
User Manual M1 - tricolour

Standard signal 0/4-20 mA, 0-10 V



Technical features:

- tricolour display of -1999...9999 digits (red, green, orange switchable via limit values)
- minimal installation depth: 25 mm without plug-in terminal
- adjustment via factory default or directly on the sensor signal
- min/max-value recording
- 11 adjustable supporting points
- display flashing at threshold exceedance / undershooting
- tara-function
- programming interlock via access code
- protection class IP65 at the front
- plug-in terminal
- 2 relay outputs (change-over-contacts)
- accessories: pc-based configuration-kit PM-TOOL with CD & USB adapter for devices without keypad, for a simple adjustment of standard devices via PC

Identification

STANDARD TYPES	ORDER NUMBER
Direct voltage/current, tricolour Housing size: 96x48 mm	M1-1VT4B.0001.772xD

Options – breakdown of order code:

	M	1	1	V	T	4	B.	0	0	0	1.	7	7	2	x	D	
Basic type M-Line																	Dimension [D] physical Unit
Installation depth 45 mm incl. plug-in terminal			[1]														Version [x] internal version
Housing size 96x48x25 mm (WxHxD)			[1]														Switching points [2] Relay outputs
Display type Current, voltage				[V]													Protection class [1] without keypad, operation via PM-TOOL [7] IP65/plug-in terminal
Display colours Red-Green-Orange					[T]												Supply voltage [7] 24 VDC galv.insulated
Number of digits 4-digit						[4]											Measuring input [1] Standard signal 0/4-20 mA, 0-10 VDC
Digit height 14 mm																	Analog output [0] without
Interface without																	Sensor supply [3] without

Please state physical unit by order, e.g. m/min.

Contents

1. Brief description	1
2. Assembly	1
3. Electrical connection and connection examples	2
4. Function description and operation	3
4.1. Programming software PM-TOOL	3
5. Setting up the device	4
5.1. Switching on	4
5.2. Standard parameterisation (flat operation level)	4
Value assignment for control of the signal input	
5.3. Programming interlock <i>RUN</i>	6
Activation/Deactivation of the programming interlock or change into extended parameterisation	
5.4. Extended parameterisation	6
Superior device functions like e.g.:	
- rescaling of the input signals, <i>ENDR</i> , <i>OFFR</i>	6
- parameterisation of a TARA-function, <i>TARR</i>	6
- zero point slowdown of the input signal, <i>ZERO</i>	7
- allocation of functions onto the navigation keys	7
- adjustment of limit values for optical alarm, <i>LI-1/2</i> , <i>LI3/4</i>	8
- safety parameter for locking of the programming, <i>CODE</i>	14
- input of supporting points for the linearisation of the input signals, <i>SPCT</i>	14
6. Reset to default values	15
Reset of the parameter onto delivery condition	
7. Alarms / Switching points	16
Functional principle of the optical switching points	
8. Technical data	17
9. Safety advices	19
10. Error elimination	20

1. Brief description

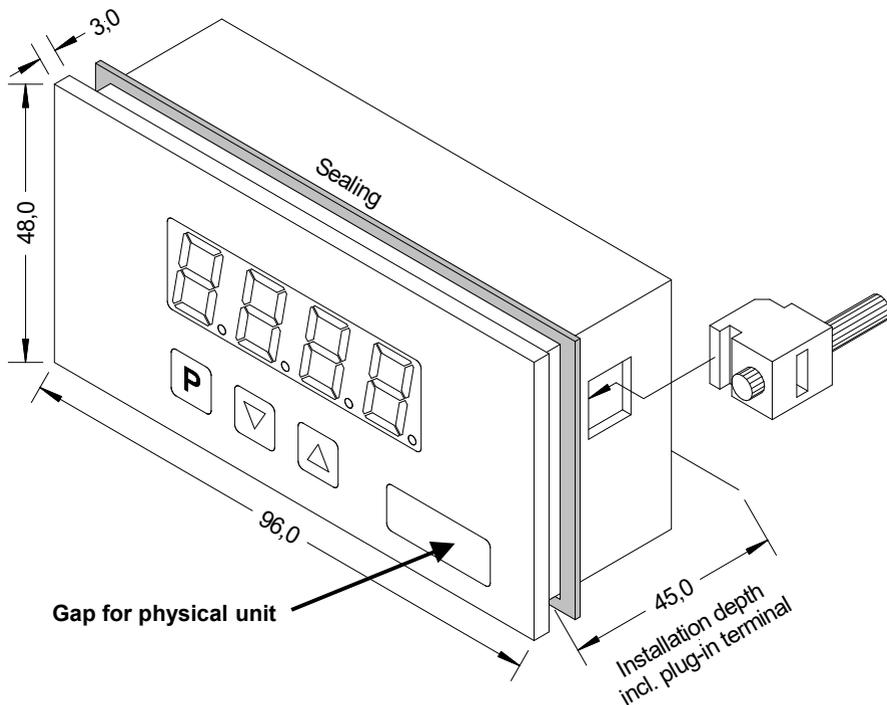
The panel instrument **M1-11** is a tricolour 4-digit device for direct voltage and direct current signals and a visual limit value monitoring via the display. The configuration happens via three front keys or via the optional PC-software PM-TOOL. An integrated programming interlock prevents unrequested changes of the parameter and can be unlocked again via an individual code.

