

Fluid Types

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

Petroleum base oil	Use equivalent to ISO VG32 or VG46.
Synthetic Fluids	Use phosphate ester type fluid. When phosphate ester fluid is used, prefix “F-” to the model number because the special seals (fluororubber) are required to be used.
Water Containing Fluids	Use water-glycol fluid.

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

Recommended Fluid Viscosity and Oil Temperature

Use under conditions where the viscosity and temperature of the hydraulic fluid remain in the ranges indicated in the following table.

Name	Viscosity	Temperature
Remote Control Relief Valve Direct Type Relief Valve Cartridge Type Relief Valves Cartridge Type Remote Relief Valves Direct Type Relief Valves Pilot Operated Relief Valves Solenoid Controlled Relief Valves Pilot Operated Relief Valves H Type Pressure Control Valves HC Type Pressure Controls Valve Pressure Reducing Valve Pressure Reducing and Check Valve Unloading Relief Valves Pressure Switches Hydro-Electric Pressure Switches	15 to 400 cSt	-15 to +70 ⁰ C

* If the valve is provided with a vent restrictor (ex.:A-BSG-03), the viscosity range should be 15-200 cSt.

Control of Contamination

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

Mounting Bolt Tightening Torques

Sl. No.	Size	Tightening Torque Kgf-cm
1	M5	90.0
2	M6	154.0
3	M8	365.0
4	M10	720.0
5	M12	1235.0
6	M16	3010.0

Fluid Types

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

Petroleum base oil	Use equivalent to ISO VG32 or VG46.
Synthetic Fluids	Use phosphate ester type fluid. When phosphate ester fluid is used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.
Water Containing Fluids	Use water-glycol fluid.

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

Recommended Fluid Viscosity and Temperature

Use hydraulic fluids which satisfy the recommended viscosity and oil temperature given below.

Name	Viscosity	Temperature
Flow control valves Flow control and check valves Feed Control Valves	20 to 200 cSt	-15 to +70°C
Throttle and Check Valves Deceleration Valves Deceleration and Check Valves	15 to 400 cSt	

Control of Contamination

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

Mounting Bolt Tightening Torques

Sl. No.	Size	Tightening Torque Kgf-cm
1	M5	90.0
2	M6	154.0
3	M8	365.0
4	M10	720.0

Solenoid

■ Solenoid connector (DIN connector)

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

■ Plug-in connector

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

Plug-in connector type with solenoid indicator light

A solenoid indicator light is added to the above mentioned plug-in connector type.

Operation of the solenoid easily identified.

■ AC Solenoid

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

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

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

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

■ R Type Models with Current Rectifier and DC Solenoid

Specially designed DC solenoid and receptacle (or connector) containing AC-DC rectifier and transient peak suppressor are provided. Connection to be made to AC Power source as with conventional AC solenoid.

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

■ RQ Type Models with Current rectifier and quick Return Solenoid

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


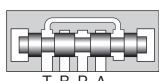

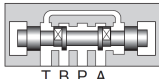

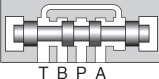

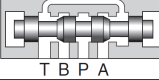

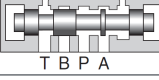
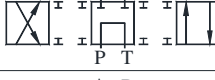
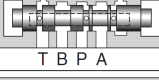

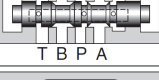










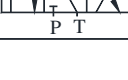
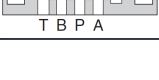
■ Insulation class of Solenoid: Class-H

Directional Valves

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

Spool Types

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

Spool Type	Graphic Symbols	Schematic Drawing (Centre Position)	Functions and Application
2 (Closed Centre All Ports)			Hold pumps pressure and cylinder position at neutral. Care should be paid if used cylinder as a 2-position type because shock occurs when each port is blocked in Transit.
3 (Open Centre All Ports)			Pump can be unloaded and actuator is floating at neutral. If a 2-position type is used, shock reduced as each port is released to tank in transit.
4 (Open Centre A, B&T)			Pump pressure is held and actuator is floated at neutral. 2-position type is used when system pressure is required to be held in transit. Shock during transit is less compared to spool type "2"
40 (Open Centre A, B&T Restricted Flow)			In a variation of spool type "4", a restrictor is provided in A-T and B-T ports, making it faster at stopping the actuator.
5 (Open Centre P, A&T)			It can be used when a pump is loading at neutral and actuator is halted at one way flow.
6 (Open Centre P&T Closed Crossover)			Pump is unloading and actuator position held at neutral. Suitable for series operation.
60 (Open Centre P&T Open Crossover)			It is a variation of spool type "6". Shock is reduced as each port is released to tank on transit.
7 (Open Centre All Ports Restricted Flow)			Mainly used as a 2-position type. Shock is reduced on transit.
8 (2-Way)			Pump pressure and cylinder position is held at neutral in the same way as spool type "2". It is used as 2 way type.
9 (Open Centre P, A&B)			Regenerative circuit is provided at neutral.
10 (Open Centre B&T)			Prevent actuator from one direction drift by leakage of P port at neutral.
11 (Open Centre P&A)			Half actuator movement positively at B, T ports blocked P, A ports connected at neutral.
12 (Open Centre A&T)			Prevent actuator from one direction drift by leakage of P port at neutral.

