Wireless digital pressure and temperature integrated transmitter

operating instruction

1. Overview

   Wireless digital pressure temperature integrated transmitter is designed for industrial pipeline pressure, temperature monitoring, set stainless steel oil core detection components, high precision PT 100 platinum resistance A class, high precision measurement circuit, low power embedded single chip, low power consumption wireless digital communication technology in the integration of high performance wireless digital transmitter, is with a variety of low power wireless communication network technology, and research and development of oil and gas production Internet construction one of the important front acquisition equipment.

   The high reliability design adapted to the industrial environment, as well as high accuracy, simple installation, convenient maintenance, environmental protection and durable characteristics have won user recognition, has been widely used in major oil and gas fields and other industrial stress testing fields in China.

2. Technical indicators

2.1. Working environment:

➢ Temperature, -40~70℃; relative humidity, 0 ~ 100% RH; atmospheric pressure, 80 ~ 110 kPa;

➢ Vibration, 10-500 Hz, with a peak acceleration of <19.6m/s2;

➢ The AC external magnetic field is 400 A/m.

2.2. Power supply:

➢ Wuhan Fuante Technology Co., LTD., lithium thionyl chloride battery

➢ ER34615H (Energy type), 3.6V38Ah (2 ER34615 batteries in parallel)

2.3. Measurement performance:

➢ Range: 0~110MPa, -200~600℃ optional;

➢ Accuracy: 0.5 level, 0.25 level is optional;

➢ Overload capacity: 120%FS;

➢ Measurement principle: the pressure adopts the piezoresistance principle, the temperature adopts the PT 100 platinum resistance conversion principle.

2.4. Display:

➢ LCD combination information display, pressure value, temperature value, battery voltage, channel number, signal strength, etc.;

➢ LCD backlight, power-saving mode;

➢ Two-color LED status indication.

2.4. Explosion-proof device:

➢ **Explosion-proof certificate No.: CCRI 23.2642X**

➢ **Explosion-proof sign: Ex i a ⅡC T4 G a.**

➢ Warning: When the equipment is used in zone 0, attention should be paid to prevent ignition hazard caused by impact or friction; there is potential electrostatic charge danger on the surface of non-metal shell, it should be wiped with wet cloth for maintenance.

. 2.5 Wireless communication:

   A variety of wireless communication systems can be selected and customized.

2.5.1 ZigBee

➢ Operating frequency, ISM2.4~2.5GHz, transmitting power: 10 mW (+ 10 dBm); receiving

sensitivity: -103 dBm;

➢ Transmission distance (open field) 300m;

➢ Communication protocol, ZigBee PRO 2007, CNPC A11-GRM, Sinopec Q / SLSH0021, can be customized according to the requirements.

2.5.2 LoRa

➢ Operating frequency, 410 ~ 510 MHz, transmitting power: 100 mW (+ 20 dBm); receiving sensitivity: -140 dBm;

➢ Transmission distance (open straight view) 3500m;

➢ Communication protocol, LoRa, LoRaWAN, LoRa +, can customize the supporting LoRa modules according to the requirements, to achieve point-to-point, point-to-point and multi-point applications.

2.5. Structure

➢ Protection level: IP68 (1m, 1h);

➢ Instrument shell material: cast aluminum;

➢ Contact medium material: 316L;

➢ Process connection: M20X1.5, M27 * 2, M12 * 1.5, NPT 1 / 2, R1 / 2, G1 / 2 optional customization;

➢ Weight: 1kg;