The electrical connection happens on the rear side via plug-in terminals.

Selectable functions like e.g. the recall of the min/max-value, a zero point slowdown, a direct change of the limit value in operating mode and additional measuring supporting points for linearisation complete the modern device concept.

2. Assembly

Please read the *Safety advices* on page 19 before installation and keep this user manual for future reference.



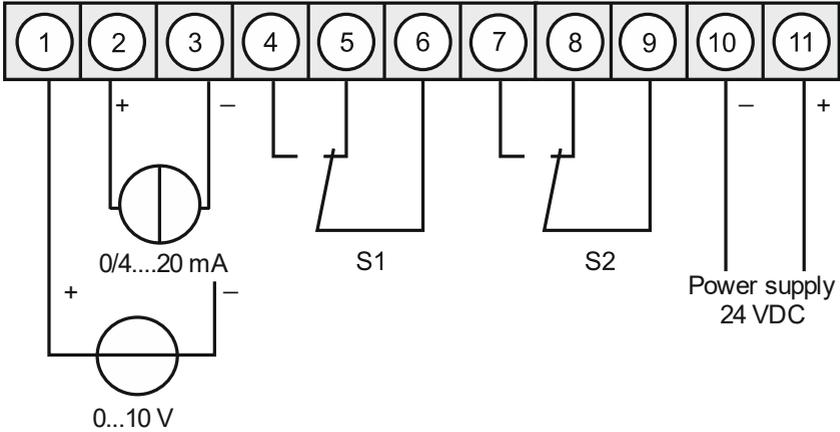
1. After removing the fixing elements, insert the device.
2. Check the seal to make sure it fits securely.
3. Click the fixing elements back into place and tighten the clamping screws by hand. Then use a screwdriver to tighten them another half a turn.

CAUTION! The torque should not exceed 0.1 Nm!

The dimension symbols can be exchanged before installation via a channel on the side!

3. Electrical connection

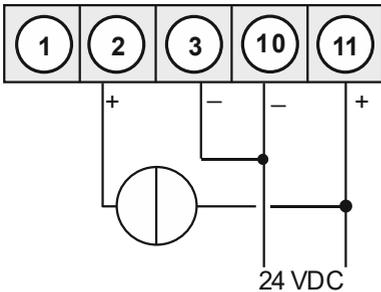
Type M1-1VT4B.0001.772xD - supply 24 VDC



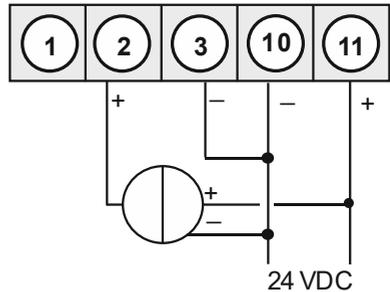
Connection examples:

Below you find some connection examples, which demonstrate some practical applications:

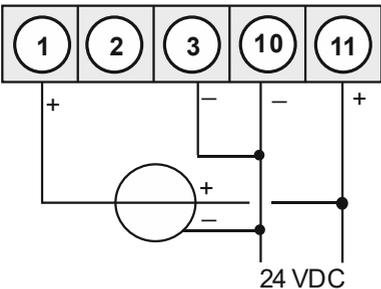
2-wire sensor with 4-20 mA



3-wire sensor with 0/4-20 mA



3-wire sensor with 0-10 V



4. Function and operation description

Operation

The operation is divided into two different levels.

Menu Level

Here it is possible to navigate between the individual menu items.

Parameterization level:

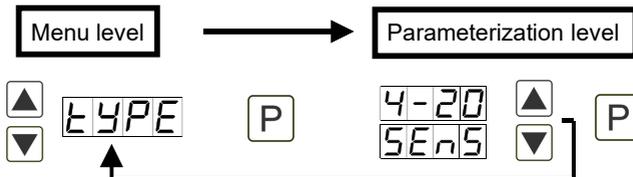
The parameters stored in the menu item can be parameterized here.

Functions that can be adjusted or changed are always indicated with a flashing of the display. Adjustments made at the parameterization level should be always confirmed by pressing the [P] key to save them.

However, the display automatically saves all adjustments and then switches to operation mode if no further keys are pressed within 10 seconds.

Level	Button	Description
Menu level	[P]	Change to parameterization level with the relevant parameters.
	[▲] [▼]	For navigation at the menu level
Parameterization level	[P]	To confirm the changes made at the parameterization level.
	[▲] [▼]	To change the value or setting.

Example:



4.1. Programming via configuration software PM-TOOL-MUSB4

You receive the software on CD incl. an USB-cable with a device adaptor. The connection is done via a 4-pole micromatch connector plug on the back and the PC is connected via an USB connector plug.

System requirements:

PC with USB interface

Software:

Windows XP, Windows Vista

CAUTION!

During parameterisation with connected measuring signal, make sure that the measuring signal has no mass supply to the programming plug. The programming adapter is galvanic not isolated and directly connected with the PC. Via polarity of the input signal, a current can discharge via the adapter and destroy the device as well as other connected components!

