



Read this document carefully before using this device. The guarantee will be expired by device damages if you don't attend to the directions in the user manual. Also we don't accept any compensations for personal injury, material damage or capital disadvantages.

ENDA EPV942 PROGRAMMABLE AC/DC VOLTMETER

Thank you for choosing ENDA EPV942 Programmable AC/DC voltmeter.

- ▶ 96 x 96 mm sized
- ▶ 4 digits display
- ▶ Selectable number of decimal point
- ▶ Can be displayed between -999 and + 9999V by using voltage transformer
- ▶ Easy to use front panel keypad
- ▶ Multi-function alarm output for lower and upper limits (NO + NC)
- ▶ Multi-function alarm setpoints with alarm output (NO)
- ▶ Communication feature over isolated RS485, using ModBus RTU protocol (Optional)
- ▶ Measuring type can be selected as AC, DC or true RMS (ACDC)
- ▶ CE Marked according to European Norms.



Order Code : EPV942 -

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|---|---|--|
| 1 - Output R.....(Out) Relay R2.....(Out + ALR) Relay Blank....No Relay | 2 - Supply Voltage 230VAC...230V AC 110VAC...110V AC 24VAC.....24V AC SM.....9-30V DC / 7-24V AC | 3 - Isolated ModBus RSI.....Isolated ModBus (Specify at Order). |
|---|---|--|

R^HHS
Compliant



| ENVIRONMENTAL CONDITIONS | |
|---|--|
| Ambient / Storage Temperature | 0 ... +50°C/-25 ... +70°C (with no icing) |
| Max. Relative Humidity | 80% Relative humidity for temperatures up to 31°C, decreasing linearly to 50% at 40°C. |
| Rated Pollution Degree | According to EN 60529 ; Front Panel : IP65, Rear Panel : IP20 |
| Height | Max. 2000m |
| KEEP AWAY device from exposed to corrosive, volatile and flammable gases or liquids and DO NOT USE the device in similar hazardous locations. | |

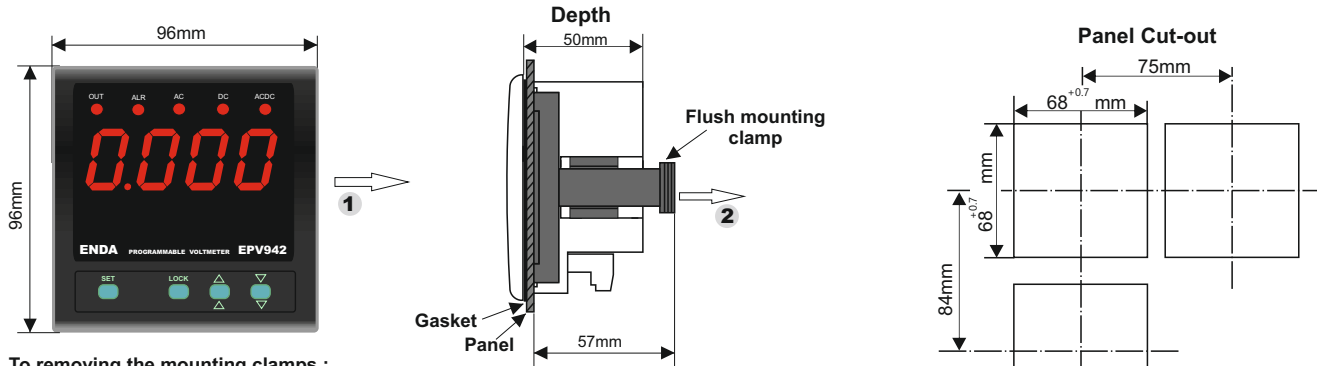
| ELECTRICAL CHARACTERISTICS | |
|----------------------------|--|
| Supply Voltage | 230V AC +10% -20%, 110V AC +10% -20%, 24V AC ±%10, 50/60Hz or 9-30V DC / 7-24V AC ±10% (Optional) |
| Power Consumption | Max. 5VA |
| Wiring | 2.5mm ² screw-terminal connections |
| Scale | AC and RMS For <i>uErr</i> 0...9999V, for <i>u100</i> 0.....100V, for <i>u500</i> 0...500V DC For <i>uErr</i> -999...9999V DC, for <i>u100</i> -100...100V DC, for <i>u500</i> -500...+500V DC |
| Sensitivity | 0,01V (If, <i>uErr</i> is selected) 0,1V (If, <i>uErr</i> or <i>u500</i> is selected and higher than -100V, lower from 100V for input values) 1V (If <i>uErr</i> or <i>u500</i> is selected and lower than -100V, higher from 100V for input values) |
| Accuracy | AC ±%1 (Full scale) (For square wave form ± 2%) DC ±%1 (Full scale) RMS ±%1 (Full scale) (For square wave form ± 2%) |
| Input Range | -500V...500V (Device will be damaged if more than ±1250 DC voltages applied when <i>u500</i> is selected) -100V...100V (Device will be damaged if more than ±250 DC voltages applied when <i>u500</i> or <i>uErr</i> is selected) |
| Input Impedance | 870kΩ |
| Frequency Range | DC , 10Hz - 200Hz (For square wave form 10Hz-70Hz) |
| EMC | EN 61326-1: 2013 |
| Safety Requirements | EN 61010-1: 2010 (Pollution degree 2, overvoltage category II) |

