User manual

Universal measuring transducer UMU 500

Version 2.1.1

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Content

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1. General

1.1 For information

- These operating manual provides important information on handling the measuring element. A prerequisite for safe working is compliance with all specified safety notes and instructions for action.
- The qualified personnel must have read and understood these operating manual before mounting and starting up the sensor.
- These operating manual is a component part of the product. Therefore, keep them in a place that is accessible to all users at all times, close to the place of use.
- The local regulations and safety rules applicable to the area of application of the sensor must be observed.
- If the serial number on the type label is no longer readable (e.g. due to mechanical damage), traceability is no longer ensure.
- The sensor described in the user manual are developed and manufactured according to the newest finding. All components are subject strict quality and environmental criteria during production.
- The manufacturer shall not be liable if damage is caused by improper use, non-observance of these operating instructions, use of insufficiently qualified personnel and unauthorized modifications to the sensor.

1.2 Signs and abbreviations

Warning!
Non-observance can lead to injuries to persons and/ or destuction of the device. There may be danger to life.

Attention!
Non-observance can lead to incorrect operation of the device or damage to property.

Information!
Non-observance can influence the operation of the device or cause undesired device reactions.

Danger!
If the safety instructions are not observed, there is a risk of serious or fatal injury from electric current.

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Warning!
A dangerous situation may possibly occur, which can lead to burns due to hot surfaces or liquids if they are not avoided.

2. transport, packaging and storage

2.1 transport

Inspect the device for a damage that may have occurred during transport. Report obvious damage immediately.

2.2 packaging

Do not remove the packaging until immediately before assembly. Keep the packaging, because it provides optimal protection during transport (e.g. changeable installation location, return).

2.3 storage

Avoid the following influences during longer storage:
- Direct sunlight or close to hot objects
- Mechanical vibration, mechanical shock (hard set up)
- Soot, steam, dust and corrosive gases

If possible, store the device in the original packaging or appropriate packaging.

3. Safety instructions

Further important safety instructions can be found in the individual chapters.

3.1 Intended use of the product

The sensor is designed and constructed exclusively for the intended use described here and may only be used as follows. The technical specifications in these operating instructions must be observed.
Improper handling or operation of the unit outside the technical specifications requires immediate decommissioning and inspection by the manufacturer. If the unit is transported from a cold to a warm environment, condensation may cause the unit to malfunction. Wait for the temperature of the appliance to adjust to the room temperature before starting it up again. Claims of any kind are excluded due to improper use.

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3.2 Personnel qualification

Risk of injury due to inadequate qualification Improper handling can lead to considerable personal injury and damage to property.
The activities described in these operating instructions may only be carried out by qualified personnel with the following qualifications.
Keep unqualified personnel away from the hazardous areas.

For installation and commissioning of the sensor, these persons must be familiar with the applicable country-specific directives and standards and have the appropriate qualifications. They must have knowledge of measurement and control technology, be familiar with electrical circuits and be able to carry out the work described and recognise possible dangers independently. Depending on the conditions of use, other knowledge may also be required, e.g. about aggressive media.

3.3 Special hazards

Observe the country-specific regulations (e.g. standards) and, in the case of special applications, observe the applicable standards and directives (e.g. for hazardous media such as Acetylene, flammable or toxic substances as well as refrigeration plants and compressors).
If the relevant regulations are not observed, serious personal injury and damage to property may result!

Electrostatic discharge (ESD) protection is required. Proper use of grounded work surfaces and personal wrist straps is required when working with open circuits (printed circuit boards) to prevent damage to sensitive electronic components from electrostatic discharge.

There is danger to life from electric current. There is a immediate risk of death if live parts are touched. Installation and mounting of electrical equipment may only be carried out by qualified electricians. When operating with a defective power supply unit (e.g. short-circuit from mains voltage to output voltage), life-threatening voltages can result at the device.

Residual media in devices that have been removed can be hazardous to persons, the environmet and equipment. Sufficient precautions must be taken. This device must not be used in safety or emergency stop devices. Incorrect applications of the device can lead to injuries. In case of a fault, aggressive media at extreme temperatures and under high pressure or vacuum may be present at the device.

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4. Commissioning and operation

4.1 Brief description and function

The **UMU 500** is a measuring transducer for top-hat rail mounting and is used to measure voltage/current, temperature and frequency. The configuration happens via 3 front keys or via optional PC-Software PM-TOOL. An integrated programming interlock prevents unwanted changes of parameter and can be unlocked via an individual code. Optionally, the display can be equipped with a sensor supply and an analogue output.

4.2 Before mounting

Check that a fully assembled transmitter has been supplied.
Inspect the unit for any damage that may have occurred during transport. If such damage is present, notify the transport company and supplier immediately.
Keep the packaging as it provides optimum protection during transport.
Make sure that the housing and the connection contacts are not damaged.

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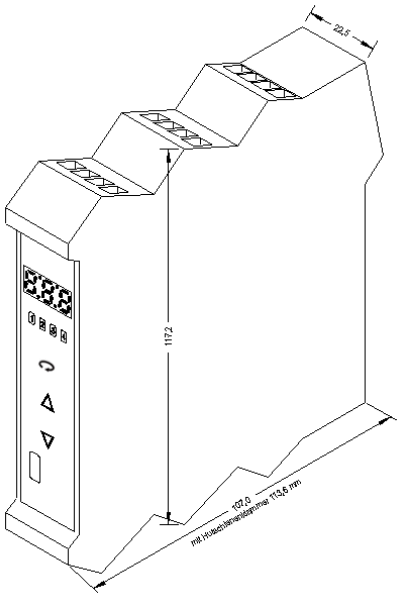
4.3 Assembly

Please read the safety instructions on page 46 before assembly and keep this manual for future refererence.



The **UMU 500** measuring transducer is already prepared for top-hat rail mounting. Simply place the device on the top hat rail in the correct position.
By pressing down the orange lever, the display is automatically locked.

4.4 Electrical connection and connection examples

The unit is not approved for electrical installations in explosionproof areas.

After mounting the unit, it is essential to check whether the housing is connected to an earth potential.

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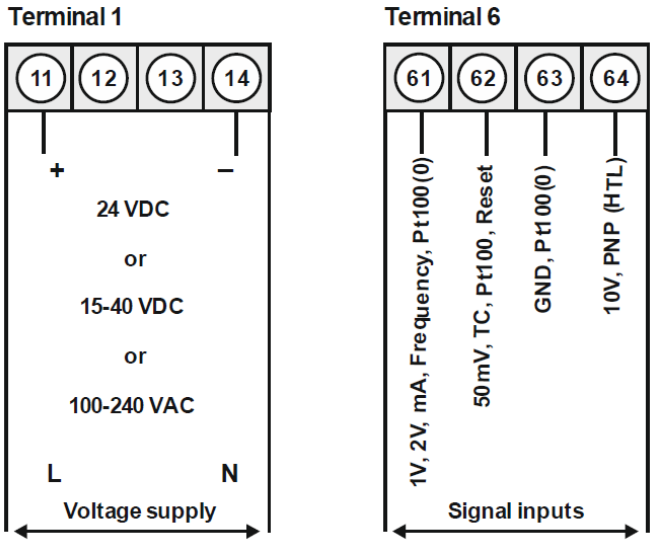
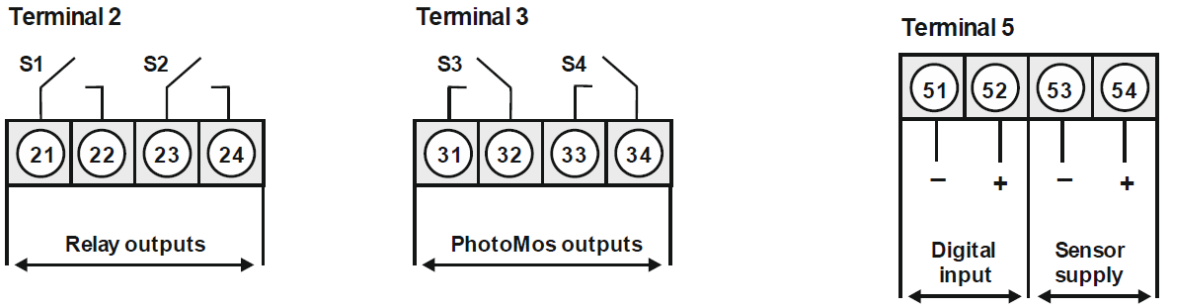
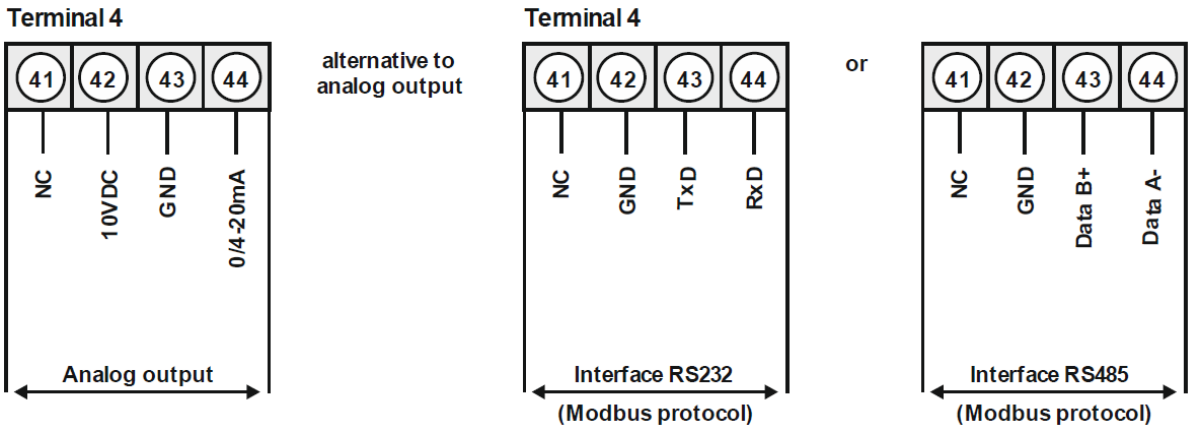
4.4.1 Pin assignment



Options:





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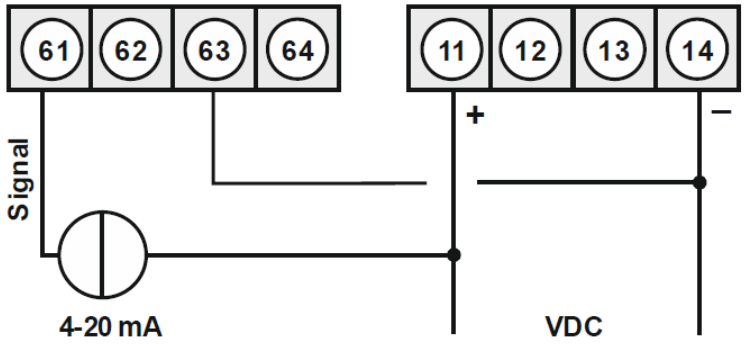
Connection examples

