



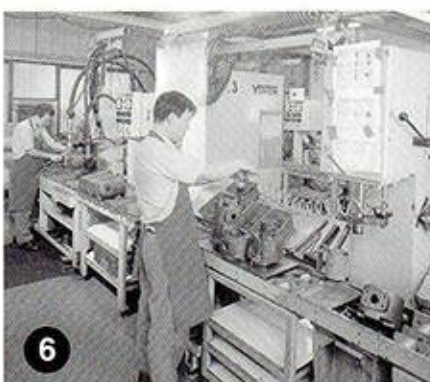
# EQUIPO HIDRÁULICO

# D

# VÁLVULAS DIRECCIONALES DE CONTROL







1. Front View of the Main Factory

2. Front View of 2nd Factory

3. Power Unit Assembly Line

4. Horizontal Machining Centers

5. Processing Production Line (2nd Factory)

6. Vane Pumps Test Bench

7. Proportional Electro-Hydraulic Controls Test Bench

8. Solenoid Valves Assembly Line

## Brief Introduction

The main factory of Yuken Hydraulics (T.W.) Co., Ltd., is located at No. 12 7th Rd., Taichung Industrial Park, Taichung, Taiwan. the area is 9,543 m<sup>2</sup>. 2nd factory is located at No. 6, 7th Rd, the area is 5,623 m<sup>2</sup>.

"To improve Technology, to improve Quality, to strengthen Service, and to satisfy Customers" are our consistent quality promises. In order to keep our promises, we have a strong focus on the promotion of automation and computerization covering sales, design, operations, production management and even quality control, to ensure quality of our products and services. All our employees pursue the organization's Goal - "To work hard, to ameliorate, and to grow perpetually."

As the domestic market was getting saturated gradually, we started exploring overseas market since July, 1996. The achievement has been remarkable. Our market is not only in Asia but also North America, Europe, Middle East and Africa.

- March, 1997, Yuken Hydraulics (T.W.) Co., Ltd., was awarded ISO-9002 certificate and built up international-level quality system.
- January, 1998, We open our second factory located at No.6 7th Rd., Taichung Industrial Park, Taichung, Taiwan, area is 5,623 m<sup>2</sup>.
- February, 2002, Yuken Hydraulics (T.W.) Co., Ltd., was awarded CSA-C/US certificate, to strengthen our competition in North American market.
- May, 2002, Yuken Hydraulics (T.W.) Co., Ltd., was awarded ISO-9001 certificate and scaled new heights of quality system.
- October, 2002, Organization simplified, management institutionalized.
- June, 2003, Production line readjusted, equipment reinforced, production rationalized, striding into a new milestone.
- April, 2005, Proportional Valve was awarded CE certificate.
- November, 2005, Solenoid Valve was awarded CE certificate.
- November, 2008, Solenoid Valves with monitoring switches were patented in Taiwan.
- March, 2009, Solenoid Valves with monitoring switches were patented in China.
- June, 2010, Solenoid Valves with monitoring switches were awarded CE certificate.
- December, 2011, 2nd factory's expansion is finished.

Yuken Hydraulics (T.W.) Co., Ltd. has been leading the Industry here in Taiwan. We will increase technical cooperation with our parent company, Yuken Kogyo Co., Ltd. in the future. We will build an efficient and comprehensive sales network both in domestic and overseas market. Concurrently, we will train our talented people extensively to upgrade quality continuously. All our efforts are to achieve our goal - to grow perpetually!

- Name : **Yuken Hydraulics (T.W.) Co., Ltd.**
- Main Factory : No. 12, 7th Road, Taichung Industrial Park, Taichung, Taiwan.  
Tel: 886-4-2359-3077 (Rep.)  
Fax: 886-4-2359-2500  
Website: <http://www.yuken.com.tw>
- Taichung Office: No. 12, 7th Road, Taichung Industrial Park, Taichung, Taiwan.  
(Sales Dept) Tel: 886-4-2359-3077 (Rep.)  
Fax: 886-4-2359-8813
- Taipei Office : No. 18-1, Wun Hua 5th Road, Guei Shan Township, Taoyuan County, Taiwan.  
(Sales Dept) Tel: 886-3-328-3628 (Rep.)  
Fax: 886-3-328-3242
- Established : 1, May, 1969
- Paid in Capital : NTS 90,000,000 (as of January, 2004)
- Line of Business : • Manufacture & sales of Hydraulic Pumps, Pressure Control Valves, Flow Control Valves, Directional Control Valves, Modular Valves, Proportional Electro-Hydraulic Control Valves, Electro-Hydraulic Servo Valves, Power Unit, Hydraulic Cylinders, Hydraulic Motors & Associated Products.  
• Design, manufacture & installation of Hydraulic systems.
- Licensor : **YUKEN KOGYO CO., LTD.**

# Group of Components



Hydraulic Pumps

Pressure Control Valves

Flow Control Valves

Directional Control Valves

Check Valves

Proportional Electro-Hydraulic Control

## A Hydraulic Pump

1 MPa = 10.2 kgf/cm<sup>2</sup>

| Pump Type                                                              | Max. Pressure<br>MPa | Nominal Displacement cm <sup>3</sup> /rev            |   |   |      |       |                  |                  |                    |                       |    | Page |
|------------------------------------------------------------------------|----------------------|------------------------------------------------------|---|---|------|-------|------------------|------------------|--------------------|-----------------------|----|------|
|                                                                        |                      | 1                                                    | 2 | 5 | 10   | 20    | 50               | 100              | 200                | 500                   |    |      |
| ARL1 Series Variable<br>Piston Pumps                                   | 7                    |                                                      |   |   | ARL1 |       |                  |                  |                    |                       | 9  |      |
| AML1 Series<br>Motor-Pumps                                             | 7                    |                                                      |   |   | AML1 |       |                  |                  |                    |                       | 12 |      |
| ML1 Series<br>Electric Motors                                          | -                    | ML1 (0.75 / 1.5 / 2.2 kw)                            |   |   |      |       |                  |                  |                    |                       |    | 15   |
| AR Series Variable<br>Piston Pumps                                     | 16                   |                                                      |   |   | AR16 | AR22  |                  |                  |                    |                       | 16 |      |
| 50T 150T<br>Single Pumps                                               | 7                    |                                                      |   |   |      | 50T   |                  | 150T             |                    |                       | 20 |      |
| PV2R S-PV2R<br>Series Single Pumps                                     | 21 (17.5/16/14)      |                                                      |   |   |      | PV2R1 | PV2R2<br>S-PV2R2 | PV2R3<br>S-PV2R3 | PV2R4<br>S-PV2R4   |                       | 24 |      |
| PV2R S-PV2R<br>Series Double Pumps                                     | 21 (17.5/16/14)      |                                                      |   |   |      | PV2R1 | PV2R2<br>S-PV2R2 | PV2R3<br>S-PV2R3 | Small Volume Pumps |                       | 38 |      |
|                                                                        |                      |                                                      |   |   |      |       | PV2R2<br>S-PV2R2 | PV2R3<br>S-PV2R3 | PV2R4<br>S-PV2R4   | Large Volume<br>Pumps |    |      |
| A <sub>16</sub> SR3, A <sub>22</sub> SR4 Series<br>Piston & Vane Pumps | 21 (17.5/16/14)      |                                                      |   |   | A16  | A22   | Piston Pump      |                  |                    |                       | 48 |      |
|                                                                        |                      |                                                      |   |   |      |       |                  | PV2R3<br>S-PV2R3 | PV2R4<br>S-PV2R4   | Vane Pump             |    |      |
| SVPF Series<br>Variable Vane Pump                                      | 7                    | SVPF-12 20 30 40                                     |   |   |      |       |                  |                  |                    |                       |    | 51   |
| SVPDF Series Double<br>Variable Vane Pump                              | 7                    | SVPDF-30 40 50 60 80 100 120 150 200 250 300 400 500 |   |   |      |       |                  |                  |                    |                       |    | 52   |

## B Pressure Control Valves

| Valve Type                                       | Max. Pressure MPa | Max. Flow L/min |   |          |    |                  |    |     |     |     |      | Page |
|--------------------------------------------------|-------------------|-----------------|---|----------|----|------------------|----|-----|-----|-----|------|------|
|                                                  |                   | 1               | 2 | 5        | 10 | 20               | 50 | 100 | 200 | 500 | 1000 |      |
| Remote Control Relief Valves                     | 25                | DT-01           |   |          |    |                  |    |     |     |     |      | 53   |
| Direct Type Relief Valves                        | 21                |                 |   | DT-DG-02 |    |                  |    |     |     |     |      | 53   |
| Pilot Operated Relief Valves                     | 25                |                 |   |          |    | BT-BG-03         |    | 06  | 10  |     |      | 53   |
| Low Noise Type Pilot Operated Relief Valves      | 25                |                 |   |          |    | S-BG-03          |    | 06  |     |     |      | 53   |
| Solenoid Controlled Relief Valves                | 25                |                 |   |          |    | BST-03           |    | 06  | 10  |     |      | 57   |
| Low Noise Type Solenoid Controlled Relief Valves | 25                |                 |   |          |    | S-BSG-03         |    | 06  |     |     |      | 57   |
| H & HC Type Pressure Control Valves              | 21                |                 |   |          |    | HT/HCT HG/HCG-03 |    | 06  | 10  |     |      | 61   |
| Pressure Reducing (and Check) Valves             | 21                |                 |   |          |    | RT/RCT RG/RCG-03 |    | 06  | 10  |     |      | 67   |
| Unloading Relief Valves                          | 21                |                 |   |          |    | BUCG-06          |    |     |     |     |      | 72   |
| Balancing Valves                                 | 14                |                 |   |          |    | RBG-03           |    |     |     |     |      | 73   |

## C Flow Control Valves

| Valve Type                      | Max. Pressure MPa | Max. Flow L/min |   |   |    |                  |    |                  |         |      |                     | Page |
|---------------------------------|-------------------|-----------------|---|---|----|------------------|----|------------------|---------|------|---------------------|------|
|                                 |                   | 1               | 2 | 5 | 10 | 20               | 50 | 100              | 200     | 500  | 1000                |      |
| Flow Control (and Check) Valves | 21                |                 |   |   |    | FG FCG-02        |    | 03               | 06 *    | 10 * | *Yuken Kogyo Models | 74   |
| (One Way) Restrictors           | 21                |                 |   |   |    | SRCT SRG/SRCG-03 |    | SRCT SRG/SRCG-06 | SRCT-10 |      |                     | 77   |
| Throttle (and Check) Modules    | 25                |                 |   |   |    | TC1G TC2G-01     |    |                  |         |      |                     | 80   |
| Needle Valves                   | 35                |                 |   |   |    | GCT GTCR-02      |    |                  |         |      |                     | 81   |

## D Directional Control Valves 1 MPa = 10.2 kgf/cm<sup>2</sup>

| Valve Type                                                           | Max. Pressure<br>MPa | Max. Flow L/min                                |   |   |    |    |    |     |     |     |      |      |      | Page |
|----------------------------------------------------------------------|----------------------|------------------------------------------------|---|---|----|----|----|-----|-----|-----|------|------|------|------|
|                                                                      |                      | 1                                              | 2 | 5 | 10 | 20 | 50 | 100 | 200 | 500 | 1000 | 2000 | 8000 |      |
| Solenoid Operated Directional Valves                                 | 7                    | DSGL-01                                        |   |   |    |    |    |     |     |     |      |      |      | 84   |
| Solenoid Operated Directional Valves                                 | 31.5                 | DSG-01 : 03                                    |   |   |    |    |    |     |     |     |      |      |      | 86   |
| Solenoid Valves with Monitoring Switch-DSGS                          | 31.5                 | DSGS-01 : 03                                   |   |   |    |    |    |     |     |     |      |      |      | 92   |
| Solenoid Controlled Pilot Operated Directional Valves                | 31.5                 | DSHG-04 : 06 : 10                              |   |   |    |    |    |     |     |     |      |      |      | 94   |
| Solenoid Valves with Monitoring Switch-DSHGN                         | 25                   | DSHGN-03 : 04 : 06                             |   |   |    |    |    |     |     |     |      |      |      | 99   |
| Pilot Operated Directional Valves                                    | 31.5                 | DHG-04 : 06 : 10                               |   |   |    |    |    |     |     |     |      |      |      | 104  |
| Manually Operated Directional Valves                                 | 25 ( 21 )            | DMT-03<br>DMG-03                               |   |   |    |    |    |     |     |     |      |      |      | 107  |
| Mechanically Operated Directional Valves                             | 21 ( 25 )            | DCT-01 : 03<br>DCG-01                          |   |   |    |    |    |     |     |     |      |      |      | 109  |
| Mechanically Operated Directional Valves with Monitoring Switch-DCGS | 21 ( 25 )            | DCTS-01 : 03<br>DCGS-01                        |   |   |    |    |    |     |     |     |      |      |      | 112  |
| Logic Valves with Monitoring Switch-LDLS                             | 30                   | LDLS-16 : 25 : 32 : 40 : 50                    |   |   |    |    |    |     |     |     |      |      |      | 115  |
| Check Valves                                                         | 21                   | CIT-03 : 06 : 10                               |   |   |    |    |    |     |     |     |      |      |      | 119  |
|                                                                      |                      | CRT-03 : 06 : 10<br>CRG-03                     |   |   |    |    |    |     |     |     |      |      |      |      |
| Pilot Controlled Check Valves                                        | 25                   | CPT/CPG : 06 : 10<br>CPDT/CPDG-03              |   |   |    |    |    |     |     |     |      |      |      | 121  |
| Poppet Type Directional Valves                                       | 21                   | LVT-03 : 06 : 10<br>LVG-03                     |   |   |    |    |    |     |     |     |      |      |      | 123  |
| Prefill Valves                                                       | 25                   | PF-80 : 90 : 100 : 125 : 150 : PF-200 (PF-300) |   |   |    |    |    |     |     |     |      |      |      | 124  |

## E Proportional Electro-Hydraulic Controls

| Valve Type                                                            | Max. Pressure<br>MPa | Max. Flow L/min              |        |           |    |             |    |              |      |                      |      | Page |
|-----------------------------------------------------------------------|----------------------|------------------------------|--------|-----------|----|-------------|----|--------------|------|----------------------|------|------|
|                                                                       |                      | 1                            | 2      | 5         | 10 | 20          | 50 | 100          | 200  | 500                  | 1000 |      |
| Proportional Electro-Hydraulic Pilot Relief Valves                    | 25                   | EDG-01                       |        |           |    |             |    |              |      |                      |      | 131  |
| Proportional Relief Valves                                            | 25                   |                              | EBG-03 |           |    |             |    | 06           | 10 * | * Yuken Kogyo Models |      | 133  |
| Power Saving Valves                                                   | 25                   | EFBG-03                      |        |           |    |             |    |              | 06   | 10                   |      | 135  |
| Power Saving Valves<br>10Ω~10Ω                                        | 25                   | EFBG-03                      |        |           |    |             |    |              |      |                      |      | 141  |
| Power Saving Valves<br>High Performance                               | 25                   | ELFBG<br>ELFBCG-03           |        |           |    |             |    |              | 06   |                      |      | 143  |
| Proportional Electro-Hydraulic<br>Directional and Flow Control Valves | 25                   | EDFG-01                      |        |           |    | EDFHG-03    |    | 04           | 06   |                      |      | 149  |
| Power Amplifiers                                                      | -                    | AME-D2-H1 (Kogyo )<br>Models |        | AMN-D-20T |    | AMN-D-L-20T |    | SK1115-※-30T |      | AMN-W-10T            |      | 156  |

## F Other Valves

| Valve Type                | Max. Pressure<br>MPa | Max. Flow L/min          |   |   |    |    |    |     |     |     |  |  |  |  |  |  | Page |
|---------------------------|----------------------|--------------------------|---|---|----|----|----|-----|-----|-----|--|--|--|--|--|--|------|
|                           |                      | 1                        | 2 | 5 | 10 | 20 | 50 | 100 | 200 | 500 |  |  |  |  |  |  |      |
| Lift Valves               | 21                   | LVST-03                  |   |   |    |    |    |     |     |     |  |  |  |  |  |  | 165  |
| Air Bleed Valves          | 21                   | AVT-03-05      AVT-03-20 |   |   |    |    |    |     |     |     |  |  |  |  |  |  | 166  |
| Automatic Shut Off Valves | 21                   | DAS-03-20                |   |   |    |    |    |     |     |     |  |  |  |  |  |  | 166  |

## G Modular Base Plates

| Series Number | Max. Pressure<br>MPa | Max. Flow L/min |    |    |    | Page |
|---------------|----------------------|-----------------|----|----|----|------|
|               |                      | 0               | 20 | 40 | 60 |      |
| Base Plates   | 31.5                 | MMC-01 : MMC-03 |    |    |    | 167  |

\* As for the products other than those listed in this catalogue, please consult with our engineers for your requirement.

# General Information

## Design Standard

The distinctive features of Yuken Standard products is as shown below.

| Feature                           | Domestic Standard         | Remarks                                           |
|-----------------------------------|---------------------------|---------------------------------------------------|
| Port Tapping                      | Rc(=PT)                   | Taper Pipe Thread (ISO 7/1)                       |
| Port Tapping (Partial)            | G(=PF)                    | Straight Pipe Thread (ISO 228/1)                  |
| Pressure Gauge Tapping            | Rc(=PT)                   | Taper Pipe Thread (ISO 7/1)                       |
| Mounting Bolts                    | Metric                    | General Purpose Thread (ISO 261)                  |
| Mounting Dimensions               | Metric                    |                                                   |
| Conduit Entry                     | G(=PF)                    | Straight Pipe Thread (ISO 228/1)                  |
| Solenoid Voltages AC/DC           | Domestic voltage          | Voltage and frequency change according to country |
| Frequency                         | 50/60 Hz                  |                                                   |
| Electronic Amplifier Input Supply | Domestic voltage 50/60 Hz |                                                   |
| Graphic Symbol                    | ISO Standard              | ISO 1219                                          |
| Valve Port Size                   | Inch                      |                                                   |

## Design Number

Yuken products have factory applied Design numbers, the key to which is as follows.

Example: 4222T68

42 22 T68

Major Design No. \_\_\_\_\_ Design No. for modified products in Taiwan  
Minor Design No. \_\_\_\_\_ Omitted: Domestic standard

Design numbers are subject to change. But installation dimensions and specifications remain unchanged for variation in second digit of design numbers (Minor Design No.).

## Hydraulic Fluids

### Type of hydraulic fluids

- Petroleum base oil-Please use anti-wear type hydraulic oil or R & O (Rust and Oxidation inhibitor) type hydraulic oil equivalent to ISO VG 32 or 46. Do not use VG 68 hydraulic oils in winter; it will cause suction failure or cavitation.
- Fire resistant or other special fluids-Please consult with our sales engineers for your requirement.

### Fluid viscosity and temperature range

Please use hydraulic fluids in a range which satisfies the conditions of both viscosity and temperature (specified in table.)

| Type of Components                            | Viscosity Range                                                              | Temperature Range |
|-----------------------------------------------|------------------------------------------------------------------------------|-------------------|
| Hydraulic Pumps                               | 20 ~ 400 mm <sup>2</sup> /s ★ 1                                              | 0 ~ 70°           |
| Pressure Control Valves                       | 15 ~ 400 mm <sup>2</sup> /s ★ 2                                              | -15 ~ +70°        |
| Flow Control Valves                           | FG, FCG : 20 ~ 200 mm <sup>2</sup> /s<br>Other : 15 ~ 400 mm <sup>2</sup> /s |                   |
| Directional Control Valves                    | 15 ~ 400 mm <sup>2</sup> /s                                                  |                   |
| Proportional Electro-Hydraulic Control Valves | EBG : 15 ~ 400 mm <sup>2</sup> /s<br>EFBG : 20 ~ 200 mm <sup>2</sup> /s      |                   |

- ★ 1. When starting the pumps at low speed, maximum viscosity is restricted. (see table above right).  
★ 2. If the valve is provided with a vent restrictor (ex.: A-BSG-03), the viscosity range should be 15-200 mm<sup>2</sup>/s.

### Control of contamination

Contamination of the hydraulic fluids may cause any damage to the products or shorten the life of the products, therefore, please maintain the degree of contamination level lower than NAS Class Numbers as shown on the table 1 below

① The suction port line must have a reservoir type filter of 100 μm (150 mesh) and the filter should be installed minimum 50 mm higher than the bottom of the reservoir.

② The return line must have a line filter.

### Line type filter ratings

| Type of Components  | Line Type Filter                                                                            |
|---------------------|---------------------------------------------------------------------------------------------|
| Pump's Suction Port | 100μm                                                                                       |
| Circuit System      | Piston Pumps: below 10μm<br>E series components: below 20μm<br>Other components: below 25μm |

### Limit of contamination

| Type of Components  | NAS Class No. |
|---------------------|---------------|
| Piston Pumps        | 10 or less    |
| E series components | 11 or less    |
| Other components    | 12 or less    |

# General Information

## ■ Limitation of general properties of fluids

### ● Limit of fluid purity

| Characteristics <sup>1</sup> | Value changed |
|------------------------------|---------------|
| Specific gravity (15/4°C)    | 0.05          |
| Colour                       | 2             |
| Flash point (°C) COC         | 60            |
| Total acid number (mg KOH/g) | 0.2           |
| Viscosity (cSt)              | 10 ~ 15       |

## ■ High-pressure specialized hydraulic fluid

| Manufacture | Brand               |
|-------------|---------------------|
| Mobil       | Mobil DTE 25        |
| Shell       | Shell Tellus Oil 46 |
| China Oil   | Aw46, LPS 46        |

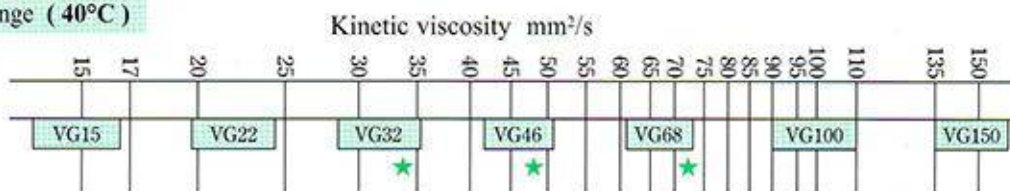
### ● Limit of water content

| Applicable conditions                                                                                                                                         | Limit                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Fluid becomes milky with water contained.                                                                                                                     | To be replaced immediately. |
| Systems in which operating fluid circulates and returns to reservoir and which are not to be stopped for a long period of time.                               | 1000ppm                     |
| System with long piping lines in which operating fluid in circuits does not completely circulate.                                                             | 500ppm                      |
| Systems to be stopped for a long period of time (Safety systems) or systems in which operating fluid in circuits moves little, and precision control systems. | 300ppm                      |

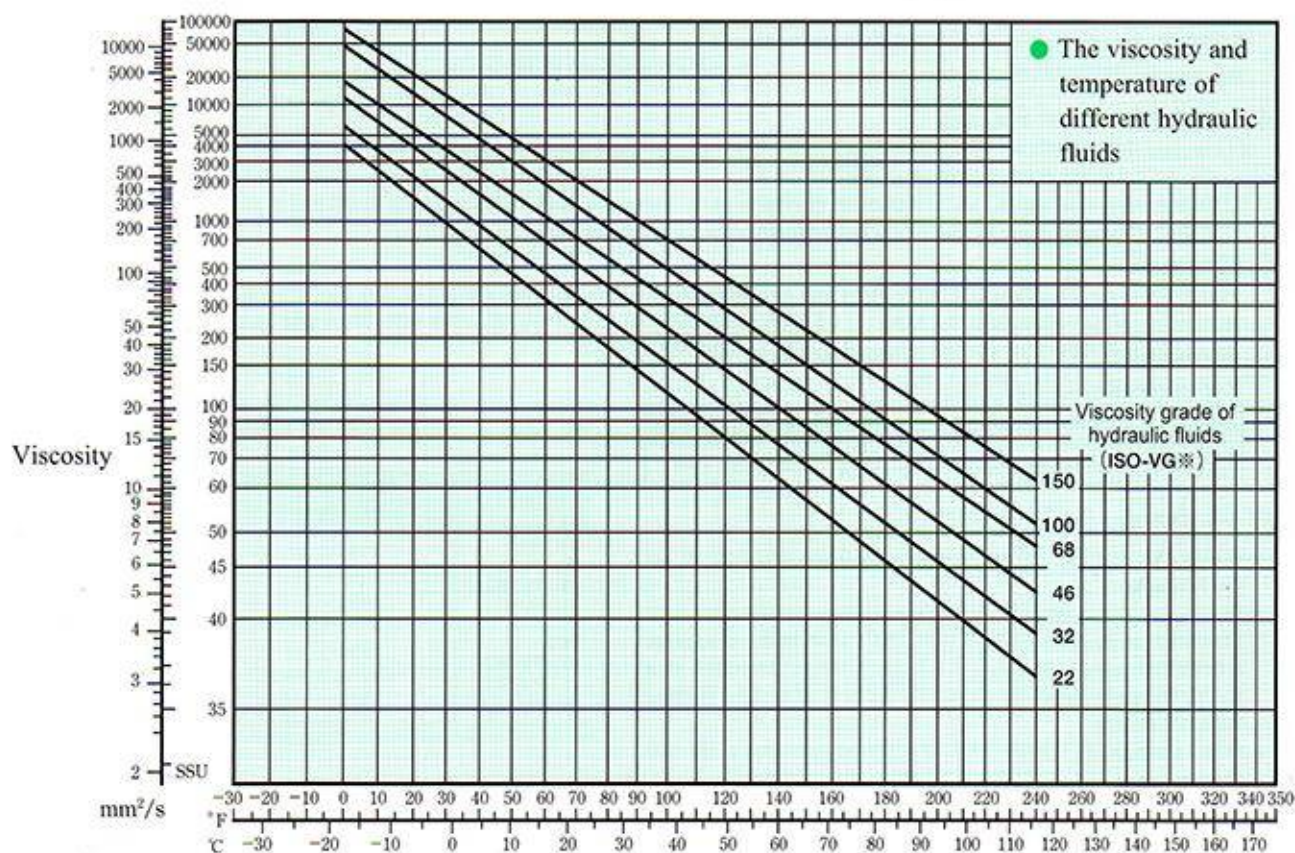
## ■ Viscosity of hydraulic fluids

Viscosity range (40°C)

● ISO  
Viscosity  
grade  
(ISO VG)



★ JIS K 2213 The Second Type ( Added Turbine oil )  
for ISO VG32, 46, 68.



# General Information

## Instructions for hydraulic pump

### 1. Mounting

When installing piston pumps the filling port should be positioned upwards. When (S)-PV2R Single and Double Vane Pumps are operated below 1200 r/min; we recommend the suction port upwards to suck oil easily.

### 2. Alignment of Shaft

Employ a flexible coupling whenever possible, and avoid any stress from bending or thrust. Maximum permissible misalignment is less than 0.1 mm. TIR (Total Indicator Reading) and maximum permissible misangular is less than 0.2°.

### 3. Suction Pressure

★ 1 kPa = 0.01 kgf/cm<sup>2</sup> = 7.5 mmHg

| Model                  |                                                        | Suction Pressure Range |                                   |          |
|------------------------|--------------------------------------------------------|------------------------|-----------------------------------|----------|
|                        |                                                        | Min                    |                                   | Max.     |
|                        |                                                        | Petroleum base oils    | Water containing phosphate esters |          |
| Piston Pumps           | ARL1 AR※                                               | -16.7 kPa              | —                                 | +50 kPa  |
| Single Pumps           | 50T 150T                                               | -20 kPa                | -16 kPa                           | +140 kPa |
| PV2R Single Vane Pumps | (S)-PV2R1 (S)-PV2R2 (S)-PV2R3 (S)-PV2R4                | -20 kPa                | -16 kPa                           | +30 kPa  |
| PV2R Double Vane Pumps | (S)-PV2R12 (S)-PV2R13 (S)-PV2R23 (S)-PV2R24 (S)-PV2R34 | -20 kPa                |                                   |          |
|                        |                                                        | -20 kPa                |                                   |          |
|                        |                                                        | -20 kPa ★              |                                   |          |

- Make sure that the height of the pump suction port is within 1m from the oil level in the reservoir.
- Please follow the instructions of catalogue to choose suitable caliber of suction port pipes; otherwise, it might lead to dangerous cavitation. We suggest the suction port flow rate under 1 m/s.

★ For some displacement of pumps, the Min. suction pressure is restricted by the rotation speed. Please refer to Table 1.

● Table 1: The limitation of Min. suction pressure for specific displacement of hydraulic pumps.

The following hydraulic pumps with rotation speed 1700 r/min are restricted by the Min. suction pressure. (Min. suction pressure of other hydraulic pumps is -150 mmHg)

| Model No.          | Min. Suction Pressure kPa |                 |
|--------------------|---------------------------|-----------------|
|                    | 1700 r/min Below          | 1700-1800 r/min |
| (S)-PV2R3-116      | -20                       | 0               |
| (S)-PV2R4-237      | -20                       | -13.3           |
| (S)-PV2R※3-※-76    | -20                       | -6.7            |
| (S)-PV2R※3-※-94    | -20                       | -6.7            |
| (S)-PV2R※3-※-116   | -20                       | 0               |
| (S)-PV2R※4-※-237   | -20                       | -13.3           |
| (S)-PV2R34-76-※    | -20                       | -6.7            |
| (S)-PV2R34-94-※    | -20                       | -6.7            |
| (S)-PV2R34-116-※   | -20                       | 0               |
| (S)-PV2R34-116-237 | -20                       | 0               |

### 4. Instructions of Piping

- ① In case the pump is installed above the oil level, the suction piping and suction line filter should be located lower than the pump position to prevent air in the suction line.
- ② When using steel pipes for the suction or discharge ports, excessive load from the piping to the pump generates excessive noise. Whenever there is fear of excessive load, please use rubber hoses.

### 5. Drain Piping

Install drain piping according to the chart and ensure that pressure within the pump housing should be maintained at a normal pressure of less than 0.1 MPa (14.5 PSI) and surge pressure of less than 0.5 MPa (72.5 PSI). Length of piping should be less than 1 m, and the pipe end should be submerged in oil.

