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Instruction Manual

ELDFG-*EH Series
Direct Operated and High Response Type
Proportional Electro-Hydraulic
Directional and Flow Control Valves

Model: ELDFG-01EH-*--*-10**

Model: ELDFG-03EH-*--*-10**

- To ensure safe and correct use of the product -

- To ensure proper handling of the product, read this manual thoroughly before use.
- Be sure to follow the instructions described in the Safety Precautions section of this manual.
- Keep this manual at hand for future reference.
- When creating instruction manuals for systems equipped with the product, be sure to reflect the contents of this manual in such documents.

About This Manual




- Some figures and illustrations in this manual are simplified and may not be an exact representation of the product.
 - The contents of this manual are subject to change without prior notice as improvements are made to the product.
 - Although this manual has been prepared with great care, please contact the place of purchase or our customer support if you find any ambiguous explanations, errors, or omissions.
 - If there are missing pages or erratic pagination in this manual, please contact our customer support. We will replace the manual.
 - Reprint, reproduction, or modification of this manual without the permission of YUKEN KOGYO CO., LTD. is prohibited.
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■ Safety Precautions

- This manual is intended for users of the product with basic knowledge of hydraulics (who are at least equivalent to a class-2 hydraulic system control engineer or who have received technical training from YUKEN KOGYO).
- The product should be handled by users with knowledge equivalent to that stated above or under the supervision of such personnel.
- Be sure to provide end-users with the instructions, warnings, and cautions described in this manual.
- Be sure to attach this manual when transferring or reselling the product.

Safety precautions in this manual are classified into three levels: "DANGER", "WARNING", and "CAUTION". Be sure to read and understand the safety precautions before reading the main body of this manual.

Symbols and definitions for safety precautions in this manual are as follows.

	DANGER	Indicates an imminent danger that is very likely to cause death or severe injury if the instructions are ignored.
	WARNING	Indicates a potential danger that may cause death or severe injury if the instructions are ignored.
	CAUTION	Indicates a potential danger that may cause injury or property damage if the instructions are ignored.

Ignoring safety precautions labeled "CAUTION" may result in serious consequences depending on the situation. Regardless of their classification, all safety precautions contain important instructions. Be sure to follow them.

YUKEN KOGYO CO., LTD. assumes no liability for any accident or damage arising from the use or operation of the product in a manner other than specified in this manual.

— Always follow the safety precautions. —

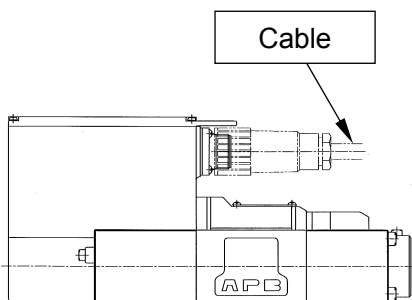
⚠ DANGER

Never use the product in an explosive atmosphere where flammable gases or explosives are handled. Doing so may result in a fatal accident, such as fire or explosion.

Foreign matter in hydraulic fluid may result in malfunction of the product. Keep hydraulic fluid clean (NAS 1638 class 10 or better).

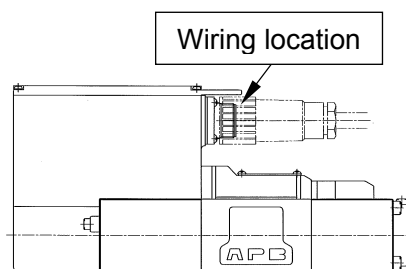
⚠ WARNING

When handling the valve, pay attention not to apply tension to the cable. Doing so may cause malfunction due to cable breakage.



Do not apply load to the cable.

The connector is not included with the valve. Wire the valve correctly by using the specified standard connector and referring to the instructions for the connector. For the use of YUKEN's connector TK290457-1, see the "Wiring" section of this manual.



Make sure of correct wiring!

Never touch the connector while the power is on. Doing so may cause electric shock, resulting in a fatal accident.

Do not modify the product. Doing so may prevent the product from achieving the design performance and impair safe operation.

⚠ CAUTION

Do not step on or put any heavy object on the product. Doing so may result in damage to the product/equipment or injury from collapse/falling.

Valve characteristics may vary depending on the load pressure and fluid temperature. Make adjustments so that the valve can accelerate, decelerate, and stop safely across the entire range of operating pressures and fluid temperatures.

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1. Introduction

1.1 Intended users of the product

The product should be handled by users with basic knowledge of hydraulics and electrics (who are at least equivalent to a class-2 hydraulic system control engineer, who have received technical training from YUKEN KOGYO, or who can fully understand the contents of this manual) or under the supervision of such personnel.

1.2 Intended purpose

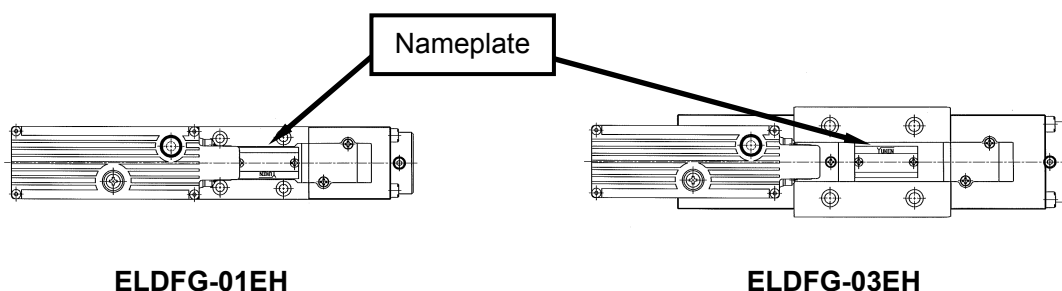
The valves are closed loop, high response type proportional electro-hydraulic directional and flow control valves with OBE (on-board electronics). With closed loop control based on a combination of newly developed compact, powerful solenoids and a LVDT for spool position detection, the valves provide high response, high accuracy, and high reliability equivalent to those of simple servo valves. The spool type 3C2L is suitable for position control (2% overlap).

1.3 Product check

Check the following points upon delivery of the product.

If any questions or problems arise, please contact the place of purchase or our local customer support.

- Check that the model is correct.
Check the model number marked on the nameplate.



- Check for any damage to the product and/or loose screws.
- Check that all accessories are included.

