

Size 10, 16

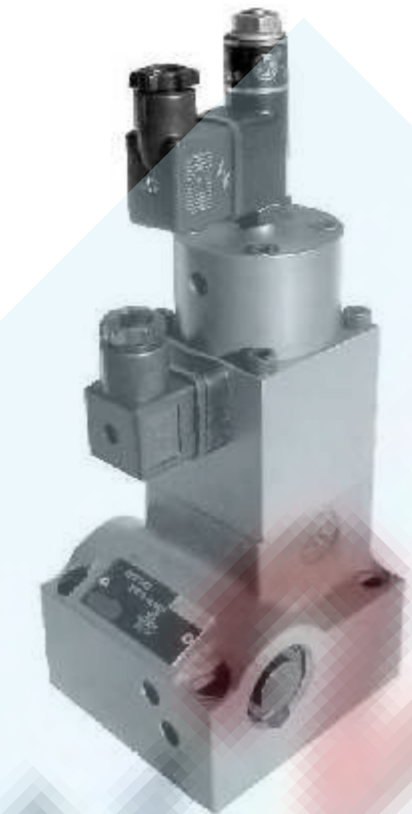
up to 21 MPa

up to 160 L/min

Replaces:

Features:

- Valve with a pressure compensator for pressure compensated control of a flow
- Actuation via a proportional solenoid
- With electrical position feedback of the control orifice
- The position transducer coil can be axially moved making the zero point adjustment of the control orifice easy, without having to touch the electronics (electrical-hydraulic)
- Minimum sample variation of valve and electrical amplifier VT 5004 (separate order)



Functional , section

The type 2FRE.. proportional flow control valves have a 2-way function. They can, from an applied electrical command value, regulate a flow which is pressure and to a great extent temperature compensated.

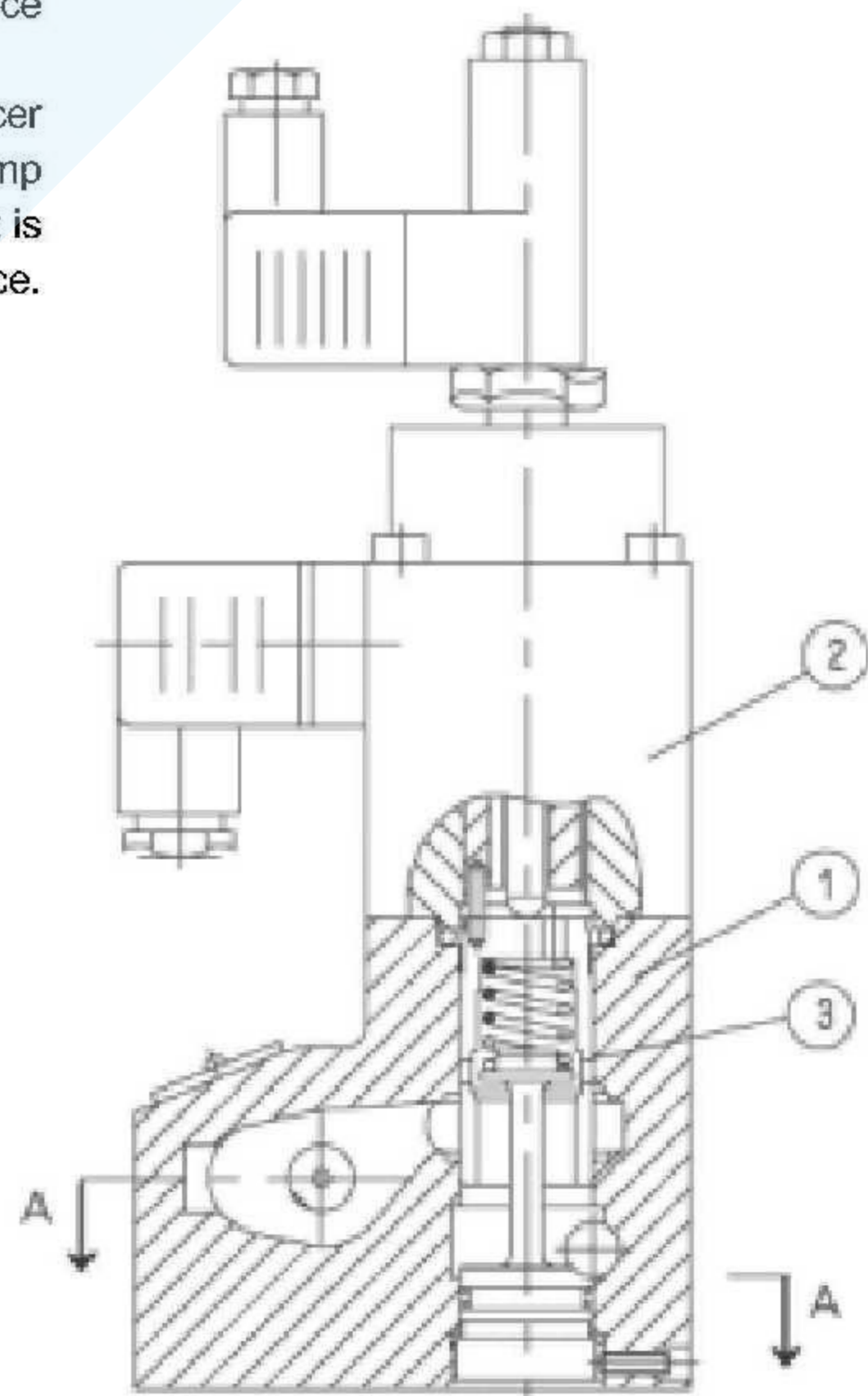
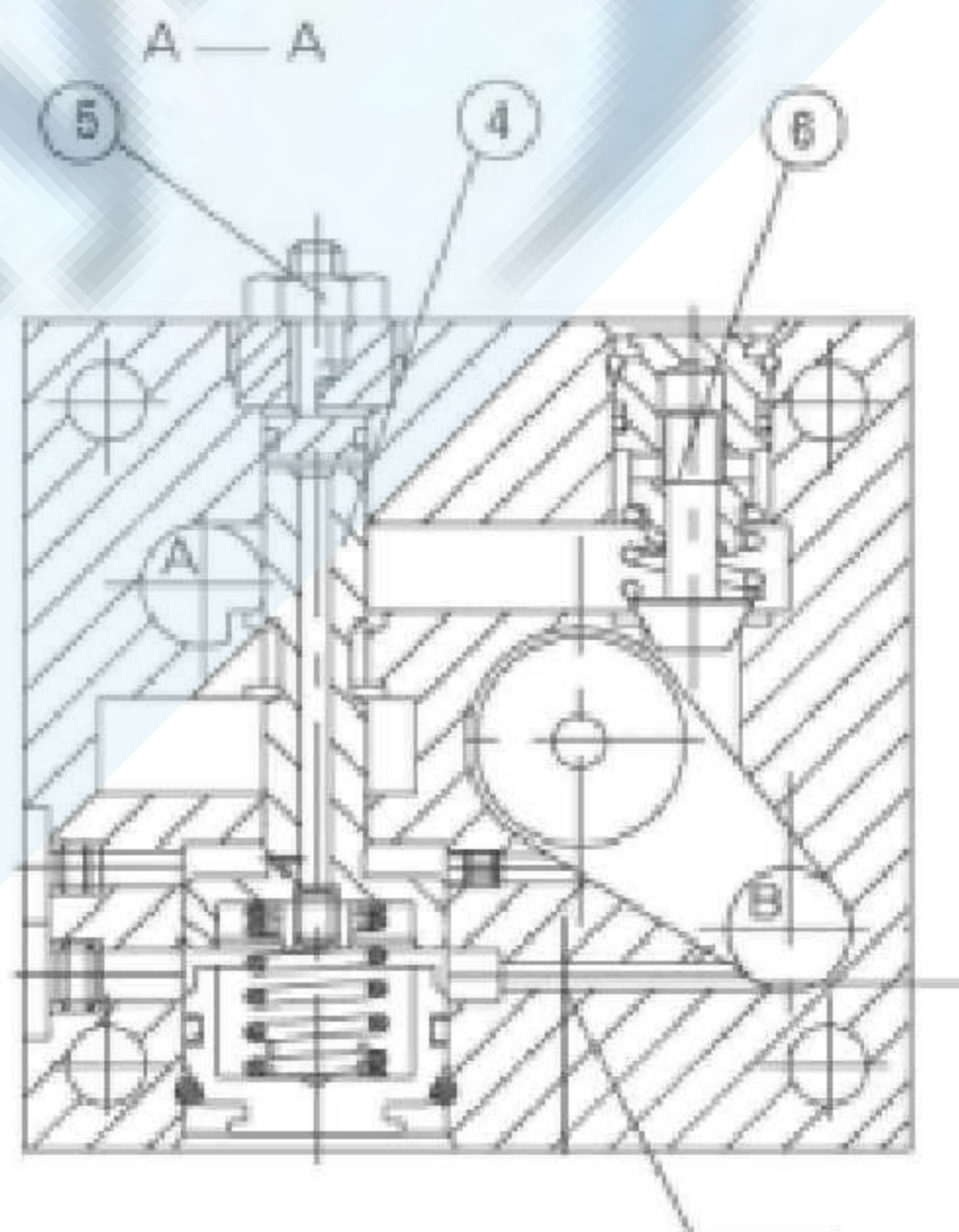
They basically comprise of the housing (1), proportional solenoid with inductive position transducer (2), measuring orifice (3), pressure compensator (4), stroke limiter (5), as well as an optional check valve (6).

