



Operating instructions  
Electronic Preset Counter  
with two presets  
LCD positive, green backlighting  
relay outputs

UK

**E89005**

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## 1 Preliminary note

Please read this instruction manual carefully before installation and start-up.

Please observe all warnings and advice, both for your own safety and for general plant safety. If the device is not used in accordance with this instruction manual, then the intended protection can be impaired.

### 1.1 Symbols used

- ▶ Instructions
- > Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note  
Non-compliance can result in malfunction or interference.
-  Information  
Supplementary note

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### 1.2 Warning signs used

#### WARNING

Warning of serious personal injury.  
Death or serious irreversible injuries may result.

#### CAUTION

Warning of personal injury.  
Slight reversible injuries may result.

#### NOTE

Warning of damage to property.

## 2 Safety instructions

Please use the device only if its technical condition is perfect. It should be used only for its intended purpose.

Please bear in mind safety aspects and potential dangers and adhere to the operating instructions at all times.

#### WARNING

If the device is used to monitor machines or processes in which, in the event of a failure of the device or an error made by the operator, there might be the risk of damaging the machine or causing an accident to the operators, then it is your responsibility to take the appropriate safety measures.

### 3 Functions and features

The preset counter detects and measures pulses, times and frequencies and offers a wide variety of different operating modes. At the same time, the preset counter processes programmed presets.

The application area for this device lies in industrial processes and controls, in the fields of manufacturing lines for the metal, wood, plastics, paper, glass, textile and other like industries.

Use for any purpose over and beyond this will be deemed as not in accordance with its intended purpose and thus not complying with the requirements.

Overvoltages at the terminals of the device must be kept within the limits of Over-voltage Category II.

The device must only be operated when mounted in a panel in the correct way and in accordance with the section "Technical Data" (→ 11 Technical data).

Correct operation of the device requires the mandatory use of the appropriate external safety fuse. Advice concerning the recommended fuseprotection can be found under (→ 11.7 Supply voltage).

The device is not suitable for use in hazardous areas and for areas excluded in EN 61010 Part 1.

#### 3.1 General description

- 6-digit multifunction LCD display
- 2-line LCD-display with annunciators for both the displayed preset and the status of the two outputs
- Simultaneous display of the actual value and of the presets or auxiliary counters
- Backlit display
- Add./Sub. Preset counter with two presets
- Relay outputs
- Preset entry via the front keys or via the Teach-In function
- Step or tracking preset
- Pulse, frequency, time or batch counter
- Preset counter, Batch counter or Total Counter (cumulative count)
- Set function for pulse and time counter
- Multiplication and division factor (00.0001...99.9999) for pulse counter and frequency meter
- Averaging and Start Delay for frequency meter
- 4-stage RESET-Mode
- 3-stage keypad locking (Lock)
- MPI input for Display Latch, Teach-In function or Set function

##### 3.1.1 Input modes

- Pulse counter: cnt.dir, up.dn, up.up, quad, quad2, quad4, A/B, (A-B)/Ax100%
- Timer: FrErUn, Auto, InpA.InpB, InpB.InpB
- Frequency meter: A, A-B, A+B, quad, A/B, (A-B)/Ax100%

### 3.1.2 Output operations

- Add, Sub, AddAr, SubAr, AddBat, SubBat, AddTot, SubTot, Trail, TrailAr

## 3.2 Inputs

### 3.2.1 INP A, INP B

Signal inputs: function acc. to operating mode.

Max. frequency 60 kHz, can be damped in the programming menu to 30 Hz.

- Pulse counter: Count inputs
- Timer: Start input or Start/Stop inputs
- Frequency meter: Frequency inputs

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### 3.2.2 RESET

Dynamic reset input: resets the pulse counter or timer to zero (adding mode) or to preset value 2 (subtracting mode). The reset input can be inhibited in the programming menu.

- Pulse counter: RESET input
- Timer: RESET input
- Frequency meter: no function

### 3.2.3 GATE

Static gate input: function depending on operating mode.

- Pulse counter: no counting while active
- Timer: no time measurement while active (Gate.hi), no time measurement while not active (Gate.Lo).
- Frequency meter: no counting while active

### 3.2.4 LOCK INPUT

Static keypad lock input for presets or programming. Lock-out level can be set in the programming menu.

### 3.2.5 MPI

Input. Programmable as Display Latch, Set or Teach-In input.




### 3.3 Outputs

2 relay outputs with potential-free contacts (→ 11.6 Outputs).

#### 3.3.1 Active Outputs

An active output will be shown on the display.

 I /  II

For safety switching the relay outputs can be inverted, i.e. the relay will be deenergized when the presets are reached. To do this, the parameters Pr.OUT1 and Pr.OUT2 must be set to  (for permanent signal) or  or  (for timed signal). See (→ 2 Safety instructions).

## 4 Mounting

### CAUTION

Mount the device away from heat sources and avoid direct contact with corrosive liquids, hot steam or similar.

- ▶ Remove mounting clip from the device.
- ▶ Insert the device from the front into the panel cut-out, ensuring the front-panel gasket is correctly seated.
- ▶ Slide the fixing clip from the rear onto the housing, until the spring clamps are under tension and the upper and lower latching lugs have snapped into place.

## 5 Electrical connection

### **⚠ WARNING**

The device must be disconnected from the power supply, before any installation or maintenance work is carried out.  
AC-powered devices must only be connected to the lowvoltage network via a switch or circuit breaker.  
Installation or maintenance work must only be carried out by qualified personnel.

### 5.1 Advice on noise immunity

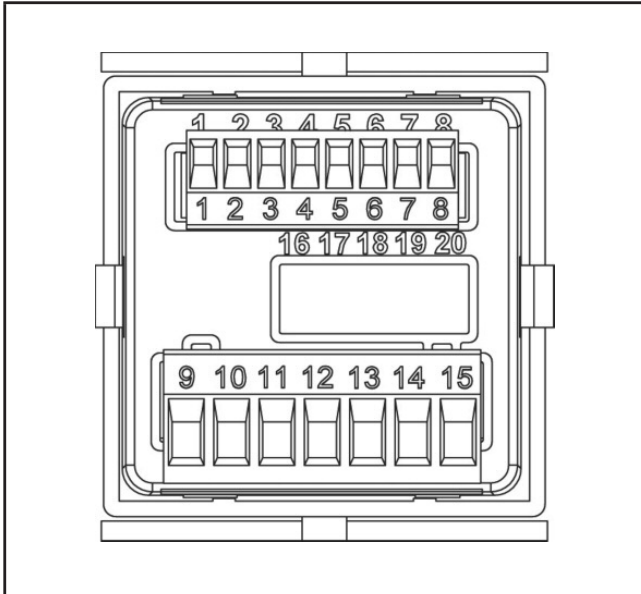
All connections are protected against external sources of interference.

The installation location should be chosen so that inductive or capacitive interference does not affect the device or its connecting lines! Interference (e.g. from switchmode power supplies, motors, clocked controllers or contactors) can be reduced by means of appropriate cable routing and wiring.

Measures to be taken:

- ▶ Connect the terminal 2 (GND) with ground.
- ▶ Use only shielded cable for signal and control lines.
- ▶ Connect cable shield at both ends.
- ▶ The conductor cross-section of the cables should be a minimum of 0.4 mm<sup>2</sup>.
- ▶ The shield connection to the equipotential bonding should be as short as possible and with a contact area as large as possible (low-impedance).
- ▶ Only connect the shields to the control panel, if the latter is also earthed.
- ▶ Install the device as far away as possible from noise-containing cables.
- ▶ Avoid routing signal or control cables parallel to power lines.
- ▶ Cables and their insulation should be in accordance with the intended temperature and voltage ranges.

## 5.2 Connections



Terminals

### 5.2.1 Signal and control inputs

Terminal	Designation	Function
1	24 V DC / 80 mA	Sensor supply voltage
2	GND (0 VDC)	Common connection signal and control inputs
3	INP A	Signal input A
4	INP B	Signal input B
5	RESET	Reset input
6	LOCK	Keypad lock
7	GATE	Gate input
8	MPI	User input

### 5.2.2 Supply voltage and outputs

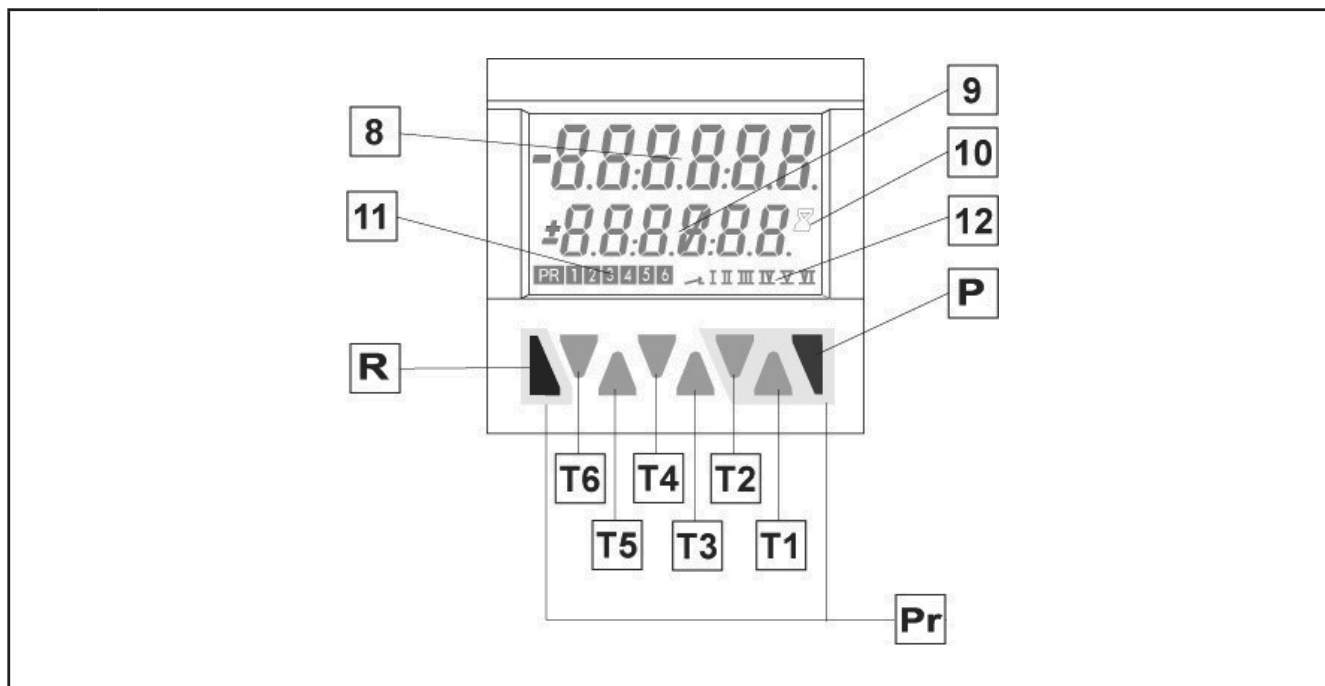
Terminal	Designation	Function
9	Relay contact C1	Output 1
10	Relay contact NO1	
11	Relay contact C2	Output 2 (changeover contact)
12	Relay contact NO2	
13	Relay contact NC2	

