

High Response Type Proportional Electro-Hydraulic Directional and Flow Control Valves

High response, high precision and high reliability are achieved by a combination of compact and powerful solenoid and spool-position-detection LVDT.

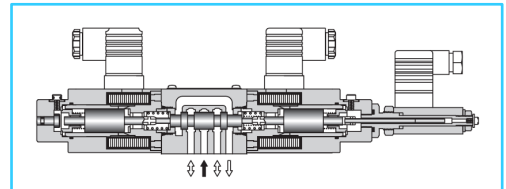
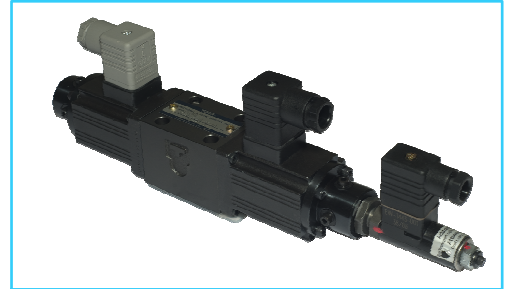
Direct type ELDFG-01/03 and two stage type ELDFHG-04/06 (which use the ELDFG-01 as a pilot) are available.

Direct Operated Type Directional and Flow Control Valves

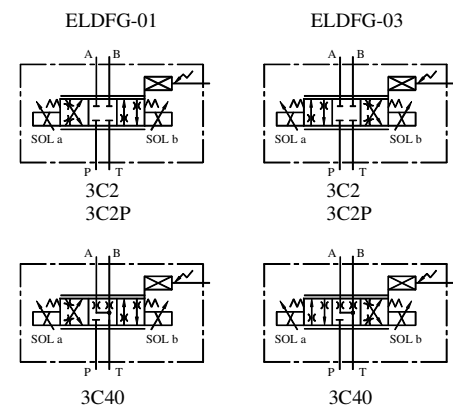
This product can be interchanged with the simplified servo valve to perform position control and pressure control. Compared to nozzle flapper type of servo valve, this product can handle contamination-related problems.

Specification

Model Numbers		ELDFG-01	ELDFG-03
Description			
Max. Operating Pressure	Kgf/cm ²	315	
Max. Tank Line Pres.	Kgf/cm ²	210	
Rated Flow	L/min.	10 : 10 20 : 20 35 : 35	40 : 40 80 : 80
[Valve ΔP : 150 Kgf/cm ²]			
Hysteresis		0.5% or less	
Repeatability		0.5% or less	
Step Response (Typical Rating)	0 → 100 %	30 ms	3C2, 3C40: 29 ms 3C2P: 25 ms
	100 → 0 %	38 ms	3C2, 3C40: 26 ms 3C2P: 23 ms
Frequency Response (0 ±25 %V)	Phase -90 Degree	48 Hz	3C2, 3C40: 36 Hz 3C2P: 41 Hz
	Gain -3dB	52 Hz	3C2, 3C40: 35 Hz 3C2P: 38 Hz
Rated Current		Max. 2.5 A	Max. 3A
Coil Resistance	[20°C]	3.9 Ω	3 Ω
Power Input		Max. 25 W	Max. 27 W
Approx. Mass	Kg.	3.2	7.5



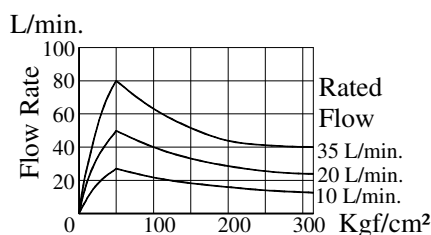
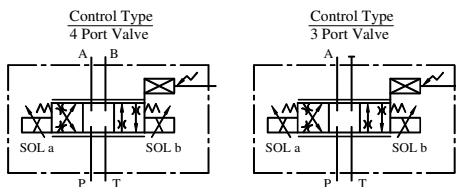
Graphic Symbol



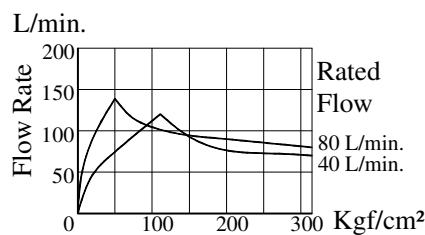
Range of Flow Control

See “Valve Pres. Difference vs. Flow Rate” below characteristics for the appropriate range.

ELDFG-01

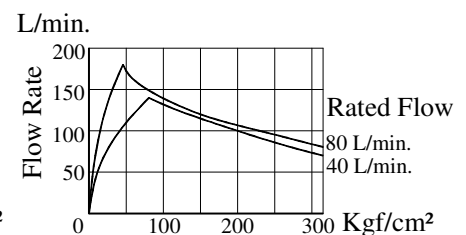
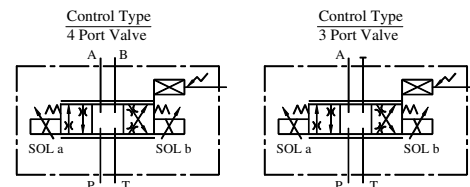


Valves Pressure Difference ΔP



Valves Pressure Difference ΔP

ELDFG-03



Valves Pressure Difference ΔP

* Valve pressure difference “ΔP” is reference by follows. In addition, “P”, “A”, “B”, “T” are pressure of each port.

