



Safety Precautions

Read and follow all the safety precautions and instructions before installing and working with this equipment.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. In the USA, see NFPA 70E.
- Only qualified electrical workers should install this equipment. Such work should be performed only after reading this entire set of instructions.
- If the equipment is not used in the manner specified by the manufacturer, the protection provided by the equipment may be impaired.
- NEVER work alone.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Turn off all power supplying the power meter and the equipment in which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Before closing all covers and doors, carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Use caution while removing or installing panels so that they do not extend into the energized bus; avoid handling the panels, which could cause personal injury.
- The successful operation of this equipment depends upon proper handling, installation, and operation. Neglecting fundamental installation requirements may lead to personal injury as well as damage to electrical equipment or other property.
- NEVER bypass external fusing.
- NEVER short the secondary of a PT.
- NEVER open circuit a CT; use the shorting block to short circuit the leads of the CT before removing the connection from the power meter.
- Before performing Dielectric (Hi-Pot) or Megger testing on any equipment in which the power meter is installed, disconnect all input and output wires to the power meter. High voltage testing may damage electronic components contained in the power meter.
- The power meter should be installed in a suitable electrical enclosure.
- RS 485 is safe to access up to 277 L-N / 480 L-L V only. If the voltage is above 277 L-N / 480 L-L V, then switch OFF the input voltage before handling the RS485 terminal.

Failure to follow these instructions will result in death or serious injury

Additional Resources

Go to <http://www.schneider-electric.co.in> > in the search window enter EM6430 dual > On the EM6430 screen, click Downloads tab, then click on tech publications tab > click on the document name to download or read the document file.

Introduction

The power meter has the following parameters.

Parameters

Table 1: EM6430 power meter parameters

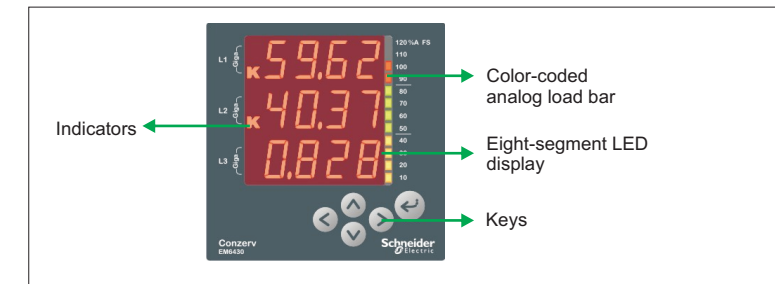
Parameters			
RMS	VLL	A	PF
	V12	V23	V31
	VLN	A	F
	V1	V2	V3
	A	W	PF
	A1	A2	A3
	W1	W2	W3
	PF1	PF2	PF3
INTG FWD	Wh		
OLD FWD	Wh		

Box Contents

- One (1) EM6430 power meter
- One (1) quick start guide (QSG)
- One (1) test and calibration certificate for the power meter

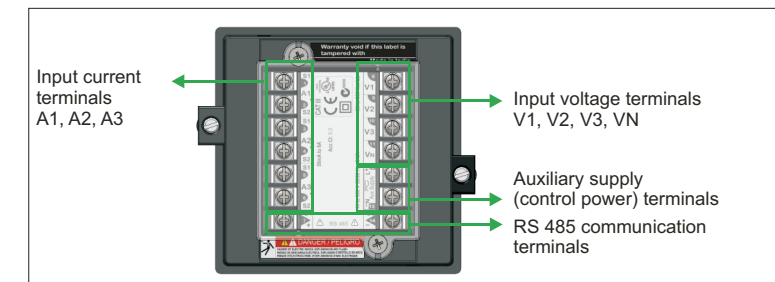
Power Meter Physical Description
Front Panel

Figure 1: Front panel



Rear Panel

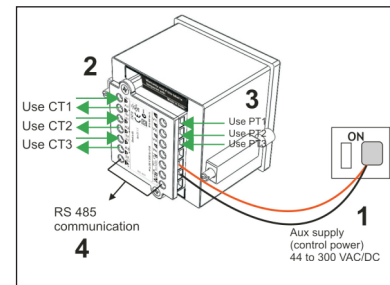
Figure 2: Rear panel



Quick Setup, While Powering ON

It is much easier to set up the power meter before you mount the power meter into the panel. This section explains you, how to set up the power meter before mounting.

