



OPERATING INSTRUCTIONS

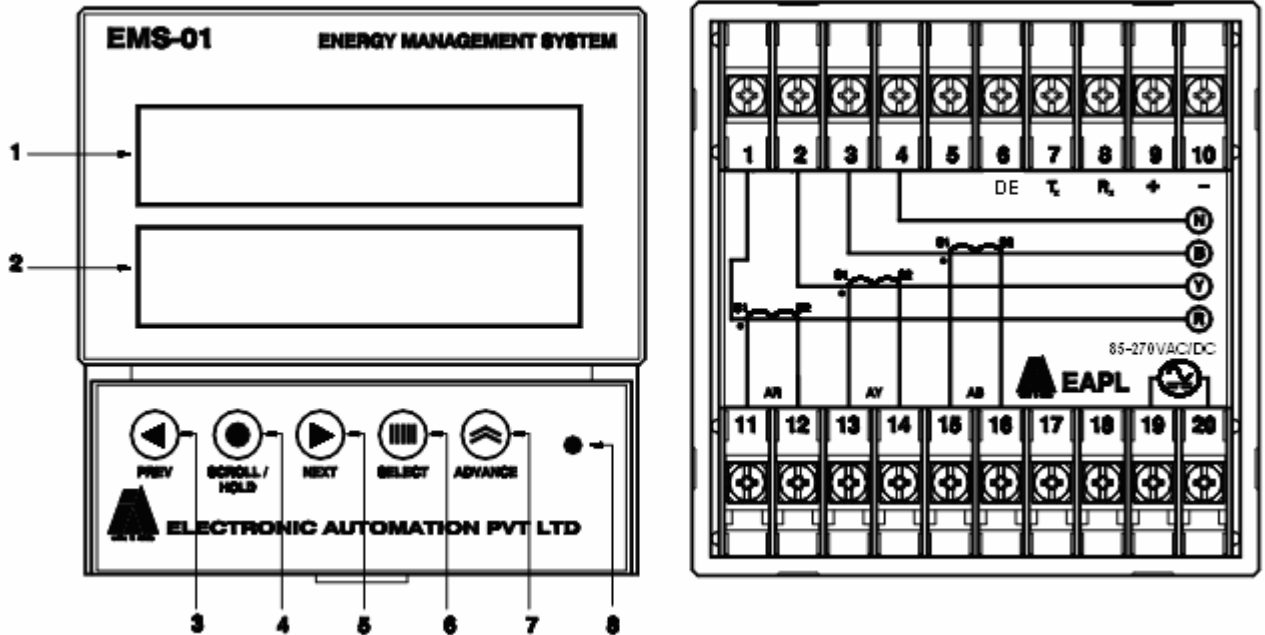
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INSTALLATION & OPERATING INSTRUCTIONS



DESCRIPTION :

- 1) **Display 1(Top Display):** Shows the **numerical values** of the parameter.
- 2) **Display 2 (Bottom Display):** Shows the the corresponding **parameter**.
- 3) **SCROLL/HOLD:** By pressing this button either display can be made to scroll or display can be held in selected parameter. (On power failure, program goes to default mode that is scrolling)
- 4) **PREVIOUS:** This button is active only when “HOLD” is selected. Upon pressing this button previous parameters can be viewed one by one.
- 5) **NEXT:** This button is active only when “HOLD” is selected. Upon pressing this button next parameters can be viewed one by one.
- 6) **SELECT:** This button is used to select the **program menu** during programming. Also used to shift the digit one by one.

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- 7) **ADVANCE:** This button is used to increment the values during programming. In model EMS-04 this button is also used to open Page2.
- 8) **LED:** Indicates the pulse constant output.

HOW TO INSTALL?

- 1 Connect 3 phase and neutral terminals to the voltage and current circuits respectively as per the diagram given on the back panel.(Fig.2)
- 2 Connect rated auxiliary supply at terminal 19 & 20
- 3 When voltage is applied on auxiliary terminal, display starts showing parameter one by one in auto scrolling mode.
- 4 When “**SCROLL/HOLD**” button is pressed scrolling will stop (hold mode) & by again pressing the same scrolling will continue from where it stopped (scrolling mode).
- 5 When display is in “**HOLD**” mode “**NEXT**” & “**PREVIOUS**” can be pressed to view the forward or backward parameters respectively.