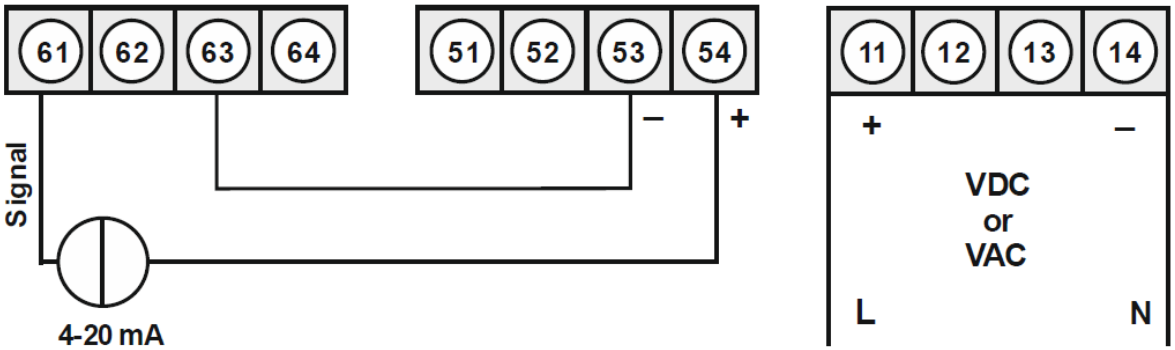
Below you will find some connection examples in which practical applications are shown:

4.4.2 Current / Voltage

2-wire sensor 4-20 mA



2-wire sensor 4-20 mA in combination with 24 VDC sensor supply



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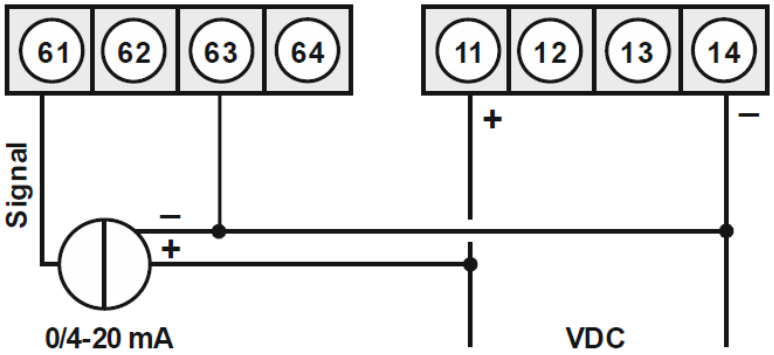
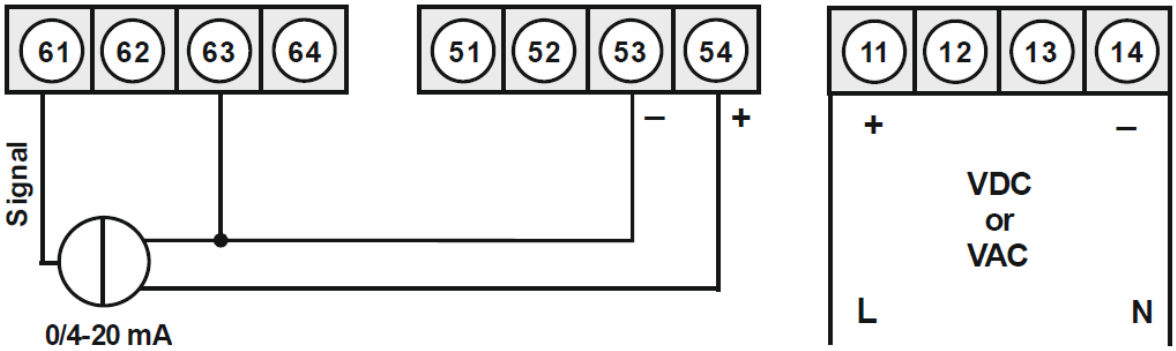
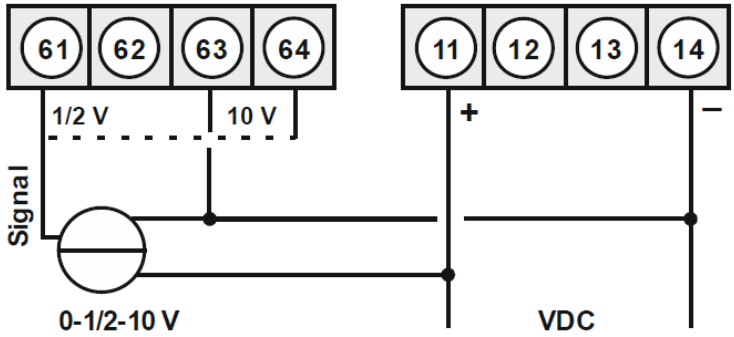
3-Leiter Sensor 0/4-20 mA



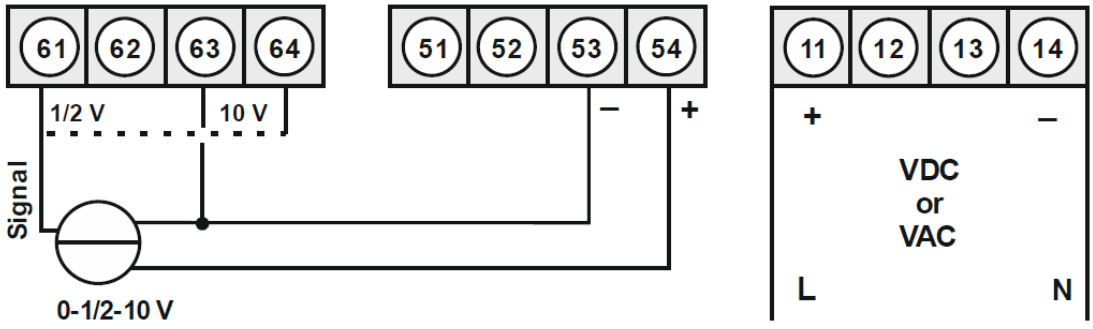
3-wire sensor 0/4-20 mA in combination with 24 VDC sensor supply



3-wire sensor 0-1/2-10 V



3-wire sensor 0-1/2-10 V in combination with 24 VDC sensor supply



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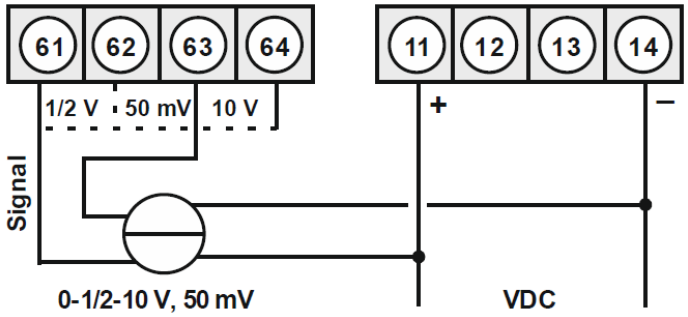
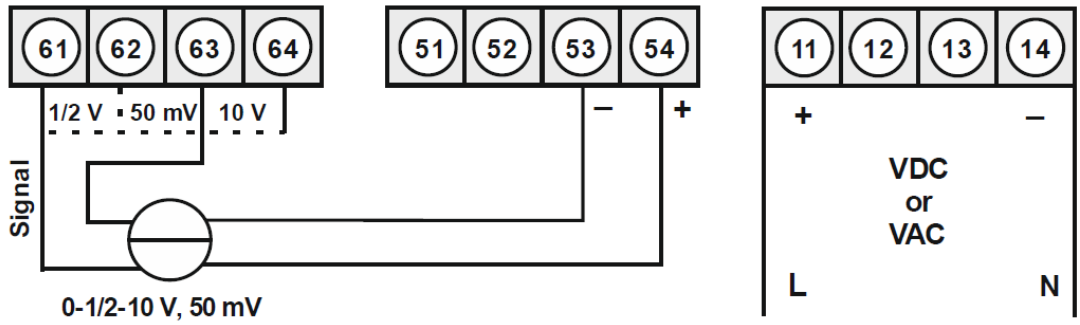
4-wire sensor 0-1/2-10 V, 50 mV

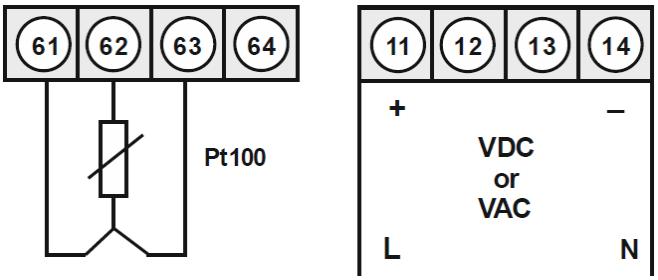


4-wire sensor 0-1/2-10 V, 50 mV in combination with 24 VDC sensor supply

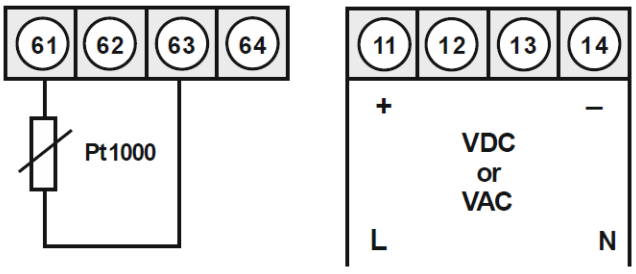


4.4.3 Temperature

Pt100 3-wire



Pt1000 2-wire



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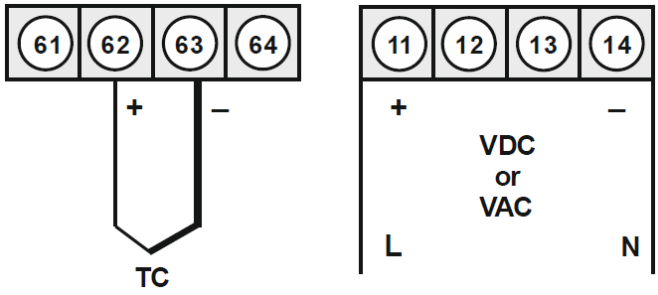
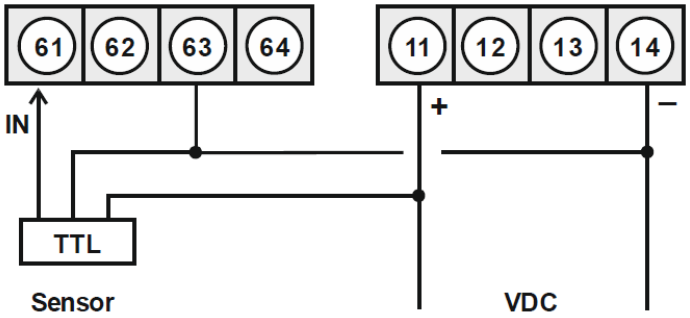
Thermocouple

