Operating manual (Translation)

Panel mounting display

Type VA3K01

Please keep this operating manual for future reference.
If the device is resold, please provide the operating manual along with it.

Table of contents

page

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 it is in perfect technical condition. 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.

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.

2.1 Indended use

The panel mounting display VA3K01 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.
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, then 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

CAUTION

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

Provide a free space of 10mm 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.

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

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.

DANGER

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 under “Technical Data”.

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

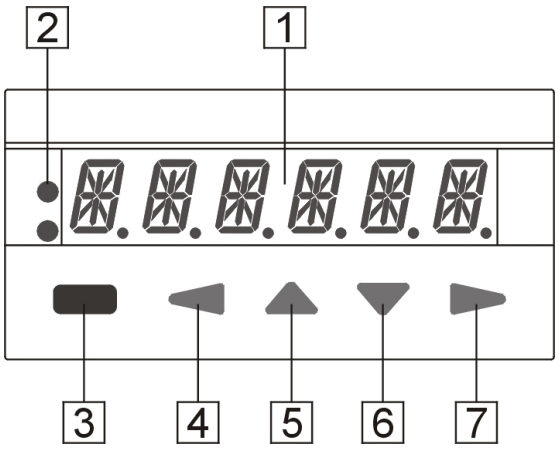
The front side of the unit should only be cleaned using a soft damp (water!) cloth. Cleaning of the embedded rear side is not planned and is the responsibility of the service personnel or of the installer.

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, Sub-Bat, AddTot, 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 VAC ±10 % or 10...30 VDC

4 Display/Operating elements



1	6-digit LED display
2	Status display LED1 / LED2
3	RESET key / ENTER key
4	Key LEFT
5	Key UP
6	Key DOWN
7	Key RIGHT

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:	Count inputs
Frequency meter:	Frequency inputs
Timer:	Start input or Start/Stop inputs

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
Frequency meter:	no function
Timer:	RESET input

5.3 GATE

Static gate input: function dependent on operating mode.

Pulse counter:	no counting while active
Frequency meter:	no counting while active
Timer:	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.

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.

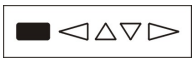
For safety switching the relays can be inverted, i.e. the relays will be de-energized when the presets are reached.
To do this, the parameters Pr.OUT1 and Pr. OUT2 must be set to ⎍ (for permanent signal) and to ⎍ or ⎍ (for timed signal).

7 Programming

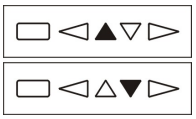
7.1 Entering the programming

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

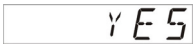
The security prompt appears alternately in the display.



Programming can be exited again using the ENTER key.



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



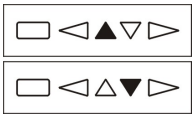
The security prompt YES appears in the display.

Enter the main menu by pressing the ENTER key.

The first menu item in the main menu appears in the display.

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

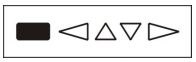
7.2 Selecting the main menus



The main menus are selected using the UP and DOWN keys.

Indicated by LED1.

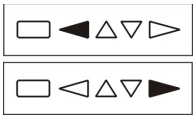
7.3 Entering a sub-menu



Press the ENTER key.
The first parameter is displayed with the current setting flashing.

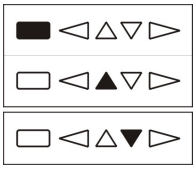
Indicated by LED1 and LED2

7.4 Selecting the parameters



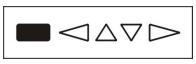
The parameters are selected using either the RIGHT key or the LEFT key.

7.5 Changing parameter values



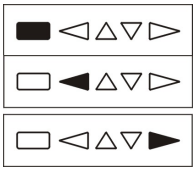
Press the ENTER key.

Change the parameter value using the UP or DOWN keys.



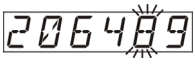
Press the ENTER key.
The new setting is again displayed flashing.

7.6 Setting count values

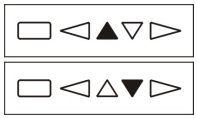


Press the ENTER key.

Select the decade using the RIGHT key or the LEFT key.



The corresponding decade flashes.

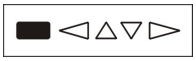


Change the count value using the UP key or the DOWN key.

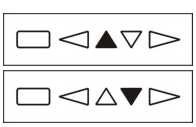
Press the ENTER key.
The new setting is again displayed flashing.

7.7 Ending the programming

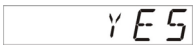
Select the menu item.



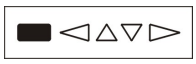
Pressing the ENTER key acknowledges this prompt and allows the programming to be repeated. The previously-programmed values are preserved. These can now be checked or changed once again.



Pressing the UP key or the DOWN key selects the termination oft 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

English.

German (Deutsch).

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

Submenu Basic function.

Pulse counter (→ § 7.9.3).

Timer / Hour meter (→ § 7.9.5).

Tacho / Frequency meter (→ § 7.9.4).

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

INPUT — Submenu for programming the signal and control inputs.

INP.POL. — **Input polarity**

PNP — PNP: switching to Plus for all inputs in common.

NPN — NPN: switching to 0 V for all inputs in common.

FILTER — **Filter for signal inputs INP A and INP B**

OFF — Maximum count frequency.

ON — Damped to approx. 30 Hz (for control with mechanical contacts).

CNT.INP. — **Count Input mode** (→ § 14).

CNT.DIR — **Count / Direction control**
INP A: count input.
INP B: count direction input.

UP.DN — **Differential counting [A – B]**
INP A: count input add.
INP B: count input sub.

UP.UP — **Totalising [A + B]**
INP A: count input add.
INP B: count input add.

QUAD — **Quadrature input**
INP A: count input 0°.
INP B: count input 90°.

QUAD2 — **Quadrature with pulse doubling (x2)**
INP A: count input 0°.
INP B: count input 90°.
Each pulse edge of INP A will be counted.

QUAD4 — **Quadrature with pulse quadrupling (x4)**
INP A: count input 0°.
INP B: count input 90°.
Each pulse edge of INP A and INP B will be counted.

A / B — **Ratio measurement [A / B]**
INP A: count input A.
INP B: count input B.

A-B / oB — **Percentage differential counting [(A – B) / A in %]**
INP A: count input A.
INP B: count input B.

