

## PKM 02

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2-channel press force measuring device

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### Subject to changes

Subject to changes in the interests of technical advancement.

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*Italic* or **bold** font refers to the title of a document or is used to highlight text.

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## 1 Change index

Change	Date	Index
First edition	13. june 23	00

## 2 General

This user manual contains the following subjects:

- Electrical specifications
- Installation
- Commissioning
- Configuration/parameterization

Since the documentation has a modular structure, this user manual is deemed a supplement to other sources of documentation such as product data sheets, dimensional drawings, brochures and assembly instructions.

The user manual may form part of the scope of delivery depending on customer specifications or it may be requested separately.



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*These operating instructions are kept up-to-date. However, since **TRsystems GmbH/UNIDOR** products are subject to continuous further development, it is possible that short-term deviations between the device version and the operating instructions might occur due to technical changes. Please note that we do not assume liability for damage which might arise as a result.*

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### 2.1 Scope of application

This user manual solely applies to the following product:

PKM 02

Order number: 1050 300X 0000

The products are marked by attached nameplates and form part of a system.

Therefore, the following documentation applies:

- The system-specific operating instructions of the operator
- This user manual
- Further documents supplied together with system

### 3 Additional safety notes

#### 3.1 Definition of icons and notes



*means that minor physical injury or property damage may occur if appropriate precautions are not taken.*

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*refers to important information and/or characteristics of and application advice for the product used.*

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#### 3.2 Supplement notes to the intended use

The system is designed to be used in **Ethernet** networks with a maximum speed of 100 Mbs for full-duplex operation specified in IEC 61158 as CPF2/2 (Communication Profile)

The technical directives on establishing the Ethernet network must be complied with in order to ensure safe operation.



***The intended use also includes:***

*observing all notes contained in this user manual,  
observing the assembly instructions, in particular the chapter "**Fundamental safety notes**" must be read and understood before beginning to work*

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#### 3.3 Organizational measures

This user manual must always be available at the place of use of the system.

Before beginning work, the personnel assigned to perform activities on the system must have read and understood

- the assembly instructions, in particular the chapter "Fundamental safety notes",
- and this user manual, in particular the chapter "Additional safety notes"

This particularly applies to temporary personnel.

#### 4 Technical data

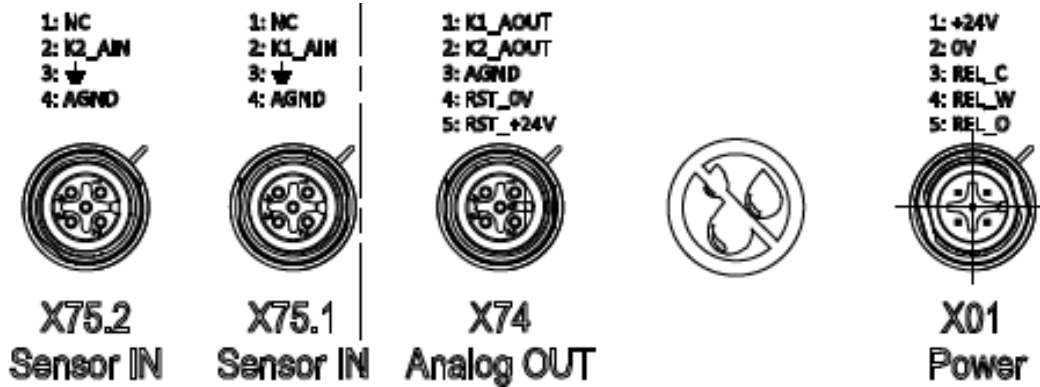
design	PKM 02
display	2x pointer instrument 0-130% drag indicator
operating system	2x potentiometer 0-100% 2x reset-/2x testbutton
power supply	24V DC
power consumption	ca. 6W
temperature range	0-60°C
humidity	max. 95% non condensing
input impedance amplifier	1013 $\Omega$
output signal analog	47 $\Omega$ / 0-10V DC via M12 socket 5pin
output signal digital	NC contact max. 250V AC/1A
dimensions (WxHxD)	264.5x175.14x59.0mm
weight	ca. 2.3 kg

#### 5 Introduction

The PKM 2000 is an analog press force measuring device with 2 channels. The control and monitoring components installed in the device have been designed according to state-of-the-art technology. The extension and compression of the press is measured by the piezo sensors. The piezo sensors then convert the extension (compression), proportional to the force, into an electric voltage. The maximum force occurring in any one cycle is saved to memory and displayed and compared to the set value. If the set values are exceeded, the press is automatically switched off. The values can be set to up to 130% of the press load as the tools often have an asymmetric force distribution.

