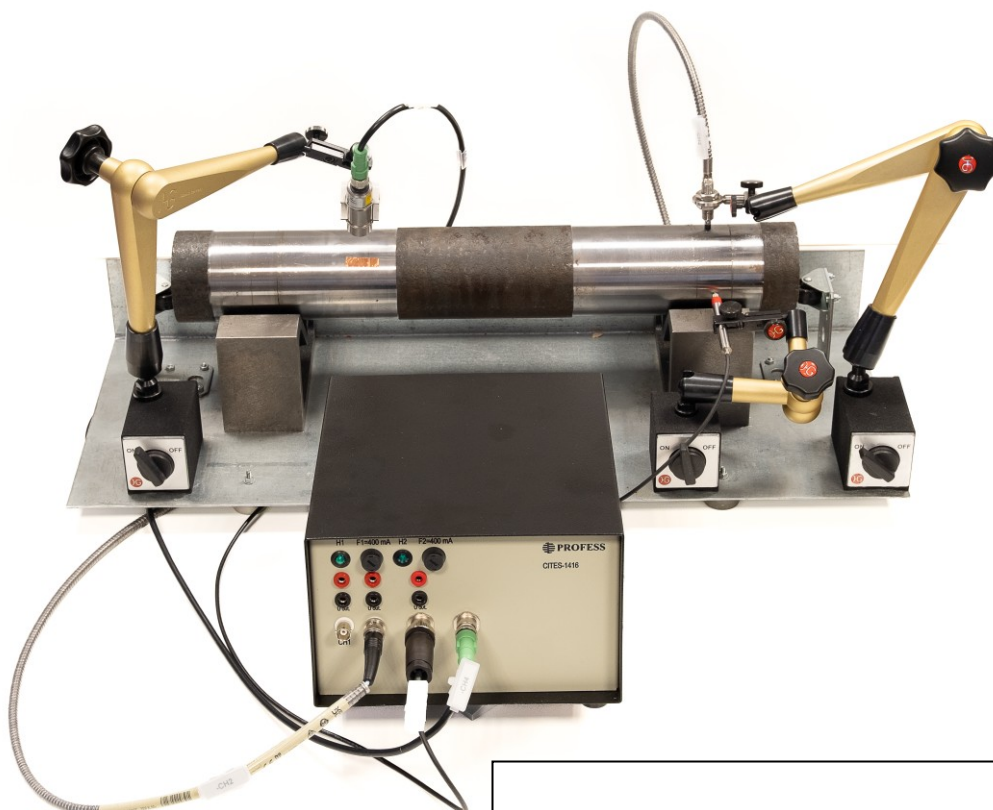


CITES



OPERATION MANUAL

valid since 5/2026



PROFESS, spol. s r.o., Květná 5, 326 00 Plzeň
Tel: 377 454 411, 377 240 470 Fax: 377 240 472
E-mail: profess@profess.cz Internet: www.profess.cz

Obsah

Installation	3
Using the application	6
Available devices	6
Input-output configuration	7
Measurement administration	8
Continuous measurement:	8
Single measurement:	8
Export-Import:	8
Settings – Save and Load:	8
Measurement information:	8
Chart	9
Zooming and scrolling in the chart:	9
BarGraph	10
Single measurement	10
Special Functions – Evaluation, Rotor Surface	11
Evaluation	11
Rotor surface	13
Cautions and recommendations	15
Technical data of PROFESS CITES	15
Device description and practical instructions	16
Mechanical design of the PROFESS CITES	16
Setting the measuring range	16
Setting the measuring range – examples	17
Wiring diagram	18
Contents of the measuring apparatus:	19

Installation

Installation is carried out in three steps:

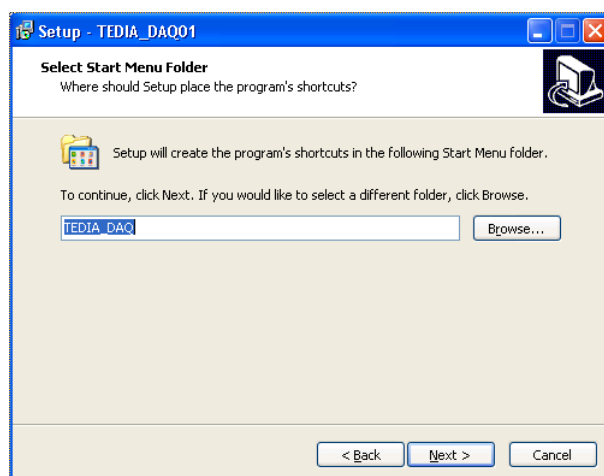
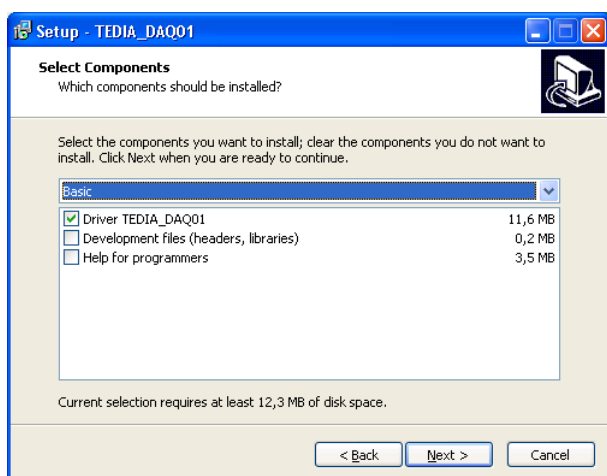
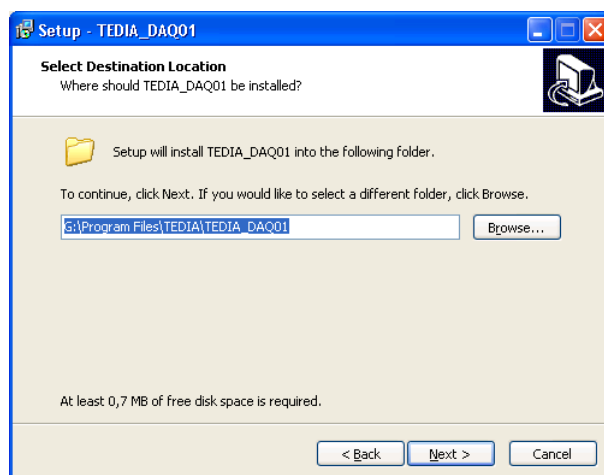
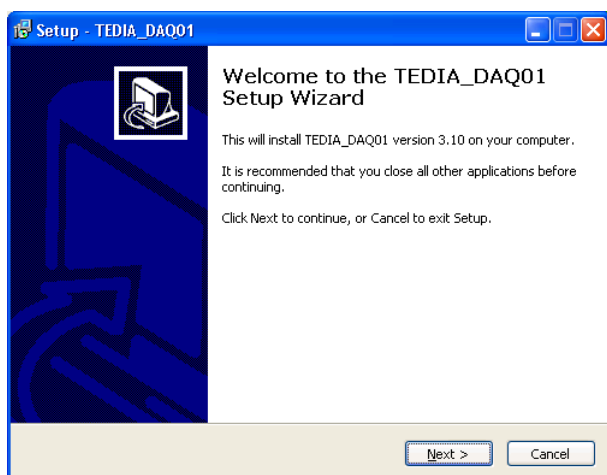
1. Hardware installation
2. Installation of Drivers and Administration Programs
3. Installation of UDAQsw

Ad 1.)

