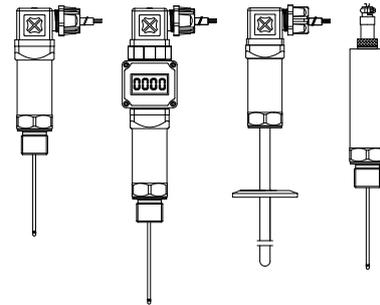# Temperature transmitter

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Supmea Automation Co.,Ltd.

U-SUP-P202/PX202-EN2

Preface

Thank you for purchasing temperature transmitter. Please read this manual carefully before operating and using it correctly to avoid unnecessary losses caused by false operation.

Note

- Modification of this manual's contents will not be notified as a result of some factors, such as function upgrading.
- We try our best to guarantee that the manual content is accurate, if you find something wrong or incorrect, please contact us.
- This product is forbidden to use in explosion-proof occasions.

Version

U-SUP-P202/PX202-EN2

Disclaimer

- The company does not make any guarantees for the terms outside the scope of this product warranty.
- This company is not responsible for damage to the instrument or loss of parts or unpredictable damage caused directly or indirectly by improper operation of the user.

Package contents

Number	Name	Quantity	Remarks
1	Temperature transmitter	1	
2	Manual	1	
3	Certificate	1	

Package contents

After opening the box, please confirm the package contents before starting the operation. If you find that the model and quantity are incorrect or there is physical damage in appearance, please contact us.

Contents

1 Introduction

1.1. Introduction

Intelligent temperature transmitter, used for thermal resistance RTD) input, 2-wire (4~20) mA analog output, RS485 output. Built-in the latest ASSIC single-chip integrated circuit, using high-precision 24-bit ADC to convert into digital signals, the product has the characteristics of accurate measurement, stable operation, long service life, etc.

1.2. Characteristics

- Compact structure and easy installation.
- High stability and high reliability.
- Anti-vibration, anti-radio frequency interference.
- High precision, all stainless steel structure.
- Strong anti-interference, good long-term stability.
- Wide range.

1.3. Parameters

Table 1 Technical parameters

Measured variables	Temperature
Temperature sensor	Pt100
Measuring range	(-50～200)℃
Accuracy	0.5%F.S
Response time	T$_{90}$≤60s
Current output	(4～20)mA，load capacity =(U-9V)/0.02A U: supply voltage, unit: V
Communication output	RS485，Modbus communication protocol.
Temperature output	Pt100
Power supply	(4～20)mA output: (9～30)VDC RS485 output without display: (5～30)VDC RS485 output with display: (5～28)VDC
Power consumption	(4～20)mA output: 0.7W@24VDC RS485 output without display: 0.2W@24VDC RS485 output with display:0.4W@24VDC
Cable entries	DIN43650-A Hirschmann connector； GX12 aviation plug
Insulation resistance	20MΩ，250VDC
Dielectric strength	500VAC
Ingress protection	IP65（Display part: IP50）
Process pressure	4MPa
Ambient temperature	(-20~70)℃
Storage temperature:	(-20~70)℃

2 Dimensions

2.1. Dimensions of P202

(1) Threaded connection type (Hirschmann connector)

Unit: mm

(4~20)mA output, L=42
RS485 output, L=57
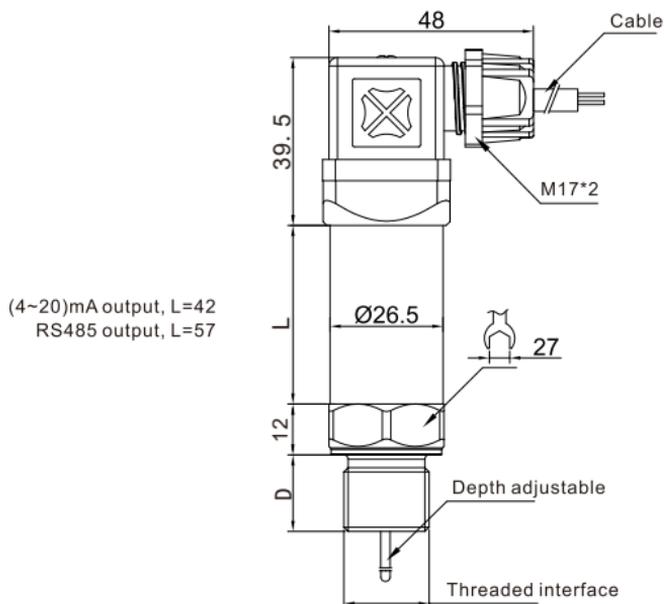
Fig.1

