



DRM1250D – 20/100A

DIN rail three phase four wire energy meter



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User manual



1.1 Safety instructions

Information for Your Own Safety

This manual does not contain all of the safety measures for operation of the equipment (module, device), because special operating conditions, and local code requirements or regulations may necessitate further measures. However, it does contain information which must be read for your own personal safety and to avoid material damages. This information is highlighted by a warning triangle and is represented as follows, depending on the degree of potential danger.



Warning

This means that failure to observe the instruction can result in death, serious injury or considerable material damage.



Caution

This means hazard of electric shock and failure to take the necessary safety precautions can result in death, serious injury or considerable material damage.

Qualified personnel

Commissioning and operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in the sense of the safety information contained in this manual are persons who are authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

Use for the intended purpose

The equipment (device, module) may only be used for the application cases specified in the catalog and the user manual and only in connection with devices and components recommended and approved by DMMetering.

Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, proper storage, installation and assembly, as well as proper operation and maintenance. When operating electrical equipment, certain parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injury or material damage.

- Use only isolated tools.
- Do not connect while circuit is live (hot).
- Place the meter only in dry surroundings.
- Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects.
- Make sure the used wires are suitable for the maximum current of this meter.
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- Do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you will have the chance of an electric shock and a possible chance for health damage.
- Make sure the protection cover is placed after installation.

- Installation, maintenance and repair should only be done by qualified personnel.
- Never break the seals and open the front cover as this might influence the functionality of the meter, and will void any warranty.
- Do not drop, or allow physical impact to the meter as there are high precision components inside that may break.

Exclusion of liability

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.

However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions contained in the information given. The data in this manual are checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you care to suggest.

Subject to technical modifications without notice.

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1.2 Foreword

Thank you for purchasing the DMMetering DRM1250D DIN rail three phase four wire energy meter. The DMMetering DRM1250D energy meter is the most advanced type electronic kWh meter available at the market. With the DMMetering product range we have introduced a large scale of energy meters on the market suitable for 110V AC to 400V AC (50 or 60Hz). Besides the normal energy meters we also developed our own pre-paid meters with chip card, chip card re-loaders and a complete PC management control system. For more information on other product please contact our sales department at sales@dm-metering.com or info@inepro.com.hk.

Although we produce the DMMetering DRM1250D meter according to IEC 62053-21 and our quality inspection is very accurate there might always be a possibility that your product shows a fault or failure for which we do apologize. Under normal conditions your product should give you years of benefit and pleasure. In case there is problem with the energy meter you should contact your dealer immediately. All energy meters are sealed with a special seal. Once this seal is broken there is no possibility to claim for warranty. Therefore NEVER open an energy meter or break the seal of the energy meter. The warranty time is 6 months, after installation, and only valid for construction faults.

1.3 Performance criteria:

Operating humidity	$\leq 75\%$
Storage humidity	$\leq 95\%$
Operating temperature	$-10^{\circ}\text{C} - +50^{\circ}\text{C}$
Storage temperature	$-30^{\circ}\text{C} - +70^{\circ}\text{C}$
International standard	IEC 62053-21
Accuracy class	1
Protection against penetration of dust and water	IP51
Insulating encased meter of protective class	II

1.4 Specifications:

Nominal voltage (U_n)	230/400V AC (3~)
Operational voltage	161/279 – 300/520V AC (3~)
Insulation capabilities:	
- AC voltage withstand	2KV for 1 minute
- Impulse voltage withstand	6KV – 1.2 μ S waveform
Basic current (I_b)	20A
Maximum rated current (I_{max})	100 A
Operational current range	1A - 100A
Over current withstand	3000A for 0.01s
Operational frequency range	50Hz $\pm 10\%$
Internal power consumption	$\leq 2\text{W} / 10\text{VA}$ per phase
Test output flash rate (PULSE LED)	160 impulses per kWh
Remote output flash rate (SO LED)	10 impulses per kWh
Test pulse output rate (pins 7 & 8)	160 pulses per kWh
Remote pulse output rate (pins 15 & 16)	10 pulses per kWh
Power supply indicator (L1, L2 & L3 LED)	Meter is connected and working OK.
Consumption indicator (PULSE & SO LED)	Flashing at load running.
Data display mode	5+2 digits or 6+1 digits for option LCD (5+2 digits for default).
Data communication port	Far infrared and RS485 port.
Data communication indication (COM. LED)	Flashing during the data communication.
Data transportation speed	1200bps.
Data save	The data can be stored more than 20 years when power cut.

