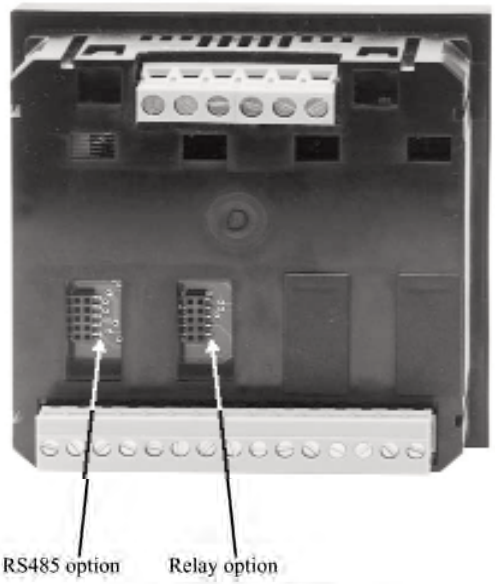
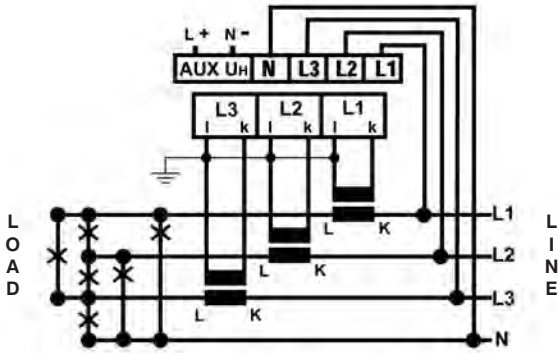
M850-MP1

‘Quick Start’ Guide



Pod Positions

Wiring and Connections

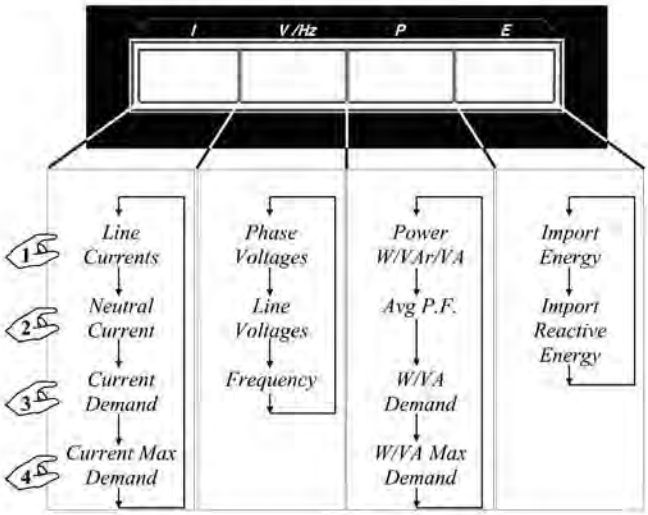


	Voltage				Current		
	L1	L2	L3	N	L1	L2	L3
1ph	✓	✗	✗	✓	✓	✗	✗
1ph 3W	✓	✓	✗	✓	✓	✓	✗
3ph 3W	✓	✓	✓	✗	✓	✗	✓
3ph 4W	✓	✓	✓	✓	✓	✓	✓
3ph 3W BAL	✓	✓	✓	✗	✓	✗	✗
3ph 4W BAL	✓	✗	✗	✓	✓	✗	✗

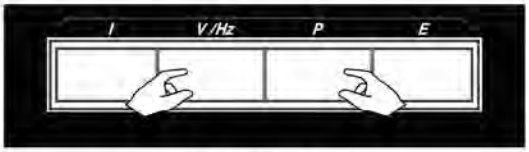
Unused Voltage terminals are internally connected
Secondary of CTs must be connected to earth
l = X2 (Black) = Grounded **k = X1 (White)**
L = H2 **K = H1 = faces Source**

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.



