Read this document carefully before using this device. The guarantee will be expired by damaging of the device 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 EPA942 PROGRAMMABLE AC/DC AMMETER

Thank you for choosing **ENDA EPA942** Programmable AC/DC Ammeter.

- 96 x 96mm sized.
- 4 digits display.
- Easy to use with front panel keypad.
- Can be used with current transformer or shunt.
- Programmable scale between 5A and 9999A.
- Multi-functional alarm output for Lower and Upper limits (NO+NC).
- Multi-functional alarm setpoints with Alarm Output (NO+NC).
- Multifunctional alarm output (NO+NC) for upper and lower limits.
- Communication feature over isolated RS485, using ModBus RTU protocol.(Optional).
- Measuring type can be selected as AC, DC or true RMS.
- Key lock feature.
- CE marked according to European Norms.

Order code : EPA942 - □□ (1) - □□ (2) - □□□ (3)

1 - Supply Voltaje	2 -Output	3 - Modbus
UV.....90-250V AC LV.....10-30V DC / 8-24V AC	R.....10A(Out)Relay 2R.....10A(Out+Alr)Relay	RSI...RS485 Modbus Available (Specify at Order)

RoHS Compliant CE

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	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 DC	0A...9999A (Specified by c.tr.r parameter. For example:scale is 0A...5A for c.tr.r=5.00) -999A...9999A (Specified by c.tr.r parameter. For example:scale is -5A...5A for c.tr.r=5.00)
Sensitivity	0.001A x (c.tr.r /5) (For example , 0.001A for c.tr.r=5.00)	
Accuracy	AC DC RMS	± 1% (full scale) (± 2% For square wave form) ± 1% (full scale) ± 1% (full scale) (± 2% For square wave form)
Input Range	13 & 14 12 & 15	-5A...5A **(Device may be damaged at 10A and above currents)** ⚠ -60mV...60mV **(Device may be damaged at 50V and above voltages)**
Input Impedance	13 & 14 12 & 15	12mΩ 40kΩ
Frequency Range	DC , 10Hz - 200Hz (10Hz - 70Hz For square wave form)	
EMC	EN 61326-1: 2013	
Safety requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)	

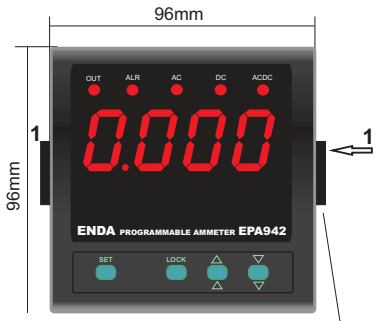
OUTPUTS	
Output	250V AC, 10A (for resistive load), NO+NC
Alarm output	250V AC, 10A (for resistive load), NO+NC
Life expectancy for relay	Mechanical 30.000.000 ; Electrical 100.000 operation.

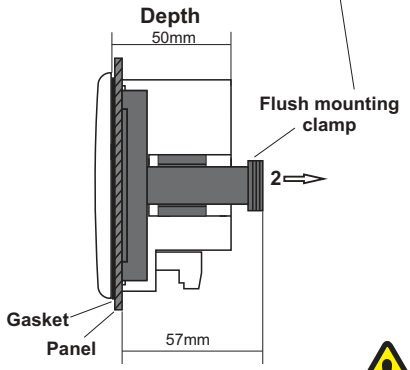
HOUSING	
Housing type	Suitable for flush-panel mounting.
Dimensions	W96xH96xD50mm
Weight	Approx. 410g (after packing)
Enclosure material	Self extinguishing plastics.
⚠ **While cleaning the device, solvents (thinner, gasoline, acid etc.) or corrosive materials must not be used.**	

sisel
SİSEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.
Şerifali Mah. Barbaros Cad. No:18 Y.Dudullu 34775
ÜMRANİYE/İSTANBUL-TURKEY
Tel : +90 216 499 46 64 Pbx. Fax : +90 216 365 74 01
url : www.enda.com.tr

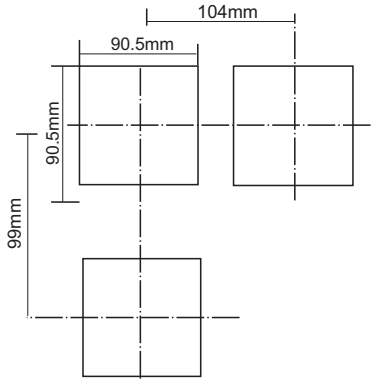
ENDA™

DIMENSIONS





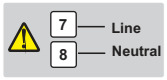
Panel Cut-out



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.**

1) Panel thickness should be maximum 10mm.
2) There must be at least 60mm free space behind the device, otherwise it would be difficult to remove it from the panel.



