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 EPV942 PROGRAMMABLE AC/DC VOLTMETER

Thank you for choosing **ENDA EPV942** Programmable AC/DC voltmeter.

- 96 x 96 mm sized
- 4 digits display
- Selectable number of decimal point
- Can be displayed between -999 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 (ACDC)
- CE Marked according to Europan Norms.

Order Code : EPV942 - □□ - □□ - □□□
(1 - 2 - 3)

1 - Supply Voltage	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

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

KEEP AWAY device from exposed to corrosive, volatile and flammable gases or liquids and DO NOT USE the device in similar hazardous locations.

ELECTRICAL CHARACTERISTICS		
Supply Voltage	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**	For uEEr 0...9999V, for u100 0.....100V, for u500 0...500V
	DC	For uEEr -999...9999V DC, for u100 -100...100V DC, for u500 -500...+500V DC
Sensitivity	0,01V (If, uEEr is selected) 0,1V (If, uEEr or u500 is selected and higher than -100V, lower from 100V for input values) 1V (If uEEr or u500 is selected and lower than -100V, higher from 100V for input values)	
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 will be damaged if more than ±1250 DC voltages applied when u500 is selected)** -100V...100V **(Device will be damaged if more than ±250 DC voltages applied when u500 or uEEr is selected)**	
Input Impedance	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	
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. (According to DIN 43 700)
Dimensions	W96xH96xD50mm
Weight	Approx. 410g (after packing)
Enclosure Material	Self extinguishing plastics.

Avoid any liquid contact when the device is switched on.
DO NOT clean the device with solvent (thinner, gasoline, acid etc.) and / or abrasive cleaning agents.

sisel
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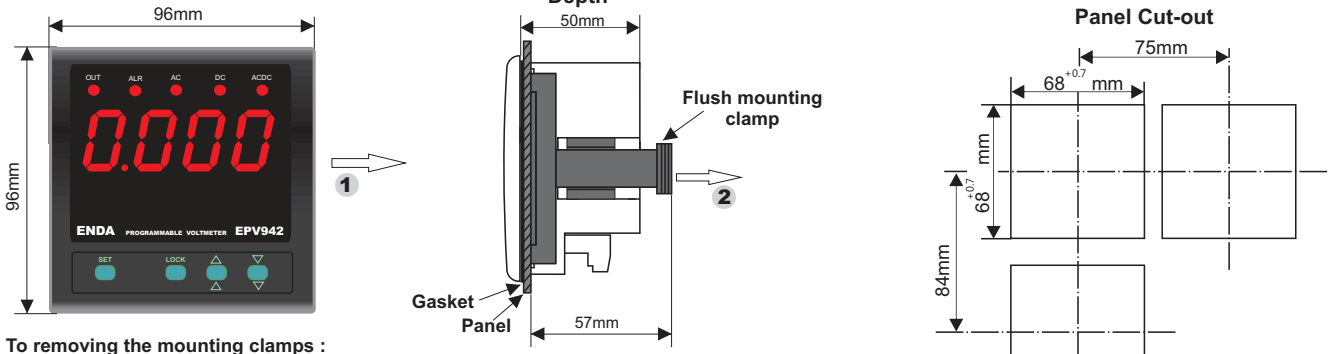
DIMENSIONS



To removing the 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 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

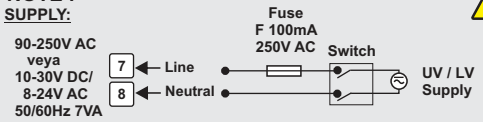
ENDA EPV942 is intended for installation in control panels. Make sure that the device is used only for intended purpose.The electrical connections must be carried on by a qualified staff and must be according to the relevant locally applicable regulations. During an installation, all of the cables that 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 *InYP* input type "*u500*" is selected, the measurement lines 12 and 15 of the terminals must be connected. Otherwise, measurement will be incorrect.

If *InYP* input type "*u100*" or *uErr* is selected, the measurement lines 13 and 14 of the terminals must be connected. Otherwise, measurement will be incorrect.

NOTE :

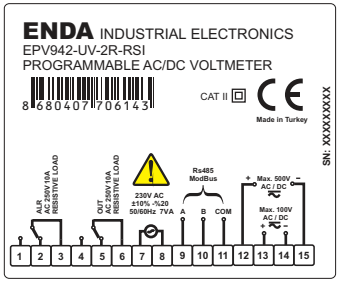
SUPPLY:

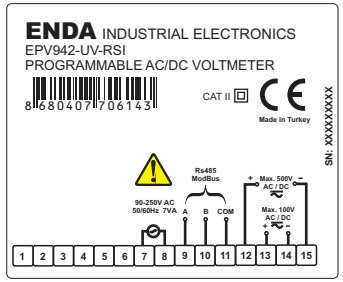


Fuse should be connected.

Cable size: 1,5mm²

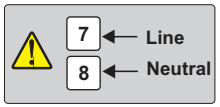
1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.
2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.