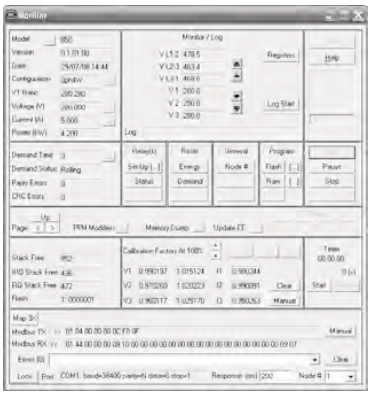
Brightness Adjustment



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.



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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:

SUPPLY *[SUPP]*	COMMS *[485]*	DEMAND *[dt]*	ENERGY *[ENGY]*	RELAY *[RLAY]*	CODE *[CODE]*	EEPROM *[STOR]*	END *[END]*
System Current	*Address*	*Reset*	*Adjust Pulses (W)*	*Relay Type*	*Edit*	*Cancel*	*...*
Primary Voltage	*Baud Rate*	*Demand Time*	*Adjust Pulses (VAr)*	*Pulse Length*	*Set*	*Confirm*	
Secondary Voltage	*Stop Bits*	*Cancel*	*Reset*	*Pulses per Hour*	*Cancel*		
System Type	*Parity*	*Confirm*	*Cancel*	*Cancel*	*Confirm*		
Cancel	*Endian*		*Confirm*	*Confirm*			
Confirm	*Lock*						
	Cancel						
	Confirm						

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.

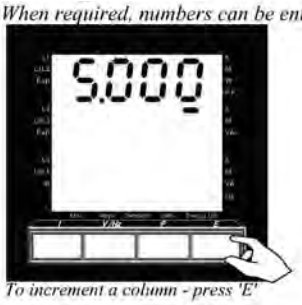
- [*0*] no stop bits
- [*1*] 1 stop bit
- [*2*] 2 stop bits

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

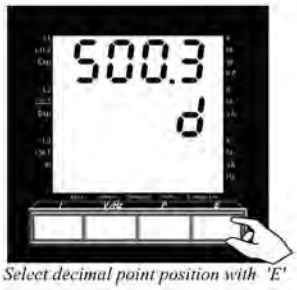
Entering Data

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

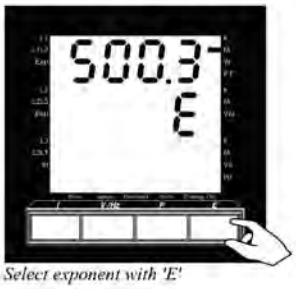


To increment a column - press 'E'

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.

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

RESET *[RSET]*

The reset option resets ALL energy readings.

1000
100
10
1
0.1
0.01
0.001

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.