Note:

- a) When the meter is in scrolling mode the “**NEXT**” & “**PREVIOUS**” buttons gets de-activated “**ADVANCE**” button remains de-activated in scroll & hold mode.(except EMS-04).

On power failure and resumption, the display of parameters will automatically scroll by default. It will not have any bearings on the conditions (either scrolling or hold mode) set prior to the power failure.



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Depending on the features required, the customer can choose the appropriate model from the below given table-1.

PARAMETERS		EMS-01	EMS-03	EMS-04	EMS-05	EMS-06	EMS-07	EMS-08	EMS-09	EMS-10
BASIC	V L-N (R, Y, B)	✓		✓	✓			✓	✓	
	V L-L (R-Y, Y-B, B-R)	✓		✓	✓			✓	✓	
	Ampere (R,Y,B)	✓		✓	✓		✓	✓	✓	
	Frequency	✓		✓	✓			✓	✓	
	PF (R,Y,B)	✓		✓	✓		✓	✓	✓	✓
	PF (Total) *		✓	✓	✓		✓	✓	✓	✓
	RPM			✓	✓			✓		
	Phase Angle (R,Y,B)			✓	✓			✓		
POWER	Active Power (W) R, Y,B	✓		✓		✓	✓	✓	✓	✓
	Active Power (W) Total	✓	✓	✓		✓	✓	✓	✓	✓
	Reactive Power (VAr) R,Y,B	✓		✓		✓		✓		✓
	Reactive Power (VAr) Total	✓		✓		✓		✓		✓
	Apparent Power (VA) R,Y,B	✓		✓		✓		✓		✓
	Apparent Power (VA Total)	✓		✓		✓		✓		✓
ENERGY	Active Energy (Wh)	✓	✓	✓			✓		✓	✓
	Total Reactive Energy (VARh)	✓								
	Reactive Energy Inductive (VARh)			✓						✓
	Reactive Energy Capacitive (-VARh)			✓						✓
	Apparent Energy (VAh)	✓		✓						✓
OTHERS	Load On Hours			✓			✓		✓	
	OLD Active Energy(Wh)			✓			✓		✓	✓
	OLD Reactive Energy Inductive (VARh)			✓						
	OLD Reactive Energy Capacitive (-VARh)			✓						
	OLD Apparent Energy (VAh)			✓						
	OLD Load On Hours			✓			✓		✓	
	Communication RS485/RS232	✓	✓	✓	✓	✓	✓	✓	✓	✓

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FUNCTION:

Energy Management System acts as a monitoring system & can cater to various industries like cement plants, power plants, steel plants, individual machineries, commercial establishments, small & large scale industries etc., which helps to understand, evaluate & correct their existing energy deficiencies to a better and proper energy usage. It helps the company to have certain statistics like energy used, the major loads and when power is used to the maximum. These EMS instruments' being microcontroller based, provides excellent centralized power monitoring and control facility, thus facilitating timing in machinery, precision in other readings.

$$*PF(\text{Total}) = \frac{T-KW}{T-KVA}$$

Communication Port (Optional):

- a) RS232: Connect terminals Tx, Rx, +, - (terminals 7, 8, 9, 10 respectively on the unit) correspondingly to the add-on board terminals. Connect the other end of the add-on board having DB-9 pin serial port to the computer as shown in fig-3. The distance between the unit and the computer should not exceed more than 50 Meters.

RS485: Connect terminals DE, Tx, Rx, +, - (terminals 6, 7, 8,9,10 respectively on the unit) correspondingly to the add-on board terminals. Connect the other end of the add-on board having 'A' & 'B' terminals to the converter (RS232 to RS485 Converter). Connect the other end of the converter through the serial port of the computer (distance should be less than 5 meters). Multiple units can be connected in daisy chain fashion as shown in figure-4. Maximum units that can be connected will be up to 32 units & terminate network with 120 ohms resistor. Transmission distance between PC & RS485 should not exceed 1.2 Kilo Meters



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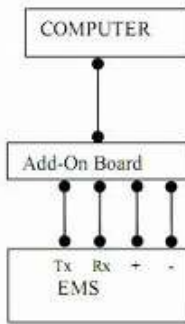


