

## Quick Start Guide

# RGM180 Display Series



## LIMITED WARRANTY

The manufacturer offers the customer a 24-month functional warranty on the instrument for faulty workmanship or parts from date of dispatch from the distributor. In all cases, this warranty is valid for 36 months from the date of production. This warranty is on a return to factory basis.

The manufacturer does not accept liability for any damage caused by instrument malfunction. The manufacturer accepts no responsibility for the suitability of the instrument to the application for which it was purchased.

Failure to install, set up or operate the instrument according to the instructions herein will void the warranty.

Only a duly authorized representative of the manufacturer may open your instrument. The unit should only be opened in a fully anti-static environment. Failure to do so may damage the electronic components and will void the warranty.

The greatest care has been taken to manufacture and calibrate your instrument. However, these instructions do not cover all possible contingencies that may arise during installation, operation or maintenance, and all details and variations of this equipment are not covered by these instructions.

For additional information regarding installation, operation or maintenance of this instrument, contact the manufacturer or your local representative or distributor.

## WARNING

**Read the instructions in this manual before performing installation, and take note of the following precautions:**

- **Ensure that all incoming AC power and other power sources are turned OFF before performing any work on the instrument. Failure to do so may result in serious or even fatal injury and/or equipment damage.**
- **Before connecting the instrument to the power source, check the labels on the back of the instrument to ensure that your instrument is equipped with the appropriate power supply voltage, input voltages and currents.**
- **Under no circumstances should the instrument be connected to a power source if it is damaged.**
- **To prevent potential fire or shock hazard, do not expose the instrument to rain or moisture.**
- **The secondary of an external current transformer must never be allowed to be open circuit when the primary is energized. An open circuit can cause high voltages, possibly resulting in equipment damage, fire and even serious or fatal injury. Ensure that the current transformer wiring is secured using an external strain relief to reduce mechanical strain on the screw terminals, if necessary.**
- **Only qualified personnel familiar with the instrument and its associated electrical equipment must perform setup procedures.**
- **Do not open the instrument under any circumstances when it is connected to a power source.**
- **Do not use the instrument for primary protection functions where failure of the device can cause fire, injury or death. The instrument can only be used for secondary protection if needed.**
- **Read this manual thoroughly before connecting the device to the current carrying circuits.**
- **During operation of the device, hazardous voltages are present on input terminals. Failure to observe precautions can result in serious or even fatal injury or damage to equipment.**

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## General

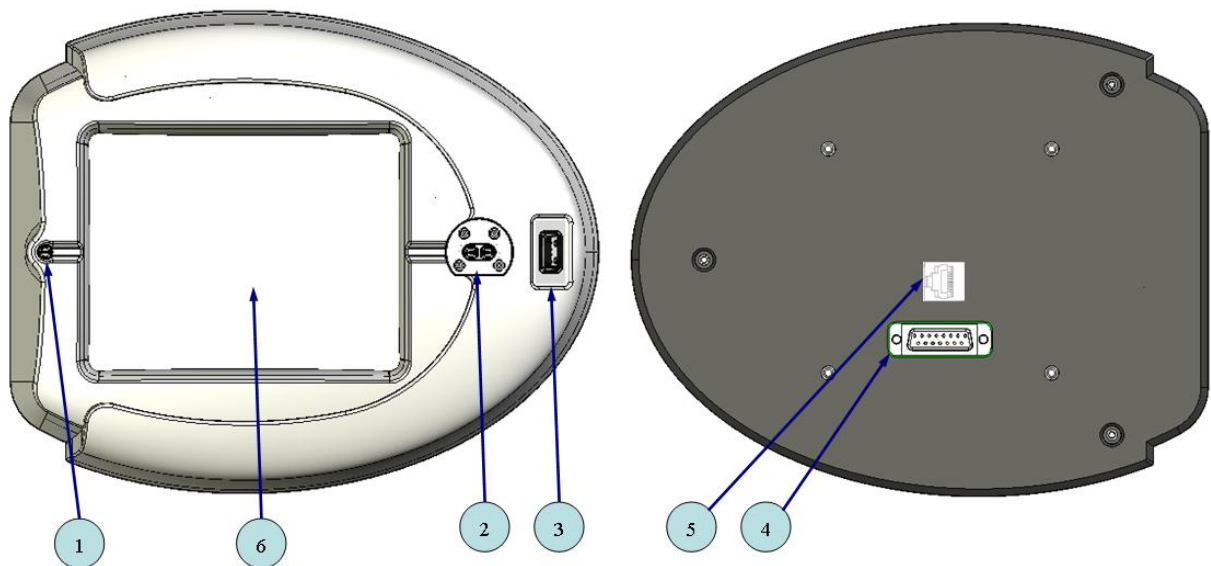
The RGM180 series provides a user-friendly interface to monitor and configure SATEC devices.

The RGM180 series includes two models:

- Local Graphic Display RGM180-G1: the RGM180 communicates with a single host processor *expertmeter*<sup>™</sup> SATEC device, using an RS-485 interface. It is powered directly from the device.
- Network Graphic Display RGM180-G3: the RGM180 communicates with multiple host processor *expertmeter*<sup>™</sup> SATEC devices (up to 32), using a 10/100Base T Ethernet or RS-485 interface. It is powered by Power over Ethernet (PoE) and/or an external AC/DC adaptor.

## Installation

### 1. Interface Description

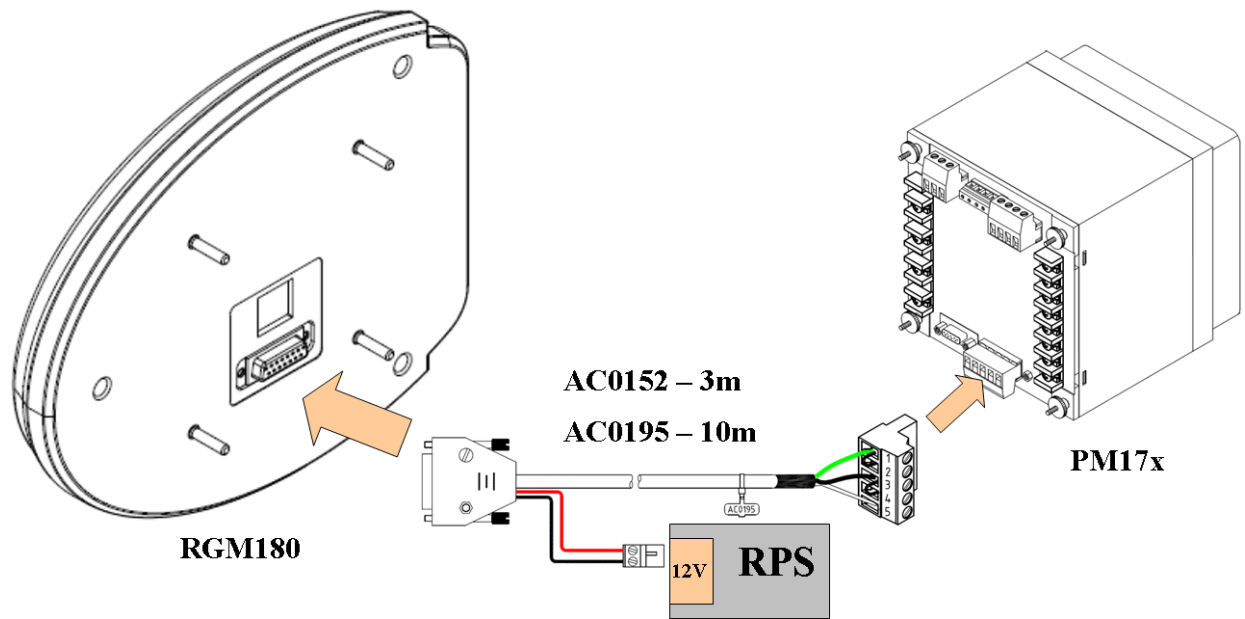


1. LED: Red (Wh)/Green (Ethernet Link).
2. IR Communication port (for PM180 only)
3. USB Communication port
4. RS485 Communication port and PM17x/PM180 display connector
5. Ethernet Communication port (**RGM180-G3 only**)
6. Display & Touchscreen.

