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user manual UDA 50-…-U

Device features:

- red display from -1999...9999 digits (optional: green, orange oder blue)
- digit height 10 mm
- display adjustment via factory settings or directly at the sensor signal possible
- min/max memory
- 5 parameterizable support points
- display flashes when limit value is exceeded / limit value undershot
- tara-function
- sliding averaging
- two semiconductor switching points galvanically not separated
- programming lock via code entry
- protection class IP65 front side
- pluggable screw clamp
- accessories: PC-based configuration software with CD and USB adapter

Identification

STANDARD-TYPE	ORDER NUMBER
UDA 50-5-U-0	**99-003648**

Dimension symbols are to be specified on request when ordering, e.g. mbar

Content

Content

1. Short description

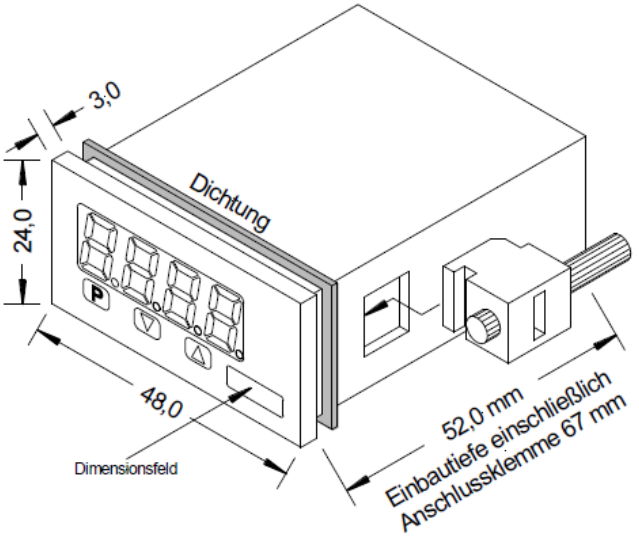
The switch panel meter UDA 50...-U... is a 4-digit digital display for measuring various measuring signals such as voltage/current, temperature and frequency. The configuration is done via 3 front keys or by means of an optional PC software PM-TOOL. An integrated programming lock prevents unwanted changes to parameters and can be unlocked again via an individual code.

With the 2 integrated semiconductor switching points, limit values can be monitored and reported to a higher-level control room. The electrical connection is made at the rear via plug-in clamps.

Selectable functions such as min/max value query, tare function, averaging, direct limit value adjustment in operating mode and additional measuring support points for linearization of the measuring input meet the requirements of measurement and control technology.

2. Assembly

Please read the safety instructions on page 34 before assembly and keep these instructions for future reference.



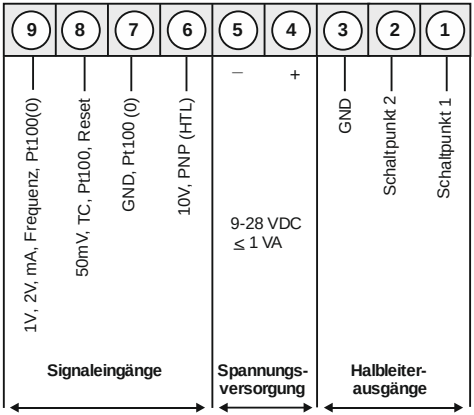
1. After removing the fasteners, insert the device.
2. Check seal for good fit.
3. Re-engage fastening elements and tighten clamping screws by hand. Then tighten further by half a turn with the screwdriver..

ATTENTION! Torque should not exceed max. 0.1 Nm!

3. Electrical connection

3.1. Pin assignment

Type UDA 50...-U... - Supply 9-28 VDC, galvanically not isolated



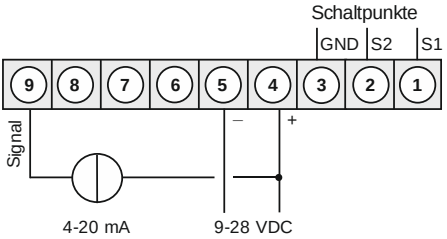
Note:
Clamps 3, 5 and 7 are electrically connected in the device.

3.2. Connection examples

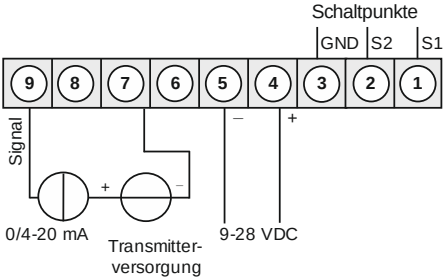
In the following you will find some connection examples in which practical applications are shown:

3.2.1. Current / Voltage

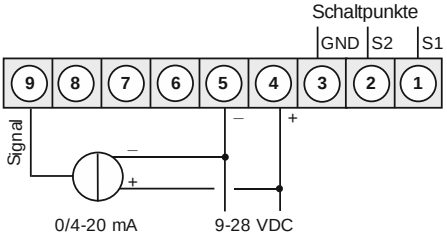
2-wire sensor 4-20 mA



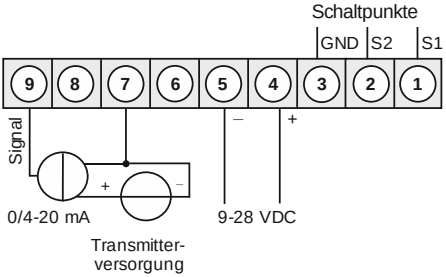
2-wire sensor 4-20 mA with external power supply



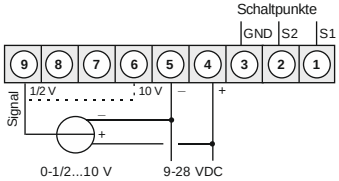
3-wire sensor 0/4-20 mA



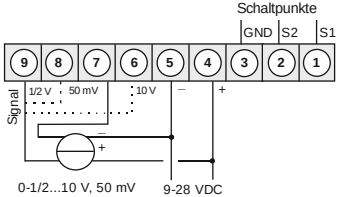
3-wire sensor 0/4-20 mA with external power supply