5. Setting up the device

5.1. Switching on

Once the installation is complete, start the device by applying the current loop. Check beforehand once again that all the electrical connections are correct.

Starting sequence

For 1 second during the switching-on process, the segment test (*8 8 8 8*) is displayed, followed by an indication of the software type and, after that, also for 1 second, the software version. After the start-up sequence, the device switches to operation/display mode.

5.2. Parameterization:

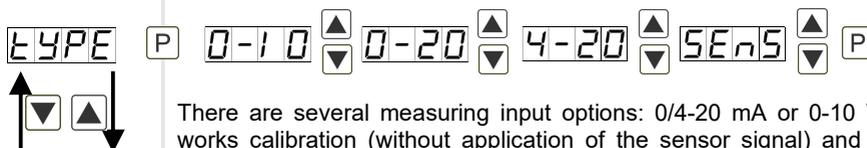
To be able to parameterize the display, press the **[P]** key in operating mode for 1 second. The display then changes to the menu level with the first menu item *TYPE*.

Menu level

Parameterization level

Selection of the input signal, *TYPE*:

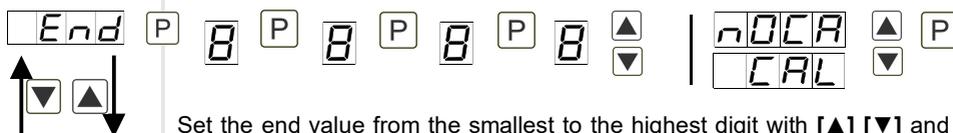
Default: *SENS*



There are several measuring input options: 0/4-20 mA or 0-10 VDC signals as works calibration (without application of the sensor signal) and *SENS* as sensor calibration (with the sensor applied). Confirm the selection with **[P]** and the display switches back to menu level.

Setting the final value of the measuring range, *END*:

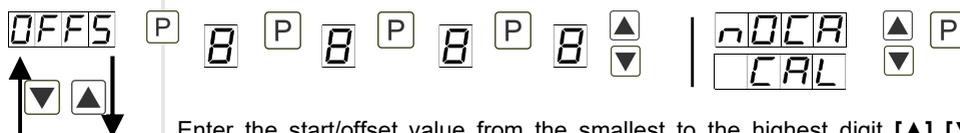
Default: *1000*



Set the end value from the smallest to the highest digit with **[▲]** **[▼]** and confirm each digit with **[P]**. A minus sign can only be parameterized on the highest value digit. After the last digit, the display switches back to the menu level. If *SENS* was selected as input option, you can only select between *NOCCA* and *CAL*. With *NOCCA*, only the previously set display value is taken over, and with *CAL*, the device takes over both the display value and the analogue input value.

Setting the start/offset value of the measuring range, *OFFS*:

Default: *0000*



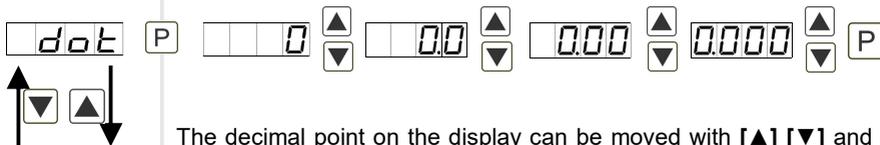
Enter the start/offset value from the smallest to the highest digit **[▲]** **[▼]** and confirm each digit with **[P]**. After the last digit the display switches back to the menu level. If *SENS* was selected as input option, you can only select between *NOCCA* and *CAL*. With *NOCCA*, only the previously set display value is taken over, and with *CAL*, the device takes over both the display value and the analogue input value.

Menu level

Parameterization level

Setting the decimal point, DOT:

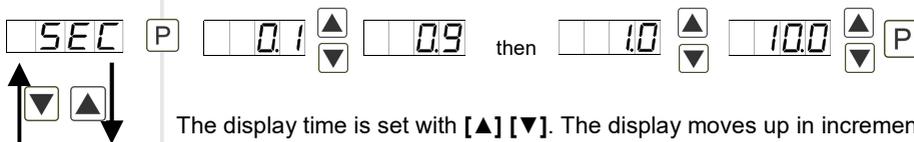
Default: 0



The decimal point on the display can be moved with [▲] [▼] and confirmed with [P]. The display then switches back to the menu level again.

Setting the display time, SEC:

Default: 01.0



The display time is set with [▲] [▼]. The display moves up in increments of 0.1 up to 1 second and in increments of 1.0 to 10.0 seconds. Confirm the selection by pressing the [P] button. The display then switches back to the menu level again.

Sliding average determination, AVG:

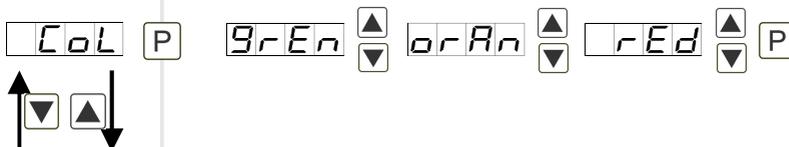
Default: 01



The numbers of the included individual measurements for the average determination can be selected from 1 to 50. The product of the selected number (AVG) and the preset measuring time (SEC) is the total average time. The result will be displayed and evaluated for the alarms.