| OUTPUTS | |
|---------------------------|--|
| Alarm Output | For both relays : 250V AC, 8A (for resistive load), NO+NC |
| Life Expectancy for Relay | Mechanical 30.000.000 operation; 100.000 operation at 250V AC, 10A resistive load. |

| HOUSING | |
|--------------------|--|
| Housing Type | Suitable for flush-panel mounting. (According to DIN 43 700) |
| Dimensions | W96xH96xD50mm |
| Weight | Approx. 410g (after packing) |
| Enclosure Material | Self extinguishing plastics. |

Avoid any liquid contact when the device is switched on.
DO NOT clean the device with solvent (thinner, gasoline, acid etc.) and / or abrasive cleaning agents.

DIMENSIONS



To removing the mounting clamps :

- Push the flush-mounting clamp in direction **1** as shown in the figure left.
- Then, pull out the clamp in direction **2**.



Note :

- 1) Panel thickness should be maximum 10mm.
- 2) There must be at least 60mm free space behind the device, otherwise it would be difficult to remove it from the panel.

CONNECTION DIAGRAM



END A EPV942 is intended for installation in control panels. Make sure that the device is used only for intended purpose. The electrical connections must be carried on by a qualified staff and must be according to the relevant locally applicable regulations. During an installation, all of the cables that are connected to the device must be free of electrical power. The device must be protected against inadmissible humidity, vibrations and severe soiling. Make sure that the operation temperature is not exceeded. The cables should not be close to the power cables or components.



If *ItYP* input type "*u500*" is selected, the measurement lines 12 and 15 of the terminals must be connected. Otherwise, measurement will be incorrect.
 If *ItYP* input type "*u100*" or *uErr*" is selected, the measurement lines 13 and 14 of the terminals must be connected. Otherwise, measurement will be incorrect.

NOTE :

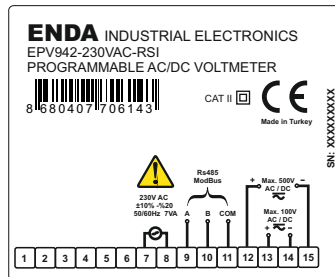
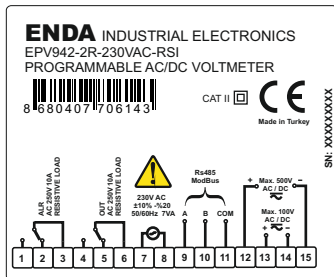
SUPPLY:



Fuse should be connected.



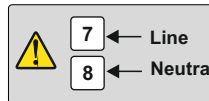
- 1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.
- 2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.



