

RT-PQDA-1(2)-40

Modular proportional amplifier without electrical position feedback, double-channel single electromagnet
Design number 40 series
Power supply range 19~32VDC
Command types 0~10V, 4~20mA (confirmed before leaving the factory)
Maximum output current
Q valve 0.01~2A (settable on-site)
P valve 0.01~1.5A (settable on-site)



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Features

- It is applicable to controlling proportional pressure and flow valves.
- The CPU adopts a powerful 32-bit processor.
- The command input is 0 - 10V or 4 - 20mA.
- Double-channel independent control.
- It provides a 10V reference voltage, facilitating direct connection with a potentiometer for control.
- For the RT-PQDA-2 model, it is powered by 24VDC and can directly drive 40Ω coils without the need for an external transformer.
- There are abundant parameter settings. Through the panel buttons and digital tubes, parameters such as the maximum and minimum values of current, the dither frequency, and the rising and falling ramps can be set.
- Alarm prompts for coil open circuit and short circuit.

Ordering Model

RT-PQDA	-	1	-	40	/	A1
01		02		03		04

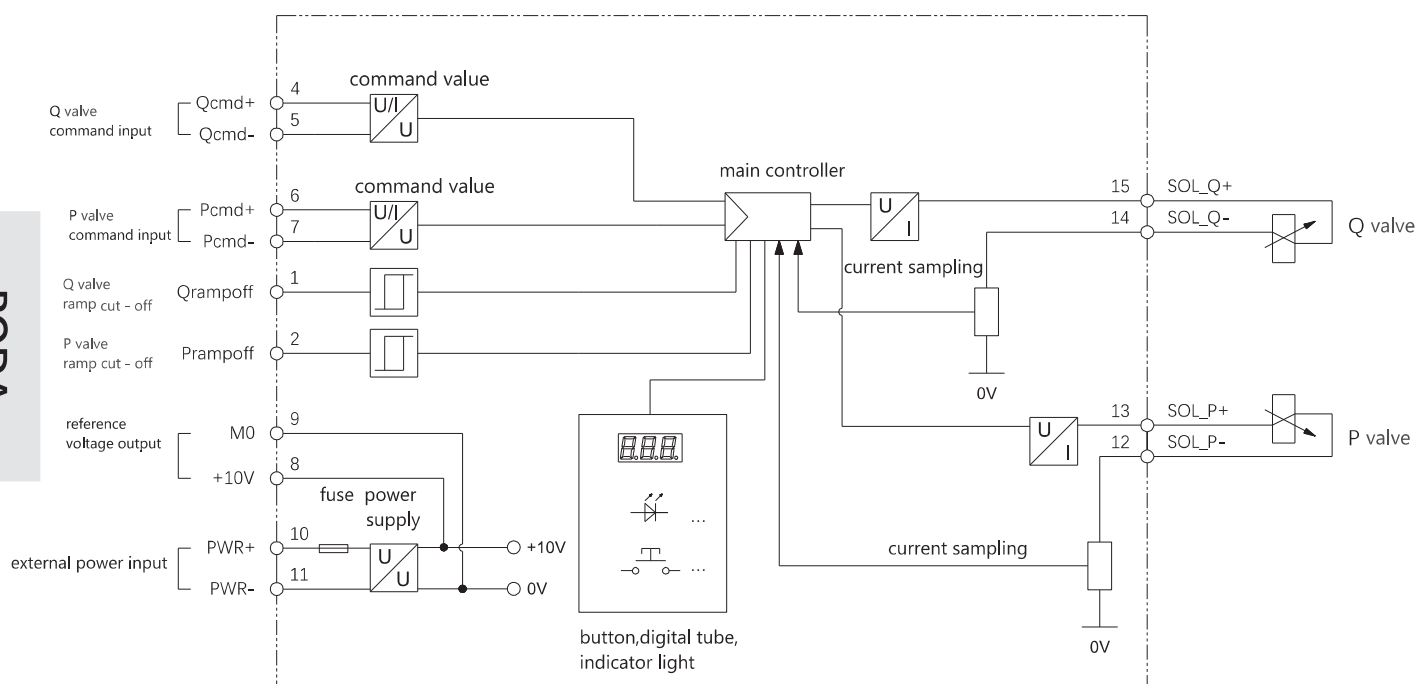
01	RT-PQDA	Modular proportional amplifier, control proportional pressure and flow valves.
02	1	Drive coil resistance (P valve: 10Ω/Q valve: 10Ω).
	2	Drive coil resistance (P valve: 10Ω/Q valve: 10Ω).
03	40	The design number is of 40 series
04	A1	The command input is 0~10V
	F1	The command input is 4~20mA

