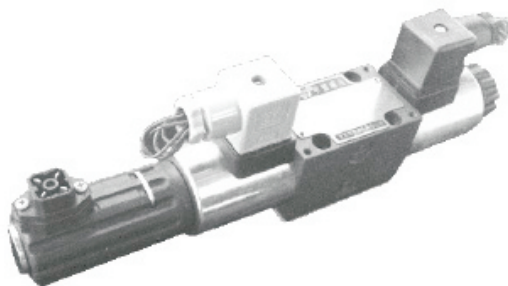


- Directly controlled proportional directional valve for the control of the direction and magnitude of a flow
- For subplate mounting
- Electrical position feedback
- Spring centred control spool
- Type 4WREE, integrated valve electronics with interface A1 or F1
- Actuation is by proportional solenoids with central thread and removable coil
- Valve and electronic control from one source



Function, section

The 4/2 and 4/3 proportional directional valves are directly controlled components of subplate mounting design. They are operated by proportional solenoids with central thread and removable coil. The solenoids are optionally controlled by either external control electronics (type WRE) or by integrated control electronics (type WREE).

Functional description:

With the solenoids (5 and 6), de-energised, the control spool (2) is held in the central position by the compression springs (3 and 4)

Direct operation of the control spool (2) by energising one of the proportional solenoids, e.g. control of solenoid "b" (6)

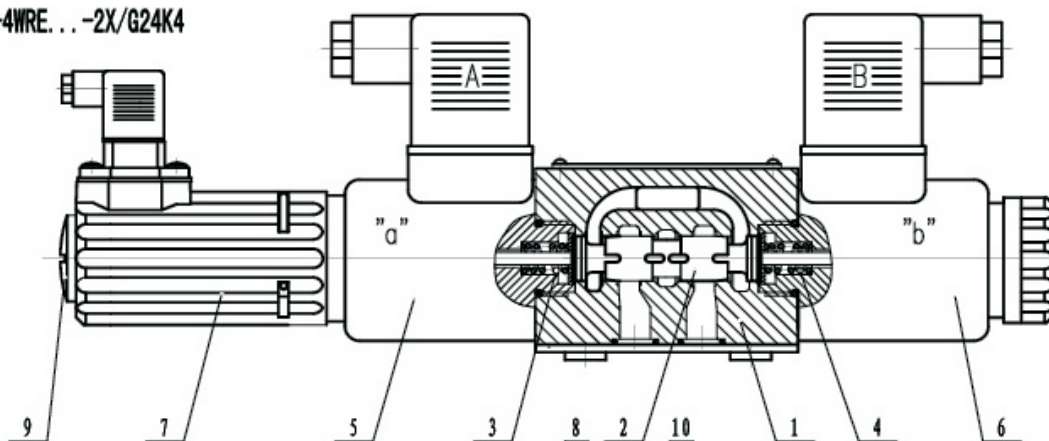
→ Movement of the control spool (2) to the left in proportion to the electrical input signal

→ Connection from P to A and B to T via orifice like cross-sections with progressive flow characteristics

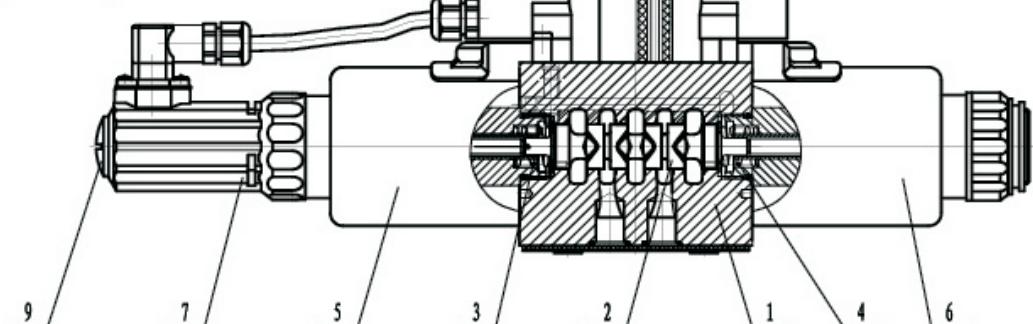
De-energising of solenoid (6)

→ The control spool (2) is returned to the central position via the compression spring (3)

HD-4WRE...-2X/G24K4



HD-4WREE...-2X/G24K4

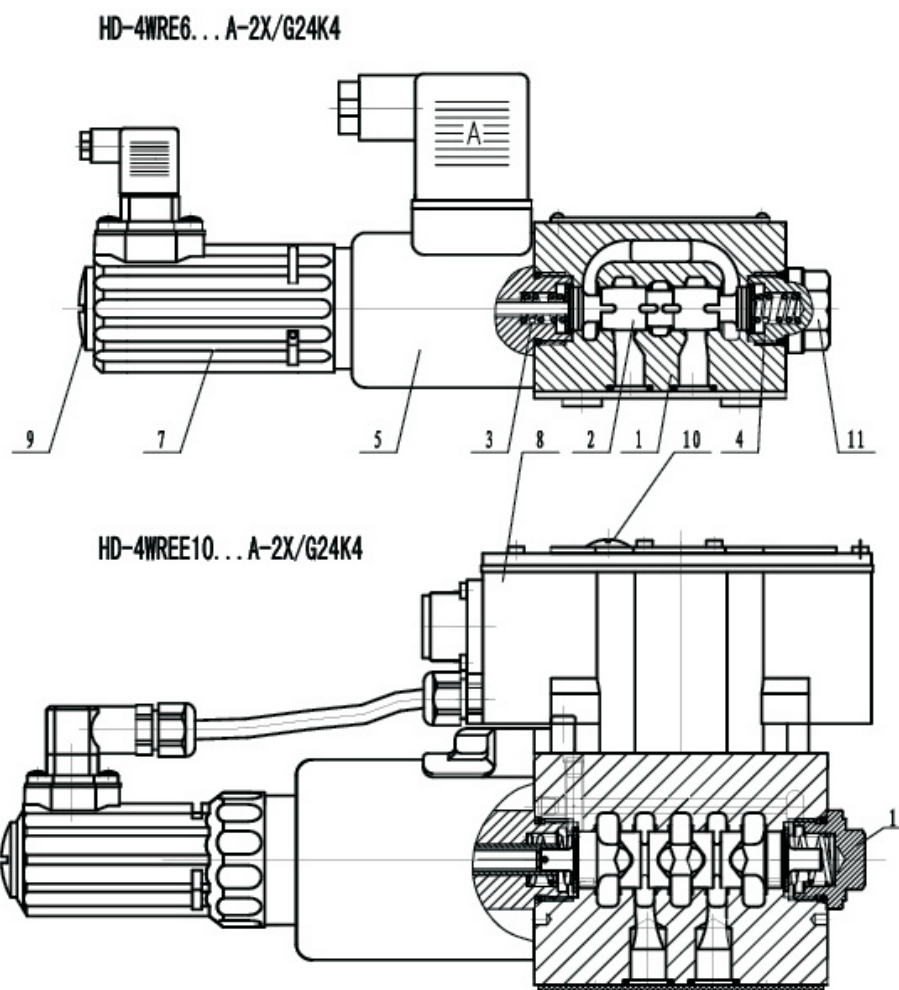


In the de-energised condition the spool (2) is held in a mechanical centre position by the solenoid return springs. This, for the spool symbol "V", does not relate to the hydraulic centre position! When the electrical valve closed loop control circuit is closed then the spool is positioned in the hydraulic centre position.

