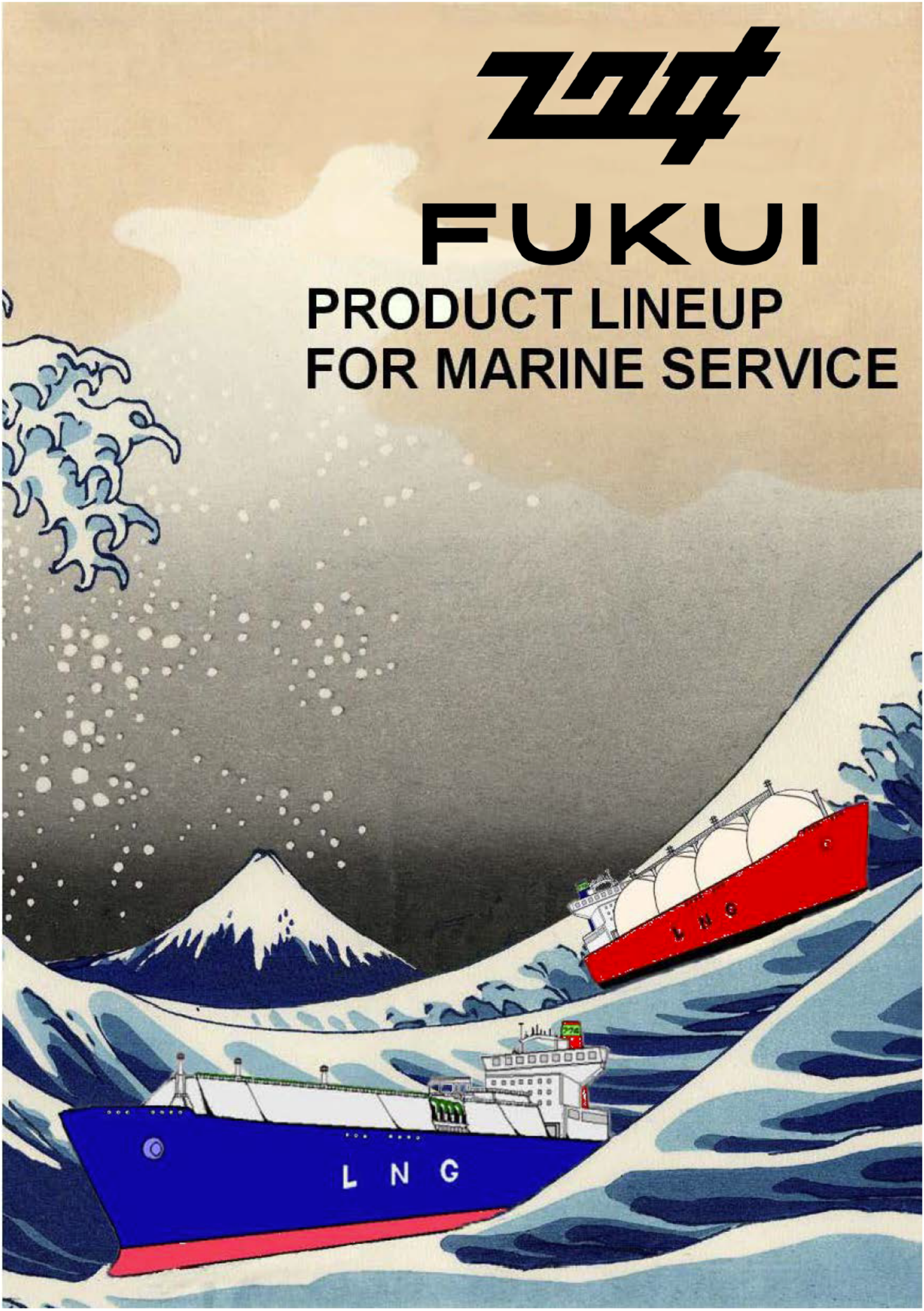
FUKUI

PRODUCT LINEUP FOR MARINE SERVICE



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1. Safety valves for cargo tanks

These safety valves are used for installation on cargo tanks for LNG vessels, LPG vessels, FPSO (Floating Production, Storage and Offloading system), FSO (Floating Storage and Offloading system) and other types of systems and vessels.

As safety valves for marine use, the pilot-operated safety valve structure is adopted because the set pressure is not affected by vibration. The following two types are available:

- PSL-MD Series: Low pressure/ diaphragm type mainly used onboard LNG vessels
- PSL-MP Series: Low pressure/piston type mainly used onboard pressure type LPG vessels

2. Safety valves for boiler service

As safety valves for marine boiler use, the following series are available from our lineup.

- SL and SJ series of cast steel make
- SP series of bronze casing make for small package boilers

These series valves have been designed and developed for steam service only, featuring firm seat tightness during operation and secure operating performance in case of an emergency.

3. Safety valves for piping

RE series provides high flexibility in service as safety valves for cargo piping and utilities.

4. Classification society

Theses series of safety valves have been type approved from each classification society.

Appendix A

PSL-MD SERIES

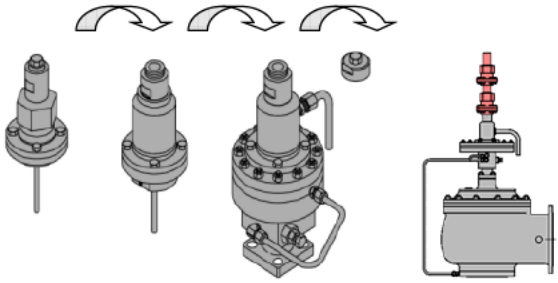
FUKUI SEISAKUSHO CO., LTD.

Achievements in the rocket fuel, helium gas, and liquefied gas fields have realized our ideal as a product.

Global warming in recent years, seriously affecting our environment!
Green action on a global level now brings about attention focused on “natural gas” as a clean energy that can replace oil and coal.
The PSL series we offer here is based on FUKUI’s hands-on experience and know-how about liquefied gas covering transportation and storage of this “natural gas“, thus realizing the use in a harsh environment involving extremely low temperatures and very low pressures.

Features of valves for cargo tanks of liquefied gas vessels

Changing the popping pressure is possible even during operation!



Ordinary safety valves were not easy to change the popping pressure during system operation. However, PSL series allows simple and reliable change of the popping pressure appropriate to the cargo by using aux. setter.
Also meets the IGC code in design.

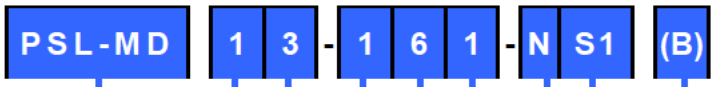
Accurate operation!

Adopts PTFE diaphragm excellent in durability and corrosion resistance.
Accommodates all types of cargo, and realizes accurate operation and reduced maintenance costs at the same time.
Employs a flange structure to attain easy installation of a pilot valve, and also as a means for preventing a malfunction from occurring due to loose connection caused by vibration, for example.

Excellent gastightness

Adopts a membrane seat structure that allows no leaks of cargo from the main valve.
Uses PTFE sealing to prevent deterioration of sealing performance that may occur over years, thus ensuring 100% protection of cargo loaded onboard.

Model code



Series code

Pilot valve code

Designation	Description
1	Single pilot as single set
2	Single pilot as multi-set
3	Dual pilot as single set
4	Dual pilot as multi-set

Main valve structure code

Designation	Description
2	Flangeless type with no diaphragm support.
3	Flangeless type with diaphragm support

Pressure class code

Designation	Pressure class	
	JIS	ANSI, JPI
1	10K	150#
2	20K	300#
3	30K	300#

Cap code

Designation	Description
A	Closed type
B	Closed type with test gag

Valve body material code

Designation	Material	
	JIS	ASTM
(Blank)	SCPH2	A216 Gr.WCB
C5	SCPL1	A352 Gr.LCB
S	SCS13A	A351 Gr.CF8
S1	SCS14A	A351 Gr.CF8M
S2	SCS19A	A351 Gr.CF3
S3	SCS16A	A351 Gr.CF3M

Added code

Designation	Description
(Blank)	Diaphragm retainer made of casting material or none.
N	Diaphragm retainer made of plate material
D	Diaphragm retainer made of plate material for sealed LNGC
T	Diaphragm retainer made of plate material. Disc and other parts are made of titanium.
X	With limit switch (ATEX)
W	Double pilot

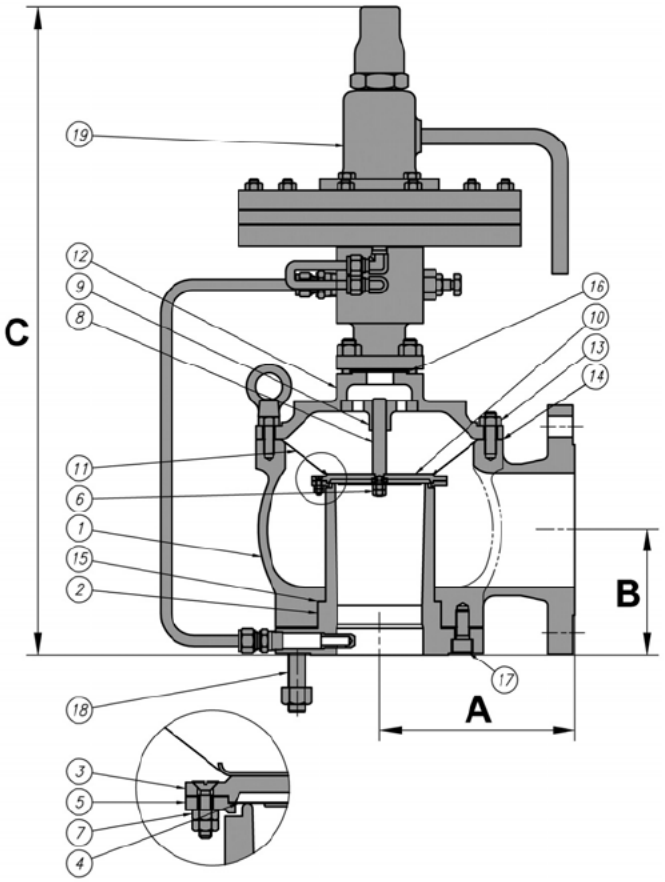
Inlet connection code

Designation	Inlet connection
1	ANSI flange standard
2	JPI flange standard
4	JIS B 2220
5	Specified by customer (for special connection)

Temperature class code

Designation	Operating temperature range
3	-196.0 to -101.1°C
5	-101.1 to -28.8°C
6	-28.8 to 125°C

PSL-MD( )2



■Standard material

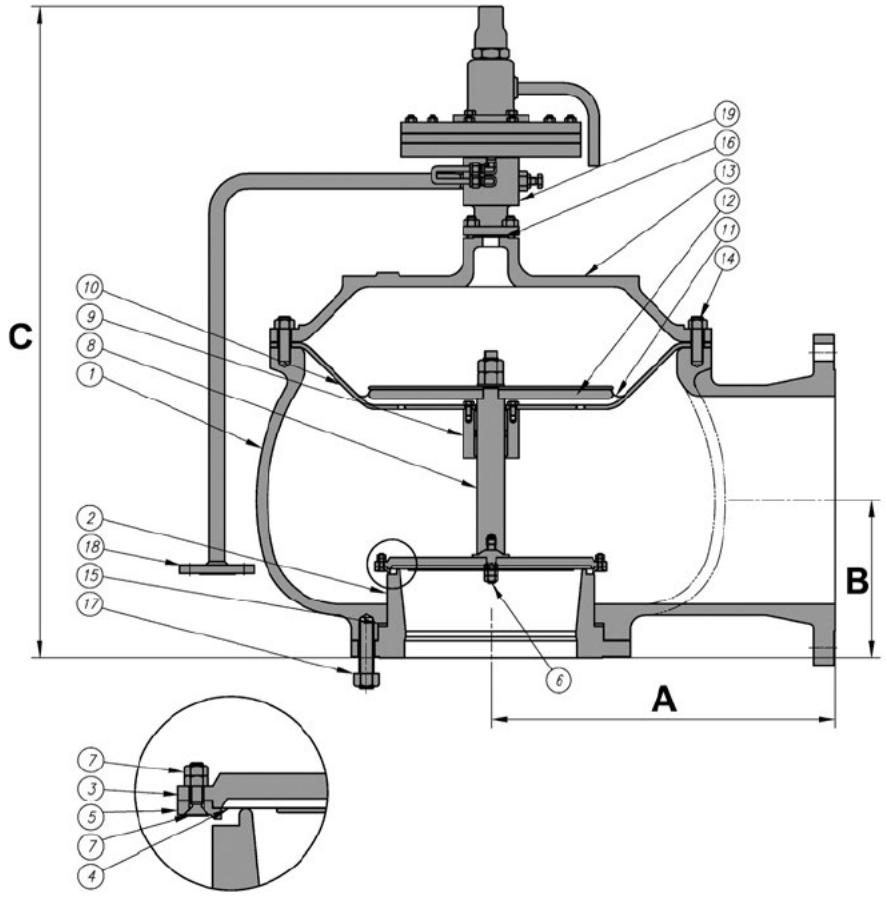
Model code		PSL-MD ()2-()()()-S	PSL-MD ()2-()()()-C5	PSL-MD ()2-()()()-S1
Temperature range		-196.0 - 125℃	-45 - 125℃	-196.0 - 125℃
1	Body *1	SCS13A	SCPL1	SCS14A
2	Nozzle seat	SUS304 or SCS13A		SUS316 or SCS14A
3	Disc	SUS304		SUS316
4	Seat	PTFE		PTFE
5	Disc retainer	SUS304		SUS316
6	Disc center nut	SUS304		SUS316
7	Retainer bolt & nut	SUS304		SUS316
8	Spindle	SUS304		SUS316
9	Guide	SUS304		SUS316
10	Upper diaphragm set plate	SUS304		SUS316
11	Diaphragm	PTFE		PTFE
12	Cover *1	SCS13A	SCS13A	SCS14A
13	Bolt & nut	SUS304		SUS316
14	Gasket	PTFE		PTFE
15	Gasket	PTFE		PTFE
16	Gasket	PTFE		PTFE
17	Nozzle seat installation bolt	SUS304		SUS316
18	Inlet bolt & nut	SUS304		SUS316
19	Pilot valve	SUS304 or SCS13A		SUS316 or SCS14A

*1: Can comply with the material specified by a specific Classification Society.
Note that the operating temperature range varies depending on the material standard of the valve body.

■Dimension table

Operating temp. range		1 - 10kPa (0.01 - 0.1bar)					
Dimensions		INLET × OUTLET					
		2×2	3×3	4×4	6×6	8×8	10×10
Orifice area	cm^2	21.647	47.783	82.194	186.265	334.587	479.163
Dimensions (mm)	A	150	180	200	315	400	500
	B	105	115	140	175	200	230
	C	580	620	700	820	900	975
Weight (kg)		45	65	100	160	240	380

PSL-MD ( )3-( ) ( ) ( )-N



■ Standard material

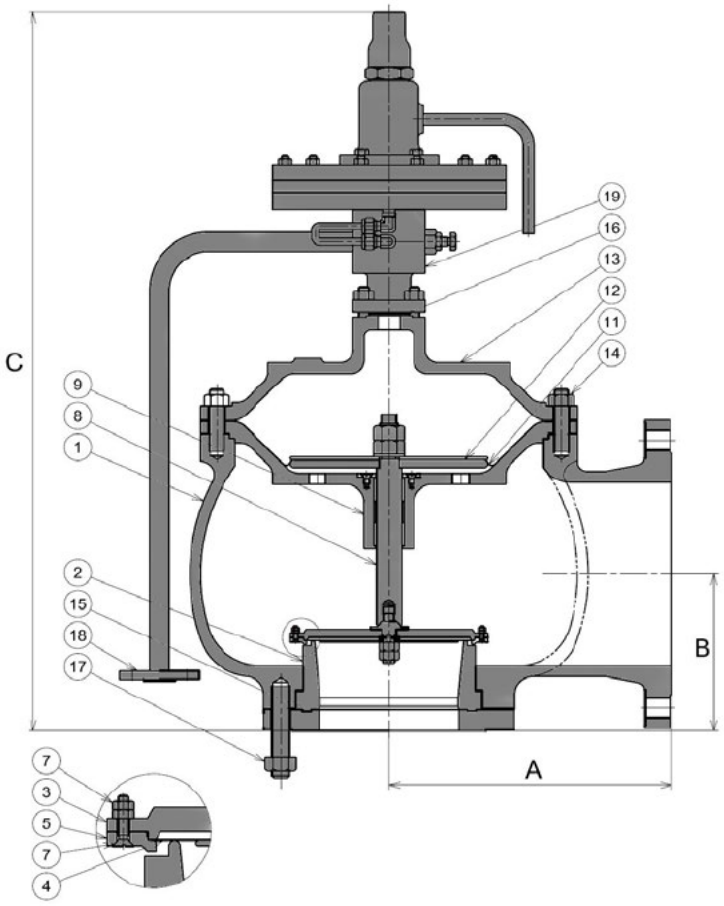
Model code		PSL-MD()3-()()()-NS	PSL-MD()3-()()()-NC5	PSL-MD()3-()()()-NS1
Operating temperature range		-196 - 125 ˚ C	-45 - 125 ˚ C	-196 - 125 ˚ C
1	Body *1	SCS13A	SCPL1	SCS14A
2	Nozzle seat	SUS304 or SCS13A		SUS316 or SCS14A
3	Disc	SUS304		SUS316
4	Seat	PTFE		PTFE
5	Disc retainer	SUS304		SUS316
6	Disc center bolt	SUS304		SUS316
7	Retainer bolt & nut	SUS304		SUS316
8	Spindle	SUS304		SUS316
9	Guide	SUS304		SUS316
10	Diaphragm cover	SUS304		SUS316
11	Diaphragm	PTFE		PTFE
12	Diaphragm retainer	SUS304		SUS316
13	Cover *1	SCS13A	SCPL1	SCS14A
14	Bolt & nut	SUS304		SUS316
15	Gasket	PTFE		PTFE
16	Gasket	PTFE		PTFE
17	Inlet bolt & nut	SUS304		SUS316
18	Remote pickup flange & pipe	SUS304		SUS316
19	Pilot valve	SUS304 or SCS13A		SUS3016or SCS14A

*1: Can comply with the material specified by a specific Classification Society.
Note that the operating temperature range varies depending on the material standard of the valve body.
*2 Inlet and outlet flanges can also be manufactured in accordance with JIS, in which case the nozzle may be a semi-nozzle type.

■ Dimension table

Operating temp. range		5 - 250kPa (0.05 - 2.5bar)				
Dimensions		INLET (ANSI150LB) × OUTLET (ANSI150LB)				
		4×6	6×8	8×10	10×12	12×16
Orifice area	cm^2	82.194	186.265	334.587	479.163	759.644
Dimensions (mm)	A	200	315	400	500	560
	B	140	175	200	230	250
	C	665	780	860	935	1025
Weight (kg)		120	200	280	400	600

PSL-MD ( )3-( ) ( ) ( )



■Standard material

Model codel		PSL-MD()3-()()()-S	PSL-MD()3-()()()-C5	PSL-MD()3-()()()-S1
Operating temperature range		-196 - 125 ˚ C	-45 - 125 ˚ C	-196 - 125 ˚ C
1	Body *1	SCS13A	SCPL1	SCS14A
2	Nozzle seat	SUS304 or SCS13A		SUS316 or SCS14A
3	Disc	SUS304		SUS316
4	Seat	PTFE		PTFE
5	Disc retainer	SUS304		SUS316
6	Disc center bolt	SUS304		SUS316
7	Retainer bolt & nut	SUS304		SUS316
8	Spindle	SUS304		SUS316
9	Guide	SCS13A		SCS14A
11	Diaphragm	PTFE		PTFE
12	Diaphragm retainer	SUS304		SUS316
13	Cover *1	SCS13A	SCPL1	SUS316 or SCS14A
14	Bolt & nut	SUS304		SUS316
15	Gasket	PTFE		PTFE
16	Gasket	PTFE		PTFE
17	Inlet bolt & nut	SUS304		SUS316
18	Remote pickup flange & pipe	SUS304		SUS316
19	Pilot valve	SUS304 or SCS13A		SUS316 or SCS14A

*1: Can comply with material specified by a specific Classification Society.
Note that the operating temperature range varies depending on the material standard of the valve body.
*2 Inlet and outlet flanges can also be manufactured in accordance with JIS, in which case the nozzle may be a semi-nozzle type.

■ Dimension table

Operating temp. range		5 - 250 kPaG (0.05 - 2.5bar)		
Dimensions		INLET (ANSI150LB) × OUTLET (ANSI150LB)		
		2×3	3×4	14×18
Orifice area	cm^2	21.647	47.783	905.251
Dimensions (mm)	A	150	180	630
	B	100	115	300
	C	550	590	1150
Weight (kg)		50	80	850

Appendix B

PSL-MP SERIES

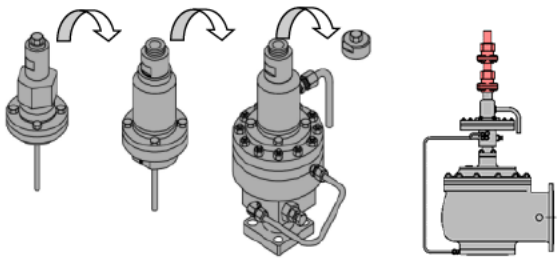
FUKUI SEISAKUSHO CO., LTD.

We support safety of transportation of various liquefied gases as industrial infrastructure.

PSL-MP series is suited for air, gases, vapors and other services at low and medium pressures.
Adopts optimum design as a safety valve for use in cargo tanks of liquefied gas bulk carriers in particular.
Allows minimum installation costs with respect to the IGC code multi-pressure and large popping capacity (discharge coefficient: 0.843).
A good combination of “main valve of simple structure” and “pilot valve with excellent durability” ensures safety of the system.

Features of valves for cargo tanks of liquefied gas bulk carriers

Can change the popping pressure setting even during operation!



For ordinary safety valves, the popping pressure could not be changed with ease during system operation. However, PSL-MP series allows simple and reliable change of the popping pressure setting to suit the cargo by using an aux. setter.
Also meets the IGC code design requirements.

Accurate operation!

Adopts metal diaphragm excellent in durability and corrosion resistance.
Accommodates all types of cargo, and also realizes accurate operation and reduced maintenance costs.
Employs a flange structure for easy installation of a pilot valve, and also as a means for preventing a malfunction from occurring due to loose connection caused by vibration, for instance.

Excellent safety!

Can be optionally equipped with a protector to avoid possible damage to the valve and piping that may be caused by driftwood or floatage on a stormy day during navigation.
Provided with measures against malfunction in any condition.

Superb gastightness!

Adopts the self-sealing structure that allows no leaks of cargo from the main valve.
Uses highly corrosion-resistant O-ring for sealing purposes to attain better gastightness.

Model code

Series code

Pilot valve code

Designation	Description
1	Single pilot as single set
2	Single pilot as multi-set
3	Dual pilot as single set
4	Dual pilot as multi-set

Main-valve structure code

Designation	Description
1	1 only for MP series

Pressure class code

Designation	Pressure class	
	JIS	ANSI, JPI
1	10K	150#
2	20K	300#
3	30K	300#

Cap code

Designation	Description
A	Closed type
B	Closed type with test gag

Valve body material code

Designation	Material	
	JIS	ASTM
(Blank)	SCPH2	A216 Gr.WCB
C5	SCPL1	A352 Gr.LCB
S	SCS13A	A351 Gr.CF8
S1	SCS14A	A351 Gr.CF8M
S2	SCS19A	A351 Gr.CF3
S3	SCS16A	A351 Gr.CF3M

Added code

Designation	Description
R	O-Ring seat
T	PTFE seat

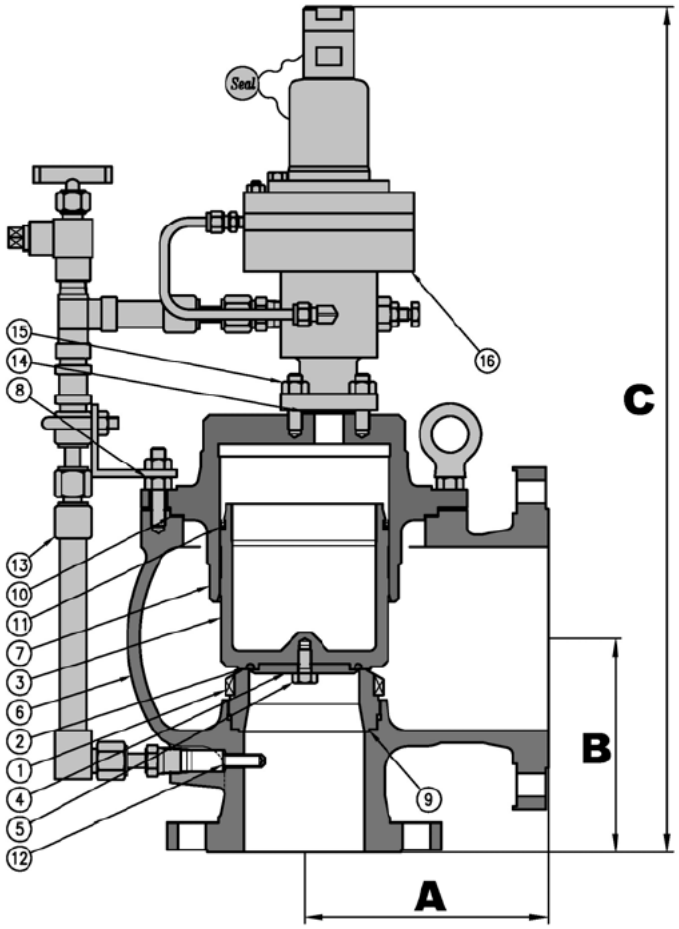
Inlet connection code

Designation	Inlet connection
1	ANSI flange standard
2	JPI flange standard
4	JIS B 2220
5	Specified by customer for special connection

Pressure class code

Designation	Operating temperature range
3	-196.0 - -101.1°C
5	-101.1 - -28.8°C
6	-28.8 - 125°C

Parts name and material



■ Standard material

Model code		PSL-MP()1-()()()-S	PSL-MP()1-()()()-C5	PSL-MP()1-()()()
Operating temperature range		-196.0 - 125℃	-45 - 125℃	-28.8 - 125℃
1	Nozzle seat	SUS304		
2	Seat *2	Perfluoro-elastomer		
3	Disc	SUS304		
4	Seat retainer	SUS304		
5	Retainer bolt	SUS304		
6	Body *1	SCS13A	SCPL1	SCPH2
7	Cover *1	SCS13A		
8	Bolt & nut	SUS304		
9	Gasket	PTFE		
10	Gasket	PTFE		
11	Piston seal	PTFE		
12	Dipper tube	SUS304		
13	Supply pipe	SUS316/SUS304TP		
14	Gasket	PTFE		
15	Bolt & nut	SUS304		
16	Pilot valve	SUS304		

*1: Can comply with the material specified by a specific Classification Society.
Note that the operating temperature range varies depending on the material standard of the valve body.
*2 Can also accommodate PTFE seats.

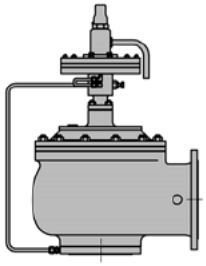
■Dimension table

Operating temp. range		0.1 - 2.0 MPaG				
Dimensions		INLET (ANSI150LB) × OUTLET (ANSI150LB)				
		2×3	3×4	4×6	6×8	8×10
Orifice area	cm^2	19.634	44.178	71.63	153.938	254.469
Dimensions (mm)	A	135	175	200	280	310
	B	125	160	175	220	240
	C	610	680	720	830	900
Weight (kg)		50	70	110	170	250

PSL-MD/MP Common Specifications

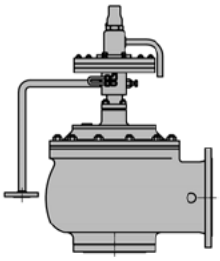
Pilot valve pressure supply method

Internal pickup method



The pressure sensing section of the pilot valve is connected to the main valve inlet. Therefore, as with conventional type safety valves, these series of valves can be simply installed on the piping or tank for ready use.
However, ensure that the pressure loss across the safety valve inlet piping and the inlet piping is less than 3%.

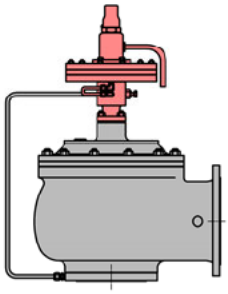
Remote pickup method



This method is such that the pressure sensing section of the pilot valve is individually piped.
Take care to ensure that no hunting or other problem will occur when the pressure loss across the safety valve inlet piping or the inlet piping exceeds 3%.
For use on tanks, we recommend this remote pickup method.

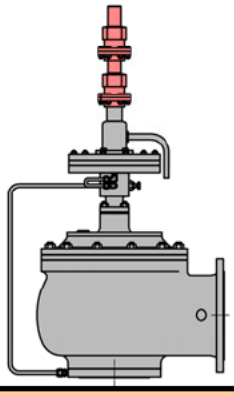
Pilot valve code

Code designation = 1 ·····Single pilot as single set



One pilot valve is mounted on the main valve to control one pressure setting.

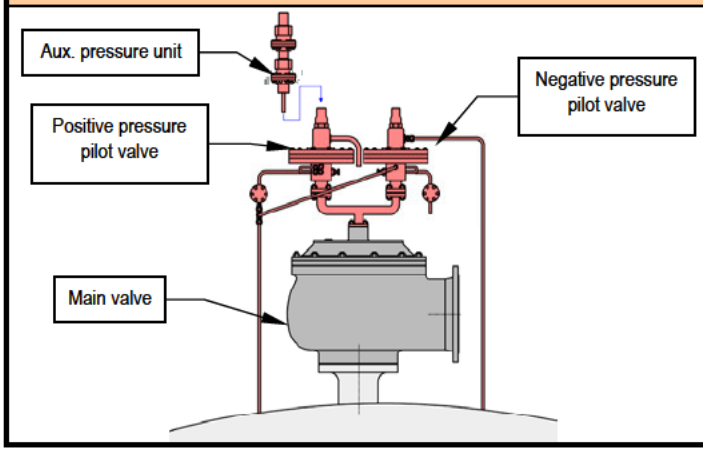
Code designation = 2 ·····Single pilot as multi set



One pilot valve is mounted on the main valve, and by equipping the pilot valve with an aux. setter, two or three pressure settings can be controlled.

