485 Transceiver

B485ZT-R3

FCC ID:2AY22-B485ZT-R3

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Disclaimer

1、Product Profile

The 485 Transceiver (model: B485ZT-R3) is a sensor product developed by Xiamen ZiFiSense InfoTech Co., Ltd, supporting wireless transmission using the ZETA protocol (ZETA-P/S).

Working Principle: The sensor is connected to the reading equipment via a RS485 interface to read device parameters. The sensor supports the Modbus RTU protocol, capable of concurrently reading up to 32 channels.

Description : ZETA-P/S protocol are two communication sub-protocol developed by ZiFiSense for various scenarios. The ZETA-P protocol is suitable for small-scale networks with high real-time requirements, while the ZETA-S protocol is designed for large-scale networks with lower real-time demands. Both protocols support self-organizing Mote layers, effectively addressing coverage blind spots.

2、Features

- Wireless communication

- Low power consumption

- High signal sensitivity

- High reliability data transmission

3、Application Scenario

- Smart Energy meter reading

- Sensors with RS485 Modbus RTU interface

4、Specification

4.1. Wireless communication

- Protocol: ZETA-S/ZETA-P

- Frequency: 920~925 MHz

- Maximum Field Strength: 92.41dBμV/m@3m (Follow the regulation for RF devices)

- Coverage: Regular 200-500m

*AP topology and device installation environment will greatly affect the coverage

4.2. Product Characteristics

- Periodically collect data, report abnormal alarm

- Customize parameter to meet vary scenarios

- Up to 5 years battery life

  * Negatively correlated with reporting period.

- Apply ZETA LPWAN protocol

4.3. Electrical Characteristics

Power Supply: Battery

Battery Capacity :4*ER14505/4*2700mAh

4.4. Environmental requirement

Working T/RH: -20℃~+60℃, 0~95%RH

Storage T/RH: -25℃~+75℃, 0~95%RH

4.5. Physical Characteristics

Dimension : 182*169*68mm

Casing Material: Metal

Protection: -

Antenna : External Rubber Antenna

Indicator light: Description refer to Chapter 8 Troubleshooting No.5

5、System structure

Standard structure of ZETA system

- ZETA RS485 Transceiver

- ZETA AP+Mote

- ZETA Server

- ZETA FM Platform (Support API interface to existing third party platfor/system)

The ZETA network is a powerful and reliable wireless system known for its exceptional coverage and penetration capabilities. The wireless communication capability maintains between hundreds of meters extending to kilometers while under complex environment like industrial, urban and buildings. The network supports self-organizing

and self-healing functionalities.

When the B485ZT-R3 device is powered on, it automatically selects the optimal path to join the network, consistently communicating with other ZETA AP on site. The main advantages of using the ZETA communication protocol include:

Reliability: ZETA offers 99.9% end-to-end reliability in environments challenge radio communication, even with interference, depending on the features of tree network topology, interference resistance, time-synchronized messaging, and retransmission mechanisms.

Cost-effective Networking: The tree network topology and parsing beneath noise level capability of ZETA minimized the deployment cost of network infrastructure. High-cost-effective ZETA Mote can cover blind spots that typically arise in industrial wireless signal coverage.

Security and Privacy: ZETA implements a comprehensive IoT security system, ensuring network security through multi-layered measures such as access authentication, data encryption, ZETA Server management, user terminal management, and server database security management.

Extended Battery Life: The low power consumption design of ZETA and its sensors enables long battery life (2-3 years), making it highly efficient for diverse applications. ZETA allows users to quickly and easily experience the benefits of wireless technology while maintaining compatibility with existing devices and tools. Additionally, the adoption of more sensors using the ZETA communication protocol ensures scalability, laying a solid foundation for building intelligence and data collection.

