PowerLogic™ PM1000 Series Digital Meters

Quick Start Guide

PLSED309038EN

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Schneider Electric

SECTION 1: BEFORE YOU BEGIN

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

Safety Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

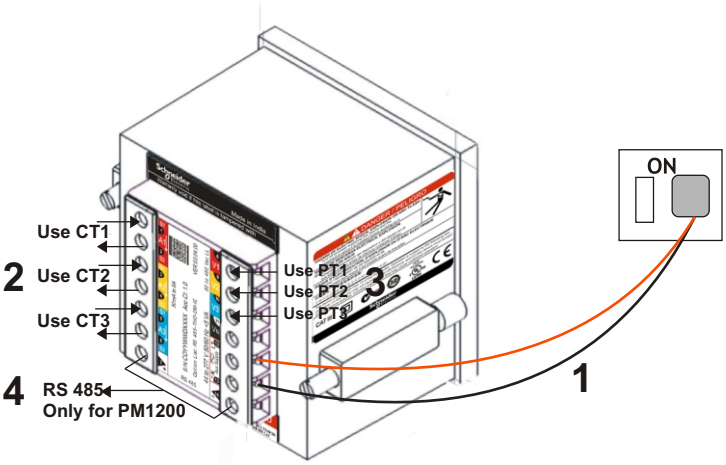
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. In the USA, see NFPA 70E.
- Only qualified electrical workers should install this equipment. Such work should be performed only after reading this entire set of instructions.
- If the equipment is not used 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, inspect the work area for tools and objects that may have been left inside the equipment.
- When removing or installing panels, do not allow them to extend into the energized bus.
- 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.

Failure to follow these instructions 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



1. Connect auxiliary supply (control power) 44 to 277 VAC/DC to terminals 12 and 13 in order to power ON the power meter.
   - Keep ↵ pressed for two seconds, while powering up the power meter.
   - The power meter directly enters into the setup menu and displays **EDIT A.PRI 100.0.** This is the easiest way to enter the PROG menu setup.

   Program the following setup parameters 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 match the input voltage VLL of the circuit, if the input voltage < 480 VAC LL. For example, if input voltage = 300 VAC LL, set V.pri = 300.0 and V.sec = 300.0.
     - Use potential transformer (PT/VT), if the input voltage > 480 VAC LL. 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/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: 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 > 480 VACLL.

Pt1	PT2	PT3	Neutral
8	9	10	11

4. RS 485 (only for PM1200)

+ ve	- ve
7	14

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

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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 (14 AWG) minimum

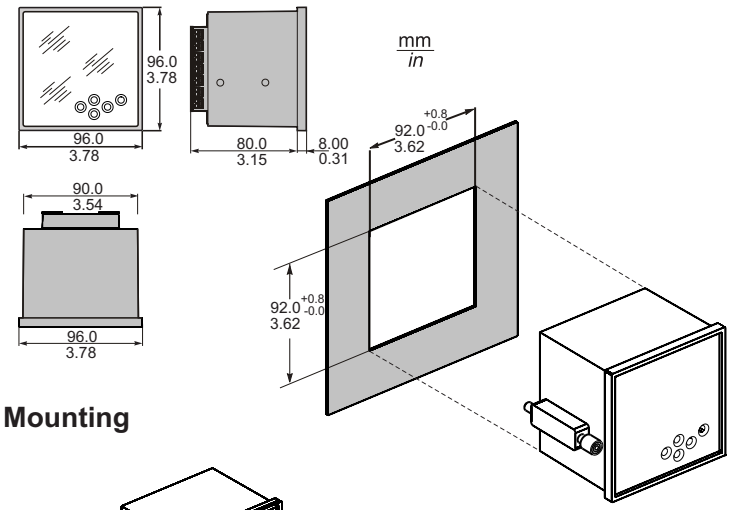
Tools and equipments

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) Loosening Torque: 0.8 to 1 N.m (7.08 to 8.85 lb-in) Torque > 1 N.m (8.85 lb-in) may strip the screw or break the cover.
Screw Travel	6 mm (0.24 in.) less wire thickness

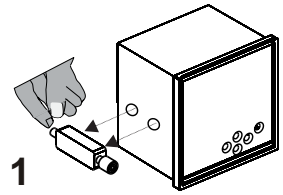
Schneider Electric recommends the use of insulated sleeved U lugs (2.5 mm²/14 AWG) for wiring terminals.

