DPM-3221

Digital DC Power Meter with data logging capability.

User Manual

Introduction

As a digital DC power meter, it measures the real time DC Voltage (5-60V), DC Current (0-200 A with the correct shunt), Watts, and it also displays the Amp-hour, Watt-hour, Watts Max, the total running time, the maximum & minimum values of voltage and current during the measuring period.

The power meter can either be powered by the input (source) or the output (load) which ever has a minimum 5V DC. The Power Meter can also be powered by an external DC voltage of 5 to 60V DC if DC voltage range of 0-60V is desired.

Once the Power Meter is powered up, it starts to data logged Amp hour, Watt-hour, Max. & Min. Voltage & Current values selectable interval from 30 seconds to 3 minutes.

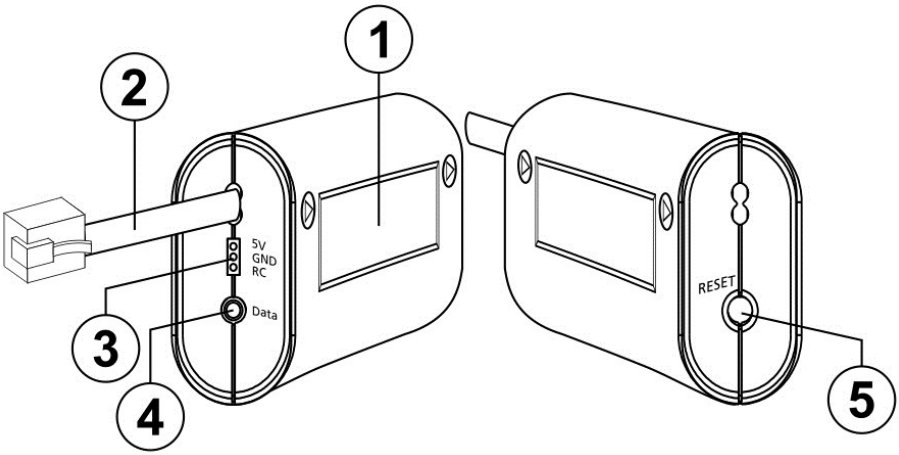
Up to 1,500 sets of Voltage and Current are stored in the Power Meter Memory (EEPROM) even when the Power Meter is off power. The data can be retrieved by a PC using our optional Data adapter and software program.

The Power Meter has a magnetic back and a clip on mounting bracket.

Precaution

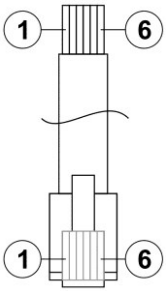
- Do not exceed 60V DC or the rated value of external shunt in the application.
- This meter is designed and made for indoor use only.
  Do not dis-assemble or attempt to repair the power meter.
- If Start-up screen does not appear when power up, immediate remove the power sources.
- Double check for correct polarity. If either input or output connection is in wrong polarity, there will be no display on LCD.
- Damage to the Power Meter may result if wrong polarity power is applied.
- Do not exert pressure on the display to avoid damage to LCD display.