6、Use guidance

6.1. Guidance Diagram
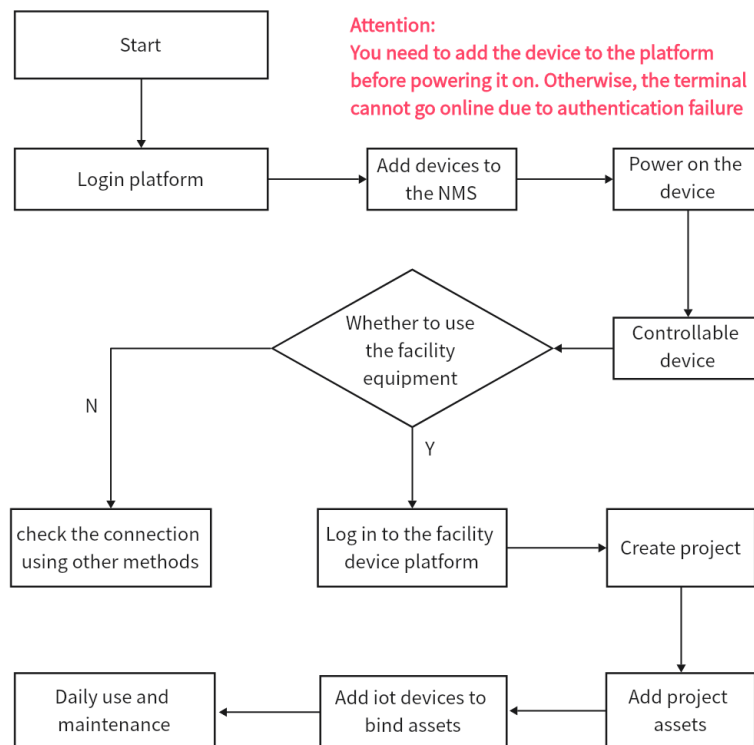
Note: The following steps outline the control process for sensors only. Ensure the ZETA

network is functioning correctly during use. For additional information on using the

ZETA Server, please log in at (https://platforms.zifisense.com/network/#/login) to

access the user manual. You can download the platform's user manual by clicking the

link in the top right corner of the platform page.

6.2. Sensor Control

After adding and powering on the device, check if it is online and registered to the

gateway. If the ZETA network is normal, the device is ready for use. In the "Device

Control" section of the platform, you can send commands such as reboot, re-register,

send heartbeat, transmit data, and set downlink mode. For details, refer to the user