Allows easy compliance to I.G.C. code 8.2.7.

Code designation = 3 ·····Dual pilot as single set



Code designation = 4·····Dual pilot as multi set

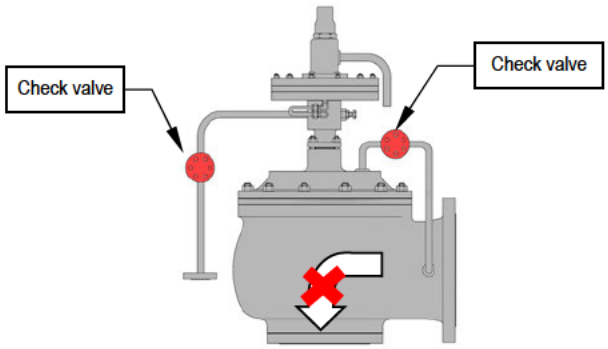
Two pilot valves are mounted on one main valve, with each pilot valve controlling the two settings of positive and negative pressures.
(Code designation = 3)

Furthermore, equipping the pilot valve with an aux. pressure unit allows control of two or three settings of positive and negative pressures.
(Code designation = 4)

PSL-MD/MP Common Specifications

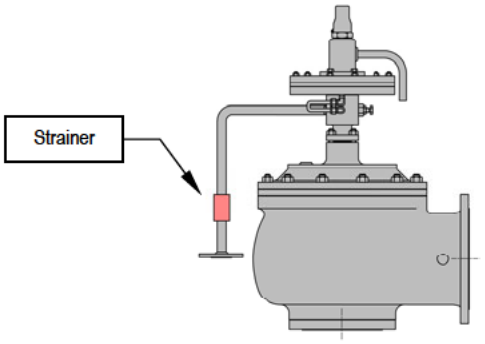
Accessories

Check valve



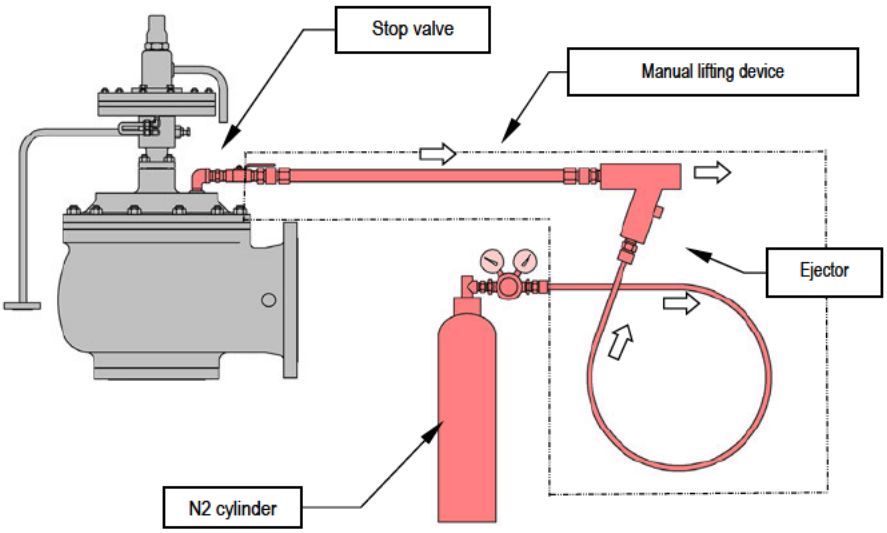
A pilot operated safety valve is so structured that when a specific container on which the valve is installed turns to a vacuum condition, air is sucked into the container from the main valve outlet.
In order to prevent it from occurring, a check valve is installed on the supply line to ensure no reverse flow.

Strainer



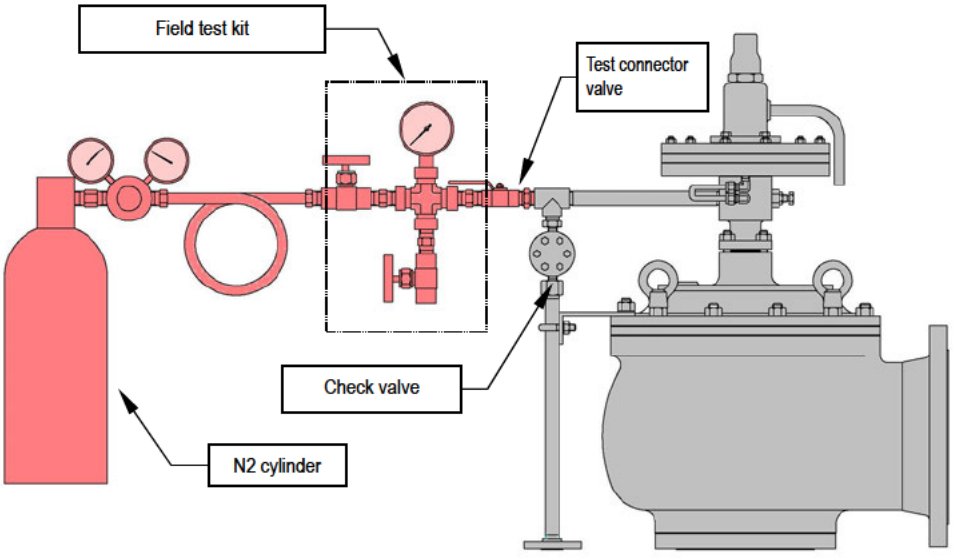
When scale or other foreign matter is present inside the container on which a safety valve is installed, a strainer is required for their removal to ensure protection and proper operation of the pilot valve.

Manual lifting device



The manual lifting device allows the main valve to be checked for operation even when there is no pressure on the primary side of the pilot-operated safety valve, by sucking the pressure from inside the main valve dome through the flow of gas from a pressure source such as an N2 cylinder.

Field test connector and test kit



In a field test the pilot valve can be checked for the popping pressure with the safety valve installed on a plant, for example.
In other words, to carry out a field test there is no need to remove the safety valve from the system or to arrange for large-scale testing equipment, thus making it possible to realize a simple and effective test.

Appendix C

SL/SJ SERIES

FOR STEAM SERVICE

FUKUI SEISAKUSHO CO., LTD.

SJ/SL series safety valves for steam service

SJ/SL series safety valves have been developed for steam service to meet the Rules for the Survey and Construction of Steel Ships (NK) and the Rules and Regulations of those classifications societies such as LRS.
The SJ/SL series are designed to endure harsh operating conditions involving high temperatures and high pressures, in terms of structure and material.

Technology for enhancing product reliability (SJ/SL100~300)

In case of an emergency under a tough operating condition, safety valves must operate to quickly discharge an extra pressure to protect the pressure equipment from the risk of explosion. They also need gastightness good enough to permit no leaks of fluid from pressure equipment.

Thus, safety valves must play a role of meeting these two conflicting requirements at the same time. However, only the force of the spring built in the safety valve must cope with this tough problem.

In order to solve this problem, we adopt the disc structures called “feather lip disc“ and ”thermo lip disc“ that are made by forming the seat tip to be lip shaped, followed by high-precision machining to provide excellent flexibility in property so that accurate operating and secure sealing characteristics will be drawn forth by utilizing the fluid temperature and pressure.

In addition, we dedicate efforts to create reliable springs, spindles and other products into the market by making full use of our longstanding experience/know-how and achievements so far made.

■ Yoke

SJ/SL100 to 300 series adopt a yoke structure.
The structure with a spring installed in the yoke promotes efficient air cooling so that steam heat does not affect the spring at the time of valve operation.

■ Spring

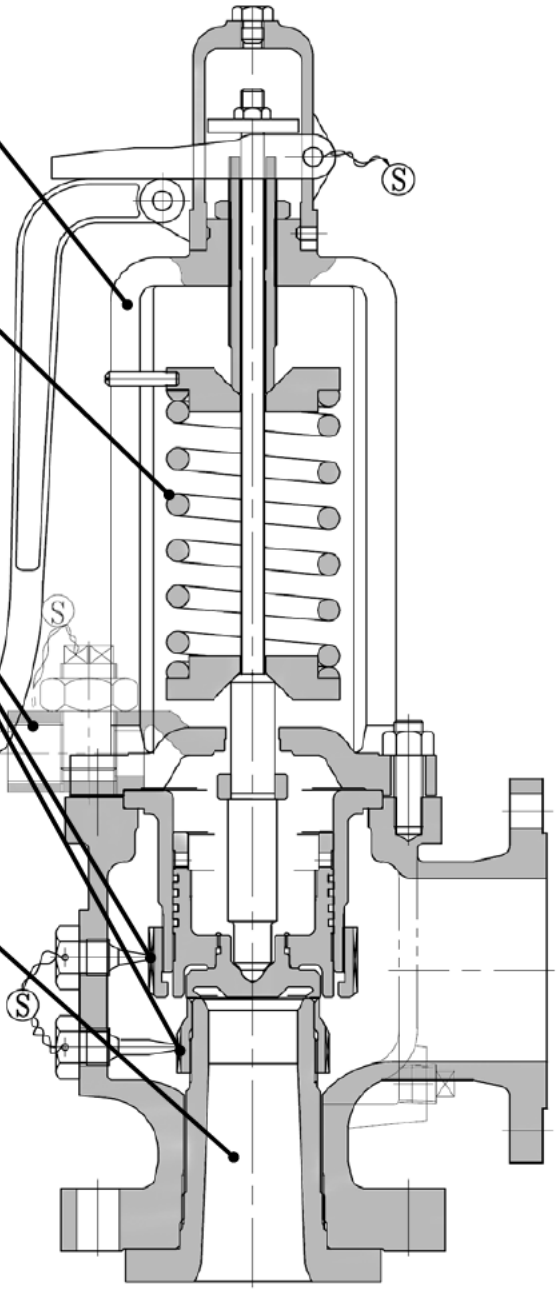
A cylindrical coil spring of high dimensional accuracy in which the flexibility index is maintained at constant irrespective of pressure, and eccentric load is corrected.
For the spring material, alloy steel is used because of its excellent fatigue resistance, workability, and hardenability.

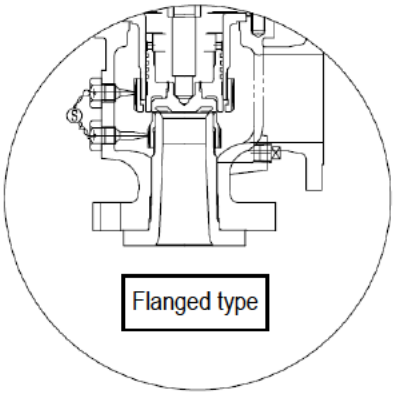
■ Operation adjustment mechanism

The lower adjusting ring equipped on the upper edge of the nozzle seat is a means for making fine adjustments of a popping action at its initial stage.
The upper adjusting ring is provided on the lower part of the guide as a blowdown adjusting mechanism.
In addition our back pressure adjusting mechanism is for blowdown adjustment and it is such that the back pressure adjusting needle or back pressure adjusting cock equipped on the yoke is used to control the back pressure that occurs at the back of the disc when the safety valve starts popping.

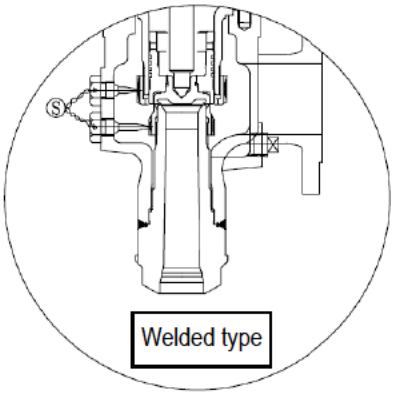
■ Nozzle seat

The nozzle seat adopted is so structured that an integral full nozzle is screwed in the valve body to fix in position, with the lower section seal-welded. The nozzle seat material used is carbon steel, forged steel or low alloy forged steel that are all high in safety, and the edge seat section coming in contact with the disc is clad with stellite for surface hardening.





Flanged type



Welded type

Technology for enhancing product reliability (SL400)

■ Yoke

SL400 type series adopts a yoke structure.
The structure with a spring installed in the yoke allows efficient air cooling so that steam heat does not affect the spring at the time of valve operation.

■ Spring

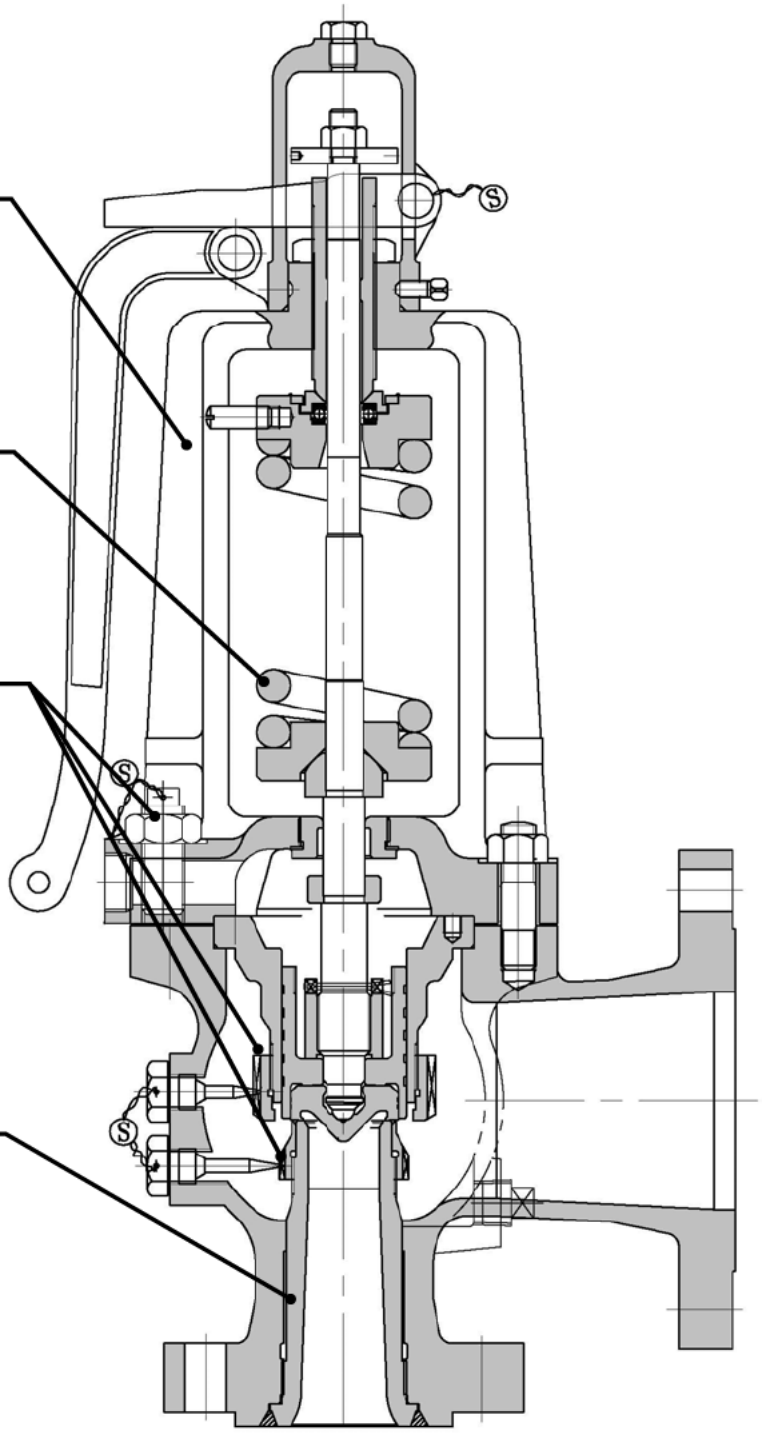
A cylindrical coil spring of high dimensional accuracy in which the flexibility index is maintained at constant irrespective of pressure, and eccentric load is corrected.
For the spring material, alloy steel is used because of its excellent fatigue resistance, workability, and hardenability.

■ Operation adjustment mechanism

The lower adjusting ring equipped on the upper edge of the nozzle seat is a means for making fine adjustments of a popping action at its initial stage.
The upper adjusting ring is provided on the lower part of the guide and it is a blowdown adjusting mechanism.
Our back pressure adjusting mechanism is for blowdown adjustment and it is such that the back pressure adjusting needle equipped on the yoke is used to control the back pressure that occurs at the back of the disc when the safety valve.

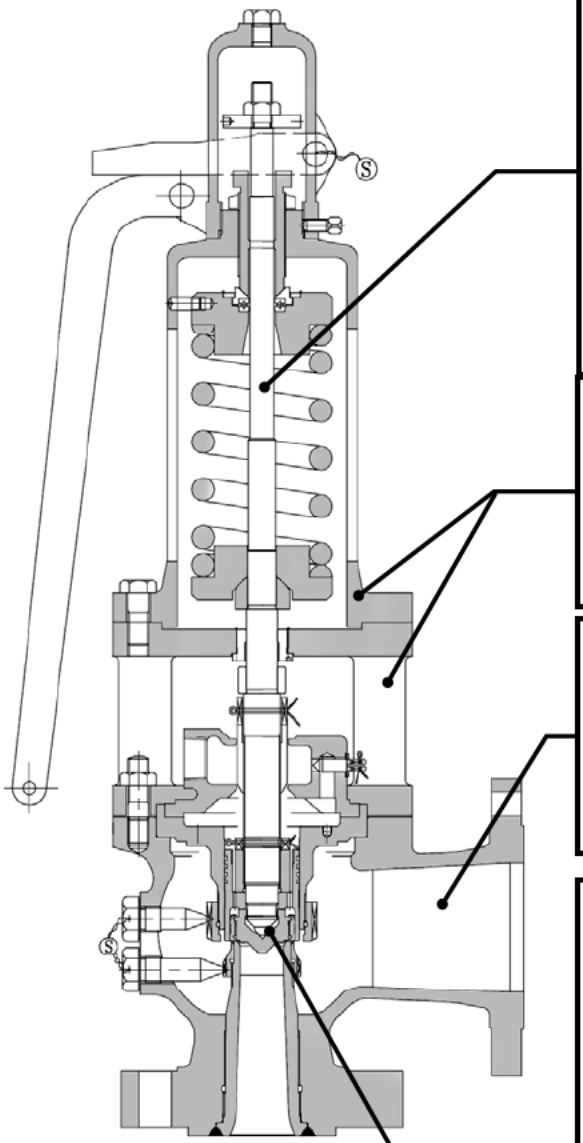
■ Nozzle seat

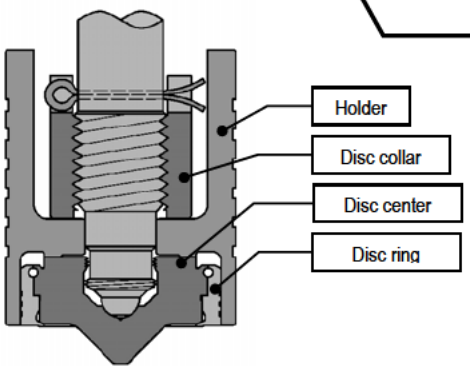
The nozzle seat adopted is so structured that an integral full nozzle is screwed in the valve body to fix in position, with the lower section seal-welded.
The nozzle seat material used is carbon steel, forged steel or low alloy forged steel that are all high in safety, and the edge seat section that comes in contact with the disc is clad with stellite for surface hardening.



Technology for enhancing product reliability (SL500~900)

In addition to the popping characteristics and the seat tightness, safety valves need a mechanism that provides high reliability. One example is a back pressure adjusting mechanism unique in our safety valves.
Besides the clear popping mechanism and the valve lifting force adjustment mechanism, our safety valves are equipped with our original back pressure adjusting mechanism to allow safety valve blowdown adjustment.
This mechanism is based on the yoke type side needle method that features coil spring protection and easy adjustment work after installation, and also on the cooling type center throttle method in which the throttle automatically opens and closes in accordance with the disc action: these two methods have been put into practical use.





Thermal disc

■ Spindle

At the edge of the spindle transmitting a spring thrust that ranges from hundreds of kilos to several tons, the spring thrust must be transmitted accurately to the disc center in the vertical direction, thus requiring load and wear resistances against the thrust.
For this, our spindle is so structured that the disc back section and the spindle edge at which the spindle thrust is to be received are finished to be perfectly spherical with each other to ensure centricity of the spring thrust and also reliable transmission of a load by maintaining an appropriate contact surface area.
The spindle material is 13-chrome based stainless steel, and for high temperature & high pressure specifications, special chrome nickel silicon stainless steel is adopted for its higher wear resistance.

■ Cooling spool and bonnet

The bonnet of SL 700 type and above is of a cylindrical type for spring protection and increased strength against vibration.
In addition, a cooling spool is provided between the valve body and the bonnet to avoid direct exposure of the spring to high temperature steam at the time of valve operation. At the same time, this cooling section is structured to allow easy release of the center throttle adjusting back pressure.

■ Valve body

The valve body is spherical in shape to provide a structure that allows minimum influence of reaction force by popping steam or of distortion resulting from pipe vibration at the installation side or at the exhaust side.
Furthermore, this structure eliminates useless dead space in the body, and instead allows uniform pressure distribution inside the body, thus making the flow toward the valve outlet smooth.

■ Disc

The disc structure comes in two types: feather lip disc in which the contact surface with the nozzle seat is formed to be a lip face, and a thermo lip disc. These are selectively used depending on the operating temperature and pressure.
The operating principle is that the disc seating section is machined to form a lip so that the lip edge is bent by the internal pressure until the safety valve starts popping, and with an increase in pressure the disc seat surface pressure decreases, in which case the raised section of the lip reduces the contact area of the disc with the nozzle seat, thus maintaining a high seat surface pressure to ensure good gas tightness.
The thermo lip disc is of a built-up structure consisting of a combination of the disc center and the disc ring, and is actually an improved version of a feather lip disc in terms of function, for use at high pressures. This method features that a lip support is provided at the disc center edge and the lip back-side, to prevent deformation of the lip section: to be more specific, the lip section is protected from deformation due to shocks that occur when the safety valve closes. This means that even in the high temperature/ high pressure area the feather lip's excellent function of maintaining tightness is not impaired, thus contributing to enhancing the durability of the disc.
In addition, a gap is provided between the disc and the holder, presenting a flexible type. Therefore, even if the spindle is subjected to inclination by an external force such as the reaction force of piping, the disc is not affected in its function.

Model code of safety valves for steam service

	4	3	1	–	3		(T)
Model code	Pressure class code	Temperature class code	Inlet connection code		Special connection code	Casing material code	Cap code

Designation	Description
(C)	Open lever type
(T)	Open lever type with test gag

Designation	Material	
	JIS	ASTM
None	SCPH2	A216 Gr.WCB
-C2	SCPH21	A217 Gr.WC6
-C3	SCPH32	A217 Gr.WC9
-C4	SCPH61	A217 Gr.C5
-CA	SCPH91	A217 Gr.C12A

Designation	Inlet connection standard		
	JIS B8210	ANSI , JPI	JIS B2220
-3	30K	300#	30K
-4	40K	600#	40K
-5		900#	63K
-6	-	1500#	-
-7	-	2500#	-

If the nominal pressure of the inlet connection is the same as those of the pressure class code, then no designation is given.

Designation	Inlet connection
0	JIS B8210 (1986)
1	ANSI flange standard
2	JPI flange standard
3	Welded type
4	JIS B2220
5	Specified by customer for special connection
9	JIS B8210 (1994)

Designation	Max. operating temperature
3	400□ (750˚F)
4	450□ (850˚F)
5	510□ (950˚F)
6	570□ (1060˚F)
7	604□ (1120˚F)

Designation	Inlet connection standard		
	JIS B8210	ANSI , JPI	JIS B2220
1	10K	150#	10K
2	20K	300#	20K
3	30K	300#	30K
4	40K	600#	40K
5		900#	63K
6	-	1500#	-
7	-	2500#	-
8	-	2500#	-
9	-	3000# *1	-
10	-	4500# *1	-

*1: Welded type only

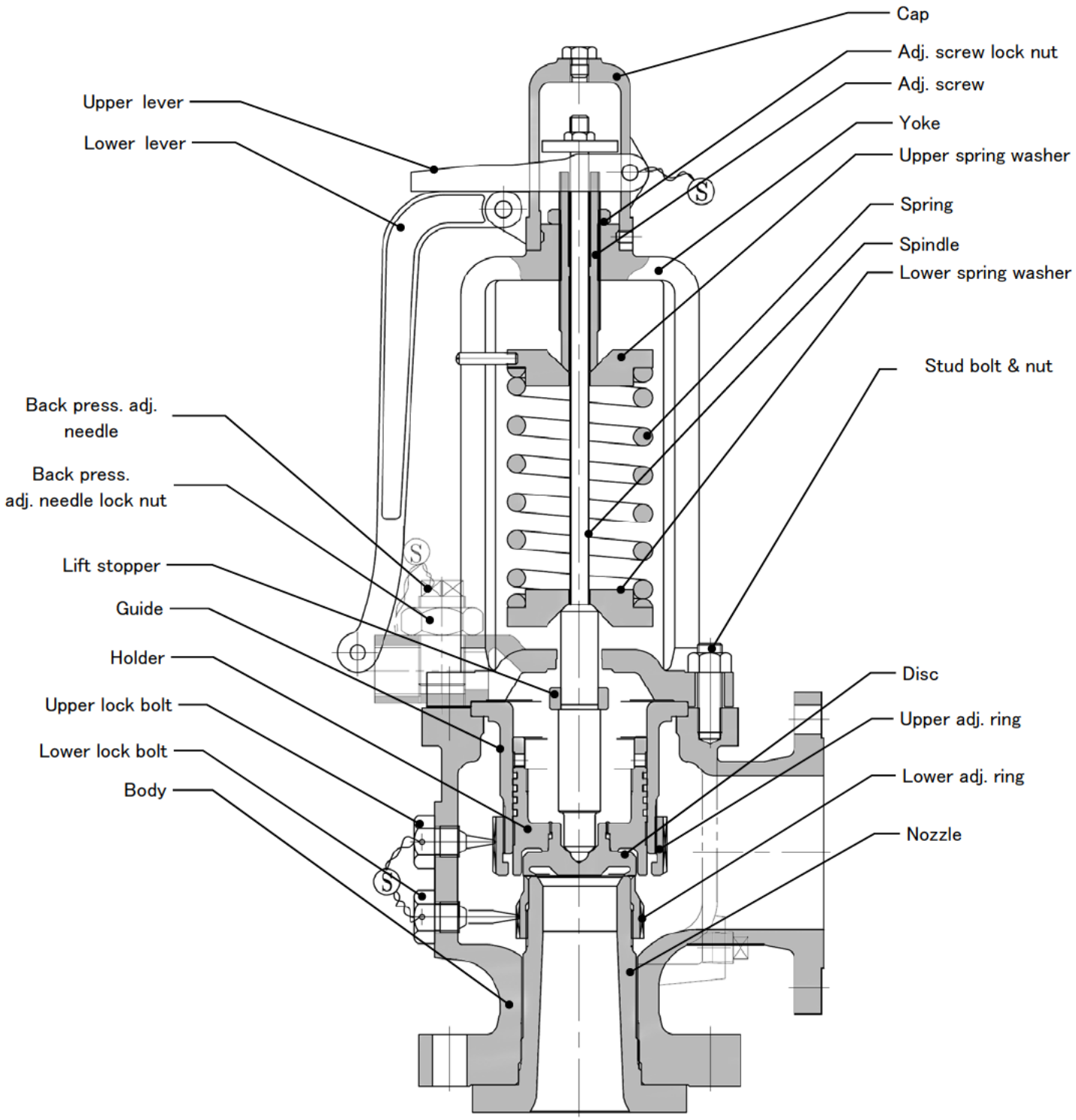
Designation	Applicable standard and code	Inlet connection standard		
	Classification society	ANSI , JPI	JIS B2220	Welded type
SJ	◎	○	◎	◎
SL	◎	◎	○	◎

Relieving capacity calculations for safety valves for steam service

Applicable standard	Equation	Symbol	
NK	$W = \frac{A \cdot Kd(1.03Ps+1)}{100}\sqrt{\frac{Vsat}{Vsh}}$	*W* : nominal relieving capacity	kg/h
		A : throat area	mm^2
		Kd : nominal discharge coefficient	
LR	$W = \frac{A \cdot Kd(1.03Ps+1)}{98.1}\sqrt{\frac{Vsat}{Vsh}}$	*Ps* : set pressure	barG
		Vsat : specific volume of saturated steam	m^3/kg
		Vsh : specific volume of superheated steam (*Vsh* = *Vsat* for saturated steam)	m^3/kg
DNV	$W = \frac{A(Ps+1)}{Kd(1+0.0018\times Td)}$	*Td* : difference between relieving temp. and saturated temp. (0 for saturated steam)	℃
		Tsh : superheated steam temperature (0 for saturated steam)	℃
BV	$W = \frac{A}{Kd}\cdot\frac{L}{dt}\cdot\frac{1.02Ps+1}{\left(1+\frac{Tsh}{556}\right)}$	*L*: safety valve lift	mm
		dt: safety valve throat diameter	mm
KR	$W = \frac{A}{Kd}\frac{1.05Ps+1.0}{\left(1+\frac{Tsh}{556}\right)}$		

For the Rules and Regulations of other classification societies, please contact us.