Design:

The valve basically consists of:

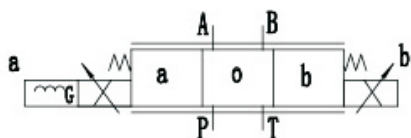
- Housing (1) with mounting face
- Control spool (2) with compression springs (3 and 4)
- Solenoids (5 and 6) with central thread
- Position transducer (7)
- Optional integrated control electronics (8)
- The mechanical zero point adjustment (9) is accessible via the Pg 13.5 and the electrical zero point is accessible via the Pg 7 (10) (type 4WREE)



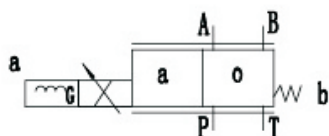
Symbols

Without integrated control electronics

Type HD-4WRE...-2X/...
4/3 proportional directional valve

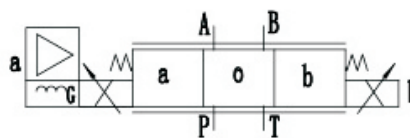


Type HD-4WRE...A- 2X/...
4/2 proportional directional valve

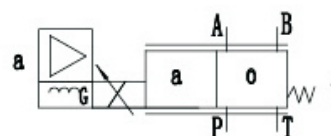


With integrated control electronics

Type HD-4WREE...-2X/...
4/3 proportional directional valve



Type HD-4WREE...A- 2X/...
4/2 proportional directional valve



Ordering details

Technology of beijing huade hydraulic = HD Without integrated control electronics = No code With integrated control electronics = E Nominal size 6 = 6 Nominal size 10 = 10	Further details in clear text No code = NBR seals V = FKM seals Interface A1 or F1 for WREE A1 = Command value input ± 10 VDC F1 = Command value input 4 to 20 mA Electrical connection for WREE K4 = With component plug(for WRA) K31 = With component plug(for WRAE) G24 = Power supply voltage 24 VDC 2X = Series 20 to 29 (20 to 29: unchanged installation and connection dimensions)	HD 4WRE 2X/G24 *
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Symbols

With symbols E1- and W1-:

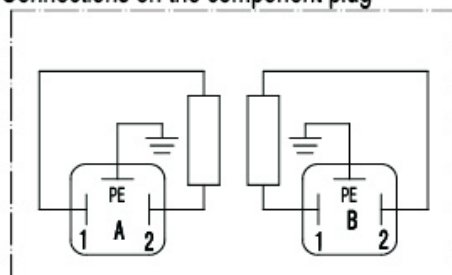
P → A: $q_{v \max}$ B → T: $q_v / 2$
P → B: $q_v / 2$ A → T: $q_{v \max}$

Note:
For spools W and WA there is, in the neutral position, a connection between A to T and B to T with approx. 3 % of the relevant nominal cross-section.

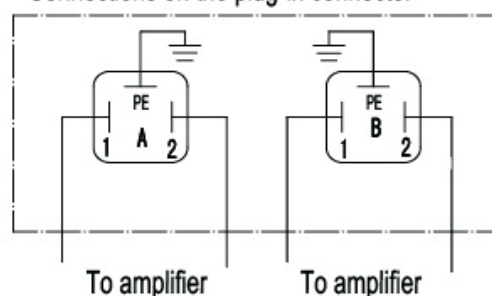
Electrical connection

Type 4WRE(for external control electronics)

Connections on the component plug



Connections on the plug-in connector



Technical data(for applications outside these parameters, please consult us!)

Hydraulic

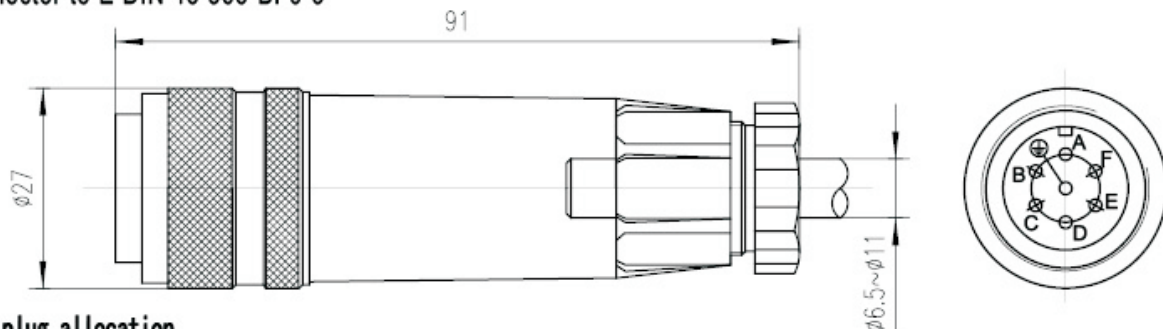
Size		6	10
Operating pressure MPa	Ports A、P、B	31.5	31.5
	Port T	21	21
Nominal flow $Q_{V\text{ nom}}$ at $\Delta P=1\text{MPa}$ (L/min)		8、16、32	25、50、75
Max. permissible flow (L/min)		80	180
Degree of contamination (μm)		≤ 20 (recommend 10)	
Hysteresis(%)		≤ 0.1	
Reversal span (%)		≤ 0.05	
Response sensitivity (%)		≤ 0.05	
Pressure fluid		Mineral oils, phosphate ester	
Viscosity range mm^2/S		20 to 380	
Ambient temperature range ($^{\circ}\text{C}$)	4WRE	-20 to +70	
	4WREE	-20 to +50	
Weight (Kg)	4WRE	2.2	6.3
	4WREE	2.4	6.5

Electrical

Electrical (integrated electronics)			
Size		6	10
Type of supply		DC	DC
Nominal voltage (V)		24	
Norminal current of solenoid (A)		2.5	
Solenoid coil resistance (Ω)	Coil resistance at 20° C	2.7	3.7
		4.05	5.55
Duty		100%	
Max. coil temperature (C°)		to 150	
Insulation to DIN40050		IP65	
Technical data of associated amplifier			
Associated amplifier	4WRE	HD-VT-VRPA2-. -1X/	HD-VT-VRPA2-. -1X/
	4WREE	HD-VT-4WREE6-2X	HD-VT-4WREE10-2X
Supply voltage	Nominal voltage VDC	24	
	Lower limiting value V	19.4	
	Upper limiting value V	35	
Amplifier power consumption	I _{max} A	< 2	
	Impulse current A	3	

Integrated control electronics for type 4WREE

Plug-in connector to E DIN 3 563-BF6-3



Component plug allocation

	Contact	Allocation interface A1	Allocation interface F1
Supply voltage	A	24 VDC ($u(t) \approx 19.4V$ to $35V$); $I_{max} = 2A$	
	B	0 V	
Ref. potential actual value	C	reference contact F; $R_e > 50k\Omega$	reference contact F; $R_e < 10\Omega$
Differential amplifier input	D	$\pm 10 V$ com. value; $R_e > 50 k\Omega$;	4~20 mA com. value; $R_e > 100 \Omega$
	E	ref. potential com. value	
Measurement output (act. value)	F	$\pm 10 V$ act. value, (limiting load 5 mA)	4~20 mA act. value, load max. 300 Ω
	PE	Connected with cooling body and valve housing	

Command value: A positive command value (or 12 to 20 mA) at D and the reference potential at E results in a flow from P to A and B to T. A negative command value (or 4 to 12 mA) at D and the reference potential at E results in a flow from P to B and A to T. For a valve with 1 solenoid on side a (e.g. spool variants EA and WA) a positive command value (or 4 ... 20 mA) at D and the reference potential at E results in a flow from P to B and A to T.

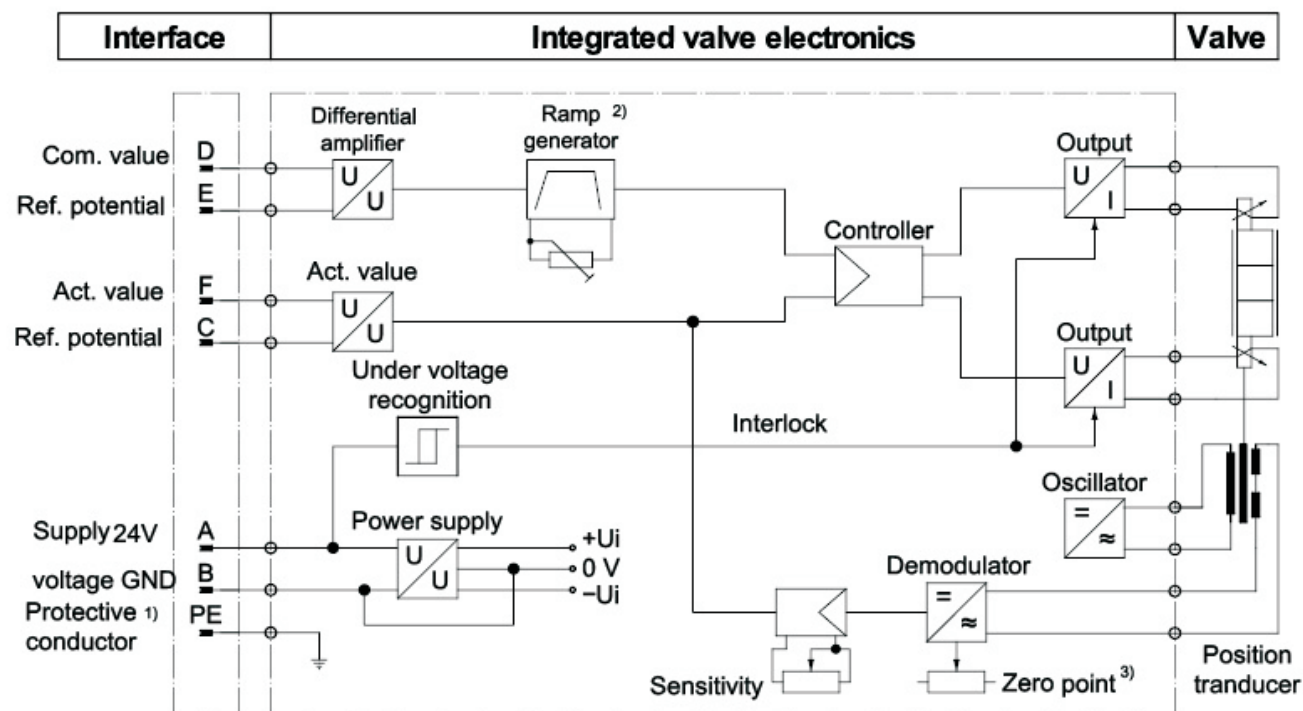
Actual value: A positive actual value (or 12 to 20 mA) at F and the reference potential at C results in a flow from P to A.

