M850-MP1

'QUICK START' GUIDE

15765 Acorn Trail / Faribault, MN 55021 / 507.333.3990

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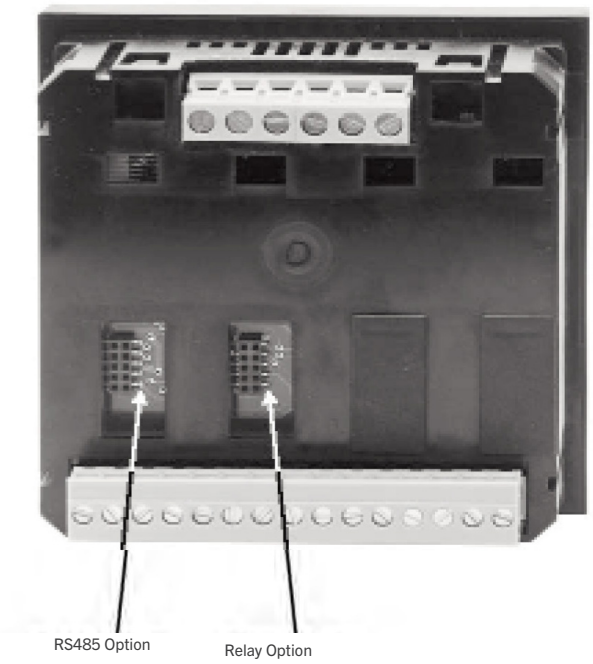
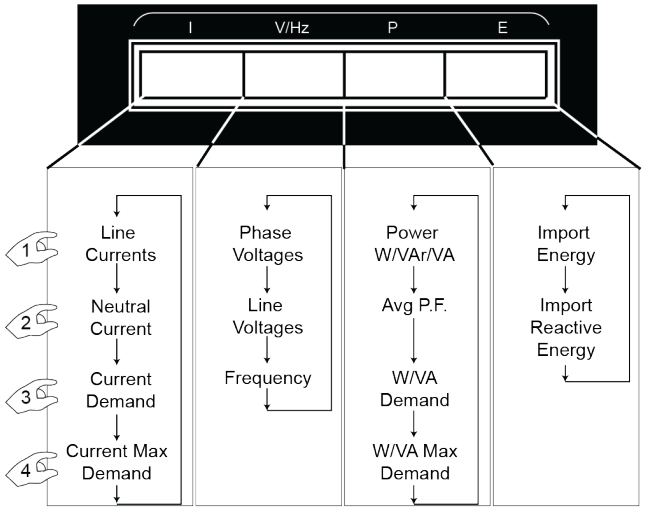
POD POSITIONS



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.



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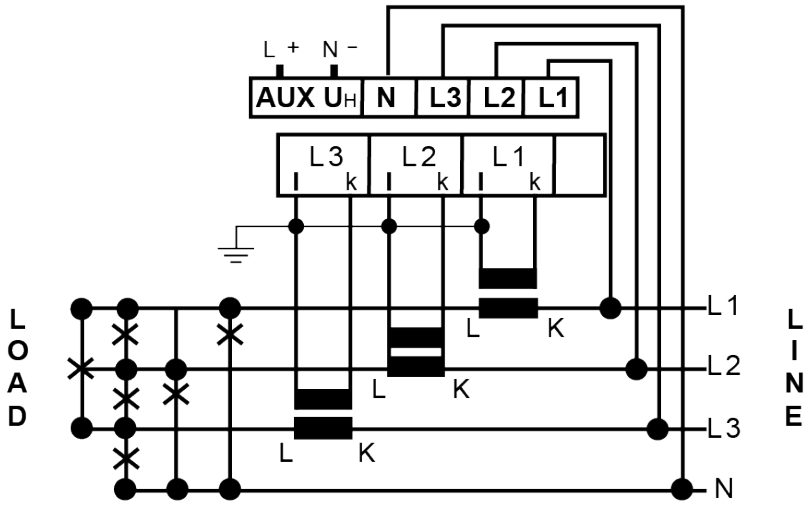
WIRING AND CONNECTIONS



