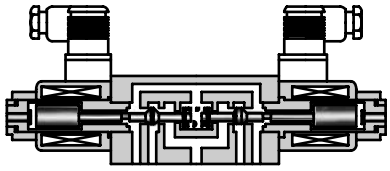
YUKEN

# POPPET TYPE SOLENOID OPERATED DIRECTIONAL VALVES DSLG-01-3-C/O DSLG-01-4-O Sub-plate Mounting

DIRECTIONAL CONTROLS

**Up to 31.5 MPa (4570 PSI), 16 L/min (4.2 U.S.GPM)**

These are Solenoid Operated Directional Valves of No Leak Type developed with the aim of responding the demand of the age including energy saving. Because these valves are of no leak type they allow the low viscosity hydraulic fluids to be used as well as the circuit construction which cannot be used by the conventional spool type directional valves because of too much internal leak of pressure oil. The use of the low viscosity hydraulic fluids reduces the pressure loss which can arise from the passage resistance of the hydraulic fluids, leading to the system energy saving.



- **High Response High Reliability**
  Because these valves are of poppet type, there is no overlap, high response can be achieved. At the same time, hydraulic lock is eliminated.

- **No Leak**
  Sheet type seal has been adopted and internal leak is greatly reduced.

- **ISO Comformant Mounting Surface**
  Because the mounting surface conforms to ISO 4401-AB-03-4-A, there is an interchangeability with the conventional valves. This makes it possible to use these valves in combination with 01 Series Modular Valves.

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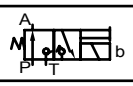
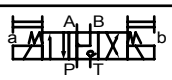
## Specifications

| Model Numbers | Max. Flow L/min (U.S. GPM) | Max. Operating Pressure MPa (PSI) | Max. T-Line Back Pressure MPa (PSI) | Max. Changeover Frequency $min^{-1}$ {Cycles/Min} | Internal leakage $cm^3/min$ (cu. in./min) | Approx. Mass kg (lbs.) | Graphic Symbols |
|---|---|---|---|---|---|---|---|
| DSLG-01-3-C-∗-N-10∗ | 16 (4.2) | 31.5 (4570) | 16 (2320) | 240 | Less than ★1 0.5 (.03) | 1.9 (4.2) |  |
| DSLG-01-3-O-∗-N-10∗ | | | | | | |  |
| DSLG-01-4-O-∗-N-10∗ | | | | | Less than ★2 1 (.06) | 3.7 (8.2) |  |

★1. This is the leakage towards "T" port in A port block at "P" port pressure 14 MPa (2030 PSI).
★2. This is the leakage towards "T" port in A•B port block at "P" port pressure 14 MPa (2030 PSI).

## Solenoid Ratings

| Electric Source | Coil Type | Frequency (Hz) | Voltage (V) | | Current & Power at Rated Voltage | |
|---|---|---|---|---|---|---|
| | | | Source Rating | Serviceable Range | Holding (A) | Power (W) |
| DC (K Series) | D12 | — | 12 | 10.8 - 13.2 | 2.2 | 26 |
| | D24 | — | 24 | 21.6 - 26.4 | 1.1 | |
| AC→DC Rectified | R100 | 50/60 | 100 | 90 - 110 | 0.3 | 26 |
| | R200 | 50/60 | 200 | 180 - 220 | 0.15 | |

## Hydraulic Fluids

**Fluid Types**

Any type of hydraulic fluids listed in the table below can be used.

| | |
|---|---|
| Petroleum base oils | Use fluids equivalent to ISO VG 32 or VG 46. |
| Synthetic fluids | Use phosphate ester or polyol ester fluid. When phosphate ester fluid is used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used. |
| Water containing fluids | Use water-glycol fluid. |

Note: For use with hydraulic fluids other than those listed above, please consult your Yuken representatives in advance.

**Recommended Viscosity and Oil Temperatures**

Viscosity ranging between 15 - 400 $mm^2/s$ (77 - 1800 SSU).

Oil temperatures between -15/+70°C (5 - 158°F).

Use hydraulic fluids which satisfy the recommended viscosity and oil temperatures given above.

**Control of Contamination**

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorten the life of the valves. Please maintain the degree of contamination within NAS 1638-Grade 12. Use 25 μm or finer line filter.

