EBYTE®

Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

CONTENTS

1. Overview

1.1 Brief introduction

E800-DTU is a wireless data transceiver with the function of digital data processing, digital modulation and demodulation, FEC, balanced soft decision, etc. Wireless data transceiver provides transparent RS232 / RS485 interface, different with the analog FM transceiver plus MODEM analog digital transceiver.

Wireless data transceiver working as a communication medium, as well as the fiber, microwave, the same line, has a certain scope of application: it provides some special conditions in the private network monitoring signal real-time, reliable data transmission, with the features of low cost, convenient installation and maintenance, diffraction ability, flexible network structure,   range of coverage, suitable for the occasion of dot and scatter, complex geographical environment , connecting with PLC, RTU, rain gauge, level gauge and other data terminals.

1.2 Features

❖   All the core components are imported originally, compared with the current imports of digital transceiver, we are the most advanced, most cost effective and the smallest one.

❖   Transmission power is optional, all technical indicators have met the European industry standards.

❖   Use temperature compensation circuit, the frequency stability is better than ±2PPM.

❖   With operating temperature range: -40 ℃ ~ +85 ℃, adapting to a variety of harsh working environment.

❖   All with aluminum alloy shell, compact, easy installation, good heat dissipation; perfect shielding design, good electromagnetic compatibility and strong anti-interference ability.

❖   Power reverse protection, over-protection, antenna surge protection and other multiple protection functions, greatly increase the reliability of the transceiver.

❖   Powerful software features, all parameters can be programmed to set: such as power, frequency, air data rate, address ID, etc.

❖   Ultra-low power consumption, standby current is 20mA (the power consumption of power saving mode and sleep mode is lower), the transmitting current ≤ 350A (1W).

❖   With watchdog and accurate time layout, in the event of an exception, the module will automatically restart and continue to follow the previous parameters to operate.

2. Installation Dimension

2.1 Pin description
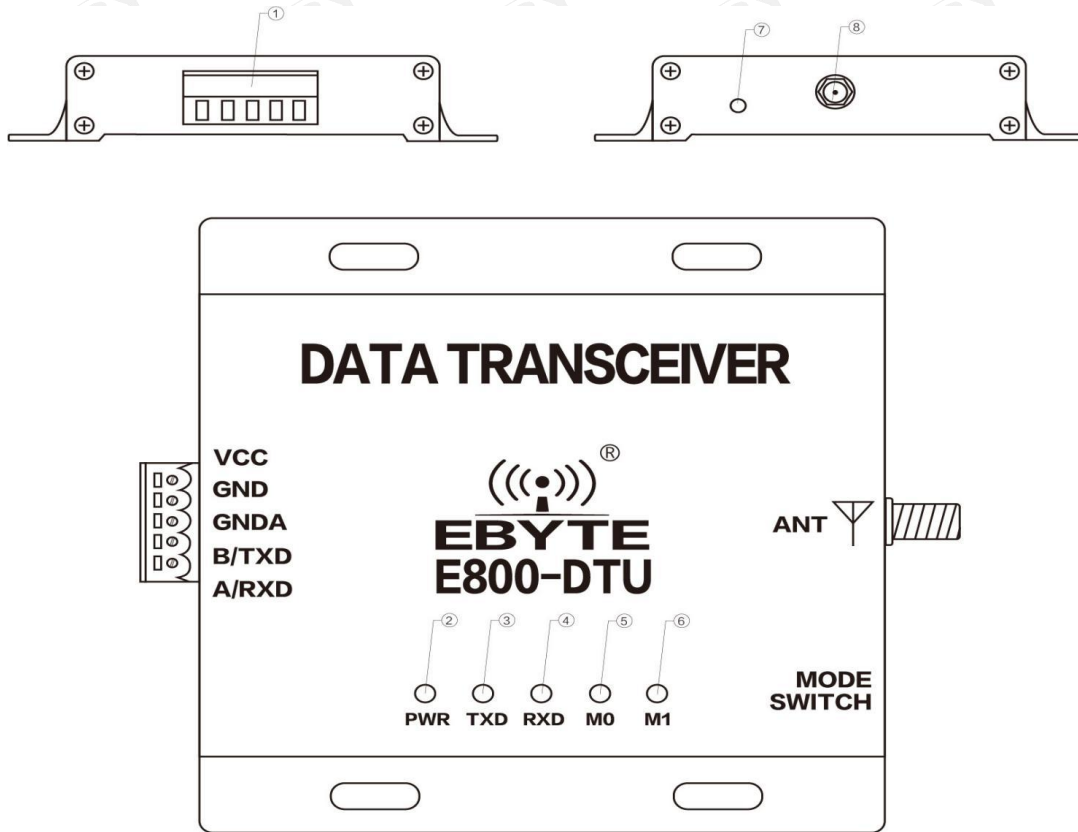
Pin NO.	Name	Function	Description
1	3.81mm terminal block	UART interface/ Power supply interface	Standard RS-232&485 interface/ Screwing power supply interface
2	PWR-LED	Power LED	Red, lit when the power is on
3	TXD-LED	Transmit LED	Yellow, blinks when sending data
4	RXD-LED	Receive LED	Yellow, blinks when sending data
5	M0-LED	Mode LED	Red,M0 M1 indicate the Operating mode together
6	M1-LED	Mode LED	Red,M0 M1 indicate the Operating mode together
7	Mode switch	Tact switch	Control the Operating mode
8	Antenna interface	SMA-K interface	External thread, 10mm, 50Ωcharacteristic impedance

