



CODIX 560

**Elektronischer
Vorwahlzähler**
mit zwei Vorwählen



Electronic Preset Counter

With two presets

**Compteur à présélection
électronique**
avec deux présélections

**Contatore elettronico
a preselezione**
con due preselezioni

**Contador electrónico
de preselección**
con dos preselecciones

english

Table of Contents

(German is the original version.)

Preface	4
1	2 Safety instructions and Warnings
2.1	Use according to the intended purpose
2.2	Mounting in a control panel
2.3	Electrical Installation
2.4	Cleaning and maintenance
3 Description	5
4 Display/Operating elements	6
5 Inputs	6
5.1	INP A, INP B
5.2	RESET
5.3	GATE
5.4	LOC.INP
5.5	MPI 1 / MPI 2
6 Outputs	6
6.1	Output 1 / Output 2
6.2	Active Outputs
7 Programming	7
7.1	Entering the programming
7.2	Selecting the main menus
7.3	Entering a sub-menu
7.4	Selecting the parameters
7.5	Changing parameter values
7.6	Setting count values
7.7	Ending the programming
7.8	Programming menu
7.8.1	Select language
7.8.2	Setting the Basic Function
7.8.3	Pulse Counter
7.8.4	Tacho/Frequency meter
7.8.5	Timer
8 Operation	8
8.1	Switching the display during operation
8.2	Setting the presets
8.2.1	Setting via front keys
8.2.2	Teach Function
8.2.3	Teach-In with tracking presets
8.3	Set Function
8.4	Default Parameters
8.4.1	Entry into the default setting
8.4.2	Selecting the parameter sets
8.4.3	Accepting the setting
8.4.4	Parameter Set Table
9 Error Message	9
10 Connections	10
10.1	Signal and Control Inputs
10.2	Supply Voltage and Outputs
11 Technical Data	11
11.1	General Data
11.2	Pulse Counter
11.3	Tacho/Frequency Meter

11.4 Timer	18
11.5 Signal and Control Inputs	18
11.6 Outputs	18
11.7 Supply Voltage	18
11.8 Sensor Supply Voltage	18
11.9 Climatic Conditions	18
11.10 EMC	18
11.11 Device Safety	18
11.12 Mechanical Data	18
11.13 Connections	19
12 Scope of Delivery	19
13 Ordering Codes	19
14 Frequencies (typical)	19
14.1 Pulse Counter	19
14.2 Frequency Meter	19
15 Input modes: Pulse counting	20
16 Input modes: Timing	22
17 Input modes: Frequency meter	23
18 Output operations	24
19 Help Texts	26
20 Dimensional Drawings	28

1 Preface



Please read this instruction manual entirely and 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.

2 Safety instructions and Warnings



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. Defective or damaged devices should be disconnected from the mains immediately and taken out of operation. The device shall not be opened. Use the repair service of the manufacturer (www.kuebler.com/rma).

Only connect the device to the electricity networks provided to that purpose.

The safety of the system in which the device is integrated is the responsibility of the installer. Disconnect all electricity networks prior to any installation or maintenance work.

Use exclusively cables approved in your country and designed for your temperature and power ranges.

Installation and service work shall be carried out exclusively by qualified personnel.

The device must compulsorily be protected with approved external fuses. The value of these fuses can be found in the technical information.



This symbol is used on the device to

remind of the existence of dangers,

which are referred to in this manual.

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. Over-voltages 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".

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

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, it is your responsibility to take the appropriate safety measures.

The device has been designed for indoor operation. It may nevertheless be used outdoors, provided the technical data is adhered to. In this case, take care to provide suitable UV protection.

2.2 Mounting in a control panel

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

CAUTION

Provide a free space of 10 mm all around the device for its ventilation.

The device should be mounted so that the terminals are out of the reach of the operator and cannot be touched by him. When mounting the device, consider the fact that only the front side is classified as accessible for the operator.

Mounting instructions

1. Remove the mounting clip from the device.
2. Insert the device from the front into the panel cut-out, ensuring the front-panel gasket is correctly seated.
3. 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.

Note: In case of proper installation, IP65 can be reached on the front side.

2.1 Use according to the intended purpose

The preset counter 560 detects and measures pulses, times and frequencies up to max. 60 kHz and offers a wide variety of different operating modes. At the same time, the preset counter processes programmed presets. 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.

2.3 Electrical Installation



DANGER

The device must be disconnected from any power supply prior to any installation or maintenance work.
Make sure that no more voltages LIABLE TO CAUSE AN ELECTROCUTION are present.

AC-powered devices must only be connected to the low-voltage network via a switch or circuit breaker installed close to the device and marked as their disconnecting device.

Installation or maintenance work must only be carried out by qualified personnel and in compliance with the applicable national and international standards.

Take care to separate all extra-low voltages entering or exiting the device from hazardous electrical conductors by means of a double or reinforced insulation (SELV circuits).



DANGER

The device must be protected externally for its proper operation. Information about the prescribed fuses can be found in the technical information.

The relay outputs are not protected internally in the device. Without suitable protection of the relay outputs, undesired heat development or even fire may occur. The relay outputs must be protected externally by the manufacturer of the plant. It must also be made sure that, even in case of a malfunction, the values stated in the technical data are under no circumstances exceeded.

- During installation, make sure that the supply voltage and the wiring of the output contacts are both fed from the same mains phase, in order not to exceed the maximum permitted voltage of 250V.

- The cables and their insulation must be designed for the planned temperature and voltage ranges. Regarding the type of the cables, adhere to the applicable standards of the country and of the plant. The cross sections allowed for the screw terminals can be found in the technical data.

- Before starting the device, check the cables for proper wiring and tightening. The screws of

- unused screw terminals must be screwed to the stop, so that they cannot loosen and get lost.
- The device has been designed for overvoltage category II. If higher transient voltages cannot be excluded, additional protection measures must be taken in order to limit the overvoltage to the values of CAT II.

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 switch-mode power supplies, motors, clocked controllers or contactors) can be reduced by means of appropriate cable routing and wiring.

Measures to be taken

Use only shielded cable and control lines. Connect shield at both ends. The conductor cross-section of the cables should be a minimum of 0.14 mm². 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.

2.4 Cleaning and maintenance

The front side of the unit should only be cleaned using a soft damp (water) cloth. Cleaning of the embedded rear side is not planned and is the responsibility of the service personnel or of the installer.

In normal operation, this device is maintenance-free. Should the device nevertheless not operate properly, it must be sent back to the manufacturer or to the supplier. Opening and repairing the device by the user is not allowed and can adversely affect the original protection level.

- 3 Description**
 - 6-digit 14-segment LED display, 14 mm Help text display
 - Preset counter with two relay outputs Preset entry via the front keys or via the Teach-In function
 - Step or tracking preset
 - Pulse counter, Frequency meter, Timer or Hour meter
 - Preset, Batch- or Total counter
 - Set function for pulse counter and timer

Multiplication and division factor
Averaging and Start Delay for frequency meter

Input modes:

Pulse counter: cnt.dir, up.dn, up.up, quad, quad2,
quad4, A/B, (A-B)/Ax100%

Frequency meter: A, A - B, A + B, quad, A/B,
(A-B)/Ax100%

Timer: FrErun, Auto, InpA.InpB, InpB.InpB

Output operations:

Add, Sub, AddAr, SubAr, AddBat, SubBat, AddTTot,
SubTot, Trail, TrailAr

4-stage RESET mode

3-stage keypad locking (Lock)

MPI input for Display Latch, Teach-In or Set
function

Supply voltage 100 ... 240 V AC ± 10% or
10 ... 30 VDC

5.2 RESET

Dynamic reset input: resets the pulse counter or
timer to zero ('Add' output operations) or to preset
value 2 ('Sub' output operations). The reset input
can be inhibited in the programming menu.