NOTE: Installations 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 placed within the reach of the equipment and the operator.

Mechanical Dimensions and Panel Cut-out

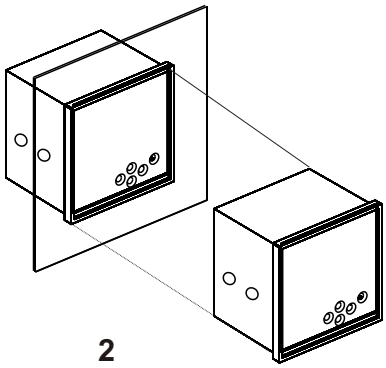


Mounting



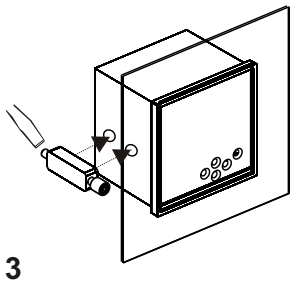
1

Remove the mounting clamps from the digital meter.



2

Gently slide the digital meter through the cut-out.



3

Put the mounting clamps back in the digital meter and tighten the clamps screws.

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
Single-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

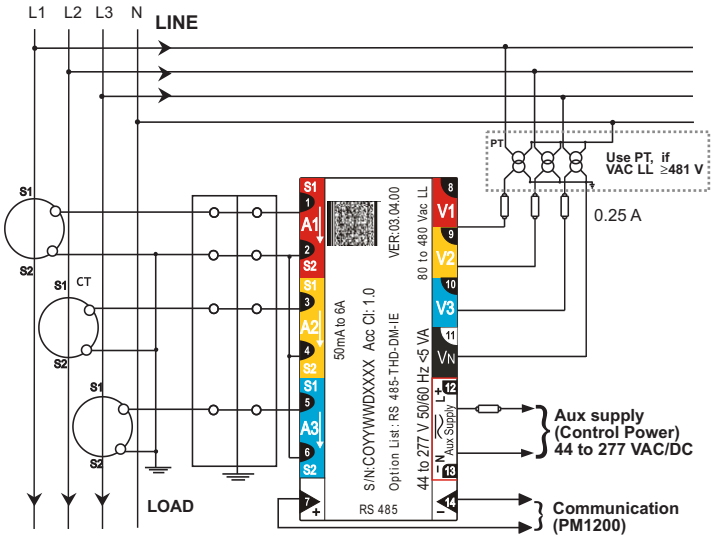
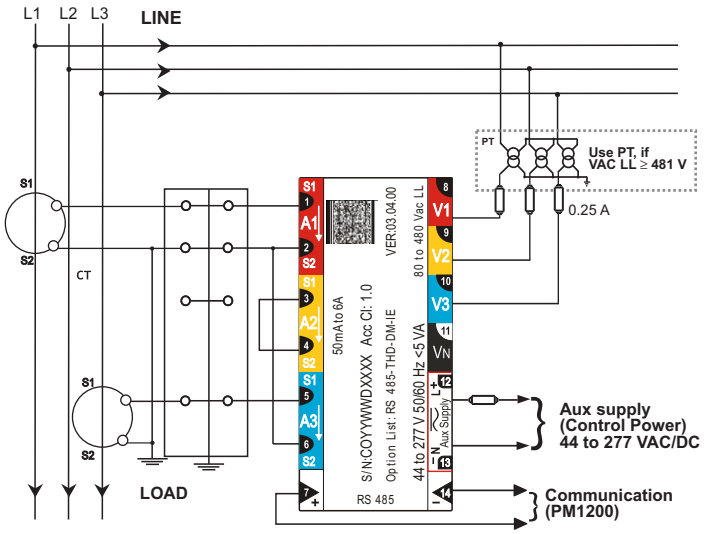


