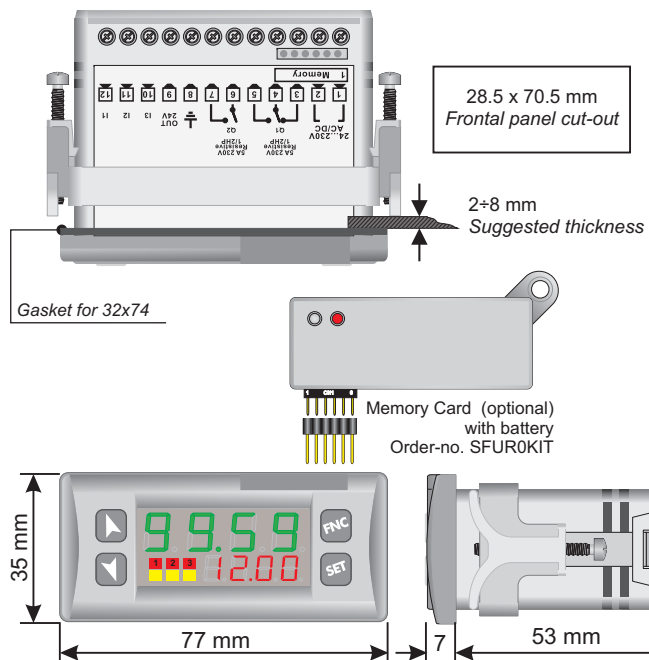


# MANUAL COUNTER ZD327401



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Version 2.0

## SIZE AND INSTALLATION



## TECHNICAL DATA

**Operating conditions** Operating temperature 0-40°C, humidity 35..95uR%

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

**Material** PC ABS UL94V0 self-extinguishing

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

**Outputs** 2 relays 5A resistive charge

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

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

**Power Supply** 24...230Vac/Vdc +/-15% 50/60Hz / 2W

## INTRODUCTION

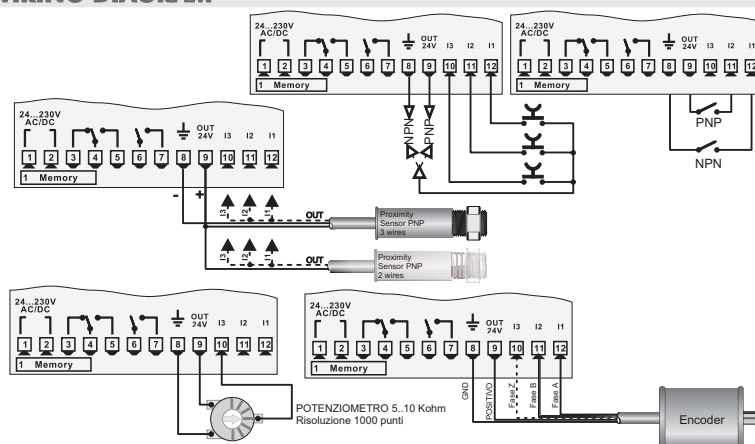
Thanks for choosing a Wachendorff Prozesstechnik device. The ZD327401 can be set in 2 different modes: Single or Double counter, all with independent settings. 3 universal digital inputs are available (NPN/PNP/Potential free contact) and can be used for bidirectional encoders reading, UP/DOWN counter function, LOCK/HOLD to lock or hold current visualization. One input is also analogue in order to allow setpoint modification by an external potentiometer.



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

LED	MEANING
	Report the activation of Q1
	Report the activation of Q2
	Report serial transmission by the ZD327401

## WIRING DIAGRAM



## Potentiometer:

To modify Set1 or Set2 by external potentiometer follow the steps below:

- 1-use potentiometers 0 to 5/10kohm
- 2-connect cursor to pin 13; 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 preset value related to Set1 between 50 and 150 pulses 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.Ar** as Enable

Exit configuration mode and place potentiometer at minimum level and press **ESC** key, then place potentiometer at max level and press **PREMERE** 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: Pls. perform first an update of the memory card.

