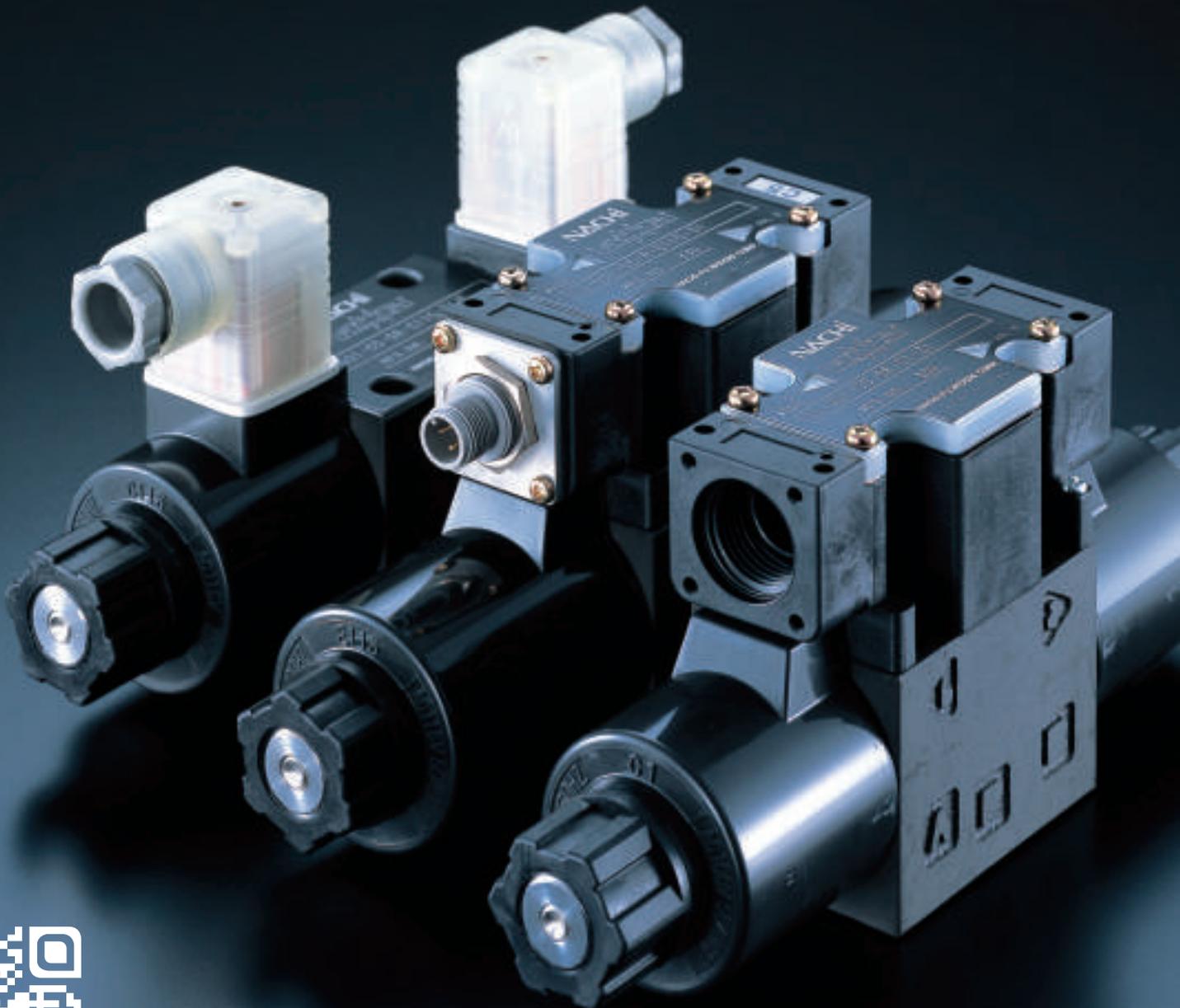


# Wet Type Magnetic Solenoid Valve SS and SA Series G01-31 Design

Recognized by Overseas Safety Standards



# In Pursuit of Safety (conforms to overseas standards) and Easy Use

## Conformance to Global Standards

CE-, UL- and CSA-recognized

You can depend on solenoid valves of NACHI brand.

Recognized by reliable overseas safety standards such as CE (Europe), UL (U.S.A.) and CSA (Canada).

## Interchangeable with Conventional Products (30 designs)

The valve proper as well as such parts as a centralized terminal box and coil are interchangeable with the conventional ones in terms of a kit.

## Features

### 1. Easy use

- An expanded wiring space ensures easy wiring.
- Use of a 4-pin M12-connector (IEC60947-5-2) permits one-touch connection of wires. (Compatible with special parts)
- Redesigned terminal box improves waterproof properties.

### 2. Low power consumption

- The power consumption of the DC solenoid (D※ and E※) is reduced, with high voltage and heavy current kept unchanged. This will further promote your energy saving policy.

### 3. Reliable switching

- An innovative fluid reaction compensating mechanism assures reliable valve switching. (Patent pending)

#### ■ Improved water proof properties

The packing is designed to be mated with the plate groove.

#### ■ Improved setscrews

The setscrews are not disengaged even if they are excessively loosened.