4 Port Valve: ΔP = [(P-A) + (B-T)] or [(P-B) + (A-T)]

3 Port Valve: ΔP = (P-A) or (A-T)

E Series

Proportional Electro-Hydraulic High Response Type Directional and Flow Control Valve

Model Number Designation

F-	ELDF	G	-01	-35	-3C2	-XY	-10
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min.	Spool	Direction of Flow	Design Number
F: Special Seals For Phosphate Ester Type Fluid (Omit if not required)	ELDF: Proportional Electro-Hydraulic Direct Operated Type Directional and Flow Control Valves	G: Sub-Plate Mounting	01	10:10 20:20 35:35	3C2 	XY: Metre-Out Metre-In	10
			03	40:40 80:80	3C40  3C2P  (Zero Lap)		10

Attachment

Mounting Bolts

Model number	Socket Head Cap Screw	Qty.	Bolt Kit Model Number
ELDFG-01	M5x45Lg.	4	BKELDFG-01-10
ELDFG-03	M6x35Lg.	4	BKELDFG-03-10

Sub-Plate

Valve Model No.	Sub Plate Model No.	Pipe Connection Thd.	Mass Kg.
ELDFG-01	DSGM-01-3080	1/8 BSP.F	0.8
	DSGM-01X-3080	1/4 BSP.F	
	DSGM-01Y-3080	3/8 BSP.F	
ELDFG-03	DSGM-03-2180	3/8 BSP.F	3
	DSGM-03X-2180	1/2 BSP.F	
	DSGM-03Y-2180	3/4 BSP.F	4.7

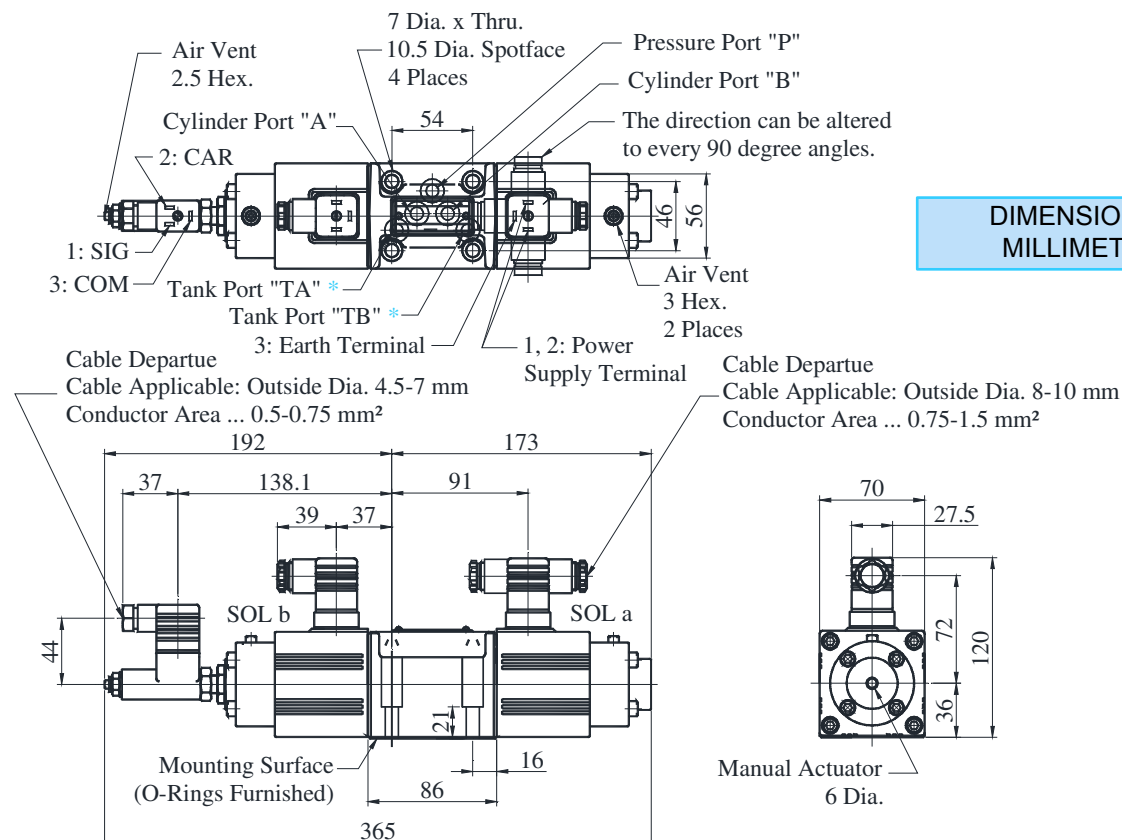
- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- The Sub-plates are those for 1/8 and 3/8 solenoid operated directional valves. For dimensions, see Page. No. 358 EIC-E-1001 and Page. No. 370 EIC-E-1002.

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page 618 of EIC-H-1008).

Valve Model Numbers	Power Amplifier Model Numbers
ELDFG-01-※-3C2 3C40	AMN-L-01-1-10
ELDFG-01-※-3C2P	AMN-L-01-3-2P-10
ELDFG-03-※-3C2 3C40	AMB-EL-03-1-10
ELDFG-03-※-3C2P	AMB-EL-03-2P-1-10

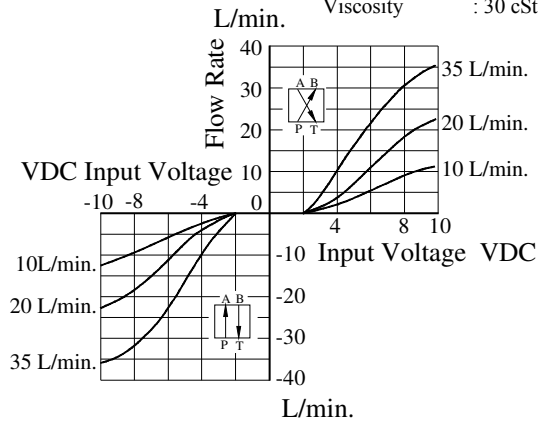
Note : For valve mounting surface dimensions see the dimensional drawing of sub-plates page 358 of EIC-E-1001.



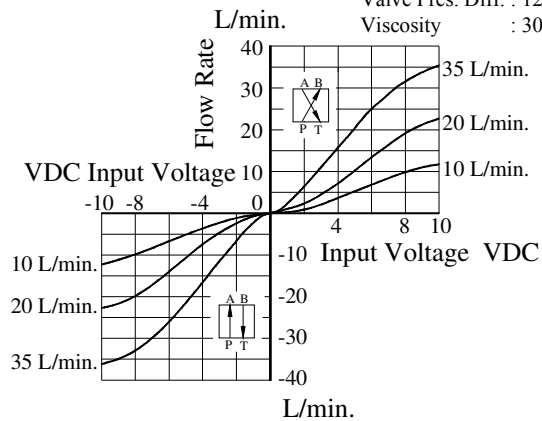
Note : For valve mounting surface dimensions see the dimensional drawing of sub-plates page 370 of EIC-E-1002.

