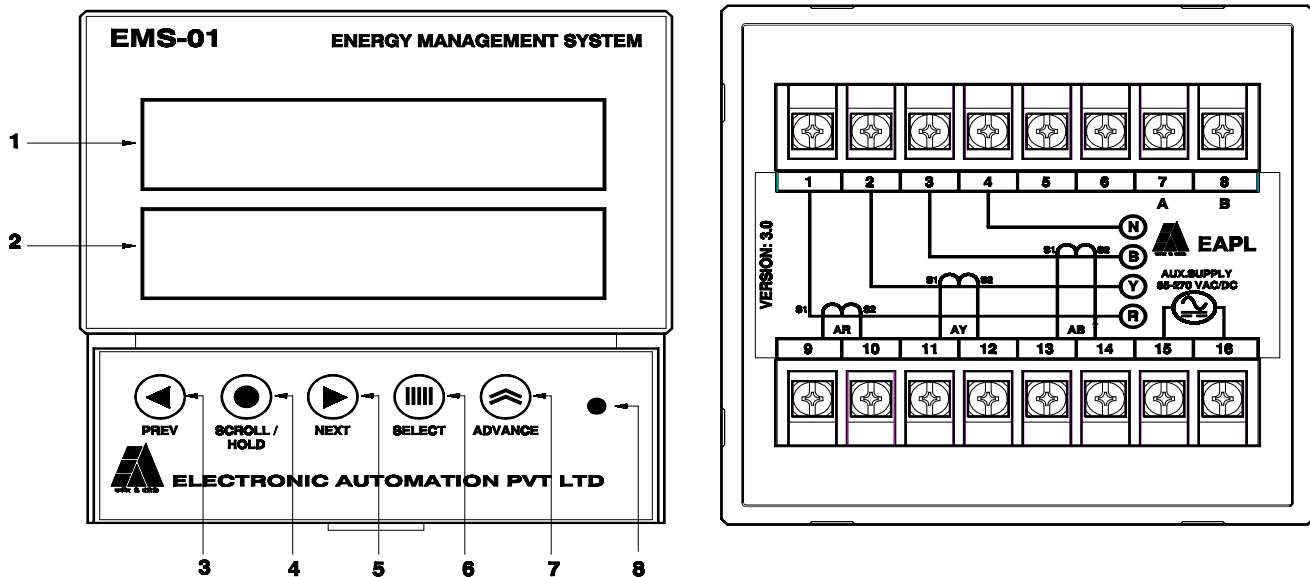


**FUNCTION:** Energy Management System acts as a monitoring system & can cater to various industries like cement plants, power plants, steel plants, individual machineries, commercial establishments, small & large scale industries etc., which helps to understand, evaluate & correct their existing energy deficiencies to a better and proper energy usage. It helps the user to have 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.

**DESCRIPTION :**



- 1) **Display 1(Top Display):** Shows the numerical values of the parameter.
- 2) **Display 2 (Bottom Display):** Shows the units of the corresponding parameter.

**RUN MODE:**

3) **SCROLL /HOLD:**

This button is used to scroll through all the parameters one by one or hold the display in any one parameter (On power failure & resumption, same pattern of display will follow.)

4) **PREVIOUS:**

This button gets activated only when HOLD button is pressed.

- a) When “HOLD” is selected, previous parameter can be viewed by pressing “PREVIOUS” Button.

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b) When “ADVANCE” is selected, previous page can be viewed by pressing “PREVIOUS” button.

**NEXT:**

This button gets activated only when HOLD or ADVANCE buttons are pressed.

a) When “HOLD” is selected, next parameter can be viewed by pressing “NEXT” button.

b) When “ADVANCE” is selected, next page can be viewed by pressing “NEXT” button

5) **SELECT:**

This button is used to:

- a) Enter program mode.
- b) Select the pages in scroll or run mode.
- c) Shift the digit one by one (from left to right direction).

6) **ADVANCE:**

This button is used to:

- a) Increment the values during programming.
- b) View the pages in run mode.

8) **LED:** Pulse constant output for Active Energy or Reactive Energy.

**HOW TO INSTALL...?**

1) Connect all 3 phases and Neutral voltage wires to 1, 2, 3, and 4 terminals respectively and S1 and S2 of each phase (R Phase- S1-9, S2-10, Y Phase – S1-11,S2-12, B Phase- S1-13, S2-14) to the respective S1 and S2 terminals of similar phase current transformers as shown in the diagram given on the back panel (Fig.2)

**IMPORTANT:** Do not connect R Phase current transformers terminals to S1, S2 of Y or B phase on meter. Similar precaution should be taken for other phases also.