Table 2 Dimensions of conventional threaded interfaces

Threaded interfaces	M20×1.5	M27×2	M14×1.5
D	16.5mm	18.5mm	13.5mm
Threaded interfaces	G 1/2	G 1/4	NPT 1/2
D	16.5mm	13.5mm	16.5mm

(2) Threaded connection type (aviation plug)

Unit: mm
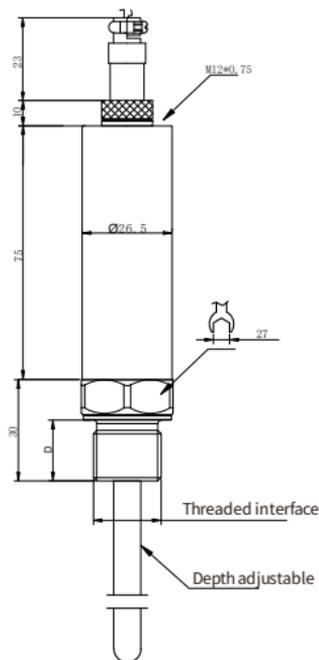
Fig.2

Table 3 Dimensions of conventional threaded interfaces

Threaded interfaces	M20×1.5	M27×2	M14×1.5
D	16.5mm	18.5mm	13.5mm
Threaded interfaces	G 1/2	G 1/4	NPT 1/2
D	16.5mm	13.5mm	16.5mm

