

SE Series Lower Power Solenoid Valve

10.5 to 15.8 gpm
1450 to 2320 psi

Features

Low current, low power

The SE series magnetic switching valve's solenoid has significantly lower power consumption.

Directly drivable by a programmable controller

Low-current operation means not only allows direct drive by a programmable controller (PC) output circuit, it also enables the use of a compact and simple control circuit.

Little coil temperature rise

Low power operation means there is little heat generated from the coil, which minimizes the effects of heat on mechanisms. Even with the AC solenoid, there is little chance of coil burnout.

With M12-4 pin connector (option)

Makes it easier to interface with open networks like Device Net. This connector streamlines wiring work. The diode for

preventing current back surge is built in to the terminal box to protect the slave unit connection. (With M12-4 pin connector)

Global compliance (G01 size)

Meets overseas safety standards TÜV (CE marking). Can be used safely around the world.

Specifications

Operation Symbol	JIS Symbol	SE-G01-**-*(G)R-**-40		SE-G03-**-GR-**-*(J) 30	
		Rated Flow Rate - Maximum Flow Rate gpm	Maximum Working Pressure psi	Rated Flow Rate - Maximum Flow Rate gpm	Maximum Working Pressure psi
A2X		7.9	2320	10.5	1450
A3X				13.2	
H3X		10.5		—	
E3X		7.9		13.2	
C4				15.8	
C5		10.5			
C6					

Note: The maximum flow rate of each valve depends on the pressure. For details, see page D-32.

• Handling

- 1 In order to realize the full benefits of the solenoid valve, configure piping so oil is constantly supplied to the T(DR) port.
- 2 Ensure that surge pressure in excess of the maximum allowable back pressure can be accidentally at 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 Be sure to note the allowable pressure range of the coil being used.
- 7 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.
- 8 When using a detent type (E3X), provide constant energization when secure maintenance of the switching position is required.
- 9 Note that manual pin operating pressure changes in accordance with tank line back pressure.
- 10 If you do not select the option with the M12-4 pin connector, current back surge may occur because there is no solenoid in the central terminal box. Therefore, install solenoid valves to protect against current back surge on both ends of the coil in the output circuit of the programmable controller (PC) if directly operating the solenoid valves.

Solenoid Assembly Specifications

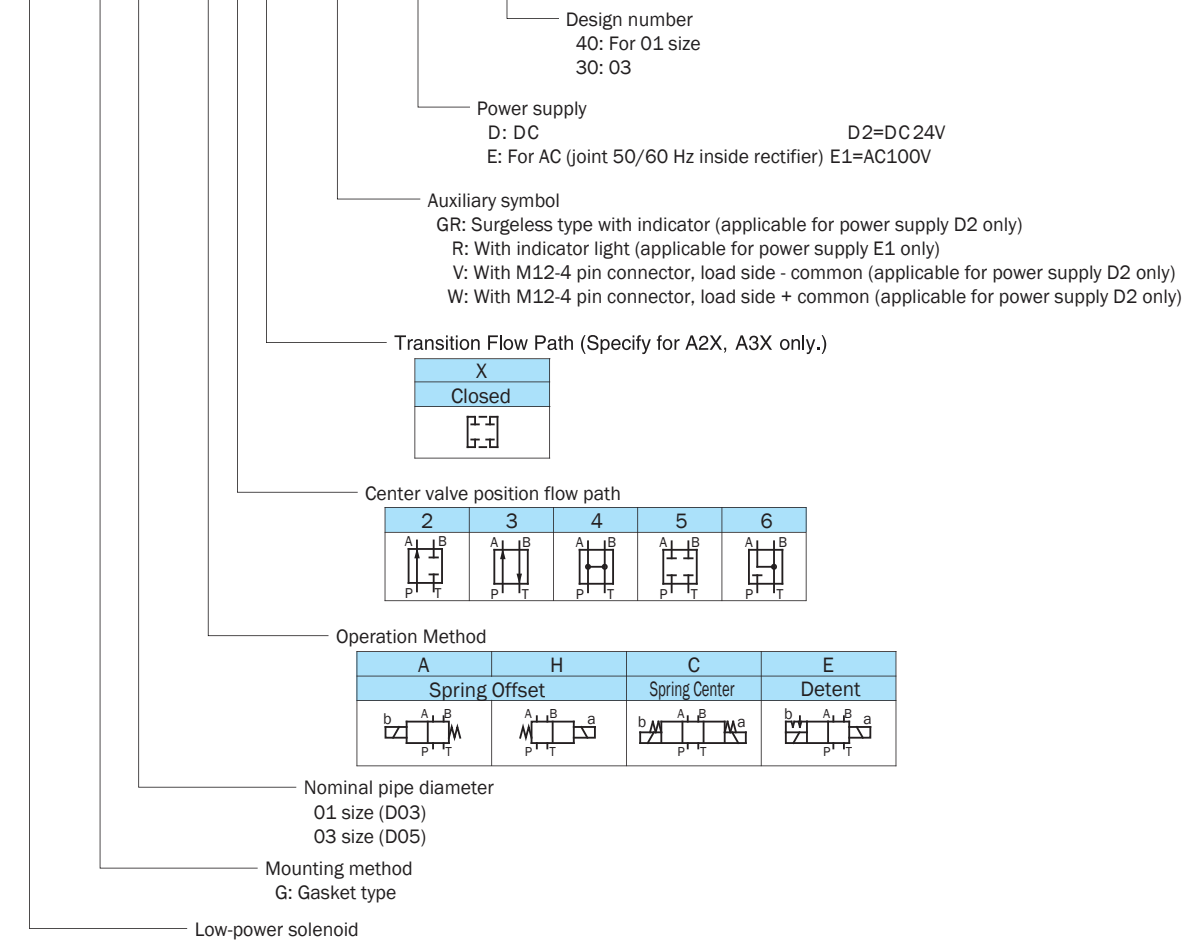
Solenoid Type	Power Supply Type	Voltage (V)	Frequency (Hz)	For SE-G01				For SE-G03			
				Solenoid Coil Type	Holding Current (A)	Holding Power (W)	Allowable Voltage Range (V)	Solenoid Coil Type	Holding Current (A)	Holding Power (W)	Allowable Voltage Range (V)
Built-in rectifier type AC	E1	AC100	50	EED64-E1	0.08	7.0	80 to 120	SLH1-03BR1-01	0.06	5.8	80 to 120
			60								
DC	D2	DC24	—	EED64-D2	0.2	4.8	21.6 to 26.4	SLH1-03BD2-01	0.2	4.8	21.6 to 26.4

