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 EPV541 AC/DC VOLTMETER

Thank you for choosing **ENDA EPV541** AC/DC voltmeter.

* 54 x 94mm sized.
* 3 digits display.
* Values between -100V and 100 V can be indicated with one decimal point.
* For maximum 50V AC/DC measurements, measurements between -50V and +50V can be shown with two decimal digits by having 10 times more accurate measurement input.
* Easy to configure with front panel keypad.
* Multifunctional alarm output (NO+NC) for upper and lower limits.
* Communication feature over isolated RS485, using ModBus RTU protocol. (Functional).
* Measuring type can be selected as AC, DC or true RMS.
* CE marked according to Europan Norms.

**RoHS Compliant**

CE


**Order Code : EPV541 - □ - □□□□ - □□□**
**1 2 3**

**1-Output**
R.....Relay
None...No relay

**2-Supply Voltage**
230VAC...230V AC
110VAC...110V AC
24VAC.....24V AC
SM.....9-30V DC / 7-24V AC

**3-ModBus**
RSI..... Insulated ModBus (optional)

## Technical Specifications

| ENVIRONMENTAL CONDITIONS | |
|---|---|
| Ambient/stroge temperature | 0 ... +50°C/-25 ... 70°C |
| 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 | 230V AC +10% -20%, 50/60Hz or 24V AC ±10% , 50/60Hz or optional 9-30V DC / 7-24V AC ±10% SMPS | |
| Power consumption | Max. 5VA | |
| Wiring | 2.5mm² screw-terminal connections | |
| Scale | AC and RMS : If C. inP; 500 is selected, it is 0V...500V or If C.inP ;50 is selected, it is 0....50V<br>DC : If C. inP ;500 is selected, it is -500V DC....500V DC or If C. inP;50 is selected, it is -50V DC....50V DC | |
| Sensitivity | 0,01V (If C. inP;50 is selected )<br>0,1V (If C inP;500 is selected and higher than -100V or lower than 100V for input values)<br>1V (If C inP;500 is selected and lower than -100V or higher than 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 | -500V...500V (If C inP 500 is selected, device breaks down at more than ±1250 DC voltages.)<br>-50V....50V (If C inP 50 is selected, device breaks down at more than ±125 DC voltages.) | |
| Input Impedance | 870kΩ | |
| Frequency Range | DC , 10Hz - 200Hz (For square wave form 10Hz-70Hz) | |
| EMC | EN 61326-1: 2012 | |
| Safety requirements | EN 61010-1: 2010 (Pollution degree 2, overvoltage category II) | |

| OUTPUTS | |
|---|---|
| Alarm output | Relay: 250V AC, 8A (for resistive load), NO+NC |
| Life expectancy for relay | Mechanical 30.000.000 ; Electrical 100.000 operation. |

| HOUSING | |
|---|---|
| Housing type | Rail mountable (EN60715,TH35) |
| Dimensions | W54xH94xD68mm |
| Weight | Approx. 250g (after packing) |
| Enclosure material | Self extinguishing plastics. |

**While cleaning the device, solvents (thinner, benzine, acid etc.) or corrosive materials must not be used.**


sisel

**SİSEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.**
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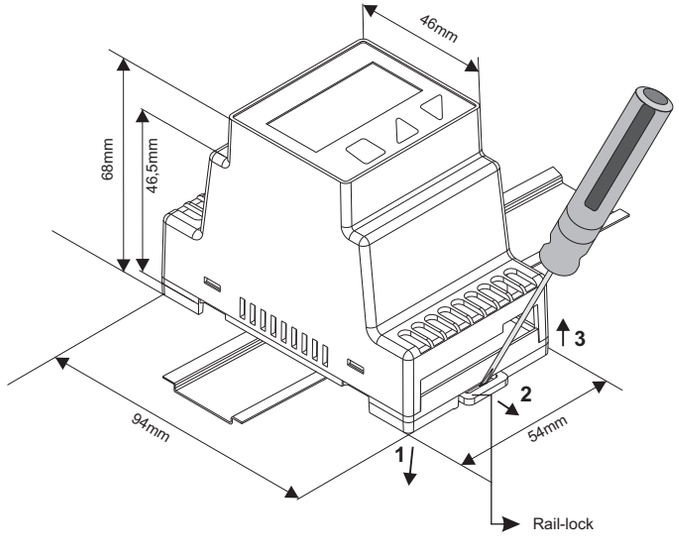
ENDA™


EPV541-E-02-201409




**For mounting the device on rail :**

Push the device to rail in direction **1** and make shure that rail-lock is interlocked to rail.

