

**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-            |                       |
|            | -C7Y-            | 3.9                   |

| Solenoid Type                     |                         | AC Solenoid                   |    | DC Solenoid              |     |
|-----------------------------------|-------------------------|-------------------------------|----|--------------------------|-----|
|                                   |                         | C1                            | C2 | Built-in Rectifier<br>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                  |            |

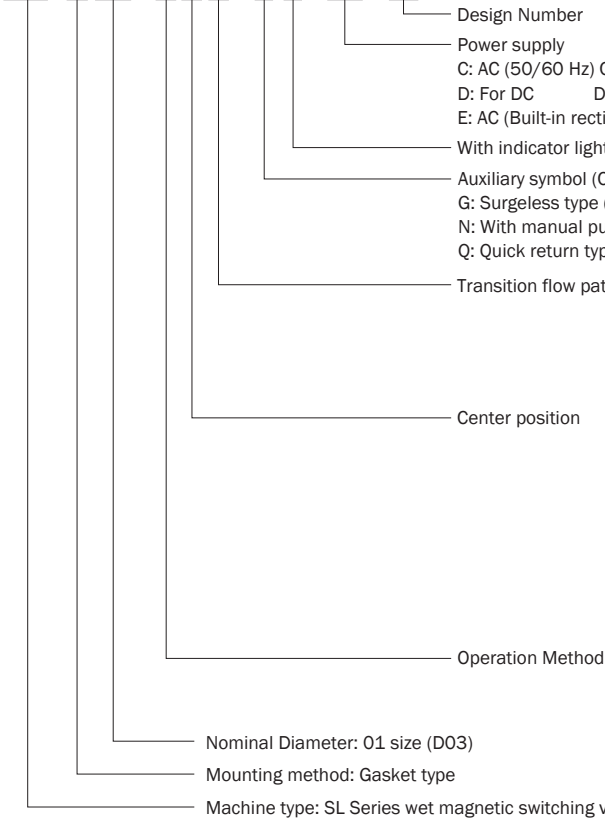
• Solenoid Assembly Specifications

| 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.

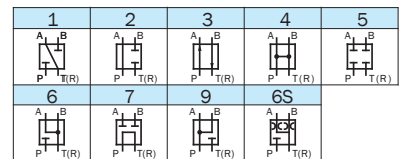
**Understanding Model Numbers**

SL - G 01 - A 3 X - ※ R - C2 - 31

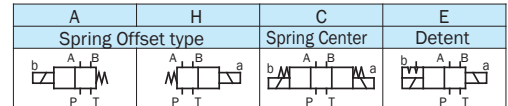


- Design Number
- Power supply
- C: AC (50/60 Hz) C1 = AC100 V C2 = AC200 V
- D: For DC D2 = DC24V
- E: AC (Built-in rectifier; 50/60Hz) E1 = AC100V
- With indicator light
- Auxiliary symbol (Can be combined in alphabetic sequence.)
- G: Surgeless type (Power supply C ※ D2 Applicable)
- N: With manual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

| 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.



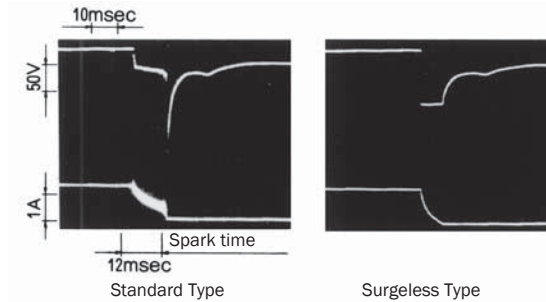
## Options

(Auxiliary Symbol)

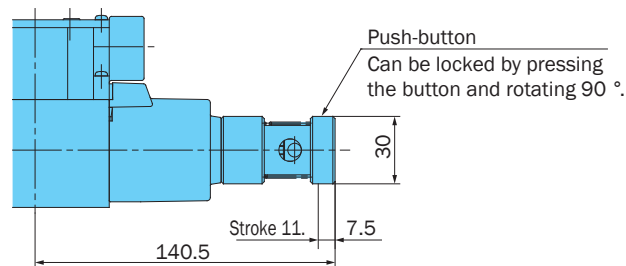
### Surgeless Type (Auxiliary Symbol: G)

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.

