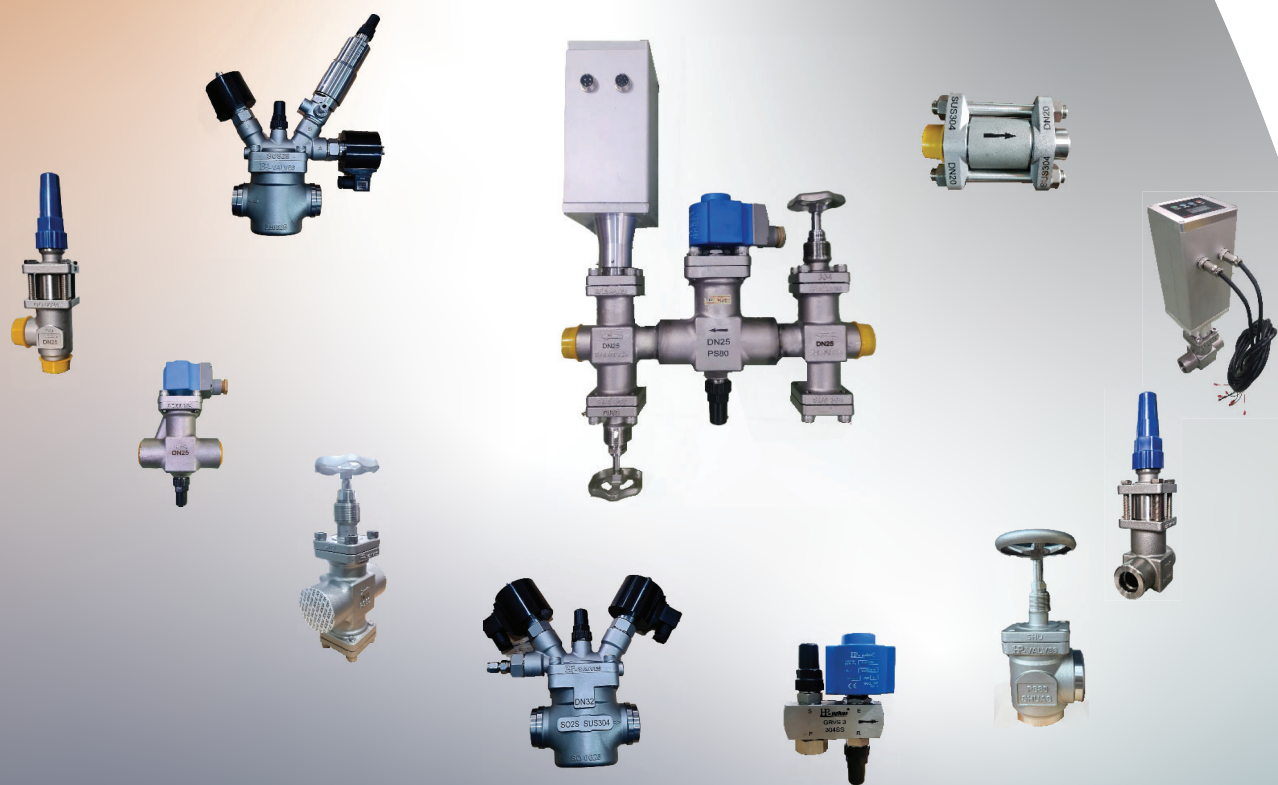


Stainless Steel Valves for Industrial Refrigeration





HP- valves®

Refrigeration Valves

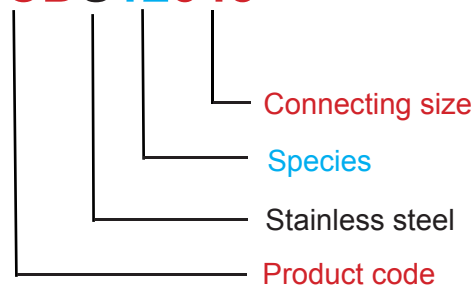
Index

OUR PRODUCTS

Applied for refrigeration system only.
Maximal working pressure MWP: 80 bar.
Temperature range: -50°C / +150°C.
Refrigerants : HCFC, CFC, R717, R744.

ORDER CODE

ABCD S 12345



Shut-off Valves, angle



SHUAS

DN10 - DN100

P.5

Shut-off Valves, straight



SHUSS

DN15 - DN65

P.6

Shut-off Valves, straight



SHUSS

DN10 - DN100

P.7

Shut-off Valves with Built-in Strainer



SHUFS

DN15 - DN65

P.8

Differential pressure relief valve



**DPRLS
DPRSS**

DN20 - DN25

P.9

Non return valves, straight



CHKSS

DN50 - DN100

P.10

Refrigeration Valves

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Solenoid valves



SOSS

DN15 - DN40

P.11

Solenoid valves



SOSL

DN15 - DN40

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Solenoid valves, 1-functional



SO1S

DN25 - DN100



P.15

Solenoid valves, 2-step open



SO2S

DN25 - DN100

P.17

Solenoid valves, 3-functional



SO3S

DN25 - DN100

P.19

Induction coils & pilots

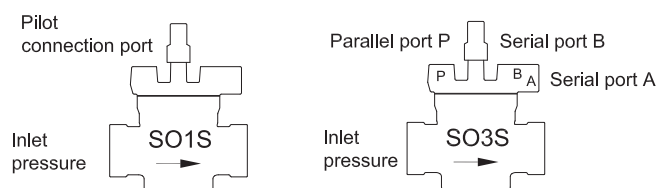


PILOTSOL
PILOTCDP
PILOTCEP
PILOTCEP

M24

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Installation of Pilot valve in the Main valve



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Valves station



GRV4S

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Refrigeration Valves

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LFSES

DN25

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**SERAS
SERSS**

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Hand regulating and stop valves, angle



HRGAS

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Hand regulating and stop valves, straight



HRGSS

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Shut-off check valves, angle



CHSAS

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Shut-off check valves, straight

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DN32 - DN150

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T-way valves



TWAYS

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Safety pressure relief valve



SRLAS

DN15 - DN40

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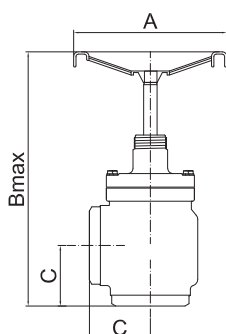
Refrigeration Valves**Index**



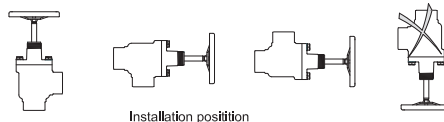
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used in suction, discharge, liquid, hot gas, recirculating liquid and oil lines.
- Connecting method: butt weld.

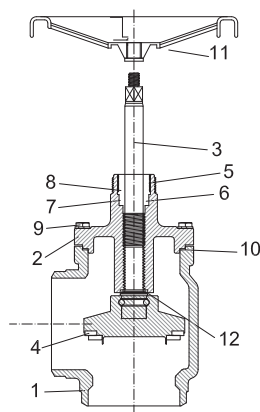
Installation dimensions



Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
SHUAS00010	10 mm $\frac{3}{8}$ inch	62	150	32	1.0
SHUAS00015	15 mm $\frac{1}{2}$ inch	62	195	41	1.2
SHUAS00020	20 mm $\frac{3}{4}$ inch	62	195	41	1.2
SHUAS00025	25 mm 1 inch	62	220	46	1.8
SHUAS00032	32 mm $1\frac{1}{4}$ inch	82	250	55	2.8
SHUAS00040	40 mm $1\frac{1}{2}$ inch	82	250	55	2.8
SHUAS00050	50 mm 2 inch	106	250	60	3.0
SHUAS00065	65 mm $2\frac{1}{2}$ inch	106	272	70	6.0
SHUAS00080	80 mm 3 inch	106	272	70	6.0



Construction



Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Valve bonnet	Stainless steel	AISI 304
3	Spindle	Stainless steel	AISI 304
4	Cone seal	Teflon (PTFE)	
5	Packing gland	Stainless steel	AISI 304
6	Gasket - Teflon spring	PTFE + SS	
7	Oring	Cloroprene (Neoprene)	
8	Oring	Cloroprene (Neoprene)	
9	Bolts	Stainless steel	AISI 304
10	Gasket	Fiber non-amiang	
11	Hand wheel	Stainless steel	AISI 304
12	Gasket - O-ring	PTFE + VITON	

Shut-off Valves, straight

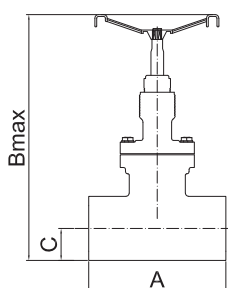
SHUSS



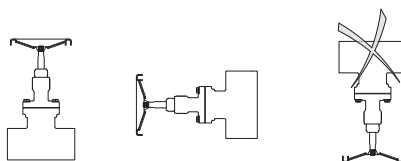
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used in suction, discharge, liquid, hot gas, recirculating liquid and oil lines.
- Connecting method: butt weld.