The installation is described in detail in `tedia_udaq_fdi.pdf` located on the USB in the Documentation directory. Simply described. First, connect the device to your computer using the included USB cable. Your computer will run the installation wizard to install the newly detected Hw. Then select the Drivers directory in the installation, which can be found on the included USB, where the drivers for the UDAQ are located. Complete the installation.

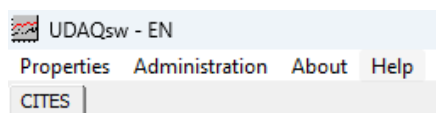
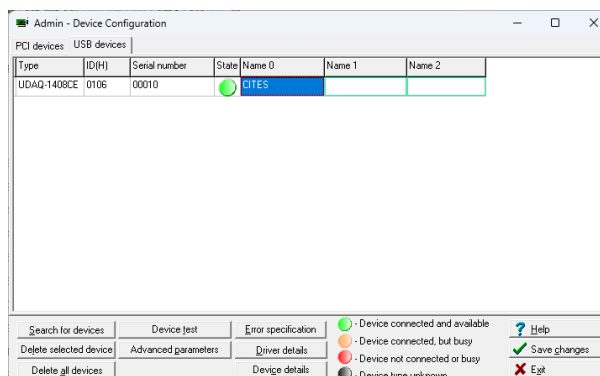
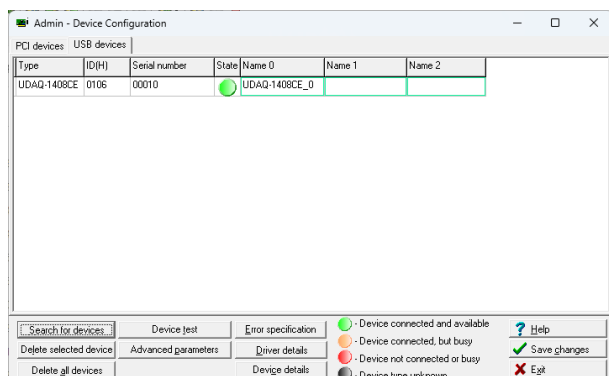
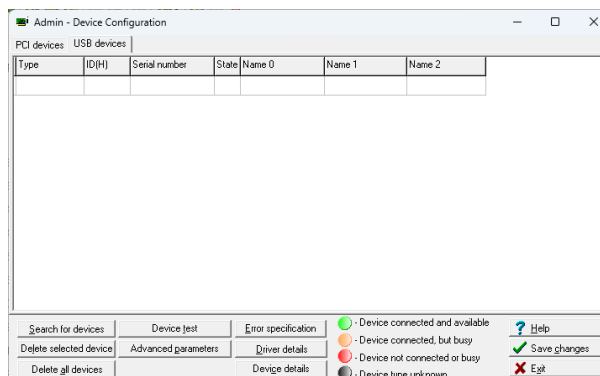
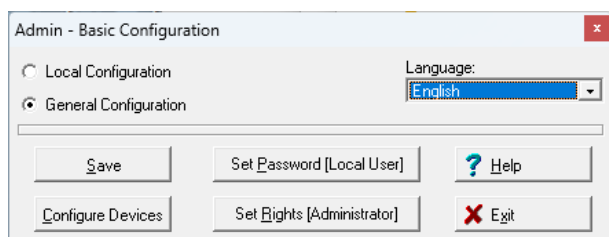
Ad 2.)

For the correct operation of the program, it is necessary to install an administration program that stores information about the connected devices and communicates with the system drivers. To install it, just run `setup\TEDIA_DAQ01_v280_setup.exe`, which again can be found on the included USB. The installer will guide you through the installation. In the Setup window, see Figure, select Basic Installation, which is sufficient to ensure that the entire UDAQ system runs flawlessly.



After the installation is complete, a new TEDIA folder will appear in your programs, where you will find the administration program *Admin* and a manual on how to use it. See `tedia_daq01_en.pdf` chapter 6.

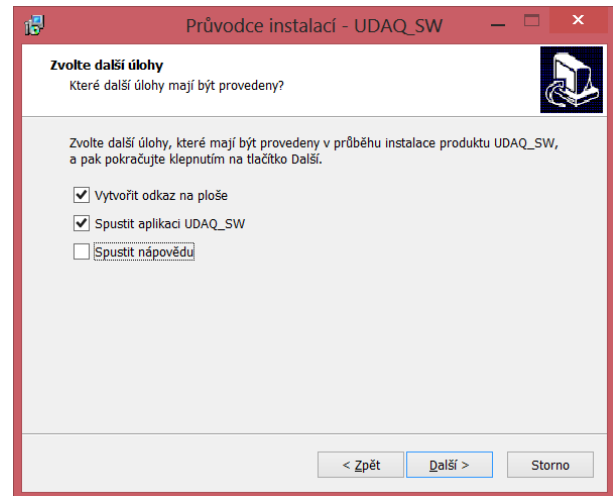
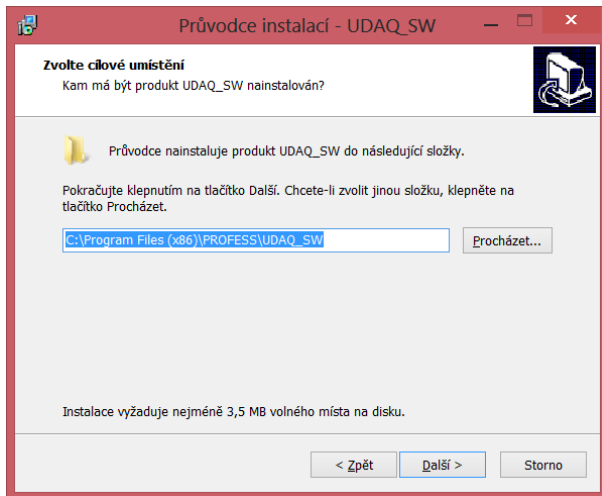
Setting of administration program Admin.exe (TEDIA). Select *General Configuration* and press button *Configure Devices*. In next window in tab USB devices you will see empty list, press button *Search for Devices* for search connected devices. Connected device appear in the list. You could change the default device name. For confirmation changes (new device or changing the name) you have to press button *Save changes*. The device will be stored in computer and will be ready to use in application UDAQ_SW.



