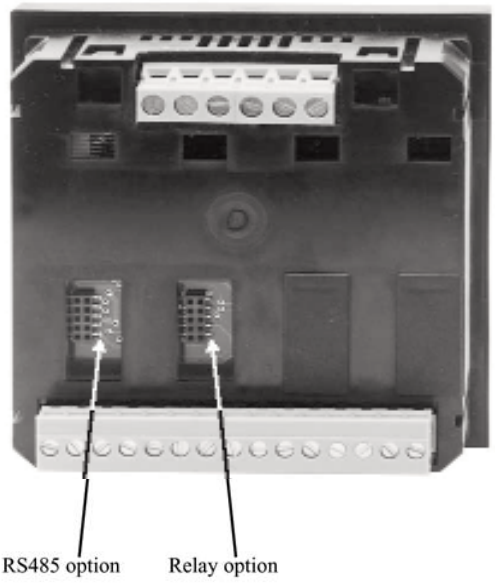
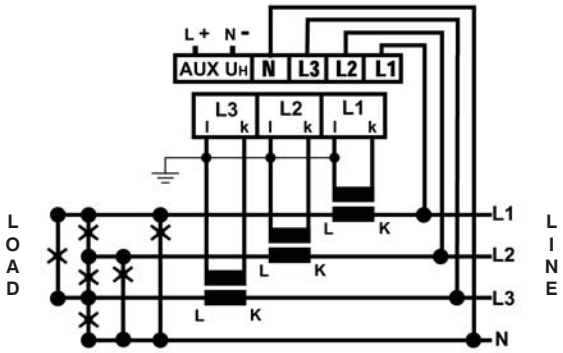
M850-MP1

'Quick Start' Guide



Pod Positions

Wiring and Connections

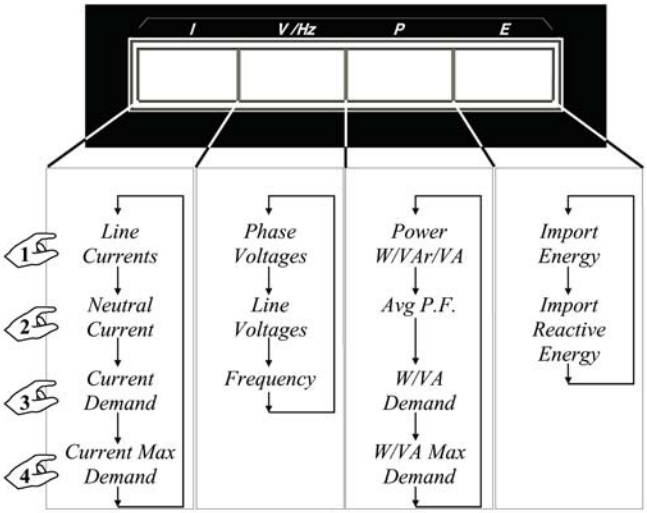


	Voltage				Current		
	L1	L2	L3	N	L1	L2	L3
1ph	✓	✗	✗	✓	✓	✗	✗
1ph 3W	✓	✓	✗	✓	✓	✓	✗
3ph 3W	✓	✓	✓	✗	✓	✗	✓
3ph 4W	✓	✓	✓	✓	✓	✓	✓
3ph 3W BAL	✓	✓	✓	✗	✓	✗	✗
3ph 4W BAL	✓	✗	✗	✓	✓	✗	✗

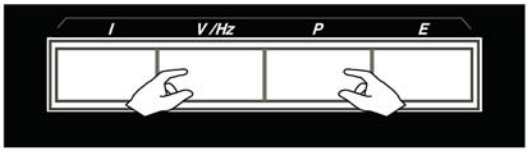
Unused Voltage terminals are internally connected
Secondary of CTs must be connected to earth
l = X2 (Black) = Grounded **k = X1 (White)**
L = H2 **K = H1 = faces Source**

Display Screens

Each screen is displayed by pressing its appropriate button, (I for Current, V/Hz for Voltage and Frequency, P for Power and E for Energy). Further presses of a screen's button will scroll through the available measurements associated with that button. Each button's state is stored in memory.



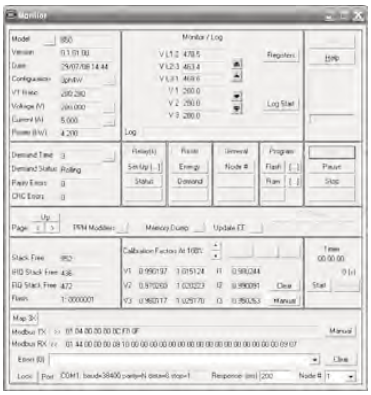
Brightness Adjustment



The LED brightness is adjusted by holding down the two center buttons.