MP.INP.1 — **User input 1**

MP.INP.2 — **User input 2**

LATCH — 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.

TEACH — 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 (→ § 8.2.2).

SET — When the MPI input is activated the preset counter will be set to the value specified in the parameter *SETPT* (→ § 8.3).

LOC.INP. — **Lock input**

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

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

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

7.8.3.2 Submenu for Output operations

MODE — Submenu for determining the operation of the outputs.

MODE — **Output operation** (→ § 17).

ADD — **Count mode ADDING**
Outputs active when count status ⩾ preset value
Reset to zero

SUB — **Count mode SUBTRACTING**
Output 1 active when count status ⩽ preset value 1.
Output 2 active when count status ⩽ 0.
Reset to preset 2.

ADD.AR — **Count mode ADDING with automatic reset**
Output 1 active when count status ⩾ 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

SUB.AR — **Count mode SUBTRACTING with automatic reset**
Output 1 active when count status ⩽ 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.

ADD.BAT — **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 ⩾ preset 1.
Manual reset sets both counters to zero.
Electrical reset sets only the main counter to zero.

SUB.BAT — **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 ⩾ 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.

ADD.TOT — **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.

SUB.TOT **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 ⩽ zero.

Manual reset sets both counters to the preset values.

Electrical reset sets only main counter to preset value 2.

TRAIL **Tracking Preset mode**

When preset 2 is changed then preset 1 automatically tracks it.

Reset to zero.

Preset 1 relative to Preset 2.

TR.AR **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 2.

Preset 1 relative to Preset 2.

7.8.3.3 Submenu for configuration

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

FACTOR
0 1.0000 **Multiplication factor**

can be programmed from 00.0001 to 99.9999 .

The setting 00.0000 will not be accepted.

DIVISO.
0 1.0000 **Division factor**

can be programmed from 00.0001 to 99.9999 .

A setting < 01.0000 will not be accepted.

DP
0 **Decimal point setting**

(only optical function)

0	no decimal place
0.0	1 decimal place
0.00	2 decimal places
0.000	3 decimal places
0.0000	4 decimal places
0.00000	5 decimal places

SETPT.
000000 **Set value**

Set value can be programmed from -999999 to 999999.

A previously programmed decimal point will be displayed.

7.8.3.4 Submenu for reset mode

RES.MOD. Submenu for setting the reset mode.

RES.MOD.
MAN.EL. **Reset mode**

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

NO.RES. No reset possible (reset key and reset input inhibited).

EL.RES. Only electrical reset possible (reset input).

MAN.RES. 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.

7.8.3.5 Preset 1

→ § 7.9.5.5 .

7.8.3.6 Preset 2

→ § 7.9.5.6 .

7.8.4 Tacho/Frequency meter

7.8.4.1 Submenu for the Signal and Control inputs

INPUT — Submenu for programming the signal and control inputs.

INP.POL. — **Input polarity**

PNP — PNP: switching to Plus for all inputs in common.

NPN — NPN: switching to 0 V for all inputs in common.

FILTER — **Filter for signal inputs INP A and INP B**

OFF — maximum count frequency.

ON — Damped to approx. 30 Hz (for control with mechanical contacts).

TAC.INP. — **Input mode Frequency measurement** (→ § 16).

A — **Simple frequency measurement**
INP A: Frequency input.
INP B: no function.

A - B — **Differential measurement [A – B]**
INP A: Frequency input A.
INP B: Frequency input B.

A + B — **Total measurement [A + B]**
INP A: Frequency input A.
INP B: Frequency input B.

QUAD — **Frequency measurement with direction detection [Quad]**
INP A: Frequency input 0°.
INP B: Frequency input 90°.

A / B — **Ratio measurement [A / B]**
INP A: Frequency input A.
INP B: Frequency input B.

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

MP.INP.1 — **User input 1**

MP.INP.2 — **User input 2**

LATCH — 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).

TEACH — 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 (→ § 8.2.2) .

LOC.INP. — **Lock input**

PROG. — When the Lock input is activated the programming is inhibited.

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

PRG.PRE. — 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

CONFIG. — Submenu for matching the input pulses to the display.

FACTOR
0 1.0000 — **Multiplication factor** can be programmed from 00.0001 to 99.9999 .The setting 00.0000 will not be accepted.

DIVISO.
0 1.0000 — **Division factor** can be programmed from 01.0000 to 99.9999 .
A setting < 01.0000 will not be accepted.

I.MODE
SEC-1

Display mode
Calculation and display of the frequency / speed in 1/sec.

MIN-1
Calculation and display of the frequency / speed in 1/min.

DP
0

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

AVG
OFF

Moving average
Moving average calculated over

AVG 2	2 measurements
AVG 5	5 measurements
AVG 10	10 measurements
AVG 20	20 measurements
OFF	no average

START
00.0

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.

WAIT 0
00.1
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.

7.8.4.3 Preset 1

→ § 7.9.5.5 .

7.8.4.4 Preset 2

→ § 7.9.5.6 .

7.8.5 Timer

7.8.5.1 Submenu for the Signal and Control inputs

INPUT
Submenu for programming the signal and control inputs.

INP.POL.
PNP

Input polarity
PNP: switching to Plus for all inputs in common.

NPN
NPN: switching to 0 V for all inputs in common.

FILTER

Filter for signal inputs INP A and INP B

OFF
for electronic control of the signal inputs.

ON
for mechanical control of the signal inputs (for control with mechanical contacts).

START

Input mode Time measurement
(→ § 15).

INA.INB
Start: Edge to INP A.
Stop: Edge to INP B.

INB.INB
Start: 1. Edge to INP B.
Stop: 2. Edge to INP B.

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

AUTO
The timer is reset by means of a RESET and then starts timing again (to zero when adding, to preset 2 when subtracting).
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.

MP.INP.1 **User input 1**

MP.INP.2 **User input 2**

LATCH 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.

TEACH 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 (→ § 8.2.2).

SET When the MPI input is activated the preset counter will be set to the value specified in the parameter *SETPT* (→ § 8.3).

LOC.INP. **Lock input**

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

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

PRG.PRE. 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

MODE Submenu for determining the operation of the outputs.

MODE **Output operation** (→ § 17).

ADD **Count mode ADDING**
Outputs active when count status ≥ preset value.
Reset to zero.

SUB **Count mode SUBTRACTING**
Output 1 active when count status ≤ preset value 1.
Output 2 active when count status ≤ 0.
Reset to preset 2.

