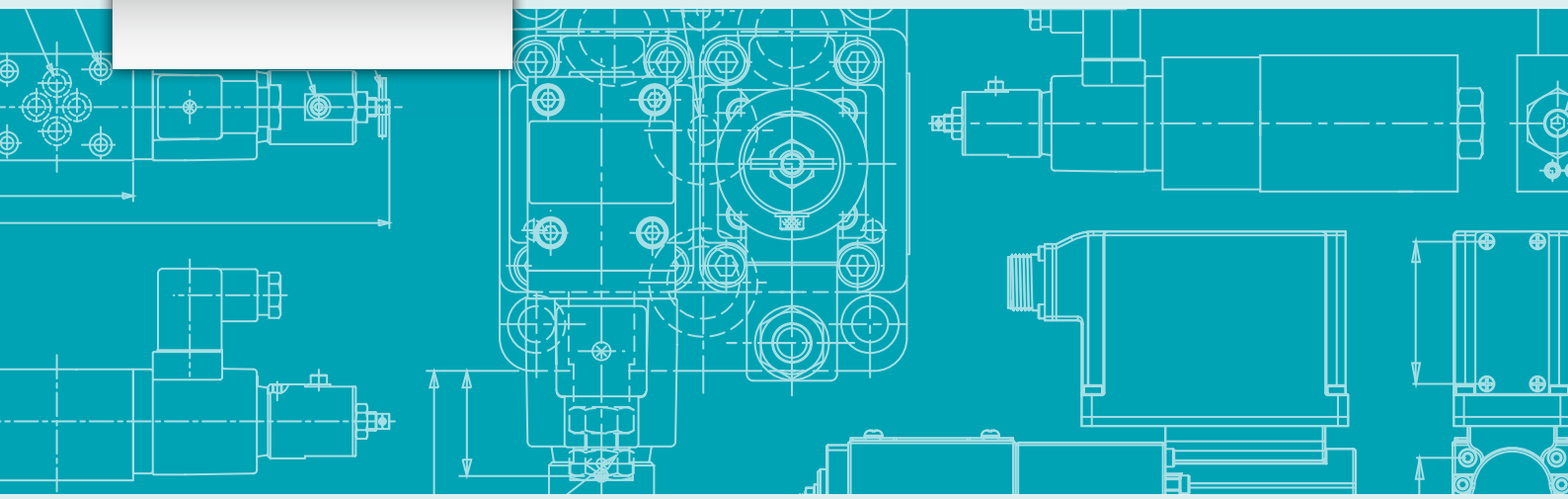
STEED
HYDRAULIC TECHNOLOGY



Close-loop Proportional Valve
Proportional Valve

High Response Proportional Flow and Directional Control Valve
Modular Type Electro-hydraulic Proportional Reducing Valve
Electro-Hydraulic Proportional Pilot Relief Valve
Electro-Hydraulic Proportional Flow & Directional Control Valve
Electro-Hydraulic Proportional Relief & Flow Control Valve
Electronic Amplifier P-C Board



www.steedmachinery.com.tw

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Close-loop Proportional Valve

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High Response Proportional Flow and Directional Control Valve

ELVDT-G02 20

Modular Type Electro-hydraulic Proportional Reducing Valve

EOG-G01 24

Electro-Hydraulic Proportional Pilot Relief Valve

EDG-G01 26

EBG-G03, G06 30

Electro-Hydraulic Proportional Flow & Directional Control Valve

EDFG-G01 34

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Electro-Hydraulic Proportional Relief & Flow Control Valve

EFBG-03, 06 40

Electronic Amplifier P-C Board

TW2085-2 46

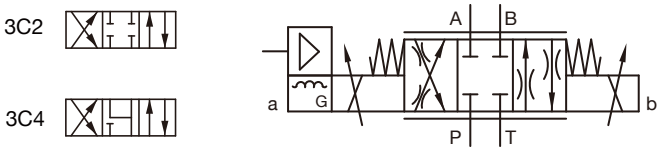
TW9820 48

TW9820-2 50

NPEDV



SYMBOLS



ORDER CODES

NPEDV - 06 - 3C2 - 32L

1 2 3 4

1 ▸	Model Name	NPEDV	
2 ▸	Size	06	3/4"
		10	1 1/4"
3 ▸	Type of Valves	3C2	
		3C4 *	
4 ▸	Flow (l/min) :	NPEDV-06 : 16L, 32L	
		NPEDV-10 : 50L, 75L	

* Only for NPEDV-06-3C4-32L

FEATURE

1. The hydraulic valve and the integrated electronic controller form a hydraulic-electric combination. Compared with the valve body and the amplifier board, the wiring is much less (7 wirings can be reduced), the wiring is easier, it reduces the damage caused by wiring errors, and the space of the electric control box is shunk.
2. All matching parameters between valve body and integrated electronic controller have been calibrated in the workshop, making the machine commissioning easier and faster.
3. The short distance between the valve core displacement sensor (LVDT) transmission wire and the integrated electronic controller can better the accuracy.
4. 7-pin standard electrical connector, user friendly.
5. Standard DC power supply DC+24V, wide dynamic range (DC+18V~DC+36V).
6. The control command signal is DC 0~±10V, easy to match with industrial computers.
7. The LVDT voltage output line provide signal is handy for error diagnosis.
8. The LVDT and integrated electronic controller on the valve body can realize the high response direction switching, The control spool stroke and the control opening change proportionally to the command value.

MODEL SPEC.

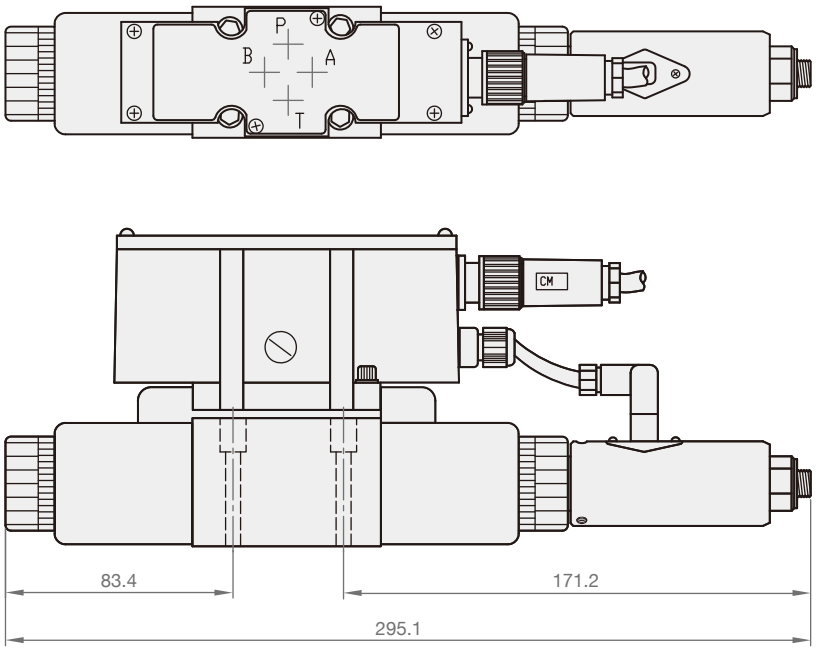
Model		NPEDV-06	NPEDV-10
Installation Position		Prefer horizontal installation	
Max. Operating Pressure (bar)	P, A, B Port	315	
	T Port	210	
Flow Rate (l/min) ±10% ΔP = 10bar		16, 32	50, 75
Max. Flow (l/min)		80	180
Fluid Clean Class		DIN 51524 ... 535	
Recommended Viscosity (mm^2/s)		20 ~ 100	
Magnetic Hysteresis		≤0.1%	
Sensitivity		≤0.1%	
Range of Inversion		≤0.1%	
Response Sensitivity (ms) ΔP = 10bar, Hydraulic Operating Fluid HLP 46 40±5°C	0% ~ 100%	28	44
	100% ~ 0%	26	36
Zero Shift Upon Change of Hydraulic Fluid Temperature	% / 10K	0.15	
Operating Fluid Temperature Range (°C)		-20 ~ 80 (recommended : +35~55)	
Storage Temperature Range (°C)		-20 ~ 80	
Operating Temperature (°C)		-20 ~ 60	
Weight		3.5	8.1

Cleanliness Class *	
NA 1638	Filtration Element βx = 75
8	X = 10
9	20
10	25

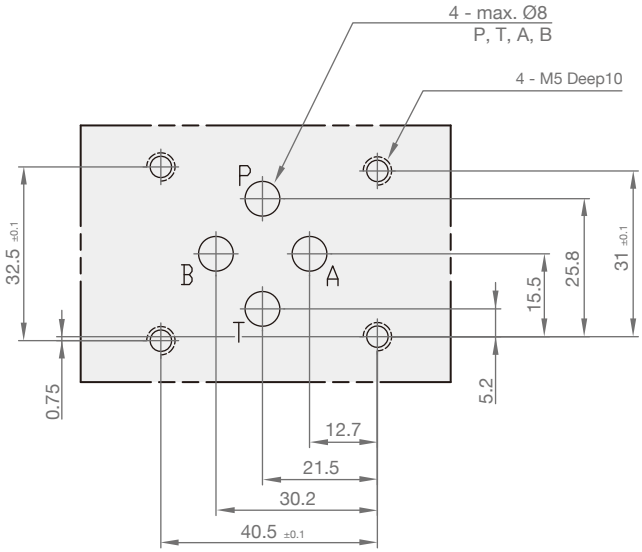
* The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

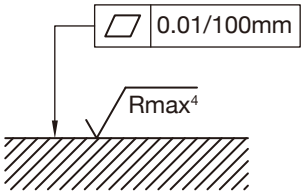
DIMENSION (UNIT : mm)

▸ NPEDV-06



▸ Sub Plates for NPEDV-06



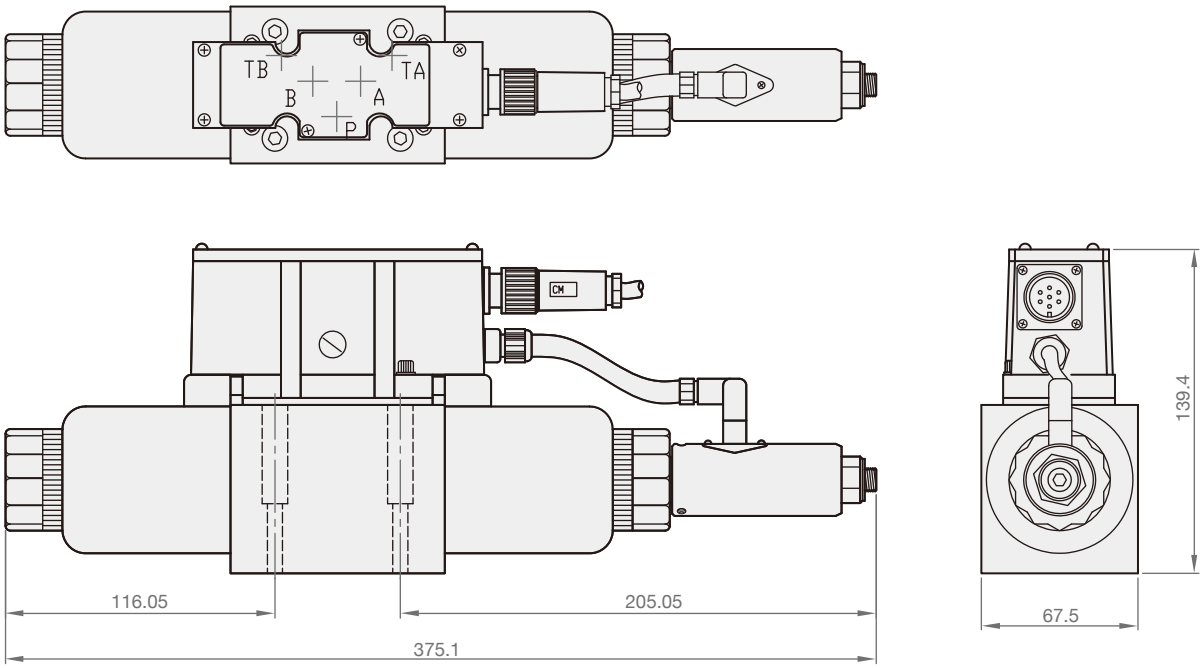


Machined valve contact surface

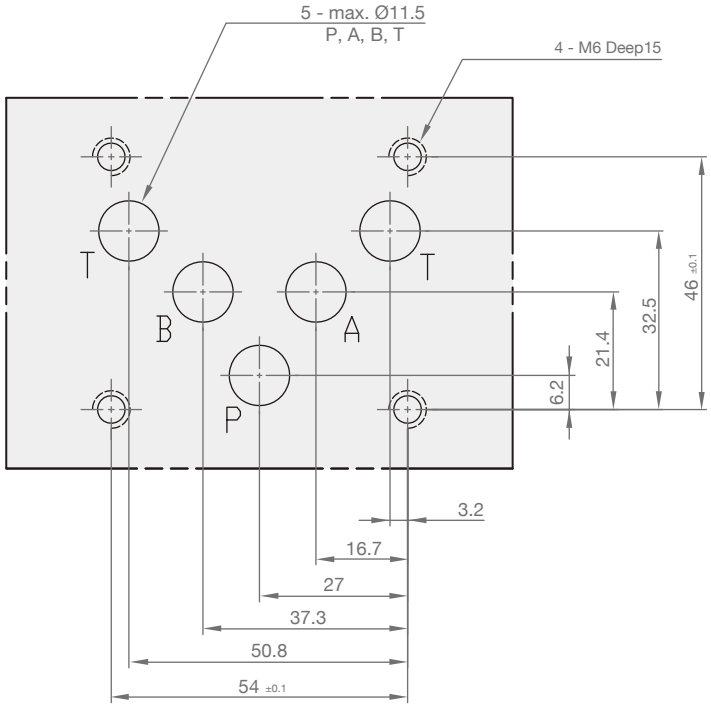
Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M5 x L45	4

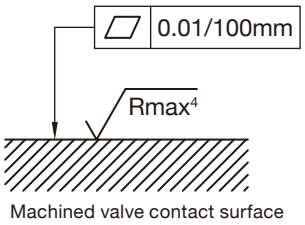
DIMENSION (UNIT : mm)

▸ NPEDV-10



▸ Sub Plates for NPEDV-10

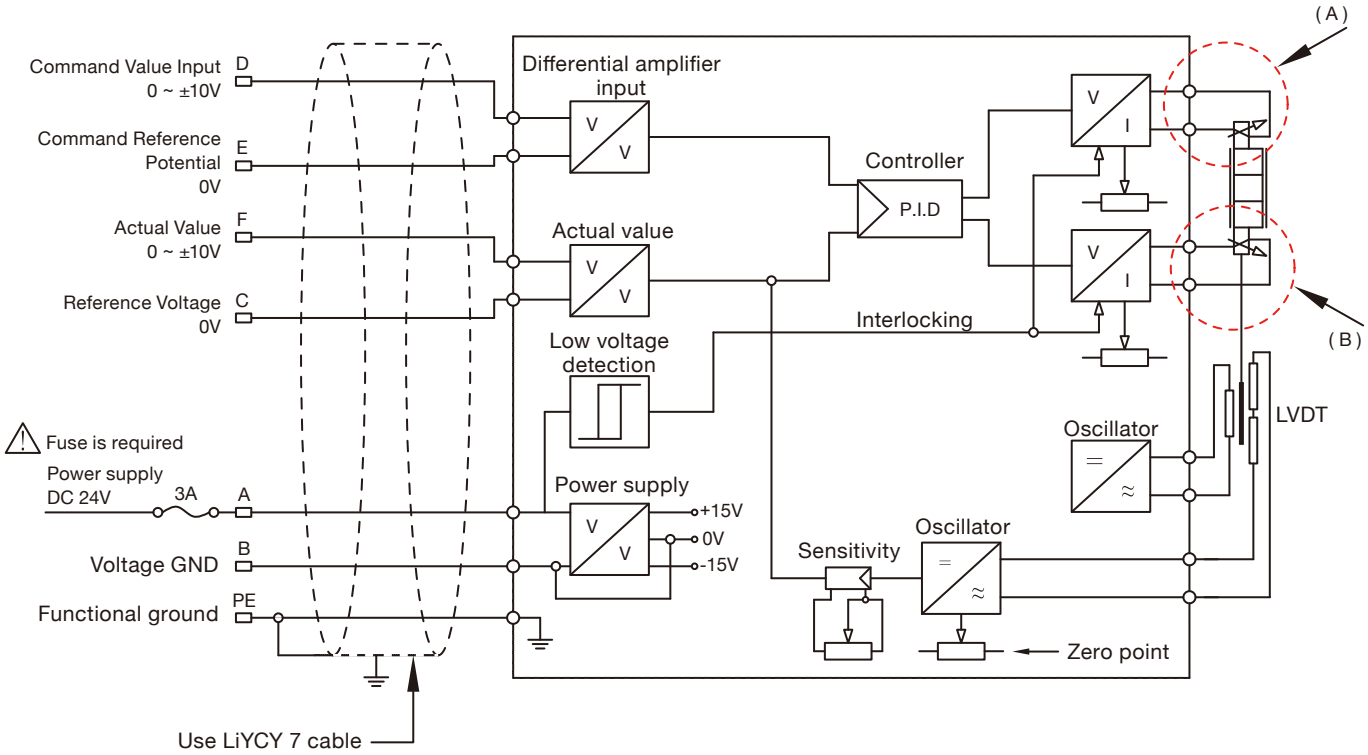


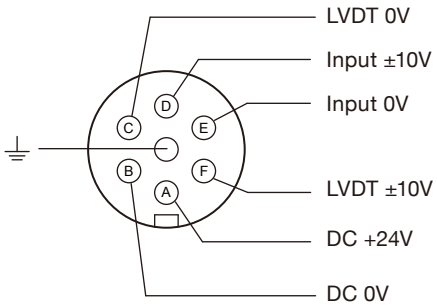


Machined valve contact surface

Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M6 x L40	4

ELECTRIC DISTRIBUTION

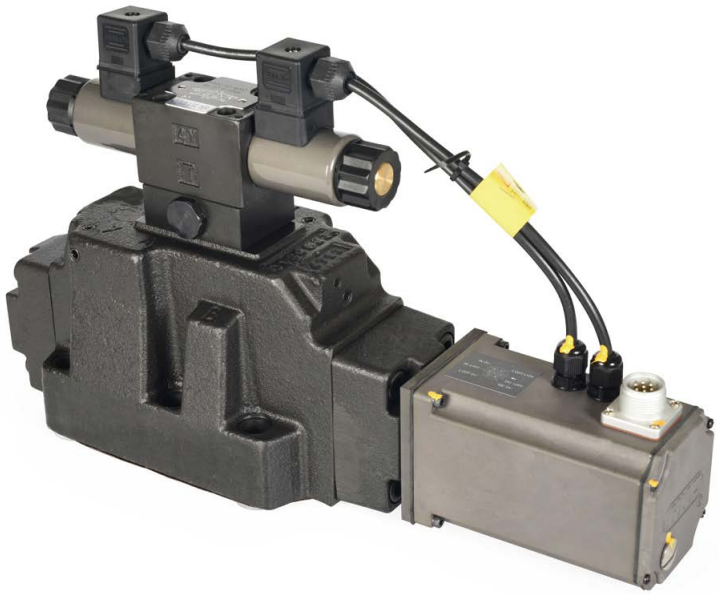




Wiring Instruction	7-Pin Plug	Signal
Power supply	A	DC +24V (19.2~35VDC), max. = 1.5A, impact load ≤3A (fuse)
Power supply	B	0V
Reference Potential Actual Value	C	Actual value 0 V at F
Command Value Voltage	D	±10V
Command Value Voltage	E	Command value potential reference 0 V
Measuring Output	F	Actual value ±10 V
Measuring Output	PE	Functional ground (directly connected to cooling element and valve housing)

Command Value	Positive command value (0 ... 10 V or 12 … 20 mA) at D and reference potential at E cause flow from P → A and B → T. Negative command value (0 ... -10 V or 12 … 4 mA) at D and reference potential at E cause flow from P → B and A → T.
Connecting Cables	Recommend : longer than 20 m cable length type LiYCY 7 x 0.75 mm^2 longer than 50 m cable length type LiYCY 7 x 1.0 mm^2
	External diameter : 6.5 to 11 mm (Plastic plug) * Apply screening on supply side
Notice	Electrical signals provided via control electronics (e. g. actual value) must not be used to switch off safety-relevant machine functions.

NPEDK



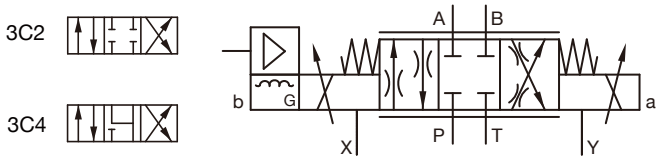
ORDER CODES

NPEDK - 10 - 3C2 - 100L - OI

1	Model Name	NPEDK	
2	Size	10	1 1/4"
		16	2"
		25	3 1/8"
		27	3 3/8"
		32	4"
		35	4 3/8"
3	Type of Valves	3C2	
		3C4	
4	Flow (l/min) *	100L, 200L, 350L, 500L, 600L, 700L	
5	Pilot Oil Flow	OO	external pilot oil supply, external pilot oil return
		II	internal pilot oil supply, internal pilot oil return
		OI	external pilot oil supply, internal pilot oil return
		IO	pilot oil supply internal, pilot oil return external

* NPEDK-10-100L supply 3C2 only

SYMBOLS



FEATURE

1. The hydraulic valve and the integrated electronic controller form a hydraulic-electric combination. Compared with the valve body and the amplifier board, the wiring is much less (7 wirings can be reduced), the wiring is easier, it reduces the damage caused by wiring errors, and the space of the electric control box is shunk.
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MODEL SPEC.