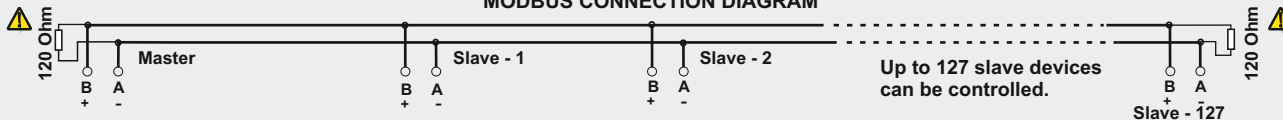
Holding screw 0.4-0.5Nm.



Equipment is protected throughout by DOUBLE INSULATION



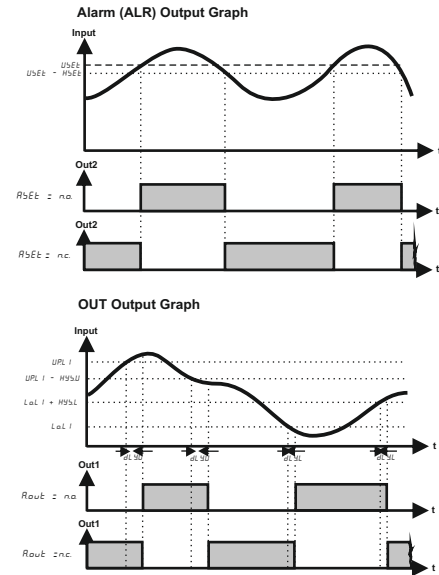
* MODBUS CONNECTION DIAGRAM



Termination should be accomplished by attaching 120 Ohm resistors to the start and at the end of the communication line.

* Applies to devices with Modbus function.

OUTPUT GRAPHICS



| | ac | dc | Ac,dc (rms) |
|--|--|-------------------|------------------------|
| | $A \frac{1}{\sqrt{2}}$ | 0.000 | $A \frac{1}{\sqrt{2}}$ |
| | 0.308 A | $A \frac{2}{\pi}$ | $A \frac{1}{\sqrt{2}}$ |
| | 0.386 A | $A \frac{1}{\pi}$ | $A \frac{1}{2}$ |
| | A | 0.000 | A |
| | $A \frac{1}{2}$ | $A \frac{1}{2}$ | $A \frac{1}{\sqrt{2}}$ |
| | $A \sqrt{\frac{d}{T} - \frac{d^2}{T^2}}$ | $A \frac{d}{T}$ | $A \sqrt{\frac{d}{T}}$ |
| | $A \frac{1}{\sqrt{3}}$ | 0.000 | $A \frac{1}{\sqrt{3}}$ |