Software

Software can be provided for use with the optional RS485 module. The plug-in module enables the unit to communicate with devices using the popular Modbus protocol.



For more information on this product, please contact:
PC&S, Inc. at +1 (800) 523-9194 or +1 (973) 448-9400
www.pc-s.com

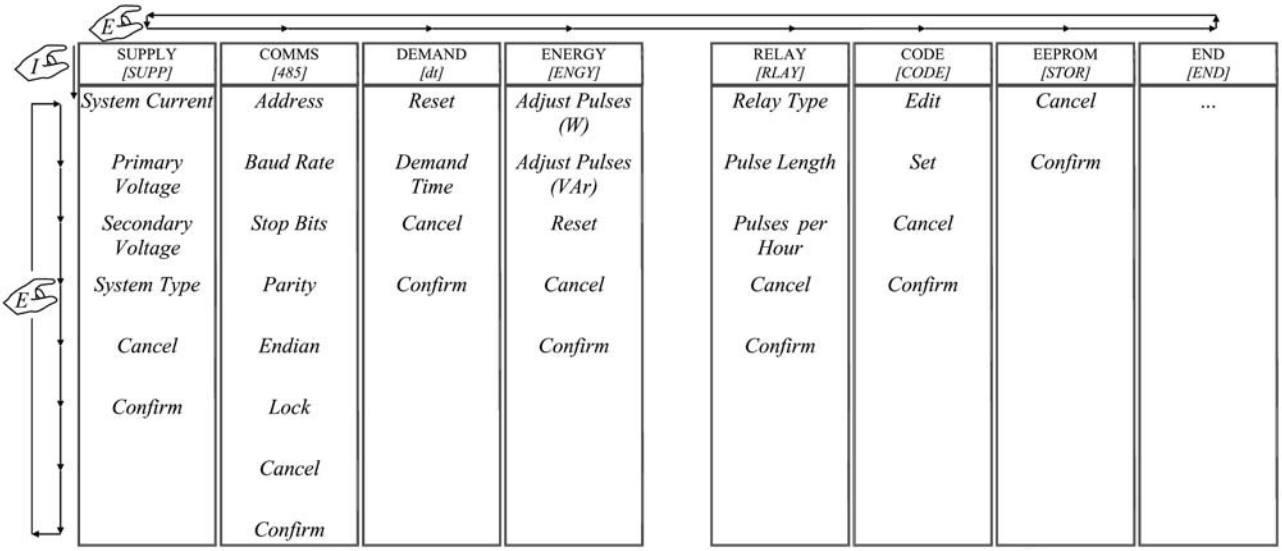
M850-MP1 'Quick Start' Guide

Settings Menu

The main menu is entered by holding buttons 'I' and 'E' down for approximately 5 seconds. The main menu and all sub-menus are scrolled through using the 'E' button. Any selection is made using the 'I' button.

If no buttons are pressed for 6 minutes the unit will exit the Settings Menu.

The Settings Menu structure is defined below:



Settings Sub-Menus

Supply *[SUPP]*

SYSTEM CURRENT *[SYSA]*
PRIMARY VOLTAGE *[UPRI]*
SECONDARY VOLTAGE *[USEC]*
SYSTEM TYPE *[TYPE]*

The VT ratio and the system current are entered using this sub-menu. The secondary voltage (meter input) is optimised at 280V L-N. Decimal point positioning and exponent selection is used in this section

The system's type is selected from the list on the right:

Un-Balanced
[1P2] 1 phase 2 wire
[3P3] 3 phase 3 wire
[3P4] 3 phase 4 wire
[1P3] 1 phase 3 wire Balanced
[3P3B] 3 phase 3 wire
[3P4B] 3 phase 4 wire

Comms *[485]*

ADDRESS *[ADDR]*
BAUD RATE *[BAUD]*
STOP BITS *[STOP]*
PARITY *[PAR]*
ENDIAN *[ENDI]*
LOCK *[LOC]*

(RS485 option) Network settings can be detected and the unit configured automatically. If manual configuration is preferred, the meter can be set up as follows:

The unit's baud rate, number of stop bits and parity can be selected from the lists on the right:

[4.8] 4800 baud
[9.6] 9600 baud
[19.2] 19200 baud
[38.4] 38400 baud
[57.6] 57600 baud

Floating point numbers can be transmitted in either Big Endian (default) or Little Endian BYTE order and can be selected using the ENDIAN item.