The setting of the flow is determined (0 bis 100 %) at the command value potentiometer. The applied command value, causes via the amplifier as well as the proportional solenoid, the adjustment of the measurement orifice (3). The position of the measurement orifice (3) is obtained by the position transducer. Any deviations from the command value are compensated for by the position feedback control.

The pressure compensator (4) holds the pressure drop at the measurement orifice (3) at a constant value. The flow is, therefore pressure compensated.

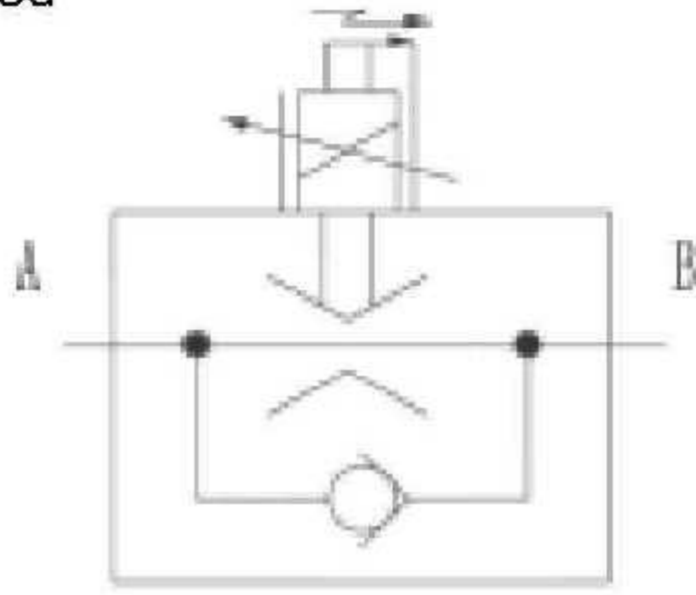
The small temperature drift is achieved due to the design of the measurement orifice. At a 0 % command value the measurement orifice is closed.

In the case of a loss of power or a cable break at the position transducer the measurement orifice closes. From a 0 % command value a jump free start is possible. Via two ramps within the electrical amplifier it is possible to delay the opening and closing of the measurement orifice. Via the check valve (6) free flow is possible from B to A.

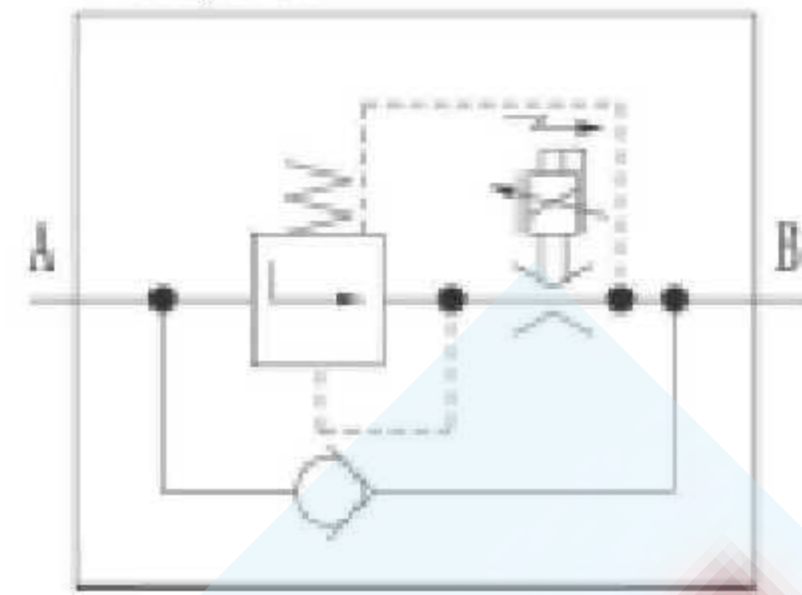


Symbols:

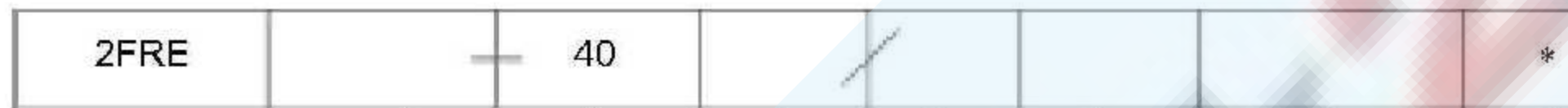
simplified



complete



Ordering details



Nominal size 10 = 10
Nominal size 16 = 16

Series 40 to 49 = 40
(40 to 49: unchanged installation and connection dimensions)