Installation dimensions

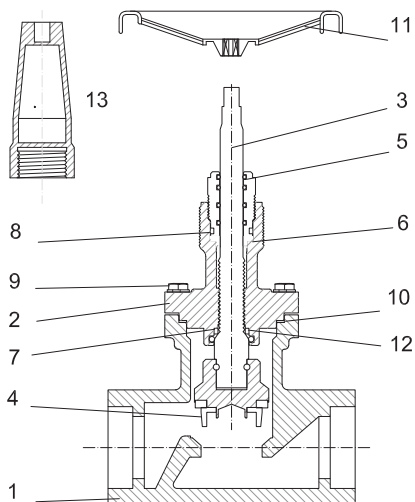


Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
SHUSS10015	15 mm $\frac{1}{2}$ inch	62	205	110	1.5
SHUSS10020	20 mm $\frac{3}{4}$ inch	62	205	110	1.5
SHUSS10025	25 mm 1 inch	62	230	127	2.0
SHUSS10032	32 mm $1\frac{1}{4}$ inch	82	270	145	3.0
SHUSS10040	40 mm $1\frac{1}{2}$ inch	82	270	145	3.0
SHUSS10050	50 mm 2 inch				
SHUSS10065	65 mm $2\frac{1}{2}$ inch				



Installation position

Construction



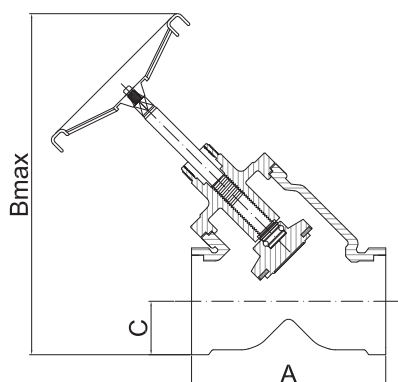
Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Valve bonnet	Stainless steel	AISI 304
3	Spindle	Stainless steel	AISI 304
4	Cone seal	Teflon (PTFE)	
5	Packing gland	Stainless steel	AISI 304
6	Gasket - Teflon spring	PTFE + SS	
7	O-ring	Cloroprene (Neoprene)	
8	O-ring	Cloroprene (Neoprene)	
9	Bolts	Stainless steel	AISI 304
10	Gasket	Teflon / Fiber non-amiang	
11	Hand wheel	Stainless steel	AISI 304
12	Gasket - O-ring	PTEF + FKM	
13	Cap	Aluminium / Plastic	Alu or ABS



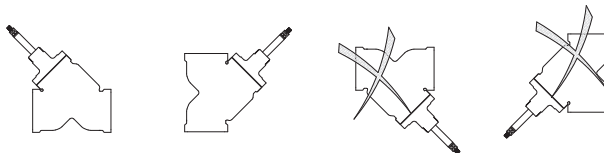
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used in suction, discharge, liquid, hot gas, recirculating liquid and oil lines.
- Connecting method: butt weld.

Installation dimensions

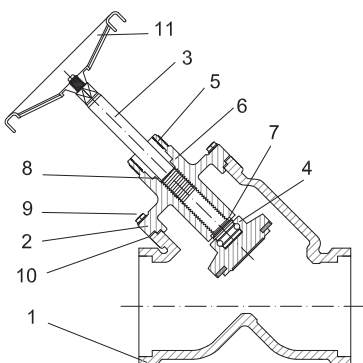


Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
SHUSS00010	10 mm $\frac{3}{8}$ inch				
SHUSS00015	15 mm $\frac{1}{2}$ inch				
SHUSS00020	20 mm $\frac{3}{4}$ inch				
SHUSS00025	25 mm 1 inch				
SHUSS00032	32 mm $1\frac{1}{4}$ inch				
SHUSS00040	40 mm $1\frac{1}{2}$ inch				
SHUSS00050	50 mm 2 inch				
SHUSS00065	65 mm $2\frac{1}{2}$ inch	187	252	40	
SHUSS00080	80 mm 3 inch				
SHUSS00100	100 mm 4 inch	240	350	66	



Installation position

Construction



Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Valve bonnet	Stainless steel	AISI 304
3	Spindle	Stainless steel	AISI 304
4	Cone seal	Teflon (PTFE)	
5	Packing gland	Stainless steel	AISI 304
6	Gasket	Teflon Spring	PTFE
7	Oring	Cloroprene (Neoprene)	
8	Oring	Cloroprene (Neoprene)	
9	Bolts	Stainless steel	AISI 304
10	Gasket	Teflon / Fiber non-amiang	
11	Hand wheel	Stainless steel	AISI 304

Shut-off Valves with Built-in Strainer

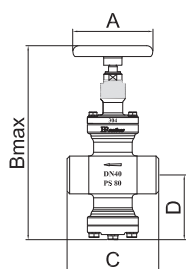
SHUFS



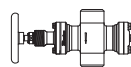
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used in suction, discharge, liquid, hot gas, recirculating liquid and oil lines.
- Connecting method: butt weld.

Installation dimensions

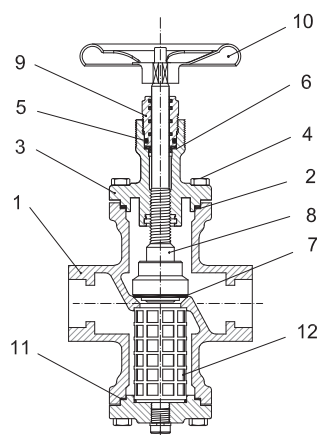


Model	Connection in/out	Dimensions				Weight (kg)
		A	Bmax	C	D	
SHUFS00015	15 mm $\frac{1}{2}$ inch	63	230	103	75	2.3
SHUFS00020	20 mm $\frac{3}{4}$ inch	63	230	103	75	2.3
SHUFS00025	25 mm 1 inch	63	230	103	75	2.3
SHUFS00032	32 mm $1\frac{1}{4}$ inch	82	285	128	90	4.1
SHUFS00040	40 mm $1\frac{1}{2}$ inch	82	285	128	90	4.1



Installation position

Construction



Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Gasket	Fiber non amiang	
3	Valves bonnet	Stainless steel	AISI 304
4	Bolts	Stainless steel	AISI 304
5	Oring	Cloroprene (Neoprene)	
6	Teflon spring	PTFE + SS	
7	Cone seal	Teflon (PTFE)	
8	Spindle	Stainless steel	AISI 304
9	Packing gland	Stainless steel	AISI 304
10	Hand wheel	Stainless steel	AISI 304
11	Gasket	Fiber non amiang	
12	Filter	Stainless steel	AISI 304

Differential pressure relief valve

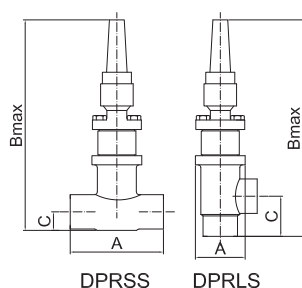
DPRLS DPRSS



Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for release the adjustable overpressure difference. The valve has the function of over flow, non-return and shut-off.
- Used in liquid and vapor lines. For example in liquid supply line after liquid pump or overflow drain line of hot gas defrost...
- Connecting method: butt weld.

Installation dimensions

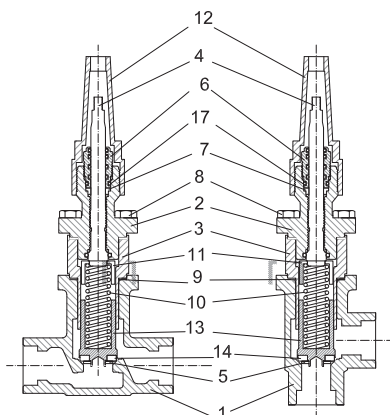


Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
DPRLS00020	20 mm 3/4 inch	69	240	44	1.7
DPRLS00025	25 mm 1 inch	69	240	44	1.7
DPRSS00020	20 mm 3/4 inch	103	233	21	1.7
DPRSS00025	25 mm 1 inch	103	233	21	1.7



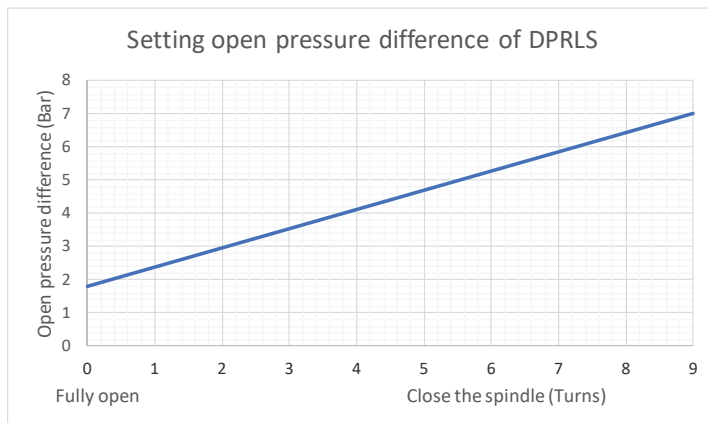
Installation position

Construction

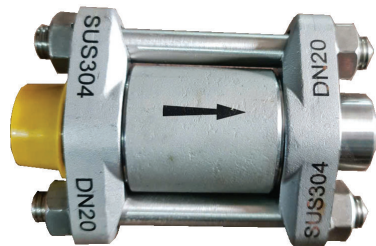


Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Valves bonnet	Stainless steel	AISI 304
3	Positioning tube	Stainless steel	AISI 304
4	Spindle	Stainless steel	AISI 304
5	Seat	Stainless steel	AISI 304
6	Packing gland	Stainless steel	AISI 304
7	Gasket- Teflon spring	PTFE + SS	
8	Bolts	Stainless steel	AISI 304
9	Gasket	Teflon, Fiber non-amiang	
10	Spring	Steel	S20C
11	Spring washer	Steel	S20C
12	Cap	Aluminium or Plastic	Alu or ABS
13	Guide Sleeve	Stainless steel	AISI 304
14	O-ring	Cloroprene (Neoprene)	

Setting open pressure difference of DPRLS



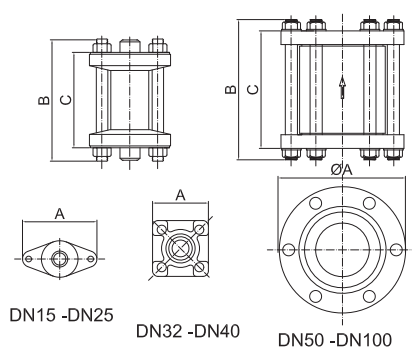
Non return valve, straight

CHKSS


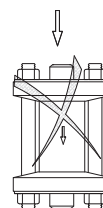
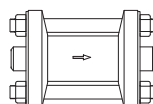
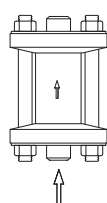
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for control the flow of refrigerants in one direction.
- Used in gas, liquid supply, pumped recirculating liquid lines.
- Connecting method: butt or socket weld.

