Instruction manual

Universal mobile Diagnosis Measurement System

for Service, Development and Quality Control

- **1. Table of contents**

2. Read first

- 2.1 General safety notices for electrical equipment

The set up, start up and maintenance of electrical devices should always be performed by trained, qualified personnel! To avoid the danger of electrical shock, the device housing must not be opened or removed. The inside of this device contains parts that should only be serviced or operated by trained, qualified personnel. There are no user-serviceable parts inside. To prevent short circuits or danger of electric shock, these devices must not be exposed to high humidity or moisture. The symbol showing a lightning bolt with an arrowhead pointing downward and contained within an equilateral triangle indicates that the device contains uninsulated parts standing under high voltage. Contact with these parts may result in a harmful or fatal electrical shock.

- 2.1.1 Operating instructions

Read the data sheet, operating instructions, safety guidelines and, if necessary, the certificate of conformity before placing the device in operation for the first time. Be sure to retain the documentation and store it in a place where it can be readily accessed for further reference.

- 2.1.2 Safety notes

For your own benefit, be sure to read all warning notes on the device and in the related documentation mentioned above. Be sure to comply with all regulations pertaining to the use and operation of this device. Do not, under any circumstances, open a device in cases where this is expressly prohibited.

- 2.1.3 Water and moisture

Never use this device in moist, humid environments or near water. Be sure to note the protection type specified in the data sheet.

- 2.1.4 Ventilation

This device should always be used in locations with adequate ventilation. Any opening on the device must remain free and unobstructed to ensure proper ventilation. Avoid placing the device on surfaces that could accumulate static charge.

- 2.1.5 Effects of heat

Note any maximum operating temperature specified in the data sheets. Avoid placing the device near sources of heat.

- 2.1.6 Electrical connection

Connect the device only as shown in the wiring diagram, data sheet and/or operating instruction.

- 2.1.7 Protection of current and measuring lines

The device leads should be routed so that they cannot be tripped over or stepped on and so that nothing can be placed on or against them. In this regard, pay particular attention to the sections of leads near plugs, power sources and where they connect to the device.

- 2.1.8 Cleaning

Do not use any strong cleaning agents. When cleaning the device, be sure that fluid does not enter the interior.

- 2.1.9 Devices not being used or in storage

If the device will not be used for an extended period of time, be sure to disconnect the power supply.

- 2.1.10 Entry of foreign objects

Be particularly careful to ensure that neither fluids nor foreign objects can enter and contaminate the interior of the device.

- 2.1.11 Service and maintenance in the event of damage

This device must only be serviced by trained, qualified personnel. In doubtful cases, “Unit Control Messtechnik” should always be consulted. Repairs performed without proper advice and consultation can have serious, dangerous consequences and may even void the right to claim under device warranty.

- 2.2 Information on Disposal

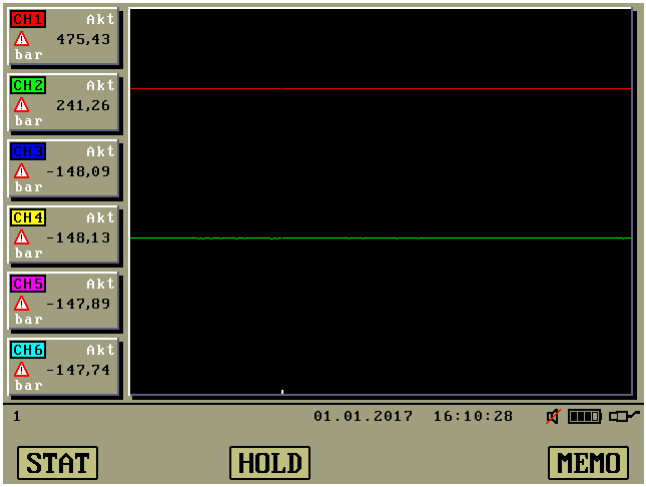
For business users in the European Union:
If you wish to discard electrical and electronic equipment, please contact your local dealer or supplier for further information.

Information on disposal in other countries outside the European Union:
The disposal symbols are only valid in the European Union . If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.

3. Basic operation

- 3.1 Switch on

Switch on the device with ON.
After the start screen, the measuring display used last time appears.



- 3.2 Brightness of display

Increase the picture brightness with and decrease it with .

- 3.3 Beeper

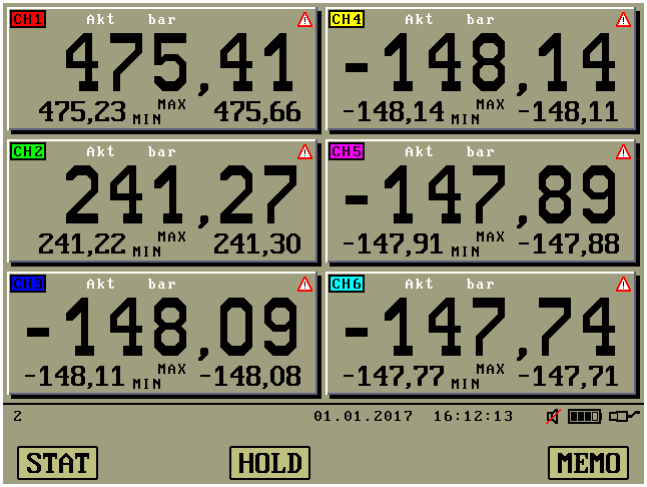
With NUM + F5 the beeper toggles on and off.

- 3.4 Status line

In the lower display area the status line is located with time, date, beeper on or off, battery condition and power supply signal, as well as on the left side the number of the current measuring display.

- 3.5 Selection of the measuring display

Select the measuring display with  and  , the number of the current display is shown at the bottom left within the status line, here it is number 2:



There are 10 measuring displays. Within the measuring displays there are measuring windows. The amount and the size of these windows, as well as theirs settings can be individually fitted. This is described in the chapter “Settings of Measuring windows”. So you can define appropriate Displays for many different measuring tasks.
In delivery status, different measuring displays are already preset.

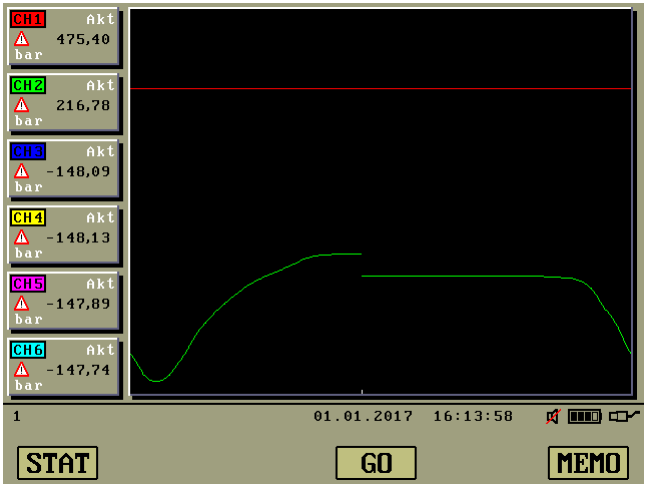
The warning signs inside the Measuring windows indicate, that the zero point of the appropriate channel is not adjusted yet, read more about that in chapter “Zero point correction”.

