

# ETCR2800 Series Non-contact Earth Resistance On-line Detector

## MODBUS Protocol V2.0

ETCR2800 communication protocol use the standard MODBUS-RTU communication protocol. The detector as the slave.

### 1. RTU Message frame basic definition

0	1	2	3	4	5	6	7
Device address	Function code	Address 1	Address 0	Address 1	Address 0	CRC	CRC
8 Bit byte	8 Bit byte	8 Bit byte	8 Bit byte	8 Bit byte	8 Bit byte	8 Bit byte	8 Bit byte

### 2. Parameter Reading Command

#### 2.1.Host reading, setting command format

0	1	2	3	4	5	6	7
Device address	Function code	Address 1	Address 0	Data 1	Data 0	CRC	CRC
1~255	03,06	00	01-03(03 read) 02-03(06 write)	XX	XX	XX	XX

#### 2.2. Slave data feedback format

0	1	2	3	4	6	7
Device address	Function code	Length	Data 1	Data 0	CRC	CRC
1~255	03	02	XX	XX	XX	XX

0	1	2	3	4	5	6	7
Device address	Function code	Adress1	Address0	Data 1	Data0	CRC	CRC
1~255	06	00	02-03	XX	XX	XX	XX

#### Notes:

1. The baud rate is 9600bps, the data bit is 8 bits, the stop bit is 1 bit, and there is no check bit.
2. When officially used, it is not allowed to set the slave to address as 0.
3. The broadcast address 0x00 can send setting commands to all slaves, but the slave does not return confirmation response!
4. When testing resistance alone, the RS485 communication interval must be kept above 600ms. When testing resistance and current at the same time, the communication interval must be kept above 1000ms. The faster the time, the more it will affect the detection data of

the detector.

5. If forget the present device address, check the present address through the instrument's button operation. For specific operations, refer to the manual.

6. Alarm value, line resistance value, address, and test mode can all be checked and set through buttons.

Register Description: Device address: 1~255, 0 is the broadcast address (used as debug configuration), \* is the common command for new and old models

Address	Read-write property (0x03-read, 0x06-write)	Data Range	Function Introduction
*0x01	0x03	0-50000	The resistance value is divided by 100. For example, if the value is 100, it is 1.00Ω, and if it is 50000, it means over range OL.
*0x02	0x03/0x06	0-255	Setting and reading device address
*0x03	0x03/0x06	0-500	Resistance alarm value, unit is Ω, can be read or configured the alarm threshold. 0 or 500 means off
*0x04	0x03	43707 (0xAA 0xBB)	When the command test mode is enabled, this command is a manual test once.
*0x05	0x03/0x06	0-1	1 means start the control test mode. 0 means close the control test mode and enter the real-time test.
0x06	0x03,0x06	0-999	Read or configure line resistance value, unit is 0.1Ω
0x07	0x03	0-2000	The current value is divided by 10 and needs to be checked with the unit
0x08	0x03/0x06	0-1	Current unit value: 1 is A, 0 is mA
0x09	0x03/0x06	0-9999	Current alarm value, unit is mA, can be read or configured the current alarm threshold. 0 means off
0x0A	0x03	0-1	The device performs self-testing at the small resistance gear of 5.1Ω, and the interface displays the value during self-testing.
0x0B	0x03	0-1	The device performs self-testing at the large resistance gear of 36Ω, and the interface displays the value during self-testing.
0x0C	0x03	0-1999	Read the internal temperature of the device. The temperature value is divided by 10. If the thousandth place is 1, it is below zero.

**Example :( Note: The broadcast address is only used for debugging configuration. The following demonstration device address is 1)**

Via broadcast address reading the device address (hypothesis device address is 1)

Send: 00 03 00 02 00 01 24 1B

Receive: 01 03 02 00 01 79 84 (device address is1)

Use broadcast address 0 to set the device address to 1: (0 - 255)

Send: 00 06 00 02 00 01 E8 1B

Receive: 00 06 00 02 00 01 E8 1B

Note: 00 01 represents address 1.

(Device address is 1)

Read the device resistance test value through address 1

Send: 01 03 00 01 00 01 D5 CA

Receive: 01 03 02 C3 50 E8 88 (The value is 50000, display OL over range)

Via address1 reading the device resistance alarm value

Send: 00 03 00 03 00 01 74 0A

Receive: 01 03 02 01 F4 B8 53(Resistance alarm value is 500, means close the alarm function)

Read the present control test mode through address 1 (0 - real-time test, 1 - control test mode)

Send: 01 03 00 05 00 01 94 0B

Receive: 01 03 02 00 00 B8 44 (the value is 0, indicating real-time test)

Start the resistance test through address 1. (Read 03)

Send: 01 03 00 04 00 01 C5 CB

Receive: 01 03 02 AA BB 86 97

**(Note: Feedback data content AA BB indicates that the test is successfully started: send this command to test in control test mode)**

Read the device line resistance value through address 1

Send: 01 03 00 06 00 01 64 0B

Receive: 01 03 02 00 0A 38 43 (the value is 10, representing the line group value is 1.0Ω)

Read the device current test value through address 1

Send: 01 03 00 07 00 01 35 CB

Receive: 01 03 02 00 08 B9 82 (the value is 8)

Read the device current test value unit through address 1

Send: 01 03 00 08 00 01 05 C8

Receive: 01 03 02 00 00 B8 44 (the value is 0, indicating that the current test value unit is mA)

The current test result is: 8mA

Read the device current test value and unit through address 1 (the value is 50000A, which is over range)

Send: 01 03 00 07 00 02 75 CA

Receive: 01 03 04 00 95 00 00 EA 1F

00 95: Test value is 149

00 00: Unit is mA

Result: 14.9mA

Read the device current alarm value through address 1

Send: 01 03 00 09 00 01 54 08

Receive: 01 03 02 01 2C B8 09 (the value is 300, which means the current alarm value is 300mA)

Read whether the device 5.1R self-testing is correct (execute self-test) through 1 address setting

Only receive 0 and 1: 1 -> correct (device self-test is normal); 0 -> failed (device self-test is abnormal)

Send: 01 03 00 0A 00 01 A4 08

Receive: 01 03 02 00 00 B8 44 Device self-test is abnormal

Read whether the device 36R self-testing is correct (execute self-test) by setting the 1 address

Only receive 0 and 1: 1-> correct (device self-test is normal); 0 -> failed (device self-test is abnormal)

Send: 01 03 00 0B 00 01 F5 C8

Receive: 01 03 02 00 01 79 84 Device self-test is normal

!!! If the device equipped with screen, the resistance value will also be displayed. If the device self-testing is normal, which with 10% error is normal.

Read the device circuit board temperature through address 1

Send: 01 03 00 0C 00 01 44 09

Receive: 01 03 02 01 14 B9 DB (the value is 256, the temperature value is 25.6°C)