Sensor Instruments — Let's make sensors more individual

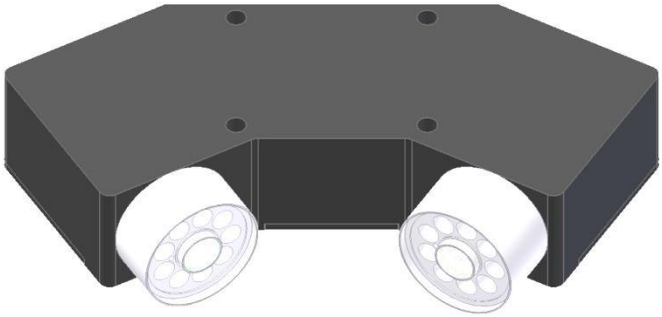
P R E L I M I N A R Y V E R S I O N !

Short Instructions

STRUCT-Scope V1.3

(PC Software for Microsoft® Windows 8, Windows 7, Vista, XP)

for COAST (Color and Structure) sensors



Design versions:

COAST-85-30°/30°

COAST-85-45°/45°

Sensor Instruments GmbH - Schlinding 11 - D-94169 Thurmansbang
Tel.: +49 (0)8544 / 9719-0 - Fax: +49 (0)8544 / 9719-13
E-mail: info@sensorinstruments.de - www.sensorinstruments.de

0 Contents

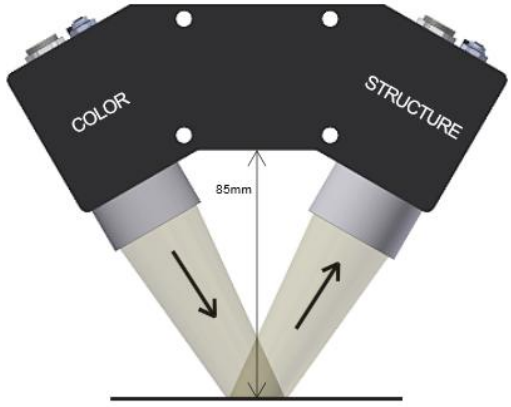
1 Functional principle: COAST color gloss and structure sensor

1.1 Technical description

The sensors of the ***COAST*** *series* (***CO****lor* ***A****nd* ***ST****ructure*) are hybrid sensors comprising a color sensor and a structure sensor, both of which are contained in one housing and operate independently of each other. The *COAST sensor* has two LED ring lights that can be operated alternately (forward reflection, backward reflection). Each of the sensors is equipped with a PLC interface and an RS232 interface. The color sensor evaluates the color and gloss of the object to be inspected, the structure sensor evaluates the surface quality of the object.

Function of the STRUCTURE sensor:

The evaluation unit for structure detection (see. fig. 1) is arranged behind one of the LED ring lights in the *COAST* sensor housing. By way of an optical aperture system that is positioned at the centre of one ring light the surface quality (structure) of the measuring object is represented on a line sensor. This optical representation of a line-shaped range (approx. 30 mm) of the surface onto the pixels of the line sensor results in an intensity characteristic across the line that is typical of the respective surface quality (structure). By way of fast Fourier transformation (FFT) a frequency spectrum can thus be calculated from the intensity characteristic of the line sensor. From this frequency spectrum the typical features of the surface quality (structure) can be learned by means of suitable evaluation algorithms and can thus be monitored and recognised with the help of tolerance ranges. The microcontroller of the *COAST sensor* can be parameterised through the serial RS232 interface by means of a Windows PC software. The software also can be used to set various evaluation modes. Switching states are visualised by way of 5 yellow LEDs that are integrated at the STRUCTURE side of the *COAST* housing. The housing of the control unit features a button for switching over the ring light. This function also can be realised through the digital input (IN0) of the 8-pole PLC connection socket.



(noch zu ergänzen)

Intensity characteristic across pixel position on line detector

Fig.1: Functional principle of the COAST sensor

2 Installation of the *STRUCT-Scope* software

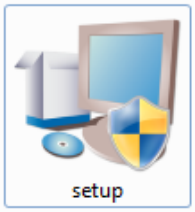
Hardware requirements for successful installation of the *STRUCT-Scope* software:

- 1GHz Pentium-compatible processor or better
- CD-ROM or DVD-ROM drive
- Approx. 100 MByte of free hard disk space
- SVGA graphics card with at least 800x600 pixel resolution and 256 colors or better.
- Windows® XP, Windows® Vista, Windows® 7 or Windows® 8 operating system
- Free serial RS232 interface or USB port with USB-RS/232 adaptor at the PC

Please install the *STRUCT-Scope* software as described below:

1. 

Insert the installation CD-ROM in your CD-ROM drive. In our example we suppose that this is drive "D".

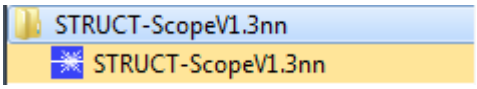
2. 

Start the Windows Explorer, and in the folder tree of your CD-ROM drive go to the installation folder D:\INSTALLATION\L-LAS\L-LAS-STRUCT\.
Then start the installation program by double-clicking on the SETUP.EXE symbol.

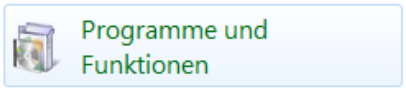
As an alternative, software installation also can be started by clicking on **START-Run**... and then entering "D:\INSTALLATION\L-LAS\L-LAS-STRUCT\setup.exe", which must be confirmed by pressing the **OK** button.

3. During the installation process a new program group for the software is created in the Windows Program Manager. In this program group an icon for starting the software is created automatically. When installation is successfully completed the installation program displays a "Setup OK" message.

4. The *STRUCT-Scope* software can now be started with a mouse-click on the respective icon in the newly created program group under:
Start >All Programs > *STRUCT-ScopeV1.3*



Uninstalling the *STRUCT-Scope* software:



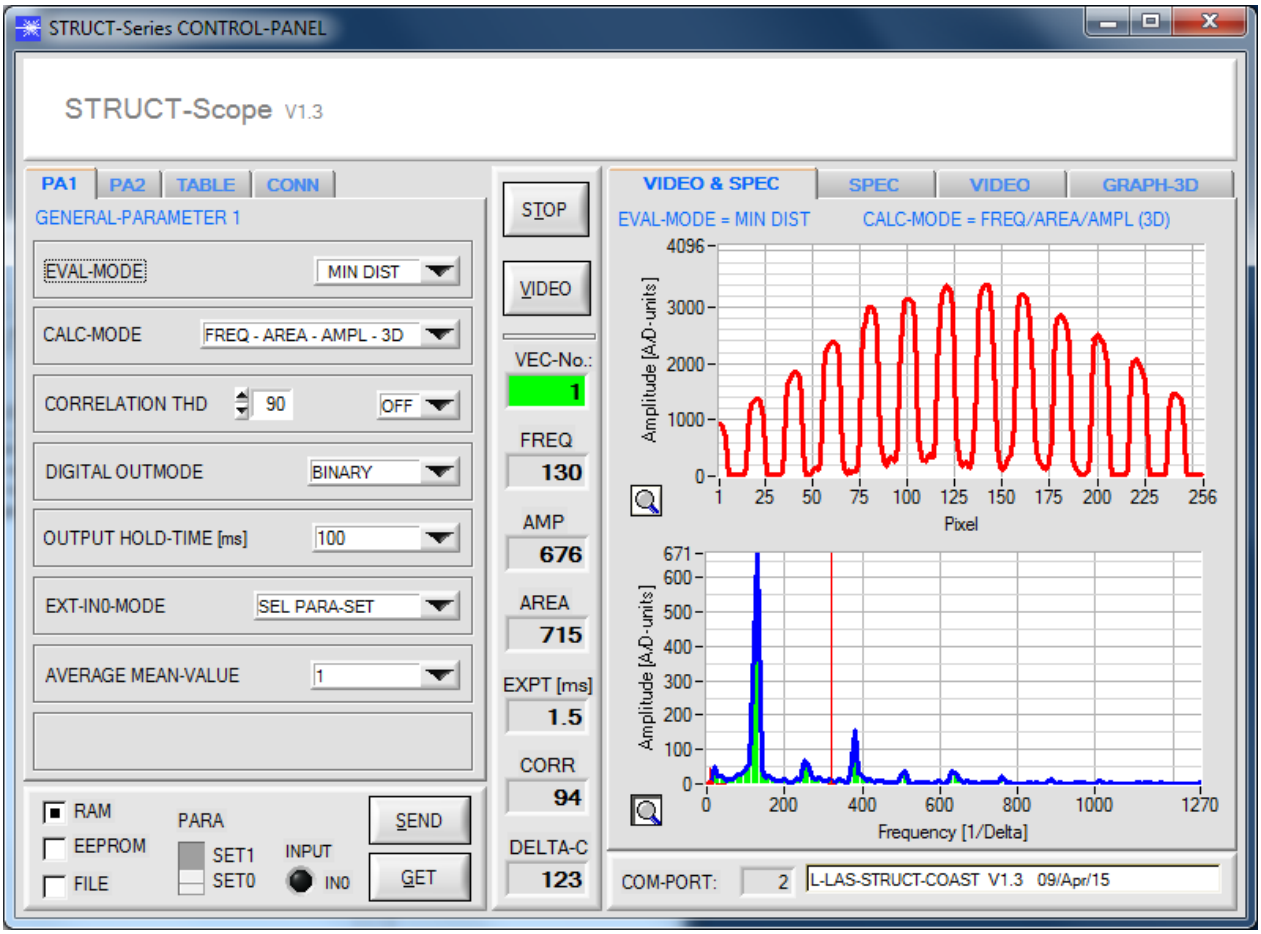
Please use the Windows® uninstall tool to remove the software.
The Windows® uninstall tool can be found under

Start / Settings / Control Panel.