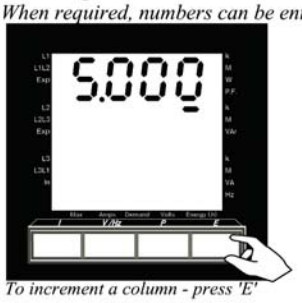
[0] no stop bits
[1] 1 stop bit
[2] 2 stop bits

Locking prevents the unit hunting for a valid network if communication errors are occurring and can be set using the LOCK item.

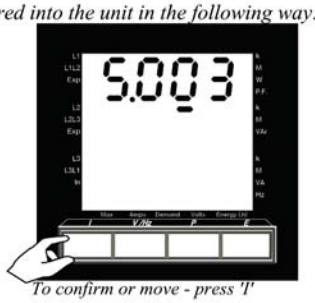
[N] no parity bit
[O] odd parity bit
[E] even parity bit

Entering Data

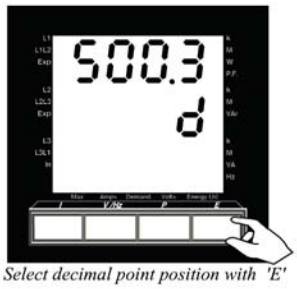
When required, numbers can be entered into the unit in the following way:



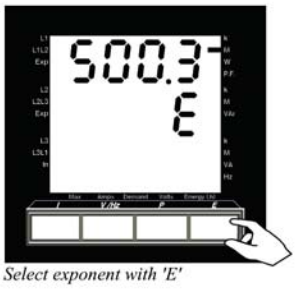
To increment a column - press 'E'



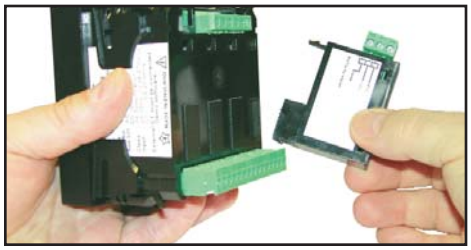
To confirm or move - press 'I'



Select decimal point position with 'E'



Select exponent with 'E'



The versatile plug-in units for RS485 (Modbus protocol) and relay option can be purchased with the meter or can be retrofitted at a later time.

M850-MP1 'Quick Start' Guide

Demand *[dt]*

The unit integrates all measurements of Amps, Power and VA within a variable time length, sliding window.

RESET *[RSET]*

The reset option will reset all demand and maximum demand measurements.

DEMAND TIME *[DTST]*

The demand time (window) can be set to a value of between 3 and 60 minutes inclusive.

Energy *[ENGY]*

There are two energy accumulators in the unit; Import Power and Import VAr. Modifications to the pulses per hour rate can be done through this sub-menu.

ADJUST PULSES *[ADJ] (W)*

ADJUST PULSES *[ADJ] (VAr)*

Adjust pulses (W or VAr) allows the selection of a DIVISOR from the list on the right:
Caution: Changing the divisor and confirming the selection will reset ALL energy readings

1000
100
10
1
0.1
0.01
0.001

RESET *[RSET]*

The reset option resets ALL energy readings.

Relay *[RLAY]*

The relay(s) (optional) can operate as W.h or VAr.h types. The principle relay can be set up in this sub-menu. If two relays are installed the secondary relay is automatically set as the alternative type.

RELAY TYPE *[TYPE]*

PULSE LENGTH *[PULS LNTH]*

The pulse length of the relay(s) can be set from the list on the right (0-200ms). PPH are modified using the decimal point positioning method.

OFF
40
60
80
100
120
140
160
180
200

PULSES per HOUR *[PPH]*

Code *[CODE]*

The Pass Code is used to help prevent unauthorised tampering with the unit's settings.

EDIT PASS CODE *[EDIT]*

The Pass Code can be changed using the EDIT facility in the sub-menu.

SET PASS CODE *[SET]*

It is activated using the SET option.

EEPROM *[STOR]*

The EEPROM sub-menu allows the user to save all settings into the unit's non-volatile memory. It is recommended that this option is used whenever settings have been updated. However, the unit will save all settings on a power down or brown out condition.

END *[END]*

This selection leaves the main menu and resumes displaying measurements.

****

CANCEL *[CNCL]*

At the end of most sub-menus is the option to cancel any changes made in that sub-menu.

CONFIRM *[CONF]*

Confirmation is required before any changes are implemented. The changes are effective as soon as they are confirmed.