Figure 2: 3-phase 3-wire delta connection with 2 CTs and 3 Pts



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SECTION 3: INSTALLATION (Cont'd)
Connection Diagrams (Cont'd)

Figure 3: 3-phase 3-wire open delta connection with 2 CTs and 2 PTs

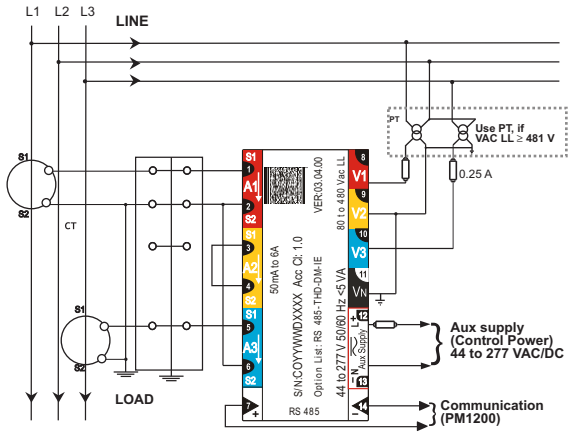


Figure 4: 2-phase 3-wire connection with 2 CTs

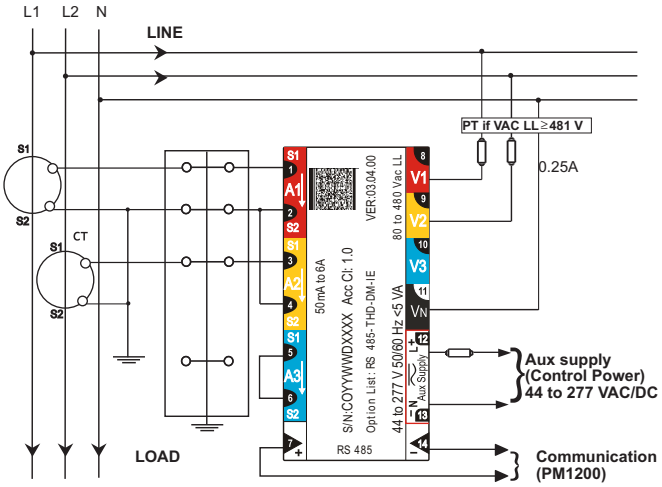
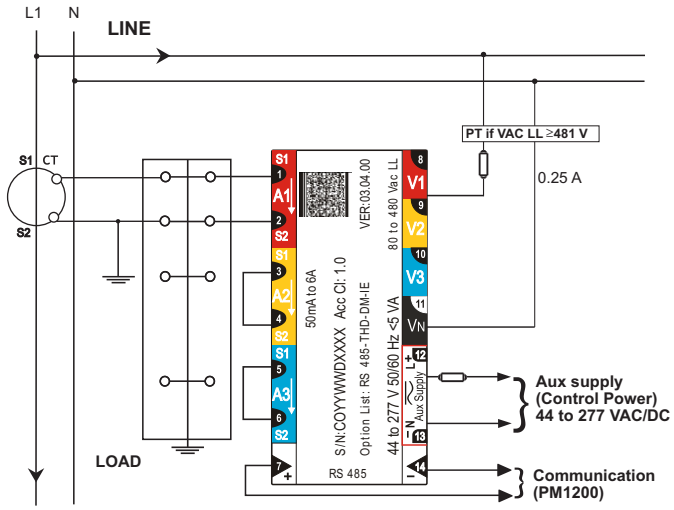