Connection cable: Recommended: - Up to 25 m cable length type LiYCY 7 $\times$ 0.75 mm²
- Up to 50 m cable length type LiYCY 7 $\times$ 1.0 mm²

Outside diameter 6.5 to 11 mm

Only connect screen to PE on the supply side.

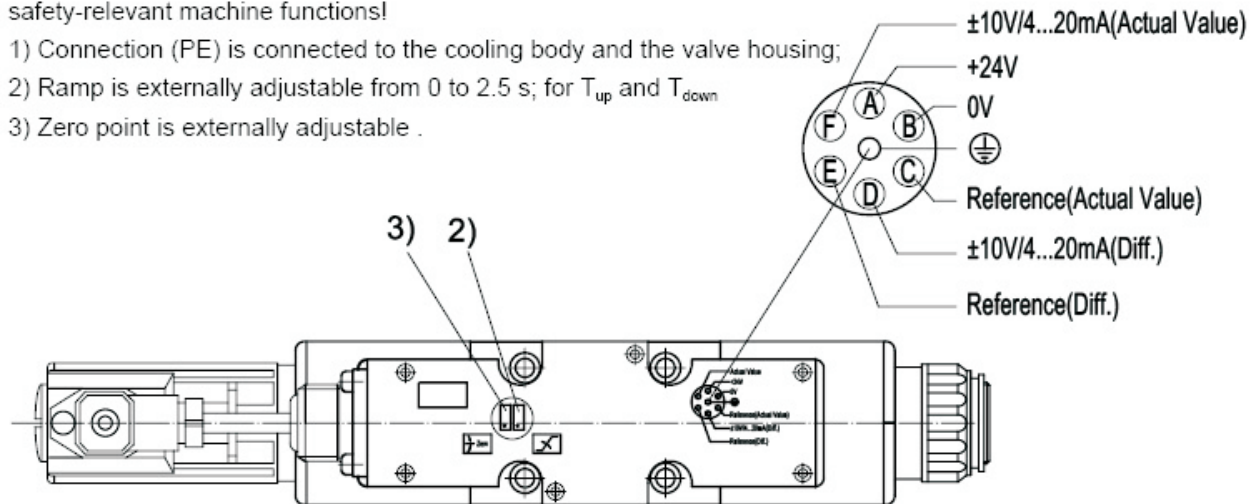
Block circuit diagram / connection allocation for the integrated valve electronics



Integrated control electronics for type 4WREE

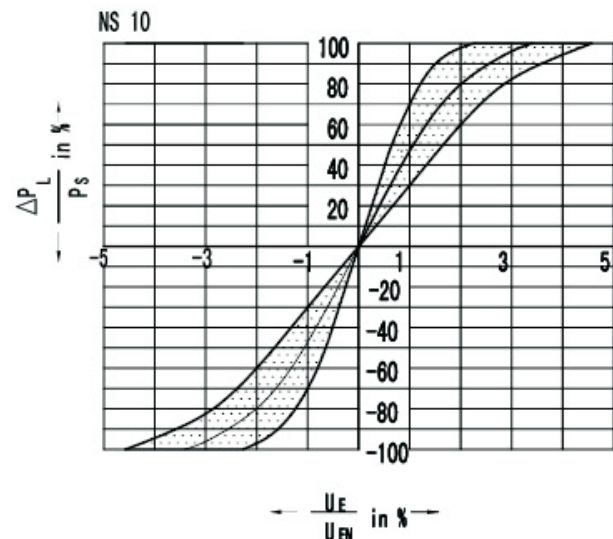
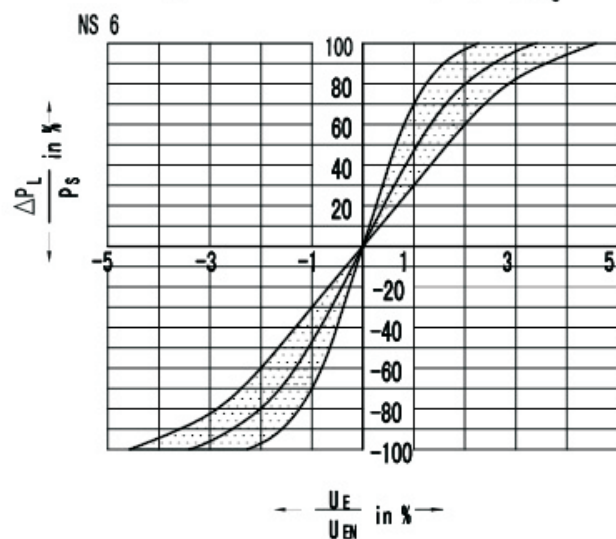
Note: Electrical signals processed by control electronics (e.g. actual value) must not be used for switching off safety-relevant machine functions!

- 1) Connection (PE) is connected to the cooling body and the valve housing;
- 2) Ramp is externally adjustable from 0 to 2.5 s; for T_{up} and T_{down}
- 3) Zero point is externally adjustable.



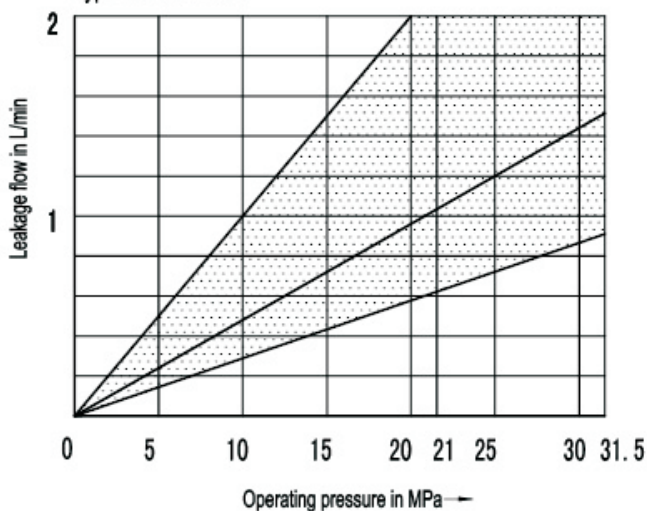
Characteristic curves for type 4WREE ($P=10\text{MPa}$, $v=36\times 10^{-6}\text{m}^2/\text{s}$, $t=50^\circ\text{C}$) NS 6 and 10

Pressure-signal-characteristic curves (V spool), $p_s = 10\text{MPa}$

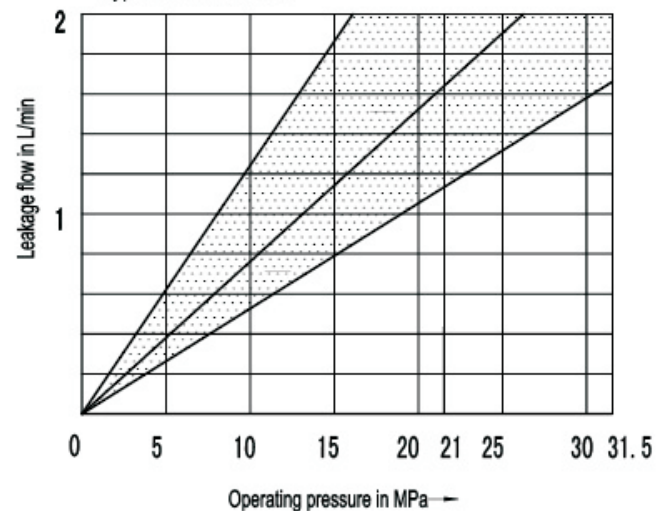


Leakage flow (with the spool in the central position)