1) Port O-rings (attached to Ports P, A, B, and T on the valve mounting surface)

Valve Model Number	Ports P, A, B, and T	Qty.
ELDFG-01EH	AS568-012(NBR, Hs90)	4
ELDFG-03EH	AS568-014(NBR, Hs90)	5

For phosphate ester type fluids, special seals (fluororubber) are required.

2) Valve mounting bolts




Valve Model Number	Valve Mounting Bolt	Qty.
ELDFG-01EH	M5 × 45L	4
ELDFG-03EH	M6 × 35L	4

Note) The connector is separately available. Use a 6 + PE connector [EN175201 Part 804]. When using YUKEN's connector, place your order by specifying the following parts number.

YUKEN parts number: TK290457-1

2. About the product

2.1 Model number designation

ELDF	G	- 01	EH	- 35	- 3C2P	- XY	- C	T	10
Series Number	Type of Mounting	Valve Size	Amplifier Type	Rated Flow L/min ($\Delta P=1$ MPa)	Spool Type *1	Direction of Flow	Fail-Safe Function	Input Signal/Spool Travel Monitoring	Design Number
ELDFG: Direct Operated and High Response Type Proportional Electro-Hydraulic Directional and Flow Control Valves	G: Sub-plate Mounting	01	EH: OBE Type	10: 10 L/min 20: 20 L/min 35: 35 L/min	3C2: 10% Overlap  3C40: A, B, T Connection 	XY: Meter-In /Meter-Out	C: Neutral A: P→A, B→T Position B: P→B, A→T Position	D: Voltage Signal ± 10 V (P→A→B→T Flow with Positive Input) E: Current Signal 4 - 20 mA (P→A→B→T Flow with 12 - 20 mA Input) F: Current Signal ± 10 mA (P→A→B→T Flow with Positive Input)	10
		03		40: 40 L/min 80: 80 L/min	3C2L: 2% Overlap  (Linear Flow Gain)				

*1. The spool in the neutral position is shown.

*2. Phosphate ester type fluids are also supported. When phosphate ester type fluids are used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.

2.2 Specifications

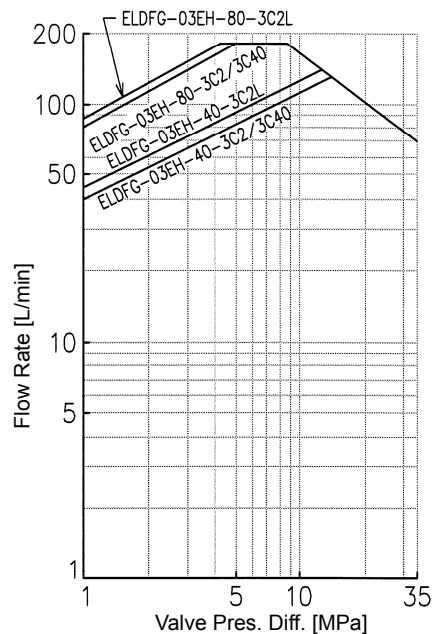
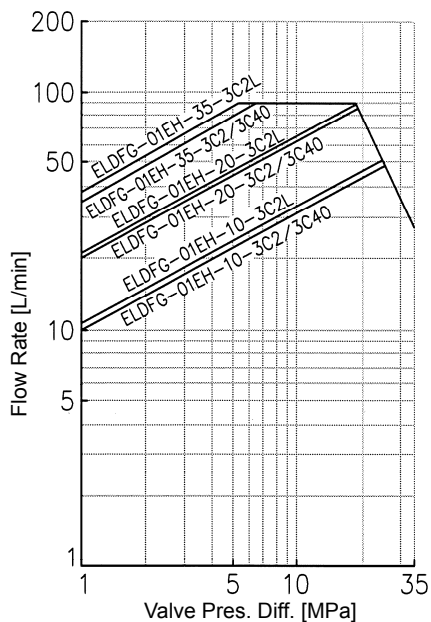
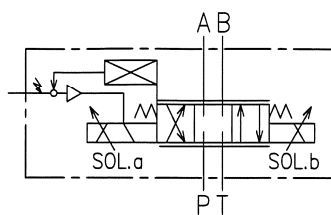
Model Number	ELDFG-01EH			ELDFG-03EH		
	-10-3C*	-20-3C*	-35-3C*	-40-3C*	-80-3C*	
Max. Operating Pressure	MPa					
Max. Tank Line Back Pressure	MPa					
Rated Flow @ $\Delta P = 1$ MPa (4-Way Valve)*1	L/min	10	20	35	40	80
Hysteresis	0.1% or less					
Repeatability	0.1% or less					
Step Response (Typical Rating)*2	(0↔100%V) ms	16			23	
	(100↔0%V) ms	16			23	
Frequency Response ($\pm 25\%$ Amplitude) (Typical Rating)*2	(Phase: -90°) Hz	80			50	
	(Gain: -3 dB) Hz	80			50	
Vibration Proof	G	10				
Protection	IP65					
Ambient Temperature	$^\circ\text{C}$	$-15 - +60$				
Spool Stroke to Stops	mm	± 2.5			± 3	
Coil Resistance [20 $^\circ\text{C}$]	Ω	3			2	
Current Consumption	A	2 (Impulse Load: 3 A)				
Approx. Mass	kg	3.3			7.3	
Electric Connection	6 + PE Connector					

*1. Use the valves so that the relationship between the valve pressure difference and the flow rate, as specified in "Range of flow control" on page 7, is met.

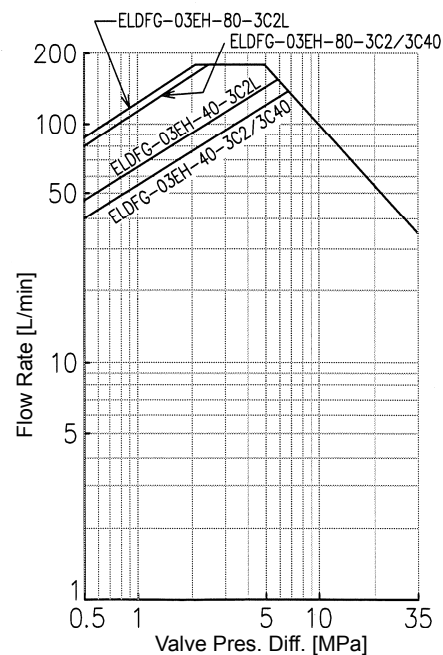
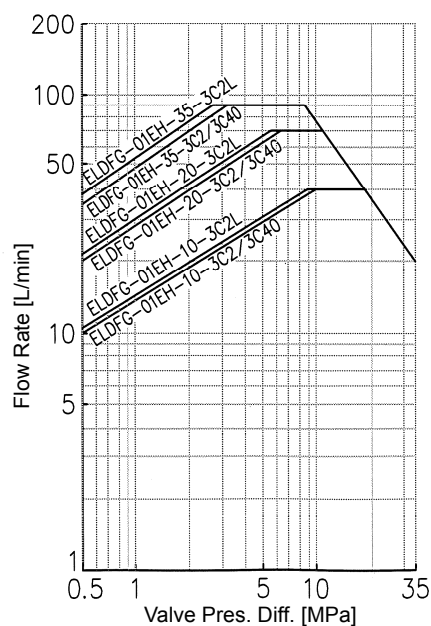
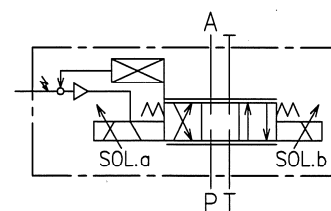
*2. This value is measured for each valve at a supply pressure of 14 MPa; it may differ depending on the actual circuit and operating conditions.

