

# PowerLogic™ PM1000 Series Power Meters

## Quick Start Guide

PLSED309038EN  
01/2010



## SECTION 1: BEFORE YOU BEGIN

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

### SAFETY SYMBOLS



The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personnel injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### SAFETY MESSAGES

#### ⚠ DANGER

**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

#### ⚠ WARNING

**WARNING** indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

#### ⚠ CAUTION

**CAUTION** indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

#### CAUTION

**CAUTION** used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage.

### OTHER SYMBOLS



This symbol indicates direct and alternating currents

This is double insulation symbol which indicates that, the user accessible area is protected through out by double or reinforced insulation

## Safety Precautions

#### ⚠ 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.
- The protection provided by the manufacturer will be impaired, if the equipment is not used in the specified manner.
- 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 back feeding.
- 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.
- Building installation shall be included with a disconnecting device like switch or circuit breaker, with clear ON/OFF markings and within close proximity to equipment and the reach of operator, to cut-off the supply mains in case of any hazardous voltages.
- 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.
- During the normal operation of this equipment, hazardous voltages might be present at the rear terminals, which can causes severe injury or death. High voltages are likely to be present even after the power meter has been switched off.
- The power meter should be installed in a suitable electrical enclosure.

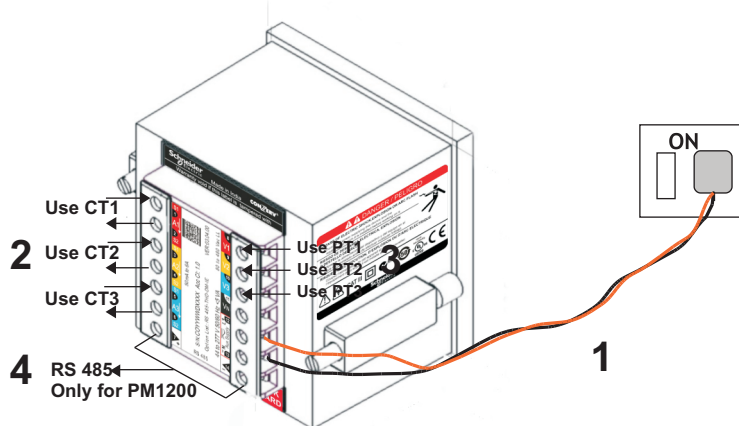
**Failure to follow this instruction will result in death or serious injury**

### PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

## SECTION 2: QUICK SETUP

To make connections refer wiring diagrams. Here are few tips



1. Connect Auxiliary supply (Control power) 44 to 277 VAC/DC to terminals 12 and 13 in order to power ON the power meter.

#### Quick setup when input voltage < 480 VAC LL

- Keep the TURBO key pressed for 2 Seconds, while powering up the meter.
- The display will directly enter into the setup menu and display **EDIT A.PRI 100.0**

#### This is the simplest way to enter the PROG menu setup.

- Program the following in your meter for accurate readings.
- A.pri, A.sec values match your CT primary and secondary values respectively. E.g.: If your CT ratio is 200:5, the A.pri = 200.0 and A.sec = 5.000.
- If input voltage <480 VAC LL, program the V.pri, V.sec values in the PROG menu to input voltage VLL of the circuit. E.g. if input voltage = 300 VAC LL, V.pri = 300.0 and V. sec = 300.0
- **Use a Potential Transformer (PT/VT) if input voltage >480 VAC LL**
- Program the V.pri and V.sec to primary and secondary of the PT(VT) respectively. E.g. if your PT(VT) ratio is 11 kV:110 V, V.pri = 11.00 k and V.sec = 110.0
- Program the following in your system setup as per your wiring configuration
  - SYS - STAR/WYE for 3-Phase 4-Wire system
  - SYS - DLTA for 3-Phase 3-Wire system
  - SYS - 2 Phase for 2-Phase 3-Wire system
  - SYS - 1 Phase for 1-Phase 2-Wire system

2. Use CT1 CT2 CT3  
Terminals 1,2 3,4 5,6
3. Use PT1(VT1) PT2(VT2) PT3(VT3) if voltage exceeds 480 VAC LL  
Terminals 8 9 10 (11 for neutral)
4. RS 485 Terminals 7(ve), 14(ve) (Only for PM1200)

**NOTE:** Refer "SECTION 5: PROG MENU SETUP, CLR " in page 4, for details about PROG menu setup, A.pri, A.sec, V.pri, V.sec etc.