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 and display 2 shows **---** (Only if the values stored on Memory Card are correct).

By pressing the **ESC** key display 2 shows **Load**

Confirm using the **ESC** 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.

## LOADING DEFAULT VALUES

This procedure restores the factory settings of the instrument.

SETPOINT MODIFICATION		
PRESS	DISPLAY	
1 <b>ESC</b>	Visualizes SETPOINT 1 / 2	
2 <b>▶</b> or <b>◀</b>	Modify selected SET	
2a <b>ESC</b>	Selects chosen digit	
3a <b>▶</b> or <b>◀</b>	Modify blinking digit of selected SET	

## LOADING DEFAULT VALUES

This procedure restores the factory settings of the instrument.

LOADING DEFAULT VALUE		
PRESS	DISPLAY	DO
1 <b>ESC</b> for 3 seconds	Display 1 shows <b>0000</b> and 1st digit flashes. Display 2 shows <b>PASS</b>	
2 <b>▶</b> or <b>◀</b>	Modify flashing digit and pass to the next one pressing <b>ESC</b>	Enter password <b>9999</b>
3 <b>ESC</b> to confirm	Device loads default settings	Switch-off and restart the device

## MODIFY CONFIGURATION PARAMETERS

PRESS	DISPLAY	DO
1 <b>ESC</b> for 3 seconds	Display 1 shows <b>0000</b> and 1st digit flashes. Display 2 shows <b>PASS</b>	
2 <b>▶</b> or <b>◀</b>	Modify flashing digit and pass to the next one pressing <b>ESC</b>	Enter password <b>1234</b>
3 <b>ESC</b> to confirm	Display shows first parameter of configuration table <b>Func</b>	
4 <b>▶</b> or <b>◀</b>	Scroll parameters	
5 <b>ESC</b> + <b>▶</b> or <b>◀</b>	Increase or decrease visualized value by pressing <b>ESC</b> and an arrow key.	Enter the new data which will be stored releasing the keys
6 <b>ESC</b>	End configuration, controller exits from programming mode.	