Figure 5: Single-phase connection with 1 CT

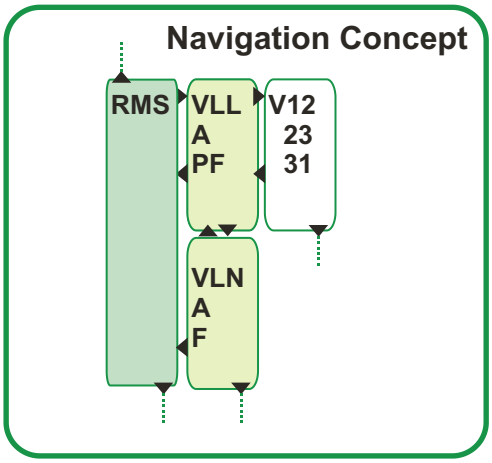


SECTION 4: KEYPAD SETUP
Keypad Description

	Right Key: Go forward to sub-parameters page.
	Left Key: Go back towards main parameters page.
	Up Key: Scroll up through the display pages at the level, within the same function
	Down Key: Scroll down through the display pages at the same level through all the functions
	TURBO Key: TURBO key provides one-touch access to most commonly used parameters pages (factory-set). The TURBO pages for PM1000 series 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, use TURBO key to quickly return to RMS page.

See the online PM1000 user manual at www.powerlogic.com for more information on keys and other features.

Keypad Operation



The following example explains how you can navigate from the **RMS** page to the **VLN A F** page, back to **RMS** in PM1000 series power meters.

1. From the RMS page, press >. The display shows **VLL A PF.**
2. Press v. The display shows **VLN A F.**
3. Press < to go back to **RMS**.

NOTE: Use the ^ and v to navigate to the other pages on the same level. Use > to go to the sub-parameter pages. Use < to go back to the main parameter pages.

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SECTION 5: PROG MENU SETUP, CLR

PROG Menu • Setup

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

- You must configure 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/wye or Delta or 2-phase or single-phase), 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 setup menu in

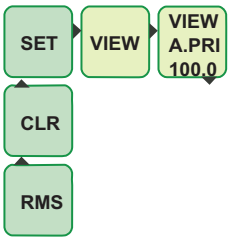
- Edit mode: To view or edit set parameters.
- View only mode: To view the set parameters.

⚠ CAUTION

HAZARD OF UNINTENDED OPERATION
Only qualified personnel are authorized to set up the power meter.

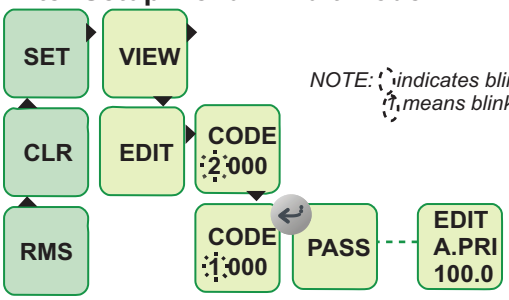
Failure to follow these instructions can result in injury or equipment damage.

Enter Setup Menu in View (Read-Only) Mode



1. From RMS press ^. The display shows **CLR**.
2. Press ^. The display shows **SET**.
3. Press >. The display shows **VIEW**.
4. Press >. Use ^ or v to scroll and view the setup parameters and their current settings.