Pulse counter:

RESET input
no function
RESET input

Frequency meter:

no function
RESET input

Timer:

no function
RESET input

5.3 GATE

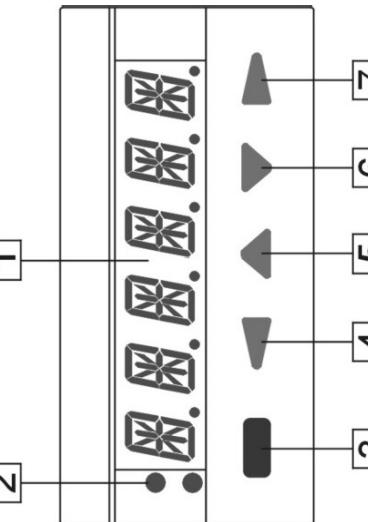
Static gate input: function dependent on operating
mode.

Pulse counter:

no counting while active
no counting while active
no time measurement while
active

5.4 LOC.INP

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



4 Display/Operating elements

5.5 MPI 1 / MPI 2

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

6 Outputs

6.1 Output 1 / Output 2

Relays with potential-free changeover contacts.

6.2 Active Outputs

LED1 and LED2 indicate an active output.
For safety switching the relays can be inverted, i.e.
the relays will be de-energized when the presets
are reached. To do this, the parameters Pr.OUT1
and Pr.OUT2 must be set to (for permanent
signal) and to or (for timed signal).

7 Programming

5 Inputs

5.1 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:

Frequency meter:
Start input or
Start/Stop inputs

Timer:
Start input or
Start/Stop inputs

7.1 Entering the programming

Simultaneously press the UP key
and the DOWN key for 3 sec.

The security prompt appears
alternately in the display

Programming can be exited again
using the ENTER key.

Press the UP key or DOWN key
to continue with the programming.

 YES
The security prompt YES appears in the display

 ENTER key
Enter the main menu by pressing the ENTER key

 MAIN MENU
The first menu item in the main menu appears in the display

 □ ▷ ▲ ▽ ▷
Change the count value using the UP key or the DOWN key.

 □ ▷ △ ▽ ▷
Press the ENTER key.
The new setting is again displayed flashing.

 When ending the programming via PROG.
NO the counter contents are not reset.

7.2 Selecting the main menus

 □ ▷ ▲ ▽ ▷
The main menus are selected using the UP and DOWN keys

 □ ▷ △ ▽ ▷
Indicated by LED1

7.3 Entering a sub-menu

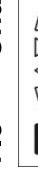
 □ ▷ △ ▽ ▷
Press the ENTER key.
The first parameter is displayed with the current setting flashing.

 □ ▷ △ ▽ ▷
Indicated by LED1 and LED2

7.4 Selecting the parameters

 □ ▷ ▲ ▽ ▷
The parameters are selected using either the RIGHT key or the LEFT key.

7.5 Changing parameter values

 □ ▷ △ ▽ ▷
Press the ENTER key.

 □ ▷ ▲ ▽ ▷
Change the parameter value using the UP or DOWN keys.

 □ ▷ △ ▽ ▷
Press the ENTER key.
The new setting is again displayed flashing.

7.6 Setting count values

 □ ▷ △ ▽ ▷
Press the ENTER key.

 □ ▷ △ ▽ ▷
Select the decade using the RIGHT key or the LEFT key.
 ⇒ the corresponding decade flashes

English

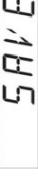
7.7 Ending the programming

 □ ▷ △ ▽ ▷
Select the menu item

 □ ▷ △ ▽ ▷
Pressing the ENTER key acknowledges this prompt and allows the programming to be repeated. The previously-programmed values are preserved. These can now be checked or changed once again.

 □ ▷ △ ▽ ▷
Pressing the UP key or the DOWN key selects the termination off he programming.

 □ ▷ △ ▽ ▷
The security prompt YES appears in the display

 □ ▷ △ ▽ ▷
Pressing the ENTER key acknowledges this prompt and terminates the programming; the modified settings are saved in the EEPROM.
 □ ▷ △ ▽ ▷
The text SAVE is shown in the display for 2 sec.

 When ending the programme via END.PRG. YES the counter contents are reset.

 No count pulses, frequencies or times are detected or measured whilst programming is taking place.

7.8 Programming menu



Factory settings are highlighted in grey

7.8.1 Select language

 □ ▷ △ ▽ ▷
Submenu: Select language

 □ ▷ △ ▽ ▷
Help Text
 □ ▷ △ ▽ ▷
Help Text ON
 □ ▷ △ ▽ ▷
Help Text OFF

Select language for Help Text

SELECT LANGUAGE	U P U P
English	E N
German (Deutsch)	DE



When 'Help Text ON' is selected, a running text in English or German automatically appears after 3 sec. in the display. This provides an explanation of the menu item. Once a running text has started, it can be cancelled by pressing any key.

7.8.2 Setting the Basic Function

F U N C T. Submenu: Basic function

Basic Function

Pulse counter (7.8.3)

Timer/Hour meter

(7.8.5)

T A C H O Tacho/Frequency meter (7.8.4)

i Changing the basic function causes all parameters to be reset to factory settings.

7.8.3 Pulse Counter

7.8.3.1 Submenu for the Signal and Control inputs

I N P U T Submenu for programming the signal and control inputs

Input polarity

P N P PNP: switching to Plus for all inputs in common

N P N NPN: switching to 0 V for all inputs in common

Filter for signal inputs INP A and INP B

D F F Maximum count frequency

D N Damped to approx. 30 Hz (for control with mechanical contacts)

Count Input mode

(See also under 15.)

Count/Direction control

INP A: count input

INP B: count direction input

Differential counting [A - B]

INP A: count input add
INP B: count input sub

Totalising [A + B]

INP A: count input add
INP B: count input add

Quadrature input

INP A: count input 0°

INP B: count input 90°

Quadrature with pulse doubling (x2)

INP A: count input 0°

INP B: count input 90°

Each pulse edge of INP A will be counted

Quadrature x4

INP A: count input 0°

INP B: count input 90°

Each pulse edge of INP A and INP B will be counted.

Ratio measurement [A / B]

INP A: count input A

INP B: count input B

Percentage differential counting

$[(A - B) / A] \text{ in \%}$

INP A: count input A

INP B: count input B

User input 1

User input 2

User input 3

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.

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. (see also 8.2.2)

When the MPI input is activated the preset counter will be set to the value specified in the parameter SETPT (see also 8.3).

Lock input

When the Lock input is activated, the programming is inhibited.

When the Lock input is activated, the setting of the preset values is inhibited.

Page 8

P R E

When the Lock input is activated,
the setting of the preset values
and the programming are both
inhibited.

Electrical reset sets only the
main counter to zero.

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 1

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 sets only the
main counter to zero

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

Tracking Preset mode

When preset 2 is changed then
preset 1 automatically tracks it.
Reset to zero
Preset 1 relative to Preset 2

Tracking Preset mode with automatic reset

T R F R

7.8.3.2 Submenu for Output operations

M D I E Submenu for determining the
operation of the outputs

O U P O
(See also under 18.)

Count mode ADDING

Outputs active when count status
 \geq preset value
Reset to zero

Count mode SUBTRACTING

Output 1 active when
count status \leq preset value 1
Output 2 active when
count status \leq 0
Reset to preset 2

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

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

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.

T R F I L

English

When preset 2 is changed then
preset 1 automatically tracks it.
Reset to zero.