#### ■ Pursuit of safety

The terminal block has been modified to improve the insulation performance. (Conforms to overseas standards)

#### ■ Available M12 connector makes wiring simple.

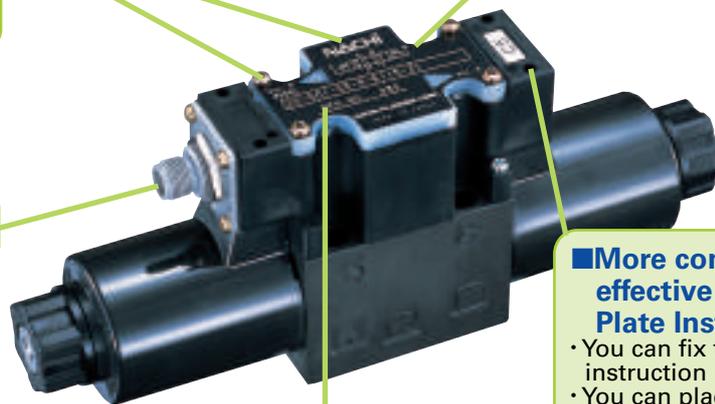
#### ■ Improved shape of cable entrance

The cable entrance slope has been made less sharp to ensure easy cable connection.

#### ■ Improved legibility of nameplate

#### ■ More convenient due to effective use of "Name Plate Installation Hole"

- You can fix the work instruction nameplate directly.
- You can place the plate there temporarily during wiring work. This will prevent the plate from being lost.



## Handling

- 1 To make an effective use of the wet type solenoid valve, connect the pipe so that the T(R) port is always filled with oil. Do not plug the T(R) port.
- 2 Take appropriate measures to ensure that abnormal surge pressure in excess of the maximum permissible backpressure does not occur to the T(R) port.
- 3 Please note that the maximum flow rate is subjected to restriction when you use a four-way valve as a two-way or one-way valve by blocking each port.
- 4 Keep the hydraulic oil clean at all times.  
(Level of contamination: equal to or better than NAS 12 class)
- 5 Use the petroleum based hydraulic oil conforming to Class 1 or 2 according to JIS K2213.
- 6 Water or glycol based hydraulic oil can be used for the standard valve. In this case, pressure must not exceed 31.5 MPa; further the flow rate must not exceed 80 % of the maximum flow rate. If you want to use other flame resistant hydraulic oil, please contact us for detailed information and precautions.
- 7 Take care that the permissible voltage range is not exceeded.
- 8 Turn on the AC solenoid after you have installed the coil on the valve.
- 9 Connect a drain pipe to the T(R) port of the valve for operation symbols 2X, H2X and E2X.
- 10 If the product is kept at the switched position for a long time at a high pressure, operation failure may occur due to sticking of fluid. When it must be kept at the switched position for a long time at a high pressure, contact us for further information.
- 11 When you use a detent type valve (E2X, E3X, E3Z), keep power turned on in order to keep the switched position without fail.
- 12 It should be noted that the manual pin operating force is changed by tank line back pressure.
- 13 If you use the valve with power kept turned on, the coil surface temperature will rise. So determine the valve installation position to ensure that your hand will not touch the heated position.

## Specifications

Type		Standard type		Shock-less type					
JIS symbol	Operation symbol	Max. working pressure MPa {kgf/cm <sup>2</sup> }	Max. flow rate ℓ /min	Max. working pressure MPa {kgf/cm <sup>2</sup> }	Max. flow rate ℓ /min				
	A2X	35 {357}	30	25 {255}	30				
	H2X								
	E2X								
	A3X		80		100	50			
	H3X								
	E3X								
	A3Z		65		100		50		
	H3Z								
	E3Z								
	A5		35 {357}		100			25 {255}	50
	H5								
	C2								
	C5								
	C9								
	C1S								
	C6S								
	C1								
	C6								
	A4	AC solenoid 65 DC solenoid 80		50		50			
	H4								
	C4								
	C7Y								
	C8								
			50		40				

Note: The maximum flow rate of each valve varies according to the pressure. For details, see page 10.

## Valve specifications

		AC solenoid				DC solenoid							
						Rectifier built-in type							
		C1	C115	C2	C230	E1	E115	E2	E230	D1	D2		
Max. working pressure (ports P, A and B)		35MPa{357kgf/cm <sup>2</sup> }											
Permissible back pressure (port T)		21MPa{214kgf/cm <sup>2</sup> }											
Switching frequency (times/min.)		Standard type		300				120				300	
		Shock-less type		—								120	
Option		Indicator light		R (Standard for SS type)									
		Shock-less		—				F					
		Surge-less		G (SS type alone)				—				G	
		With manual pushbutton		N									
		Quick return		—				Q				—	
Mass (kg)		Double solenoid		1.8				2.0					
		Single solenoid		1.4				1.5					
Working conditions		Dust and water protection		SS type		JIS C 0920 IP64 (Dust and spray protection type)							
				SA type		JIS C 0920 IP65 (Dust and jet protection type)							
		Working temperature range		-20 – 70 °C									
		Working viscosity range		15–300mm <sup>2</sup> /s{cSt}									
		Viscosity index		90 or more									
		Filtration		25 microns or less									
Installation bolts		Size x length		Hexagon socket head bolts of strength 12T, M5 x 45, four bolts									
		Locking torque		5–7N · m{51–71kgf · cm}									

Note: The valve is not provided with installation bolts. Use the specified bolts.