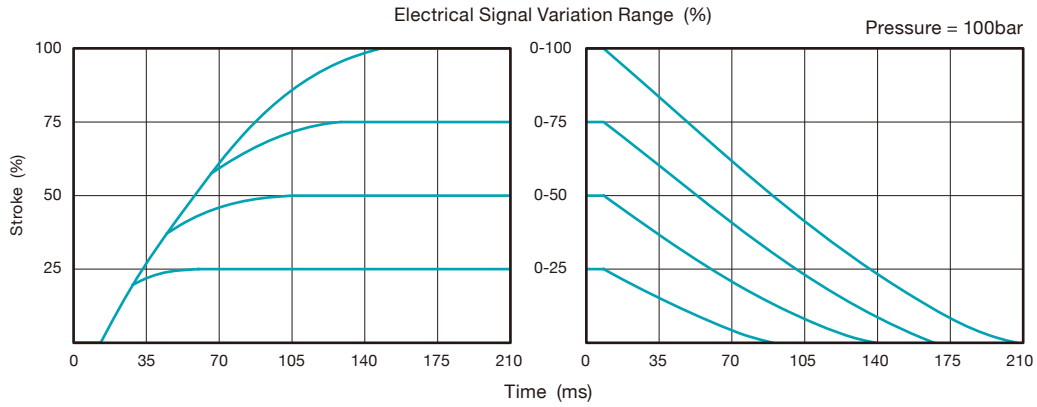
Model			NPEDK-10	NPEDK-16	NPEDK-25	NPEDK-27	NPEDK-32	NPEDK-35
Installation Position			Prefer horizontal installation					
Max. Operating Pressure (bar)	Pilot Control Valve, Control Pilot Fluid		25 ~ 315					
	Main Stage, Port P, A, B		315	315	315	210	315	350
Back Pressure	Port T	Pilot Oil Supply Internal, Pilot Oil Return External	Static < 10					
	Port T	Internal Pilot Oil Supply, Internal Pilot Oil Return	315	250	250	210	250	250
	Port Y		Static < 10					
Flow Rate (l/min) ±10% ΔP = 10bar			100	200	350	500	600	1000
Max. Flow (l/min)			170	460	870	1000	1600	3000
Min. Pilot Oil Flow with Stepped Input Signals (0 to 100 %) (315 bar)			4.1	8.5	11.7	11.7	13	13
Fluid Clean Class According to ISO 4406 (c)		Pilot Control Valve	Class 17/15/12					
		Main Valve	Class 20/18/15					
Recommended Viscosity (mm^2/s)			20 ~ 100					
Magnetic Hysteresis			≤1%					
Sensitivity			≤0.5%					
Response Sensitivity (ms) ΔP = 10bar, Hydraulic Operating Fluid HLP 46 40±5°C		0% ~ 100%	≤ 30	≤ 34	≤ 60	≤ 60	≤ 96	≤ 170
		100% ~ 0%	≤ 18	≤ 30	≤ 54	≤ 54	≤ 140	≤ 210
Zero Shift (V) Upon Change of Hydraulic Fluid Temperature			±0.15					
Operating Fluid Temperature Range (°C)			-20 ~ 80 (recommended : +35~55)					
Storage Temperature Range (°C)			-20 ~ 80					
Operating Temperature (°C)			-20 ~ 60					
Weight			8.7	11.2	16.8	17	33.6	71

Cleanliness Class *	
NA 1638	Filtration Element βx = 75
8	X = 10
9	20
10	25

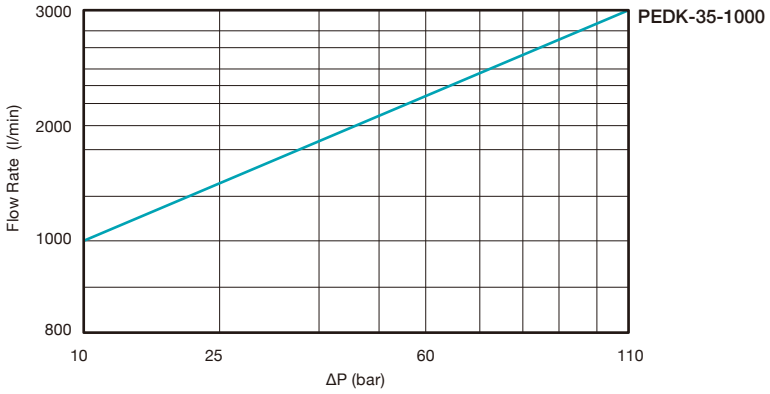
* The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

PERFORMANCE CURVES

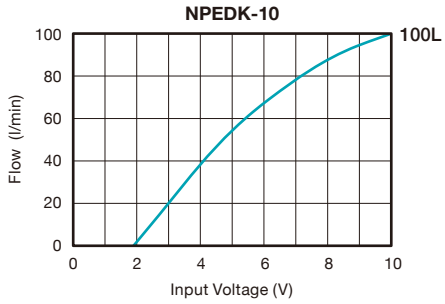
▸ Response Sensitivity (Electrical Signals are Stepped Waveforms)

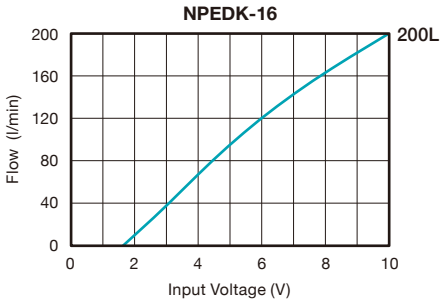


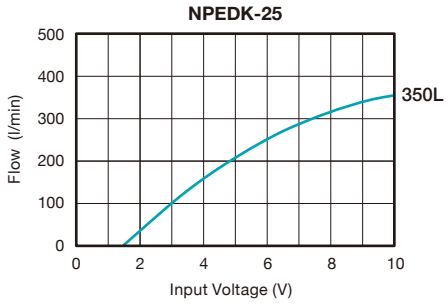
▸ Max. Flow Rate ±10%

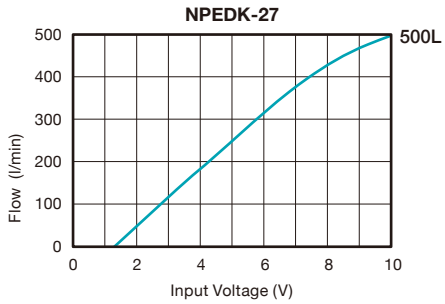


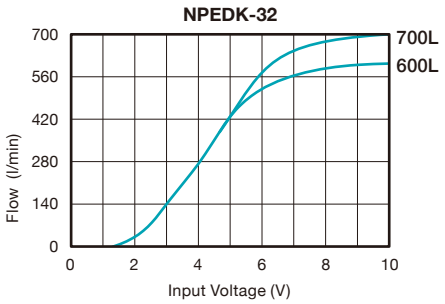
▸ Input Voltage - Output Flow

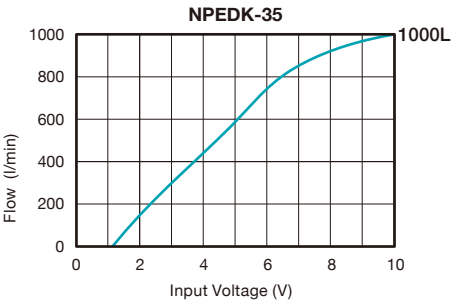






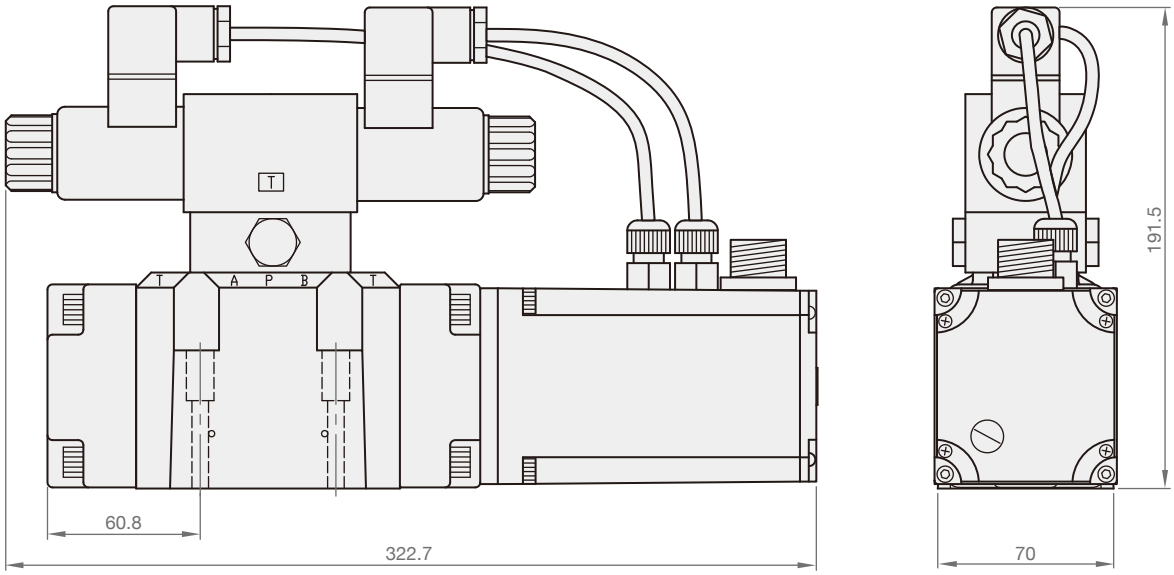




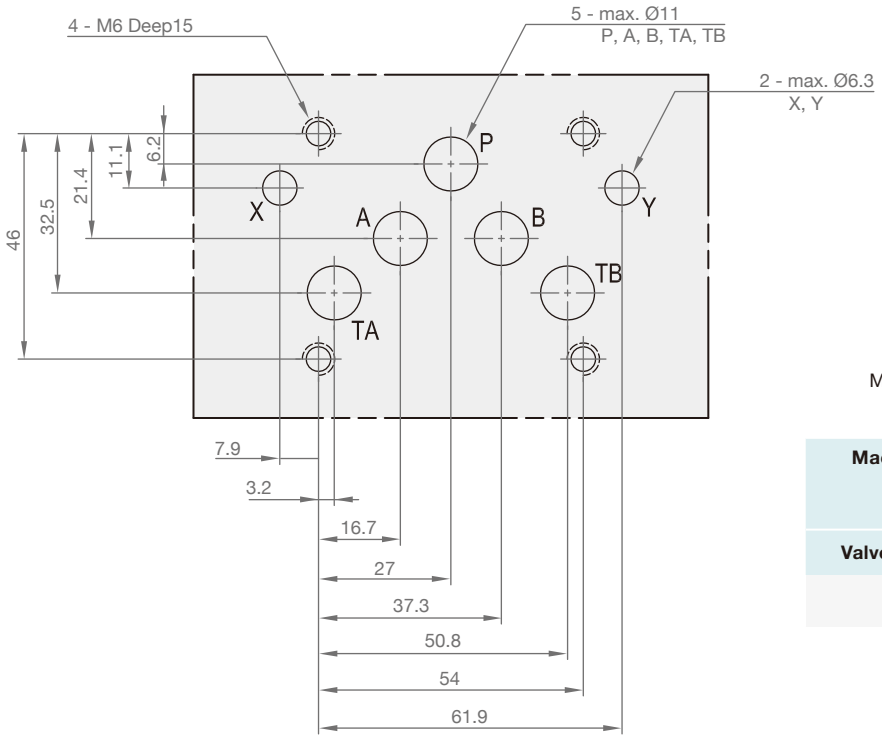


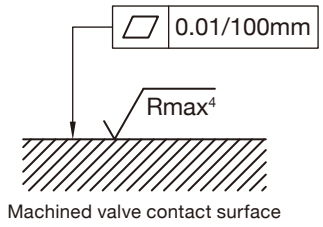
DIMENSION (UNIT : mm)

▸ NPEDK-10



▸ Sub Plates for NPEDK-10



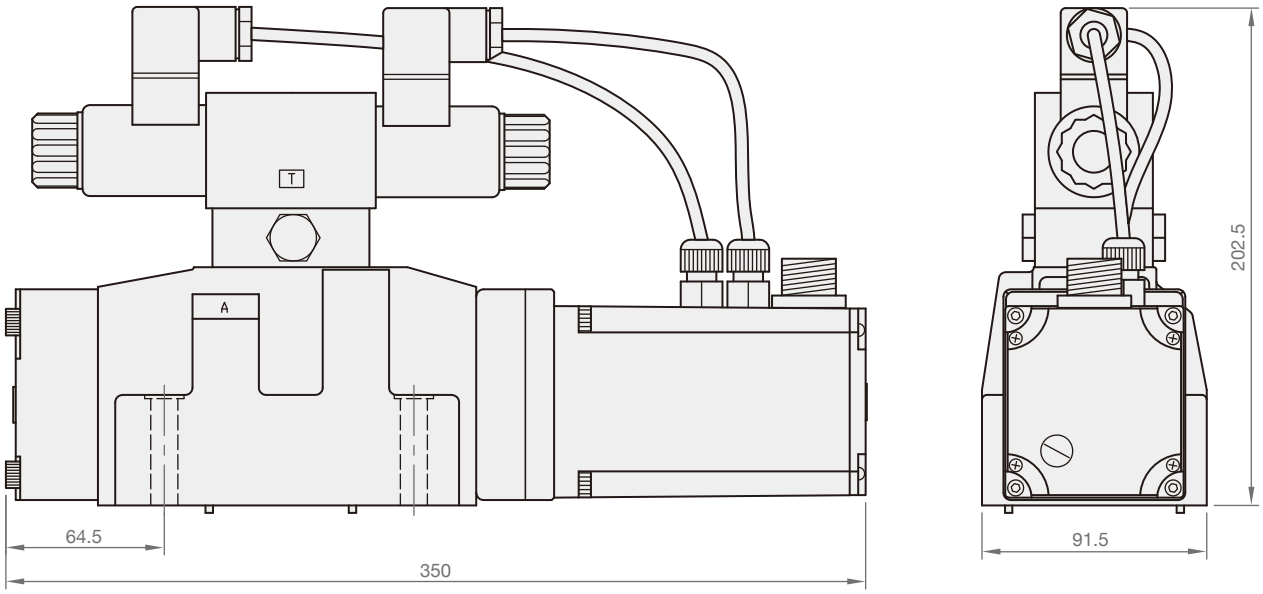


Machined valve contact surface

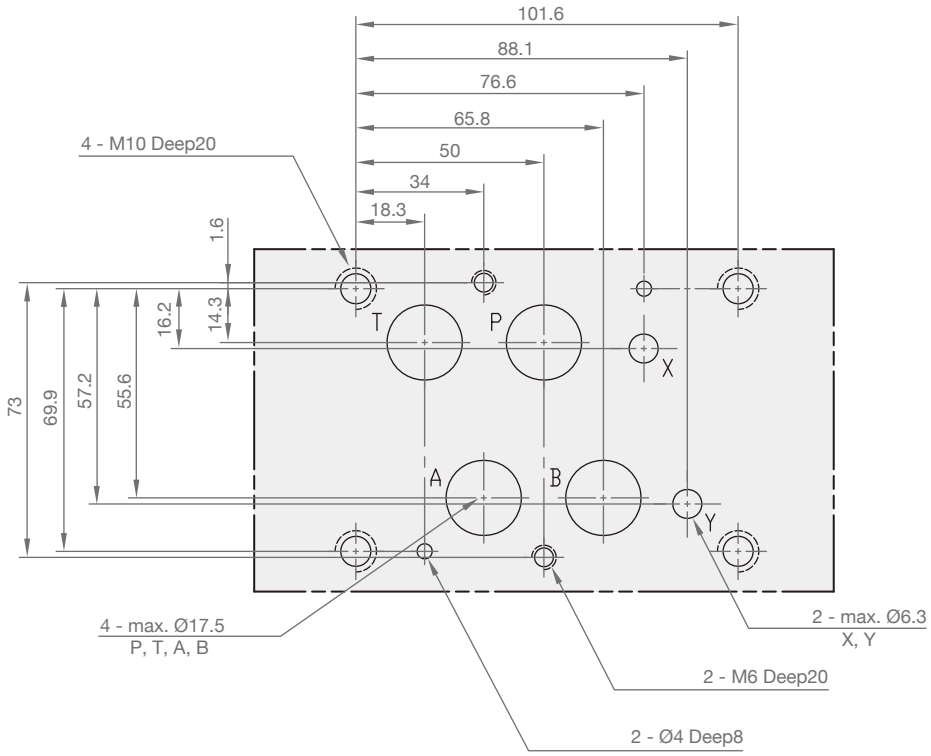
Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M6 x L45	4

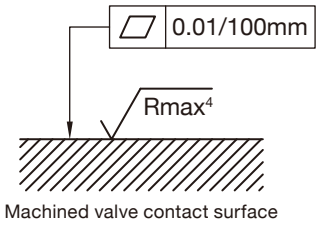
DIMENSION (UNIT : mm)

▸ NPEDK-16



▸ Sub Plates for NPEDK-16



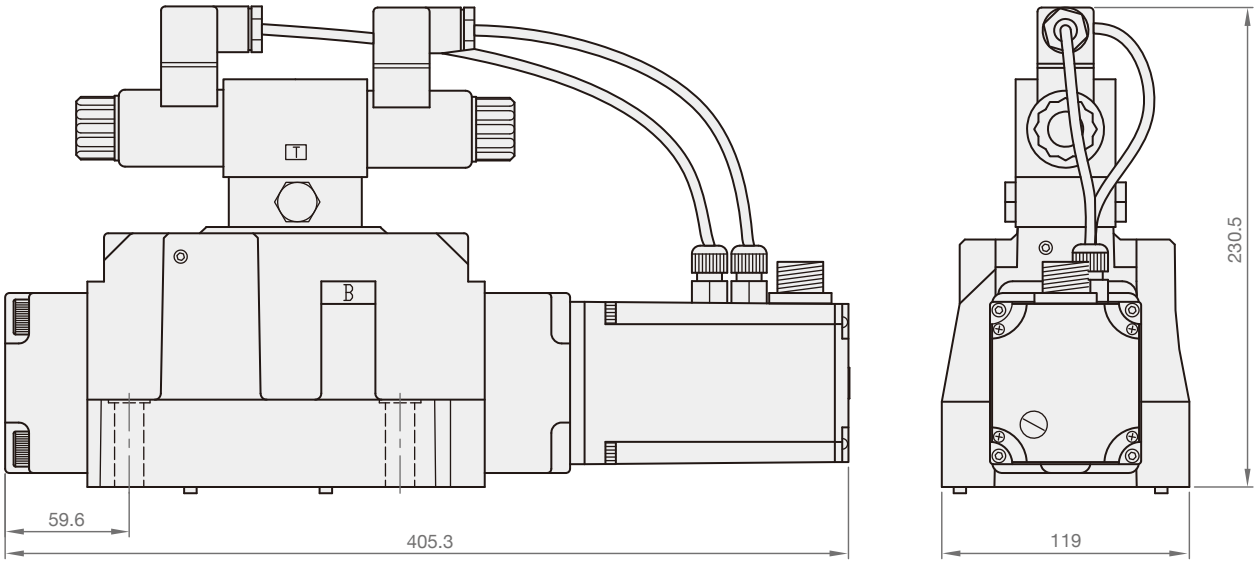


Machined valve contact surface

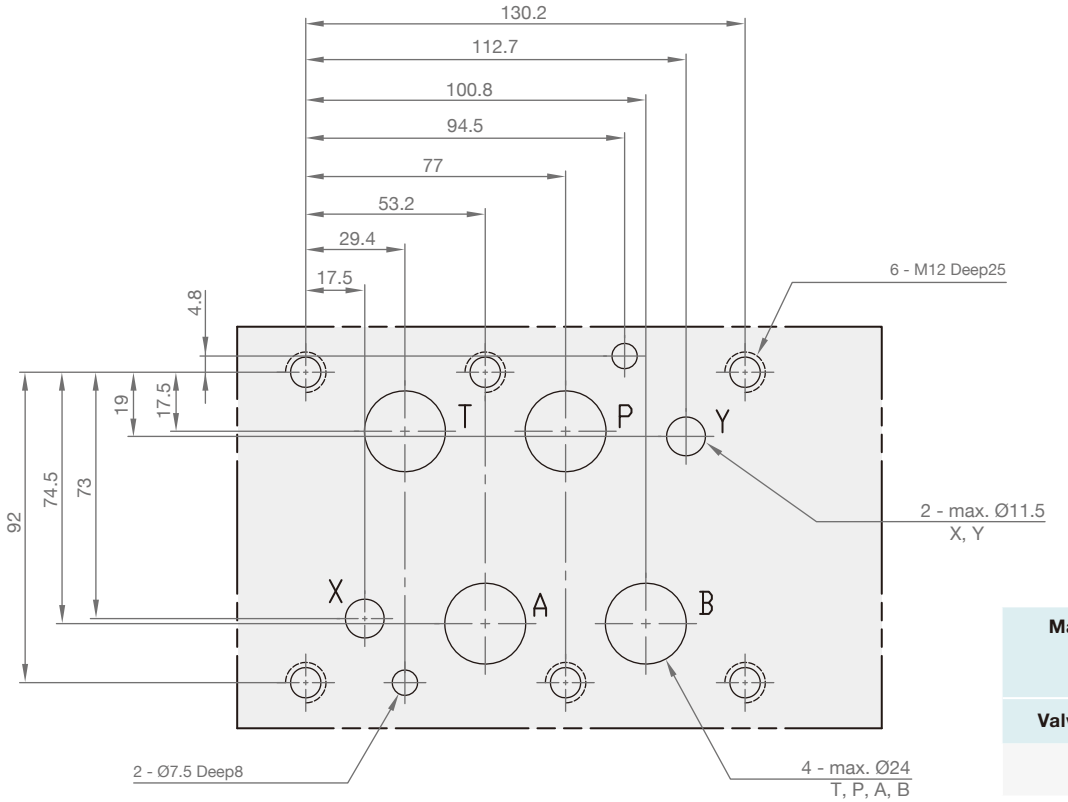
Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M10 x L60	4
M6 x L60	2

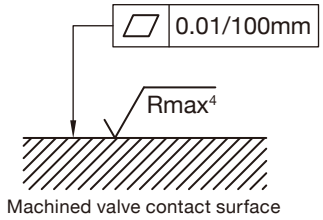
DIMENSION (UNIT : mm)

