

## Digital Proportional Amplifier

**RT-MSPD2**

**Series: 1X**



### Table of contents

Contents	Page
Features	1
Ordering code	2
Technical data	2
Block circuit diagram	3
Output curve	4
Pin assignment	4
Display / setting elements	5
Unit dimensions	6
Circuit examples	7

### Features

- Suitable for the control of proportional directional valves without electrical position feedback
- Powerful 32-bit processor
- Command value input  $0 \sim \pm 10V$  or  $4 \sim 20$  mA
- Two pulsed current output stages
- Adjustment range of minimum solenoid current  $0 \sim 0.8$  A
- Adjustment range of maximum solenoid current  $0.8 \sim 3$  A
- Adjustment range of ramp time  $0.05 \sim 5$  s
- $+10V$  regulated voltage, used for external potentiometer control
- One configurable digital input/ output, used for the customers' special requirement, defaults to be amplifier enable input
- Fault diagnosis function, power supply voltage, coil short circuit, open circuit or other abnormal conditions prompted
- Polarity protection for the voltage supply
- 35mm rail mounting

## Odering code

RT- MSPD2 - 1X / \*

### Proportional amplifier

Suitable for two proportional directional amplifiers without electrical position feedback

Configuration instructions of terminal “I/O<sup>1)</sup>”

E = Enable function

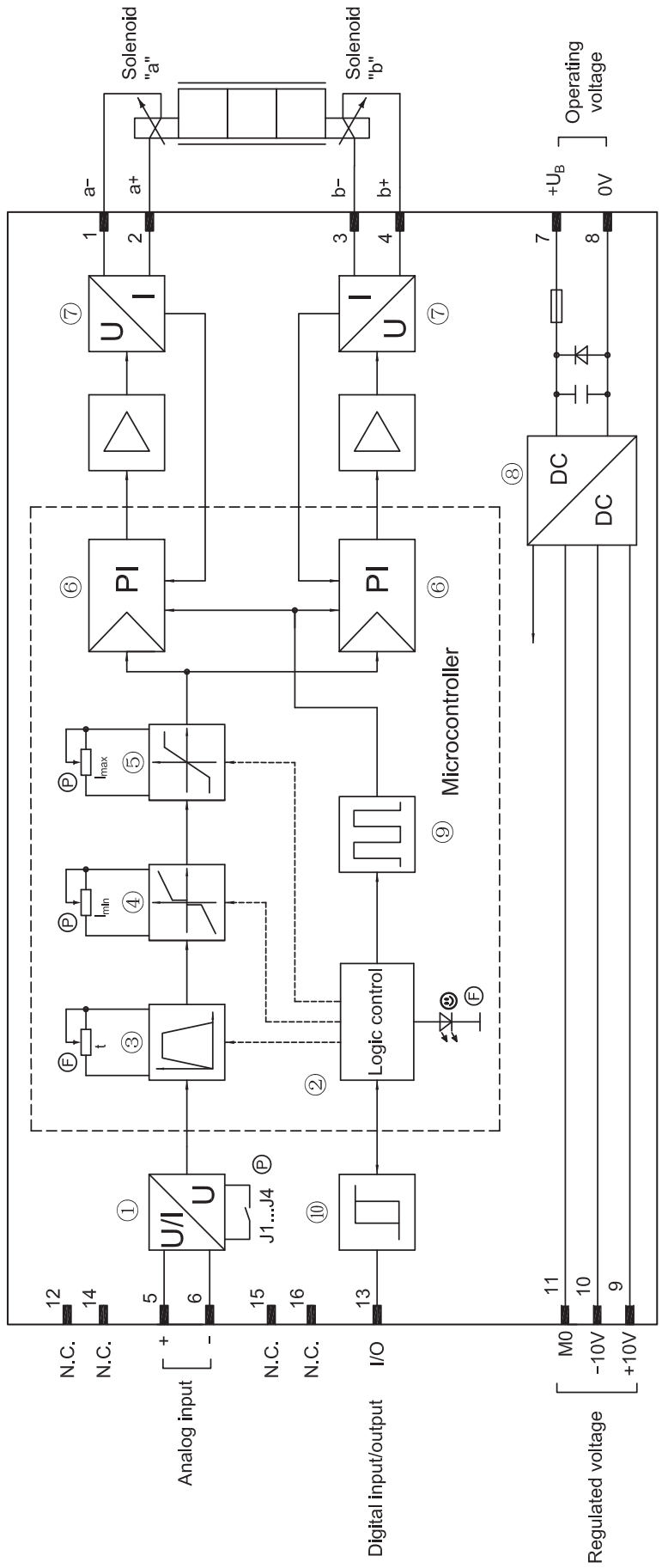
Design number =1X  
10 ~ 19: Technical data and terminal function remain unchanged

1) “/E” is the default setting if no special requirements are needed; please apply textual description if need to configure into other functions.