2.2 Dimension
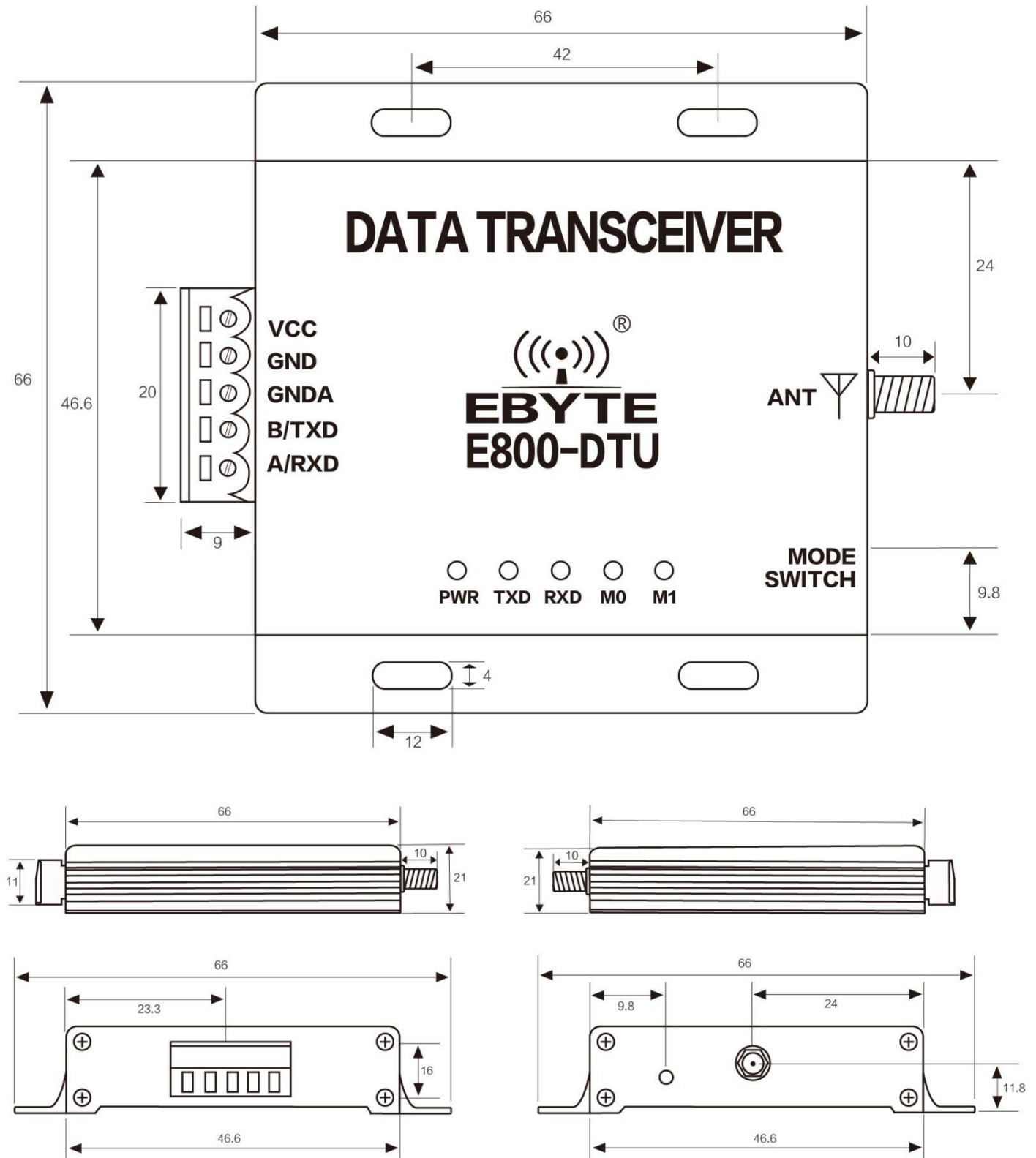
3. Interface definition

3.1 Power interface definition

Users can choose ① the VCC and GND terminal power supply, E800-DTU can use 8~ 28V DC power supply, but it is recommended to use 12V or 24V DC power supply.

