



Catálogo de Produtos

Proportional Relief Valve Types HD-(Z)DBE and HD-(Z)DBEE

- Valve for limiting a system pressure
- Actuation via proportional solenoids
- For subplate mounting or sandwich plate design
- Valve and control electronics from a single source
- Types HD-DBEE and HD-ZDBEE with integrated control electronics:
 - Low example spread of the command value pressure characteristic curve
 - Independently adjustable up and down ramps

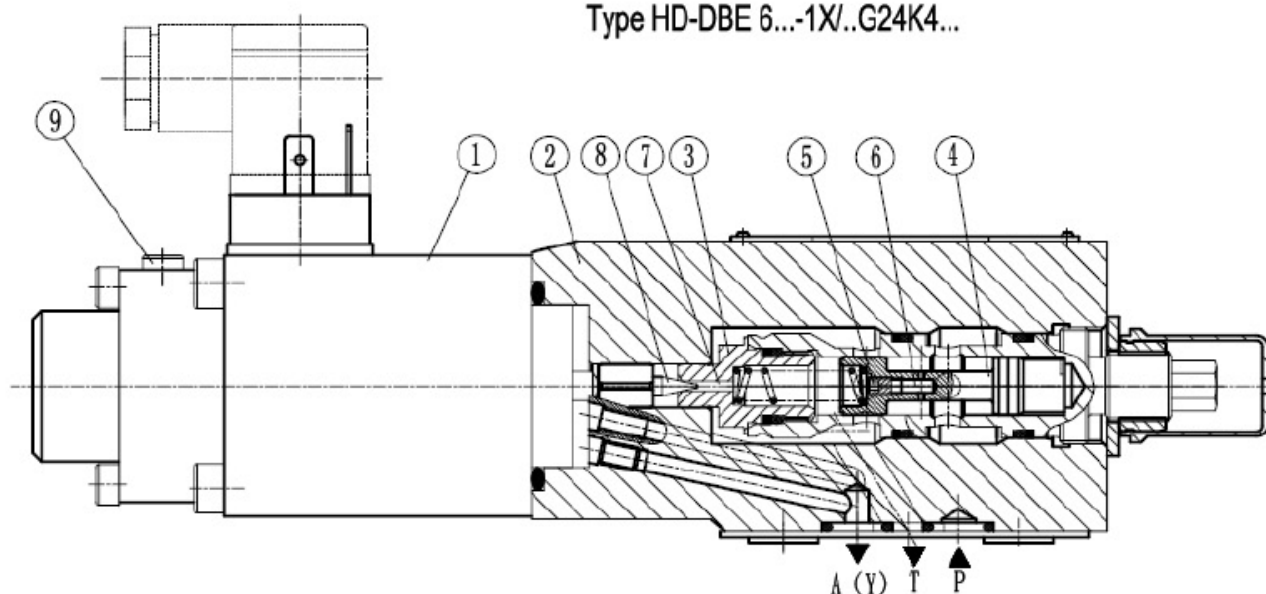


Function, section

Proportional pressure relief valves, types HD-DBE and HD-ZDBE are actuated by means of a proportional solenoid. These valves are used to limit a system pressure. With these valves it is possible to steplessly adjust the system pressure, which is to be limited, in relation to the electrical command value.

These valves basically consist of a proportional solenoid (1), the housing (2), the valve cartridge (3), the spool (4) and the pilot poppet (8). The proportional solenoid converts the electrical current proportionally into a mechanical force. An increase in current causes a corresponding rise in the solenoid force. The solenoid armature chamber is filled with hydraulic fluid and is pressure-balanced. The setting of the system pressure is carried out via the proportional solenoids (1) in relation to the command value. Pressure arising from the system in port P acts on the right hand side of the spool (4). At the same time the system pressure acts via the control line (6) which is fitted with an orifice (5) on the spring loaded side of the spool (4). Via a further orifice (7) the system pressure acts on the pilot poppet (8) against the force of the proportional solenoid (1). Once the system pressure has reached the pre-set value the pilot poppet (8) lifts from its seat. Depending on the model, pilot oil can now flow away externally via port A (Y) or internally into the tank, this has the effect of limiting the pressure on the spring loaded side of the spool (4). If the system pressure continues to rise slightly then the higher pressure on the right hand side of the spool pushes the spool to the left into control position P to T.

Type HD-DBE 6...-1X/..G24K4...

