Pilot Operated Proportional Relief Valve

Model: DBEM/DBEME...7X

- Size 10/25/32
- Maximum working pressure 350 bar
- Maximum working flow 700 L/min

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Features

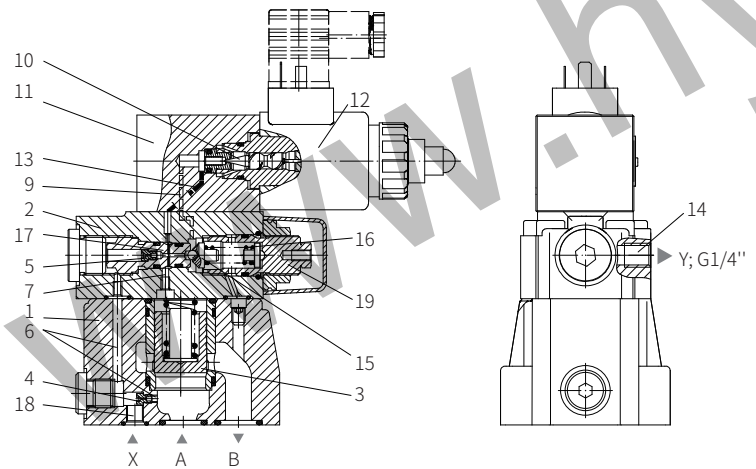
- For subplate mounting
- For installation in manifolds
- Maximum pressure limitation
- Both valves and proportional amplifiers from the same supplier

Function description, sectional drawing

The DBEM and DBEME valves are pilot operated proportional relief valves and used to limit the hydraulic system pressure. The pressure in hydraulic system can be adjusted according to the electric command value by these valves.
They basically consist of the main valve body (1) with main valve spool (3), pilot control valve (2) and the solenoid pilot valve (11).

Model DBEM
The pressure at the P port acts on the bottom of the main valve spool (3), and also acts on the spring loaded side of the main valve spool (3) by orifices (6,7) and plug-in damping (4,5). The pressure is applied to the needle valve (10) of the solenoid pilot valve (11) through the control hole (9) to counteract the output force of the proportional solenoid (12) according to the set value. If the hydraulic pressure exceeds the output force of the proportional solenoid, the needle valve (10) opens. The pilot oil flows into port Y through orifice (13) and returns to the oil tank.
Subsequently, The pressure drop is formed from orifices (6,7) and against the force of the return spring to lift the main valve spool (3). The port P is connected to port T. The main valve spool (3) controls the pressure at the P port.

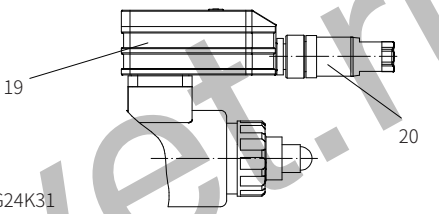
An additional spring loaded pilot control valve (2) is required to limit the maximum pressure (pressure protection function). The conical valve (15) and pilot valve seat (17) are closed due to the force of the spring (16).
If the pressure in the spring chamber of the main valve spool (3) exceeds the maximum allowable setting pressure of the valve, the conical valve (15) overcomes the force of the return spring to open and connect the oil circuit to the spring chamber. The pressure oil returns to the oil tank via port Y. The pressure drop is formed from orifices (6, 7) and overcome the force of the return spring to lift the main valve spool (3). The connection from port P to port T is opened. The main valve spool (3) controls the pressure at the port P.
The pre-set pressure can be reduced by the adjusting sleeve (19) if necessary. Port Y must return to the oil tank from the external pipeline, and there is no pressure in the return pipeline layer. The valve unloads and limits the maximum pressure through port X (18).



Model DBEME10-7XJ/...XYG24K4

Function description, sectional drawing

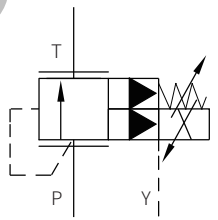
Model DBEME
The function and design of this valve is basically the same as model DBE/DBEM except electronic controller.
The electronic control position and integrated plug amplifier (19) receive power and command values by the plug-in plug (20).