Recommended Drain Piping Size:

| Model     | Piping Fitting Size                | Internal Dia. of Pipe |
|-----------|------------------------------------|-----------------------|
| ARL1, AR※ | 3/8 (Internal Dia. more than Ø8.5) | more than Ø10         |

### 6. Hydraulic Pumps Starting

- Before first starting, fill pump case with clean operating oil via the filling port.
- In order to avoid air blockage when starting pumps after long time shut down, to set up air bleeding valve on the discharge sides in advance or to loose discharge piping connection area for bleeding the air in the pipes. To the best of pumps' starting with no loading.
- When temperature is under 15°C in winter or viscosity is 200~400 mm<sup>2</sup>/s (1000SSU~1800SSU), please refer to the following instructions to start pumps in order to make better internal lubrication, and it will help the suction of the pump and extend the pump's life.
- Starting instructions: to start running pumps for 5 seconds, and then stop it for 10 seconds. To repeat this process 10 times, and then keep it running.

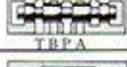
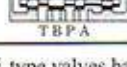
● Table 2: Max. viscosity list of starting at low rotation speed

| Model                                  | Rotation speed of starting r/min | Max. viscosity mm <sup>2</sup> /s |
|----------------------------------------|----------------------------------|-----------------------------------|
| PV2R1 (S)-PV2R12 (S)-PV2R13 (S)-PV2R14 | 750                              | 100                               |
|                                        | 950                              | 200                               |
| 50T (S)-PV2R2 (S)-PV2R23 (S)-PV2R24    | 600                              | 100                               |
|                                        | 950                              | 200                               |

## Directional Control Valves

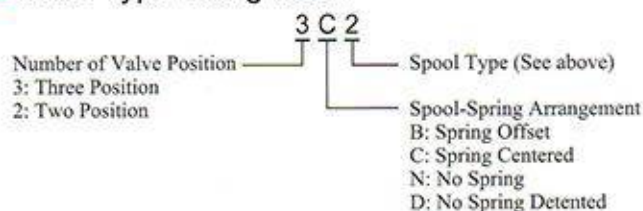
Directional Control Valves are designed to start, stop, control direction, accelerate and decelerate cylinders and hydraulic motors. Directional valves are classified into following five types depending on the operational method: Solenoid Operated Directional Valves, Solenoid Controlled Pilot Operated Directional Valves, Pilot Operated Directional Valves, Manually Operated Directional Valves, and Mechanically Operated Directional Valves.

### Types of Spool

| Spool No. | Schematic Drawing (Center position)                                                 | Functions                             | Graphic Symbols                                                                     |                                                                                      |                                                                                       |                                                                                       |
|-----------|-------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|           |                                                                                     |                                       | Three Positions<br>3※※                                                              | Two Positions                                                                        |                                                                                       |                                                                                       |
|           |                                                                                     |                                       |                                                                                     | 2B※/2D※/2N※*                                                                         | 2B※A                                                                                  | 2B※B                                                                                  |
| 2         |    | Closed Center all Ports               |    |    |    |    |
| 3         |    | Open Center all Ports                 |    |    |    |    |
| 4         |    | Open Center A, B, & T                 |    |    |    |    |
| 40        |    | Open Center A, B, & T Restricted Flow |    |    |    |    |
| 5         |   | Open Center P, A, & T                 |   |                                                                                      |   |   |
| 60        |  | Open Center P & T Open Crossover      |  |                                                                                      |  |  |
| 7         |  | Open Center all Ports Restricted Flow |  |  |  |  |
| 8         |  | Two Way                               |  |  |  |  |
| 9         |  | Open Center P, A, & B                 |  |                                                                                      |  |  |
| 10        |  | Open Center B, & T                    |  |                                                                                      |  |  |
| 11        |  | Open Center P, & A                    |  |                                                                                      |  |  |
| 12        |  | Open Center A, & T                    |  |                                                                                      |  |  |

\* These 2※※ type valves have no center position.

### Valve Type Designation



## Solenoid Operated Directional Valves Solenoid Controlled Pilot Operated Directional Valves

These valves have the following features and satisfy the needs of users in the various industries.

### ■ 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 surge voltage is very low and will not jam the other electronic systems; therefore, it will not make wrong action to the computers.
2. The spark between the relay contacts has been eliminated and therefore the valve can be operated by miniature relays.
3. Time lag on de-energization is reduced approximately 50%.

#### Simple and Rational Structure

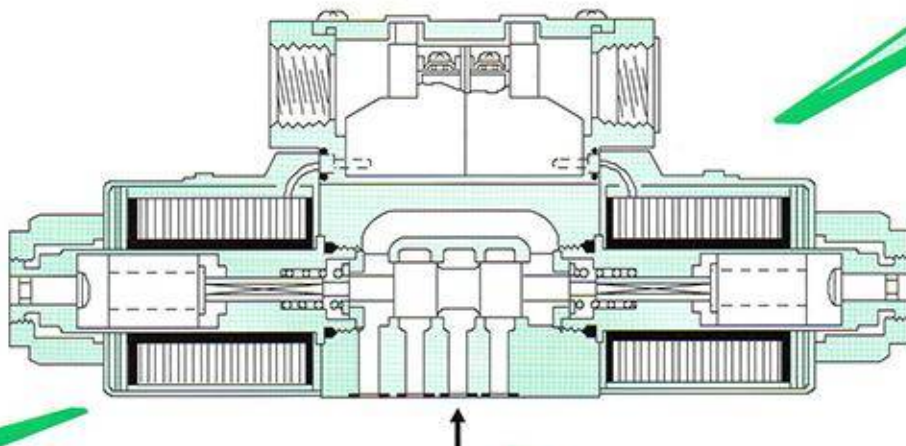
- The terminal-box type is available for electric connection.
- The terminal-box type is equipped with indicator lights as a standard.
- A drip-proof structure is employed to protect the electric devices.
- Simple dismantling and assembling makes maintenance easy.

### ■ R type solenoid

Remarkably high reliability and long life and other advantages including quiet valve operation. No overheating of coil due to the spool sticking and protection against transient voltage peaks are assured.

#### Solenoid development is based on learned experiences

- AC Solenoid  
Common two terminals for both 50Hz and 60 Hz. For the AC solenoid, rewiring is not required when applied frequency is changed.
- The DC solenoid is the famous "K" series. Advantages of DC control can be fully displayed.
- AC-DC convertible solenoid  
This solenoid has high reliability and durability, with no coil burnout.
- Various solenoids available for different voltage.
- Winding and insulation of the solenoids are class H of IEC (Classification of Materials for insulation of Electrical Machinery and Apparatus)



#### Design Reaching the Ultimate of Wet-Type Solenoid

- Stable operation  
Stable operation can be obtained, since these solenoids are resistant to contaminants, with high absorbing power and a strong spring returned force.
- Mould-Type coil  
With the mould-type coil, it is excellent in heat radiation so that temperature rise on the solenoid surface can be reduced.
- Lower power consumption  
in spite of high absorbing power, power consumption is low.

#### High Pressure and High Flow Rate Realized by High Technology

High pressure, high flow rate, and small pressure drop are produced by high-power wet type solenoids that are newly developed and the rational passage design of the valve.

## Solenoid Operated Directional Valves Max. Pressure 7 MPa

The valve is specially designed for power saving, high efficiency and space saving. Its power consumption is less than DSG-01 series and its mounting dimensions is as same as DSG-01, however its length with double solenoid (DC) is 18 mm less than DSG-01 series. It is available for shoe machine, CNC machine and low-pressure automatic equipment.



### Specifications

| Valve Size | Model No.                        | Max. flow L/min | Max. Operating pressure MPa (kgf/cm <sup>2</sup> ) | Max. T-Line Back Pressure MPa (kgf/cm <sup>2</sup> ) | Mass kg |
|------------|----------------------------------|-----------------|----------------------------------------------------|------------------------------------------------------|---------|
| 1/8        | DSGL-01-2B2- $\star$ -60         | 40              | 7 (70)                                             | 7 (70)                                               | 1.5     |
|            | $\star$ DSGL-01-2D2- $\star$ -60 |                 |                                                    |                                                      | 2       |
|            | DSGL-01-3C $\star$ - $\star$ -60 |                 |                                                    |                                                      | 2       |

$\star$  The max. flow of 2D2 is 30 L/min.

### Model Number Designation

**DSGL-01-3C2-A110-N1-60-50Hz**

Series Number  
(Sub-plate Mounting)

Valve Size : 01

Valve Type  
(Please refer to above table)

Coil Type  
A110, A220, D12, D24

None: 60Hz or DC  
50 Hz : 50Hz only

$\star$  1: Please make a note of the available range of different frequency. If you want to choose the coil in 50Hz area, please add 50Hz after the design no.

Design Number

Electrical Conduit Connection

None: Normal (Terminal Box Type is only for D12, D24)

N: Plug-In Connector Type Without Indicator Light

N1: Plug-In Connector Type With Indicator Light

### Valve Types

| Valve Type     | 3C2 | 3C4 | 3C10 | 3C12 |
|----------------|-----|-----|------|------|
| Graphic Symbol |     |     |      |      |
| Valve Type     | 2B2 | 2B3 | 2D2  | 3C9  |
| Graphic Symbol |     |     |      |      |

- The valve other than above types are available, please contact our sales engineers for your requirement.
- These 2B2, 2B3 & 2D2 have no center position.

### Solenoid Ratings

| Electric Source | Coil Type | Serviceable Range |             | Current & Power at Rated Voltage |             |           |
|-----------------|-----------|-------------------|-------------|----------------------------------|-------------|-----------|
|                 |           | Frequency (Hz)    | Voltage (V) | Inrush (A)                       | Holding (A) | Power (W) |
| AC              | A110/50Hz | 50                | 100-120     | 1.56                             | 0.42        | 23        |
|                 | A110/60Hz | 60                | 100-120     | 1.72                             | 0.37        | 18        |
|                 | A220/50Hz | 50                | 200-240     | 0.69                             | 0.21        | 23        |
|                 | A220/60Hz | 60                | 200-240     | 0.82                             | 0.18        | 18        |
| DC              | D12       | -                 | 10.8-13.2   | -                                | 1.75        | 20        |
|                 | D24       | -                 | 21.6-26.4   | -                                | 0.85        | 20        |

### Mounting Bolts (Attachment)

| Socket Head Cap Screw | Tightening Torque |
|-----------------------|-------------------|
| M5 x 45 Lg 4 Pcs      | 5~7 N·m           |

### Sub-plate

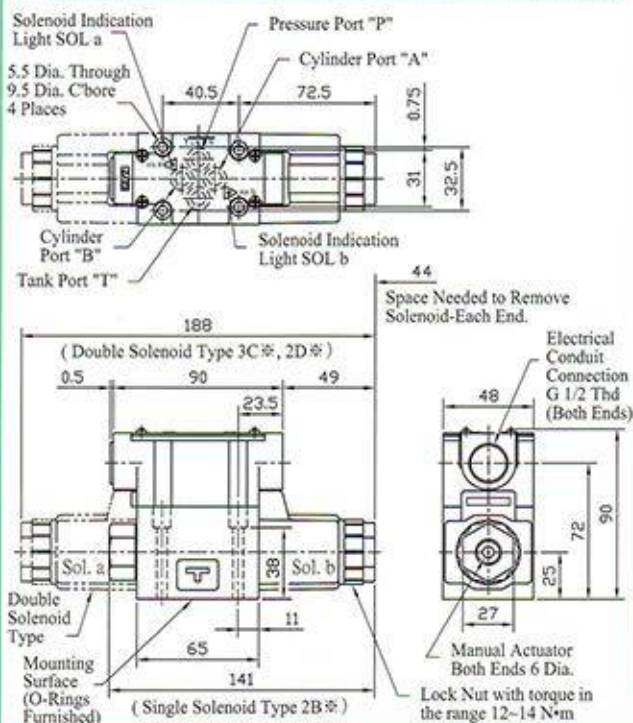
| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| DSGL-01         | DSGM-01-30          | 1/8            | 0.8     |
|                 | DSGM-01X-30         | 1/4            |         |
|                 | DSGM-01Y-30         | 3/8            |         |
|                 |                     |                |         |

- Sub-plates are available. When ordering, please specify sub-plate model from the table above.
- Please refer to page 88 for dimension details.

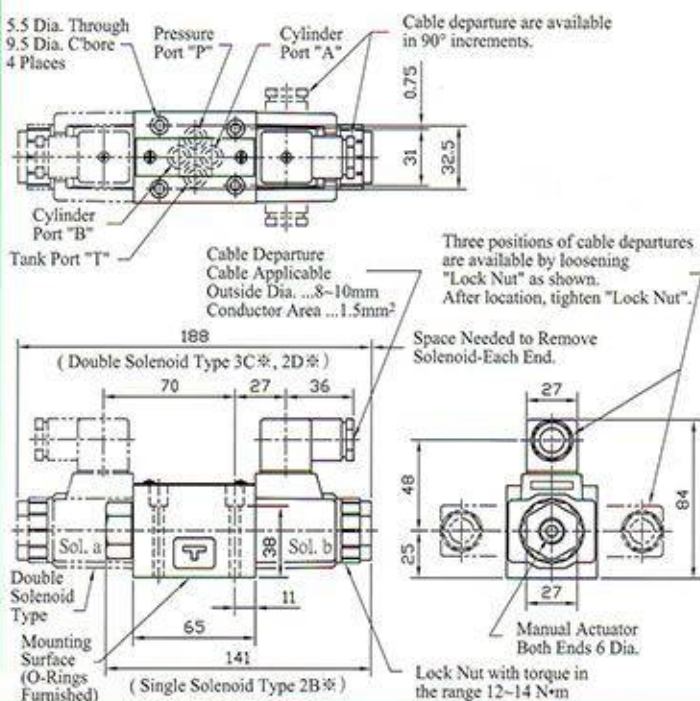
## Solenoid Operated Directional Valves Max. Pressure 7 MPa

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

Model with AC solenoids : DSG1-01-\*\*\*-A\*

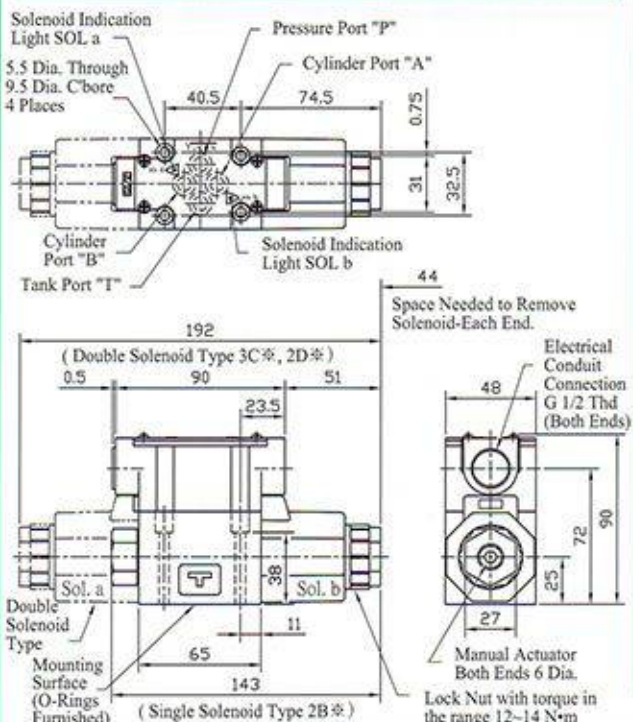


Model with AC solenoids : DSG1-01-\*\*\*-A\*-N/N1

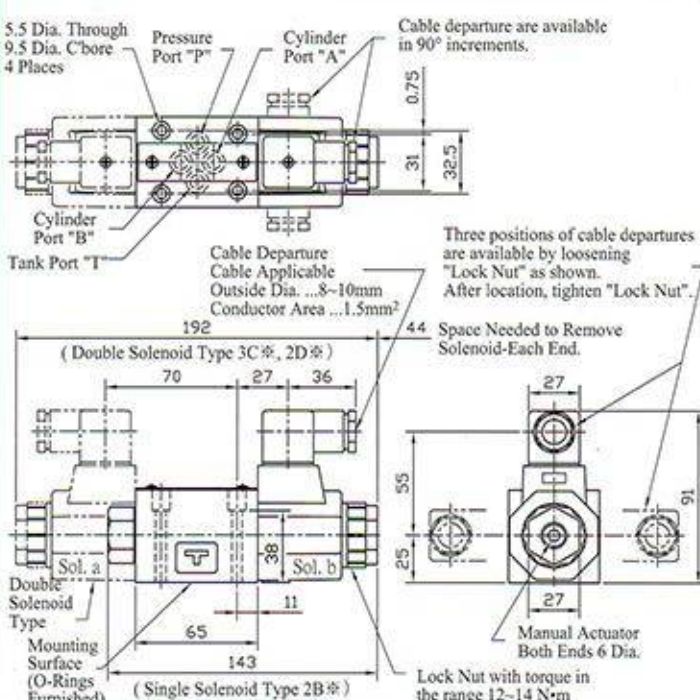


Mounting surface: ISO 4401-AB-03-4-A

Model with DC solenoids : DSG1-01-\*\*\*-D\*



Model with DC solenoids : DSG1-01-\*\*\*-D\*-N/N1



## Solenoid Operated Directional Valves Max. Pressure 31.5 MPa

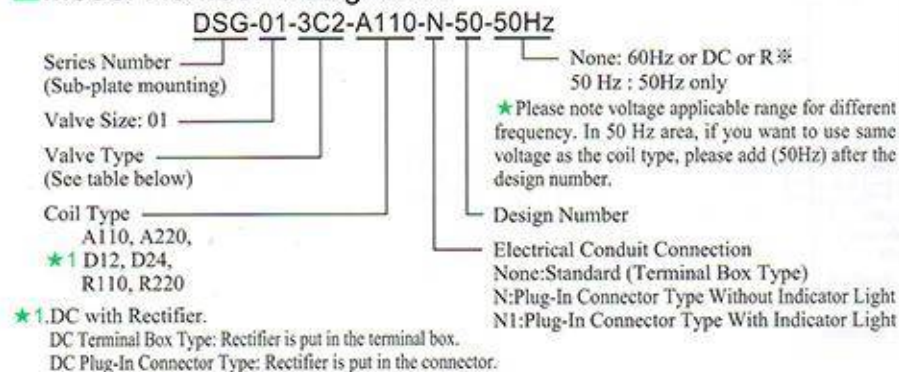
### DSG-01 Series

- These valves are adapted with strong wet-type solenoid and circuit designs to accomplish high pressure, large volume flow and lower pressure drop.
- The optimum valve for any system can be utilized since many spool types and various solenoids are all available, along with other optional function.

### Specifications

| Valve Size | Model Number    | Max. Flow L/min | Max. Pressure MPa (kgf/cm <sup>2</sup> ) | Max. T-Line Back Pressure MPa (kgf/cm <sup>2</sup> ) | Max. Changeover Frequency Cycle/min | Mass kg |
|------------|-----------------|-----------------|------------------------------------------|------------------------------------------------------|-------------------------------------|---------|
| 1/8        | DSG-01-3C※-※-50 | 63              | 31.5 (315)<br>Spool Type<br>60 only 250  | 16<br>(160)                                          | 300<br>R Type<br>only 120           | 2.2     |
|            | DSG-01-2D2-※-50 |                 |                                          |                                                      |                                     | 2.2     |
|            | DSG-01-2B※-※-50 |                 |                                          |                                                      |                                     | 1.6     |

### Model Number Designation



### Valve Type

| Valve Type     | 3C2 | 3C3 | 3C4 | 3C40 | 3C60 | 3C12 |
|----------------|-----|-----|-----|------|------|------|
| Graphic Symbol |     |     |     |      |      |      |
| Valve Type     | 2B2 | 2B3 | 2B8 | 2B2B | 2D2  | 3C9  |
| Graphic Symbol |     |     |     |      |      |      |

- Valves, other than the types above are available, please contact our sales engineer for your requirement.
- 2B2, 2B3, 2B8 & 2D2 type valves have no center position.

### Mounting Bolts (Attachment)

| Socket Head Cap Screw | Tightening Torque                                                             |
|-----------------------|-------------------------------------------------------------------------------|
| M5 x 45Lg 4pcs        | 5 ~ 7 N•m<br>(Applicable to working pressure higher than 25 MPa)<br>6 ~ 7 N•m |

### Sub-plate

| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| DSG-01          | DSGM-01-30          | 1/8            | 0.8     |
|                 | DSGM-01X-30         | 1/4            |         |
|                 | DSGM-01Y-30         | 3/8            |         |

\* Sub-plates are available. When ordering, please specify sub-plate model no. from the table above.

\* Please refer to page 88 for dimension details.

### Solenoid Rating

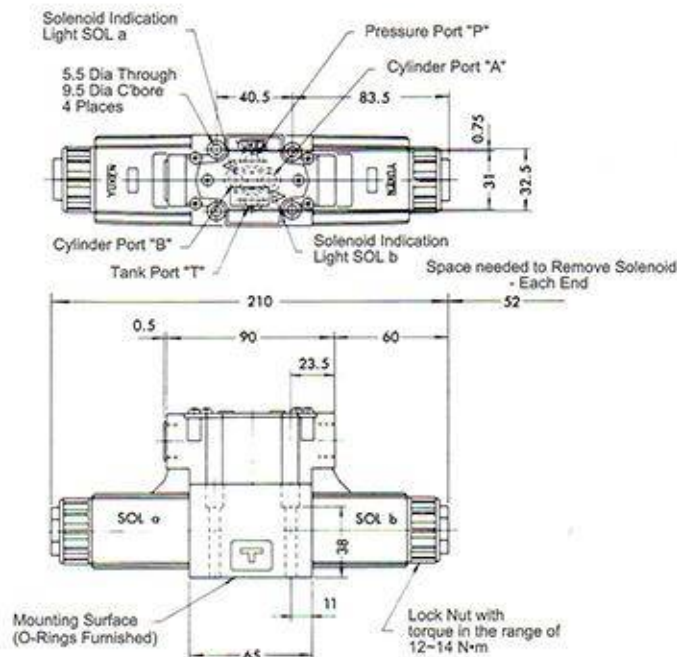
| Electric Source | Coil Type | Serviceable Voltage Range |             | Current & Power at Rated Voltage |             |           |
|-----------------|-----------|---------------------------|-------------|----------------------------------|-------------|-----------|
|                 |           | Frequency (Hz)            | Voltage (V) | Inrush (A)                       | Holding (A) | Power (W) |
| AC              | A110/50Hz | 50                        | 100-120     | 1.68                             | 0.35        | 18        |
|                 | A110/60Hz | 60                        | 100-120     | 1.79                             | 0.35        | 20        |
|                 | A220/50Hz | 50                        | 200-240     | 0.89                             | 0.20        | 19        |
|                 | A220/60Hz | 60                        | 200-240     | 0.90                             | 0.18        | 21        |
| DC              | D12       | -                         | 10.8-13.2   | -                                | 2.00        | 24        |
|                 | D24       | -                         | 21.6-26.4   | -                                | 1.10        | 26        |
| AC→DC           | R110      | 50/60                     | 100-120     | -                                | 0.33        | 29        |
|                 | R220      | 50/60                     | 200-240     | -                                | 0.15        | 29        |

There are other coil types available, please contact our sales engineers for your requirement.

# Solenoid Operated Directional Valves Max. Pressure 31.5 MPa

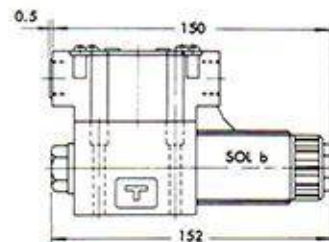
Model with AC solenoids : DSG-01-※※※-A※

- Spring Centered
- No Spring Detented

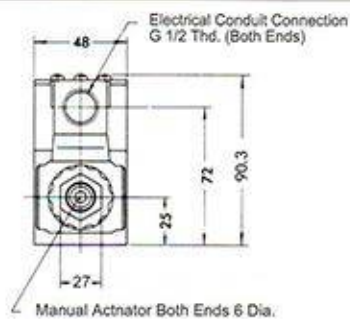


Mounting Surface : ISO 4401-AB-03-4-A

- Spring Offset

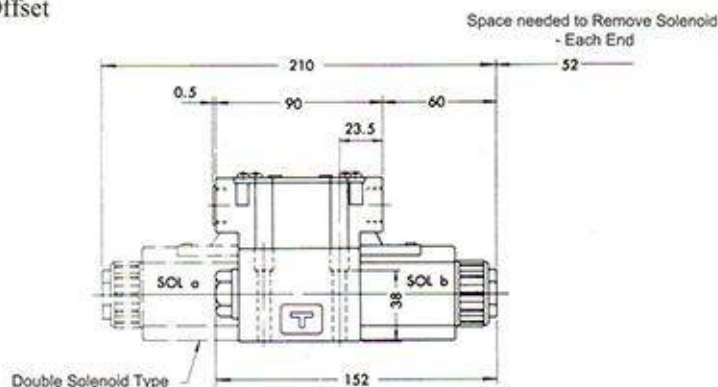


For other dimensions, please refer to left diagram.  
Alternative models using solenoid "a" are also available.

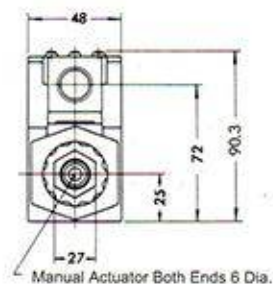


Model with DC solenoids : DSG-01-※※※-D※  
Model with R solenoids : DSG-01-※※※-R※

- Spring Centered
- No Spring Detented
- Spring Offset



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

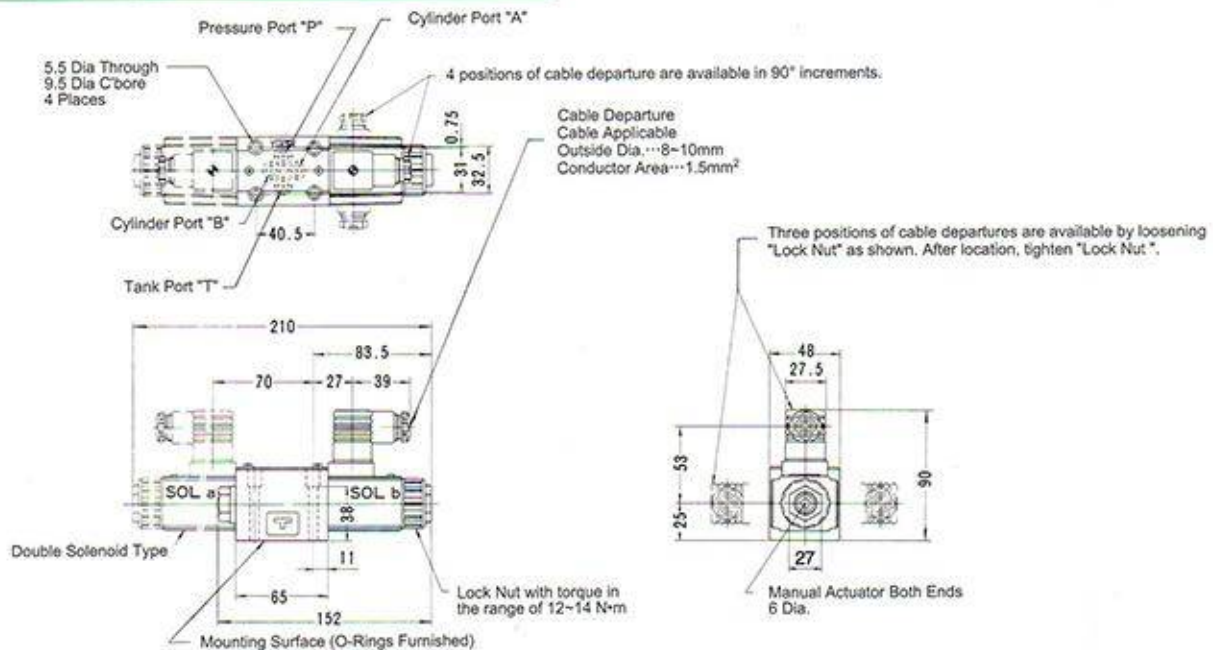


• For other dimensions, please refer to above model with AC solenoid.

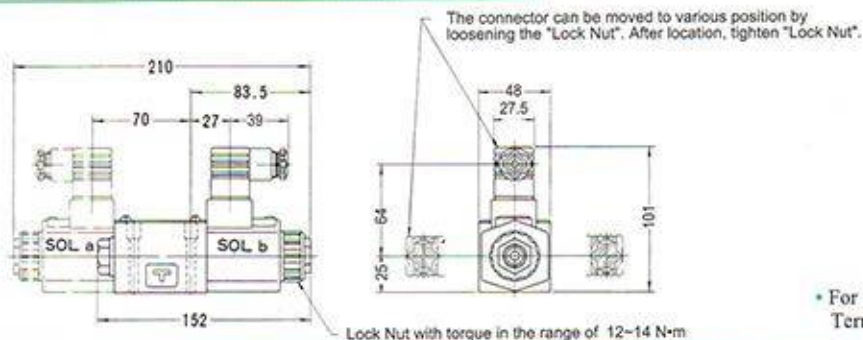
# Solenoid Operated Directional Valves Max. Pressure 31.5 MPa

## DIN Connector type, DIN Connector Type with Indicator Light

Model with AC Solenoids : DSG-01-※※※-A※-N/N1

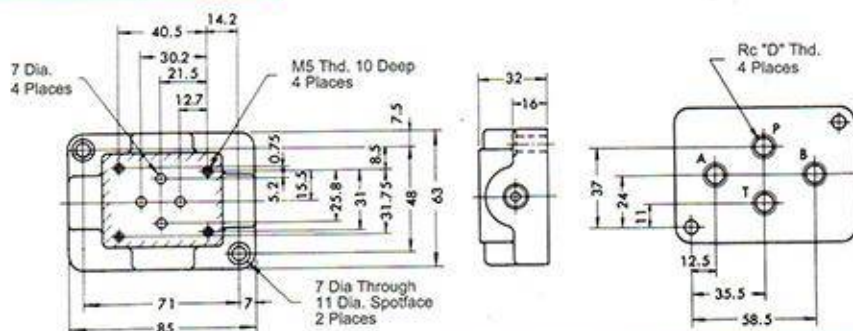


Model with DC solenoids : DSG-01-※※※-D※-N/N1  
Model with R solenoids : DSG-01-※※※-R※-N/N1



• For other dimensions, please refer to Terminal Box Type (page 87).