3 Operation of the *STRUCT-Scope* software

The *STRUCT-Scope* software is used to parameterise the control unit for the control/evaluation of the *COAST (STRUCT) sensor*. The PC software visualises the measurement values that are provided by the sensor. It can therefore, among others, be used to select a suitable evaluation algorithm and to set tolerance limits for the inspection of the measurement object.

Data exchange between the PC user interface and the sensor system is effected through a standard RS232 interface. For this purpose the sensor is connected to the PC with the serial interface cable cab-las-4/PC. When parameterisation is finished, the setting values can be permanently saved in an EEPROM memory of the *COAST (STRUCT) control unit*. The *COAST (STRUCT) sensor* then continues to operate in "STAND-ALONE" mode without the PC.
When the *STRUCT-Scope* software is started, the following Windows® user interface will be displayed:



The **STRUCT-Series CONTROL-PANEL** provides a large variety of functions:

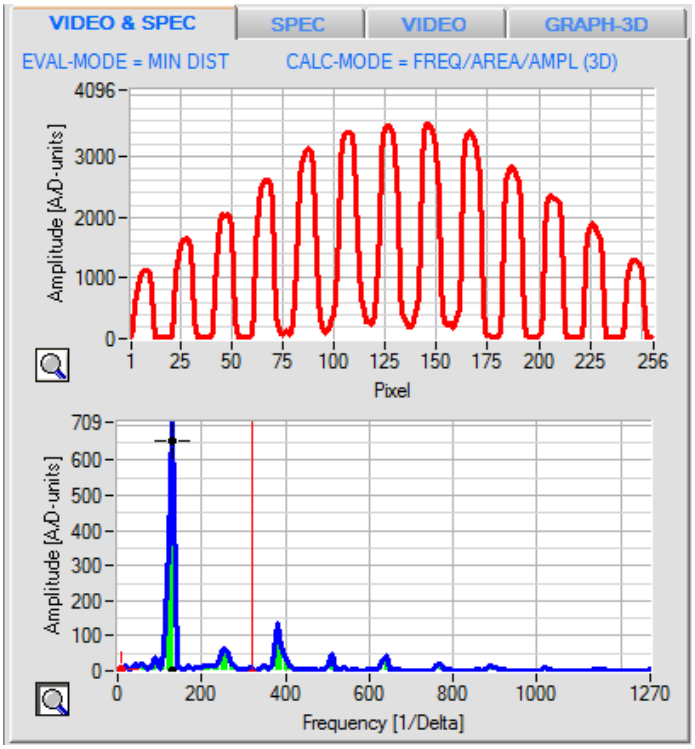
- Visualisation of measurement data in numeric and graphic output fields.
- Setting of the light source.
- Setting of the polarity of digital switching outputs OUT0 to OUT4.
- Selection of a suitable evaluation mode.
- Setting of setpoint value and tolerance band size.
- Saving of parameters in the RAM / EEPROM memory of the control unit or in a configuration file on the PC's hard disk.

The following chapters provide explanations of the individual control elements of the *STRUCT-Scope* software.
A click with the right mouse button on a control element displays a short help text on the respective element.

3.1 General control elements of the *STRUCT-Scope* software

VIDEO button:

After a click on the VIDEO button the intensity profile (video image) that is measured at the CMOS line receiver and the frequency spectrum that is calculated from it are transferred to the PC.



When the **<VIDEO&SPEC>** tab is selected, both the intensity profile (red curve) and the frequency spectrum calculated from it (blue curve) are displayed.

Intensity characteristic at the line sensor:
Y-axis: Amplitude at the respective pixel
X-axis: Pixel of the line sensor

The picture on the left shows the typical representation of a strip-shaped structure with periodically repeated, different reflectance (bright/dark transitions).

Frequency spectrum:
Y-axis: Amplitude of the respective frequency
X-axis: Frequency

The frequency spectrum is calculated from the video image (intensity characteristic) by way of a FFT algorithm. The frequency spectrum displays the frequency distribution of the frequency components contained in the video image.

Numeric display elements:
Various numeric evaluation values are derived from the frequency spectrum.
VEC-No:
Currently detected teach vector of the teach table.

FREQ:
Frequency component that occurs most frequently in the video image.

AMP:
Maximum amplitude of the most frequent frequency component.

AREA:
Normed area ratio calculated from the frequency spectrum.

CORR:
Correlation coefficient (similarity analysis) of the current frequency spectrum with a taught comparison spectrum.

DELTA-C:
Distance of the currently determined structure value from the teach values.

STOP button:

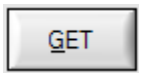
A click on the STOP button stops the data transfer from the *COAST (STRUCT) sensor* to the PC through the serial interface.

PARAMETER TRANSFER:

This group of buttons is used for the transfer of parameters between the PC and the *COAST (STRUCT) control unit* through the serial RS232 interface.

SEND:

When the SEND button is clicked, the parameters currently set in the user interface are transferred to the *COAST (STRUCT) control unit*.
The target of the respective parameter transfer is determined by the selected radio button (RAM, EEPROM, or FILE).



GET:

When the GET button is clicked, the setting parameters are transferred from the *COAST (STRUCT) control unit* to the PC and are refreshed in the user interface. The source of parameter transfer again is determined by the selected radio button:

RAM:

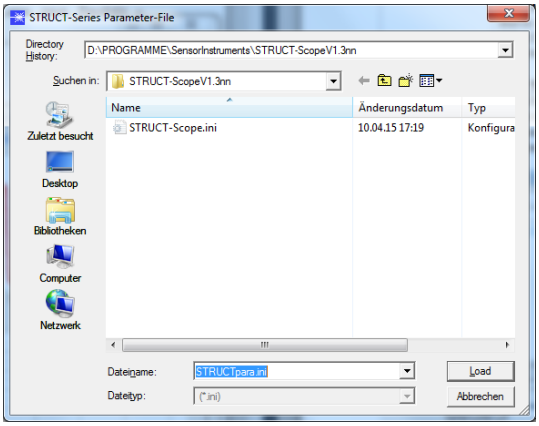
The currently set parameters are written to the volatile RAM memory of the *COAST (STRUCT) control unit*, or they are read from there and transferred to the PC.

EEPROM:

The currently set parameters are written to the non-volatile EEPROM memory of the *COAST (STRUCT) control unit*, or they are read from there and transferred to the PC. Parameters that have been saved in the EEPROM will not be lost when the sensor's power supply is turned off. When parameters are loaded from the EEPROM of the *COAST (STRUCT) control unit*, they must then be written to the RAM of the *COAST* (STRUCT) *control unit* by selecting the RAM button and pressing the SEND button. The *COAST (STRUCT) control unit* then continues to operate with the set RAM parameters.

FILE:

When the FILE radio button is selected, a click on the SEND/GET button will open a new file dialog on the user interface.



FILE dialog:

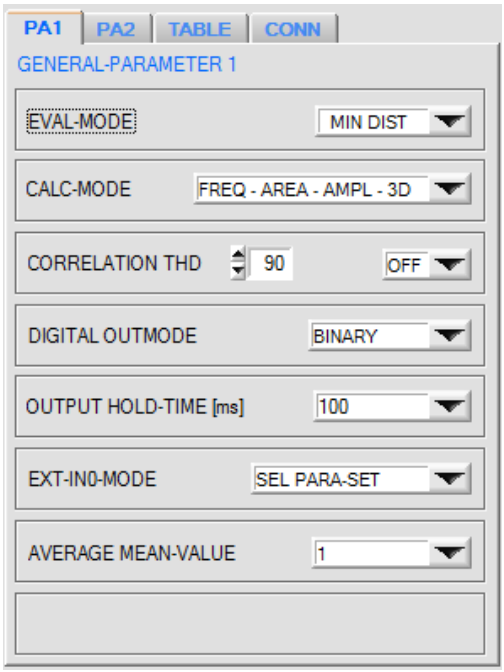
The current parameters can be written to a selectable file on the PC's hard disk, or they can be read from such a file. The file name of the standard output file for parameter values is "STRUCTpara.ini".

The output file for example can be opened with the standard Windows text editor program "EDITOR".

