

# POWERMETER EPR-04 / EPR-04S

## TECHNICAL DATA

Operating Voltage (Un)	: Please look at the back labels on the device
Operating frequency (f)	: 45-65 Hz
Auxiliary supply Power Consumption	: < 4 VA
Measuring Input Power Consumption	: < 1VA
$V_{in}$	: 10-300VAC 45-65Hz. (L-N) : 10-500VAC 45-65Hz. (L-L)
$I_{in}$	: 0.05 - 5.5 A~ : 2-120 A ~ (for CT-25)
Measuring Range	: 0...215 M(W,VAr,VA) : 999999999.999 kWh,kVArh
Measuring Category	: CAT III
Class	: 1±1digit [(%10-%110) xFull Scale]
Voltage Transformer Ratio	: 0.1 ... 4000.0
Current Transformer Ratio	: 1 ... 2000
Max. Ctr x Vtr	: 40,000
Demand Time	: 1-60 min. (programmable)
Serial Interface (for EPM-04S)	: MODBUS RTU (RS 485) : Optically Isolated, programmable
Baud Rate (for EPM-04S)	: 2400-38400 bps
Address (for EPM-04S)	: 1-247
Parity (for EPM-04S)	: No , odd, Even, 8 Data Bits, 2 Stop Bits
Pulse Output	: NPN Transistor
Switch Period	: Min. 100 msec pulse period : 80 msec pulse width
Operation Current	: Max. 50 mA
Operation Voltage	: 5...24 V DC, max. 30 VDC
Input	: 12...48 V DC
Ambient Temperature	: -5°C; +50°C
Display	: Red LED Display
Dimensions	: PR-19, PK-26
Equipment Protection Class	: Double Insulation-Class II (□)
Box Protection Class	: IP 40
Box Material	: Non-flammable
Installation	: Panel Mounted (PR-19) : Rail Mounted (PK-26)
Wire Thickness(for terminal block)	: 2.5 mm <sup>2</sup>
Weight	: 0.45 kg (PR-19, PK-26)
Installation Category	: Class III

## Factory Settings

<b>Trafo :</b>	<b>Eng Cnt :</b>
Ctr (Current Transformer Ratio) : 0001	E-1 (Energy Counter 1) : on
trn (Turn number for CT-25 device) : 01	E-2 (Energy Counter 2) : on
Utr (Voltage Transformer Ratio) : 0001.0	
CAL (Calculation Method) : 1	

**Pin :** 0000 (Not Activated)

## RS-485 :

Adr (Address) : 1  
Bau (Baud Rate) : 9600  
PAr (Parity) : no

## PRECAUTIONS FOR INSTALLATION AND SAFE USE

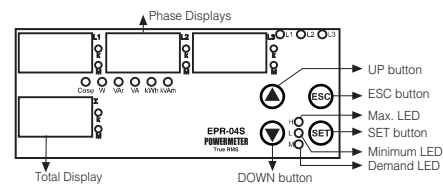
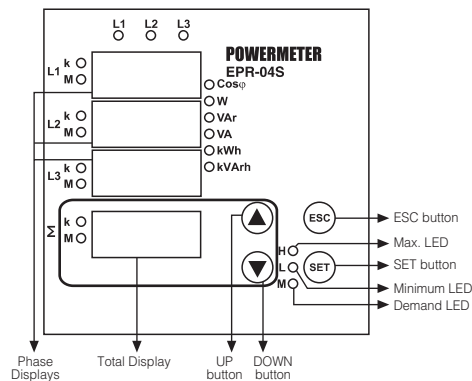
**△ The current terminal connections must be implemented with using CT-25.**

- Failure to follow those instructions will result in death or serious injury.
- Disconnect all power before working on equipment..
  - When the device is connected to the network, do not remove the front panel.
  - Do not try to clean the device with solvent or the like.Only clean with dry cloth.
  - Verify correct terminal connections when wiring.
  - Electrical equipment should be serviced only by your component seller.
  - No responsibility is assured by manufacturer or any of its subsidiaries for any consequences arising out of the use of this material.
  - Only for rack panel mounting.

# POWERMETER EPR-04 / EPR-04S

## General :

EPR-04/04S is a microprocessor based device which is developed for measuring the power and energy values in an Electrical Network. Measured parameters are displayed in 4 displays separately EPR-04S has an MODBUS serial communication interface.



## Using of EPR-04/04S:

Parameters (Cosφ: W, VAr, VA; kWh, kVArh) are monitored in L1, L2, L3 displays by scrolling UP/DOWN buttons. Total Active (ΣW), Total Reactive Power (ΣVAr), Total Apparent Power (ΣVA) and Cosφ values and average values of these parameters are monitored in 4th display.

