NACHI Hydraulic Valves

Features

1 Maximum operating pressure of 3045 to 5000 psi provides smooth operation at high pressures. Low leakage for high efficiency.
2 Extremely stable performance across all pressure ranges.
3 Conformance with ISO recommended dimensions for most gasket installations enables a high degree of international compatibility.
4 A highly reliable and quiet wet type solenoid valve series is available when the noise and reliability issues of solenoid valves are a problem.
5 A comprehensive pipe-less series provides the ultimate in compact design and reliability.

Installation and Maintenance

1 Installation is possible in horizontal, vertical, and diagonal configurations. However, the spool must be oriented horizontally in the case of a solenoid valve or hydraulic switching solenoid valve no-spring type.
2 Precision finish the mounting surface to a surface roughness of 1.6a and degree of flatness of 0.0003 in.
3 Make sure that the return piping from the hydraulic valve to the tank is below the fluid level surface.
4 Be sure to use only specified bolts on hydraulic valves. Use grade 8 bolts or equivalent.
5 Installation bolts are not included with any modular valves, the SS, SA, SF, and SNG G01 size solenoid valves, the DMA-G01 manual valve, or with sub plates. Bolts are included with gasket type valves other than those mentioned above.
6 Use O-rings with a hardness of 90 durometer for valve gasket O-rings.

Management of Hydraulic Operating Fluid

1 Use mineral oil-based hydraulic operating fluid.
2 See pages N-1 and N-2 for information about the viscosity of the operating fluid you need to use.
3 When using water- or glycol-based hydraulic operating fluid, refer to pages N-4 through N-6 for details on applicable models. Contact your agent for information about other fire-resistant hydraulic fluids and special fluids.
4 Foreign matter in the hydraulic operating fluid can lead to frequent valve operation problems. Use a 10μm line filter to protect against contamination.

Terms Used in This Catalog

The following describes the meanings of the following terms used in this catalog:

- Rated Flow Rate :
  Specific guaranteed flow rate under certain fixed conditions
- Maximum Flow Rate :
  Maximum flow rate that satisfies valve function
- The following are the ratings that apply to the seal part list.

JIS standard	B2401 (O-ring)
JIS standard	B2407 (backup ring)
SAE standard	AS568 (O-ring)

- Pipe apertures mentioned in this catalog that are indicated as "G*/*" comply with BSPP O-ring seal systems.

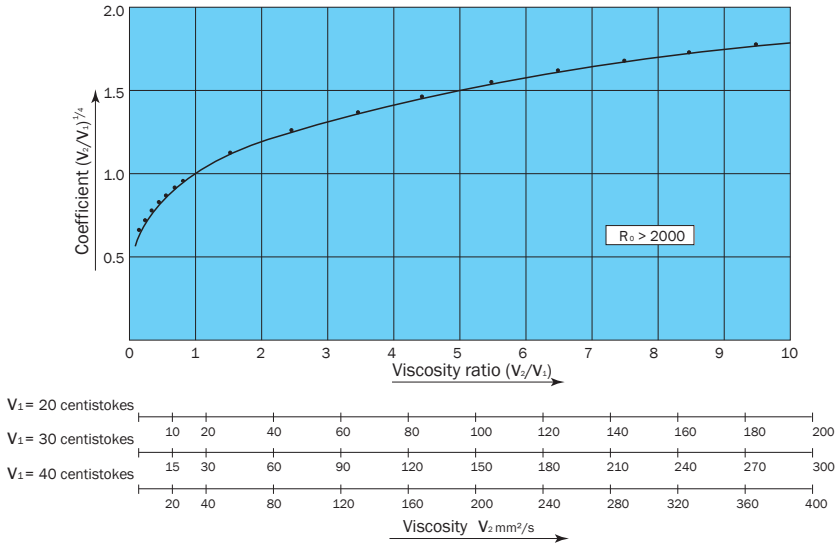
Calculation of Hydraulic Valve Pressure Loss

Use the following formula to convert pressure loss values for each hydraulic valve in accordance with changes in operating fluid viscosity.

$$\Delta P_2 = \left(\frac{V_1}{V_2}\right)^{1/4} \cdot \Delta P_1$$

ΔP_1 : Pressure loss psi at for viscosity V_1
ΔP_2 : Pressure loss psi at for viscosity V_2
V_1 : Viscosity centistokes
V_2 : Viscosity centistokes
The graph on the right shows coefficient values $(V_2/V_1)^{1/4}$ viscosity ratios (V_1/V_2).
<Example>
For a value whose pressure loss at the rated flow rate when V_1 = 30 centistokes is ΔP_1 = 43 psi, a change in viscosity to V_2 = 90 centistokes produces a pressure loss of (V_2/V_1) = 3.
According to the graph on the right, coefficient $(V_1/V_2)^{1/4}$ = 1.3.
Accordingly :

$\Delta P_2 = 1.3\Delta P_1 = 1.3 \times 43$ psi = 56 psi



Factory Default Handle Setting

The following are the factory default pressure and flow rate settings for handles (screws) on adjustable valves.
1 Pressure Control Valve: Near the minimum control pressure.
2 Flow Control Valve: Near the minimum control flow rate.

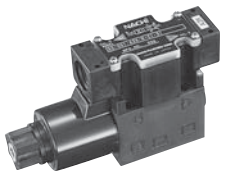
Note, however, that ER and ESR relief valves are set to rated pressures. For details, see the applicable pages for each type of valve.

NACHI

WET TYPE SOLENOID OPERATED DIRECTIONAL CONTROL VALVE

SS Series (Wiring System: Central Terminal Box) Wet Type Solenoid Valve

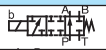
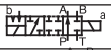
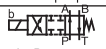
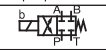
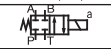
26.4 to 42 gpm
5075 psi



Features

Very long life
The movable iron core of the wet type solenoid is immersed in oil, which keeps it lubricated and cushions it from impact and vibration, ensuring very long life.
Low switching noise
The wet-type solenoid valve provides very low core switching noise, for quiet operation.
High pressure, large capacity, with minimal pressure loss
Comprehensive fluid reaction force compensation and low pressure compensation construction provide large capacity and low pressure loss.
G01 : 5075 psi (26.4 gpm)
G03 : 5075 psi (42 gpm)
Easy connections
A special wiring box provides a COM port and indicator light as standard for simple wiring and maintenance.
Easy coil replacement
A plug-in type coil enables one-touch coil replacement.
Wide-ranging backward compatibility makes it simple to replace previous valve models with this one. Combining this valve with a modular valve contributes to the compact configuration of the overall device.
Compliant with global and international safety regulations (G01 size CE, UL, CSA, and G03 size UL). Can be used safely around the world. Contact us for models and specifications of compliant products.