## Solenoid assembly specifications

Classification of solenoid		AC solenoid											
Power supply type		C1			C115			C2			C230		
Solenoid coil	SS type	EDC64-C1			EDC64-C115			EDC64-C2			EDC64-C230		
	SA type	EAC64-C1			EAC64-C115			EAC64-C2			EAC64-C230		
Voltage (V)		AC100		AC110	AC110		AC115	AC200		AC220	AC220		AC230
Frequency (Hz)		50	60	60	50	60	60	50	60	60	50	60	60
Starting current (A)		2.2	2.0	2.2	2.0	1.8	2.0	1.1	1.0	1.1	1.0	0.91	1.0
Holding current (A)		0.52	0.38	0.46	0.47	0.35	0.42	0.26	0.19	0.23	0.24	0.17	0.21
Holding power (W)		25	22	28	25	22	28	25	22	28	25	22	28
Permissible voltage range (V)		80–110	90–120		90–120	100–130		160–220	180–240		180–240	200–260	
Insulation resistance (MΩ)		100 or more (500V)											

Classification of solenoid		DC solenoid									
		Rectifier built-in type									
Power supply type		E1	E115		E2	E230		D1		D2	
Solenoid coil	SS type	EDC64-E1-1A	EDC64-E115-1A		EDC64-E2-1A	EDC64-E230-1A		EDC64-D1-1A		EDC64-D2-1A	
	SA type	EAC64-E1-1A	EAC64-E115-1A		EAC64-E2-1A	EAC64-E230-1A		EAC64-D1-1A		EAC64-D2-1A	
Voltage (V)		AC100	AC110	AC115	AC200	AC220	AC230	DC12		DC24	
Frequency (Hz)		50/60	50/60		50/60	50/60		—		—	
Current (A)		0.31	0.26	0.27	0.15	0.12	0.13	2.2		1.1	
Power (W)		27	25	27	26	24	27	26		26	
Permissible voltage range (V)		90–110	100–125		180–220	200–250		10.8–13.2		21.6–26.4	
Insulation resistance (MΩ)		100 or more (500V)									

# Type Description

**SS - G 01 - A 3 X - ※R - C2 - 31**

Design number

Power supply indication

C: for alternating current (for both 50/60 Hz)

C1 : AC100V, C115 : AC110V

C2 : AC200V, C230 : AC220V

D: for direct current

D1 : DC12V, D2 : DC24V

E: For alternating current (rectifier built-in type for both 50/60 Hz)

E1 : AC100V, E115 : AC115V

E2 : AC200V, E230 : AC230V

Auxiliary symbols (combinations are permitted in alphabetical order)

R: With indicator (Write "R").

Standard for SS type, and optional for SA type.

F: Shock-less type (applicable to power supply types D※ and E※)

G: Surge-less type (applicable to power supply types C※ and D※)

GR: Surge-less type with indicator light (applicable to power supply types C※ and D※ of the SA type)

J: PG (German Standard) thread → with G-thread conversion adaptor (applicable to power supply types C※ and D※ of the SA type. Omitted in the case of power supply type E※ because G thread is used)

N: With manual pushbutton

Q: Quick return type (applicable to power supply type E※)

Form of flow path for transient period

(Write only for part of the types A2X, H2X, E2X, ※3※ and C7Y).

X	Y	Z
Closed	Semi-open	Open

Neutral position


Note 1: "P" denotes a pressure board, and "A" and "B" indicate communication ports leading to the cylinder or the like. "T(R)" represents a communication port leading to the tank.

Operation method

A	H	C	E
Spring offset type	Spring center type	Spring center type	Detent type

Nominal diameter

01 size

Installation method

G: Gasket installation type

Model

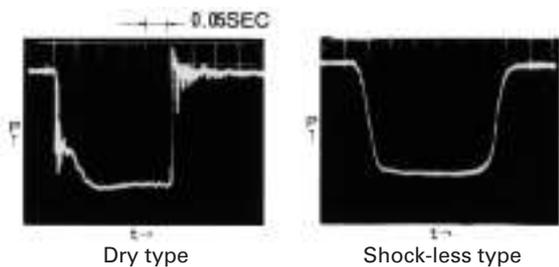
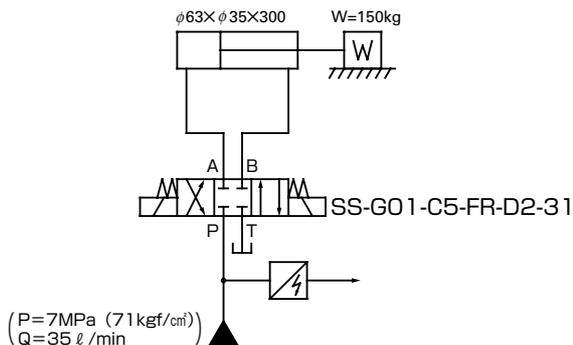
SS: Centralized terminal box type solenoid valve

