

RT-MRPD1-PH6(10)

Modular proportional amplifier with electrical position feedback, single electromagnet.

Design number 30series

Power supply range 19~35VDC

Command types: $\pm 10V$, 4~20mA
(confirmed before leaving the factory)

Types of control valves: 4WRPH6 or 4WRPH10



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Features

- It is applicable to control the 4WRPH6(10) series proportional valves with position feedback.
- The CPU adopts a powerful 32-bit processor.
- The command input is $\pm 10V$ or 4~20mA
- Monitoring of the actual value of spool position
- Enable input
- The fault diagnosis function can give prompts for abnormal conditions such as broken wires of electromagnets and broken wires of displacement sensor cables.
- The power supply has a reverse polarity protection function.

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Ordering Model

RT-MRPD	1	-	PH6	-	30	/	A1
01	02		03		04		05

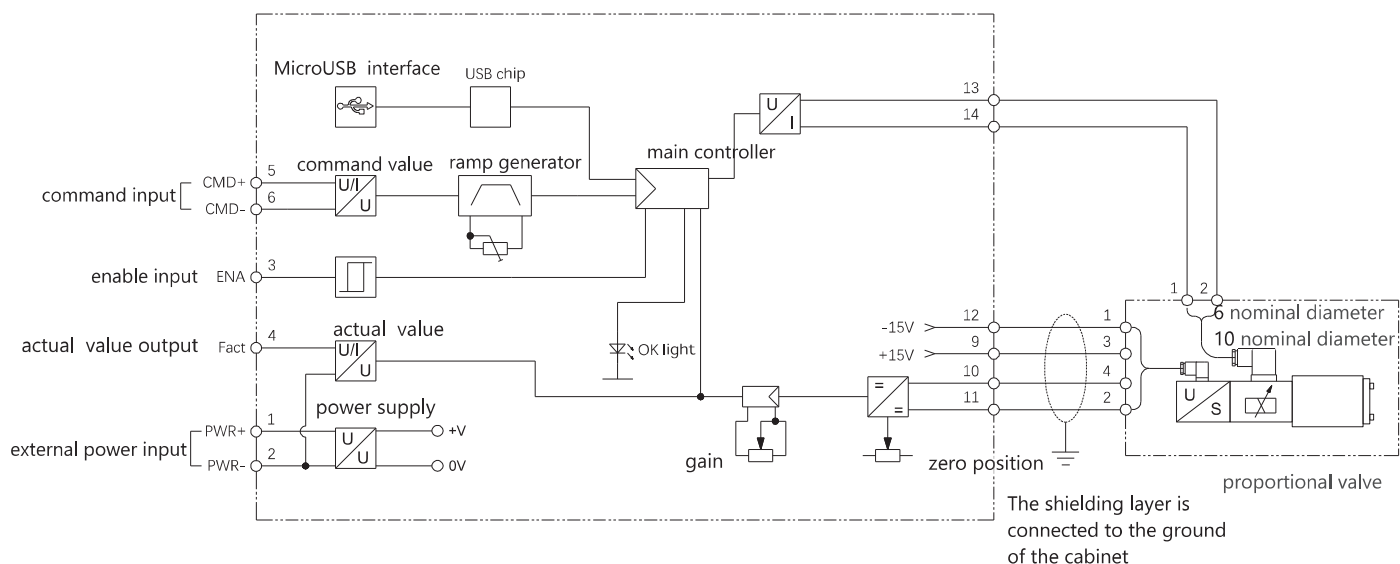
01	RT-MRPD	Modular proportional amplifier ,with electrical feedback
02	1	Drive single-electromagnet proportional valve
03	PH6	Control the 4WRPH6 proportional valve
	PH10	Control the 4WRPH10 proportional valve
04	30	The design number is of 30 series
05	A1	The command input of $\pm 10V$
	F1	The command input of 4~20mA

Technical Data

Working Voltage	19~35 VDC (commonly 24VDC)
Maximum Power Consumption	< 48VA
No-load Current	≤100mA (24V)
Differential Signal Input	±10 V, input impedance ≥100KΩ 4~20 mA, input impedance=100Ω (Specify before delivery, not switchable on site)
Resolution	≤1 %
Nonlinearity	≤1 %
Output of Actual Position Value	±10 V, load impedance ≥550KΩ 4~20 mA, load impedance <300Ω
Maximum Drive Current	3A
Ramp Time	10~5000 ms (settle)
Enable input	11V~UB, The electromagnet output is normal and the OK light stays green all the time. < 10V, The electromagnet output is severed s and the OK light flashes green.
Operating Temperature	-20~60℃
Storage Temperature	-25~70℃
Operating and Storage Humidity	0 %~90 %
Connection Type	Plug-in threaded fastening terminals

