

## SM5100 ZigBee DTU specification

### 1. 综述



SM5100ZigBeeDTU is a simplified version of RTU. It can convert the digital sensor data using ZigBee communication into ModBusRTU/TCP standard interface protocol, which is convenient for the third party user to integrate the system.

This DTU encapsulates the standard communication protocol used in the construction of digital oilfield in China:

1. Downlink data: communication with wireless digital sensors at the well site, compatible with the standard protocols of "A11" of CNPC and "Four Modernization" of Sinopec. Other third-party wireless instrument protocols can also be customized:

2, uplink data: and station control center server or PLC, inverter and other control equipment communication, can choose Rs485, Rs232, Ethernet and other interface forms, to achieve ModBusRTU/TCP, IEC104 and other standard protocol communication transmission.

This DTU can be equipped with wireless digital sensors, widely used in industrial Internet of things measurement and control system: has been widely used and praised in oil well production data acquisition, environmental protection, agriculture, forestry, water, coal mine, petrochemical and other fields.

Wireless digital word



Figure 1, application networking topology diagram

## 2. Characteristic

### Standard and easy to use

- > Use industrial connector interface to facilitate industrial field application: > standard Rs485, Rs232 and Ethernet interface (to be customized) :
- > Intelligent data terminal, power on to enter the data transmission state:
- > Built-in Flash memory:
- > Can provide powerful central management software, convenient equipment management: > a variety of work modes to choose, easy to use, flexible:
- > Support online remote software upgrade and maintenance:
- > Provide complete and mature technical application solution support.

### Industrial application design

- > High performance industrial wireless communication module:
- > High performance industrial grade 32-bit microprocessor:
- > Low power design, low temperature rise of the whole system:
- > Metal enclosure, IP30 protection class, safe from external systems

It is suitable for industrial control field applications:

- > Wide operating voltage (5 ~ 24vDC).

### Stable and reliable

- > Dual watchdog design, external hardware monitors WDT and CPU internal WDT to ensure system stability:
- > Rs485, Rs232 communication interface EsD protection:
- > Built-in EsD, inverting, overvoltage, overcurrent protection circuit in power interface.

## 3. Function

Item	Content
Remote monitoring of oil well diagram	<p>A variety of oil well power chart measurement application modes can be selected:</p> <ul style="list-style-type: none"> <li>&gt; Optional supporting wireless load displacement integrated work diagram sensor, wireless load + wireless dead point switch, wireless load + Angle position</li> </ul> <p>To realize the production data acquisition of pumping Wells, such as work diagram, maximum/minimum load, stroke and stroke rate:</p> <ul style="list-style-type: none"> <li>&gt; Supporting wireless power collector, can realize electric power diagram curve (current diagram, power diagram), balance degree, three-phase current, three-phase</li> </ul> <p>Synchronous acquisition of voltage, active power, power factor and other electrical data of pumping Wells.</p>
Wellhead data monitoring	Supporting wireless digital pressure and temperature transmitters to measure oil pressure (or manifold pressure), sleeve pressure, wellhead temperature, etc.
Oil well remote control	Equipped with wireless power collector, it realizes remote well opening and well stopping of pumping Wells, and complete voice alarm before remote well opening and well stopping
System alarm monitoring	Supporting wireless power collector to realize remote stop and open well alarm, three-phase current imbalance and voltage lack equal alarm of pumping Wells
Metering room (station), pumping station (room)temperature, pressure, Network cluster monitoring	<ul style="list-style-type: none"> <li>&gt; Each DTU has a maximum of 40 wireless temperature or pressure transmitter measurement nodes:</li> <li>&gt; Multiple Dtus are concatenated through ZigBee network routing:</li> <li>&gt; Remote system server via Ethernet.</li> </ul>