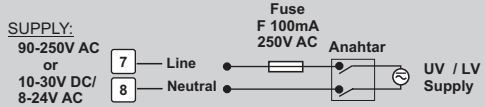
CONNECTION DIAGRAM

ENDA EPA942 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

CAUTION :

If 5A and 60mV inputs are connected at the same time, the measurement will be incorrect.

NOTE :

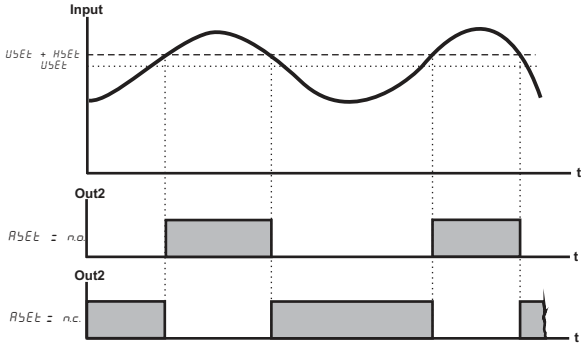


Fuse should be connected.

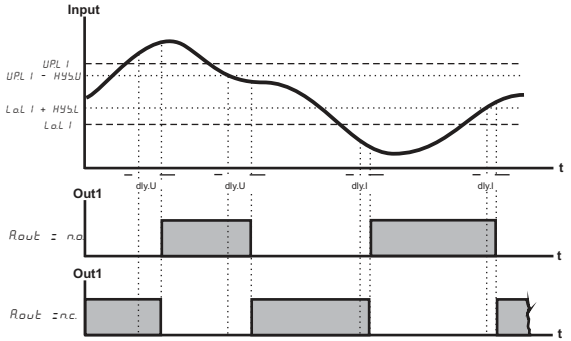
Cable size: 1,5mm²

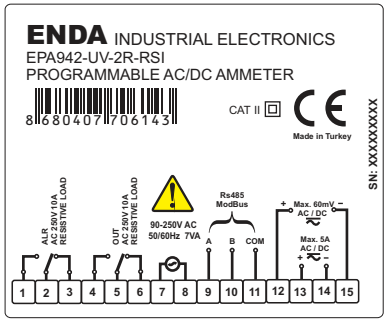
1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.
2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.

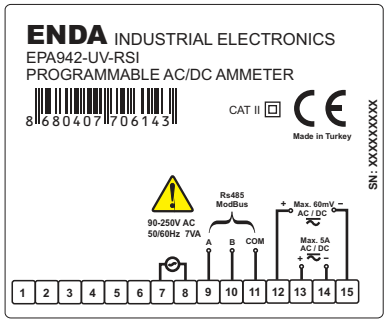
ALARM OUTPUT CHART



OUTPUT CHART

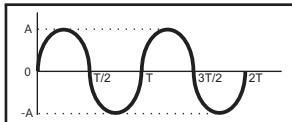
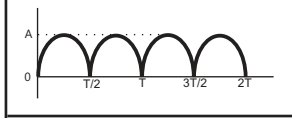
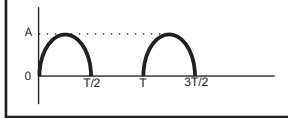
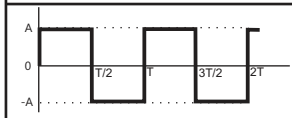
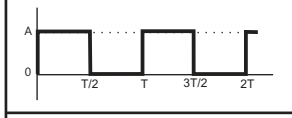
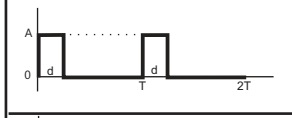
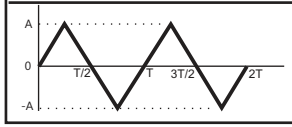






Equipment is protected throughout by DOUBLE INSULATION

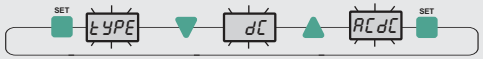
Holding screw 0.4-0.5Nm.

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

EPA942 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 parameters. When held down for a few seconds, configured numeric value increases faster.
Programming Key	Used for displaying and configuring the selected parameter value.
Lock / Unlock Keypad	Locks / Unlocks keypad.

SETTING UP THE PARAMETERS



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.

