MANUAL RATE METER
TA327401

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Version 2.0

INTRODUCTION

Thanks for choosing a Wachendorff Prozesstechnik device.

The tachometer TA327401 allows to read the frequency (max 100 kHz) of a signal from single or double (bidirectional encoder) input.
2 universal digital inputs are available (NPN/PNP/potential free contact) for external commands like output activation or Hold/ Stop current visualization; one input is also analogue in order to allow setpoint modification by external potentiometers.

TECHNICAL DATA

Operating Conditions *Operating temperature: 0 °C to 40 °C, humidity 35 uR% to 95 uR%*

Sealing *Front panel: IP65 (with gasket) , Box: IP30, Terminal blocks: IP20*

Material *PC ABS UL94V0 self-extinguishing*

Digital Inputs *3 PNP/NPN configurable as analogue for potentiometers. (max 28 Vdc in PNP mode)*

Outputs *2 relays 5A resistive charge*

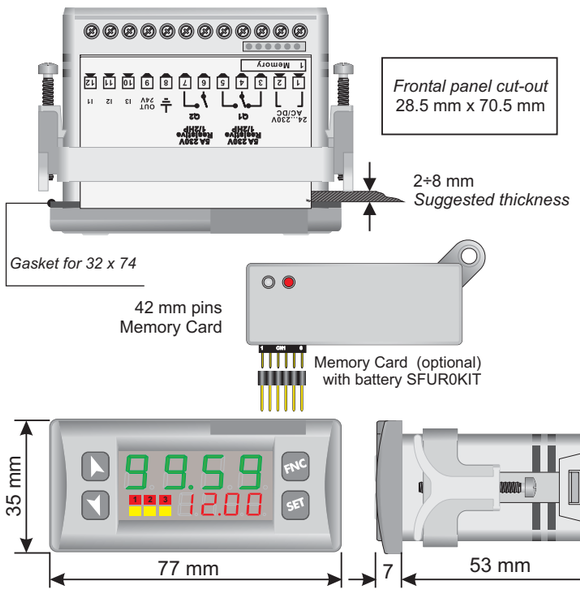
OUT 24V *30mA(at 24 VAV supply),40 mA(at 24 VDC supply),60 mA (at 110 to 230 VAC)*

Back-UP *Rechargeable battery, approx. 7 days autonomy*

Power Supply *24 to 230 VAC/VDC +/-15 % 50/60 Hz / 2 W*

LED	MEANING
	Report the activation of Q1
	Report the activation of Q2
	Report serial transmission by the TA327401

SIZE AND INSTALLATION



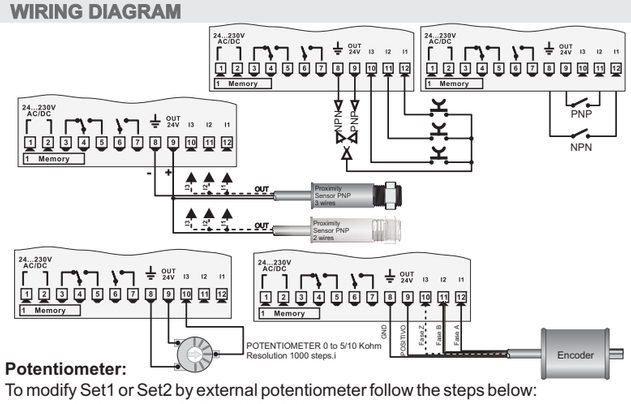
Read carefully the safety guidelines and programming instructions contained in this manual before using/connecting the device.

Disconnect power supply before proceeding to hardware settings or electrical wirings.

Only qualified personnel should be allowed to use the device and/or service it and in accordance to technical data and environmental conditions listed in this manual.

Do not dispose electric tools together with household waste materials in observance of European Directive 2002/96/CE

WIRING DIAGRAM



Potentiometer:
To modify Set1 or Set2 by external potentiometer follow the steps below:
1- use potentiometers 0 kOhm to 5/10 kOhm
2- connect cursor to pin I3; a wrong connection may damage the potentiometer and lead to lock of the device.
3- accuracy on input is max 1000 points, therefore set the parameters "Upper limit" and "Lower limit" with a max difference of 1000 units.
(Ex.: LoS1 to 50,0 and uPS1 to 150,0 to modify setpoint value related to Set1 between 50 and 150 steps with steps of one tenth). Greater differences would make unstable the less significant digit.
4- To calibrate the scale of potentiometer enter the configuration mode and select:
Hin.3 as Pot Fin.3 as Set1 or Set2 P.tAr as Enable
Exit configuration mode and place potentiometer at minimum level and press key, then place potentiometer at max level and press key: the device automatically exit the calibration procedure.
N.B.: A switch-off of the device would interrupt the calibration.