Input Voltage vs. Flow Rate

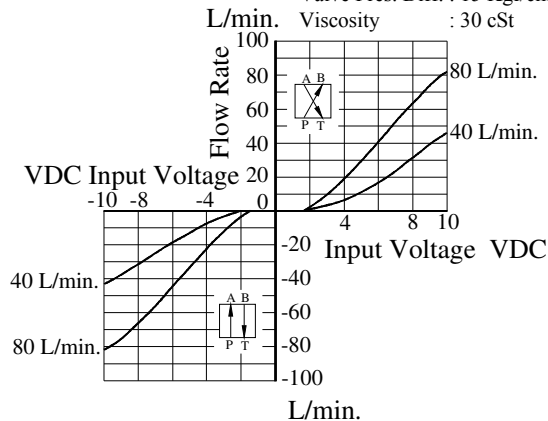
- **ELD FG-01-※-3C2/3C40** Valve Pres. Diff. : 12 Kg/cm²
Viscosity : 30 cSt



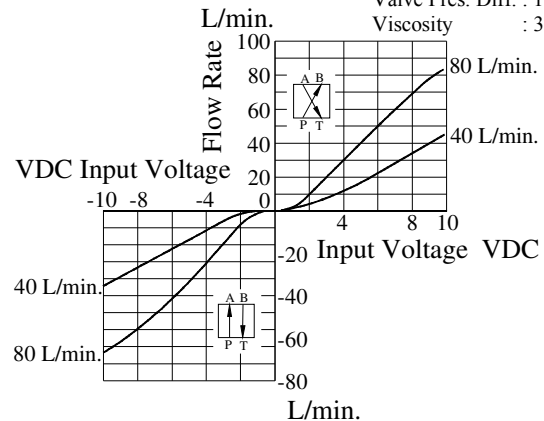
- **ELD FG-01-※-3C2P** Valve Pres. Diff. : 12 Kg/cm²
Viscosity : 30 cSt



- **ELD FG-03-※-3C2/3C40** Valve Pres. Diff. : 15 Kg/cm²
Viscosity : 30 cSt

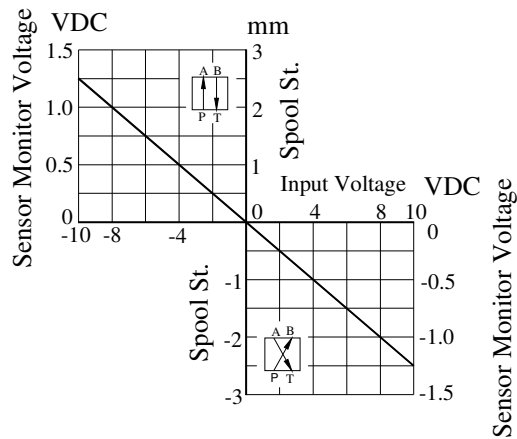


- **ELD FG-03-※-3C2P** Valve Pres. Diff. : 15 Kg/cm²
Viscosity : 30 cSt

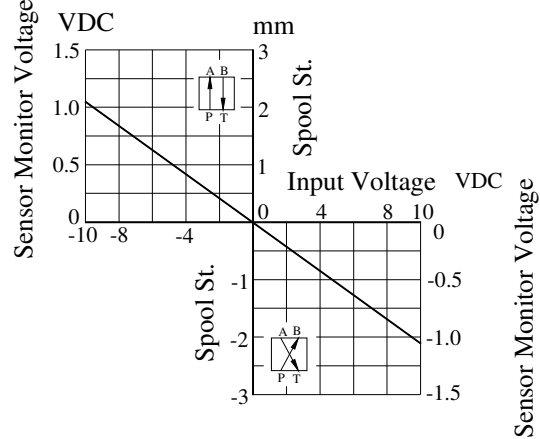


Input Voltage vs. Spool St.

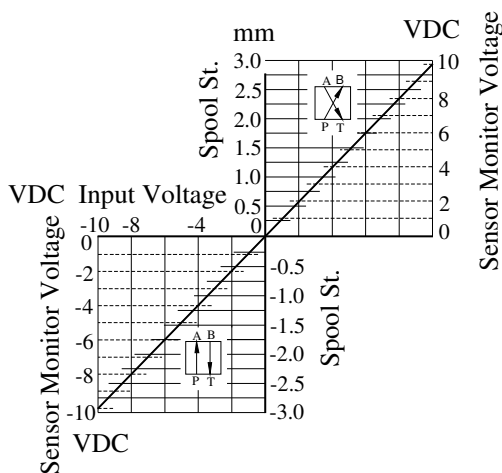
- **ELD FG-01-※-3C2/3C40**



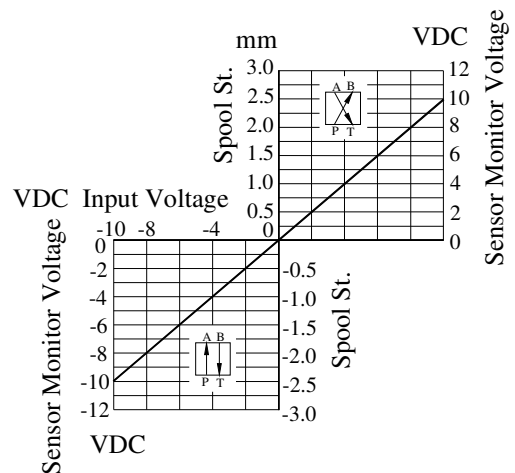
- **ELD FG-01-※-3C2P**



- **ELD FG-03-※-3C2/3C40**



- **ELD FG-03-※-3C2P**



E Series

Proportional Electro-Hydraulic High Response Type
Directional and Flow Control Valve

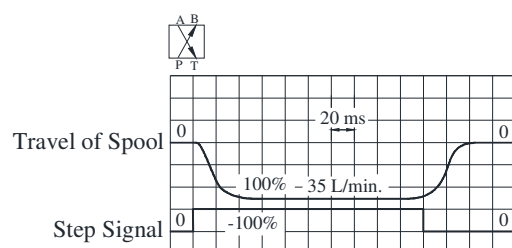
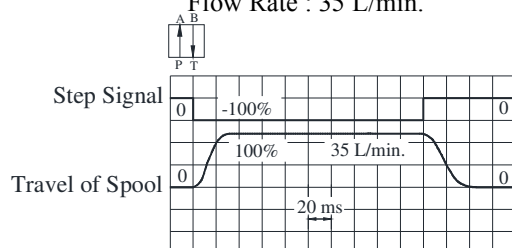
Step Response

Viscosity : 30 mm²/s

The values were measured on independent valves. They vary by circuit.

