# **User Manual M1**

Resistance values: 1 k $\Omega$ , 10 k $\Omega$ , 100 k $\Omega$ , 1000 k $\Omega$ 



Installation size 96x48 mm (BxH)



Installation size 48x24 mm (BxH)



Installation size mm (BxH)



Installation size 72x36 mm (BxH)

#### **Technical features:**

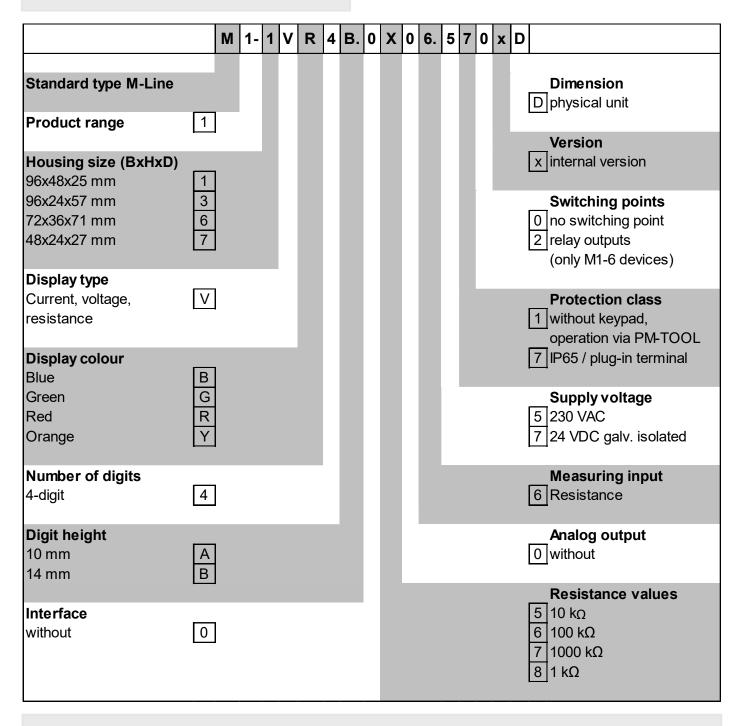
- red display of -1999...9999 digits (optional: green, orange or blue)
- minimal installation depth: 25 mm, 27 mm, 60 mm or 71 mm without plug-in terminal
- adjustment via factory default or directly on the sensor signal
- min/max-memory
- 10 adjustable supporting points
- display flashing at threshold exceedance / undershooting
- tara function
- programming interlock via access code
- protection class IP65 at the front
- plug-in terminal
- pc-based configuration software PM-TOOL with CD and USB-adapter
- on request: devices for operating temperature of -40°...+70°C (M1O)

M1 x6GB.pdf update: 27.04.2023

## Identification - Resistance values

STANDARD TYPES	ORDER NUMBER	
Housing dimension: 96x48x38 mm (incl. plug-in terminal)	M1-1VR4B.0X06.570xD M1-1VR4B.0X06.770xD	
Housing dimension: 96x24x74 mm (incl. plug-in terminal)	M1-3VR4B.0X06.570xD M1-3VR4B.0X06.770xD	
Housing dimension: 72x36x100 mm (incl. plug-in terminal)	M1-6VR4B.0X06.570xD M1-6VR4B.0X06.770xD	
Housing dimension: 48x24x54 mm (incl. plug-in terminal)	M1-7VR4A.0X06.770xD	

## Options – breakdown of order code:



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## 1. Brief description

The panel instrument **M1-x6** is a 4-digit device for resistance values 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 lock prevents unrequested changes of the parameter and can be unlocked again via an individual code.