Installation dimensions

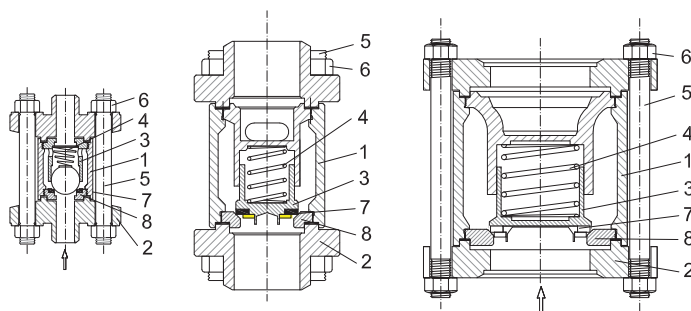


Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
CHKSS00015	15 mm 1/2 inch	85	115	87	1.15
CHKSS00020	20 mm 3/4 inch	85	115	87	1.15
CHKSS00025	25 mm 1 inch	85	115	87	2.0
CHKSS00032	32 mm 1 1/4 inch	82	140	102	3.8
CHKSS00040	40 mm 1 1/2 inch	82	140	102	4.2
CHKSS00050	50 mm 2 inch	136	169	137	8.5
CHKSS00065	65 mm 2 1/2 inch	162	185	156	12.0
CHKSS00080	80 mm 3 inch	188	208	176	19.0
CHKSS00100	100 mm 4 inch	219	234	200	25



Installation position

Construction



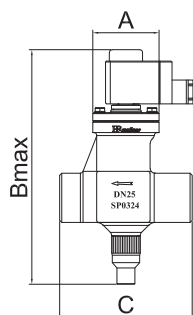
Item	Part	Material	Species
1	Housing	Stainless Steel	AISI 304
2	Flanges	Stainless Steel	AISI 304
3	Valve cone	SUS & Teflon	
4	Spring	Stainless Steel	AISI 304
5	Bolts	Stainless Steel	AISI 304
6	Nuts	Stainless Steel	AISI 304
7	Gasket	Non amiang	
8	Valve seat	Stainless Steel	AISI 304



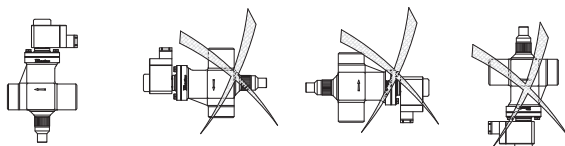
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- The SOSS controls the direct on/off flow of refrigerant. The valve is closed with de-energized of the coil.
- Do not use the SOSS solenoid valve in pressure equalizing lines or in applications where the inlet pressure is below 2 bar (30 psi). In this case the SOSL must be used.
- The SOSS is recommended for installation on the pump recirculating liquid lines, liquid lines, suction line and gas lines, but not for equalizing line.
- When during operation, there may be times when the outlet pressure is higher than the inlet pressure, so a check valve should be installed to prevent backflow.
- The SOSS should be installed in combination with strainer to prevent entrance of foreign materials into the valve.

Installation dimensions

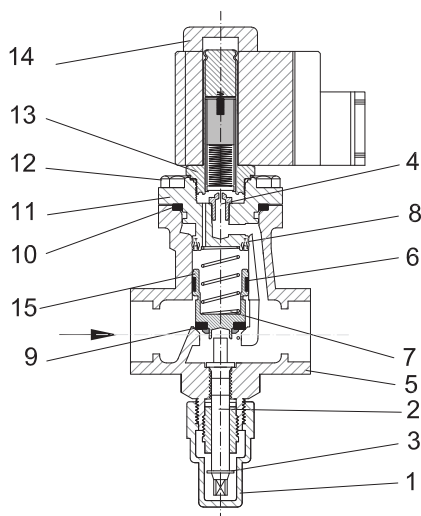


Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
SOSS521015	15 mm $\frac{1}{2}$ inch	54	220	80	1.79
SOSS521020	20 mm $\frac{3}{4}$ inch	54	220	80	1.79
SOSS521025	25 mm 1 inch	70	246	127	3
SOSS521032	32 mm $1\frac{1}{4}$ inch	70	246	127	3
SOSS522032	40 mm $1\frac{1}{2}$ inch	70	250	127	3.4
SOSS501040	40 mm $1\frac{1}{2}$ inch	70	250	127	3.4



Installation position

Construction



Item	Part name	Material	Class
1	Cap	Plastic	ABS
2	Spindle	Stainless Steel	AISI 304
3	Faction	Steel	
4	Balancing orifice		
5	Body	Stainless Steel	AISI 304
6	Gasket	PTFE	
7	Spring	Stainless Steel	
8	Gasket	PTFE + SS	
9	Back seal	PTFE	
10	Gasket	PTFE	
11	Bonnet	Stainless Steel	AISI 304
12	Bolt	Stainless Steel	AISI 304
13	Amature tube nut	Stainless Steel	
14	Solenoid coil	Copper	
15	Guide cylinder	Stainless Steel	

Operating Principle

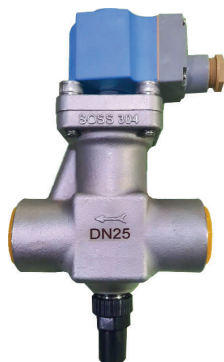
- The SOSS solenoid valve is operated by means of a pressure differential. The valve opens when the solenoid coil is energized and closes when the coil is de-energized.

- When the solenoid coil is energized, the magnetic field lifts the sealing plunger, opening the balancing orifice (4). Refrigerant from the outlet side of the valve flows through the balancing orifice, creating a lower pressure inside the piston chamber (15). Since the inlet pressure acting on the outside surface of the piston is higher than the pressure inside the piston chamber, the piston is lifted upward and the valve opens.

- When the solenoid coil is de-energized, the sealing

plunger moves downward and closes the balancing orifice. Through the bleed hole in the piston, the pressure inside the piston chamber is gradually equalized with the pressure outside the piston. The piston (15), assisted by the spring (7), moves downward and closes the valve port.

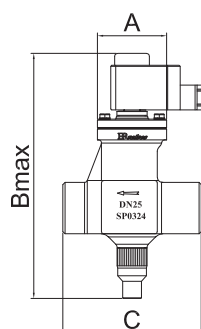
- Manual Opening: To open the valve without energizing the solenoid coil, use the manual stem located at the bottom of the valve. Remove the cap (1), then turn the manual stem knob (2) clockwise to open the valve. Exercise caution when removing the cap (1), as refrigerant may be present inside the cap. To restore automatic operation, turn the manual stem knob (2) fully counterclockwise.



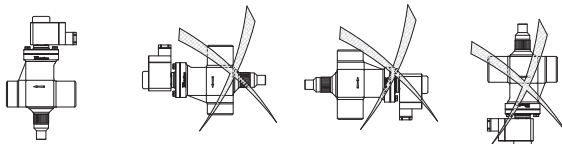
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- The SOSL controls the direct on/off flow of refrigerant. The valve is closed with de-energized of the coil.
- The SOSL must be used where the inlet pressure is less than 2 bar. The maximum operating pressure differential (MOPD) is 6 bar.
- The SOSL has low pressure loss and is therefore recommended for installation on the pump recirculating liquid lines, equalizing line, thermosyphon liquid feed line, liquid line from intermediate to low pressure vessels and in other applications where low pressure loss is required.
- When during operation, there may be times when the outlet pressure is higher than the inlet pressure, so a check valve should be installed to prevent backflow.
- The SOSL should be installed in combination with strainer to prevent entrance of foreign materials into the valve.

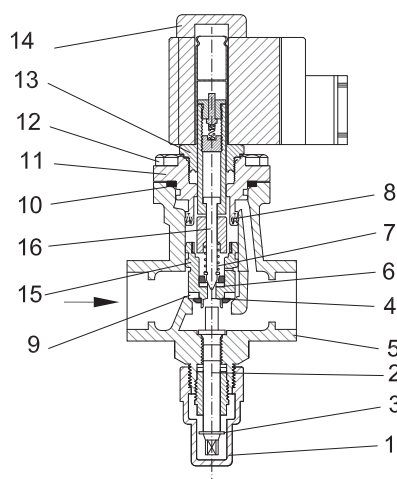
Installation dimensions



Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
SOSL521015	15 mm $\frac{1}{2}$ inch	54	220	80	1.79
SOSL521020	20 mm $\frac{3}{4}$ inch	54	220	80	1.79
SOSL521025	25 mm 1 inch	70	246	127	3
SOSL521032	32 mm $1\frac{1}{4}$ inch	70	246	127	3
SOSL522032	40 mm $1\frac{1}{2}$ inch	70	250	127	3.4
SOSL501040	40 mm $1\frac{1}{2}$ inch	70	250	127	3.4



Installation position

Construction

Item	Part name	Material	Class
1	Cap	Plastic	ABS
2	Spindle	Stainless Steel	AISI 304
3	Faction	Steel	
4	Balancing orifice		
5	Body	Stainless Steel	AISI 304
6	Gasket	PTFE	
7	Spring	Stainless Steel	
8	Gasket	PTFE + SS	
9	Back seal	PTFE	
10	Gasket	PTFE	
11	Bonnet	Stainless Steel	AISI 304
12	Bolt	Stainless Steel	AISI 304
13	Amature tube nut	Stainless Steel	
14	Solenoid coil	Copper	
15	Guide cylinder	Stainless Steel	
16	Needle	Stainless Steel	

Operating Principle

- The SOSS solenoid valve is opened by the magnetic force generated by the solenoid coil and closed by the combined action of the gravitational force of the piston (15) and the needle (16). The valve opens when the solenoid coil is energized and closes when the coil is de-energized.

- When the solenoid coil is energized, the magnetic field attracts the plunger and the needle (16) upward, compressing the spring (7) and opening the balancing orifice (4). Refrigerant from the outlet side of the valve flows through the balancing orifice, creating a lower pressure inside the piston chamber (15). Since the inlet pressure acting on the outer surface of the piston is higher than the pressure inside the piston chamber, the piston is lifted upward and the valve opens.

- When the solenoid coil is de-energized, the plunger and the needle (16) move downward to seal the balancing orifice. At the same time, the spring (7) pushes the needle (16) and the piston (15) downward to close the valve. Through the bleed hole in the piston, the pressure inside the piston chamber is gradually equalized with the pressure outside the piston. The piston (15), assisted by the spring (7), continues moving downward until the valve port is fully closed.

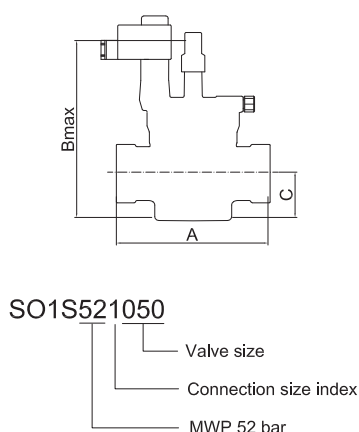
- **Manual Opening:** To open the valve without energizing the solenoid coil, use the manual stem located at the bottom of the valve. Remove the cap (1), then turn the manual stem knob (2) clockwise to open the valve. Exercise caution when removing the cap (1), as refrigerant may be present inside the cap. To restore automatic operation, turn the manual stem knob (2) fully counterclockwise.