Automatic reset to zero when
main counter = preset value 2.
Preset 1 relative to Preset 2

7.8.3.3 Submenu for configuration

CONFING. Submenu for matching the input
pulses to the display.

Multiplication factor

can be programmed from
00.0001 to 99.9999. The setting
00.0000 will not be accepted.

Division factor

can be programmed from
01.0000 to 99.9999

A setting < 01.0000 will not be
accepted.

see below 7.8.5.5

Preset 2

see below 7.8.5.5

7.8.3.5 Preset 1

see below 7.8.5.5

7.8.3.6 Preset 2

see below 7.8.5.5

Submenu for the Signal and Control inputs

INP_U_T Submenu for programming the
signal and control inputs

Input polarity

INP_PDL	PNP: switching to Plus for all inputs in common
INP_NPN	NPN: switching to 0 V for all inputs in common

Filter for signal inputs INP A and INP B

FILTER	maximum count frequency
OFF	Damped to approx. 30 Hz (for control with mechanical contacts)
ON	

Input mode Frequency measurement

(see also under 17.)

Simple frequency measurement

INP A: Frequency input
INP B: no function

Differential measurement

A - B	[A - B]
	INP A: Frequency input A INP B: Frequency input B

Total measurement [A + B]

INP A: Frequency input A
INP B: Frequency input B

Frequency measurement with direction detection [Quad]

INP A: Frequency input 0°
INP B: Frequency input 90°

Ratio measurement [A / B]

RATIO	[R / B]
	INP A: Frequency input A / B

7.8.3.4 Submenu for reset mode

RESET Submenu for setting the reset
mode

Reset mode

Manual reset (reset key) and
electrical reset (reset input)

No reset possible
(reset key and reset input
inhibited)

Only electrical reset possible
(reset input)

Only manual reset possible
(reset key)

Electrical Reset:

Always resets only the main counter.

Manual Reset:

Resets the main counter (ACTUAL) and
auxiliary counters (BATCH or TOTAL), if the
value of the main counter or the value of an
auxiliary counters is shown on the display.



Always resets only the main counter.

INP A: Frequency input A
 INP B: Frequency input B
Percentage differential measurement [(A-B) / A in %]
 INP A: Frequency input A
 INP B: Frequency input B

Decimal point setting
 (determines the resolution)
 0 no decimal place
 0.0 1 decimal place
 0.00 2 decimal places
 0.000 3 decimal places

PF

User input 1
User input 2

Moving average

PF

Moving average calculated
 AVG 2 over 2 measurements
 AVG 5 over 5 measurements
 AVG 10 over 10 measurements
 AVG 20 over 20 measurements

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 (display store).

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 (see also 8.2.2).

Lock input

When the Lock input is activated the programming is inhibited.

When the Lock input is activated the setting of the preset values is inhibited.

When the Lock input is activated the setting of the preset values and the programming are both inhibited.

7.8.4.2 Submenu for configuration

Submenu for matching the input pulses to the display.

FATDR

can be programmed from 00.0001 to 99.9999. The setting 00.0000 will not be accepted

BITSO

can be programmed from 01.0000 to 99.9999. A setting < 01.0000 will not be accepted.

Display mode

Calculation and display of the frequency / speed in 1/sec
 Calculation and display of the frequency / speed in 1/min

PF

PF

Calculation and display of the frequency / speed in 1/sec
 Calculation and display of the frequency / speed in 1/min

english

Start delay
 Programmable from 00.0 up to 99.9 sec.
 At the start of a measurement the measurement results within this time-period are ignored.

PF

Programmable from 00.0 up to 99.9 sec.
 At the start of a measurement the measurement results within this time-period are ignored.

Waiting time

Programmable from 00.1 up to 99.9 sec.
 This value specifies how much time should elapse, after the last valid edge, before zero is to be displayed.

Waiting time

Programmable from 00.1 up to 99.9 sec.
 This value specifies how much time should elapse, after the last valid edge, before zero is to be displayed.

INP

INP

Submenu for programming the signal and control inputs

INPUL

Input polarity
 PNP: switching to Plus for all inputs in common
 NPN: switching to 0 V for all inputs in common

INPUL

Filter for signal inputs INP A and INP B
 for electronic control of the signal inputs

INPUL

Filter for signal inputs INP A and INP B
 for mechanical control of the signal inputs (for control with mechanical contacts)

INP

INP

Submenu for programming the signal and control inputs

INPUL

Input polarity
 PNP: switching to Plus for all inputs in common
 NPN: switching to 0 V for all inputs in common

INPUL

Filter for signal inputs INP A and INP B
 for electronic control of the signal inputs

INPUL

Filter for signal inputs INP A and INP B
 for mechanical control of the signal inputs (for control with mechanical contacts)

5 T F R T

(see also under 16.)

Start: Edge to INP A

Stop: Edge to INP B

Start: 1. Edge to INP B

Stop: 2. Edge to INP B

Timing can only be controlled via the Gate input. INP A and INP B have no function.

A U T O

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.

 With AUTO: no output operations with automatic repeat.

M P . I N P . 1

M P . I N P . 2

When the MPI input is activated the display is "frozen" and remains "frozen" until the MPI input is deactivated.
Internally the preset timer continues counting.

T E R C H

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
(see also under 8.2.2).

S E T

When the MPI input is activated the preset counter will be set to the value specified in the parameter SETPT (see also under 8.3).

L O C . I N P .

P R D G .

When the Lock input is activated the programming is inhibited
When the Lock input is activated the setting of the preset values is inhibited.

P R G . P R E .

When the Lock input is activated the setting of the preset values and the programming is both inhibited.

7.8.5.2 Submenu for output operations

M D D E

Submenu for determining the operation of the outputs

M D D E

(See also under 18.)

C o u n t m o d e A D D I N G

Outputs active when count status \geq preset value
Reset to zero

C o u n t m o d e S U B T R A C T I N G

Output 1 active when count status \leq preset value 1
Output 2 active when count status ≤ 0
Reset to preset 2

C o u n t m o d e A D D I N G w i t h a u t o m a t i c r e s e t

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

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

C o u n t m o d e S U B T R A C T I N G w i t h a u t o m a t i c r e s e t

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

C o u n t m o d e A D D I N G w i t h a u t o m a t i c r e s e t a n d B a t c h c o u n t e r

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

C o u n t m o d e A D D I N G w i t h a u t o m a t i c r e s e t a n d B a t c h

Output 1 active when Batch counter \geq preset 1
Manual reset sets both counters to zero.
Electrical reset sets only the main counter to zero.

C o u n t m o d e S U B T R A C T I N G w i t h a u t o m a t i c r e s e t a n d B a t c h c o u n t e r

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 and batch
counter to zero

Electronic reset only sets the
main counter to preset value 2

**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 $>$ preset value 1
Manual Reset sets both counters
to zero

Electrical reset sets only the
main counter to zero

**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

Tracking Preset mode
When preset 2 is changed then
preset 1 automatically tracks it.

Reset to zero

Preset 1 relative to Preset 2

**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
preset 1 automatically tracks it.
Reset to zero.

main counter = preset value 2.
Preset 1 relative to Preset 2

7.8.5.3 Submenu for configuration

Submenu for matching the input
pulses to the display.

T M D I E

S E C

Decimal point setting determines
the resolution

M I N

D

Decimal point setting determines
the resolution

H O U R

Decimal point setting determines
the resolution

Hrs. Min. Sec.

D

D
(Determines the resolution)
0 no decimal place
0.0 1 decimal place
0.00 2 decimal places
0.000 3 decimal places

S E T P T

D

Set value
Set value can be programmed
from 000000 to 999999.
A previously programmed
decimal point will be displayed.

7.8.5.4 Submenu for reset mode

Submenu for setting the reset
mode

R E S . M I O I

M A N . E L .