## 4. Technical index

Item	Content
Work environment	Operating temperature, -40 ~ +65°C; relative humidity, 95%RH (no condensation); storage temperature, -40 ~ +85°C.
Wireless communication	<ul style="list-style-type: none"> <li>&gt; Frequency band, ISM 2.4GHz: support ZigBee PR02007 standard, a variety of network topologies, fast, reliable, safe;</li> <li>&gt; Transmit power, 100mW (+20dBm); receive sensitivity, -103dBm;</li> <li>&gt; Theoretical communication bandwidth, 250Kbps</li> <li>&gt; Standard SMA cathodal antenna interface, characteristic impedance 50 Q.</li> </ul>
Serial communication	<ul style="list-style-type: none"> <li>&gt; 1 RS232, 1 RS485 interface, built-in ESD protection circuit;</li> <li>&gt; Serial communication physical parameters: Baud rate 19200bps (can be set): 8 data bits, 1 stop bit, no parity check.</li> <li>&gt; Standard ModBus RTU protocol communication sequence format, can access third-party PLC or data acquisition terminal and other equipment: communication Protocol details: "SM5100 ZigBee DTU Communication Protocol".</li> </ul>
Ethernet Communication (requires special customization)	<ul style="list-style-type: none"> <li>&gt; 100/1000BASE-T compatible, built-in EMI filter;</li> <li>&gt; Support IPv6; Support ModBus TCP; support remote maintenance.</li> </ul>
Microprocessor	Industrial grade 32-bit microprocessor.
Memorizer	2M Bytes Flash Memory: Special customization, expandable to 8M Bytes.
Real-time clock RTC	Built-in Li battery, support network calibration
Power supply	<ul style="list-style-type: none"> <li>&gt; Power supply: 5 ~ 24VDC: power consumption, working current <math>\leq 200\text{mA}</math>, quiescent current <math>\leq 50\text{mA}</math>;</li> <li>&gt; Protection: built-in ESD, reverse, over current, over voltage protection circuit.</li> </ul>
Mechanical structure	<ul style="list-style-type: none"> <li>&gt; Metal shell, safe isolation from external systems: Protection class IP30;</li> <li>&gt; External dimension, 91.5 × 58.5 × 25mm (excluding antenna and mounting parts), see Fig.2 for details, structure dimension diagram;</li> <li>&gt; Weight, 200g.</li> </ul>

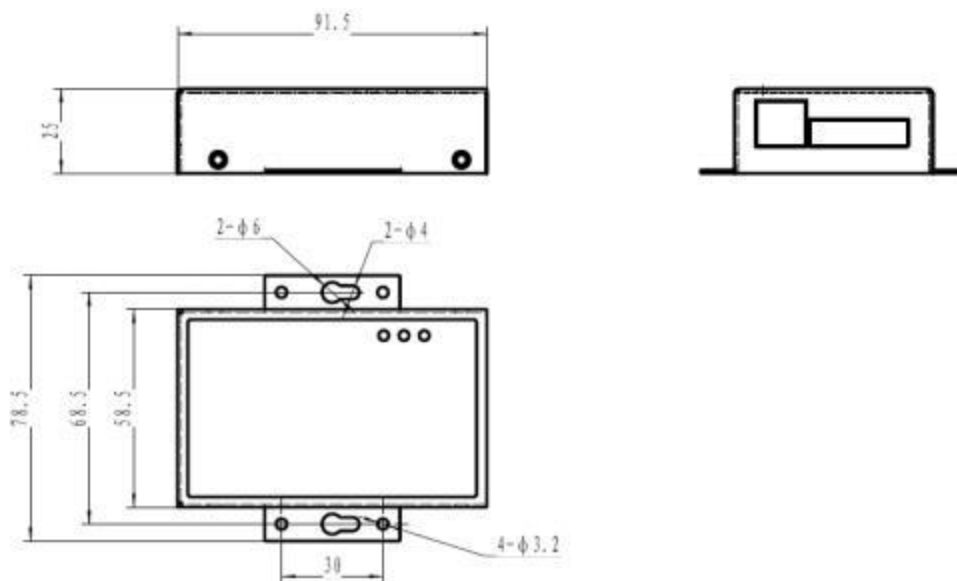


FIG. 2, The structure size diagram