➢ Overall dimensions: height, 225, width, 144, deep, 126

3. Appearance and structure
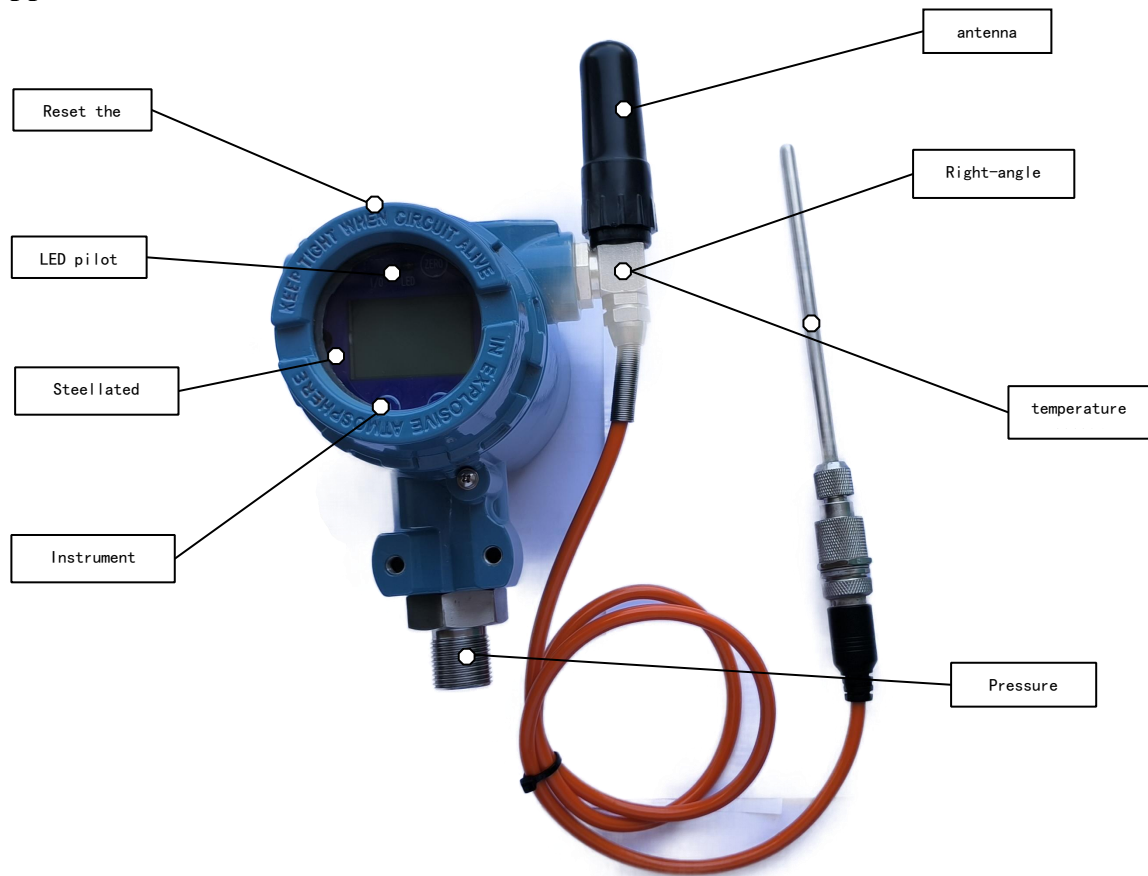
Figure 1. Function component indication diagram of the wireless digital pressure and temperature integrated transmitter
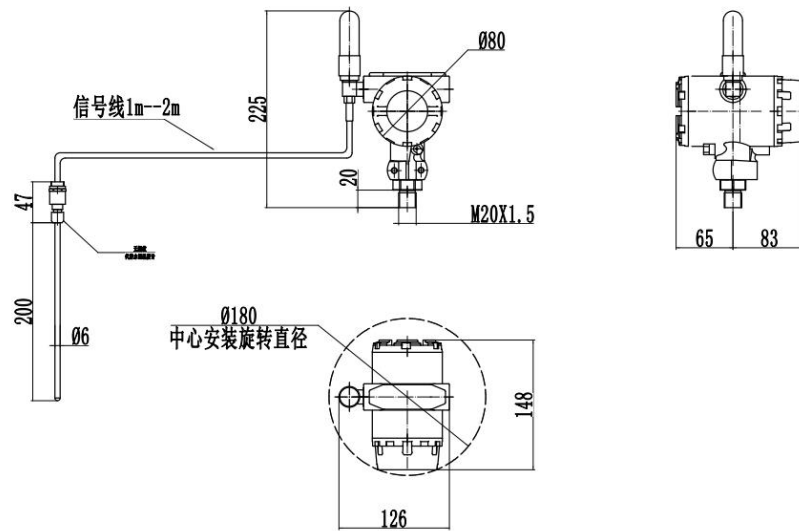
Figure 2. Outline dimensions of the wireless digital pressure and temperature integrated transmitter