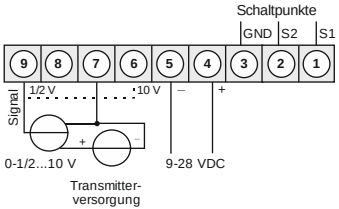
3-wire sensor 0-1/2…10 V



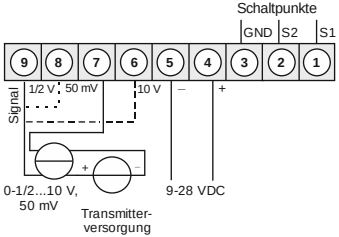
4-wire sensor 0-1/2…10 V, 50 mV



3-wire sensor 0-1/2…10 V with external power supply

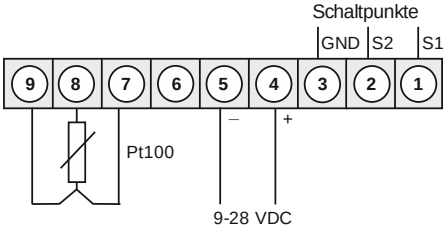


4-wire sensor 0-1/2…10 V, 50 mV with external power supply

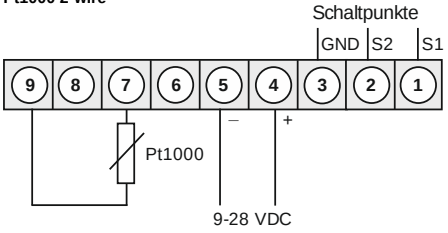


3.2.2. Temperature

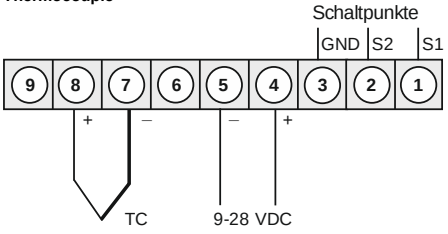
Pt100 3-wire



Pt1000 2-wire

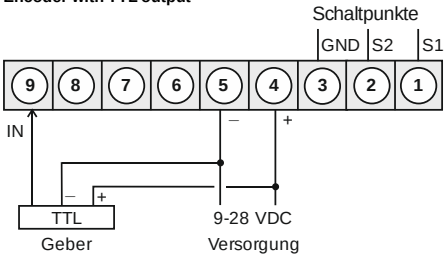


Thermocouple

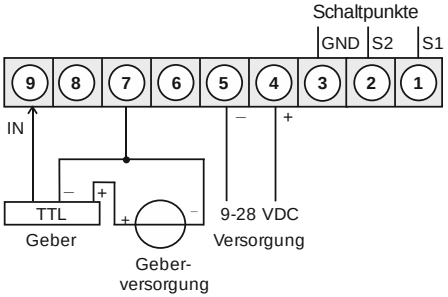


3.2.3. Frequency / Rotational speed

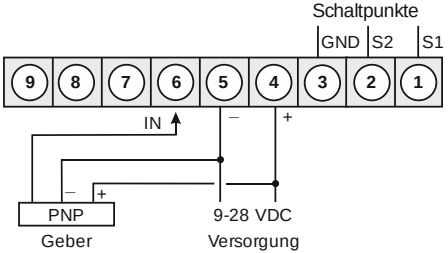
Encoder with TTL output



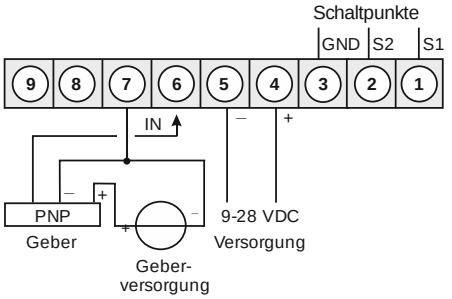
Encoder with external power supply and TTL output



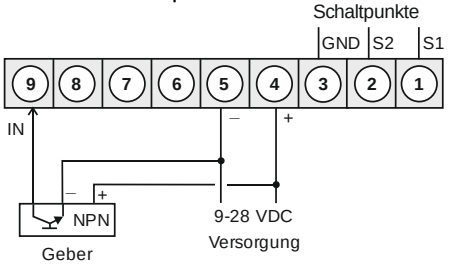
Encoder with PNP output



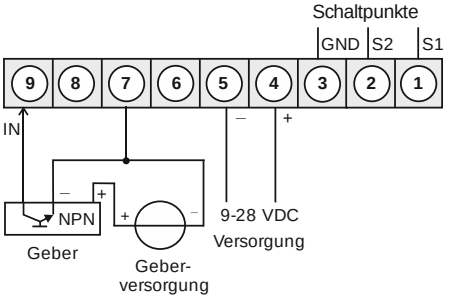
Encoder with ext. power supply and PNP output



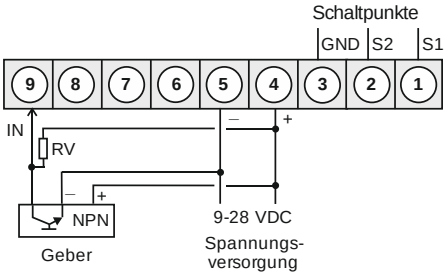
Encoder with NPN-output



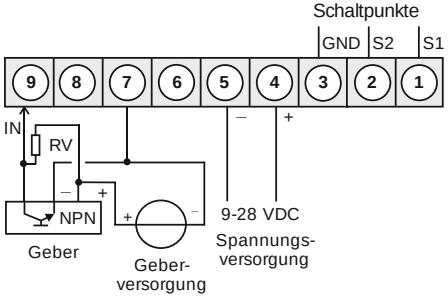
Encoder with ext. power supply and NPN-output