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

* **c.trr. Current Conversion Ratio**
Can be adjusted between 5.00(/5) and 9999(/5). If this parameter changes, upper limit value is set to maximum scale ,minimum limit value is set to minimum scale and hysteresis

* **tYPE Measuring Method**C
an be adjusted to Ac , dc or Acdc. LEDs on the top of the display indicates the adjusted measurement method.

* **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)).
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 measured value is higher than 1000, it can be shown as (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**
Can be adjusted between 1 - 247 .

** **bAUd Baud Rate**
Can be adjusted as oFF, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200

(*) c.trr. , tYPE , dPnt and OPtn parameters are available for only that devices have no relays.

(**) AdrS and bAUd parameters are available for only that devices have ModBus.

out 1

i Includes in R extension devices.

otYP Out1 Output Relay Contact Position
Can be adjusted as no. or nc. If no is selected, incase of alarm, out relay is activated.

UPLL Upper Limit Value
Can be adjusted between minimum and maximum scale that is specified with c.trr parameter. This parameter can't be lower than (LoLL - HYSU - HYSU) value.

HYSU Hysteresis Value for Upper Limit
Can be adjusted between 0 and 20.
When ctrr changed, HYSU gets the value of 0.1 .

dLYU Delay Time for Upper Limit Alarm
Can be adjusted between 0 and 900 .

LoLL Lower Limit Value
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.

HYSL Hysteresis Value for Lower Limit
Can be adjusted between 0 and 20.
When ctrr is changed, HYSU gets the value of 0.1 .

dLYL Delay Time for Lower Limit Alarm
Can be adjusted between 0 and 900 seconds.

out2

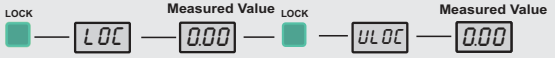
i Includes in 2R extension devices.

AtSt Alarm Output Relay Contact Position
Can be adjusted as no or nc .
If no is selected, in case of alarm, ALr relay is activated.

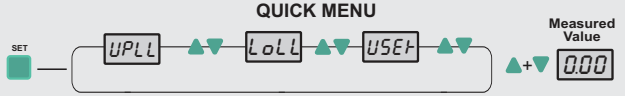
USEt Alarm Upper Limit Value
Can be adjusted between minimum and maximum scale that is specified with c.trr parameter. This parameter can't be lower than HSEt value.

HSEt Hysteresis Alarm Value for Upper Limit
Can be adjusted between 0 and 20. This parameter can't be higher than USEt or 20 value. When ctrr changed, HSEt gets the value of 0.1 .

LOCKING & UNLOCKING KEYPAD

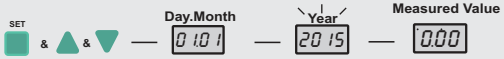


QUICK MENU



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

REVISION NUMBER



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.

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 EPA942 DIGITAL AMPERMETER 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 Relay Contact Position	oEYP	Readable/Writable	no
0001d	0x0001	word	Current change ratio.	ctrr	Readable/Writable	5
0002d	0x0002	word	The upper limit of the setpoint	UPLL	Readable/Writable	5.000
0003d	0x0003	word	The upper limit of the hysteresis value	HYSU	Readable/Writable	0.100
0004d	0x0004	word	Delay time for the upper limit alarm	dLYU	Readable/Writable	0
0005d	0x0005	word	The lower limit of the setpoint	LOLL	Readable/Writable	0.000
0006d	0x0006	word	The lower limit of the hysteresis value	HYSL	Readable/Writable	0.100
0007d	0x0007	word	Delay time for the lower limit alarm	dLYL	Readable/Writable	0
0008d	0x0008	word	Measurement method (0=AC, 1=dC, 2=ACdC)	tYPE	Readable/Writable	ACdC
0009d	0x0009	word	Decimal point. (0=X, 1=X.X, 2=X.XX, 3=X.XXX)	dPnt	Readable/Writable	0.000
0010d	0x000A	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
0011d	0x000B	word	Device address for RS485 network connection. Adjustable between 1-247.	AdrS	Readable/Writable	1
0012d	0x000C	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	Current change ratio.	ctrr	Readable/Writable	5
0001d	0x0001	word	Measurement method (0=AC, 1=dC, 2=ACdC)	tYPE	Readable/Writable	ACdC
0002d	0x0002	word	Decimal point. (0=X.XX,1=X.X,2=X)	dPnt	Readable/Writable	0.00
0003d	0x0003	word	Sampling time of the measurement value	oPtn	Readable/Writable	4
0004d	0x0004	word	Device address for RS485 network connection. Adjustable between 1-247.	AdrS	Readable/Writable	1
0005d	0x0005	word	Baudrate (0=Off;1=1200;2=2400; 3=4800; 4=9600; 5=19200 6= 38400; 7= 57600; 8= 115200)	bAUd	Readable/Writable	OFF

