> ⚠️ 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 EPV241 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.**
* **Easy to configure with front panel keypad.**
* **Multifunctional alarm output (NO+NC) for upper and lower limits.**
* **CE marked according to Europan Norms.**
* **Measuring type can be selected AC, DC or True RMS.**

CE

Order Code : EPV241- ☐ - ☐ - ☐☐☐☐☐☐ - ☐☐
                      1   2   3   4

1-Input
  L.........-50V..+50V
  None...-500V...+500V

2-Output
  R......Relay
  None...No relay

3-Supply Voltage
  230VAC...230V AC
  24VAC.....24V AC
  SM...........9-30V DC / 7-24V AC

4-ModBus
  RS..... ModBus (optional)

Technical Specifications

ENVIRONMENTAL CONDITIONS	
Ambient/stroge temperature	0 ... +50°C/-25 ... 70°C
Max. Relative humidity	Relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity 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 0V...500V or For EPV241-L devices 0.00V...50.00V DC -500V...500V -50.0V...50.00V
Sensitivity	0,01V (For input voltages between -10V and 50V in EPV241-L devices.) 0,1V (For input voltages between -100V and 100V in EPV241 devices and for input voltages lower than -10V in EPV241-L devices.) 1V (For input voltages lower than -100V or higher than 100V.)
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 breaks down at more than ±1250V DC voltages.) -50V....50V (For EPV241-L)
Input Impedance	870kΩ
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	EPV241 Approx. 350g (after packing) EPV241-24 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

Depth

61mm   5mm

77mm

35mm

OUT AC DC ACDC

- 400

V SET

ENDA   EPV 241

Flush mounting clamp

Panel

Rubber packing

2

1

Panel cut-out

71mm

29mm
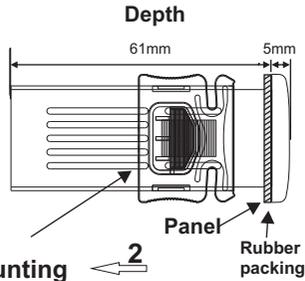
To remove the device from panel:
- While pushing the the flush-mounting clamp in direction **1,** pull out it in direction **2.**

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.

NOTE :
SUPPLY:

184-253V AC 50/60Hz 5VA

| 5 | ← Line |
| 6 | ← Neutral |

Fuse F 100mA 250V AC   Switch

230V AC 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.
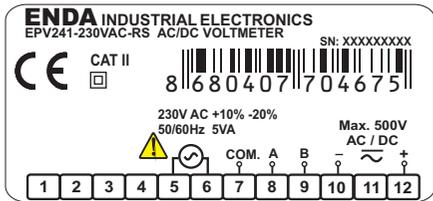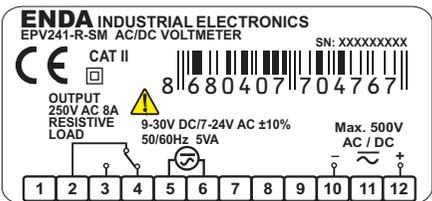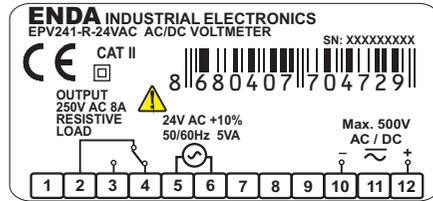
⚠ Fuse should be connected.   Cable Size: 1,5mm²;

▭ Equipment is protected throughout by DOUBLE INSULATION

⊥ Holding screw 0.4-0.5Nm.

| 10 | ← Faz |
| 12 | ← Nötr |
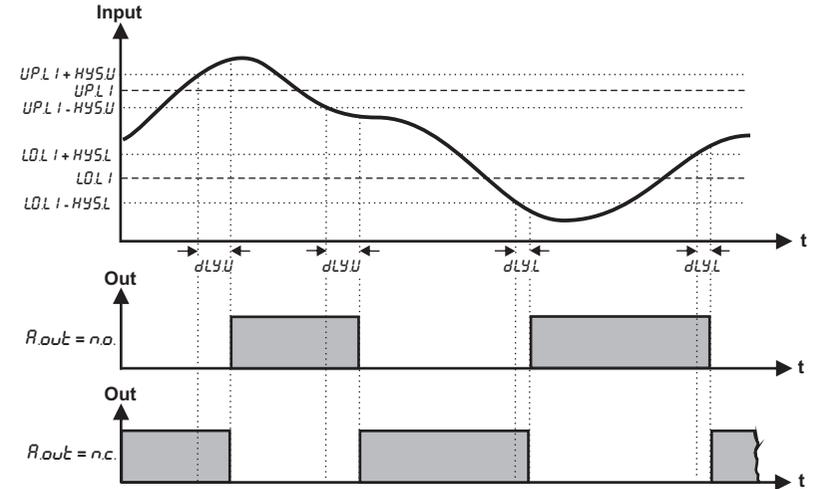
Connection Diagram

⚠ ENDA EPV241 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.