Sub-plate : DSGM-01, 01X, 01Y



| Model No.   | D   |
|-------------|-----|
| DSGM-01-30  | 1/8 |
| DSGM-01X-30 | 1/4 |
| DSGM-01Y-30 | 3/8 |

## Solenoid Operated Directional Valves Max. Pressure 31.5 MPa



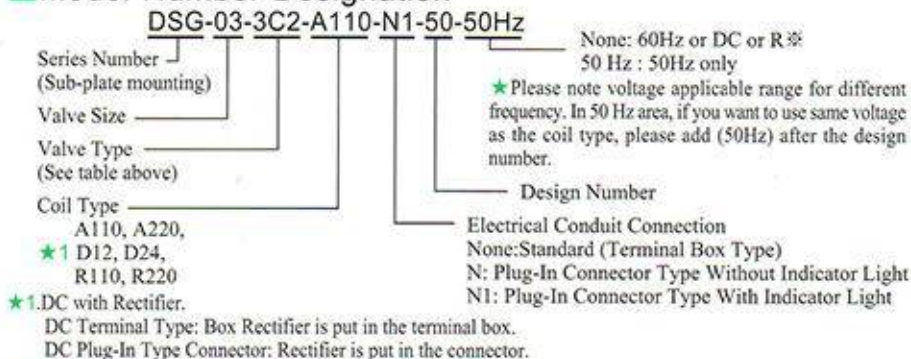
### DSG-03 Series

- These valves are adapted with strong wet-type solenoid and circuit designs to accomplish high pressure, large volume flow and lower pressure drop.
- The optimum valve for any system can be utilized since many spool types and various solenoids are all available, along with other optional function.
- The pressure drop caused by the passing of pressurized oil is reduced to approx. 1/2 of the conventional Yuken model.
- Good Light Weight design has accomplished to reduce body weight.

### Specifications

| Valve Size | Model No       | Max. Flow L/min | Max. Pressure MPa (kgf/cm <sup>2</sup> )  | Max. T-Line Back Pressure MPa (kgf/cm <sup>2</sup> ) | Max. Changeover Frequency Cycle/min | Mass kg          |     |
|------------|----------------|-----------------|-------------------------------------------|------------------------------------------------------|-------------------------------------|------------------|-----|
|            |                |                 |                                           |                                                      |                                     | Type of Solenoid |     |
| 3/8        | DSG-03-2B※-50  | 120             | 31.5 (315)<br>Spool Type 60 only 25 (250) | 16<br>(160)                                          | 240<br>(R Type Only 120)            | AC               | 2.9 |
|            | DSG-03-2D2※-50 |                 |                                           |                                                      |                                     | DC               | 3.6 |
|            | DSG-03-3C※-50  |                 |                                           |                                                      |                                     |                  | 5   |

### Model Number Designation



### Sub-plate

| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| DSG-03          | DSGM-03-40          | Rc             | 3       |
|                 | DSGM-03X-40         | 3/8            |         |
|                 | DSGM-03Y-40         | 1/2            | 4.7     |

•Sub-plates are available. When ordering, please specify sub-plate model no. from the table above.

•Please refer to page 91 for dimension details.

### Mounting Bolts (Attachment)

| Socket Head Cap Screw | Tightening Torque |
|-----------------------|-------------------|
| M6 x 35Lg 4pcs        | 12~15 N·m         |

### Valve Type

| Valve Type     | 3C2 | 3C3 | 3C4 | 3C40 | 3C60 | 3C12 |
|----------------|-----|-----|-----|------|------|------|
| Graphic Symbol |     |     |     |      |      |      |
| Valve Type     | 2B2 | 2B3 | 2B8 | 2B2B | 2D2  | 3C9  |
| Graphic Symbol |     |     |     |      |      |      |

- Valve, other than the types above are available, please contact our sales engineers for your requirements.
- 2B2,2B3,2B8 & 2D2 type valves have no center position.

### Solenoid Rating

| Electric Source | Coil Type | Serviceable Voltage Range |             | Current & Power at Rated Voltage |             |           |
|-----------------|-----------|---------------------------|-------------|----------------------------------|-------------|-----------|
|                 |           | Frequency (Hz)            | Voltage (V) | Inrush (A)                       | Holding (A) | Power (W) |
| AC              | A110/50Hz | 50                        | 100-120     | 3.90                             | 0.78        | 39        |
|                 | A110/60Hz | 60                        | 100-120     | 3.86                             | 0.71        | 39        |
|                 | A220/50Hz | 50                        | 200-240     | 1.82                             | 0.34        | 37        |
|                 | A220/60Hz | 60                        | 200-240     | 1.85                             | 0.34        | 39        |
| DC              | D12       | -                         | 10.8-13.2   | -                                | 2.75        | 33        |
|                 | D24       | -                         | 21.6-26.4   | -                                | 1.41        | 34        |
| AC → DC         | R110      | 50/60                     | 100-120     | -                                | 0.42        | 38        |
|                 | R220      | 60/60                     | 200-240     | -                                | 0.20        | 38        |

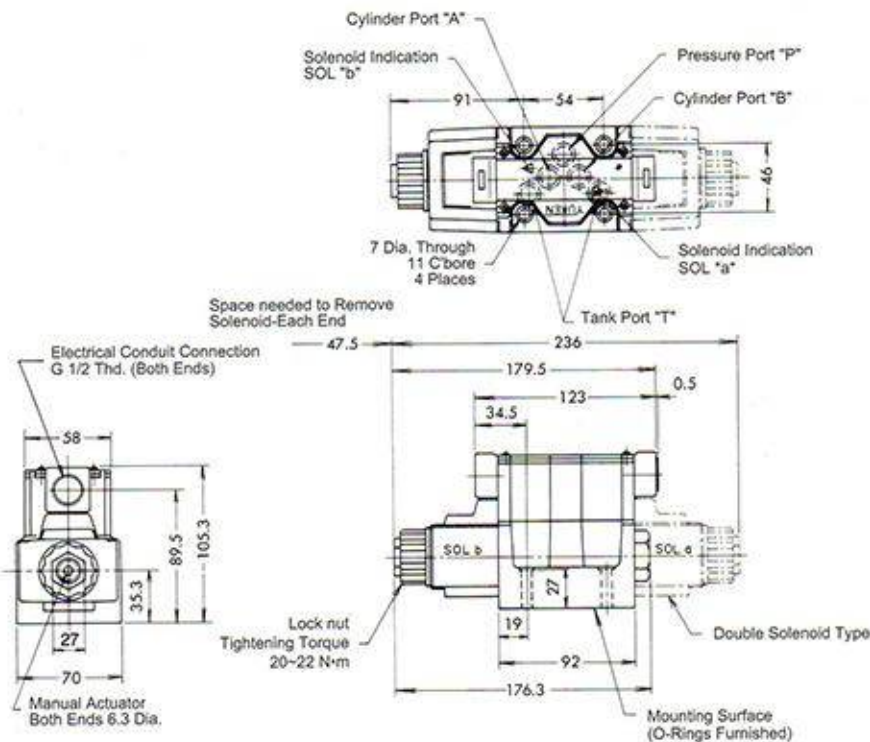
There are other coil types available, please contact our sales engineers for your requirement.

# Solenoid Operated Directional Valves Max. Pressure 31.5 MPa

Model with AC solenoids : DSG-03-※※※-A※

- Spring Centered
- No Spring Detented
- Spring Offset

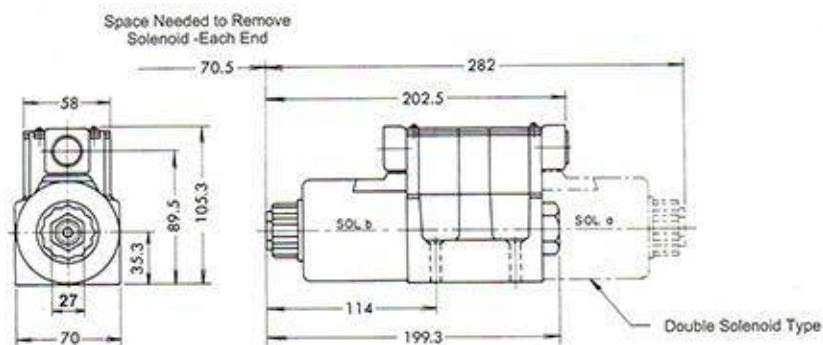
Mounting Surface:ISO 4401-AC-05-4-A-80



Model with DC solenoids : DSG-03-※※※-D※

Model with R solenoids : DSG-03-※※※-R※

Mounting Surface:ISO 4401-AC-85-04-A-80



• For other dimensions, please refer to the above model with AC solenoids.

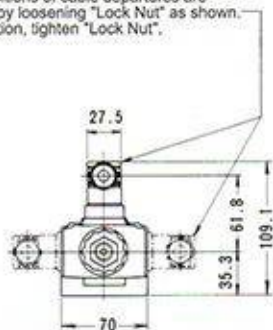
Note: For dimensions of mounting surface, please refer to DSGM-03 type sub-plate on page 91.

## Solenoid Operated Directional Valves Max. Pressure 31.5 MPa

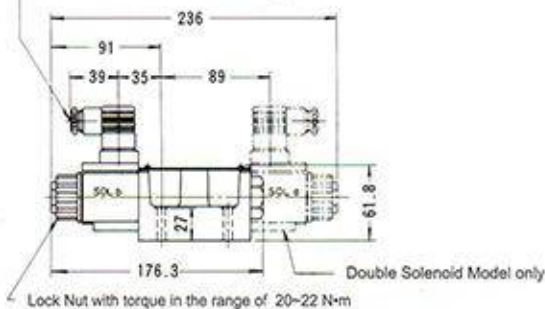
DIN type Connector, DIN Type Connector with Indicator Light

Model with AC Solenoids : DSG-03-\*\*\*-A\*-N/N1

Three positions of cable departures are available by loosening "Lock Nut" as shown. After location, tighten "Lock Nut".



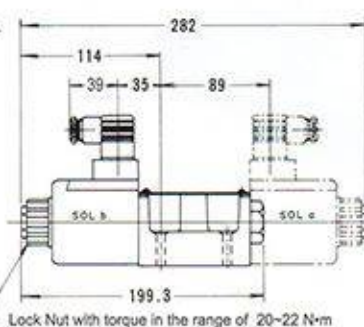
Cable Departure Cable Applicable  
Outside Dia. ...8~10mm  
Conductor Area...Not exceeding 1.5mm<sup>2</sup>



Model with DC solenoids : DSG-03-\*\*\*-D\*-N/N1

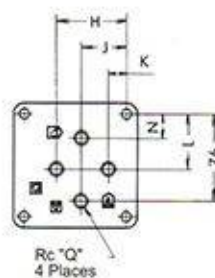
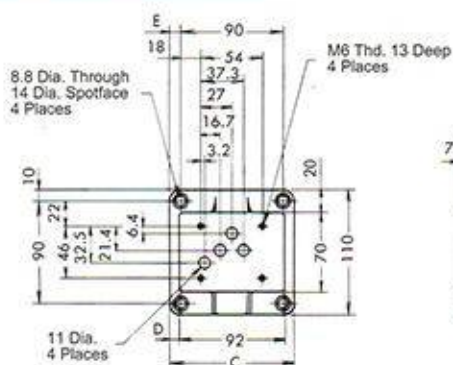
Model with R solenoids : DSG-03-\*\*\*-R\*-N/N1

Three positions of cable departures are available by loosening "Lock Nut" as shown. After location, tighten "Lock Nut".



• For other dimensions, please refer to Terminal Box Type.

Sub-plate DSGM-03, 03X, 03Y-40



| Model No.   | C   | D  | E  | F  | H  | J  | K  | L  | N  | Q   |
|-------------|-----|----|----|----|----|----|----|----|----|-----|
| DSGM-03-40  | 110 | 9  | 10 | 32 | 62 | 40 | 16 | 48 | 21 | 3/8 |
| DSGM-03X-40 |     |    |    |    |    |    |    |    |    | 1/2 |
| DSGM-03Y-40 | 120 | 14 | 15 | 50 | 80 | 45 | 10 | 47 | 16 | 3/4 |

## Solenoid Valves with Monitoring Switch-(S)-DSGS Max. Pressure 31.5 MPa

Injection Machines and Machine Tools  
**Patented**  
To improve the safety of hydraulic machines

China Patent No. ZL200820107394.0  
Taiwan Patent No. M344413



- It can monitor the spool position shifting correctly.
- It is adopted with non-contact parts and zero-torn part with long-life.
- It can choose PNP output and directly check the function with little hysteresis.
- There is no special requirement for the water level in the fluid and the pollution.
- Dust-proof and water-proof level is IP 65. It will not be interfered by the external magnetic field.
- D24 Type Solenoid Valves was awarded CE certificate.

It is available for injection moulding machines, machine tools and the other hydraulic machines that need to improve the safety.

**WARNING :** The Monitoring switch has been set the position after testing. If you reverse any other directions, it may cause the monitoring switch out of function.

**Specifications:** For the flow and pressure details of valves, please refer to (S)-DSGS-01-50

| Valve Type     | Model                | Max. Flow L/min | Max. Pressure MPa            | Max. T-Line Back Pressure MPa | Max. Changeover Frequency Cycle / min | Mass kg |
|----------------|----------------------|-----------------|------------------------------|-------------------------------|---------------------------------------|---------|
| Standard Type  | DSGS-01-3C*-50(-L)   | 63              | 31.5 (Spool Type 60 only 25) | 16                            | 300 (R Type nly 120)                  | 3.7     |
|                | DSGS-01-2B*-50(-L)   |                 |                              |                               |                                       | 2.4     |
| Shockless Type | S-DSGS-01-3C*-50(-L) | 40              | 16                           |                               | 120                                   | 3.7     |
|                | S-DSGS-01-2B*-50(-L) |                 |                              |                               |                                       | 2.4     |
| Standard Type  | DSGS-03-3C*-50(-L)   | 120             | 31.5 (Spool Type 60 only 25) | 16                            | 240 (R Type nly 120)                  | 8.1     |
|                | DSGS-03-2B*-50(-L)   |                 |                              |                               |                                       | 5.2     |
| Shockless Type | S-DSGS-03-3C*-50(-L) | 120             | 16                           |                               | 120                                   | 8.1     |
|                | S-DSGS-03-2B*-50(-L) |                 |                              |                               |                                       | 5.2     |

### Model Number Designation

**S - DSGS - 01 - 3C2 - D24 - SW P 1 C - 50 - L**

Shockless Type  
None: standard  
S: Shockless

Series Number

Valve Size 01, 03

Valve Type \*1

Coil Type  
R110, R220, D12, D24  
\*All for plug-in connector type with Indicator light

None: standard  
L: Solenoid Valves adverse mounting

Design Number

Connected Type  
C: M12 Connector (standard)

Monitoring Switch Contact Type  
1: NO normal open (standard)

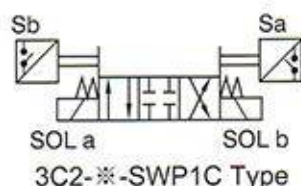
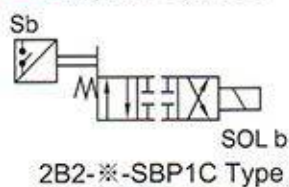
Monitoring Switch Contact  
P: PNP (standard)

Monitoring switch position \*2  
SW: both side  
SA: Sa monitoring switch (SOL a)  
SB: Sb monitoring switch (SOL b)

\*1. Flow rate is as same as (S)-DSG-01/03-50. Please refer to P86 (DSG-01) and P89 (DSG-03)

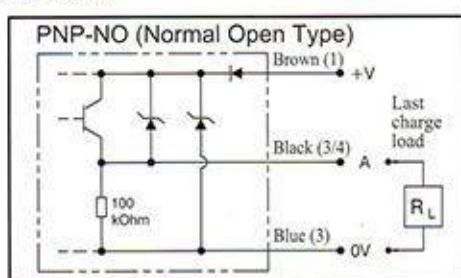
\*2. The monitoring switch (Sa) of SOL a is at A port. The monitoring switch (Sb) of SOL a is at B port.

### Graphic Symbol



### Monitoring Switch and Wiring Diagrams

| Item                      | Specification        |
|---------------------------|----------------------|
| Supply Voltage Range      | 10~30 VDC            |
| Max. Output Current       | 200 mA (32 VDC max.) |
| Switching Frequency       | 600 Hz               |
| Ambient Temperature Range | -25~70 °C            |
| Degree of Protection      | IP 67                |



### Mounting Bolts (Attachment)

| Valve Model No. | Socket Head Cap Screw | Tightening Torque |
|-----------------|-----------------------|-------------------|
| (S)-DSGS-01     | M5 x 45L 4 Pcs        | 6~7 N·m           |
| (S)-DSGS-03     | M6 x 35L 4 Pcs        | 12~15 N·m         |
| DSHGS-06        | M12 x 60L 6 Pcs       | 100~123N·m        |

Note) This series of valves can not be mounted in vertical way.

### Switch M12 Connector with Wire (Options)

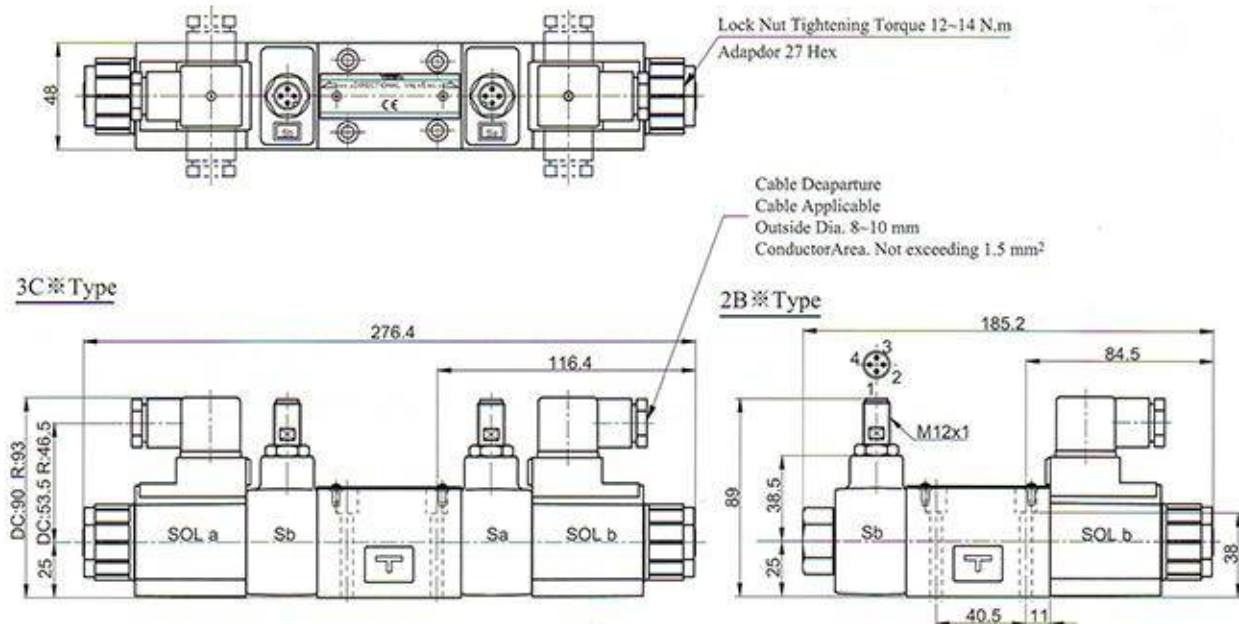
| Model                        | Valve Type           | Remark                         |
|------------------------------|----------------------|--------------------------------|
| M124R-PUR-2M (Straight type) | (S)-DSHGS-04*-50(-L) | 2M: 2M (Oil Resistance Cables) |
| M124RL-PUR-2M (90° Type)     | (S)-DSHGS-06*-50(-L) |                                |

Solenoid Valves with Monitoring Switch-(S)-DSGS Max. Pressure 31.5 MPa

(S)-DSGS-01

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

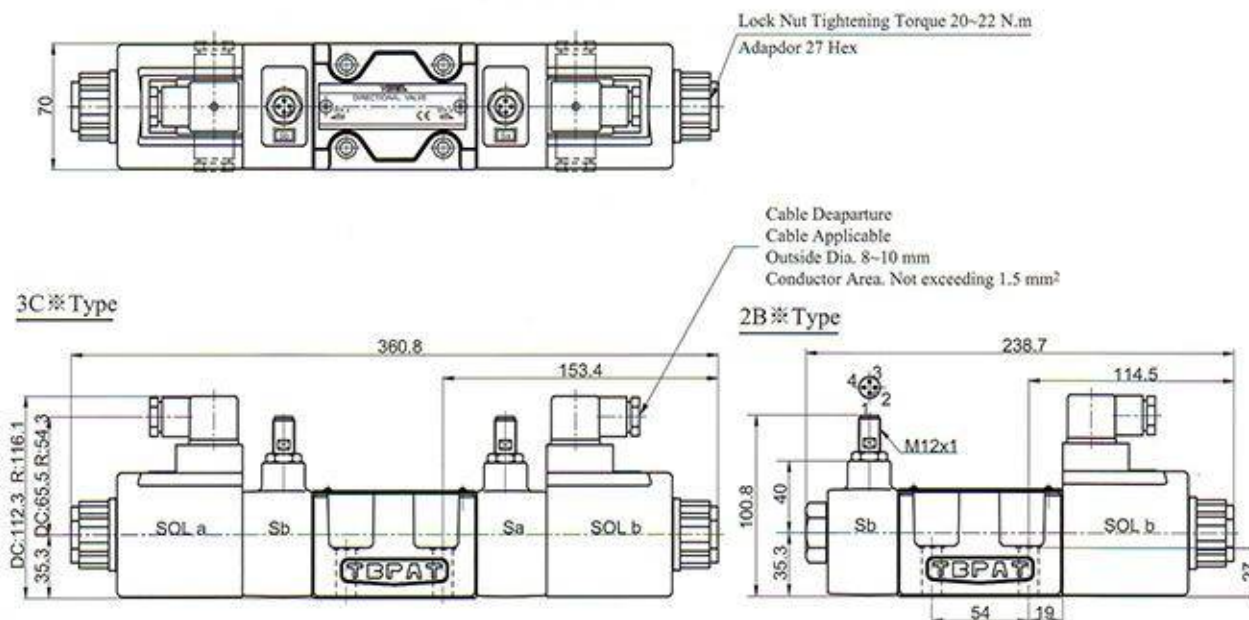
D



Note) For dimensions of valves mounting surface, please refer to DSGM-01 sub-plate on page 88.

(S)-DSGS-03

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



Note) For dimensions of valves mounting surface, please refer to DSGM-03 sub-plate on page 91.

## Solenoid Controlled Pilot Operated Directional Valves Max. Pressure 31.5 MPa

### DSHG Series

These valves are composed of a solenoid operated pilot valve and a pilot operated slave valve. When a solenoid is energized 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 (31.5 kgf/cm<sup>2</sup>) along with high flow means compact system design. (e.g. "04" size valve- 300 L/min, "06" size valve- 500 L/min, "10" size valve- 1100 L/min.

#### Lower Pressure Drop

System energy saving increased as pressure drop of each valve has been greatly reduced.

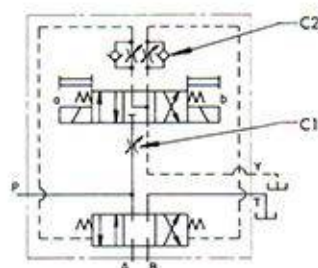
### Specifications

| Valve Size | Model Number   | Max. Flow L/min | Max. Operating Pressure MPa (kgf/cm <sup>2</sup> ) | Max. Pilot Pressure MPa (kgf/cm <sup>2</sup> ) | Max. T-Line Back Pressure MPa | Changeover Frequency Cycles/min | Mass kg |
|------------|----------------|-----------------|----------------------------------------------------|------------------------------------------------|-------------------------------|---------------------------------|---------|
| 1/2        | DSHG-04-2B※-50 | 300             | 31.5<br>(315)                                      | 0.8~25<br>(8~250)                              | 21 (16)※2                     | 120                             | 8.2     |
|            | DSHG-04-3C※-50 |                 |                                                    |                                                |                               |                                 | 8.8     |
|            | DSHG-04-2N※-50 |                 |                                                    |                                                |                               |                                 | 8.8     |
| 3/4        | DSHG-06-2B※-51 | 500             | 31.5<br>(315)                                      | 0.8~25<br>(8~250)                              | 21 (16)※2                     | 120                             | 12.1    |
|            | DSHG-06-3C※-51 |                 |                                                    |                                                |                               |                                 | 12.7    |
|            | DSHG-06-2N※-51 |                 |                                                    |                                                |                               |                                 | 12.7    |
| 1 1/4      | DSHG-10-2B※-41 | 1100            | 31.5<br>(315)                                      | 1~21 (10~210)                                  | 21 (16)※2                     | 60                              | 44.7    |
|            | DSHG-10-3C※-41 |                 |                                                    | 1~25<br>(10~250)                               |                               | 100                             | 45.3    |
|            | DSHG-10-2N※-41 |                 |                                                    |                                                |                               | 120                             | 45.3    |

※1 - Max. flow depends on the type of spool and operating conditions.

※2 - Please refer to the bracket for T-Line back pressure.

### Graphic Symbol with Choke Valve



### Model Number Designation

DSHG-04-3C2-C1-ET-A110-N1-※-50HZ

Series Number  
(Sub-plate mounting)

Valve Size 04, 06, 10

Valve Type  
(Please refer to next page)

With pilot choke valve (optional)  
C1: with C1 Choke valve  
C2: with C2 Choke valve  
C1C2: with C1 & C2 Choke valve  
(Omit if not required)

Nobe: 60Hz or DC or R※  
50 Hz: 50Hz only

★ Please note voltage applicable range for different frequency. In 50 Hz area, if you want to use same voltage as the coil type, please add (50Hz) after the design number.

Design Number

Electrical Conduit Connection

Coil Type

A110, A220, D12, D24, R110, R220...etc.

※ Drain Connection T: Internal Drain. None: External Drain

※ Pilot Connection E: External Pilot. None: Internal pilot

※ Classification of application on spool type "3", "5", "60" & "7" has been described as below.

| Pilot Connection | Drain Connection | Attention                                                                                                                                                 |
|------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Internal Pilot   | External Drain   | Hold back pressure in the tank line so that the difference between pilot pressure and drain pressure is always more than minimum required pilot pressure. |
|                  | Internal Drain   | Combination is not available.                                                                                                                             |
| External Pilot   | External Drain   | No limitation in use.                                                                                                                                     |
|                  | Internal Drain   |                                                                                                                                                           |

※ Minimum Pilot pressure: 1/2, 3/4 size valve are 0.8 MPa (kgf/cm<sup>2</sup>), 1-1/4 size valve is 1 MPa (10 kgf/cm<sup>2</sup>).

## Solenoid Controlled Pilot Operated Directional Valves Max. Pressure 31.5 MPa

### Valve Type

| Valve Type       | 3C2  | 3C3  | 3C4  | 3C40 | 3C60* |
|------------------|------|------|------|------|-------|
| Graphical Symbol |      |      |      |      |       |
| Valve Type       | 3C12 | 2B2* | 2B7* | 2N2* | 2N7*  |
| Graphical Symbol |      |      |      |      |       |

- Valves, other than the type above are available, please contact our sales engineers for your requirement.
- The "2B2", "2B7", "2N2" & "2N7" type valves have no center position.

### Pilot Valve Type

| Valve Model No. | Pilot Valve Model No. |
|-----------------|-----------------------|
| DSHG-04-        | 2B* DSG-01-2B2-*-50   |
|                 | 3C* DSG-01-3C4-*-50   |
| DSHG-06-        | 2B* DSG-01-2B2-*-50-L |
|                 | 3C* DSG-01-3C4-*-50   |
| DSHG-10-        | 2B* DSG-01-2B2-*-50-L |
|                 | 3C* DSG-01-3C4-*-50   |

Please refer to page 86

### Sub-plate

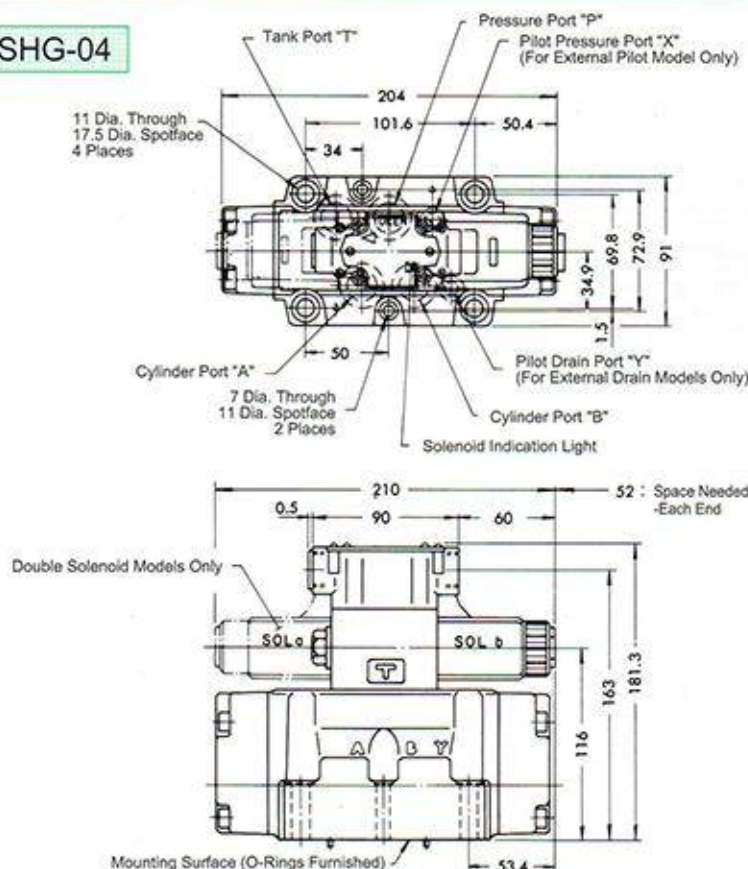
| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| DSHG-04         | DHGM-04-20          | 1/2            | 4.4     |
|                 | DHGM-04X-20         | 3/4            | 4.1     |
| DSHG-06         | DHGM-06-50          | 3/4            | 7.4     |
|                 | DHGM-06X-50         | 1              |         |
| DSHG-10         | DHGM-10-40          | 1 1/4          | 21.5    |
|                 | DHGM-10X-40         | 1 1/2          |         |

Sub-plates are available. When ordering, please specify sub-plate model from the table above. Please refer to page 97, 98 for dimensions.