Setting the standard colour, COL:

Default: 9REN

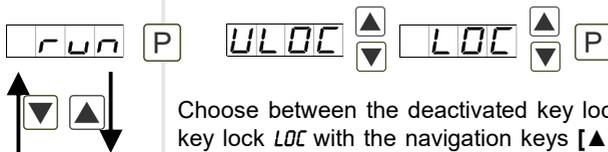


Here, the standard colour of the display can be set without off-limit condition. The colours red, green and orange are available.

Menu level	Parameterization level
------------	------------------------

5.3. Programming interlock „RUN“

Activation / deactivation of the programming lock and completion of the standard parameterization, RUN:



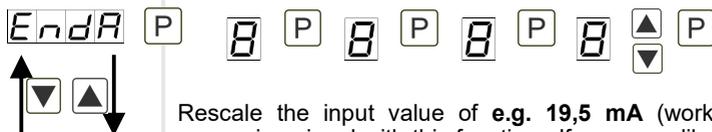
Choose between the deactivated key lock *ULOC* (works setting) and the activated key lock *LOC* with the navigation keys **[▲]** **[▼]**. Make the selection with **[P]**. After this, the display confirms the settings with "- - - -" and switches automatically to operating mode. If *LOC* was selected, the keyboard is locked. To get back into the menu level, press **[P]** for 3 seconds in operating mode. Now enter the *CODE* (works setting 1 2 3 4) that appears using the **[▲]** **[▼]** keys plus **[P]** to unlock the keyboard. *FAIL* appears if the input is wrong.

5.4. Extended parameterization

By pressing the **[▲]** & **[▼]** keys during standard parameterization for one second, the display switches to the extended parameterization mode. Operation is the same as in standard parameterization.

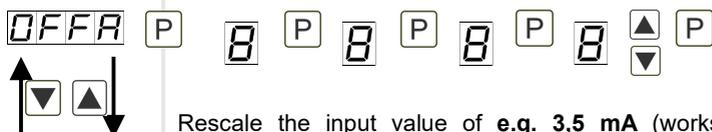
Menu level	Parameterization level
------------	------------------------

Rescaling the measuring input values, ENDA:



Rescale the input value of e.g. 19,5 mA (works setting) without applying a measuring signal with this function.. If sensor calibration has been selected, these parameters are not available.

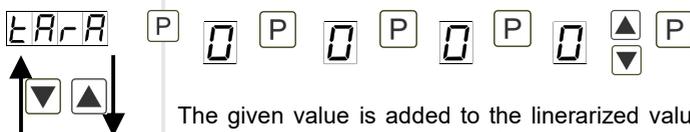
Rescaling the measuring input values, OFFR:



Rescale the input value of e.g. 3,5 mA (works setting) without applying a measuring signal with the this function. If sensor calibration has been selected, these parameters are not available.

Setting the tare/offset value, TARR:

Default: 0



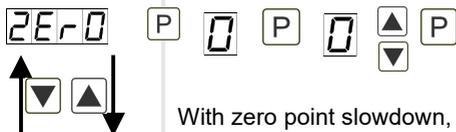
The given value is added to the linerarized value. In this way, the characteristic line can be shifted by the selected amount.

Menu level

Parameterization level

Zero point slowdown, ZERD:

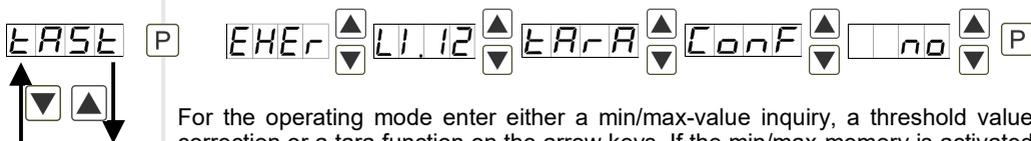
Default: 0



With zero point slowdown, a value range around zero can be preselected at which the display shows zero. If, for example, a 10 is set, the display would show a zero in the range from -10 to +10 and continue below it with -11 and above it with +11.

Min/max-value inquiry - assignment of key functions, TAST:

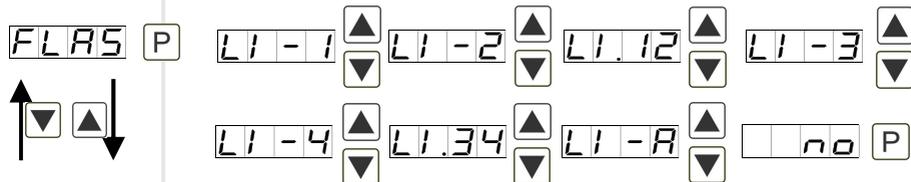
Default: NO



For the operating mode enter either a min/max-value inquiry, a threshold value correction or a tara function on the arrow keys. If the min/max-memory is activated with *EHER*, the measured min/max-values will be saved during operation and can be called up via the arrow keys [▲] [▼]. When the device is restarted or the buttons are pressed simultaneously, the values are lost or deleted. If the threshold value correction *LI.1* is selected, the limit values can be changed during operation without hindering the operating procedure. With the *TARA* function the device can be set on a temporarily parameterized value. This function is activated by pushing the two arrow keys [▼] [▲] simultaneously. The device receipts the correct taring by showing "0000" in the display. If a set point confirmation via the navigation keys is desired, then *CONF* needs to be parameterised. The selection of the relays is done in the menu level under *OUT1 - OUT4*. With *TARA* the display is tared to zero and is saved permanently as offset. The device confirms the correct taring by showing 0000 in the display. If *NO* is parameterized, the navigation keys [▼] [▲] have no function in operating mode.