R
Manual reset (reset key) and
electrical reset (reset input)

N O . R E S .

No reset possible
(reset key and reset input
inhibited)

E L . R E S .

Only manual reset possible
(reset key)

M A N . R E S .

Only manual reset possible
(reset key)



Electrical Reset:

Always resets only the main counter.

Manual Reset:

Resets the main counter (ACTUAL) and
auxiliary counters (BATCH or TOTAL), if the
value of the main counter or the value of an
auxiliary counters is shown on the display.

7.8.5.5 Submenu for Preset 1

P R E S . 1 Submenu Preset 1

P R E S . 1

Preset 1 ON/OFF

Preset 1 ON

Preset 1 OFF and no function

Output signal

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
positive direction).

ADD mode output operations:
timed signal at Output 1,
becomes passive when count \geq
Preset 1 (deactivation only in
negative 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 Output 1,
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 Output 1,

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

Duration of timed signal of Output 1

programmable from 00.01 to
99.99 sec.

Timed signal is post-triggered

7.8.5.6 Submenu for Preset 2

P R E S . 2 Output signal

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

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

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:
timed signal at Output 2,
becomes active when count \leq
zero (activation only in negative
direction).

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:
timed signal at Output 2,

becomes active when count \leq

positive direction).

ADD mode output operations:
timed signal at Output 2,
becomes passive when count \geq
Preset 2 (deactivation only in
positive direction).

becomes passive when count \leq zero (Deactivation only in negative direction).

8 Operation

8.1 Switching the display during operation

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

direction and when count \geq zero and subsequently with positive direction and when count \leq zero

ADD mode output operations:
timed signal at Output 2,

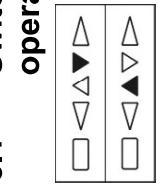
becomes passive with positive direction and when count \geq Preset 2 and subsequently with negative direction and when

count \leq Preset 2

SUB mode output operations:
timed signal at Output 2,

becomes passive with negative direction and when count \leq zero and subsequently with positive direction and when count \geq zero

direction and when count \geq zero and subsequently with positive direction and when count \leq zero



- U - - U -

Pressing the DOWN key or the UP key once causes the name of the currently selected display function to be displayed for 2 sec. If within this time the DOWN key or the UP key is pressed a second time, then the display switches to the next or previous display function. This is confirmed by displaying the new name for a period of 2 sec. After 2 sec the count value that corresponds to the selected display function is displayed.

A C T U R L
3 A T C H
T D T R L
P R E S . 1
P R E S . 2

8.2 Setting the presets

8.2.1 Setting via front keys

Using the UP key or the DOWN key, select the preset to be changed, either PRES1 or PRES2 (see 8.1).

Timed signal is post-triggered

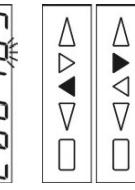
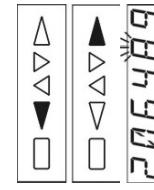
i Active:

Relays are activated when the preset value is reached.

Passive:

Relays become de-energized when the preset value is reached.

Timed outputs that have started are not aborted by a RESET.



The new setting is accepted either by pressing the ENTER key or after a period of 2 sec.



Preset setting is inhibited if the lock function for the presets is active (Parameter LOC.INP set to PRESET or PRG.PRE and keypad lock input LOCK active).

8.2.2 Teach Function

- In the programming menu, programme MPI input 1 or MPI input 2 (MP.INP.1 / MP.INP.2) to **TEACH**
- In operating mode, select the preset to be changed: PRESET1 or PRESET2
- In operating mode, briefly activate MPI input 1 or MPI input 2 (NPN or PNP input logic)

⇒ the current count value will be adopted as the new preset value

i See also 9. Error messages.

The preset value can subsequently be further modified via the keypad. If preset entry is inhibited (see note 8.2.1), then the Teach Function is also locked out.

8.2.3 Teach-In with tracking presets

If a tracking (trailing) preset (TRAIL or TR.AR) has been programmed, the value for Preset 2 can be set either via the keypad or via the Teach-In function.

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

i With output operations ADD.BAT, SUB.BAT, ADD.TOT, SUB.TOT, TRAIL and TR.AR, the Teach-In function is not available for Preset 1.

8.3 Set Function

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

- In the programming menu, programme MPI Input 1 or MPI Input 2 (MP.INP1 / MP.INP2) to **SET**
- In the programming menu, set the parameter **SETPT** to the desired value
- In operating mode, briefly activate MPI input 1 or MPI input 2 (NPN or PNP input logic)

⇒ Pulse counters and hour meters are preset to the **SETPT** value for adding output operations and to the difference of preselection 2 and the **SETPT** value for subtracting output operations.

i See also 9. Error messages

8.4 Default Parameters

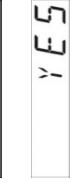
i Note: Three default parameter sets have been permanently stored; these can be adapted as required. With each acknowledgment of the parameter sets, all parameters will be reset to the values listed in the table.

8.4.1 Entry into the default setting

 Simultaneously press the UP key and the DOWN key for 3 sec.
i The security prompt appears in the display.

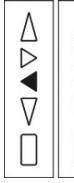
Programming can be exited again using the ENTER key.

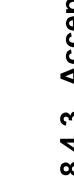
 Press the UP key or the DOWN key to continue with the programming.

i  The security prompt YES appears in the display

 Enter the default menu by pressing the ENTER key
i  The parameter set last programmed appears in the display

8.4.2 Selecting the parameter sets

 The parameter sets are selected using the UP key and the DOWN key.

i  Default parameter set 1
 Default parameter set 2
 Default parameter set 3

8.4.3 Accepting the setting

 Pressing the ENTER key accepts the current setting and returns to the operating mode.
i The text **SAVE** is shown in the display for 2 sec.

8.4.4 Parameter Set Table

10.1 Signal and Control Inputs

	P.SET1	P.SET2	P.SET3	N° Designation	Function
HL.P.TXT.	ON	ON	ON	1 INP A	Signal input A
SL.LANG.	EN	EN	EN	2 INP B	Signal input B
FUNCT	COUNT	COUNT	COUNT	3 RESET	Reset input
INP.POL.	PNP	PNP	PNP	4 LOCK	Keypad lock
FILTER	ON	OFF	OFF	5 GATE	Gate input
COUNT	CNT.DIR	UP.DN	QUAD	6 MPI 1	User input 1
MP.INP.1	LATCH	LATCH	SET	7 MPI 2	User input 2
MP.INP.2	TEACH	SET	TEACH	8 AC: 24 VDC/80 mA DC: UB connected through	Sensor supply voltage
LOC.INP.	PROG	PROG	PROG		
MODE	ADD	SUB	TRAIL	9 GND (0 VDC)	Common connection Signal and Control inputs
FACTOR	01.0000	01.0000	01.0000		
DIVISO.	01.0000	01.0000	01.0000		
DP	0	0	0.00		
SETPT.	000000	000000	000000		
RES.MOD.	MAN.EL	MAN.EL	MAN.EL		
PRES.1	ON	ON	ON		
PR.OUT1				10 Relay contact C.2	
T.OUT1	00.10			11 Relay contact N.O.2	Output 2
PR.OUT2				12 Relay contact N.C.2	
T.OUT2	00.10	00.10	00.10	13 Relay contact C.1	
				14 Relay contact N.O.1	Output 1
				15 Relay contact N.C.1	
				16 AC: 100...240 V AC ± 10% N~	Supply voltage
				DC: 10...30 VDC	
				17 AC: 100...240 V AC ± 10% L~	Supply voltage
				DC: GND (0 VDC)	

