
DIN-rail Mounted Multi-Functional
Energy Meter
User Manual

Applicable model:

DTS1946-2P-M

DTSF1946-2P-M

DTS1946-4P-M

DTSF1946-4P-M

catalogue

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1. Overview

Our company guide rail installed multi-functional power instrument adopts advanced power metering chip, using digital sampling processing technology and SMT process design and manufacturing. This series of multi-function power instruments adopts modular structure, small size, convenient installation and reliable operation.

2. Product selection

Function		Model	Single phase	Single phase	Three phase	
			DTS1946-2P-M	DTSF1946-2P-M	DTS1946-4P-M	DTSF1946-4P-M
Wiring method	1P2W	√	√	-	-	
	3P4W		-	√	√	
Voltage	220V	√	√			
	3×220/380V		-	√	√	
Current		5 (100) A	5 (100) A	1.5 (6) A	5 (100) A	
Measuring	Voltage, current	√	√	√	√	
	Active / reactive / apparent power	√	√	√	√	
	Power factor	√	√	√	√	
	Frequency	√	√	√	√	
	Total harmonic distortion rate		-	√	√	
Energy metering	Bidirectional active / reactive electric energy	√	√	√	√	
	Four-quadrant reactive electric energy	√	√	√	√	
	Multi-rate electricity	○	○	○	○	
Demand		√	√	√	√	
Maximum / min value		√	√	√	√	
Event record		√	√	√	√	

The RS485 communication interface	√	√	√	√
Electric energy pulse	√	√	√	√
Display mode	LCD	LCD	LCD	LCD

Note: The above "√" means this function, "-" is not available, and "○" is optional.

3. Technical specifications

Electrical feature			
Model	DTS1946-2P-M/ DTSF1946-2P-M	DTS1946-4P-M	DTSF1946-4P-M
Accuracy	Voltage, current: 0.2 Class, Power, active energy: 0.5S Class, Reactive energy: 2 Class.		
Rated voltage	220V	3×220/380V	
Input current	5(100)A	1.5(6)A	5(100)A
Frequency	50/60 Hz		
Wiring method	1P2W	3P4W	
Voltage range	0.8Un ~ 1.2Un		
Consumption	Voltage circuit consumption	< 4VA	
	Current circuit consumption	< 1VA	
Start current	0.002IbSSS	0.001In	0.002Ib
Energy pulse	One active energy pulse output, pulse width (80±20%) ms		
RTC error	≤0.5s/day		
Communication feature			
RS485 port	Modbus-RTU or MBUS protocol, baud rate up to 9600bps		
Mechanical feature			
Size (mm)	36×90×63.5	72×90×63.5	
IP degree	IP54 (front case) /IP20 (rear case)		
Environment feature			

Work temperature	(-25~70)°C
Storage temperature	(-30~80)°C
Relative humidity	(5~95)%(no condensation)
EMC	
Electrostatic discharge immunity	IEC 61000-4-2-III class
Radiated, radio-frequency, electromagnetic field immunity	IEC 61000-4-3-III class
Electrical fast transient/burst immunity test	IEC 61000-4-4-IV class
Surge immunity	IEC 61000-4-5-IV class
Immunity to conducted disturbances, induced by radio-frequency fields	IEC 61000-4-6-III class
Power frequency magnetic field immunity	IEC 61000-4-8-III class
Voltage dips, short interruptions and voltage variations immunity	IEC 61000-4-11-III class

4. Characteristics

4.1 Parameter measurement

The following parameters are measured in real-time time:

- Voltage, and current
- Active power, reactive power, and apparent power
- Power factor
- Frequency
- Demand
- Maximum / min

4.2 Electric energy metering

Electric energy supported by the meter:

- Two-way active electric energy
- Bidirectional reactive electric energy
- Four-quadrant reactive electric energy
- In electric energy
- Rerate electric energy: total rerate electric energy, rerate electric energy of each rate of sharp, peak, flat and valley.

It has 2 sets of 12 periods and 4 kinds of rate metering functions, which can set the automatic meter reading time and save the electric energy information of the last 3 months.

4.3 Communication function

- RS485 interface is electrically isolated from the meter and designed with anti-overvoltage circuit.
- RS485 communication via PC, programming setup and meter reading.
- The communication protocol is Modbus-RTU protocol, which can be modified to MBUS by key press.

