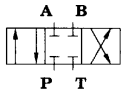
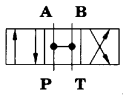
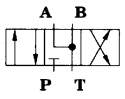
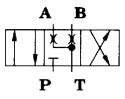
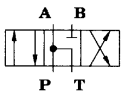
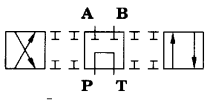
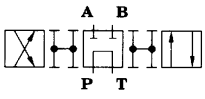
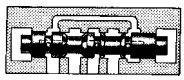
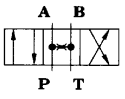
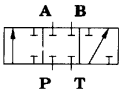
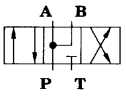
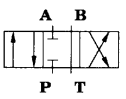
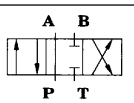
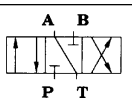
# Directional Valves

These valves are used for shifting oil flow direction of hydraulic circuit and for a control of actuator starting/stopping as well as the operating direction shifting of actuator. Directional valves are classified in the following five types depending on the operational method. Solenoid Operated Directional Valves, Solenoid Controlled Pilot Operated Directional Valves, Pilot Operated Directional Valves, Manually Operated Directional Valves, and Mechanically Operated Directional Valves.

## ■ Spool Types

Spool types are classified to the condition of flow at the neutral position.

| Spool Type | Graphic Symbols | Schematic Drawing (Centre Position) | Functions and Applications |
|---|---|---|---|
| **2** (Closed Centre All Ports) |   |   | Holds pump pressure and cylinder position at neutral. Care should be paid if used as a 2-position type because shock occurs when each port is blocked in transit. |
| **3** (Open Centre All Ports) |   |   | Pump can be unloaded and actuator is floating at neutral. If a 2-position type is used, shock is reduced as each port is released to tank in transit. |
| **4** (Open Centre A, B&T) |   |   | Pump pressure is held and actuator is floated at neutral. 2-postion type is used when system pressure is required to be held in transit. Shock during transit is less compared to spool type "2' |
| **40** (Open Centre A, B&T Restricted Flow) |   |   | In a variation of spool type "4", a restrictor is provided in A-T and B-T ports. Making it faster at stopping the actuator. |
| **5** (Open Centre P, A&T) |   |   | It can be used when a pump is unloading at neutral and actuator is halted at one way flow. |
| **6** (Open Centre P&T Closed Crossover) |   |   | Pump is unloading and actuator position held at neutral. Suitable for series operation. |
| **60** (Open CentreP&T Open Crossover) |   |   | It is a variation of spool type "6". Shock is reduced as each port is released to tank on transit. |
| **7** (Open Centre All Ports Restricted Flow) |   |   | Mainly used as a 2-position type. Shock is reduced on transit. |
| **8** (2-Way) |   |   | Pump pressure and cylinder position is held at neutral in the same way as spool type "2". It is used as 2 way type. |
| **9** (Open Centre P, A&B) |   |   | Regenerative circuit is provided at neutral. |
| **10** (Open Centre B&T) |   |   | Prevent actuator from one direction drift by leakage of P port at neutral. |
| **11** (Open Centre P&A) |   |   | Halt actuator movement positively at B, T ports blocked P, A ports connected at neutral. |
| **12** (Open Centre A&T) |   |   | Prevent actuator from one direction drift by leakage of P port at neutral. |

## Solenoid

- Solenoid connector (DIN connector)

  The solenoid connector is in accordance with the international standard ISO 4400 (Fluid power systems and components - Three pin electrical plug connectors - Characteristics and requirements).

- **Plug-in connector type**

  Electrical wires are of the plug-in type which allows mounting and removal of the valve without removing connections.

  **Plug-in connector type with solenoid indicator light**

  A solenoid indicator light is added to the above plug-in connector type.
  Operation of the solenoid easily identified.

- AC Solenoid

  50-60 Hz common service solenoids do not require rewiring when the applied frequency is changed.

- DC Solenoid (K-Series Solenoid Operated Directional Valve)

  These valves differ from conventional DC Solenoid Operated Directional Valves and have the following characteristics:

  1. The spark between the relay contacts has been eliminated and therefore the valve can be operated by miniature relays.
  2. The surge voltage is approximately 10% of that normally experienced.
  3. Time lag on de-energisation is reduced by approximately 50%.

- R Type Models with Current Rectifier and DC Solenoid

  Specially designed DC solenoid and receptacle (or connector) containing AC-DC rectifier and transient peak suppressor are provided. Connection to be made to AC power source as with conventional AC solenoid.
  Remarkably high reliability and long life and other advantages including quite valve operation. No overheating of coil due to the spool sticking and protection against transient voltage peaks are assured.

- RQ Type Models with Current rectifier and Quick Return Solenoid

  Valve characteristics are identical to all type except for the fast return time of the spool after de-energisation.

- Insulation class of Solenoid: Class-H

# Mounting Surface

Mounting surface diamensions conform to ISO 4401, Hydraulic fluid power-Four-port directional control valves-Mounting surfaces.

| Name | Model Numbers | ISO Code of Mounting Surface |
|---|---|---|
| Solenoid Operated Directional Valves | ❊-DSG-01 | ISO-4401-AB-03-4-A |
| | ❊-DSG-03 | ISO-4401-AC-05-4-A |
| Solenoid Controlled Pilot Operated Directional Valves | ❊-DSHG-06 | ISO-4401-AE-08-4-A |
| | ❊-DSHG-10 | ISO-4401-AF-10-4-A |

# Instructions

## ● Mounting

| | |
|---|---|
| (S-)DSG-01<br>(S-)DSG-03<br>(S-)DSHG-❊ | No-spring detented models not energised continuously must be installed so that the spool axis L-L' is horizontal. Otherwise there is no mounting restrictions. |

## ● Energisation

1. No-Spring Type
   One of two solenoids should be energised continuously to avoid malfunction.
2. On double solenoid valves do not energise both at the same time as it will result in coils burning out.

## ● Valve Tank Port

Avoid connecting the valve tank port to a line with possible surge pressure.
Piping end of tank line should be submerged in oil.

## ● Pilot Drain Port for Solenoid Controlled Pilot Operated Valve

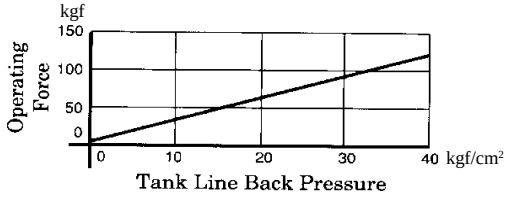
Avoid connecting the valve pilot drain port to a line with possible surge pressure.
Piping end of drain should be submerged in oil.

## ● Shockless Type

In order to benefit from a shockless operation, it is necessary to fill the tank line with operating oil.
Only after the tank line has been filled with operating oil the valve should be used on a regular basis.

## ● 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 below.)



# ■ 1/8 Solenoid Operated Directional Valves, DSG-01 Series

● ***WIDE RANGE OF MODELS--Choose the optimum valve to meet your needs from a large selection available.***

The DSG-01 50 series solenoid operated directional valve comes with two basic models:

- **Standard type** ------- high pressure, high flow [315 kgf/cm² 63 l/min]
- **Shockless type** ------- which greatly reduces noise which is a result of spool changeover and vibrating pipes.

Plug-in Connector Type

The optimum valve for any system can be utilised since many spool types, and various solenoids are all available, along with other optional functions.

## ■ Ratings

| Valve Type | Model Nmbers | Max. Flow l/min | Max. Operating Pressure kgf/cm² | Max. T-Line Back Pressure kgf/cm² | Max. Changeover Frequency Cycles/Min | Mass kg |
|---|---|---|---|---|---|---|
| Standard Type | DSG-01-3C❋-❋-50 | 63 | 315 (Spool Type 60 Only) 250 | 160 | 300 (R Type Sol. Only) 120 | 2.2 |
| | DSG-01-2D2❋-❋-50 | | | | | |
| | DSG-01-2B❋-❋-50 | | | | | 1.6 |
| Shockless Type | S-DSG-01-3C❋-❋-50 | 40 | 160 | 160 | 120 | 2.2 |
| | S-DSG-01-2B2-❋-50 | | | | | 1.6 |

Maximum flow indicates a ceiling flow. As the ceiling flow depends on the type of spool and operating condition, refer to the List of Spool Functions on pages 145 and 146 for details.

## ■ Sub-Plates

| Sub-plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|
| DSGM-01-3080 | 1/8 BSP.F | 0.8 |
| DSGM-01X-3080 | 1/4 BSP.F | 0.8 |

Sub-plates are available. Specify sub-plate model 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.

| Soc. Hd. Cap Screw | Qty. | Tightning Torque | Bolt kit Model No. |
|---|---|---|---|
| M5 x 45 Lg | 4 | 0.5-0.7 kgf-m [Applicable to working pressure more than 250 kgf/cm² : 0.6 - 0.7 kgf-m] | BKDSG-01-10 |

## ■ Solenoid Ratings

| Valve Type | Electric Source | Coil Type | Frequency (Hz) | Voltage (V) | | Current & Power at Rated Voltage | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Source Rating | Serviceable Range | Inrush (A)*2 | Holding (A) | Power (W) |
| Standard Type | *1 AC | A100 | 50 | 100 | 80 - 110 | 2.38 | 0.46 | — |
| | | | 60 | 100 | 90 - 120 | 2.12 | 0.32 | |
| | | | | 110 | | 2.33 | 0.39 | |
| | | A120 | 50 | 120 | 96 - 132 | 1.98 | 0.38 | |
| | | | 60 | | 108 - 144 | 1.77 | 0.27 | |
| | | A200 | 50 | 200 | 160 - 220 | 1.19 | 0.23 | |
| | | | 60 | 200 | 180 - 240 | 1.06 | 0.16 | |
| | | | | 220 | | 1.17 | 0.19 | |
| | | A240 | 50 | 240 | 192 - 264 | 0.99 | 0.19 | |
| | | | 60 | | 216 - 288 | 0.89 | 0.13 | |
| Shockless Type | DC (K Series) | D12 | — | 12 | 10.8- 13.2 | — | 2.2 | 26 |
| | | D24 | | 24 | 21.6 - 26.4 | | 1.1 | |
| | | D100 | | 100 | 90 - 110 | | 0.27 | |
| | AC→DC Rectified | R100 | 50/60 | 100 | 90 - 110 | — | 0.30 | 26 |
| | | R200 | | 200 | 180 - 220 | | 0.15 | |

*1. AC solenoid is not available in shockless type.
R type models with built-in current rectifier is recommended for shockless operation with AC power.
*2. Inrush current in the above table show rms values at maximum stroke.

## ■ Model Number Designation

| F - | S - | DSG | - 01 | - 2 | B | 2 | A | - A 100 | - N | 50 | - L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Special Seals | Shock-Less Type | Series Number | Valve Size | Number of Valve Positions | Spool - Spring Arrangement | Spool Type | Special Two Position Valve [Omit if not required] | Coil Type | Electrical Conduit Connection | *3 Design Number | Models with Alternate Offset Solenoid [Omit if not required] |
| **F:** Special Seals for Phophate Ester Type Fluids (Omit if not required) | **None :** Standard Type | **DSG :** Solenoid Operated Directional Valve | **01** | **3 :** Three Positions | **C :** Spring Centered | 2. 3 4.40 5.60 7. 8 9.10 11.12 | — | AC : A 100 A 120 A 200 A 240 DC : D 12 D 24 D 100 R : (AC → DC) R 100 R 200 | **N :** With Plug-in Connector (DIN) — — — **N1 :** With Plug-in Connector with Indicator Light (Option) | 50 | — |
| | | | | **2 :** Two Positions | **D :** No-Spring Detented | 2. 3 7. 8 | **A*1** | | | | |
| | | | | | **B :** Spring Offset | 2. 3 8 | **A*1** **B*1** | | | | L |
| | **S :** Shock-Less Type | | | **3 :** Three Positions | **C :** Spring Centered | 2. 4 40 | — | DC : D 12 D 24 D 100 R: *2 AC→DC R 100 R 200 | | | — |
| | | | | **2 :** Two Positions | **N :** No-Spring | 2 | | | | | L |
| | | | | | B: Spring Offset | 2 | | | | | |

* 1. Another spool types for special 2-position valves are available in addition to spool type 2,3,7 and 8.
* 2. Coil type "R" is not available for plug-in connector with indicator light type "N1".
* 3. Design numbers subject to change. But installation dimensions remain as shown for design number 50 through 59.

## ■ List of Spool Function of Standard Type

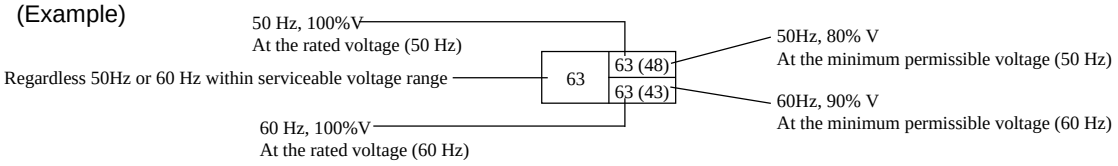
● Models with AC Solenoids : DSG-01-✻✻✻-A✻

| No. of Valve Positions | Spool-Spring Arrangements | Model Numbers | Graphic Symbols | Max. Flow l/min P→A→B→T, B→A | | | | | P→A [Port "B" Blocked] | | | | | P→B [Port "A" Blocked] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| Three Positions | Spring Centered | DSG-01-3C2 | | 63 | 63 | 63 | 63 | 63 | 63 (30) | 63 (23) | 63 (15) | 50 (10) | 40 (10) | 63 (30) | 63 (23) | 63 (15) | 50 (10) | 40 (10) |
| | | | | | | | | | 45 (25) | 33 (18) | 20 (10) | 13 ( 5 ) | 13 ( 5 ) | 45 (25) | 33 (18) | 20 (10) | 13 ( 5 ) | 13 ( 5 ) |
| | | DSG-01-3C3 | | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| | | DSG-01-3C4 | | 63 | 63 | 63 | 63 | 63 (48) | 63 (25) | 63 (23) | 63 (20) | 63 (13) | 55 (10) | 63 (25) | 63 (23) | 63 (20) | 63 (13) | 55 (10) |
| | | | | | | | | 63 (43) | 58 (20) | 48 (18) | 35 (15) | 20 (8) | 13 (5) | 58 (20) | 48 (18) | 35 (15) | 20 (8) | 13 (5) |
| | | DSG-01-3C40 | | 63 | 63 | 63 | 63 | 63 | 63 (30) | 63 (23) | 63 (15) | 50 (10) | 40 (10) | 63 (30) | 63 (23) | 63 (15) | 50 (10) | 40 (10) |
| | | | | | | | | | 45 (25) | 33 (18) | 20 (10) | 13 ( 5 ) | 13 ( 5 ) | 45 (25) | 33 (18) | 20 (10) | 13 ( 5 ) | 13 ( 5 ) |
| | | DSG-01-3C5 * | | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — |
| | | DSG-01-3C60 * | | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — |
| | | DSG-01-3C7 | | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| | | DSG-01-3C8 | | — | — | — | — | — | 63 (25) | 63 (25) | 63 (25) | 63 (15) | 63 (10) | 63 (25) | 63 (25) | 63 (25) | 63 (13) | 63 (10) |
| | | | | | | | | | 63 (20) | 38 (20) | 28 (20) | 20 (10) | 15 (5) | 63 (20) | 38 (20) | 28 (20) | 20 (10) | 15 (5) |
| | | DSG-01-3C9 | | 63 | 63 | 63 | 63 | 63 | 28 | 20 | 15 | 10 | 10 | 28 | 20 | 15 | 10 | 10 |
| | | DSG-01-3C10 | | 63 | 63 | 63 | 63 | 63 | 63 (38) | 63 (30) | 63 (25) | 63 (15) | 63 (13) | 63 (38) | 63 (30) | 63 (25) | 63 (15) | 63 (13) |
| | | | | | | | | | 63 (33) | 45 (25) | 30 (20) | 20 (10) | 15 (8) | 63(33) | 45 (25) | 30 (20) | 20 (10) | 15 (8) |
| | | DSG-01-3C11 | | 63 | 63 | 63 | 63 | 63 | 30 | 23 | 20 | 13 | 10 | 63 | 63 (50) | 63 (50) | 63 (50) | 63 (50) |
| | | | | | | | | | | | | | | 63 (58) | 63 (45) | 63 (45) | 63 (45) | 63 (45) |
| | | DSG-01-3C12 | | 63 | 63 | 63 | 63 | 63 | 63 (30) | 63 (28) | 63 (23) | 63 (18) | 63 (15) | 63 (30) | 63 (28) | 63 (23) | 63 (18) | 63 (15) |
| | | | | | | | | | 63 (25) | 35 (23) | 25 (18) | 18 (13) | 15 (10) | 63 (25) | 35 (23) | 25 (18) | 18 (13) | 15 (10) |
| Two Positions | No Spring Detented | DSG-01-2D2 | | 63 | 63 | 63 | 63 | 63 | 45 | 45 | 45 | 45 (35) | 45 (25) | 45 | 45 | 45 | 45 (35) | 45 (25) |
| | | | | | | | | | | | | 40 (30) | 30 (20) | | | | 40 (30) | 30 (20) |
| | | DSG-01-2D3 | | 63 | 63 | 63 | 63 | 63 | 45 | 45 | 45 | 45 (35) | 45 (25) | 45 | 45 | 45 | 45 (35) | 45 (25) |
| | | | | | | | | | | | | 40 (30) | 30 (20) | | | | 40 (30) | 30 (20) |
| | | DSG-01-2D7 | | 63 | 63 | 63 | 63 | 63 | 45 | 45 | 45 | 45 (35) | 45 (25) | 45 | 45 | 45 | 45 (35) | 45 (25) |
| | | | | | | | | | | | | 40 (30) | 30 (20) | | | | 40 (30) | 30 (20) |
| | | DSG-01-2D8 | | — | — | — | — | — | 40 (30) | 40 (30) | 40 (30) | 35 (30) | 35 (25) | 40 (30) | 40 (30) | 40 (30) | 35 (30) | 35 (25) |
| | | | | | | | | | 35 (30) | 35 (30) | 35 (30) | 30 (25) | 25 (20) | 35 (30) | 35 (30) | 35 (30) | 30 (25) | 25 (20) |
| | Spring Offset | DSG-01-2B2 | | 63 | 63 | 63 | 63 | 63 | 20 | 20 | 20 | 20 | 20 | 63 | 63 (55) | 63 (50) | 63 (50) | 63 (45) |
| | | | | | | | | | | | | | | | 63 (50) | 63 (45) | 63 (45) | 60 (40) |
| | | DSG-01-2B3 | | 63 | 63 | 63 | 63 | 63 | 50 | 50 | 50 | 50 | 50 | 63 | 63 | 63 | 63 | 63 |
| | | | | | 63 (60) | 63 (60) | 63 (60) | 63 (60) | | | | | | 63 (55) | 63 (55) | 63 (55) | 63 (55) | 63 (55) |
| | | DSG-01-2B8 | | — | — | — | — | — | 25 | 13 | 10 | 10 | 10 | 63 (28) | 63 (25) | 63 (20) | 63 (13) | 50 (10) |
| | | | | | | | | | | | | | | 63 (23) | 35 (20) | 23 (15) | 15 (8) | 10 (5) |

Note : 1. Maximum flow rates and applied current.

- The single column describs maximum flow rates regardless AC solenoid 50 Hz or 60 Hz within serviceable voltage range.
- Maximum flow rates at 50 Hz solenoid with serviceable voltage range refer to the figures in the upper column and 60 Hz solenoid within serviceable voltage range refer to the figures in the latter column. Where two figures are shown in the same column, the figure outside ( ) is at rated voltage and inside ( ) is at the minimum permissible solenoid voltage.

(Example)




2. For the maximum flow between P and T of those valves marked "*", refer to page 147

## ■ List of Spool Function of Standard Type

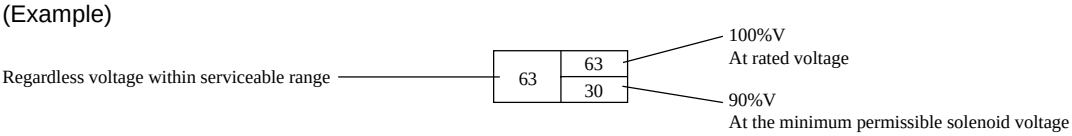
● Models with DC or R Type Solenoids : DSG-01-✻✻✻-D✻/R✻

| No. of Valve Positions | Spool-Spring Arrangements | Model Numbers | Graphic Symbols | Max. Flow l/min | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | P → A → B → T<br>P → B → A → T | | | | | P → A [Port "B" Blocked] | | | | | P → B [Port "A" Blocked] | | | | | |
| | | | | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| Three Positions | Spring Centered | DSG-01-3C2 | | 63 | 63 | 63 | 63 | 63 | 45 | 30 | 20 | 15 | 13 | 45 | 30 | 20 | 15 | 13 |
| | | | | | | | | | 33 | 23 | 15 | 10 | 10 | 33 | 23 | 15 | 10 | 10 |
| | | DSG-01-3C3 | | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| | | DSG-01-3C4 | | 63 | 63 | 63 | 63 | 35 | 63 | 45 | 35 | 30 | 28 | 63 | 45 | 35 | 30 | 28 |
| | | | | | | | 28 | 23 | 50 | 30 | 23 | 15 | 13 | 50 | 30 | 23 | 15 | 13 |
| | | DSG-01-3C40 | | 63 | 63 | 63 | 63 | 63 | 45 | 30 | 20 | 15 | 13 | 45 | 30 | 20 | 15 | 13 |
| | | | | | | | | | 33 | 23 | 15 | 10 | 10 | 33 | 23 | 15 | 10 | 10 |
| | | * DSG-01-3C5 | | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — |
| | | * DSG-01-3C60 | | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — | 45 | 43 | 40 | 40 | — |
| | | DSG-01-3C7 | | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| | | DSG-01-3C8 | | — | — | — | — | — | 63 | 50 | 30 | 20 | 15 | 63 | 50 | 30 | 20 | 15 |
| | | | | | | | | | 55 | 28 | 18 | 13 | 10 | 55 | 28 | 18 | 13 | 10 |
| | | DSG-01-3C9 | | 63 | 63 | 63 | 63 | 63 | 25 | 20 | 15 | 10 | 10 | 25 | 20 | 15 | 10 | 10 |
| | | DSG-01-3C10 | | 63 | 63 | 63 | 63 | 45 | 63 | 55 | 40 | 28 | 20 | 63 | 55 | 40 | 28 | 20 |
| | | | | | | | 33 | 23 | | 40 | 28 | 18 | 13 | | 40 | 28 | 18 | 13 |
| | | DSG-01-3C11 | | 63 | 63 | 63 | 63 | 63 | 30 | 23 | 20 | 13 | 10 | 63 | 58 | 55 | 55 | 55 |
| | | | | | | | | | | | | | | | 50 | 50 | 50 | 50 |
| | | DSG-01-3C12 | | 63 | 63 | 63 | 63 | 38 | 63 | 60 | 40 | 25 | 20 | 63 | 60 | 40 | 25 | 20 |
| | | | | | | | 30 | 23 | | 38 | 28 | 20 | 15 | | 38 | 28 | 20 | 15 |
| Two Positions | No Spring Detented | DSG-01-2D2 | | 63 | 63 | 63 | 63 | 63 | 45 | 45 | 45 | 40 | 30 | 45 | 45 | 45 | 40 | 30 |
| | | | | 58 | 55 | 55 | 55 | 55 | | | | 30 | 25 | | | | 30 | 25 |
| | | DSG-01-2D3 | | 63 | 63 | 63 | 63 | 63 | 45 | 45 | 45 | 40 | 30 | 45 | 45 | 45 | 40 | 30 |
| | | | | 58 | 55 | 55 | 55 | 55 | | | | 30 | 25 | | | | 30 | 25 |
| | | DSG-01-2D7 | | 63 | 63 | 63 | 63 | 63 | 45 | 45 | 45 | 40 | 30 | 45 | 45 | 45 | 40 | 30 |
| | | | | 58 | 55 | 55 | 55 | 55 | | | | 30 | 25 | | | | 30 | 25 |
| | | DSG-01-2D8 | | — | — | — | — | — | 35 | 35 | 35 | 30 | 25 | 35 | 35 | 35 | 30 | 25 |
| | | | | | | | | | 30 | 30 | 30 | 25 | 20 | 30 | 30 | 30 | 25 | 20 |
| | Spring Offset | DSG-01-2B2 | | 63 | 63 | 63 | 63 | 63 | 20 | 18 | 18 | 18 | 18 | 63 | 58 | 40 | 30 | 30 |
| | | | | 53 | 53 | 53 | 53 | 53 | | | | | | | 40 | 28 | 25 | 25 |
| | | DSG-01-2B3 | | 38 | 38 | 38 | 38 | 38 | 48 | 48 | 45 | 45 | 40 | 63 | 63 | 63 | 63 | 63 |
| | | | | 28 | 28 | 28 | 28 | 28 | 45 | 45 | 40 | 40 | 38 | | 60 | 60 | 60 | 60 |
| | | DSG-01-2B8 | | — | — | — | — | — | 25 | 13 | 10 | 8 | 8 | 63 | 48 | 28 | 15 | 15 |
| | | | | | | | | | | | | | | | 30 | 20 | 13 | 10 |

Note : 1. Maximum flow rates and applied current.

- The single column describes maximum flow rates regardless voltage within serviceable voltage range.
- Where two figures are shown in the same column, the upper is at rated voltage and the latter is at the minimum permissible solenoid voltage.

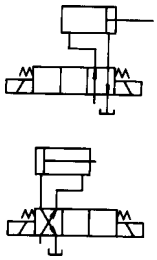
(Example)

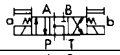



2. For the maximum flow between P and T of those valves marked "*", refer to page 147

## ■ Maximum Flow of Center By-Pass

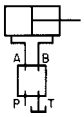
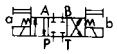
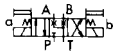
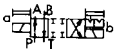
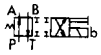
In spool type 5 and 60, P→T (Center By-Pass) flow rates are limited as shown the column below. Described maximum flow rates are regardless volatge within serviceable voltage range.



| Model Numbers | Graphics Symbols | Max. Flow l/min | | | |
|---|---|---|---|---|---|
| | | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² |
| DSG-01-3C5-A✻/D✻/R✻ |  | 45 | 43 | 40 | 30 |
| DSG-01-3C60-A✻/D✻/R✻ |  | 45 | 43 | 40 | 30 |

## ■ List of Spool Function of Shock-Less Type

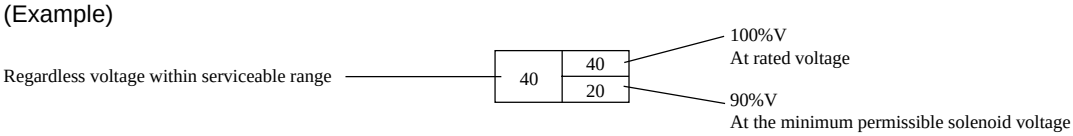
- Models with Dc of R Type Solenoids : S-DSG-01-✻✻✻-D✻/R✻

| No. of Valve Positions | Spool Spring Arrangement | Model Numbers | Graphic Symbols | Max. Flow l/min | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | P→A→B→T, P→B→A→T | | | P → A [Port "B" Blocked] | | | P → B [Port "A" Blocked] | | |
| | | | |  | | |  | | |  | | |
| | | | | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² |
| Three Positions | Spring Centered | S-DSG-01-3C2 |  | 40 | 40 | 40 | 40 | 40<br>20 | 30<br>15 | 40 | 40<br>20 | 30<br>15 |
| | | S-DSG-01-3C4 |  | 40 | 40 | 40 | 40 | 40<br>20 | 30<br>15 | 40 | 40<br>20 | 30<br>15 |
| | | S-DSG-01-3C40 |  | 40 | 40 | 40<br>30 | 40 | 40<br>20 | 25<br>15 | 40 | 40<br>20 | 25<br>15 |
| Two Positions | No-Spring | S-DSG-01-2N2 |  | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | Spring Offset | S-DSG-01-2B2 |  | 40 | 40<br>35 | 40<br>35 | 40 | 30 | 30 | 40 | 40<br>20 | 30<br>15 |

Note : 1. Maximum flow rates and applied current.

- The single column describes maximum flow rates regardless voltage within serviceable voltage range.
- Where two figures are shown in the same column, the upper is at rated voltage and the latter is at the minimum permissible solenoid voltage.

(Example)

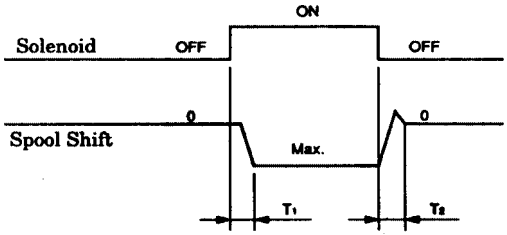


## ■ Typical Changeover Time

Changeover time varies according to oil viscosity, spool type and hydraulic circuit.

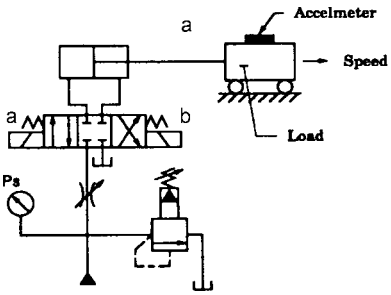
### ● Standard Type

(Without Shockless Function)




### ● Shockless Type

[Test Circuit and Conditions]



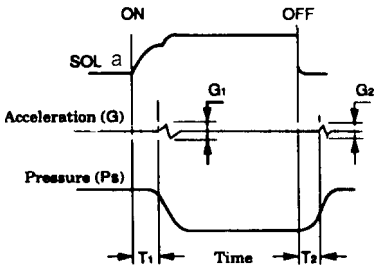

Setting Pressure (Ps):70 kgf/cm$^2$
Speed : 8m/min

[Test Conditions]
Pressure: 160 kgf/cm$^2$
Flow Rate: 31.5 l/min
Viscosity: 35cSt(160 SSU)
Voltage: 100% V
(After coil temperature rise and saturates)

[Result of Measurement]

| Type | Model Numbers | Time ms | |
|---|---|---|---|
| | | T1 | T2 |
| Standard Type | DSG-01-3C2-A* | 15 | 23 |
| | DSG-01-3C2-D* | 48 | 19 |
| | DSG-01-3C2-R* | 50 | 100 |

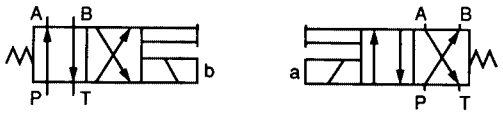
[Result of Measurement]




| Type | Model Numbers | Time ms | | Acceleration G | |
|---|---|---|---|---|---|
| | | T1 | T2 | G1 | G2 |
| Shockless Type | S-DSG-01-3C2-D* | 70 | 30 | 1.2 | 0.7 |
| Standard Type | DSG-01-3C2-D* | 35 | 25 | 1.8 | 1.5 |

## ■ Spring Offset Valves with Alternate Solenoid

Though our standard spring offset models use solenoid "b", alternate models using solenoid "a" are also available. The graphic symbols are expressed below.
For Models 2 B✻A and 2B✻B, refer to table below.

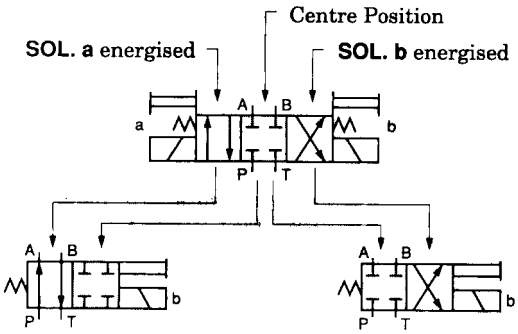



Standard Offset　　Alternate Offset ("L")

## ■ Valves with Centre Position and One Offset Position (Special Two Position Velve)

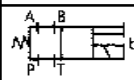
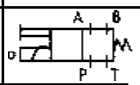
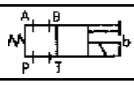
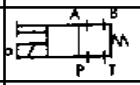
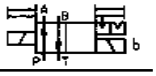
In addition to the standard two position valves shown on the table on pages 145 and 146 two kinds of valves are available with centre position and either one of two offset positions.
Standard and alternate offset types use solenoid "b" and solenoid "a" respectively.

