

RT-PVDA-2-40

Modular proportional amplifier without electrical position feedback, double electromagnets.

Design number 40series

Power supply range 19~32VDC

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

Maximum output current 0.01~3.3A
(settable on-site)



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Features

- It is applicable to control various double-electromagnet proportional valves without position feedback.
- The CPU adopts a powerful 32-bit processor.
- The command input is $\pm 10V$ or $4\sim 20mA$;
- It provides a $\pm 10V$ reference voltage, facilitating direct connection with a potentiometer for control.
- 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.
- The drive current and commands are displayed in real time.
- Alarm prompts for coil open circuit and short circuit.

Ordering Model

RT-PVDA	-	2	-	40	/	A1	-	85
01		02		03		04		05

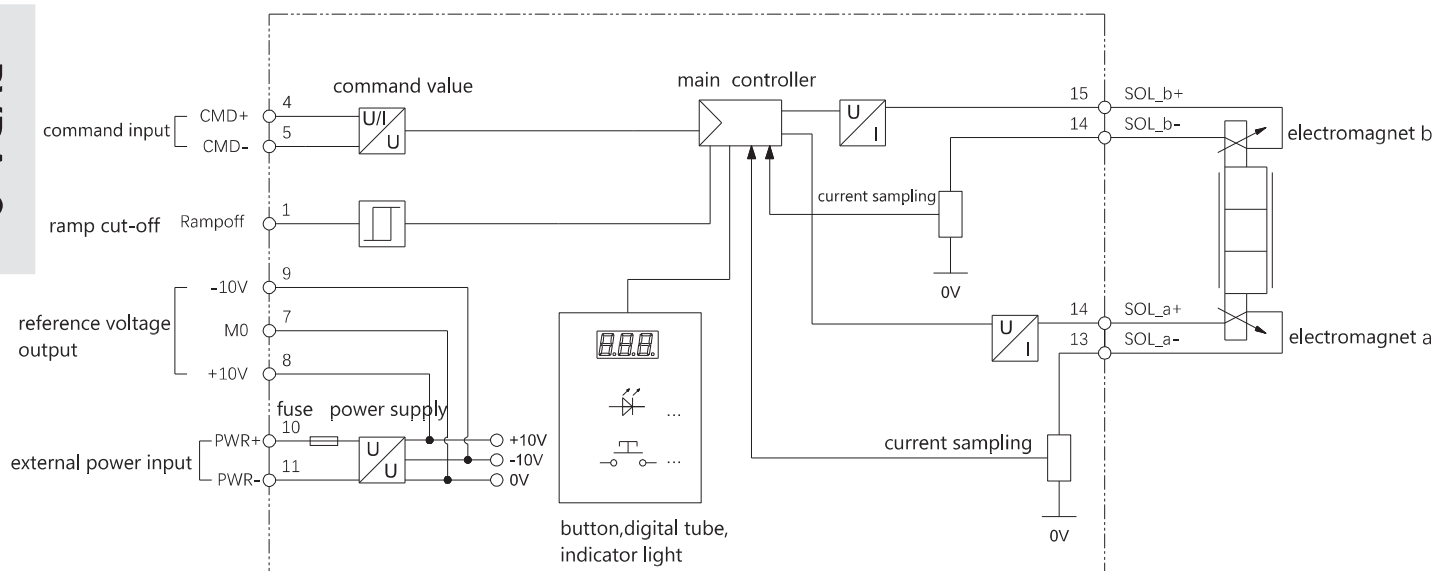
01	RT-PVDA	Modular proportional amplifier
02	2	Drive double-electromagnet proportional valve (When the electromagnets are energized, they repel each other , and only one of the electromagnets can be driven at a time.)
03	40	The design number is of 40 series
04	A1	The command input is $\pm 10V$
	F1	The command input is $4\sim 20mA$
05	None	Regular model, the maximum drive current is 3.3A (settable)
	85	The low-current model, the driving current range is from 14 mA to 85 mA, applicable to some Danfoss pumps.