Specifications

Model No.		SS-G01 (D03)				SS-G03 (D05)					
		Standard Type		Shockless Type		Standard Type				Shockless Type	
						AC Solenoid Type		DC Solenoid Type (With built-in rectifier)			
JIS Symbol	Operation Symbol	Maximum Flow Rate gpm	Maximum Working Pressure psi	Maximum Flow Rate gpm	Maximum Working Pressure psi	Maximum Flow Rate gpm	Maximum Working Pressure psi	Maximum Flow Rate gpm	Maximum Working Pressure psi	Maximum Flow Rate gpm	Maximum Working Pressure psi
	-A2X-	7.9	5075	7.9	3625	10.5	5075	22.4	5075	22.4	3625
	-H2X-										
	-E2X-					22.4					
	-A3X-	21		13.2		34.3		42.2		34.3	
	-H3X-										
	-E3X-	26.4									
	-A3Z-	17.1									
	-H3Z-										
	-E3Z-										
	-A4-	13.2									
	-H4-										
	-A5-	26.4									
	-H5-										
	-C2-										
	-C5-										
	-C9-										
	-C1S-										
	-C6S-										
	-C1-	AC Solenoid 17.1 DC Solenoid 21.1									
	-C6-										
	-C4-	13.2									
	-C7Y-			10.5		18.5	3625	26.4	3625	22.4	
	-C8-										

Note: The maximum flow rate of each valve depends on the pressure. For details, see pages D-12 and D-13.

			SS-G01			SS-G03		
			AC Solenoid	DC Solenoid		AC Solenoid	DC Solenoid	
				Built-in Rectifier			Built-in Rectifier	
			C*	E*	D*	C*	E*	D*
Maximum Working Pressure	P, A, B ports		5075 psi					
Maximum Allowable Backpressure	T port		3045 psi			2320 psi		
Switching frequency (cycles/minute)		Standard Type	300	120	300	300	120	240
		Shockless Type	–		120	–		120
Standard	Indicator light		R			R		
Option	Shockless		–	F		–	F	
	Surgeless		G	–	G	G	–	G
	With manual push-button		N			N		
	Quick Return		–	Q	–	–	Q	–
Weight (kg)	Double Solenoid		1.8	2.0		4.2	5.5	
	Single Solenoid		1.4	1.5		3.5	4.1	
Operating Environment	Dust Resistance/Water Resistance Rank		IP64 (Dust-tight, Splash-proof)					
	Ambient Temperature		-4 to 122°F					
	Operating Fluid	Temperature Range	-4 to 158°F					
		Viscosity Range	15 to 300 centistokes					
		Filtration	10 microns or less					
Mounting bolt	Size × Length		10-24 x 1 3/4 LG (not included)			1/4-20 x 2 3/4		
	Tightening Torque		3.6 to 5 ft lbs			14.7 to 18.4 ft lbs		

Note: 1. Maximum operating pressure depends on the valve type. For details, see page D-1.
2. For mounting bolts, use 12T, grade 8 or equivalent.
3. Mounting bolts are not included with the 01 size. Bolts are included with the 03 size.

• Handling

1 In order to realize the full benefits of the wet type solenoid valve, configure piping so oil is constantly supplied to the T port. Never use a stopper plug in the T port.
2 Ensure that surge pressure in excess of the maximum allowable back pressure does not reach the T port.
3 Note that the maximum flow rate is limited when used as a four-way valve, or by blocking ports for use as a two-way valve or one-way valve.
4 Always keep the operating fluid clean. Allowable contamination is class NAS12 or less.
5 When using petroleum type operating fluid, use ISO VG 32, 46.
6 For details about using fire-resistant hydraulic fluid, contact your agent.
7 Use this valve only within the allowable voltage range.
8 Do not allow the AC solenoid to become charged until you install the coil into the valve.
9 In the case of operation symbols A2X, H2X, and E2X, run drain piping from the valve T port.
10 Maintaining a switching position under high pressure for a long period can cause abnormal operation due to hydraulic lockup. Contact your agent when you need to maintain a switching position for a long period.
11 When using a detent type (E2X, 3X, E3Z), use constant energization in order to securely maintain the switching position.
12 Note that manual pin operating pressure changes in accordance with tank line back pressure.
13 The series described in the table below are available for use as RSS and RIS Series solenoid control relief valves.

RSS-***-AR*-(H)-**-$^{15}_{23}$ RIS-***-AR*-(H)-**-21	SS-G01-AR-R-**-31
RSS-***-AQ*-(H)-**-$^{15}_{23}$ RIS-***-AQ*-(H)-**-21	SS-G01-A3X-R-**-31
RSS-***-*-F(H)-**-$^{15}_{23}$	SS-G01-A8X0-R-**-31
RIS-***-*-F-**-21	SS-G01-A3X-R-**-31

14 The coil surface temperature increases if this valve is kept continuously energized. Install the valve so there is no chance of it being touched directly by hand.
15 Use the following table for specification when a sub plate is required.

Model No.	Pipe Diameter	Maximum Working Pressure psi	Recommended Flow Rate gpm	Weight lbs	Applicable Valve Type
MSA-01X-E10	1/4	3625	5.2	1.2	SS-G01-**-R-**-31
MSA-01Y-E10	3/8		10.4		
MS-03-E30	3/8		11.8	2.3	SS-G03-**-R-**-22
MS-03X-E30	1/2		21.1		

• Solenoid Assembly Specifications

Solenoid Type	Power Supply Type	Voltage (V)	Frequency (Hz)	For SS-G01					For SS-G03				
				Solenoid Coil Type	Drive Current (A)	Holding Current (A)	Holding Power (W)	Allowable Voltage Range (V)	Solenoid Coil Type	Drive Current (A)	Holding Current (A)	Holding Power (W)	Allowable Voltage Range (V)
AC	C1	AC100	50	EDC64-C1	2.2	0.52	25	80 to 110	ECB64-C1	5.4	0.92	36.0	80 to 110
			60		2.0	0.38	22	90 to 120		4.6	0.62	34.0	90 to 120
		AC110	60		2.2	0.46	28			5.0	0.78	42.0	
	C115	AC110	50	EDC64-C115	2.0	0.47	25	90 to 120	ECB64-C115	5.0	0.85	36.0	90 to 120
			60		1.8	0.35	22	100 to 130		4.2	0.57	34.0	100 to 130
		AC115	60		2.0	0.42	28			4.6	0.72	42.0	
	C2	AC200	50	EDC64-C2	1.1	0.26	25	160 to 220	ECB64-C2	2.7	0.46	36.0	160 to 220
			60		1.0	0.19	22	180 to 240		2.3	0.31	34.0	180 to 240
		AC220	60		1.1	0.23	28			2.5	0.39	42.0	
	C230	AC220	50	EDC64-C230	1.0	0.24	25	180 to 240	ECB64-C230	2.5	0.42	36.0	180 to 240
			60		0.91	0.17	22	200 to 260		2.1	0.29	34.0	200 to 260
		AC230	60		1.0	0.21	28			2.3	0.36	42.0	
DC with Built-in Rectifier	E1	AC100	50/60	EDC64-E1-1A	0.31		27	90 to 110	ECB64-E1	0.40		34.0	90 to 110
	E115	AC110	50/60	EDC64-E115-1A	0.26		25	100 to 125	ECB64-E115	0.33		31.0	100 to 125
		AC115			0.27		27			0.34		34.0	
	E2	AC200	50/60	EDC64-E2-1A	0.15		26	180 to 220	ECB64-E2	0.22		37.0	180 to 220
	E230	AC220	50/60	EDC64-E230-1A	0.12		24	200 to 250	ECB64-E230	0.16		30.0	200 to 250
		AC230			0.13		27			0.17		33.0	
DC	D1	DC12		EDC64-D1-1A	2.2		26	10.8 to 13.2	ECB64-D1	2.6		31.0	10.8 to 13.2
	D2	DC24		EDC64-D2-1A	1.1		26	21.6 to 26.4	ECB64-D2	1.5		36.0	21.6 to 26.4