MEMORY CARD (optional)

Parameters and setpoint values can be copied from one device to another using the Memory card. **Attention: Perform first an update of the programm module.**

There are two methods:

> With the device connected to the power supply
insert the memory card **when the controller is off**.

On activation display 1 shows MEM0 and display 2 shows ----

(Only if the values stored on Memory Card are correct).

By pressing the key display 2 shows LoAd

Confirm using the key .

The device loads the new data and starts again.

> With the controller disconnected from the power supply:

The memory card is equipped with an internal battery with a life of about 1000 uses.

Insert the memory card and press the programming button.

When writing the parameters, the LED turns red and on completing the procedure it changes to green. It is possible to repeat the procedure.

⚠ **UPDATING MEMORY CARD.**

To *update* the memory card values, follow the procedure described in the first method, setting display 2 to ---- so as not to load the parameters on controller.

Enter configuration and **change at least one parameter**.
Exit configuration. Changes are saved automatically.

MAXIMUM AND MINIMUM PEAK FUNCTION

	PRESS	DISPLAY
1		If enabled maximum peak function, maximum peak value obtained is visualized.
2		If enabled minimum peak function, minimum peak value obtained is visualized.
3	and	If enabled peak function, minimum and maximum peak value will initialize to current tachometer value.

SETPOINT MODIFICATION

	PRESS	DISPLAY
1	SET	Visualizes SETPOINT 1 / 2
2	or	Modifies selected SET
2a	FNC	Selects chosen digit
3a	or	Modifies blinking digit of selected SET

LOADING DEFAULT SETTINGS

	PRESS	DISPLAY	DO
1	FNC for 3 seconds	Display 1 shows 0000 with 1st digit blinking, while Display 2 shows PASS	
2	or	Modify blinking digit, pass to the next digit pressing	Enter password 9999
3	SET to confirm	The device loads default settings	Switch the device off and restart it

CONFIGURATION PARAMETER MODIFICATION

	PRESS	DISPLAY	DO
1	FNC for 3 seconds	Display 1 shows 0000 with 1st digit blinking, while Display 2 shows PASS	
2	or	Modify blinking digit, pass to the next one pressing	Enter password 1234
3	SET to confirm	Display shows first parameter of configuration table Func	
4	or	Scroll parameters	
5	SET + or	Increase or decrease value on display pressing and an arrow key	Enter the new data that will be stored when releasing the keys
6	FNC	End of configuration, the device exits from programming mode.	

PARAMETERS LIST

CLOCK INPUT CONFIGURATION

CL.in	**P-01 Clock Input**	*Input signal selection*	
in I	I1	*Input signal on I1*	Default
Enc	Encoder	*Input signal on I1 and I2 (bidirectional encoder)*	

INPUT CONFIGURATION

H.in1	**P-02 Hardware input 1**	*Input 1 hardware configuration*	
H.in2	**P-03 Hardware input 2**	*Input 2 hardware configuration*	
H.in3	**P-04 Hardware input 3**	*Input 3 hardware configuration*	
nPn	NPN	*NPN (not available on input 3)*	
PnP	PNP	*PNP*	Default
ttL	TTL	*TTL*	
Pot	Potent.	*Potentiometer (available only for input 3)*	
FiL.1	**P-05 Filter Input 1**	*Input 1 hardware filter configuration*	
oFF	**Off**	*Input hardware filter desabled*	Default
on	**On**	*Input hardware filter enabled (22nF)*	
A.in2	**P-06 Active State Input 2**	*Input 2 active state*	
A.in3	**P-07 Active State Input 3**	*Input 3 active state*	
HLEv	High Level	*High level*	Default
LLEv	Low Level	*Low level*	
F.in2	**P-08 Function Input 2**	*Function associated to Input 2*	
F.in3	**P-09 Function Input 3**	*Function associated to Input 3*	
dis	Disable	*Disabled*	Default
outE	Out Enable/Disable	*Enable / Desable tachometer outputs*	
Hold	Hold (only for I3)	*Hold visualized tachometer value*	
SEt.1	Set1 (only for I3)	*Set1 setting by potentiometer*	
SEt2	Set2 (only for I3)	*Set2 setting by potentiometer*	
PtAr.	**P-10 Potentiom. Tarature**	*Potentiometer calibration procedure*	
dis	Disable	*Disabled*	Default
En	Enable	*Enabled*	
FtuP	**P-11 Function Key UP**	*Function associated to key UP (up arrow)*	
dis	Disable	*Disabled*	Default
MAHP.	Display max peak	*Max. registered peak visualization (reset by UP+DOWN key)*	
Ftdo	**P-12 Function Key DOWN**	*Function associated to key DOWN (down arrow)*	
dis	Disable	*Disabled*	Default
MinP.	Display min peak	*Min. registered peak visualization (reset by UP+DOWN key)*	