Controls and Indicators

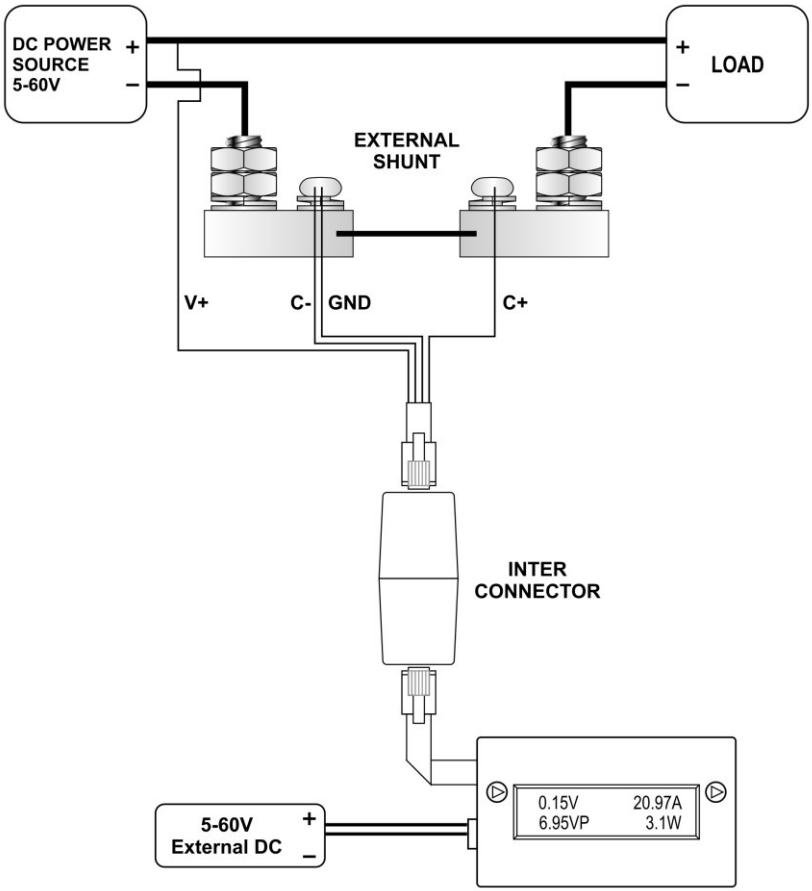


1. LCD display
2. Shunt connect flat cable with phone plug
3. External Power Jack: for external power source (5-60V DC) to extend measured voltage to 0- 60V DC from 5-60V.
Pin: 5V / GND / RC
5V = Positive 5v to 60v external DC power source.
GND = Negative of external DC power source
RC = This is for changing the Shunt Rating setting.
4. Data Jack: for connection to optional Data adapter.
5. Reset button: a. To clear previous saved data.
b. To change the Shunt Rating setting.

Wiring Diagram



PIN	Function	Description
1	C-	SENSOR -
2	C+	SENSOR +
3	NC	No Connection
4	NC	No Connection
5	V+	Voltage +
6	GND	Voltage -



Using the DC Power Meter

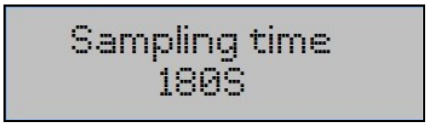
1. Checking LCD and the shunt rating of DPM

Before wiring the DPM with the external shunt, it is advisable to check the DPM by powering it up with any of the following methods.
Use a 9V battery or any DC source of 5V to 60V to connect:
a. the external power jack (3) 5v and GDN .
b. the Load side (+ , -) see wiring diagram.
c. the Source side (+ , -) see wiring diagram.
When powered up, the LCD displays first shows the firmware version and then factory preset data port mode as below.

Diagram software version

Diagram Shunt rating

Diagram Sampling time



After the above three displays disappear, the normal display will be shown.
The V, A, and W will appear continuously while the bottom left quadrant displays all other data in a cyclic order at 2 to 3 second interval.
The unit is then confirmed to be in good working order.
If there is no display, check for reverse polarity or if the applied dc power is less than 5V.

Diagram showing normal operation

Setting the shunt rating of the DPM to match your shunt

If you want to change the DPM shunt rating to match your shunt, proceed as following:

1. After checking the DPM is in good order, plug in the supplied external power plug.
2. Unplug the shunt phone jack half way such that the LCD display disappears.
3. Press and hold the reset button and re-insert the shunt phone jack again at the same time until the LCD display is on again.
4. The LCD will show the present shunt setting See fig.1
5. Release the reset button. The LCD will display USB. see fig 2
6. Make a quick contact of the black and white wires from the external power wires to enter the setting mode of shunt type.
   The LCD will show as in fig 3
7. Quick press on the Reset Button will cycle the setting from 50A to 100 A to 200A.
8. Making a quick contact of the black and white wires will confirm your new shunt setting and the LCD should show normal operation display. See fig 4
9. Unplug and replug the phone jack to check if your new shunt setting has been successful.

