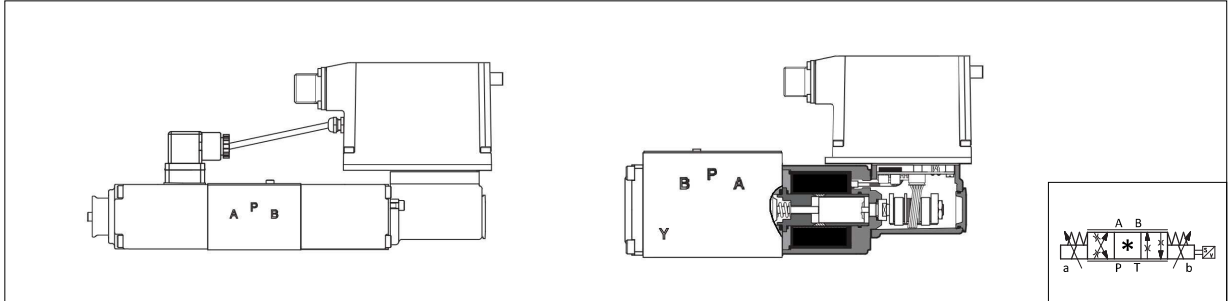


PDVA-T, PDVB-T closed-loop proportional directional valve

directly-operated, sub-plate mounting, closed-loop, max pressure 350bar, max flow 120L/min

1. Introduction

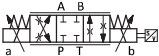
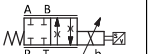
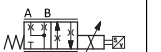
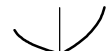


PDVA-T and PDVB-T are directly-operated sub-plate mounting closed-loop control proportional directional valves with spool position transducer (LVDT). PDVA is commonly-used valves for general applications while PDVB is tailored for customers with special requirements.

2. How to order

PDVA	-	T	B	-	06	E0	-	L	50	-	UA	-	M	T	N	-	20
(1)		(2)	(3)		(4)	(5)		(6)	(7)		(8)		(9)	(10)	(11)		(12)

(see below the details)

Product Category				
(1)	PDVA	common proportional directional valve		
	PDVB	special proportional directional valve (consult BMEG)		
(2)	Spool LVDT			
	T	spool with LVDT (closed-loop)		
(3)	Electronic Driver			
	N	without OBE (on-board electronic) driver ¹⁾		
	B	with OBE (on-board electronic) driver		
(4)	Size			
	06	NG6	10 NG10	
(5)	Valve Configuration (see section 3) ²⁾			
	E0		J0	
	E1		E2	
	J1		J2	
(6)	Regulation Diagram (see section 6.1) ³⁾			
	L		linear	
	S		standard progressive (for flow 30/50/80/120 only)	
	D		differential ($Q_{P-A}=Q_{A-T}=2Q_{P-B}=2Q_{B-T}$, for flow 50/120 only)	

Nominal Flow Rate ⁴⁾				
(7)	02	2 L/min	(NG6)	Note: flow rate at full ΔP=30bar and 40cSt of ISO VG46
	08	8 L/min		
	30	30 L/min		
	50	50 L/min		
	80	80 L/min	(NG10)	
	120	120 L/min		
(8)	Command Signal			
	UA	0 - ± 10V (for PDV*-TB-**-E0/J0 only)		
	UB	0 - +10V (for PDV*-TB-**- E1/E2/J1/J2 only)		
	IA	4 - 20mA (for PDV*-TB- only)		
NS ⁵⁾	without OBE driver (for PDV*-TN)			
(9)	Fluid			
	M	mineral-based oil		
	W	water glycol		
	P	phosphate ester		
	A	aero red oil		
	O	other fluids (consult BMEG)		
(10)	Leakage Drain			
	T	internal drain		
	Y	external drain (consult BMEG)		
(11)	Special Function (see section 8.2)			
	N	no special function		
	Q	with enable signal (+24Vdc) (for PDV*-TB)		
	F	with failure alarm signal (for PDV*-TB)		
(12)	Series No.			
	20	design series No.		

- 1) PDV*-TN valves must be driven by BMEG non-OBE electronic driver EP2*, which should be ordered separately;
- 2) For other configurations, consult BMEG;
- 3) For other regulation diagrams, consult BMEG;
- 4) Flow 02 and 08 for regulation diagram "L" only; 30 and 80 for "L" & "S" only; 50 and 120 for "L", "S" & "D";
- 5) Command signal should be defined in the code of the non-OBE electronic driver (see section 8.3).

