Operating instruction MG-XF

Frequency measuring, 4- or 6-digit

Panel instrument – type MG-BF

Wall-mounted instrument – type MG-AF

Contents

1. Brief description

With the **MG-XF**, you can record, calculate and display in scaled form up to two frequencies of 0.01 Hz… 100 kHz. With single-channel use, you can, if you wish, tare the display value, or display it as a reciprocal, linearise it via 10 set points, or use it as a frequency divider. Threshold values can be monitored via the two digital outputs.

2. Safety instructions

Please read the users guide before installation and keep it for future reference.

2.1. Proper use

The **MG-XF** is designed for registering and displaying pulses of max. 30 V.

Danger! Careless use or improper operation can result in personal injury and/or damage to the equipment.

2.2. Control of the device

The devices are checked before dispatch and sent out in perfect condition. Should there be any visible damage, we recommend close examination of the packaging. Please inform the supplier immediately of any damage.

2.3. Installation

The **MG-XF** must be installed by a suitably qualified specialist only (e.g. with a qualification in industrial electronics).

2.4. Notes on installation

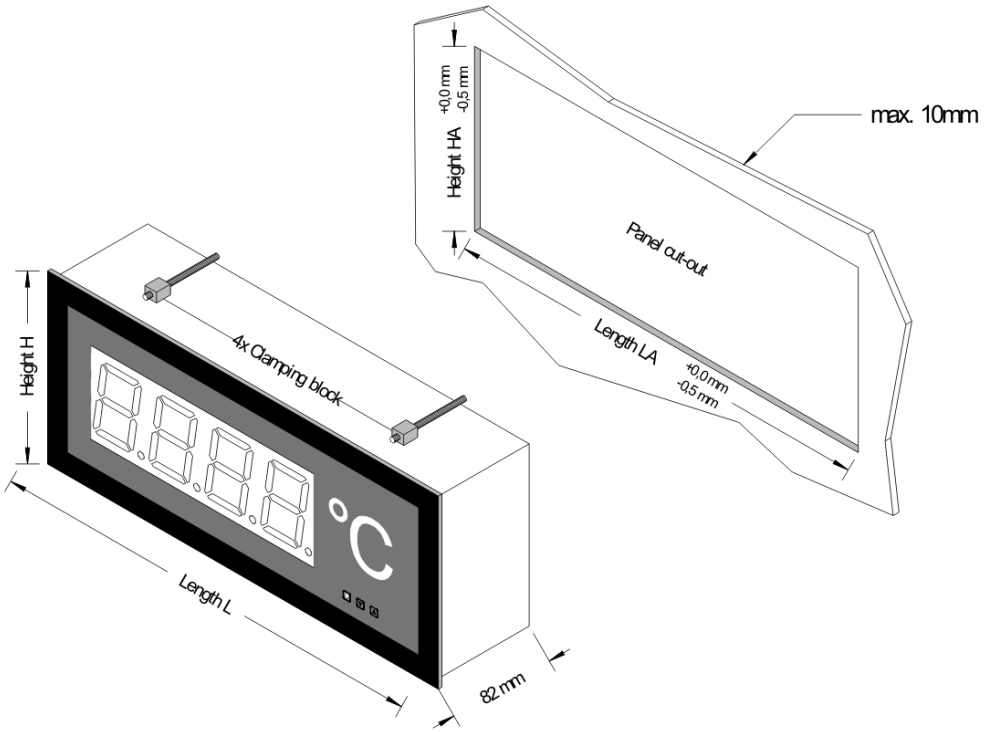
- ❑ There must be no magnetic or electric fields in the vicinity of the device, e.g. due to transformers, mobile phones or electrostatic discharge
- ❑ The fuse rating of the supply voltage should not exceed a value of 6A N.B. fuse.
- ❑ Do not install inductive consumers (relays, solenoid valves etc.) near the device and suppress any interference with the aid of RC spark extinguishing combinations or free-wheeling diodes.
- ❑ Keep input, output and supply lines separate from one another and do not lay them parallel with each other. Position go and return lines next to one another. Where possible use twisted pair.
- ❑ **The device is not suitable for installation in areas where there is a risk of explosion (hazardous areas)**.
- ❑ Any electrical connection deviating from the connection diagram can endanger human life and/or can destroy the equipment.
- ❑ The device must not be mounted in the field of direct solar radiation.
- ❑ Do not install several devices immediately above one another (Ambient temperature; *see Technical data*).

3. Assembly

MG-XF is intended for installation in a control panel or as wall-mounted instrument (please indicate which version when ordering).

3.1. Panel instrument **MG-BF**

Before assembly, a cut-out must be made to accommodate the device. The sizes and tolerances are given in the technical data. The device should be installed with the supplied fixtures in line with the drawings.



Anzeige 57 mm

Version B

Number of digits	Length L	Length LA	Height H	Height HA
3-digit with dimension	268mm	262mm	124mm	118mm
4-digit with dimension	316mm	310mm		
5-digit with dimension	364mm	358mm		
6-digit with dimension	412mm	406mm		
7-digit with dimension	460mm	454mm		

Version A

Number of digits	Length L	Length LA	Height H	Height HA
3-digit with dimension	288mm	282mm	144mm	138mm
4-digit with dimension	336mm	330mm		
5-digit with dimension	384mm	378mm		
6-digit with dimension	432mm	426mm		
7-digit with dimension	480mm	474mm		

Anzeige 100 mm

Version B

Number of digits	Length L	Length LA	Height H	Height HA
3-digit with dimension	436mm	430mm	176mm	170mm
4-digit with dimension	526mm	520mm		
5-digit with dimension	616mm	610mm		
6-digit with dimension	706mm	700mm		
7-digit with dimension	796mm	790mm		