You could see this after installation and launch the app.

Ad 3.)

Installing the UDAQsw software. To install the software, run setup\setup_UDAQ_SW.exe . It will run the installer to guide you through the installation.

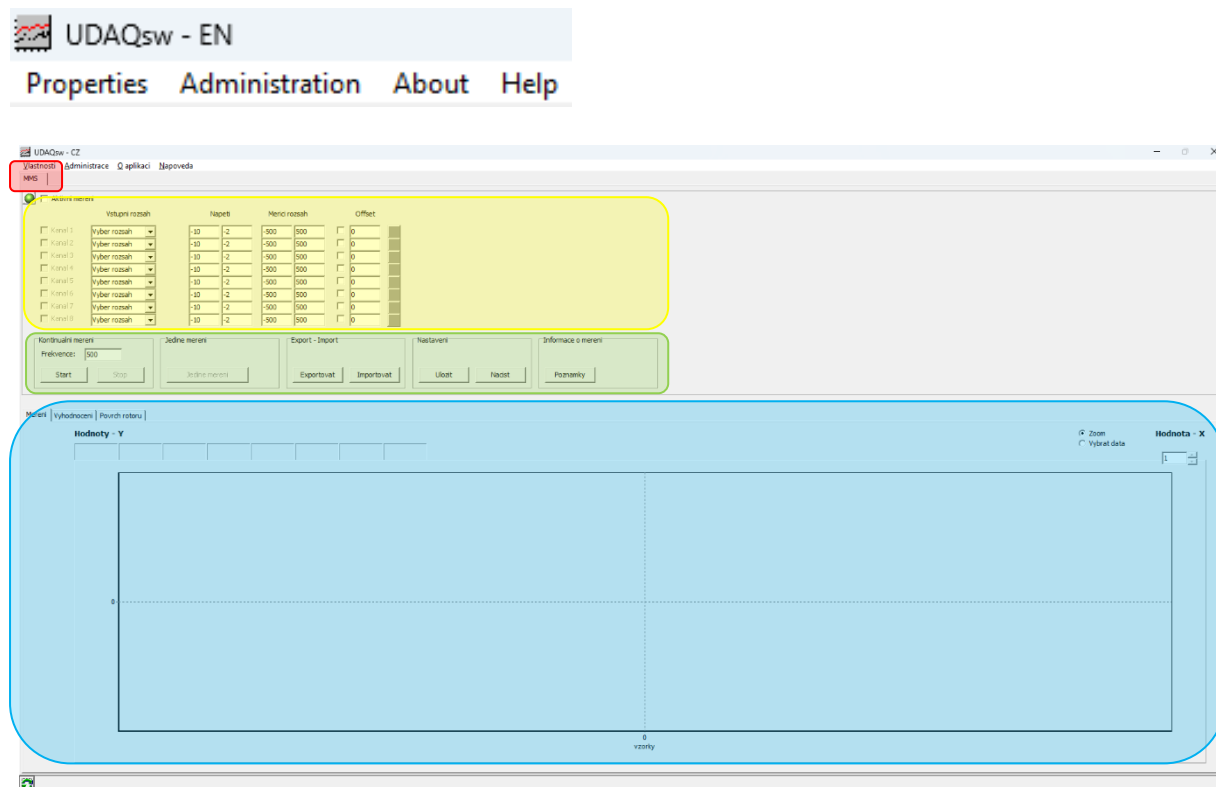


Select the target directory for the installation (we recommend leaving the default).

Choose whether you want to create a shortcut on the desktop or run the application directly after installation. When you click Next, a summary window appears before the installation begins.

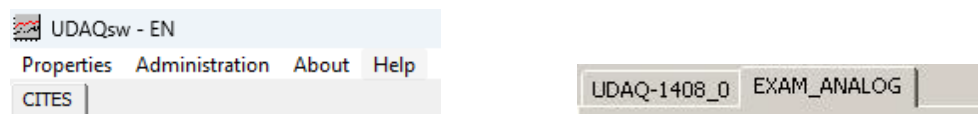
Press Install to install the application.

Using the application



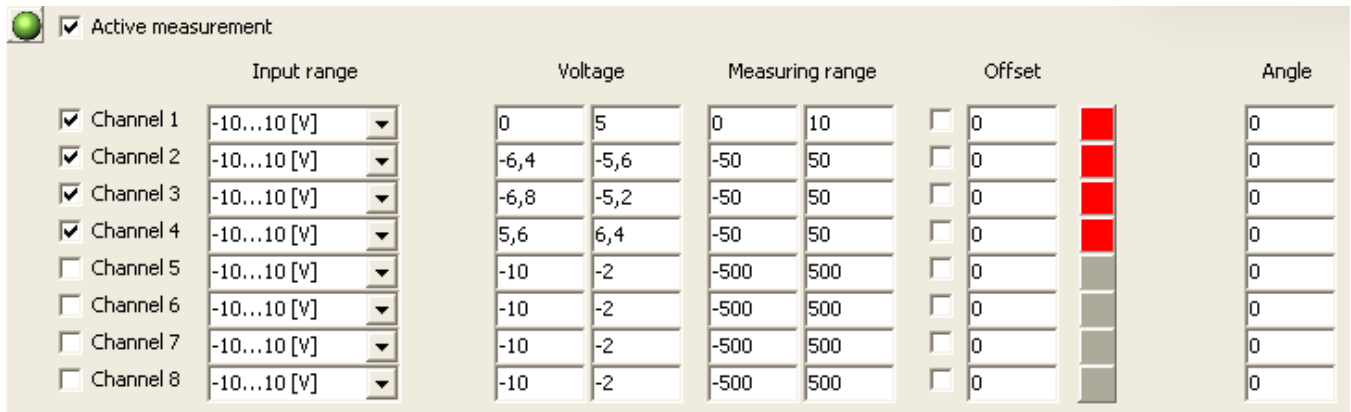
- Red field – available devices
- Yellow field – input/output channel configuration
- Green field – measurement administration
- Blue field – graph

Available devices



Each tab represents one connected device, as the device is named in the administration program. It is possible that there are two or three so-called aliases for one device in the administration program, which correspond to different settings for the same device.