ADD.AR **Count mode ADDING with automatic reset**
Output 1 active when count status ≥ 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.

SUB.AR **Count mode SUBTRACTING with automatic reset**
Output 1 active when count status ≤ 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.

ADD.BAT **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 ≥ preset 1.
Manual reset sets both counters to zero.
Electrical reset sets only the main counter to zero.

SUB.BAT **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 ⩾ 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 ⩽ 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 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.

Unit of time
Seconds

Decimal point setting determines the resolution.

Minutes

Decimal point setting determines the resolution.

Hours

Decimal point setting determines the resolution.

Hrs. Min. Sec

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

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

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.

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 ⩾ Preset 1.
SUB mode output operations: permanent signal at Output 1, becomes active when count ⩽ Preset 1.

ADD mode output operations: permanent signal at Output 1, becomes passive when count ⩾ Preset 1.
SUB mode output operations: permanent signal at Output 1, becomes passive when count ⩽ Preset 1.

ADD mode output operations: timed signal at Output 1, becomes active when count ⩾ Preset 1 (activation only in positive direction).
SUB mode output operations: timed output at Output 1, becomes active when count ⩽ Preset 1 (activation only in negative direction).

ADD mode output operations: timed signal at Output 1, becomes passive when count ⩾ Preset 1 (deactivation only in positive direction).
SUB mode output operations: timed output at Output 1, becomes passive when count ⩽ Preset 1 (deactivation only in negative direction).

7.8.5.5 Submenu for Preset 1

Submenu Preset 1.

ADD mode output operations: timed signal at Output1, be-

comes active with positive direction and when count ≥ Preset 1 and subsequently active with negative direction and when count ≤ Preset 1.
SUB mode output operations: timed signal at Output 1, becomes active with negative direction and when count ≤ Preset 1 and subsequently active with positive direction and when count ≥ Preset 1.

ADD mode output operations: timed signal at Output1, becomes passive with positive direction and when count ≥ Preset 1 and subsequently passive with negative direction and when count ≤ Preset 1.
SUB mode output operations: timed output at Output 1, becomes passive with negative direction and when count ≤ Preset 1 and subsequently passive with positive direction and when count ≥ 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

Output signal

ADD mode output operations: permanent signal at Output 2, becomes active when count ≥ Preset 2.
SUB mode output operations: permanent signal at Output 2, becomes active when count ≤ zero.

ADD mode output operations: permanent signal at Output 2, becomes passive when count ≥ Preset 2.
SUB mode output operations: permanent signal at Output 2, becomes passive when count ≤ zero.

ADD mode output operations: timed signal at Output 2, becomes active when count ≥ Preset 2 (activation only in positive direction).
SUB mode output operations: timed signal at Output 2, becomes active when count ≤ zero (activation only in negative direction).

ADD mode output operations: timed signal at Output 2, becomes passive when count ≥ Preset 2 (deactivation only in positive direction).
SUB mode output operations: timed signal at Output 2, becomes passive when count ≤ zero (deactivation only in negative direction).

ADD mode output operations: timed signal at Output 2, becomes active with positive direction and when count ≥ Preset 2 and subsequently with negative direction and when count ≤ Preset 2.
SUB mode output operations: timed signal at Output 2, becomes active with negative direction and when count ≤ zero and subsequently with positive direction and when count ≥ zero.

ADD mode output operations: timed signal at Output 2, becomes passive with positive direction and when count ≥ Preset 2 and subsequently with negative direction and when count ≤ Preset 2 .
SUB mode output operations: timed signal at Output 2, becomes passive with negative direction and when count ≤ zero and subse-

quently with positive direction and when count ≥ zero.

T.OUT2 **Duration of timed signal of Output 2**

00.01 programmable from 00.01 to 99.99 sec.
Timed signal is post-triggered.

Active:
Relays are activated when the preset value is reached.

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

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

8 Operation

8.1 Switching the display during operation

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.

t = 2 sec

ACTUAL Main counter.

BATCH Batch counter.

TOTAL Total counter.

PRES.1 Preset 1.

PRES.2 Preset 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 (→ § 8.1).

Select the decade using the RIGHT key or the LEFT key.

206489 The corresponding decade flashes.

Set the count value using the UP key or the DOWN key.

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

1. In the programming menu, programme MPI input 1 or MPI input 2 (MP.INP.1 / MP.INP.2) to ***TEACH***.
2. In operating mode, select the preset to be changed PRES1 or PRES2.
3. 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.

→ § 9 "Error messages".

The preset value can subsequently be further modified via the keypad. If preset entry is inhibited (→ § 8.2.1 "note"), 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.

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.

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

↳ For add. output operations the pulse counter or timer will be set to the ***SETPT*** 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***.

→ § 9 "Error messages".

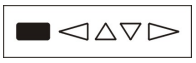
8.4 Default Parameters

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.

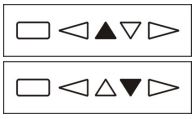
8.4.1 Entry into the default setting

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

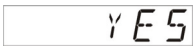
The security prompt appears in the display.



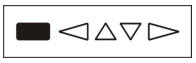
Programming can be exited again using the ENTER key.



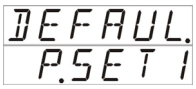
Press the UP key or the DOWN key to continue with the programming.



The security prompt YES appears in the display.

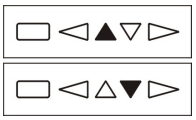


Enter the default menu by pressing the ENTER key.



The parameter set last programmed appears in the display.

8.4.2 Selecting the parameter sets



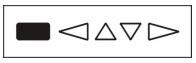
The parameter sets are selected using the UP key and the DOWN key.

Default parameter set 1.

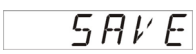
Default parameter set 2.

Default parameter set 3.

8.4.3 Accepting the setting



M Pressing the ENTER key accepts the current setting and returns to the operating mode.



The text SAVE is shown in the display for 2 sec.