## Digital Input

EPR-04/04S has 2 digital inputs. Digital inputs have 2 functions:  
- When a remote device has activated, situation of this device which is connected to the digital input, can be monitored according to data register (Battery, thermostat, circuit breaker and motor position).  
- When the digital inputs have activated in Energy Count menu, device will control the Energy Counters.

## Energy Pulse Outputs

EPR-04/04S has 2 Energy Pulse Outputs. These outputs give the pulses only for E-1 (Energy Counter).

**Pu1 and Pu2:** In "o-1 (Pulse1)", "o-2 (Pulse2)" menus which are in the pulse menu, device give pulse according to selected energy parameters as [Active energy (ACT, A-1, A-E), Reactive energy (rEA, r-L, r-C)]. Please refer to the pulse menu for the coefficients of energies.

## Monitoring of Min.,Max. and Max. Demand Values:

Min. and max. values are defined for W, VAr, VA, ΣW, ΣVAr, ΣVA; demand values are defined for W, VAr, VA, ΣW, ΣVA, ΣVAr.  
If measured instant value is smaller than min. value which was stored before, it is stored as new min. value. If measured instant value is greater than max. value which was stored before, it is stored as new max. value. Demand value is the average value of the measured values in demand time (15 minute).  
If one of defined parameters is displayed (ie. "W") when demand button is pressed min., max or max. demand values are displayed. When an undefined parameter is displayed (ie. "Cosφ") if demand button is pressed, instant value is continued to display.

## H-L-M LEDs

H-L-M LEDs are dedicated to displaying the min., max. and max. demand values according to selected parameters.

**H:** Maximum Value, **L:** Minimum Value, **M:** Max. Demand Value

## Calculation Methods for Active / Reactive Power Values

If the led on the most right side blinks it represents that active / reactive power's direction is inverted.

There are two methods for calculating total active and total reactive powers:

- 1) Active / Reactive power can be calculated by summing import and export values and displaying as a single value.
- 2) Active / Reactive power can be calculated according to direction as import / export.

## Note :

**1) The dot at the most right digit of the fourth display (During ΣW is displayed) represents that displayed value is export active power value. Vice versa, displayed value is import active power value.**

**2) The dot at the most right digit of the fourth display (During ΣVAr is displayed) represents that displayed value is capacitive reactive power value. Vice versa, displayed value is inductive reactive power value.**

**3) The displayed parameter will not change if power is off after 30 seconds of stand-by (ie. W).**

## Measured Parameters:

Cosφ	AI (kWh) (Import Active Energy)	ΣW (Total Active Power)
W (Active Power)	AE (kWh) (Export Active Energy)	ΣVAr (Total Reactive Power)
VAr (Reactive Power)	rI (kVArh) (Import Reactive Energy)	ΣVA (Total Apparent Power)
VA (Apparent Power)	rE(kVArh) (Export Reactive Energy)	

## FUNCTIONS OF BUTTONS

**▲** When W led lights, it shows max. power values which are measured instantaneously and it shows total max demand values. Also it is used for moving upwards in the menu.

**▼** When W led lights, it shows min. power values which are measured instantaneously and it shows total demand values. Also it is used for moving downwards in the menu.

**SET** It is used for passing between parameters such as W, VAr, VA, kWh, kVArh, cosφ. When it is pressed for 3 second, adjustment mode is entered. In the adjustment mode it is used for saving parameters and moving to the sub menu.

**ESC** In the adjustment mode, it is used for entering to the upper menu or it is used for quitting from the adjustment mode without saving the values.

**!** If user password is activated and set button is pressed for 3 seconds, a pin code is required in order to enter to the menu.

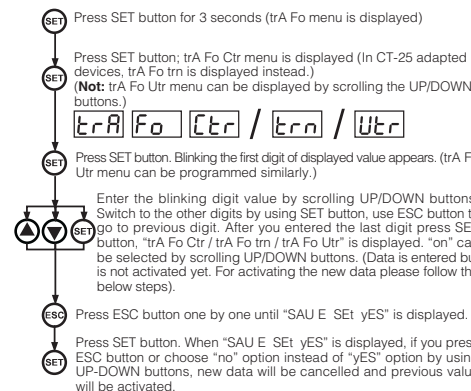
## Current Transformer Ratio Setup

**trA** (This menu is not available in the devices which are adapted with CT-25.)

In this menu, current transformer ratio is set between 1 - 2000.