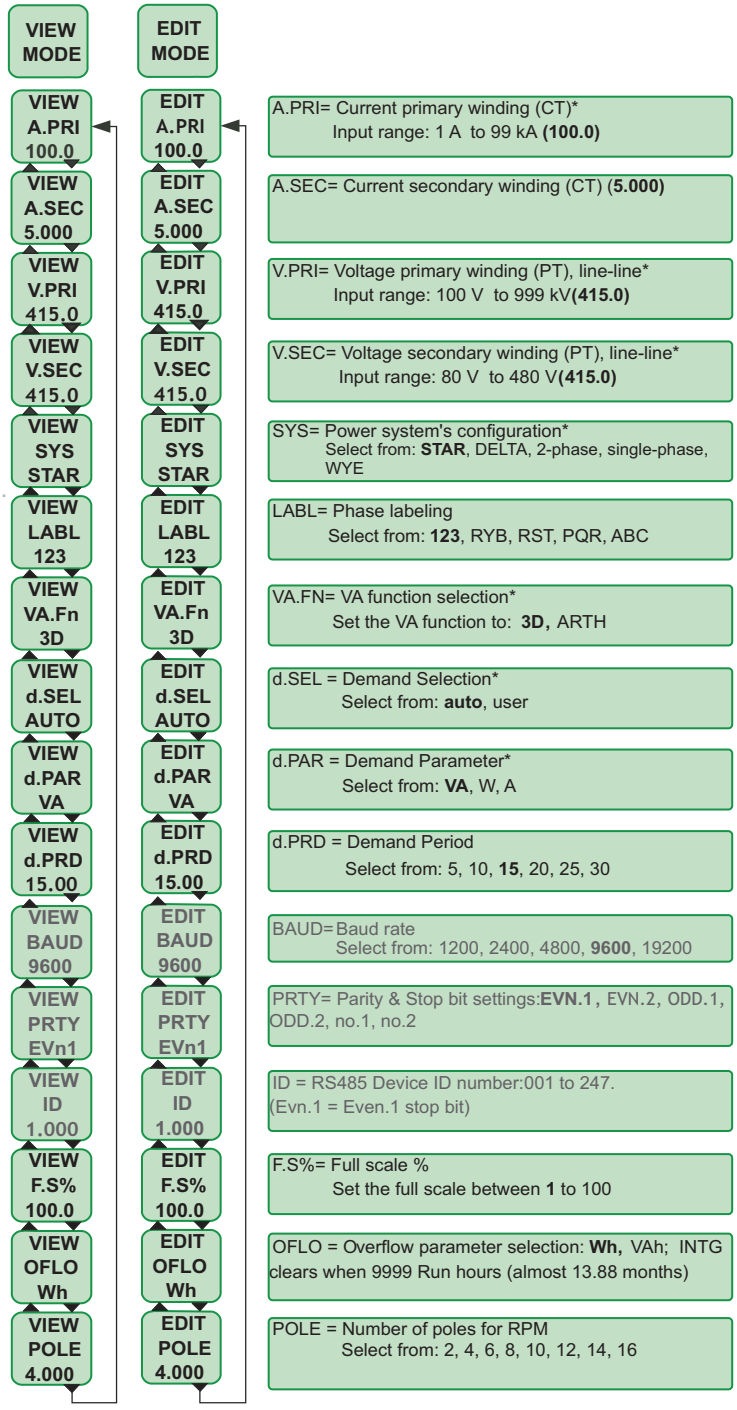
Enter Setup Menu in Edit Mode



1. From RMS press ^. The display shows **CLR**.
2. Press ^. The display shows **SET**.
3. Press >. The display shows **VIEW**.
4. Press v. The display shows **EDIT. CODE** entry is required to edit the setup parameters.
5. Press > for two seconds. The display shows **CODE 2000** with blinking **2**. The factory set **CODE** is **1000**.
6. Press v. The display shows **CODE 1000** with blinking **1**.
7. Press ↵ once or > 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.

*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.*

Setup Parameters in View and Edit Modes



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

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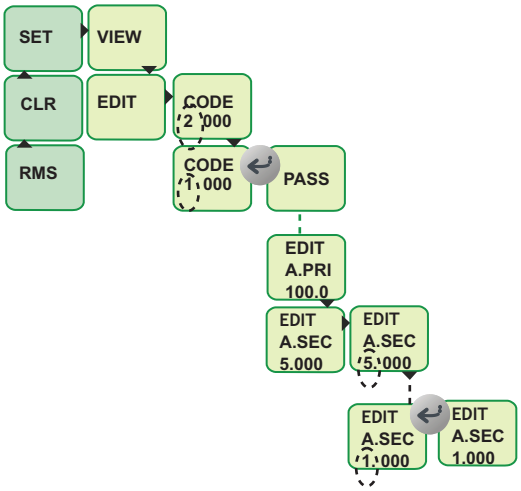
SECTION 5: PROG MENU SETUP, CLR (Cont'd)

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 meter. For easy understanding, the setup editing is explained in two parts: **edit and accept setup** and **save new value to setup.**

