

02	02	FF	00	XXX.XXX	2	A	*		Current data block
02	80	00	02	XX.XX	2	Hz	*		Grid frequency
02	06	01	00	X.XXX	2		*		A-phase power factor
02	06	00	00	X.XXX	2		*		Instantaneous total PF
02	06	FF	00	X.XXX	2		*		Instantaneous total PF data block
04	00	04	01	XXXXXXXX XXXX	6		*	*	Meter address
09	09	09	09	XX	1		*	*	Baud rate: 0-4800 1-9600 2-2400
09	09	09	08	XX	1		*	*	0-MODBUS 1-DLT645
04	DD	11	00		20		*		Software version number

DIN Rail Single Phase Energy Meter
Installation & Operation Manual





Danger and warning!

This device can be installed only by professionals.

The manufacturer shall not be held responsible for any accident caused by the failure to comply with the instructions in this manual.



Risks of electric shocks, burning, or explosion

- This device can be installed and maintained only by qualified people.
- Before operating the device, isolate the voltage input and power supply and short-circuit the secondary windings of all current transformers.
- Use appropriate voltage tester to make sure the voltage has been cut-off.
- Put all mechanical parts, doors, or covers in their original positions before energizing the device.
- Always supply the device with the correct working voltage during its operation.

Failure to take these preventive measures could cause damage to equipment or injuries to people.

00	04	00	00	XXXXXX.XX	4	kvarh	*	Combination Q 2 energy
00	04	FF	00	XXXXXX.XX	4	kvarh	*	Combination Q 2 energy data block
02	03	01	00	XX.XXXX	3	kW	*	A-phase P
02	03	00	00	XX.XXXX	3	kW	*	Instantaneous total P
02	03	FF	00	XX.XXXX	3	kW	*	Instantaneous total P data block
02	04	01	00	XX.XXXX	3	kvar	*	A-phase Q
02	04	00	00	XX.XXXX	3	kvar	*	Instantaneous total Q
02	04	FF	00	XX.XXXX	3	kvar	*	Instantaneous total Q data block
02	05	01	00	XX.XXXX	3	kVA	*	A-phase S
02	05	00	00	XX.XXXX	3	kVA	*	Instantaneous total S
02	05	FF	00	XX.XXXX	3	kVA	*	Instantaneous total S data block
02	01	01	00	XXX.X	2	V	*	A-phase voltage
02	01	FF	00	XXX.X	2	V	*	Voltage data block
02	02	01	00	XXX.XXX	2	A	*	A-phase current

DLT645-2007 communication protocol register address

Label				Format	Data length (Byte)	Unit	Funct ion		Data name
DI 3	DI 2	DI 1	DI 0				R	W	
00	00	00	00	XXXXXX.XX	4	kWh	*		Combination active energy
00	00	FF	00	XXXXXX.XX	4	kWh	*		Combination active energy data block
00	01	00	00	XXXXXX.XX	4	kWh	*		Positive active energy
00	01	FF	00	XXXXXX.XX	4	kWh	*		Positive active energy data block
00	02	00	00	XXXXXX.XX	4	kWh	*		Negative active energy
00	02	FF	00	XXXXXX.XX	4	kWh	*		Negative active energy data block
00	03	00	00	XXXXXX.XX	4	kvarh	*		Combination Q 1 energy
00	03	FF	00	XXXXXX.XX	4	kvarh	*		Combination Q 1 energy data block

CONTENTS

1. General Information4

2. Features 4

3. Order Information5

4. Figure and Installation Dimension 5

5. Wiring 6

6. Display and Keys6

 6.1 Display Instruction6

 6.2 Menu Description 7

7. Main Technical Data 11

8. Communication Protocol 12

 DLT645-2007 communication protocol register address 14

1. General Information

REN-220-DS DIN rail energy meter is a kind of new style single phase whole electronic type meter. The meter is completely conformed to the relative requirements of the International Standard IDT IEC 62053-21:2003 (Class 1). It is an integration of up-to-date micro-electronics technique, special large scale integrate circuit, advanced technique of digital sampling technique and SMT techniques etc.

REN-220-DS is used for measuring active energy, voltage, current, active power, reactive power, apparent power, power factor, input active energy, output active energy, input reactive energy, output reactive energy, total active energy, total reactive energy in a rated frequency of 50Hz or 60Hz single phase alternating current circuit. It displays total active energy, voltage, current, active power via LCD and is characterized with good reliability, compact size, light weight, specious nice appearance and easy installation.

2. Features

- ◆ 35mm DIN installing, in accordance with Standard DIN ED50022
- ◆ High accuracy, active energy accuracy up to class 1
- ◆ Measure and display V, I, P, kWh value
- ◆ 6+1 digits LCD display (999999.9 kWh)
- ◆ Passive pulse output, output signal is in accordance with Standard DIN43864
- ◆ LED indicates pulse
- ◆ Key-press for local parameter setting
- ◆ RS485 communication port, Modbus protocol
- ◆ Support DLT645-2007 communication protocol

40011		The highest byte is the sign byte.
40012	Frequency	× 0.01, unit: Hz
40013	Power factor	× 0.001
40014	Input active energy	× 0.1, unit: KWH
40015		
40016	Output active energy	× 0.1, unit: KWH
40017		
40018	Reserved	
40019	Reserved	
40020	Input reactive energy	× 0.1, unit: KVarh
40021		
40022	Output reactive energy	× 0.1, unit: KVarh
40023		
40024	Total reactive energy	× 0.1, unit: KVarh
40025		
40026	Total apparent energy	× 0.1, unit: KVA
40027		
40028	Energy decimal point display setting	Default is 1, settable range 1-3
Configuration parameter register (0x10 RW)		
40202	Communication address	Range:1-247
40203	Baud rate	0:4800bps 1:9600bps 2:2400bps 1:1200bps
40207	Password	0x0000-0xFFFF
40251	Clear energy	Write 901 to clear energy

Electrical fast transient/ burst immunity test	IEC61000-4-4,Level 4
Surge immunity test (1,2/50µs~8/20µs)	IEC61000-4-5,Level 4
Conducted Emissions	EN55022, Class B
Radiated Emissions	EN55022, Class B

8. Communication Protocol

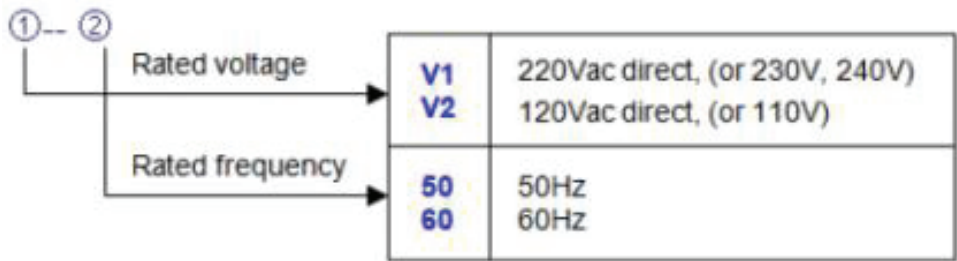
REN-220-DS support standard Modbus communication protocol, and support 0x03 and 0x10 command. Please refer to below registers list.

Because some data is too long, the device uses two registers to present. And these data is transits in way of “low byte in the former, high byte in the back”.

Register No.	Definition	Remarks
Real-time data registers (0x03 RO)		
40001	Total active energy	× 0.1, unit: kWh
40002		Low byte in the back, high byte in the former. Range: 0-999999.9
40003	Voltage	× 0.01, unit: V
40004	Current	× 0.001, unit: A
40005		Low byte in the back, high byte in the former.
40006	Active power	× 0.1, unit: W
40007		The highest byte is the sign byte.
40008	Apparent power	× 0.1, unit: VA
40009		The highest byte is the sign byte.
40010	Reactive power	× 0.1, unit: Var

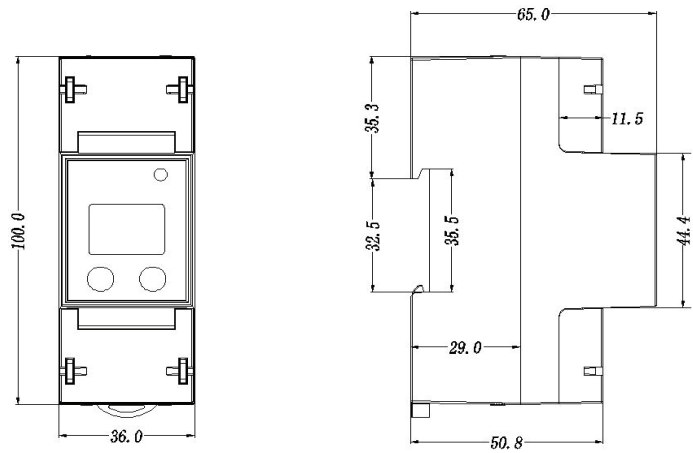
3. Order Information

REN-220-DS

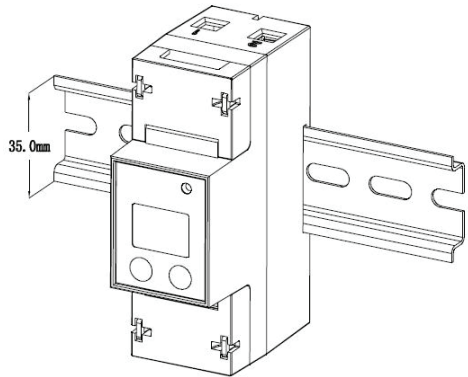


4. Figure and Installation Dimension

REN-220-DS dimension: (Unit: mm)

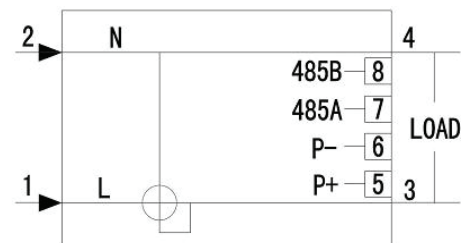


Installation



5. Wiring

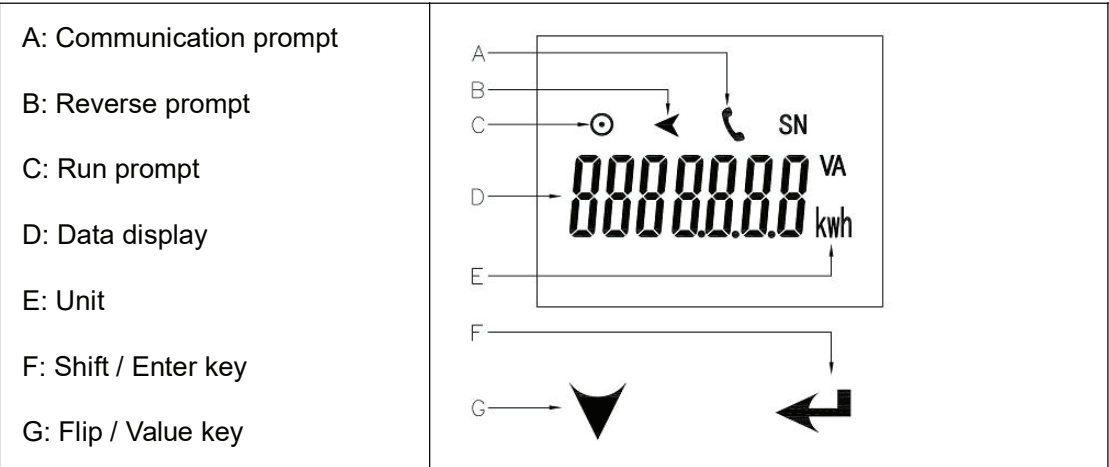
REN-220-DS is directly connection type, (maximum rated current ≤ 63A) Wiring as shown below:



Pulse interface is passive, range of cut-in power: 5-30Vdc.

6. Display and Keys

6.1 Display Instruction



Device panel has an indicator light: PULSE.

It is indicator light for pulse output: For each pulse output, the indicator light flashes once, synchronous pulse output.

7. Main Technical Data

Rated voltage	220Vac, direct	
Rated (Max.) current	5(63)A direct	
Input frequency	50Hz or 60Hz	
Power supply	self-supply 230V, (184V-275V)	
Starting current	0.4%Ib	
Power consumption	<2W	
Insulating property	Power frequency withstand voltage: AC 2 KV Impulse withstand voltage: 6KV	
Accuracy	Class 1 (IEC62053-21)	
Pulse output	1000imp/kWh	
Communication	RS485 output, Modbus-RTU protocol Address: 1~247 Baud rate: 2400bps, 4800bps, 9600bps	
Connection mode	1-phase 2-wire	
Dimension	36 × 100 × 65mm	
Installation mode	Standard 35mm DIN rail	
Operating environment	Operating temperature: -20°C~+55°C Storage temperature: -25°C~+70°C Relative humidity: 5%~95%,non-condensing	
Electrostatic discharge immunity test		IEC61000-4-2,Level 4
Radiated immunity test		IEC61000-4-3,Level 3

◆ Setting Example-1: Modify Communication Address

1. Long press (> 3S) Enter key to enter the configuration data modification interface, enter the correct password
2. Short press the flip key, enter the Adr menu.
3. Short press the Enter key, the address data starts flashing.
4. Under this interface short press the flip key for modifying data, short press the Enter key to shift.
5. After modifying the data to the desired address, press (> 3S) Enter button to save the address.
6. Complete address modification.

◆ Setting Example-2: Clear Energy

1. Long press (> 3S) Enter key to enter the configuration data modification interface, enter the correct password
2. Short press the flip key, enter the CLr menu
3. Short press the Enter key, the remove command starts flashing, the default display (no) command
4. Under this interface short press the flip key for choosing (YES) or (no) command.
5. Select (YES) to clear energy, (no) does not clear, long press the Enter key (> 3S) to confirm
6. Automatically back to CLr menu.

6.2 Menu Description

6.2.1 Real-time Data Query

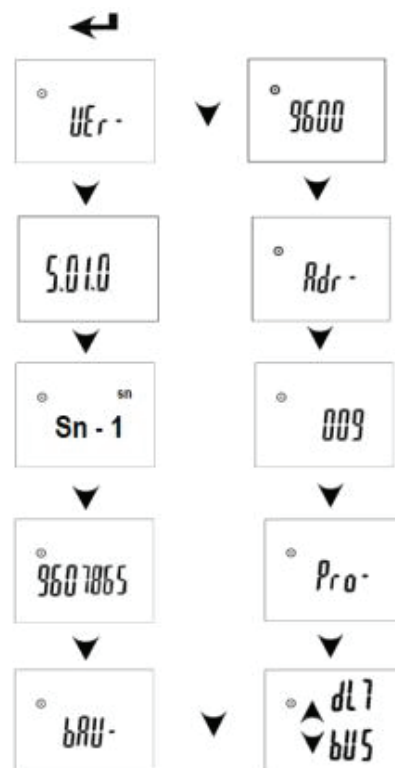
After power on, short press flip key, users can cycle query active energy, voltage, current, active power.



6.2.2 Configuration Data Query

Under real-time data query interface, long press (> 3S) Enter key to enter the configuration data query interface, short press the flip button, users can cycle check:

Under this interface long press (>3S) the flip button, can back to the real-time data query interface.



- (1) VEr represent version number,
- (2) bAU represent baud rate ,
- (3) Adr represent address.
- (4) Pro represent communication select

6.2.3 Configuration Data Modify

Under the configuration data query interface, long press (> 3S) Enter key to enter the configuration data modification interface, but entering the configuration data modification interface need to enter the correct password, the default password is "0000", if enter the wrong password, the meter will prompt error, and automatically back to the configuration data query interface.



After entering the configuration data modification interface, short press the flip, can cycle query prompt of baud rate (bAU) , baud rate, prompt of address (Adr) , address, prompt of password (PSd) , password, clear energy prompt (CLr), clear energy command options.

Under this interface long press (>3S) the flip button, can back to the real-time data query interface.

Under this interface short press the Enter key, can enter the modification status, if the corresponding data bits flashing, it prompt that data can be modified.

Note: Err is error promote