Understanding Model Numbers

SS – G 03 – A 3 X – * R – C2 – E22

Design number
E31: 01 size; 10 - 24 mounting bolt
E22: 03 size; 1/4 - 20 mounting bolt

Power supply
C: AC (50/60Hz) C1=AC100V C115=AC110V C2=AC200V C230=AC220V
D: DC D1=DC12V D2=DC24V
E: AC (Built-in rectifier; 50/60Hz) E1=AC100V E115=AC115V E2=AC200V E230=AC230V

With indicator light

Auxiliary symbol (Can be combined in alphabetic sequence.)
F: Shockless type (Available with power supply D*, E)
G: Surgeless type (Available with power supply C*, D*)
N: With manual push-button
Q: Quick return type (Available with power supply E*)

Transition Flow Path (Specify for A2X, H2X, E2X, A3X, H3X, E3X, A3Z, H3Z, E3Z, C7Y only.)

X	Y	Z
Closed	Semi-open	Open

Center position

0	1	2	3	4	5
6	7	8	9	1S	6S

Note 1: P=Pressure port; A and B=Connection port to cylinder, etc.; T=Connection port to tank

Operation Method

A	H	C	E
Spring Offset		Spring Center	Detent

Nominal diameter
01 size (D03)
03 size (D05)

Mounting method
G: Cascade mounting

Wet type solenoid operated directional control valve

Options

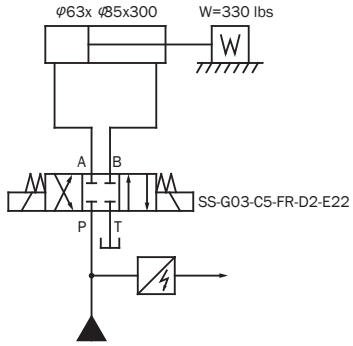
(Auxiliary Symbol Explanations)

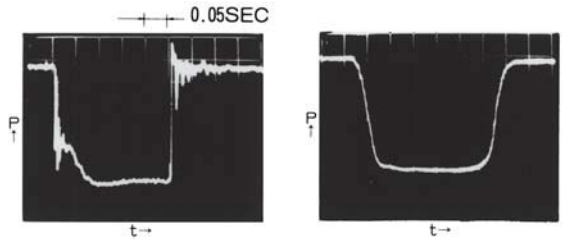
Shockless Type (Auxiliary Symbol: F)

Switching Response Characteristics

The pressure waveforms for each valve in the hydraulic circuit shown below are shown at the bottom of this block.

Opening and closing of a dry type valve generates shock (noise) and pipe vibration due to the sudden drop or rise in pressure. With a shockless solenoid valve, pressure fluctuation when the valve is opened or closed is smoothened, which eliminates shock (noise) and pipe vibration.

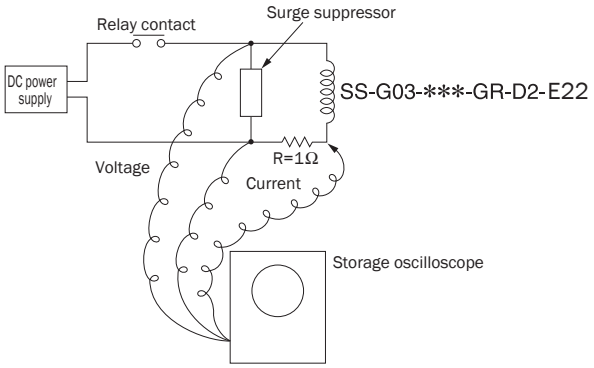


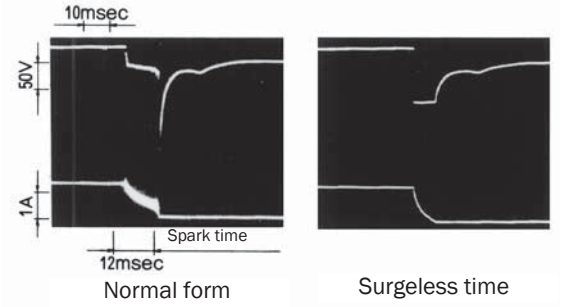


Dry type　　Shockless type

Surgeless Type (Auxiliary Symbol: G)

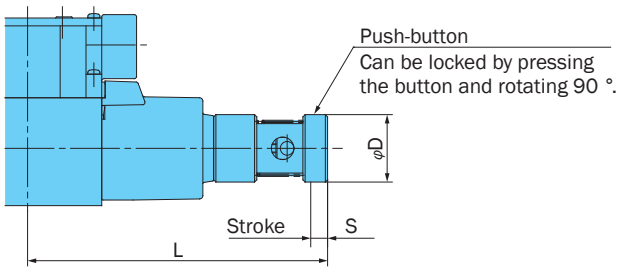
The surge pressure waveforms when the DC solenoid valve power supply is opened and closed by a relay are shown at the bottom of this block. A built-in surge absorber element eliminates sparking and surge pressure.





Normal form　　Surgeless time

Manual Button Type (Auxiliary Symbol: N)



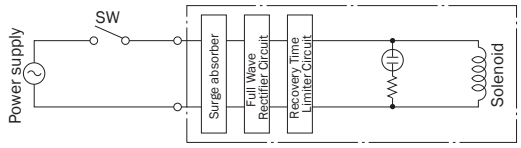
Part No.		L	S	D
EDB14-D-1A	AC Solenoid	133.5	7.5	30
EDB14-A	DC Solenoid	140.5		
ECB14-A	AC Solenoid	155.5	9.5	35
ECB14-D	DC Solenoid	173.5		

Quick Return (Auxiliary Symbol: Q)

• Handling

1. This type is used in the case of power supply type E* (with built-in rectifier) to shorten the spring return time. This also applies to D*.