Terminal	Designation	Function
14	90...260 V AC N	Supply voltage
15	90...260 V AC L	

NO= normally open  
 NC = normally closed  
 C = common

## 6 Operating and display elements

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- R Reset key [R]
- P Prog/Mode key [P]
- T1-6 Decade keys [T...]
- 8 Current count value / main counter
- 9 Preset value / Total count / Batch counter
- 10 Run display for Timer
- 11 Shows which preset value is being displayed
- 12 Shows which preset output is active
- Pr Keys necessary for programming the parameters (highlighted in grey)  
[R], [P], [T1], [T2]

### 6.1 Error message

#### Err 1

Set value is outside the permitted range.

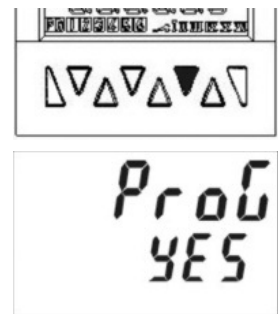
## 7 Programming

### 7.1 Entering the programming

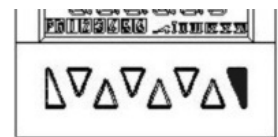
- ▶ Press [R] and [P] simultaneously for 3 s
- > The security prompt appears in the display.  
Programming can be exited again using [P].



- ▶ Press [T2] to continue with the programming.
- > The security prompt appears in the display.



- ▶ Enter the main menu by pressing [P].



### 7.2 Choice of main menu

- ▶ The menus are selected using [T2] (next) and [T1] (back).



### 7.3 Entering a submenu

- ▶ The submenu is opened with [P] and the first menu item is displayed.



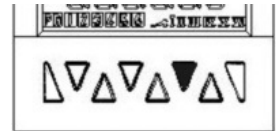
### 7.4 Selecting the menu items

- ▶ [P] is used to select a menu item within the sub-menu.

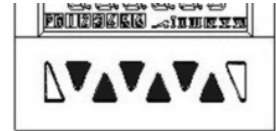


## 7.5 Setting the menu items

- ▶ [T2] is used to select the individual settings for the menu items.

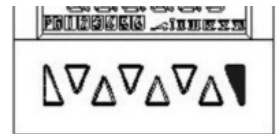


When setting count values, each decade has a key assigned to it. Each time the key is pressed, the value increments by one.



## 7.6 Accepting the setting

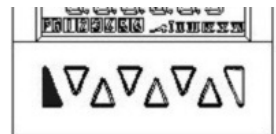
- ▶ Pressing [P] causes the current setting to be accepted. Programming then switches to the next menu item.



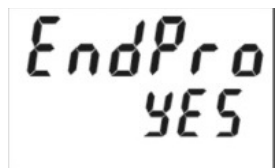
## 7.7 Ending the programming

During programming, it is possible to exit the programming at each menu item by pressing the reset key.

- ▶ Press [R].
- > The security prompt appears in the display.



- ▶ Pressing [P] acknowledges this prompt and causes the programming menu to start again from the beginning.
- > The previously-programmed values are preserved. These can now be changed or checked again.
- ▶ Pressing [T2] selects the termination of the programming.
- > The security prompt appears in the display.



- ▶ Pressing [P] acknowledges this prompt and terminates the programming.
- > The modified settings are saved in the EEPROM.  
The text SAVE is displayed for 2 s.



Complete parameter structure and menus see attachment.

## 7.8 Setting the presets

### 7.8.1 Setting via Decade Keys

In programming mode Preset 2 will always be displayed in the lower line. This is except for the output operations AddBat, SubBat, AddTot and SubTot.

- ▶ Press [P] until the preset to be changed is displayed.  
(**PR1** or **PR2**)
- ▶ Press any decade key.
- > Display switches to the editor mode.
- ▶ Set the desired preset value using the decade keys.
- ▶ Press [P] to confirm the value and save it.
- > Display switches to the editor mode of the next preset.  
(**PR1** or **PR2**)
- > Approx. 3 s after the last press of the decade keys or by pressing [R] key the new preset value will be accepted and the counter will switch back to operating mode.



### 7.8.2 Setting via Teach-in function

- ▶ Programme the MPI input to tEAch.
- ▶ Press [P] until the preset to be changed is displayed.  
(**PR1** or **PR2**)
- ▶ Briefly activate the MPI (NPN or PNP input logic).
- > The current count value will be adopted as the new preset value.
- ▶ The preset value can subsequently be further modified via the decade keypad.



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### **7.8.3 Setting the tracking presets (trail)**

If a tracking preset has been programmed, the value for Preset 2 can be set either via the decade keypad or via the Teach-In function.

However the value for Preset 1 must be entered via the decade keypad. In this instance, it is not possible to use the Teach-In function.

## 7.9 Set Function

Both the pulse counter and the timer can be set to a default value by means of the Set function.

- ▶ Programme the MPI input to SEt.



- ▶ Set menu item SEtPt to the desired value.
- ▶ Briefly activate the MPI (NPN or PNP input logic).
- > For add. output operations the pulse counter or timer will be set to the SEtPt default value.  
For sub. output operations the pulse counter or timer will be set to the difference between the value of Preset 2 and the value of SEtPt.



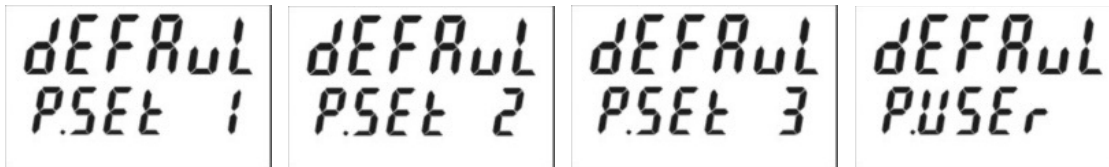
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## 8 Parameters

### 8.1 Default parameters

Three default parameter sets have been permanently stored; these can be adapted as required. With each acknowledgment of the parameter sets, all parameters will be reset to the values listed in the table.

The default parameter set P.USER can be freely programmed.



### 8.2 Table: Default Parameter Sets

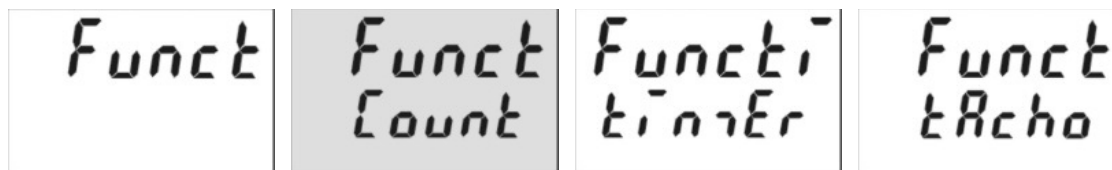
Display	Description	P.SET 1	P.SET 2	P.SET 3	P.USER
<b>Func</b>	Basic function of the device	Count	Count	Count	Freely programmable User settings
<b>InP.PoL</b>	Input polarity	PnP	PnP	PnP	
<b>FiLteR</b>	Filter for the signal inputs InpA and InpB	on	oFF	oFF	
<b>Count</b>	Count input mode	Cnt.dir	uP.dn	Quad	
<b>MPI</b>	User input	LAtch	LAtch	Set	
<b>Loc.InP</b>	Lock input	ProG	ProG	ProG	
<b>ModE</b>	Mode	Add	Sub	TrAiL	
<b>FActor</b>	Multiplication factor	01.0000	01.0000	01.0000	
<b>diViSo</b>	Division factor	01.0000	01.0000	01.0000	
<b>dP</b>	Decimal point	0	0	0.00	
<b>SEtPt</b>	Set value	000000	000000	0000.00	
<b>CoLor</b>	Display colour	red.Grn	red.Grn	red.Grn	
<b>rESmd</b>	Reset mode	Man.EL	Man.EL	Man.EL	
<b>PrES 1</b>	Preset 1	on	on	on	
<b>Pr.Out 1</b>	Preset output 1				
<b>t.Out 1</b>	Duration of timed signal of output 1	-	00.10	-	
<b>Pr.Out 2</b>	Preset output 2				
<b>t.Out 2</b>	Duration of timed signal of output 1	-	00.10	00.10	

factory settings are highlighted in grey



Complete parameter structure and menus see attachment.

### 8.3 Setting the basic function of the device



Parameters and submenus of the basic functions

- Pulse counter (→ 8.4)
- Timer/Hour meter (→ 8.5)
- Tacho/Frequency meter (→ 8.6)

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## 8.4 Pulse counter

### 8.4.1 Input

Submenus for the signal and control inputs.