- 3.6 Reset of peak values

With  the minimum and maximum values are reset.

- 3.7 Display hold

Press F3 „HOLD“ for holding the display (freeze).



This state can ONLY be left with F4 „GO“.

- 3.8 Methods of input

Most settings are done with the keys 4 and 6 .

These keys are featured with automatic repeat. For that, just hold the keys.

At some settings, numerical values are keyed in directly. This is done by holding the NUM -key and the number keys 0 ESC to 9 DIS,

the decimal point key CR , as well as the sign key # SET.

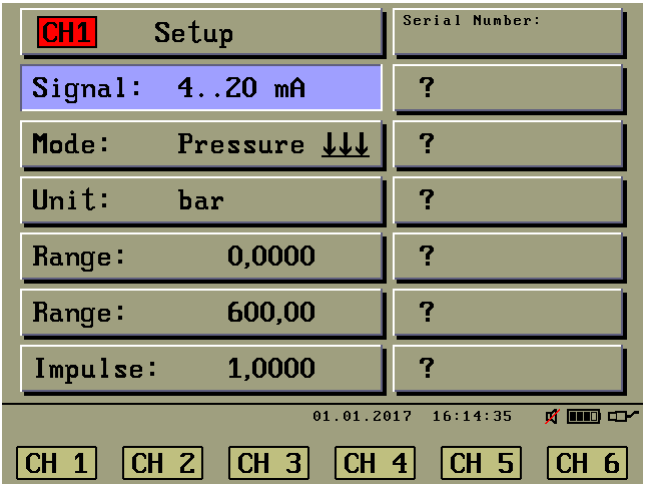
This method is called “numerical” in the following of this manual.

- 3.9 Switch off

With OFF the device shuts down.

4. Setting sensor parameters

With SET enter the Sensor parameter settings:



Select the channel to be adjusted with F1 HELP „CH1“ to F6 „CH6“.

4.1 Setting sensor parameters manually

Select the parameter to be adjusted with 8 and 2.

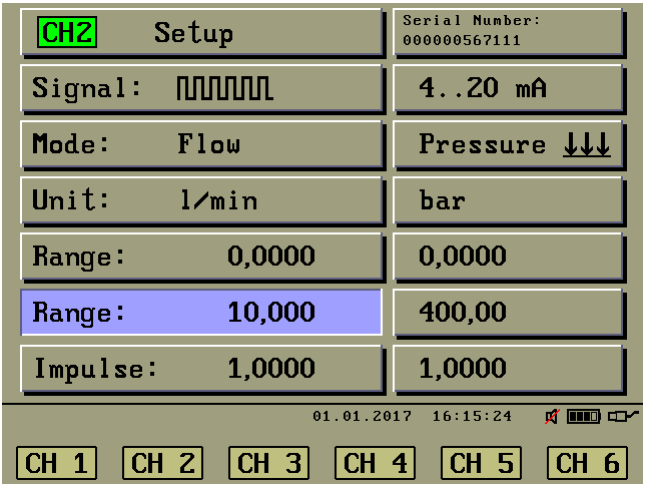
The settings for Signal, mode and physical unit are changed with 4 and 6 .

The numerals of the start value, the end value and the pulses(k-factor) are entered numerical.

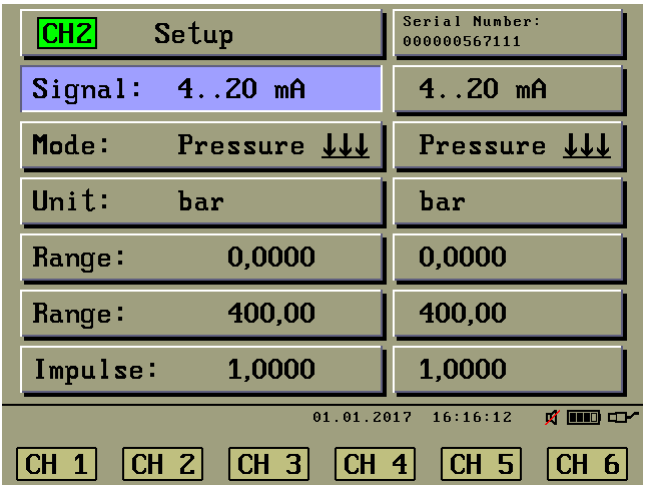
The start and end value can also be selected from a list by 4 and 6.

- 4.2 Setting sensor parameters by chip identification

Press SCN for scanning the sensor. If the connected sensor is provided with an identification chip, its parameters will appear in the right column.



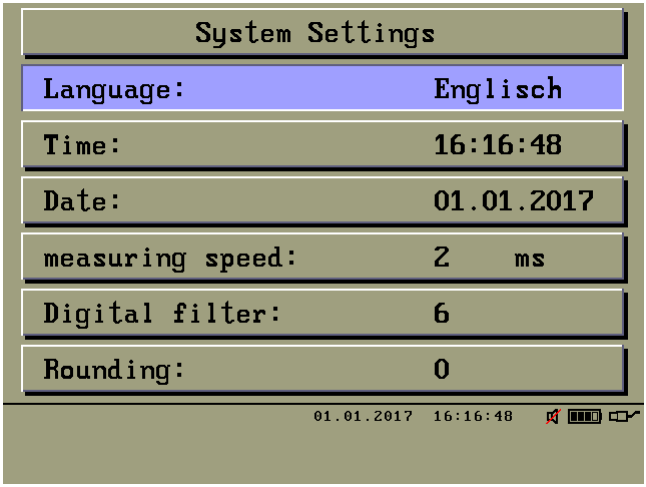
To take over these parameters press CR .



With ESC save the changes and exit this display.

5. System settings

With SYS 3 enter the system settings:



Select the parameter to be adjusted with 8 and 2.

The time and date are entered numerically.

The time has to be entered in the format HH:MM:SS and the

date in the format DD:MM:YY without century.

The other parameters are changed with 4 and 6.

The measuring speed determines the speed of the numerical and the graphical display.
The slower the measuring speed, the slower the sampling rate.
This setting affects also the recording time at the PC programm.