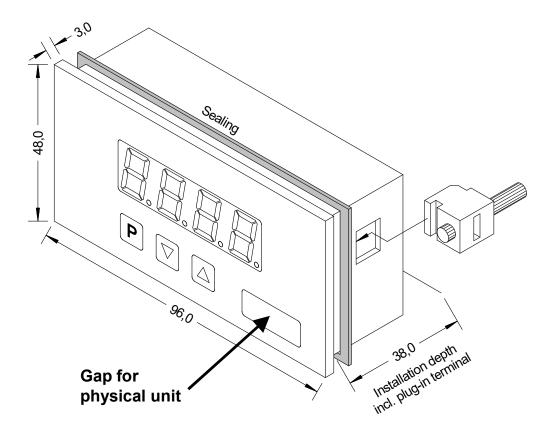
The electrical connection happens on the rear side via plug-in terminals.

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 a linearisation of the input signal, complete the modern device concept.

## 2. Assembly

Please read the *Safety advices* on *page 15* before installation and keep this user manual for future reference.

The example given below shows a device in housing size 96x48mm.

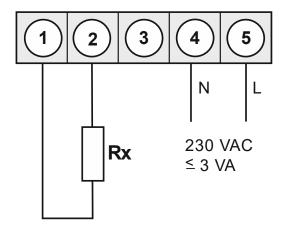


- 1. After removing the fixing elements, insert the device.
- 2. Check the seal to make sure it fits securely.
- 3. Click the fixing elements back into place and tighten the clamping screws by hand. Then use a screwdriver to tighten them another half a turn.

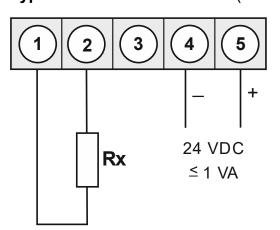
### **CAUTION!** The torque should not exceed 0.1 Nm!

# 3. Electrical connection

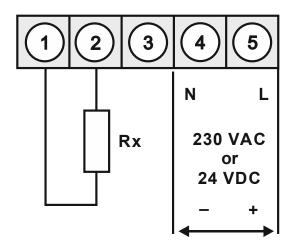
Type M1-1VR4B.0X06.570xD (96x48mm)
Type M1-3VR4B.0X06.570xD (96x24mm)



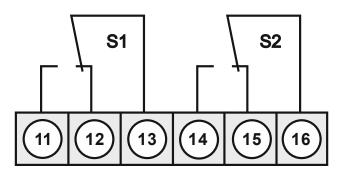
Type M1-1VR4B.0X06.770xD (96x48mm)
Type M1-3VR4B.0X06.770xD (96x24mm)
Type M1-7VR4A.0X06.770xD (48x24mm)



**Type M1-6VR4B.0X06.570xD / Type M1-6VR4B.0X06.770xD** (Housing 72x36mm)



# **Option:**



# 4. Function description and operation

#### Operation

The operation is divided into two different levels.

#### Menu Level

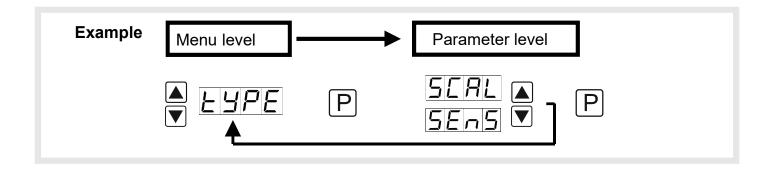
Here it is possible to navigate between the individual menu items.

#### 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		
Widing 10 Vol		For navigation at the menu level		
Parameter	P	To confirm the changes made at the parameterization level		
level		To change the value or setting		



#### 4.1. Programming via configuration software PM-TOOL-MUSB4:

You receive the software on CD incl. an USB-cable with a device adapter. 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

With this tool the device configuration can be created, skipped and saved on the PC. Via the easy to handle program surface the parameter can be changed, whereat the mode of operation and the possible selection options can be preset via the program.