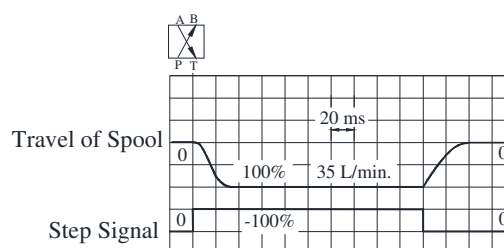
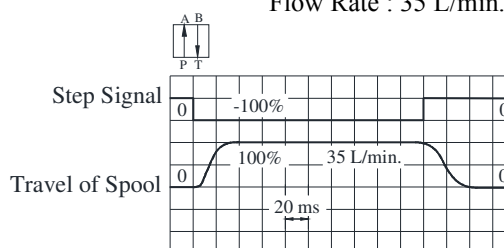
● ELDFG-01-35-3C2/3C40

Supply Pressure : 20 Kgf/cm²
Flow Rate : 35 L/min.



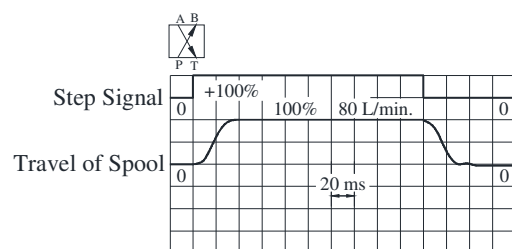
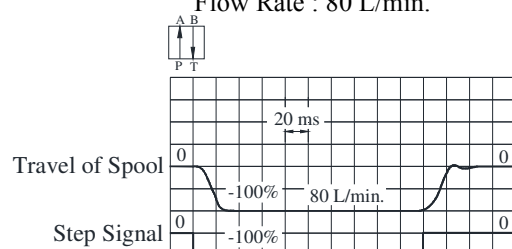
● ELDFG-01-35-3C2P

Supply Pressure : 20 Kgf/cm²
Flow Rate : 35 L/min.



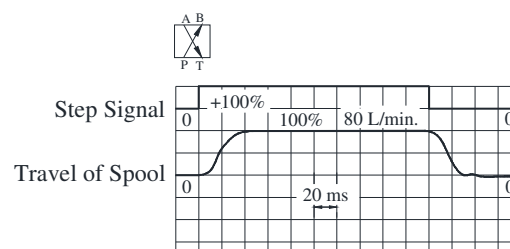
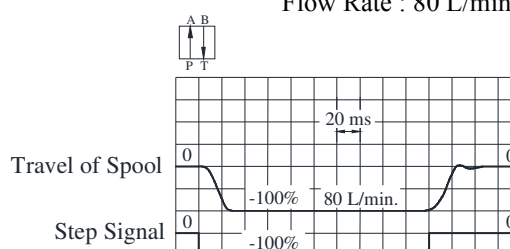
● ELDFG-03-80-3C2/3C40

Supply Pressure : 40 Kgf/cm²
Flow Rate : 80 L/min.



● ELDFG-03-80-3C2P

Supply Pressure : 40 Kgf/cm²
Flow Rate : 80 L/min.



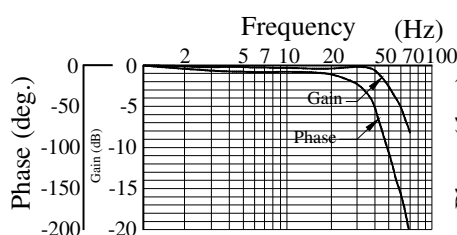
Frequency Response

Input Signal : 0±25 %V

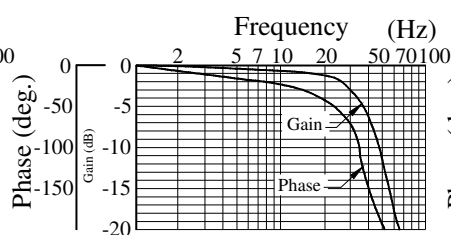
Primary Pressure : 140 Kgf/cm²

Viscosity : 30 mm²/s

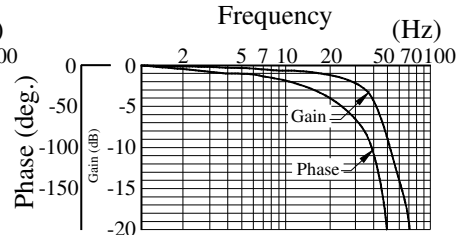
● ELDFG-01-35-3C2/3C40/3C2P



● ELDFG-03-80-3C2/3C40



● ELDFG-03-80-3C2P



E Series

Proportional Electro-Hydraulic High Response Type Directional and Flow Control Valve

■ Spare Parts List

● List of Seals

Name of Parts	Part Numbers		Qty.	
	ELDFG-01-	ELDFG-03-	ELDFG-01-	ELDFG-03-
O-Ring	SO-NB-P18	SO-NB-A128	2	2
Fastner Seal	SG-FCF-4	SG-FCF-4	2	2
Fastner Seal	TK280152-0	TK280152-0	1	1
O-Ring	SO-NB-P9	SO-NB-A014	4	4

● List of Seal Kits

Model Numbers	Seal Kit Number
ELDFG-01	KS-ELDFG-01-10
ELDFG-03	KS-ELDFG-03-10

■ Solenoid Assembly

Valve Model Number	Solenoid Assy.	Qty.
ELDFG-01-※-※-XY-10	E318-Y06M2-14-5007	1
	E318-Y06M2-14-L-5007	
ELDFG-03-※-※-XY-10	E324-Y12M2-28-10	1
	E324-Y12M2-28-L-10	

Note: The connector assembly GDM-211-※-11 is not included in the solenoid assembly.