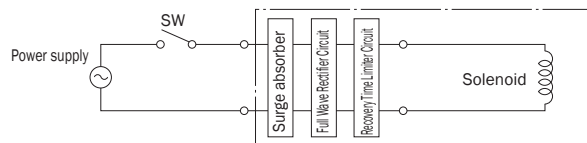
- Features
- Surge voltage is inhibited.
  - Sparking at relay contact points is eliminated.



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



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



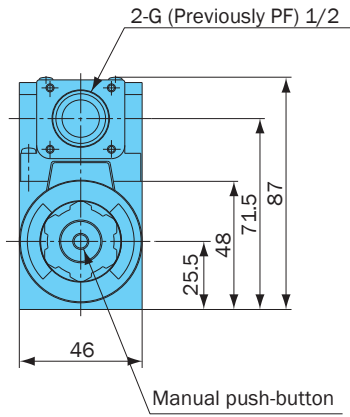
#### Handling

- 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.
- 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.



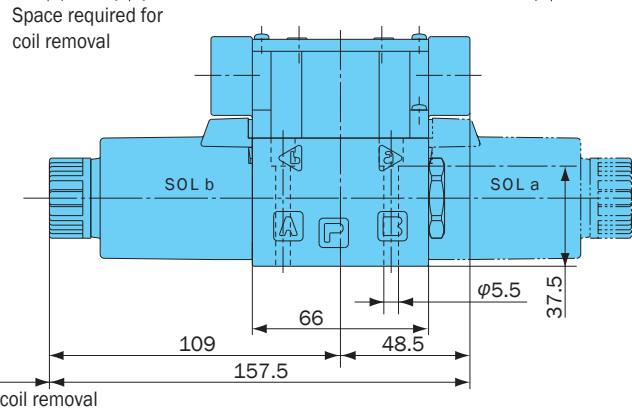
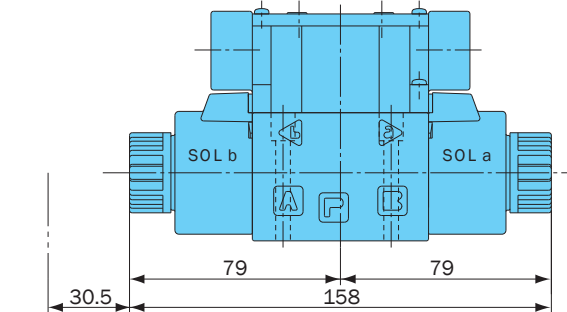
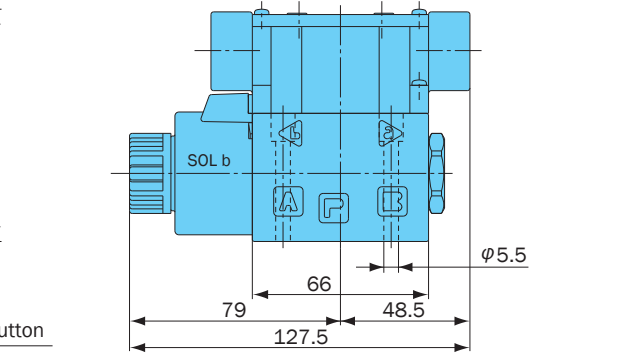
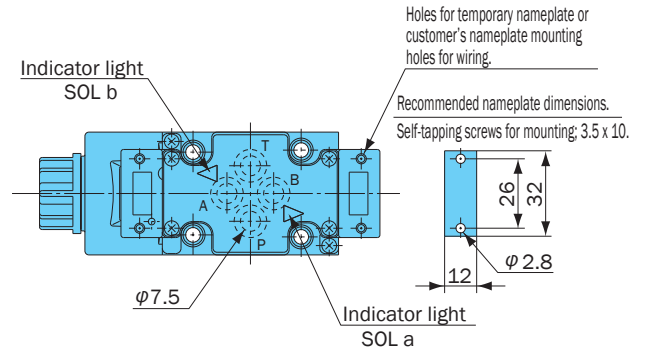
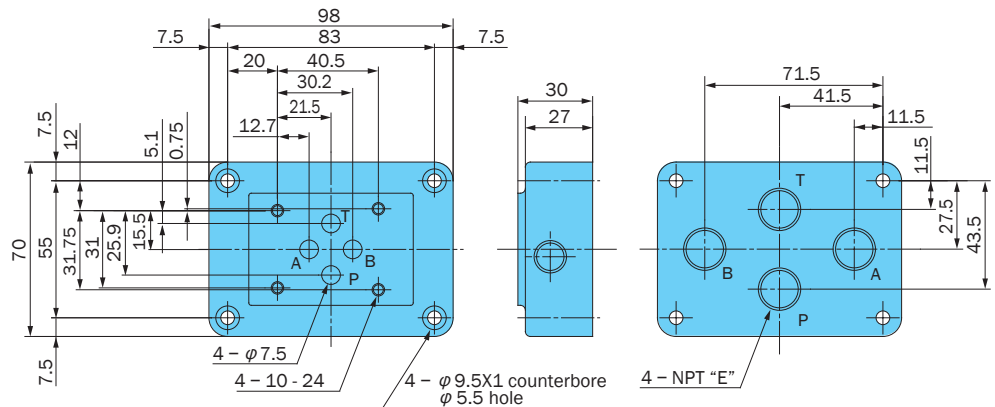
SL-G01-C\*\*-R-C\*-31  
 SL-G01-E\*\*-R-C\*-31