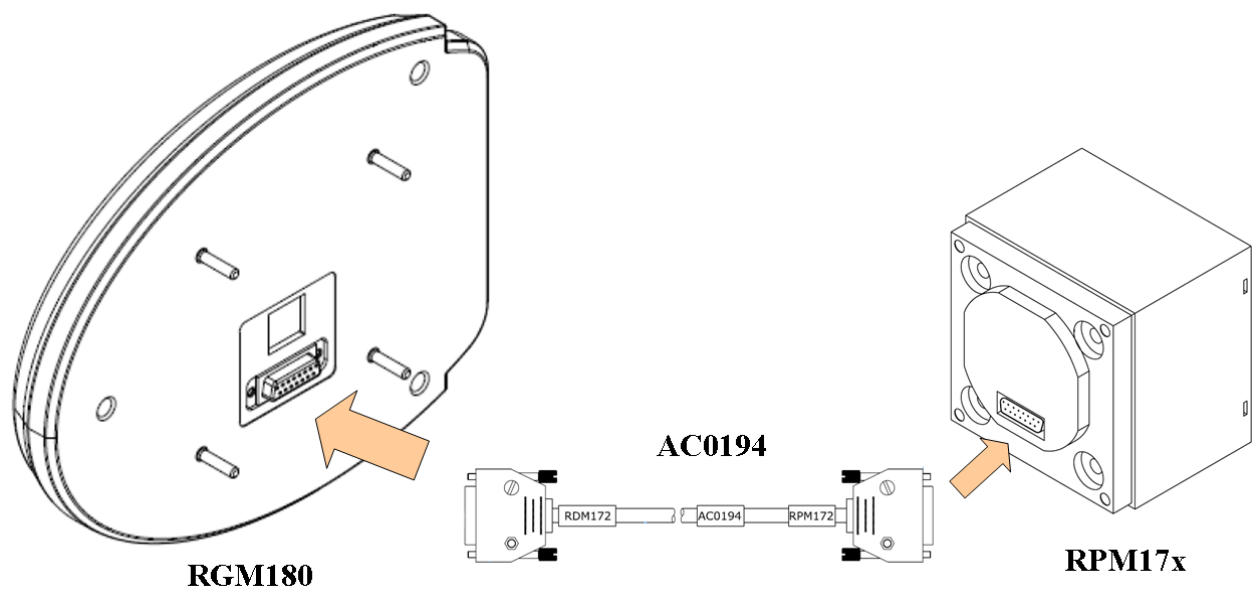
Note: this document prepared for the following devices: RGM180-G1 & RGM180-G3.