## Technical data (For applications beyond these parameters, please consult us!)

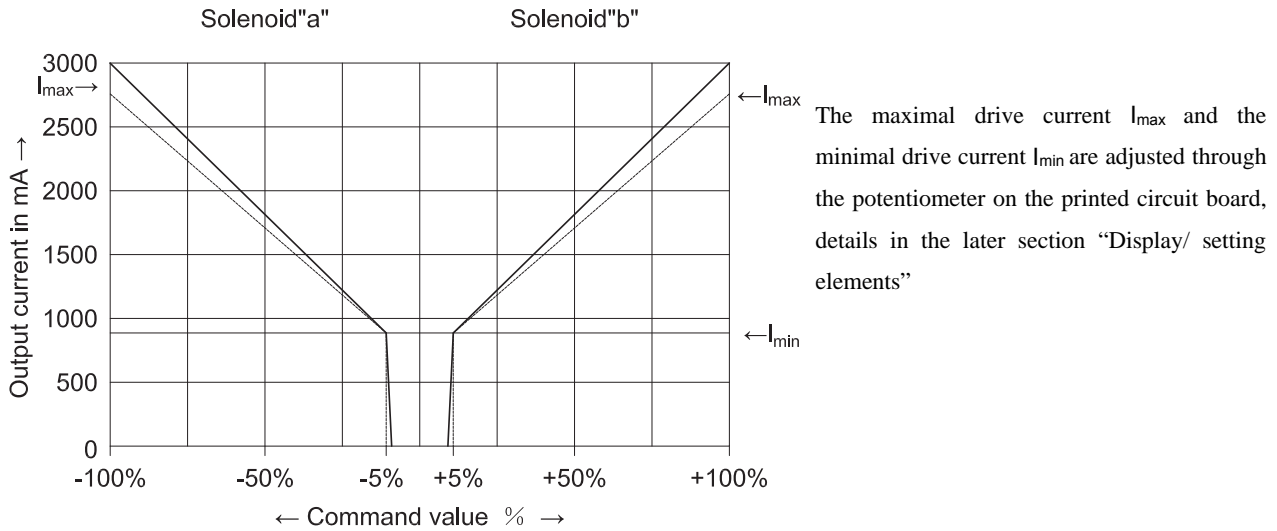
Dimensions (L × W × H)		100×23×114 mm
Operating voltage	$U_B$	24 VDC
Operating range		
– Upper limit value	$U_B(t)_{max}$	30 V
– Lower limit value	$U_B(t)_{min}$	10 V
Non-driving current consumption	$I_{cmax}$	60 mA
Ramp time		0.05 ~ 5 s, adjustable
Analog inputs:		-10 V ~ 0 ~ +10 V
– Input voltage level	$U$	100 kΩ
• Input resistance level	$R_e$	< 10mV
• Resolution		4 ~ 20 mA, 4 mA corresponding -100%, 12 mA
– Input current level	$I$	corresponding 0%, 20 mA corresponding +100%
• Input resistance	$R_e$	200Ω
Digital input/ output:	$U$	Configuration depending on customers' requirements, 10 V < U < $U_B$ , valid; U < 10 V, invalid; amplifier enable as the default configuration if no special requirements
Outputs:		
– Output stage		
• Maximal drive current	$I_{max}$	0.8 ~ 3 A, adjustable
• Minimal drive current	$I_{min}$	0 ~ 0.8 A, adjustable
– Regulated voltage	$U$	±10 V, reference point is M0, $I_{max} = 15$ mA
Type of connection		Connection terminal (inserted type)
Permissible operating temperature range		-25 ~ 70 °C
Storage temperature range		-25 ~ 85 °C
Weight	$m$	0.30 kg

Block circuit diagram



- Ⓕ On front panel
- Ⓖ On printed circuit board
- ① (U/I)U converter
- ② Logic controller
- ③ Ramp generator
- ④ Zero adjustment
- ⑤ Output limiter
- ⑥ PI current regulator
- ⑦ Output stage
- ⑧ Switch power supply
- ⑨ Dither signal
- ⑩ Lever converter

