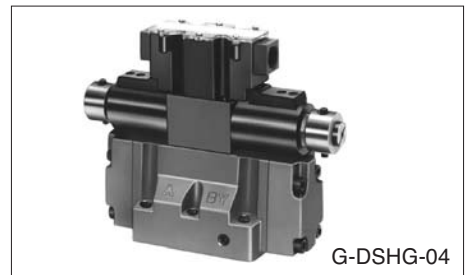
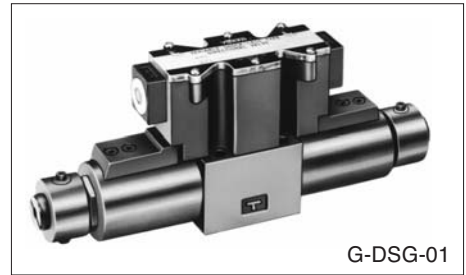


“G” Series Shockless Type Solenoid Operated / Solenoid Controlled Pilot Operated Directional Valves

The G-Series Solenoid Operated Directional Valves incorporate electronic circuits to enable adjustment of the spool shifting time.

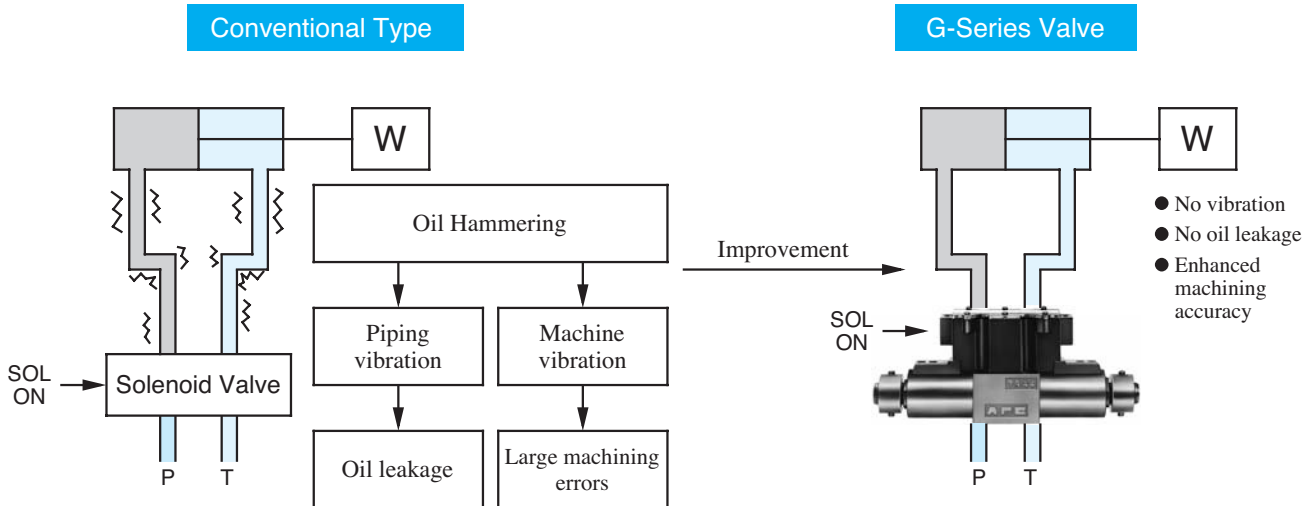
A special spool shape that minimises shock is used, shocks caused by the actuator starting and stopping, as well as vibration due to oil hammering. The shifting time of conventional Solenoid Operated, Shockless, and Directional Valves is constant and cannot be adjusted.

As the shifting time of the G-Series valves can be adjusted, it can be set at an optimal level to minimise shocks to the machine.

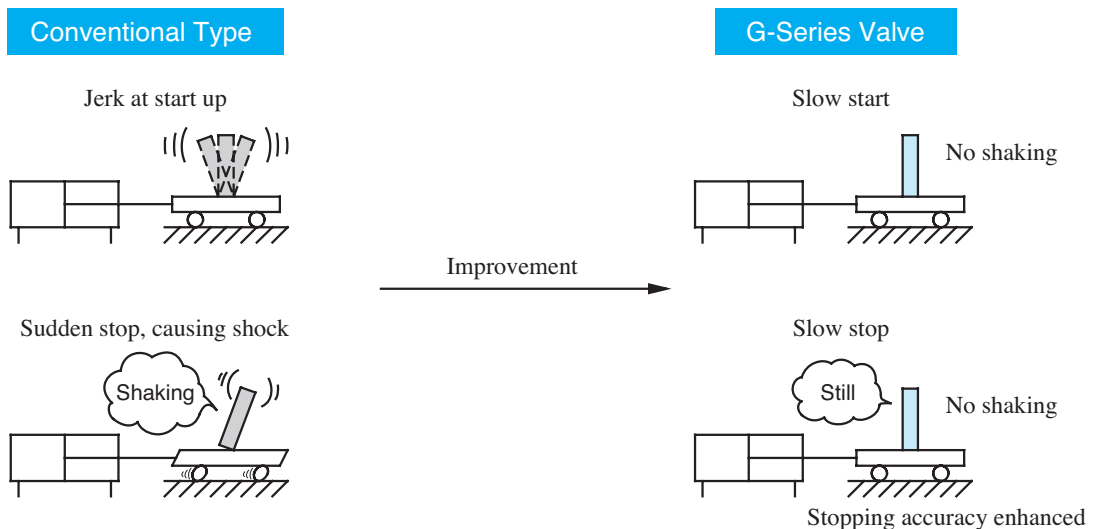


“G” Series Shockless Type Solenoid Operated / Solenoid Controlled Pilot Operated Directional Valves