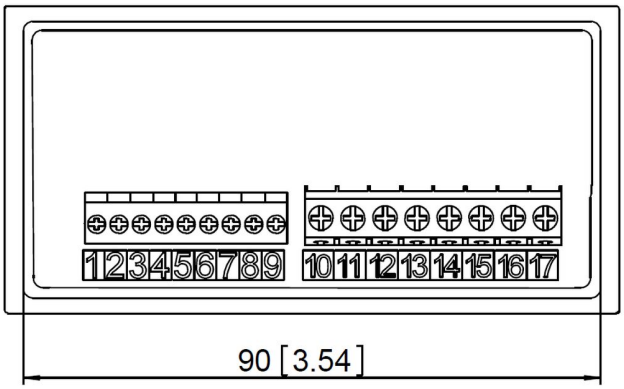
8.4.4 Parameter Set Table

	P.SET1	P.SET2	P.SET3
HLP.TXT.	ON	ON	ON
SL.LANG.	EN	EN	EN
FUNCT	TACHO	TACHO	TACHO
INP.POL.	NPN	NPN	PNP
FILTER	OFF	OFF	OFF
TAC.INP	A	A	A
MP.INP.1	LATCH	LATCH	LATCH
MP.INP.2	TEACH	TEACH	TEACH
LOC.INP.	PRG.PRE	PRG.PRE	PRG.PRE
MODE	ADD	SUB	TRAIL
FACTOR	00.1000	00.1000	00.1000
TMODE	MIN-1	MIN-1	MIN-1
DIVISO.	85.5000	20.0000	85.5000
DP	0.0	0.0	0.0
AVG	AVG 20	AVG 20	AVG 20
START	00.0	00.0	00.0
WAIT	00.5	00.5	00.5
PRES.1	ON	ON	ON
PR.OUT1			
T.OUT1			
PR.OUT2			
T.OUT2			

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

10 Connections



10.1 Signal and Control Inputs

N°	Designation	Function
1	INP A	Signal input A
2	INP B	Signal input B
3	RESET	Reset input
4	LOCK	Keypad lock
5	GATE	Gate input
6	MPI 1	User input 1
7	MPI 2	User input 2
8	AC: 24 VDC/80 mA DC: U_B durchge-schleift	Sensor supply voltage
9	GND (0 VDC)	Common connection Signal and Control inputs

10.2 Supply Voltage and Outputs

N°	Designation	Function
10	Relay contact C.2	Output 2
11	Relay contact N.O.2	
12	Relay contact N.C.2	
13	Relay contact C.1	Output 1
14	Relay contact N.O.1	
15	Relay contact N.C.1	
16	AC: 100...240 VAC ±10 % DC: 10..30 V_{DC}	Supply voltage
17	AC: 100...240 VAC ±10 % DC: GND (0 V_{DC})	Supply voltage

11 Technical Data

General Data

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

Pulse Counter

Count frequency	max. 55 kHz (→ § 13 "Frequencies - typical")

Response time of the outputs:

Add;Sub;Trail	< 13 ms
With automatic repeat	< 13 ms
A/B ; (A-B)/A	< 34 ms

Tacho/Frequency Meter

Frequency range	Frequency range (→ § 13 "Frequencies typical"
Measuring principle	≤ 76.3 Hz Periodic time > 76.3 Hz Gate time Gate time approx. 13,1 ms
Measuring error	< 0,1% per channel

Response time of the outputs:

1- channel operation	< 100 ms @ 40 kHz < 350 ms @ 65 kHz
2- channel operation	< 150 ms @ 40 kHz < 600 ms @ 65 kHz

Zeitzähler

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	500 µs
Measuring error	< 100 ppm
Output response time	< 13 ms

Signal and Control Inputs

SELV circuits, reinforced / double insulation

Polarity	programmable NPN / PNP for all inputs in common
Input resistance	5 kΩ
Pulse shape	any

Switching level with AC supply:

HTL level	Low: 0 ... 4 V_{DC} High: 12 ... 30 V_{DC}
4...30 V_{DC} level	Low: 0 ... 2V_{DC} High: 3.5 ... 30 V_{DC}

Switching level with DC supply:

HTL level	Low: 0 ... 0,2 x UB High: 0.6 x UB ... 30 V_{DC}
4...30 V_{DC} level	Low: 0 ... 2 V_{DC} High: 3.5 ... 30 V_{DC}

Minimum pulse length	
of the Reset input	1 ms
of the Control inputs	10 ms

Output 1 / Output 2

Relays with changeover contacts

Prescribed fuse:	3A
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

⚠ The maximum values shall in no case be exceeded!

Mechanical service life (switching cycles)	$20x10^6$
N° of switching cycles at 3 A/250 V_{AC}	$5x10^4$
N° of switching cycles at 3 A/30 V_{DC}	$5x10^4$

Supply Voltage

AC supply	100 ... 240 V_{AC} / max. 11 VA 50/ 60 Hz, Tolerance ±10% ext. fuse protection: T 0,1 A
DC supply	10 ... 30 V_{DC}/ max. 5,5 W reverse polarity protection, SELV, CLASS II (Limited Power Source) ext. fuse protection T 0,25 A

Sensor Supply Voltage

(Voltage output for external sensors)
SELV circuits, reinforced / double insulation for

AC supply	24 V_{DC} ±15%, 80 mA
DC supply	max. 80 mA, ext. voltage supply is connected through

Climatic Conditions

Operating temperature	-20°C ... +65°C
Storage temperature	-25°C ... +75°C
Luftfeuchtigkeit (r.F.)	93% at +40°C, non-condensing
Altitude	up to 2000 m

EMC

Noise immunity	EN61000-6-2 with shielded signal and control cables
Noise emission	EN55011 Class B

Device Safety

Design to	EN61010 Part1
Protection Class	Protection Class 2 (front side)

⚠ Only the front side is classified as accessible for the operator!

Application area	Pollution level 2 Overvoltage category II
Insulation:	
- Front	Double insulation
- Rear side	Basic insulation

Signal inputs and und sensor power supply: SELV

Mechanical Data

Housing	Panel-mount housing to DIN 43 700, RAL 7021
Dimensions	96 x 48 x 102 mm
Panel cut-out	$92^{+0,8}$ x $45^{+0,6}$ mm
Installation depth	approx. 92 mm incl. terminals
Weight	approx. 180 g
Degree of protection	IP 65 (front, device only)
Housing material	Polycarbonate UL94 V-2
Vibration resistance:	
EN60068-2-6	10 - 55 Hz / 1 mm / XYZ 30 min. in each direction
Shock resistance:	
EN60068-2-27	100G / XYZ 3 times in each direction
EN60068-2-29	10G / 6 ms / XYZ 2000 times in each direction

Connections

Supply voltage and outputs:
Plug-in screw terminal, 8-pin, RM 5.00
Core cross - section, max. 2.5 mm²
Signal- und Steuereingänge:
Plug-in screw terminal, 9-pin, RM 3.50
Core cross - section, max. 1.5 mm²

12 Scope of Delivery

Panel mounting display VA3K01.
Mounting clip.
Operating manual.

