

RT-MSPD1-30

Modular proportional amplifier without electrical position feedback, single electromagnet.
Design number 30series
Power supply range 19~35VDC
Command types 0~10V,4~20mA((confirmed before leaving the factory)
Maximum output current 0~3A
(settable on-site)



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Features

- It is applicable to control various single-electromagnet proportional valves without position feedback.
- The CPU adopts a powerful 32-bit processor.
- The command input is 0 - 10V or 4 - 20mA
- Enable input
- The dither frequency and dither amplitude are independently adjustable.
- The device features a fault diagnosis function that can alert users to abnormal situations like electromagnet wire breakage. Additionally, its power supply is furnished with a wrong-phase protection function to safeguard against incorrect power connections.
- Parameter setting on the host computer.

Ordering Model

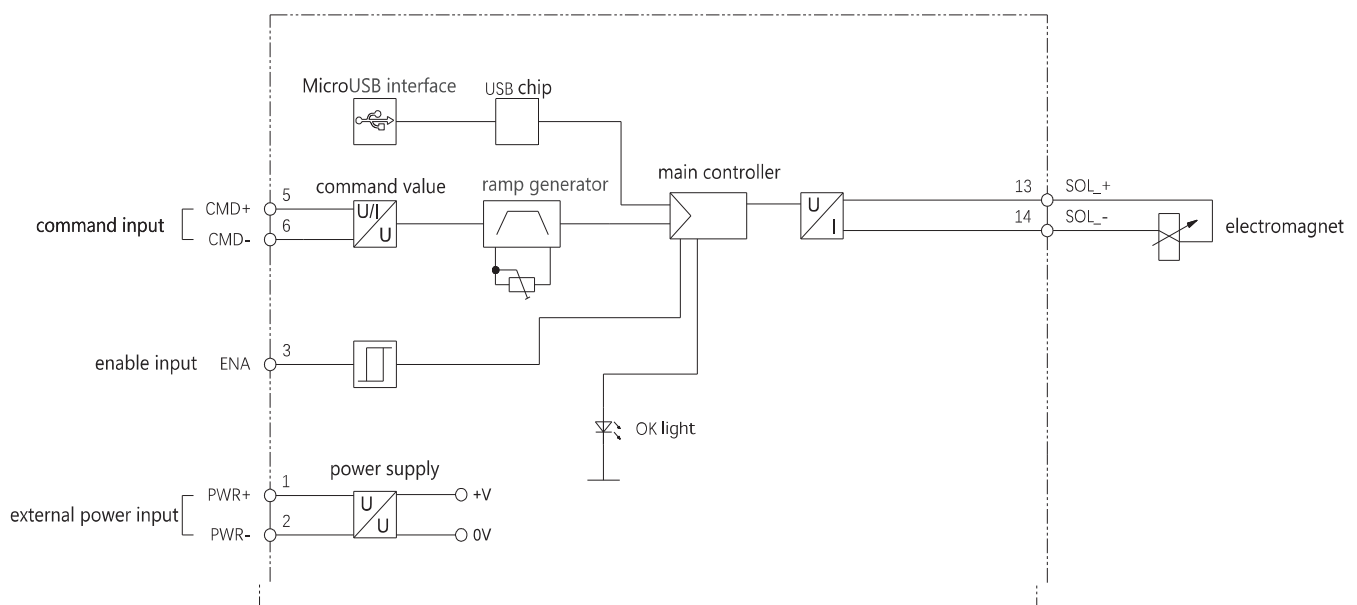
RT-MSPD	1	-	30	/	A1
01	02		03		04

01	RT-MSPD	Modular proportional amplifier
02	1	Drive single-electromagnet proportional valve
03	30	The design number is of 30 series
04	A1	The command input of 0~10V
	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	0~10 V, input impedance ≥100KΩ 4~20 mA, input impedance=100Ω (Specify before delivery, not switchable on site)
Resolution	≤1 ‰
Nonlinearity	≤1 ‰
Maximum Output Current	200~3000mA (settable)
Dither Frequency	50~2000Hz (settable)
Dither Amplitude	0~2000mA (settable)
Ramp Time	10~5000 mS (settable)
Enable input	11V~UB, The electromagnet output is normal and the OK light stays green all the time. < 10V, The electromagnet output is cut off and the OK light flashes green.
Communication Interface	MicroUSB
Communication Protocol	ModBus-RTU
Baud Rate	9600 Baud
PC Software	ACManager
Operating Temperature	-20~60°C
Storage Temperature	-25~70°C
Operating and Storage Humidity	0%~90%
Connection Type	Plug-in threaded fastening terminals