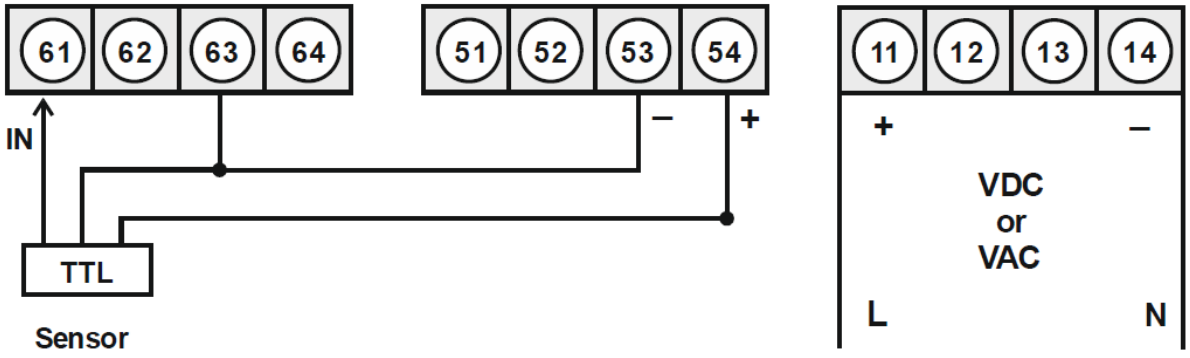


4.4.4 Frequency / Rotational speed

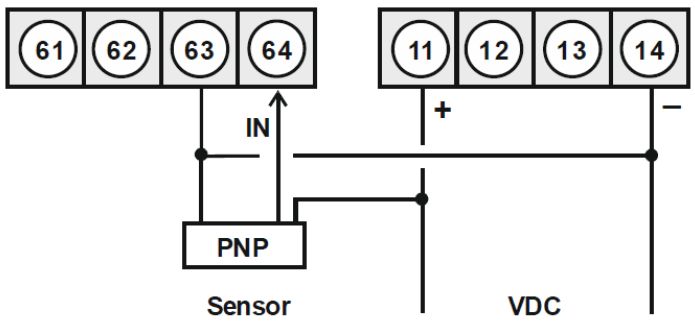
Sensor with TTL-output



Sensor with TTL-output in combination with 24 VDC sensor supply



Sensor with PNP-output



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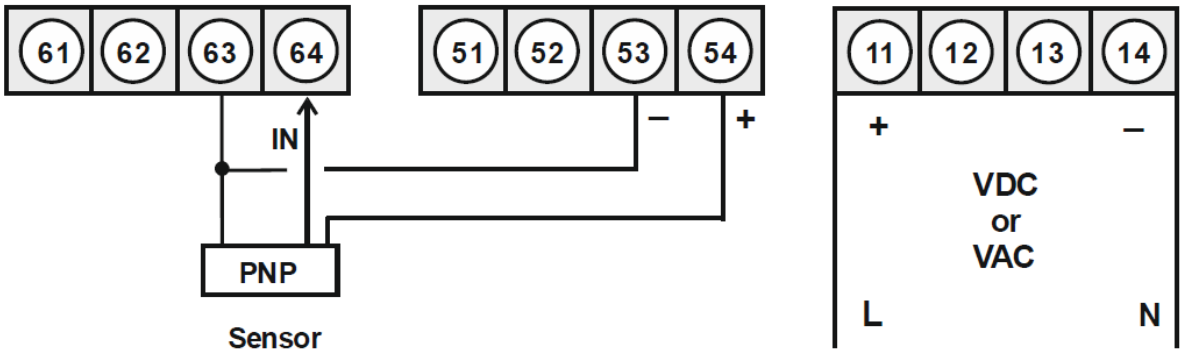
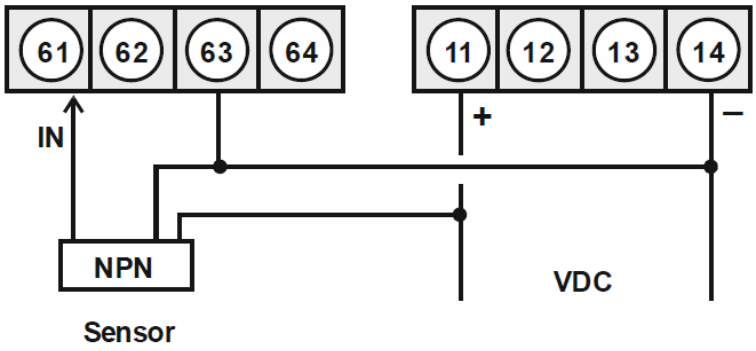
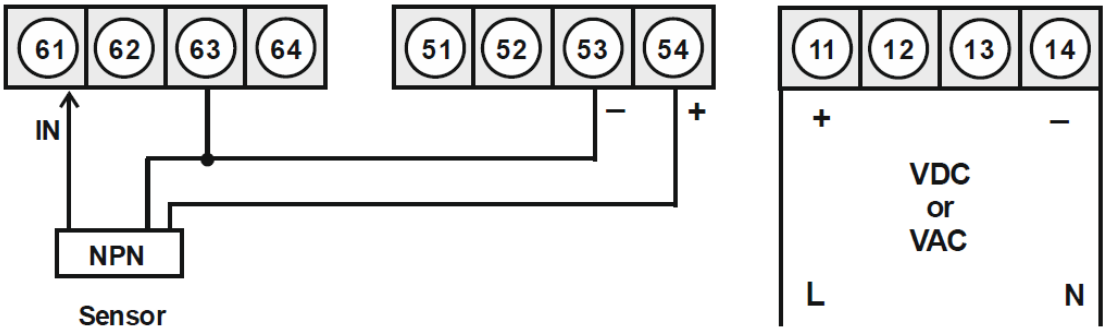
Sensor with PNP-output in combination with 24 VDC sensor supply



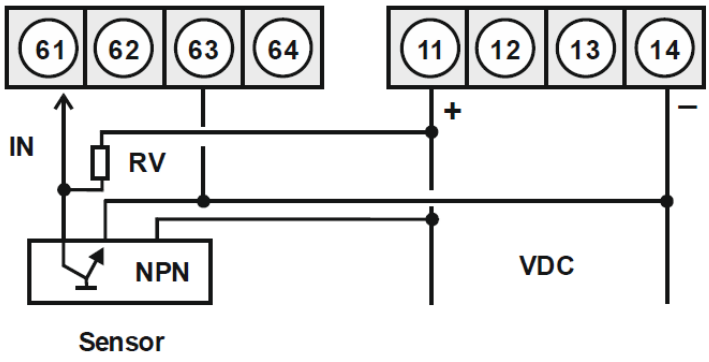
Sensor with NPN-output



Sensor with NPN-output in combination with 24 VDC sensor supply



Sensor with NPN-output and required external resistance



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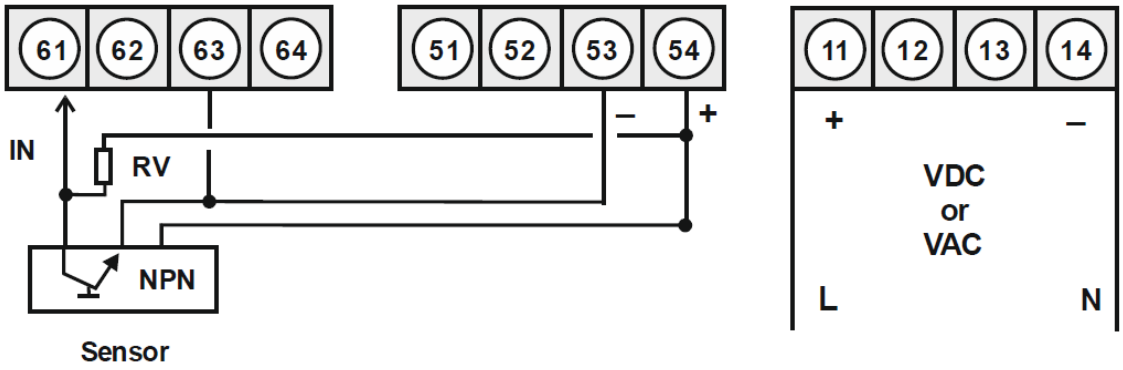
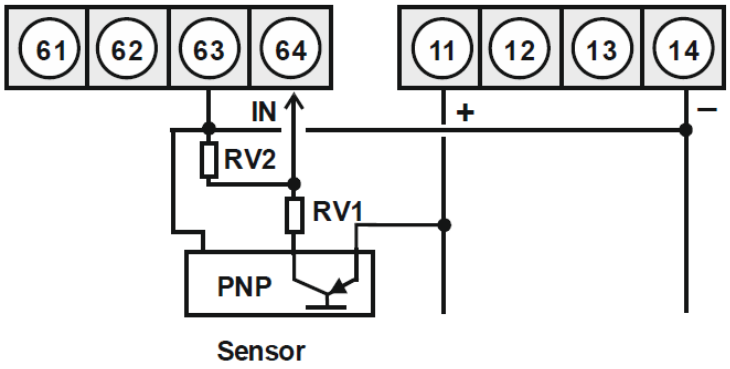
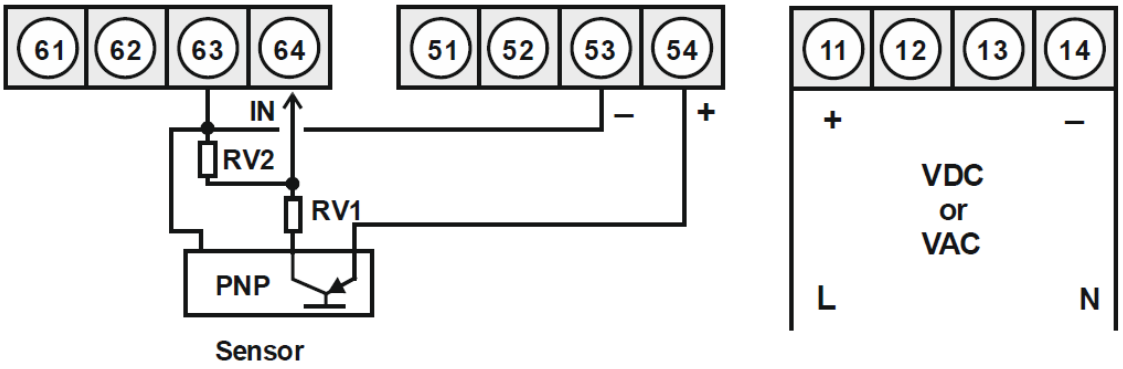
Sensor with NPN-output and required external resistance in combination with 24 VDC sensor supply



Sensor with PNP-output and external resistance circuit



Sensor with PNP-output, external resistance circuit in combination with 24 VDC sensor supply



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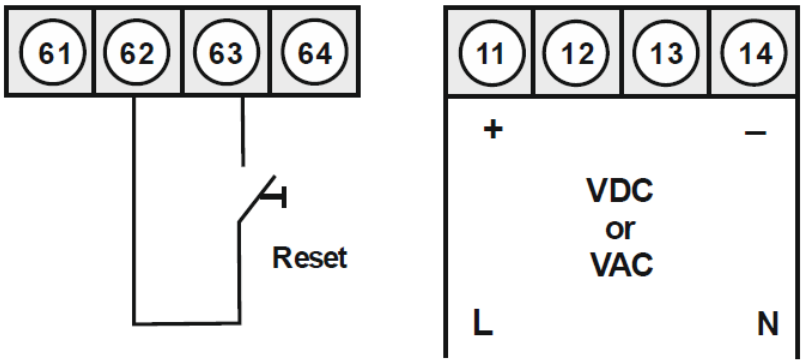
4.4.5 Counter

When use as a counter, use frequency / rotational speed connection examples and the reset input below.

