

OBE (On-Board Electronics) Type High Response Proportional Electro-Hydraulic



Directional and Flow Control Valves (Two Stage Type)

ELDFHG-03EH-100-*-XY--**-10**

ELDFHG-10EH-1440-*-XY--**-10**

————— **Release of New Products** —————

We are pleased to announce the release of 3/8 sized version and 1 1/4 sized version which are high-flow and two stage type valves as an addition to our highly appreciated product series: OBE type high response electro-hydraulic directional and flow control valves series.

■Features

• Simple Operation and User-Friendliness

The addition of OBE to the ELDFHG series valves for simplified wiring offers simple operation and user-friendliness. Only with 24 V DC power supply and command signal input, the valves allow highly accurate and fast operation of hydraulic systems.

• Response Characteristics Equivalent to Simple Servo Valves

A closed loop structure provided by incorporating a differential transformer for spool position detection enables feedback control, achieving high response equivalent to a simple servo valve.

• High Accuracy

The valves have a hysteresis of 0.1% or less(In case of ELDFHG - 03EH, 0.2% or less), achieving high accuracy equivalent to that of servo valves. The 2% overlap type (spool type: 3C2L) with linear no-load flow characteristics is suitable for position and pressure control in machinery/equipment.

• Safety and Reliability

The valves support a fail-safe function to ensure safe operation in the event of electric failure (power failure, power cable disconnection, etc.).

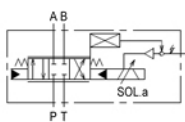
• High flow rate

No.	Series Number	Rated Flow L/min	Measurement Conditions
1	ELDFHG-03EH	90/100	ΔP = 1 MPa 4-Way Valve
2	ELDFHG-10EH	1440	

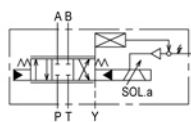


■JIS Graphic Symbols

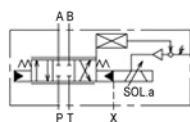
•Spool type “3C2”, “3C2P”, “3C2L”



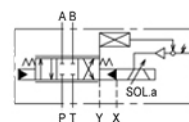
Internal Pilot
Internal drain type



Internal Pilot
Internal drain type

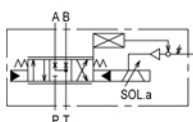


External pilot
Internal drain

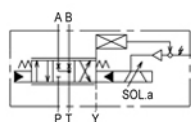


External pilot
Internal drain

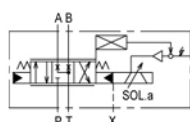
• Spool type “3C40”



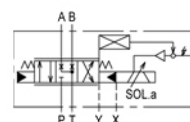
Internal Pilot
Internal drain type



Internal Pilot
Internal drain type



External pilot
Internal drain type



External pilot
Internal drain type

* “SOL.a” is for the model-03EH. For the model-10EH, it is “SOL.b”

■ Specifications

Model number		ELDFHG-03EH-100-3C2L	ELDFHG-03EH-100-3C2/3C2P/3C40	ELDFHG-10EH		
Rated Flow $\Delta P=1$ MPa (4-Way Valve) $\Delta P = 0.5$ MPa per Land		L/min	90	100	1440	
Max. Operating Pressure		MPa	31.5		35	
Max. T-Line Back Pressure *1	External Drain T Port	MPa	21		28	
	External Drain Y Port	MPa	21			
	Internal Drain T & Y Port	MPa	21			
Pilot Pressure*2		MPa	1.5 to 25			
Pilot Flow Rate*3		L/min	5 or more		17 or more	
Internal Leakage Supply Pressure: 14 MPa Pilot Pressure: 14 MPa Fluid Viscosity:	Pilot Valve	L/min	1.5 or less		1.8 or less	
		Main	3C2	-	0.5 or less	5.0 or less
			3C40	-	1.0 or less	9.0 or less
	3C2P		-	5.6 or less	14.5 or less	
	L/min	3C2L	1.6 or less	-	11.5 or less	
Hysteresis			0.2% or less		0.1% or less	
Step Response (0 \leftrightarrow 100%) V Pilot Pressure: 14MPa (Typical Rating)*4		ms	15	14	28	
Frequency Response $\pm 25\%$ Amplitude Pilot Pressure: 14MPa (Typical Rating)*4	Phase:-90°	Hz	50	55	33	
	Gain:-3 dB	Hz	56	60	40	
Vibration Proof*5		m/s ²	100			
Protection			Equivalent to IP65			
Ambient Temperature Range		°C	0 to +50			
Spool Stroke to Stops		mm	± 4	± 3.5	± 7	
Spool End Area		cm ²	3		11.3	
Current		A	2 (MAX. 3)			
Coil Resistance at 20 °C		Ω	3			
Approx. Mass		kg	10.7	8.2	74.5	
Electric Connection			6 + PE Connector [EN 175201 Part 804]			

*1: Max. T-Line back pressure should be the actual supply pressure or less.