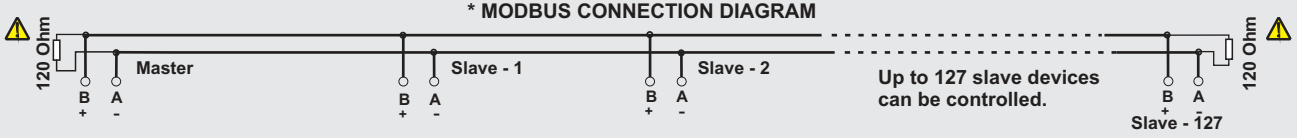


Holding screw 0.4-0.5Nm.

Equipment is protected throughout by DOUBLE INSULATION



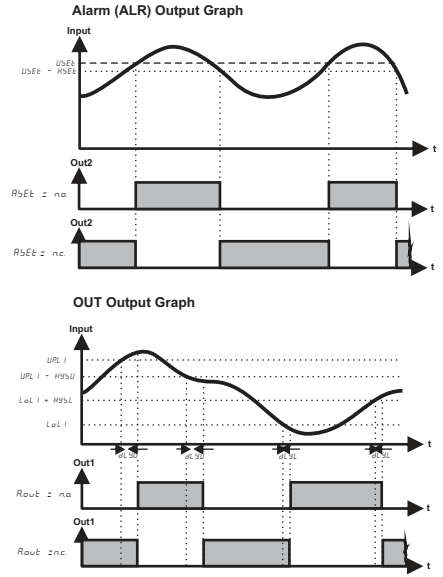
*** MODBUS CONNECTION DIAGRAM**

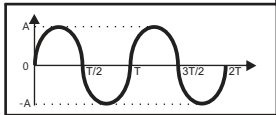
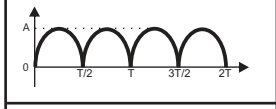
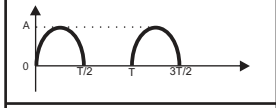
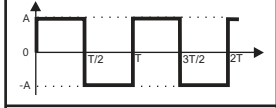
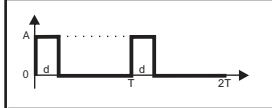
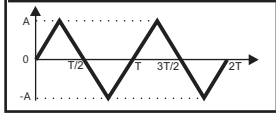


Termination should be accomplished by attaching 120 Ohm resistors to the start and at the end of the communication line.

**** Applies to devices with Modbus function.***

OUTPUT GRAPHICS

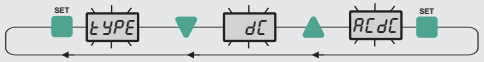


	ac	dc	Ac.dc (rms)
	$A\frac{1}{\sqrt{2}}$	0.000	$A\frac{1}{\sqrt{2}}$
	0.308 A	$A\frac{2}{\pi}$	$A\frac{1}{\sqrt{2}}$
	0.386 A	$A\frac{1}{\pi}$	$A\frac{1}{2}$
	A	0.000	A
	$A\frac{1}{2}$	$A\frac{1}{2}$	$A\frac{1}{\sqrt{2}}$
	$A\sqrt{\frac{d}{T}-\frac{d^2}{T^2}}$	$A\frac{d}{T}$	$A\sqrt{\frac{d}{T}}$
	$A\frac{1}{\sqrt{3}}$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

EPV942 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



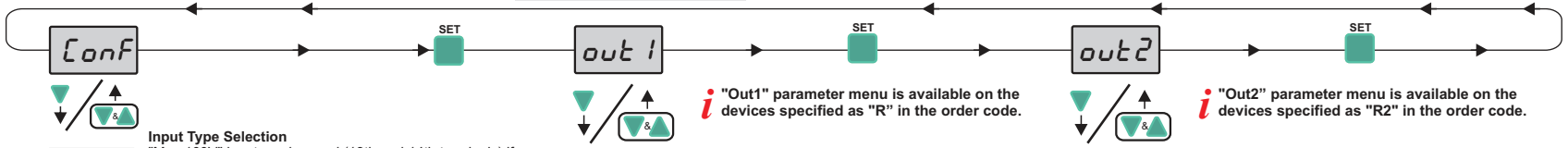
If SET key is pressed, the current value of the parameter appears by flashing on the display.

By using "UP" or "DOWN" navigation keys, selected parameter can be adjusted to the desired value.

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



Input Type Selection
"Max 100V" input can be used (13th and 14th terminals) if U 100 is selected. Value will be hidden in uEtr menu.
"Max 500V" input can be used (12th and 15th terminals) if U500 is selected. Value will be hidden in uEtr menu.
"Max 100V" input can be used (13th and 14th terminals) if uEtr is selected. Value can be displayed in uEtr menu and can be adjusted between 1 and 9999.

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 value will set to the 0.1.

Measurement Method
Can be set as AC, dC or ACdC. Adjusted measurement method will be indicated by top of the display LEDs.

Decimal Indicator
If measured value is lower than 10, it will be displayed 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 will be displayed as (0.00) ,(0.0) or (0), (For DC measurements (0.0) or (0)).
If measured value between 100 and 1000, it will be displated as (0.0) or (0), (For DC measurements only (0) .
If device includes relay, dPnt type may change according to relay parameters value.