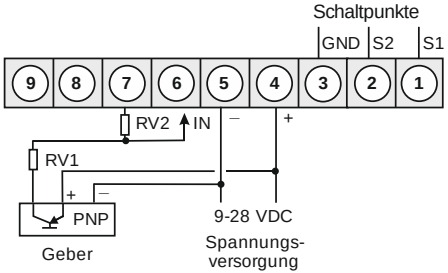
Encoder with NPN-output and required external resistance



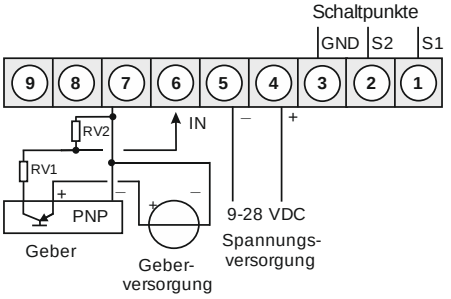
Encoder with external power supply, NPN-output and required external resistance



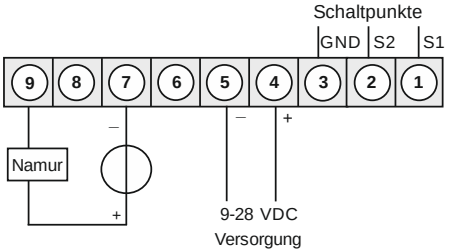
Encoder with PNP-output and external resistance circuit



Encoder with external supply, PNP-output and external resistance circuit



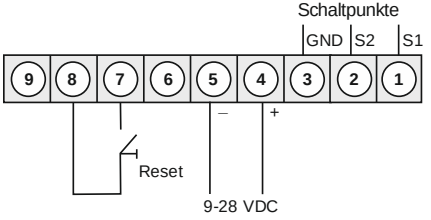
Encoder with external supply and namur output



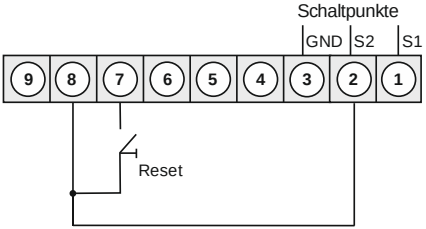
3.2.4. Counter

When used as a counter, use the connection examples for Frequency/Rotation and the reset input executed below.

Manual reset with external button



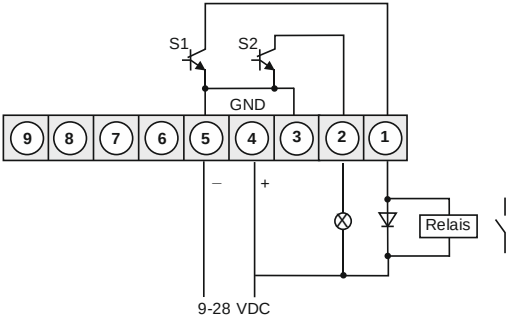
Automatic reset with output 2 and manual reset with external button



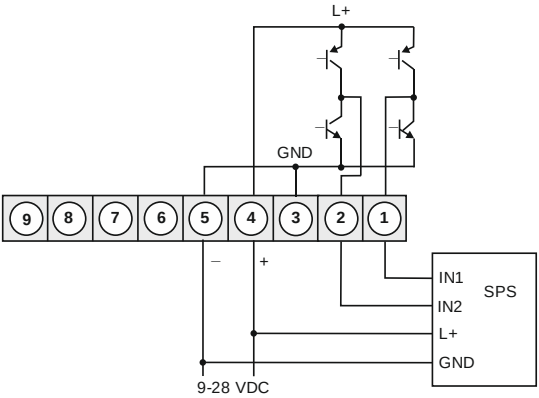
3.3. Switching points

Connection examples

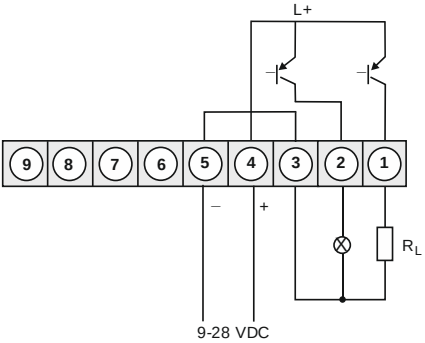
NPN-output GND switching



Push-Pull-output U_V and GND-switching



PNP-output L+-switching



4. Functional description and operation

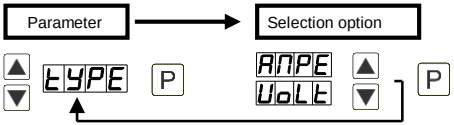
4.1. Operating and display elements

The display has 3 keys with which you can parameterize the device and call up stored functions during operation. Functions that can be adjusted or changed are always signaled with a flashing of the display. The settings made in the parameter level are always confirmed with **[P]** and thus saved. However, the display also automatically saves all adjustments and switches to operating mode if there are no further key operations within 10 seconds.

Key symbol	Function in operating mode	Function during parameterization
Program key **[P]**	The program key **[P]** is used to switch to parameterization.	Change to a lower parameter level or to the stored value.
Minus key **[▼]**	The minus key [▼] can be used to call up the min value or change a lower limit value, depending on the key function set.	Switching between parameters and changing parameters in the value level.
Plus key **[▲]**	The plus key [▲] can be used to call up the max value or change a lower limit value, depending on the key function set.	Switching between parameters and changing parameters in the value level.

A switched on relay or an activated switching point is visually signaled by a lighting of the respective switching point LED next to the 7-segment display.
A display overflow/underflow is indicated by 4 bars "- - - -".

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



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

Numerical values are adjusted from the smallest to the largest digit with [▲] [▼] and confirmed digit-selectively with **[P]**. A minus sign can only be parameterized on the most significant digit. After the last digit, the display switches back to the menu level.

4.2. Programming via configuration software PM-TOOL:

Part including the software on CD, is a USB cable with device adapter. The connection is established via a 4-pin micromatch connector on the back of the device and to the PC side with a USB connector.