Figure 3: Quick setup



1. Connect the auxiliary supply (control power) 44 to 300 VAC/DC to the terminals 12 and 13. Press and hold for two seconds, while powering up the power meter. The display directly enters into PROG menu setup and displays **EDIT A.PRI 100.0**. Refer to "Edit set parameters" for programming.

Program the following readings for accurate readings:

- A.PRI, A.SEC:** Set these values to match your CT primary and secondary values. For example, if your CT ratio is 200:5, set A.PRI = 200.0 and A.SEC = 5.000.
 - V.PRI, V.SEC:** Set these values to your input voltage VLL of circuit, if your input voltage is < 600 VACLL. For example, if the input voltage is 300 VACLL, set V.PRI = 300.0 and V.SEC = 300.0.
- Use potential transformer (PT/VT), if the input voltage > 600 VACLL. Set the V.pri and V.sec values to match the primary and secondary of the PT(VT) respectively. For example, if PT(VT) ratio is 11 kV: 110, set V.pri = 11.00 k and V.sec = 110.0.

Select one of the following systems according to your wiring configuration.

- SYS = Star for 4-phase 3-wire system
- SYS = Delta for 3-phase 3-wire system
- SYS = 2-phase for 2-phase 3-wire system
- SYS = Single-phase for single-phase 2-wire system

2. Connect the current transformers (CTs).

CT1	CT2	CT3
1, 2	3, 4	5, 6

3. Connect the voltage inputs. Use PT(VT) if input voltage exceeds 600 VLL.

PT1	PT2	PT3	Neutral
8	9	10	11

4. Connect the RS 485 communication terminals.

+ve	-ve
7	14

Installation

Mechanical and Electrical Installation

Connecting Cable Requirements

Table 2: Connecting cable requirements

	Insulation rating	Current rating
Voltage circuit	> 600 VAC	> 0.1 A
Current circuit	> 600 VAC	> 7.5 A or 2.5 mm ² /14 AWG minimum

NOTICE

DAMAGE TO THE DEVICE

- Use only the specified tool for tightening and loosening the screw
- Do not over-torque the screw above the specified range

Failure to follow these instructions can result in equipment damage.

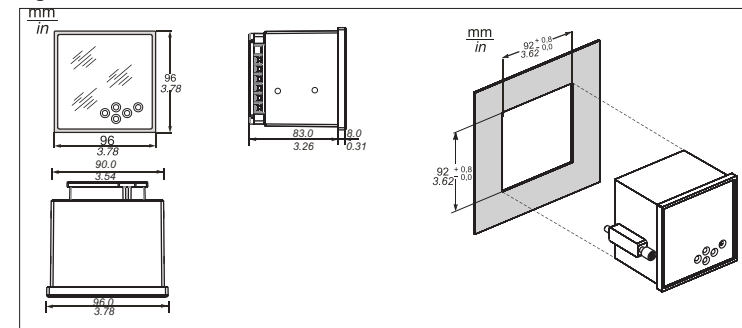
Tools and Equipments Requirements

Driver	Torque driver preferred; may use hand screwdriver.
Tip	Phillips tip preferred, but you can also use flat. Do not use Pozidriv tip.
Screw head Diameter	3.5 mm(0.14 in.)
Shaft diameter	< 5 mm (0.2 in.). Diameter 5 mm (0.2 in.) will get stuck in the cover.
Torque	Tightening Torque: 0.25 to 1 N.m (2.21 to 8.85 lb-in) If the torque is more than 1 N.m (8.85 lb-in), then it may damage the screw or the screw head. Loosening Torque: 1.2 N.m

NOTE: Installation should include a disconnecting device, like a switch or circuit breaker, with clear ON/OFF markings, to turn-off the auxiliary supply (control power). The disconnecting device should be within the reach of the equipment and the operator.

Dimensions and Mounting

Figure 4: Power meter dimensions



Power Meter Mounting

Figure 5: Power meter mounting angle

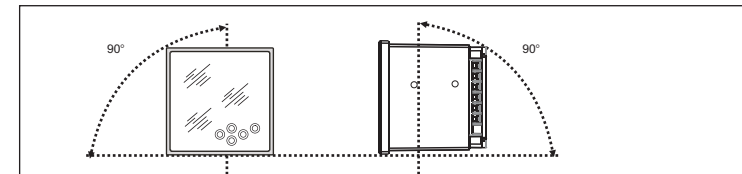
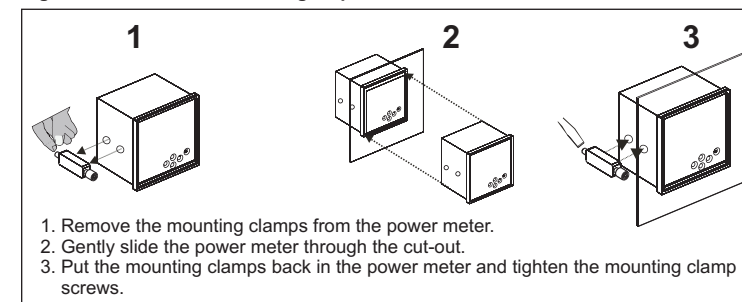