Further details in clear text

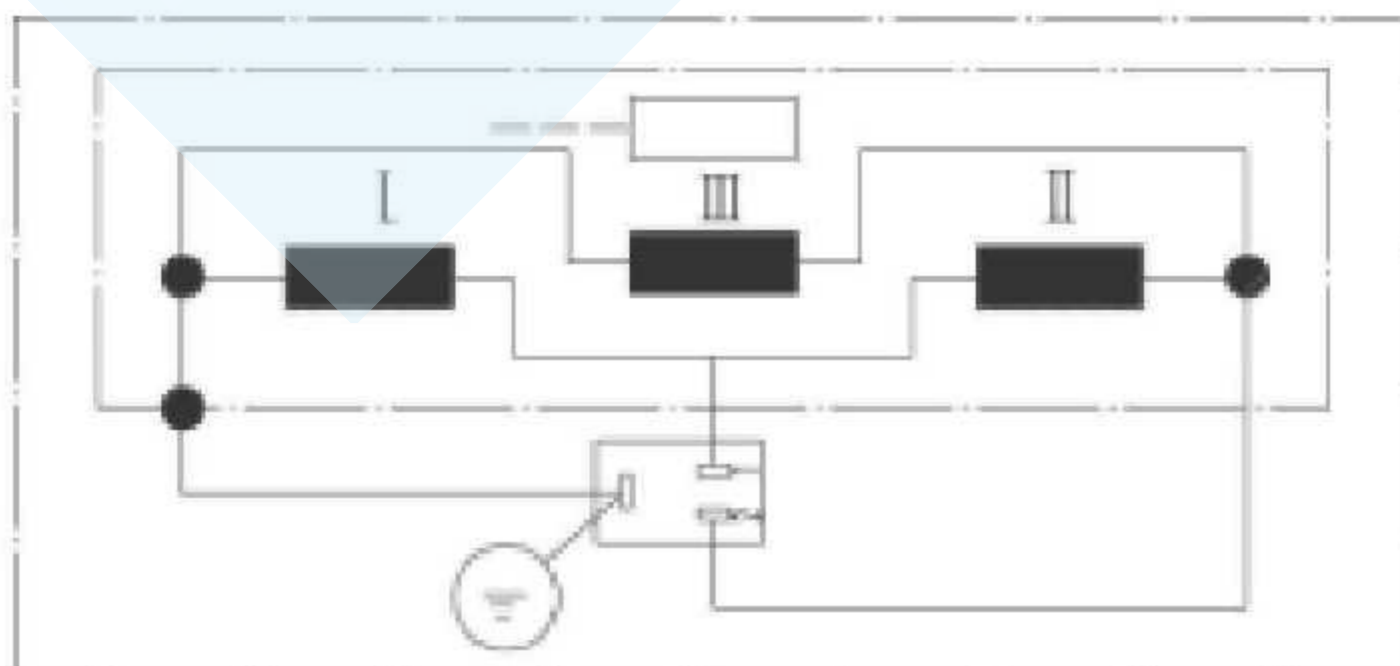
No code = Mineral oil
V = Phosphate ester

No code = Without pressure compensator stroke limiter
B = With pressure compensator stroke limiter

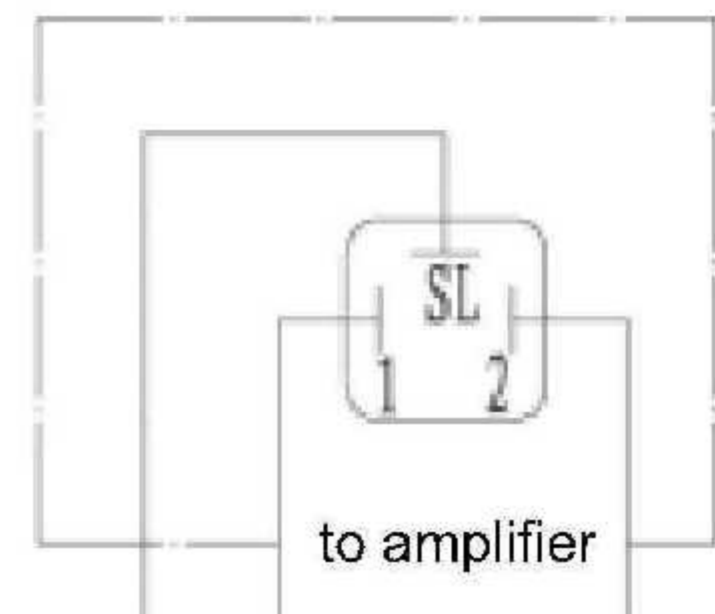
Flow control range A → B			
Nominal size 10			Nominal size 16
Linear	Increase by degrees	Progressive with fast feed Linear (fine control range)	Linear
up to 5 L/min = 5L up to 10 L/min = 10L up to 16 L/min = 16L up to 25 L/min = 25L up to 50 L/min = 50L up to 60 L/min = 60L	up to 5 L/min=5 Q up to 10L/min=10Q up to 16L/min=16Q up to 25L/min=25Q	up to 2L/min=2QE up to 5L/min=5QE	up to 80 L/min = 80L up to 100 L/min = 100L up to 125 L/min = 125L up to 160 L/min = 160L

Electrical connections ---- Inductive position transducer

Connections on loops



Connections on plug-in connector



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

Hydraulic

Operating pressure (MPa)		31.5									
Minimum pressure differential (MPa)		Size 10					Size 16				
		0.3~0.8					0.6~1				
△ p free return flow B → A	Measurement orifice open(MPa)	0.1	0.12	0.15	0.2	0.3	0.35	0.16	0.19	0.24	0.31
	Measurement orifice closed(MPa)	0.17	0.2	0.25	0.3	0.5	0.6	0.3	0.35	0.45	0.6
Flow Q max. (L/min)		5	10	16	25	50	60	80	100	125	160
Flow Character		0.1Q max									
		± 2Qmax									
Temperature drift Hydraulic + electrical Pressure compensated up to $\Delta p = 31.5\text{MPa}$ (%)											
Degree of contamination (μM)		≤ 20 (We recommend a filter with a minimum retention rate of 10)									
Pressure fluid		Mineral oil(for NBR seal),Phosphate ester (for FPM seal)									
Viscosity range (mm^2/s)		2.8 to 380									
Pressure fluid temperature range ($^{\circ}\text{C}$)		-20 to +70									
Hysteresis (%)		< ± 1Qmax									
Repeatability (%)		< 1Qmax									
Sample spread (%)		< ± 2									
Installation		optional									
Weight (Kg)		6					8.3				