Flashing of display, FLAS:

Default: NO



A flashing of the display can be added as an extra alarm function. It can be either related to the single limit values *LI-1...LI-4*, pairwise to *LI.12* or *LI.34* or it can be related to all limit values *LI-A*. With *NO* (works setting) the device is without flashing function.

Menu level

Parameterization level

Limit values / limits, *L1-1*:

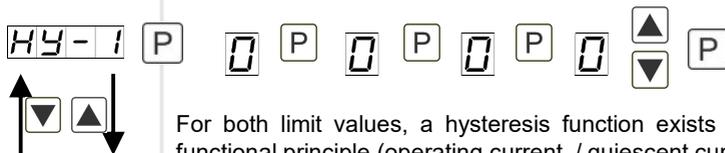
Default: 0200



For both limit values, two different values can be parameterized. With this, the parameters for each limit value are called up one after the other.

Hysteresis for limit values, *HY-1*:

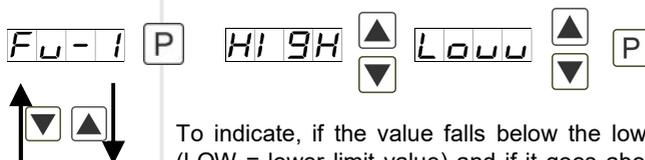
Default: 0000



For both limit values, a hysteresis function exists that reacts according to the functional principle (operating current / quiescent current).

Function if display falls below / exceeds limit value, *FU-1*:

Default: HIGH



To indicate, if the value falls below the lower limit value, *LOWU* can be selected (LOW = lower limit value) and if it goes above the upper limit value, *HIGH* can be selected (HIGH = upper limit value). LOW corresponds to the quiescent current principle and HIGH to the operating current principle.

Switching-on delay, *TOn1*:

Default: 0000



Here, for limit value 1 a delayed switching-on of 0-6000 seconds can be given.

Switching-off delay, *TOf1*:

Default: 0000



Here for limit value 1 a delayed switching-off of 0-6000 seconds can be given.

Menu level

Parameterization level

Colour switch on limit value 1, COL1:

Default: *NO*

COL1 P GREEN ORAN RED no P

With function an off-limit condition can be emphasised by a colour change of the display.

Selection of switching points, OUT:

Default: *REL1*

OUT1 P REL1 REL2 INP.1 INP.2 CON.1 CON.2 no P

Via the limit value setpoint S1 (=REL1) or setpoint S2 (=REL2) can be activated. If further limit values impact on the same setpoint, this equates to an OR-function, this means the first applied off-limit condition sets the output. Additionally a fleeting contact INP.1 (1 second) can be output onto setpoint S1 or INP.2 (1 sec) or onto setpoint S2 at an off-limit condition. If a set point confirmation via the navigation keys is desired, then CON.1 (relay 1) or CON.2 (relay 2) needs to be selected. By choosing NO the setpoints are deactivated.

Limit values / limits, LI-2:

Default: *0300*

LI-2 P 0 P 0 P 0 P 0 P

For all values, different values can be parameterized. With this, the parameters for each limit value are called up one after the other.

Hysteresis for limit values, HY-2:

Default: *0000*

HY-2 P 0 P 0 P 0 P 0 P

For all limit values, a hysteresis function exists that reacts according to the settings (threshold exceedance / threshold undercut).

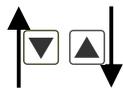
Menu level

Parameterization level

Function if display falls below / exceeds limit value, *FU-2*:

Default: *HIGH*

Fu-2 P *HIGH* *LOW* P

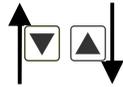


To indicate if the value falls below the lower limit value, *LOW* can be selected (LOW = lower limit value) and if it goes above the upper limit value, *HIGH* can be selected (HIGH = upper limit value). LOW corresponds to the quiescent current principle and HIGH to the operating current principle.

Switching-on delay, *TOn2*:

Default: *0000*

Ton2 P 0 P 0 P 0 P 0 P



Here, for limit value 1 a delayed switching-on of 0-6000 seconds can be given.

Switching-off delay, *TOf2*:

Default: *0000*

ToF2 P 0 P 0 P 0 P 0 P

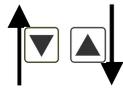


Here for limit value 1 a delayed switching-off of 0-6000 seconds can be given.

Colour switch on limit value 1, *COL2*:

Default: *NO*

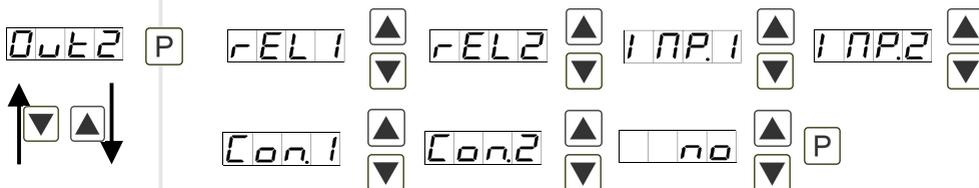
CoL2 P *GrEn* *orAn* *rEd* *no* P



Here, an off-limit condition can be emphasised by a colour change of the display.