Input-output configuration



	Input range	Voltage		Measuring range		Offset		Angle
☒ Channel 1	-10...10 [V]	0	5	0	10	☐	0	0
☒ Channel 2	-10...10 [V]	-6,4	-5,6	-50	50	☐	0	0
☒ Channel 3	-10...10 [V]	-6,8	-5,2	-50	50	☐	0	0
☒ Channel 4	-10...10 [V]	5,6	6,4	-50	50	☐	0	0
☐ Channel 5	-10...10 [V]	-10	-2	-500	500	☐	0	0
☐ Channel 6	-10...10 [V]	-10	-2	-500	500	☐	0	0
☐ Channel 7	-10...10 [V]	-10	-2	-500	500	☐	0	0
☐ Channel 8	-10...10 [V]	-10	-2	-500	500	☐	0	0

The green wheel indicates that the device with the given name is ready for measuring. Conversely, a red circle indicates that the device cannot be used for some reason (the device is being used under a different alias).

Active measurement:

Activates the device (only an active device you can measure with)

Channel 1 ... 8:

Channels must be activated for measurement, channels 1 and 5 are active in the picture. If other compatible devices are used, the number of channels may be different.

Input range:

Setting of the HW measuring range of individual CITES control panel channels. The maximum range is -10 ... 10V and the maximum sensitivity is -0.2 ... 0.2V.

Measuring range:

Used to linearly transform the measurand (volts) to any scalar unit, consists of *voltage*, *measuring range* and *offset*. Thus, for *channel 5* we have set the range -10 ... 10V. From this range we convert the interval -1 ... 1[V] to the interval -3 ... 5 [] and shift this interval by an offset of 0.6.

The button at the end of each line will show a bar graph in which we can see the current measured value from the channel. The button can be either green or red, depending on whether the measured channel is within 20% around the center. The center is taken as the value of the center of the **voltage**. For the graph, see, below. The button is not continuously refreshed! The color of the button changes only when a channel is activated or deactivated or when the BarGraph window is closed, where it takes on the color of the BarGraph.

!!!! !!!!!

Note:

Always make settings for channels 1 ... 8 according to the attached protocol:

Input range

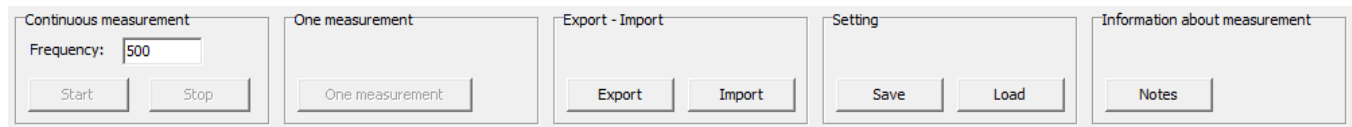
Voltage

Measuring range

Measuring range The configuration can be saved to a file and loaded again for the next measurement.

!!!! !!!!!

Measurement administration



The screenshot shows a software interface with five distinct panels arranged horizontally. The first panel, 'Continuous measurement', contains a 'Frequency:' label with a text input field showing '500' and two buttons, 'Start' and 'Stop'. The second panel, 'One measurement', has a single button labeled 'One measurement'. The third panel, 'Export - Import', contains two buttons, 'Export' and 'Import'. The fourth panel, 'Setting', contains two buttons, 'Save' and 'Load'. The fifth panel, 'Information about measurement', contains a single button labeled 'Notes'.

Continuous measurement:

The Start button starts continuous measurement of all active channels with the frequency that is entered in the *Frequency* field. The Stop button stops the measurement. After pressing the Stop button, the data can still be loaded into the graph for some time (at high speeds the graph does not keep plotting all measurements and therefore there is a delay, this increases with the number of channels and the sampling frequency).

The measurement frequency can be entered in the interval 100 - 3000 Hz.

Continuous measurement can be terminated automatically if the number of measured values reaches a value higher than 10,000 samples.

Single measurement:

A single measurement triggers a window with many graphs. These graphs correspond to the active channels. A file can be selected and the values from the graphs can be saved to it using the corresponding button. Fig. and description below.

Export-Import:

Export - exports values from the chart to a file. Files can be of two types. TXT, a standard text file, containing a header and data stored in lines and data from different channels separated by semicolons on the line. Another option is to save the data directly into an Excel file. This file also contains the header and then the data stored in the cells. It should be noted that exporting to Excel takes longer, especially with larger data volumes. In the chart it is possible to select which data to export. That is, select the channels and the time interval. If no interval is selected, all data is automatically exported. *Import* - imports data from a text or excel file. Data compatibility is left to the user. It is recommended to import only files created in UDAQsw, if you import other or modified files, correct functionality cannot be guaranteed!

Settings – Save and Load:

Save - saves the current program configuration.

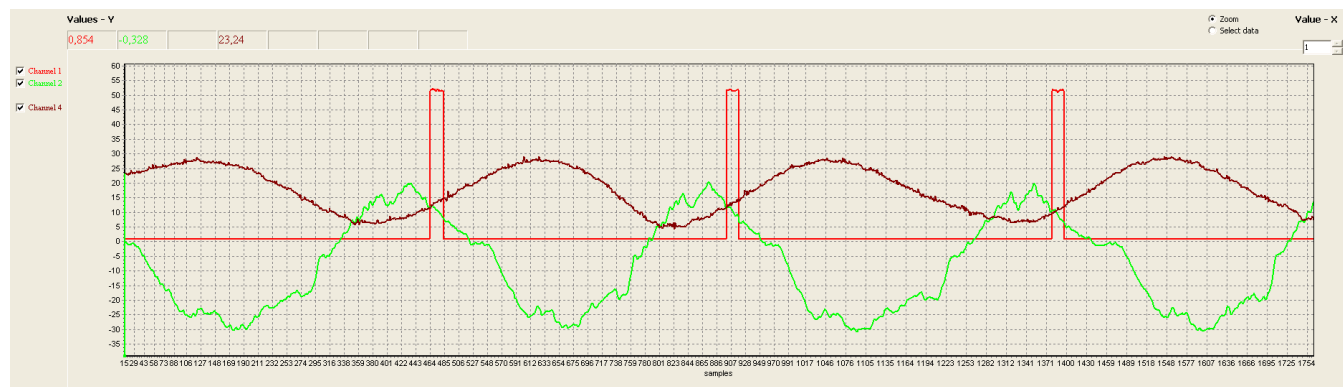
Load - reads the configuration from the file and updates the corresponding values.

The configurations are stored in *.dcf files.

Measurement information:

Notes - opens a window where you can fill in the measurement data or write notes about the measurement. These notes will be saved in the exported files.

Chart



The chart shows the measured values from each channel. **Values - Y** displays the values corresponding to the individual channels at the cursor position. The horizontal axis **Value - X** indicates the sample number since the measurement started. The cursor can be moved either by clicking in the graph, or by entering a specific value in the box under **Value - X**, or by clicking on the arrows at the same location.

