

Quick Start Guide

PM174 Powermeter



Introduction

The PM174 is a compact, multi-function, three-phase AC Powermeter and Power Quality Analyzer specially designed to meet the requirements of users ranging from electrical panel builders to substation operators.

If you are familiar with the PM174 Powermeter, use this quick start guide to prepare the unit for operation. If you are not familiar with the PM174, read the Installation and Operation Manual carefully before installing and using the unit.

This quick start guide does not contain information on all the features of PM174. See the Installation and Operation Manual for full operating details and features.

Assembly Instructions

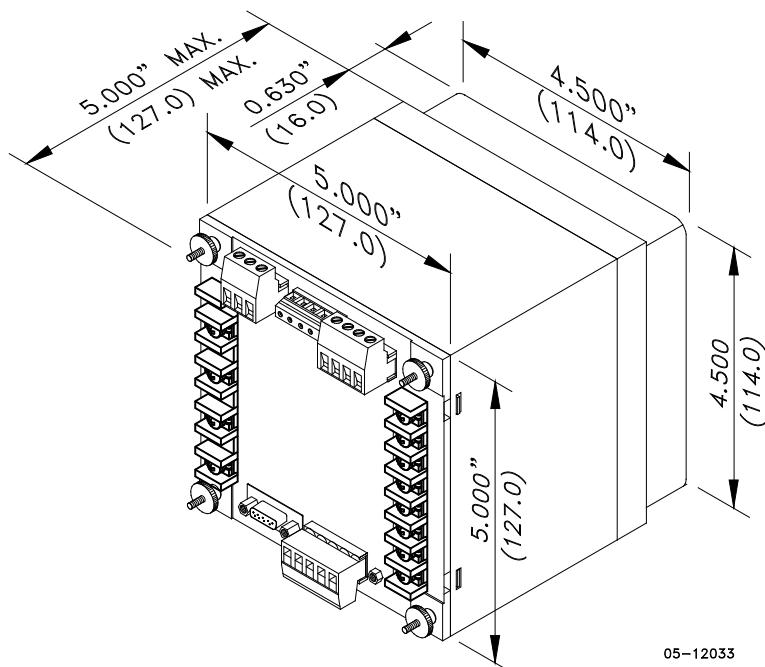


Figure 1: Instrument Dimensions

The PM174 may be mounted in a standard 4-inch round or DIN92 square cutout.