Menu level

Parameterization level

Selection of switching points, *OUT2*:Default: *REL2*

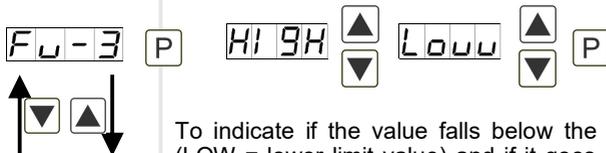
Via the limit value setpoint S1 (=REL1) or setpoint S2 (=REL2) can be activated. If further limit values impact on the same setpoint, this equates to an OR-function, this means the first applied off-limit condition sets the output. Additionally a fleeting contact *IMP.1* (1 second) can be output onto setpoint S1 or *IMP.2* (1 sec) or onto setpoint S2 at an off-limit condition. If a set point confirmation via the navigation keys is desired, then *CON.1* (relay 1) or *CON.2* (relay 2) needs to be selected. By choosing *NO* the setpoints are deactivated.

Limit values / limits, *LI-3*:Default: *0400*

For all values, different values can be parameterized. With this, the parameters for each limit value are called up one after the other.

Hysteresis for limit values, *HY-3*:Default: *0000*

For all limit values, a hysteresis function exists that reacts according to the settings (threshold exceedance / threshold undercut).

Function if display falls below / exceeds limit value, *FU-3*:Default: *HIGH*

To indicate if the value falls below the lower limit value, *LOWU* can be selected (LOW = lower limit value) and if it goes above the upper limit value, *HIGH* can be selected (HIGH = upper limit value). LOW corresponds to the quiescent current principle and HIGH to the operating current principle.

Menu level

Parameterization level

Switching-on delay, *TOM3*:

Default: 0000



Here, for limit value 1 a delayed switching-on of 0-6000 seconds can be given.

Switching-off delay, *TOF3*:

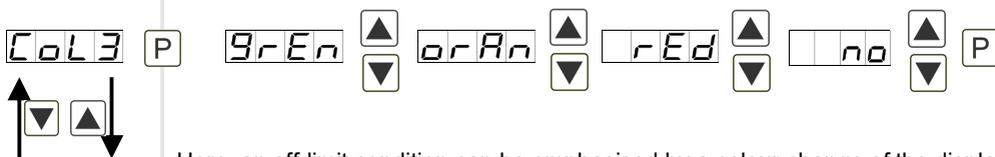
Default: 0000



Here for limit value 1 a delayed switching-off of 0-6000 seconds can be given.

Colour switch on limit value 1, *COL3*:

Default: NO



Here, an off-limit condition can be emphasised by a colour change of the display.

Selection of switching points, *OUT3*:

Default: REL3

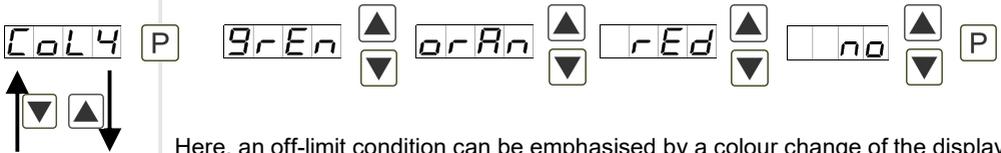


Via the limit value setpoint S1 (=REL1) or setpoint S2 (=REL2) can be activated. If further limit values impact on the same setpoint, this equates to an OR-function, this means the first applied off-limit condition sets the output. Additionally a fleeting contact IMP.1 (1 second) can be output onto setpoint S1 or IMP.2 (1 sec) or onto setpoint S2 at an off-limit condition. If a set point confirmation via the navigation keys is desired, then COM.1 (relay 1) or COM.2 (relay 2) needs to be selected. By choosing NO the setpoints are deactivated.

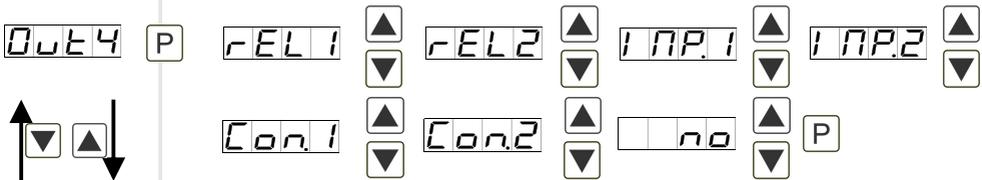
Menu level	Parameterization level
	<p>Limit values / Limits, LI-4: Default: 0500</p> <p>LI-4 P 0 P 0 P 0 P 0 P</p> <p>For all values, different values can be parameterized. With this, the parameters for each limit value are called up one after the other.</p>
	<p>Hysteresis for limit values, HY-4: Default: 0000</p> <p>HY-4 P 0 P 0 P 0 P 0 P</p> <p>For all limit values, a hysteresis function exists that reacts according to the settings (threshold exceedance / threshold undercut).</p>
	<p>Function if display falls below / exceeds limit value, FU-4: Default: HIGH</p> <p>FU-4 P HIGH LOW P</p> <p>To indicate, if the value falls below the lower limit value, <i>LOW</i> can be selected (LOW = lower limit value) and if it goes above the upper limit value, <i>HIGH</i> can be selected (HIGH = upper limit value). LOW corresponds to the quiescent current principle and HIGH to the operating current principle.</p>
	<p>Switching-on delay, TOM4: Default: 0000</p> <p>TOM4 P 0 P 0 P 0 P 0 P</p> <p>Here, for limit value 1 a delayed switching-on of 0-6000 seconds can be given.</p>
	<p>Switching-off delay, TOF4: Default: 000</p> <p>TOF4 P 0 P 0 P 0 P 0 P</p> <p>Here, for limit value 1 a delayed switching-off of 0-100 seconds can be given.</p>