Fig.3

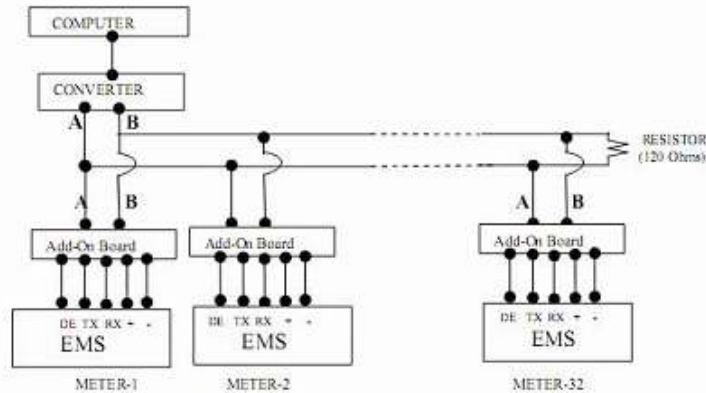


Fig.4

How to read pg2 (Page 2) parameters? (For EMS-04 only)

- 1) When unit is in “**SCROLL/HOLD**” mode, Press “**ADVANCE**”.
- 2) Following parameters are displayed upon pressing “**ADVANCE**” constantly.
 - a) RPM
 - b) PHASE ANGLE (R,Y,B)
 - c) LOAD HOURS
 - d) OLD ACTIVE ENERGY
 - e) OLD APPARENT ENERGY
 - f) OLD REACTIVE ENERGY(CAPACITIVE)
 - g) OLD REACTIVE ENERGY (INDUCTIVE)
 - h) OLD LOAD HOURS.

NOTE:

- 1) Ensure that MCB protection is available between input bus bar and the unit for avoiding damage to the unit.
- 2) Ensure that PT ratio is inline with the PT name plate provided on the PT used.
- 3) Ensure that CT ratio is inline with the CT name plate provided on the CT used.
- 4) Ensure that in 3 phase 4 wire system CT's that are not connected to the unit should be shorted. S1 & S2 of the unused phase in the unit need not to be shorted.
- 5) Ensure that all terminals are tightened securely.

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6) Blinking of display could indicate over voltage cut off. Switch off the unit for 20 seconds to reset the resettable fuse and switch on the unit.

7) Since it is a high voltage device, while connecting and operating, precautions are a must and only licensed people should handle it.

8) For any operation including taking it out, the power should also completely switched off.

9) EAPL is not responsible for any consequential damages arising out of use of our products, though the technology is cautiously chosen & implemented like any other well designed good electric meter.

How to Record Energy?

- 1) All energy values get saved in EEPROM once in 5 minutes approximately.
- 2) Due to this, difference may be observed between the last energy saved when load is off and the energy saved when power is off to the unit.
- 3) While recording the energy for any initial and final measurement purposes, it is suggested to interrupt the auxiliary supply to the unit and then record the energy.
- 4) Clear the energy as soon as meter is installed.
- 5) All energy values get saved in EEPROM once in 5 minutes approximately.
- 6) Due to this, difference may be observed between the last energy saved when load is off and the energy saved when power is off to the unit.
- 7) While recording the energy for any initial and final measurement purposes, it is suggested to interrupt the auxiliary supply to the unit and then record the energy.

Clear the energy as soon as meter is installed.

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HOW TO PROGRAM?