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 cut off.
4	N.C.	Not connected
5	CMD+	Analog 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
6	CMD-	
7	N.C.	Not connected
8	N.C.	
9	N.C.	
10	N.C.	
11	N.C.	
12	N.C.	
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 pins 5 and 6 will energize the electromagnet. For amplifiers of the 4 - 20mA command type, when the given value is less than 2mA, the amplifier will determine that the command wire 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.

Display and Adjustment

Indicator light display

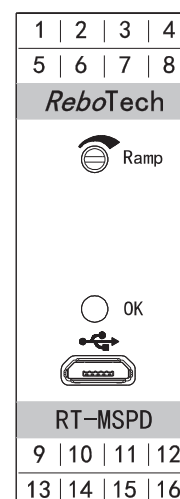
The status of the OK light	Descriptions
Green light always on	Normal
Green light flashing	Disabled
Red light always on	Electromagnet wire breakage.

Potentiometer adjustment

Potentiometer name	Descriptions
Ramp	Ramp time adjustment. The time increases when turning clockwise and decreases when turning counterclockwise. The adjustment range is from 0.01 to 5 seconds (the default factory value is 0.01s).

Communication interface function

Communication interface types	Descriptions
MicroUSB	Connect the computer and the amplifier through the MicroUSB data cable, and abundant parameter settings can be carried out. For details, please refer to the user manual of the host computer software ACManager.



Note: Please use data cables from regular manufacturers for connection. Otherwise, it may lead to the failure of the connection to the host computer!

Parameter Table

Serial Number	Item	Factory-set Value	Value Range	Unit	Descriptions
1	Dither amplitude ①	200	0~2000	mA	It is recommended to keep the factory-set values
2	Dither frequency ①	140	50~2000	Hz	It is recommended to keep the factory-set values
3	Initial current ②	100	10~1000	mA	
4	Dead zone setting ②	200	100~1000	mV or μ A	The unit of Type A1 is mV The unit of Type F1 is μ A It is recommended to keep the factory-set values
5	Current gain ②	1000	200~3000	mA	
6	Command zero point③	0	0~ $\pm$ 1000	mV or μ A	The unit of Type A1 is mV The unit of Type F1 is μ A It is recommended to keep the factory-set values
7	Ramp setting ④	10	10~5000	mS	It needs to be adjusted through the front panel potentiometer.

① It is recommended to keep the factory-set value of "dither amplitude" and "dither frequency". When the valve experiences jitter or a large hysteresis loop, the situation can be improved by adjusting these two parameters.

② The "initial current" and "dead zone setting" can be used to bypass the valve dead-zone, increasing the effective control range of the command. The "Current Gain" corresponds to the maximum flow rate or pressure of the valve.

Note: There may be a certain error between the current gain and the actual output current (the larger the current gain, the greater the error, but generally it does not exceed 20 mA). In case of occasions where extremely precise control of the current is required, it is recommended to connect a DC ammeter in series at the electromagnet terminal for calibration (that is, when the given instruction is 100%, adjust the "current gain" by observing the actual value on the ammeter until the actual value meets the requirements).

③ The "command zero point" is recommended to keep the factory-set value and is mainly used to compensate for the mechanical zero-position offset of the valve spool.

④ The "Ramp Setting" needs to be adjusted through the front-panel potentiometer. The host computer is only used to display the ramp time. When the impact on the hydraulic system is too large, the "ramp time" can be increased (turn the potentiometer clockwise) for buffering. If there is no impact on the system, it is recommended to keep the factory-set value.