BACKUP MEMORY CONFIGURATION

PoME	**P-13 Power-off Memory**	*Power-off memory*	
dis	Disable	*No peak value stored at switch-off*	Default
MinP	Min Peak	*Minimum peak value stored at switch-off*	
MAHP.	Max Peak	*Maximum peak value stored at switch-off*	
ALL	All Peak	*Max. and Min. peak values stored at switch-off*	

CLOCK INPUT CONFIGURATION

MinF.	**P-14 Minimum Input Frequency**	*Lower frequency visualized*	
001	0.01 Hz	*For lower frequency values 0 is visualized on display.*	
...		*This parameter forces max. refresh time of display*	
009	0.09Hz	*from 100 to 0.1 sec.*	
0.1	0.1 Hz		Default
...			
100	10.0Hz		
SFLt.	**P-15 Software Filter**	*Sampling frequency software filter*	
oFF	off	*No software filter on reading*	Default
001	0.01 sec	*Mean realized on samplings done within time set*	
...		*in this parameter. Display will be updated according to*	
100	1.00 sec	*this time range.*	

DISPLAY CONFIGURATION

bASE	**P-16 Timebase**	*Visualization time base*	
SEc	sec	*Visualized value referred to the second*	Default
Min	min	*Visualized value referred to the minute*	
Hour	hour	*Visualized value referred to the hour*	
PuLS.	**P-17 Pulse in Unit**	*Impulses on visualized unit*	
9999	99.99 pulse	*Number of impulses for single unit. For example,*	
...		*in speed measurement, it indicates how many*	
001	0.01 pulse	*Impulses correspond to a full revolution.*	
1	1 pulse		Default
...			
9999	9999 pulse		
dP.	**P-18 Decimal Point**	*Tachometer value visualization format*	
0	0	*No decimal digit visualization*	**Default**
0.0	0.0	*1 decimal digit visualization*	
0.00	0.00	*2 decimal digits visualization*	
0.000	0.000	*3 decimal digits visualization*	

MEASURE UNIT CONFIGURATION

Mun.1	**P-19 Measure Unit 1**	***Setting digit 1 of displayed measuring unit***	
Mun.2	**P-20 Measure Unit 2**	***Setting digit 2 of displayed measuring unit***	
Mun.3	**P-21 Measure Unit 3**	***Setting digit 3 of displayed measuring unit***	
Mun.4	**P-22 Measure Unit 4**	***Setting digit 4 of displayed measuring unit***	
AAAA	Edit digits	*Set each of 4 digits as chosen*	Default ----

SETPOINT CONFIGURATION

d.S.1	**P-23 Display Set 1**	***Setpoint 1 display selection***	
d.S.2	**P-26 Display Set 2**	***Setpoint 2 display selection***	
dis	Disable	*Setpoint value not visualized*	Default Set2
USu	Visualized	*Setpoint value visualized*	
Mod.	Modifiable	*Setpoint value visualized and modifiable*	Default Set1
LoS.1	**P-24 Lower Limit Set 1**	***Set 1 minimum value (0...9999)***	Default 0
LoS2	**P-27 Lower Limit Set 2**	***Set 2 minimum value (0...9999)***	Default 0
uPS.1	**P-25 Upper Limit Set 1**	***Set 1 maximum value (0...9999)***	Default 999
uPS2	**P-28 Upper Limit Set 2**	***Set 2 maximum value(0...9999)***	Default 999

OUTPUT ENABLE CONFIGURATION

outE.	**P-29 Output Enable**	***Outputs enabled***	
EnAb	Always enable	*Tachometer outputs always enabled*	Default
Auto	Automati enable	*Outputs enabled automatically*	
inP.	Enable by input	*Tachometer outputs enabled by digital inputs*	

