

1. Description

- 6-digit adding/subtracting counter with two presets
- Very bright 8mm high LED display
- Counting and preset range from –199999 to 999999. Overshoots and undershoots up to one decade without loss of pulses. In this case, the display blinks at a 1 Hz frequency.
- Indication of the active outputs and display of the preset by means of LED's
- Programmable as a pulse counter, a frequency meter/speed indicator or a time counter/operating time counter
- Relay or optocoupler outputs
- Programming of the functions and of the operating parameters by means of the push buttons. Operator guidance by the display while programming
- Can be programmed:
 - Operating mode (output signal at 0 or at the preset value, with or without automatic repetition)
 - Reset by means of push-button or Reset input
 - Polarity of the inputs (npn or pnp)
 - Input mode and scale factor
 - Decimal point
 - Output signals in the shape of a positive or negative, timed or continuous signal
 - Frequency meter/speed indicator display in 1/s or 1/min
 - Time counter/operating time counter resolution in s, min, h or h:min:s, 1, 0.1, 0.01 or 0.001
 - Start and stop with the time counter/operating time counter
- Supply voltage
 - 90..250 VAC
 - 10..30 VDC
- Optional serial interface
 - RS232 or
 - RS422 or
 - RS485

2. Inputs

2.1 INP A, INP B

Counting inputs. Their function depends on the selected input mode. The maximum counting frequency of 20 kHz can be reduced to 30 Hz by programming.

2.2 GATE

Static gate input. Function depending on the programmed operating mode.

Pulse counter mode:

No counting if the input is ON.

Time counter mode:

Counting programmable for input ON (gate.lo) or OFF (gate.hi). The decimal point of the lowest decade blinks to indicate that the counting is running.

2.3 RESET

Dynamic reset input. Resets the counter to zero when counting up, and sets it to the preselected value when counting down. The reset input can be inhibited in the Setup.

2.4 KEY

Static key locking input. The presets cannot be modified as long as this input is ON. It is however still possible to switch the display between the counting value and the presets.

3. Outputs

3.1 Output 1

Potential-free opening or closing relay, or optocoupler with open emitter and collector.

3.2 Output 2

Potential-free change-over relay or optocoupler with open emitter and collector.

3.3 Active outputs

The active output is indicated by a status LED. The outputs can be reversed in case of safety circuits, i. e. voltage to the relay coils is cut off or the optocouplers block when the preset values are reached.

Caution:

In all modes with automatic repetition (AddAr, SubAr) the duration of the pulse is to be programmed for the timed signal of output 2, otherwise this signal will have no defined duration.

4. Setting of the operating parameters

- Press push-button "P" and apply power to the device.
- The display shows the message:

Prog

- When the push-button is released, the title of the menu and the current values of its parameters are displayed in one-second periods. Press the "←" key to interrupt the scrolling and display only the current parameters.
- Press the "↑" key to jump to the following value of the parameter currently being set.
- Press the "P" key to accept the value of the parameter currently being and switch over to the following menu item.
- The last parameter of the setting menu, "EndPro" allows, selecting "YES", to leave the programming menu and to take over (to save) the new values. If "NO" is selected, the programming routine starts again from the beginning, keeping the last input values. They can then be checked and modified again.
- For the setting of the numerical values, like for instance the scale factor, see also 6. *Setting of the preset.*

5. Programming mode

Mode

The first parameter of the menu is the selection of the operating mode.

Count

Mode pulse counter. See 5.1.

Timer

Mode time counter. See 5.2.

Fcho

Mode frequency meter. See 5.3.

