## WET TYPE SOLENOID OPERATED DIRECTIONAL CONTROL VALVE

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

30ℓ/min 7MPa



#### **Features**

- ①Very 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.
- 2 Low switching noise
  - The wet-type solenoid valve provides very low core switching noise, for quiet operation.
- ③Low power consumption type.
  The low power for the AC solenoid
  9.6 W (60 Hz), DC solenoid 10 W contribute to energy conservation.
- 4 Easy connections
- A special wiring box provides a COM port and indicator light as standard for simple wiring and maintenance.
- ⑤ 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. 
  (7) Global standard
- 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 (l/min)
EZ X H	-A5-	
MATTER STATE OF THE PARTY OF TH	-H5-	
	-A3X-	
MATE TIME	-H3X-	30
	-E3X-	
- AXATE IN:	-C1-	
	-C2-	

JIS Symbol	Operation symbol	Maximum flow rate (ℓ/min)
	-C4-	
PAX F FINA	-C5-	
	-C6-	30
MATHER.	-C9-	
	-C6S-	
	-C7Y-	15

			400		DC Sc	lenoid	
Solenoid Type		AC Solenoid		Built-in Rectifier			
		C1	C2	E1	D2		
Maximum Working Pressure		P, A, B Ports			7MPa{71kgf/cm²}		
Maximum Allowable Backpressure		T Port			7MPa{71kgf/cm²}		
Changeover Fre	que	ncy (per minute)	2	40	120	240	
Standard		Indicator light			R		
		Surgeless	G		_	G	
Options	With manual push-button		N				
		Quick Return		_	Q	-	
Maight (kg)		Double Solenoid	1.5		2.0		
Weight (kg)		Single Solenoid	1.2		1.	1.5	
	Dust	Resistance/Water Resistance Rank	JIS C 0920 IP64 (Dust-tight, Splash-proof)				
		Ambient Temperature	−20 to 50°C				
Operating Environment	Fluid	Temperature Range			-20 to 70°C		
	Environment   Pin   Temperature Range   Kinematic Viscosity Range   Filtration				15 to 300mm²/s		
	Oper	Filtration			25 $\mu$ m or less		
Mour	Mounting bolt		Hex bolt with hole of 12.9 strength classification M5 $ imes$ 45 4 each				
Tighter	ing <sup>-</sup>	Torque		5 to 7N·m{51 to 71kgf·cm}			

Note) Mounting bolts are not included.

#### Handling

- In order to realize the full benefits of the wet type solenoid valve, configure piping so oil is constantly supplied to the T(R) port. Never use a stopper plug in the T(R) 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)
- 5When using petroleum type operating fluid, use JIS K 2213 Class 1 or Class 2, or equivalent.

- 6 Use the SS series solenoid valve when using fire resistant hydraulic operating fluid.
- 7 Use this valve only within the allowable voltage range.
- BDo not allow the AC solenoid to become charged until you install the coil into the valve.
- 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.
- 10When using a detent type (E3X), 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.

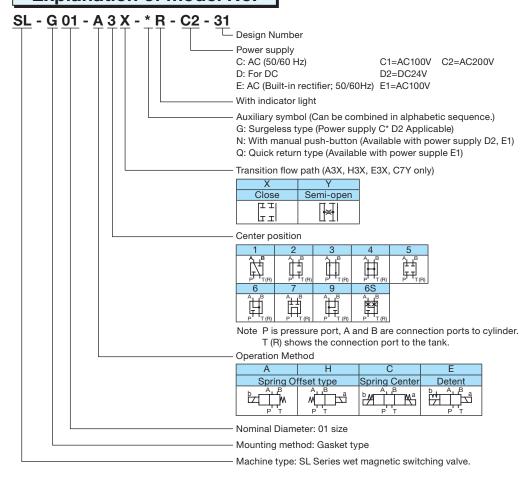
Model No.	Pipe Diameter	Maximum flow rate ( $\ell$ /min)	Weight (kg)
MSA-01X-10	1/4	20	1.2
MSA-01Y-10	3/8	40	1.2

#### Solenoid Assembly Specifications

	Coloneld Tone	AC Calanaid			DC Solenoid				
	Solenoid Type		AC Solenoid			Built-in Rectifier			
Po	ower Supply Type		C1			C2		E1	D2
	Voltage (V)	AC.	100	AC110	AC2	200	AC220	AC100	DC24
	Cycles (Hz)	50	60	60	50	60	60	50/60	_
	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	0.11	0.42
For 01	Holding Power (W)	12.0	9.6	12.2	12.0	9.6	12.2	10	10
	Allowable Voltage Range (V)	80 to 110	90 to	120	160 to 220 180 to 240			90 to 110	21.6 to 26.4
	Allowable Pressure (MPa{kgf/cm²})		7{71}						
	Insulator Resistance (MΩ)						100 or grea	ater (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.