Display		Description
Submenu	Value	
<b>InP.PoL</b>		Input polarity
	<b>PnP</b>	PNP: switching to Plus for all inputs in common
	<b>nPn</b>	NPN: switching to 0 V for all inputs in common
<b>FiLtEr</b>		Filter for the signal inputs InpA and InpB
	<b>oFF</b>	Maximum count frequency
	<b>on</b>	Damped to approx. 30 Hz (for control with mechanical contacts)
<b>Count</b>		Count input mode
	<b>Cnt.Dir</b>	Count/Direction INP A: count input INP B: count direction input
	<b>uP.dn</b>	Differential counting [A-B] INP A: count input add INP B: count input sub
	<b>uP.uP</b>	Totalising [A+B] INP A: count input add INP B: count input add
	<b>quAd</b>	Quadrature input INP A: count input 0° INP B: count input 90°
	<b>quA2</b>	Quadrature with pulse doubling INP A: count input 0° INP B: count input 90° Each pulse edge of INP A will be counted
	<b>quA4</b>	Quadrature x4 INP A: count input 0° INP B: count input 90° Each pulse edge of INP A and INP B will be counted.
	<b>A / B</b>	Ratio measurement [A/B] Inp A: count input A Inp B: count input B
	<b>A % b</b>	Percentage differential counting [(A-B) / A in %] Inp A: count input A Inp B: count input B

Display		Description
Submenu	Value	
<b>MPI</b>		User input
	<b>LAtch</b>	When the MPI input is activated the display is “frozen” and remains “frozen” until the MPI input is deactivated. Internally the preset counter continues counting.
	<b>tEAcH</b>	When the MPI input is activated the current count value for the preset that has just been selected will be adopted as the new preset value.
	<b>SEt</b>	When the MPI input is activated the preset counter will be set to the value specified in the parameter SEtPt.
<b>Loc.InP</b>		Lock input
	<b>ProG</b>	When the lock input is activated the programming is inhibited.
	<b>PrESET</b>	When the lock input is activated the setting of the preset values is inhibited.
	<b>PrG.PrE</b>	When the lock input is activated the setting of the preset values and the programming are both inhibited.

factory settings are highlighted in grey

## 8.4.2 Mode

Submenus for output operations.

Display		Description
Submenu	Value	
<b>ModE</b>		Submenu for determining the operation of the outputs
	<b>Add</b>	Count mode ADD Outputs active when count status $\geq$ preset value Reset to zero.
	<b>Sub</b>	Count mode SUBTRACT Output 1 active when count status $\leq$ preset value 1. Output 2 active when count status $\leq 0$ . Reset to preset 2
	<b>AddAr</b>	Count mode ADDING with automatic reset Output 1 active when count status $\geq$ preset value 1. Output 2 (timed signal) active when count status = preset value 2. Automatic reset to zero when count status = preset value 2. Reset to zero.
	<b>SubAr</b>	Count mode SUBTRACTING with automatic reset Output 1 active when count status $\leq$ preset value 1. Output 2 (timed signal) active when count status = 0. Automatic reset to preset 2 when count status = 0. Reset to preset 2.

Display		Description
Submenu	Value	
	<b>AddbAt</b>	Count mode ADDING with automatic reset and Batch counter Output 2 (timed signal) active when main counter = preset value 2. Automatic reset to zero when main counter = preset 2. Batch counter counts the number of automatic repetitions of preset 2. Output 1 active when Batch counter $\geq$ preset 1. Manual reset sets both counters to zero. Electrical reset only sets the main counter to zero.
	<b>SubbAt</b>	Count mode SUBTRACTING with automatic reset and Batch counter Output 2 (timed signal) active when main counter = zero. Automatic reset to preset 2 when main counter = zero. Batch counter counts the number of automatic repetitions of preset 2. Output 1 active when Batch counter $\geq$ preset 1. Manual reset sets main counter to preset value 2, batch counter to zero. Electrical reset only sets the main counter to preset value 2.
	<b>Addtot</b>	Count mode ADDING with automatic reset and Total counter Output 2 (timed signal) active when main counter = preset value 2. Automatic reset to zero when main counter = preset value 2. Total counter counts all the count pulses from the main counter. Output 1 active when total counter $\geq$ preset value 1. Manual reset sets both counters to zero. Electrical reset only sets the main counter to zero.
	<b>Subtot</b>	Count mode SUBTRACTING with automatic reset and Total counter Output 2 (timed signal) active when main counter = zero. Automatic reset to preset value 2 when main counter = zero. Total counter counts (sub from preset value 1) all count pulses from main counter. Output 1 active when Total counter $\leq$ zero. Manual reset sets both counters to the preset values. Electrical reset sets only main counter to preset value 2.
	<b>trAiL</b>	Tracking Preset mode When preset 2 is changed then preset 1 automatically tracks it. Reset to zero. Preset 1 relative to preset 2.
	<b>tr_Ar</b>	Tracking Preset mode with automatic reset When preset 2 is changed then preset 1 automatically tracks it. Reset to zero. Automatic reset to zero when main counter = preset value.

factory settings are highlighted in grey

### 8.4.3 Config

Submenus for matching the input pulses and display.

Display		Description
Submenu	Value	
<b>F</b> actor		Multiplication factor
	<b>01.0000</b>	Factory setting
	<b>00.0001... 99.9999</b>	Multiplication factor can be programmed from 00.0001 to 99.9999. The setting 00.0000 will not be accepted.
<b>d</b> iV <b>i</b> So		Division factor
	<b>01.0000</b>	Factory setting
	<b>01.0000... 99.9999</b>	Division factor can be programmed from 01.0000 to 99.9999. The setting < 01.0000 will not be accepted.
<b>d</b> p		Decimal point setting (only optical function)
	<b>0</b>	no decimal place
	<b>0.0</b>	1 decimal place
	<b>0.00</b>	2 decimal places
	<b>0.000</b>	3 decimal places
	<b>0.0000</b>	4 decimal places
	<b>0.00000</b>	5 decimal places
<b>S</b> et <b>P</b> t		Set value
	<b>000000</b>	Factory setting
	<b>000000... 999999</b>	Set value can be programmed from 000000 to 999999. A previously programmed decimal point will be displayed.
<b>C</b> o <b>L</b> or		Display colour (not supported)
	<b>rEd</b>	Upper line red. Lower line red.
	<b>rEdGrn</b>	Upper line red Lower line green

factory settings are highlighted in grey

### 8.4.4 Reset mode

Submenus for reset mode.

Display		Description
Submenu	Value	
<b>rESmd</b>		Setting the reset mode
	<b>Man.EL</b>	Manual reset (with red key) and electrical reset (reset input).
	<b>no rES</b>	No reset possible (red key and reset input inhibited).
	<b>EL.rEs</b>	Only electrical reset possible (reset input).
	<b>MAnrE</b>	Only manual reset possible (red key).

factory settings are highlighted in grey

### 8.4.5 Preset 1

Submenus for preset 1.

Display		Description
Submenu	Value	
<b>PrES 1</b>		Submenu for turning preset 1 ON/OFF
	<b>on</b>	Preset 1 ON
	<b>off</b>	Preset 1 OFF and no function
<b>Pr.Out 1</b>		Preset output 1
	<b>---f---</b>	ADD mode output operations: permanent signal at Output 1, becomes active when count $\geq$ Preset 1 SUB mode output operations: permanent signal at Output 1, becomes active when count $\leq$ Preset 1
	<b>--7---</b>	ADD mode output operations: permanent signal at Output 1, becomes passive when count $\geq$ Preset 1 SUB mode output operations: permanent signal at Output 1, becomes passive when count $\leq$ Preset 1
	<b>--f7--</b>	ADD mode output operations: timed signal at Output 1, becomes active when count $\geq$ Preset 1. (Activation only in positive direction) SUB mode output operations: timed output at Output 1, becomes active when count $\leq$ Preset 1 (Activation only in negative direction)
	<b>--LJ--</b>	ADD mode output operations: timed signal at Output 1, becomes passive when count $\geq$ Preset 1. (Deactivation only in positive direction) SUB mode output operations: timed output at Output 1, becomes passive when count $\leq$ Preset 1. (Deactivation only in negative direction)

Display		Description
Submenu	Value	
	<code>~n~n~</code>	<p>ADD mode output operations: timed signal at Output1, becomes active with positive direction and when count <math>\geq</math> Preset 1 and subsequently active with negative direction and when count <math>\leq</math> Preset 1</p> <p>SUB mode output operations: timed signal at Output 1, becomes active with negative direction and when count <math>\leq</math> Preset 1 and subsequently active with positive direction and when count <math>\geq</math> Preset 1</p>
	<code>~u~u~</code>	<p>ADD mode output operations: timed signal at Output1, becomes passive with positive direction and when count <math>\geq</math> Preset 1 and subsequently passive with negative direction and when count <math>\leq</math> Preset 1</p> <p>SUB mode output operations: timed output at Output 1, becomes passive with negative direction and when count <math>\leq</math> Preset 1 and subsequently passive with positive direction and when count <math>\geq</math> Preset 1</p>
<b>t.Out 1</b>		Duration of timed signal of Output 1 Timed signal is post-triggered
	<b>00.01</b>	Factory setting
	<b>00.01... 99.99</b>	Programmable from 00.01 to 99.99 s

UK

factory settings are highlighted in grey

## 8.4.6 Preset 2

Submenus for preset 2.

Display		Description
Submenu	Value	
<b>PrES 2</b>		Submenu for Preset 2
<b>Pr.Out 2</b>		Preset output 2
	<code>---f---</code>	<p>ADD mode output operations: permanent signal at Output 2, becomes active when count <math>\geq</math> Preset 2</p> <p>SUB mode output operations: permanent signal at Output 2, becomes active when count <math>\leq</math> zero</p>
	<code>--7---</code>	<p>ADD mode output operations: permanent signal at Output 2, becomes passive when count <math>\geq</math> Preset 2</p> <p>SUB mode output operations: permanent signal at Output 2, becomes passive when count <math>\leq</math> zero</p>
	<code>--f7--</code>	<p>ADD mode output operations: timed signal at Output 2, becomes active when count <math>\geq</math> Preset 2 (Activation only in positive direction).</p> <p>SUB mode output operations: permanent signal at Output 2, becomes active when count <math>\leq</math> zero (Activation only in negative direction)</p>

Display		Description
Submenu	Value	
	~LJ~	<p>ADD mode output operations: timed signal at Output 2, becomes passive when count <math>\geq</math> Preset 2 (Deactivation only in positive direction)</p> <p>SUB mode output operations: permanent signal at Output 2, becomes passive when count <math>\leq</math> zero (Deactivation only in negative direction)</p>
	~n~n~	<p>ADD mode output operations: timed signal at Output 2, becomes active with positive direction and when count <math>\geq</math> Preset 2 and subsequently with negative direction and when count <math>\leq</math> Preset 2</p> <p>SUB mode output operations: timed signal at Output 2, becomes active with negative direction and when count <math>\leq</math> zero and subsequently with positive direction and when count <math>\geq</math> zero</p>
	~u~u~	<p>ADD mode output operations: timed signal at Output 2, becomes passive with positive direction and when count <math>\geq</math> Preset 2 and subsequently with negative direction and when count <math>\leq</math> Preset 2</p> <p>SUB mode output operations: timed signal at Output 2, becomes passive with negative direction and when count <math>\leq</math> zero and subsequently with positive direction and when count <math>\geq</math> zero</p>
<b>t.Out 2</b>		Duration of timed signal of Output 2 Timed signal is post-triggered
	<b>00.01</b>	Factory setting
	<b>00.01... 99.99</b>	Programmable from 00.01 to 99.99 s

factory settings are highlighted in grey



Active: Relay is activated when the preset value is reached.