Electrica

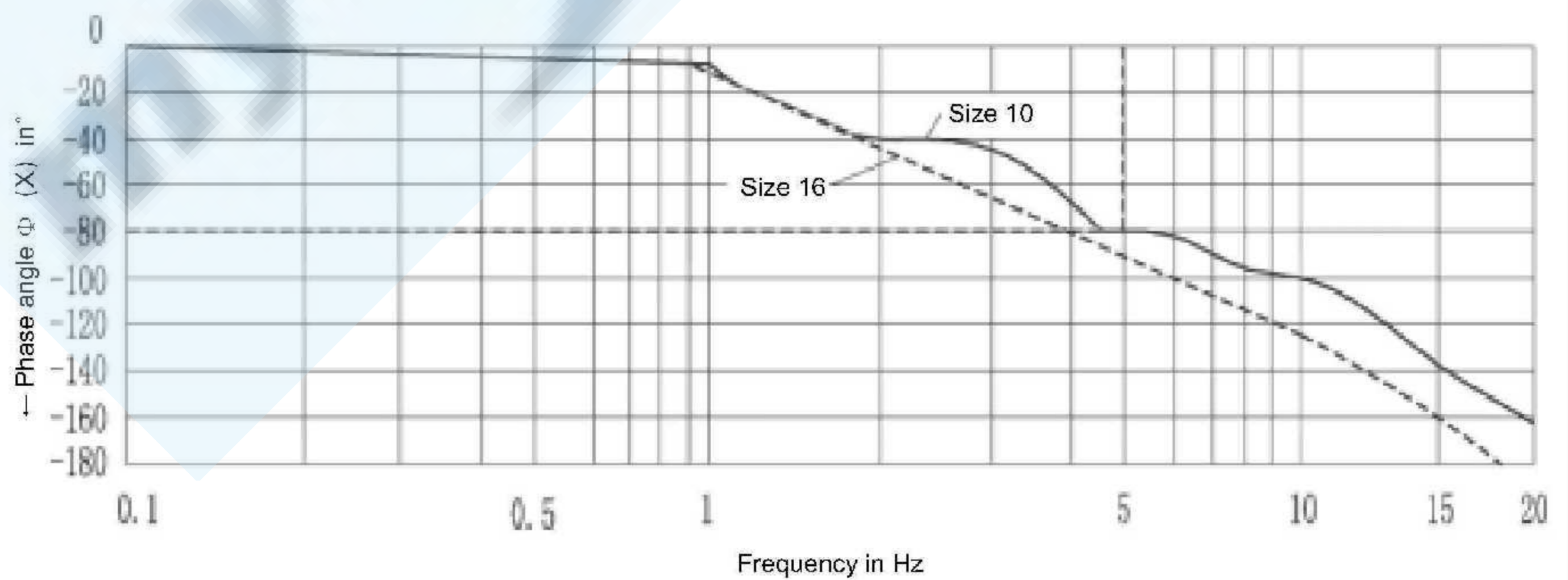
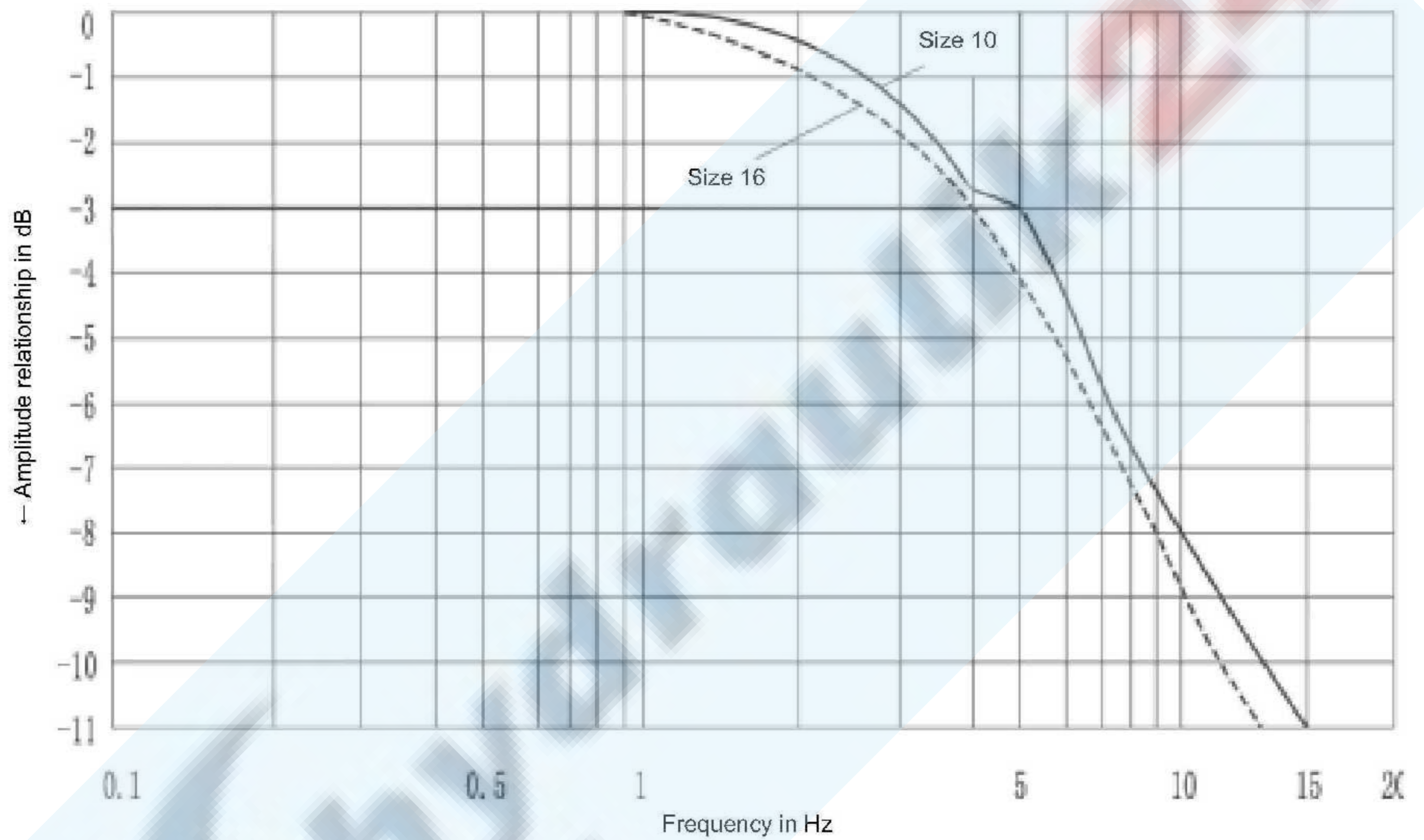
Voltage type		DC 24V
Coil resistance (Ω)	Cold value at 20°C 10 , Max. warm value 13.9	
Operation state	Continuous	
Max. fluid temperature ($^{\circ}\text{C}$)	+50	
Max. Power (VA)	50	
Coil resistance of transducer (Ω)	at 20°C I -56、II -56、III -112	
Inductivity (mH)	6~8	
Oscillator frequency (KHz)	2.5	
VT-5010S30 Demand of insulation IP65	IP65	
Amplifier (Supplied with valves)	VT-5004 S30	
Types of Electrical connections	see page 72	

Characteristic curves (measured at $\nu = 36 \times 10^{-6} \text{m}^2/\text{S}$; $t=50^\circ\text{C}$)

(measured at $t = 50^\circ\text{C}$; $P_{\text{nom}} = 5 \text{ MPa}$; amplitude 0 ~100 %; NS 10 / 60L ; NS 16 / 160L)