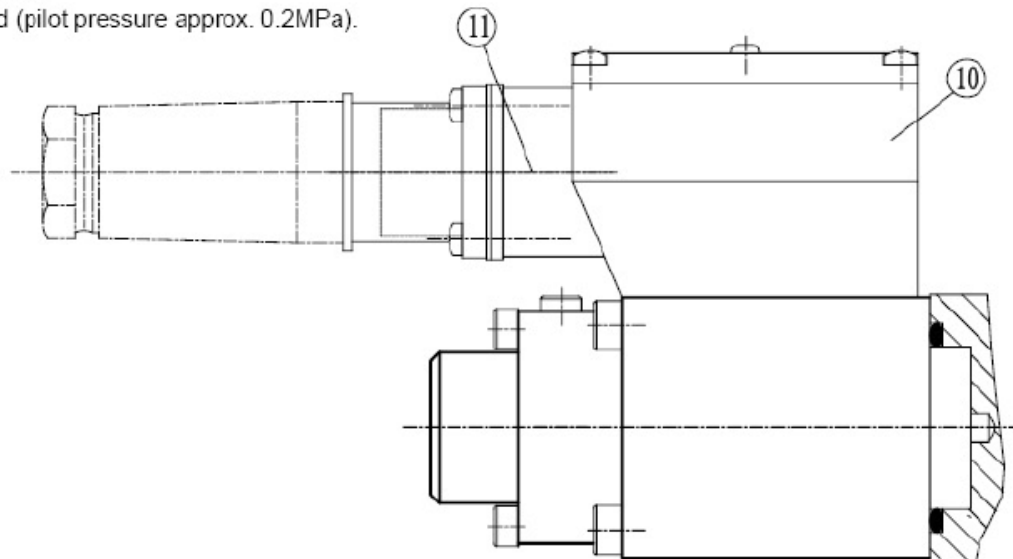


Function, section

Note!

To ensure optimum function, the valve must be bled at the commissioning stage:

- Remove bleed screw (9),
- Pour hydraulic fluid into the open threaded hole 9,
- When no more bubbles appear, re-fit screw.
- The tank should be prevented from draining. Where installation conditions are applicable a back pressure insert should be used (pilot pressure approx. 0.2MPa).



In terms of function and design these valves basically correspond to the types DBE and ZDBE.

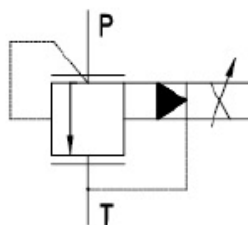
An additional housing (10) is fitted on the proportional solenoid which contains the control electronics. Supply and command value voltages are applied to the plug-in connector (11).

The command value pressure characteristic curve is factory pre-set (zero point at the valve cartridge (12) and the increase at the

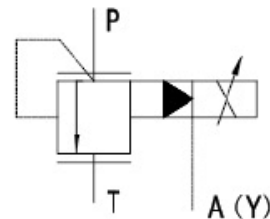
Imax potentiometer (R30) in the control electronics). At two potentiometers it is possible to independently adjust the ramp times for the increase and decrease in pressure. For further details regarding the integrated electronics, see page afterwards.

Symbols (for sandwich plate symbol: 1 = component side, 2 = subplate side)

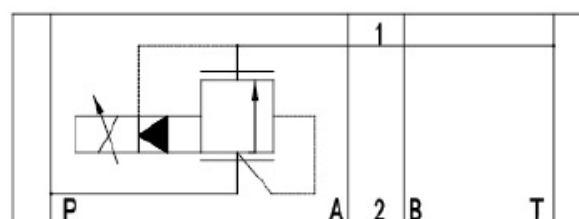
Type DBE(E) 6...



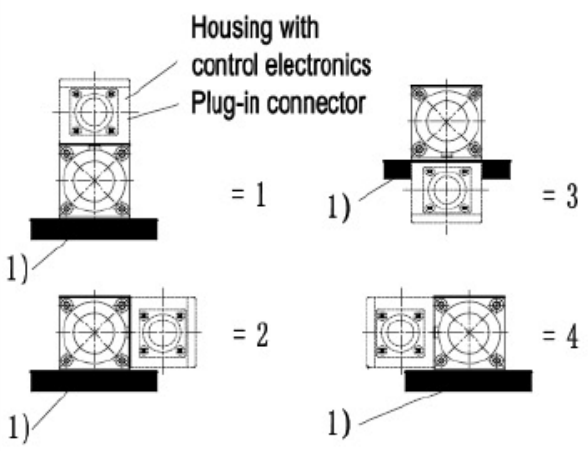
Type DBE(E) 6...Y..



Type ZDBE(E) 6 VP...



Ordering details

HD	DBE	6	— 1X /	G24	*
Technology of Beijing Huade Hydraulic =HD					Further details in clear text
Subplate mounting=No code Sandwich plate =Z					No code = NBR seals V = FKM seals
Proportional pressure relief valve					
For external control electronics = No code With integrated control electronics = E					Electrical connection for DBE; ZDBE K4= Without plug-in connector Electrical connection For DBEE; ZDBEE K31= Without plug-in connector
Nominal size 6 = 6					
Subplate mounting valve = No code Sandwich plate P — T = VP					G24 = Supply voltage for the control electronics, 24 V DC
Position of the plug-in connector for the type ZDBE Position of housing with control electronics, type ZDBEE					No code = Internal pilot oil drain (Recommendation: subplate mounting up to $q_{vmax} = 15 \text{ L/min}$) Y= External pilot oil drain (only possible with subplate mounting)
 <p>Housing with control electronics Plug-in connector</p> <p>1) = 1 1) = 3</p> <p>1) = 2 1) = 4</p> <p>1) Valve mounting side (O-ring grooves in the housing)</p>					<p>50 = Pressure stage 5MPa 100= Pressure stage 10MPa 200= Pressure stage 20MPa 315= Pressure stage 31.5 MPa</p>
			1X=		Series 10 to 19 (10 to19: unchanged installation and connection dimensions)