ENDA INDUSTRIAL ELECTRONICS
EPV241-230VAC AC/DC VOLTMETER
SN: XXXXXXXXX
CE CAT II ▭
8 680407 704668
230V AC +10% -20% 50/60Hz 5VA
Max. 500V AC / DC
− ∼ +
1 2 3 4 5 6 7 8 9 10 11 12

ENDA INDUSTRIAL ELECTRONICS
EPV241-R-24VAC AC/DC VOLTMETER
SN: XXXXXXXXX
CE CAT II ▭
8 680407 704729
OUTPUT 250V AC 8A RESISTIVE LOAD   24V AC +10% 50/60Hz 5VA
Max. 500V AC / DC
− ∼ +
1 2 3 4 5 6 7 8 9 10 11 12

ENDA INDUSTRIAL ELECTRONICS
EPV241-R-SM AC/DC VOLTMETER
SN: XXXXXXXXX
CE CAT II ▭
8 680407 704767
OUTPUT 250V AC 8A RESISTIVE LOAD   9-30V DC/7-24V AC ±10% 50/60Hz 5VA
Max. 500V AC / DC
− ∼ +
1 2 3 4 5 6 7 8 9 10 11 12

ENDA INDUSTRIAL ELECTRONICS
EPV241-230VAC-RS AC/DC VOLTMETER
SN: XXXXXXXXX
CE CAT II ▭
8 680407 704675
230V AC +10% -20% 50/60Hz 5VA   COM. A B
Max. 500V AC / DC
− ∼ +
1 2 3 4 5 6 7 8 9 10 11 12

Input

$UPL1+HYS.U$
$UPL1$
$UPL1-HYS.U$

$LOL1+HYS.L$
$LOL1$
$LOL1-HYS.L$

t

$dLY.U$ $dLY.U$ $dLY.L$ $dLY.L$

Out

$A.out = n.o.$ t

Out

$A.out = n.c.$ t

	Ac	dc	$Ac.dc$ (rms)
sine wave	$A\dfrac{1}{\sqrt{2}}$	0.000	$A\dfrac{1}{\sqrt{2}}$
full-wave rectified	0.308 A	$A\dfrac{2}{\pi}$	$A\dfrac{1}{\sqrt{2}}$
half-wave rectified	0.386 A	$A\dfrac{1}{\pi}$	$A\dfrac{1}{2}$
square wave (bipolar)	A	0.000	A
square wave (unipolar)	$A\dfrac{1}{2}$	$A\dfrac{1}{2}$	$A\dfrac{1}{\sqrt{2}}$
pulse	$A\sqrt{\dfrac{d}{T}-\dfrac{d^2}{T^2}}$	$A\dfrac{d}{T}$	$A\sqrt{\dfrac{d}{T}}$
triangle wave	$A\dfrac{1}{\sqrt{3}}$	0.000	$A\dfrac{1}{\sqrt{3}}$