## 2. Connection Configurations

### 2.1 PM17x / RPM17x



**Figure 1: PM17x connection**



**Figure 2: RPM17x Connection**

## 2.2 ezPAC Connection

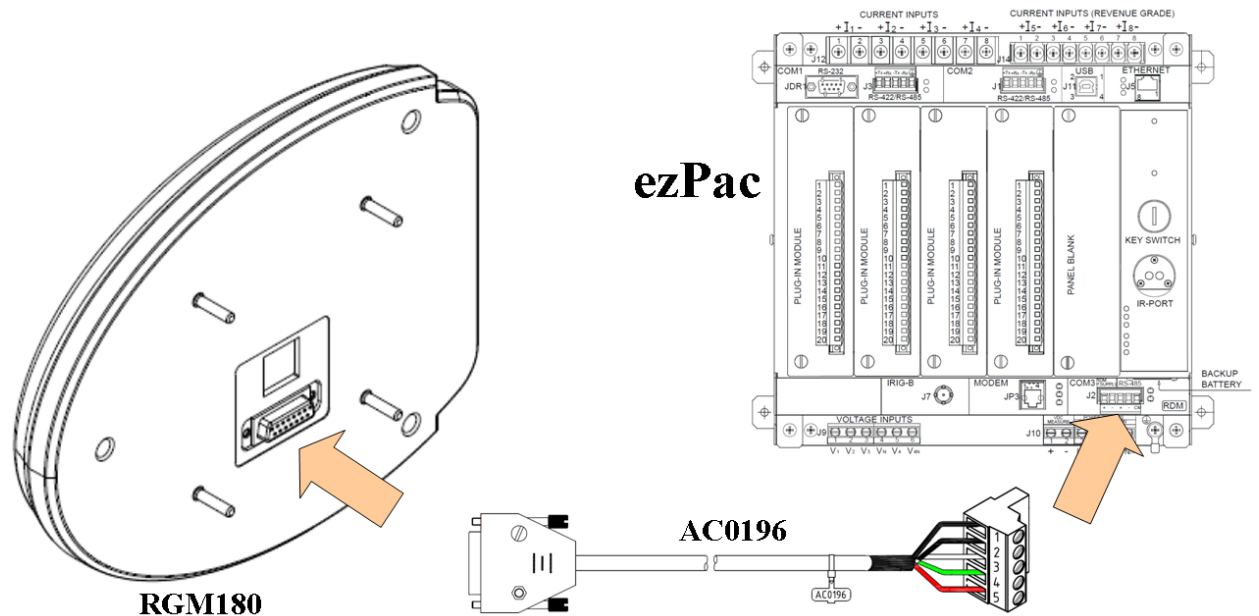


Figure 3: ezPac Connection

## 2.3 EM720 Connection

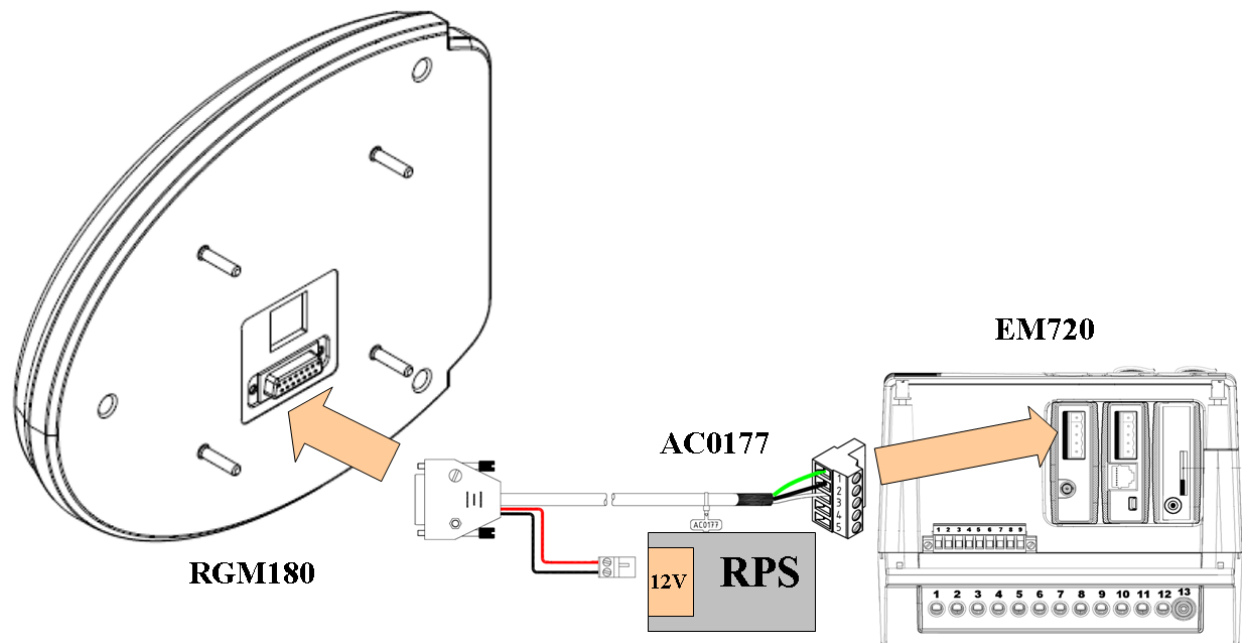


Figure 4: EM720 Connection

## 2.4 PM130 PLUS Connection

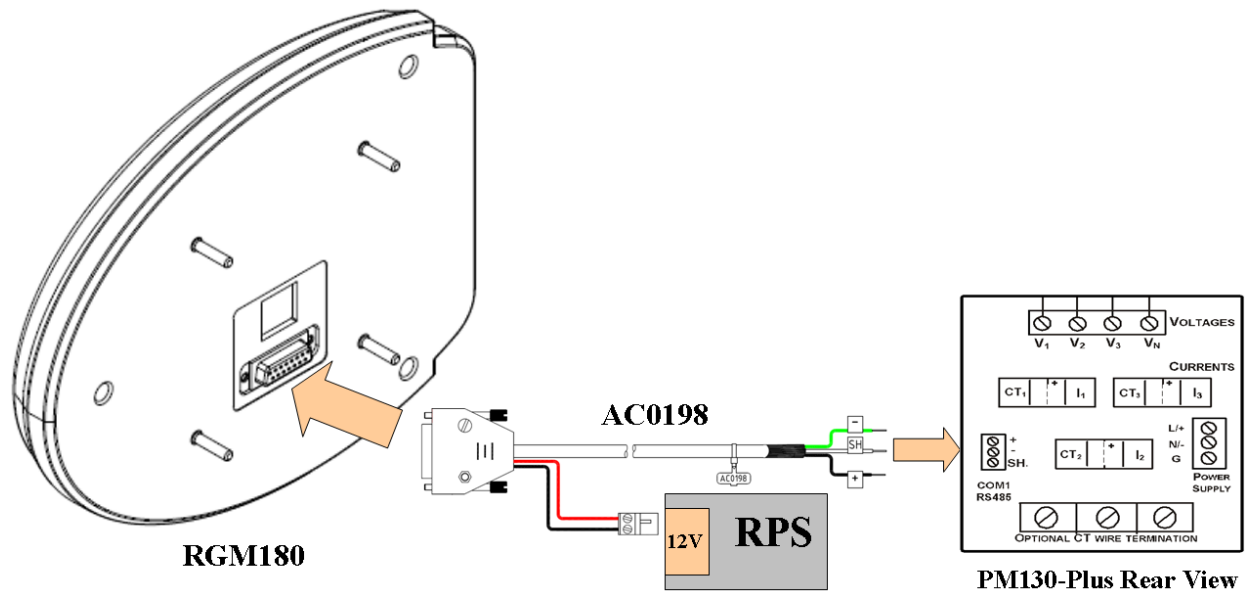


Figure 5: PM130 Plus Connection

## 2.5 EM133 Connection

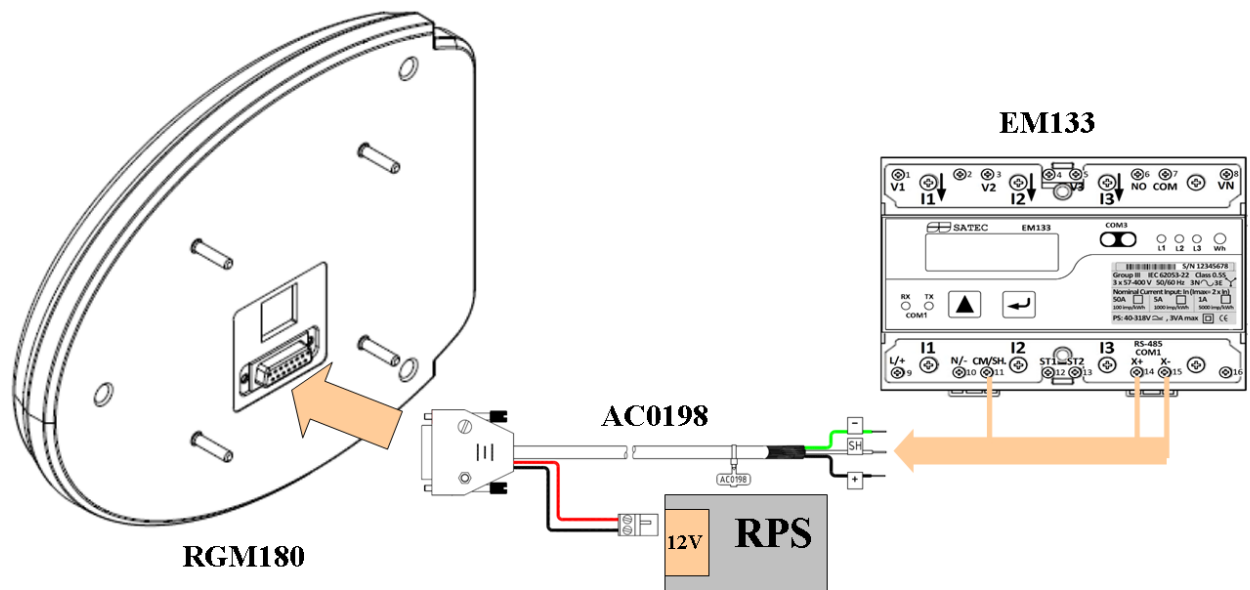
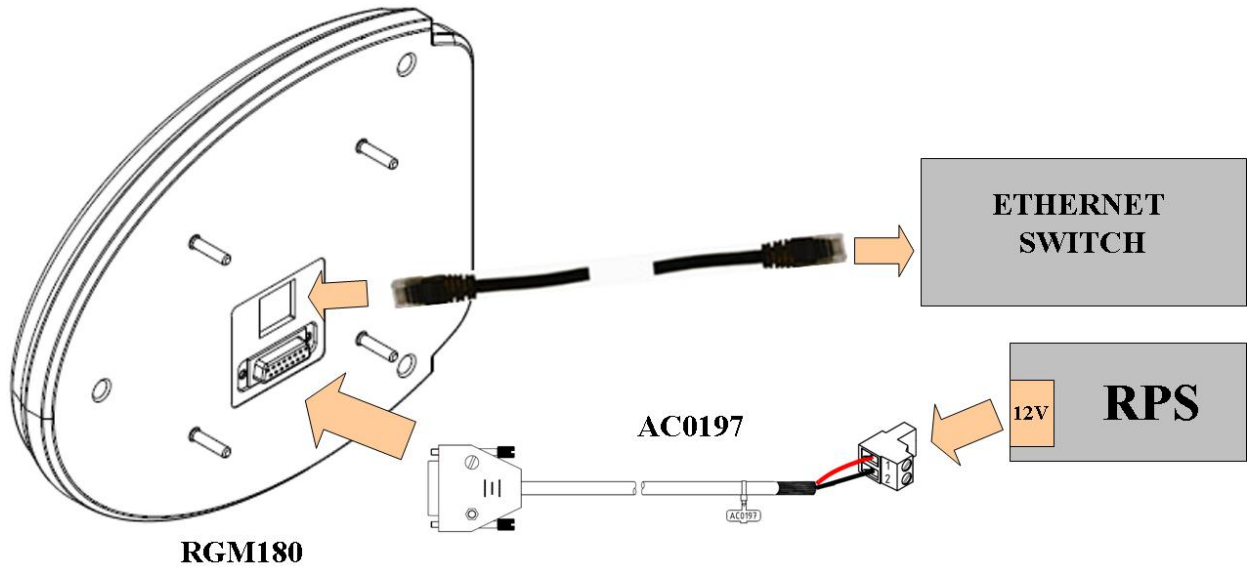