*2: Supply pressure for the pilot valve should be within the range described above and should also be 60% of the actual main valve supply pressure or more.

*3: Pilot flow is calculated with the above step response time at pilot pressure 14 MPa.





*4: This value is measured on a per-valve basis under the conditions described above; it may differ depending on the actual circuit and operating conditions.

*5: There are restrictions on the mounting position. See page 4 for details.

■ Details of the valve 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.

No.	Model number	Fail-Safe Function	
		Spool Position	Function
1	ELDFHG-*EH*-3C2-XY-**-C	Neutral	All Ports Blocked 
2	ELDFHG-*EH*-3C40-XY-**-C	Neutral	A, B, T Connection 
3	ELDFHG-*EH*-3C2L/3C2P-XY-**-A	Valve Opening: 20%	PABT Position 
4	ELDFHG-*EH*-3C2L/3C2P-XY-**-B	Valve Opening: 20%	PBAT Position 

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

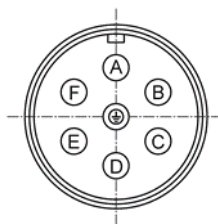
■ Model Number Designation

ELDFHG	- 03	EH	- 100	- 3C2P	- XY	- E	T	- C	- D	- 10
Series Number	Valve Size	Amplifier Type	Rated Flow L/min $\Delta P=1$ MPa (4-Way Valve)	Spool Type	Direction of Flow	Pilot Type	Drain Type	Fail-Safe Function	Input Signal/ Spool Travel Monitoring	Design Number
ELDFHG: Two Stage Type High Response Proportional Electro-Hydraulic Directional and Flow Control Valves (Sub-plate Mounting)	03	EH: OBE Type	100 100*2	3C2: 10% Overlap 3C40: A, B, T Connection 3C2P: Zero Lap (Dual Flow Gain) 3C2L: 2% Overlap (Linear Flow Gain)	XY: Meter-In/ Meter-Out	None: Internal Pilot E: External Pilot	None: External Drain T: Internal Drain	C: Neutral	D: Voltage Signal ± 10 V (PABT Flow with Positive Input) E: Current Signal 4 to 20 mA (PABT Flow with 12 to 20 mA Input) F: Current Signal ± 10 mA (PABT Flow with Positive Input)	10
	10		1440 1440	3C2: 10% Overlap 3C40: A, B, T Connection 3C2P: Zero Lap (Dual Flow Gain) 3C2L: 2% Overlap (Linear Flow Gain)				C: Neutral		

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

*2 For Spool Type 3C2L (2% Overlap), the rated flow will be 90 L/min

■ Electrical Specifications

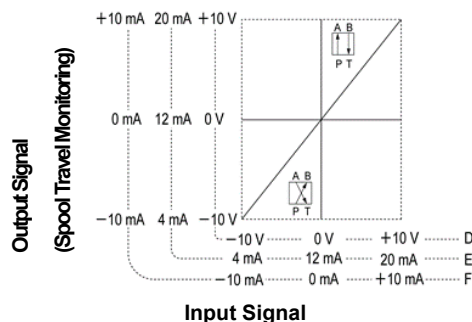


Input Signal		Voltage Signal "D"	Current Signal "E"	Current Signal "F"
Pin A	Power Supply	24 V DC (21.6 - 26.4 V DC Included Ripple), 75 VA or more		
Pin B		0 V		
Pin C	Signal Common	COM (0 V)		
Pin D	Input (+) (Differential)*1	0 - ± 10 V	4 - 20 mA	0 - ± 10 mA
Pin E	Input (-) (Differential)*1	$R_i \geq 50$ k Ω	$R_i = 200$ Ω	$R_i = 200$ Ω
Pin F	Spool Travel Monitoring	0 - ± 10 V $R_L \geq 10$ k Ω	4 - 20 mA $R_L = 100 - 500$ Ω *2	0 - ± 10 mA $R_L = 100 - 500$ Ω *2
Pin \oplus	Protective Earth	-		

