



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 EPV241A AC/DC VOLTMETER

Thank you for choosing ENDA EPV241 AC/DC voltmeter.

- * 77 x 35mm sized.
- * 3 digits display.
- * Values between -100V and 100 V can be indicated with one decimal point.
- * For maximum 50V AC/DC measurements; 10 times the sensitivity of the measurement values between -50V and +50V with two decimal places to show.
- * 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 European Norms.



**RoHS
Compliant**



Order Code : EPV241A- ☐ - ☐☐☐ - ☐☐☐
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 $\pm 10\%$, 50/60Hz or optional 9-30V DC / 7-24V AC $\pm 10\%$ SMPS
Power consumption	Max. 5VA
Wiring	2.5mm ² screw-terminal connections
Scale	AC and RMS: If $\overline{C.inP;500}$ is selected, it is 0V...500V or If $\overline{C.inP;50}$ is selected, it is 0....50V DC : If $\overline{C.inP;500}$ is selected, it is -500V DC....500V DC or If $\overline{C.inP;50}$ is selected, it is -50V DC....50V DC
Sensitivity	0,01V (If $\overline{C.inP;50}$ is selected) 0,1V (If $\overline{C.inP;500}$ is selected and higher than -100V or lower than 100V for input values) 1V (If $\overline{C.inP;500}$ is selected and lower than -100V or higher than 100V for input values)
Accuracy	AC $\pm 1\%$ (Full scale) (For square wave form $\pm 2\%$) DC $\pm 1\%$ (Full scale) RMS $\pm 1\%$ (Full scale) (For square wave form $\pm 2\%$)
Input Range	-500V...500V (If $\overline{C.inP;500}$ is selected, device breaks down at more than ± 1250 DC voltages.) -50V....50V (If $\overline{C.inP;50}$ is selected, device breaks down at more than ± 125 DC voltages.)
Input Impedance	870k Ω
Frequency Range	DC , 10Hz - 200Hz (For square wave form 10Hz-70Hz)
EMC	EN 61326-1: 2006
Safety requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)

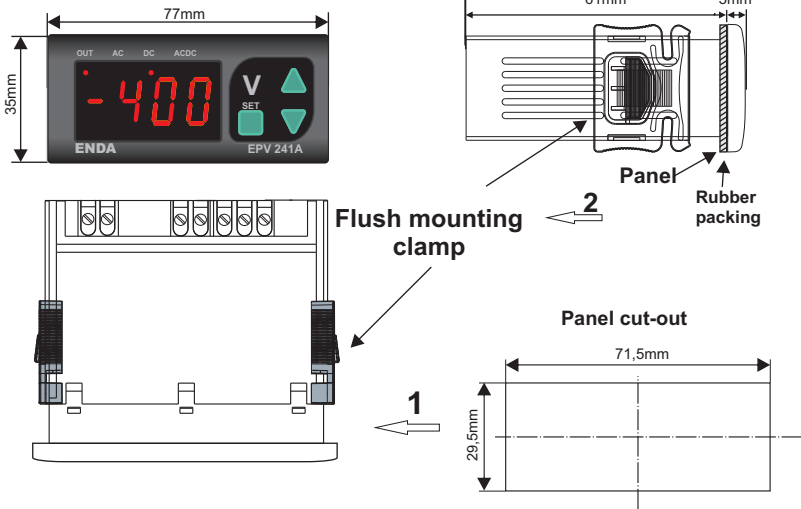
OUTPUTS	
Alarm output	Relay: 250V AC, 8A (for resistive load), NO+NC
Life expectancy for relay	Mechanical 30.000.000 ; Electrical 100.000 operation.

HOUSING	
Housing type	Suitable for flush-panel mounting. (According to DIN 43 700)
Dimensions	W77xH35xD71mm
Weight	Approx. 350g (after packing)
Enclosure material	Self extinguishing plastics.