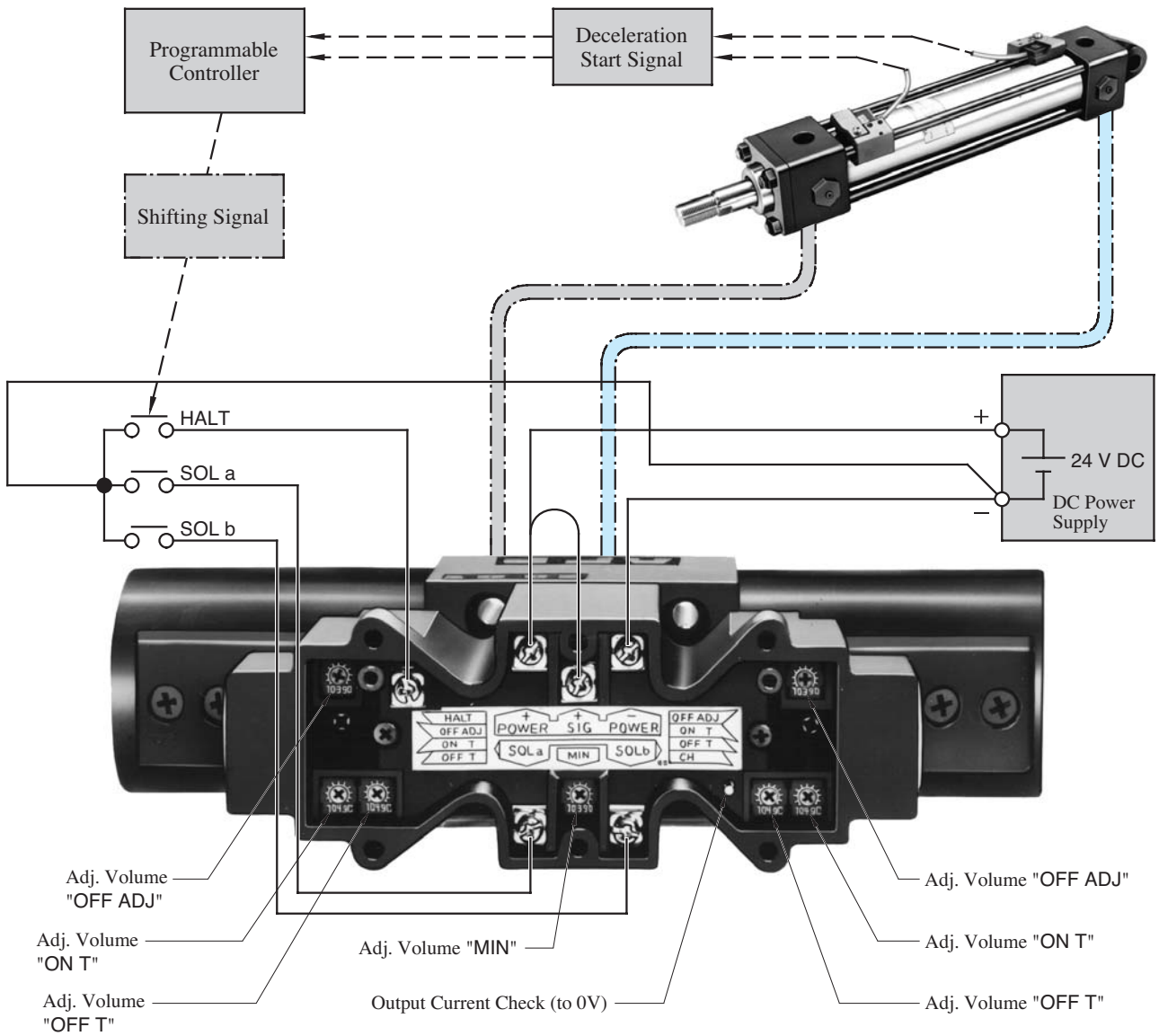
1 Reduces oil hammering during spool changeover.



2 Reduces shock caused by acceleration and deceleration

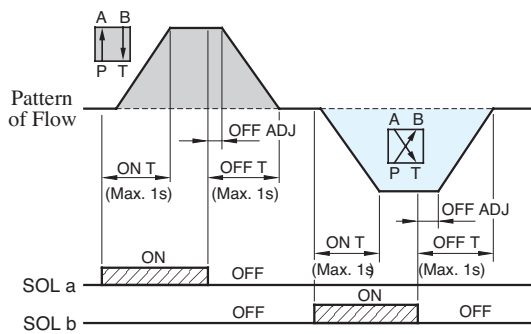


■ System Diagram (Example of sink type wiring)

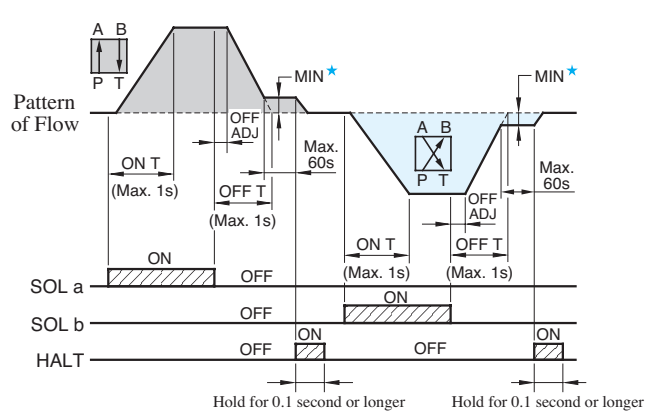


■ Relationships between SOL signals and flow patterns

● Without HALT functions



● With HALT functions



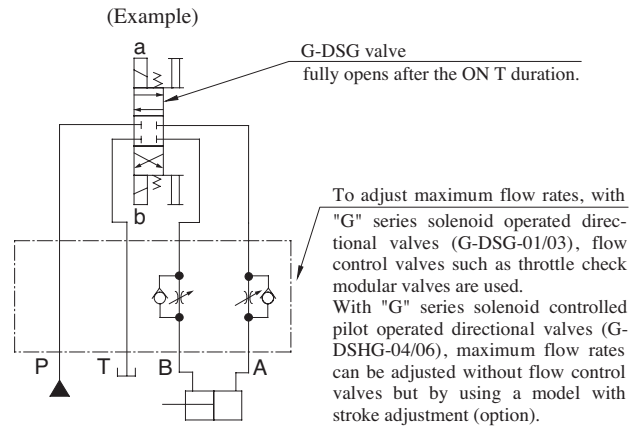
★ The minimum adjustment volume is common for SOL a and b, and it is not possible to set a different volume for each SOL a and b individually. If the HALT functions are not used, set the minimum adjustment volume to zero.

Instructions

Adjustment of maximum flow rate

The G-Series Solenoid Operated Directional Valves cannot be adjusted for maximum flow rates.

To adjust maximum flow rates, use flow control valves. In G-series solenoid controlled pilot operated directional valves (G-DSHG-04/06), the maximum flow rate can be adjusted by use of the valve with stroke adjustment screw of optional extra.

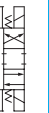
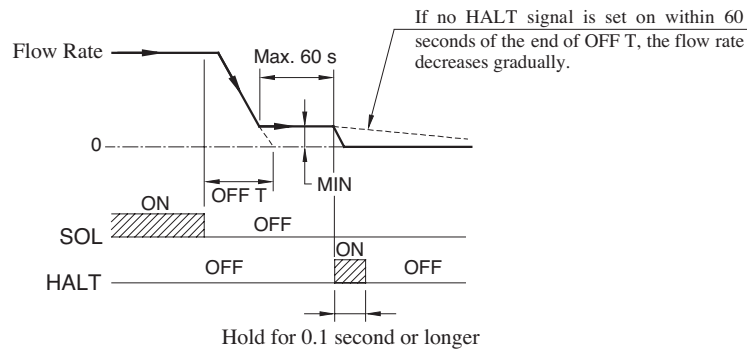


How to use HALT functions

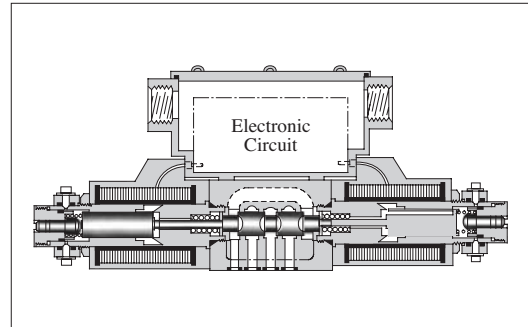
The HALT functions are used to drive the actuator at a low speed to the stop position while keeping a slight flow after OFF T.

A flow rate (min. flow rate) during a low-speed operation can be set with the minimum adjusting volume (The minimum adjusting volume is common for SOL a and b. Individual setting is not possible for SOL a and b.) When HALT signal is on, the min. flow rate becomes zero and the actuator stops. Here, take care to keep the HALT signal on for longer than 0.1 second. The min. flow rate gets to "0" after about 60 seconds following the OFF T. If the HALT functions are not used, set the minimum adjusting volume to zero.

The HALT functions are not applicable to the spool function "2B7".