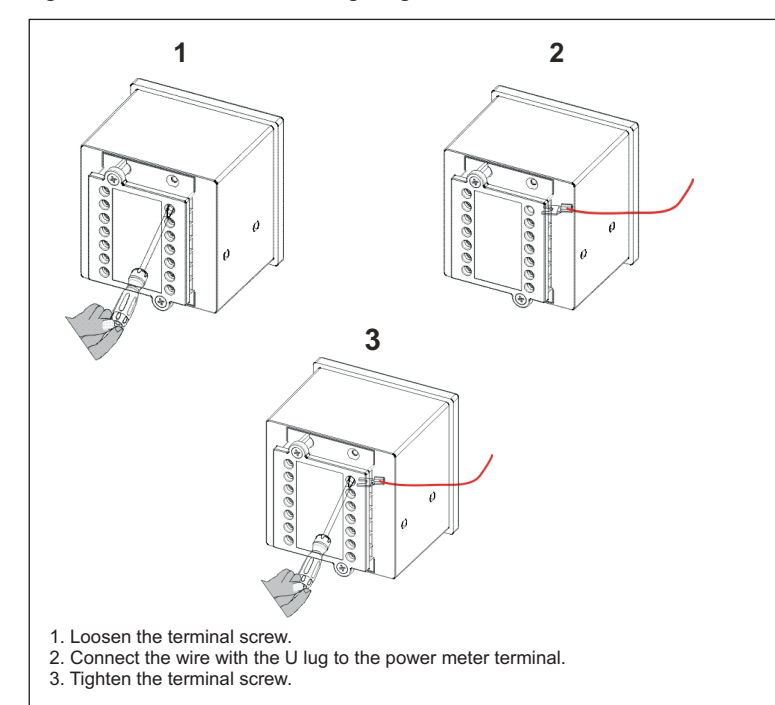
Figure 6: Power meter mounting steps



Terminal Connections using Lugs

Terminal Connections using U Lugs
 Lug: Insulated sleeved U lug
 Cross-section: 2.5 mm²/14 AWG

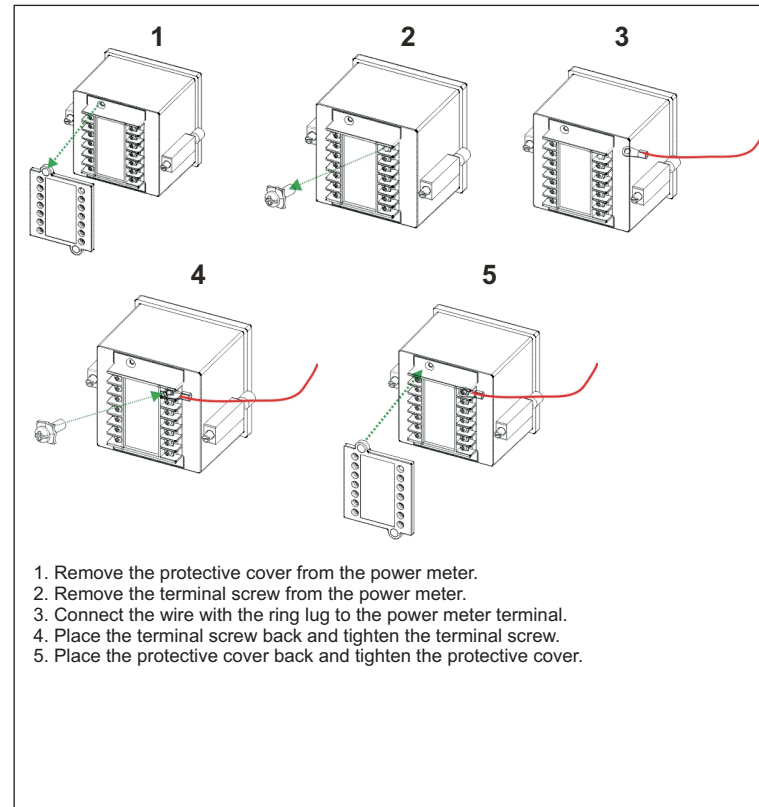
Figure 7: Terminal connections using U lugs