SJ/SL1 ( ) ( ) ~3 ( ) ( ) series safety valves: Parts name



SJ100～300 (Unit: mm²)

Orifice designation	F2	G2	H2	J2	L1	M	N3	P2	Q2	Q3	R	T
Throat area	283.5	452.4	706.8	1134.1	1885.7	2533.9	3739.3	4560.4	6082.1	7208.1	10386.9	18385.4

SL100～300 (Unit: mm²)

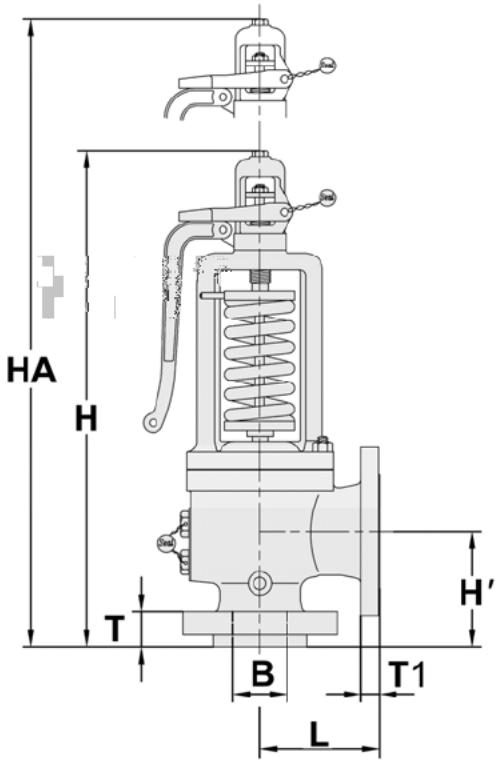
Orifice designation	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
Throat area	78.5	138.9	216.4	353.0	555.7	907.9	1294.6	2010.9	2533.9	3058.1	4500.7	7791.3	11272.0	18385.4

SJ/SL1 ( ) ( ) ~3 ( ) ( ) series safety valves: Standard material

	Model	SJ/SL ( ) 3 ( )	SJ/SL ( ) 5 ( )	SJ/SL ( ) 6 ( )
	Max. operating temperature	400˚C 750˚F	510˚C 950˚F	570˚C 1060˚F
Parts name	Nozzle seat *1	ASTM A105	ASTM A182-F12	ASTM A182-F22
	Disc	SUS630・・・(≦320℃) or B637 No. 7750 (Inconel X)・・・(＞320℃)		
	Disc collar	SUS420J2		
	Holder	SUS403		
	Body	SCPH2 or A216 Gr. WCB	SCPH21 or A217 Gr. WC6	SCPH32 or A217 Gr. WC9
	Yoke	SCPH2 or A216 Gr. WCB	SCPH21 or A217 Gr. WC6	
	Spindle	SUS403	SUS431	
	Guide	SUS403 or SCS1		
	Upper and lower adjusting rings	SUS304 or SCS13A		
	Upper lock bolt	SUS403	SUS431	
	Lower lock bolt	SUS403	SUS431	
	Spring washer and spring retainer	S25C		
	Spring	Carbon steel or alloy steel		
	Adj. screw	SUS403		
	Adj. screw locknut	SUS304		
	Lift stopper	SUS420J2		
	Step ring	SUS420J2		
	Stud bolt and nut	SNB7 / S45C		SNB16 / A194 Gr.4
	Cap	FCMB310		
	Upper lever	FCMB310		
	Lower lever	FCMB310		
	Pin	SUS304		
	Back pres. adj. needle & locknut *2	SUS304 / SS400		
	Back press. adj. cock *2	SCS13A		

* 1: This part is clad with stellite on the seating surface.
* 2: For the back pressure adjusting mechanism, either a back pressure adjusting needle or a back pressure adjusting cock is maker standard.

SJ1 ( ) ( ) ~ 3 ( ) ( ) series safety valves: Operating range and dimensions



Safety valve: major dimensions and weight

(Unit: mm)

Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG		Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				400□	450□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SJ109	JIS B 8210 (1994) 10K RF	JIS B 2220 10K RF	25xF2x40	1.07	1.07	25	283 5	40	120	110	400	540	40	16	1/2	1/2	17
			32xG2x50			32	452.4	50	125	120	435	610	44	16	1/2	3/4	23
			40xH2x65			40	706.8	65	135	130	520	730	46	18	1/2	3/4	31
			50xJ2x80			50	1134.1	80	155	150	625	865	44	18	1/2	1	47
			65xL1x100			65	1885.7	100	170	160	690	975	48	18	1/2	1	63
			80xMx125			80	2533 9	125	180	160	710	1000	50	20	1/2	1	71
			90xN3x150			90	3739 3	150	190	180	800	1150	52	22	1/2	1-1/4	94
			100xP2x150			100	4560.4	150	200	200	885	1235	54	22	1/2	1-1/4	120
			125xQ2x200			115	6082.1	200	220	220	1010	1460	56	22	3/4	1-1/4	178
			125xQ3x200			125	7208.1	200	240	230	1060	1510	56	22	3/4	1-1/4	198
			150xRx200			150	10386 9	200	250	240	1190	1705	60	22	3/4	1-1/4	290
			200xTx250			200	18385.4	250	292	290	1395	2065	66	31	3/4	1-1/2	465
SJ209	JIS B 8210 (1994) 20K RF	JIS B 2220 10K RF	25xF2x40	2.15	2.15	25	283 5	40	120	110	400	540	40	16	1/2	1/2	17
			32xG2x50			32	452.4	50	125	120	435	610	44	16	1/2	3/4	23
			40xH2x65			40	706.8	65	135	130	520	730	46	18	1/2	3/4	31
			50xJ2x80			50	1134.1	80	155	150	625	865	44	18	1/2	1	47
			65xL1x100			65	1885.7	100	170	160	690	975	48	18	1/2	1	63
			80xMx125			80	2533 9	125	180	160	710	1000	50	20	1/2	1	71
			90xN3x150			90	3739 3	150	190	180	800	1150	52	22	1/2	1-1/4	94
			100xP2x150			100	4560.4	150	200	200	885	1235	54	22	1/2	1-1/4	120
			125xQ2x200			115	6082.1	200	220	220	1010	1465	56	22	3/4	1-1/4	178
			125xQ3x200			125	7208.1	200	240	230	1060	1510	56	22	3/4	1-1/4	198
			150xRx200			150	10386 9	200	250	240	1190	1705	60	22	3/4	1-1/4	290
			200xTx250	1.56	1 56	200	18385.4	250	292	290	1395	2065	66	31	3/4	1-1/2	465
SJ309	JIS B 8210 (1994) 30K RF	JIS B 2220 10K RF	25xF2x40	3.23	3 23	25	283 5	40	120	120	425	595	42	16	1/2	3/4	20
			32xG2x50			32	452.4	50	125	120	505	710	44	16	1/2	3/4	27
			40xH2x65			40	706.8	65	135	130	595	840	46	18	1/2	1	40
			50xJ2x80			50	1134.1	80	165	155	670	960	48	18	1/2	1	54
			65xL1x100			65	1885.7	100	180	165	745	1095	52	18	1/2	1-1/4	75
			80xMx125			80	2533 9	125	200	180	840	1195	54	20	1/2	1-1/4	100
			90xN3x150			90	3739 3	150	210	200	865	1220	56	22	1/2	1-1/4	112
			100xP2x150			100	4560.4	150	210	220	985	1435	58	22	3/4	1-1/4	167
			125xQ2x200			115	6082.1	200	222	220	1120	1635	62	22	3/4	1-1/4	240
			125xQ3x200			125	7208.1	200	240	250	1160	1685	62	22	3/4	1-1/4	265
			150xRx250	2.15	2.15	150	10386 9	250	262	260	1190	1705	68	24	3/4	1-1/4	310

"Installation dimensions" are the nominal sizes of the inlet and outlet flanges. "Inlet diameter" denotes the inner diameter of the safety valve inlet and may therefore differ from the inlet flange size depending on safety valves.

SJ1 ( ) ( ) ~ 3 ( ) ( ) series safety valves: Operating range and dimensions

Safety valve: major dimensions and weight

(Unit: mm)

Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				220□	350□	425□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SJ204	JIS B 2220 (1996) 20K RF	JIS B 2220 10K RF	32xF2x40	1.07	1.07	1.07	25	283.5	40	120	110	400	540	40	16	1/2	1/2	17
			40xG2x50				32	452.4	50	125	120	435	610	44	16	1/2	3/4	23
			50xH2x65				40	706.8	65	135	130	520	730	46	18	1/2	3/4	31
			65xJ2x80				50	1134.1	80	155	150	625	865	44	18	1/2	1	47
			80xL1x100				65	1885.7	100	170	160	690	975	48	18	1/2	1	63
			90xMx125				80	2533.9	125	180	160	710	1000	50	20	1/2	1	71
			100xN3x150				90	3739.3	150	190	180	800	1150	52	22	1/2	1-1/4	94
			125xP2x150				100	4560.4	150	200	200	885	1235	54	22	1/2	1-1/4	120
			150xQ2x200				115	6082.1	200	220	220	1010	1460	56	22	3/4	1-1/4	178
			150xQ3x200				125	7208.1	200	240	230	1060	1510	56	22	3/4	1-1/4	198
			200xRx200				150	10386.9	200	250	240	1190	1705	60	22	3/4	1-1/4	290
			250xTx250				200	18385.4	250	292	290	1395	2065	66	31	3/4	1-1/2	465
SJ204-3	JIS B 2220 (1996) 30K RF	JIS B 2220 10K RF	32xF2x40	2.15	2.15	2.15	25	283.5	40	120	110	400	540	40	16	1/2	1/2	17
			40xG2x50				32	452.4	50	125	120	435	610	44	16	1/2	3/4	23
			50xH2x65				40	706.8	65	135	130	520	730	46	18	1/2	3/4	31
			65xJ2x80				50	1134.1	80	155	150	625	865	44	18	1/2	1	47
			80xL1x100				65	1885.7	100	170	160	690	975	48	18	1/2	1	63
			90xMx125				80	2533.9	125	180	160	710	1000	50	20	1/2	1	71
			100xN3x150				90	3739.3	150	190	180	800	1150	52	22	1/2	1-1/4	94
			125xP2x150				100	4560.4	150	200	200	885	1235	54	22	1/2	1-1/4	120
			150xQ2x200				115	6082.1	200	220	220	1010	1465	56	22	3/4	1-1/4	178
			150xQ3x200				125	7208.1	200	240	230	1060	1510	56	22	3/4	1-1/4	198
			200xRx200				150	10386.9	200	250	240	1190	1705	60	22	3/4	1-1/4	290
			250xTx250	1 56	1 56	1.56	200	18385.4	250	292	290	1395	2065	66	31	3/4	1-1/2	465
SJ304-4	JIS B 2220 (1996) 40K RF	JIS B 2220 10K RF	32xF2x40	3 23	3 23	3.23	25	283.5	40	120	120	425	595	42	16	1/2	3/4	20
			40xG2x50				32	452.4	50	125	120	505	710	44	16	1/2	3/4	27
			50xH2x65				40	706.8	65	135	130	595	840	46	18	1/2	1	40
			65xJ2x80				50	1134.1	80	165	155	670	960	48	18	1/2	1	54
			80xL1x100				65	1885.7	100	180	165	745	1095	52	18	1/2	1-1/4	75
			90xMx125				80	2533.9	125	200	180	840	1195	54	20	1/2	1-1/4	100
			100xN3x150				90	3739.3	150	210	200	865	1220	56	22	1/2	1-1/4	112
			125xP2x150				100	4560.4	150	210	220	985	1435	58	22	3/4	1-1/4	167
			150xQ2x200				115	6082.1	200	222	220	1120	1635	62	22	3/4	1-1/4	240
			150xQ3x200				125	7208.1	200	240	250	1160	1685	62	22	3/4	1-1/4	265
			200xRx250	2.15	2.15	2.15	150	10386.9	250	262	260	1190	1705	68	24	3/4	1-1/4	310

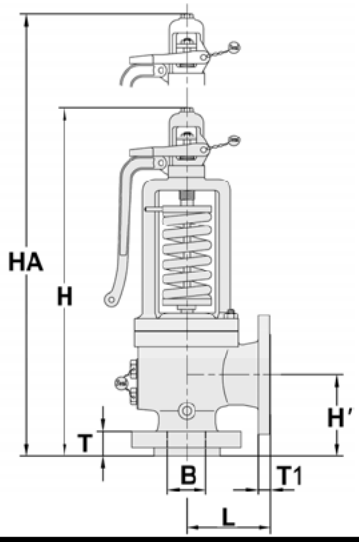
Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				400□	510□	538□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SJ201	ANSI 300Lb RF	ANSI 150Lb RF	1-1/4xF2x1-1/2	2.15	2.15	1.79	25	283 5	40	120	110	400	540	40	16	1/2	1/2	17
			1-1/2xG2x2				32	452.4	50	125	120	435	610	44	16	1/2	3/4	23
			2xH2x2-1/2				40	706.8	65	135	130	520	730	46	18	1/2	3/4	31
			2-1/2xJ2x3				50	1134.1	80	155	152	625	865	44	20	1/2	1	47
			3xL1x4				65	1885.7	100	170	166	690	975	48	24	1/2	1	63
			3-1/2xMx5				80	2533 9	125	180	164	710	1000	50	24	1/2	1	71
			4xN3x6				90	3739 3	150	190	184	800	1150	52	26	1/2	1-1/4	94
			5xP2x6				100	4560.4	150	200	204	885	1235	54	26	1/2	1-1/4	120
			6xQ2x8				115	6082.1	200	220	227	1010	1460	56	29	3/4	1-1/4	178
			6xQ3x8				125	7208.1	200	240	237	1060	1510	56	29	3/4	1-1/4	198
			8xRx8				150	10386 9	200	250	247	1190	1705	60	29	3/4	1-1/4	290
			10xTx10	1 56	1.56	1.56	200	18385.4	250	292	290	1395	2065	66	31	3/4	1-1/2	465
SJ301-4	ANSI 600Lb RF	ANSI 150Lb RF	1-1/4xF2x1-1/2	3 23	3 23	3.23	25	283 5	40	120	120	425	595	42	16	1/2	1/2	20
			1-1/2xG2x2				32	452.4	50	125	120	505	710	44	16	1/2	3/4	27
			2xH2x2-1/2				40	706.8	65	135	130	595	840	46	18	1/2	1	40
			2-1/2xJ2x3				50	1134.1	80	165	157	670	960	48	20	1/2	1	54
			3xL1x4				65	1885.7	100	180	171	745	1095	56	24	1/2	1-1/4	75
			3-1/2xMx5				80	2533 9	125	202	184	840	1195	56	24	1/2	1-1/4	100
			4xN3x6				90	3739 3	150	210	204	865	1220	56	26	1/2	1-1/4	112
			5xP2x6				100	4560.4	150	215	224	985	1435	63	26	3/4	1-1/4	167
			5xQ2x8				115	6082.1	200	226	227	1120	1635	66	29	3/4	1-1/4	240
			5xQ3x8				125	7208.1	200	241	257	1160	1685	63	29	3/4	1-1/4	265
SJ301-5	ANSI 900Lb RF	ANSI 150Lb RF	6xRx10	2.15	2.15	2.15	150	10386 9	250	268	267	1190	1705	74	31	3/4	1-1/4	310

"Installation dimensions" are the nominal sizes of the inlet and outlet flanges. "Inlet diameter" denotes the inner diameter of the safety valve inlet and may therefore differ from the inlet flange size depending on safety valves.

SL1 ( ) ( ) ~ 3 ( ) ( ) series safety valves: Operating range and dimensions

Safety valve: major dimensions and weight

(Unit: mm)



Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				40□	230□	400□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL101	ANSI 150Lb RF	ANSI 150Lb RF	3/4xDx1	1 96	1 27	0.65	20	78.5	25	92	96	345	470	30	14 5	3/8	1/2	11
			1xDx2				25	78.5	50	105	114	360	485	32	16	3/8	1/2	13
			1xEx2				25	138.9	50	105	114	360	485	32	16	3/8	1/2	13
			1-1/2xFx2				40	216.4	50	124	121	380	505	39	16	1/2	1/2	16
			1-1/2xGx2-1/2				40	353.0	65	124	121	410	550	39	18	1/2	1/2	19
			1-1/2xHx3				40	555.7	80	130	124	440	610	39	20	1/2	3/4	23
			2xJx3				50	907.9	80	137	124	515	720	41	20	1/2	3/4	30
			3xKx4				80	1294.6	100	156	162	620	860	47	24	1/2	3/4	51
			3xLx4				80	2010 9	100	156	165	680	965	47	24	1/2	3/4	59
			4xMx6				100	2533.9	150	178	184	700	990	50	26	1/2	3/4	71
			4xNx6				100	3058.1	150	197	210	790	1140	50	26	1/2	1-1/4	90
			4xPx6				100	4500.7	150	181	229	875	1230	50	26	1/2	1-1/4	110
			6xQx8	1.12	1.12		150	7791 3	200	240	241	1050	1500	44	29	3/4	1-1/4	200
			6xRx8	0.68	0.68		150	11272.0	200	240	241	1155	1675	44	29	3/4	1-1/4	260
			8xTx10	0.44	0.44	0.44	200	18385.4	250	276	279	1380	2055	48	31	3/4	1-1/2	400
SL201	ANSI 300Lb RF	ANSI 150Lb RF	3/4xDx1	1 96	1 96	1 96	20	78.5	25	92	96	345	470	30	14 5	3/8	1/2	11
			1xDx2				25	78.5	50	105	114	360	485	32	16	3/8	1/2	13
			1xEx2				25	138.9	50	105	114	360	485	32	16	3/8	1/2	13
			1-1/2xFx2				40	216.4	50	124	121	380	505	39	16	1/2	1/2	16
			1-1/2xGx2-1/2				40	353.0	65	124	121	410	550	39	18	1/2	1/2	20
			1-1/2xHx3				40	555.7	80	130	124	440	610	39	20	1/2	3/4	24
			2xJx3				50	907.9	80	137	124	515	720	41	20	1/2	3/4	31
			3xKx4				80	1294.6	100	156	162	620	860	47	24	1/2	1	53
			3xLx4				80	2010.9	100	156	165	680	965	47	24	1/2	1	61
			4xMx6				100	2533 9	150	178	184	700	990	50	26	1/2	1	73
			4xNx6				100	3058.1	150	197	210	790	1140	50	26	1/2	1-1/4	92
			4xPx6				100	4500.7	150	181	229	875	1230	50	26	1/2	1-1/4	112
			6xQx8	1.12	1.12	1.12	150	7791.3	200	240	241	1050	1500	55	29	1/2	1-1/4	205
			6xRx8	0.68	0.68	0.68	150	11272.0	200	240	241	1155	1675	56	29	3/4	1-1/4	265
			8xTx10	0.44	0.44	0.44	200	18385.4	250	276	279	1380	2055	60	31	3/4	1-1/2	410

Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				230□	400□	510□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL301	ANSI 300Lb RF	ANSI 150Lb RF	1xDx2	3.72	3.45	2.62	25	78.5	50	105	114	360	485	32	16	3/8	1/2	14
			1xEx2				25	138.9	50	105	114	360	485	32	16	3/8	1/2	14
			1-1/2xFx2				40	216.4	50	124	152	380	505	40	16	1/2	1/2	19
			1-1/2xGx2-1/2				40	353.0	65	124	152	420	590	40	18	1/2	3/4	22
			2xHx3				50	555.7	80	130	124	500	705	41	20	1/2	3/4	31
			2-1/2xJx4				65	907.9	100	137	143	595	835	44	24	1/2	3/4	46
			3xKx4				80	1294.6	100	156	162	665	955	47	24	1/2	3/4	60
			3xLx6				80	2010.9	150	179	181	765	1115	50	26	1/2	1-1/4	90
			4xMx6				100	2533.9	150	178	184	840	1195	50	26	1/2	1-1/4	105
			4xNx6				100	3058.1	150	197	210	865	1215	50	26	1/2	1-1/4	113
			4xPx6	2.94	2 94		100	4500.7	150	225	254	1005	1455	50	26	1/2	1-1/4	160
			6xQx8	2.06	2.06	2.06	150	7791.3	200	240	241	1050	1500	55	29	1/2	1-1/4	220
			6xRx10	1.56	1 56	1 56	150	11272.0	250	240	267	1155	1675	56	31	3/4	1-1/4	285
			8xTx10				200	18385.4	250	276	279	1380	2055	60	31	3/4	1-1/2	420

"Installation dimensions" are the nominal sizes of the inlet and outlet flanges. "Inlet diameter" denotes the inner diameter of the safety valve inlet and may therefore differ from the inlet flange size depending on safety valves.

SL1 ( ) ( ) ~ 3 ( ) ( ) series safety valves: Operating range and dimensions

Safety valve: major dimensions and weight

(Unit: mm)

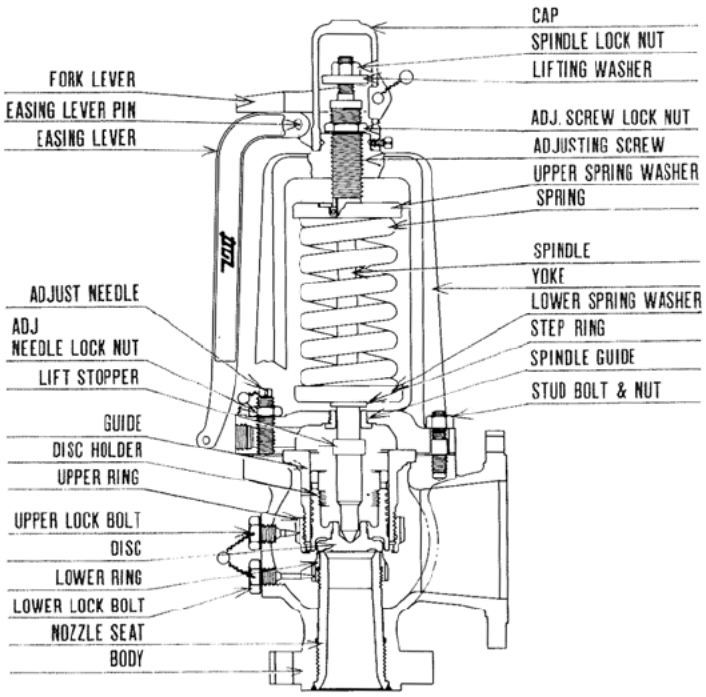
Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG		Inlet diameter	Throat area mm^2	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				220□	300□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL104	JIS B 2220 (1996) 10K RF	JIS B 2220 10K RF	20xDx25	1.18	0.98	20	78.5	25	92	96	345	470	30	14	3/8	1/2	11
			25xDx50			25	78.5	50	105	114	360	485	32	16	3/8	1/2	13
			25xEx50			25	138.9	50	105	114	360	485	32	16	3/8	1/2	13
			40xFx50			40	216.4	50	124	121	380	505	39	16	1/2	1/2	16
			40xGx65			40	353.0	65	124	121	410	550	39	18	1/2	1/2	19
			40xHx80	1.13		40	555.7	80	130	124	440	610	39	20	1/2	3/4	23
			50xJx80			50	907.9	80	137	124	515	720	41	20	1/2	3/4	30
			80xKx100	0.98	0.93	80	1294.6	100	156	162	620	860	47	24	1/2	1	51
			80xLx100	0.88	0.83	80	2010.9	100	156	165	680	965	47	24	1/2	1	59
			100xMx150			100	2533.9	150	178	184	700	990	50	26	1/2	1	71
			100xNx150	0.78	0.73	100	3058.1	150	197	210	790	1140	50	26	1/2	1-1/4	90
			100xPx150	0.73	0.68	100	4500.7	150	181	229	875	1230	50	22	1/2	1-1/4	110
			150xQx200	0.98	0.83	150	7791.3	200	240	241	1050	1500	44	29	1/2	1-1/4	200
			150xRx200	0.68	0.68	150	11272.0	200	240	241	1155	1675	44	29	3/4	1-1/4	260
			200xTx250	0.45	0.45	200	18385.4	250	276	279	1380	2055	48	31	3/4	1-1/2	400

Type	Inlet F	Outle F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm^2	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				220□	300□	400□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL204	JIS B 2220 (1996) 20K RF	JIS B 2220 10K RF	20xDx25	1.96	1.96	1.96	20	78.5	25	92	96	345	470	30	14	3/8	1/2	11
			25xDx50				25	78.5	50	105	114	360	485	32	16	3/8	1/2	13
			25xEx50				25	138.9	50	105	114	360	485	32	16	3/8	1/2	13
			40xFx50				40	216.4	50	124	121	380	505	39	16	1/2	1/2	16
			40xGx65				40	353.0	65	124	121	410	550	39	18	1/2	1/2	19
			40xHx80				40	555.7	80	130	124	440	610	39	20	1/2	3/4	24
			50xJx80				50	907.9	80	137	124	515	720	41	20	1/2	3/4	31
			80xKx100				80	1294.6	100	156	162	620	860	47	24	1/2	1	53
			80xLx100				80	2010.9	100	156	165	680	965	47	24	1/2	1	61
			100xMx150				100	2533.9	150	178	184	700	990	50	26	1/2	1	73
			100xNx150	1.86	1.86	1.86	100	3058.1	150	197	210	790	1140	50	26	1/2	1-1/4	92
			100xPx150	1.76	1.76	1.76	100	4500.7	150	181	229	875	1230	50	26	1/2	1-1/4	112
			150xQx200	1.18	1.18	1.18	150	7791.3	200	240	241	1050	1500	55	55	1/2	1-1/4	205
			150xRx200	0.68	0.68	0.68	150	11272.0	200	240	241	1155	1675	56	56	3/4	1-1/4	265
			200xTx250	0.44	0.44	0.44	200	18385.4	250	276	279	1380	2055	48	31	3/4	1-1/2	410

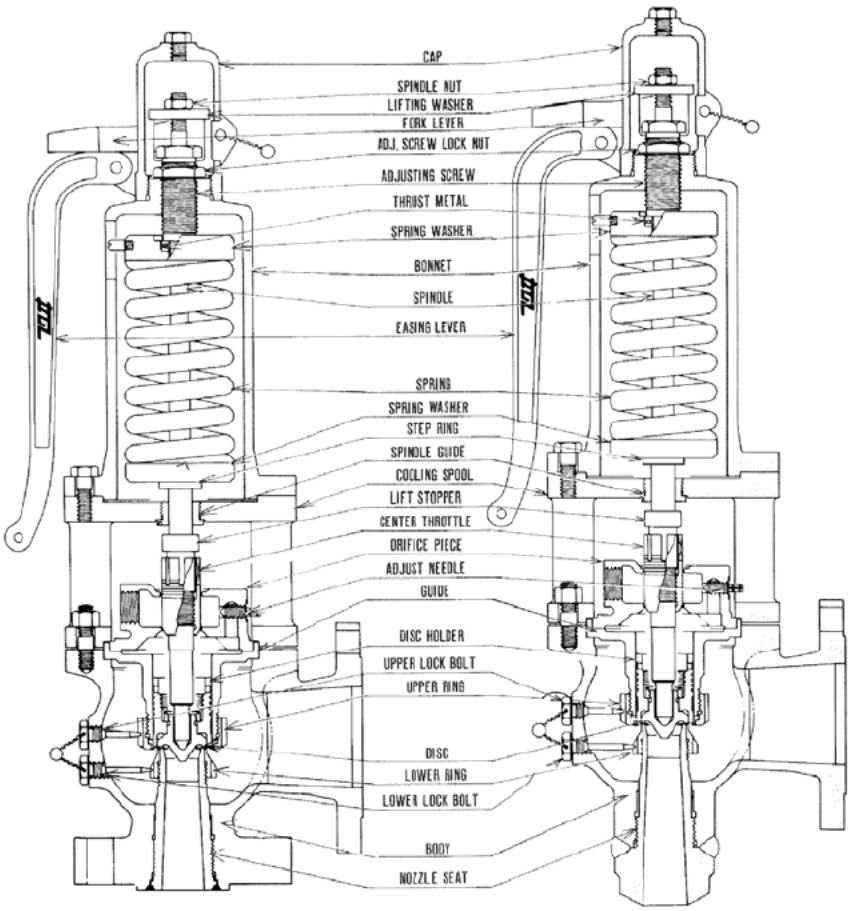
Type	Inlet F	Outle F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm^2	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				300□	400□	490□	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL304	JIS B 2220 (1996) 30K RF	JIS B 2220 10K RF	25xDx50	3.72	2.94	2.84	25	78.5	50	105	114	360	485	32	16	3/8	1/2	14
			25xEx50				25	138.9	50	105	114	360	485	32	16	3/8	1/2	14
			40xFx50				40	216.4	50	124	152	380	505	40	16	1/2	1/2	19
			40xGx65				40	353.0	65	124	152	420	590	40	18	1/2	3/4	22
			50xHx80	3.53			50	555.7	80	130	124	500	705	41	20	1/2	3/4	31
			65xJx100				65	907.9	100	137	143	595	835	44	24	1/2	1	46
			80xKx100	3.13	2.64	2.45	80	1294.6	100	156	162	665	955	47	24	1/2	1	60
			100xLx150				100	2010.9	150	179	181	765	1115	50	26	1/2	1-1/4	90
			100xMx150	3.04	2.55	2 25	100	2533.9	150	178	184	840	1195	50	26	1/2	1-1/4	105
			100xNx150	2.74	2.25	2.15	100	3058.1	150	197	210	865	1215	50	26	1/2	1-1/4	113
			100xPx150	2.55	2.15	1 96	100	4500.7	150	225	254	1005	1455	50	26	1/2	1-1/4	160
			150xQx200	2.06	2.06	1.08	150	7791.3	200	240	241	1050	1500	55	29	1/2	1-1/4	220
			150xRx250	1.37	1.18	0.68	150	11272.0	250	240	267	1155	1675	56	31	3/4	1-1/4	285
			200xTx250	0.78	0.78	0.78	200	18385.4	250	276	279	1380	2055	60	31	3/4	1-1/2	420

"Installation dimensions" are the nominal sizes of the inlet and outlet flanges. "Inlet diameter" denotes the inner diameter of the safety valve inlet and may therefore differ from the inlet flange size depending on safety valves.