## **Explanation of model No.**

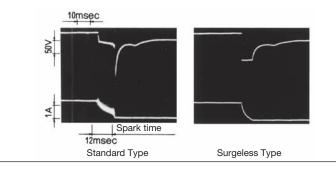


### **Surgeless Type (Auxiliary Symbol: G)**

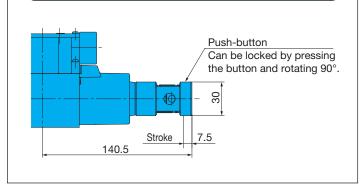
The surge pressure waveforms when the DC solenoid valve power supply is opened and closed by a relay are shown at the bottom of this block.

A built-in surge absorber element eliminates sparking and surge pressure.

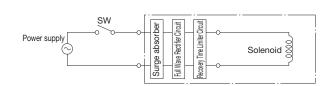
- Features Surge voltage is inhibited.
  - Sparking at relay contact points is eliminated.



## Manual Push-button Type (Auxiliary symbol: N)

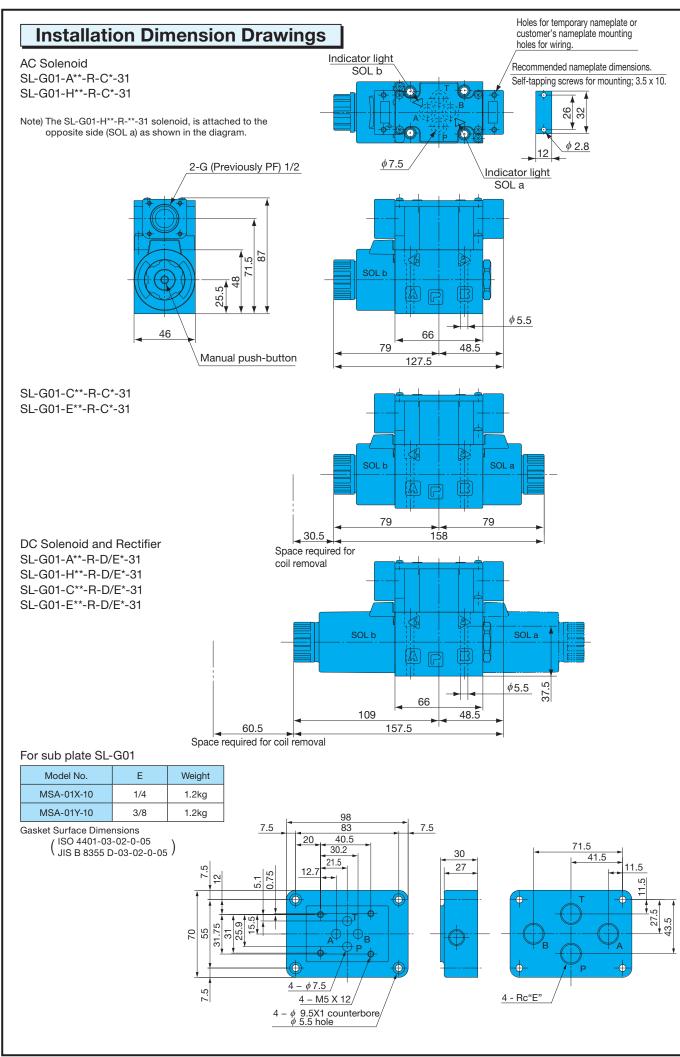


#### **Quick Return Type (Auxiliary Symbol: Q)**

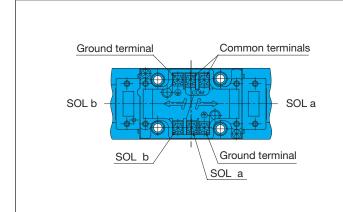


#### Handling

- 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.



#### 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.

  - Use an M3 type as a solderless terminal.
     Tighten terminal screws to a torque of 0.5 to 0.7N·m {5.1 to 7.1kgf·cm}.