2.2.1 Range of flow control

- Control Method: 4-Way Valve

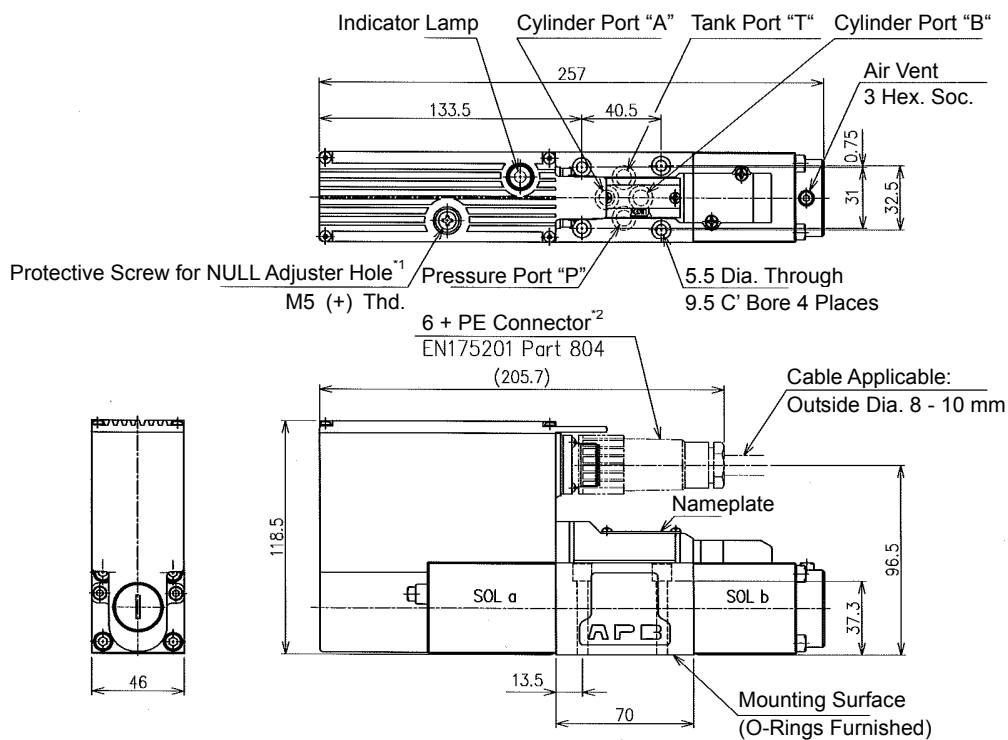


- Control Method: 3-Way Valve



2.3 External dimensions/valve mounting surface dimensions

ELDFG-01EH-*-XY-*-10



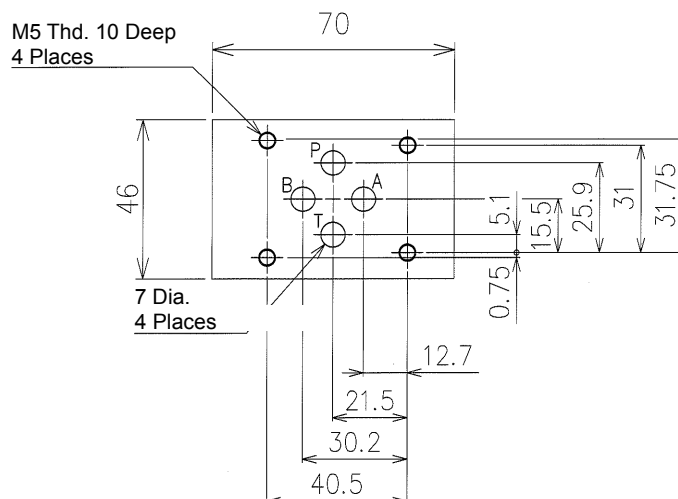
Color	Indicator Lamp
Green	Power Supply
Red	Deviation Alarm