manual appendix.
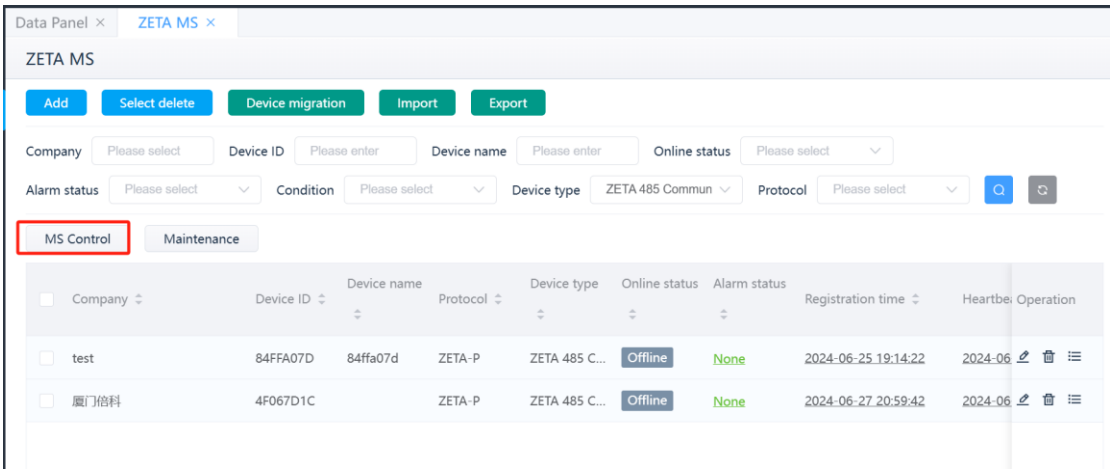
Device function parameters can be queried and set in the "Application Device Control" section. As shown below, refer to the device function parameters guide for details on each function.
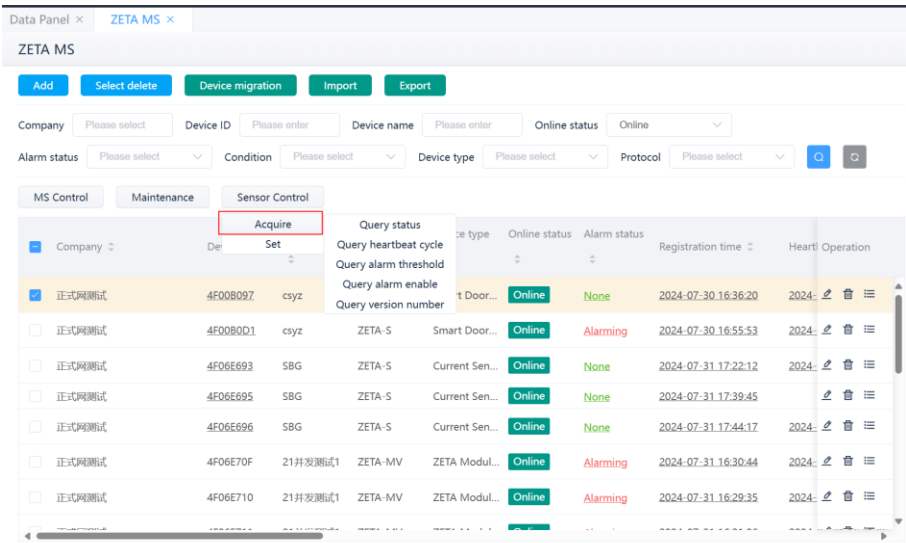
Note: To parse and view device-reported data and alarm information, log in to the

Facilities Management Platform at (https://platforms.zifisense.com/property/#/login).

Add and control devices on the platform.

The following steps outline the control process for devices only. Additional usage

methods can be found by downloading the user manual from the top right corner of

the platform.

As shown in the picture below:

1. Select the device by clicking on it.

2. In the query bar, choose the corresponding query content.

3. A confirmation box will appear; click confirm to proceed with the query.
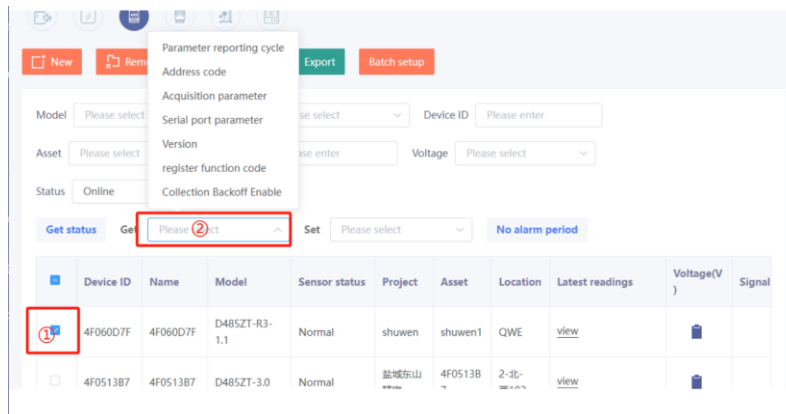
As shown in the picture below:

1. Click to select the device.

2. Click the settings bar and choose the appropriate setting. Enter the parameters in the

corresponding pop-up box and click confirm to apply the settings.