**Note:** If the current transformer is not used between the system and EPR-04/04S, current transformer ratio is entered as "1".

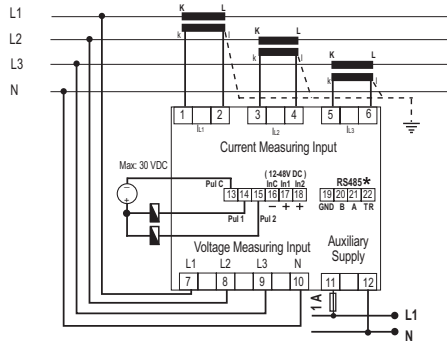
**Example:** If a current transformer which has a ratio of 250/5A is used between the system and EPR-04/04S; Current transformer ratio is entered as "50" (250/5).



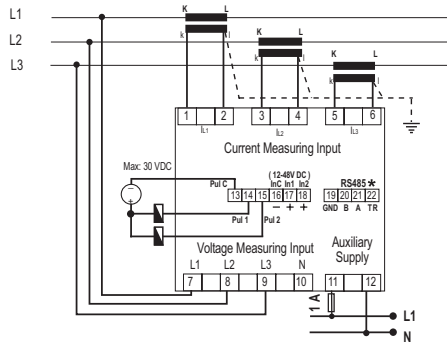


# POWMETER EPR-04 / EPR-04S

## PR 19 Box Connection Diagram



3 Phase neutral

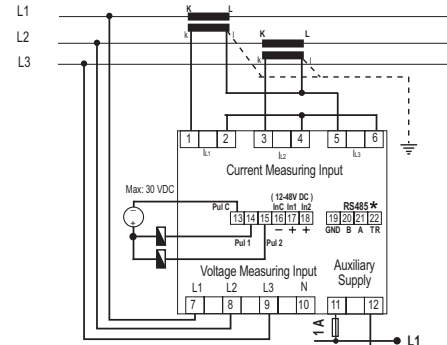


3 Phase without neutral

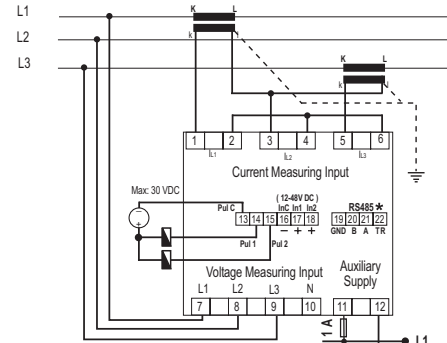
\*Available only for EPR-04S

### Note: For CT-25 models:

**k:** When CT-25 is used, Red cable is connected to k terminal.  
**l:** When CT-25 is used, Black cable is connected to l terminal.



3 Phase without neutral current input with Aron wiring configuration



3 Phase without neutral current input with Aron wiring configuration

# POWMETER EPR-04 / EPR-04S

## Pulse Menu

**PUL** In this menu, three parameters can be selected: "PUL SE rAt", "PUL SE o-1", "PUL SE o-2".  
**SE** **PUL SE rAt** io : Pulse ratio can be set as : 1, 10, 100 (wh/VArh/kVA); 1, 10, 100 (kwh/kVArh/kVA); 1 Mwh/MVArh/MVA.

**PUL SE o-1** : If this parameter is selected, in every increase in output 1, one pulse is counted. Output 1 parameter can be set as : ACt (Export/Import), A-I (Active Import), A-E (Active Export), rEA (Inductive / Capacitive), r-L (Reactive Inductive), r-C (Reactive Capacitive).

**PUL SE o-2** : If this parameter is selected, in every increase in output 2, one pulse is counted. Output 2 parameter can be set as : ACt (Export/Import), A-I (Active Import), A-E (Active Export), rEA (Inductive / Capacitive), r-L (Reactive Inductive), r-C (Reactive Capacitive).

- 1. Press SET button for 3 seconds (trA Fo menu is displayed)
- 2. By using UP-DOWN buttons, find "PULSE" menu.
- 3. Press SET button ("PUL SE rAt" menu is displayed)
- 4. By using UP-DOWN buttons, select "PUL SE rAt", "PUL SE o-1" or "PUL SE o-2".
- 5. Press SET button. **PUL SE**
- 6. By using UP-DOWN buttons, type the required value for selected parameter.
- 7. Press SET button. (Data is entered but is not activated yet. For activating the new data please follow the below steps).
- 8. Press ESC button one by one until "SAU E SET yES" is displayed.
- 9. Press SET button. When "SAU E SET yES" is displayed, if you press ESC button or choose "no" option instead of "yES" option by using UP-DOWN buttons, new data will be cancelled and previous value will be activated.