“G” Series Shockless Type Solenoid Operated Directional Valves



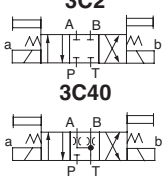

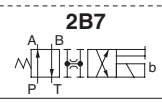
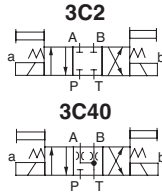
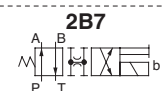
Specifications

| Descriptions | | Model Numbers | G-DSG-01-***-*/50/5090 | G-DSG-03-***-*/50/5090 |
|--|--------------------|---|---|---------------------------------|
| Max. Flow ^{★1} | L/min (U.S.GPM) | | 10 (2.6), 20 (5.3), 30 (7.9), 40 (10.6) | 40 (10.6), 60 (15.9), 80 (21.1) |
| Max. Operating Pres. ^{★2} | MPa (PSI) | | 25 (3630) | 25 (3630) |
| Max. T-Line Back Pres. | MPa (PSI) | | 16 (2320) | 16 (2320) |
| Electric Power Supply | Voltage | 24 V DC (21 - 28 V DC Included Ripple): Use a stable power supply | | |
| | Input Power at 24V | | 36 W | 36 W |
| Shifting signal, low speed operation halt signal (can be used in common with electric power supply). | Voltage | 5 - 48 V DC (Use a stable power supply) | | |
| | Current | Constant at 10 mA (A constant-current circuit is used) | | |
| | Input interface | Sink Type, Source Type | | |
| Shifting time range (for ON and OFF) | | | 0.1 - 1 s | 0.3 - 1 s |
| Low speed operation flow rate (min. flow rate) range (for SOL a and b) L/min (U.S.GPM) | | | 0.5 - 5 (.13 - 1.3) | 1 - 10 (.26 - 2.6) |
| Low speed operation flow rate (min. flow rate) hold time | | Max. 60 s (After 60 seconds, the flow rate decreases gradually.) | | |
| Ambient Temperature | | 0 - 50 °C (32 - 122 °F) with circulated air | | |
| Approx. Mass | Single Solenoid | | 2.1 kg (4.6 lbs.) | 5.3 kg (11.7 lbs.) |
| | Double Solenoid | | 3.0 kg (6.6 lbs.) | 7.5 kg (16.5 lbs.) |

★1. The maximum flow rates may vary according to the operating pressure. Refer to Maximum Flow Rates Characteristics on pages 414 and 415 for details.

★2. At pressures more than 21 MPa (3050 PSI), the "shockless effect" is slightly less if compared it with that at 16 MPa (2320 PSI).

Model Number Designation

| G-DSG | -01 | -10 | -2B7 | -S | -50 | * | -L |
|---|------------|---|---|--|---------------|------------------|---|
| Series Number | Valve Size | Metred Flow Capacity | Spool Type | Input Interface | Design Number | Design Standards | Models with Alternate Offset Solenoid |
| G-DSG : G Series Shockless Type Solenoid Operated Directional Valve, Sub-plate Mounting | 01 | None: 40 L/min 10 : 10 L/min 20 : 20 L/min |  | None: Sink Type (Standard) S: Source Type | 50 | Refer to ★ | L Applicable only for 2B7 (Omit if not required)  |
| | | None: 30 L/min 10 : 10 L/min 20 : 20 L/min |  | | | | |
| | 03 | None: 80 L/min 40 : 40 L/min 60 : 60 L/min |  | | 50 | | |
| | | None: 60 L/min 40 : 40 L/min |  | | | | |

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

Sub-plate

| Valve Model Numbers | Japanese Standard "JIS" | | European Design Standard | | N. American Design Standard | | Approx. Mass kg (lbs.) |
|---------------------|-------------------------|-------------|--------------------------|-------------|-----------------------------|-------------|---------------------------|
| | Sub-plate Model Numbers | Thread Size | Sub-plate Model Numbers | Thread Size | Sub-plate Model Numbers | Thread Size | |
| G-DSG-01 | DSGM-01-31 | Rc 1/8 | DSGM-01-3180 | 1/8 BSPF | DSGM-01-3190 | 1/8 NPT | 0.8 (1.8) |
| | DSGM-01X-31 | Rc 1/4 | DSGM-01X-3180 | 1/4 BSPF | DSGM-01X-3190 | 1/4 NPT | 0.8 (1.8) |
| | DSGM-01Y-31 | Rc 3/8 | — | — | DSGM-01Y-3190 | 3/8 NPT | 0.8 (1.8) |
| G-DSG-03 | DSGM-03-40 | Rc 3/8 | DSGM-03-2180 | 3/8 BSPF | DSGM-03-2190 | 3/8 NPT | 3.0 (6.6) |
| | DSGM-03X-40 | Rc 1/2 | DSGM-03X-2180 | 1/2 BSPF | DSGM-03X-2190 | 1/2 NPT | 3.0 (6.6) |
| | DSGM-03Y-40 | Rc 3/4 | DSGM-03Y-2180 | 3/4 BSPF | DSGM-03Y-2190 | 3/4 NPT | 4.7 (10.4) |

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

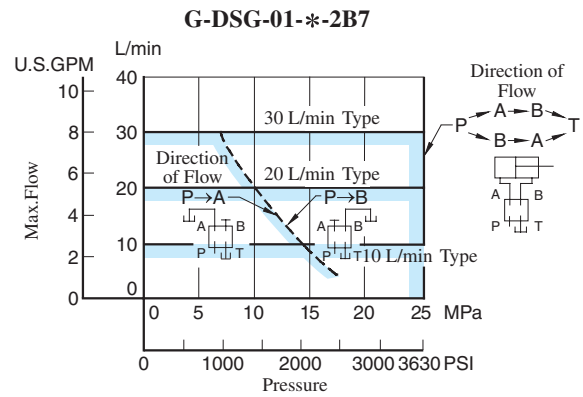
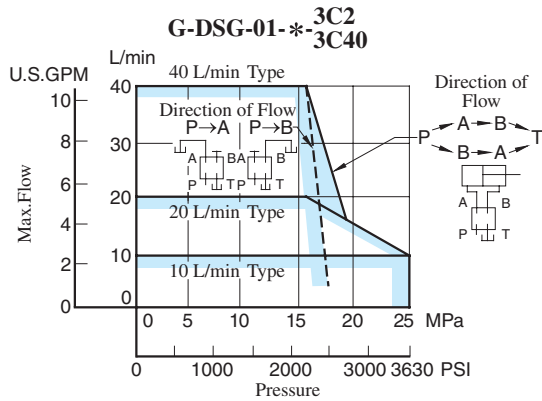
Attachment (Mtg. Bolt)