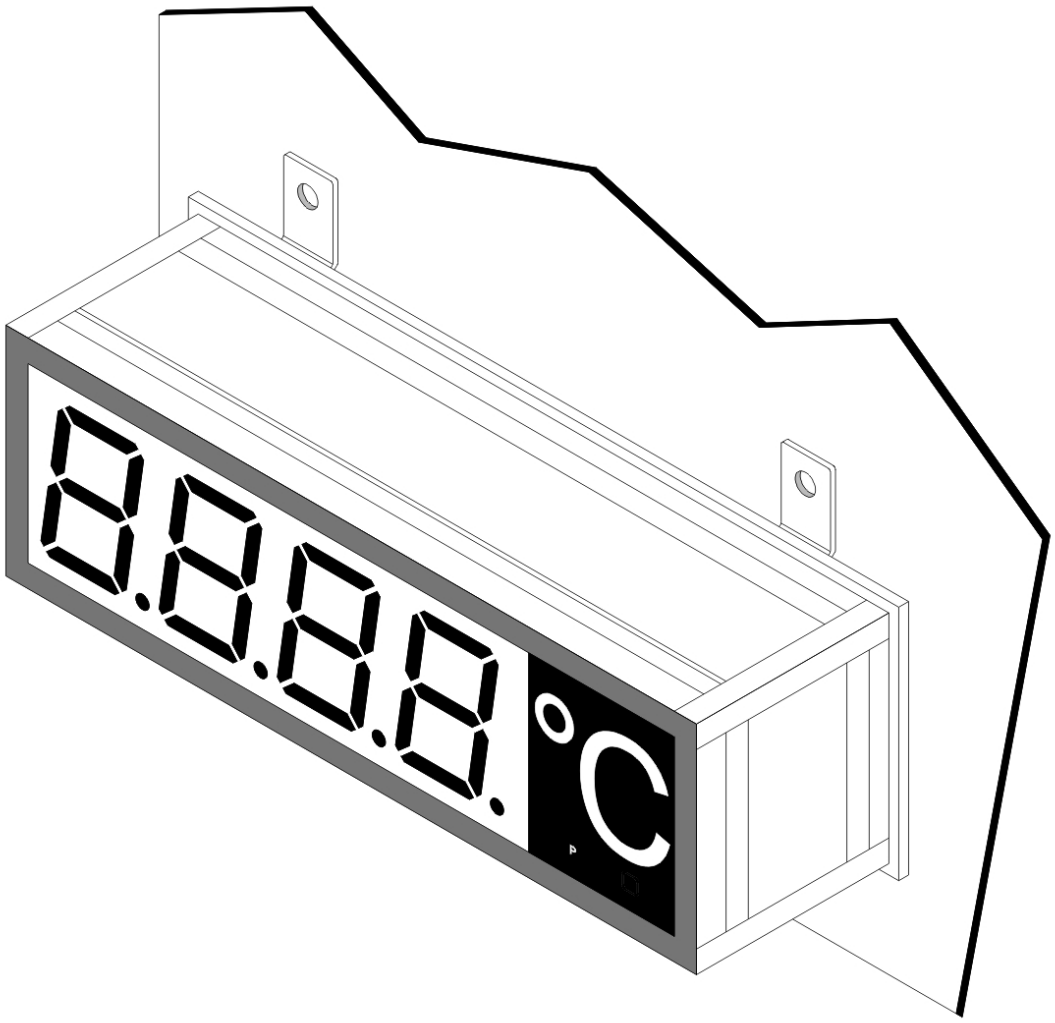
Version A

Number of digit	Length L	Length LA	Height H	Height HA
3-digit with dimension	460mm	454mm	200mm	194mm
4-digit with dimension	550mm	544mm		
5-digit with dimension	640mm	634mm		
6-digit with dimension	730mm	724mm		
7-digit with dimension	820mm	814mm		

Assembly

3.2. Wall-mounted instrument **MG-AF** (57 mm and 100 mm)

For fixing of the device, please use the assembly drillings in the fastening angle. The sizes are equal to the sizes of the panel instruments; the fixing is done via fastening angles at the back side.

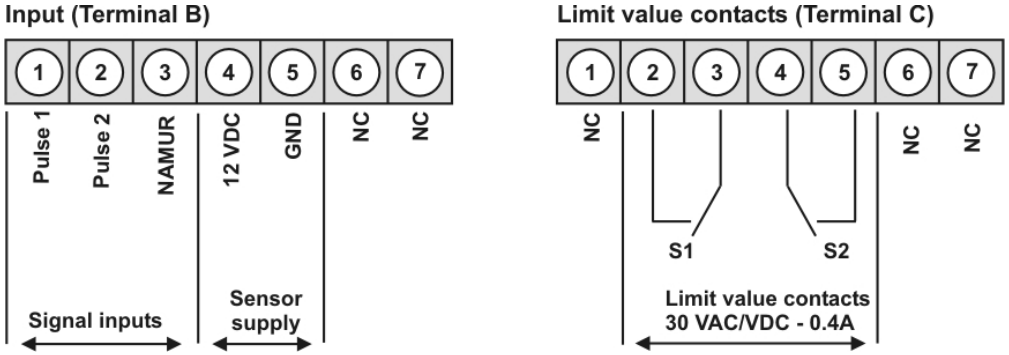


4. Electrical connection

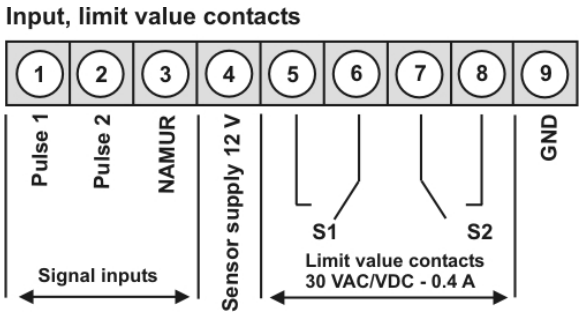
All signals that are needed for operation can be connected on the rear or the top side of the device. All possible connection details of the **MG-XF** are given below.