EPV241 PROGRAMMING DIAGRAM

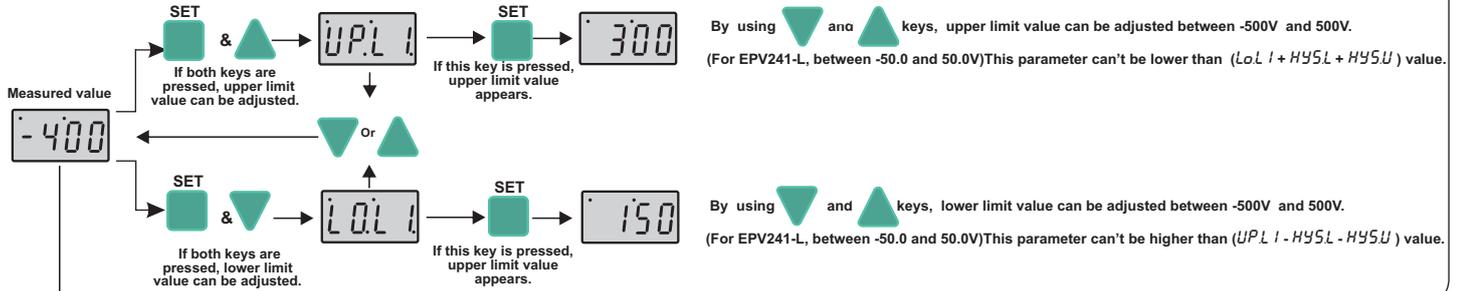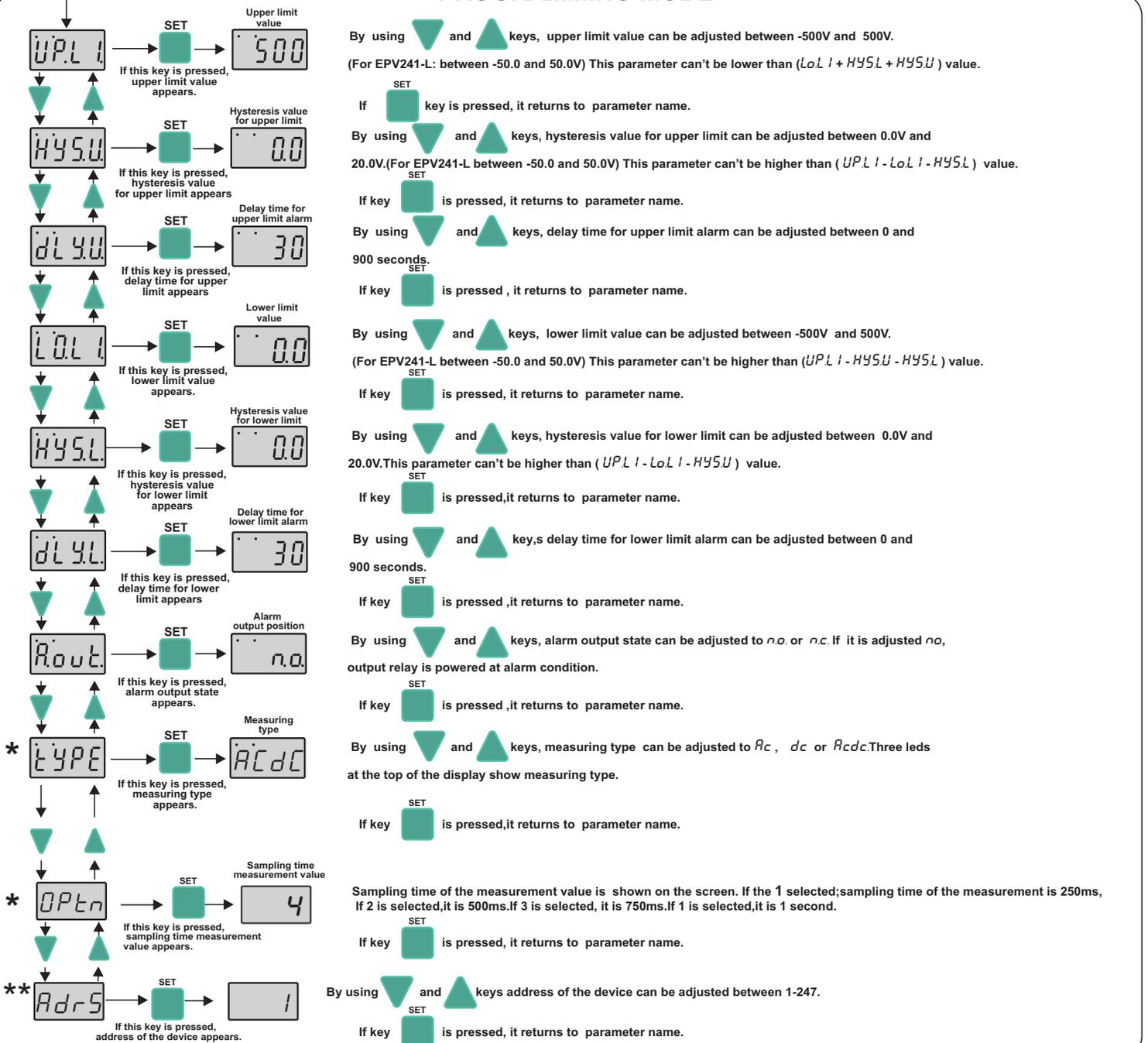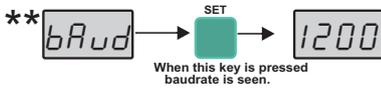|	
Increment key	Used for increasing the setpoint value and changing parameters. When held down for a few seconds, configured numeric value increases faster.
Decrement key	Used for decreasing the setpoint value and changing parameter. When held down for a few seconds, configured numeric value decreases faster.
SET Programming key	Used for displaying and configuring the selected parameter value.