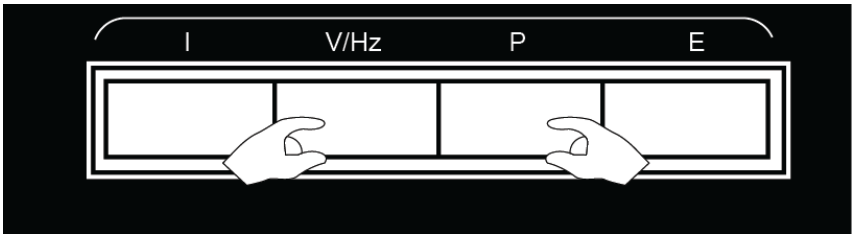
	Voltage				Current		
	L1	L2	L3	N	L1	L2	L3
1ph	✓	✗	✗	✓	✓	✗	✗
1ph 3W	✓	✓	✗	✓	✓	✓	✗
3ph 3W	✓	✓	✓	✗	✓	✗	✓
3ph 4W	✓	✓	✓	✓	✓	✓	✓
3ph 3W BAL	✓	✓	✓	✗	✓	✗	✗
3ph 4W BAL	✓	✗	✗	✓	✓	✗	✗

Unused Voltage terminals are internally connected Secondary of CTs must be connected to earth

I = X2 (Black) + Grounded k = X1 (White)

L = H2 K = H1 = faces Source

BRIGHTNESS ADJUSTMENT



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

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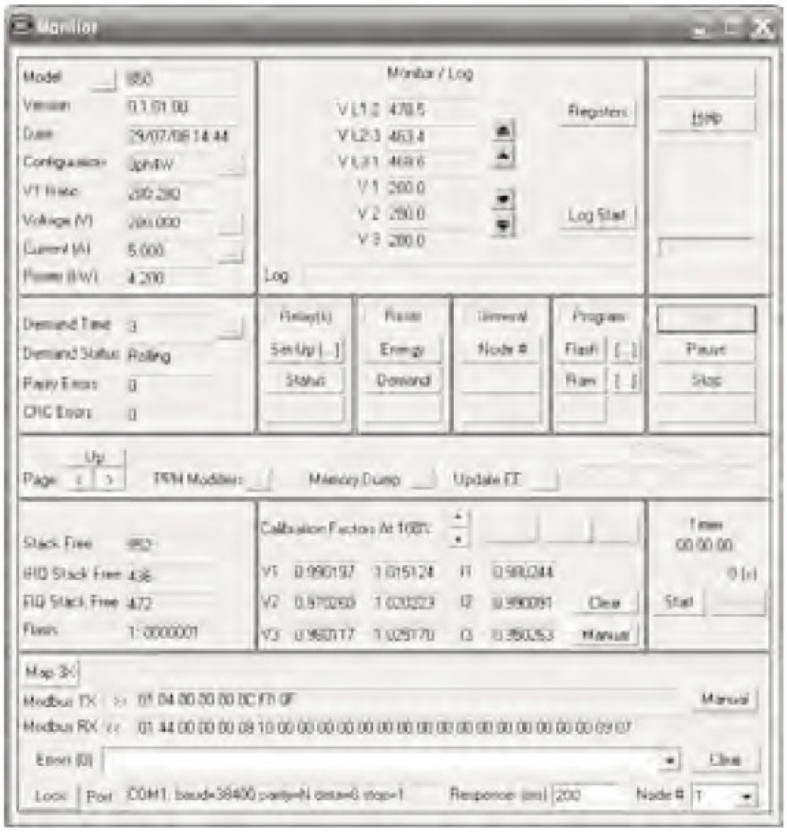
SOFTWARE