SECTION 3: INSTALLATION


Mechanical and Electrical installation

Connecting cable

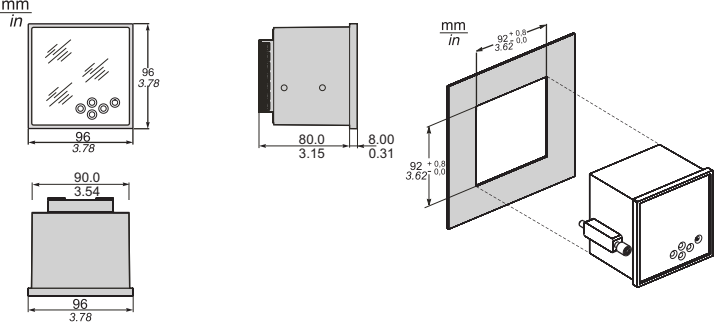
	Insulation Rating	Current Rating
Voltage Circuit	> 600 VAC	> 0.1 A
Current Circuit	> 600 VAC	> 7.5 A Or 2.5 mm² minimum

Tools & Equipments

Driver	Power Driver preferred or hand screw driver
Tip	Phillips tip preferred or flat tip. DO NOT USE POZIDRIV TIP
Screw head Diameter	3.5 mm
Shaft diameter	< 5 mm. Diameter = 5 mm or more will get stuck in the safety cover
Torque	Tightening Torque: 2.5 to 6 N.m Loosening Torque: 5.5 to 6 N.m Torque greater than 6 N.m may strip the screw or break the Safety Cover.
Screw Travel	6 mm less wire thickness

 Schneider Electric recommends the use of insulated sleeved U lugs (2.5 mm²) for wiring terminals. Don't use pin lugs which may reduce the safety isolation.

Mechanical dimensions and Panel cut-out



Connection Diagrams  
Supported system types

System type	Meter configuration	Figure number
WYE	StAR/WyE	1
Delta, Open Delta	dLtA	2, 3
2-Phase	2 Ph	4
1-Phase	1 Ph	5

Connection diagram symbols





Symbol	Description
	Current transformer (CT)
	Fuse
	Shorting block
	Potential transformer (PT)