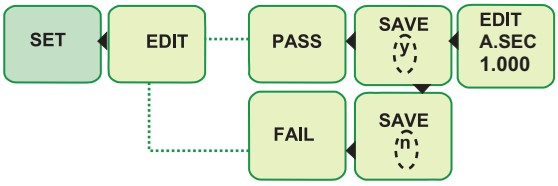
Edit and Accept Setup



NOTE: indicates blinking/editable
2 means blinking 2

1. After you have successfully entered setup menu in edit mode (Refer to "Enter setup menu in Edit mode" on page 5), press . The display shows **EDIT A.SEC 5.000**.
2. Press . The display shows **EDIT A.SEC 5.000** with blinking **5.** You can edit this value.
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.

Save New Value to Setup



NOTE: indicates blinking/editable
y means blinking y

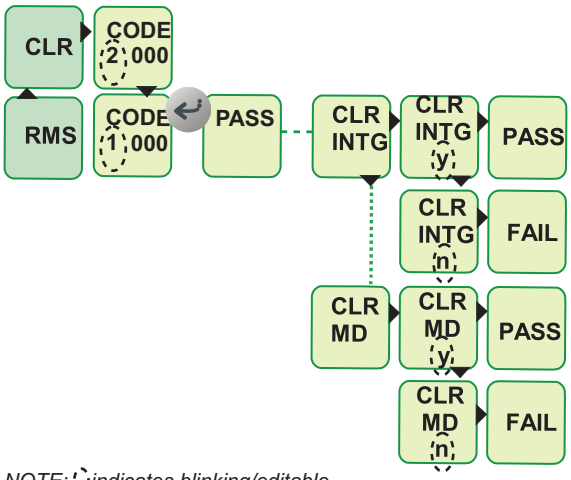
1. After you edit the parameter as described above, press .
   The display shows **SAVE Y** with a blinking **Y.**
2. Press or to save the new value.
   The display flashes **PASS** and then shows **EDIT.**
3. Press to go back to **SET.**

*NOTE: If you do not want to save the new value, press to change the value from **SAVE y** to **SAVE n** in step 1. Then press or . The display flashes **FAIL** and then shows **EDIT**. Proceed to step 3.*

CLR INTG and 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
y means blinking y

INTG CLR

1. From **RMS**, Press . The display shows **CLR**.
   CODE entry is required to clear the **INTG** values.
2. Press for two seconds. The display shows **CODE 2000** with blinking **2**.
   The factory set **CODE** is **1000**.
3. Press . The display shows **CODE 1000** with blinking **1**.
4. Press once or four times to accept the new value.
   After the successful CODE entry, the display shows **CLR INTG**.
5. In order to clear **INTG,** press . The display shows **CLR INTG y** with blinking **y**.
6. Press or to clear INTG. The display flashes **PASS** and then **CLR INTG.**
7. Press . The display shows **CLR.**
8. Press to return to **RMS** page.

*NOTE: If you do not want to clear the integrators, press to change the value from **CLR INTG y** to **CLR INTG n** in step 5. Then press or . The display flashes **FAIL** and then shows **CLR INTG**. Proceed to step 7.*

MD CLR

1. From **RMS**, Press . The display shows **CLR**.
   CODE entry is required to clear the **MD** values.
2. Press for two seconds. The display shows **CODE 2000** with blinking **2**.
   The factory set **CODE** is **1000**.
3. Press . The display shows **CODE 1000** with blinking **1**.
4. Press once or four times to accept the new value
   After the successful **CODE** entry, the display shows **CLR INTG**.
5. Press . The display shows **CLR MD**.
6. In order to clear MD, press . The display shows **CLR MD y** with blinking **y**.
7. Press or to clear MD. The display flashes **PASS** and then **CLR MD**.
8. Press . The display shows **CLR**.
9. Press to return to **RMS** page.

*NOTE: If you do not want to clear the MD, press to change the value from **CLR MD y** to **CLR MD n** in step 6. Then press or . The display flashes **FAIL** and then shows **CLR MD**. Proceed to step 8.*

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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 power 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 die out from time to time.