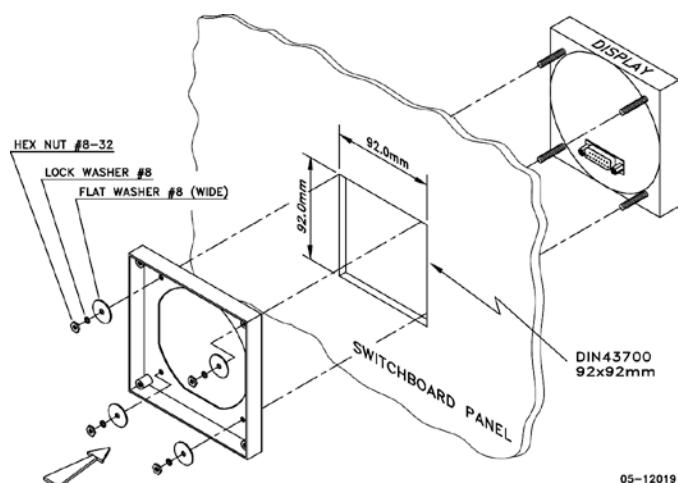


Figure 2: Mounting the display unit

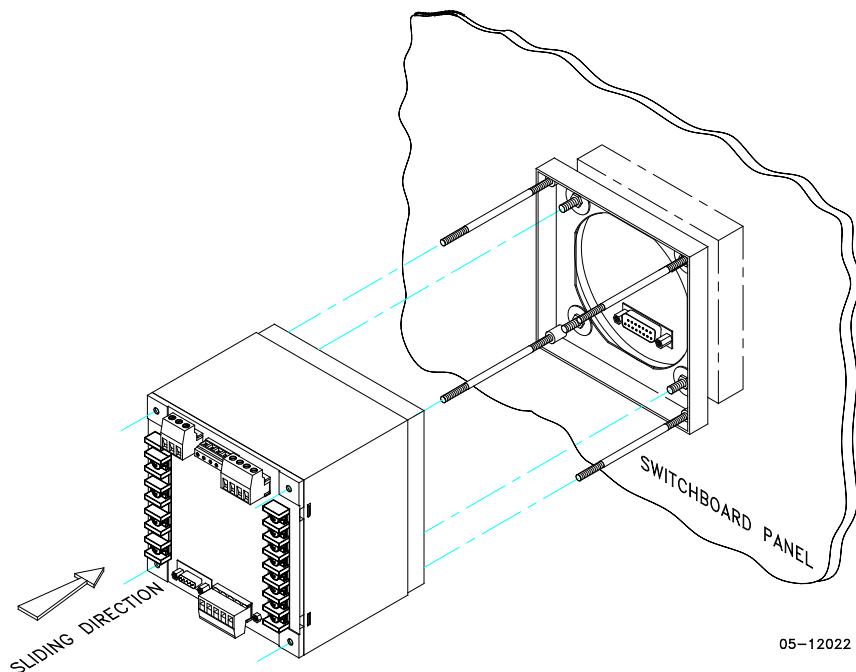


Figure 3: Slide and position the meter on locating studs

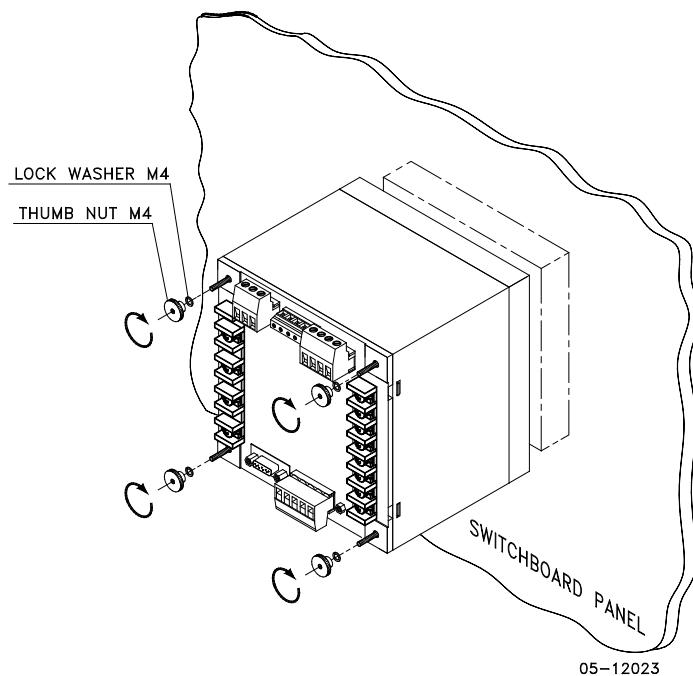


Figure 4: Affix the meter using the thumb nuts (please do not over-tighten the nuts)

Electrical Installation

IMPORTANT!

Only qualified personnel can perform setup.

All incoming power sources must be turned off during installation. During operation of the Powermeter, hazardous voltages are present on the input terminals. Failure to observe precautions can result in serious or even fatal injury or damage to equipment.

Refer to the installation and operation manual for further information.

The figure below shows all the connectors and terminals on the rear side of the PM174.