*Please note: 100% for each side of the press is equal to 50% of the overall tonnage.*

## 6 Signals and connection diagram



### Inputs PKM 02

On the rear of the device there are two M12 connection sockets (X75.1 and X75.2) to connect the piezo sensors.

### Outputs and power supply PKM 02

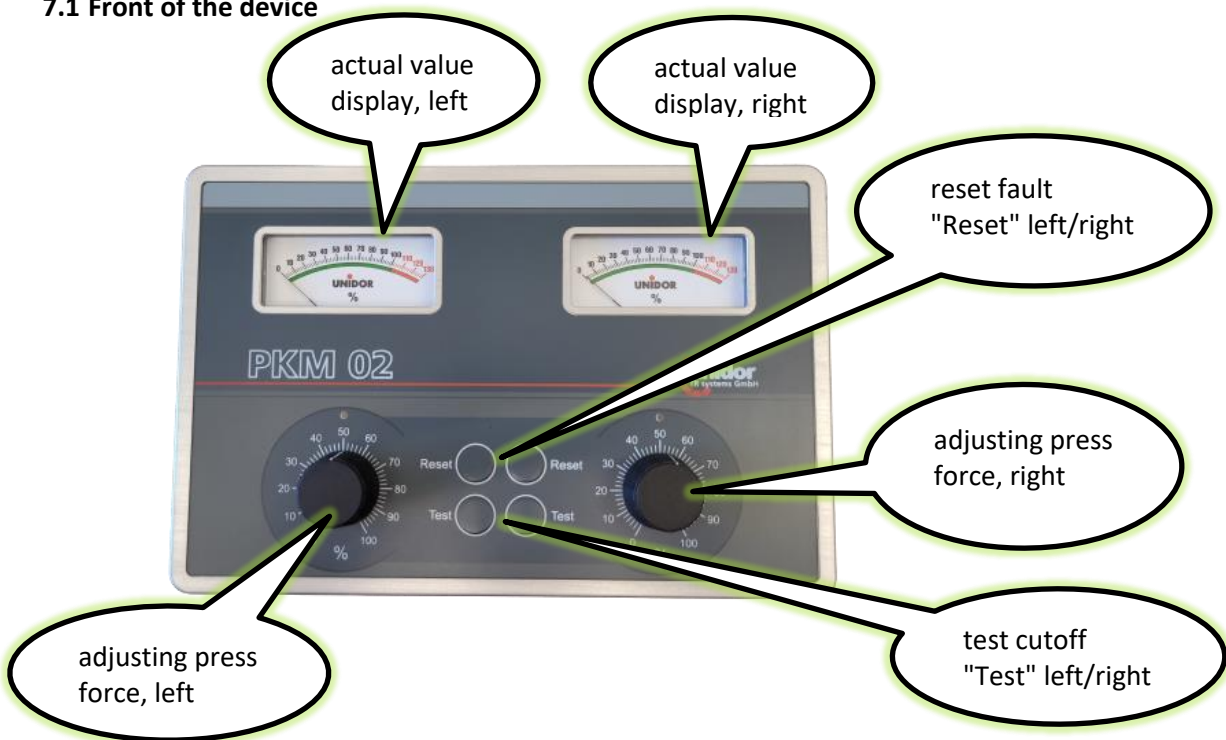
M12 socket X01 machine - stop. The relay is linked to the stop circuit of the machine. linked. This stops the machine immediately in the event of an error.