FIG.1

FIG.2

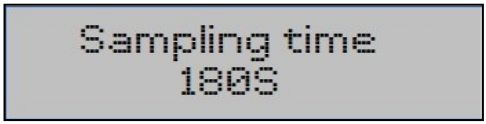
FIG.3

FIG.4

Remarks: If at step 3, the reset button is pressed for a longer time than 5 seconds, the DPM will enter into selection of communication mode then all the steps 4, 5, 6, 7, 8 will be for selection of USB->RS232->RS->485->USB. However at present only USB is available all other communication modes are for future development.

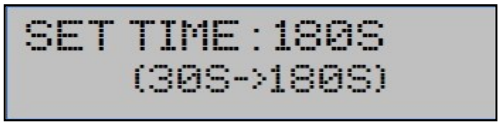
Setting data logging time interval (with firmware version 2.0 or above)

1. DPM will display “Sampling time” setting after “External Shunt” rating display. To enter sampling time setup mode, PRESS and HOLD “RESET” button within 5 second while “Sampling time” showing.

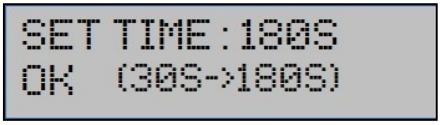


2. The sampling time can be set as integer second between 30s and 180s. It start setup from most left-hand side digit. The digit under setting is keep flashing.

3. Short press of “RESET” button to change value in the digit.

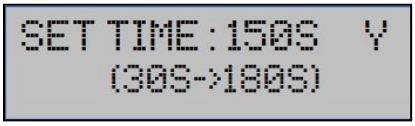


4. **PRESS** and **HOLD** the “RESET” button to confirm number in digit. It show OK then go to next digit.

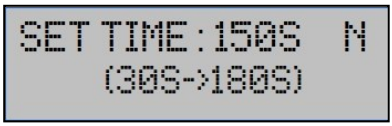


5. Repeat step 3 and step 4 to set all digit.

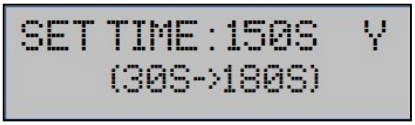
6. After setup all three digits, it will display a “Y” for you to confirm.



7. In case it is need to setup the number again, press “RESET” button to change “Y” to “N”. Then **PRESS** and **HOLD** “RESET” button to restart setup from most left-hand side digit.



8. In case the setting is collect, then **PRESS** and **HOLD** “RESET” button to confirm the value. It will show OK to confirm sampling time setting. Then the DPM go to operation mode.

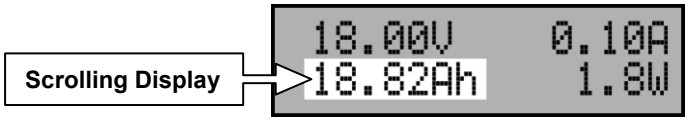


DISPLAYS

A. On the first power up the display shows the firmware version and factory preset data port mode. Then quickly shows the preset shunt rating of the DPM.

B. The Sampling time

C. Measured Data Displays



D. The Volts, Amps and Watts are continuously shown, all other data is shown in the scrolling display at 3sec. interval, any one of the scrolling displays can be held (and released) by a quick press of the Reset button(5)

1. **Current (Amps A, Peak Amps Ap, MIN. Amps):**
   The Amps value is the average current through the Meter's shunt over the last screen update interval.
   Ap is the Peak (maximum) current to the LOAD side, since the startup screen to the present moment. Similarly for **Am** which is the minimum current.
2. **Voltage (Volts V, Maximum Voltage Vp, Minimum Voltage Vm):**
   The Volts value is the average voltage over the last screen update interval. Vp is the Peak (maximum) voltage from the source side since startup screen to the present moment. Similarly for Vm (minimum) which is the voltage dip on the source side since startup.
3. **Charge (Amp-hours Ah):**
   The value displayed is the total charge in Amp-hours delivered to the LOAD since startup synchronized with the internal clock of the MCU.
4. **Energy (Watt-hours Wh):**
   The value displayed is the total energy delivered to the LOAD in Watt-hours since start up.
5. **Power (Watts W, Peak Watts Wp):**
   The value displayed is the average power delivered. The displayed Peak Watts value (Wp) is the maximum power drawn on the LOAD side, since the startup.