3. Valve configuration

Code	Schematic	Description	Code	Schematic	Description
PDV*-TB-**-E0		with OBE (on-board electronics) see section 8.2	PDV*-TN-**-E0		without OBE
PDV*-TB-**-J0			PDV*-TN-**-J0		(PDV*-TN should be driven by non-OBE electronic driver EP2* which should be ordered separately)
PDV*-TB-**-E1			PDV*-TN-**-E1		
PDV*-TB-**-J1			PDV*-TN-**-J1		
PDV*-TB-**-E2			PDV*-TN-**-E2		see section 8.3
PDV*-TB-**-J2			PDV*-TN-**-J2		

4. Main hydraulic data ¹⁾

Code	Max flow ²⁾ (L/min)	Max pressure (bar)	Response time ³⁾ (ms)	Repeatability	Hysteresis	Temperature Drift
PDV*-T*-06**-L02	2	P, A, B: 350 T: 160 (internal drain) 250 (external drain)	< 15	<= 0.2% * S _{max} ⁴⁾	<= ±0.15% * S _{max} ⁴⁾	< 1% (at ΔT=40 °C)
PDV*-T*-06**-L08	8					
PDV*-T*-06**-L30	30					
PDV*-T*-06**-S30	30					
PDV*-T*-06**-L50	50	160 (internal drain) 250 (external drain)	< 15			
PDV*-T*-06**-S50						
PDV*-T*-06**-D50						
PDV*-T*-10**-L80	80	P, A, B: 315	< 20			
PDV*-T*-10**-S80	120	T: 160 (internal drain) 250 (external drain)				
PDV*-T*-10**-L120						
PDV*-T*-10**-S120						
PDV*-T*-10**-D120						

1) Testing condition: ISO VG46 mineral-based oil, 40cSt with BMEG electronic amplifiers;

2) Flow rate at full $\Delta P = 30 \text{ bar}$, details refer to section 6;

3) Step signal from 0 to 100%;

4) S_{max} is referred to as max spool openness.

5. Main technical characteristics

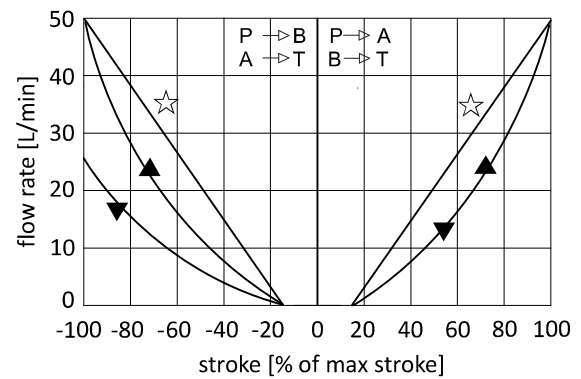
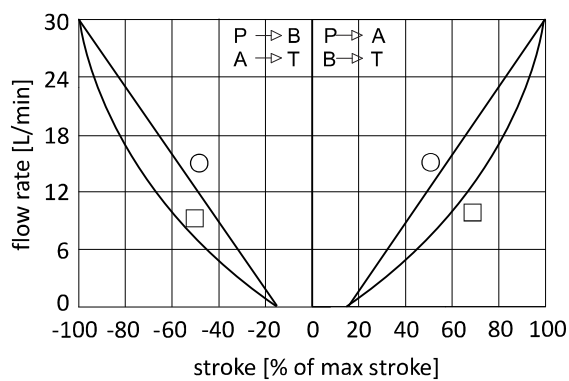
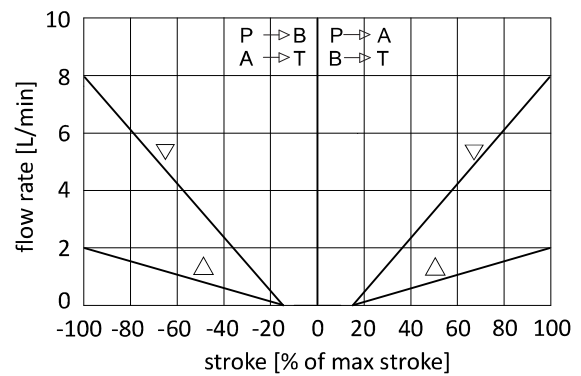
Mounting	mounting type	sub-plate mounting
	mounting position	any
	mounting interface	PDV*-T*-06: NG6, ISO 4401 / CETOP 03 PDV*-T*-10: NG10, ISO 4401 / CETOP 05
	mounting surface	surface flatness: 0.01/100(ISO 1101); surface roughness: Ra 0.4
Temperature	ambient temp.	-20 °C - +60 °C
	fluid temp.	-20 °C - +80 °C (in relation to the seals)
Fluid	fluid applicable	DIN 51524...535 oil, etc. (see ordering codes)
	viscosity recommended	10 - 100 cSt @ 40°C, max: 2.8 - 400 cSt
	filtration finess	ISO 4406 21/19/16, NAS1638 10; 25µm & $\beta_{25} \geq 75$ suggested