### (Example) In case of Spool Type "2"




"A": Use of Centre and **SOL. a** energised Position (2B2A)

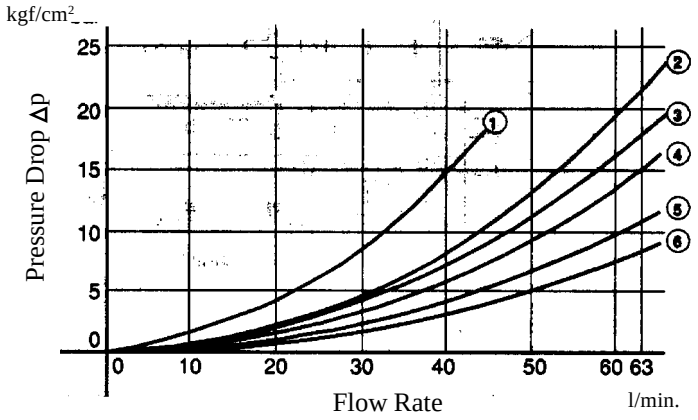
"B": Use of Centre and **SOL. b** energised Position (2B2B)

| Model Numbers | Graphic Symbols | | Model Numbers | Graphic Symbols | | Model Numbers | Graphic Symbols |
|---|---|---|---|---|---|---|---|
| | Standard Offset Type | Alternate Offset Type | | Standard Offset Type | Alternate Offset Type | | Standard Offset Type |
| DSG-012B✻A |  |  | DSG-012B✻B |  |  | DSG-012D✻A |  |
| DSG-01-2B2A |  |  | DSG-01-2B2B |  |  | DSG-01-2D2A |  |
| DSG-01-2B3A |  |  | DSG-01-2B3B |  |  | DSG-01-2D3A |  |
| DSG-01-2B4A |  |  | DSG-01-2B4B |  |  | DSG-01-2D4A |  |
| DSG-01-2B40A |  |  | DSG-01-2B40B |  |  | DSG-01-2D40A |  |
| DSG-01-2B5A |  |  | DSG-01-2B5B |  |  | DSG-01-2D5A |  |
| DSG-01-2B60A |  |  | DSG-01-2B60B |  |  | DSG-01-2D7A |  |
| DSG-01-2B7A |  |  | DSG-01-2B7B |  |  | DSG-01-2D9A |  |
| DSG-01-2B8A |  |  | DSG-01-2B8B |  |  | DSG-01-2D10A |  |
| DSG-01-2B9A |  |  | DSG-01-2B9B |  |  | DSG-01-2D11A |  |
| DSG-01-2B10A |  |  | DSG-01-2B10B |  |  | DSG-01-2D12A |  |
| DSG-01-2B11A |  |  | DSG-01-2B11B |  |  | | |
| DSG-01-2B12A |  |  | DSG-01-2B12B |  |  | | |

## ■ Pressure Drop

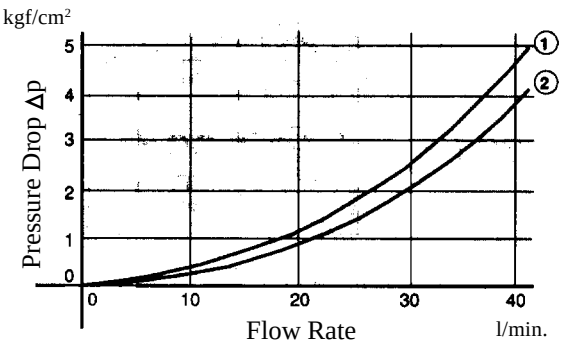
Pressure drop based on viscosity of 35 cSt (mm²/s) (160 SSU) and specific gravity of 0.850.

### ● Standrad Type : DSG-01




| Model Numbers | Presure Drop Curve Number | | | | |
|---|---|---|---|---|---|
| | P →A | B →T | P →B | A →T | P →T |
| DSG-01-3C2 | ⑤ | ⑤ | ⑤ | ⑤ | — |
| DSG-01-3C3 | ⑥ | ⑥ | ⑥ | ⑥ | ④ |
| DSG-01-3C4 | ⑤ | ⑥ | ⑤ | ⑥ | — |
| DSG-01-3C40 | ⑤ | ⑤ | ⑤ | ⑤ | — |
| DSG-01-3C5 | ① | ① | ① | ① | ④ |
| DSG-01-3C60 | ① | ① | ① | ① | ④ |
| DSG-01-3C7 | ⑤ | ⑤ | ⑤ | ⑤ | — |
| DSG-01-3C8 | ⑤ | — | ⑤ | — | — |
| DSG-01-3C9 | ⑥ | ⑤ | ⑤ | ⑥ | — |
| DSG-01-3C10 | ⑤ | ⑥ | ⑤ | ⑤ | — |
| DSG-01-3C11 | ⑥ | ⑤ | ⑤ | ⑤ | — |
| DSG-01-3C12 | ⑤ | ⑤ | ⑤ | ⑤ | — |
| DSG-01-2D2 | ⑤ | ② | ⑤ | ② | — |
| DSG-01-2D3 | ⑤ | ③ | ⑤ | ③ | — |
| DSG-01-2D7 | ⑤ | ③ | ⑤ | ③ | — |
| DSG-01-2D8 | ⑤ | — | ⑤ | — | — |
| DSG-01-2B2 | ② | ② | ⑤ | ② | — |
| DSG-01-2B3 | ③ | ③ | ⑤ | ⑥ | — |
| DSG-01-2B8 | ⑤ | — | ⑤ | — | — |
| DSG-01-2N2 | ⑤ | ② | ⑤ | ② | — |
| DSG-01-2N3 | ⑤ | ③ | ⑤ | ③ | — |
| DSG-01-2N7 | ⑤ | ③ | ⑤ | ③ | — |
| DSG-01-2N8 | ⑤ | — | ⑤ | — | — |

### ● Shock-Less Type : S-DSG-01




| Model Numbers | Presure Drop Curve Number | | | |
|---|---|---|---|---|
| | P →A | B→ T | P →B | A →T |
| S-DSG-01-3C2 | ① | ① | ① | ① |
| S-DSG-01-3C4 | ① | ② | ① | ② |
| S-DSG-01-3C40 | ① | ② | ① | ② |
| S-DSG-01-2N2 | ① | ① | ① | ① |
| S-DSG-01-2B2 | ① | ① | ① | ① |

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

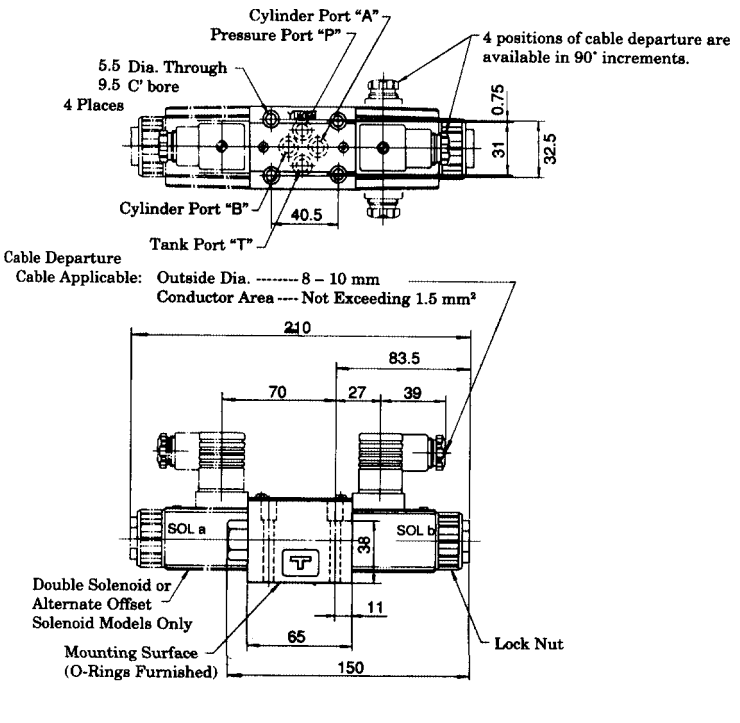
| Viscosity | cSt (mm²/s) | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SSU | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 | 464 |
| | Factor | 0.81 | 0.87 | 0.96 | 1.03 | 1.09 | 1.14 | 1.19 | 1.23 | 1.27 | 1.30 |

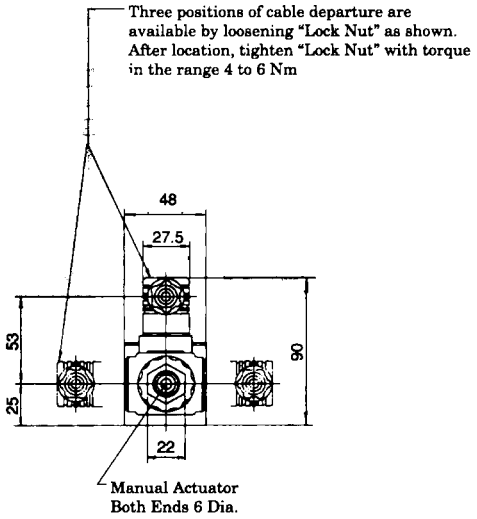
- For any other specific gravity (G'), the pressure drop (ΔP') any be obtained from the formula below.
  ΔP' = P(G'/0.850)

## PLUG-IN CONNECTOR TYPE (N)
## PLUG-IN CONNECTOR WITH INDICATOR LIGHT (N1)

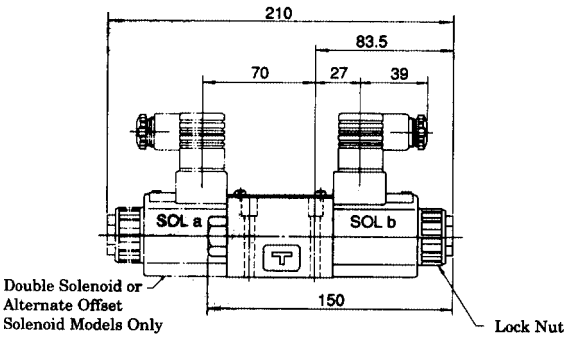
■ Models with AC Solenoids : DSG-01-✻✻✻-A✻-$\frac{N}{N1}$-50

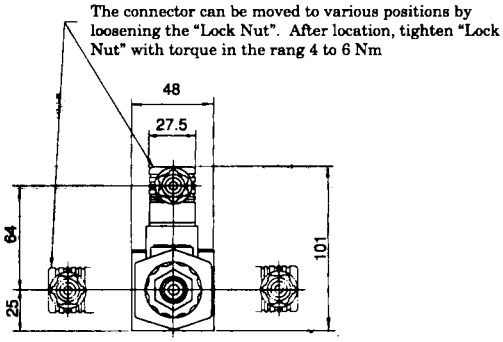
DIMENSION IN MILLIMETERS



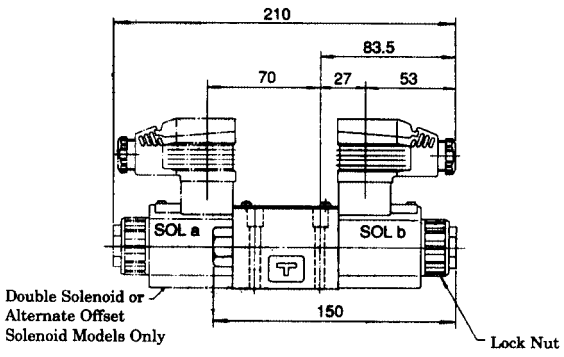



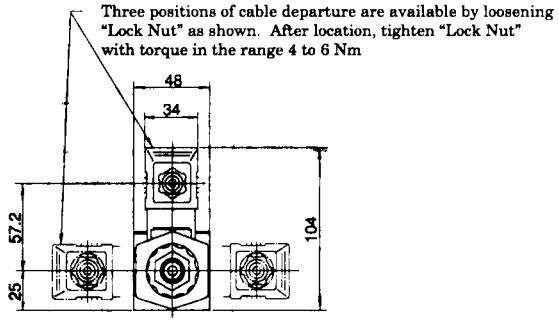

■ Models with DC Solenoids : (S-)DSG-01-✻✻✻-D✻-$\frac{N}{N1}$-50




■ Models with R Solenoids : (S-)DSG-01-✻✻✻-R✻-N-50

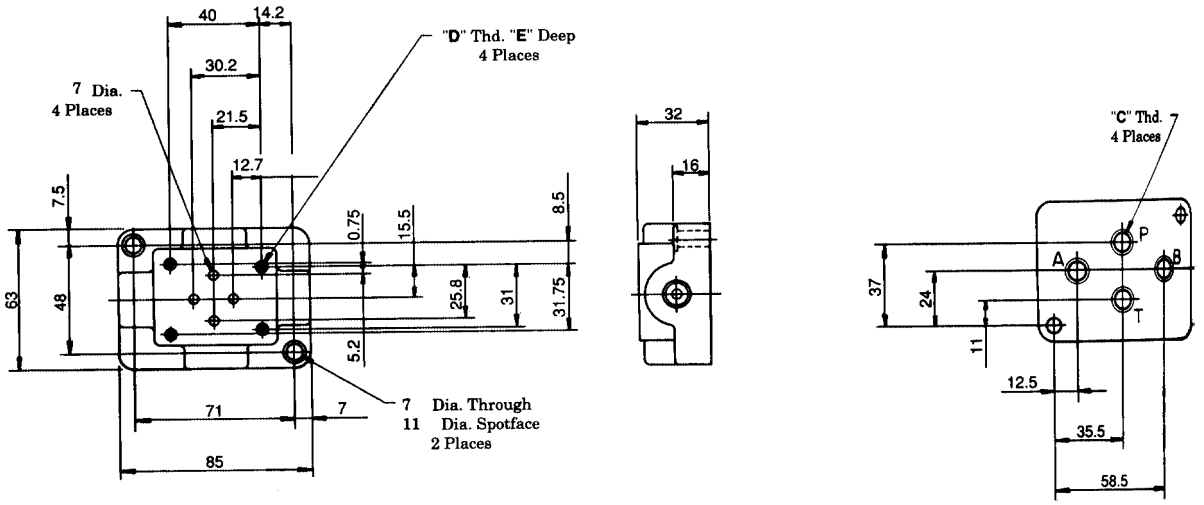


## ■ Sub Plates

DSGM-01✳-3080

DIMENSION IN MILLIMETERS




| Sub-Plate Model Numbers | 'C' BSP.F | "D" Thd. | "E" |
|---|---|---|---|
| DSGM-01-3080 | 1/8 | M5 | 10 |
| DSGM-01X-3080 | 1/4 | | |

Sub-Plate are availab.e Specify sub-plate model from the table above. When sub-plates are are not used. The mounting surface as shown by shaded are should have a good machined finish.

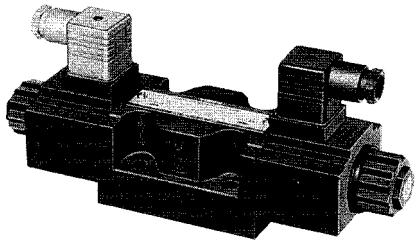
# ■ 3/8 Solenoid Operated Directional Valves, DSG-03 Series

● ***WIDE RANGE OF MODELS--Choose the optimum valve to meet your needs from a large selection available.***

The DSG-03 50 series solenoid operated directional valve comes with two basic models:

- **Standard type** ------- high pressure, high flow [315 kgf/cm$^2$ 120 l/min]
- **Shockless type** ------ which greatly reduces noise which is a result of spool changeover and vibrating pipes.

The optimum valve for any system can be utilised since many spool types, and various solenoids are all available, along with other optional functions.



Plug-in Connector Type

## ■ Ratings

| Valve Type | Model Numbers | Max. Flow l/min | Max. Operating Pressure kgf/cm$^2$ | Max. T-Line Back Pressure kgf/cm$^2$ | Max. Changeover Frequency Cycles/Min {min$^{-1}$} | Mass kg | |
|---|---|---|---|---|---|---|---|
| | | | | | | Type of Solenoid | |
| | | | | | | AC | DC, R, RQ |
| Standard Type | DSG-03-3C✻-✻-50 | 120 | 315 (Spool Type 60 Only) 250 | 160 | 240 (R Type Sol. Only) 120 | 3.6 | 5 |
| | DSG-03-2D2✻-✻-50 | | | | | | |
| | DSG-03-2B✻-✻-50 | | | | | 2.9 | 3.6 |
| Shockless Type | S-DSG-03-3C✻-✻-50 | 120 | 160 | 160 | 120 | — | 5 |
| | S-DSG-03-2B2-✻-50 | | | | | | 3.6 |

* Maximum flow indicates a ceiling flow. As the ceiling flow depends on the type of spool and operating condition, refer to the List of Spool Functions on pages 155 and 156 for details.

## ● Sub-Plates

| Sub-plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|
| DSGM-03-2180 | 3/8 BSP.F | 3.0 |
| DSGM-03X-2180 | 1/2 BSP.F | 3.0 |
| DSGM-03Y-2180 | 3/4 BSP.F | 4.7 |

● Sub-plates are available. Specify sub-plate model 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.

| Soc. Hd. Cap Screw | Qty. | Tightning Torque | Bolt kit Model No. |
|---|---|---|---|
| M6 x 35 Lg | 4 | 1.2 - 1.5 kgf-m | BKDSG-03-20 |

## ■ Solenoid Ratings

| Valve Type | Electric Source | Coil Type | Frequency (Hz) | Voltage (V) | | Current & Power at Rated Voltage | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Source Rating | Serviceable Range | Inrush (A) *2 | Holding (A) | Power (W) |
| Standard Type | *1 AC | A100 | 50 | 100 | 80 - 110 | 5.37 | 0.90 | — |
| | | | 60 | 100 | 90 - 120 | 4.57 | 0.63 | |
| | | | | 110 | | 5.03 | 0.77 | |
| | | A120 | 50 | 120 | 96 - 132 | 4.48 | 0.75 | |
| | | | 60 | | 108 - 144 | 3.81 | 0.52 | |
| | | A200 | 50 | 200 | 160 - 220 | 2.69 | 0.45 | |
| | | | 60 | 200 | 180 - 240 | 2.29 | 0.31 | |
| | | | | 220 | | 2.52 | 0.38 | |
| | | A240 | 50 | 240 | 192 - 264 | 2.24 | 0.37 | |
| | | | 60 | | 216 - 288 | 1.91 | 0.26 | |
| Shockless Type | DC (K Series) | D12 | — | 12 | 10.8- 13.2 | — | 3.16 | 38 |
| | | D24 | | 24 | 21.6 - 26.4 | | 1.57 | |
| | | D100 | | 100 | 90 - 110 | | 0.38 | |
| | AC→DC Rectified | R100 | 50/60 | 100 | 90 - 110 | — | 0.43 | 38 |
| | | R200 | | 200 | 180 - 220 | | 0.21 | |

*1. AC solenoid is not available in shockless type.
R type models with built-in current rectifier is recommended for shockless operation with AC power.
*2. Inrush current in the above table show rms values at maximum stroke.

## ■ Model Number Designation

| F - | S - | DSG | - 03 | - 2 | B | 2 | A | - A 100 | - N | 50 | - L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Special Seals | Shock-Less Type | Series Number | Valve Size | Number of Valve Positions | Spool - Spring Arrangement | Spool Type | Special Two Position Valve [Omit if not required] | Coil Type | Electrical Conduit Connection | *3 Design Number | Models with Alternate Offset Solenoid [Omit if not required] |
| **F:** Special Seals for Phophate Ester Type Fluids (Omit if not required) | **None :** Standard Type | **DSG :** Solenoid Operated Directional Valve | **03** | **3 :** Three Positions | **C :** Spring Centered | 2. 3<br>4.40<br>5.60<br>7. 8<br>9.10<br>11.12 | — | AC :<br>A 100<br>A 120<br>A 200<br>A 240<br><br>DC :<br>D 12<br>D 24<br>D 100<br><br>R :<br>(AC → DC)<br>R 100<br>R 200 | **N :** With Plug-in Connec-tor (DIN)<br>— — —<br><br>**N1 :** With Plug-in Connector with Indicator Light (Option) | 50 | — |
| | | | | **2 :** Two Positions | **D :** No-Spring Detented | 2. 3<br>7. 8 | **A*1** | | | | |
| | | | | | **B :** Spring Offset | 2. 3<br>8 | **A*1**<br>**B*1** | | | | L |
| | **S :** Shock-Less Type | | | **3 :** Three Positions | **C :** Spring Centered | 2. 4<br>40.60<br>10.12 | — | DC :<br>D 12<br>D 24<br>D 100<br><br>R: *2<br>AC→DC<br>R 100<br>R 200 | | | — |
| | | | | **2 :** Two Positions | **D :** No-Spring Detented | 2 | | | | | L |
| | | | | | **B:** Spring Offset | 2 | | | | | |

* 1. Another spool types for special 2-position valves are available in addition to spool type 2,3,7 and 8.
* 2. Coil type "R" is not available for plug-in connector with indicator light type "N1".
* 3. Design numbers subject to change. But installation dimensions remain as shown for design number 50 through 59.

## ■ List of Spool Function of Standard Type

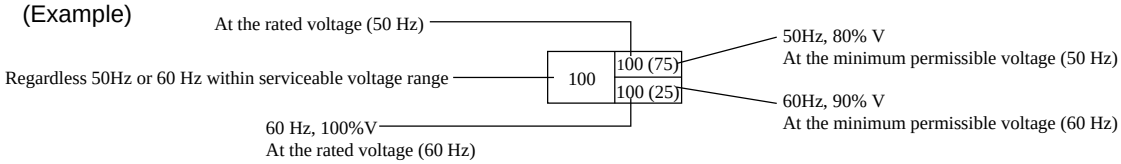
● Models with AC Solenoids : DSG-03-✻✻✻-A✻

| No. of Valve Positions | Spool-Spring Arrangements | Model Numbers | Graphic Symbols | Max. Flow l/min: P → A → B → T / P → B → A | | | | P → A [Port "B" Blocked] | | | | P → B [Port "A" Blocked] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| Three Positions | Spring Centered | DSG-03-3C2 | | 100 | 100 | 100 | 100 | 100 (70) | 100 (48) | 96 (28) | 65 (24) | 100 (70) | 100 (48) | 96 (28) | 65 (24) |
| | | | | | | | | 90 (49) | 53 (30) | 34 (19) | 26 (15) | 90 (49) | 53 (30) | 34 (19) | 26 (15) |
| | | DSG-03-3C3* | | 90 | 90 | 90 | 90 | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) |
| | | | | | | | | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) | 100 (81) |
| | | DSG-03-3C4 | | 80 | 80 | 80 (65) | 80 (25) | 100 (58) | 100 (33) | 76 (22) | 46 (19) | 100 (58) | 100 (33) | 76 (22) | 46 (19) |
| | | | | | | 75 (20) | 30 (15) | 90 (47) | 50 (26) | 28 (18) | 22 (15) | 90 (47) | 50 (26) | 28 (18) | 22 (15) |
| | | DSG-03-3C40 | | 100 | 100 | 100 | 100 (75) | 100 (62) | 100 (39) | 84 (21) | 48 (18) | 100 (62) | 100 (39) | 84 (21) | 48 (18) |
| | | | | | | | 100 (25) | 62 (40) | 47(26) | 27 (16) | 20 (12) | 62 (40) | 47(26) | 27 (16) | 20 (12) |
| | | DSG-03-3C5* | | 30 | 30 | 30 | 30 | 26 | 21 | 18 | 16 | 30 | 28 | 28 | 28 |
| | | DSG-03-3C60* | | 70 | 70 | 70 | — | 100 | 100 | 100 | — | 100 | 100 | 100 | — |
| | | DSG-03-3C7 | | 100 | 100 (50) | 100 (30) | 100 (30) | 100 (22) | 100 (22) | 40 (22) | 40 (22) | 100 (22) | 100 (22) | 40 (22) | 40 (22) |
| | | | | 100 (50) | 60 (30) | 30 (25) | 30 (25) | 22 (19) | 22 (19) | 22 (19) | 22 (19) | 22 (19) | 22 (19) | 22 (19) | 22 (19) |
| | | DSG-03-3C8 | | — | — | — | — | 100 (64) | 100 (45) | 86 (23) | 65 (17) | 100 (64) | 100 (45) | 86 (23) | 65 (17) |
| | | | | | | | | 85 (52) | 60 (29) | 32 (15) | 22 (13) | 85 (52) | 60 (29) | 32 (15) | 22 (13) |
| | | DSG-03-3C9 | | 100 | 100 | 100 | 100 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| | | DSG-03-3C10 | | 80 | 80 | 80 (30) | 80 (20) | 100 (55) | 100 (36) | 60 (21) | 34 (16) | 100 (55) | 100 (36) | 60 (21) | 34 (16) |
| | | | | | | 30 (25) | 20 (15) | 60 (38) | 47 (24) | 23 (14) | 17 (11) | 60 (38) | 47 (24) | 23 (14) | 17 (11) |
| | | DSG-03-3C11 | | 100 | 100 | 100 | 100 | 100 (80) | 100 (65) | 85 (35) | 62 (28) | 100 (80) | 100 (65) | 85 (35) | 62 (28) |
| | | | | | | | | 80 (60) | 70 (46) | 51 (32) | 45 (25) | 80 (60) | 70 (46) | 51 (32) | 45 (25) |
| | | DSG-03-3C12 | | 90 | 90 | 90 (30) | 90 (20) | 100 (55) | 100 (36) | 60 (21) | 34 (16) | 100 (55) | 100 (36) | 60 (21) | 34 (16) |
| | | | | | | 40 (20) | 20 (15) | 60 (38) | 47 (24) | 23 (14) | 17 (11) | 60 (38) | 47 (24) | 23 (14) | 17 (11) |
| Two Positions | No Spring Detented | DSG-03-2D2 | | 100 | 100 | 100 | 100 | 40 | 40 | 30 | 28 | 60 | 60 | 40 | 35 |
| | | DSG-03-2D3 | | 100 | 100 | 100 | 100 | 40 | 40 | 30 | 28 | 60 | 60 | 40 | 35 |
| | | DSG-03-2D7 | | 100 | 100 | 100 | 100 | 40 | 40 | 30 | 28 | 60 | 60 | 40 | 35 |
| | | DSG-03-2D8 | | — | — | — | — | 50 | 50 | 50 (35) | 40 (23) | 50 | 50 | 50 (35) | 40 (23) |
| | | | | | | | | | | 50 (30) | 35 (20) | | | 50 (30) | 35 (30) |
| | Spring Offset | DSG-03-2B2 | | 100 | 100 | 100 | 100 | 34 | 24 | 20 | 19 | 100 (62) | 100 (62) | 100 (44) | 94 (37) |
| | | | | 100(90) | 100(90) | 100(90) | 100(90) | | | | | 80 (42) | 73 (36) | 63 (34) | 51 (33) |
| | | DSG-03-2B3 | | 100 | 100 | 100 | 100 | 57 | 57 | 57 | 57 | 100 (79) | 100 (72) | 100 (64) | 100 (59) |
| | | | | 100(75) | 100(75) | 100(75) | 100(75) | | | | | 92 (55) | 89 (46) | 78 (28) | 70 (27) |
| | | DSG-03-2B8 | | — | — | — | — | 26 | 19 | 18 | 16 | 100 (35) | 87 (15) | 61 (9) | 49 (7) |
| | | | | | | | | | | | | 45 (21) | 34 (12) | 15 (9) | 11 (6) |

Note : 1. Maximum flow rates and applied current.

- The single column describes maximum flow rates regardless AC solenoid 50 Hz or 60 Hz within serviceable voltage range.
- Maximum flow rates at 50 Hz solenoid with serviceable voltage range refer to the figures in the upper column and 60 Hz solenoid within serviceable voltage range refer to the figures in the latter column. Where two figures are shown in the same column, the figure outside ( ) is at rated voltage and inside ( ) is at the minimum permissible solenoid voltage.

(Example)




2. For the maximum flow between P and T of those valves marked "*", refer to page 157

## ■ List of Spool Function of Standard Type

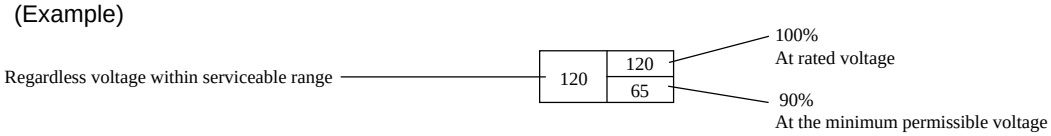
- Models with DC Solenoids : DSG-03-✻✻✻-D✻
- Models with R Type Solenoids : DSG-03-✻✻✻-R✻

| No. of Valve Positions | Spool-Spring Arrangements | Model Numbers | Graphic Symbols | Max. Flow l/min P→A→B→T, P→B→A→T | | | | P→A [Port "B" Blocked] | | | | P→B [Port "A" Blocked] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| Three Positions | Spring Centered | DSG-03-3C2 | | 120 | 120 | 120 | 120 | 120 | 120<br>100 | 80<br>54 | 55<br>43 | 120 | 120<br>100 | 80<br>54 | 55<br>43 |
| | | DSG-03-3C3* | | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | | DSG-03-3C4 | | 120 | 120 | 120 | 120 | 120 | 120 | 84<br>65 | 64<br>53 | 120 | 120 | 84<br>65 | 64<br>53 |
| | | DSG-03-3C40 | | 120 | 120 | 120 | 120 | 120 | 120<br>104 | 62<br>57 | 49<br>42 | 120 | 120<br>104 | 62<br>57 | 49<br>42 |
| | | DSG-03-3C5* | | 50 | 50 | 50 | 50 | 35 | 24 | 21 | 20 | 45 | 45 | 45 | 45 |
| | | DSG-03-3C60* | | 120 | 120 | 120 | — | 120 | 120 | 120 | — | 120 | 120 | 120 | — |
| | | DSG-03-3C7 | | 120 | 120 | 120<br>65 | 45<br>40 | 120 | 67<br>45 | 35<br>31 | 35<br>31 | 120 | 67<br>45 | 35<br>31 | 35<br>31 |
| | | DSG-03-3C8 | | — | — | — | — | 120 | 120 | 79<br>57 | 57<br>51 | 120 | 120 | 79<br>57 | 57<br>51 |
| | | DSG-03-3C9 | | 120 | 120 | 120 | 120 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | DSG-03-3C10 | | 120 | 120 | 120<br>65 | 65<br>50 | 120 | 112<br>69 | 60<br>46 | 51<br>40 | 120 | 112<br>69 | 60<br>46 | 51<br>40 |
| | | DSG-03-3C11 | | 120 | 120 | 120 | 120 | 100 | 100 | 80<br>62 | 65<br>65 | 100 | 100 | 80<br>62 | 65<br>52 |
| | | DSG-03-3C12 | | 120 | 120 | 120<br>65 | 65<br>50 | 120 | 120<br>86 | 62<br>47 | 51<br>40 | 120 | 120<br>86 | 62<br>47 | 51<br>40 |
| Two Positions | No Spring Detented | DSG-03-2D2 | | 120 | 120 | 120 | 120 | 45 | 37 | 30 | 28 | 60 | 60 | 40 | 35 |
| | | DSG-03-2D3 | | 120 | 120 | 120 | 120 | 45 | 37 | 30 | 28 | 60 | 60 | 40 | 35 |
| | | DSG-03-2D7 | | 120 | 120 | 120 | 120 | 45 | 37 | 30 | 28 | 60 | 60 | 40 | 35 |
| | | DSG-03-2D8 | | — | — | — | — | 60 | 60 | 40 | 35 | 60 | 60 | 45 | 35 |
| | Spring Offset | DSG-03-2B2 | | 110<br>100 | 110<br>100 | 110<br>100 | 110<br>100 | 68 | 47 | 38 | 38 | 120 | 114<br>83 | 75<br>58 | 63<br>48 |
| | | DSG-03-2B3 | | 120 | 120 | 120 | 120 | 77 | 77 | 77 | 77 | 120 | 120 | 120 | 120<br>103 |
| | | DSG-03-2B8 | | — | — | — | — | 53 | 33 | 24 | 23 | 120 | 120<br>62 | 62<br>40 | 47<br>37 |

Note : 1. Maximum flow rates and applied current.

- The single column describes maximum flow rates regardless voltage within serviceable range.
- Where two figures are shown in the same rows, the upper is at rated voltage and the latter is at the minimum permissible solenoid voltage.