Mounting Surface

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

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

Instructions

- Mounting**

(S-) DSG-01	No –spring detented models not energized continuously must be installed so that the spool axis L-L' is horizontal.
(S-) DSG-03	
(S-) DSHG-※	Otherwise there is no mounting restrictions.

- Energisation**

1 No-Spring Type

One of two solenoid should be energized continuously to avoid malfunction.

2 On double solenoid valves do not energise both at the same time as it will result in coils burning out.

- Valve Tank Port**

Avoid connecting the valve tank port to a line with possible surge pressure.

Piping end of tank line should be submerged in oil.

- Pilot Drain Port for Solenoid Controlled Pilot Operated Valve**

Avoid connecting the valve pilot drain port to a line with possible surge pressure.

Piping end of drain should be submerged in oil.

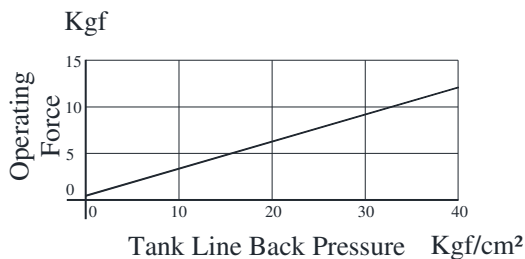
- Shockless Type**

In order to benefit from a shockless operation, it is necessary to fill the tank with operating oil.

Only after the tank line has been filled with operating oil the valve should be used on a regular basis.

- Operating Force by Manual Actuator**

Take care as the operating force by the manual actuator increases in proportion to the tank line back pressure. (See the graph below.)



■ Type of Fluids

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

Petroleum base oil	Use equivalent to ISO VG32 or VG46.
Synthetic Fluids	Use phosphate ester type fluid. When phosphate ester fluid is to be used, prefix “F-” to the model number because a special seal (fluororubber) will be used.
Water Containing Fluids	Use water-glycol fluids or w/o emulsion type fluids.

- Note: 1 Not applicable with G-DSG series valves.
 2 Water -glycol fluids cannot be used for CDSG-03 types.
 3 For use with hydraulic fluids other than those listed above, please consult Yuken representatives in advance.

■ Recommended Fluid Viscosity and Oil Temperature

Use hydraulic fluids which satisfy the recommended viscosity and oil temperature given in the table below.

Name	Viscosity	Temperature
Solenoid Operated Directional Valves Solenoid Controlled Pilot Operated Directional Valves Pilot Operated Directional Valves Manually Operated Directional Valves Cam Operated Directional Valves In-Line Check Valves Right Angle Check Valves Pilot Controlled Check Valve Solenoid Operated Poppet Type Two-Way Valve Poppet Type Directional Valves Double Locking Check Valve	20 – 200 cSt	-15 to +70°C
G series Shockless Type Solenoid Operated Directional Valves (Shifting Time Adjustable)	15 – 200 cSt	-15 to +60°C