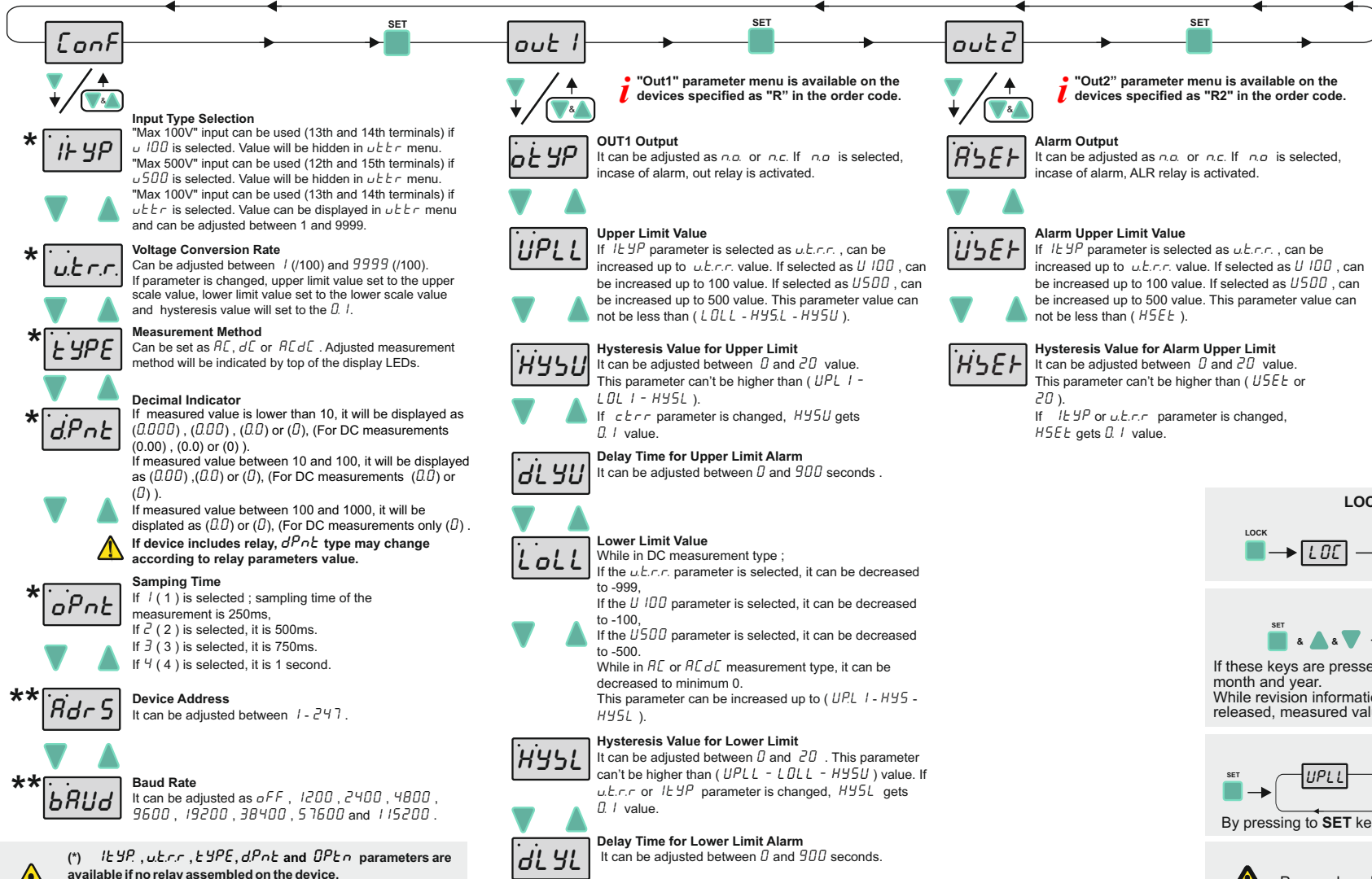


EPV942 PROGRAMMING DIAGRAM

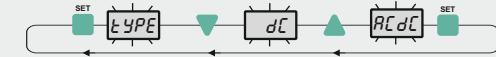
| | | |
|-----------------------------|--|--|
| Increment Key | | Used for increasing the setpoint value and changing parameters. When held down for a few seconds, configured numeric value increases faster. |
| Decrement Key | | Used for decreasing the setpoint value and changing parameters. When held down for a few seconds, configured numeric value increases faster. |
| Programming Key | | Used for displaying and configuring the selected parameter value. |
| Lock / Unlock Keypad | | Locks / Unlocks keypad. |

If these keys are pressed and held for 3 seconds, "Programming Mode" is entered or it returns to "Running Mode". If and keys are pressed while parameter names are displayed, than it returns to measured value.

PROGRAMMING MODE

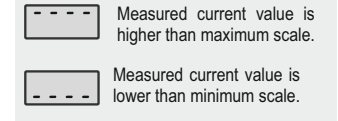


SETTING UP THE PARAMETERS

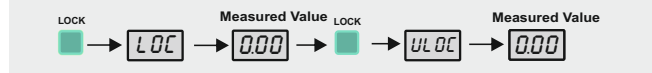


If key is pressed, the current value of the parameter appears by flashing on the display.
 By using "UP" or "DOWN" navigation keys, selected parameter can be adjusted to the desired value.
 After the setting up the parameters, if set key is pressed again, adjusted parameter name appears on display.