Solenoid Type		SE-G01		SE-G03		
		DC Solenoid	Internal DC solenoid for rectifier	DC Solenoid	Internal DC solenoid for rectifier	
		D2	E1	D2	E1	
Maximum Working Pressure	P, A, B Ports	2320 psi		1450 psi		
Maximum Allowable Backpressure	T port	2320 psi		1450 psi (In the case of 290 psi operation symbol E3X)		
Changeover Frequency (per minute)		120		120		
Standard	Indicator light Surgeless	GR	R		GR	
Weight lbs	Double Solenoid	4.8		7.7		
	Single Solenoid	3.7		7.2		
Operating Environment	Dust Resistance/Water Resistance Rank	IP64 (Dust-tight, Splash proof)		IP65 (Dust-tight, Waterjet-proof)		
	Ambient Temperature	-4 to 122° F		14 to 122° F		
	Operating Fluid	Temperature Range	-4 to 158° F		32 to 149° F	
		Viscosity Range	15 to 300 centistokes			
		Filtration	10 microns or less			
Bundled Accessories	Mounting bolt	(4) 10-24 x 1 3/4 LG (not included)		1/4-20 UNC x 2 3/4		
	Tightening Torque	3.6 to 5 ft lbs		7.2 to 9.4 ft lbs		

Note: For mounting bolts, use grade 8 or equivalent.

Understanding Model Numbers

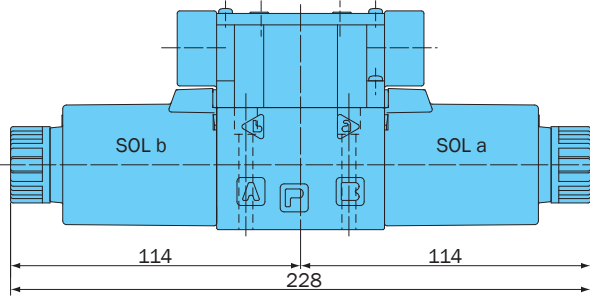
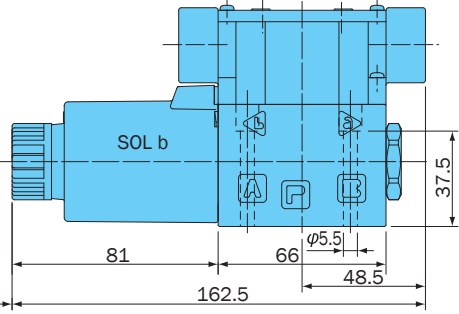
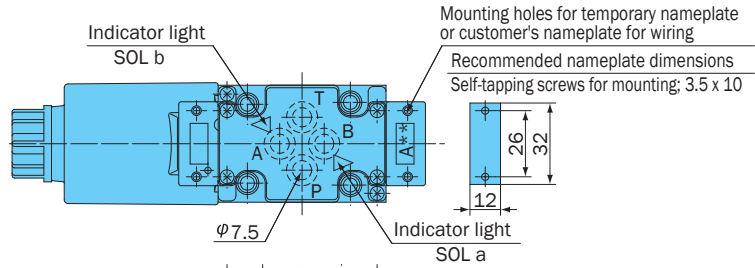
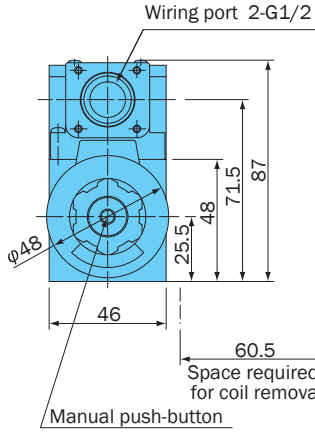
SE - G 03 - A 3 X - GR - C2 - J30



Installation Dimension Drawings

SE-G01-A***-(G)R-**-40
 SE-G01-H***-(G)R-**-40

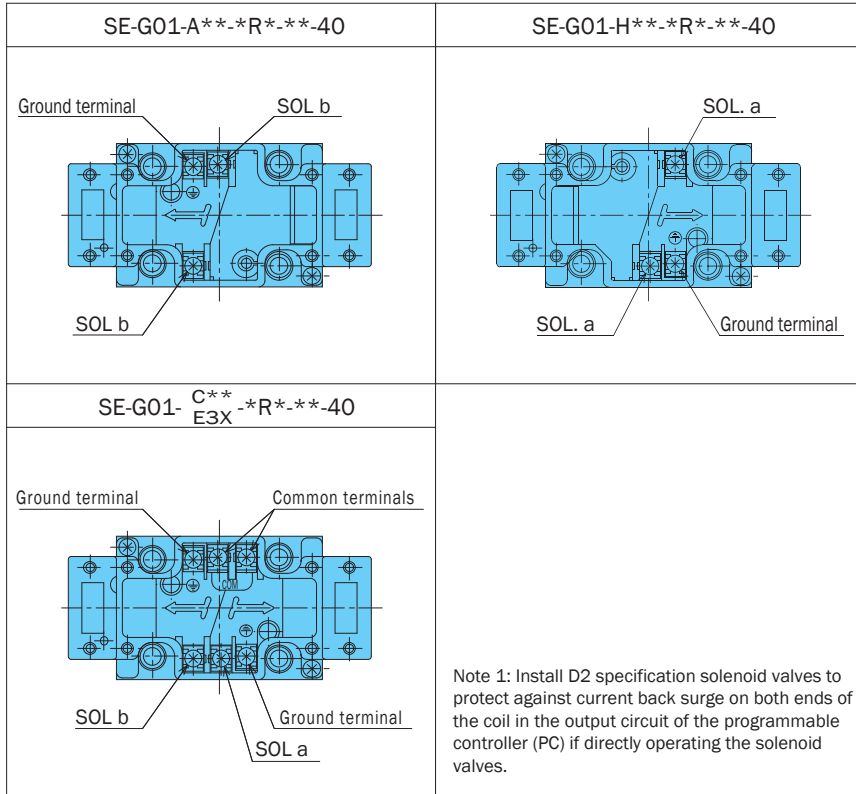
Note: For SE-G01-H*** (G) R ** 40, the solenoid is on the opposite side as that shown in the diagram (SOL.a).