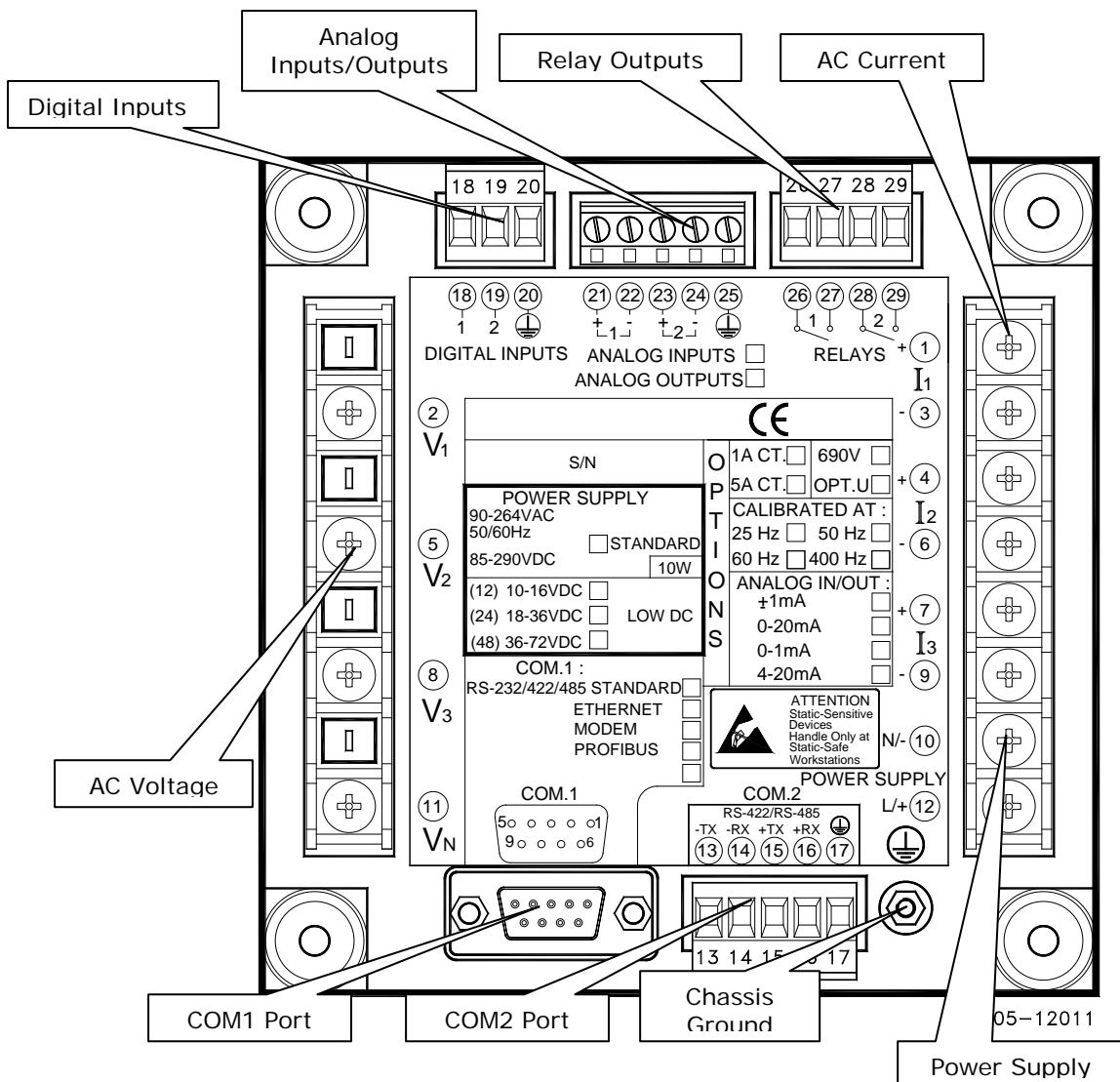


Figure 5: Connections and Terminals

The diagrams below show typical installations of the PM174.