(3) Chuck connection type

Unit: mm

48

39.5

M17*2

(4~20)mA output, L=42
RS485 output, L=57

Φ26.5

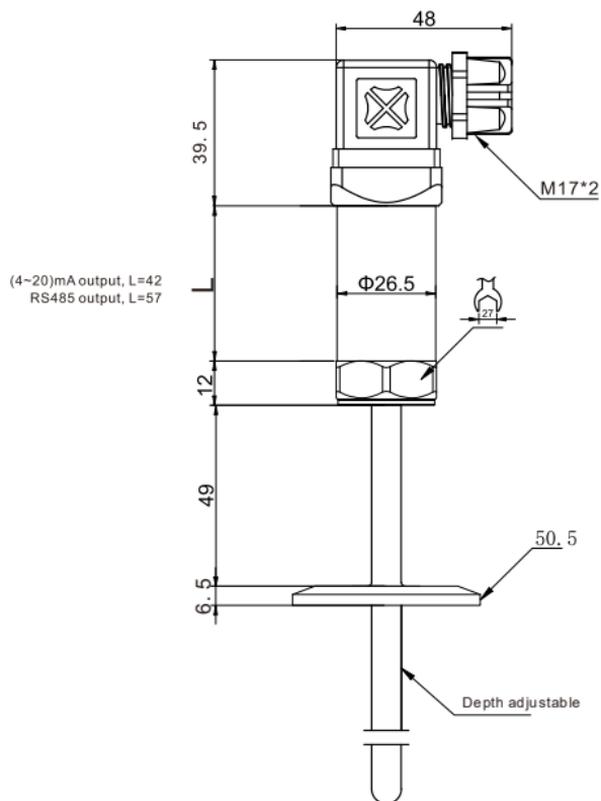27

12

49

50.5

6.5

Depth adjustable

Fig.3

2.2. Dimensions of PX202

Unit: mm
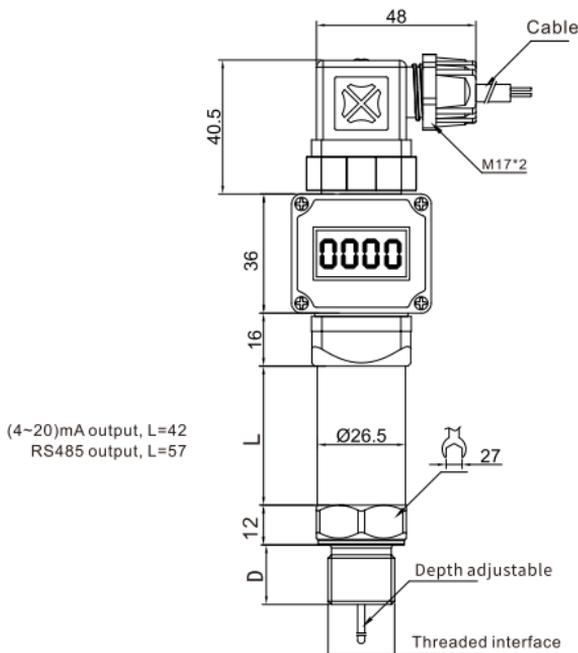
Fig.4

Table 4 Dimensions of conventional threaded interfaces

Threaded interfaces	M20×1.5	M27×2	M14×1.5
D	16.5mm	18.5mm	13.5mm
Threaded interfaces	G 1/2	G 1/4	NPT 1/2
D	16.5mm	13.5mm	16.5mm

3 Electrical connections

3.1. Current output connections

2-wire current
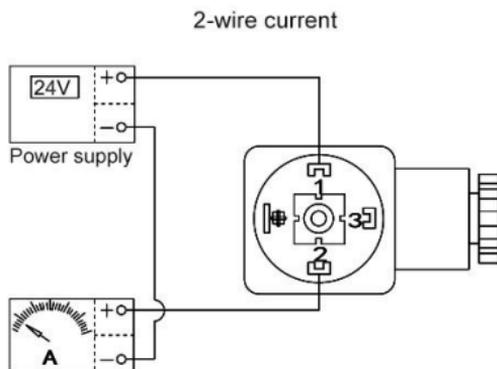
Fig.5 Current output connections

3.2. RS485 output connections

RS485 output

485A

485B

1 Power supply +
2 Power supply -
3 RS485 A
RS485 B
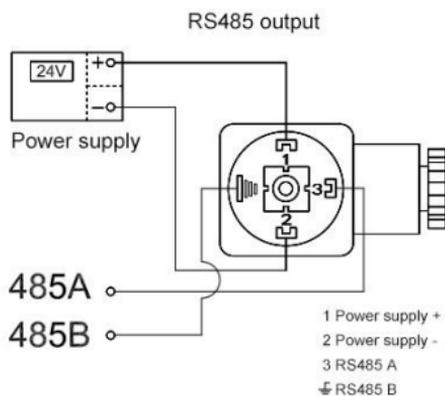
Fig.6 RS485 output connections

3.3. Pt100 output connections

Measuring terminal B
Measuring terminal B
Measuring terminal A
1 Red
2 Green
3 Yellow

1-Measuring terminal B:Red
2-Measuring terminal B: Green
3-Measuring terminal A: Yellow

Fig.7 Pt100output connections

-

4 Operation

4.1. Display and operation unit
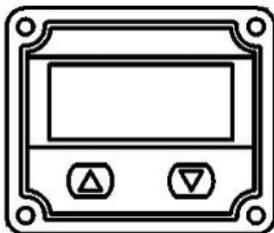
Fig.8 Display and operation unit

4.2. Operation of analog signal output type

4.2.1 Display interface

①：Measurement Value

②：Measurement Unit

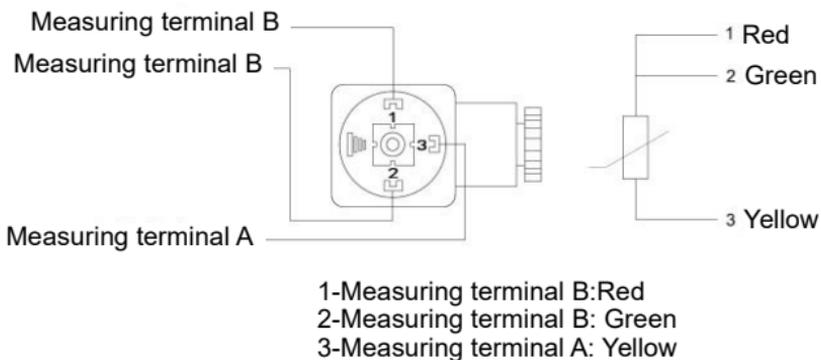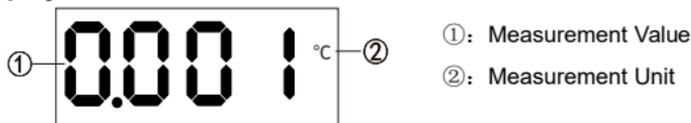Fig.9 Main interface

4.2.2 Accessing the menu

Press both the 【▲】 and 【▼】 keys simultaneously to enter the password input state "Lock". Press the 【▲】 or 【▼】 keys to move the cursor or change the value at the cursor, respectively. Enter the password "0001" to access the settings menu.