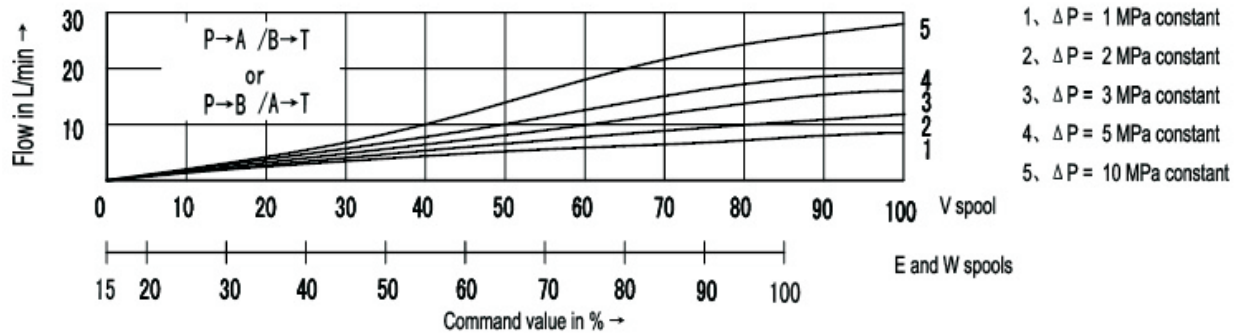
Type 4WREE 6 V32



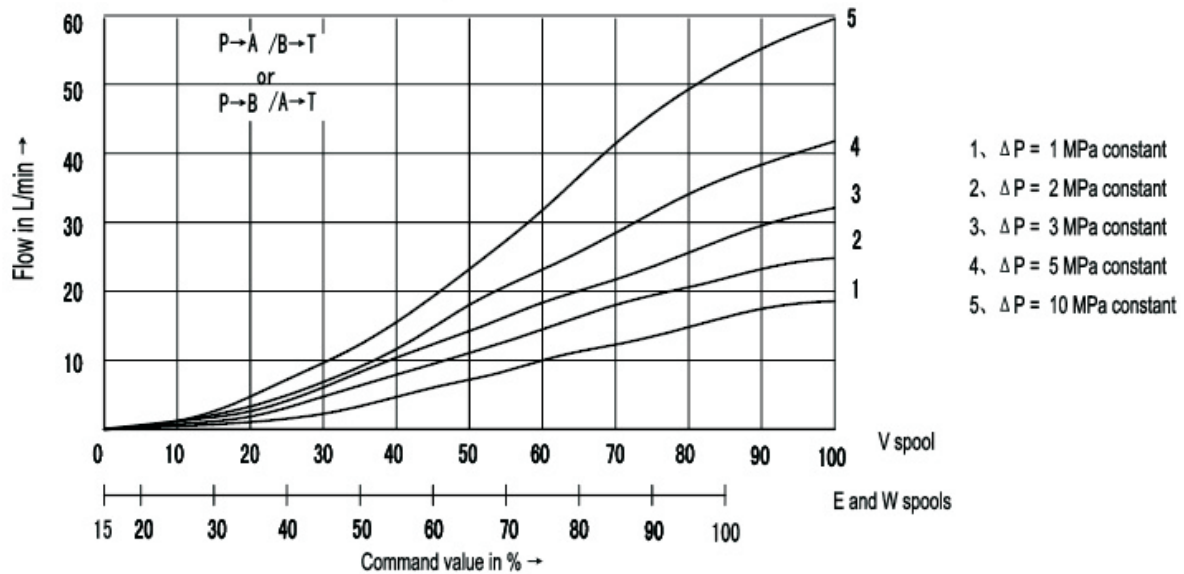
Type 4WREE 10 V75



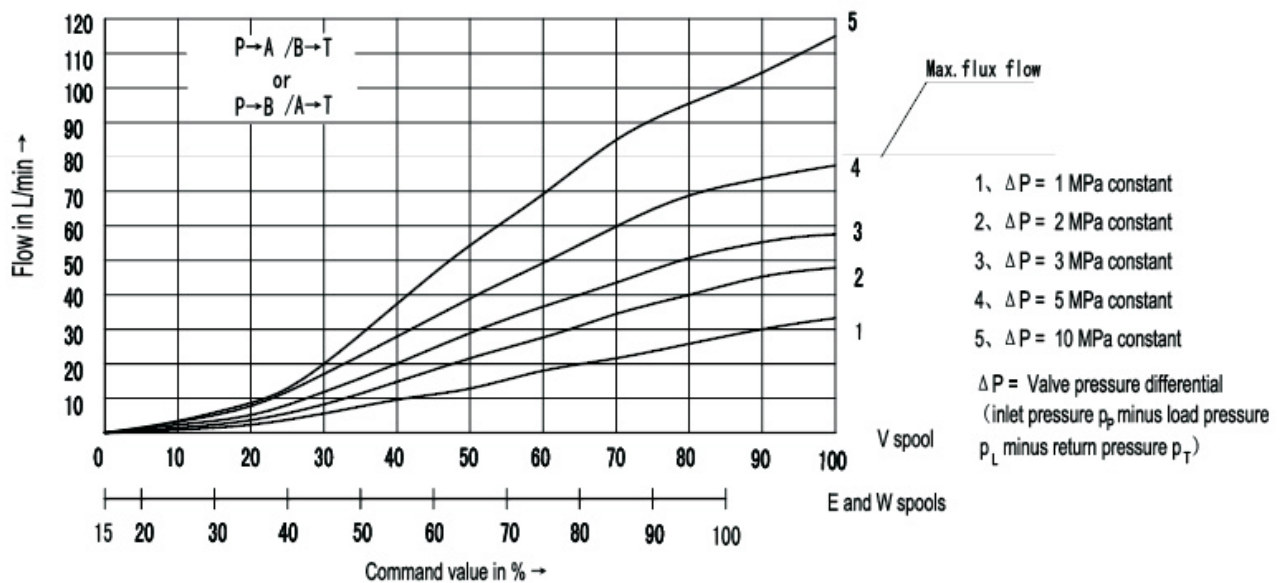
8 L/min nominal flow at a 1 MPa valve pressure differential



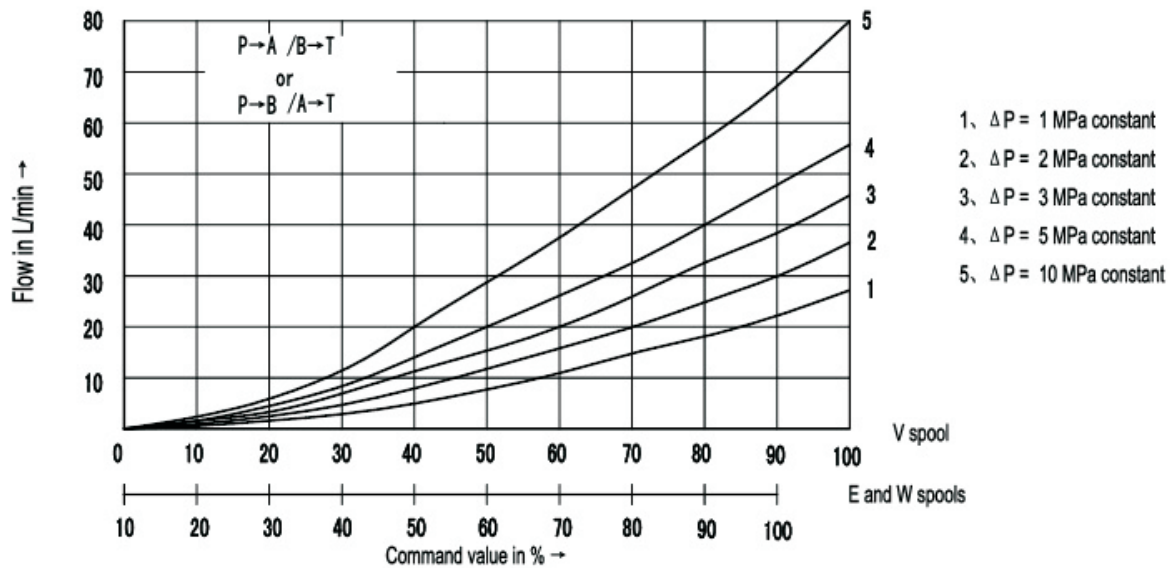
16 L/min nominal flow at a 1 MPa valve pressure differential