PQDA

Technical Data

Working Voltage	19~32 VDC (commonly 24VDC)
Maximum Power Consumption	< 48VA
Fuse	2A slow-blow, replaceable.
No-load Current	≤100mA
Differential Signal Input	0~10 V, input impedance ≥100KΩ 4~20 mA, input impedance=100Ω (Specify before delivery, not switchable on site)
Resolution	≤1 ‰
Nonlinearity	≤1 ‰
Reference Voltage	+10V (10mA Max) , with the reference point being M0.
Maximum Output Current	P valve: 0.01~1.5A (settable) Q valve PQDA-1: 0.01~2A (settable) Q valve PQDA-2: 0.01~0.8A (settable)
Dither Frequency	50~500Hz (Dual channels can be independently set.)
Ramp Time	0.05~5 S (Dual channels can be independently set.)
Ramp Cut-off	8.5V~UB, ramp cut-off; 0~6.5V, ramp normal;
Operating Temperature	-20~50℃
Storage Temperature	-20~70℃
Operating and Storage Humidity	0 %~90 %
Connection Type	Plug-in threaded fastening terminals

Principle Block Diagram

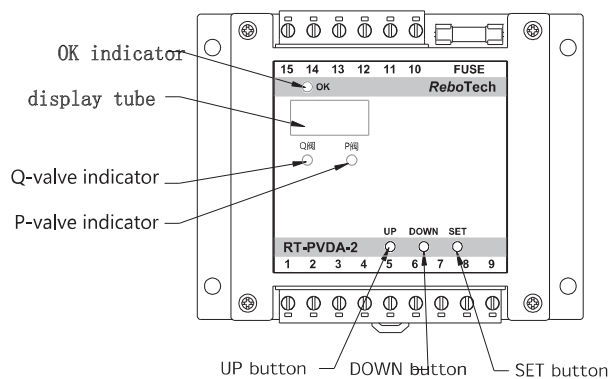


Terminal Definition

Terminals	Function Descriptions
1 Q rampoff	Q valve Ramp cut-off ①
2 P rampoff	P valve Ramp cut-off ①
3 N.C.	Not connected
4 Q cmd+	Q valve command input Type A1: 0 - 10 V, with input impedance $\geq 100 \text{ K}\Omega$. Type F1: 4 - 20 mA, with input impedance = 100 Ω .
5 Q cmd-	
6 P cmd+	P valve command input Type A1: 0 - 10 V, with input impedance $\geq 100 \text{ K}\Omega$. Type F1: 4 - 20 mA, with input impedance = 100 Ω
7 P cmd-	
8 +10V	Reference voltage output, with the reference point being M0.
9 M0	
10 PWR+	External power input
11 PWR-	
12 SOL_P-	P valve electromagnet
13 SOL_P+	
14 SOL_Q-	Q valve electromagnet
15 SOL_Q+	

① When a high-level signal (8.5V - UB) is input at the ramp cut-off terminal point, the ramp will be cut off and the output current will rise or fall at the fastest speed. When a low-level signal (0V - 6.5V) is input at the ramp cut-off terminal point, the ramp time takes effect and the output current will rise or fall with the set rise (fall) time.