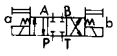
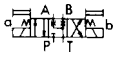
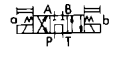
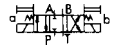
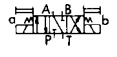
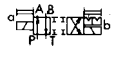
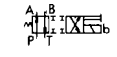
(Example)




2. For the maximum flow between P and T of those valves marked "*", refer to page 157

## ■ List of Spool Function of Shock-Less Type

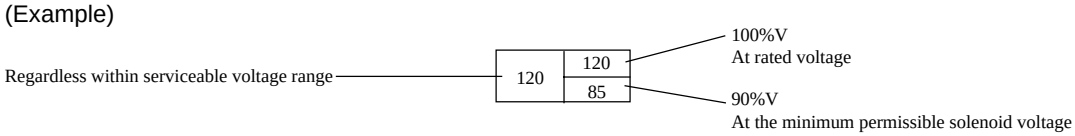
- Models with DC Solenoids : S-DSG-03-✻✻✻-D✻
- Models with R Type Solenoids : S-DSG-03-✻✻✻-R✻

| No. of Valve Positions | Spool Spring Arrangement | Model Numbers | Graphic Symbols | Max. Flow l/min | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | P→A→B→T, P→B→A→T | | | P → A [Port "B" Blocked] | | | P → B [Port "A" Blocked] | | |
| | | | | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² |
| Three Positions | Spring Centered | S-DSG-03-3C2 |  | 120 | 120 | 120 | 120 | 120 | 75 | 120 | 120 | 75 |
| | | | | | | | | 105 | 65 | | 105 | 65 |
| | | S-DSG-03-3C4 |  | 120 | 120 | 85 | 120 | 120 | 75 | 120 | 120 | 75 |
| | | | | | | 70 | | 100 | 65 | | 100 | 65 |
| | | S-DSG-03-3C40 |  | 120 | 120 | 95 | 120 | 120 | 80 | 120 | 120 | 80 |
| | | | | | | 75 | | | 65 | | | 65 |
| | | S-DSG-03-3C60* |  | 120 | 120 | 105 | 120 | 100 | 65 | 120 | 100 | 65 |
| | | S-DSG-03-3C10 |  | 120 | 120 | 120 | 120 | 120 | 75 | 120 | 120 | 75 |
| | | | | | | 85 | | 105 | 65 | | 105 | 65 |
| | | S-DSG-03-3C12 |  | 120 | 120 | 120 | 120 | 120 | 75 | 120 | 120 | 75 |
| | | | | | | 85 | | 105 | 65 | | 105 | 65 |
| Two Positions | No-Spring Detented | S-DSG-03-2D2 |  | 120 | 120 | 120 | 45 | 45 | 37 | 60 | 60 | 60 |
| | Spring Offset | S-DSG-03-2B2 |  | 120 | 100 | 75 | 39 | 39 | 39 | 120 | 120 | 105 |
| | | | | | | | | | | | | 80 |

Note : 1. Maximum flow rates and applied current.

- The single column describes maximum flow rates regardless voltage within serviceable voltage range.
- Where two figures are shown in the same rows, the upper is at rated voltage and the latter is at the minimum permissible solenoid voltage.

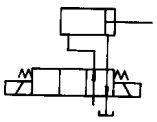
(Example)

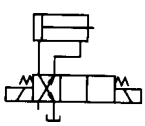


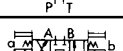

2. For the maximum flow between P and T of those valves marked "*", refer to below.

## ■ Maximum Flow of Center By-Pass

In spool type 3, 5 and 60, P→T (Center By-Pass) flow rates are limited as shown the column below. Described maximum flow rates are regardless volatge within serviceable voltage range.

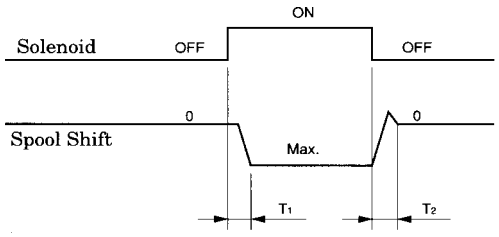




| Model Numbers | Graphics Symbols | Max. Flow l/min | | | |
|---|---|---|---|---|---|
| | | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| DSG-03-3C3-A✻ |  | 100 | 100 | 100 | 120 |
| DSG-03-3C3-D✻/R✻ | | 120 | 120 | 120 | 120 |
| DSG-03-3C5-A✻ |  | 26 | 21 | 18 | 16 |
| DSG-03-3C5-D✻/R✻ | | 35 | 24 | 21 | 20 |
| DSG-03-3C60-A✻ |  | 84 | 52 | 52 | |
| DSG-03-3C60-D✻/R✻ | | 68 | 65 | 61 | |
| S-DSG-03-3C60-D✻/R✻ |  | 50 kgf/cm² | 100 kgf/cm² | 160 kgf/cm² | |
| | | 120 | 65 | 65 | |

## ■ Typical Changeover Time

● **Standard Type** (Without shockless Function)




[Test Conditions]

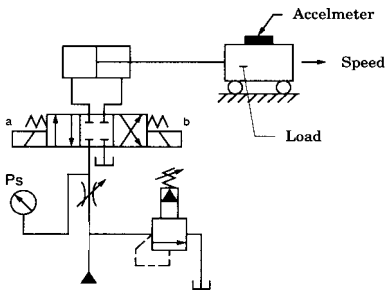
Pressure: 160 kgf/cm²
Flow Rate : 70 l/min
Viscosity : 30cSt (140 SSU)
(After coil temperature rise and saturates)

[Result of Measurement]

| Type | Model Numbers | Changeover Time ms | |
|---|---|---|---|
| | | T1 | T2 |
| Standard Type | DSG-03-3C2-A✻ | 27 | 22 |
| | DSG-03-3C2-D✻ | 97 | 30 |
| | DSG-03-3C2-R✻ | 97 | 204 |

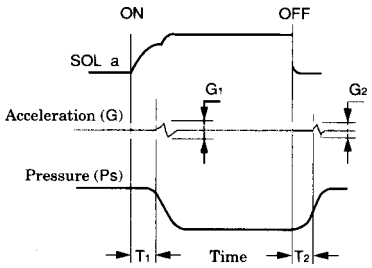
● **Shockless Type**

[Test Circuit and Condtions]




Setting Pressure (Ps): 70 kgf/cm²
Load (W): 1000 kg
Speed : 8.8 m/min
Oil Viscosity: 30 cSt (140 SSU)

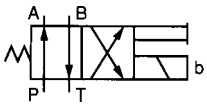
[Result of Measurement]



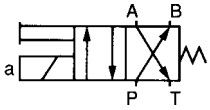

| Type | Model Numbers | Time ms | | Acceleration G | |
|---|---|---|---|---|---|
| | | T1 | T2 | G1 | G2 |
| Shockless Type | S-DSG-03-3C2-D✻ | 110 | 120 | 0.65 | 0.65 |
| | S-DSG-03-C2-R✻ | 110 | 220 | | |
| Dry Type Conven-tional | K-DSG-03-3C2-D✻-41 | 70 | 40 | 1.4 | 1.2 |

## ■ Spring Offset Valves with Alternate Solenoid

Though our standard spring offset models use solenoid "b", alternate models using solenoid "a" are also available. The graphic symbols are expressed below.
For Models 2 B✻A and 2B✻B, refer to table below.




Standard Offset

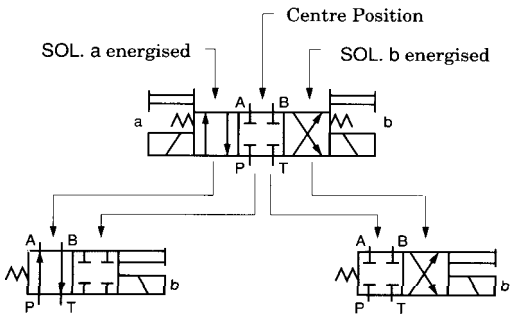



Alternate Offset ("L")

## ■ Valves with Centre Position and One Offset Position (Special Two Position Valve)

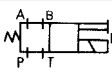
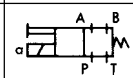
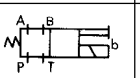
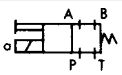
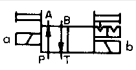
In addition to the standard two position valves shown on the table on pages 155 and 156 two kinds of valves are available with centre position and either one of two offset positions.
Standard and alternate offset types use solenoid "b" and solenoid "a" respectively.

(Example) In case of Spool Type "2"




"A": Use of Centre and **SOL.a** energised Position (2B2A)

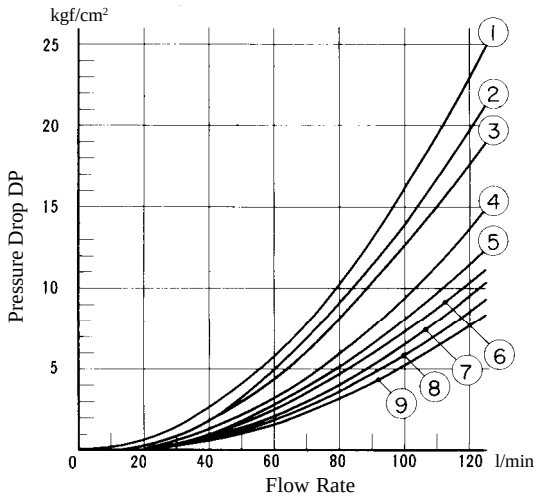
"B": Use of Centre and **SOL.b** energised Position (2B2B)

| Model Numbers | Graphic Symbols | | Model Numbers | Graphic Symbols | | Model Numbers | Graphic Symbols |
|---|---|---|---|---|---|---|---|
| | Standard Offset Type | Alternate Offset Type | | Standard Offset Type | Alternate Offset Type | | Standard Offset Type |
| ✻-DSG-03-2B✻A |  |  | ✻-DSG-03-2B✻B |  |  | DSG-03-2D✻A |  |
| (S-)DSG-03-2B2A |  |  | (S-)DSG-03-2B2B |  |  | DSG-03-2D2A |  |
| DSG-03-2B3A |  |  | DSG-03-2B3B |  |  | DSG-03-2D3A |  |
| (S-)DSG-03-2B4A |  |  | (S-)DSG-03-2B4B |  |  | DSG-03-2D4A |  |
| (S-)DSG-03-2B40A |  |  | (S-)DSG-03-2B40B |  |  | DSG-03-2D40A |  |
| DSG-03-2B5A |  |  | DSG-03-2B5B |  |  | DSG-03-2D5A |  |
| (S-)DSG-03-2B60A |  |  | (S-)DSG-03-2B60B |  |  | DSG-03-2D7A |  |
| DSG-03-2B7A |  |  | DSG-03-2B7B |  |  | DSG-03-2D9A |  |
| DSG-03-2B8A |  |  | DSG-03-2B8B |  |  | DSG-03-2D10A |  |
| DSG-03-2B9A |  |  | DSG-03-2B9B |  |  | DSG-03-2D11A |  |
| (S-)DSG-03-2B10A |  |  | (S-)DSG-03-2B10B |  |  | DSG-03-2D12A |  |
| DSG-03-2B11A |  |  | DSG-03-2B11B |  |  | | |
| (S-)DSG-03-2B12A |  |  | (S)-DSG-03-2B12B |  |  | | |

## ■ Pressure Drop

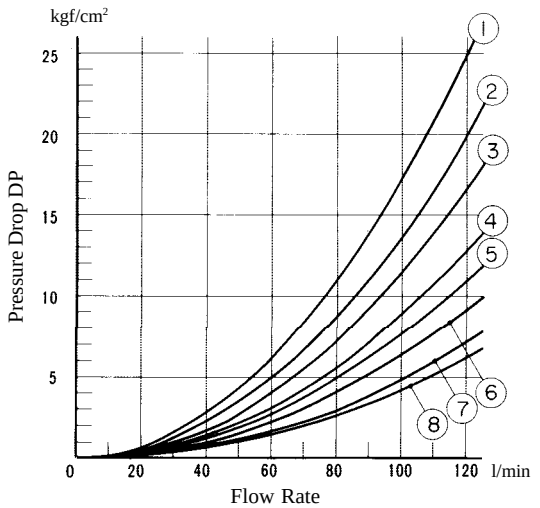
Pressure drop based on viscosity of 35 cSt (mm²/s) (160 SSU) and specific gravity of 0.850.

### ● Standard Type : DSG-03




| Models Numbers | Presure Drop Curve Number | | | | |
|---|---|---|---|---|---|
| | P→A | B→T | P→B | A→T | P→T |
| DSG-03-3C2 | ⑦ | ⑦ | ⑦ | ⑦ | — |
| DSG-03-3C3 | ⑨ | ⑨ | ⑨ | ⑨ | ⑤ |
| DSG-03-3C4 | ⑦ | ⑧ | ⑦ | ⑧ | — |
| DSG-03-3C40 | ⑦ | ⑦ | ⑦ | ⑦ | — |
| DSG-03-3C5 | ⑨ | ⑦ | ⑦ | ⑨ | ① |
| DSG-03-3C60 | ⑥ | ⑤ | ⑥ | ⑤ | ① |
| DSG-03-3C7 | ⑦ | ⑦ | ⑦ | ⑦ | — |
| DSG-03-3C8 | ⑤ | — | ⑤ | — | — |
| DSG-03-3C9 | ⑨ | ⑦ | ⑨ | ⑦ | — |
| DSG-03-3C10 | ⑦ | ⑧ | ⑦ | ⑦ | — |
| DSG-03-3C11 | ⑨ | ⑦ | ⑦ | ⑦ | — |
| DSG-03-3C12 | ⑦ | ⑦ | ⑦ | ⑧ | — |
| DSG-03-2D2 | ④ | ③ | ⑥ | ⑥ | — |
| DSG-03-2D3 | ⑥ | ④ | ⑦ | ⑦ | — |
| DSG-03-2D7 | ① | ① | ⑥ | ⑥ | — |
| DSG-03-2D8 | ⑥ | — | ⑥ | — | — |
| DSG-03-2B2 | ② | ① | ⑦ | ⑦ | — |
| DSG-03-2B3 | ③ | ② | ⑨ | ⑨ | — |
| DSG-03-2B8 | ⑥ | — | ⑤ | — | — |

### ● Shock-Less Type : S-DSG-03




| Models Numbers | Presure Drop Curve Number | | | | |
|---|---|---|---|---|---|
| | P→A | B→T | P→B | A→T | P→T |
| S-DSG-03-3C2 | ③ | ③ | ③ | ③ | — |
| S-DSG-03-3C4 | ③ | ③ | ⑥ | ⑥ | — |
| S-DSG-03-3C40 | ③ | ③ | ⑦ | ⑦ | — |
| S-DSG-03-3C60 | ④ | ④ | ⑤ | ⑤ | ① |
| S-DSG-03-3C10 | ③ | ③ | ③ | ⑧ | — |
| S-DSG-03-3C12 | ③ | ③ | ⑦ | ③ | — |
| S-DSG-03-2D2 | ③ | ③ | ② | ① | — |
| S-DSG-03-2B2 | ① | ③ | ③ | ③ | — |

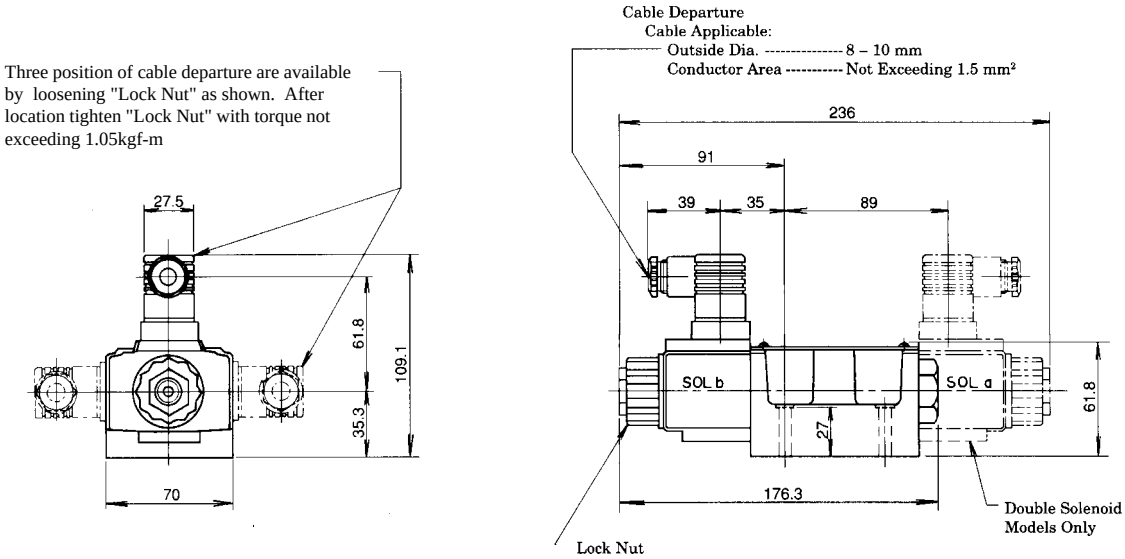
● For any other viscosity, multiply by the factors in the table below.

| Viscosity | cSt {mm²/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 (DP') may be obatained from the formula below.
DP' = DP(G'/0.850)

## PLUG-IN CONNECTOR TYPE (N)
## PLUG-IN CONNECTOR WITH INDICATOR LIGHT (N1)

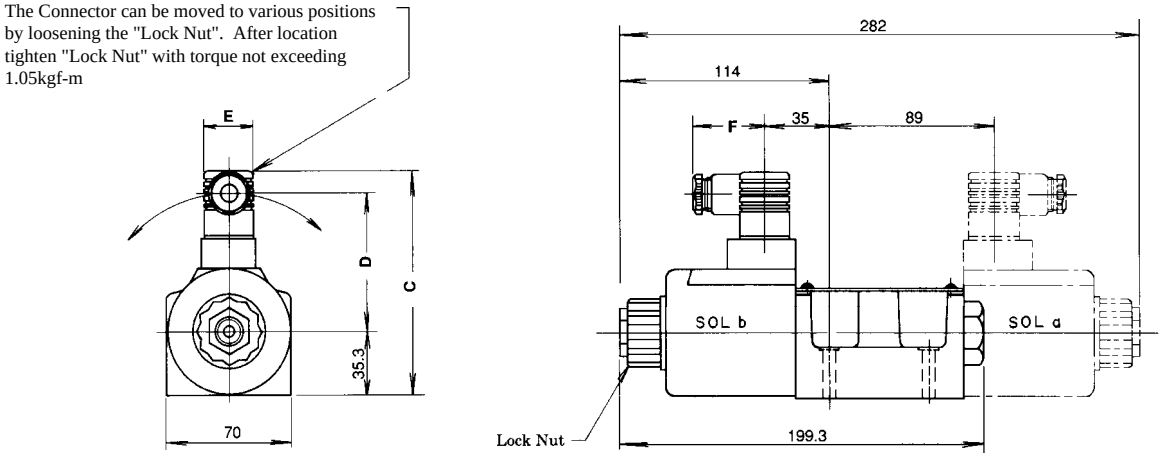
■ Models with AC Solenoids: DSG-03-✻✻✻-A✻-$^{N}_{N1}$-50




DIMENSIONS IN MILLIMETERS

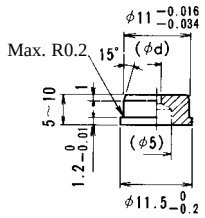
■ Models with DC Solenoids: (S-) DSG-03-✻✻✻-A✻-$^{N}_{N1}$-50

■ Models with R Type Solenoids: (S-) DSG-03-✻✻✻-R✻-N-50




| Model Number | Dimensions mm | | | |
|---|---|---|---|---|
| | C | D | E | F |
| DSG-03-✻✻✻-D✻-$^{N}_{N1}$-50 | 121.1 | 73.8 | 27.5 | 39 |
| DSG-03-✻✻✻-R✻-N-50 | 124.9 | 62.6 | 34 | 53 |

## ■ Finishing Dimension of Flow Restrictor

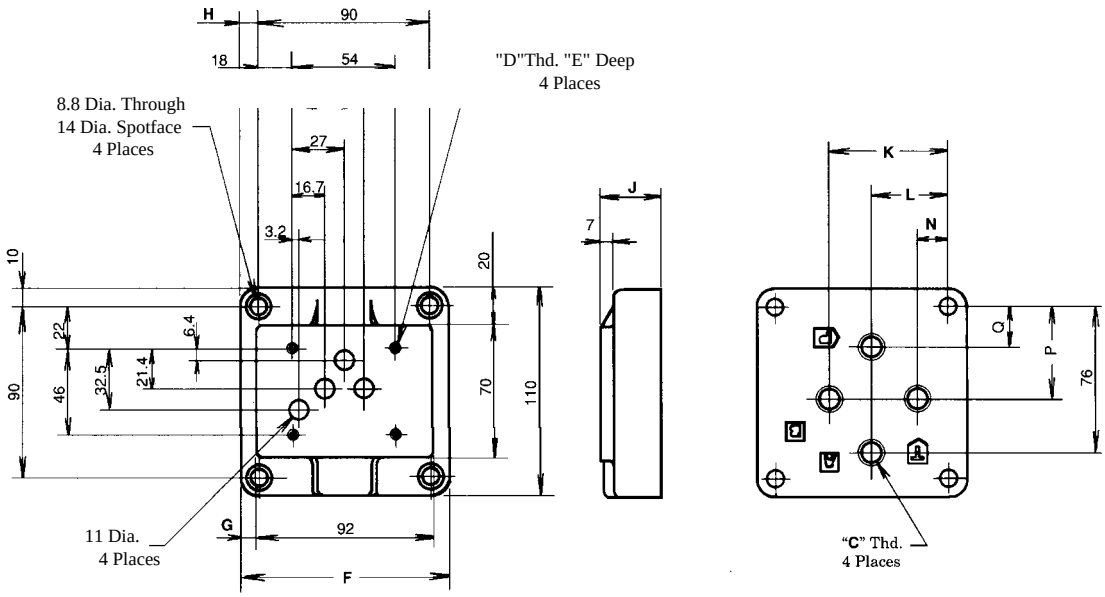



* Orifice dia. "ϕd" should be determined by customer application.

Each port (P, A, B and T) is machined for flow restrictor.
The flow restrictor should be machined in accordance with the above figures if required.

DIMENSION IN MILLIMETERS

## ■ Sub-plates
## DSGM-03❊-2180

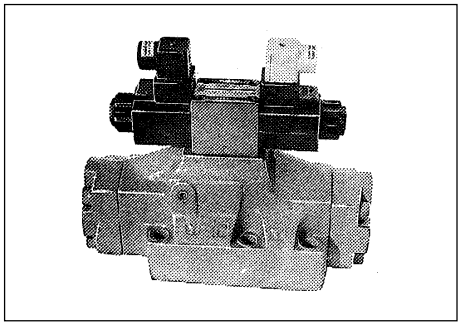


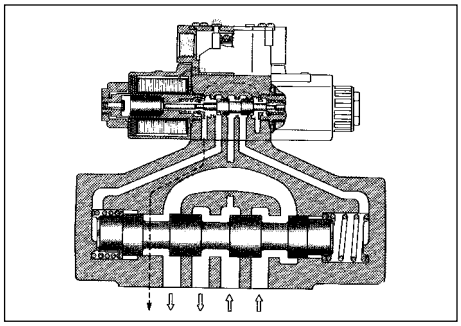

| Sub-plate Model Numbers | Piping Size "C" Thd. | "D" Thd. | Dimensions mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | E | F | G | H | J | K | L | N | P | Q |
| DSGM-03-2180 | 3/8 BSP.F | M6 | 13 | 110 | 9 | 10 | 32 | 62 | 40 | 16 | 48 | 21 |
| DSGM-03X-2180 | 1/2 BSP.F | M6 | 13 | 110 | 9 | 10 | 32 | 62 | 40 | 16 | 48 | 21 |
| DSGM-03Y-2180 | 3/4 BSP.F | M6 | 13 | 120 | 14 | 15 | 50 | 80 | 45 | 10 | 47 | 16 |

## ■ Solenoid Controlled Pilot Operated Directional Valves

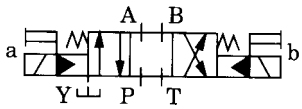
These valves are composed of a solenoid operated pilot valves and a pilot operated slave valve. When a solenoid is energised the pilot valve directs the flow to move the spool of the slave valve, thus changing the direction of flow in the hydraulic circuit.

- **High Pressure High Flow**
  High pressure [315 kgf/cm²] along with high flow means compact system design.
- **Lower Pressure Drop**
  System energy saving increased as pressrure drop of each valve has greatly reduced.





Graphic Symbol




### ■ Ratings

| Valve Type | Model Numbers | *1 Max. Flow l/min | Max. Operating Pressure kgf/cm² | Max. Pilot Pressure kgf/cm² | Min. *2 Required Pilot Pres. kgf/cm² | Max. T-Line Back Pressure kgf/cm² | | Max. Change over Frequency Cycles/min | | | Mass kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Ext. Drain | Int. Drain | AC | DC | R | |
| Standard Type | (S-)DSHG-04-3C✻-✻-46 | 215 | 210 | 210 | 5 | 210 | 140 | 120 | 120 | 120 | 8.8 |
| | (S-)DSHG-04-2N✻-✻-46 | | | | | | | | | | 8.8 |
| | (S-)DSHG-04-2B✻-✻-46 | | | | | | | | | | 8.2 |
| | (S-)DSHG-06-3C✻-✻-51 | 500 | 315 | 250 | 8 | 210 | 160 | 120 | 120 | 120 | 12.7 |
| | (S-)DSHG-06-2N✻-✻-51 | | | | | | | | | | 12.7 |
| | (S-)DSHG-06-2B✻-✻-51 | | | | | | | | | | 12.1 |
| | (S-)DSHG-06-3H✻-✻-51 | | | 210 | 10 | | | 110 | 110 | 110 | 13.5 |
| Shockless Type | (S-)DSHG-10-3C✻-✻-41 | 1100 | 315 | 250 | 10 | 210 | 160 | 120 | 120 | 100 | 45.3 |
| | (S-)DSHG-10-2N✻-✻-41 | | | | | | | 100 | 100 | 100 | 45.3 |
| | (S-)DSHG-10-2B✻-✻-41 | | | 210 | | | | 60 | 60 | 50 | 44.7 |
| | (S-)DSHG-10-3H✻-✻-41 | | | | | | | | | | 53.1 |

*1. Maximum flow indicates a ceiling flow. As the ceiling flow depends on the type of spool and operating condition, refer to the List of Spool Functions on pages 166 to 168 for details.

*2. Pilot pressure of internal pilot drain models must always exceed tank line back pressure by a minimum required pilot pressure.

## ■ Model Number Designation

| F- | S- | DSH | G | -06 | -2 | B | 2 | A | -C2* | -E | T | -R2* | -D24 | -N | -51 | -L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Special Seals | Type | Series Number | Type of Mounting | Valve Size | Number of Valve Positions | Spool-Spring Arrangement | Spool Type | Special Two Position Valve | Models with Pilot Choke Valve | Pilot Connection | Drain Connection | Spool Control Modification | Coil Type | Type of Electrical Conduit Con. | Design Number | Mod. with Alternate Offset Sol. |
| **F:** For phosphate ester type fluids (Omit if not required) | **None:** Standard Type | **DSH:** Solenoid Controlled Pilot Operated Directional Valve. | **G:** Sub-plate Mounting | **04** | **3** | **C:** Spring Centred | **2, 4, 40, 60, 10, 12, (3, 5, 6,*1 7, 9, 11)** | — | **C1:*** With C1 With Choke | **None:** Internal Pilot | **None:** External Drain | **R2:** With Stroke Adjustment, Both Ends | AC **A100, A120 A200, A240** DC **D12, D24 D100** *3 AC →DC **R100, R200** | **N:** Plug-in Connector Type | **46** | — |
| | | | | | **2** | **N:** No-Spring | **2, 4, 40, 6,60,9,12 (3, 7)*1** | A*2 (Omit if not required) | | | | | | | | **L** (Omit if not required) |
| | | | | | | **B:** Spring Offset | **2, 4, 40, 6,60,9,12 (3, 7)*1** | A*2 B*2 (Omit if not required) | | | | | | | | |
| | **S:** Shockless Type | | | **06** | **3** | **C:** Spring Centred | **2, 4, 40 60, 10, 12 (3, 5, 6 *1 7, 9, 11)** | — | **C1C2:*** With C1 & C2 Choke | **E:** External Pilot | **T:** internal Drain | **RA:** With Stroke Adjustment, Port "A" End | | **N1:*** Plug-in Connector with Indicator Light | **51** | — |
| | | | | **10** | **2** | **N:** No-Spring | **2, 4, 40, (3, 7)*1** | A*2 (Omit if not required) | (Omit if not required) | | | **RB:** With Stroke Adjustment, Port "B" End | | | **41** | **L** (Omit if not required) |
| | | | | | | **B:** Spring Offset | **2, 4, 40, (3, 7)*1** | A*2 B*2 (Omit if not required) | | | | | | | | |

Note 1. Options are marked with *
2. Classification of application on spool type "3", "5", "6", "60" and "7' has been described as below.

| Pilot Connection | Drain Connection | Care in Application |
|---|---|---|
| Internal Pilot | External Drain | Hold back pressure in the tank line so that the differnce between pilot pressure and drain pressure is always more than minimum required pilot pressure. |
| | Internal Drain (T) | Combination not available. |
| External Pilot (E) | External Drain | No limitation in use. |
| | Ineternal Drain (T) | |

*1. Shockless type (S-DSHG) are not available for spool type marked ( ).
*2. Other spool types for special 2-position valves are available in addition to spool type 2, 3, 4, 40 and 7. [Refer to the column "valves with centre position and one offset position" (Special 2-position valve) on page 169
*3. Coil type "R" is not available for plug-in connector with Indicator type "N1".

## ■ Solenoid Ratings

Solenoid ratings of pilot valve are identical with those of standard solenoid valve. Refer to relevant solenoid ratings described on the page below.

| Model Numbers | Pilot Valve Model Numbers | Solenoid Ratings described on the page below |
|---|---|---|
| (S-)DSHG-04 | DSG-01-✻✻✻-✻-50 | 144 |
| (S-)DSHG-06 | | |
| (S-)DSHG-10 | | |

## ■ Sub-plates

| Vavle Model Numbers | Sub-plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|---|
| DSHG-04 | DHGM-04-2080 | 1/2 BSP.F | 4.4 |
| | DHGM-04X-2080 | 3/4 BSP.F | 4.1 |
| DSHG-06 | DHGM-06-5080 | 3/4BSP.F | 8.5 |
| | DHGM-06X-5080 | 1 BSP.F | 8.5 |
| DSHG-10 | DHGM-10-4080 | 1-1/4 BSP.F | 21.5 |
| | DHGM-10X-4080 | 1-1/2 BSP.F | 21.5 |

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

## ■ Mounting Bolt

| Model Numbers | Name | Mouting Bolt | Qty. | Tightening Torque kgf-m | Bolt kit Model No. |
|---|---|---|---|---|---|
| DSHG-04 | Soc. Hd. Cap Screw | M6 x 40 Lg | 2 | 1.2 ~1.5 | BKDSHG-04-20 |
| | | M10 x 45 Lg | 4 | 5.9 ~ 7.3 | |
| DSHG-06 | Soc. Hd. Cap Screw | M12 x 60 Lg | 6 | 10.2 ~ 12.5 | BKDSHG-06-50 |
| DSHG-10 | Soc. Hd. Cap Screw | M20 x 75 Lg | 6 | 48.2 ~ 59.7 | BKDSHG-10-41 |

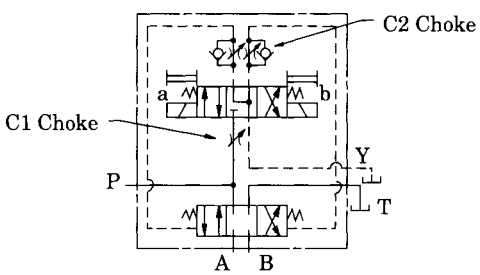
## ■ Options

- **Models with Pilot Choke Adjustment (C1/C2/C1C2)**

  "C1" Models --- By turning the adjusting screw clockwise, main spool changeover speed by the pilot pressure can be lowered. But centering speed of spring centred modes can not be changed.

  "C2" Models --- When the adjusting screw is turned clockwise, main spool changeover speed can be lowered, and centering speed of spring centred models can be also lowered.

Graphic Symbols (Ex.: Spring Centred)

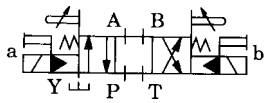



- **Models with Stroke Adjustment (R2/RA/RB)**

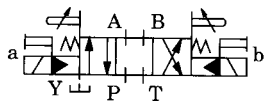
  When the adjusting screw is screwed in, the main spool stroke becomes short and flow rate reduces.