The checkboxes for *Channel 1* to *Channel 8* indicate which channels will be displayed and which will also be exported. If it is not desired to export the entire measurement interval, only the selected data can be exported by clicking on **Select Data** and selecting the time interval. Select the beginning of the interval by clicking in the graph with the Left Mouse Button and the end of the time interval with the Right Mouse Button. The selected part of the graph is distinguished by a darker background color.

Zooming and scrolling in the chart:

Zooming in the chart is performed using the mouse and its left button. To enlarge an area, left click and hold, create a rectangle by dragging from left to right and from top to bottom, other methods lead to return to the overall chart view. Scroll the whole selected part of the chart by right button. Press and hold the right button, and drag until you are satisfied with the result.

Choice of colours for chart rendering

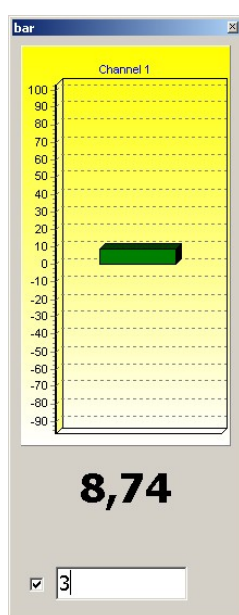
When you run the program for the first time, a configuration file for defining colors for the graph (*graph_color.ini*) is automatically created. It is possible to edit this file and use the color constants for user settings. The enabled color constants are stored in this file. When the file is deleted, the default colors are used again and the file is created. If there is a typo in a color, the default color will be used for that channel.

BarGraph

The BarGraph is primarily used to facilitate the adjustment of the sensor to the correct position. The green color of the BarGraph indicates that the voltage at the instrument input (sensor output) is within 40...60% of the **Measuring Range**. The format of the BarGraph display is chosen to allow visibility from a distance during the physical adjustment of the sensor to the working position.

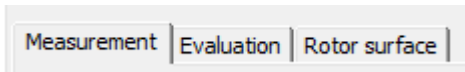
In the lower part of the BarGraph it is possible to enable and enter the **Offset**, i.e. the constant that will be added to the measured value. The Offset is mainly intended for fine adjustment of the zero (default) measurement value after the sensor is fixed in the "green range". To "reset" the reading, check the offset and enter the currently measured value with the opposite sign.

Single measurement



The Single Measurement function displays all eight measurement channels of the control panel as BarGraphs. It also allows you to take several single measurements and save them sequentially to a file. The file can be selected with the *Save As* button and any file name with any extension can be written. The displayed values are saved to the file whenever the *Add Measurement* button is clicked on. The data in the file has a standard format. A header followed by the data from each channel separated by a semicolon. Individual measurements are separated by lines.

Special Functions – Evaluation, Rotor Surface



The *Evaluation* and *Rotor Surface* tabs are used for a deeper analysis of the rotor surface, including the size and angular position of each analyzed shape or displacement of the rotor surface.

Evaluation



The screenshot shows the 'Evaluation' tab of the software. It features two main sections for 'Cidlo 1' and 'Cidlo 2'. Each section includes a graphical display area with a dashed crosshair and a list of parameters (E, A1, F1, A2, F2, A3, F3, A4, F4) with numerical input fields. To the left of these sections are controls for 'Vyber kanál' (Channel selection) and 'Otáčky' (Rotations). At the top, there are buttons for 'Vymazat vše' (Clear all), 'Vymazat poslední' (Clear last), and 'Report'. The 'Moznosti vyhodnocení' (Evaluation options) section contains fields for 'Vyhodnotit' (Evaluate), 'Souvisle měřit a vyhodnotit' (Measure and evaluate continuously), 'Počet otáček' (Number of rotations), 'Počet měření' (Number of measurements), and 'Prodleva [s]' (Delay [s]).

Channel selection – select the desired sensors and phase marker sensor for measuring. Then, the value of the rotor angular frequency at which the phase mark signal and the signals of the individual sensors appears in the *Rotational* speed window. This value can be compared, for example, with the value of the angular frequency of the lathe on which the rotor was machined.

Number of rotations (left) - enter the number of rotations over which the signals are evaluated.

Evaluate - after entering the number of rotations (left), click on this button and in the graphs named **Sensor 1** and **Sensors 2**, vectors corresponding to the amplitudes and phases of the 1st, 2nd, 3rd, 4th harmonic component of the analyzed signals will appear with their sizes and angles relative to the right half of the x-axis. The values of the angles are composed of the relative positions of the phase mark sensor, the sensors of the individual signals and the position of the phase mark on the rotor circuit. All values are also shown in numerical form on the right-hand sides of the chart. Using the 1, 2, 3, 4 buttons, the vectors of the respective harmonic components can be removed or returned from the charts. The value of *E* corresponds to the mean distance between the rotor surface and the corresponding sensor. The value without label is the serial number of the measurement made.

Number of rotations (right) – used to specify the number of revolutions over which the continuous evaluation of the amplitudes and phases of the individual harmonic components will take place within a continuous measurement.

Number of measurements – specifies how many separate measurements are made in a continuous measurement and evaluation.

Delay [s] - the length of the delay in seconds between separate measurements.

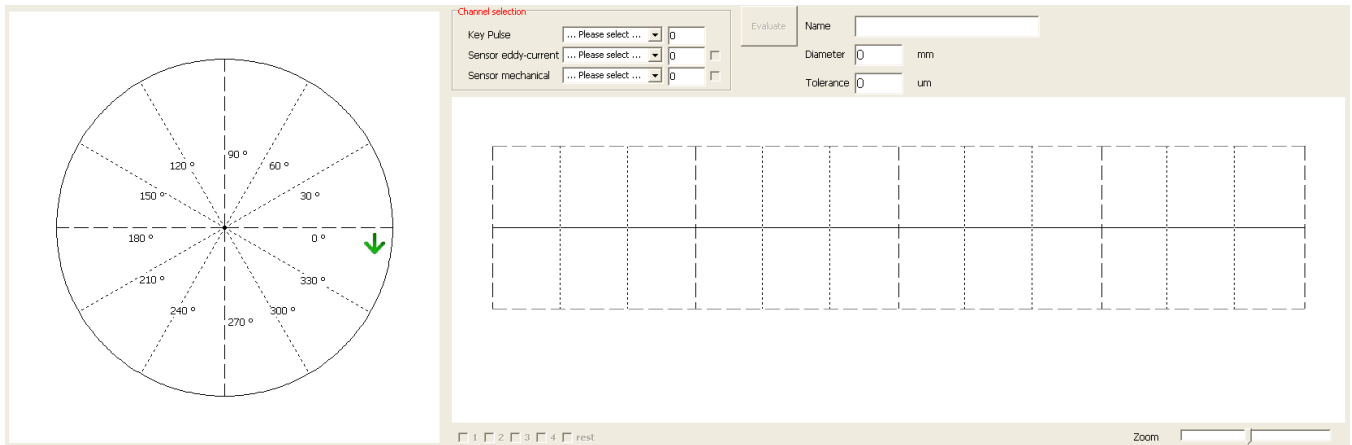
Measure and evaluate continuously - when this button is pressed, a continuous measurement and evaluation of the amplitudes and phases of the individual harmonic components is started over the specified number of rotations within each measurement, separated by a given delay. In the graphs Sensor 1 and Sensor 2, the change of the positions of the vectors of the individual harmonic components over time can then be monitored. The values to the right of the graphs correspond to the last actual positions of the vectors. Once the measurement is complete, all evaluated values corresponding to the individual measurements made can be scrolled through using the *up* and *down* buttons located to the right of the last value in the column.