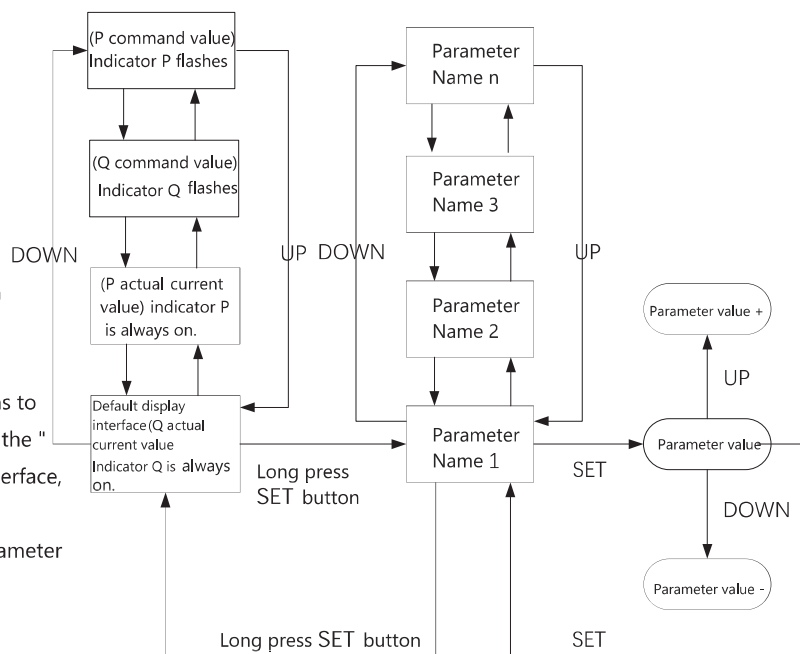
Parameter Setting Navigation



By pressing the "SET", "UP", and "DOWN" buttons to set parameters. Long press the "SET" button (>2S) to enter the "parameter name" interface. Press the "UP" and "DOWN" buttons to select the parameter, and short press the "SET" button to enter the "parameter value" interface. After entering a parameter value interface, change the parameter value by pressing the "UP" and "DOWN" buttons. Short press the "SET" button to return to the "parameter name" interface.

In the "parameter name" interface, long press the "SET" button (>2S) to return to the "default display interface".

In the "parameter name" or "parameter value" interface, if there is no input for more than 60S, it will automatically return to the default display interface.



Parameter Table

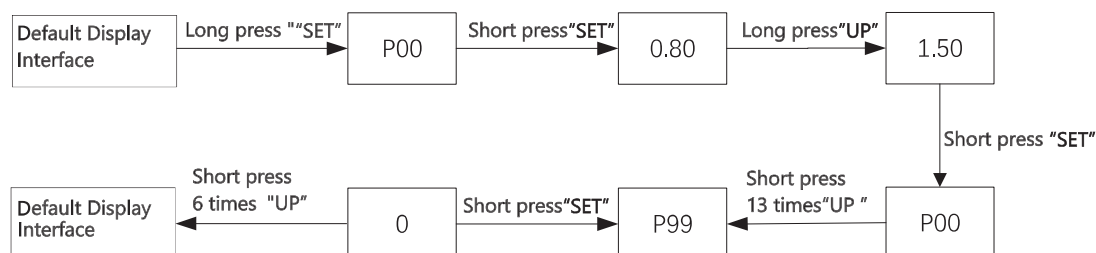
Serial Number	Item	Tube Display	Factory-set Value	Value Range	Unit	Descriptions
1	Q-valve Maximum Current	P00	0.8	0.01~Y	A	Adjustment step length: 0.01A PQDA-1: (Y=2A) PQDA-2: (Y=0.8A)
2	Q-valve Minimum Current	P01	0.1	0.01~0.50	A	Adjustment step length: 0.01A
3	Q-valve Ramp-up Time	P02	0.05	0.05~5	S	Adjustment step length: 0.01S
4	Q-valve Ramp-down Time	P03	0.05	0.05~5	S	Adjustment step length: 0.01S
5	Q-valve Command Dead Zone	P04	2	0~10	%	Adjustment step length: 1%
6	Q-valve Dither Frequency	P05	250	50~500	Hz	Adjustment step length: 1Hz
7	P-valve Maximum Current	P10	0.80	0.01~1.50	A	Adjustment step length: 0.01A
8	P-valve Minimum Current	P11	0.1	0.01~0.50	A	Adjustment step length: 0.01A
9	P-valve Ramp-up Time	P12	0.05	0.05~5	S	Adjustment step length: 0.01S
10	P-valve Ramp-down Time	P13	0.05	0.05~5	S	Adjustment step length: 0.01S
11	P-valve Command Dead Zone	P14	2	0~10	%	Adjustment step length: 1%
12	P-valve Dither Frequency	P15	250	50~500	Hz	Adjustment step length: 1Hz
13	Restore Factory Parameters	P98	0	0~5		When the value is over 5, restore the factory parameters ②
14	Parameter Save	P99	0	0~5		When the value is over 5, save the parameters ①

① The values of parameters 1 - 8 take effect immediately during the setting process and will remain unchanged until power failure. To permanently save the parameter values, it is necessary to enter parameter P99 and press the UP key to make the set value of P99 greater than 5. Then the parameter values will be permanently saved and the amplifier will return to the "default display interface" at the same time. If you want to abandon the changes, power off and then power on again without operating parameter P99, and the parameters will revert to the previously saved values.