PARA-SET:

When EXT-IN0-MODE=SEL-PARA-SET is used, two independent parameter sets can be saved in the sensor. This changeover switch is used to select whether parameter set 0 or parameter set 1 should be displayed in the user interface. Through the external input IN0/Pin3 a PLC can be used to determine which parameter set should be used for evaluation. The LED display provides information about the status of digital input IN0 (off:=IN0=0V, green:=IN0=24VDC).

3.2 PARAMETER1 tab



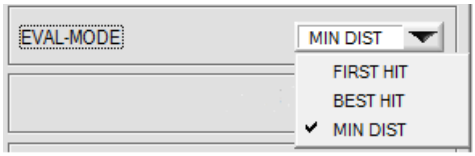
PA1 TAB:

A click on the PA1 tab opens the GENERAL-PARAMETER 1 window.

In this window various general parameters can be set at the control unit.

Please note ! SEND

Any changes that are made in the function fields described below only become active at the control unit of the *COAST (STRUCT) sensor* when the SEND button is pressed!

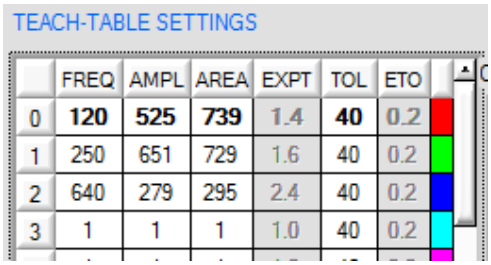


EVAL-MODE:

This list selection field is used to set the evaluation mode at the *COAST (STRUCT) sensor*. The evaluation mode that is set here applies to all the calculation modes that are available in CALC-MODE.

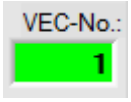
FIRST HIT:

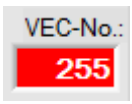
The current measurement values for frequency (FREQ), amplitude (AMPL) and area ratio (AREA) are line by line compared with the setpoint values and tolerance limits (TOL) in the **TEACH TABLE**, starting with teach vector 0.

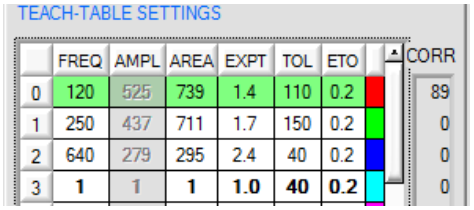


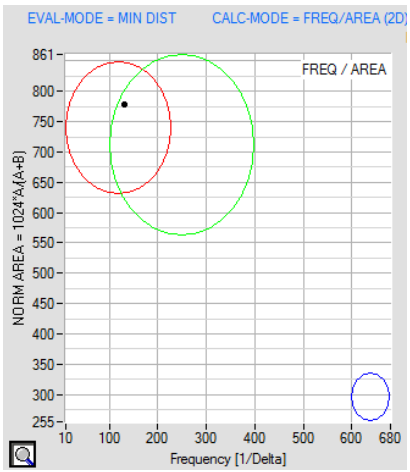
If this line by line comparison of the current measurement values with the teach vectors in the teach table provides a match, this first "hit" is displayed in green as a hit vector number (**VEC-No.**) in the teach table, and is provided at the digital outputs (OUT0 ... OUT4) in accordance with the **DIGITAL-OUTMODE** parameter settings.

If the current structure does not match any of the taught structures, vector number **VEC-No.** = 255 will be set ("error").





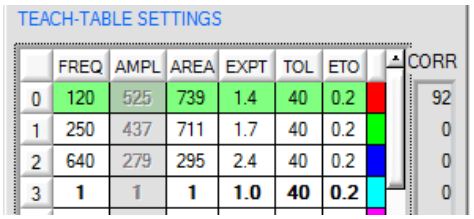


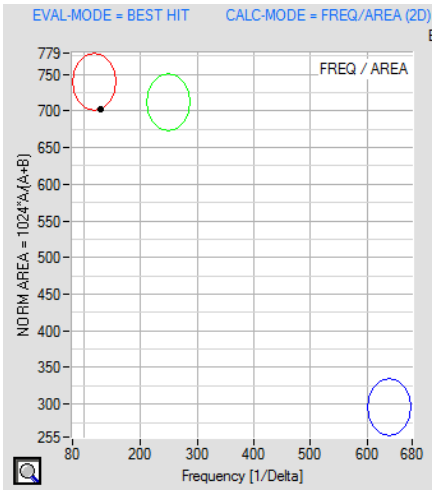


BEST HIT:

The current measurement values for frequency, amplitude and area ratio are line by line compared with the setpoint values in the **TEACH TABLE**, starting with teach vector 0.

If this line by line comparison of the current measurement values with the teach vectors in the teach table provides several matches, the teach vector that has the shortest distance from the vector will be used.
This optimal best "hit" in the teach table is displayed as a vector number (**VEC-No**.) in green, and is provided at the digital outputs (OUT0 ... OUT4) in accordance with the **DIGITAL-OUTMODE** parameter settings.
If the current color does not match any of the taught colors, vector number **VEC-No**. = 255 will be set ("error").



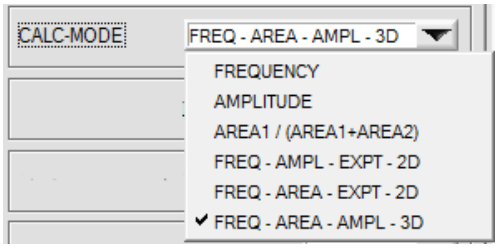


MIN DIST:

In the graphic 2D representation the individual teach vectors defined in the teach table are points that are determined by their (X,Y) value pairs (e.g. X=FREQ, Y=AREA).
When this evaluation mode is set at the structure sensor, the evaluation algorithm calculates the distance from the currently measured structure value (X=FREQ, Y=AREA) to the individual teach vectors. The current structure value (X,Y) is assigned to the teach vector that lies closest to the current structure value.
The closest teach vector in the teach table that is determined this way is displayed as a vector number (**VEC-No**.) in green, and is provided at the digital outputs (OUT0 ... OUT4) in accordance with the **DIGITAL-OUTMODE** parameter settings.

If the current color does not match any of the taught colors, vector number **VEC-No**. = 255 will be set ("error").

Tip! This mode can be used if several different structures have been taught, and the current structure by all means must be assigned to one of the taught structures.



CALC-MODE:

This list selection field is used to define the calculation mode that the *COAST (STRUCT) sensor* uses for evaluation.

FREQUENCY:
Only the most frequently occurring frequency value of the frequency spectrum, together with the set tolerance TOL, is used for calculation.

AMPLITUDE:
Only the amplitude of the most frequently occurring frequency of the frequency spectrum, together with the set tolerance TOL, is used for calculation.

AREA1/(AREA1+AREA2):
A normed area ratio is used for calculation. The area ratio is calculated from the frequency spectrum. The FREQ-SPLIT parameter is used as a dividing line for ratio calculation. All frequencies lower than FREQ-SPLIT are assigned to AREA1, all frequencies higher than FREQ-SPLIT are assigned to AREA2. It is then checked whether the area ratio determined this way lies within a set tolerance TOL.

FREQ-AMPL-EXPT-2D:
The most frequently occurring frequency (X=FREQ) and the corresponding amplitude value (Y=AMPL) are used for 2D calculation. In an X/Y 2D representation these two values are a value pair (X/Y). A tolerance circle with radius TOL is defined around this value pair. If the currently measured structure value pair (X=FREQ, Y=AMPL) lies within the tolerance circle, the first evaluation condition is fulfilled. In addition, the exposure time [ms] (EXPT) with the corresponding tolerance ETO is used as a second evaluation criterion. If both criteria are fulfilled, a structure vector is recognised, and the corresponding vector number is output.

FREQ-AREA-EXPT-2D:
Analog to FREQ-AMPL-EXT-2D calculation. The frequency (X=FREQ) is used as x-value, the normed area ratio (Y=AREA) is used as y-value.

FREQ-AREA-AMPL-3D:
All three components of the frequency spectrum are used for evaluation. The most frequently occurring frequency (X=FREQ) is used as x-value, the normed area ratio (X=AREA) is used as y-value, and the amplitude of the most frequently occurring frequency (Z=AMPL) is used as z-value. These three values define a point in a three-dimensional space. The specified tolerance forms a sphere with radius TOL in space (see fig. 2 below).