## PARAMETERS LIST

FUNCTION CONFIGURATION		
Func	P-01 Counter Function	Counter Functions
<b>S.in1</b>	Single (1 Counter)	1 counter functioning
<b>dob</b>	Double (2 Counters)	2 counters functioning
BACKUP MEMORY CONFIGURATION		
P-02 Power-off Memory Power-off memory		
<b>d.s</b>	Disable	No counter stored at power-off
<b>cnt1</b>	Counter 1	Counter 1 stored at power-off
<b>cnt2</b>	Counter 2	Counter 2 stored at power-off
<b>ALL</b>	All Counters	All counters stored at power-off
INPUT CONFIGURATION		
P-03 Hardware input 1 Input 1 Hardware configuration		
P-04 Hardware input 2 Input 2 Hardware configuration		
P-05 Hardware input 3 Input 3 Hardware configuration		
<b>n.pn</b>	NPN	NPN (not available on Input 3)
<b>p.pn</b>	PNP	PNP
<b>t.ttl</b>	TTL	TTL
<b>Pot</b>	Potent.	Potentiometer (available only for Input 3)
P-06 Filter Delay Input 1 Input 1 digital filter configuration		
P-07 Filter Delay Input 2 Input 2 digital filter configuration		
P-08 Filter Delay Input 3 Input 3 digital filter configuration		
<b>00</b>	No delay	Input filter disabled
<b>05</b>	0,5 ms	Filter of 0,5 ms
<b>...</b>	...	...(Step 0,5 ms)
<b>1000</b>	100,0 ms	Filter of 100,0 ms
P-09 Active State Input 1 Active state Input 1		
P-10 Active State Input 2 Active state Input 2		
P-11 Active State Input 3 Active state Input 3		
<b>H.LEV</b>	High Level	High level (available only for Input 2)
<b>L.LEV</b>	Low Level	Low level (available only for Input 2)
<b>R.S.</b>	Rising edge	Rising edge
<b>FALL</b>	Falling edge	Falling edge
P-12 Function Input 3 Function associated to Input 3		
<b>d.s</b>	Disable	Disabled
<b>Enc2</b>	Encoder Z	Loading encoder Z
<b>Ld 1</b>	Load Counter 1	Loading counter 1
<b>Ld 2</b>	Load Counter 2	Loading counter 2
<b>Ld 1&amp;2</b>	Load Counter 1&2	Loading counters 1 and 2
<b>SET1</b>	Set1	Set1 setting by potentiometer
<b>SET2</b>	Set2	Set2 setting by potentiometer
P-13 Function Key UP Function associated to UP (up arrow key)		
<b>d.s</b>	Disable	Disabled
<b>Ld 1</b>	Load Counter 1	Loading counter 1
<b>Ld 2</b>	Load Counter 2	Loading counter 2
<b>Ld 1&amp;2</b>	Load Counter 1&2	Loading counters 1 and 2
<b>PtAr</b>	P-14 Potentiometer Tarature	Potentiometer calibration procedure
<b>d.s</b>	Disable	Disabled
<b>En</b>	Enable	Enabled
COUNTER CLOCK CONFIGURATION		
P-15 Clock Counter 1 Counter 1 count mode selection		
P-33 Clock Counter 2 Counter 2 count mode selection		
<b>d.s</b>	Disable	Disabled
<b>Enc</b>	Encoder	Bidirectional encoder (I1) phase A, (I2) phase B
<b>UP--</b>	I1 Up, I2 Off	UP mode (I1)
<b>DA--</b>	I1 Down, I2 Off	DOWN mode (I1)
<b>--UP</b>	I1 Off, I2 Up	UP mode (I2)
<b>--DA</b>	I1 Off, I2 Down	DOWN mode (I2)
<b>uPda</b>	I1 Up, I2 Down	UP mode (I1) - DOWN mode (I2)
<b>uPd</b>	I1 Up, I2 Incr./Decr.	UP mode (I1) with reverse direction (I2)
<b>uPEL</b>	I1 Up, I2 En./Lock	UP mode (I1) with count lock (I2)
<b>uPEH</b>	I1 Up, I2 En./Hold	UP mode (I1) with keeping value on display (I2)
<b>daEL</b>	I1 Down, I2 En./Lock	DOWN mode (I1) with count lock (I2)
<b>daEH</b>	I1 Down, I2 En./Hold	DOWN mode (I1) with keeping value on display (I2)
<b>oc2</b>	Output Counter 2/1	UP count on rising edge of counter 2/1 output