Two Stage Type Directional and Flow Control Valves

Specification

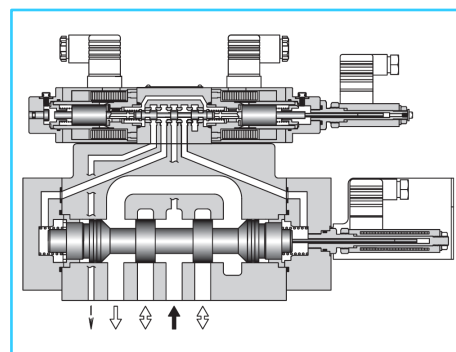
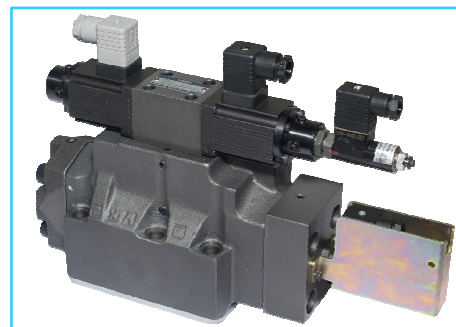
Model Numbers		ELDFHG-04	ELDFHG-06
Description			
Max. Operating Pres.	Kgf/cm ²	350	350: 350 500: 500
Rated Flow Valve	L/min.	280	350: 350 500: 315
Pres. Difference: 15 Kgf/cm ²			
Proof Pressure at Return Port ^{*1} (External Drain)	Kgf/cm ²	"T" Port : 315 "Y" Port : 210	350 "T" Port : 350 "Y" Port : 210 500 "T" Port : 250 "Y" Port : 210
Proof Pressure at Return Port (Internal Drain)	Kgf/cm ²	210	
Pilot Pressure ^{*2}	Kgf/cm ²	15 - 315	
Pilot Flow ^{*3}		16 L/min. or more	350 : 16 L/min. or more 500 : 19 L/min. or more
Null Leakage ^{*4} Ps = 140 Kgf/cm ² Pp = 140 Kgf/cm ²		3C2: 3 L/min. or less 3C2P: 10 L/min. or less	3C40: 4 L/min. or less
Step Response (Typical Rating) (0↔100%) Pp = 140 Kgf/cm ²		13 ms	350: 15 ms 500: 18 ms
Frequency Response (0±25% V, Phase) Pp = 140 Kgf/cm ²		46 Hz (-90 degrees)	350: 66Hz 500: 39 Hz (-90 degrees)
Water - Proofness		IP64	
Operating Temperature Type		-15 to +60 °C	
Spool Type		3C2:  3C2P:  3C40:  (Zero Rap)	
Approximate Spool Stroke to Stops		±5 mm	350: ±5 mm 500: ±7 mm
Main Spool End Area	cm ²	7.1	8
Rated Current		Max. 2.5 A	
Coil Resistance	20 °C	3.9 Ω	
Approx. Mass	Kg.	10	350: 18 500: 19

^{*1} Return pressure should be less than the actual supply pressure.

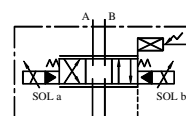
^{*2} Pilot pressure should be between 15 Kgf/cm² and 35 Kgf/cm², and should exceed 60% of the actual supply pressure to main valve.

^{*3} Pilot flow is calculated with the above step response time at pilot pressure 140 Kgf/cm².

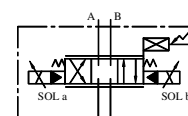
^{*4} Added up leakage of main and pilot spools are stated.



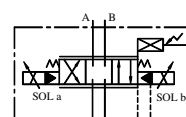
Graphic Symbols



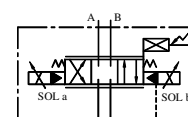
Internal Pilot /
External Drain Type



Internal Pilot /
Internal Drain Type



External Pilot /
External Drain Type



External Pilot /
Internal Drain Type

Model Number Designation

F-	ELDFH	G	-04	-280	-3C2P	-XY	-E	T	-10
Special Seals	Series Number	Type of Mounting	Valve Size	Rated Flow L/min.	Spool Type ¹	Direction of Flow	Pilot Connection	Drain Connection	Design Number
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	ELDFH: High Response (Two Stage) Type Proportional Electro-Hydraulic Directional and Flow Control Valves	G: Sub-Plate Mounting	04	280 : 280	3C2  3C40 	XY: Meter-In Meter-Out	None: Internal Pilot	T: Internal Drain	10
			06	350 : 350 500 : 500	3C2P  (Zero Lap)		E: External Pilot	None: External Drain	

E Series

Proportional Electro-Hydraulic High Response Type Directional and Flow Control Valve