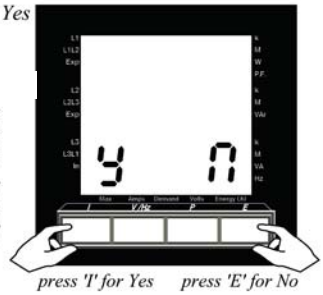
Lists

When only fixed data can be entered, selection is made from a list:

To scroll through a list - press 'E'

To select the displayed item - press 'I'

When a decision has to be made the Yes - No screen is displayed



press 'I' for Yes press 'E' for No

Entering Data - Summary

Pressing the 'I' button accepts the currently selected item and moves on to the next. Pressing the 'E' button either changes the item's option or increments a column. Other menu items that may be displayed are all treated in the same manner.

General Specifications

Input *(accuracy range)*

Un 28V to 330V L-N (48V to 570V L-L)	
Burden	*< 0.5VA*
In 0.5A to 6A via CT	
Burden	*< 0.5VA*
Frequency	*45Hz to 65Hz*

Secondary of CTs must be connected to earth

Overload
800V L-L indefinitely
In x 10 for 1 sec

Accuracy

Voltage	*0.5% +/- 2 digits*
Current	*0.5% +/- 2 digits*
Power (W,VAr,VA)	*1.0% +/- 2 digits*
Power Factor	*1% of range*
Frequency	*0.1 Hz*
Energy	*IEC 1036 Class 1*

Auxiliary Voltage
100V to 440V ac (45Hz to 65Hz)
100V to 420V dc
Burden: < 10VA

Display

Digits	*3 lines 9999*
Digit size	*14.2mm 7 segment*
Update time	*1 second*

Options
Plug-in RS485 module (Modbus)
Plug-in relay module (W.h VAr.h)

Insulation

Test Voltage	*3 kV RMS 50 Hz for 1 min between case, input, aux.*
Impulse Test	*EMC 5kV transient complying with IEC 801 / EN 55020 HF*
Surge withstand	*IEC 801 / EN55020 ANSI C37.90A*
Interference	*EHF 2.5 kV 1MHz complying with IEC 255-4*
Protection	*Class II complying with IEC348 /BS4753 / DIN 57411 / VDE*

Environment

Working Temperature	*0 to 60 deg C*
Storage Temperature	*-40 to 85 deg C*
Relative Humidity	*0-95% non condensing*
Shock	*30G in 2 planes*

Enclosure

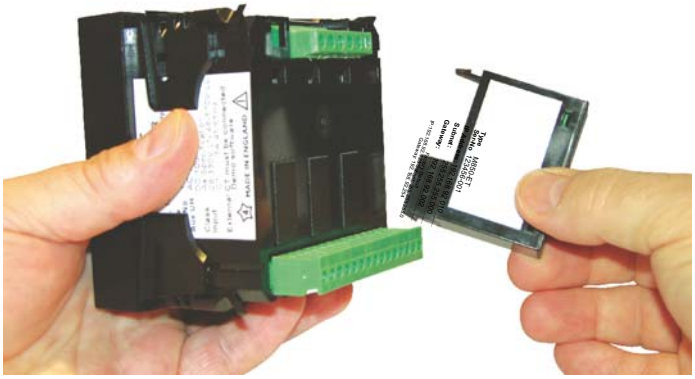
Standard DIN case	*96 x 96 x 60mm*
Panel mounting	*4 retaining clips*
Cutout	*92.8mm x 92.8mm*

Applied Standards

General	*IEC688, BSEN60688, BS4889, IEC 359*
EMC Emissions	*BSEN61000-6-3 :2007*
EMC Immunity	*BSEN61000-6-4 :2007*
Safety	*IEC 1010, BSEN601010*

Approvals
UL, C-UL (File No. E337752)

Installing the Ethernet Plug-in Module



The Ethernet pod (option) can be installed into either position in the back of a M850 power meter.
The pod incorporates a 10/100Base-T Ethernet controller.
The protocols supported are:

1 Telnet	Port 23
2 Modbus TCP/IP	Port 502
3 Modbus TCP	Port 4000
4 HTML	Port 80

A cross-over CAT5 Ethernet cable should be used if the network card doesn't automatically swap lines to suit the cable's terminations.

Configuring the pod

The factory default settings of the pod, IP address 192.168.92.123, mask 255.255.255.0 and default gateway 192.168.92.254, can be recalled by depressing the button under the lid for 15 seconds at any time.

