DPM-3321

Bi-directional Digital DC Power Meter
with built-in USB data logger & adapter
External shunt model

User Manual

Bi-Directional DC Power Meter with built-in USB data logger & adapter.

The new DPM-3321 is an upgrade version of previous DPM series. It measures current in both direction, using a battery as the reference, it measures the Charging and Discharging current.
DPM-3321 is a self contained with built in data adapter for data retrieval to PC* via USB port and for real time monitoring.
In addition to USB, it can be connected through Bluetooth* for Bluetooth model. The new EEPROM is increased to 3,600 sets of data.
The direction of current is with reference to the receiving end (output) typically a battery.
Current(charging) going to battery is Positive (+) and current out of battery (discharging) is Negative(-).
The power meter is powered up by 5-60V dc from either side or an external USB power bank for extended measured dc voltage range of 0-60V.

*Remark: PC software, driver, software and Bluetooth manual can be download from
http://www.manson.com.hk/product/dpm-3321/

Precaution

a. Do not exceed 60V DC in application of DC Meter.
b. This meter is designed and made for indoor use only.
c. Do not disassemble or attempt to repair the power meter.
d. If Start up screen does not appear, immediate remove all input and output connections power sources.
e. Double check on the correct polarity. If either input or output connection is in wrong polarity, there is no display on LCD.
f. Damage to the Power Meter may result if wrong polarity power is applied.
g. Do not exert pressure on the display to avoid damage to LCD display.

Controls, Indicators & terminals

FRONT
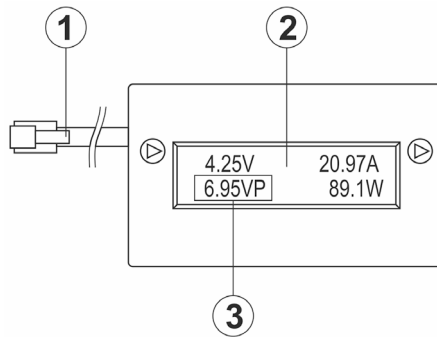
① Shunt connect flat cable with phone plug
② LCD Display: Constant displays: V, A, and W.
③ Scrolling Displays: Two sets of values for most parameters, the positive value means current going into the battery and the negative value means current coming out of the battery .

         Parameters: Time period in use, Ah (Amp Hour), WH (Watt Hour), Vp (max voltage), Ap (max.current), Wp (max.Watt), Vm (min.Voltage), Negative: -Ah, -WH, -AP, -Wp back to Time period in use.

         Freeze Scrolling display: Hold and release of any scrolling display by quick press of RESET button ⑤.

SIDE
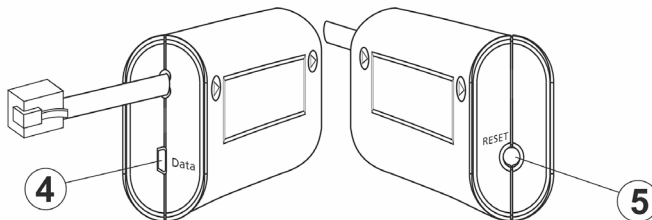
④ Micro USB socket: Either for connection to PC for data retrieval & real time monitoring. Or for connection to External Power source (such as 5V USB Power Bank) to extend voltage range from 5V-60V to 0V-60V.
⑤ Reset Switch: To set the data logging interval from 30 sec to 180 sec.
                           To clear old data.
                           To freeze and release rolling display 4.