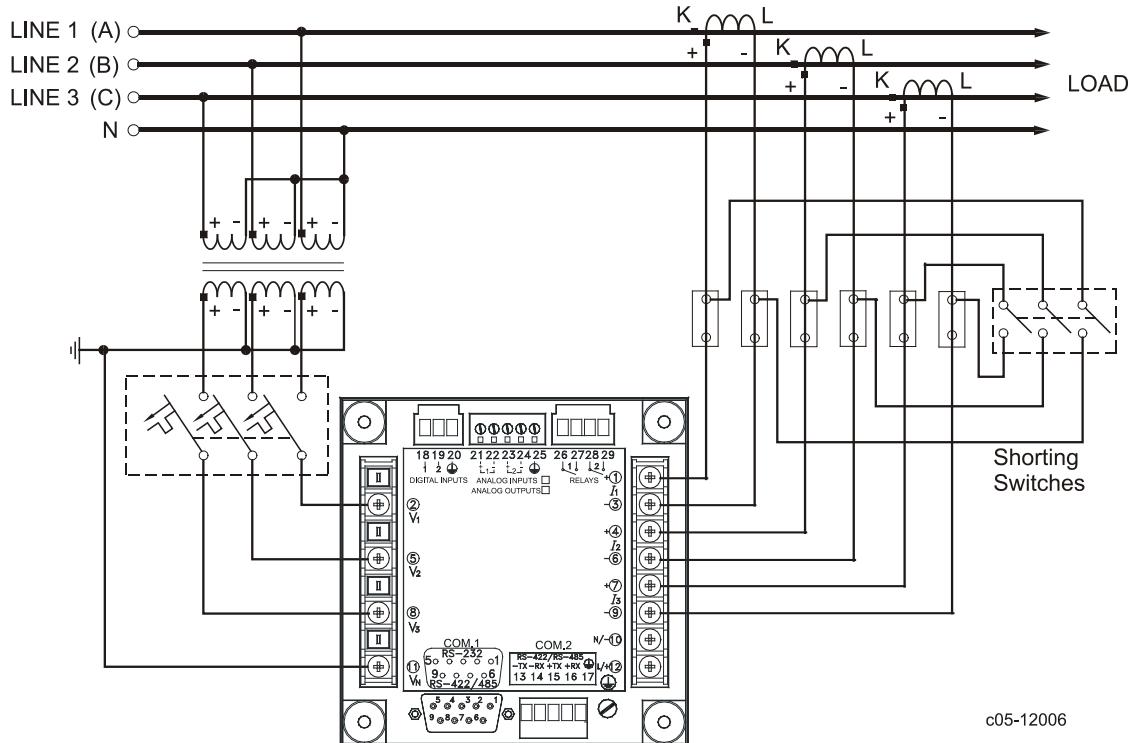


Figure 6: Typical Installation 1

The typical installation diagram above shows a 4-Wire Wye 3-element connection using 3 PTs and 3 CTs. The wiring mode is 4LL3 or 4Ln3.

