
- (	m	m	

SIZE	А	В	С	$\phi$ D	<b>φ</b> d
18	340.2	259.4	100	35.7	23.0
28	426.1	323.4	125	59.5	47.8
3S	566.0	444.2	140	97.6	72.3
48	699.8	554.9	160	133.8	97.6

Sanitary tank cleaning equipment

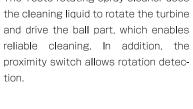
pray ball

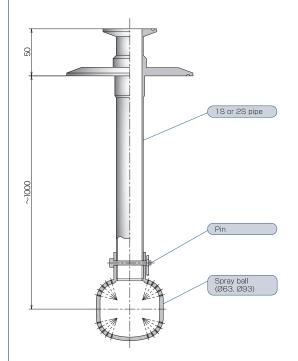
In the case of a comparatively small diameter tank, a spray ball is used.

Sanitary tank cleaning equipment

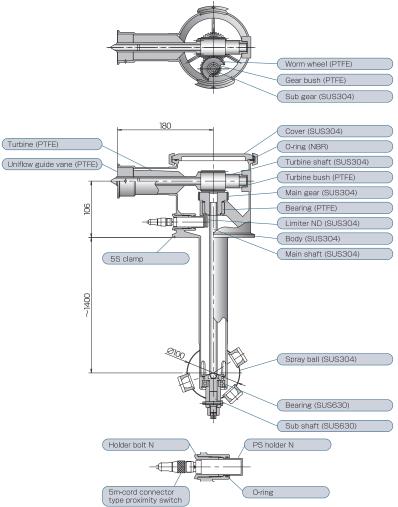
Rotating spray cleaner

The Toste rotating spray cleaner uses proximity switch allows rotation detec-





Spray ball type

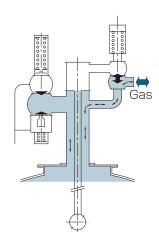




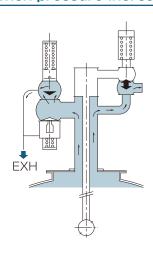
#### **Technical material**

#### Operation

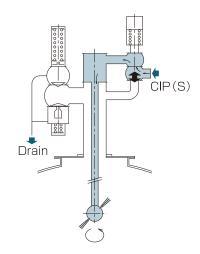
#### **During normal use**



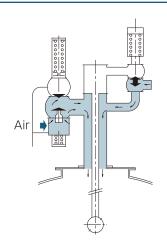
### When pressure increases



#### During tank CIP



#### When negative pressure is applied



#### ► Safety valve (VRV, PRV) capacity table

### **VRV** Vacuum relief valve

	Tacaan rener vary					
Set	Suction			SIZE		
pressure pre	pressure	38	48	5S	4S×2*	5S×2*
-150	-300	250	550	650	900	1200
mmAq			1	√lm³/Hr(A	ir)	
Manifold size		125A	125A	125A	20	OA

 $<sup>^{\</sup>ast}$  4S x 2 and 5S x 2 indicates cases where 2 safety valves are used.

### **PRV** Pressure relief valve

Set	Discharge		SIZ	∠E	
pressure	pressure	18	28	38	48
0.02		—	80	160	320
0.05	Set pressure x 1.1	40	200	400	800
0.07	(If the set pressure is less than 0.1 MPa.	60	300	600	1200
0.10		80	400	800	1600
0.12	±0.015MPa	100	500	1000	2000
0.15	is used.)	120	600	1200	
0.17		150	700	1400	
MP		Nm <sup>3</sup> /I	Hr(Air)		



#### Technical material

#### Tank cleaning mechanism

SBE Spray ball

Spray ball					
Ball	Standard		Flow rate	Pressure	Tank
diameter	Type	Ho <b>l</b> e diameter	Tiowrate	riessuie	diameter
	А	φ1~	19	0.2~0.25	~3
φ63	В	φ1~	16	0.2~0.25	~3
φοσ	С	φ1~	13	0.2~0.25	~3
	D	φ1~	12	0.2~0.25	~3
	А	φ1.5~	47	0.25~0.3	~5
φ93	В	φ1.5~	38	0.25~0.3	~5
φθδ	С	φ1.5~	32	0.25~0.3	~5
	D	φ1.5~	28	0.25~0.3	~5
Unit		mm	m³/Hr	MPa	m