Menu level

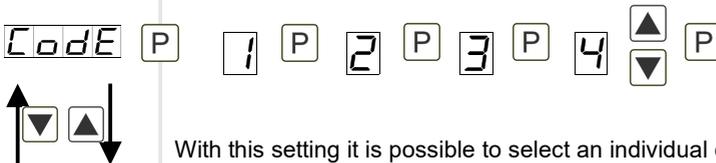
Parameterization level

Colour switch on limit value 1, COL4:Default: *NO*

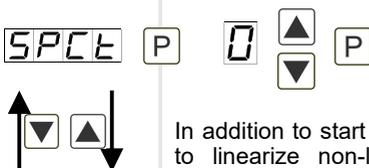
Here, an off-limit condition can be emphasised by a colour change of the display.

Selection of switching points, OUT4:Default: *REL4*

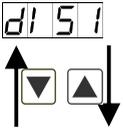
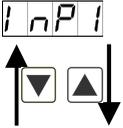
Via the limit value setpoint S1 (=REL1) or setpoint S2 (=REL2) can be activated. If further limit values impact on the same setpoint, this equates to an OR-function, this means the first applied off-limit condition sets the output. Additionally a fleeting contact *INP.1* (1 second) can be output onto setpoint S1 or *INP.2* (1 sec) or onto setpoint S2 at an off-limit condition. If a set point confirmation via the navigation keys is desired, then *COM.1* (relay 1) or *COM.2* (relay 2) needs to be selected. By choosing *NO* the setpoints are deactivated.

Setting the code, CODE:Default: *1234*

With this setting it is possible to select an individual code (works setting *1234*) for locking the keyboard. To lock/release the key, proceed according to menu item *RUN*.

Supporting points - number of additional supporting points, SPCT:Default: *0*

In addition to start value and end value, 9 extra supporting points can be defined to linearize non-linear sensor values. Only the activated supporting point parameters are displayed.

Menu level	Parameterization level
	<p data-bbox="221 167 744 199">Display values for supporting points, DIS1 ... DIS5:</p> <div data-bbox="268 231 1024 311">  </div> <p data-bbox="221 335 1080 422">Under this parameter the supporting points are defined on a value basis. At the sensor calibration one will be asked at the end (like at Final value/Offset, too), if a calibration shall be triggered.</p>
	<p data-bbox="221 434 767 466">Analogue values for supporting points, INP1 ... INP8:</p> <div data-bbox="268 502 756 566">  </div> <p data-bbox="221 598 1080 662">Supporting points are always preset according to the selected input signal mV. Here, the desired analog values can be freely adjusted in ascending order.</p>

6. Reset to default values

To return the unit to a **defined basic state**, a reset can be carried out to the default values.

The following procedure should be used:

- Switch off the power supply
- Press button [P]
- Switch on voltage supply and press [P]-button until „- - - -“ is shown in the display.

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.

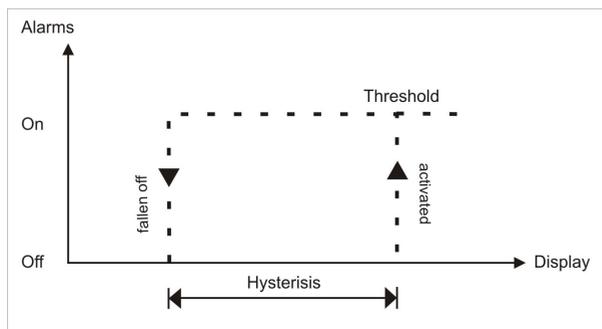
Caution! All application-related data are lost.

7. Alarms / Switching points

Functional principle of the alarms

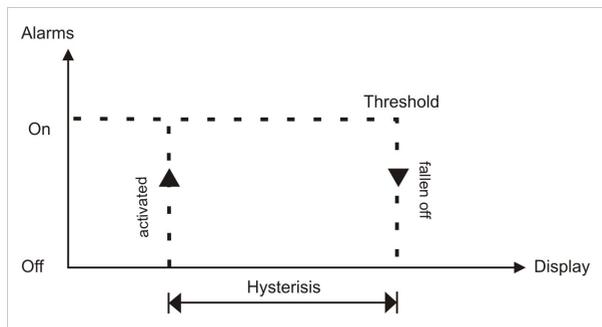
Limit value exceedance “HIGH”

By limit value exceedance the alarm S1-S2 is **off** below the threshold and **on** on reaching the threshold.