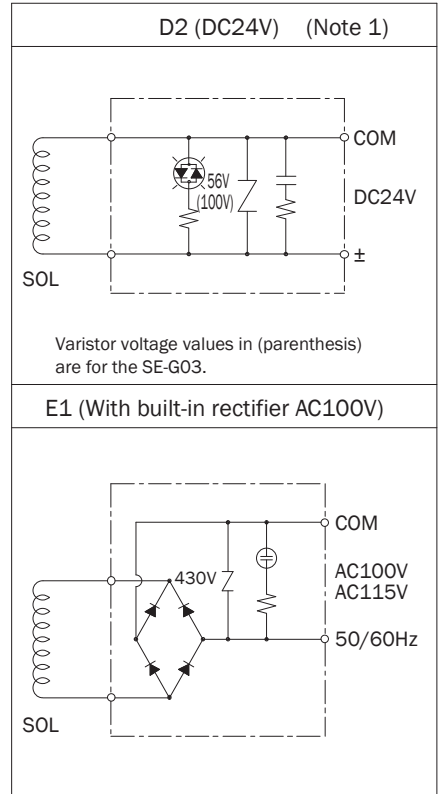
SE-G01-C**-(G)R-**-40
 SE-G01-E3X-(G)R-**-40

Note: Gasket surface dimensions and sub plate are the same as those for SS-G01. See page D-8 for more information.

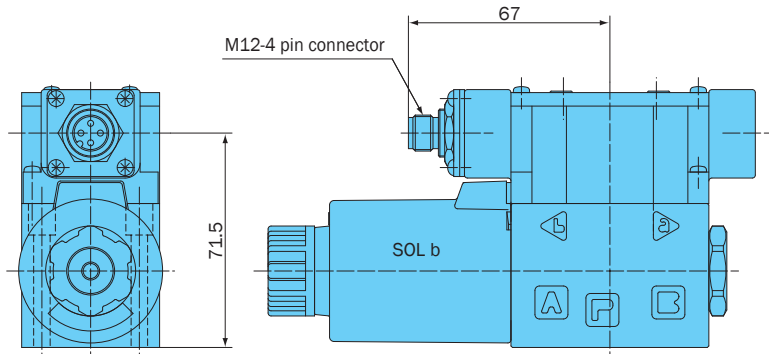
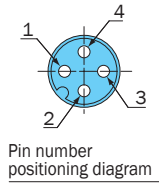
Wiring diagram for central terminal box kit



Electrical circuit diagram for central terminal box kit

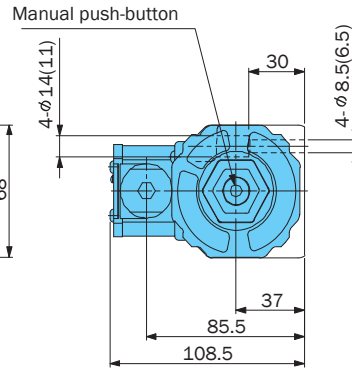
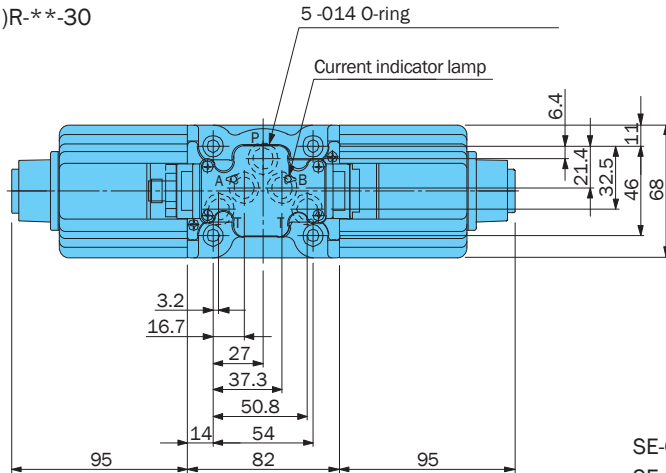


With M12-4 pin connector
 SE-G01-**-GRV-D2-40
 SE-G01-**-GRW-D2-40

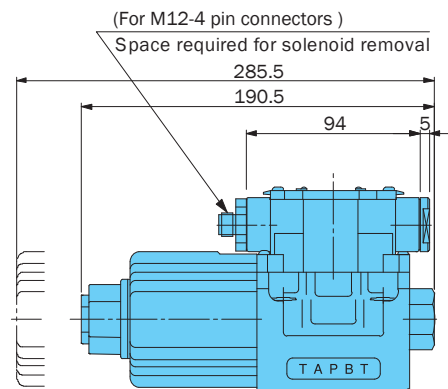
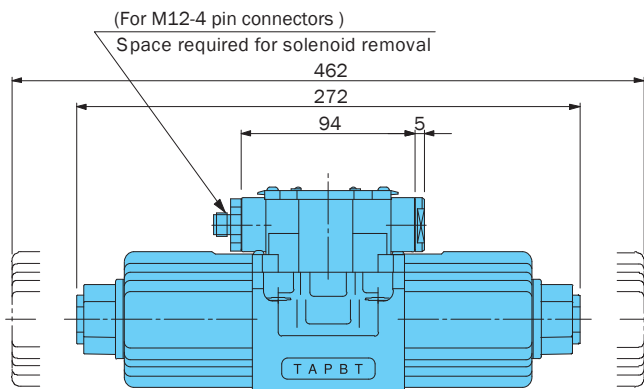