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.
Output Current	0.01~3.3A settable
Dither Frequency	50~500Hz settable
Ramp Time	0.05~5 S (settable)
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

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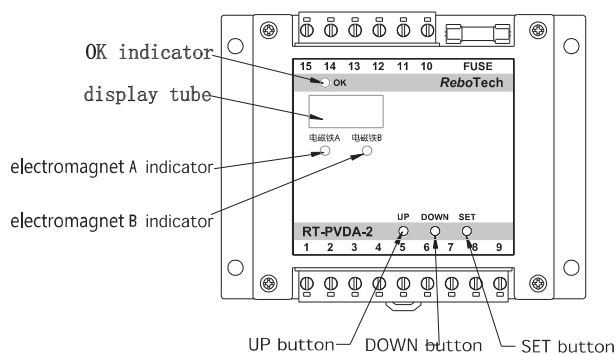
Terminal Definition

Terminals		Function Descriptions
1	Rampoff	Ramp cut-off ①
2	N.C.	Not connected
3	N.C.	
4	CMD+	Analog command input Type A1: 0 $\pm$ 10 V, with input impedance $\geq$ 100 K Ω . Type F1: 4 - 20 mA, with input impedance = 100 Ω
5	CMD-	
6	N.C.	Not connected
7	M0	Reference voltage output, with the reference point being M0.
8	+10V	
9	-10V	
10	PWR+	External power input
11	PWR-	
12	SOL_a-	Electromagnet a
13	SOL_a+	
14	SOL_b-	Electromagnet b
15	SOL_b+	

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.

② For the command of 0 - 10V: Electromagnet b is energized and pushes the valve spool to move towards port A. For the command of -10 - 0V: Electromagnet a is energized and pushes the valve spool to move towards port B.

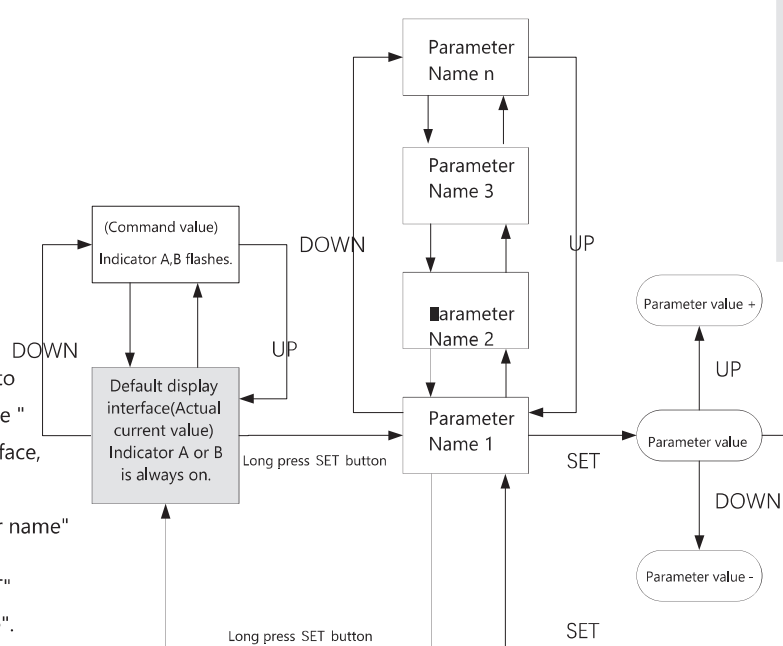
Parameter Setting Navigation



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.



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Parameter Table

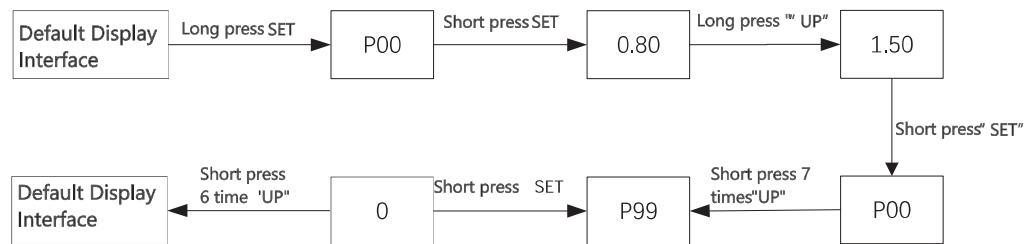
Serial Number	Item	Tube Display	Factory-set Value	Value Range	Unit	Descriptions
1	b Maximum Current	P00	0.8	0.01~3.30	A	Adjustment step length: 0.01A ③
2	b Minimum Current	P01	0.1	0.01~1.50	A	Adjustment step length: 0.01A ③
3	Ramp-up Time	P02	0.05	0.05~5	S	Adjustment step length: 0.01S
4	Ramp-down Time	P03	0.05	0.05~5	S	Adjustment step length: 0.01S
5	Command Dead Zone	P04	2	0~10	%	Adjustment step length: 1%
6	Dither Frequency	P05	250	50~500	Hz	Adjustment step length: 1Hz
7	a Maximum Current	P10	0.8	0.01~3.30	A	Adjustment step length: 0.01A ③
8	a Minimum Current	P11	0.1	0.01~1.50	A	Adjustment step length: 0.01A ③
9	Restore Factory Parameters	P98	0	0~5		When the value is over 5, restore the factory parameters. ②
10	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.