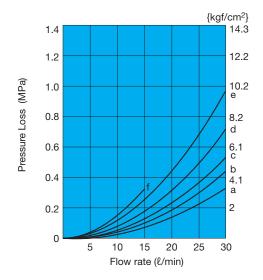
#### Electrical Circuit Diagram

Туре	Model No.	Electrical Circuits
AC Solenoid	SL-G01-***-R-C*-31	○50/60Hz 
AC Solenoid Surgeless Type	SL-G01-***-GR-C*-31	○ 50/60Hz 7 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
Built-in Rectifier	SL-G01-***-R-E*-31	050/60Hz
DC Solenoid	SL-G01-***-R-D*-31	°COM
DC Solenoid Surgeless Type	SL-G01-***-GR-D*-31	~ COM
Built-in Rectifier Quick Return Type	SL-G01-***-QR-E*-31	See page E-4 for more information.

## **Performance Curves**

#### Hydraulic Operating Fluid Kinematic Viscosity 20 mm²/s {cSt}

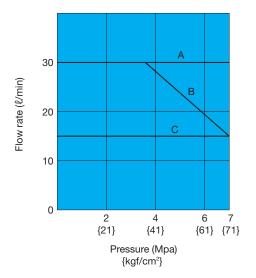
#### Pressure Loss Characteristics



Flow Path	P→A	P→B	A→T	В→Т	P→T
A5	-	С	С	-	-
H5	С	-	-	С	-
A3X, H3X, E3X	b	b	е	е	-
C1	С	С	а	С	-
C2	а	С	е	С	-
C4	а	а	С	С	d
C5, C6S	С	С	С	С	-
C6	С	С	а	а	-
C7Y	f	f	е	е	d
C9	а	а	е	е	-

Pressure - Flow Volume Allowable Value

Operation Example Operation Symbol	b M A B M a	b M a P I	b A B A a
A5		-	В
H5		В	-
A3X, H3X, E3X C1, C2, C4, C5 C6, C9, C6S	А	В	В
C7Y	С	С	С



#### Switching Response Time

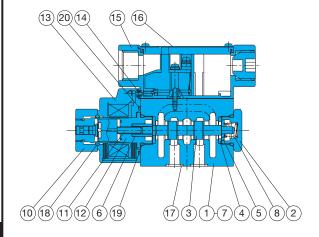
MadalNa	Response	Management On all this are	
Model No.	Solenoid ON	Spring Return	Measurement Conditions
SL-G01-**-R-C*-31	0.010 to 0.020	0.010 to 0.020	7MPa{71kgf/cm²}
SL-G01-**-R-E1-31	0.055 to 0.080	0.150 to 0.185	20ℓ/min
SL-G01-**-(G)R-D2-31	0.055 to 0.080	0.025 to 0.035	40mm²/s {cSt}

Note) 1. The switching response time changes slightly with operating conditions (pressure, flow rate, viscosity, etc.)

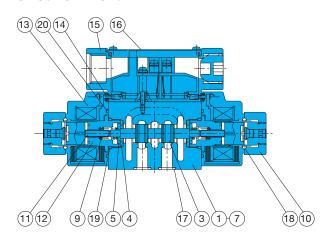
2. In the case of power supply type E1 (with built-in rectifier), the spring return time using Quick Return (option symbol: Q) is the same as D2.

## **Cross-sectional Drawings**

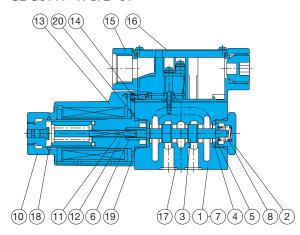
SL-G01-A\*\*-R-C\*-31



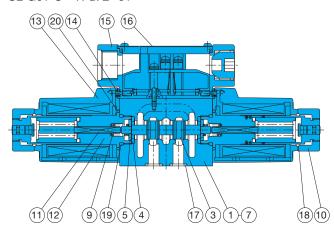
SL-G01-C\*\*-R-C\*-31



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



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



### List of Sealing Parts

Part			art Number	Q'ty	
No.	Part Name	DC SOL	AC SOL	Single Solenoid	Double Solenoid
17	O-ring	AS568-0	4	4	
18	O-ring	NBR-70-1 P20 NBR-70-1 P18		1	2
19	O-ring	NBR-90 P18		2	2
20	O-ring	S-25(NBR-70-1)	S-25(NBR-70-1) AS568-025(NBR-70-1)		2

Note) The materials and hardness of the O-ring conforms with JIS B2401. AS568 is SAE standard.

#### Seal Kit Number

AC S	SOL.	DC SOL.		
Single Solenoid Double Solenoid		Single Solenoid Double Solenoi		
ELCS-AA	ELCS-CA	ELCS-AD	ELCS-CD	

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