The digital filter determines the inertia of the numerical display.
The higher the filter, the higher the inertia of the display.

The rounding specifies, how many digits shall be cut after decimal point.

With ESC 0 save the changes and exit this display.

6. Zero point correction

With ADJ enter the zero point correction.

With F1 HELP „CH1“ to F6 „CH6“ the zero point correction will be performed for the appropriate channel. With SET start an automatic sequence for all six channels.

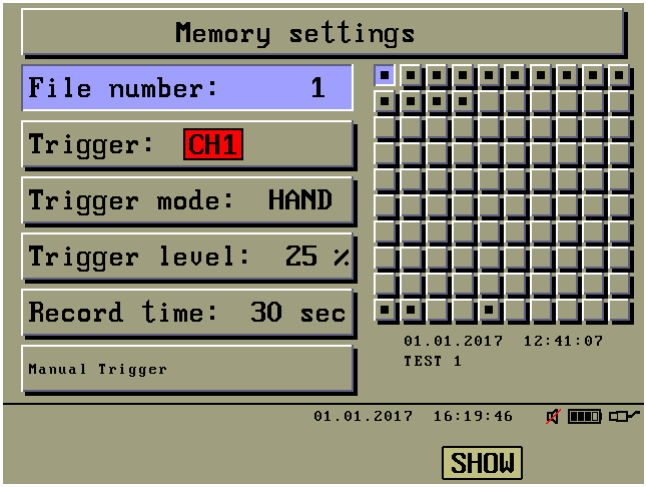
Attention: Deviation greater than +/- 3% will not be accepted.
With a faultless sensor without loading the zero point will be calibrated and the OK sign appears.

Attention: At channels which are set to frequency input there is no zero point correction, because frequency is absolute.

With ESC save the changes and exit this display.

7. Memory functions

With F6 „MEMO“ enter the memory functions:



Select the memory page with 4 and 6, or enter the number of the page numerically.

Occupied memory pages are marked with a small quadrat.
For every occupied memory page the recording parameters, date and time of recording, as well as a short description, if inserted at the recording, are shown.
For a occupied memory page the recording parameters are not changeable.

- 7.1 Record a measurement

Select an emty memory page.

The recording parameters are selected with  and  and are changed with  and  .

- 7.1.1 Automatic triggering

For automatic triggering first select the channel to be triggered on.

For triggering on an difference press the key  „DIFF“ serveral times for the desired difference channel.

Attention: Only channels with the same physical mode and unit can be selected for difference triggering.

Then select a trigger mode. The first symbol marks the start condition, the second symbol the stop condition for the recording.

The triggering is edge controlled.

After that enter a trigger level either with  and  in 5% steps, or directliy numerical a level between 0 and 100%.

The calculated trigger value is shown below.

- 7.1.2 Manual triggering

For manual triggering select trigger mode “HAND”, the recording will then be started with pressing a key. The parameters trigger channel and trigger level are not considered at this case.

- 7.1.3 Recording time

Select a recording time which is as near as possible at the current expected measuring time to get the maximum degree of resolution.

- 7.1.4 Short description of a recording

The date and time of a recording are generally stored. For a better assignment, here is a possibility for adding a short description with 2x20 characters to the intended recording.

For that press TYP[1].

With [8], [2], [4], [6] select the character, short press for single step, otherwise hold the key.

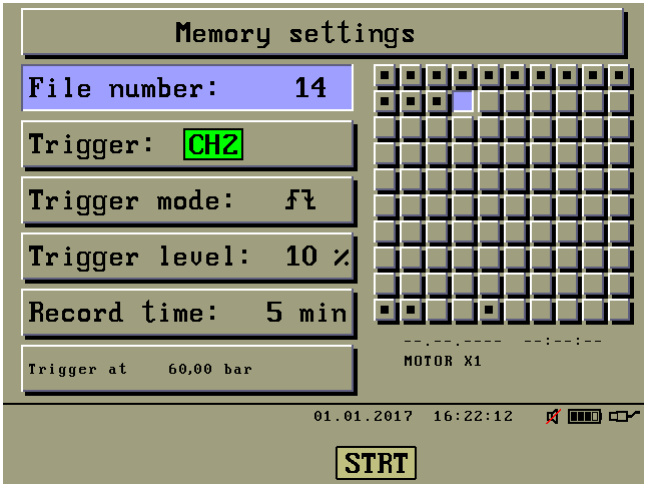
With CR[*] the character is set,

with F3 „<-“ the last character is deleted.

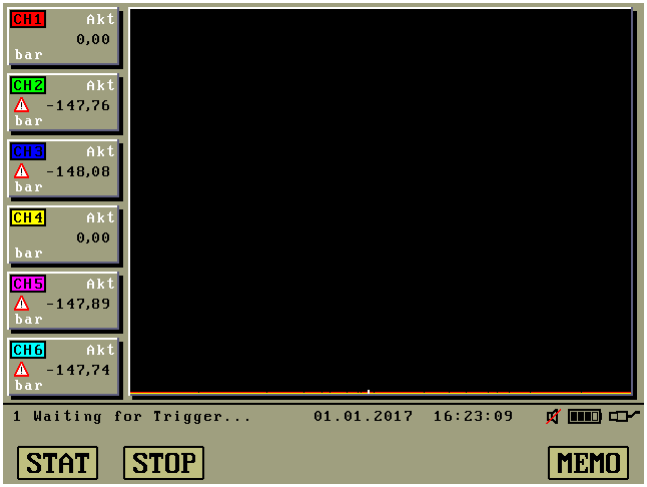
After completed exit this display with ESC[0].