1.5 Basic errors:

With balanced loads

0.05 I_b	$\cos\varphi = 1$	$\pm 1.5\%$
0.1 I_b	$\cos\varphi = 0.5L$	$\pm 1.5\%$
	$\cos\varphi = 0.8C$	$\pm 1.5\%$

0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
	Cosφ = 0.8C	±1.0%

With single phase load

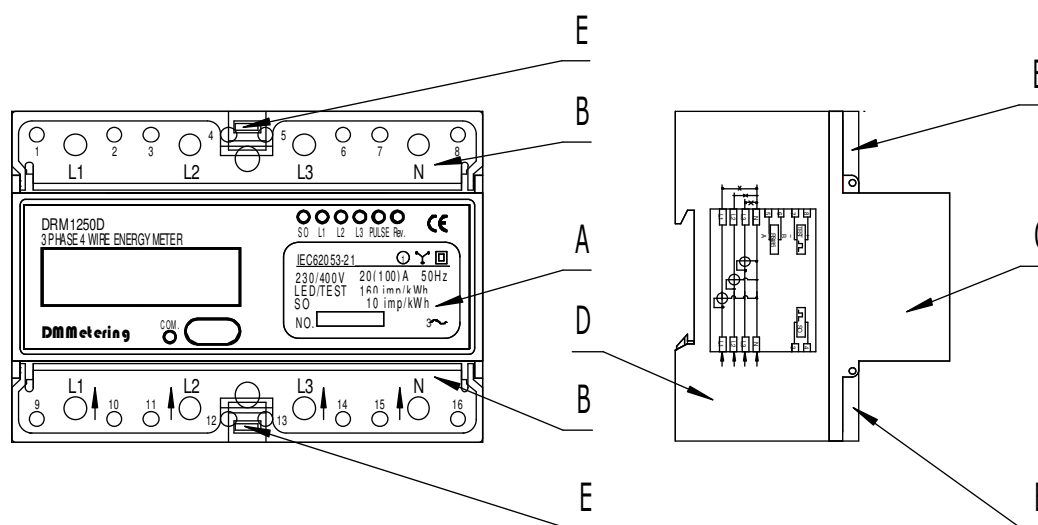
0.1Ib - Imax	Cosφ = 1	±2.0%
0.2Ib - Imax	Cosφ = 0.5L	±2.0%

1.6 Description

A	Front panel
B	Protection cover
C	Cover
D	Base
E	Security hasp

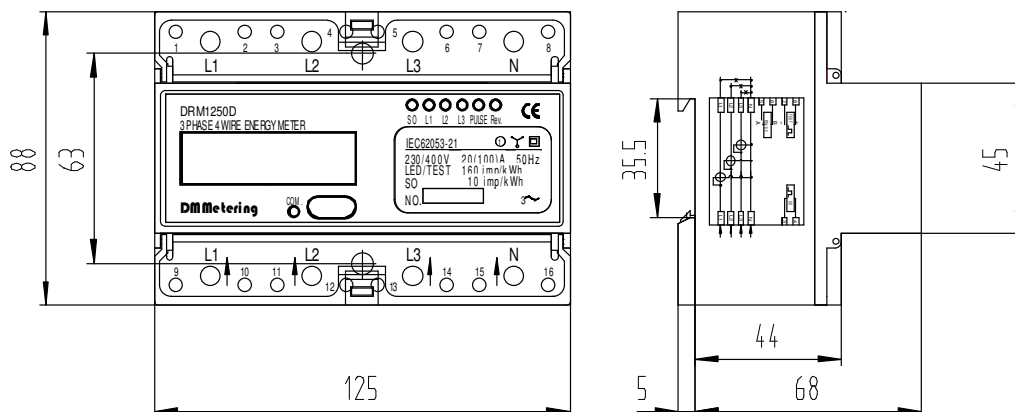
Material

Front panel	PC inflammable retarding
Protection cover	ABS inflammable retarding
Cover	ABS inflammable retarding
Base	ABS inflammable retarding



1.7 Dimensions

Height	88 mm
Width	125 mm
Depth	68 mm
Distance between installation holes	63 mm (installation mode in front of board)
Weight	0.75Kg (net)



1.8 Installation

CAUTION

- Turn off and lock out all power supplying the energy meter and the equipment to which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that power is off.