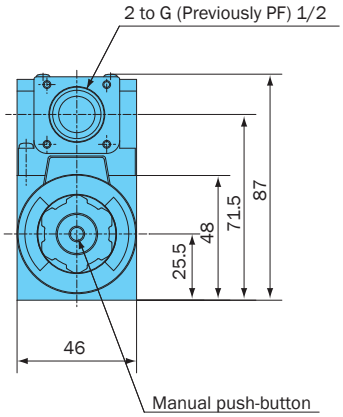
2. Quick return device is built-in to central terminal box.

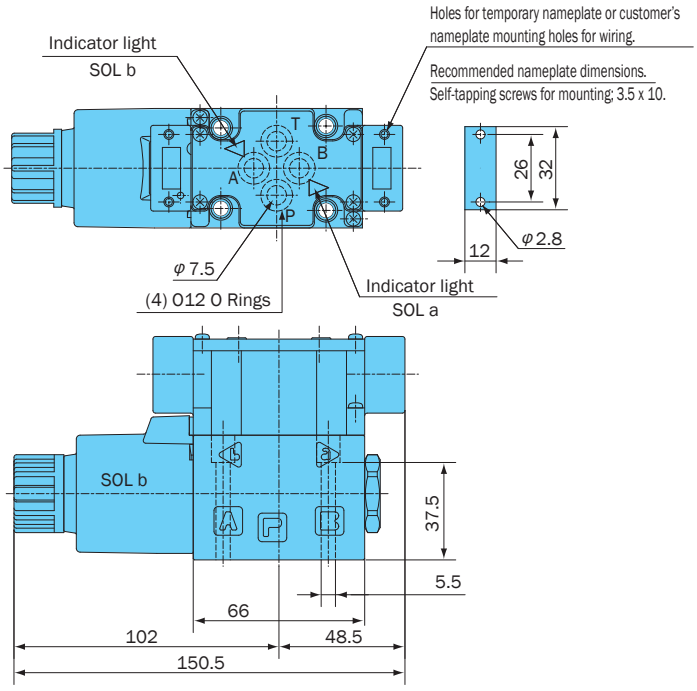


Installation Dimension Drawings

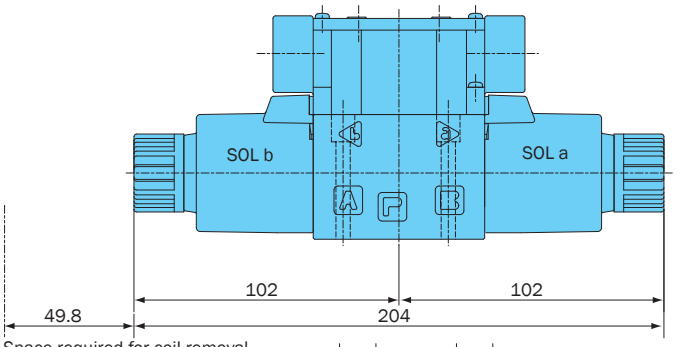
AC Solenoid
SS-G01-A**-R-C*-31
SS-G01-H**-R-C*-31

Note)
SS-G01-H**-R**-31
The solenoid is on the opposite side of that shown for SOLa in the illustrations shown here.

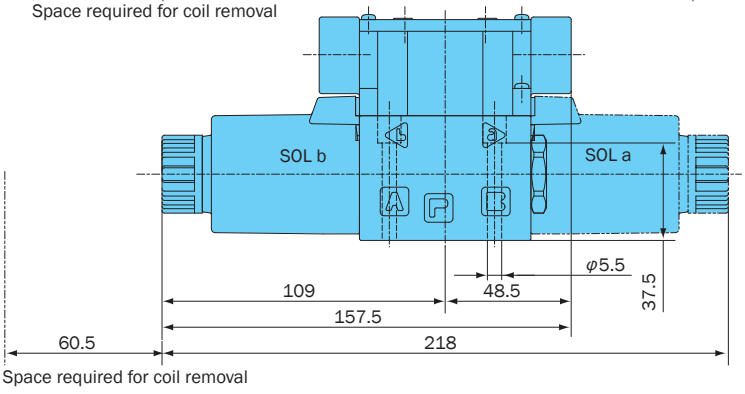




SS-G01-C **-R-C*-31
SS-G01-E **-R-C*-31



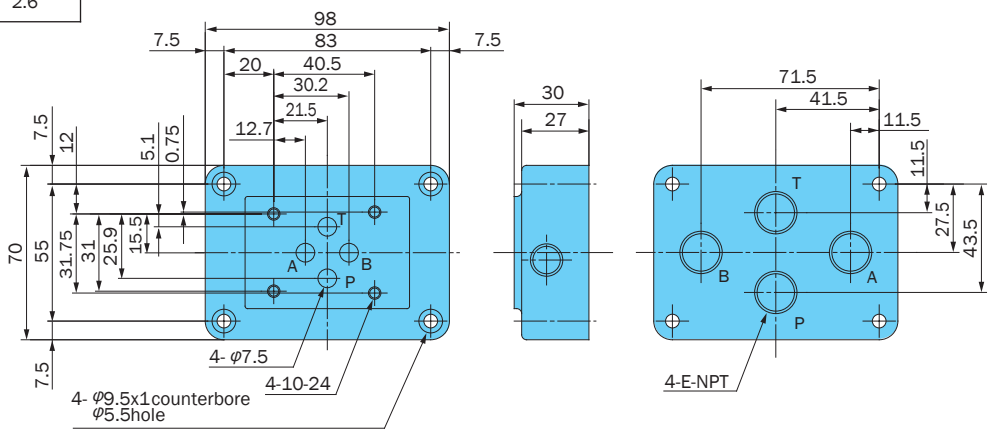
DDC Solenoid and Rectifier
SS-G01-A **-R-D/E*-31
SS-G01-H **-R-D/E*-31
SS-G01-C **-R-D/E*-31
SS-G01-E **-R-D/E*-31



For sub plate SS-G01

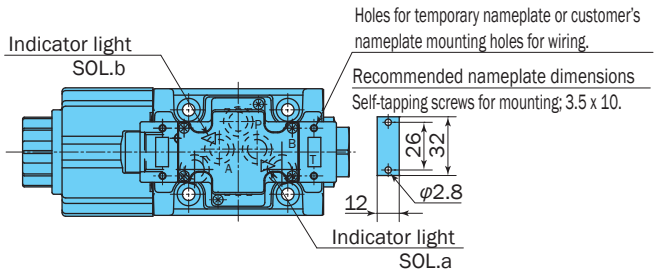
Model No.	E	Weight lbs
MSA-01X-E10	1/4	2.6
MSA-01Y-E10	3/8	2.6

Gasket Surface Dimensions
(ISO 4401-03-02-0-94
JIS B 8355 D-03-02-0-94)