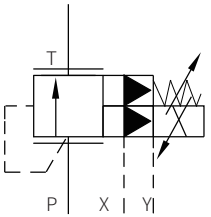
Model DBEME10-7XJ/...YG24K31

Functional symbols

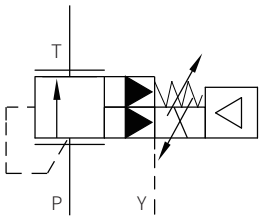
Model DBEM...7XJ/...Y...



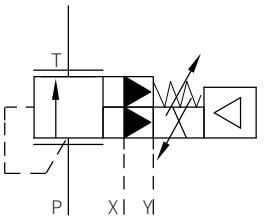
Model DBEM...7XJ/...XY...



Model DBEME...7XJ/...Y...



Model DBEME...7XJ/...XY...



Models and specifications

DBE M [ ] [ ] – 7X [ ] / [ ] G24 [ ] / [ ] [ ] *

with maximum pressure Limitation =M

external amplifier =No code
with integrated amplifier =E

size
NG10 =10
NG25 =20
NG32 =30

subplate mounting =No code
threaded connection =G

70 to 79 series =7X
(70 to 79 series installation and connection size unchanged)

maximum pressure stage
to 50bar =50
to 100bar =100
to 200bar =200
to 315bar =315
to 350bar =350

Y= pilot oil supply internal and drain external
XY= pilot oil supply external and drain external

G24= supply voltage 24 VDC

No code= 1600mA coil
-8 800mA coil

DBEM electrical connection:
K4= square socket without plug

DBEME electrical connection:
K31S= with 1.5 meter cable and tin on the end
K31C= with M12x1 aviation plug, 5-pin

for model DBE(M)E
A1= command value 0 to 10 V
F1= command value 4 to 20 mA

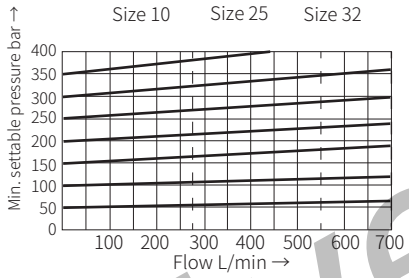
sealing material
No code= NBR seals
V= FKM seals
(consult for other seals)

more information in text

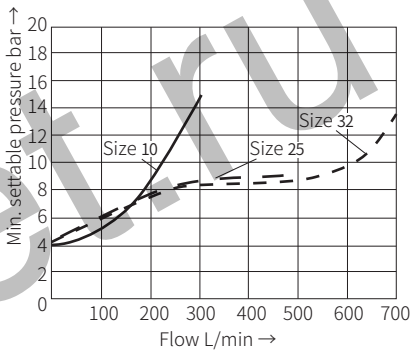
Characteristic curve

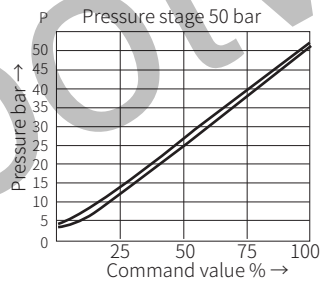
(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

Settable pressure in relation to the flow

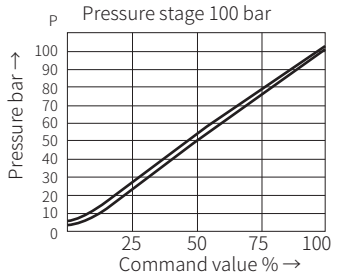


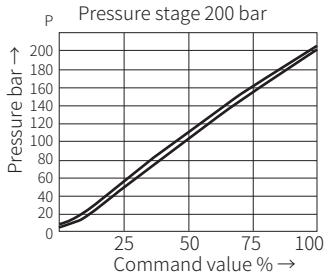
Minimum settable pressure at command value 0

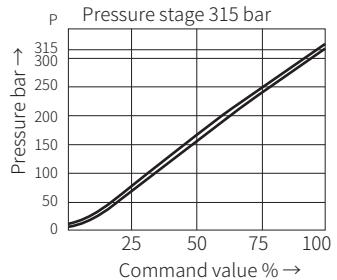


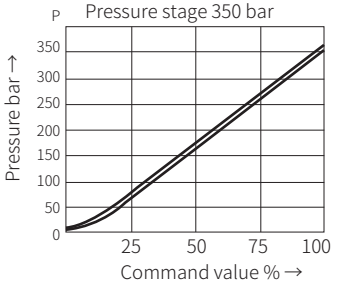


Command value pressure characteristic curve
(measured at a flow rate of 24L/min)