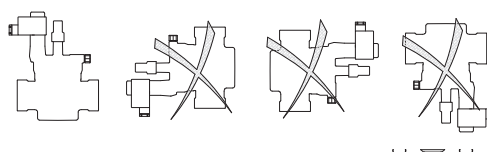
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- SOS1 control on/off, the inlet pressure, differential pressure or temperature depend on installed pilot valve. SOS1 has 1 connection for pilots.
- Used for gas, pump circulated refrigerant return lines.
- Connecting method: butt weld.
- The pilots for Used with SO1S can be PILOTSOL, PILOT COP, PILOTCDP, PILOTCEP.
- The PILOTSOL provides the ON/OFF function of the SO1S.
- PILOT COP maintains a constant inlet pressure at SO1S. The inlet pressure is determined by the pressure setting of PILOT COP.
- PILOTCDP maintains a constant pressure difference between the reference pressure at the PILOTCDP connection and the inlet pressure of SO1S. The pressure difference is determined by the pressure setting of PILOTCDP.
- PILOTCEP maintains a constant pressure at an external reference point in the system. The pressure is determined by the pressure setting of PILOTCEP.
- Forced opening: The manual spindle (12) is used to force the valve open.

Installation dimensions

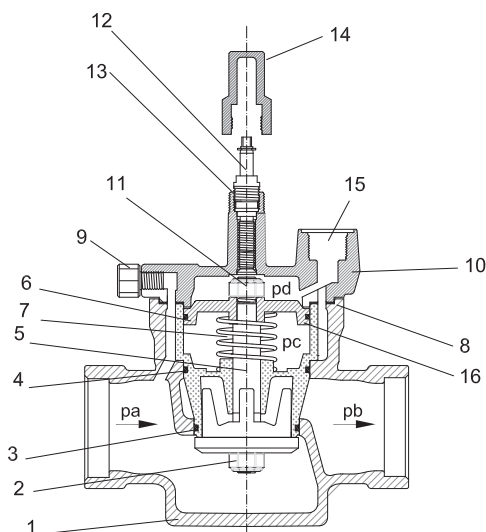


Model 52 bar	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
SO1S520025	20 mm $\frac{3}{4}$ inch				
SO1S521025	25 mm 1 inch				
SO1S522025	32 mm $1\frac{1}{4}$ inch				
SO1S521032	32 mm $1\frac{1}{4}$ inch	136	240	49	6.0
SO1S522032	40 mm $1\frac{1}{2}$ inch				
SO1S521040	40 mm $1\frac{1}{2}$ inch				
SO1S522040	50 mm 2 inch				
SO1S521050	50 mm 2 inch	220	280	60	9.5
SO1S522050	65 mm $2\frac{1}{2}$ inch				
SO1S521065	65 mm $2\frac{1}{2}$ inch	230	310	67	15.0
SO1S522065	80 mm 3 inch				
SO1S521080	80 mm 3 inch				
SO1S521100	100 mm 4 inch				



Installation position

Construction



Item	Part	Material	Species
1	Body	Stainless Steel	AISI 304
2	Nut	Stainless Steel	AISI 304
3	Gasket - Teflon spring	PTFE + SS	
4	Gasket - Teflon spring	PTFE + SS	
5	Spindle	Stainless Steel	AISI 304
6	Piston-ring	PTFE	
7	Spring	Stainless Steel	AISI 304
8	Gasket	Fiber Non amiang	
9	Bolt	Stainless Steel	AISI 304
10	Bonnet	Stainless Steel	AISI 304
11	Nut	Stainless Steel	AISI 304
12	Manual spindle	Stainless Steel	AISI 304
13	Teflon spring	PTFE + SS	
14	Cap	Plastic	ABS
15	Port for pilots		
16	Piston	Stainless Steel	AISI 304

Operating Principle

- The valve's opening and closing depend on the pressure difference between the pressure p_d above the piston (16) and the pressure p_c below the piston.

- When p_c equals p_d , the valve closes completely under the force of the spring (7).

- When p_d begins to exceed p_c , the spring (7) starts to compress and the valve begins to open; the valve opens

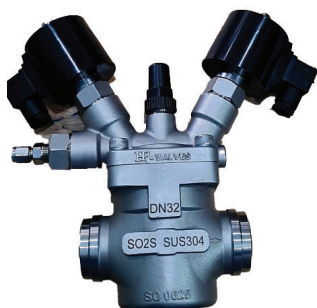
fully when p_d reaches $p_a + 0.2$ bar.

- The pressure p_{ab} above the piston (16) corresponds to the inlet pressure p_{in} . The pressure p_{un} is related to the outlet pressure p_{out} and the pilot setting.

- Forced opening: use manual spindle (12) for forced opening of the valve.

2-step open solenoid Valves

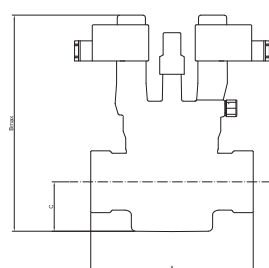
SO2S



Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used in suction line, pump circulated refrigerant return lines in case of Used hot gas for cooler defrost.
- SO2S control the indirect on/off flow in 2 steps depend on the pressure difference across the valve..
- Connecting method: butt weld.

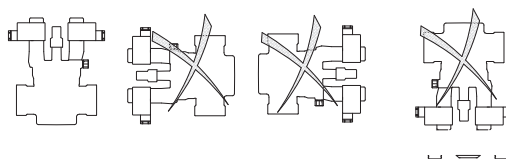
Installation dimensions



SO2S521050

- Valve size
- Connection size index
- MWP 52 bar

Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
52 bar					
SO2S520025	20 mm $\frac{3}{4}$ inch				
SO2S521025	25 mm 1 inch				
SO2S522025	32 mm $1\frac{1}{4}$ inch				
SO2S521032	32 mm $1\frac{1}{4}$ inch	136	240	49	6.0
SO2S522032	40 mm $1\frac{1}{2}$ inch				
SO2S521040	40 mm $1\frac{1}{2}$ inch				
SO2S522040	50 mm 2 inch				
SO2S521050	50 mm 2 inch	220	280	60	11.0
SO2S522050	65 mm $2\frac{1}{2}$ inch				
SO2S521065	65 mm $2\frac{1}{2}$ inch	230	310	67	15.0
SO2S522065	80 mm 3 inch				
SO2S521080	80 mm 3 inch				
SO2S521100	100 mm 4 inch				



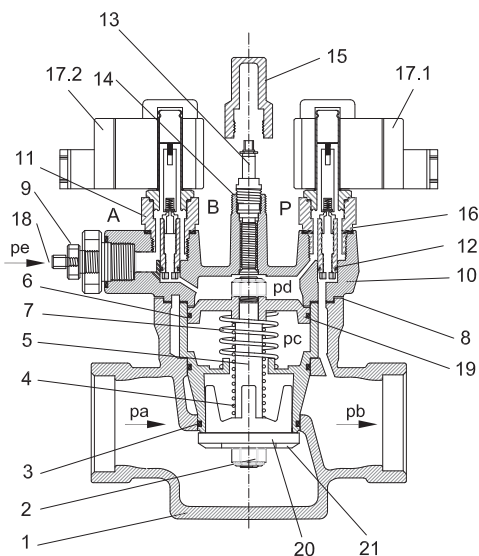
Installation position

Step	normal operating	defrost starts	defrost ends	
pa- pb	pa- pb $\leq$ 1.25 bar	pa- pb $\leq$ 1.25 bar	pa- pb > 1.25 bar	pa- pb $\leq$ 1.25 bar
Solenoid 17.1	close	open	close	close
Solenoid 17.2	open	close	open	open
SO2S	fully open	close	partly open 10%	fully open

2-step open solenoid Valves

SO2S

Construction



Item	Part	Material	Species
1	Body	Stainless Steel	AISI 304
2	Nut	Stainless Steel	AISI 304
3	Gasket - Teflon spring	PTFE + SS	
4	Spring	Stainless Steel	AISI 304
5	Spindle	Stainless Steel	AISI 304
6	Piston-ring	PTFE	
7	Spring	Stainless Steel	AISI 304
8	Gasket	Fiber Non amiang	
9	Bolt	Stainless Steel	AISI 304
10	Bonnet	Stainless Steel	AISI 304
11	EVM	Stainless Steel	AISI 304
12	O-ring	FKM	
13	Manual spindle	Stainless Steel	AISI 304
14	Gasket - Teflon spring	PTFE + SS	
15	Cap	Plastic	ABS
16	Gasket	Aluminium	
17	Solenoid coil		
18	Connector for external pressure	Stainless Steel	AISI 304
19	Piston	Stainless Steel	AISI 304
20	Upper sealed disk	Stainless Steel	AISI 304
21	Lower sealed disk	Stainless Steel	AISI 304

Operating Principle

- Pressure definitions:

- pa: Valve inlet pressure.
- pb: Valve outlet pressure.
- pc: Pressure below piston (19).
- pd: Pressure above piston (19).
- pe: External system pressure acting on the valve (normally the system condensing pressure).

- **Normal evaporator operation:** During normal evaporator operation, solenoid pilot 17.1 is closed and solenoid pilot 17.2 is open. When pilot 17.2 is open, $pe = pd$, and this pressure pushes piston (19) together with the sealing discs (20) and (21) downward, thereby opening the valve. At this time, the pressure difference across the valve is small, with $(pa - pb) \leq 1.25$ bar.

- **Beginning of the defrost cycle:** At the beginning of the defrost cycle, solenoid pilot 17.1 opens while solenoid pilot 17.2 closes. As a result, $pb = pc = pd$, and the force of spring (7) closes the valve.

- **End of the defrost cycle:** When the defrost period set by the defrost timer expires, pilot 17.1 closes and pilot 17.2 opens. Consequently, $pe = pd$ and $pb = pc$. At this moment, the inlet pressure pa (corresponding to the pressure of the remaining hot gas in the evaporator) is still relatively high, so $(pa - pb) > 1.25$ bar. Piston (19) moves

downward a short distance, pushing sealing disc (20) open, and the valve opens to approximately 10% of its full stroke.