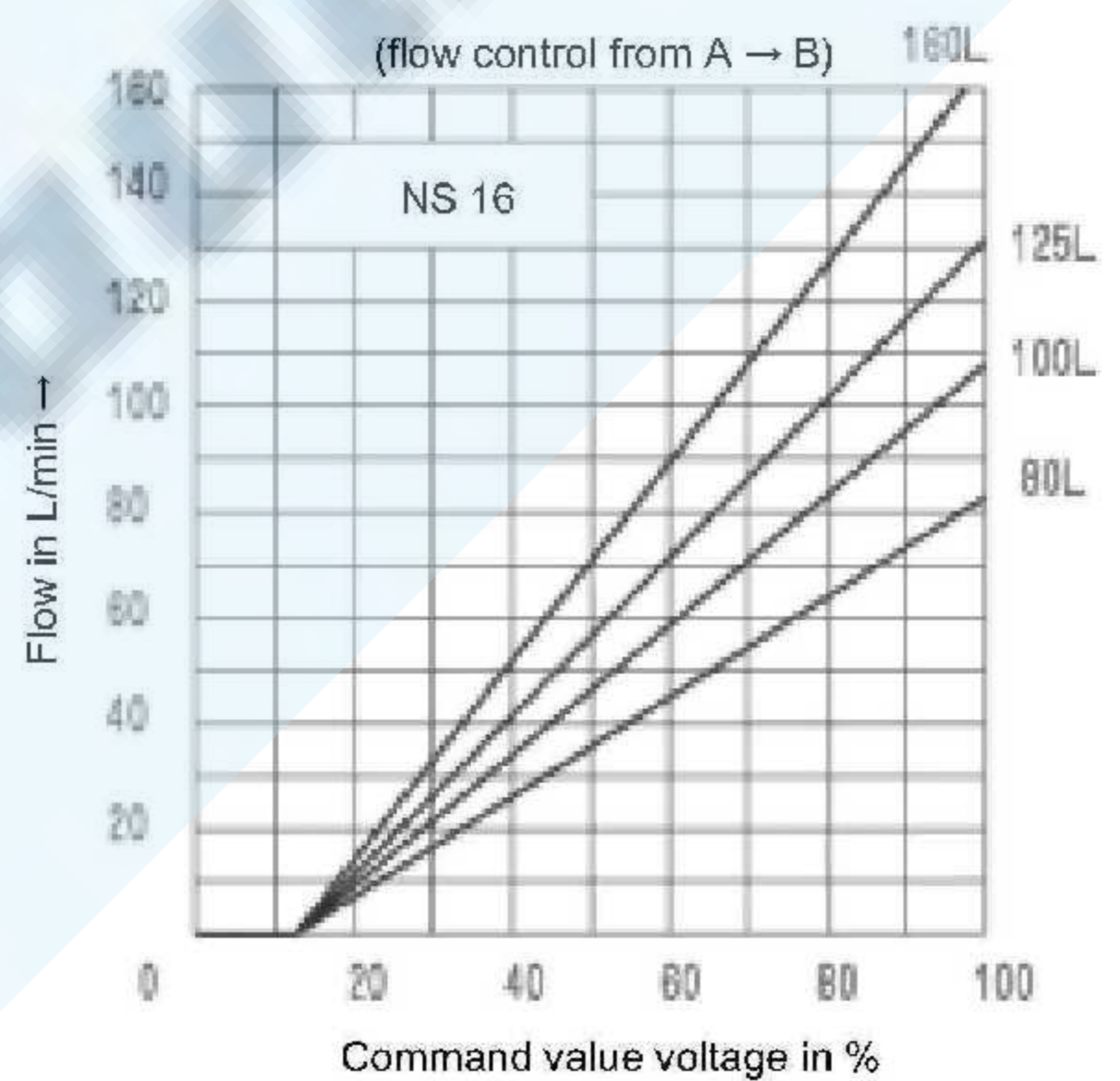
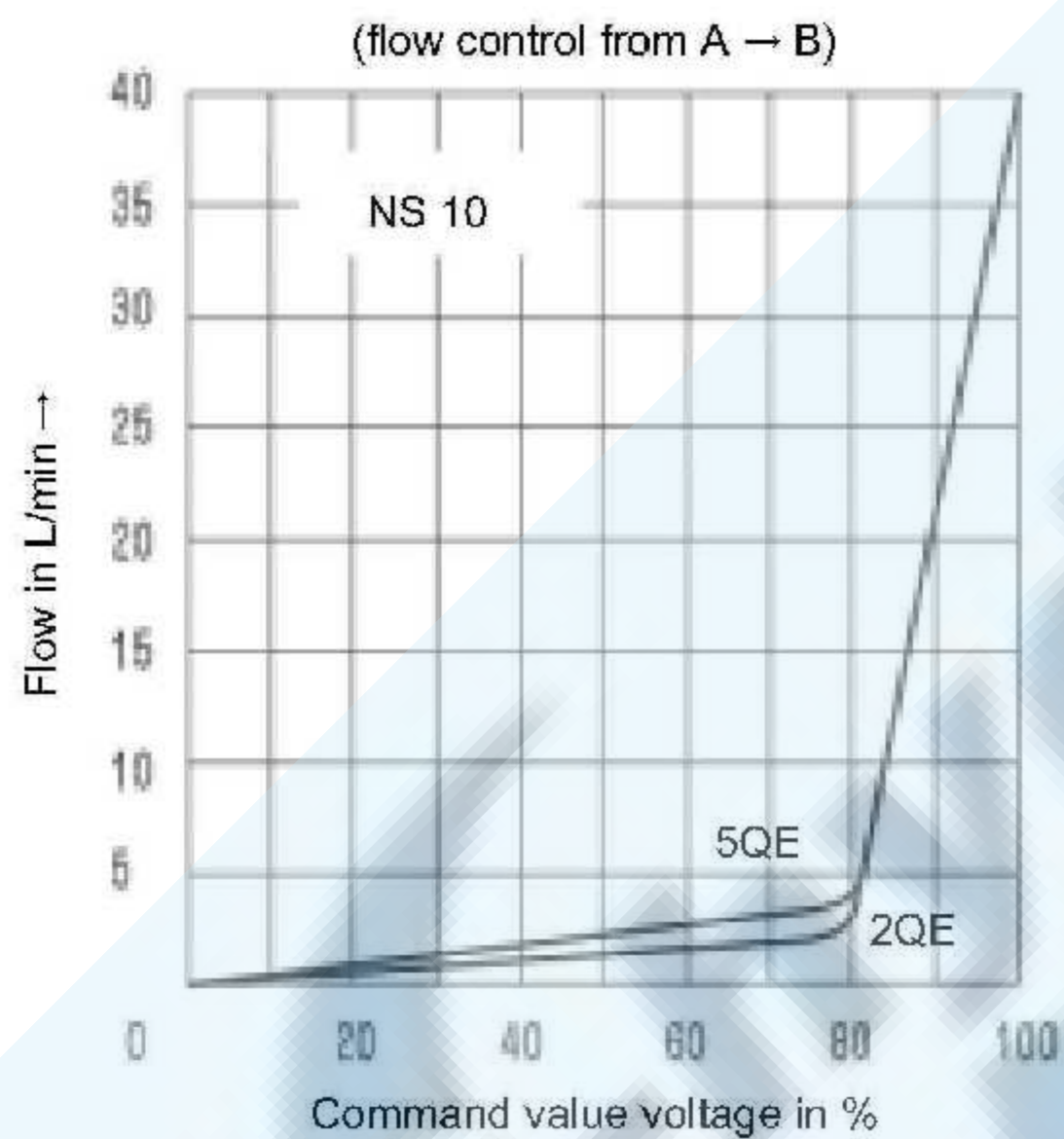
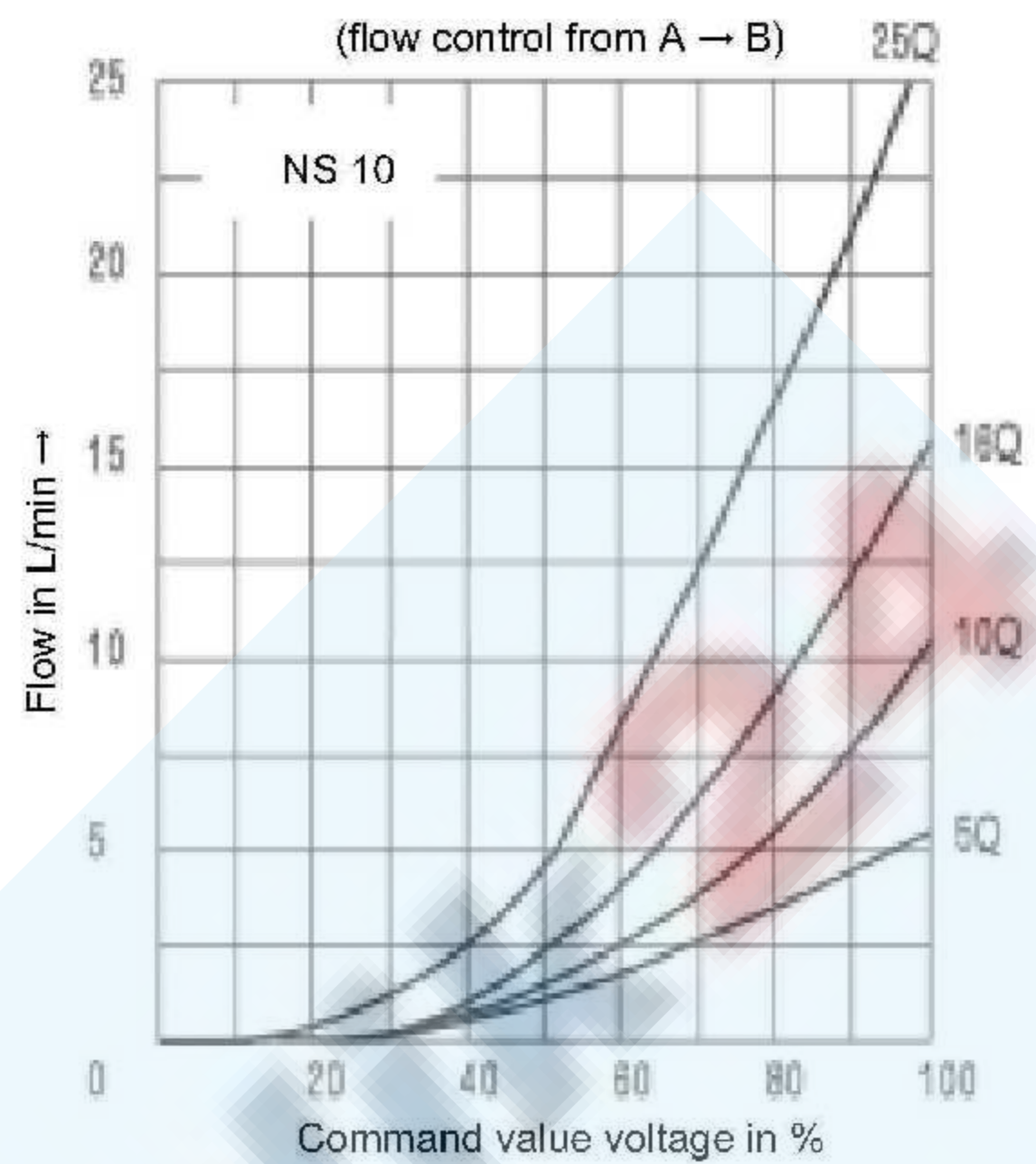