TACHOMETER LOGIC OUTPUT MODE CONFIGURATION

LoM.1	**P-30 Logic Output Mode1**	***Tachometer logic output mode 1***	
LoM2	**P-34 Logic Output Mode2**	***Tachometer logic output mode 2***	
HdEv	High Deviation	*Active output with high deviation*	Default
LdEv	Low Deviation	*Active output with low deviation*	
inSb	Inside Band	*Active output inside band*	
outb	Out of Band	*Active output out of band*	
AdE.1	**P-31 Activation Delay 1**	***Logic output 1 activation delay***	
AdE2	**P-35 Activation Delay 2**	***Logic output 2 activation delay***	
00	0.0 sec	*Defines logic output activation delay.*	Default
	to	*Setting range from 0.0 sec*	
9999	999.9 sec	*to 999.9 sec.*	
ddE.1	**P-32 Deactivation Delay 1**	***Logic output 1 deactivation delay***	
ddE2	**P-36 Deactivation Delay 2**	***Logic output 2 deactivation delay***	
00	0.0 sec	*Defines logic output deactivation delay.*	Default
	to	*Setting range from 0.0 sec*	
9999	999.9 sec	*to 999.9 sec.*	
adU.1	**P-33 Output 1 Duration**	***Tachometer logic output 1 duration***	
adU2	**P-37 Output 2 Duration**	***Tachometer logic output 2 duration***	
Auto	Automatic	*Automatic output duration*	Default
LAtc	Latch output (clear by FNC key)	*Latch output, reset by FNC*	
0.1	Pulse 0.1 sec	*0,1 sec output impulse duration*	
	to		
999	Pulse 99.9 sec	*99,9 sec output impulse duration*	

OUTPUT CONFIGURATION

out.1	**P-38 Output Q1 Setup**	***Relay Q1 output setting***	
out2	**P-39 Output Q2 Setup**	***Relay Q2 output setting***	
dis	Disable	*Disabled output*	Default 2
L.no	Logic Out 1 n.o.	*Logic output 1 on n.o. contact*	Default 1
L.nc	Logic Out 1 n.c.	*Logic output 1 on n.c. contact*	
L2no	Logic Out 2 n.o.	*Logic output 2 on n.o. contact*	
L2nc	Logic Out 2 n.c.	*Logic output 2 on n.c. contact*	

TA327401 “RATE METER”

INPUT CONFIGURATION

I1

P-02 Hardware Input 1: nPn NPN; PnP PNP; tTL TTL

P-05 Filter Input 1: oFF Off; on On

I2

P-03 Hardware Input 2: nPn NPN; PnP PNP; tTL TTL

P-06 Active State Input 2: HLEv High Level; LLEv Low Level

P-08 Function Input 2: d.S Disable; outE Out Enable/Disable

I3

P-04 Hardware Input 3: PnP PNP; tTL TTL; Pot Potent.

P-07 Active State Input 3: HLEv High Level; LLEv Low Level

P-09 Function Input 3: d.S Disable; outE Out Enable/Disable; Hold Display Value; SEt.1 Set1; SEt2 Set2

P-10 Potentiometer calibration: PtAr. d.S Disable; En Enable

Key ▲

P-11 Function Key UP: F.uP d.S Disable; MAxP. Display max peak

Key ▼

P-12 Function Key DOWN: F.do. d.S Disable; MinP. Display min peak

CLOCK INPUT CONFIGURATION

P-01 Clock Input: CL.in in.1 I1; Enc. Encoder

P-14 Minimum Input Frequency: MinF. 00.1 0.01 Hz to 100 10,0 Hz

P-15 Software Filter: SFLt oFF off; 00.1 0.01 sec ... 1.00 sec

DISPLAY CONFIGURATION

P-16 Timebase: bASE SEc sec; Min min; Hour hour

P-17 Pulses in Unit: PuLS 9999 99.99 to 00.01; 1 to 9999 9999

P-18 Decimal Point: dP. 0 0; 00 0.0; 000 0.00; 0000 0.000

MEASURE UNIT CONFIGURATION

P-19 Measure Unit 1 (Mun.1) edit digit 1; P-20 Measure Unit 2 (Mun2) edit digit 2; P-21 Measure Unit 3 (Mun3) edit digit 3; P-22 Measure Unit 4 (Mun4) edit digit 4

OUTPUT ENABLE CONFIGURATION

P-29 Output Enable: outE. EnAb Always enable; Auto Automatic enable; inP. Enable by Input → Out Enable