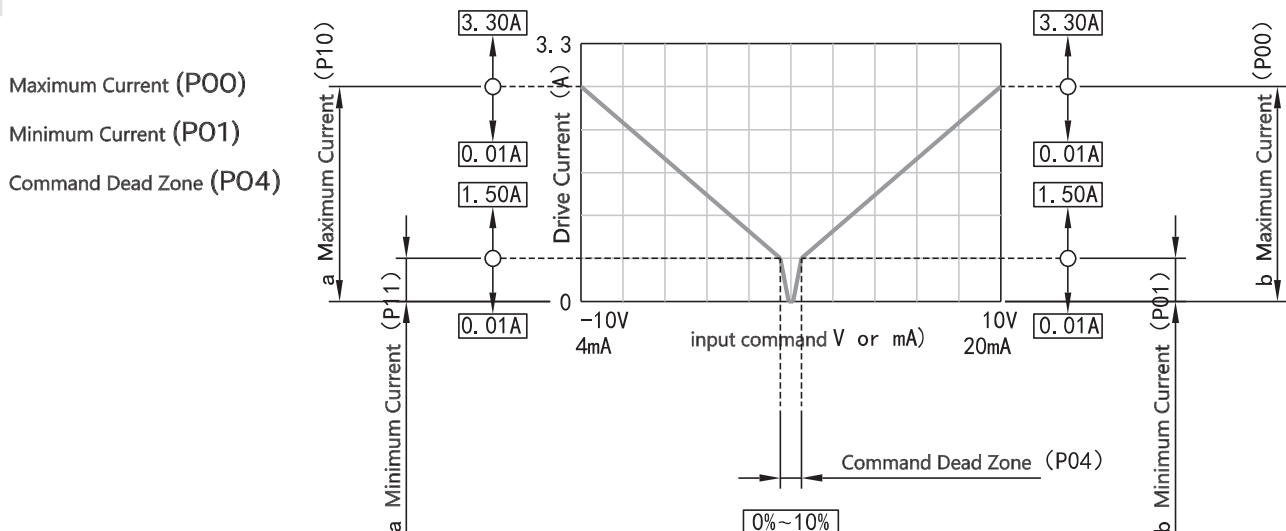
② Enter the parameter "P98" and press the "UP" key to make the set value of "P98" greater than 5. Then all parameters will be restored to the factory values and the amplifier will return to the "default display interface" at the same time

③ For the low-current amplifiers, the maximum current has been preset to 85 mA and the minimum current has been preset to 14 mA.

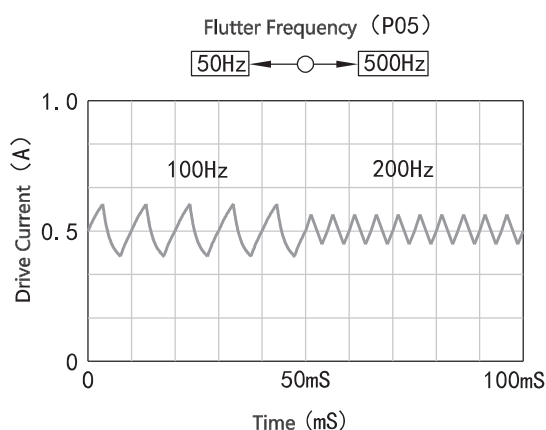
Parameter Setting Example: When you need to adjust the maximum current of electromagnet A from 0.8A to 1.5A, follow the process shown in the figure below. Other parameter adjustments are similar. If multiple parameters need to be adjusted at once, adjust the other parameters first and then only one parameter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