Terminal Connections using Ring Lugs

Lug: Ring lug
Cross-section: 2.5 mm²/14 AWG

Figure 8: Terminal connections using ring lugs



Wirings Supported System Types

Table 4: Supported system types

System type	Meter configuration	Figure number
Star/Wye	StAr	9
Delta, open delta	dLTA	10, 11
2-phase	2-phase	12
Single-phase	Single-phase	13

Wiring Diagram Symbols

Table 5: Wiring diagram symbols

Symbol	Description
	Fuse
	Current transformer (CT)

Wiring Diagrams

Figure 9: 3-phase 4-wire star/wye connection

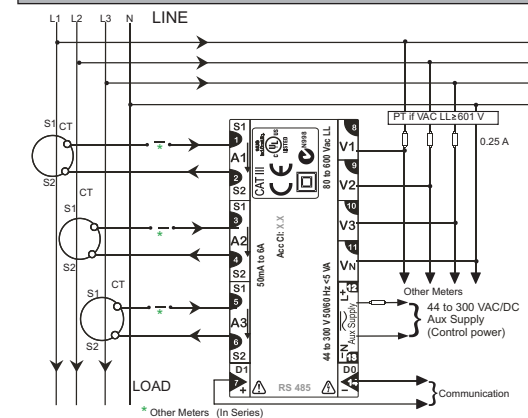


Figure 10: 3-phase 3-wire delta connection

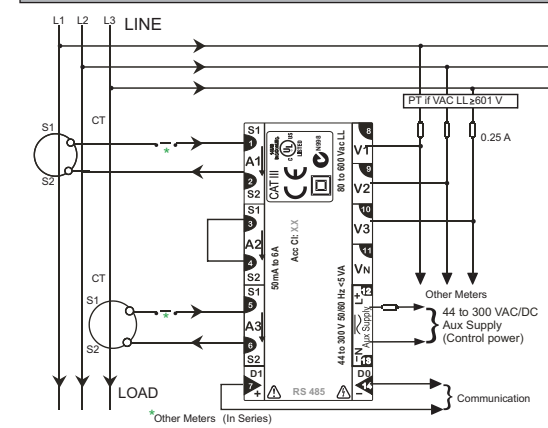


Figure 11: 3-phase 3-wire open delta connection

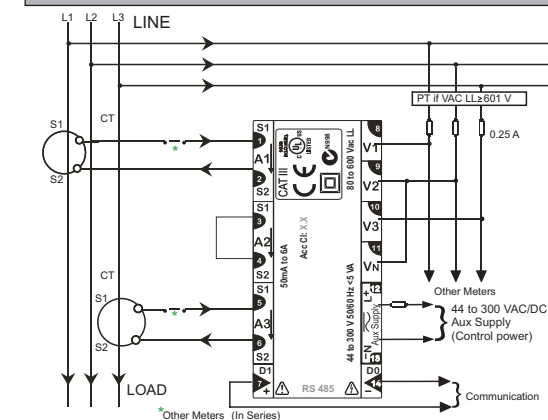


Figure 12: 2-phase 3-wire connection

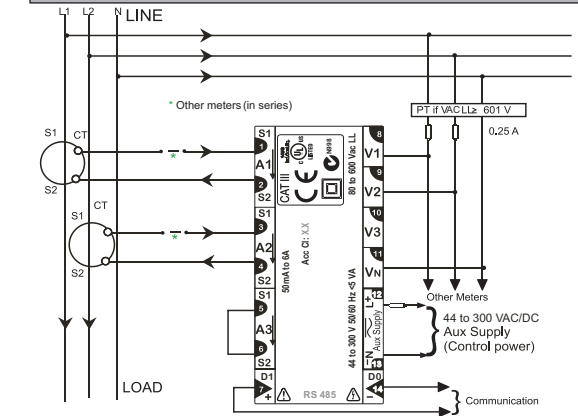
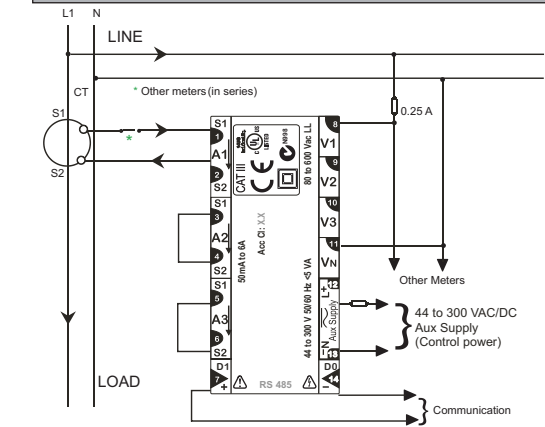