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

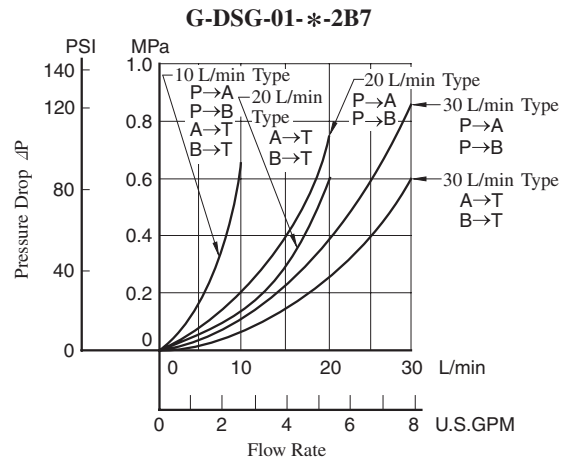
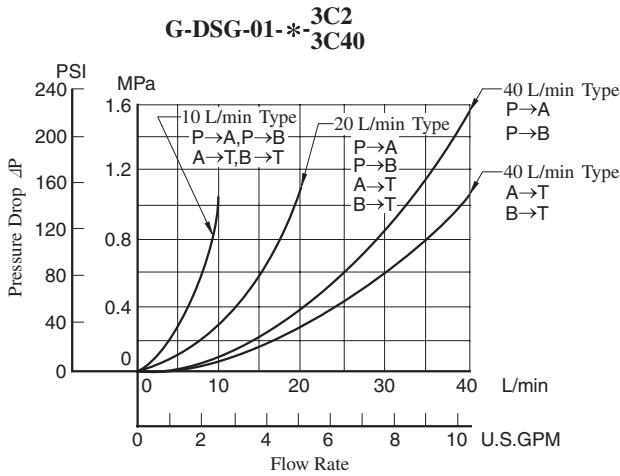
| Model Numbers | Socket Head Cap Screw (4 pcs.) | | |
|---------------|--|-----------------------------|-----------------------------|
| | Japanese Standard "JIS" & European Design Standard | N. American Design Standard | Tightening Torque |
| G-DSG-01 | M5 × 45 Lg. | No.10-24 UNC × 1-3/4 Lg. | 5-7 Nm (44-62 in. lbs.) |
| G-DSG-03 | M6 × 35 Lg. | 1/4-20 UNC × 1-1/2 Lg. | 12-15 Nm (106-133 in. lbs.) |

Typical Performance Characteristics of "G-DSG-01" at Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Maximum Flow Rate



Pressure Drop



- For any other viscosity, multiply the factors in the table right.
- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

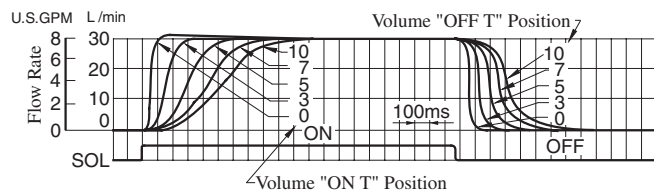
$$\Delta P' = \Delta P (G'/0.850)$$

| Viscosity | mm ² /s | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|-----------|--------------------|------|------|------|------|------|------|------|------|------|------|
| | | SSU | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 |
| Factor | | 0.84 | 0.91 | 1.00 | 1.07 | 1.14 | 1.19 | 1.24 | 1.28 | 1.32 | 1.35 |

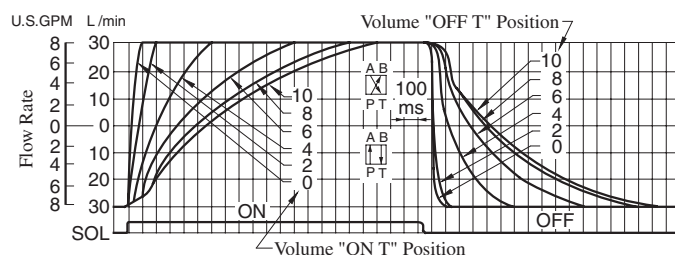
Shifting Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 30 L/min (7.9 U.S.GPM)

3C2, 3C40

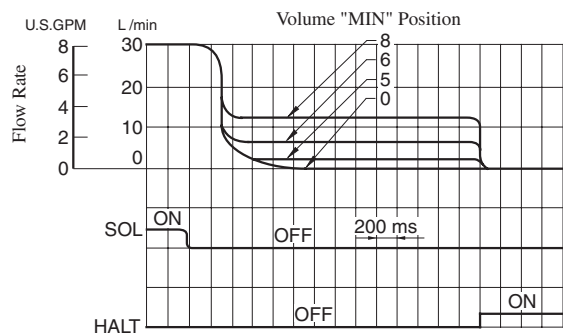


2B7



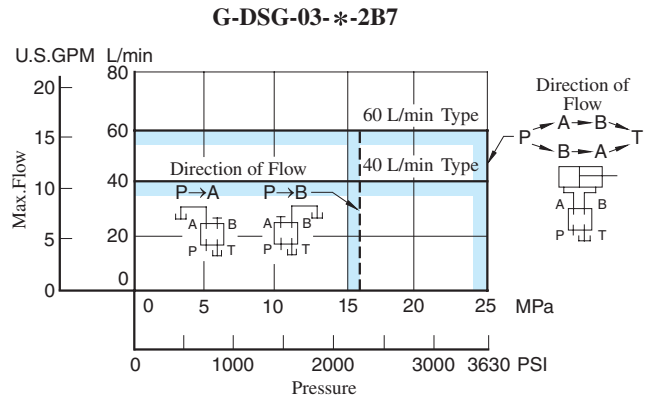
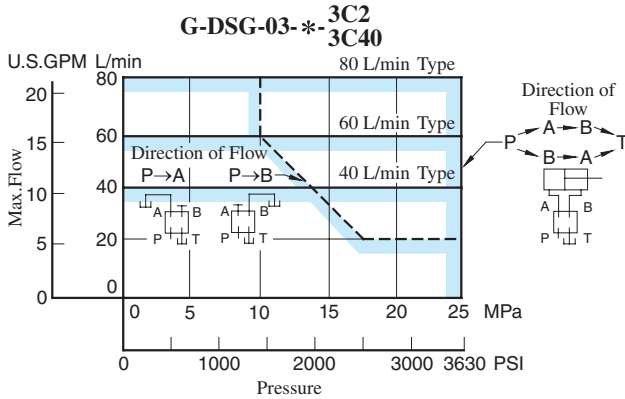
Low Speed Operating Flow Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 30 L/min (7.9 U.S.GPM)

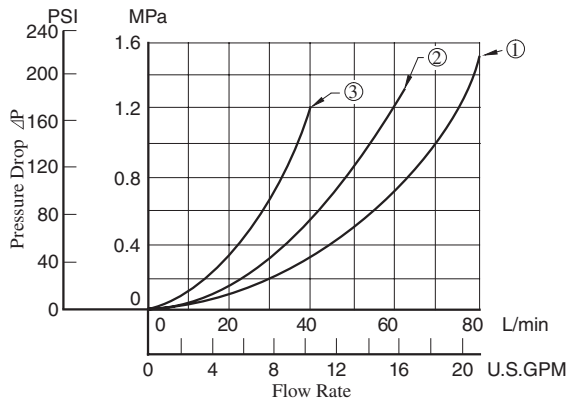


Typical Performance Characteristics of "G-DSG-03" at Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Maximum Flow Rate



Pressure Drop



| Model Numbers | Pressure Drop Curve Numbers* |
|--|------------------------------|
| G-DSG-03- ³ C2- ³ C40 | ① |
| G-DSG-03-40- ³ C2- ³ C40 | ③ |
| G-DSG-03-60- ³ C2- ³ C40 | ② |
| G-DSG-03-2B7 | ① |
| G-DSG-03-40-2B7 | ③ |

* The numbers of the pressure drop curves are the same for P→A, P→B, A→T and B→T.

- For any other viscosity, multiply the factors in the table right.
- For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the formula below.