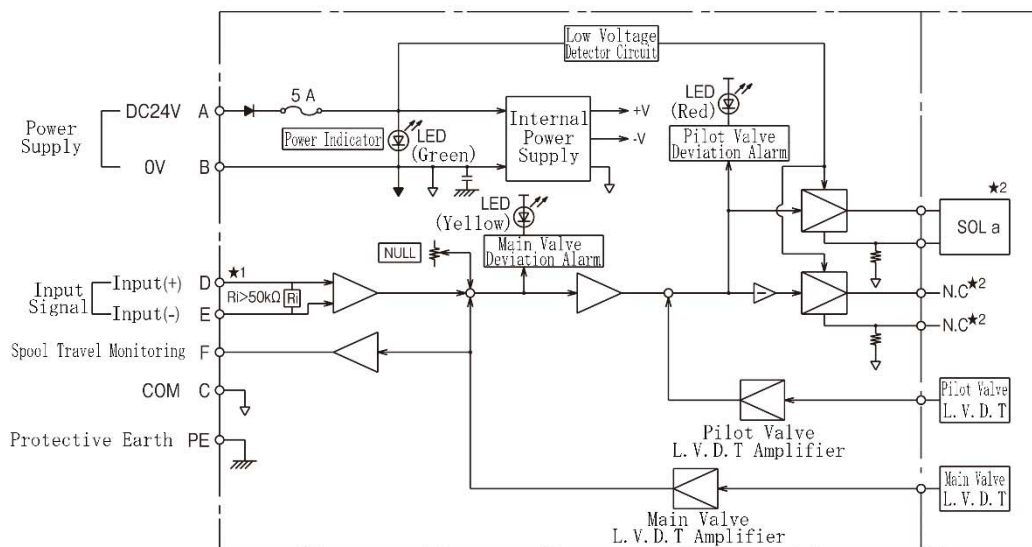
*1: Differential input signals can be used only for the valves with the voltage signal specifications of ± 10 V (ELDFHG-*EH-*D).

*2: The recommended load resistance is 200 Ω .

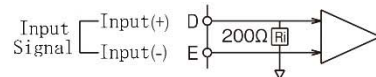
• I/O Signal Characteristics



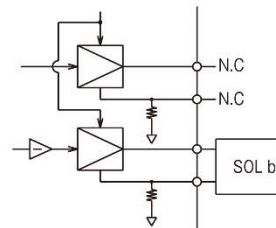
■ Block Diagram



★1. The input stage for the models. (F-)ELDFHG-**EH-*/E/F(Current Signal) is as shown below.



★2. SOL a: (F-)ELDFHG-03EH
SOL b: (F-)ELDFHG-10EH (See below)



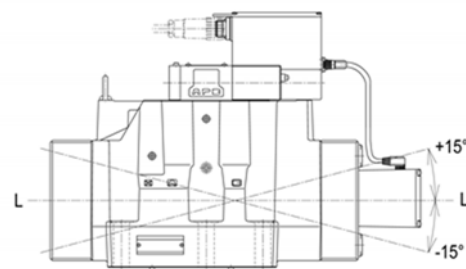
■ Accessories

• Mounting bolt

Valve Model Number	Mounting bolt	Qty	Tightening Torque N•m
ELDFHG-03EH	Hexagon Socket Head Cap Screw: M6 x 35L	4	12.9 to 15.9
ELDFHG-10EH	Hexagon Socket Head Cap Screw: M20 x 90L	6	494 to 603