System requirements: PC with USB interface
Software: Windows XP, Windows VISTA

With this tool the device configuration can be generated, omitted and saved on the PC. Through the easy-to-use program interface, the parameters can be changed, whereby the mode of operation and the possible selection options are specified by the program.

ATTENTION!
When setting parameters with a measuring signal connected, make sure that the measuring signal does not have a ground reference to the programming plug.
The programming adapter is not galvanically isolated and is directly connected to the PC. Reversing the polarity of the input signal can cause a current to flow through the adapter and destroy the device and connected components!

5. Setting the display

5.1. Switch on

After completing the installation, you can put the device into operation by applying the supply voltage. Before doing so, check all electrical connections once again to ensure that they are correctly connected.

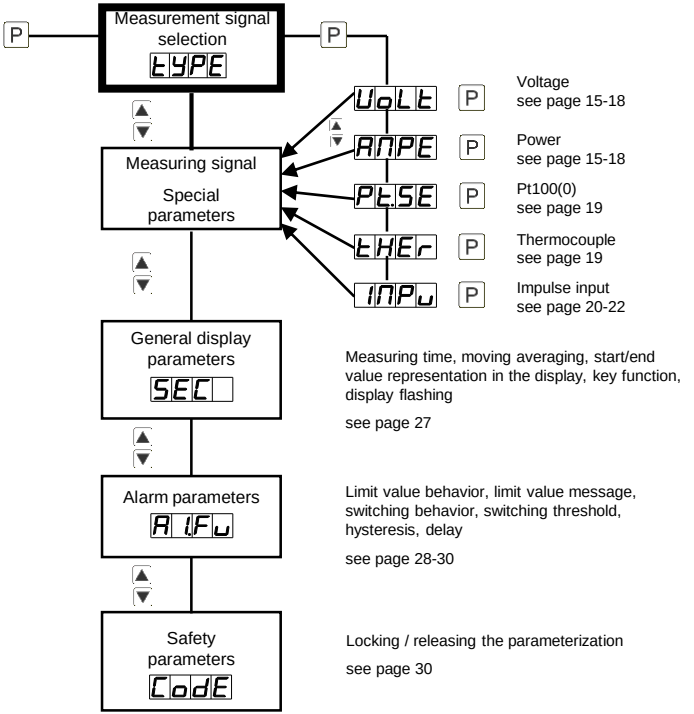
Start sequence

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

6. Parameterization

6.1. Input signal selection: type

With the type setting an assignment of the input variant takes place, here can be selected between the five input types voltage, current, Pt100(0), thermocouple and impulse signal.



6.1.1. Device parameters for the assignment of voltage/current signals: VoLT, AMPE

VoLT: Four voltage signals are available for selection : **0-10 V**, **0-2 V**, **0-1 V** and **0-50 mV**
AMPE: Here you can choose between the following signals : **0-20 mA** and **4-20 mA**

Parameter		Selection option				Default
VoLt	UoLt	0-10	0-2	0-1	0-50	0-10
		SEnU				
AMPE	AMPE	0-20	4-20	SEnA		0-20

Parameter		Selection option				Default
End	End	-999	to	9999		1000
	at	SEnU or SEnA	additional	noCA CAL		
OFFS	OFFS	-999	to	9999		0
	at	SEnU or SEnA	additional	noCA CAL		
dot.A	dot.A	0	to	0.000		0
EndA	EndA	-19.99	to	99.99		10.00
OFFA	OFFA	-19.99	to	99.99		00.00
tArA	tArA	-999	to	9999		0
ZErO	ZErO	00	to	99		00
OUEr	OUEr	no	AdC	rAnG	SPr	
		10Pr				no

Parameter		Selection option				Default
SPC.A			to			
dIS.1			to			
InP.1			to			
dIS.2			to			
InP.2			to			
dIS.3			to			
InP.3			to			
dIS.4			to			
InP.4			to			
diS.5			to			
InP.5			to			

End / OFFS: Measuring range end value / measuring range start value
With this pair of values the desired display value is assigned to the measuring signal.
If Sen.V or Sen.A was selected as input variant, you can choose between noCA and CAL. With noCA the previously set display value is taken over, with CAL the adjustment is carried out via the measuring section and the analog input value is taken over.

dot.A: Decimal point / Decimal place
The decimal point is used to define the decimal representation of the display value. This is also used for setting the limit values.

EndA / OFFA: Rescaling the measurement input values
With this function the final value / initial value can be rescaled to e.g. 19.5mA / 3.2mA without applying the measuring signal.

tArA: Setting the tare value / offset value
The preset value is added to the linearized value. This allows the characteristic curve to be shifted by the selected amount.

ZErO: Zero point calming
With zero point calming, a range of values around the zero point can be preselected at which the display shows a zero. If, for example, a 10 should be set, the display would show a zero in a value range from -10 to +10 and continue with -11 below and +11 above.

OVEr: Overflow and underflow behavior
The overflow / underflow of the measuring input is displayed with 4 bars at the top or 4 bars at the bottom. The exception is the input type "4-20" (mA) where a measured value smaller than 1 mA is already considered as underflow. This is to indicate a sensor failure.

no	No additional range check takes place here. If the display range is left, the display simply remains at the lowest value "dI.Lo" or highest value "dI.HI".
AdC	If the display range "dI.Lo" / "dI.HI" is exceeded / undershot, overflow / underflow is displayed.
rAnG	The measuring signal must be exactly in the specified measuring range "EnD"/"OFFS" so that no overflow is detected. The display and transducer range is additionally monitored.
5 Pr	The measuring signal is monitored for ±5% of the set measuring range. The display range is additionally monitored.
10 Pr	The measuring signal is monitored for ±10% of the set measuring range. The display range is additionally monitored.

SPC.A: Number of additional support points.
5 additional supporting points can be defined for the start and end values in order to linearize non-linear sensor values. Only the activated support point parameters are displayed.

dIS1…dIS5: Display values for support points.
Under this parameter, the support points are defined in value terms.