### Analog output/reset

Channel1 and channel2 via M12 socket X74 Output voltage 0-10V DC

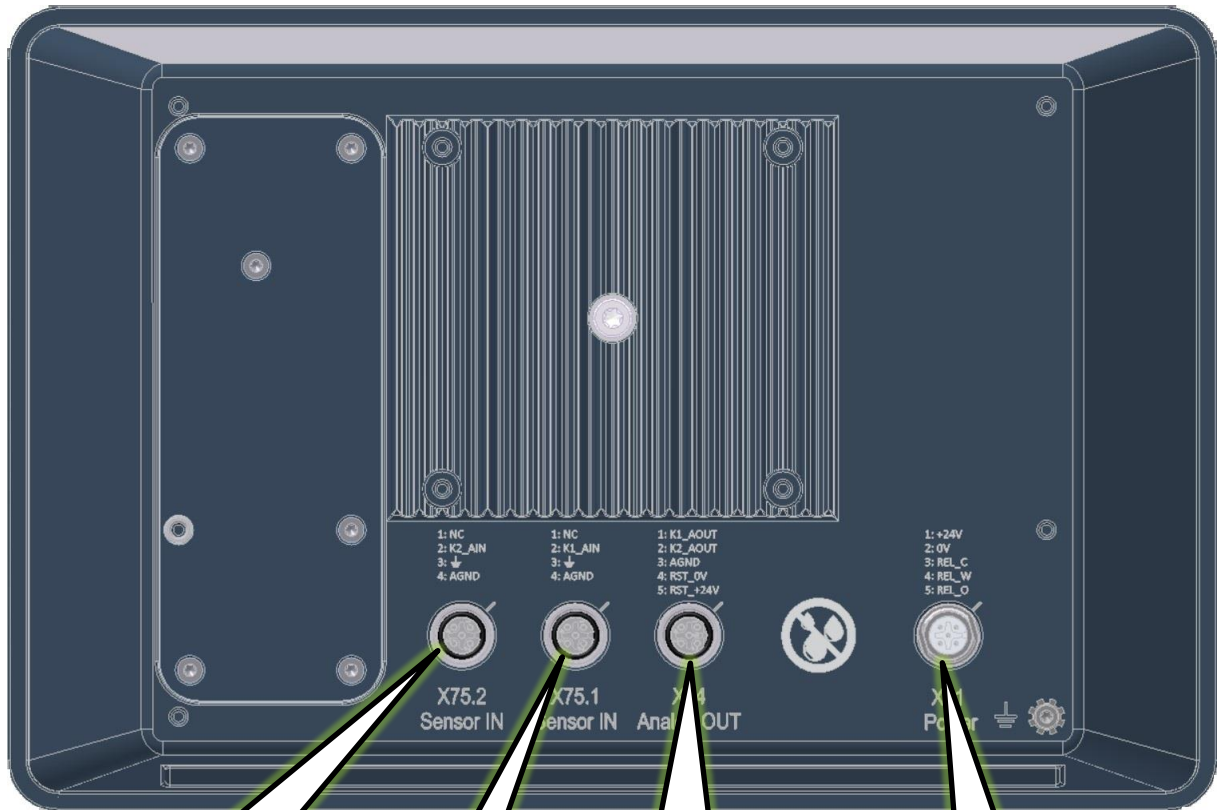
## 7 View of the device

### 7.1 Front of the device





## 7.2 Back of the device



X75.2 sensor input channel 2

X75.1 sensor input channel 1

X74 analog output/reset

X01 power supply and stop output

## 8 Programming the cutoff values

Turn the setting dial "max. press force" to the press force you require.

Example: If you set the dial to 40%, a press with 1000 kN - i.e. 500 kN for each side - will automatically be switched off if a press force of >200 kN is reached. The value last recorded is saved for several seconds and can be read off the instruments.

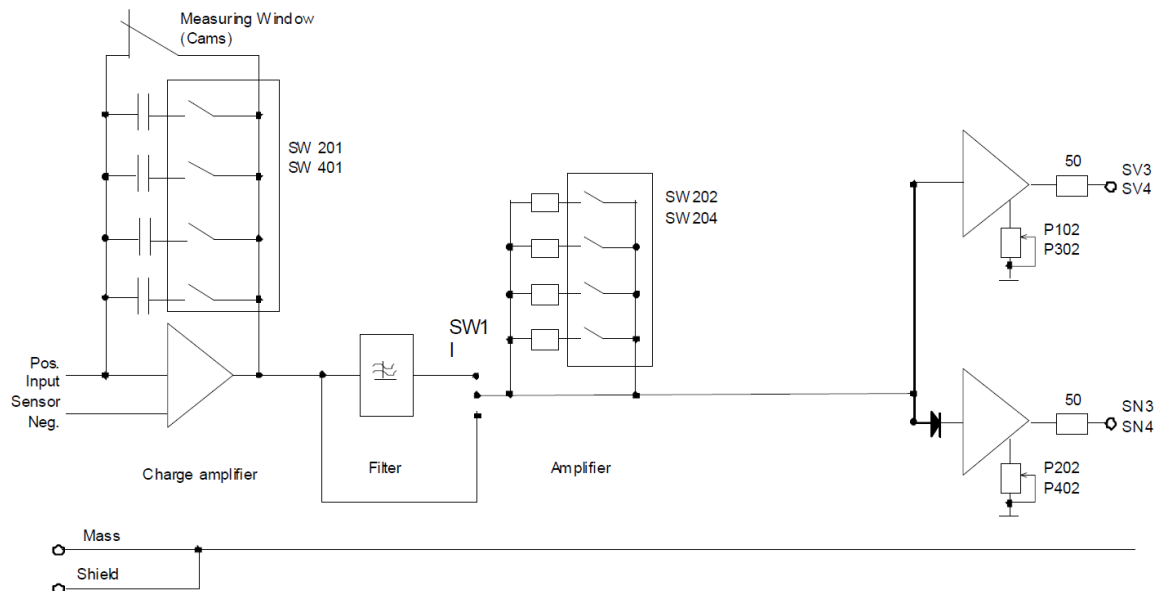
### 8.1 Resetting faults

By pressing the RESET button or over X74 the fault will be reset. The display shows 0% again. The device is ready for operation.