SL4 ( ) ( ) ~6 ( ) ( ) series safety valves: Parts name



SL400



SL400 - 600

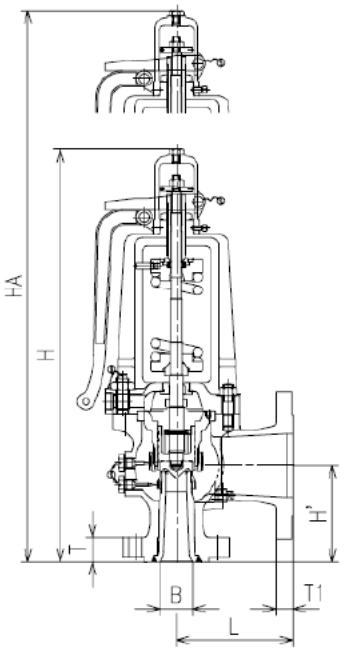
SL400 - 600 (Unit: mm^2)

Orifice designation	F1	G1	H	J	K	K2	L	M	M2	N2	P	Q0	Q1	Q	R	T
Throat area	216.4	353.0	555.7	855.3	1294.6	1727.6	2010.9	2533.9	2587.7	3421.2	4500.7	5462.9	6418.4	7791.3	11272.0	18337.3

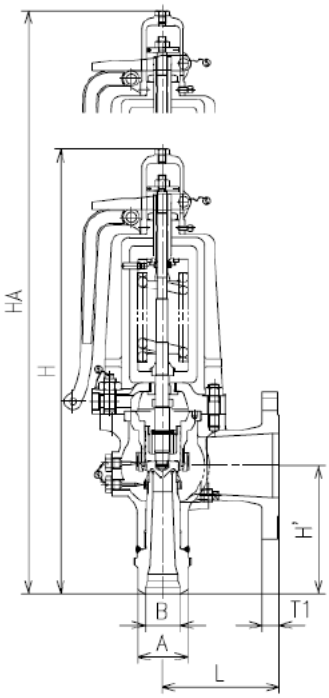
			SL ( ) 3 ( )	SL ( ) 5 ( )	SL ( ) 6 ( )
	Max. operating temperature		400˚C 750˚F	510˚C 950˚F	570˚C 1060˚F
部品名称	Nozzle seat *1		ASTM A105	ASTM A182-F12	ASTM A182-F22
	Disc	SJ/SL4( )( )～5( )( )	SUS630･･･(≦320℃) or B637 No. 7750 (Inconel X)･･･(>320℃)		
		SL6( )( )	B637 No. 7750 (Inconel X)		
	Disc collar		SUS420J2		
	Holder		SUS403		
	Valve body		SCPH2 or A216 Gr. WCB	SCPH21 or A217 Gr. WC6	SCPH32 or A217 Gr. WC9
	Yoke	Yoke	SCPH2 or A216 Gr. WCB		
		spindle Guide	SUS630		
	Cooling spool		A105 or A216 Gr. WCB		A182-F12 or A217 Gr. WC6
	Spindle		SUS403	SUS431	
	Guide		SUS403 or SCS1		
	Upper and lower adjusting rings		SUS304 or SCS13A		
	Upper lock bolt		SUS403	SUS431	
	Lower lock bolt		SUS403	SUS431	
	Spring washer		S25C		
	Spring retainer	Spring retainer	S25C		
		Bearing	as per JIS B1532 Thrust Ball Bearing		
	Spring		Carbon steel or alloy steel		
	Adj. screw		SUS403		
	Adj. screw locknut		SUS304		
	Lift stopper		SUS420J2		
	Step ring		SUP10		
	Stud bolt and nut		SNB7 / S45C		SNB16 / A194 Gr.4
	Hexagon head bolt (SL600 K~R)		S45C		
	Cap		FCMB310		
	Upper lever		FCMB310		
	Lower lever		FCMB310		
	Pin		SUS304		
	Back press. adj. cock		SCS13A		

※ 1: This part is clad with stellite on the seating surface.

SL4 ( ) ( ) series safety valves: Operating range and dimensions



Flanged type



Welded type

Safety valve: major dimensions and weight

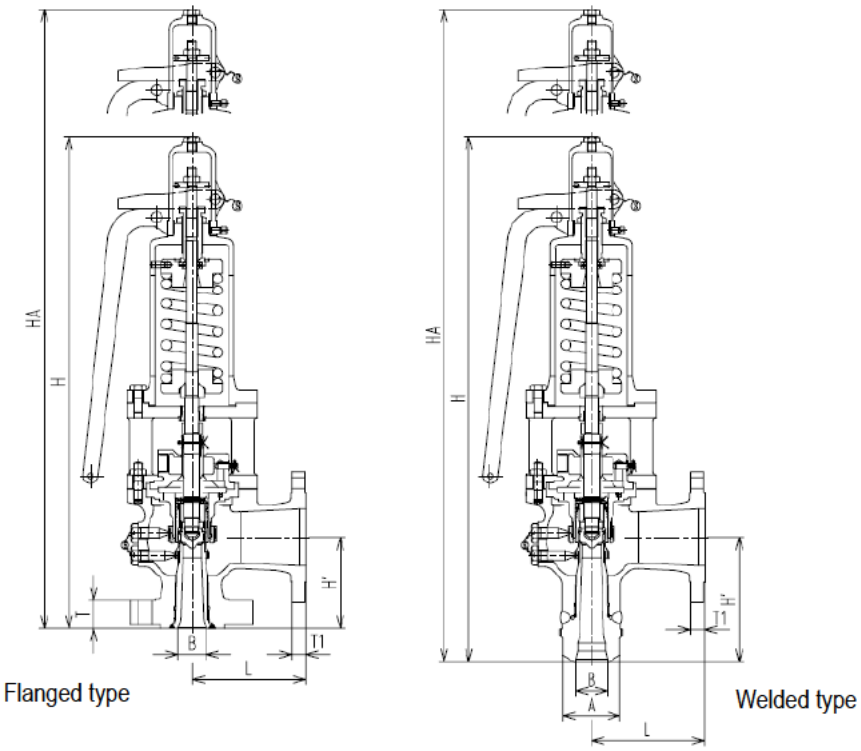
(Unit: mm)

Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				400℃	510℃	570℃	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL401	ANSI 600Lb RF	ANSI 150Lb RF	1.1/2xFx2.1/2	5.5	4.4	2.2	40	216.4	65	130	140	475	545	33	19.1	1/2	3/4	25
			1.1/2xGx3				40	353.0	80	130	140	475	545	35	19.1	1/2	3/4	25
			1.1/2xHx3				40	555.7	80	140	140	580	670	33	19.1	1/2	3/4	35
			2xJx4				50	855 3	100	150	180	645	740	36	24	1/2	3/4	52
			2.1/2xKx6				65	1294.6	150	185	180	810	920	39	26	1/2	3/4	78
			2.1/2xK2x6				65	1727.6	150	185	180	810	920	39	26	1/2	1	82
			3xLx6				80	2010.9	150	190	200	825	935	48	26	1/2	1	92
			3xMx6				80	2533.9	150	190	200	860	1000	48	26	1/2	1	115
			3xM2x6				80	2587.7	150	190	200	860	1000	48	26	1/2	1	115
			4xN2x6				100	3421.2	150	215	220	995	1135	52	26	1/2	1	165
			4xPx6				100	4500.7	150	235	250	1110	1270	60	26	1/2	1-1/4	205
			4xPx8				100	4500.7	200	235	250	1110	1270	60	29	1/2	1-1/4	205
			6xQ0x8	4.8			150	5462.9	200	255	250	1240	1410	62	29	3/4	1-1/4	290
			6xQ1x8				150	6418.4	200	255	260	1360	1560	62	29	3/4	1-1/4	350
			6xQx8				150	7791.3	200	285	270	1460	1690	62	29	3/4	1-1/4	445
			6xQx10				150	7791.3	250	285	280	1460	1690	62	31	3/4	1-1/4	445
			6xRx10				150	11272.0	250	290	300	1485	1745	70	31	3/4	1-1/4	480
			8xTx12	3.4	3.4		200	18337.3	300	320	300	1670	1980	68	32	3/4	1-1/4	650

Type	inlet	Outlet F	Installation dimensions	Max. operating pressure MPaG	Inlet diameter	Inlet neck outside diameter A			Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness	Screw diameter		Weight
					B	400℃	510℃	570℃			H'	L	H	HA	T1	Drain Rc	Needle Rp	kg
SL403	Welded type	ANSI 150Lb RF	1.1/2xFx2.1/2	5 5	40	64	64	67	216.4	65	165	140	515	585	19.1	1/2	3/4	25
			1.1/2xGx3		40	64	64	67	353.0	80	165	140	515	585	19.1	1/2	3/4	25
			1.1/2xHx3		40	67	67	70	555.7	80	165	140	610	700	19.1	1/2	3/4	35
			2xJx4		50	80	80	80	855.3	100	200	180	695	790	24	1/2	3/4	52
			2.1/2xKx6		65	92	92	98	1294.6	150	250	180	875	985	26	1/2	3/4	78
			2.1/2xK2x6		65	92	92	98	1727.6	150	250	180	875	985	26	1/2	1	82
			3xLx6		76	105	105	105	2010.9	150	250	200	885	995	26	1/2	1	92
			3xMx6		76	105	105	114	2533.9	150	250	200	920	1060	26	1/2	1	115
			3xM2x6		76	105	105	114	2587.7	150	250	200	920	1060	26	1/2	1	115
			4xN2x6		102	140	140	146	3421.2	150	250	220	1025	1165	26	1/2	1	165
			4xPx6		102	146	146	152	4500.7	150	330	250	1200	1360	26	1/2	1-1/4	205
			4xPx8		102	146	146	152	4500.7	200	330	250	1200	1360	29	1/2	1-1/4	205
			6xQ0x8	4.8	152	203	203	210	5462.9	200	330	250	1320	1490	29	3/4	1-1/4	290
			6xQ1x8		152	203	203	210	6418.4	200	350	260	1435	1625	29	3/4	1-1/4	350
			6xQx8		152	203	203	210	7791.3	200	350	270	1520	1750	29	3/4	1-1/4	445
			6xQx10		152	203	203	210	7791.3	250	350	280	1520	1750	31	3/4	1-1/4	445
			6xRx10		152	210	210	232	11272.0	250	350	300	1545	1805	31	3/4	1-1/4	480
			8xTx12	3.4	203	230	230	240	18337.3	300	360	300	1720	2030	32	3/4	1-1/4	650

"Installation dimensions" are the nominal sizes of the inlet and outlet flanges. "Inlet diameter" denotes the inner diameter of the safety valve inlet and may therefore differ from the inlet flange size depending on safety valves.

SL5 ( ) () series safety valves: Operating range and dimensions



Flanged type

Welded type

Safety valve: major dimensions and weight

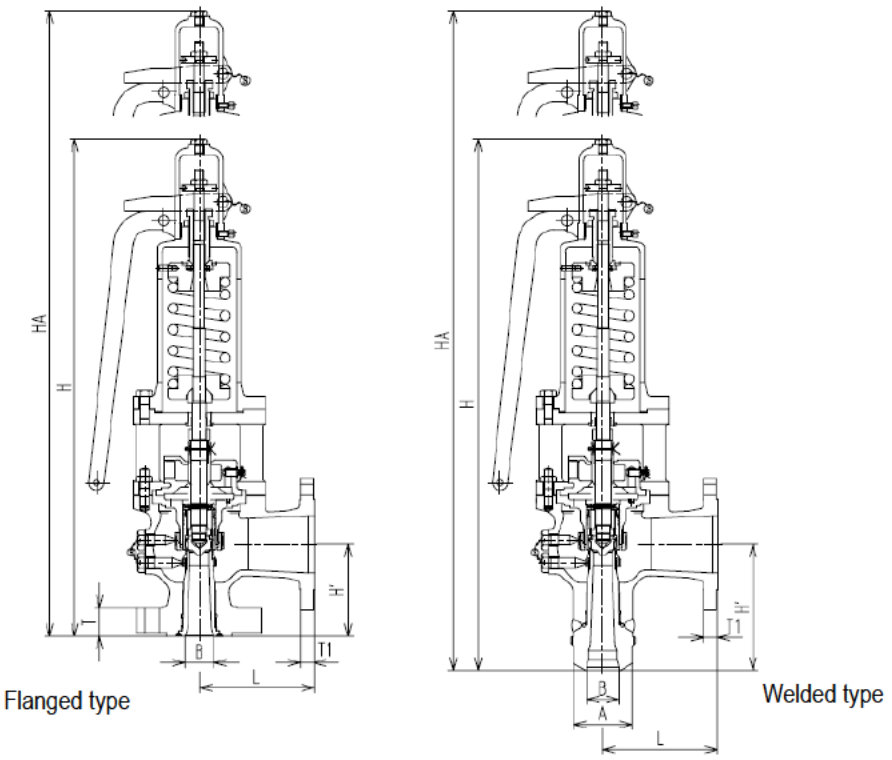
(Unit: mm)

Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
				400℃	510℃	570℃	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL501	ANSI 900Lb RF	ANSI 150Lb RF	1.1/2xF1x3	6.18	6.18	3.55	40	216.4	80	140	155	695	920	45	19.1	1/2	3/4	48
			1.1/2xG1x3				40	353.0	80	140	155	695	920	45	19.1	1/2	3/4	48
			1.1/2xHx3				40	555.7	80	140	155	695	920	45	19.1	1/2	3/4	48
			2xJx4				50	855.3	100	150	180	855	1140	49	24	1/2	3/4	78
			2.1/2xKx6				65	1294.6	150	185	180	895	1180	50	26	1/2	3/4	83
			2.1/2xK2x6				65	1727.6	150	195	200	965	1280	53	26	1/2	1	123
			3xLx6				80	2010.9	150	195	200	970	1285	52	26	1/2	1	123
			3xMx6				80	2533.9	150	220	220	1120	1500	52	26	1/2	1	176
			3xM2x6				80	2587.7	150	220	220	1120	1500	52	26	1/2	1	176
			4xN2x6				100	3421.2	150	230	250	1210	1650	60	26	1/2	1	210
			4xPx6				100	4500.7	150	250	270	1360	1825	68	26	1/2	1-1/4	287
			4xPx8				100	4500.7	200	250	270	1370	1835	68	29	1/2	1-1/4	290
			6xQ0x8				150	5462.9	200	280	280	1550	2120	70	29	3/4	1-1/4	378
			6xQ1x8				150	6418.4	200	290	280	1620	2210	70	29	3/4	1-1/4	433
			6xQx8				150	7791.3	200	290	300	1630	2220	70	29	3/4	1-1/4	490
			6xQx10				150	7791.3	250	290	300	1630	2220	70	31	3/4	1-1/4	490
			6xRx10	5.49	5.49		150	11272.0	250	290	300	1695	2315	70	31	3/4	1-1/4	550

Type	inlet	Outlet F	Installation dimensions	Max. operating pressure MPaG	Inlet diameter	Inlet neck outside diameter A			Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange hickness	Screw diameter		Weight
					B	400℃	510℃	570℃			H'	L	H	HA	T1	Drain Rc	Needle Rp	kg
SL503	Welded type	ANSI 150Lb RF	1.1/2xF1x3	6.18	40	70	70	80	216.4	80	165	155	720	945	19.1	1/2	3/4	48
			1.1/2xG1x3		40	70	70	80	353.0	80	165	155	720	945	19.1	1/2	3/4	48
			1.1/2xHx3		40	70	70	80	555.7	80	165	155	720	945	19.1	1/2	3/4	48
			2xJx4		50	83	83	90	855.3	100	200	180	905	1190	24	1/2	3/4	78
			2.1/2xKx6		65	102	102	110	1294.6	150	250	180	960	1245	26	1/2	3/4	83
			2.1/2xK2x6		65	102	102	110	1727.6	150	250	200	1020	1335	26	1/2	1	123
			3xLx6		76	108	108	125	2010.9	150	250	200	1025	1340	26	1/2	1	123
			3xMx6		76	117	117	130	2533.9	150	250	220	1150	1530	26	1/2	1	176
			3xM2x6		76	117	117	130	2587.7	150	250	220	1150	1530	26	1/2	1	176
			4xN2x6		102	146	146	152	3421.2	150	250	250	1230	1670	26	1/2	1	210
			4xPx6		102	156	156	168	4500.7	150	330	270	1440	1905	26	1/2	1-1/4	287
			4xPx8		102	156	156	168	4500.7	200	330	270	1450	1915	29	1/2	1-1/4	290
			6xQ0x8		152	200	200	210	5462.9	200	330	280	1600	2170	29	3/4	1-1/4	378
			6xQ1x8		152	210	210	222	6418.4	200	330	280	1660	2250	29	3/4	1-1/4	433
			6xQx8		152	210	210	222	7791.3	200	350	300	1810	2560	29	3/4	1-1/4	490
			6xQx10		152	210	210	222	7791.3	250	350	300	1810	2560	31	3/4	1-1/4	490
			6xRx10	5.49	152	216	216	240	11272.0	250	350	300	1810	2560	31	3/4	1-1/4	550

"Installation dimensions" are the nominal sizes of the inlet and outlet flanges. "Inlet diameter" denotes the inner diameter of the safety valve inlet and may therefore differ from the inlet flange size depending on safety valves.

SL6 ( ) ( ) series safety valves: Operating range and dimensions



Safety valve: major dimensions and weight

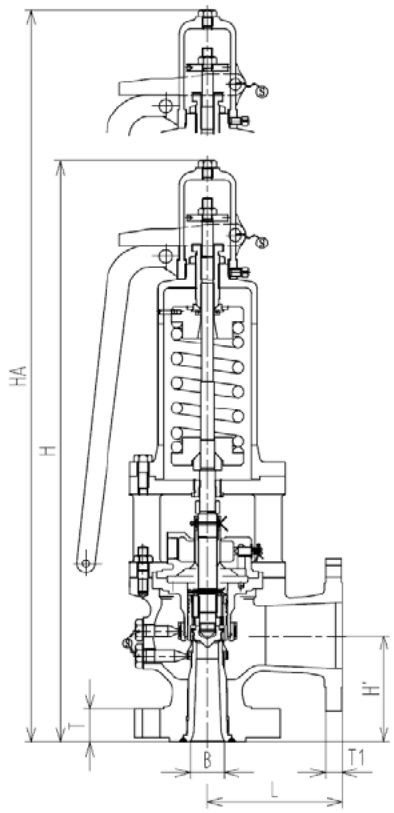
(Unit: mm)

Type	Inlet F	Outle F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weigh
				400℃	510℃	570℃	B			H'	L	H	HA	Inlet T	Outlet T1	Drain Rc	Needle Rp	kg
SL601	ANSI 1500Lb RF	ANSI 150Lb RF	1.1/2xF1x3	10.3	10.3	5.58	40	216.4	80	150	155	705	930	48	19.1	1/2	3/4	53
			1.1/2xG1x3				40	353.0	80	150	155	705	930	48	19.1	1/2	3/4	53
			1.1/2xHx3				40	555.7	80	150	155	705	930	48	19.1	1/2	3/4	53
			2.1/2xJx4				50	855.3	100	168	200	870	1100	57	24	1/2	3/4	100
			2.1/2xKx6				50	1294.6	150	195	240	965	1280	57	26	1/2	3/4	134
			2.1/2xK2x6				65	1727.6	150	195	240	1085	1460	62	26	1/2	1	188
			3xLx6				80	2010.9	150	210	250	1175	1620	67	26	1/2	1	225
			3xMx6				80	2533.9	150	230	250	1305	1770	73	26	1/2	1	300
			3xM2x6				80	2587.7	150	230	250	1305	1770	73	26	1/2	1	300
			4xN2x6				100	3421.2	150	240	280	1340	1805	74	26	1/2	1	308
			4xPx6				100	4500.7	150	260	280	1550	2150	74	26	1/2	1-1/4	345
			4xPx8				100	4500.7	200	260	280	1550	2150	74	29	1/2	1-1/4	345
			6xQ0x8				150	5462.9	200	290	320	1640	2265	100	29	3/4	1-1/4	470
			6xQ1x8				150	6418.4	200	330	320	1790	2540	100	29	3/4	1-1/4	530
			6xQx8				150	7791.3	200	340	320	1920	2700	100	29	3/4	1-1/4	570
			6xQx10				150	7791.3	250	340	330	1920	2700	100	31	3/4	1-1/4	570
			6xRx10	8.23	8.23		150	11272.0	250	340	330	1920	2700	100	31	3/4	1-1/4	650

Type	inle	Outlet F	Installation dimensions	Max. operating pressure MPaG	Inlet diameter	Inlet neck outside diameter A			Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness	Screw diameter		Weigh
					B	400℃	510℃	570℃			H'	L	H	HA	T1	Drain Rc	Needle Rp	kg
SL603	Welded type	ANSI 150Lb RF	1-1/2xF1x3	10.3	40	76	76	86	216.4	80	165	155	720	945	19.1	1/2	3/4	53
			1-1/2xG1x3		40	76	76	86	353.0	80	165	155	720	945	19.1	1/2	3/4	53
			1-1/2xHx3		40	76	76	86	555.7	80	165	155	720	945	19.1	1/2	3/4	53
			2xJx4		50	90	90	102	855.3	100	200	200	900	1185	24	1/2	3/4	100
			2-1/2xKx6		65	108	108	125	1294.6	150	250	240	1020	1335	26	1/2	3/4	134
			2-1/2xK2x6		65	120	120	135	1727.6	150	250	240	1140	1515	26	1/2	1	188
			3xLx6		76	124	124	140	2010.9	150	250	250	1215	1660	26	1/2	1	225
			3xMx6		76	137	137	155	2533.9	150	250	250	1325	1790	26	1/2	1	300
			3xM2x6		76	137	137	155	2587.7	150	250	250	1325	1790	26	1/2	1	300
			4xN2x6		102	160	160	175	3421.2	150	280	280	1380	1845	26	1/2	1	308
			4xPx6		102	170	170	180	4500.7	150	330	280	1620	2220	26	1/2	1-1/4	345
			4xPx8		102	170	170	180	4500.7	200	330	280	1620	2220	29	1/2	1-1/4	345
			6xQ0x8		152	216	216	230	5462.9	200	350	320	1700	2325	29	3/4	1-1/4	470
			6xQ1x8		152	216	216	230	6418.4	200	390	320	1850	2600	29	3/4	1-1/4	530
			6xQx8		152	216	216	230	7791.3	200	400	320	1980	2760	29	3/4	1-1/4	570
			6xQx10		152	216	216	230	7791.3	250	400	330	1980	2760	31	3/4	1-1/4	570
			6xRx10	8.23	152	216	216	240	11272.0	250	400	330	1980	2760	31	3/4	1-1/4	650

"Installation dimensions" are the nominal sizes of the inlet and outlet flanges. "Inlet diameter" denotes the inner diameter of the safety valve inlet and may therefore differ from the inlet flange size depending on safety valves.

SL7 ( ) ( ), 8 ( ) ( ) series safety valves: Operating range & dimensions (Flanged type)



Flanged type

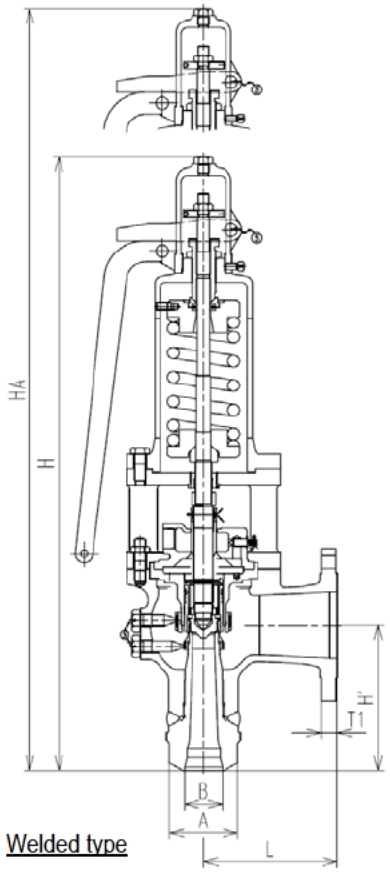
Safety valve: major dimensions and weight

(Unit: mm)

Type	Inlet F	Outlet F	Installation dimensions	Max. operating pressure MPaG			Inlet diameter	Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness		Screw diameter		Weight
														Inlet	Outlet	Drain	Needle	
				400℃	510℃	570℃	B			H'	L	H	HA	T	T1	Rc	Rp	kg
SL701	ANSI 2500Lb RF	ANSI 300Lb RF	1-1/2xF1x4	13.7	13.7	9.28	40	216.4	80	220	200	920	1200	65	29	1/2	1/2	102
			1-1/2xG1x4				40	353.0	80	220	200	920	1200	65	29	1/2	1/2	102
			1-1/2xHx4				40	555.7	80	220	200	920	1200	65	32	1/2	3/4	102
			2xJx4				50	855.3	100	220	220	980	1295	74	32	1/2	3/4	148
			2-1/2xKx6				65	1294.6	150	270	240	1160	1530	84	37	1/2	1-1/4	217
			2-1/2xK2x6				65	1727.6	150	270	240	1250	1690	84	37	3/4	1-1/4	250
			3xLx6				80	2010.9	150	280	260	1260	1260	96	37	3/4	1-1/2	258
			3xMx6				80	2533.9	150	280	260	1525	1525	96	37	3/4	1-1/2	447
			3xM2x6				80	2587.7	150	280	260	1545	1545	96	37	3/4	1-1/2	447
SL801	ANSI 2500Lb RF	ANSI 300Lb RF	1-1/2xF1x4	17.1	17.1	9.28	40	216.4	80	220	200	920	1200	65	29	1/2	1/2	110
			1-1/2xG1x4				40	353.0	80	220	200	920	1200	65	29	1/2	1/2	110
			1-1/2xHx4				40	555.7	80	220	200	920	1200	65	32	1/2	3/4	110
			2xJx4				50	855.3	100	220	220	980	1295	74	32	1/2	1	155
			2-1/2xKx6				65	1294.6	150	270	240	1160	1530	84	37	1/2	1-1/4	225
			2-1/2xK2x6				65	1727.6	150	270	240	1250	1690	84	37	3/4	1-1/4	260
			3xLx6				80	2010.9	150	280	260	1260	1260	96	37	3/4	1-1/2	265
			3xMx6				80	2533.9	150	280	260	1525	1525	96	37	3/4	1-1/2	450
			3xM2x6				80	2587.7	150	280	260	1545	1545	96	37	3/4	1-1/2	450

Note: For SL ( )6 ( ), some have the max. operating pressure exceed the ANSI pressure-temperature rating, and those failing to meet the ANSI standard must not be used.
For details, see ANSI B16.34 "PRESSURE-TEMPERATURE RATING TABLE."