INP1…INP5: Analog values for support points.
The supporting points are always preset according to the selected input signal ma/V. Here the desired analog values can be freely parameterized in ascending order.

6.1.2. Device parameters for the assignment of Pt100(0), thermocouple: Pt.SE, THEr

Pt.SE: Three variants are available:
Pt.Lo: Pt100 3-wire -50.0…200.0°C / -58.0…392.0°F
Pt.Hi: Pt100 3-wire -200…850°C / -328…1562°F
Pt.tH: Pt1000 2-wire -200…850°C / -328…1562°F

tHEr: Here we differentiate between : **Thermocouple type L, J, K, B, S, N, E, T, R**

Parameter		Selection option				Default
Pt.SE	Pt.SE	Pt.Lo	Pt.Hi	Pt.tH		Pt.Lo

Parameter		Selection option				Default
tHEr	tHEr	tYP.L	tYP.J	tYP.H	tYP.b	tYP.L
		tYP.S	tYP.n	tYP.E	tYP.t	
		tYP.r				

Parameter		Selection option				Default
Unlt	Unlt	°C	°F			°C
OFFS	OFFS	-19.9	to	19.9		
		-35.9	to	35.9		000.0

Unlt: Type of temperature measurement.

With Unit you select the representation of the temperature in °C or °F.

OFFS: Line adjustment.
The value adjustment for a temperature measurement in °C can be set between -20.0 and +20.0 and for a later measurement in °F between -36 and +36. If the type of measurement is switched later, the value is rounded.

General display parameters see page 27
Alarm parameters see page 28
Backup parameters for locking / unlocking the parameterization see page 30

6.1.3. Device parameters for the assignment of pulse signals: IMPU

FrEq: Frequency measurement of TTL signals, PNP/NPN sensors.
tUrn: Rotational speed measurement (simplified setting option) of TTL signals, PNP/NPN sensors. This function also allows a flow to be scaled.
CO.up: Counting input (up-counter) for TTL signals, PNP/NPN sensors.
CO.on: Counting input (down counter) for TTL signals, PNP/NPN sensors.

6.1.3.1. Frequency measurement

Parameter		Selection option				Default
IMPu	IMPu	FrEq				

Parameter		Selection option				Default
I.tYP	ItYP	tEL	nPn	PnP	nAN	tEL
rAnG	rAnG	9.999	99.99	999.9	9999	9999
FILt	FILt	no	2	5	10	no
		20	50	100	200	
		500				
End	End	-1999	to	9999		1000
OFFS	OFFS	-1999	to	9999		0000
dot.F	dot.F	0	to	0.000		0
End.F	End.F	0.0.00	to	99.99		1000
OFF.F	OFF.F	0.0.00	to	99.99		0000
tArA	tArA	-1999	to	9999		0
SPC. F	SPC.F	0	to	5		0
dIS.2	dI S.1	-1999	to	9999		

Parameter		Selection option				Default
dIS.2			to			
InP.2			to			
dIS.3			to			
InP.3			to			
diS.4			to			
InP.4			to			
diS.5			to			
InP.5			to			

I.tYP: Impulse signal

The impulse input can be controlled in three different modes.

ttL	Active TTL signals with approx. 0.8 V lower and approx. 2 V upper threshold.
nPn	Passive switching contact that switches the internal pull up to ground.
PnP	Active sensor output. A pulldown is switched in the display.
nAM	Namur output. Low <1,5 mA, High > 2,5 mA

rAnG: Selection of the frequency range

Here you can choose from four different frequency ranges.

9.999	0…9,999 Hz (automatic software filter on 100 Hz/5ms)
99.99	0…99,99 Hz (automatic software filter on 500 Hz/5ms)
999.9	0…999,9 Hz
9999	0…9999 Hz (approximate 10 kHz)

FILt: Limitation of the impulse length

For debouncing mechanical contacts via the selection of the filter frequency.

no	none Special evaluation of the impulse length.
2	2 Hz at duty cycle 1:1 => minimum impulse length 250 ms
5	5 Hz at duty cycle 1:1 => minimum impulse length 100 ms
10	10 Hz at duty cycle 1:1 => minimum impulse length 50 ms
20	20 Hz at duty cycle 1:1 => minimum impulse length 25 ms
50	50 Hz at duty cycle 1:1 => minimum impulse length 10 ms
100	100 Hz at duty cycle 1:1 => minimum impulse length 5 ms
500	500 Hz at duty cycle 1:1 => minimum impulse length 1 ms

End / OFFS: Measuring range end value / measuring range start value
This value pair is used to assign the desired display value to the impulse signal.

dot.F: Decimal point / Decimal place
The decimal point determines the decimal representation of the display value. This is also used for setting the limit values.

End.F / OFF.F: Rescaling the impulse signals
This function allows the input frequency (rAnGE) to be rescaled without applying the impulse signal.

tArA: Setting the tare value / offset value
The preset value is added to the linearized value. This allows the characteristic curve to be shifted by the selected amount.

SPC.F: Number of additional support points
5 additional supporting points can be defined for the start and end values in order to linearize non-linear sensor values. Only the activated supporting point parameters are displayed.

dIS1…dIS5: Display values for support points.
Under this parameter, the support points are defined in terms of value.

INP1…INP5: Analog values for supporting points.
The supporting points are always preset according to the selected input signal ma/V. Here the desired analog values can be freely parameterized in ascending order.

6.1.3.2. Rotational speed measurement

Since more than 80% of the applications of a frequency measurement refer to a rotational speed, there is a simplified setting option via the "Turn" type. This function can also be used to scale a flow.