6. Performance diagrams (ISO VG46 oil @40cSt)

6.1. Flow regulating diagram

PDV*-T*-06

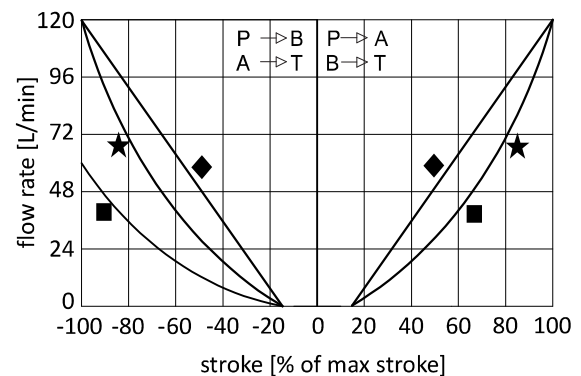
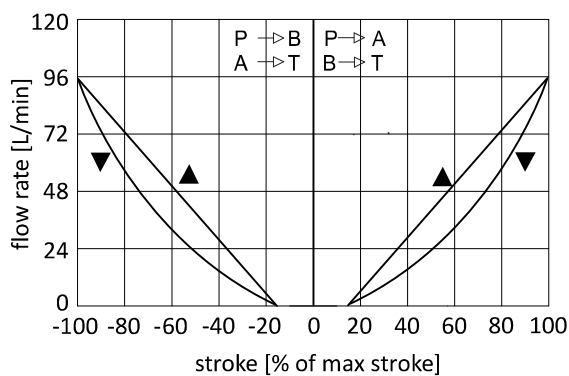
- △ = PDV*-T*-06**-L02
- ▽ = PDV*-T*-06**-L08
- = PDV*-T*-06**-L30
- = PDV*-T*-06**-S30
- ☆ = PDV*-T*-06**-L50
- ▲ = PDV*-T*-06**-S50
- ▼ = PDV*-T*-06**-D50



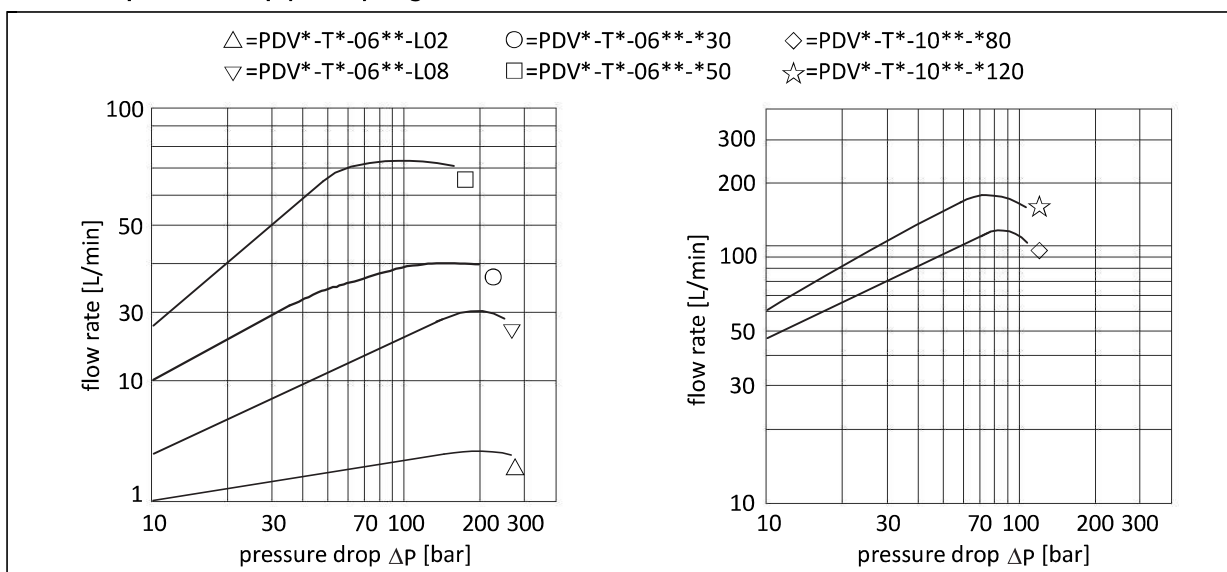
PDV*-T*-10

- ▲ = PDV*-T*-10**-L80
- ▼ = PDV*-T*-10**-S80

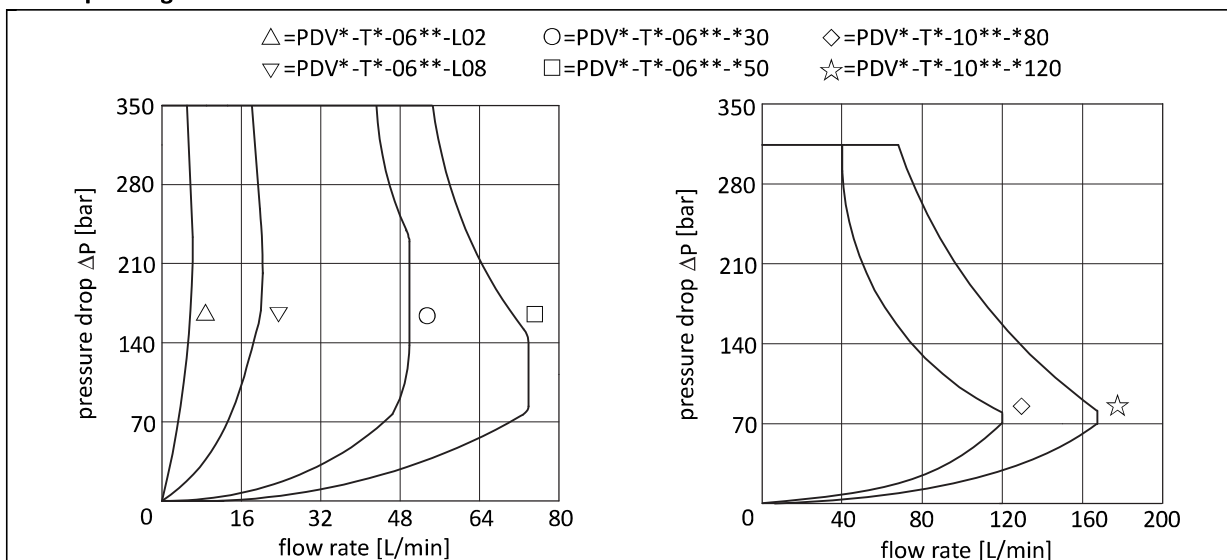
- ◆ = PDV*-T*-10**-L120
- ★ = PDV*-T*-10**-S120
- = PDV*-T*-10**-D120