- 7.1.5 Initiate a recording

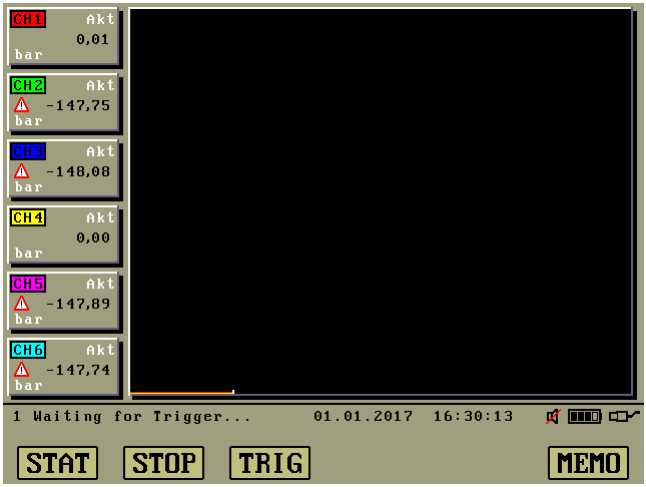
The following example shows the settings for automatic triggering on channel 2, recording start with rising edge, recording stop with falling edge, trigger level at 10%, 60,00 bar at this case, recording time 5 minutes and the short description “MOTOR X1”:



With F4 „STRT“, the recording is initiated, here with automatic triggering…



…and here with manual triggering:

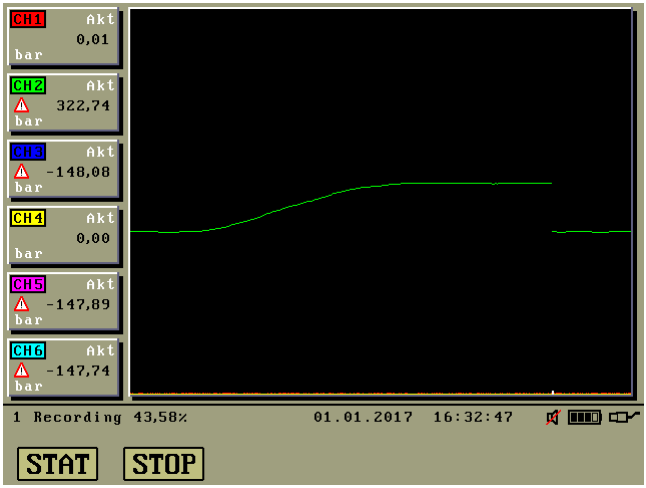


The device is now waiting for the preset trigger conditions. During that, a trigger advance up to 10% of the total recording time will be recorded.

This status can ONLY be exited with F2 „STOP".

- 7.1.6 Start the recording

The recording starts with automatic triggering as soon as the trigger level is reached, or with manual triggering by pressing F3 „TRIG“.



- 7.1.7 Stop the recording

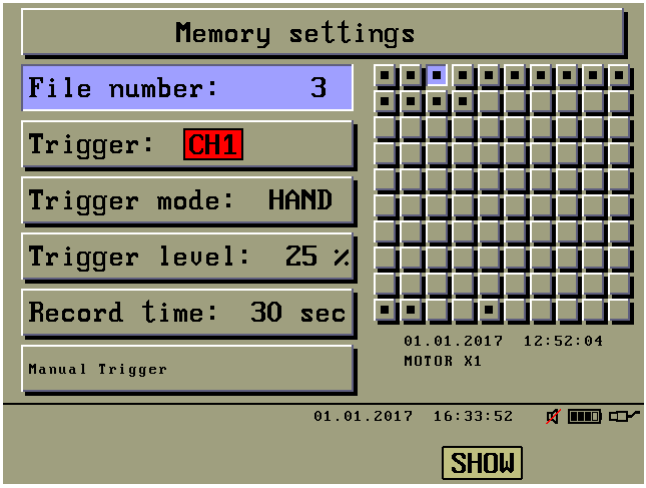
The end of a recording can be reached by different kinds:

1. You press F2 „STOP“
2. A preset trigger condition for stopping the recording occurs
3. The preset recording time has elapsed
4. With battery operation, when the battery runs low

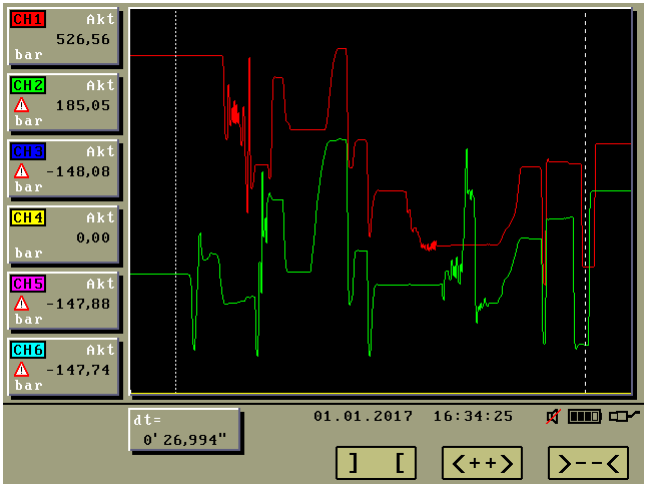
After the recording has finished, the normal measuring display appears again.

- 7.2 Invoke stored recordings

Select an occupied memory page

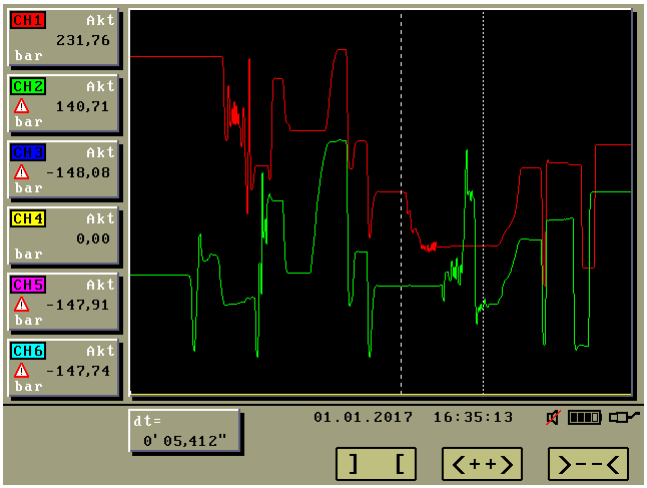


With F5 „SHOW“, this page is invoked



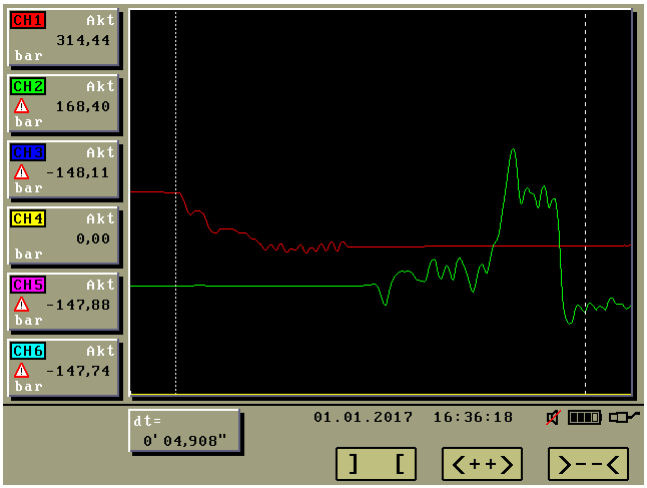
There is a fine dotted measuring line which can be moved with  and  .
For fast moves, hold the appropriate key, for slow moves press the key short time.
The values measured at the position of the measuring line are shown in the left measuring windows.