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

General						
Installation			optional			
Storage temperature range		°C	-20 to +80			
Ambient temperature range	DBE and ZDBE	°C	-20 to +70			
	DBEE and ZDBEE	°C	-20 to +50			
Weight	DBE and ZDBE	Kg	2.4			
	DBEE and ZDBEE	Kg	2.5			
Hydraulic (measured at $\nu = 46 \text{ mm}^2/\text{s}$ and $t = 40^\circ\text{C} \pm 5^\circ\text{C}$)						
Max. operating pressure	Ports P ; P1 - P2; A1 - A2; B1 - B2	MPa	31.5			
	Port T	MPa	5			
Max. settable pressure	Pressure stage 5	MPa	5			
	Pressure stage 10	MPa	10			
	Pressure stage 20	MPa	20			
	Pressure stage 31.5	MPa	31.5			
Min. settable pressure at signal value 0		MPa	see characteristic curves			
Return pressure port A; with external pilot oil drain (Y)			separate and at zero pressure to tank			
Pilot oil flow		L/min	0.6 to 1.2			
Max. flow		L/min	30			
Pressure fluid		mineral oil (HL, HLP) to DIN 51 524				
		further pressure fluids on request!				
Pressure fluid temperature range		°C	-20 to +80			
Viscosity range		mm ² /s	15 to 380			
Degree of contamination to ISO			Max. permissible degree of contamination of the fluid pressure to ISO 4406 (C) 20/18/15			
Hysteresis		%	± 1.5 of maximum settable pressure			
Repeatability		%	± 2 of maximum settable pressure			
Linearity		%	± 3.5 of maximum settable pressure			
Example spread of the com. value pressure char. curve, referring to the hysteresis char. curve, pressure increasing						
			DBE and ZDBE	%	± 2.5 of maximum settable pressure	
			DBEE and ZDBEE	%	± 1.5 of maximum settable pressure	
Step response $T_u + T_g$	10% —→ 90%	ms	approx. 80			
	90% —→ 10%	ms	approx. 50			
			depending on installation			

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

Electrical

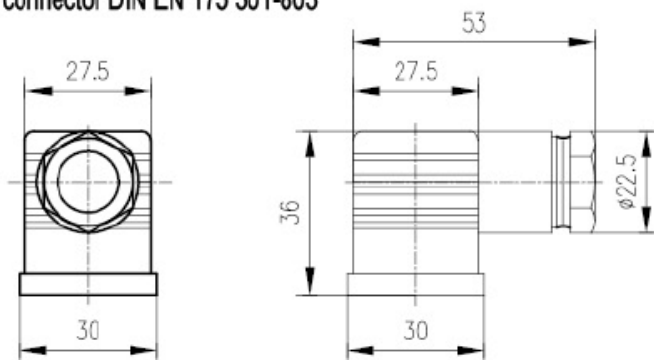
Voltage type		24V DC
Min. control current	mA	100
Max. control current	mA	1600
Solenoid coil resistance	Cold value at 20° C	Ω 5.4
	Max. warm value	Ω 7.8
Duty	%	100
Electrical connections	DBE and ZDBE	With component plug to DIN EN 175 301-803
		Plug-in connector to DIN EN 175 301-803 ¹⁾
	DBEE and ZDBEE	With component plug to E DIN 43 563-AM6-3
		Plug-in connector to E DIN 43 563-BF6-3 ¹⁾
Valve protection to DIN 40 050		IP 65
Control electronics		
For DBEE and ZDBEE		Integrated into the valve
For DBE and ZDBE		
Amplifier in Eurocard format	analogue	HD-VT-VSPA1-1-IX/ ¹⁾

1) separate order

Electrical connections

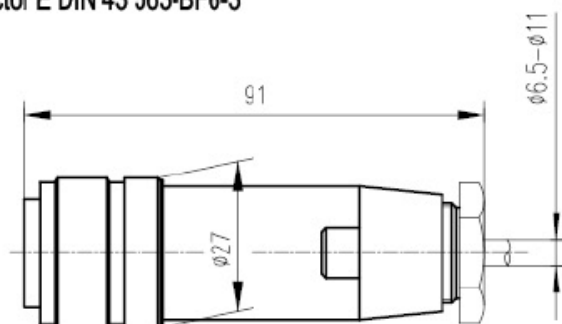
For type DBE, ZDBE (for external control electronics)