## Energy Counter (Eng Cnt) Menu

**Eng** EPR-04/04S has 2 energy counters :

Energy counter 1 (E-1), Energy counter 2 (E-2).

E-1 / E-2 have 4 parameters :

**on** : Activate "E-1 / E-2" counters for energy counting without depending on any parameter.

r-1 : Activate "E-1 / E-2" counters, when digital input 1 is on (=1).

r-2 : Activate "E-1 / E-2" counters, when digital input 2 is on (=1).

E-2 : "E-1" does not count when "E-2" is activated. (Only for "E-1")

E-1 : "E-2" does not count when "E-1" is activated. (Only for "E-2")

**Note** : Counting status is undefined if E-2 is selected on E-1 and if E-1 is selected on E-2.

When the status is defined as above, both energy counters count while digital input is not on (=1), but if either one or both digital inputs are on (=1) then counters will not count.

- 1. Press SET button for 3 seconds (trA Fo menu is displayed)
- 2. By using UP-DOWN buttons, find "Eng Cnt" menu.
- 3. Press SET button ("Eng Cnt E-1" menu is displayed)
- 4. By using UP-DOWN buttons, select "E-1" or "E-2".
- 5. Press SET button. **Eng Cnt**
- 6. By using UP-DOWN buttons, select "on", "r-1", "r-2" or "E-1 / E-2".
- 7. Press SET button. (Data is entered but is not activated yet. For activating the new data please follow the below steps).
- 8. Press ESC button one by one until "SAU E SET yES" is displayed.
- 9. Press SET button. When "SAU E SET yES" is displayed, if you press ESC button or choose "no" option instead of "yES" option by using UP-DOWN buttons, new data will be cancelled and previous value will be activated.

## User password Setup:

**Pin** In this menu user password is defined and activated. You must define and activate a 4 digit user password for preventing device settings from the illegal usage. There are 2 sub menu under the Pin menu.

### Changing of User Password:

This menu is used for changing the user password . **Note** : Factory default value for user password is "0000"

**CHA** For changing the user password, In the measurement mode,

- 1. Press SET button 3 seconds (trA Fo menu is displayed)
- 2. Bu using UP-DOWN buttons find Pin menu.
- 3. Press SET button (Pin Act IUA IE menu is displayed.)
- 4. By using the UP-DOWN buttons find Pin CHA nGE menu. **Pin CHA nGE**
- 5. By using UP-DOWN-SET button enter the old password
- 6. By using UP-DOWN-SET button enter the new password
- 7. By using UP-DOWN-SET button reenter the new password.
- 8. Press SET button, Pin CHA nGE is displayed. Data is entered but is not activated yet. For activating the new data please follow the below steps).
- 9. Press ESC button one by one until (SAU SET yES) appears at the display.
- 10. Press SET button when (SAU SET yES) appears at the display. (When SAU SET yES appears at the display, if you Press ESC button or choose "no" option instead of "yES" option, you quit from adjustment menu without saving new settings and device continues to work with previous settings).

### Activating the user password:

This menu is used for activating the user password. After the user password is activated, while the instant values are observed, user password is required in order to enter to the menu. If the wrong user password is entered, user can not enter to the menu.

**Note** : Factory default value of user password is "0000"

- 1. Press SET button for 3 seconds (trA Fo menu is displayed)
- 2. Bu using UP-DOWN buttons, find "Pin" menu.
- 3. Press SET button ("Pin Act IUA IE" menu is displayed)
- 4. **Pin Act IUA IE**
- 5. **IE**
- 6. Press SET button. First digit of the displayed value is blinking.
- 7. Enter the blinking digit value by scrolling UP/DOWN buttons. Switch to the other digits by using SET button, use ESC button to go to previous digit. After you entered the last digit press SET button, "Pin Act of" is displayed. "on" can be selected by scrolling UP/DOWN buttons. (Data is entered but is not activated yet. For activating the new data please follow the below steps).
- 8. Press ESC button one by one until "SAU E SET yES" is displayed.
- 9. Press SET button. When "SAU E SET yES" is displayed, if you press ESC button or choose "no" option instead of "yES" option by using UP-DOWN buttons, new data will be cancelled and previous value will be activated.

# POWMETER EPR-04 / EPR-04S

## Serial Communication (Available only for EPR-04S)

EPR-04S has MODBUS RTU communication protocol which is optical isolated. All measured parameters can be transfer to the computer. Transformer ratios and communication parameters can be set. Saved demand and energy values can be reset.