SA: DIN connector type solenoid valve

## Shock-less Type (Type symbol: F)

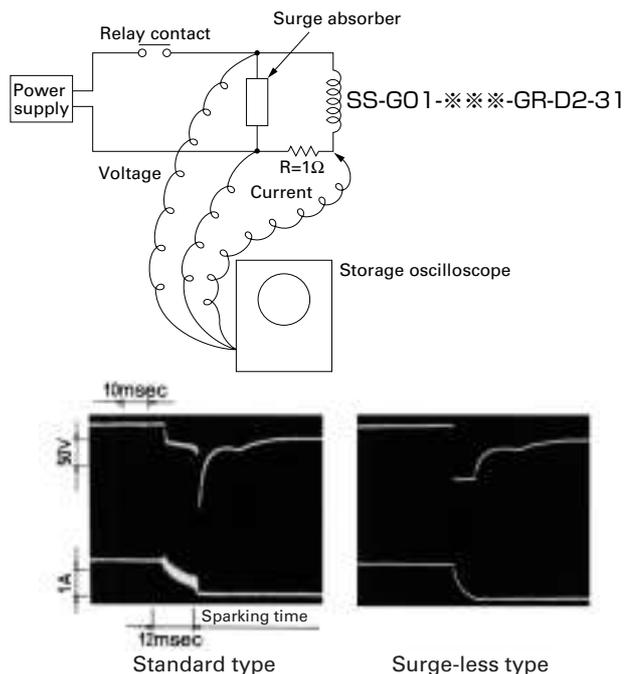
### Switching response characteristics

Indicates the pressure waveform of valves in the hydraulic circuit given in the following sketch. In the dry type valve, a big impact (noise) or pipe vibration will occur due to sudden pressure drop or rise caused by open/close operation of the valve. In the shock-less solenoid valve, however, there is no pressure change due to open/close operation of the valve. Accordingly, there is no impact (noise) or pipe vibration when the valve is switched.



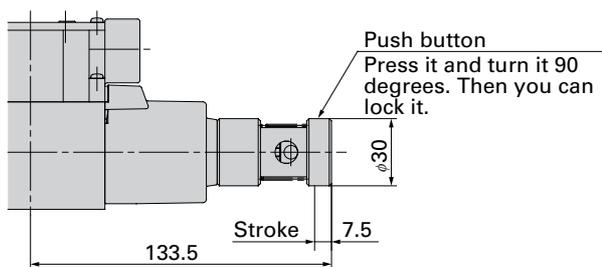
## Surge-less type (Type symbol: G)

Indicates the surge voltage waveform when the power supply of the DC solenoid valve is turned on or off by a relay. When a surge absorbing element is incorporated, contact spark or surge voltage does not occur.

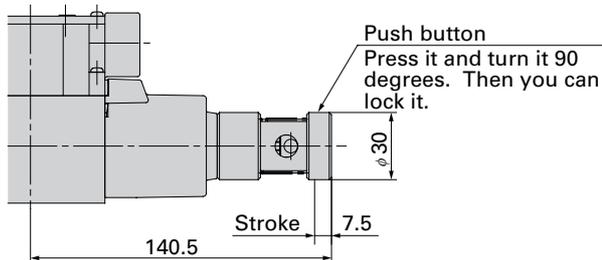


## Manual push button type (Type symbol: N)

### AC solenoid valve



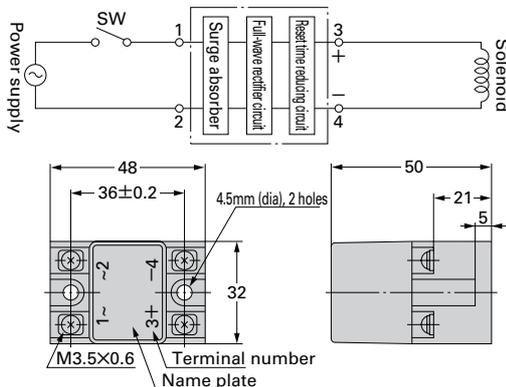
### DC solenoid valve



## Quick return type (Type symbol: Q)

### Handling

- 1 Used to reduce the spring return time for the power supply type E\* (rectifier built-in type). (Same as D\*)
- 2 For the SS type, the quick return device is built in the terminal box. For the SA type, it is not built in the terminal box. So install it on the electric box. (For installation dimensions, see the following sketch).
- 3 If two or more quick return devices are used, do not connect the COM cable to the output side (on the side of terminal numbers 3 and 4).