Press the 【▲】 or 【▼】 keys briefly to scroll through the menu items. To modify a specific menu item, press both 【▲】 and 【▼】 keys simultaneously to enter the modification mode. Once the modifications are completed, press both keys simultaneously again to return to the menu state.

4 Operation

4.2.3 Configuration settings

Table 5 Configuration explanation

Symbol	Meaning	Setting explanation
DS-L	Zero Display Value	Sets the zero position display for temperature
DS-H	Full Scale Display Value	Sets the full scale display for temperature
DP	Decimal Point Selection	Sets the decimal point position; symbol only, no dynamic range conversion. For example, factory settings DS-L = 0000, DS-H = 1000, if decimal point is set to 0.1, full scale display will show 100.0. If no other parameters are changed, only the decimal point setting changed to 0, the full scale will display as 1000.
UNIT	Unit Selection	Provides seven common units "MPa, kPa, bar, psi, M, Pa, ℃, none", symbol only, no dynamic range conversion.
LINE	Non-linear Correction	Inverse value of the midpoint error in current, input by user. Reference standard is the meter display value.
FILT	Filter Coefficient	Prevents display fluctuations due to current variations. Selectable from 0 to 9, higher coefficients yield more stable display but slower data changes.
ZER	Zero Suppression	Removes insignificant small signals, settable from 0.0% to 2.0% of the range.

4.3. Operation of RS485 output type

4.3.1 Main Interface

Fig.10   Main interface

4.3.2 Accessing the menu

Press and hold both the 【▲】and 【▼】keys for 5 seconds to enter the password input mode. Use the 【▲】 key to move the cursor and the 【▼】key to change the value at the cursor position. Enter the password "0016" to access the user settings menu.

Press the 【▲】 or 【▼】 keys briefly to scroll through the menu items. To modify a particular menu item, press both 【▲】 and 【▼】 keys simultaneously to enter the modification mode. Once modifications are completed, press both keys simultaneously again to return to the menu state.

4.3.3 Configuration settings

Table 6 Configuration settings

Symbol	Meaning	Setting explanation
ADDR	Address Setting	Range: 1~247, Adjust using the 【▲】or 【▼】keys.
BAUD	Baud Rate Setting	Range: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps. The last '**00**' are not displayed, e.g., 12 represents 1200 bps, 1152 represents 115200 bps.

Symbol	Meaning	Setting explanation
		Adjust using the 【▲】 or 【▼】 keys.
PAR	Parity Setting	Options (N: none, O: odd, E: even). Adjust using the 【▲】 or 【▼】 keys.
SPD	ADC Speed	Unit Hz, 10 represents 10Hz (slow conversion rate, stable data), 40 represents 40Hz (faster conversion rate, but less stable than at 10Hz). Adjust using the 【▲】 or 【▼】 keys.
UNIT	Unit Setting	Range (0：Pa，1：kPa，2：MPa，3：mmH$_2$O，4：mH$_2$O，5：bar，6：psi，7：atm，8：kgf/cm^2，9：mm，10：m，11：℃，12：℉). Adjust using the 【▲】 or 【▼】 keys.
DOT	Decimal Places Setting	Range (0~3). Adjust using the 【▲】 or 【▼】 keys.
OFT	Offset Value Setting	Set by UNIT. Move cursor with 【▲】, change value with 【▼】.
SAVE	Exit	Save settings with YES, do not save with NO, exit settings mode by simultaneously pressing 【▲】【▼】 Note: If no button is pressed for 60 seconds, the device automatically exits user settings.

4.3.4 Zeroing operation

Press and hold the 【▲】 and 【▼】 keys simultaneously for 5 seconds to enter the password input mode. Use the 【▲】 key to move the cursor and the 【▼】 key to change the value at the cursor. Enter the password "0036" to initiate the zeroing state.

Press the 【▲】 and 【▼】 keys to select "YES" (confirm zeroing), "NO" (do not zero), or "RST" (cancel zeroing). Press both keys simultaneously to exit.