### Parameter Settings

**Address Parameters :** Value can be enter between 001-247.

**Baud Rate Parameters :** Value can be selected as 2400, 4800, 9600, 19200 and 38400 bps.

**Parity Parameters :** "no", "odd" and "EUEn" can be selected.

Press SET button for 3 seconds (trA Fo menu is displayed)

Bu using UP-DOWN buttons, find "RS-485" menu.

Press SET button ("Adr ESS" menu is displayed)

Find the menu which is programmed in Adr ESS / bAU d / PAnTy menus by scrolling UP-DOWN buttons.

Press SET button ("001 / 9600 / no" is displayed.)

Enter the value of related parameters by scrolling UP/DOWN buttons (001...247 / 2400...38400 / no, EUEn, odd).

Press SET button, Adr ESS / bAU d / PAnTy is displayed. (Data is entered but is not activated yet. For activating the new data please follow the below steps).

Press ESC button one by one until "SAU E SEt yES" is displayed.

Press SET button. When "SAU E SEt yES" is displayed, if you press ESC button or choose "no" option instead of "yES" option by using UP-DOWN buttons, new data will be cancelled and previous value will be activated.

## MODBUS RTU PROTOCOL (Available only for EPR-04S)

Standart MODBUS RTU message is shown below.

T	ADDRESS 8 BIT	FUNCTION 8 BIT	DATA NX8BIT	CRCH	CRCL	T
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The T times corresponds to a time in which data must not be exchanged on the communication bus to allow the connected devices to recognize the end of one message and the beginning of another. This time must be at least 3.5 characters at the selected baud rate. Address range (1-247) is address of the connected device. The data field contains data sent to the slave by master or data sent to master by slave. CRC is a error check method by using MODBUS RTU protocol and consists of 2 bytes.

### Available Modbus Function:

03H	READ HOLD REGISTERS
06H	PRESET SINGLE REGISTER
10H	PRESET MULTIPLE REGISTERS

Read Hold (03) function is used for reading measured values and set value. If any request of reading of a register, excepted mentioned in register table, device will send an error message. For example to read phase1 voltage by sending a message to the device.

01 03 00 00 00 02 XX XX  
01 Device address  
03 Function  
00 MSB address  
14 LSB address  
00 Register number MSB  
02 Register number LSB  
XX CRC MSB  
XX CRC LSB

Preset Single Register (06) function is used for writing the setting values, erasing the energy counter or resetting the min., max., demand values. Current transformers ratio can be set 0-2000, voltage transformer ratio can be set 1-40000. Min., Max. and Demand values can be only clear. If sent value is outside of this range device responds with an error message. i.e. Setting CT as 100;

01 06 80 02 00 64 XX XX  
01 Device address  
06 Function  
80 MSB address  
02 LSB address  
00 Data MSB  
64 Data LSB  
XX CRC MSB  
XX CRC LSB

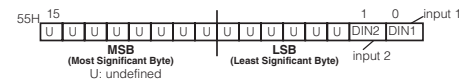
Preset Multiple Register(10H) is used to set more then one register at same time.

i.e. Setting CT as 100, Ut as 20.0;

01 10 80 00 00 02 04 00 C8 00 64 XX XX  
01 Device Address  
10 Function  
80 MSB address  
00 LSB address  
00 Register number MSB  
02 Register number LSB  
04 Byte count  
00 Data MSB  
C8 Data LSB  
00 Data MSB  
64 Data LSB  
XX CRC MSB  
XX CRC LSB

## Digital Inputs (Available only for EPM-04S)

Digital input are sent in 16 bit hexadecimal format as below:



If 12-48 V AC / DC is applied to In1 (Input 1), 0 (zero) bit of DIN register is set as "1". Otherwise, 0 (zero) bit is set as "0".

If 12-48 V AC / DC is applied to In2 (Input 2), 1st bit of DIN register is set as "1". Otherwise, 1st bit is set as "0".

The Parameters are sent in 32bit Hexadecimal format. For Example, 230.0V voltage will be sent as 000008FCH. Cosφ values shall be divided to 1000. 0.980 Cosφ will be sent as 000003D4H. Energy values are sent in 64 bytes. 1234567890123456789 Wh = AB 54 A9 8C EB 1F 0A 02 Wh

### Specifications for data cable;

- 24 AWG or thicker
- Less than 100 ohm/ km
- Nominal characteristic impedance at 100 kHz of 100 ohms
- Less than 60 pF/m mutual capacitance (between two wires in a pair)
- Less than 120 pF/m mutual pair capacitance ( the capacitance between one wire and all others connected to earth).
- Twisted Pair

### ERROR CODES (Available only for EPR-04S)

Slave device (EPR-04S) sends error message when receive any missing query. Error codes are given below.