## Model Number Designation

| F- | DSLG | -01 | -4 | -O | -D24 | -N | -10 | * |
|---|---|---|---|---|---|---|---|---|
| Special Seals | Series Number | Valve Size | Number of Port | Function | Coil Type | Type of Electrical Conduit Connection | Design Number | Design Standards |
| **F:** Special Seals for Phosphate Ester Type Fluids (Omit if not required) | **DSLG:** Poppet Type Solenoid Operated Directional Valve (Sub-plate Mtg.) | **01** | **3:** 3 Port | **O:** Normally Open **C:** Normally Closed | DC **D12, D24** AC→DC **R100 R200** | **N:** Plug-in Connector | **10** | Refer to★ |
| | | | **4:** 4 Port | **O:** Normally Open | | | | |

★ Design Standards: None ..... Japanese Standard "JIS" and European Design Standard
90 ..... N. American Design Standard

## Sub-plate

| Piping Size | Japanese Standard "JIS" | | European Design Std. | | N. American Design Std. | | Approx. Mass kg (lbs.) |
|---|---|---|---|---|---|---|---|
| | Sub-plate Model No. | Thread Size | Sub-plate Model No. | Thread Size | Sub-plate Model No. | Thread Size | |
| 1/8 | DSGM-01-30 | Rc 1/8 | DSGM-01-3080 | 1/8 BSP.F | DSGM-01-3090 | 1/8 NPT | 0.8 (1.8) |
| 1/4 | DSGM-01X-30 | Rc 1/4 | DSGM-01X-3080 | 1/4 BSP.F | DSGM-01X-3090 | 1/4 NPT | 0.8 (1.8) |
| 3/8 | DSGM-01Y-30 | Rc 3/8 | — | — | DSGM-01Y-3090 | 3/8 NPT | 0.8 (1.8) |

● Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

## Mounting Bolts

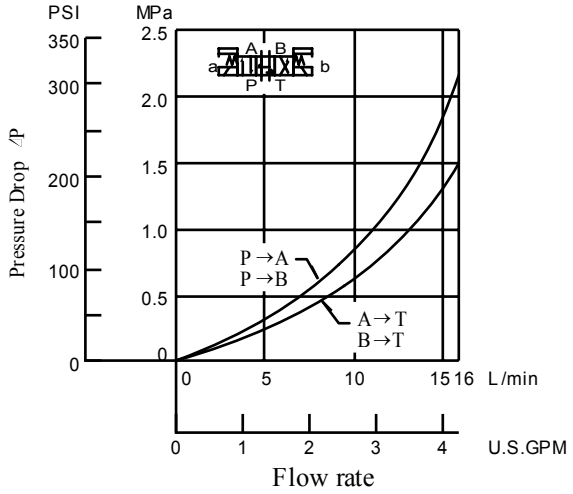
Four socket head cap screws in the table below are included.

| Descriptions | Socket Head Cap Screw (4 pcs.) | Tightening Torque |
|---|---|---|
| Japanese Standard "JIS" European Design Standard | M5 × 45 Lg. | 5-7 Nm (44-62 in. lbs.) [Applicable to working pressure more than 25 MPa (3630 PSI) : 6-7 Nm (53-62 in. lbs.)] |
| N. American Design Standard | No. 10-24 UNC × 1-3/4 Lg. | |

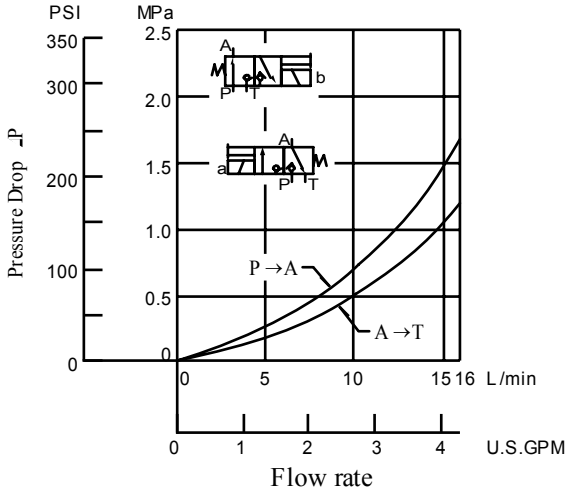
## Pressure Drop

Hydraulic Fluid: Viscosity 35 $mm^2/s$ (164 SSU), Specific Gravity 0.850

● **4 Port Valve**




● **3 Port Valve**




● For any other viscosity, multiply the factors in the table below.

| Viscosity | $mm^2/s$ | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SSU | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 | 464 |
| Factor | | 0.81 | 0.87 | 0.96 | 1.03 | 1.09 | 1.14 | 1.19 | 1.23 | 1.27 | 1.30 |