Figure 6: EM133 Connection

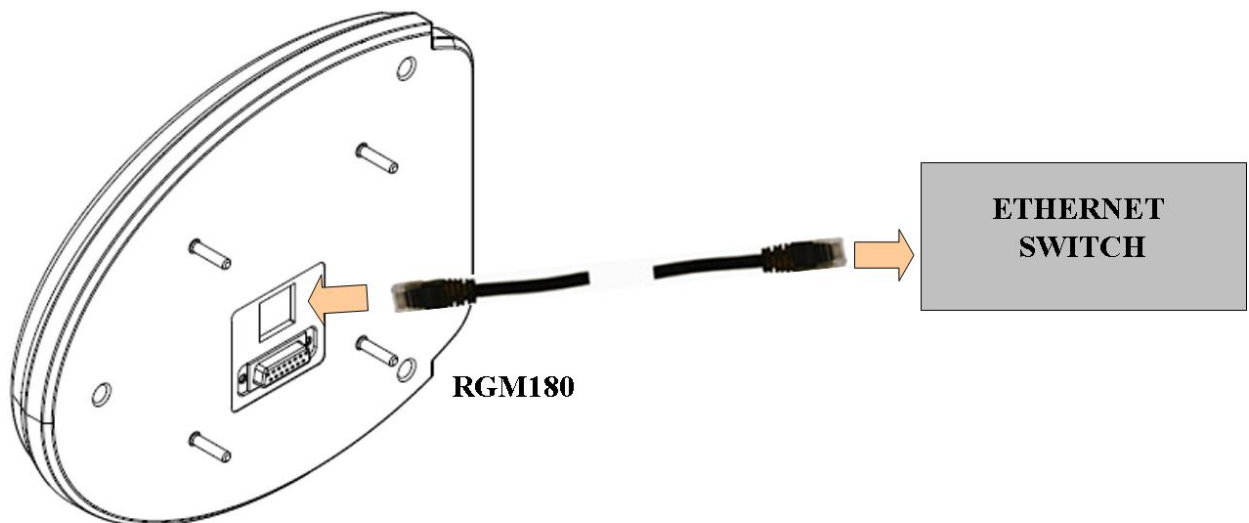
## 2.6 Ethernet Connection

### 2.6.1. Regular Ethernet connection



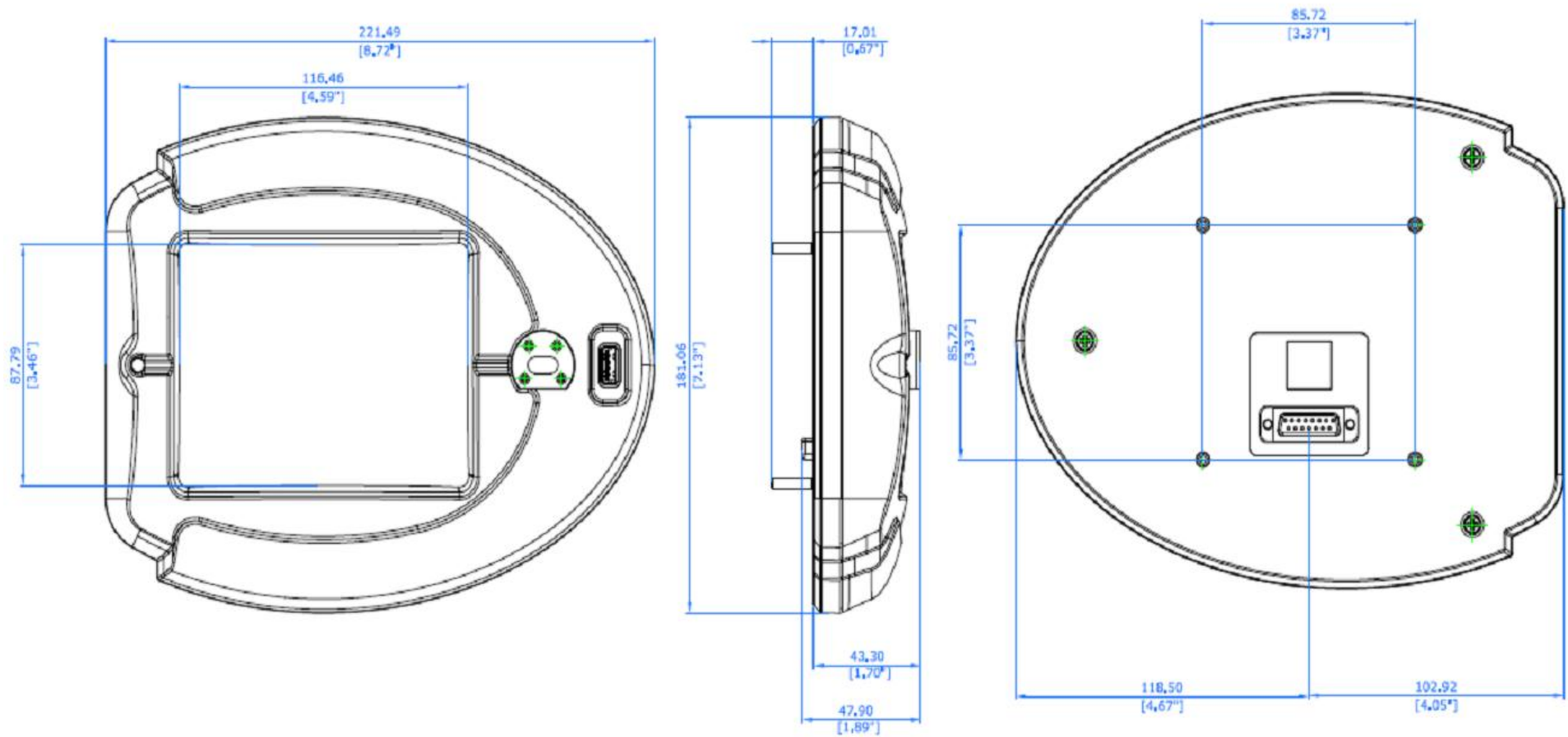
**Figure 7: Regular Ethernet Connection**