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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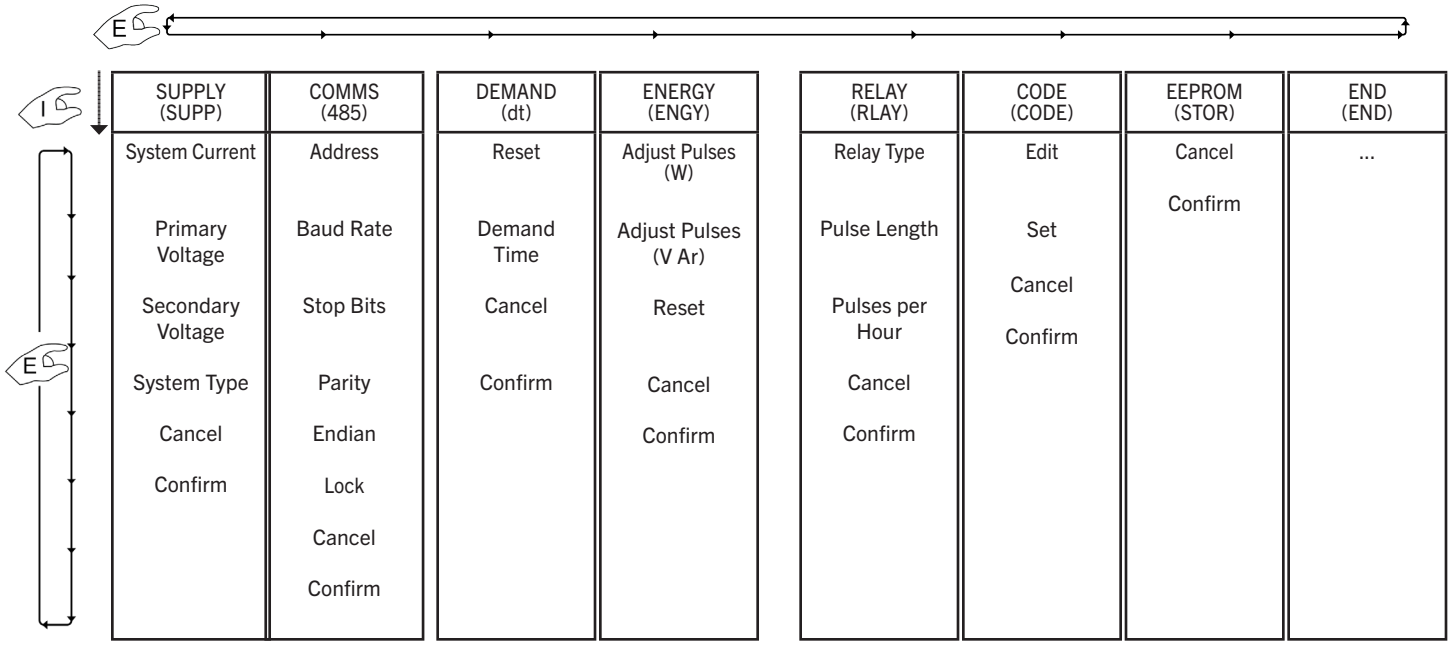
SETTINGS MENU

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:



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.

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

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

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COMMS [485]

(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:

ADDRESS
[ADDR]

BAUD RATE
[BAUD]

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

STOP BITS
[STOP]

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

PARITY
[PAR]

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

ENDIAN
[ENDI]

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

LOCK
[LOC]

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

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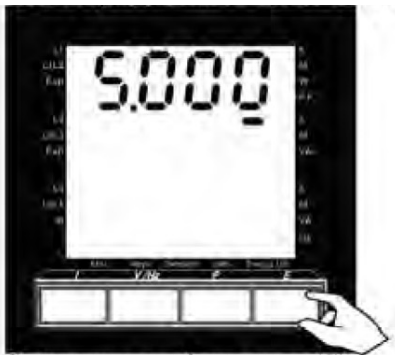
ENTERING DATA

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.

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M850-MP1 'QUICK START' GUIDE

Demand [dt]

RESET
[RSET]

DEMAND TIME
[DTST]

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

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

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

Energy [ENGY]

ADJUST PULSES
[ADJ] (W)

ADJUST PULSES
[ADJ] (VAr)

RESET
[RSET]

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 (W or VAr) allows the selection of a DIVISOR from the list on the right:

1000
100
10
1
0.1
0.01
0.001

Caution: Changing the divisor and confirming the selection will reset ALL energy readings. The reset option resets ALL energy readings.

Relay [RLAY]

RELAY TYPE
[TYPE]

PULSE LENGTH
[PULS LNTH]

PULSES per HOUR
[PPH]

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.

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

Code [CODE]

EDIT PASS CODE [EDIT]

SET PASS CODE
[SET]

The Pass Code is used to help prevent unauthorised tampering with the unit's settings. The Pass Code can be changed using the EDIT facility in the sub-menu.

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.