Installation Dimension Drawings

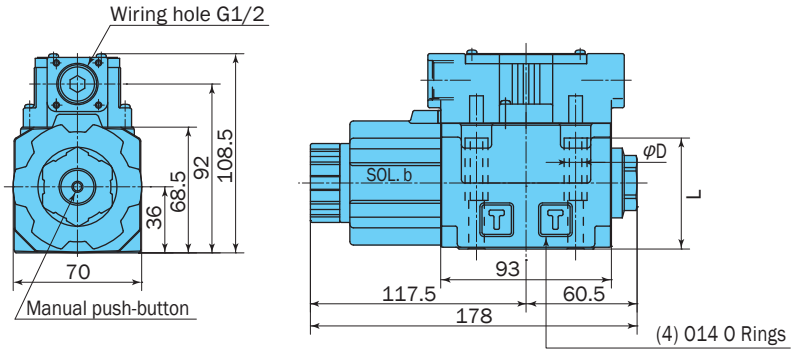
AC Solenoid
SS-G03-A**-R-C*-E22
SS-G03-H**-R-C*-E22



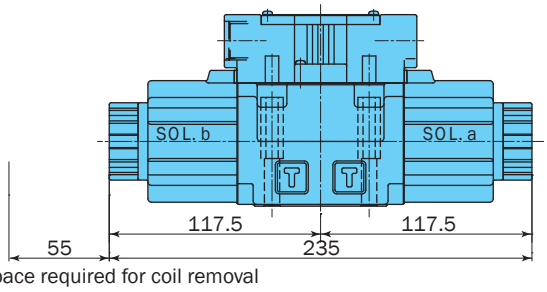
Note:
SS-G03-H**-R-**-E22
The solenoid is on the opposite side of that shown for SOLa in the illustrations shown here.

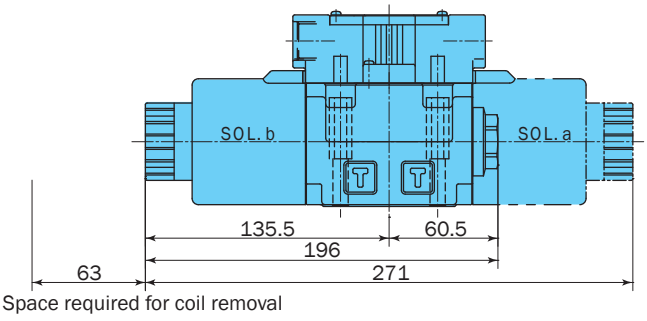
	SS-G03-**-*R-**-J22	SS-G03-**-*R-**-22
φD	φ6.8	φ8.5
L	60.5	58

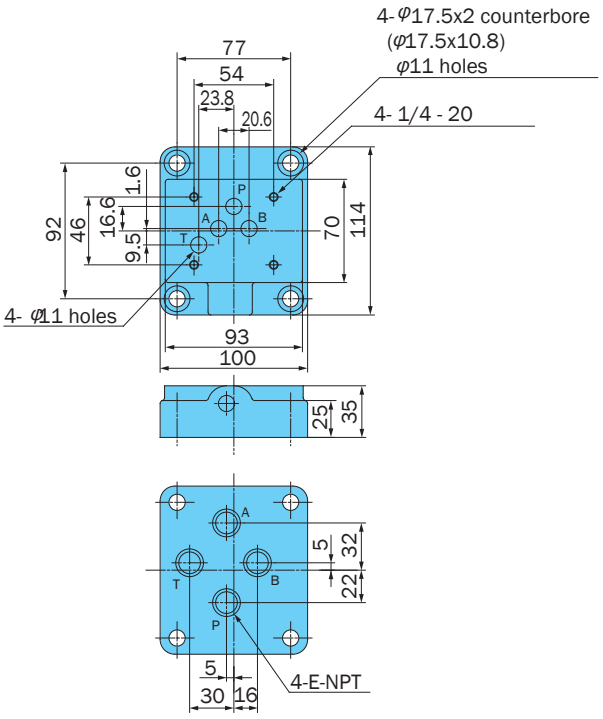
SS-G03-C**-R-C*-E22
SS-G03-E**-R-C*-E22



DC Solenoid and Rectifier
SS-G03-A **-R-D*/E*-E22
SS-G03-H **-R-D*/E*-E22
SS-G03-C **-R-D*/E*-E22
SS-G03-E **-R-D*/E*-E22





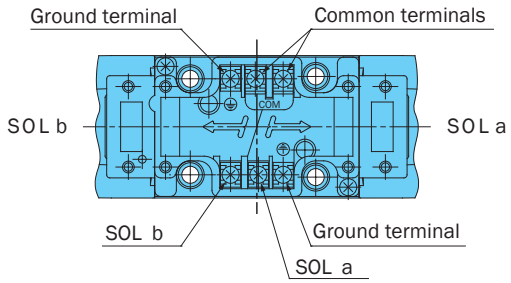


For sub plate SS-G03

Mounting bolt	Model No.	E	Weight lbs
1/4 - 20 x 2 3/4	MSA-03-E10	3/8	5.0
	MSA-03X-E10	1/2	

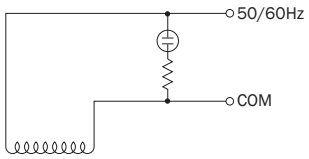
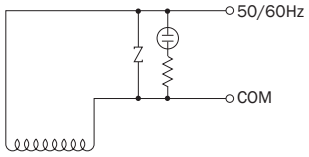
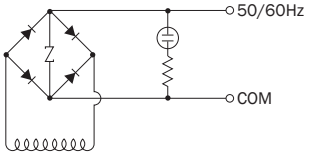
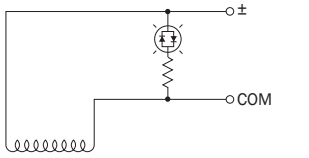
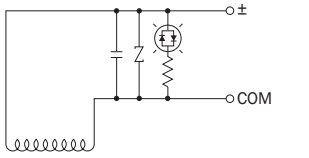
Gasket surface dimensions
(ISO 4401-05-04-0-94
JIS B 8355 D-05-04-0-94)

Wiring Diagram



Note:
1. In the case of a double solenoid valve, a common terminal is provided to simplify wiring. When the common terminal is not used, remove the terminal screws.
2. Use the ground terminal when grounding is required.
3. In the case of a solderless terminal, M3 screws.
4. Tighten terminal screws to a torque of 3.6 to 5 ft lbs.