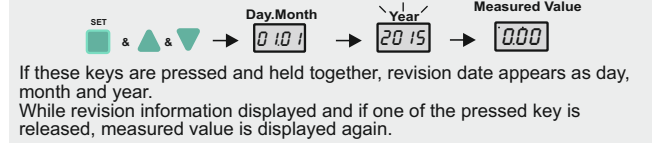
ERROR MESSAGES



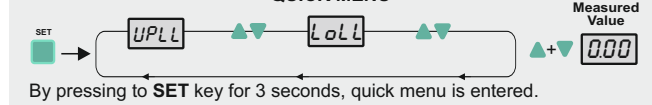
LOCKING & UNLOCKING KEYPAD



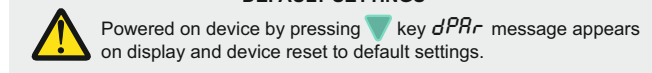
REVISION NUMBER



QUICK MENU



DEFAULT SETTINGS



⚠ (*) itYP, uErr, tYPE, dPnt and oPnt parameters are available if no relay assembled on the device.
 (**) AdrS and bAUD parameters are available only with Modbus featured devices.

ENDA EPV942 DIGITAL VOLTMETER MODBUS PROTOCOL ADDRESS MAP

HOLDING REGISTERS FOR "R" EXTENSION DEVICES

| Holding Register Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission | Status Value |
|----------------------------|--------|-----------|--|----------------|-----------------------|----------------|
| Decimal | Hex | | | | | |
| 0000d | 0x0000 | word | Alarm output status | <i>0LYP</i> | Readable/Writable | <i>no</i> |
| 0001d | 0x0001 | word | Input type selection | <i>1LYP</i> | Readable/Writable | <i>u.t.r.r</i> |
| 0002d | 0x0002 | word | Voltage Conversion Rate | <i>u.t.r.r</i> | Readable/Writable | <i>100</i> |
| 0003d | 0x0003 | word | The upper limit of the setpoint | <i>UPLL</i> | Readable/Writable | <i>5000</i> |
| 0004d | 0x0004 | word | The upper limit of the hysteresis value | <i>HYSU</i> | Readable/Writable | <i>10</i> |
| 0005d | 0x0005 | word | Delay time for the upper limit alarm | <i>dLYU</i> | Readable/Writable | <i>0</i> |
| 0006d | 0x0006 | word | The lower limit of the setpoint | <i>LOLL</i> | Readable/Writable | <i>00</i> |
| 0007d | 0x0007 | word | The lower limit of the hysteresis value | <i>HYSL</i> | Readable/Writable | <i>10</i> |
| 0008d | 0x0008 | word | Delay time for the lower limit alarm | <i>dLYL</i> | Readable/Writable | <i>0</i> |
| 0009d | 0x0009 | word | Measurement method (<i>0=AC</i> , <i>1=dC</i> , <i>2=ACdC</i>) | <i>tYPE</i> | Readable/Writable | <i>ACdC</i> |
| 0010d | 0x000A | word | Decimal point. (<i>0=X</i> , <i>1=X.X</i> , <i>2=X.XX</i> , <i>3=X.XXX</i>) | <i>dPnt</i> | Readable/Writable | <i>00</i> |
| 0011d | 0x000B | word | Sampling time of the measurement value. If 1 is selected, it is 250ms. If 2 is selected, it is 500ms. If 3 is selected, it is 750ms. If 4 is selected, it is 1 second. | <i>oPtn</i> | Readable/Writable | <i>4</i> |
| 0012d | 0x000C | word | Device address for RS485 network connection. Adjustable between 1-247. | <i>Adr5</i> | Readable/Writable | <i>1</i> |
| 0013d | 0x000D | word | Baudrate (<i>0=Off</i> ; <i>1=1200</i> ; <i>2=2400</i> ; <i>3=4800</i> ; <i>4=9600</i> ; <i>5=19200</i> ; <i>6=38400</i> ; <i>7=57600</i> ; <i>8=115200</i>) | <i>bAUD</i> | Readable/Writable | <i>oFF</i> |