INPUT REGISTERS FOR R EXTENSION DEVICES

Input Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
0000d	0x0000	word	Measured current 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	Out1 Output Relay Contact Position (0=no; 1=nc)	oEYP	Readable/Writable	no
0001d	0x0001	Bit	Alarm Output Relay Contact Position (0=no; 1=nc)	ASEt	Readable/Writable	no

* Coil and Discrete input parameters are not available that devices have no relays.

Note 1 : oEYP and ASEt menu parameters can be used as “Holding Register” or “Coil”.

Note 2 : Received "ModBus input register value" is multiplying by 1000 (based on d.Pnt) and mA value reached. For example ;
if modbus value is 2842, (for d.Pnt = 2 (0.00)) 28.42x1000 = 28420 mA, ie 28.42A
if modbus value is 2842, (for d.Pnt = 3 (0.000)) 2.842x1000 = 2842 mA, ie 2.842A

sisel
SİSEL MÜHENDİSLİK ELEKTRONİK SAN. VE TİC. A.Ş.
Şerifali Mah. Barbaros Cad. No:18 Y.Dudullu 34775
ÜMRANİYE/İSTANBUL-TURKEY
Tel : +90 216 499 46 64 Pbx. Fax : +90 216 365 74 01
url : www.enda.com.tr

ENDA™

ENDA EPA542-xx-x-xxx-RSI INPUT REGISTERS DEVICES						
Holding Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission	Status Value
Decimal	Hex					
0000d	0x0000	word	Alarm Output (OUT) Relay Contact Position	OtYP	Readable/Writable	no
0001d	0x0001	word	Alarm Output (OUT) Relay Contact Position	ASEt	Readable/Writable	no
0002d	0x0002	word	Current change ratio.	ctrr	Readable/Writable	5
0003d	0x0003	word	The upper limit of the setpoint	UPLL	Readable/Writable	5.000
0004d	0x0004	word	The upper limit of the hysteresis value	HYSU	Readable/Writable	0.100
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	0.000
0007d	0x0007	word	The lower limit of the hysteresis value	HYSL	Readable/Writable	0.100
0008d	0x0008	word	Delay time for the lower limit alarm	dLYL	Readable/Writable	0
0009d	0x0009	word	Alarm Upper Limit Value	USEt	Readable/Writable	5.000
0010d	0x000A	word	Hysteresis Alarm Value for Upper Limit	HSEt	Readable/Writable	0.100
0011d	0x000B	word	Measurement method (0=AC, 1=dC, 2=ACdC)	tYPE	Readable/Writable	ACdC
0012d	0x000C	word	Decimal point. (0=X, 1=X.X, 2=X.XX, 3=X.XXX)	dPnt	Readable/Writable	0.000
0013d	0x000D	word	Measurement period. 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
0014d	0x000E	word	Device address for RS485 network connection. Adjustable between 1-247.	AdrS	Readable/Writable	1
0015d	0x000F	word	Baudrate (0=Off;1=1200;2=2400; 3=4800; 4=9600; 5=19200 6= 38400; 7= 57600; 8= 115200)	bAUd	Readable/Writable	oFF

INPUT REGISTERS FOR 2R EXTENSION DEVICES

Input Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
0000d	0x0000	word	Measured current value	--	Only Readable

DISCRETE INPUTS FOR 2R 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 2R EXTENSION DEVICES

Coil Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission	Status Value
Decimal	Hex					
0000d	0x0000	Bit	Out1 Output Relay Contact Position (0=no; 1=nc)	OtYP	Readable/Writable	no
0001d	0x0001	Bit	Alarm Output Relay Contact Position (0=no; 1=nc)	ASEt	Readable/Writable	no

Note 1 : OtYP and ASEt menu parameters can be used as “Holding Register” or “Coil”.

Note 2 : Received "ModBus input register value" is multiplying by 1000 (based on d.Pnt) and mA value reached.
For example ;
if modbus value is 2842, (for d.Pnt = 2 (0.00)) 28.42x1000 = 28420 mA, ie 28.42A
if modbus value is 2842, (for d.Pnt = 3 (0.000)) 2.842x1000 = 2842 mA, ie 2.842A