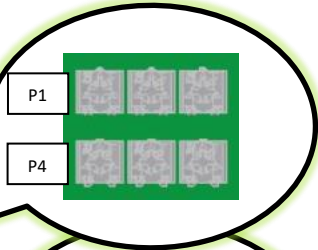
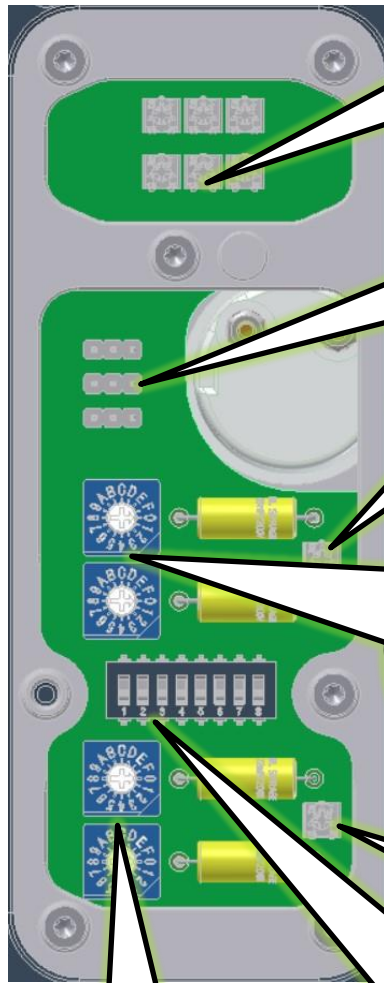
### 8.2 Test

By pressing the TEST button, the 100% display can be checked. If the limit values on the setting dials are set to <100%, the output relay cuts off. (Checking the cutoff function).

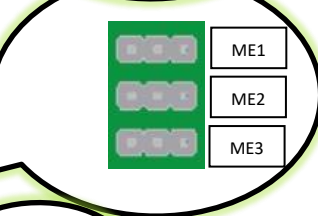
### 8.3 Block diagram



## 8.3.1 View of the board



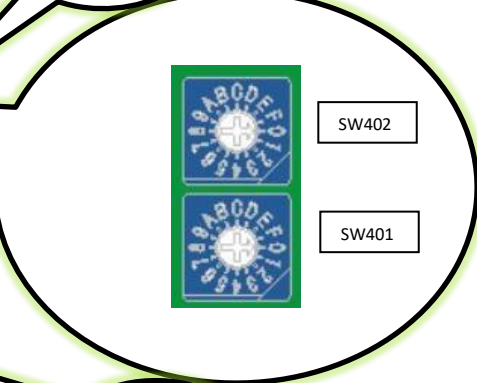
poti P1-3 setting comparator stage channel 1  
poti P4-6 setting of comparator stage channel 2  
factory settings



jumper ME1 setting  
jumper ME2 setting  
jumper ME3 setting



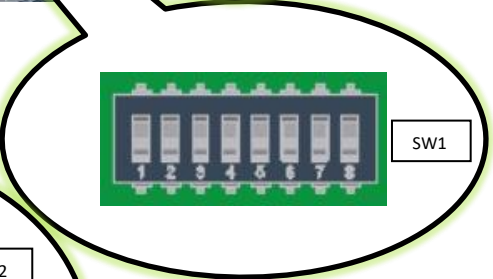
P302 trimmpoti channel 2



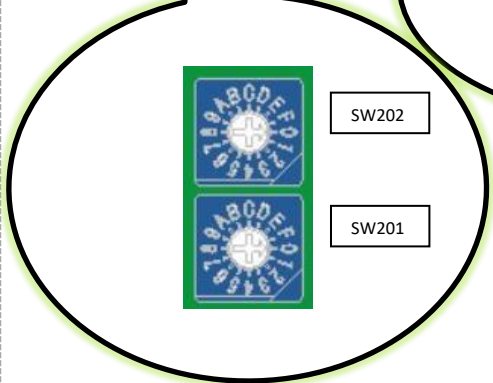
SW402 amplifier stages channel 2  
SW401 capacity levels integrator channel 2