Applicable Power Amplifiers

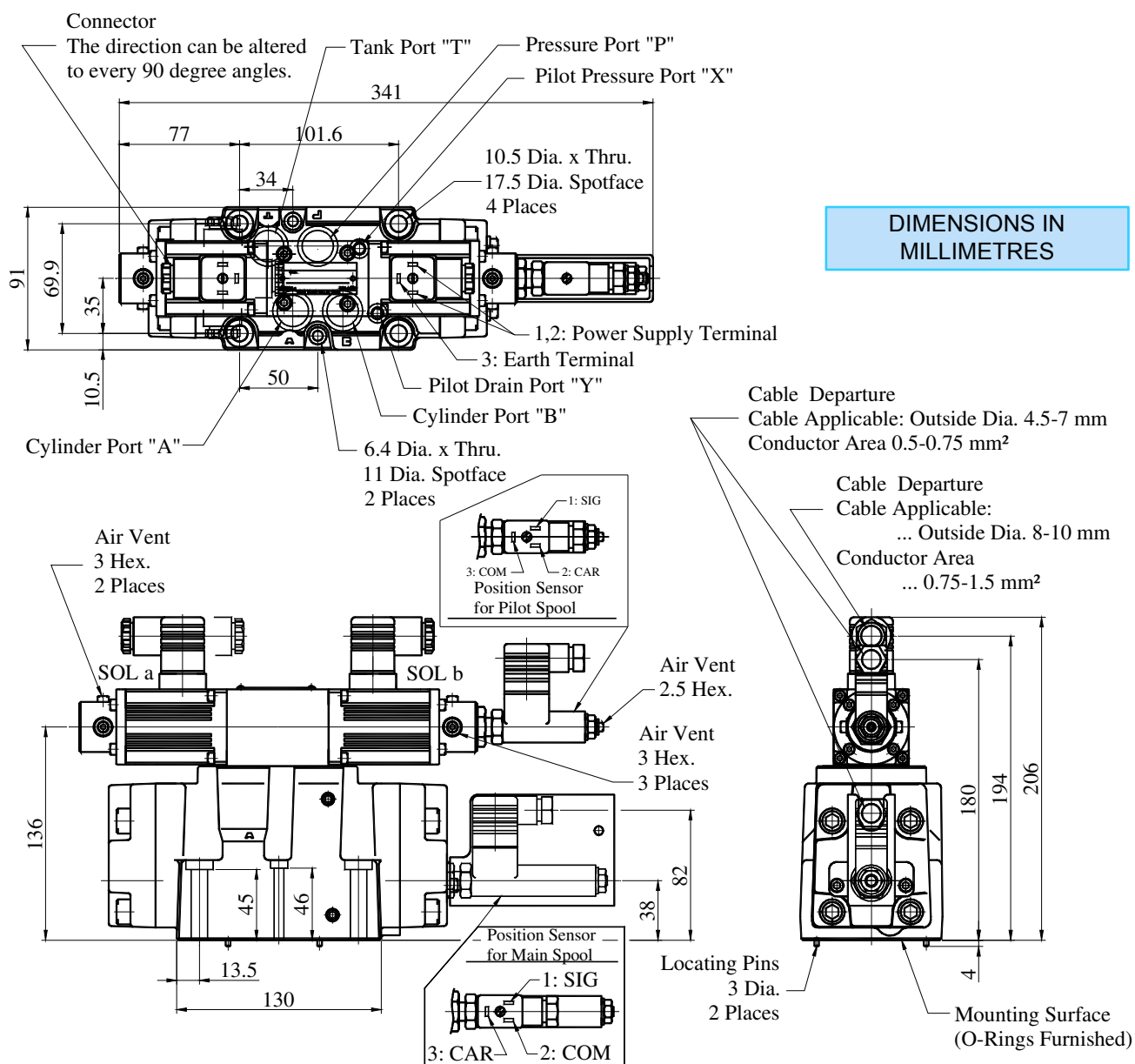
For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page no.712).

Attachment

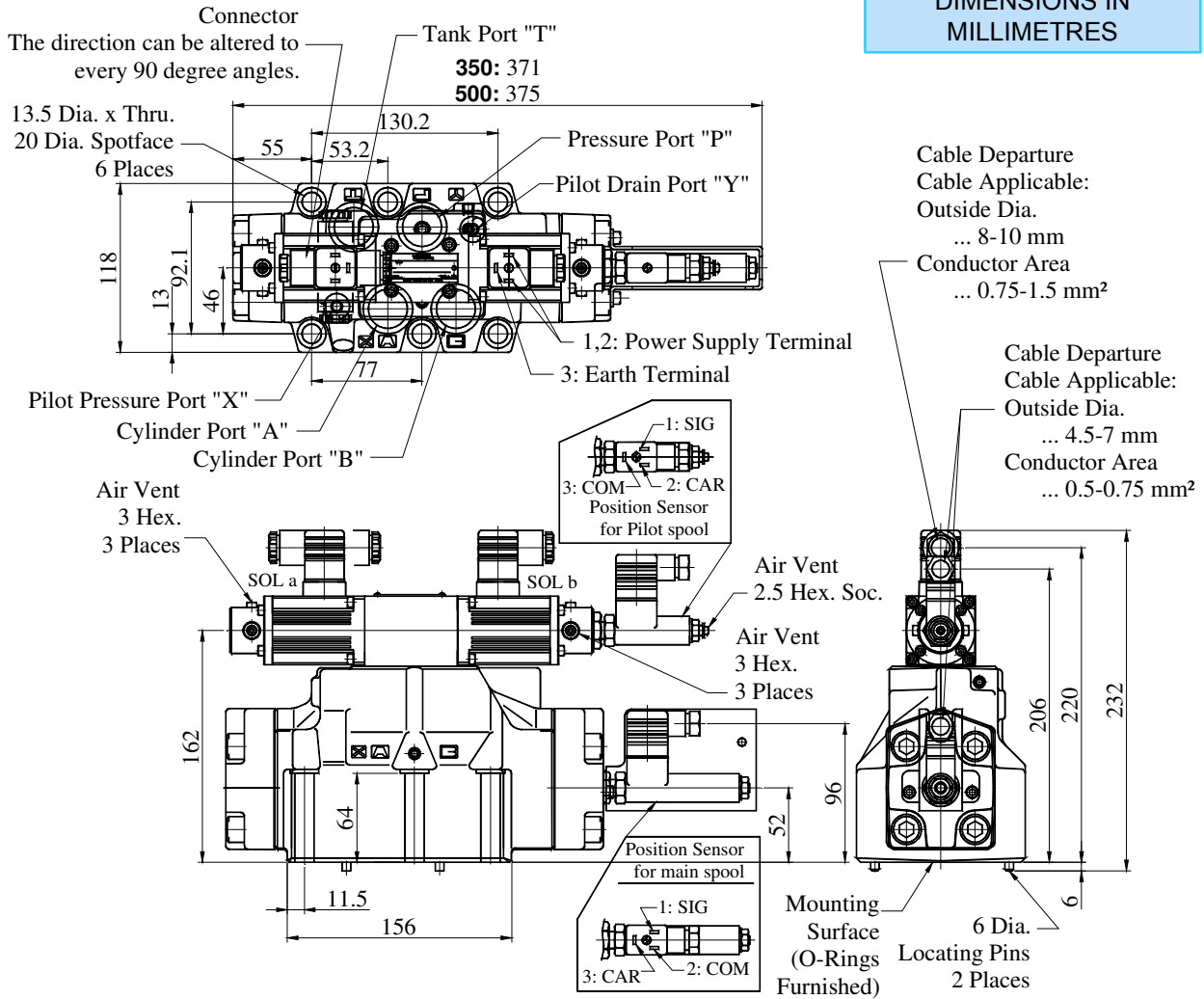
Installation condition

Model Numbers	Socket Head Cap Screw	Qty.
ELDFHG-04	M6x55Lg.	2
	M10x60Lg.	4
ELDFHG-06	M12x85Lg.	6