▸ NPEDK-25



▸ Sub Plates for NPEDK-25

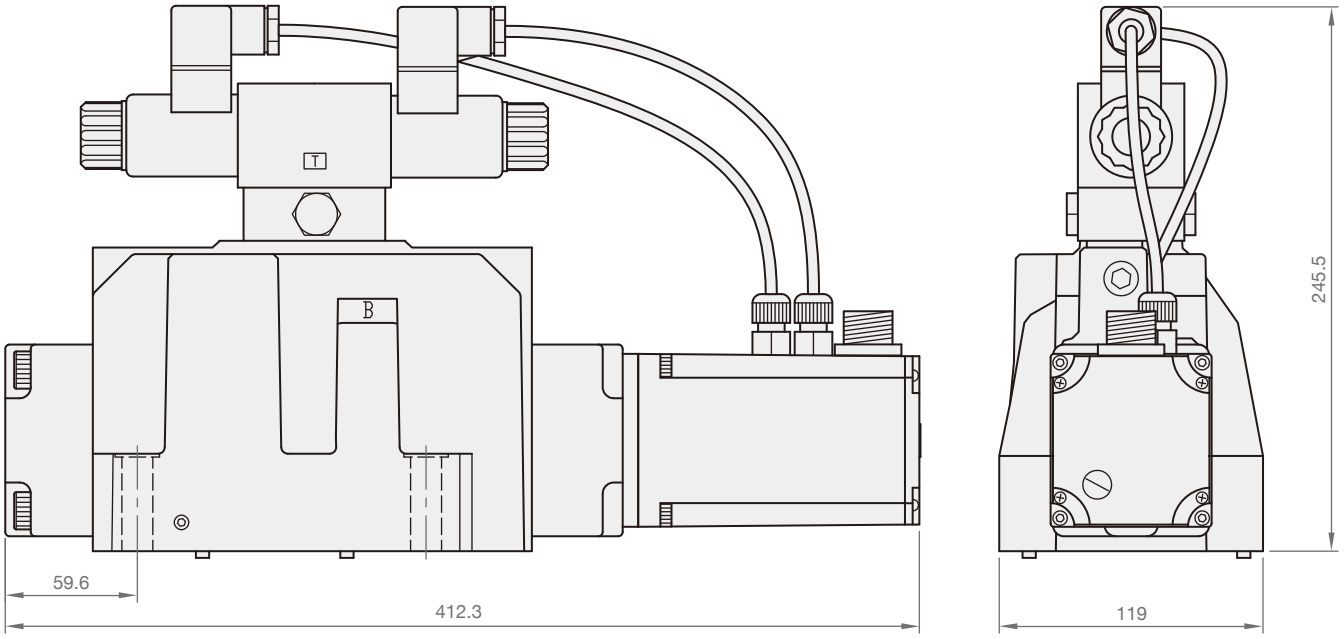




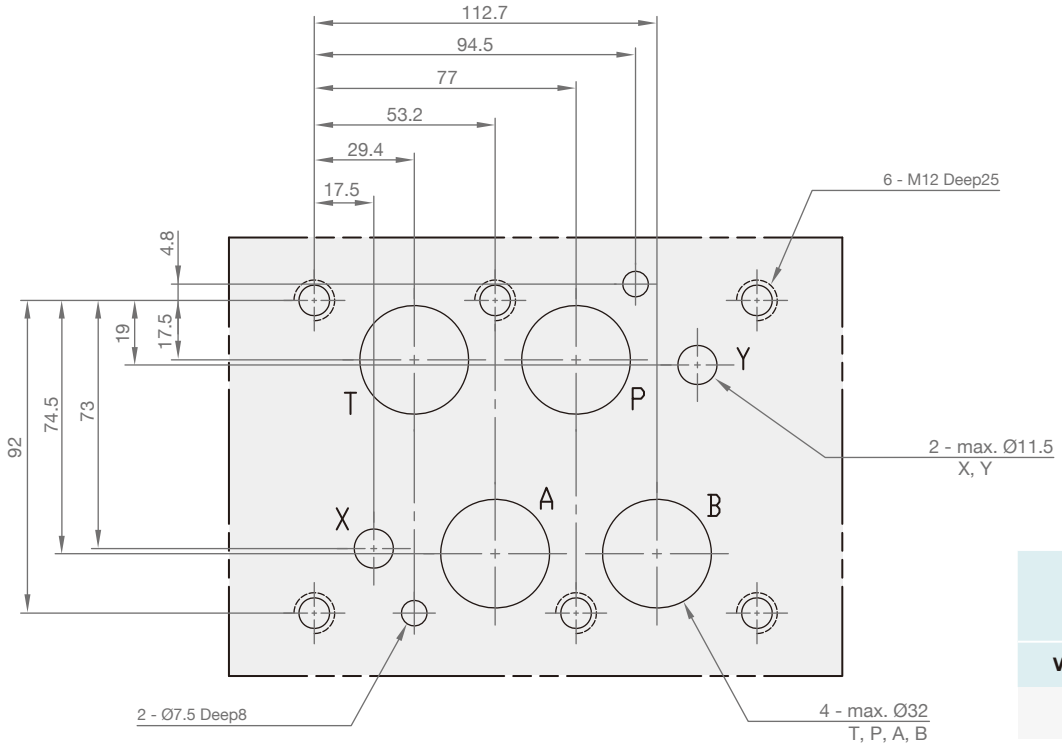
Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M12 x L60	6

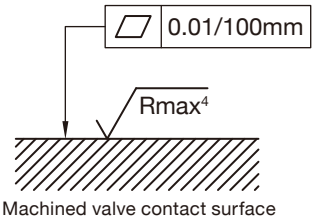
DIMENSION (UNIT : mm)

▸ NPEDK-27



▸ Sub Plates for NPEDK-27

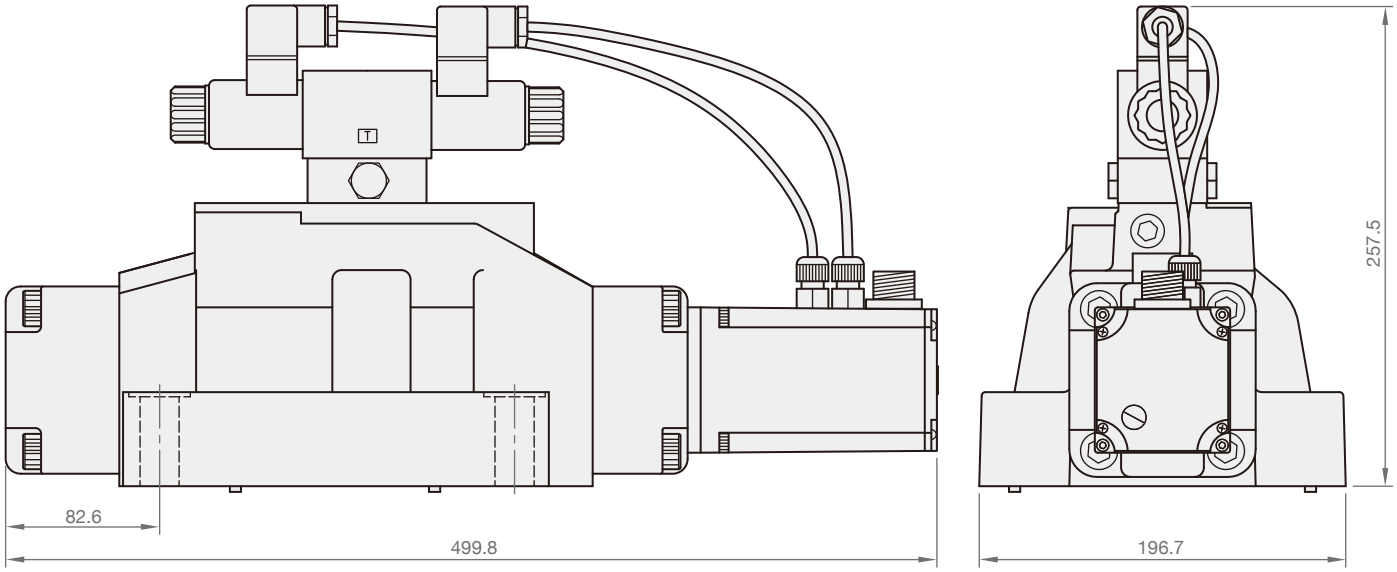




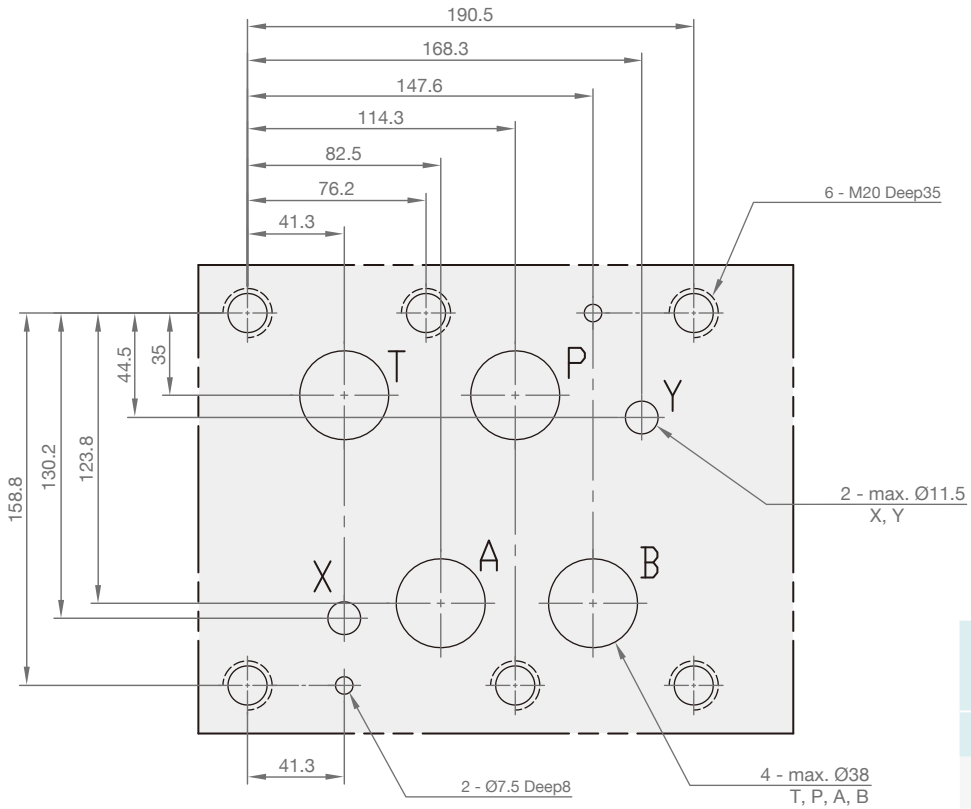
Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M12 x L60	6

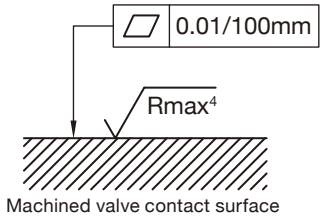
DIMENSION (UNIT : mm)

▸ NPEDK-32



▸ Sub Plates for NPEDK-32

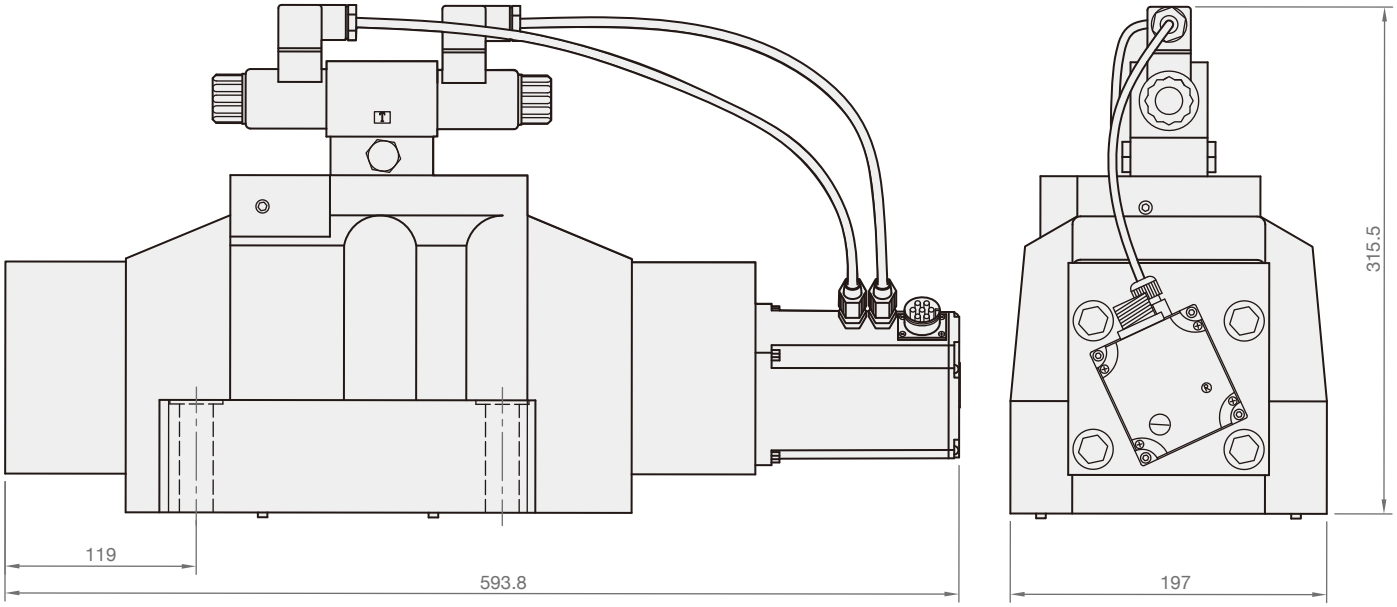




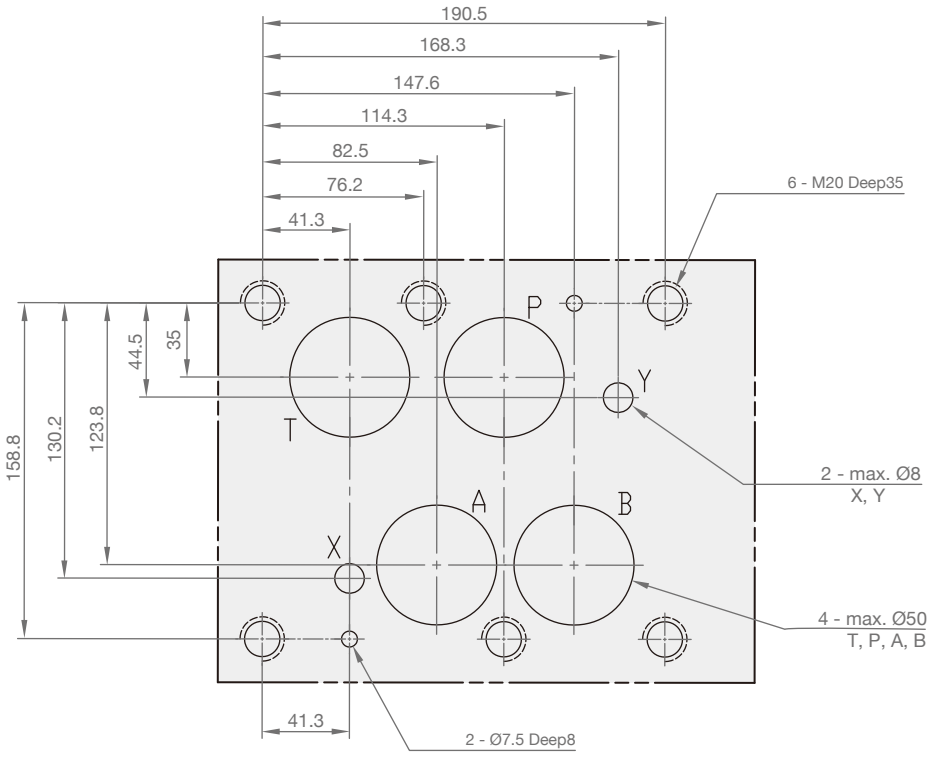
Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M20 x L80	6

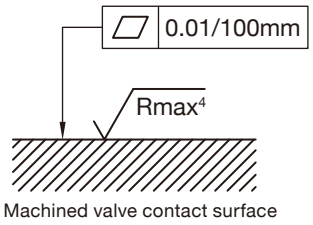
DIMENSION (UNIT : mm)

▸ NPEDK-35



▸ Sub Plates for NPEDK-35

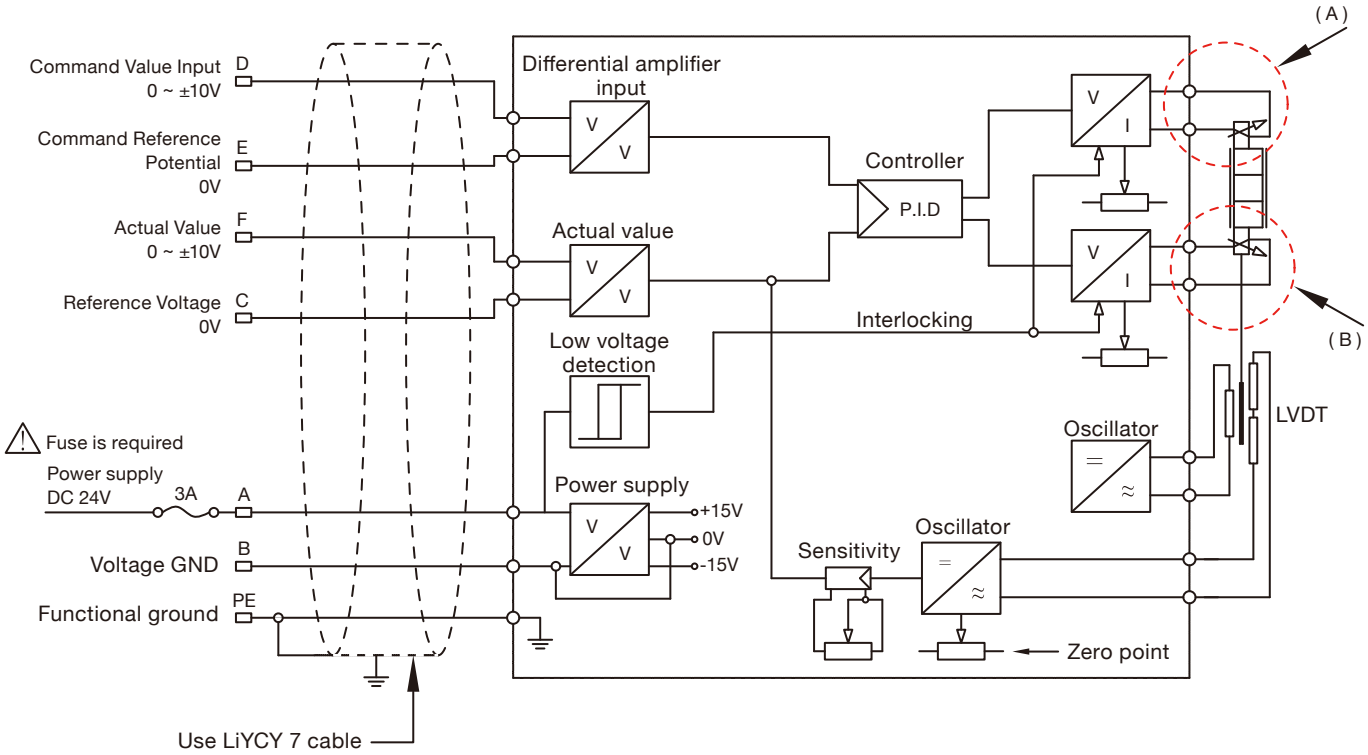


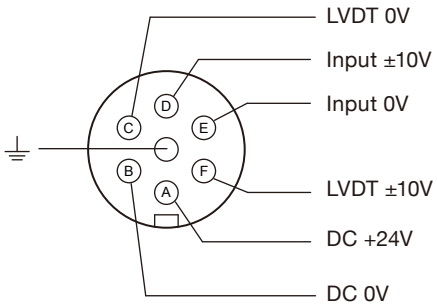


Machined valve contact surface

Machined Valve Contact Surface; Porting Pattern According to ISO 4401-03-02-0-05	
Valve Mounting Screws	**Q'ty**
M20 x L95	6

ELECTRIC DISTRIBUTION





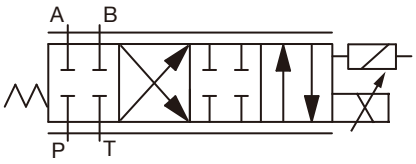
Wiring Instruction	7-Pin Plug	Signal
Power supply	A	DC +24V (19.2~35VDC), max. = 1.5A, impact load ≤3A (fuse)
Power supply	B	0V
Reference Potential Actual Value	C	Actual value 0 V at F
Command Value Voltage	D	±10V
Command Value Voltage	E	Command value potential reference 0 V
Measuring Output	F	Actual value ±10 V
Measuring Output	PE	Functional ground (directly connected to cooling element and valve housing)

Command Value	Positive command value (0 ~ 10 V or 12 ~ 20 mA) at D and reference potential at E cause flow from P → A and B → T. Negative command value (0 ~ -10 V or 12 ~ 4 mA) at D and reference potential at E cause flow from P → B and A → T.
Connecting Cables	Recommend : longer than 20 m cable length type LiYCY 7 x 0.75 mm^2 longer than 50 m cable length type LiYCY 7 x 1.0 mm^2
	External diameter : 6.5 to 11 mm (Plastic plug) * Apply screening on supply side
Notice	Electrical signals provided via control electronics (e. g. actual value) must not be used to switch off safety-relevant machine functions.

ELVDT-G02



SYMBOLS



ORDER CODES

ELVDT - G02 - H 5 20

(1) (2) (3) (4) (5)

1	Model Name	ELVDT	
2	Thread Connection	G02	1/4"
3	Action Mode	H	spring biased type
4	Relieve Position Flow Path	5	all ports closed
5	Rated Flow (Pressure Drop 7 MPa (71kgf/cm^2))	10	10 l/min
		20	20 l/min
		35	40 l/min

HANDLING

1. The amplifier and valve have been adjusted to match at the factory.
2. Install position : horizontal.
3. In the case of 3-port applications and for the direction that throughflow is most common, use of the following flow is recommended P→A→B→T. P→A limit differentialpressure is greater than that of P→B.
4. Be sure to perform sufficient flushing before a testing run.
5. Use steel piping for this valve and the main actuator, and keep piping as shortas possible.
6. There is no air bleeding.
7. Mineral oil hydraulic operating fluid isstandard. Use an R&O type and wearresistant type of ISO VG32, 46, or 68 or equivalent.
8. Cleanness of the operating Oil should be apply to Nas 9 or cleaner level.
9. Electrical wiring between the amp and valve should be no longer than 30 meters. For the solenoid valve use VCTF 2mm2 2-conductor shielded wire, and for the differential transformer use VCTF 0.5mm2 4-conductor shielded wire.
10. After disassembling the valve, be sure to fill the inside of the guide with operatingfluid before reassembling. Tightening torque : 5 to 7N · m (51 to 71kgf-cm)

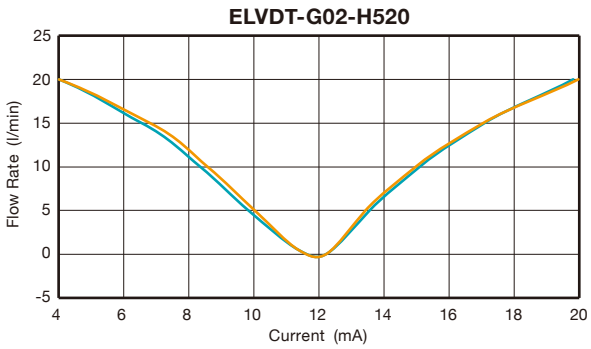
MODEL SPEC.