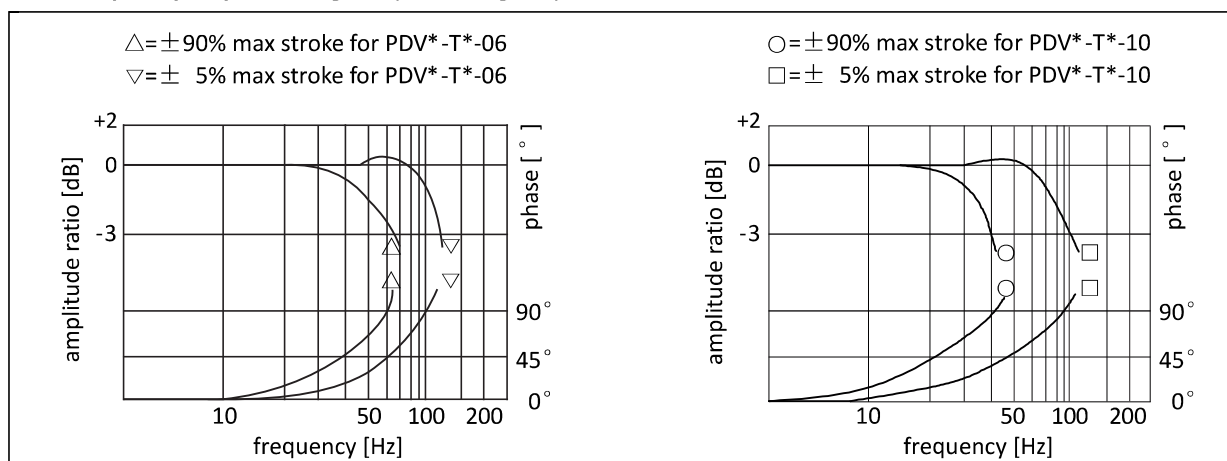
6.2. Flow-pressure drop (Q - ΔP) diagram



6.3. Operating limit



6.4. Frequency response diagram (Bode diagram)



7. Command signal vs. valve operating position

	Control signal & corresponding operating position			Description
E0 / J0	L (-10 - 0V or 4 - 12mA)	C (0V or 12mA)	R (0 - +10V or 12 - 20mA)	voltage for signal UA and UB; amperage for signal IA
E1 / J1	L (0 - +10V or 4 - 20mA)	C (0V or 4mA)	without right position	
E2 / J2	without left position	C (0V or 4mA)	R (0 - +10V or 4 - 20mA)	

Notes: L = left position; R = right position; C = center position (spring centered).

8. Electronic amplifier

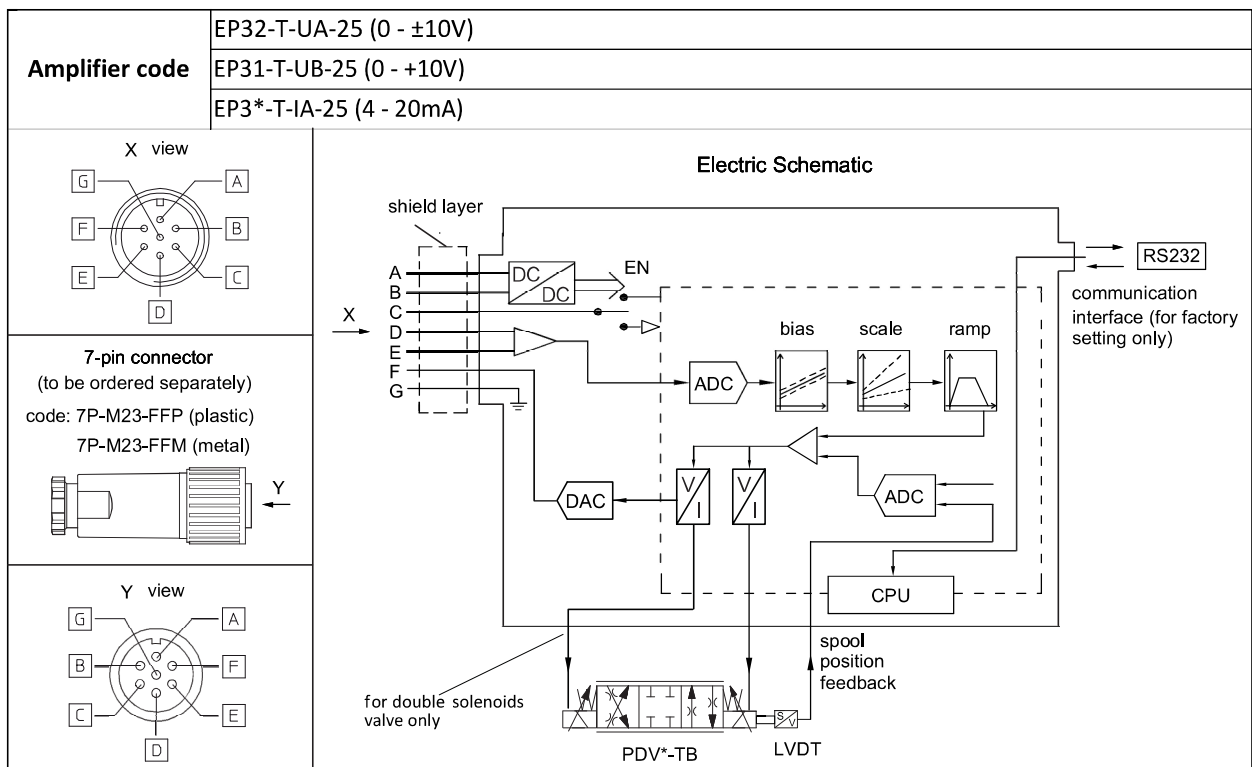
8.1. type of applicable electronic amplifier