3.2 RS232/RS485 interface definition

E800-DTU series products can choose whether RS232 or RS485 to be connected according to product number or back label. How to connect the cable? Choose the corresponding interface in ① 3.81mm terminal block, details below:
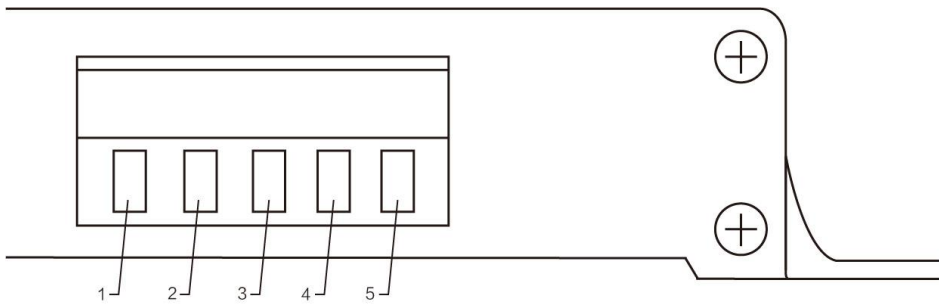
Pin NO.	Definition	Function	Description
1	VCC	Screwing power interface, positive	8 ~ 28V DC, 12V or 24V(recommended)
2	GND	Screwing power interface, negative	The power supply negative pole is connected to the system ground and the housing
3	GNDA	RS232 common terminal	Connected to RS 232 device GND
4	B/TXD	Serial port terminal	RS-485: Connected to RS 485 device interface B RS-232: Output terminal,connected to RS 232 device RXD
5	A/RXD	Serial port terminal	RS-485: Connected to RS 485 device interface A RS-232: Input terminal, connected to RS 232 device TXD

★ Note: The transceiver will be in poor communication when connecting multiple devices , while connecting a single device is not, please try to parallel connect a 120Ω resistor between 485_A terminal and 485_B terminal.

4. Technical indicators

4.1 Model specifications

Series	Model	Frequency（Hz）	Transmit power (dBm)	Distance（Km）	Feature	Application
L	433L20-485	433M	20	3	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
	433L30-485	433M	30	8	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
	433L20-232	433M	20	3	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
	433L30-232	433M	30	8	LoRa Spread spectrum anti-interference	To the environment with small data, far distance
N	433N17-485	433M	17	2	Narrowband technology	To the environment with medium data, dense deployment
	433N30-485	433M	30	6	Narrowband technology	To the environment with medium data, dense deployment
	433N17-232	433M	17	2	Narrowband technology	To the environment with medium data, dense deployment
	433N30-232	433M	30	6	Narrowband technology	To the environment with medium data, dense deployment
C	433C17-485	433M	17	1	High-speed continuous transmission	To the environment with large data, supporting Modbus
	433C30-485	433M	30	2.5	High-speed continuous transmission	To the environment with large data, supporting Modbus
	433C17-232	433M	17	1	High-speed continuous transmission	To the environment with large data, supporting Modbus
	433C30-232	433M	30	2.5	High-speed continuous transmission	To the environment with large data, supporting Modbus

★ Note: Test condition: in clear and open air without shelters, 12V /2A power supply, 5dBi gain sucker antenna over 2 meters height from the ground, with the factory default parameters.

4.2 General specification parameters

NO.	Parameter	Specification	Description
1	Size	66 * 66 * 21 mm	L series/ N series / C series
2	Weight	79±1g	L series/ N series / C series
3	Operating temperature	-40℃～+85℃	Long time use above 70 ℃(not recommended)
4	Antenna impedance	50 Ω	Standard 50 Ω characteristic impedance
5	Supply voltage	+8 ~ +28V DC	It is recommended to use 12V or 24V
6	Communication interface	RS232/RS485	Standard DB9 hole / 3.81 terminal block
7	Baud rate	Default 9600	from 1200 to 115200 bps
8	Address	Default 0	65536 configurable addresses