■ Control of Contamination

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

■ Mounting Bolt Tightening Torques

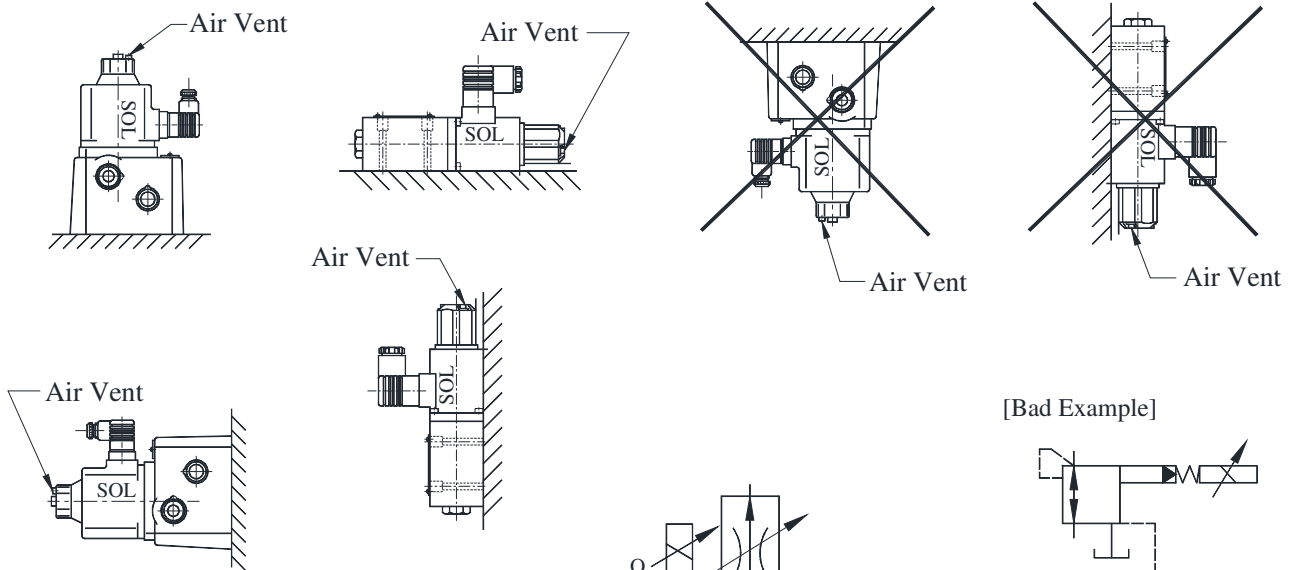
Sl. No.	Size	Tightening Torque Kgf-cm
1	M5	90.0
2	M6	154.0
3	M10	720.0
4	M12	1235.0
5	M16	3010.0
6	M20	5860.0

Care in Application

Control Valve Installation Requirements

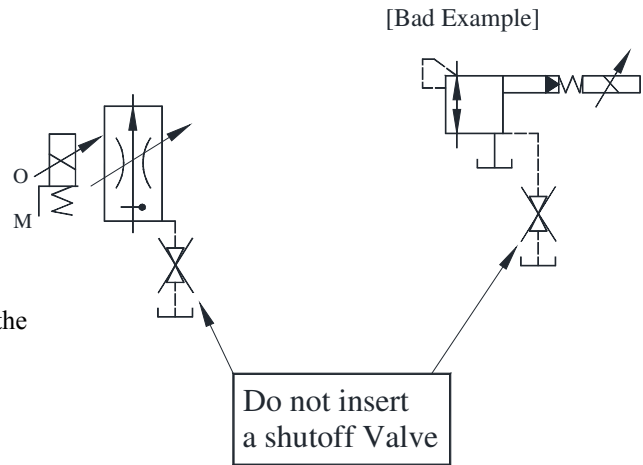
Mounting

Be sure that Air Vent faces up. In addition, if the valve is positioned vertically, the minimum adjustment pressure is 2 Kgf/cm² or higher.



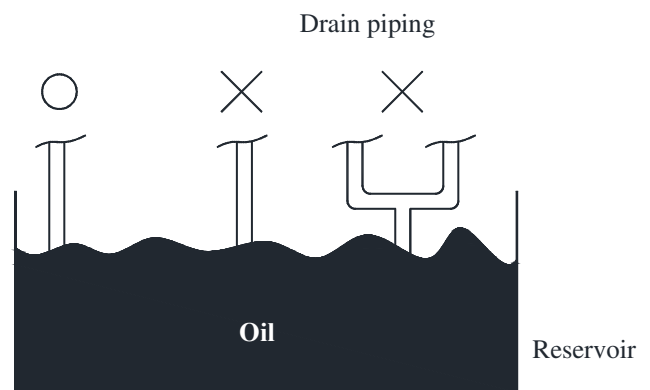
Do not Insert the Shut -off Valve in the Drain line

If the drain line is closed with the shut-off valve, then the solenoid inner pressure rise unduly to incur machine malfunction or breakage.



Ensure that the drain piping is separated from the other drains and positioned below the reservoir oil level

The drain piping must be such that no air intake occurs. Furthermore to minimize the effect of back pressure, the drain line is not connected to the other drains.



Operating Precautions

Electrical

- Do not insert or take out PC boards from the inside with the power amplifier turned on.
- Do not connect or disconnect the control valve solenoid connector with the power amplifier turned on.