10.2 Supply Voltage and Outputs

	N° Designation	Function
PRES.1	ON	Relay contact C.2
PR.OUT1		11 Relay contact N.O.2
T.OUT1	00.10	Output 2
PR.OUT2		12 Relay contact N.C.2
T.OUT2	00.10	13 Relay contact C.1
		14 Relay contact N.O.1
		Output 1
		15 Relay contact N.C.1
		16 AC: 100...240 V AC ± 10% N~
		DC: 10...30 VDC
		17 AC: 100...240 V AC ± 10% L~
		DC: GND (0 VDC)

9 Error Message

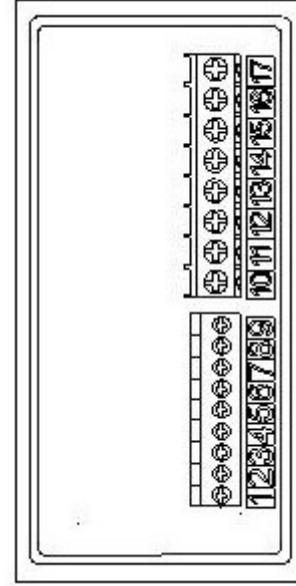
Err 1	Set value ≤ 0 not allowed
Err 2	Set value ≥ Preset 2 not allowed
Err 3	negative Teach-In value for Preset 1 not permitted
Err 4	Zero or negative Teach-In value for Preset 2 not permitted
Err 45	EEPROM error

11 Technical Data

11.1 General Data	Display Digit height Overload/ Underload Data retention Operation	6-digit, 14-segment LED 14 mm Blinking, 1 sec., counter loses no pulses up to 1 decade > 10 years, EEPROM 5 keys
-------------------	--	---

11.2 Pulse Counter

Count frequency	max. 55 kHz (see under 14.)
Response time of the outputs:	Frequencies - typical)
Add/Sub/Trail	< 13 ms
With automatic repeat	< 13 ms
A/B ; (A-B)/A	< 34 ms



english

11.3 Tacho/Frequency Meter

Frequency range	0.01 Hz to 65 kHz (see under 14: Frequencies typ.)
Measuring principle	<p>≤ 76.3 Hz Time interval (Period measurement)</p> <p>> 76.3 Hz Gate time Gate time approx. 13.1 ms</p>
Measuring error	< 0.1% per channel
Response time of the outputs:	<p>1-channel operation < 100 ms @ 40 kHz</p> <p>< 350 ms @ 65 kHz</p> <p>2-channel operation < 150 ms @ 40 kHz</p> <p>< 600 ms @ 65 kHz</p>

11.4 Timer

Seconds	0.001 sec ... 999 999 sec
Minutes	0.001 min ... 999 999 min
Hours	0.001 hrs ... 999 999 hrs
Hrs. Min. Sec	00hrs. 00min.01sec ...
	99hrs.59min.59sec
Min. time measurable	500µs
Measuring error	< 100 ppm
Output response time:	< 13 ms

11.5 Signal and Control Inputs

SELV circuits, reinforced / double insulation
programmable NPN/PNP
for all inputs in common

Input resistance

Pulse shape

Switching level with AC supply:

HTL level Low: 0 ... 4 VDC

High: 12 ... 30 VDC

Low: 0 ... 2 VDC

High: 3.5 ... 30 VDC

Switching level with DC supply:

Low: 0 ... 0.2 x U_B

High: 0.6 x U_B ... 30 VDC

Low: 0 ... 2 VDC

High: 3.5 ... 30 VDC

Minimum pulse length of the Reset input: 1 ms

Minimum pulse length of the Control inputs: 10 ms

11.6 Outputs

Output 1 / Output 2

Relays with changeover contacts

Prescribed fuse: 3A

Switching voltage max. 250 VAC/ 150 VDC

Switching current max. 3 A AC/ DC

min. 30 mA DC

max. 750 VA/ 90 W

The maximum values shall in no case be exceeded.

Mechanical service life (switching cycles) 20×10^6
 N° of switching cycles at 3 A/ 250 V AC 5×10^4
 N° of switching cycles at 3 A/ 30 V DC 5×10^4

11.7 Supply Voltage

AC supply:	100 ... 240 V AC / max. 11 VA
	50/ 60 Hz, Tolerance $\pm 10\%$
ext. fuse protection:	T 0.1 A
10 ... 30 V DC/ max. 5.5 W	
reverse polarity protection, SELV, CLASS II (Limited Power Source)	
ext. fuse protection T 0.25 A	

11.8 Sensor Supply Voltage

(Voltage output for external sensors)	SELV circuits, reinforced / double insulation
for AC supply:	24 V DC $\pm 15\%$, 80 mA
for DC supply:	max. 80 mA, ext. voltage supply is connected through
Seconds	0.001 sec ... 999 999 sec
Minutes	0.001 min ... 999 999 min
Hours	0.001 hrs ... 999 999 hrs
Hrs. Min. Sec	00hrs. 00min.01sec ...
	99hrs.59min.59sec
Min. time measurable	500µs
Measuring error	< 100 ppm
Output response time:	< 13 ms

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:	Protection Class 2 (front side)
	Only the front side is classified as accessible for the operator.
Application area:	Pollution level 2 over-voltage Category II
Insulation:	Front: double insulation, Rear side: basic insulation,
	Signal inputs and und sensor power supply: SELV

11.12 Mechanical Data

Housing:	Panel-mount housing to DIN 43 700, RAL 7021
Dimensions:	96 x 48 x 102 mm
Panel cut-out:	$92^{+0.8}_{-0.6}$ x $45^{+0.6}_{-0.6}$ mm
Installation depth:	ca. 92 mm incl. terminals
Weight:	ca. 180 g
Protection:	IP65 (front, device only) Polycarbonate UL94 V-2
Housing material:	Vibration resistance: 10 - 55 Hz / 1 mm / XYZ
	30 min. in each direction
	The maximum values shall in no case be exceeded.
Shock resistance:	EN 60068-2-27 100G / XYZ 3 times in each direction
	EN 60068-2-29 10G / 6 ms/XYZ 2000 times in each direction

11.13 Connections

Supply voltage and outputs:
Plug-in screw terminal, 8-pin, RM5.00
Core cross - section, max. 2.5 mm²

Signal and control inputs:

Plug-in screw terminal, 9-pin, RM 3.50
Core cross - section, max. 1.5 mm²

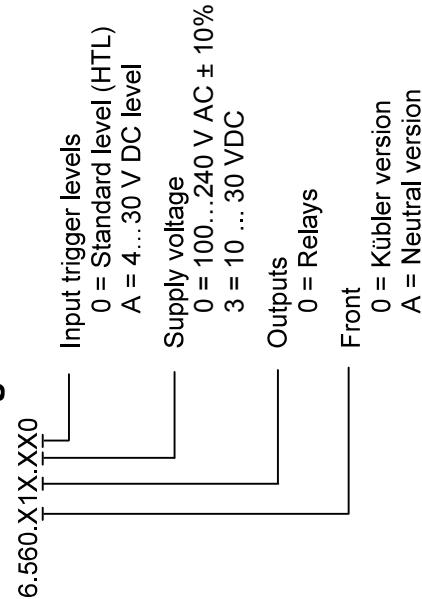
12 Scope of Delivery

Preset counter

Mounting clip

Instruction manual

13 Ordering Codes



	Add	Sub	Trail	AddAr	SubAr	AddBat	SubBat	TrailAr	AddTot	SubTot
Cnt.Dir	55	kHz		2.6	kHz				2.5	kHz
Up.Dn ; Up.Up	29	kHz		2.6	kHz				2.5	kHz
Quad ; Quad 2	28	kHz		1.2	kHz				1.1	kHz
Quad 4	18	kHz		1.1	kHz				0.8	kHz
A/B ; (A-B)/A			29	kHz						