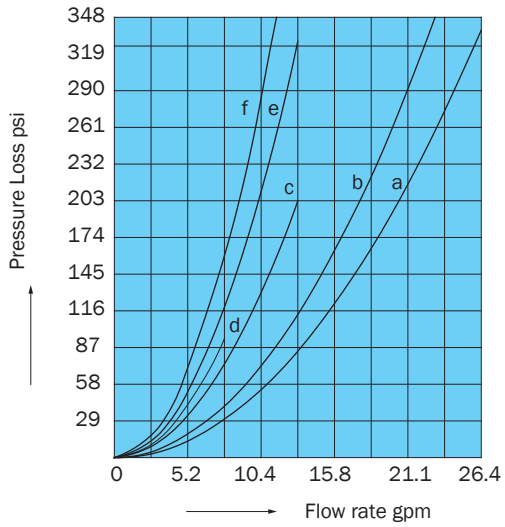
Electrical Circuit Diagram

Type	Model No.	Electrical Circuit
AC Solenoid	SS-$\frac{G01}{G03}$-***-R-C*-$\frac{31}{22}$	
AC Solenoid Surgeless Type	SS-$\frac{G01}{G03}$-***-GR-C*-$\frac{31}{22}$	
Built-in Rectifier	SS-$\frac{G01}{G03}$-***-R-E*-$\frac{31}{22}$	
DC Solenoid	SS-$\frac{G01}{G03}$-***-R-D*-$\frac{31}{22}$	
DC Solenoid Surgeless Type	SS-$\frac{G01}{G03}$-***-GR-D*-$\frac{31}{22}$	
Built-in Rectifier Quick Return Type	SS-$\frac{G01}{G03}$-***-QR-E*-$\frac{31}{22}$	See page D-7 for more information.

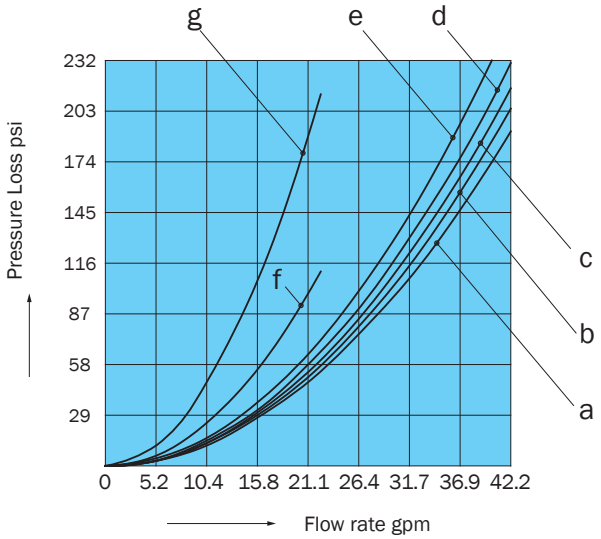
Performance Curves

Hydraulic Operating Fluid Viscosity 32 centistokes

Pressure Loss Characteristics



Pump Type	Flow Path	P/ A	P/ B	A/ T	B/ T	P/ T
SS-G01	A2X, H2X, E2X	d	d	–	–	–
	A3X, H3X	b	b	b	b	–
	E3X	b	b	b	b	–
	A3Z, H3Z, E3Z	a	a	a	a	–
	A4, H4, C4	a	a	a	a	a
	A5, H5, C5, C6S	b	b	b	b	–
	C1, C1S	b	b	a	b	–
	C2	a	b	b	b	–
	C6	b	b	a	a	–
	C7Y	f	f	e	e	c
	C8	a	f	b	e	c
	C9	a	a	b	b	–



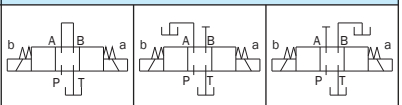
Pump Type	Flow Path	P/ A	P/ B	A/ T	B/ T	P/ T
SS-G03	A2X, H2X, E2X	e	e	–	–	–
	A5	–	c	c	–	–
	H5	c	–	–	c	–
	A3X, H3X, E3X	c	c	d	d	–
	A3Z, H3Z	a	a	d	d	–
	E3Z	b	b	a	a	–
	C1	c	c	a	c	–
	C2	a	c	c	c	–
	A4, H4, C4	a	a	a	a	a
	C5, C1S, C6S	c	c	c	c	–
	C6	c	c	a	a	–
	C7Y	g	g	g	g	f
	C8	a	g	a	g	f
	C9	a	a	c	c	–

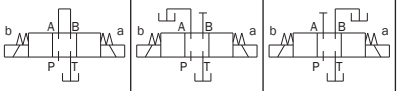
Switching Response Time

Model No.	Response Time (sec)		Measurement Conditions
	Solenoid ON	Spring Return	
SS-G01-**-R-C*-E31	0.02 to 0.03	0.02 to 0.03	2030 psi 7.9 gpm
SS-G01-**-(G)R-D*-E31	0.03 to 0.04	0.02 to 0.04	
SS-G01-**-R-E*-E31	0.03 to 0.04	0.07 to 0.10	
SS-G01-**-F(G)R-D*-E31	0.07 to 0.10	0.04 to 0.07	
SS-G01-**-FR-E*-E31	0.07 to 0.10	0.10 to 0.15	
SS-G03-**-R-C*-E22	0.02 to 0.03	0.02 to 0.03	2030 psi 18.4 gpm
SS-G03-**-(G)R-D*-E22	0.06 to 0.09	0.03 to 0.05	
SS-G03-**-R-E*-E22	0.07 to 0.10	0.10 to 0.15	
SS-G03-**-F(G)R-D*-E22	0.13 to 0.15	0.08 to 0.15	
SS-G03-**-FR-E*-E22	0.10 to 0.15	0.15 to 0.20	

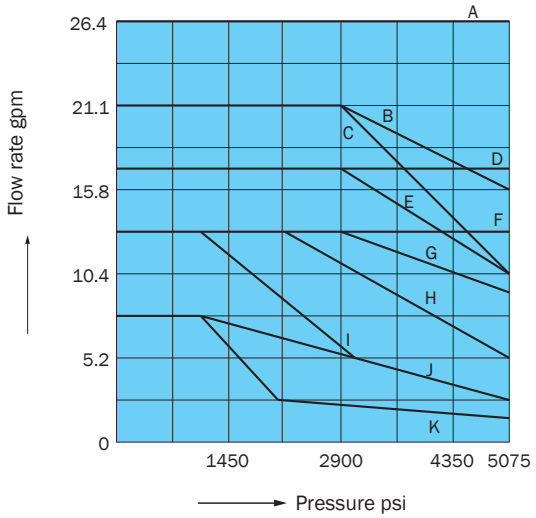
Note: 1.The switching response time changes slightly with operating conditions (pressure, flow rate, viscosity, etc.)
2. In the case of power supply type E* (with built-in rectifier), the spring return time using Quick Return (option symbol: Q) is the same as D*.