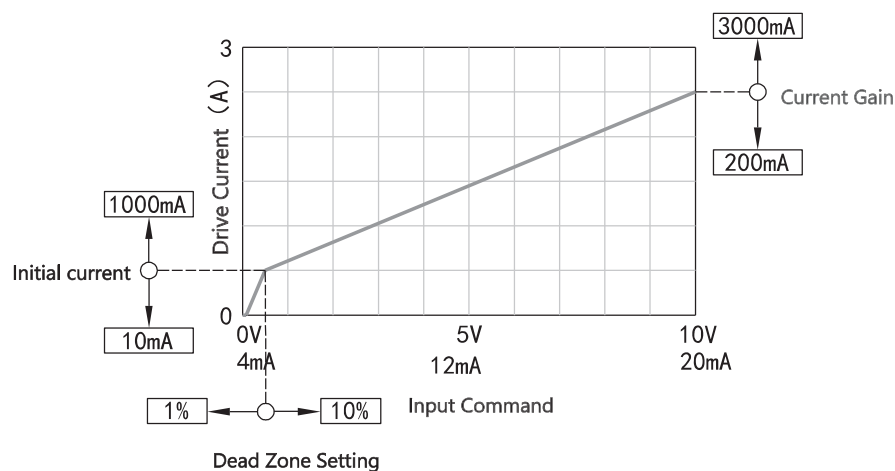
Note: The ramp time will affect both the rising and falling of the instruction simultaneously.