The second, rough dotted line is the reference line. With  „] [„, the lines can be swapped. In this way, an area can be located with the two lines.



The selected area can be magnified with  „<++>“ .
This procedure can be repeated until the maximum resolution of the measured curve is reached.

The measuring window below shows the time difference (dt) between the measuring and the reference line. This time is formatted automatically from 0h00’00 to 0’00.000 adapt to the resolution.



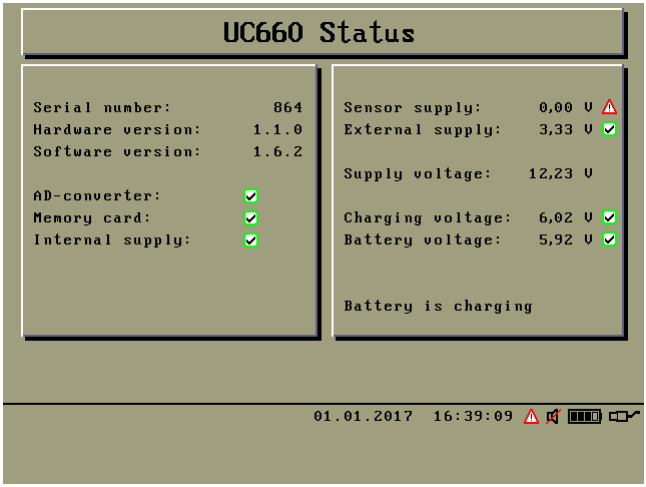
With F6 „>--<“, scale down to the 100% total view.

With ESC, close the memory page.

With ESC, exit the memory function display.

8. Status key, show device information

With F1 HELP „STAT“ enter the status display:

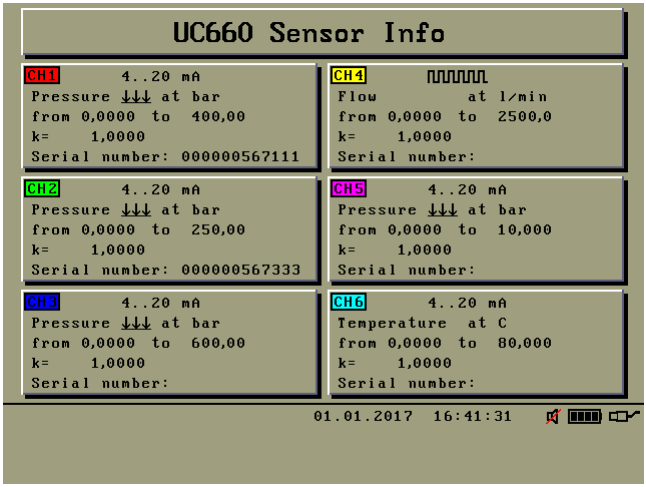


The OK signs indicate everything is faultless, the device is ready for use.
Warning signs indicate a fault, the proper function cannot be ensured any more.
This example shows the failure of the sensor supply, see more information about that in the chapter “Error messages”.

With ESC 0 exit this display.

▪ 9. Info key, show all sensor information

With INFO 5 get the information about the sensor settings for all channels:



With ESC 0 exit this display.

▪ 10. Battery indicator

The battery indicator shows the battery condition as follows:

 The battery is running low, the charger must be connected

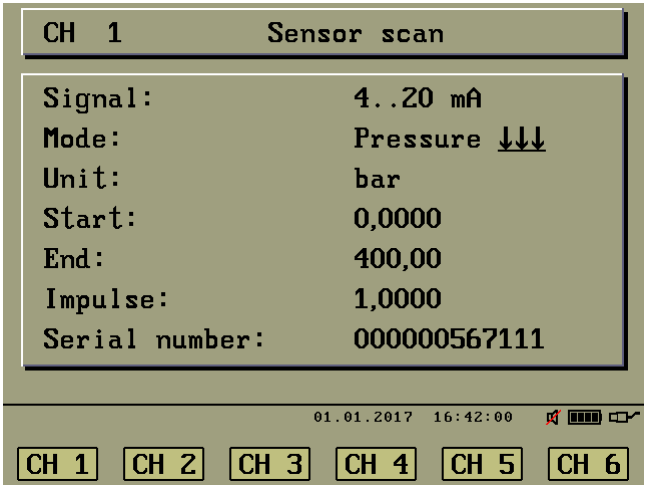
 The battery is charging

 The battery is fully charged, no charging anymore

11. Scanning a sensor with identification chip

With SCN enter the sensor scan display. This scanning is only for your information, the values can only be taken over within the sensor parameter settings.

With F1 HELP „CH1“ to F6 „CH6“ select the Channel to be scanned. If the connected sensor is provided with an identification chip, its parameters will appear immediately.



With ESC exit this display.

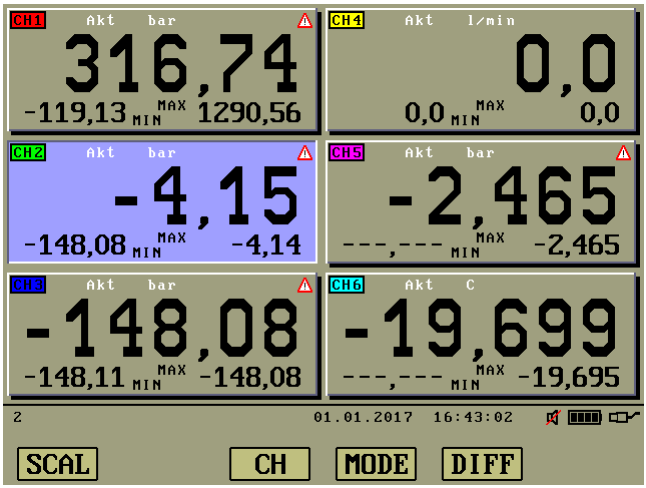
12. Configuration of measuring displays

The 10 measuring displays are preset in delivery status,

you can adapt these for your measuring tasks.