PDV*-T can be equipped with on-board electronic driver (OBE) type EP3*-T or non-OBE electronic driver type EP2*-T as the electronic amplifier.

Type of amplifier	Amplifier mounting	Amplifier code	Input signal	Valve applicable	Remarks
OBE electronics	on board (integrated onto the proportional solenoid)	EP32-T-UA-25	0 - ± 10V	PDV*-TB-**E0/J0	see section 8.2
		EP32-T-IA-25	4 - 20mA		
		EP31-T-UB-25	0 - + 10V	PDV*-TB-**E1//E2/J1/J2	
		EP31-T-IA-25	4 - 20mA		
Non-OBE electronics *	DIN standard rail	EP22-T-UA-25	0 - ± 10V	PDV*-TN-**E0/J0	see section 8.3
		EP22-T-IA-25	4 - 20mA		
		EP21-T-UB-25	0 - + 10V	PDV*-TN-**E1//E2/J1/J2	
		EP21-T-IA-25	4 - 20mA		

* To be ordered separately.

8.2. EP3*-T on-board electronic driver (OBE) for PDV*-TB

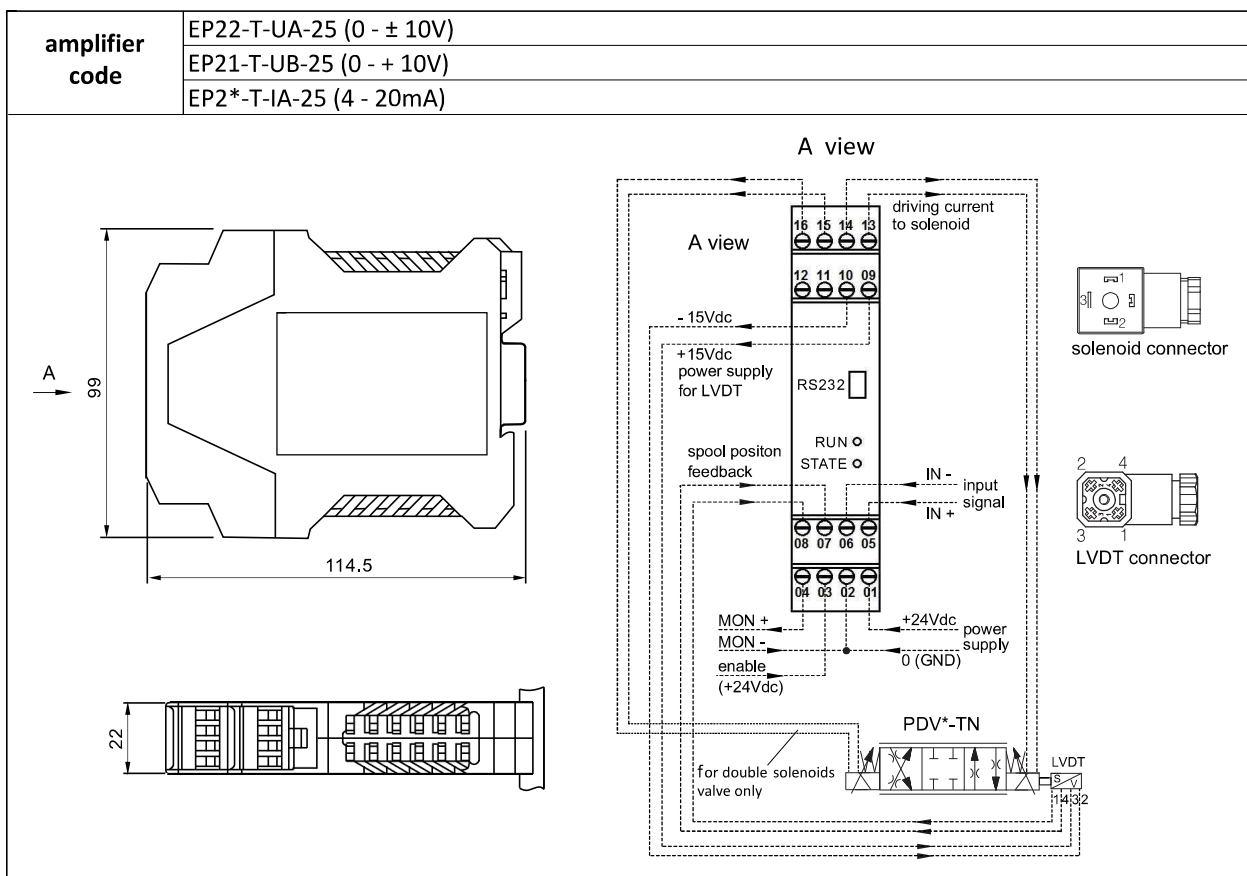


(8.2 EP3*-T on-board electronic driver for PDV*-TB)