SL7 ( ) ( ) ~ 9 ( ) ( ) series safety valves: Operating range & dimensions (Welded type)



Welded type

Safety valve: major dimensions and weight

(Unit: mm)

Type	Inlet	Outlet F	Installation dimensions	Max. operating pressure MPaG	Inlet diameter	Inlet neck outside diameter A			Throat area mm²	Outlet diameter	Face-to-face dimension		Overall length	Disassembly height	Flange thickness	Screw diameter		Weight
					B	400℃	510℃	570℃			H'	L	H	HA	T1	Drain Rc	Needle Rp	kg
SL703	Welded type	ANSI 300Lb RF	1-1/2xF1x4	13.7	40	90	90	100	216.4	100	250	200	950	1230	29	1/2	1/2	102
			1-1/2xG1x4		40	90	90	100	353.0	100	250	200	950	1230	29	1/2	1/2	102
			1-1/2xHx4		40	90	90	100	555.7	100	250	200	950	1230	32	1/2	3/4	102
			2xJx4		50	110	110	120	855.3	100	250	220	1010	1325	32	1/2	1	148
			2-1/2xKx6		65	120	120	135	1294.6	150	305	240	1200	1575	37	1/2	1-1/4	217
			2-1/2xK2x6		65	130	130	150	1727.6	150	305	240	1285	1725	37	3/4	1-1/4	250
			3xLx6		76	140	140	155	2010.9	150	305	260	1285	1725	37	3/4	1-1/2	258
			3xMx6		76	150	150	170	2533.9	150	305	260	1570	2115	37	3/4	1-1/2	447
			3xM2x6		76	150	150	170	2587.7	150	305	260	1570	2115	37	3/4	1-1/2	447
SL803	Welded type	ANSI 300Lb RF	1-1/2xF1x4	17.1	40	95	95	105	216.4	100	250	200	950	1230	29	1/2	1/2	110
			1-1/2xG1x4		40	95	95	105	353.0	100	250	200	950	1230	29	1/2	1/2	110
			1-1/2xHx4		40	95	95	105	555.7	100	250	200	950	1230	32	1/2	3/4	110
			2xJx4		50	110	110	130	855.3	100	250	220	1010	1325	32	1/2	1	155
			2-1/2xKx6		65	130	130	145	1294.6	150	305	240	1200	1575	37	1/2	1-1/4	225
			2-1/2xK2x6		65	145	145	160	1727.6	150	305	240	1285	1725	37	3/4	1-1/4	260
			3xLx6		76	150	155	170	2010.9	150	305	260	1285	1725	37	3/4	1-1/2	265
			3xMx6		76	160	165	185	2533.9	150	305	260	1570	2115	37	3/4	1-1/2	450
			3xM2x6		76	160	165	185	2587.7	150	305	260	1570	2115	37	3/4	1-1/2	450
SL903	Welded type	ANSI 300Lb RF	1-1/2xF1x4	20.6	40	105	105	120	216.4	100	250	200	950	1230	29	1/2	1/2	110
			1-1/2xG1x4		40	105	105	120	353.0	100	250	200	950	1230	29	1/2	1/2	110
			1-1/2xHx4		40	105	105	120	555.7	100	250	200	950	1230	32	1/2	3/4	110
			2xJx4		50	125	125	145	855.3	100	250	220	1125	1490	32	1/2	1	200
			2-1/2xKx6		65	145	145	165	1294.6	150	305	240	1285	1700	37	1/2	1-1/4	250
			2-1/2xK2x6		65	155	155	180	1727.6	150	305	240	1400	1850	37	3/4	1-1/4	280
			3xLx6		76	160	170	195	2010.9	150	305	260	1535	2000	37	3/4	1-1/2	300
			3xMx6		76	165	180	210	2533.9	150	305	260	1610	2195	37	3/4	1-1/2	480
			3xM2x6		76	165	180	210	2587.7	150	305	260	1610	2195	37	3/4	1-1/2	480

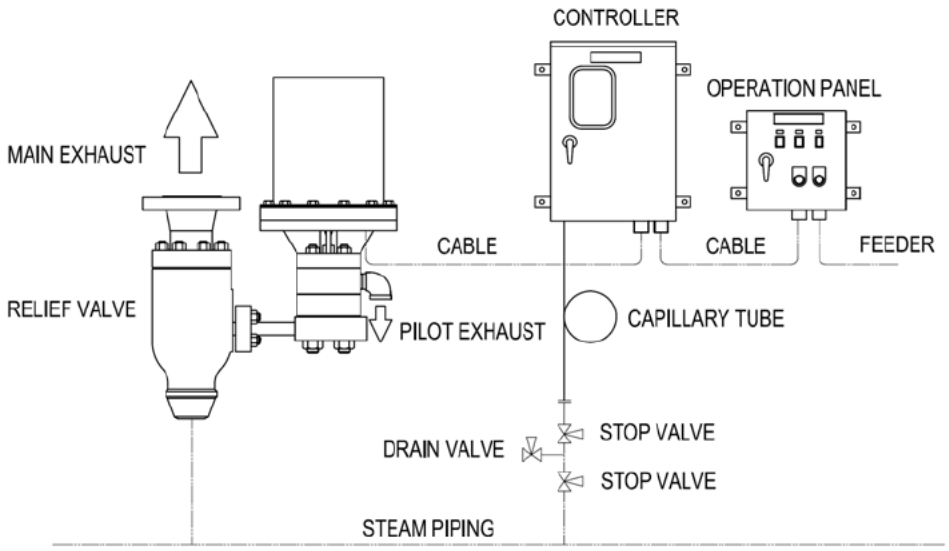
Electromagnetic pressure relief valves: PSH-ER series

PSH-ER series solenoid operated pressure relief valves are operated for opening and closing using electricity (or electromagnet) as a source of power.
PSH-ER series valves consist of a main valve, a pilot valve, a solenoid (or electromagnet) assembly, a controller and an operation panel.
In comparison with ordinary spring-loaded safety valves, this series features:

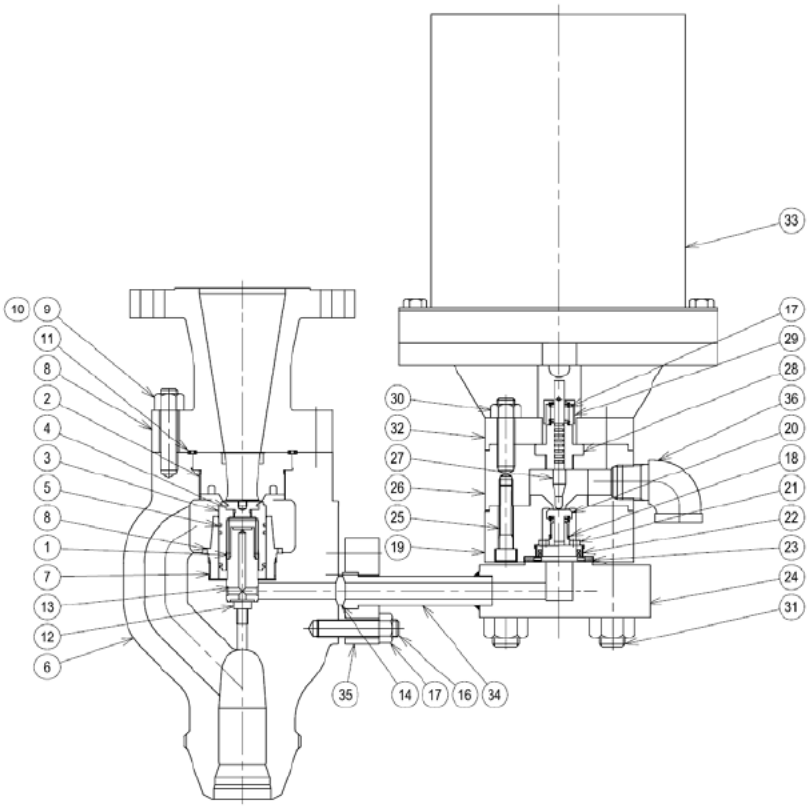
- Permits perfect prevention of leaks until the set pressure is reached
- Permits accurate and reliable popping pressure setting by use of a pressure sensor
- Performs reliable blowdown (2% blowdown achieved)

Thus this valve series contributes to improving boiler operating efficiency and reducing costs.

Product configuration



Structure and major materials



NO.	ITEM	MATERIAL
01	SPRING	B637-7750
02	NOZZLE	A182-F22 HF
03	DISC	B637-7750
04	DISC CENTER	B637-7750
05	PISTON RING	THERMORIC
06	BODY	A217-WC9
07	GUIDE	SUS316
08	VALVE OUTLET	A182-F22
09	STUD BOLT	SNB16
10	NUT	A194-4
11	GASKET	B637-7750
12	ORIFICE	SUS316
13	DUMPER	B637-7750
14	GASKET	SUS321
15	STUD BOLT	SNB16
16	NUT	A194-4
17	SPRING	SUS304
18	SPRING	B637-7750
19	SEAT	A182-F22
20	DISC	B637-7750
21	GUIDE	K-MONEL
22	GUIDE RETAINER	SUS420J2
23	GASKET	ASBESTO FREE
24	FLANGE	SUS316
25	HEX.SOCKET HEAD BOLT	SUS304-A2
26	BODY	A182-F22
27	SPINDLE	STELLITE
28	SPINDLE GUIDE	K-MONEL
29	SPRING COVER	SUS304
30	STUD BOLT&NUT	SNB16 & A194-4
31	STUD BOLT&NUT	SNB16 & A194-4
32	COOLING SPOOL	A216-WCB
33	SOLENOID ASSY.	
34	CONNECTION PIPE	SUS316
35	FLANGE	SUS316
36	ELBOW	SCS13

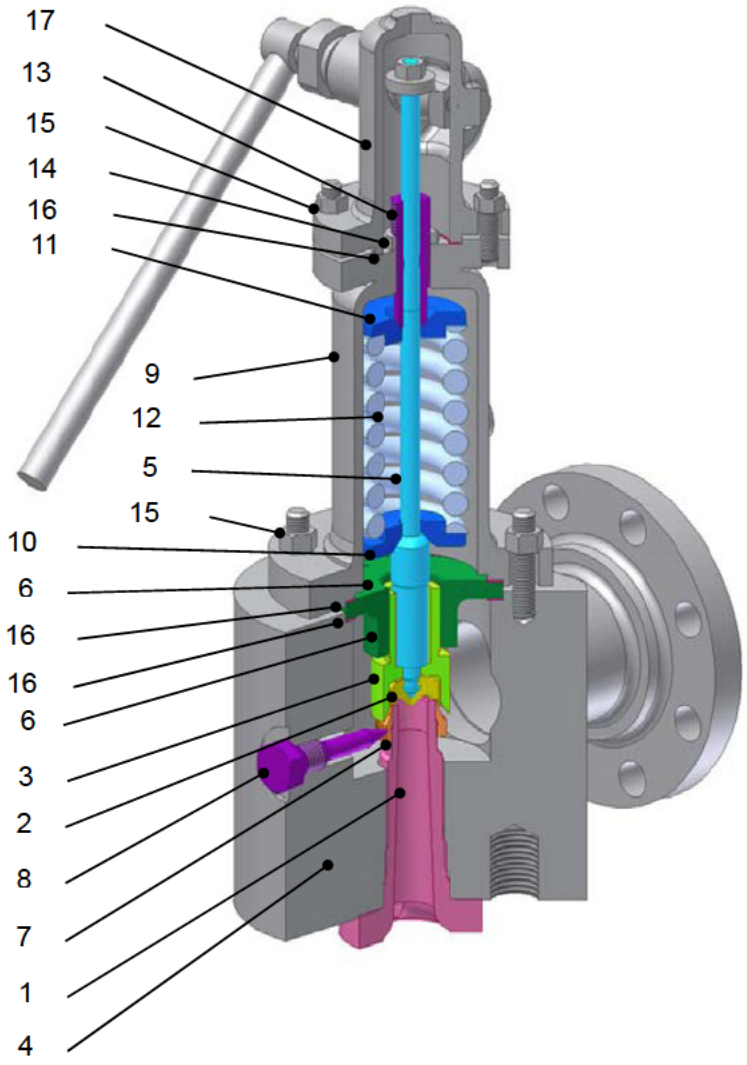
RECL-PE series: Relief valves for high temperature/high pressure liquids

This RECL-PE series has been developed mainly for feed-water heaters and other equipment that deal with high temperature and high pressure liquids, and its structure and materials used are, on the design stage, carefully selected in consideration of harsh operating conditions involving high temperatures and high pressures.
Relief valves of this series feature the optimized shapes of major sections that have realized smooth operation for liquid service, and a forged body that accommodates excess piping reaction force, as well as the surface hardening treatment of the sliding section to allow continuous valve operation. For details, please contact our Business Dept.

Product specifications

Operating pressure range	5.72 - 42.5MPa
Operating temperature range	142 - 371℃
Blowdown	15%
ASME certified discharge coefficient	K=0.717 (ASME Sec. VIII)

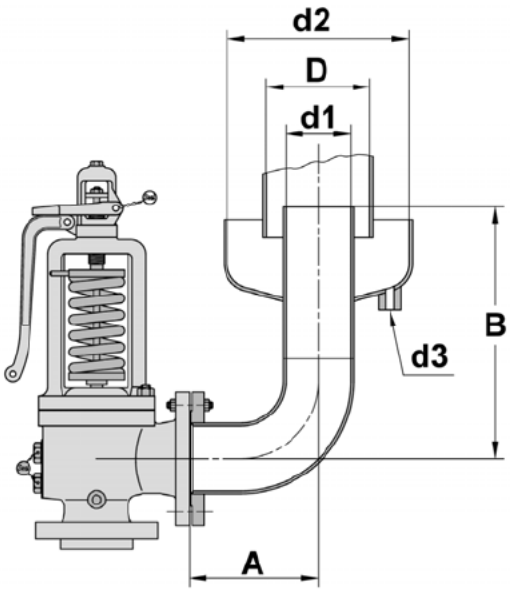
Parts name and major materials



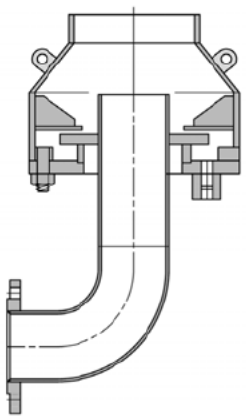
	Parts name	Major material
1	Nozzle seat	A105
2	Disc	SUS630
3	Holder	SUS403
4	Body	A105
5	Spindle	SUS403
6	Guide	SUS304
7	Adjusting ring	SUS304
8	Lock bolt	S20C
9	Bonnet	SCPH2
10	Spring washer	S25C
11	Spring retainer	S25C
12	Spring	Spring steel
13	Adjusting screw	SUS403
14	Jam nut	SS400
15	Stud bolt & nut	SNB7/S45C
16	Gasket	Non-asbestos or dead soft steel
17	Cap	SCPH2

Discharge pipe (drip pan) for steam service safety valves

More than 90% of reported safety valve problems are seat leaks, and this problem is mostly due to binding or immobilization of a discharge pipe of safety valve.
In order to prevent such a seat-leak problem, we manufacture drip pans most suited to our safety valves. Please order them together with safety valves.



General type drip pan



Closed type drip pan

Dimensional table for general type drip pans

Safety valve outlet diameter	d1	d2	d3	A	B	D
25	25	50	Rc3/8	40	150	125
40	40	65	Rc3/8	60	225	125
50	50	80	Rc1/2	80	270	150
65	65	90	Rc1/2	100	365	200
80	80	125	Rc1/2	120	380	200
100	100	150	Rc3/4	160	395	250
125	125	175	Rc3/4	195	430	300
150	150	200	Rc1	235	460	300
200	200	250	Rc1	310	600	400

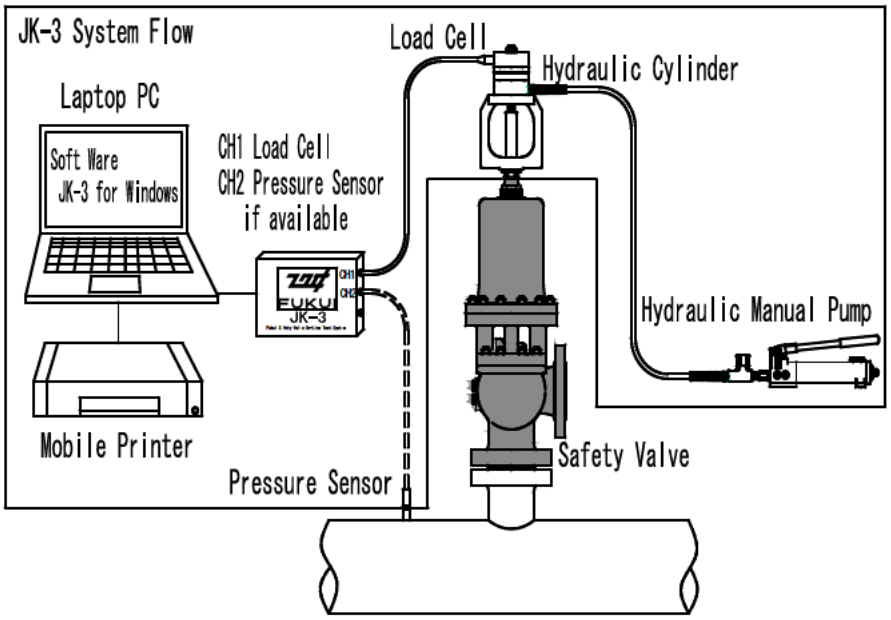
Field tester JK-3 for jack-up tests

Safety valve operation test required for periodic inspection of boilers
Use our JK-3 to save time and money, instead of testing on an actual boiler!

The JK-1 features:

- Permits tests at normal operating pressure;
- Permits tests at low fuel cost, lost cost and low noise;
- Permits direct reading of a load with high reliability;
- Uses a PC for simple, reliable and speedy tests; and
- Displays measurement results on the spot.

A jack-up test is performed to check a safety valve for its popping pressure while a boiler or other equipment under protection by the safety valve is in operation at the operating pressure. This field tester contributes not only to reducing test costs but also to environmental measures in the neighborhood, thus presenting a convenient test method. For details, please contact our Business Department.



SL & SJ series safety valves: Discharging capacity table for LRS (Unit: kg/h)

Series	SL													
Orifice	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
Set P (MPa)	78.5	138.9	216.4	353	555.7	907.9	1294.6	2010.9	2533.9	3058.1	4500.7	7791.3	11272	18385.4
0.1	73	129	202	329	517	845	1206	1873	2360	2848	4191	7255	10496	17120
0.2	109	193	301	491	772	1262	1799	2795	3522	4250	6256	10829	15667	25554
0.3	145	257	400	653	1027	1678	2393	3717	4684	5653	8320	14403	20838	33988
0.4	181	320	499	814	1282	2095	2987	4640	5847	7056	10385	17977	26008	42421
0.5	217	384	599	976	1537	2511	3581	5562	7009	8459	12449	21551	31179	50855
0.6	253	448	698	1138	1792	2928	4175	6485	8171	9862	14514	25125	36350	59289
0.7	289	512	797	1300	2047	3344	4769	7407	9334	11264	16578	28699	41520	67722
0.8	325	575	896	1462	2302	3761	5362	8330	10496	12667	18643	32273	46691	76156
0.9	361	639	996	1624	2557	4177	5956	9252	11658	14070	20707	35847	51862	84590
1.0	397	703	1095	1786	2812	4594	6550	10174	12821	15473	22772	39421	57032	93023
1.1	433	766	1194	1948	3067	5010	7144	11097	13983	16876	24836	42995	62203	101457
1.2	469	830	1293	2110	3321	5427	7738	12019	15145	18278	26901	46569	67373	109891
1.3	505	894	1393	2272	3576	5843	8332	12942	16308	19681	28966	50143	72544	118324
1.4	541	958	1492	2434	3831	6260	8926	13864	17470	21084	31030	53717	77715	126758
1.5	577	1021	1591	2596	4086	6676	9519	14787	18632	22487	33095	57291	82885	135192
1.6	613	1085	1691	2758	4341	7092	10113	15709	19795	23890	35159	60865	88056	143625
1.7	649	1149	1790	2920	4596	7509	10707	16631	20957	25292	37224	64439	93227	152059
1.8	685	1213	1889	3081	4851	7925	11301	17554	22119	26695	39288	68013	98397	160493
1.9	721	1276	1988	3243	5106	8342	11895	18476	23282	28098	41353	71587	103568	168926
2.0	757	1340	2088	3405	5361	8758	12489	19399	24444	29501	43417	75161	108739	177360
2.1	793	1404	2187	3567	5616	9175	13083	20321	25606	30904	45482	78735	113909	185794
2.2	829	1467	2286	3729	5871	9591	13676	21244	26769	32306	47546	82309	119080	194227
2.3	865	1531	2385	3891	6125	10008	14270	22166	27931	33709	49611	85883	124251	202661
2.4	901	1595	2485	4053	6380	10424	14864	23088	29093	35112	51675	89457	129421	211095
2.5	937	1659	2584	4215	6635	10841	15458	24011	30256	36515	53740	93031	134592	219528
2.6	973	1722	2683	4377	6890	11257	16052	24933	31418	37918	55805	96605	139762	227962
2.7	1009	1786	2782	4539	7145	11674	16646	25856	32580	39320	57869	100179	144933	236396
2.8	1045	1850	2882	4701	7400	12090	17240	26778	33743	40723	59934	103753	150104	244829
2.9	1081	1913	2981	4863	7655	12507	17833	27701	34905	42126	61998	107327	155274	253263
3.0	1117	1977	3080	5025	7910	12923	18427	28623	36067	43529	64063	110901	160445	261697

Series	SJ											
Orifice	F2	G2	H2	J2	L1	M	N3	P2	Q2	Q3	R	T
Set P (MPa)	28.5	452.4	706.8	1134.1	1885.7	2533.9	3739.3	4560.4	6082.1	7208.1	10386.9	18385.4
0.1	264	421	658	1056	1756	2360	3482	4247	5664	6712	9672	17120
0.2	394	629	982	1576	2621	3522	5197	6339	8454	10019	14437	25554
0.3	524	836	1307	2097	3486	4684	6913	8430	11244	13325	19201	33988
0.4	654	1044	1631	2617	4351	5847	8628	10522	14033	16632	23966	42421
0.5	784	1251	1955	3137	5216	7009	10343	12614	16823	19938	28731	50855
0.6	914	1459	2279	3657	6081	8171	12058	14706	19613	23244	33495	59289
0.7	1044	1666	2603	4177	6946	9334	13774	16798	22403	26551	38260	67722
0.8	1174	1874	2928	4698	7811	10496	15489	18890	25193	29857	43025	76156
0.9	1304	2081	3252	5218	8676	11658	17204	20982	27983	33164	47789	84590
1.0	1434	2289	3576	5738	9541	12821	18919	23074	30773	36470	52554	93023
1.1	1564	2497	3900	6258	10406	13983	20635	25166	33563	39777	57319	101457
1.2	1694	2704	4225	6779	11271	15145	22350	27258	36353	43083	62083	109891
1.3	1825	2912	4549	7299	12136	16308	24065	29350	39143	46390	66848	118324
1.4	1955	3119	4873	7819	13001	17470	25781	31442	41933	49696	71612	126758
1.5	2085	3327	5197	8339	13866	18632	27496	33534	44723	53003	76377	135192
1.6	2215	3534	5521	8860	14731	19795	29211	35626	47513	56309	81142	143625
1.7	2345	3742	5846	9380	15596	20957	30926	37717	50303	59616	85906	152059
1.8	2475	3949	6170	9900	16461	22119	32642	39809	53093	62922	90671	160493
1.9	2605	4157	6494	10420	17326	23282	34357	41901	55883	66229	95436	168926
2.0	2735	4364	6818	10940	18191	24444	36072	43993	58673	69535	100200	177360
2.1	2865	4572	7143	11461	19056	25606	37788	46085	61463	72841	104965	185794
2.2	2995	4779	7467	11981	19921	26769	39503	48177	64253	76148	109729	194227
2.3	3125	4987	7791	12501	20786	27931	41218	50269	67043	79454	114494	202661
2.4	3255	5194	8115	13021	21651	29093	42933	52361	69833	82761	119259	211095
2.5	3385	5402	8439	13542	22516	30256	44649	54453	72623	86067	124023	219528
2.6	3515	5609	8764	14062	23381	31418	46364	56545	75412	89374	128788	227962
2.7	3645	5817	9088	14582	24246	32580	48079	58637	78202	92680	133553	236396
2.8	3775	6024	9412	15102	25111	33743	49794	60729	80992	95987	138317	244829
2.9	3905	6232	9736	15622	25976	34905	51510	62821	83782	99293	143082	253263
3.0	4035	6439	10061	16143	26841	36067	53225	64912	86572	102600	147847	261697

SL & SJ series safety valves: Discharging capacity table for NK (Unit: kg/h)

Series	SL													
Orifice / Set P (MPa)	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
	78.5	138.9	216.4	353	555.7	907.9	1294.6	2010.9	2533.9	3058.1	4500.7	7791.3	11272	18385.4
0.1	72	127	198	322	508	829	1183	1837	2315	2794	4111	7117	10297	16795
0.2	108	191	298	486	765	1250	1783	2769	3489	4211	6197	10729	15522	25317
0.3	144	256	398	650	1023	1671	2383	3701	4664	5628	8284	14340	20746	33838
0.4	181	320	499	813	1280	2092	2983	4633	5838	7046	10370	17951	25971	42360
0.5	217	384	599	977	1538	2513	3583	5565	7013	8463	12456	21562	31195	50882
0.6	254	449	699	1141	1795	2933	4183	6497	8187	9881	14542	25174	36420	59403
0.7	290	513	799	1304	2053	3354	4783	7429	9361	11298	16628	28785	41644	67925
0.8	326	578	900	1468	2311	3775	5383	8361	10536	12716	18714	32396	46869	76446
0.9	363	642	1000	1631	2568	4196	5983	9293	11710	14133	20800	36007	52094	84968
1.0	399	706	1100	1795	2826	4617	6583	10225	12885	15550	22886	39619	57318	93490
1.1	436	771	1201	1959	3083	5037	7183	11157	14059	16968	24972	43230	62543	102011
1.2	472	835	1301	2122	3341	5458	7783	12090	15234	18385	27058	46841	67767	110533
1.3	508	899	1401	2286	3598	5879	8383	13022	16408	19803	29144	50453	72992	119055
1.4	545	964	1502	2449	3856	6300	8983	13954	17583	21220	31230	54064	78216	127576
1.5	581	1028	1602	2613	4114	6721	9583	14886	18757	22638	33316	57675	83441	136098
1.6	617	1093	1702	2777	4371	7142	10183	15818	19932	24055	35403	61286	88666	144620
1.7	654	1157	1803	2940	4629	7562	10783	16750	21106	25472	37489	64898	93890	153141
1.8	690	1221	1903	3104	4886	7983	11383	17682	22281	26890	39575	68509	99115	161663
1.9	727	1286	2003	3268	5144	8404	11983	18614	23455	28307	41661	72120	104339	170184
2.0	763	1350	2103	3431	5401	8825	12584	19546	24630	29725	43747	75731	109564	178706
2.1	799	1414	2204	3595	5659	9246	13184	20478	25804	31142	45833	79343	114788	187228
2.2	836	1479	2304	3758	5917	9666	13784	21410	26978	32560	47919	82954	120013	195749
2.3	872	1543	2404	3922	6174	10087	14384	22342	28153	33977	50005	86565	125238	204271
2.4	909	1608	2505	4086	6432	10508	14984	23274	29327	35394	52091	90177	130462	212793
2.5	945	1672	2605	4249	6689	10929	15584	24206	30502	36812	54177	93788	135687	221314
2.6	981	1736	2705	4413	6947	11350	16184	25138	31676	38229	56263	97399	140911	229836
2.7	1018	1801	2806	4576	7204	11770	16784	26070	32851	39647	58349	101010	146136	238358
2.8	1054	1865	2906	4740	7462	12191	17384	27002	34025	41064	60435	104622	151360	246879
2.9	1090	1930	3006	4904	7720	12612	17984	27934	35200	42482	62521	108233	156585	255401
3.0	1127	1994	3106	5067	7977	13033	18584	28866	36374	43899	64608	111844	161810	263922

Series	SJ											
Orifice / Set P (MPa)	F2	G2	H2	J2	L1	M	N3	P2	Q2	Q3	R	T
	28.5	452.4	706.8	1134.1	1885.7	2533.9	3739.3	4560.4	6082.1	7208.1	10386.9	18385.4
0.1	259	413	646	1036	1723	2315	3416	4166	5556	6585	9488	16795
0.2	390	623	973	1562	2597	3489	5149	6280	8375	9926	14303	25317
0.3	522	833	1301	2087	3471	4664	6882	8393	11194	13267	19117	33838
0.4	653	1042	1628	2613	4345	5838	8615	10507	14013	16607	23931	42360
0.5	785	1252	1956	3139	5219	7013	10349	12621	16832	19948	28746	50882
0.6	916	1462	2284	3664	6093	8187	12082	14735	19651	23289	33560	59403
0.7	1047	1671	2611	4190	6967	9361	13815	16848	22470	26630	38374	67925
0.8	1179	1881	2939	4716	7841	10536	15548	18962	25289	29971	43189	76446
0.9	1310	2091	3266	5241	8715	11710	17281	21076	28108	33312	48003	84968
1.0	1442	2300	3594	5767	9589	12885	19014	23190	30927	36653	52817	93490
1.1	1573	2510	3922	6293	10463	14059	20748	25303	33747	39994	57632	102011
1.2	1704	2720	4249	6818	11337	15234	22481	27417	36566	43335	62446	110533
1.3	1836	2930	4577	7344	12211	16408	24214	29531	39385	46676	67260	119055
1.4	1967	3139	4904	7870	13085	17583	25947	31645	42204	50017	72075	127576
1.5	2099	3349	5232	8395	13959	18757	27680	33758	45023	53358	76889	136098
1.6	2230	3559	5560	8921	14833	19932	29413	35872	47842	56699	81703	144620
1.7	2361	3768	5887	9446	15707	21106	31146	37986	50661	60040	86518	153141
1.8	2493	3978	6215	9972	16581	22281	32880	40100	53480	63381	91332	161663
1.9	2624	4188	6542	10498	17455	23455	34613	42213	56299	66722	96146	170184
2.0	2756	4397	6870	11023	18329	24630	36346	44327	59118	70063	100961	178706
2.1	2887	4607	7198	11549	19203	25804	38079	46441	61937	73404	105775	187228
2.2	3018	4817	7525	12075	20077	26978	39812	48555	64756	76745	110589	195749
2.3	3150	5026	7853	12600	20951	28153	41545	50668	67575	80086	115404	204271
2.4	3281	5236	8181	13126	21825	29327	43279	52782	70394	83427	120218	212793
2.5	3413	5446	8508	13652	22699	30502	45012	54896	73213	86768	125032	221314
2.6	3544	5655	8836	14177	23573	31676	46745	57010	76032	90108	129847	229836
2.7	3675	5865	9163	14703	24447	32851	48478	59123	78851	93449	134661	238358
2.8	3807	6075	9491	15229	25321	34025	50211	61237	81670	96790	139475	246879
2.9	3938	6285	9819	15754	26195	35200	51944	63351	84489	100131	144290	255401
3.0	4070	6494	10146	16280	27069	36374	53678	65465	87309	103472	149104	263922

SL & SJ series safety valves: Discharging capacity table for DNV (Unit: kg/h)

Series	SL													
Orifice / Set P (MPa)	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
	78.5	138.9	216.4	353	555.7	907.9	1294.6	2010.9	2533.9	3058.1	4500.7	7791.3	11272	18385.4
0.1	71	125	195	318	501	818	1166	1812	2283	2755	4055	7019	10155	16563
0.2	106	188	292	477	751	1227	1749	2717	3424	4133	6082	10529	15232	24845
0.3	141	250	390	636	1001	1636	2333	3623	4566	5510	8109	14038	20310	33127
0.4	177	313	487	795	1252	2045	2916	4529	5707	6888	10137	17548	25387	41409
0.5	212	375	585	954	1502	2454	3499	5435	6848	8265	12164	21058	30465	49690
0.6	248	438	682	1113	1752	2863	4082	6341	7990	9643	14191	24567	35542	57972
0.7	283	501	780	1272	2003	3272	4665	7246	9131	11020	16219	28077	40620	66254
0.8	318	563	877	1431	2253	3681	5248	8152	10273	12398	18246	31586	45697	74535
0.9	354	626	975	1590	2503	4090	5832	9058	11414	13775	20273	35096	50775	82817
1.0	389	688	1072	1749	2753	4499	6415	9964	12555	15153	22301	38606	55852	91099
1.1	424	751	1170	1908	3004	4908	6998	10870	13697	16530	24328	42115	60930	99381
1.2	460	813	1267	2067	3254	5317	7581	11776	14838	17908	26355	45625	66007	107662
1.3	495	876	1365	2226	3504	5725	8164	12681	15980	19285	28383	49134	71085	115944
1.4	530	939	1462	2385	3755	6134	8747	13587	17121	20663	30410	52644	76162	124226
1.5	566	1001	1560	2544	4005	6543	9330	14493	18262	22040	32437	56154	81240	132507
1.6	601	1064	1657	2703	4255	6952	9914	15399	19404	23418	34465	59663	86317	140789
1.7	636	1126	1755	2862	4506	7361	10497	16305	20545	24795	36492	63173	91395	149071
1.8	672	1189	1852	3021	4756	7770	11080	17210	21687	26173	38520	66682	96472	157353
1.9	707	1251	1950	3180	5006	8179	11663	18116	22828	27550	40547	70192	101550	165634
2.0	743	1314	2047	3339	5257	8588	12246	19022	23969	28928	42574	73701	106627	173916
2.1	778	1376	2145	3498	5507	8997	12829	19928	25111	30305	44602	77211	111705	182198
2.2	813	1439	2242	3657	5757	9406	13413	20834	26252	31683	46629	80721	116782	190479
2.3	849	1502	2339	3816	6008	9815	13996	21739	27394	33061	48656	84230	121859	198761
2.4	884	1564	2437	3975	6258	10224	14579	22645	28535	34438	50684	87740	126937	207043
2.5	919	1627	2534	4134	6508	10633	15162	23551	29676	35816	52711	91249	132014	215325
2.6	955	1689	2632	4293	6759	11042	15745	24457	30818	37193	54738	94759	137092	223606
2.7	990	1752	2729	4452	7009	11451	16328	25363	31959	38571	56766	98269	142169	231888
2.8	1025	1814	2827	4611	7259	11860	16911	26269	33100	39948	58793	101778	147247	240170
2.9	1061	1877	2924	4770	7509	12269	17495	27174	34242	41326	60820	105288	152324	248451
3.0	1096	1940	3022	4929	7760	12678	18078	28080	35383	42703	62848	108797	157402	256733