Display reads: -400 ENDA EPV 241
LEDs: OUT AC DC ACDC

ADJUSTING THE ALARM VALUE

Measured value: -400

SET & ▲ If both keys are pressed, upper limit value can be adjusted. → **UP.L I** → **SET** If this key is pressed, upper limit value appears. → **300**

By using ▼ and ▲ keys, upper limit value can be adjusted between -500V and 500V.
(For EPV241-L, between -50.0 and 50.0V)This parameter can't be lower than ($LoL I + HYSL + HYSU$) value.

▼ Or ▲

SET & ▼ If both keys are pressed, lower limit value can be adjusted. → **L O.L I** → **SET** If this key is pressed, upper limit value appears. → **150**

By using ▼ and ▲ keys, lower limit value can be adjusted between -500V and 500V.
(For EPV241-L, between -50.0 and 50.0V)This parameter can't be higher than ($UP.L I - HYSL - HYSU$) 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 mensured value made.

PROGRAMMING MODE

UP.L I → **SET** If this key is pressed, upper limit value appears. → Upper limit value **500**

By using ▼ and ▲ keys, upper limit value can be adjusted between -500V and 500V.
(For EPV241-L: between -50.0 and 50.0V) This parameter can't be lower than ($LoL I + HYSL + HYSU$) value.
If **SET** key is pressed, it returns to parameter name.

HYS.U → **SET** If this key is pressed, hysteresis value for upper limit appears → Hysteresis value for upper limit **0.0**

By using ▼ and ▲ keys, hysteresis value for upper limit can be adjusted between 0.0V and 20.0V.(For EPV241-L between -50.0 and 50.0V) This parameter can't be higher than ($UP.L I - LoL I - HYSL$) value.
If key **SET** is pressed, it returns to parameter name.

dL Y.U → **SET** If this key is pressed, delay time for upper limit appears → Delay time for upper limit alarm **30**

By using ▼ and ▲ keys, delay time for upper limit alarm can be adjusted between 0 and 900 seconds.
If key **SET** is pressed , it returns to parameter name.

L O.L I → **SET** If this key is pressed, lower limit value appears. → Lower limit value **0.0**

By using ▼ and ▲ keys, lower limit value can be adjusted between -500V and 500V.
(For EPV241-L between -50.0 and 50.0V) This parameter can't be higher than ($UP.L I - HYSU - HYSL$) value.
If key **SET** is pressed, it returns to parameter name.

HYS.L → **SET** If this key is pressed, hysteresis value for lower limit appears → Hysteresis value for lower limit **0.0**

By using ▼ and ▲ keys, hysteresis value for lower limit can be adjusted between 0.0V and 20.0V.This parameter can't be higher than ($UP.L I - LoL I - HYSU$) value.
If key **SET** is pressed,it returns to parameter name.

dL Y.L → **SET** If this key is pressed, delay time for lower limit appears → Delay time for lower limit alarm **30**

By using ▼ and ▲ key,s delay time for lower limit alarm can be adjusted between 0 and 900 seconds.
If key **SET** is pressed ,it returns to parameter name.

A.out. → **SET** If this key is pressed, alarm output state appears. → Alarm output position **n.o.**

By using ▼ and ▲ keys, alarm output state can be adjusted to $n.o.$ or $n.c.$ If it is adjusted no, output relay is powered at alarm condition.
If key **SET** is pressed ,it returns to parameter name.

* **type** → **SET** If this key is pressed, measuring type appears. → Measuring type **ACdC**

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

* **OPtn** → **SET** If this key is pressed, sampling time measurement value appears. → Sampling time measurement value **4**

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

** **AdrS** → **SET** If this key is pressed, address of the device appears. → **1**

By using ▼ and ▲ keys address of the device can be adjusted between 1-247.
If key **SET** 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.**

SET

If ■ **key is pressed,it returns to parameter name.**

(*) There are only *ct.r.r.,tYPE,d.Pnt* and *oPtn* parameters in the devices those have no relay.

(**)The *AdrS* 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 ups,then it returns to operation mode.

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

ERROR MESSAGES

 Means, measured current value is higher than maximum scale.   **Means, measured current value is lower than minimum scale.**

ENDA EPV241 DİJİTAL 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

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