13 Frequencies (typical)

NOTE: Switching levels of the inputs

Switching levels with AC supply:

HTL level	Low:	0 ... 4 V_{DC}
	High:	12 ... 30 V_{DC}
4...30 V_{DC} level	Low:	0 ... 2 V_{DC}
	High:	3.5 ... 30 V_{DC}

Switching levels with DC supply:

HTL level	Low:	0 ... 0,2 x UB
	High:	0.6 x UB ... 30 V_{DC}
4...30 V_{DC} level	Low:	0 ... 2 V_{DC}
	High:	3.5 ... 30 V_{DC}

13.1 Pulse Counter

HTL level, signal shape square wave 1:1

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

	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		

13.2 Frequency Meter

HTL level, signal shape square wave 1:1

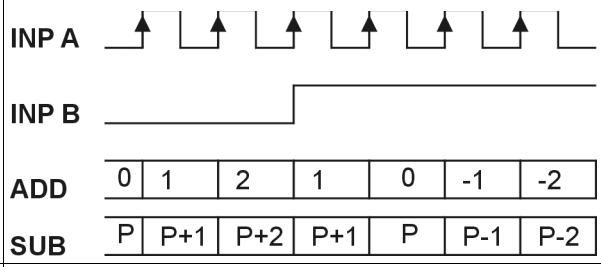
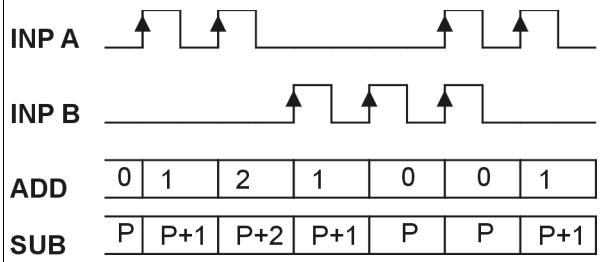
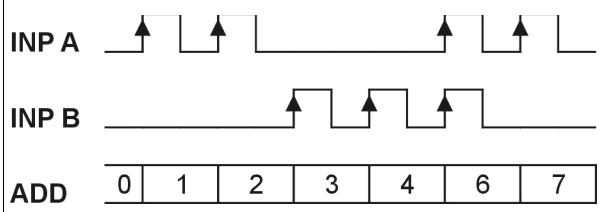
AC supply	typ. Low	2.5 V
	typ. High	22 V
DC supply 12V	typ. Low	2 V
	typ. High	10 V
DC supply 24V	typ. Low	2.5 V
	typ. High	22 V

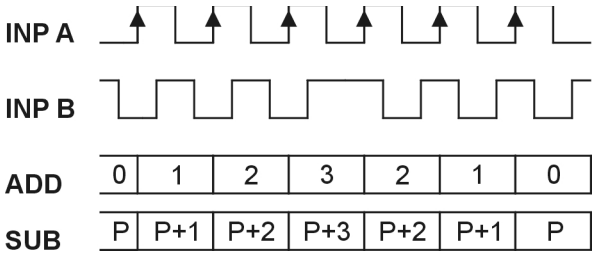
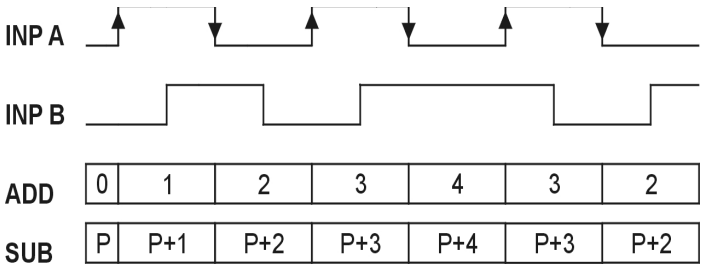
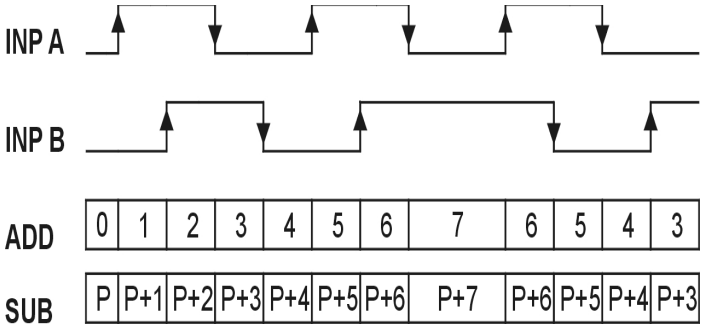
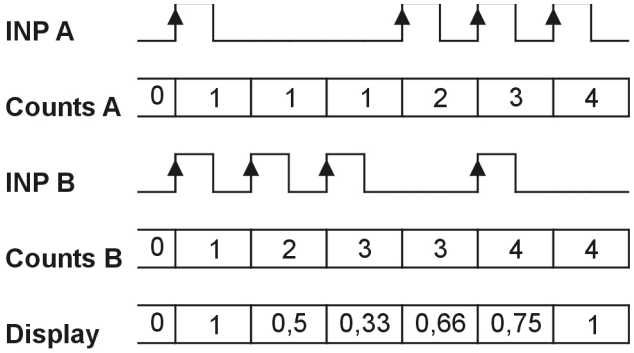
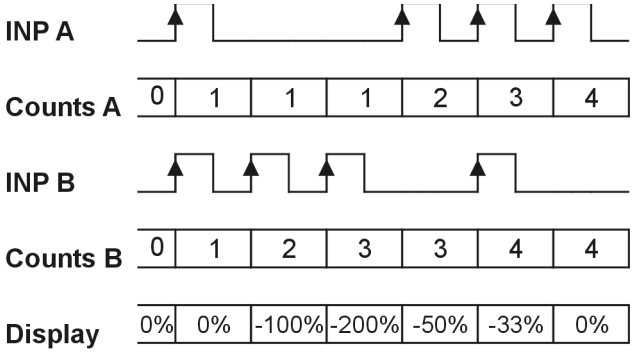
4...30 V_{DC} level, signal shape square wave 1:1