4.1. Construction for impulse counter

Construction indicator MG-AF

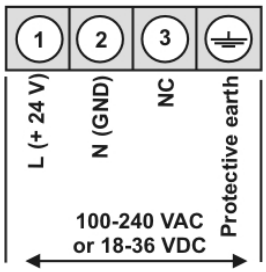


Panel instrument MG-BF

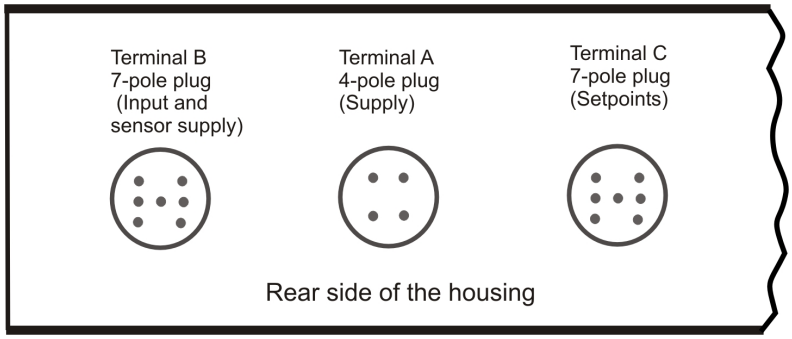


4.2. Pin assignment of the supply voltage

Terminal A

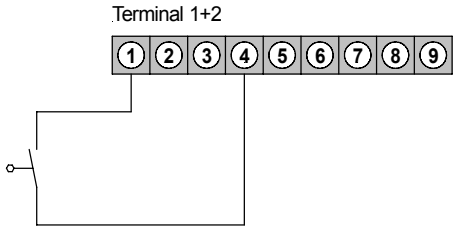


4.3. Position of terminal plugs (GAF)

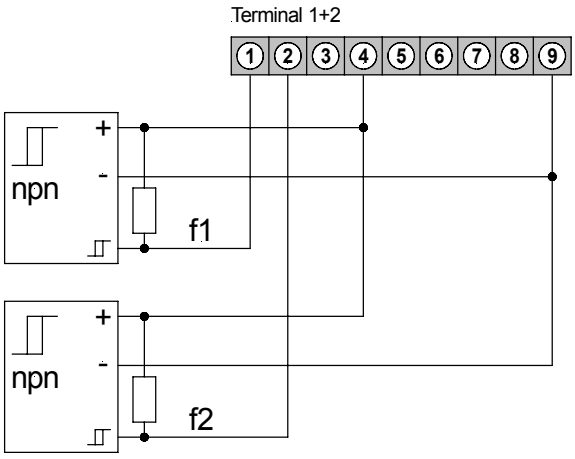


4.4. Connection examples for panel meters (MG-BF)

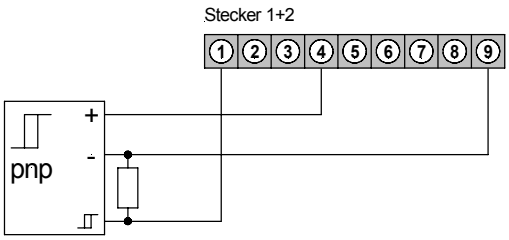
Connection of a mechanical switch



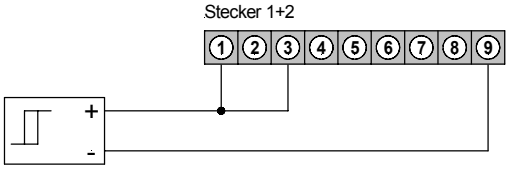
Connection of a initiator (npn) with external Pull-Up-Resistance for 2 frequency inputs



Connection of an initiators (npn) with optional external Pull-Down-Resistance for disturbance suppression (recommended value of Pull-Down-Resistance: 1.8 kOhm/0.5W)