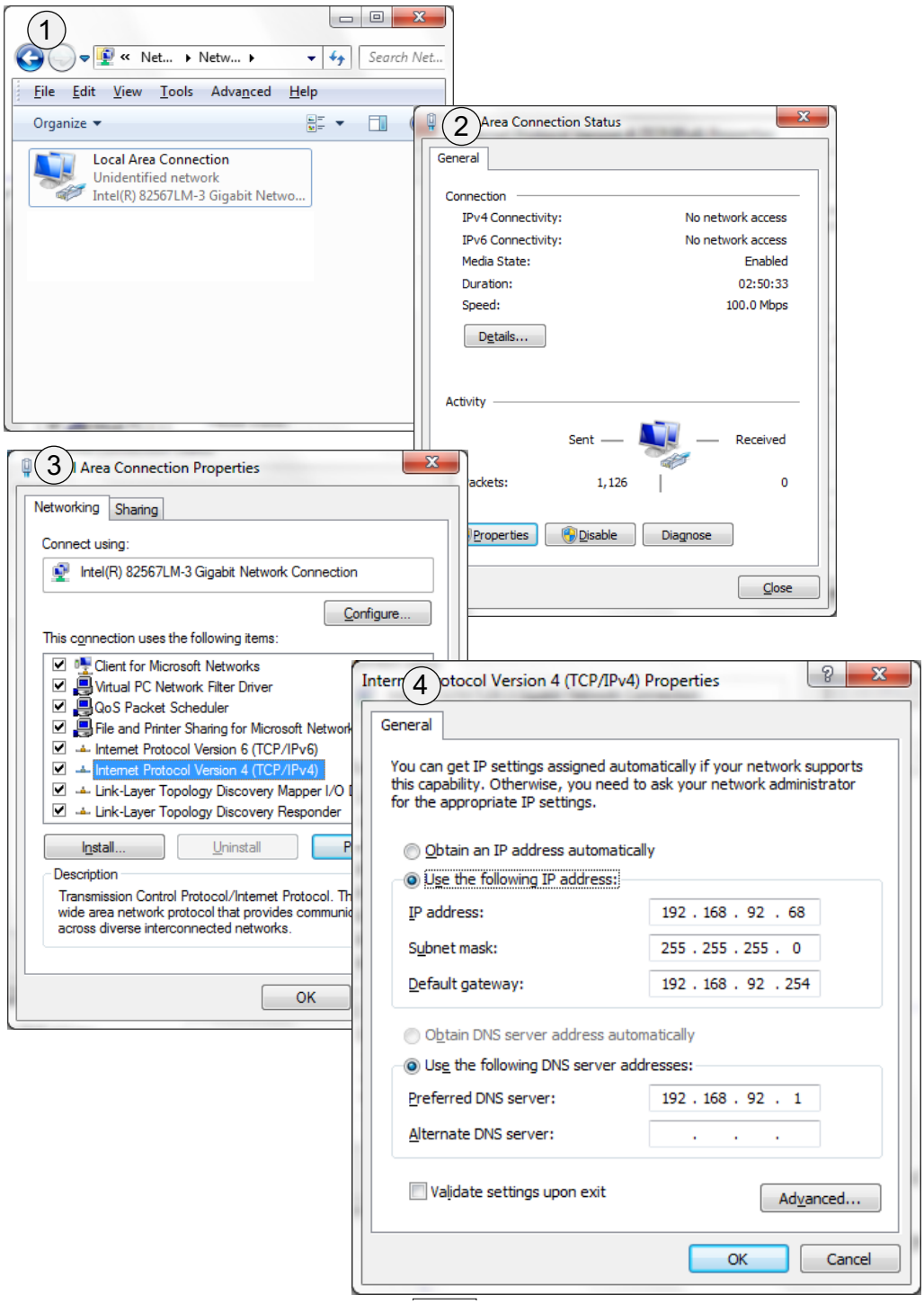
Connect the meter to a computer's network port using a cross-over Ethernet cable.

Set up the computer's port as follows:
Open 'Control Panel'
Windows 7:
Select 'Network and Internet' and then select 'Network and Sharing Center'. Click on Change Adapter Settings.
Windows XP:
Select 'Network and Internet Connections' and then select 'Network Connections'.

(1) Double click the network connection you have connected the pod to. (2) Select 'Properties'.
(3) Click on 'Internet Protocol 4' or 'Internet Protocol (TCP/IP) and 'Properties'.