Clear last - clears the last measurement evaluation from the visualization.

Clear All - clears all evaluations of all measurements from the visualization.

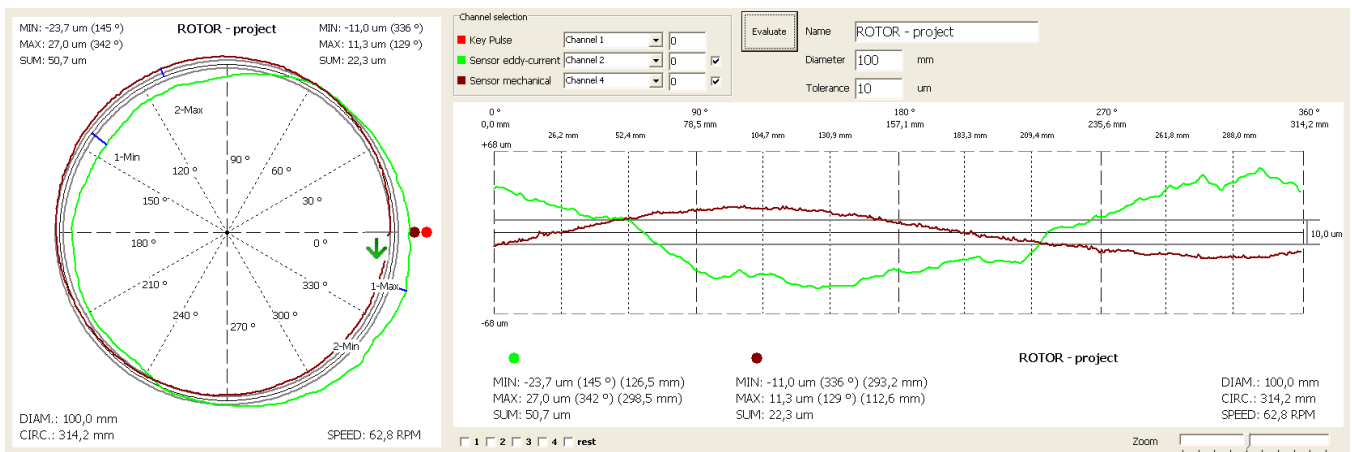
Report - automatically generates a report of the defined format.

Rotor surface



Channel selection – select the channel through which the phase marker signal was measured and the channel for measuring the sensor signal under which the rotor surface to be evaluated is located.

Evaluate - evaluates the rotor surface and visualize it in the image on the left. The arrow in the image indicates the location of the phase mark on the rotor circumference (right half of the x-axis) and the direction of rotor rotation (CCW - CounterClockWise). Using the 1, 2, 3, 4, *residue* buttons, the individual harmonic components of the signal and residue can be extracted from the rotor surface or returned there again. For a pure analysis of the rotor surface, the 1st harmonic component of the signal, which is an image of the rotor eccentricity or rotor misalignment, must always be extracted.



Measurement name - name, if entered

Speed - evaluated speed

Max - the size and position of the maximum deviation from the ideal circle on the rotor circumference relative to the position of the phase mark on the rotor circumference

Min - the size and position of the minimum deviation from the ideal circle on the rotor circumference relative to the position of the phase mark on the rotor circumference

Sum - the addition of the magnitudes of the minima and maxima

Diameter - the specified rotor diameter

Circumference - the calculated rotor circumference if the diameter has been specified

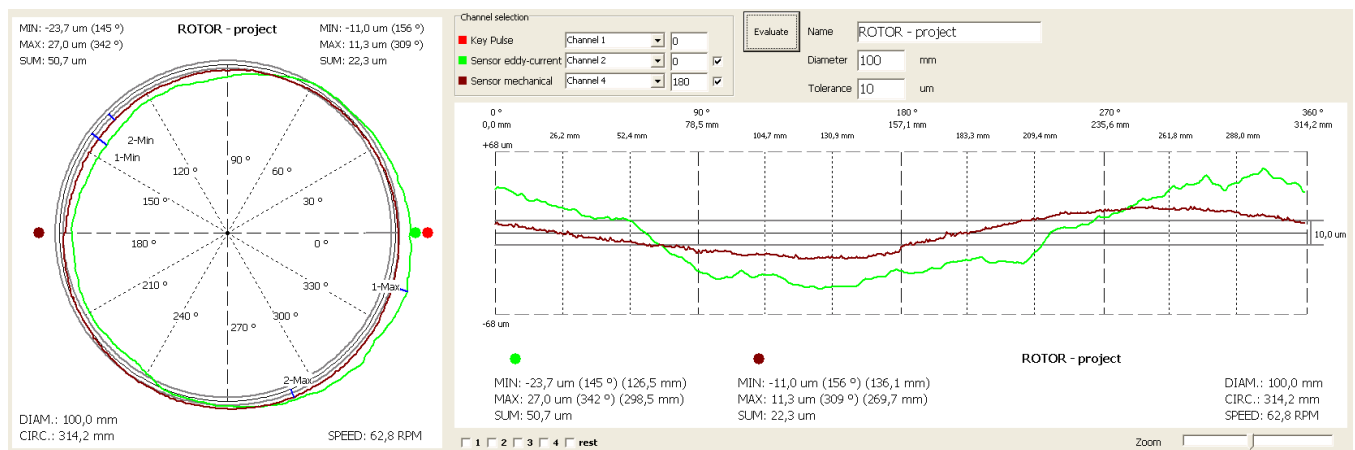
By clicking the mouse on a pie chart or on a trend, it is possible to save individual charts to a file. If a measurement name is specified, it is used, or the default name is used and the current date and time is assigned to it.

The measured and evaluated minimum and maximum is also shown in the circular graph and in the trend. The specified measurement name is also displayed in both graphs.