4...30 V DC level, signal shape square wave 1:1
typ. Low 1.0 V
typ. High 4.0 V

	Add	Sub	Trail	AddAr	SubAr	AddBat	SubBat	TrailAr	AddTot	SubTot
Cnt.Dir	9	kHz		2.5	kHz				2.2	kHz
Up.Dn ; Up.Up	9	kHz		2.5	kHz				2.2	kHz
Quad ; Quad 2	9	kHz		1.1	kHz				1.1	kHz
Quad 4	9	kHz		1.1	kHz				0.9	kHz
A/B ; (A-B)/A			9	kHz						

english

14 Frequencies (typical)

NOTE: Switching levels of the inputs

Switching levels with AC supply:

HTL level
Low: 0 ... 4 VDC
High: 12 ... 30 VDC

4...30 V DC level

Low: 0 ... 2 VDC
High: 3.5 ... 30 VDC

Switching levels with DC supply:

HTL level
Low: 0 ... 0.2 x U_B
High: 0.6 x U_B ... 30 VDC
Low: 0 ... 2 VDC
High: 3.5 ... 30 VDC

4...30 V DC level

4...30 V DC level, signal shape square wave 1:1
typ. Low 1.0 V
typ. High 4.0 V

14.1 Pulse Counter

HTL level, signal shape square wave 1:1

AC supply	2.5 V	22 V	2 V	10 V	2.5 V	22 V
DC supply 12V	typ. Low	typ. High	typ. Low	typ. High	typ. Low	typ. High
DC supply 24V	typ. Low	typ. High	typ. Low	typ. High	typ. Low	typ. High
Quad	30	kHz			30	kHz

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

15 Input modes: Pulse counting

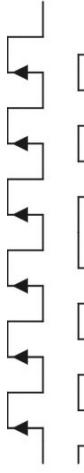
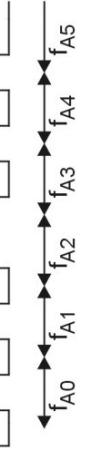
Function	Diagram																	
CNT.DIR	<p>Note: No counting when GATE input is active P = Preset</p> <table border="1"> <tr> <td>ADD</td> <td>0</td><td>1</td><td>2</td><td>1</td><td>0</td><td>-1</td><td>-2</td> </tr> <tr> <td>SUB</td> <td>P</td><td>P+1</td><td>P+2</td><td>P+1</td><td>P</td><td>P-1</td><td>P-2</td> </tr> </table>	ADD	0	1	2	1	0	-1	-2	SUB	P	P+1	P+2	P+1	P	P-1	P-2	PNP: Count on rising edge NPN: Count on falling edge
ADD	0	1	2	1	0	-1	-2											
SUB	P	P+1	P+2	P+1	P	P-1	P-2											
UP.DN	<table border="1"> <tr> <td>ADD</td> <td>0</td><td>1</td><td>2</td><td>1</td><td>0</td><td>0</td><td>1</td> </tr> <tr> <td>SUB</td> <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>	ADD	0	1	2	1	0	0	1	SUB	P	P+1	P+2	P+1	P	P	P+1	Inp A: Count input add Inp B: Count input sub Add: Display 0 --> Preset Sub: Display Preset -> 0
ADD	0	1	2	1	0	0	1											
SUB	P	P+1	P+2	P+1	P	P	P+1											
UP.UP	<table border="1"> <tr> <td>ADD</td> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7</td> </tr> <tr> <td>SUB</td> <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>	ADD	0	1	2	3	4	6	7	SUB	P	P+1	P+2	P+3	P+2	P+1	P	Inp A: Count input 1 add Inp B: Count input 2 add Add: Display 0 --> Preset Sub: Display Preset -> 0
ADD	0	1	2	3	4	6	7											
SUB	P	P+1	P+2	P+3	P+2	P+1	P											
QUAD	<table border="1"> <tr> <td>ADD</td> <td>0</td><td>1</td><td>2</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>SUB</td> <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>	ADD	0	1	2	3	2	1	0	SUB	P	P+1	P+2	P+3	P+2	P+1	P	A 90° B Inp A: Count input Count on one edge Inp B: Reverse direction Add: Display 0 --> Preset Sub: Display Preset -> 0
ADD	0	1	2	3	2	1	0											
SUB	P	P+1	P+2	P+3	P+2	P+1	P											
QUAD2	<table border="1"> <tr> <td>ADD</td> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>3</td><td>2</td> </tr> <tr> <td>SUB</td> <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>	ADD	0	1	2	3	4	3	2	SUB	P	P+1	P+2	P+3	P+4	P+3	P+2	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
ADD	0	1	2	3	4	3	2											
SUB	P	P+1	P+2	P+3	P+4	P+3	P+2											

Function	Diagram	Note: No counting when GATE input is active	PNP: Count on rising edge NPN: Count on falling edge																								
QUAD4	<p>INP A INP B</p> <p>Counts A Counts B Display</p> <table border="1"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td></tr> <tr><td>P</td><td>P+1</td><td>P+2</td><td>P+3</td><td>P+4</td><td>P+5</td><td>P+6</td><td>P+7</td><td>P+6</td><td>P+5</td><td>P+4</td><td>P+3</td></tr> </table>	0	1	2	3	4	5	6	7	6	5	4	3	P	P+1	P+2	P+3	P+4	P+5	P+6	P+7	P+6	P+5	P+4	P+3	<p>A 90° B</p> <p>Inp A: Count input Count on rising and on falling edges</p> <p>Inp B: Count input Count on rising and on falling edges, Reverse direction</p> <p>Add: Display 0 --> Preset Sub: Display Preset -> 0</p>	<p>Inp A: Count input 1 Inp B: Count input 2</p> <p>Formula: A / B</p>
0	1	2	3	4	5	6	7	6	5	4	3																
P	P+1	P+2	P+3	P+4	P+5	P+6	P+7	P+6	P+5	P+4	P+3																
A / B	<p>INP A INP B</p> <p>Counts A Counts B Display</p> <table border="1"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>4</td></tr> <tr><td>0</td><td>1</td><td>0,5</td><td>0,33</td><td>0,66</td><td>0,75</td><td>1</td></tr> </table>	0	1	2	3	4	4	0	1	0,5	0,33	0,66	0,75	1	<p>Inp A: Count input 1 Inp B: Count input 2</p> <p>Formula: $(A - B)/A \times 100$</p>	<p>Inp A: Count input 1 Inp B: Count input 2</p> <p>Formula: $(A - B)/A \times 100$</p>											
0	1	2	3	4	4																						
0	1	0,5	0,33	0,66	0,75	1																					