Graphic Symbols (Ex.: Spring Centred)

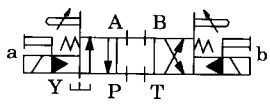
● "R2" Models




● "RA" Models




● "RB" Models




- **Additional Mass of Options**

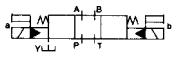
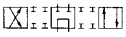
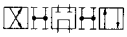
  Add mass of options described below to mass of standard type if options are used.

kg

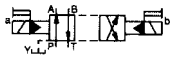
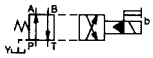
| Model Numbers | Models with Pilot Choke Adj. | | Models with Stroke Adj. | |
|---|---|---|---|---|
| | C1, C2 | C1C2 | R2 | RA RB |
| (S-)DSHG-04 | 0.65 | 1.3 | 1.0 | 0.5 |
| (S-)DSHG-06 | 0.65 | 1.3 | 1.2 | 0.6 |
| (S-)DSHG-10 | 0.65 | 1.3 | 3.7 | 1.85 |

## ■ List of Spool Functions (DSHG-04/S-DSHG-04)

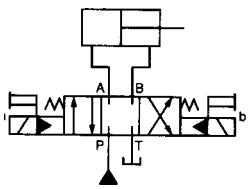
### ● Three Positions

| Spool Type | Spring Centred | | | |
|---|---|---|---|---|
| | Graphic Symbol  | Maximum Flow l/min | | |
| | Model Numbers | 70 kgf/cm² | 140 kgf/cm² | 210 kgf/cm² |
| "2"  | DSHG-04-3C2 | 110 | 60 | 50 |
| | | 250 | 130 | 85 |
| "3"  | DSHG-04-3C3 | 180 | 90 | 70 |
| "4"  | DSHG-04-3C4 | 230 | 60 | 45 |
| | | 250 | 210 | 90 |
| "40"  | DSHG-04-3C40 | 240 | 65 | 55 |
| | | 250 | 250 | 105 |
| "5"  | DSHG-04-3C5 | 80 | 50 | 40 |
| "6"  | DSHG-04-3C6 | 90 | 65 | 55 |
| "60"  | DSHG-04-3C60 | 140 | 70 | 55 |
| "7"  | DSHG-04-3C7 | 65 | 40 | 40 |
| | | 250 | 75 | 55 |
| "9"  | DSHG-04-3C9 | 95 | 65 | 55 |
| | | 250 | 125 | 100 |
| "10"  | DSHG-04-3C10 | 105 | 60 | 50 |
| | | 250 | 130 | 85 |
| "11"  | DSHG-04-3C11 | 80 | 55 | 50 |
| | | 250 | 150 | 85 |
| "12"  | DSHG-04-3C12 | 230 | 65 | 50 |
| | | 250 | 250 | 95 |

### ● Two Positions

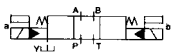
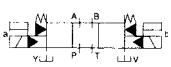
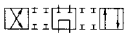
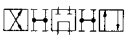
| Spool Type | No-Spring | | | | Spring Offset | | | |
|---|---|---|---|---|---|---|---|---|
| | Graphic Symbol  | Maximum Flow l/min | | | Graphic Symbol  | Maximum Flow l/min | | |
| | Model Numbers | 70 kgf/cm² | 140 kgf/cm² | 210 kgf/cm² | Model Numbers | 70 kgf/cm² | 140 kgf/cm² | 210 kgf/cm² |
| "2"  | DSHG-04-2N2 | 250 | 230 | 145 | DSHG-04-2B2 | 250 | 230 | 145 |
| | | | 250 | 250 | | | 250 | 250 |
| "3"  | DSHG-04-2N3 | 250 | 250 | 200 | DSHG-04-2B3 | 250 | 250 | 200 |
| | | | | 250 | | | | 250 |
| "4"  | DSHG-04-2N4 | 250 | 240 | 150 | DSHG-04-2B4 | 250 | 240 | 150 |
| | | | 250 | 250 | | | 250 | 250 |
| "40"  | DSHG-04-2N40 | 250 | 250 | 210 | DSHG-04-2B40 | 250 | 250 | 210 |
| | | | | 250 | | | | 250 |
| "7"  | DSHG-04-2N7 | 250 | 130 | 85 | DSHG-04-2B7 | 250 | 130 | 85 |
| | | | 250 | 170 | | | 250 | 170 |

Note : 1. Max. Flow described above shows value at pilot pressure more than 6kgf/cm²
2. Max. Flow shows value at the condition of flow as shown right figure
P →A→B→T (or P→B→A→T).
Max. Flow is subject to hydraulic circuit, if port "A" or "B" is blocked, consult Yuken for such application.
3. Value in the double row, upper is maximum flow at pilot pressure 5 kgf/cm².
(In case pressure centred models, pilot pressure is 5 kgf/cm²) , lower is pilot pressure of 7 kgf/cm².

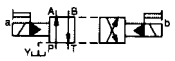
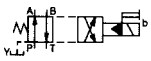


## ■ List of Spool Functions (DSHG-06/S-DSHG-06)

### ● Three Positions

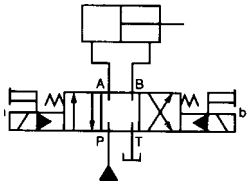
| Spool Type | Spring Centred | | | | | Pressure Centred | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Graphic Symbol  | Maximum Flow l/min | | | | Graphic Symbol  | Maximum Flow l/min | | | |
| | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| "2"  | (S-)DSHG-06-3C2 | 500 | 500 | 410<br>500 | 310<br>500 | (S-)DSHG-06-3H2 | 500 | 500 | 500 | 420<br>500 |
| "3"  | DSHG-06-3C3 | 500 | 500 | 460 | 370 | DSHG-06-3H3 | 500 | 500 | 500 | 500 |
| "4"  | (S-)DSHG-06-3C4 | 500 | 500 | 410<br>500 | 310<br>500 | (S-)DSHG-06-3H4 | 500 | 500 | 500 | 420<br>500 |
| "40"  | (S-)DSHG-06-3C40 | 500 | 500 | 410<br>500 | 310<br>500 | (S-)DSHG-06-3H40 | 500 | 500 | 500 | 420<br>500 |
| "5"  | DSHG-06-3C5 | 500 | 500 | 425 | 350 | DSHG-06-3H5 | 500 | 500 | 500 | 470<br>500 |
| "6"  | DSHG-06-3C6 | 475 | 390 | 300 | 230 | DSHG-06-3H6 | 500 | 500 | 500 | 420<br>500 |
| "60"  | (S-)DSHG-06-3C60 | 475 | 420 | 340 | 280 | (S-)DSHG-06-3H60 | 500 | 500 | 500 | 420<br>500 |
| "7"  | DSHG-06-3C7 | 500 | 500 | 450 | 360 | DSHG-06-3H7 | 500 | 500 | 500 | 500 |
| "9"  | DSHG-06-3C9 | 500 | 500 | 450<br>500 | 360<br>500 | DSHG-06-3H9 | 500 | 500 | 500 | 500 |
| "10"  | (S-)DSHG-06-3C10 | 500 | 500 | 410<br>500 | 310<br>500 | (S-)DSHG-06-3H10 | 500 | 500 | 500 | 460<br>500 |
| "11"  | DSHG-06-3C11 | 500 | 500 | 410<br>500 | 310<br>500 | DSHG-06-3H11 | 500 | 500 | 500 | 460<br>500 |
| "12"  | (S-)DSHG-06-3C12 | 500 | 500 | 410<br>500 | 310<br>500 | (S-)DSHG-06-3H12 | 500 | 500 | 500 | 460<br>500 |

### ● Two Positions

| Spool Type | No-Spring | | | | | Spring Offset | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Graphic Symbol  | Maximum Flow l/min | | | | Graphic Symbol  | Maximum Flow l/min | | | |
| | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| "2"  | (S-)DSHG-06-2N2 | 500 | 500 | 500 | 500 | (S-)DSHG-06-2B2 | 500 | 500 | 500 | 500 |
| "3"  | DSHG-06-2N3 | 500 | 500 | 500 | 500 | DSHG-06-2B3 | 500 | 500 | 500 | 500 |
| "4"  | (S-)DSHG-06-2N4 | 500 | 500 | 500 | 500 | (S-)DSHG-06-2B4 | 500 | 500 | 500 | 500 |
| "40"  | (S-)DSHG-06-2N40 | 500 | 500 | 500 | 500 | (S-)DSHG-06-2B40 | 500 | 500 | 500 | 500 |
| "7"  | DSHG-06-2N7 | 500 | 500 | 500 | 500 | DSHG-06-2B7 | 500 | 500 | 500 | 500 |

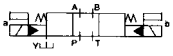
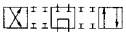
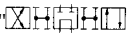
Note : 1. Relation between max. flow and pilot pressure is:
- Value in the single column is constant regardless of pilot pressure subject to pilot pressure more than 8 kgf/cm² . In case pressure centred models, pilot pressure is more than 10 kgf/cm² .
- Value in the double row, upper is max. flow at pilot pressure 8 kgf/cm². (In case pressure centred models, pilot pressure is 10 kgf/cm²). Lower is pilot pressure of 15 kgf/cm².

2. Max. Flow shows value at the condition of flow as shown right figure
P →A→B→T (or P→B→A→T).
Max. Flow is subject to hydraulic circuit. If port "A" or "B" is blocked, consult Yuken for such application.

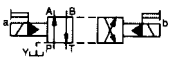
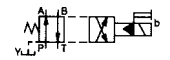


## ■ List of Spool Functions (DSHG-10/S-DSHG-10)

### ● Three Positions

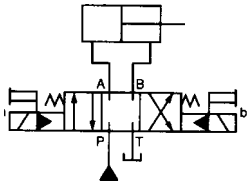
| Spool Type | Spring Centred | | | | | Pressure Centred | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Graphic Symbol  | Maximum Flow l/min | | | | Graphic Symbol  | Maximum Flow l/min | | | |
| | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| "2"  | (S-)DSHG-10-3C2 | 1100 | 1100 | 950<br>1100 | 750<br>1100 | (S-)DSHG-10-3H2 | 1100 | 1100 | 1100 | 970<br>1100 |
| "3"  | DSHG-10-3C3 | 1100 | 1100 | 1060 | 895 | DSHG-10-3H3 | 1100 | 1100 | 1100 | 1050<br>1100 |
| "4"  | (S-)DSHG-10-3C4 | 1100 | 1100 | 950<br>1100 | 750<br>1100 | (S-)DSHG-10-3H4 | 1100 | 1100 | 1100 | 970<br>1100 |
| "40"  | (S-)DSHG-10-3C40 | 1100 | 1100 | 950<br>1100 | 750<br>1100 | (S-)DSHG-10-3H40 | 1100 | 1100 | 1100 | 970<br>1100 |
| "5"  | DSHG-10-3C5 | 1100 | 1100 | 980 | 850 | DSHG-10-3H5 | 1100 | 1100 | 1100 | 1000<br>1100 |
| "6"  | DSHG-10-3C6 | 1050 | 880 | 700 | 570 | DSHG-10-3H6 | 1100 | 1100 | 1100 | 970<br>1100 |
| "60"  | (S-)DSHG-10-3C60 | 1050 | 940 | 785 | 680 | (S-)DSHG-10-3H60 | 1100 | 1100 | 1100 | 970<br>1100 |
| "7"  | | 1100 | 1100 | 1040<br>1100 | 870<br>1100 | | 1100 | 1100 | 1100 | 1110 |
| "9"  | DSHG-10-3C7 | 1100 | 1100 | 1040 | 870 | DSHG-10-3H7 | 1100 | 1100 | 1100 | 1100 |
| "10"  | DSHG-10-3C9 | 1100 | 1100 | 950<br>1100 | 750<br>1100 | DSHG-10-3H9 | 1100 | 1100 | 1100 | 1060<br>1100 |
| "11"  | (S-)DSHG-10-3C10 | 1100 | 1100 | 950<br>1100 | 750<br>1100 | (S-)DSHG-10-3H10 | 1100 | 1100 | 1100 | 1060<br>1100 |
| "12"  | DSHG-10-3C11 | 1100 | 1100 | 950<br>1100 | 750<br>1100 | DSHG-10-3H11 | 1100 | 1100 | 1100 | 1060<br>1100 |
| | (S-)DSHG-10-3C12 | | | | | (S-)DSHG-10-3H12 | | | | |

### ● Two Positions

| Spool Type | No-Spring | | | | | Spring Offset | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Graphic Symbol  | Maximum Flow l/min | | | | Graphic Symbol  | Maximum Flow l/min | | | |
| | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | Model Numbers | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² |
| "2"  | (S-)DSHG-10-2N2 | 1100 | 1100 | 1100 | 1100 | (S-)DSHG-10-2B2 | 1100 | 1100 | 1100 | 1100 |
| "3"  | DSHG-10-2N3 | 1100 | 1100 | 1100 | 1100 | DSHG-10-2B3 | 1100 | 1100 | 1100 | 1100 |
| "4"  | (S-)DSHG-10-2N4 | 1100 | 1100 | 1100 | 1100 | (S-)DSHG-10-2B4 | 1100 | 1100 | 1100 | 1100 |
| "40"  | (S-)DSHG-10-2N40 | 1100 | 1100 | 1100 | 1100 | (S-)DSHG-10-2B40 | 1100 | 1100 | 1100 | 1100 |
| "7"  | DSHG-10-2N7 | 1100 | 1100 | 1100 | 1100 | DSHG-10-2B7 | 1100 | 1100 | 1100 | 1100 |

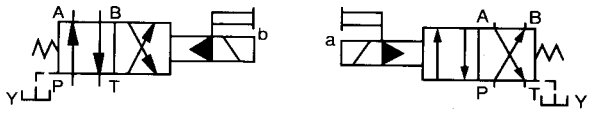
Note : 1. Relation between max. flow and pilot pressure is
- Value in the single column is constant regardless of pilot pressure subject to pilot pressure more than 10 kgf/cm².
- Value in the double row, upper is max. flow at pilot pressure at 10 kgf/cm². Lower is pilot pressure of 15 kgf/cm².

2. Max. Flow shows value at the condition of flow as shown right figure P →A→B→T (or P→B→A→T).
Max. Flow is subject to hydraulic circuit, if port "A" or "B" is blocked, consult Yuken for such application.



## ■ Spring Offset Valves with Alternate Solenoid

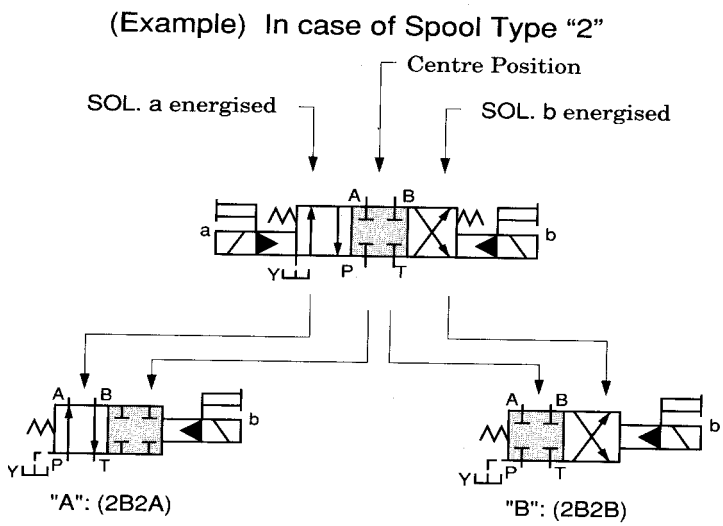
Though our standard spring offset models used solenoid "b", alternate models using solenoid "a" are also available. The graphic symbols are expressed below.
For Models 2B✻-A and 2B✻B, refer to the table below.




Standard Offset  Alternate Offset ("L")

## ■ Valve with Centre Position and One Offset Position (Special Two Position Valve)

In addition to the standard two position valves as shown in the table on pages 166 to 168 two kinds of valves are available with centre position and either one of two offset positions.
Standard and alternate offset types use solenoid "b" and solenoid "a" respectively.




| Model Numbers | Graphic Symbols | |
|---|---|---|
| | Standard Offset Type | Alternate Offset Type |
| 04 ✻-DSHG-06-2B✻A_ 10 | | |
| (S-)DSHG-✻-2B2A | | |
| DSHG-✻-2B3A | | |
| (S-)DSHG-✻-2B4A | | |
| (S-)DSHG-✻-2B40A | | |
| DSHG-✻-2B5A | | |
| DSHG-✻-2B6A | | |
| (S-)DSHG-✻-2B60A | | |
| DSHG-✻-2B7A | | |
| DSHG-✻-2B9A | | |
| (S-)DSHG-✻-2B10A | | |
| DSHG-✻-2B11A | | |
| (S-)DSHG-✻-2B12A | | |

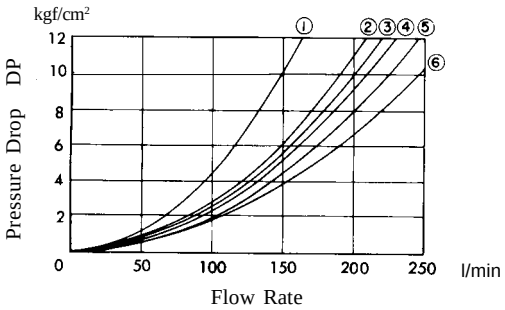
| Model Numbers | Graphic Symbols | |
|---|---|---|
| | Standard Offset Type | Alternate Offset Type |
| 04 ✻-DSHG-06-2B✻B_ 10 | | |
| (S-)DSHG-✻-2B2B | | |
| DSHG-✻-2B3B | | |
| (S-)DSHG-✻-2B4B | | |
| (S-)DSHG-✻-2B40B | | |
| DSHG-✻-2B5B | | |
| DSHG-✻-2B6B | | |
| (S-)DSHG-✻-2B60B | | |
| DSHG-✻-2B7B | | |
| DSHG-✻-2B9B | | |
| (S-)DSHG-✻-2B10B | | |
| DSHG-✻-2B11B | | |
| (S-)DSHG-✻-2B12B | | |

| Model Numbers | Graphic Symbols |
|---|---|
| | Standard Offset Type |
| 04 ✻-DSHG-06-2N✻A_ 10 | |
| (S-)DSHG-✻-2N2A | |
| DSHG-✻-2N3A | |
| (S-)DSHG-✻-2N4A | |
| (S-)DSHG-✻-2N40A | |
| DSHG-✻-2N5A | |
| DSHG-✻-2N6A | |
| (S-)DSHG-✻-2N60A | |
| DSHG-✻-2N7A | |
| DSHG-✻-2N9A | |
| (S-)DSHG-✻-2N10A | |
| DSHG-✻-2N11A | |
| (S-)DSHG-✻-2N12A | |

## ■ Pressure Drop

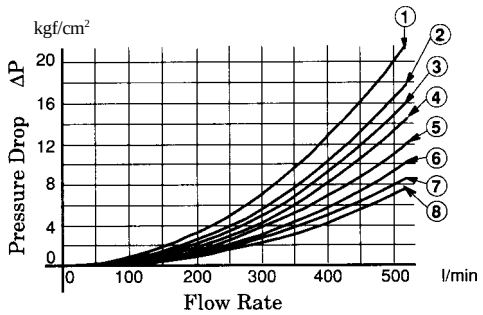
Pressure drop curves based on viscosity of 35cSt (160SSU) and specific gravity of 0.850.

### ● DSHG-04, S-DSHG-04




| Spool Type | Pressure Drop Curve Numbers | | | | | Spool Type | Pressure Drop Curve Numbers | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | P→A | B→T | P→B | A→T | P→T | | P→A | B→T | P→B | A→T | P→T |
| **2** | ⑤ | ② | ⑤ | ④ | — | **60** | ② | ③ | ④ | ② | ① |
| **3** | ⑥ | ③ | ⑥ | ⑤ | ③ | **7** | ⑤ | ② | ④ | ⑤ | — |
| **4** | ⑤ | ④ | ④ | ⑤ | — | **9** | ⑥ | ② | ⑥ | ⑤ | — |
| **40** | ⑤ | ④ | ④ | ⑤ | — | **10** | ⑤ | ④ | ⑤ | ⑤ | — |
| **5** | ⑤ | ② | ④ | ⑤ | ① | **11** | ⑤ | ④ | ⑤ | ⑤ | — |
| **6** | ② | ③ | ④ | ② | ① | **12** | ⑤ | ③ | ⑤ | ⑤ | — |

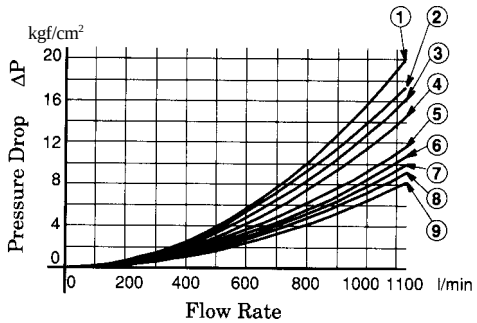
### ● DSHG-06, S-DSHG-06




| Spool Type | Pressure Drop Curve Numbers | | | | | Spool Type | Pressure Drop Curve Numbers | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | P→A | B→T | P→B | A→T | P→T | | P→A | B→T | P→B | A→T | P→T |
| **2** | ⑧(⑥) | ⑤(①) | ⑧(⑥) | ⑦(②) | — | **60** | ⑤(⑥) | ⑤(②) | ⑤(⑥) | ⑦(③) | ③(①) |
| **3** | ⑥ | ④ | ⑥ | ⑦ | ⑥ | **7** | ⑤ | ④ | ⑥ | ⑦ | — |
| **4** | ⑧(⑥) | ⑤(②) | ⑧(⑥) | ⑦(②) | — | **9** | ⑤ | ⑤ | ⑥ | ⑦ | — |
| **40** | ⑧ | ⑤ | ⑧ | ⑦ | — | **10** | ⑧ | ⑤ | ⑥ | ⑦ | — |
| **5** | ⑧ | ④ | ⑧ | ⑦ | ② | **11** | ⑧ | ④ | ⑥ | ⑦ | — |
| **6** | ⑤ | ① | ⑤ | ④ | ③ | **12** | ⑤ | ⑤ | ⑥ | ⑦ | — |

Note : Figure enclosed ( ) shows curve number for shockless type (S-DSHG-06)

### ● DSHG-10, S-DSHG-10




| Spool Type | Pressure Drop Curve Numbers | | | | | Spool Type | Pressure Drop Curve Numbers | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | P→A | B→T | P→B | A→T | P→T | | P→A | B→T | P→B | A→T | P→T |
| **2** | ⑨(⑧) | ⑥(③) | ⑨(⑧) | ⑧(④) | — | **60** | ⑧⑧ | ⑤④ | ⑧⑧ | ⑤④ | ③② |
| **3** | ⑦ | ⑥ | ⑦ | ⑦ | ⑤ | **7** | ⑦ | ⑥⑥ | ⑦ | ⑦ | — |
| **4** | ⑨(⑧) | ⑥(⑤) | ⑨(⑧) | ⑥(⑥) | — | **9** | ⑦ | ⑥ | ⑦ | ⑦ | — |
| **40** | ⑨ | ⑥ | ⑨ | ⑧ | — | **10** | ⑨ | ⑤ | ⑨ | ⑨ | — |
| **5** | ⑨ | ④ | ⑨ | ⑥ | ① | **11** | ⑨ | ⑥ | ⑨ | ⑧ | — |
| **6** | ⑤ | ③ | ⑤ | ④ | ② | **12** | ⑨ | ⑦ | ⑨ | ⑨ | — |

Note : Figures enclosed ( ) shows curve number for shockless type (S-DSHG-10)

For any other viscosity, multiply by the factors in the table right.

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

$$DP' = DP\ (G'/0.850)$$

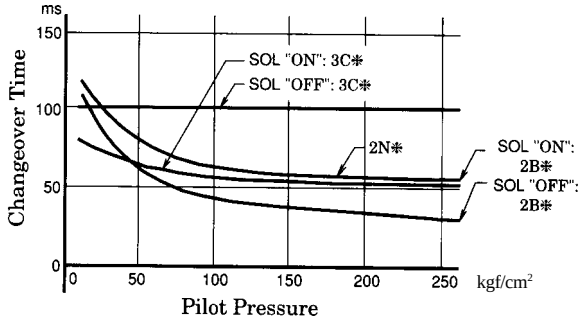
| Viscosity | cSt | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SSU | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 | 464 |
| Factor | | 0.81 | 0.87 | 0.96 | 1.03 | 1.09 | 1.14 | 1.19 | 1.23 | 1.27 | 1.30 |

## ■ Typical Changeover Time

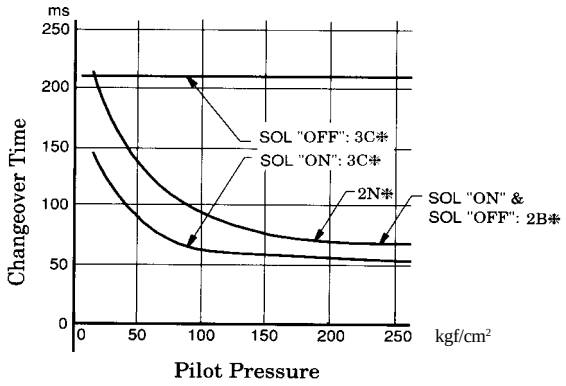
Changeover time varies according to oil viscosity, spool type and hydraulic circuit.

[Test Conditions] Coil Type: D❊(Models with DC solenoids)
Voltage : Rated Voltage
Oil viscosity : 35cSt (160 SSU)

● **DSHG-06**



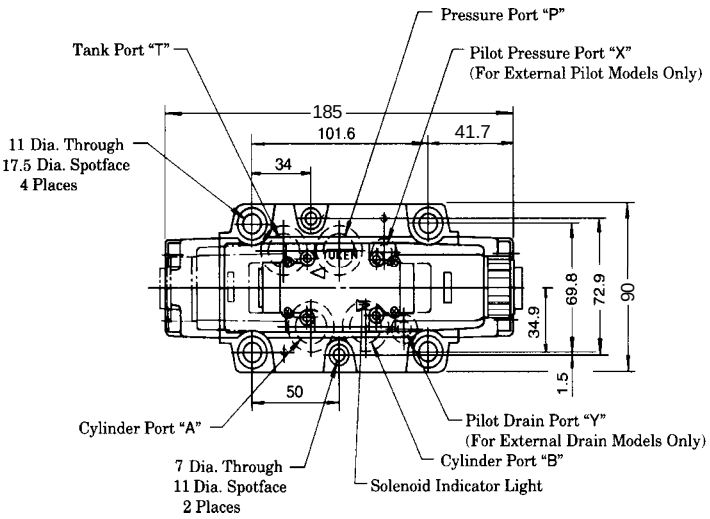

● **DSHG-10**



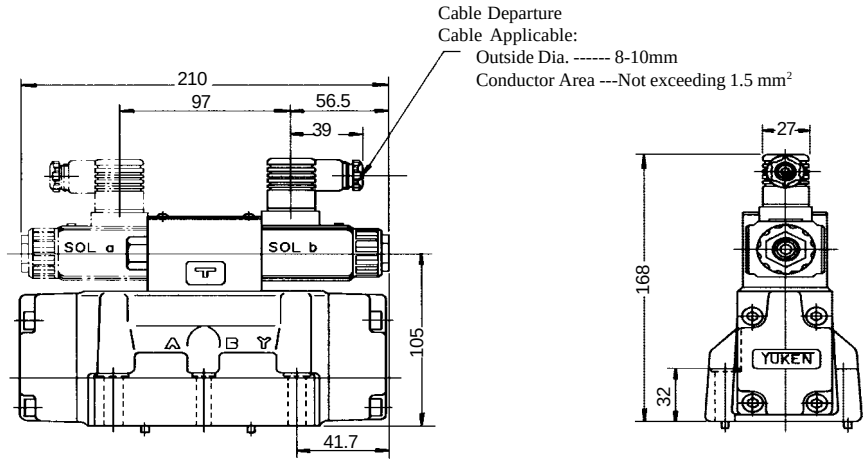

## ■ Plug-in Connector Type: (S-) DSHG-04-❊❊❊-❊- $^{N}_{N1}$-46

**Mounting Surface: ISO 4401-AD-07-4-A**

DIMENSION IN MILIMETERS

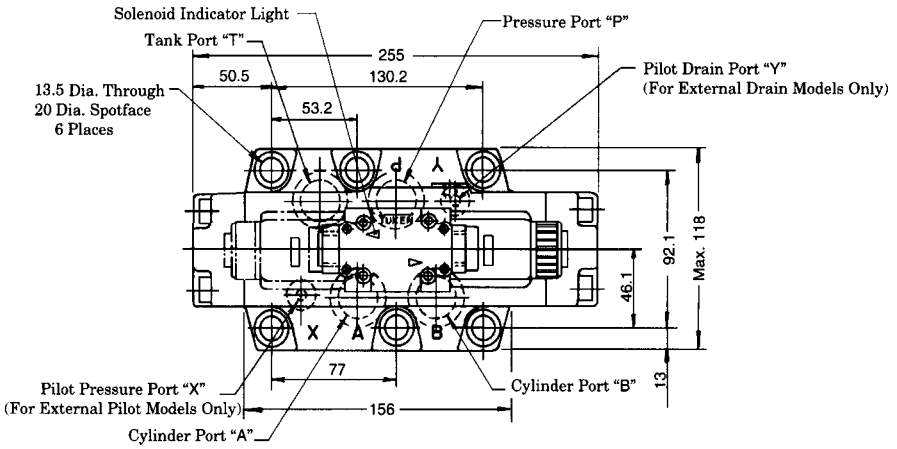



Position of cable departure can be changed. For details, refer to DSG-01 valve on page 151.

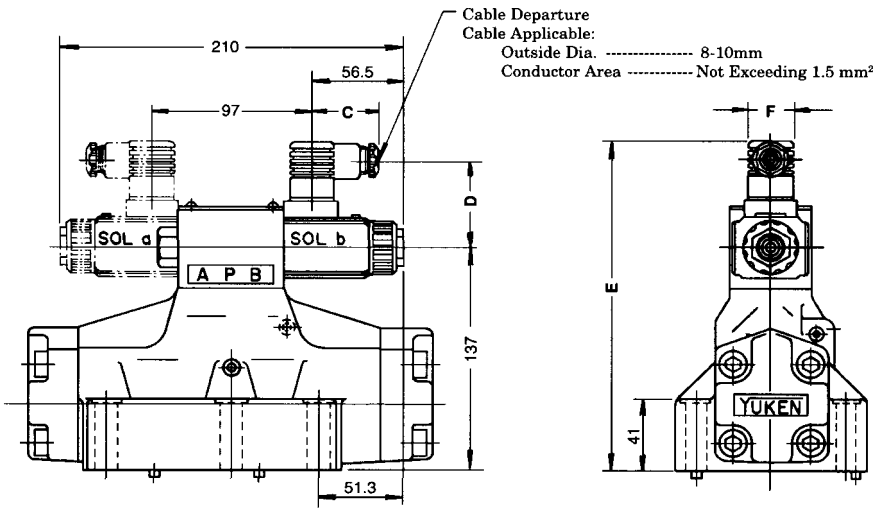


■ Plug-in Connector Type : (S-)DSHG-06-✻✻✻-✻-$^{N}_{N1}$-51

**Mounting Surface: ISO 4401-AE-08-4-A**




DIMENSION IN MILIMETERS

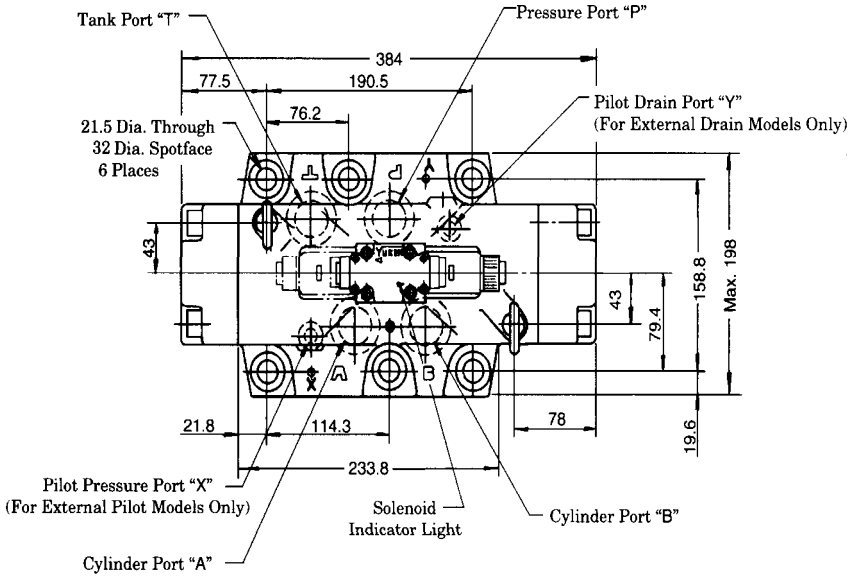



| Model Numbers | Dimensions mm | | | |
|---|---|---|---|---|
| | C | D | E | F |
| (S-)DSHG-06-✻✻✻-A✻-N/N1 | 39 | 53 | 202 | 27.5 |
| (S-)DSHG-06-✻✻✻-D✻-N/N1 | 39 | 64 | 213 | 27.5 |
| (S-)DSHG-06-✻✻✻-R✻-N | 53 | 57.2 | 216 | 34 |

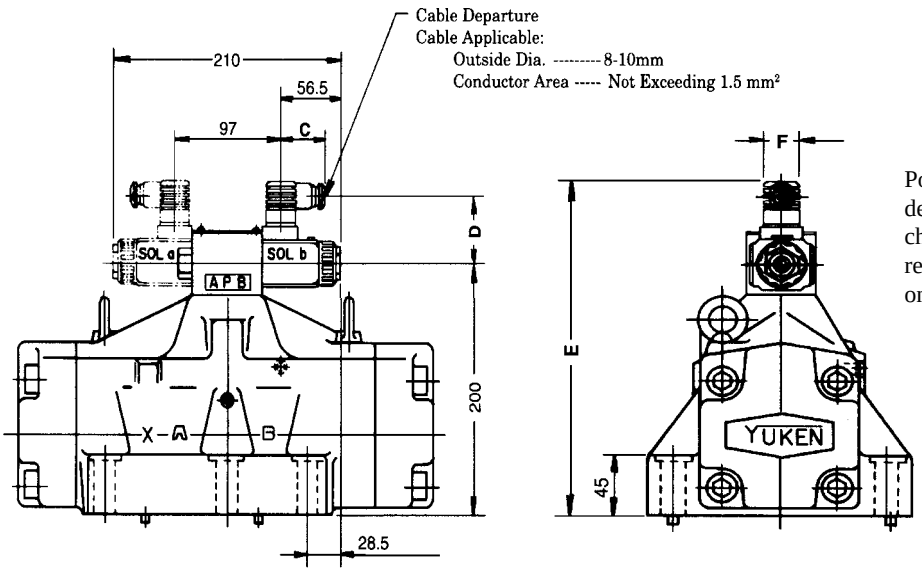
Position of cable deparutre can be changed. For details, refer to DSG-01 valve on page 151.