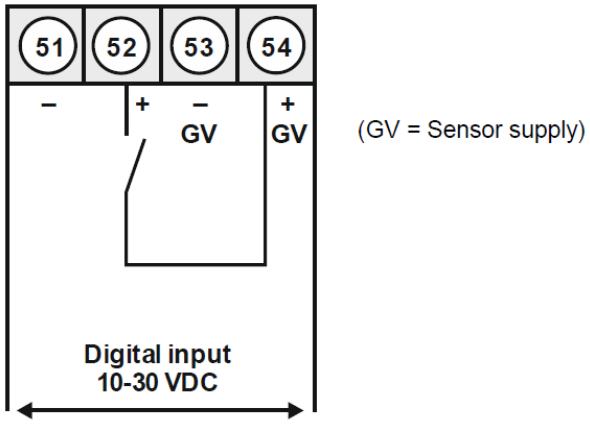
Manual reset with external push-button:



4.4.6 Digital input

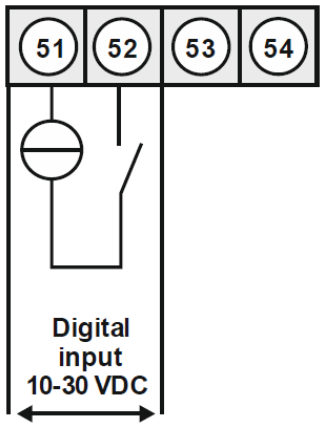
Devices with digital input, sensor supply or external voltage source:

UMU 500 with digital input in combination with 24 VDC sensor supply



(GV = Sensor supply)

UMU 500 with Digital input



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4.5 functional test

Only open connections in a depressurised state.
Observe the operating parameters in the technical data.
When touching the measuring device, be aware that the surfaces of the device components could become hot during operation.

4.6 Setting the display

Switch on
After completing the installation, you can put the unit into operation by applying the supply voltage. Check all electrical connections once again beforehand to ensure that they are connected correctly.

Start sequence
During the switch-on process, the segment test (**8 8 8**), the message of the software type and then the software version are displayed for 1 second for the same time. The start-up sequence is followed by the change to the operating or display mode.

Parameterisation of 4-digit values
If 4-digit values are to be parameterised, the ones digit is set first and then (**[↻]**–key briefly) the tens, hundreds and thousands position is set.

Display of 4-digit values
If, for example, the end value was parameterised to a thousand value during linearisation, the display divides the display by 10 from the display of the thousand value and displays it as follows: 2‘00 for 2000. The last digit is rounded commercially.

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5. Handling and configuration

Description of the operation and setting of the unit with the 3 keys on the display unit.

5.1 operation

The operation is selectable in 2 presentations: cryptic or numerical (program numbers). A changeover occurs when leaving the program by selecting „**run**“, with subsequent confirmation of „**UnL**“ for the cryptic menu or „**FLt**“ for the numeric menu. Furthermore, the parameter lock can e activated there by selecting „**LOC**“.

The display has 3 push buttons with which you can parameterize the device and call stored functions during operation.
Functions, that can be adjusted or changed are always signalled with a flashing display. The settings made in the parameter level are always confirmed with **[↻]** and thus saved. However, the indicator also automatically saves all adjustments and switches to operating mode if no further keypress occur within 30 seconds. By simultaneously pressing the two navigation keys **[▲] & [▼]** the configuration mode can be interrupted and taring (depending on the selected input) can be triggered in the operating mode.

Key symbol	function in operating mode	function at parameterization
Program key **[↻]**	Use the program key **[↻]** to change to the parameterization.	Change to a lower parameter level or to the deposited value.
Minus key **[▼]**	The minus key **[▼]** can be used to call up the minimum value or to change a lower limit depending on the set key function.	Change between the parameters and change parameters in the value level.
Plus key **[▲]**	Depending on the set key function, the maximum value can be called up or an upper limit value can be changed with the plus key **[▲]**.	Change between the parameters and change parameters in the value level.

A switched-on relay or an activated switching points is optically signalled by a flashing of the respective switching point LED below the 7-segment display. An display overflow / underflow is represented by 3 bars: „ **- - -** „.

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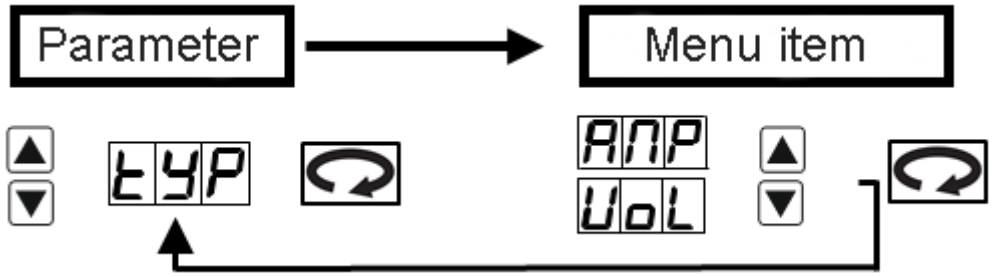
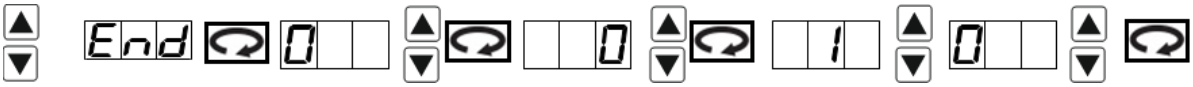
Example: Setting of device parameters, e.g. selection of the input signal



Example: Setting of numerical values, e.g. limit value of measuring range



Numerical values are adjusted from the smallest to the largest digit with **[▲] [▼]** ad confirmed digit by digit with **[↻]**. A minus sign can only be parameterized in the most significant place. After the last digit, the display changes back to the menu level.

Parameterization software PM-TOOL:
Component including the software on CD is a USB cable. The connection is made via a USB port on the front panel to the PC side.
System requirements: PC with USB-interface
Software: Windows 7, Windows 10

With this tool, the device configuration can be created, skipped and stored on the PC. The easy-to-use program interface allows the parameters to be changed, whereby the mode of operation and the possible selection options are preset by the program.

ATTENTION!
When parameterizing with an applied measuring signal, make sure that the measuring signal has no ground reference to the programming plug.
The programming adapter is galvanically not isolated and directly connected with the PC. By reversing the polarity of the input signal, a current can flow through the adapter and destroy the device and connected components!

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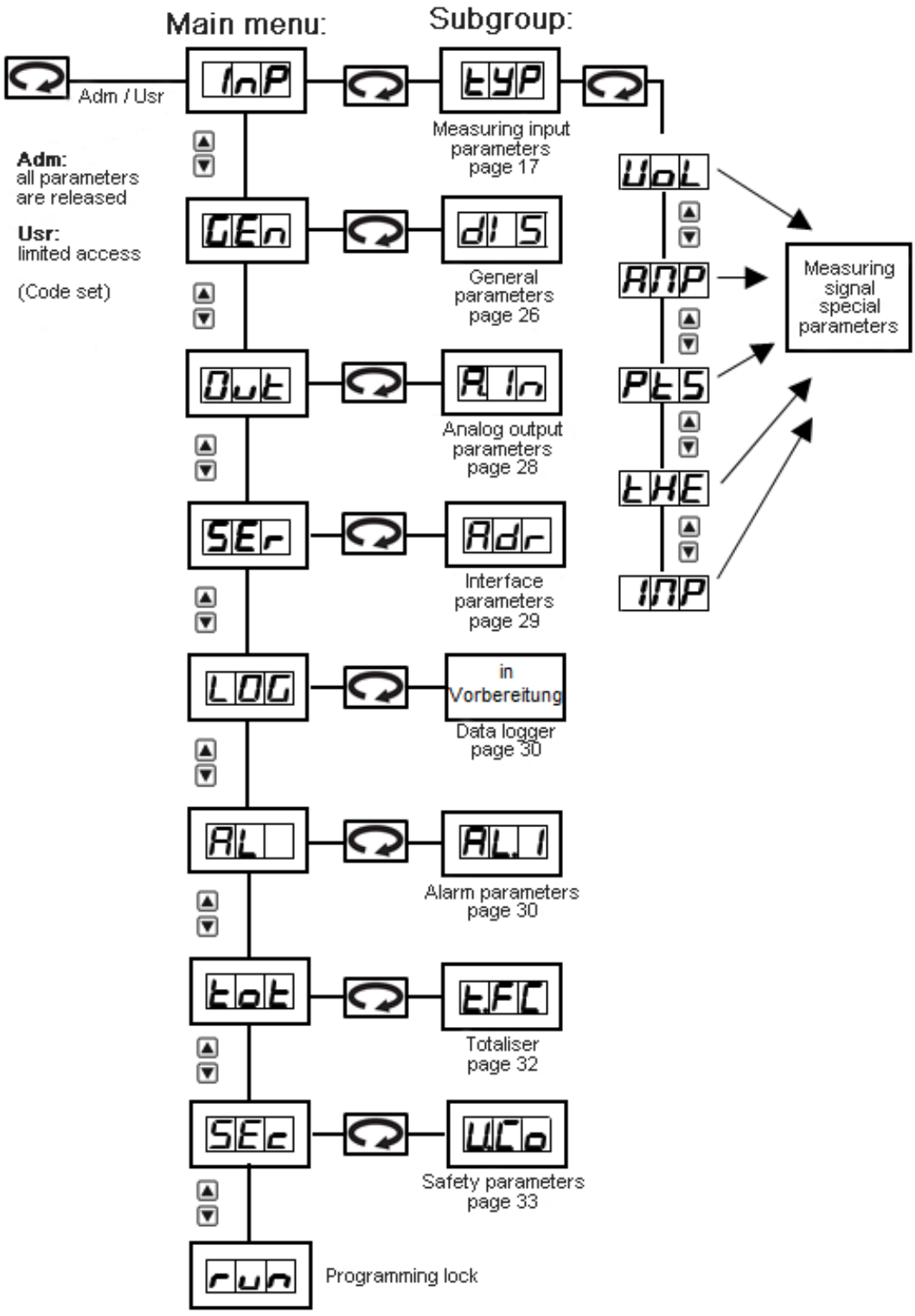
6. Parameterization

6.1 Program structure

Über das Hauptmenü kann man unter 8 Untergruppen auswählen.
In den Untergruppen findet die Parametrierung der entsprechenden Funktion statt.



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run: Activation / Deactivation of programming interlock
Select with **[▲] [▼]** between deactivated key lock **UnL** (factory setting) and activated key lock **LoC**. If **LoC** was selected, the keypad is locked. In order to return to the menu level, **[↻]** must be pressed for 3 seconds in operating mode. The new appearing code **Cod** (factory setting 000) is entered with **[▲] [▼]** and **[↻]** and unlocks the keyboard. An incorrect entry is displayed with **FAL**.
In **LoC**-Mode, the display can not be reset, this shall additionally ensure a regular operation.

UnL: all parameters are open.
LoC: parameterization is locked.

6.2 Selection of input signal: tYP

During type setting, an assignment of the input variants takes place, you can choosenbetween the 5 input types voltages, current, Pt100(0), thermocouple and pulse signal.

