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 - Output
R.....Relay
Blank....N/A

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)

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	230V AC +10% -20% or 24V AC ±%10, 50/60Hz or 9-30V DC / 7-24V AC ±10% (Optional)	
Power Consumption	Max. 5VA	
Wiring	2.5mm² screw-terminal connections	
Scale	**AC and RMS** **DC**	For uEr r 0...9999V, for u 100 0.....100V, for u500 0...500V For uEr r -999...9999V DC, for u 100 -100...100V DC, for u500 -500...+500V DC
Sensitivity	0,01V (If, u 100 or uEr r is selected) 0,1V (If, u500 is selected and higher than -100V, lower from 100V for input values) 1V (If u500 is selected and lower than -100V, higher from 100V for input values)	
Accuracy	**AC** **DC** **RMS**	±%1 (Full scale) (For square wave form ± 2%) ±%1 (Full scale) ±%1 (Full scale) (For square wave form ± 2%)
Input Range	9 and 12 10 and 11	-500V...500V **(If u500 is selected, device breaks down at more than ±1250 DC voltages.)** -100V...100V **(If uEr r or u 100 is selected, device breaks down at more than ±250 DC voltages.)** ⚠
Input Impedance	9 and 12 10 and 11	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	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.**	

sisel
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Şerifali Mah. Barbaros Cad. No:18 Y.Dudullu 34775
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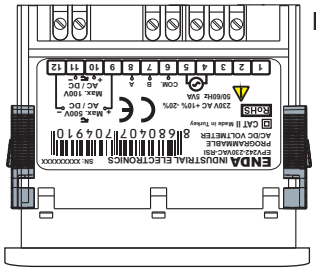
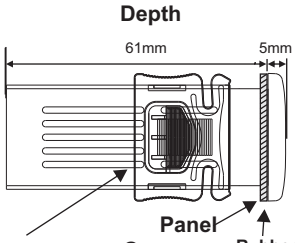
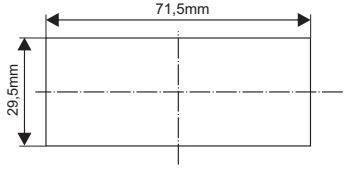
url : www.enda.com.tr

Dimensions



Flush mounting clamp





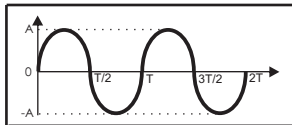
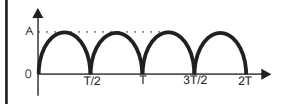
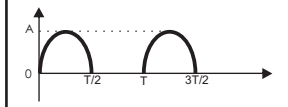
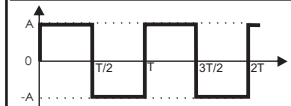
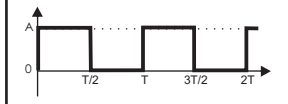
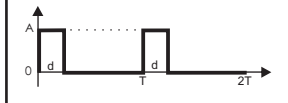
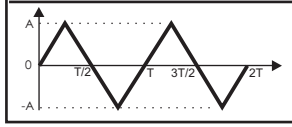
For removing mounting clamps :
- Push the flush-mounting clamp in direction **1** as shown in the figure left.
- Then, pull out the clamp in direction **2**.

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

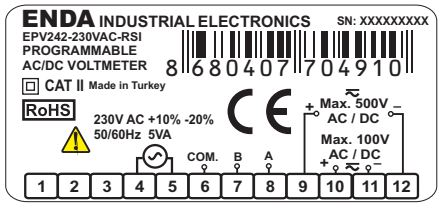
	Ac	dc	Ac.dc (rms)
	$A\frac{1}{\sqrt{2}}$	0.000	$A\frac{1}{\sqrt{2}}$
	0.308 A	$A\frac{2}{\pi}$	$A\frac{1}{\sqrt{2}}$
	0.386 A	$A\frac{1}{\pi}$	$A\frac{1}{2}$
	A	0.000	A
	$A\frac{1}{2}$	$A\frac{1}{2}$	$A\frac{1}{\sqrt{2}}$
	$A\sqrt{\frac{d}{T}-\frac{d^2}{T^2}}$	$A\frac{d}{T}$	$A\sqrt{\frac{d}{T}}$
	$A\frac{1}{\sqrt{3}}$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

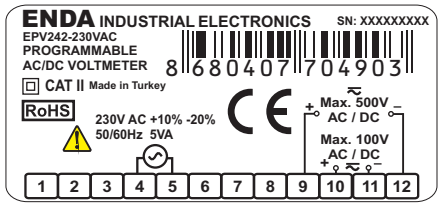
Connection Diagram

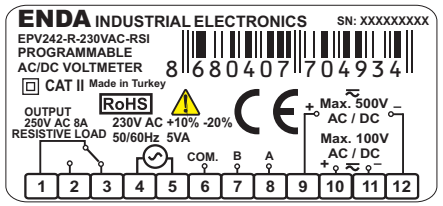
ENDA EPV242 is intended for installation in control panels. Make sure that the device is used only for intended purpose. The electrical connections must be carried out by a qualified staff and must be according to the relevant locally applicable regulations. During an installation, all of the cables 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.

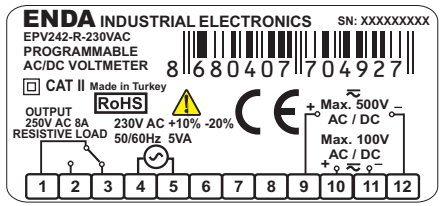
If `InP` input type "`u500`" is selected, the measurement terminals 9 and 12 of the terminals must be connected. Otherwise, measurement will be incorrect.

If `InP` input type "`u 100`" or `uLrr` is selected, the measurement terminals 10 and 11 of the terminals must be connected. Otherwise, measurement will be incorrect.



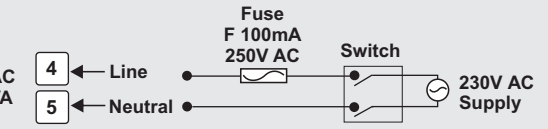






NOTE :

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

`i` 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.

** `Adr5`

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.

`otYP` → `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`).

`UPLL` → `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` .

`HYSU` → `dLYU`

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

`dLYU` → `LoLL`

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

`LoLL` → `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` .

`HYSL` → `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 `Adr5` and `bAUd` parameters are only in the devices those have modbus.**

LOCKING & UNLOCKING KEYPAD

`LOC` → `0.00` → `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.

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	oEYP	Readable/Writable	no
0001d	0x0001	word	Input type selection	IEYP	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	IEYP	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 R EXTENSION 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)	oEYP	Readable/Writable	no

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

Note 1 : oEYP 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