

RT-D1FP

Direct - acting High - frequency - response Servo Directional Valve with electrical position feedback, double solenoids

Nominal size: 6
 Maximum operating pressure: 350bar
 Rated flow: 3~40 l/min($\Delta p=70\text{bar}$)
 document number: RD A1G101-2309a



Contents

Contents
 Features
 Ordering details
 Function,section
 Technical data
 Electrical connections
 Characteristic curves
 Dimensions

Features

- Direct - acting servo directional control valve, adopting a spool - sleeve structure with servo - valve - like performance
- True servo - valve dynamic characteristics (-3dB/350Hz, under a 5 % input signal)
- Maximum pressure at the oil return port is 350 bar (for the type with external leakage port Y)
- When power is cut off, the spool returns to the specified position
- options include P - A/B - T or P - B/A - T or the neutral position.
- With a digital integrated amplifier
- High frequency response and low hysteresis
- Suitable for electro - hydraulic servo control systems with high requirements for control accuracy
- For subplate mounting: porting pattern toISO4401-03-02-0-05

Ordering details

RT-	D	1	F	P	E50	F	H	9	N	B	0	0	*
01	02	03	04	05	06	07	08	09	10	11	12	13	14

01	RT-	Rebo Tech
02	D	Directional control valve
03	1	Nominal size 6
04	F	Proportional control
05	P	VCD driver

Symbols

06	E50	E50, B60, E55, E01, E02, B31, B32; See hydraulic symbol table for details
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Rated flow ($\Delta p = 35\text{bar}$ / metering notch)

07	B	3 l/min
	C	6 l/min
	F	12 l/min
	G	16 l/min
	H	25 l/min
	M	40 l/min

RT-	D	1	F	P	E50	F	H	9	N	B	0	0	*
01	02	03	04	05	06	07	08	09	10	11	12	13	14

Fail-safe position¹⁾

08	A ³⁾	+10% command opening position (only available for zero - overlap types, such as E52, B61, R61)
	B ³⁾	-10% command opening position (only available for zero - overlap types, e.g., E52, B61, R61)
	C ⁴⁾	Neutral position (only available for positive - lap types, e.g., E01, E02, B31, B32, R31, R32)
	H ⁵⁾	4 - position, 4 - way configuration with a safety position.
	J ⁵⁾	4 - position, 4 - way configuration with a safety position.

09	9	Port Y (plugged) ²⁾
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Sealing material

10	N	NBR seals
	V	FKM seals

Command type

11	B	Control input signal: $\pm 10V$ (0...+10V $\rightarrow$ P - A), actual value feedback: $\pm 10V$
	E	Control input signal: $\pm 20mA$ (0...+20mA $\rightarrow$ P - A), actual value feedback: $\pm 10V$
	K	Control input signal: $\pm 10V$ (0...+10V $\rightarrow$ P - B), actual value feedback: $\pm 10V$
	S	Control input signal: 4~(12)~20mA (12...+20mA $\rightarrow$ P - A), actual value feedback: $\pm 10V$

Electrical connection

12	0	6 + PE, seven - core socket compliant with DIN EN 175201 - 804 standard (ordered separately)
	5	11 + PE, a twelve - core socket compliant with the DIN EN 175201 - 804 standard (ordered separately.)
	7	6 + PE, seven - core socket with enable function, compliant with DIN EN 175201 - 804 standard (ordered separately.)