P102 trimmpoti channel 2

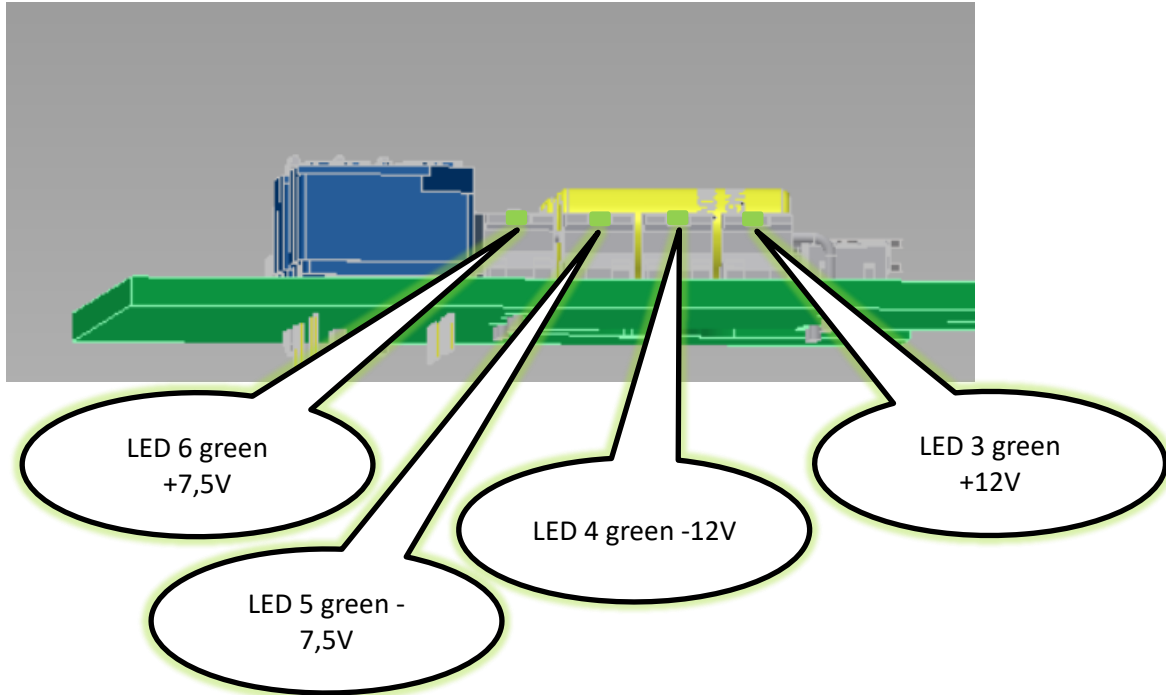


SW1 DIP switch on and off signal- filter stages  
channel 1+2



SW202 amplifier stages channel 1  
SW201 capacity levels integrator channel 1

### 8.3.1 View of the board



### 8.4 Connections and settings on the board

To adjust the capacitance and gain, the rear cover of the device must be removed.  
be removed.

*Warning! Before opening the device, ensure it is disconnected from the mains.*

## 8.4.1 Settings for code switches

Codeswitches SW201(401) capacity (nF)

0	71,8
1	65,0
2	61,8
3	55,0
4	49,8
5	43,0
6	39,8
7	33,0
8	38,8
9	32,0
A	28,8
B	22,0
C	16,8
D	10,0
E	6,8
F*	0,0

SW402



SW401

SW202



SW201

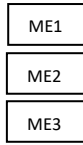
Codeswitches SW202(402) amplification

0	11,12
1	11,08
2	11,03
3	10,96
4	10,93
5	10,84
6	10,76
7	10,64
8	10,48
9	10,27
A	10,07
B	9,67
C	9,51
D	8,80
E	7,90
F	5,27

\*setting not permitted

### 8.4.2 jumper und DIP-switch settings

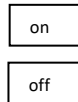
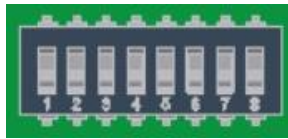
#### jumper ME1-ME3



ME1+2 sampling latch channel 1+2: jumper left 2.2 $\mu$ F/right 10  $\mu$ F

ME3 reference voltage: jumper left Uref = 7.06V/right Uref = 6.79V

#### DIP-switch SW1



##### switch 1-4 filter setting channel 1

*either turn on only 1 or 2, or turn on none\**

F limit = 1KHz (33nF) (default 1+2= OFF)

1 F limit = 100Hz (220nF || 33nF) (1=ON, 2=OFF)

2 F limit = 355Hz (47nF || 33nF) (2=ON, 1=OFF)

*either turn on only 3 or 4, or turn on none\**

3 with filter (default 3=ON, 4=OFF)