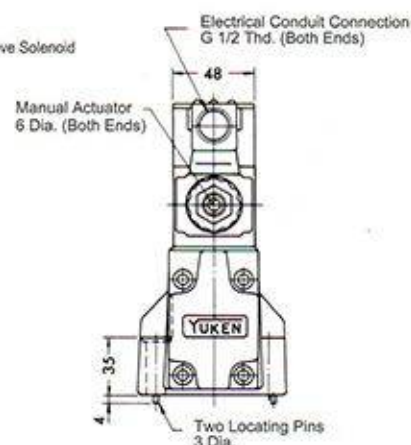
### Mounting Bolts (Attachment)

| Valve Model No. | Socket Head Cap Screw | Q'ty | Tightening Torque N·m (kgf.m) |
|-----------------|-----------------------|------|-------------------------------|
| DSHG-04         | M6 x 45 Lg            | 2    | 12~15 (1.2~1.5)               |
|                 | M10 x 50 Lg           | 4    | 58~72 (5.9~7.3)               |
| DSHG-06         | M12 x 60 Lg           | 6    | 100~123 (10.2~12.5)           |
| DSHG-10         | M20 x 75 Lg           | 6    | 473~585 (48.2~59.7)           |

### DSHG-04



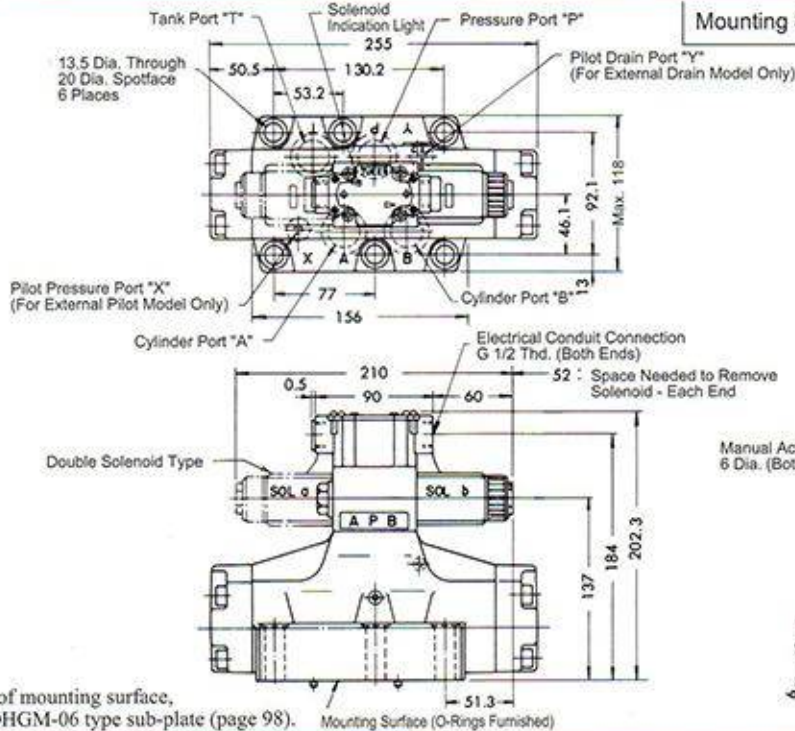
Mounting Surface: ISO 4401-AD-07-4-A-80



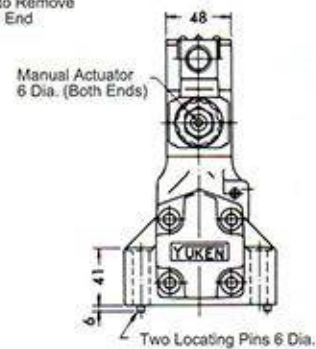
Note: For dimensions of mounting surface, please refer to DHGM-04 type sub-plate (page 97).

## Solenoid Controlled Pilot Operated Directional Valves Max. Pressure 31.5 MPa

### DSHG-06

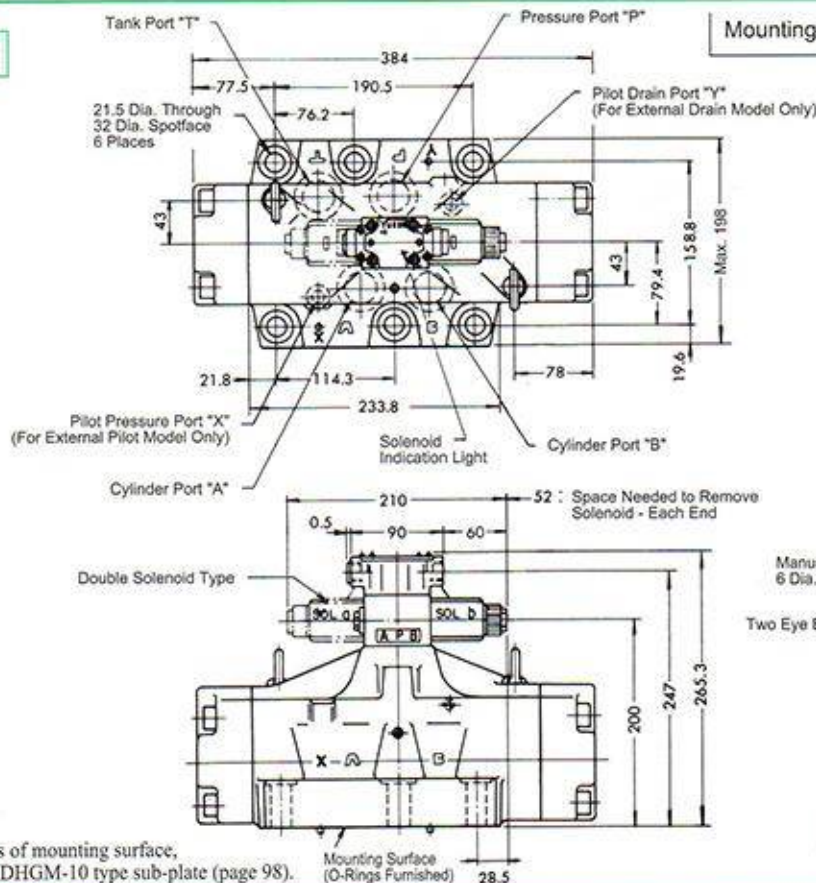


Mounting Surface:ISO 4401-AE-08-4-A-80

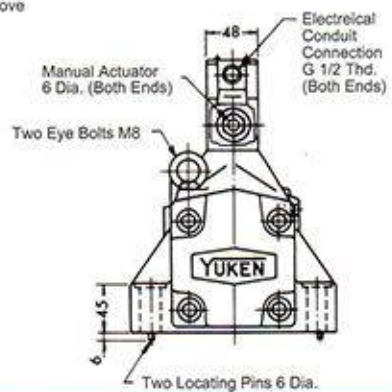


Note: For dimensions of mounting surface, please refer to DHGM-06 type sub-plate (page 98).

### DSHG-10



Mounting Surface:ISO 4401-AF-10-4-A-80

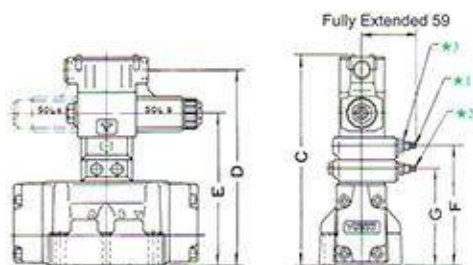


Note: For dimensions of mounting surface, please refer to DHGM-10 type sub-plate (page 98).

**Solenoid Controlled Pilot Operated Directional Valves Max. Pressure 31.5 MPa**

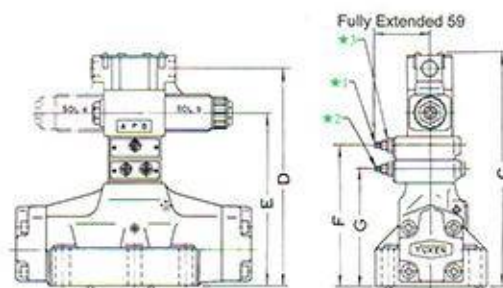
Options-Model with Pilot Choke Valve

DSHG-04-※※※-C1,C2,C1C2



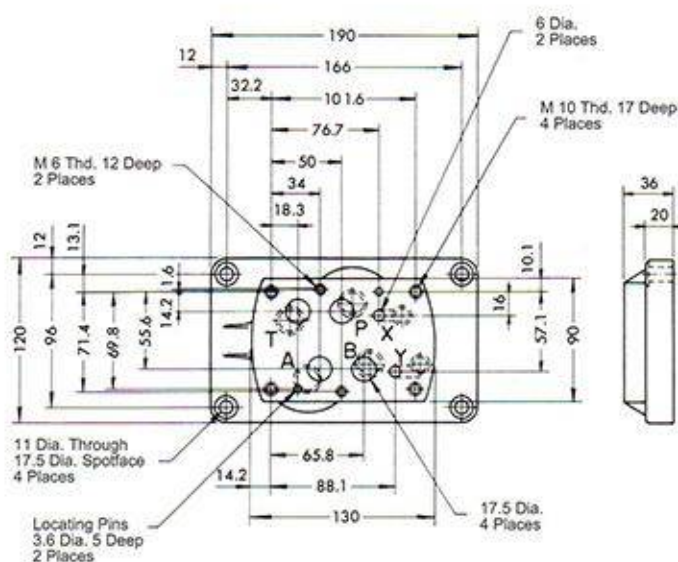
- \*1. C1 Choke Adj. (TC1G-01)  
Screw 6 Hex, Lock Nut 12 Hex
- \*2. C2 Choke Adj. (TC2G-01)  
Screw 6 Hex, Lock Nut 12 Hex

DSHG-06-※※※-C1,C2,C1C2  
10

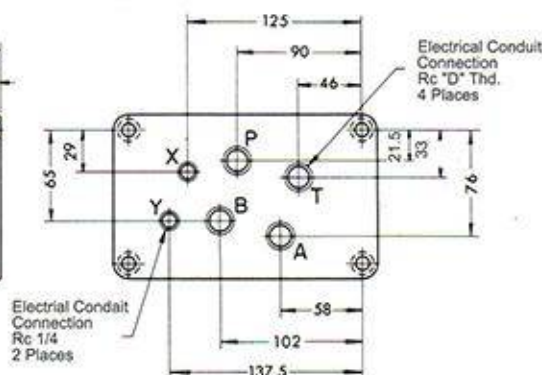


| Model No.        | C     | D   | E   | F   | G   |
|------------------|-------|-----|-----|-----|-----|
| DSHG-04-※※※-C1   | 206.3 | 188 | 141 | 106 | -   |
| DSHG-04-※※※-C2   |       |     |     | -   | 106 |
| DSHG-04-※※※-C1C2 | 231.3 | 213 | 166 | 131 | 106 |
| DSHG-06-※※※-C1   | 227.3 | 209 | 162 | 127 | -   |
| DSHG-06-※※※-C2   |       |     |     | -   | 127 |
| DSHG-06-※※※-C1C2 | 252.3 | 234 | 187 | 152 | 127 |
| DSHG-10-※※※-C1   | 290.3 | 272 | 225 | 190 | -   |
| DSHG-10-※※※-C2   |       |     |     | -   | 190 |
| DSHG-10-※※※-C1C2 | 315.3 | 297 | 250 | 215 | 190 |

Sub-Plate: DHGM-04 / 04X-20

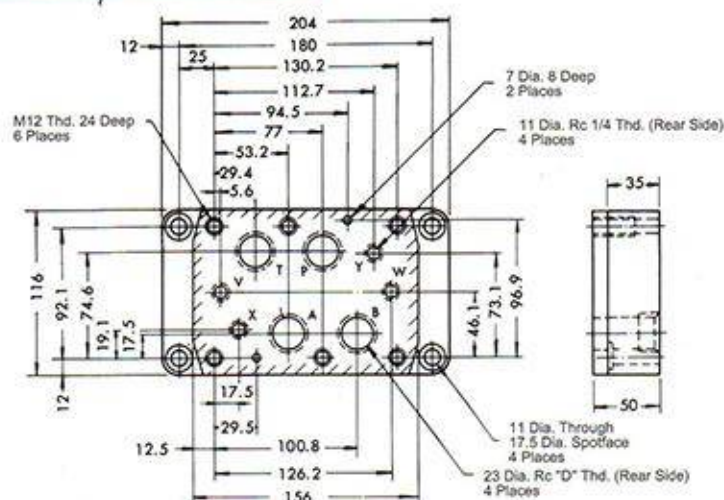


| Sub-plate Model No. | D   |
|---------------------|-----|
| DHGM-04-20          | 1/2 |
| DHGM-04X-20         | 3/4 |



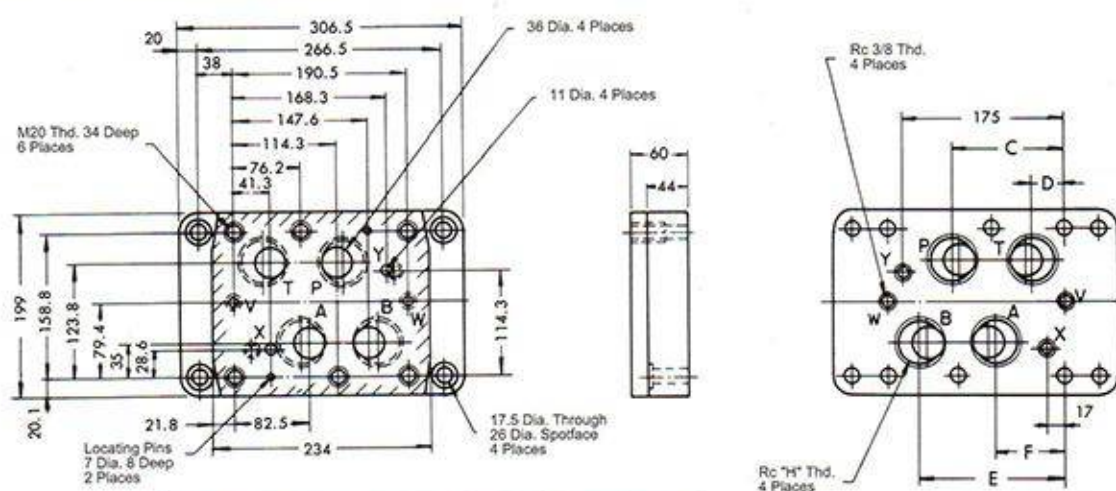
## Solenoid Controlled Pilot Operated Directional Valves Max. Pressure 31.5 MPa

Sub-plate DHGM-06 / 06X-50



| Model No.   | D   |
|-------------|-----|
| DHGM-06-50  | 3/4 |
| DHGM-06X-50 | 1   |

Sub-plate DHGM-10 / 10X-40



| Model No.   | C   | D  | E     | F    | H     |
|-------------|-----|----|-------|------|-------|
| DHGM-10-40  | 114 | 41 | 147.5 | 82.5 | 1-1/4 |
| DHGM-10X-40 | 118 | 36 | 156.5 | 74.5 | 1-1/2 |

Note: For Uses of Port "X" "Y", "V" and "W"

| Valve Types                                                  |                 | X                                                      | Y                                                      | V*W*                            |
|--------------------------------------------------------------|-----------------|--------------------------------------------------------|--------------------------------------------------------|---------------------------------|
| Solenoid Controlled Pilot Operated Directional Valves (DSHG) | Spring Centered | Used as pilot port only on external pilot type valves. | Used as drain port only on external drain type valves. | Not used (Plug is not required) |
|                                                              | No Spring       | To be plugged on internal pilot type valves            | To be plugged on internal drain type valves            |                                 |
| Pilot Operated Directional Valves (DHG)                      | Spring Centered | Used as pilot pressure port / drain port               | Used as pilot pressure port / drain port               |                                 |
|                                                              | Spring Offset   | Used as pilot pressure port                            | Used as pilot drain port                               |                                 |

\* DHGM-04, 04X types do not have these ports. (Port "V" and Port "W")

# Solenoid Valves with Monitoring Switch-DSHGN

**Max. Pressure 25 MPa**

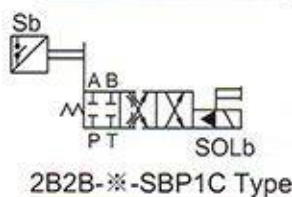
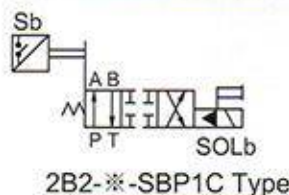
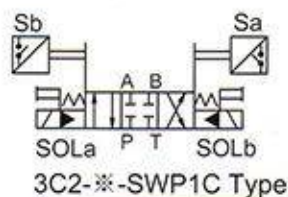

- It can monitor the spool position shifting correctly.
- It is adopted with non-contact parts and zero-torn part with long-life.
- There are two monitoring switch contact for PNP and NPN type.
- It can directly check the function with little hysteresis.
- There is no special requirement for the water and the pollution of the hydraulic fluid.
- Dust-proof and water-proof level is IP 65.
- It will not be interfered by the external magnetic field.

**WARNING :** The Monitoring switch has been set the position after testing. If you reverse any other directions, it may cause the monitoring switch out of function.

**Specifications:** For the flow and pressure drop details, please refer to DSHG-03/04/06

| Model                  | Max. Flow<br>L/min | Max. Pressure<br>MPa | Max. T-Line<br>Back Pressure<br>MPa | Max. Changeover<br>Frequency<br>Cycle / min | Mass kg |      |      |
|------------------------|--------------------|----------------------|-------------------------------------|---------------------------------------------|---------|------|------|
|                        |                    |                      |                                     |                                             | SW      | SA   | SB   |
| DSHGN-03-3C2-※-10      | 160                | 25                   | 16                                  | 120                                         | 9.3     | 8.5  | 8.5  |
| DSHGN-03-2B2B-※-10(-L) |                    |                      |                                     |                                             | 8.8     | 8.0  | 8.0  |
| DSHGN-03-2B2-※-10(-L)  |                    |                      |                                     |                                             | 9.3     | 8.0  | 8.5  |
| DSHGN-04-3C2-※-50      | 300                | 25                   | 21<br>(Internal Drain : 16)         | 120                                         | 10.2    | 9.6  | 9.6  |
| DSHGN-04-2B2B-※-50(-L) |                    |                      |                                     |                                             | 9.7     | 9.0  | 9.0  |
| DSHGN-04-2B2-※-50(-L)  |                    |                      |                                     |                                             | 10.1    | 9.4  | 9.5  |
| DSHGN-06-3C2-※-51      | 500                | 25                   | 21<br>(Internal Drain : 16)         | 120                                         | 15.0    | 13.9 | 13.9 |
| DSHGN-06-2B2B-※-51(-L) |                    |                      |                                     |                                             | 14.4    | 13.3 | 13.3 |
| DSHGN-06-2B2-※-51(-L)  |                    |                      |                                     |                                             | 15.1    | 14.3 | 14.0 |

## Graphic Symbol



## Sub-plate

| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| DSHGN-03        | DHGM-03Y-10         | 3/4            | 4.7     |
| DSHGN-04        | DHGM-04-20          | 1/2            | 4.4     |
|                 | DHGM-04X-20         | 3/4            | 4.1     |
| DSHGN-06        | DHGM-06-50          | 3/4            | 7.4     |
|                 | DHGM-06X-50         | 1              |         |

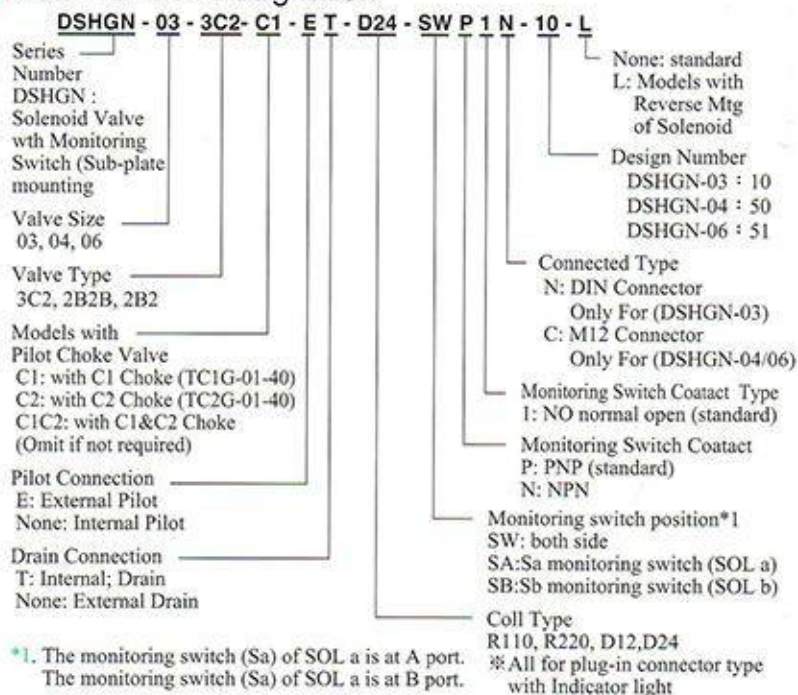
\*Sub-plates are available. When ordering, please specify sub-plate model no. from the table above.

\*Please refer to page P97(DHGM-04), P98(DHGM-06), P103(DHGM-03)

## Mounting Bolts (Attachment)

| Valve Model No. | Socket Head Cap Screw | Tightening Torque |
|-----------------|-----------------------|-------------------|
| DSHGN-03        | M6 x 35L 4 Pcs        | 11.8~14.7 N·m     |
| DSHGN-04        | M6 x 45L 2 Pcs        | 11.8~14.7 N·m     |
|                 | M10 x 50L 4 Pcs       | 57.9~71.6 N·m     |
| DSHGN-06        | M12 x 60L 6 Pcs       | 100~122.6 N·m     |

## Model Number Designation



## Switch M12 Connector with Leading Wire (Options)

| Model                        | Valve Type              | Remark                         |
|------------------------------|-------------------------|--------------------------------|
| M124R-PUR-2M (Straight type) | DSHGN-04-※-※-※-C-50(-L) | 2M: 2M (Oil Resistance Cables) |
| M124RL-PUR-2M (90° Type)     | DSHGN-06-※-※-※-C-51(-L) |                                |

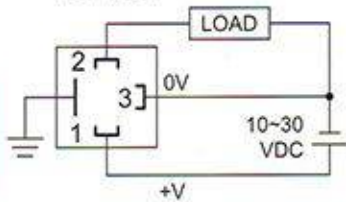
## Solenoid Valves with Monitoring Switch-DSHGN

Max. Pressure 25 MPa

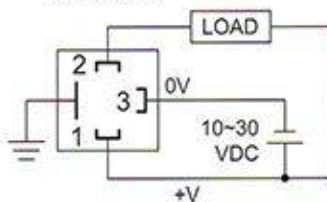
### Monitoring Switch and Wiring Diagrams

#### DSHGN-03

PNP N.O.



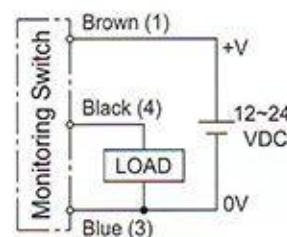
NPN N.O.



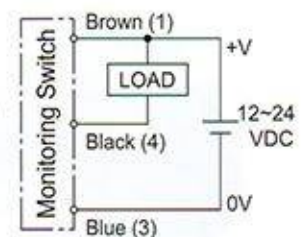
- ※1. Current Consumption : DSHGN-03 ≤ 15mA : DSHGN-04/06 ≤ 13mA
- ※2. Max. Output Current : Under 200mA

#### DSHGN-04/06

PNP N.O.



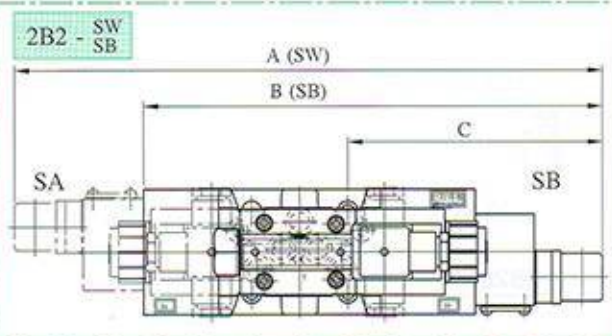
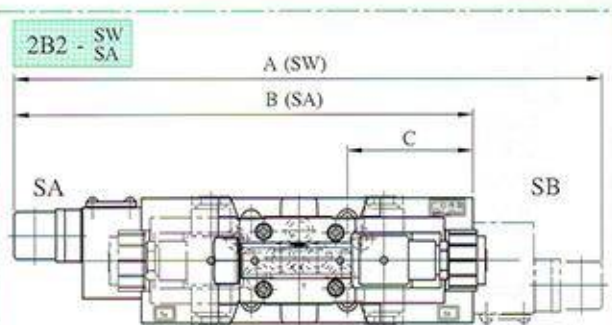
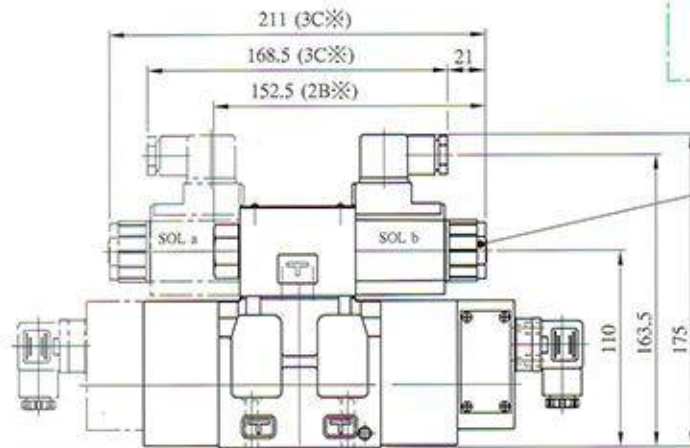
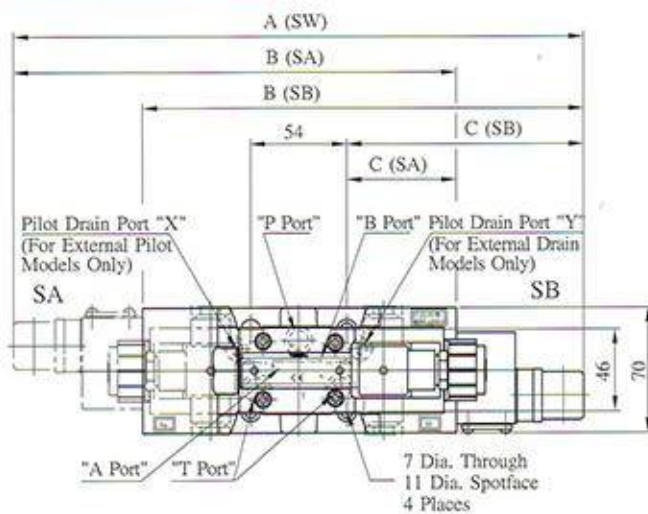
NPN N.O.