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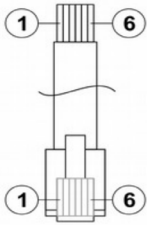
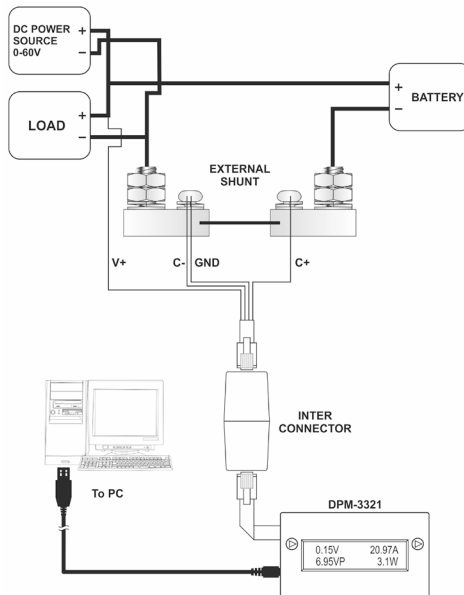| PIN	Function	Description
1	C-	SENSOR-
2	C+	SENSOR+
3	NC	No Connection
4	NC	No Connection
5	V+	Voltage+
6	GND	Voltage-

Bi-directional Connections with 5-60V DC range
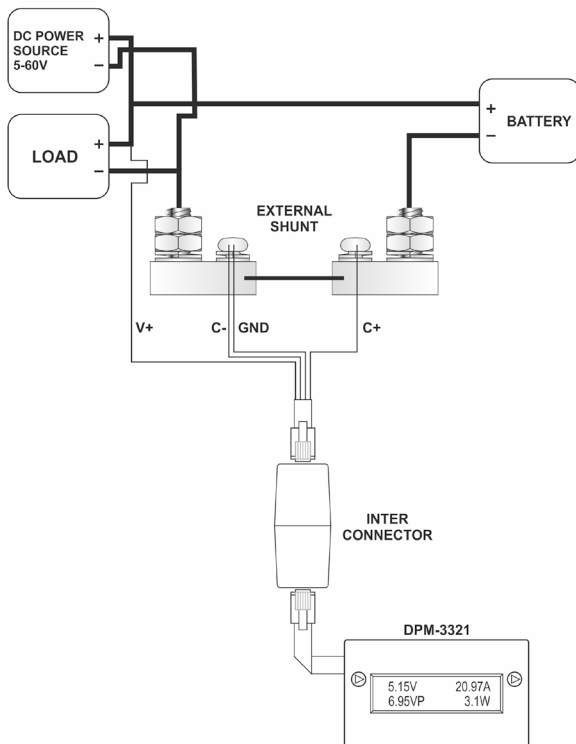
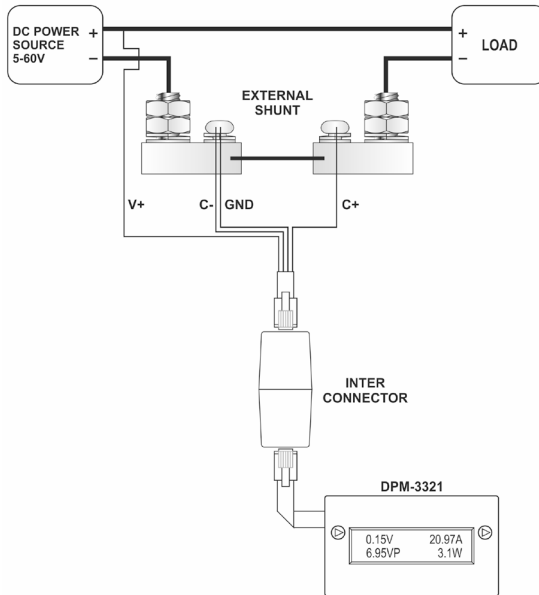**Bi-directional application with external DC for 0-60V meter range**
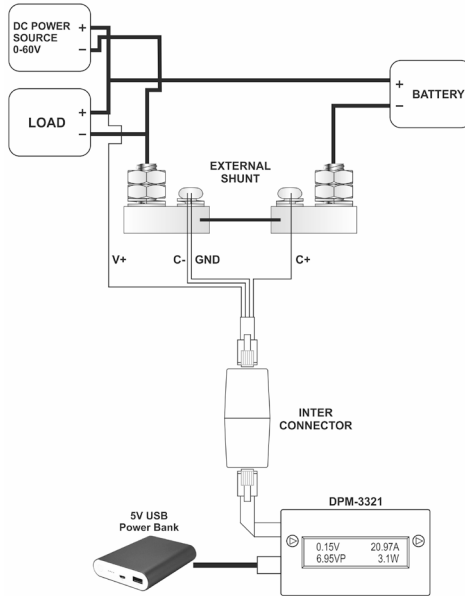

```
DC POWER  +
SOURCE    −
0-60V

                                              +
                                              −  BATTERY

LOAD      +
          −

                    EXTERNAL
                     SHUNT

V+     C-  GND      C+

                INTER
                CONNECTOR

5V USB                          DPM-3321
Power Bank
                          0.15V      20.97A
                          6.95VP     3.1W
```
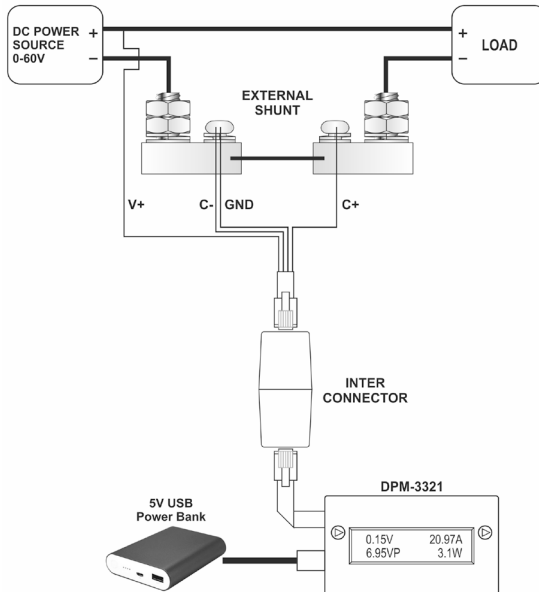
Bi-directional application connect to PC


```
DC POWER  +
SOURCE    −
0-60V
                                              +
                                              −  BATTERY
LOAD      +
          −
                    EXTERNAL
                     SHUNT

V+     C-  GND      C+

                                    INTER
                                    CONNECTOR

To PC                     DPM-3321

                          0.15V      20.97A
                          6.95VP     3.1W
```