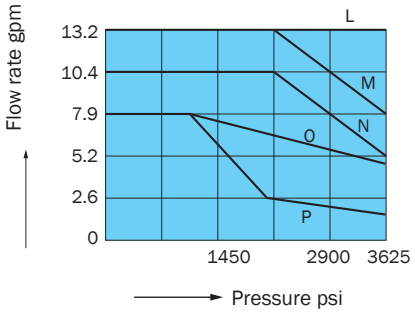
Pressure – Flow Volume Allowable Value

Size	Standard Form, with AC, DC solenoid SS-G01-**-R-**-31		
Operation Example / Operation Symbol			
A2X, H2X	–	K	K
E2X	–	J	J
A3X, H3X	B	K	K
E3X	A	J	J
A3Z, H3Z	D	D	D
E3Z	D	D	D
A5	A	–	I
H5	A	I	–
C1, C6	Note1) C(E)	I	I
C1S, C5, C6S	A	I	I
C2, C9	A	K	K
A4	F	F	F
H4	F	F	F
C4	F	F	F
C7Y, C8	Note2) G(H)	K	K

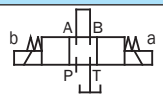
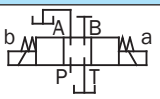
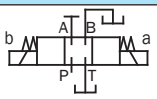
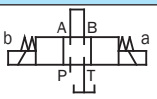
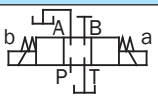
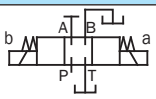
Size	Shockless Type, with DC solenoid SS-G01-**-FR-**-31		
Operation Example / Operation Symbol			
A2X, H2X	–	P	P
E2X	–	O	O
A3X, H3X	L	P	P
E3X	L	O	O
A3Z, H3Z	L	L	L
E3Z	L	L	L
A5	L	–	P
H5	L	P	–
C1, C6	M	P	P
C1S, C2, C5, C6S, C9	L	P	P
A4, H4	L	L	L
C4	L	L	L
C7Y, C8	N	P	P

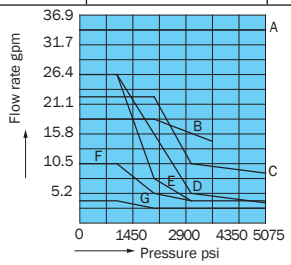
Note: 1.Letter in parentheses is for AC solenoid.
2.Letter in parentheses is for solenoid with built-in rectifier (E*), but without Quick Return, and for DC solenoid (D*) with surge voltage absorbing diode on the electrical circuit.

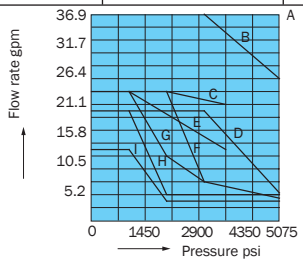


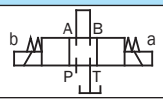
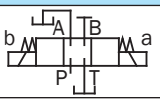
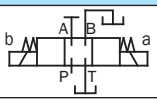


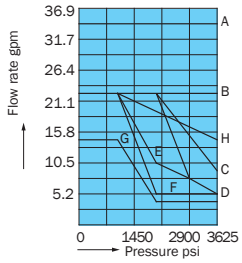
Pressure – Flow Volume Allowable Value

Model No.	Standard Form, with AC Solenoid			Standard Form, with DC Solenoid		
		SS-G03-**-R-C*-E22			SS-G03-**-R-**-E22	
Operation Example / Operation Symbol						
A2X	–	F	E		G	H
H2X	–	E	F		H	G
E2X	–	C	C		D	D
A3X	A	E	E	A	F	H
H3X	A	E	E	A	H	F
A3Z	A	A	C	A	D	D
H3Z	A	C	A	A	D	D
E3X, E3Z	A	C	C	A	D	D
A5	A	–	D	A	–	G
H5	A	D	–	A	G	–
C1S, C5, C6S	A	D	D	A	G	G
C1, C6	A	D	D	B	G	G
C2	A	G	D	A	I	G
A4, H4, C4	A	A	A	A	A	A
C9	A	G	G	A	I	I
C7Y, C8	B	B	B	Note1) C(E)	C(E)	C(E)





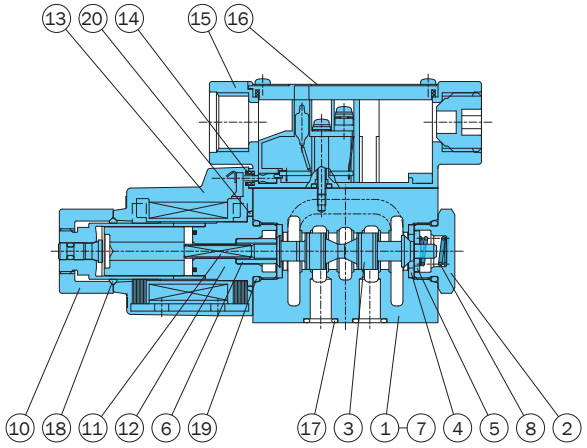
Model No.	Shockless Type, with DC solenoid		
	SS-G03-**-FR-**-E22		
Operation Example / Operation Symbol			
A2X	–	E	F
H2X	–	F	E
E2X	–	C	C
A3X	A	D	F
H3X	A	F	D
A3Z	A	C	C
H3Z	A	C	C
E3X, E3Z	A	C	C
A5	A	–	E
H5	A	E	–
C1, C1S, C5, C6, C6S	A	E	E
C2	A	G	E
A4, H4, C4	A	A	A
C9	A	G	G
C7Y, C8	Note1) B(H)	B(H)	B(H)



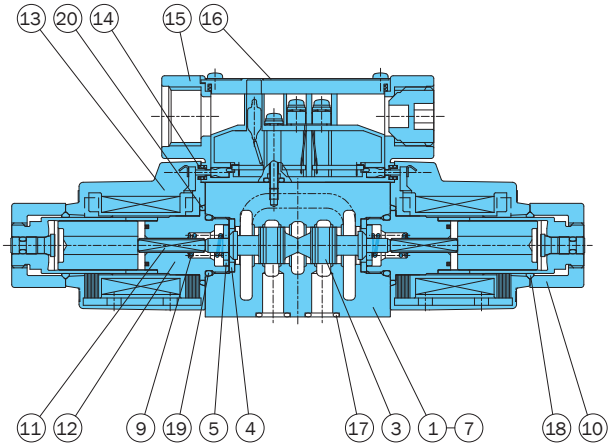
Note:
1. Letter in parentheses is for solenoid with built-in rectifier (E*), but without Quick Return, and for DC solenoid (D*) with surge voltage absorbing diode on the electrical circuit.
2. There is no shockless type for the AC solenoid (C*), so use a solenoid with built-in rectifier (E*) when shockless operation is required with an AC power supply.
3. The maximum flow rate is the allowable value of each port.