Parameter Meaning Diagram

Current Gain

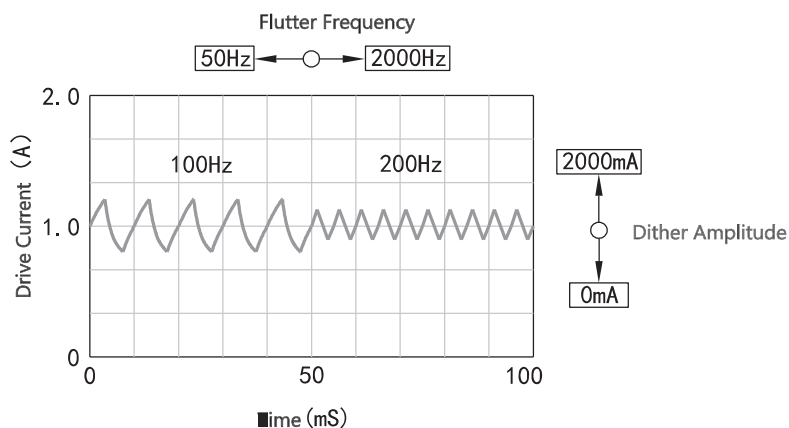
Initial Current

Dead Zone Setting

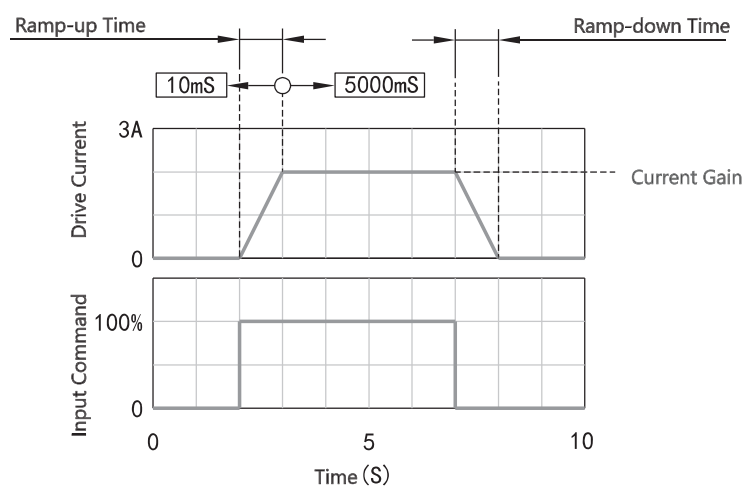


Flutter Frequency

Flutter Amplitude



Ramp Setting

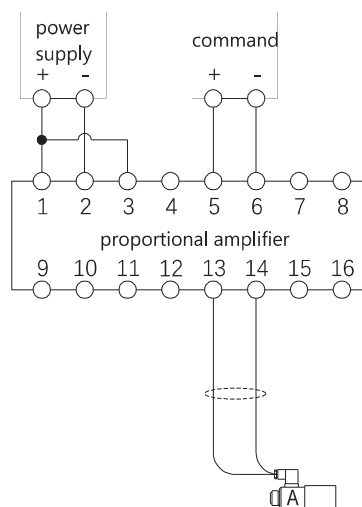


Wiring Examples

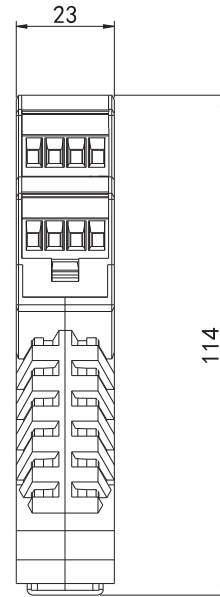
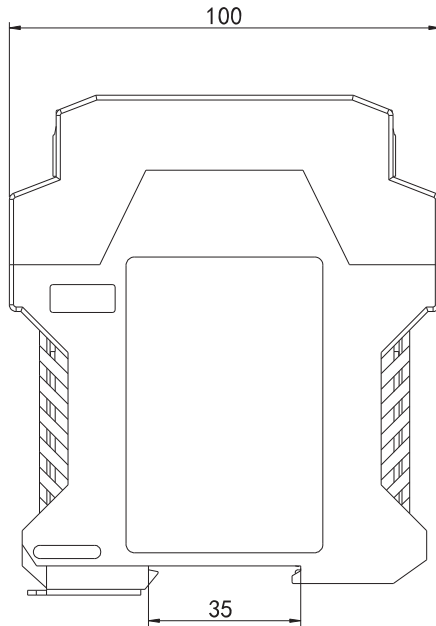
Example 1

Give an analog commands through PLC, CNC, acquisition card, etc. The analog commands can be any signal of 0~14V, 4~20mA.

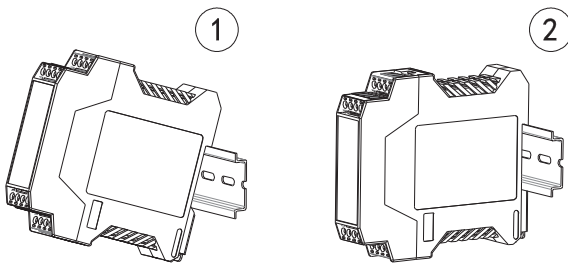
Note: The command type has been determined at the factory and cannot be changed on site.



Overall Dimensions (Unit: mm)

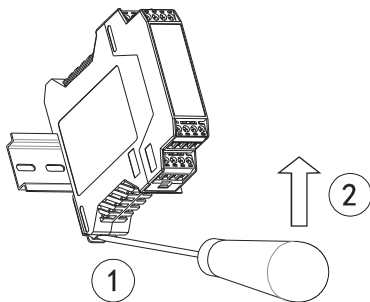


Installation Guidance



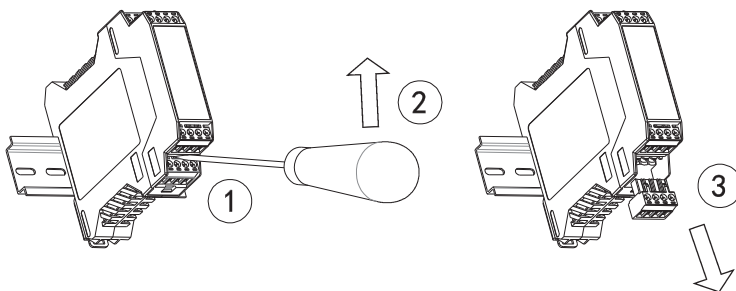
Amplifier Installation:

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 is 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 mm² 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".