Passive: Relay becomes de-energized when the preset value is reached.

## 8.5 Timer

### 8.5.1 Input

Submenus for the signal and control inputs.

Display		Description
Submenu	Value	
<b>InP.PoL</b>		Input polarity
	<b>PnP</b>	PNP: switching to Plus for all inputs in common
	<b>nPn</b>	NPN: switching to 0 V for all inputs in common
<b>FiLtEr</b>		Filter for the signal inputs InpA and InpB
	<b>oFF</b>	For electronic control of the signal inputs.
	<b>on</b>	For mechanical control of the signal inputs (for control with mechanical contacts).
<b>StArt</b>		Input mode time measurement
	<b>InA.Inb</b>	Start: Edge to Inp A Stop: Edge to Inp B
	<b>Inb.Inb</b>	Start: 1. Edge to Inp B Stop: 2. Edge to Inp B
	<b>FrERun</b>	Timing can only be controlled via the Gate input. Inp A and Inp B: no function.
	<b>Auto</b>	The timer is reset by means of a RESET (to zero when adding, to preset 2 when subtracting) and then starts timing again. Timing is stopped with adding operations when preset 2 is reached. Timing is stopped with subtracting operations when zero is reached. A RESET during the timing process also causes this to stop. Inp A and Inp B: no function.
<b>GAtE</b>		Gate control for timing
	<b>GAtE.Lo</b>	Timing takes place when the Gate input is not active.
	<b>GAtE.hi</b>	Timing takes place when the Gate input is active.
<b>MPi</b>		User input
	<b>LAtch</b>	When the MPI input is activated the display is “frozen” and remains “frozen” until the MPI input is deactivated. Internally the preset counter continues counting.
	<b>tEAch</b>	When the MPI input is activated the current count value for the preset that has just been selected will be adopted as the new preset value.
	<b>SEt</b>	When the MPI input is activated the preset counter will be set to the value specified in the parameter SEtPt.

Display		Description
Submenu	Value	
<b>Loc.InP</b>		Lock input
	<b>ProG</b>	When the lock input is activated the programming is inhibited.
	<b>PrESET</b>	When the lock input is activated the setting of the preset values is inhibited.
	<b>PrG.PrE</b>	When the lock input is activated the setting of the preset values and the programming are both inhibited.

factory settings are highlighted in grey

## 8.5.2 Mode

Submenus for output operations.

Display		Description
Submenu	Value	
<b>ModE</b>		Submenu for determining the operation of the outputs
	<b>Add</b>	Count mode ADD Outputs active when count status $\geq$ preset value Reset to zero.
	<b>Sub</b>	Count mode SUBTRACT Output 1 active when count status $\leq$ preset value 1. Output 2 active when count status $\leq 0$ . Reset to preset 2
	<b>AddAr</b>	Count mode ADDING with automatic reset Output 1 active when count status $\geq$ preset value 1. Output 2 (timed signal) active when count status = preset value 2. Automatic reset to zero when count status = preset value 2. Reset to zero.
	<b>SubAr</b>	Count mode SUBTRACTING with automatic reset Output 1 active when count status $\leq$ preset value 1. Output 2 (timed signal) active when count status = 0. Automatic reset to preset 2 when count status = 0. Reset to preset 2.
	<b>AddbAt</b>	Count mode ADDING with automatic reset and Batch counter Output 2 (timed signal) active when main counter = preset value 2. Automatic reset to zero when main counter = preset 2. Batch counter counts the number of automatic repetitions of preset 2. Output 1 active when Batch counter $\geq$ preset 1. Manual reset sets both counters to zero. Electrical reset only sets the main counter to zero.

Display		Description
Submenu	Value	
	<b>SubbAt</b>	Count mode SUBTRACTING with automatic reset and Batch counter Output 2 (timed signal) active when main counter = zero. Automatic reset to preset 2 when main counter = zero. Batch counter counts the number of automatic repetitions of preset 2. Output 1 active when Batch counter $\geq$ preset 1. Manual reset sets main counter to preset value 2, batch counter to zero. Electrical reset only sets the main counter to preset value 2.
	<b>Addtot</b>	Count mode ADDING with automatic reset and Total counter Output 2 (timed signal) active when main counter = preset value 2. Automatic reset to zero when main counter = preset value 2. Total counter counts all the count pulses from the main counter. Output 1 active when total counter $\geq$ preset value 1. Manual reset sets both counters to zero. Electrical reset only sets the main counter to zero.
	<b>Subtot</b>	Count mode SUBTRACTING with automatic reset and Total counter Output 2 (timed signal) active when main counter = zero. Automatic reset to preset value 2 when main counter = zero. Total counter counts (sub from preset value 1) all count pulses from main counter. Output 1 active when Total counter $\leq$ zero. Manual reset sets both counters to the preset values. Electrical reset sets only main counter to preset value 2.
	<b>trAiL</b>	Tracking Preset mode When preset 2 is changed then preset 1 automatically tracks it. Reset to zero. Preset 1 relative to preset 2.
	<b>tr_Ar</b>	Tracking Preset mode with automatic reset When preset 2 is changed then preset 1 automatically tracks it. Reset to zero. Automatic reset to zero when main counter = preset value.

factory settings are highlighted in grey

### 8.5.3 Config

Submenus for matching the input pulses and display.

Display		Description
Submenu	Value	
<b>tModE</b>		Unit of time
	<b>SEC</b>	Unit of time: seconds Decimal point setting determines the resolution.
	<b>Min</b>	Unit of time: minutes Decimal point setting determines the resolution.
	<b>hour</b>	Unit of time: hours Decimal point setting determines the resolution.
	<b>h.Min.S</b>	Unit of time: Hrs. Min. Sec.
<b>dp</b>		Decimal point setting (only optical function)
	<b>0</b>	no decimal place
	<b>0.0</b>	1 decimal place
	<b>0.00</b>	2 decimal places
	<b>0.000</b>	3 decimal places
<b>SetPt</b>		Set value
	<b>000000</b>	Factory setting
	<b>000000... 999999</b>	Set value can be programmed from 000000 to 999999. A previously programmed decimal point will be displayed.
<b>CoLor</b>		Display colour (not supported)
	<b>rEd</b>	Upper line red. Lower line red.
	<b>rEdGrn</b>	Upper line red Lower line green

factory settings are highlighted in grey

### 8.5.4 Reset mode

Submenus for reset mode.

Display		Description
Submenu	Value	
<b>rESmd</b>		Setting the reset mode
	<b>Man.EL</b>	Manual reset (with red key) and electrical reset (reset input).
	<b>no rES</b>	No reset possible (red key and reset input inhibited).
	<b>EL.rEs</b>	Only electrical reset possible (reset input).
	<b>MAnrE</b>	Only manual reset possible (red key).

factory settings are highlighted in grey

## 8.5.5 Preset 1

Submenus for preset 1.

Display		Description
Submenu	Value	
<b>PrES 1</b>		Submenu for turning preset 1 ON/OFF
	<b>on</b>	Preset 1 ON
	<b>off</b>	Preset 1 OFF and no function
<b>Pr.Out 1</b>		Preset output 1
		ADD mode output operations: permanent signal at Output 1, becomes active when count $\geq$ Preset 1 SUB mode output operations: permanent signal at Output 1, becomes active when count $\leq$ Preset 1
		ADD mode output operations: permanent signal at Output 1, becomes passive when count $\geq$ Preset 1 SUB mode output operations: permanent signal at Output 1, becomes passive when count $\leq$ Preset 1
		ADD mode output operations: timed signal at Output 1, becomes active when count $\geq$ Preset 1. (Activation only in positive direction) SUB mode output operations: timed output at Output 1, becomes active when count $\leq$ Preset 1 (Activation only in negative direction)
		ADD mode output operations: timed signal at Output 1, becomes passive when count $\geq$ Preset 1. (Deactivation only in positive direction) SUB mode output operations: timed output at Output 1, becomes passive when count $\leq$ Preset 1. (Deactivation only in negative direction)
		ADD mode output operations: timed signal at Output1, becomes active with positive direction and when count $\geq$ Preset 1 and subsequently active with negative direction and when count $\leq$ Preset 1 SUB mode output operations: timed signal at Output 1, becomes active with negative direction and when count $\leq$ Preset 1 and subsequently active with positive direction and when count $\geq$ Preset 1
		ADD mode output operations: timed signal at Output1, becomes passive with positive direction and when count $\geq$ Preset 1 and subsequently passive with negative direction and when count $\leq$ Preset 1 SUB mode output operations: timed output at Output 1, becomes passive with negative direction and when count $\leq$ Preset 1 and subsequently passive with positive direction and when count $\geq$ Preset 1

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Display		Description
Submenu	Value	
<b>t.Out 1</b>		Duration of timed signal of Output 1 Timed signal is post-triggered
	<b>00.01</b>	Factory setting
	<b>00.01...</b> <b>99.99</b>	Programmable from 00.01 to 99.99 s

factory settings are highlighted in grey

## 8.5.6 Preset 2

Submenus for preset 2.