# Installation Dimension Drawing (SS Series)

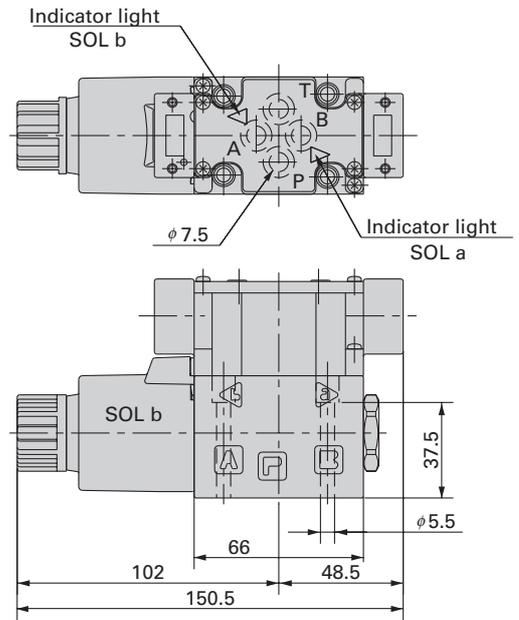
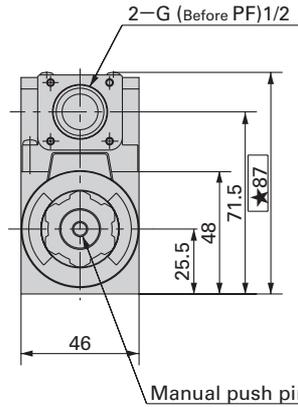
## AC solenoid valve

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

SS-G01-H\*\*R-C\*-31

Note: For SS-G01-H\*\*R-C\*-31, the solenoid is located on the side (SOL a) opposite to that shown in the drawing.

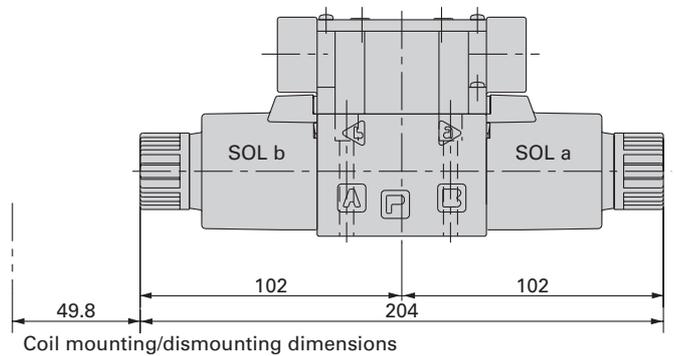
### AC solenoid



Note: Height is different with respect to 30D.  
85.5mm→87mm

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

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



## With DC solenoid and rectifier

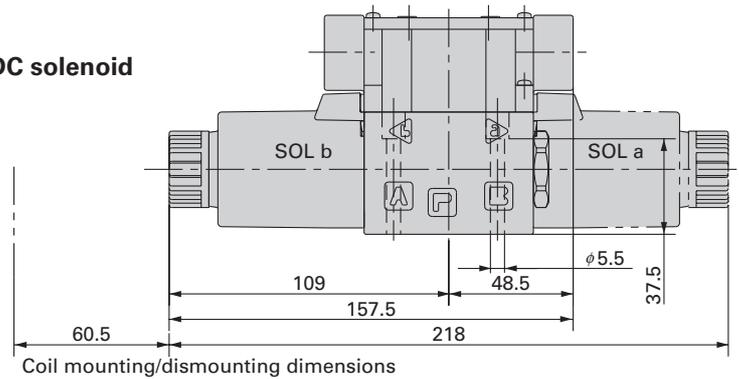
SS-G01-A\*\*R-D/E\*-31

SS-G01-H\*\*R-D/E\*-31

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

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

### DC solenoid

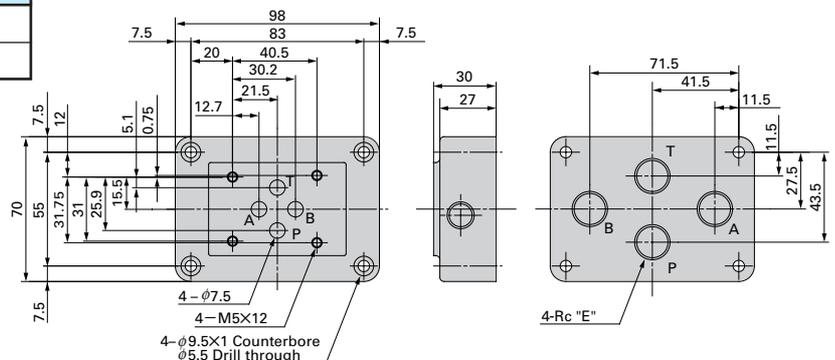


## Sub-plate

Type	E	Max. working pressure MPa {kgf/cm <sup>2</sup> }	Mass (kg)
MSA-01X-10	1/4	25 {255}	1.2
MSA-01Y-10	3/8		1.2

Gasket surface dimensions  
(ISO4401-03-02-0-94  
(JIS B 8355 D-03-02-0-94)

Note: If you want to use at a pressure of 25 MPa or more,  
please contact us.