- O-Rings for the Ports
AS568-012 (NBR, Hs90): 4 Pieces

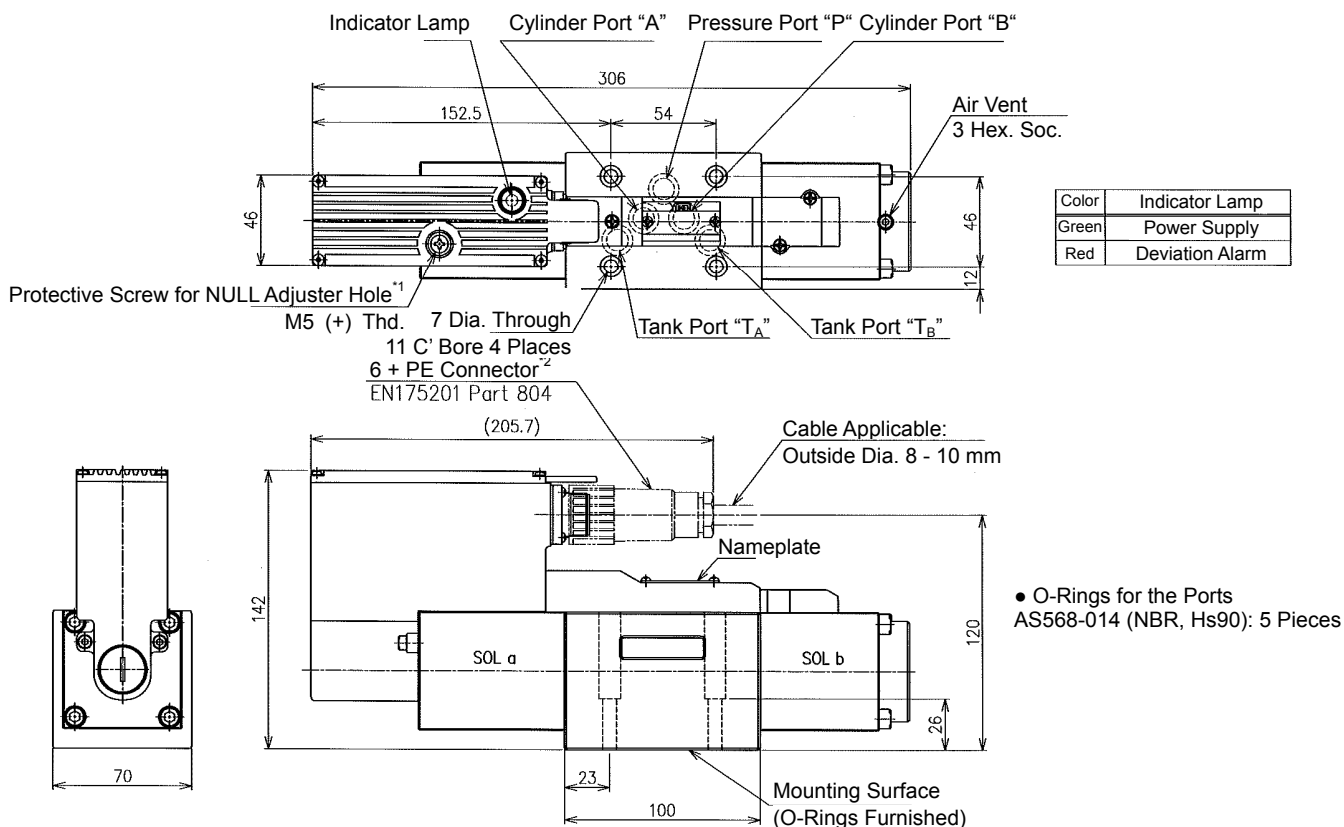
- *1. For NULL adjustment, remove the protective screw and turn the trimmer behind the screw. After adjustment, be sure to attach the protective screw.
- *2. The 6 + PE connector is not included with the valve. Prepare it separately.
YUKEN parts number: TK290457-1

• Dimensions of Mounting Surface

Prepare the mounting surface as shown below. Basically, the dimensions of the mounting surface conform to ISO 4401-03-02-0-94. The mounting surface should have a good machined finish, e.g. surface roughness of 6-S.



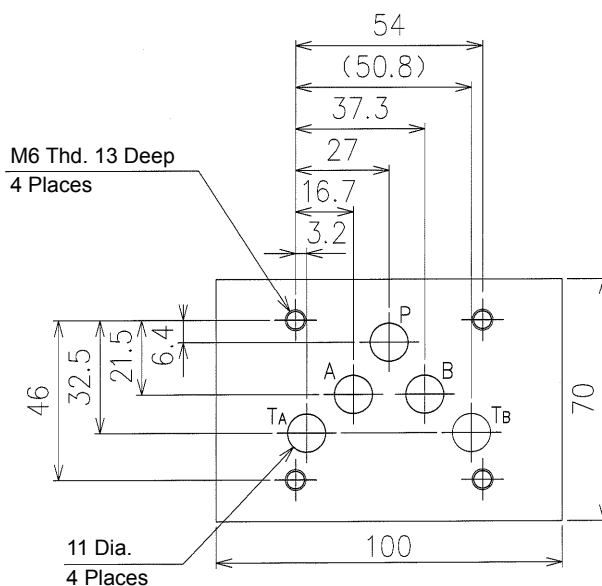
ELDFG-03EH-*-XY-*-10



- *1. For NULL adjustment, remove the protective screw and turn the trimmer behind the screw. After adjustment, be sure to attach the protective screw.
- *2. The 6 + PE connector is not included with the valve. Prepare it separately.
YUKEN parts number: TK290457-1
- *3. With standard sub-plates, one ("T_A") of the two tank ports is used, but either one may be used.

● Dimensions of Mounting Surface

Prepare the mounting surface as shown below. Basically, the dimensions of the mounting surface conform to ISO 4401-05-04-0-94. The mounting surface should have a good machined finish, e.g. surface roughness of 6-S.



2.4 Fail-safe function

With reference to the information given below, select the option for the fail-safe function according to the use of applications. A separate safety circuit should be provided if the hydraulic actuator must be reliably held or stopped to ensure safety in the event of electric failure (power failure, power cable disconnection, etc.) or upon startup.

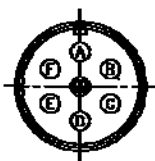
- Electric System: OFF

Model Number	Fail-Safe Function ^{*1}		
	Spool Position	Function	Graphic Symbols
(F-)ELDFG-*EH-*-3C2-XY-C	Neutral	All Ports Blocked	
(F-)ELDFG-*EH-*-3C2L-XY-C	Neutral	-	or or
(F-)ELDFG-*EH-*-3C40-XY-C	Neutral	A, B, T Connection	
(F-)ELDFG-01EH-*-*-XY-A	ab.20%	P→A→B→T Position	
(F-)ELDFG-01EH-*-*-XY-B	ab.20%	P→B→A→T Position	
(F-)ELDFG-03EH-*-*-XY-A	ab.17%	P→A→B→T Position	
(F-)ELDFG-03EH-*-*-XY-B	ab.17%	P→B→A→T Position	

*1. The fail-safe function's activation time depends on the electric and hydraulic conditions.