### DSHGN-03

Mounting Surface: ISO 4401-05-05-0-94

3C2 - SW / SA / SB  
2B2B - SW / SA / SB



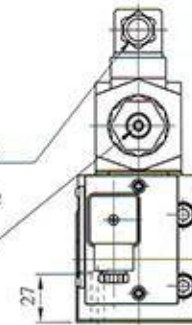
Lock Nut Tightening Torque 10~12 N·m

27 Hex

Cable Departure  
Cable Application  
Outside Dia. 8~10 mm

Conductor Area  
not exceeding 1.5 mm<sup>2</sup>

Manual Actuator  
6 Dia. (Both Ends)



| ITEM            | A   | B     |       | C    |     |
|-----------------|-----|-------|-------|------|-----|
|                 | SW  | SA    | SB    | SA   | SB  |
| DSHGN-03-3C2-※  | 320 | 248.5 | 247.5 | 61.5 | 133 |
| DSHGN-03-2B2B-※ |     |       |       |      |     |
| DSHGN-03-2B2-※  | 330 | 257.5 | 257.5 | 70.5 | 143 |

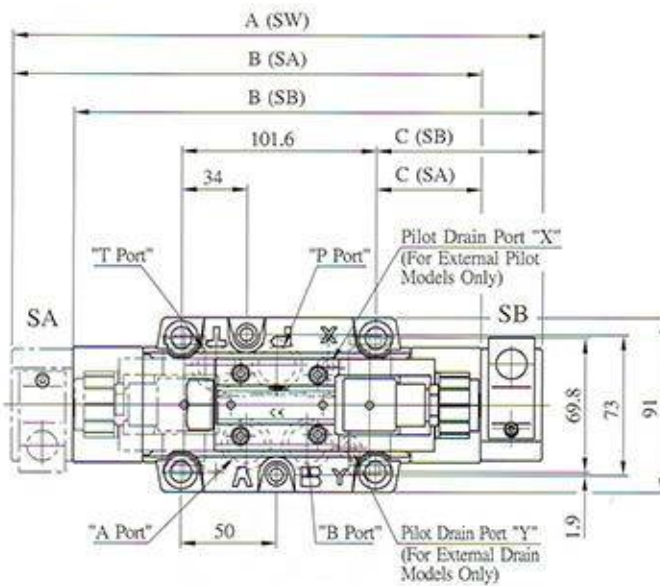
## Solenoid Valves with Monitoring Switch-DSHGN

Max. Pressure 25 MPa

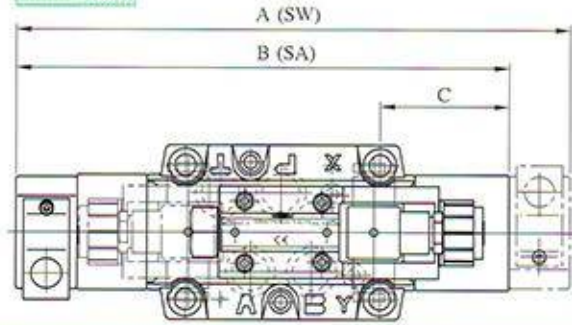
### DSHGN-04

Mounting Surface: ISO 4401-AD-07-4-A-80

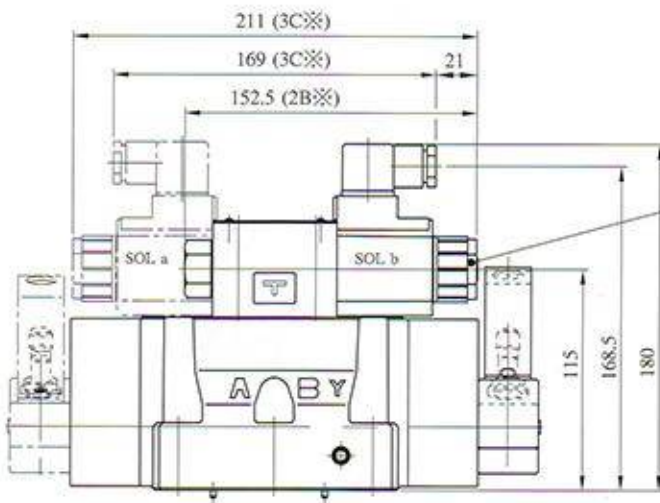
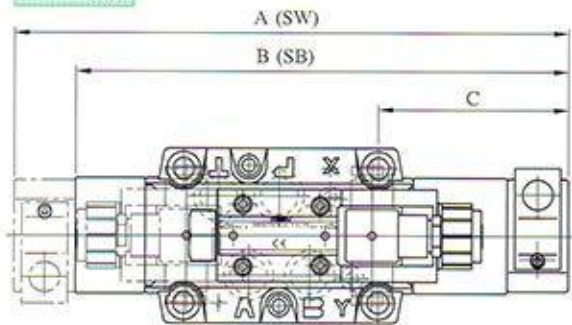
3C2  
2B2B - SW / SA / SB



2B2 - SW  
SA



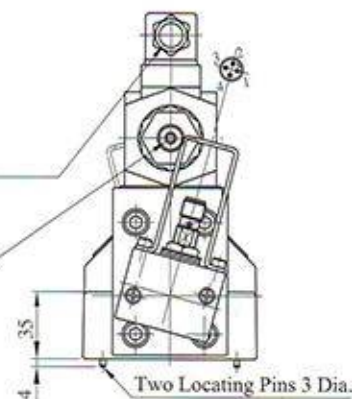
2B2 - SW  
SB



Lock Nut Tightening  
Torque 10~12 N·m  
27 Hex

Cable Departure  
Cable Application  
Outside Dia. 8~10 mm  
Conductor Area,  
not exceeding 1.5 mm<sup>2</sup>

Manual Actuator  
6 Dia. (Both Ends)



| ITEM            | A     | B     |       | C    |      |
|-----------------|-------|-------|-------|------|------|
|                 | SW    | SA    | SB    | SA   | SB   |
| DSHGN-04-3C2-※  | 277   | 240.5 | 240.5 | 50.4 | 87.5 |
| DSHGN-04-2B2B-※ |       |       |       |      |      |
| DSHGN-04-2B2-※  | 289.5 | 253   | 253   | 62.9 | 99.4 |

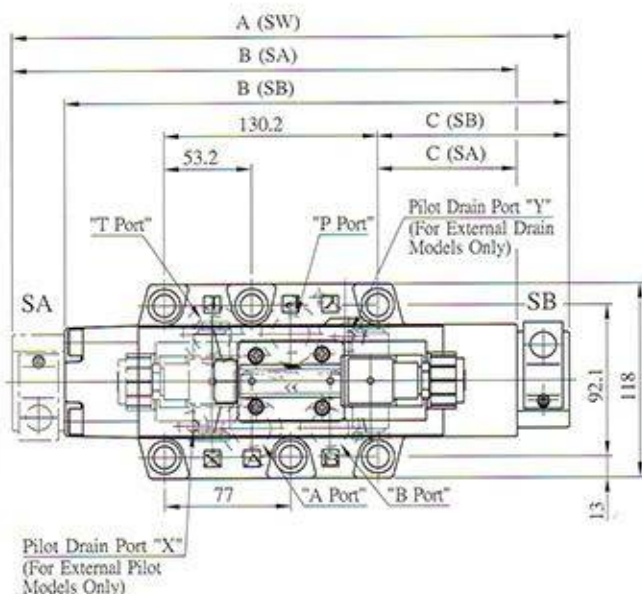
## Solenoid Valves with Monitoring Switch-DSHGN

Max. Pressure 25 MPa

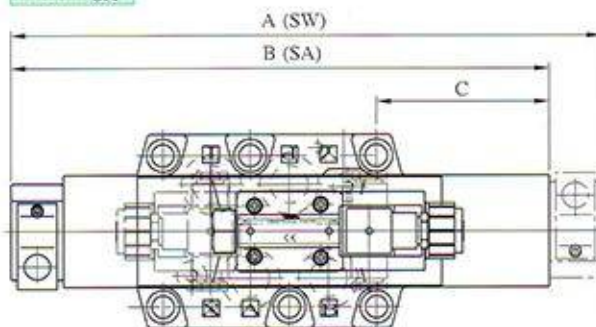
### DSHGN-06

Mounting Surface: ISO 4401-AE-08-4-A-80

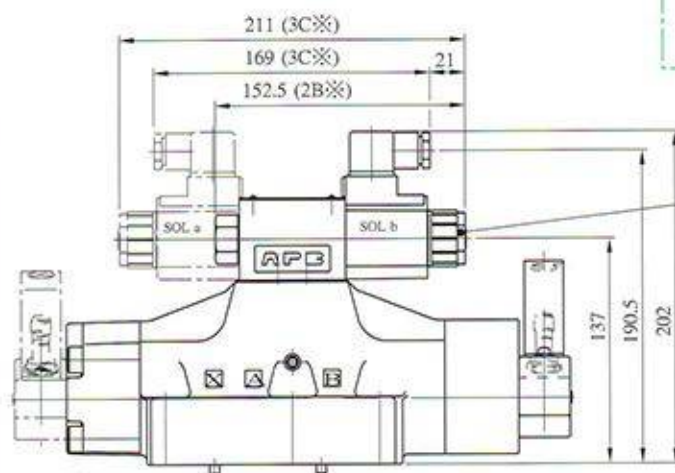
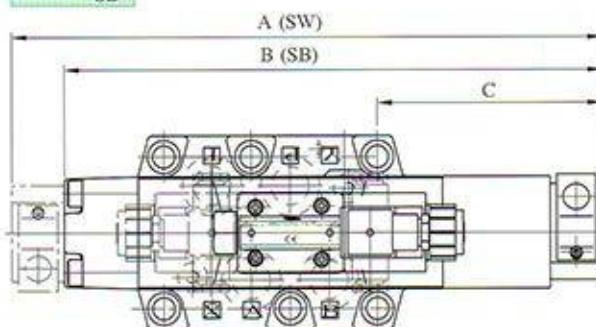
3C2  
2B2B - SW / SA / SB



2B2 - SW  
SA



2B2 - SW  
SB



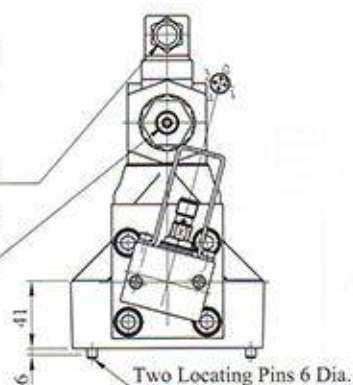
Lock Nut Tightening  
Torque 10-12 N·m

27 Hex

Cable Departure  
Cable Application  
Outside Dia. 8-10 mm

Conductor Area,  
not exceeding 1.5 mm<sup>2</sup>

Manual Actuator  
6 Dia. (Both Ends)

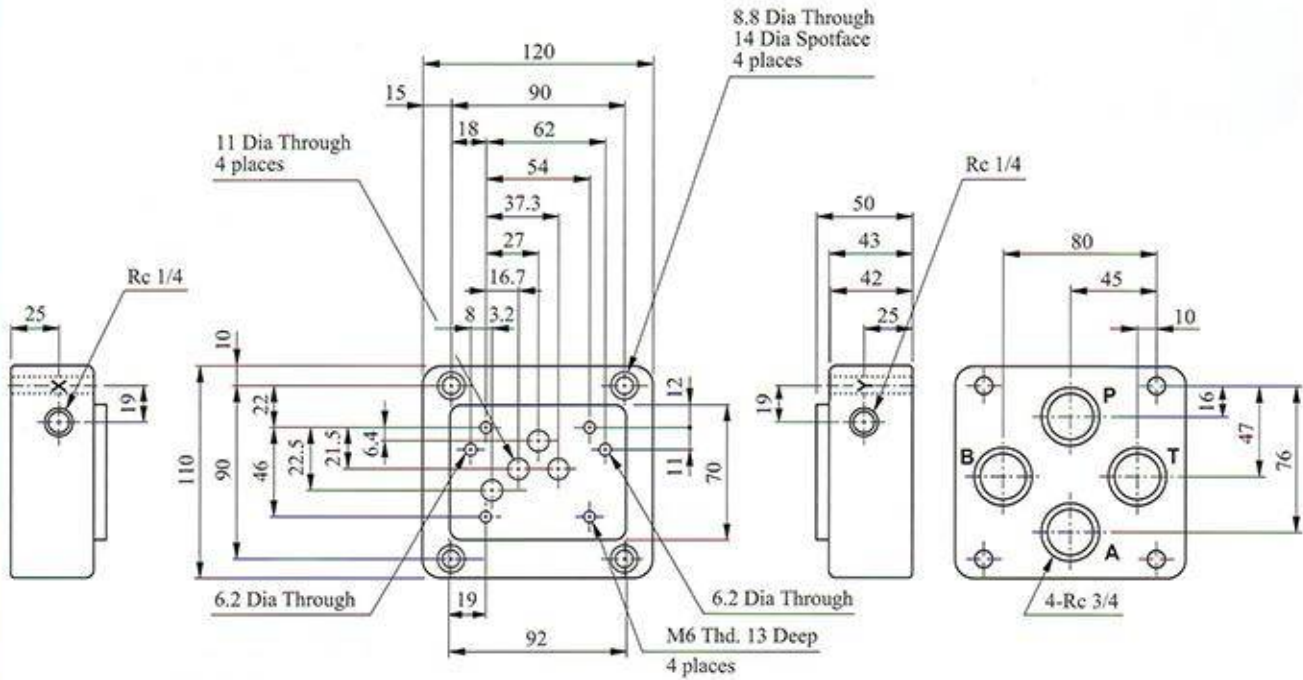


| ITEM            | A     | B     |       | C    |       |
|-----------------|-------|-------|-------|------|-------|
|                 | SW    | SA    | SB    | SA   | SB    |
| DSHGN-06-3C2-※  | 340   | 297.5 | 297.5 | 74.5 | 117.5 |
| DSHGN-06-2B2B-※ | 360.5 | 318.5 | 318   | 95.5 | 137.5 |

## Solenoid Valves with Monitoring Switch-DSHGN

Max. Pressure 25 MPa

■ Sub-Plate: DHGM-03Y



D

## Pilot Operated Directional Valves Max. Pressure 31.5 MPa

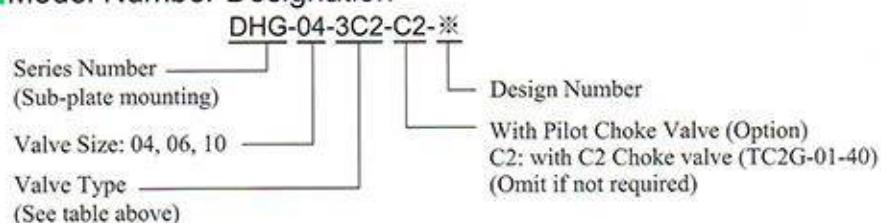
The valves control the direction of flow by way of the pilot pressure provided from a remote source.



### Specifications

| Valve Size | Model No.     | Max. Flow L/min | Max. Pilot Pressure MPa (kgf/cm <sup>2</sup> ) | Min. Pilot Pressure MPa (kgf/cm <sup>2</sup> ) | Max. T-Line Back Press. MPa (kgf/cm <sup>2</sup> ) | Mass kg |
|------------|---------------|-----------------|------------------------------------------------|------------------------------------------------|----------------------------------------------------|---------|
| 1/2        | DHG-04-2B※-50 | 130             | 31.5<br>(315)                                  | 0.8-25<br>(8-250)                              | 21<br>(210)                                        | 7.8     |
|            | DHG-04-3C※-50 | 300             |                                                |                                                |                                                    | 7.4     |
|            | DHG-04-2N※-50 | 300             |                                                |                                                |                                                    | 7.4     |
| 3/4        | DHG-06-2B※-50 | 140             | 31.5<br>(315)                                  | 0.8-25<br>(8-250)                              | 21<br>(210)                                        | 11.7    |
|            | DHG-06-3C※-50 | 500             |                                                |                                                |                                                    | 11.2    |
|            | DHG-06-2N※-50 | 500             |                                                |                                                |                                                    | 11.2    |
| 1 1/4      | DHG-10-2B※-40 | 460             | 31.5<br>(315)                                  | 1.0-25<br>(10-250)                             | 21<br>(210)                                        | 45.6    |
|            | DHG-10-3C※-40 | 1100            |                                                |                                                |                                                    | 43.8    |
|            | DHG-10-2N※-40 | 1100            |                                                |                                                |                                                    | 43.8    |

### Model Number Designation



### Valve Type

| Valve Type     | 3C2  | 3C4  | 3C40 | 3C5  | 3C60 |
|----------------|------|------|------|------|------|
| Graphic Symbol |      |      |      |      |      |
| Valve Type     | 3C12 | 2B2* | 2B7* | 2N2* | 2N7* |
| Graphic Symbol |      |      |      |      |      |

\* Valves, other than the type above are available, please contact our sales engineers for your requirement.  
\* The 2B2, 2B7, 2N2 & 2N7 type valves have no center position.

### Sub-plate

| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| DHG-04          | DHGM-04-20          | 1/2            | 4.4     |
|                 | DHGM-04X-20         | 3/4            | 4.1     |
| DHG-06          | DHGM-06-50          | 3/4            | 7.4     |
|                 | DHGM-06X-50         | 1              |         |
| DHG-10          | DHGM-10-40          | 1 1/4          | 21.5    |
|                 | DHGM-10X-40         | 1 1/2          |         |

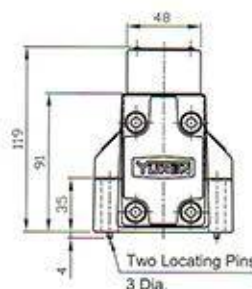
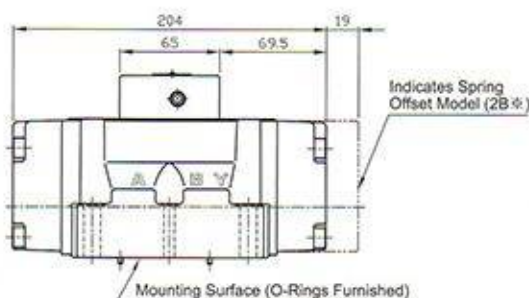
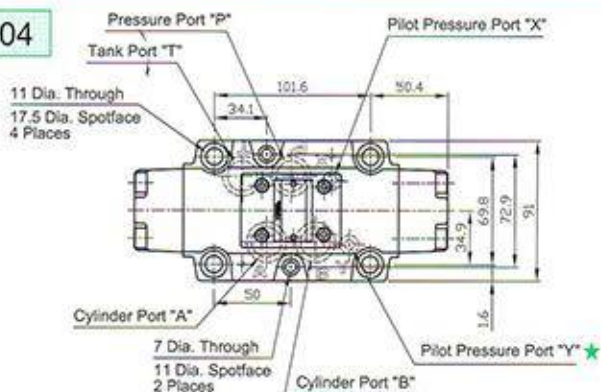
• Sub-plates are available. When ordering, please specify sub-plate model no. from the table above.  
• Please refer to page 97, 98 for dimensions.

### Mounting Bolts (Attachment)

| Valve Model No. | Socket Head Cap Screw | Qty | Tightening Torque N·m (kgf·m) |
|-----------------|-----------------------|-----|-------------------------------|
| DHG-04          | M6 x 45 Lg            | 2   | 12~15 (1.2~1.5)               |
|                 | M10 x 50 Lg           | 4   | 58~72 (5.9~7.3)               |
| DHG-06          | M12 x 60 Lg           | 6   | 100~123 (10.2~12.5)           |
| DHG-10          | M20 x 75 Lg           | 6   | 473~585 (48.2~59.7)           |

# Pilot Operated Directional Valves Max. Pressure 31.5 MPa

## DHG-04

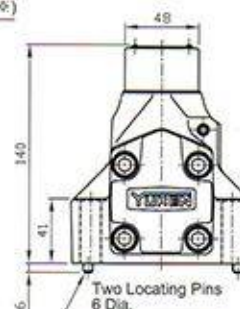
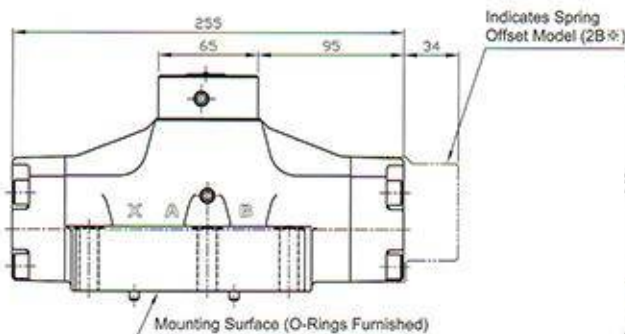
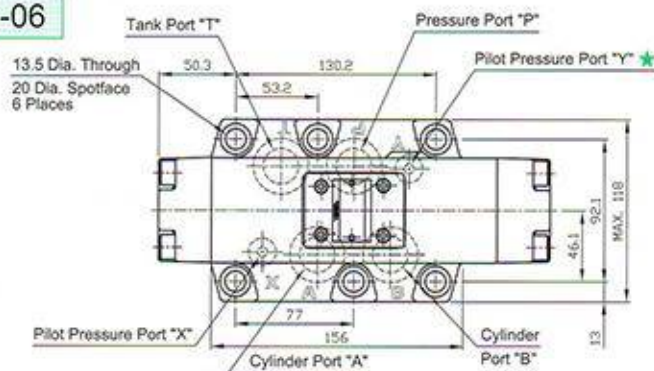


Note: For dimensions of mounting surface, please refer to DHGM-04 type sub-plate (page 97).

Mounting Surface: ISO 4401-AD-07-4-A-80

★ In case of Spring Offset model (2B※)  
 It functions as a drain port.  
 When the model is used, please connect it  
 directly to the reservoir.

## DHG-06



Note: For dimensions of mounting surface, please refer to DHGM-06 type sub-plate (page 98).

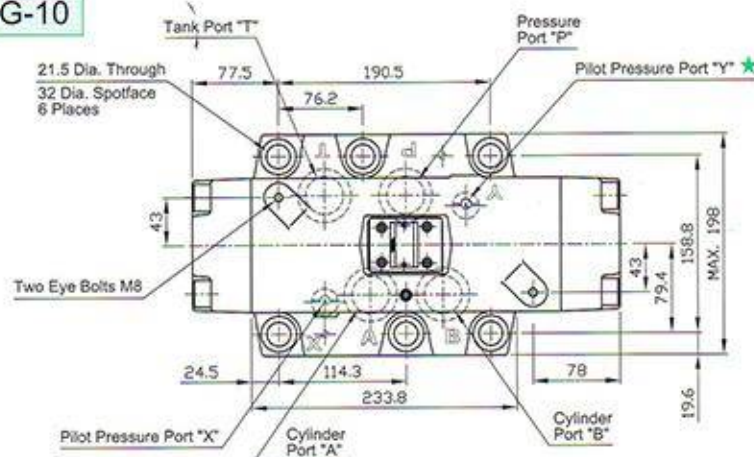
Mounting Surface: ISO 4401-AE-08-4-A-80

★ In case of Spring Offset model (2B※)  
 It functions as a drain port.  
 When the model is used, please connect it  
 directly to the reservoir.

## Pilot Operated Directional Valves

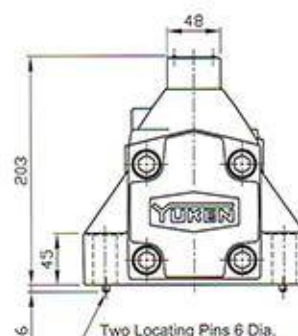
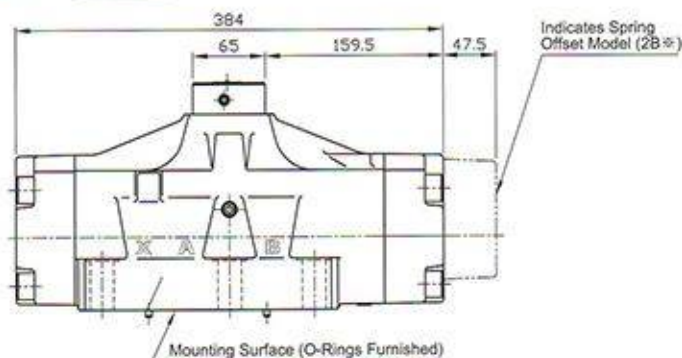
Max. Pressure 31.5 MPa

### DHG-10



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

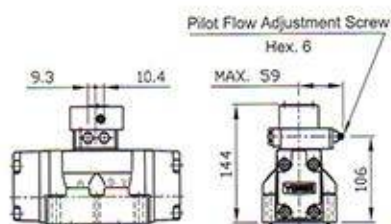
★ In case of Spring Offset model (2B※)  
It functions as a drain port.  
When the model is used, please connect it  
directly to the reservoir.



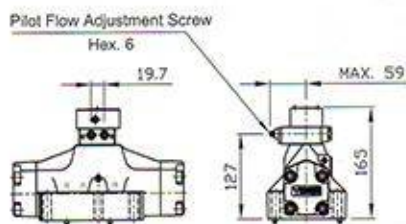
Note: For dimensions of mounting surface, please refer to DHGM-10 type sub-plate (page 98).

### Options with Choke Valves

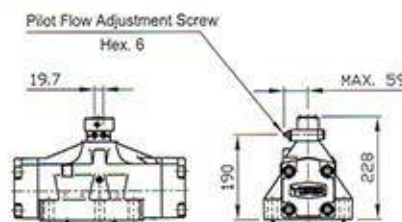
#### DHG-04-※※※-C2



#### DHG-06-※※※-C2



#### DHG-10-※※※-C2

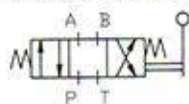


## Manually Operated Directional Valves Max. Pressure 25 MPa

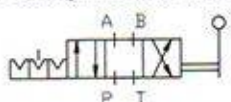


### Graphic Symbol

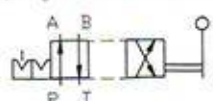
Spring Centered Models 3C※



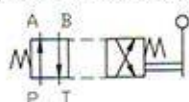
No-Spring Detented Models 3D※



No-Spring Detented Models 2D※



Spring Offset Models 2B※



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

### Specifications

| Valve Size | Model No.     | Max. Flow<br>L/min | Max. Pressure<br>MPa (kgf/cm <sup>2</sup> ) | Max. T-Line<br>Back Pressure<br>MPa (kgf/cm <sup>2</sup> ) | Mass<br>Kg.    |
|------------|---------------|--------------------|---------------------------------------------|------------------------------------------------------------|----------------|
| 3/8        | DM※-03-2B※-50 | 100                | 25<br>( 250 )                               | 16<br>( 160 )                                              | DMT:5<br>DMG:4 |
|            | DM※-03-2D※-50 |                    |                                             |                                                            |                |
|            | DM※-03-3C※-50 |                    |                                             |                                                            |                |
|            | DM※-03-3D※-50 |                    |                                             |                                                            |                |

### Model Number Designation

DM T-03-3C2-50

Series Number  
Type of Connection  
T: Threaded Connection  
G: Sub-plate Mounting  
Valve Size: 03  
Valve Type  
Please refer to left graphic Symbol and page 82.  
Design Number

Note: For other valve types, please contact our sales engineers.

### Sub-plates

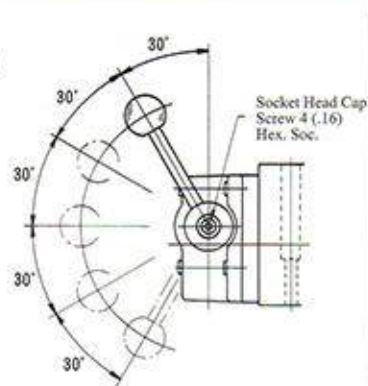
| Valve Model No. | Sub-plate Model No. | Piping Size<br>Rc | Mass<br>kg |
|-----------------|---------------------|-------------------|------------|
| DMG-03          | DSGM-03-40          | 3/8               | 3          |
|                 | DSGM-03X-40         | 1/2               |            |
|                 | DSGM-03Y-40         | 3/4               | 4.7        |

### Mounting Bolts (Attachment)

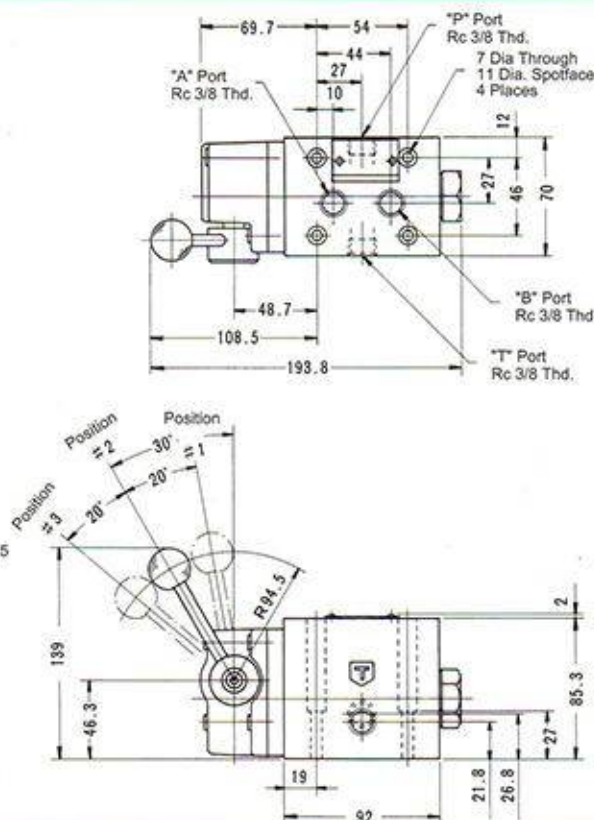
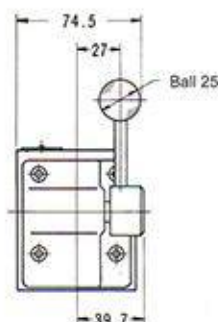
| Model No. | Socket Head Cap Screw | Q'ty | Tightening Torque N·m |
|-----------|-----------------------|------|-----------------------|
| DMG-03    | M6 x 35 Lg            | 4    | 12~15                 |

### DMT-03 How to change lever position

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. Hd. Cap Screw and lever, set the lever at the required position and tighten it with Soc. Hd. Cap Screw firmly.



\* Lever Operating Torque  
Not exceeding 30 N·m (3.06 kgf·m)

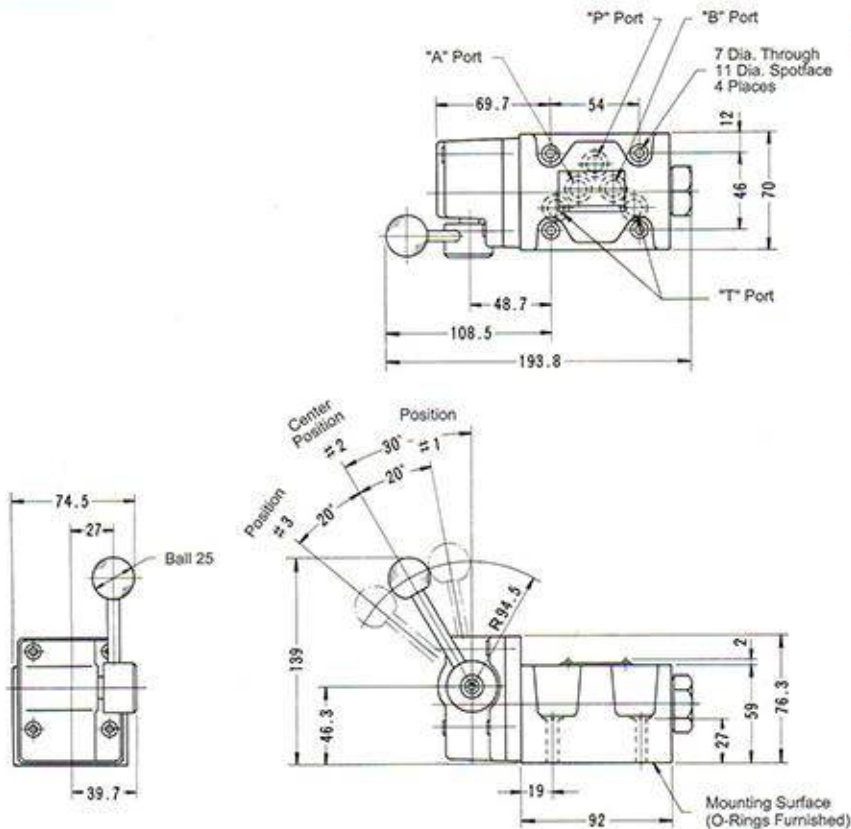


## Manually Operated Directional Valves Max. Pressure 25 MPa

### DMG-03

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

- ★1. The position of operating the lever can be changed as required. For the details, please see the DMT-03 in the previous page.
- ★2. Max. torque of operating the lever:  
30 N·m (3.06 kgf·m)



Note: For dimensions of mounting surface, please refer to the dimensional drawing of the sharable sub-plate (page 91).