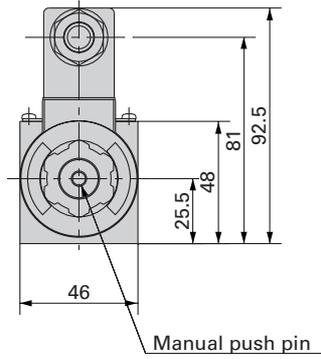
# Installation Dimension Drawing (SA Series)

## AC solenoid valve

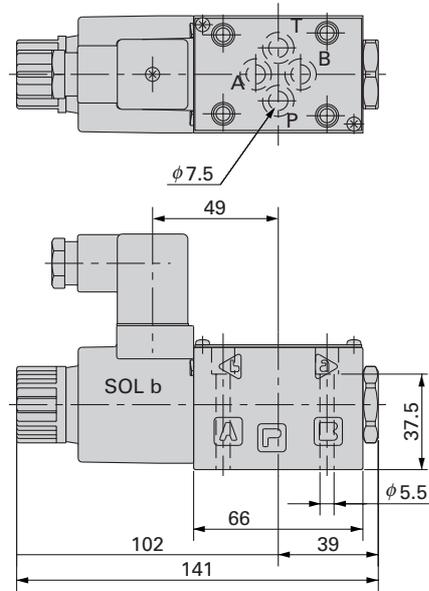
SA-G01-A\*\*\*-C\*-31

SA-G01-H\*\*\*-C\*-31

Note: For SA-G01-H\*\*\*-R\*\*\*-31, the solenoid is located on the side (SOL a) opposite to that shown in the drawing.

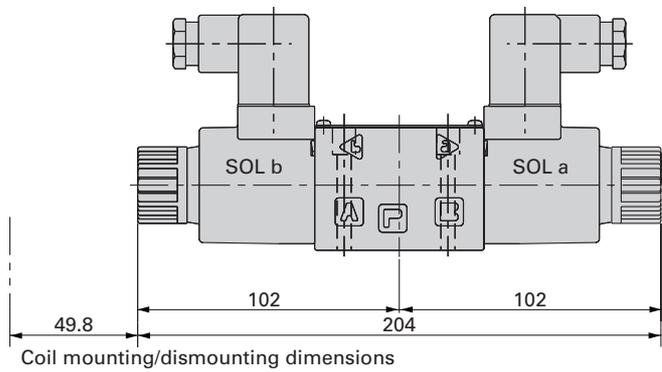


AC solenoid



SA-G01-C\*\*\*-R-C\*-31

SA-G01-E\*\*\*-R-C\*-31



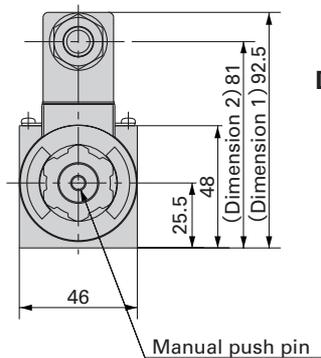
## With DC solenoid and rectifier

SA-G01-A\*\*\*-D\*/E\*-31

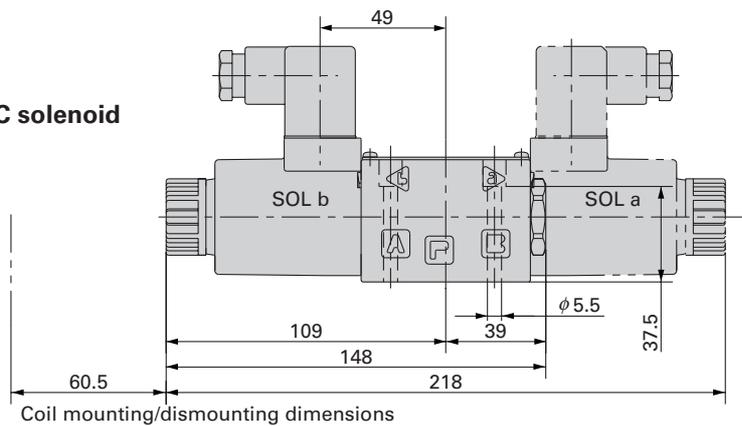
SA-G01-H\*\*\*-D\*/E\*-31

SA-G01-C\*\*\*-D\*/E\*-31

SA-G01-E\*\*\*-D\*/E\*-31



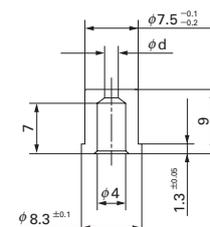
DC solenoid



A fixed throttle valve can be inserted into the ports P, A and B (for both SS and SA types).

Notes: 1. For SA-G01-H\*\*\*-D\*/E\*-31, the solenoid is located on the side (SOL a) opposite to that shown in the drawing.