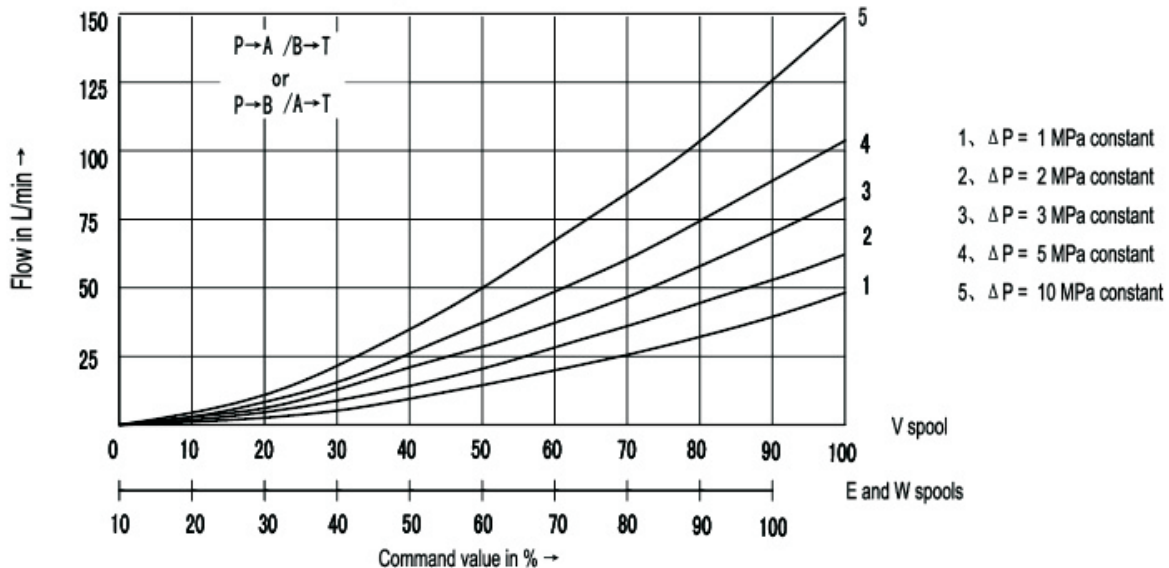
32 L/min nominal flow at a 1 MPa valve pressure differential



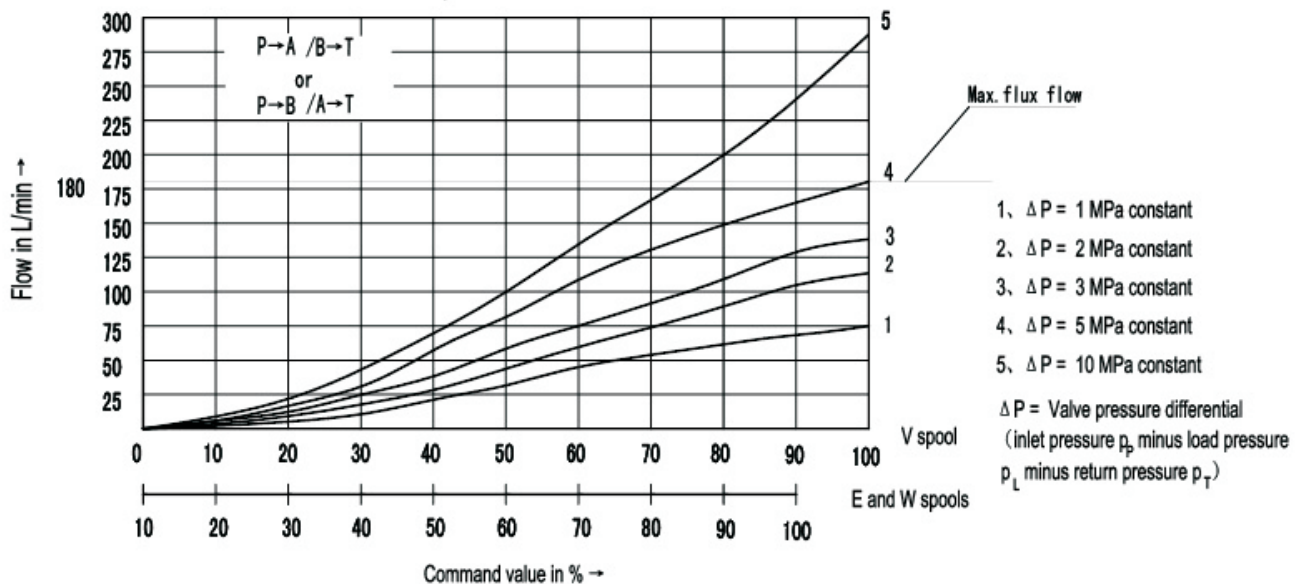
25 L/min nominal flow at a 1 MPa valve pressure differential



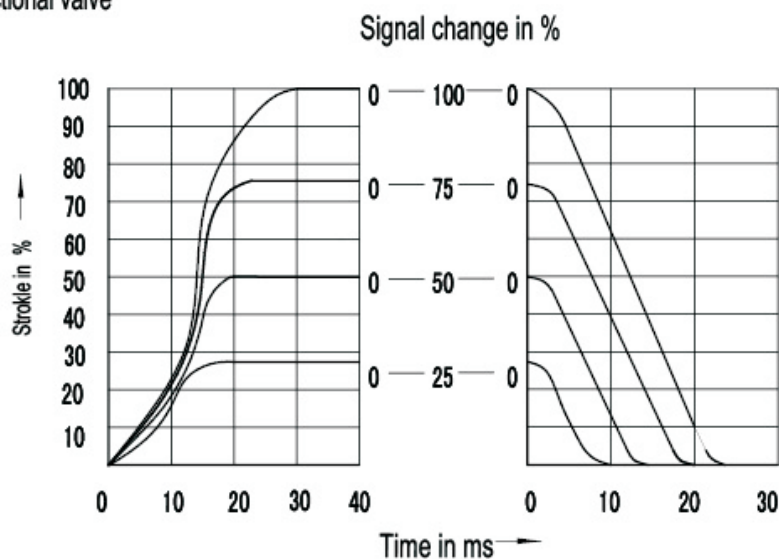
50 L/min nominal flow at a 1 MPa valve pressure differential



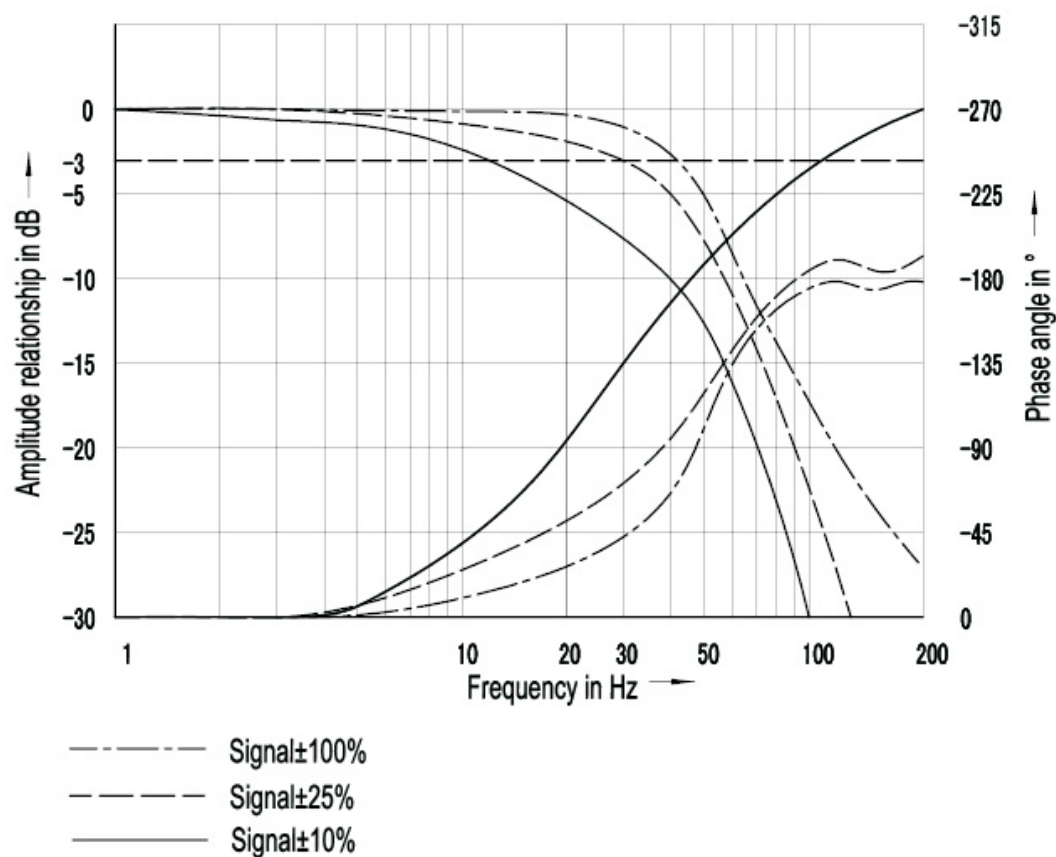
75 L/min nominal flow at a 1 MPa valve pressure differential