typ.Low	1.0 V
typ. High	4.0 V

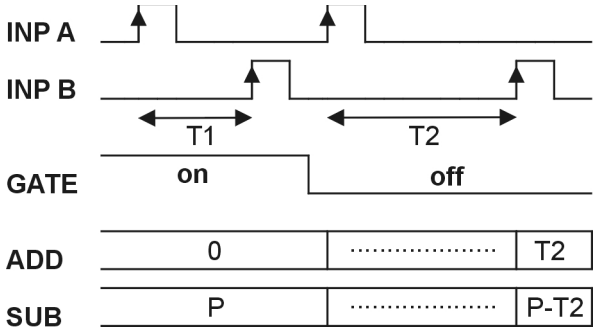
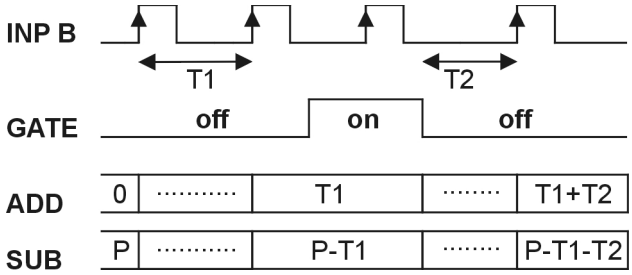
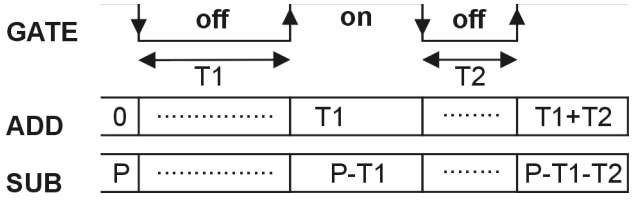
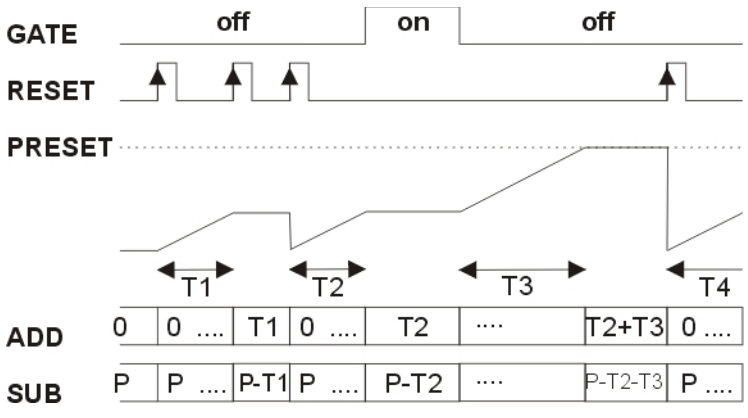
	HTL	5V
A	65 kHz	9 kHz
A – B ; A + B A / B ; (A-B)/A	65 kHz	9 kHz
Quad	30 kHz	9 kHz

14 Input modes: Pulse counting

Function	Diagram Note: No counting when GATE input is active P = Preset	PNP: Count on rising edge NPN: Count on falling edge
CNT.DIR		Inp A: Count input Inp B: Count direction Add: Display 0 --> Preset Sub: Display Preset --> 0
UP.DN		Inp A: Count input add Inp B: Count input sub Add: Display 0 --> Preset Sub: Display Preset --> 0
UP.UP		Inp A: Count input 1 add Inp B: Count input 2 add Add: Display 0 --> Preset

Function	**Diagram** Note: No counting when GATE input is active	PNP: Count on rising edge NPN: Count on falling edge
QUAD		A 90° B Inp A: Count input Count on one edge Inp B: Reverse direction Add: Display 0 --> Preset Sub: Display Preset --> 0
QUAD2		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
QUAD4		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
A / B		Inp A: Count input 1 Inp B: Count input 2 Formula: A / B
A % B		Inp A: Count input 1 Inp B: Count input 2 Formula: (A – B)/A x100

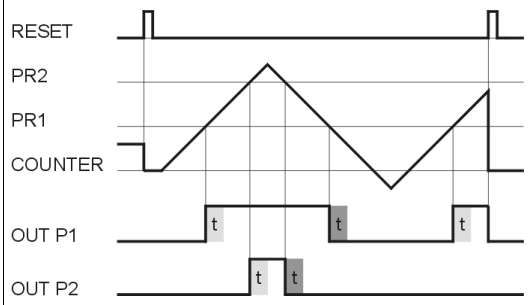
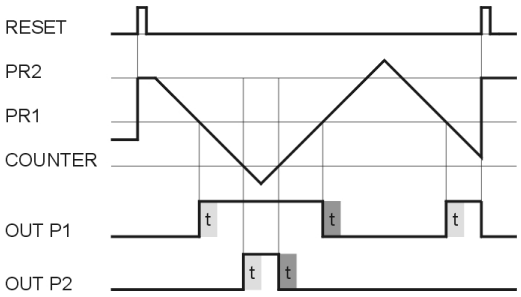
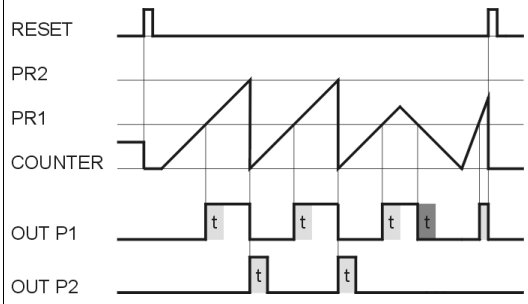
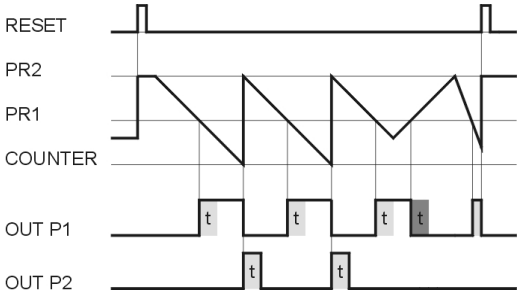
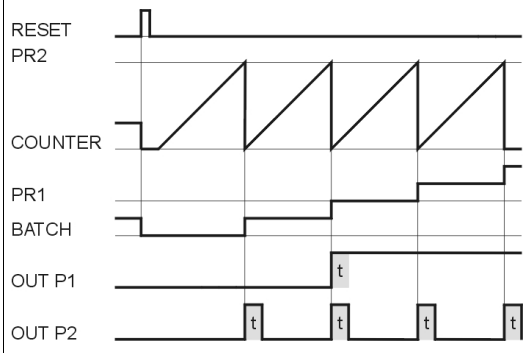
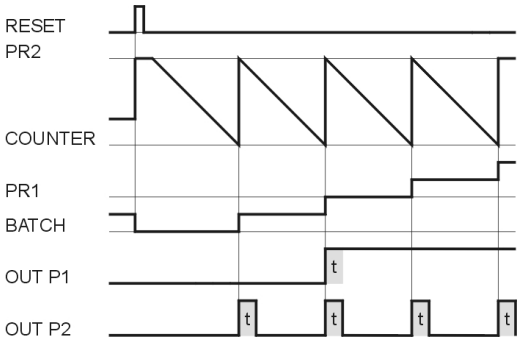
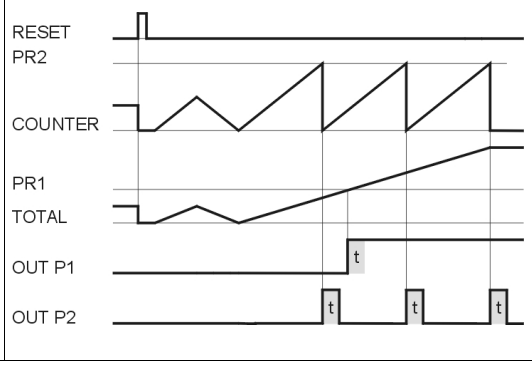
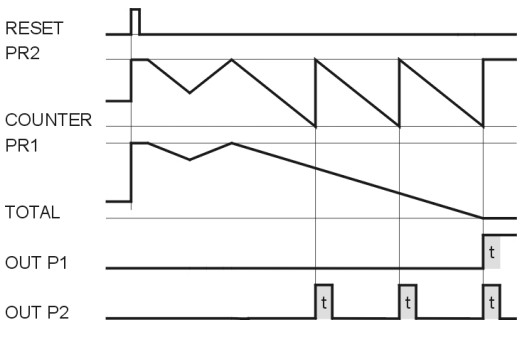
15 Input modes: Timing