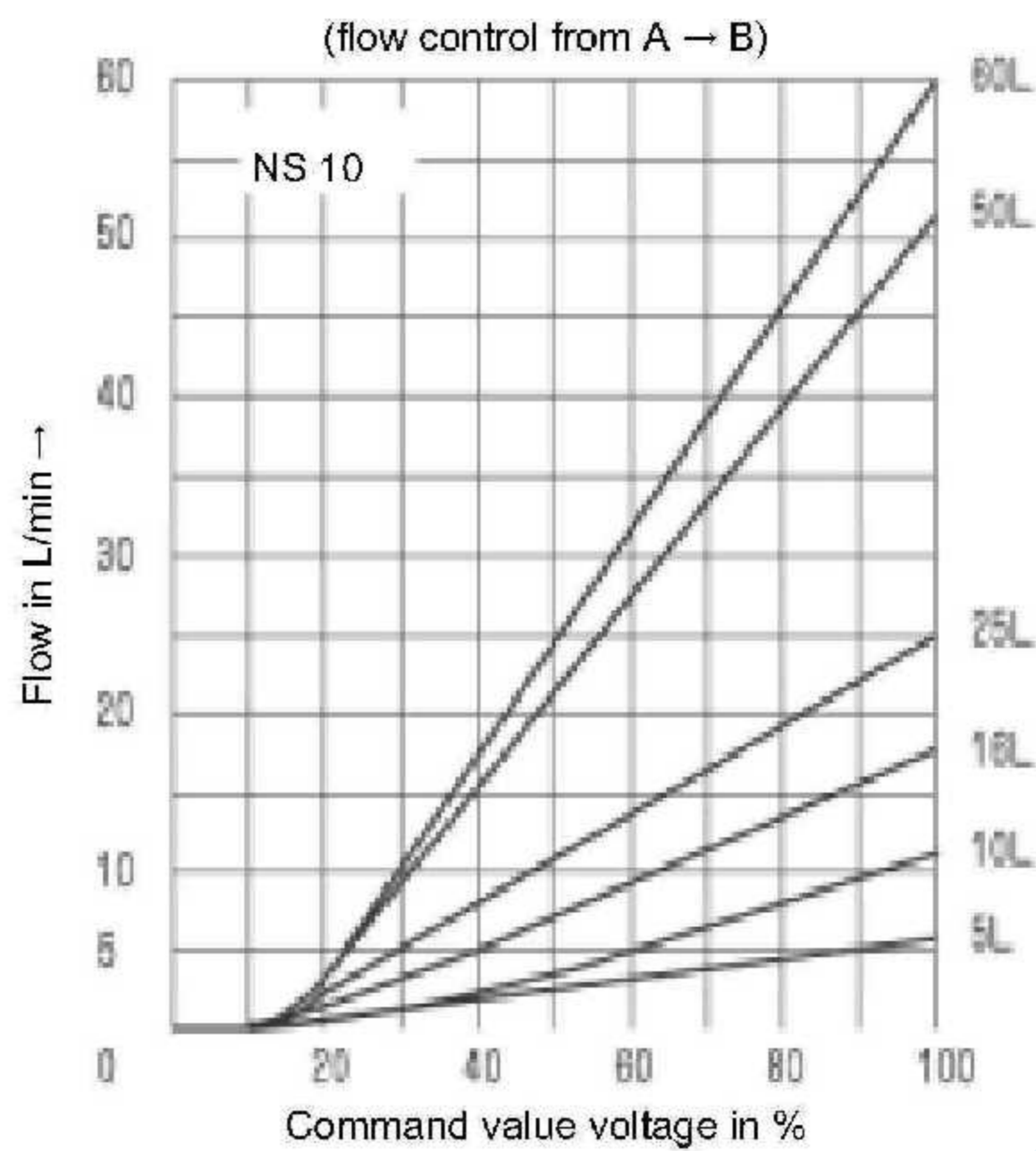
Transient function with a stepped form of command value change