Figure 1: 3-Phase 4-Wire WYE Connection with 3 CTs and 3 PTs

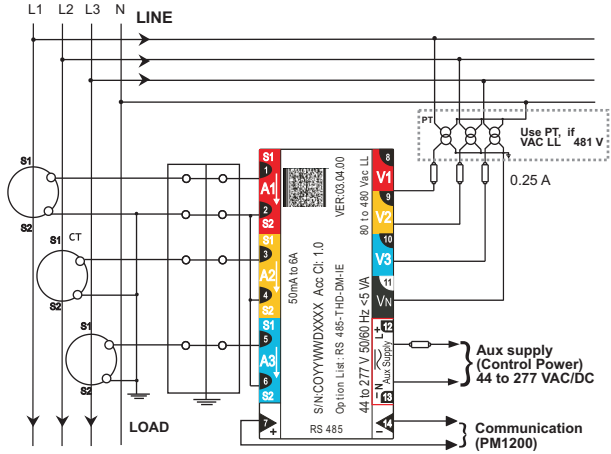


Figure 2: 3-Phase 3-Wire Delta Connection with 2 CTs and 3 PTs

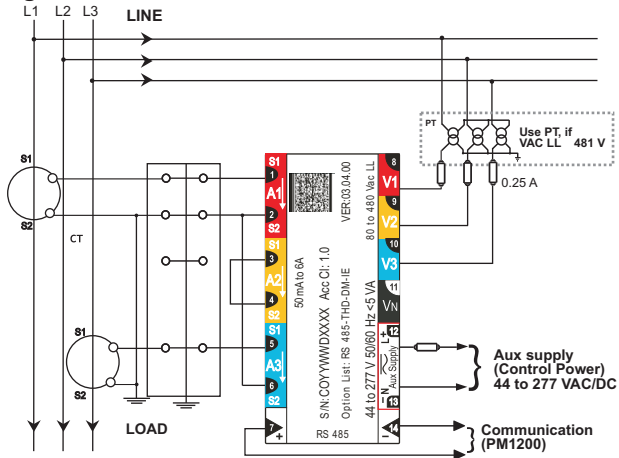


Figure 3: 3-Phase 3-Wire Open Delta Connection with 2 CTs and 2 PTs

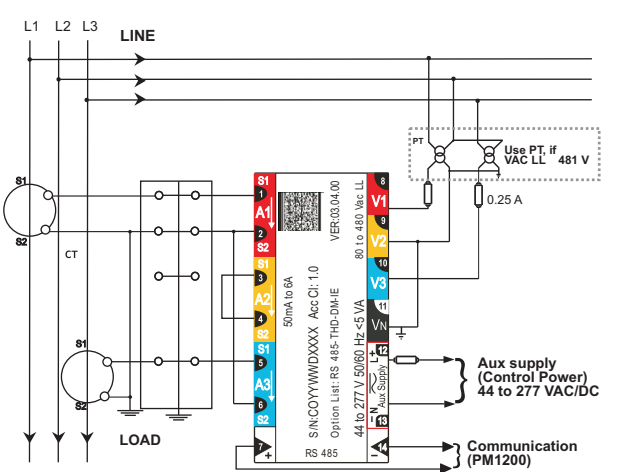


Figure 4: 2-Phase 3-Wire connection with 2 CTs

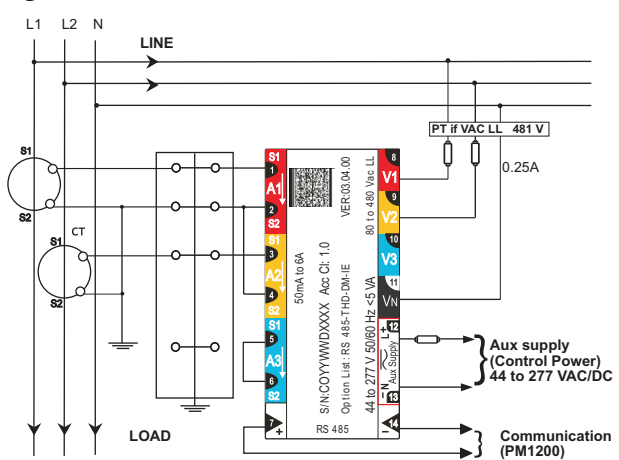
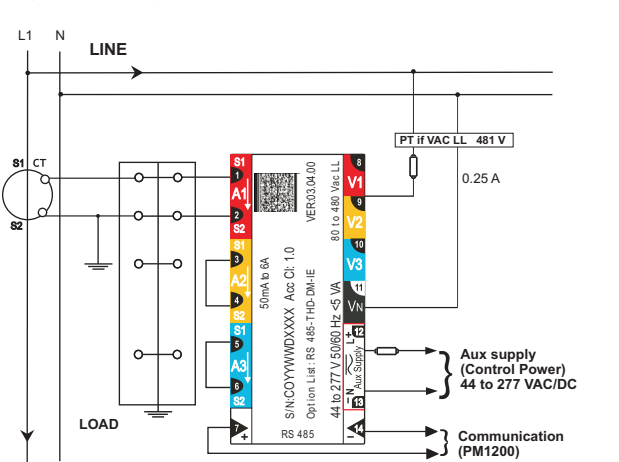