(4) Using the example, enter the recommended settings. (IP = 192.168.92.68, Subnet = 255.255.255.0, Gateway = 192.168.92.254)

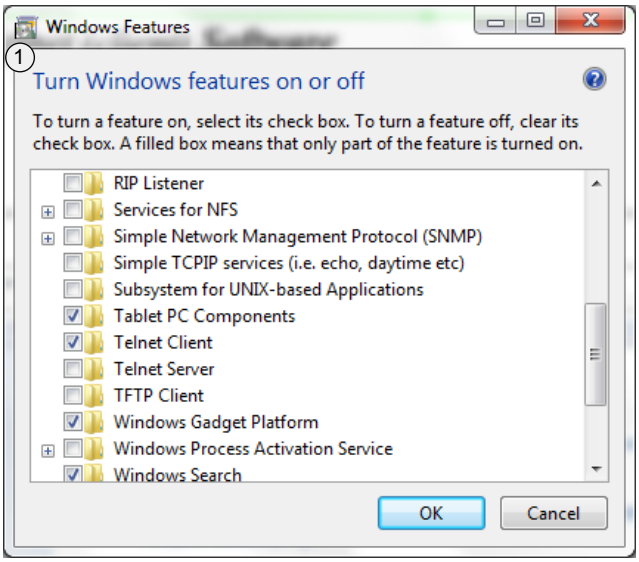
The pod will now be accessible through a web browser using the network address 192.168.92.123.
To change any settings in the pod and/or meter at this stage will require the use of a Telnet client program.
Computers using a Windows operating system have this ready to be installed.

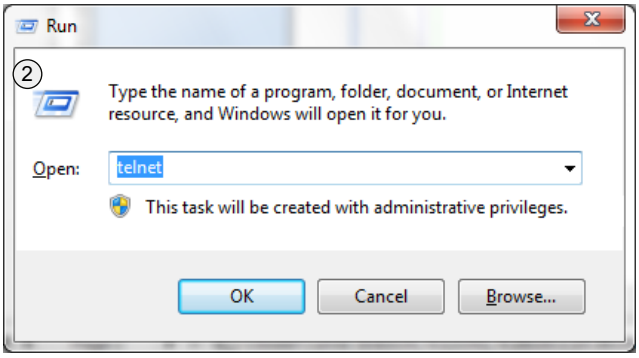

1
Net... Netw...
Search Net...
File Edit View Tools Advanced Help
Organize
Local Area Connection
Unidentified network
Intel(R) 82567LM-3 Gigabit Netwo...
2
Area Connection Status
General
Connection
IPv4 Connectivity: No network access
IPv6 Connectivity: No network access
Media State: Enabled
Duration: 02:50:33
Speed: 100.0 Mbps
Details...
Activity
Sent
Received
1,126
0
Properties
Disable
Diagnose
Close
3
Area Connection Properties
Networking
Sharing
Connect using:
Intel(R) 82567LM-3 Gigabit Network Connection
Configure...
This connection uses the following items:
Client for Microsoft Networks
Virtual PC Network Filter Driver
QoS Packet Scheduler
File and Printer Sharing for Microsoft Network
Internet Protocol Version 6 (TCP/IPv6)
Internet Protocol Version 4 (TCP/IPv4)
Link-Layer Topology Discovery Mapper I/O
Link-Layer Topology Discovery Responder
Install...
Uninstall
Description
Transmission Control Protocol/Internet Protocol. Th
wide area network protocol that provides communic
across diverse interconnected networks.
OK
4
otocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 92 . 68
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 92 . 254
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server: 192 . 168 . 92 . 1
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

Installing Telnet (client) Software

Windows 7:
Open 'Control Panel' and click on 'Programs'
Select 'Turn Windows Features on or off'.
(1)
From the list shown, tick the Telnet Client box and then OK.
The software will be installed and access to it will be through the RUN command from Windows 'Start->All Programs ->Accessories'
(2)
Enter telnet to run the program.

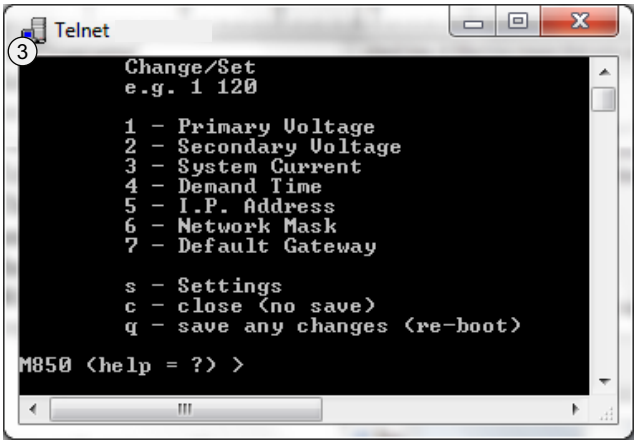
Windows XP:
From the Start menu, select RUN.
(2)
In the Open drop-down list box, type in Telnet to run the program.