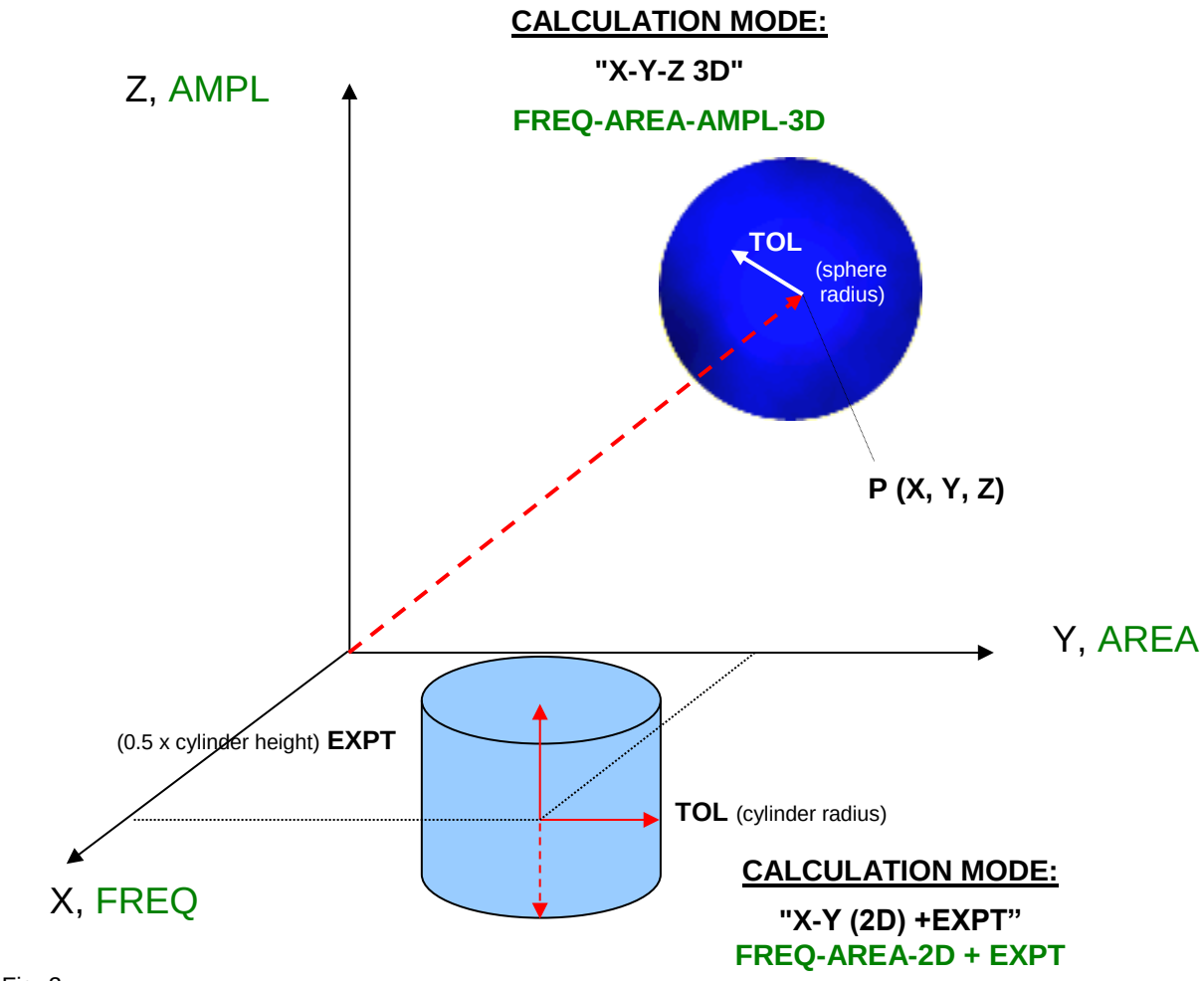
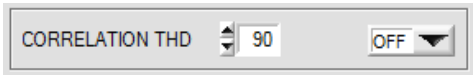


Fig. 2



CORRELATION THD:

In these input fields a switching threshold for correlation evaluation can be activated or deactivated by entering a numerical value and/or clicking on the arrows.

CORRELATION THD: 0 .. 100

Threshold for evaluation of the correlation coefficient.

OFF: Correlation calculation deactivated

ON: Correlation calculation activated.

DIGITAL OUTMODE:

This list element is used to set the operating mode of the 5 digital outputs:

BINARY:

The vector for the current structure that is found by way of comparison with the teach table is provided as a bit pattern at the digital outputs (OUT0 … OUT4). A maximum of 31 structures can be taught.

DIRECT HI:

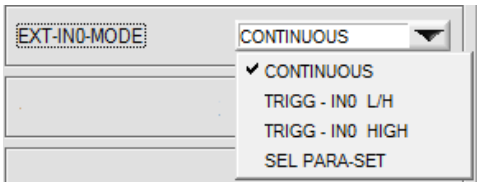
In this mode a maximum of 5 teach vector entries in the teach table are allowed. When a teach vector is recognised, the corresponding digital output is set to high level (24VDC).

DIRECT LO:

In this mode a maximum of 5 teach vector entries in the teach table are allowed. When a teach vector is recognised, the corresponding digital output is set to low level (0V).

OUTPUT HOLD-TIME [ms] :

This list field is used to define the output hold time [ms] for the digital outputs OUT0 … OUT4. If this value is set to 0, no output hold time will be used.



EXT-IN0-MODE:

This list field is used to set the external trigger mode.

CONTINUOUS:

The control unit continuously evaluates the video images. The evaluation result is continuously provided at the digital outputs (OUT0 … OUT4).

TRIGG-IN0 L/H:

The most recent video image directly after the LOW/HIGH edge is used for evaluation.

TRIGG IN0 HIGH:

Video images only are evaluated when there is a HIGH level (+24VDC) at Pin3/IN0.

SEL PARA-SET:

The active parameter set can be selected by way of the external trigger input IN0/Pin3.

IN0 = 0V: Parameter set 0

IN0 = +24VDC: Parameter set 1

In the software the status of IN0 is visualised by an LED. The changeover switch can be used to display the respective parameter set.

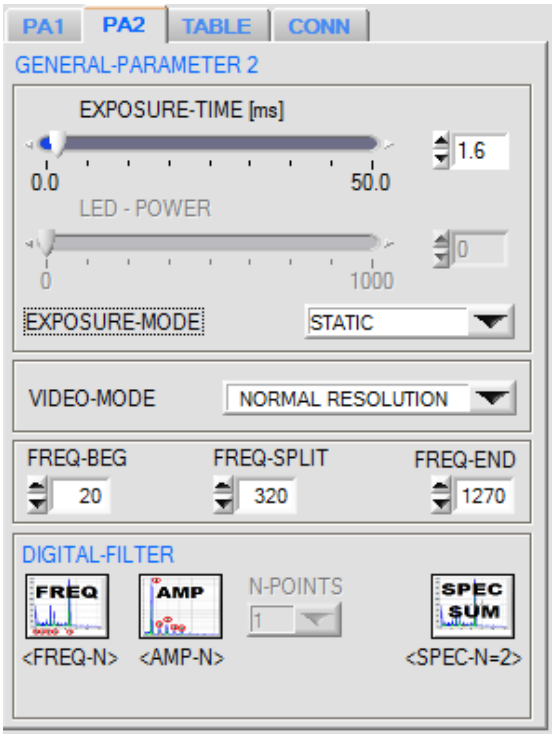
AVERAGE MEAN-VALUE:

This list field is used to set the averaging function at the *COAST (STRUCT) control unit*.

Possible values: N = 1, 2,4,8,16 or 32.

A figure N can be set here that is used for forming the measurement value. After every video image the calculated values are written to individual ring memories of size N. With every cycle of the main program the mean value of the ring memories is used for further calculation.

3.3 PARAMETER 2 tab

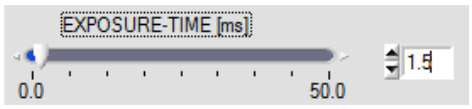


PA2 TAB:

A click on the PA2 tab opens the GENERAL-PARAMETER 2 window.
In this window additional parameters can be set at the control unit.

Please note !

Any changes that are made in the function fields described below only become active at the control unit of the *COAST (STRUCT) sensor* when the SEND button is pressed!

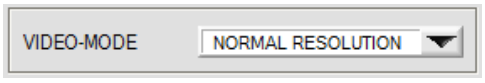


EXPOSURE-TIME [ms]:

In this function field the exposure time at the receiver unit of the *COAST (STRUCT) sensor* can be set by using the arrows or the slider or by entering a numeric value in the respective input field.

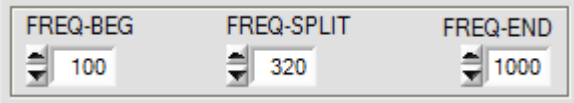
EXPOSURE-MODE:

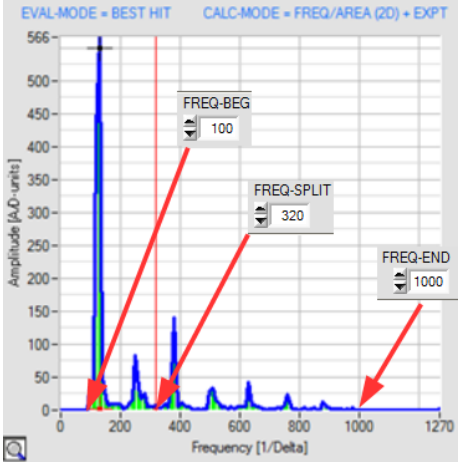
This list field is used to set the operating mode for the receiver unit of the *COAST (STRUCT) sensor*.
STATIC:
Fixed exposure time with the time specified by the EXPOSURE-TIME [ms] slider.
DYNAMIC:
Automatic setting of the exposure time by way of the amplitude of the received video signal.