Limit value undercut “LOW”

By limit value undercut the alarm S1-S2 is **on** below the threshold and switched **off** on reaching the threshold.



Alarms / optical limit value display

Limit values can be optically indicated by flashing of the 7-segment display.

Functional principle of the alarms

Alarm	Deactivated, display value
Threshold	Threshold/limit value for switch over
Hysteresis	Width of the window between the thresholds
Function	Limit value exceedance / limit value undercut

8. Technical data

Housing				
Dimensions				
96x48	96x48x25 mm (BxHxD)			
	96x48x45 mm (BxHxD) including plug-in terminal			
Panel cut-out				
96x48	92.0 ^{+0.8} x 45.0 ^{+0.6} mm			
Insulation thickness	up to 3 mm			
Fixing	snap-in screw element			
Material	PC Polycarbonate, black, UL94V-0			
Sealing material	EPDM, 65 Shore, black			
Protection class	standard IP65 (front), IP00 (back side)			
Weight	approx. 100 g			
Connection	plug-in terminal; wire cross section up to 2.5 mm ²			
Display				
Digit height	14 mm			
Segment colour	Red, green, orange switchable via limit values			
Display range	-1999 to 9999			
Setpoints	optical display flashing			
Overflow	horizontal bars at the top			
Underflow	horizontal bars at the bottom			
Display time	0.1 to 10.0 seconds			
Input				
	Measuring range	Ri	Measuring fault	Digit
min. -22...max. 24 mA	0/4 – 20 mA	~ 100 Ω	0.1 % of measuring range	±1
min. -12...max. 12 VDC	0 – 10 VDC	~ 200 kΩ	0.1 % of measuring range	±1
Temperature drift	100 ppm / K			
Measuring time	0.1...10.0 seconds			
Measuring principle	U/F-conversion			
Resolution	approx. 18 bit at 1 second measuring time			

Switching outputs	Type	Switching contact
	Relay with change-over contact	250 VAC / 5 AAC; 30 VDC / 5 ADC 30 x 10 ³ at 5 AAC, 5 ADC ohm resistive load 10 x 10 ⁶ mechanically
Diversity according to DIN EN 50178 / Characteristics according to DIN EN 60255		
Power pack	24 VDC ±10 % max. 2 VA	
Memory		
	EEPROM	
Data life	≥ 100 years at 25°C	
Ambient conditions		
Working temperature	0...60°C	
Storing temperature	-20...80°C	
Climatic density	relative humidity 0-80% on years average without dew	
EMV		
	EN 61326	
CE-sign		
	Conformity to directive 2014/30/EU	
Safety standard		
	according to low voltage directive 2014/35/EU EN 61010; EN 60664-1	

9. Safety advices

Please read the following safety advices and the assembly *chapter 1* before installation and keep it for future reference.

Proper use

The **M1-11-tricolour-device** is designed for the evaluation and display of sensor signals.



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

Control of the device

The panel meters 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.

Installation

The **M1-11-tricolour-device** must be installed by a suitably **qualified specialist** (e.g. with a qualification in industrial electronics).

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 0.5A 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. So, you receive best measuring results.
- Screen off and twist sensor lines. Do not lay current-carrying lines in the vicinity. Connect the **screening on one side** on a suitable potential equaliser (normally signal ground).
- The device is not suitable for installation in areas where there is a risk of explosion.
- Any electrical connection deviating from the connection diagram can endanger human life and/or can destroy the equipment.
- The terminal area of the devices is part of the service. Here electrostatic discharge needs to be avoided. Attention! High voltages can cause dangerous body currents.
- Galvanic isolated potentials within one complex need to be placed on an appropriate point (normally earth or machines ground). So, a lower disturbance sensibility against impacted energy can be reached and dangerous potentials, that can occur on long lines or due to faulty wiring, can be avoided.

10. Error elimination

	Error description	Measures
1.	<p>The unit permanently indicates overflow.</p> 	<ul style="list-style-type: none"> The input has a very high measurement, check the measuring circuit. With a selected input with a low voltage signal, it is only connected on one side or the input is open. Not all of the activated supporting points are parameterised. Check if the relevant parameters are adjusted correctly.
2.	<p>The unit permanently shows underflow.</p> 	<ul style="list-style-type: none"> The input has a very low measurement, check the measuring circuit . With a selected input with a low voltage signal, it is only connected on one side or the input is open. Not all of the activated supporting points are parameterised. Check if the relevant parameters are adjusted correctly.
3.	<p>The word HELP lights up in the 7-segment display.</p>	<ul style="list-style-type: none"> 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.
4.	<p>Program numbers for parameterising of the input are not accessible.</p>	<ul style="list-style-type: none"> Programming lock is activated. Enter correct code.
5.	<p>Err1 lights up in the 7-segment display.</p>	<ul style="list-style-type: none"> Please contact the manufacturer if errors of this kind occur.
6.	<p>The device does not react as expected.</p>	<ul style="list-style-type: none"> If you are not sure if the device has been parameterised before, then follow the steps as written in <i>chapter 6</i>. and set it back to its delivery status.