2. For SA-G01-\*\*\*-E\*-31, the dimension 1 is 96mm, and dimension 2 is 73mm.



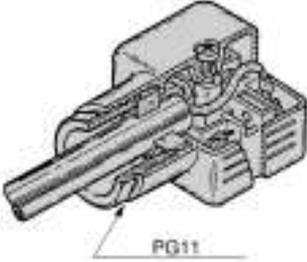
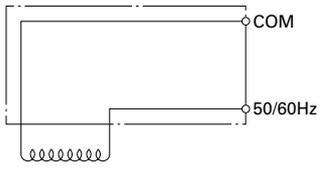
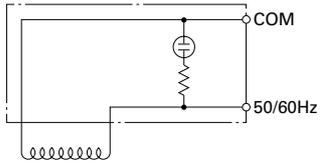
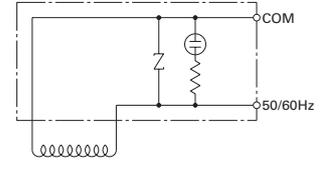
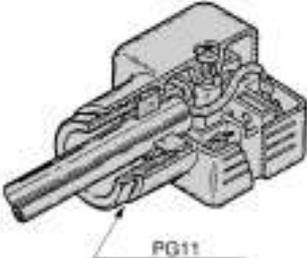
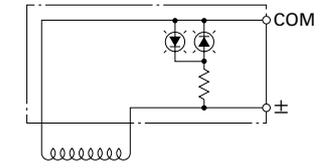
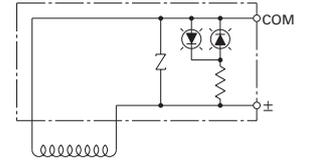
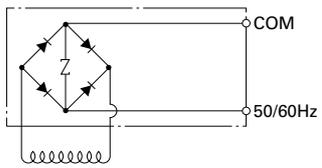
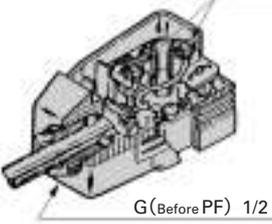
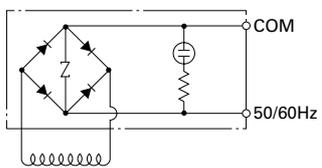
## Connection diagram (SS type)

	<p>Notes:</p> <ol style="list-style-type: none"> <li>1. The double solenoid valve is provided with a common terminal to ensure easy connection. When not used, loosen the set screw of the terminal and remove it.</li> <li>2. If the ground wire is required, use the grounding terminal.</li> <li>3. Use the crimp contact for M3.</li> <li>4. Lock the terminal screw at a torque of 0.5 through 0.7 N·m (5.1 through 7.1 kgf·cm).</li> </ol>
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## Electric circuit diagram (SS type)

Model	Type	Electric circuit
AC solenoid	SS-G01-***-R-C*-31	
AC solenoid, surge-less type	SS-G01-***-GR-C*-31	
Rectifier built-in type	SS-G01-***-R-E*-31	
DC solenoid	SS-G01-***-R-D*-31	
DC solenoid, surge-less type	SS-G01-***-GR-D*-31	
Rectifier built-in quick return type	SS-G01-***-QR-E*-31	See page 5.

## Connector (SA type)

Type	Connection method	Electric connection diagram
SA-G01-※※※-C※-31 (EA41-1A)	 <p>Connect the power supply to the terminals No.1 and No.2. The terminal marked with ⊕ should be used for grounding.</p>	
SA-G01-※※※-R-C※-31 (EA41-R※-1C)		
SA-G01-※※※-GR-C※-31 (EA41-GRC※-1C)		
SA-G01-※※※-R-D※-31 (EA41-DR※-1C)	 <p>Connect the power supply to the terminals No.1 and No.2. The terminal marked with ⊕ should be used for grounding. Use it whenever required.</p>	
SA-G01-※※※-GR-D※-31 (EA41-GRD※-1C)		
SA-G01-※※※-E※-31 (EA42-1B)	 <p>Power supply terminal</p>	
SA-G01-※※※-R-E※-31 (EA42-R※-1B)	 <p>G (Before PF) 1/2</p>	

A symbol in parenthesis indicates a connector type.

Notes: 1. The asterisks (※) attached to the connector type and power supply indicating symbols show voltage voltages (1, 2).

2. The connector cord diameter is from 8 through 10 mm. Outside this range, waterproofing function will be lost.

3. The connector can be installed in a desired direction at every 90 degrees by reassembling of the terminal block.

4. The cover can be removed only when the installation set screw has been removed.

5. When there is an auxiliary symbol "J", the connector is provided with the G-thread adaptor, and the wire port is provided with the G (1BPF) 1/2 thread (where PG11 is standard). EA42 and EA42-R※ are also provided with G(1BPF) 1/2 thread.

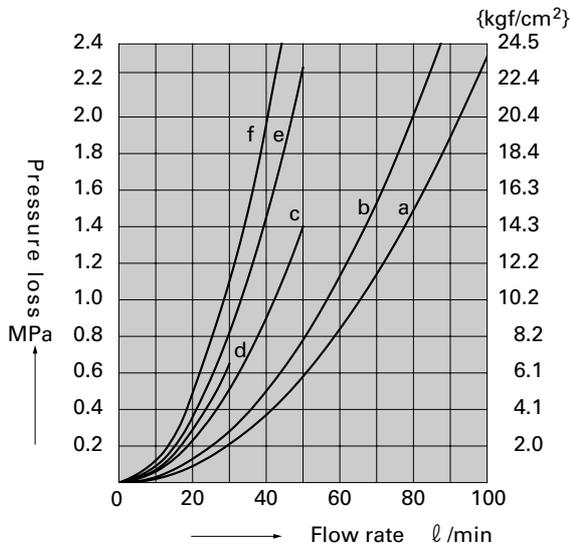
6. Use the crimp contact having a round shape or the form of a letter Y for M3.