## ■ Plug-in Connector Type : (S-)DSHG-10-✻✻✻-✻- $^{N}_{N1}$ -41

**Mounting Surface: ISO 4401-AE-10-4-A**




DIMENSION IN MILIMETERS

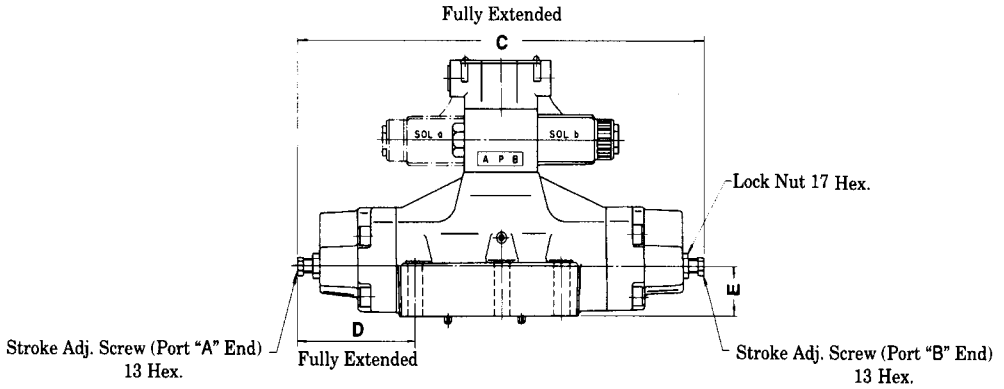



Position of cable departure can be changed. For details, refer to DSG-01 valve on page 151.

| Model Numbers | Dimensions mm | | | |
|---|---|---|---|---|
| | C | D | E | F |
| (S-)DSHG-10-✻✻✻-A✻-N/N1 | 39 | 53 | 265 | 27.5 |
| (S-)DSHG-10-✻✻✻-D✻-N/N1 | 39 | 64 | 276 | 27.5 |
| (S-)DSHG-10-✻✻✻-R✻-N | 53 | 57.2 | 279 | 34 |

## OPTIONS Models with Stroke Adjustment

- (S-)DSHG-$\begin{matrix}06\\10\end{matrix}$-✻✻✻-R✻

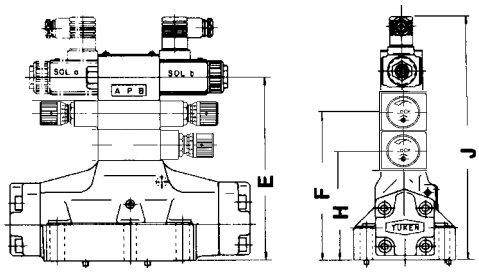



| Model Numbers | C | D | E |
|---|---|---|---|
| (S-)DSHG-06-✻✻✻-R2 | 376 | 111 | 40 |
| (S-)DSHG-10-✻✻✻-R2 | 558 | 164.5 | 65 |

DIMENSION IN MILIMETERS

## OPTIONS Models with Pilot Choke Valve

- (S-)DSHG-$\begin{matrix}N1\\04\\06\\10\end{matrix}$-✻✻✻-C1/C2/$\begin{matrix}C1C2-\\N\end{matrix}$



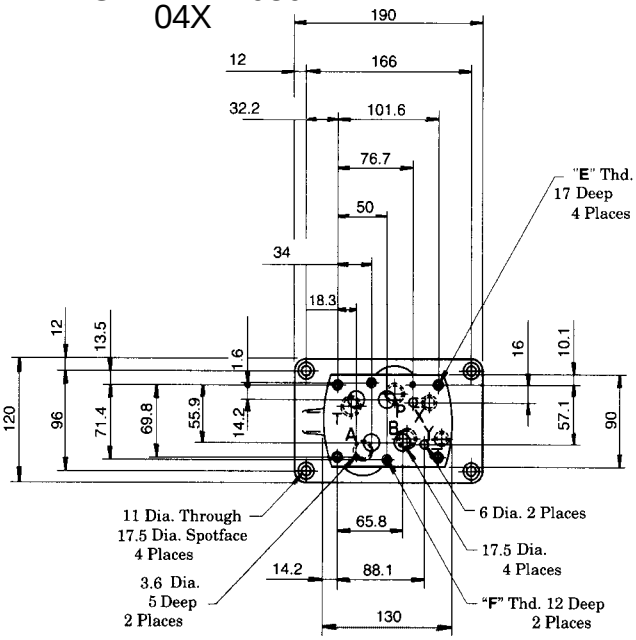

| Model Numbers | Dimensions mm | | | | | |
|---|---|---|---|---|---|---|
| | E | F | H | J | | |
| | | | | AC SOL | DC SOL | R SOL |
| (S-)DSHG-04-✻✻✻-C1 | 145 | — | 100 | 193 | 177 | 177 |
| (S-)DSHG-04-✻✻✻-C2 | 145 | 100 | — | 193 | 177 | 177 |
| (S-)DSHG-04-✻✻✻-C1C2 | 185 | 140 | 100 | 233 | 217 | 217 |
| (S-)DSHG-06-✻✻✻-C1 | 177 | — | 132 | 240 | 240 | 240 |
| (S-)DSHG-06-✻✻✻-C2 | 177 | 132 | — | 240 | 240 | 240 |
| (S-)DSHG-06-✻✻✻-C1C2 | 217 | 174 | 132 | 280 | 280 | 280 |
| (S-)DSHG-10-✻✻✻-C1 | 240 | — | 195 | 390 | 401 | 404 |
| (S-)DSHG-10-✻✻✻-C2 | 240 | 195 | — | 390 | 401 | 404 |
| (S-)DSHG-10-✻✻✻-C1C2 | 280 | 235 | 195 | 415 | 426 | 429 |

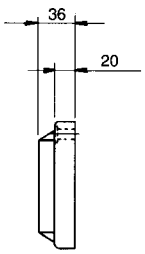
## ■ Sub-Plates

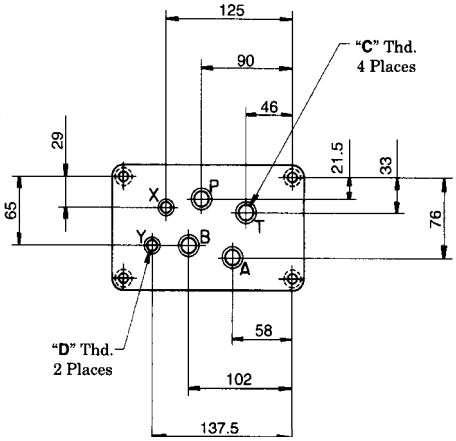
### ● DHGM-$^{04}_{04X}$-2080

DIMENSION IN MILIMETERS

| Sub-plate Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | "F" Thd. |
|---|---|---|---|---|
| DHGM-04-2080<br>DHGM-04X-2080 | 1/2 BSP.F<br>3/4 BSP.F | 1/4BSP.F | M10 | M6 |



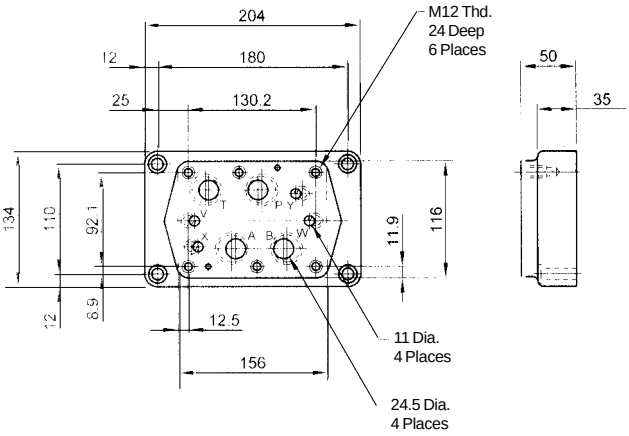




| Valve Types | | Pilot Pressure Port "X" | Port "Y" | Remarks |
|---|---|---|---|---|
| Solenoid Controlled Pilot Operated Directional Valves | | Used only on external pilot type valves.<br>To be plugged on internal pilot type valves | Used as drain port only on external drain type valves.<br>To be plugged on internal drain type valves | |
| Pilot Operated Directional Valves | Spring Centred<br>No-spring | Used | Used as pilot pressure port | Normal size: only 04 |
| | Spring Offset | | Used as pilot drain port | |
| Manually Operated Direction Valves | | Not used (plug is not required) | Used as drain port | |

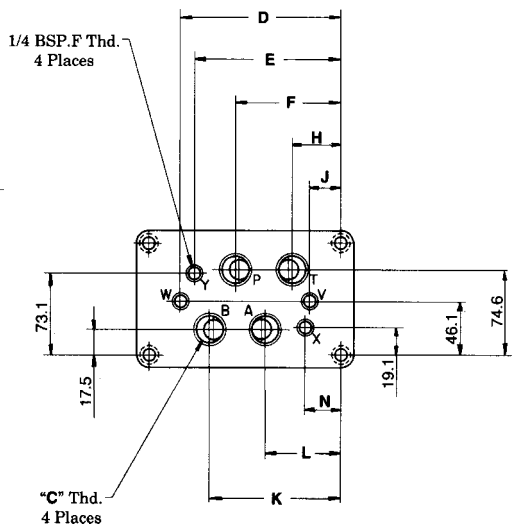
## ■ Sub-Plates

### ● DHGM-$^{06}_{06X}$-5080







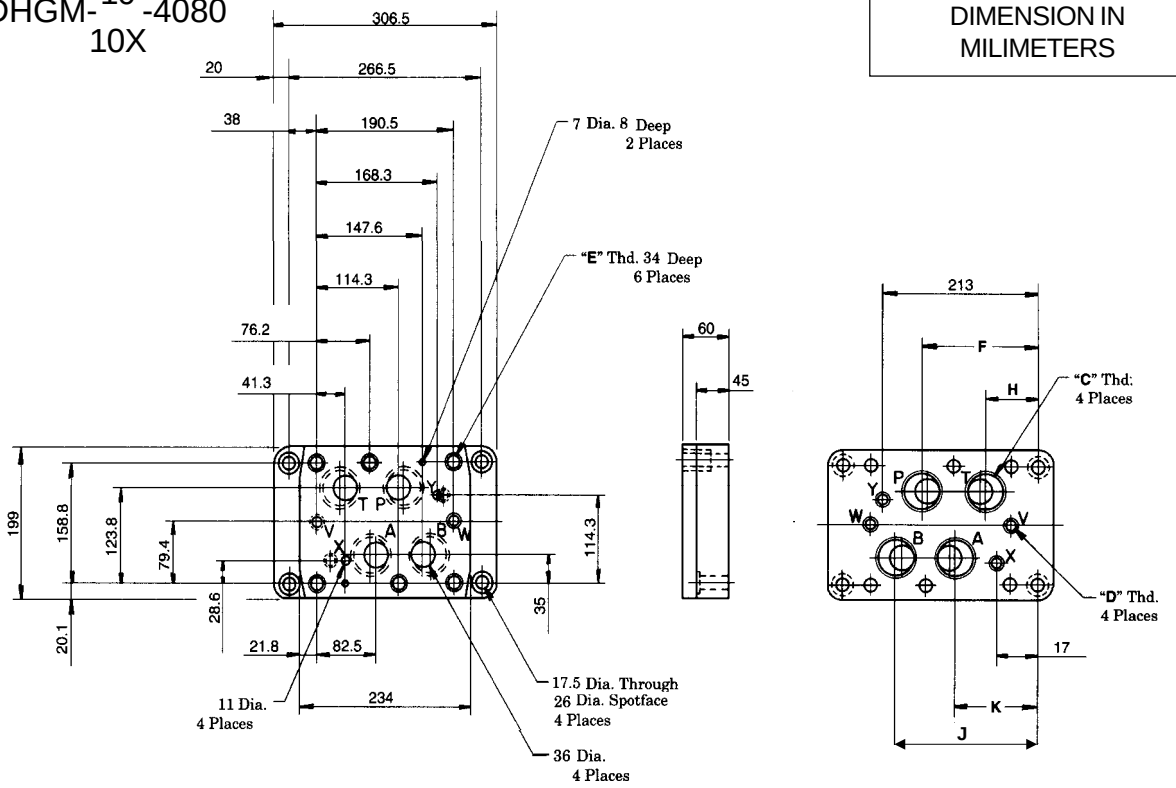



| Sub-plate Model Numbers | "C" Thd. | Dimensions mm | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | D | E | F | H | J | K | L | N |
| DHGM-06-5080 | 3/4 BSP.F | 151.2 | 137.7 | 102 | 54.4 | 30.6 | 125.8 | 78.2 | 42.5 |
| DHGM-06X-5080 | 1 BSP.F | 155.2 | 148 | 106 | 50 | 25 | 130 | 74 | 32 |

For uses of Port "X", "Y", "V", "W", refer to DHGM-10-✻

● DHGM-$^{10}_{10X}$-4080

DIMENSION IN MILIMETERS




| Sub-Plate Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | Dimensions mm | | | |
|---|---|---|---|---|---|---|---|
| | | | | F | H | J | K |
| DHGM-10-4080 | 1-1/4 BSP.F | 3/8 BSP.F | M20 | 152 | 79 | 185.5 | 120.5 |
| DHGM-10X-4080 | 1-1/2 BSP.F | 3/8 BSP.F | M20 | 156 | 74 | 194.5 | 112.5 |

Note : Uses of port "X", "Y", "V" and "W"

| Valve Types | | Pilot Pres. Port "X" | Port "Y" | Port "V" | Port "W" |
|---|---|---|---|---|---|
| Solenoid Controlled Pilot Operated Directional Valves | Spring Centred, No-spring, Spring Offset | Used only on external pilot type valves.<br>To be plugged on internal pilot type valves. | Used as drain port only on external drain type valves.<br>To be plugged on * internal drain type valves. | Not used (plug is not required) | |
| Pilot Operated Directional Valves | Spring Centred, No-spring, | Used | Used as pilot pres. port | Not used (plug is not required) | |
| | Spring Offset | | Used as pilot drain port | | |
| Manually Operated Directional Valves | | Not used (plug is not required) | Not used (plug is not required) | Used | Not used (plug is not required) |

* As the thread is provided on the body, plug either port on the sub-plate or port on the body

## ■ List of Pilot Valves

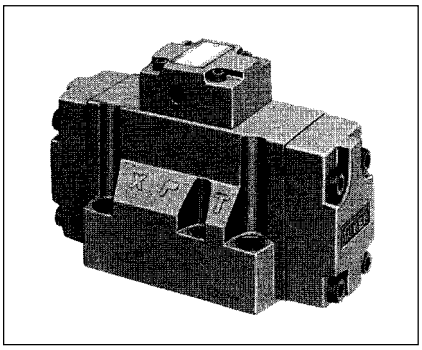
| Valve Model Nubmers | Pilot Valve Model Numbers |
|---|---|
| (S-)DSHG-04/06/10-3C❋-★-▲-50 | DSG-01-3C4-★-▲-50 |
| (S-)DSHG-04/06/10-2B❋-★-▲-50 | DSG-01-2B2-★-▲-50-L |
| (S-)DSHG-04/06/10-2N❋-★-▲-50 | DSG-01-2D2-★-▲-50 |

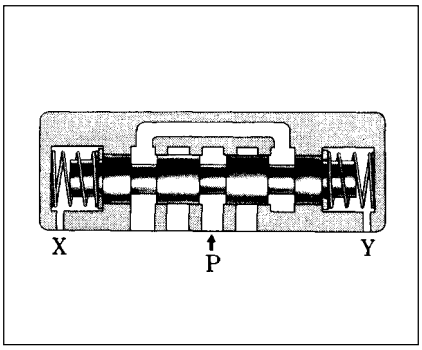
Notes:

1. Fill coil type (a symbol representing current/ voltage) in section marked ★. Likewise, in section marked ▲, fill a symbol representing the type of conduit connection (N: Plug-in Connector Type).
2. For the details of the pilot valves, see page 144.

## ■ Pilot Operated Directional Valves

These valves perform a change over of spool by hydraulic pilot and shift the direction of oil flow.

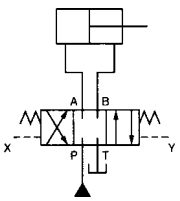





### ■ Ratings

| Model Numbers | Maximum Flow l/min | | | | Max. Operating Pressure kgf/cm² | Max. Pilot Pressure kgf/cm² | Min. Required Pilot Pressure kgf/cm² | Max. T-Line Back Pres. kgf/cm² | Mass kg |
|---|---|---|---|---|---|---|---|---|---|
| | 100 kgf/cm² | 160 kgf/cm² | 250 kgf/cm² | 315 kgf/cm² | | | | | |
| DHG-04-3C✻-50 | 300 *1 | 300 *1 | 300 *1 | 300 *1 | 315 | 250 | 8 | 210 | 7.4 |
| DHG-04-2N✻-50 | 300 | 300 | 300 | 300 | | | | | 7.4 |
| DHG-04-2B✻-50 | 130 | 70 | 70 | 60 | | | | | 7.8 |
| DHG-06-3C✻-50 | 500 *2 | 500 *2 | 500 *2 | 500 *2 | 315 | 250 | 8 | 210 | 11.2 |
| DHG-06-2N✻-50 | 500 | 500 | 500 | 500 | | | | | 11.2 |
| DHG-06-2B✻-50 | 140 | 100 | 90 | 80 | | | | | 11.7 |
| DHG-10-3C✻-40 | 1100 *3 | 1100 *3 | 1100 *3 | 1100 *3 | 315 | 250 | 10 | 210 | 43.8 |
| DHG-10-2N✻-40 | 1100 | 1100 | 1100 | 1100 | | | | | 43.8 |
| DHG-10-2B✻-40 | 460 | 300 | 220 | 200 | | | | | 45.6 |

Note : Max. flow refers to a ceiling flow which does not affect the normal function (changeover) of the valve. Also, max. Flow in the above table indicates values when the flow condition is as shown in the right-hand figure,
P→A→B→T (or P→B→A→T).
Max. flow varies according to the circuit if port "A" or "B" is to be blocked. Consult Yuken for such application.




*1. Varies depending on the spool type.
*2. Varies depending on the spool type and pilot pressure. For more information, see page 167 for the List of Spool Functions (DSHG-06) related to the Solenoid Controlled Pilot Operated Directional Valves.
*3. Varies depending on the spool type and pilot pressure. For more information, see page 168 for the List of Spool Functions (DSHG-10) related to the Solenoid Controlled Pilot Operated Directional Valves.
*4. Minimum Pilot Pressure for the models with pilot piston is 18 kgf/cm²

### ■ Pressure Drop

Same as those Solenoid Controlled Pilot Operated Directional Valves. See page 170 for the related information

### ■ Instruction

In case of spring Offset Models, directly connect the pilot pressure port "Y" to the reservoir as a drain port.

## ■ Model Number Designation

| F- | DH | G | -04 | -2 | B | 2 | A | -C2 | -RA | -H | -50 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Special Seals | Series Number | Type of Connection | Valve Size | Number of Valve Positions | Spool Spring Arrangement | Spool Type | Special Two Position Valve | Models with Pilot Choke Valve (Options) | Spool Control Modification (Options) | Built-in Orifice for Pilot Line | Design Number |
| **F:** Special seals for Phosphate Ester Type Fluids (Omit if not required) | **DH :** Pilot Operated Directional Valve | **G:** Sub-plate Mounting | **04** | **3** | **C:** Spring Centred | **2・3** **4・40** **5・6** **60・7** **9・10** **11・12** | **A*2, B*2** (Omit if not required) | **C2:** With C2 Choke | **R2:** With Stroke Adjustment, Both Ends | — | **50** |
| | | | **06** | **2** | **N:** No-Spring | | | | **RA:** With Stroke Adjustment, Port A End | **H*3** | **50** |
| | | | **10** | | **B:** Spring Offset | | | | **RB:** With Stroke, Adjustment, Port B End | | **40** |
| | | | | | Refer to *1 | | | | | | |

* 1 For various combinations, see the List of Valve Types below.

* 2 Refer to the column "valves with centre position and one offset position" (Special 2-position valve) on page 180.

* 3 When the spool-spring arrangement is of "H" (pressure Centre Type) and the pilot pressure more than 100 kgf/cm$^2$ always be sure to specify "H" (with built in orifice)

### ● List of Valve Type

| Spool Type | Valve Types | | |
|---|---|---|---|
| | Three Positions | Two Positions | |
| | Spring Centred | No Spring | Spring Offset |
| | Graphic Symbols | | |
| | 3C2 | 2N2 | 2B2 |
| | 3C3 | 2N3 | 2B3 |
| | 3C4 | 2N4 | 2B4 |
| | 3C40 | 2N40 | 2B40 |
| | 3C5 | | |
| | 3C6 | | |
| | 3C60 | | |
| | 3C7 | 2N7 | 2B7 |
| | 3C9 | | |
| | 3C10 | | |
| | 3C11 | | |
| | 3C12 | | |

### ● List of Options

| Model Numbers | Option Code | | | |
|---|---|---|---|---|
| | C2 | R2 | RA | RB |
| DHG-04-3C✻ | O | O | O | O |
| DHG-04-2N✻ | O | O | O | O |
| DHG-04-2B✻ | O | X | O | X |
| DHG-06-3C✻ | O | O | O | O |
| DHG-06-2N✻ | O | O | O | O |
| DHG-06-2B✻ | O | X | O | X |
| DHG-10-3C✻ | O | O | O | O |
| DHG-10-2N✻ | O | O | O | O |
| DHG-10-2B✻ | O | X | O | X |

Note O Mark : Avaiable
X Mark : Not Available

## ■ Sub-plate

| Valve Model Numbers | Sub-Plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|---|
| DHG-04 | DHGM-04-2080 | 1/2 BSP.F | 4.4 |
| | DHGM-04X-2080 | 3/4 BSP.F | 4.1 |
| DHG-06 | DHGM-06-5080 | 3/4 BSP.F | 8.5 |
| | DHGM-06X-5080 | 1 BSP.F | 8.5 |
| DHG-10 | DHGM-10-4080 | 1-1/4BSP.F | 21.5 |
| | DHGM-10X-4080 | 1-1/2 BSP.F | 21.5 |

- Sub-plates are available. Specify sub-plate model from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are shared with those for Solenoid Controlled Pilot Operated Directional Valves. Refer page 175 and 176 for dimensions.

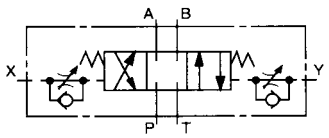
## ■ Mounting Bolts

| Model Numbers | Socket Head Cap Screw | Qty. | Tightening Torque kgf-m | Bolt kit Model No. |
|---|---|---|---|---|
| DHG-04 | M6 x 45 Lg.<br>M10 x 50 Lg. | 2<br>4 | 1.2-1.5<br>5.8-7.2 | BKDHG-04-50 |
| DHG-06 | M12 x 60 Lg. | 6 | 10.0-12.3 | BKDHG-06-50 |
| DHG-10 | M20 x 75 Lg. | 6 | 47.3-58.5 | BKDHG-10-40 |

## ■ Options

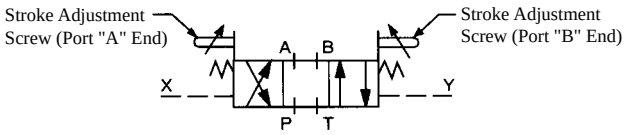
- **Models with Pilot Choke Adjustment (C2)**
  To lower the changeover speed, turn the adjusting screw clockwise. In particular, the centering speed which is controlled by spring force can be lowered. This applies to Spring Centered Models and Spring Offset Models. These models can be used in combination with Spring Centered Models, No-Spring Detented Models, and Models with Stroke Adjustment.

Graphic Symbols
Spring Centred Models




- **Models with Stroke Adjustment (R❋)**
  When the adjusting screw is turned in, the spool strike becomes shorter as flow rate reduces.

Graphic Symbol
Spring Centred Models with Stroke Adjustment on Both Ends (R2)



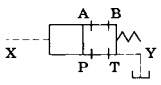

- **Additional Mass of Options**
  Add mass of options below to mass of standard type (see page 177) if options are used.

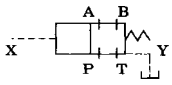
kg

| Model Numbers | With Pilot Choke Valve | With Stroke Adjustment | |
|---|---|---|---|
| | | R2 | RA<br>RB |
| DHG-04 | 0.65 | 1.0 | 0.5 |
| DHG-06 | 0.65 | 1.2 | 0.6 |
| DHG-10 | 0.65 | 3.7 | 1.85 |

## ■ Valves with Centre Position and One Offset Position (Special Two Position Valves)

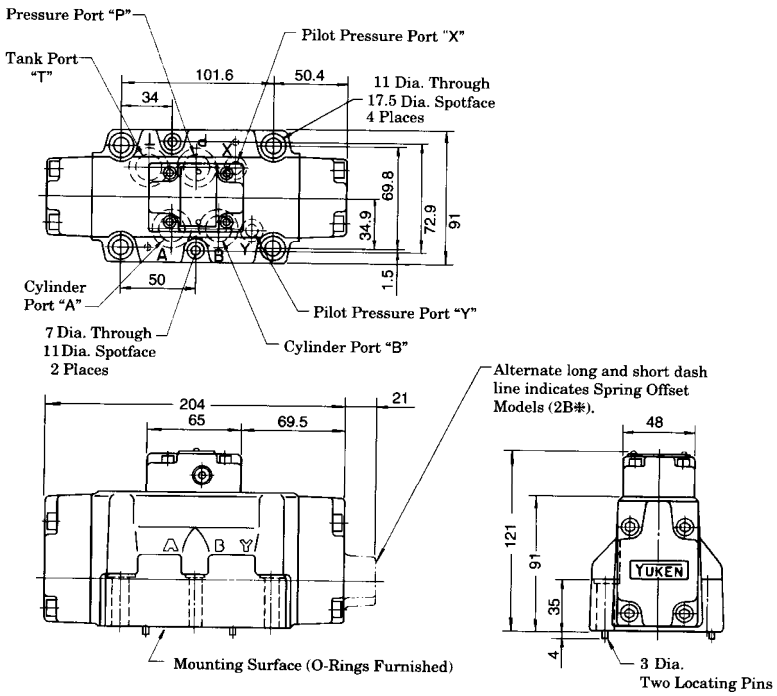
In addition to the standard Two Position Valves (2B✻), the following two types of two position valves are available: Valves with centre position and pilot Y pressure position (2B✻A), valves with centre position and pilot X pressure position (2B✻B).

| Model Numbers | Graphic Symbols |
|---|---|
| 04<br>DHG-06-2B✻A<br>10 |  |
| DHG-✻-2B2A |  |
| DHG-✻-2B3A |  |
| DHG-✻-2B4A |  |
| DHG-✻-2B40A |  |
| DHG-✻-2B5A |  |
| DHG-✻-2B6A |  |
| DHG-✻-2B60A |  |
| DHG-✻-2B7A |  |
| DHG-✻-2B9A |  |
| DHG-✻-2B10A |  |
| DHG-✻-2B11A |  |
| DHG-✻-2B12A |  |

| Model Numbers | Graphic Symbols |
|---|---|
| 04<br>DHG- 06-2B✻B<br>10 |  |
| DHG-✻-2B2B |  |
| DHG-✻-2B3B |  |
| DHG-✻-2B4B |  |
| DHG-✻-2B40B |  |
| DHG-✻-2B5B |  |
| DHG-✻-2B6B |  |
| DHG-✻-2B60B |  |
| DHG-✻-2B7B |  |
| DHG-✻-2B9B |  |
| DHG-✻-2B10B |  |
| DHG-✻-2B11B |  |
| DHG-✻-2B12B |  |

DHG-04-✻✻✻-50

DIMENSION IN MILLIMETERS

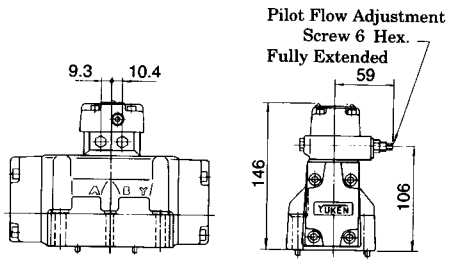



Note : For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate on page 175

**Mounting Surface: ISO 4401-AD-07-4-A**

Options

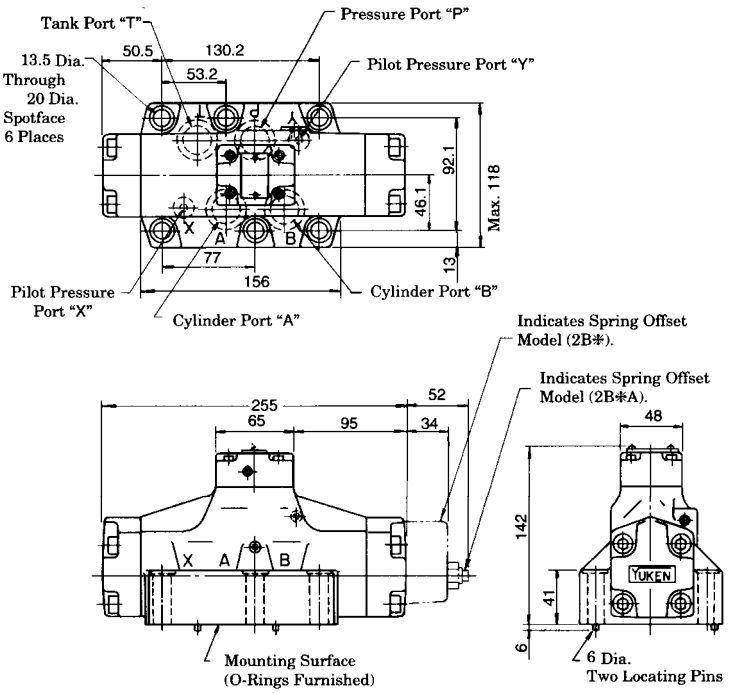
- **Models with Pilot Choke Valve**
  DHG-04-✻✻✻-C2




For Spring Offset Models (2B✻2B✻-$\frac{A}{B}$) it functions as a drain port. When that model is used directly connect it to the resvervoir.

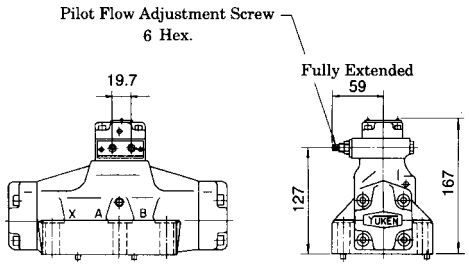
## DHG-06-✻✻✻-50

**Mounting Surface: ISO 4401-AE-08-4-A**




Options

- **Models with Pilot Choke Valve**
  DHG-06-✻✻✻-C2




- **Models with Stroke Adj. (R✻)**
  Outside dimensions are the same as those of the main valve of Solenoid Controlled Pilot Operated Directional Valves (DSHG-06). See page 172.