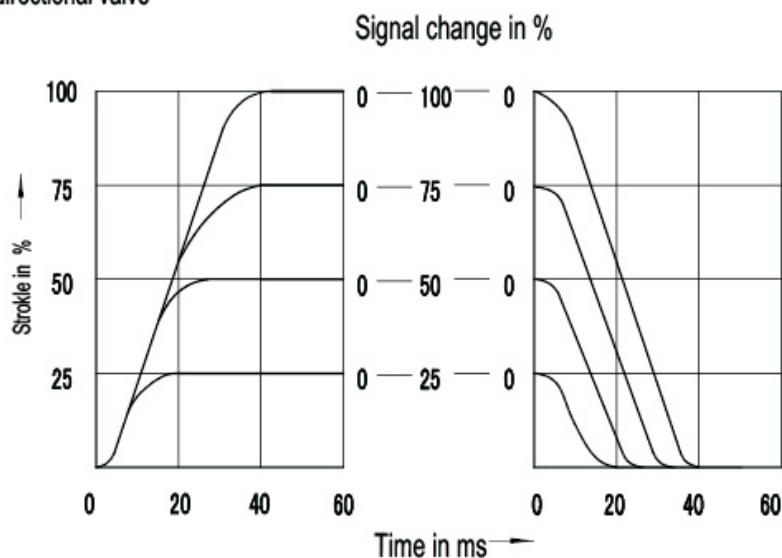
4/3 proportional directional valve
Symbols "E"



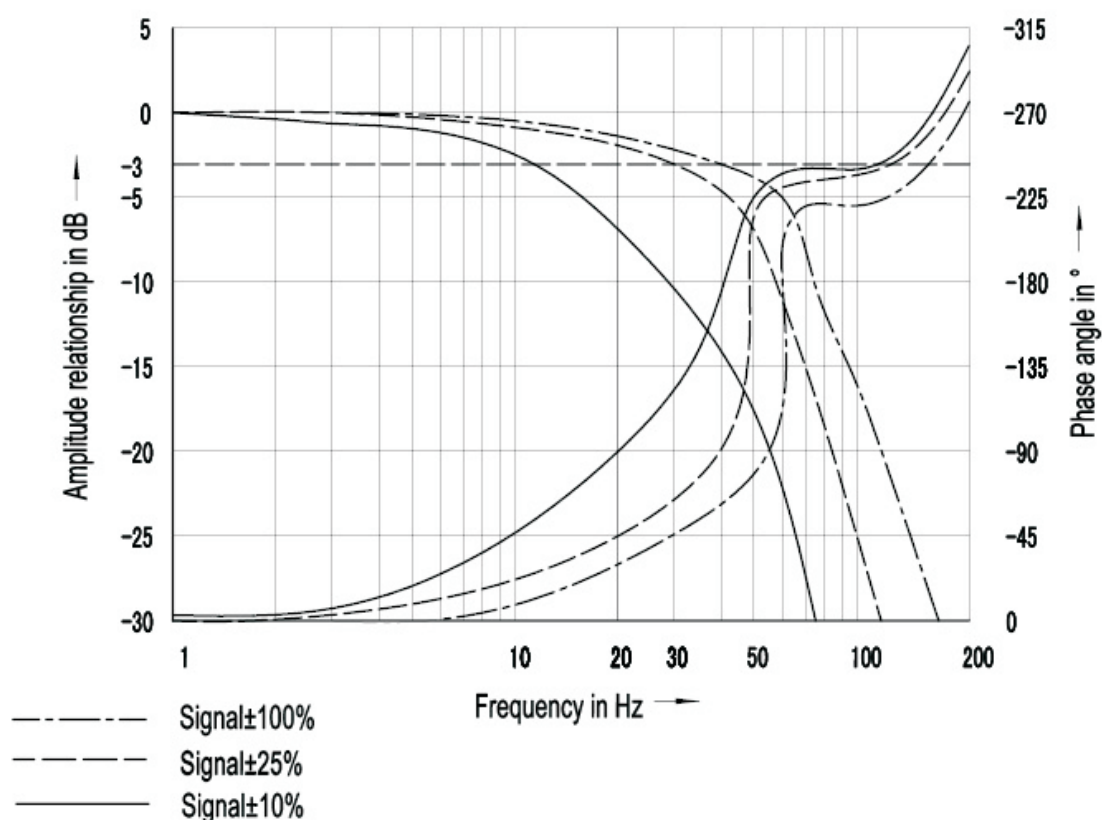
4/3 proportional directional valve
Symbols "V"



4/3 proportional directional valve
Symbols "E"



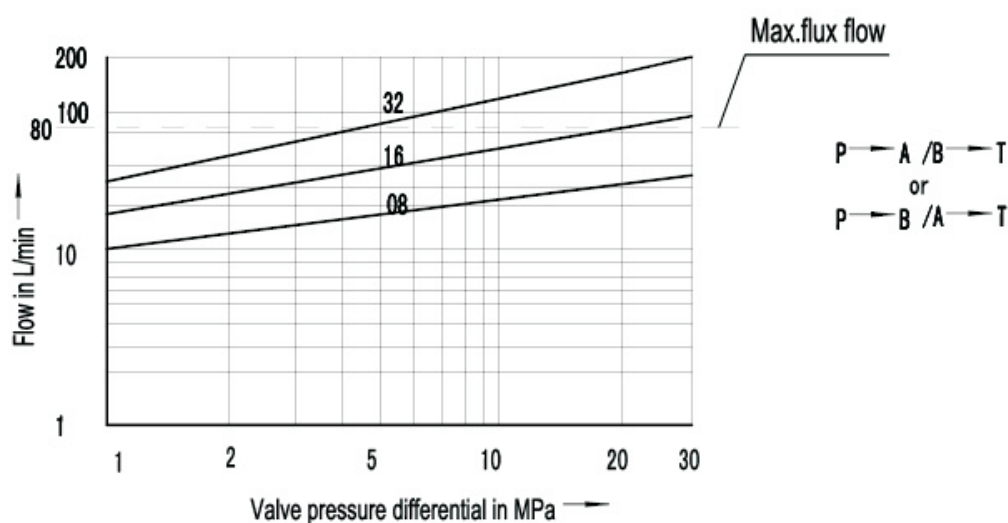
4/3 proportional directional valve
Symbols "V"



Flow load function at maximum valve opening

Nominal flow 8L/min, 16L/min, 32L/min

Symbols "V"

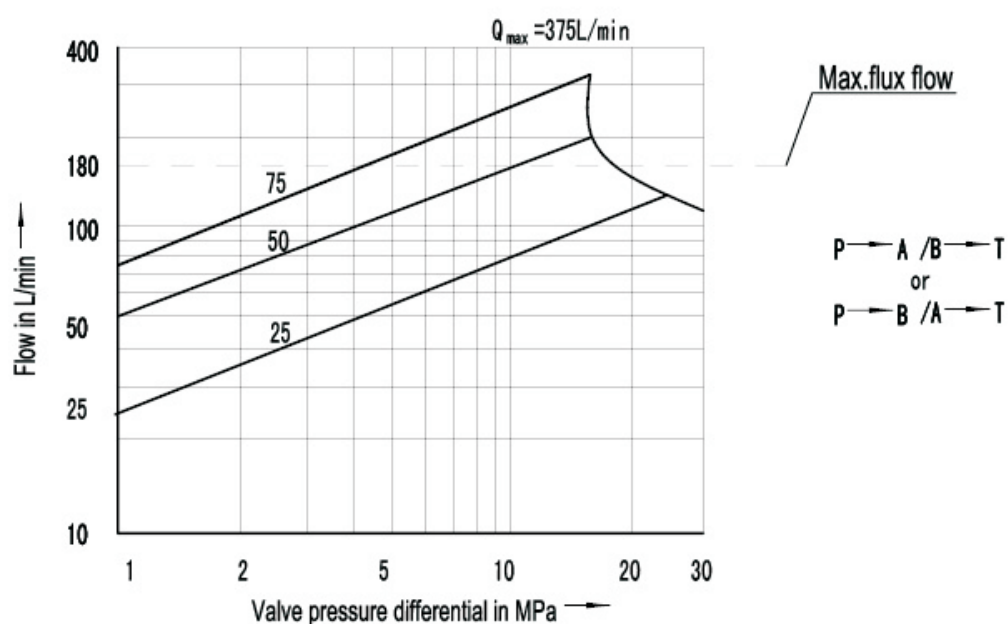


Warning : Please note the Max. flow 80L/min!