**01 Invalid Function:** If any message except given above is used, then 01 error messages will be sent.

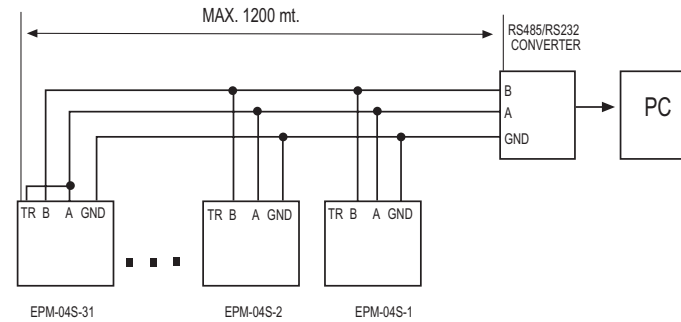
**02 Invalid Register:** Error 02 will be send when a reading of a register is requested, except the registers which mentioned in table.

**03 Invalid data:** If any different value is been set for dedicated Transformer values and nonzero for demand value, then error message 03 will be sent.

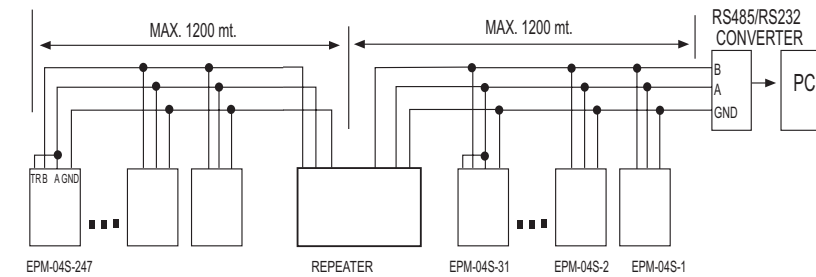
# POWMETER EPR-04 / EPR-04S

## EPM-04S COMPUTER CONNECTION

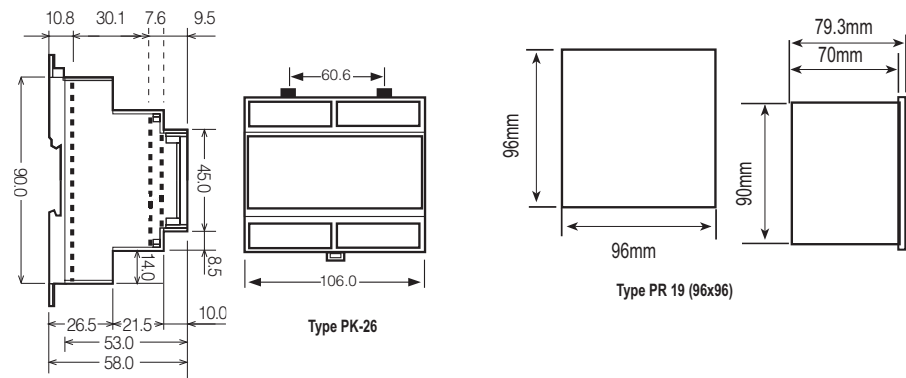
31 DEVICES CAN BE CONNECTED AT THE SAME LINE



MAX. 247 DEVICES CAN BE CONNECTED AT SAME LINE BY USING REPEATER.