16 Input modes: Timing

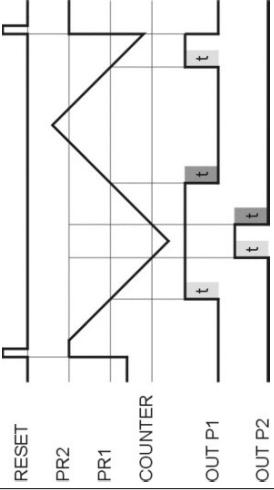
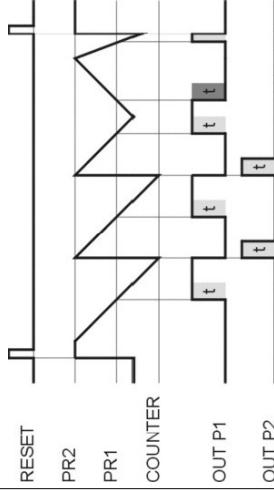
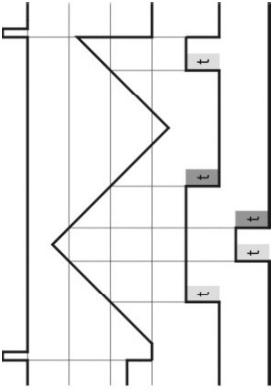
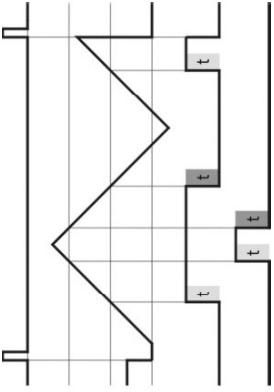
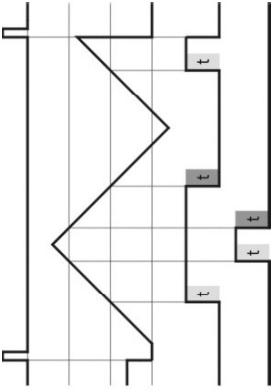
Function	Diagram	
INA.INB	<p>INP A INP B GATE ADD SUB</p> <p>0 T1 T2 P-T2</p> <p>P P-T1 P-T2</p>	PNP: Count on rising edge NPN: Count on falling edge Inp A: Start Inp B: Stop Add: Display 0 --> Preset Sub: Display Preset -> 0
INB.INB	<p>INP B GATE ADD SUB</p> <p>0 T1 T2 T1+T2</p> <p>P P-T1 P-T1-T2</p>	Inp A: no function Inp B: Start/Stop Add: Display 0 --> Preset Sub: Display Preset -> 0
FREE.RN	<p>GATE ADD SUB</p> <p>0 T1 T2 T1+T2</p> <p>P P-T1 P-T1-T2</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
AUTO	<p>GATE RESET PRESET ADD SUB</p> <p>0 0 ... T1 0 ... T2 ... T2+T3 0 ...</p> <p>P P ... P-T1 P P-T2 ... P-T2-T3 P ...</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

17 Input modes: Frequency meter

Function	Diagram	
A	<p>INP A 0 F_{A0} F_{A1} F_{A2} 0 0 x</p> <p>Display 0 0 F_{A0} F_{A1} F_{A2} 0</p>	PNP: Count on rising edge NPN: Count on falling edge Inp A: Frequency input Inp B: no function
A - B	<p>INP A 0 F_{A0} F_{A1} F_{A2} 0 0 x</p> <p>INP B 0 0 F_{B0} F_{B1} F_{B2} x</p> <p>Display 0 0 $F_{A0} - F_{B0}$ $F_{A1} - F_{B1}$ $-F_{B2}$</p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: $A - B$
A + B	<p>INP A 0 F_{A0} F_{A1} F_{A2} 0 0 x</p> <p>INP B 0 0 F_{B0} F_{B1} F_{B2} x</p> <p>Display 0 0 $F_{A0} + F_{B0}$ $F_{A1} + F_{B1}$ F_{B2}</p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: $A + B$
QUAD	<p>Inp A </p> <p>Inp B </p> <p>Display 0 0 F_{A0} F_{A1} F_{A2} $-F_{A3}$ $-F_{A4}$</p>	A 90° B Inp A: Frequency input 1 Inp B: Reverse direction Formula: A / B
A / B	<p>INP A 0 F_{A0} F_{A1} 0 0 0 x</p> <p>INP B 0 0 F_{B0} F_{B1} F_{B2} x</p> <p>Display 0 0 0 F_{A0}/F_{B0} F_{A1}/F_{B1} 0</p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: A / B
A % B	<p>INP A 0 F_{A0} F_{A1} 0 0 0 x</p> <p>INP B 0 0 F_{B0} F_{B1} F_{B2} x</p> <p>Display 0 0 100% $F_{A0}\%F_{B0}$ $F_{A1}\%F_{B1}$ 0</p>	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: $(A - B)/A \times 100$

english

18 Output operations

Mode	Diagram	Mode	Diagram
	t Only in mode  and 		t Additionally in mode  and 
ADD	 <p>RESET PR2 PR1 COUNTER OUT P1 OUT P2</p>	SUB	 <p>RESET PR2 PR1 COUNTER OUT P1 OUT P2</p>
ADD.AR	 <p>RESET PR2 PR1 COUNTER OUT P1 OUT P2</p>	SUB.AR	<p>RESET PR2 PR1 COUNTER OUT P1 OUT P2</p>
ADD.BAT	 <p>RESET PR2 COUNTER PR1 BATCH OUT P1 OUT P2</p>	SUB.BAT	<p>RESET PR2 COUNTER PR1 BATCH OUT P1 OUT P2</p>
ADD.TOT	 <p>RESET PR2 COUNTER PR1 TOTAL OUT P1 OUT P2</p>	SUB.TOT	<p>RESET PR2 COUNTER PR1 TOTAL OUT P1 OUT P2</p>

Mode	Diagram
TRAIL	<p>Diagram illustrating the TRAIL mode timing. The counter increases from 0 to 15. The counter value is indicated by the sequence 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>Inputs:</p> <ul style="list-style-type: none"> RESET (Initial state) PR1: Triggered on rising edge ($\Delta +PR1$) PR2: Triggered on falling edge ($\Delta -PR1$) <p>Outputs:</p> <ul style="list-style-type: none"> OUT P1_{$\Delta +/PR1$}: Active during the rising edge of PR1 OUT P1_{$\Delta +PR1$}: Active during the falling edge of PR2 OUT P1_{$\Delta -PR1$}: Active during the rising edge of PR2 OUT P2: Active during the falling edge of PR1
TR.AR	<p>Diagram illustrating the TR.AR mode timing. The counter decreases from 9 to 0. The counter value is indicated by the sequence n 9 0 1 2 3 4 5 6 7 6 5 4 3 2 3 4 5 6 7 8 9/0.</p> <p>Inputs:</p> <ul style="list-style-type: none"> RESET (Initial state) PR1: Triggered on rising edge ($\Delta +PR1$) PR2: Triggered on falling edge ($\Delta -PR1$) <p>Outputs:</p> <ul style="list-style-type: none"> OUT P1_{$\Delta +/PR1$}: Active during the falling edge of PR1 OUT P1_{$\Delta +PR1$}: Active during the rising edge of PR2 OUT P1_{$\Delta -PR1$}: Active during the falling edge of PR2 OUT P2: Active during the rising edge of PR1

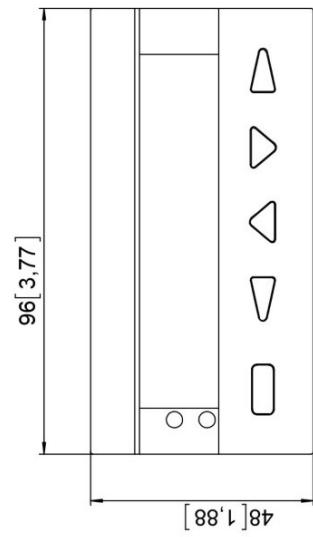
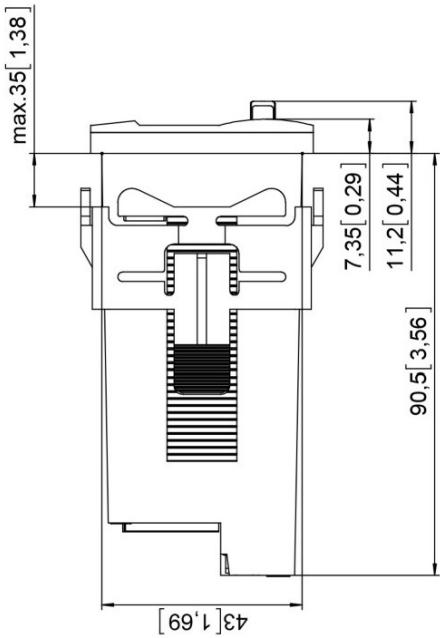
19 Help Texts