*Remark: PC software, driver, software and Bluetooth manual can be download from http://www.manson.com.hk/product/dpm-3321/
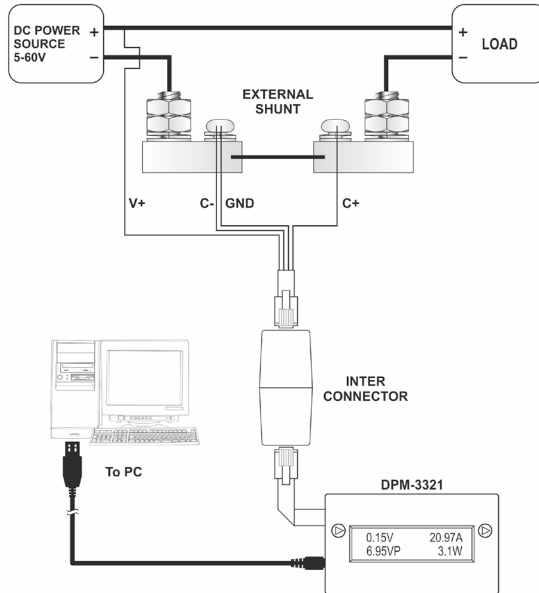
Unidirectional Connections

When used in unidirectional applications, there is no negative current.
The following are some examples for meter connections.

DC POWER SOURCE 5-60V + −   LOAD + −

EXTERNAL SHUNT

V+   C- GND   C+

INTER CONNECTOR

DPM-3321

0.15V   20.97A
6.95VP   3.1W

Unidirectional application with external DC for 0-60V meter range

DC POWER SOURCE 0-60V + −   LOAD + −

EXTERNAL SHUNT

V+   C- GND   C+

INTER CONNECTOR

DPM-3321

5V USB Power Bank

0.15V   20.97A
6.95VP   3.1W

Unidirectional Application Connect to a PC*

*Remark: PC software, driver, software and Bluetooth manual can be download from http://www.manson.com.hk/product/dpm-3321/

Operations and Displays

Installation
Connect shunt according to one of the connect in bidirectional or unidirectional connection diagram. Then connect DPM-3321 to shunt. The DPM will start up and show information in following sequence.