2) Connect rated (85 to 270 VAC/DC) auxiliary supply at terminal point 15 & 16.

3) When voltage is applied across auxiliary terminals, display starts showing parameter one by one in auto scrolling mode. Following are the parameters displayed.

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PARAMETERS		EMS-01
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)	✓
	Total PF *	✓
	RPM	✓
	PHASE ANGLE (R, Y, B)	✓
	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	✓
TOTAL	Total Active Energy (Wh)	✓
	Total Reactive Energy Capacitive (VArhC)	✓
	Total Reactive Energy Inductive (VArhI)	✓
	Total Apparent Energy (VAh)	✓
	Total Load On Hours	✓
IMPORT	Active Energy (Wh)	✓
	Reactive Energy Capacitive (VArhC)	✓
	Reactive Energy Inductive (VArhI)	✓
	Apparent Energy (VAh)	✓
	Load On Hours	✓
EXPORT	Active Energy (Wh)	✓
	Reactive Energy Capacitive (VArhC)	✓
	Reactive Energy Inductive (VArhI)	✓
	Apparent Energy (VAh)	✓
	Load On Hours	✓
OLD TOTAL	Old Total Active Energy (Wh)	✓
	Old Total Reactive Energy Capacitive (VArhC)	✓
	Old Total Reactive Energy Inductive (VArhI)	✓
	Old Total Apparent Energy (VAh)	✓
	Old Total Load On Hours	✓
OLD IMPORT	Old Active Energy (Wh)	✓
	Old Reactive Energy Capacitive (VArhC)	✓
	Old Reactive Energy Inductive (VArhI)	✓
	Old Apparent Energy (VAh)	✓
	Old Load On Hours	✓
OLD EXPORT	Old Active Energy (Wh)	✓
	Old Reactive Energy Capacitive (VArhC)	✓
	Old Reactive Energy Inductive (VArhI)	✓
	Old Apparent Energy (VAh)	✓
	Old Load On Hours	✓

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

- 4) Every current Running page is identified by periodical flashing of respective page name. Eg: If IMPORT page is running, periodically "IMPORT" is displayed for approximately 500m secs.
- 5) When CT is reversed, "Total page" ignores the condition and accumulates the energy. However this can be identified through import/export pages. During CT reversal, all types of energies will be accumulated in export page instead of import page.
- 6) 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).
- 7) When display is in "HOLD" mode "NEXT" & "PREVIOUS" can be pressed to view the forward or backward parameters respectively.
- 8) When power fails, Energy reading at that instant will be saved.

**Communication Port:**

**RS-485:** Connect terminals '7' & '8' from the unit ('A' & 'B' terminals from the unit) to the converter terminals 'A' & 'B'. Connect the other end of the converter having DB-9 pin serial port to the computer (distance should be less than 5 meters). Multiple units that can be connected in daisy chain fashion as shown in Fig.3. Maximum units that can be connected will be up to 32 units & terminate network with 120 ohms resistors on either side. Transmission distance between RS232/RS485 converter to the terminating unit should not exceed more than 1.2 Kilo Meters.