PULSES per HOUR *[PPH]*

OFF
40
60
80
100
120
140
160
180
200

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

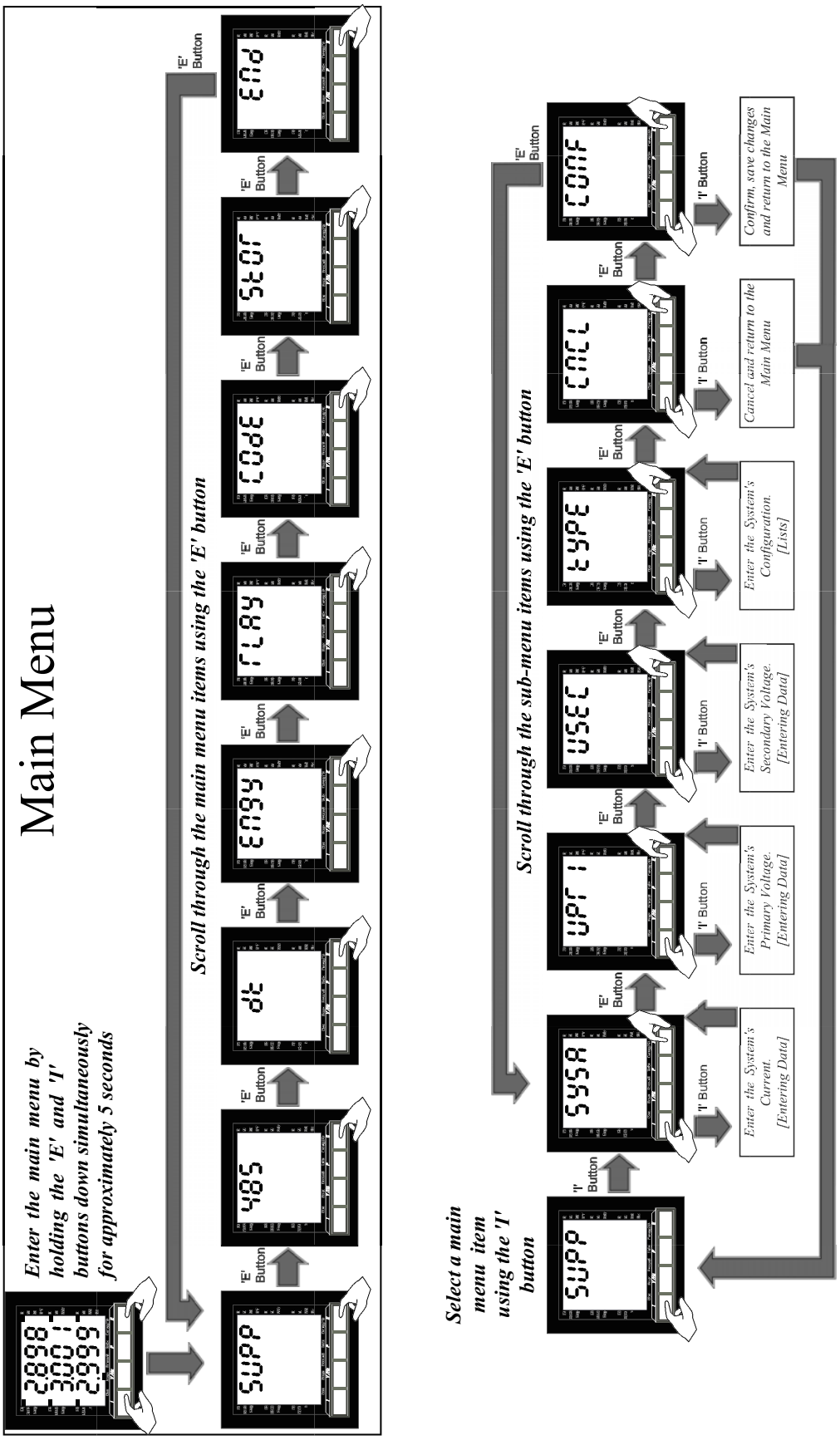
Standard DIN case	*96 x 96 x 60mm*
Panel mounting	*4 retaining clips*
Cutout	*92.8mm x 92.8mm*