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Principle Block Diagram



Terminal Definition

Terminals		Function Descriptions
1	PWR+	External power input, 24VDC
2	PWR-	
3	ENA	Enable input: When the voltage is greater than 11V, the electromagnet output is normal; when the voltage is less than 10V (or the terminal is left floating), the electromagnet output is severed.
4	Fact ②	Actual position value Type A1: ± 10 V, load impedance $\geq 550\text{K}\Omega$ With reference point being terminal No. 2 Type F1: 4 - 20 mA, load impedance $< 300\Omega$
5	CMD+ ①	Analog command input Type A1: ± 10 V, with input impedance $\geq 100\text{K}\Omega$. Type F1: 4 - 20 mA, with input impedance = 100Ω
6	CMD-	
7	N.C.	Not connected
8	N.C.	
9	P+	Sensor power supply +15V (connected to sensor terminal 3)
10	S+	Positive terminal of the sensor signal $\pm 10\text{V}$ (connected to sensor terminal 4)
11	S-	Sensor signal ground (connected to sensor terminal 2)
12	P-	Sensor power supply -15V (connected to sensor terminal 1)
13	SOL+	Electromagnet
14	SOL-	
15	N.C.	Not connected
16	N.C.	

① A positive given input value (ranging from 0 to +10V or from 12 to 20mA) applied to terminals 5 and 6 will make port P of the valve communicate with port A and port B communicate with port T. A negative given input value (ranging from 0 to -10V or from 12 to 4mA) applied to terminals 5 and 6 will make port P of the valve communicate with port B and port A communicate with port T.

Note: For the amplifier with the 4 - 20mA command type, when the given value is less than 2mA, the amplifier will determine that the command line is broken. At this time, the output terminal of the amplifier will be powered off, and the valve spool will be reset by the spring.

② A positive actual value (ranging from 0 to +10V or from 12 to 20mA) measured at terminals 4 and 2 indicates that port P of the valve communicates with port A and port B communicates with port T. A negative actual value (ranging from 0 to -10V or from 12 to 4mA) measured at terminals 4 and 2 indicates that port P of the valve communicates with port B and port A communicates with port T.

Display and Adjustment

Indicator light display

The status of the OK light	Descriptions
Green light always on	Normal
Green light flashing	Disabled
Red light always on	Electromagnet wire breakage
Red light flashing	Position sensor broken

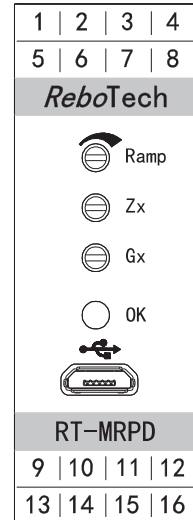
Potentiometer adjustment

Potentiometer name	Descriptions
Ramp ①	Ramp time adjustment: The time increases clockwise and decreases counter-clockwise. The adjustment range is 0.01-5s (default: 0.01s).
Zx ②	Sensor zero position adjustment: Clockwise P-A flow , P-B flow ; Counter-clockwise P-A flow , P-B flow .
Gx ③	Sensor gain adjustment: Clockwise smaller overall flow rate; Counter-clockwise larger overall flow rate.

- ① Note that the adjustment of the ramp time will reduce the frequency response of the valve. If the valve is used in a closed-loop control system, please be sure to adjust the ramp time to the minimum.
- ② Zero position adjustment: After the valve has been in operation for a period of time, the zero position of the valve spool may shift due to factors such as vibration. You can adjust this potentiometer to readjust the zero position. Note that the amplitude of the on-site zero position adjustment should be as small as possible.
- ③ Gain adjustment: It is applicable to the calibration of the maximum flow rate of the valve before it leaves the factory (which requires the cooperation of a flow test bench). It is not recommended that customers make adjustments on the equipment site.

Communication interface function

Communication interface types	Descriptions
MicroUSB	At present, there are no available parameters for the amplifier to be used by customers.



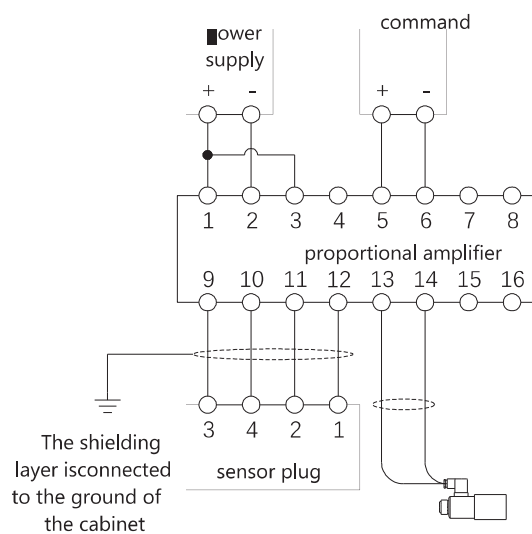
Wiring Examples

Example 1

Give an analog commands through PLC, CNC, acquisition card, etc.