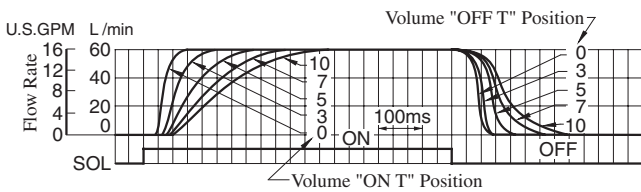
$$\Delta P' = \Delta P (G'/0.850)$$

| Viscosity | mm ² /s | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|-----------|--------------------|------|------|------|------|------|------|------|------|------|------|
| | SSU | | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 |
| Factor | | 0.84 | 0.91 | 1.00 | 1.07 | 1.14 | 1.19 | 1.24 | 1.28 | 1.32 | 1.35 |

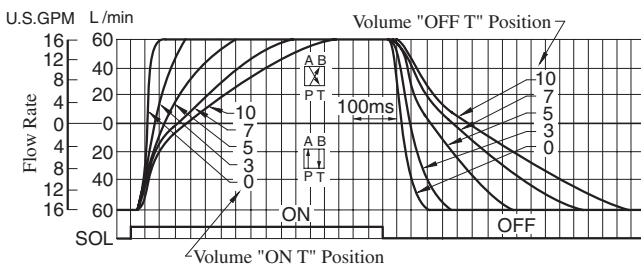
Shifting Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 60 L/min (15.9 U.S.GPM)

3C2, 3C40

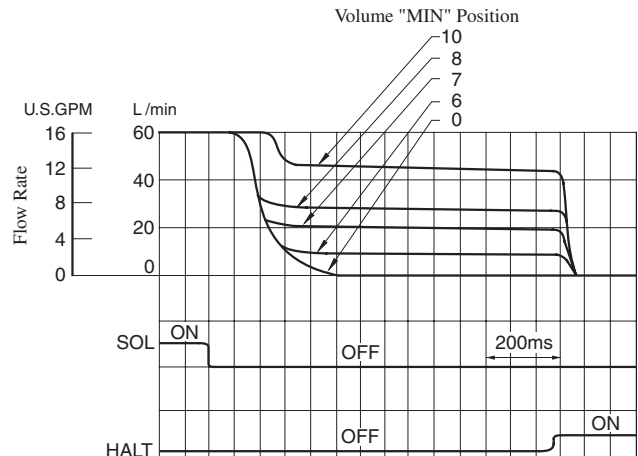


2B7



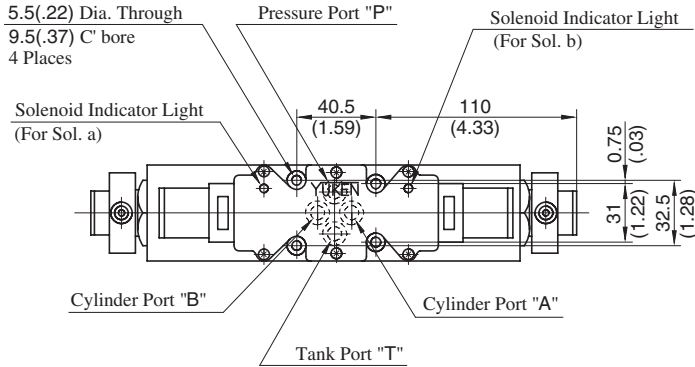
Low Speed Operating Flow Characteristics

Supply Pressure : 16 MPa (2320 PSI)
Flow Rate : 60 L/min (15.9 U.S.GPM)

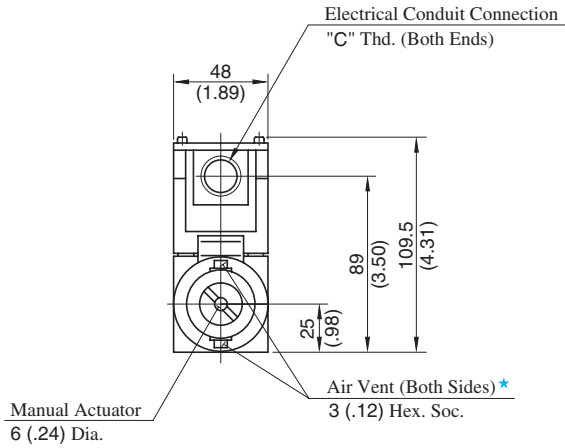
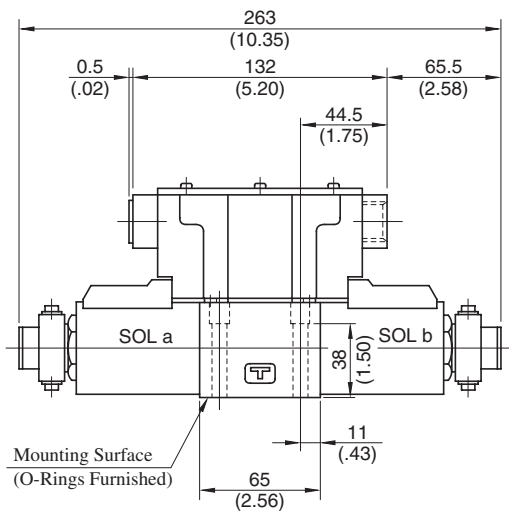


G-DSG-01-* -3C2/3C40-* -50/5090

Mounting Surface:
ISO4401-AB-03-4-A



| Model Numbers | "C" Thd. |
|-------------------|----------|
| G-DSG-01-***-50 | G 1/2 |
| G-DSG-01-***-5090 | 1/2 NPT |

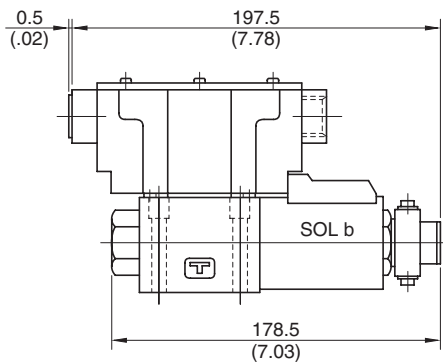


★ Air vent position around valve longitudinal axis can be optionally selected.

Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 356](#).

**DIMENSIONS IN
MILLIMETRES (INCHES)**

G-DSG-01-* -2B7-* -50/5090

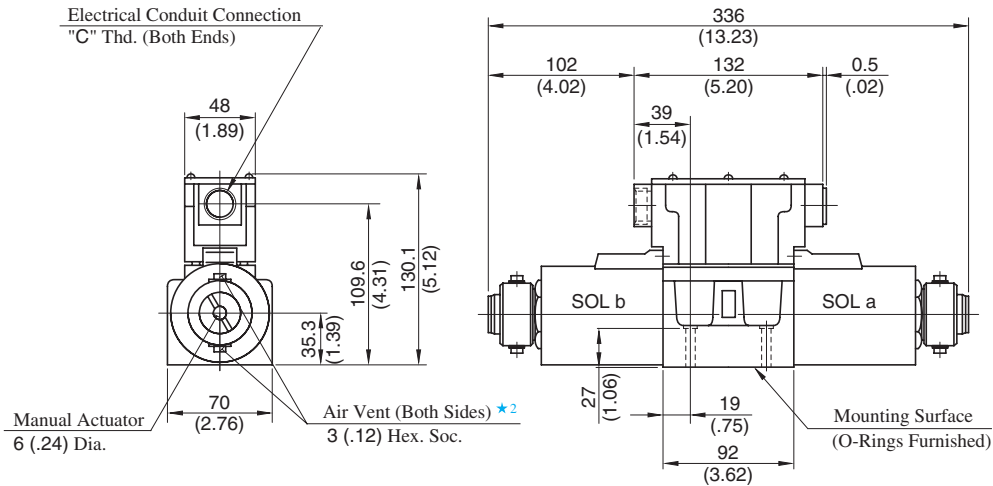
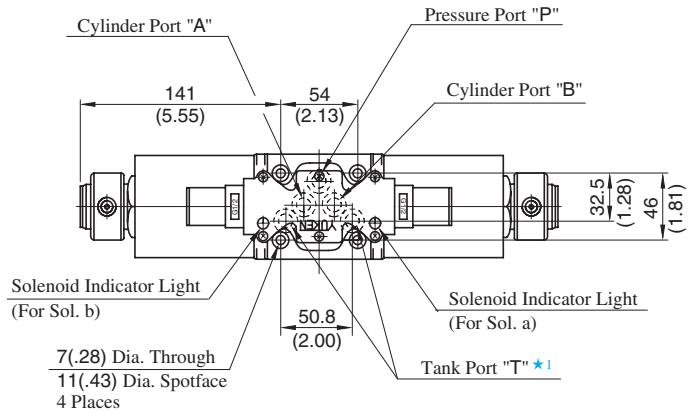


• For other dimensions, refer to the drawing above.