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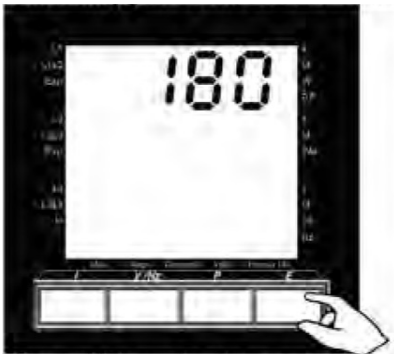
END [END]	This selection leaves the main menu and resumes displaying measurements.

****

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 date can be entered, selection is made from a list:



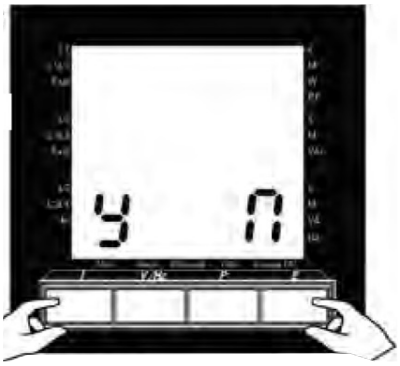
To scroll through a list - press 'E'

To select the displayed item - press 'I'

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

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.



press 'I' for yes
press 'E' for No

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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 (45H = 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 V Ar.h)

Insulation

Test Voltage	3kV 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 11 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

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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)

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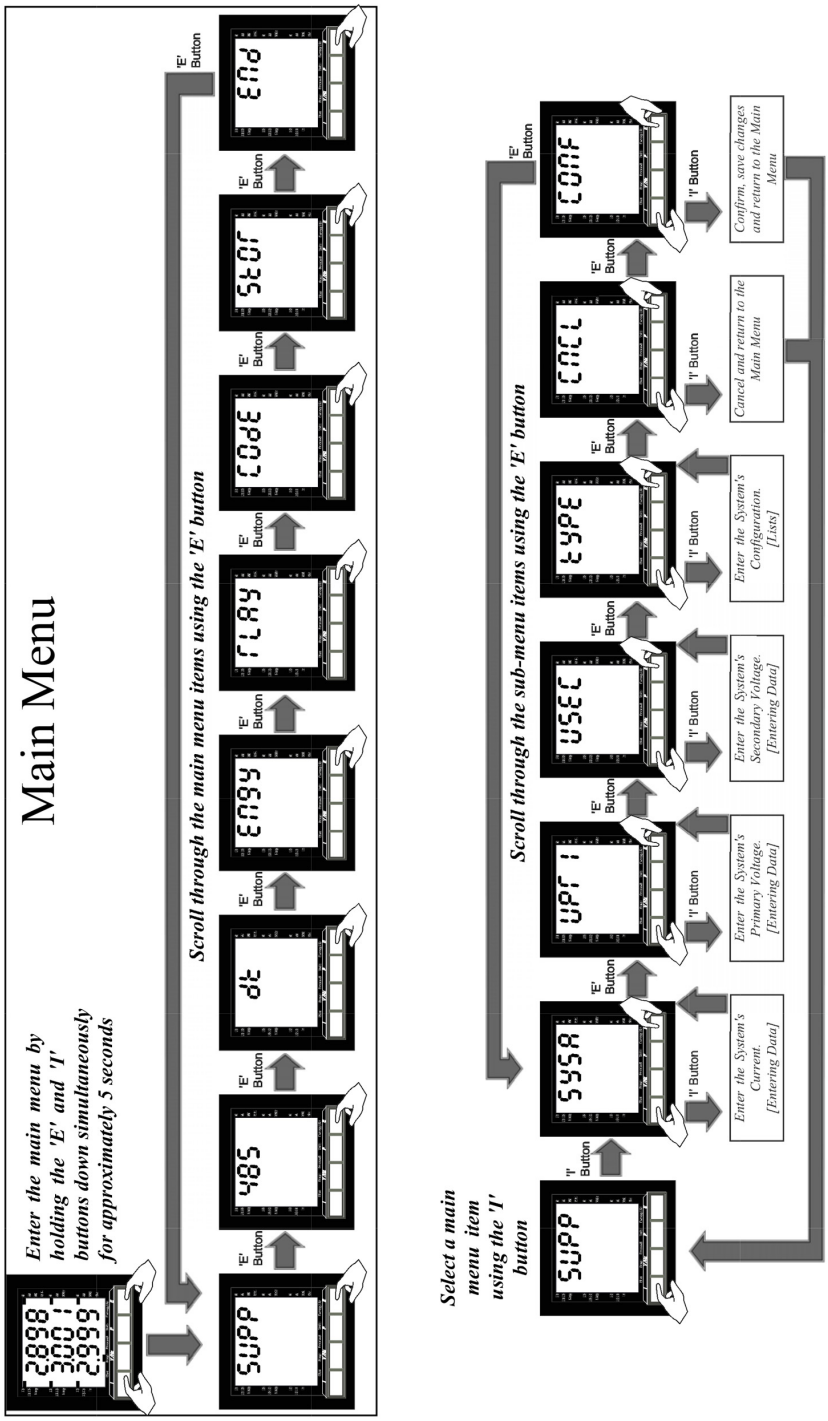