Display		Description
Submenu	Value	
<b>PrES 2</b>		Submenu for Preset 2
<b>Pr.Out 2</b>		Preset output 2
	<b>---</b> f <b>---</b>	ADD mode output operations: permanent signal at Output 2, becomes active when count $\geq$ Preset 2 SUB mode output operations: permanent signal at Output 2, becomes active when count $\leq$ zero
	<b>--</b> 7 <b>---</b>	ADD mode output operations: permanent signal at Output 2, becomes passive when count $\geq$ Preset 2 SUB mode output operations: permanent signal at Output 2, becomes passive when count $\leq$ zero
	<b>--</b> f 7 <b>--</b>	ADD mode output operations: timed signal at Output 2, becomes active when count $\geq$ Preset 2 (Activation only in positive direction). SUB mode output operations: permanent signal at Output 2, becomes active when count $\leq$ zero (Activation only in negative direction)
	<b>--</b> L J <b>--</b>	ADD mode output operations: timed signal at Output 2, becomes passive when count $\geq$ Preset 2 (Deactivation only in positive direction) SUB mode output operations: permanent signal at Output 2, becomes passive when count $\leq$ zero (Deactivation only in negative direction)
	<b>--</b> n <b>--</b> n <b>--</b>	ADD mode output operations: timed signal at Output 2, becomes active with positive direction and when count $\geq$ Preset 2 and subsequently with negative direction and when count $\leq$ Preset 2 SUB mode output operations: timed signal at Output 2, becomes active with negative direction and when count $\leq$ zero and subsequently with positive direction and when count $\geq$ zero

Display		Description
Submenu	Value	
	<b>~U~ ~U~</b>	<p>ADD mode output operations: timed signal at Output 2, becomes passive with positive direction and when count <math>\geq</math> Preset 2 and subsequently with negative direction and when count <math>\leq</math> Preset 2</p> <p>SUB mode output operations: timed signal at Output 2, becomes passive with negative direction and when count <math>\leq</math> zero and subsequently with positive direction and when count <math>\geq</math> zero</p>
<b>t.Out 2</b>		Duration of timed signal of Output 2 Timed signal is post-triggered
	<b>00.01</b>	Factory setting
	<b>00.01... 99.99</b>	Programmable from 00.01 to 99.99 s

factory settings are highlighted in grey



Active: Relay is activated when the preset value is reached.

Passive: Relay becomes de-energized when the preset value is reached.

## 8.6 Tacho/Frequency meter

### 8.6.1 Input

Submenus for the signal and control inputs.

Display		Description
Submenu	Value	
<b>InP.PoL</b>		Input polarity
	<b>PnP</b>	PNP: switching to Plus for all inputs in common
	<b>nPn</b>	NPN: switching to 0 V for all inputs in common
<b>FiLtEr</b>		Filter for the signal inputs InpA and InpB
	<b>oFF</b>	Maximum count frequency
	<b>on</b>	Damped to approx. 30 Hz (for control with mechanical contacts)
<b>InPut</b>		Input mode frequency feasurement
	<b>A</b>	Simple frequency measurement Inp A: frequency input Inp B: no function
	<b>ASub b</b>	Differential measurement [A-B] Inp A: frequency input A Inp B: frequency input B
	<b>AAdd b</b>	Total measurement [A+B] Inp A: Frequency input A Inp B: Frequency input B
	<b>quAd</b>	Frequency measurement with direction recognition [Quad] Inp A: Frequency input 0° Inp B: Frequency input 90°
	<b>A / B</b>	Ratio measurement [A/B] Inp A: Frequency input A Inp B: Frequency input B
	<b>A % b</b>	Percentage differential measurement [(A-B) / A in %] Inp A: Frequency input A Inp B: Frequency input B
<b>MPi</b>		User input
	<b>LAth</b>	When the MPI input is activated the display is “frozen” and remains “frozen” until the MPI input is deactivated. Internally the frequency meter continues running.
	<b>tEAch</b>	When the MPI input is activated the current frequency for the preset that has just been selected will be adopted as the new preset value.

Display		Description
Submenu	Value	
<b>Loc.InP</b>		Lock input
	<b>ProG</b>	When the lock input is activated the programming is inhibited.
	<b>PrESET</b>	When the lock input is activated the setting of the preset values is inhibited.
	<b>PrG.PrE</b>	When the lock input is activated the setting of the preset values and the programming are both inhibited.

factory settings are highlighted in grey

UK

## 8.6.2 Config

Submenus for matching the input pulses and display.

Display		Description
Submenu	Value	
<b>FActor</b>		Multiplication factor
	<b>01.0000</b>	Factory setting
	<b>00.0001... 99.9999</b>	Multiplication factor can be programmed from 00.0001 to 99.9999. The setting 00.0000 will not be accepted.
<b>diViSo</b>		Division factor
	<b>01.0000</b>	Factory setting
	<b>01.0000... 99.9999</b>	Division factor can be programmed from 01.0000 to 99.9999. The setting < 01.0000 will not be accepted.
<b>tModE</b>		Display mode (time mode)
	<b>SEC -1</b>	Calculation and display of the frequency or speed in 1/s.
	<b>Min -1</b>	Calculation and display of the frequency or speed in 1/min.
<b>dp</b>		Decimal point setting (only optical function).
	<b>0</b>	no decimal place
	<b>0.0</b>	1 decimal place
	<b>0.00</b>	2 decimal places
	<b>0.000</b>	3 decimal places
<b>AVG</b>		Moving average
	<b>oFF</b>	Moving average off
	<b>AVG 2</b>	Moving average on, calculated over 2 measurements.
	<b>AVG 5</b>	Moving average on, calculated over 5 measurements.
	<b>AVG 10</b>	Moving average on, calculated over 10 measurements.
	<b>AVG 20</b>	Moving average on, calculated over 20 measurements.

Display		Description	
Submenu	Value		
<b>StArt</b>		Start delay	
		<b>00.0</b>	Factory setting
		<b>00.0...99.9</b>	Programmable from 00.0 to 99.9 s. At the start of a measurement the measurement results within this time-period are ignored.
<b>WAit0</b>		Waiting time	
		<b>00.1</b>	Factory setting
		<b>00.1...99.0</b>	Programmable from 00.1 to 99.9 s. This value specifies how much time should elapse, after the last valid edge, before zero is to be displayed.
<b>CoLor</b>		Display colour (not supported)	
		<b>rEd</b>	Upper line red. Lower line red.
		<b>rEdGrn</b>	Upper line red Lower line green

factory settings are highlighted in grey

### 8.6.3 Preset 1

Submenus for preset 1.

Display		Description	
Submenu	Value		
<b>PrES 1</b>		Submenu for turning preset 1 ON/OFF	
		<b>on</b>	Preset 1 ON
		<b>off</b>	Preset 1 OFF and no function
<b>Pr.Out 1</b>		Preset output 1	
		<b>---f---</b>	ADD mode output operations: permanent signal at Output 1, becomes active when count $\geq$ Preset 1 SUB mode output operations: permanent signal at Output 1, becomes active when count $\leq$ Preset 1
		<b>---f---</b>	ADD mode output operations: permanent signal at Output 1, becomes passive when count $\geq$ Preset 1 SUB mode output operations: permanent signal at Output 1, becomes passive when count $\leq$ Preset 1
		<b>---f---</b>	ADD mode output operations: timed signal at Output 1, becomes active when count $\geq$ Preset 1. (Activation only in positive direction) SUB mode output operations: timed output at Output 1, becomes active when count $\leq$ Preset 1 (Activation only in negative direction)

Display		Description
Submenu	Value	
	---LJ---	ADD mode output operations: timed signal at Output 1, becomes passive when count $\geq$ Preset 1. (Deactivation only in positive direction)  SUB mode output operations: timed output at Output 1, becomes passive when count $\leq$ Preset 1. (Deactivation only in negative direction)
	-.n-.n-	ADD mode output operations: timed signal at Output1, becomes active with positive direction and when count $\geq$ Preset 1 and subsequently active with negative direction and when count $\leq$ Preset 1  SUB mode output operations: timed signal at Output 1, becomes active with negative direction and when count $\leq$ Preset 1 and subsequently active with positive direction and when count $\geq$ Preset 1
	-U--U-	ADD mode output operations: timed signal at Output1, becomes passive with positive direction and when count $\geq$ Preset 1 and subsequently passive with negative direction and when count $\leq$ Preset 1  SUB mode output operations: timed output at Output 1, becomes passive with negative direction and when count $\leq$ Preset 1 and subsequently passive with positive direction and when count $\geq$ Preset 1
t.Out 1		Duration of timed signal of Output 1 Timed signal is post-triggered
	00.01	Factory setting
	00.01... 99.99	Programmable from 00.01 to 99.99 s

factory settings are highlighted in grey

## 8.6.4 Preset 2

Submenus for preset 2.