#### **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

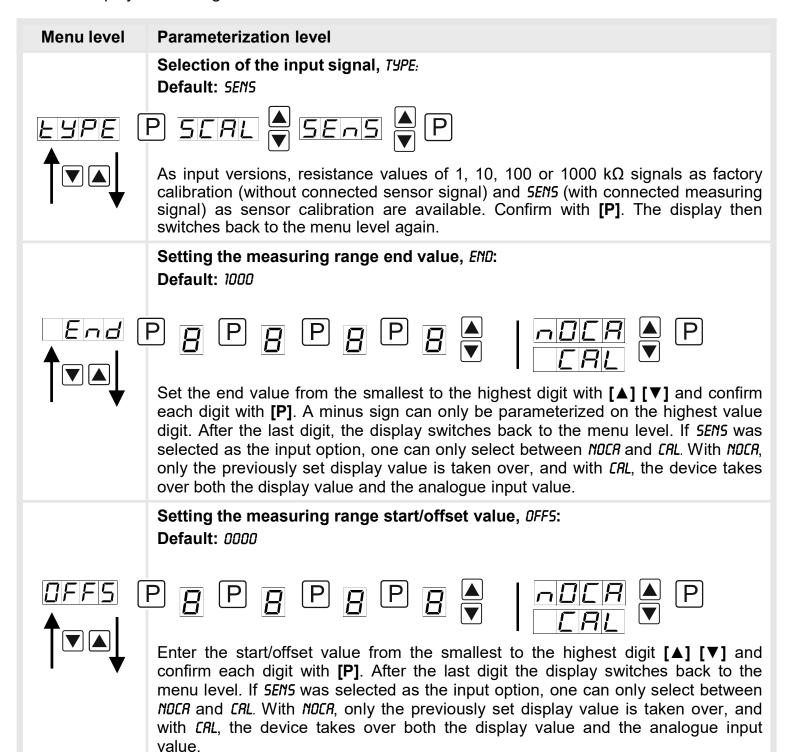
Once the installation is complete, you can start the device by applying the current loop. Check beforehand once again that all the electrical connections are correct.

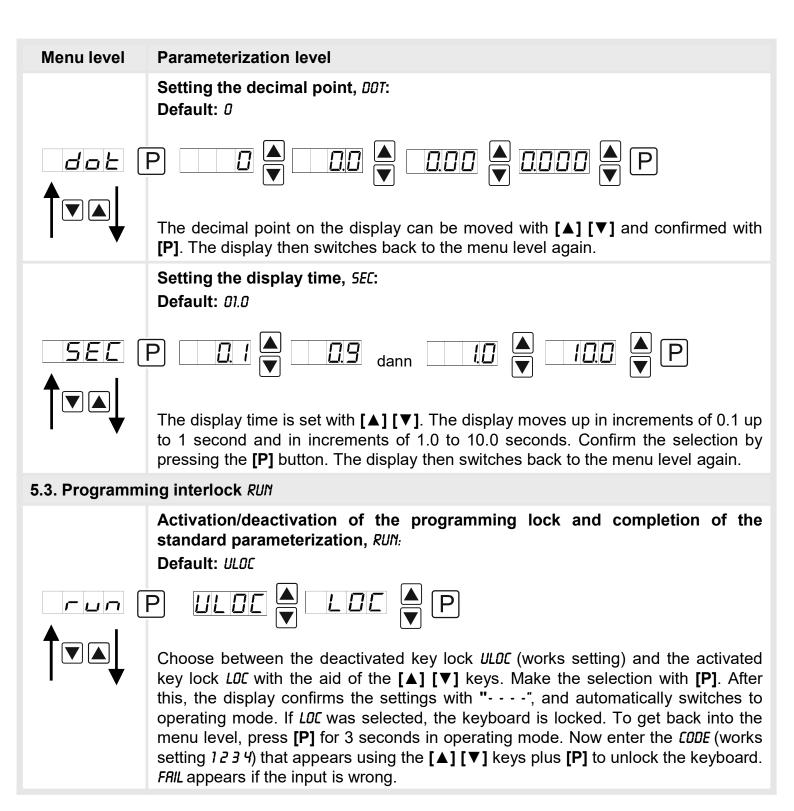
### Starting sequence

For 1 second during the switching-on process, the segment test (8 8 8 8 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. Standard parameterization:

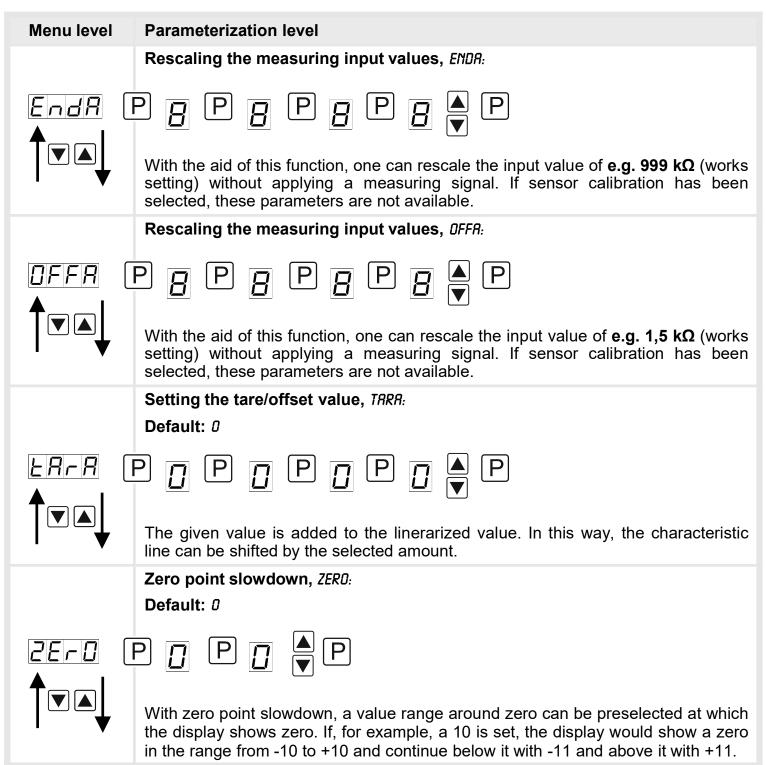
To be able to parameterize the display, press the **[P]** key in operating mode for 1 second. The display then changes to the menu level with the first menu item *TYPE*.