Flow load function at maximum valve opening

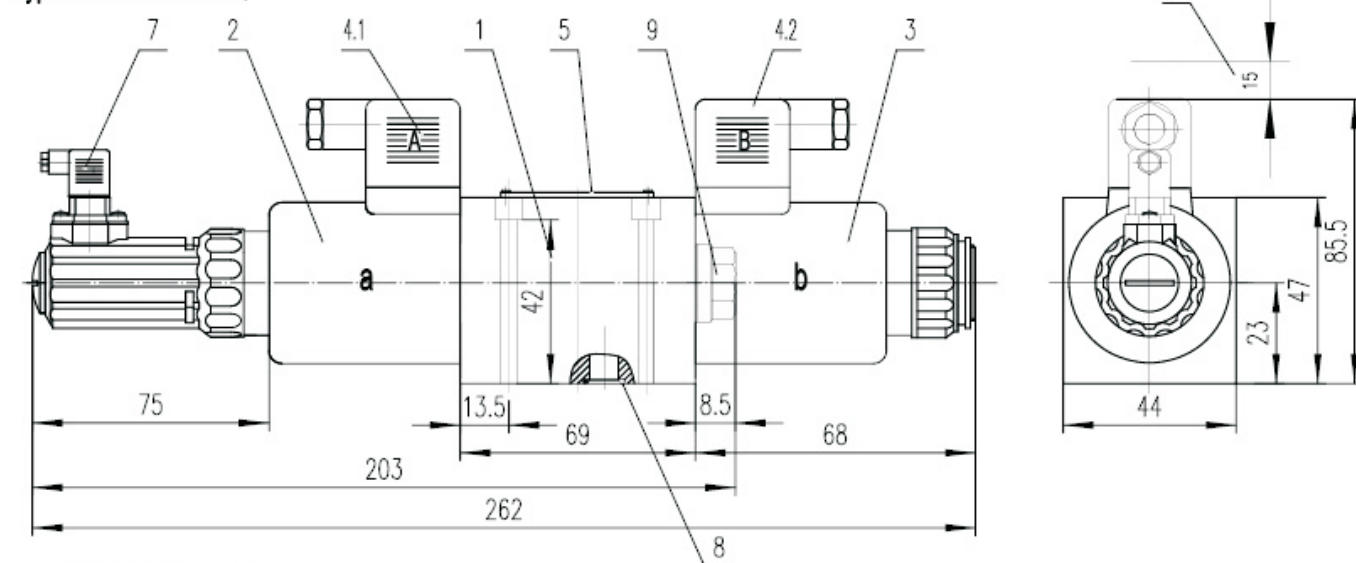
Nominal flow 25 L/min, 50L/min, 75L/min

Symbols "V"

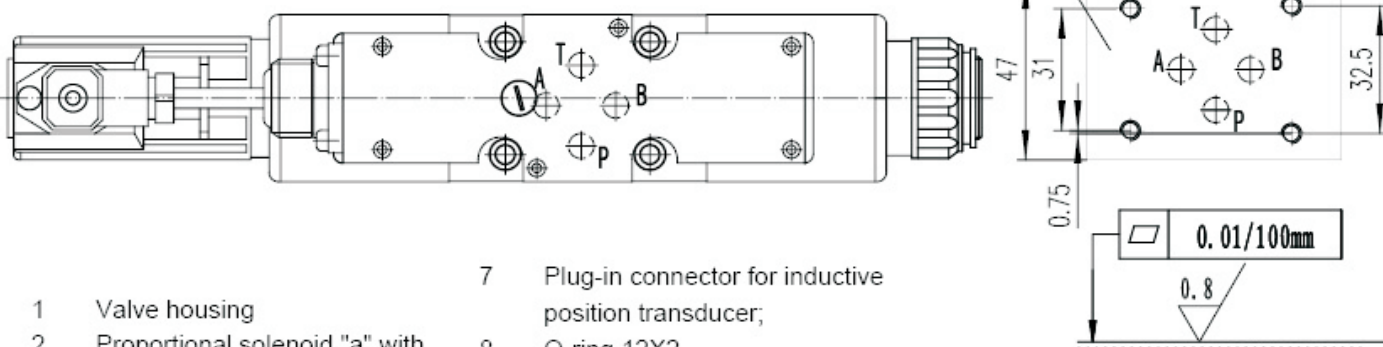
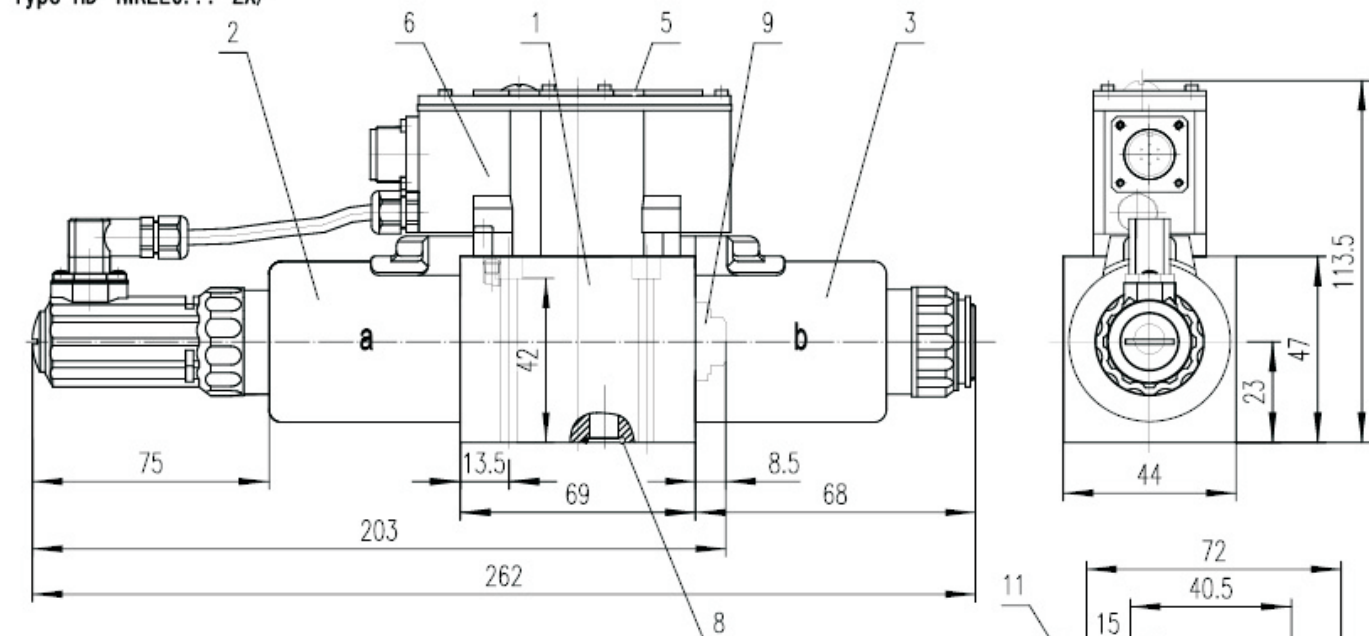


Warning : Please note the Max. flow 180L/min!