VIDEO-MODE:

This list field is used to specify the resolution at the CMOS line sensor.
NORMAL RESOLUTION:
Every second pixel at the line sensor is evaluated. The full measuring range is available.
HIGH RESOLUTION:
Every pixel at the line sensor is evaluated. Only half the measuring range is available.





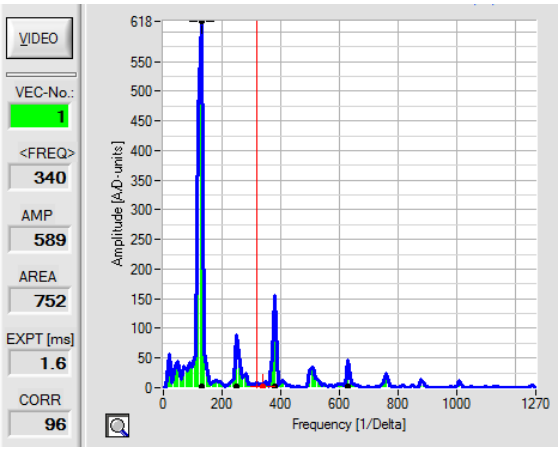
FREQ-BEG, FREQ-SPLIT, FREQ-END:

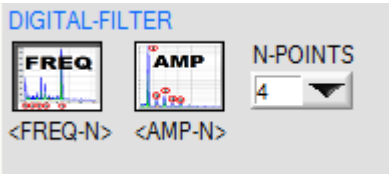
These numeric input fields are used to set evaluation limits in the frequency spectrum.

FREQ-BEG:
Evaluation beginning in the frequency spectrum.

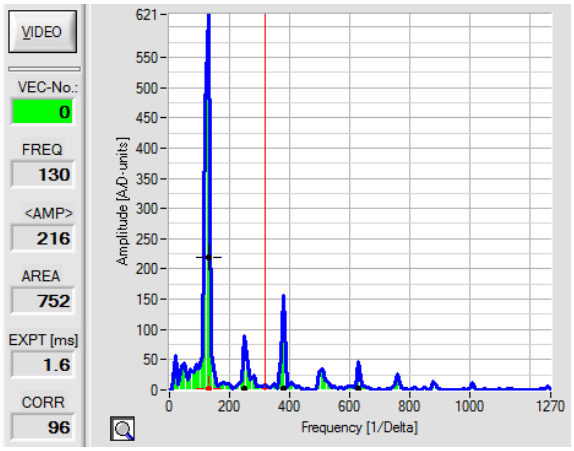
FREQ-END:
Evaluation end in the frequency spectrum.

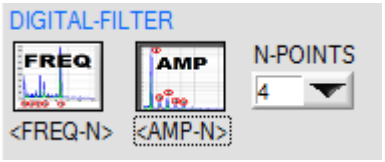
FREQ-SPLIT:
This is the dividing line that is used for the calculation of the normed area ratio. It is displayed as a red vertical auxiliary line in the frequency spectrum.



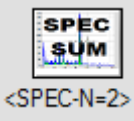


<FREQ-N> = 4
The 4 highest spectral values are searched in the frequency spectrum. The **mean value of the frequency** of these 4 highest spectral values is calculated and displayed in the numeric <FREQ> field and as a red cursor in the graphic window.





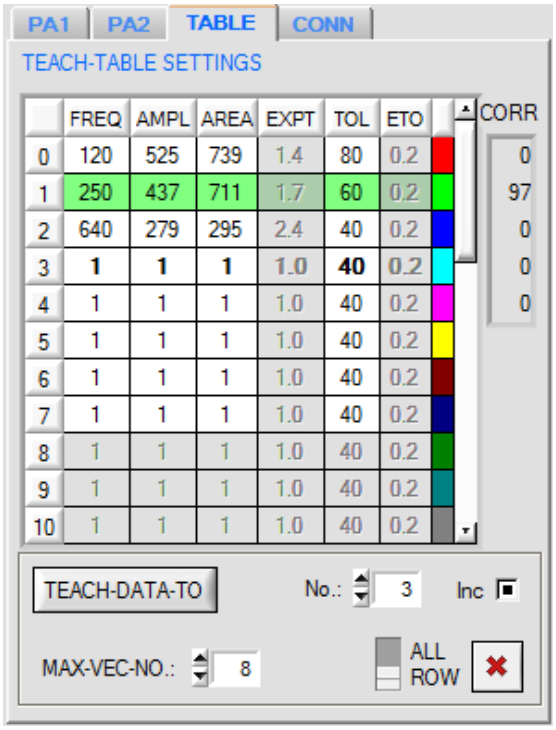
<AMP-N> = 4
The 4 highest spectral values are searched in the frequency spectrum. The **mean value of the amplitude** of these 4 highest spectral values is calculated and displayed in the numeric <AMP> field and as a black cursor in the graphic window.



SPECTRA-SUM N=2:

When this function field is activated, two successive frequency spectrums are added up and then evaluated. This method is useful in case of very small amplitudes of the spectral values.

3.4 TEACH-TABLE SETTINGS tab



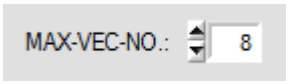
TEACH-TABLE SETTINGS TAB:

A click on the TABLE tab opens the TEACH-TABLE SETTINGS window.
This window can be used for the teaching of differently structured objects.
When you double-click on a field with the left mouse button (or highlight the field and then press F2) the values in the table can be changed, i.e. new values can be entered with the PC keyboard.

The **TEACH TABLE** is organised in rows, i.e. the individual parameters for the teach vectors are listed side by side in the respective row.
The sensor can work with up to 31 teach vectors. The number of the respective teach vector is shown in the left column of the table. Only rows with a white background are used for evaluation in the sensor.

Please note !

Changes that are made here only become active at the control unit of the *COAST (STRUCT) sensor* when the SEND button is pressed!

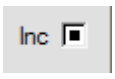


MAX-VEC-NO:

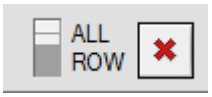
This numeric input field is used to define the number of teach vectors that should be used. Enabled teach vectors are shown with a white background.

TEACH-DATA-TO:

After a click on the **TEACH-DATA-TO** button the data for **FREQ**, **AMPL**, **AREA** and **EXPT[ms]** that are currently determined at the sensor are written to the row in the TEACH TABLE that is selected under **No.:** The currently selected row is identified by bold type.

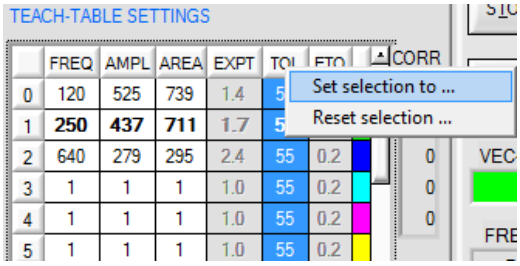


When the **Inc** radio button is activated, the row number in which the teach values are entered is automatically increased by 1 every time you click on the TEACH DATA TO button.



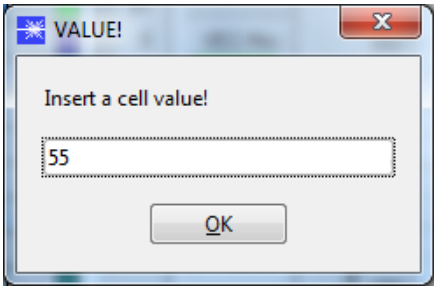
CLEAR/RESET:

This button is used to reset the entries in the TEACH TABLE.
RESET value = 1.
ALL:
The complete TEACH TABLE will be reset.
ROW:
The currently active row in the TEACH TABLE will be reset.

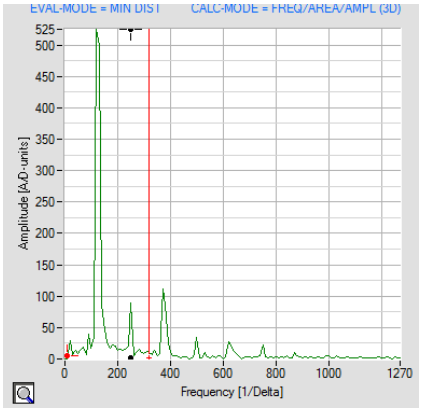


SET SELECTION TO:

When you **right-click on a column** you can fill the complete column of the TEACH TABLE with a default value.