	M12-4 pin connector	Electrical Circuit Diagram
Type V	<p>1: Not used 2: SOL a 3: COM (-) 4: SOL b</p>	
Type W	<p>1: COM (+) 2: SOL a 3: Not used 4: SOL b</p>	

SE-G03-A**-(G)R**-30



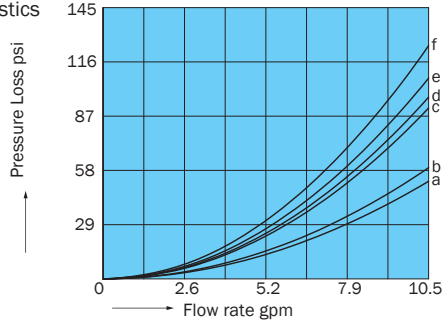
SE-G03-C*-(G)R**-30
 SE-G03-E3X-(G)R**-30



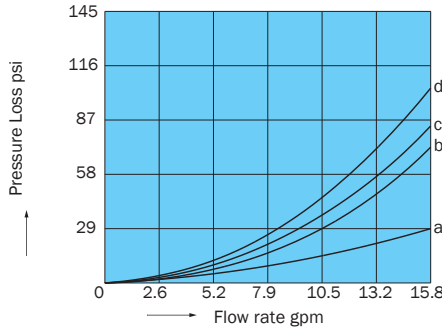
Performance Curves

Differential Hydraulic Fluid Viscosity 32 centistokes

Pressure Loss Characteristics



Pump Type	Flow Path	P/ A	P/ B	A/ T	B/ T	P/ T
SE-G01	A2X	d	f	—	—	—
	A3X	f	f	e	e	—
	H3X	f	f	e	e	—
	E3X	c	c	e	e	—
	C4	b	b	b	b	d
	C5	e	e	d	d	—
C6	f	f	a	a	—	



Pump Type	Flow Path	P/ A	P/ B	A/ T	B/ T	P/ T
SE-G03	A2X	d	d	—	—	—
	A3X	d	d	d	d	—
	E3X	d	d	c	c	—
	C4	c	c	a	a	b
	C5	d	d	d	d	—
	C6	d	d	b	b	—

Pressure - Flow Volume Allowable Value

Pump Type	SE-G01			SE-G03		
Operation Example						
Operation symbol						
A2X	—	D	D	—	E	A
A3X	A	D	D	C	E	A
H3X	A	D	D	—	—	—
E3X	A	C	C	D	D	C
C4	C	C	C	C	F	C
C5	A	D	D	A	B	B
C6	B	D	D	A	B	B

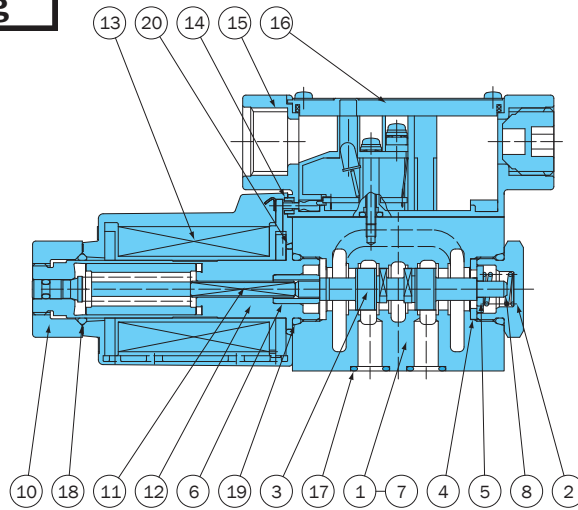
Flow rate (gpm)	Pressure (psi)	Port
10.5	145	A
7.9	116	B
5.2	87	C
2.6	58	D

Flow rate (gpm)	Pressure (psi)	Port
15.8	145	A
11.6	116	B
8.7	87	C
5.2	58	D
2.6	29	E

Note: 1.The maximum flow rate is the value when a rated 90%V is applied following solenoid temperature rise and saturation.
 2.The maximum flow rate is the allowable value of each port.

Cross-sectional Drawing

SE-G01-A3X-(G)R-**-40



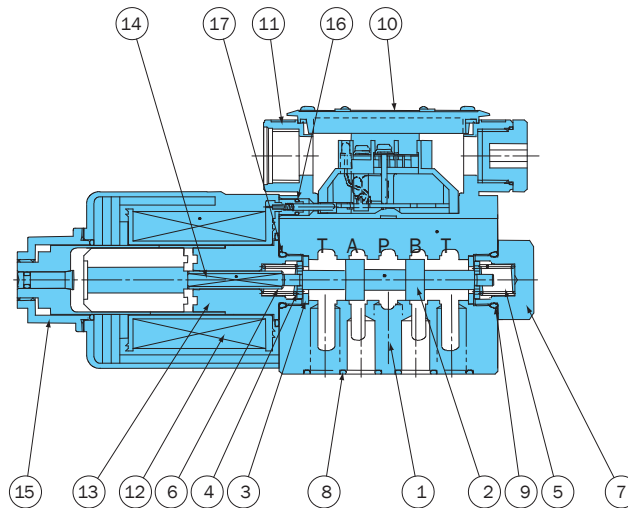
Part No.	Part Name
1	Body
2	Plug
3	Spool
4	Retainer A
5	Retainer B
6	Spring pin
7	Spacer
8	Spring A
9	Spring C
10	Nut
11	Rod
12	Solenoid guide
13	Solenoid coil
14	Packing
15	Terminal box kit
16	Nameplate
17	O-ring
18	O-ring
19	O-ring
20	O-ring