Technical parameters

(Test conditions: measured at v =40mm²/s, t=50°C)

Size				Size 10	Size 25	Size 32
Maximum working pressure	Oil ports P and X		bar	350		
	Oil port T		bar	315		
	Oil port Y		bar	zero pressure return oil tank Separately		
Maximum setting pressure	Pressure stage 50		bar	50		
	Pressure stage 100		bar	100		
	Pressure stage 200		bar	200		
	Pressure stage 315		bar	315		
	Pressure stage 350		bar	350		
Minimum setting pressure at command value zero			bar	See characteristic curve		
Maximum flow rate			L/min	275	550	700
Pilot flow rate			L/min	0.4 to 1	0.4 to 1.5	0.4 to 1.5
Fluid				Mineral hydraulic oil, phosphate ester hydraulic oil		
Oil temperature range			°C	-20 to +80		
Viscosity range			mm²/s	15 to 380		
Hysteresis (see command value pressure characteristic curve)			%	⩽ 5% of the maximum setting pressure		
Linearity			%	± 3.5 of the maximum setting pressure		
Manufacturing tolerance of the command value pressure characteristic curve, according to the hysteresis characteristic curve when pressure increasing	Model DBEM		%	± 5 of the maximum pressure regulation value		
	Model DBEME		%	± 1.5 of the maximum setting pressure		
Step response Tu+Tg		10 % →90 %	ms	~100	Measured with 0.2L of oil at port A	
		90 % →10 %	ms	~100		
Step response Tu+Tg		10 % →90 %	ms	~200	Measured with 5L of oil at port A	
		90 % →10 %	ms	~200		

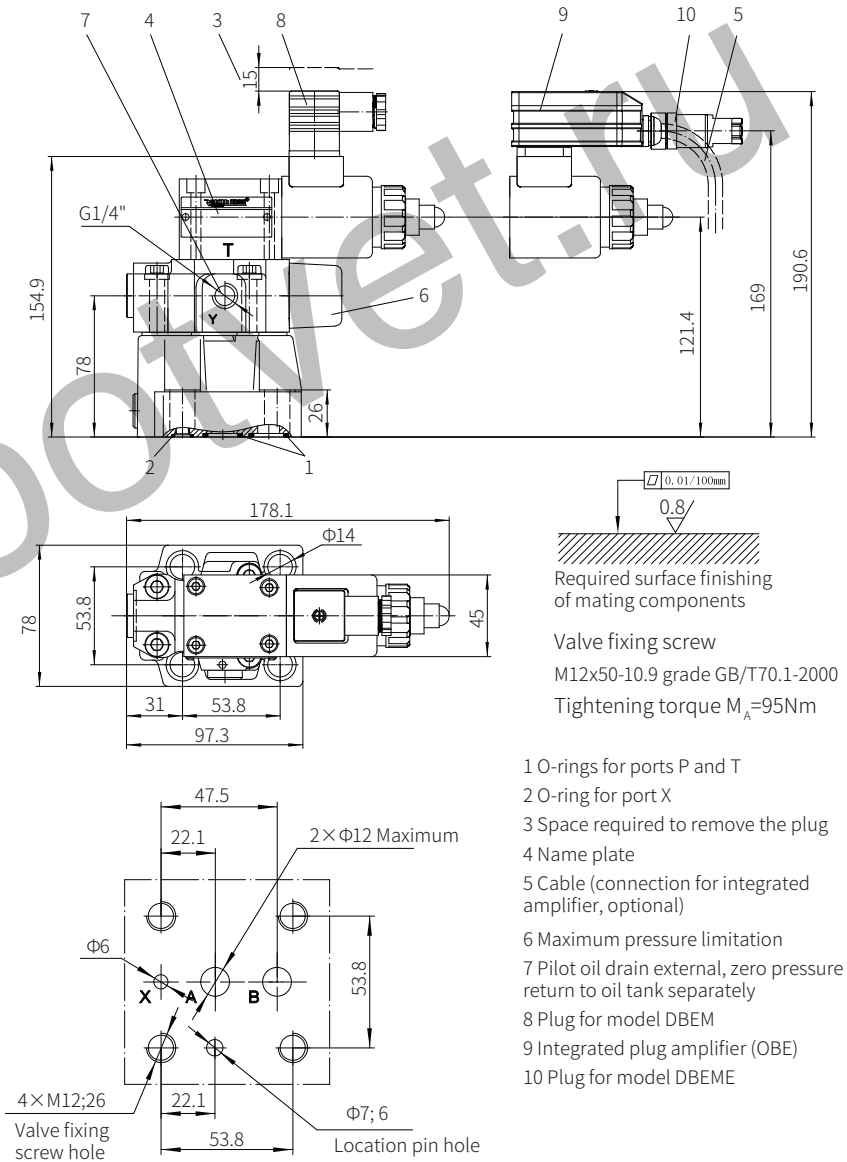
Electrical			G24	G24-8
Minimum control current		mA	⩽100	⩽100
Maximum control current		mA	1600 ± 10 %	800 ±5 %
Coil resistance	Cold value 20 °C	Ω	5.5	20.6
	Maximum hot value	Ω	8.05	33
Duty		%	100	100