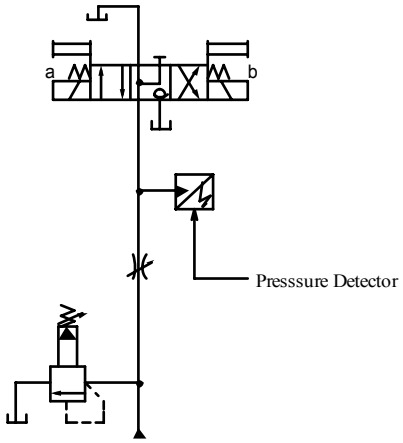
● For any other specific gravity (G'), the pressure drop (⊿P') may be obtained from the formula below.

$$\Delta P' = \Delta P \ (G'/0.850)$$

## Changeover Time

Changeover time varies according to hydraulic circuit of the model actually used and conditions. An example of measurement is given in the figure below.

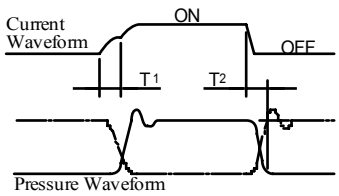
● **Test Circuit and Conditions**



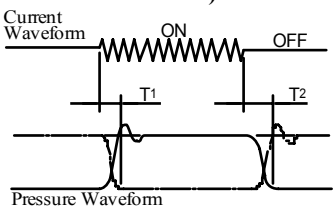

Pressure: 21 MPa (3050 PSI)
Flow Rate: 16 L/min (4.2 U.S.GPM)
Voltage: Rated voltage

● **Result of Measurement**

**(DC Solenoid)**




**(AC→ DC Rectified)**




Note: Alternate long and short dash lines in the pressure waveform figures indicate the waveforms for Normally Closed Type 3 Port Valves.

| Solenoid Type | Model Numbers | Time (ms) T1 | Time (ms) T2 | Remarks |
|---|---|---|---|---|
| DC | DSLG-01-4-O-D✻ | 55 | 30 | 4 port valve, normally open |
| | DSLG-01-3-O-D✻ | 55 | 30 | 3 port valve, normally open |
| | DSLG-01-3-C-D✻ | 70 | 25 | 3 port valve, normally closed |
| AC→DC Rectified | DSLG-01-4-O-R✻ | 55 | 150 | 4 port valve, normally open |
| | DSLG-01-3-O-R✻ | 55 | 150 | 3 port valve, normally open |
| | DSLG-01-3-C-R✻ | 70 | 150 | 3 port valve, normally closed |

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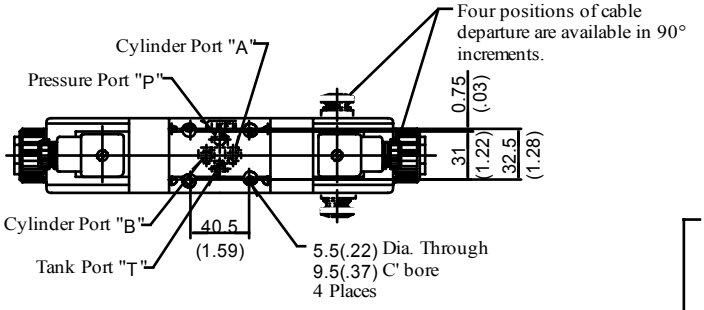
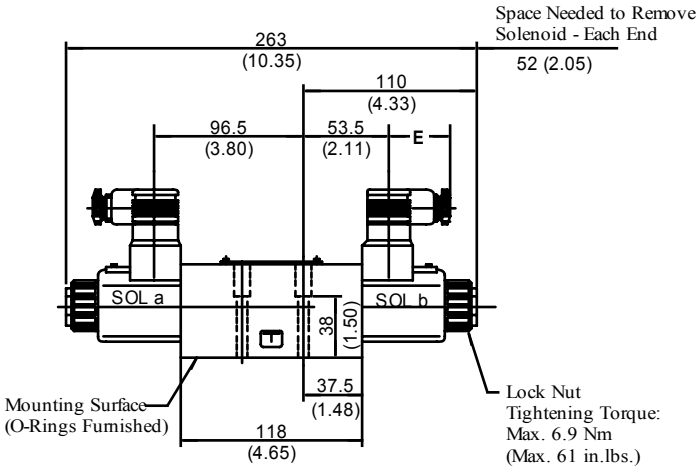
## 4 Port Valve