Display		Description
Submenu	Value	
PrES 2		Submenu for Preset 2
Pr.Out 2		Preset output 2
	---f---	ADD mode output operations: permanent signal at Output 2, becomes active when count $\geq$ Preset 2  SUB mode output operations: permanent signal at Output 2, becomes active when count $\leq$ zero
	---7---	ADD mode output operations: permanent signal at Output 2, becomes passive when count $\geq$ Preset 2  SUB mode output operations: permanent signal at Output 2, becomes passive when count $\leq$ zero

Display		Description
Submenu	Value	
	---f7---	<p>ADD mode output operations: timed signal at Output 2, becomes active when count <math>\geq</math> Preset 2 (Activation only in positive direction).</p> <p>SUB mode output operations: permanent signal at Output 2, becomes active when count <math>\leq</math> zero (Activation only in negative direction)</p>
	---LJ---	<p>ADD mode output operations: timed signal at Output 2, becomes passive when count <math>\geq</math> Preset 2 (Deactivation only in positive direction)</p> <p>SUB mode output operations: permanent signal at Output 2, becomes passive when count <math>\leq</math> zero (Deactivation only in negative direction)</p>
	-.n-.n-	<p>ADD mode output operations: timed signal at Output 2, becomes active with positive direction and when count <math>\geq</math> Preset 2 and subsequently with negative direction and when count <math>\leq</math> Preset 2</p> <p>SUB mode output operations: timed signal at Output 2, becomes active with negative direction and when count <math>\leq</math> zero and subsequently with positive direction and when count <math>\geq</math> zero</p>
	~u~u~	<p>ADD mode output operations: timed signal at Output 2, becomes passive with positive direction and when count <math>\geq</math> Preset 2 and subsequently with negative direction and when count <math>\leq</math> Preset 2</p> <p>SUB mode output operations: timed signal at Output 2, becomes passive with negative direction and when count <math>\leq</math> zero and subsequently with positive direction and when count <math>\geq</math> zero</p>
t.Out 2		Duration of timed signal of Output 2 Timed signal is post-triggered
	<b>00.01</b>	Factory setting
	<b>00.01... 99.99</b>	Programmable from 00.01 to 99.99 s

factory settings are highlighted in grey



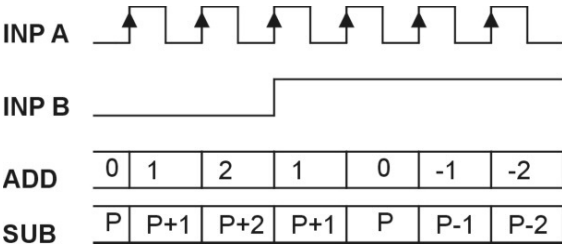
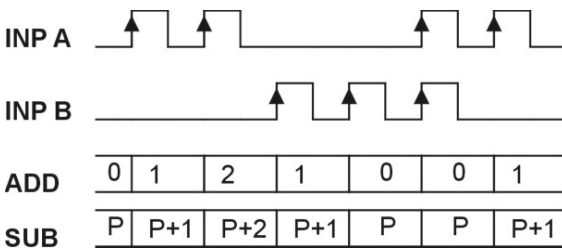
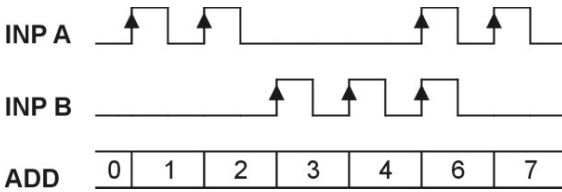
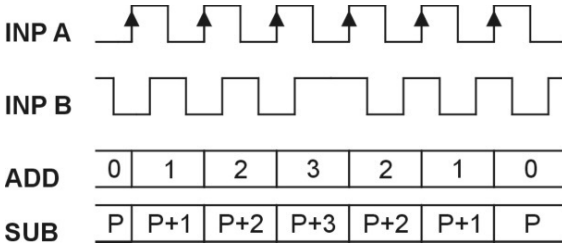
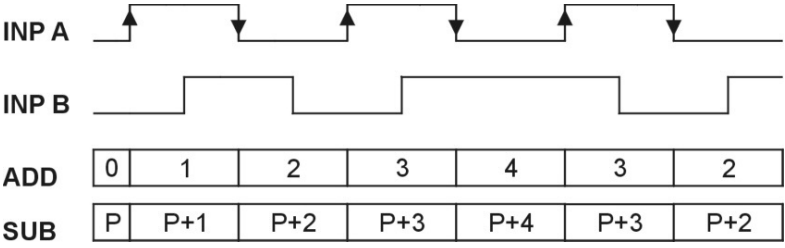
Active: Relay is activated when the preset value is reached.

Passive: Relay becomes de-energized when the preset value is reached.

## 9 Diagrams

### 9.1 Input modes

#### 9.1.1 Pulse counting

Function	Diagram															
<b>Cnt.Dir</b>	 <p>INP A </p> <p>INP B </p> <p>ADD <table border="1" style="display: inline-table;"><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>0</td><td>-1</td><td>-2</td></tr></table></p> <p>SUB <table border="1" style="display: inline-table;"><tr><td>P</td><td>P+1</td><td>P+2</td><td>P+1</td><td>P</td><td>P-1</td><td>P-2</td></tr></table></p>	0	1	2	1	0	-1	-2	P	P+1	P+2	P+1	P	P-1	P-2	<p>Inp A: Count input Inp B: Count direction Add: Display 0 → Preset Sub: Display Preset → 0</p>
0	1	2	1	0	-1	-2										
P	P+1	P+2	P+1	P	P-1	P-2										
<b>Up.Dn</b>	 <p>INP A </p> <p>INP B </p> <p>ADD <table border="1" style="display: inline-table;"><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>0</td><td>0</td><td>1</td></tr></table></p> <p>SUB <table border="1" style="display: inline-table;"><tr><td>P</td><td>P+1</td><td>P+2</td><td>P+1</td><td>P</td><td>P</td><td>P+1</td></tr></table></p>	0	1	2	1	0	0	1	P	P+1	P+2	P+1	P	P	P+1	<p>Inp A: Count input add Inp B: Count input sub Add: Display 0 → Preset Sub: Display Preset → 0</p>
0	1	2	1	0	0	1										
P	P+1	P+2	P+1	P	P	P+1										
<b>Up.Up</b>	 <p>INP A </p> <p>INP B </p> <p>ADD <table border="1" style="display: inline-table;"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td></tr></table></p>	0	1	2	3	4	6	7	<p>Inp A: Count input 1 add Inp B: Count input 2 add Add: Display 0 → Preset</p>							
0	1	2	3	4	6	7										
<b>Quad</b>	 <p>INP A </p> <p>INP B </p> <p>ADD <table border="1" style="display: inline-table;"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table></p> <p>SUB <table border="1" style="display: inline-table;"><tr><td>P</td><td>P+1</td><td>P+2</td><td>P+3</td><td>P+2</td><td>P+1</td><td>P</td></tr></table></p>	0	1	2	3	2	1	0	P	P+1	P+2	P+3	P+2	P+1	P	<p>A 90° B Inp A: Count input Count on one edge Inp B: Reverse direction Add: Display 0 → Preset Sub: Display Preset → 0</p>
0	1	2	3	2	1	0										
P	P+1	P+2	P+3	P+2	P+1	P										
<b>Quad 2</b>	 <p>INP A </p> <p>INP B </p> <p>ADD <table border="1" style="display: inline-table;"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>3</td><td>2</td></tr></table></p> <p>SUB <table border="1" style="display: inline-table;"><tr><td>P</td><td>P+1</td><td>P+2</td><td>P+3</td><td>P+4</td><td>P+3</td><td>P+2</td></tr></table></p>	0	1	2	3	4	3	2	P	P+1	P+2	P+3	P+4	P+3	P+2	<p>A 90° B Inp A: Count input Count on rising and on falling edges Inp B: Reverse direction Add: Display 0 → Preset Sub: Display Preset → 0</p>
0	1	2	3	4	3	2										
P	P+1	P+2	P+3	P+4	P+3	P+2										

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Function	Diagram	
<b>Quad 4</b>	<p>INP A</p> <p>INP B</p> <p>ADD 0 1 2 3 4 5 6 7 6 5 4 3</p> <p>SUB P P+1 P+2 P+3 P+4 P+5 P+6 P+7 P+6 P+5 P+4 P+3</p>	<p>A 90° B                      Inp A: Count input                      Count on rising and on falling edges                      Inp B: Count input                      Count on rising and on falling edges,                      Reverse direction                      Add: Display 0 → Preset                      Sub: Display Preset → 0</p>
<b>A / B</b>	<p>INP A</p> <p>Counts A 0 1 1 1 2 3 4</p> <p>INP B</p> <p>Counts B 0 1 2 3 3 4 4</p> <p>Display 0 1 0,5 0,33 0,66 0,75 1</p>	<p>Inp A: Count input 1                      Inp B: Count input 2                      Formula:                      A/B</p>
<b>(A-B)/A</b>	<p>INP A</p> <p>Counts A 0 1 1 1 2 3 4</p> <p>INP B</p> <p>Counts B 0 1 2 3 3 4 4</p> <p>Display 0% 0% -100% -200% -50% -33% 0%</p>	<p>Inp A: Count input 1                      Inp B: Count input 2                      Formula:                      (A-B)/A x100</p>

No counting when GATE input is active

P = Preset

PNP: Count on rising edge

NPN: Count on falling edge




### 9.1.2 Timing

Function	Diagram	
<b>InA.InB</b>	<p>INP A: Start INP B: Stop Add: Display 0 → Preset Sub: Display Preset → 0</p>	
<b>InB.InB</b>	<p>INP A: no function INP B: Start/Stop Add: Display 0 → Preset Sub: Display Preset → 0</p>	
<b>FrRrun</b>	<p>INP A: no function INP B: no function Control of the timing only via the GATE input Add: Display 0 → Preset Sub: Display Preset → 0</p>	
<b>Auto</b>	<p>INP A: no function INP B: no function Control of the timing via RESET (manual or electrical) Add: Display 0 → Preset Sub: Display Preset → 0</p>	

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PNP: Count on rising edge  
NPN: Count on falling edge

### 9.1.3 Frequency meter

Function	Diagram	
<b>A</b>	<p><b>INP A</b>    0   F<sub>A0</sub>   F<sub>A1</sub>   F<sub>A2</sub>   0   x</p> <p><b>Display</b>    0   0   F<sub>A0</sub>   F<sub>A1</sub>   F<sub>A2</sub>   0</p>	Inp A: Frequency input Inp B: no function
<b>AsubB</b>	<p><b>INP A</b>    0   F<sub>A0</sub>   F<sub>A1</sub>   F<sub>A2</sub>   0   x</p> <p><b>INP B</b>    0   0   F<sub>B0</sub>   F<sub>B1</sub>   F<sub>B2</sub>   x</p> <p><b>Display</b>    0   0   F<sub>A0</sub>   F<sub>A0</sub> - F<sub>B0</sub>   F<sub>A1</sub> - F<sub>B1</sub>   - F<sub>B2</sub></p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: A-B
<b>AaddB</b>	<p><b>INP A</b>    0   F<sub>A0</sub>   F<sub>A1</sub>   F<sub>A2</sub>   0   x</p> <p><b>INP B</b>    0   0   F<sub>B0</sub>   F<sub>B1</sub>   F<sub>B2</sub>   x</p> <p><b>Display</b>    0   0   F<sub>A0</sub>   F<sub>A0</sub> + F<sub>B0</sub>   F<sub>A1</sub> + F<sub>B1</sub>   F<sub>B2</sub></p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: A+B
<b>Quad</b>	<p><b>Inp A</b>    </p> <p><b>Inp B</b>    </p> <p></p> <p><b>Display</b>    0   0   F<sub>A0</sub>   F<sub>A1</sub>   F<sub>A2</sub>   - F<sub>A3</sub>   - F<sub>A4</sub></p>	A 90° B Inp A: Frequency input 1 Inp B: Reverse direction
<b>A / B</b>	<p><b>INP A</b>    0   F<sub>A0</sub>   F<sub>A1</sub>   0   0   x</p> <p><b>INP B</b>    0   0   F<sub>B0</sub>   F<sub>B1</sub>   F<sub>B2</sub>   x</p> <p><b>Display</b>    0   0   0   F<sub>A0</sub>/F<sub>B0</sub>   F<sub>A1</sub>/F<sub>B1</sub>   0</p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: A/B
<b>(A-B)/A</b>	<p><b>INP A</b>    0   F<sub>A0</sub>   F<sub>A1</sub>   0   0   x</p> <p><b>INP B</b>    0   0   F<sub>B0</sub>   F<sub>B1</sub>   F<sub>B2</sub>   x</p> <p><b>Display</b>    0   0   100%   F<sub>A0</sub>%F<sub>B0</sub>   F<sub>A1</sub>%F<sub>B1</sub>   0</p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: (A-B)/A x100