## COUNTER DISPLAY CONFIGURATION

<b>d.c.1</b>	P-16 Display Counter 1	Counter 1 visualization selection	
<b>d.c.2</b>	P-34 Display Counter 2	Counter 2 visualization selection	
<b>d.s</b>	Disable	Counter value not visualized	Default C2
<b>u.su</b>	Visualized	Counter value visualized	Default C1
P-17 Decimal Point Counter 1 Counter 1 visualization format			
P-35 Decimal Point Counter 2 Counter 2 visualization format			
<b>0</b>	0	No decimal digit visualization	Default
<b>00</b>	0.0	1 decimal digit visualization	
<b>000</b>	0.00	2 decimal digits visualization	
<b>0000</b>	0.000	3 decimal digits visualization	
P-18 Counter 1 input counts Counter 1 input counts (1...9999)			
P-36 Counter 2 input counts Counter 2 input counts (1...9999)			
P-19 Counter 1 Visualized Counts Counter 1 visualized counts (1...9999)			
P-37 Counter 2 Visualized Counts Counter 2 visualized counts (1...9999)			
SETPOINT CONFIGURATION			
P-20 Display Set 1 Counter 1 setpoint visualization selection			
P-38 Display Set 2 Counter 2 setpoint visualization selection			
<b>d.s</b>	Disable	Setpoint value not visualized	Default C2
<b>u.su</b>	Visualized	Setpoint value visualized	
<b>Mod</b>	Modifiable	Setpoint value visualized and modifiable	Default C1
P-21 Lower Limit Set 1 Set 1 minimum value (0...9999)			
P-39 Lower Limit Set 2 Set 2 minimum value (0...9999)			
P-22 Upper Limit Set 1 Set 1 maximum value (0...9999)			
P-40 Upper Limit Set 2 Set 2 maximum value (0...9999)			
AUTOMATIC LOAD CONFIGURATION			
P-23 Automatic Load Counter 1 Counter 1 automatic loading			
P-41 Automatic Load Counter 2 Counter 2 automatic loading			
<b>d.s</b>	Disable	Automatic loading disabled	Default
<b>SET1</b>	Counter = Set 1	Loading if counter = Set1	
<b>SET2</b>	Counter = Set 2	Loading if counter = Set2	
<b>Sod1</b>	Counter = Set 1+Output Duration 1	Loading if counter = Set1 + "Output Duration 1"	
<b>Sod2</b>	Counter = Set 2+Output Duration 2	Loading if counter = Set2 + "Output Duration 2"	
<b>u.c.1</b>	Counter = Visualized counts	Loading if counter = "Visualized Counts"	
COUNTER LOAD VALUE CONFIGURATION			
P-24 Counter Load Value 1 Counter 1 loading value			
P-42 Counter Load Value 2 Counter 2 loading value			
COUNTER OUTPUT MODE CONFIGURATION			
P-25 Counter 1 Output Mode Counter 1 output mode			
P-43 Counter 2 Output Mode Counter 2 output mode			
<b>SET</b>	Counter =Set	Output active if Counter =Set	Default
<b>En</b>	Counter =Set * Output Duration (time)	Output active for "Output Duration" time if Counter =Set	
<b>Count</b>	Counter =Set * Output Duration (counts)	Output active for "Output Duration" counts if Counter =Set	
<b>SE12</b>	Counter =Set1+Set2	Output active if Counter =Set1+Set2	
OUTPUT DURATION CONFIGURATION			
P-26 Output 1 Duration Counter 1 output duration			
P-44 Output 2 Duration Counter 2 output duration			
<b>USEr</b>	Output Duration Input by User	Value modifiable by user	Default
<b>LARc</b>	Latch output (clear only by load)	Latch output, resettable by counter loading	
<b>1</b>	Min output duration	Output duration minimum value	
<b>999</b>	Max output duration	Output duration maximum value	
COUNTER FREQUENCY DISPLAY CONFIGURATION			
P-27 Display Frequency Counter 1 Counter 1 frequency visualization			
P-45 Display Frequency Counter 2 Counter 2 frequency visualization			
<b>d.s</b>	Disable	Counter frequency value not visualized	Default
<b>u.su</b>	Visualized	Counter frequency value visualized	
P-28 Decimal Point Frequency Counter 1 Counter 1 frequency format			
P-46 Decimal Point Frequency Counter 2 Counter 2 frequency format			
<b>0</b>	0	Visualization with no decimal digit	Default
<b>00</b>	0.0	Visualization with 1 decimal digit	
<b>000</b>	0.00	Visualization with 2 decimal digits	
<b>0000</b>	0.000	Visualization with 3 decimal digits	
P-29 Counter 1 Input frequency Counter 1 input frequency (1...9999Hz)			
P-47 Counter 2 Input frequency Counter 2 input frequency (1...9999Hz)			
P-30 Counter 1 Visualized Frequency Counter 1 visualized frequency			
P-48 Counter 2 Visualized Frequency Counter 2 visualized frequency			
P-31 Output Q1 Setup Output Q1 setting			
P-32 Output Q2 Setup Output Q2 setting			
<b>d.s</b>	Disable	Disabled output	Default C2
<b>C.Inc</b>	Out Counter 1 n.o.	Counter 1 output on n.o. contact	Default C1
<b>C.nc</b>	Out Counter 1 n.c.	Counter 1 output on n.c. contact	
<b>C2nc</b>	Out Counter 2 n.o.	Counter 2 output on n.o. contact	
<b>C2nc</b>	Out Counter 2 n.c.	Counter 2 output on n.c. contact	