4 without filter (4=ON, 3=OFF)

##### switch 5-8 filter setting channel 2

*either only 5 or 6, or turn on none\**

5 with filter (default 5=ON, 6=OFF)

6 without filter (6=ON, 5=OFF)

*either only 7 or 8, or turn none on\**

F limit = 1KHz (33nF) (default 7+8= OFF)

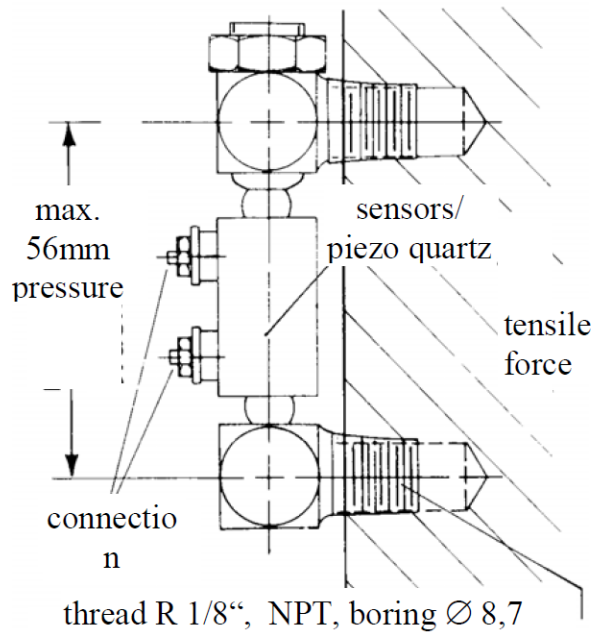
7 F limit = 100Hz (220nF || 33nF) (7=ON, 8=OFF)

8 F limit = 355Hz (47nF || 33nF) (8=ON, 7=OFF)

*\*never both at the same time, otherwise this can lead to malfunctions or damage to the electronics!*

### 8.5 Piezo sensor connection

The piezo sensors delivered with the device are mounted to the press either on the pressing or drawing side (see diagram below). In order to protect the sensors, please place the protective caps over the sensors once the latter have been mounted and calibrated. The cables that connect the sensors to the device should not be disconnected or extended with either connectors or terminals (charge loss).