### Dimensions



MODBUS REGISTER MAP							
ADDRESS	ADDRESS (HEX)	REGISTER	R/W	RANGE	UNIT	MULTIPLIER	FORMAT
0	0000						
2	0002						
4	0004						
6	0006						
8	0008						
10	000A						
12	000C						
14	000E						
16	0010						
18	0012						
20	0014	L1 PHASE ACTIVE POWER	R	(-18000 - 18000)xCTxVT	Watt	0.1	int
22	0016	L2 PHASE ACTIVE POWER	R	(-18000 - 18000)xCTxVT	Watt	0.1	int
24	0018	L3 PHASE ACTIVE POWER	R	(-18000 - 18000)xCTxVT	Watt	0.1	int
26	001A	L1 PHASE REACTIVE POWER	R	(-18000 - 18000)xCTxVT	Var	0.1	int
28	001C	L2 PHASE REACTIVE POWER	R	(-18000 - 18000)xCTxVT	Var	0.1	int
30	001E	L3 PHASE REACTIVE POWER	R	(-18000 - 18000)xCTxVT	Var	0.1	int
32	0020	L1 PHASE APPARENT POWER	R	(0 - 18000)xCTxVT	VA	0.1	unsigned int
34	0022	L2 PHASE APPARENT POWER	R	(0 - 18000)xCTxVT	VA	0.1	unsigned int
36	0024	L3 PHASE APPARENT POWER	R	(0 - 18000)xCTxVT	VA	0.1	unsigned int
38	0026	L1 PHASE COS $\phi$	R	(-1000 - 1000)	-	0.001	int
40	0028	L2 PHASE COS $\phi$	R	(-1000 - 1000)	-	0.001	int
42	002A	L3 PHASE COS $\phi$	R	(-1000 - 1000)	-	0.001	int
44	002C	TOTAL IMPORT ACTIVE POWER	R	(0 - 54000)xCTxVT	Watt	0.1	int
46	002E	TOTAL EXPORT ACTIVE POWER	R	(0 - 54000)xCTxVT	Watt	0.1	int
48	0030	TOTAL INDUCTIVE REACTIVE POWER	R	(0 - 54000)xCTxVT	Var	0.1	int
50	0032	TOTAL CAPACITIVE REACTIVE POWER	R	(0 - 54000)xCTxVT	Var	0.1	int
52	0034	TOTAL APPARENT POWER	R	(0 - 54000)xCTxVT	VA	0.1	unsigned int
54	0036	AVERAGE INDUCTIVE COS $\phi$	R	(-1000 - 1000)	-	0.001	int
56	0038	AVERAGE CAPACITIVE COS $\phi$	R	(-1000 - 1000)	-	0.001	int
58	003A	FREQUENCY	R	(4000 - 7000)	Hz	0.01	unsigned int
60	003C						
62	003E						
64	0040						
66	0042						
68	0044						
70	0046						
72	0048						
74	004A						
76	004C						
78	004E						
80	0050						
82	0052						
84	0054	DIGITAL INPUT STATUS	R	-	-	-	-
86	0056	IMPORT ACTIVE ENERGY-1	R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
88	0058	EXPORT ACTIVE ENERGY-1	R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
90	005A	INDUCTIVE REACTIVE ENERGY-1	R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
92	005C	CAPACITIVE REACTIVE ENERGY-1	R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
94	005E	IMPORT ACTIVE ENERGY-2	R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
96	0060	EXPORT ACTIVE ENERGY-2	R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
98	0062	INDUCTIVE REACTIVE ENERGY-2	R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
100	0064	CAPACITIVE REACTIVE ENERGY-2	R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
102	0066		R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
104	0068		R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
106	006A		R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
108	006C		R/W	0-FFFFFFFFFFFFFFF	Wh	1	long int
110	006E		R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
112	0070		R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
114	0072		R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
116	0074		R/W	0-FFFFFFFFFFFFFFF	Varh	1	long int
118	0076						
120	0078						
122	007A						
124	007C						
126	007E						
128	0080						
130	0082						
132	0084						
134	0086						
136	0088	L1 PHASE MIN. ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
138	008A	L2 PHASE MIN. ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
140	008C	L3 PHASE MIN. ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
142	008E	L1 PHASE MIN. REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
144	0090	L2 PHASE MIN. REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
146	0092	L3 PHASE MIN. REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
148	0094	L1 PHASE MIN. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
150	0096	L2 PHASE MIN. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int