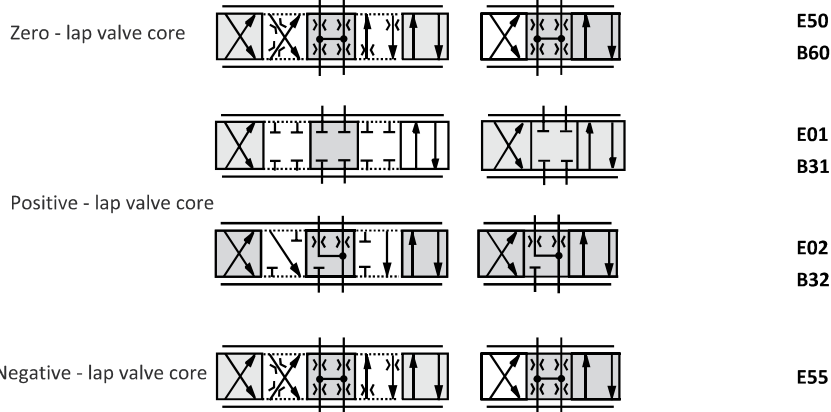
13	0	Valve Core/Valve Sleeve Design
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14	*	Other information descriptions
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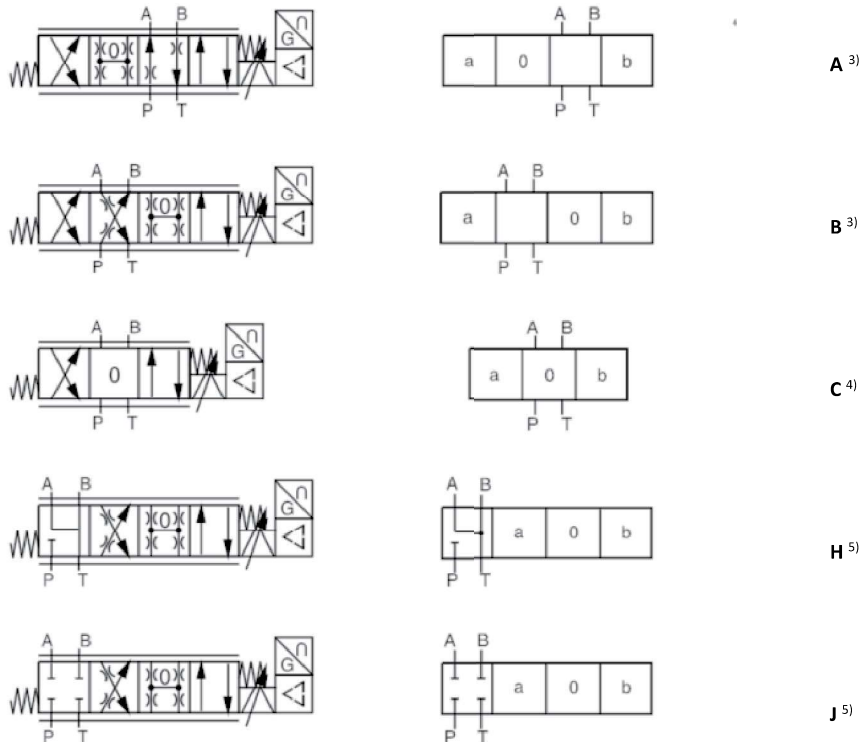
1 When power is cut off, the valve core will return to a specified position. However, when there is flow on the single - controlled edge of A - T or B - T, if the pressure drop is higher than 120 bar or the oil is contaminated, this function cannot be guaranteed.

2 When the return oil pressure is greater than 35 bar, the plug in this place needs to be removed.

Hydraulic Symbol Control Functions



Fail - safe position



B60, B31 and B32 valve:

$$P \rightarrow A: q_{V \text{ nom}} \quad B \rightarrow T: q_{V \text{ nom}} / 2$$

$$P \rightarrow B: q_{V \text{ nom}} / 2 \quad A \rightarrow T: q_{V \text{ nom}}$$

Note: For valve cores E02 and B32, when in the neutral position, A is connected to T and B is connected to T, and the flow area is approximately 3% of the nominal flow area.

- 3) The opening is approximately 10%. It is only applicable to zero - lap and negative - lap valve cores.
- 4) It is only applicable to positive - lap valve cores
- 5) It is not applicable to the flow code M (40L/min).

Function, section

Normal State

After the servo valve is normally powered on, the displacement sensor feeds back the actual displacement of the spool to the controller. The controller compares the actual displacement value with the command value. If the actual value deviates from the command value, the output force of the voice - coil motor will change until it equals the thrust of the feedback spring, thus ensuring that the actual displacement value is equal to the command value.