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.

Device Address
It can be adjusted between 1 - 247 .

Baud Rate
It can be adjusted as oFF , 1200 , 2400 , 4800 , 9600 , 19200 , 38400 , 57600 and 115200 .

(*) ItYP , uEtr , tYPE , dPnt and OPtn parameters are available if no relay assembled on the device.
(**) AdrS and bAud parameters are available only with Modbus featured devices.

i **"Out1" parameter menu is available on the devices specified as "R" in the order code.**

OUT1 Output
It can be adjusted as n.o. or n.c. If n.o is selected, incase of alarm, out relay is activated.

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).

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).
If cEtr parameter is changed, HYSU gets 0.1 value.

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

Lower Limit Value
While in DC measurement type ;
If the u.t.r.r. parameter is selected, it can be decreased to -999,
If the U 100 parameter is selected, it can be decreased to -100,
If the U500 parameter is selected, it can be decreased to -500.
While in AC or ACdC measurement type, it can be decreased to minimum 0.
This parameter can be increased up to (UPL 1 - HYS - HYSL).

Hysteresis Value for Lower Limit
It can be adjusted between 0 and 20 . This parameter can't be higher than (UPLL - LOLL - HYSU) value. If u.t.r.r or ItYP parameter is changed, HYSL gets 0.1 value.

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

i **"Out2" parameter menu is available on the devices specified as "R2" in the order code.**

Alarm Output
It can be adjusted as n.o. or n.c. If n.o is selected, incase of alarm, ALR relay is activated.

Alarm 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 (HSEt).

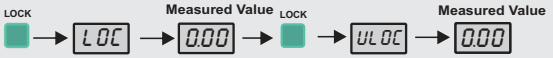
Hysteresis Value for Alarm Upper Limit
It can be adjusted between 0 and 20 value.
This parameter can't be higher than (USEt or 20).
If ItYP or u.t.r.r parameter is changed, HSEt gets 0.1 value.

ERROR MESSAGES

- - - - Measured current value is higher than maximum scale.

- - - - Measured current value is lower than minimum scale.

LOCKING & UNLOCKING KEYPAD



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.

QUICK MENU

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

DEFAULT SETTINGS

Powered on device by pressing ▼ key dPAr message appears on display and device reset to default settings.

ENDA EPV942 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	oUYP	Readable/Writable	no
0001d	0x0001	word	Input type selection	IUYP	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.	Adr5	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	IUYP	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.	Adr5	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	OFF

INPUT REGISTERS FOR EPV942-x-xxx-RSI 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)	oUYP	Readable/Writable	no

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

Note 1 : oUYP 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

ENDA EPV942 DIGITAL VOLTMETER MODBUS PROTOCOL ADDRESS MAP

HOLDING REGISTERS FOR "R2" EXTENSION DEVICES

Holding Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission	Status Value
Decimal	Hex					
0000d	0x0000	word	Alarm (OUT) output status	otyP	Readable/Writable	no
0001d	0x0001	word	Alarm (ALR) output status	rSEt	Readable/Writable	no
0002d	0x0002	word	Input type selection	itYP	Readable/Writable	u.t.r.r
0003d	0x0003	word	Voltage Conversion Rate	u.t.r.r	Readable/Writable	100
0004d	0x0004	word	The upper limit of the setpoint	UPLL	Readable/Writable	500.0
0005d	0x0005	word	The upper limit of the hysteresis value	HYSU	Readable/Writable	1.0
0006d	0x0006	word	Delay time for the upper limit alarm	dLYU	Readable/Writable	0
0007d	0x0007	word	The lower limit of the setpoint	LOLL	Readable/Writable	0.0
0008d	0x0008	word	The lower limit of the hysteresis value	HYSL	Readable/Writable	1.0
0009d	0x0009	word	Delay time for the lower limit alarm	dLYL	Readable/Writable	0
0010d	0x000A	word	Upper limit value for alarm	USEt	Readable/Writable	5.000
0011d	0x000B	word	Hysteresis value for upper alarm limit			
0012d	0x000C	word	Measurement method (0=AC, 1=dC, 2=ACdC)	tYPE	Readable/Writable	ACdC
0013d	0x000D	word	Decimal point. (0=X, 1=X.X, 2=X.XX, 3=X.XXX)	dPnt	Readable/Writable	0.000
0014d	0x000E	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
0015d	0x000F	word	Device address for RS485 network connection. Adjustable between 1-247.	AdrS	Readable/Writable	1
0016d	0x0010	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 EPV942-x-xxx-RSI 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 "R2" 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 "R2" EXTENSION DEVICES

Coil Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission	Status Value
Decimal	Hex					
0000d	0x0000	Bit	Alarm (OUT) output status (0 = no , 1 = nc)	otyP	Readable/Writable	no
0001d	0x0001	Bit	Alarm (ALR) output status (0 = no , 1 = nc)	rSEt	Readable/Writable	no

Note 1 : otyP and rSSEt 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

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