■ Mounting position

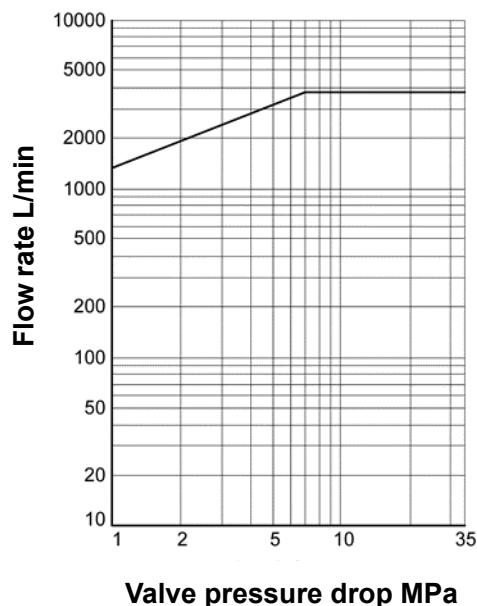
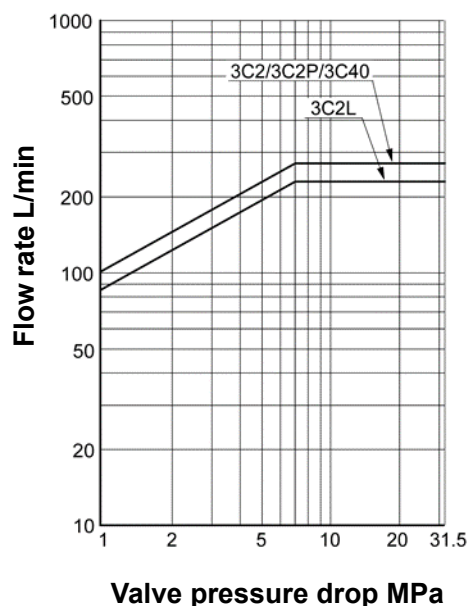
Mount the valve with the angle of the axis line L-L' within about $\pm 15^\circ$ from the horizontal plane as shown in the right figure. When the principal vibration direction is consistent with the axial direction of the spool, the spool may malfunction due to external force. Make sure that the principal vibration direction is not consistent with the axial direction of the spool.



■ Range of fail-safe function

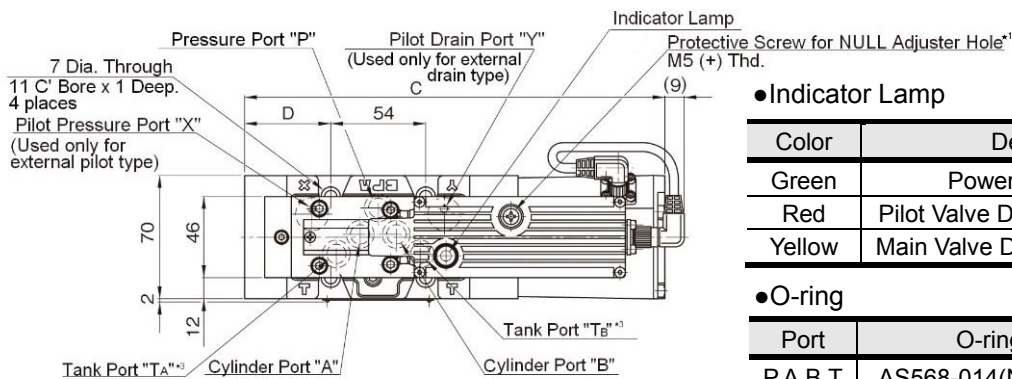
ELDFHG-03EH-100-3C2/3C40/3C2P/3C2L

ELDFHG-10EH



ELDFHG-03EH-100-**-XY-**-**-10

Mounting Surface: Conforming to ISO 4401-05-05-0-05



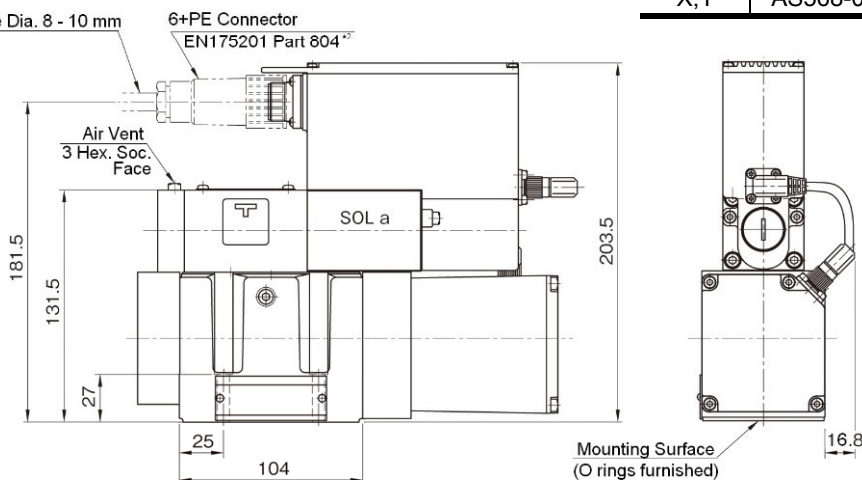
●Indicator Lamp

Color	Detail
Green	Power Supply
Red	Pilot Valve Deviation Alarm
Yellow	Main Valve Deviation Alarm