## Output curve



## Pin assignment

Terminal	Function description
1 a-	Solenoid "a" coils
2 a+	
3 b-	Solenoid "b" coils
4 b+	
5 +	Analog input: Voltage: $-10V \sim 0 \sim +10V$ , $-10V \dots 0$ , control solenoid "a", $0 \dots +10V$ , control solenoid "b" Current: $4 \sim 20mA$ , $4 mA \equiv -100\%$ , $12 mA \equiv 0\%$ , $20 mA \equiv +100\%$
6 -	
7 $+U_B$	Operating voltage 24VDC
8 0V	
9 -10V	Regulated voltage output, the reference point is M0
10 +10V	
11 M0	Measuring reference point
12 N.C.	Reserve
13 I/O	Digital input/ output: $10 V < U < U_B$ , valid; $U < 10$ , invalid, see detail in the upper section "Technical data"
14 N.C.	Reserve
15 N.C.	Reserve
16 N.C.	Reserve

## Display/ setting elements

LED and potentiometers on the front panel  
States and meanings of light “☺”

No.	States of light “☺”	Meanings
1	Green always	In working order
2	Light off	No or lack of power supply of amplifier
3	Red flashes every 1s	Electromagnet cable fracture
4	Red flashes every 0.2s	Electromagnet cable short circuit

“t” —Ramp time, clockwise increases, counterclockwise decreases

Meanings of potentiometer and dial switch on the printed circuit board

Potentiometer

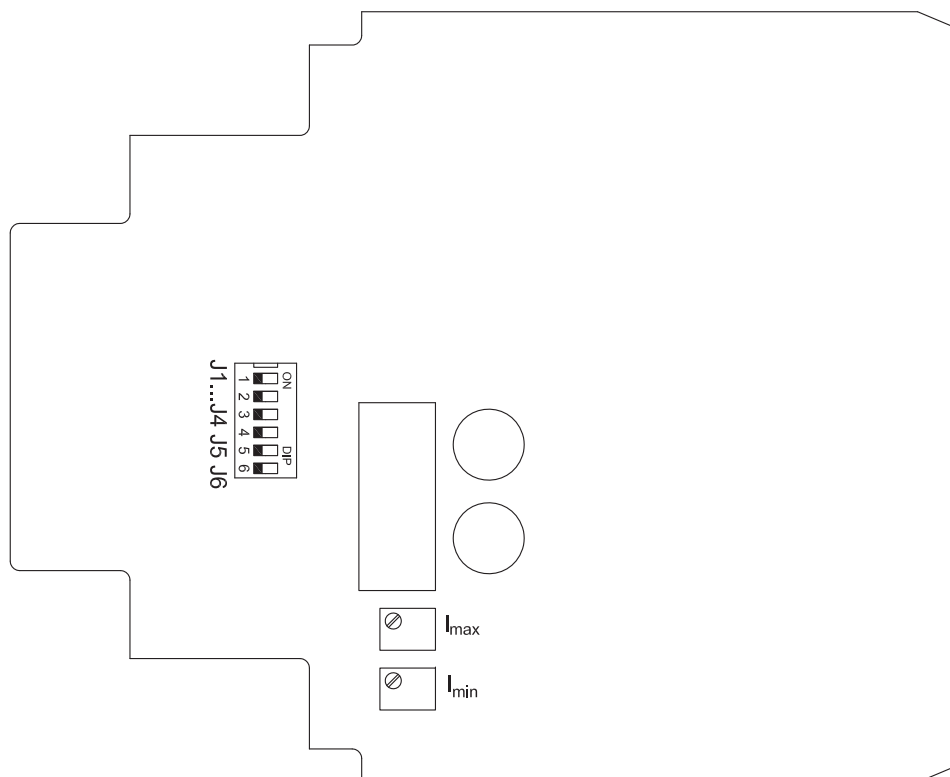
“ $I_{max}$ ” — Maximal drive current, clockwise increases, counterclockwise decreases

“ $I_{min}$ ” — Minimal drive current, clockwise increases, counterclockwise decreases

Dial switch

State of “J1, J2, J3, J4”	Analog input form of terminal 5, 6
ON, ON, ON, ON	Voltage mode $-10\text{ V} \sim 0 \sim +10\text{ V}$
OFF, OFF, OFF, OFF	Current mode $4 \sim 20\text{ mA}$