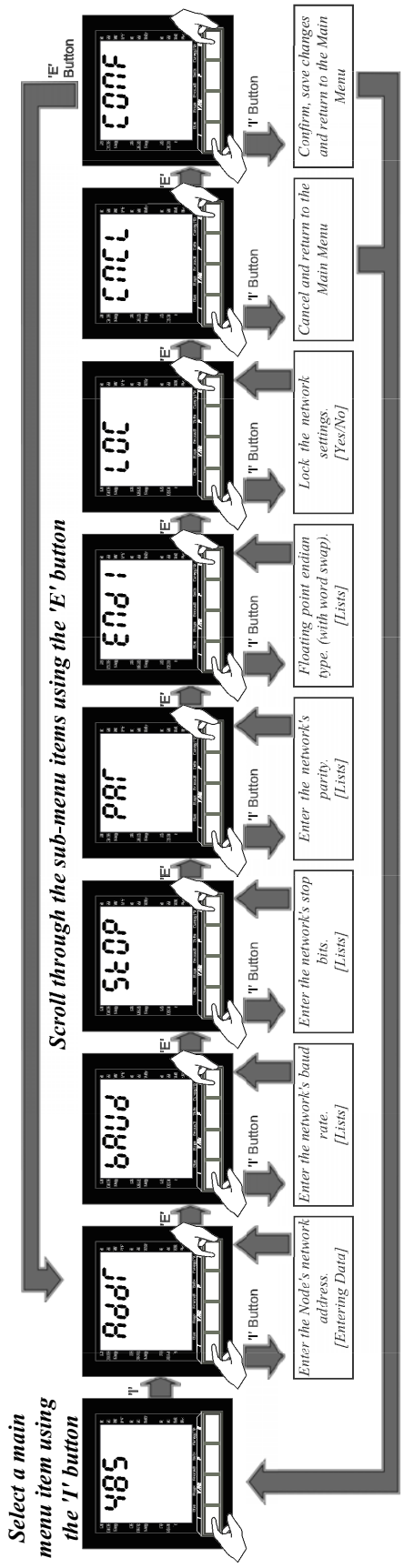
Applied Standards

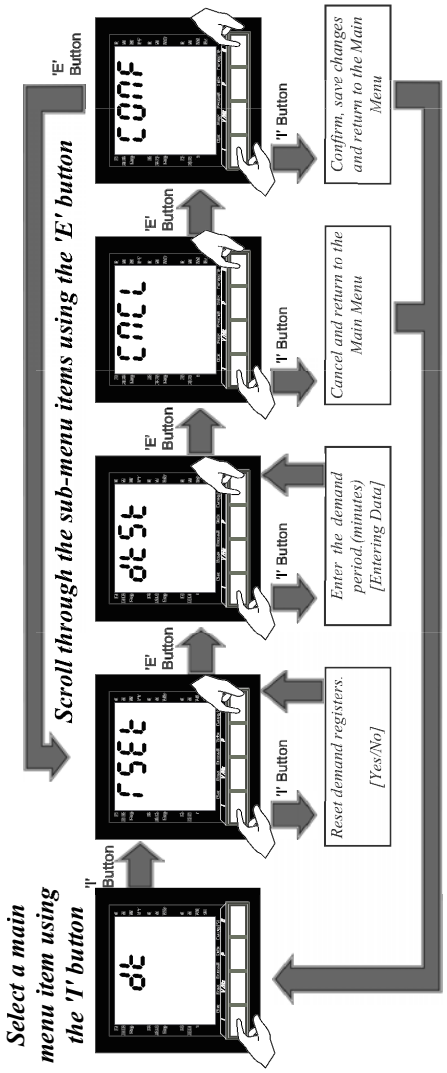
General	*IEC688, BSEN60688, BS4889, IEC 359*
EMC Emissions	*BSEN61000-6-3 :2007*
EMC Immunity	*BSEN61000-6-4 :2007*
Safety	*IEC 1010, BSEN601010*