Model		ELVDT-G02-H510	ELVDT-G02-H520	ELVDT-G02-H535
Max. Operating Pressure		32 MPa (327 kgf/cm^2)		
Allowable Back Pressure of T Port		2.5 MPa (25.5 kgf/cm^2)		
Rated Flow (Pressure Drop 7 MPa (71kgf/cm^2))		10 l/min	20 l/min	40 l/min
Max. Operating Flow		22 l/min	35 l/min	50 l/min
Max. Pressrue Drop		32MPa (327 kgf/cm^2)	21MPa (214 kgf/cm^2)	14MPa (143 kgf/cm^2)
Magnetic Hysteresis		< 0.5%		
Step Response ms (0 → 100% Displacement)		< 16 ms *		
Frequency Response Hz (90° Phase Delay ±10% Displacement)		> 80 Hz		
Center Drift	Supply Pressure	< 0.5% / FS (Δp=25 MPa)		
	Fluid Temperature	< 1.5% / FS (ΔT=40°C)		
Filtration Finenes		Cleanness of oil must be under NAS VALUE 9 ISO 18/15		
Operating Fluid Temperature Range		30~60°C		
Recommended Fluid Temperature Range		30~60°C		
Waterproof		IP53		
Weight		2.3 kg		

* Note : Step response is typical value for a supply pressure of 7MPa (71kgf/cm2) and uid temperature of 40°C (kinematic viscosity : 40mm2/s).

PERFORMANCE CURVES

▸ Flow Rate – Current Characteristics



Note :
Hydraulic configuration vs. reference signal :

Standard:

Reference signal 0 ÷ +10V / 12 ÷ 20mA } P → A/B → T

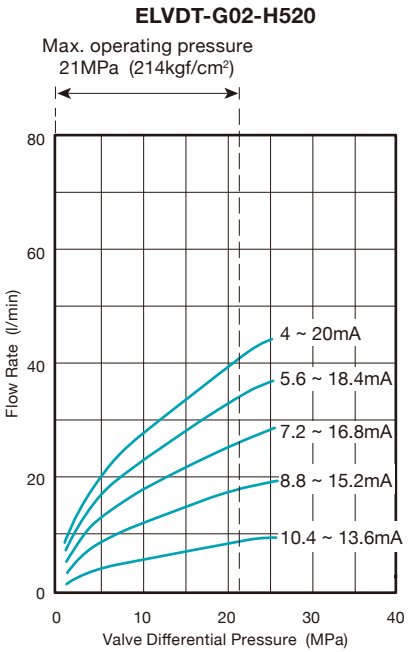
Reference signal 0 ÷ -10V / 12 ÷ 4mA } P → B/A → T

Option /B:

Reference signal 0 ÷ +10V / 12 ÷ 20mA } P → B/A → T

Reference signal 0 ÷ -10V / 12 ÷ 4mA } P → A/B → T

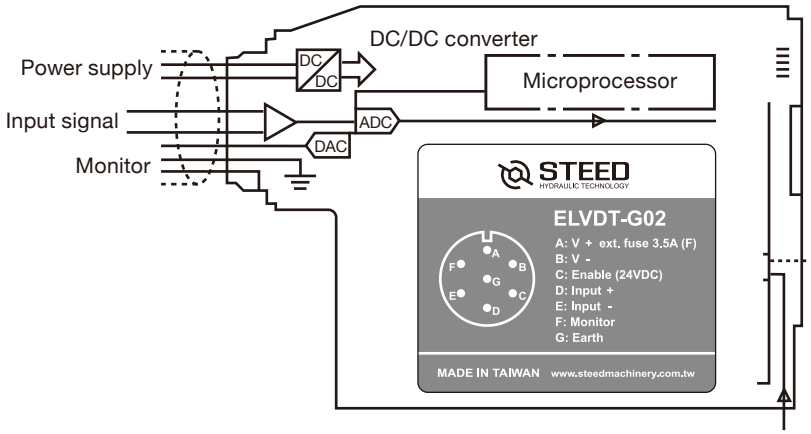
▸ Valve Differential Pressure – Flow Rate Characteristics



INSTRUCTION

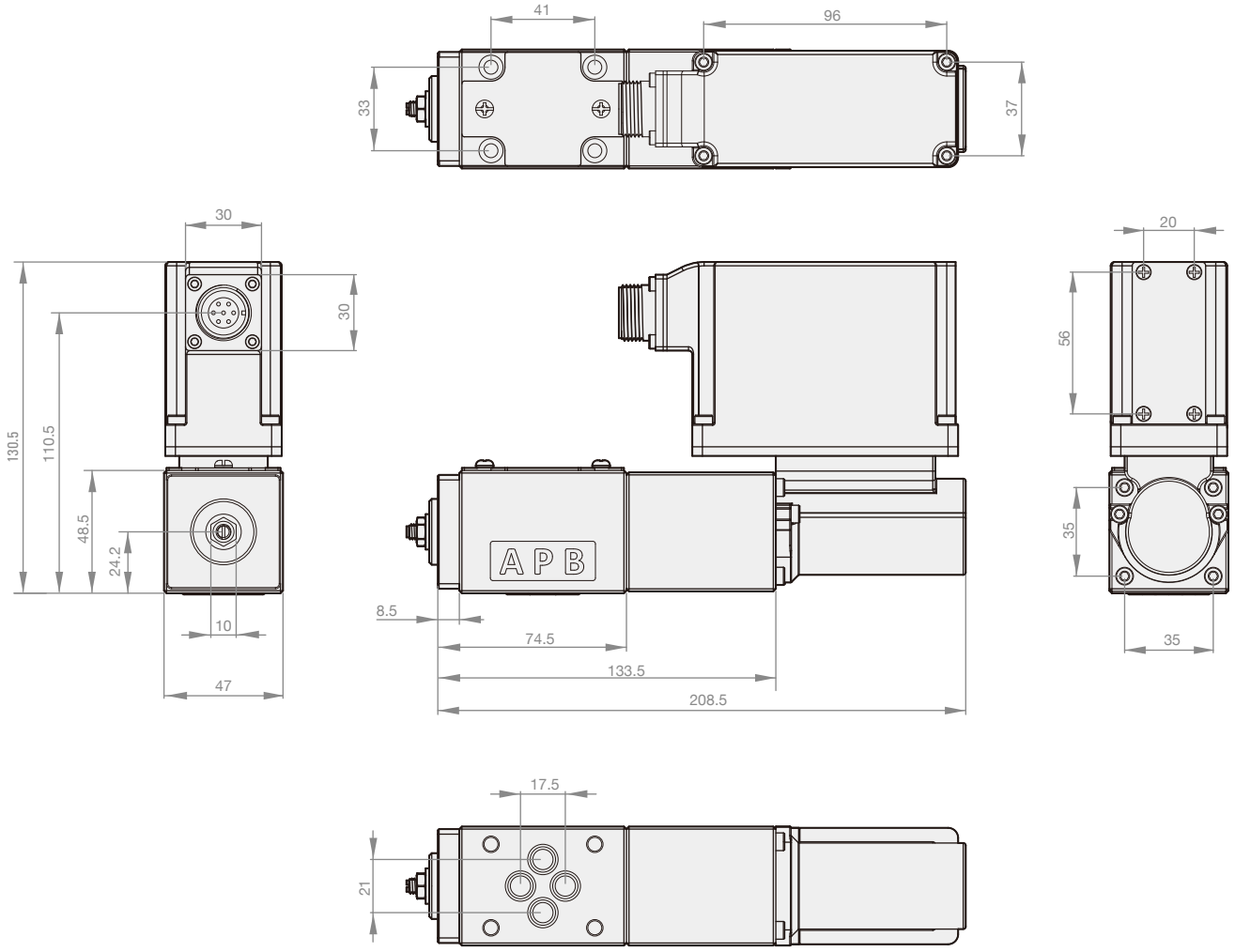
Wiring instruction		
A	Power supply voltage +	DC 24V
B	Power supply voltage -	DC 24V
C	Enable	DC 24V
D	Input signal terminal +	+10V
E	Input signal terminal -	-10V
F	Monitor terminal	
G	Earth	

* Terminal D, E : Input signal terminals (0~10V)
Terminal E, F : Monitor
Precise electronic product which should not be adjusted.



DIMENSION

(UNIT : mm)

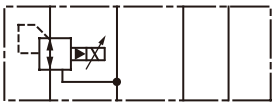


EOG-G01

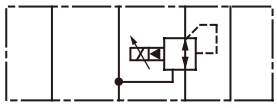


SYMBOLS

P Port Control



B Port Control



ORDER CODES

EOG - G01 - P 1

1	Model Name	EOG	
2	Thread Connection	G01	1/4"
3	Control Port	P	P Port
		B	B Port
4	Pressure Adjusting Range	B	3.1~25.5 kgf/cm^2 (0.3~2.5 MPa)
		1	4~71 kgf/cm^2 (0.4~7 MPa)
		2	6~143 kgf/cm^2 (0.6~14 MPa)

HANDLING

1. Air Bleeding
To enable proper pressure control, loosen the air vent when starting up the pump in order to bleed any air from the pump, and fill the inside of the solenoid with hydraulic operating fluid.

2. Mounting Method
For the initial adjustment or when there is no input current to the valve due to an electrical problem or some other reason, valve pressure can be increased by rotating the manual adjustment screw clockwise (rightward). Normally, the manual adjusting screw should be rotated back fully to the left (counterclockwise) and secured with the lock nut.

3. Minimum Control Pressure
Since this valve has an internal drain system, T port back pressure has an effect on minimum control pressure.

4. Load Capacity
Make load capacity (valve OUT side capacity) at least 0.5l

5. Use an operating fluid that conforms to the both of the following
Oil temperature: -20 to 70°C, Viscosity: 12 to 400mm^2/s. The recommended viscosity range is 15 to 60mm^2/s.

MODEL SPEC.

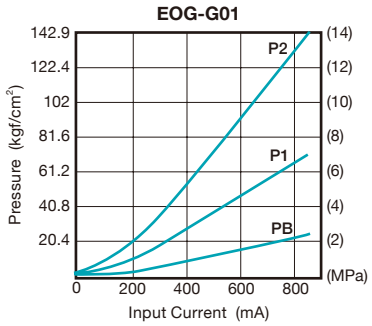
Model	EOG-G01
Max. Operational Pressure	255 kgf/cm^2 (25 MPa)
Max. Flows	30 l/min
Pressure Adjusting Range	B : 3.1~25.5 kgf/cm^2 (0.3~2.5 MPa) 1 : 4~71 kgf/cm^2 (0.4~7 MPa) 2 : 6~143 kgf/cm^2 (0.6~14 MPa)
Allowable Back Pressure of T port	<25 kgf/cm^2 (<2.5 MPa)

Model	EOG-G01
Rated Current	850 mA
Coil Resistance	20Ω (20°C)
Magnetic Hysteresis	<3% *
Amplifier No.	TW2085-2
Weight	3.6 kg

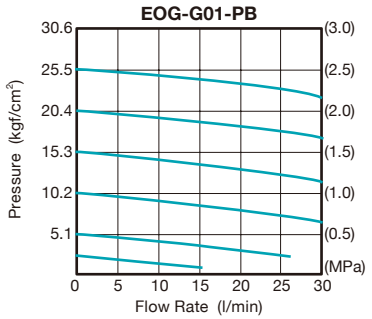
* Note : Value when a STEED amplifier TW2085-2 is used (with dithering).

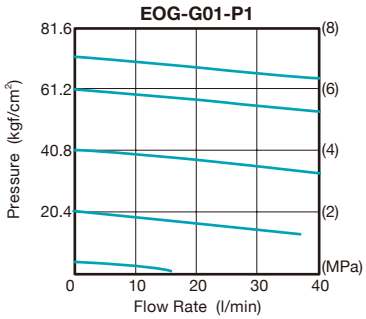
PERFORMANCE CURVES

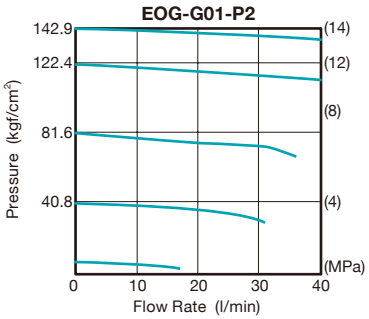
▸ Input Current - Pressure Characteristics



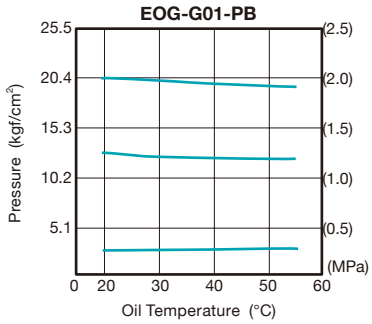
▸ Flow Rate - Pressure Characteristics

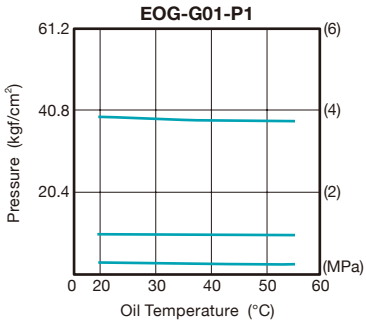


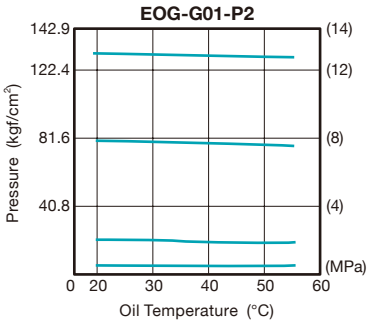




▸ Fluid Temperature Characteristics



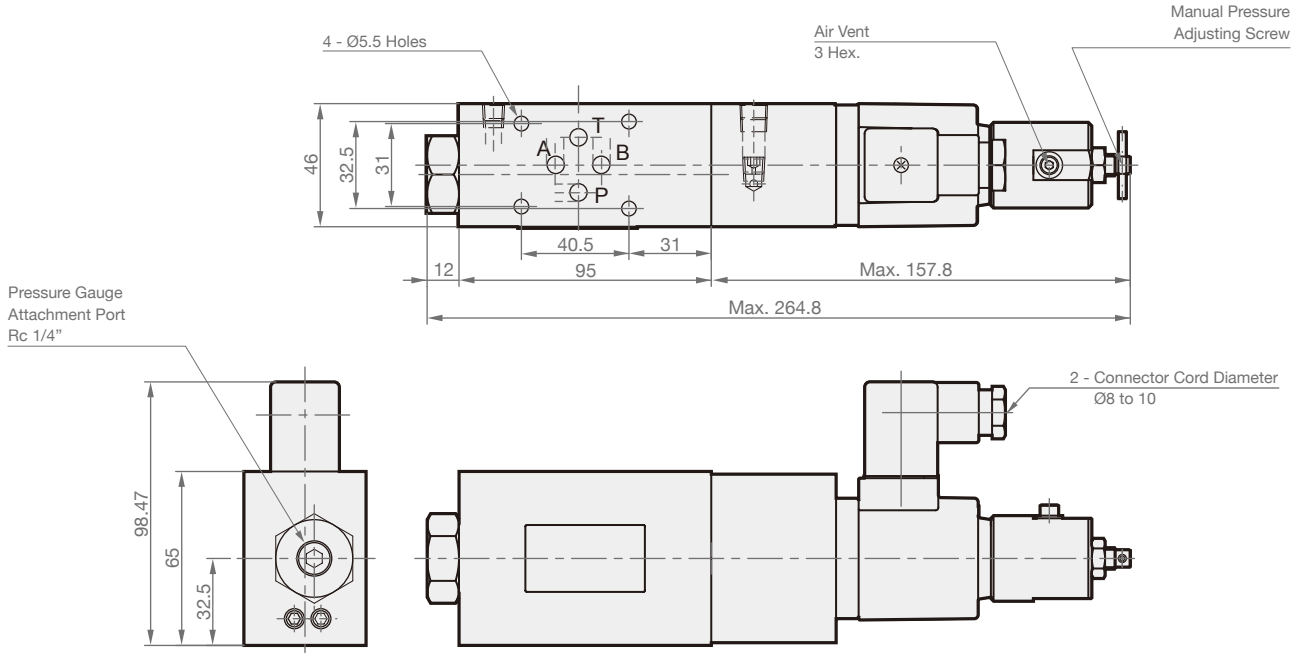




* Hydraulic Operating Fluid Viscosity : 32mm²/s

DIMENSION

(UNIT : mm)

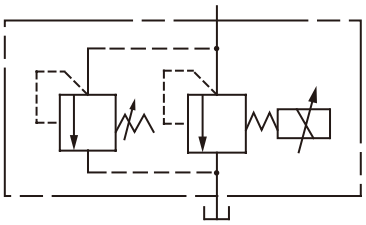


EDG-G01

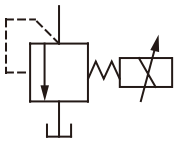


SYMBOLS

With safety valve



Without safety valve



ORDER CODES

EDG - G01 - H2 - D1 - R

1 2 3 4 5

1 ▸	Model Name	EDG	
2 ▸	Thread Connection	G01	1/4"
3 ▸	Pressure Adjusting Range	H1	10~143 kgf/cm^2 (1.0~14 MPa)
		H2	15.3~214 kgf/cm^2 (1.5~21 MPa)
		H3	15.3~286 kgf/cm^2 (1.5~28 MPa)
		H4	20~357 kgf/cm^2 (2.0~35 MPa)
4 ▸	Coil Resistance	D1	10Ω
		D2	20Ω
5 ▸	Safety Valve	R	with safety valve
		none	without safety valve

HANDLING

1. Air Bleeding
To enable proper pressure control, loosen the air vent when starting up the pump in order to drain any air from the pump, and fill the inside of the solenoid with hydraulic operating fluid. The position of the air vent can change by loosening the M4 screw and rotating the cover.

2. Mounting Method
Mounting on a vertical surface causes minimum pressure to increase by 2 kgf/cm^2 (0.2 MPa).

3. Manual Pressure Adjusting Screw
For the initial adjustment or when there is no input current to the valve due to an electrical problem or some other reason, valve pressure can be increased by rotating the manual adjustment screw clockwise (rightward). Normally, the manual adjusting screw should be rotated back fully to the left (counterclockwise) and secured with the lock nut.

4. Minimum Relief Flow Rate
A small flow rate can cause setting pressure to become unstable. Use a flow rate of at least 0.3 l/min.

5. Load Capacity
When using this valve to control direct circuit pressure, make sure the load volume (P port side volume) is at least 40 cm^3.

6. Bundled Accessories (Valve Mounting Bolts)
M5 x L45 (4pcs) Tightening torque : 51~72 kgf/cm^2

7. Use An Operating Fluid That Conforms to The Both of The Following.
Oil temperature : -20 to 70°C.
Viscosity : 12 to 400 mm^2/s.
The recommended viscosity range is 15 to 60 mm^2/s.

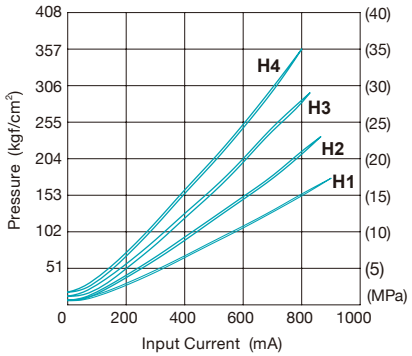
MODEL SPEC.

Model	EDG-G01
Max. Flows	1.2 l/min
Pressure Adjusting Range	H1 : 10~143 kgf/cm^2 (1.0~14 MPa) H2 : 15.3~214 kgf/cm^2 (1.5~21 MPa) H3 : 15.3~286 kgf/cm^2 (1.5~28 MPa) H4 : 20~357 kgf/cm^2 (2.0~35 MPa)
Rated Current	800 mA
Coil Resistance	10Ω or 20Ω (20°C)
Magnetic Hysteresis	<3%
Repeatability	<1%
Amplifier No.	TW2085-2
Weight	1.6 kg

* Note : Value when a STEED amplifier TW2085-2 is used (with dithering).