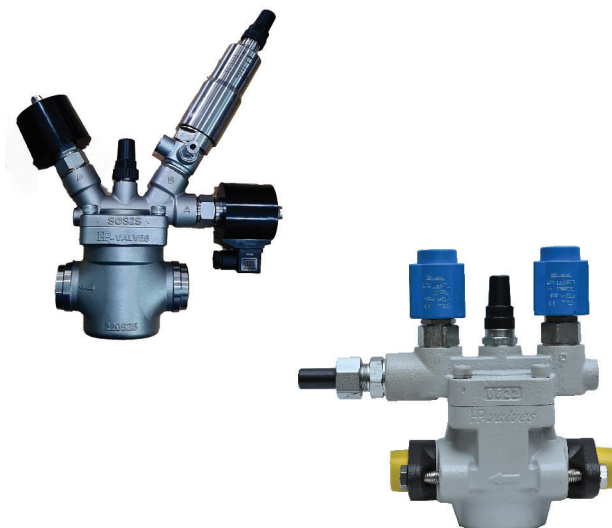
- **Valve opening to full capacity:** As the valve opens to approximately 10%, the pressure pa inside the evaporator gradually decreases. The spring (7) is further compressed, allowing sealing disc (21) to open slowly. The valve then opens fully when $(pa - pb) \leq 1.25$ bar.

- **Under normal operating conditions,** a small amount of liquid refrigerant may condense above piston (19). Therefore, the hot gas defrost cycle should begin by stopping the liquid refrigerant supply to the evaporator. After allowing sufficient time for the remaining liquid refrigerant in the evaporator to be completely drawn out by the compressor, the SO2S valve should be closed, followed by the admission of hot gas for defrost.

- **The hot gas supply should be delayed** for approximately 30–60 seconds after the valve closing signal (depending on the evaporator size and operating conditions). This delay allows the liquid refrigerant trapped above piston (19) to evaporate completely, preventing sudden flash evaporation when hot gas is introduced, which could otherwise cause loud banging noises and piping vibration and shortening the service life of the valve..

Pilot-operated Valves – 3-functional

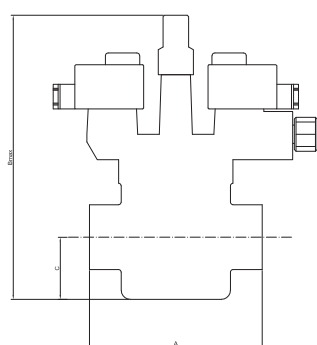
SO3S



Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- SOS3 control the regulating on/off function, pressure, differential pressure or temperature depend on installed pilot valves. SOS3 has 3 connections for pilots.
- Used for gas, pump circulated refrigerant return lines.
- Connecting method: butt weld.

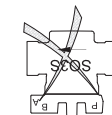
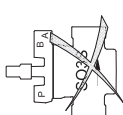
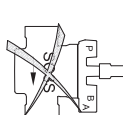
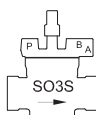
Installation dimensions



SO3S521050

- Valve size
- Connection size index
- MWP 52 bar

Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
52 bar					
SO3S520025	20 mm $\frac{3}{4}$ inch	200	210	35	8.7
SO3S521025	25 mm 1 inch				
SO3S522025	32 mm $1\frac{1}{4}$ inch				
SO3S521032	32 mm $1\frac{1}{4}$ inch	220	225	40	9.4
SO3S522032	40 mm $1\frac{1}{2}$ inch				
SO3S521040	40 mm $1\frac{1}{2}$ inch	220	225	40	10
SO3S522040	50 mm 2 inch				
SO3S521050	50 mm 2 inch	250	265	60	15.6
SO3S522050	65 mm $2\frac{1}{2}$ inch				
SO3S521065	65 mm $2\frac{1}{2}$ inch	300	295	70	21.3
SO3S522065	80 mm 3 inch				
SO3S521080	80 mm 3 inch	300	295	70	23
SO3S521100	100 mm 4 inch	365	400	105	55.6

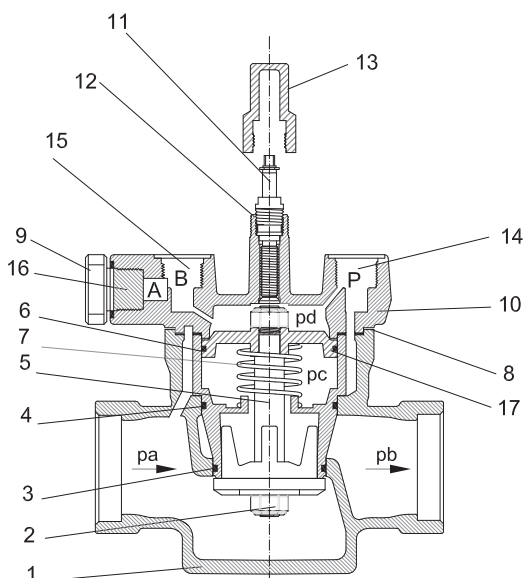


Installation position

Pilot-operated Valves – 3-functional

SO3S

Construction



Item	Part	Material	Species
1	Body	Stainless Steel	AISI 304
2	Nut	Stainless Steel	AISI 304
3	Gasket - Teflon spring	PTFE + SS	
4	Gasket - Teflon spring	PTFE + SS	
5	Spindle	Stainless Steel	AISI 304
6	Piston-ring	PTFE	
7	Spring	Stainless Steel	AISI 304
8	Gasket	Fiber Non amiang	
9	Bolt	Stainless Steel	AISI 304
10	Bonnet	Stainless Steel	AISI 304
11	Manual spindle	Stainless Steel	AISI 304
12	Gasket - Teflon spring	PTFE + SS	
13	Cap	Plastic	ABS
14	Parallel connection port P	Stainless Steel	
15	Second serial connection port B	Stainless Steel	
16	First serial connection port A	Stainless Steel	AISI 304
17	Piston	Stainless Steel	AISI 304

ON/OFF Functions

Port P	Open	Close	Close	Close	Close
Port A	Open / Close	Open	Close	Open	Close
Port B	Open / Close	Open	Open	Close	Close
SO3S	ON	ON	OFF	OFF	OFF

Operating Principle

- The valve's opening and closing depend on the pressure difference between the pressure p_d above the piston (17) and the pressure p_c below the piston.

- When p_d equals p_c , the valve closes completely under the force of the spring (7).

- When p_d begins to exceed p_c , the spring (7) starts to compress and the valve begins to open; the valve opens fully when p_d reaches $p_c + 0.2$ bar.

- The pressure p_d above the piston (17) corresponds to the inlet pressure p_a . The pressure p_c is related to the outlet pressure p_b and the pilot setting.

- Forced opening: use manual spindle (11) for forced opening of the valve.

- The pilots for Used with SO3S can be PILOTSOL, PILOT COP, PILOT CDP, PILOT CEP. Maximal can be 3 pilots installed on SO3S.

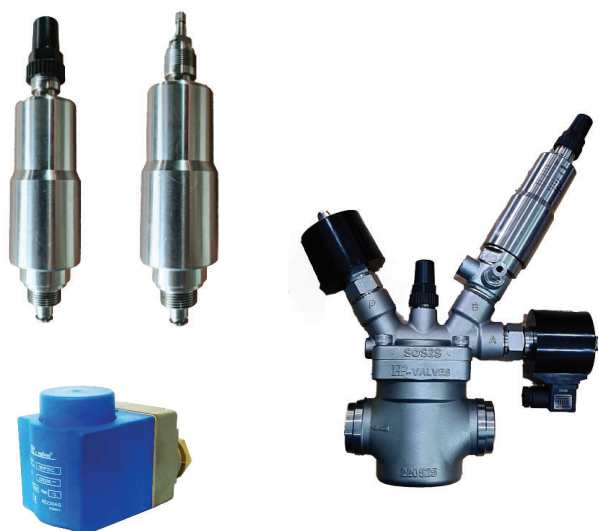
- The PILOTSOL provides the ON/OFF function for the SO3S or for any other pilot installed in parallel with the PILOTSOL.

- PILOT COP maintains a constant inlet pressure at SO1S. The inlet pressure is determined by the pressure setting of PILOT COP.

- PILOT CDP maintains a constant pressure difference between the reference pressure at the PILOT CDP connection and the inlet pressure of SO3S. The pressure difference is determined by the pressure setting of PILOT CDP.

- PILOT CEP maintains a constant pressure at an external reference point in the system. The pressure is determined by the pressure setting of PILOT CEP.

- Forced opening: The manual spindle (12) is used to force the valve open.

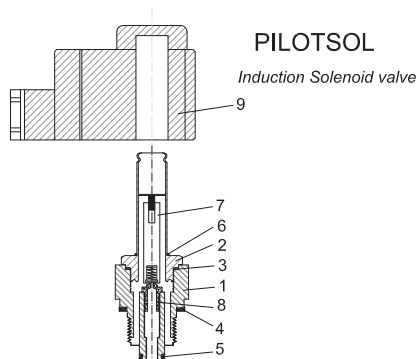


Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- The pilots valves are installed in the main valve SO1P, SO3P, SOS1, SOS2, SOS3, GRV4 or GRV6 for regulating pressure, temperature and ON/OFF function.
- PILOTSOL is the induction solenoid valve for the ON/OFF function of the main valve.
- PILOTCDP is used to maintain a constant pressure on the inlet side of the main valve.
- PILOTCEP is used to maintain a constant pressure at an external reference point in the system.
- Connecting method: threaded M24.