## Manually Operated Directional Valves Max. Pressure 25 MPa

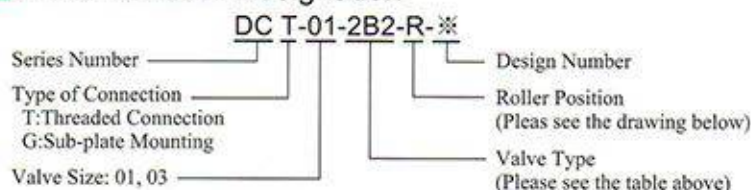


These valves may be used to shift the direction of oil flow by depressing the spool by way of a cam.

### Specifications

| Valve Size | Model No      | Max. Flow L/min | Max. Pressure MPa (kgf/cm <sup>2</sup> ) | Max. T-Line Back Press. MPa (kgf/cm <sup>2</sup> ) | Mass kg |
|------------|---------------|-----------------|------------------------------------------|----------------------------------------------------|---------|
| 1/8        | DCT-01-2B※-40 | 30              | 21 (210)                                 | 7.0 (70)                                           | 1.1     |
|            | DCG-01-2B※-40 |                 |                                          |                                                    |         |
| 3/8        | DCT-03-2B※-50 | 100             | 25 (250)                                 | 10.0 (100)                                         | 4.5     |
|            | DCG-03-2B※-50 |                 |                                          |                                                    | 3.8     |

### Model Number Designation

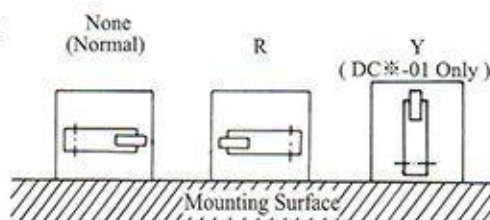


### Valve Type Note: 01 and 03 graphic symbols are different.

| Valve Type | 2B2 | 2B3 | 2B8* |
|------------|-----|-----|------|
| DCG-01     |     |     |      |
| DCT-03     |     |     |      |

\*Valve type 2B8, Tank port "T" functions as a drain port. Please connect it directly to the reservoir (Max. allowable T-line back pressure 0.35 MPa)

### Roller Position



### Mounting Bolts (Attachment)

| Model No. | Socket Head Cap Screw | Q'ty | Tightening Torque N•m (kgf•m) |
|-----------|-----------------------|------|-------------------------------|
| DCT-01    | M5 x 45 Lg            | 2    | 5~7 (0.5~0.7)                 |
| DCG-01    | M5 x 45 Lg            | 4    |                               |
| DCG-03    | M6 x 35 Lg            | 4    | 12~15 (1.2~1.5)               |

※DCT-03 Type is without mounting bolts.

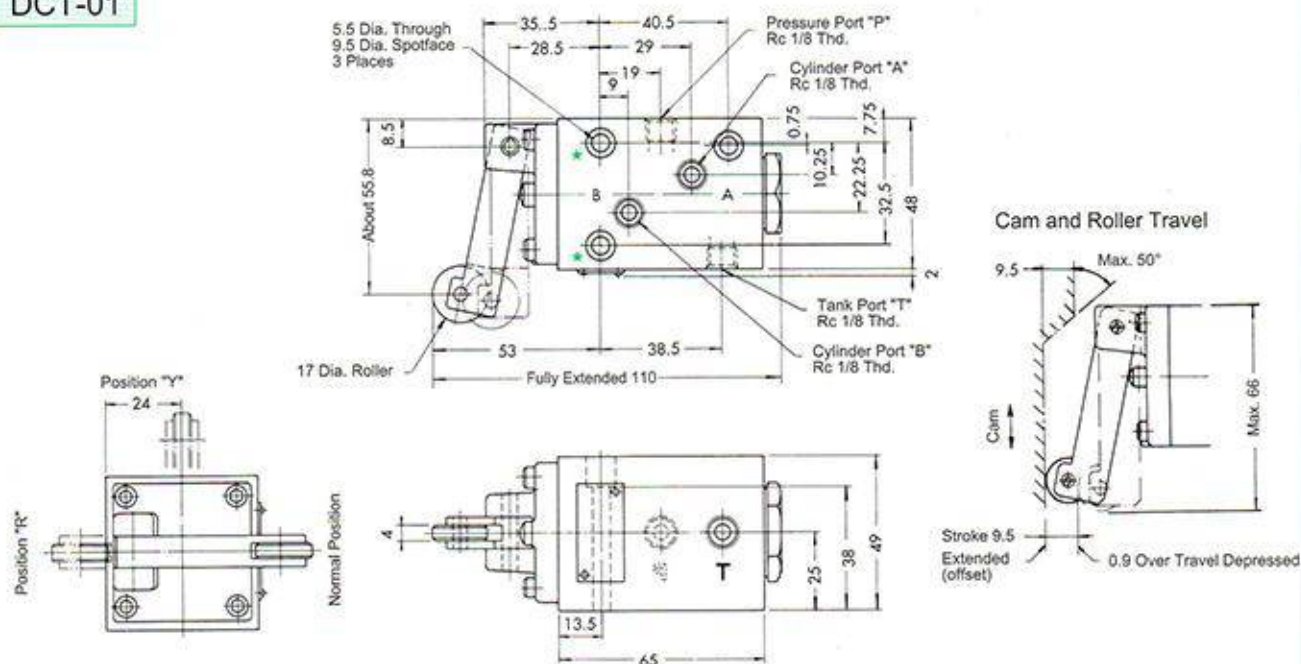
### Sub-plate

| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| DCG-01          | DSGM-01-30          | 1/8            | 0.8     |
|                 | DSGM-01X-30         | 1/4            |         |
|                 | DSGM-01Y-30         | 3/8            |         |
| DCG-03          | DSGM-03-40          | 3/8            | 3       |
|                 | DSGM-03X-40         | 1/2            | 3       |
|                 | DSGM-03Y-40         | 3/4            | 4.7     |

• When ordering sub-plate, please specify sub-plate model no. from the table above.  
• Please refer to page 88 (DSGM-01) and page 91 (DSGM-03) for dimensions.

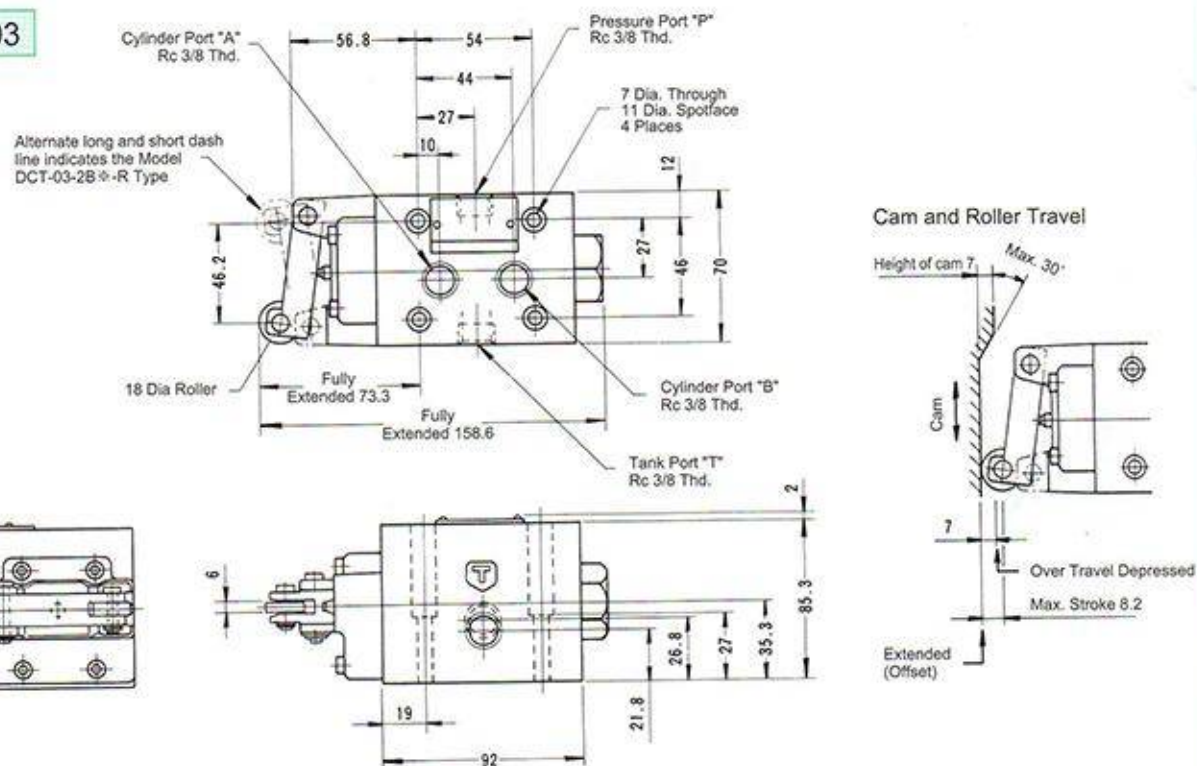
## Mechanically Operated Directional Valves Max. Pressure 25 MPa

### DCT-01



Note: When mounting the valve, be sure to use the two mounting holes marked with ★

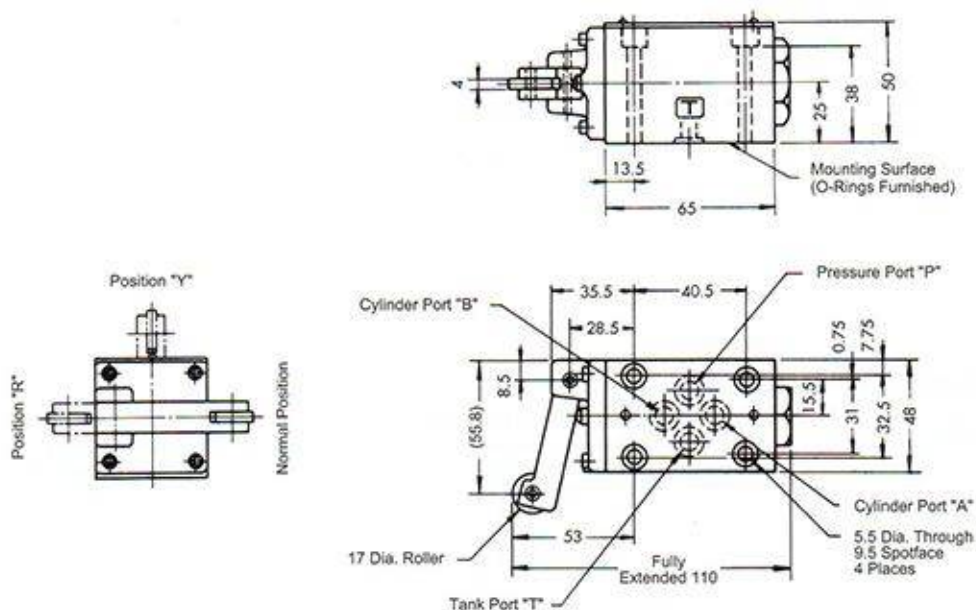
### DCT-03



**Mechanically Operated Directional Valves Max. Pressure 25 MPa**

**DCG-01**

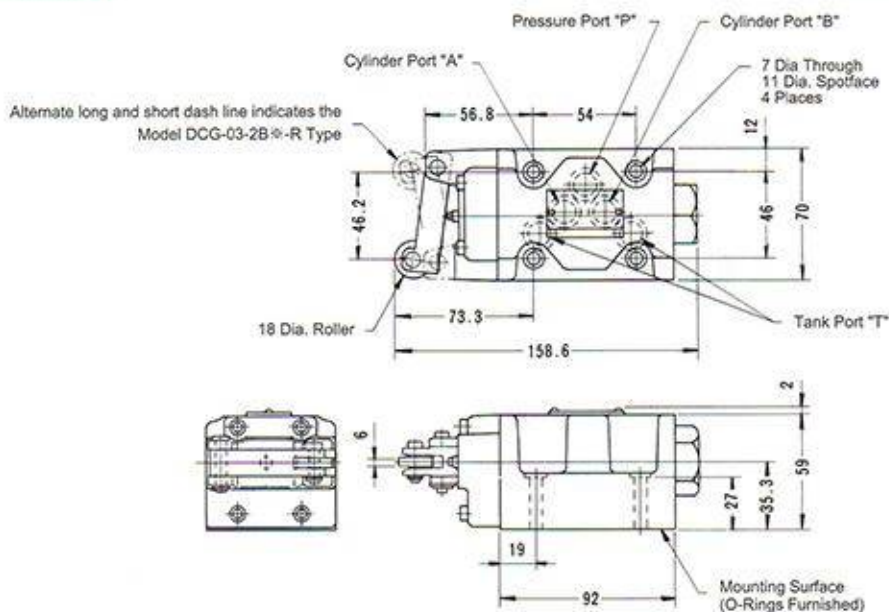
Mounting Surface:ISO 4401-AB-03-4-A



Note:1. For the cam and roller travel, please refer to DCT-01 in the previous page.  
2. For the valve's mounting surface dimensions, please refer to DSGM-01 type sub-plate (page 88).

**DCG-03**

Mounting Surface:ISO 4401-AC-05-4-A-80



Note:1. For the cam and roller travel, please refer to DCT-03 in the previous page.  
2. For the valve's mounting surface dimensions, please refer to DSGM-03 type sub-plate (page 91).

## Mechanically Operated Directional Valves with Monitoring Switch-DCGS

Max. Pressure 25 MPa



- The monitoring switch can monitor the spool shifting to make sure the safety door open or close correctly.
- The monitoring switch is secluded from the outside circumstance and will not be influenced by the pollution.
- Degree of protection is IP 65.
- It will not be interfered by the external magnetic field.

### Specifications

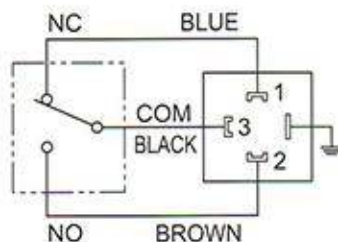
| Valve size | Model No.      | Max. Flow L/min | Max. Pressure MPa | Max. T-Line Back Pressure MPa | Mass kg |
|------------|----------------|-----------------|-------------------|-------------------------------|---------|
| 1/8        | DCGS-01-2B※-40 | 30              | 21                | 5                             | 1.8     |
|            | DCTS-01-2B※-40 |                 |                   |                               | 1.8     |
| 3/8        | DCGS-03-2B※-50 | 100             | 25                | 5                             | 3.4     |
|            | DCTS-03-2B※-50 |                 |                   |                               | 4.7     |

### Monitoring Switch Specification

| Rated Voltage (V) ± 10%   | Load available (A) | Life time (Cycle)                                          |
|---------------------------|--------------------|------------------------------------------------------------|
| AC 125<br>AC 250<br>DC 24 | 0.08 ~ 0.2         | 3 x 10 <sup>6</sup><br>( Operating frequency 30 cycle/min) |

- ※ 1. Max. changeover frequency :60 cycle/min.  
2. Ambient temperature: 0 ~ 70°C, under 60%RH.  
3. When DC current controlled, please use surge absorber to control the circuit.

### Mounting Switch Wiring Diagram



### Mounting Switch Movement Range

| Item | Spool Position |           |           |
|------|----------------|-----------|-----------|
|      | Switching      | Crossover | Returning |
| NO   |                |           |           |
| NC   |                |           |           |

### Mounting Bolts (Attachment)

| Model No. | Socket Head Cap. Screw | Tightening Torque |
|-----------|------------------------|-------------------|
| DCGS-01   | M5 x 45L 4 Pcs         | 5~7 N·m           |
| DCTS-01   | M5 x 45L 2 Pcs         |                   |
| DCGS-03   | M6 x 35L 4 Pcs         | 12~15 N·m         |

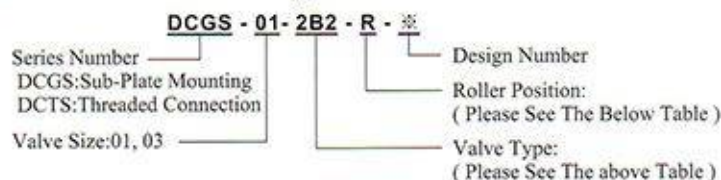
DCTS-03 type is without mounting bolts

### Model No. Note: 01 and 03 graphic symbols are different

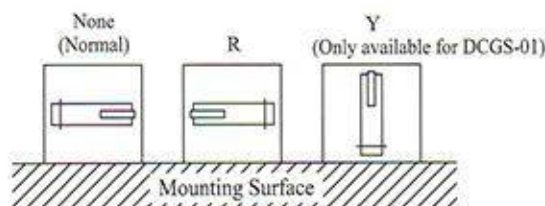
| Valve Type | 2B2 | 2B3 | 2B8 ★ |
|------------|-----|-----|-------|
| DCGS-01    |     |     |       |
| DCTS-01    |     |     |       |
| DCGS-03    |     |     |       |
| DCTS-03    |     |     |       |

★2B8 Type: Tank port "T" functioned as a drain port and connect it directly to the reservoir.  
(Max. allowable T-line back pressure: 0.35 MPa)

### Model Number Designation



### Roller Position



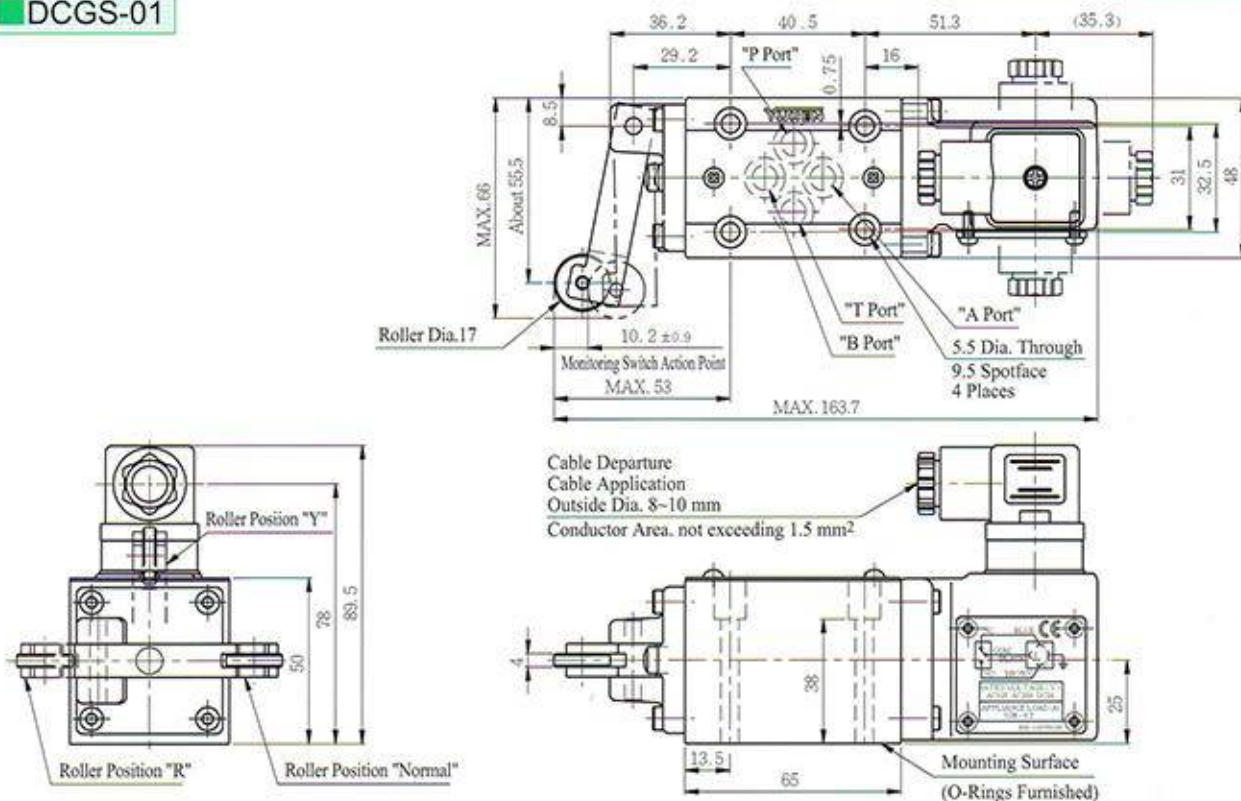
# Mechanically Operated Directional Valves with Monitoring Switch-DCGS

Max. Pressure 25 MPa

D

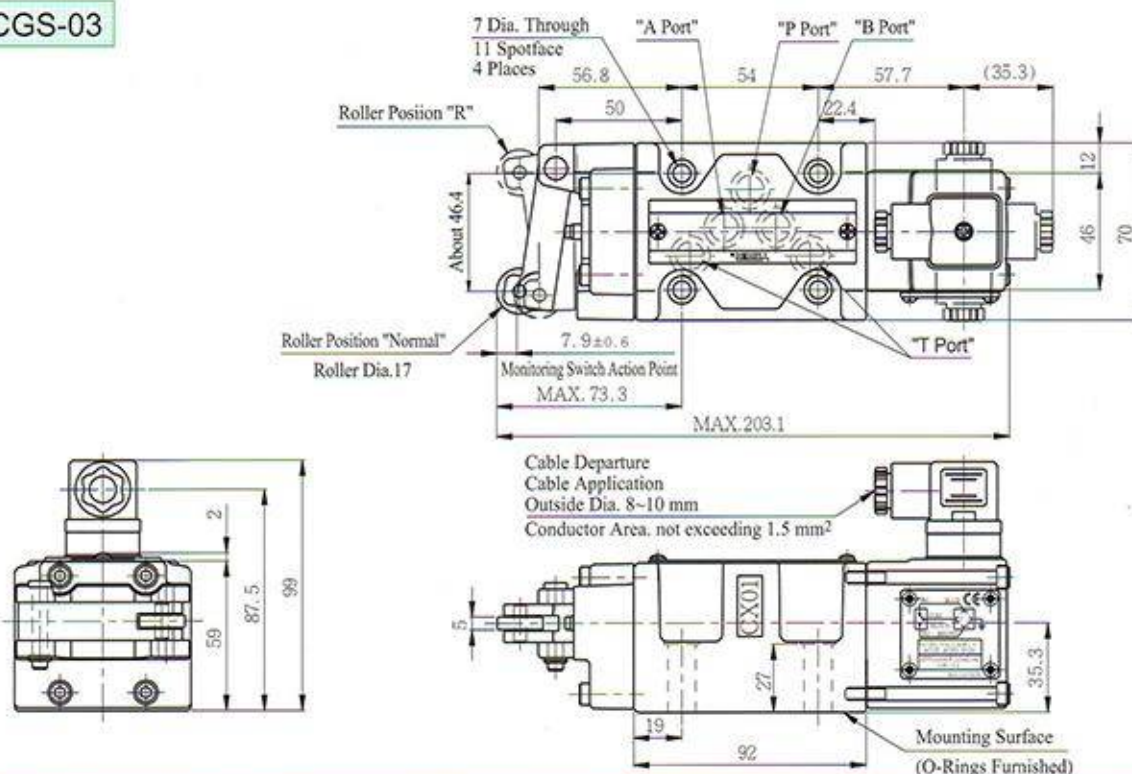
## DCGS-01

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



## DCGS-03

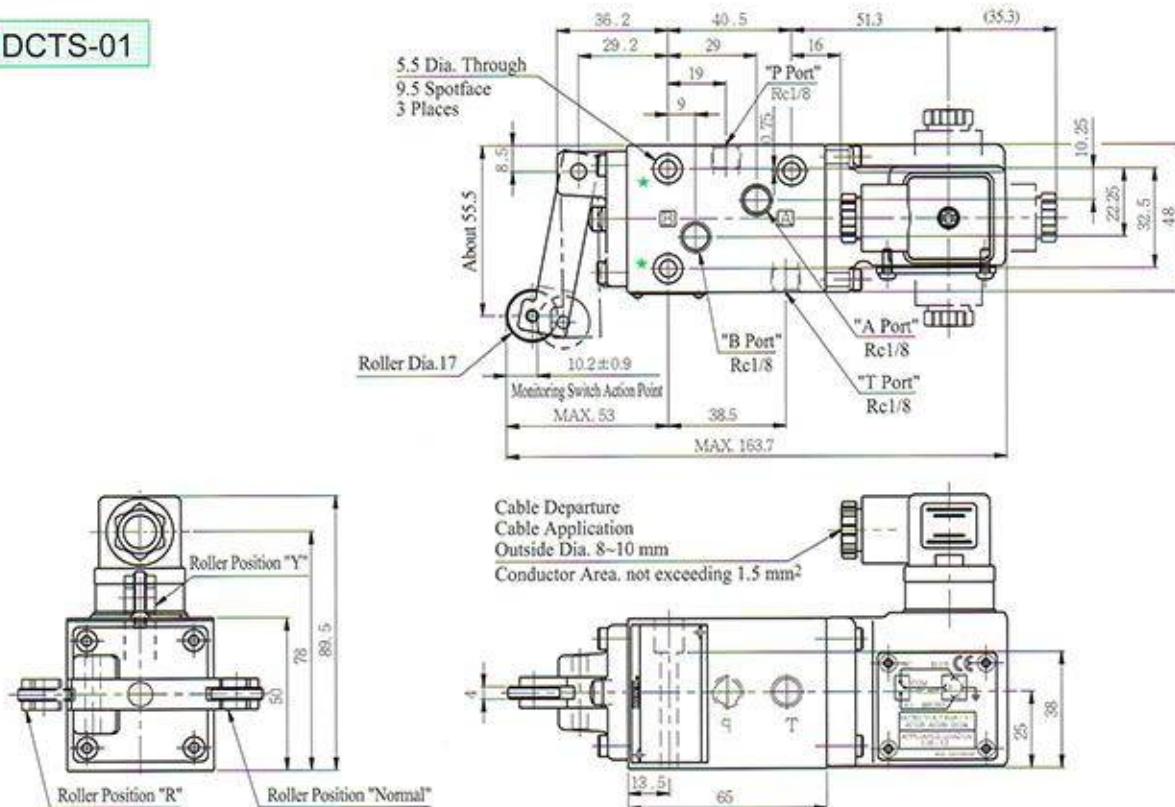
Mounting Surface:ISO 4401-AC-05-4-A



## Mechanically Operated Directional Valves with Monitoring Switch-DCGS

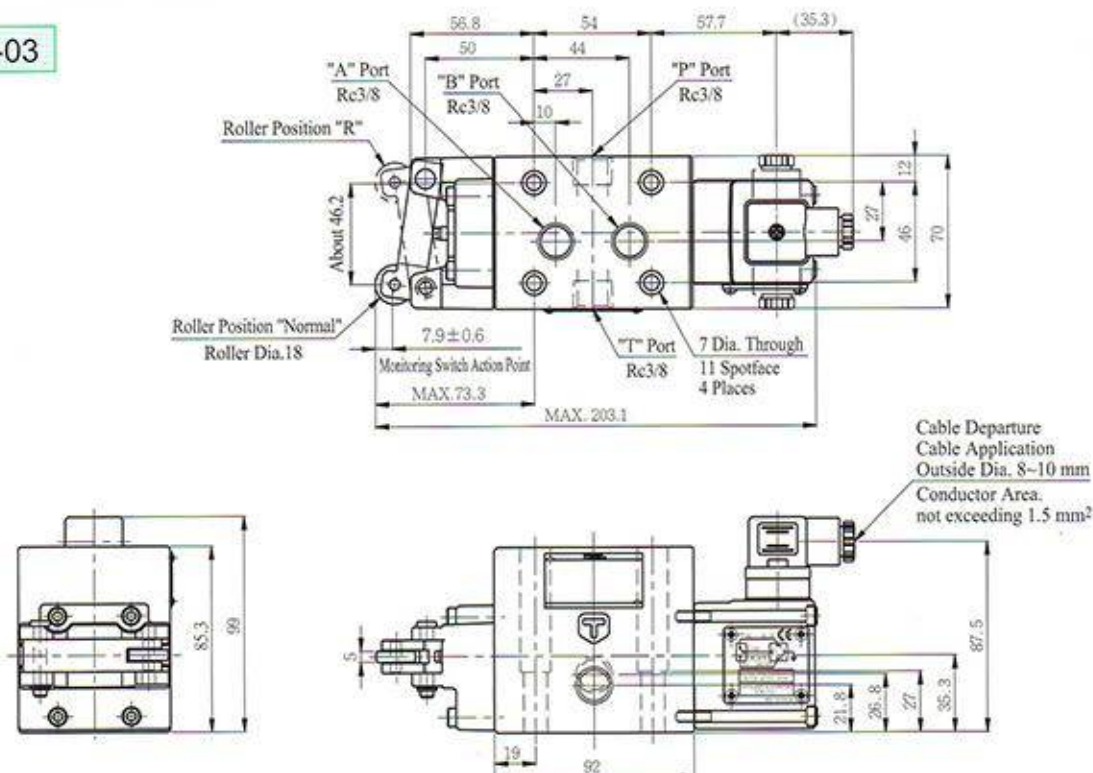
Max. Pressure 25 MPa

### DCTS-01



Note: When mounting the valve, make sure to use two mounting holes marked with ★

### DCTS-03



# Logic Valve With Monitoring Switch

Max. Pressure 30 MPa



- The Limits Switch is connected to the poppet to monitor the open and close position of the logic valve
- Upon the poppet opening, we can sense the signal immediately.
- The poppet has the cushion function and low shocking of the shifting movement.
- Water-proof, Dust-proof IP 65