② Enter the parameter "P98" and press the "UP" key to make the set value of "P98" greater than 5. Then all parameters will be restored to the factory values and the amplifier will return to the "default display interface" at the same time.

Parameter Setting Example

When you need to adjust the maximum current of electromagnet A from 0.8A to 1.5A, follow the process shown in the figure below. Other parameter adjustments are similar. If multiple parameters need to be adjusted at once, adjust the other parameters first and then only one parameter saving operation for P99 needs to be executed at last.



Parameter Meaning Diagram

Maximum Current (P00,P10)

Minimum Current (P01,P11)

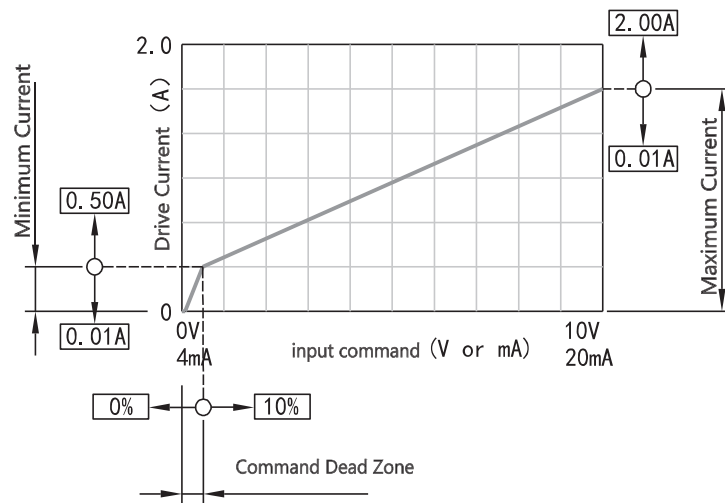
Command Dead Zone (P04,P14)

Attention:

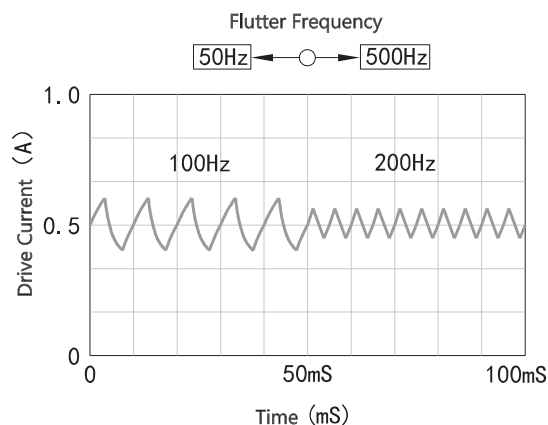
The maximum current limit of the P valve is 1.5A.

For the Q valve, the maximum current limit is 2.0A (for PQDA - 1) and 0.8A (for PQDA - 2).

0A (for PQDA - 1) and 0.8A (for PQDA - 2).

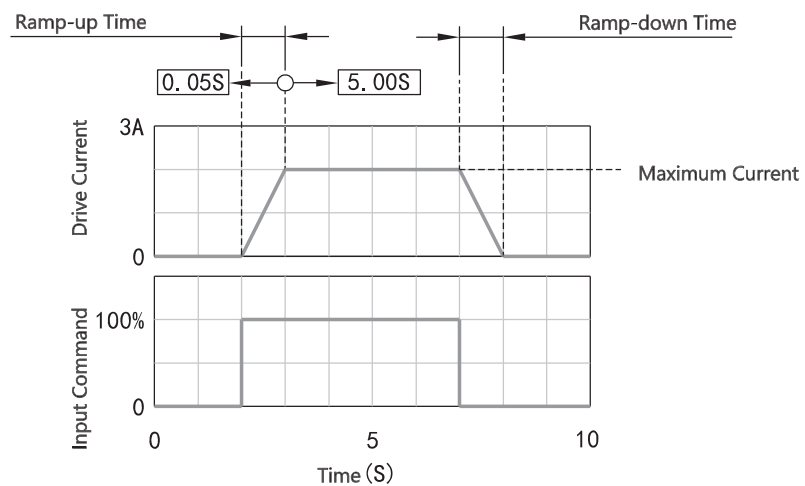


Dither Frequency (P05,P15)