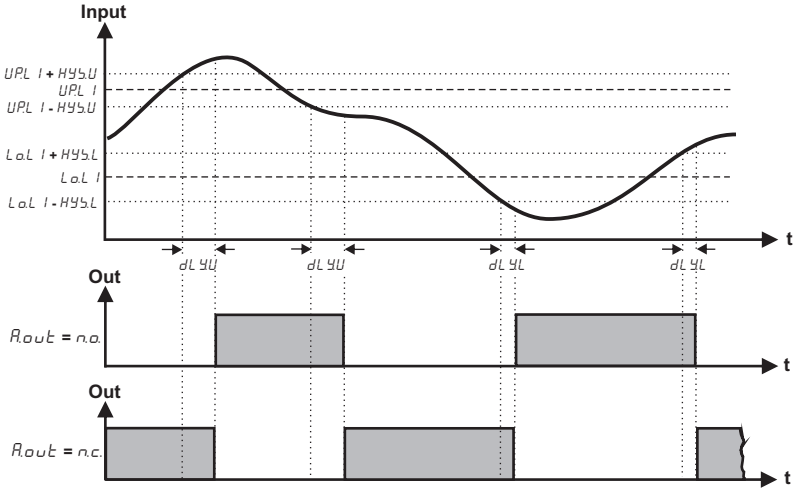
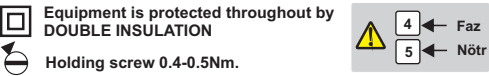
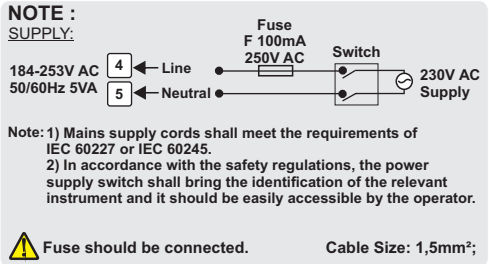
While cleaning the device, solvents (thinner, benzine, acid etc.) or corrosive materials must not be used.

Dimensions



To remove the device from panel:
- While pushing the the flush-mounting clamp in direction 1, pull out it in direction 2.

- Note :**
- 1) Panel thickness should be maximum 7mm.
 - 2) If there is no 60mm free space at the back side of the device, it would be difficult to remove it from the panel.



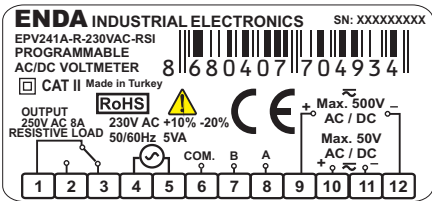
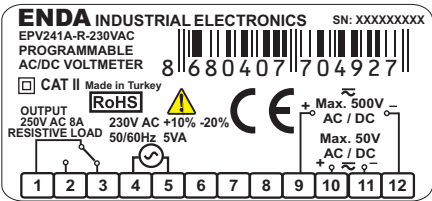
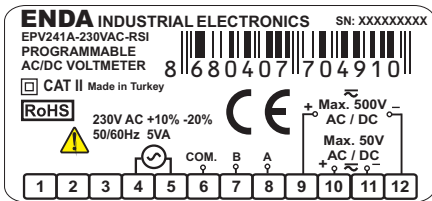
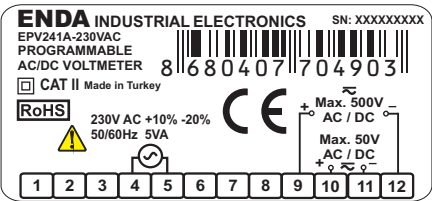
Connection Diagram



ENDA EPV241A 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 C_{inP} input type "500" is selected, the measurement terminals 9 and 12 of the terminals must be connected. Otherwise the measurement is done incorrectly.

If C_{inP} input type "50" is selected, the measurement terminals 10 and 11 of the terminals must be connected. Otherwise the measurement is done incorrectly.



	R_c	d_c	$R_c.d_c$ (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	$A \frac{1}{\sqrt{3}}$



Programming key

SET

Setting Upper Limit Value:

- Start with a measurement value (e.g., -400V).
- Press **SET** and **▲** keys. If both are pressed, the upper limit value can be adjusted.
- The display shows **UPL 1**.
- Press the **SET** key. If this key is pressed, the upper limit value appears (e.g., 300).
- By using **▼** and **▲** keys, the upper limit value can be adjusted between -500V and 500V.
- If **C_{min}P** is 50, this parameter is adjustable between -50.00V and 50.00V.
- This parameter can't be lower than $(L_{OL1} + H_{YL} + H_{YU})$ value.

Setting Lower Limit Value:

- Press **SET** and **▼** keys. If both are pressed, the lower limit value can be adjusted.
- The display shows **LOL 1**.
- Press the **SET** key. If this key is pressed, the lower limit value appears (e.g., 150).
- By using **▼** and **▲** keys, the lower limit value can be adjusted between -500V and 500V.
- If **C_{min}P** is 50, this parameter is adjustable between -50.00V and 50.00V.
- This parameter can't be lower than $(UPL1 - H_{YL} - H_{YU})$ value.