PERFORMANCE CURVES

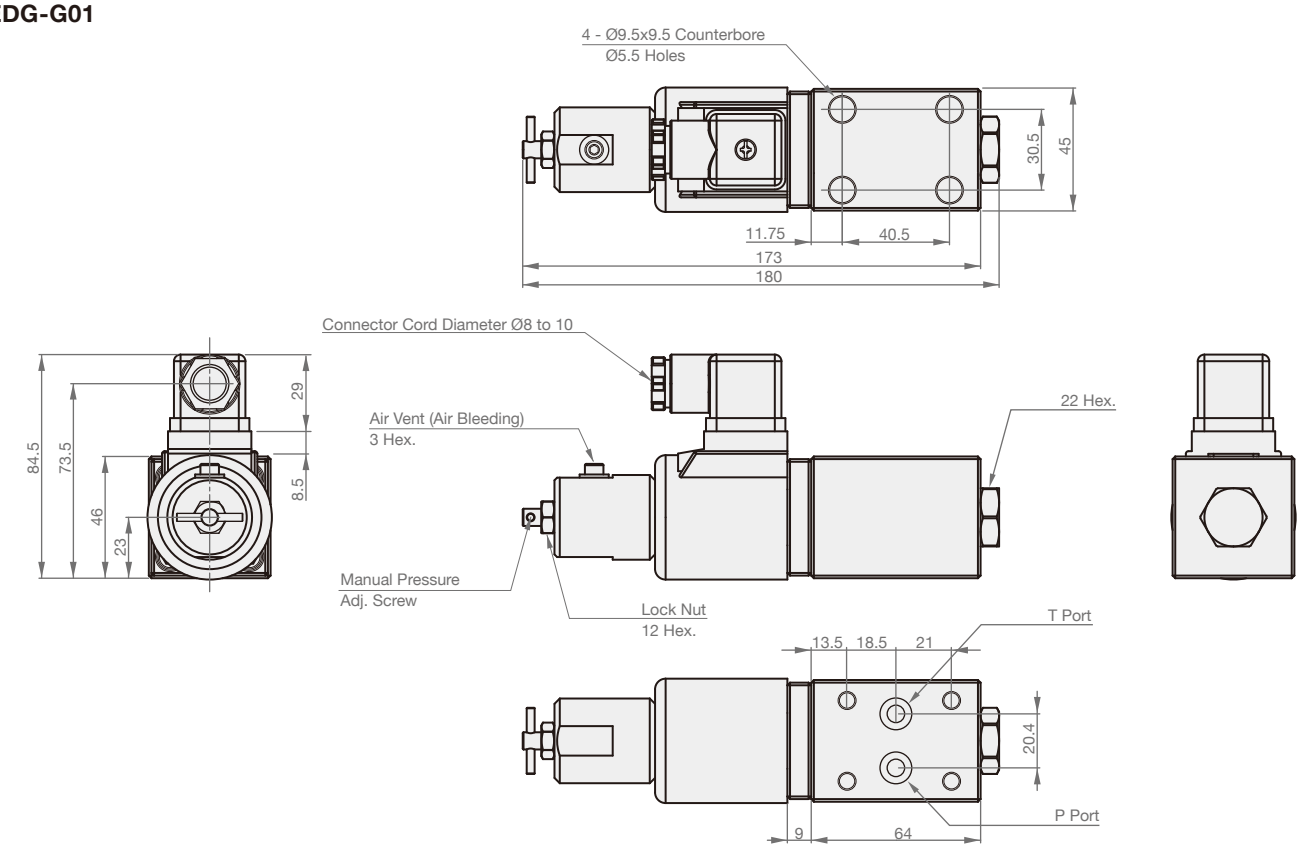
▸ Input Current - Pressure Characteristics



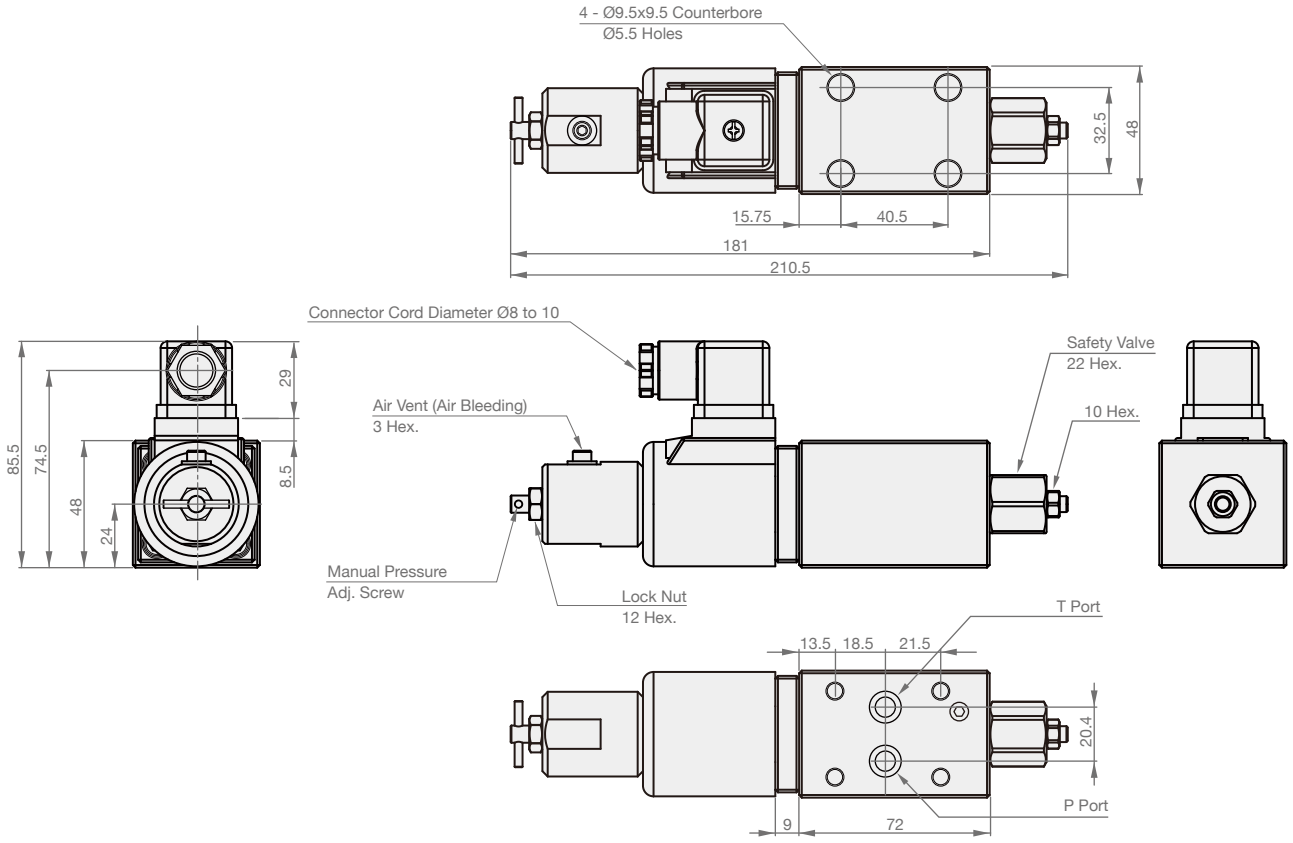
* Hydraulic Operating Fluid Viscosity : 32mm^2/s

DIMENSION (UNIT : mm)

▸ EDG-G01



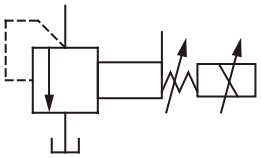
▸ EDG-G01-R



EBG-G03, G06



SYMBOLS



ORDER CODES

EBG - G03 - H2 - D2

1 2 3 4

1 ▸ Model Name	EBG		
2 ▸ Thread Connection	G03	3/8"	
	G06	3/4"	
3 ▸ Pressure Adjusting Range	H1	10~143 kgf/cm^2 (1.0~14 MPa)	
	H2	15.3~214 kgf/cm^2 (1.5~21 MPa)	
	H3	15.3~286 kgf/cm^2 (1.5~28 MPa)	
	H4	20~357 kgf/cm^2 (2.0~35 MPa)	
4 ▸ Coil Resistance	D1	10Ω	
	D2	20Ω	

HANDLING

1. Air Bleeding
To enable proper pressure control, loosen the air vent when starting up the pump in order to bleed any air from the pump, and fill the inside of the solenoid with hydraulic operating fluid.

2. Manual Pressure Adjusting Screw
For the initial adjustment or when there is no input current to the valve due to an electrical problem or some other reason, valve pressure can be increased by rotating the manual adjustment screw clockwise (rightward). Normally, the manual adjusting screw should be rotated back fully to the left (counterclockwise) and secured with the lock nut.

3. Tank Port Back Pressure
Make sure that tank port back pressure is as small as possible; no greater than 2.0 kgf/cm^2 (0.2 MPa).

4. Safety Valve Setting Pressure
The safety valve is set to maximum adjustment pressure plus 15.3 to 20.4 kgf/cm^2 (1.5 to 2.0 MPa). When actually using the valve, adjust in accordance with actual pressure.

5. Bundled Accessories (Valve Mounting Bolts)

Model No.	Bolt Size	Q'ty
EBG-G03	M12 L35	4
EBG-G06	M16 L45	4

6. Use An Operating Fluid That Conforms to The Both of The Following.
Oil temperature : -20 to 70°C.
Viscosity : 12 to 400 mm^2/s.
The recommended viscosity range is 15 to 60 mm^2/s.

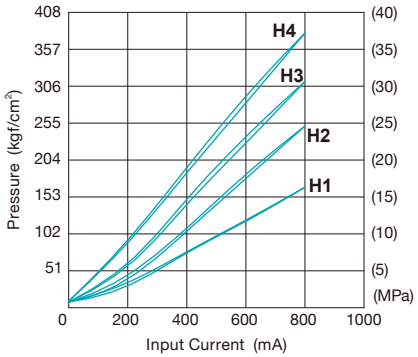
MODEL SPEC.

Model	EBG-G03	EBG-G06
Max. Flows	100 l/min (26.4 gpm)	200 l/min (52.8 gpm)
Pressure Adjusting Range	H1 : 10~143 kgf/cm^2 (1.0~14 MPa) H2 : 15.3~214 kgf/cm^2 (1.5~21 MPa) H3 : 15.3~286 kgf/cm^2 (1.5~28 MPa) H4 : 20~357 kgf/cm^2 (2.0~35 MPa)	
Rated Current	800mA	
Coil Resistance	20Ω (20°C)	
Magnetic Hysteresis	<3%	
Repeatability	<1%	
Amplifier No.	TW2085-2	
Weight	6.6 kg	7.8 kg

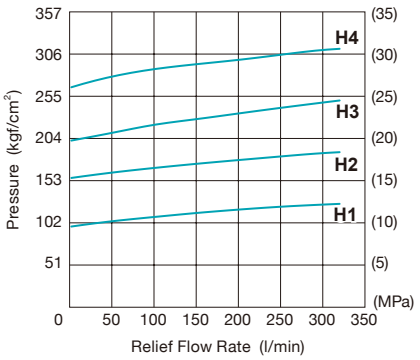
* Note : Value when a STEED amplifier TW2085-2 is used (with dithering).

PERFORMANCE CURVES

▸ Input Current - Pressure Characteristics



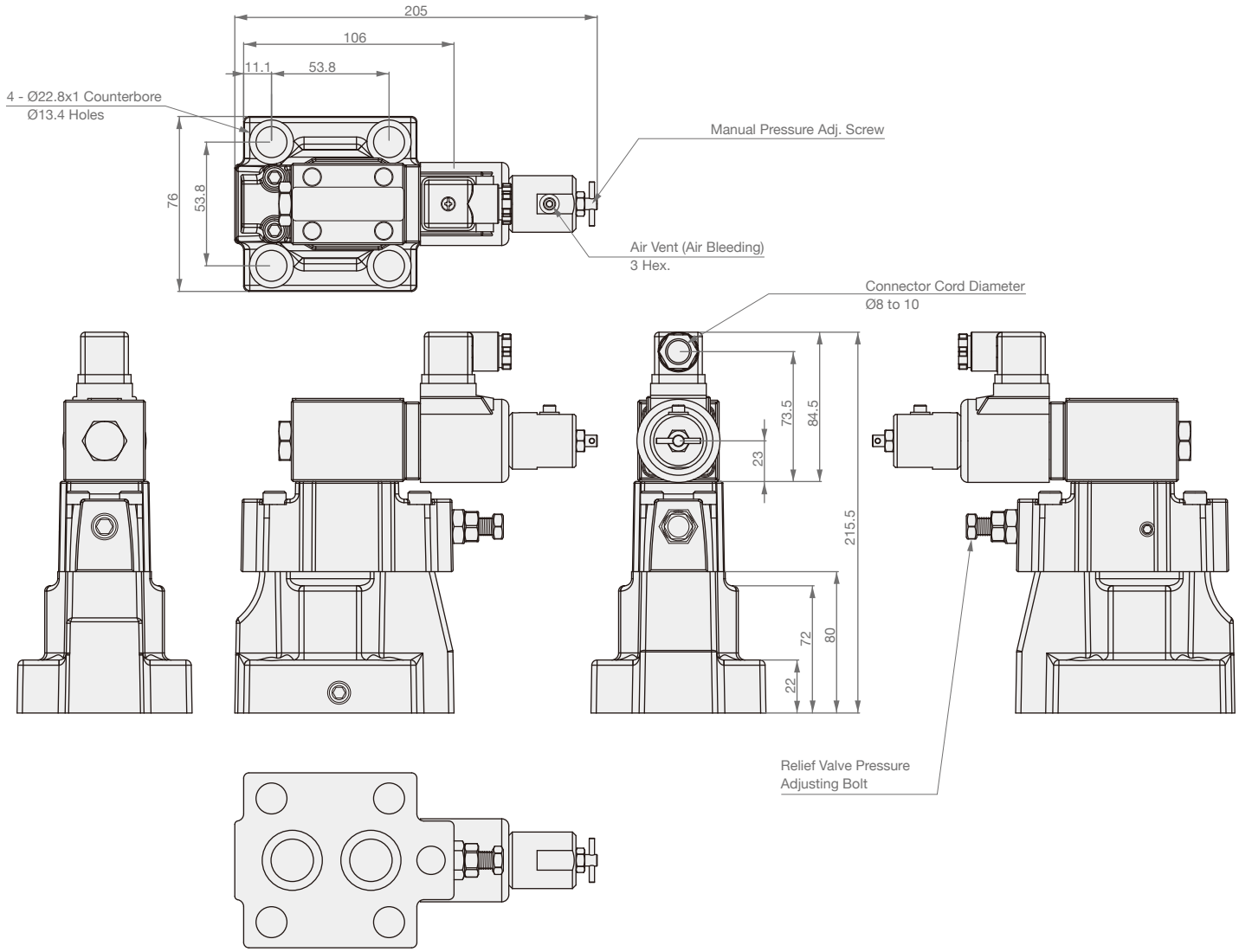
▸ Flow Rate - Pressure Characteristics



* Hydraulic Operating Fluid Viscosity : 32mm^2/s

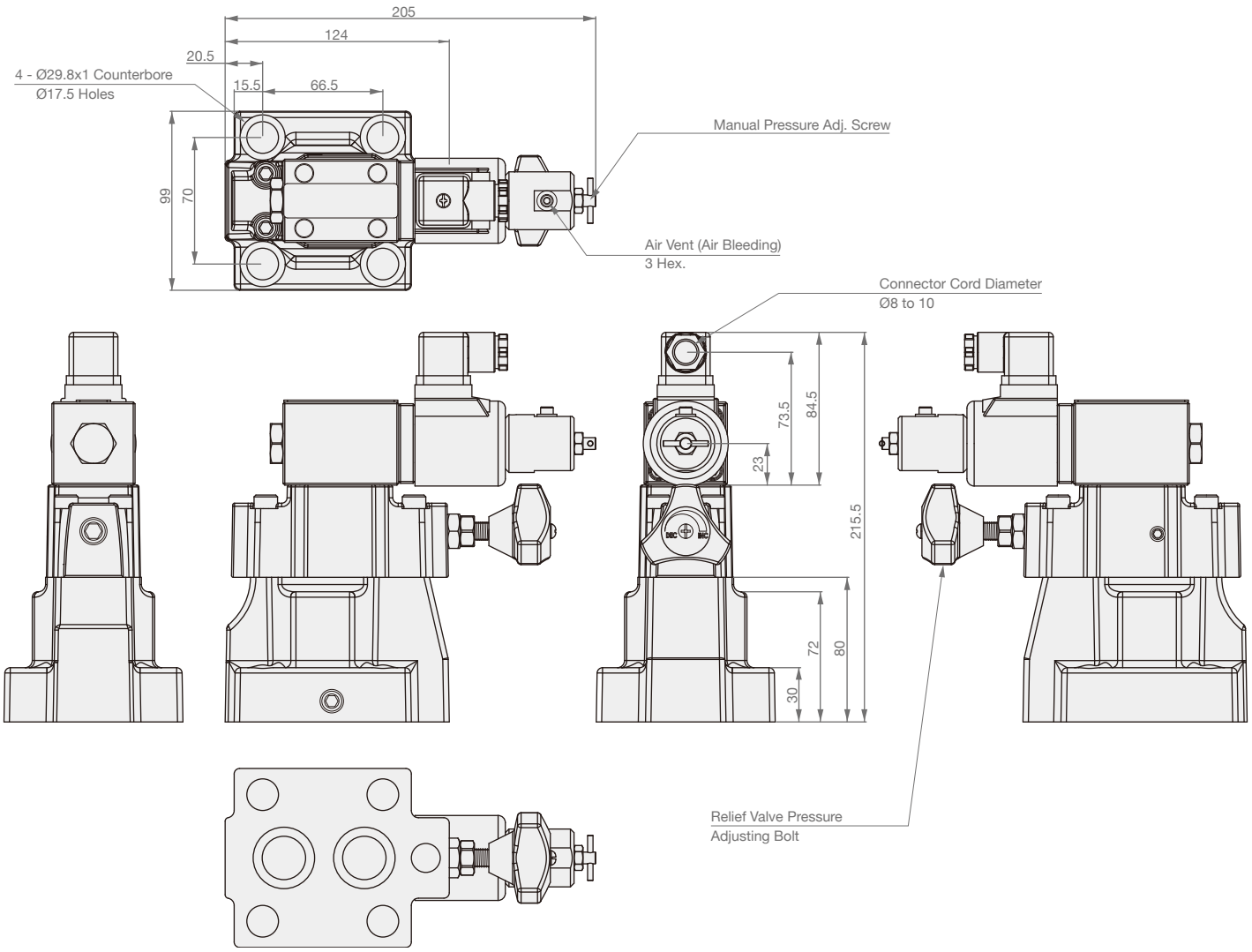
DIMENSION (UNIT : mm)

▸ EBG-G03

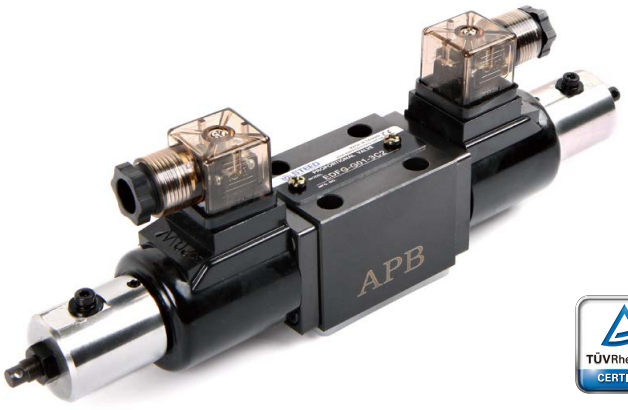


DIMENSION (UNIT : mm)

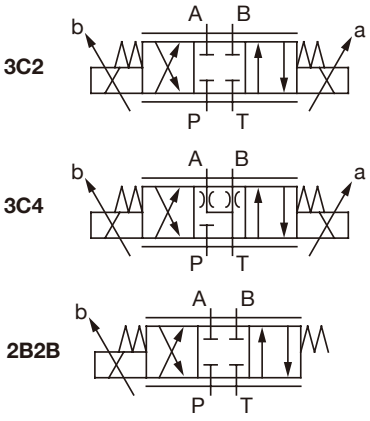
▸ EBG-G06



EDFG-G01



SYMBOLS



ORDER CODES

EDFG - G01 - 3C2

1	Model Name	EDFG	
2	Thread Connection	G01	1/4"
3	Spool Type	3C2	
		3C4	
		2B2B	

HANDLING

1. Air Bleeding
In order to ensure stable control, loosen the air vent and bleed air from the valve before starting operation.

2. T Port Piping
When configuring piping, ensure that the T port is filled with operating fluid.

3. Manual Adjusting Screw
For the initial adjustment or when there is no input current to the valve due to an electrical problem or some other reason, the valve can be operated and valve pressure can be increased by rotating the manual adjustment screw clockwise (rightward). Normally, the manual adjusting screw should be rotated back fully to the left (counterclockwise).

4. Valve Mounting Orientation
Install the valve so the spool axis line is horizontal.

5. Combining with A Pressure Compensation Valve
Use of the optional pressure compensation kit is recommended when higher precision flow rate control is required or in high-pressure applications.

6. If pilot pressure exceeds 92 kgf/cm^2 (9 MPa) use a modular type P port reduction valve (MBRV-02-P-1) at a setting of 20 kgf/cm^2 (2 MPa).

7. On a system that requires large brake pressure during deceleration or a system that uses a vertical cylinder, equip a counter balance valve. Use a single rod, if the rod exit is not slowed sufficiently, use a counter balance valve on the rod.

8. Maintain hydraulic operating fluid contamination so it is at least Class 9.

9. Bundled Accessories (Valve Mounting Bolts)

Model No.	Bolt Size	Q'ty
EDFG-G01	M5 L45	4

10. Use An Operating Fluid That Conforms to The Both of The Following.
Oil temperature : -20 to 70°C.
Viscosity : 12 to 400 mm^2/s.
The recommended viscosity range is 15 to 60 mm^2/s.

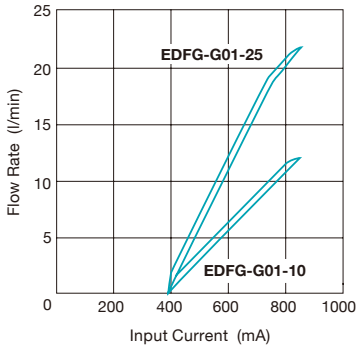
MODEL SPEC.

Model	EDFG-G01
Max. Operating Pressure	225 kgf/cm^2 (25 MPa)
Rated Flow	10/25 l/min
Allowable Back Pressure	25.5 kgf/cm^2 (2.5 MPa)
Rated Current	850 mA
Coil Resistance	20Ω (20°C)
Magnetic Hysteresis	<5%
Repeatability	0.04 sec
Amplifier No.	TW9820, TW9820-2
Weight	2.2 kg

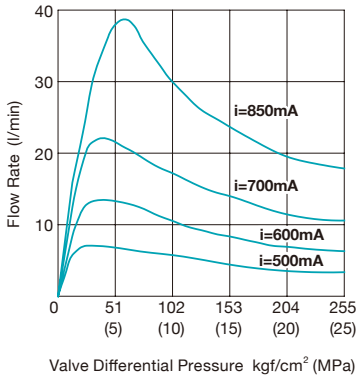
* Note :
1. Value when pressure drop volume to P → A and P → B is ΔP = 10 kgf/cm^2 (1.0 MPa).
2. Indicates maximum throughput volume value between each port.
3. Indicates differential between the pilot port and tank port, or drain port.
4. Value when 0.1 second is assumed for the response time from zero to the rated flow volume.
5. Value when a STEED amplifier TW9820-2 is used (with dithering).
6. Response time is typical value for a supply pressure of 143 kgf/cm^2 (14 MPa) and fluid temperature of 40°C (kinematic viscosity : 40 mm^2/s).