*Holding Register Parameter Table (No Relay Models)

| | | | | | | |
|-------|--------|------|--|----------------|-------------------|----------------|
| 0000d | 0x0000 | word | Input type selection | <i>1LYP</i> | Readable/Writable | <i>u.t.r.r</i> |
| 0001d | 0x0001 | word | Voltage Conversion Rate | <i>u.t.r.r</i> | Readable/Writable | <i>100</i> |
| 0003d | 0x0003 | word | Measurement method (<i>0=AC</i> , <i>1=dC</i> , <i>2=ACdC</i>) | <i>tYPE</i> | Readable/Writable | <i>ACdC</i> |
| 0004d | 0x0004 | word | Decimal point. (<i>0=X.XX</i> , <i>1=X.X</i> , <i>2=X</i>) | <i>dPnt</i> | Readable/Writable | <i>0.000</i> |
| 0005d | 0x0005 | word | Sampling time of the measurement value | <i>oPtn</i> | Readable/Writable | <i>4</i> |
| 0006d | 0x0006 | word | Device address for RS485 network connection. Adjustable between 1-247. | <i>Adr5</i> | Readable/Writable | <i>1</i> |
| 0007d | 0x0007 | word | Baudrate (<i>0=Off</i> ; <i>1=1200</i> ; <i>2=2400</i> ; <i>3=4800</i> ; <i>4=9600</i> ; <i>5=19200</i> ; <i>6=38400</i> ; <i>7=57600</i> ; <i>8=115200</i>) | <i>bAUD</i> | Readable/Writable | <i>oFF</i> |

INPUT REGISTERS FOR EPV942-x-xxx-RSI DEVICES

| Input Register Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission |
|--------------------------|--------|-----------|------------------------|----------------|-----------------------|
| Decimal | Hex | | | | |
| 0000d | 0x0000 | word | Measured voltage value | -- | Only Readable |

DISCRETE INPUTS FOR "R" EXTENSION DEVICES

| Discrete Input Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission |
|--------------------------|--------|-----------|---|----------------|-----------------------|
| Decimal | Hex | | | | |
| 0000d | 0x0000 | Bit | Relay output state (<i>0=oFF</i> ; <i>1=on</i>) | -- | Only Readable |

COILS FOR "R" EXTENSION DEVICES

| Coil Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission | Status Value |
|----------------|--------|-----------|--|----------------|-----------------------|--------------|
| Decimal | Hex | | | | | |
| 0000d | 0x0000 | Bit | Alarm output state (<i>0=no</i> ; <i>1=nc</i>) | <i>0LYP</i> | Readable/Writable | <i>no</i> |

* Coil and Discrete input parameters are not available in the devices those have no relay

Note 1 : *0LYP* menu parameters can be used as "Holding Register" or "Coil".

Note 2 : Received "ModBus input register value" is multiplying by 1000 (based on *dPnt*) and mV value reached.

For example ;

if modbus value is 2842, (for *dPnt* = 2 (*0.00*)) $28.42 \times 1000 = 28420$ mV, ie 28.42V

if modbus value is 2842, (for *dPnt* = 3 (*0.000*)) $2.842 \times 1000 = 2842$ mV, ie 2.842V