At the prompt type in:
O 192.168.92.123

(3) A menu will be displayed.



It's here that final network settings can be entered and meter settings changed.

e.g. To change the network address to 192.168.92.21, enter
5 192.168.92.21
Note. IP address, mask and gateway changes are not implemented until Telnet is closed using command q.

Connecting to an existing network:

The network settings will have to be obtained from the network administrator.

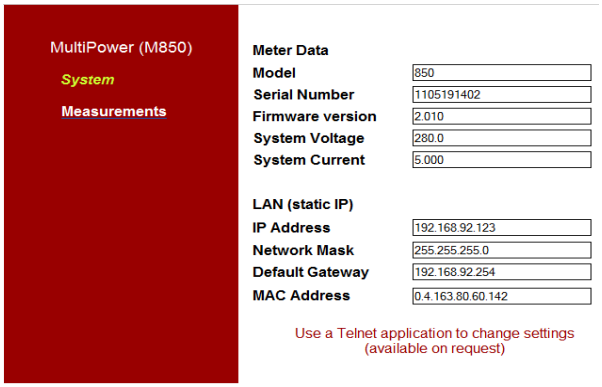
If the network settings match those of the pod's and its address is unique to that network, the pod can be introduced onto the network and used without alteration.

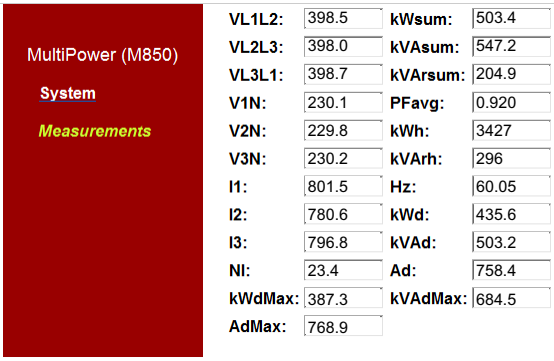
Alternatively, new network settings will have to be entered using Telnet as previously documented.

SCADA software using Port 502 can use the Modbus TCP/IP protocol to monitor the meter.

MultView software (Windows application) using Port 4000 and a virtual port driver (not supplied) can be used to monitor the meter.

A browser (HTTP Port 80), using the meter's IP address (default 192.168.92.123), will show the front page of the controller with the option of displaying measurements from the meter and also verify the meter's connection.





MODBUS Register Addresses and Modes

Modbus Address	Register Address/Name	Mode
40001	(0x00) SYSTEM VOLTAGE	(RO)
40003	(0x02) SYSTEM CURRENT	(R/W)
40005	(0x04) SYSTEM TYPE	(R/W)
40007	(0x06) DEMAND TIME	(R/W)
40009	(0x08) DEMAND STATUS	(RO)
40011	(0x0A) kW.h COUNTER DIVISOR	(R/W)
40013	(0x0C) kVA.h COUNTER DIVISOR	(R/W)
40015	(0x0E) N/A	(N/A)
40017	(0x10) N/A	(N/A)
40019	(0x12) RESET ENERGY	(WO)
40021	(0x14) RESET DEMAND	(WO)
40023	(0x16) N/A	(N/A)
40025	(0X18) N/A	(N/A)
40027	(0X1A) SET NODE ADDRESS	(R/W)
40029	(0X1C) PRIMARY VOLTAGE	(R/W)
40031	(0X1E) SECONDARY VOLTAGE	(R/W)
40097	(0x60) LOCK ACIA SETTINGS	(WO)