4.3 Frequency range and channels

Series	Model	Default frequency （MHz）	Frequency range （MHz）	Channel spacing （MHz）	Channels
L	433L20-485	433	410~441	1	32，Half-duplex
	433L30-485	433	410~441	1	32，Half-duplex
	433L20-232	433	410~441	1	32，Half-duplex
	433L30-232	433	410~441	1	32，Half-duplex
N	433N17-485	433	425~450.5	0.1	256，Half-duplex
	433N30-485	433	425~450.5	0.1	256，Half-duplex
	433N17-232	433	425~450.5	0.1	256，Half-duplex
	433N30-232	433	425~450.5	0.1	256，Half-duplex
C	433C17-485	433	425~450.5	0.1	256，Half-duplex
	433C30-485	433	425~450.5	0.1	256，Half-duplex
	433C17-232	433	425~450.5	0.1	256，Half-duplex
	433C30-232	433	425~450.5	0.1	256，Half-duplex

★ Note: In the same area when multiple data transceivers are communicating one to one at the same time, it is recommended to set the channel spacing between each group of data transceivers at 2MHz or more.

4.4 Transmit power level

Series	Model	7 dBm	10 dBm	14 dBm	17 dBm	20 dBm	21 dBm	24 dBm	27 dBm	30 dBm
L	433L20-485		√	√	√	√				
	433L30-485						√	√	√	√
	433L20-232		√	√	√	√				
	433L30-232						√	√	√	√
N	433N17-485	√	√	√	√					
	433N30-485						√	√	√	√
	433N17-232	√	√	√	√					
	433N30-232						√	√	√	√
C	433C17-485	√	√	√	√					
	433C30-485						√	√	√	√
	433C17-232	√	√	√	√					
	433C30-232						√	√	√	√

★ Note: 1. The lower the transmit power, the closer the transmission distance, but the working current won't be declined in exact proportion, it is recommended to use the maximum transmit power.

2. In order to guarantee the transmitting efficiency of, the factory default is the maximum transmitting power.

4.5 Air data rate

Series	Model	Default air data rate (kbps)	Levels	Air data rate(kbps)
L	433L20-485	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
	433L30-485	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
	433L20-232	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
	433L30-232	2.4	6	0.3, 1.2, 2.4, 4.8, 9.6, 19.2
N	433N17-485	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	433N30-485	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	433N17-232	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	433N30-232	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
C	433C17-485	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	433C30-485	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	433C17-232	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70
	433C30-232	1.2	8	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 50, 70

★ Note: The higher the air data rate, the faster the transmission rate, the transmission distance is also closer; when the rate meets the requirements, the lower air data rate, the better quality.

4.6 Current parameters

Series	Model	Transmitting current（mA）		Standby current（mA）	
		12V	24V	12V	24V
L	433L20-485	60.0	30.0	20.0	10.0
	433L30-485	310.0	150.0	20.0	10.0
	433L20-232	60.0	30.0	20.0	10.0
	433L30-232	310.0	150.0	20.0	10.0
N	433N17-485	50.0	30.0	20.0	10.0
	433N30-485	330.0	170.0	20.0	10.0
	433N17-232	50.0	30.0	20.0	10.0
	433N30-232	330.0	170.0	20.0	10.0
C	433C17-485	50.0	30.0	20.0	10.0
	433C30-485	350.0	180.0	20.0	10.0
	433C17-232	50.0	30.0	20.0	10.0
	433C30-232	350.0	180.0	20.0	10.0

★ Note: It is recommended to retain more than 50% of the current margin when selecting the power supply, which will help the data transceiver to work steadily for a long time.

4.7. Transceiver Length and Sub-packing Mode

Series	Model	Buffer	Sub-package
L	433L20-485	512 bytes	Automatically send 197 bytes per package
	433L30-485	512 bytes	Automatically send 197 bytes per package
	433L20-232	512 bytes	Automatically send 197 bytes per package
	433L30-232	512 bytes	Automatically send 197 bytes per package
N	433N17-485	512 bytes	Automatically send 186 bytes per package
	433N30-485	512 bytes	Automatically send 186 bytes per package
	433N17-232	512 bytes	Automatically send 186 bytes per package
	433N30-232	512 bytes	Automatically send 186 bytes per package
C	433C17-485	512 bytes	No limitation of package length without sub-package
	433C30-485	512 bytes	No limitation of package length without sub-package
	433C17-232	512 bytes	No limitation of package length without sub-package
	433C30-232	512 bytes	No limitation of package length without sub-package

★ Note:

1. When the receiving data is more than a single packet capacity (100 bytes), the beyond part will be automatically assigned to the second transmission until it is completed;

2. The data transceiver can not receive data which is more than the buffer capacity;

3. If one can not determine the amount of data sent and received, it is recommended to use C series.

5. Operating mode

There are four operating modes, if low power consumption is not required, it is recommended to configure the data transceiver for the normal mode (mode 0). The factory default is normal mode (mode 0).