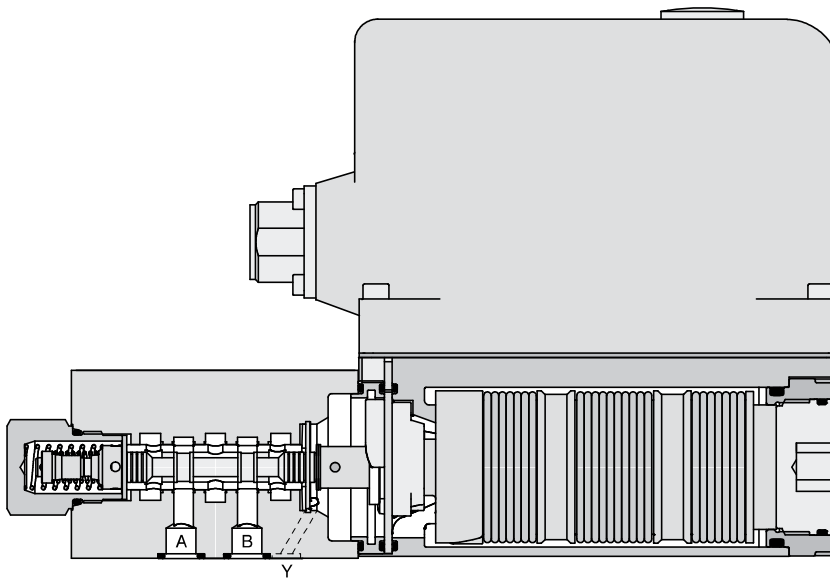
The flow - through area of the control throttle port of the spool and valve sleeve is proportional to the spool displacement, which means it is also proportional to the command value of the valve. If the command value of the valve is zero, the spool is in the middle position. If the command value is non - zero, the spool operates at the position corresponding to the command value.

Fault State

In the following fault scenarios, the integrated amplifier will cut off the power to the voice - coil motor. Under the action of the feedback spring force, the valve spool will immediately move to the safe position.

- 1, The power supply voltage drops below the minimum value.
- 2, When the command type is "S" and the current command value is below 3.6 mA (including the case of control cable breakage).

When the power - off safe position is of type H or J, during the movement of the valve spool from the working position to the safe position, it passes through the path $P \rightarrow B/A \rightarrow T$, which may trigger the operation of the actuator. This situation should be considered during the design of the hydraulic system.



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

General

Design		Direct - acting slide valve with a valve core and valve sleeve structure
Drive		VCD driver with position feedback and integrated amplifier
Specification		NG6 / CETOP 03 / NFPA D03
Type of Installation		Mounting base plate complying with ISO4401 - 03 - 02 - 0 - 05
Installation position		Optional
Ambient temperature range	°C	-20~+50
Weight	Kg	3.6
Vibration resistance strength	g	10, sine, 5...2000Hz, according to IEC 68 - 2 - 610, 10 random, 20...2000Hz, according to IEC 68 - 2 - 3 6 15, shock, according to IEC 68 - 2 - 27

Hydraulic (with HLP46 at 40 °C ± 5 °C)

Max. operating pressure	Ports A, B, P	bar	350
	Port T	bar	35 (The external drain port Y is opened at 350 ¹)
Hydraulic fluid			GB/T7631.2,ISO6743-4,DIN51524F for other types,please consult us.
Hydraulic fluid temperature range		°C	-20 to +60
Viscosity range		mm ² /s	20 to 400(preferably: 20 to 100)
Degree of contamination			ISO4406: 1999 18/16/13 ⁴⁾
Nominal flow $q_{v\text{ nom}}$ ($\Delta p = 35\text{bar}$ / metering notch ²⁾)		l/min	3 / 6 / 12 / 16 / 25 / 40
Max. flow		l/min	90 (Δp of two control edges = 350 bar)
Leakage flow ($P_s=100\text{bar}$)		ml/min	< 400 (for zero - overlap spool); < 50 (for positive - overlap spool);
Dead zone		%	23

Fail-safe position

Response time to reach fail-safe position	0bar	ms	7
	100bar	ms	10

Static/Dynamic

Step response, 100% step signal ³⁾		ms	< 3.5
Frequency response (signal amplitude ±5%) ³⁾		Hz	350: Amplitude ratio -3dB, Phase shift -90°
Hysteresis		%	≤ 0.05
Sensitivity		%	≤ 0.03
Manufacturing error $q_{v\text{ max}}$		%	< 10
Temperature drift		%/°C	< 0.025

1) For $P_T > 35\text{bar}$ operating conditions, the plug at port Y must be removed, and port Y should be connected to the drain oil.