Model	Description
PILOTSOL-12W	Coil power 12W
PILOTSOL-15W	Coil power 15W
BOLT P	Bolt for port P of parallel channel
BOLT A	Bolt for port A of serial channel

Model	Operating Range
PILOTCDP-L	-0.46 - 7bar -7 - 102psi
PILOTCDP-M	0 - 10bar 0 - 145psi
PILOTCDP-H	0 - 20bar 0 - 290psi
PILOTCEP-L	0 - 10bar 0 - 145psi
PILOTCEP-H	0 - 20bar 0 - 290psi

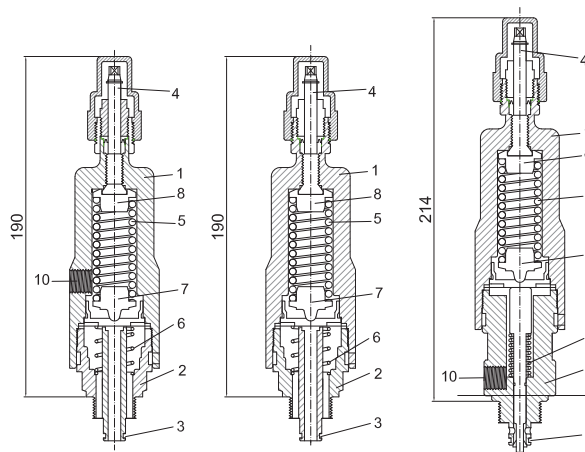


Item	Part	Material	Species
1	Body	Stainless Steel	AISI 304
2	Capsule	Stainless Steel	AISI 304
3	Gasket	Aluminum	
4	Gasket	Aluminum	
5	O-ring	Teflon (PTFE)	
6	O-ring	Teflon (PTFE)	
7	Cartridge	Stainless Steel	AISI 430
8	Valve seat	Stainless Steel	AISI 304
9	Solenoid		12W / 15W

PILOTCDP

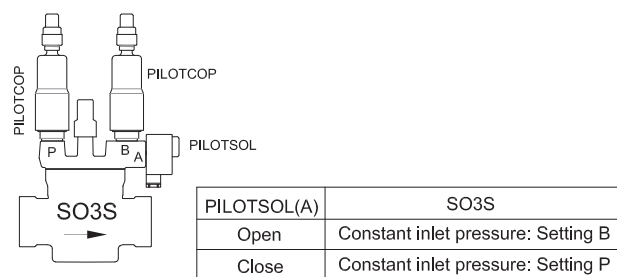
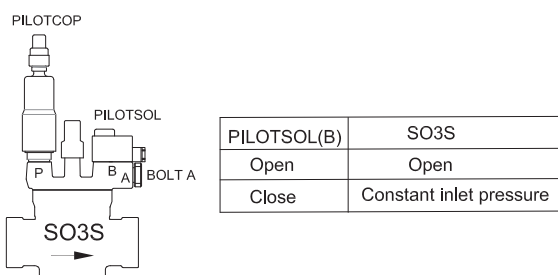
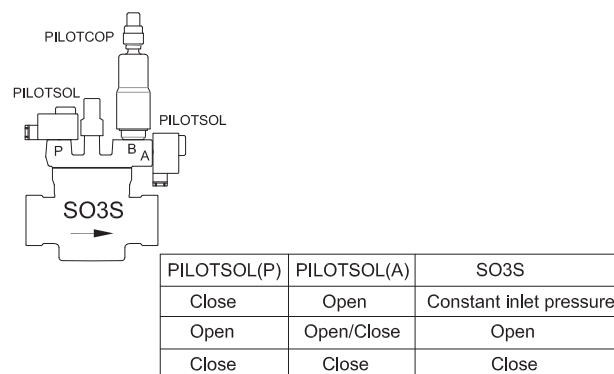
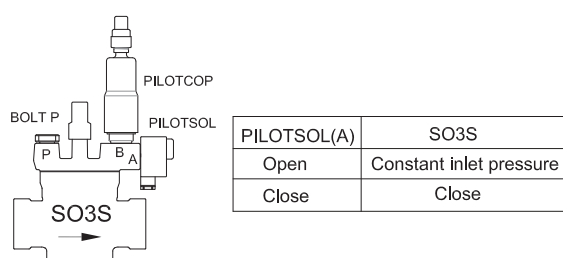
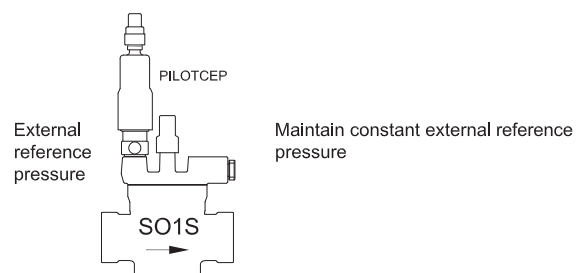
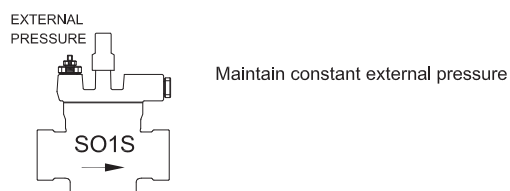
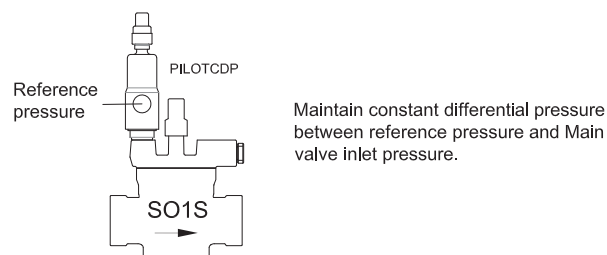
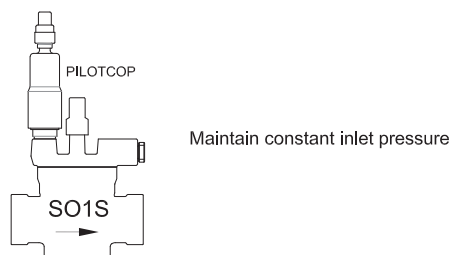
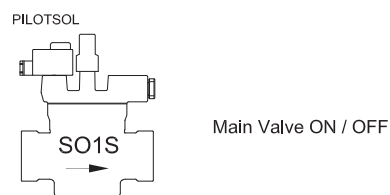
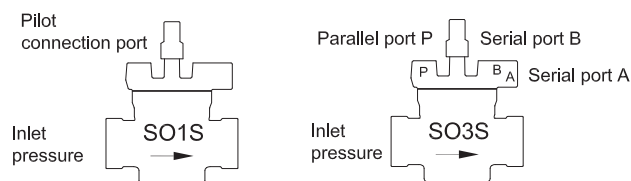
PILOTCDP

PILOTCEP

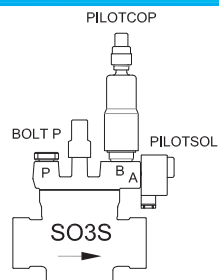


Item	Part	Material	Species
1	Body	Stainless Steel	AISI 304
2	Capsule	Stainless Steel	AISI 304
3	O-ring	Neoprene	
4	Spindle	Stainless Steel	AISI 304
5	Spring	Steel	
6	Spring	Steel	
7	Valve Cone	Stainless Steel	AISI 304
8	Valve seat	Stainless Steel	AISI 304
9	Cap	Plastic	ABS
10	Connecting port for external pressure		

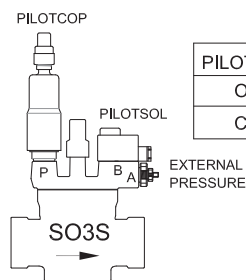
Typical Installation of Pilot valves in the Main valve



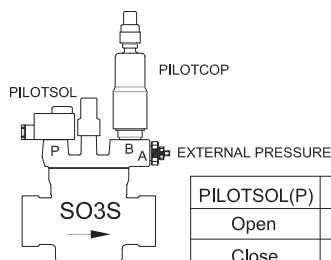
Typical Installation of Pilot valves in the Main valve



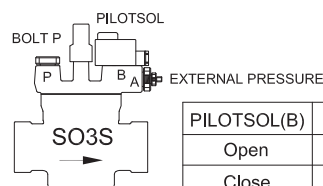
PILOTSOL(A)	SO3S
Open	Constant inlet pressure
Close	Close



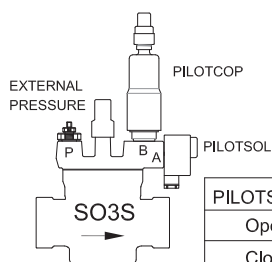
PILOTSOL(B)	SO3S
Open	External pressure control
Close	Constant inlet pressure: Setting P



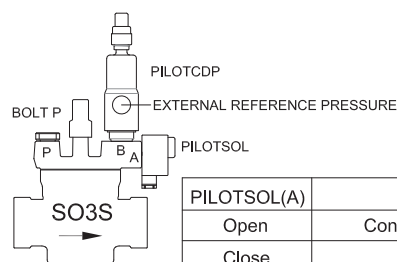
PILOTSOL(P)	SO3S
Open	Open
Close	Constant external pressure



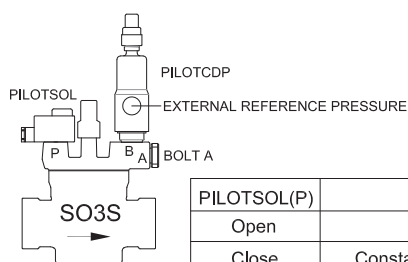
PILOTSOL(B)	SO3S
Open	External pressure control
Close	Close



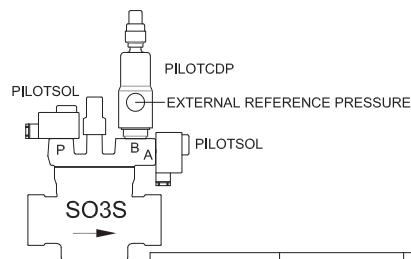
PILOTSOL(A)	SO3S
Open	Constant inlet pressure
Close	External pressure control



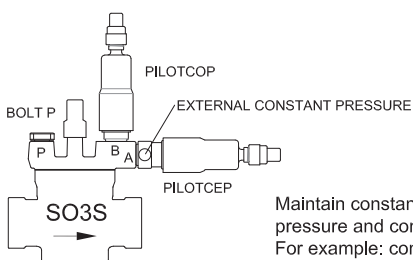
PILOTSOL(A)	SO3S
Open	Constant differential pressure
Close	Close



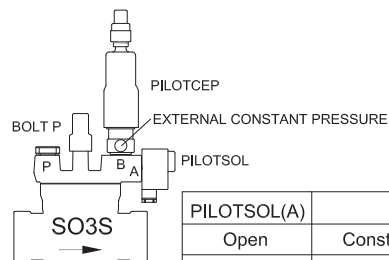
PILOTSOL(P)	SO3S
Open	Open
Close	Constant differential pressure



PILOTSOL(P)	PILOTSOL(A)	SO3S
Open	Open / Close	Open
Close	Open	Constant differential pressure
Close	Close	Close



Maintain constant external reference pressure and constant inlet pressure. For example: constant crankcase pressure and constant evaporating pressure.