Figure 5: Single Phase connection with 1 CT



SECTION 4: KEYPAD SETUP

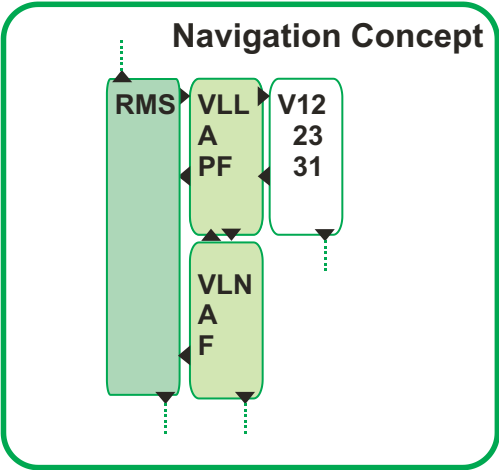
Keypad description



	<b>Right Key:</b> Go forward to sub-parameters page.
	<b>Left Key:</b> Opposite to right key. Go back towards main parameters page.
	<b>Up Key:</b> Scroll up through the display pages at the level, within the same function
	<b>Down Key:</b> Opposite of up key. Scroll down through the display pages at the same level through all the functions
	<b>TURBO Key:</b> TURBO key is the simple one touch access to the most commonly used parameters pages (Factory set) even for the unskilled operators. The TURBO pages for PM1000series power meters are RMS (Home page), VLL A PF, VLN A F, VA W PF VA, W VAR W, VAR, PF PF1 PF2 PF3, V% 1 2 3 A % 1 2 3, VAd RD TR, MD HR, VAh, Wh, RVAh, RWh, tVAh, tWh. If you are lost TURBO key is the quick way to get back to the RMS page.

See the online PM1000 User Manual at [www.powerlogic.com](http://www.powerlogic.com) for more information on keys and other features.

Keypad operation



Let us take an example to understand the actions of the front panel keys in the RMS menu. This example will explain how you can navigate from the RMS page to the VLN A F page, back to RMS in PM1000 series power meters.

- From the RMS page use the right key . The display shows **VLL A PF**. The Right key can be used to go forward into sub-parameter pages.
- Now press the down key . The display shows **VLN A F**. Congratulations you have successfully navigated from **RMS** to **VLN A F**
- To return to **RMS** press the left key . The display shows **RMS**
- Using the left key you can go backwards to the main parameter pages from sub-parameter pages.

SECTION 5: PROG MENU SETUP, CLR

PROG menu - Setup

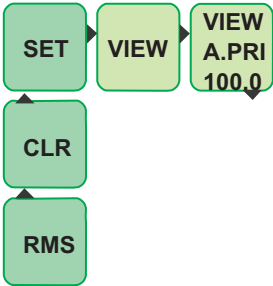
- Setup menu gives the complete list of user-programmable parameters.
- The power meter must be set (programmed/configured) to match the application settings, before use. Otherwise, the readings will be wrong.
  - All the Setup values can be re-programmed at any time, upon entering SET. However, the settings: SYS (Star/bye or Delta or 2-Phase or 1-Phase), Vpri, Vsec, Apri, Asec critically determine the scaling of measured readings.
  - While the scaling may be used to minimize the error in readings due to Instrument Transformer errors, wrong settings will upset the readings of running systems.
- You can enter Setup menu in
- Edit mode – to view or edit set parameters
  - View only mode – to view the set parameters

**CAUTION**

**HAZARD OF UNINTENDED OPERATION**  
Only qualified personnel are authorized to setup the power meter.

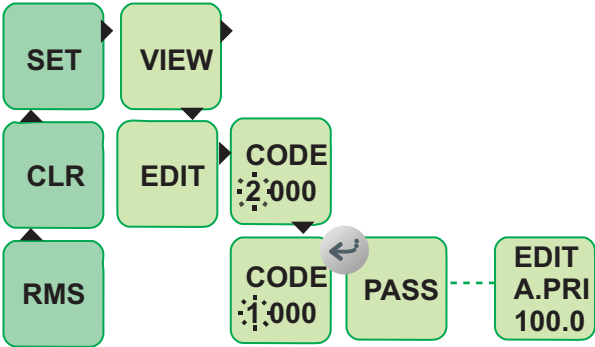
**Failure to follow these instructions can result in injury or equipment damage.**

Enter setup menu in View (Read-Only) mode



1. From RMS press up . The display shows **CLR**.
2. Press . The display shows **SET**.
3. Press . The display shows **VIEW**.
4. Press , You can view the setup parameters.

Enter setup menu in Edit mode



- NOTE: indicates blinking/editable  
 means blinking 2
1. From RMS press up . The display shows **CLR**.
  2. Press . The display shows **SET**.
  3. Press . The display shows **VIEW**.
  4. Press . The display shows **EDIT**. CODE entry is required to edit the setup parameters.
  5. Press key for 2 Seconds. The display shows **CODE 2000** with blinking 2.
  6. The factory set **CODE** is **1000**.
  7. Press . The display shows **CODE 1000** with blinking 1.
  8. Press key once or key 4 times to accept the new **CODE** value.
  9. The display flashes **PASS** and then **EDIT A.PRI 100.0** indicating the successful entry to setup menu in Edit mode.