2) Flow rate at a different p $q_x = q_{v\text{ nom}} \cdot \sqrt{\frac{\Delta P_x}{35}}$;

3) Load - carrying test (pressure difference of 100 bar on both control edges);

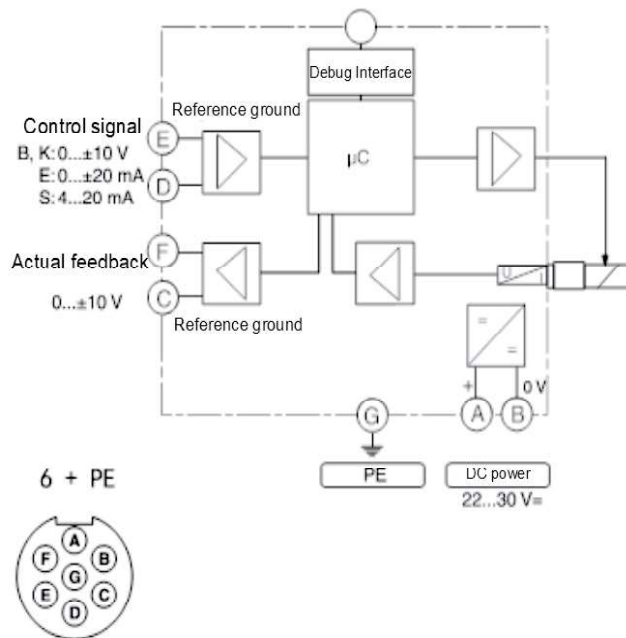
4) In a hydraulic system, the cleanliness of the hydraulic fluid must meet the requirements of the components. Effective filtration can prevent failures in the hydraulic system and, at the same time, extend the service life of the components.

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

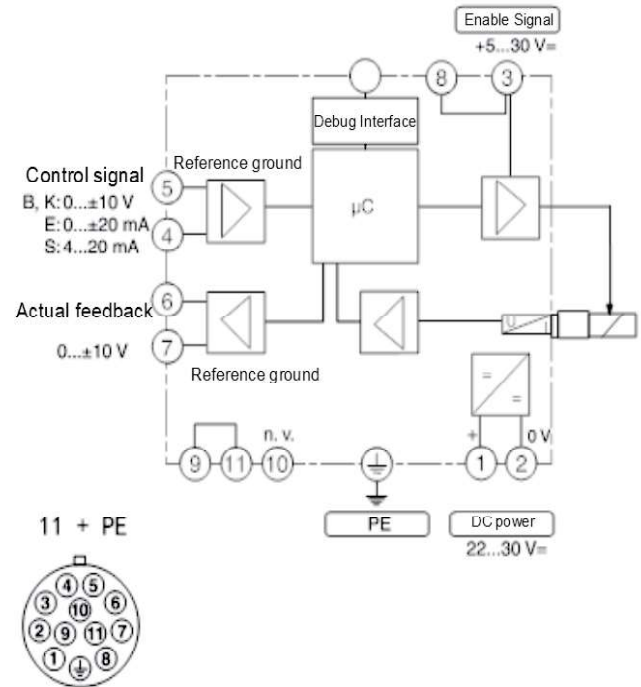
Electrical parameters			
Duty	%		100
Valve protection			IP65
Supply voltage		VDC	24
	power supply+	VDC	Mlin.22/Max.30
	power supply-	VDC	0 (Ripple voltage maximum 2V)
Maximum power current	A		3.5
External fuse	A		4.0, medium hysteresis
Shielding grounding			Refer to the "Pin Arrangement" diagram. The installation complies with CE requirements.
Electromagnetic compatibility			conforming to EN61000-6-2:2005-08 a n d EN61000-6-3:2007-01
Command type: B (K)	voltage	V	±10, fluctuation < 0.01% RMS (root mean square value), no shock, 0...+10V: P -> A (P -> B)
	resistance	kΩ	>50
Command type: E	current	mA	±20, fluctuation < 0.01% RMS, no shock, 0...+20mA: , 0...+20mA: P->A
	resistance	Ω	<250
Command type: S	current	mA	4~(12)~20, fluctuation < 0.01% RMS, no shock, 12...20mA: P->A < 3.6mA= cut - off, over 3.8mA = enable
	resistance	Ω	<250
Position feedback	voltage	V	±10, maximum load 5mA
Enable signal, applicable only to electrical connection codes: 0 (7) V			Enable input: 24VDC (Enabled when ≥11VDC, Disabled when ≤5VDC)
Electrical connection interface	code: 0 (7)		6 + PE, a seven - core socket compliant with the DIN EN 175201 - 804 standard
	code: 5		11 + PE, a twelve-core socket compliant with the DIN EN 175201 - 804 standard