Plug-in connector DIN EN 175 301-803

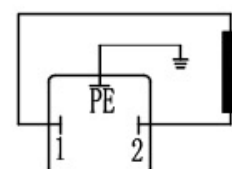


For types DBEE, ZDBEE (with integrated control electronics)

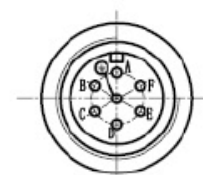
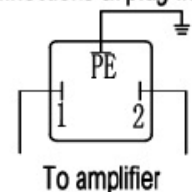
Plug-in connector E DIN 43 563-BF6-3



Connections at component plug



Connections at plug-in connector



Function:

The control of the integrated electronics is at the two differential amplifier ports D and E.

The ramp generator generates a delayed increase or decrease of the solenoid current from a command value jump (0 to 10 V or 10 to 0 V). At the potentiometer R14 the increase time of the solenoid current may be set and the decrease time at potentiometer R13.

The maximum ramp time of 5 s is only possible over the complete command value range. With smaller command value changes the ramp is shortened accordingly.

The command value-solenoid current characteristic curve is adjusted to the valve via the characteristic curve generator in such a way that nonlinearities are compensated for in the hydraulics and thus a linear command value-pressure characteristic curve is formed.

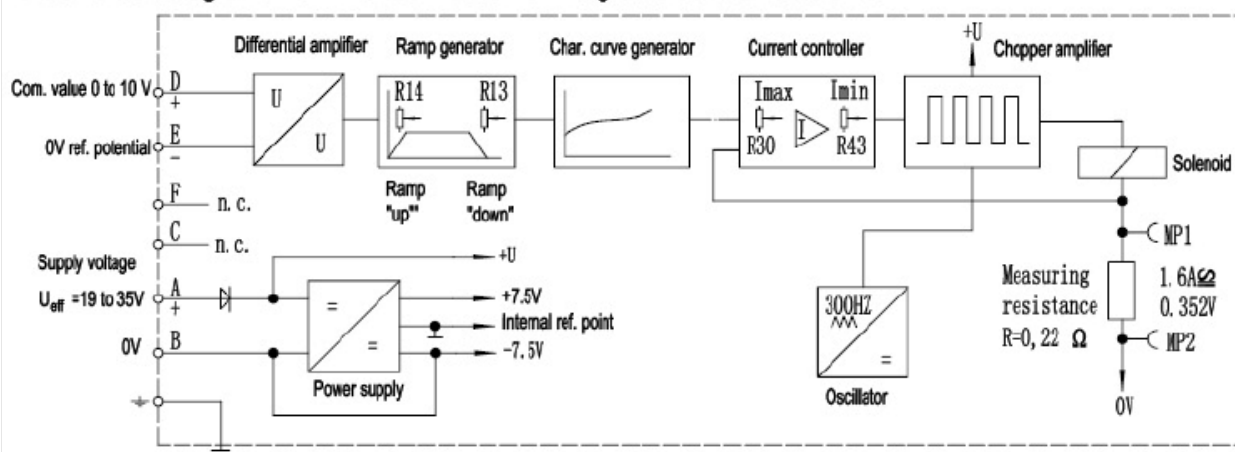
The current controller controls the solenoid current independent from the solenoid coil resistance.

At the potentiometer R30 the increase of the command value-current characteristic curve and thus also the increase of the command value-pressure characteristic curve of the proportional pressure valve may be altered. The potentiometer R43 is used for the setting of the bias current. This setting should not be altered. If necessary the zero point of the command value-pressure characteristic curve may be set at the valve seat.

The power stage of the electronics for the control of the proportional solenoid is formed by a chopper amplifier. It is pulse width modulated with a pulse frequency of 300 Hz.

The solenoid current may be measured at both test points MP1 and MP2. A voltage decrease of 0.352 V at the measuring resistance equals a solenoid current of 1.6 A.

Block circuit diagram / Terminal connection of integrated control electronics



Supply voltage

Power supply with rectification

One-phase rectification or three-phase bridge: $U = 19$ to 35 V

Residual ripple factor at power supply: $< 5\%$

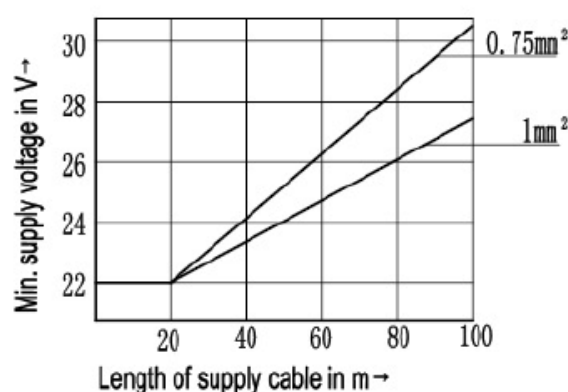
Output current: $I_{eff} = \max. 1.4$ A

Supply cable: - Recommendation 5 core 0.75 or 1 mm with protective conductor and screen
 - External diameter 6.5 to 11 mm
 - Screen on 0 V supply voltage
 - Max. permissible length 100 m

The minimum supply voltage at the power supply depends on the length of the supply cable (see diagram).