Note: If no button is pressed for 60 seconds, the device automatically exits zeroing mode.

4.3.5 Factory reset

Press and hold the 【▲】 and 【▼】 keys simultaneously for 5 seconds to enter the password input mode. Use the 【▲】 key to move the cursor and the 【▼】 key to change the value at the cursor. Enter the password "9876" and then press both 【▲】 and 【▼】 keys simultaneously to perform the factory reset.

Note: If no button is pressed for 60 seconds, the device automatically exits.

5 Use and installation

(1) The temperature transmitter should be installed as far as possible to avoid vibration and shock.

(2) The transmitter is suitable for various general corrosive liquids and gases. For strong corrosive media, strong corrosion-resistant structure is required, order according to special requirements.

(3) Do not pass the signal through the conduit or open wire slot together with other power lines, nor pass through the vicinity of high-power equipment.

(4) The sealing joint of the transmitter must not be loose, and must maintain a reliable seal.

(5) The transmitter must be used according to the specifications, and different types cannot be interchanged.

(6) Care should be taken when handling and installing the transmitter to avoid collision and affect the performance of the circuit.

(7) If you encounter problems during the installation and use of the product, please contact our company. When the product is abnormal, please do not open it for repair without authorization, and contact the manufacturer in time.

(8) This product is forbidden to be used in explosion-proof occasions.

6 Notice

(1) The transmitter is used in non-corrosive medium to silicon and stainless steel (or aluminum alloy).

(2) The back end of the transmitter should not be in contact with conductive, corrosive liquids or gases.

(3) The rear lead wire of the sensor cannot enter water.

Please strictly follow the precautions when using, otherwise you will be responsible

7 Communication protocol

Using RS485 serial interface.

Factory default serial port parameters: Baud rate: 9600bps (adjustable for 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200bps).

All message formats comply with GBZ 19582.1-2004 Industrial Automation Network Specification Based on Modbus Protocol Part 1: Modbus Application Protocol.

According to the device's functions, the MODBUS-RTU protocol function codes currently supported by the device include: 03H, 04H, 06H, and 10H.

Table 7 Register address

Details	Data type	Number of registers	Register offset address	Function code	Explanation
Address	Unsigned integer	1	0000H	03H, 04H, 06H, 10H	Range: 1~247 Automatically save after writing, effective immediately after saving
Baud rate	Unsigned integer	1	0001H	03H, 04H, 06H, 10H	0:1200 1:2400 2:4800 3:9600 4:19200 5:38400 6:57600

Details	Data type	Number of registers	Register offset address	Function code	Explanation
					7:115200 Automatically save after writing, effective immediately after saving
Units	Unsigned integer	1	0002H	03H, 04H, 06H, 10H	0:Pa 1:kPa 2:MPa 3:mmH$_2$O 4:mH$_2$O 5:bar 6:psi 7:atm 8:kgf/cm^2 9:mm 10:m 11:℃ 12:℉ Automatically save after writing, effective immediately after saving

Details	Data type	Number of registers	Register offset address	Function code	Explanation
Number of decimal places	Unsigned integer	1	0003H	03H, 04H, 06H, 10H	Range:0~3 Automatically save after writing, effective immediately after saving
Measurement output value	Unsigned integer	1	0004H	03H, 04H	Range: -32768~32767
Check bit	Unsigned integer	1	0006H	03H, 04H, 06H, 10H	0: none, 1: odd, 2: even Automatically save after writing, effective immediately after saving
Rate	Unsigned integer	1	000AH	03H, 04H, 06H, 10H	Range:0~3 Automatically save after writing, effective immediately after saving
Float output value high 16	Float	2	0016H	03H, 04H	Main variable floate output

Details	Data type	Number of registers	Register offset address	Function code	Explanation
bits					value, format: ABCD
Floate output value low 16 bits			0017H	03H, 04H	
Offset value high 16 bits	Float	2	0018H	03H, 04H, 06H, 10H	Main variable floate output value, format: ABCD
Offset value low 16 bits			0019H	03H, 04H, 06H, 10H	
Range zero position high 16 bits	Float	2	001AH	03H, 04H	Main variable floate output value, format: ABCD
Range zero position low 16 bits			001BH	03H, 04H	
Full range high 16 bits	Float	2	001CH	03H, 04H	Main variable floate output value, format: ABCD
Full range low 16 bits			001DH	03H, 04H	