2.5 Electrical specifications

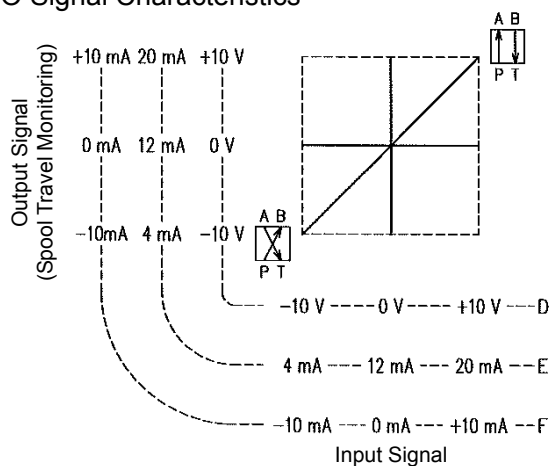
Valve Model		ELDFG-*EH-*-D	ELDFG-*EH-*-E	ELDFG-*EH-*-F
Pin A	Power Supply	24 V DC (21.6 - 26.4 V DC Included Ripple), 75 VA or more		
Pin B		0 V		
Pin C	Signal Common	COM (0 V)		
Pin D	Input (+) (Differential) ^{*1}	0 - ±10 V Ri ≥ 50 kΩ	4 - 20 mA Ri = 200 Ω	0 - ±10 mA Ri = 200 Ω
Pin E	Input (-) (Differential) ^{*1}			
Pin F	Spool Travel Monitoring	0 - ±10 V Ri ≥ 10 kΩ	4 - 20 mA Ri = 100 - 500 Ω ^{*2}	0 - ±10 mA Ri = 100 - 500 Ω ^{*2}
Pin	Protective Earth	-		



*1. Differential input signals can be used only for the valves with the voltage signal specifications of ±10 V (ELDFG-*EH-*-D).

*2. The recommended load resistance is 200 Ω.

• I/O Signal Characteristics



3. Valve installation

3.1 Valve mounting surface dimensions

For the valve mounting surface, see the table below.

For the detailed dimensions of the mounting surface, see 2.3 or the installation drawing.

The mounting surface should have a good machined finish, e.g. surface roughness of 6-S.

Valve Model Number	Mounting Surface
ELDFG-01EH	Basically, conforming to ISO 4401-03-02-0-94.
ELDFG-03EH	Basically, conforming to ISO 4401-05-04-0-94.

* Use the dimensions of the valve mounting surface specified in 2.3 or the installation drawing.

3.2 Required tools

Prepare the tools listed below.

Valve Model Number	Tool Name	Use
ELDFG-01EH	Hexagon Wrench (Width Across Flats: 4 mm)	For M5 Valve Mounting Bolts
ELDFG-03EH	Hexagon Wrench (Width Across Flats: 5 mm)	For M6 Valve Mounting Bolts
ELDFG-*EH	Phillips Screwdriver for M5 Screws	For Protective Screw for NULL Adjuster Hole

3.3 Check of the valve mounting surface

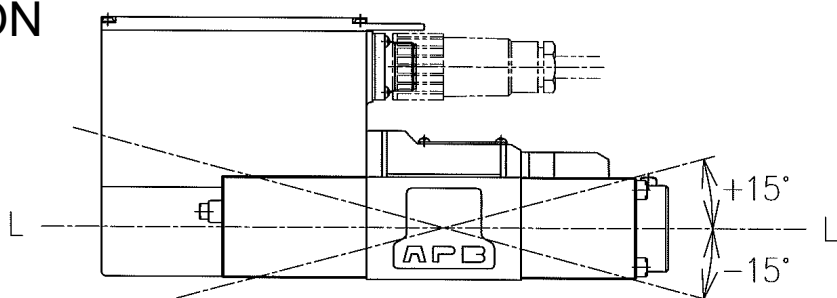
⚠ CAUTION

- (1) Any critical scratch on the valve's mounting surface may cause fluid leakage. In particular, take extra care to ensure that there is no critical scratch on the valve mounting surface of equipment.
- (2) Improper mounting of the O-rings may cause damage to them or outflow of hydraulic fluid. Check that the O-rings are properly mounted in the grooves.

3.4 Mounting position

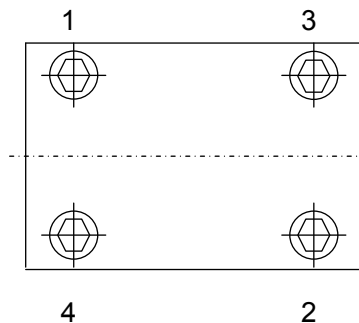
Mount the valve with the angle of the axis line L-L' within about $\pm 15^\circ$ from the horizontal plane as shown below.

⚠ CAUTION



3.5 Installation

Upon valve installation, check the port locations with reference to the installation drawing. Be careful to install the valve in the correct direction for the proper operation of equipment. When mounting the valve, use four hexagon socket head cap bolts supplied with the product. Tighten the bolts gradually and evenly in the order shown by the numbers 1 to 4 below and repeat this cycle two to three times. Refer to the recommended tightening torque listed below.



Tighten the bolts diagonally in the order of 1 → 2 → 3 → 4 → 1.

Bolt Tightening

Valve Model Number	Mounting Bolt	Tightening Torque
ELDFG-01EH	M5 × 45L	6 - 8 Nm
ELDFG-03EH	M6 × 35L	13 - 16 Nm



WARNING

For valve installation, use the specified number of bolts and apply the specified tightening torque. Failure to do so may cause damage to the bolts or outflow of hydraulic fluid, resulting in a major accident.

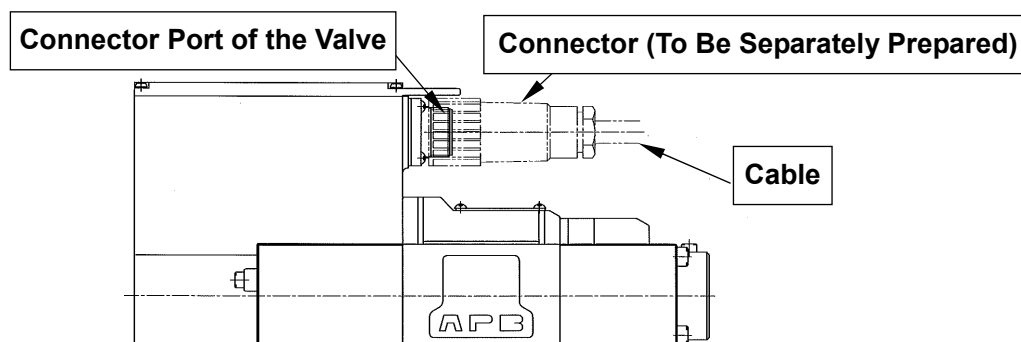


CAUTION

- (1) Install the valve in the correct direction. Failure to do so may interfere with the normal operation of equipment, resulting in a major accident.
- (2) Handle the valve carefully, since it is a precision device.
- (3) Do not install the valve with any foreign matter left between the valve and the mounting surface or with the O-rings mounted improperly. Doing so may cause damage to the O-rings or outflow of hydraulic fluid, resulting in injury or fire.