List of Sealing Parts

Part No.	Part Name	SE-G01		
		Part Number	Q'ty	
			Single Solenoid	Double Solenoid
17	O-ring	AS568-012(HS90)	4	4
18	O-ring	1A-P18	1	2
19	O-ring	1B-P18	2	2
20	O-ring	S-25	1	2

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

SE-G03-A3X-GR-**-*(J)30



Part No.	Part Name
1	Body
2	Spool
3	Spacer
4	Holder
5	Spring
6	Spring
7	Plug
8	O-ring
9	O-ring
10	Nameplate
11	Terminal box kit
12	Solenoid coil
13	Solenoid guide
14	Rod
15	Nut
16	O-ring
17	O-ring

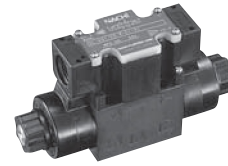
List of Sealing Parts

Part No.	Part Name	SE-G03		
		Part Number	Q'ty	
			Single Solenoid	Double Solenoid
8	O-ring	1B-P12	5	5
9, 17	O-ring	1B-P18	2	2
16	O-ring	1A-P3	2	4

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

Seal Kit Number

SE-G01		SE-G03	
Single Solenoid	Double Solenoid	Single Solenoid	Double Solenoid
EEDS-01A	EEDS-01C	EECS-03A	EECS-03C



**SL Series (Wiring System: Central Terminal Box)
Lower Power Solenoid Valve**

7.9 gpm
1015 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.

Low power consumption type.

The low power for the AC solenoid 9.6 W (60 Hz), DC solenoid 10 W contribute to energy conservation.

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.

Global support

Meets overseas safety standards (CE, UL, and CSA). It can be safely used anywhere in the world. Contact your agent for certified products.

Specifications

JIS Symbol	Operation symbol	Maximum flow rate gpm
	-A5-	7.9
	-H5-	
	-A3X-	
	-H3X-	
	-E3X-	
	-C1-	
	-C2-	

JIS Symbol	Operation symbol	Maximum flow rate gpm
	-C4-	7.9
	-C5-	
	-C6-	
	-C9-	
	-C6S-	3.9
	-C7Y-	

Solenoid Type		AC Solenoid		DC Solenoid	
		C1	C2	Built-in Rectifier E1	D2
Maximum Working Pressure	P.A.B. Ports	1015 psi			
Maximum Allowable Backpressure	T Port	1015 psi			
Changeover Frequency (per minute)		240		120	240
Standard	Indicator light	R			
Options	Surgeless	G		-	G
	With manual push-button	N			
	Quick Return	-		Q	-
Mass lbs	Double Solenoid	3.3		4.4	
	Single Solenoid	2.6		3.3	
Recommended	Ambient Temperature	-4 to 158° F			
	Viscosity Range	15 to 300 centistokes			
	Viscosity Index	90 or greater			
	Filtration	10 microns or less			
Mounting bolt		Allen head - 10-24 x 1 3/4 LG			
Tightening Torque		3.6 to 5 ft lbs			

Note: Mounting bolts are not included.

• 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. (contamination level: 12 or lower)

- 5 When using petroleum type operating fluid, use ISO VG 32, 46.
- 6 Use the SS series solenoid valve when using fire resistant hydraulic operating fluid.
- 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 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.

- 10 When using a detent type (3X), use constant energization in order to securely maintain the switching position.
- 11 Note that manual pin operating pressure changes in accordance with tank line back pressure.
- 12 Use the following table for specification when a sub plate is required.

Model No.	Pipe Diameter	Maximum flow rate gpm	Weight lbs
MSA-01X-E10	1/4	5.2	2.6
MSA-01Y-E10	3/8	10.5	

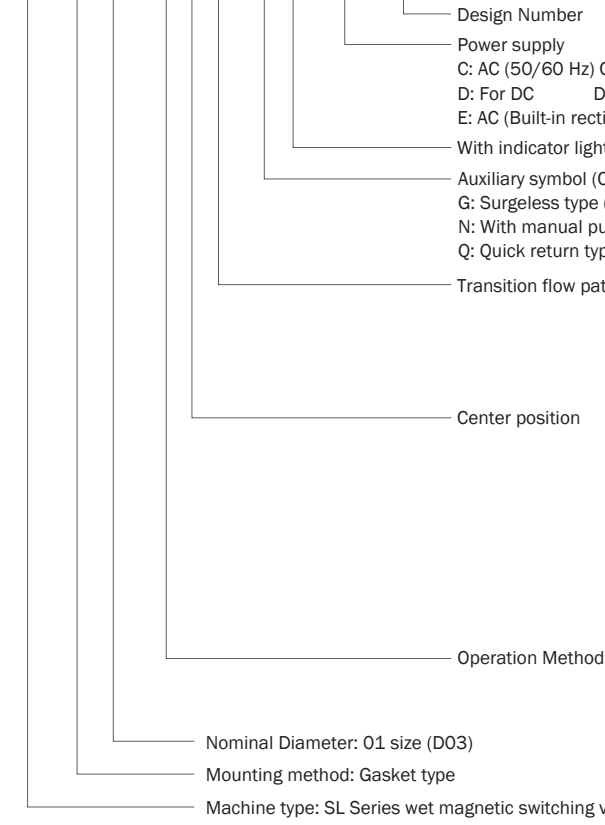
• Solenoid Assembly Specifications

Solenoid Type	AC Solenoid						DC Solenoid		
	C1			C2			Built-in Rectifier		
Power Supply Type	C1			C2			E1	D2	
Voltage (V)	AC100		AC110	AC200		AC220	AC100	DC24	
Cycles (Hz)	50	60	60	50	60	60	50/60	-	
For 01	Solenoid Coil Type	EL64-C1			EL64-C2			ELC64-E1-1A	ELC64-D2-1A
	Drive Current (A)	1.30	1.10	1.30	0.65	0.55	0.65	0.11	0.42
	Holding Current (A)	0.30	0.24	0.28	0.15	0.12	0.14		
	Holding Power (W)	12.0	9.6	12.2	12.0	9.6	12.2	10	10
	Allowable Voltage Range	80 to 110	90 to 120		160 to 220	180 to 240		90 to 110	21.6 to 26.4
Allowable Pressure psi	1000								
Insulator Resistance (M Ω)	100 or greater (500 V)								

- Note: 1. A DC solenoid surge absorption circuit is effective in preventing misoperation in sensitive relays and IC circuits. (Applicable for power supply display D", option: G)
 2. A DC solenoid RAC type (power supply E1) greatly increases the life of the contacts by eliminating contact arc without changing circuit sequence on an AC line, 50/60Hz can be used.