Parameter Meaning Diagram

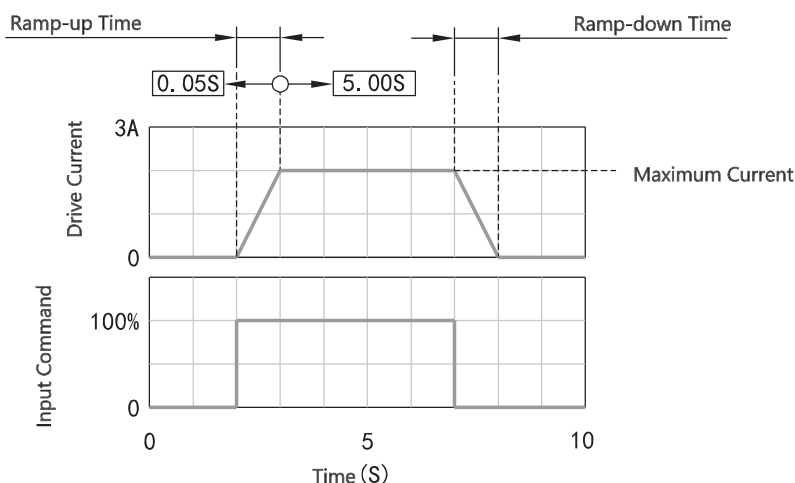


Dither Frequency (P05)



Ramp-up Time (P02)

Ramp-down Time (P03)



Alarm and Indications

Digital Tube Displays	Fault descriptions
E 10	4~20mA signal wire break (command signal is much less than 4mA)
E 11	4~20mA signal overload (command signal is much greater than 20mA)
E 30	The wire of electromagnet B is broken (the coil of electromagnet B is open or the plug is loose)
E 31	Overcurrent occurs in electromagnet B (the coil of electromagnet B is short-circuited).
E 40	The wire of electromagnet A is broken (the coil of electromagnet A is open or the plug is loose)
E 41	Overcurrent occurs in electromagnet A (the coil of electromagnet A is short-circuited).

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 electromagnet b light is always on.	The digital tube displays the output current value of the electromagnet b
The green electromagnet a light is always on.	The digital tube displays the output current value of the electromagnet a
Lights a and b of the electromagnet are flashing simultaneously.	The digital tube displays the value of the input command.

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 electromagnet by default (the green light of the electromagnet b always on). Press the "UP" button once, and then the input command value will be displayed (the green light of the electromagnet b is flashing). Press the "UP" button again, and it will return to display the actual output current value of the electromagnet. This cycle repeats.

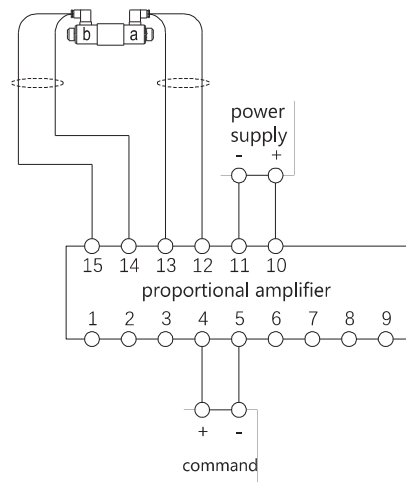
Wiring Examples

Example 1

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

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

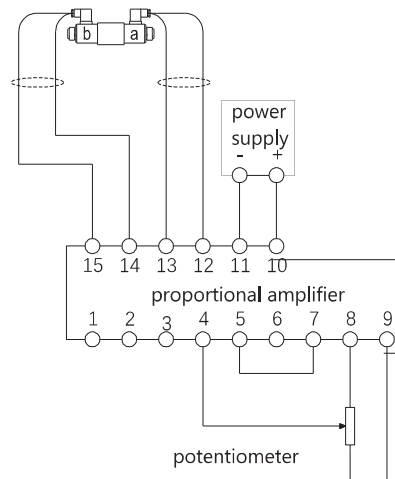
Note: The command type has been determined at the factory and cannot be changed on site.