### 2.6.2. PoE Ethernet Connection



**Figure 8: PoE Ethernet Connection**

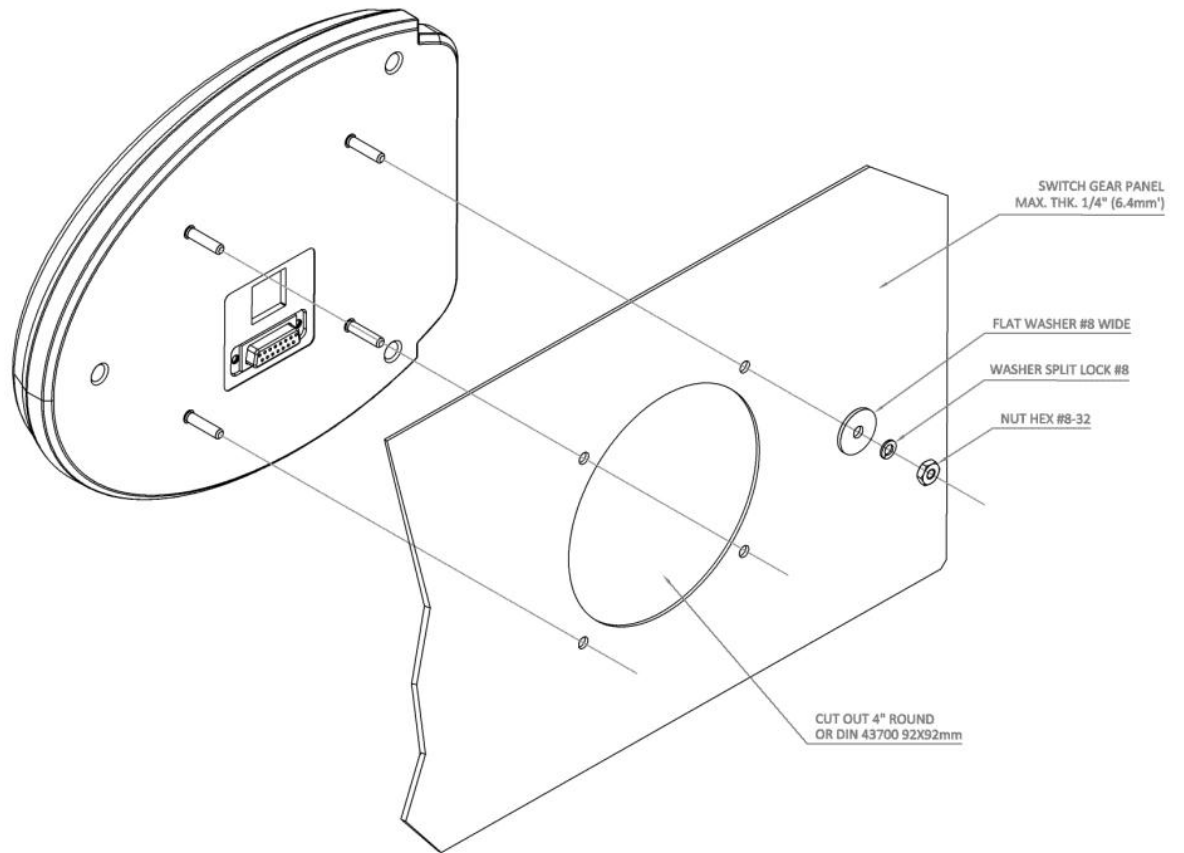
## 2.7 Mechanical Installation



**Figure 9: Instrument Dimensions**



## 2.8 RGM180 Panel Mount Installation



**Figure 10: Panel Mount Installation**

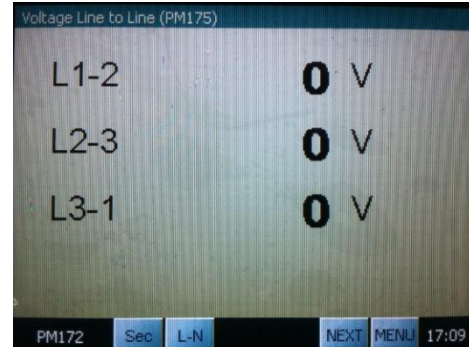
## Operation

### 1. Connection

#### Connecting to a Meter

The RGM runs a self-test prior to connection.

The screen will display "Connecting....;" when connected, Voltage measurement data will be displayed.

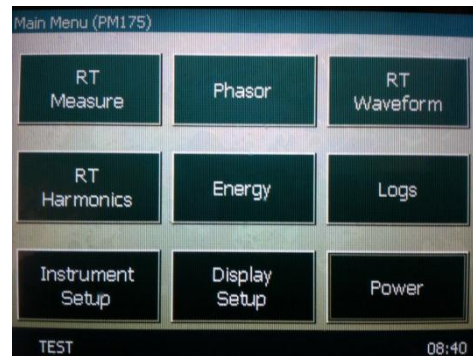


The screen is touch activated.

To display the Main Menu, press **MENU** 3 times.

The Main Menu allows you to:

- Select the data group you wish to be displayed (see Section 6);
- Conduct display and instrument setups (see Sections 2 and 3).

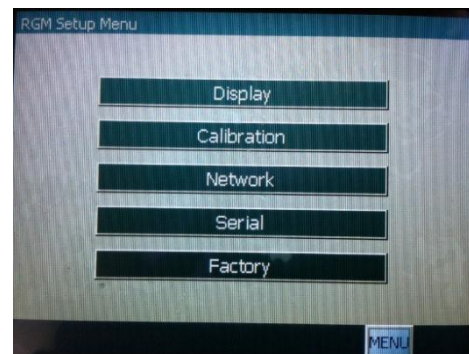


#### Connecting to the RGM

The device allows configuration through the USB or Ethernet at Modbus address 99.

### 2. Display Setup

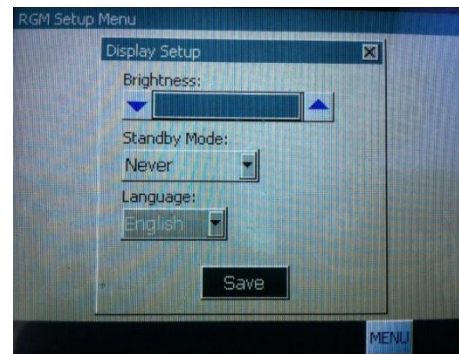
Press on **Display Setup** from the Main Menu. The Display Setup menu will appear.



## Display Definitions

Press **Display** to set Brightness, Standby Mode and Language:

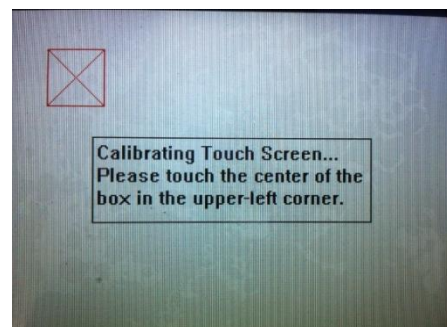
After setting these options, press Save and then close the window by pressing on the X in the top right corner.



## Screen Calibration

Press **Calibration** to calibrate the display touch screen sensor:

Follow the instructions on the screen to calibrate the display. A message will appear indicating if input values are out of range.



Press OK to return to Display Setup menu.

## Network Setup

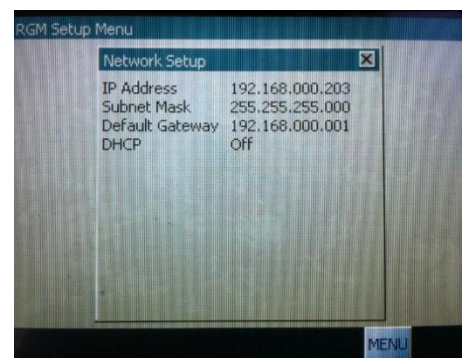
Press **Network** to define the network connection:

Press on the IP Address number to define the address; input the correct IP address (or press Clear to input a new address) and press OK to save or Cancel to restore the previous address.

Define or change the Subnet Mask number and Default Gateway in the same manner.

DHCP – Press the setting (Off or On) to change, then press OK to save.

Press X to close the window and return to the Display setup menu.