4. Selection table

SM39PTWB	Wireless digital pressure and temperature integrated transmitter						
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	☐	Wireless form					
		Z: ZigBee L：LoRa 4；4G N：NB-IoT					
		☐	Pressure range				
			M: 2 3.5 7 10 20 35 70 100 (unit: MPa)				
			K: 7 20 35 70 100 200 350 1000 (unit: kPa)				
			☐	Temperature range			
				-200 -100 0 100 200 300 400			
				500 600 700 800 900 1000 (unit: ℃)			
				☐	procedural interface		
					M：M20×1.5	N：NPT1/2	G：G1/2	R：R1/2
					☐	power supply mode	
						C:3.6V/38Ah Disposable lithium battery	S:3.6V/6.6Ah Solar energy rechargeable battery
						☐	type of protection［of an electrical apparatus for explosive at mospheres］
							I: Intrinsically safe type (Ex ia ⅡC T4 Ga)	N: Standard type (not explosive-proof)

5. Commissioning manual

The software protocol refers to "Sinopec Victory Four Modernization Agreement", "CNPC A11 Agreement", and the technical documents. During the debugging process, the host server software of Bengbu Sun and Moon Instrument Research Institute Co., LTD., is used.

SM39PTWB Is a battery power supply, ultra-low power consumption, pressure board card module, ZIGBEE wireless protocol output, using advanced 32bit microprocessor and 24bit ADC, both high precision and ultra-low power consumption products.

characteristic:

- With an advanced 32bit microprocessor and 24bit ADC

- Zigbee Wireless protocol

- Temperature and pressure integrated design, can be a separate pressure, separate temperature, can also do temperature and pressure integrated

- The 5-bit liquid crystal 8-segment digital display, ignoring the value error

- Support user zero, anti-zero zero and other operations

- Magnetron backlight, magnetron fast acquisition mode

- Alarm function, alarm value can be set, alarm enabling can be set

- It has the function of upper computer debugging, and is compatible with

the field key debugging process, which greatly improves the debugging efficiency

5.1 Panel description
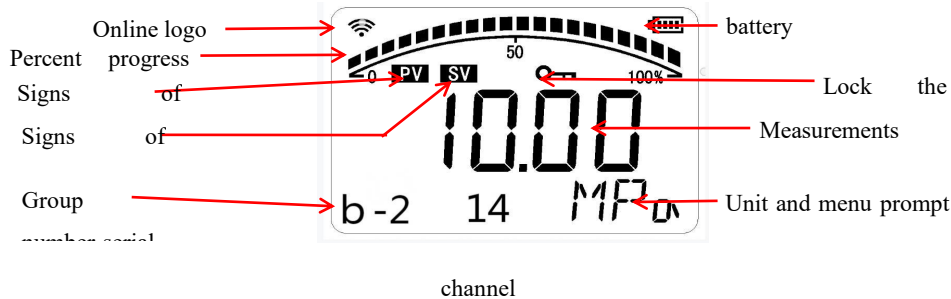
The online logo indicates that the interaction between the instrument and the field RTU is normal and online

5.2 LED indicator light instructions

● The first battery on or magnet reset, LED red light flashing three times can enter the configuration mode to modify the network number, channel number, instrument into the configuration mode LED red light long on.
● By default, the instrument collects the pressure temperature once for every 10S, or the LED blue light flashes once in the communication chain with the RTU.
● When the magnet reset LED blue light is often on, the magnet quickly leaves, and the instrument flashes three times to enter the configuration.

5.3 Key-press operation instructions

1. Magnetic control operation

Put the powerful magnet near the instrument Hall element for 3-5 seconds. When the LED blue light is always on, the magnet leaves quickly, the instrument flashes three times, refresh reset can enter the configuration mode, if the magnet is greater than 6 seconds, the LED blue light is always out
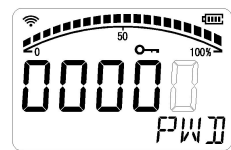
The instrument enters the rapid pressure / temperature refresh mode, and the cumulative test is 300 seconds, which is convenient for the site users to observe the pressure / temperature change in real time.

Energy saving skills: you can refresh the collection with slow cycle, and when you need to watch the measured value, you can open the backlight and activate the fast pressure / temperature refresh mode. After 300 seconds of fast pressure / temperature refresh mode, the program automatically exits. After exit, the instrument enters the

slow acquisition mode, that is, the cycle collection and report mode.