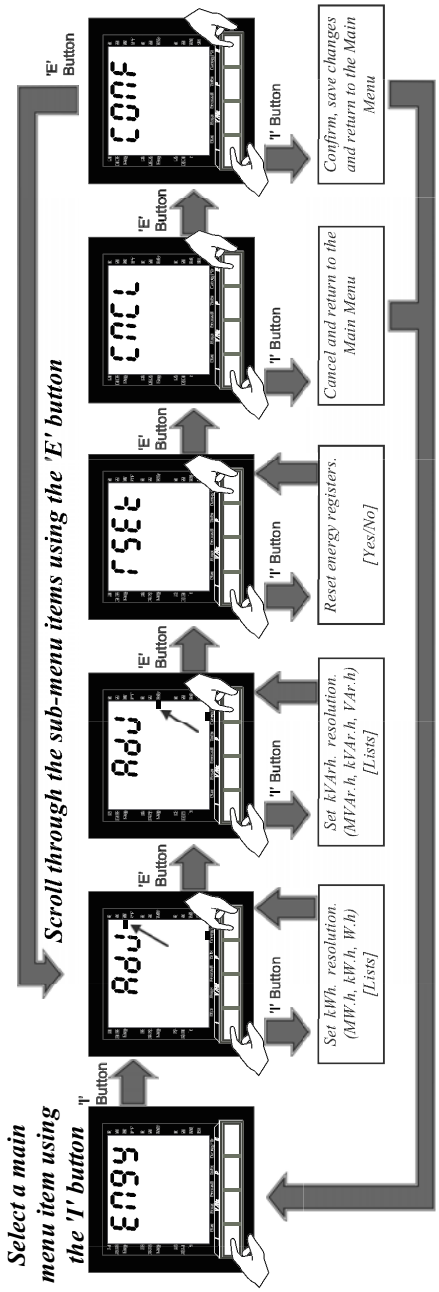
Approvals

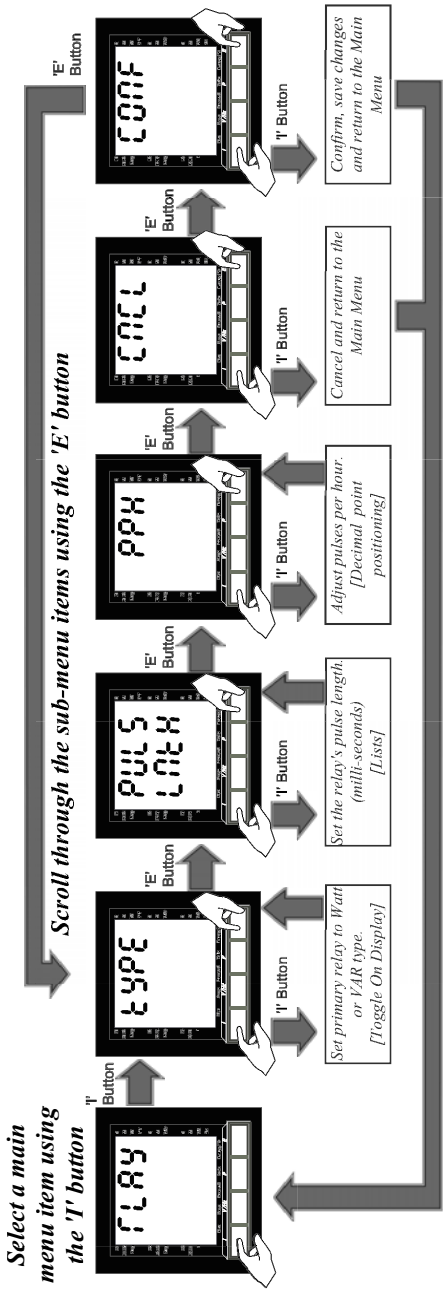
UL, C-UL (File No. E337752)

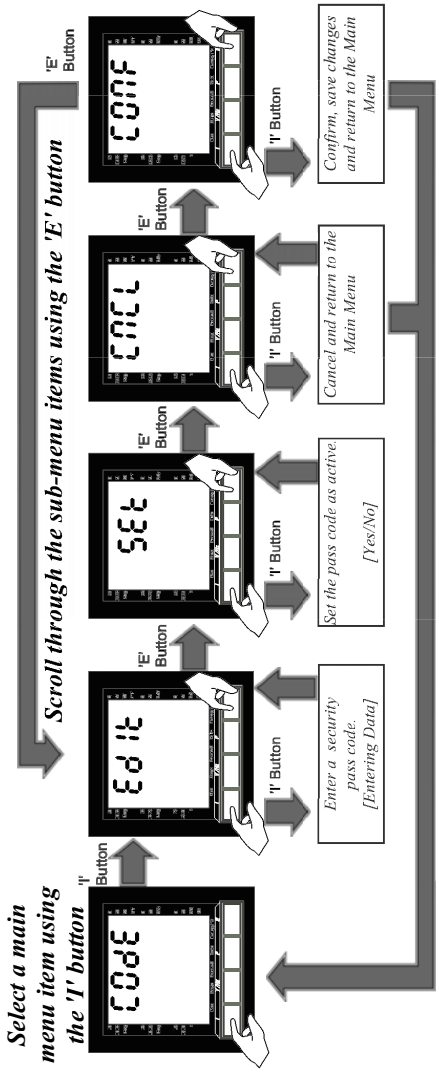

Main Menu
Enter the main menu by holding the 'E' and 'I' buttons down simultaneously for approximately 5 seconds
Scroll through the main menu items using the 'E' button
'E' Button
'I' Button
Select a main menu item using the 'I' button
Scroll through the sub-menu items using the 'E' button
Enter the System's Current. [Entering Data]
Enter the System's Primary Voltage. [Entering Data]
Enter the System's Secondary Voltage. [Entering Data]
Enter the System's Configuration. [Lists]
Cancel and return to the Main Menu
Confirm, save changes and return to the Main Menu