**For removing the device from rail :**

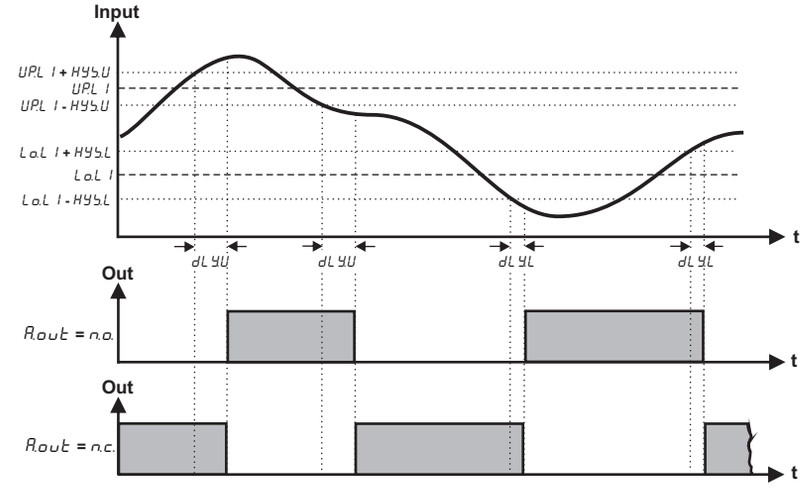
Push the rail-lock with a flat tip screwdriver in direction **2** and pull the device in direction **3** .

**Holding screw 0.4-0.5Nm.**

**Equipment is protected throughout by DOUBLE INSULATION**

**RoHS Compliant**

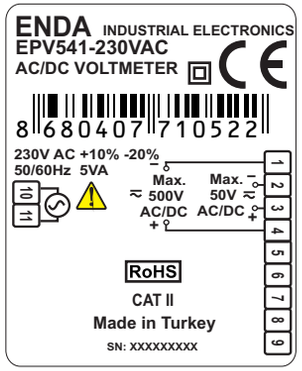
CE

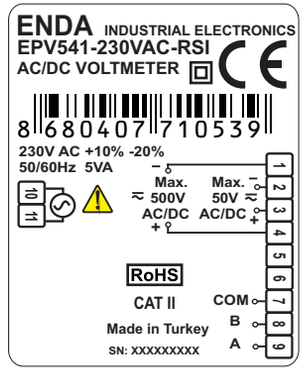


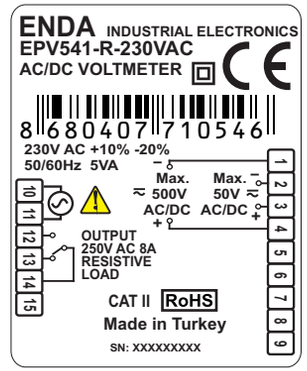

## CONNECTION DIAGRAM

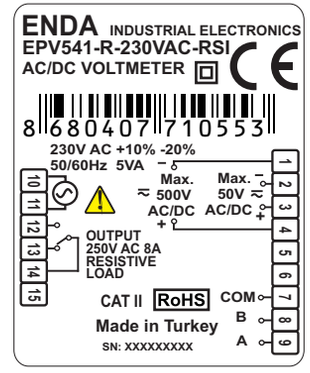

**ENDA EPV541** is intended for installation in control panels.Make sure that the device is used only for intended purpose.The electrical connections must be carried on by a qualified staff and must be according to the relevant locally applicable regulations. During an installation, all of the cables 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 C. inP input type "500" is selected, the measurement terminals 1 and 4 of the terminals must be connected. Otherwise the measurement will be incorrect.**
**If C.inP input type "50" is selected, the measurement terminals 2 and 3 of the terminals must be connected. Otherwise the measurement will be incorrect.**



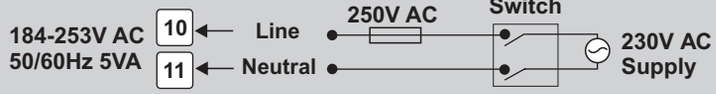




## NOTE :

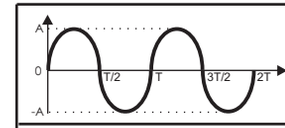
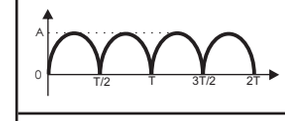
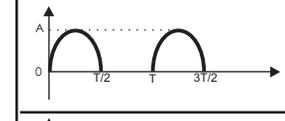
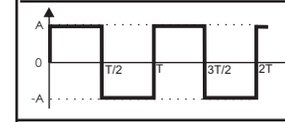
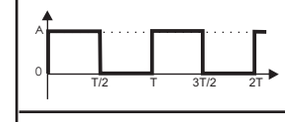
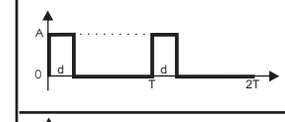
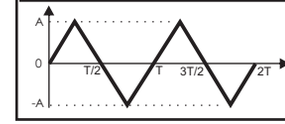
SUPPLY:



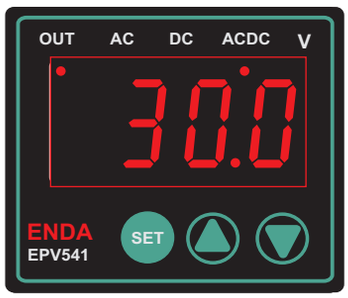

**Fuse should be connected.**

**Cable size: 1,5mm²**

**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.**

| | 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 | $A\frac{1}{\sqrt{3}}$ |

# EPV541 PROGRAMMING DIAGRAM

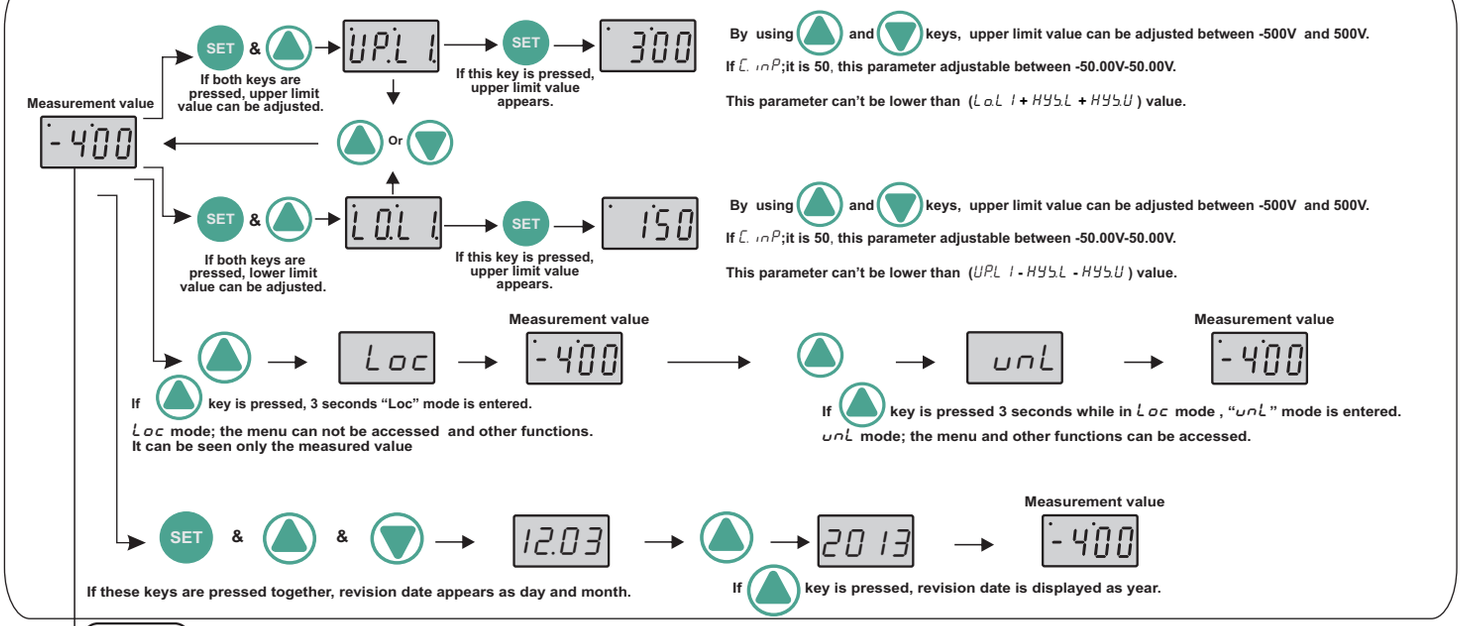



**Increment key** — Used for increasing the setpoint value and changing parameters. When held down for a few seconds, configured numeric value increases faster.

**Decrement key** — Used for decreasing the setpoint value and changing parameter. When held down for a few seconds, configured numeric value decreases faster.