**RSC** Rotating spray cleaner

Hotating Spray Cleaner						
Maximum diameter	Type	Flow rate	Pressure	Rotation speed	Tank diameter	
		12			~4	
	1 nozzle 2 nozzle 3 nozzle	14	0.2~0.25	6~12	~4.5	
100		16			~5	
φ130		20			~6	
		25	0.25~0.3		~7	
		30			~8	
Unit		m³/Hr	MPa	r.p.m	m	

Screen cleaning (cleaning by chemical effect) + physical cleaning enables cleaning the tank using only a small flow rate.

Screen cleaning (cleaning by chemical effect) is applied basically.

#### ► Required flow rate for screen cleaning

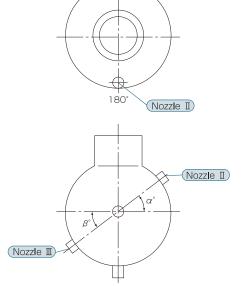
 $Q=\pi \times D \times (25\sim35) (\ell/min)$ 

D : Tank diameter (m) 25 : Common 35 : Heavy dirty

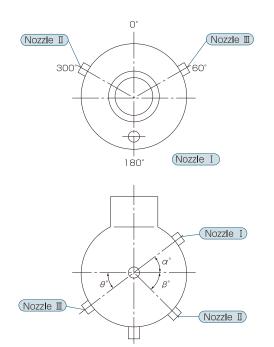
#### Nozzle orientation

#### With 2 nozzles

Nozzle II)



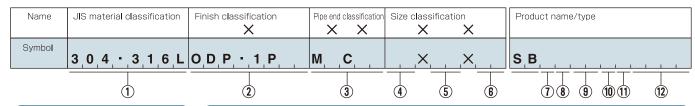
#### With 3 nozzles



Be sure to attach a 150 mesh or higher filter to the supplying line for CIP liquid.



#### Type symbol table of SBE spray ball



# Material classification (main body) Category Symbol Material Standard 304 (or equivalent) Option 316L SUS 316L (or equivalent) Special — —

② Finish classification							
Cotogoni	Or make al		F	inish condi	tions		
Category	Symbol	Ball inner surface	Nozzle pipe inner surface	Ball outer surface	Nozzle pipe outer surface	Atmosphere part outer surface	Parts
Standard	ODP	PP	PP	ВМ	ВМ	GB	PP
	0P	PP	PP	PP	PP	GB	PP
Option	2P	PP	PP	ВМ	ВМ	ВМ	PP
	EP(1P)	PP	PP	EP	EP	GB	EP
	EP(2P)	PP	PP	EP	EP	ВМ	EP
[Legend]	•						

[Legend] PP: Acid wash finish; BM: #320 to #400 buff finish; EP: Electropolished finish; GB: Bead shot finish; Parts: Pin or lock pin

Pipe end classification							
Enter the connection part (piping side) x attachment part (tank side). In the case of spray ball, enter $x \times W$ .							
Symbol	С	M	N	W			
Туре	ISO clamp	ISO male	ISO nut	Weld			

Ball size classification						
Category	Symbol	Ball size				
Standard	63	Outside diameter $\phi$ 63				
Stariuaru	93	Outside $\phi$ 93				

5 Nozzle pipe size classification						
Symbol	Nozzle pipe size	Category				
10	۱s	Standard				
20	2 <sup>s</sup>	Stanuaru				

6 Tank attachment part pipe size			
Category	Symbol	SIZE	
Standard	30	3s	
Stanuaru	40	<b>4</b> 8	
Option	Other	Other	

7 Fo	rm clas	sification
Category Standard	Symbol	Details
	Е	Spray ball only
	N	With nozzle pipe

(8) Sp	ray tip	e classification
Category	Symbol	Details
	Α	Spraying equa <b>ll</b> y through 360°
Standard	В	Spraying equally through upper 270°
Stariuaru	С	Spraying equally through upper 210°
	D	Spraying equally through lower 210°
Ontion	Х	Spraying equally A through D (Necessary to design additionally.)
Option	Р	Pinpoint spraying type (Necessary to design additionally.)