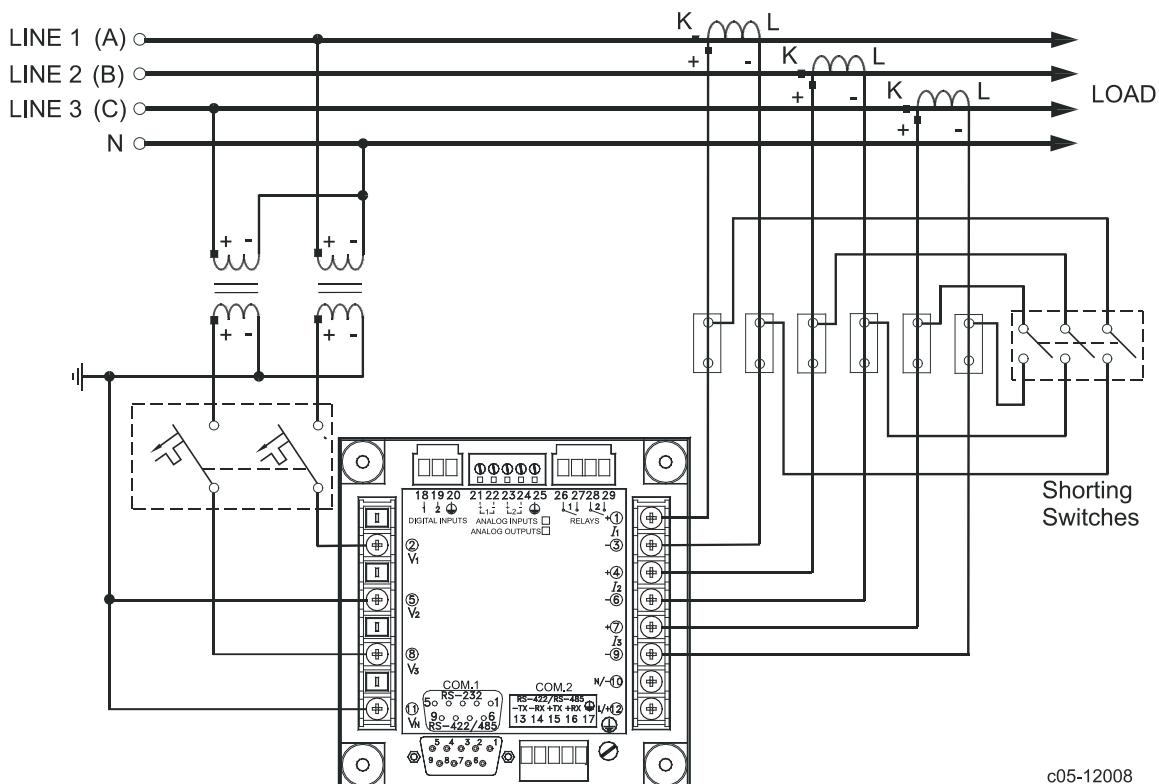


Figure 7: Typical Installation 2

The typical installation diagram above shows a 4-Wire Wye 2½-element connection using 2 PTs and 3 CTs. The wiring mode is 3LL3 or 3Ln3. The voltages must be balanced for the configuration to provide accurate power measurements.

There are approximately nine different wiring configurations in the PM17X Series. Refer to the Installation and Operational Manual for additional configurations.

For electrical installation of the display panel follow the following steps:

1. Connect the remote display using the pinout for a self-powered display or a remote powered display. Refer to the Installation and Operation Manual for the wiring schematic diagrams.

Pinout for a self-powered remote display

PM174 D15 Female Pinout	Signal	Remote Display D15 Male Pinout
1	+12V	1
5	RS-485 + (plus)	5
7	RS-485 - (minus)	7
8	GND	8
15	Chassis	15

Pinout for a remote display powered from an external 12V DC, 350 mA power source

PM174 D15 Female Pinout	Signal	Remote Display D15 Male Pinout
1 N.C.	+12V	1
5	RS-485 + (plus)	5
7	RS-485 - (minus)	7
8 N.C.	GND	8
15	Chassis	15

2. Connect the DC or AC power.
3. Connect the chassis ground.
4. Connect the required wiring configuration.
5. Connect the I/O connections as required. For I/O ratings, see the Technical Specifications section in the Installation and Operation Manual.

Navigation Buttons

Setup is performed directly from the display panel or via communication ports using PAS communication software.



In Data Display mode, the navigation buttons function as follows.

The **MIN/MAX** button switches to the Min/Max Maximum Demands display pages. When briefly pressed again, it switches back to the common measurements display.

The **PQ** button switches between different power quality/harmonic displays: Total Harmonics, Individual Voltage and Current Harmonics, and Power Quality parameters – short-term (Pst) and long-term (Plt) flicker, and voltage and current negative sequence unbalance. When briefly pressed once again, it switches back to the common measurements display.

The **UP** and **DOWN** arrow buttons, labeled by arrowheads, scroll forwards and backwards through the display pages. Pressed briefly, they move one page forward or backward. If you hold the button down, the display pages are scrolled at rate of a twice per second.

Pressing both the UP and DOWN arrow buttons together returns to the first page within the current display.

The **SELECT** button operates once it's released. The button has two functions:

- When pressed briefly, switches to programming mode.
- When pressed together with the **ENTER** button for more than 5 seconds, it resets Min/Max records, maximum demands, or energies depending on the currently displayed page. If the meter is password protected, and a simple reset of data from the display is not allowed, the action has no effect.

The **ENERGY** button switches to the Energy display. If TOU registers are configured in the meter, you can repeatedly press this button to scroll through all available TOU registers. When briefly pressed once again, it switches back to the common measurements display

Auto Return

If no buttons are pressed for 30 seconds while the display **Auto Return** option is enabled, the display automatically returns to the main screen from any other measurement display.

The Auto Return option is enabled through the Display Setup menu

Auto Scroll

If no buttons are pressed for 30 seconds while in the common measurements display, and the Auto Scroll option is enabled in the meter, the display automatically scrolls through all available pages. The scroll interval is adjustable in the Display Setup menu.

To stop auto scrolling, briefly press the UP or DOWN button.

Basic Setup

Entering the Password

1. Enter the password (default 0000).
 - a. Adjust the first digit with the UP and DOWN arrow buttons.
 - b. Press the **SELECT** button to advance to the next digit.
 - c. Adjust the remaining password digits in the same manner.
 - d. Press **ENTER** to confirm the password.
2. If the password entered is correct, you move to the Main menu, otherwise you return to the previous menu.