Wiring ¹⁾	
Pin no.	wiring description
A	power supply +: +24VDC $\pm$ 10% (power $\geq$ 40W)
B	power supply 0 (for option Q, pin B also serves as the reference point for current monitoring)
C	reference point for current monitoring test for valves without option Q
	enable signal (for option Q only, +24V)
D	input signal + (UA: $\pm$ 10Vdc; UB: 0 - +10Vdc; IA: 4-20mA)
E	input signal -
F	monitoring output signal, max range :0 - $\pm$ 10Vdc for UA; 0 - +10Vdc for UB; 4-20mA for IA. (for option Q, tested with pin B as reference point; for other options, tested with pin C as reference)
	fault alarming output signal (for option F only: +24V=functioning OK; 0=malfunTION)
G	GND, normally NC [connected only when power not in conformity with VDE 0551(CEI 14/6)]
Electric characteristics	
max current	2650mA
ambient temp.	-20 - + 60 °C
protection class	IP67
cable length	max. 50m
cable size	A、B: $\geq$ 0.75mm ² ; other pins: $\geq$ 0.25mm ²

1) shut off the power supply before wiring and better to use shield cable.

8.3. EP2*-T electronic driver for PDV*-TN ²⁾



2) EP2*-T must be ordered separately when ordering PDV*-TN;

(8.3 EP2*-T electronic driver for PDV*-TN)

Wiring ²⁾	PIN no.	wiring description
	1	power supply: +24Vdc $\pm$ 10% (power $\geq$ 40W)
	2	power supply 0
	3	enable signal (+24Vdc)
	4	driving current monitoring (1V=1A, tested with pin 2 as reference)
	5	input signal + (UA: $\pm$ 10Vdc; UB: 0 - +10Vdc; IA: 4-20mA)
	6	input signal -
	7	spool position feedback reference (0V, connected to pin 4 of LVDT connector)
	8	spool position feedback signal (0 - $\pm$ 5V, connected to pin 1 of LVDT connector)
	9	power supply to LVDT (+15Vdc, connected to pin 3 of LVDT connector)
	10	power supply to LVDT (-15Vdc, connected to pin 2 of LVDT connector)
	11	NC
	12	NC
	13	driving current output to solenoid 1
	14	
	15	for PDV* with double solenoids: driving current output to solenoid 2;
	16	for PDV* with single solenoid: NC
Parameter regulation	parameter	description
	scale	via software only: max.=200%
	bias	via software only: range = 0 - 60% of max openness
Electric characteristics	max driving cur.	2800mA
	input impedance	EP22-T-UA & EP21-T-UB: $R_i > 50k\Omega$ EP2*-T- IA: $R_i = 499\Omega$
	ambient temp.	-20 - + 60 °C
	protection class	IP65
	cable length	max.=50m
Installation	DIN standard rail	

1) Shut off the power supply before wiring and better to use shield cable.

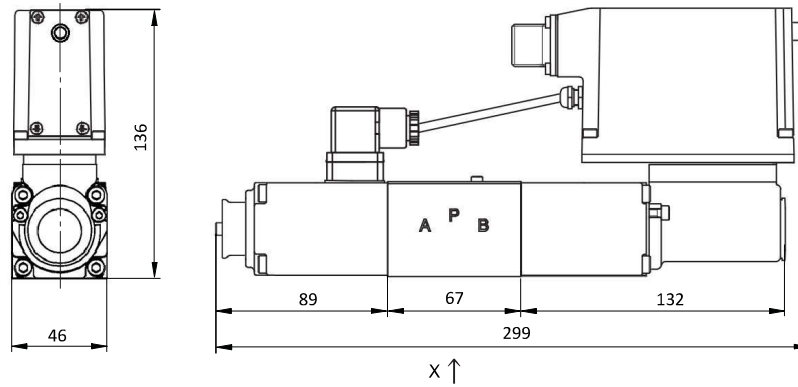
9. Mounting dimensions

9.1. Mounting dimension of PDV*-T*-06

mount. interface	ISO: 4401-03-02-0-05; CETOP 03	screw-hole pitch error	<= ±0.1mm
mount. surface flatness	0.01/100 (ISO 1101)	screw-hole thread depth	>= 15mm
mount. surface finish	Ra 0.4	port size	P, A, B, T: Φ7.5mm(max); Y: Φ3.2mm
fastening bolts	4-M5X30, socket head screw, class 12.9	"O"-ring seal size	4-Φ12.29X1.78(ext. * wire), Sh=70
tighening torque	8 Nm		1-Φ9.63X1.78(ext. * wire), Sh=70
Mounting interface	all dimensions in mm		
	X view (refer to following pages) Note: port Y for PDV*-T*-06 with external drain option Y only.		