With lengths > 50 m a capacitor of $2200 \mu F$ must be installed near

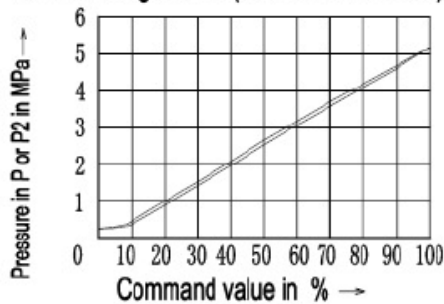
the valve in the supply line.



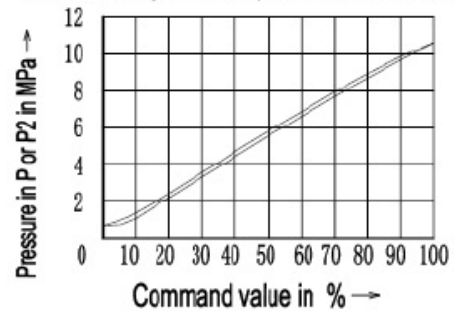
Characteristic curves (measured at $v=46\text{mm}^2/\text{s}$ and $t=40^\circ\text{C}\pm 5^\circ\text{C}$)

Pressure in ports P or P2 in relation to the command value ($q_v = 5\text{ L/min}$)

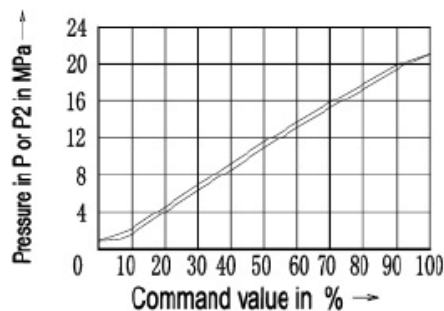
Pressure stage 5MPa (external and internal)



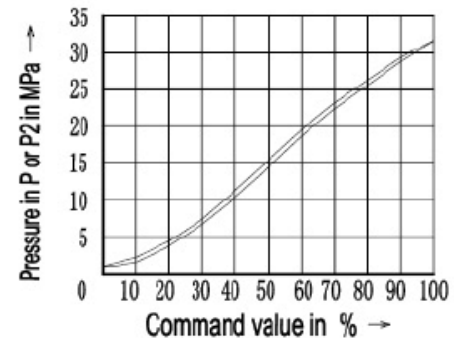
Pressure stage 10MPa (external and internal)



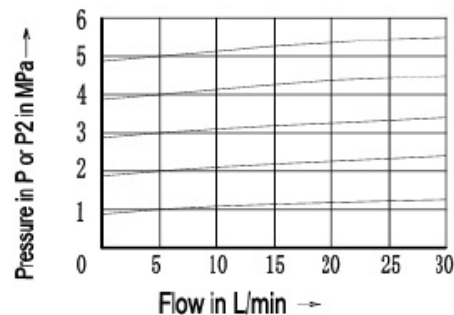
Pressure stage 20MPa (external and internal)



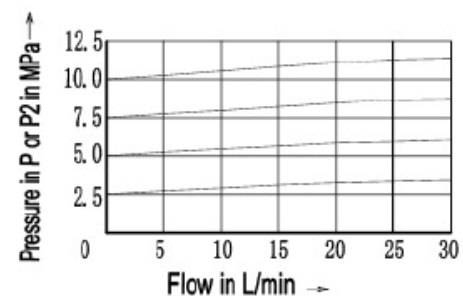
Pressure stage 31.5MPa (external and internal)



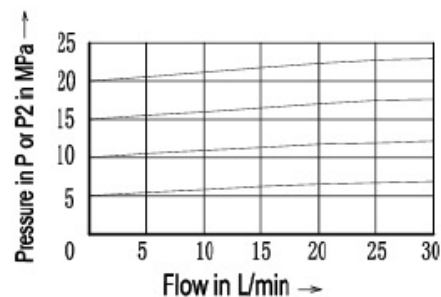
Pressure stage 5MPa (external and internal)



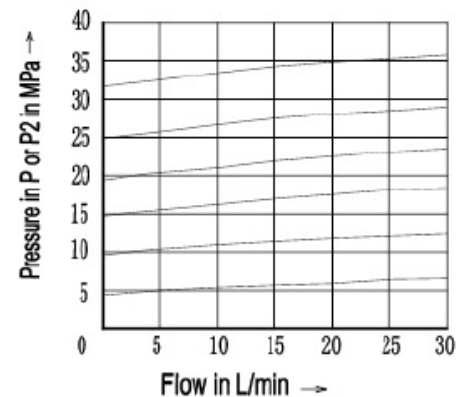
Pressure stage 10MPa (external and internal)