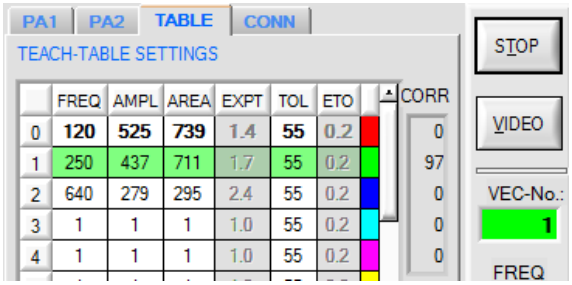


Select **Set selection to.** A window will open where you can enter a numeric value.
This value will then be entered in the complete column of the TEACH TABLE.



Display of 5 taught spectrums:

When you **left-click on one of the first 5 rows in the first column** you can display the first 5 taught spectrums. The taught spectrums are displayed as a thin green curve in the SPEC output window.



Display of the correlation coefficient:

A **click on the VIDEO button** starts the transfer of measurement data from the *COAST (STRUCT) sensor* to the PC. The **CORR display field** shows the correlation coefficients of the first 5 spectrums. If the current spectrum to a large extent matches the teach spectrum, the correlation coefficient comes close to a value of CORR = 100.
When a match is recognised in the teach table, the recognised teach vector is shown with a green background, and the vector number is updated in the numeric **VEC-No.:** display field.

3.5 CONNECTION tab

RS232 COMMUNICATION:

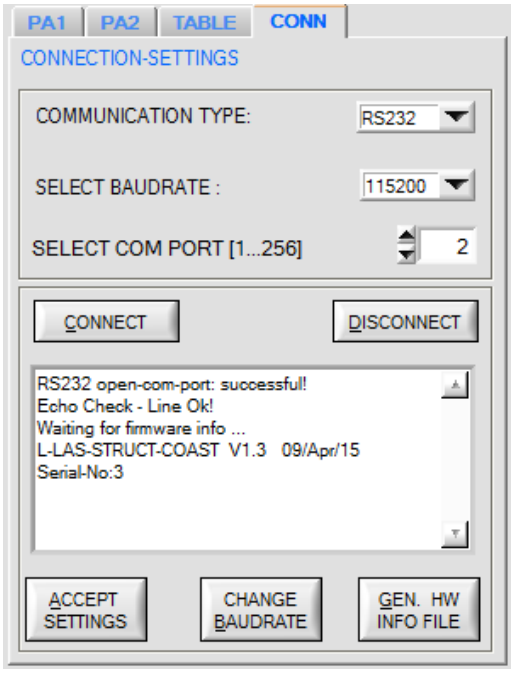
- Standard RS232 serial interface without hardware-handshake.
- 3-line connection: GND, TXD, RXD.
- Speed: Can be set from 9600 Baud to 115200 Baud, 8 data bits, no parity bit, 1 stop bit in binary mode, MSB first.

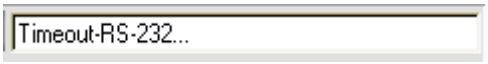
Attention !

The stable function of the RS232 interface (status message after program start) is a basic prerequisite for a successful parameter transfer between PC and *COAST (STRUCT) control unit*. Due to the low data transfer rate of the serial interface only slow changes of the analog values can be observed in the graphic display at the PC. In order to guarantee the maximum switching frequency of the *COAST (STRUCT) control unit* it is therefore necessary to stop the data exchange during the normal monitoring process (click on the STOP button).

CONN:

When the software is started it attempts to establish a connection to the *COAST (STRUCT) sensor* through the COM interface that was last used. If connection could be established successfully, the current firmware version and the number of the COM port are displayed in the status line.



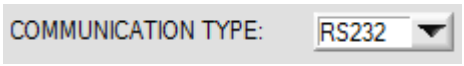


The serial connection between PC and *COAST (STRUCT) control unit* could not be established, or the connection is faulty.

In this case it should first be checked whether the *COAST* (STRUCT) *control unit* is connected to the power supply, and whether the serial interface cable is correctly connected to PC and control unit.

If there is an "Invalid port number" status message, the selected interface, e.g. COM PORT 2, is not available at your PC.

If there is a "Cannot open port" status message, the selected interface, e.g. COM PORT 2, may already be used by another device.



COMMUNICATION TYPE:

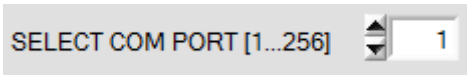
The type of data communication can be set in this function field:

RS232:
Data communication through the standard RS232 interface.

TCP/IP:
Data communication through a RS232-TCP/IP Ethernet converter module.

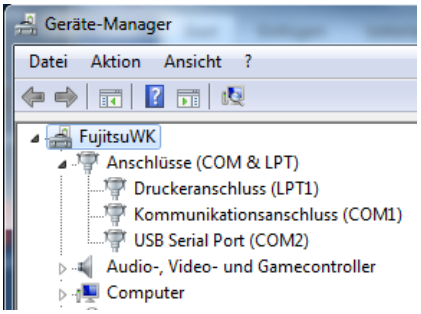
SELECT BAUDRATE:

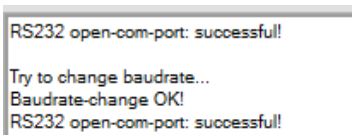
The baud rate of the serial interface can be set in this function field:
Possible values: 9600Baud, 19200Baud, 38400Baud, 57600Baud or 115200Baud (Setting when delivered = 115200Baud).



SELECT COM PORT [1…256]:

The number of the communication port can be set in this function field.
Possible values are COM PORT 1 to 255.
The communication port number can be found in the Windows® operating system under START/Control Panel/Device Manager.

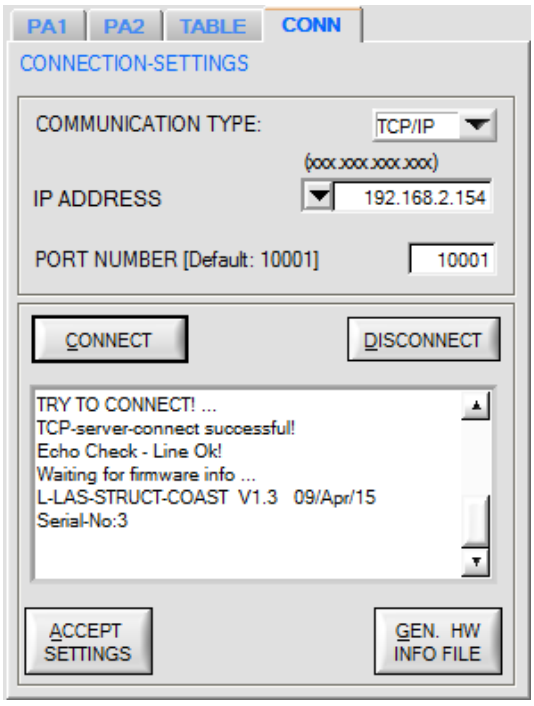




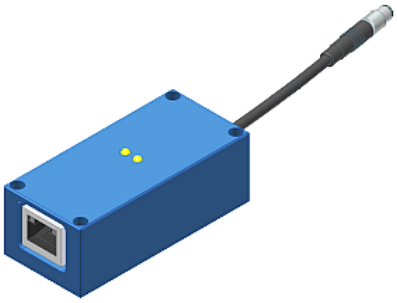
CHANGE BAUDRATE:

With a click on this button the baud rate of the serial interface at the sensor hardware is changed to the value selected in the SELECT-BAUDRATE list field. A corresponding status message will be displayed when the change of the baud rate at the sensor was successful.
The baud rate change only is performed in the volatile RAM memory of the *COAST (STRUCT) sensor*. If the baud rate should be changed permanently, the new baud rate value must be saved to the EEPROM by clicking on the SEND + EE button!

3.6 Data transfer through the external RS232 to Ethernet adapter



If the sensor should communicate through a local area network, an RS232 to Ethernet adaptor will be needed. This adapter makes it possible to establish a connection to the sensor with the **TCP/IP** protocol.
The network adaptors that are available from us are based on the **Lantronix XPort module**. For parameterising these adapters (assigning of an IP address, setting of the Baud rate, ...) please download the "DeviceInstaller" software that is provided free of charge by Lantronix at http://www.lantronix.com/. DeviceInstaller is based on Microsoft's ".NET" framework. Detailed operating instructions for the "DeviceInstaller" software also are available from *Lantronix*.

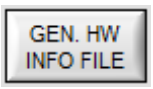


RS232/Ethernet converter

IP ADDRESS:
Input mask for entering the IP address.

PORT NUMBER:
The **PORT NUMBER** for the network adapter based on Lantronix-XPort is set to 10001. This value must not be changed.

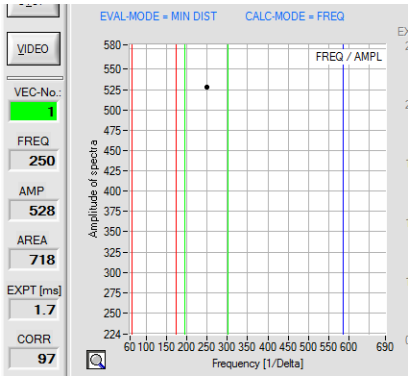
ACCEPT SETTINGS:
With a click on the ACCEPT SETTINGS button the current setting values of the *STRUCT-Scope* PC software are saved in the TB-Scope.ini file. The popup window will then be closed. When the *STRUCT-Scope* software is restarted, the parameters saved in the INI file will be loaded.