Measuring input types:
The following measuring input types are available:
In numerical programming, **E.00** stands for the selection of the input parameter and consecutively the numbers 0-23 for the desired input signal. The cryptic representation is described seperately for each input type.

- **Voltage „VoL“**
  - 0: Standard signal 0…10 VDC „10U“
  - 1: Low voltage 0…2 VDC „2U“
  - 2: Low voltage 0…1 VDC „1U“
  - 3: Low voltage 0…50 mVDC „50m“
  - 4: Sensor calibration 0…10 V „Sen“
- **Current „AMP“**
  - 5: Standard signal 0…20 mA „0.20“
  - 6: Standard signal 4…20 mA „4.20“
  - 7: Sensor calibration 0…20 mA „Sen“
- **Pt-Sensor (PT100/PT1000) „Pt.S“**
  - 8: PT100 3-wire -50.0…200.0°C / -58.0…392.0°F „Pt.L“
  - 9: PT100 3-wire -200…850.0°C / -328…1562°F „Pt.H“
  - 10: PT1000 2-wire -200…850°C / -328…1562°F „Pt.t.“
- **Thermocouple „tHE“**
  - 11: Thermocouple type L „tY.L“
  - 12: Thermocouple type J „tY.J“
  - 13: Thermocouple type K „tY.K“
  - 14: Thermocouple type B „tY.b“
  - 15: Thermocouple type S „tY.S“
  - 16: Thermocouple type N „tY.n“
  - 17: Thermocouple type E „tY.E“
  - 18: Thermocouple type T „tY.t“
  - 19: Thermocouple type R „tY.r“

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- **Pulse measuring „IMP“**
  - 20: Frequency „FrE“
  - 21: Rotational speed 1/min „trn“
  - 22: Counter upwards „C.uP“
  - 23: Counter downwards „C.dn“

6.2.1 Voltage input-/current input parameters: Vol, AmP

As the display only has 3 digits, the least significant digit (single position) is not displayed and the set value is internally multiplied by 10.

A setting of e.g. 751 in the display corresponds to a setting of 7510.

VoL: Available are 4 voltage signals ad 1 signal for the sensor calibration on the measuring section: **0-10 V**, **0-2 V**, **0-1 V**, **0-50 mV, SEn**
AMP: Here, select between the following signals: **0-20 mA, 4-20 mA, Sen**

For the measuring inputs voltage / current, in addition to the preset input signals a calibration can be made directly at the measuring section. For this, select **SEn**, as input variant, now you can choose between **nOC** (no calibration) and **CAL** (calibration). With **nOC**, the previously set display value is adopted, with **CAL** the adjustment takes place via the measuring section and the analog input value is accepted.

Parameter	Menu item					Default
VoL	UoL	10U	2U	1U	50n	SEn	10U
AMP	AMP	0.20	4.20	SEn			0.20

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Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
End	E.11	-1999	-1999	9999	1000	1000	1000	Upper range value
OFS	E.12	-1999	-1999	9999	9999	0	0	Lower range value
dot	E.13	0	0	0.000	3	0	0	Decimal point
En.A	E.14	-19.99	-19.99	99.99	99.99	10.00	10.00	Final value of meas. input
OF.A	E.15	-19.99	-19.99	99.99	99.99	0.00	0.00	Initial value of meas. input
tAr	E.16	-1999	-1999	9999	9999	0	0	Tara value
SP.C	E.20	0	0	9	9	0	0	Supporting points
dI.1	E.21	-199(9)		999(9)				SPx display value
In.1	E.22	-19.9(9)		99.9(9)				SPx analogue value
…	…							
dI.9	E.37	-199(9)		999(9)				SPx display value
In.9	E.38	-19.9(9)		99.9(9)				SPx analogue value
rEt								

End / OFS – E.11 / E.12: Upper range value / Lower range value
This value pair is used to the measurement signal to the desired display value.

Dot – E.13: Decimal point
The decimal point defines the decimal representation of the displayed value. This is also used for the setting of the limit value.

En.A / OF.A – E.14 / E.15: Rescaling of measurement input values
With this function, the final value/initial value can be rescaled to e.g. 19,5mA/3,2mA, without applying a measuring signal.

tAr – E.16: Setting of tara value / offset value
The preset value is added to the linearized value. This allows the characteristic line to be shifted by the selected amount.

SP.C – E.20: Number of additional supporting points
For initial and final value, it is possible to define 9 additional supporting points, in order to linearize non-linear sensor values. Only activated supporting points parameters are displayed.

dI.1…dI.9 – E.21, E.23, E.25, E.27, E.29. E.31, E.33, E.35. E,37: Display value for supporting points
The supporting points are defined by value under this parameter.
In.1…In.9 – E.22, E.24, E.26, E.28, E.30. E.32, E.34, E.36. E,38: Analoge value for supporting points
The supporting points are always specified according to the selected input signal. Here, the desired analog values can be freely parameterized.

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rEt: Exit submenu.

6.2.2 Temperature measurement

Geräteparameter für die Zuordnung von Pt100(0): Pt.S

Pt.S: There are three variants available:
Pt.L: Pt100 3-wire -50.0…200.0°C / -58.0…392.0°F
Pt.H: Pt100 3-wire -200…850°C / -328…1562°F
Pt.t: Pt1000 2-wire -200…850°C / -328…1562°F

Parameter	Menu item				Default
Pt.S	Pt.S	Pt.L	Pt.H	Pt.t	Pt.L

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
Unt	E.41	°C	0	°F	1	°C	0	Unit
OFS	E.42	-19.9	-19.9	19.9	19.9	0.0	0.0	Impedance matching
		-35.9	-35.9	35.9	35.9	0.0	0.0	
rEt								

Unt – E.41: Type of temperature measurement
Select the indication of the temperature in °C or °F with **Unt**.

OFS – E.42: Impedance matching
In case of a switchover, the value is rounded.

rEt: Exit submenu.

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Temperature measurement thermocouple: tHE

tHE: Here a distinction is made between: **Thermocouple types L, J, K, B, S, N, E, T, R**

Parameter		Menu item				Default
tHE	tHE	t.YL	t.YJ	t.YH	t.Yb	t.YL
		t.YS	t.Yn	t.YE	t.Yt	
		t.Yr				

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
Unt	E.41	°C	0	°F	1	°C	0	Unit
OFS	E.42	-19.9	-19.9	19.9	19.9	0.0	0.0	Impedance matching
		-35.9	-35.9	35.9	35.9	0.0	0.0	
rEt								

Unt – E.41: Type of temperature measurement
Select the indication of the temperature in °C or °F **Unt**.

OFS – E.42: Impedance matching
In case of a switchover, the value is rounded.

rEt: Exit sub menu.

Pulse signal: IMP
As the display only has 3 digits, the least significant digit (unit position) is not displayed and the set value is multiplied by 10 internally.

FrE: Frequency measurement of TTL-signals, PNP-/NPN-sensors.
trn: Rotational speed measurement (simplified adjustment) of TTL-signals, PNP-/NPN-sensors. This function also scales a flow.
C.up: Counter input (upwards) for TTL-signals, PNP-/NPN-sensors.
C.dn: Counter input (downwards) for TTL-signals, PNP-/NPN-sensors.

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Frequency measurement, FrE

Parameter		Menu item				Default
IMPu	INP	FrE				

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
rnG	E.51	9.99	0	99.9	1	9E3	3	Frequency range
		999	2	9E3	3			
I.tY	E.52	ttL	0	nPn	1	ttL	0	Pulse signal
		PnP	2	nAM	3			
FIL	E.53	no	0	2	1	no	0	Filter frequency
		5	2	10	3			
		20	4	50	5			
		100	6	200	7			
		500	8					
End	E.54	-1999	-1999	9999	9999	1000	1000	Final value
OFS	E.55	-1999	-1999	9999	9999	0	0	Initial value
dot	E.56	0	0	0.000	3	0	0	Decimal point
En.F	E.57	0	0	9999	9999	1000	1000	Final frequency
OF.F	E.58	0	0	9999	9999	0	0	Initial frequency
tAr	E.59	-1999	1999	9999	9999	0	0	Tara value
SP.C	E.60	0	0	9	9	0	0	Supporting points
dI.1	E.61	-1999		9999				SPx display value
In.1	E.62	0		9999				SPx analogue value
...								
dI.9	E.77	-1999		9999				SPx display value
In.9	E.78	0		9999				SPx analogue value
rEt								

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rnG – E.51: Selection of the frequency range
Select between 4 different frequency ranges:

- 9.99 – 0: 0…9.999 Hz (automatic software filter at 100Hz/5ms)
- 99.9 – 1: 0…99.99 Hz (automatic software filter at 500Hz/5ms)
- 999 – 2: 0…999.9 Hz
- 9E3 – 3: 0…9999 Hz

I.tY – E.52: pulse signal
The triggering of the pulse signal can be done in 4 different modes:

- ttL – 0: Active TTL-signals with approx. 0,8V lower and approx. 2V upper threshold.
- nPn – 1: Passive switching contact, that switches the internal pullup to earth.
- PnP – 2: Active sensor output. The indicator operates a pullup.
- nAm – 3: Namur input

FIL – E.53: Limitation of the pulse length
Debouncing of mechanical contacts via the choise of filter frequency.

- no – 0: No evaluation of the pulse length
- 2 – 1: 2 Hz at pulse-duty factor 1:1 => minimum pulse length 250 ms
- 5 – 2: 5 Hz at pulse-duty factor 1:1 => minimum pulse length 100 ms
- 10 – 3: 10 Hz at pulse-duty factor 1:1 => minimum pulse length 50 ms
- 20 – 4: 20 Hz at pulse-duty factor 1:1 => minimum pulse length 25 ms
- 50 – 5: 50 Hz at pulse-duty factor 1:1 => minimum pulse length 10 ms
- 100 – 6: 100 Hz at pulse-duty factor 1:1 => minimum pulse length 5 ms
- 200 – 7: 200 Hz at pulse-duty factor 1:1 => minimum pulse length 2.5 ms
- 500 – 8: 500 Hz at pulse-duty factor 1:1 => minimum pulse length 1 ms

End / OFS – E.54 / E.55: Upper range value / Lower range value
This value pair is used to assign the desired display value to the pulse signal.

dot – E.56: Decimal point

En.F / OF.F– E.57 / E.58: Rescaling of pulse signals

tAr – E.59: Setting of tara value / offset value

SP.C – E.60: Number of additional supporting points

dl.1…dl.2 – E.61, E.63, E.65, E.67, E.69, E.71, E.73, E.75, E.77: Display value for supporting points

In.1…In.29 – E.62, E.64, E.66, E.68, E.70, E.72, E.74, E.76, E.78: Analog value for supporting points

rEt: Exit submenu.

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Rotational speed measurement: trn

As more than 80% of the frequency measurement applications refer to one rotational speed, there is a simplified setting option via the „**Trn**“ type. This function also scales a flow.