Modes:

- If **▲** key is pressed, "Loc" mode is entered. Loc mode; the menu can not be accessed and other functions. It can be seen only the measured value.
- If **▲** key is pressed, "uNL" mode is entered. uNL mode; the menu and other functions can be accessed.

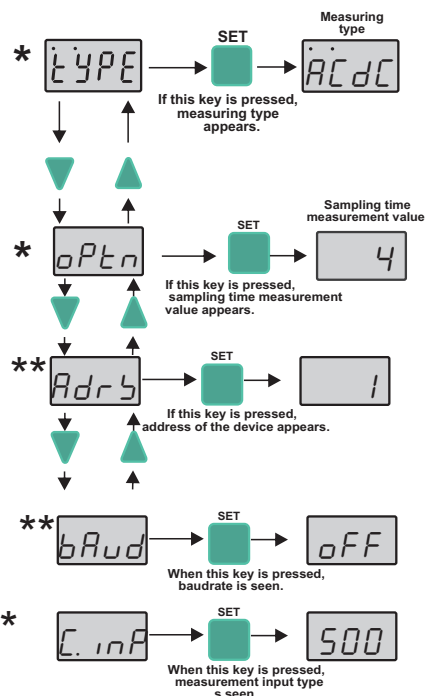
Revision Date:

- If keys are pressed together, revision date, day and month are displayed (e.g., 12.03).
- While the revision date is shown as day/month, if **▲** key is pressed, the revision date is displayed as year (e.g., 2013).

Programming Mode:

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

Output relay is powered at alarm condition.



By using  and  keys, measuring type can be adjusted to R_c , d_c or $R_c d_c$. Three leds at the top of the display show measuring type.

If 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 4 is selected, it is 1 second.

If key  is pressed, it returns to parameter name.

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

If 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  key is pressed, it returns to parameter name.

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

(**) The **Addr5** and **bAud** parameters are only in the devices those have modbus.

If any key is pressed in 25 seconds or the device is powered down and powered up, then it returns to operation mode.

NOTE: If  key is held down while the device is powered up, the **dPAr** message will appear and the factory settings will be restored.

Factory settings restored after **C.inP**; 50, **HYSL** and **HYSU** are set to "100"

If **C.inP** input type "500" is selected, the measurement terminals 9 and 12 of the terminals must be connected. Otherwise the measurement is done incorrectly.

If **C.inP** input type "50" is selected, the measurement terminals 10 and 11 of the terminals must be connected. Otherwise the measurement is done incorrectly.

ERROR MESSAGES



Means, measured current value is higher than maximum scale.



Means, measured current value is lower than minimum scale.

ENDA EPV241A 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	UP L I	Readable/Writable	500
0001d	0x0001	word	The upper limit of the hysteresis value	HY SU	Readable/Writable	0
0002d	0x0002	word	Delay time for the upper limit alarm	DL YU	Readable/Writable	30
0003d	0x0003	word	The lower limit of the setpoint	LO L I	Readable/Writable	0
0004d	0x0004	word	The lower limit of the hysteresis value	HY SL	Readable/Writable	0
0005d	0x0005	word	Delay time for the lower limit alarm	DL YL	Readable/Writable	30
0006d	0x0006	word	Measurement method (0=RC, 1=dC, 2=RC dC)	TYPE	Readable/Writable	RC dC
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.	SP En	Readable/Writable	4
0008d	0x0008	word	Device address for RS485 network connection. Adjustable between 1-247.	Ad F S	Readable/Writable	1
0009d	0x0009	word	Baudrate (0=Off; 1=1200; 2=2400; 3=4800; 4=9600; 5=19200)	BA Ud	Readable/Writable	OFF

*Holding Register Parameter Table (No Relay Models)

0000d	0x0000	word	Measurement method (0=RC, 1=dC, 2=RC dC)	TYPE	Readable/Writable	RC dC
0001d	0x0001	word	Sampling time of the measurement value	SP En	Readable/Writable	4
0002d	0x0002	word	Device address for RS485 network connection. Adjustable between 1-247.	Ad F S	Readable/Writable	1
0003d	0x0003	word	Baudrate (0=Off; 1=1200; 2=2400; 3=4800; 4=9600; 5=19200)	BA Ud	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)	AL Out	Readable/Writable	no

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