Basic Configuration

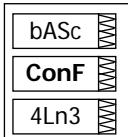
Use the navigation buttons to set up the PM174 as required.

The table below shows the available options.

The basic menu allows you to configure the basic meter settings that define the general operating characteristics of the device.

To enter the set-up menu, select the "baSc" entry from the main menu by the UP and DOWN arrow buttons, and then press the **ENTER** button.

To select a setup option:



1. Press the SELECT button to activate the middle window.
2. Use the UP and DOWN arrow buttons to scroll to the desired option.

To change the option:

1. Press the SELECT button to activate the lower window.
2. Use the UP and DOWN arrow buttons to select the desired option.
3. Press ENTER to confirm your changes and to store your new setting, or press ESC to discard changes.

The table below lists the available options.

Press ESC to exit the menu.

Label	Parameter	Options	Default	Description
ConF	Wiring connection (configuration) mode	3OP2 4LN3 3DIR2 4LL3 3OP3 3LN3 3LL3 3BLN3 3BLL3	4Ln3	The wiring connection of the device
Pt	PT ratio	1.0-6500.0	1.0	The phase potential transformer's primary to secondary ratio
Pt.F	PT Ratio multiplier	x1, x10	x1	PT Ratio multiplication factor. Used in extra high voltage networks to accommodate the PT ratio for 500 kV and higher networks.
U.SEC	Nominal secondary voltage	10-690 V	120 V	The nominal secondary line-to-neutral (in 4LN3, 3LN3 and 3BLN3 wiring modes) or line-to-line (in 4LL3, 3LL3, 3BLL3, 3OP2, 3OP3 and 3DIR modes) voltage. Used as a reference voltage for the IEEE 1159 Power Quality recorder.
Ct	CT primary current	1-50000 A	5 A	The primary rating of the phase current transformer
d.P	Power block demand	1, 2, 3, 5, 10, 15, 20, 30, 60 min, E=external sync	30 min	The length of the demand period for power demand calculations. If the external synchronization is selected, a pulse front on the digital input DI1 denotes the start of the demand interval.
nd.P	The number of blocks in the sliding window	1-15	1	The number of blocks to be averaged for sliding window demands
Ad.P	Ampere, volt and THD demand period	0-1800 sec	900 sec	The length of the demand period for ampere, volt and THD demand calculations
Freq	Nominal frequency	50,60 Hz	60 Hz	The nominal line frequency
LoAd	Maximum demand load current	0-50000 A	0	The maximum demand load current (0 = CT primary)

⚠ Always specify the wiring mode and transformer ratings prior to setting up setpoints and analog outputs.

⚠ The maximum value for the product of the phase CT primary current and PT ratio is 57,500,000. If the product is greater, power readings are zeroed.

Setting the Communications

You communicate with the meter via a changeable COM1 communication port, or through a second factory set serial RS-485/RS-422 COM2 port. Depending on what was ordered, your meter's COM1 port can be equipped with an RS-232/RS-422/RS-485 serial interface, with a dial-up modem for communicating through public telephone lines, with an Ethernet module for communicating through the Internet, or with Profibus DP.

To configure your communications with the PM174 from PAS software:

1. Select Configuration from the Tools menu. Under the Communication group on the Instrument Setup tab, select the type of a connection for your device.
2. Set the device communication address you assigned to the PM174.
3. In the Sampling Rate box, select a rate at which PAS updates data on your screen when you continuously poll the device in the PAS Data Monitor.

The communication protocol and port settings in PAS must match the settings made in your device.

The tables below show the available options. The asterisk * shows the default settings.