Electrical connection

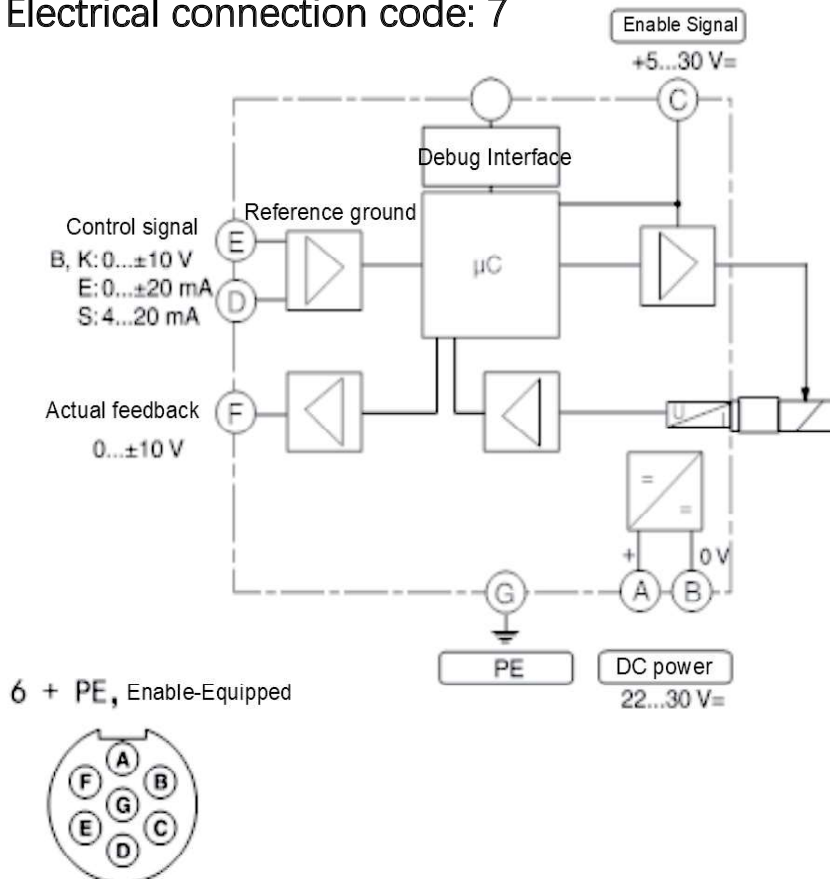
Electrical connection code: 0



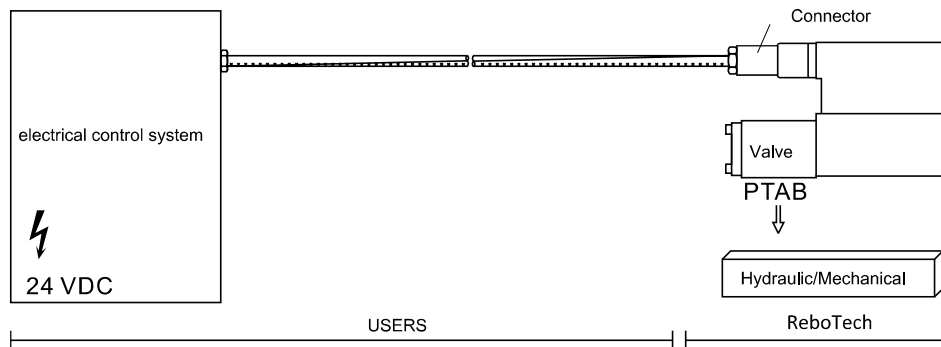
Electrical connection code : 5



Electrical connection code: 7



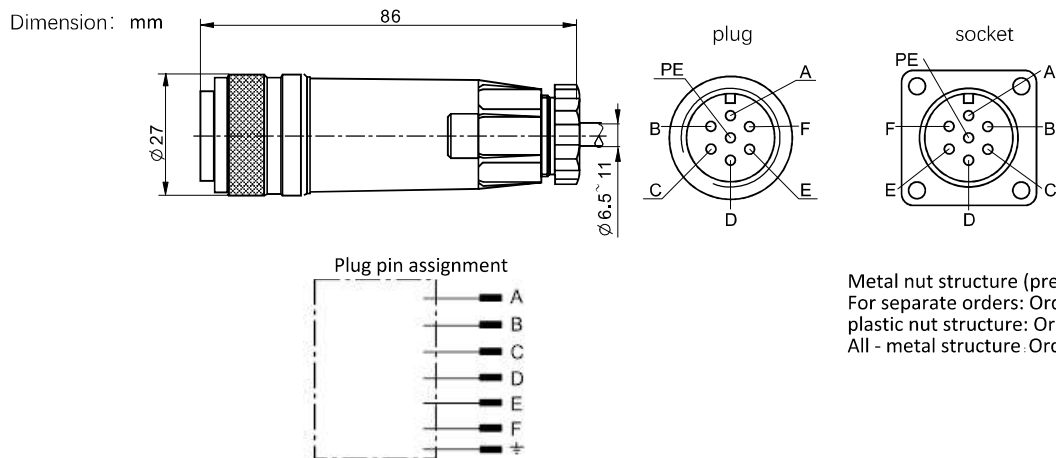
Electrical connection



Type: LiYCY Flexible Shielded Data Transmission Wire
Wire number: Determined by the valve signal, plug model, and plug pin assignment
Cable diameter Φ : 0.75mm² with a length up to 20m; 1mm² with a length up to 40m
Outer diameter Φ : 12... 14mm

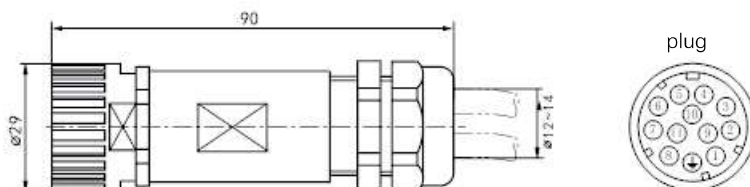
Note: Nominal supply voltage is 24 VDC. If the voltage drops below 18 VDC, a rapid shutdown occurs internally, similar to an "enable switch".