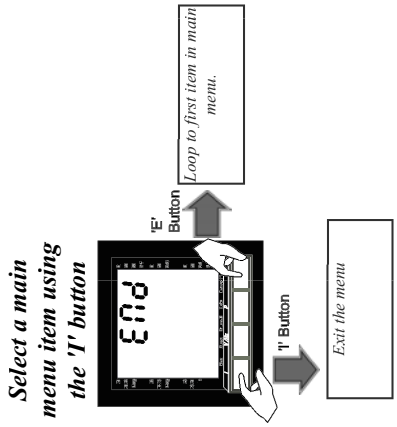

Select a main menu item using the 'I' button
485
'I'
Scroll through the sub-menu items using the 'E' button
'E' Button
'I' Button
Addr
Enter the Node's network address [Entering Data]
baud
Enter the network's baud rate. [Lists]
stop
Enter the network's stop bits. [Lists]
PAr
Enter the network's parity. [Lists]
End i
Floating point endian type. (with word swap). [Lists]
LOC
Lock the network settings. [Yes/No]
CAnCL
Cancel and return to the Main Menu
CONF
Confirm, save changes and return to the Main Menu

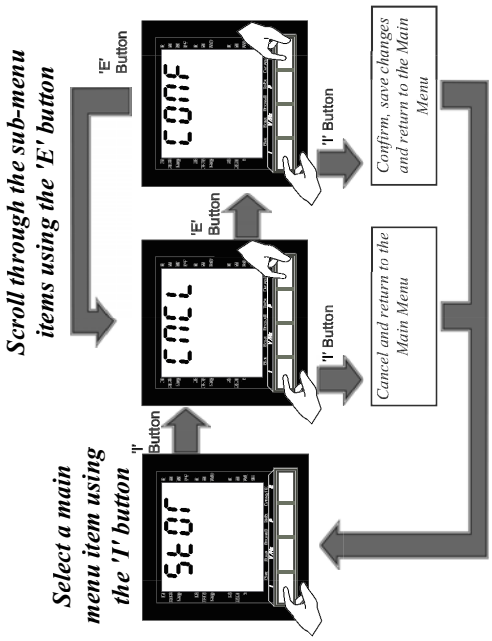

Select a main menu item using the 'I' button
dt
'I' Button
Scroll through the sub-menu items using the 'E' button
'E' Button
rSEt
Reset demand registers. [Yes/No]
dtSt
Enter the demand period.(minutes) [Entering Data]
CAnCL
Cancel and return to the Main Menu
CONF
Confirm, save changes and return to the Main Menu


Select a main menu item using the 'I' button
'I' Button
Scroll through the sub-menu items using the 'E' button
'E' Button
Set kWh resolution. (MWh, kWh, Wh) [Lists]
Set kVArh resolution. (MVArh, kVArh, VArh) [Lists]
Reset energy registers. [Yes/No]
Cancel and return to the Main Menu
Confirm, save changes and return to the Main Menu


Select a main menu item using the 'I' button
'I' Button
Scroll through the sub-menu items using the 'E' button
'E' Button
Set primary relay to Watt or VAR type. [Toggle On Display]
Set the relay's pulse length. (milli-seconds) [Lists]
Adjust pulses per hour. [Decimal point positioning]
Cancel and return to the Main Menu
Confirm, save changes and return to the Main Menu


Select a main menu item using the 'I' button
'I' Button
Scroll through the sub-menu items using the 'E' button
'E' Button
'I' Button
Enter a security pass code. [Entering Data]
'E' Button
'I' Button
Set the pass code as active. [Yes/No]
'E' Button
'I' Button
Cancel and return to the Main Menu
'E' Button
'I' Button
Confirm, save changes and return to the Main Menu


Select a main menu item using the 'I' button
'I' Button
Exit the menu
'E' Button
Loop to first item in main menu.