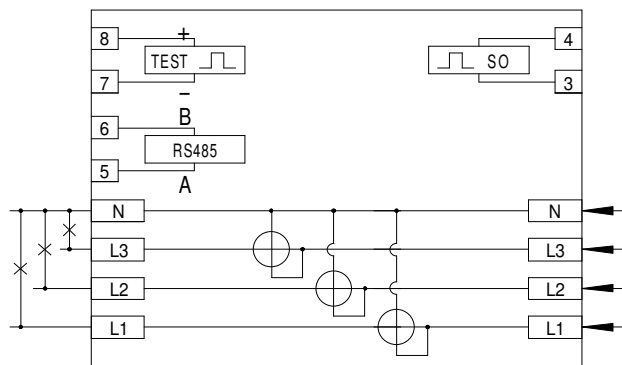
⚠ WARNING

- Installation should be performed by qualified personnel familiar with applicable codes and regulations.
- Use isolated tools to install the meter.
- Fuse or thermal cut-off or single-pole circuit breaker can't be fitted on the supply line and not the neutral line.

- We recommend that the connecting wire which is used to connect meter to outside circuit should be sized according to local codes and regulations for the ampacity of the circuit breaker or over current device used in the circuit.
- An external switch or a circuit-breaker should be installed on the inlet wire, which will be used as a disconnection device for the meter. And there it is recommendation that the switch or circuit-breaker be near the meter so that it is more convenience for the operator. The switch or circuit-breaker should comply with the specifications of the building electrical design and all local regulations.
- This meter can be installed indoor directly, or in a meter box which is waterproof outdoor, subject to local codes and regulations.
- To prevent tampering, secure the meter with a padlock or a similar device.
- The meter has to be installed against a wall which is fire resistant.
- The meter has to be installed in a good ventilated and dry place.
- The meter has to be installed in a protection box when placed in dangerous or dusty environment.
- The meter can be installed and used after being tested and sealed with a letter

press printing.

- The meter can be installed on a 35mm DIN rail or direct on a meter board with screws.
- The meter should be installed in an available height so that it is easy to read.
- When the meter is installed in an area with frequent surges due to e.g. thunderstorms, welding machines, inverters etc, protect the meter with Surge Protection Devices
- After finishing installation, the meter must be sealed to prevent tampering.
- Connection of the wires should be done in accordance with the underneath connection diagram.



L1	L1 phase wire
L2	L2 phase wire
L3	L3 phase wire
N	Neutral wire
7 and 8	Test pulse output contact
5 and 6	RS485 communication contact
3 and 4	Remote pulse output contact

1.9 Operating

Working indication

On the DRM1250D's front panel, there are three power indicating LED which have different color from each other. The yellow LED represent L1 phase; the green LED represent L2 phase; the red LED represent L3 phase. When any phases work normally, the LED representation will burn. When any phases have failure or no power, the LED will turn off.

Consumption indication

On the DRM1250D's front panel, there are two impulse indicating LED which have different color from each other. The white LED is PULSE LED (When it burns, it is red.) The green one is SO LED. When the load is running, these LED will flash to indicate the load is consuming power. The more quickly LED flash, the more consumption there is. The PULSE LED's flash rate is 160 impulses per kWh. And the flash rate of SO LED is 10 impulses per kWh.

Communication indication

On the front panel of DRM1250D, there is a COM. LED. When the data communicate between the far infrared port and RS485 port with outside equipment, the LED will flash.

Reading the meter

DRM1250D has a LCD. The display can display several electric energy data and meter information. The 2 display modes are: recycle mode and key-press one by one outside mode. Via the meter's far infrared port or RS485 port, the display mode can be selected to program the meter.

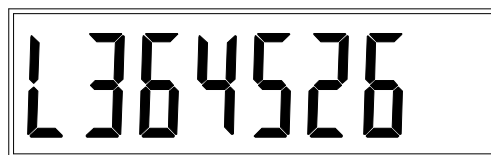
- When the meter defaults the recycle display after the production, the recycling period is 5 seconds. The recycling period can be setup in the 1-99 seconds, via the meter's far infrared port or RS485 port.
- When the recycling period is set to 0 second, the display mode will be changed to the key-press one by one outside mode. Then to connect an open-button between the terminal 1 and 2, to press this button once, the display data will be the new one.
- The meter can display up most 4 items, whether how is the display mode, the display data will be done as per the following order. The data needed can be displayed after programming via the meter's far infrared port or RS485 port.

a) Meter number

- Indication: NNNNNNNNNNNN

12 digits displayed in a high and low display.