EnAb **Always enable**	**TACHOMETER OUTPUTS ARE ALWAYS ENABLED.**
Auto **Automatic enable**	DEPENDING ON LOGIC OUTPUT MODE PARAMETER, THERE ARE DIFFERENT OPERATING MODES: - **High Deviation** : OUTPUTS ARE ALWAYS ENABLED - **Low Deviation** : AT STARTING, OUTPUTS ARE DESABLED; THEY CAN BE ENABLED WHEN TACHOMETER VALUE OVERCOMES SETPOINT VALUE AND KEPT ENABLED UNTIL INPUT SIGNAL FALLS BELOW VALUE SET ON PARAMETER «MINIMUM INPUT FREQUENCY» (P-14); - **Inside Band** : OUTPUTS ARE ALWAYS ENABLED - **Out of Band** : AT STARTING OUTPUTS ARE DESABLED, THEY CAN BE ENABLED WHEN TACHOMETER VALUE OVERCOMES SET1-SET2 VALUE, AND KEPT UNITL INPUT SIGNAL FREQUENCY FALLS BELOW VALUE SET ON PARAMETER «MINIMUM INPUT FREQUENCY» (P-14);
inP **Enable by input**	TACHOMETER OUTPUTS ARE ENABLED TO OPERATE ONLY IF: - INPUT 2 FUNCTION IS SET ON **OUT ENABLE/DISABLE** AND INPUT IS ACTIVE - INPUT 3 FUNCTION IS SET ON **Out Enable/Disable** AND INPUT IS ACTIVE

SETPOINT CONFIGURATION

P-23 Display Set 1: d.S.1 d.iS Disable; U.Sv Visualized; Mod. Modifiable

P-25 Upper limit Set 1: uP.S.1

P-24 Lower limit Set 1: Lo.S.1 → Set1

P-26 Display Set 2: d.S2 d.iS Disable; U.Sv Visualized; Mod. Modifiable

P-28 Upper limit Set 2: uP.S2

P-27 Lower limit Set 2: Lo.S2 → Set2

TACHOMETER LOGIC OUTPUT MODE CONFIGURATION

P-30 Logic Output Mode 1: Lo.1 HdEv High Deviation; LdEv Low Deviation; inSb Inside Band (Band defined by SET2); outb Out of Band (Band defined by SET2)

P-31 Activation Delay 1: AdE.1 00 0.0 sec ... 9999 999.9 sec

P-32 Deactivation Delay 1: ddE.1 00 0.0 sec ... 9999 999.9 sec

P-33 Output 1 Duration: odU.1 Auto Automatic; LAtc Latch output (clear only by FNC key); 0.1 Pulse 0.1 (sec) to. 999 Pulse 99.9 (sec)

TACHOMETER LOGIC OUTPUT MODE CONFIGURATION

P-34 Logic Output Mode 2: Lo.2 HdEv High Deviation; LdEv Low Deviation

P-35 Activation Delay 2: AdE.2 00 0.0 sec ... 9999 999.9 sec

P-36 Deactivation Delay 2: ddE.2 00 0.0 sec ... 9999 999.9 sec

P-37 Output 2 Duration: odU.2 Auto Automatic; LAtc Latch output (clear only by FNC key); 0.1 Pulse 0.1 (sec) to 999 Pulse 99.9 (sec)

BACKUP MEMORY CONFIGURATION

POWER-ON RESET

P-13 Power-off Memory: PoME d.S Disable; MAxP Max Peak; MinP Min Peak; ALL All Peak