Stroke %	Time (from start to 100% amplitude) (ms)		Time (from start to Min. amplitude) (ms)	
	NS 10	NS 16	NS 10	NS 16
0-100	100	110	80	110
10-90	90	100	85	100
25-75	85	95	80	95

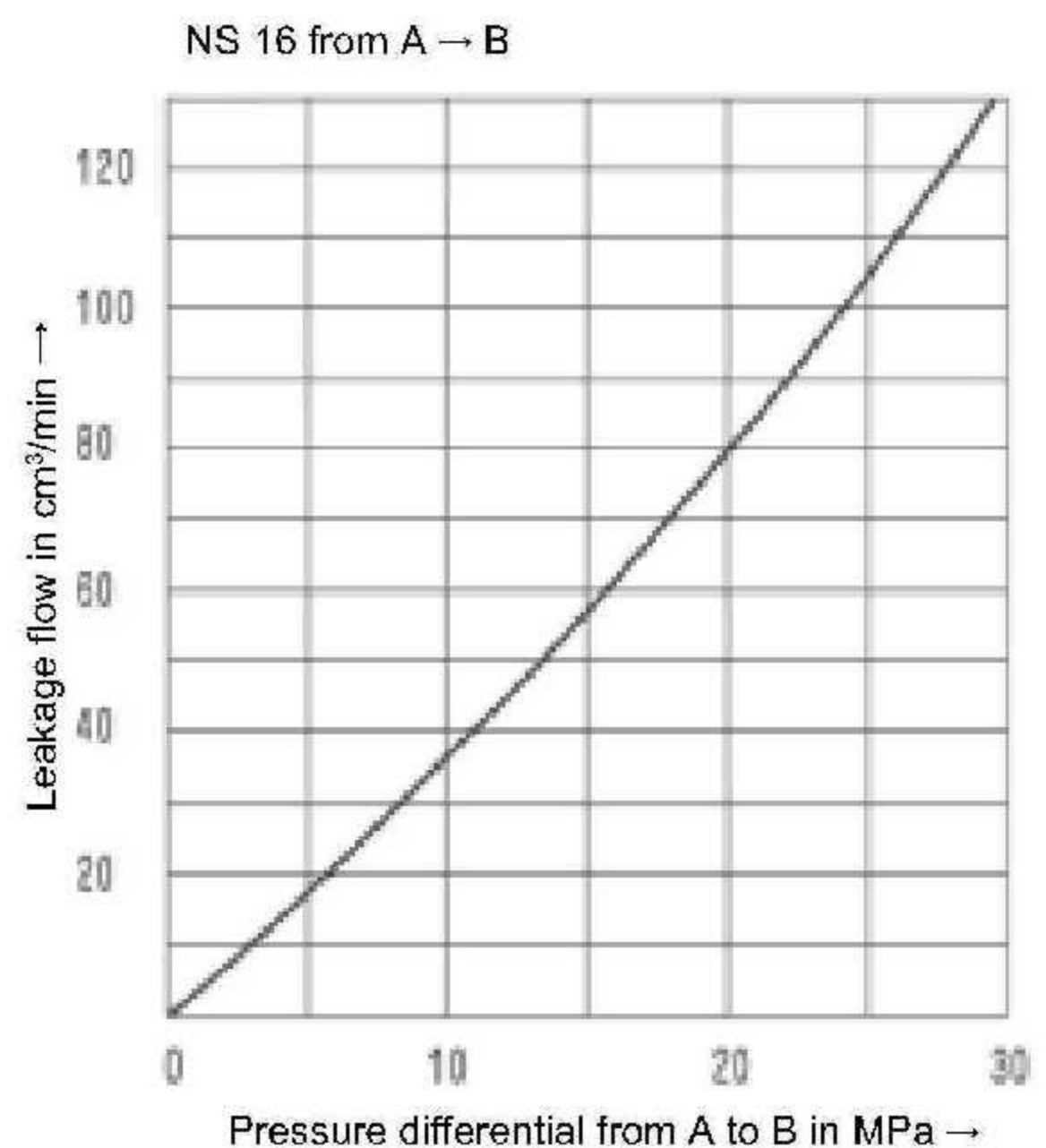
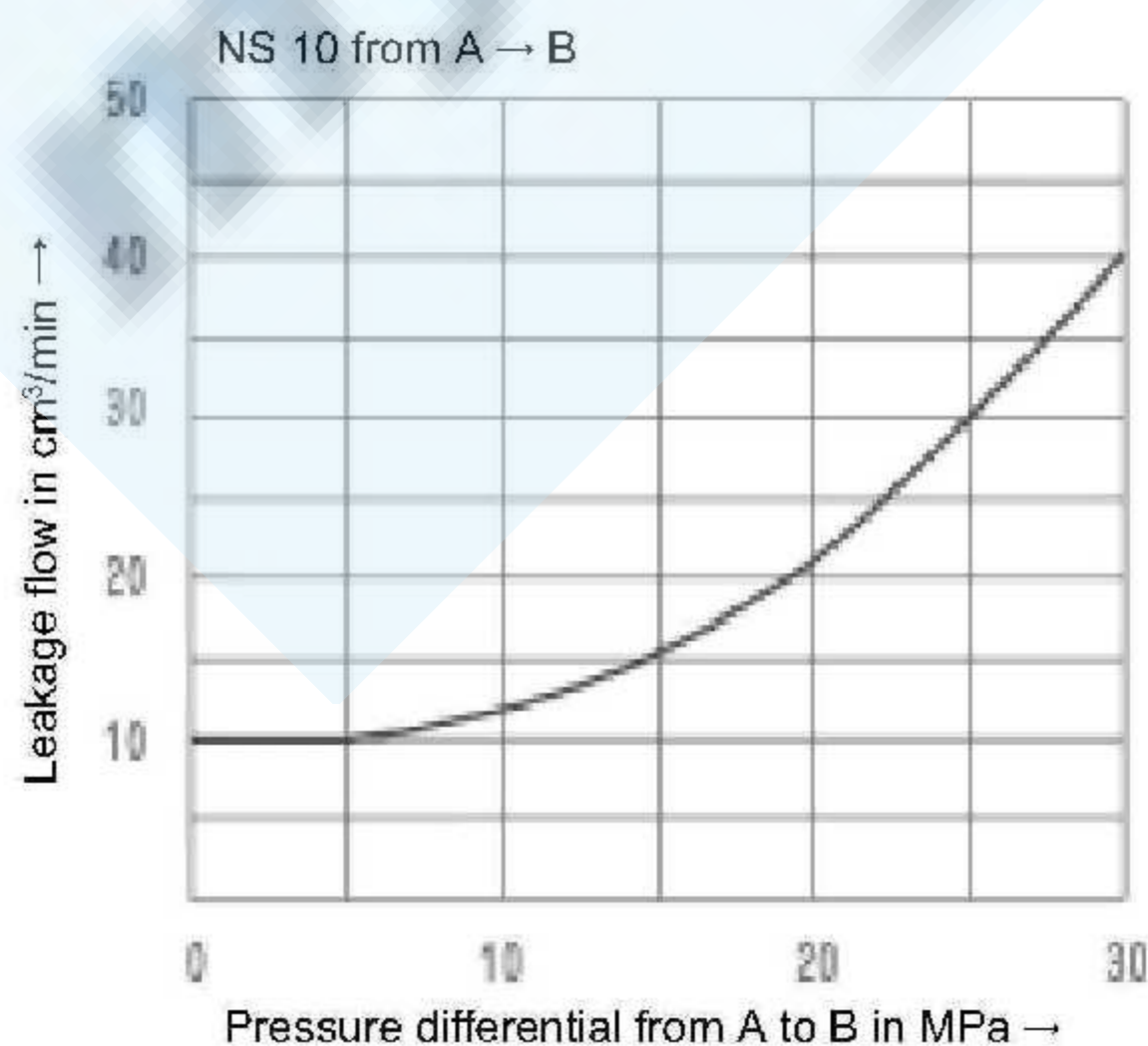