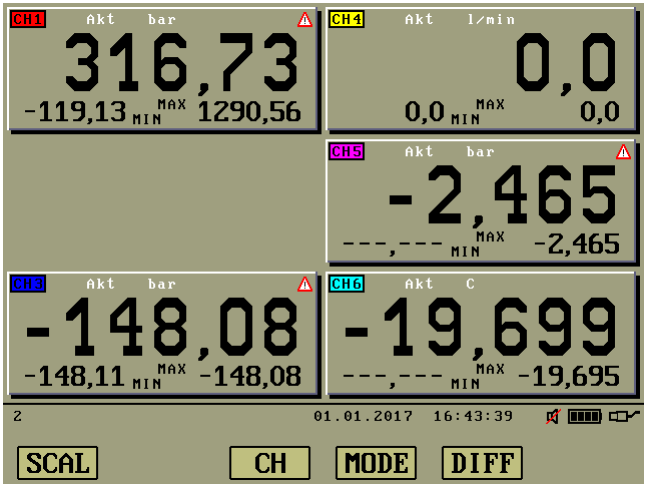
For that press DIS 9, the first measuring window is marked.

With 8 and 2 select the window to be adjusted.

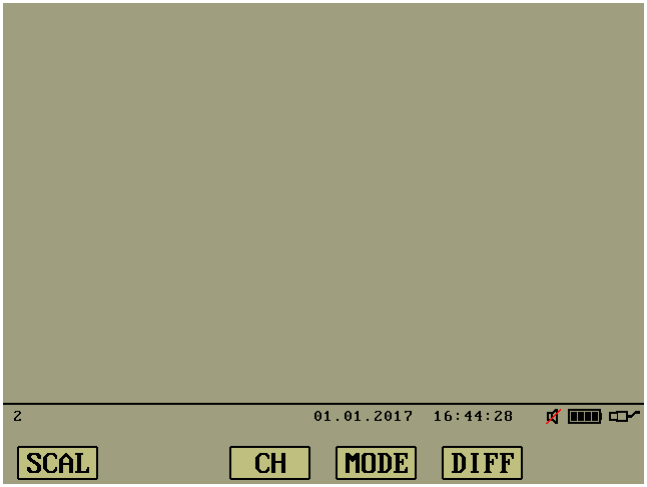


- 12.1 Delete measuring windows

With RES delete the marked window.



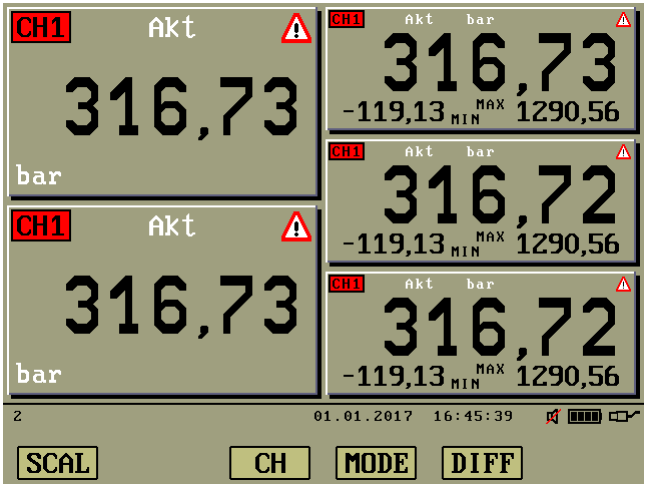
Then select the next window and delete it too.
This way you can delete all not used or all windows.



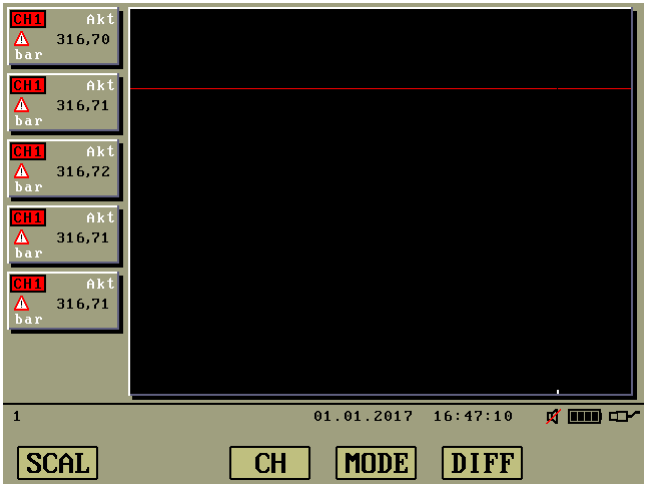
- 12.2 Set measuring windows

With every keypress on SET a new, bigger measuring window appears, as long as it finds a place. With CR this window will be fixed. For more windows, repeat this procedure. Here you also can delete windows as well.

Example 1, numerical:



Example 2, graphical:



- 12.3 Configure measuring windows

select the window to be configured.

With F3 „ CH „ select the channel to be displayed.

With F4 „MODE“ select the display mode:

„AKT“ for the current value

„MIN“ for the stored minimum value

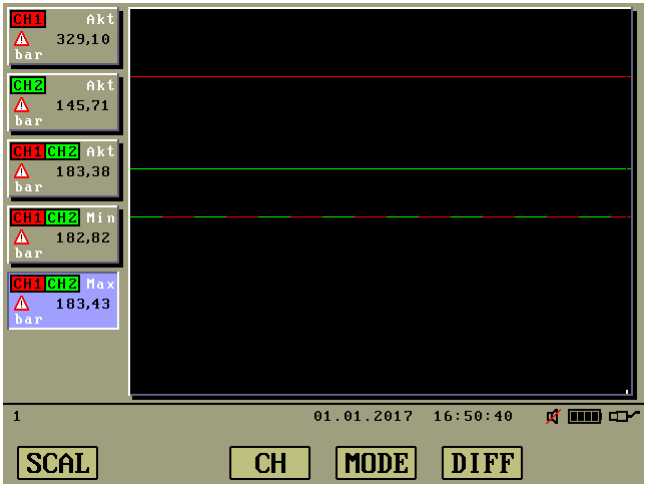
„MAX“ for the stored maximum value

With F5 „DIFF“ select a channel for differential measuring.

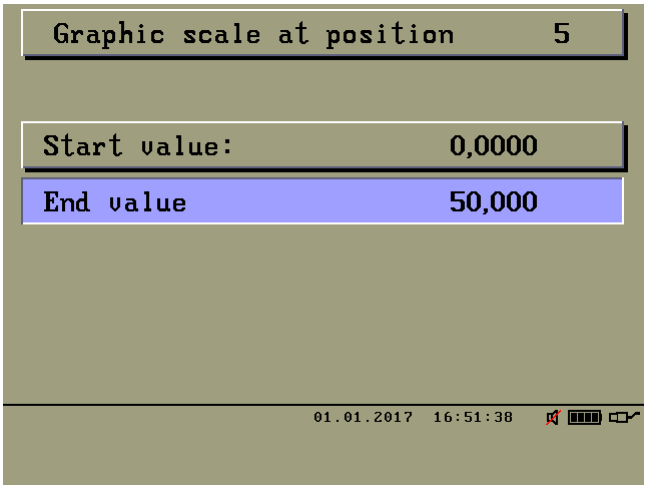
Attention: Only channels with the same physical mode and unit can be selected for differential measuring.