Figure 13: Single-phase connection



Keypad Setup

Keys Description

Table 6: Keys description

	Right key: Go forward to sub-parameter pages. When changing parameters, moves one position to the right.
	Left key: Go backward to main parameter pages. When changing parameters, moves one position to the left.
	Up key: Scroll up through the display pages at the level, within the same function. When changing parameters, increases value by one.
	Down key: Scroll down through the display pages at the same level through all the functions. When changing the parameters decreases the value by one.
	TURBO key: The TURBO key is the one-touch access to the most commonly used parameters (factory-set). The TURBO key scrolls through RMS (home page), VLL A PF, VLN A F, A F, W PF, PF1 PF2 PF3, Wh. If you are lost, use the TURBO key to quickly return to RMS page.

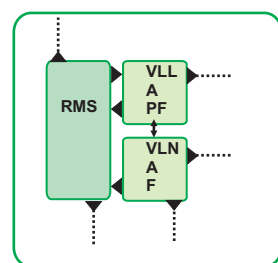
NOTE: THD values are indicative only.

Keys Operation

The following example explains how the different keys in the power meter operates. The example explains, how to navigate from the RMS page to VLN A F page and back to RMS page, in EM6430 power meter.

NOTE: The following symbols are used to explain the different operations of the keys.

- ▶ for right key operation.
- ◀ for left key operation.
- ▲ for up key operation.
- ▼ for down key operation.



- Press from RMS page. The display shows VLL A PF.
- Press . The display shows VLN A F.
- Press , to return to RMS page.

NOTE: Use to go forward to sub-parameter pages. Use to go back to main parameter pages. Use and to scroll up and down through the display pages.

PROG Menu - Setup

The PROG menu setup gives the complete list of user-programmable parameters.

- You must set up the power meter to match the application settings before use. Otherwise, readings will be wrong.
- All the setup parameters can be re-programmed, using SET. However, the following settings critically determine the scaling of the measured readings: SYS (star or delta), Vpri, Vsec, Apri, Asec.
- The scaling may be used to minimize the errors in reading due to Instrument Transformer errors. However, wrong settings will introduce errors in readings on other running systems.

You can enter PROG menu setup in

- View mode: To view the set parameters.
- Edit mode: To view or edit the set parameters.

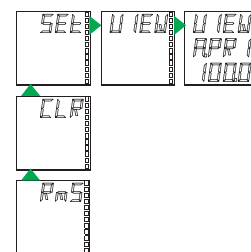
CAUTION

HAZARD OF UNINTENDED OPERATION

Only qualified personnel are authorized to set up the power meter.

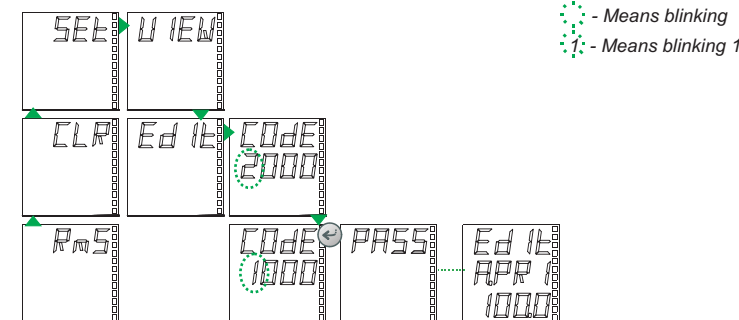
Failure to follow this instruction can result in injury or equipment damage.

Enter Setup Menu in View (Read-only) Mode



- Press from RMS page. The display shows CLR.
- Press , the display shows SET.
- Press , the display shows VIEW.
- Press . The display shows VIEW A.PRI 100.0. Use and to view the setup parameters and their default values.

Enter Setup Menu in Edit Mode



- Press from RMS page. The display shows CLR.
- Press . The display shows CLR.
- Press . The display shows VLN A F.
- Press . The display shows EDIT.
- Press for two seconds. The display shows CODE 2000 with blinking 2. The factory set CODE is 1000.
- Press . The display shows CODE 1000 with blinking 1.
- Press once or four times to accept the new CODE value. The display flashes PASS and shows EDIT A.PRI 100.0. This indicates that you have successfully entered the setup menu in edit mode.