SECTION 5: PROG MENU SETUP, CLR (Cont'd)

Setup parameters in View & Edit modes

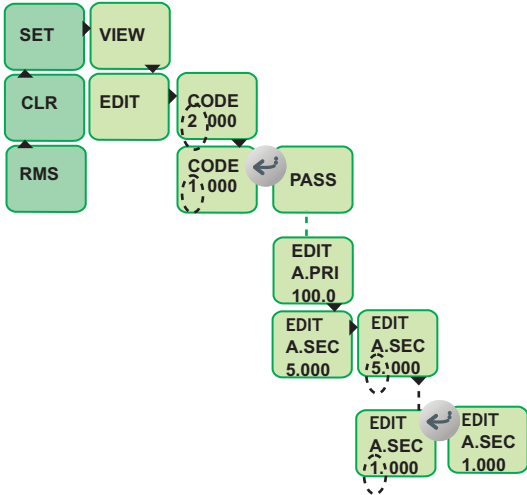
VIEW MODE	EDIT MODE	
VIEW A.PRI 100.0	EDIT A.PRI 100.0	A.PRI= Current primary winding (CT)* Input range: 1 A to 99 kA ( <b>100.0</b> )
VIEW A.SEC 5.000	EDIT A.SEC 5.000	A.SEC= Current secondary winding (CT) ( <b>5.000</b> )
VIEW V.PRI 415.0	EDIT V.PRI 415.0	V.PRI= Voltage primary winding (PT), line-line* Input range: 100 V to 999 kV( <b>415.0</b> )
VIEW V.SEC 415.0	EDIT V.SEC 415.0	V.SEC= Voltage secondary winding (PT), line-line* Input range: 80 V to 480 V( <b>415.0</b> )
VIEW SYS STAR	EDIT SYS STAR	SYS= Power system's configuration* Select from: <b>STAR</b> , DELTA, 2-Phase, 1-Phase, WYE
VIEW LABL 123	EDIT LABL 123	LABL= Phase labeling Select from: <b>123</b> , RYB, RST, PQR, ABC
VIEW VA.Fn 3D	EDIT VA.Fn 3D	VA.FN= VA function selection* Set the VA function to: <b>3D</b> , ARTH
VIEW d.SEL AUTO	EDIT d.SEL AUTO	d.SEL = Demand Selection* Select from: <b>auto</b> , user
VIEW d.PAR VA	EDIT d.PAR VA	d.PAR = Demand Parameter* Select from: <b>VA</b> , W, A
VIEW d.PRД 15.00	EDIT d.PRД 15.00	d.PRД = Demand Period Select from: 5, 10, <b>15</b> , 20, 25, 30
VIEW BAUD 9600	EDIT BAUD 9600	BAUD=Baud rate Select from: 1200, 2400, 4800, <b>9600</b> , 19200
VIEW РТY EVn1	EDIT РТY EVn1	РТY= Parity & Stop bit settings: <b>EVN.1</b> , EVN.2, ODD.1, ODD.2, no.1, no.2
VIEW ID 1.000	EDIT ID 1.000	ID = RS485 Device ID number:001 to 247. (Evn.1 = Even.1 stop bit)
VIEW F.S% 100.0	EDIT F.S% 100.0	F.S%= Full scale % Set the full scale between 1 to 100
VIEW OFLO Wh	EDIT OFLO Wh	OFLO = Overflow parameter selection: <b>Wh</b> , VAh; INTG clears when 9999 Run hours (almost 13.88 months)
VIEW POLE 4.000	EDIT POLE 4.000	POLE = Number of poles for RPM Select from: 2, 4, 6, 8, 10, 12, 14, 16

NOTE: Default Setup values are given in BOLD  
\*Changing these values while the device is in use, is not recommended.  
BAUD, РТY & ID are applicable only for PM1200.