# ZD327401 "COUNTER"

### COUNTER FUNCTION

P-01 Counter Function

Func Single (1 Counter)  
 Sing Double (2 Counters)  
 doub Double (2 Counters)

### BACKUP MEMORY CONFIGURATION

P-02 Power-off Memory

PaNE Disable  
 cnt1 Counter 1  
 cnt2 Counter 2  
 ALL All Counter

### COUNTER CLOCK CONFIGURATION

P-15 Clock Counter 1

CLC1 Disable  
 Enc Encoder  
 UP-- I1 Up, I2 Off  
 da-- I1 Down, I2 Off  
 --UP I1 Off, I2 Up  
 --da I1 Off, I2 Down  
 UPda I1 Up, I2 Down  
 UPd I1 Up, I2 En./Decr.  
 UPdL I1 Up, I2 En./Lock  
 UPdH I1 Up, I2 En./Hold  
 daEL I1 Down, I2 En./Lock  
 daEH I1 Down, I2 En./Hold  
 oc2 Output Counter 2

### INPUT CONFIGURATION

P-03 Hardware Input 1

Pin1 NPN  
 PnP  
 TTL

P-04 Hardware Input 2

Pin2 NPN  
 PnP  
 TTL

P-05 Hardware Input 3

Pin3 PnP  
 TTL  
 Potent.

P-06 Filter Delay Input 1

FL1 No delay  
 05 0,5 ms  
 1000 100,0 ms

P-07 Filter Delay Input 2

FL2 No delay  
 05 0,5 ms  
 1000 100,0 ms

P-08 Filter Delay Input 3

FL3 No delay  
 05 0,5 ms  
 1000 100,0 ms

P-09 Active State Input 1

RS1 Rising edge  
 FALL Falling edge

P-10 Active State Input 2

RS2 High Level  
 LEW Low Level  
 RS4 Rising edge  
 FALL Falling edge

P-11 Active State Input 3

RS3 Rising edge  
 FALL Falling edge

P-12 Function Input 3

EncZ Encoder Z  
 Ld1 Load Counter 1  
 Ld2 Load Counter 2  
 Ld12 Load Counter 1&2  
 SET1 Set1  
 SET2 Set2

P-13 Function Key UP

FTuP Disable  
 Ld1 Load Counter 1  
 Ld2 Load Counter 2  
 Ld12 Load Counter 1&2