G-DSG-03-*3C2/3C40-*50/5090

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

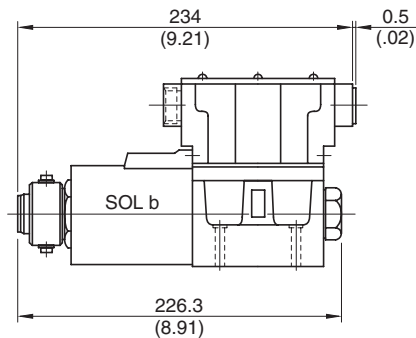
| Model Numbers | "C" Thd. |
|-------------------|----------|
| G-DSG-03-***-50 | G 1/2 |
| G-DSG-03-***-5090 | 1/2 NPT |



- ★ 1. Although the tank port is shown on the left in our sub-plate, either may be used.
 - ★ 2. Air vent position around valve longitudinal axis can be optionally selected.
- Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 373](#).

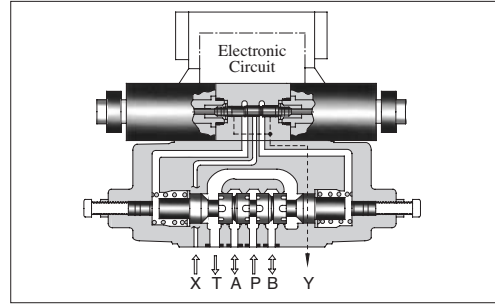
DIMENSIONS IN
MILLIMETRES (INCHES)

G-DSG-03-*2B7-*50/5090



- For other dimensions, refer to the drawing above.

“G” Series Shockless Type Solenoid Controlled Pilot Operated Directional Valves



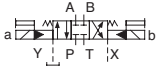

Specifications

| Descriptions | | Model Numbers | G-DSHG-04-3C*-**-50/5090 | G-DSHG-06-3C*-**-50/5090 |
|---|--------------------|---------------|---|-------------------------------|
| Max. Flow | L/min (U.S.GPM) | | 160 (42.3) ^{★1} | 250 (66.1) ^{★1} |
| Max. Operating Pres. | MPa (PSI) | | 25 (3630) | 25 (3630) |
| Max. T-Line Back Pres. | MPa (PSI) | | 16 (2320) | 16 (2320) |
| Max. Drain Line Back Pressure | MPa (PSI) | | 3 (440) | 3 (440) |
| Max. Pilot Pressure | MPa (PSI) | | 16 (2320) | 16 (2320) |
| Min. Required Pilot Pres. | MPa (PSI) | | 1.5 (220) ^{★2} | |
| Pilot Flow L/min (U.S.GPM) | at Normal | | 1 (0.3) | 1 (0.3) |
| | at Transition | | 4 (1.1) | 6 (1.6) |
| Electric Power Supply | Voltage | | 24 V DC (21 - 28 V DC Included Ripple): Use a stable power supply | |
| | Input Power at 24V | | 36 W | 36 W |
| Shifting signal, low speed operation halt signal (can be used in common with electric power supply) | Voltage | | 5 - 48 V DC (Use a stable power supply) | |
| | Current | | Constant at 10 mA (A constant-current circuit is used) | |
| | Input interface | | Sink Type, Source Type | |
| Shifting time range (for ON and OFF) | | | ON: 0.06 - 1.5 s, OFF: 0.1 - 2 s | ON: 0.1 - 1 s, OFF: 0.2 - 2 s |
| Low speed operation flow rate (min. flow rate) range (for SOL a and b) L/min (U.S.GPM) | | | 5 - 20 (1.3 - 5.3) | 10 - 30 (2.6 - 7.9) |
| Low speed operation flow rate (min. flow rate) hold time | | | Max. 60 s (After 60 seconds, the flow rate decreases gradually.) | |
| Ambient Temperature | | | 0 - 50 °C (32 - 122 °F) with circulated air | |
| Approx. Mass | | | 12 kg (26.5 lbs.) | 15 kg (33.1 lbs.) |

★1. The maximum flow rate is constant irrespective of the working pressure.

★2. Be sure that the difference between pilot pressure and drain port back pressure is larger than the minimum pilot pressure.

Model Number Designation

| G-DSHG | -04 | -3C2 | -E | -R2 | -S | -50 | * |
|---|------------|--|--------------------------------|---|--------------------------------------|---------------|------------------|
| Series Number | Valve Size | Spool Type | Pilot Connection | Spool Control Modification (Omit if not required) | Input Interface | Design Number | Design Standards |
| G-DSHG : G Series Shockless Type Solenoid Controlled Pilot Operated Directional Valve, Sub-plate Mounting | 04 | 3C2  | None: Internal Pilot | R2: With Stroke Adjustment, Both Ends RA: With Stroke Adjustment, Port "A" End RB: With Stroke Adjustment, Port "B" End | None: Sink Type (Standard) | 50 | Refer to ★ |
| | 06 | 3C40  | E: External Pilot | S: Source Type | 50 | | |

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

Sub-plate

| Valve Model Numbers | Japanese Standard "JIS" | | | European Design Standard | | | N. American Design Standard | | |
|---------------------|-------------------------|-------------|------------------------|--------------------------|-------------|------------------------|-----------------------------|-------------|------------------------|
| | Sub-plate Model Numbers | Thread Size | Approx. Mass kg (lbs.) | Sub-plate Model Numbers | Thread Size | Approx. Mass kg (lbs.) | Sub-plate Model Numbers | Thread Size | Approx. Mass kg (lbs.) |
| G-DSHG-04 | DHGM-04-20 | Rc 1/2 | 4.4 (9.7) | DHGM-04-2080 | 1/2 BSP.F | 4.4 (9.7) | DHGM-04-2090 | 1/2 NPT | 4.4 (9.7) |
| | DHGM-04X-20 | Rc 3/4 | 4.1 (9.0) | DHGM-04X-2080 | 3/4 BSP.F | 4.1 (9.0) | DHGM-04X-2090 | 3/4 NPT | 4.1 (9.0) |
| G-DSHG-06 | DHGM-06-50 | Rc 3/4 | 7.4 (16.3) | DHGM-06-5080 | 3/4 BSP.F | 8.5 (18.7) | DHGM-06-5090 | 3/4 NPT | 7.4 (16.3) |
| | DHGM-06X-50 | Rc 1 | 7.4 (16.3) | DHGM-06X-5080 | 1 BSP.F | 8.5 (18.7) | DHGM-06X-5090 | 1 NPT | 7.4 (16.3) |

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

Attachment (Mtg. Bolts)