Edit Set parameters

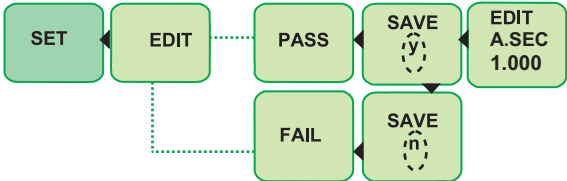
This example explains how to edit the **A.SEC** from **5.000** to **1.000** in the Edit Setup menu of PM1000 series power meters. For easy understanding the setup editing is explained in two sections

Edit & Accept setup



- NOTE: indicates blinking/editable  
 means blinking 2
1. After the successful entry to setup menu in edit mode (Refer "Enter setup menu in Edit mode" in page 4), press . The display shows **EDIT A.SEC 5.000**.
  2. Press . The display shows **EDIT A.SEC 5.000** with blinking 5 i.e, the value can be edited.
  3. Press four times. The display shows **EDIT A.SEC 1.000** with blinking 1.
  4. Press once to accept the new value
  5. If you want to edit next parameter, press and repeat the steps.

To save new value to setup



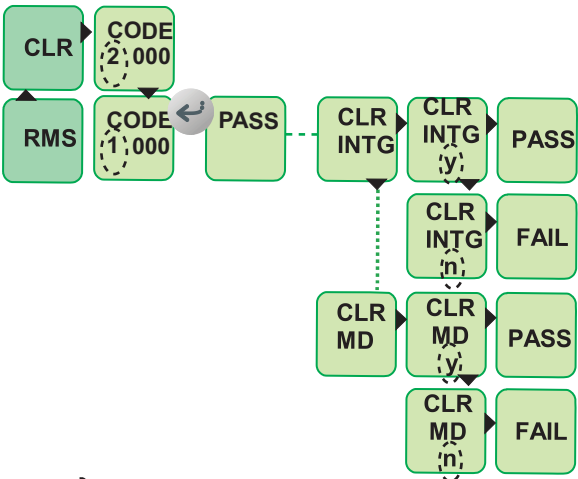
- NOTE: indicates blinking/editable  
 means blinking y
1. After completing the parameter editing as above press . The display shows **SAVE y** with y blinking. Go to step 4 to not save the new value.
  2. If you want to save the new value, press or key.
  3. The display flashes **PASS** and then **EDIT**. Go to step 7.
  4. Press .
  5. The display shows **SAVE n** with n blinking.
  6. Now press or key. The display flashes **FAIL** and then shows **EDIT**.
  7. Press to return **SET**.



SECTION 5: PROG MENU SETUP, CLR (Cont'd)  
CLR INTG & MD

PM1000 series power meters are equipped with **INTG** , where the energy parameters are accumulated.

- INTG clear - clears both INTG and MD
- MD clear - clears only MD  
where MD is maximum demand



NOTE: indicates blinking/editable  
 means blinking y

INTG CLR

1. From **RMS**, Press . The display will show **CLR**.
2. **CODE** entry is required to clear the **INTG** values.
3. Press for 2 Seconds. The display will show **CODE 2000** with blinking **2**. The factory set **CODE** is **1000**.
4. Press . The display will show **CODE 1000** with blinking **1**.
5. Press key once or four times to accept the new value
6. After the successful **CODE** entry, the display shows **CLR INTG**.
7. In order to clear **INTG** press key. The display shows **CLR INTG y** with blinking **y**. Go to step 9 to not clear the **INTG**.
8. Press key to clear **INTG**. The display flashes **PASS** and then **CLR INTG**. Go to step 11
9. Press key. The display shows **CLR INTG n** with blinking **n**.
10. Press key. The display flashes **FAIL** and then **CLR INTG**.
11. Press key. The display shows **CLR** means exit
12. Press key to return to **RMS** page.

MD CLR

1. From **RMS**, Press . The display will show **CLR**.
2. **CODE** entry is required to clear the **MD** values.
3. Press for 2 Seconds. The display will show **CODE 2000** with blinking **2**. The factory set **CODE** is **1000**.
4. Press . The display will show **CODE 1000** with blinking **1**.
5. Press key once or four times to accept the new value
6. After the successful **CODE** entry, the display shows **CLR INTG**.
7. Press key. The display shows **CLR MD**.
8. In order to clear MD press key. The display shows **CLR MD y** with blinking **y**. Go to step 10 to not clear the **MD**.
9. Press key to clear MD. The display flashes **PASS** and then **CLR MD**. Go to step 12.
10. Press key. The display shows **CLR MD n** with blinking **n**.
11. Press key. The display flashes **FAIL** and then **CLR MD**
12. Press key. The display shows **CLR** means exit
13. Press key to return to **RMS** page.