Parameter		Menu item				Default
IMP	inP	trn				

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
I.tY	E.81	ttL	0	nPn	1	ttL	0	Pulse signal
		PnP	2	nAM	3			
FIL	E.82	no	0	2	1	no	0	Filter frequency
		5	2	10	3			
		20	4	50	5			
		100	6	200	7			
		500	8					
PPt	E.83	1	1	9999	9999	1	1	Pulses per turn
tIM	E.84	SEC	0	MIn	1	MIn	1	Time basis
		hou	2					
dot	E.85	0	0	0.000	3	0	0	Decimal point
rEt								

I.tY – E.81: Pulse signal
The triggering of the pulse signal can be done in 4 different modes:

- ttL – 0: active TTL-signal with approx. 0,8 V lower and approx. 2 V upper threshold.
- nPn – 1: Passive switching contact, that switches the internal pullup to earth.
- PnP – 2: Active sensor output. The indicator operates a pullup.
- nAm – 3: Namur input

FIL – E.82: Limitation of the pulse length
Debouncing of mechanical contacts via the couice of filter frequency.

- no – 0: no evaluation of the pulse length
- 2 – 1: 2 Hz at pulse-duty factor 1:1 => minimum pulse length 250 ms
- 5 – 2: 5 Hz at pulse-duty factor 1:1 => minimum pulse length 100 ms
- 10 – 3: 10 Hz at pulse-duty factor 1:1 => minimum pulse length 50 ms
- 20 – 4: 20 Hz at pulse-duty factor 1:1 => minimum pulse length 25 ms

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- 50 – 5: 50 Hz at pulse-duty factor 1:1 => minimum pulse length 10 ms
- 100 – 6: 100 Hz at pulse-duty factor 1:1 => minimum pulse length 5 ms
- 200 – 7: 200 Hz at pulse-duty factor 1:1 => minimum pulse length 2.5 ms
- 500 – 8: 500 Hz at pulse-duty factor 1:1 => minimum pulse length 1 ms

PPt – E.83: Pulses per turn
Via this parameter, the number of pulses per turn can be entered directly. Here, you will usually work with sprockets and their teeth, incremental encoders with their resolution ad discs with a number of drilled holes. With simple flow meters with impeller, you only enter the numberof pulses per liter or cubic meter.

tIM – E.84: Time basis
The changed time basis for the rotational speed is usually always minute, but can be changed to second and hour.

dot– E.85: Decimal point
The decimal point defines the decimal place of the display value. Thus, rotational speed can be displayed with up to 3 decimal places, if this is small enough.

ret: Exit submenu.

Counter upwards/downwards: C.uP / C.dn

Parameter	Menu item				Default
IMP	INP	C.uP	C.dn		

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Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
I.tY	E.91	ttL	0	nPn	1	ttL	0	Pulse signal
		Pep	2	nAM	3			
C.bA	E.92	PLS	0	SEC	1	PLS	0	Counter basis
		Min	2					
EdG	E.93	PoS	0	nEG	1	PoS	0	Flank
PrE	E.94	1	1	9999	9999	1	1	Prescaler
FIL	E.95	no	0	2	1	no	1	Filter frequency
		5	2	10	3			
		20	4	50	5			
		100	6	200	7			
		500	8					
End	E.96	-1999	-1999	9999	9999	1000	1000	Final value
En.C	E.97	1	1	9999	9999	1000	1000	Final value pulse number
rSt	E.98	0	0	9999	9999	0	0	Reset value
dot	E.99	0	0	0.000	3	0	0	Decimal point
rEt								

I.tY – E.91: Pulse signal
The triggering of the pulse signal can be done in 4 different modes:

- ttL – 0: Active TTL-Signal with approx. 0,8 V lower and approx. 2 V upper threshold.
- nPn – 1: Passive switching contact, that switches the internal pullup to earth.
- PnP – 2: Active sensor output. The indicator operates a pullup.
- nAm – 3: Namur input

C.bA – E.92: Counter basis
By default, the display detects the incoming pulse in counting mode. However, the system time in seconds or minutes can also be used as a counter basis. The puls input becomes the gate time, which counts at the flanks **PoS** (HIGH-signal) and is at **LOW**. At the flank **nEG** the logic is reversed.

edG – E.93: Counter start/Counter end (Flanke)
The active flank indicates, when is being counted. If the pulse detection **PuL** is selected as counter basis, then it is specified whether the internal counter is increased on the positive flank **PoS** or the negative flank **nEG**. If time is the counter basis, then the active/**HIGH** control is selected with **PoS** ad the passive/**LOW** control with **nEG**. The counter reset is always static.

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PrE – E.94: Prescaler
A prescaling takes place in the display via the prescaler, so that also large numbers of pulses, e.g. 5.000.000 can be determined by the indicator. Only the prescaled value is included for the scaling.

FIL – E.95: Limitation of the pulse length
Debouncing of mechanical contracts via the choice of filter frequency.

- no – 0: No evaluation of the pulse length
- 2 – 1: 2 Hz at pulse-duty factor 1:1 => minimum pulse length 250 ms
- 5 – 2: 5 Hz at pulse-duty factor 1:1 => minimum pulse length 100 ms
- 10 – 3: 10 Hz at pulse-duty factor 1:1 => minimum pulse length 50 ms
- 20 – 4: 20 Hz at pulse-duty factor 1:1 => minimum pulse length 25 ms
- 50 – 5: 50 Hz at pulse-duty factor 1:1 => minimum pulse length 10 ms
- 100 – 6: 100 Hz at pulse-duty factor 1:1 => minimum pulse length 5 ms
- 200 – 7: 200 Hz at pulse-duty factor 1:1 => minimum pulse length 2.5 ms
- 500 – 8: 500 Hz at pulse-duty factor 1:1 => minimum pulse length 1 ms

rSt – E.96: Reset value
With the setting **rSt = 0,** the start value is reset by a reset contact. If the value is not equal to zero, the display value is changed by the number of entered pulse. The change takes place in the opposite direction to the preset running direction.

End / En.C – E.97 / E.98: Final display value and final pulse number value
The final display value is freely linearized over the prescaled pulse number. For this purpose, the number of desired pulses is assigned to a display value. The zero point cannot be preselected. For a backward counter, the **End** and **En.C** are used as initial values. For the absolute counter limits the setting of **dI.H** and **dI.L** are used. When these are reached, all digits flash with the reached value, which corresponds to an overflow or underflow.

dot– E.99: Decimal point
The decimal point defines the decimal place of the display value.

ret: Exit submenu.

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6.3 General parameters: GEn

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
dIS	A.01	Act	0	tot	1	Act	0	Display value
		bUS	2					
di.T	A.02	0.1	0.1	2.0	2.0	1.0	1.0	Display time
SEC	A.03	0.01	0.01	2.00	2.00	1.00	1.00	Measuring time
GLM	A.04	1	1	20	20	1	1	Averaging
ZEr	A.05	0	0	99	99	0	0	Zero point steadying
Arl	A.06	no	0	rot	1	no	0	Arithmetic
		SqU	2	rEP	3			
Ovr	A.07	no	0	AdC	1	no	0	Oberflow/underflow behaviour
		rnG	2	5P	3			
		10P	4					
dI.L	A.08	-1999	-1999	9999	9999	9999	9999	Minimum value
dI.H	A.09	-1999	-1999	9999	9999	-1999	-1999	Maximum value
brt	A.10	1	1	9	9	6	6	Brightness
tSt	A.11	no	0	Ext	1	no	0	Key function
		A.LI	2	tAr	3			
		to.r	4	Ac.A	5			
dI.F	A.12	no	0	Ac.A	1	No	0	Digital input
		tr.A	2	tAr	3			
		to.r	4	Ac.A	5			
rEt								

dIS – A.01: Display value
Choose between the current measured value, the totalizer value and the ModBus.

- Act – 0: Current measurand
- tot – 1: Totalizer
- bUS – 2: ModBus

dI.t – A.02: Display time
Via this function, the display value can be steadied. Alarms and analogue output re still controlled by the measuring time.

SEC – A.03: Measuring time
Set the basic measuring time or the frequency filter to steady the measured value. This filter value is adjustable from 0,01…2,00 seconds. For pulse measurements, the value can be set up to 0,00, so detection runs at maximum speed.

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GLM – A.04: Averaging
In addition to the measuring time, a moving averaging of 1…20 values can be activated, too. There is no separate weighting between the past values. If **GLM = 1** is set, the moving averaging is switched off.

ZEr – A.05: Zero point steadying
For zero point steadying, a value range around the zero point can be preselected, at which the display represents a zero. If e.g. 10 is set, the display zero in a range of +10 to -10 and below, it will continue down with -11 and above with +11.

Ari – A.06: Arithmetic
This function does not display the measured value but the calculated value in the display:

- no – 0: no calculation
- rot – 1: Root
- SqU – 2: Square root
- rEP – 3: Reciprocal value

OVr – A.07: Overflow / Underflow behaviour
The overflow/underflow of the measuring input is indicated b 3 ars at the top or 3 bars at the bottom. The excetion is input type **4-20 mA**, here a measured value smaller than **1 mA** is already considered as underflow. This shall indicate a sensor value.

- – 0: No overflow evaluation
- AdC – 1: Depends on **dI.L** and **dI.H**
- rAG – 2: Depends on **OFS** and **End**
- no 5P – 3: ± 5% of **OFS** and **End**
- 10P – 4: ± 10% of **OFS** and **End**

dI.L / dI.H – A.08 / A.09: Indication of initial value and final value in the display
For overflow evaluation, the measuring range and the optionally selected overflow behavior **Ovr** are evaluated. In addition, this range can be further limited by these two parameters.

brt – A.10: Brightness
Here, the brightness of the display can be adjusted in 9 levels.

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tSt – A.11: Allocation of key functions
Here, either a min/max value query or a limit value correction can be stored on the direction keys for the operating mode. If the min/max memory is activated with **EXt** the measured min/max values are stored during operation and can be retrieved via the direction keys **[▲] [▼]**.The values are lost when the unit is restarted. If you select the limit value correction **A.LI**, you can change the values of the limit values during operation without interfering with the operating procedure. If **no** has been parameterised, the direction keys **[▲] [▼]**have no function in operating mode.

- no – 0: No function
- EXt – 1: Display minimum/maximum-value
- A.LI – 2: Show/change alarm unit
- tAr - 3: Taring
- to.r – 4: Totalizer reset
- Ac.A – 5: Acknowledge alarm

- **dI.F –** A.12: Function of digital input
- no – 0: No function
- Ac.A – 1: Acknowledge alarm
- tr.A – 2: Trigger alarm
- tAr – 3: Taring
- to.r – 4: Totalizer reset
- AAL – 5: alternative threshold alarm value

- **ret**: Exit submenu.

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6.4 Analog output parameters: Out

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
A.In	o.01	Act	0	Min	1	Act	0	Reference source
		MAX	2		3			
A.rA	o.02	0.10	0	0.20	1	0.10		Output signal
		4.20	2					
A.En	o.03	-1999	-1999	9999	9999	1000		Final value
A.OF	o.04	-1999	-1999	9999	9999	0		Initial value
A.FL	o.05	EdG	2	t.En	1	EdG		Underflow/overflow behaviour
		t.OF	4	t.Mi	3			
		t.MA	6					
Ret								

A.In – o.01: Reference of the analogue output
The analog output signal may refer to various functions.
Act: Current measurand
MIn: minimum value
MAX: maximum value

A.rA – o.02: Output signal
0.10: 0…10V
0.20: 0…20mA
4.20: 4…20mA

A.En – o.03: Final value of analogue output

A.OF – o.04: Initial value of analogue output

A.FL – o.05: Overflow behaviour
To detect and evaluate faulty signals, e.g. via a controller, the overflow behavior of the analogue output can be defined.
EdG: The analogue output runs to the set limit e.g. 4 and 20 mA.
t.En: The analogue output jumps to the final value e.g. 20 mA.
t.OF: The analogue output jumps to the initial value e.g. 4 mA.
t.MI: The analogue output jumps to the smallest possible output value.
t.MA: The analogue output jumps to the highest possible output value. The value can be higher than 20mA or 10V, too.
ret: Exit submenu.