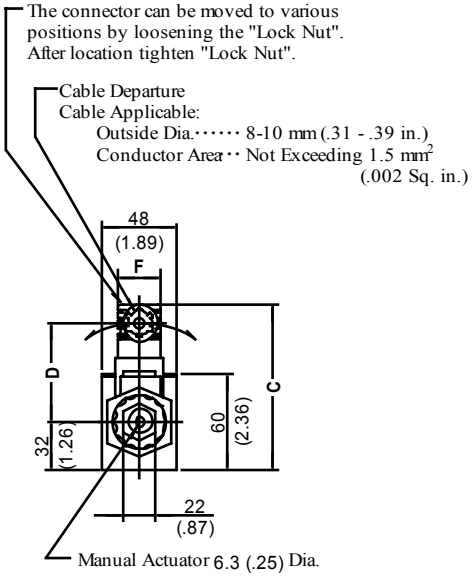
Mounting Surface:
ISO 4401-AB-03-4-A

● **Normally Open: DSLG-01-4-O-∗-N-10/1090**

DIMENSIONS IN MILLIMETRES (INCHES)




| Model Numbers | Dimensions mm (Inches) | | | |
|---|---|---|---|---|
| | C | D | E | F |
| DSLG-01-4-O-D∗-N | 108 (4.25) | 64 (2.52) | 39 (1.54) | 27.5 (1.08) |
| DSLG-01-4-O-R∗-N | 111 (4.37) | 57.2 (2.25) | 53 (2.09) | 34 (1.34) |

● The information on 3 Port Valves is provided in the following page.

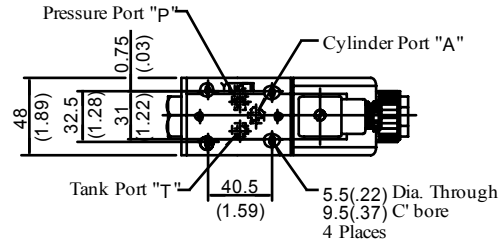
Mounting Surface:
ISO 4401-AB-03-4-A

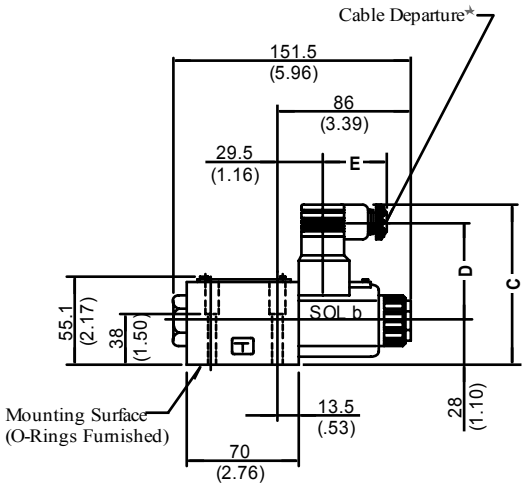
## 3 Port Valves

DIMENSIONS IN MILLIMETRES (INCHES)

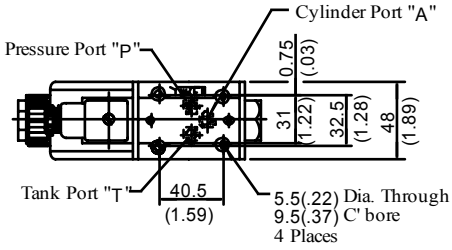


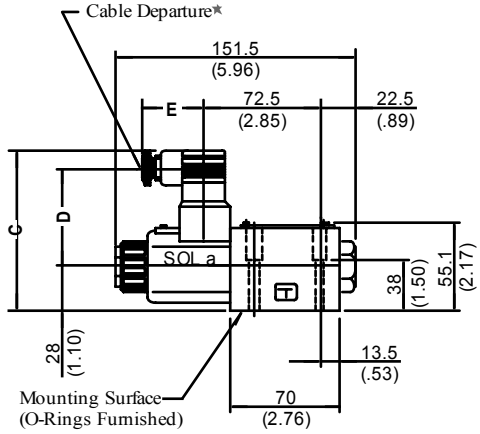
● **Normally Open Type:**
**DSLG-01-3-O-∗-N-10/1090**