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

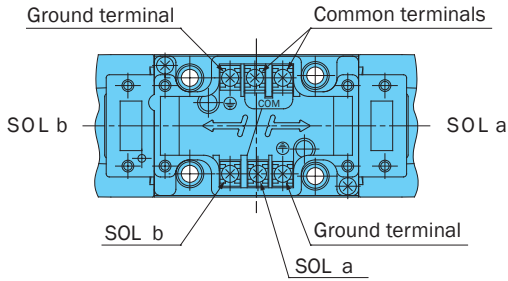
For sub plate SL-G01

| 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 )



## 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

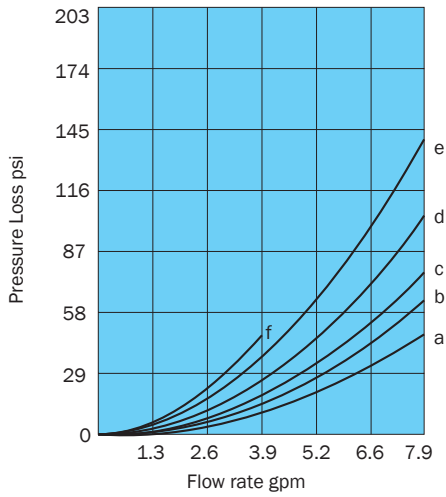
## Electrical Circuit Diagram

| 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

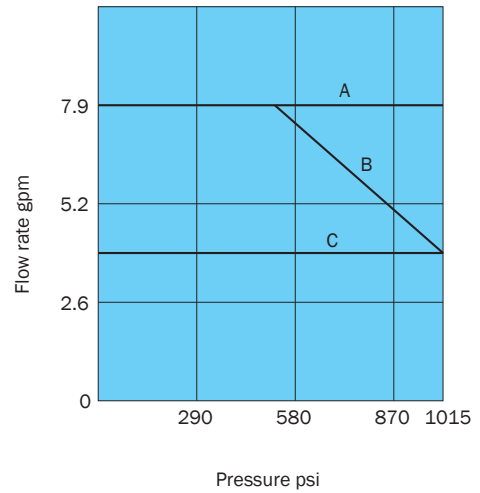
## Pressure Loss Characteristics



| 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 symbol                               | Operation Example | Diagram 1 | Diagram 2 | Diagram 3 |
|--|-------------------|-----------|-----------|-----------|
| A5   | A                 | [Diagram] | -         | B         |
| H5   |                   |           | B         | -         |
| A3X, H3X, E3X<br>C1, C2, C4, C5<br>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         |