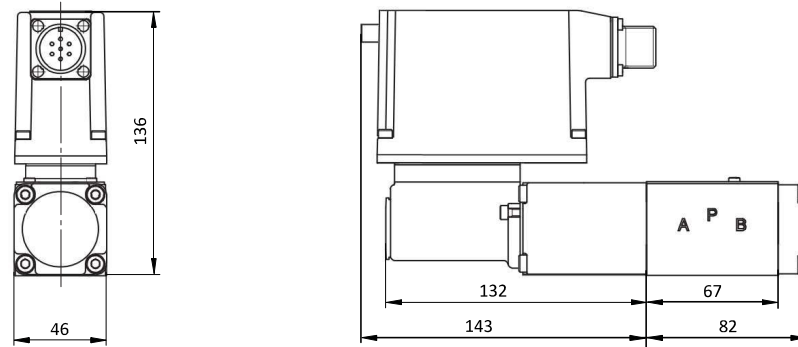
(mounting dimension of PDV*-T*-06)

PDV*-TB-06E0
PDV*-TB-06J0



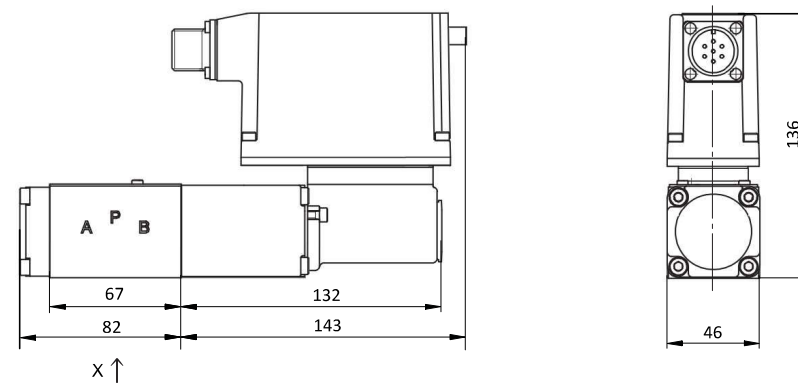
mass: 3.2kg

PDV*-TB-06E1
PDV*-TB-06J1



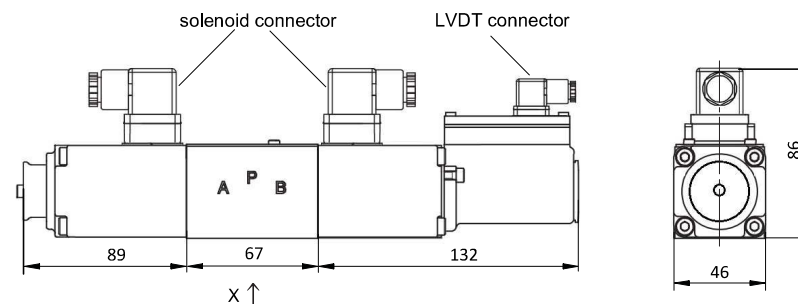
mass: 2.4kg

PDV*-TB-06E2
PDV*-TB-06J2



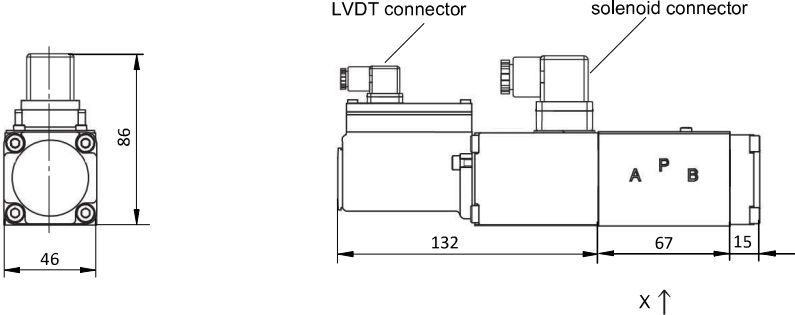
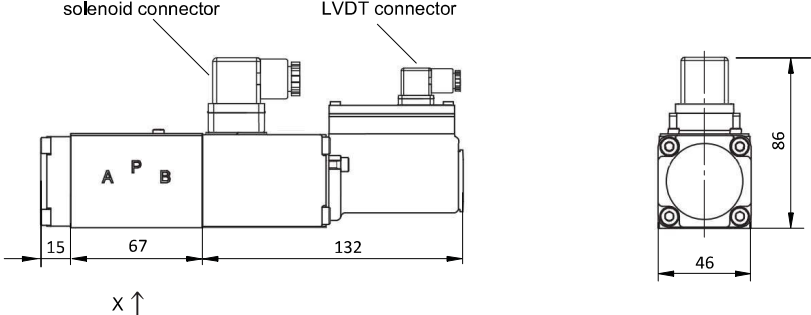
mass: 2.4kg