Example 2:

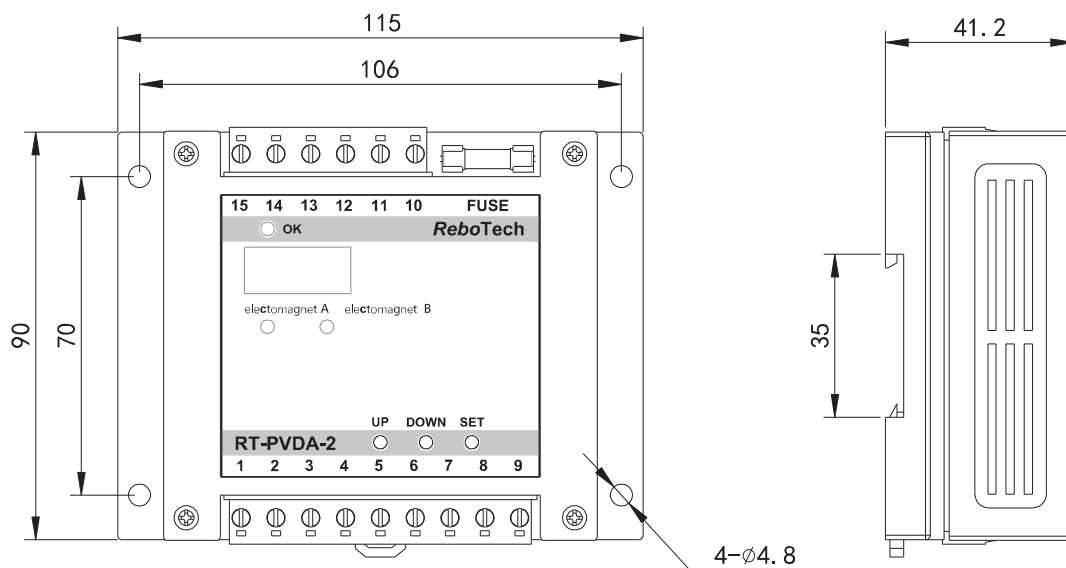
Give an analog command through a potentiometer, which is connected to the $\pm 10V$ and 0V reference voltages of the amplifier. Only the $\pm 10V$ command types can use a potentiometer to give commands.

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

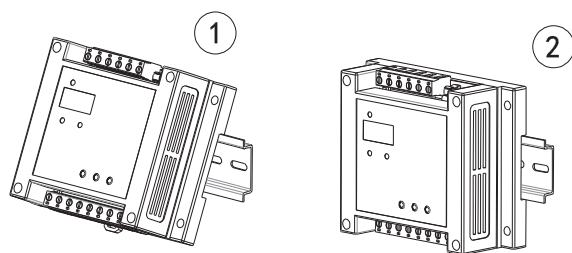


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Overall Dimensions (Unit: mm)

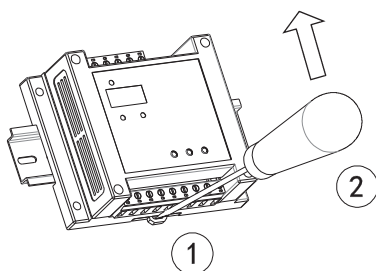


Installation Guidance



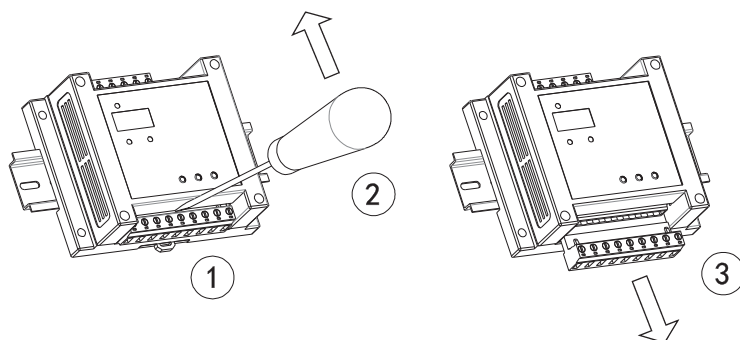
Amplifier Installation:

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 disassembled and then a new amplifier can be inserted. There is no need to repeatedly disassemble and assemble the wires. This effectively avoids amplifier failures caused by 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".