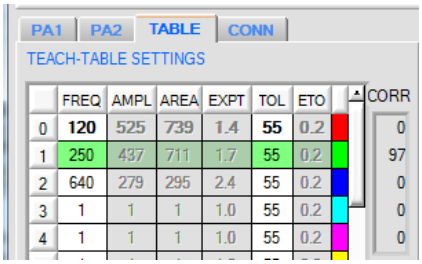


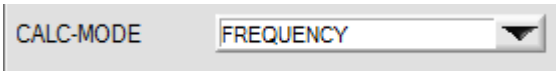
GEN. HW INFO FILE:
A click on this button generates a file in which all the important sensor data are stored in encrypted form. This file can be sent to the sensor manufacturer for diagnostic purposes.

4 Evaluation modes

4.1 1D modes







With 1D evaluation modes only one column in the TEACH TABLE is evaluated. It is checked whether the selected evaluation parameter (e.g. FREQ) lies within the set tolerance band.

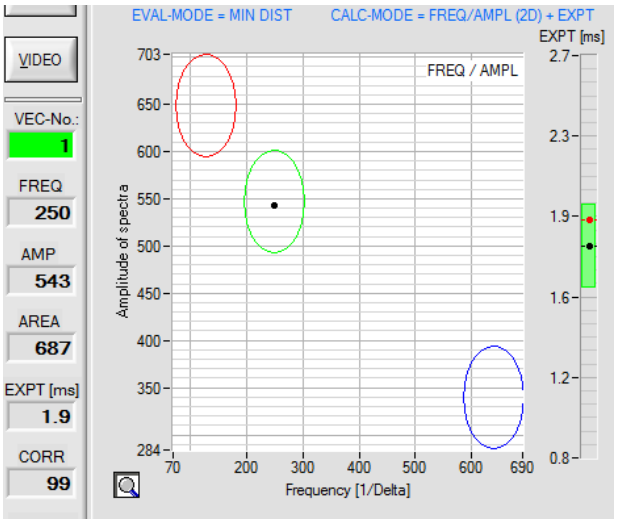
The following 1D evaluations can be activated:

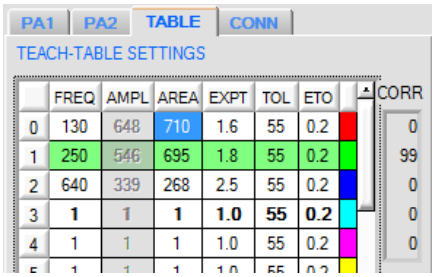
FREQUENCY

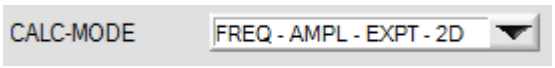
AMPLITUDE

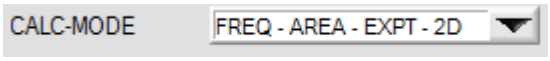
AREA1/(AREA1+AREA2)

4.2 2D modes









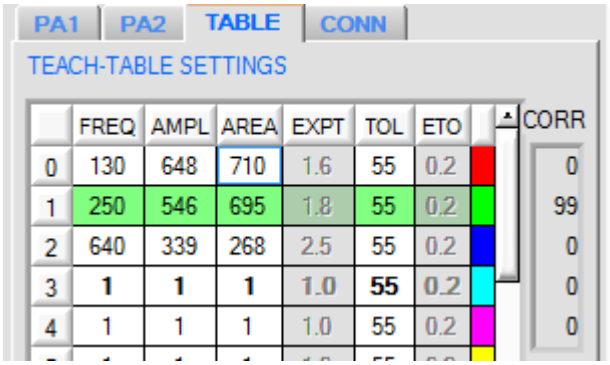
With 2D evaluation modes 3 columns of the TEACH TABLE are evaluated. 2 evaluation parameters are represented in a 2-dimensional X/Y graph. In addition the exposure time EXPT [ms] is represented with its own bar display.

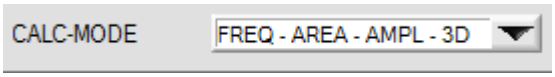
The TOL column of the TEACH TABLE defines the tolerance for the 2D display parameters. In this graph, for example, X=FREQ and Y=AREA are evaluated.

The teach vectors form circles around the respective X/Y value pairs. The X/Y value pair that is determined in the current measurement is displayed as a black point-shaped cursor.

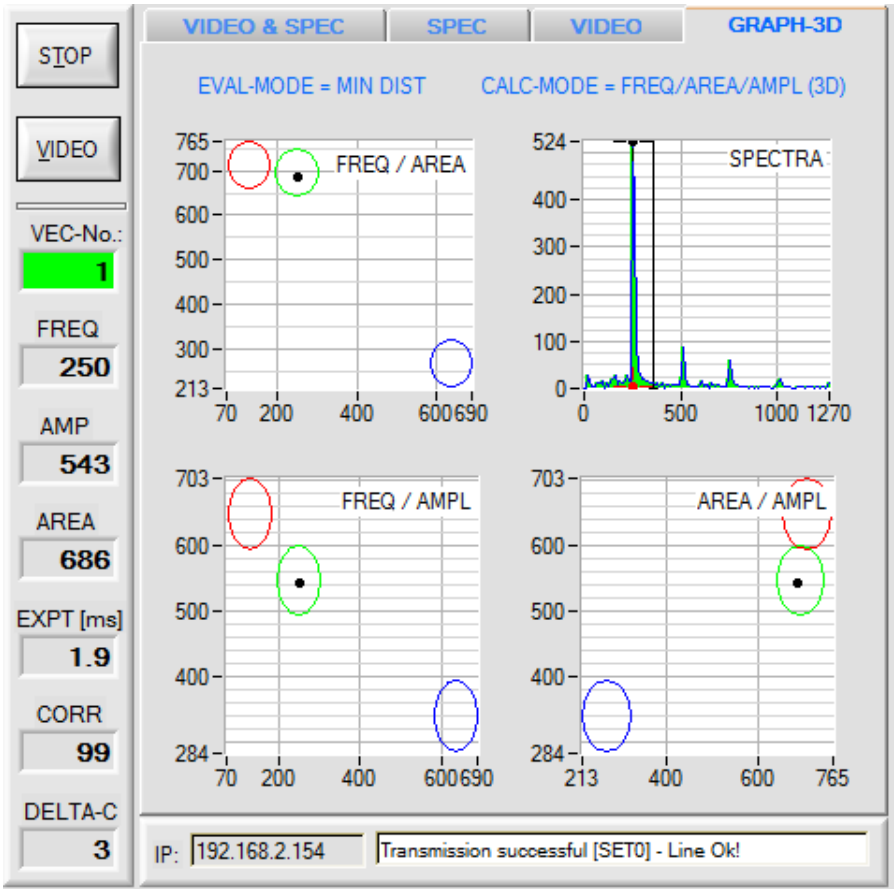
The exposure time EXPT [ms] evaluation parameter has its own tolerance (ETO) in the TEACH TABLE.