PDV*-TN-06E0
PDV*-TN-06J0



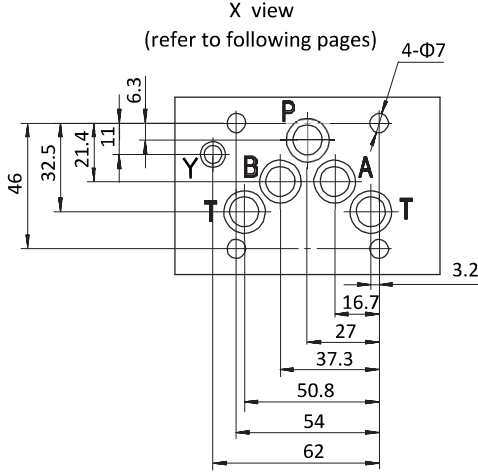
mass: 2.8kg

(mounting dimension of PDV*-T*-06)

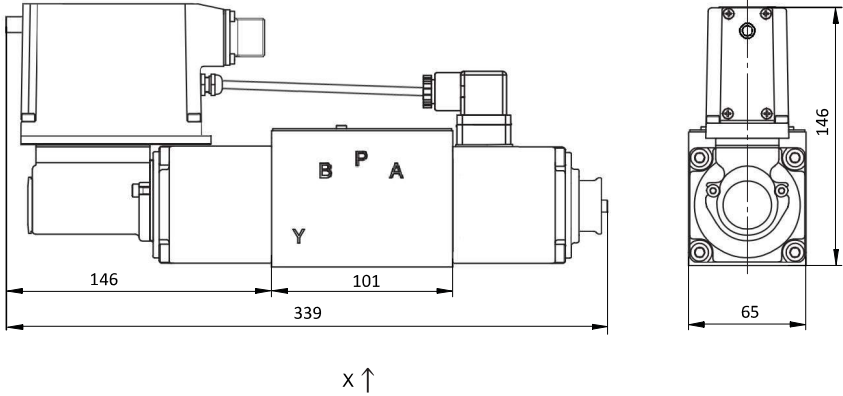
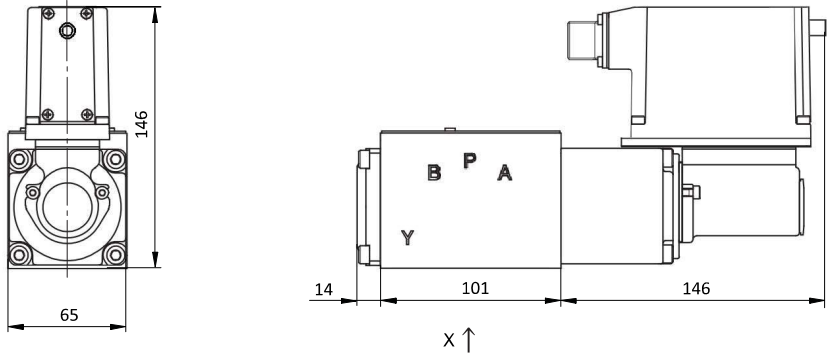
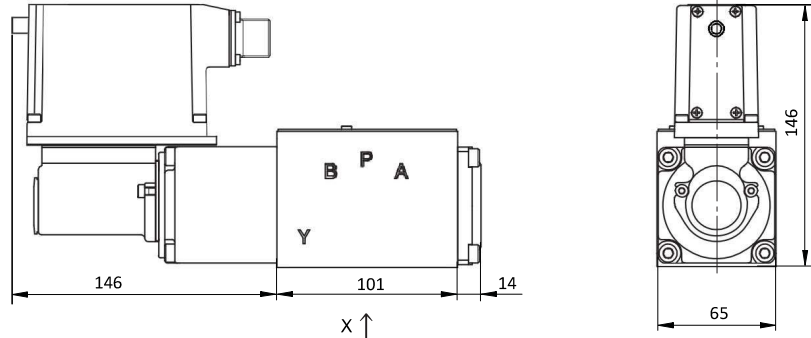
PDV*-TN-06E1 PDV*-TN-06J1	 mass: 2.0kg
PDV*-TN-06E2 PDV*-TN-06J2	 mass: 2.0kg

9.2. Mounting dimension of PDV*-T*-10

mount. interface	ISO: 4401-05-05-0-05; CETOP 05	screw-hole pitch error	$\leq \pm 0.1\text{mm}$
mount. surface flatness	0.01/100 (ISO 1101)	screw-hole thread depth	$\geq 15\text{mm}$
mount. surface finish	Ra 0.4	port size	P, A, B, T: $\Phi 11.5\text{mm}(\text{max})$; Y: $\Phi 5\text{mm}$
fastening bolts	4-M6X40, socket head screw, class 12.9	"O"-ring seal size	5- $\Phi 15.98 \times 1.78(\text{ext. * wire})$, Sh=90
tightening torque	15 Nm		1- $\Phi 12.29 \times 1.78(\text{ext. * wire})$, Sh=70

Mounting interface	all dimensions in mm X view (refer to following pages)  Note: port Y for PDV*-T*-10 with external drain option Y only.
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(mounting dimension of PDV*-T*-10)

PDV*-TB-10E0 PDV* TB 10J0	 mass: 5.1kg
PDV*-TB-10E1 PDV*-TB-10J1	 mass: 4.6kg
PDV*-TB-10E2 PDV*-TB-10J2	 mass: 4.6kg
PDV*-TN-10**	Consult BMEG.