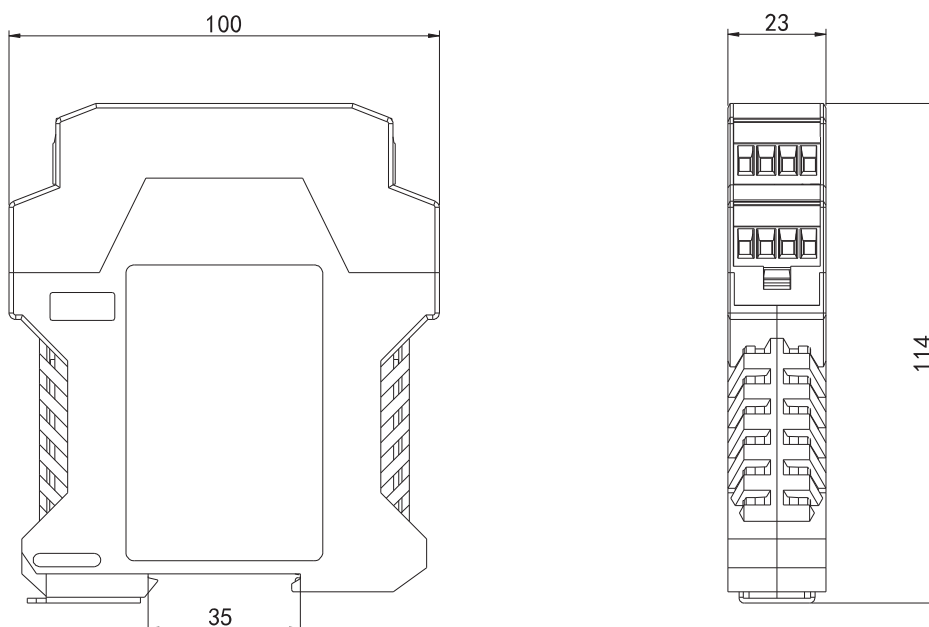
The analog commands can be any signal of $\pm 10V, 4\sim 20mA$.

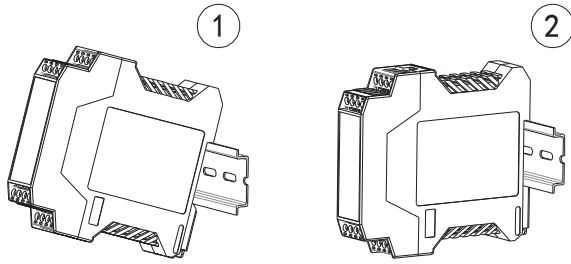
Note: The command type has been determined at the factory and cannot be changed on site.



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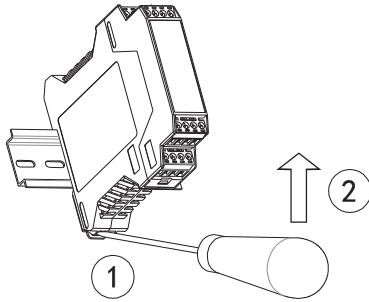
Overall Dimensions (Unit: mm)





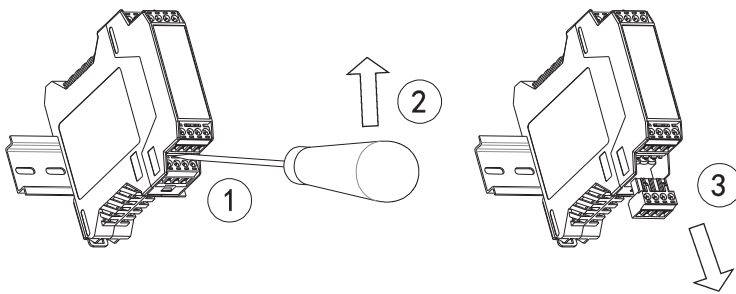
Amplifier Installation:

1. Clip the upper end of the back bayonet of the amplifier onto the guide rail
2. Press the lower front of the amplifier by hand until you hear a clicking sound, meaning it is installed properly.



Amplifier Disassemble:

Insert a flathead screwdriver into the bottom latch. Push the handle of the screwdriver in the direction shown in the illustration to remove the amplifier from the guide rail.



Terminal Disassembly:

1. Insert a flathead screwdriver into the gap between the terminal and the housing.
2. Push the handle of the screwdriver in the direction shown in the illustration to separate the terminal from the socket.
3. Pull out the terminal in the direction shown in the illustration.

Note: If it is necessary to replace the amplifier on site, the terminals can be directly removed and then a new amplifier can be inserted. There is no need to repeatedly disassemble and assemble the wires. This effectively prevents the amplifier from malfunctioning due to incorrect wiring.

Precautions

- The amplifier can only be plugged in or unplugged when the power is off!
 - When connecting to the electromagnet, do not use plugs with freewheeling diodes or LED displays!
 - When measuring the amplifier, instruments with $R_i > 100k\Omega$ must be used!
 - Use relays with gold contacts to switch the command values (low voltage, low current)!
 - When using external control, the maximum fluctuation of the control voltage should not exceed 10%.
 - The distance from antennas, wireless power sources and radar equipment must be greater than 1m.
 - Don't lay the electromagnet and the command value cables near the power cables!
 - For coil cables with a length within 50 m, wires with a wire diameter of 1.5 mm^2 are applicable. If longer cables are needed, please contact us.
- Suggestion: The connections of the electromagnet should also be shielded.
- The electrical signals generated by the amplifier (such as the reference voltage +10V) are not allowed to be used as functional signals related to equipment safety! Please refer to the European standard "BS EN 982:1996 Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulic power transmission devices".