●O-ring

Port	O-ring	Qty
P,A,B,T	AS568-014(NBR-90)	5
X,Y	AS568-016(NBR-90)	2

Cable Applicable: Outside Dia. 8 - 10 mm

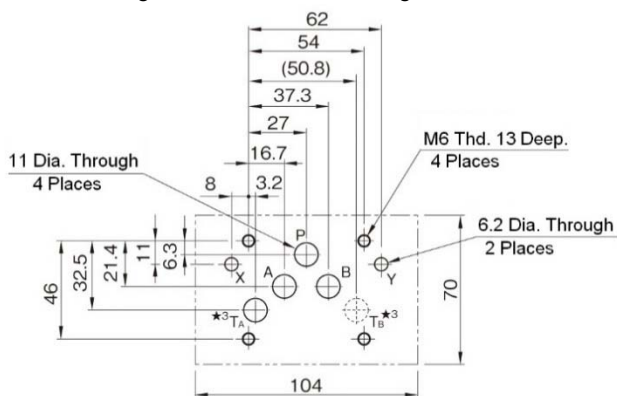


Model number	C	D
ELDFHG-03EH-100-3C2/3C40/3C2P	239	49
ELDFHG-03EH-100-3C2L	248	58

• Dimensions of mounting surface

Prepare the mounting surface as shown in the right figure.

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



*1. For NULL adjustment, remove the protective screw and turn the trimmer behind the screw.

After adjustment, be sure to attach the protective screw.

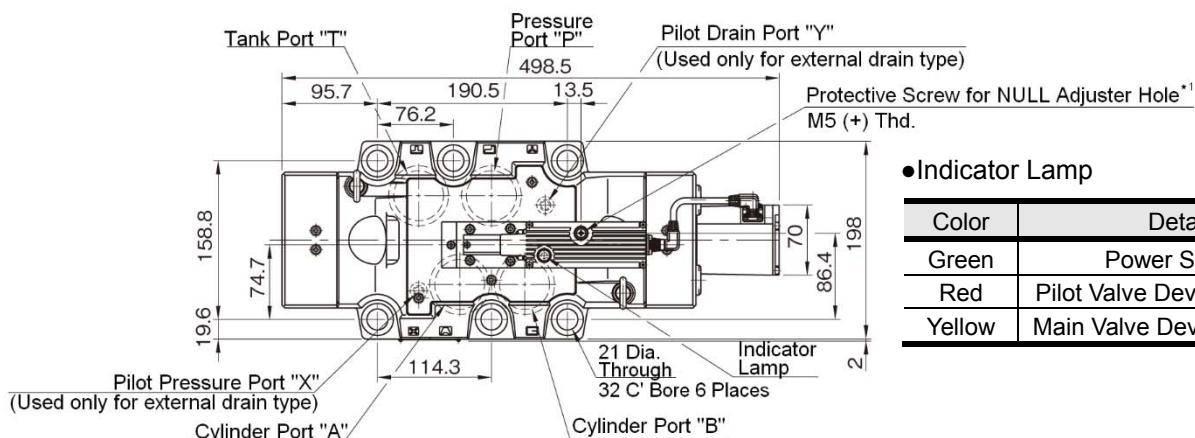
*2. The 6 + PE connector is not included with the valve. Prepare it separately.

YUKEN parts number: TK290457-1

*3. Of the two tank ports "TA" and "TB", using "TA" only works fine.