Series	SJ											
Orifice / Set P (MPa)	F2	G2	H2	J2	L1	M	N3	P2	Q2	Q3	R	T
	28.5	452.4	706.8	1134.1	1885.7	2533.9	3739.3	4560.4	6082.1	7208.1	10386.9	18385.4
0.1	255	408	637	1022	1699	2283	3369	4108	5479	6494	9358	16563
0.2	383	611	955	1533	2548	3424	5053	6163	8219	9741	14036	24845
0.3	511	815	1274	2043	3398	4566	6737	8217	10959	12988	18715	33127
0.4	639	1019	1592	2554	4247	5707	8422	10271	13698	16234	23394	41409
0.5	766	1223	1910	3065	5096	6848	10106	12325	16438	19481	28073	49690
0.6	894	1426	2229	3576	5946	7990	11791	14380	19178	22728	32751	57972
0.7	1022	1630	2547	4087	6795	9131	13475	16434	21917	25975	37430	66254
0.8	1149	1834	2865	4598	7645	10273	15159	18488	24657	29222	42109	74535
0.9	1277	2038	3184	5109	8494	11414	16844	20542	27397	32469	46788	82817
1.0	1405	2242	3502	5619	9344	12555	18528	22597	30137	35716	51467	91099
1.1	1532	2445	3821	6130	10193	13697	20212	24651	32876	38963	56145	99381
1.2	1660	2649	4139	6641	11042	14838	21897	26705	35616	42210	60824	107662
1.3	1788	2853	4457	7152	11892	15980	23581	28759	38356	45456	65503	115944
1.4	1916	3057	4776	7663	12741	17121	25266	30814	41095	48703	70182	124226
1.5	2043	3261	5094	8174	13591	18262	26950	32868	43835	51950	74861	132507
1.6	2171	3464	5412	8685	14440	19404	28634	34922	46575	55197	79539	140789
1.7	2299	3668	5731	9195	15289	20545	30319	36976	49314	58444	84218	149071
1.8	2426	3872	6049	9706	16139	21687	32003	39030	52054	61691	88897	157353
1.9	2554	4076	6368	10217	16988	22828	33687	41085	54794	64938	93576	165634
2.0	2682	4279	6686	10728	17838	23969	35372	43139	57533	68185	98254	173916
2.1	2809	4483	7004	11239	18687	25111	37056	45193	60273	71432	102933	182198
2.2	2937	4687	7323	11750	19537	26252	38740	47247	63013	74679	107612	190479
2.3	3065	4891	7641	12261	20386	27394	40425	49302	65752	77925	112291	198761
2.4	3193	5095	7959	12771	21235	28535	42109	51356	68492	81172	116970	207043
2.5	3320	5298	8278	13282	22085	29676	43794	53410	71232	84419	121648	215325
2.6	3448	5502	8596	13793	22934	30818	45478	55464	73971	87666	126327	223606
2.7	3576	5706	8915	14304	23784	31959	47162	57519	76711	90913	131006	231888
2.8	3703	5910	9233	14815	24633	33100	48847	59573	79451	94160	135685	240170
2.9	3831	6114	9551	15326	25482	34242	50531	61627	82191	97407	140364	248451
3.0	3959	6317	9870	15837	26332	35383	52215	63681	84930	100654	145042	256733

SL & SJ series safety valves: Discharging capacity table for BV (Unit: kg/h)

Series	SL													
Orifice	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
Set P (MPa)	78.5	138.9	216.4	353	555.7	907.9	1294.6	2010.9	2533.9	3058.1	4500.7	7791.3	11272	18385.4
0.1	72	128	200	326	513	838	1194	1855	2338	2821	4152	7187	10398	16961
0.2	108	191	297	484	763	1246	1777	2760	3478	4197	6177	10694	15471	25234
0.3	143	253	394	643	1013	1655	2359	3665	4618	5573	8203	14200	20543	33507
0.4	178	316	492	802	1263	2063	2942	4570	5758	6950	10228	17706	25616	41781
0.5	214	378	589	961	1513	2472	3525	5475	6899	8326	12253	21212	30688	50054
0.6	249	441	687	1120	1763	2880	4107	6380	8039	9702	14278	24718	35760	58328
0.7	284	503	784	1279	2013	3289	4690	7284	9179	11078	16304	28224	40833	66601
0.8	320	566	881	1438	2263	3697	5272	8189	10319	12454	18329	31730	45905	74875
0.9	355	628	979	1596	2513	4106	5855	9094	11460	13830	20354	35236	50978	83148
1.0	390	691	1076	1755	2763	4515	6437	9999	12600	15206	22380	38742	56050	91421
1.1	426	753	1173	1914	3013	4923	7020	10904	13740	16583	24405	42248	61122	99695
1.2	461	816	1271	2073	3263	5332	7603	11809	14880	17959	26430	45754	66195	107968
1.3	496	878	1368	2232	3513	5740	8185	12714	16021	19335	28456	49260	71267	116242
1.4	532	941	1466	2391	3763	6149	8768	13619	17161	20711	30481	52767	76340	124515
1.5	567	1003	1563	2550	4014	6557	9350	14524	18301	22087	32506	56273	81412	132789
1.6	602	1066	1660	2708	4264	6966	9933	15429	19441	23463	34532	59779	86484	141062
1.7	638	1128	1758	2867	4514	7374	10515	16334	20582	24839	36557	63285	91557	149335
1.8	673	1191	1855	3026	4764	7783	11098	17238	21722	26216	38582	66791	96629	157609
1.9	708	1253	1952	3185	5014	8192	11681	18143	22862	27592	40608	70297	101702	165882
2.0	744	1316	2050	3344	5264	8600	12263	19048	24002	28968	42633	73803	106774	174156
2.1	779	1378	2147	3503	5514	9009	12846	19953	25143	30344	44658	77309	111846	182429
2.2	814	1441	2245	3661	5764	9417	13428	20858	26283	31720	46684	80815	116919	190703
2.3	850	1503	2342	3820	6014	9826	14011	21763	27423	33096	48709	84321	121991	198976
2.4	885	1566	2439	3979	6264	10234	14593	22668	28563	34472	50734	87827	127064	207249
2.5	920	1628	2537	4138	6514	10643	15176	23573	29704	35849	52759	91334	132136	215523
2.6	956	1691	2634	4297	6764	11051	15759	24478	30844	37225	54785	94840	137208	223796
2.7	991	1753	2732	4456	7014	11460	16341	25383	31984	38601	56810	98346	142281	232070
2.8	1026	1816	2829	4615	7264	11869	16924	26287	33124	39977	58835	101852	147353	240343
2.9	1062	1878	2926	4773	7514	12277	17506	27192	34265	41353	60861	105358	152426	248617
3.0	1097	1941	3024	4932	7765	12686	18089	28097	35405	42729	62886	108864	157498	256890

Series	SJ											
Orifice	F2	G2	H2	J2	L1	M	N3	P2	Q2	Q3	R	T
Set P (MPa)	28.5	452.4	706.8	1134.1	1885.7	2533.9	3739.3	4560.4	6082.1	7208.1	10386.9	18385.4
0.1	262	417	652	1046	1740	2338	3450	4207	5611	6649	9582	16961
0.2	389	621	970	1557	2588	3478	5132	6259	8348	9893	14256	25234
0.3	517	824	1288	2067	3437	4618	6815	8311	11085	13137	18930	33507
0.4	644	1028	1606	2577	4285	5758	8498	10364	13822	16380	23604	41781
0.5	772	1232	1924	3088	5134	6899	10180	12416	16559	19624	28278	50054
0.6	899	1435	2242	3598	5982	8039	11863	14468	19295	22868	32952	58328
0.7	1027	1639	2560	4108	6831	9179	13546	16520	22032	26111	37627	66601
0.8	1155	1842	2878	4619	7680	10319	15228	18572	24769	29355	42301	74875
0.9	1282	2046	3197	5129	8528	11460	16911	20624	27506	32599	46975	83148
1.0	1410	2250	3515	5639	9377	12600	18594	22677	30243	35842	51649	91421
1.1	1537	2453	3833	6150	10225	13740	20276	24729	32980	39086	56323	99695
1.2	1665	2657	4151	6660	11074	14880	21959	26781	35717	42330	60997	107968
1.3	1792	2860	4469	7170	11922	16021	23642	28833	38454	45573	65671	116242
1.4	1920	3064	4787	7681	12771	17161	25324	30885	41191	48817	70345	124515
1.5	2048	3267	5105	8191	13619	18301	27007	32937	43928	52061	75019	132789
1.6	2175	3471	5423	8701	14468	19441	28690	34990	46665	55304	79693	141062
1.7	2303	3675	5741	9212	15317	20582	30372	37042	49402	58548	84368	149335
1.8	2430	3878	6059	9722	16165	21722	32055	39094	52139	61791	89042	157609
1.9	2558	4082	6377	10232	17014	22862	33738	41146	54876	65035	93716	165882
2.0	2685	4285	6695	10743	17862	24002	35421	43198	57613	68279	98390	174156
2.1	2813	4489	7013	11253	18711	25143	37103	45251	60350	71522	103064	182429
2.2	2941	4693	7331	11763	19559	26283	38786	47303	63087	74766	107738	190703
2.3	3068	4896	7649	12274	20408	27423	40469	49355	65824	78010	112412	198976
2.4	3196	5100	7967	12784	21257	28563	42151	51407	68560	81253	117086	207249
2.5	3323	5303	8285	13294	22105	29704	43834	53459	71297	84497	121760	215523
2.6	3451	5507	8604	13805	22954	30844	45517	55511	74034	87741	126435	223796
2.7	3578	5710	8922	14315	23802	31984	47199	57564	76771	90984	131109	232070
2.8	3706	5914	9240	14826	24651	33124	48882	59616	79508	94228	135783	240343
2.9	3834	6118	9558	15336	25499	34265	50565	61668	82245	97472	140457	248617
3.0	3961	6321	9876	15846	26348	35405	52247	63720	84982	100715	145131	256890

SL & SJ series safety valves: Discharging capacity table for KR (Unit: kg/h)

Series	SL													
Orifice / Set P (MPa)	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
	78.5	138.9	216.4	353	555.7	907.9	1294.6	2010.9	2533.9	3058.1	4500.7	7791.3	11272	18385.4
0.1	72	128	200	326	513	838	1195	1857	2340	2824	4156	7195	10409	16978
0.2	110	194	302	493	776	1268	1808	2808	3538	4270	6285	10880	15740	25673
0.3	147	260	405	660	1039	1697	2420	3759	4737	5717	8413	14565	21072	34369
0.4	184	325	507	827	1302	2127	3032	4710	5935	7163	10542	18250	26403	43065
0.5	221	391	609	994	1564	2556	3645	5661	7134	8610	12671	21935	31734	51761
0.6	258	457	712	1161	1827	2985	4257	6612	8332	10056	14800	25620	37066	60456
0.7	295	522	814	1328	2090	3415	4869	7564	9531	11502	16928	29305	42397	69152
0.8	332	588	916	1495	2353	3844	5482	8515	10729	12949	19057	32990	47728	77848
0.9	370	654	1019	1662	2616	4274	6094	9466	11928	14395	21186	36675	53060	86544
1.0	407	720	1121	1829	2879	4703	6706	10417	13126	15842	23314	40360	58391	95240
1.1	444	785	1223	1996	3141	5132	7319	11368	14325	17288	25443	44045	63722	103935
1.2	481	851	1326	2163	3404	5562	7931	12319	15523	18734	27572	47730	69054	112631
1.3	518	917	1428	2329	3667	5991	8543	13270	16721	20181	29701	51416	74385	121327
1.4	555	982	1530	2496	3930	6421	9156	14221	17920	21627	31829	55101	79716	130023
1.5	592	1048	1633	2663	4193	6850	9768	15172	19118	23074	33958	58786	85048	138719
1.6	629	1114	1735	2830	4456	7280	10380	16123	20317	24520	36087	62471	90379	147414
1.7	667	1179	1837	2997	4718	7709	10992	17075	21515	25966	38215	66156	95710	156110
1.8	704	1245	1940	3164	4981	8138	11605	18026	22714	27413	40344	69841	101042	164806
1.9	741	1311	2042	3331	5244	8568	12217	18977	23912	28859	42473	73526	106373	173502
2.0	778	1376	2145	3498	5507	8997	12829	19928	25111	30305	44602	77211	111705	182198
2.1	815	1442	2247	3665	5770	9427	13442	20879	26309	31752	46730	80896	117036	190893
2.2	852	1508	2349	3832	6033	9856	14054	21830	27508	33198	48859	84581	122367	199589
2.3	889	1574	2452	3999	6295	10285	14666	22781	28706	34645	50988	88266	127699	208285
2.4	926	1639	2554	4166	6558	10715	15279	23732	29905	36091	53116	91951	133030	216981
2.5	964	1705	2656	4333	6821	11144	15891	24683	31103	37537	55245	95636	138361	225677
2.6	1001	1771	2759	4500	7084	11574	16503	25634	32302	38984	57374	99322	143693	234372
2.7	1038	1836	2861	4667	7347	12003	17116	26586	33500	40430	59502	103007	149024	243068
2.8	1075	1902	2963	4834	7610	12433	17728	27537	34698	41877	61631	106692	154355	251764
2.9	1112	1968	3066	5001	7872	12862	18340	28488	35897	43323	63760	110377	159687	260460
3.0	1149	2033	3168	5168	8135	13291	18952	29439	37095	44769	65889	114062	165018	269156

Series	SJ											
Orifice / Set P (MPa)	F2	G2	H2	J2	L1	M	N3	P2	Q2	Q3	R	T
	28.5	452.4	706.8	1134.1	1885.7	2533.9	3739.3	4560.4	6082.1	7208.1	10386.9	18385.4
0.1	262	418	653	1047	1741	2340	3453	4211	5616	6656	9592	16978
0.2	396	632	987	1584	2633	3538	5222	6368	8493	10065	14504	25673
0.3	530	846	1321	2120	3525	4737	6990	8525	11370	13475	19417	34369
0.4	664	1060	1656	2656	4417	5935	8759	10682	14246	16884	24330	43065
0.5	798	1274	1990	3193	5309	7134	10527	12839	17123	20293	29242	51761
0.6	932	1488	2324	3729	6201	8332	12296	14996	20000	23702	34155	60456
0.7	1066	1702	2658	4266	7093	9531	14064	17153	22876	27112	39068	69152
0.8	1200	1916	2993	4802	7984	10729	15833	19310	25753	30521	43981	77848
0.9	1334	2130	3327	5338	8876	11928	17602	21467	28630	33930	48893	86544
1.0	1469	2344	3661	5875	9768	13126	19370	23624	31506	37339	53806	95240
1.1	1603	2557	3996	6411	10660	14325	21139	25781	34383	40748	58719	103935
1.2	1737	2771	4330	6948	11552	15523	22907	27938	37260	44158	63631	112631
1.3	1871	2985	4664	7484	12444	16721	24676	30095	40136	47567	68544	121327
1.4	2005	3199	4999	8020	13336	17920	26445	32251	43013	50976	73457	130023
1.5	2139	3413	5333	8557	14228	19118	28213	34408	45890	54385	78370	138719
1.6	2273	3627	5667	9093	15120	20317	29982	36565	48766	57795	83282	147414
1.7	2407	3841	6001	9630	16011	21515	31750	38722	51643	61204	88195	156110
1.8	2541	4055	6336	10166	16903	22714	33519	40879	54520	64613	93108	164806
1.9	2675	4269	6670	10702	17795	23912	35288	43036	57396	68022	98021	173502
2.0	2809	4483	7004	11239	18687	25111	37056	45193	60273	71432	102933	182198
2.1	2944	4697	7339	11775	19579	26309	38825	47350	63150	74841	107846	190893
2.2	3078	4911	7673	12312	20471	27508	40593	49507	66026	78250	112759	199589
2.3	3212	5125	8007	12848	21363	28706	42362	51664	68903	81659	117671	208285
2.4	3346	5339	8342	13384	22255	29905	44130	53821	71780	85069	122584	216981
2.5	3480	5553	8676	13921	23147	31103	45899	55978	74656	88478	127497	225677
2.6	3614	5767	9010	14457	24038	32302	47668	58135	77533	91887	132410	234372
2.7	3748	5981	9344	14994	24930	33500	49436	60292	80410	95296	137322	243068
2.8	3882	6195	9679	15530	25822	34698	51205	62449	83286	98706	142235	251764
2.9	4016	6409	10013	16066	26714	35897	52973	64606	86163	102115	147148	260460
3.0	4150	6623	10347	16603	27606	37095	54742	66763	89040	105524	152060	269156

SL & SJ series safety valves: Discharging capacity table for ABS (Unit: kg/h)

Series	SL													
Orifice / Set P (MPa)	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
	78.5	138.9	216.4	353	555.7	907.9	1294.6	2010.9	2533.9	3058.1	4500.7	7791.3	11272	18385.4
0.1	80	142	222	362	570	931	1327	2061	2598	3135	4614	7987	11555	18847
0.2	117	206	322	525	826	1349	1924	2989	3766	4545	6689	11580	16753	27325
0.3	153	270	421	687	1082	1768	2521	3916	4934	5955	8765	15173	21951	35803
0.4	189	335	521	850	1338	2187	3118	4843	6103	7365	10840	18765	27149	44281
0.5	225	399	621	1013	1595	2605	3715	5771	7271	8776	12915	22358	32347	52759
0.6	261	463	721	1176	1851	3024	4312	6698	8440	10186	14991	25951	37544	61238
0.7	298	527	821	1339	2107	3443	4909	7625	9608	11596	17066	29544	42742	69716
0.8	334	591	920	1501	2363	3861	5506	8552	10777	13006	19142	33137	47940	78194
0.9	370	655	1020	1664	2620	4280	6103	9480	11945	14416	21217	36730	53138	86672
1.0	406	719	1120	1827	2876	4699	6700	10407	13114	15827	23293	40322	58336	95150
1.1	442	783	1220	1990	3132	5117	7297	11334	14282	17237	25368	43915	63534	103628
1.2	479	847	1320	2152	3388	5536	7894	12262	15451	18647	27443	47508	68732	112106
1.3	515	911	1419	2315	3645	5955	8491	13189	16619	20057	29519	51101	73930	120585
1.4	551	975	1519	2478	3901	6373	9088	14116	17788	21467	31594	54694	79128	129063
1.5	587	1039	1619	2641	4157	6792	9685	15044	18956	22878	33670	58287	84326	137541
1.6	623	1103	1719	2804	4413	7211	10282	15971	20125	24288	35745	61879	89524	146019
1.7	660	1167	1818	2966	4670	7629	10879	16898	21293	25698	37821	65472	94721	154497
1.8	696	1231	1918	3129	4926	8048	11476	17825	22461	27108	39896	69065	99919	162975
1.9	732	1295	2018	3292	5182	8467	12073	18753	23630	28518	41971	72658	105117	171453
2.0	768	1359	2118	3455	5438	8885	12670	19680	24798	29929	44047	76251	110315	179932
2.1	804	1423	2218	3617	5695	9304	13267	20607	25967	31339	46122	79844	115513	188410
2.2	841	1487	2317	3780	5951	9723	13864	21535	27135	32749	48198	83436	120711	196888
2.3	877	1552	2417	3943	6207	10141	14461	22462	28304	34159	50273	87029	125909	205366
2.4	913	1616	2517	4106	6463	10560	15058	23389	29472	35569	52349	90622	131107	213844
2.5	949	1680	2617	4269	6720	10979	15655	24316	30641	36980	54424	94215	136305	222322
2.6	985	1744	2717	4431	6976	11397	16252	25244	31809	38390	56499	97808	141503	230800
2.7	1022	1808	2816	4594	7232	11816	16849	26171	32978	39800	58575	101401	146701	239279
2.8	1058	1872	2916	4757	7488	12235	17446	27098	34146	41210	60650	104993	151898	247757
2.9	1094	1936	3016	4920	7745	12653	18043	28026	35315	42620	62726	108586	157096	256235
3.0	1130	2000	3116	5082	8001	13072	18640	28953	36483	44031	64801	112179	162294	264713

Series	SJ											
Orifice / Set P (MPa)	F2	G2	H2	J2	L1	M	N3	P2	Q2	Q3	R	T
	28.5	452.4	706.8	1134.1	1885.7	2533.9	3739.3	4560.4	6082.1	7208.1	10386.9	18385.4
0.1	291	464	725	1163	1933	2598	3833	4675	6235	7389	10648	18847
0.2	421	672	1050	1686	2803	3766	5557	6778	9039	10713	15437	27325
0.3	552	881	1376	2209	3672	4934	7282	8881	11844	14037	20227	35803
0.4	683	1090	1702	2731	4542	6103	9006	10984	14649	17361	25017	44281
0.5	814	1298	2028	3254	5411	7271	10730	13087	17453	20685	29807	52759
0.6	944	1507	2354	3777	6281	8440	12455	15190	20258	24009	34596	61238
0.7	1075	1715	2680	4300	7150	9608	14179	17293	23063	27332	39386	69716
0.8	1206	1924	3006	4823	8020	10777	15903	19396	25867	30656	44176	78194
0.9	1336	2133	3332	5346	8890	11945	17628	21499	28672	33980	48966	86672
1.0	1467	2341	3658	5869	9759	13114	19352	23601	31477	37304	53755	95150
1.1	1598	2550	3984	6392	10629	14282	21076	25704	34281	40628	58545	103628
1.2	1729	2759	4310	6915	11498	15451	22801	27807	37086	43952	63335	112106
1.3	1859	2967	4636	7438	12368	16619	24525	29910	39891	47276	68125	120585
1.4	1990	3176	4962	7961	13237	17788	26249	32013	42695	50600	72914	129063
1.5	2121	3384	5288	8484	14107	18956	27974	34116	45500	53924	77704	137541
1.6	2252	3593	5613	9007	14976	20125	29698	36219	48305	57248	82494	146019
1.7	2382	3802	5939	9530	15846	21293	31422	38322	51109	60571	87284	154497
1.8	2513	4010	6265	10053	16716	22461	33147	40425	53914	63895	92074	162975
1.9	2644	4219	6591	10576	17585	23630	34871	42528	56719	67219	96863	171453
2.0	2775	4427	6917	11099	18455	24798	36595	44631	59523	70543	101653	179932
2.1	2905	4636	7243	11622	19324	25967	38320	46734	62328	73867	106443	188410
2.2	3036	4845	7569	12145	20194	27135	40044	48837	65133	77191	111233	196888
2.3	3167	5053	7895	12668	21063	28304	41768	50940	67937	80515	116022	205366
2.4	3297	5262	8221	13191	21933	29472	43493	53043	70742	83839	120812	213844
2.5	3428	5471	8547	13714	22803	30641	45217	55146	73547	87163	125602	222322
2.6	3559	5679	8873	14237	23672	31809	46941	57249	76351	90487	130392	230800
2.7	3690	5888	9199	14760	24542	32978	48665	59352	79156	93811	135181	239279
2.8	3820	6096	9525	15283	25411	34146	50390	61455	81961	97134	139971	247757
2.9	3951	6305	9851	15806	26281	35315	52114	63558	84765	100458	144761	256235
3.0	4082	6514	10177	16329	27150	36483	53838	65661	87570	103782	149551	264713

Installation precautions for safety valves

Safety precautions

Below is a description about danger or fault that may occur if the following instruction is ignored and improper handling or operation is done

危険 Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

警告 Indicates a potentially hazardous situation which, if not avoided, could resulting in death or serious injury.

注意 Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

Transporting and storing safety valves	危険	**When hoisting a safety valve, do not get under it.** To avoid an accident due to a falling object for instance, try to hoist a safety valve as vertically as possible. In addition, never get under a safety valve that is in a hoisted condition. Before hoisting, check the weight of the safety valve and use an appropriate hoisting tool in consideration of the valve weight.
	注意	**Never use the safety valve lever or cap for hoisting purposes.** Hooking the lever or cap for lifting adversely affects the valve performance, and therefore it should be avoided. We recommend that a wire(s) or a nylon sling(s) be wound around the valve outlet neck and the bonnet or the yoke for lifting.
	警告	**Take care not to have a safety valve fall.** Many of safety valves are of an angle type, meaning extreme instability. Therefore, when storing safety valves, avoid excess piling. Otherwise, they may be damaged by falling.
	注意	**Store safety valves indoors.** Store safety valves indoors until they are actually installed. If it should ever be impossible to do so, then cover them with waterproof sheets or the like to avoid exposure to rain and wind.
Installing safety valves	注意	**Install safety valves vertically on the inlet piping.** Install safety valves vertically on the boiler body or on the inlet piping for installation. If installed in a tilted condition, poor gastightness or instable operation may result. The allowable inclination of safety valve in terms of angle is within ±1° of the vertical line.
	警告	**Take care in tightening the flange bolts.** Before installing a safety valve, remove the dustproof cover each from the inlet and outlet, and check for foreign matter. Furthermore, when installing a flanged type safety valve, take care that the flange gasket is not out of place from the flange outer end, and that flange bolts are evenly tightened (this can be achieved by alternately and uniformly tightening). Poor tightening may result in leaks of steam, possibly leading to burns.
	警告	**Make sure that the safety valve inlet piping is larger than the valve inlet diameter.** Round off the corners of safety valve inlet piping to ensure smooth flow of steam to the safety valve from inside the boiler, and arrange its inside diameter to be at least equal to the nominal diameter of the safety valve. Dimension “R” of the corners of the recommended inlet pipe inside diameter is at least 1/4 of the inside diameter.
	注意	**Make sure that the pressure loss across the safety valve inlet is below 2%.** Design the pressure loss from the installation section to the safety valve to be less than 2% of the set pressure. When this pressure loss is larger, the safety valve may chatter at the time of valve operation. When installing a safety valve on an elbow, raise the elbow pipe diameter one size from the safety valve inlet diameter. In addition, use an elbow with a large curvature (i.e. long elbow) and provide appropriate supports in consideration of the reaction force generated at the time of valve operation.
	注意	**Install a safety valve in a place sufficiently away from other valves and joints.** When installing a safety valve in the pipeline, keep it sufficiently away from other valves and joints that may disturb a smooth flow of fluid. To be more specific, install a safety valve in a place away at least the distance equivalent to 10xD (D: pipe diameter) each upstream and downstream. Also, provide no branch pipe in the symmetrical position to the safety valve installation position. When installing two or more safety valves on the same header and line, take appropriate spacing into due consideration. If all the safety valves operate at one time, a malfunction may result due to a partially uneven distribution of pressure.

		**Be careful of a reaction force at the time of popping action.** Use a blowoff pipe of a size equivalent to or larger than the blowoff port diameter of safety valve. Maintain the distance between the valve axis of safety valve and the center of blowoff pipe to be less than 4 times the blowoff port diameter. Such a blowoff pipe should be minimized in its length with no bending, and it should be led to outside while making the structure as simple and reliable as possible. Make sure that the back pressure that is generated inside the blowoff pipe at the time of valve operation is less than 10% of the set pressure. Failure to do so may result in unstable operation of the valve. In addition, the blowoff piping arrangement should be such that the safety valve is not unduly affected by possible thermal expansion of a boiler, equipment and/or a blowoff pipe. When installing a drain pipe on the blowoff pipe, keep the drain pipe open at its bottom end.
		**Do not bind the safety valve with a drain pipe.** To remove drain generated in the blow-off process of a safety valve, or rainwater, be sure to provide a drain pipe separately from other pipes to avoid binding the safety valve. Furthermore, keep the drain pipe open at its bottom end and do not equip a cock or a valve at that end.
Operating the safety valves		**When performing a hydrostatic pressure test, be careful of the test pressure.** At the time of a hydrostatic test, check the test pressure and make sure that it is never exceeded. Some safety valves have a hydrostatic plug inserted in the nozzle seat for hydrostatic test purposes. In this case, be sure to remove the hydrostatic plug in the period between after completing a hydrostatic pressure test and before starting operation. For details, see the instruction manual.
		**Do not tinker with the safety valve lever,** The lever equipped on the safety valve should not be touched or lifted unless it becomes necessary. Doing so may cause the valve to malfunction.
		**Do not use a safety valve as a foothold.** Do not use the installed safety valve as a foothold because damage may result. Accidental operation of the valve in that condition may create a dangerous situation.
		**Be careful of the safety valve installation environment.** If the safety valve installation environment is close to a heat source, or conversely it is exposed to a cold wind, the valve may malfunction or cause poor gastightness due to uneven expansion or shrinkage caused by the thermal effect from outside. In such a case, change the installation place and take measures for heat insulation. When installing heat insulation material, cover the valve body section down to its lower end while taking care not to cover the adjusting lock bolt.
		**When dismounting or disassembling the safety valve, be careful of the pressure.** Before attempting to dismount the safety valve for maintenance or repair purposes, or to disassemble it in an installed condition, check that no internal pressure exists in the equipment on which the safety valve is mounted. Failure to do so may result in a serious accident.
		**Secure a work space around the safety valve.** For disassembly, checking and adjustment purposes of safety valves, secure a work space around them. To allow a hoisting chain block to be used, a disassembling space is required above the safety valve.