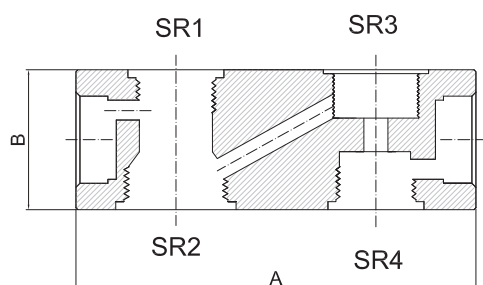
PILOTSOL(A)	SO3S
Open	Constant external pressure
Close	Close



Recommendations

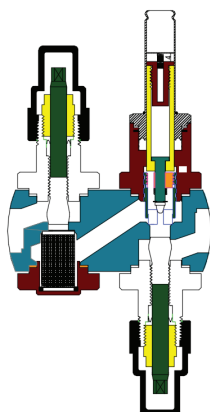
- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- GRV4S has 4 ports for installation of: shut-off, filter, expansion, regulating, check valves. The combination of the valves creates 6 differential functions.
- Usually Used for control of evaporator: liquid supply, expansion, hot gas supply and condensate relief; also for liquid supply and expansion to LP-receiver...
- Connecting method: butt weld.

Installation dimensions



Model	Connection in/out	Dimensions		
		A	B	C
GRV4S..003	15 mm $\frac{1}{2}$ inch	100	35	35
GRV4S..010	15 mm $\frac{1}{2}$ inch	100	35	35
GRV4S..015	15 mm $\frac{1}{2}$ inch	100	35	35
GRV4S..020	20 mm $\frac{3}{4}$ inch	120	50	50
GRV4S..025	25 mm 1 inch	120	50	50
GRV4S..032	32 mm 1 $\frac{1}{4}$ inch	130	65	65
GRV4S..040	40 mm 1 $\frac{1}{2}$ inch	130	65	65

Port	SR1	SR2	SR3	SR4				
Valve	Shut-off	Filter	Solenoid	Expansion	Regulate	Check & stop	Shut-off	Manual opener
GRV4S00....	X	X	X					
GRV4SEX....	X	X	X	X				
GRV4SRE....	X	X	X		X			
GRV4SCS....	X	X	X			X		
GRV4SSH....	X	X	X				X	
GRV4SMA....	X	X	X					X



GRV4SEX403

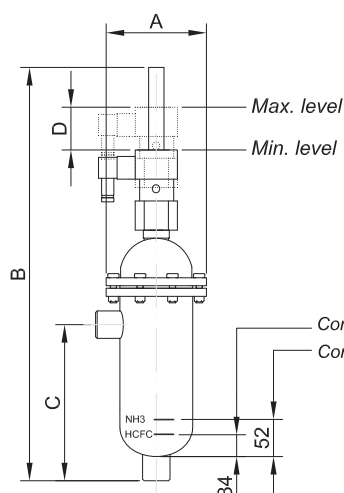
Electronic level sensors

LFSE


Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for control of liquid level of liquid receiver. The float ball with a magnet is detected by magnetic sensor.
- Optional: 2 sensors for 2 levels.
- Connecting method: socket weld.

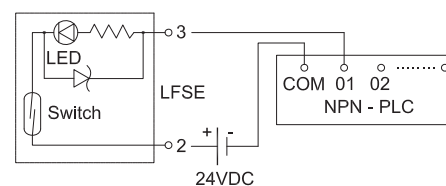
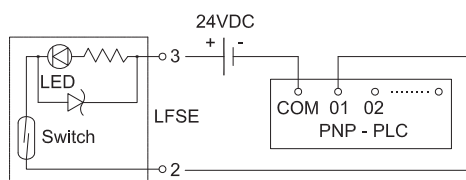
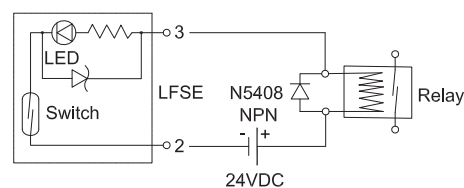
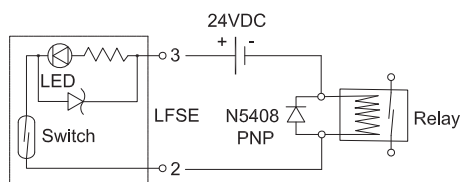
Installation dimensions



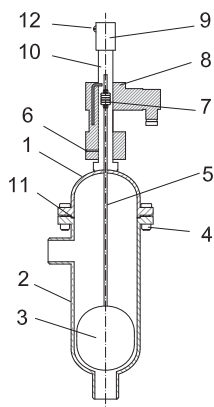
Model	Connection	Dimensions				Level point	Material	Weight (kg)
		A	B	C	D			
LFSE0025	25 mm 1 inch	124	480	193	50	single	Inox AISI 304	3.5
LFSE1025		124	480	193	50	single	Gang Cast iron	3.8
LFSE2025		124	480	193	50	2 points	Inox AISI 304	3.5
LFSE3025		124	480	193	50	2 points	Gang Cast iron	3.8

Hysteresis	Switch	LED	Circuit
≤ 15mm	ON	ON	close
> 15mm	OFF	OFF	open

Elec. Wiring



Construction



Item	Part	Material	Species
1	Top cover	Stainless steel	AISI 304
2	Housing	Stainless steel	AISI 304
3	Float ball	Stainless steel	AISI 304
4	M8 x 35 Bolts	Stainless steel	AISI 304
5	Float rod	Stainless steel	AISI 304
6	Fixing Screw	Stainless steel	AISI 304
7	Magnet		
8	Auto switch	ABS	
9	Limiter	Stainless steel	AISI 304
10	Pressure tube	Stainless steel	AISI 304
11	Gasket	Fiber non amiang	
12	M4 x 2 Bolts	Stainless steel	AISI 304

Service valves

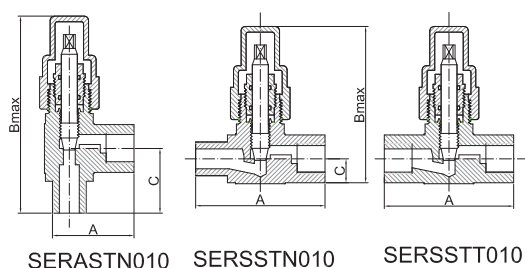
SERAS SERSS



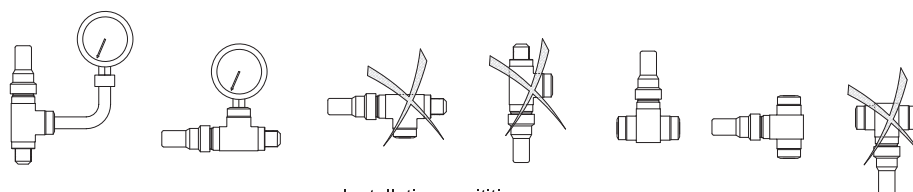
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for suction, discharge, liquid, hot gas, recirculating liquid and oil lines. Especially for connecting with pressure gauge.
- Connecting method: inner and outer thread.

Installation dimensions

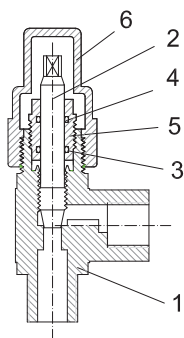


Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
SERASTN010	NPT 17	45	99	32.5	0.35
SERSSTN010	NPT 17	65	79	12	0.35
SERSSTT010	NPT 17	65	79	12	0.35



Installation position

Construction



Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Spindle	Stainless steel	AISI 304
3	Gasket- - Teflon spring	PTFE + SS	
4	Oring	Cloroprene (Neoprene)	
5	Packing gland	Stainless steel	
6	Cap	Nhựa Plastic	ABS

Hand regulating valves, angle

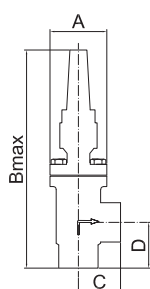
HRGAS



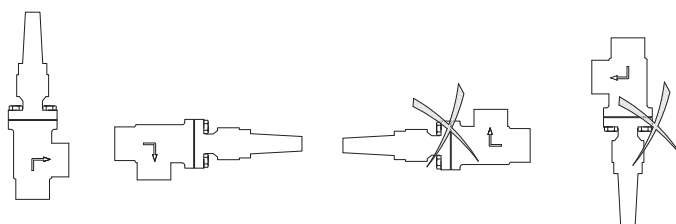
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for regulation or expansion of liquid refrigerants.
- Used in liquid supply, pumped recirculating liquid lines.
- Connecting method: butt weld.

Installation dimensions

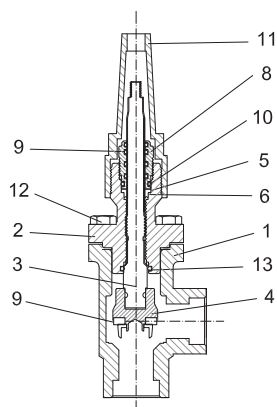


Model		Connection in/out	Dimensions				Weight (kg)
Expansion	Regulating		A	Bmax	C	D	
HRGASE0015	HRGASR0015	15 mm $\frac{1}{2}$ inch	54	195	41	41	1.8
HRGASE0020	HRGASR0020	20 mm $\frac{3}{4}$ inch	55	211	41	45	1.8
HRGASE0025	HRGASR0025	25 mm 1 inch	58	220	46	46	2.5
HRGASE0032	HRGASR0032	32 mm $1 \frac{1}{4}$ inch	71	250	55	55	3.5



Installation position

Construction



Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Valve bonnet	Stainless steel	AISI 304
3	Spindle	Stainless steel	AISI 304
4	Cone seal	Teflon (PTFE)	
5	Gasket	Teflon-Fiber non-amiang	
6	Gasket - Teflon spring	PTFE + SS	
7	Gasket	Teflon (PTFE)	
8	Packing gland	Stainless steel	AISI 304
9	Oring	Cloroprene (Neoprene)	
10	Oring	Cloroprene (Neoprene)	
11	Seal Cap	Aluminium or Plastic	Alu or ABS
12	Bolts	Stainless steel	AISI 304
13	Gasket	Aluminium	

Hand regulating valves, straight

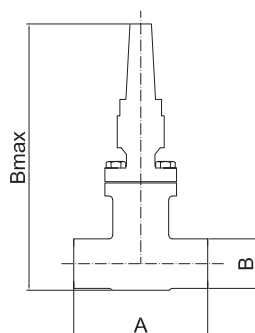
HRGSS



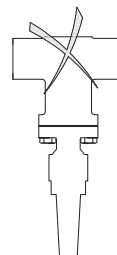
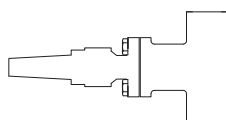
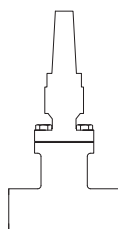
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for regulation or expansion of liquid refrigerants.
- Used in liquid supply, pumped recirculating liquid lines.
- Connecting method: butt weld.