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6.5 Interface parameter: Ser (in preparation)

The interface data for a communication via RS232, RS485 and Bluetooth correspond to:

- 9600 Baud
- 8 Data bits
- 1 Stop bit
- No parity

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
Adr	r.01	1	1	250	250	1	1	Address
Mod	r.02	ASC	0	Rtu	1	ASC	0	Modus
t.Ou	r.03	0	0	100	100	0	0	Timeout
Pin	r.04	0000	0000	9999	9999	0	0000	Pin number
Ret								

Adr: Modbus-address
Device address under which the device can be reached in the communication bus.

Mod: Modbus-mode
ASC – 0: ASCII-mode. A communication with the PM-TOOL is only possible in this mode
rtu – 1: Remote Terminal Unit. Here, the data are transmitted in binary form.

t.ou: Modbus timeout
If a value greater than 0 is set, an internal timer is reset to the adjusted value for each communication. If the timer runs to zero, a timeout error is generated. This leads to an error bit, which can be output via a register or forwarded to an alarm.

PIn: Safety code for bluetooth
This code is required for communication with the PM-TOOL. This code can be used to deny access to the data. If the value is 0, the data can be queried without a pin.

ret: Exit submenu.

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6.6 Data logger (in preparation)

6.7 Alarm parameters, AL:

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
x.Sr	x.00	OFF	0	A.In	1	OFF	0	Alarm source
		tot	2	d.In	3			
		bUS	4	S.Er	5			
x.Fu	x.01	H.LI	0	L.LI	1	H.LI	0	Threshold value behaviour
		H.LA	2	L.LA	3			
		rnG	4	OU.r	5			
x.bH	x.02	on	0	OFF	1	on	0	Behaviour system error / digital input
x.rE	x.03	no	0	rE.1	1	no	0	Alarm output
		rE.2	2	PH.1	3			
		PH.2	4					
x.LI	x.04	-1999	-1999	9999	9999	100	100	Limit
x.HY	x.05	0	0	9999	9999	0	0	Hysteresis
x.HI	x.06	-1999	-1999	9999	9999	200	200	Upper window limit
x.Lo	x.07	-1999	-1999	9999	9999	100	100	Lower window limit
x.oF	x.08	0	0	100	100	0	0	Switching off delay
x.on	x.09	0	0	100	100	0	0	Switch-on delay
x.FL	x.10	on	0	OFF	1	OFF	1	Alarm flashing
x.Ac	x.11	on	0	OFF	1	OFF	1	Alarm acknowledgement
x.AL	x.12	-1999	-1999	9999	9999	15	200	Alternative threshold value
ret								

x.Sr – x.00: Alarm source

- OFF – 0: Deactive
- A.In – 1: Measuring signal
- tot – 2: Totalizer value
- d.In – 3: Digital input
- bUS – 4: Modbus
- S.Er – 5: System error

System errors can be triggered by overflow, underflow and Modbus timeout.

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x.Fu – x.01: Threshold value behaviour
With the functional principle it is possible to switch between different work types of the switching outputs:

- H.LI – 0: Switch at threshold value exceedance.
- L.LI – 1: Switch at threshold value undercut.
- H.LA – 2: Exceeding the alternative threshold value, is triggered by the digital input.
- L.LA – 3: Falling below the alternative threshold value, triggered by the digital input.
- rnG – 4: Switch within the preset range.
- Ou.r – 5: Switch outside the preset range.

x.bH – x.02: Alarm at system error / digital input
If a device checksum is not correct or the display range is violated, you can preset the behavior of the switching points.

- on – 0: Alarm is activated in case of an error / digital input (relay switching off)
- OFF – 1: Alarm is activated in case of no error / digital input (relay switched)

x.rE – x.03: Alarm output
- no – 0: No output selection
- rE.1 – 1: Relay 1
- rE.2 – 2: Relay 2
- Ph.1 – 3: PhotoMos-output 1
- Ph.2 – 4: PhotoMos-output 2

x.LI – x.04: Switching threshold
Here, the switching threshold is specified, from which an alarm responds or is activated / deactivated. For the window function of a switching point, this parameter is not requested.

x.HY – x.05: Hysteresis
The hysteresis defines a difference to the threshold value by which an alarm reacts delayed. This parameter is not queried in the window function of a switching point.

x.Hl / x.Lo – x.06 / x.07: Upper and lower threshold value at window function
For the range function **x.Fu = rAG** or **Ou.r** this value defines upper / lower limit of the window function between -199(9)…999(9). The operating principle can change between switching point 1 and 2.

x.oF – x.08: Delayed release
Here, a delayed switch-off of 0-100s can be preset for the threshold values. The time value is not stored permanently and is reset by a device startup. In addition, the alarm status is determined directly when the device starts, without taking into account the set delay.

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x.on – x.09: On-delay

Here, a delayed switch-on of 0-100s can be preset for the threshold values. The time value is not stored permanently and is reset by a device startup. In addition, the alarm status is determined directly when the device starts, without taking into account the set delay.

x.FL – x.10: Alarm flashing
Flashing of the display in case of an alarm violation.

x.Ac – x.11: Alarm acknowledgement
The alarm can not reset itself. An acknowledgement via the digital input is necessary.

x.AL – x.12: Alternative threshold value
Alternative switching point can be activated via the digital input. Replaces the value from x.LI. Please set parameter dI.F.

ret: Exit submenu.

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6.8 Totalizer, tot:

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
t.FC	t.01	OFF	0	Std	1	OFF	0	Totalizer state
		tMP	2					
t.bA	t.02	SEC	0	Min	1	SEC	0	Time basis
		Hou	2					
t.FA	t.03	E^0	0	E^1	1	E^0	0	Factor
		E^2	2	E^3	3			
		E^4	4	E^5	5			
		E^6	6					
t.Dt	t.04	000	0	00.0	1	0	0	Dezimal place
		0.00	2	0.000	3			
t.rE	t.05	-1999	-1999	9999	9999	0	0	Reset value
ret								

t.FC – t.01: Totalizer state
- OFF – 0: Deactivated
- Std – 1: The scaled input value is integrated over a period of time and stored permanently.
- tMP – 2: The scaled input value is integrated over time and stored volatile.

t.bA – t.02: Time basis
- SEC: Seconds
- MIn: Minutes
- Hou: Hours

t.FA – t.03: Totalizer factor
Here, the factor or divisor for the internal calculation of the measurand is assigned.

- E^0 – 0: 10^0
- E^1 – 1: 10^1
- E^2 – 2: 10^2
- E^3 – 3: 10^3
- E^4 – 4: 10^4
- E^5 – 5: 10^5
- E^6 – 6: 10^6

t.dt – t.04: Decimal place
Decimal place for the totalizer.

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t.rE – t.05: Totalizer reset value

ret: Exit submenu.

6.9 Safety parameters, Sec

Parameter		Menu item				Default		Description
UnL	FLt	UnL	FLt	UnL	FLt	UnL	FLt	
U.Co	C.01	**0000**	0000	**9999**	9999	**0**	0	User code
A.Co	C.02	**0000**	0000	**9999**	9999	**0**	0	Admin code
LEV	C.03	**0**	0	**8**	8	**6**	6	User level
U:AC	C.04	**UnL**	0	**LOC**	1	**UnL**	0	Exit parameterization
A.AC	C.05	**0**	0	**9999**	9999			Unlock administrator menu
LFS	C.06	**no**	0	**YES**	1	**no**	0	Load factory settings
ret								

U.Co – C.01: User Code
With this code, limited access to the parameters is possible, depending on the set user level. The user only sees the released menu items.

A.Co – C.02: Admin Code
Assignment of an individual numerical code (4-digit number combination, freely assignble). If this code is assigned (0000 factory setting), all parameters are locked to the user, when **LOC** is subsequently selected in the menu item **RUN**. By pressing **[⟲]** in operating mode for approx. 3 seconds, the display will show the message **Cod**. The code must be entered before each attempted parameterized.

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LEV – C.03: Defines the parameter, which are accessible to the user:

User level =		0	1	2	3	4	5	6
Access to menu	**Description**							
Alarm x	Threshold value	X	X	X	X	X	X	X
Alarm x	Hysteresis/Threshold value	X	X	X	X	X	X	
Alarm x	all parameters	X	X	X	X	X		
Measuring input		X	X	X				
Analogue output		X	X	X				
General		X	X	X				
Data logger		X	X	X				
Interface		X	X	X				
Totalizer		X	X	X				

U.AC – C.04: Activation / Deactivation of programming interlock
Here, select between deactivated key lock **UnL** (factory setting) and activated key lock **LOC** with **[▲] [▼]**. If **LOC** is selected, the keyboard is locked. In order to return to the menu level, **[↵]** must be pressed for 3 seconds in operating mode. The now appearing code **Cod** (factory setting 0000) is entered with **[▲] [▼]** and **[↵]** and unlocked the keyboard. An incorrect entry is diplayed with **FAL**. In the **LOC**-Mode, the display can not be reset, which should additionally ensure regular operation.

- UnL – 0: All parameters are open.
- LOC – 1: Parameterization is locked.
- FLT – numeric menu

A.AC – C.05: Unlock administrator menu

LFS – C.06: Load factor settings

- no – 0: Break-off of the function, settings are not overwritten.
- YES – 1: Loading the factory settings. Attention! All settings in the devie will be overwritten!

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7. Reset of default values

There are two ways of resetting the unit to the default values in order to set it to a **defined basic state**:

1.) Switch off power supply.
Hold down the **[↻]-**key (for 3 seconds) and reconnect the power supply until "- - -" appears in the display.

2.) Voltage supply cannot be switched off.
Change with the **[↻]-key** into menu level.
Than select **LFS** in the **SEC** (security parameters) and confirm with **YES** (loading the factory settings).

Attention!
With a reset, all user settings are lost.

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8. Error elimination

Only open connections in a depressurised state.
Residues of the medium can endanger persons, the environment and the equipment.
Set the meter out of operation and protect it against inadvertent start-up if faults cannot be remedied.

Error description	Measures
The unit permanently indicates overflow.	– The input has a very high measurement, check the measuring circut. – For a selected input with a small sensor signal, it is only connected on one side or the input is open. – Not all activated supporting points are paramete-rized. Check wheater the relevant parameters for this are set correctly.
The unit permanently shows underflow.	– The input has a very low measurement, check the measuring circuit. – For a selected input with a small sensor signal, it is only connected on one side or input is open. – Not all activated supporting points are paramete-rized. Check whether the relevant parameters for this are set correctly.
The device shows „**HIP**“ in the 7-segment display.	– The device has detected an error in the configuration memory, perform a reset to the default values and reconfigure the device according to your application.
Program numbers for the parameterization of the in-put are not available.	– The programming lock is activated. – Enter correct code.
The device shows „**Er1**“ in the 7-segment display.	– If errors of this kind occur, please contact the manufacturer.
The device does not react as expected.	– If you are not sure, that the device has already been parameterized before, then restore the delivery state as described in chapter 6.
The device shows Lbr in the 7-segment display	– For a selected input with a small sensor signal, it is only connected on one side or the input is open. Only with for measuring input 4-20 mA, thermocouple, Pt100(0) sensor.