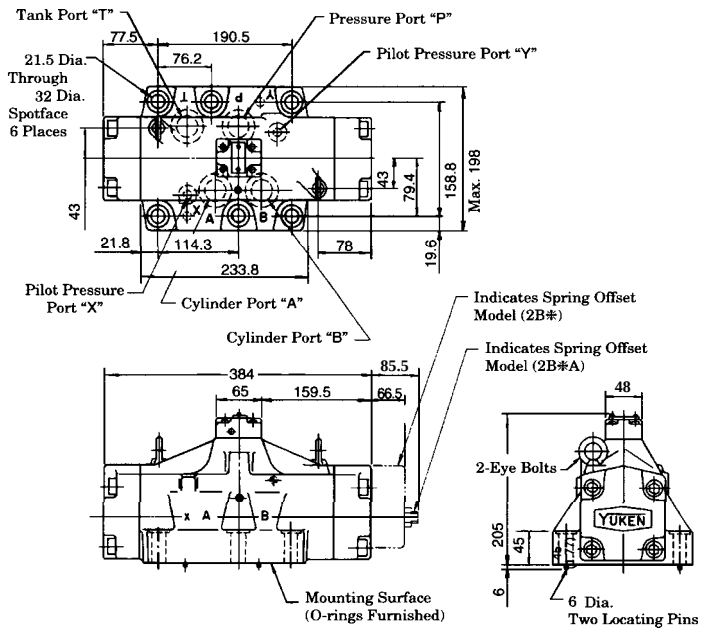
In case of Spring Offset Models (2B✻-2B✻-$\frac{A}{B}$) it functions as a drain port. When that model is used directly connect it to the resvervoir

Note : For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in page 175.

DIMENSION IN MILLIMETERS

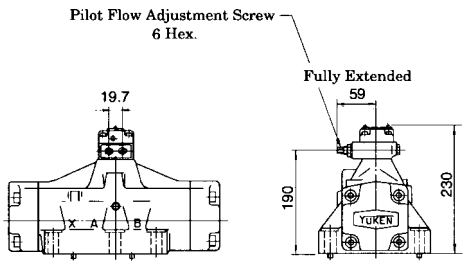
## DHG-10-✻✻✻-40

**Mounting Surface: ISO 4401-AF-10-4-A**




Options

- **Models with Pilot Choke Valve**
  DHG-10-✻✻✻-C2




- **Models with Stroke Adj. (R✻)**
  Outside dimensions are the same as those of the main valve of Solenoid Controlled Pilot Operated Directional Valves (DSHG-10). See page 173.

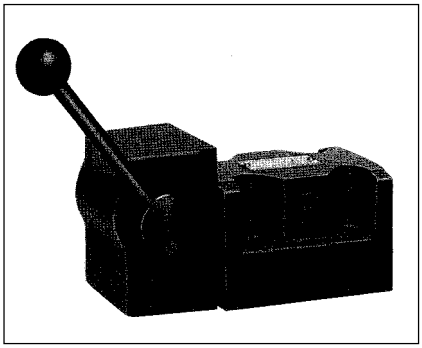
In case of Spring Offset Models (2B✻-2B✻-$\frac{A}{B}$) it functions as a drain port. When that model is used directly connect it to the resvervoir

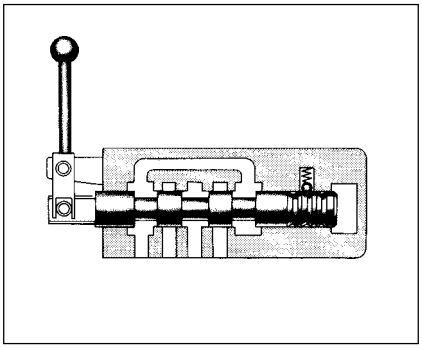
Note : For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in page 176.

DIMENSION IN MILLIMETERS

# ■ Manually Operated Directional Valves

These valves may be used to manually shift the spool position and change the direction of oil flow.





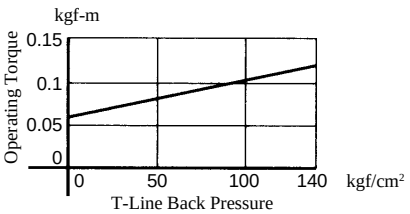
## ■ Ratings

| Model Numbers | Maximum Flow l/min | | | | Max. Operating Pressure kgf/cm² | Max. T-Line Back Pressure kgf/cm² | Mass kg |
|---|---|---|---|---|---|---|---|
| | 70 kgf/cm² | 140 kgf/cm² | 210 kgf/cm² | 315 kgf/cm² | | | |
| DMG-01-3C✻-10 | 35 | 35 | 35 | — | 250 | 140 *2 | 1.8 |
| DMG-01-3D✻-10 | | | | | | | |
| DMG-01-2D✻-10 | | | | | | | |
| DMG-01-2B✻-10 | | | | | | | |
| DMG-03-3C✻-50 | 100 *1 | 100 *1 | 100 *1 | — | 250 | 160*3 | 4.0 |
| DMG-03-3D✻-50 | 100 | 100 | 100 | — | | | |
| DMG-03-2D✻-50 | 100 | 100 | 100 | — | | | |
| DMG-03-2B✻-50 | 100 *1 | 100 *1 | 100 *1 | — | | | |
| DMG-06-3C✻-50 | 500 | 500 | 500 | 500 | 315 | 210 *3 | 11.5 |
| DMG-06-3D✻-50 | 500 | 500 | 500 | 500 | | | |
| DMG-06-2D✻-50 | 500 | 500 | 500 | 500 | | | |
| DMG-06-2B✻-50 | 420 | 300 | 250 | 200 | | | 12 |

Note : Max. flow indicates a ceiling flow which does not affect the normal function (changeover) of the valve.

- 1. Varies depending of the spool type. For the details, see the "List of Standard Spool Functions" for DSG-03 Series Solenoid Operated Directional Valves (page 155 or 156 at 50 Hz rated voltage.)
- 2. Over operating torque varies depending on the T-Line back pressure. See the figure below.
- 3. If the T-Line back pressure exceeds 70 kgf/cm², directly connect the drain port to the reservoir.

### ● DMG-01 Lever Operating Torque



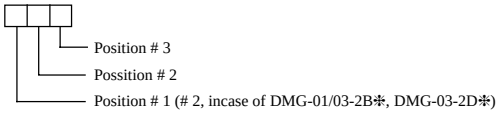
## ■ Model Number Designation

| F- | DM | G | -03 | -2 | B | 2 | A | -50 |
|---|---|---|---|---|---|---|---|---|
| Special Seals | Series Number | Type of Connection | Valves size | No. of Valve Position | Spool-Spring Arrangement | Spool Type | Special Two Position Valve | Design Number |
| **F:** Special seals for phos-phate ester type fluids (Omit if not required) | **DM:** Manually Operated Direc-tional Valves | **G:** Sub- plate Mounting | **01** | **3** | **C:** Spring Centred | **2 · 3** **4 · 40** **5 · 6** **60 · 7** **8 · 9** **10.11** **12** | **A***, **B*** (Omit if not required) | **10** |
| | | | **03** | **2** | **D:** No-spring Detented | | | **50** |
| | | | **06** | | **B:** Spring Offset | | | **50** |
| | | | See the table for combinations. | | | | | |

Refer to column "valves with centre position and one offset position" (special 2-position vlave) on page 184.

## ● List of Spool Type

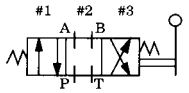
| Spool Type | | DMG-01 | | | DMG-03 | | | DMG-06 | |
|---|---|---|---|---|---|---|---|---|---|
| | | 3C 3D | 2D | 2B | 3C 2D | 2D | 2B | 3C 3D | 2D 2B |
| 2 | | O | O | O | O | O | O | O | O |
| 3 | | O | O | O | O | — | O | O | O |
| 4 | | O | — | — | O | — | — | O | O |
| 40 | | O | — | — | O | — | — | O | O |
| 5 | | O | — | — | — | — | — | — | — |
| | | — | — | — | — | — | — | O | — |
| 6 | | — | — | — | — | — | — | O | — |
| | | — | — | — | — | — | — | — | — |
| 60 | | O | — | — | O | — | — | O | — |
| | | — | — | — | — | — | — | — | — |
| 7 | | O | O | — | — | — | — | O | O |
| 8 | | O | O | O | — | — | O | — | — |
| 9 | | O | — | — | O | — | — | O | — |
| 10 | | O | — | — | O | — | — | O | — |
| 11 | | O | — | — | — | — | — | O | — |
| 12 | | O | — | — | O | — | — | O | — |




Note : The O mark indicate the spool type available for each type.

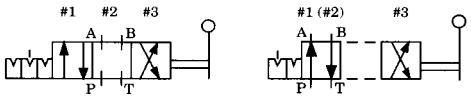
## ■ Graphic Symbols

**Spring Centred Models (3C*)**

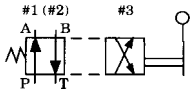



**No-Spring Detented Models**

**3D*** **2D***




**Spring Offset Models (2B*)**




Position #2 is applied for models DMG-01-2B* and DMG-03-2B*/2D*

## ■ Valves with Centre Position and One Offset Position (Special Two Position Valve)

In addition to the standard two position valves (2D✻, 2B✻), the following two types of two position valves are available: Valves with centre position (#2) and position #1(2B✻A,2D✻A)valves with centre postion (#2) and position #3 (2B✻B, 2D✻B).

The O mark in the table below indicates the spool type available for each models.

### ● Spring Offset Models

| Valve Type | Graphic Symbols | Model | |
|---|---|---|---|
| | | DMG-03 | DMG-06 |
| 2B2A |  | O | O |
| 2B3A |  | O | O |
| 2B4A |  | — | O |
| 2B40A |  | — | O |
| — | — | — | — |
| 2B5A |  | — | O |
| 2B6A |  | — | O |
| |  | — | — |
| 2B60A |  | — | O |
| |  | — | — |
| 2B7A |  | — | O |
| 2B8A |  | — | — |
| 2B9A |  | — | O |
| 2B10A |  | — | O |
| 2B11A |  | — | O |
| 2B12A |  | — | O |

* Position # 1 
* Position # 2

| Valve Type | Graphic Symbols | Model | | |
|---|---|---|---|---|
| | | DMG-01 | DMG-03 | DMG-06 |
| 2B2B |  | O | O | O |
| 2B3B |  | O | O | O |
| 2B4B |  | O | O | O |
| 2B40B |  | O | — | O |
| 2B5B |  | O | — | — |
| |  | — | — | O |
| 2B6B |  | — | — | O |
| |  | — | — | — |
| 2B60B |  | O | O | O |
| |  | — | — | — |
| 2B7B |  | O | — | O |
| 2B8B |  | O | — | — |
| 2B9B |  | O | — | O |
| 2B10B |  | O | O | O |
| 2B11B |  | O | — | O |
| 2B12B |  | O | O | O |

* Position # 2 
* Position # 3

### ● No-spring Detented Models

| Valve Type | Graphic Symbols | Model |
|---|---|---|
| | | DMG-06 |
| 2D2A |  | O |
| 2D3A |  | O |
| 2D4A |  | O |
| 2D40A |  | O |
| — | — | — |
| 2D5A |  | O |
| 2D6A |  | O |
| |  | — |
| 2D60A |  | O |
| |  | — |
| 2D7A |  | O |
| 2D8A |  | — |
| 2D9A |  | O |
| 2D10A |  | O |
| 2D11A |  | O |
| 2D12A |  | O |

* Position # 1 
* Position # 2

| Valve Type | Graphic Symbols | Model | |
|---|---|---|---|
| | | DMG-01 | DMG-06 |
| 2D2B |  | O | O |
| 2D3B |  | O | O |
| 2D4B |  | O | O |
| 2D40B |  | O | O |
| 2D5B |  | O | — |
| |  | — | O |
| 2D6B |  | — | O |
| |  | — | — |
| 2D60B |  | O | O |
| |  | — | — |
| 2D7B |  | O | O |
| 2D8B |  | O | — |
| 2D9B |  | O | O |
| 2D10B |  | O | O |
| 2D11B |  | O | O |
| 2D12B |  | O | O |

* Position # 2 
* Position # 3

Note : Position number is determinec with three position type (3C✻ and 3D✻) as the standard.

## ■ Sub-plates

| Valve Model Numbers | Sub-plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|---|
| DMG-01 | DSGM-01-3080 | 1/8 BSP.F | 0.8 |
| | DSGM-01X-3080 | 1/4 BSP.F | 0.8 |
| DMG-03 | DSGM-03-2180 | 3/8 BSP.F | 3.0 |
| | DSGM-03X-2180 | 1/2 BSP.F | 3.0 |
| | DSGM-03Y-2180 | 3/4 BSP.F | 4.7 |
| DMG-06 | DHGM-06-5080 | 3/4 BSP.F | 8.5 |
| | DHGM-06X-5080 | 1 BSP.F | 8.5 |

- Sub-plates are available. Specify sub-plate model from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sharable with Solenoid Operated Directional Valves and Solenoid Controlled Pilot Operated Directional Vales. For dimensions, refer to the right table then see the corresponding pages.

- Sub-plate dimesnions appearing page

| Sub-plate Model No. | Page |
|---|---|
| DSGM-01❋ | 152 |
| DSGM-03❋ | 162 |
| DHGM-06❋ | 175 |

## ■ Mounting Bolts

| Model Numbers | Socket Head Cap Screw | Qty. | TighteningTorqe kgf-m | Bolt Kit Model No. |
|---|---|---|---|---|
| DMG-01 | M5 x 45 Lg | 4 | 0.5-0.7 | BKDSG-01-10 |
| DMG-03 | M6 x 35 Lg | 4 | 1.2-1.5 | BKDSG-03-20 |
| DMG-06 | M12 x 60 Lg | 6 | 10.0-12.3 | BKDSHG-06-50 |

## ■ Instructions

- Avoid connecting the Tank Port "T" to a line with possible surge pressure.

## ■ Pressure Drops

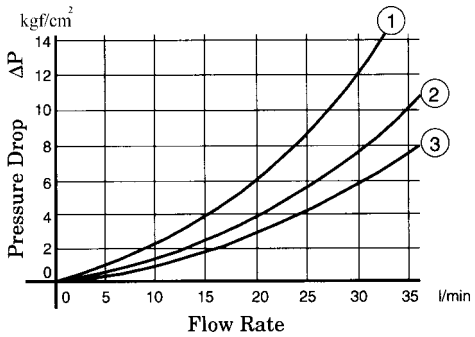
The following charateristics are based on the following conditions: viscosity of the fluid: 35 cSt (160 SSU) Specific Gravity: 0.850

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

| Viscosity | cSt | 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 (DP') may be obtained from the formula below.
  DP' = DP G'/G where, DP is a value on the following chart and G is 0.850.

## ● DMG-01

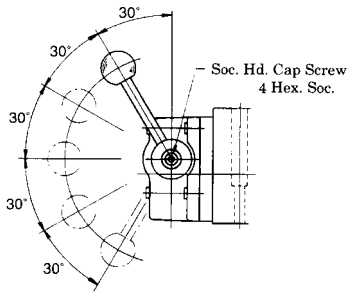



| Valve Type | | | | Pressure Drop Curve Number | | | | |
|---|---|---|---|---|---|---|---|---|
| 3C✻ | 3D✻ | 2D✻ | 2B✻ | P→A | B→T | P→B | A→T | P→T |
| 3C2 | 3D2 | 2D2 | | ③ | ③ | ③ | ③ | — |
| 3C3 | 3D3 | 2D3 | | ③ | ③ | ③ | ③ | ② |
| 3C4 | 3D4 | | | ③ | ③ | ③ | ③ | — |
| 3C40 | 3D40 | | | ③ | ③ | ③ | ③ | — |
| 3C5 | 3D5 | | | ② | ① | ① | ① | ③ |
| 3C60 | 3D60 | | | ① | ① | ① | ① | ③ |
| 3C7 | 3D7 | 2D7 | | ③ | ③ | ③ | ③ | — |
| 3C8 | 3D8 | 2D8 | | ③ | — | ③ | — | — |
| 3C9 | 3D9 | | | ③ | ③ | ③ | ③ | — |
| 3C10 | 3D10 | | | ③ | ③ | ③ | ③ | — |
| 3C11 | 3D11 | | | ③ | ③ | ③ | ③ | — |
| 3C12 | 3D12 | | | ③ | ③ | ③ | ③ | — |
| | | | 2B2 | ② | ② | ③ | ③ | — |
| | | | 2B3 | ② | ② | ③ | ③ | — |
| | | | 2B8 | ③ | — | ③ | — | — |

● For **DMG-03, DMG-06,** refer to the table below then see the related page.

| Model Number | Pressure Drop Characteristics | Page | Remarks |
|---|---|---|---|
| DMG-03 | Same as DSG-03 Series Solenoid Operated Directional Valves (Standard Type) | 160 | 3D✻ is same as 3C✻ |
| DMG-06 | Same asa Solenoid Controlled Pilot Operated Directional Valves (DSHG-06) | 170 | |

**How to Change Lever Postion:**

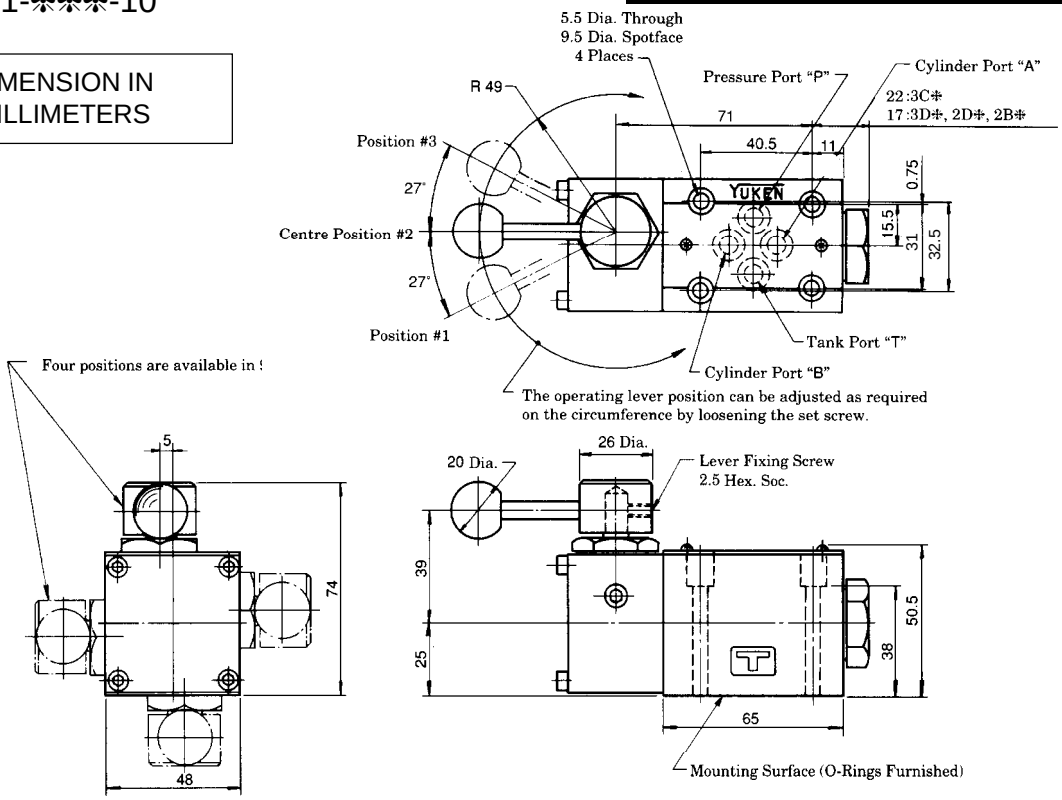



The lever position can be changed to any position in five different positions shown on the sketch in the right. For the lever position change, remove the Soc. Head Cap Screw and lever once, set the lever at the required position and tighten it with Soc. Head Cap Screw firmly.

## DMG-01-✻✻✻-10

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

DIMENSION IN MILLIMETERS

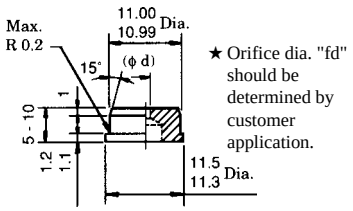



Note : For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in page 152

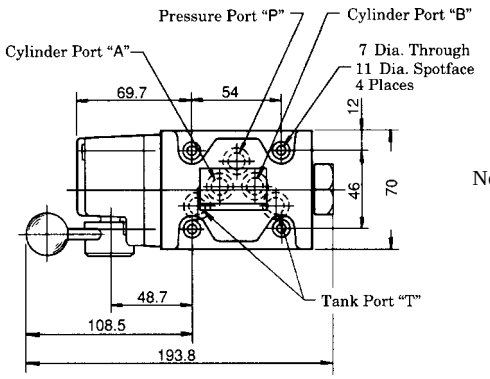
## DMG-03-✻✻✻-50

**Mounting Surface: ISO 4401-AC-05-4-A**

**Finishing Dimensions of Flow Restrictor**



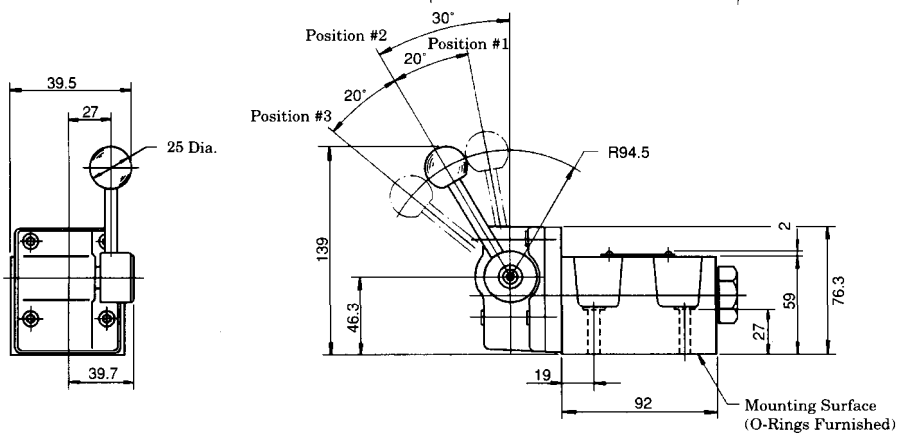

★ Orientation dia. "fd" should be determined by customer application.




Notes 1. Each port (P, A, B and T) is machined for flow restrictor. The flow restrictor should be machined in accordance with the Finishing Dimensions for Flow Restrictor as shown in the left-hand drawing.

2. Although the tank port is shown on the left in our sub-plate either may be used.

3. For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in page 162

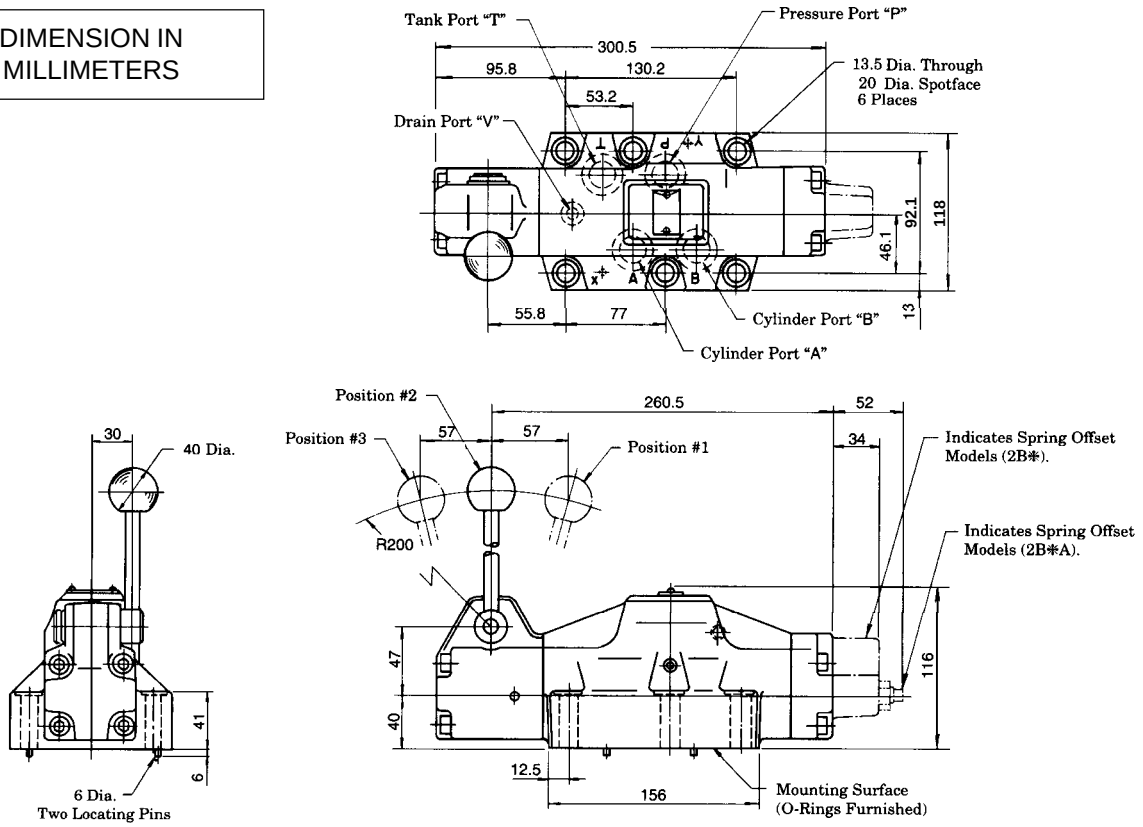



DIMENSION IN MILLIMETERS

**Mounting Surface: ISO 4401-AE-08-4-A**

DMG-06-✻✻✻-50

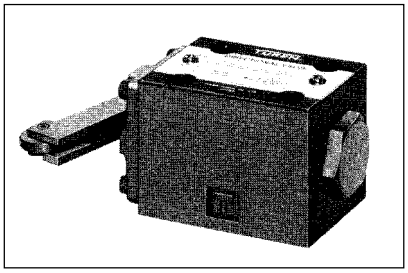
DIMENSION IN MILLIMETERS

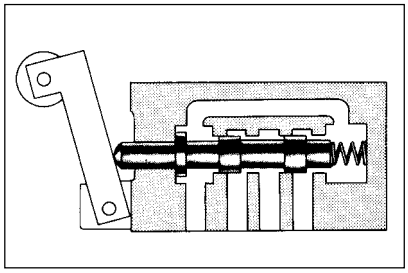



Note : For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in page 175

# ■ Cam Operated Directional Valves

These valves may be used to shift the direction of oil flow by depressing the spool by way of a cam.



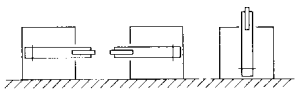


## ■ Ratings

| Models Numbers | Max.Flow l/min | Max. Operating Pressure kgf/cm² | Max. T-Line Pressure kgf/cm² | Mass kg |
|---|---|---|---|---|
| Sub-plate Mounting | | | | DCG Type |
| DCG-01-2B❋-40 | 30 | 210 | 70 | 1.1 |
| DCG-03-2B❋-50 | 100 | 250 | 100 | 3.8 |

- Max. flow indicates the ceiling flow which does not affect the normal function (changeover) of valves.

## ■ Model Number Designation

| F- | DC | G | -01 | -2 | B | 2 | -R | -40 |
|---|---|---|---|---|---|---|---|---|
| Special Seals | Series Number | Type of Connection | Valve Size | No. of Valve Position | Spool-Spring Arrangement | Spool Type | Roller Position | Design Number |
| **F:** Special Seals for Phosphate Ester type Fluids (Omit if not required) | **DC:** Cam Operated Direc-tional Valve | **G:** Sub-plate Mounting | **01** | **2** | **B:** Spring Offset | **2 · 3 · 8** | **None** (Normal Position) **R** **Y** (DC❋-01 only)  Mounting Surface | **40** |
| | | | **03** | | | | | **50** |

## ■ Sub-plates

| Valve Model Numbers | Sub-plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|---|
| DCG-01 | DSGM-01-3080 | 1/8 BSP.F | 0.8 |
| | DSGM-01X-3080 | 1/4 BSP.F | 0.8 |
| | — | — | — |
| DCG-03 | DSGM-03-2180 | 3/8 BSP.F | 3.0 |
| | DSGM-03X-2180 | 1/2 BSP.F | 3.0 |
| | DSGM-03Y-2180 | 3/4 BSP.F | 4.7 |

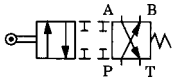
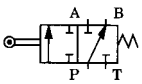
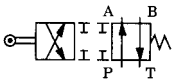
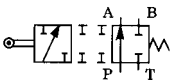
- Sub-plates are available. Specify Sub-plate model from the table above.
  When Sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are sharable with DSG-01 (page 152) and DSG-03 (page 162 ). See each pages for dimensional drawings.

## ■ Mounting Bolts

Socket head-cap screws in the table below are included.

| Model Numbers | Socket Head Cap Screw | Qty. | Tightening Torque kgf-m | Bolt kit Model No. |
|---|---|---|---|---|
| DCG-01 | M5 x 45 Lg | 4 | 0.5~0.7 | BKDSG-01-10 |
| DCG-03 | M6 x 35 Lg | 4 | 1.2~1.5 | BKDSG-03-20 |

## ■ Directional of Oil Flow for Roller Position

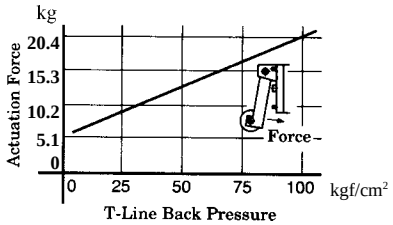
| Model Numbers | Graphic Symbols | Roller Position and Direction of Oil Flow<br>Roller Stroke from Offset Position mm<br>Extended (Offset) — Depressed |
|---|---|---|
| DCG-01-2B2 |  | P→B, A→T / All ports blocked / P→A, B→T<br>0 — 3.8 — 4.6 — 9.5 |
| DCG-01-2B3 |  | P→B, A→T / All ports open / P→A, B→T<br>0 — 3.8 — 4.6 — 9.5 |
| DCG-01-2B8 |  | P→B / A&T ports blocked / P→A / B&T ports blocked<br>0 — 3.8 — 9.5 |
| DCG-03-2B2 |  | P→A, B→T / All ports blocked / P→B, A→T<br>0 — 3.4 3.8 — 7 |
| DCG-03-2B3 |  | P→A, B→T / All ports open / P→B, A→T<br>0 — 3.0 — 4.0 — 7 |
| DCG-03-2B8 |  | P→A / B&T ports blocked / All ports blocked / P→B / A&T ports blocked<br>0 — 3.6 — 4.7 — 7 |

## ■ Instructions

● **Valve Type "2B8"**

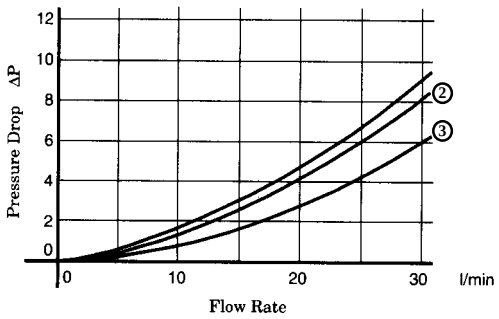
Tank port "T" functions as a drain port. Directly connect it to the reservoir.
[Max. allowable back pressure 3.5kgf/cm²]

● **Actuation Force**




## ■ Pressure Drop

● **DCG-01**




| Model Numbers | Pressure Drop Curve No. | | | |
|---|---|---|---|---|
| | P→A | B→T | P→B | A→T |
| DCG-01-2B2 | 2 | 2 | 3 | 3 |
| DCG-01-2B3 | | | | |
| DCG-01-2B8 | 3 | — | 3 | — |

- For any viscosity, multiply the factors in the table below.

| Viscosity | cSt | 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 |

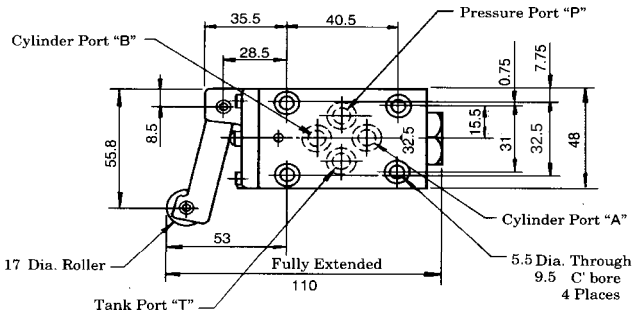
- For any other specific gravity (G'), the pressure drop (DP') may be obtained from the formula below
DP' = DP (G'/G) where, DP is the value on the above chart and G is 0.850

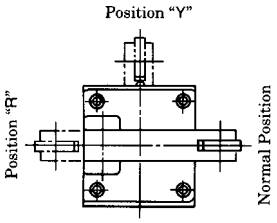
● **DCG-03**

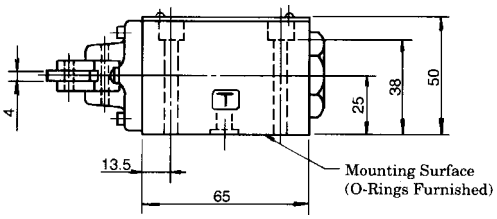
Same as DSG-03 Series Solenoid Operated Directional Valves (Standard Type). See page 160.