4. Wiring

To drive the valve, it must be wired to the power supply and the setting adjuster. Connect the cable/connector to the connector port of the valve as shown below.



Cable Connection for the Valve

According to the input signal type, determine the cable length with reference to the table below.

Valve Model Number	Input Signal Type	Maximum Cable Length for Input Signals
ELDFG-*EH*- D*	± 10 V	50 m*
ELDFG-*EH*- E*	4 - 20 mA	300 m
ELDFG-*EH*- F*	± 10 mA	

* If the cable length exceeds 50 m, consult us separately.

⚠ CAUTION Keep the power cable resistance within $1\ \Omega$ and as low as possible.

4.1 Recommended cable

Depending on the operating environment, use the following standard cable or the equivalent.

JCS 271 "Polyvinyl chloride insulated flexible cords for microphone (shielded)/MVVS" or the equivalent

JIS C 3306 "Polyvinyl chloride insulated flexible cords (shielded)/VCTF" or the equivalent

JIS C 3401 "Control cables (shielded)/CVVS" or the equivalent

- Finished outside diameter: 8 - 10 mm

- Nominal cross-sectional area:

0.75 - 1 mm² (cable length less than 25 m) or 1 mm² (cable length of 25 m or more)

⚠ CAUTION Be sure to use the recommended cable or the equivalent for protection against noise.

⚠ CAUTION Be sure to use a shielded cable, since noise generated with the solenoid powered on may affect other equipment depending on the wiring environment.

4.2 Connection between the cable and the connector

The connector is not included with the valve. Prepare a connector that conforms to the standard specified by YUKEN and wire it correctly by following the instructions for the connector.

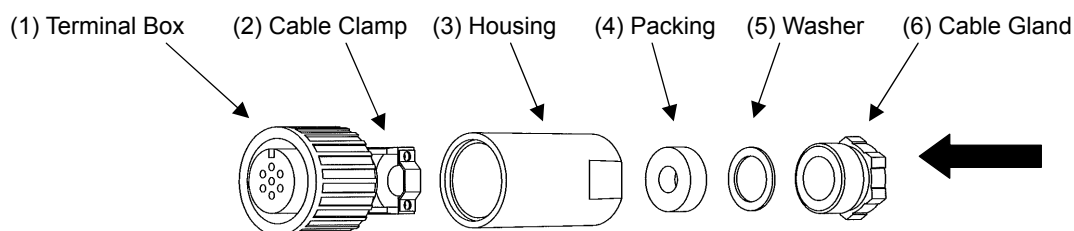
Connect the connector to the power supply and the setting adjuster via the recommended cable with reference to the connector pin assignment shown in 2.5 or the installation drawing.

For YUKEN's connector TK290457-1, see 4.2.1 "Assembly of the 6 + PE connector".

⚠ DANGER Do not wire the connector while the power is on. Doing so may cause electric shock, resulting in a fatal accident.

4.2.1 Assembly of the 6 + PE connector (YUKEN parts number: TK290457-1)

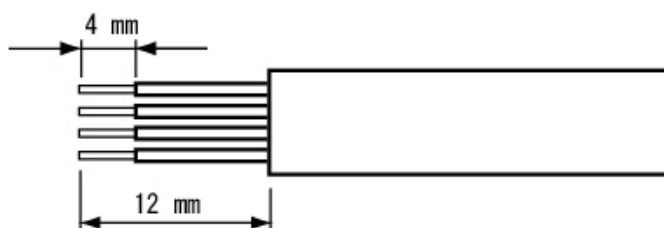
Components



Assembly

1. Cable preparation

- a. The applicable cable outside diameter is $\phi 8$ to 10 mm.
- b. The applicable lead wire size is 1.0 mm² (AWG17) or less.
- c. Terminate the end of the cable as shown below.



Peel off the length of the cable sheath and the ends of the lead wires as shown above.

2. Wiring

- a. Pass the cable through (6), (5), (4), (3), and (2) in this order in the direction of the arrow in the figure above.
- b. Solder the lead wires to the terminals in the terminal box (1). Then, tighten the screws of the cable clamp (2) to hold the cable sheath securely.
- c. Screw the housing (3) into the terminal box (1).
- d. Put the packing (4) and the washer (5) into the housing (3). Then, tighten the cable gland (6).

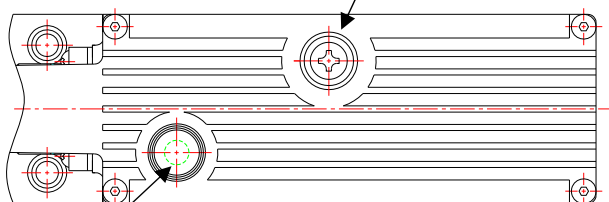
* The tightening force depends on the cable size. Tighten the cable gland so that no gap is left between the cable and the packing.

5. On-board amplifier

5.1 Appearance of the on-board amplifier

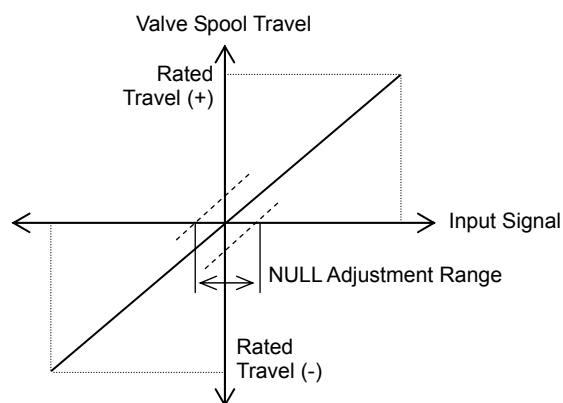
NULL Adjuster

This trimmer is used to adjust the neutral position of the valve spool. It is set by default. If neutral position adjustment is required for the load conditions, remove the protective screw (M5) and turn the trimmer behind the screw. After adjustment, be sure to attach the protective screw. The adjustment range is about $\pm 15\%$.