The following example shows the configurations

at position 1 the channel 1, current measuring value,
at position 2 the channel 2, current measuring value,
at position 3 the difference between channel 1 and channel 2, current value,
at position 4 the difference between channel 1 and channel 2, minimum value,
at position 5 the difference between channel 1 and channel 2, maximum value:



With F1 HELP „SCAL“ change the scale for the GRAPHICAL display of the marked window. All measuring windows can be scaled individually.



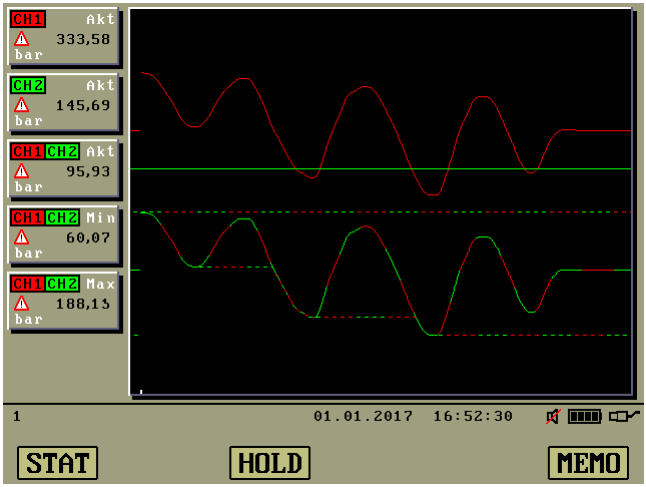
By default, the scaling is set to the start and end values of the appropriate sensor. You can enter a lower and upper tolerance value, achieving a greater magnification within the tolerance area and a graphical control of tolerance deviation.

With 8 and 2 select the start or end value and enter it numerically.

With ESC 0 save the changes and exit this display.

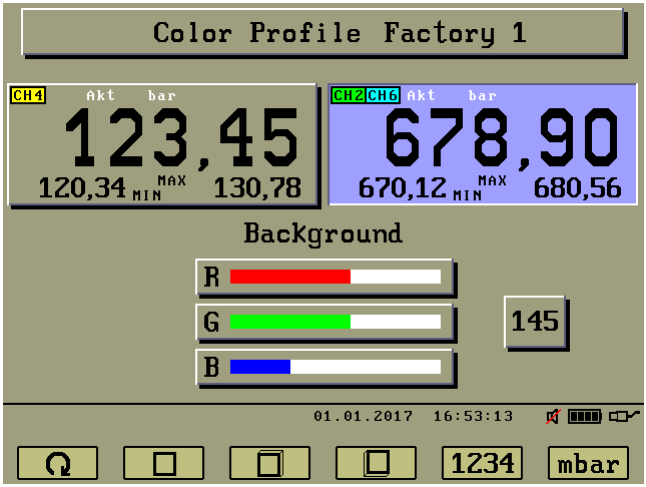
If necessary, scale the other measuring windows in the same manner.

When all adjustments are done, exit the configuration with ESC.

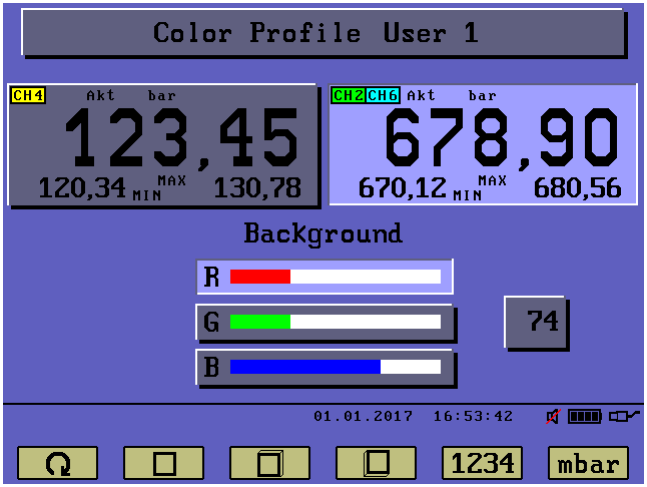


13. Colour profiles

With COL 7 enter the colour profile settings:



There are 6 colour profiles which can be rotated with F1 HELP.
The factory profiles Factory 1 to Factory 3 are unchangeable preset, the user profiles User 1 to User 3 can be changed.



Press

for the background colour of the measuring display

for the background colour of the measuring windows

for the background colour of the marked measuring window

for the font colour of the values

for the font colour of the labels

All colours are adjusted with the RGB rulers, with 

and 

select the ruler, with 

and 

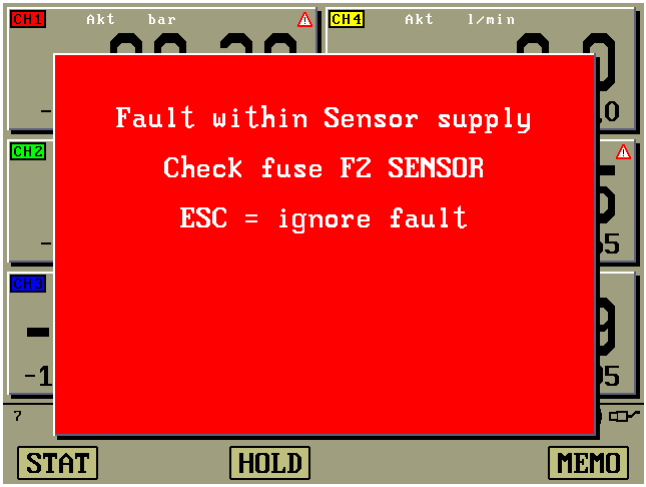
change the value.

With 

save the changes and exit this display.

14. Error messages

With malfunctions, error messages can appear, like this on for example:



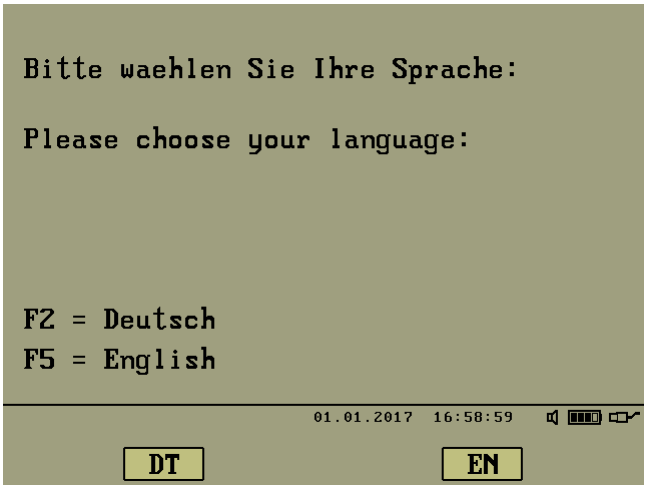
This error occurs from a short-circuited measuring line. Solve this problem by replacing the measuring line and the fuse “F2 SENSOR” at the left top of the device. Then the error message will disappear automatically.
Spare fuses are in the case of the device.