5.1 Pulse counter mode setting

5.1.1 Sub-operating mode

Mode

Add

Adding
Outputs active at count value \geq preset
Resetting to zero

Sub

Subtracting
Output 1 active at count value \leq preset 1
Output 2 active at count value ≤ 0
Resetting to preset 2

AddAr

Adding
Outputs active at count value \geq preset
Automatic reset to zero at count value = preset 2
Resetting to zero

SubAr

Subtracting
Output 1 active at count value \leq preset 1
Output 2 active at count value = 0
Automatic positioning to preset 2 at count value = 0
Resetting to preset 2

5.1.2 Polarity of the inputs

InPol

nPN

nPN: switching to 0 V

PNP

PNP: switching to +24 V

5.1.3 Activation of the 30 Hz filter

Filter

off

max. counting frequency: 20 kHz

on

max. counting frequency: 30 Hz

5.1.4 Input modes

Input

CntDir

Counting and counting direction inputs
INP A: counting input
INP B: counting direction input

uP.dn

Differential counting input
INP A: adding counting input
INP B: subtracting counting input

QuAd

Phase discriminator
INP A: 0° counting input
INP B: 90° counting input

QuAd 2

Phase discriminator with multiplication of the pulses by two
INP A: 0° counting input
INP B: 90° counting input
Each INP A pulse edge is considered

5.1.5 Setting of the scale factor

Factor

000001

Scale factor setting range from 00.0001 to 99.9999. Fixed decimal point set to 4 decimal places.

999999

A "0" setting is not accepted.

5.1.6 Decimal point setting

dP

The decimal point determines the number of decimal places displayed. It is only used for displaying purposes and has no influence on the counting.

0

0 no decimal place
0.0 one decimal place
0.00 two decimal places
0.000 three decimal places

0.000

5.1.7 Resetting mode

rESEt

MANuEL

Manual (using the red push-button) and electrical resetting

no rES

No resetting possible (red push-button and reset input idle)

ELEctr

Only electrical resetting

MANu

Only manual resetting

5.1.8 Preset 1

PrES 1

on

Preset 1 activated

off

Preset 1 deactivated and without function

5.1.9 Shape of output 1 (only if preset 1 is activated)

Out 1

--r--

Permanent signal of output 1, activated at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

--L--

Permanent signal of output 1, will become passive at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

--u--

Timed signal of output 1 will become passive at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

--n--

Timed signal. of output 1 is activated at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

5.1.10 Duration of the transient output 1 (only if a timed signal has been programmed in 5.1.9)

Out 1

00.01

The duration can be set between 0.01 sec. and 99.99 sec.

99.99

A 0.00 setting is not accepted

5.1.11 Shape of output signal 2

Out 2

--r--

Permanent signal of output 2, activated at count value \geq preset 2 in adding mode and at count value \leq 0 in subtracting mode

--L--

Permanent signal of output 2, will become passive at count value \geq preset 2 in adding mode and at count value \leq 0 in subtracting mode

--u--

Timed signal of output 2 will become passive at count value \geq preset 2 in adding mode and at count value \leq 0 in subtracting mode

--n--

Timed signal. of output 2 is activated at count value \geq preset 2 in adding mode and at count value \leq 0 in subtracting mode

5.1.12 Duration of the timed signal of output 2 (only if a timed signal has been programmed in 5.1.11)

Out 2

00.01

The duration can be set between 0.01 sec. and 99.99 sec.

99.99

A 0.00 setting is not accepted

5.1.13 End of programming

EndPro

no

Programming is carried out once more. The values input can be checked and modified.

YES

Programming is complete and the values input are taken over as new parameters. Then the device is ready for operation.

5.2 Time meter mode setting

5.2.1 Sub operating mode

SPMode

Add

Adding
Outputs active at count value \geq preset
Resetting to zero

Sub

Subtracting
Output 1 active at count value \leq preset 1
Output 2 active at count value \leq 0
Resetting to preset 2

AddAr

Adding
Outputs active at count value \geq preset
Automatic reset to zero at count value = preset 2
Resetting to zero

SubAr

Subtracting
Output 1 active at count value \leq preset 1
Output 2 active at count value = 0
Automatic positioning to preset 2 at count value = 0
Resetting to preset 2

5.2.2 Polarity of the inputs

InPol

nPn

npn: switching to 0 V

pnp

pnp: switching to +24 V

5.2.3 Activation of the 30 Hz filter

Filter

off

Electronic input driving

on

Mechanical input driving

5.2.4 Start and stop of time counting

Start

Inb.Inb

A pulse on INP B starts the counting, the following pulse on INP B stops it (raising pulse edge for pnp, descending pulse edge for npn).

InA.Inb

A pulse on INP A starts the counting, a pulse on INP B stops it (raising pulse edge for pnp, descending pulse edge for npn).