Indicator Lamp

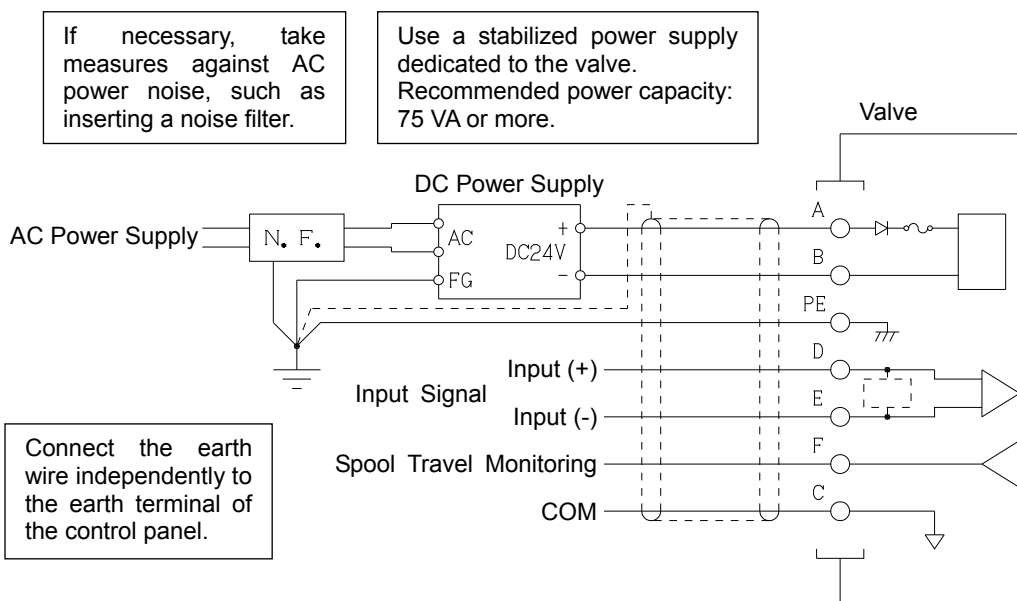
- Power Supply (Green)
Lights up when the valve is powered on.
- Deviation Alarm (Red)
Lights up when the spool travel deviates about 3% or more from the input value and does not follow the input signal for one second or more.



CAUTION

Do not remove the amplifier cover, since the amplifier contains precision devices. Doing so may cause malfunction or failure.

5.2 Wiring



⚠ WARNING

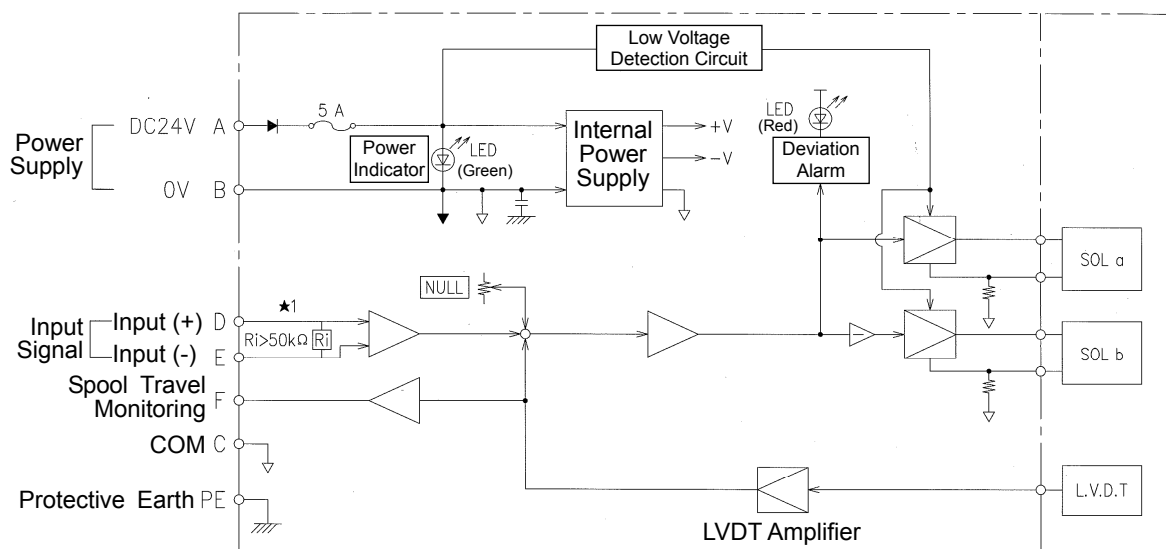
- ◆ When installing/relocating the valve or connecting the cable, be sure to turn off the main power supply in advance. Failure to do so may cause electric shock, fire, amplifier malfunction, or failure.
- ◆ Be sure to use the specified power supply voltage (24 V DC). Failure to do so may cause fire or electric shock.

⚠ CAUTION

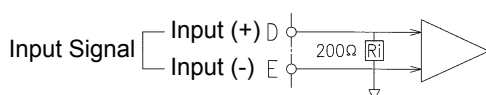
- ◆ The permissible power supply voltage fluctuation for the on-board amplifier is $\pm 10\%$. Surge voltage exceeding the permissible range may cause malfunction of the amplifier. To prevent such cases, take measures against noise, such as inserting a noise filter on the power supply side.
- ◆ Do not share the AC power source to the DC power supply with high noise generating equipment (solenoid operated directional valves, heaters, motors, etc.).
- ◆ If high noise generating equipment (e.g. inverter) is located in the same cabinet, use separate power supply filters and earth wires.

5.3 Block diagram

The circuit of the on-board amplifier is shown below.



★1. The input stage for the models (F-)ELDFG-*EH-*-*-*E/F (current signal) is as follow.



5.4 Description of signals

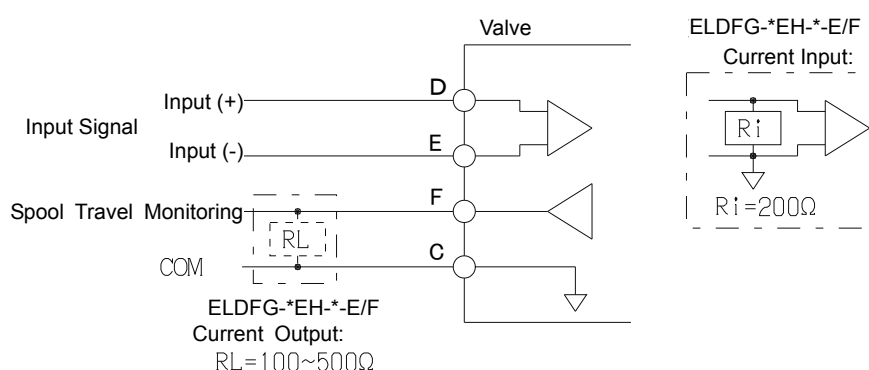
5.4.1 Input signal and spool travel monitoring

Input signals to drive the valve are used for spool position control.

The types of input and spool travel monitoring signals differ depending on the model number.