Note: You may incur costs in the event of unjustified complaints.

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9. Maintenance, Dismounting, Return, Cleaning and Disposal

9.1 Maintenance, Dismounting

Residual media in dismounted instruments can result in a risk of personnel, the environment and equipment. Take sufficient precautionary measures.

There is a risk of burns. Let the instrument cool down sufficiently before dismounting. During dismounting there is a risk of dangerously hot pressure media escaping.

9.2 Return

For return of the device use the original packaging or similar.
As protection against damage can be used, for example, antistatic film, isulating material, labeling as a sensetive measuring device.

9.3 Cleaning

Before cleaning the device, disconnect the electrical connection.
Clean the device with a damp towel.
Do not bring the electrical connection into contact with dampness.

9.4 Disposal

Dispose of device components and packaging materials in an environmentally friendl manner in accordance with the country specific waste treatment and disposal regulations.

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Safety instructions

Please read the following safety instructions and mounting chapter 2 before installation and keep these instructions for future reference.

Inproper use or operation may result in personal injury and/or property damagee.

Control of the device

The device are checked before shipment and shipped in perfect condition. If any damage is visible on the device, we recommend a precise inspection of the transport packaging. In case of damage, please inform the supplier immediately.

Installation

The **UMU 500** may only be installed by a specialist with appropriate qualifications, such as an industrial electronics technician or a specialist with comparable training.

Installation instructions:

- There must be no magnetic or electric fields in the immediate vicinity of the unit, e.g. from transformers, two-way radios or electrostatic discharges.
- The fuse protection of the supply should not exceed a value of 1 A slow-blow.
- Do not install inductive loads (relays, solenoid valves, etc.) near the unit and suppress them using RC spark suppressor combinations or free-wheeling diodes.
- Lay input and output lines spatially separated from each other and not parallel to each other. Route outgoing and return lines next to each other. If possible, use twisted wires. This will give you the most accurate measurement results.
- If high accuracy is required and the measuring signal is small, the sensor cables must be shielded and twisted. As a general rule, they should not be laid in the immediate vicinity of consumer supply lines. If shielding is used, it should only be connected on one side to a suitable equipotential bonding (usually the measuring earth).
- The unit is not suitable for installation in potentially explosive atmospheres.
- An electrical connection that deviates from the connection diagram can lead to danger to persons and destruction of the unit.

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- The terminal area of the units is part of the service area. Electrostatic discharges must be avoided here. Dangerous body currents can occur in the terminal area due to high voltages, which is why increased caution is required.

- Galvanically separated potentials within a system should be connected to a suitable point (usually earth or system ground). This reduces the susceptibility to interference from radiated energy and avoids dangerous potentials that can build up on long lines or arise from faulty wiring.

10. Technical Data

Housing			
Dimensions	22,5 x 117,2 x 107 mm (BxHxD)		
Fixing	Top hat rail		
Housing material	PA6.6, black, UL94V-0		
Connection	Plug-in terminal, wire cross section up to 1,5mm²		
Display			
Display	3-digit		
Digit height	7mm		
Segment colour	Red		
Display range	-199 to 999		
Switching points	LED S1, LED S2, LED S3, LED S4		
Overflow	Horizontal bars at the top		
Underflow	Horizontal bars at the bottom		
Display time	0,1 to 10,0 seconds		
Measuring input			
Signal	**Measuring range**	**Measuring span**	**Resolution**
Voltage	0…10 V (Ri > 100 kOhm)	0…12 V	≥ 14 bit
Voltage	0…2 V (Ri ≥ 10kOhm)	0…2,2 V	≥ 14 bit
Voltage	0…1 V (Ri ≥ 10kOhm)	0…1,1 V	≥ 14 bit
Voltage	0…50 mV (Ri ≥ 10kOhm)	0…75 mV	
Current	4…20 mA (Ri = ~ 125 Ohm)	1…22 mA	
Current	0…20 mA (Ri = ~ 125 Ohm)	0…22 mA	
Pt100-3-wire	-50…200°C	-58…392°F	0,1°C / 0,1°F
Pt100-3-wire	-200…850°C	-328…1562°F	1°C / 1°F
Pt1000-2-wire	-200…850°C	-328…1562°F	1°C / 1°F
Thermo K	-270…1350°C	-454…2462°F	1°C / 1°F
Thermo S	-50…1750°C	-325…3182°F	1°C / 1°F
Thermo N	-270…1300°C	-454…2372°F	1°C / 1°F
Thermo J	-170…950°C	-274…1742°F	1°C / 1°F

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Thermo T	-270…400°C	-454…752°F	1°C / 1°F
Thermo R	-50…1768°C	-58…3214°F	1°C / 1°F
Thermo B	80…1820°C	176…3308°F	1°C / 1°F
Thermo E	-270…100°C	-454…1832°F	1°C / 1°F
Thermo L	-200…900°C	-328…1652°F	1°C / 1°F
Frequency	0…10kHz	0…10 kHz	0,001 Hz
NPN	0…3 kHz	0…3 kHz	0,001 Hz
PNP	0…1kHz	0…1 kHz	0,001 Hz
Rotational speed	0…9999 1/min	0…9999 1/min	0,001 1/min
Counter	0…9999 (prescaler up to 1000)		
Pulse input	**TTL** / Low < 2V / High < 3V **NPN** / Low < 0,8 V / High via resistance	**HTL/PNP** / Low <6 V / High >8 V **Namur** / Low < 1,5 mA / High > 2,5 mA	
Reset-input	active <0,8V		
Measuring error			
Standard	0,2% of measuring range, ± 1digit		
Pt100 / Pt1000	0,5% of measuring range, ± 1 digit		
Thermocouple	0,3% of measuring range, ± 1 digit		
Accuracy			
Reference junction	± 1°C		
Temperature drift	100ppm / K		
Measuring time	0,01…2,0 Seconds		
Measuring rate	Approx. 1/s with temperature sensor, approx. 100/s with standard signals		
Measuring principle	U/F-conversion		
Resolution	approx. 14 Bit at 1s measuring time		
Output			
Sensor supply	24 VDC /50 mA incl. Digital input, < 2,4V OFF, >10V ON, max. 30VDC / Ri~ 40 kOhm		
Switching points			
2x relay outputs with normally open contacts	Switching voltage 30 VDC/AC, max. 2A resistive load Operating life <30 mV/<10 mA – min. 205x10^6 30 VDC / 1 A – min. 5x10^5 30 VDC / 2 A – min. 1x10^5		
2 PhotoMos-outputs with normally open contacts	Switching voltage 30 VDC/AC, max.0,4 A		
Analog output	0-10 VDC/load min. 10 kOhm, 0/4-20 mA/load max. 500 Ohm, 12 Bit		
Interface	Modbus with ASCII or RTU-protocol		
USB	11520 Baud, no parity, 8 data bit, 1 stopp bit, flow control (none)		
Bluetooth	9600 Baud, no parity, 8 data bit, 1 stopp bit, flow control (none)		
RS232	9.600 Baud, no parity, 8 data bit, 1 stopp bit, wire length maximum 3m		

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RS485	9.600 Baud, no parity, 8 data bit, 1 stopp bit, wire length maximum 1000m
Power pack	
Supply	24VDC ± 10% galvanic isolated,≤ 5 VA
Supply	100-240 VAC 50/60 Hz DC + 10%,≤ 15VA
Supply	15-40VDC galvanic isolated / 20-30 VAC 50/60 Hz, ≤10 VA
Memory	EEPROM
Data life	≥ 100 years at 25°C
Ambient conditions	
Working temperature	0°C…50°C
Storing temperature	-20°C…80°C
Weathering resistance	Relative humidity 0-85% on years average without dew
EMV	EN61326
CE-confomity mark	Conformity according to directive 2014/35/EU
Safety regulations	According to low voltage directive 2014/35/EU EN61010; EN60664-1

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11. Order code

order code: UMU 500… **order-example: UMU500-1-B-B-1**

Power supply

-1 100...240VAC/DC +/-10%
-2 15....40VDC / 20...30VAC

Limit value output relay or Photo-Mos output

-A without limit relay
-B with 2 limit relay
-C with 2 Photo-Mos outputs
-D with 2 limit relay and 2 Photo-Mos outputs

Analog outputs

-A without analogue output
-B with analogue output

Sensor supply

-0 without sensor supply
-1 with sensor supply 24VDC/50mA

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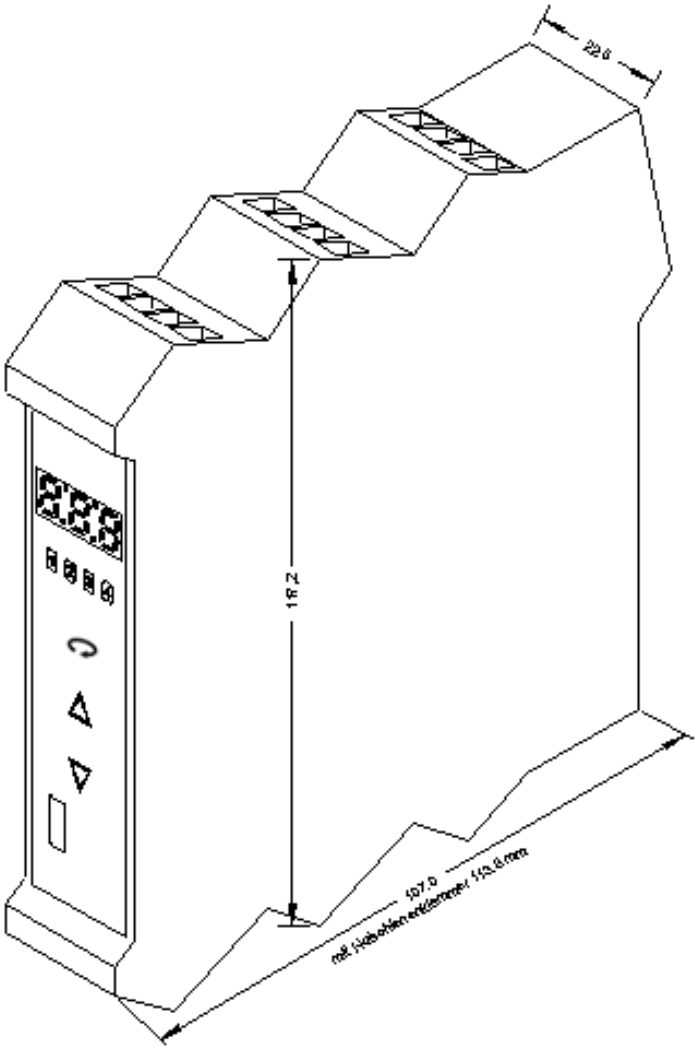
12. dimensions (mm)



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