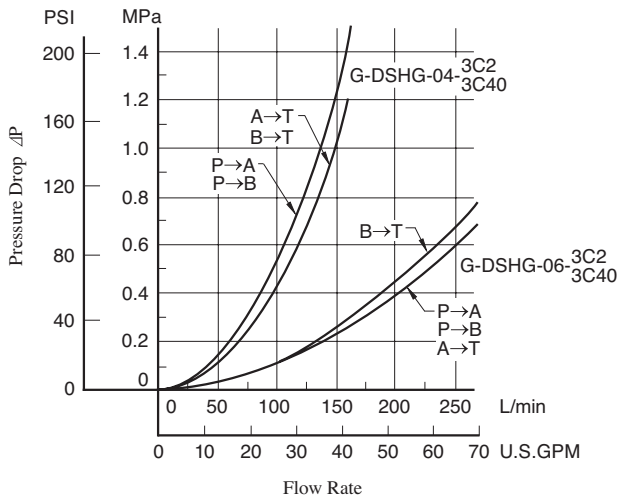
Socket head cap screws in the table below are included.

| Model Numbers | Socket Head Cap Screw | | | |
|---------------|--|-----------------------------|------|---------------------------------|
| | Japanese Standard "JIS" & European Design Standard | N. American Design Standard | Qty. | Tightening Torque Nm (in. lbs.) |
| G-DSHG-04 | M6 × 45 Lg. | 1/4-20 UNC × 1-3/4 Lg. | 2 | 12-15 (106-133) |
| | M10 × 50 Lg. | 3/8-16 UNC × 2 Lg. | 4 | 58-72 (513-637) |
| G-DSHG-06 | M12 × 60 Lg. | 1/2-13 UNC × 2-1/2 Lg. | 6 | 100-123 (885-1089) |

Hydraulic Fluid: Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Pressure Drop

G-DSHG-04-06-3C2/3C40



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

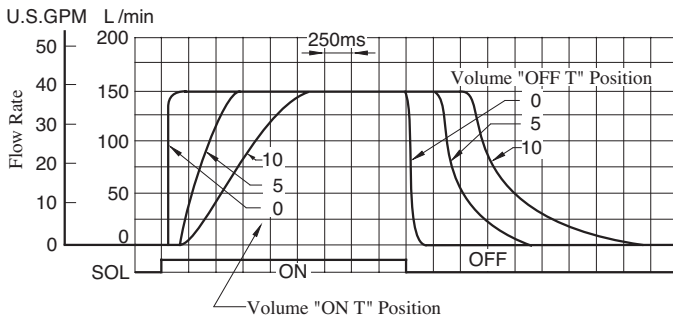
| Viscosity | mm ² /s | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|-----------|--------------------|------|------|------|------|------|------|------|------|------|------|
| | SSU | 77 | 98 | 141 | 186 | 232 | 278 | 324 | 371 | 417 | 464 |
| | Factor | 0.84 | 0.91 | 1.00 | 1.07 | 1.14 | 1.19 | 1.24 | 1.28 | 1.32 | 1.35 |

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

Shifting Characteristics

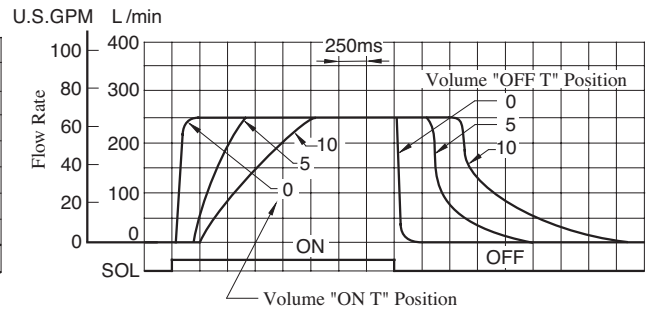
G-DSHG-04-3C2/3C40

Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 150 L/min (39.6 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)



G-DSHG-06-3C2/3C40

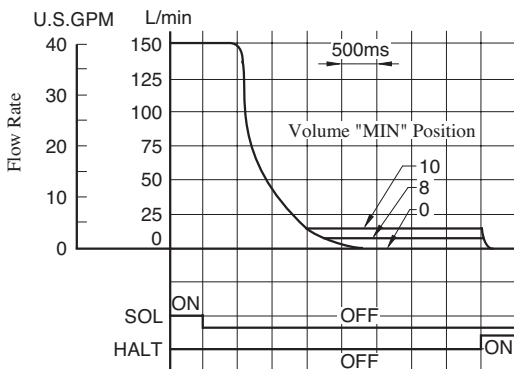
Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 250 L/min (66.1 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)



Low Speed Operating Flow Characteristics

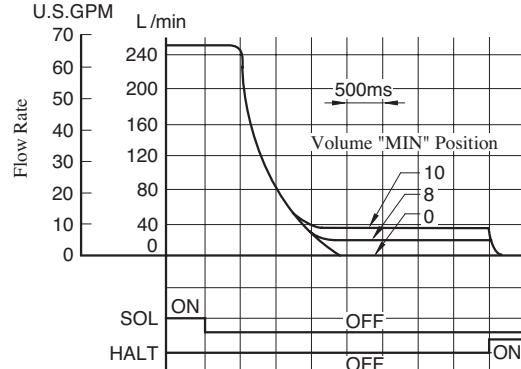
G-DSHG-04-3C2/3C40

Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 150 L/min (39.6 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)



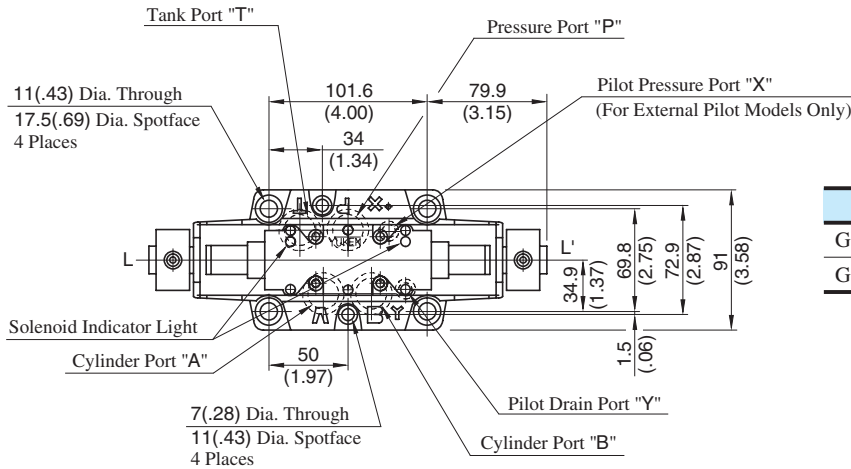
G-DSHG-06-3C2/3C40

Supply Pressure : 16 MPa (2320 PSI)
 Flow Rate : 250 L/min (66.1 U.S.GPM)
 Pilot Pressure : 16 MPa (2320 PSI)