For type S: The valve operates when the command signal ID - E ≥ 3 mA. The valve does not operate when the command signal ID - E ≤ 2 mA. The electrical signals generated by the integrated controller (e.g., LVDT feedback signal) are not allowed to be used as functional signals related to equipment safety!

Seven - core plug compliant with DIN EN 175201 - 804 (to be ordered separately)



Metal nut structure (preferred model)
 For separate orders: Order number: R00050406,
 plastic nut structure: Order number: R00050408,
 All - metal structure: Order number: R00050407

Twelve - core plug compliant with DIN EN 175201 - 804 (to be ordered separately)



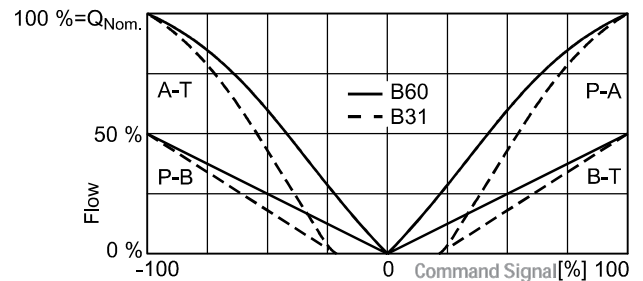
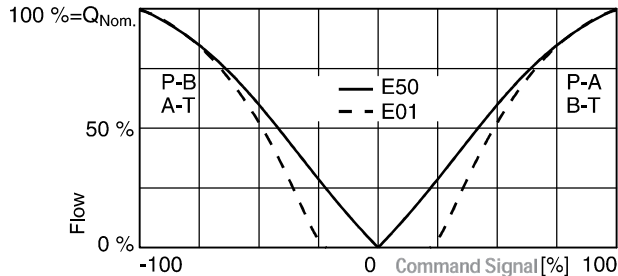
Plastic nut structure
 For separate orders, order number: R00050400