Select a main menu item using the 'I' button
'I' Button
Scroll through the sub-menu items using the 'E' button
'E' Button
'I' Button
Cancel and return to the Main Menu
'E' Button
'I' Button
Confirm, save changes and return to the Main Menu

MODBUS 3X and 4X Registers --
M850-MP1 models

3X Address	Register	Register Name	Order No ?
30001	(0x0000)	V L1-2	1
30002	(0x0002)	V L2-3	2
30003	(0x0004)	V L3-1	3
30004	(0x0006)	V 1	4
30005	(0x0008)	V 2	5
30006	(0x000A)	V 3	6
30007	(0x000C)	I 1	7
30008	(0x000E)	I 2	8
30009	(0x0010)	I 3	9
30010	(0x0012)	kW Sum	10
30011	(0x0014)	kVA Sum	11
30012	(0x0016)	kVAR Sum	12
30013	(0x0018)	PF Avg	13
30014	(0x001A)	kWHr (Import)	14
30015	(0x001C)	kVArHr (Import)	15
30016	(0x001E)	Hz	16
30017	(0x0020)	N/A	17
30018	(0x0022)	N/A	18
30019	(0x0024)	N/A	19
30020	(0x0026)	N/A	20
30021	(0x0028)	N/A	21
30022	(0x002A)	N/A	22
30023	(0x002C)	kWd (Import)	23
30024	(0x002E)	kVAd	24
30025	(0x0030)	Ad	25
30026	(0x0032)	Neutral Current	26
30027	(0x0034)	N/A	27
30028	(0x0036)	N/A	28
30029	(0x0038)	N/A	29
30030	(0x003A)	N/A	30
30031	(0x003C)	N/A	31
30032	(0x003E)	N/A	32
30033	(0x0040)	N/A	33
30034	(0x0042)	N/A	34
30035	(0x0044)	N/A	35
30036	(0x0046)	N/A	36
30037	(0x0048)	N/A	37
30038	(0x004A)	Max kWd (Import)	38
30039	(0x004C)	N/A	39
30040	(0x004E)	Max kVAd	40
30041	(0x0050)	Max Ad	41

4X Address	Register	Register Name	Order No ?
41001	(0x07D0)	V L1-2	1
41002	(0x07D2)	V L2-3	2
41003	(0x07D4)	V L3-1	3
41004	(0x07D6)	V 1	4
41005	(0x07D8)	V 2	5
41006	(0x07DA)	V 3	6
41007	(0x07DC)	I 1	7
41008	(0x07DE)	I 2	8
41009	(0x07E0)	I 3	9
41010	(0x07E2)	kW Sum	10
41011	(0x07E4)	kVA Sum	11
41012	(0x07E6)	kVAR Sum	12
41013	(0x07E8)	PF Avg	13
41014	(0x07EA)	kWHr (Import)	14
41015	(0x07EC)	kVArHr (Import)	15
41016	(0x07EE)	Hz	16
41017	(0x07F0)	N/A	17
41018	(0x07F2)	N/A	18
41019	(0x07F4)	N/A	19
41020	(0x07F6)	N/A	20
41021	(0x07F8)	N/A	21
41022	(0x07FA)	N/A	22
41023	(0x07FC)	kWd (Import)	23
41024	(0x07FE)	kVAd	24
41025	(0x0800)	Ad	25
41026	(0x0802)	Neutral Current	26
41027	(0x0804)	N/A	27
41028	(0x0806)	N/A	28
41029	(0x0808)	N/A	29
41030	(0x080A)	N/A	30
41031	(0x080C)	N/A	31
41032	(0x080E)	N/A	32
41033	(0x0810)	N/A	33
41034	(0x0812)	N/A	34
41035	(0x0814)	N/A	35
41036	(0x0816)	N/A	36
41037	(0x0818)	N/A	37
41038	(0x081A)	Max kWd (Import)	38
41039	(0x081C)	N/A	39
41040	(0x081E)	Max kVAd	40
41041	(0x0820)	Max Ad	41

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M850
System Type Programming Guide