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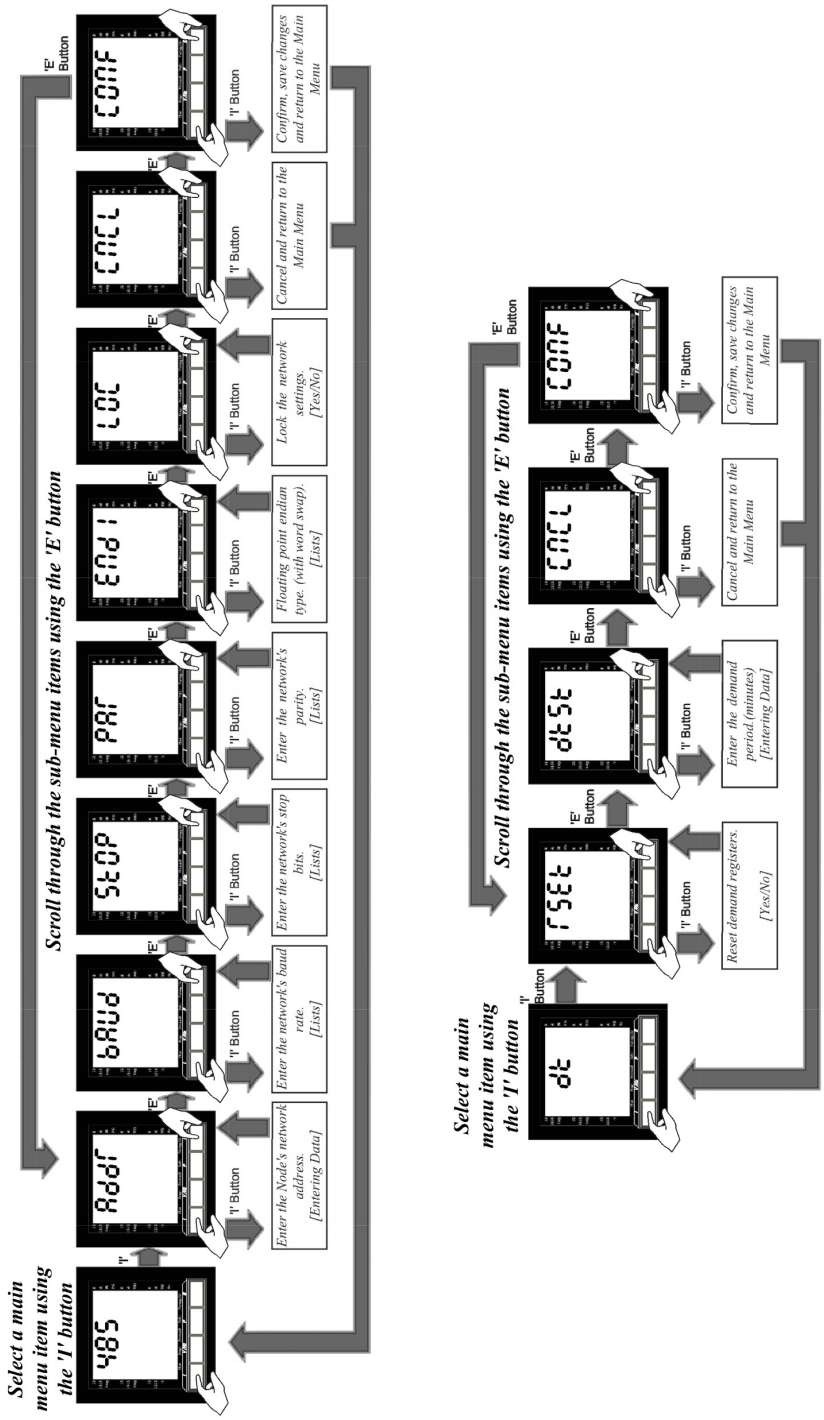
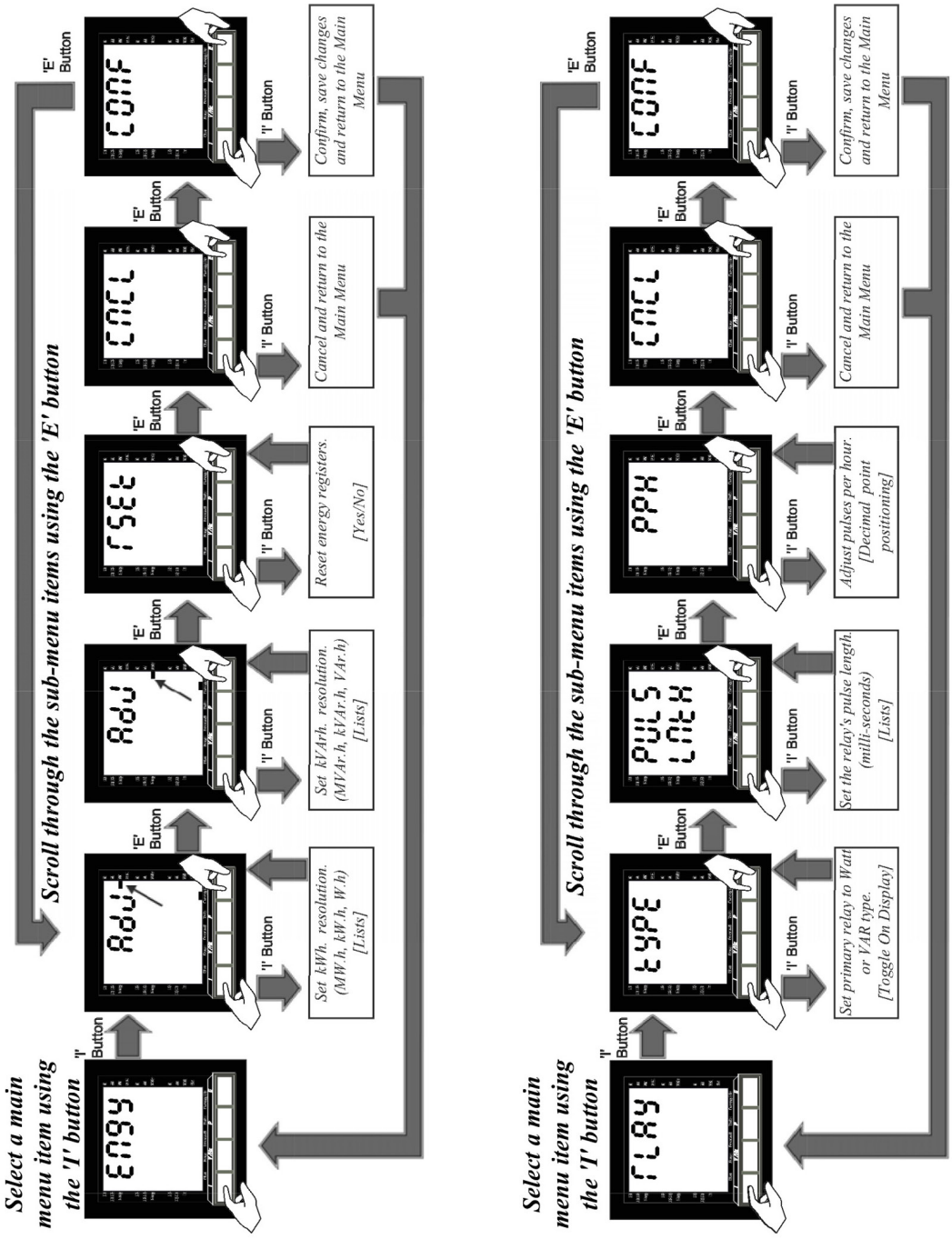