ELDFHG-04-280-※-XY-※-※-10



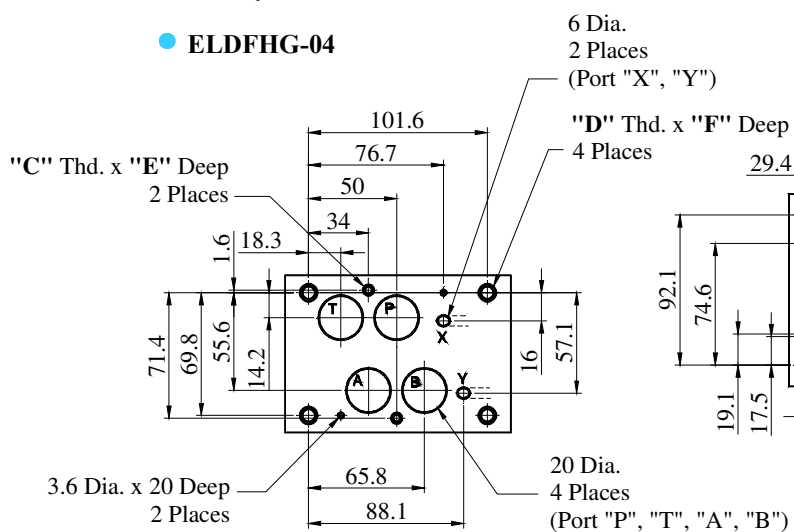
● ELDFHG-06-※-※-XY-※-※-10



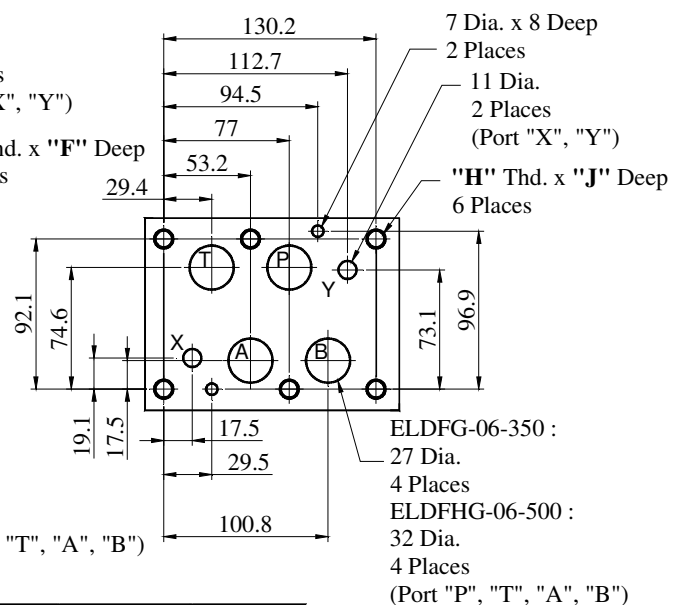
Dimensions of valve mounting surface

Prepare a mounting surface as shown to the below.
Also finish it finely.

● ELDFHG-04



● ELDFHG-06



Model Numbers	"C" Thd.	"D" Thd.	"E" mm	"F" mm	"H" Thd.	"J" mm
ELDFHG-04	M6	M10	12	17	—	—
ELDFHG-06	—	—	—	—	M12	24

E Series

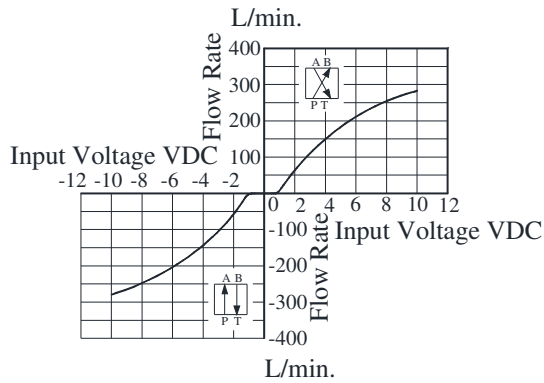
**Proportional Electro-Hydraulic High Response Type
Directional and Flow Control Valve**