Pressure stage 20MPa (external and internal)



Pressure stage 31.5MPa (external and internal)

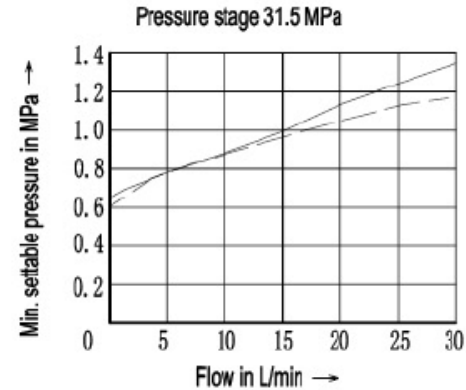
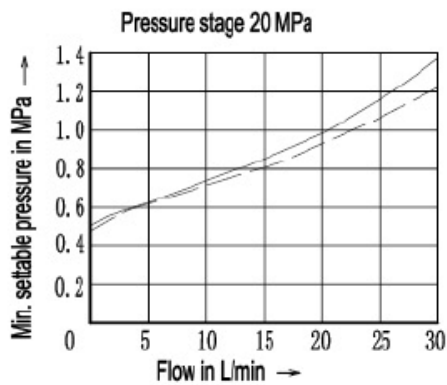
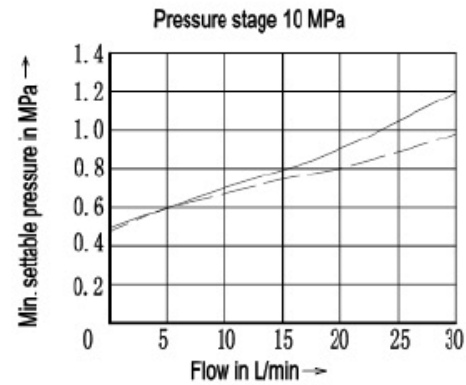
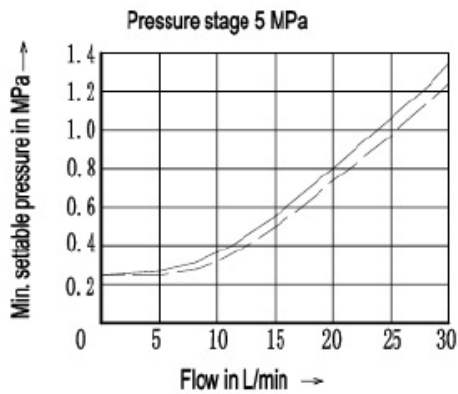


The characteristic curves were measured without back pressure at port A (external pilot oil drain) and T (internal pilot oil drain).
With internal pilot oil drain the pilot oil drain increases the pressure in P or P2 by the amount acting in port T.

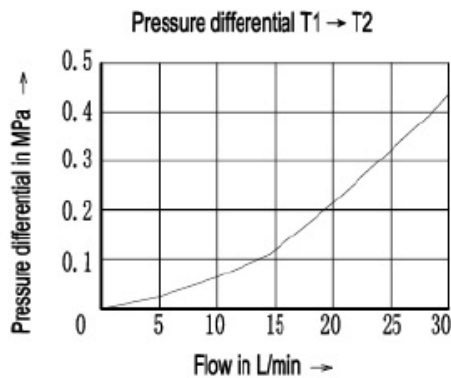
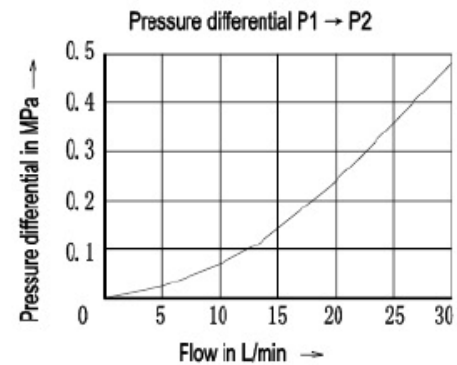
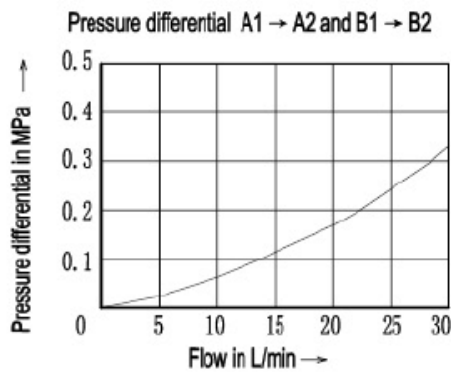
Characteristic curves (measured at $v=46\text{mm}^2/\text{s}$ and $t=40^\circ\text{C}\pm 5^\circ\text{C}$)