Parameter		Selection option				Default
IMPu	IMPu	turn				

Parameter		Selection option				Default
I.tYP	ItYP	ttL	nPn	PnP	nAn	ttL
FILt	FILt	no	2	5	10	no
		20	50	100	200	
		500				
PPt	PPt	0001	to	9999		0001
tIME	tIME	SEC	Min	hour		Min
dot	dot	0	to	0.000		0

I.tYP: Impulse signal

The impulse input can be controlled in three different modes.

ttL	Active TTL signals with approx. 0.8 V lower and approx. 2 V upper threshold.
nPn	Passive switching contact that switches the internal pull up to ground.
PnP	Active sensor output. A pulldown is switched in the display.
nAM	Namur output. Low <1,5 mA, High > 2,5 mA

FILt: Limitation of the impulse length
For debouncing mechanical contacts via the selection of the filter frequency.

no	none Special evaluation of the impulse length.
2	2 Hz at duty cycle 1:1 => minimum impulse length 250 ms
5	5 Hz at duty cycle 1:1 => minimum impulse length 100 ms
10	10 Hz at duty cycle 1:1 => minimum impulse length 50 ms
20	20 Hz at duty cycle 1:1 => minimum impulse length 25 ms
50	50 Hz at duty cycle 1:1 => minimum impulse length 10 ms
100	100 Hz at duty cycle 1:1 => minimum impulse length 5 ms
500	500 Hz at duty cycle 1:1 => minimum impulse length 1 ms

PPt: Impulses per revolution
The number of impulses per revolution can be entered directly via this parameter. As a rule, gears and their number of teeth, incremental encoders with their resolution or disks with a number of bores are used here. In the case of simple flow meters with paddlewheel, only the number of impulses per liter or cubic meter is entered.

tIME: Time base
The time base is usually always „**MIn**“ for the rotation speed, but can also be changed to seconds and hours.

dot: Decimal point / Decimal place
The decimal point determines the decimal representation of the display value. Thus, a rotational speed can be displayed with up to 3 decimal places if it is small enough.

Example: Rotational speed measurement
The rotational speed of a roll in a steel mill is to be displayed in revolutions/minute with one decimal place. Via a perforated disc with 18 holes at an angle of 20°, the rotational speed is recorded. The maximum rotational speed of the roller is 60 revolutions per minute. Thus, the customer provides e.g.. **FILt** = **100**; **PPt** = **18**; **tIME** = **MIn**; **dot** = **0,0** on. The challenge with the filter setting is to estimate the impulse length correctly.

6.1.3.3. Up/down counter

Parameter		Selection option				Default
IMPu	IMPu	CouP	Codn			

Parameter		Selection option				Default
I.tYP	ItYP	tEL	nPn	PnP	nAM	tEL
Co.bA	CobA	PuLS	SEC	M In		PuLS
EdGE	EdGE	PoSI	nEGA			PoSI
PrES	PrES	0001	to	9999		0001
FILt	FILt	no	2	5	10	no
		20	50	100	200	
		500				
End	End	-1999	to	9999		1000
End.C	EndC	0001	to	9999		1001
dot	dot	0	to	0.000		0

I.tYP: Impulse signal
The impulse input can be controlled in three different modes.

ttL	Active TTL signals with approx. 0.8 V lower threshold and approx. 2 V upper threshold
nPn	Passive switching contact that switches the internal pull up to ground.
PnP	Active sensor output. A pulldown is switched in the display.
nAM	Namur output. Low <1,5 mA, High > 2,5 mA

Co.bA: Counter base
By default, the display in counter mode records the incoming impulses. However, the system time in seconds or minutes can also be used as the counter basis. In this case, the impulse input at the gate time, which at flank **PoSI** (HIGH signal) counts and at **LOW** stands. At the flank **nEGA** the logic is reversed.

EdGE: Count start / count end (edge)
The active edge indicates when to count . If the impulse acquisition is used as the counter base **PuLS** is selected, then it is indicated whether at the positive edge **PoSI** or the negativ flank **nEGA** the internal counter is incremented. If the counter base is the time, the active/HIGH control is activated with **PoSI** and the passive-/ LOW control with **nEGA** selected. The counter reset is always static.

PrES: Prescaler
A prescaler is used in the display so that even large numbers of impulses, e.g. 5,000,000, can be recorded by the display . Only the pre-divided value is included for the scaling.

FILt: Limitation of the impulse length
For debouncing mechanical contacts via the selection of the filter frequency.

no	none Special evaluation of the impulse length.
2	2 Hz at duty cycle 1:1 => minimum impulse length 250 ms
5	5 Hz at duty cycle 1:1 => minimum impulse length 100 ms
10	10 Hz at duty cycle 1:1 => minimum impulse length 50 ms
20	20 Hz at duty cycle 1:1 => minimum impulse length 25 ms
50	50 Hz at duty cycle 1:1 => minimum impulse length 10 ms
100	100 Hz at duty cycle 1:1 => minimum impulse length 5 ms
500	500 Hz at duty cycle 1:1 => minimum impulse length 1 ms

End, End.C: Display end value and impulse count end value
The display value is freely linearized over the preset number of impulses. For this purpose, the number of desired impulses is assigned to a display value. The zero point cannot be preselected. With a down counter, the **End** and **End.C** as the start value. For the absolute counter limit values, the settings of **dI.HI** and **dI.Lo** are used. If these are reached, all digits with the reached value flash, which corresponds to an overflow or underflow.

General display parameters see page 27
Alarm parameters see page 28
Backup parameters for locking / unlocking the parameterization see page 30

6.2. General display parameters

Parameter	Selection option				Default
SEC	0.01	to	2.00		1.00
GLM	01	to	20		
dl.HI	1999	to	9999		1999
dl.Lo	1999	to	9999		9999
tASt	no	EHtr	AL.L1		no
FLAS	no	AL-1	AL-2	AL.12	no

SEC: Measurement timet
Setting the base measuring time or the frequency filter for calming the measured value. This filter value can be set from 0.01...2.00 seconds. For impulse measurements, the value can be selected up to 0.00, so that the detection runs at the maximum speed.