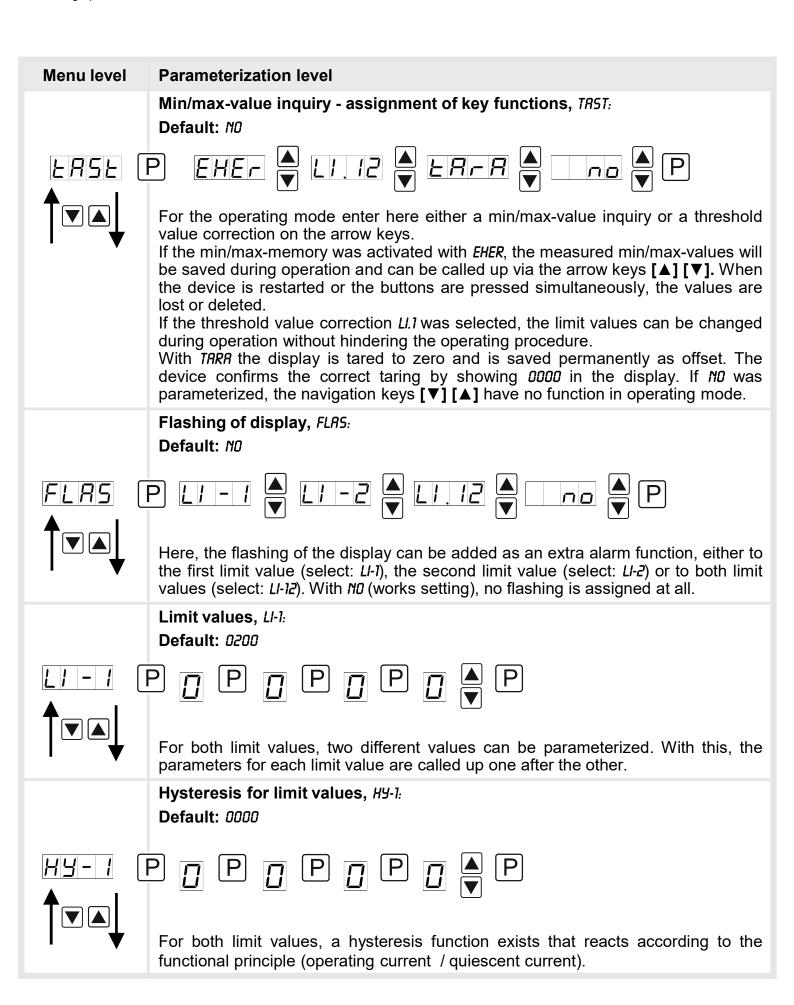


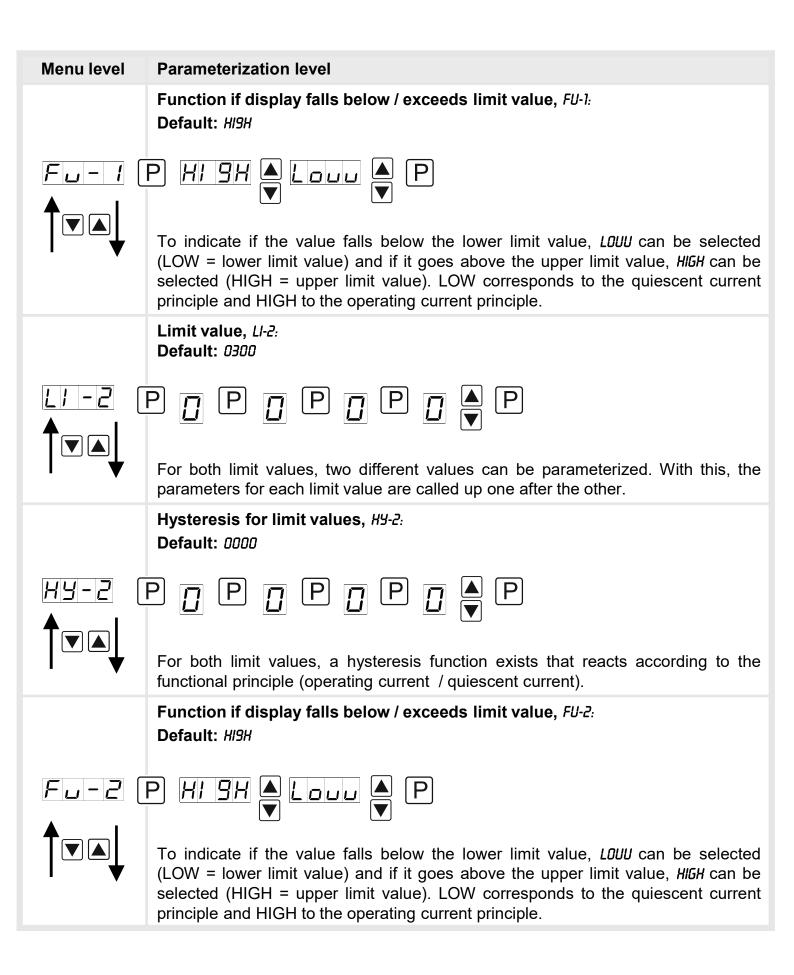


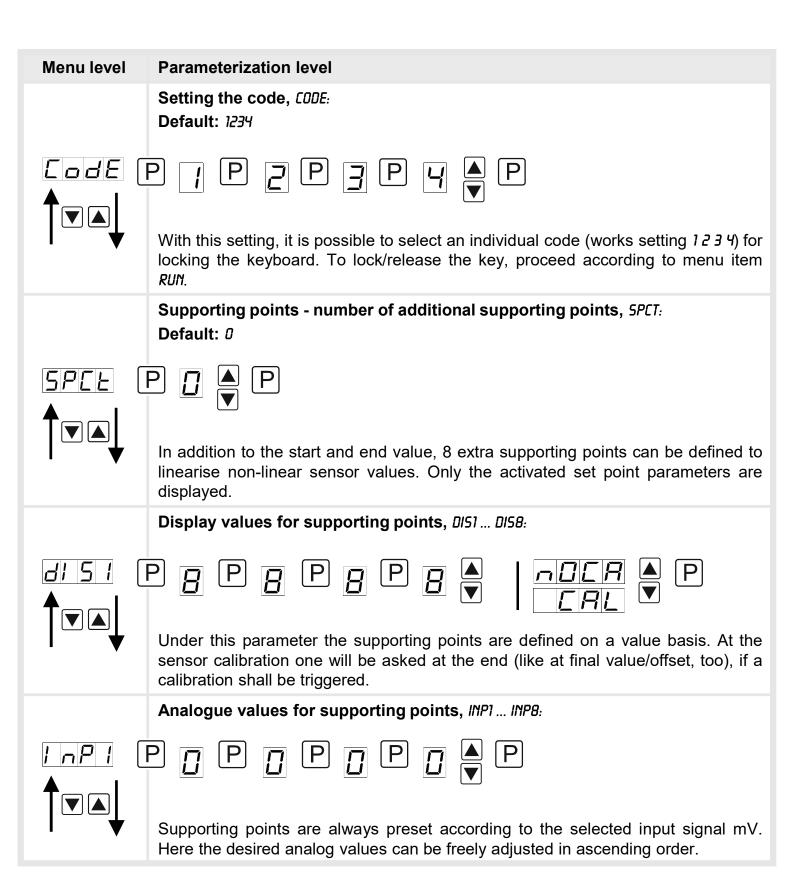
### 5.4. Extended parameterization

By pressing the  $[\blacktriangle]$  &  $[\blacktriangledown]$  keys during standard parameterization for one second, the display switches to the extended parameterization mode. Operation is the same as in standard parameterization.









# 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 [P]-button
- Switch on voltage supply and press [P]-button until "----" is shown in the display.

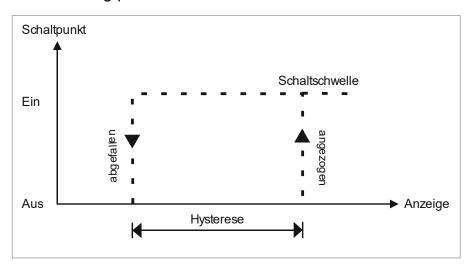
With reset, the default values of the program table are loaded and used for subsequent operation. This sets the unit back into the state in which it was supplied.

Caution! All application-related data are lost.

# 7. Functional principle of the switching points

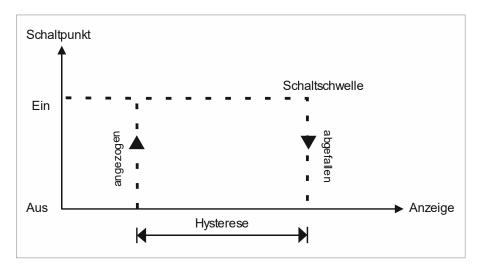
### Limit value exceedance "HIGH"

The switching point S1-S2 is "off" below the threshold and "on" on reaching the threshold.



## Limit value undercut "LOW"

The switching point S1-S2 is "on" below the threshold and switched "off" on reaching the threshold.



## Alarms / optical switching point display

An activated switching point can be optically indicated by flashing of the 7-segment display.