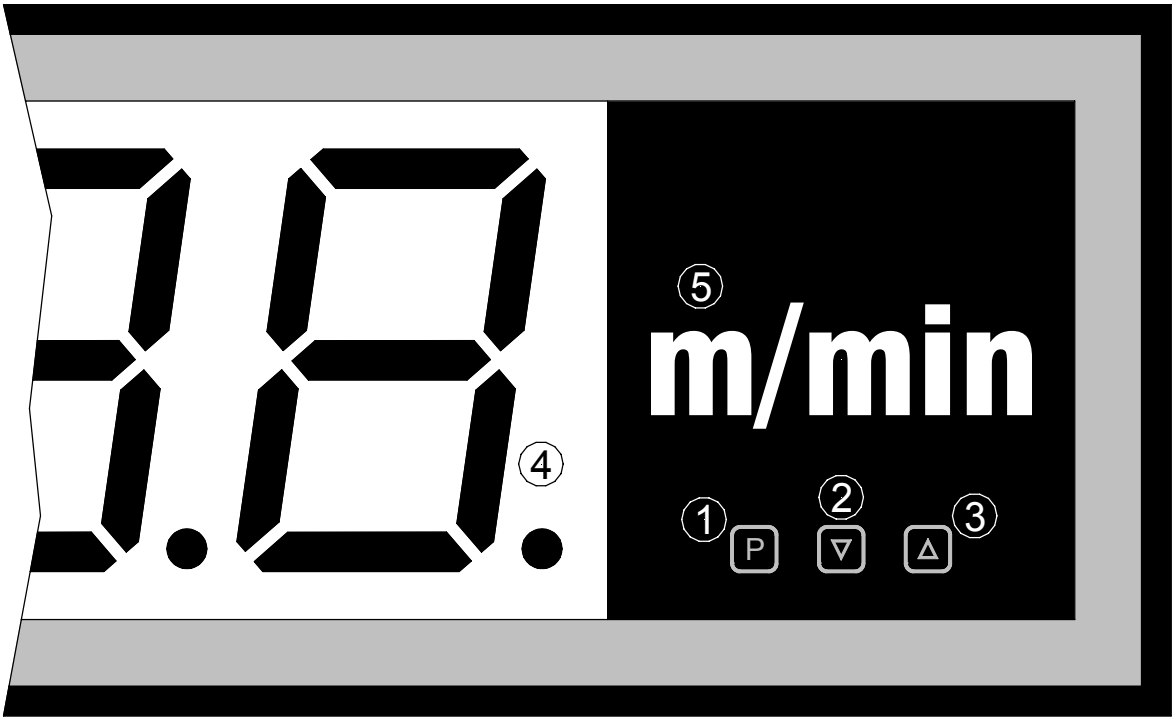
Connection of a Namur sensor



5. Operation / display elements

This unit is operated via 3 keys and has a 4- or 6-digit 7-segment display.

5.1. **Operation and display elements**

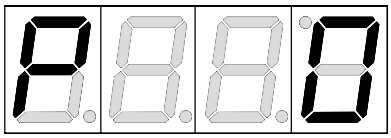


Example of a single-lined unit with foil keypad.

1	Program key **[P]**	With the program key, you can call up the programming mode or perform various functions in the programming mode.
2	Minus key [▼]	With the decrease key, you can call up the MIN memory or alter parameters in the programming mode.
3	Plus key [▲]	With the increase key, you can call up the MAX memory or alter parameters in the programming mode.
4	7-segment display	The 7-segment display shows measurements or, during programming, the program numbers or parameters.
5	Dimension window	The dimension window shows the factory-set **physical unit** for the measurement. Here, a physical unit can be placed according to customer preferences.

6. Programming

The display shows the **program numbers** (**PN**) right-aligned as a 3-digit number with a capitol **P** at the front.



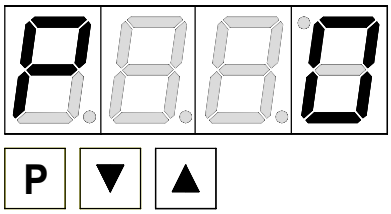
Display of e.g. program number **0**

6.1. Programming procedure

The entire programming of the **MG-XF** is done by the steps described below.

Change to programming mode

Push the [**P**] key to change to programming mode. The unit goes to the lowest available program number. When the programming lock is activated, the key must be pressed for at least 1 second.

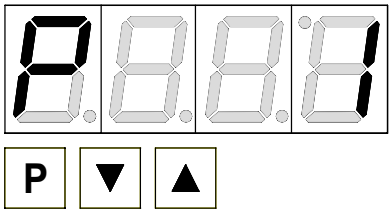


Example:

Change to programming mode by pushing key [**P**]. The first released program number (PN) appears, in this case PN0.

Change between program numbers

To change between individual program numbers, hold the [**P**] key down and press the [▲] key for changing to a higher program number or the [▼] key for changing to a lower number. By keeping the keys pushed, e.g. [**P**] & [▲], the display will begin, after approx. 1 second, to automatically run through the program numbers.

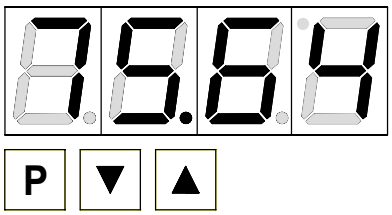


Example:

A **1** is parameterised under PN0.
Hold the [**P**] key down and press the [▲] key once.
PN1 appears in the display. Under this parameter, the final value of input can be changed.

Change to the parameter

Once the program number appears in the display, you can press the [▼] or [▲] key to get to the parameters set for this program number. The currently stored parameter is displayed.

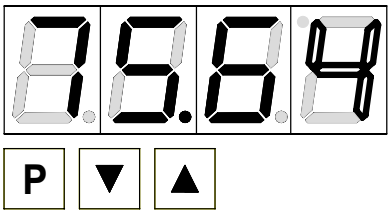


Example:

By pressing the [▼] or [▲] key, the currently stored value for PN1 appears in the display.
In this case, it is **75.64**.

Changing a parameter

After changing to the parameter, the lowest digit of the respective parameter flashes on the display. The value can be changed with the [▲] or [▼] key. To move to the next digit, the [**P**] key must be briefly pressed. Once the highest digit has been set and confirmed with [**P**], the lowest digit will begin to flash again.

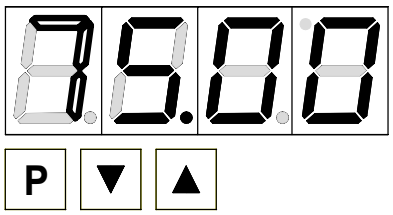


Example:

The **4** is flashing; this is the lowest value digit and, by flashing, it is asking for a figure to be entered. In our example, the value is to be changed from **75.64** to **75.00**. You can change the value by changing the figure from **4** to **0** using the [▲] or [▼] key. To move to the next digit, the [**P**] key must be briefly pressed. The **6** begins to flash. Change the value from **6** to **0** using the [▲] or [▼] key. The **5** and the **7** need no change.

Saving parameters

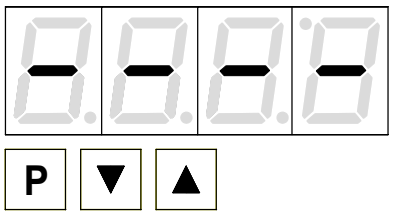
All parameters must be acknowledged by the user by pressing the [**P**] key for one second. The changed parameters are then taken over as the current operating parameters and saved in the EEPROM. This is confirmed by horizontal bars lighting up in the display.



Example:

Save the parameters by pressing [**P**] for 1 second.

All the newly entered data are confirmed by the unit. If no confirmation is received, the relevant parameters have not been saved.