9 Spray ball hole diameter classification							
Other	10	12	15	18	20	25	30
Hole	φ1.0	φ1.2	φ1.5	φ1.8	φ2.0	φ2.5	φ3.0
diameter	L		Ø63 ra	_	3 range		

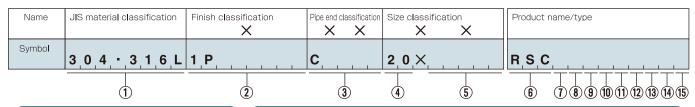
Nozzle pipe specification classification			
Category Symbol Standard 0		Details	
		No cleaning hole except for spray ball hole	
	1	With an upper cleaning hole	
Option	2	With an upper cleaning hole and an intermediate-part nozzle tip	
	9	Other special specifications	

(11) c	se purpose lassification
Symbol	Details
S	Tank cleaning
J	Diffusion spraying
D	Defoaming, dispersion/mixing
X	Other

$\widehat{ ext{(12)}}$ Nozzle length classification (Enter only for products equipped with a nozzle pipe.)			
Category Symbol Details			
Standard	0200	The distance from the lower part of attachment coupling to the ball center is 200mm.	
	0300~1900	Setting every 10mm	
	2000	The distance from the lower part of attachment coupling to the ball center is 2000mm.	



#### Type symbol table of rotating spray cleaner (RSC)



# Material classification (main body) Category Symbol Material Standard 304 SUS 304 (or equivalent) Option 316L SUS 316L (or equivalent)

(2) Finish classification					
Catagani	0	Finish conditions			
Category	Symbol	Internal finish	External finish		
	0P	Pickling	Pickling or beads shot brast		
Standard	1P	#320 to #400 buff polishing	Pickling or beads shot brast		
	2P	#320 to #400 buff polishing(Ra 0.2)	#180 Hairline finish		
	ODP	Pickling	#180 Hairline finish		
Onting	EP(1P)	Electrolytic polishing finish (Ra 0.2)	Pickling or beads shot brast		
Option	EP(2P)	Electrolytic polishing finish (Ra 0.2)	#180 Hairline finish		
	XP	Special	Special		

3 Pipe	e end cl	assification
Category	Symbol	Details
Standard	С	ISO clamp
Special	Х	





6 Ball size classification		
Symbol	Details	
RSC	Rotation type spray	

7 Flow rate classification		
Symbol	Details	
1		
2	Above 10m <sup>3</sup> /Hr and 15m <sup>3</sup> /Hr or less	
3	Above 15m <sup>3</sup> /Hr and 20m <sup>3</sup> /Hr or less	
4	Above 20m³/Hr and 25m³/Hr or less	
5	Above 25m <sup>3</sup> /Hr and 30m <sup>3</sup> /Hr or less	
6	Above 30m <sup>3</sup> /Hr	

8 Pressure classification			
Symbol	Details		
1	0.2MPa or less		
2	Above 0.2MPa and 0.25MPa or less		
3	Above 0.25MPa and 0.3MPa or less		
4	0.3MPa or more		

	9	9 Slit shape		
	Symbol	Symbol Details		
	Α	<b>A</b> 1×12mm		
	<b>B</b> 1.5×12mm			
-	С	2.0×12mm		
	0 No slit			
J				

10	Nozzle specification classification				
Symbol	Details				
10	Shows flow rate and injection angle of Nozzle I				
11)	Shows mounting angle of Nozzle II				
12	Shows flow rate and injection angle of Nozzle II				
13	Shows mounting angle of Nozzle II				
14)	Shows flow rate and injection angle of Nozzle II				
Mounting angle of Nozzle Lis $\alpha = 32.5^{\circ}$					