Installation dimensions

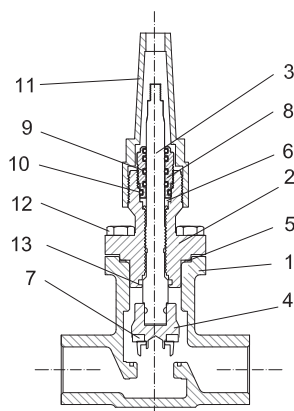


Model		Connection in/out	Dimensions			Weight (kg)
Expasion	Regulating		A	Bmax	C	
HRGSSE0015	HRGSSR0015	15 mm $\frac{1}{2}$ inch	103	205	20	2.1
HRGSSE0020	HRGSSR0020	20 mm $\frac{3}{4}$ inch	103	205	21	2.1
HRGSSE0025	HRGSSR0025	25 mm 1 inch	110	230	28	2.8
HRGSSE0032	HRGSSR0032	32 mm $1\frac{1}{4}$ inch	120	270	40	3.8



Installation position

Construction



Item	Part	Material	Species
1	Housing	Stainless steel	AISI 304
2	Valve bonnet	Stainless steel	AISI 304
3	Spindle	Stainless steel	AISI 304
4	Cone seal	Teflon (PTFE)	
5	Gasket	Teflon-Fiber non-amiang	
6	Gasket - Teflon spring	PTFE + SS	
7	Gasket	Teflon (PTFE)	
8	Packing gland	Stainless steel	AISI 304
9	Oring	Cloroprene (Neoprene)	
10	Oring	Cloroprene (Neoprene)	
11	Seal Cap	Aluminium or Plastic	Alu or ABS
12	Bolts	Stainless steel	AISI 304
13	Gasket	Aluminium	

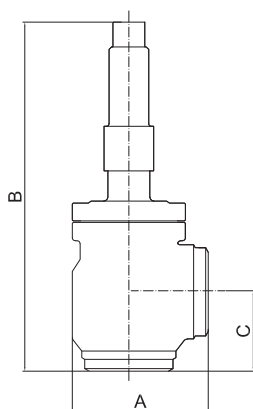
Shut-off check valves, angle

CHSAS

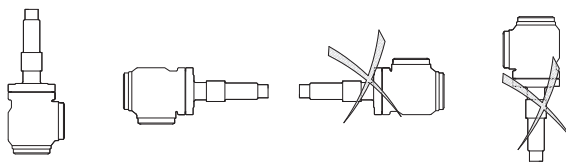

Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for control the flow of refrigerants in one direction.
- Used in discharge, liquid supply, pumped recirculating liquid lines.
- Connecting method: butt weld.

Installation dimensions

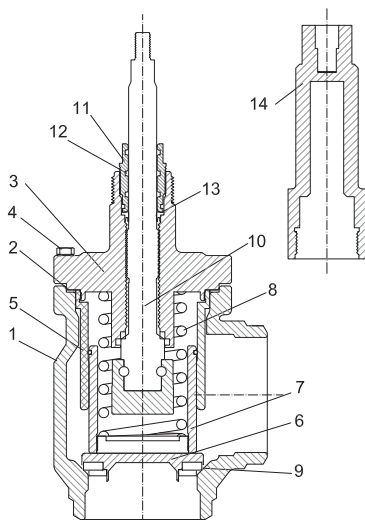


Model	Connection in/out	Dimensions			Weight (kg)
		A	Bmax	C	
CHSAS00032	32 mm 1 1/4 inch	71	280	55	3.2
CHSAS00040	40 mm 1 1/2 inch	71	280	55	3.2
CHSAS00050	50 mm 2 inch	78	240	60	4.0
CHSAS00065	65 mm 2 1/2 inch	100	272	70	7.0
CHSAS00080	80 mm 3 inch	137	352	80	11.0
CHSAS00100	100 mm 4 inch	160	380	106	16.0
CHSAS00125	125 mm 5 inch	193	480	128	28.0
CHSAS00150	150 mm 6 inch	219	564	145	38.0



Installation position

Construction



Item	Part	Material	Species
1	Housing	Stainless steel	A352 LCC
2	Cone seal	Teflon - Fiber non amiang	
3	Valve bonnet	Stainless steel	S20C
4	Bolts	Stainless steel	AISI 304
5	Tube	Stainless steel	
6	Valve plate	Stainless steel	
7	Guide sleeve	Stainless steel	
8	Spring	Stainless steel	
9	Gasket - Teflon spring	PTFE + SS	
10	Spindle	Stainless steel	AISI 304
11	Packing gland	Stainless steel	AISI 304
12	Oring	Cloroprene (Neoprene)	
13	Gasket	PTFE + SS	
14	Cap- Hand wheel	Aluminium	Alu

Recommendations

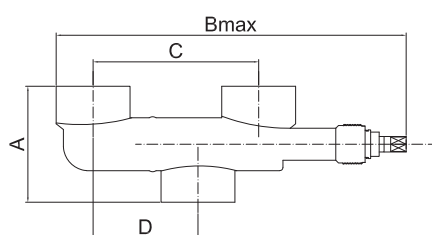
- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for control the flow of refrigerants in one direction.
- Used in discharge, liquid supply, pumped recirculating liquid lines.
- Connecting method: butt weld.



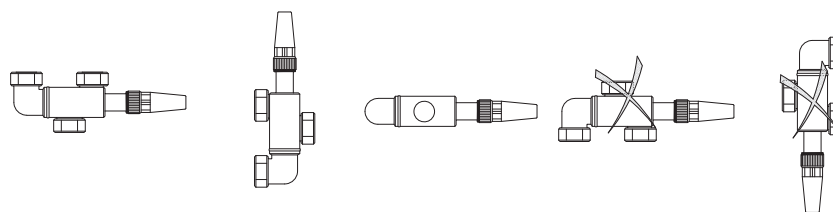
Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- T-way is shut-off valve with 2 outputs - one open and the other closed or both outputs open - Used for installation of 2 safety valves.
- T-way is installed in pressure vessels with volume greater than 285lts in vapor part of vessel. T-way also installed for other refrigeration system components, which required always one safety valve permanent.
- Connecting method: inside pipe threaded.

Installation dimensions

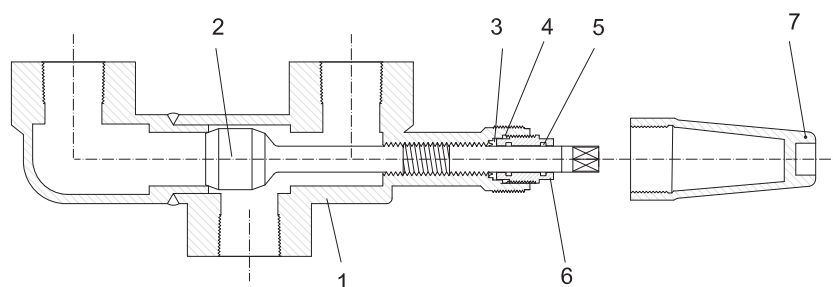


Model	Connection in/out	Dimensions				Weight (kg)
		A	Bmax	C	D	
TWAYS00015	15 mm $\frac{1}{2}$ inch	84	230	92	60	2.7
TWAYS00020	20 mm $\frac{3}{4}$ inch	84	230	92	60	2.7
TWAYS00025	25 mm 1 inch	105	335	150	95	3.5
TWAYS00032	32 mm $1\frac{1}{4}$ inch	105	335	150	95	3.5



Installation position

Construction



Item	Part	Material	Species
1	Housing	Steel	AISI 304
2	Spindle	Stainless steel	AISI 304
3	Gasket- Teflon spring	PTFE + SS	
4	Oring	Cloroprene (Neoprene)	
5	Oring	Cloroprene (Neoprene)	
6	Packing gland	Stainless steel	AISI 304
7	Cap	Aluminium or Plastic	Alu or ABS

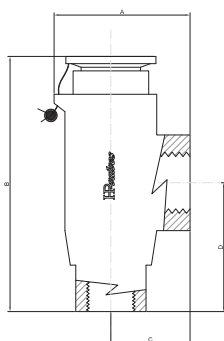
Safety pressure relief valve

SRLAS

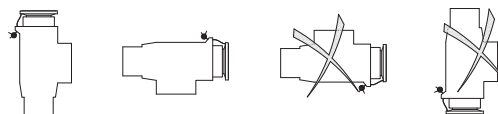

Recommendations

- Maximal working pressure MWP: 52 bar up to 80 bar
- Temperature range: -50°C / +150°C
- Refrigerants : HCFC, CFC, R717, R744
- Used for protection of the pressure of pressure vessels or piping system from excessive pressure.
- Used in gas lines or at vapor part of pressure vessels.
- Connecting method: inside pipe threaded.

Installation dimensions

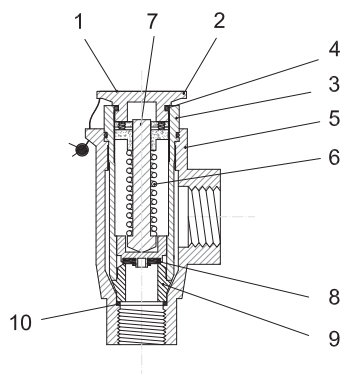


Model	Thread connection (NPT)		Dimensions				Weight (kg)
	Bottom inlet	Side outlet	A	B	C	D	
SRLAS015	$\frac{1}{2}$ inch	$\frac{3}{4}$ inch	70	145	44	75	2.0
SRLAS020	$\frac{3}{4}$ inch	1 inch	70	145	44	75	2.0
SRLAS025	1 inch	1 $\frac{1}{2}$ inch	95	180	60	95	3.35
SRLAS032	1 $\frac{1}{2}$ inch	1 $\frac{1}{2}$ inch	95	180	60	95	3.35



Installation position

Construction



Item	Part	Material	Species
1	Name plate	Stainless steel	AISI 304
2	Cap	Stainless steel	AISI 304
3	Inner Body	Stainless steel	AISI 304
4	Oring	Cloroprene (Neoprene)	
5	Main Body	Cast - iron	
6	Spring	Steel	
7	Spindle	Stainless steel	AISI 304
8	Plug	Teflon (PTFE)	
9	Seat	Stainless steel	AISI 304
10	Gasket	Aluminium	



HP-*valves*[®]