#### Assignment sensor JZT 127

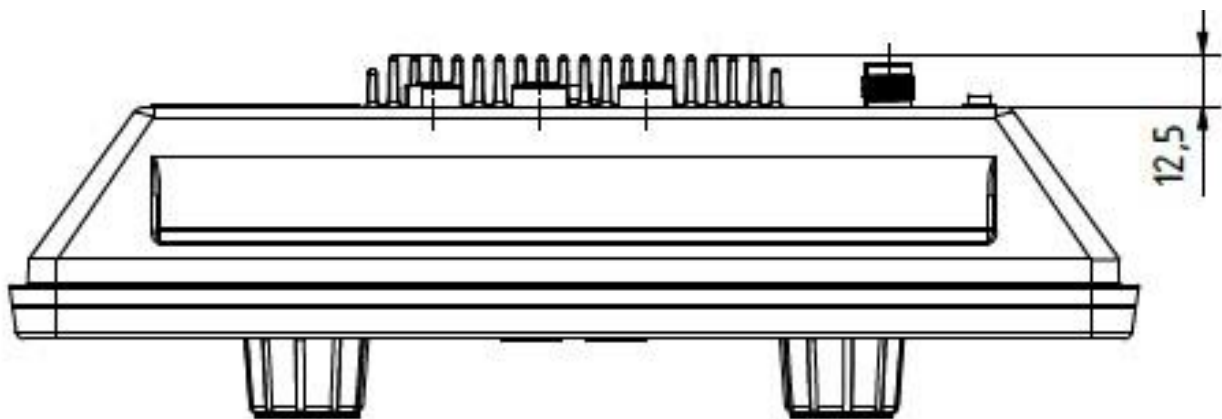
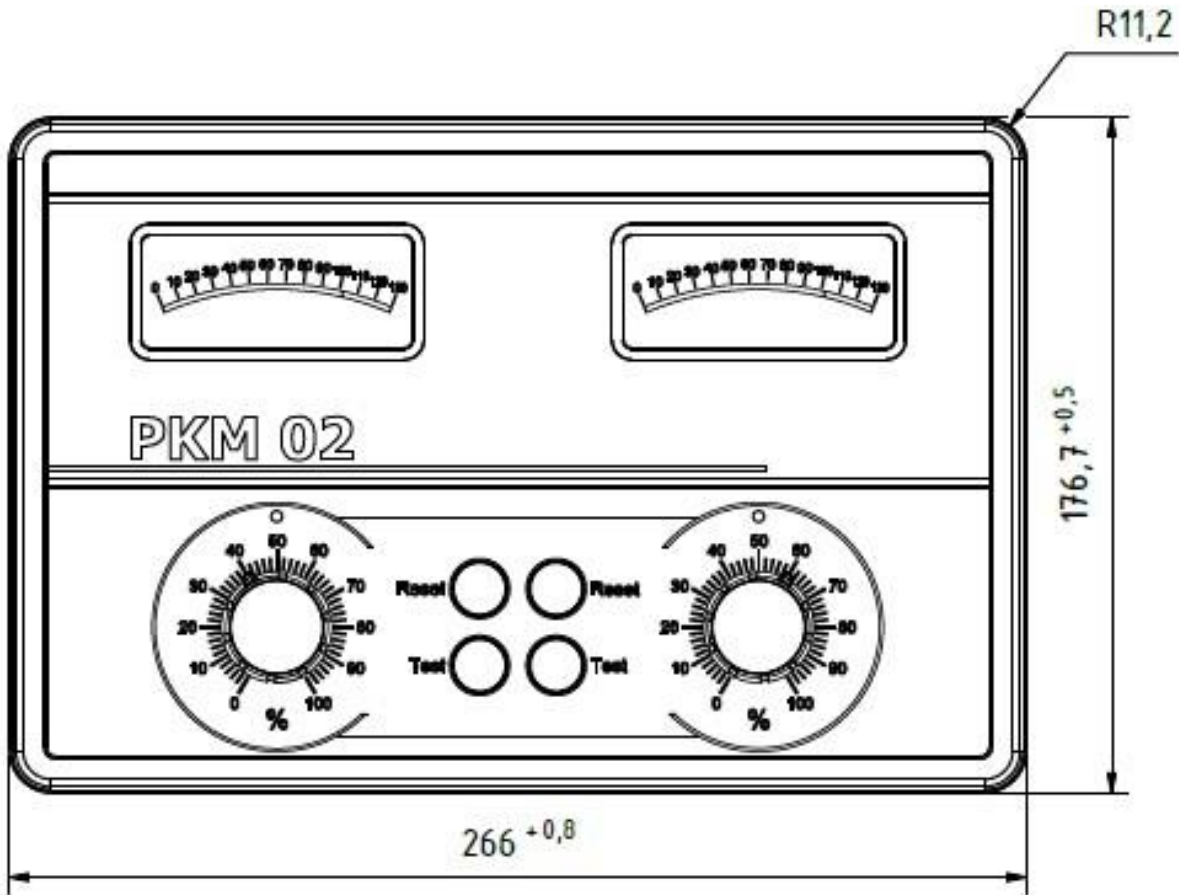
Press	pull
<b>channel 1+</b>	<b>channel 1 -</b>
black	red
red	black
<b>Channel 2+</b>	<b>Channel 2 -</b>
black	red
red	black