Warranty

We thank you for patronizing our FUKUI products

We provide our products under the standardized production process and strict quality control. However, in the event that a failure should occur due to our production deficiency, the product shall be repaired on a free-of-charge basis or replaced with a new one in accordance with the following warranty conditions. If this is applicable, then please feel free to contact us.

1. Warranty period

The warranty period shall be 12 months after operation is initiated, or it shall not exceed 18 months after delivery from the Factory, whichever comes earlier.

2. Coverage

If a failure responsible for us should occur within the warranty period, the product concerned shall be repaired or replaced with a new one on a free-of-charge basis. However, this shall not apply if any of the following conditions is met.

2-1. if seat leaks or unstable operation should occur due to foreign matter present inside the boiler or piping;

2-2. if the product was improperly handled or operated;

2-3. if the failure is due to other causes than ours.;

2-4. if unauthorized repair or modification was made;

2-5. if the product was handled, stored or operated under harsh environmental condition exceeding the design specification;

2-6. if the fault is due to parts declared to be subjected to quick wear, to the customer;

2-7. if the fault is due to a fire, flood damage, earthquake, lightning, other natural disaster or act of God; or

2-8. When making repairs or adjustments in the product installation place that is at an elevated level or at a dangerous position, or if the product is very heavy requiring a specialist and special tools and equipment (such as a crane and scaffolding) for dismounting and remounting, then costs related to this work shall not be covered by the warranty.

3. Plants in foreign countries

If a failure responsible for us should occur within the warranty period, we shall provide a replacement at our expense on an FOB or ex-factory basis under the same coverage condition as stated in section 2 above.

4. After-sales service

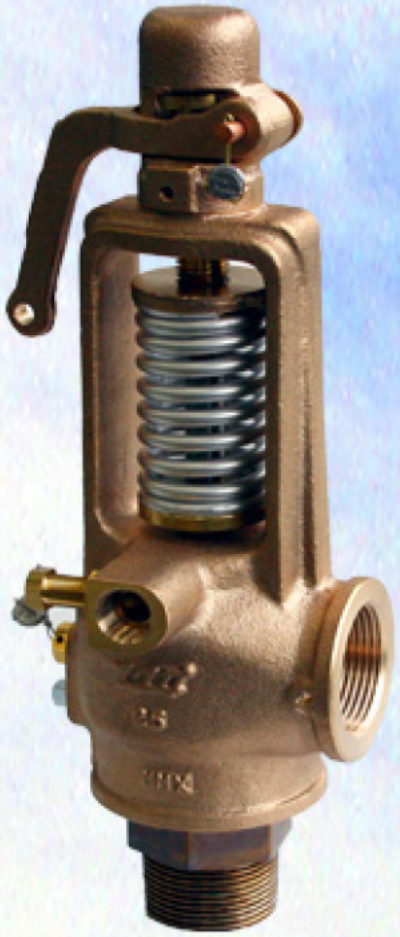
If a supervisor or worker(s) should be requested for dispatch to the site, traveling expenses, accommodation expenses, daily allowance and all other necessary expenses shall be separately charged to the customer.

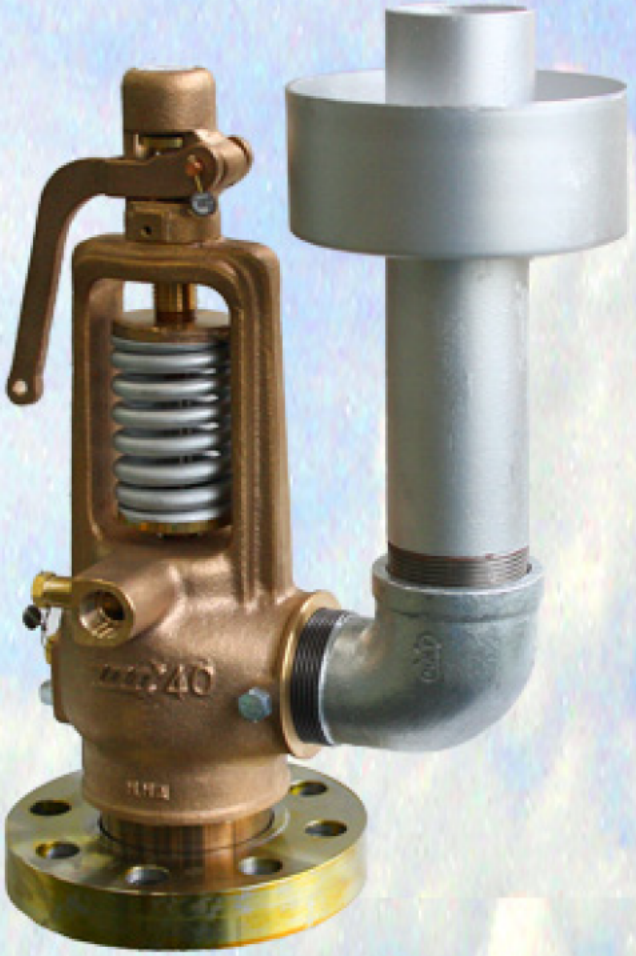
Appendix D

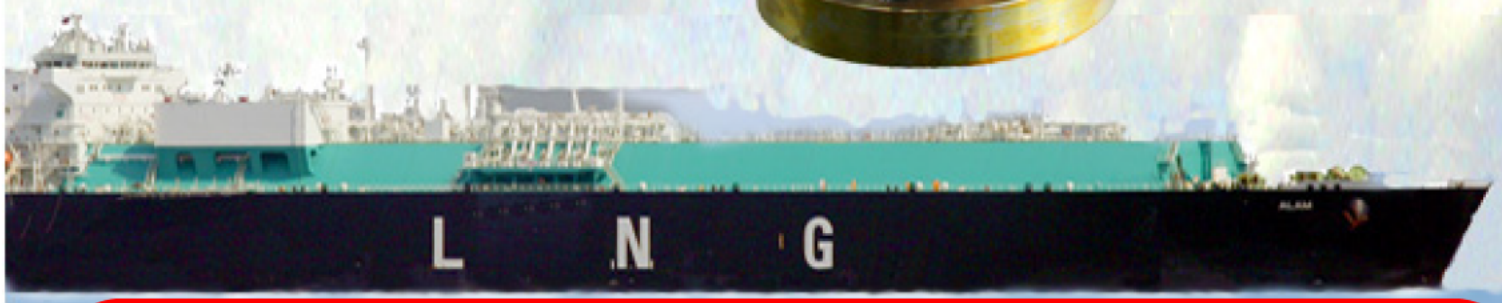
CATALOG No. SP061024J

SP & SUP SERIES

FUKUI SEISAKUSHO CO., LTD.







BRONZE CASTING FULL-BORE SAFETY VALVES

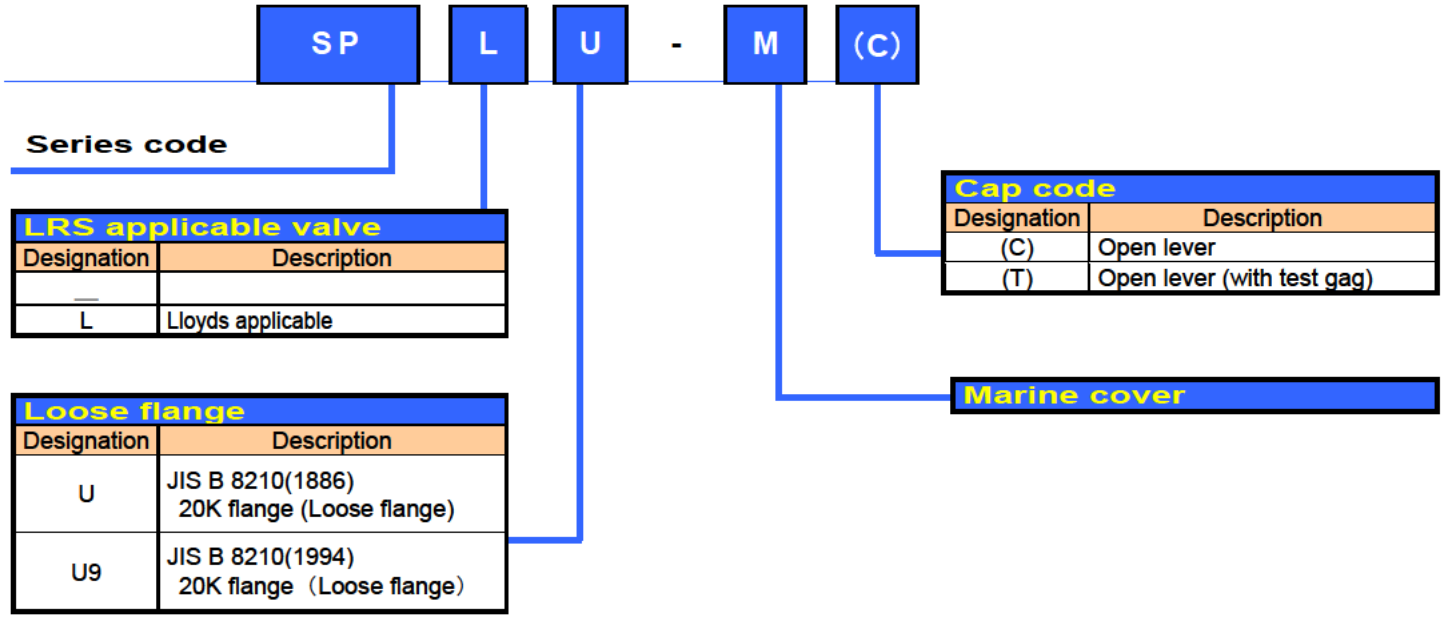
Features

- Adopts a needle structure for easy blowdown adjustment
- Type-approved by various classification societies
- Compact design with high performance

Applications:

For use in the secondary-side piping of small boilers, package boilers, pressure vessels, steam headers, air headers, compressors, blowers, reducing valves

Model code



LRS applicable valve

Designation	Description
—	
L	Lloyds applicable

Loose flange

Designation	Description
U	JIS B 8210(1886) 20K flange (Loose flange)
U9	JIS B 8210(1994) 20K flange（Loose flange）

Cap code

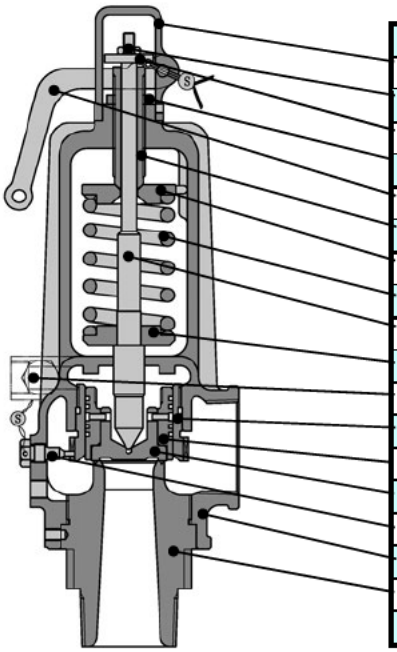
Designation	Description
(C)	Open lever
(T)	Open lever (with test gag)

Marine cover

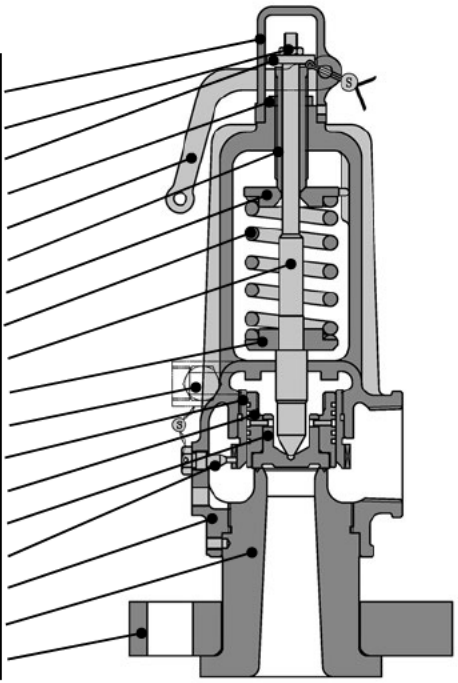
Product specifications

Set pressure range : 0.324 - 2.157 MPa
Set temp. range : Max. 220 °C
Blowdown : 7 - 15 %
Applicable fluids : Steam, air, non-corrosive gases, and noninflammable gases

Parts name and materials



Parts name	Material
Cap	CAC406
Nut	SS400
Lifting washer	C3604BD
Adj. screw lock nut	C3604BD
Lever	CAC406
Adj. screw	C3604BD
Lower spring washer	CAC406
Spring	SWPA or SWOSM
Spindle	SUS403
Upper spring washer	C3604BD
Needle	C3604BD
Guide	CAC406
Holder	CAC406
Disc	SUS630
Lock bolt	C3604BD
Body	CAC406
Nozzle seat	SUS403
Flange	A105



SP

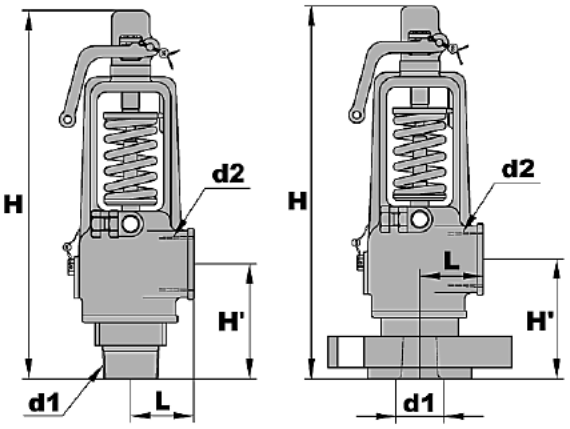
SPU

Dimensions and weight

SP Screw type

Nominal diameter	Orifice area (mm^2)	Installation size		Face-to-face dimension		Overall length	Weight
		Inlet (d_1)	Outlet (d_2)	(L)	(H')	(H)	(kg)
20	176	R 1	Rc 1	45	85	260	2.0
25	283	R 1 1/4	Rc 1 1/4	50	90	290	3.0
32	452	R 1 1/2	Rc 1 1/2	55	100	325	4.0
40	706	R 2	Rc 2	65	115	370	7.0
50	1134	R 2 1/2	Rc 2 1/2	80	130	435	12.0

* For installation tube screws (inlet) R × (outlet) Rc are used.



Nominal diameter	Orifice area (mm^2)	Installation size JIS B 8210 20K		Face-to-face dimension		Overall length	Weight
		Inlet (d_1)	Outlet (d_2)	(L)	(H')	(H)	(kg)
20	176	20A	Rc 1	45	90	265	5.0
25	283	25A	Rc 1 1/4	50	100	300	6.0
32	452	32A	Rc 1 1/2	55	110	335	8.0
40	706	40A	Rc 2	65	115	370	11.0
50	1134	50A	Rc 2 1/2	80	140	445	17.0

* For installation, JIS B 8210 20K for inlet and Rc for outlet are respectively adopted.

CATALOG No. RE070227J

Appendix E

RE SERIES

FUKUI SEISAKUSHO CO., LTD.

Introduction

FUKUI RE series safety valves

FUKUI RE series safety valves are born out of our technology and experience in design and production of safety valves accumulated over about 50 years of business in this filed.
Various types of FUKUI safety valves have met a variety of customers' needs for many years, and the recent addition, to the lineup, of the RE series featuring a simple design, high performance and low cost makes us believe that we can contribute more to prevention against excessive pressure particularly in the process line. Fluids applicable include air, steam and other various gases, vapors and liquids.

- A disc and a disc holder are of an assembly structure. In addition, the disc is disc-shaped, presenting a simple design, and therefore minimizing the thermal effect by high temperatures. As a result, excellent sealing performance is attained against seat leaks.

- By forming the disc holder periphery to be umbrella-shaped for utilization of a fluid reaction force, an excess pressure (i.e. increased by less than 10% above the popping pressure) is created to allow perfect lifting of the disc. Furthermore, as a mechanism for attaining clear popping by acceleration of initial valve lifting at the time of valve operation, and also as a means of blowdown pressure adjustment, an adjusting ring is provided on the upper edge of the nozzle.

- The safety valves of this series consist of parts that are required as minimum, each having interchangeability. This means that minimum quantities of spares will do, allowing easy maintenance and significant cost reduction.

- The inlet/outlet face-to-face dimensions are in accordance with API Standard 526.

1. Standard installation method

(a) For mounting flanges, raised face flanges specified in the following standards are adopted as standard.
Class 150 - 2500 ASME B16.5 Standard
Class 10K - 30K JIS

(b) Flange bolt holes are arranged around the center.
Ring joints, tongue type, and groove type flange faces can be manufactured upon request.

2. Valve major parts (Trim)

In FUKUI safety valves the valve major parts (trim) are a nozzle seat and disc only.

3. Balanced bellows type safety valve

Balanced bellows type safety valves are available from size D to T expect the nominal diameter 3/4D1.

1) Application: Bellows type safety valves are mainly used in the following applications:

1-1 In locations where a back pressure accumulates or occurs on the safety valve blowoff pipe side (secondary side) and where the back pressure varies to affect the popping pressure of the safety valve

1-2 In locations where a back pressure fluid must not leak to outside when adjusting the safety valve blowoff pressure

1-3 In case where corrosion of parts (spindle, springs) inside the bonnet by a fluid must be prevented.

To meet the above specifications, a balanced bellows type safety valve or a simple bellows seal type safety valve is selectively used. Further, a back pressure that occurs on the safety valve blowoff pipe side is classified as follows in accordance with its nature.

i) Superimposed back pressure
A pressure already accumulated on the blow-off pipe side (secondary side) before the safety valve pops.

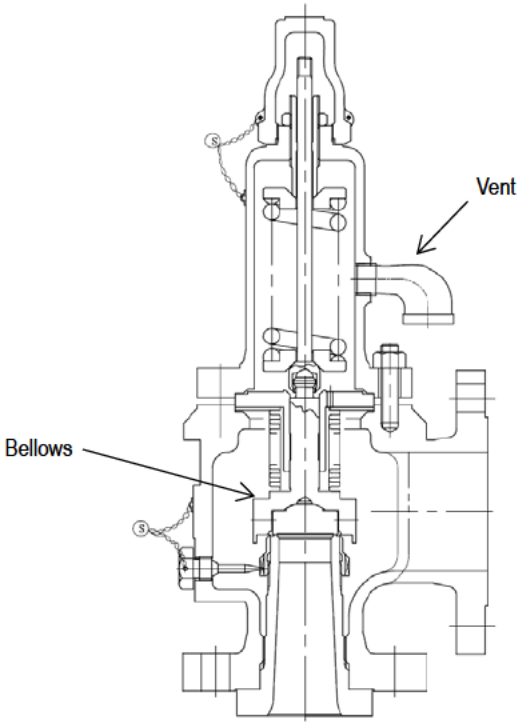
ii) Built-up back pressure
A pressure that occurs on the blowoff pipe side (secondary side) by the flow of a fluid after the safety valve pops.

2) Structure: The structure of a bellows type safety valve is as shown in the figure on the right, and has the following features: The effective area of the bellows is equal to the surface area of the nozzle seat so that the part of disc covered by the bellows will not be subjected to the back pressure. This helps perfectly balance the top and bottom surfaces of the disc. Therefore, if a back pressure is imposed and it changes hard, the blowoff pressure will not be affected. In addition, the bellows is fixed with one end on the disc side, and the other end on the valve body and bonnet side. This means that the fluid path of the valve body and the bonnet section are blocked off, thus permitting no fluid leaks into the bonnet section.

The disc holder guide section is housed in the bellows to avoid direct exposure to the blowoff fluid. Therefore, the vital sliding section is not subjected to damage, and the limited lift prevents excess compression of the bellows to protect the bellows from being damaged.
The bonnet must be provided with a gas releasing means (i.e. vent). If no vent is provided, the bonnet will serve as a totally closed chamber, failing to attain perfect balance. As a result the valve performance or the blowoff pressure will be adversely affected. In addition, detecting gas leaks from the vent holes enables us to readily know damage to the bellows.

3) Bellows:
Two types of bellows are available: molded bellows and welded bellows, and they are selectively used as specified in the table below.

Bellows type	Bellows spring constant (kgf/mm)	Pressure resistance	Application	Bellows material
Molded bellows	large	small	If bellows can be molded for production	SUS316, SUS316L, etc
Welded bellows	small	large	If bellows cannot be molded for production	Titanium, Hastelloy, Monel, etc.



4. Min. set pressure

Type	Orifice	Min. set pressure MPa
Conventional type REC	D - T 15 - 120	0.035
Balanced bellows type (REB)	D - T	0.175

Model code

Model code system

We at Fukui define the model code system as described in the following. Please use this code system when you specify a valve.

1. 1st symbol

Series name and always starts with RE

Added symbols

RE	C	4	6	1	-	3	S	1		A

2. 2nd symbol

C — Conventional type
B — Balanced bellows type)

Indicates cap & lever structure

3. 3rd symbol

Indicates pressure class and inlet flange rating.

Designation No.	Rating (ANSI), (JPI)	JIS nom. pressure
1	150	10
2	300	20
3	300	30
4	600	-
5	900	-
6	1500	-
7	2500	-

7. Added 2nd symbol

Indicates special material
See 7. Added 2nd Symbol below.

6. Added 1st symbol

Indicates inlet flange rating outside the standard

Designation No.	Flange rating (ANSI), (JPI)
3	300
4	600
5	900

4. 4th symbol

Indicates temperature and body standard material.

Designation No.	Temperature range ℃	Body standard material	
7	232 - 427	WCB	SCPH2
6	-29 - 232	WCB	SCPH2
5	-29.4 to -59.4	LC3	SCPL31
4	-60 to -101.1	LC3	SCPL31
3	-101.7 to -267.8	CF8	SCS13A

5. 5th symbol

Indicates the inlet connection method.

Designation No.	Connection code
1	ANSI flange
2	JPI flange
3	Welded
4	JIS flange
5	To be specified by customer for special connection

7. Added 2nd symbol

Indicates the body material outside the standard.
A combination of body material and material of other major parts not listed here is also selectable from the following lists.

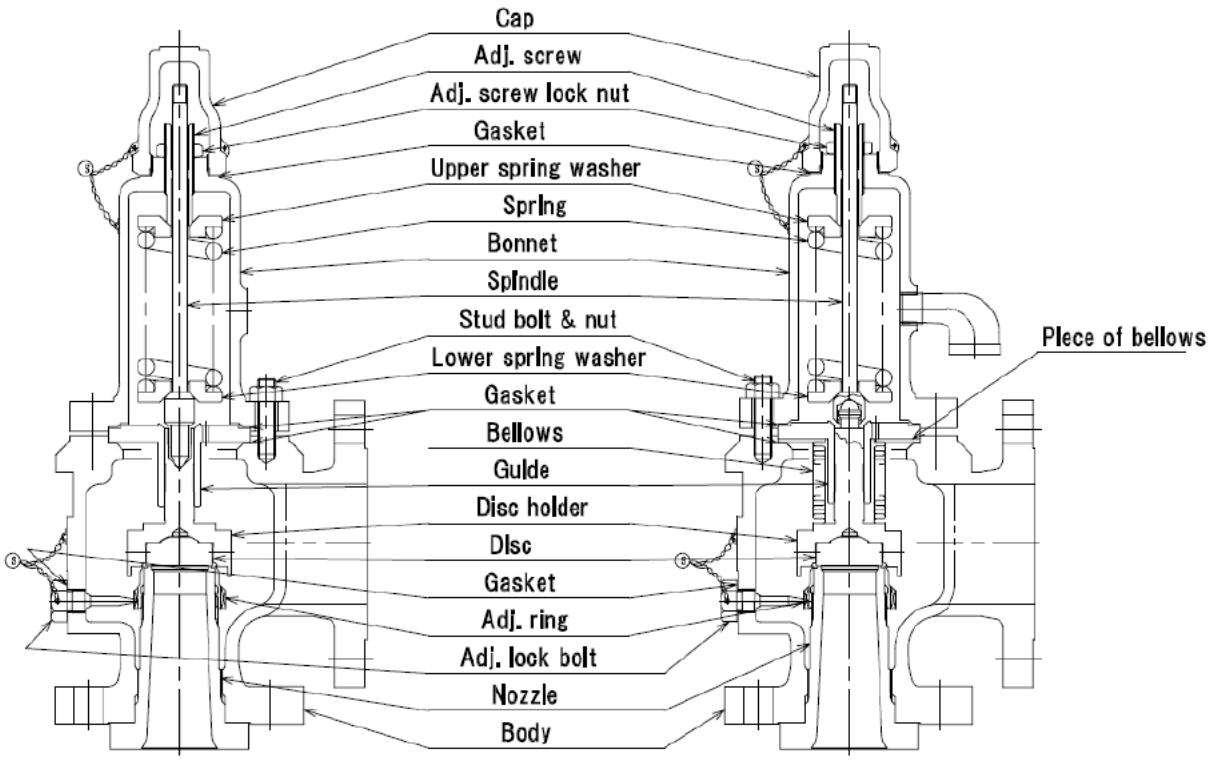
Designation No.	Body material		Temperature range ℃
	WCB	SCPH2	-5 - 400
C1	WC1	SCPH11	-5 - 450
C2	WC6	SCPH21	-5 - 538
C3	WC9	SCPH32	
C4	C5	SCPH32	
C5	LCB	SCPL1	-45 - 350

Designation No.	Body material		Temperature range℃
S	CF8	SCS13A	-196 - 350
S1	CF8M	SCS14A	
S2	CF3	SCS19A	
S3	CF3M	SCS16A	

Major part material (nozzle, disc)
SUS304
SUS316
SUS304L
SUS316L
Monel
Hastelloy B
Hastelloy C

The temperature range each for designation Nos. C1 - C4 is as per JISG5151, C5 - C8 as per JISG5152, and S - S3 as per JISB8243, respectively.

Parts name and materials



REC and REB standard materials

Parts name		1000 F - 800 F (538℃) - (427℃)	800 F - 450 F (427℃) - (232℃)	450 F - -20 F (232℃) - (-29℃)	-21 F - -75 F (-29.4℃) - (-59.4℃)	-76 F - -150 F (-60℃) - (-101.1℃)	-151 F - -450 F (-101.7℃) - (-267.8℃)
		REC & REB()81	REC & REB()71	REC & REB()61	REC & REB()51	REC & REB()41	REC & REB()31
Body		A217 WC6 SCPH21	A216 WCB SCPH2		A351 Gr.CF8 SCS13A		
Bonnet		A217 WCB SCPH2	A216 WCB SCPH2 or STPG ,S25C		A351 Gr.CF8 SCS13A		
Cap		SCPH2 or carbon steel			SCS13A		
Nozzle seat		SUS304 or SCS13A					
* Disc		SUS304					
* Disc holder		SUS403			SUS304		
Adjusting ring		SUS304 or					
Adjusting ring lock bolt		SUS304	Carbon steel		SUS304		
Guide	Guide sleeve	SUS304	SUS304		SUS304		
	Guide flange	SUS304	A105		SUS304		
Spindle		SUS403			SUS304		
Adjusting screw		SUS403			SUS304		
Adjusting screw lock nut		Steel			SUS304		
Spring washer/retainer		Steel			SUS304		
Spring		Alloy steel		Carbon steel or alloy steel	SUS304		
Stud bolt		SNB7			SUS304		
Nut		Carbon steel			SUS304		
* Bellows		SUS316L					
* Piece of bellows		Non-asbestos or extra low carbon steel			PTFE		
* Gasket (cap)		Non-asbestos or extra low carbon steel			PTFE		
* Gasket (bonnet)		Non-asbestos or extra low carbon steel			PTFE		
* Gasket (body)		Non-asbestos or extra low carbon steel			PTFE		
* Gasket (lock bolt)		Non-asbestos or extra low carbon steel			PTFE		

* Recommended spares

Note: Production specifications and materials are subject to change without notice.