● **Normally Closed Type:**
**DSLG-01-3-C-∗-N-10/1090**



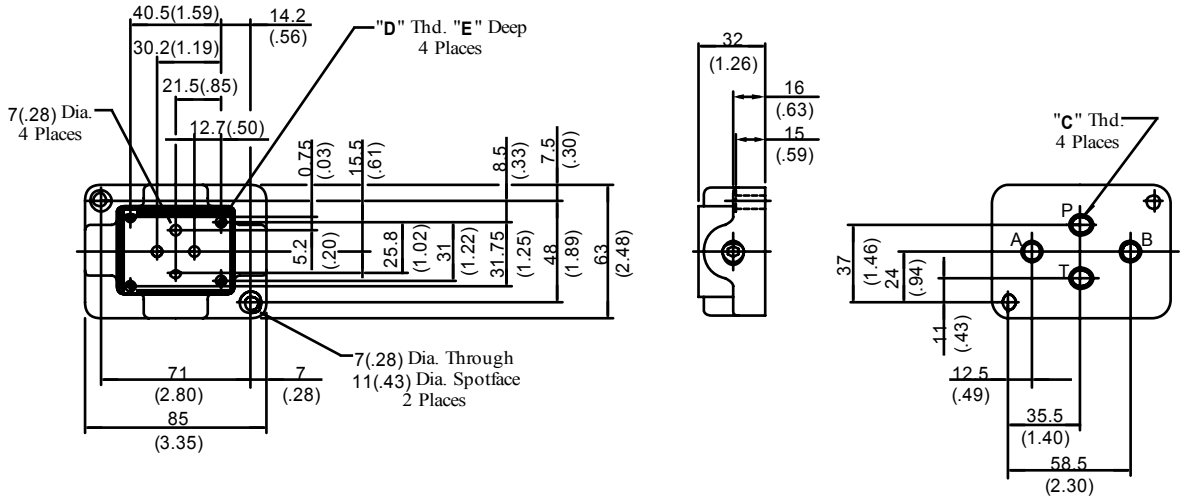

★ Cable departure position can be changed. See "4 Port Valves" in the previous page for the details.

| Model Numbers | Dimensions mm (Inches) | | |
|---|---|---|---|
| | C | D | E |
| DSLG-01-3-∗-D∗-N | 104 (4.09) | 64 (2.52) | 39 (1.54) |
| DSLG-01-3-∗-R∗-N | 107 (4.21) | 57.2 (2.25) | 53 (2.09) |

## Sub-plate

DIMENSIONS IN MILLIMETRES (INCHES)

DSGM-01∗-30/3080/3090




| Sub-plate Model Numbers | Thread Size | | "E" |
|---|---|---|---|
| | "C" Thd. | "D" Thd. | mm (in.) |
| DSGM-01-30 | Rc 1/8 | M5 | 10 (.39) |
| DSGM-01-3080 | 1/8 BSP.F | | |
| DSGM-01-3090 | 1/8 NPT | No.10-24 UNC | 12 (.47) |
| DSGM-01X-30 | Rc 1/4 | M5 | 10 (.39) |
| DSGM-01X-3080 | 1/4 BSP.F | | |
| DSGM-01X-3090 | 1/4 NPT | No.10-24 UNC | 12 (.47) |
| DSGM-01Y-30 | Rc 3/8 | M5 | 10 (.39) |
| DSGM-01Y-3090 | 3/8 NPT | No.10-24 UNC | 12 (.47) |

## Instructions

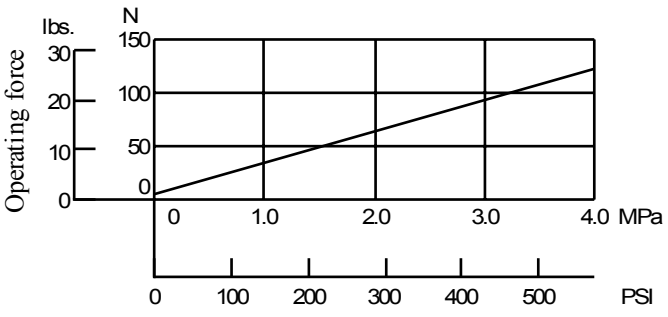
- **Mounting**
  No mounting restrictions for any models.

- **Solenoid Shifting**
  On double solenoid valves do not energise both at the same time.

- **Valve Tank Port**
  Avoid connecting the valve tank port to a line with possible surge pressure.

- **Operating Force by Manual Actuator**
  Take care as the operating force by the manual actuator increases in proportion to the tank line back pressure. (See the graph right.)