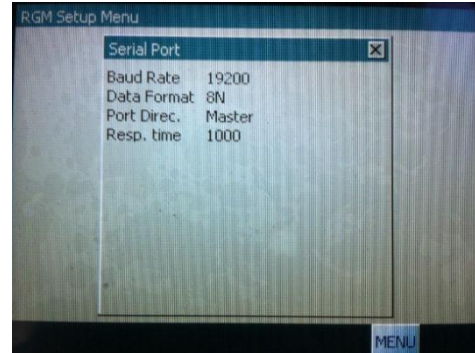


## Serial Port Settings

Press **Serial** to define the serial port settings:

Set the Baud rate, Data format, Port direction and response time in the same manner as in the Network Setup.

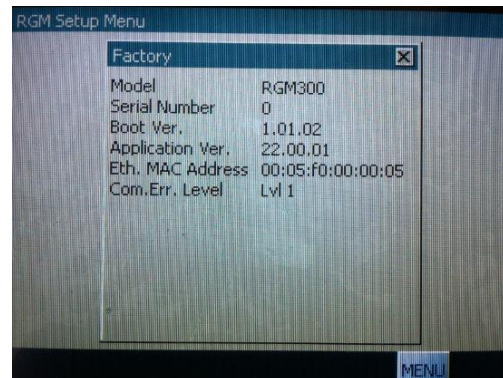
Press X to close the window and return to the Display setup menu.



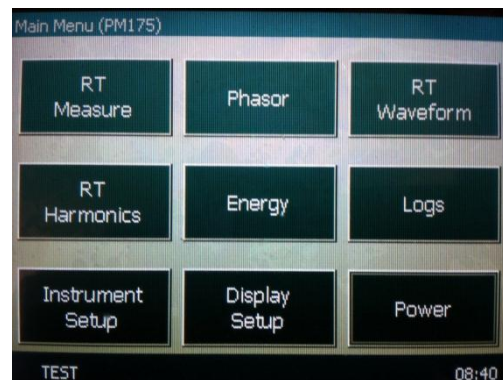
## Factory Settings

Press **Factory** to view the factory-set definition of the RGM.

**It is not recommended to change these settings.**



Press **MENU** to return to the Main Menu.



### 3. Instrument Setup

The RGM connects to up to 32 devices. Each device has its own instrument setup definition.

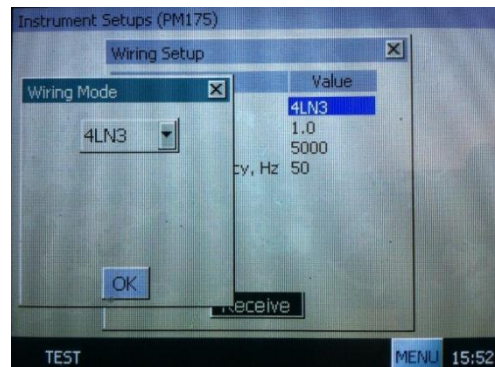
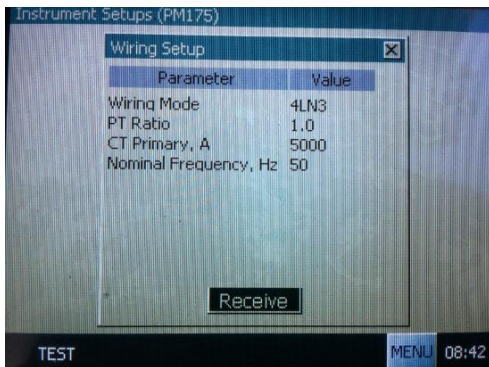
Press **Instrument Setup** to define Wiring Setup and Demand Setup, to adjust the Time, to Reset measurement parameters and to define Communication parameters.



#### Wiring Setup

Press **Wiring Setup** to define the Wiring Mode, CT primary and Nominal Frequency.

Press on the value of the desired parameter and enter the correct value. Press **Receive** to complete the definition, then close the window using the X in the upper right corner.



#### Demand Setup

Power demand parameters can be defined on this screen, used in the same fashion as the Wiring Setup.

#### Time Adjustment

Use this screen to set the date and time. Press OK when completed. Press OK on the 'Operation successfully completed' message.

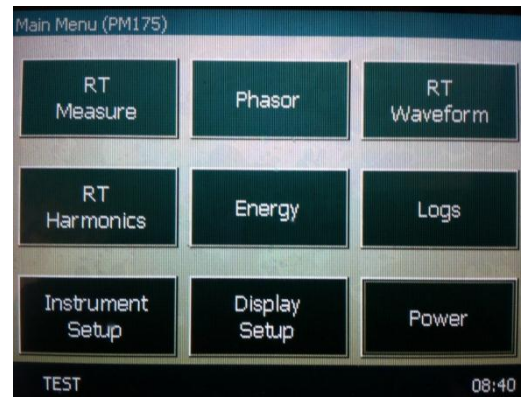
#### Reset Setup

Use this screen to reset parameters or clear logs. You will be asked after each operation if you are sure you want to perform the reset.

## Communications

Communications parameters can be set in the same fashion as the Wiring and Demand Setups.

Press **MENU** to return to the Main Menu.

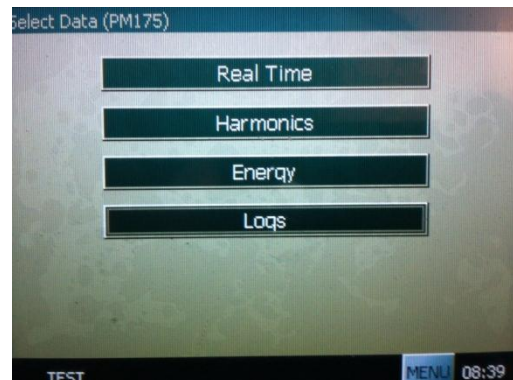


## 4. Data Display

From the Main Menu, press **RT Measure** to display the **Select Data Menu**.

The Select Data Menu allows you to choose from the four data groups: Real Time Measurements, Harmonics, Energy, and the Logs (Event Log).

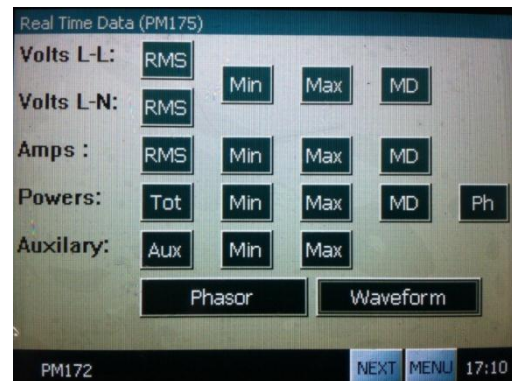
To display Real Time Measurements, press on **Real Time**.



### 4.1 Real Time Measurements

Press on the desired data item to display the data. Continue to press **NEXT** to progress through the data in this group:

- Voltage: RMS, minimum, maximum and maximum demands
- Current: RMS, minimum, maximum and maximum demands
- Power: Total, minimum, maximum, maximum demands, power per phase
- Auxiliary power: Total, minimum, maximum
- Phasor and waveform graphs



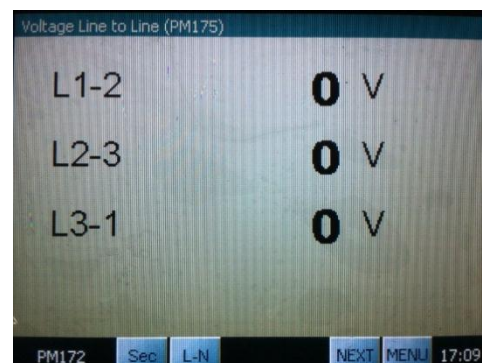
This screen can be reached at any point from any of the real time measurement screens by pressing on **MENU** from those screens.