Example meter number 698532364526

The high display shows the first six digits of the meter number, '698532', in a large, black, seven-segment digital font.The low display shows the last six digits of the meter number, '364526', in a large, black, seven-segment digital font.

b) User number

- Indication: NNNNNNNNNNNN

12 digits displayed in a high and low display

Example user number 260935625408

The high display shows the first six digits of the user number, '260935', in a large, black, seven-segment digital font.The low display shows the last six digits of the user number, '625408', in a large, black, seven-segment digital font.

c) Current total energy

- Indication: NNNNN.NN kWh or NNNNNN.N kWh

The display is as follows on two screens.

Example total energy is 45748.91 kWh.

d) Reverse direction energy

- Indication: NNNNN.NN kWh or NNNNNN.N kWh

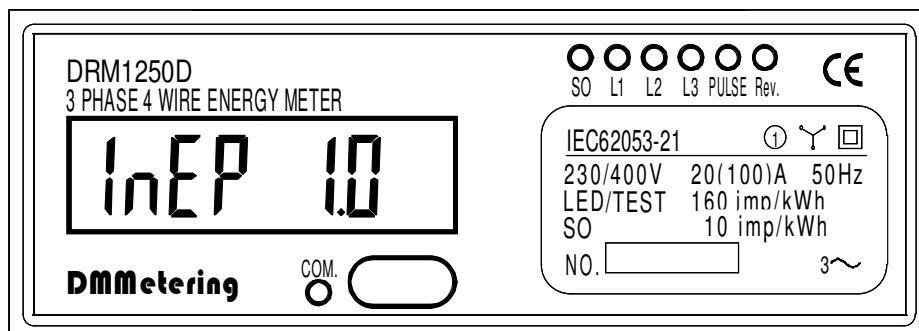
The display is as follows on two screens. Example reverse direction energy is 8456.78 kWh.

The other instructions

The LCD of DRM75D, beside the display of the normal information, for some sudden issues, it can also display several instructions for reminding.

➤ **Meter version**

- When the meter re-switches on the power, it will display the meter version for 5 seconds, and then display the other items.
- Indication DMMetering version 1.0

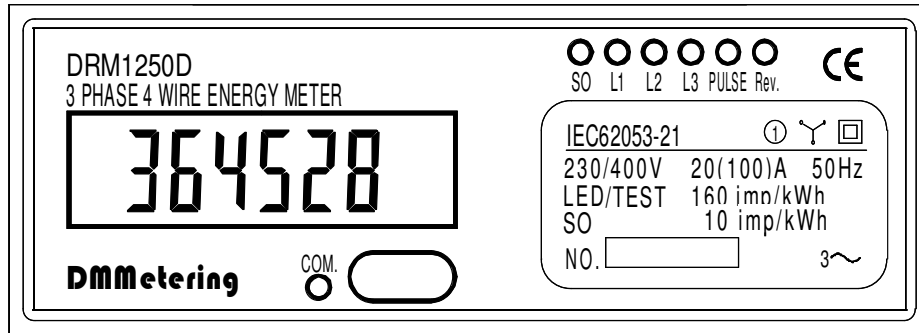


➤ **The meter communication address (Meter ID)**

- Every meter has a 12 digits sole communication address for identification, called Meter ID. Via the meter's far infrared port or RS485 port, we can program to

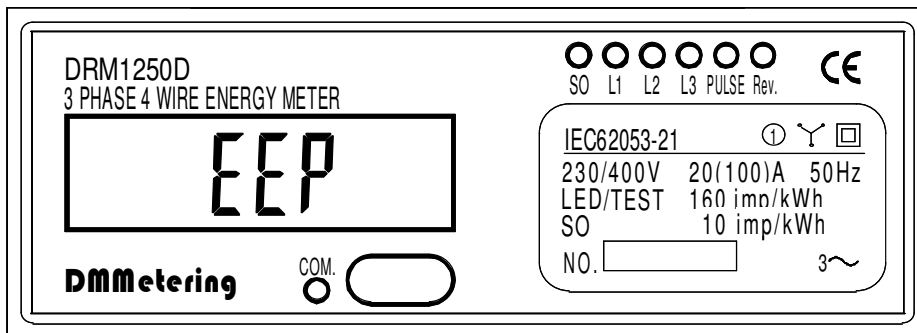
modify the Meter ID.