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.

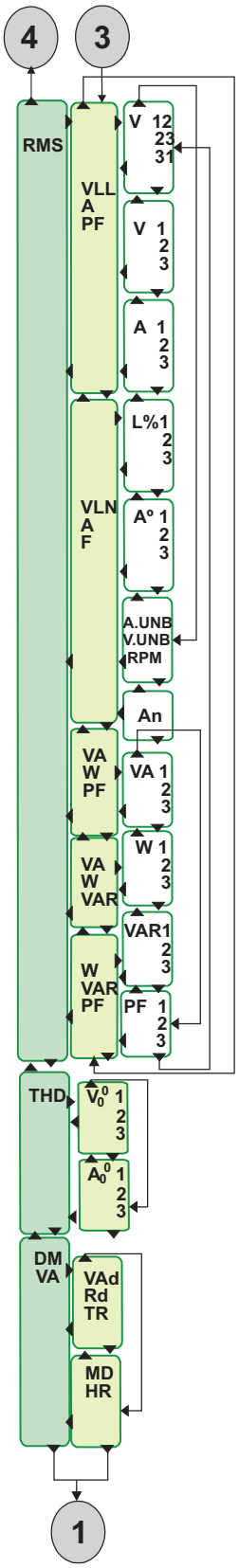
V.PRI x A.PRI x 1.732	Max Reading (Wh/VAh)	Max time to reset the integrator in Run Hours	Max time to overflow in months at full scale
1 VA to 1000 VA	9999 K	9999	13.88
1 kVA to 1000 kVA	9999 M	9999	13.88
1 MVA to 1000 MVA	9999 G	9999	13.88
>1000 MVA		<9999	< 1 year

OLD Data Register

- When the integrator is cleared (manually or due to overflow), the energy values stored in the integrator will be transferred to 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.

SECTION 7: PM1000 SERIES MENU HIERARCHY



RMS = RMS value display pages are in sub level

VLL = Phase-Phase voltage average
A = Current average
PF = Power Factor average

VLN = Phase-Neutral voltage average
A = Current average
F = Frequency in Hz

VA = Apparent power total
W = Active power total
PF = Power factor average

V12 = RMS voltage, phase 12
V23 = RMS voltage, phase 23
V31 = RMS voltage, phase 31

V1 = RMS voltage phase 1 to neutral
V2 = RMS voltage phase 2 to neutral
V3 = RMS voltage phase 3 to neutral

A1 = RMS current, phase 1
A2 = RMS current, phase 2
A3 = RMS current, phase 3

L1% = % of load, phase 1
L2% = % of load, phase 2
L3% = % of load, phase 3

A°1 = Current phase angle, phase 1 in degrees
A°2 = Current phase angle, phase 2 in degrees
A°3 = Current phase angle, phase 3 in degrees

A.UNB = Current unbalance
V.UNB = Voltage unbalance
RPM = RPM of the motor

An = Neutral current

VA1 = Volt-amperes, phase 1
VA2 = Volt-amperes, phase 2
VA3 = Volt-amperes, phase 3

W1 = Watts, phase 1
W2 = Watts, phase 2
W3 = Watts, phase 3

VAR1 = VAR, phase 1
VAR2 = VAR, phase 2
VAR3 = VAR, phase 3

PF1 = Power factor, phase 1
PF2 = Power factor, phase 2
PF3 = Power factor, phase 3

THD = Total Harmonic Distortion

$V_0^0$1 = Voltage THD, Phase 1
$V_0^0$2 = Voltage THD, Phase 2
$V_0^0$3 = Voltage THD, Phase 3

$A_0^0$1 = Current THD, Phase 1
$A_0^0$2 = Current THD, Phase 2
$A_0^0$3 = Current THD, Phase 3

DM VA = VA Demand
This can be DM A or DM W depending on the d.PAR selected in PROG menu