PNP: Count on rising edge  
NPN: Count on falling edge

## 9.2 Output operations

### 9.2.1 Add modes

Mode	Diagram
<b>Add</b>	
<b>AddAr</b>	
<b>AddBat</b>	
<b>AddTot</b>	

only in this modes



additionally in this modes



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### 9.2.2 Sub modes

Mode	Diagram
<b>Sub</b>	
<b>SubAr</b>	
<b>SubBat</b>	
<b>SubTot</b>	

only in this modes

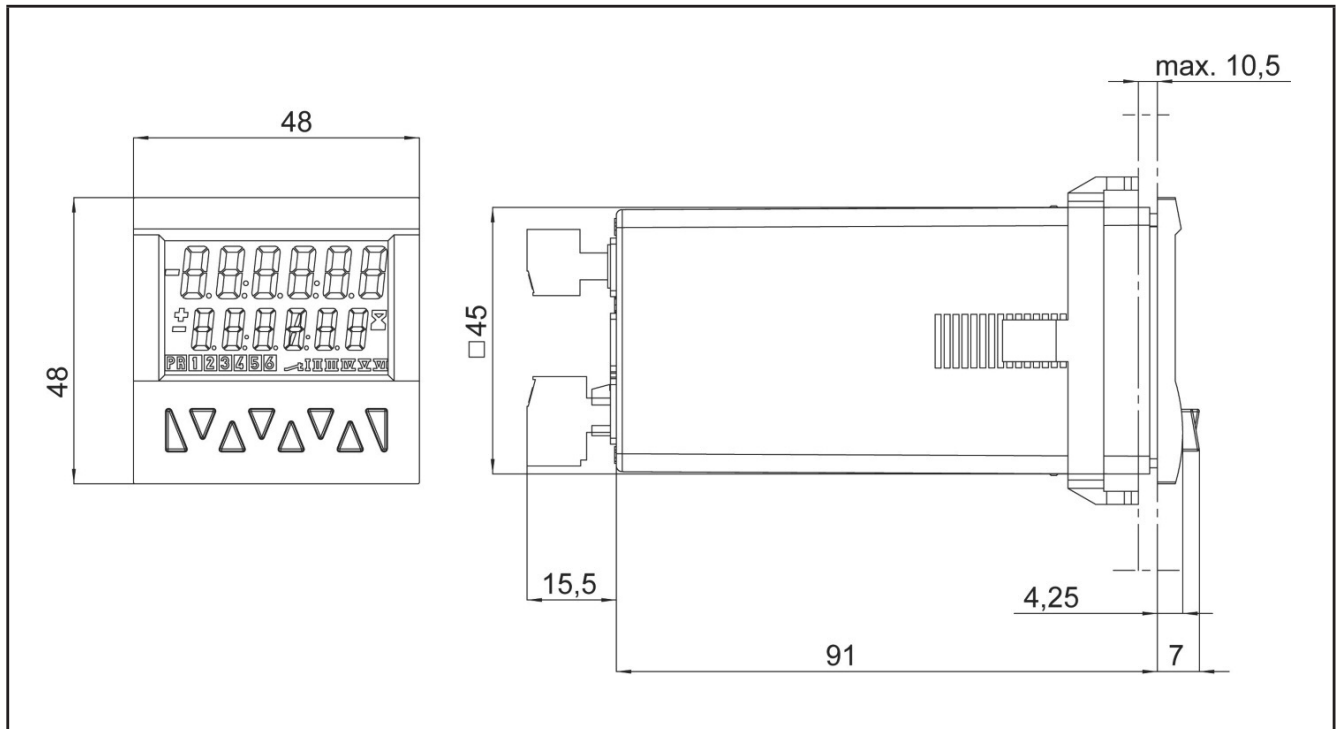
additionally in this modes

### 9.2.3 Trail modes

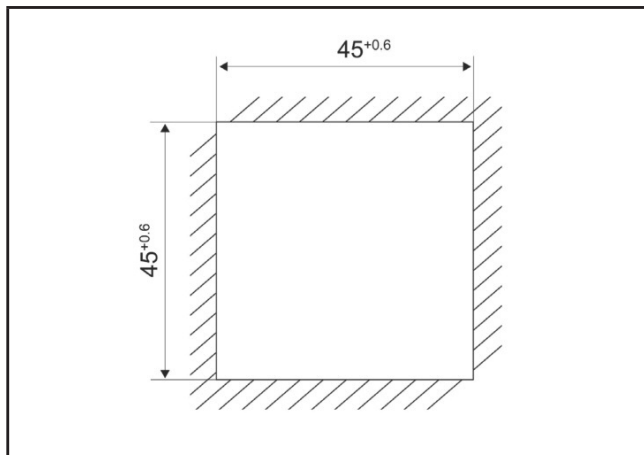
Mode	Diagram
<p><b>Trail</b></p>	<p>RESET</p> <p>PR1</p> <p>PR2</p> <p>PR1</p> <p>COUNTER</p> <p>n 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 13 12 11 10 9 8 7 6 5</p> <p>OUT P1 <math>\Delta +/-PR1</math></p> <p>OUT P1 <math>\Delta +PR1</math></p> <p>OUT P1 <math>\Delta -PR1</math></p> <p>OUT P2</p>
<p><b>TrailAr</b></p>	<p>RESET</p> <p>PR1</p> <p>PR2</p> <p>PR1</p> <p>COUNTER</p> <p>n 0 1 2 3 4 5 6 7 6 5 4 3 2 3 4 5 6 7 8 9 0</p> <p>OUT P1 <math>\Delta +/-PR1</math></p> <p>OUT P1 <math>\Delta +PR1</math></p> <p>OUT P1 <math>\Delta -PR1</math></p> <p>OUT P2</p>

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## 10 Dimensions



E89005



Panel cut-out

## 11 Technical data

### 11.1 General Data

Display	LCD positive backlite, 2 x 6-digit
Digit height	
Upper line	9 mm
Lower line	7 mm
Special characters	2 mm
Overload	Blinking, 1 s
Underload	Counter loses up to 1 decade, no pulses
Data retention	> 10 years, EEPROM
Operation	8 keys

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### 11.2 Pulse counter

Count frequency	max. 55 kHz
Response time of the relay outputs	
Add/Sub/Trail	< 7 ms
With automatic repeat	< 7 ms
A/B; (A-B)/A	< 29 ms

Frequencies (typical)

	<b>Add Sub Trail</b>	<b>AddAr SubAr AddBat SubBat TrailAr</b>	<b>AddTot SubTot</b>
Cnt.Dir	55 kHz	2,8 kHz	2,7 kHz
Up.Dn Up.Up	29 kHz	2,8 kHz	2,7 kHz
Quad Quad 2	28 kHz	1,4 kHz	1,3 kHz
Quad 4	18 kHz	1,2 kHz	0,9 kHz
A/B (A-B)/A	29 kHz		

### 11.3 Tacho/Frequency meter

Frequency range	0,01 Hz to 65 kHz
Measuring principle	≤ 76.3 Hz time interval (period measurement) > 76.3 Hz gate time (gate time approx.13.1 ms)
Measuring error	< 0.1 % per channel

Response time of the relay outputs	
1-channel operation	< 100 ms @ 40 kHz < 350 ms @ 65 kHz
2-channel operation	< 150 ms @ 40 kHz < 600 ms @ 65 kHz

Frequencies (typical)

	HTL	5V
A	65 kHz	9 kHz
A – B A + B A / B (A-B)/A	65 kHz	9 kHz
Quad	30 kHz	9 kHz

## 11.4 Timer

Seconds	0.001...999 999 s
Minutes	0.001...999 999 min
Hours	0.001...999 999 h
h.min.s	00h.00min.01s...99h.59min.59s
Min. time measurable	500 $\mu$ s
Measuring error	< 50 ppm
Response time of the relay outputs	< 7 ms

## 11.5 Signal and Control inputs

Polarity	programmable NPN/PNP (for all inputs in common)
Input resistance	5 k $\Omega$
Pulse shape	any
Switching level with AC supply	
HTL level Low	0...4 V DC
HTL level High	12...30 V DC
Min. pulse length of the reset input	1 ms
Min. pulse length of the control inputs	10 ms

## 11.6 Outputs

### 11.6.1 Output 1

Type	relay with make contact, programmable as NC or NO
Switching voltage	max. 250 V AC / 110 V DC

Switching current	max. 3 A AC / DC min. 30 mA DC
Switching capacity	max. 750 VA / 90 W
Mechanical switching cycles	$2 \times 10^7$
N° of switching cycles	$1 \times 10^5$ (at 3 A / 250 V AC)
N° of switching cycles	$1 \times 10^5$ (at 3 A / 30 V DC)