Free run

The counting can only be controlled by means of the GATE input. INPA and INP B have no function.

Auto

The counter is reset by a reset signal (manual or electrical) (to 0 when adding, to preset 2 when subtracting), then counting starts. Counting is stopped when the adding counting reaches preset 2 or when the subtracting counting reaches 0. A reset signal during counting also stops the counting. INP A and INP B have no function.

5.2.5 Operation of the GATE input

GATE

LoActi

Counting runs when the GATE input is OFF.

hiActi

Counting runs when the GATE input is ON.

5.2.6 Counting unit

SPMode

SEC

Counting unit: seconds (the setting of the decimal point determines the resolution).

min

Counting unit: minutes (the setting of the decimal point determines the resolution).

hour

Counting unit: hours (the setting of the decimal point determines the resolution).

h.min.s

Counting unit: hours:minutes:seconds (the setting of the decimal point is ignored).

5.2.7 Decimal point setting

dp

The decimal point determines the number of decimal places displayed. It is only used for displaying purposes and has no influence on the counting.

0

0 no decimal place

0.000

0.0 one decimal place

0.00 two decimal places

0.000 three decimal places

5.2.8 Resetting mode

reset

manuel

Manual (using the red push-button) and electrical resetting

no res

No resetting possible (red push-button and reset input idle)

electr

Only electrical resetting

manu

Only manual resetting

5.2.9 Preset 1

Pres 1

on

Preset 1 activated

off

Preset 1 deactivated and without function

5.2.10 Shape of output 1 (only if preset 1 is activated)

Out 1

--r--

Permanent signal of output 1, activated at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

--L--

Permanent signal of output 1, will become passive at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

--u--

Timed signal of output 1 will become passive at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

--n--

Timed signal of output 1 is activated at count value \geq preset 1 in adding mode and at count value \leq preset 1 in subtracting mode

5.2.11 Duration of the timed signal of output 1 (only if a timed signal has been programmed in 5.2.10)

Out 1

00.01

The duration can be set between 0.01 sec. and 99.99 sec.

99.99

A 0.00 setting is not accepted

5.2.12 Shape of output signal 2

Out 2

--r--

Permanent signal of output 2, activated at count value \geq preset 2 in adding mode and at count value ≤ 0 in subtracting mode

--L--

Permanent signal of output 2, will become passive at count value \geq preset 2 in adding mode and at count value ≤ 0 in subtracting mode

--u--

Timed signal of output 2 will become passive at count value \geq preset 2 in adding mode and at count value ≤ 0 in subtracting mode

--n--

Timed signal of output 2 is activated at count value \geq preset 2 in adding mode and at count value ≤ 0 in subtracting mode

5.2.13 Duration of the timed signal of output 2 (only if a timed signal has been programmed in 5.2.12)

Out 2

00.01

The duration can be set between 0.01 sec. and 99.99 sec.

99.99

A 0.00 setting is not accepted

5.2.14 End of programming

EndPro

no

Programming is carried out once more. The values input can be checked and modified.

YES

Programming is complete and the values input are taken over as new parameters. Then the device is ready for operation.

5.3 Speed indicator / frequency meter mode setting

In the speed indicator / frequency meter mode, inputs INP B, RESET and GATE have no function.

5.3.1 Polarity of the inputs

InPol

nPn

npn: switching to 0 V

PnP

pnp: switching to +24 V

5.3.2 Activation of the 30 Hz filter

Filter

off

max. counting frequency: 20 kHz

on

max. counting frequency: 30 Hz

5.3.3 Setting of the scale factor

Factor

00.0001

Scale factor setting range from 00.0001 to 99.9999. Fixed decimal point set to 4 decimal places.

99.9999

A "0" setting is not accepted.

5.3.4 Decimal point setting

dP

The decimal point determines the number of decimal places displayed. It is only used for displaying purposes and has no influence on the counting.

0

0 no decimal place

0.0 one decimal place

0.00 two decimal places

0.000 three decimal places

0.000

5.3.5 Display mode

diSPn1

5EE - 1

Conversion and display of the frequency / speed in 1/sec.