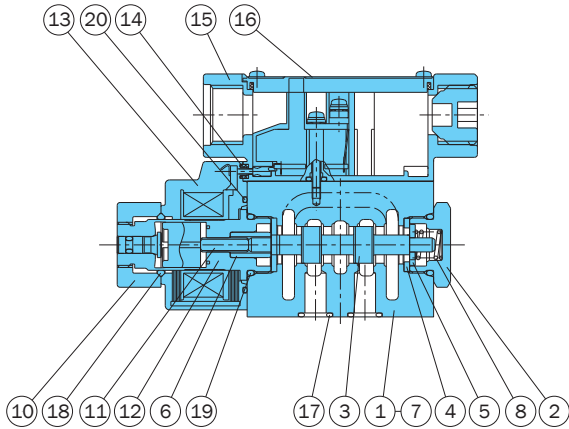
Note: 1. The switching response time changes slightly with operating conditions (pressure, flow rate, viscosity, etc.)  
 2. In the case of power supply type E1 (with built-in rectifier), the spring return time using Quick Return (option symbol: Q) is the same as D2.

D

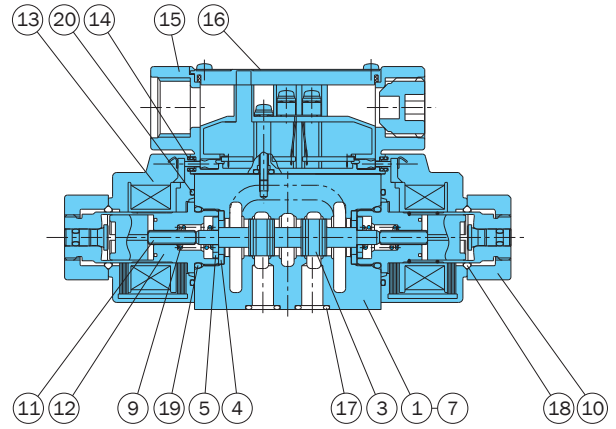
Solenoid Valves

## Cross-sectional Drawing

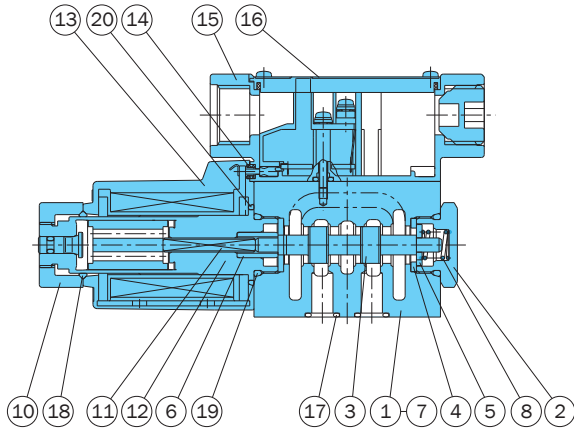
SL-G01-A\*\*-R-C\*-31



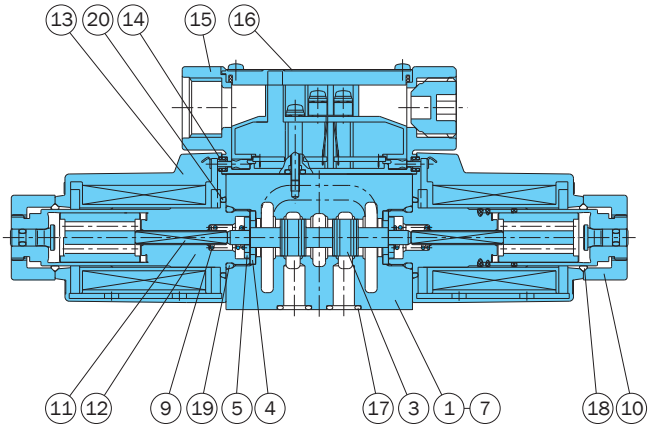
SL-G01-C\*\*-R-C\*-31



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           |