### 11.6.2 Output 2

Type	relay with changeover contact
Switching voltage	max. 250 V AC/ 150 V DC
Switching current	max. 3 A AC / DC min. 30 mA DC
Switching capacity	max. 750 VA / 90 W
Mechanical switching cycles	$2 \times 10^6$
N° of switching cycles	$5 \times 10^4$ (at 3 A / 250 V AC)
N° of switching cycles	$5 \times 10^4$ (at 3 A / 30 V DC)

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### 11.7 Supply voltage

Supply voltage	90...260 V AC, max. 8 VA
Frequency	50...60 Hz
Ext. fuse protection	T 0.1 A

### 11.8 Sensor supply

Sensor supply voltage	24 V DC, $\pm 15\%$
Current	80 mA

### 11.9 Climatic Conditions

Operating temperature	-20...65 °C
Storage temperature	-25...75 °C
Relative humidity	93 % at 40 °C, non-condensing
Altitude	to 2000 m

### 11.10 EMC

Noise immunity	EN 61000-6-2 with shielded signal and control cables
Noise emission	EN 55011 Class B

### 11.11 Device safety

Design to	EN 61010 Part 1
Protection Class	2
Application area	Soiling Level 2

### 11.12 Mechanical Data

Housing	panel-mount housing to DIN 43 700, RAL 7021
Dimensions	48 x 48 x 91 mm
Panel cut-out	45 <sup>+0.6</sup> x 45 <sup>+0.6</sup> mm
Installation depth	ca. 107 mm incl. terminals
Weight	ca. 125 g
Protection	IP 65 (front)
Housing material	Polycarbonate UL94 V-2
Vibration resistance (EN 60068-2-6)	10...55 Hz / 1 mm / XYZ 30 min in each direction
Shock resistance (EN 60068-2-27)	100 g / XYZ 3 times in each directio
Cleaning	The front of the unit should only be cleaned using a soft damp (water!) cloth.

### 11.13 Connections

Supply voltage and relay outputs	
Plug-in screw terminal	7-pin, RM 5.08
Core cross section	max. 2.5 mm <sup>2</sup>
Signal and control inputs	
Plug-in screw terminal	8-pin, RM 3.81
Core cross section	max. 1.5 mm <sup>2</sup>

## 12 Maintenance, repair and disposal

The unit is maintenance-free.

- ▶ Do not open the housing as the device does not contain any components which can be repaired by the user. The device must only be repaired by the manufacturer.
- ▶ Dispose of the device in accordance with the national environmental regulations.

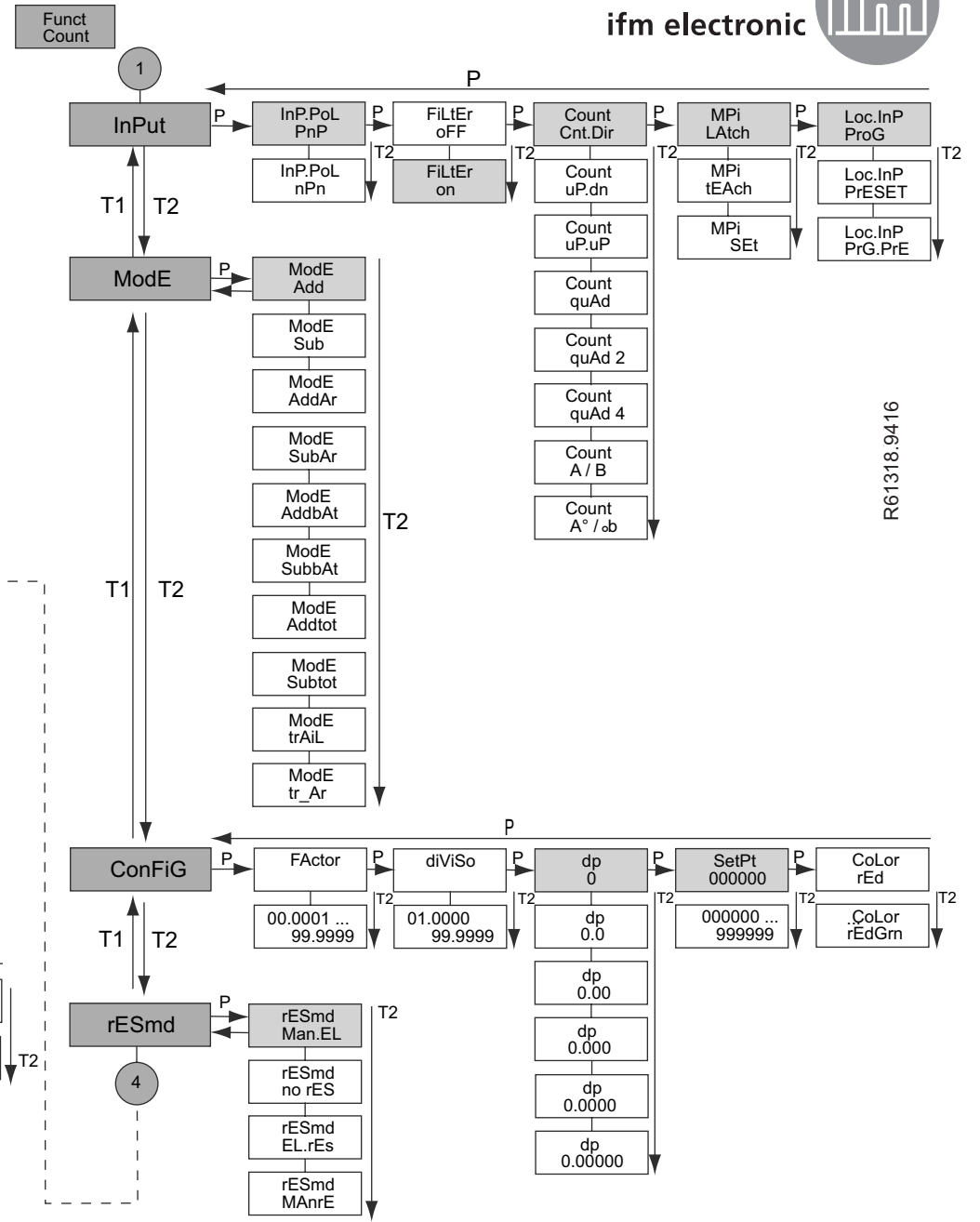
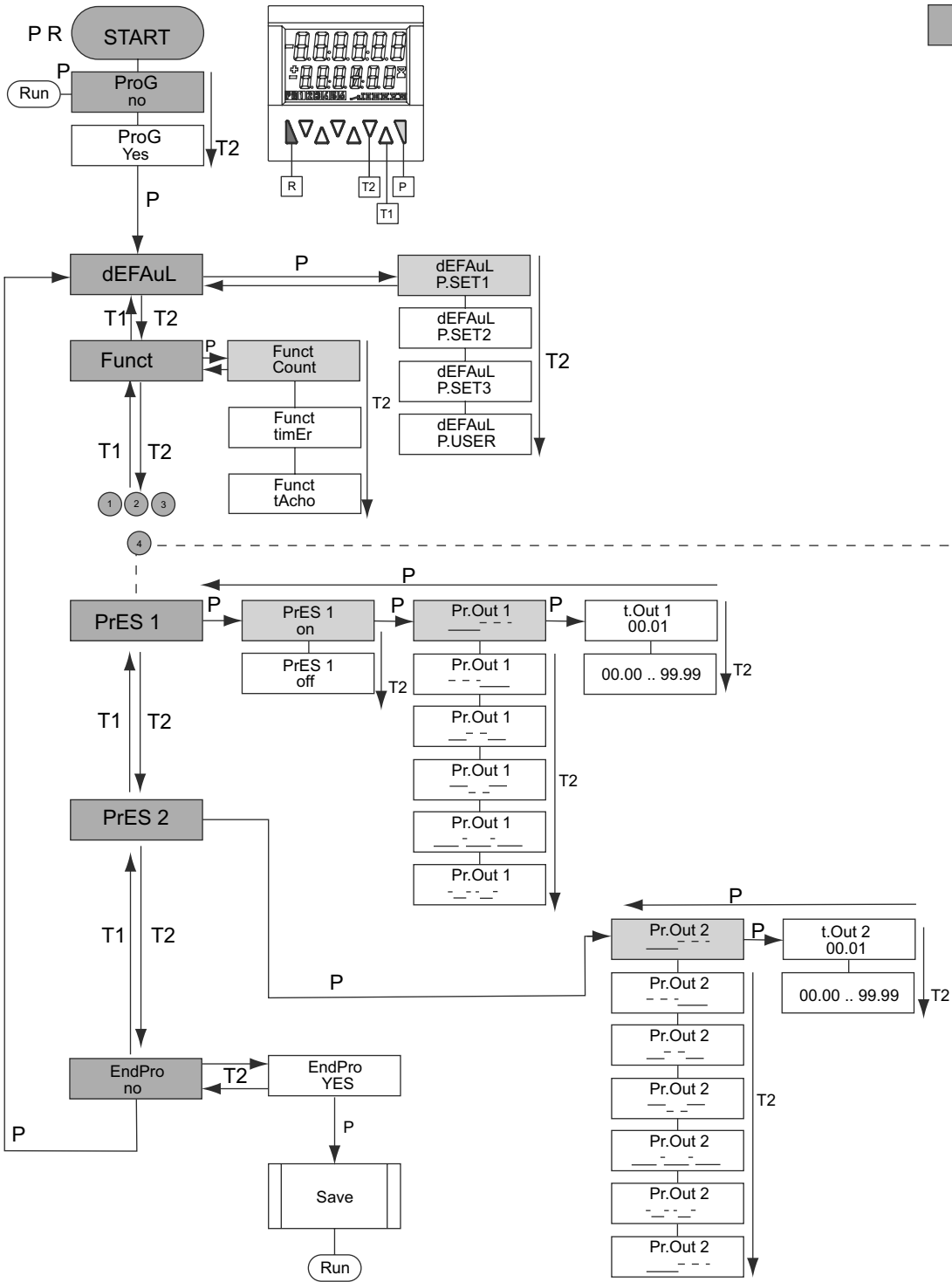
## **13 Approvals/standards**

The EC declaration of conformity and approvals can be found at:  
[www.ifm.com](http://www.ifm.com)

## **14 Attachement**

Parameter structure (see next pages)





R61318.9416