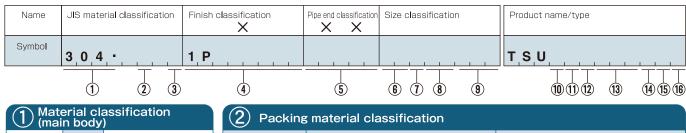
Feedback switches classification				
Symbol	Details			
Р	Efector IGT214 (Heat resistance: 100°C or less; DC10-30V) 2-wire/4-wire type (NPN, PNP) (E10906 with 5m cable) Protection type			
В	Sensor Giken HA-141-8266E (Heat resistance: 120°C or less; special amplifier is required separately) (MS-550-DT)			
Υ	Sensor Giken HA-141 (Heat resistance: 120°C or less; with AC100V special amplifier)			

Mounting angle of Nozzles II and II				
Symbol	De	etails $(lpha^\circ$ 、 $eta^\circ$ )		
1	10.0°			
2	17.5°	u		
3	25.0°	range		
4	32.5°			
5	40.0°	$\beta^{\circ}$ 、 $\theta^{\circ}$		
6	47.5°	range		
7	45.0°			
8	20.0°	$\begin{bmatrix} \alpha^{\circ} \\ \text{range} \end{bmatrix}$		
9	62.5°			

10 12 4 Nozzle type classification				
Details Symbol	Injection ( ° ) angle ( ° )	Flow rate (m³/Hr)	Outside diameter (mm)	
Α		1.5	17	
В		3	25	
С	65	6	30	
D		9	30	
E		4.5	25	
F		1.5	17	
G	40	3	25	
Н		6	30	
J	40	9	30	
K		4.5	25	
L		1.5	17	
M	90	3	25	
N	50	6	30	
Р		9	30	



#### Type symbol table of tank safety unit



# Material classification (main body) Category Symbol Material Standard 304 SUS 304 (or equivalent) Option 316L SUS 316L (or equivalent) Special — —

2 Packing material classification				
Symbol	Blank	A		
Seat material	SPRB (HNBR + PTFE coating)			
Flange packing	PTFE	PTFE		
Joint material	VMQ	FKM		
Application	General use	Acid-proof		

Cold region specification classification				
Symbol	Remarks			
Blank	Without PTFE coating	Standard		
Т	With PTFE coating	Option		

PTFE	PTFE coating range				
PRV	Disc & valve seat				
VRV	Disc & valve seat				
Switching valve	Valve seat B & shaft K				

4 Finish classification				
Category	0	Finish conditions		
Category	Symbol	Internal finish	External finish	
	0P	Pickling	Pickling or beads shot brast	
Standard	1P	#320 to #400 buff polishing	Pickling or beads shot brast	
	2P	#320 to #400 buff polishing(Ra 0.2)	#180 Hairline finish	
	ODP	Pickling	#180 Hairline finish	
Option	EP(1P)	Electrolytic polishing finish (Ra 0.2)	Pickling or beads shot brast	
Οριίση	EP(2P)	Electrolytic polishing finish (Ra 0.2)	#180 Hairline finish	
	XP	Special	Special	

Pipe connection (pipe end) classification				
Symbol	Details			
	Not provided			
С	ISO clamp			
Т	Sanitary flange			
	1	CIP inlet		
Connection	2	Exhaust outlet		
part	3	Air supply inlet		
	4	Drain outlet		

6 VRV size classification				
Symbol	Details	Applicable manifold size	Remarks	
30	3°×1*			
40	4 <sup>S</sup> ×1*	125A	Refer to Page 7 for capacity selection.	
50	5 <sup>S</sup> ×1*			
44	4 <sup>S</sup> ×2*	0004		
55	5 <sup>S</sup> ×2*	200A		
No. of units for 1 set				

7 VRV set pressure classification				
Symbol	Details	Remarks		
2	Set pressure —1470Pa (—150mmH20)	Standard		
1 Set pressure -980Pa (-100mmH20)				
8	Set pressure —780Pa (—80mmH20)	Option		

8 PRV size classification					
Symbol	Details Remarks				
10	1 <sup>S</sup> PRV				
20	2 <sup>S</sup> PRV	Refer to Page 7			
30	3 <sup>S</sup> PRV	for capacity selection.			
40	4 <sup>S</sup> PRV				



### Type symbol table of tank safety unit

PRV set pressure classification				
Symbol	Details			
	Enter the pressure within the range of 0.02 to 0.17MPa. * Products over 0.17MPa cannot be manufactured.			