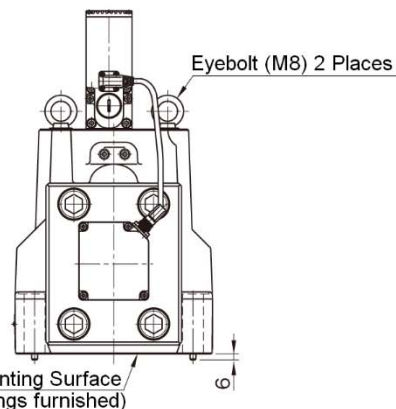
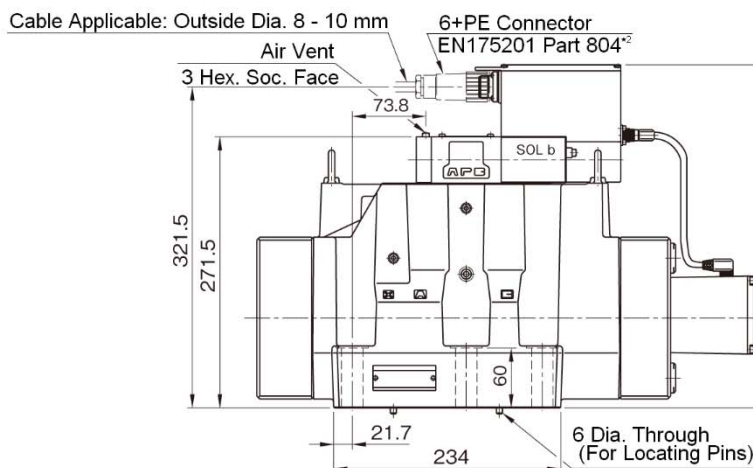
ELDFHG-10EH-1440-*-XY--*. *-10**

Mounting Surface: Conforming to ISO 4401-10-09-0-05



●Indicator Lamp

Color	Detail
Green	Power Supply
Red	Pilot Valve Deviation Alarm
Yellow	Main Valve Deviation Alarm



●O-ring

Port	O-ring	Qty
P,A,B,T	AS568-227(NBR-90)	4
X,Y	AS568-015(NBR-90)	2

*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.

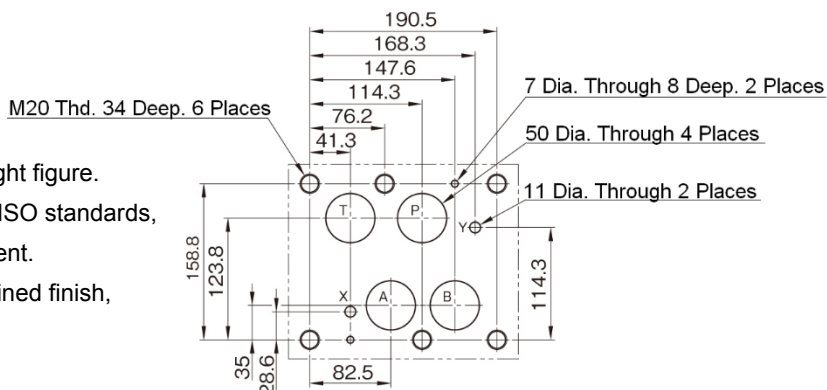
YUKEN parts number: TK290457-1

• Dimensions of mounting surface

Prepare the mounting surface as shown in the right figure.