**Note:** From this screen, press **MENU** to display the Select Data menu; press **NEXT** to bring up the next data group: Harmonic Data (see 4.2).

Press Volts L-L **RMS** to display the screen at right.

Press on **L-N** at the bottom of the screen to view Line to Neutral voltage; press on **Sec** to display Line to Line Secondary voltage.

Press **NEXT** to proceed to the next data item.

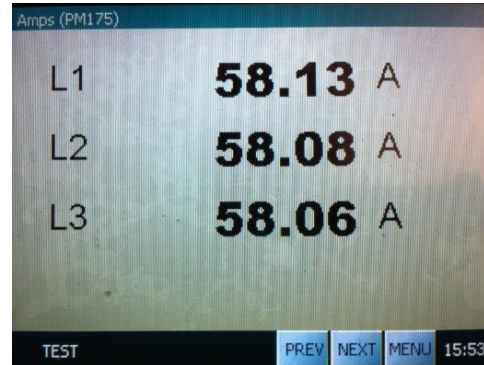


To maneuver between the data items displayed, press **PREV** or **NEXT**.  
 At the display of voltage maximum demand, press **NEXT** to display Current data.

### Current (Amps)

The next four screens display:

- Currents (Amps)
- Minimum currents
- Maximum currents
- Maximum Demand currents



Press **NEXT** to display Power data.

### Power

The next five screens display:

- Total Power: kW, kvar, kVA, PF
- Total Power Minimum
- Total Power Maximum
- Power Demands: Maximum, Present and Predicted
- Power per phase



Press **NEXT** to display Auxiliary power data.

### Auxiliary Power

The next three screens display:

- Auxiliary power
- Minimum auxiliary power
- Maximum auxiliary power



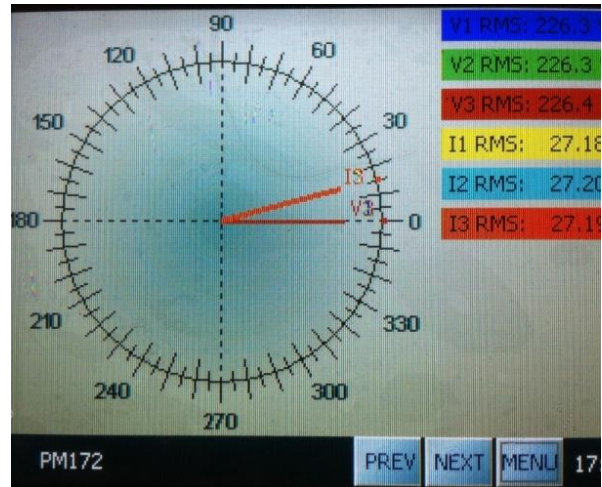
Press **NEXT** to display the phasor graph.



## Phasor

The phasor is a graphical display of phase angles for voltage and current per phase.

The phases are color coded for easy reading of the graph.



Press **NEXT** to display the Waveform graph.

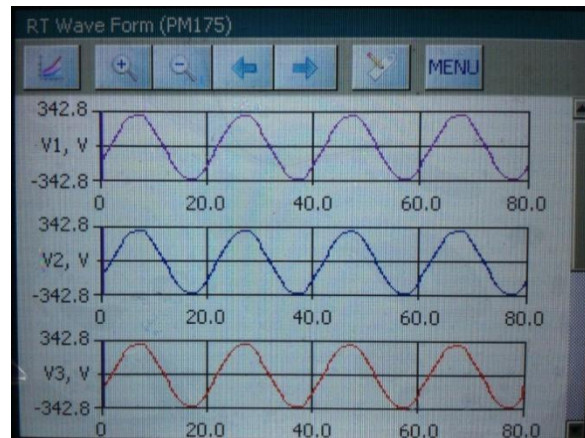
## Waveform

The waveform is a real time graphical display.

Use the sliding bar on the right to view different waveforms.

The icons at the top are (from left to right):

- Channel selection
- Zoom
- View previous or next section of the graph
- View waveform properties



Press **MENU** to close this screen. "Closing" will appear, after which you will be back to the **Real Time Measurement Data Menu** (see 4.1).

From the Real Time Measurement Data screen, press **MENU** to display the Select Data menu; press **NEXT** to display the **Harmonic Data Menu** (see 4.2).

## 4.2 Harmonic Data Menu

This screen presents the Harmonic data group. This includes the following data:

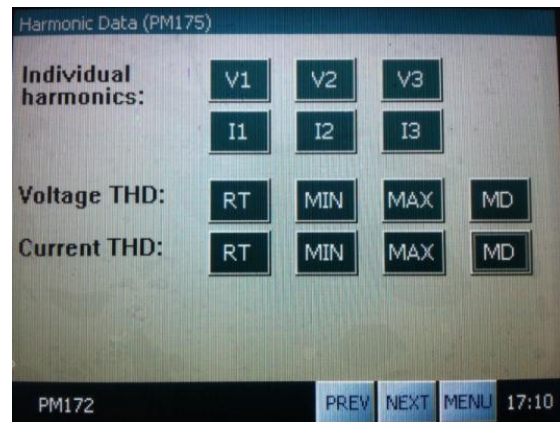
Individual harmonics, for each phase: Voltage and current

Voltage THD (Total Harmonic Distortion)

Current THD

Press on the desired data item to view that data.

Continue to press **NEXT** to progress through the data in this group.



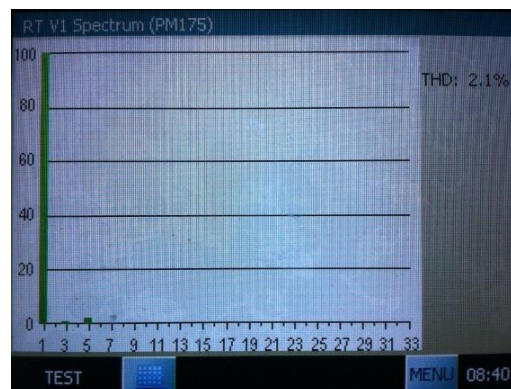
**Note:** From this screen, press **MENU** to display the Select Data Menu menu; press **NEXT** to display the next data group: Energy Data (see 4.3). Press **PREV** to return to the Real Time Measurement Data Menu (see 4.1).

### Individual Harmonics

These screens work differently from the Real Time Measurement Data screens – you will always need to press **MENU** to return to the screen shown above and then select the next item you want to view.

Each harmonic spectrum can be viewed in graph or tabular form, as shown below. The table expresses the harmonic distortion as a percentage. To view the full table, use the scroll bar on the right.

Press on **V1** to display the Voltage Harmonic Spectrum (displayed per phase) graph:



Press on the table icon at the bottom of the screen to view the Voltage Harmonic Spectrum table.

Harmonic Order	HD, %
H01	100.0
H02	0
H03	0.5
H04	0.1
H05	1.9
H06	0.1
H07	0.4
H08	0
H09	0.4
H10	0

View Current Harmonic Spectrum (per phase) in the same way, by pressing on **I1** on the Harmonic Data screen above.

## Total Harmonic Distortion

These screens work the same as the Real Time Measurement Data screens – press **NEXT** to proceed to the next data item, or **PREV** to return to the previous data screen.

Voltage THD – per phase

- Total
- Minimum
- Maximum
- Maximum Demands



Current THD – per phase

- Total
- Minimum
- Maximum
- Maximum Demands

Press **MENU** to return to the Harmonic Data group screen. Press **NEXT** to proceed to the **Energy Data Menu** (see 4.3).