Example:

You receive a confirmation from the unit that the changes have been saved through the appearance of horizontal bars in the middle segments.

6.1.1. **Change to operating mode**

If no key is pressed in programming mode for approx. 7 seconds, the unit automatically returns to operating mode.

7. Software

7.1. Range of functions

- Simple frequency measurement from 0.01 Hz to 100 kHz.
- Display on a 7-segment display in scaled form.
- Frequency measurement possible on two channels.
- Both scaled input signals can be freely calculated.
- With single-channel measurement, taring, reciprocal display and frequency division can be set.
- Every frequency channel can be linearised via 10 additional set points.
- Frequency input signal from 6…30 VDC possible (TTL on request).
- One channel can be operated via a Namur sensor.
- The frequency range can be predetermined in steps to the power of 10.
- The measuring/display time can be freely selected from 0.1s to 10s.
- Two threshold values can be freely parametrised via the frequency.
- All parameters can be set via 3 keys.

7.2. Reset to factory settings

The display can be reset to the original factory settings. To do this, keep the **P** button pressed while switching on the supply voltage. After a short period, the reset will be confirmed by bars appearing in the display, and the **P** button can be released.

7.3. Frequency measurement

The frequencies are measured over the entire frequency range from 0.01 Hz…100 kHz. The shorter the measuring time (display time), the lower the accuracy.

7.4. Overflow of the display value

If the display value exceeds the maximum displayable value, bars are shown at the top of all the segments.

7.5. **MIN/MAX-memory**

The measured minimum and maximum values are saved in a volatile memory in the unit and get lost when the unit is switched off.
You can call up the contents of the memory by pushing (less than 1 second) the [▲] or [▼] key. The relevant value is indicated for approx. 7 seconds. By briefly pressing the same key again, you will return immediately to the display mode.

[▲] ⇒ Display of MAX value
[▼] ⇒ Display of MIN value

You can erase the value shown in the display by simultaneously operating the [▲] & [▼] keys. The erasure is acknowledged by horizontal bars.

The content of the memory is lost when the unit is switched off.

7.6. Overflow on exceeding the maximum frequency

If the frequency rises above the maximum recordable frequency, bars appear in the middle of all the segments.

7.7. Underflow of the display value

If the value falls to below the minimum level that can be shown in the display, bars appear at the bottom of all the segments. Since the display is frequency-dependent, the minimum frequency can, if desired, be changed via PN8. With frequencies below this defined value, an underflow is also shown.

7.8. Channel change during operation

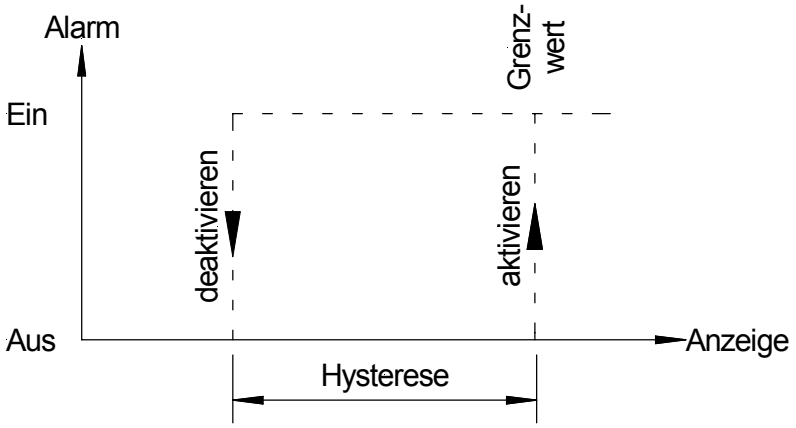
With two-channel measurement, the channels for the display can be changed. To do this, hold the [▲] or [▼] buttons in display mode for at least 1 second. After this, the next registered channel (ch1 = channel 1, ch2 = channel 2, chA = arithmetic channel) and then the scaled value are displayed. If no key is activated for about 7 seconds, the display automatically returns to default display.

7.9. **Limit value monitoring**

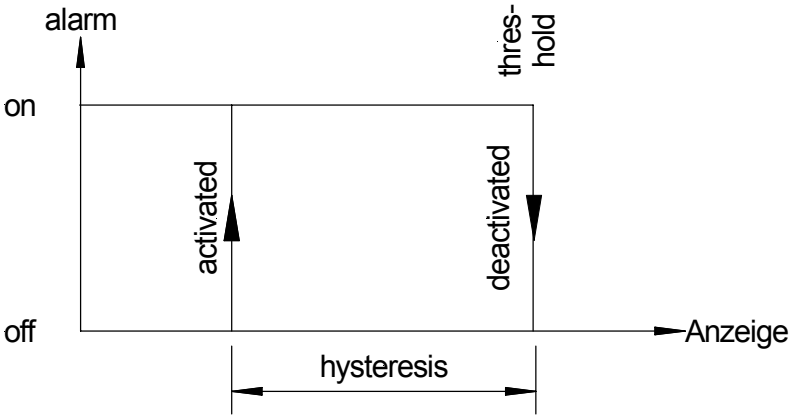
The limit value monitoring has the following properties:

Limit value alarm x	deactivated, activated
Limit value	threshold of limit value monitoring
Hysteresis	Width of the window between the switch thresholds
Operating principle	active above SP value / active below SP value
Switch-on delay	Time between reaching the limit value alarm and the resultant switching on of the limit value alarm.
Switch-off delay	Time between reaching the limit value alarm and the resultant switching off of the limit value alarm.