GLM: sliding averaging
In addition to the measuring time, a sliding average of 1...20 values can also be activated. Here, no separate weighting takes place between the past values. With GLM = 1 the sliding averaging is switched off.

dl.Lo, dl.HI: Initial value representation / final value representation in the display
For overflow evaluation, the measuring range and the optionally selected overflow behavior are (**OVEr)** evaluated. In addition to this, this range can be further narrowed down by the two parameters **dl.HI** and **dl.Lo** .

tASt: Assignment (deposit) 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 **EHtr**, the measured min/max values are stored during operation and can be queried via the **[▲] [▼]** direction keys. The values are lost when the device is restarted. If you select the limit value correction **AL.LI** , you can change the values of the limit values during operation without interfering with the operating sequence. If **no** has been parameterized, the direction keys **[▲] [▼]** have no function in the operating mode.

FLAS: Display flashes when limit value is undershot / limit value exceeded
Here, a display flashing can be used as an additional alarm function either to the first limit value (Selectionl: **AL-1**), to the second limit value (Selectionl: **AL-2**) or to both limits (Selection: **AL-12**) be added. With **no** (Factory setting) no blinking is assigned.

6.3. Alarm parameters

Parameter		Selection option				Default
AI.Fu						
						
AI.Er						
AI.tY						
AI.LI			to			
AI.HY			to			
AI.HI			to			
AI.Lo			to			
AI.oF			to			
AI.on			to			
A2.Fu						
A2.Er						
A2.tY						
A2.LI			to			
A2.HY			to			
A2.HI			to			
A2.Lo			to			
A2.oF			to			
A2.on			to			

A1.Fu, A2.Fu: Limit value behavior
With the operating principle it is possible to switch between different working types of the switching outputs. Is **Ax.Fu** = **oFF** selected, the associated setpoint parameters are not displayed.

oFF	The switching point is without function and associated parameters are not displayed (Default state).
On	The switching point is switched on in measuring mode and associated parameters except for **Ax.Er** and **Ax.tY** are`t displayed.
HI-LI	Switch when limit value is exceeded.
Lo.LI	Switch when limit value is undershot.
rAnG	Switching in the specified range.
Out.r	Switching outside the specified range.

A1.Er, A2.Er: Message in case of limit value error
If a device checksum is not correct or the display range is violated, you can specify the behavior of the switching points.

on	The selected switching point behavior is activated. In push-pull operation HIGH/L+ is switched.
oFF	The switching points behave in the opposite way. The error behavior overwrites the actual limit value function when an error occurs.
no	An error has no defined effects. This means a value of 10,000 for the overflow evaluation and a value of -2,000 for the underflow evaluation.

A1.tY, A2.tY: Switching behavior of the outputs
Depending on the wiring, the switching outputs support different operating modes and work in an inverting manner. This means that the switching outputs are deactivated in the event of an alarm condition. Thus, in case of device failure, the alarm condition is maintained.

nPn	Here, without alarm conditions, the output is actively switched to GND.
PnP	PnP without alarm condition the output is actively switched to the power supply (rectified, filtered internal device supply).
Ac.HI	Here the output is switched to HIGH or power supply without alarm condition.
Ac.LO	Here without alarm condition the output is switched to LOW or GND.

A1.L1, A2.L1: Switching threshold
Here the switching threshold is specified, from which an alarm reacts or is activated/deactivated. With the window function of a switching point, this parameter is not queried.

A1.HY, A2.HY: Hysteresis
The hysteresis defines a difference to the limit value by which an alarm reacts delayed. This parameter is not queried during the window function of a switching point.

A1.HI, A2.HI: upper limit value
A1.Lo, A2.Lo: lower limit value
For the range functions **A1.FU, A2.FU** = **rAnG** or **Out.r** this value defines between „-1999…9999“ the upper/lower limit of the window function. This parameter is not displayed for other operating principles. The operating principle can switch between switching point 1 and 2.

A1.oF, A2.oF: Dropout delay
Here, for the limit values, a delayed switch-off of 0-5999 s are specified. 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 is started, without taking the set delay into account.

A1.on, A2.on: Pick-up delay
Here, a delayed switch-on of 0-5999 s can be specified for the limit values. The time value is not stored permanently and is reset by a device start. In addition, the alarm status is determined directly when the device is started, without taking the set delay into account.

6.4. Safety parameters for locking/unlocking the parameterization

Parameter		Selection option				Default
CodE	CodE	0000	to	9999		1234
run	run	ULOC	LOC			ULOC

CodE: Assignment of an individual numerical code (4-digit number combination, freely assignable). If this code is assigned (0000 factory setting), all parameters are locked for the operator if **LOC** is then selected in the **run** menu item. By pressing **[P]** in operating mode for approx. 3 seconds, the display shows the message **CodE**. The code must be entered before each parameterization attempt until under **run** programming with **ULoC** is unlocked again.

run: Activation / deactivation of the programming lock
Here, [▲] [▼] can be used to switch between deactivated key lock **ULOC** (factory setting) and activated key lock **LOC** be selected. Was **LOC** selected, the keyboard is locked. To return to the menu level, **[P]** must be pressed for 3 seconds in operating mode. The now appearing **CodE** (factory setting 0000) is set with **[▲] [▼]** and **[P]** entered and unlocks the keyboard. An incorrect entry is displayed with **FAIL**.
In **LOC**-mode, the display cannot be reset, which is to additionally secure the regular operation.

7. Reset to Default values (factory setting)

To set the device to a defined basic state, it is possible to perform a reset to the default values. For this purpose, the following procedure shall be applied:
Switch off the voltage supply of the device. Press the **[P]** key and switch on the power supply again while holding down the **[P]** key. Press the **[P]** key until "----" appears in the display. Resetting loads the default values and uses them for further operation. The device is now reset to the delivery state.

CAUTION! All application-specific data will be lost!