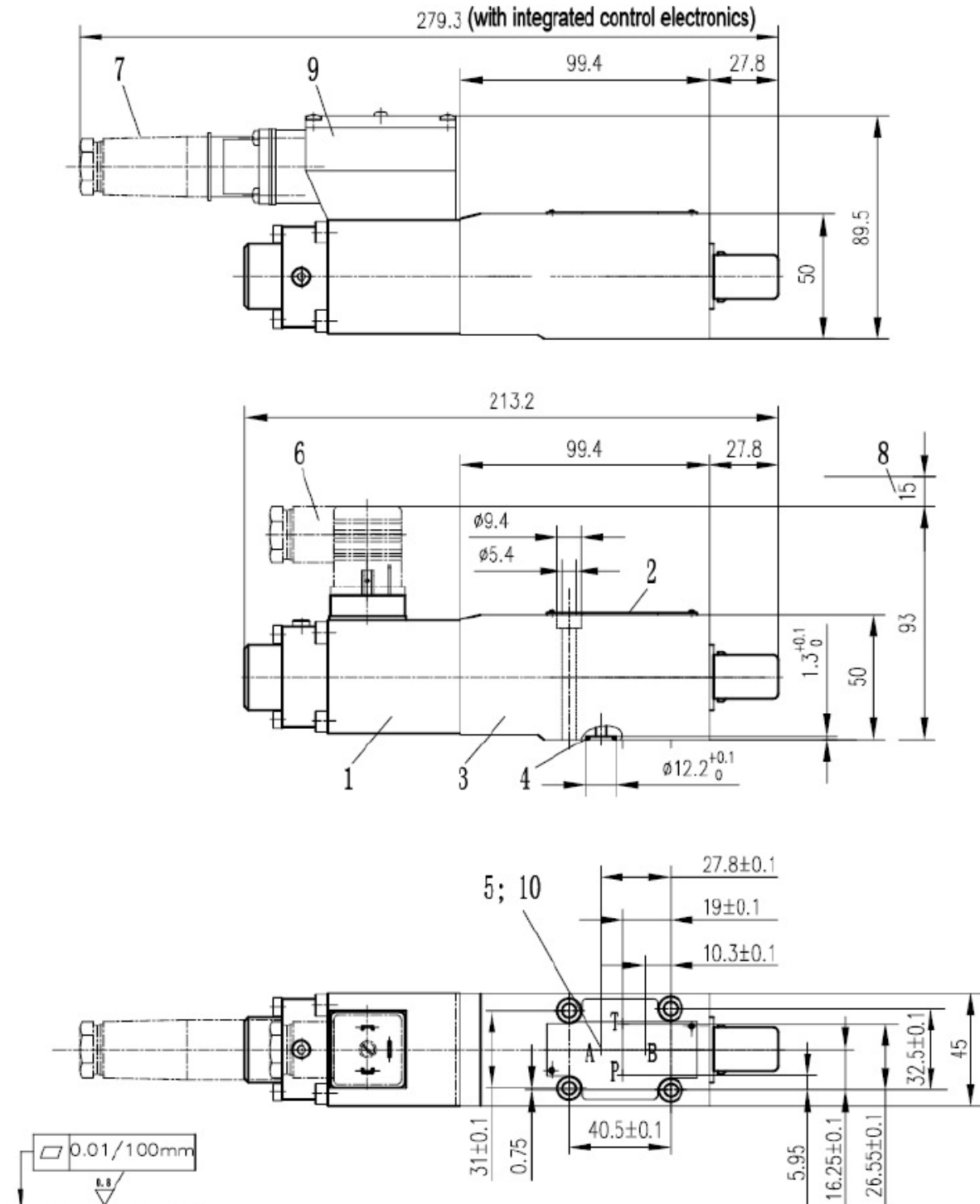
Min. settable pressure at port P or P2 with a 0 command value