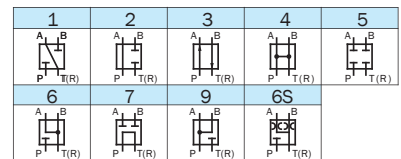
Understanding Model Numbers

SL - G 01 - A 3 X - ※ R - C2 - 31

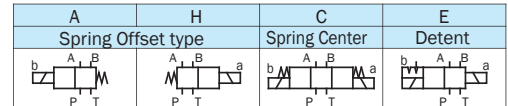


- Design Number
- Power supply
C: AC (50/60 Hz) C1 = AC100 V C2 = AC200 V
D: For DC D2 = DC24V
E: AC (Built-in rectifier; 50/60Hz) E1 = AC100V
- With indicator light
- Auxiliary symbol (Can be combined in alphabetic sequence.)
G: Surgeless type (Power supply C ※ D2 Applicable)
N: With manual push-button (Available with power supply D2, E1)
Q: Quick return type (Available with power supply E1)
- Transition flow path (A3X, H3X, E3X, C7Y only)

X	Y
Close	Semi-open



Note 1. P is pressure port, A and B are connection ports to cylinder. T (R) shows the connection port to the tank.



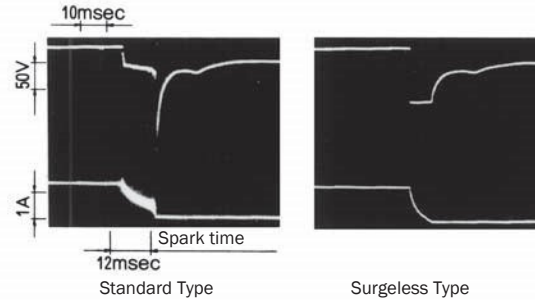
Options

(Auxiliary Symbol)

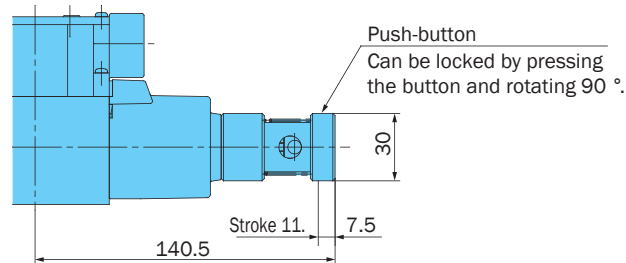
Surgeless Type (Auxiliary Symbol: G)

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.

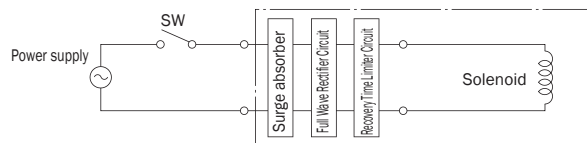
- Features
- ; Surge voltage is inhibited.
 - ; Sparking at relay contact points is eliminated.



Manual Push-button Type (Auxiliary symbol: N)



Quick Return Type (Auxiliary Symbol: Q)



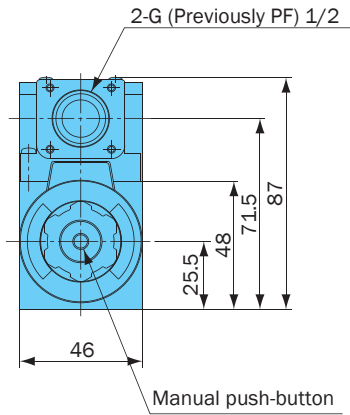
Handling

1. This type is used in the case of power supply type E1 (with built-in rectifier) to shorten the spring return time. This also applies to D2.
2. The quick return mechanism is built-in.

Installation Dimension Drawing

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

Note: The SL-G01-H**-R**-31 solenoid, is attached to the opposite side (SOL a) as shown in the diagram.