ENDA EPV942 DIGITAL VOLTMETER MODBUS PROTOCOL ADDRESS MAP

HOLDING REGISTERS FOR "R2" EXTENSION DEVICES

| Holding Register Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission | Status Value |
|----------------------------|--------|-----------|--|----------------|-----------------------|----------------|
| Decimal | Hex | | | | | |
| 0000d | 0x0000 | word | Alarm (OUT) output status | <i>0tYP</i> | Readable/Writable | <i>no</i> |
| 0001d | 0x0001 | word | Alarm (ALR) output status | <i>RS5Et</i> | Readable/Writable | <i>no</i> |
| 0002d | 0x0002 | word | Input type selection | <i>ItYP</i> | Readable/Writable | <i>u.t.r.r</i> |
| 0003d | 0x0003 | word | Voltage Conversion Rate | <i>u.t.r.r</i> | Readable/Writable | <i>100</i> |
| 0004d | 0x0004 | word | The upper limit of the setpoint | <i>UPLL</i> | Readable/Writable | <i>500.0</i> |
| 0005d | 0x0005 | word | The upper limit of the hysteresis value | <i>HYSU</i> | Readable/Writable | <i>1.0</i> |
| 0006d | 0x0006 | word | Delay time for the upper limit alarm | <i>dLYU</i> | Readable/Writable | <i>0</i> |
| 0007d | 0x0007 | word | The lower limit of the setpoint | <i>LOLL</i> | Readable/Writable | <i>0.0</i> |
| 0008d | 0x0008 | word | The lower limit of the hysteresis value | <i>HYSL</i> | Readable/Writable | <i>1.0</i> |
| 0009d | 0x0009 | word | Delay time for the lower limit alarm | <i>dLYL</i> | Readable/Writable | <i>0</i> |
| 0010d | 0x000A | word | Upper limit value for alarm | <i>USEt</i> | Readable/Writable | <i>5.000</i> |
| 0011d | 0x000B | word | Hysteresis value for upper alarm limit | | | |
| 0012d | 0x000C | word | Measurement method (0=AC, 1=dC, 2=ACdC) | <i>tYPE</i> | Readable/Writable | <i>ACdC</i> |
| 0013d | 0x000D | word | Decimal point. (0=X, 1=X.X, 2=X.XX, 3=X.XXX) | <i>dPnt</i> | Readable/Writable | <i>0.000</i> |
| 0014d | 0x000E | word | Sampling time of the measurement value. If 1 is selected, it is 250ms. If 2 is selected, it is 500ms. If 3 is selected, it is 750ms. If 4 is selected, it is 1 second. | <i>oPtn</i> | Readable/Writable | <i>4</i> |
| 0015d | 0x000F | word | Device address for RS485 network connection. Adjustable between 1-247. | <i>AdRS</i> | Readable/Writable | <i>1</i> |
| 0016d | 0x0010 | word | Baudrate (0=Off;1=1200;2=2400; 3=4800; 4=9600; 5=19200 6= 38400; 7= 57600; 8= 115200) | <i>bAUD</i> | Readable/Writable | <i>oFF</i> |

INPUT REGISTERS FOR EPV942-x-xxx-RSI DEVICES

| Input Register Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission |
|--------------------------|--------|-----------|------------------------|----------------|-----------------------|
| Decimal | Hex | | | | |
| 0000d | 0x0000 | word | Measured voltage value | -- | Only Readable |

DISCRETE INPUTS FOR "R2" EXTENSION DEVICES

| Discrete Input Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission |
|--------------------------|--------|-----------|----------------------------------|----------------|-----------------------|
| Decimal | Hex | | | | |
| 0000d | 0x0000 | Bit | Relay output state (0=OFF; 1=on) | -- | Only Readable |

COILS FOR "R2" EXTENSION DEVICES

| Coil Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission | Status Value |
|----------------|--------|-----------|---|----------------|-----------------------|--------------|
| Decimal | Hex | | | | | |
| 0000d | 0x0000 | Bit | Alarm (OUT) output status (0 = no , 1 = nc) | <i>0tYP</i> | Readable/Writable | <i>no</i> |
| 0001d | 0x0001 | Bit | Alarm (ALR) output status (0 = no , 1 = nc) | <i>RS5Et</i> | Readable/Writable | <i>no</i> |

Note 1 : *0tYP* and *RS5Et* menu parameters can be used as "Holding Register" or "Coil."

Note 2 : Received "ModBus input register value" is multiplying by 1000 (based on *dPnt*) and mV value reached.

For example ;

if modbus value is 2842, (for *dPnt* = 2 (0.00)) 28.42x1000 = 28420 mV, ie 28.42V

if modbus value is 2842, (for *dPnt* = 3 (0.000)) 2.842x1000 = 2842 mV, ie 2.842V