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

# 8. Technical data

Housing					
Dimensions	96x48x25 mm (BxHxD), D = 38 mm including plug-in terminal				
	96x24x60 mm (BxHxl	96x24x60 mm (BxHxD), D = 74 mm including plug-in terminal			
	72x36x71 mm (BxHxl	D), D = 100 mm including plug-in	terminal		
	48x24x27 mm (BxHxD), D = 54 mm including plug-in termin				
Panel cut-out	92.0 <sup>+0.8</sup> x 45.0 <sup>+0.6</sup> mm	92.0 <sup>+0.8</sup> x 45.0 <sup>+0.6</sup> mm (Housing 96x48 mm)			
	92.0 <sup>+0.8</sup> x 22.2 <sup>+0.3</sup> mm (Housing 96x24 mm)				
	68.0 <sup>+0.7</sup> x 32.0 <sup>+0.7</sup> mm	68.0 <sup>+0.7</sup> x 32.0 <sup>+0.7</sup> mm (Housing 72x36 mm)			
	45.0 <sup>+0.6</sup> x 22.2 <sup>+0.3</sup> mm	(Housing 48x24 mm)			
Insulation thickness	up to 3 mm				
Fixing	snap-in screw elemer	nt			
Material	PC Polycarbonate, bl	PC Polycarbonate, black, UL94V-0			
Sealing material	EPDM, 65 Shore, bla	EPDM, 65 Shore, black			
Protection class	standard IP65 (front),	standard IP65 (front), IP00 (back side)			
Weight	approx. 100 g (96x48 mm, 96x24 mm, 48x24 mm) approx. 200 g (72x36 mm)				
Connection	plug-in terminal; wire cross section up to 2.5 mm <sup>2</sup>				
Display					
Digit height	`	10 mm (housing 48x24 mm) 14 mm (housing 96x48 mm, 96x24 mm, 72x36 mm)			
Segment colour	red (optional green, orange or blue)				
Display range	-1999 to 9999				
Setpoints	optical display flashin	optical display flashing			
Overflow	horizontal bars at the	horizontal bars at the top			
Underflow	horizontal bars at the	horizontal bars at the bottom			
Display time	0.1 to 10.0 seconds				
Input	Measuring range	Measuring fault	Digit		
01,1 kΩ	1 kΩ	0.5 % of measuring range	±1		
011 kΩ	10 kΩ	0.5 % of measuring range	±1		
0110 kΩ	100 kΩ	0.5 % of measuring range	±1		
01100 kΩ	1000 k $\Omega$ 0.5 % of measuring range ±1				

Switching outputs	Туре	Switching contact		
Only in housing size 72x36 mm	2 relays wit change-ove contact			
Accuracy				
Temperature drift		100 ppm / K		
Measuring time		0.110.0 seconds		
Measuring princip	ole	U/F-conversion		
Resolution		approx. 18 bit at 1s measuring time		
Power pack		230 VAC ±10 % max. 3 VA 24 VDC ±10 % max. 1 VA		
Memory		EEPROM		
Data life		≥ 100 years at 25°C		
Ambient condition	ons			
Working temperat	ture	0°C60°C		
Storing temperatu	ıre	-20°C80°C		
Weathering resist	ance	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 2* before installation and keep it for future reference.

#### Proper use

The **M1-x6-device** is designed for the evaluation and display of sensor signals.



Danger! Careless use or improper operation can result in personal injury and/or cause 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-x6-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 freewheeling diodes.
- Keep input, output and supply lines separate from each other and do not lay them parallel
  with each other. Position "go" and "return lines" next to one another. Where possible use
  twisted pair. So, the best measuring results can be received.
- 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.	The unit permanently indicates overflow.	<ul> <li>The input has a very high measurement, check the measuring circuit.</li> <li>With a selected input with a low voltage signal, it is only connected on one side or the input is open.</li> <li>Not all of the activated supporting points are parameterised. Check if the relevant parameters are adjusted correctly.</li> </ul>
2.	The unit permanently shows underflow.	<ul> <li>The input has a very low measurement, check the measuring circuit.</li> <li>With a selected input with a low voltage signal, it is only connected on one side or the input is open.</li> <li>Not all of the activated supporting points are parameterised. Check if the relevant parameters are adjusted correctly.</li> </ul>
3.	The word <i>HELP</i> lights up in the 7-segment display.	The unit has found an error in the configuration memory. Perform a reset to the default values and reconfigure the unit according to your application.
4.	Program numbers for parameterising of the input are not accessible.	<ul><li>Programming lock is activated</li><li>Enter correct code</li></ul>
5.	ERR1 lights up in the 7-segment display.	Please contact the manufacturer if errors of this kind occur.
6.	The device does not react as expected.	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.