SECTION 6: ENERGY INTEGRATOR INTG, OLD, OVERFLOW

Energy Integrator INTG

Your PM1000 series power meter is equipped with an Energy Integrator function which provides several parameters for Energy Management: VAh, Wh, VARh (Ind), -VARh (Cap), RUN.h (run hours), ON.h (on hours), INTR (Interruptions / outages). All the values stored in INTG are direct readings and have high resolution

A few of these need explanation:

- **RUN.h**: Indicates the period the Load is ON and has run. This counter accumulates as long as the load is ON.
- **ON.h**: The period for which the Auxiliary Supply (control power) is ON
- **INTR**: Number of Supply Outages, means the number of Auxiliary Supply interruptions. If the meter Auxiliary Supply is from a UPS then the INTR (number of interruptions) will be zero (as long as the UPS stays ON), even if the Voltage Signals did die out from time to time.

Integrator Overflow

- The energy values stored in INTG is based on V.Pri x A.Pri and independent of secondary value 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 lesser 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.

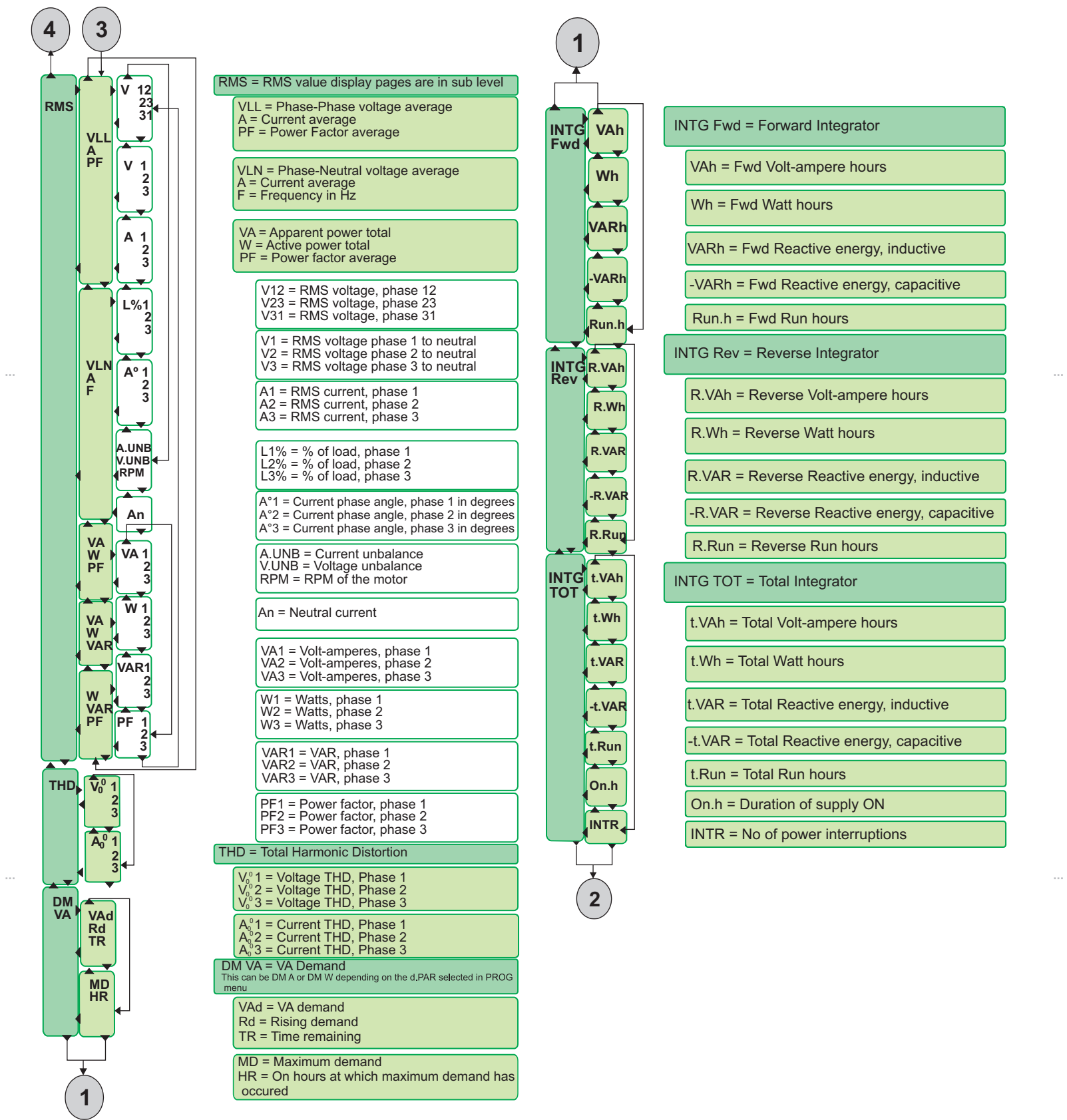
V.PRI x A.PRI x 1.732	Max Reading (Wh/VAh)	Max time to reset the integrator in Run Hours	Max time to overflow in months at full scale
1 VA to 1000 VA	9999 k	9999	13.88
1 kVA to 1000 kVA	9999 M	9999	13.88
1 MVA to 1000 MVA	9999 G	9999	13.88
>1000 MVA		<9999	< 1 year