For all other error messages please contact us.

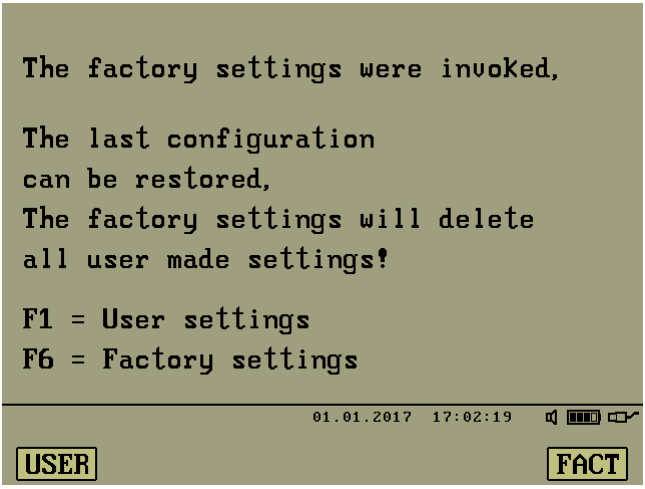
With ESC error messages can be ignored and faded out. Measurements are not possible at this point, but you could invoke memory pages for example.
As hint on the error a warning sign persists right below.
You can see the kind of error in the status display with F1 HELP „STAT“ .

15. Reset the device

If necessary due to a malfunction to reset the device,
keep holding ON until the restart occurs. This takes about 10 seconds.



Select your language with F2 „DT“ Deutsch or with F5 „EN“ English.
After that two options for reset appear.



With 

„KONF“ all user settings are restored.

With 

„FACT“ delivery status, all user settings are deleted

If the malfunction still exists after restoring the user settings,
repeat the reset and select delivery status.

If the device reset does not behave as described, or no restart occurs after 15 seconds,
repeat the procedure with connected mains adaptor.

If this also has no success, the firmware must be transferred by means of the
PC program “VisUC660”

For that keep holding 

and 

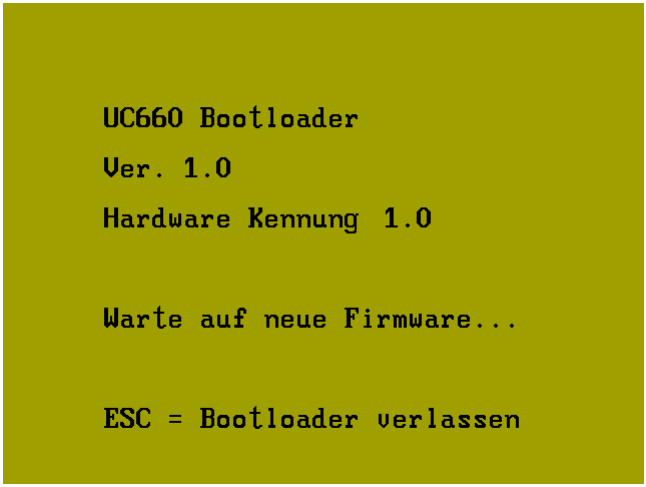
together until the boot loader appears.
Read on now in the chapter “Firmware-Update”.

16. Firmware-Update

For the firmware update absolutely connect the mains adaptor!

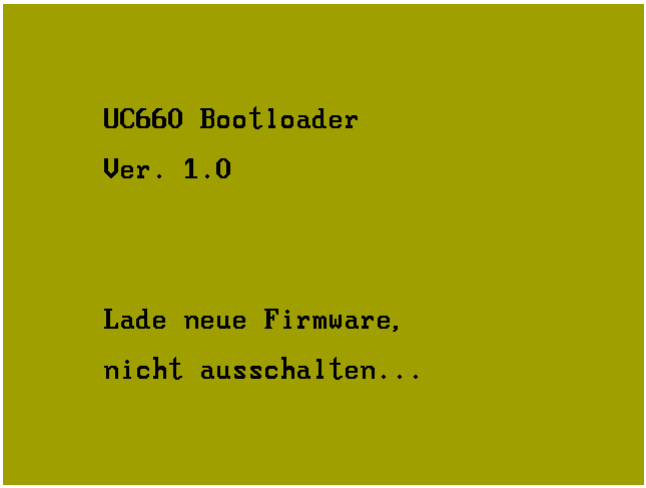
First disconnect the USB connection.

With NUM + SCN invoke the boot loader, which is used to restore the firmware of the device via the PC-Program “VisUC660”.
If this way is not possible due to a malfunction,
keep holding ON and SCN together, until the boot loader appears.



If you do not want to update the firmware, then exit the boot loader with ESC.
The device will be reset, more information about that in the chapter “Reset the device”.

Now connect the USB connection and start the update on the PC.



Wait until the restart occurs.

Meanwhile DO NOT switch off the device!

After the restart, the device will be reset, see chapter “Reset the device”.

Disconnect the USB connection.

17. Technical specifications

- Connections

6 Inputs analogue	0/4…20 mA
therefrom 3 switchable to frequency input	1 Hz … 12 KHz / max. 35V
1 USB-connection	USB 2.0
1 Connection for mains adaptor	10 – 30 V / 2,5 A

- Built-in battery

Technology	NiMh
Capacity	10Ah
Battery running time at 20°C, Medium brightness and 3 Sensors:	ca. 12 hours

- Screen

Colour display fully sunlight capable	5,7“ VGA
Backlight with long life LED	50000 hours
Custom specific start screen on request	

- Measuring converter

Resolution	24 Bits
Sampling rate	0,33 ms per channel
Accuracy	< +/- 0, 15%

- Measuring data memory

Memory pages	100
Recording time	30 s … 24h

- Operating conditions

Temperature	-10°C … +70°C
Humidity relative	20 … 80 %

- General

Dimensions	ca. W220xH260xD60

- Measuring lines

The measuring lines consist of PUR, signal colour yellow, oil resistant and drag chain capable, high grade connectors from the medical engineering.