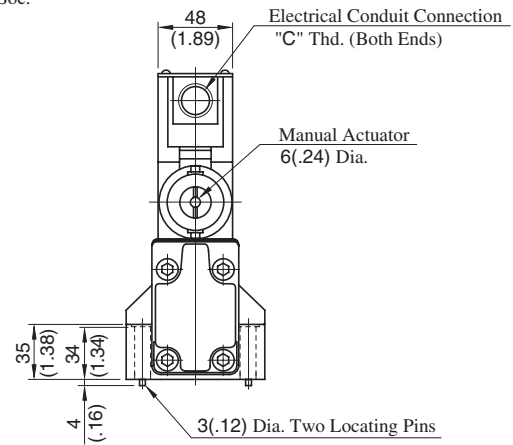
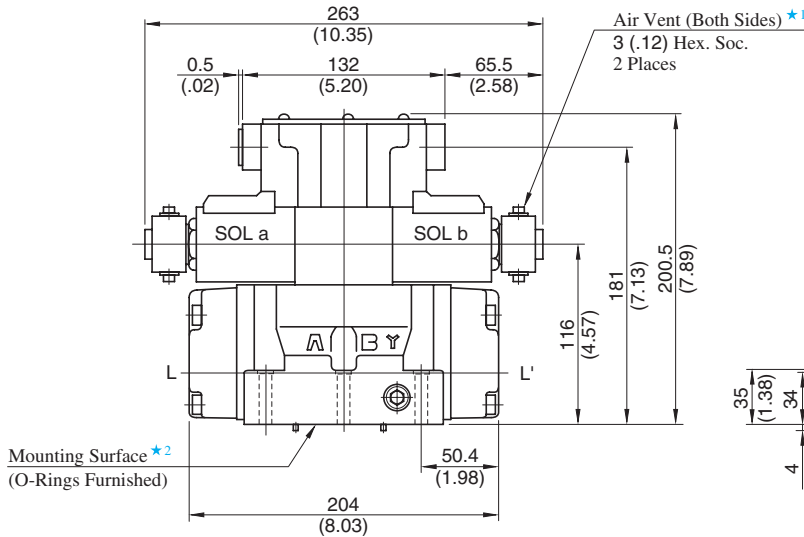


G-DSHG-04-3C*-*-50/5090

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



| Model Numbers | "C" Thd. |
|----------------------|----------|
| G-DSHG-04-3C*-*-50 | G 1/2 |
| G-DSHG-04-3C*-*-5090 | 1/2 NPT |



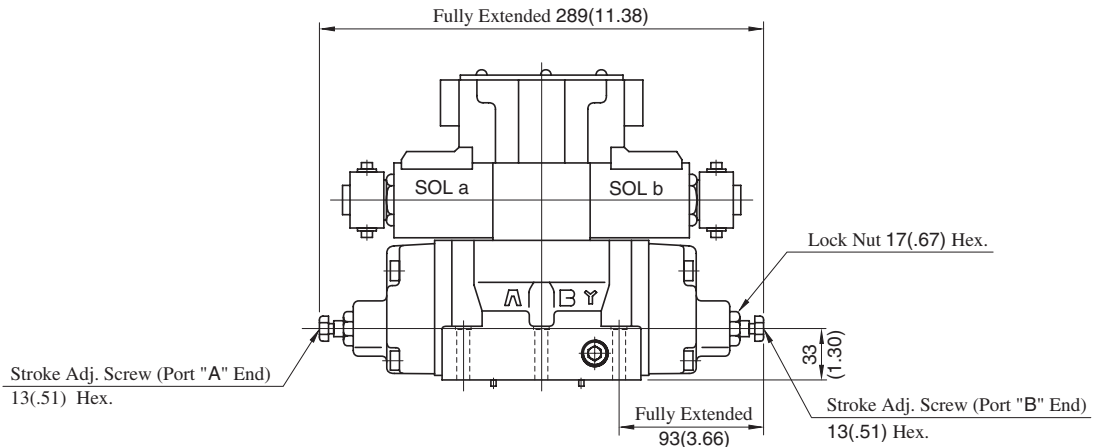
- *1. Air vent position around valve longitudinal axis can be optionally selected.
- *2. O-rings for ports: SO-NB-P22 for P/A/B/T ports
SO-NB-P9 for X/Y ports

Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate on [page 401](#).

DIMENSIONS IN
MILLIMETRES (INCHES)

● Models with Stroke Adjustment (Option)

G-DSHG-04-3C*-*-R*-*-50/5090



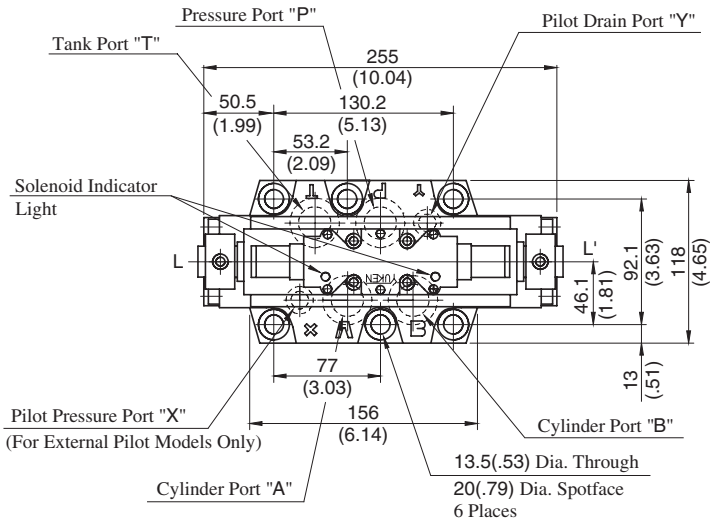
F



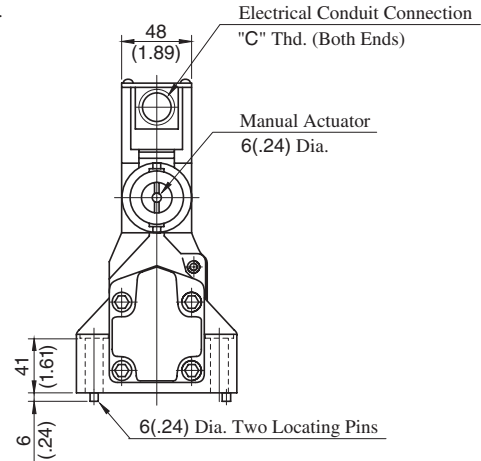
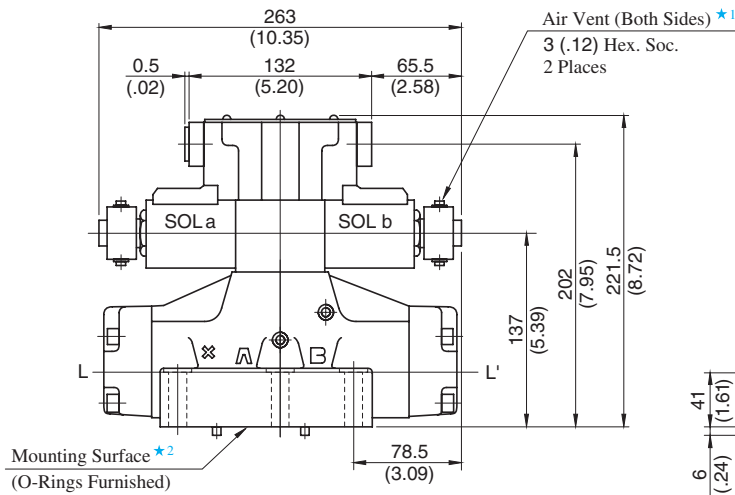
"G" Series Shockless Type
Solenoid Controlled Pilot Directional Valves

G-DSHG-06-3C*-**-50/5090

Mounting Surface:
ISO4401-AE-08-4-A



| Model Numbers | "C" Thd. |
|-----------------------|----------|
| G-DSHG-06-3C*-**-50 | G 1/2 |
| G-DSHG-06-3C*-**-5090 | 1/2 NPT |



- ★ 1. Air vent position around valve longitudinal axis can be optionally selected.
 - ★ 2. O-rings for ports: SO-NB-P30 for P/A/B/T ports
SO-NB-P14 for X/Y ports
- Note: For the valve mounting surface dimensions, see the dimensional drawing of the sharable sub-plate in [page 403](#).

DIMENSIONS IN
MILLIMETRES (INCHES)

● **Models with Stroke Adjustment (Option)**

G-DSHG-06-3C*-**-R*-**-50/5090