4.4 Energy pulse

The electricity meter provides the pulse output of active power, adopts the open circuit mode to realize the remote transmission of active power, and the remote computer terminal, PLC or switching volume acquisition module collects the total number of pulses of the instrument to realize the cumulative measurement of electric energy.

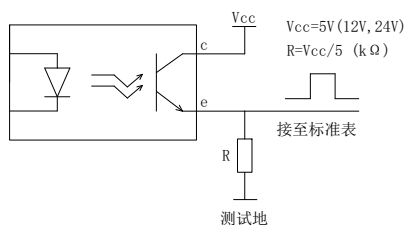
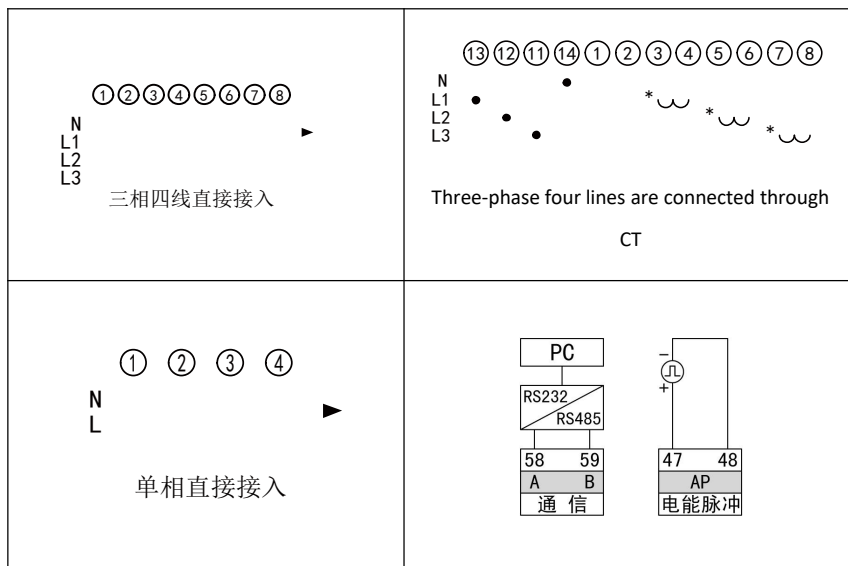


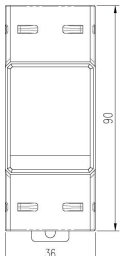
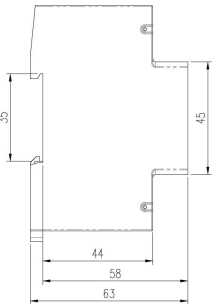
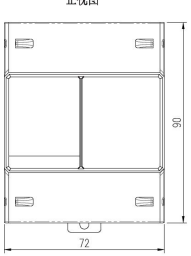
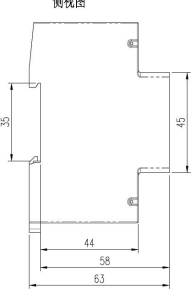
Figure 5.1 Schematic diagram of electric energy pulse test

5. Install and wiring

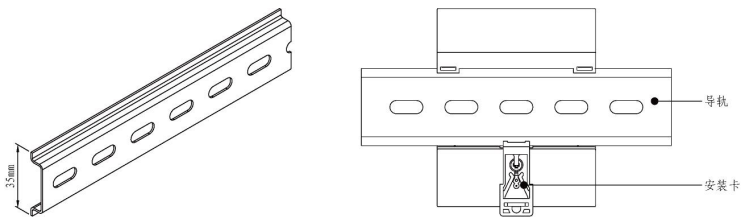
5.1 Wiring method



5.2 Overall dimensions

DTS1946-2P-M DTS1946-2P-M		DTS1946-4P-M DTSF1946-4P-M	
正视图	侧视图	正视图	侧视图
			

5.3 Installation method



安装图

6. Operation

6.1 Panel

DTS1946-2P-M DTSF1946-2P-M	DTS1946-4P-M DTSF1946-4P-M
<p>1: LCD display window 2: electric power pulse indicator light 3: key 4: instrument parameters</p>	

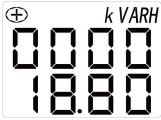
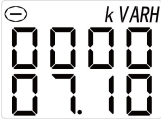
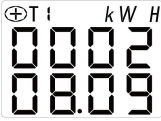

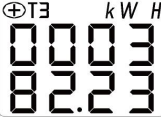
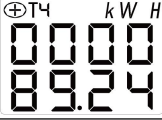
6.2 Display

The meter can display the voltage, current, power, power factor, frequency and other electricity data and electric energy data.