7. Lock the M3 screw for fixing the connector and terminal at a torque of 0.3 through 0.5 N·m (3.1 through 5.1 kgf·cm).

8. In the case of the power supply type E※ of quick return shape Q, use the connector EA-41-1A or EA41-R※-1C.

# Performance Curve

## Pressure loss characteristics



Type	Flow path	P→A	P→B	A→T	B→T	P→T
SS-G01 SA-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	—

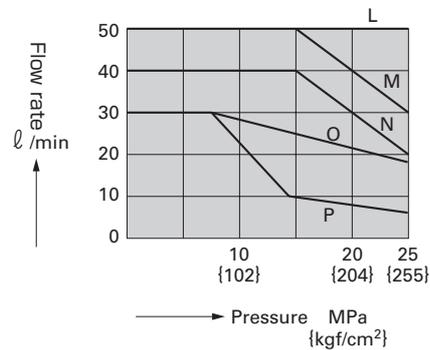
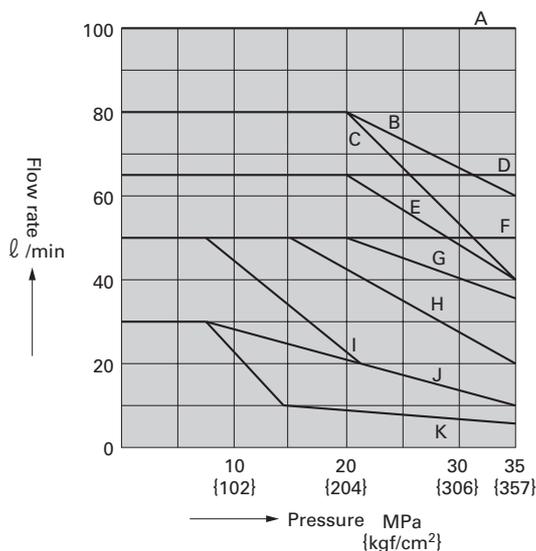
Hydraulic oil viscosity 32mm<sup>2</sup>/s(cSt)

## Permissible pressure - flow rate values

Size	Standard type with AC and DC solenoid SS/SA-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	Note 1 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	Note 2 G(H)	K	K

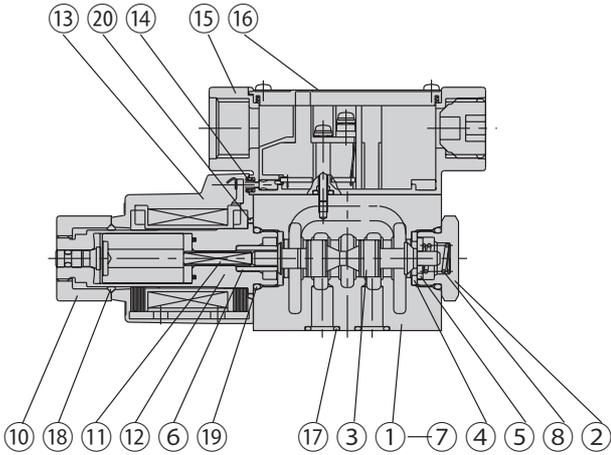
Size	Shock-less type with DC solenoid SS/SA-G01-※※-FR-※※-31		
Operation example			
Operation symbol			
A2X, H2X	—	P	P
E2X	—	O	O
A3X, H3X	L	P	P
E3X	L	O	O
A3Z, H3Z	L	L	L
E3Z	L	L	L
A5	L	—	P
H5	L	P	—
C1, C6	M	P	P
C1S, C2, C5, C6S, C9	L	P	P
A4, H4	L	L	L
C4	L	L	L
C7Y, C8	N	P	P

Notes: 1. Description in parenthesis is given for an AC solenoid.  
2. Description in parenthesis is given for the rectifier built-in type solenoid (E※) except for the quick return type, and for the power supply solenoid (D※) where a surge voltage absorbing diode is mounted on the electric circuit.



## Sectional Structure View

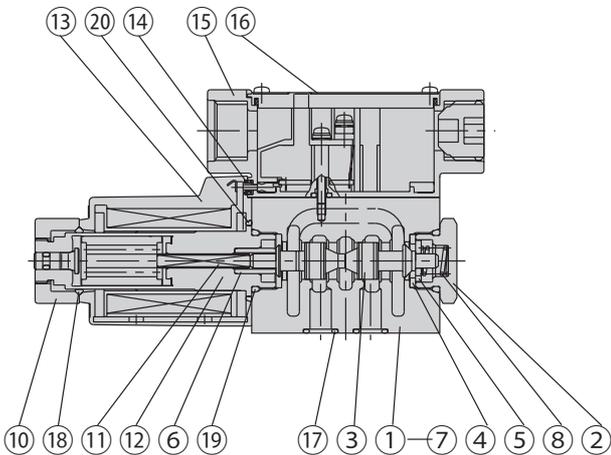
SS-G01-A3X-R-C -31



Parts No.	Parts name
1	Body
2	Plug
3	Spool valve
4	Retainer A
5	Retainer B
6	Special spring pin
7	Spacer
8	Spring A
9	Spring C
10	Nut

Parts No.	Parts name
11	Rod
12	Solenoid guide
13	Solenoid coil
14	Packing
15	Centralized terminal box kit
16	Name plate
17	O-ring
18	O-ring
19	O-ring
20	O-ring

SS-G01-A3X-R-D/E -31



### Seal Parts List

Parts No.	Parts name	Parts type	Quantity	
			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 based on B2401 of the JIS Standards, and AS568 conforms to SAE Standards.

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