Electronic control unit (OBE)			
Voltage type	Nominal voltage	VDC	24
	Upper limit	VDC	35
	Lower limit	VDC	21
Current consumption		A	1.5
Demand power		A	2. Time interval
input	Voltage	V	0 to 10
	Current	mA	4 to 20
output	Measuring current	mV	1 mV ≙ 1 mA
Valve protection to EN60529			IP65

Component size

Size unit: mm

Model DBEM(E)10...-7XJ/...



Required surface finishing of mating components

Valve fixing screw

M12x50-10.9 grade GB/T70.1-2000

Tightening torque M_A=95Nm

1 O-rings for ports P and T

2 O-ring for port X

3 Space required to remove the plug

4 Name plate

5 Cable (connection for integrated amplifier, optional)

6 Maximum pressure limitation

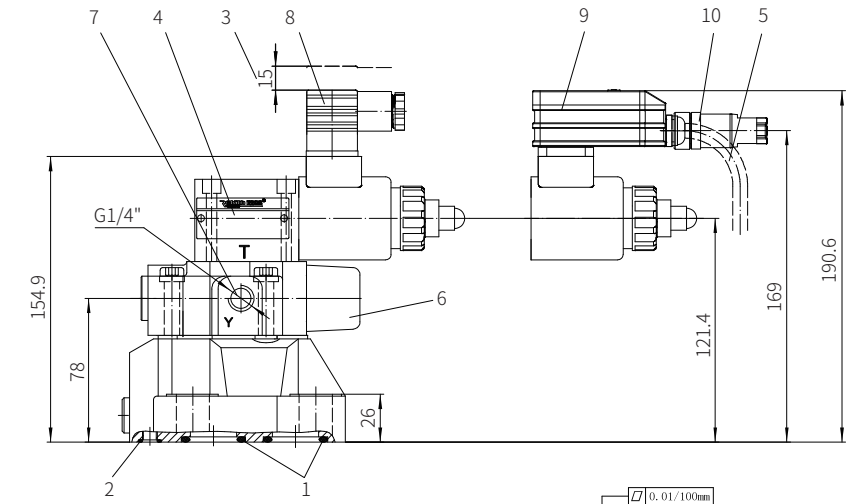
7 Pilot oil drain external, zero pressure return to oil tank separately

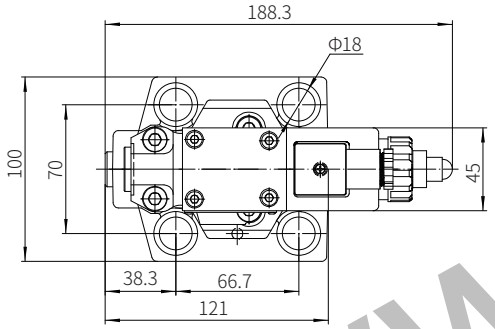
8 Plug for model DBEM

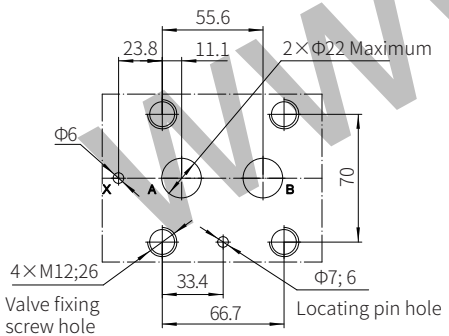
9 Integrated plug amplifier (OBE)

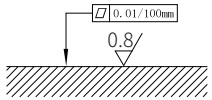
10 Plug for model DBEME

Model DBEM(E)20...-7XJ/...