Cross-sectional Drawing

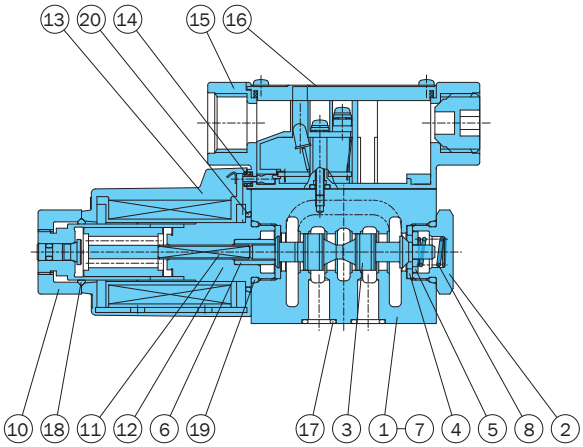
SS-G01-A**-R-C*-31



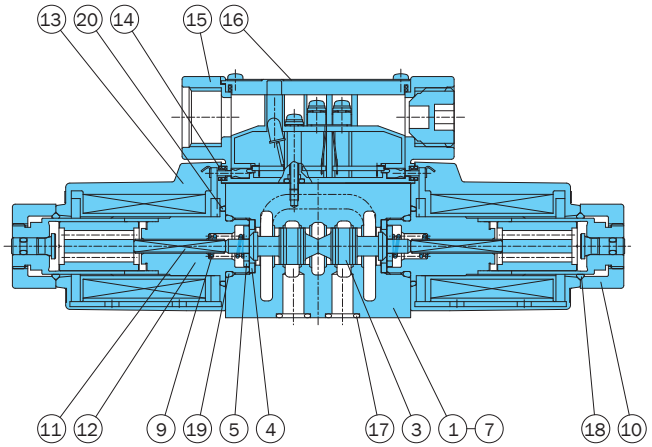
SS-G01-C**-R-C*-31



SS-G01-A**-R-D/E*-31



SS-G01-C**-R-D/E*-31



List of Sealing Parts

Part No.	Part Name	Part Number	Q'ty	
			Single Solenoid	Double Solenoid
17	O-ring	AS568-012(Hs90)	4	4
18	O-ring	1A-P20	1	2
19	O-ring	1B-P18	2	2
20	O-ring	S-25	1	2

Note: 1A and 1B are JIS Standard B 2401, while AS568 is SAE standard.

Seal Kit Number

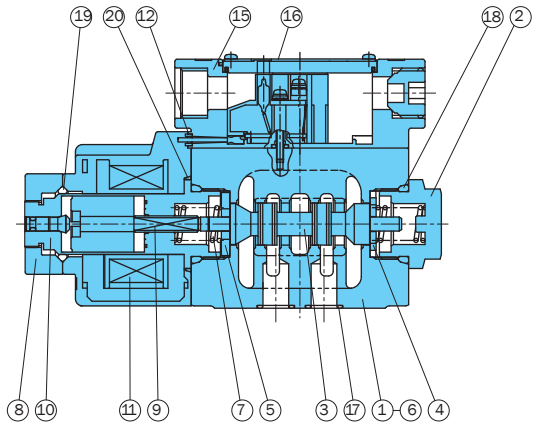
Single Solenoid	Double Solenoid
EDCS-A	EDCS-C

Part No.	Part Name
1	Body
2	Plug
3	Spool
4	Retainer A
5	Retainer B
6	Retainer C
7	Spacer
8	Spring A
9	Spring C
10	Nut

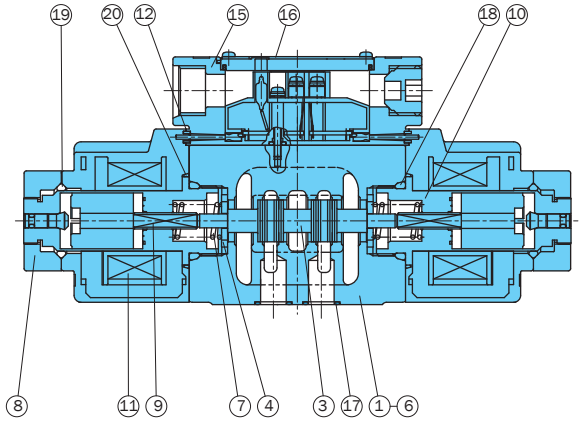
Part No.	Part Name
11	Rod
12	Solenoid guide
13	Solenoid coil
14	Packing
15	Terminal box kit
16	Nameplate
17	O-ring
18	O-ring
19	O-ring
20	O-ring

Cross-sectional Drawing

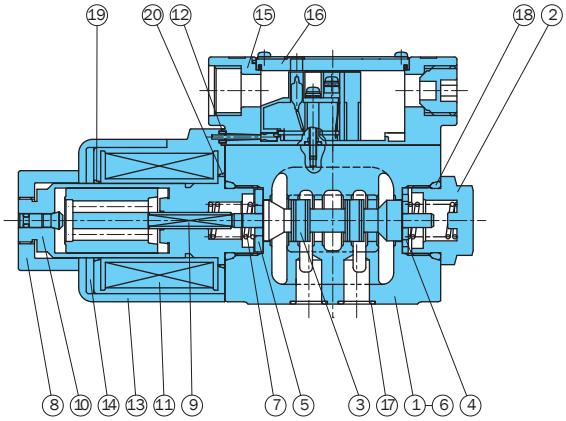
SS-G03-A**-R-C*-E22



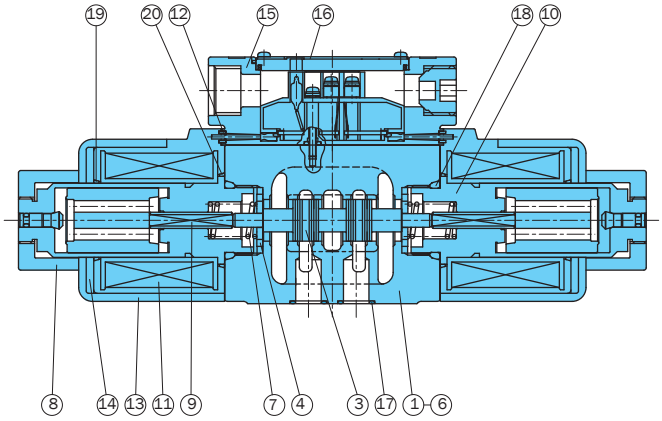
SS-G03-C**-R-C*-E22



SS-G03-A**-R-D/E*-E22



SS-G03-C**-R-D/E*-E22



List of Sealing Parts

Part No.	Part Name	Type/Part Number		Q'ty	
		AC SOL.	DC SOL.	Single Solenoid	Double Solenoid
17	O-ring	AS568-014(Hs90)		5	5
18	O-ring	1B-P28		2	2
19	O-ring	1A-P26	AS568-026	1	2
20	O-ring	AS568-029		2	2

Note: 1A and 1B** indicate JIS Standard B 2401-1A/1B-**.

Seal Kit Number

AC SOL.		DC SOL.	
Single Solenoid	Double Solenoid	Single Solenoid	Double Solenoid
ECBS-AA	ECBS-CA	ECBS-AD	ECBS-CD

Part No.	Part Name
1	Body
2	Plug
3	Spool
4	Retainer
5	Retainer B
6	Spacer
7	Spring
8	Nut
9	Rod
10	Solenoid guide
11	Solenoid coil
12	Packing B
13	Coil case

Part No.	Part Name
14	Coil yoke
15	Terminal box kit
16	Nameplate
17	O-ring
18	O-ring
19	O-ring
20	O-ring