MODBUS 3X and 4X Addresses

3X Address	Register	4X Address	Register2	Measurement	M550/M560 V4.01	M850Standard	M850 dc Version	Order No
30001	(0x0000)	41001	(0x07D0)	V L1-2	Yes	Yes	***	1
30003	(0x0002)	41003	(0x07D2)	V L2-3	Yes	Yes	***	2
30005	(0x0004)	41005	(0x07D4)	V L3-1	Yes	Yes	***	3
30007	(0x0006)	41007	(0x07D6)	V 1	Yes	Yes	Yes	4
30009	(0x0008)	41009	(0x07D8)	V 2	Yes	Yes	***	5
30011	(0x000A)	41011	(0x07DA)	V 3	Yes	Yes	***	6
30013	(0x000C)	41013	(0x07DC)	I 1	Yes	Yes	Yes	7
30015	(0x000E)	41015	(0x07DE)	I 2	Yes	Yes	***	8
30017	(0x0010)	41017	(0x07E0)	I 3	Yes	Yes	***	9
30019	(0x0012)	41019	(0x07E2)	kW Sum	Yes	Yes	Yes	10
30021	(0x0014)	41021	(0x07E4)	kVA Sum	Yes	Yes	***	11
30023	(0x0016)	41023	(0x07E6)	kVAR Sum	Yes	Yes	***	12
30025	(0x0018)	41025	(0x07E8)	PF Avg	Yes	Yes	***	13
30027	(0x001A)	41027	(0x07EA)	kWHr (Import)	Yes	Yes	Yes	14
30029	(0x001C)	41029	(0x07EC)	kVArHr (Import)	Yes	Yes	***	15
30031	(0x001E)	41031	(0x07EE)	Hz	Yes	Yes	***	16
30033	(0x0020)	41033	(0x07F0)	kW 1	Yes	***	***	17
30035	(0x0022)	41035	(0x07F2)	kW 2	Yes	***	***	18
30037	(0x0024)	41037	(0x07F4)	kW 3	Yes	***	***	19
30039	(0x0026)	41039	(0x07F6)	kVAr 1	Yes	***	***	20
30041	(0x0028)	41041	(0x07F8)	kVAr 2	Yes	***	***	21
30043	(0x002A)	41043	(0x07FA)	kVAr 3	Yes	***	***	22
30045	(0x002C)	41045	(0x07FC)	kWd (Import)	Yes	Yes	Yes	23
30047	(0x002E)	41047	(0x07FE)	kVAd	Yes	Yes	***	24
30049	(0x0030)	41049	(0x0800)	Ad	Yes	Yes	Yes	25
30051	(0x0032)	41051	(0x0802)	Neutral Current	Yes	Yes	***	26
30053	(0x0034)	41053	(0x0804)	kVA 1	Yes	***	***	27
30055	(0x0036)	41055	(0x0806)	kVA 2	Yes	***	***	28
30057	(0x0038)	41057	(0x0808)	kVA 3	Yes	***	***	29
30059	(0x003A)	41059	(0x080A)	PF L1	Yes	***	***	30
30061	(0x003C)	41061	(0x080C)	PF L2	Yes	***	***	31
30063	(0x003E)	41063	(0x080E)	PF L3	Yes	***	***	32
30065	(0x0040)	41065	(0x0810)	kWHr (Export)	Yes	***	Yes	33
30067	(0x0042)	41067	(0x0812)	kVArHr (Export)	Yes	***	***	34
30069	(0x0044)	41069	(0x0814)	kVAHr	Yes	***	***	35
30071	(0x0046)	41071	(0x0816)	AHr	Yes	***	Yes	36
30073	(0x0048)	41073	(0x0818)	kWd (Export)	Yes	***	***	37
30075	(0x004A)	41075	(0x081A)	Max kWd (Import)	Yes	Yes	Yes	38
30077	(0x004C)	41077	(0x081C)	Max kWd (Export)	Yes	***	***	39
30079	(0x004E)	41079	(0x081E)	Max kVAd	Yes	Yes	***	40
30081	(0x0050)	41081	(0x0820)	Max Ad	Yes	Yes	Yes	41
30083	(0x0052)	41083	(0x0822)	Hours Run	***	* S2	***	42
30085	(0x0054)	41085	(0x0824)	THD V1	***	* S7	***	43
30087	(0x0056)	41087	(0x0826)	THD V2	***	* S7	***	44
30089	(0x0058)	41089	(0x0828)	THD V3	***	* S7	***	45
30091	(0x005A)	41091	(0x082A)	THD I1	***	* S7	***	46
30093	(0x005C)	41093	(0x082C)	THD I2	***	* S7	***	47
30095	(0x005E)	41095	(0x082E)	THD I3	***	* S7	***	48

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For more information and certifications, please contact:
Panel Components & Systems, Inc. ■ Phone: (800) 523-9194 ■ info@pc-s.com

Main Office:	Stanhope, NJ	Phone: (973) 448-9400
South East:	Charlotte, NC	Phone: (704) 535-3357
South Central:	Tulsa, OK	Phone: (862) 258-6974
Canada:	Edmonton, AB	Phone: (877) 962-0557