**Operating Force by Manual Actuator**

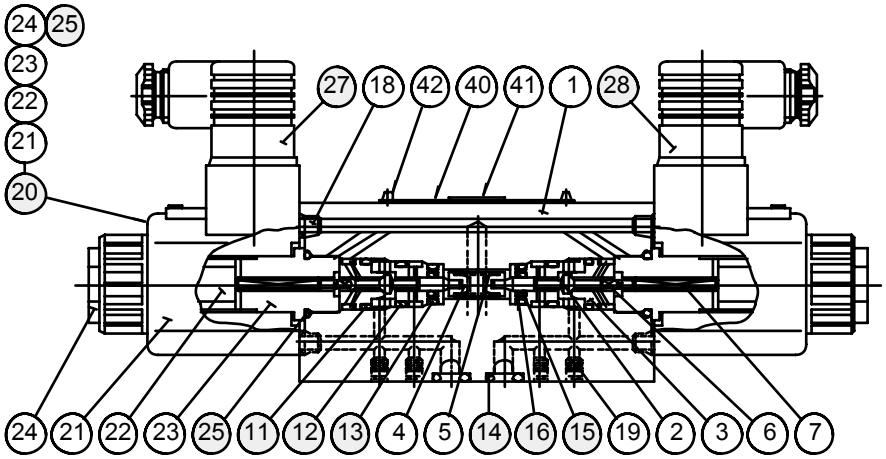



Tank Line Back Pressure

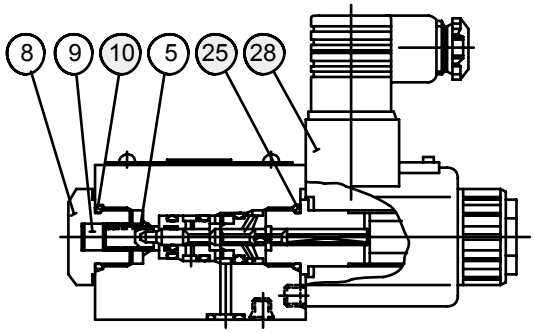
# Poppet Type Solenoid Operated Directional Valves DSLG-01-3-C/O DSLG-01-4-O

## Spare Parts List

### 4 Port Valve




### 3 Port Valve




**⚠ CAUTION**

When making replacement of seals or solenoid assemblies, do it carefully after reading through the relevant instructions in the Operator's Manual.

### ● List of Seals

| Item | Name of Parts | Part Numbers | Quantity | |
|---|---|---|---|---|
| | | | 4 Port Valve | 3 Port Valve |
| 10 | O-Ring | SO-NB-P18 | — | 1 |
| 11 | O-Ring | SO-NB-P14 | 2 | 1 |
| 12 | O-Ring | SO-NB-P12 | 2 | 1 |
| 13 | O-Ring | SO-NB-P11 | 2 | 1 |
| 14 | O-Ring | SO-NB-P9 | 4 | 3 |
| 15 | O-Ring | SO-NA-P5 | 2 | 1 |
| 16 | Back Up Ring | 2705-VK414322-8 | 2 | 1 |
| 25 | O-Ring | SO-NB-P18 | 2 | 1 |

Note 1: O-Ring of item (25) are included in solenoid assembly.
2: When ordering the seals, specify the seal kit number from the table right.

### ● Change of supply voltage

The supply voltage can be changed by replacing the coil (21) only.

### ● List of Seal Kits

| Valve Model Numbers | Seal Kit Numbers |
|---|---|
| DSLG-01-3-O-∗-N-10∗ | KS-DSLG-01-3-N-10 |
| DSLG-01-3-C-∗-N-10∗ | |
| DSLG-01-4-O-∗-N-10∗ | KS-DSLG-01-4-N-10 |

### ● List of Solenoid Ass'y and Connectors

| Valve Model No. | (20) Solenoid Ass'y No. | (21) Coil No. | (27) Connector No. | (28) Connector No. |
|---|---|---|---|---|
| DSLG-01-∗-∗-D12-N-10∗ | SD1L-12-N-11 | C-SD1-12-N-50 | GDM-211-A-11 | GDM-211-B-11 |
| DSLG-01-∗-∗-D24-N-10∗ | SD1L-24-N-11 | C-SD1-24-N-50 | | |
| DSLG-01-∗-∗-R100-N-10∗ | SD1L-100-N-11 | C-SR1-100-N-50 | GDME-211-R-A-10 | GDME-211-R-B-10 |
| DSLG-01-∗-∗-R200-N-10∗ | SD1L-200-N-11 | C-SR1-200-N-50 | | |