The cycle collection and reporting here refers to the direct communication interval between the instrument and the RTU. The parameters are set to the RTU to issue commands to the instrument, and the instrument corresponds accordingly and modify the parameters.
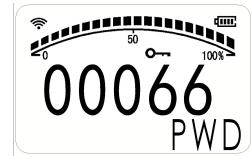
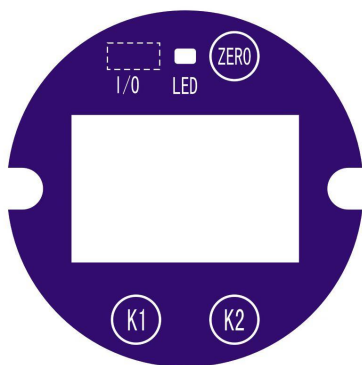The instrument defaults for 10 seconds, and the LCD refreshes the pressure / temperature value and is not reported.
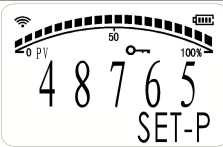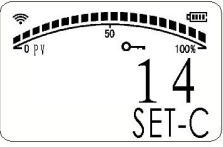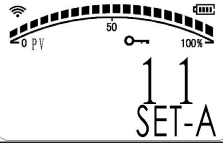
2. Instrument parameter settings A
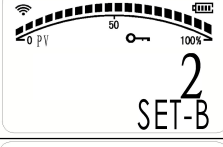
① In the ordinary measurement mode, long press K1 or K2 any key, enter the input password state, the screen display: blank indicates flashing, that is, the cursor position.

② Press K1 to move the cursor to the left, press K2 to change the value of the cursor bit, enter the password 00066 or 00088, press ZERO to determine, and enter the instrument parameter setting state;

③ Each menu item can be divided into viewing status and setting status, viewing status can view the value of this menu item, press K1 or K2 to switch between the menu item, press ZERO to enter the current menu item, setting status to change the value of this menu item, press the ZERO key to return to the viewing status of this menu item.

④ Touch the K1 button, LCD display network number, touch the K2 button, LCD display error code.

⑤ Key operation, enter the password 00066, and enter the instrument parameter setting A;

The corresponding network number, channel number, instrument group number and instrument serial number can be changed.

After entering, the program code of the first meter is SET-P. Press ZERO to enter the setting state of the current menu item, press K1 to move the cursor, press K2 to change the value of the cursor bit, and press the correct value to ZERO to determine until the last menu YES is saved. The specific operation functions are shown as follows:

LCD screen display	Lower right corner code name	Enter the password, password 00066

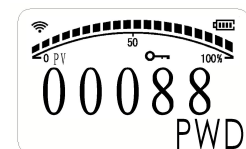| LCD screen display	Lower right corner code name	
4 8 7 6 5 SET-P	SET-P	Well name corresponding to the network number, code name: P
1 4 SET-C	SET-C	Well name corresponding to the channel number, code name: C
1 1 SET-A	SET-A	Instrument group number code: A
2 SET-B	SET-B	Instrument serial number code: B
YES SAVE / NO SAVE	SAVE	Whether to save exit YES means save exit, NO means not save exit, press K2 to switch, press ZERO to determine and exit the setting

Note: The instrument automatically exits the instrument parameter setting mode for 60 seconds without press.
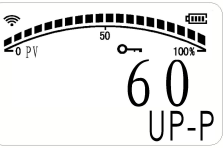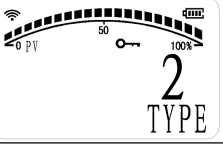
3. Meter parameter setting B

Key operation, enter the password 00088, enter the instrument parameter setting B;
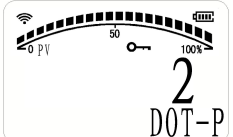
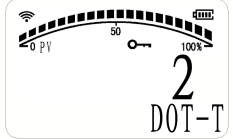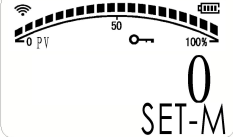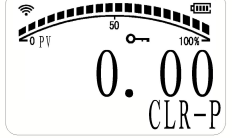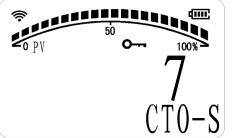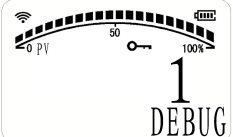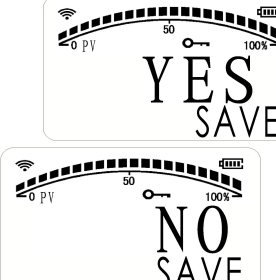Read the user adjustment functions such as RTU reporting cycle, instrument equipment type, pressure decimal place, temperature decimal place, physical quantity unit switching, manufacturer code, calibration switch and on.