Characteristic curves (46# Anti - wear Hydraulic Oil, oil temperature $\pm 40 \pm 5^\circ\text{C}$)

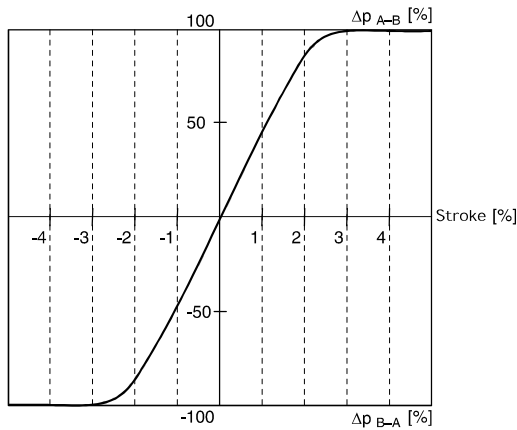
Flow characteristic curve (The dead zone is 23%)

In the state of single control side pressure drop $\Delta P = 35$ bar, the valve core forms are E01 and E50.

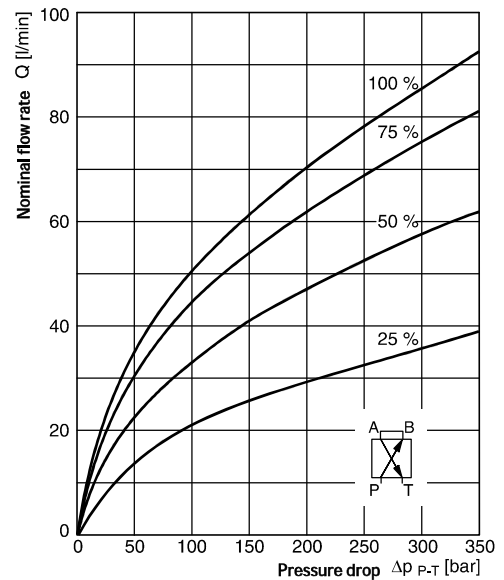
Valve core forms B31 and B60