3. To mute alarm periods, click to select the time periods during which alarm

notifications should not be received.
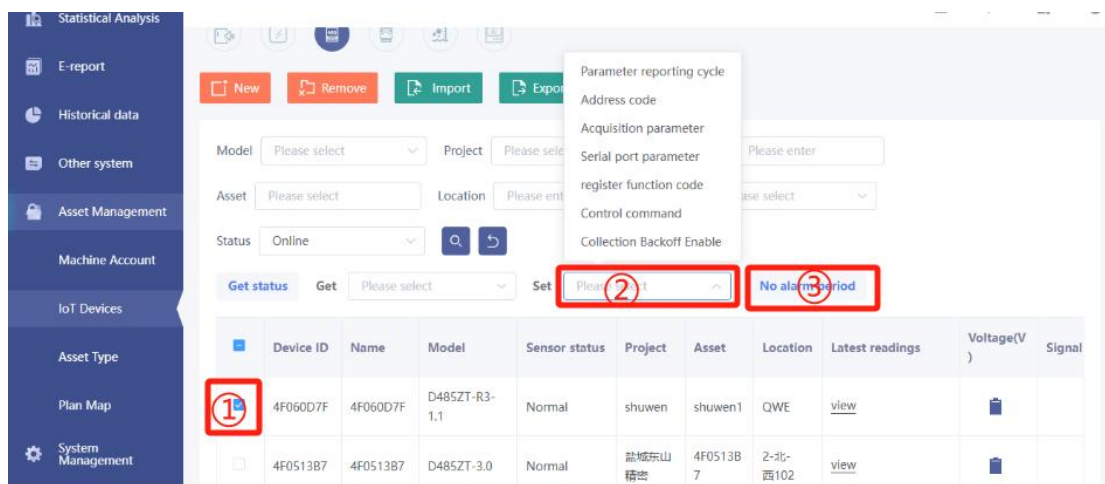
Note:

- **Report Version Number**: Reported only once after power-on.

- **Report Data:** Periodically reports collected data.

- **Set/Query Reporting Interval:** Set or query the current reporting interval. (Range: 1~65535 min, default: 12*60 min)

- **Set/Query Address Code:** Address code must match for 485 communications. (Range: 1~247, default: none)

- **Set/Query Register Function Code:** Set or query the Modbus function code. (Range: 03 or 04)

- **Set/Query Collection Parameters:** When setting, input the desired register address and the number of bytes to read. Multiple collection parameters can be set simultaneously.

- **Set/Query Serial Port Parameters:** Includes baud rate, data bits, parity bits, and stop bits. Parameters must match the device for proper data reading.

- **Query Data:** Actively query the current collected data from the device in addition to passive reporting.

- **Query Version Number:** Actively query the current software version of the device.

- **Note:** Some older sensors may not support certain functions. For version support, contact ZiFiSense.

7、Installation

7.1 Shipment Content

- 1*RS485 Transceiver B485ZT-R3

- 4*14505 Batteries

- 1*Rubber Antenna

Common Issues and Solutions

1. Check Packaging and Product Model:

- Verify that the packaging is intact and confirm that the product model matches the selected type.

2. Signal Coverage Issues:

- If the sensor exceeded the ZETA signal coverage or the RSSI is poor, consult with technical support personnel to adjust the project deployment plan. Additional Mote may be needed to expand signal coverage according to project requirements.

3. ZETA Sensor Not Online:

1. Check if the sensor has proper authentication and encryption settings. If missing, follow the above process to input them. In the gateway management interface, select the corresponding upper-level gateway and go to Device Control → Settings → Clear Authentication Failure Sensor Records.

2. Ensure the sensor and gateway belong to the same enterprise. If not, update to the correct enterprise and reboot the sensor.

3. Verify if the device has powered on successfully. Try reboot the device. If the green light is on for 5 seconds, the device has successfully connected to the network.

4. Power Supply Issues:

- Ensure proper power supply and correct wiring connections. The device uses specific batteries for power. Incorrect or unstable power supply may cause data anomalies. Check the device's power level on the platform. If the battery level is at 2.3V, replace the sensor battery. If at 9V, replace the sensor battery.