PRESS	DISPLAY 1 SHOWS	DISPLAY 2 SHOWS	COMMENTS / RANGE / DEFAULT VALUE
“SELECT”	‘1’ 0 0	<i>PASSWd</i>	# Enter 3 digits PASS WORD. # DEFAULT VALUE: 100. # If password is forgotten contact EAPL . # Press “ADVANCE” to set 1 st digit (Rolls between 0 & 1)
“SELECT”	1 ‘0’ 0	<i>PASSWd</i>	# Press “ADVANCE” to set 2 nd digit (Rolls from 0 to 9)
“SELECT”	1 0 ‘0’	<i>PASSWd</i>	# Press “ADVANCE” to set 3 rd digit (Rolls from 0 to 9)
“SELECT”	‘0’ 0 0 0 5	<i>CT-PRI</i>	# Enter 5 digit CT-PRIMARY VALUE # RANGE : 00001 - 50000 # DEFAULT VALUE : 00005 # Press “ADVANCE” to set 1 st digit (Rolls from 0 to 5)
“SELECT”	0 ‘0’ 0 0 5	<i>CT-PRI</i>	# Press “ADVANCE” to set 2 nd digit (Rolls from 0 to 9)
“SELECT”	0 0 ‘0’ 0 5	<i>CT-PRI</i>	# Press “ADVANCE” to set 3 rd digit (Rolls from 0 to 9)
“SELECT”	0 0 0 ‘0’ 5	<i>CT-PRI</i>	# Press “ADVANCE” to set 4 th digit (Rolls from 0 to 9)
“SELECT”	0 0 0 0 ‘5’	<i>CT-PRI</i>	# Press “ADVANCE” to set 5 th digit (Rolls from 0 to 9)
“SELECT”	‘5’	<i>CT-SEC</i>	# Enter CT-SECONDARY VALUE # RANGE : 1 to 5 # DEFAULT VALUE : 5 # Press “ADVANCE” to set the digit (Rolls from 1 to 5)
“SELECT”	‘0’ 0 0 4 1 5	<i>PT-PRI</i>	# Enter 6 digit PT-PRIMARY VALUE # RANGE : 000100 - 999000 # DEFAULT VALUE : 000415 # Press “ADVANCE” to set 1 st digit (Rolls from 0 to 9)
“SELECT”	0 ‘0’ 0 4 1 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 2 nd digit (Rolls from 0 to 9)
“SELECT”	0 0 ‘0’ 4 1 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 3 rd digit (Rolls from 0 to 9)
“SELECT”	0 0 0 ‘4’ 1 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 4 th digit (Rolls from 0 to 9)
“SELECT”	0 0 0 4 ‘1’ 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 5 th digit (Rolls from 0 to 9)
“SELECT”	0 0 0 4 1 ‘5’	<i>PT-PRI</i>	# Press “ADVANCE” to set 6 th digit (Rolls from 0 to 9)



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PRESS	DISPLAY 1 SHOWS	DISPLAY 2 SHOWS	COMMENTS / RANGE / DEFAULT VALUE
“SELECT”	‘4’ 1 5	PT-SEC	# Enter 6 digit PT-SECONDARY VALUE # RANGE : 080 - 500 # DEFAULT VALUE : 415 # Press “ADVANCE” to set 1 st digit (Rolls from 0 to 5)
“SELECT”	4 ‘1’ 5	PT-SEC	# Press “ADVANCE” to set 2 nd digit (Rolls from 0 to 9)
“SELECT”	4 1 ‘5’	PT-SEC	# Press “ADVANCE” to set 3 rd digit (Rolls from 0 to 9)
“SELECT”	‘n’	CLR-EN	# DEFAULT VALUE : n # Press “ADVANCE” to toggle to ‘Y’ (YES) and ‘n’ (NO). # If ‘y’ selected, clears Energy registers & old energy registers are updated with current energy readings. # Refer above parameter table for applicability.
“SELECT”	‘0’ 0 0	ChPASS	# Enter 3 digit PASS WORD to change the current password. # RANGE : 001 – 100. # Press “ADVANCE” to set 1 st digit. (Rolls from 0 to 1)
“SELECT”	0 ‘0’ 0	ChPASS	# Press “ADVANCE” to set 2 nd digit (Rolls from 0 to 9)
“SELECT”	0 0 ‘0’	ChPASS	# Press “ADVANCE” to set 3 rd digit (Rolls from 0 to 9)
“SELECT”	‘n’	SAVE ?	# DEFAULT VALUE : n # Press “ADVANCE” to toggle to ‘Y’ (YES) and ‘n’ (NO). # If ‘y’ selected, saves the newly set password. # In case the password is set to 000 and saved, by default gets adjusted to 001.
“SELECT”	‘0’ 4	POLES	# Enter 2 digit number to set the no. of poles for rpm measurement # RANGE: 01 – 28. # DEFAULT VALUE: 04. # Press “ADVANCE” to set 1 st digit. (Rolls from 0 to 2). # Refer above parameter table for applicability.
“SELECT”	0 ‘4’	POLES	# Press “ADVANCE” to set 2 nd digit (Rolls from 0 to 9). # Refer above parameter table for applicability.
“SELECT”	‘0’ 0 1	dEV-Id	# Enter 3 digit device ID. # RANGE: 01 – 247. # DEFAULT VALUE: 001. # Press “ADVANCE” to set 1 st digit. (Rolls from 0 to 2)
“SELECT”	0 ‘0’ 1	dEV-Id	# Press “ADVANCE” to set 2 nd digit (Rolls from 0 to 9)
“SELECT”	0 0 ‘1’	dEV-Id	# Press “ADVANCE” to set 3 rd digit (Rolls from 0 to 9)