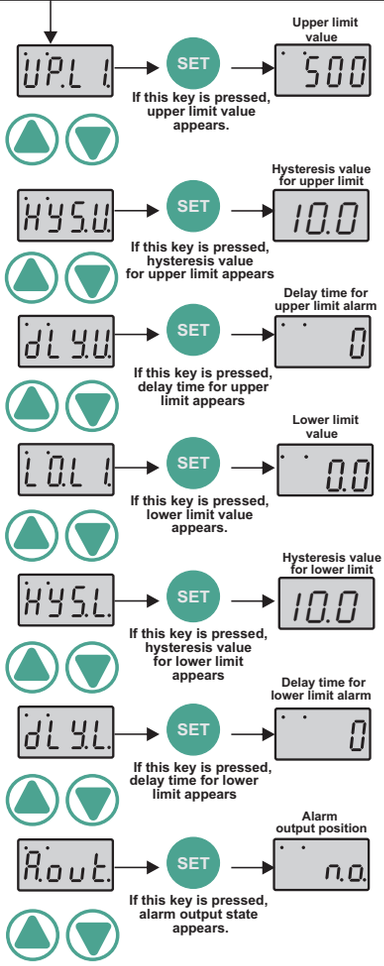
**Programming key** — SET — Used for displaying and configuring the selected parameter value.

## ADJUSTING THE ALARM VALUE




If both ▲ & ▼ keys are pressed and held for 3 seconds, programming mode is entered. If ▲ & ▼ keys are pressed while parameter names are displayed, then it returns to measured value made.

## PROGRAMMING MODE




By using ▲ and ▼ keys, upper limit value can be adjusted between -500V and 500V.

If C. inP;it is 50, this parameter adjustable between -50.00V-50.00V.

( This parameter can't be lower than (LoL 1 + HYSL + HYSU ) value.

If SET key is pressed, it returns to parameter name.

By using ▲ and ▼ keys, hysteresis value for upper limit can be adjusted between 0.0V and 20.0V.If C. inP;it is 50, this parameter adjustable between 0.00 and 20.00.This parameter can't be higher than ( UPL 1 - LoL 1 - HYSL ) value.

If SET key is pressed, it returns to parameter name.

By using ▲ and ▼ keys, delay time for upper limit alarm can be adjusted between 0 and 900 seconds.

If SET key is pressed , it returns to parameter name.

By using ▲ and ▼ keys, lower limit value can be adjusted between -500V and 500V.

If C. inP;it is 50, this parameter adjustable between -50.00V-50.00V. This parameter can't be higher than (UPL 1 - HYSU - HYSL ) value.

If SET key is pressed, it returns to parameter name.

By using ▲ and ▼ keys, hysteresis value for lower limit can be adjusted between 0.0V and 20.0V. If C. inP;it is 50, this parameter adjustable between 0.00 and 20.00.This parameter can't be higher than ( UPL 1 - LoL 1 - HYSU ) value.

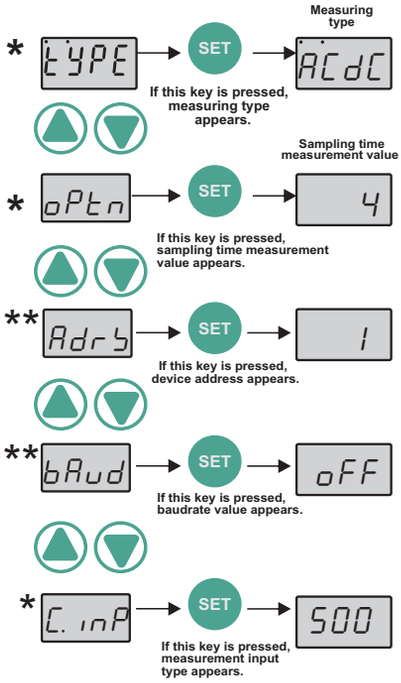
If SET key is pressed,it returns to parameter name.

By using ▲ and ▼ key,s delay time for lower limit alarm can be adjusted between 0 and 900 seconds.

If SET key is pressed ,it returns to parameter name.

By using ▲ and ▼ keys, alarm output state can be adjusted to no. or nc. If it is adjusted no, output relay is powered at alarm condition.

If SET key is pressed ,it returns to parameter name.




By using and keys, measuring type can be adjusted to Ac , dc or Acdc.**Three leds at the top of the display show measuring type.**

If SET key is pressed,it returns to parameter name.

**Sampling time of the measurement value is shown on the screen. If the 1 selected;sampling time of the measurement is 250ms, If 2 is selected,it is 500ms.If 3 is selected, it is 750ms.If 1 is selected,it is 1 second.**

If SET key is pressed, it returns to parameter name.

By using and keys device address can be adjusted between 1-247.