NOTE: If you enter a wrong CODE, the display flashes FAIL and shows EDIT. Repeat the steps and make sure that you enter the correct CODE.

Setup Parameters in View and Edit Modes

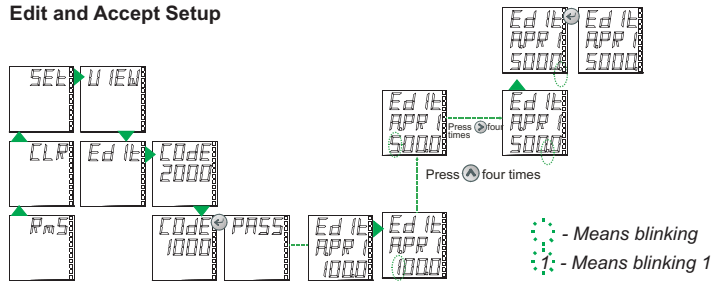
Ed It APP 1 1000	A.PRI = Current primary winding (CT); Input range 1 A to 99 kA. Default value is 100.0
Ed It ASEC 5000	A.SEC = Current secondary winding (CT); Default value is 5,000
Ed It UPP 1 4 150	V.PRI = Voltage primary winding (PT), line to line; Input range 100 V to 999 kV; Default value is 415.0
Ed It USEC 4 150	V.SEC = Voltage secondary winding (PT), line to line; Input range 80 V to 600 V; Default value is 415.0
Ed It SYS 5 STAR	SYS = System configuration; Select from Star, Delta, Wye, 2 ph, 1 ph; Default value is Star.
Ed It LABL 123	LABL = Phase labeling; Select from 123, RYB, RST, PQR, ABC; Default value is 123.
Ed It UAFn 3d	VA.Fn = VA function selection; Select between 3D, ARTH; Default value is 3D.
Ed It BAUD 1 1920	Baud = Baud rate; Select from 4800, 9600, 19200; Default value is 19200.
Ed It PRBY Evn 1	PRTY = Parity and stop bit settings; Select from EVN.1, EVN.2, OD.1, ODD.2, no.1, no.2; Default value is EVN.1.
Ed It ID 1000	ID = RS 485 device ID number; Select from 1,000 to 247.0; Default value is 1,000.
Ed It FSA 1000	F.S% = Full scale percentage; Set the full scale between 1,000 to 100.0; Default value is 100.0
Ed It OFLo Wh	OFLO = Overflow parameter selection; Select from Wh, VAh, Wh E, VAh E;
Ed It PAR Wh	*PAR = Parameter Selection; Select from VAh, Wh; Default value is Wh;
Ed It FSeq 2 43	F Seq. = Float byte order sequence; Default value is 2143; Optional value is 4321;

Notice: * The Parameter Selection is user selectable. You can select only one energy parameter at a time.

Edit Set Parameter

This section explains how you can edit the setup parameter A.PRI from 100.0 to 5000 in the EM6430 power meter. For better understanding, the editing is explained in two parts: Edit and accept setup, save new value to the setup.

Edit and Accept Setup



- After you have successfully entered into setup menu in edit mode (Refer to "Enter Setup Menu in Edit mode" for more information), press [Enter]. The display shows **EDIT A.PRI 100.0** with blinking 1.
- Press [Up] four times. The display shows **EDIT A.PRI 500.0** with blinking 5.
- Press [Down] four times. The display shows **EDIT A.PRI 5000.0** with blinking ".".
- Press [Enter]. The display shows **EDIT A.PRI 5000.0** with blinking ".".
- Press [Enter] to accept the new value. To edit the next parameter, press [Enter] and repeat the above steps.

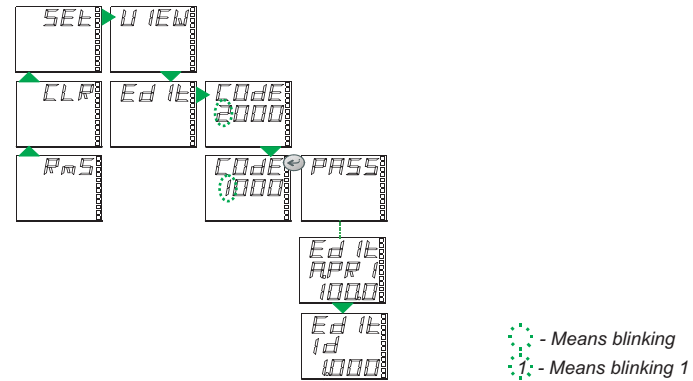
Save New Value to Setup



- After you edit the parameter as described above, press [Enter]. The display shows **SAVE y** with blinking y.
- Press [Enter]. The display flashes **PASS** and shows **EDIT**.
- Press [Enter]. The display shows **SET**.