- When to modify Meter ID, the meter will display the backward 6 digits of the new Meter ID for 30 seconds for confirmation outside. If you confirm to modify the Meter ID, please press the button outside in 30 seconds. If the time is over 30 seconds, it defaults No Modification.
- After the production, the Meter ID defaults 12 digits meter number.
- E.g. The modified new Meter ID is 698532364528. The backward 6 digits is 364528.



➤ Error message

- When the display indicates EEP there is a problem with the internal EEPROM. If this display does not return to normal, or happens frequently, please contact your dealer to replace the meter to prevent any damage on your meter.



Pulse output

DRM1250D DIN rail energy meter is equipped with a pulse output which is fully separated from the inside circuit. That generates pulses in proportion to the measured energy. They are test pulse output (pins 7 & 8) and remote pulse output (pins 3 & 4). Usually, the test pulse output is used as testing accuracy or reading purpose in close quarters. And the remote pulse output is used as remote reading purposes.

- The test pulse output is a polarity dependant, passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (U_i) should be 5-27V DC, and the maximum input current (I_{imax}) should be 27mA DC. To connect the impulse output, connect 5-27V DC to connector 8 (anode), and the signal wire (S) to connector 7 (cathode). The test pulses 160 per kWh.
- The remote pulse output is a polarity dependant, passive MOSFET or an internal relay output requiring an external voltage source for correct operation. For this external voltage source, the voltage (U_i) should be 5-60V DC or 5-30V AC, and the maximum input current (I_{imax}) should be 80mA DC or 60mA AC. To connect the impulse output,

connect 5-60V DC or 5-30V AC to any one from connector 3 and 4, and the signal wire to another connector. The remote pulses 10 per kWh.

Communication port

This model meter has equipped a far infrared port and a RS485 port, we can program the meter's operation data or reading via these 2 ports. The communication protocol conforms to DL/T645-1997 Standards.

➤ **Far infrared communication port**

- The far infrared communication port is on the right of LCD screen. It is infrared wireless communication port. The TP800 hand-held programmer with TP800V2.0 version can directly communicate the data between the meter and this port.
- The data transmission speed is 1200bps.
- The communication distance is not less than 5m.

➤ **RS485 communication port**

- RS485 communication port is between the meter terminal 5 and 6. It is a synchronization wire port. Installing software in PC, via RS232/RS485 adapter, connecting the meter terminal 5 and 6, PC can communicate with the meter immediately.
- The data transmission speed is 1200bps.
- The communication distance is not less than 1000m.
- The most quantity of the main wire is 128pcs.

1.10 Troubleshooting



CAUTION

- During repair and maintenance, do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you will have the chance of an electricity shock and a possible chance for health damage.
- Turn off and lock out all power supplying the energy meter and the equipment to which it is installed before opening the protection cover to prevent the hazard of electric shock.



WARNING

- Maintenance or repair should be performed by qualified personnel familiar with applicable codes and regulations.
- Use insulated tools to maintain or repair the meter.
- Make sure the protection cover is in place after maintenance or reparation.

Problem	Check	Solution
No light for the Power supply indicator (L1, L2 & L3 LED).	Is AC power supply connected to the meter ?	Check switch or circuit-breaker and fuse or thermal cut-off.
	Is the L1, L2, L3 and N connecting correct ?	Reinstall terminal screws on the L1, L2, L3 and N. Make sure all screws are fixed. Then there should be a 230V 50Hz AC voltage between the terminal screws on the N and L1 or L2 or L3, when power supply is input.
	Is the terminals 9, 10, 11, 12, 13 and 14 connecting correct ?	Reinstall terminal screws on the 9, 10, 11, 12, 13 and 14. Make sure all screws are fixed. Then there should be a 230V 50Hz AC voltage between the terminal screws on the N and 9 or 11 or 13, when power supply is input.
	Maybe there is a fault in the inside circuit.	Please contact your technical supporter to replace this meter.
No light for the consumption indicator (PULSE & SO LED).	Is the load running ?	Only when load is running, this LED will flash.
	Is the operating power too low ?	If the operating power is too low, the spacing interval of the flashes will take some more time, this is why it seems like the LED isn't burning.
	Maybe there is a fault in the inside circuit.	Please contact your technical supporter to replace this meter.
No light for the communication indicator (COM. LED).	Is there a power supply inside the meter ?	Check that the power supply indicator (L1, L2 & L3 LED) is burning.
	Does any equipment outside communicate with the meter ?	Only when the communication between the meter's infrared port or the RS485 port and the equipment outside, the LED will blink.
	Maybe there is a fault in the inside circuit.	Please contact your technical supporter to replace this meter.