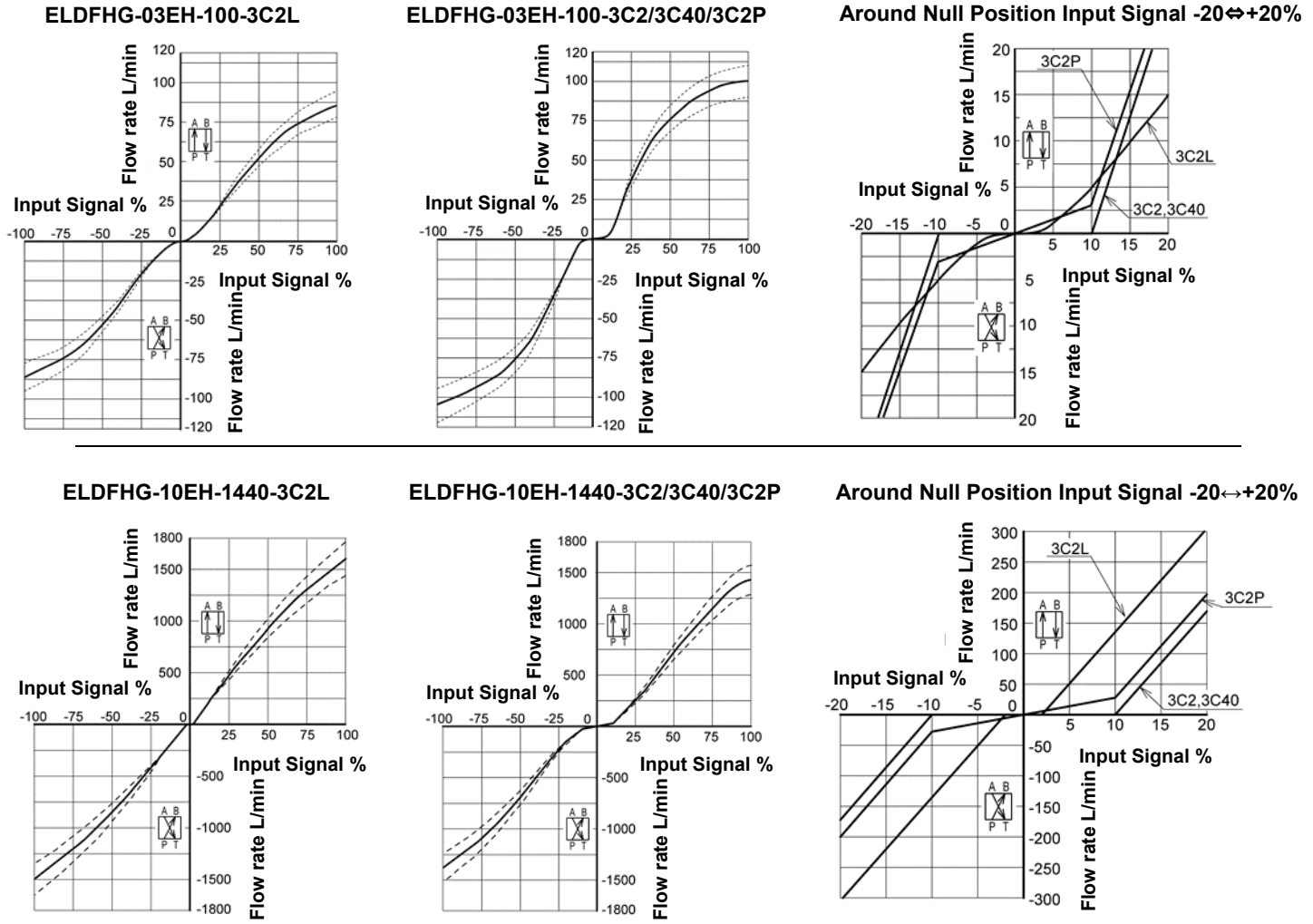
The dimensions of mounting surface conform to ISO standards, but the hole diameter of P,A,B,T ports are different.

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



■ No-load flow characteristics

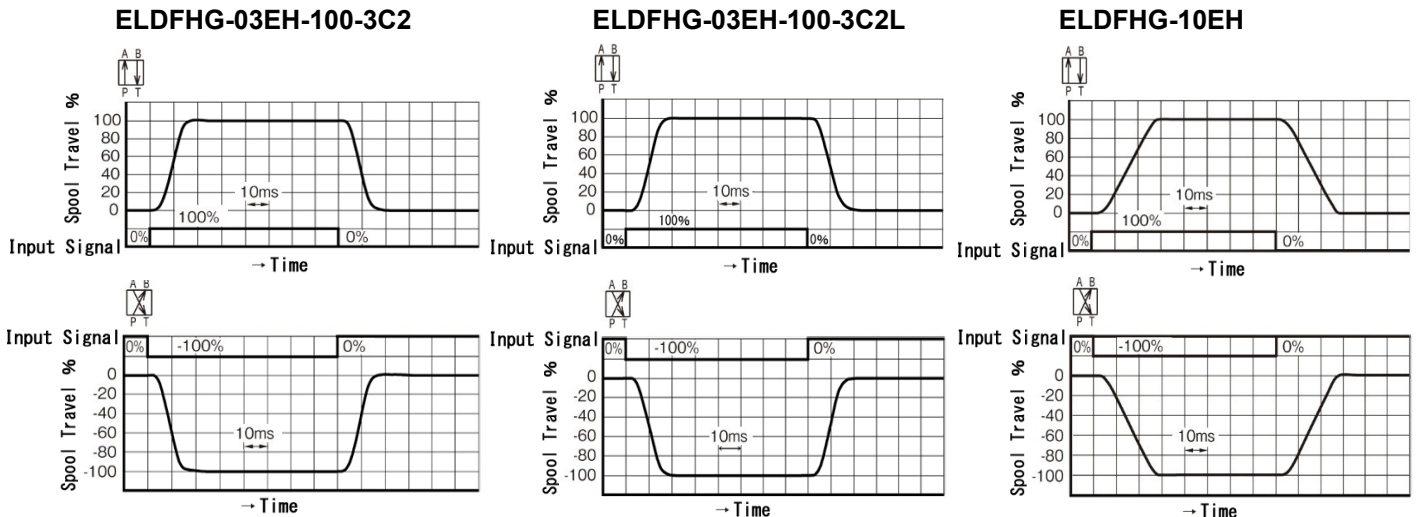
- <Conditions> • Valve pressure difference: 1 MPa (4-Way Valve/Pressure difference per land: 0.5 MPa)
 • Viscosity: 30 mm²/s