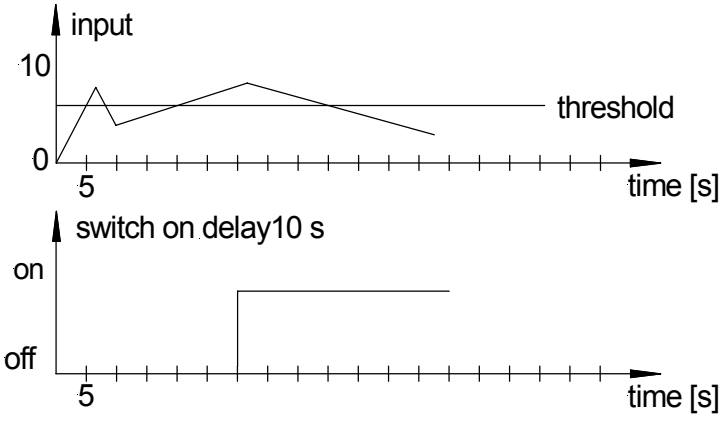
Exceedence
The limit value alarm is off below the limit value and switched on on reaching the limit value.



Undershooting
The limit value alarm is on below the limit value and switched off on reaching the limit value.



Alarm delay
The alarm is on e.g. 10 seconds after reaching the limit value; briefly exceeding the limit value does not lead to the alarm being switched on.The swith-off delay works in a similar manner, in other words, it keeps the alarm output switched on until the parameterised time has elapsed.



7.9.1. **Optical response, flashing display**

The switching on of one or more alarm outputs can also be set to trigger a flashing of the display to enhance the optical response.

8. Program table

The program table lists all the program numbers (PN) with their function, range of values, default values and user level.

PN	Description	Setting range	Default
Channel 1			
0	Operation scale via 0 = Sensor calibration 1 = Frequency set point	0/1	1
1	Scaled final value (range of display)	Min...Max	1000
2	Scaled start value (range of display)	Min...Max	0
3	Number of decimal places of the display value	0…3	0
4	Frequency final value	0...Max	1000
5	Frequency start value	0...Max	0
6	Default of frequency range via exponent 10^{-3}... 10^{+3}	-3...3	0
7	Max. valid display value	Min...Max	PN1
8	Min. valid display value	Min...Max	PN2
9	Offset value for single-channel measuring only	Min…Max	0
Channel 2			
10	Operation scale via 0 = Sensor calibration 1 = Frequency default	0…2	1
11	Scaled final value (range of display)	Min...Max	1000
12	Scaled start value (range of display)	Min...Max	0
13	Number of decimal places of the display value	0 ... 0.000 (so far)	0
14	Frequency final value	0...Max	1000
15	Frequency start value	0...Max	0
16	Default of frequency range via exponent 10^{-3}... 10^{+3}	-3...3	0
17	Max. valid display value	Min...Max	PN11
18	Min. valid display value	Min...Max	PN12
General setting for measured value acquisition			
20	Max. pulse delay channel 1 and 2 0 sec responds with the current display time	0s...250s	0
21	Measuring time/ display time	0.1s...10.0s	0
22	Default display 1 = Channel 1 2 = Channel 2 3 = Arithmetical result	1…3	1
23	Measuring function 0 = Frequency measuring on channel 1 only 1 = Frequency measuring on channel 1 and 2 2 = Frequency measuring on channel 1 and taring function on channel 2 3 = Frequency coefficient on channel 2 with Coefficient factor PN24	0…3	0

Program table

PN	Description	Setting range	Default
24	Dividing value for frequency coefficient function on channel 2.	1…65535	1
25	Arithmetic operation with co-channel measuring 1 = (channel 1 + channel 2) * factor 2 = (channel 1 – channel 2) * factor 3 = (channel 1 * channel 2) * factor 4 = (channel 1 / channel 2) * factor 5 = Faktor / Kanal 1	1...5	0
26	Number of decimal places for calculation	0…3	0
27	Factor of numerical value	-99999…999999	1
28	Number of decimal places for the factor	0…3	0
Programming lock			
50	Programming lock	0000...9999	0000
51	Activation code	0000...9999	0000
52	User level	0…5	5
Threshold value functions			
59	Display-flashing function 0 = no flashing function 1 = flashing by release of set point 1 2 = flashing by release of set point 2 3 = flashing at set point 1 or 2	0…3	0
60	Threshold value function set point 1 0 = no threshold value monitoring 1 = threshold value monitoring channel 1 2 = threshold value monitoring channel 2 3 = threshold value monitoring arithmetic	0...3	0
61	Threshold value barrier	min. ...max.	0
62	Hysteresis	0000…max.	0
63	Operation mode (0 = quiescent current; 1 = operating current)	0/1	1
64	Delay in seconds	1…1000	1
65	Type of delay 0 = no delay 1 = switch-on delay 2 = switch-off delay 3 = switch-on/-off delay	0…3	0
70	Threshold value function set point 2 0 = no threshold value monitoring 1 = threshold value monitoring channel 1 2 = threshold value monitoring channel 2 3 = threshold value monitoring arithmetic	0...2	0
71	Threshold value barrier or cycle value (stated as scaled value)	0000...max.	0
72	Hysteresis	0000…max.	0

Program table

73	Operation mode (0 = quiescent current; 1 = operating current)	0/1	1
74	Delay in seconds	1…1000	1
75	Type of delay 0 = no delay 1 = switch-on delay 2 = switch-off delay 3 = switch-on/-off delay	0…3	0
Linearisation channel 1			
100	Number of additional support points	1…10	0
101... 110	Additional support points	min…max.	
Linearisation channel 2			
140	Number of additional support points	1…10	0
141... 150	Additional support points	min…max.	
System parameter (only readable)			
200	Serial number	X	X

Program numbers

8.1. Scaling function PN0 / PN10

With this parameter, the form of scaling is determined as well as the procedure for adjusting the display. A distinction is made between teaching the display with the aid of a real sensor signal (sensor calibration), and setting the display via the integrated time base (frequency set point).

8.2. Scaled final value PN1 / PN11

With sensor calibration (PN0 / PN10 = 0), if you take over the final value, the current frequency and target display values are saved. The frequency value is transferred to PN4/PN14.
With frequency set point (PN0 / PN10 = 1), the display value to be displayed for the frequency final value under PN4 / PN14 is given under PN1 / PN11.