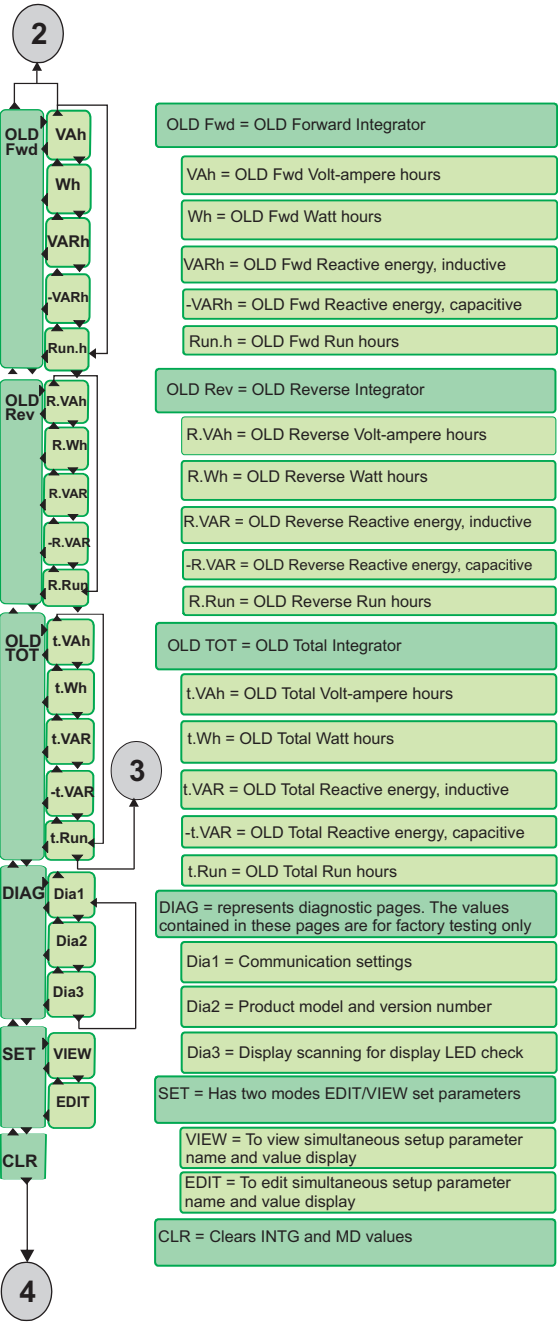
OLD data register

- When the Integrator is cleared (manually or due to overflow), the energy values stored in the integrator will be transferred to 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 will, transfer all the stored energy values to the OLD register and held frozen, while the Integrator begins accumulating data for the next observation. Remember that the next time the Integrator is cleared, the OLD values will be over-written.

SECTION 7: PM1000 SERIES MENU HIERARCHY





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