(10) Manifold size classification					
Symbol	Details	Remarks			
5	125A φ139.8×t3	Defer to VDV size			
8	200A φ216.3×t3	Refer to VRV size			
X	Other special size	<u> </u>			

1 Tank mounting flange size classification					
Symbol	Details	Remarks			
5	125A JIS flange	Comp size on (10)			
8	200A JIS flange	Same size as (10)			
X	Other special size	<del></del>			

12 000					
Symbol	Details	Remarks			
5	JIS 5K flange				
1	JIS 10K flange	Standard			
X	Other special size				

(13) Cleaning specification classification					
Symbol	Details				
RA0 S RZ9	Based on abbreviated symbols of individual type symbol (RSC)				
BA0	Based on abbreviated symbols of individual type symbol (SBE)				
000	No cleaning equipment				
X00 \$ X99	Special product				

(14) Cip-vent switching classification					
Symbol	Details	Remarks			
V	Valve 2S SK03J****X*	Standard			
0	Not provided	Standard			
F	Float chamber 2s	Option			
Х	Other	_			

Presence/absence of air supply pipe and size					
Symbol	Details	Remarks			
0	Not provided				
2	With 2 <sup>s</sup> air supply nozzle	Standard			
4	With 4 <sup>s</sup> air supply nozzle				
X	Other special size	_			

$\widehat{\ ig( eta ig)}$ Presence/absence of exhaust pipe and size					
Symbol	Details	Remarks			
0	Not provided	Standard			
2	With 2 <sup>s</sup> air supply nozzle	Standard			
X	Other special size				

Sanitary tank cleaning equipment

## $\mathsf{SCV}_\mathsf{type}$

Dynamic surface cleaning

This is a cleaning valve equipped with a cleaning nozzle to generate an ultra-thin film of water continuously. This valve exerts a more excellent cleaning effect than conventional point spray and linear spray.

- Cleaning of silos
- Cleaning of spray driers
- Cleaning of large-sized ducts
- Partial cleaning of large-sized ducts
- Cleaning of tunnel freezers
- Integrated spray nozzle/automatic valve The nozzle part protrudes during cleaning and is stored in the valve when not cleaning, so that it becomes flush with the cleaning surface to provide excellently sanitary conditions.

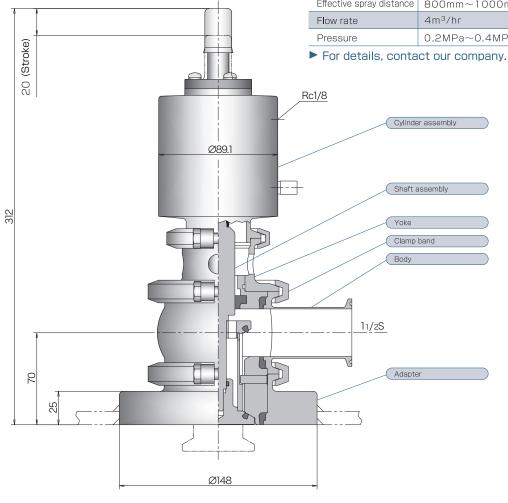
#### Material

SUS-304

SUS-316L

#### Production standard

Surface finish	Internal: #320 to #400 buff polishing			
Dimensional accuracy	Surface-to-surface dimension: +1.5mm Angular tolerance: +0.5°			
Main body max pressure	1Ma (water pressure, normal temperature)			
Valve seat max pressure	0.5Ma (water pressure, normal temperature)			
Operation air connection hole	0.4MPa			
Use temperature	0~100℃			
Effective spray distance	800mm~1000mm			
Flow rate	4m³/hr			
Pressure	0.2MPa~0.4MPa			
For details, contest our company				