1	2	3	4
5	6	7	8
RT-MSPD2			
9	10	11	12
13	14	15	16



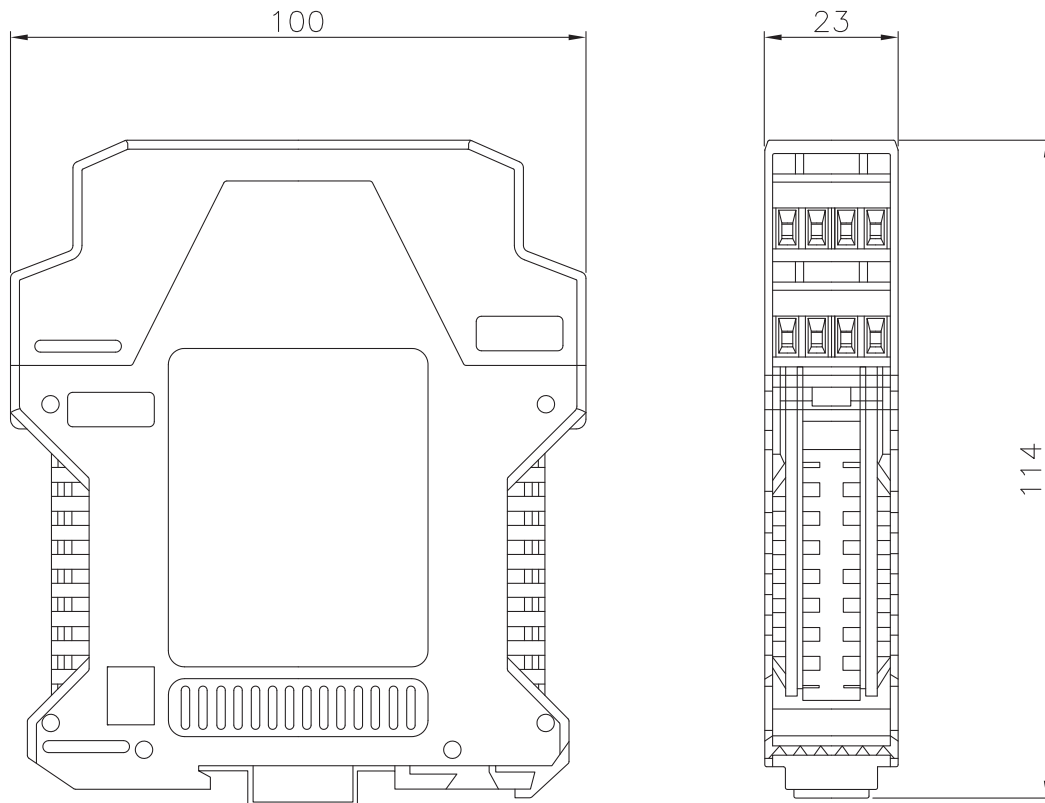
**Note:**

- The potentiometers and other jumpers on the printed circuit board has been adjusted at the factory, if you change settings of these potentiometers and jumpers, the warranty will become void!

2. Dial swith J5 and J6 on the printed circuit board are invalid.

**Unit dimensions (in mm)**

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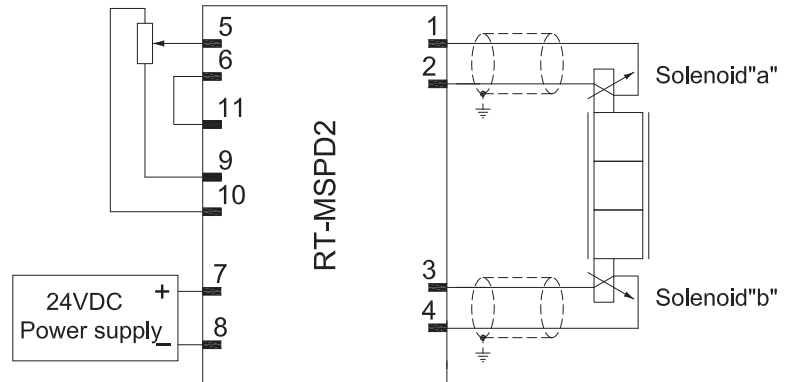


## Circuit examples

### Example 1: Use reference voltage of the amplifier as value-setting device

Shorten terminal 6 and 11, connect terminal 9 and 10 to both ends of the potentiometer, and connect terminal 5 to the potentiometer tap.

When the potentiometer is in the central position, solenoid "a" and solenoid "b" have no control current. When the potentiometer turns to a certain direction, one solenoid gets control current, the actuator (hydraulic cylinder or motor) moves in a certain direction, the speed is determined by displacement of the potentiometer on the front panel. When the potentiometer turns to the other direction, the other solenoid gets control current, the actuator (hydraulic cylinder or motor) moves in the other direction, the speed is determined by the displacement of the potentiometer.



### Example 2: Use PLC, CNC or PC as value-setting device

Use external independent value-setting device, amplifier analog input terminal 5 and 6 should be applied.