Select a main menu item using the 'I' button
'I' Button
485
Addr
Enter the Node's network address. [Entering Data]
'E' Button
'I' Button
bAUd
Enter the network's baud rate. [Lists]
'E' Button
'I' Button
StOP
Enter the network's stop bits. [Lists]
'E' Button
'I' Button
PAr
Enter the network's parity.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



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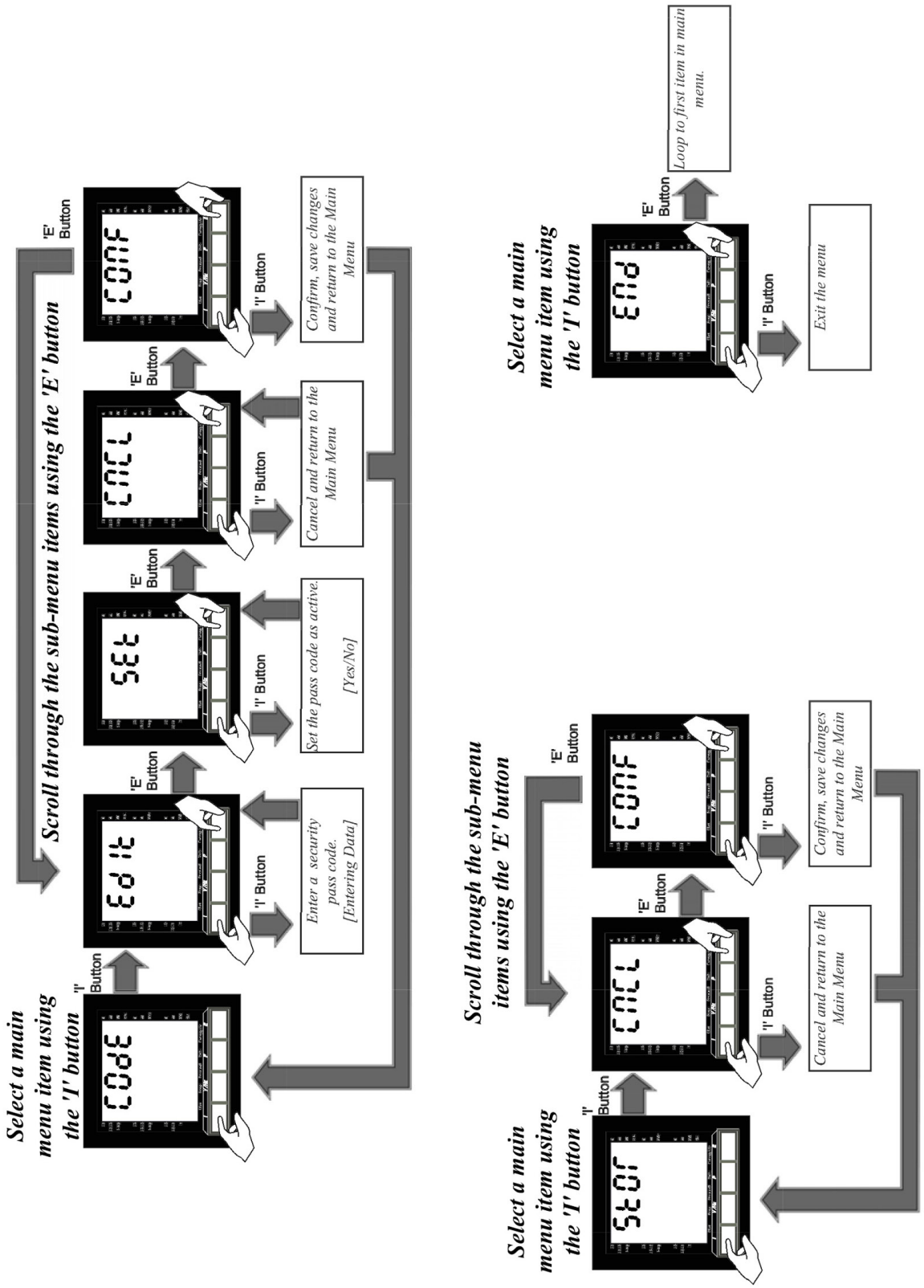
Select a main menu item using the 'I' button
'I' Button
Scroll through the sub-menu items using the 'E' button
'E' Button
Enter a security pass code. [Entering Data]
Set the pass code as active. [Yes/No]
Cancel and return to the Main Menu
Confirm, save changes and return to the Main Menu
Exit the menu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