8.3. Scaled start value PN2 / PN12

With sensor calibration, if you take over the scaled starting value, the frequency is recorded in parallel and saved under PN5/PN15. It must be borne in mind that the frequency range is dependent on the previously calibrated frequency range!
As a rule, with the start value, the frequency and the scaled value are equal to zero. With the frequency set point (PN0/PN10 = 1), the start value is linked to the preset frequency under PN5/PN15.

8.4. Number of decimal places in the display value PN3 / PN13

The decimal point is shown in the display for the signal value. Later, it serves as the variable decimal point in the arithmetic calculation.

8.5. Frequency final value PN4 / PN14 and frequency start value PN5 / PN15

Via the program numbers, a known frequency can be assigned to a display range. With the sensor calibration, the program parameters are for the user's orientation. The values in the system have a higher resolution than can be executed via the keyboard. No consideration needs to be taken of the decimal point in the display. A setting of 1,000 at a frequency range of 0 means that the final value is displayed at 1000 Hz.

8.6. Frequency range PN6 / PN16

You can control the required frequency values via the frequency range. The figure given here can be preset between -3…3 (-3 corresponds to mHz … 0 corresponds to Hz … 3 corresponds to kHz).

8.7. Max/min display value PN7 / PN8 / PN17 / PN18

The allowed display range can be additionally restricted via the program numbers, whereby an overflow or underflow is displayed when the figure is above or below the predetermined values. In the event of an overflow, the bars are displayed at the top, and with an underflow at the bottom.

8.8. Offset value PN9

This offset value is added to the scaled display value and can only be used in one-channel operation.

8.9. Maximum pulse delay PN20

Via the maximum pulse delay in seconds, you can register frequencies well below 1 Hz. At these low frequencies, the display is updated with a certain delay with every arriving pulse. Should the frequency rise, the display again reacts with the given delay. If there is no pulse, the pulse delay shows the time needed to jump to zero. This parameter applies to both frequency inputs.

8.10. Measurement/display time PN21

The display time is identical to the measuring time. It gives the minimum reaction time of the display. During the entire period, the number of pulses is recorded and, at the end, calculated with the real gate time (approx. measuring time). It can be extended via PN20. This parameter also applies to both possible inputs.

8.11. Default display PN22

The display has 3 possible display values when both frequency inputs and the arithmetic channel are activated. Via the default display, you can choose which value should be permanently displayed.

8.12. Measuring function PN23

The display has, through its 2 digital inputs, various measuring functions.
With the simple one-channel measurement (PN23 = 0), the second frequency is not recorded and is set to zero within the system. Only with two-frequency measurement (PN23 = 1) are both inputs scaled and made available for the subsequent calculation. With the tare function (PN23 = 2) via the second input, only one frequency can be recorded. Taring is used on the offset value (PN9).
Channel 2 has a frequency divider function (PN23 = 3), with which any frequency can be reduced by a pre-defined division factor, though it must be whole number (see PN14).
Channel 1 operates in its familiar measuring function as PN23 = 0.
As a rule, the input of channels 1 and 2 is bridged with this function.

8.13. Dividing value for channel 2 PN24

This parameter is only used when the dividing value (PN23 = 3) is selected. The input frequency of channel 2 is divided by this dividing value (whole number). This function runs directly through the internal hardware counter and reacts very quickly. The reaction speed of the switch outputs limits the maximum output frequency to around 200 Hz! Since this function is not directly influenced by the software, the user should ensure this maximum frequency.

8.14. Arithmetic operation PN25

Via this parameter, the two inputs (for this, PN23 must be = 1) can be offset against each other in scaled form. This is done with floating decimal point arithmetic, in other words the scaled input values are offset against each other with a decimal point and the adjustable constant (factor). Accordingly, the decimal point must also be pre-defined to obtain the result.

8.15. Number of decimal places for the display and the calculation PN26

The pre-defined decimal point is used to calculate the scaled arithmetical result and to show the result on the display.

8.16. Factor and number of decimal places PN27 / PN28

Via parameter PN27, you can define the actual figure and via PN28, the number of decimal places. The factor is processed in this form. If, for example, you want to display the result in millilitres instead of litres, you set PN27 to 1000 and PN28 to 0. Conversely, if you want to rescale the result from kilograms to tons, you set PN27 to 1 and PN28 to 3.

8.17. Programming lock PN50

Here, you enter the code to gain access to the programming function. If the programming lock is activated (PN50 is not equal to PN51) then no reset to the factory calibration can be carried out. Only the program numbers that have a higher user level than is set in PN52 can be displayed and adjusted (see PU5). With the lock activated, the table is searched above program number 60 for free parameters. This behaviour simplifies the most used tracking of the set points by the operating staff.

8.18. Activation code PN51

You can use the activation code to program a number to give access to the program numbers.

8.19. User level PN52

The user level enables the supervisor to block certain program numbers. PN52 is only activated when PN50 = PN51. All the parameters have level 2, only the set point parameters have level 3 and the threshold value itself has level 4.

8.20. Limit value function of the set points PN60 / PN70

The set points can be deactivated (PN60/PN70 = 0). Through higher values, the threshold value monitoring can be switched to the display value of channel 1 (PN60=1), display value of channel 2 (PN60=2) or to the display value of the arithmetic channel (PN60=3).

8.21. Threshold value barrier of the set points PN61 / PN71

This defines the barrier for the respective threshold value function. The figure always relates to the selected display value and its current decimal point position.

8.22. Limit value hysteresis of the switch points PN62 / PN72

You can assign the threshold value a hysteresis of 0… maximum. This prevents frequent switching around a set threshold value.

8.23. Operation mode of the switch points PN63 / PN73

The operation mode defines whether, on exceeding the threshold value, the output is on (operating current principle) or switched off (idle current principle).