00088 PWD

(Note: The function here is mainly a small number of users debugging, integrator debugging personnel, password 00088 into the modification.)

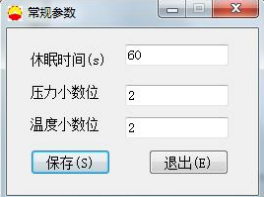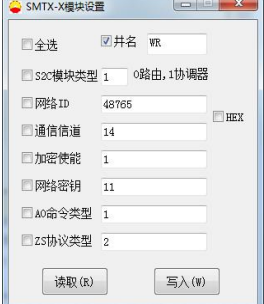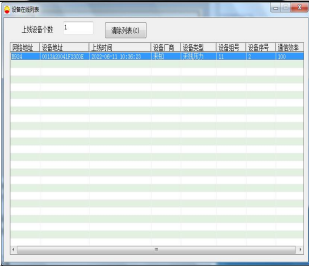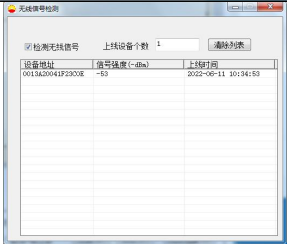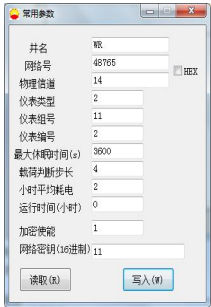| LCD screen display	Lower right corner code name	Enter the password, 00088
6 0 UP-P	UP-P	With the RTU reporting period, in seconds,
2 TYPE	TYPE	Instrument type 2 pressure 3 temperature 11 pressure temperature integrated

	DOT-P	LCD display pressure decimal place: 0- -3
	DOT-T	LCD display temperature decimal place: 0- -3
	SET-M	Unit of physical quantity switch: 0-MPA 1-KPA 2-℃
	CLR-P	The current transmitter is in the non-pressure state, that is, the pressure 0, can use the zero function, press ZERO key to enter the instrument parameter setting state, press K2 key to display 000.00, press ZERO key to determine. The current pressure value changes to 0.00.
	CTO-S	Manufacturer code (Bengbu Moon)
	DEBUG	The switch of the calibration enabling force
	SAVE	Whether to save exit YES means save exit, NO means not save exit, press K2 to switch, press ZERO to determine and exit the setting

Note: The instrument automatically exits the instrument parameter setting mode for 60 seconds without press.

5.4 Description of debugging of upper computer parameters

software interface	debugging specification
	Communication mode, select serial port, U turn serial port, port rate 19200, check mode without check.

	The reporting period with RTU can be set in 60 seconds, pressure decimal place: 0-3, temperature decimal place: 0-3.
	Through the well name, calculate the corresponding network number, channel number, encryption enable 1, network key 11, A0 command type 1, and ZS protocol type 2
	Device address, communication launch time, device type, device group number, device serial number, communication efficiency is 100%
	Number of online devices, equipment address, communication online time, and signal intensity
	In the configuration mode, the corresponding network number, channel number, group number and serial number of the well name can be set on the site. The maximum hibernation time is 3600 seconds. After the instrument and the RTU directly communicate for three consecutive times, the instrument enters the hibernation mode and finds the RTU every 3600 seconds. When the communication with the RTU is normal, it switches to the normal 60-second communication cycle.
	Upper and lower range limits of the meter. The measurement accuracy of the instrument is 0.5%, the protection grade IP68 (1m, 1h), **Explosion-proof grade: Ex i a ⅡC T4 G a**
	Factory version and date of the instrument

	Channel 1 is the pressure channel. Channel 2 is a temperature channel (1 is open and 0 is closed) When both channel 1 and channel 2 are 1, the temperature and pressure state is integrated.
	Manufacturer Code 7 (Bengbu Sun and Moon) Agreement Type 1 (A11)
	Pressure zero clearance function, the current pressure is suspended, not on the pipeline, the liquid crystal display value as the skin weight, so that the current pressure value of the software and liquid crystal display is 0.
	In the conventional communication state, the instrument equipment MAC address, instrument type, equipment group number, communication efficiency, remaining power, sleep time (communication cycle), the current pressure / temperature value of the instrument.