Software version

```
Version: 2.0
     USB
```

Shunt rating

```
External Shunt
   100A/50mV
```

Sampling time

```
Sampling time
     180S
```

Normal operation

```
18.00V      0.10A
18.82Ah     1.8W
```

Set shunt rating of DPM
In case it is need to change the DPM shunt rating to match your shunt, proceed as following:
1. Disconnect phone plug from shunt.
2. Press and hold the reset button. Then reconnect the phone plug to shunt.
3. The LCD displays present shunt setting.
4. Release the reset button.
5. Quick press on the reset button to select the your shunt rating in 50A, 100A or 200A.
6. Press and hold the reset button until the LCD displays Sample time.
7. Unplug and replug the phone jack to check if your new shunt setting has been successful.

```
External Shunt
   100A/50mV
```
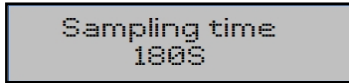
▼

```
External Shunt
   200A/50mV
```
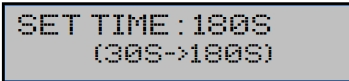
▼

```
Sampling time
     180S
```

Set data logging time interval

1. On powering up DPM will display "Version No. & USB" and shunt rating then "Sampling time". To enter sampling time setup mode, **PRESS** and **HOLD** the "RESET" button within 5 second of "Sampling time" being on display.
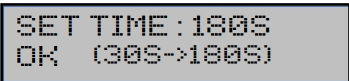
```
Sampling time
     180S
```

2. The sampling time can be adjusted between 30s and 180s.
    It starts with the setup of the far left digit at the hundred position first then the second and third digit.
    The number being set is flashing.

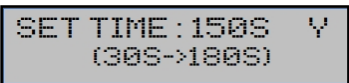3. Short presses of "RESET" button to change value in the digit.

```
SET TIME:180S
    (30S->180S)
```

4. **PRESS** and **HOLD** the "RESET" button to confirm the chosen digit in the number.
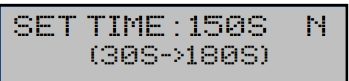   It will show "OK" then go to set next digit.

```
SET TIME:180S
OK  (30S->180S)
```

5. Repeat step 3 and step 4 for all digits.

6. After all three digits are set, it will display a "Y" meaning YES for you to confirm by a long press of the RESET.
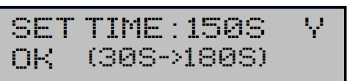
```
SET TIME:150S   Y
    (30S->180S)
```

7. In case you want to change the new setting, a short press at the "RESET" button to change "Y" to "N" followed by a long press at the RESET to do the whole new setting of sampling period.

```
SET TIME:150S   N
    (30S->180S)
```

8. In the case the setting is correct, 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.

```
SET TIME:150S   Y
OK  (30S->180S)
```
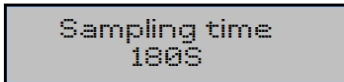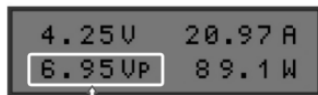
DISPLAY Indications

1. On the first power up the display shows the firmware version and factory preset data port mode.

```
Version: 1.0
       USB
```

2. Sampling time setting

```
Sampling time
     180S
```

3. Measured Data Displays

```
4.25V    20.97A
6.95Vp   89.1W
```

Scrolling Display

The data in the scrolling quadrant: Time period in use, Ah(Amp Hour), WH(Watt Hour), Vp(max voltage), Ap(max.current), Wp(max.Watt), Vm(min.Voltage), Negative: -Ah, -WH, -AP,-Wp back to Time period in use, can be fixed and released by one quick press of the Reset button.