PERFORMANCE CURVES

▸ Input Current - Pressure Characteristics



▸ Pressure - Flow Rate Characteristics

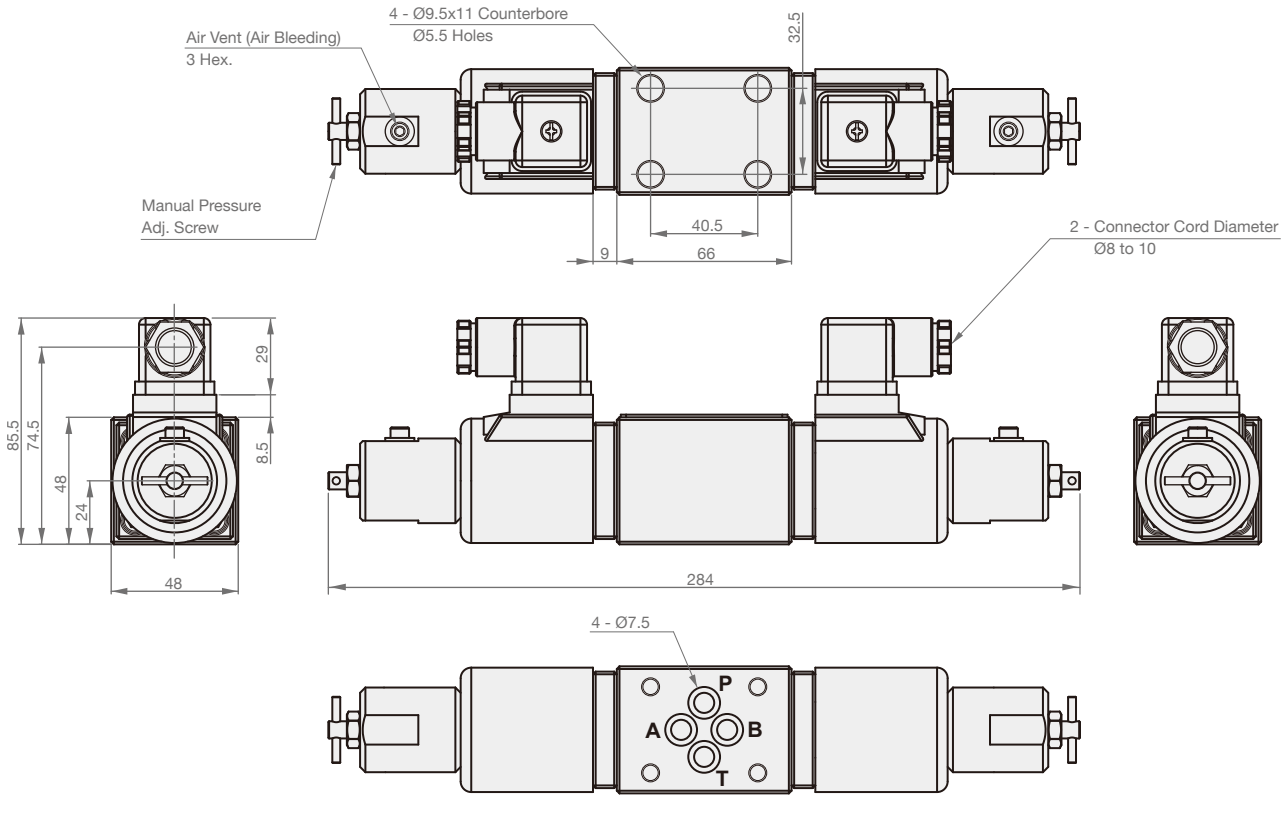


* Hydraulic Operating Fluid Viscosity : 32mm^2/s

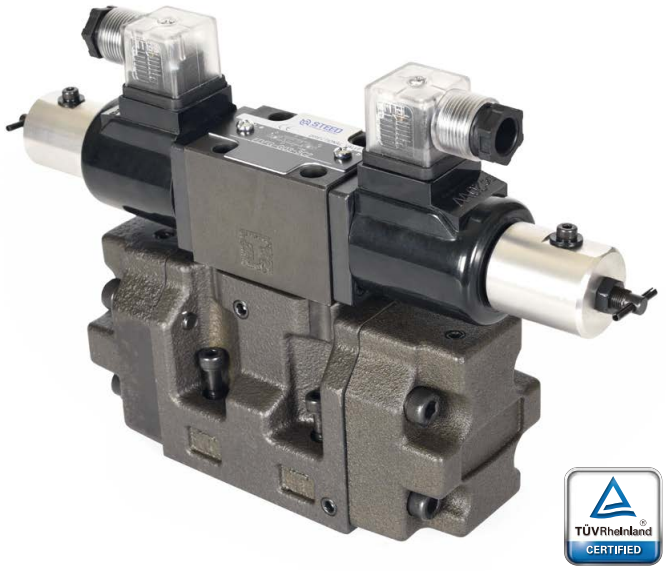
DIMENSION

(UNIT : mm)

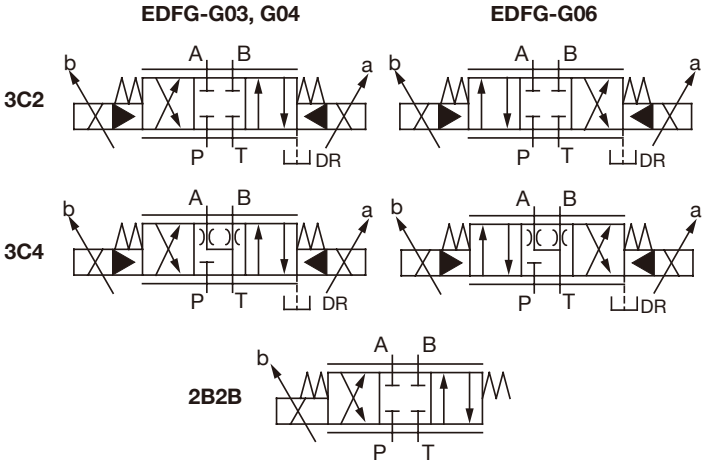
▸ EDFG-G01



EDFG-G03, G04, G06



SYMBOLS



HANDLING

1. Air Bleeding
In order to ensure stable control, loosen the air vent and bleed air from the valve before starting operation.

2. T Port Piping
When configuring piping, ensure that the T port (pilot valve T port for the G03, G04, and G06 sizes) is filled with operating fluid.

3. Manual Adjusting Screw
For the initial adjustment or when there is no input current to the valve due to an electrical problem or some other reason, the valve can be operated and valve pressure can be increased by rotating the manual adjustment screw clockwise (rightward). Normally, the manual adjusting screw should be rotated back fully to the left (counterclockwise).

4. Valve Mounting Orientation
Install the valve so the spool axis line is horizontal.

5. Combining with A Pressure Compensation Valve
Use of the optional pressure compensation kit is recommended when higher precision flow rate control is required or in high-pressure applications.

6. If pilot pressure (EDFG-G03, G04,G06) exceeds 92 kgf/cm² (9 MPa) use a modular type P port reduction valve (MBRV-02-P-1) at a setting of 20 kgf/cm² (2 MPa).

7. On a system that requires large brake pressure during deceleration or a system that uses a vertical cylinder, equip a counter balance valve. Use a single rod, if the rod exit is not slowed sufficiently, use a counter balance valve on the rod.

8. Maintain hydraulic operating fluid contamination so it is at least Class 9. Use of a G01 modular filter (absolute : 8um) is also helpful.

9. Bundled Accessories (Valve Mounting Bolts)

Model No.	Bolt Size	Q'ty
EDFG-G03	M6 L35	4
EDFG-G04	M6 L45 M10 L50	2 4
EDFG-G06	M120 L60	6

10. Use An Operating Fluid That Conforms to The Both of The Following.
Oil temperature : -20 to 70°C. Viscosity : 12 to 400 mm²/s.
The recommended viscosity range is 15 to 60 mm²/s.

ORDER CODES

EDFG - G03 - 3C2 - XY
1 2 3 4

1 ▸	Model Name	EDFG	
2 ▸	Thread Connection	G03	3/8"
		G04	1/2"
		G06	3/4"
3 ▸	Spool Type	3C2	
		3C4	
		2B2B	
4 ▸	Drain Type	XY	external pilot and external drain
		none	internal pilot and internal drain

MODEL SPEC.

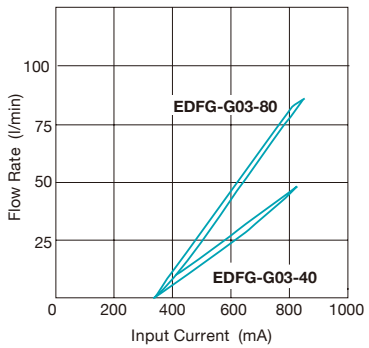
Model	EDFG - G03	EDFG - G04	EDFG - G06
Max. Operating Pressure	225 kgf/cm^2 (25 MPa)		
Rated Flow	40/80 l/min	140 l/min	250 l/min
Pilot Pressure	>10 kgf/cm^2 (1.0 MPa)		
Pilot Flow	>2 l/min	>3 l/min	>5 l/min
Allowable Back Pressure	25.5 kgf/cm^2 (2.5 MPa) 214 kgf/cm^2 (21 MPa)		
Rated Current	850 mA		
Coil Resistance	20Ω (20°C)		
Magnetic Hysteresis	<5%		
Repeatability	0.05 sec	0.08 sec	0.1 sec
Amplifier No.	TW9820, TW9820-2		
Weight	6.6 kg	7.8 kg	12.9 kg

* Note :
1. Value when pressure drop volume to P → A and P → B is ΔP = 10 kgf/cm^2 (1.0 MPa).
2. Indicates maximum throughput volume value between each port.
3. Indicates differential between the pilot port and tank port, or drain port.
4. Value when 0.1 second is assumed for the response time from zero to the rated flow volume.
5. Value when a STEED amplifier TW9820-2 is used (with dithering).
6. Response time is typical value for a supply pressure of 143 kgf/cm^2 (14 MPa) and fluid temperature of 40°C (kinematic viscosity : 40 mm^2/s).

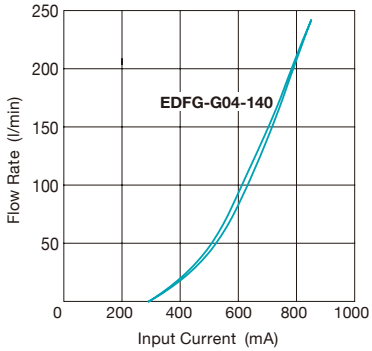
PERFORMANCE CURVES

▸ Input Current - Pressure Characteristics

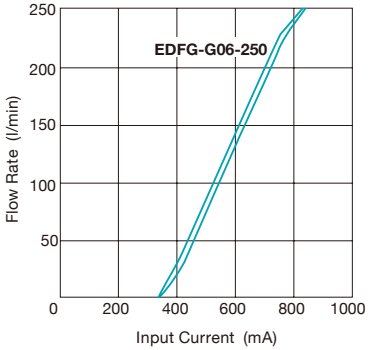
EDFG-G03



EDFG-G04

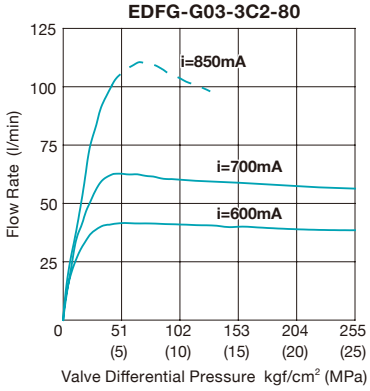


EDFG-G06

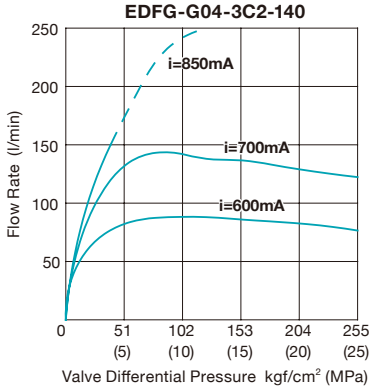


▸ Pressure - Flow Rate Characteristics

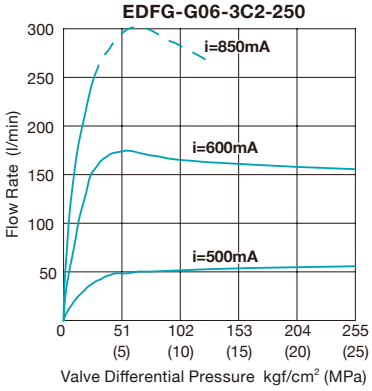
EDFG-G03-3C2-80



EDFG-G04-3C2-140

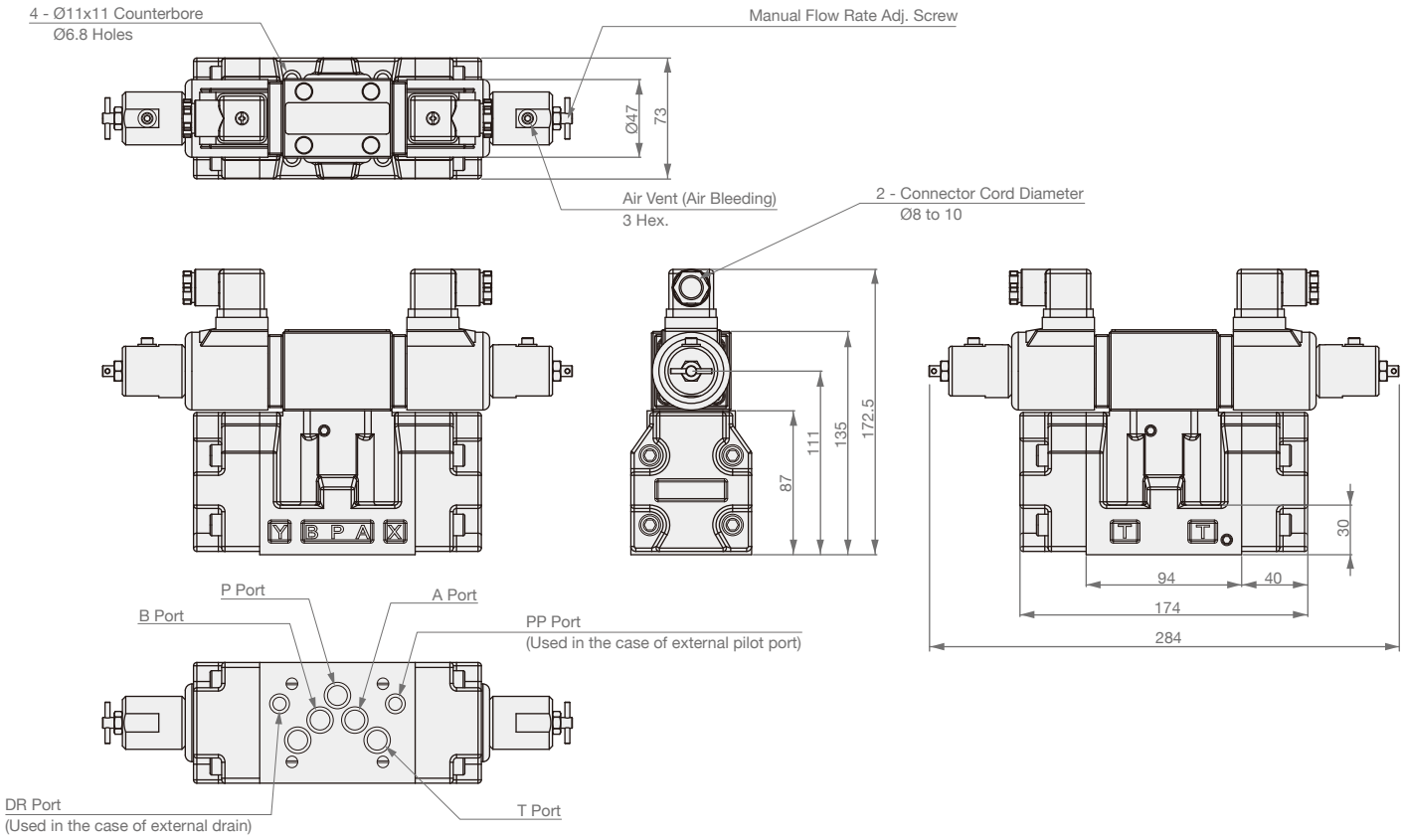


EDFG-G06-3C2-250

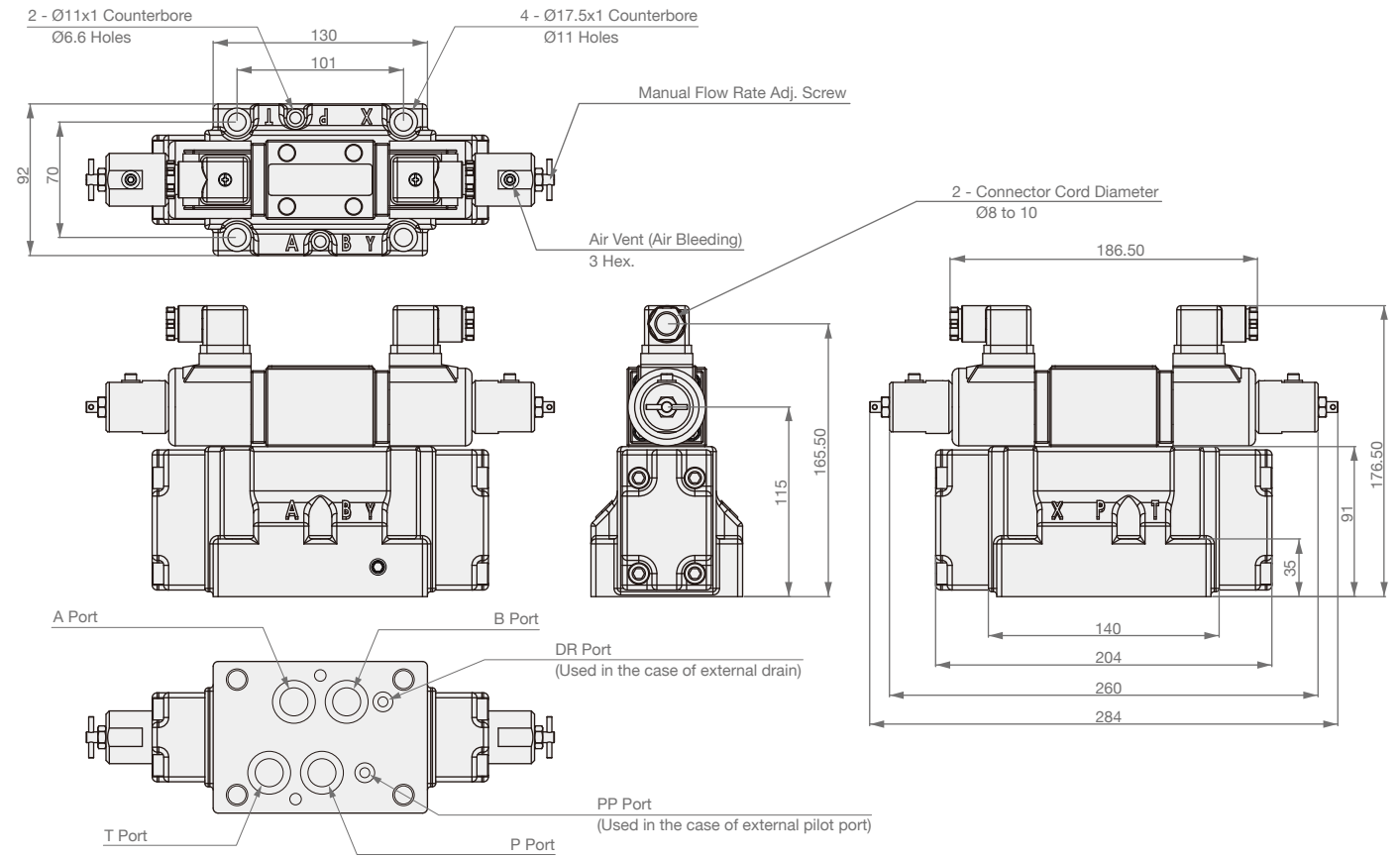


* Hydraulic Operating Fluid Viscosity : 32mm^2/s

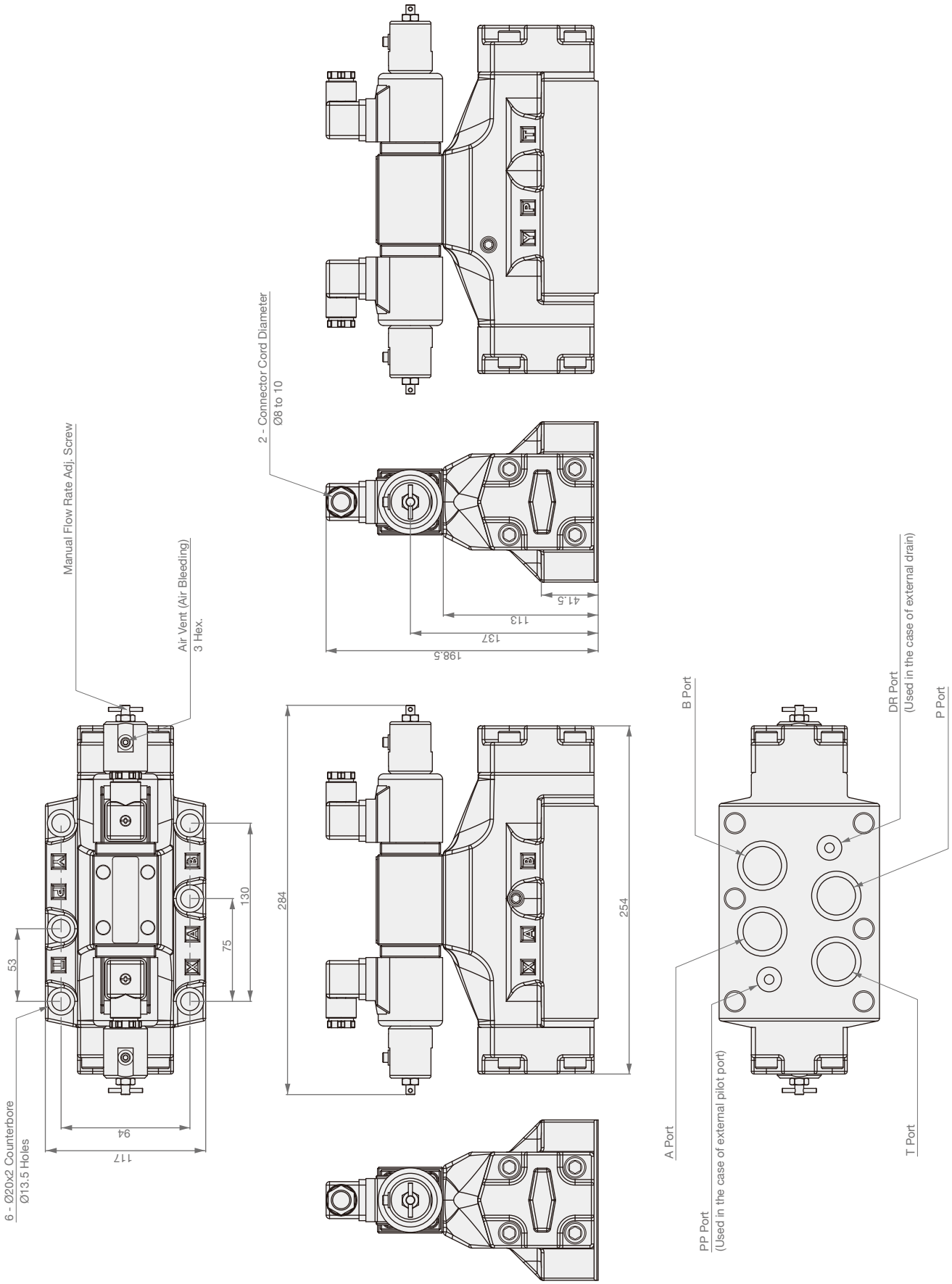
▸ EDFG-G03



▸ EDFG-G04



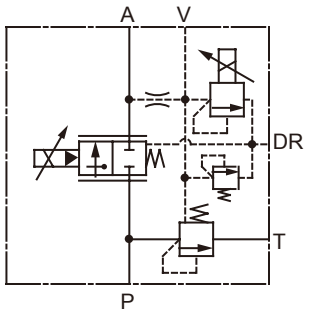
▸ **EDFG-G06**


2 - Connector Cord Diameter
Ø8 to 10
41.5
113
137
198.5
Manual Flow Rate Adj. Screw
Air Vent (Air Bleeding)
3 Hex.
53
75
130
284
254
94
117
6 - Ø20x2 Counterbore
Ø13.5 Holes
B Port
DR Port
(Used in the case of external drain)
P Port
A Port
PP Port
(Used in the case of external pilot port)
T Port

EFBG-03, 06



SYMBOLS



ORDER CODES

EFBG - 03 - 125 - C - R2

(1) (2) (3) (4) (5)

1 ▸	Model Name	EFBG	
2 ▸	Thread Connection	03	3/8"
		06	3/4"
3 ▸	Max. Flow	125	60/125 l/min
		250	250 l/min
4 ▸	Max. Operating Pressure	C	140 kgf/cm^2
		H	255 kgf/cm^2
5 ▸	Pressure Control Range	R1	12.2~71 kgf/cm^2 (1.2~7 MPa)
		R2	14.3~143 kgf/cm^2 (1.4~14 MPa)
		R3	16.3~214 kgf/cm^2 (1.6~21 MPa)
		R4	16.3~255 kgf/cm^2 (1.6~25 MPa)

HANDLING

1. Air Bleeding
In order to ensure stable control, loosen the air vent and bleed air from the valve before starting operation.