## DCG-01-2B✻-✻-40

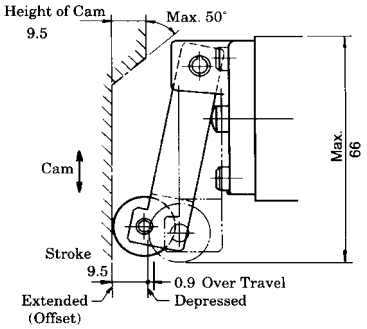
**Mounting Surface: ISO 4401-AB-03-4-A**



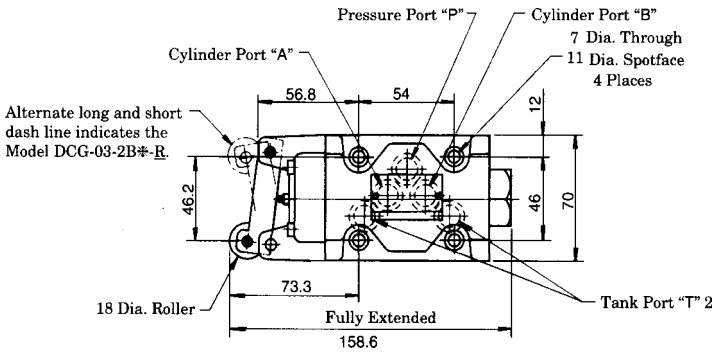

**Cam and Roller Travel**

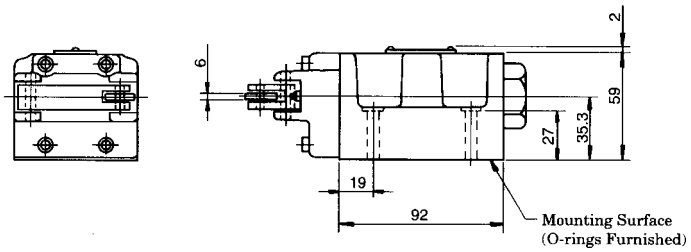



Notes : 1. For the valve mounting surface dimensions, see the sub-plate dimensional drawing for DSG-01 Series Solenoid Operated Directional Valves

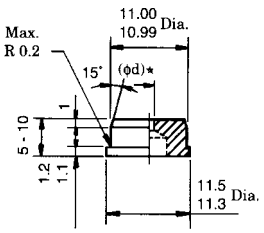
## DCG-03-2B-✻-✻-50

**Mounting Surface: ISO 4401-AC-05-4-A**



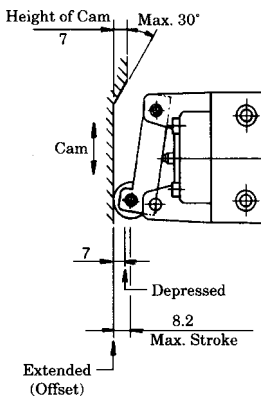




**Finishing Dimensions of Flow Restrictor**




* Orifice dia "fd" should be determined by customer application

**Cam and Roller Travel**



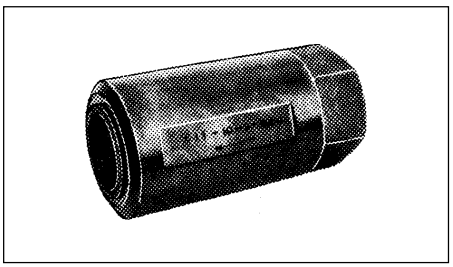

1. Each port (P,A, B and T) is machined for flow restrictor. The flow restrictor should be machined in accoredance with the Finishing Dimensions for Flow Restrictor as shown in the right-hand drawing.
2. Although the tank port is shown on the left in our sub-plate, either may be used.

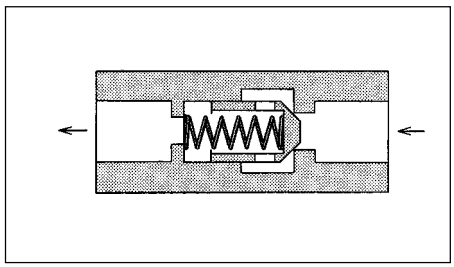
Notes :

1. For the valve mounting surface dimesnions, see the sub-plate dimensional drawing for DSG-03 Series Solenoid Operated Directional Valves.

# ■ In-Line Check Valves

These valves allow free flow in one direction and prevent flow in the reverse direction. Cracking pressure specified is the pressure required to open the valve and allow free flow.





Graphic Symbol

## ■ Ratings

| Model Number | Rated Flow * l/min | Max. Operating Pressure kgf/cm² | Cracking Pressure kgf/cm² | Mass kg |
|---|---|---|---|---|
| CIT-02-❋-2080 | 12 | 210 | 0.35 | 0.10 |
| CIT-03-❋-2080 | 30 | | 2.00 | 0.18 |
| CIT-06-❋-2080 | 80 | | 3.5 | 0.65 |
| CIT-10-❋-2080 | 200 | | 5.00 | 2.1 |

★ Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 3 kgf/cm² the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20cSt (100 SSU), and the cracking pressure is 0.4 kgf/cm²

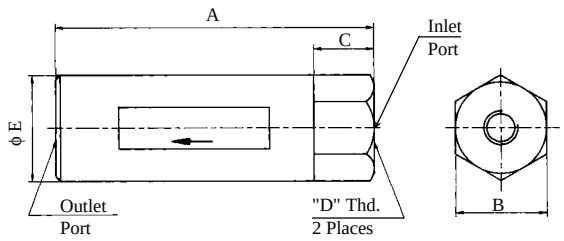
## ■ Model Number Designation

| **CI** | **T** | **- 03** | **30** | **20** | **❋** |
|---|---|---|---|---|---|
| Series Number | Type of Connection | Valve Size | Cracking Pressure kgf/cm² | Design Number | Design Standards |
| | | **02** | **5** : 0.35 | **20** | |
| **CI:** | **T:** | **03** | **30** : 2.0 | **20** | **80** |
| In-Line | Threaded | **06** | **50** : 3.5 | **20** | |
| Check-Line | Connection | **10** | **75** : 5.0 | **20** | |

● For in-line check valves, standard type (for petroleum base oil) can be used phosphate ester type fluid.

CIT-02-❋-2080
CIT-03-❋-2080
CIT-06-❋-2080
CIT-10-❋-2080

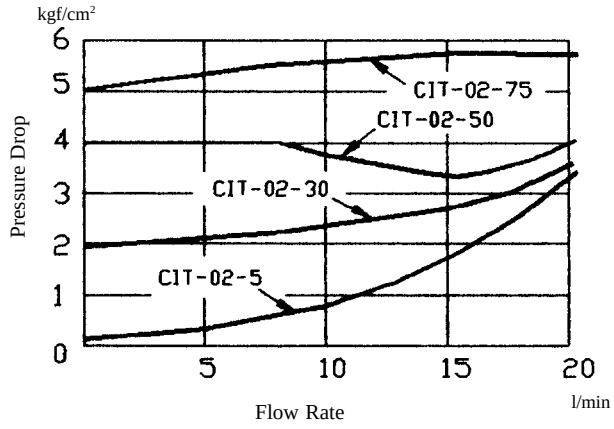
DIMENSION IN MILLIMETERS



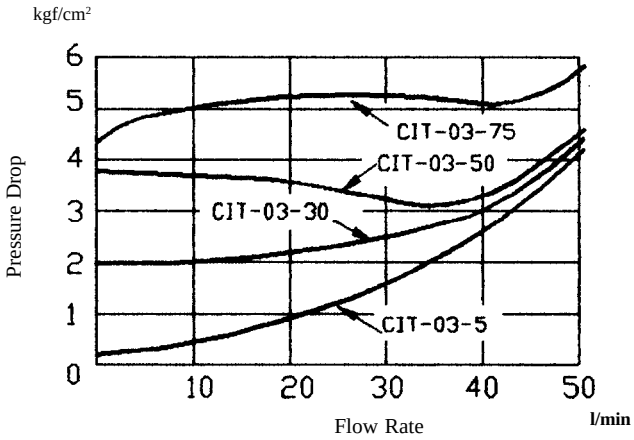

| Model Numbers | mm | | | | "D" Thd. |
|---|---|---|---|---|---|
| | A | B | C | E | |
| CIT-02-❋-2080 | 65 | 22 | 15 | 25.4 | 1/4 BSP.F |
| CIT-03-❋-2080 | 70 | 28 | 20 | 33 | 3/8 BSP.F |
| CIT-06-❋-2080 | 95 | 38 | 25 | 44 | 3/4 BSP.F |
| CIT-10-❋-2080 | 132 | 58 | 30 | 67 | 1 1/4 BSP.F |

## ■ Pressure Drop

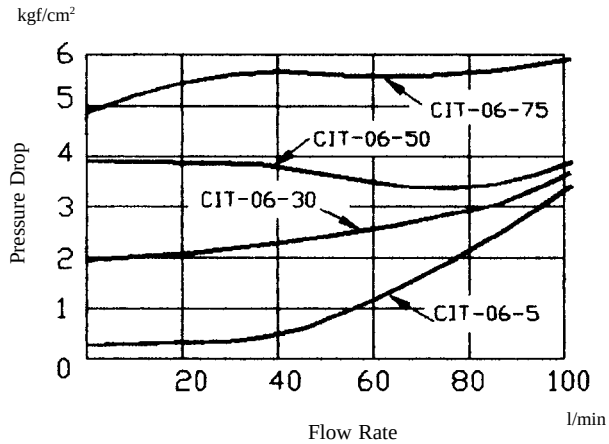
### ● CIT-02



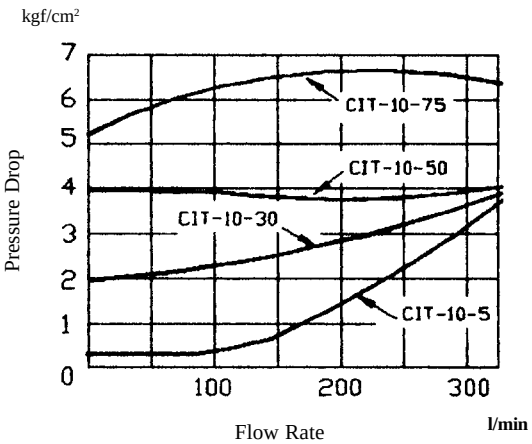

### ● CIT-03




### ● CIT-06

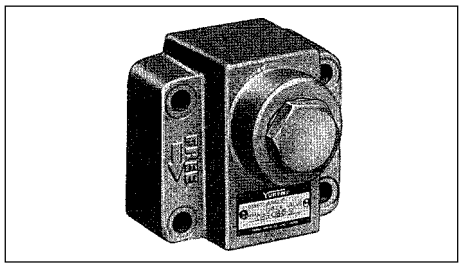


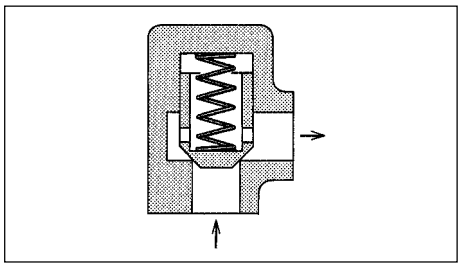

### ● CIT-10



# ■ Right Angle Check Vavles

These valves allow free flow in one direction and prevent flow in the reverse direction. Cracking pressure specified is the pressure required to open the valve and allow free flow.





Graphic Symbol

## ■ Ratings

| Model Numbers | | Rated Flow * l/min | Max. Operating Pres. kgf/cm² | Cracking Pres. kgf/cm² | Mass kg |
|---|---|---|---|---|---|
| Sub-plate Mounting | CRG-03-❋-50 | 40 | 250 | 0.4, 3.5, 5.0 | 1.7 |
| | CRG-06-❋-30 | 125 | | 0.35, 2.0, 3.5, 5.0 | 4.1 |
| | CRG-10-❋-50 | 250 | | 0.4, 3.5, 5.0 | 5.5 |
| Flanged Connection | CRF-16-❋-50 | 600 | | 0.4, 3.5, 5.0 | 15.6 |

★ Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 3 kgf/cm², the fluid has a specific gravity of 0.85 and kinematic viscosity of 20cSt (100 SSU), and the cracking pressure is 0.4 kgf/cm²

## ■ Model Number Designation

| **F-** | **CR** | **G** | **-03** | **-04** | **-50** |
|---|---|---|---|---|---|
| Special Seals | Series Number | Type of Connection | Valve Size | Cracking Pressure kgf/cm² | Design Number |
| **F:** Special seals for phosphate ester type fluids (Omit if not required) | **CR:** Right Angle Check Valve | **G:** Sub-plate Mounting | **03** | **04**:0.4, **35**:3.5, **50**:5.0 | **50** |
| | | | **06** | **5**:0.35, **30**:2.0, **50**:3.5, **75**:5.0 | **30** |
| | | | **10** | **04**:0.4, **35**:3.5, **50**:5.0 | **50** |
| | | **F:** Flanged Connection | **16** | **04**:0.4, **35**:3.5, **50**:5.0 | **50** |

## ■ Mounting Bolts

Socket head cap screws in the table below are included.

| Valve Model Numbers | Socket Head Cap Screw | Qty. | Bolt kit Model No. |
|---|---|---|---|
| CRG-03 | M10 x 45 Lg | 4 | BKCRG-03-50 |
| CRG-06 | M16 x 50 Lg | 4 | BKCRG-06-30 |
| CRG-10 | M10 x 55 Lg | 6 | BKCRG-10-50 |

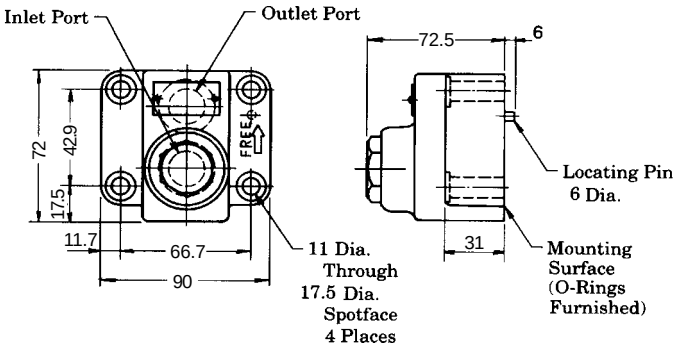
## ■ Pipe Flange Kits

Pipe flange kits are available. When ordering, specify kits model from the table below.

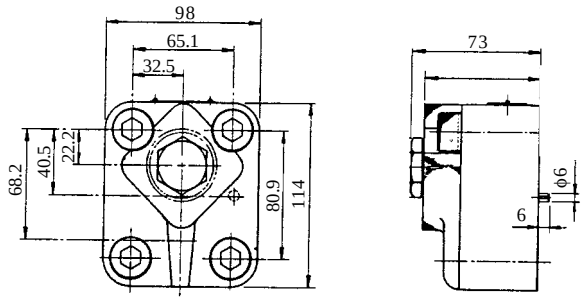
| Valve Model Numbers | Pipe Flange Kit Model Numbers | |
|---|---|---|
| | For Socket Welding | Threaded Connections |
| CRF-16 | F3-16❋-A-11 | F3-16❋-B-11 |

DIMENSION IN MILLIMETERS

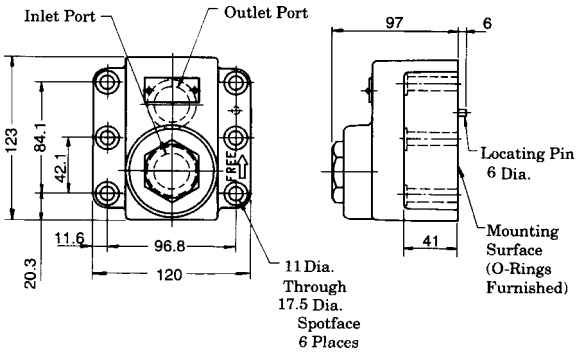
## CRG-03-❊-50



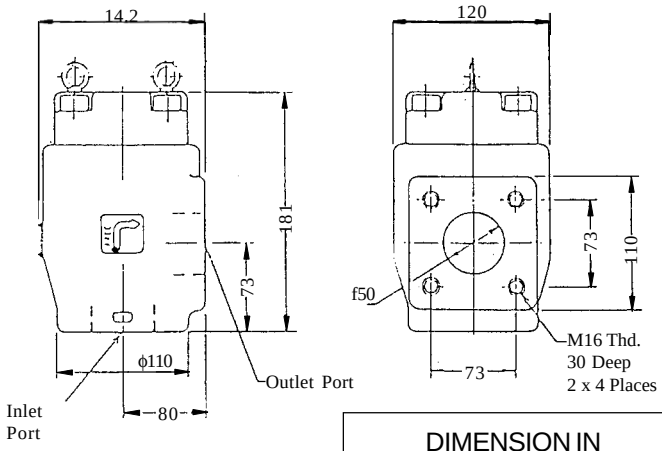

## CRG-06-❊-30




## CRG-10-❊-50




## CRF-16-❊-50




DIMENSION IN MILLIMETERS

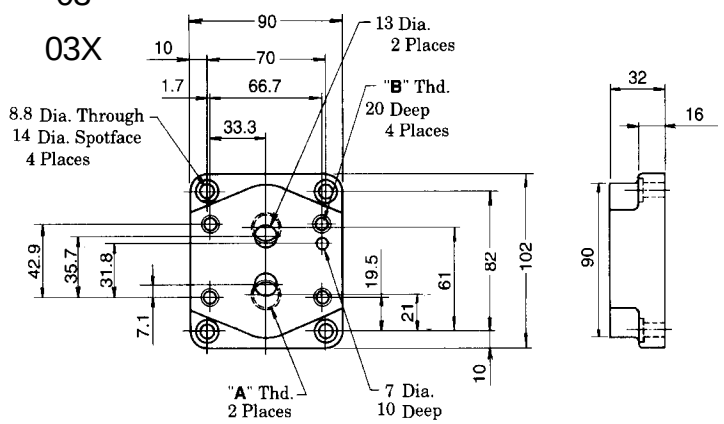
## ■ Sub-plates

| Valve Model Number | Sub-plate Model Numbers | Thread size | Mass (Approx.) kg |
|---|---|---|---|
| CRG-03 | CRGM-03-5080 | 3/8 BSP.F | 1.6 |
| | CRGM-03X-5080 | 1/2 BSP.F | 1.6 |
| CRG-06 | CRGM-06-3080 | 3/4 BSP.F | 3.2 |
| | CRGM-06X-3080 | 1 BSP.F | 3.0 |
| CRG-10 | CRGM-10-5080 | 1-1/4 BSP.F | 4.8 |
| | CRGM-10X-5080 | 1-1/2 BSP.F | 5.7 |

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

CRGM-$\begin{matrix}5080\\03\end{matrix}$ -

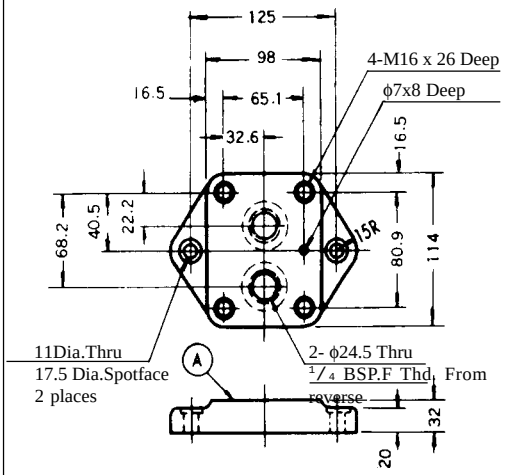
03X



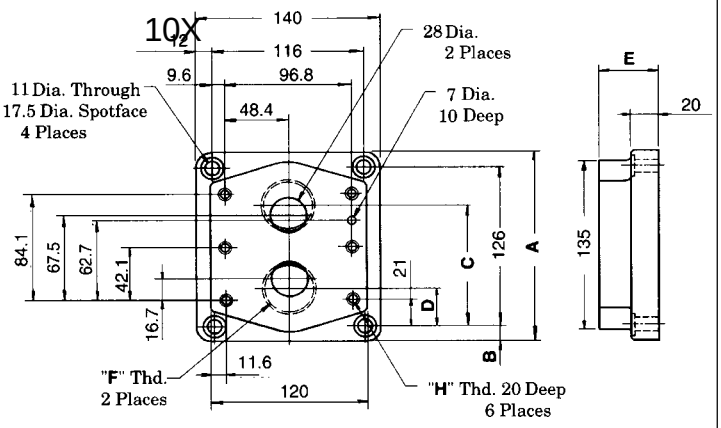

## ■ Sub-plates

| Sub-plate Model Numbers | "A" Thd. | "B" Thd. |
|---|---|---|
| CRGM-03-5080 | 3/8 BSP.F | M10 |
| CRGM-03X-5080 | 1/2 BSP.F | M10 |

CRGM-06-3080



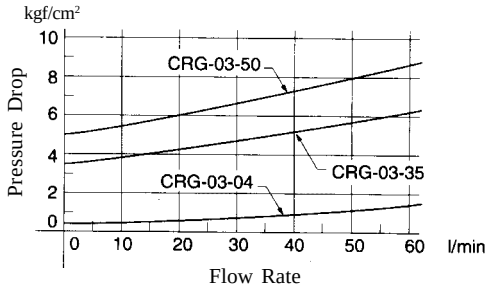

CRGM-5080 10 - 10X 1/2



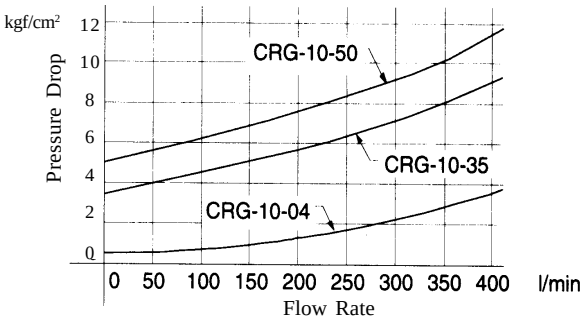

| Sub-plate Model Numbers | Dimensions mm | | | | | "F" Thd. | "H" Thd. |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | | |
| CRGM-10-5080 | 150 | 12 | 96 | 30 | 45 | 1-1/4 BSP.F | M10 |
| CRGM-10X-5080 | 177 | 25.5 | 104 | 22 | 50 | 1-1/2 BSP.F | M10 |

DIMENSION IN MILLIMETERS

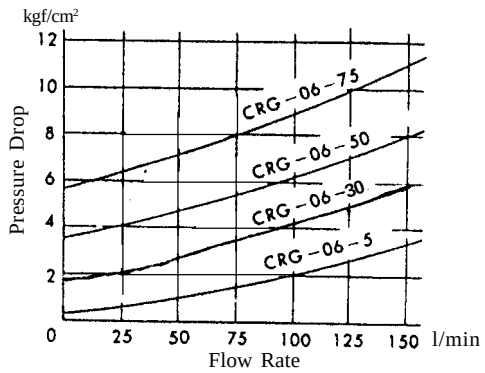
● **CRG-03**



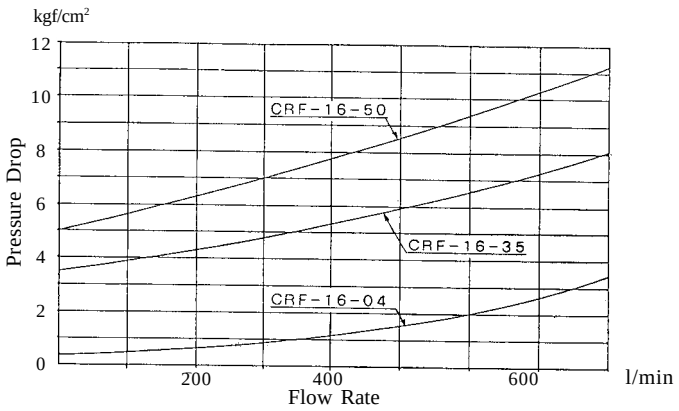

● **CRG-10**




● **CRG-06**

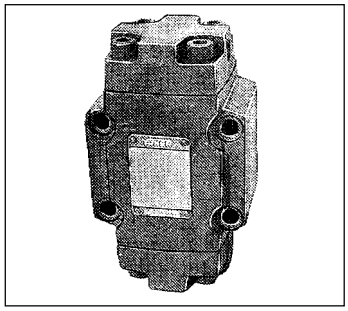


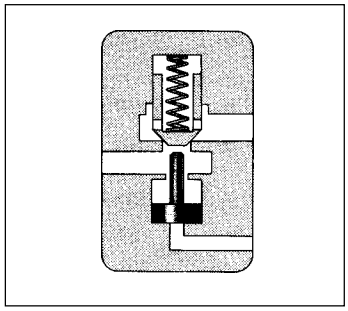

● **CRF-16**



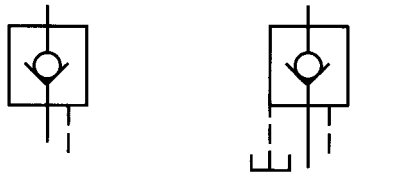
# ■ Pilot Controlled Check Valves

These check valves allow flow in one direction and prevent flow in the reverse direction, until operated by pilot pressure to allow free reverse flow. The specified crecking pressure is required to open the valve to allow free flow direction.





Graphic Symbols



Internal Drain Type

External Drain Type

## ■ Ratings

| Model Numbers | | Rated Flow * l/min | Max. Operating Pres. kgf/cm² | Cracking Pres. kgf/cm² | Mass kg |
|---|---|---|---|---|---|
| Sub-plate Mounting | CP❋G-06-❋-❋--20 | 125 | 250 | 0.35, 2<br>3.5, 5 | 7 |

★ Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 3 kgf/cm², the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 cSt (100 SSU), and the cracking pressure 0.4 kgf/cm²

## ■ Model Number Designation

| F- | CP | G | 06 | -E | -04 | -20 |
|---|---|---|---|---|---|---|
| Special Seals | Series Number | Type of Connection | Valve Size | Drain Connection | Cracking Pres. kgf/cm² | Design Number |
| **F:** Special seals for phosphate ester type fluids (Omit if not required) | **CP:** Pilot Controlled Check Valve<br>**CPD:** Decompression Type Pilot Controlled Check Valve | **G:** Sub-plate Mounting | **06** | **None:** Internal Drain<br>**E:** External Drain | **5** :0.35<br>**30** :2.0<br>**50** :3.5<br>**75** :5.0 | **20** |

## ■ Mounting Bolts

| Valve Model Number | Socket Head Cap Screw | Qty. | Bolt Kit Model Number |
|---|---|---|---|
| CP❋-G-06 | M10 x 80 Lg | 4 | BKHG-06-20 |

## ■ Sub-plates

| Valve Model Numbers | Sub-plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|---|
| CP❋G-06 | HGM-06-2080 | 3/4 BSP.F | 2.4 |
| | HGM-06X-2080 | 1 BSP.F | 3.0 |

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

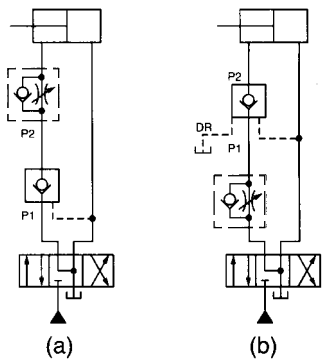
## ■ Instructions

- **Operation of internal drain and external drain types**

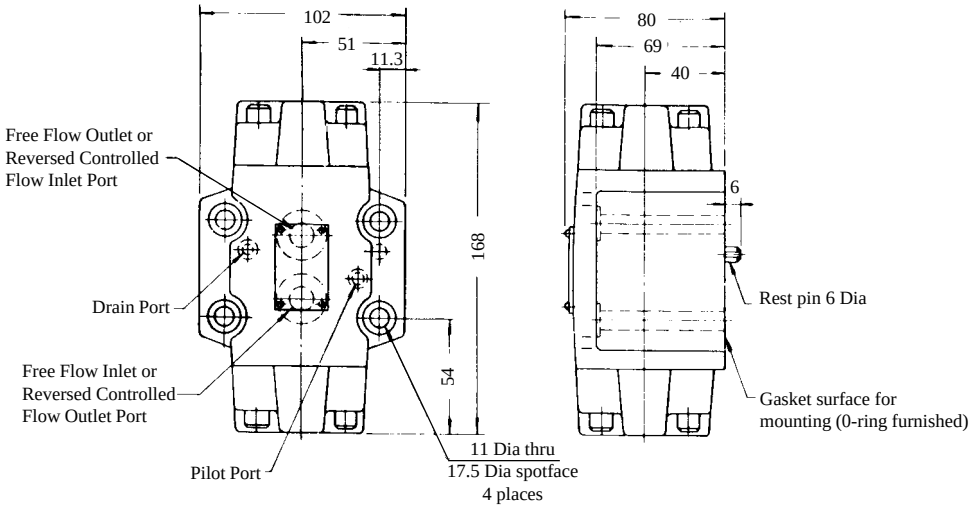
  When the outlet side P1 is directly connected to the tank in reversed free flow (Fig. a), internal drain type is normally use.
  When the back pressure is applied to the outlet side P1 (Fig. b), be sure to use external drain type.

- **Minimum pilot pressure characteristics**

  That depends on the pressure of inlet side in the reversed free flow. This value can be determined from the characteristics chart.

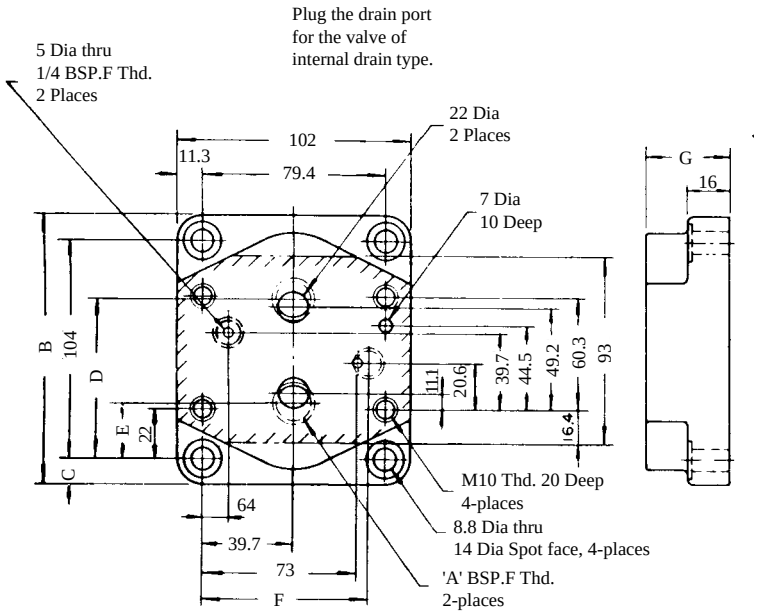


## CPG / CPDG -06-❊-❊-20




## Sub-plates

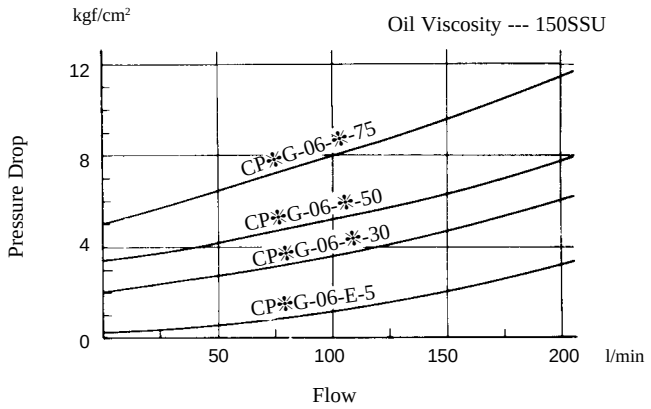
HGM- 06 -2080
06X



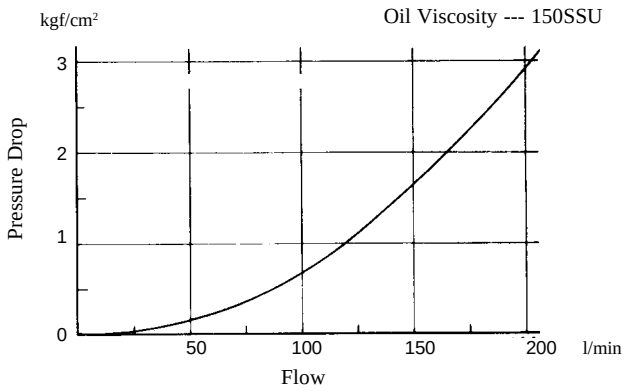

| Sub-Plate Model Numbers | A | B | C | D | E | F | G | Mass (Approx.) kg |
|---|---|---|---|---|---|---|---|---|
| HGM-06-2080 | 3/4 | 124 | 10 | 77 | 27 | 73 | 36 | 2.4 |
| HGM-06X-2080 | 1 | 136 | 16 | 82.3 | 22 | 75 | 45 | 3 |

Mounting sub-plates are available on request, specify sub-plate model number above, when sub-plates are not used, mounting surface as shown by shaded area must be finished flat and smooth.