1. Press “I” & “E” simultaneously and hold for 5 seconds. The unit is now in setup mode. The screen will change to “SUPP”
2. Press “I” button once. The screen displays “SYSA”.
3. Press “E” button until “TYPE” is displayed.
4. Press “I” to select the desired phase/wire configuration.
5. Press “E” to change to the desired phase/wire configuration.
6. Press “E” to choose: 1P3, 1P2, 3P3, 3P4, 3P3b, or 3P4b. Press “I” to set. The screen returns to “Type”.
7. Press “E” until “CONF” is displayed. Then, press “I”. Now the display shows “SUPP”.
8. Press “E” until “END” is displayed. Then, press “I”. Now you are out of programming mode.
9. Check the resulting display on the meter for voltage and current to see that the desired numeral is displayed and the decimal is in the proper location.
10. If not, repeat procedure starting with step 1 and check that the proper numbers are programmed into the meter.

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Charlotte, NC 28212
Phone: (704) 535-3357
FAX: (704) 535-6288

118 West 12th Street
Bartlesville, OK 74003
Phone: (862) 258-6974
FAX: (973) 448-1674

M850
VT Ratio Programming Guide

1. Press “I” & “E” simultaneously and hold for 5 seconds. The unit is now in setup mode. The screen will change to “SUPP”
2. Press “I” button once. The screen displays “SYSA”.
3. Press “E” button once. The screen displays “UPr1”.
4. Press “I” once. The screen displays the VT Primary Voltage setting.
5. Press “I” to select the desired digit. i.e.: for a VT Primary of 280Volts, the display will show 280.0.
6. Press “E” to change to the desired digit. i.e.: for a VT Primary of 400Volts, the display will show 400.0. Press “I” to set.
7. When the screen displays “d”, you can select a decimal location by pressing “E” . Press “I” to set.
8. The screen will then display “E” for descriptor selection. Press “E” to select K (kilo) / M (Mega) or no descriptor.
9. Press “I” once. The display will read “UPr1”.
10. Press “E” once to display “USEC”. Then press “I”. Now the display shows the Secondary Voltage setting.
11. Press “I” to select the desired numeral to be changed. i.e.: for a VT secondary of 280Volts, the display will show 280.0.
12. Press “E” to change to the desired digit. i.e.: for a VT secondary of 400Volts, the display will show 400.0. Press “I” to set.
13. When the screen displays “d”, you can select a decimal location by pressing “E”. Press “I” to set.

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14. The screen will display “E” for descriptor selection. Press “E” to select K(kilo) / M(mega) or no descriptor.
15. Press “I” once. The display will read “USEC”.
16. Press “E” until “CONF” is displayed. Then, press “I”. Now the display shows “SUPP”.
17. Press “E” until “END” is displayed. Then, press “I”. Now you are out of programming mode.
18. Check the resulting display on the meter for voltage and current to see that the desired numbers are displayed and the decimal is in the proper location.
19. If not, repeat procedure starting with step 1 and check that the proper numbers are programmed into the meter.

PANEL COMPONENTS & SYSTEMS, INCORPORATED

M850
CT Ratio Programming Guide

1. Press “I” & “E” simultaneously and hold for 5 seconds. The unit is now in setup mode. The screen will change to “SUPP”
2. Press “I” button once. The screen displays “SYSA”.
3. Press “I” button once. The screen displays the Primary Ampere setting.
4. Press “I” to select the desired numeral to be changed. i.e.: for a CT primary of 2000Amps, the display will show 2.000. Press “I” to set.
5. Press “E” to change to the desired digit. i.e.: for a CT primary of 2000Amps, the display will show 2.000. Press “I” to set.
6. When the screen displays “d” you can select a decimal location by pressing “E”. Press “I” to set.
7. The screen then will display “E” for descriptor selection. Press button “E” to select K (kilo)/ M (mega) or no descriptor.
8. Press “I” once. The display will read “SYSA”.
9. Press “E” until “CONF” is displayed. Then press “I”. Now the display shows “SUPP”.
10. Press “E” until “END” is displayed. Then press “I”. Now you are out of programming mode.
11. Check the resulting display on the meter for voltage and current to see that the desired numeral is displayed and the decimal is in the proper location.
12. If not, repeat procedure starting with step 1 and check that the proper numbers are programmed into the meter.

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