8.24. Delay of the switch points PN64 / PN74

Via this parameter, you can define the reaction time of the outputs when switching off and/or on. By doing this, you can avoid an alarm being signalled due to short-term events.

8.25. Type of delay of the set points PN65 / PN75

Via the type of delay, you can completely switch off the delay or limit it to a switch-on or switch-off delay.

8.26. Linearisation PN100 / PN140

A linearisation can be placed over both frequency inputs. Up to 10 additional set points can be parametrised per channel. In this way, you can compensate for a non-linear behaviour of a sensor. The set points can, after defining the number under parameters PN101…PN110 and PN141…PN150, be taught as the frequency rises.

9. Technical data

Dimensions
build up housing
(without plug)

Version A	336 x 144 x 82 mm (BxHxD)
57 mm display	550 x 200 x 82 mm (BxHxD)
100 mm display	
Version B	
57 mm display	316x 124 x 82 mm (BxHxD)
100 mm display	526 x 176 x 82 mm (BxHxD)
Fixing	via fixing angle on the back side
Housing material	Aluminium, black, powder-coated
Protection type	IP65
Weight	
57 mm display	approx. 3.0 kg
100 mm display	approx. 5.0 kg

Connection
57/100 mm display

Type of plug:	Circular plug-in connector Binder-Series 693
Cable admission:	PG9 (6.0 to 9.5 mm)
Protection class:	IP65
Mechanic life expectancy:	> 500 contact durability
Connection type:	Screws

Connection
Voltage supply:

Number of poles:	3 + PE
Cable cross section:	0.5 to 2.5 mm (AWG 20...14)
Rating:	400 V
Rating current:	12 A

Connection
Inputs / Outputs:

Number of poles:	7
Cable cross section:	0.34 to1.5 mm (AWG 22...16)
Rating:	250 V
Rating current:	8 A

Technical data

Dimensions		
mounting housing	**Version A**	
(without plug terminals)	57 mm display	W 336 x H 144 x D 82 mm
	100 mm display	W 550 x H 200 x D 82 mm
	Version B	
	57 mm display	W 316 x H 124 x D 82 mm
	100 mm display	W 526 x H 176 x D 82 mm
(with plug terminal)	**Version A / B**	
	57 mm /100 mm display	W … x H … x **D 104 mm**
	Assembly cut-out Version A	
	57 mm display	$330.0^{-0.5}$ x $138.0^{-0.5}$ mm (WxH)
	100 mm display	$544.0^{-0.5}$ x $194.0^{-0.5}$ mm (WxH)
	Assembly cut-out Version B	
	57 mm display	$310.0^{-0.5}$ x $118.0^{-0.5}$ mm (WxH)
	100 mm display	$520.0^{-0.5}$ x $170.0^{-0.5}$ mm (WxH)
	Weight	
	57 mm display	approx. 3.0 kg
	100 mm display	approx. 5.0 kg
	Connection 57/100 mm display	4-pole adaptable screw terminal for in- and output, adapted for line diameter up to 2.5 mm^2. 9-pole adaptable screw terminal for in- and output, adapted for line diameter up to 1.5 mm^2.
Display	Display	7-segment LED
	Digit height	57 mm, 100 mm
	Segment colour	red
	Number of places	4…6 digits
	Display range	-999...9999
	Overflow	horizontal bars at the top
	Underflow	horizontal bars at the bottom
	Display time	0.1...10.0 seconds
	Field of application	Indoor and outdoor (optionally)
Input		
Impulse input	max. 30 VDC/3 mA	
Switching threshold	LOW < 4 VDC	HIGH >6 VDC
Frequency range	0.01 Hz…100 kHz	
Measuring time & display time	0.1…10.0 s	
Metering principle	Pulse counting/ Pulse time measuring	
Metering time period	<10 µs	

Technical data

Output	
Sensor sensor	12 VDC ±10% (galv. not isolated) galvanic not isolated
Namur supply	1.5 mA
Switching points	30 VAC/0,4 A – 30 V/DC/0,4 A
Photo Mos	Input/output electric strength 100 VAC
Power supply	
Supply voltage (galvanic isolated)	Multi voltage power supply unit 100-240 VAC nominal voltage ± 10%, 50/60 Hz 18-36 VDC
Power consumption	max. 30 VA
Storage	Parameter storage EEPROM
Data preservation	>20 years
Ambient conditions	
Working temperature	0…60 °C
Storing temperature	-20…80 °C
Climatic density	Rel. humidity ≤ 75 % on years average without dew
EMV	DIN 61326
CE-sign	conformity to 89/336/EWG
Safety regulation	DIN 61010

10. Troubleshooting

The following list gives the recommended procedure for dealing with faults and locating their possible cause.

10.1. Questions and answers

I. The unit permanently indicates overflow „ ¯ ¯ ¯ ¯ “.

- The input has a very high measurement, check the measuring circuit.

II. The unit permanently indicates underflow „ _ _ _ _ “.

- The input has a very low measurement, check the measuring circuit.

III. The device shows “*HELP*” in the 7-segment display.

- The unit has found an error in the configuration memory. Perform a reset on the default values and reconfigure the unit according to your application.

IV. Program numbers for parameterisation the input are not available.

- The program lock is set to a user level that does not permit access.

V. „*ERR1*“ lights up in the 7-segment display.

- This error can only be eliminated by the manufacturer.

10.2. Reset to default values

The following procedure should be used:

I. Switch off the power supply

II. Press button [**P**]

III. Switch on the power supply and press [**P**] for further approx. 2 seconds

With reset, the default values of the program table are loaded and used for subsequent operation. This puts the unit back to the state in which it was supplied.

Caution! This is only possible when the programming lock PN50 allows access to all PNs or “*HELP*” is shown in the display.

Caution! All application-related data are lost

11. Notes

Notes

Notes