Ramp-up Time (P02,P12)

Ramp-down Time (P03,P13)



Alarm and Indications

Digital Tube Displays	Fault Descriptions
E 10	Q - valve 4 - 20mA signal wire break. (command signal is much less than 4mA)
E 11	Q - valve 4 - 20mA signal overload (command signal is much greater than 20mA)
E20	P - valve 4 - 20mA signal wire break. (command signal is much less than 4mA)
E21	P- valve 4 - 20mA signal overload (command signal is much greater than 20mA)
E30	Q - valve electromagnet wire break (The Q - valve solenoid coil is open - circuited or the plug is loose).
E31	Over-current in the electromagnet of the Q valve (Short-circuit in the coil of the electromagnet of the Q valve).
E40	P - valve electromagnet wire break (The P - valve solenoid coil is open - circuited or the plug is loose).
E41	Over-current in the electromagnet of the P valve (Short-circuit in the coil of the electromagnet of the P valve).

When the above faults occur in the amplifier, the LED digital display tube will display the fault codes and flash at a frequency of 2Hz.

When a fault code appears, after the troubleshooting is completed, the amplifier will automatically clear the fault code and re-enter the normal working state.

LED Indications	Descriptions
The green OK light is always on	Normal
The red Ok light is flashing	Fault
The green light of the Q valve is always on.	The digital tube displays the output current value of the Q valve.
The green light of the P valve is always on.	The digital tube displays the output current value of the P valve.
The green light of the Q valve flashes.	The digital tube displays the input command value of the Q valve.
The green light of the P valve flashes.	The digital tube displays the input command value of the P valve.

Switching between the display of output current and input command:

When powered on for the first time, the digital tube will display the actual output current value of the Q valve by default (the green light of the Q valve is always on). Press the "UP" key once, and the input command value of the Q valve will be displayed (the green light of the Q valve flashes).

Press the "UP" key again, and the actual output current value of the P valve will be displayed (the green light of the P valve is always on).

Press the "UP" key once more, and the input command value of the P valve will be displayed (the green light of the P valve flashes).

Press the "UP" key one more time, and it will return to the actual output current value of the Q valve (the green light of the Q valve is always on).

This cycle repeats.

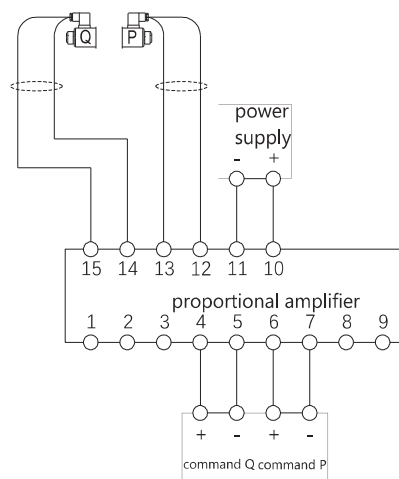
Wiring Examples

Example 1

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

The analog commands can be any signal of 0~10V, 4~20mA

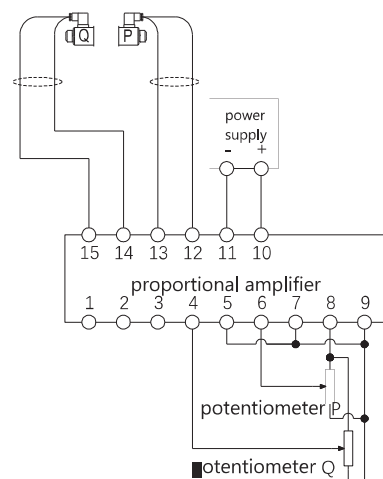
Note: The command type has been determined at the factory and cannot be changed on site.