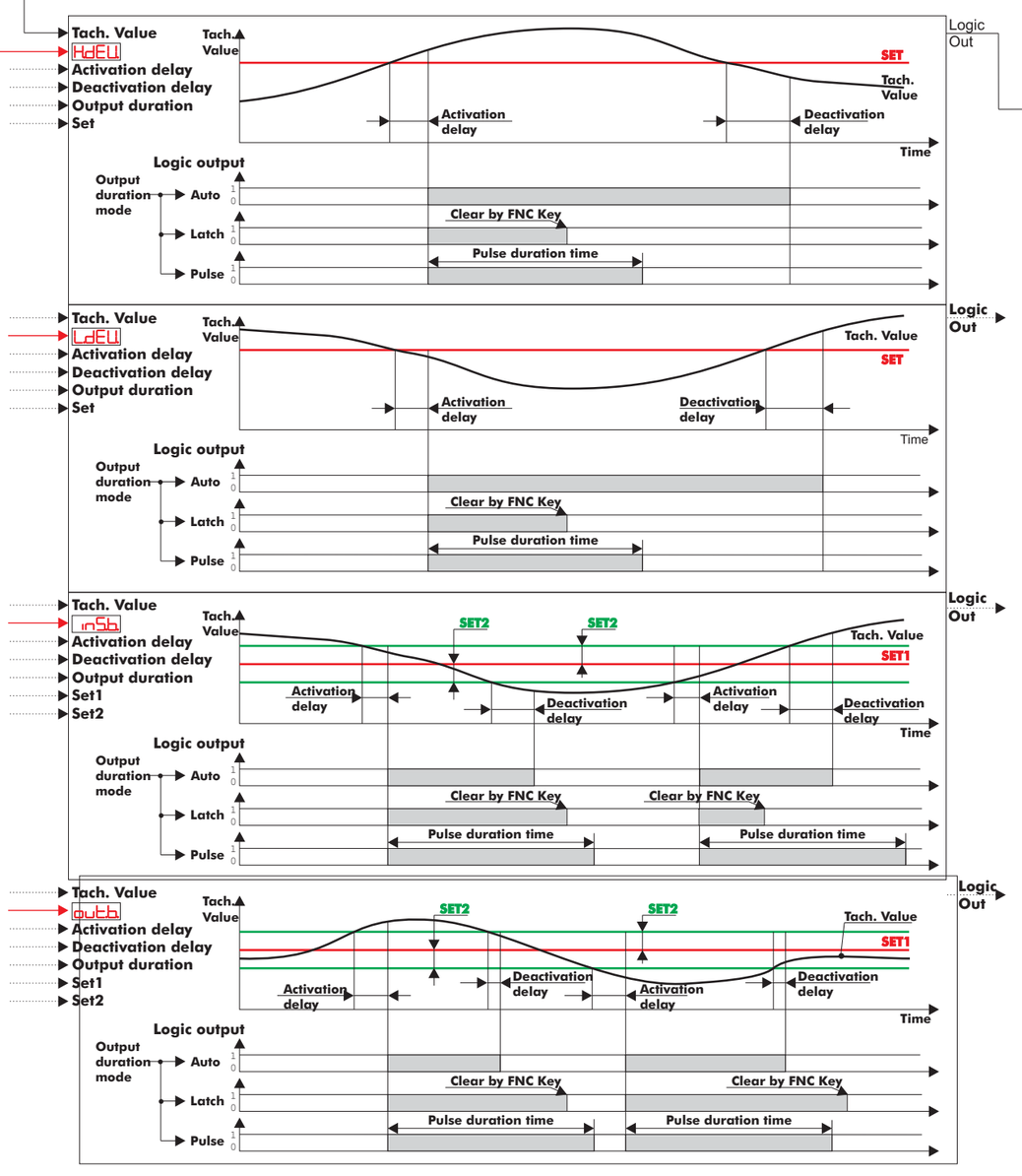
LOGIC LEVEL \ INPUT TYPE	NPN INPUT	PNP INPUT	TTL INPUT
H	< 4,7 v	>5,7 v (I1, I2) >12,4 v (I3)	>2,5 v
L	> 5,7 v	< 4,7 v (I1, I2) < 10,2 v (I3)	< 2,0 v

TABLE OF ERROR MESSAGES

E-01	ERROR IN WRITING OF EEPROM MEMORY (Note 1)
E-02	ERROR IN READING OF EEPROM MEMORY (Note 1)
E-03	INCORRECT PARAMETERS (Note 1)
E-04	INCORRECT CALIBRATION DATA (Note 1)
E-05	INCORRECT STATUS DATA (Note 1)
E-06	INCORRECT BACKUP REGISTERS (Note 2)

Note 1: SWITCH THE DEVICE OFF AND RESTART IT; IF ERROR IS STILL NOTIFIED, CONTACT TECHNICAL SERVICE.

Note 2: DISCHARGED BATTERY. KEEP THE DEVICE CONNECTED TO THE POWER SUPPLY IN ORDER TO RECHARGE THE BATTERY.



OUTPUT RELAIS CONFIGURATION

P-38 Output Q1 (relay) Setup: out.1 d.S Disable; L.no Logic Out 1 n.o.; L.nc Logic Out 1 n.c.; L2no Logic Out 2 n.o.; L2nc Logic Out 2 n.c. → Q1

P-39 Output Q2 (relay) Setup: out2 d.S Disable; L.no Logic Out 1 n.o.; L.nc Logic Out 1 n.c.; L2no Logic Out 2 n.o.; L2nc Logic Out 2 n.c. → Q2