Required surface finishing of mating components

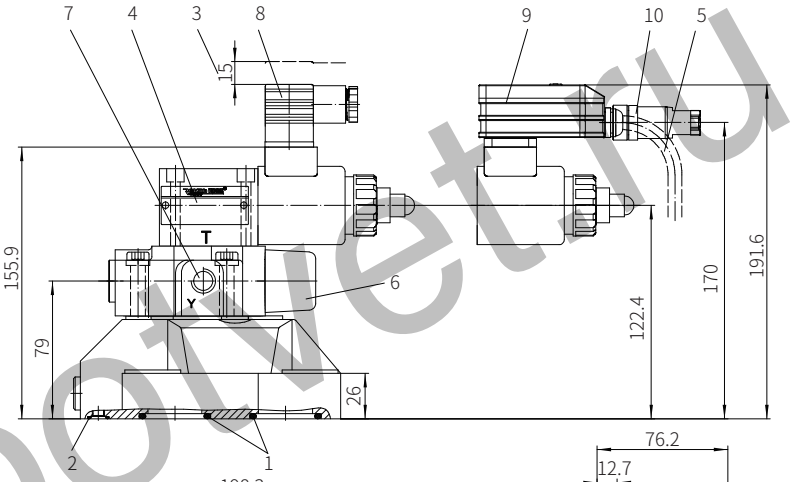
Valve fixing screw

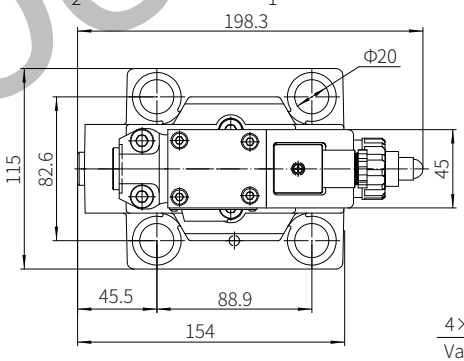
M16x50-10.9 grade GB/T70.1-2000

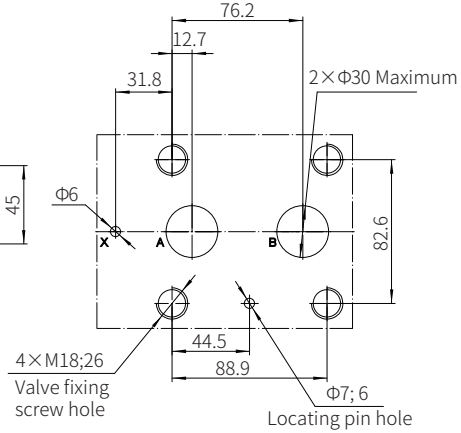
Tightening torque M_A=196Nm

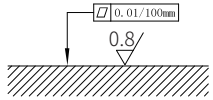
1 O-rings for ports P and T
2 O-ring for port X
3 Space required to remove the plug
4 Name plate
5 Cable (connection for integrated amplifier, optional)
6 Maximum pressure limitation
7 Pilot oil drain external, zero pressure return to oil tank separately
8 Plug for model DBEM
9 Integrated plug amplifier (OBE)
10 Plug for model DBEME

Model DBEM(E)30...-7XJ/...