2. Manual Adjusting Screw
For the initial adjustment or when there is no input current to the valve due to an electrical problem or some other reason, pressure or flow rate can be increased by rotating the manual adjustment screw clockwise (rightward). Normally, this adjusting screw should be returned completely to its original position and secured with the lock nut.

3. Drain Port
Minimum control pressure is increased by drain port back pressure, so be sure to connect the drain port directly to the fluid tank at a point that is below the oil surface.

4. Safety Valve Setting Pressure
For a safety valve without an electro-hydraulic proportional pilot relief valve, safety valve pressure is set to minimum pressure 35.7 kgf/cm^2 (3.5MPa max.) In the case of a safety valve with an electrohydraulic proportional pilot relief valve, the safety valve setting pressure is set to the minimum adjustment pressure plus 15.3 kgf/cm^2 (1.5MPa). When actually using the valve, adjust in accordance with hydraulic circuit pressure.

5. Minimum Relief Flow Rate During Pressure Control
Setting pressure can become unstable when the relief flow rate to the valve's T port is small. Because of this, use a relief flow rate of at least 10 l/min with a nominal diameter of 03 or 06.

6. Valve Mounting Orientation
When an electro-hydraulic proportional pilot relief valve main valve is mounted on a vertical surface with the pilot relief valve part facing downwards make it difficult to bleed air from the pilot relief valve. Because of this, you should not use this type of mounting orientation.

7. Bundled Accessories (Valve Mounting Bolts)

Model No.	Bolt Size	Q'ty
EFBG-03	M10 L75	2
	M10 L90	2
EFBG-06	M16 L100	2
	M16 L135	2

8. Use An Operating Fluid That Conforms to The Both of The Following.
Oil temperature : -20 to 70°C. Viscosity : 12 to 400 mm^2/s.
The recommended viscosity range is 15 to 60 mm^2/s.

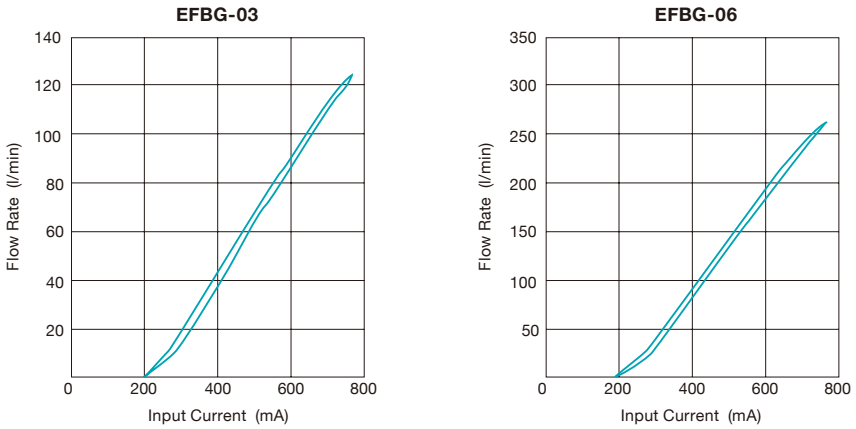
MODEL SPEC.

Model		EFBG-03	EFBG-06
Max. Operating Pressure		255 kgf/cm^2 (25 MPa)	
Max. Flows		60/125 l/min	250 l/min
Flowing System	Flow Adjusting Range	1~60 l/min 1~125 l/min	5~250 l/min
	Internal Resistance of This Valve	5.1 kgf/cm^2 (0.5 MPa) <note1>	7.1 kgf/cm^2 (0.7 MPa) <note1>
	Rated Current	800 mA	
	Coil Resistance	20Ω (20°C)	
	Magnetic Hysteresis	<3% <note2>	
	Repeatability	<1%	
Pressure System	Pressure Control Range	R1 : 12.2~71 kgf/cm^2 (1.2~7 MPa) R2 : 14.3~143 kgf/cm^2 (1.4~14 MPa) R3 : 16.3~214 kgf/cm^2 (1.6~21 MPa) R4 : 16.3~255 kgf/cm^2 (1.6~25 MPa)	
	Max. Operating Pressure	C : 140 kgf/cm^2 H : 255 kgf/cm^2	
	Rated Current	C : 700 mA H : 800 mA	
	Coil Resistance	20Ω (20°C)	
	Magnetic Hysteresis	<3%	
	Repeatability	<1%	
Amplifier No.		TW9820, TW9820-2	
Weight		14 kg	28 kg

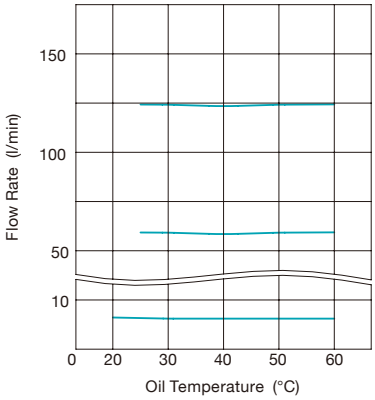
* Note :
1. Indicates the pressure differential between the valve P port and A port.The left chart is complied with our standard electronic control circuit board TW9820-2, and is the single valve test result.
2. Value when a STEED amplifier TW9820-2 is used (with dithering).
3. These specifications apply to valves that include an electro-hydraulic proportional pilot relief valve.
4. The maximum adjustment pressure is 255 kgf/cm^2 (25 MPa max.) for a valve that does not include an electro-hydraulic proportional pilot relief valve. Factory default is minimum output 35.7 kgf/cm^2 (3.5 MPa max.) Set this value in accordance with the pressure of the hydraulic circuit being used.

PERFORMANCE CURVES

▸ Input Current - Flow Rate Characteristics

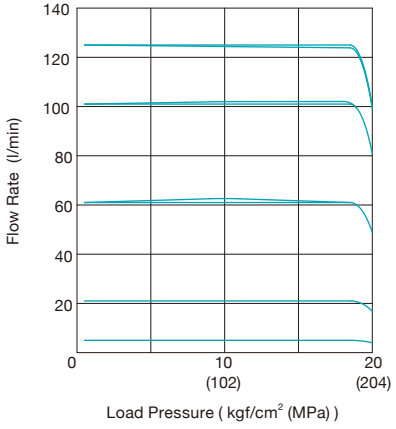


▸ Fluid Temperature - Control Flow Rate Characteristics



Load Pressure : 102kgf/cm^2 (10MPa)
Operating Fluid : VG32
Fluid Temperature : 40°C
Value when a STEED amplifier TW9820-2 is used. (with dithering)

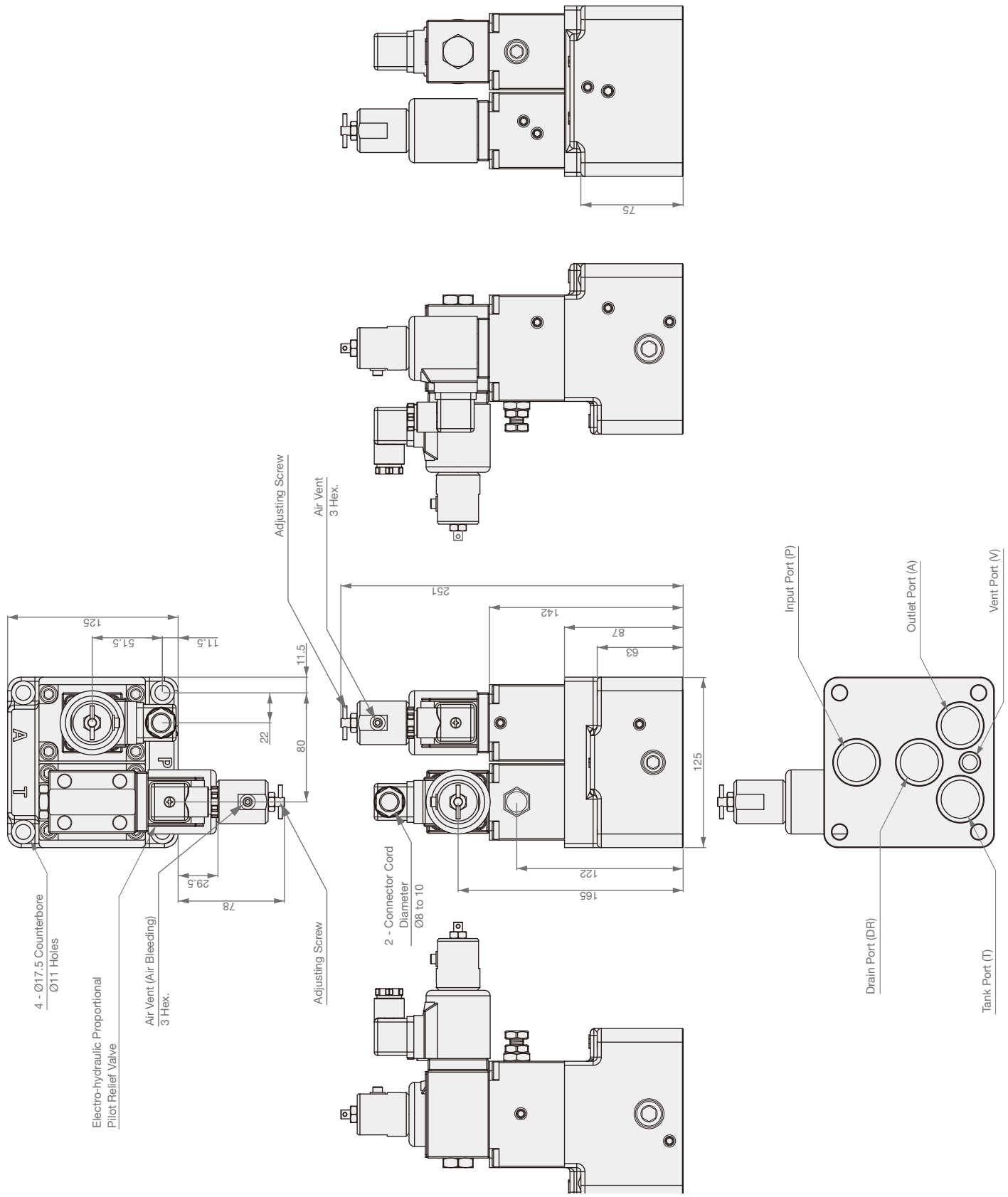
▸ Pressure - Control Flow Rate Characteristics



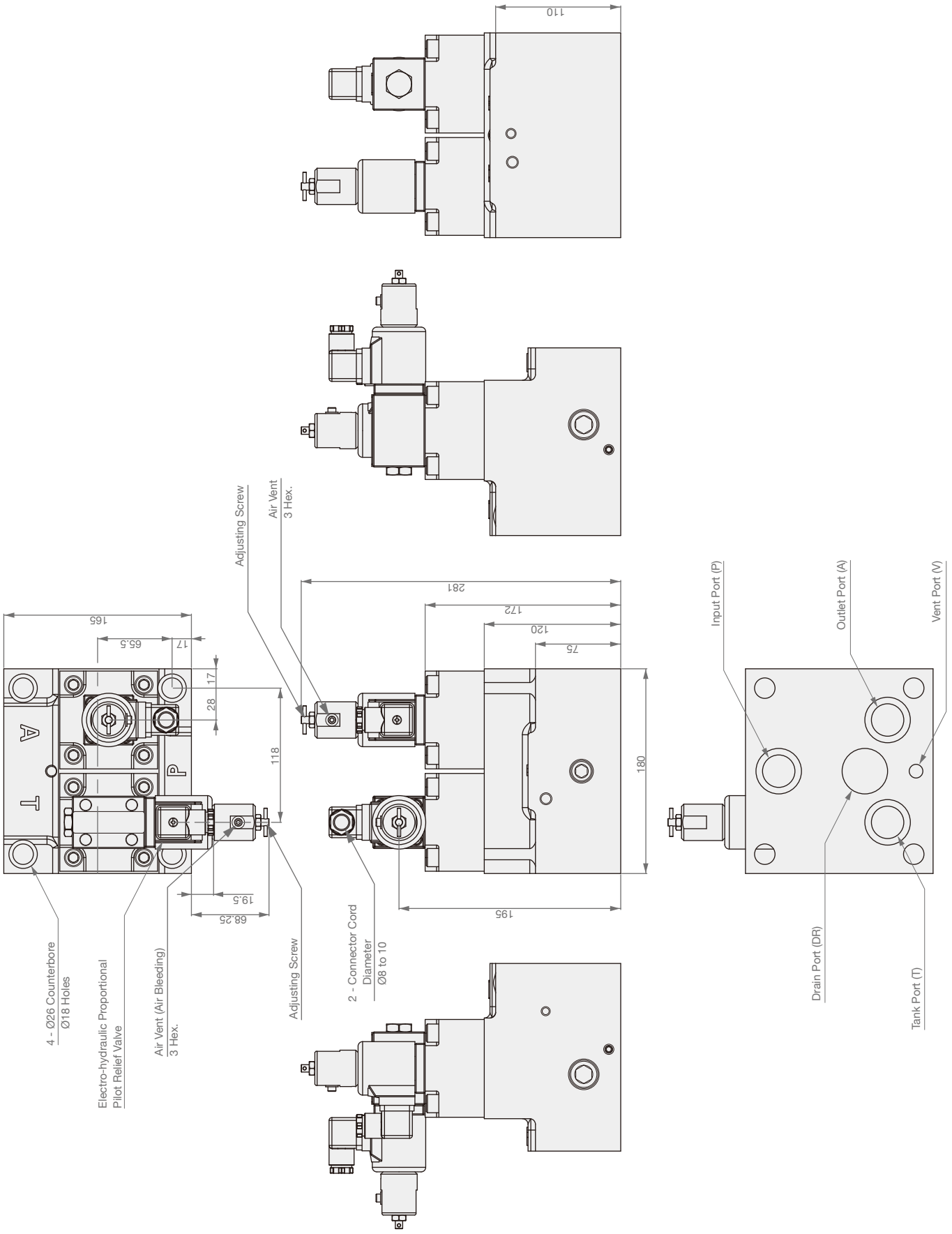
Electro-hydraulic Proportional Pilot Relief Valve Setting Pressure : 214.2kgf/cm^2 (21MPa)
Operating Fluid : VG32
Fluid Temperature : 40°C
Value when a STEED amplifier TW9820-2 is used.(with dithering)

* Hydraulic Operating Fluid Viscosity : 32mm^2/s

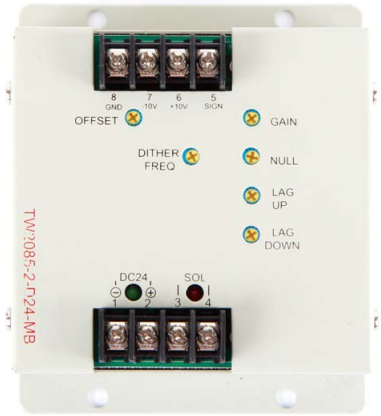
▸ **EFBG-03**

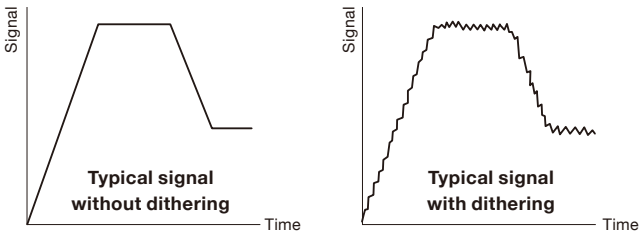

75
Adjusting Screw
Air Vent
3 Hex.
251
142
87
63
125
11.5
22
80
125
51.5
11.5
A
T
P
29.5
78
122
165
4 - Ø17.5 Counterbore
Ø11 Holes
Electro-hydraulic Proportional
Pilot Relief Valve
Air Vent (Air Bleeding)
3 Hex.
Adjusting Screw
2 - Connector Cord
Diameter
Ø8 to 10
Input Port (P)
Outlet Port (A)
Vent Port (V)
Drain Port (DR)
Tank Port (T)

▸ EFBG-06


110
Adjusting Screw
Air Vent
3 Hex.
281
172
120
75
165
65.5
17
28
17
118
180
195
19.5
68.25
A
T
P
Input Port (P)
Outlet Port (A)
Vent Port (V)
Drain Port (DR)
Tank Port (T)
4 - Ø26 Counterbore
Ø18 Holes
Electro-hydraulic Proportional
Pliot Relief Valve
Air Vent (Air Bleeding)
3 Hex.
Adjusting Screw
2 - Connector Cord
Diameter
Ø8 to 10

TW2085-2



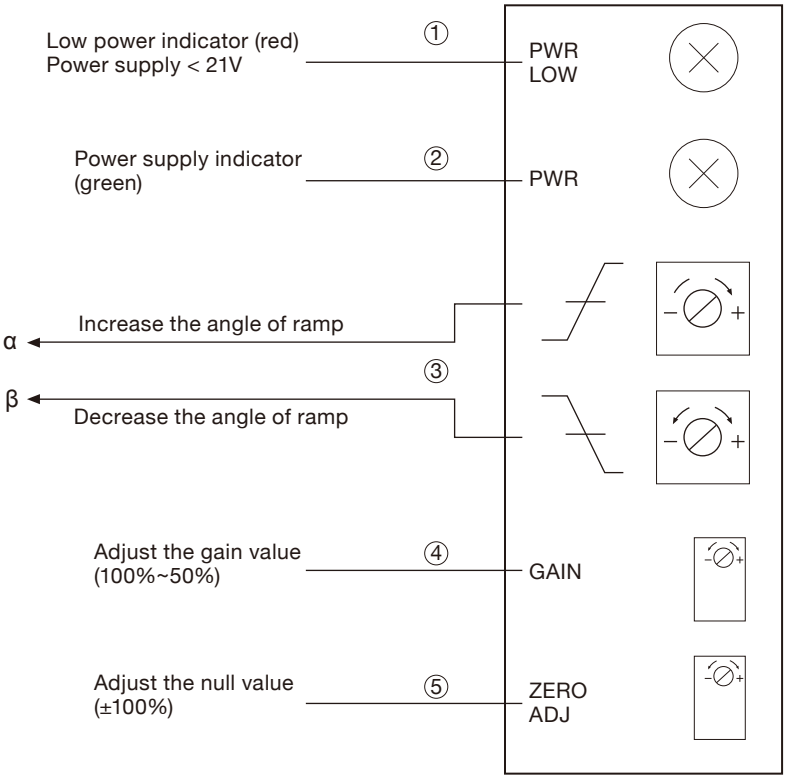


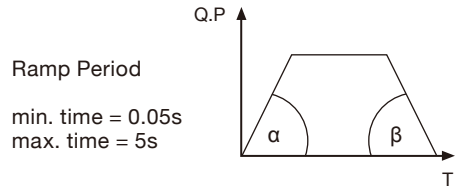
The effect used to vibrate a proportional valve spool is called dither. Dithering can offset the hysteresis. The dither frequency is specific to each valve and application,and the valve amplifier, or controller, will have an adjustable dither frequency. Hence, please purchase our amplifier togehter with the proportional valves.

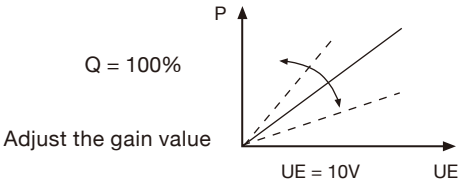
MODEL SPEC.