Model Number	Input Signal	Spool Travel Monitoring
ELDFG-*EH*-D	± 10 V	± 10 V
ELDFG-*EH*-E	4 - 20 mA*	4 - 20 mA
ELDFG-*EH*-F	± 10 mV	± 10 mV

* For the 4 - 20 mA type, an input signal of 1.5 mA or less means that the spool is in its neutral position (12 mA).



5.5 In the event of valve malfunction

In the event of valve malfunction, check the following items.

- (1) When the power indicator LED (green) does not light up:
 - Check the power supply voltage.
 - Check the power supply side if no voltage is present.
- (2) When the deviation alarm LED (red) lights up:
 - The spool has malfunctioned.
 - Spool sticking or seizure caused by foreign matter in the hydraulic fluid.
- (3) When the valve spool travel (monitored voltage) does not change in response to the command input
 - Check the command signal input.
 - Check the input signal and valve model (input type).
 - Check the wiring.
 - Check that each cable has been connected correctly.
 - Check the power supply voltage.
 - Check the power supply side if the voltage is low.

6. Operating the valve

6.1 Adjustment

- The neutral position of the valve spool has been adjusted. Do not disassemble the valve to adjust the neutral position.
- All trimmers for the on-board amplifier are set by default. If the adjustment of the neutral position of the valve spool is required for the actual load conditions, perform NULL adjustment as described in 5.1.

6.2 Operating environment

- Use this product for hydraulic circuit switching and speed/pressure adjustment for hydraulic equipment.
- To ensure the stable operation of the valve and the hydraulic circuit, bleed air completely from the hydraulic circuit.
- The valve may be used without air bleeding. If air bleeding is necessary, loosen the air vent to release air and make sure that the solenoid is filled with the hydraulic fluid. Note that air bleeding should be performed in unload condition.
- Take appropriate measures to protect the valve cable against noise. Using a cable longer than the specified length may interfere with the stable performance of the valve.
- Provide a separate safety circuit, if necessary, to securely hold/stop the hydraulic actuator for safety at the time of immediate shutdown or startup of hydraulic equipment.
- Do not operate the valve when the tank port is dry. If the tank port is dry, the inside of the solenoid core is not filled with the hydraulic fluid, resulting in unstable valve operation and/or solenoid failure.
- Do not connect the tank port to any line that generates a surge pressure. Doing so may cause malfunction or failure of the valve.
- Be sure to fill the tank port "T" with the hydraulic fluid. Providing a check valve with a cracking pressure of about 0.04 MPa is recommended to take back pressure. Do not connect the tank pipes to other lines, but connect them directly to the reservoir.
- For environmental requirements, such as water resistance and vibration conditions, refer to "Vibration Proof" and "Protection" in the specification table in 2.2 "Specifications".
- Meet the requirements for fluid viscosity and temperature specified in 6.3.2. Operate the valve at an ambient temperature of 0 to 50 °C under non-condensing conditions.
- Be sure to use the valve in the operating environment (ambient temperature, etc.) specified in this manual. Failure to do so may interfere with proper operation.

CAUTION

- (1) The product has a structure involving internal leakage. This internal leakage sometimes activates the actuator.
- (2) The valve may generate electrical noise from its solenoid. Be aware that such noise may affect surrounding electronic devices.
- (3) The valve may become excessively heated during operation. Avoid touching the valve (solenoid, in particular) during operation or immediately after the end of operation. Failure to do so may result in burn.
- (4) When operating the product manually, ensure safety by taking precautionary measures, e.g. keeping people away from the moving parts of equipment.

6.3 Hydraulic fluid

6.3.1 Fluid type

Petroleum base oil: Use a fluid equivalent to ISO VG32 or 46.

Synthetic fluid: Use a phosphate ester or polyol ester fluid.

When phosphate ester fluids are used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.

(Note) For use with hydraulic fluids other than those listed above, consult us separately.

6.3.2 Fluid viscosity and temperature

Meet the following requirements for fluid viscosity and temperature during operation.

- Viscosity: 15 to 400 mm²/s

- Fluid temperature: - 15 to 60 °C

Note that the recommended fluid temperature ranges from 40 to 50 °C.

6.3.3 Control of contamination

Contamination of hydraulic fluid with foreign matter often affects the proper operation of the valve. Keep hydraulic fluid clean and use a line filter. To ensure a longer service life of the valve, improving hydraulic fluid cleanliness is recommended.

Contamination Level
NAS 1638 Class 10
ISO 4406 21/19/15



CAUTION

Never use contaminated fluid.

Doing so may result in malfunction or failure of the valve.

7. Maintenance

- The service life of the O-rings is about two or three years depending on the condition of valve operation. Please keep spare O-rings handy for replacement in the event of fluid leakage.
- The components and performance of the valve deteriorate as the duration of service increases or depending on the operating conditions. To keep the valve in working order and prevent unexpected failure of hydraulic equipment, inspecting the valve regularly is recommended. The recommended inspection interval is at least two to three years. The valve deterioration conditions depend on the operating conditions of hydraulic equipment and the fluid contamination level. Thus, performing regular inspection depending on the situation is recommended. For periodic maintenance, contact our customer support.
- Contamination of hydraulic fluid with foreign matter often affects the proper operation of the valve. It may cause failure or shorten the valve's service life. Keep hydraulic fluid clean (contamination level: NAS class 10/ISO 4406 21/19/15 or better). Also, use a line filter and inspect/clean it regularly.
- Petroleum base oil containing water shortens the valve's service life. To avoid this situation, inspect the fluid regularly.
- Air entry into the circuit may impair the proper operation of the valve. Bleed air completely from the circuit.

8. Storage of unused valves

Store and manage unused and spare valves in a proper storage place.
To avoid rust and corrosion, do not store the valve in the following places.

- High-temperature, humid, or freezing places
- Places potentially exposed to the direct influence of weather
- Places where chemicals, such as organic solvents, acids, and alkalis, are present or the effect of vaporized gas potentially exists
- Places where dew condensation potentially occurs due to substantial temperature fluctuations

9. Disposal

When disposing of this valve, completely drain the hydraulic fluid and dispose of the valve as general industrial waste.

10. Customer service

If there are requests regarding our products or if any services are required, please contact the place of purchase, our customer support, or the following sales department.

- YUKEN KOGYO CO., LTD.

International Sales Department,
Global Business Division
4-4-34, Kamitsuchidana-Naka, Ayase,
Kanagawa Pref. 252-1113, Japan
Phone: +81-467-77-3111
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