■ Step response (example)

- <Conditions> • Hydraulic Circuit: Port A/B Closed • Supply pressure and Pilot pressure: 14 MPa
 • Input signal: 0↔100% • Viscosity: 30 mm²/s

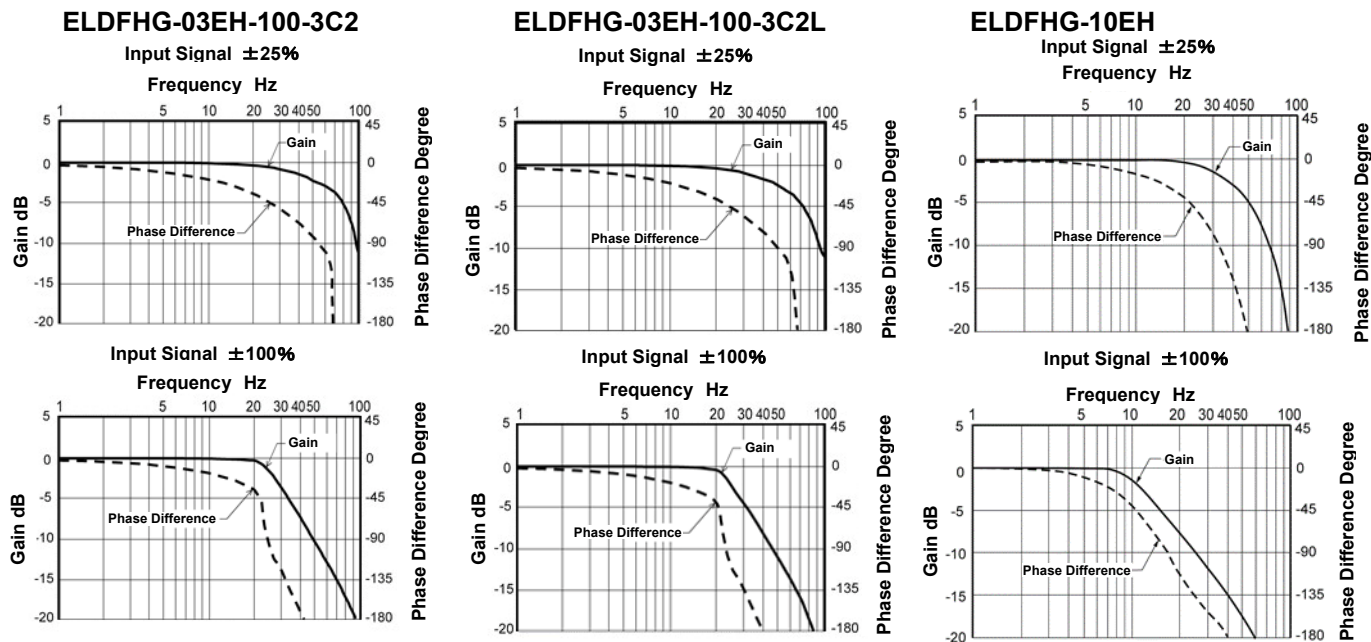
This value is measured on a per valve basis; the actual step response may differ depending on the actual circuit.



■ Frequency response (example)

- <Conditions> • Hydraulic Circuit: Port A/B Closed • Supply pressure and Pilot pressure: 14 MPa
- Viscosity: 30 mm²/s

This value is measured on a per valve basis; the actual step response may differ depending on the actual circuit.



■ Application

Injection molding machines, machine tools, wood processing machines, simulators, etc.

■ Product Release

November, 2017