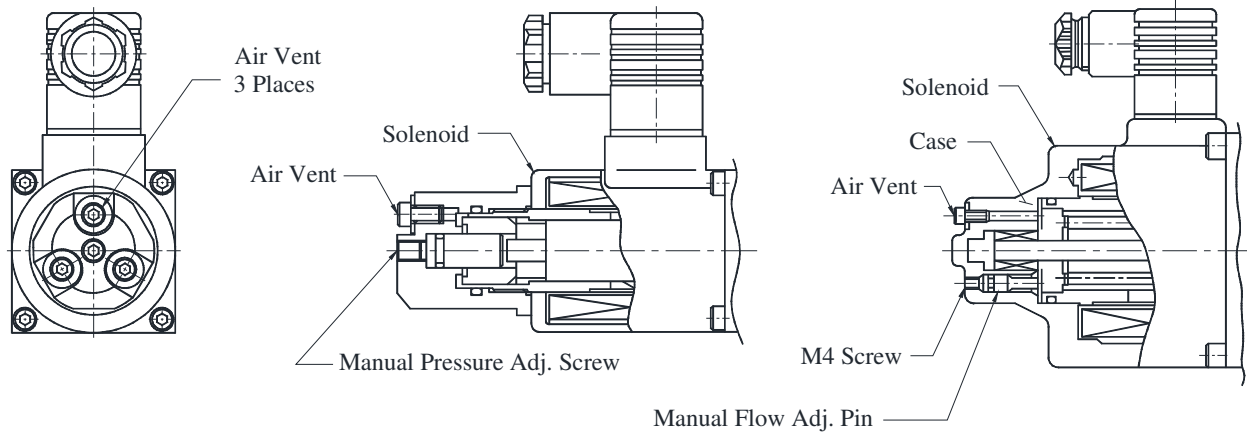
Control Valve

- Before test run or adjustment, be sure to bleed the control valve of air. Conduct air bleeding periodically.
- Before using the power amplifier for test run or adjustment purposes, be sure to manually operate the control valve with its manual adjustment screw to check that the hydraulic circuit is normal.

Air Bleeding

To ensure stable control, conduct air bleeding thoroughly and fill the solenoid cover with oil.

Air bleeding can be done by slowly loosening one of the air vents at the end of the solenoid. Choose one of the three air vents which is expected to work most effectively.



Manual Adjusting Screw

When initial adjustments are to be made or when no current is supplied to the valve due to electric failure or other problem, turn the manual adjusting screw to temporarily set the valve pressure/flow rate. Under normal conditions, however, this screw must be kept in its original position (see the figure below).

Tank and Drain Piping

The tank-line back pressure and drain back pressure directly affect the minimum adjustment pressure. Therefore, do not connect the tank or drain pipes to other lines, but connect them directly to the reservoir maintaining the back pressure as low as possible. Be sure that the tank and drain pipes ends as immersed in fluid.

Hysteresis and Repeatability Value Indication

The hysteresis and repeatability values indicated in the specifications for each control valve are determined under following conditions:

- Hysteresis Value: Obtained when Yuken's applicable power amplifier is used.
- Repeatability Value: Obtained when Yuken's applicable power amplifier is used under the same conditions.

Hydraulic Fluids

1. Fluid Types

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

Petroleum based oil	Use fluids equivalent to ISO VG32 or VG46
Synthetic fluids	Use phosphate ester or polyol ester fluid. When phosphate ester is to be used, Prefix - "F"- to the model number because a special seal (Flurorubber) will be used.
Water containing fluids	Use water glycol fluid.

2. Recommended Fluid Viscosity and Temperature

Use under conditions where the viscosity and temperature of the hydraulic fluid remain in the ranges indicated in the following table.

Name	Viscosity	Temperature
Remote Control Relief Valves Direct Type Relief Valves Pilot operated Relief Valves Solenoid Controlled Relief Valves HC Type Pressure Control Valves Pressure Reducing and Check Valve Unloading Relief Valve Pressure Switches	15-400 cSt	-15+70 ⁰ C

3. Control of Contamination

Due caution must be paid to maintain control over contamination of the hydraulic fluids which may otherwise, lead to breakdown and shorten the life of the valve. Please maintain the degree of contamination within NAS 1638-Grade 11. Use 20 μm or finer filter.

■ Mounting Bolt Tightening Torques

Sl. No.	Size	Tightening Torque Kgf-cm
1	M5	90.0
2	M8	365.0
3	M10	720.0
4	M12	1235.0
5	M16	3010.0