If SET key is pressed, it returns to parameter name.

By using and keys, baudrate value of the device can be adjusted to OFF,1200,2400,4800,9600,19200.

If SET key is pressed,it returns to parameter name.

By using and keys measurement input type can be selected as 500 or 50 .
If input type 500 is selected, max. 500V DC or 500V AC can be applied.
If input type 50 is selected, max. 50V DC or 50V AC can be applied.

If SET key is pressed, it returns to parameter name.

(*) There are only , tYPE , oPtn and C. inP parameters in the devices those have no relay.

(**) The Adrs and bAud parameters are only in the devices those have modbus.

If C. inP input type "500" is selected, the measurement terminals 1 and 4 must be connected. Otherwise the measurement will be incorrect.
If C.inP input type "50" is selected, the measurement terminals 2 and 3 must be connected. Otherwise the measurement will be incorrect.

For returning to measured value and saving to new settings, one of the following options can be applied ;

a) Wait for 25 seconds without pressing any key after the pogramming.

b) Press and keys together after the pogramming.

c) Power down and power up the device after the pogramming.

NOTE : If key is held down while the device is powered up, dPAr message will appear and factory settings will be restored.
Before the factory defaults, if the C. inP 50 is selected, HYSL and HYSU will be applied as 100 after the factory defaults.

**ERROR MESSAGES**

Means, measured current value is higher than maximum scale.

Means, measured current value is lower than minimum scale.

## ENDA EPV541 DIGITAL VOLTMETER MODBUS PROTOCOL ADDRESS MAP

### 1.1 HOLDING REGISTERS

| Holding Register Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission | Status Value |
|---|---|---|---|---|---|---|
| Decimal | Hex | | | | | |
| 0000d | 0x0000 | word | The upper limit of the setpoint | uPL 1 | Readable/Writable | 500 |
| 0001d | 0x0001 | word | The upper limit of the hysteresis value | HYSU | Readable/Writable | 0 |
| 0002d | 0x0002 | word | Delay time for the upper limit alarm | dLYU | Readable/Writable | 30 |
| 0003d | 0x0003 | word | The lower limit of the setpoint | LoL 1 | Readable/Writable | 0 |
| 0004d | 0x0004 | word | The lower limit of the hysteresis value | HYSL | Readable/Writable | 0 |
| 0005d | 0x0005 | word | Delay time for the lower limit alarm | dLYL | Readable/Writable | 30 |
| 0006d | 0x0006 | word | Measurement method (0=AC , 1=dC ,2=ACdC) | tYPE | Readable/Writable | ACdC |
| 0007d | 0x0007 | 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 |
| 0008d | 0x0008 | word | Device address for RS485 network connection. Adjustable between 1-247. | AdrS | Readable/Writable | 1 |
| 0009d | 0x0009 | word | Baudrate (0=Off;1=1200;2=2400; 3=4800; 4=9600; 5=19200) | bAUd | Readable/Writable | oFF |
| ***Holding Register Parameter Table (No Relay Models)** | | | | | | |
| 0000d | 0x0000 | word | Measurement method (0=AC , 1=dC ,2=ACdC) | tYPE | Readable/Writable | ACdC |
| 0001d | 0x0001 | word | Sampling time of the measurement value | oPtn | Readable/Writable | 4 |
| 0002d | 0x0002 | word | Device address for RS485 network connection. Adjustable between 1-247. | AdrS | Readable/Writable | 1 |
| 0003d | 0x0003 | word | Baudrate (0=Off;1=1200;2=2400; 3=4800; 4=9600; 5=19200) | bAUd | Readable/Writable | oFF |

### 1.2 INPUT REGISTERS

| Input Register Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission |
|---|---|---|---|---|---|
| Decimal | Hex | | | | |
| 0000d | 0x0000 | word | Measured voltage value | -- | Only Readable |
| 0001d | 0x0001 | word | Measured voltage value. (While the measured value of 3-digit decimal point is read as. This value is "0" in other cases.) | -- | Only Readable |

### 1.3 DISCRETE INPUTS

| Discrete Input Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission |
|---|---|---|---|---|---|
| Decimal | Hex | | | | |
| 00d | 0x00 | Bit | Relay output state (0=OFF; 1=ON) | -- | Only Readable |

### 1.4 COILS

| Coil Addresses | | Data Type | Data Content | Parameter Name | Read/Write Permission | Status Value |
|---|---|---|---|---|---|---|
| Decimal | Hex | | | | | |
| 00d | 0x00 | Bit | Alarm output state (0=no; 1=nc) | Aout | Readable/Writable | no |

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