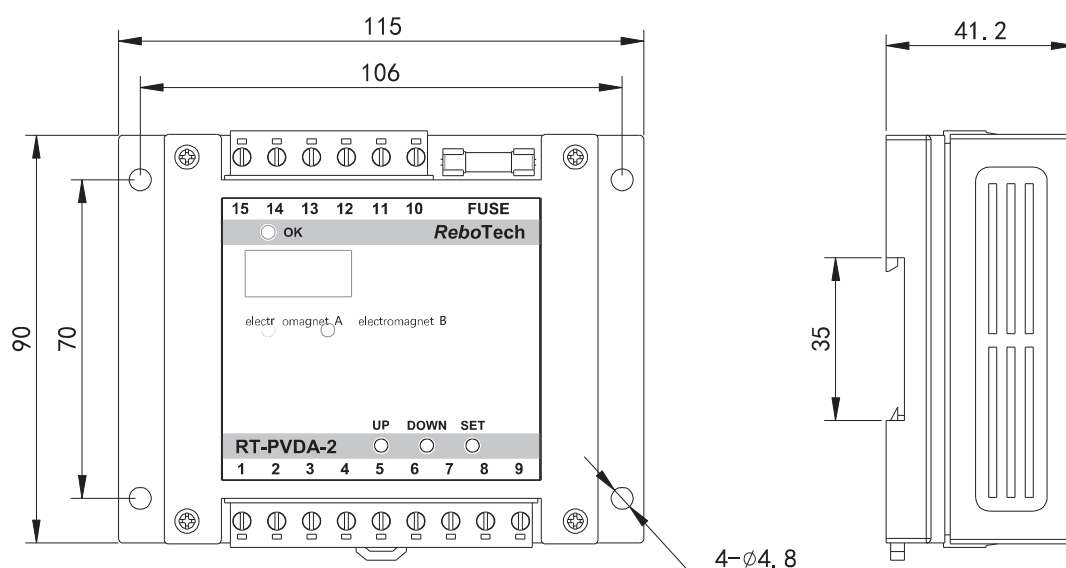
Example 2:

Give an analog command through a potentiometer, which is connected to the +10V and 0V reference voltages of the amplifier. Only the 0 - 10V command types can use a potentiometer to give commands.

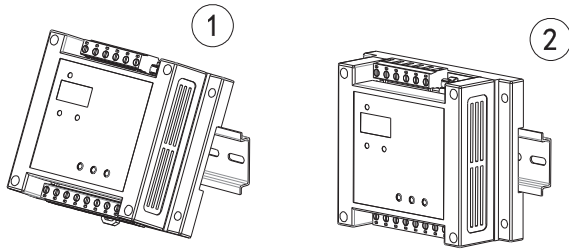
Note: It is recommended that the resistance value of the potentiometer be 5KΩ or 10KΩ.



Overall Dimensions (Unit: mm)

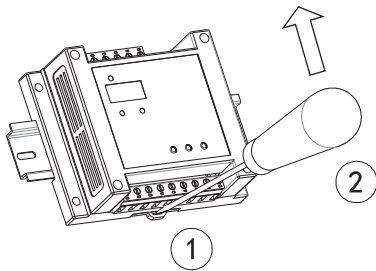


Installation Guidance



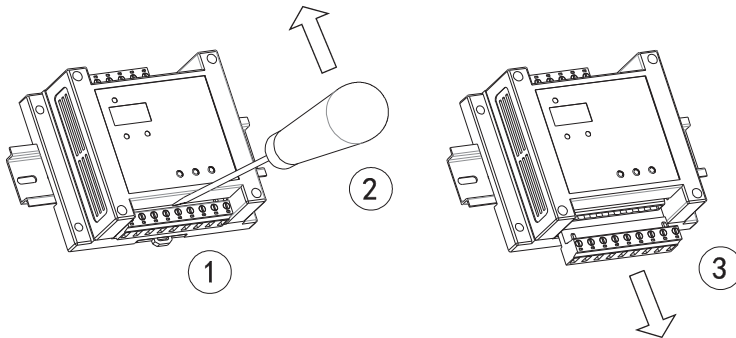
Amplifier Installation:

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 "click", meaning it's installed properly.



Amplifier Removal:

1. Insert a flathead screwdriver into the bottom latch.
2. 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".