COM1 settings

Code	Parameter	Options	Description
Prot	Communications protocol	ASCII, rtu*, dnP3, PrFb	ASCII, MODBUS RTU, DNP3.0 or PROFIBUS DP protocol
rS	Port Interface, depend on order	232 = RS-232 485 = RS-485 422 = RS-422 dial = Dial-up Modem Eth.= Ethernet PrFb = Profibus DP	For non-serial interfaces this is not changeable, it is automatically detected by the meter
Addr	Device Address	MODBUS: 1* -247, DNP3.0: 0 –255 (1*) PROFIBUS DP: 0 – 126*	
bAud	Baud rate	300 - 115200 bps (19200*)	
dAtA	Data format	7E, 8E (7/8 bits, even parity), 8N* (8 bits, no parity) 7E data format should not be used with the MODBUS RTU and DNP3 protocols	
H.Sh	Handshaking (flow control)	nonE*=no flow control SOFT=software (XON/XOFF) HARD=hardware (CTS)	
rtS	RTS mode	nonE* = not used Forc = RTS is permanently asserted Ctrl = RTS is asserted during the transmission	

COM2 settings

Code	Parameter	Options	Description
Prot	Communications protocol	Rtu* = MODBUS RTU ASCII = MODBUS ASCII dnP3 = DNP3	The communications protocol supported by the port
rS	Port Interface	485* = RS-485 422 = RS-422	
Addr	Address	MODBUS: 1*-247 DNP3: 0–65532 (1*)	Device network address
bAud	Baud rate	300-115200 bps (19200*)	The port baud rate
dAtA	Data format and parity	7E, 8N*, 8E	7E data format should not be used with the Modbus RTU and DNP3 protocols