Required surface finishing of mating components

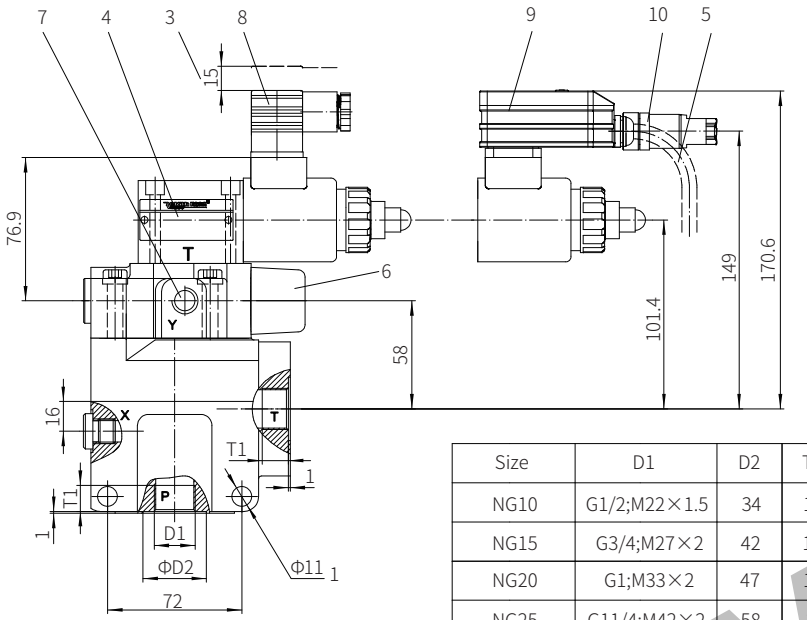
Valve fixing screw

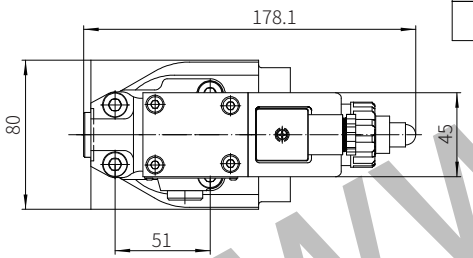
M18x50-10.9 grade GB/T70.1-2000

Tightening torque M_A=260Nm

1 O-rings for ports P and T
2 O-ring for port X
3 Space required to remove the plug
4 Name plate
5 Cable (connection for integrated amplifier, optional)
6 Maximum pressure limitation
7 Pilot oil drain external, zero pressure return to oil tank separately
8 Plug for model DBEM
9 Integrated plug amplifier (OBE)
10 Plug for model DBEME

Model DBEM (E)G

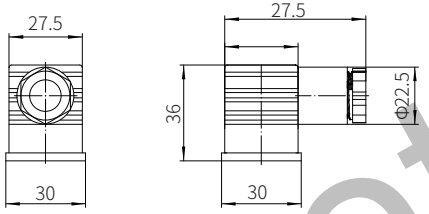




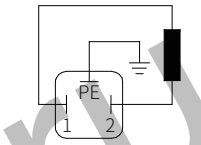
Size	D1	D2	T1
NG10	G1/2;M22×1.5	34	14
NG15	G3/4;M27×2	42	16
NG20	G1;M33×2	47	18
NG25	G11/4;M42×2	58	20
NG30	G11/2;M48×2	65	22

1 Valve fixing screw hole
2 Plug for model DBEME
3 Space required to remove the plug
4 Name plate
5 Cable (connection for integrated amplifier, optional)
6 Maximum pressure limitation
7 Pilot oil drain external, zero pressure return to oil tank separately
8 Plug for model DBEM
9 Integrated plug amplifier (OBE)

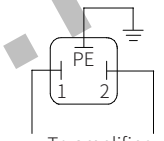
Model DBEM...7XJ/...K4
Plug -in connector to DIN 175301-803



Connection at component plug

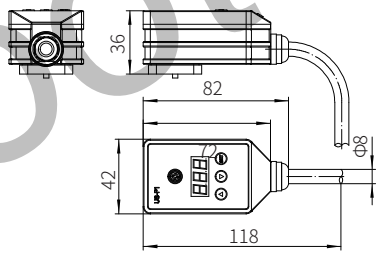


Connection at plug-in connector

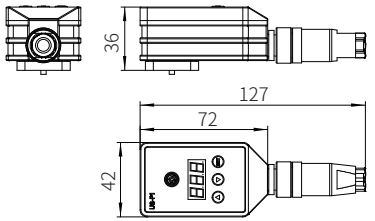


To amplifier

Model DBEM...7XJ/...K31S



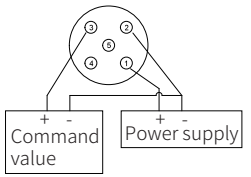
Model DBEME...7XJ/...K31C



Terminal identification

M12 plug terminal number (K31C type)	Cable color (K31S type)	Terminal identification
1	Red	Power supply +
2	Black	Power supply -/command value -
3	Yellow	Command value +
4	Blue	Reference voltage 5V
5	Green	-

Connection example:
PLC example input command



Connection example:
Potentiometer input command