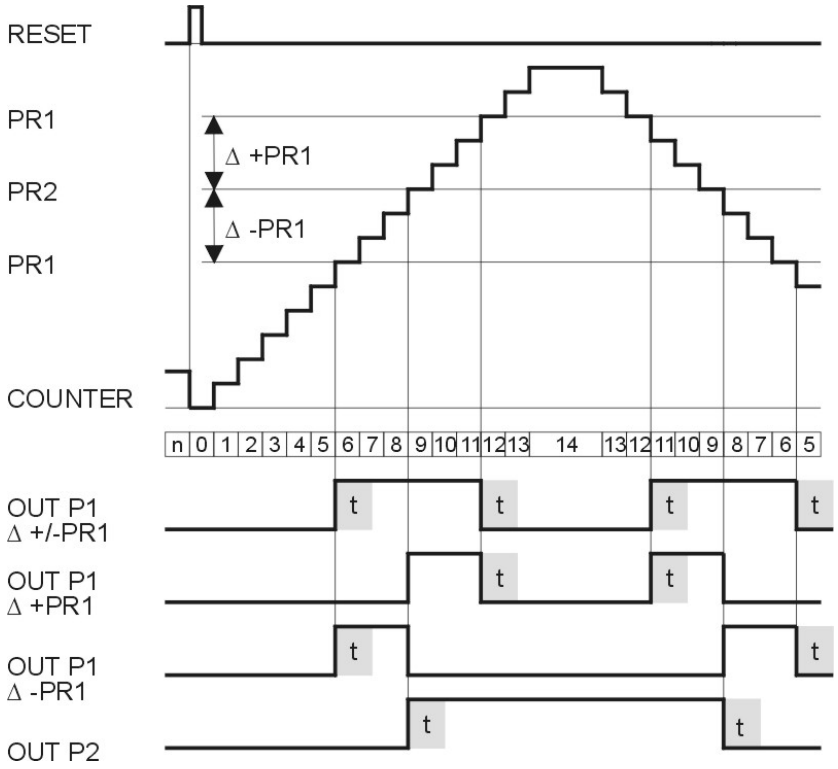
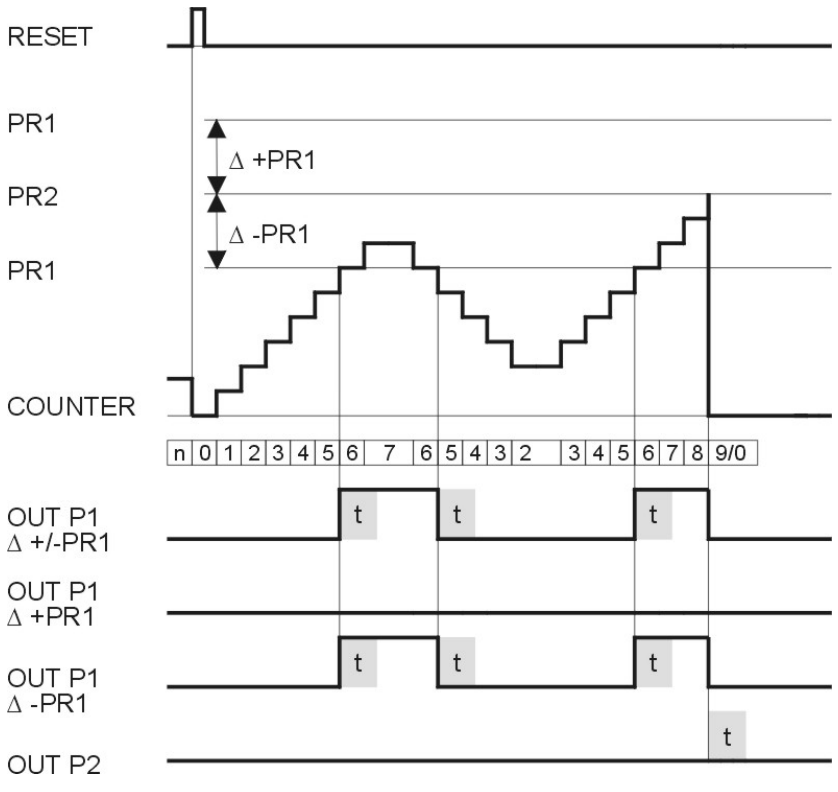
Function	Diagram	PNP: Count on rising edge NPN: Count on falling edge
INA.INB		Inp A: Start Inp B: Stop Add: Display 0 --> Preset Sub: Display Preset --> 0
INB.INB		Inp A: no function Inp B: Start/Stop Add: Display 0 --> Preset Sub: Display Preset --> 0
FREE.RN		Inp A: no function Inp B: no function Control of the timing only via the GATE input Add: Display 0 --> Preset Sub: Display Preset --> 0
AUTO		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