Current (Amps A, Peak Amps Ap, - Amps):
The Amps value is the average current through the Meter's black wire over the last screen update interval.
Ap is the Peak (maximum) is current to the LOAD side, since the start up screen to the present moment. Similarly for negative Ap.

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 & Vm (minimum) from the source side since start up screen to the present moment. There is no negative Vp or Vm registered .

Charge (Amp-hours Ah , negative amp hour Ah):
Ah is total amp-hour delivered to the battery while negative Ah is the total Ah discharge from battery since start up synchronized with the internal clock of the MCU.

Energy (Watt-hours Wh and negative Watt hour):
Wh is total watt-hour delivered to the battery while negative Wh is the total Wh discharge from battery since start up synchronized with the internal clock of the MCU.

Power (Watts W, Peak Watts Wp, negative Watts W, negative Peak Watt):
The W value displayed is the average power delivered to the battery wie negative W is the discharge W from the battery over the last screen update interval. The displayed Peak Watts value (Wp) is the maximum power delivered to the battery and negative Wp is the maximum power discharged from battery...

Display duration time after power ON

```
 4.25V    20.97A
     01:29:51
```
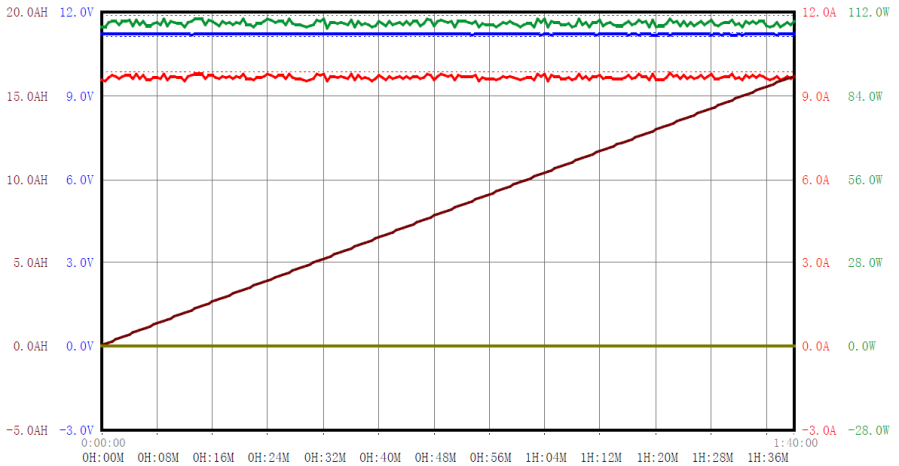
Reset DPM

The stored data can be reset to 0 by using reset button.
Press and hold the Reset button until the LCD display show "Press again 5 seconds to reset",
Then release the Reset button quickly, press again and hold 5 seconds to delete all the stored measured data.

Charger Data Log Graph

Data Log Graph

Misc. data for group Vp:11.22 / Vm:11.18 / Ap:9.81;-0.00 / Wp:110.0;-0.0 / Sample:30s

20.0AH	12.0V															12.0A	112.0W
15.0AH	9.0V															9.0A	84.0W
10.0AH	6.0V															6.0A	56.0W
5.0AH	3.0V															3.0A	28.0W
0.0AH	0.0V															0.0A	0.0W
-5.0AH	-3.0V															-3.0A	-28.0W

0:00:00   1:40:00
0H:00M 0H:08M 0H:16M 0H:24M 0H:32M 0H:40M 0H:48M 0H:56M 1H:04M 1H:12M 1H:20M 1H:28M 1H:36M

Total Ah: 16.2;0.0 / Total Wh: 181.3;0.0   ☑ Amp Hour ☑ -Amp Hour ☑ Voltage ☑ Current ☑ Power