PPn - 1

Conversion and display of the frequency / speed in 1/min.

5.3.6 Maximum pulse waiting time

This value indicates the time during which the device will wait for a pulse before displaying a 0 speed.

WART0

011

Maximum delay 01.1 sec. (minimum value)

999

Maximum delay 99.9 sec.

Values below 1.1 sec. are ignored and set automatically to 1.1 sec.

5.3.7 Preset 1

PRE5 1

on

Preset 1 activated

off

Preset 1 deactivated and without function

5.3.8 Shape of output 1 (only if preset 1 is activated)

Out 1

--f--

Permanent signal. Is activated at count value \geq preset 1.

--L--

Permanent signal. Will become passive at count value \geq preset 1.

--U--

Timed signal. Will become passive at count value \geq preset 1.

--n--

Timed signal. Is activated at count value \geq preset 1.

5.3.9 Duration of the timed signal of output 1 (only if a timed signal has been programmed in 5.3.8)

Out 1

0001

The duration can be set between 0.01 sec. and 99.99 sec.

9999

A 0.00 setting is not accepted

5.3.10 Shape of output signal 2

Out 2

--f--

Permanent signal. Is activated at count value \geq preset 2.

--L--

Permanent signal. Will become passive at count value \geq preset 2.

--U--

Timed signal. Will become passive at count value \geq preset 2.

--n--

Timed signal. Is activated at count value \geq preset 2.

5.3.11 Duration of the timed signal of output 2 (only if a transient signal has been programmed in 5.3.10)

Out 2

0001

The duration can be set between 0,01 sec. and 99,99 sec.

9999

A 0.00 setting is not accepted

5.3.12 End of programming

EndPro

no

Programming is carried out once more. The values input can be checked and modified.

yes

Programming is complete and the values input are taken over as new parameters. Then the device is ready for operation.

6. Setting of the presets

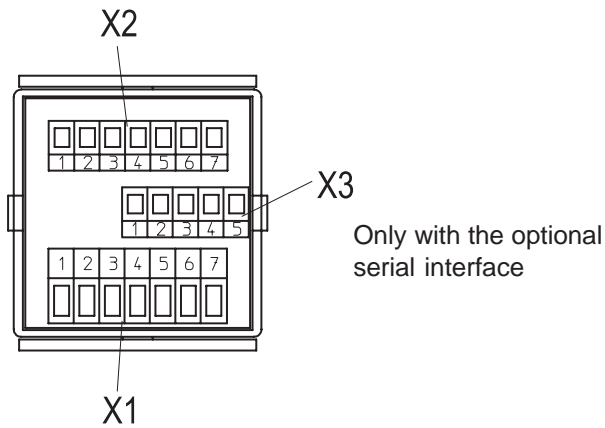
If a push-button with an arrow or the "P" push-button is pressed, the device jumps from the display of the counter to the display of the preset 1. A second operation of push-button "P" switches to the preset 2. About 4 seconds after the last operation of a push-button the device jumps back to the display of the counter and takes over a new preset value.

Exception: in the time counter mode, the new value is taken over immediately.

Once the preset is displayed, the "←" push-button allows to choose the decade to be modified. This decade then blinks at a 1 Hz frequency. The "↑" push-button allows you to raise the value of the decade. On the most significant decade, after the value "9", the sign "-" is displayed. The following operation of the "↑" push-button displays "-1" again. A new operation of the "↑" push-button lets the display of this decade start again at "0".

Caution: in case of automatic repetition, preset 2 cannot be given negative values.

7. Connections



7.1 Terminal assignment X1

Supply voltage and outputs

Terminal No	AC versions	10..30 VDC versions
1	Output 1 – Relay contact Collector when optocoupler output	
2	Output 1 – Relay contact Emitter when optocoupler output	
3	Output 2 Common relay contact (C) Emitter when optocoupler output	
4	Output 2 Relay Closing contact (NO)	
5	Output 2 Relay with opening contact (NC) Collector when optocoupler output	
6	Supply voltage 90..250 VAC	10..30 VDC Operating voltage
7	Supply voltage 90..250 VAC	0 VDC (GND)