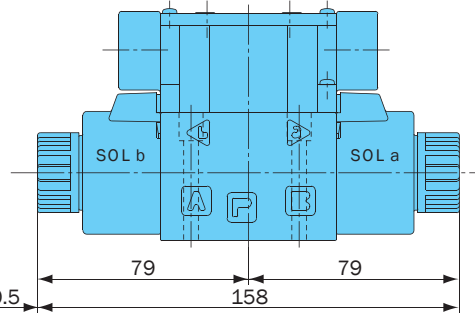
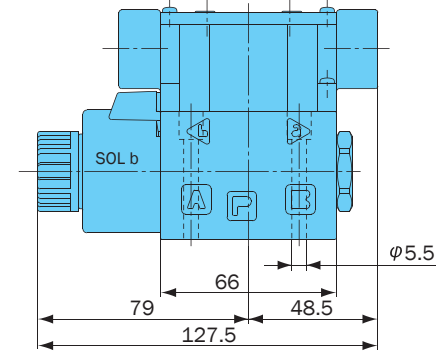
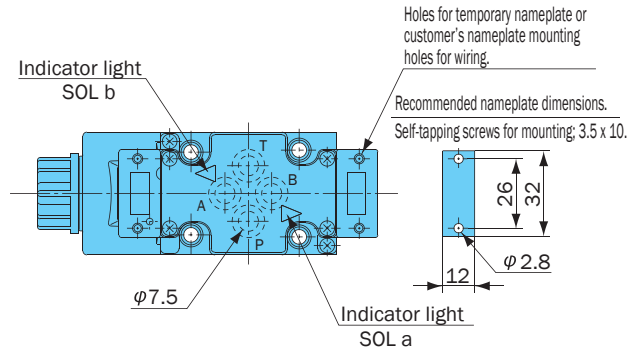
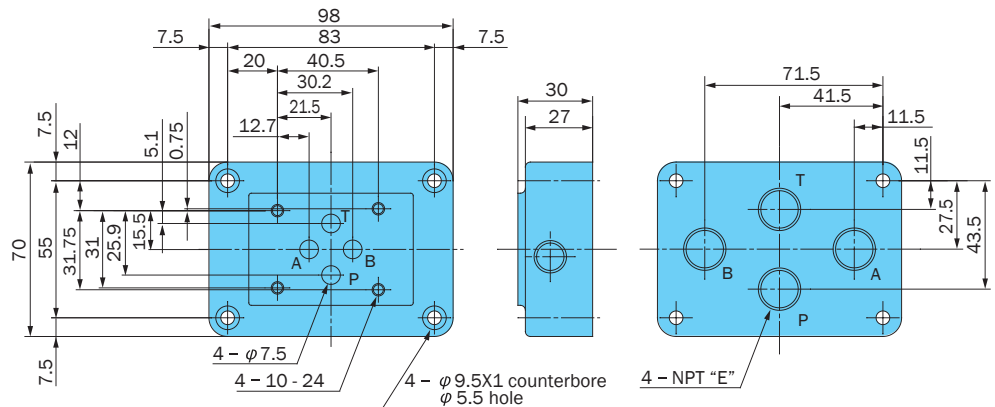
SL-G01-C**-R-C*-31
 SL-G01-E**-R-C*-31

DC Solenoid and Rectifier
 SL-G01-A**-R-D/E*-31
 SL-G01-H**-R-D/E*-31
 SL-G01-C**-R-D/E*-31
 SL-G01-E**-R-D/E*-31

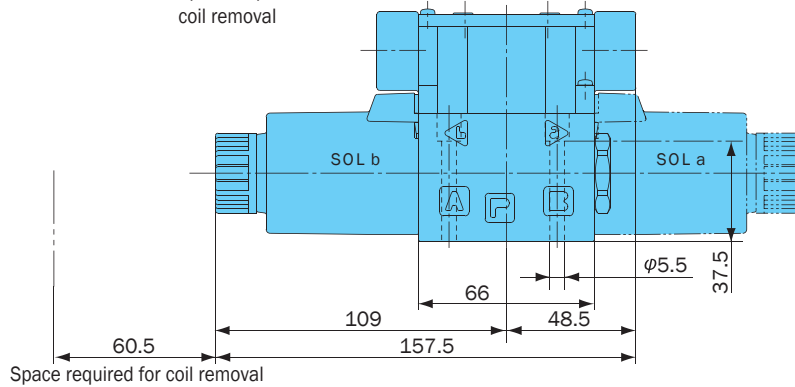
For sub plate SL-G01

Model No.	E	Mass
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)

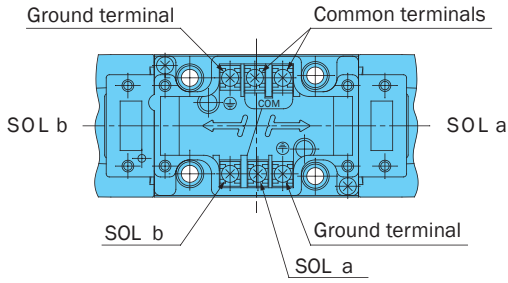


Space required for coil removal



Space required for coil removal

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. Use an M3 type as a solderless terminal.
 4. Tighten terminal screws to a torque of 4.4 to 6.1 in lbs

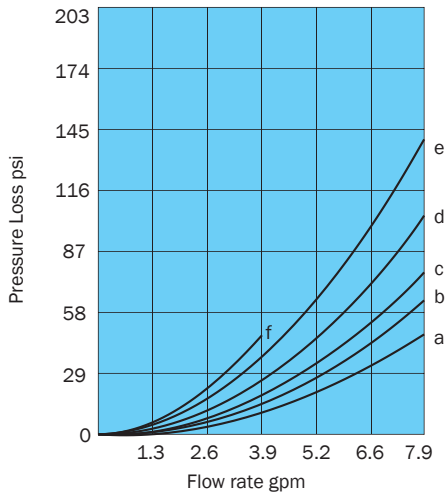
Electrical Circuit Diagram

Type	Model No.	Electrical Circuits
AC Solenoid	SL-G01-***-R-C*-31	
AC Solenoid Surgeless Type	SL-G01-***-GR-C*-31	
Built-in Rectifier	SL-G01-***-R-E*-31	
DC Solenoid	SL-G01-***-R-D*-31	
DC Solenoid Surgeless Type	SL-G01-***-GR-D*-31	
Built-in Rectifier Quick Return Type	SL-G01-***-QR-E*-31	See page D-7 for more information.

Performance Curves

Hydraulic Operating Fluid Viscosity 20 centistokes

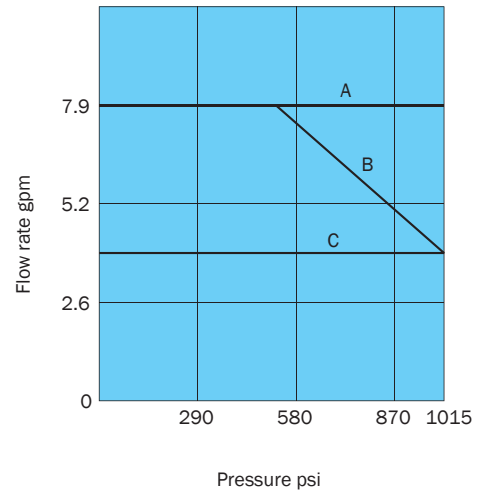
Pressure Loss Characteristics



Flow Path	P/ A	P/ B	A/ T	B/ T	P/ T
A5	—	c	c	—	—
H5	c	—	—	c	—
A3X, H3X, E3X	b	b	e	e	—
C1	c	c	a	c	—
C2	a	c	e	c	—
C4	a	a	c	c	d
C5, C6S	c	c	c	c	—
C6	c	c	a	a	—
C7Y	f	f	e	e	d
C9	a	a	e	e	—