MODBUS 3X AND 4X REGISTERS -- M850-MP1 MODELS

3X Address	Register	Register Name	Order No	4x Address	Register	Register Name	Order No
30001	(0x0000)	V L1-2	1	41001	(0x07D0)	V L1-2	1
30002	(0x0002)	V L2-3	2	41002	(0x07D2)	V L2-3	2
30003	(0x0004)	V L3-1	3	41003	(0x07D4)	V L3-1	3
30004	(0x0006)	V1	4	41004	(0x07D6)	V 1	4
30005	(0x0008)	V 2	5	41005	(0x07D8)	V 2	5
30006	(0x000A)	V 3	6	41006	(0x07DA)	V 3	6
30007	(0x000C)	I 1	7	41007	(0x07DC)	I 1	7
30008	(0x000E)	I 2	8	41008	(0x07DE)	I 2	8
30009	(0x0010)	I 3	9	41009	(0x07E0)	I 3	9
30010	(0x0012)	kW Sum	10	41010	(0x07E2)	kW Sum	10
30011	(0x0014)	kVA Sum	11	41011	(0x07E4)	kVA Sum	11
30012	(0x0016)	kVAR Sum	12	41012	(0x07E6)	kVAR Sum	12
30013	(0x0018)	PF Avg	13	41013	(0x07E8)	PF Avg	13
30014	(0x001A)	kWHr (Import)	14	41014	(0x07EA)	kWHr (Import)	14
30015	(0x001C)	kVArHr (Import)	15	41015	(0x07EC)	kVArHr (Import)	15
30016	(0x001E)	Hz	16	41016	(0x07EE)	Hz	16
30017	(0x0020)	N/A	17	41017	(0x07F0)	N/A	17
30018	(0x0022)	N/A	18	41018	(0x07F2)	N/A	18
30019	(0x0024)	N/A	19	41019	(0x07F4)	N/A	19
30020	(0x0026)	N/A	20	41020	(0x07F6)	N/A	20
30021	(0x0028)	N/A	21	41021	(0x07F8)	N/A	21
30022	(0x002A)	N/A	22	41022	(0x07FA)	N/A	22
30023	(0x002C)	kWd (Import)	23	41023	(0x07FC)	kWh (Import)	23
30024	(0x002E)	kVAd	24	41024	(0x07FE)	kVAd	24
30025	(0x0030)	Ad	25	41025	(0x0800)	Ad	25
30026	(0x0032)	Nautral Current	26	41026	(0x0802)	Neutral Current	26
30027	(0x0034)	N/A	27	41027	(0x0804)	N/A	27
30028	(0x0036)	N/A	28	41028	(0x0806)	N/A	28
30029	(0x0038)	N/A	29	41029	(0x0808)	N/A	29
30030	(0x003A	N/A	30	41030	(0x080A)	N/A	30
30031	(0x003C)	N/A	31	41031	(0x080C)	N/A	31
30032	(0x003E)	N/A	32	41032	(0x080E)	N/A	32
30033	(0x0040)	N/A	33	41033	(0x0810)	N/A	33
30034	(0x0042)	N/A	34	41034	(0x0812)	N/A	34
30035	(0x0044)	N/A	35	41035	(0x0814)	N/A	35
30036	(0X0046)	N/A	36	41036	(0x0816)	N/A	36
30037	(0X0048)	N/A	37	41037	(0x0818)	N/A	37
30038	(0X004A)	Max kWd (Import)	38	41038	(0x081A)	Max kWd (Import)	38
30039	(0X004C)	N/A	39	41039	(0x081C)	N/A	39

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3X Address	Register
30040	(0X004E)
30041	(0X0050)

Register Name	Order No
Max kVAD	40
Max Ad	41

4x Address	Order No
41040	(0x081E)
41041	(0x0820)

Register Name	Order No
Max kVAD	40
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.

Power Measurement and Control Specialists **www.pc-s.com**

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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 "UPrI".
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 "UPrI"
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.
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"

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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.

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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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