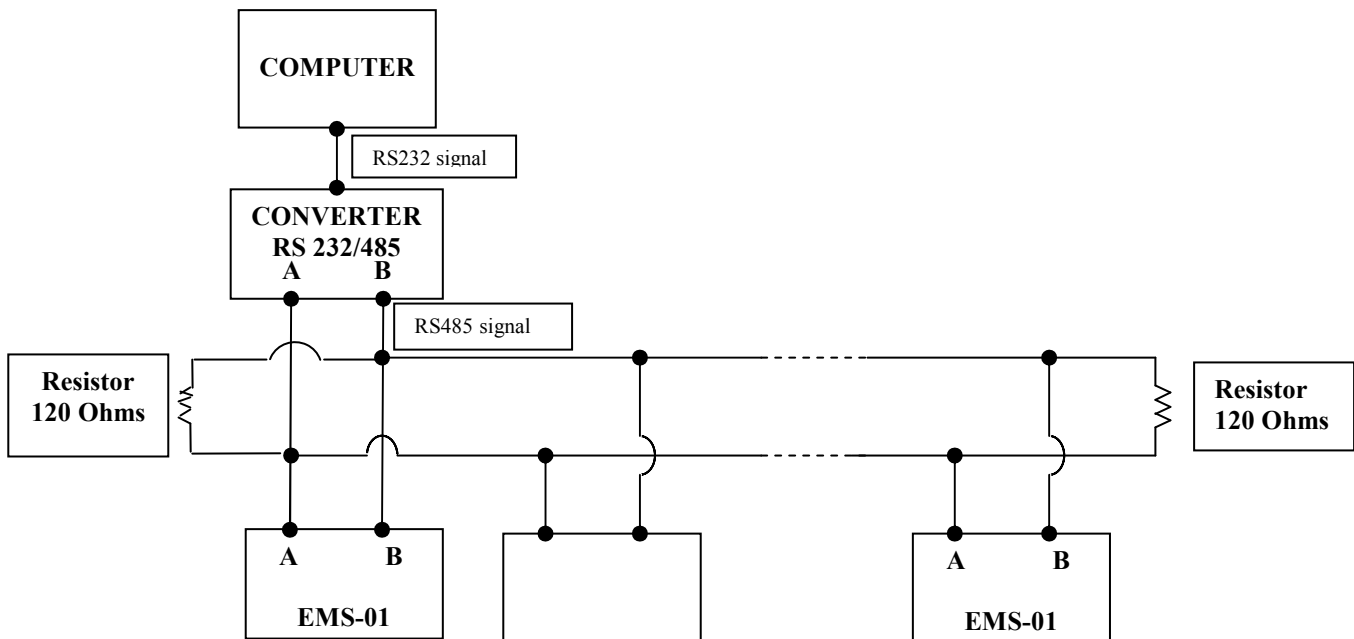


Fig. 3

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**PROGRAM MODE :**

PRESS	DISPLAY 1 SHOWS	DISPLAY 2 SHOWS	COMMENTS / RANGE / DEFAULT VALUE
“SELECT”	‘0’ 0 0 0	<i>PASSWd</i>	# Enter 4 digit PASS WORD. # DEFAULT VALUE: 1000. # If password is forgotten contact EAPL. # Press “ADVANCE” to set 1 <sup>st</sup> digit (Rolls from 0 to 9)
“SELECT”	0 ‘0’ 0 0	<i>PASSWd</i>	# Press “ADVANCE” to set 2 <sup>nd</sup> digit (Rolls from 0 to 9)
“SELECT”	0 0 ‘0’ 0	<i>PASSWd</i>	# Press “ADVANCE” to set 3 <sup>rd</sup> digit (Rolls from 0 to 9)
“SELECT”	0 0 0 ‘0’	<i>PASSWd</i>	# Press “ADVANCE” to set 4 <sup>th</sup> digit (Rolls from 0 to 9)
“NEXT”	‘0’ 0 0 0 5	<i>CT-PRI</i>	# Enter 5 digit <b>CT-PRIMARY VALUE</b> # RANGE : 00001 - 50000 # DEFAULT VALUE : 00005 # Press “ADVANCE” to set 1 <sup>st</sup> digit (Rolls from 0 to 5)
“SELECT”	0 ‘0’ 0 0 5	<i>CT-PRI</i>	# Press “ADVANCE” to set 2 <sup>nd</sup> digit (Rolls from 0 to 9)
“SELECT”	0 0 ‘0’ 0 5	<i>CT-PRI</i>	# Press “ADVANCE” to set 3 <sup>rd</sup> digit (Rolls from 0 to 9)
“SELECT”	0 0 0 ‘0’ 5	<i>CT-PRI</i>	# Press “ADVANCE” to set 4 <sup>th</sup> digit (Rolls from 0 to 9)
“SELECT”	0 0 0 0 ‘5’	<i>CT-PRI</i>	# Press “ADVANCE” to set 5 <sup>th</sup> digit (Rolls from 0 to 9)
“NEXT”	‘5’	<i>CT-SEC</i>	# Enter <b>CT-SECONDARY VALUE</b> # RANGE : 1 - 5 # DEFAULT VALUE : 5 # Press “ADVANCE” to set the digit (Rolls from 1 to 5)
“NEXT”	‘0’ 0 0 4 1 5	<i>PT-PRI</i>	# Enter 6 digit <b>PT-PRIMARY VALUE</b> # RANGE : 000100 - 999000 # DEFAULT VALUE : 000415 # Press “ADVANCE” to set 1 <sup>st</sup> digit (Rolls from 0 to 9)
“SELECT”	0 ‘0’ 0 4 1 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 2 <sup>nd</sup> digit (Rolls from 0 to 9)
“SELECT”	0 0 ‘0’ 4 1 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 3 <sup>rd</sup> digit (Rolls from 0 to 9)
“ SELECT ”	0 0 0 ‘4’ 1 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 4 <sup>th</sup> digit (Rolls from 0 to 9)
“ SELECT ”	0 0 0 4 ‘1’ 5	<i>PT-PRI</i>	# Press “ADVANCE” to set 5 <sup>th</sup> digit (Rolls from 0 to 9)