Pressure – Flow Volume Allowable Value

Operation Example	Operation symbol	Diagram 1	Diagram 2	Diagram 3
A5	A	[Diagram]	—	B
H5			B	—
A3X, H3X, E3X C1, C2, C4, C5 C6, C9, C6S			B	B
C7Y	C	C	C	C



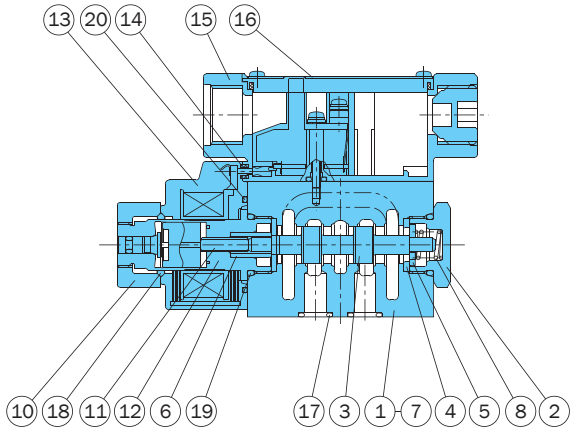
Switching Response Time

Model No.	Response Time (sec)		Measurement Conditions
	Solenoid ON	Spring Return	
SL-G01-**-R-C*-31	0.010 to 0.020	0.010 to 0.020	1015 psi
SL-G01-**-R-E1-31	0.055 to 0.080	0.150 to 0.185	5.2 gpm
SL-G01-**-G)R-D2-31	0.055 to 0.080	0.025 to 0.035	40 centistokes

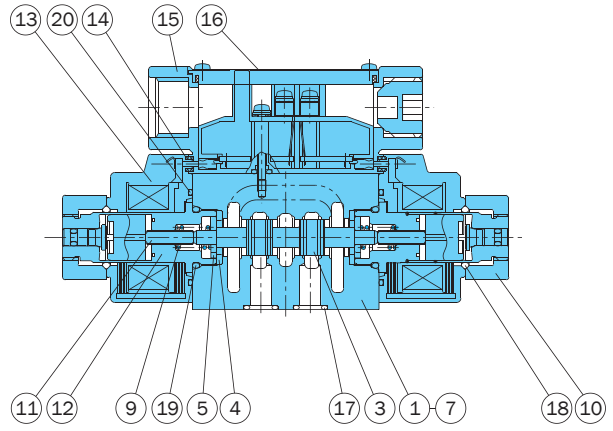
Note: 1. The switching response time changes slightly with operating conditions (pressure, flow rate, viscosity, etc.)
 2. In the case of power supply type E1 (with built-in rectifier), the spring return time using Quick Return (option symbol: Q) is the same as D2.

Cross-sectional Drawing

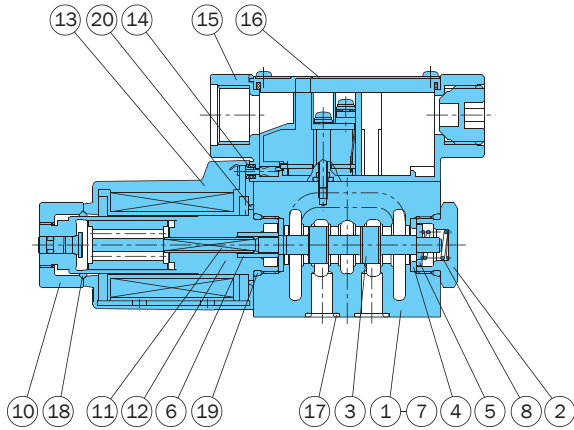
SL-G01-A**-R-C*-31



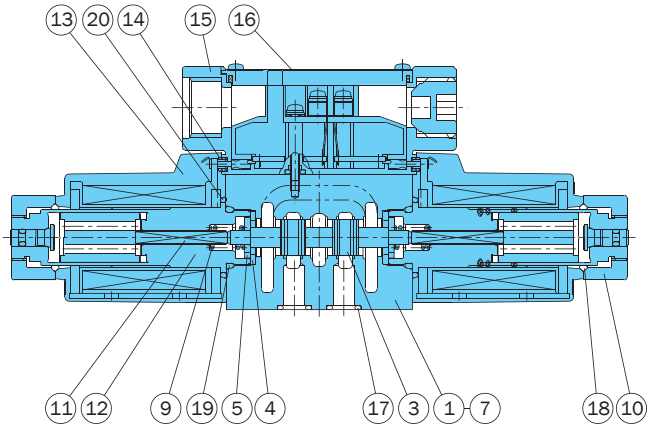
SL-G01-C**-R-C*-31



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



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



List of Sealing Parts

Part No.	Part Name	Type/ Part Number		Q'ty	
		DC SOL	AC SOL	Single Solenoid	Double Solenoid
17	O-ring	AS568-012(Hs90)		4	4
18	O-ring	1A-P20	1A-P18	1	2
19	O-ring	1B-P18		2	2
20	O-ring	S-25	AS568-025(Hs70)	1	2

Note: O-ring 1A/1B-** indicates JIS B2401-1A/1B**. AS568 is SAE standard.

Part No.	Part Name	Part No.	Part Name
1	Body	11	Rod
2	Plug	12	Solenoid guide
3	Spool	13	Solenoid coil
4	Retainer A	14	Packing
5	Retainer B	15	Terminal box kit
6	Retainer C	16	Nameplate
7	Spacer	17	O-ring
8	Spring A	18	O-ring
9	Spring C	19	O-ring
10	Nut	20	O-ring