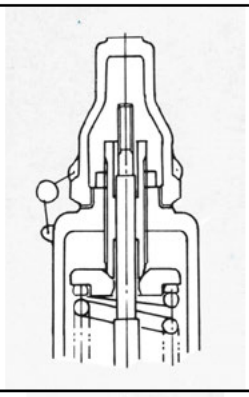
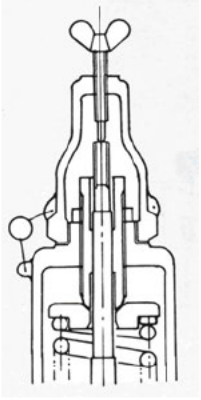
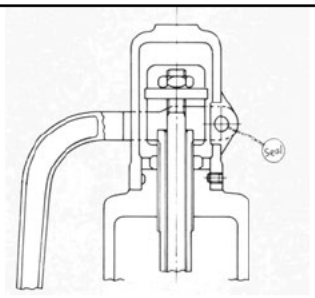
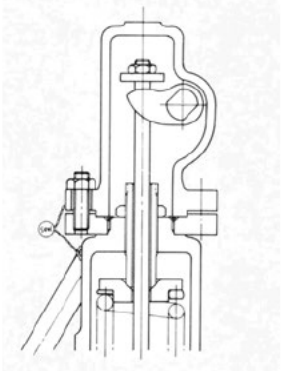
Special material

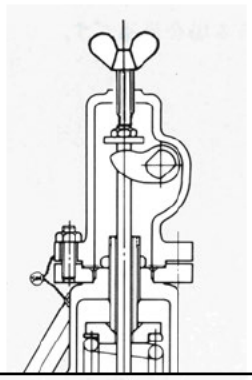
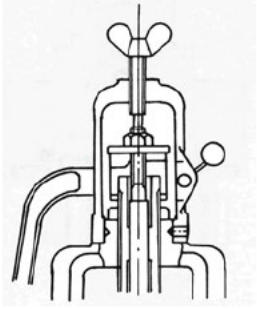
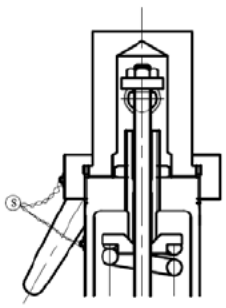
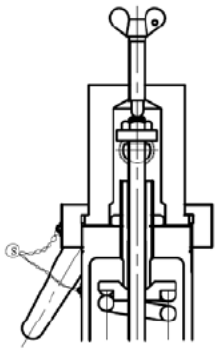
Parts name		S12 Internal parts (Spring assembly excluded)		S13 All parts (Spring assembly excluded)		S14 All parts		S16 All parts (Spring assembly excluded)	
		REC	REB	REC	REB	REC	REB	REC	REB
Body		-		A351 Gr.CF8M or SCS14A		A351 Gr.CF8M or SCS14A		A351 Gr.CF8 or SCS13A	
Bonnet		-		A351 Gr.CF8M or SCS14A		A351 Gr.CF8M or SCS14A		A351 Gr.CF8 or SCS13A	
Cap		-		A351 Gr.CF8M or SCS14A		A351 Gr.CF8M or SCS14A		A351 Gr.CF8 or SCS13A	
Nozzle seat		-		-		-		-	
Disc		-		-		-		-	
Disc holder		SUS316		SUS316		SUS316		SUS304	
Adjusting ring		SUS316		SUS316		SUS316		-	
Adjusting ring lock bolt		SUS316		SUS316		SUS316		SUS304	
Guide	Guide sleeve	SUS316	SUS316	SUS316		SUS316		-	
	Guide flange	SUS316	-	SUS316		SUS316		SUS304	
Spindle		SUS316	-	SUS316		SUS316		SUS304	
Adjusting screw		SUS316	-	SUS316		SUS316		SUS304	
Adjusting screw lock nut		SUS316	-	SUS316		SUS316		SUS304	
Spring washer/retainer		Nickel plated steel	-	Nickel plated steel		SUS316		SUS304	
Spring		Nickel plated steel	-	Nickel plating (Carbon steel and alloy steel)		SUS304 and SUS316		-	
Stud bolt		-		-		-		-	
Nut		-		-		-		-	
Bellows		none	-	none	-	none	-	none	-
Piece of bellows		none	-	none	-	none	-	none	-
Gasket (cap)		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel	
Gasket (bonnet)		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel	
Gasket (body)		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel	
Gasket (lock bolt)		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel		PTFE or extra low carbon steel	

Parts name		S18 REB	S19 REB	S20 REB	S21 REB
Body		A351 Gr.CF8M or SCS14A	A351 Gr.CF8M or SCS14A	A351 Gr.CF8M or SCS14A	A351 Gr.CF8 or SCS13A
Bonnet		-	-	-	-
Cap		-	-	-	-
Nozzle seat		-	-	SUS304L	SUS316L
Disc		-	-	SUS304L	SUS316L
Disc holder		SUS304	SUS316	SUS304L	SUS316L
Adjusting ring		-	SUS316	SUS304L	SUS316L
Adjusting ring lock bolt		SUS304	SUS316	SUS304L	SUS316L
Guide	Guide sleeve	-	SUS316	SUS304L	SUS316L
	Guide flange	-	-	-	-
Spindle		-	-	-	-
Adjusting screw		-	-	-	-
Adjusting screw lock nut		-	-	-	-
Spring washer/retainer		-	-	-	-
Spring		-	-	-	-
Stud bolt		-	-	-	-
Nut		-	-	-	-
Bellows		-	-	-	-
Piece of bellows		-	-	-	-
Gasket (cap)		PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel
Gasket (bonnet)		PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel
Gasket (body)		PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel
Gasket (lock bolt)		PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel	PTFE or extra low carbon steel

— indicates standard material.

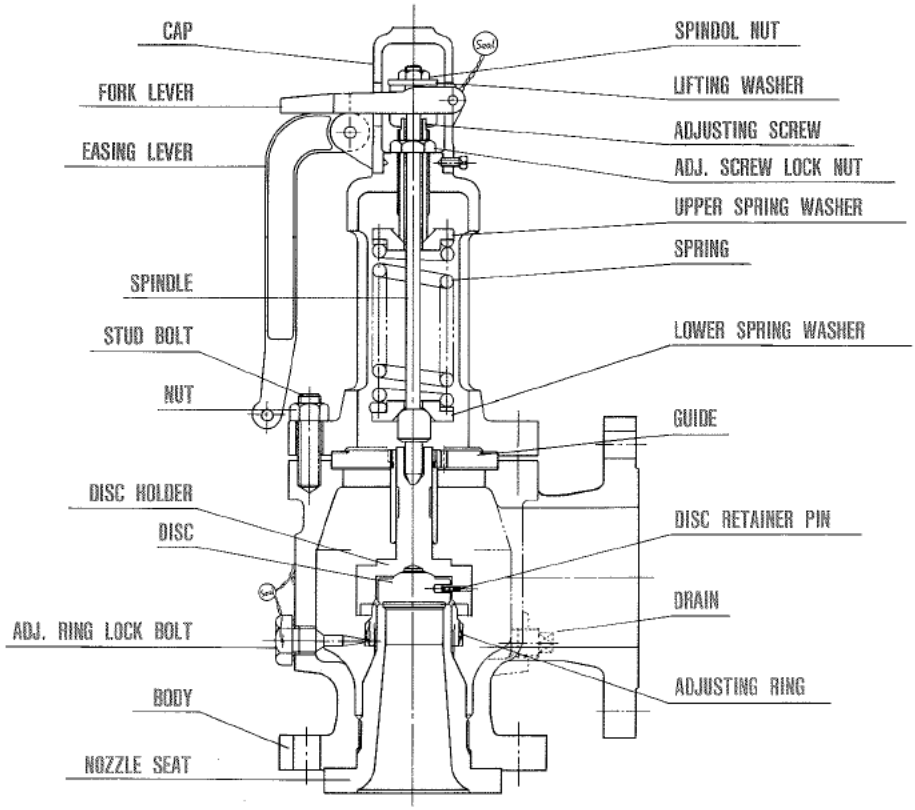
Cap structure code

	● Type A (screwed cap) Standard type ● Type G (bolted cap)
	● Type B (screwed cap with test gag) A test gag is useful and convenient at the time of hydrostatic pressure or blow-off testing. Be sure to fasten the gag finger tight. After a test is over, be sure to put back the plug in the original position to replace the gag. Otherwise, the safety valve will not operate, creating a dangerous situation. ● Type H (with bolted cap and test gag)
	● Type C (open lever) Is used when it is necessary to check the safety valve for performance on a regular basis, and if blowoff of fluid into the atmosphere does not matter as in the case of steam or air.
	● Type D (closed lever) Is used when a test lever is necessary and gastightness is required on the exhaust side.

	● Type E (closed lever with test gag)
	● Type T (open lever with test gag)
	● Type M (closed lever) Is used when a test lever is necessary and gastightness is required on the exhaust side. Type D is of a gland packing type whereas Type M is of an O-ring seal type.
	● Type N (closed lever) A version of Type M with test gag

■ REC for steam service

The REC series for steam service is of an open bonnet type with a pressure class ranging from 150 to 600.
The cap type is either Type C or Type T.



Standard materials

Parts name		Up to 800°F(427℃) REC()61-STM REC()71-STM	850°F(454℃) REC()81-STM
Body		A216 WCB,SCPH2	A217 WC6,SCPH2
Bonnet		A216 WCB,SCPH2	
Cap		Malleable cast iron	
Nozzle seat		SUS304 or SCS13A	
Disc		Precipitation hardening type stainless steel or Inconel X-750 or equivalent	
Disc holder		SUS403	
Adjusting ring		SUS304 or SCS13A	
Adjusting ring lock bolt		Carbon steel	
Guide	Guide sleeve	SUS304	
	Guide flange	A105	
Spindle		SUS403	
Adjusting screw		SUS403	
Adjusting screw lock nut		Steel	
Spring washer/retainer		Steel	
Spring		Carbon steel or alloy steel	
Stud bolt		SNB7	
Nut		Carbon steel	
Spindle nut		Steel	
Lifting washer		Steel	
Open lever		Malleable cast iron	
Fork lever		Malleable cast iron	

Note: Production specifications and material are subject to change without notice.

Effective area of safety valve

■ The effective surface areas for the RE series are as given in the tables below.
Each surface area is stated in cm^2.

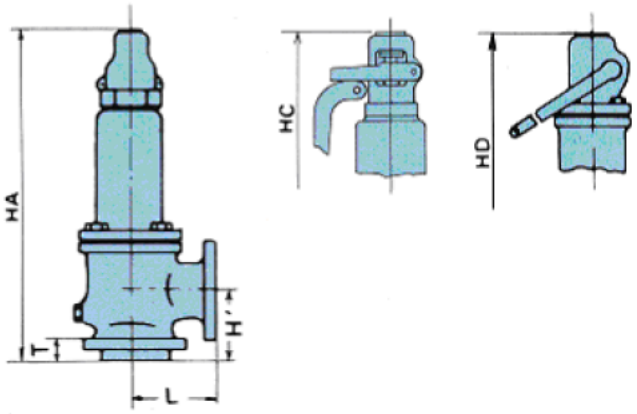
Orifice symbol	D	E	F	G
Surface area	0.882	1.815	2.433	3.836

Orifice symbol	H	J	K	L
Surface area	5.940	9.621	13.723	21.401

Orifice symbol	M	N	P	Q
Surface area	26.878	32.675	47.784	84.134

Orifice symbol	R	T
Surface area	119.403	188.692

Dimensions and weight (for ANSI flanges)

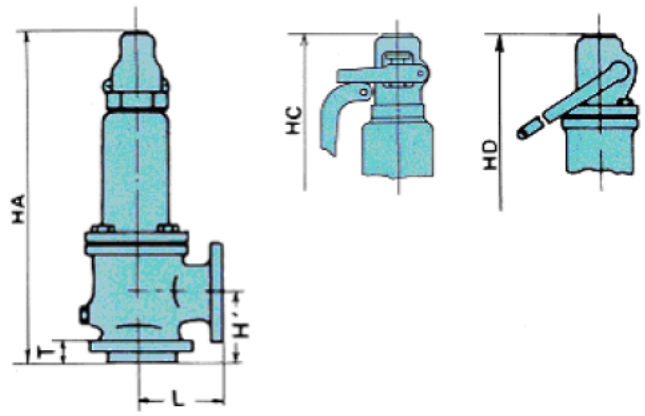


■ Dimensions and weight

(Unit: mm)

Nominal diameter	Type	ANSI flange standard installation		Face-to-face dimension		Inlet flange thickness T	Overall length			Weight (Type A) kgs
		Inlet	Outlet	Inlet H'	Outlet L		HA	HC	HD	
3/4 D1	REC 161,171	150#	150#	92	96	30	320	315	365	9
3/4 D1	REC 261,271	300	150	92	96	30	320	315	365	9
3/4 D1	REC 361,371,381	300	150	92	96	30	320	315	365	9
1D2	REC & REB 161,171	150	150	105	114	32	335	330	375	11
1D2	REC & REB 261,271	300	150	105	114	32	335	330	375	11
1D2	REC & REB 361,371,381	300	150	105	114	32	335	330	375	11
1D2	REC & REB 461,471,481	600	150	105	114	32	345	345	390	13
1 1/2 D2	REC 561,571,581	900	300	105	140	50	425	430	475	20
1 1/2 D2	REC 661,671,681	1500	300	105	140	50	425	430	475	20
1 1/2 D3	REC 761,771,781	2500	300	140	178	63	530	525	575	23
1E2	REC & REB 161,171	150	150	105	114	32	335	330	375	11
1E2	REC & REB 261,271	300	150	105	114	32	335	330	375	12
1E2	REC & REB 361,371,381	300	150	105	114	32	335	330	375	12
1E2	REC & REB 461,471,481	600	150	105	114	32	345	345	390	14
1 1/2 E2	REC 561,571,581	900	300	105	140	50	425	430	475	20
1 1/2 E2	REC 661,671,681	1500	300	105	140	50	425	430	475	20
1 1/2 E3	REC 761,771,781	2500	300	140	178	63	530	525	575	23
1 1/2 F2	REC & REB 161,171	150	150	124	121	39	350	350	395	15
1 1/2 F2	REC & REB 261,271	300	150	124	121	39	350	350	395	15
1 1/2 F2	REC & REB 361,371,381	300	150	124	152	40	350	350	395	15
1 1/2 F2	REC & REB 461,471,481	600	150	124	152	41	365	360	410	17
1 1/2 F3	REC & REB 561,571,581	900	300	124	165	50	445	450	495	27
1 1/2 F3	REC & REB 661,671,681	1500	300	124	165	50	445	450	495	27
1 1/2 F3	REC & REB 761,771,781	2500	300	140	178	63	530	525	575	35
1 1/2 G3	REC & REB 161,171	150	150	124	121	39	375	375	420	17
1 1/2 G3	REC & REB 261,271	300	150	124	121	39	375	375	420	17
1 1/2 G3	REC & REB 361,371,381	300	150	124	152	40	405	400	450	19
1 1/2 G3	REC & REB 461,471,481	600	150	124	152	41	405	400	450	21
1 1/2 G3	REC & REB 561,571,581	900	300	124	165	50	455	455	500	29
2G3	REC & REB 661,671,681	1500	300	156	171	57	555	550	600	37
2G3	REC & REB 761,771,781	2500	300	156	171	69	555	550	600	42

Dimensions and weight (for ANSI flanges)

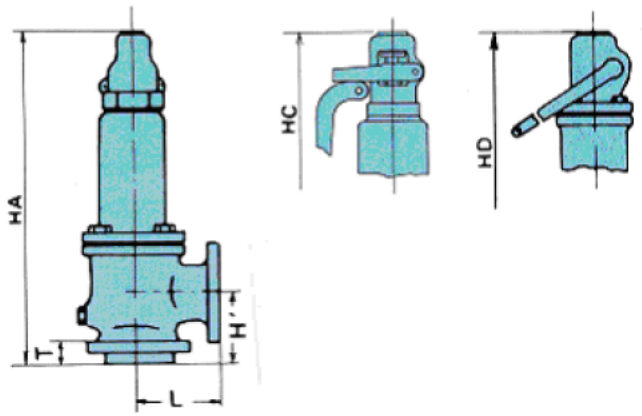


■ Dimensions and weight

(Unit: mm)

Nominal diameter	Type	ANSI flange standard installation		Face-to-face dimension		Inlet flange thickness T	Overall length			Weight (Type A) kgs
		inlet	Outlet	inlet H'	Outlet L		HA	HC	HD	
1 1/2 H3	REC & REB 161,171	150#	150#	130	124	39	425	420	465	17
1 1/2 H3	REC & REB 261,271	300	150	130	124	39	425	420	465	20
2H3	REC & REB 361,371	300	150	130	124	41	460	460	505	22
2H3	REC & REB 461,471	600	150	154	162	44	485	485	530	25
2H3	REC & REB 381	300	150	130	124	44	460	460	505	22
2H3	REC & REB 481	600	150	130	124	44	460	460	505	22
2H3	REC & REB 561,571,581	900	150	154	162	57	550	545	595	42
2H3	REC & REB 661,671,681	1500	300	154	162	57	550	545	595	45
2J3	REC & REB 161,171	150	150	137	124	41	475	475	520	23
2J3	REC & REB 261,271	300	150	137	124	41	475	475	520	24
3J4	REC & REB 361,371	300	150	184	181	47	590	585	635	44
3J4	REC & REB 461,471	600	150	184	181	50	590	585	635	50
3J4	REC & REB 381	300	150	184	181	50	590	585	635	45
3J4	REC & REB 481	600	150	184	181	50	590	585	635	45
3J4	REC & REB 561,571	900	150	184	181	57	630	625	670	59
3J4	REC & REB 581	900	150	184	181	60	630	625	670	60
3J4	REC & REB 661,671,681	1500	300	184	181	66	630	625	670	77
3K4	REC & REB 161,171	150	150	156	162	47	570	565	615	41
3K4	REC & REB 261,271	300	150	156	162	47	507	565	615	43
3K4	REC & REB 361,371	300	150	156	162	47	605	600	650	47
3K4	REC & REB 461,471	600	150	184	181	50	635	630	680	57
3K4	REC & REB 381	300	150	156	162	50	605	600	650	47
3K4	REC & REB 481	600	150	156	162	50	605	600	650	47
3K6	REC & REB 561,571	900	150	198	216	57	690	685	735	80
3K6	REC & REB 581	900	150	184	181	57	635	630	680	70
3K6	REC & REB 661,671,681	1500	300	197	216	66	690	685	735	95
3L4	REC & REB 161,171	150	150	156	165	47	620	615	665	52
3L4	REC & REB 261,271	300	150	156	165	47	620	615	665	57
4L6	REC & REB 361,371,381	300	150	179	181	50	685	680	730	72
4L6	REC & REB 461,471	600	150	179	203	56.5	685	680	730	77
4L6	REC & REB 481	600	150	181	203	57	685	680	730	77
4L6	REC & REB 561,571,581	900	150	197	222	63	820	815	885	108
4L6	REC & REB 671,681	1500	150	197	222	72	820	815	885	117

Dimensions and weight (for ANSI flanges)

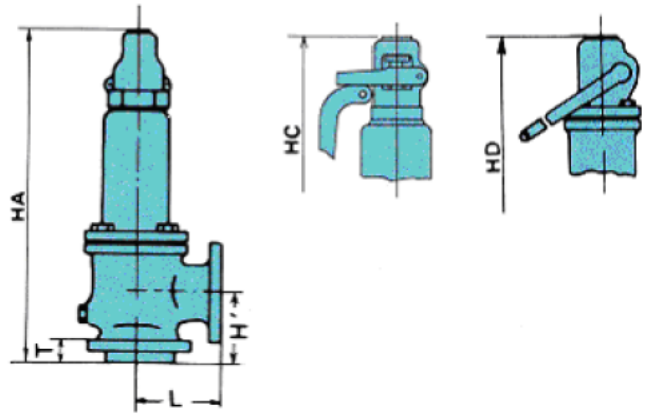


■ Dimensions and weight

(Unit: mm)

Nominal diameter	Type	ANSI flange standard installation		Face-to-face dimension		Inlet flange thickness T	Overall length			Weight (Type A) kgs
		Inlet	Outlet	Inlet H'	Outlet L		HA	HC	HD	
4M6	REC & REB 161,171	150#	150#	178	184	50	645	640	685	58
4M6	REC & REB 261,271	300	150	178	184	50	645	640	685	72
4M6	REC & REB 361,371,381	300	150	178	184	50	760	755	820	90
4M6	REC & REB 461,471,481	600	150	178	203	56.5	820	815	880	111
4M6	REC & REB 571,581	900	150	197	222	63	835	830	900	121
4N6	REC & REB 161,171	150	150	197	210	50	710	705	755	76
4N6	REC & REB 261,271	300	150	197	210	50	710	705	755	81
4N6	REC & REB 361,371,381	300	150	197	210	50	840	835	905	105
4N6	REC & REB 461,471,481	600	150	197	222	56.5	840	835	905	113
4N6	REC & REB 571,581	900	150	197	222	63	840	835	905	125
4P6	REC & REB 161,171	150	150	181	229	50	850	845	915	83
4P6	REC & REB 261,271	300	150	181	229	50	850	845	915	105
4P6	REC & REB 361,371,381	300	150	225	254	50	945	940	1010	140
4P6	REC & REB 461,471,481	600	150	225	254	56.5	945	940	1010	142
4P6	REC & REB 571,581	900	150	225	254	63	945	940	1010	162
6Q8	REC & REB 161,171	150	150	240	241	44	990	985	1050	160
6Q8	REC & REB 261,271	300	150	240	241	55	990	985	1050	170
6Q8	REC & REB 361,371,381	300	150	240	241	56	1075	1070	1155	196
6Q8	REC & REB 461,471,481	600	150	240	241	66	1075	1070	1155	253
6R8	REC & REB 161,171	150	150	240	241	44	990	985	1055	220
6R8	REC & REB 261,271,281	300	150	240	241	56	990	985	1055	230
6R10	REC & REB 361,371	300	150	240	267	56	1080	1075	1155	250
6R10	REC & REB 461,471,481	600	150	240	267	66	1095	1090	1175	260
8T10	REC & REB 161,171	150	150	276	279	48	1085	1080	1165	245
8T10	REC & REB 261,271	300	150	276	279	60	1085	1080	1165	300
8T10	REC & REB 361,371,381	300	150	276	279	60	1140	1135	1220	300
8T10	REC & REB 461-3,471-3,481-3	300	150	276	279	60	1270	1265	1350	320

Dimensions and weight (for JIS flanges)

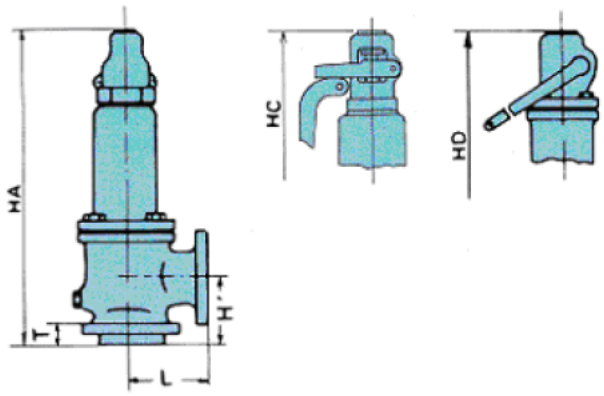


■ Dimensions and weight

(Unit: mm)

Nominal diameter	Type	ANSI flange standard installation		Face-to-face dimension		Inlet flange thickness T	Overall length			Weight (Type A) kgs
		Inlet	Outlet	Inlet H'	Outlet L		HA	HC	HD	
20D25	REC 164,175	10 k	10 k	92	96	30	320	315	365	9
20D25	REC 264,275	20	10	92	96	30	320	315	365	9
20D25	REC 364,374,384,394	30	10	92	96	30	320	315	365	9
25D50	REC & REB 164,174	10	10	105	114	32	335	330	375	11
25D50	REC & REB 264,274	20	10	105	114	32	335	330	375	11
25D50	REC & REB 364,374,384,394	30	10	105	114	32	335	330	375	11
25E50	REC & REB 164,174	10	10	105	114	32	335	330	375	11
25E50	REC & REB 264,274	20	10	105	114	32	335	330	375	12
25E50	REC & REB 364,374,384,394	30	10	105	114	32	335	330	375	12
40F50	REC & REB 164,174	10	10	124	121	39	350	345	395	15
40F50	REC & REB 264,274	20	10	124	121	39	350	345	395	15
40F50	REC & REB 364,374,384,394	30	10	124	152	40	350	345	395	15
40G80	REC & REB 164,174	10	10	124	212	39	375	375	420	17
40G80	REC & REB 264,274	20	10	124	121	39	375	375	420	17
40G80	REC & REB 364,374,384,394	30	10	124	152	40	405	400	450	19
40H80	REC & REB 164,174	10	10	130	124	39	425	420	465	17
40H80	REC & REB 264,274	20	10	130	124	39	425	420	465	20
50H80	REC & REB 364,374(384,394)	30	10	130	124	41	460	460	505	22
50H80	REC & REB 384,394	30	10	130	124	44	460	460	505	22
50J80	REC & REB 164,174	10	10	137	124	41	475	475	520	23
50J80	REC & REB 264,274	20	10	137	124	41	475	475	520	24
80J100	REC & REB 364,374(384,394)	30	10	184	181	47	590	585	635	44
80J100	REC & REB 384,394	30	10	184	181	50	590	585	635	45
80K100	REC & REB 164,174	10	10	156	162	47	570	565	615	41
80K100	REC & REB 264,274	20	10	156	162	47	570	565	615	43
80K100	REC & REB 364,374(384,394)	30	10	156	162	47	605	600	650	47
80K100	REC & REB 384,394	30	10	156	162	50	605	6000	650	47
80L100	REC & REB 164,174	10	10	156	165	47	620	615	665	52
80L100	REC & REB 264,274	20	10	156	165	47	620	615	665	54
100L150	REC & REB 364,374,384,394	30	10	179	181	50	685	680	730	72

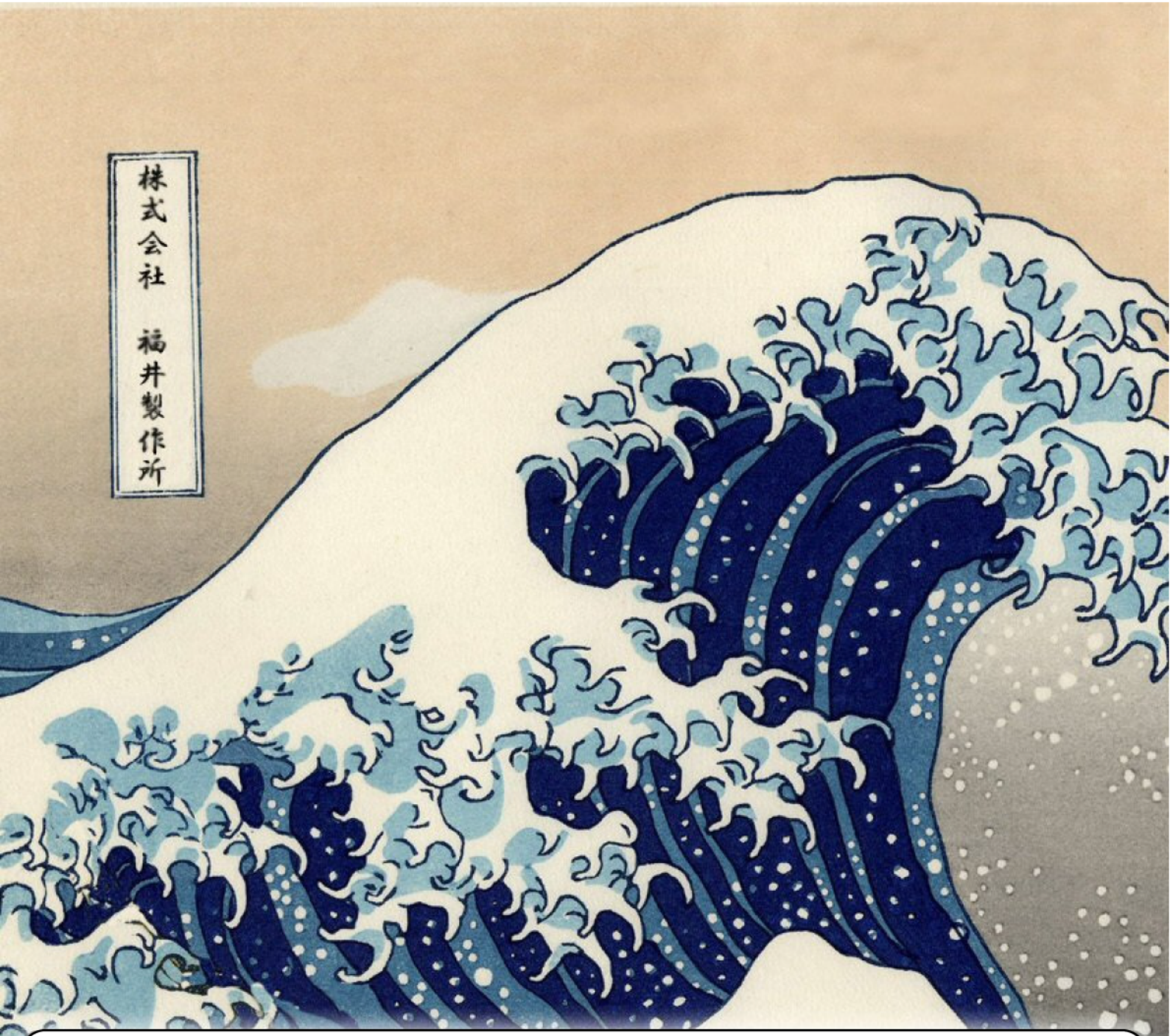
Dimensions and weight (for JIS flanges)



■ Dimensions and weight

(Unit: mm)

Nominal diameter	Type	ANSI flange standard installation		Face-to-face dimension		Inlet flange thickness T	Overall length			Weight (Type A) kgs
		inlet	Outlet	inlet H'	Outlet L		HA	HC	HD	
100M150	REC & REB 164,174	10 k	10 k	178	184	50	645	640	685	58
100M150	REC & REB 264,274	20	10	178	184	50	645	640	685	72
100M150	REC & REB 364,374,384,394	30	10	178	184	50	760	755	820	90
100N150	REC & REB 164,174	10	10	197	210	50	710	705	755	76
100N150	REC & REB 264,274	20	10	197	210	50	710	705	755	81
100N150	REC & REB 364,374,384,394	30	10	197	210	50	840	835	905	105
100P150	REC & REB 164,174	10	10	181	229	50	850	845	915	83
100P150	REC & REB 264,274	20	10	181	229	50	850	845	915	105
100P150	REC & REB 364,374,384,394	30	10	225	254	50	945	940	1010	140
150Q200	REC & REB 164,174	10	10	240	241	44	990	985	1050	160
150Q200	REC & REB 264,274	20	10	240	241	55	990	985	1050	170
150Q200	REC & REB 364,374,384,394	30	10	240	241	56	1075	1070	1155	196
150R200	REC & REB 164,174	10	10	240	241	44	990	985	1055	220
150R200	REC & REB 264,274	20	10	240	241	55	990	985	1055	230
150R250	REC & REB 364,374,384,394	30	10	240	267	56	1080	1075	1155	250
200T250	REC & REB 164,174	10	10	276	279	48	1085	1080	1165	245
200T250	REC & REB 264,274	20	10	276	279	48	1085	1080	1165	300
200T250	REC & REB 364,374,384,394	30	10	276	279	60	1140	1135	1220	300
200T250	REC & REB 464-3,474-3,484-3,494-3	30	10	276	279	60	1270	1265	1350	320



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