Attention: In case of a \overline{L} and a \overline{H} setting (reversed relay control), the connections of terminals 4 and 5 are reversed:

Terminal No	AC and DC versions
4	Opening contact relay (NC)
5	Closing contact relay (NO)

7.2 Terminal assignment X2

Inputs

Terminal No.	Designation	AC versions	10..30 VDC versions
1	+24 VDC	Sensor supply voltage	Not connected
2	0 VDC (GND)	Reference voltage	Not connected
3	INP A	Counting input A	
4	INP B	Counting input B	
5	RESET	Reset input	
6	GATE	GATE input	
7	KEY	Push-button locking input	

8. Technical characteristics

Supply voltage: 90..250 VAC, 5VA max. or
10..30 VDC, 1W max.

Display: 6 digits, red 7-segment
LED's, display height 8 mm

Polarity of the input signals:
programmable in common for
all inputs (npn or pnp).

Input resistance: approximately. 10 kW

Counting frequency:
20 kHz (10 kHz with phase
discriminator), can be reduced to
30 Hz. In case of automatic
repetition, 1.2 kHz without loss of
pulses (700 Hz with phase
discriminator and pulse multiplication
by 2).

Minimum pulse duration for control inputs:
5 ms

Input switching level:
With AC supply voltage:
log."0": 0..4 VDC
log."1": 12..30 VDC

With DC supply voltage:
log."0": $0..0,2 \times U_B$
log."1": $0,6 \times U_B..30 \text{ V DC}$

Pulse shape: any shape (Schmitt trigger inputs)

Accuracy in the frequency meter/speed indicator mode:
< 0,1 %

Accuracy in the time counter / operating time counter mode:
 $\pm 50 \text{ ppm}$

Output 1: Relay with potential-free
make or break contact,
programmable as opening or closing
contact.
Switching voltage max. 250 VAC /
125 VDC. Switching current max. 3A
Switching current min. 30 mA DC
Switching power 90 W / 750 VA
or npn optocoupler with open
collector and emitter
Switching power: 30 VDC / 15 mA
 U_{CESAT} for $I_C = 15 \text{ mA}$: max. 2.0 VDC
 U_{CESAT} for $I_C = 5 \text{ mA}$: max. 0.4 VDC

Output 2: Relay with potential-free change-over
contact, programmable as
opening or closing contact.
Switching voltage max. 250 VAC /
300 VDC.
Switching current max. 3A
Switching current min. 30 mA DC
Switching power 50 W / 2000 VA

or npn optocoupler with open collector and emitter
 Switching power: 30 VDC / 15 mA
 U_{CESAT} for $I_C = 15$ mA: max. 2.0 VDC
 U_{CESAT} for $I_C = 5$ mA: max. 0.4 VDC

Outputs response time:
 Relay: approx. 7 ms
 Optocoupler: approx. 2 ms

Data storage: at least 10 years or 10^6 recording cycles (switching on and off the device)

Sensor supply voltage:
 +24 VDC \pm 15 % / 100 mA with AC power supply

Fuses: recommended external fuses:
 for DC: 0.125 A time-delay fuse
 for AC: 0.1 A time-delay fuse

Interference immunity:
 EN 55011 class B and EN 50082-2 with shielded control cables.

Operating temperature:
 -10°C..+50°C

Storage temperature:
 -25°C..+70°C

Weight: approx. 200 g (AC version with relay)

Protection: IP 65 (front side)

Housing colour: dark grey

Cleaning: The front side of the device must be cleaned only with a damp soft cloth.

9. Delivery specification

- Counter 717
- Screw terminal (7 poles) pitch 5,08 mm.
- Screw terminal (7 poles) pitch 3,81 mm.
- Frame for screw mounting, opening 50 x 50 mm
- Frame for clamp mounting, opening 50 x 50 mm
- Clamp
- With the serial interface option: screw terminal (5 poles) Pitch 3,81 mm.

10. Order code

6.717.01X.XXX

Option

00 = none

05 = RS232 serial interface

06 = RS422 serial interface

07 = RS485 serial interface

Supply voltage

0 = 90..250 VAC

3 = 10..30 VDC

Outputs

0 = relay

1 = optocoupler

11. Dimensions