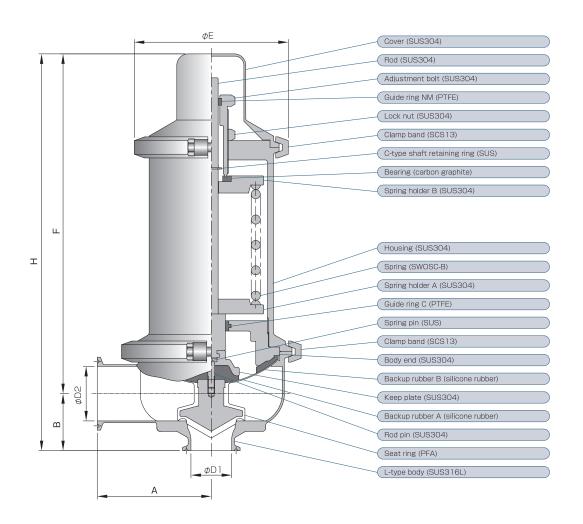
#### Sanitary tank safety equipment

## **DRV** type

DRV-type safety valve/relief valve

(JIS B 8210)

This is a pump-head safety valve with a diaphragm seat having an integrated diaphragm film and plug valve made of fluororesin for gas/steam where high sanitary properties are required. This valve can also be used as a release valve or a back-pressure valve.

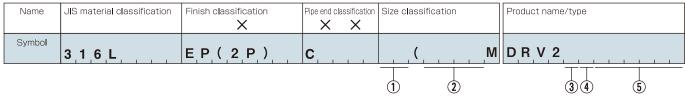


Units (mm)

Nominal dia.	Inlet side		Outlet side		۸	В	φΕ	Е	Н
Nominal dia.	Size	φD1	Size	φD2		Ь	Ψ∟	'	''
18	18	23	1.58	35.7	85	40	105	233.8	273.8
1.58	1.58	35.7	28	47.8	100	50	135	297.9	347.9
28	28	47.8	2.58	59.5	105	60	135	303.8	363.8
2.58	2.58	59.5	38	72.3	110	68	135	310.2	378.2
38	38	72.3	38	72.3	110	68	135	310.2	378.2



#### DRV-type safety valve/relief valve type symbol table



#### Material classification 316L

- Main body classification: SUS316L
- · Seat material: PFA

Finish classification EP (2P)
• Finish of wetted surfaces: #400 buff polishing + electrolytic polishing finish

#### Pipe end classification C

· ISO ferrule

1 Size classification					
Cumbal	Details				
Symbol	Inlet side (bore) x outlet side (bore)				
10	1S(φ23.0)×1.5S(φ35.7)				
15	1.5S(φ35.7)×2S(φ47.8)				
20	2S(φ47.8)×2.5S(φ59.5)				
25	2.5S (φ59.5)×3S (φ72.3)				
30	3S(φ72.3)×3S(φ72.3)				

2:	Set pressure: Values based on MPa units (0.10 to 0.40)
Symbol	Details
***	Input set pressure in MPa units to two decimal place.

(3) Main body type				
Symbol	Details			
L	L type			
T	T type			

4 Applicable fluid classification					
Symbol	Details				
S	Saturated vapor				
G	Gas				
L	Liquid				

5 Ac	lditional specification assifications	
	Contact us separately.	

Specifications for diaphragm-type safety valves							
When ordering safety valves, inform us of the following items.							
Application	☐ Tank	( 🗆 Clas	s I pressure vessel [	☐ Class II pressure vesse	el 🗆 Othei	-(	) *1
Application	☐ Line	(Line size	•				)
Applicable fluid	☐ Steam	(Saturatio	on temperature				)
Applicable Iluiu	☐ Gas	[   Air	[	☐ Other (	)]	Fluid tem	perature °C
Set pressure		MPa G	Back pressure	MPa G	Specified blo	owing amount	kg/h
Size Inlet (outlet)	□1s(1.5s)		□1.5s(2s)	2s(2.5s)	☐ 3s(3s)		re is specified, ring amount is fixed.

\*1: Classified by japanese industrial safety and health low.

#### Common specifications

Material	Wetted surface: SUS316L/PFA					
Finish	#400 buff polishing + electrolytic polishing finish (Ra0.2)					
Pipe end	ISO ferrule					
Withstand pressure	Main body withstand pressure: 0.5MPa	Set pressure range	0.10 to 0.40MPa (value to two decimal places)			
Heat resistance	150℃	Туре	Pump-head type safety valve			



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