Continue.

Problem	Check	Solution
No recycle display of every electricity data or information on LCD screen.	Is the period set for the recycle display too long ?	The recycle period is set too long, it will be misdeemed not to be recycle display. So reset the reasonable period in the range of 1-99 seconds.
	Is the display mode set to the button display one by one outside ?	Check if the recycle display period is 0 second or not. The period 0 second means to have set to the button display one by one outside, please re-set the reasonable period in the range of 1-99 seconds.
	Is it set to the only-one item display permitted ?	The LCD display data can be option to program the meter and re-choose the needed data via the meter's infrared port or the RS485 port.
	Is it set to only display "EEP" Error message ?	Maybe there is a fault in the inside circuit, Please contact your technical supporter to replace this meter.
No communication of the infrared wireless data with the meter.	Is the Meter ID correct ?	Check and use the correct the Meter ID. After the meter finish the production, the Meter ID defaults to 12 digits meter number.
	Is the communication distance too long ?	Shorten the communication distance between the reading equipment outside and the meter. Keep sure it is not more than 5m.
	Is the communication protocol correct ?	Please contact the technical support department to get the meter communication protocol, or use the TP800 hand-held programmer with TP800V2.0 version software.
	Maybe there is a fault in the inside circuit.	Please contact your technical supporter to replace this meter.

Continue.

Problem	Check	Solution
No communication of RS485 wire data with the meter.	Is the Meter ID correct ?	Check and use the correct the Meter ID. After the meter finish the production, the Meter ID defaults to 12 digits meter number.
	Is the communication distance too long ?	Shorten the communication distance between the reading equipment outside and the meter. Keep sure it is not more than 1000m.
	Is the connection wire to RS485 main wire too much ?	The equipment to connection with RS485 main wire is not more than 128 pcs.
	Is the RS485 port connection correct ?	The correct connection is: the A signal wire of RS485 main wire to the meter terminal 5, the B signal wire of RS485 main wire to the meter terminal 6.
	Is the communication distance too long ?	Please contact the technical support department to get the meter communication protocol, or use the TP800 hand-held programmer with TP800V2.0 version software.
	Maybe there is a fault in the inside circuit.	Please contact your technical support department to replace this meter.
No modification for the Meter ID.	Is the meter working correctly after the Meter ID modification ?	The correct working is: after the Meter ID modification, the meter will display the backward 6 digits of the new meter ID for 30 seconds. During the 30 seconds, please confirm the modification via pressing the buttons outside (the button outside must connect to the meter terminal 1 and 2).

Continue.

Problem	Check	Solution
The LCD energy register can't run.	<p>Is there a power supply inside the meter ?</p> <p>Is the operating power too low ?</p> <p>Maybe there is a fault in the inside circuit.</p>	<p>Check that the power supply indicator (L1, L2 & L3 LED) is burning.</p> <p>If the operating power is too low, the spacing interval of the pulses will take some more time, this is why it seems like the LCD energy register can't run.</p> <p>Please contact your technical supporter to replace this meter.</p>
No test pulse output.	<p>Is DC power supply connected to the meter ?</p> <p>Is the connecting correct ?</p> <p>Maybe there is a fault in the inside circuit.</p>	<p>Check the external voltage source (Ui) is 5-27V DC.</p> <p>Check correct connecting: connect 5-27V DC to connector 8 (anode), and the signal wire (S) to connector 7 (cathode).</p> <p>Please contact your technical supporter to replace this meter.</p>
No remote pulse output.	<p>Is power supply connected to the meter ?</p> <p>Is the connecting correct ?</p> <p>Maybe there is a fault in the inside circuit.</p>	<p>Check the external voltage source (Ui) is 5-60V DC or 5-30V AC.</p> <p>Check correct connecting: connect 5-60V DC or 5-30V AC to any one from connector 3 and 4, and the signal wire to another connector.</p> <p>Please contact your technical supporter to replace this meter.</p>
Pulse output rate wrong.	<p>Maybe there is a fault in the inside circuit.</p>	<p>Please contact your technical supporter to replace this meter.</p>

1.11 Technical support

For questions about one of our products, please contact:

- DMMetering dealer in your in your region
- Your local DMMetering distributor
- Email: support@dmmetering.com

www.dmmetering.com

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