\*Available only for EPR-04S

MODBUS REGISTER MAP							
ADDRESS	ADDRESS (HEX)	REGISTER	R/W	RANGE	UNIT	MULTIPLIER	FORMAT
152	0098	L3 PHASE MIN. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
154	009A	TOTAL MIN. IMPORT ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
156	009C	TOTAL MIN. EXPORT ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
158	009E	TOTAL MIN. IMPORT REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
160	00A0	TOTAL MIN. EXPORT REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
162	00A2	TOTAL MIN. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
164	00A4						
166	00A6						
168	00A8						
170	00AA						
172	00AC						
174	00AE						
176	00B0						
178	00B2						
180	00B4						
182	00B6	L1 PHASE MAX. ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
184	00B8	L2 PHASE MAX. ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
186	00BA	L3 PHASE MAX. ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
188	00BC	L1 PHASE MAX. REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
190	00BE	L2 PHASE MAX. REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
192	00C0	L3 PHASE MAX. REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
194	00C2	L1 PHASE MAX. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
196	00C4	L2 PHASE MAX. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
198	00C6	L3 PHASE MAX. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
200	00C8	TOTAL MAX. IMPORT ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
202	00CA	TOTAL MAX. EXPORT ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
204	00CC	TOTAL MAX. IMPORT REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
206	00CE	TOTAL MAX. EXPORT REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
208	00D0	TOTAL MAX. APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
210	00D2						
212	00D4						
214	00D6						
216	00D8	L1 PHASE IMPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
218	00DA	L1 PHASE EXPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
220	00DC	L2 PHASE IMPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
222	00DE	L2 PHASE EXPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
224	00E0	L3 PHASE IMPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
226	00E2	L3 PHASE EXPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
228	00E4	L1 PHASE IMPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
230	00E6	L1 PHASE EXPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
232	00E8	L2 PHASE IMPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
234	00EA	L2 PHASE EXPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
236	00EC	L3 PHASE IMPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
238	00EE	L3 PHASE EXPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
240	00F0	L1 PHASE MAX. DEMAND APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
242	00F2	L2 PHASE MAX. DEMAND APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
244	00F4	L3 PHASE MAX. DEMAND APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int
246	00F6	TOTAL IMPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
248	00F8	TOTAL EXPORT MAX. DEMAND ACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Watt	0.1	int
250	00FA	TOTAL IMPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
252	00FC	TOTAL EXPORT MAX. DEMAND REACTIVE POWER	R/W	(-18000 - 18000)xCTxVT	Var	0.1	int
254	00FE	TOTAL MAX. DEMAND APPARENT POWER	R/W	(0 - 18000)xCTxVT	VA	0.1	unsigned int

ADDRESS	ADDRESS (HEX)	REGISTER	R/W	RANGE	UNIT	MULTIPLIER	FORMAT
32768	8000	VOLTAGE TRANSFORMER RATIO	R/W	0-40000	-	0.1	short-int
32769	8001	CURRENT TRANSFORMER RATIO	R/W	0-2000	-	1	short-int
32770	8002	CALCULATION METHOD	R/W	0-5	-	-	short-int
32771	8003	DEMAND TIME	R/W	1-60	minute	1	short-int
32772	8004	PULSE RATIO	R/W	0-6	-	-	short-int
32773	8005	PULSE OUTPUT 1 PARAMETER SETTING	R/W	0-5	-	-	short-int
32774	8006	PULSE OUTPUT 2 PARAMETER SETTING	R/W	0-5	-	-	short-int
32775	8007	ENERGY COUNTER 1 SELECTION	R/W	0-3	-	-	short-int
32776	8008	ENERGY COUNTER 2 SELECTION	R/W	0-3	-	-	short-int
32777	8009	COMMUNICATION ADDRESS	R/W	0 - 247	-	-	short-int
32778	800A	BAUD RATE	R/W	1 - 5	-	-	short-int
32779	800B	PARITY	R/W	0 - 2	-	-	short-int
32780	800C	PASSWORD ENABLE	R/W	0-1	-	-	short-int
32781	800D	PASSWORD	R/W	0-9999	-	-	short-int

**PULSE OUTPUT 1-2**

- PARAMETER SETTING 0-5 :**  
 0: Active  
 1: Active Import  
 2: Active Export  
 3: Reactive  
 4: Reactive Import  
 5: Reactive Export

**PULSE RATIO 0-6 :**

- 0: 1 Watt / Pulse  
 1: 10 Watt / Pulse  
 2: 100 Watt / Pulse  
 3: 1 kW / Pulse  
 4: 10 kW / Pulse  
 5: 100 kW / Pulse  
 6: 1 MW / Pulse

**ENERGY COUNTER 1 SELECTION 0-3 :**

- 0: On (EC-Energy counter- will count on all conditions)  
 1: EC will count when Digital Input1 is 1 (1=active)  
 2: EC will count when Digital Input2 is 1 (1=active)  
 3: Inverse Energy Counter 2 (It will count when EC2 is not counted)

**ENERGY COUNTER 2 SELECTION 0-3 :**

- 0: On (EC-Energy counter- will count on all conditions)  
 1: EC will count when Digital Input1 is 1 (1=active)  
 2: EC will count when Digital Input2 is 1 (1=active)  
 3: Inverse Energy Counter 1 (It will count when EC1 is not counted)

**BAUD RATE 1-5 :**

- 1: 38400 bps  
 2: 19200 bps  
 3: 9600 bps  
 4: 4800 bps  
 5: 2400 bps

**PARITY 0-2 :**

- 0: No  
 1: Odd  
 2: Even

**PASSWORD ENABLE 0-1 :**

- 0: Disable  
 1: Enable

**CALCULATION 0-5 :**

Refer to "Reactive Energy Calculation Method Setting" on page 2.