先导油排放 — 内排 — 外排

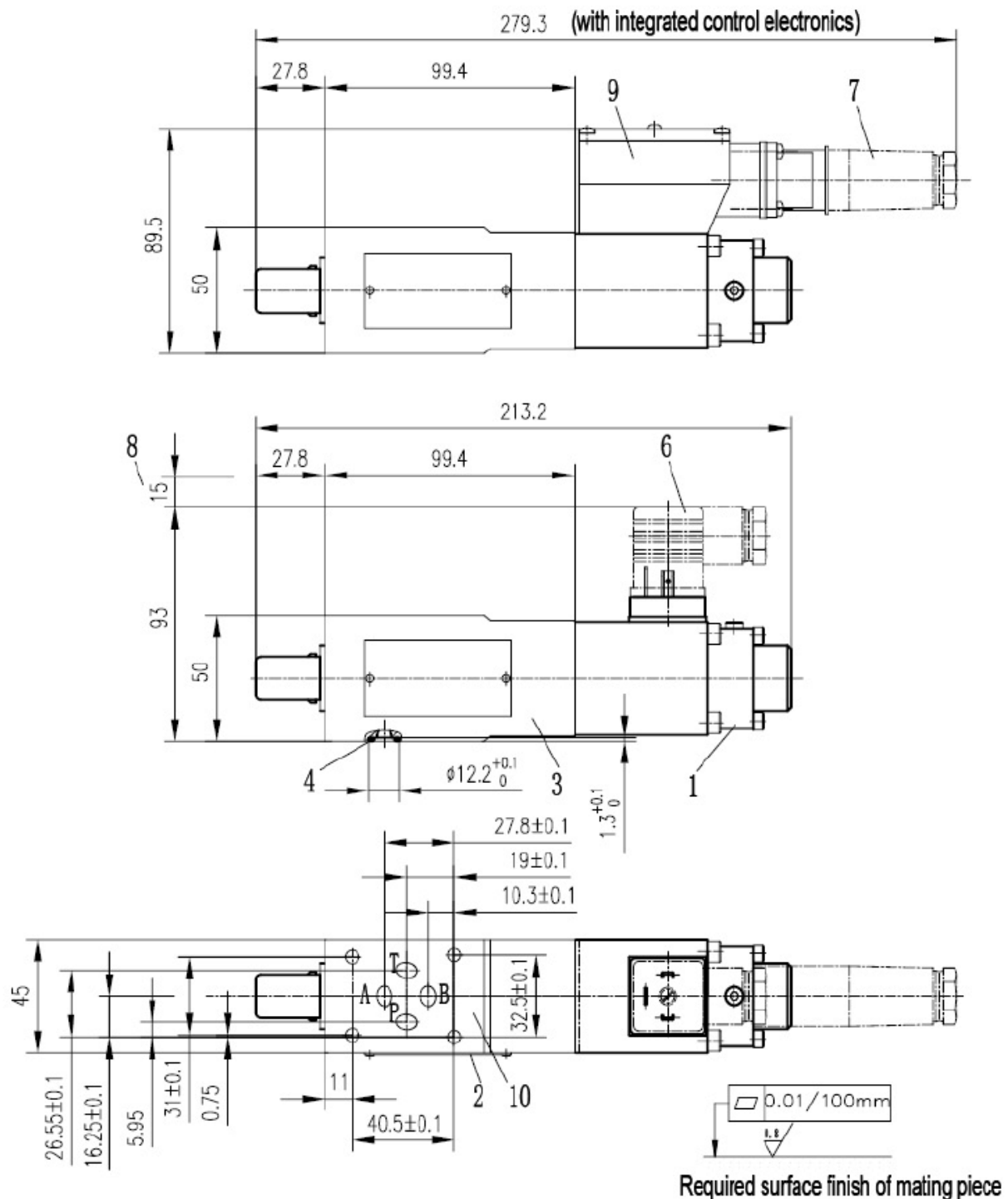


The characteristic curves were measured without back pressure at port A (external pilot oil drain) and T (internal pilot oil drain).
With internal pilot oil drain the pilot oil drain increases the pressure in ports P or P2 by the amount acting on port T.





- | | | | |
|---|--|----|--|
| 1 | Proportional solenoid | 8 | Space required to remove plug-in connector |
| 2 | Nameplate | 9 | Integrated control electronics |
| 3 | Valve housing | 10 | Porting pattern to DIN 24 340 |
| 4 | O-rings 9.25 x 1.78(for ports A, B, P and T) | | |
| 5 | Pilot oil drain for version Y is external via port A (Y) | | |
| 6 | Plug-in connector (separate order) | | |
| 7 | Plug-in connector (separate order) | | |
- Subplates and valve fixing screws must be ordered separately
 Subplates: G 341/01 (G 1/4")
 G 342/01 (G 3/8")
 G 502/01 (G 1/2")
 Valve fixing screws: 4-M5(GB/T70.1); M_A = 7 Nm



- | | | | |
|---|---|----|--|
| 1 | Proportional solenoid | 10 | Porting pattern to DIN 24 340 |
| 2 | Nameplate | | Subplates and valve fixing screws must be ordered separately |
| 3 | Valve housing | | Subplates: G 341/01 (G 1/4") |
| 4 | O-rings 9.25 x 1.78 (for ports A, B, P and T) | | G 342/01 (G 3/8") |
| 6 | Plug-in connector (separate order) | | G 502/01 (G 1/2") |
| 7 | Plug-in connector (separate order) | | Valve fixing screws: 4-M5 (GB/T70.1); $M_A = 7 \text{ Nm}$ |
| 8 | Space required to remove plug-in connector | | |
| 9 | Integrated control electronics | | |

ANNOTATIONS :

HUADE AMÉRICA

CEP : 03162-020

RUA HIPÓDROMO 1445 – MOOCA, SÃO PAULO, SP, BRASIL

TEL : (11) 3186-5959

huade@huade.com.br

www.huade.com.br