### AUTOMATIC LOAD CONFIGURATION

P-23 Automatic Load Counter 1

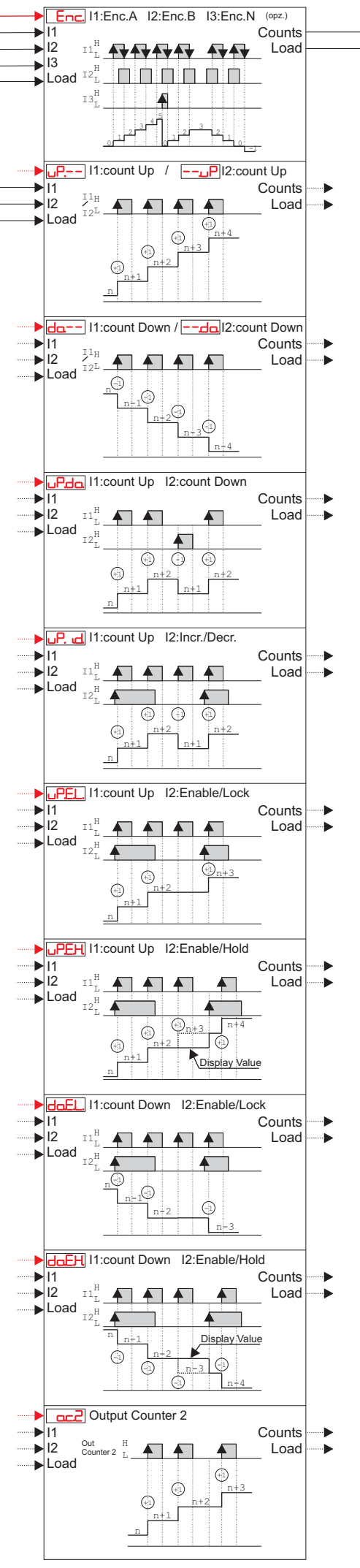
ALC1 Disable  
 SET1 Counter 1 = Set 1  
 SET2 Counter 1 = Set 2  
 Sod1 Counter 1 = Set 1 + Output Duration 1  
 Sod2 Counter 1 = Set 2 + Output Duration 2  
 VC1 Counter 1 = Visualized counts 1

### COUNTER LOAD VALUE CONFIGURATION

P-24 Counter 1 Load Value

CLd1 0 Min value  
 9999 Max value

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



### COUNTER OUTPUT MODE CONFIGURATION

P-25 Counter 1 Output Mode

CoN1 Counter = Set  
 ENE Counter = Set \* Output Duration (time)  
 Coun Counter = Set \* Output Duration (counts)  
 SE12 Counter = Set1 + Set2

### OUTPUT DURATION CONFIGURATION

P-26 Output 1 Duration

USEr Output Duration Input by User  
 LAtc Latch output (clear only by load)  
 1 Min output duration  
 999 Max output duration

### SETPOINT CONFIGURATION

P-20 Display Set 1

DS1 Disable  
 USu Visualized  
 Mod1 Modifiable

P-22 Upper limit Set 1

P-21 Lower limit Set 1

### COUNTERS DISPLAY CONFIGURATION

P-16 Display Counter 1

DC1 Disable  
 USu Visualized

P-17 Decimal Point Counter 1

DP1 0  
 00 0.0  
 000 0.00  
 0000 0.000

P-18 Counter 1 Input counts

INC1

P-19 Counter 1 Visualized counts

VC1

### COUNTERS FREQUENCY DISPLAY CONFIGURATION

P-27 Display Frequency 1

DF1 Disable  
 USu Visualized

P-28 Decimal Point Frequency 1

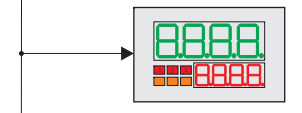
DPF1 0  
 00 0.0  
 000 0.00  
 0000 0.000

P-29 Counter 1 Input Frequency

INF1

P-30 Counter 1 Visualized Frequency

VF1



### Counter = Set

Output duration

Counts

Set

Load

Out Counter

### Counter = Set \* Output Duration (time)

Output duration

Counts

Set

Load

Out Counter

### Counter = Set \* Output Duration (counts)

Output duration

Counts

Set

Load

Out Counter

### Counter = Set1 + Set2

Output duration

Counts

Set

Load

Out Counter

### OUTPUT CONFIGURATION

P-31 Output Q1 Setup

out1 Disable  
 C1n Out Counter 1 n.o.  
 C1c Out Counter 1 n.c.  
 C2n Out Counter 2 n.o.  
 C2c Out Counter 2 n.c.

P-32 Output Q2 Setup

out2 Disable  
 C1n Out Counter 1 n.o.  
 C1c Out Counter 1 n.c.  
 C2n Out Counter 2 n.o.  
 C2c Out Counter 2 n.c.

### TABLE OF ERROR MESSAGES

E-01	ERROR IN WRITING OF EEPROM
E-02	ERROR IN READING OF EEPROM
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.