NOTE: If you do not want to save the new value, press [Enter] to change **SAVE y** to **SAVE n**. Press [Enter]. The display flashes **FAIL** and shows **EDIT**. Then proceed to step 3.

Edit ID



- From **RMS**, press [Enter]. The display shows **CLR**.
- Press [Enter]. The display shows **SET**.
- Press [Enter]. The display shows **VIEW**.
- Press [Enter]. The display shows **EDIT**.
- Press [Enter] for two seconds. The display shows **CODE 2000** with blinking 2. The factory set **CODE** is 1000.
- Press [Enter]. The display shows **CODE 1000** with blinking 1.
- Press [Enter] once or [Enter] four times to accept the new **CODE** value. The display flashes **PASS** and then **EDIT A.PRI 100.0** indicating the successful entry to setup menu in edit mode.
- Press [Enter] until the display shows **Edit Id 1.000** page. Press [Enter] to set the desired **Edit ID** value. Press [Enter] to view the **Edit ID** page set with new value.

NOTE: If you enter a wrong code, the display flashes **FAIL**, then displays **EDIT**. Repeat the procedure and make sure that you enter correct code.

Energy Integrator INTG, OLD, Overflow

Energy Integrator INTG

Your EM6430 power meter is equipped with an energy integrator function which provides several parameters for Energy Management: VAh, Wh. All the values stored in INTG are direct readings and have high resolution.

Integrator Overflow

- The energy values stored in INTG are based on V.Pri x A.Pri; they are independent of secondary values of V and A.
- The energy value readings will overflow based on V.Pri x A.Pri of the primary settings in setup, when 9999 run hours is reached.
- The energy parameter for overflow is user selectable (Wh or VAh) through setup. By default it is Wh or by the Run hours which is fixed 9999 Run hours (almost 13.88 months).
- For power systems ranging from 1 VA to 1000 MVA, the integrator will overflow at 9999 run hours. The duration required for the integrator to overflow will be 13.88 months if the power meter is constantly running at full scale.
- However, in case of power systems greater than 1000 MVA, the integrator will overflow at a value less than 9999 run hours. The duration required for the integrator to overflow will be less than a year if the meter is constantly running at full scale.

Table 7: Integrator Overflow

V.PRI x A.PRI x 1.732	Max Reading (Wh/VAh)	Max time to overflow in months at full scale
1 VA to 1000 VA	9999 K	13.88
1 kVA to 1000 kVA	9999 M	13.88
1 MVA to 1000 MVA	9999 G	13.88
>1000 MVA		< 1 year

OLD Data Register

- When the integrator is cleared (manually or due to overflow), the energy values stored in the integrator will be transferred to the OLD register.
- Thus the old energy values are not lost even after the integrator is cleared and can be viewed with the OLD parameter.

NOTE: For energy studies clear the Integrator at the end of each observation. This transfers all the stored energy values to the OLD register, where they are held while the integrator begins accumulating data for the next observation. Remember that the next time the Integrator is cleared, the OLD values will be overwritten.

Features

Auto-scroll

- Auto-scroll allows you to view a group of display pages sequentially every five seconds without manual key operation.
- During auto-scroll, the power meter displays parameter name for one second and value for four seconds.
- The power meter has three different types of auto-scroll as explained below.

Auto-scroll within the Page Group

- Go to a particular page in the desired page group.
- Press [Enter] continuously for three seconds and release. The display flashes **AUTO** and starts auto-scroll within the page group.

Auto-scroll Down the Entire Column of Pages

- Go to the desired page.
- Press [Enter] continuously for three seconds and release. The display flashes **AUTO** and starts auto-scroll down the column of pages.

TURBO Auto-scroll

Press [Enter] continuously for three seconds and release. The display flashes **AUTO** and starts auto-scroll down the TURBO pages.

NOTE: Press any key to revert to manual scrolling. Auto scrolling is not possible in setup parameters.