VAd = VA demand
Rd = Rising demand
TR = Time remaining

MD = Maximum demand
HR = On hours at which maximum demand has occurred

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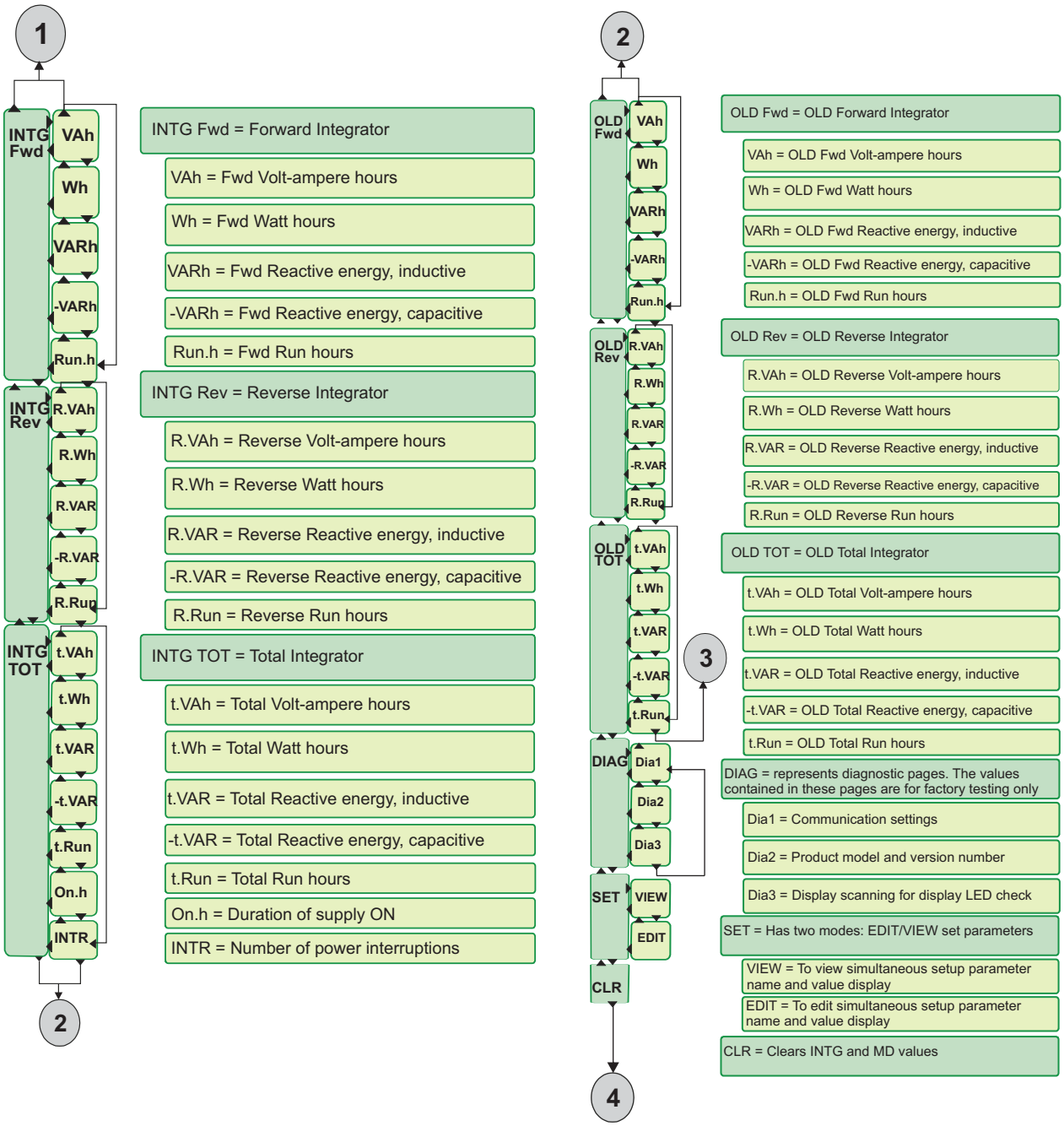

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