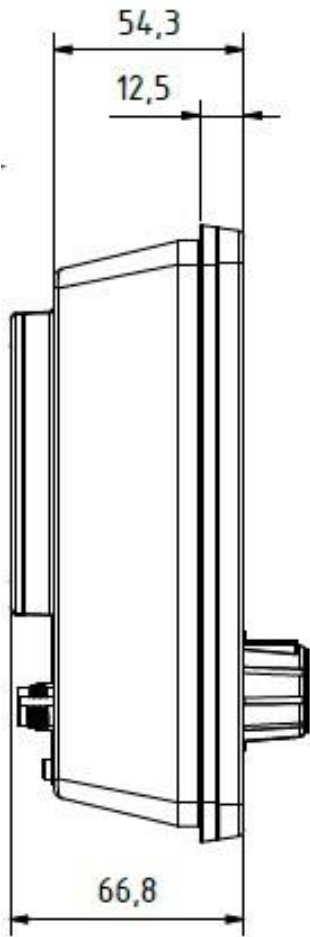
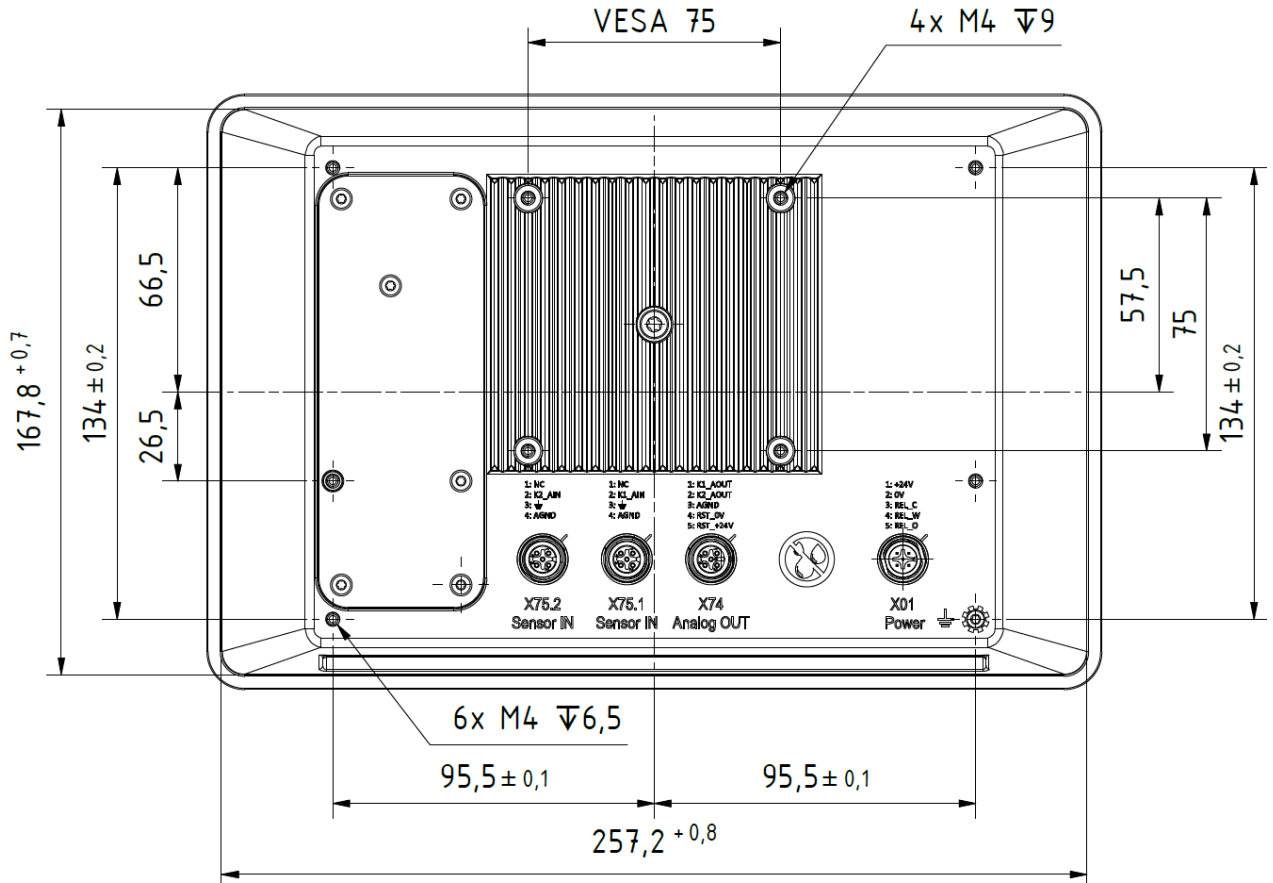
## 8.6 Initiation

- wire up the sensors and connecting cables
- connect the distribution voltage
- connect the press stop output to the press control
- set the amplifier to basic position 3 using the code switch SW202 (SW402)
- set the maximum performance of the object to be measured (e.g. max. press force)
- keep pressing the code switch SW201 (SW401) until the required output voltage is shown on the display (max. 10 V)
- using the code switch SW202 (SW402) you are also able to compensate the differing sensitivity of the sensors, for those devices with several channels
- if the board is replaced (service), please ensure that the code switches are set to the same values as before, otherwise there could be a danger of overloading. It may also be necessary to recalibrate the device.



## 9 Dimensions





## 10 EC Declaration of Conformity

**Manufacturer:** TRsystems GmbH, System department Unidor  
**Factory:** Unidor, Freiburger Straße 3, D-75179 Pforzheim

hereby confirm for the

**Product:** PKM 02  
**Device type:** Press Force Measuring Device  
**Model name:** PKM 02

compliance with the EC Directive 89/392/EEC and the following standards:

- ✓ EN 60204.1, Electrical Equipment for Industrial Machines
- ✓ Electromagnetic Compatibility 89/336/EEC IEC 801 Parts 1, 2, 4
- ✓ EN 55011 Radio Interference Voltage
- ✓ EN 55022 Noise Radiation
- ✓ VDE 0100, VDE 0113, EN 60204

**Issued by:** TRsystems GmbH, System department Unidor  
**Date:** 13 June 2023  
**Place:** Pforzheim, Germany