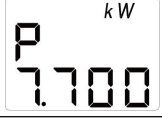
← Press the "" key or the "" key to switch between the data interfaces.





Electrical energy display interface:

Display interface	explain
	<p>Forward active electric energy: EP =780.62 kWh</p>
	<p>Reverse active power and electric energy: EP- = -0.00 kWh</p>






	<p>Forward reactive electric energy: EQ = 18.80 kvarh</p>
	<p>Reverse reactive electric energy: EQ- = -7.10 kvarh</p>
	<p>Total T1 rate for electric energy: 208.09 kWh</p>
	<p>Total T2 rate for electric energy: 101.06 kWh</p>
	<p>Total T3 rate for electric energy: 382.23 kWh</p>
	<p>Total T4 Rate Electrical energy: 89.24 kWh</p>








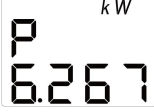


Single-phase electric meter power display interface:











Display interface	explain
	<p>voltage: U = 220.0 V</p>
	<p>current: I = 35.00 A</p>
	<p>active power: P = 7.700 kW</p>


	reactive power: $Q = -0.006 \text{ kvar}$
	apparent output: $S = 7.700 \text{ kVA}$
	power factor: $PF = 1.000$
	frequency: $F = 50.00\text{Hz}$

Display interface of three-phase electricity meter:

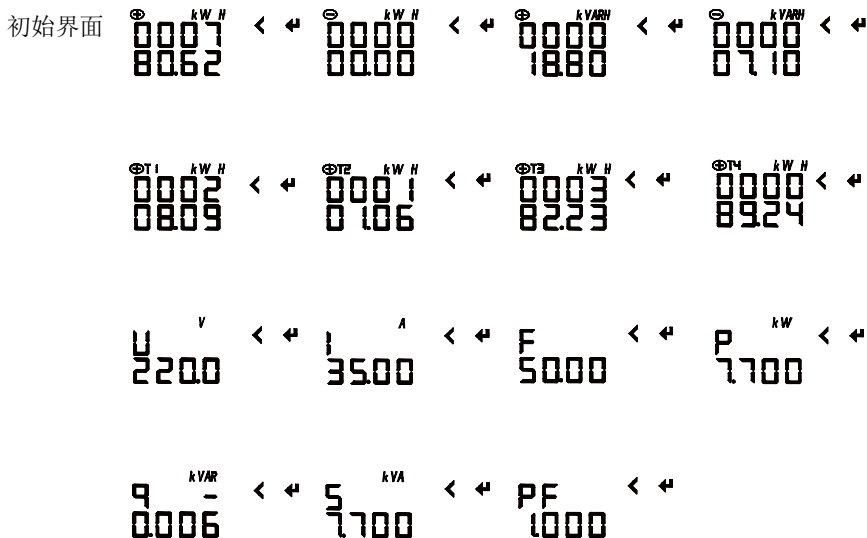
Display interface	explain
	A phase voltage $U_a = 220.1 \text{ V}$
	B phase voltage $U_b = 220.2 \text{ V}$
	C phase voltage $U_c = 220.0 \text{ V}$
	AB phase line voltage $U_{ab} = 381.3\text{V}$
	The BC phase line voltage $U_{bc} = 381.2 \text{ V}$

	<p>The CA phase line voltage $U_{ca} = 381.2 \text{ V}$</p>
	<p>A phase current $I_a = 10.10 \text{ A}$</p>
	<p>B phase current $I_b = 10.20 \text{ A}$</p>
	<p>C phase current $I_c = 11.00 \text{ A}$</p>
	<p>Phase A active power $P_a = 2.128 \text{ kW}$</p>
	<p>Phase B active power $P_b = 2.040 \text{ kW}$</p>
	<p>C-phase active power $P_c = 2.100 \text{ kW}$</p>
	<p>Total active power $P = 6.267 \text{ kW}$</p>
	<p>A-phase reactive power $Q_a = 0.108 \text{ kvar}$</p>
	<p>B-phase reactive power $Q_b = 0.210 \text{ kvar}$</p>