Characteristic curves (measured at $v = 36 \times 10^{-6} \text{m}^2/\text{S}$; $t=50^\circ\text{C}$)

Relationship of the flow to the command value voltage (flow control from A → B)



Leakage flow from A → B



Unit dimensions:

(Dimensions in mm)

- 1 Valve housing
- 2 Proportional solenoid with inductive position transducer
- 3 Nameplate
- 4 Pressure compensator stroke limiter
- 5 Port A
- 6 Port B
- 7 O-Ring for ports A, B
18.66 X 3.53(NS 10)
26.58 X 3.53(NS 16)

Subplates :

NS 10: G 279/01 (G 1/2") G 280/01 (G 3/4")

NS 16: G 281/01 (G 1") G 282/01 (G 1 1/4")

See page 90

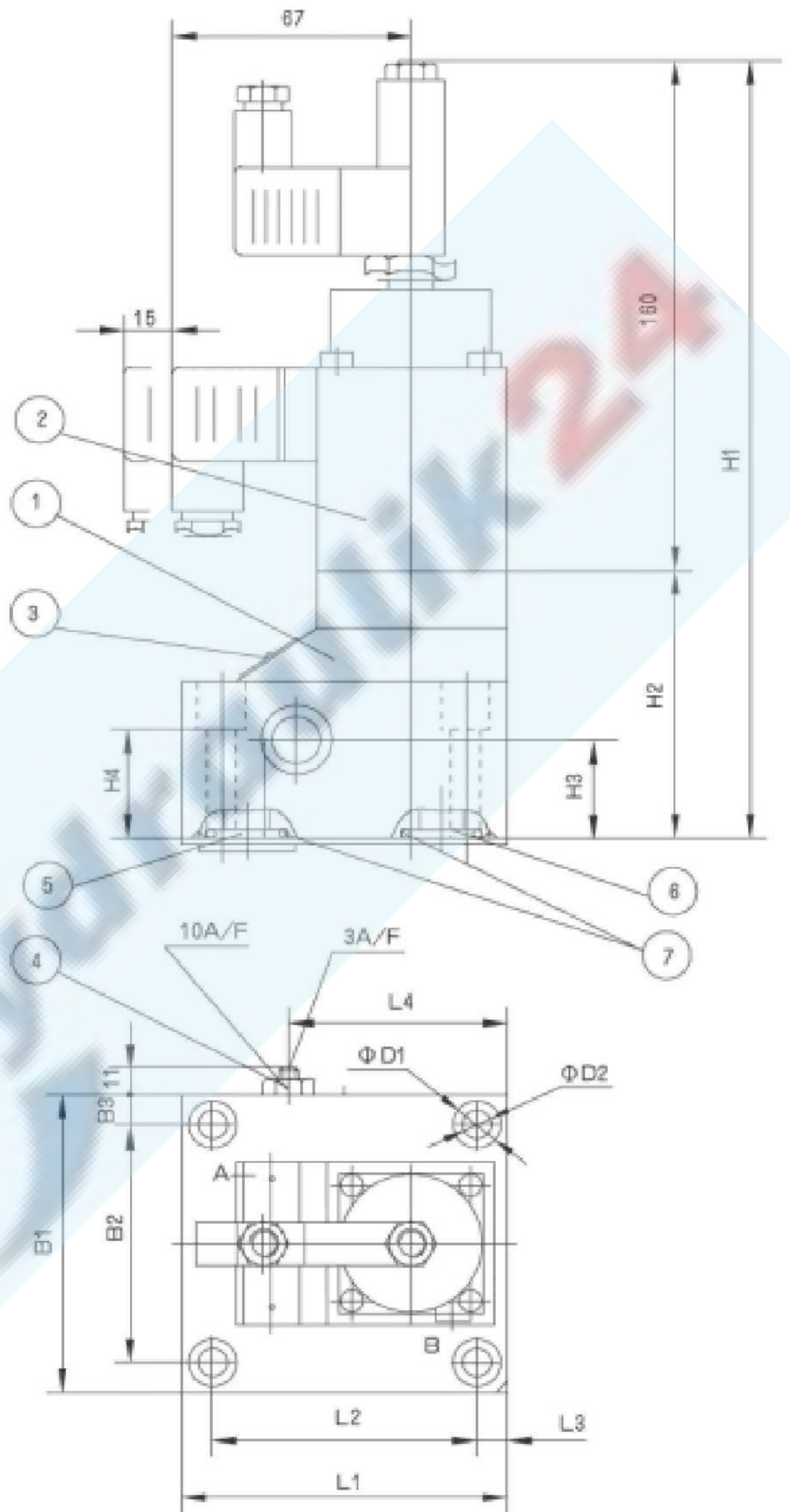
Valve fixing screws

NS 10: 4 -M8 x 60-10.9

(GB/T70.1-2000)

NS 16: 4 -M10 x 70-10.9

(GB/T70.1-2000)



NS	B1	B2	B3	$\phi D1$	$\phi D2$	H1	H2	H3	H4	L1	L2	L3	L4
10	95	76	9.5	15	9	245	85	38	48	102.5	82.5	10	68.5
16	123.5	101.5	11	18	11	255.5	95.5	31	51	123.5	101.5	11	81.5

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 $\frac{0.8}{\nabla}$.
6. Surface finish of mating piece is required to 0.01/100mm.