- When the module is in the default state, buzzer beeps for 500ms, PWR-LED is always on, other LEDs are off after power on;
- When the mode is switched, press the button for about 1s until the buzzer beeps, M0,M1 Mode-LEDs will change and the mode has been switched;
- After the module modifies the operating mode, the current status will be saved when power off;
- M0,M1 LEDs off means "OFF", M0,M1 LEDs on means "ON".

5.1. L series and N series

	Categories	M0	M1	Description
Mode 0	Normal Mode	OFF	OFF	Open UART and RF，transparent transmission is on (factory default)
Mode 1	Wake-up Mode	ON	OFF	Transmitting WOR mode, the packet comes with a preamble code
Mode 2	Power-saving Mode	OFF	ON	Receiving WOR mode, saving receive power, the mode can not be transmitted
Mode 3	Sleep Mode	ON	ON	Parameter setting using the configuration software

★ Note: no need to care about the wake-up mode (mode 1) and power saving mode (mode 2) if power consumption is not a problem.

5.2 C series

	Categories	M0	M1	Description
Mode 0	Normal Mode	OFF	OFF	Open UART and RF，transparent transmission is on
Mode 1	Reserved Mode	ON	OFF	No meaning, UART and RF are closed
Mode 2	Command Mode	OFF	ON	Parameter setting using the configuration software
Mode 3	Sleep Mode	ON	ON	Enter sleep mode, UART and module are closed

6. Connection diagram when programming

Data cable

50Ω antenna or dummy load

10-28V DC Power supply

PC or （PLC/RTU）

DTU
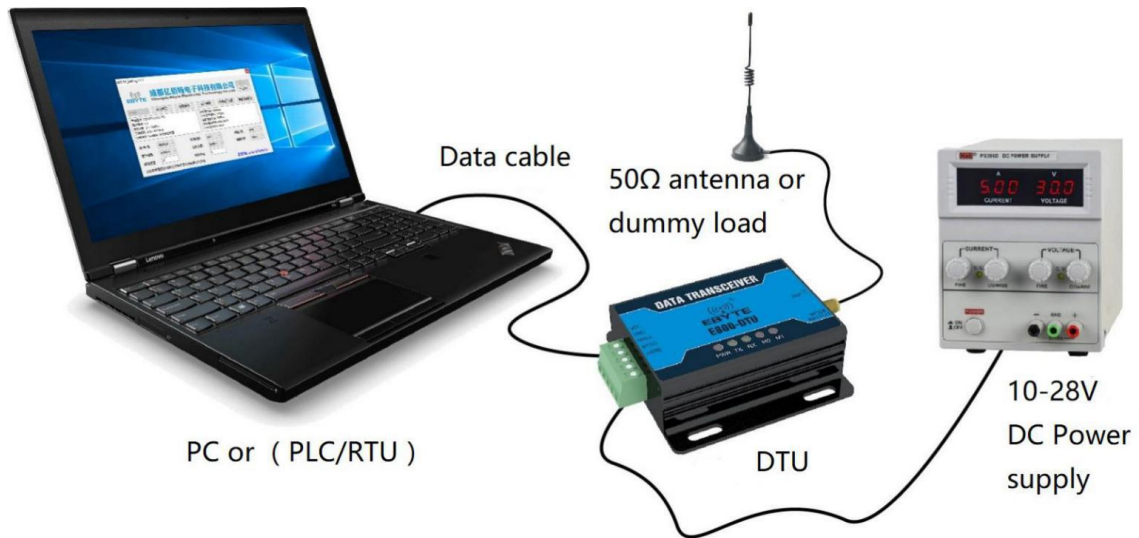
Series	Mode	M1	M0	Description
L	Sleep Mode	OFF	OFF	Only be programmed using the configuration software in the current mode
N	Sleep Mode	OFF	OFF	Only be programmed using the configuration software in the current mode
C	Command Mode	OFF	ON	Only be programmed using the configuration software in the current mode

★ Note: programming can only be carried on in a specific mode(see above), if fails, please confirm the work mode.

7. Connection diagram in test and practical application

Data cable

50Ω antenna or dummy load

10-28V DC Power supply

PC or （PLC/RTU）

DTU