4.3 3D modes



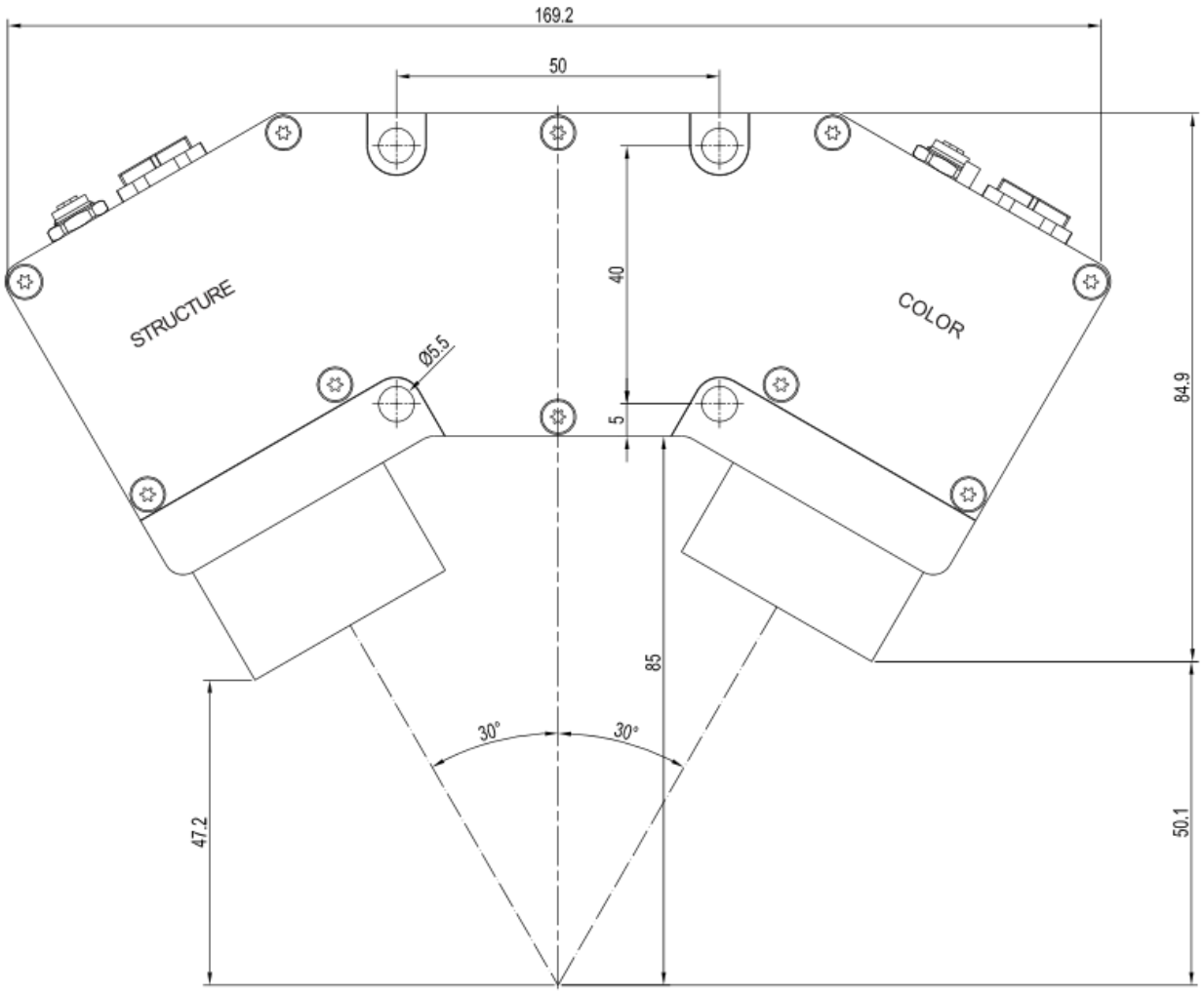


With the 3D evaluation mode 3 columns of the TEACH TABLE are evaluated. X=FREQ, Y=AREA, Z=AMPL. 2 evaluation parameters each are represented in a 2-dimensional X/Y graph. The tolerance circles are defined by the numerical values specified in the TOL column.



5 Annex

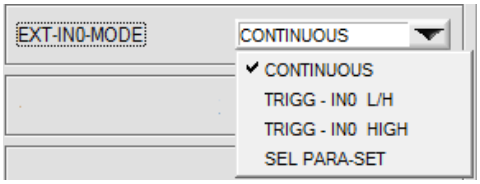
5.1 Dimensions / adjustment



All data in mm

5.2 Function of digital input IN0

The function of digital input IN0/pin3/green depends on the operating mode that is set in the EXT-IN0-MODE function field:



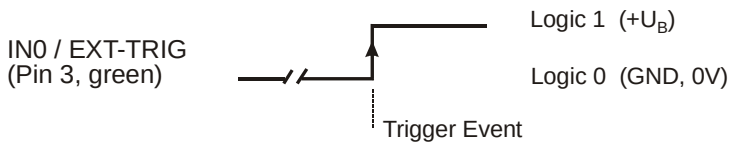
In the software the status of IN0 is visualised by an LED. The changeover switch can be used to display the respective parameter set.

CONTINUOUS:
The control unit continuously evaluates the video images. The evaluation result is continuously provided at the digital outputs (OUT0 … OUT4).

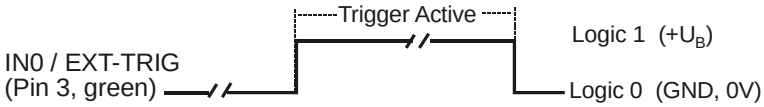
TRIGG-IN0 L/H:
The most recent video image directly after the LOW/HIGH edge is used for evaluation.

TRIGG IN0 HIGH:
Video images only are evaluated when there is a HIGH level (+24VDC) at Pin3/IN0.

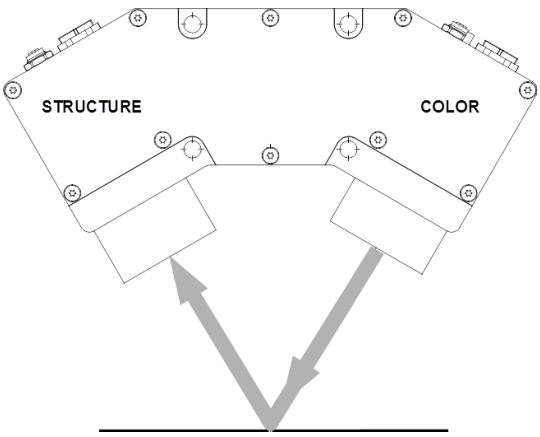
SEL PARA-SET:
The active parameter set can be selected by way of the external trigger input IN0/Pin3.
IN0 = 0V: Parameter set 0
IN0 = +24VDC: Parameter set 1



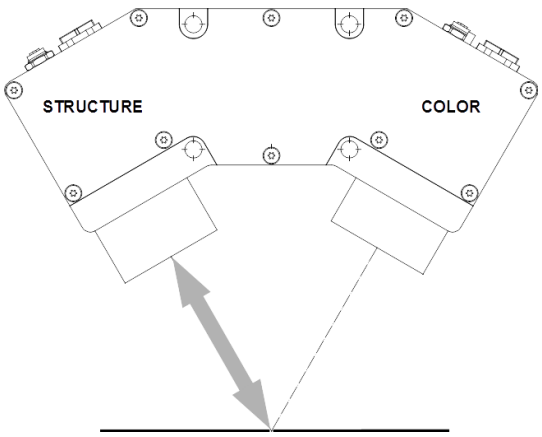
External edge-controlled (LOW/HIGH) triggering of measurement value evaluation through digital input IN0.



External triggering of measurement value evaluation through a HIGH level (+Ub) at digital input IN0.

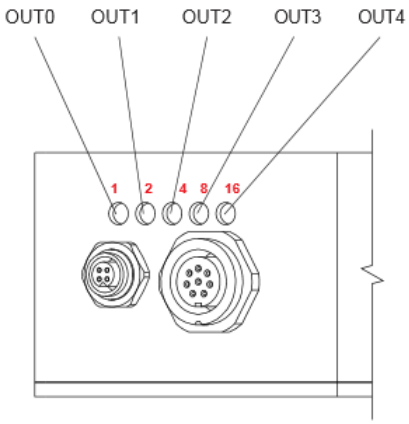


IN0 = 0VDC
Forward scattering



IN0 = +24VDC
Backward scattering

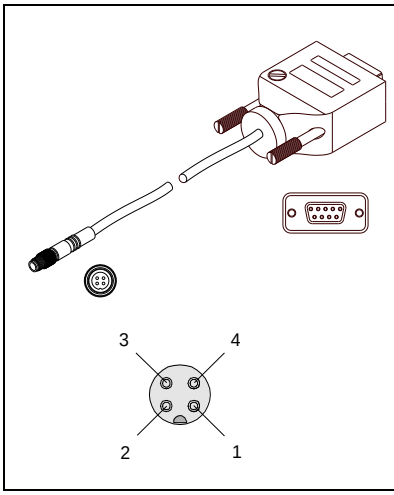
5.3 Connection sockets



At the side of the *COAST (STRUCT) sensor* housing there is a socket for connecting the power supply (8-pole M12 type Binder 712) and a second socket for connecting the serial RS232 connection cable (4-pole type M5 Binder 707).

RS232 connection to PC:

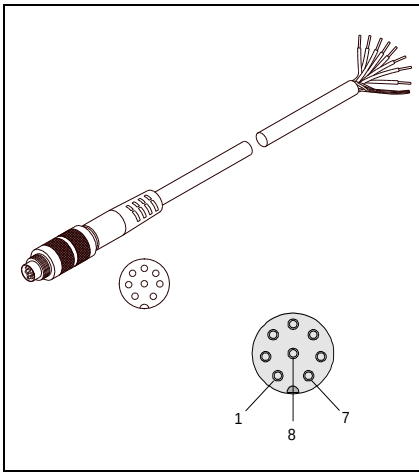
4-pole M5 socket type Binder 707, **connection cable:** cab-las4/PC (length 2m, cable sheath: PUR)



Pin	Assignment
1	+Ub
2	0V (GND)
3	RxD
4	TxD

Interface to PLC/power supply:

8-pole socket type Binder 712; **connection cable:** cab-las8/SPS (length 2m, cable sheath: PUR)



Pin	Color	Assignment COAST (STRUCT) sensor
1	white	0V (GND)
2	brown	+24VDC ±10%
3	green	IN0
4	yellow	OUT0
5	gray	OUT1
6	pink	OUT2
7	blue	OUT3
8	red	OUT4

5.4 RS232 interface protocol

(to be supplemented)