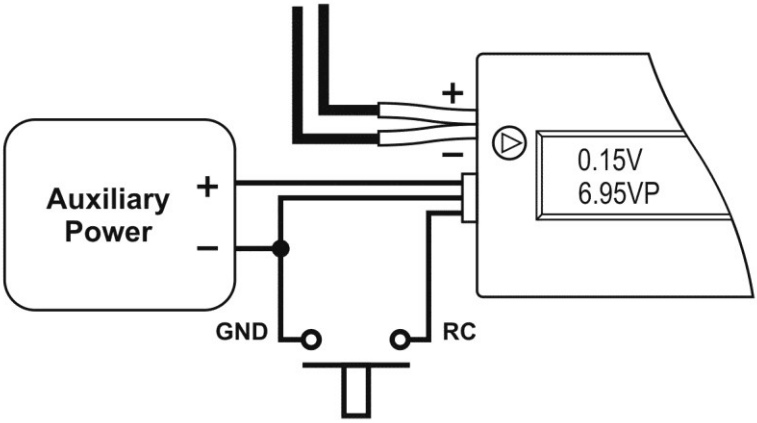
Display duration time after power ON.

When the unit is connected, it will count the duration time until disconnect.

Deleting the stored data

There are two ways to clear all the previous stored data.

1. Press the Reset Button twice allowing 5 seconds for second press.
2. Use the external power source connections, connect the remote I/O black wire to source's negative terminal for 3 seconds and then release. It will clear previous data record.



Specifications

Model	DPM-3221(For use with external shunt)		
Measured Parameters	50A/50mV	100A/50mV	200A/50mV
Current Range Amp	0-50A cont.	0-100A cont.	0-200A cont.
Voltage Range Volt.	5~60V or 0~60V with external DC source		
Power Watt(W)	Max. record W:12,000W Resolution of W:0.1W for W<10,000 1W for W>10,000		
Resolution of V&I	0.01V,0.01A	0.01V,0.02A	0.01V,0.05A
Scrolling Display of Registered Parameter			
Ampere Hour(AH)	Max. recorded AH: 99,999AH Resolution of AH: 0.01AH for total recorded AH <1,000AH 0.1AH for 10,000 > total recorded AH > 1,000AH 1AH for total recorded AH > 10,000AH		
Peak Watt (Wp) registered	12000W		
Energy: Kilo Watt Hour (KWH)	0-9999.9KWH , Resolution 0.1KWH		
Registered Peak Voltage (Vp), Min. Voltage (Vm),Peak Current (Ap), Min. Current (Am) Peak Watt(Ap)	The new high and low values of voltage and current will replace the old ones during the metering period and registered at the finish of the metering period		
Accumulative Max. Operation Period logged	75Hours		
Scrolling speed on LCD	3 seconds for one parameter		
Data Logging Interval	Selectable from 30s to 180s		
Operation Voltage and Current	5 ~ 60V and 12mA		
External DC Source Range	5 ~ 60V , 9mA ~ 12mA		
Operation Condition	0 ~ 50°C , non-condensing humidity		
Storage Condition	minus -10°C ~ 60°C		
Construction			
LCD Display	VA= 54mm x 14.4mm, 16 character x 2 row STN 5*8 dots		
Housing Material	Polycarbonate		
Dimension & Weight	75(L) x 45(W) x 23(D) mm 100g Approx.		
Supplied Accessories	Snap-on mounter & external power wire with plug, phone cable with RJ-11 plug, Inline coupler connector.		
Optional Accessories	1.Data adapter module & software for data logging. 2.External DC power box w/ socket (battery not included). 3.External shunt modules with RJ-11 socket & 5 M phone cable with plugs.		
Approvals	CE EN 61326 , FCC		