- Battery Replacement: Use an M6 Allen wrench to open the upper casing, replace the appropriate number of 14505 batteries, and re-install the upper casing.

5. Data Reporting Issues:

1. Confirm the ZETA network is functioning correctly by checking if the latest heartbeat packet time is later than the uplink data timestamp. Ensure the sensor is not frequently re-registering.

2. If an external MCU is unresponsive, perform a reset operation through the app to see if it recovers.

3. Verify the sensor data key is correct. Incorrect keys will cause decryption failures. Update the key in the network management platform by going to Device Management → Terminal Management → Edit on the right side → Modify Key.

6. Status Indicators:

■ **Red Light (Sensor Power Indicator):**

- During startup/reboot/reset:

- If voltage >10.5V: Steady for 5 seconds.

- If voltage ≤10.5V: Fast blinking, off for 250ms, on for 50ms, repeating 20 times.

■ **Yellow Light (Status Indicator & Work Status Button):**

- During power-up/reset/reboot:

- Network Connecting: Fast blinking, off for 250ms, on for 50ms, until network join succeeds. The light will then turn off during short or long sleep.

- Network Connected Successfully: Steady yellow for 5 seconds.

- Device Sleeping: Slow blinking, off for 1 second, on for 50ms. 5 cycles indicate short sleep, 10 cycles indicate long sleep.

- Network connecting: Fast blinking, off for 250ms, on for 50ms, repeating 10 times.

■ **Green Light (Data Collection Indicator):**

- Successful Data Collection: On for 10ms each time.

- Data Collection Error: Off for 500ms, on for 10ms, repeating 10 times.

7. **Device Not Working:**

- Reboot the device and check if functionality is restored. If issues persist, contact project or technical support personnel for further troubleshooting.

8、 Wireless Regulations Statement

In accordance with Announcement No. 52 of 2019 by the Ministry of Industry and Information Technology of the People's Republic of China and the "Catalog and Technical Requirements for Low-Power Short-Range Radio Transmission Devices," the following statements are made:

1. Compliance: This device has been tested and found to meet the wireless parameters and usage scenario limitations specified in Section (4) "Civilian Measuring Instruments."

2. Usage Restrictions:

   - Do not alter the usage scenario or conditions, expand the transmission frequency range, increase the transmission power (including adding external RF power amplifiers), or modify the transmission antenna.

3. Interference:

   - The device must not cause harmful interference to other legal radio stations and cannot claim immunity from harmful interference.

4. Interference Tolerance:

   - The device should tolerate interference from Industrial, Scientific, and Medical (ISM) applications or other legal radio stations.

5. Action on Harmful Interference:

   - If harmful interference to other legal radio stations occurs, immediately cease use and take measures to eliminate the interference before resuming operation.

6. Electromagnetic Environment Protection:

   - When using low-power devices within areas designated for electromagnetic environment protection, such as within 5000 meters of airport runways, radio astronomical observatories, meteorological radar stations, satellite earth stations (including control, ranging, receiving, and navigation stations), or other military and civilian radio stations, comply with electromagnetic environment protection regulations and relevant industry guidelines.

7. Model Remote Controls:

   - The use of various model remote controls is prohibited within a 5000-meter radius centered on airport runways.

8. Device Specifications:

   - Operating Temperature: -20℃ to +75℃

   - Operating Voltage: DC 2.0V to 3.6V

   - The device's transmission power and frequency tolerance comply with the requirements of the "Catalog and Technical Requirements for Low-Power Short-Range Radio Transmission Devices." Ensure the device is used within the specified range.

9.CAUTION:

-disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion;

-leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas;

- a battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

- Risk of fire or explosion if the battery is replaced by an incorrect type

Federal Communications Commission (FCC) Statement.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide Reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications made to this device not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF exposure statement:

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The device is installed and operated without restriction.