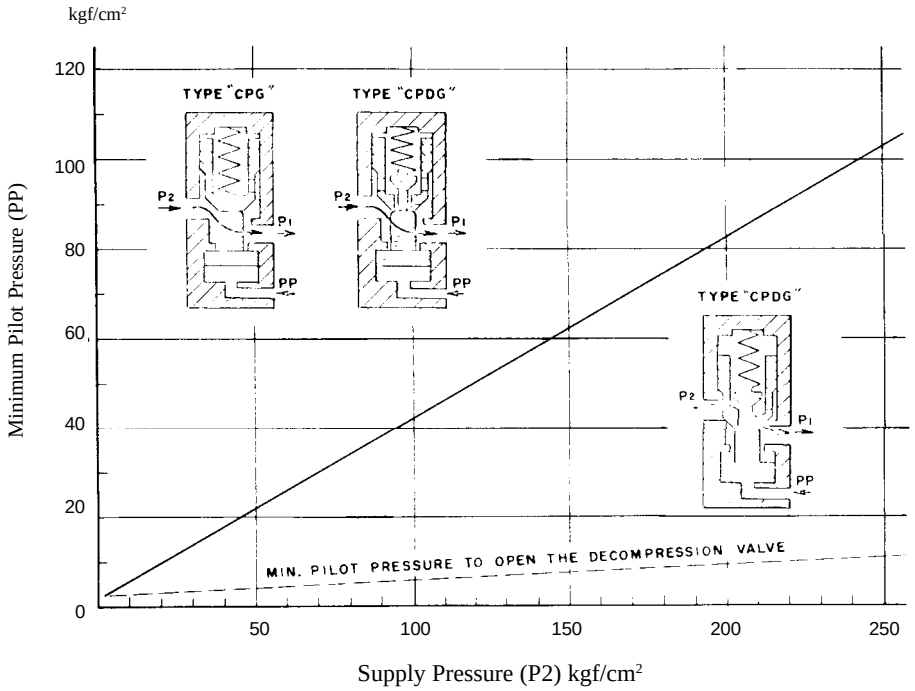
## Pressure Drop for Free Flow



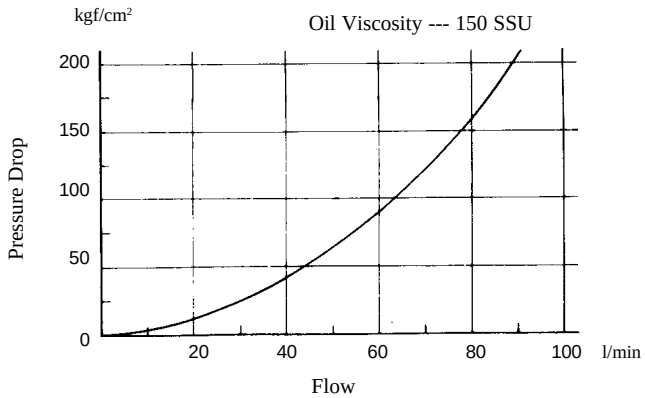

## Pressure Drop for Reversed Controlled Flow.




## Pilot Pressure Chart

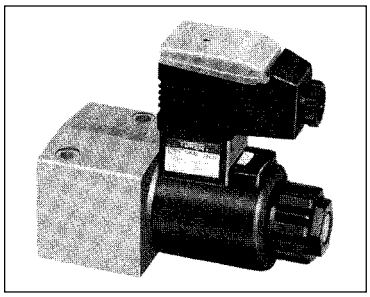


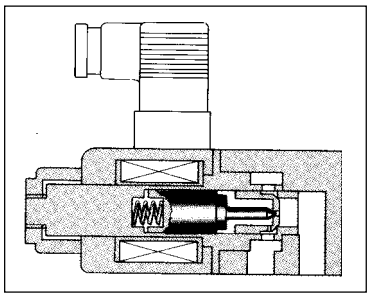

## Pressure Drop For Reversed Controlled Flow Only When Decompression Valve Is Opened.



# ■ Solenoid Operated Poppet Type Two-Way Valves

These valves are used for opening/closing oil path by having the poppet valve operated according to electric signal via solenoid. Because these are of poppet type, there is no hydraulic lock and the internal leakage can be greatly reduced.





## ■ Ratings

| Model Numbers | Max. Flow l/min | Max. Operating Pressure | Internal leakage $cm^3$/min | Max. Changeover Frequency Cycles/Min | Mass kg |
|---|---|---|---|---|---|
| CDSG-03-C-❋-20 | 50 * | 140 | Less than 0.25 | AC : 300<br>DC : 240<br>R : 120 | 0.85 |

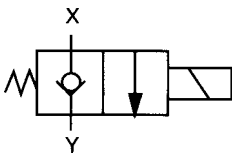
★ Maximum flow indicates a ceiling flow which does not affect the normal function (changeover) of the valve.

## ■ Solenoid Ratings

| Electric Source | Coil Type | Frequency Hz | Voltage V | | Current & Power at Rated Voltage | | |
|---|---|---|---|---|---|---|---|
| | | | Source Rating | Serviceable Range | Inrush A | Holding A | Power W |
| AC | A100 | 50 | 100 | 80 - 100 | 1.3 | 0.52 | — |
| | | 60 | 100 | 90 - 120 | 1.08 | 0.39 | |
| | | | 110 | | 1.19 | 0.47 | |
| | A120 | 50 | 120 | 96 - 132 | 1.08 | 0.45 | |
| | | 60 | | 108 - 44 | 0.98 | 0.33 | |
| | A200 | 50 | 200 | 160 - 220 | .065 | 0.27 | |
| | | 60 | 200 | 180 - 240 | 0.54 | 0.20 | |
| | | | 220 | | 0.59 | 0.24 | |
| | A240 | 50 | 240 | 192 - 264 | 0.55 | 0.23 | |
| | | 60 | | 216 - 288 | 0.45 | 0.17 | |
| DC (K Series) | D12 | — | 12 | 10.8 - 13.2 | — | 2.4 | 29 |
| | D24 | | 24 | 21.6 - 26.6 | | 1.2 | |
| | D100 | | 100 | 90 - 110 | | 0.29 | |
| AC→DC Rectified | R100 | 50/60 | 100 | 90 - 110 | — | 0.32 | 29 |
| | R200 | | 200 | 180 - 220 | | 0.17 | |

- Because both AC and DC solenoids employ the plug-in type electrical wiring, the valve can be removed without removing the wiring.
- 50-60 Hz common service AC solenoids do not require rewiring when the applied frequency is changed.
- K-Series DC Solenoid which has a reputation for excellent DC control is employed.

Graphic Symbols




## ■ Instructions

- **Direction of flow when the solenoid is energised**
  These valves do not allow flow from Y to X when the solenoid is energised.
- **Mounting**
  There are no mounting restrictions for any models.
- **At the time of test run**
  At the time of test run, air exists within the valve which can keep the oil from flowing after the solenoid is energised. Perform several changeovers in the on-load status to discharge air completely.

## ■ Model Number Designation

| F- | CDS | G | -03 | -C | -D12 | 21 |
|---|---|---|---|---|---|---|
| Special Seals | Series Number | Type of Connection | Valve Size | Valve Type | Coil Type | Design Number |
| **F:** Special Seals for Phosphate Ester Type Fluids (Omit if not required) | **CDS:** Solenoid Operated Poppet Type Two-Way Valves | **G:** Gasket Mounting | **03** | **C:** Normally Closed | AC **A100, A120 A200, A240**<br>DC **D12, D24 D100**<br>AC→DC Rectified **R100, R200** | **21** |

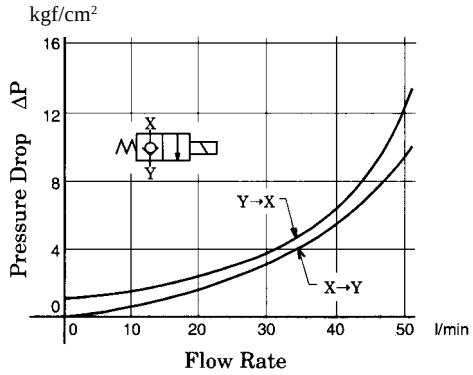
## ■ Mounting Bolts

Mounting bolt is in the table below attached only for Gasket mounting type valve (CDSG-03)

| Valve Model Numbers | Socket Head Cap Screws (2Pcs.) |
|---|---|
| CDSG-03 | M6 x 60 Lg |

## ■ Pressure

### CDSG-03




Note : Measuring has been made for the CDSG-03 (Cartridge type) when it is equipped with the same body as the threaded connections and gasket mounting type.

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

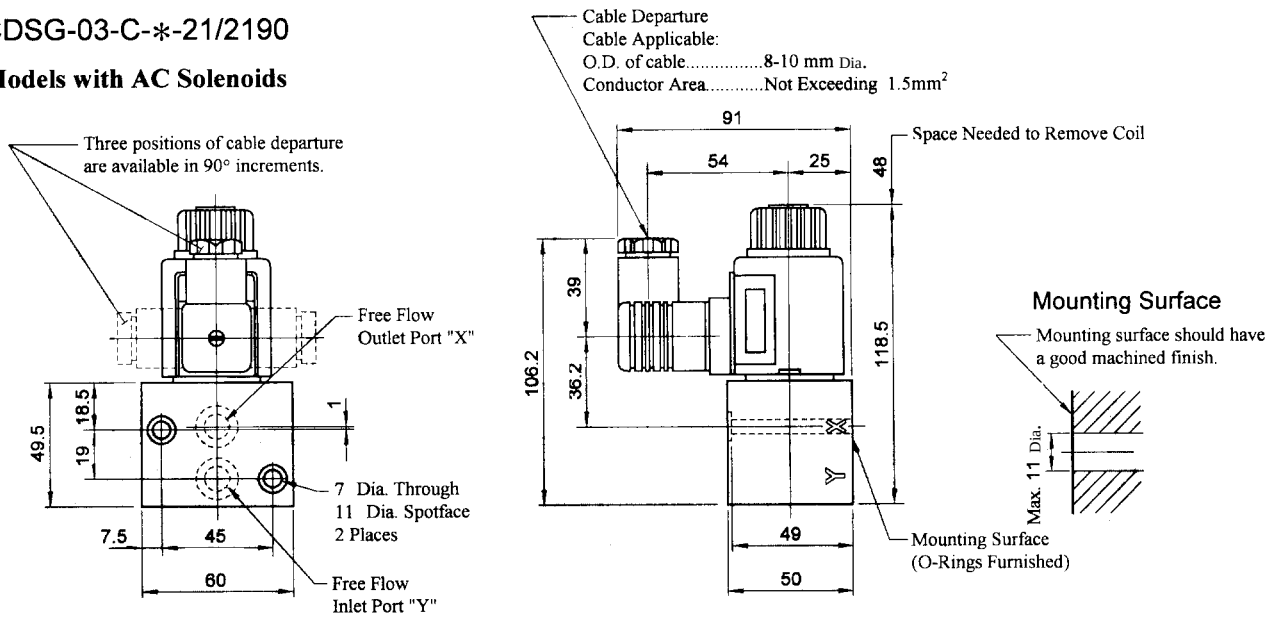
| Viscosity | cSt | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SSU | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 | 464 |
| Factor | | 0.81 | 0.87 | 0.96 | 1.03 | 1.09 | 1.14 | 1.19 | 1.23 | 1.27 | 1.30 |

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

DP' = DP (G'/0.850)

### CDSG-03-C-∗-21/2190

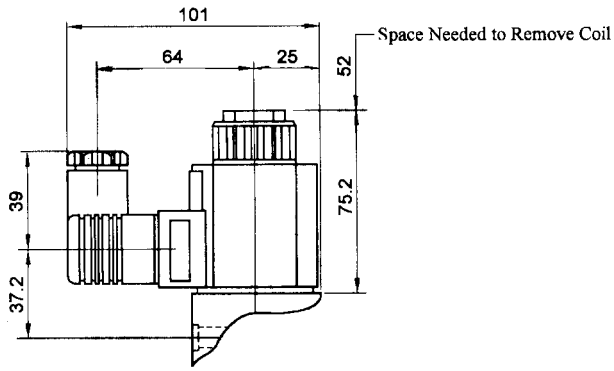
**Models with AC Solenoids**



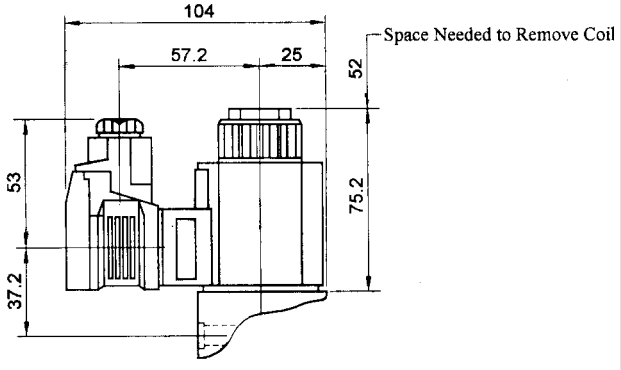

Note 1 : For models with DC solenodids and models with R type solenoids, refer to CDST-03, 03W
2 : The position of cable departure can be chnged. For the detail, refer to CDSC-03 on the previous page.

DIMENSION IN MILLIMETERS

**Models with DC Solenoids**




**Models with R Type Solenoids**



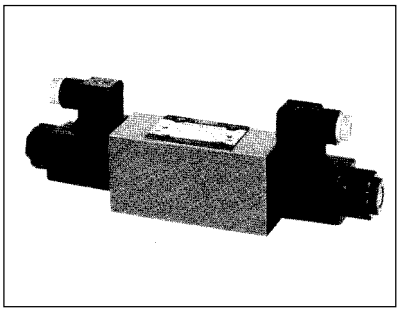

For other dimensions, refer to the "Models with AC Solenoids".

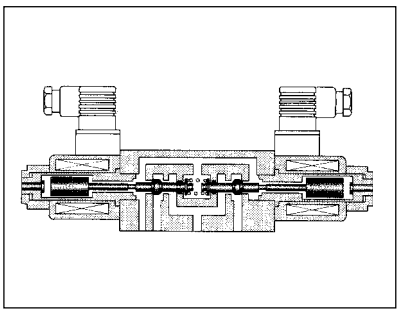
# Poppet Type Directional Valves

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.

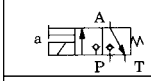
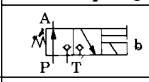
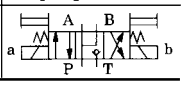
## ■ Poppet Type Solenoid Operated Directional Valves

- **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.





### ■ Ratings

| Model Numbers | Max. Flow l/min | Max. Operating Pressure kgf/cm² | Max. T-Line Back Pressure kgf/cm² | Max. Changeover Frequency Cycles/Min | Mass kg | Graphic Symbols |
|---|---|---|---|---|---|---|
| DSLG-01-3-C-❋-N-10 | 16 | 315 | 160 | 240 | 1.9 |  |
| DSLG-01-3-O-❋-N-10 | | | | | |  |
| DSLG-01-4-O-❋-N-10 | | | | | 3.7 |  |

### ■ 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 | |

## ■ Number Designation

| F- | DSLG | - 01 | - 4 | - 0 | - D24 | - N | - 10 |
|---|---|---|---|---|---|---|---|
| Special Seals | Series Number | Valve Size | Number of Port | Function | Coil Type | Type of Electrical Conduit Connection | Design Number |
| **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<br>**C:** Normally Closed | DC **D12, D24**<br>AC→DC **R100, R200** | **N:** Plug-in Connector | **10** |
| | | | **4** : 4 Port | **O:** Normally Open | | | |

## ■ Sub-plates

| Piping Size | Sub-plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|---|
| 1/8 | DSGM-01-3080 | 1/8 BSP.F | 0.8 |
| 1/4 | DSGM-01X-3080 | 1/4 BSP.F | 0.8 |

Sub-plates are available. Specify sub-plate model from the table above.
When sub-plates are not used, the mounting surface should have a good machined finish.
These sub-plates are sharable with those for DSG-01 Series Solenoid Operated Directional Valve. For dimensions see page.

## ■ Mounting Bolts

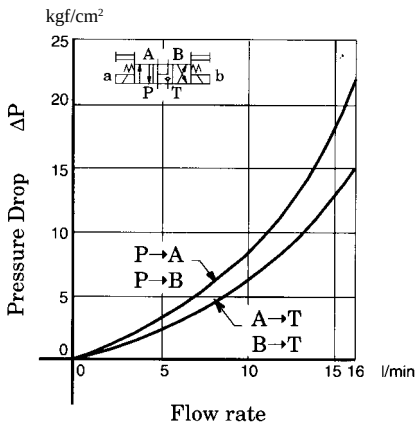
Four socket head cap screws in the table are included.

| Descriptions | Soc. Hd. Cap Screw (4Pcs.) | Tightening Torque kgf-m | Bolt kit Model No. |
|---|---|---|---|
| Japanese Standard "JIS"<br>European Design Standard | M5 x 45 Lg | 0.6 - 0.7 | BKDSG-01-10 |

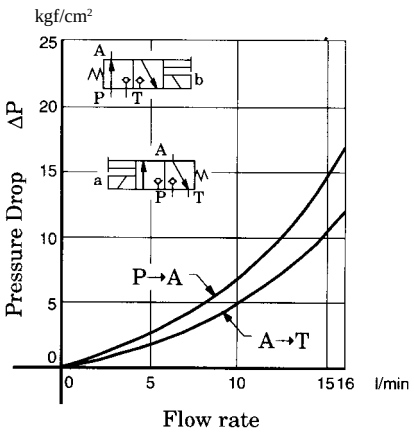
## ■ Pressure Drop

The following characteristics are based on the following conditions:
Viscosity: 35cSt (160 SSU)
Specific Gravity: 0.850

### • 4 Port Valve




### • 3 Port Valve




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

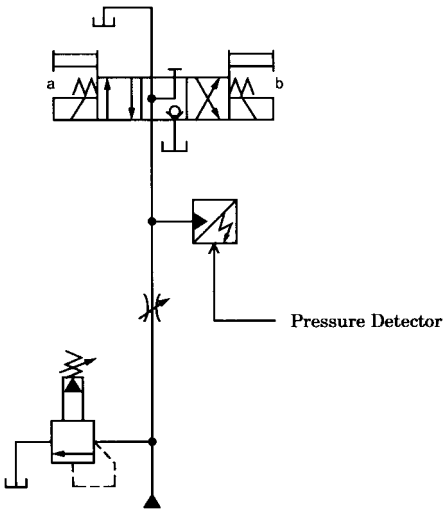
| Viscosity | cSt | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SSU | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 | 464 |
| Factor | | 0.81 | 0.87 | 0.96 | 1.03 | 1.09 | 1.14 | 1.19 | 1.23 | 1.27 | 1.30 |

- For any other specific gravity (G'), the pressure drop (DP') may be obtained from the formula below.
  DP' = DP (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.

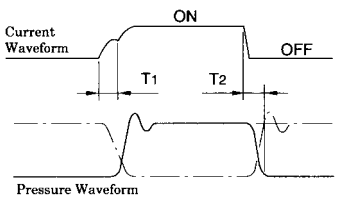
### ● Test Circuit and Conditions



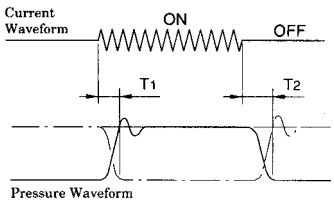

Pressure : 210 kgf/cm²
Flow Rate : 16 l/min (4.2 U.S. GPM)
Voltage : Rated Voltage

### ● 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

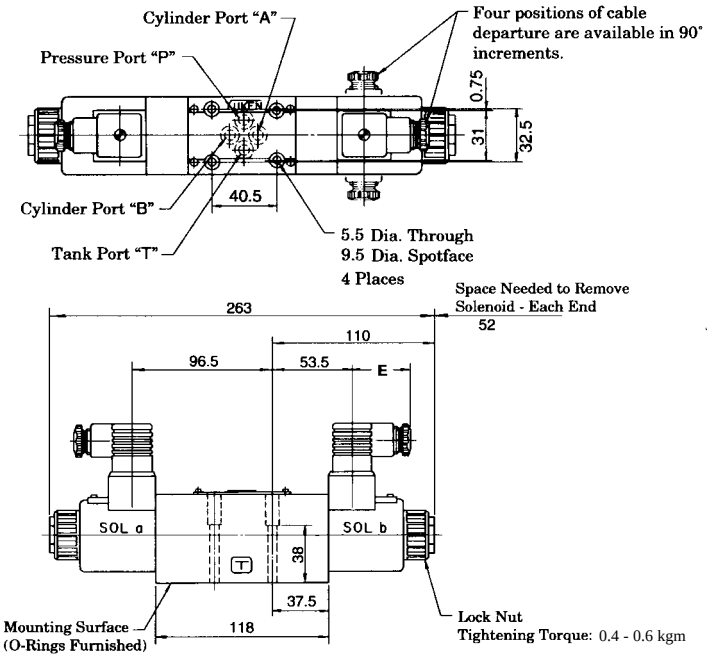
| Solenoid Type | Model Numbers | Time ms | | Remarks |
|---|---|---|---|---|
| | | T1 | T2 | |
| DC | DSLG-01-4-O-D❋ | 55 | 30 | 4 port valve, normally open |
| | DSLG-01-3-O-D❋ | 55 | 30 | 3 port valve, normally open |
| | DSLG-01-3-C-D❋ | 70 | 25 | 4 port valve, normally closed |
| AC→DC Rectified | DSLG-01-4-O-D❋ | 55 | 150 | 3 port valve, normally open |
| | DSLG-01-3-O-D❋ | 55 | 150 | 3 port valve, normally open |
| | DSLG-01-3-C-D❋ | 70 | 155 | 3 port valve, normally closed |

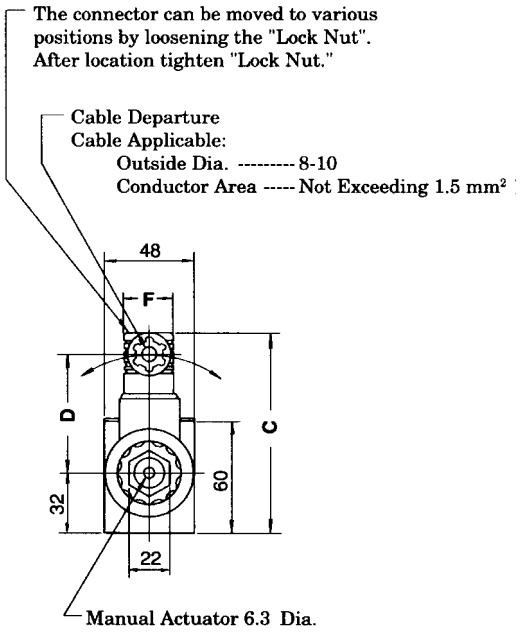
## ■ 4 Port Valve

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

### ● Normally Open: DSLG-01-4-0-❋-N-10

DIMENSION IN MILLIMETERS



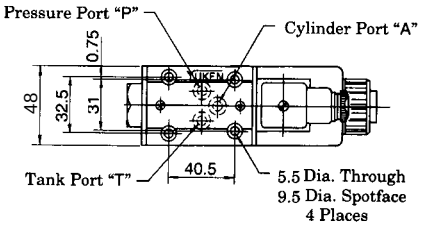

| Model Numbers | Dimensions mm | | | |
|---|---|---|---|---|
| | C | D | E | F |
| DSLG-01-4-O-D-❋ | 108 | 65 | 39 | 27.5 |
| DSLG-01-4-O-D-❋ | 110 | 58 | 51 | 34 |

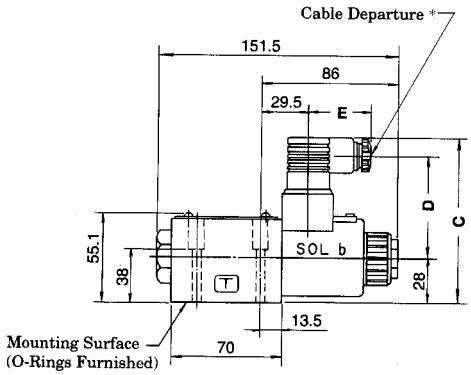
- The information on 3 Port Valves is provided in the following page
- For the information on the valve mounting dimesions, see the dimensional drawing of the shared sub-plate (DSGM-01❋), on page 152.

## ■ 3 Port Valves

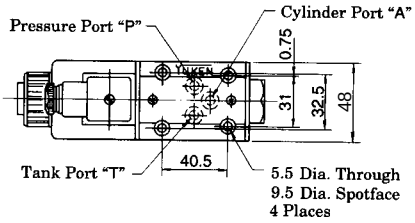
**Mounting Surface: ISO 4401-AB-03-4-A**

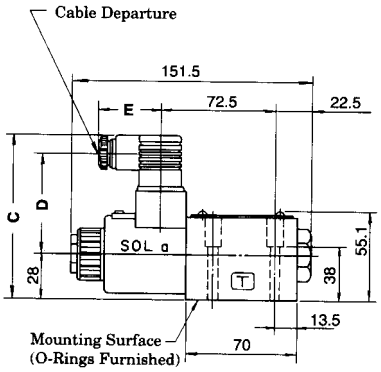
● **Normally Open Type:**
**DSLG-01-3-O-❋-N-10**




● **Normally Closed Type:**
**DSLG-01-3-C-❋-N-10**




| Model Numbers | Dimensions mm | | |
|---|---|---|---|
| | C | D | E |
| DSLG-01-3-❋-D❋-N | 104 | 64 | 39 |
| DSLG-01-3-❋-R❋-N | 107 | 57.2 | 53 |

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

DIMENSION IN MILLIMETERS

## ■ Instructions

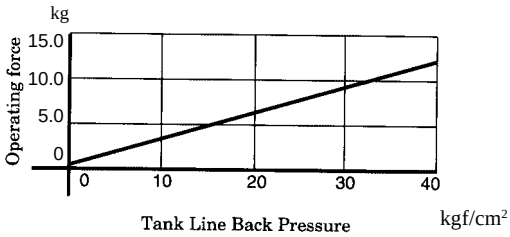
● **Mounting**
No mounting restrictions for any models.

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

● **Valve Tank Port**
Avoid connection 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.)

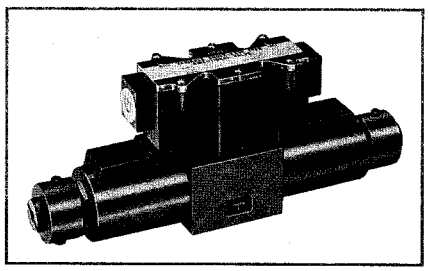
**Oerating Force by Manual Actuator**

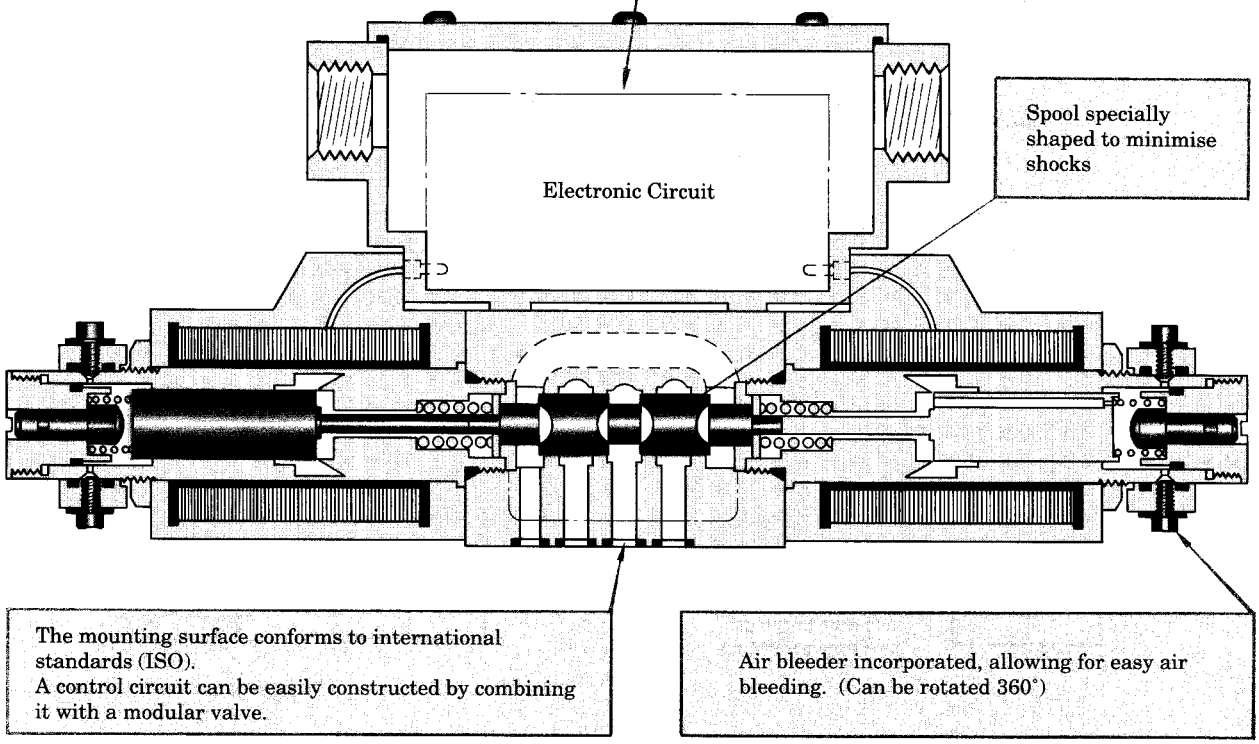


## ■ "G" Series Shockless Type Solenoid Operated Directional Valves (Shifting Time Adjustable)

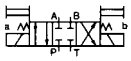
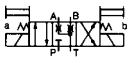
### *CREATED BY YUKEN MECHATRONICS*
### *Solenoid Operated, Shockless, Directional Valves*
### *Shifting Time Adjustable.*

The G-Series Solenoid Operated Directional Valves incorporate electronic circuits to enable adjustment of the spool shifting time.
A special spool shape that minimises shock is used, shocks caused by the actuator starting and stopping, as well as vibration due to oil hammering. The shifting time of conventional Solenoid Operated, Shockless, Directional Valves is constant and cannot be adjusted.
As the shifting time of the G-Series valves can be adjusted, it can be set at an optional level to minimise shocks to the machine





## ■ Model Number Designation

| G-DSG | -01 | -2B7 | -S | -50 | -L |
|---|---|---|---|---|---|
| Series Number | Valve Size | Vavle Type | Input Interface | Design Number | Models with Alternate Offset Solenoid |
| **G-DSG:** G-Series Shockless Type Solenoid Operated Directional Valve, Sub-plate Mounting | **01** | **3C2**  **3C40**  **3B7**  | **None:** Sink Type (Standard) **S:** Source Type | **50** | **L** Applicable only for 2B7 (Omit if not required)  |
| | **03** | | | **50** | |

★ For further details contact YIL in advance.

## ■ Sub-Plates

| Valve Model Numbers | Sub-Plate Model Numbers | Thread Size | Approx. Mass kg |
|---|---|---|---|
| G-DSG-01 | DSGM-01-3080 | 1/8 BSP.F | 0.8 |
| | DSGM-01X-3080 | 1/4 BSP.F | 0.8 |
| G-DSG-03 | DSGM-03-2180 | 3/8 BSP.F | 3.0 |
| | DSGM-03X-2180 | 1/2 BSP.F | 3.0 |
| | DSGM-03Y-2180 | 3/4 BSP.F | 4.7 |

## ■ Attachment (Mtg. Bolt)

Four socket headed cap screw as in the table below are included

| Model Numbers | Socket Hd. Cap Screw | Qty No. | Tightening Torque kgf-m | Bolt kit Model No. |
|---|---|---|---|---|
| G-DSG-01 | M5 x 45 Lg | 4 | 0.5 - 0.7 | BKDSG-01-10 |
| G-DSG-03 | M6 x 35 Lg | 4 | 1.2 - 1.5 | BKDSG-03-20 |