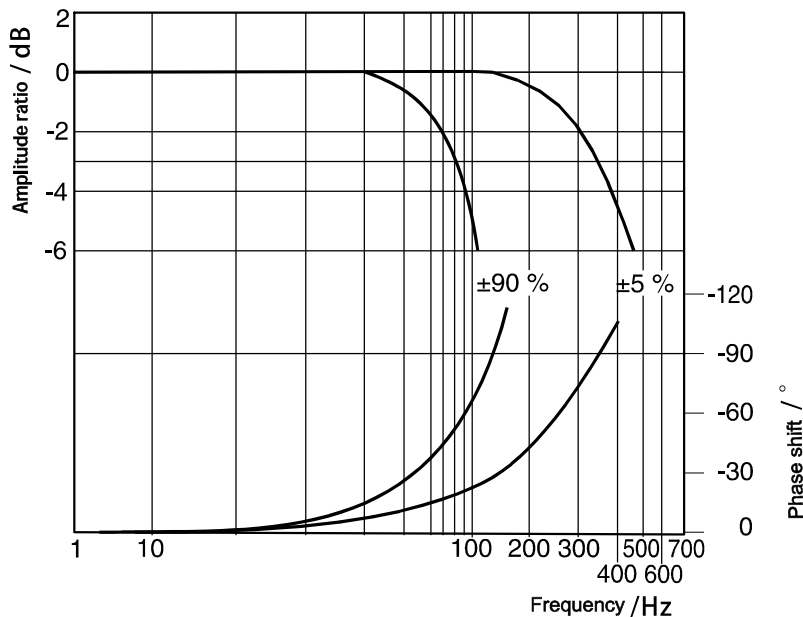
pressure gain



Flow limit, valve core type E50M

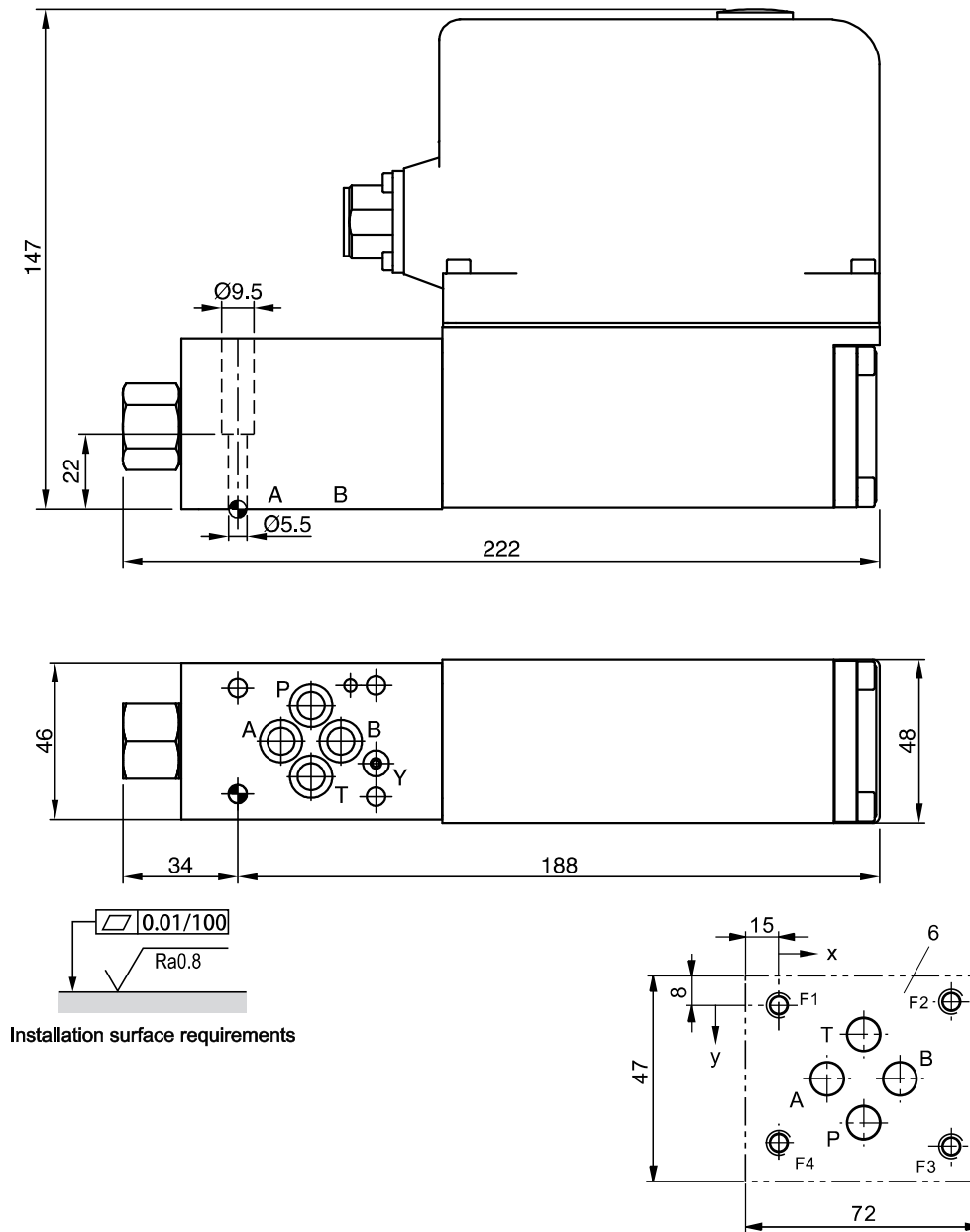


Frequency response curve



Unit dimensions

Dimensions in mm



Dimensions in mm	P	A	B	T	F1	F2	F3	F4
Diameter/thread	7.5 max	7.5 max	7.5 max	7.5 max	M5	M5	M5	M5
x	21.5	12.7	30.2	21.5	0	40.5	40.5	0
y	25.9	15.5	15.5	5.1	0	-0.75	31.75	31