16 Input modes: Frequency meter

Function	Diagram	PNP: Count on rising edge NPN: Count on falling edge
A	**INP A**: 0 | F_{A0} | F_{A1} | F_{A2} | 0 | x **Display**: 0 | 0 | F_{A0} | F_{A1} | F_{A2} | 0	Inp A: Frequency input Inp B: no function
A - B	**INP A**: 0 | F_{A0} | F_{A1} | F_{A2} | 0 | x **INP B**: 0 | 0 | F_{B0} | F_{B1} | F_{B2} | x **Display**: 0 | 0 | F_{A0} | $F_{A0} - F_{B0}$ | $F_{A1} - F_{B1}$ | $- F_{B2}$	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: A - B
A + B	**INP A**: 0 | F_{A0} | F_{A1} | F_{A2} | 0 | x **INP B**: 0 | 0 | F_{B0} | F_{B1} | F_{B2} | x **Display**: 0 | 0 | F_{A0} | $F_{A0} + F_{B0}$ | $F_{A1} + F_{B1}$ | F_{B2}	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: A + B
QUAD	**Inp A** **Inp B** f_{A0} f_{A1} f_{A2} f_{A3} f_{A4} f_{A5} **Display**: 0 | 0 | F_{A0} | F_{A1} | F_{A2} | $- F_{A3}$ | $- F_{A4}$	A 90° B Inp A: Frequency input 1 Inp B: Reverse direction
A / B	**INP A**: 0 | F_{A0} | F_{A1} | 0 | 0 | x **INP B**: 0 | 0 | F_{B0} | F_{B1} | F_{B2} | x **Display**: 0 | 0 | 0 | F_{A0}/F_{B0} | F_{A1}/F_{B1} | 0	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: A / B
A % B	**INP A**: 0 | F_{A0} | F_{A1} | 0 | 0 | x **INP B**: 0 | 0 | F_{B0} | F_{B1} | F_{B2} | x **Display**: 0 | 0 | 100% | $F_{A0}\%F_{B0}$ | $F_{A1}\%F_{B1}$ | 0	Inp A: Frequency input 1 Inp B: Frequency input 2 Formula: (A – B)/A x100

17 Output operations

Mode	Diagram	Mode	Diagram
	t Only in mode and		t Additionally in mode and
ADD		SUB	
ADD.AR		SUB.AR	
ADD.BAT		SUB.BAT	
ADD.TOT		SUB.TOT	

Mode	Diagram
TRAIL	
TR.AR	

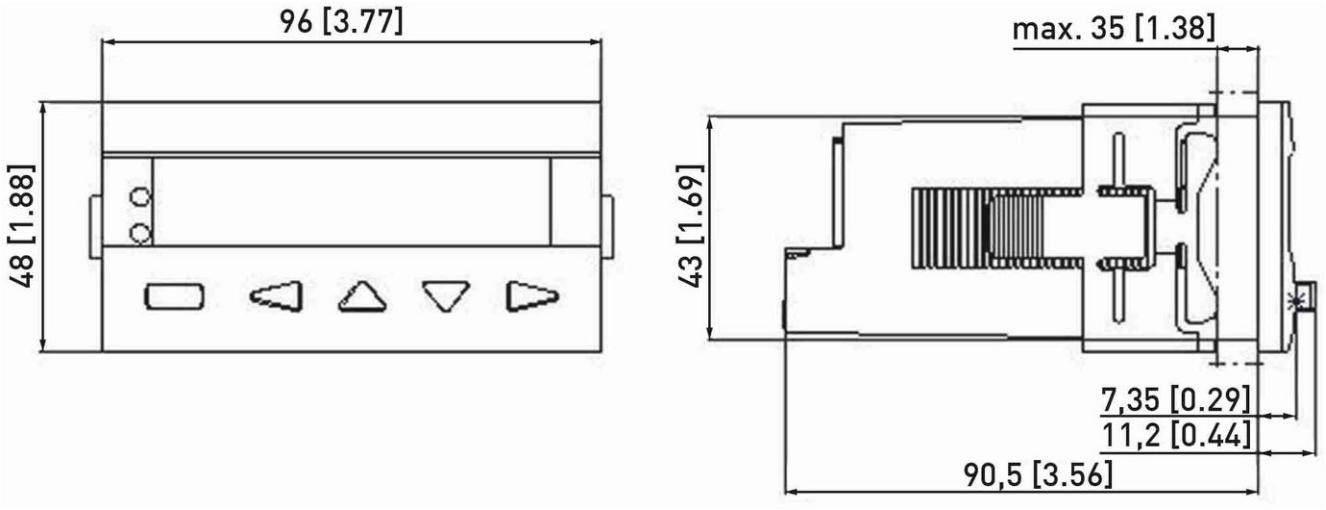
18 Help Texts

Display	Value	Description
PROG.	NO	NO PROGRAMMING
PROG.	YES	START PROGRAMMING
LANGU.		MAIN MENU SELECT LANGUAGE
HLP.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.	PRESET	LOCK EDITING OF PRESETS

Display	Value	Description
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 AUTOMATC 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.	NO.RES.	MAIN MENU RESET MODE
RES.MOD.	MAN.RES.	NO RESET FUNCTION
RES.MOD.	EL.RES.	RESET VIA FRONT BUTTON
RES.MOD.	MAN.EL.	RESET VIA 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

Display	Value	Description
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
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

19 Dimensional Drawings



Panel cut-out: $92^{+0.8}$ x $45^{+0.6}$ [$3.662^{+0.031}$ x $1.722^{+0.024}$]

For your notes

For your notes

Mechanical measuring instruments

Flow measuring instruments

Electronic measuring- & calibration instruments

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