 <p>0.098 kVAR</p>	<p>C-phase reactive power $Q_c = 0.098$ kvar</p>
 <p>0.416 kVAR</p>	<p>Total reactive power $Q = 0.416$ kvar</p>
 <p>2.218 kVA</p>	<p>A Phase A at the power $S_a = 2.218$ kVA</p>
 <p>2.207 kVA</p>	<p>B Phase phase at the power $S_b = 2.207$ kVA</p>
 <p>2.211 kVA</p>	<p>C Phase is seen at the power $S_c = 2.211$ kVA</p>
 <p>6.636 kVA</p>	<p>Always see in power $S = 6.636$ kVA</p>
 <p>0.985 PF A</p>	<p>Phase A power factor $PF_a = 0.985$</p>
 <p>0.998 PF B</p>	<p>Phase B power factor $PF_b = 0.998$</p>
 <p>0.988 PF C</p>	<p>The C-phase power factor $PF_c = 0.988$</p>
 <p>1.000 PF</p>	<p>Total power factor $PF = 1.000$</p>


	Power grid frequency F = 50.00 Hz
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Display interface overview:



7. Setting

Enter the programming mode:


 Enter the setting state through password authentication, in the instrument display state long press " ", "the instrument display" " ", press " " to confirm the password authentication interface, through the " " and " " key password, the initial password is 0001, press " " key to confirm, if the password is correct, the instrument into the setting interface, if the password is not correct, the interface does not change.

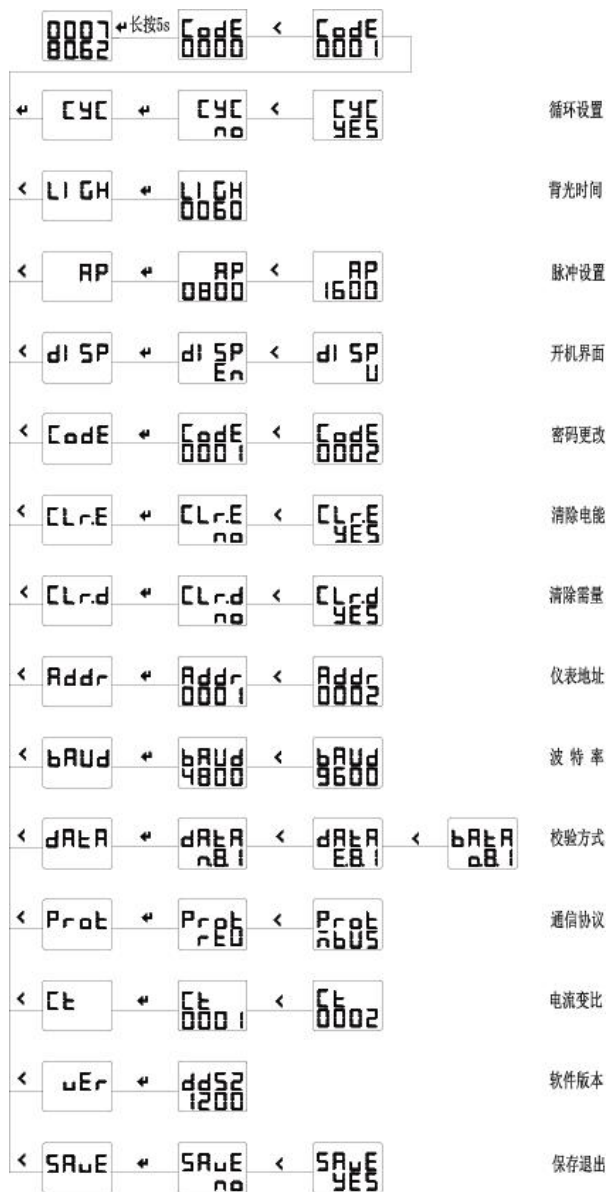
Exit the programming mode:

<<SAVE< Press "" + "" key, instrument "", then press "" key, instrument "display" ", there are two options:

<SAVE< (1) Save exit: press "" key to switch to "- -", then press "" key to save the setting parameter exit;

< (2) Do not save the exit: press the "" key not to save the setting parameter exit.

7.1 Setup menu Overview:



7.2 System parameter setting and communication parameter setting:

The communication parameter setting part sets the communication address to 2, the port rate is set to 9600, and the check mode is set to E.8.1. Set to MBUS, communication protocol, set the current change ratio to 2.



The information in this document is subject to change without notice.

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