Type HD-4WRE6...-2X/



Type HD-4WRE6...-2X/

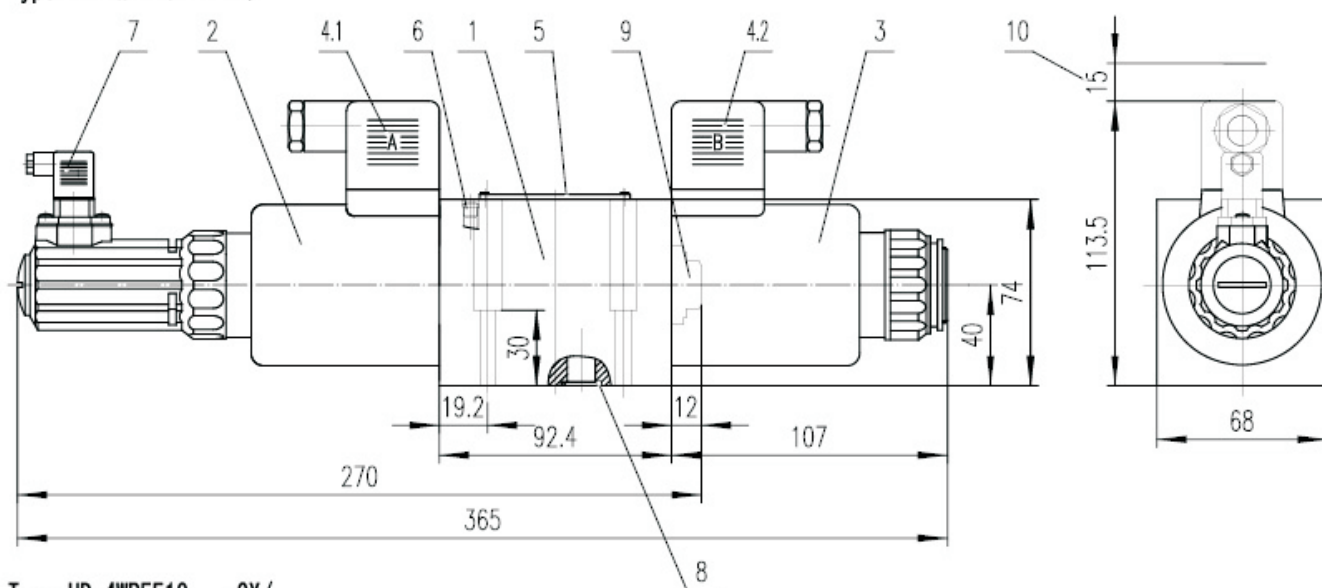


- | | | | |
|-----|--|----|--|
| 1 | Valve housing | 7 | Plug-in connector for inductive position transducer; |
| 2 | Proportional solenoid "a" with inductive position transducer | 8 | O-ring 12X2 (for ports P, A, B, TA, TB) |
| 3 | Proportional solenoid "b" | 9 | Plug for valves with one solenoid (2-switching positions), versions EA or WA |
| 4.1 | Plug-in connector "A" | 10 | Space required to remove plug-in connector |
| 4.2 | Plug-in connector "B" | 11 | Machined valve mounting surface and location of the connections |
| 5 | Nameplate | | |
| 6 | Integrated control electronics | | |

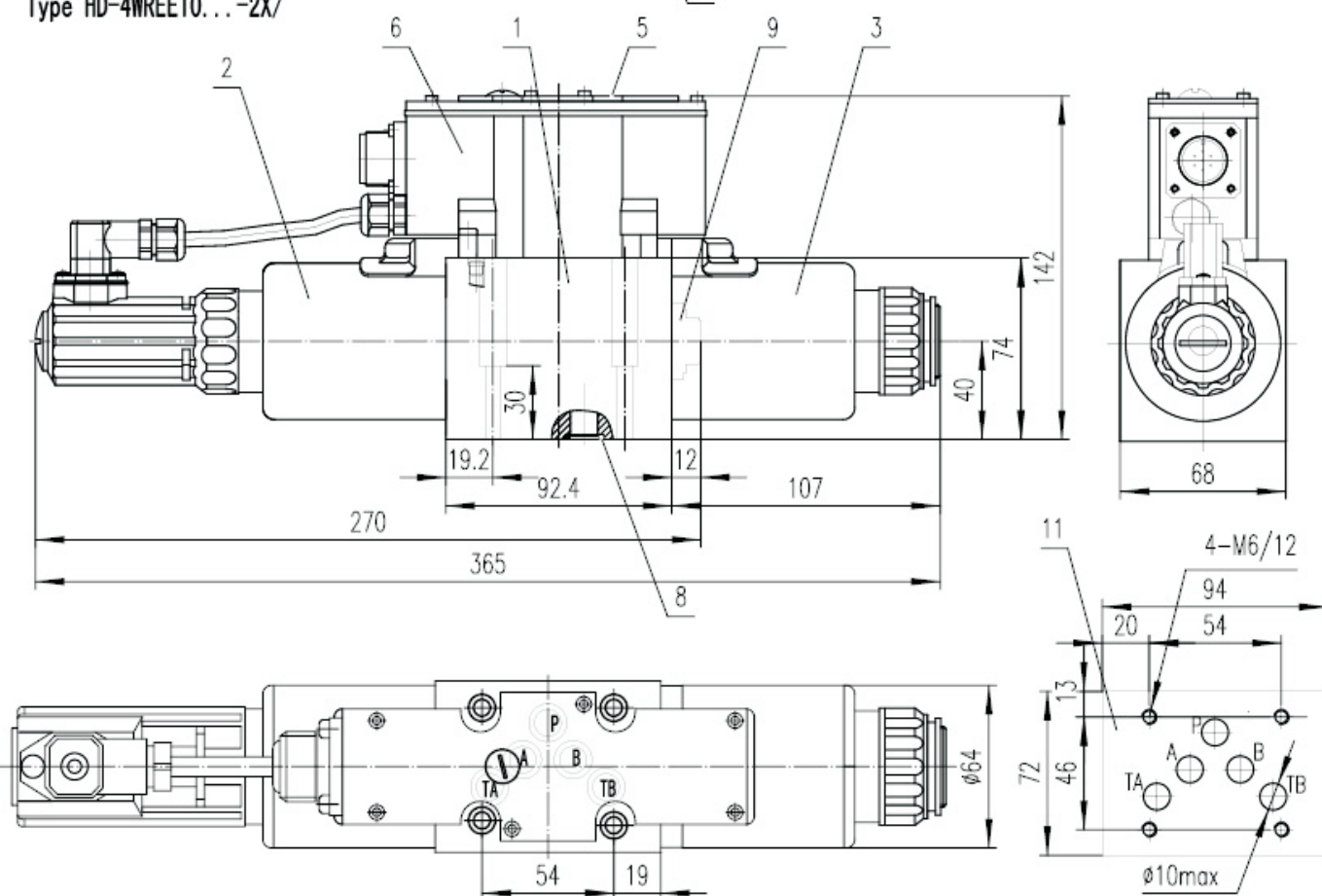
Subplates: G341/01(G 1/4")
G342/01(G 3/8")
G502/01(G 1/2")

Valve fixing screws:
4-M5X50 (GB/T70.1) $M_A = 8.9\text{Nm}$

Type HD-4WRE10...-2X/

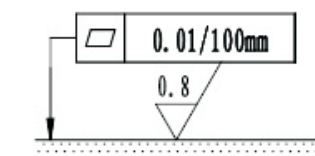


Type HD-4WREE10...-2X/



- 1 Valve housing
- 2 Proportional solenoid "a" with inductive position transducer
- 3 Proportional solenoid "b"
- 4.1 Plug-in connector "A"
- 4.2 Plug-in connector "B"
- 5 Nameplate
- 6 Integrated control electronics

- 7 Plug-in connector for inductive position transducer;
- 8 O-ring 12X2(for ports P, A, B, TA, TB)
- 9 Plug for valves with one solenoid (2-switching positions), versions EA or WA
- 10 Space required to remove plug-in connector
- 11 Machined valve mounting surface and location of the connections



Subplates: G66/01(G 3/8")
G67/01(G 1/2")
G534/01(G 3/4")

Valve fixing screws:
4-M6X40 (GB/T70.1) $M_A = 15.5\text{Nm}$

Notice

1. The fluid must be filtered. Minimum filter fineness is 20 μm .
2. The tank must be sealing up and an air filter must be installed on air entrance.
3. Products without subplate when leaving factory, if need them, please ordering specially.
4. Valve fixing screws must be high intensity level (class 10.9). Please select and use them according to the parameter listed in the sample book.
5. Roughness of surface linked with the valve is required to $\frac{0.8}{\sqrt{\text{ }}$.
6. Surface finish of mating piece is required to 0.01/100mm.

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