## Model Number Designation

|                                    |      |                    |    |                                              |    |                      |   |                             |   |                           |    |
|------------------------------------|------|--------------------|----|----------------------------------------------|----|----------------------|---|-----------------------------|---|---------------------------|----|
| Series No.                         | LDLS | Valve Size         | 16 | Cracking Pressure MPa (kgf/cm <sup>2</sup> ) | 05 | Design No.           | 1 | Monitoring Switch Connector | 1 | Monitoring Switch Contact | 20 |
| LDLS:                              |      | 16, 25, 32, 40, 50 |    | None : Without spring                        |    | 1:N.O (Normal Open)  |   |                             |   |                           |    |
| Logic valve with Monitoring Switch |      |                    |    | 05 : 0.05 (0.5)                              |    | 2:N.C (Normal Close) |   |                             |   |                           |    |
|                                    |      |                    |    | 20 : 0.2 (2)                                 |    |                      |   |                             |   |                           |    |
|                                    |      |                    |    | 35 : 0.35 (3.5)                              |    |                      |   |                             |   |                           |    |

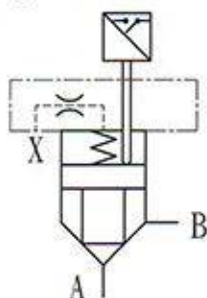
\* Location of orifice X Pilot port  
None : No orifice (standard)  
X08 : Designation of orifice ø0.8  
X10 : Designation of orifice ø1.0  
X12 : Designation of orifice ø1.2  
X14 : Designation of orifice ø1.4  
X16 : Designation of orifice ø1.6  
X18 : Designation of orifice ø1.8  
X20 : Designation of orifice ø2.0  
X25 : Designation of orifice ø2.5

## Specifications

| Model No.    | Rated Flow L/min | Cracking Pressure MPa (kgf/cm <sup>2</sup> )             | Max. Operating Pressure MPa (kgf/cm <sup>2</sup> ) | Mass (kg) With mounting Bolts |
|--------------|------------------|----------------------------------------------------------|----------------------------------------------------|-------------------------------|
| LDLS-16-※-20 | 130              | 05 : 0.05 ( 0.5 )<br>20 : 0.2 ( 2 )<br>35 : 0.35 ( 3.5 ) | 30 ( 306 )                                         | 2.1                           |
| LDLS-25-※-20 | 350              |                                                          |                                                    | 3.5                           |
| LDLS-32-※-20 | 500              |                                                          |                                                    | 5.0                           |
| LDLS-40-※-20 | 850              |                                                          |                                                    | 9.0                           |
| LDLS-50-※-20 | 1400             |                                                          |                                                    | 14.1                          |

Note : 1. Rated flow : at the valves of no spring type and the pressure drop of 0.3 MPa, .  
2. The actual pressure drop please refer to the following page, flow vs pressure drop curve

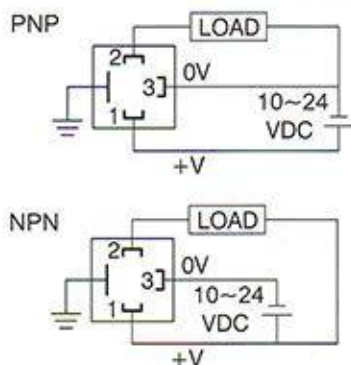
## Graphic Symbol



## Mounting Switch Movement Range

|                            |                     | Logic Valve Poppet Position |                  |             |
|----------------------------|---------------------|-----------------------------|------------------|-------------|
|                            |                     | Poppet Close                | Cushion Position | Poppet Open |
| Monitoring Switch Movement | N.O. (Normal Open)  |                             |                  |             |
|                            | N.C. (Normal Close) |                             |                  |             |

## Mounting Switch Wiring Diagram



## Mounting Bolts

| Model No. | Socket Head Cap Screw | Q'ty | Tightening Torque N·m |
|-----------|-----------------------|------|-----------------------|
| LDLS-16   | M8 x 50L              | 4    | 31 ~ 38               |
| LDLS-25   | M12 x 55L             | 4    | 104 ~ 127             |
| LDLS-32   | M16 x 60L             | 4    | 253 ~ 310             |
| LDLS-40   | M20 x 70L             | 4    | 493 ~ 603             |
| LDLS-50   | M20 x 90L             | 4    | 493 ~ 603             |

## Monitoring Switch Specifications

| Rated Voltage (V) | Load Available (A) |
|-------------------|--------------------|
| DC10-30V          | MAX. 200 mA        |

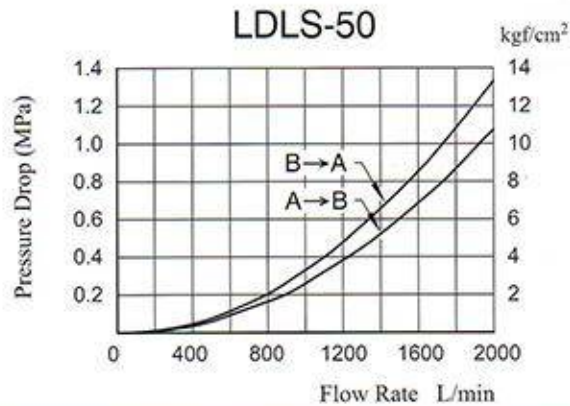
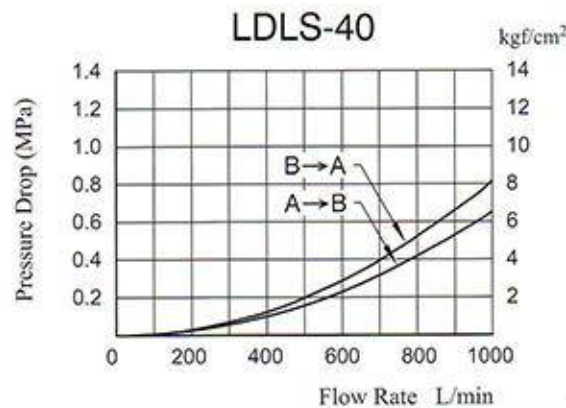
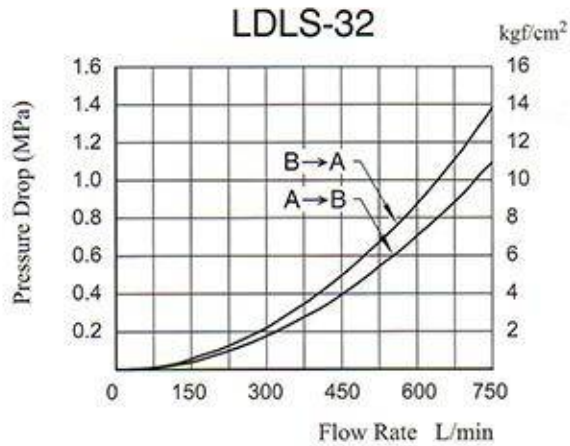
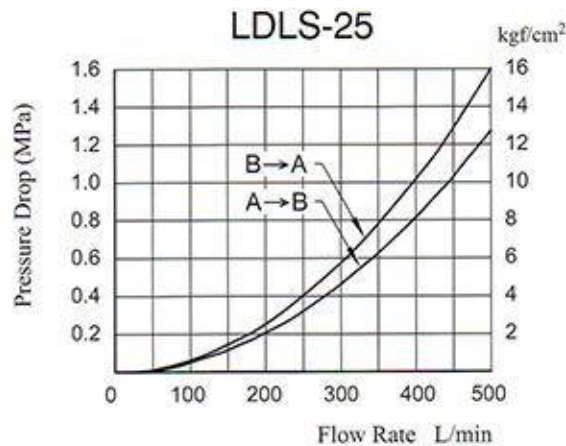
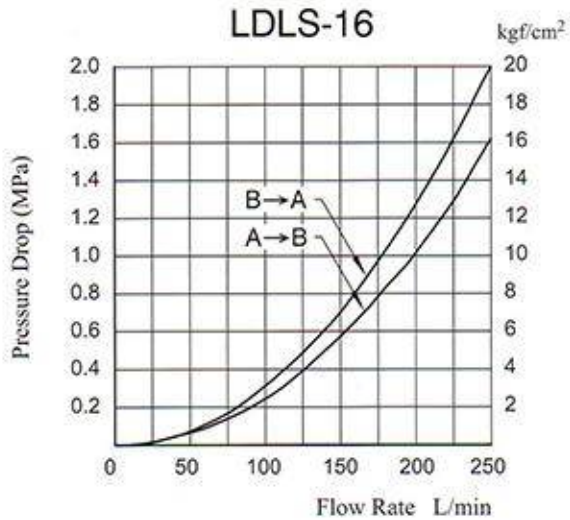
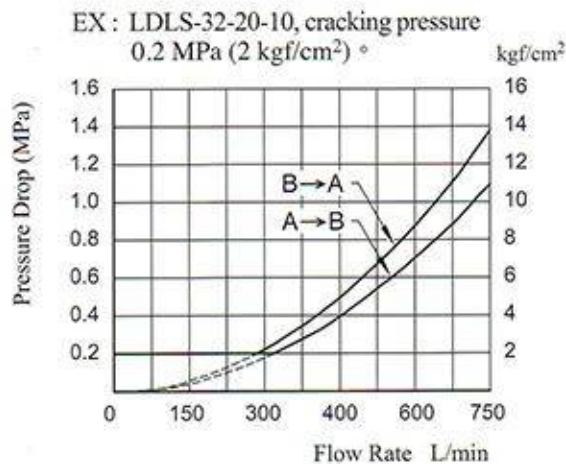
Note : 1. Switching Frequency 1000HZ  
2. Ambient Temperature Range -25~70°C  
3. When DC current is controlled, please use surge absorber to control the circuit.

# Logic Valve With Monitoring Switch

Max. Pressure 30 MPa

## LDLS -※ Flow vs Pressure Drop Curve (ISO VG46 Oils, 50°C. Fluid Viscosity 35 cSt)

This pressure drop curve is based on non-spring type, if select the cracking pressure of 05, 20, 35, the pressure drop under the cracking pressure is as same as the cracking pressure

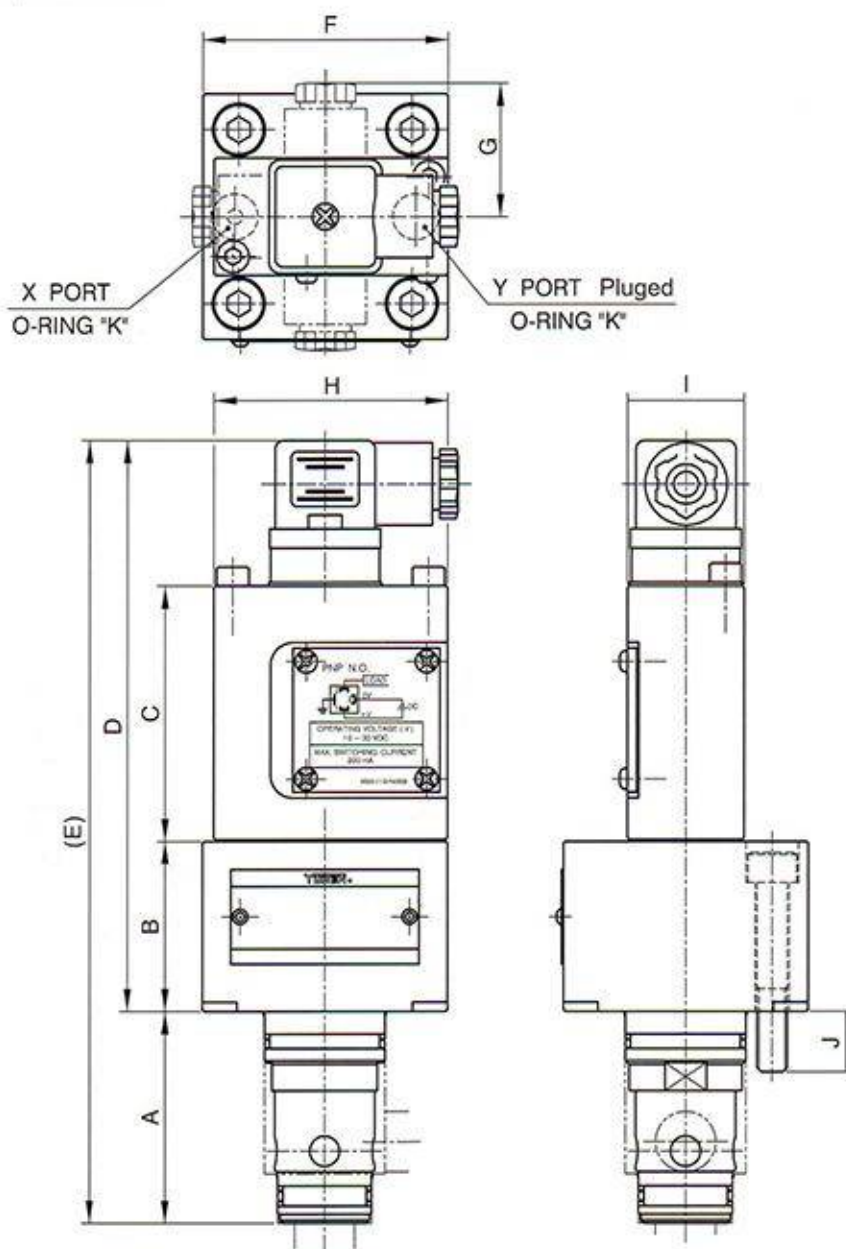


# Logic Valve With Monitoring Switch

Max. Pressure 30 MPa

**D**

## LDLS - ※ Dimensions



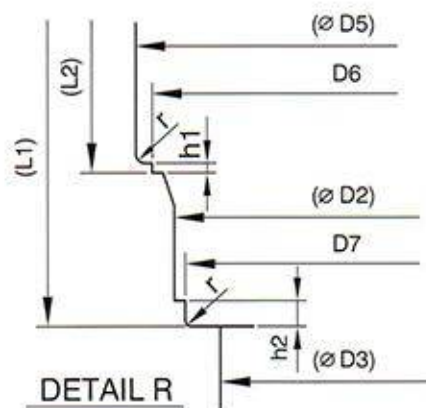
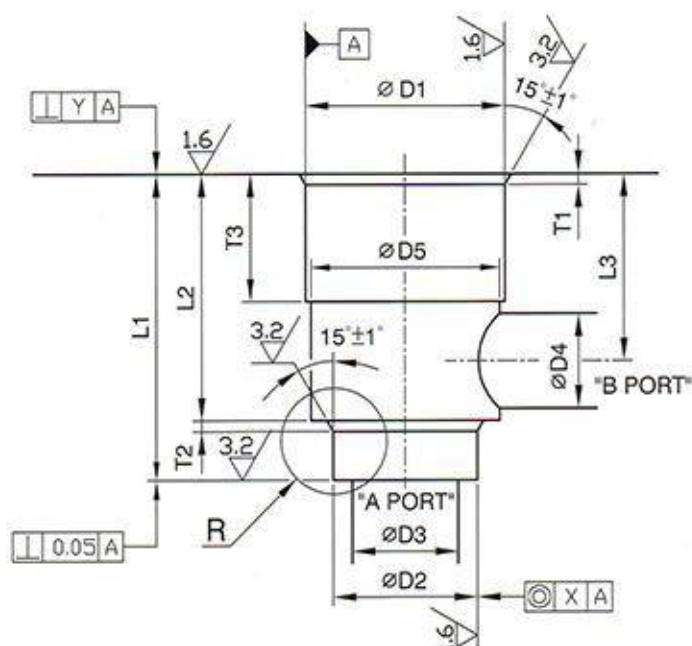
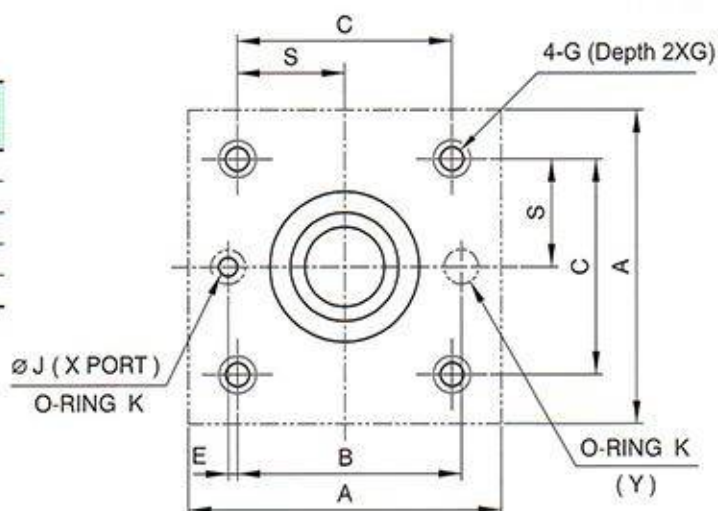
| Model No. | A   | B  | C    | D   | E   | F   | G  | H  | I  | J  | K         |
|-----------|-----|----|------|-----|-----|-----|----|----|----|----|-----------|
| LDLS-16   | 56  | 45 | 67.5 | 106 | 207 | 65  | 36 | 62 | 31 | 16 | SO-NB-P9  |
| LDLS-25   | 72  | 50 |      | 156 | 228 | 85  |    |    |    | 20 | SO-NB-P9  |
| LDLS-32   | 85  | 52 |      | 158 | 243 | 102 |    |    |    | 24 | SO-NB-P11 |
| LDLS-40   | 105 | 65 |      | 171 | 276 | 127 |    |    |    | 33 | SO-NB-P14 |
| LDLS-50   | 122 | 82 |      | 188 | 310 | 142 |    |    |    | 37 | SO-NB-P14 |

## Logic Valve With Monitoring Switch

Max. Pressure 30 MPa

### LDLS - ※ Mounting Dimensions

| Model No. | A<br>+1<br>+0 | B<br>±0.2 | C<br>±0.2 | S<br>±0.2 | E<br>±0.2 | G   | J  | K   |
|-----------|---------------|-----------|-----------|-----------|-----------|-----|----|-----|
| LDLS-16   | 65            | 47        | 46        | 23        | 1         | M8  | 4  | P9  |
| LDLS-25   | 85            | 62        | 58        | 29        | 4         | M12 | 6  | P9  |
| LDLS-32   | 102           | 76        | 70        | 35        | 6         | M16 | 8  | P11 |
| LDLS-40   | 125           | 92.5      | 85        | 42.5      | 7.5       | M20 | 10 | P14 |
| LDLS-50   | 140           | 108       | 100       | 50        | 8         | M20 | 10 | P14 |



| Model No. | L1             |            | L2             |            | L3<br>±0.3 |
|-----------|----------------|------------|----------------|------------|------------|
|           | Base dimension | Allowance  | Base dimension | Allowance  |            |
| LDLS-16   | 56             | +0.1<br>+0 | 43             | +0.1<br>+0 | 34         |
| LDLS-25   | 72             |            | 58             |            | 44         |
| LDLS-32   | 85             |            | 70             |            | 52         |
| LDLS-40   | 105            |            | 87             |            | 64         |
| LDLS-50   | 122            |            | 100            |            | 72         |

| Model No. | D1                |              | D2                |              | D3 | D4 | D5<br>Min. | D6   | D7<br>Min. | T1   | T2  | T3<br>+0.5<br>+0 | h1  | h2     | r<br>Max. | X    | Y    |
|-----------|-------------------|--------------|-------------------|--------------|----|----|------------|------|------------|------|-----|------------------|-----|--------|-----------|------|------|
|           | Base<br>dimension | Allowance    | Base<br>dimension | Allowance    |    |    |            |      |            |      |     |                  |     |        |           |      |      |
| LDLS-16   | 32                | +0.039<br>+0 | 25                | +0.033<br>+0 | 16 |    | 31.5       | 28.5 | 24.6       | 2    | 2   | 20               | 0.2 | 2      | 0.8       | 0.03 | 0.05 |
| LDLS-25   | 45                |              | 34                | +0.039<br>+0 | 25 |    | 44.5       | 39.5 | 33.6       | 2.5  | 2.5 | 30               |     |        |           |      |      |
| LDLS-32   | 60                | +0.046       | 45                | +0.046<br>+0 | 32 |    | 59.5       | 52.5 | 44.6       | 2.5  | 2.5 | 30               | 0.3 | 3<br>5 |           |      | 0.05 |
| LDLS-40   | 75                | +0           | 55                |              | 40 |    | 74         | 65   | 54.6       | 3    | 3   | 30               |     |        |           |      |      |
| LDLS-50   | 90                | +0.054<br>+0 | 68                |              | +0 | 50 |            | 89   | 75         | 67.6 | 3   | 3                |     |        | 35        |      |      |

## Check Valves

Max. Pressure 21 MPa



CIT Type



CRG Type

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.

### Specifications

| Valve Size | Model No.           |                    | Rated Flow<br>L/min | Cracking Pressure<br>MPa (kgf/cm <sup>2</sup> ) | Mass kg             |                    |
|------------|---------------------|--------------------|---------------------|-------------------------------------------------|---------------------|--------------------|
|            | Threaded Connection | Sub-plate Mounting |                     |                                                 | Threaded Connection | Sub-plate Mounting |
| 3/8        | CIT-03-※-30T        | -                  | 30                  | 0.05 (0.5)                                      | 0.18                | -                  |
| 3/4        | CIT-06-※-30T        | -                  | 80                  | 0.2 (2)                                         | 0.65                | -                  |
| 1-1/4      | CIT-10-※-30T        | -                  | 200                 | 0.35 (3.5)                                      | 2.1                 | -                  |
| 3/8        | CRT-03-※-31         | CRG-03-※-30        | 30                  | 0.50 (5)                                        | -                   | -                  |
| 3/4        | CRT-06-※-31         | CRG-06-※-30        | 100                 | 0.2 (2)                                         | 0.8                 | 2.3                |
| 1-1/4      | CRT-10-※-30         | CRG-10-※-30        | 250                 | 0.35 (3.5)                                      | 1.6                 | 4.1                |
|            |                     |                    |                     | 0.5 (5)                                         | 5.5                 | 7.8                |

\* There is 50T design for CRG series, that is ISO 5781 mounting dimension, Please contact our sales people for details.

### Model Number Designation

|                                                                       |            |             |                                                                   |
|-----------------------------------------------------------------------|------------|-------------|-------------------------------------------------------------------|
| Series Number<br>CI: In-Line Check Valve                              | CI         | T-03-05-30T | Design Number                                                     |
| Type of Connection<br>T: Threaded Connection                          | T          |             | Cracking Pressure<br>CIT                                          |
| Valve Size<br>03, 06, 10                                              | 03, 06, 10 |             | 05 : 0.05 Mpa<br>20 : 0.20 Mpa<br>35 : 0.35 Mpa<br>50 : 0.50 Mpa  |
| Series Number<br>CR: Right Angle Check Valve                          | CR         | T-03-5-※    | Design Number                                                     |
| Type of Connection<br>T: Threaded Connection<br>G: Sub-plate Mounting | T, G       |             | Cracking Pressure<br>CRG                                          |
| Valve Size                                                            | 03, 06, 10 |             | 05 : 0.035 Mpa<br>30 : 0.20 Mpa<br>50 : 0.35 Mpa<br>75 : 0.50 Mpa |

### Sub-plate

| Valve Model No. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| CRG-03          | CRGM-03-30          | Rc 3/8         | 0.9     |
| CRG-06          | CRGM-06-30          | Rc 3/4         | 2.7     |
| CRG-10          | CRGM-10-30          | Rc 1-1/4       | 6.6     |

Sub-plates are available. When ordering, please specify sub-plate model no. from the table above. For dimension of the sub-plate, please see page 114.

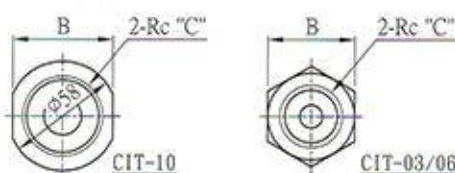
### Mounting Bolts (Attachment)

| Model No. | Socket Head Cap Screw | Q'ty | Tightening Torque N·m |
|-----------|-----------------------|------|-----------------------|
| CRG-03    | M10 x 60Lg            | 4    | 60 ~ 74               |
| CRG-06    | M16 x 60Lg            | 4    | 253 ~ 310             |
| CRG-10    | M20 x 75Lg            | 4    | 493 ~ 603             |

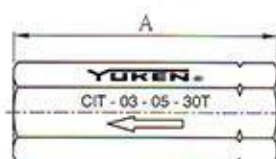
### Graphic Symbol



### CIT-03, 06, 10

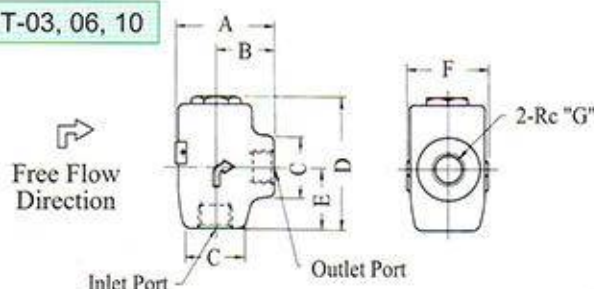


Free Flow Direction



| Model No. | A   | B  | C     |
|-----------|-----|----|-------|
| CIT-03    | 70  | 23 | 3/8   |
| CIT-06    | 90  | 35 | 3/4   |
| CIT-10    | 133 | 53 | 1-1/4 |

### CRT-03, 06, 10

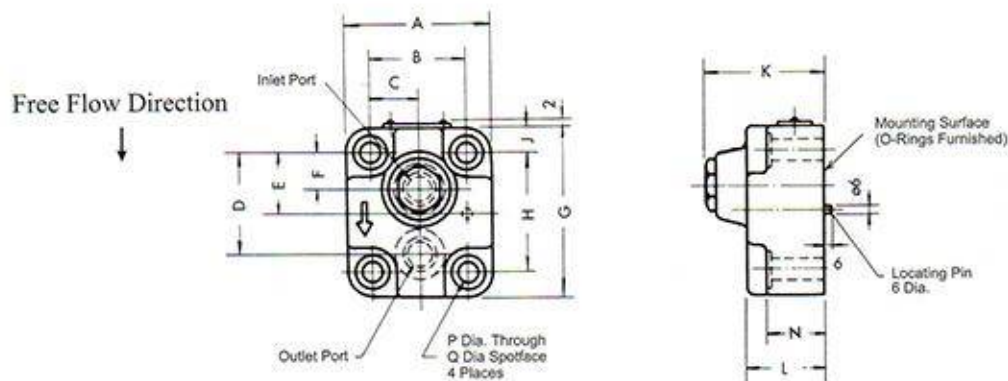


| Model No. | A    | B  | C   | D   | E  | F  | G     |
|-----------|------|----|-----|-----|----|----|-------|
| CRT-03    | 59   | 36 | ø36 | 78  | 33 | 47 | 3/8   |
| CRT-06    | 74.5 | 47 | ø45 | 106 | 51 | 57 | 3/4   |
| CRT-10    | 105  | 65 | ø80 | 126 | 62 | 83 | 1-1/4 |

## Check Valves

Max. Pressure 21 MPa

CRG-03, 06, 10

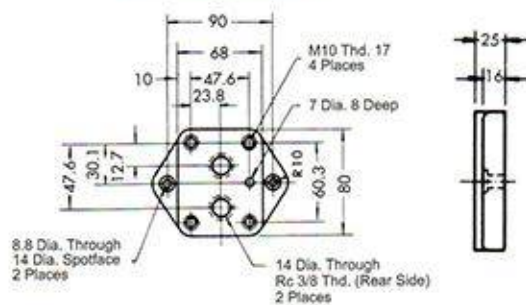


| Model No. | A   | B    | C    | D    | E    | F    | G   | H    | J    | K  | L  | N  | P    | Q    |
|-----------|-----|------|------|------|------|------|-----|------|------|----|----|----|------|------|
| CRG-03    | 68  | 47.6 | 23.8 | 47.6 | 30.1 | 12.7 | 80  | 60.3 | 10   | 72 | 55 | 46 | 11   | 17.5 |
| CRG-06    | 98  | 65.1 | 32.6 | 68.2 | 40.5 | 22.2 | 114 | 80.9 | 16.5 | 81 | 53 | 38 | 17.5 | 26   |
| CRG-10    | 130 | 92.1 | 46.1 | 71.4 | 46   | 20.6 | 130 | 92.1 | 19   | 96 | 65 | 47 | 21.5 | 32   |

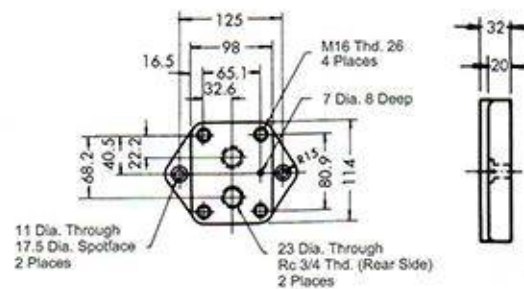
Note: For dimensions of valve's mounting surface, please refer to the diagram below.

### Sub-plate

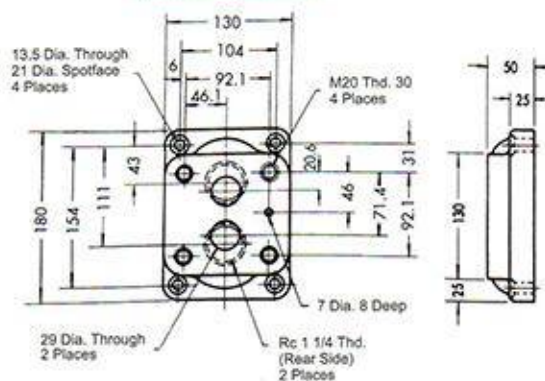
CRGM-03-30



CRGM-06-30



CRGM-10-30



## Pilot Controlled Check Valves

Max. Pressure 25 MPa



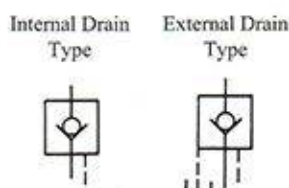
These check valves allow free flow in one direction and prevent reverse flow in the reverse direction until operated by a pilot pressure to allow free reverse flow. The specified cracking pressure is required to open the valve to allow free flow direction.