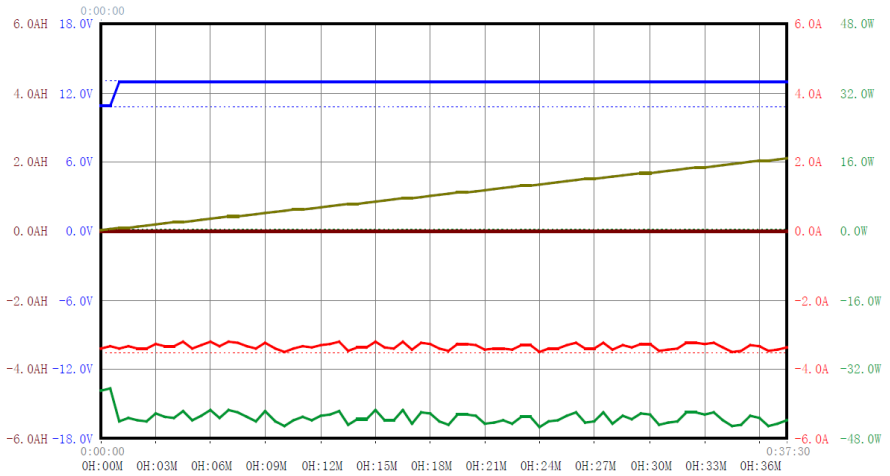Total Record: 201 / Total Time: 1:40:00   Data Log Time: 2018-9-17 13:54:00

Discharger Data Log Graph

Data Log Graph

Misc. data for group Vp:12.98 / Vm:10.86 / Ap:0.00;-3.50 / Wp:0.0;-45.4 / Sample:30s

Total Ah: 0.0;-2.1 / Total Wh: 0.0;-27.3

Total Record: 76 / Total Time: 0:37:30

☑ Amp Hour ☑ -Amp Hour ☑ Voltage ☑ Current ☑ Power

Data Log Time: 2018-9-17 13:54:00

Specifications

Measured Parameters			
Current Range Amp.	50A / 50mV	100A / 50mV	200A / 50mV
	-50 to 50A	-100 to 100A	-200 to 200A
Voltage Range Volt.	5-60V or 0-60V with external DC source		
Resolution of V & I	0.01V, 0.01A	0.01V, 0.02A	0.01V, 0.05A
Scrolling Display of Registered Parameters			
Ampere Hour (AH)	Max. recorded AH: 99,999AH; -99,999Ah Resolution of AH: 0.01AH for -1,000Ah< total recorded AH < 1,000AH 0.1AH for 10,000 > total recorded AH > 1,000AH or -10,000 < total recorded AH < -1,000AH 1AH for total recorded AH > 10,000AH or total recorded Ah< -10,000AH		
Resolution of Ah according to total Ah stored	Total Ah stored		
	Ah<1,000	1,000<Ah<10,000	Ah>10,000
	Resolution		
	0.01Ah	0.1Ah	1Ah
Power Watt (Wp) registered	Max. recorded W: 12,000W ; -12,000W Resolution of W: 0.1W for W<10,000W 1W for W>10,000W		
Energy: Kilo Watt Hour (KWH)	Max. recorded KWH: 9999.9KWH ; -999.9KWH Resolution of KWH: 0.1KWH		
Registered Peak Voltage (Vp), Min. Voltage (Vm), Peak Current (Ap), Negative Peak Current (-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	180 hours		
Scrolling speed on LCD	3 seconds for one parameter		
Data logging interval	selectable from 30s to 180s		
Operation Voltage & Current	5-60V and 20mA		
5V USB Power Bank	5V, 20mA		
Operation Condition	0-40°C, non condensing humidity		
Storage Condition	Minus -10°C -60°C		
Construction			
LCD Display	VA=54x14.4mm, 16 character x 2 row STN 5*8 dots		
Housing Material	Poly-Carbonate		
Dimension & Weight	75(L) x 45(W) x 23(D) mm 100g approx.		
Supplied Accessories	Snap-on mounter, 2 screw-on type connector blocks, USB cable, Inline coupler connector		
Approvals	CE EN 61326		