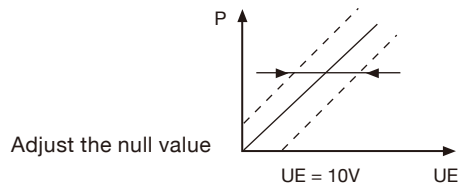
Model	TW2085-2
Supply Voltage	DC24V
Fuse	2A
Load Coil Resistance	10Ω / 20Ω (20°C)
Input Control Voltage	0V ~ +10V
Max. Current Output Range	0 ~ 900 mA
Adjust the Null Value	0 ~ 900 mA
Adjust the Gain Value	0 ~ 900mA / 2.5V
Up Ramp Period / Down Ramp Period	0.1 ~ 2.5 sec.
Temperature Drift	0.1mA / 1°C
Work Temperature	0 ~ 50°C
Max. Power Requirement	15VA
Weight	0.21 kg

INSTRUCTION

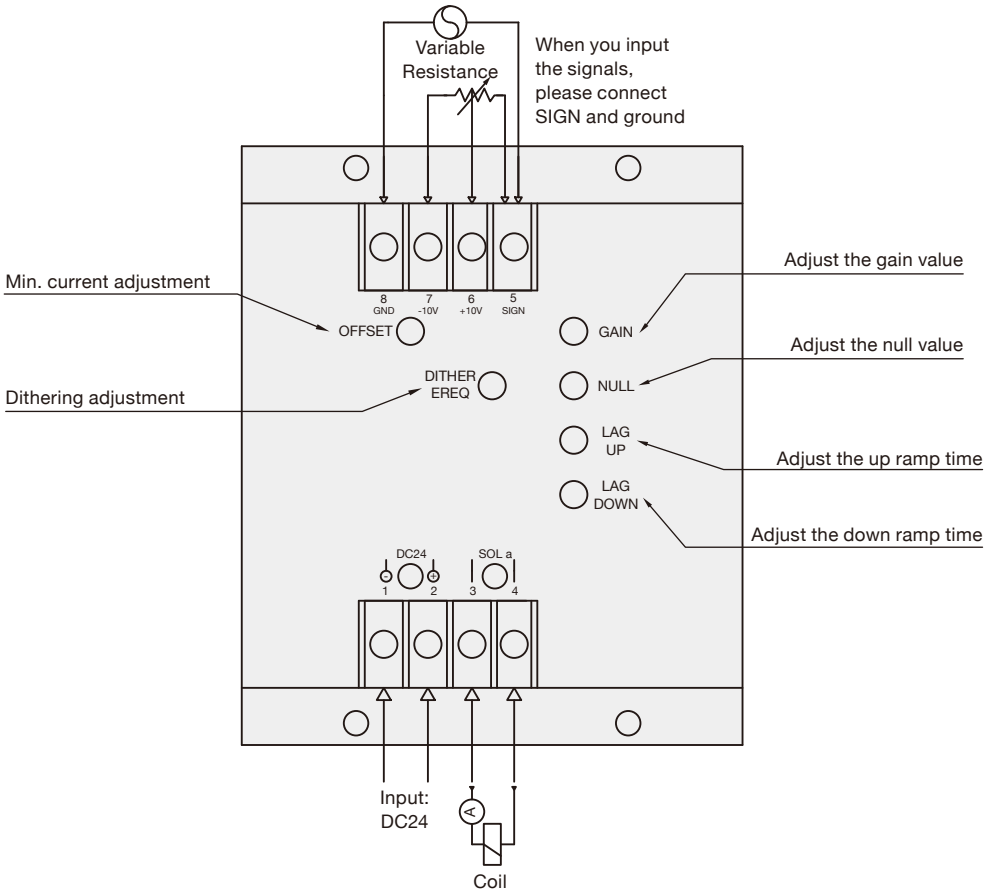








ELECTRIC DISTRIBUTION

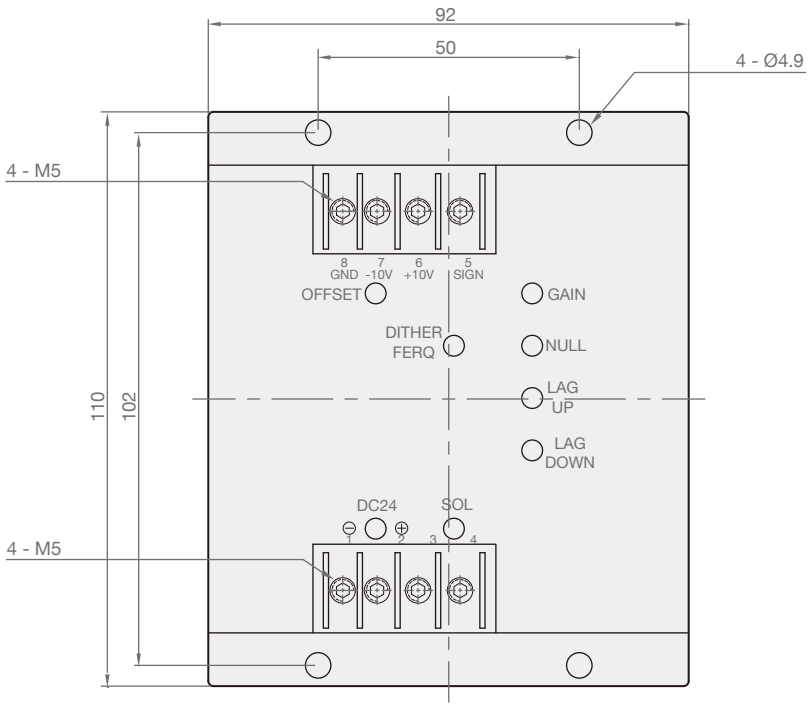


Wiring instruction		
1	Power supply voltage -	DC 24V
2	Power supply voltage +	DC 24V
3	Solenoid coil SOL	
4	Solenoid coil SOL	
5	Input signal terminal	
6	+10V	
7	-10V	
8	Ground	

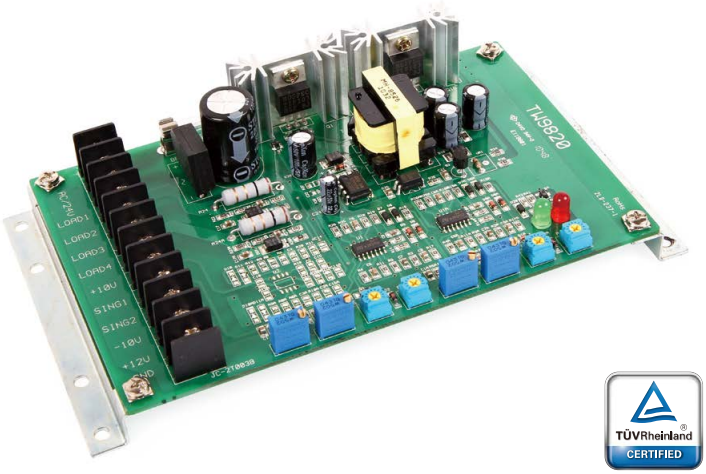
* Terminal 5, 8 : Input signal terminals (0~10V)
Terminal 5, 6, 7 : Adjustable resistor terminals.

DIMENSION

(UNIT : mm)



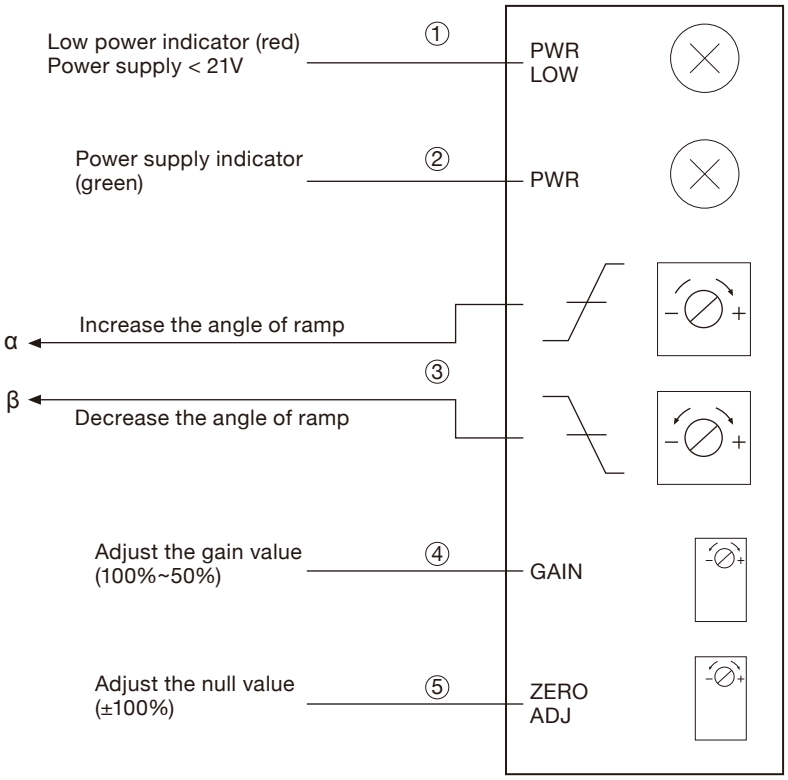
TW9820

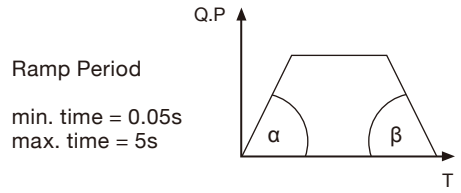


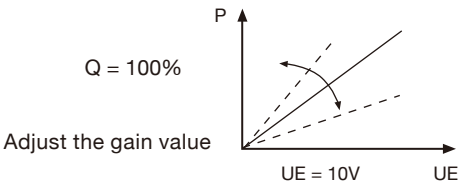
MODEL SPEC.

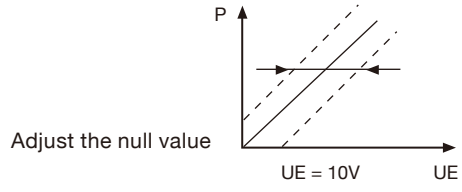
Model	TW9820
Supply Voltage	AC28V ± 20% DC24V
Fuse	2A
Load Coil Resistance	20Ω (20°C)
Input Control Voltage	0V ~ +10V
Max. Current Output Range	0 ~ 900 mA
Adjust the Null Value	0 ~ 900 mA
Adjust the Gain Value	0 ~ 900mA / 2.5V
Up Ramp Period / Down Ramp Period	0.1 ~ 2.5 sec.
Temperature Drift	0.2mA / 1°C
Work Temperature	0 ~ 50°C
Max. Power Requirement	30VA
Weight	0.21 kg

INSTRUCTION

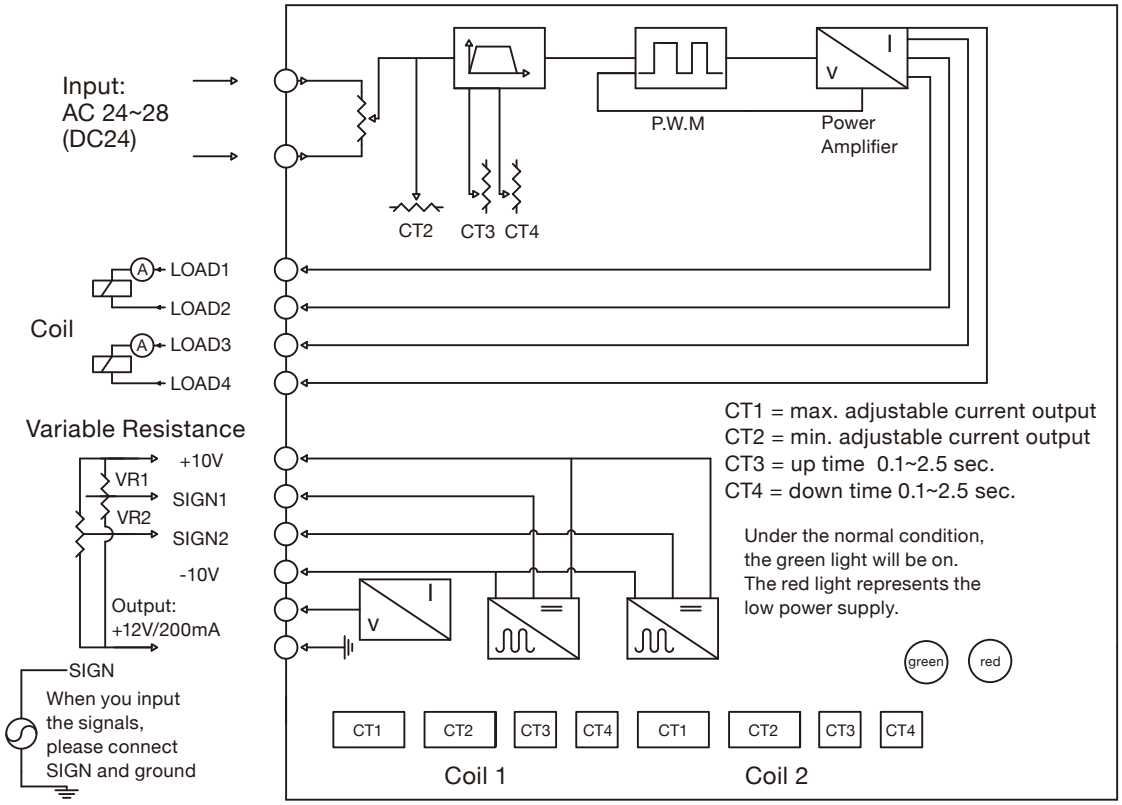






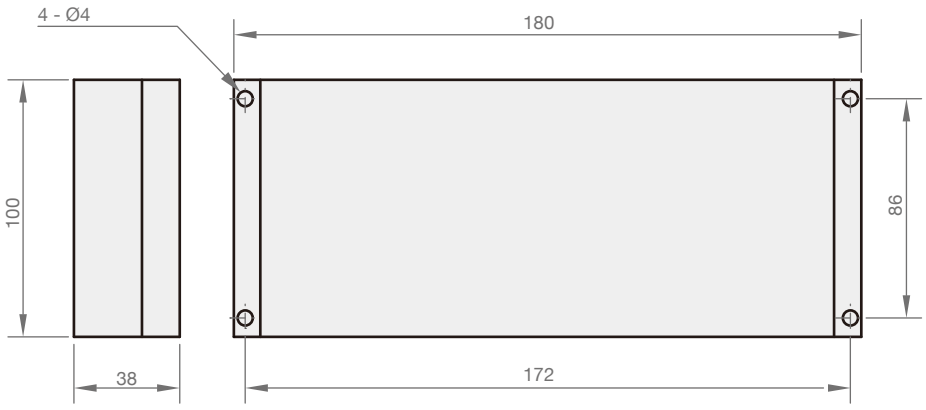


ELECTRIC DISTRIBUTION

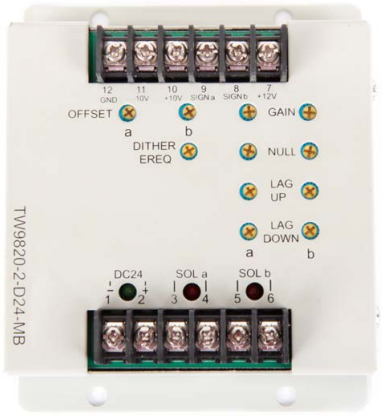


DIMENSION

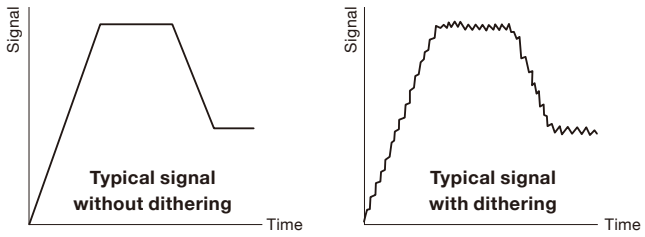
(UNIT : mm)



TW9820-2





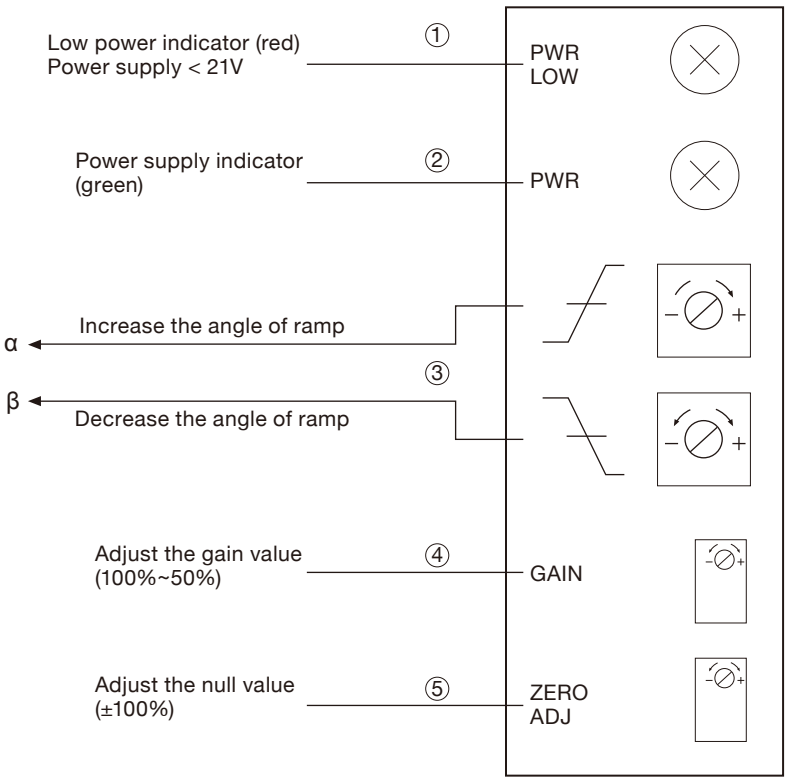


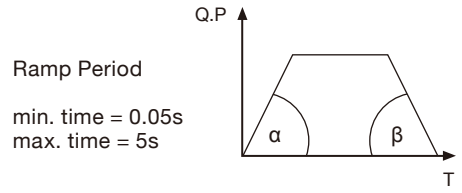
The effect used to vibrate a proportional valve spool is called dither. Dithering can offset the hysteresis. The dither frequency is specific to each valve and application,and the valve amplifier, or controller, will have an adjustable dither frequency. Hence, please purchase our amplifier togehter with the proportional valves.

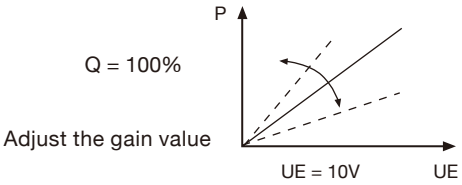
MODEL SPEC.

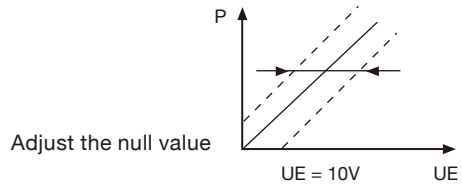
Model	TW9820-2
Supply Voltage	DC24V
Fuse	2A
Load Coil Resistance	20Ω (20°C)
Input Control Voltage	0V ~ +10V
Max. Current Output Range	0 ~ 900 mA
Adjust the Null Value	0 ~ 900 mA
Adjust the Gain Value	0 ~ 900mA / 2.5V
Up Ramp Period / Down Ramp Period	0.1 ~ 2.5 sec.
Temperature Drift	0.2mA / 1°C
Work Temperature	0 ~ 50°C
Max. Power Requirement	30VA
Weight	0.21 kg

INSTRUCTION

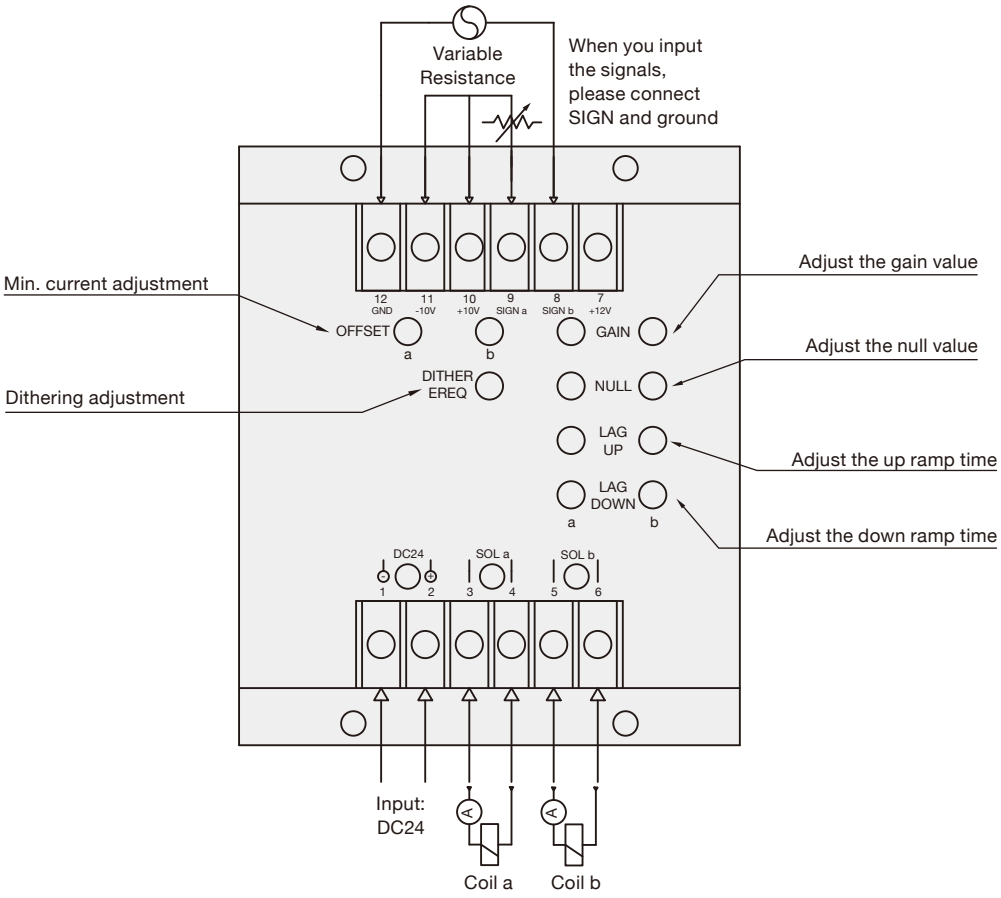








ELECTRIC DISTRIBUTION

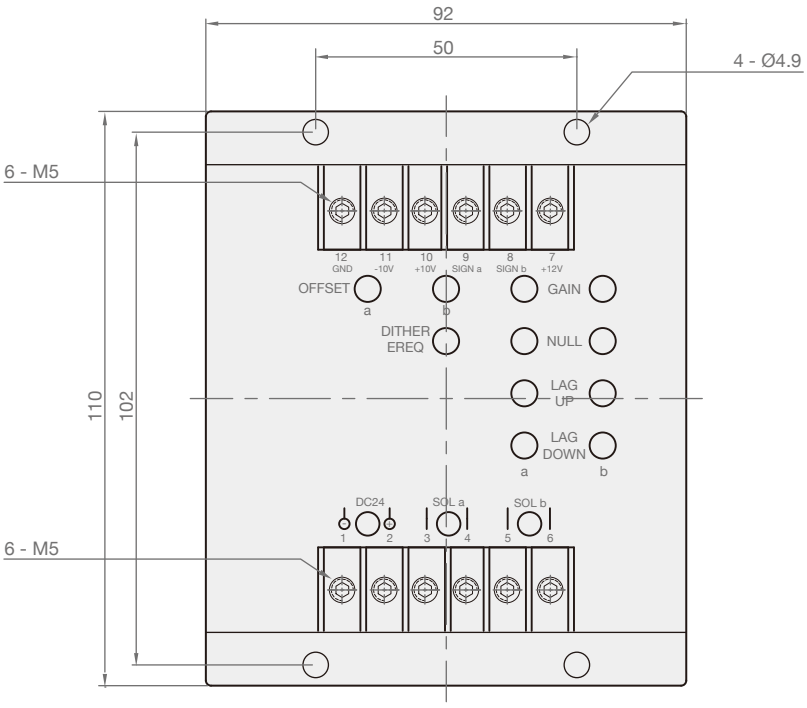


Wiring instruction		
1	Power supply voltage -	DC 24V
2	Power supply voltage +	DC 24V
3	Solenoid coil SOL a	
4	Solenoid coil SOL a	
5	Solenoid coil SOL b	
6	Solenoid coil SOL b	
7	+12V	
8	Input signal terminal b	
9	Input signal terminal a	
10	+10V	
11	-10V	
12	Ground	

* Terminal 8/9, 12 : Input signal terminals (0~10V)
Terminal 7, 8/9, 10: Adjustable resistor terminals.

DIMENSION

(UNIT : mm)



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in the course of continued development.