### Specifications

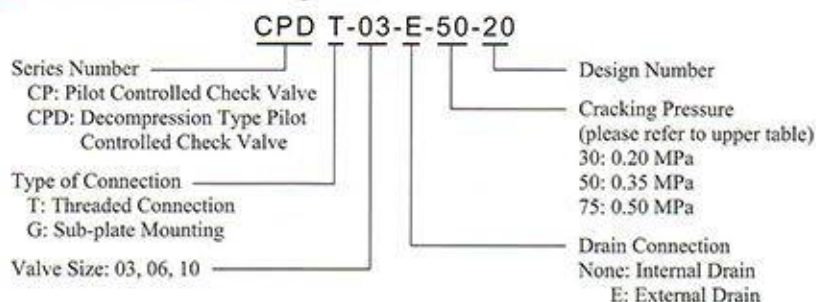
| Valve Size | Model No.           |                    | Rated Flow L/min | Cracking Pressure MPa (kgf/cm <sup>2</sup> ) | Mass kg  |           |
|------------|---------------------|--------------------|------------------|----------------------------------------------|----------|-----------|
|            | Threaded Connection | Sub-plate Mounting |                  |                                              | Threaded | Sub-Plate |
| 3/8        | CP※T-03-※-※-20      | CP※G-03-※-※-20     | 50               | 0.20 (2)                                     | 3.4      | 4.5       |
| 3/4        | CP※T-06-※-※-20      | CP※G-06-※-※-20     | 125              | 0.35 (3.5)                                   | 5.2      | 7         |
| 1-1/4      | CP※T-10-※-※-20      | CP※G-10-※-※-20     | 315              | 0.50 (5)                                     | 11.6     | 12        |

D

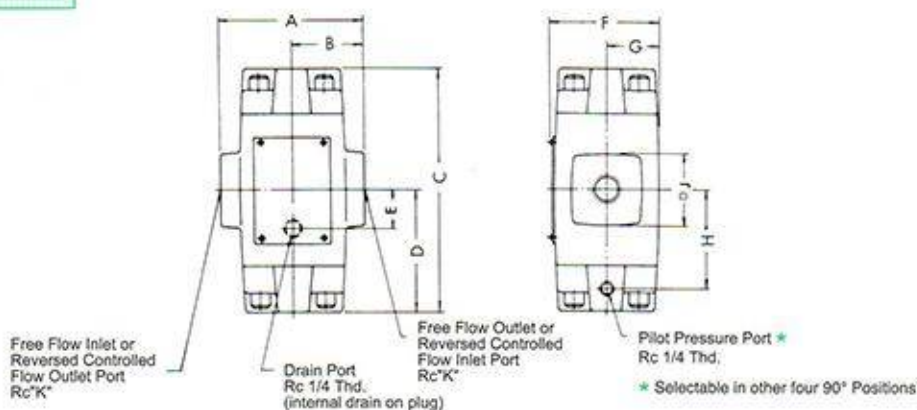
### Graphic Symbol



### Model Number Designation



CPT -03, 06, 10  
CPDT



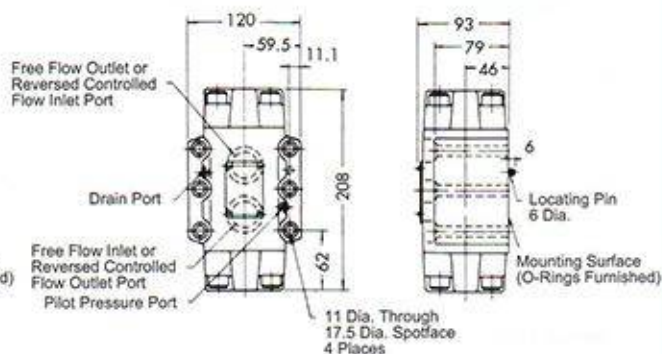
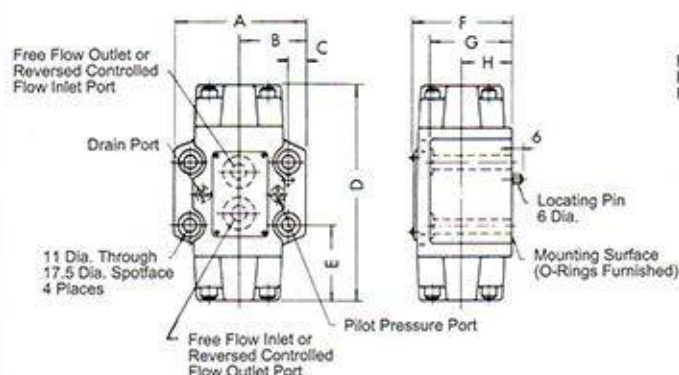
| Model No. | A   | B  | C   | D   | E  | F  | G  | H  | J  | K     |
|-----------|-----|----|-----|-----|----|----|----|----|----|-------|
| CP※T-03   | 80  | 40 | 144 | 72  | 21 | 66 | 32 | 58 | 36 | 3/8   |
| CP※T-06   | 96  | 48 | 168 | 84  | 26 | 78 | 38 | 70 | 60 | 3/4   |
| CP※T-10   | 140 | 70 | 208 | 104 | 35 | 92 | 45 | 84 | 79 | 1-1/4 |

## Pilot Controlled Check Valves

Max. Pressure 25 MPa

CPG  
CPDG -03, 06

CPG  
CPDG -10



| Model No. | A   | B    | C    | D   | E    | F  | G  | H  |
|-----------|-----|------|------|-----|------|----|----|----|
| CPG-G-03  | 90  | 44.5 | 11.1 | 144 | 50.6 | 68 | 59 | 35 |
| CPG-G-06  | 102 | 51   | 11.3 | 168 | 54   | 80 | 69 | 40 |

Note: For dimensions of mounting surface, please refer to HGM type sub-plate (page 66).

### Sub-plate

| Valve Model no. | Sub-plate Model No. | Piping Size Rc | Mass kg |
|-----------------|---------------------|----------------|---------|
| CPG<br>CPDG -03 | HGM-03-20           | 3/8            | 1.6     |
|                 | HGM-03X-20          | 1/2            | 1.6     |
| CPG<br>CPDG -06 | HGM-06-20           | 3/4            | 2.4     |
|                 | HGM-06X-20          | 1              | 3.0     |
| CPG<br>CPDG -10 | HGM-10-20           | 1-1/4          | 4.8     |
|                 | HGM-10X-20          | 1-1/2          | 5.7     |

Sub-plates are available. When ordering, please specify sub-plate model no. from the table above. Please refer to page 66.

### Mounting Bolts (Attachment)

| Model No. | Socket Head Cap Screw | Q'ty. | Tightening Torque N·m |
|-----------|-----------------------|-------|-----------------------|
| CPG-G-03  | M10 x 70 Lg           | 4     | 60 ~ 74               |
| CPG-G-06  | M10 x 80 Lg           | 4     |                       |
| CPG-G-10  | M10 x 90 Lg           | 6     |                       |

## Poppet Type Directional Valves Max. Pressure 21 MPa



These valves are of poppet type structure, therefore, response time is quicker than that of spool type valves, moreover the valves have little internal leakage. (below 0.25cm<sup>3</sup>/min)

### Specifications

| Model Number | Max. T-Line Back Pressure MPa (kgf/cm <sup>2</sup> ) | Max. Flow L/min | Mass kg |
|--------------|------------------------------------------------------|-----------------|---------|
| LVT-03-※-30  | 16 (160)                                             | 40              | 4.3     |
| LVG-03-※-30  |                                                      |                 |         |

### Sub-plate

| Valve Model No. | Piping Size Rc | Mass kg |
|-----------------|----------------|---------|
| LVGM-03-10      | 3/8            | 1.9     |
| LVGM-03X-10     | 1/2            |         |

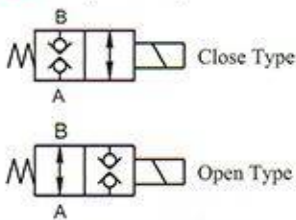
Sub-plates are available. When ordering, please specify sub-plate model no. from the table above.

### Model Number Designation

Series Number: LV T-03-0-R220-N1-30  
 Type of Connection: T: Threaded Connection, G: Sub-plate Mounting  
 Valve Size: 0: Open Type, None: Close  
 Design Number: R220  
 Electrical Conduit Connection: N1  
 Coil Type: 30  
 Design Number: R110, R220, D24  
 Coil Type: R110, R220, D24  
 ★ When used in AC electric source, please select R\* type coils.  
 ★ The coil type is the same as that of the solenoid operated directional valve DSG-03.

**D**

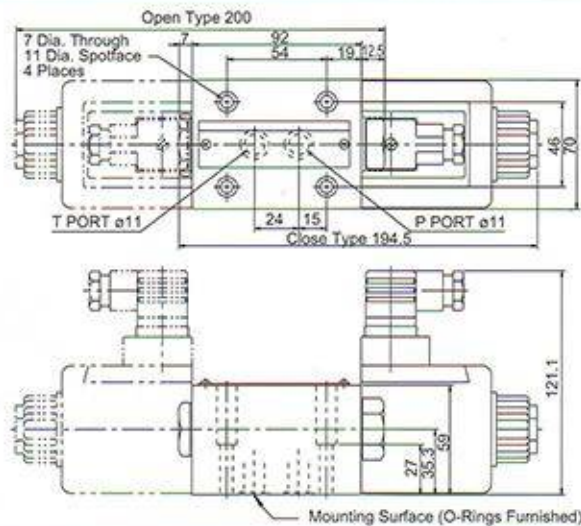
### Graphic Symbol



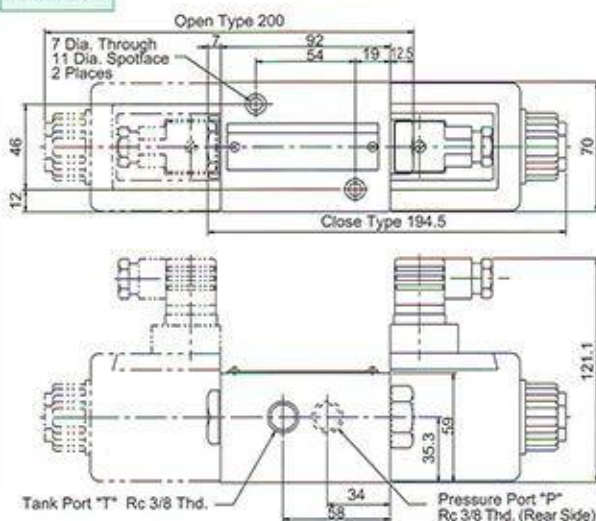
### Mounting Bolts (Attachment)

| Model No. | Socket Head Cap Screw | Q'ty | Tightening Torque N·m |
|-----------|-----------------------|------|-----------------------|
| LVT-03    | M6 x 35 Lg            | 2    | 12~15                 |
| LVG-03    | M6 x 35 Lg            | 4    | 12~15                 |

### LVG-03

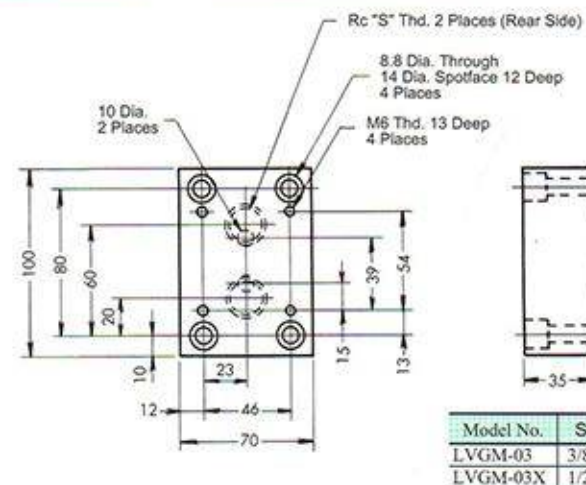


### LVT-03



### Sub-Plate

### LVGM-03, 03X-10



| Model No. | S   |
|-----------|-----|
| LVGM-03   | 3/8 |
| LVGM-03X  | 1/2 |

## Prefill Valve

Max. Pressure 25 MPa



These valves are physically small, however, offer high flow rate without internal leakage. Before opening the valves, Please make sure to decompress the pressure first.

### Specifications

1 MPa = 10.2 kgf/cm<sup>2</sup>

| Valve Size | Model Number | Max. Flow L/min | Cracking Pressure MPa | Mass kg |
|------------|--------------|-----------------|-----------------------|---------|
| 3          | PF-80-※-20   | 400             | 0.012                 | 8       |
| 3 1/2      | PF-90-※-20   | 630             | 0.012                 | 11.3    |
| 4          | PF-100-※-20  | 1000            | 0.012                 | 14.5    |
| 5          | PF-125-※-20  | 1600            | 0.012                 | 23      |
| 6          | PF-150-※-20  | 2500            | 0.013                 | 37      |

Note 1. To avoid possible shock, decompress the pressure in the cylinder line first before the valve operates, otherwise the valve does not perform well.  
(The pilot pressure should be 4.5 times more higher than the main pressure)  
Note 2. The pressure drop is about 0.3 MPa in the maximum flow rate on the table above.  
Note 3. The pilot pressure should be kept below 14.0 MPa.  
Note 4. The high pressure drop is not easy to happen in reality, selecting according to the calculation, 70% of the max. flow rate will be the best choice.

### Mounting Bolts

| Model No. | Socket Head Cap Screw | Qty | Tightening Torque N·m |
|-----------|-----------------------|-----|-----------------------|
| PF-80     | M16 x 55 Lg           | 6   | 253 ~ 310             |
| PF-90     | M18 x 65 Lg           | 6   | 352 ~ 431             |
| PF-100    | M20 x 70 Lg           | 6   | 493 ~ 603             |
| PF-125    | M20 x 80 Lg           | 12  |                       |
| PF-150    | M20 x 95 Lg           | 16  |                       |

Note: Use high tension bolts of which strength are 12.9T.  
No bolts and nuts are supplied in case the P and T pipe flanges are not ordered.

### Graphic Symbol



### Model Number Designation

**PF-80-FT-20**

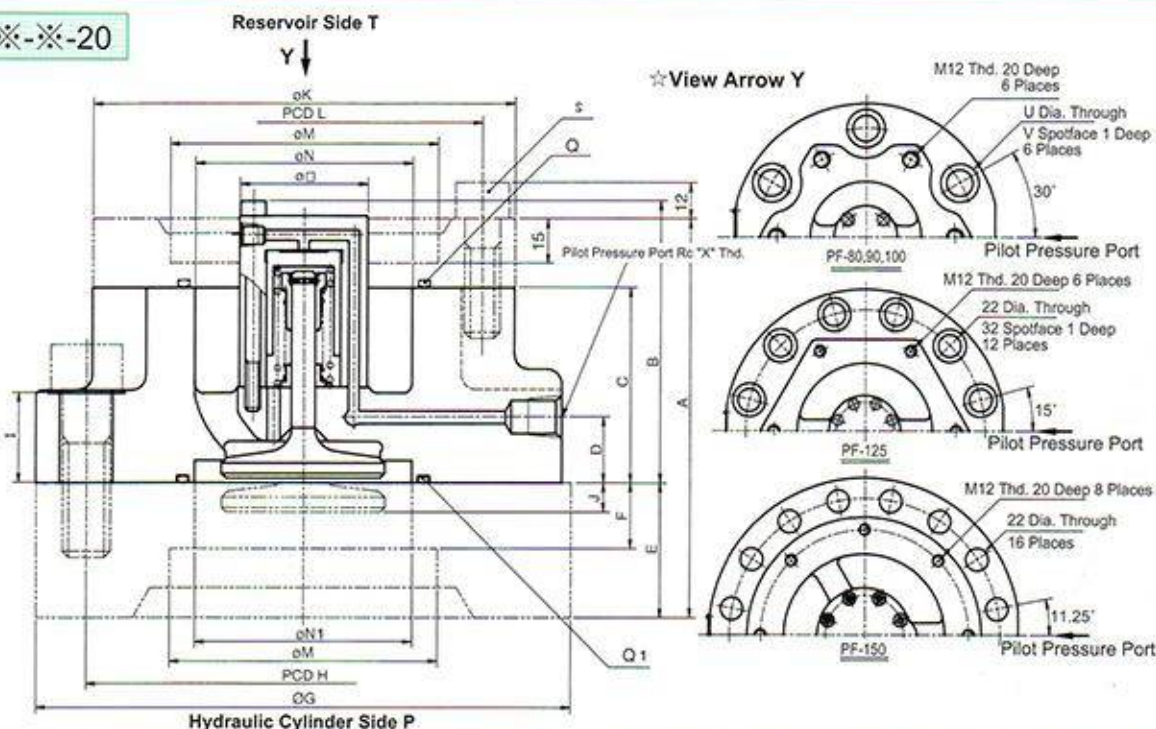
Series Number (Flange Connection) — Design Number

Type of Pipe Flange  
None: Without Pipe Flange  
FP: P Port With Pipe Flange  
FT: T Port With Pipe Flange (Standard)  
FW: P Port & T Port With Pipe Flange

### Flange's Mass / kg

| Model Number | P Port with Pipe Flange | T Port with Pipe Flange |
|--------------|-------------------------|-------------------------|
| PF-80        | 6.6                     | 2.2                     |
| PF-90        | 8.8                     | 2.6                     |
| PF-100       | 14.2                    | 2.6                     |
| PF-125       | 25.5                    | 4                       |
| PF-150       | 28                      | 8                       |

PF-※-※-20



| Model No. | Valve Size | A   | B     | C   | D    | E  | F  | G   | H   | I  | J    | K   | L   | M     | N   | N1  | O  | Q    | Q1   | S        | U  | V  | X      |
|-----------|------------|-----|-------|-----|------|----|----|-----|-----|----|------|-----|-----|-------|-----|-----|----|------|------|----------|----|----|--------|
| PF-80     | 3          | 133 | 94    | 65  | 22   | 45 | 22 | 180 | 146 | 30 | 10   | 142 | 120 | 90.2  | 71  | 71  | 43 | G80  | G80  | 6-M12x40 | 18 | 26 | Rc 1/4 |
| PF-90     | 3 1/2      | 145 | 119   | 72  | 27   | 50 | 30 | 200 | 165 | 38 | 13   | 160 | 135 | 101.6 | 88  | 88  | 50 | G100 | G100 | 6-M12x40 | 20 | 29 | Rc 1/4 |
| PF-100    | 4          | 157 | 132.5 | 74  | 31.5 | 60 | 32 | 230 | 191 | 40 | 18   | 170 | 148 | 115.5 | 106 | 106 | 56 | G115 | G115 | 6-M12x40 | 22 | 32 | Rc 1/4 |
| PF-125    | 5          | 188 | 165   | 85  | 43   | 80 | 50 | 270 | 230 | 50 | 23.5 | 200 | 175 | 141.2 | 130 | 130 | 69 | G140 | G140 | 6-M12x40 | 22 | -  | Rc 1/4 |
| PF-150    | 6          | 208 | 204   | 105 | 45   | 80 | 40 | 300 | 260 | 64 | 25   | 225 | 200 | 167   | 156 | 168 | 95 | G170 | G180 | 8-M12x40 | 22 | -  | Rc 3/8 |

## Decompression Type Prefill Valve

Max. Pressure 25 MPa



This valve is physically small, and easy to install, with high flow rate and little internal leakage: no need to install decompression valve and it can decompress pressure and open the valve at the same time. While decompressing, the min. cracking pressure is only 12~17% of the main cylinder.

### Specifications

1 MPa = 10.2 kgf/cm<sup>2</sup>

| Valve Size | Model Number   | Max. Flow L/min | Mass kg |
|------------|----------------|-----------------|---------|
| 3          | PDF-80-※-※-20  | 400             | 8.1     |
| 3 1/2      | PDF-90-※-※-20  | 630             | 11.4    |
| 4          | PDF-100-※-※-20 | 1000            | 14.6    |
| 5          | PDF-125-※-※-20 | 1600            | 23.2    |
| 6          | PDF-150-※-※-20 | 2500            | 37.5    |

Note 1. While the Max. flow rate showed in the above table, the pressure drop is about 0.03 MPa.

Note 2. Regarding the pilot pressure, please refer the characteristics as follows.

Note 3. The high pressure drop is not easy to happen in reality, selecting according to the calculation, 70% of the max. flow rate will be the best choice.

### Mounting Bolts

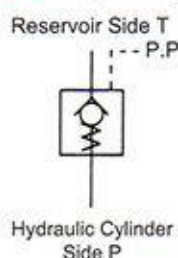
| Model No. | Socket Head Cap Screw | Qty | Tightening Torque N·m |
|-----------|-----------------------|-----|-----------------------|
| PDF-80    | M16 x 55 Lg           | 6   | 253 ~ 310             |
| PDF-90    | M18 x 65 Lg           | 6   | 352 ~ 430             |
| PDF-100   | M20 x 70 Lg           | 6   | 493 ~ 603             |
| PDF-125   | M20 x 80 Lg           | 12  |                       |
| PDF-150   | M20 x 95 Lg           | 16  |                       |

\*) Use high tension bolts of which strength are 12.9T.

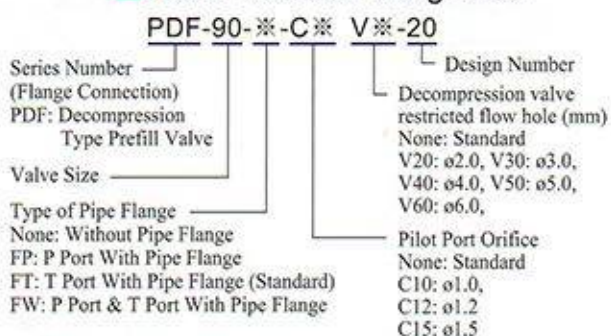
\*) No bolts and nuts are supplied in case the P and T pipe flanges are not ordered.

D

### Graphic Symbol



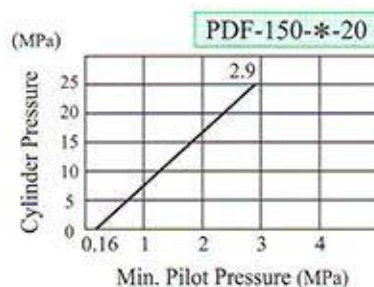
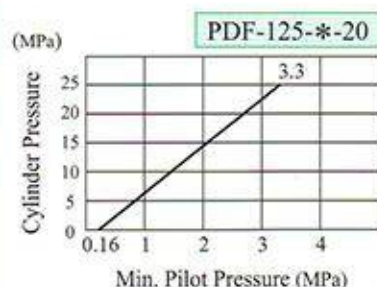
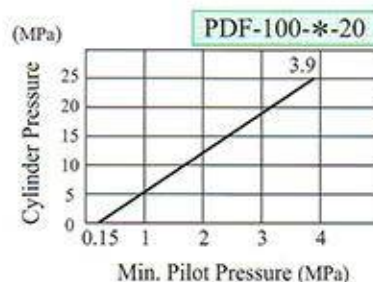
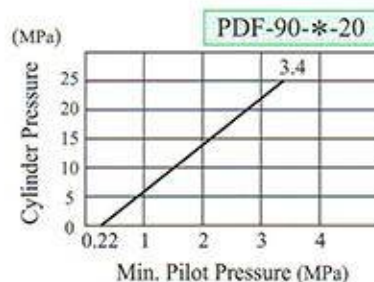
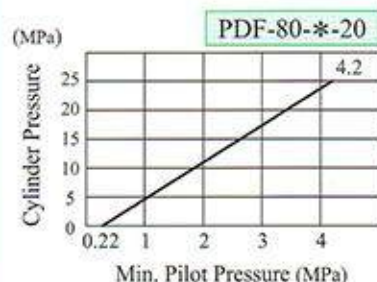
### Model Number Designation



### Flange's Mass / kg

| Model Number | Flange's Mass / kg      |                         |
|--------------|-------------------------|-------------------------|
|              | P Port with Pipe Flange | T Port with Pipe Flange |
| PDF-80-※-20  | 6.6                     | 2.2                     |
| PDF-90-※-20  | 8.8                     | 2.6                     |
| PDF-100-※-20 | 14.2                    | 2.6                     |
| PDF-125-※-20 | 25.5                    | 4                       |
| PDF-150-※-20 | 28                      | 8                       |

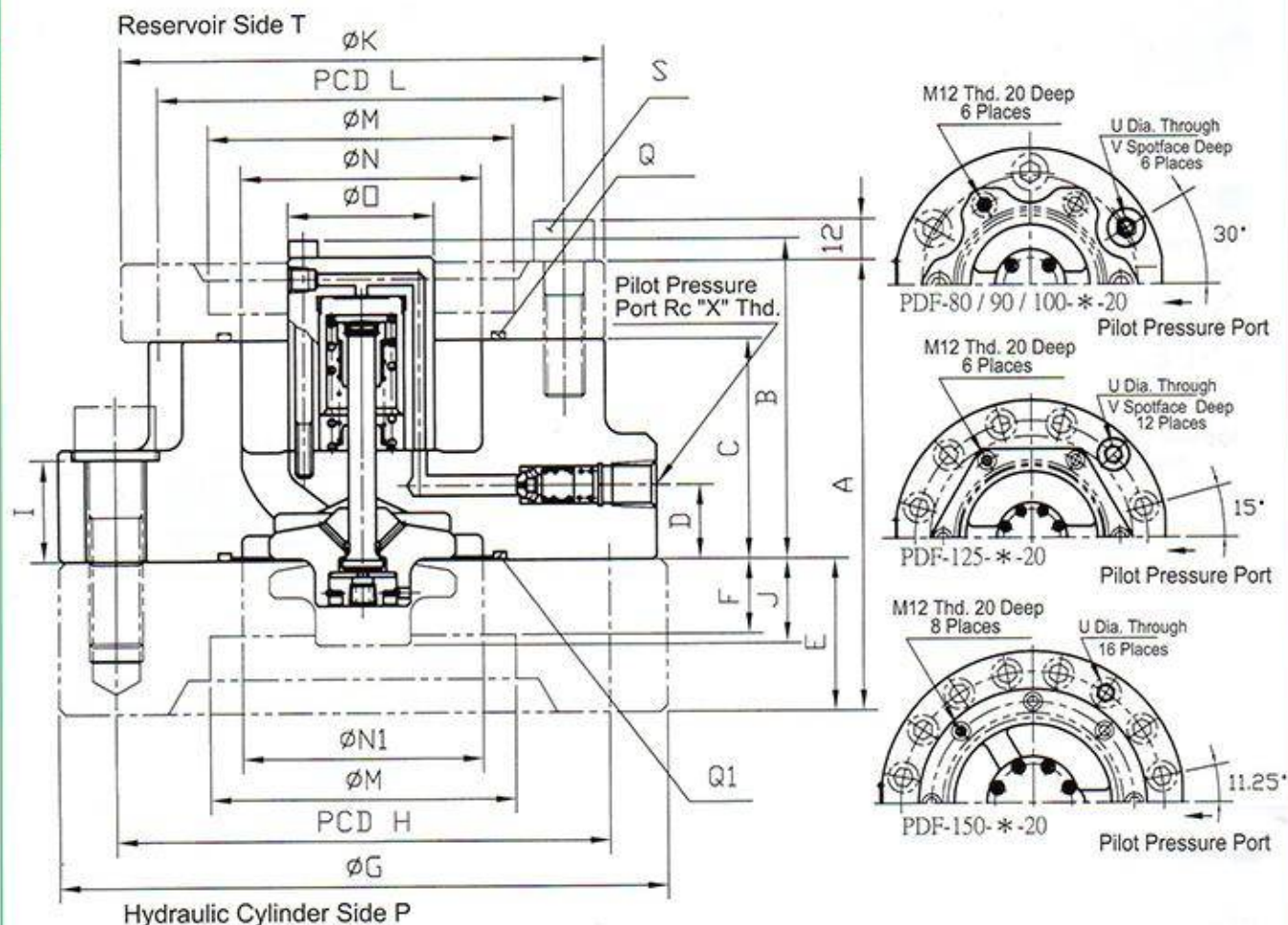
### Min. Pilot Pressure While Decompressing



## Decompression Type Prefill Valve

Max. Pressure 25 MPa

PDF-80/90/100/125/150-※-20



| Model No. | Valve Size | A   | B     | C   | D    | E  | F  | G   | H   | I  | J    | K   | L   | M     | N   | N1  | O  | Q    | Q1   | S        | U  | V  | X      |
|-----------|------------|-----|-------|-----|------|----|----|-----|-----|----|------|-----|-----|-------|-----|-----|----|------|------|----------|----|----|--------|
| PDF-80    | 3          | 133 | 94    | 65  | 22   | 45 | 22 | 180 | 146 | 30 | 10   | 142 | 120 | 90.2  | 71  | 71  | 43 | G80  | G80  | 6-M12x40 | 18 | 26 | Rc 1/4 |
| PDF-90    | 3 1/2      | 145 | 119   | 72  | 27   | 50 | 30 | 200 | 165 | 38 | 13   | 160 | 135 | 101.6 | 88  | 88  | 50 | G100 | G100 | 6-M12x40 | 20 | 29 | Rc 1/4 |
| PDF-100   | 4          | 157 | 132.5 | 74  | 31.5 | 60 | 32 | 230 | 191 | 40 | 18   | 170 | 148 | 115.5 | 106 | 106 | 56 | G115 | G115 | 6-M12x40 | 22 | 32 | Rc 1/4 |
| PDF-125   | 5          | 188 | 165   | 85  | 43   | 80 | 50 | 270 | 230 | 50 | 23.5 | 200 | 175 | 141.2 | 130 | 130 | 69 | G140 | G140 | 6-M12x40 | 22 | 32 | Rc 1/4 |
| PDF-150   | 6          | 208 | 204   | 105 | 45   | 80 | 40 | 300 | 260 | 64 | 25   | 225 | 200 | 167   | 156 | 168 | 95 | G170 | G180 | 8-M12x40 | 22 | -  | Rc 3/8 |



## YUKEN HYDRAULICS (T.W.), CO., LTD.



### MEXICO BRANCH OFFICE

Roberto Diaz No. 401  
Ciudad Industrial  
Aguascalientes, Ags.  
México  
20290

[4ManPro@4ManPro.com](mailto:4ManPro@4ManPro.com)  
(449) 171 3420  
[www.4ManPro.com/SPA/](http://www.4ManPro.com/SPA/)



### USA BRANCH OFFICE

Pennzoil Place  
700 Milam  
Suite 1300  
Houston, Tx, USA  
77002

[4ManPro-USA@4ManPro.com](mailto:4ManPro-USA@4ManPro.com)  
+1 (832) 871 5022  
[www.4ManPro.com/ENG/](http://www.4ManPro.com/ENG/)

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