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<b>PRESS</b>	<b>DISPLAY 1 SHOWS</b>	<b>DISPLAY 2 SHOWS</b>	<b>COMMENTS / RANGE / DEFAULT VALUE</b>
“SELECT ”	0 0 0 4 1 ‘5’	<b>PT-PRI</b>	# Press “ADVANCE” to set 6 <sup>th</sup> digit (Rolls from 0 to 9)
“NEXT”	‘4’ 1 5	<b>PT-SEC</b>	# Enter 6 digit <b>PT-SECONDARY VALUE</b> # RANGE : 080 - 500 # DEFAULT VALUE : 415 # Press “ADVANCE” to set 1 <sup>st</sup> digit (Rolls from 0 to 5)
“SELECT ”	4 ‘1’ 5	<b>PT-SEC</b>	# Press “ADVANCE” to set 2 <sup>nd</sup> digit (Rolls from 0 to 9)
“SELECT ”	4 1 ‘5’	<b>PT-SEC</b>	# Press “ADVANCE” to set 3 <sup>rd</sup> digit (Rolls from 0 to 9)
“NEXT”	‘n’	<b>CLR-EN</b>	# 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.
“NEXT”	‘0’ 0 1	<b>dEV-Id</b>	# Enter 3 digit device ID. # RANGE: 01 – 247. # DEFAULT VALUE: 001. # Press “ADVANCE” to set 1 <sup>st</sup> digit. (Rolls from 0 to 2)
“SELECT ”	0 ‘0’ 1	<b>dEV-Id</b>	# Press “ADVANCE” to set 2 <sup>nd</sup> digit (Rolls from 0 to 9)
“SELECT ”	0 0 ‘1’	<b>dEV-Id</b>	# Press “ADVANCE” to set 3 <sup>rd</sup> digit (Rolls from 0 to 9)
“NEXT”	’2 4 0 0’	<b>BAUd</b>	# DEFAULT VALUE: Previously selected value. # Press “ADVANCE” to set required Baud rate. (2400,4800,9600)
“NEXT”	‘0’4	<b>POLES</b>	# DEFAULT VALUE: Previously selected value. # RANGE : 1 - 28 # Press “ADVANCE” to set 1 <sup>st</sup> digit (Rolls from 1 to 2)
“SELECT ”	0’4’	<b>POLES</b>	# Press “ADVANCE” to set 2 <sup>nd</sup> digit (Rolls from 0 to 9)
“NEXT”	‘A’	<b>PLSOUT</b>	# DEFAULT VALUE: Previously selected value. # Press “ADVANCE” to select required pulse output (A or r)
“NEXT”	‘n’	<b>ChPASS</b>	# Press again “NEXT” to return to “RUN” mode. # Press “ADVANCE” to toggle to ‘Y’ (YES) and ‘n’ (NO).
“ADVANCE”	‘Y’	<b>ChPASS</b>	# If ‘y’ selected, password can be changed.
“NEXT”	‘0’ 0 0 0	<b>ChPASS</b>	# Enter 4 digit PASS WORD to change the current password. # RANGE : 0001 – 9999. # Press “ADVANCE” to set 1 <sup>st</sup> digit. (Rolls from 0 to 9)
“SELECT ”	0 ‘0’ 0 0	<b>ChPASS</b>	# Press “ADVANCE” to set 2 <sup>nd</sup> digit (Rolls from 0 to 9)
“SELECT ”	0 0 ‘0’ 0	<b>ChPASS</b>	# Press “ADVANCE” to set 3 <sup>rd</sup> digit (Rolls from 0 to 9)
“SELECT ”	0 0 0 ‘0’	<b>ChPASS</b>	# Press “ADVANCE” to set 4 <sup>th</sup> digit (Rolls from 0 to 9)

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**NOTE:**

- a) Ensure that MCB protection is available between input bus bar and the unit.
- b) Ensure that PT ratio is inline with the PT name plate provided on the PT used.
- c) Ensure that CT ratio is inline with the CT name plate provided on the CT used.
- d) 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 be shorted.
- e) Ensure that all terminals are tightened securely.
- f) Clear the energy as soon as meter is installed.
- g) 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.
- h) Since it is a high voltage device, while connecting and operating, precautions are must and only licensed people should handle it.
- i) For any operation including taking it out, the power should also completely switched off.
- j) 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.
- k) For forgotten password, please feel free to contact EAPL (080-42802345) with product batch number as well as serial number.

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