## 4.3 Energy Data

This screen presents the Energy data group, consisting of the following data:

- Energy import: kWh, kvarh, kVAh
- Energy export: kWh, kvarh
- Net energy



Press on the desired data item to view that data.



Press **NEXT** or **PREV** to see next or preceding data item. Press **MENU** to return to Energy Data Menu.

Press **MENU** to return to Select Data Menu; Press **Logs** to view Log Selection screen (only Event Log is available).

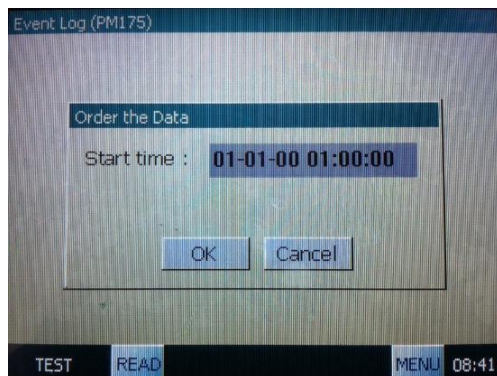
#### 4.4 Log Selection

Press **Event Log** to define and view the log.



When you start the time, the Log will download to the display.

To order the data, first define the start time. Press on the gray area to insert the time definition. Press OK. Press OK again to commence log downloading.



The log will appear. Use the scroll bars at bottom and right to view the full log. To re-start the log, press READ to again define the start time.

Event	Date/Time	Cause	Source
1	01-01-00 01:00:00	SELF-CHECK	DATA ME
2	01-01-00 01:00:00	SELF-CHECK	DATA ME
3	01-01-00 01:00:00	SELF-CHECK	DATA ME
4	01-01-00 01:00:00	SELF-CHECK	DATA ME
5	01-01-00 01:00:00	SELF-CHECK	DATA ME
6	01-01-00 01:00:00	SELF-CHECK	DATA ME
7	01-01-00 01:00:00	SELF-CHECK	DATA ME
8	01-01-00 01:00:00	SELF-CHECK	DATA ME
9	01-01-00 01:00:00	SELF-CHECK	DATA ME
10	01-01-00 01:00:00	SELF-CHECK	DATA ME
11	01-01-00 01:00:00	SELF-CHECK	DATA ME
12	01-01-00 01:00:00	SELF-CHECK	DATA ME

Press **MENU** to return to Log Selection Menu.

Press **MENU** again to return to Select Data Menu.

#### Reminder:

**In the data screens, pressing **PREV** or **NEXT** will move you to the previous/next data item within the data group you are currently displaying.**

**You can move from one data group to another. For example, if you are on the Harmonic data display, press **PREV** to move to Real Time data display; or **NEXT** to move to Energy data display. To display the Logs, you must return to the Select Data Menu.**

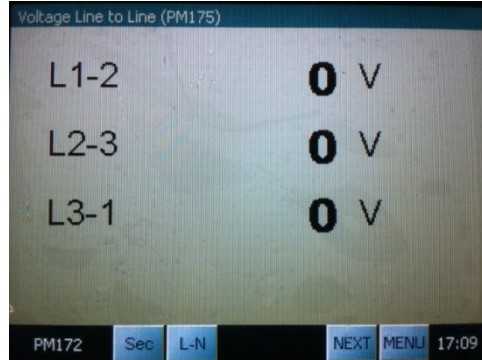
## 5. Meter Selection

### Labels

The label name assigned to a device will appear in the lower left of the screen. The user may change these label names (the actual device being displayed will appear at the top of the screen in parentheses).

### Meter Selection

To change the connection to a different device, press on the label name in the lower left of the screen (in this screen, it is PM172).



The Meter Selection screen will appear.

Press on the address of the desired meter. Press OK on the 'Connection established' box. Data display will begin.



To change the label name or address of a device, press on Setup. The **Connection Manager** screen will appear. Press on the label name or address you wish to change.

Note: In most cases, excluding stand-alone or ethernet connections, there is no need to change the address or IP. Connecting to an external device requires the definition of MODBUS and/or IP addresses.



To perform display setup from this menu, press RGM Setup. See Section 2 for Display Setup instructions.

## 6. Troubleshooting

- **If screen does not respond to touch** – perform screen calibration (see Section 2, Display Setup).
- **If the display does not connect to the remote meter** – make sure that the Modbus and/or IP address specified in the Connection Manager (see Section 5) match the remote meter address.
- **If the display does not connect through the Ethernet connection** – make sure that the installed IP address is set correctly (see Section 2, Display Setup > Network Setup). You may also need to contact your system administrator to obtain a legal address in a specific network.

## Technical Specification

Communication ports		
<b>COM1</b>	<b>IR Communication port</b>	
		<b>PM180 device Only</b>
Optional	Optical Communication port	
	Max. Baud rate	19.200 kb/s
	Protocols	Modbus or DNP3.0
	Isolation	2500 V <sub>AC</sub> @ 1 mn
<b>COM2</b>	<b>Serial Communication port</b>	
		<b>Device COM port</b>
basic	RS-485 Max. Baud rate	
	Isolation	4000 V <sub>AC</sub> @ 1 mn
	RS-485 Maximum length cable	
	Protocols	Modbus RTU
	Connection	DB-15
<b>ETHERNET</b>	<b>Multiple device Communication port</b>	
		<b>RGM180-G3 only</b>
10/100Base-T Basic	Built-in network communication port with PoE ability	
	Wired LAN communication port with auto-negotiation	
	Ethernet port Baud rate	10/100 Mb/s
	Protocols	Modbus/TCP
	ETH port Isolation	1.5 KVAC @ 1mn
	ETH connector	Standard RJ-45
<b>USB</b>	<b>Built-in USB Communication port</b>	
		<b>DISPLAY Panel</b>
Basic - Device (default)	USB communication port	Full speed Device
	USB port Baud rate	12 Mb/s
	Protocols	Modbus RTU/ASCII and DNP3.0
	USB device port Isolation (Remote display)	
	USB device port Isolation (Local display)	
	USB connector DISPLAY Panel	
	USB type A, vertical mount, straight	
<b>DISPLAY</b>	<b>Panel Display</b>	
Touch-Panel LCD graphic display, 1 Wh pulse led, IR port and USB Device/Host connector Type A	size	5.7"
	resolution	320 x 240 dots
	Type	TFT – color with Touch Panel
	Outline dimensions	131mm (W) x 102mm (H) x 14.5mm (D)
	Active area	115.2mm (W) x 86.4mm (H)
	Operating temperature	-20°C - +70 °C
	Storage temperature	-30°C - +80 °C
Non-volatile memory	For energy and tariff registers logging, EV-PQ-DATA-WV log	Basic 256MB

<b>Power supply</b>	<b>Low DC power supply</b>	
12VDC – Device PS standard	Rated Input	10.8 – 13.2V DC
	Dielectric withstand insulation	4000 V <sub>DC</sub> @ 1mn
	Power Consumption	2W
24VDC - Device PS option (PM180 Aux. PS)	Rated Input	9.5 – 24V DC
	Dielectric withstand insulation	3000 V <sub>DC</sub> @ 1mn
	Power Consumption	2W
48VDC – PoE option	Rated Input	37 – 58V DC
	Dielectric withstand insulation	1500 V <sub>DC</sub> @ 1mn
	Power Consumption	2W
All models	Detachable Terminals for wires size Header pitch PoE connection	3 x 2.5 up to 6 mm <sup>2</sup> 7.5 mm RJ45
<b>Temperature limit range</b>	Operational temperature	-30 °C to 70 °C
	LCD Operational temperature	-20 °C to 70 °C
	Storage temperature	-30 °C to 80 °C