Indicators

Table 8: Indicators

	Kilo: When lit, indicates that the reading is in Kilo (10 ³). 10,000 is displayed as 10.00 K and 1.0 K is displayed as 1000.
	Mega: When lit, indicates that the reading is in Mega (10 ⁶). 10,000 K is displayed as 10.00 M and 1.0 M is displayed as 1000 K.
	Giga: When both K and M are lit, indicates that the reading is in Giga (10 ⁹). 10,000 M is displayed as 10.00 G and 1.0 G is displayed as 1000 M.
	Negative: When lit, indicates that the reading is in negative as per IEEE 100 and industry standard. When power factor(PF) is lead (capacitive load): Both PF and VAR will be negative. When current is reversed, W will be negative.

Default Display Page

The default display page feature enables you to select any display page as user-set display page. You can scroll to other pages, when the default display page is active. The default display page will be displayed two minutes after you stop the manual key operation.

To LOCK default display page:

Go to the desired page you want to set as default display page. Press [Enter] and [Enter] together. The display shows **LOCK** and the display page is locked.

To unlock default display page:

Once the default display page is active, press [Enter] and [Enter] together. The display shows **ULOC** and the default display page is unlocked.

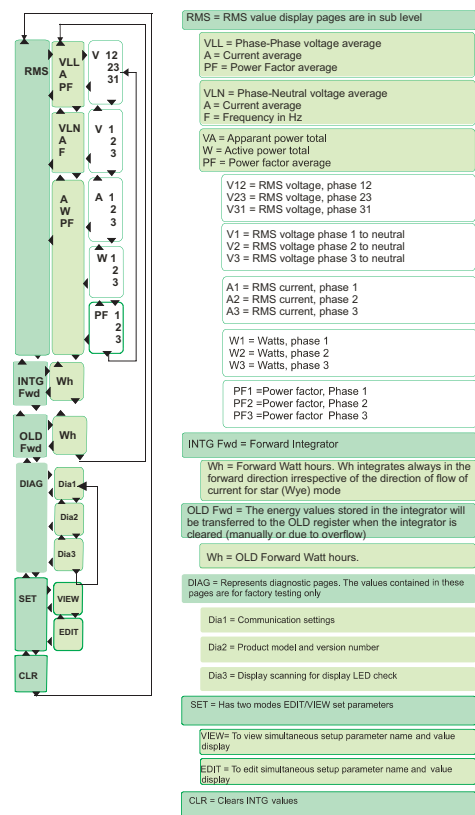
NOTE: Entry to PROG menu setup is possible only when the default display page is unlocked.

Default display page through communication:

- You can lock and unlock the default display page through communication.
- If an operator locks the default display page through communication, any user can unlock it from the front panel.
- If a supervisor locks the default display page through communication, an operator cannot unlock it. Only a supervisor can unlock it through communication.

Menu Hierarchy

EM6430: Menu Hierarchy



Technical Specifications

Table 9: Technical specifications

Description	Specification
Sensing/measurement	True RMS, one second update time, four quadrant power and energy
Accuracy	Class 1.0 as per IEC 62052-11 and IEC 62053-21; Class 0.5S (optional) as per IEC 62052-11, 62053-22 Class 0.2*(optional)
Auxiliary supply (control power)	44 to 300 VAC/DC
Input voltage	Four voltage inputs (V1, V2, V3, VN) 110 or 415 VACLL nominal (80 to 600 VACLL)
Input current** (energy measurement)	Current inputs(A1, A2, A3): 5 A Class 1.0/0.5S: 5 mA (starting) to 6 A 5 A Class 0.5S/0.2: 5 mA (starting) to 6 A 1 A Class 0.5S/0.2: 1 mA (starting) to 1.2 A
Frequency	45 to 65 Hz
Burden	Voltage and current input < 0.2 VA per phase Auxiliary supply (control power) < 3 VA at 240 V, 5 VA Max
Overload	5 A: 10 A max continuous 1 A: 2 A max continuous
Display and resolution	Alphanumeric LED display; RMS: Four digits; INTG: Eight digits
Safety	CAT III - Measurement category III, Pollution degree 2 □ - Double insulation at user-accessible area
Communication (optional)	RS 485 serial channel connection industry standard Modbus RTU protocol
Environmental	Operating temperature: -10 °C to 60 °C (14 °F to 140 °F) Storage temperature: -25 °C to 70 °C (-13 °F to 158 °F) Humidity 5 % to 95 % non-condensing
Weight	400 gms approx, unpacked 500 gms approx, shipping
Protection against dust and water	Front panel: IP 51 Rear panel: IP 40

NOTE:
* Class 0.2 is applicable when the voltage (line-neutral) is above 120 V.
**Additional error of 0.05% of full scale, for dual energy meter input current below 100mA for 5A and below 20mA for 1A.

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