Input Voltage vs Flow Rate

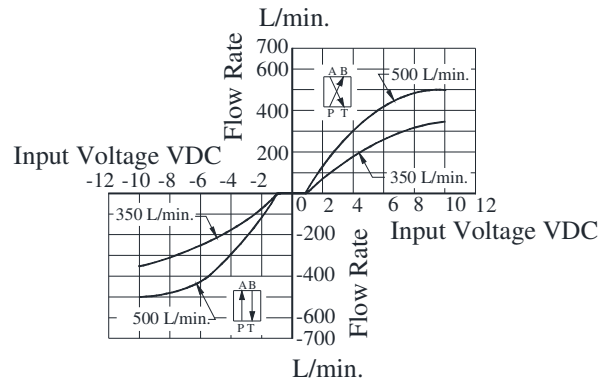
Valve Pres. Diff. : 10 Kg/cm²

Viscosity : 30 cSt

ELDFHG-04



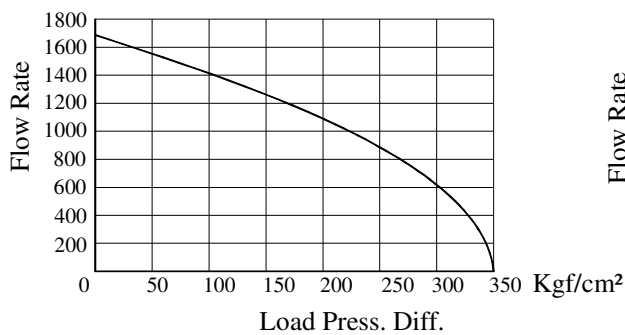
ELDFHG-06



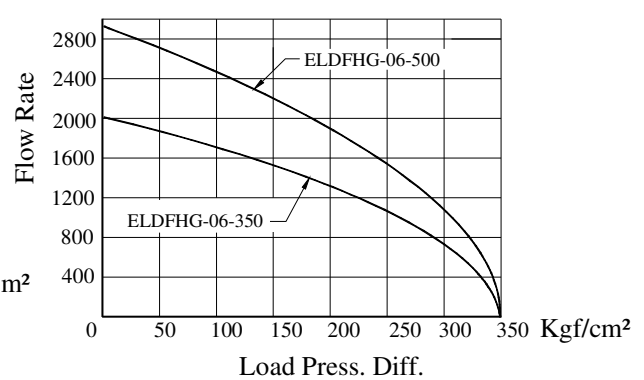
Load Flow Characteristics

Viscosity : 30 cSt

ELDFHG-04



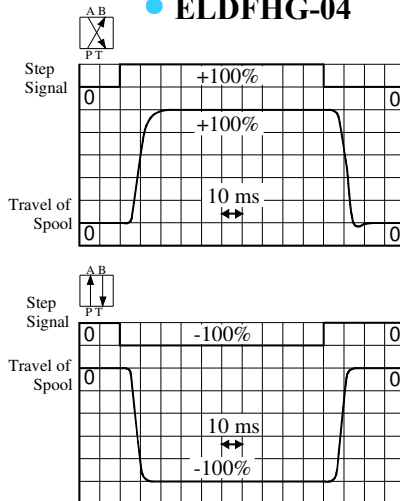
ELDFHG-06



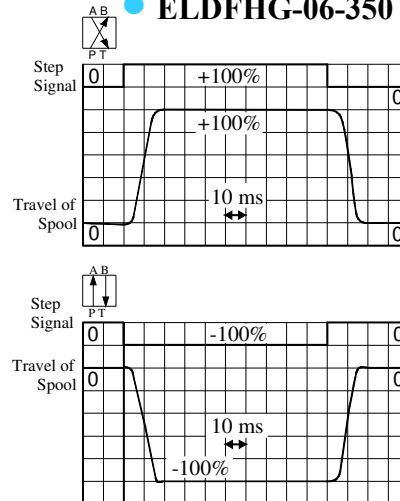
Step Response (Example)

Viscosity : 30 cSt

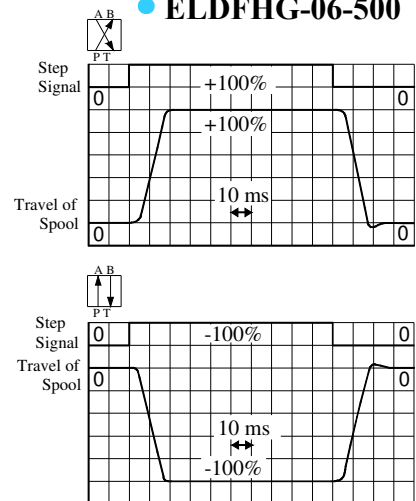
ELDFHG-04



ELDFHG-06-350



ELDFHG-06-500



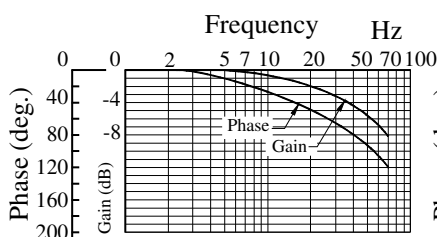
Frequency Response

Input Signal : 0±25 %

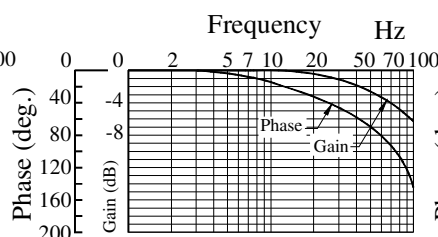
Hydraulic Circuit : Port A/B Closed

Supply and Pilot Pressure : 140 Kg/cm²Viscosity : 30 mm²/s

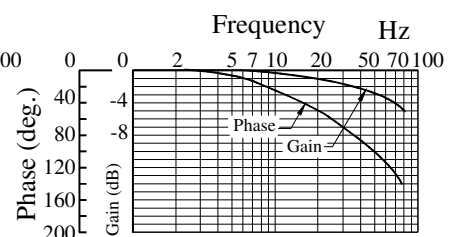
ELDFHG-04



ELDFHG-06-350



ELDFHG-06-500



E Series

Proportional Electro-Hydraulic High Response Type
Directional and Flow Control Valve

Spare Parts List

List of Seals for ELDFHG-04

Name of Parts	Part Numbers	Qty.
O-Ring	SO-NB-P39	1
O-Ring	SO-NB-P22	4
O-Ring	SO-NB-P9	2
O-Ring	SO-NB-A029	1
O-Ring	SO-NB-A012	2

List of Seals for ELDFHG-06

Name of Parts	Part Numbers		Qty.
	ELDFHG-06-350-	ELDFHG-06-500-	
O-Ring	SO-NB-P40	SO-NB-A135	1
O-Ring	SO-NB-P14		2
O-Ring	SO-NB-P10		2
O-Ring	SO-NB-A123	SO-NB-A126	4
O-Ring	SO-NB-A030	SO-NB-A135	1

List of Seal Kits

Model Numbers	Seal Kit Number
ELDFHG-04	KS-ELDFHG-04-10
ELDFHG-06-350	KS-ELDFHG-06-350-10
ELDFHG-06-500	KS-ELDFHG-06-500-10

Note: when ordering the seals, please specify the seal kit number from the table above.
In addition to the above O-Rings, seals for pilot valve are in the seal kit. For the detail of the pilot valve seals, see page no. 632.

Pilot Valve

Model Numbers	Solenoid Ass'y Model Number
ELDFHG-04	ELDFG-01-30-3C2P-XY-1004
ELDFHG-06	ELDFG-01-30-3C2P-XY-1006

Note: See ELDFG-01-※-※-XY-10 on page no. 627 for the corresponding seal and solenoid assembly for the pilot valve.