Both the circular graph and the trend are divided into sections of 30° for easier identification of the minimum and maximum. If the rotor diameter is entered, the rotor circumference is automatically calculated. This information is also displayed in both graphs. At the same time, in the trend, the individual sections are also calculated as circumferential length for easier identification directly on the rotor from the phase marker.

If a tolerance is specified, it is shown in both graphs.

If a sensor angle is specified according to the circular graph, the display of this selected signal will be adjusted in both the trend graph and also circular graph. The angle conversion can be turned off using the value 0.



Different harmonic components of the signal:

1. harmonic component - rotor eccentricity (misalignment)
2. harmonic component - rotor ovality
3. harmonic component - triangular rotor shape
4. harmonic component - square rotor shape
5. residue - residue after subtraction of 1st to 4th harmonic component from the signal

Cautions and recommendations

The software receives a large amount of data from the device via the USB link and then processes it. Therefore, it is highly advisable to terminate all programs that work with interrupts to other devices and softwares that have a high processing priority. These may include, for example, printing, graphics applications, computing applications, applications working with external resources.

The PROFESS CITES is an electrical device and may only be used in accordance with these instructions by a person properly familiar with the correct operation of the device.

The device may only be operated in a sheltered area.

Before changing the fuse or possibly removing the covers, disconnect the 230VAC power cable

Technical data of PROFESS CITES

Dimensions:	250 x 100 x 175 mm (W x H x D)
Mechanical construction:	metal box, connected to PE clamp.
Protection class:	IP 20, except for BNC connectors: the BNC connector body of the sensor forms part of the measurement circuit of the sensor. Accidental connection of the BNC connector bodies to each other or to an external frame during operation may cause a ground loop to occur and affect the operation of the instrument.
Device power supply:	100-240 VAC / 50-60 Hz
Power consumption:	approx. 10 VA
Fuse:	Tubular 5x20 mm, 400 mA-F
Galvanic separation:	The instrument cabinet is grounded to the PE terminal of the 230 VAC power cable. The power supply for the converters is galvanically isolated from the PE. The protective hoses of the transducer cables are insulated.

Device description and practical instructions

Mechanical design of the PROFESS CITES

The rotor surface quality measuring instrument consists of a metal box with a CITES measuring station. This control panel is connected via USB to a PC where the UDAQsw software must be installed. Furthermore, 2 Emerson EZ1000 transducers for EZ1050/EZ1080 non-contact sensors and 1 MSC7401 transducer for DTA-1G8 touch sensors are installed in the cabinet, 230 VAC/ 24 VDC power supply. The power supply is only used to power the transmitters. If the instrument is to be used only for measuring external signals connected to channels 5 to 8 (or 4 to 8, see below), it is not necessary to connect the 230 VAC power supply.

The presence of 24 VDC for the transducers is indicated by a green LED on the front panel of the instrument. The built-in transducers are connected to inputs 1, 2 and 3 of the control panel. Input 4 is reserved for possible expansion with an additional EZ1000 transducer for Emerson sensors. Inputs 5 through 8 are brought directly to the front panel plug-in connector and can be used for any purpose.

The EZ1050/EZ1080 transducers are connected via BNC connectors and the DTA-1G8 transducer via a 5-pin front panel connector. The sensors are identified on the cable by channel (connector) number. Interchanging them results in reduced measurement accuracy.

There are sockets above the connectors where the output voltage from the transmitter can be measured. This allows the working position of the transducers to be set without a PC using a voltmeter. In the case of channel 4, which is not yet occupied, the BNC connector is not functional, but an external signal can be fed to channel 4 via the sockets and can thus also be used. Pay attention to the sockets of channels 1, 2, and 3, no voltage must be applied externally!

Setting the measuring range

The EMERSON EZ1080 + EZ1000 proximity sensors have a measuring range of approx. 0.5...2.5 mm = -2...-18 V (see attached calibration sheets). Since the measuring range of the CITES control panel input circuits is -10...+10 V, only half of the measuring range of the sensor can be used, i.e. 0.5...1.5 mm = -2...-10 V. The DTA-1G8 touch sensor has a measuring range of -1...+1 mm = 0...10 V (see attached calibration sheets), so the full range can be used.

If channel 2 is used for measurement with EZ1050/EZ1080 sensors, in the following configuration the program will measure directly in microns in the range -500...0...+500 μ m (electrically -10...-6...-2 V). Minus means the shaft is moving away from the sensor, plus means the shaft is moving closer to the sensor. Of course, the scale can also be set in reverse (-10 ...-2 V = +500...-500), then plus means increasing the gap and vice versa. Similarly, for the DTA-1G8 sensor on channel 3, in the configuration the program will measure directly in microns in the range -500...0...+500 μ m (electrically 0...+5...+10 V).

The sensor is set to approximately 0 microns with a bargraph (or -6 V with a voltmeter, or +5 V for the DTA-1G8). A fine zero adjustment is completed using the Offset (for example -8).

1	-10...10 [V]	-10	-2	-500	500	☒	-8	
2	-10...10 [V]	-10	-2	-10	-2	☐	0	

Channel 2 will be used as a phase marker. A copper foil marker will be affixed to the sensor path. The transducer is set up in the same way as for channel 2 (however, accuracy does not matter much here). The values in the Measurement Range field for channel 1 are chosen so that the track 1 record on the time graph does not "blend" too close to the track 2 record, would be easy to read, and would not unnecessarily stretch the Y-axis scale.

Further operation is described in the previous chapters.

Setting the measuring range – examples

	Input range	Voltage		Measuring range		Offset		Angle
☒ Channel 1	-10...10 [V]	0	5	0	10	☐	0	0
☒ Channel 2	-10...10 [V]	-6,2	-5,8	-50	50	☐	0	0
☒ Channel 3	-10...10 [V]	-6,4	-5,6	-50	50	☐	0	0
☒ Channel 4	-10...10 [V]	-6,8	-5,2	-50	50	☐	0	0
☒ Channel 5	-10...10 [V]	6,4	5,6	-50	50	☐	0	0
☒ Channel 6	-10...10 [V]	-10	-2	0	10	☐	0	0
☒ Channel 7	-10...10 [V]	-2	-10	0	10	☐	0	0
☐ Channel 8	-10...10 [V]	0	0	0	0	☐	0	0

Key Phasor – laser probe (optic probe):

Channel 1: voltage: +0 ... +5 V
Measuring range: +0 ... +10

Key Phasor – eddy-current sensor:

Channel 6: tooth: voltage: -2 ... -10 V
measuring range: +0 ... +10

Channel 7: hole: voltage: -10 ... -2 V
measuring range: +0 ... +10

Measuring of run-out:

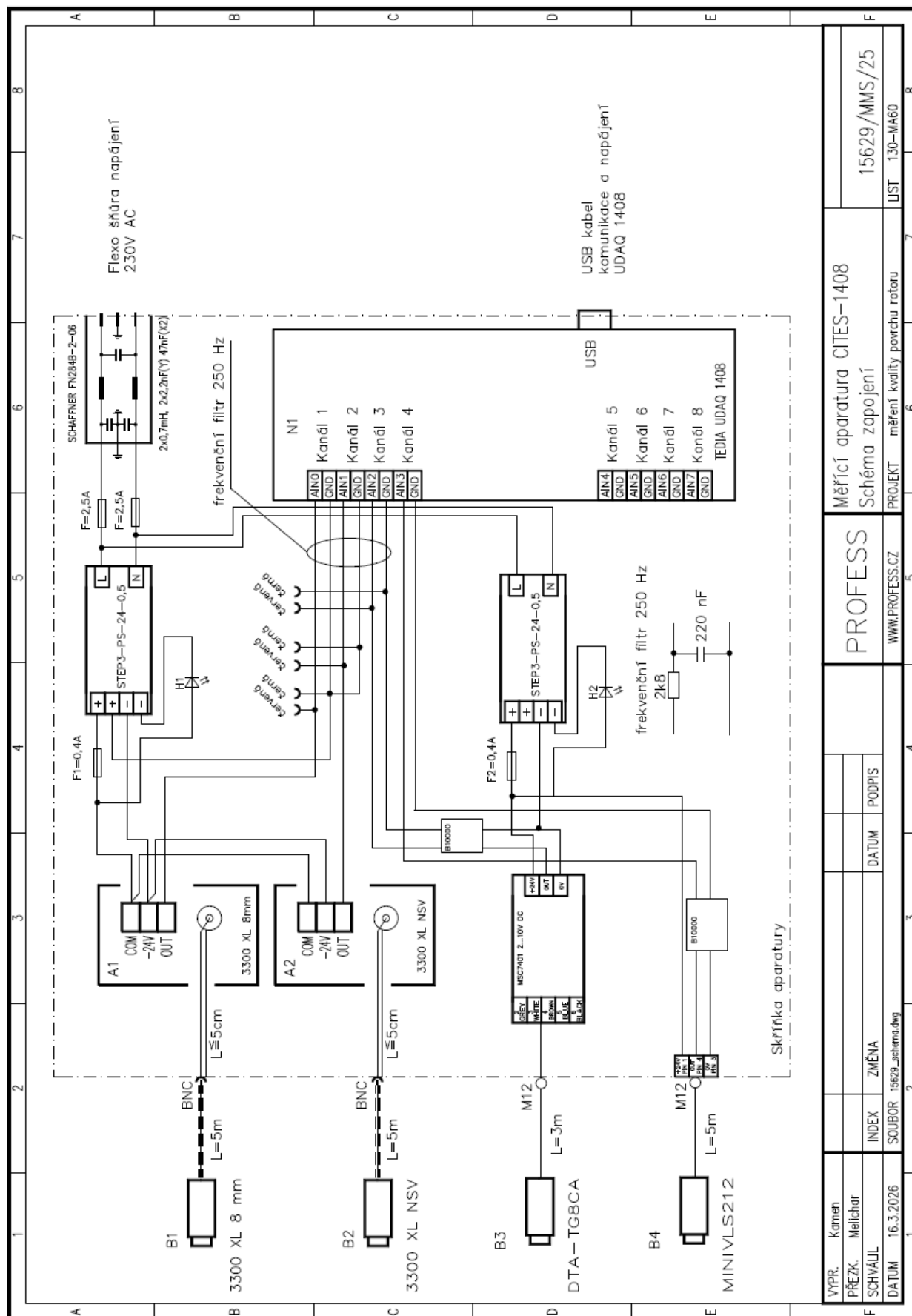
Channel 2: sensitivity: 4 mV/μm ~ 4 V/mm (~ 0,4 V / 100 μm)
sensor: PR6424, BN3300/11
measuring range: ± 2 mm (Δ 4 mm)
-2 ... -10 ... -18 V
-2 ... +0 ... +2 mm
center: -6 V
-10 ... -6 ... -2 V
-1000 ... +0 ... +1000 μm
adjusted range: ± 50 μm
-6,2 ... -6 ... -5,8 V
-50 ... +0 ... +50 μm

Channel 3: sensitivity: 8 mV/μm ~ 8 V/mm (~ 0,8 V / 100 μm)
sensor: PR6423, EZ1080, BN3300/5, BN3300/8
measuring range: ± 1 mm (Δ 2 mm)
-2 ... -10 ... -18 V
-1 ... +0 ... +1 mm
center: -6 V
-10 ... -6 ... -2 V
-500 ... +0 ... +500 μm
adjusted range: ± 50 μm
-6,4 ... -6 ... -5,6 V
-50 ... +0 ... +50 μm

Channel 4: sensitivity: 16 mV/μm ~ 16 V/mm (~ 1,6 V / 100 μm)
sensor: PR6422, EZ1050
measuring range: ± 0,5 mm (Δ 1 mm)
-2 ... -10 ... -18 V
-0,5 ... +0 ... +0,5 mm
center: -6 V
-10 ... -6 ... -2 V
-250 ... +0 ... +250 μm
adjusted range: ± 50 μm
-6,8 ... -6 ... -5,2 V
-50 ... +0 ... +50 μm

Channel 5: sensitivity: 10 V/mm (~ 1,0 V / 100 μm)
sensor: DTA-1G8
measuring range: ± 0,5 mm (Δ 1 mm)
+2 ... +6 ... +10 V
-1,0 ... +0 ... +1,0 mm
center: +5 V
+2 ... +6 ... +10 V
-1000 ... +0 ... +1000 μm
calibration: ± 250 μm
+2 ... +6 ... +10 V
-0,250 ... +0 ... +0,250 mm
adjusted range: ± 50 μm
+5,2 ... +6 ... +6,8 V
-50 ... +0 ... +50 μm

Wiring diagram



Contents of the measuring apparatus:

Device PROFESS CITES 1pc
Convertor EZ1000 and sensor EZ1080 2pcs
Convertor MSC7401 and sensor DTA-1G8..... 1pc
USB A-B cable..... 1pc
Power cable flexo 230 V 1pc
Shipping case 1pc

Instruction manual..... 1pc
Data sheets for sensors and transmitters 1pc
Installation flash drive PROFESS..... 1pc
Calibration sheets for sensors 1pc

Optional accessories:

Optical probe measurement kit:
Optical probe
Optical probe extension cable
Optical probe holder for stand
Reflective tape for optical probe
Magnetic stand



Repairs and servicing is provided by:

PROFESS, spol. s r.o.

Květná 5

326 00 Plzeň

phone: +420 377 454 411

e-mail: mms@profess.cz