PROG.	NO	NO PROGRAMMING
PROG.	YES	START PROGRAMMING
LANGU.		MAIN MENU SELECT LANGUAGE
HELP.TXT.	YES	HELPTEXT ON
SL.LANG.	DE	DEUTSCH
SL.LANG.	EN	ENGLISH
FUNCT.		MAIN MENU BASIC FUNCTION
FUNCT.	COUNT	BASIC FUNCTION COUNTER
FUNCT.	TIMER	BASIC FUNCTION TIMER
FUNCT.	TACHO	BASIC FUNCTION TACHOMETER/FREQUENCY METER
INPUT		MAIN MENU INPUTS
INP.POL.	PNP	INPUT POLARITY PNP
INP.POL.	NPN	INPUT POLARITY NPN
FILTER	OFF	INPUT 30HZ FILTER OFF
FILTER	ON	INPUT 30HZ FILTER ON
CNT.INP.	CNT.DIR	INPUT MODE COUNT DIRECTION
CNT.INP.	UP.DN	INPUT MODE UP-DOWN
CNT.INP.	UP.UP	INPUT MODE UP-UP
CNT.INP.	QUAD	INPUT MODE QUADRATURE
CNT.INP.	QUAD2	INPUT MODE QUADRATURE x 2
CNT.INP.	QUAD4	INPUT MODE QUADRATURE x 4
CNT.INP.	A/B	INPUT MODE A/B
CNT.INP.	A%B	INPUT MODE (A-B)/A IN %
START	INA.INB	START INPUT A / STOP INPUT B
START	INB.INB	START INPUT B / STOP INPUT B
START	FRE.RUN	TIMER IN FREE RUN MODE
START	AUTO	TIMER IN AUTO STOP MODE
TAC.INP.	A	ONLY INPUT A
TAC.INP.	A-B	INPUT MODE A-B
TAC.INP.	A+B	INPUT MODE A+B
TAC.INP.	QUAD	INPUT MODE QUADRATURE
TAC.INP.	A/B	INPUT MODE A/B
TAC.INP.	A%B	INPUT MODE (A-B)/A IN %
MP.INP._	LATCH	FUNCTION MP-INPUT_LATCH
MP.INP._	TEACH	FUNCTION MP-INPUT_TEACH
MP.INP._	SET	FUNCTION MP-INPUT_SET
LOC.INP.	PROG.	LOCK PROGRAMMING
LOC.INP.	RESET	LOCK EDITING OF PRESETS
LOC.INP.	PRG.PRE.	LOCK PROGRAMMING AND EDITING OF PRESETS
MODE		MAIN MENU OPERATION MODE
MODE	ADD	MODE ADDING
MODE	ADD.AR	MODE ADDING WITH AUTOMATIC RESET
MODE	ADD.BAT	MODE ADDING WITH AUTOMATIC RESET + BATCH COUNTER
MODE	ADD.TOT	MODE ADDING WITH AUTOMATIC RESET + TOTAL COUNTER
MODE	TRAIL	MODE ADDING OUTPUT 1 TRACKING PRESET OF OUTPUT 2
MODE	TR.AR	MODE ADDING OUTPUT 1 TRACKING PRESET OF OUTPUT 2 WITH AUTOMATIC RESET
MODE	SUB	MODE SUBTRACTING

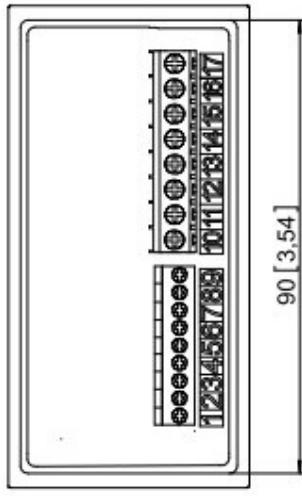
MODE	SUB.AR	MODE SUBTRACTING WITH AUTOMATIC RESET
MODE	SUB.BAT	MODE SUBTRACTING WITH AUTOMATIC RESET + BATCH COUNTER
MODE	SUB.TOT	MODE SUBTRACTING WITH AUTOMATIC RESET + TOTAL COUNTER
CONFIG.		MAIN MENU CONFIGURATION
FACTOR		MULTIPLICATION FACTOR
DIVISO.		DIVISION FACTOR
T.MODE	SEC	TIME RANGE SECONDS
T.MODE	MIN	TIME RANGE MINUTES
T.MODE	HOUR	TIME RANGE HOURS
T.MODE	HH.MM.SS	TIME RANGE HH.MM.SS
T.MODE	SEC-1	TACHO RANGE SEC-1
T.MODE	MIN-1	TACHO RANGE MIN-1
DP		DECIMAL POINT
SETPT.		SET VALUE
Avg	OFF	NO AVERAGE
Avg	Avg 2	AVERAGE OF 2 MEASUREMENTS
Avg	Avg 5	AVERAGE OF 5 MEASUREMENTS
Avg	Avg10	AVERAGE OF 10 MEASUREMENTS
Avg	Avg20	AVERAGE OF 20 MEASUREMENTS
START		START DELAY TIME [SEC]
WAIT 0		WAIT TIME UNTIL DISPLAY ZERO [SEC]
RES.MOD		MAIN MENU RESET MODE
RES.MOD.	NO.RES.	NO RESET FUNCTION
RES.MOD.	MAN.RES.	RESET VIA FRONT BUTTON
RES.MOD.	EL.RES.	RESET VIA RESET INPUT
RES.MOD.	MAN.EL.	RESET VIA FRONT BUTTON OR RESET INPUT
PRES. 1		MAIN MENU PRESET 1
PRES. 1	ON	PRESET 1 ON
PRES. 1	OFF	PRESET 1 OFF
PR.OUT1	---	PERMANENT SIGNAL FORM AT OUTPUT 1
PR.OUT1	----	PERMANENT SIGNAL FORM AT OUTPUT 1
PR.OUT1	---	TIMED SIGNAL FORM IN MAIN DIRECTION AT OUTPUT 1
PR.OUT1	---	TIMED SIGNAL FORM IN MAIN DIRECTION AT OUTPUT 1
PR.OUT1	-- --	TIMED SIGNAL FORM IN BOTH DIRECTION AT OUTPUT 1
PR.OUT1	-- --- --	TIMED SIGNAL FORM IN BOTH DIRECTION AT OUTPUT 1
T.OUT 1		ACTIVE TIME FOR OUTPUT 1
PRES. 2		MAIN MENU PRESET 2
PR.OUT2	---	PERMANENT SIGNAL FORM AT OUTPUT 2
PR.OUT2	----	PERMANENT SIGNAL FORM AT OUTPUT 2
PR.OUT2	---	TIMED SIGNAL FORM IN MAIN DIRECTION AT OUTPUT 2
PR.OUT2	-- --	TIMED SIGNAL FORM IN MAIN DIRECTION AT OUTPUT 2
PR.OUT2	-- --- --	TIMED SIGNAL FORM IN BOTH DIRECTION AT OUTPUT 2
T.OUT 2		ACTIVE TIME FOR OUTPUT 2
END.PRG.	NO	REPEAT PROGRAMMING
END.PRG.	YES	EXIT PROGRAMMING AND STORE DATAS

20 Dimensional Drawings

Dimensions in mm [inch]



Rear view:



Panel cut-out:

