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 EPV242 PROGRAMMABLE AC/DC VOLTMETER

Thank you for choosing **ENDA EPV242** Programmable AC/DC voltmeter.

- 77 x 35 mm sized
- 4 digits display
- Selectable number of decimal point
- Indicates between -999V 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
- CE Marked according to Europan Norms.


**Order Code : EPV242 - □□ - □ - □□□**
(1 - 2 - 3)

| 1 - Supply Voltage | 2 - Output | 3 - Modbus |
|---|---|---|
| UV.....90-250V AC<br>LV.....10-30V DC / 8-24V AC | R.....08A Relay | RSI.....RS485 Modbus Available (Specify at order) |

CE

RoHS Compliant

## Technical Specifications

| 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 |
| ⚠ **Do not use the device in locations subject to corrosive and flammable gases.** | |

| ELECTRICAL CHARACTERISTICS | | |
|---|---|---|
| **Supply Voltage** | 90-250V AC 50/60Hz ; 10-30V DC / 8-24V AC SMPS | |
| **Power Consumption** | Max. 5VA | |
| **Wiring** | 2.5mm² screw-terminal connections | |
| **Scale** | **AC and RMS**<br>**DC** | For utrr 0...9999V, for u100 0.....100V, for u500 0...500V<br>For utrr -999...9999V DC, for u100 -100...100V DC, for u500 -500...+500V DC |
| **Sensitivity** | 0,01V ( If, u100 or utrr is selected )<br>0,1V ( If, u500 is selected and higher than -100V, lower from 100V for input values )<br>1V ( If u500 is selected and lower than -100V, higher from 100V for input values ) | |
| **Accuracy** | **AC**<br>**DC**<br>**RMS** | ±%1 ( Full scale ) ( For square wave form ± 2% )<br>±%1 ( Full scale )<br>±%1 ( Full scale ) ( For square wave form ± 2% ) |
| **Input Range** | 9 and 12<br>10 and 11 | -500V...500V **( If u500 is selected, device breaks down at more than ±1250 DC voltages.)**<br>-100V...100V **(If utrr or u100 is selected, device breaks down at more than ±250 DC voltages. )** ⚠ |
| **Input Impedance** | 9 and 12<br>10 and 11 | 870k? |
| **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 | |
|---|---|
| **Output** | Relay: 250V AC, 8A (for resistive load), NO+NC |
| **Life Expectancy for Relay** | Mechanical 30.000.000 operation; 100.000 operation at 250V AC, 2A resistive load. |

| HOUSING | |
|---|---|
| **Housing Type** | Suitable for flush-panel mounting. (According to DIN 43 700) |
| **Dimensions** | W77xH35xD61mm |
| **Weight** | Approx. 250g (after packing) |
| **Enclosure Material** | Self extinguishing plastics. |
| ⚠ **While cleaning the device, solvents (thinner, gasoline, acid etc.) or corrosive materials must not be used.** | |


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**SİSEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.**
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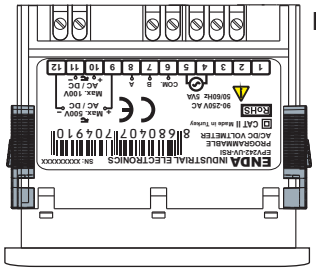
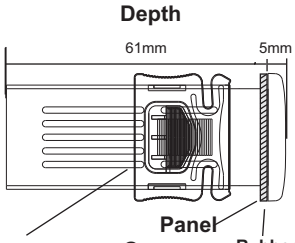
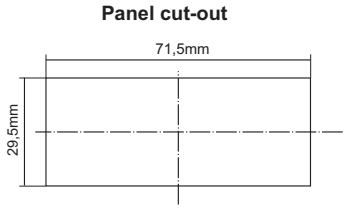
url : www.enda.com.tr

# Dimensions

Flush mounting clamp



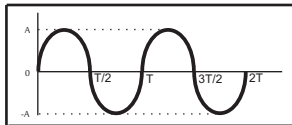
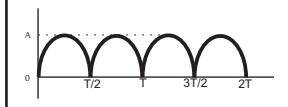
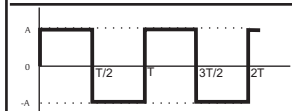
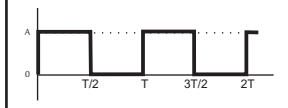
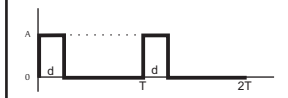
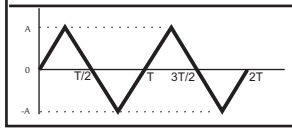

**For removing mounting clamps :**
- Push the flush-mounting clamp in direction **1** as shown in the figure left.
- Then, pull out the clamp in direction **2**.

**Note :** **1)** Panel thickness should be maximum 6 mm.

**2)** There must be at least 60mm free space behind the device, otherwise it would be difficult to remove it from the panel.

**Holding screw 0.4-0.5Nm.**

**Equipment is protected throughout by DOUBLE INSULATION**

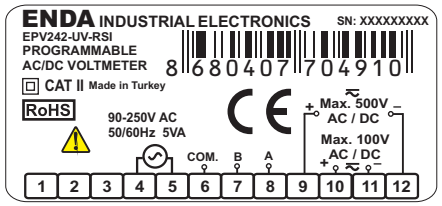
| | Ac | dc | Ac.dc (rms) |
|---|---|---|---|
|  | $A\frac{1}{\sqrt{2}}$ | 0.000 | $A\frac{1}{\sqrt{2}}$ |
|  | 0.308 A | $A\frac{2}{\pi}$ | $A\frac{1}{\sqrt{2}}$ |
|  | 0.386 A | $A\frac{1}{\pi}$ | $A\frac{1}{2}$ |
|  | A | 0.000 | A |
|  | $A\frac{1}{2}$ | $A\frac{1}{2}$ | $A\frac{1}{\sqrt{2}}$ |
|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

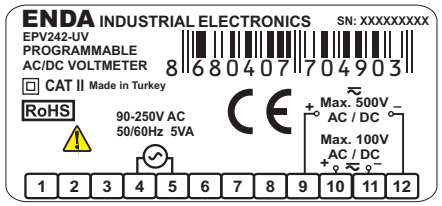
# Connection Diagram

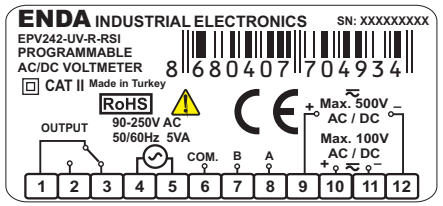
**ENDA EPV242** is intended for installation in control panels. Make sure that the device is used only for intended purpose. The electrical connections must be carried out by a qualified staff and must be according to the relevant locally applicable regulations. During an installation, all of the cables that are connected to the device must be free of electrical power. The device must be protected against inadmissible humidity, vibrations, severe soiling. Make sure that the operation temperature is not exceeded. The cables should not be close to the power cables or components.

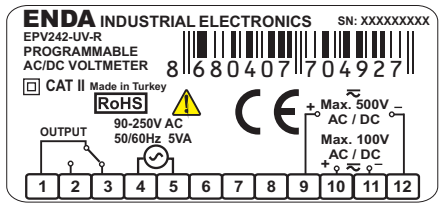
**If `InP` input type "`u500`" is selected, the measurement terminals 9 and 12 of the terminals must be connected. Otherwise, measurement will be incorrect.**

**If `InP` input type "`u100`" or `uLrr` is selected, the measurement terminals 10 and 11 of the terminals must be connected. Otherwise, measurement will be incorrect.**



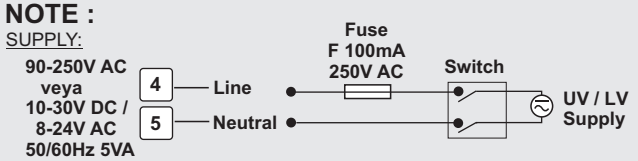




## NOTE :

SUPPLY:




**Note : 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.**

**Fuse should be connected.** **Cable Size: 1,5mm²;**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# EPV242 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. In "Runnig Mode", pressed for 3 seconds continuously, activates or deactivates keylock. |
| **Decrement Key** | ▼ | Used for decreasing the setpoint value and changing parameters. When held down for a few seconds, configured numeric value decreases faster. |
| **Programming Key** | SET | Used for displaying and configuring the selected parameter value. |

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

`ConF` → SET → `out 1` → SET

`out 1` *Includes in R extension devices.*

* `ItYP` **Input Type Selection**
If `U 100` is selected ; By using Max. 100V input (13th and 14th terminals), `u.t.r.r.` is hiden in the menu.
If `U500` is selected ; By using Max. 500V input (12th and 15th terminals), `u.t.r.r.` is hiden in the menu.
If `u.t.r.r.` is selected ; By using Max. 500V input (13th and 14th terminals), `u.t.r.r.` value appears in the menu and can be adjusted between 1 and 9999.

* `u.t.r.r.` **Voltage Conversion Rate**
Can be adjusted between `1` (/100) and `9999` (/100).
If parameter is changed, upper limit value set to the upper scale value, lower limit value set to the lower scale value and hysteresis values are set to the 0,1.

* `tYPE` **Measurement Method**
Can be set as `AC`, `dC` or `ACdC` . Adjusted measurement method indicated by top of the display LEDs.

* `dPnt` **Decimal Indicator**
If measured value is lower than 10, it can be shown as (`0.000`) , (`0.00`) , (`0.0`) or (`0`), (For DC measurements (`0.00`) , (`0.0`) or (`0`) ).
If measured value between 10 and 100, it can be shown as (`0.00`) ,(`0.0`) or (`0`), (For DC measurements (`0.0`) or (`0`) ).
If measured value between 100 and 1000, it can be shown as (`0.0`) or (`0`), (For DC measurements only (`0`) .
**If device includes relay, `dPnt` type may change according to relay parameters value.**

* `oPnt` **Samping Time**
If 1 ( `1` ) is selected ; sampling time of the measurement is 250ms,
If 2 ( `2` ) is selected, it is 500ms. If 3 ( `3` ) is selected, it is 750ms.
If 4 ( `4` ) is selected, it is 1 second.

** `AdrS` **Device Address**
It can be adjusted between `1-247` .

** `bAUd` **Baud Rate**
It can be adjusted as `oFF`, `1200`, `2400`, `4800`, `9600`, `19200`, `38400`, `57600` and `115200`.

`out 1` → `otYP` **Out1 Output**
It can be adjusted as `n.o.` or `n.c.` If `n.o` is selected, incase of alarm, out relay is activated.

`UPLL` **Upper Limit Value**
If `ItYP` parameter is selected as `u.t.r.r.` , can be increased up to `u.t.r.r.` value. If selected as `U 100` , can be increased up to 100 value. If selected as `U500` , can be increased up to 500 value.
This parameter value can not be less than ( `LOLL` - `HYSL` - `HYSU` ).

`HYSU` **Hysteresis Value for Upper Limit**
It can be adjusted between `0` and `20` value. This parameter can't be higher than ( `UPL 1` - `LOL 1` - `HYSL` ).
When `ctrr` changed, `HYSU` gets the value of `0.1` .

`dLYU` **Delay Time for Upper Limit Alarm**
It can be adjusted between `0` and `900` seconds .

`LoLL` **Lower Limit Value**
It can be adjusted between lower scale and upper scale that is specified with `c.t.r.r` parameter.
This parameter can't be higher than (`UPLL` - `HYSU` - `HYSL`) value.

`HYSL` **Hysteresis Value for Lower Limit**
It can be adjusted between `0` and `Ctrr 15` . This parameter can't be higher than ( `UPLL` - `LOLL` - `HYSU` ) value. When `ctrr` is changed, `HYSU` gets the value of `0.1` .

`dLYL` **Delay Time for Lower Limit Alarm**
It can be adjusted between `0` and `900` seconds.

(*) **There are only `ItYP` , `u.t.r.r` , `tYPE` , `dPnt` , `OPtn` parameters in the devices those have no relay.**
(**) **The `AdrS` and `bAUd` parameters are only in the devices those have modbus.**

## LOCKING & UNLOCKING KEYPAD

▲ — `LOC` — `0.00` (Measured Value) — ▲ — `ULOC` — `0.00` (Measured Value)

**In "Running Mode" , by pressing to ▲ key for 3 seconds, keypad locked or unlocked.**

## QUICK MENU

SET — `UPLL` ▲▼ `LoLL` ▲▼ ▲+▼ `0.00` (Measured Value)

**By pressing to SET key for 3 seconds, quick menu is entered.**

## REVISION NUMBER

SET & ▲ & ▼ — `0101` (Day.Month) — `2015` (Year) — `0.00` (Measured Value)

SET & ▲ & ▼ **If these keys are pressed and held together, revision date appears as day, month and year.**
**While revision information displayed and if one of the pressed key is released, measured value is displayed again.**

## SETTING UP THE PARAMETERS

SET `tYPE` ▼ `dC` ▲ `ACdC` SET

**If SET 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.**

SET **After the setting up the parameters, if set key is pressed again, adjusted parameter name appears on display.**

## DEFAULT SETTINGS

**Powered on device by pressing ▼ key. `dPAr` message appears on display and device reset to default settings.**

## ERROR MESSAGES

`----` Measured current value is higher than maximum scale.

`____` Measured current value is lower than minimum scale.

# ENDA EPV242 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 | oUTP | Readable/Writable | no |
| 0001d | 0x0001 | word | Input type selection | INTP | Readable/Writable | u.t.r.r |
| 0002d | 0x0002 | word | Voltage Conversion Rate | u.t.r.r | Readable/Writable | 100 |
| 0003d | 0x0003 | word | The upper limit of the setpoint | UPLL | Readable/Writable | 500.0 |
| 0004d | 0x0004 | word | The upper limit of the hysteresis value | HYSU | Readable/Writable | 1.0 |
| 0005d | 0x0005 | word | Delay time for the upper limit alarm | dLYU | Readable/Writable | 0 |
| 0006d | 0x0006 | word | The lower limit of the setpoint | LOLL | Readable/Writable | 0.0 |
| 0007d | 0x0007 | word | The lower limit of the hysteresis value | HYSL | Readable/Writable | 1.0 |
| 0008d | 0x0008 | word | Delay time for the lower limit alarm | dLYL | Readable/Writable | 0 |
| 0009d | 0x0009 | word | Measurement method (0=AC, 1=dC, 2=ACdC) | TYPE | Readable/Writable | ACdC |
| 0010d | 0x000A | word | Decimal point. (0=X, 1=X.X, 2=X.XX, 3=X.XXX) | dPnt | Readable/Writable | 0.0 |
| 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. | oPtn | Readable/Writable | 4 |
| 0012d | 0x000C | word | Device address for RS485 network connection. Adjustable between 1-247. | AdrS | Readable/Writable | 1 |
| 0013d | 0x000D | word | Baudrate (0=Off;1=1200;2=2400; 3=4800; 4=9600; 5=19200 6= 38400; 7= 57600; 8= 115200) | bAUd | Readable/Writable | oFF |
| *Holding Register Parameter Table (No Relay Models) | | | | | | |
| 0000d | 0x0000 | word | Input type selection | INTP | Readable/Writable | u.t.r.r |
| 0001d | 0x0001 | word | Voltage Conversion Rate | u.t.r.r | Readable/Writable | 100 |
| 0003d | 0x0003 | word | Measurement method (0=AC, 1=dC, 2=ACdC) | TYPE | Readable/Writable | ACdC |
| 0004d | 0x0004 | word | Decimal point. (0=X.XX,1=X.X,2=X) | dPnt | Readable/Writable | 0.000 |
| 0005d | 0x0005 | word | Sampling time of the measurement value | oPtn | Readable/Writable | 4 |
| 0006d | 0x0006 | word | Device address for RS485 network connection. Adjustable between 1-247. | AdrS | Readable/Writable | 1 |
| 0007d | 0x0007 | word | Baudrate (0=Off;1=1200;2=2400; 3=4800; 4=9600; 5=19200 6= 38400; 7= 57600; 8= 115200) | bAUd | Readable/Writable | 9600 |

## INPUT REGISTERS FOR EPV242-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 (0=oFF; 1=on) | -- | 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 (0=no; 1=nc) | oUTP | Readable/Writable | no |

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

**Note 1 :** oUTP 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