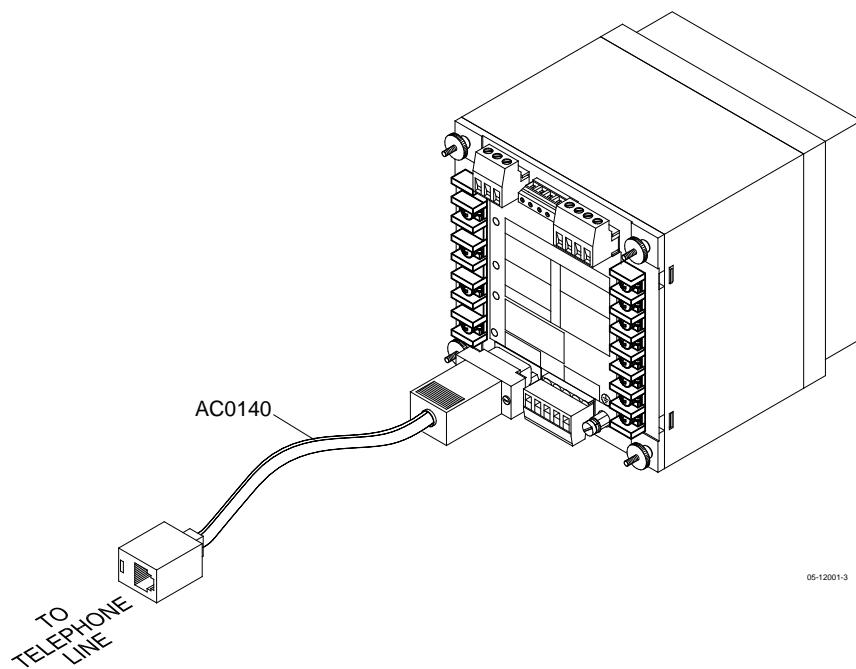


Figure 8 COM1: Telephone Line Connection

COM1 Ethernet Connection

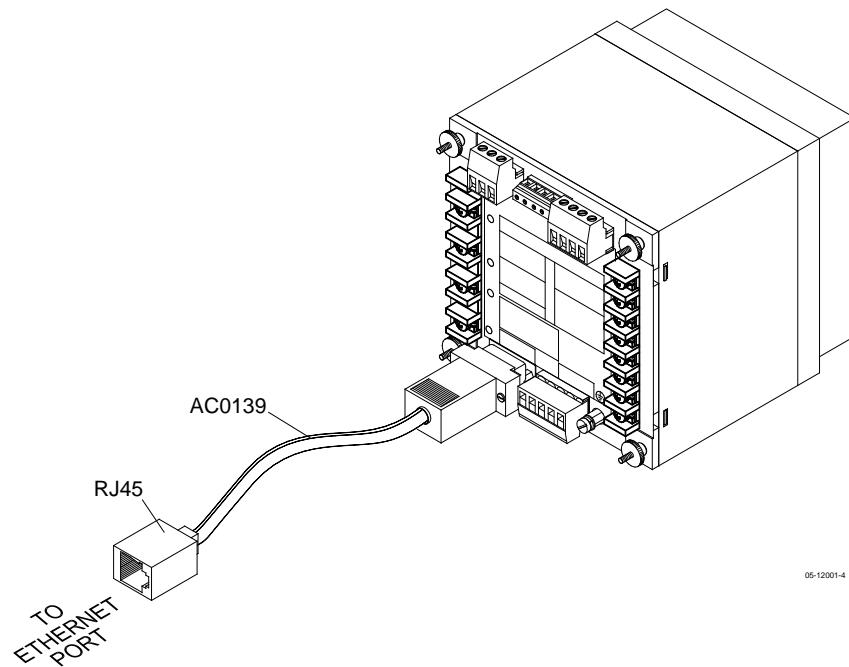


Figure 9 COM1: Ethernet Connection

Communicating via the Internet

If you are communicating through the Ethernet port, define the IP address of your meter on the network.

1. On the Instrument Setup tab, select Internet Site.
2. Click on the Connection tab.
3. Select the IP Address and type in the IP address of your meter. The default IP address preset at the factory is 192.168.0.203.

4. In the Protocol box, select the communications protocol for the TCP port. The meter can provide MODBUS/TCP connections on TCP port 502 and DNP3/TCP connections on port 20000. The host port is set automatically as you select the protocol. Select MODBUS RTU for MODBUS/TCP or DNP3 for DNP3/TCP.
5. In the Wait for Answer box, adjust the time that PAS waits for a connection before announcing an error and the number of retries PAS uses to receive a response from the device if communications fail.

Input and Output Ratings

3 voltage inputs	<i>690 (standard)</i>	V: DIRECT INPUT - Nominal: 690V line-to-line voltage, 790V maximum; 400V line-to-neutral, 460V maximum - Burden: <0.4 VA. INPUT USING PT - Burden: <0.15 VA
	<i>120 V: (optional)</i>	INPUT USING PT - Nominal: 120V line-to-line voltage, 144V maximum - Burden: <0.04 VA
	<i>Voltage input terminals</i>	Wire size: 2.5 - 4 mm ² (13-11 AWG)
3 current inputs (Galvanically isolated)	<i>5A: (standard)</i>	INPUT VIA CT with 5A secondary output Wire size: 2.5 to 4 mm ² (13-11 AWG) wire from CT. Operating range: continuous 10A RMS Burden: < 0.1 VA Overload withstand: 15A RMS continuous, 300A RMS for 1 second.
	<i>1A: (optional)</i>	INPUT VIA CT with 1A secondary output Wire size: 2.5 to 4 mm ² (13-11 AWG) wire from CT. Operating range: continuous 2A RMS Burden: < 0.02 VA Overload withstand: 3A RMS continuous, 80A RMS for 1 second.
Communication port COM1	<i>EIA RS-485 standard</i>	Optically isolated, max. speed 115.2Kb/s
	<i>COM1 terminals</i>	3 x wire size: 2.5 mm ² (12 AWG)
Communication port COM1 (Optional)	<i>Profibus</i>	Max. speed 12 Mb/s
	<i>Profibus terminals</i>	5 x wire size: 2.5 mm ² (12 AWG) or using terminal to DB9 converter: P/N AC0153 REV.A2
Communication port COM2 (Optional)	<i>Ethernet</i>	10/100 Base T, auto adaptation speed, Max. speed 100Mb/s
	<i>ETH connector</i>	Shielded RJ45 cable
Power Supply (Galvanically isolated)	<i>120/230 V AC/DC (standard)</i>	85-265VAC, 88-290VDC; 50/60 Hz, Burden 9VA
	<i>12 VDC (optional)</i>	9.6-19 VDC
	<i>24 VDC (optional)</i>	19-37 VDC
	<i>48 VDC (optional)</i>	37-72 VDC
	<i>Power Supply input terminals</i>	3 x wire size: 2.5 to 4 mm ² (13-11 AWG)

Digital inputs, relay outputs, optional analog inputs/outputs see in PM174 Installation and Operation Manual.

PM174 models with 4DI/DO and with external split core CTs see in corresponded addendums (BG0466 REV.A1 and BG0471 REV.A1 respectively).