8. Technical data

housing	
dimensions	48x24x52 mm (WxHxD)
	48x24x67 mm (WxHxD) including plug-in clamp
Installation cutout	$45{,}0^{+0{,}6}$ x $22{,}2^{+0{,}3}$ mm
Wall thickness	up to 5 mm
Mounting	Screw elements
Material	PC Polycarbonat, black, UL94V-0
Sealing material	EPDM, 65 Shore, black
Protection class	Standard IP65 (front), IP00 (backside)
wight	approx. 100 g
connection	Plug-in clamp; Cable cross section up to 1,5 mm^2
display	
Digit high	10 mm
Segment colour	red (optional green, orange or blue)
Display range	-1999 up to 9999
Switching points	LED S1, LED S2
Overflow	horizontal bars above
Underflow	horizontal bars below
Display time	0,1 up to 10,0 seconds

Signal	**Measuring range**	**Measuring span**	**Resolution**	**Internal resistance**
Voltage	0…10 V	0…12 V	≥ 14 bit	Ri > 100 kΩ
Voltage	0…2 V	0…2,2 V	≥ 14 bit	Ri ≥ 10 kΩ
Voltage	0…1 V	0…1,1 V	≥ 14 bit	Ri ≥ 10 kΩ
Voltage	0…50 mV	0…75 mV		Ri ≥ 10 kΩ
Current	4…20 mA	1…22 mA		Ri = ~125 Ω
Current	0…20 mA	0…22 mA		Ri = ~125 Ω
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	-328…3182°F	1°C / 1°F	
Thermo N	-270…1300°C	-454…2372°F	1°C / 1°F	

Signal	Measuring range	measuring range	Resolution
Thermo J	-170…950°C	-274…1742°F	1°C / 1°F
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…1000°C	-454…1832°F	1°C / 1°F
Thermo L	-200…900°C	-328…1652°F	1°C / 1°F
Frequency	0…10 kHz	0…10 kHz	0,001 Hz
NPN	0…3 kHz	0…3 kHz	0,001 Hz
PNP	0…1 kHz	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)		

Impulse input	TTL	HTL/PNP	NPN	Namur
	Low <2 V, High >3 V	Low <6 V, High >8 V	Low <0,8 V, High over resistance	Low <1,5 mA, High >2,5 mA

Reset-input	Aktiv <0,8 V
Measuring error	
Standard	0,2% from measuring range ± 1 Digit
Pt100/Pt1000	0,5% from measuring range ± 1 Digit
Thermocouple	0,3% from measuring range ± 1 Digit
Accuracy	
Reference measuring point	± 1°C
Temperature drift	100 ppm / K
Measurement time	0,01…2,0 seconds
Measurement rate	approx. 1/s For temperature sensor, approx. 100/s for standard signals
Measuring principle	U/F-conversion
Resolution	approx. 14 Bit at 1s Measurement time
Input	2 Semiconductor outputs, galvanically not isolated Low-side: max. 28 V, 100 mA (NPN; Ground switching) High-side: U_V–3V, 100 mA (PNP, +U_V-switching) Push-Pull: Switching between ground GND and auxiliary power +UV
Interface	Configuration interface to the PC software PM-TOOL with USB-Dongle
Power supply unit	9-28 VDC galvanically not isolated, ≤ 1VA

Memory	EEPROM
Data preservation	≥ 100 years at 25°C
Environmental conditions	
Working temperature	-20°C…+50°C
Storage temperature	-30°C…+70°C
Climatic resistance	Relative humidity 0-85% annual average without condensation
EMV	EN 61326
CE-marking	Conformity according to directive 2014/30/EU
Safety regulations	according to Low Voltage Directive 2014/35/EU EN 61010; EN 60664-1

9. Safety instructions

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

Intended use

The UDA 50-...-U...is intended for the evaluation and display of sensor signals.

In the event of improper use or operation personal injury and / or damage to property may occur.

Control of the device

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

Installation

The UDA 50 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 device, e.g. due to transformers, two-way radios or electrostatic discharges.

- **The fuse protection of the supply should not exceed a value of 0.4A slow-blow!**
- Do not install inductive loads (relays, solenoid valves, etc.) near the device and suppress them using RC spark quenching combinations or free-wheeling diodes.
- Lay input and output lines separately and not parallel to each other. Route outgoing and return lines next to each other. If possible, use twisted-pair cables. To obtain 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 matter of principle, these should not be laid in the immediate vicinity of supply lines of consumers. In the case of shielding, this should only be connected on one side to a suitable equipotential bonding (usually the measuring earth).
- The device is not suitable for installation in potentially explosive atmospheres.
- An electrical connection deviating from the connection diagram can lead to danger to persons and destruction of the device.
- The terminal area of the devices 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 isolated 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 which can build up on long lines or can be caused by faulty wiring.

10. Troubleshooting

	Error description	Measures
1.	The device indicates a permanent overflow. 	• The input has a very large measured value, check the measuring distance. • The display range of 999 or the specified measuring range is exceeded, check the interpolation points or selected input types and the signal range. • Not all activated interpolation points are parameterized. Check whether the relevant parameters are set correctly.
2.	The device indicates a permanent underflow. 	• The input has a very small measured value, check the measuring distance. • The display range of -1999 or the specified measuring range is undershot, check the settings. • Not all activated interpolation points are parameterized. Check whether the relevant parameters are set correctly.
3.	The device shows „Lbr“ in the 7-segment display.	• Check whether the correct input type is selected. Only temperature measurements and 4...20 mA show this error message. • Check the wiring for contact or correct connection.
4.	The device shows „HALP“ 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.
5.	Parameters for input parameterization are not available.	• The programming lock is activated. • Enter correct code.
6.	The device shows „Err1“ in the 7-segment display.	• In case of errors in this category, please contact the manufacturer.
7.	The device does not respond as expected.	• If you are not sure that the device has been parameterized before, restore the delivery state as described in chapter 7.
8.	With thermocouple measurement there are higher constant measurement deviations.	• Remove strong sources of heat or cold from the direct vicinity of the device. • Reduce the switching capacity of the relay switching points to below 10 mA if possible, since higher switching currents lead to increased local heating and thus to a greater error in the reference junction measurement. • If the deviations are permanent and constant during operation, the reference junction measurement can be corrected via the offset.