

Manual
SCOPE34 (v1.1) Windows® Software
for the *SI-CON34 Control Unit*



With the SCOPE34 Windows® software the SI-CON34 control unit can be parameterised through the RS232 interface.

By way of graphical and numerical displays the software also facilitates the setting of individual parameters such as laser power, tolerance, reference value, averaging, and trigger functions.

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1 Installation of the *SCOPE34* software

Hardware requirements for successful installation of the *SCOPE34* software:

- IBM PC AT or compatible
- VGA graphics
- Windows 3.1 or higher
- Serial RS232 interface at the PC
- Microsoft-compatible mouse
- Cable for the RS232 interface (CON3/PC art. no. 80 80 33)
- 3.5" floppy disk drive
- Approx. 3.5 MByte of free hard disk space

The *SCOPE34* software can only be installed under Windows. Windows must therefore be started first, if it is not yet running.

It is recommendable to make a backup copy of the original floppy disk before starting the installation.

Please install the *SCOPE34* software as described below:

1. Insert the disk into the 3.5" drive. In our example we suppose that this is drive "A:".
2. Start the **SETUP** installation program in the Windows Program Manager with the "File - Run" command by entering "**A:\SETUP.EXE**", then click on the **OK** button.
(In Windows 95 software installation can be started by clicking on the **START** button and then entering "**A:\SETUP.EXE**" in the text field of the "Run..." option).
3. The installation program displays a dialog and suggests to install the *SCOPE34* software in the **C:\SCOP34V11** directory on the hard disk.
You may accept this suggestion with **OK** or **[ENTER]**, or you may change the path as desired.
The installation process is then performed automatically.
4. During the installation process a new program group for the *SCOPE34* software is created in the Windows Program Manager. In the *SCOPE34* program group an icon for starting the software is created automatically. When installation is successfully completed the installation program displays "Setup OK".
5. After successful installation the software can be started with a left mouse button double-click on the *SCOPE34* icon.

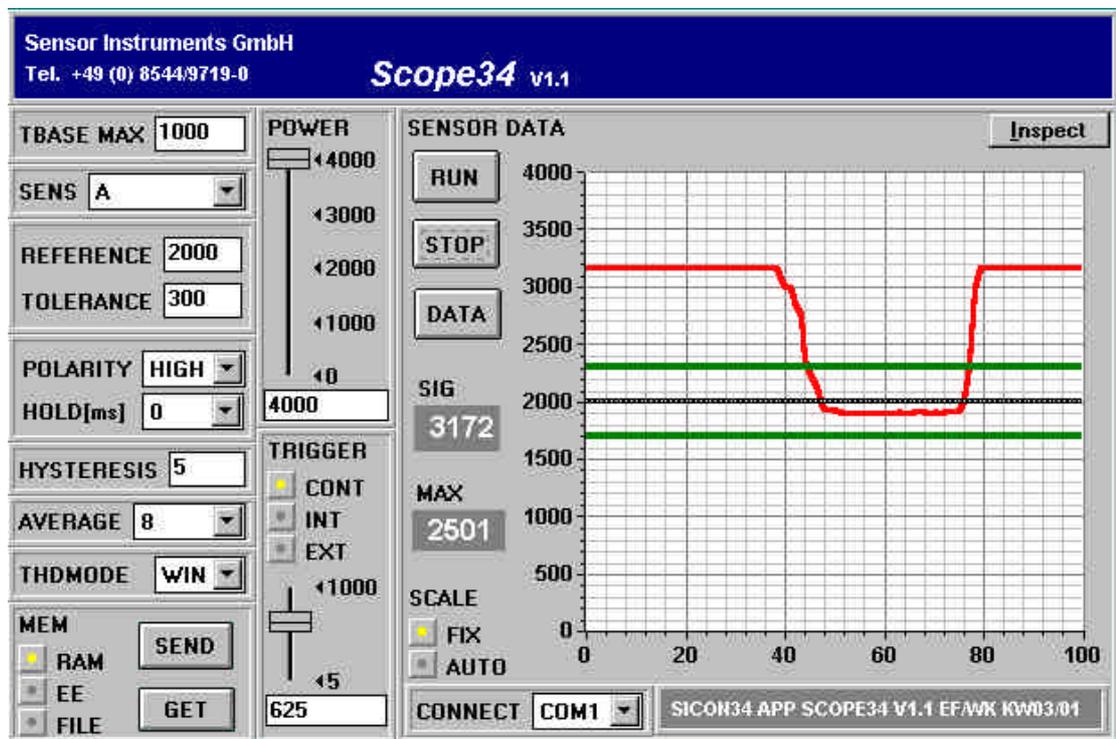
Windows™ ist ein Warenzeichen der Microsoft Corp.
MS-DOS® ist ein eingetragenes Warenzeichen der Microsoft Corp.
VGA™ ist ein Warenzeichen der International Business Machines Corp.

2 Starting the SCOPE34 software

Double-click on the SCOPE34 icon:



A double-click on the SCOPE34 icon opens the SCOPE34 V1.0 user interface:



2 Functions of the SCOPE34 control elements

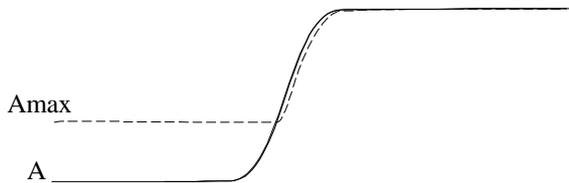
The following chapter provides an explanation of the functions of the individual control elements of the SCOPE34 software:



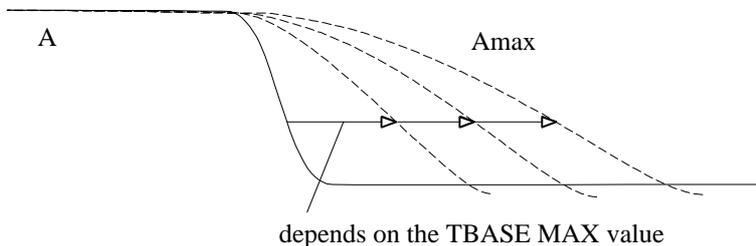
Setting of the time constant (in A/Amax-mode):

In A/Amax mode the current analog value of channel A is compared with the current maximum value Amax!

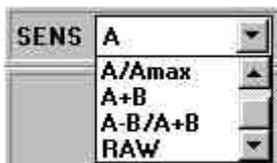
The current maximum value Amax is determined from the analog value A as follows:



If the current analog value A is higher than the stored maximum value Amax, the current maximum value is immediately adapted, i.e. the current maximum value is replaced by the current analog value A (higher than Amax).



If, however, the current analog value is smaller than the current maximum value, adaptation to the analog value A is performed with a time constant that is set in



Selecting the measuring algorithm:

The following algorithms are available:

- A
- A/Amax
- A+B
- A-B/A+B
- RAW

The desired measuring mode can be selected by clicking on the respective field.



With a click on the  field the set parameters are sent to the SI-CON34 control unit.

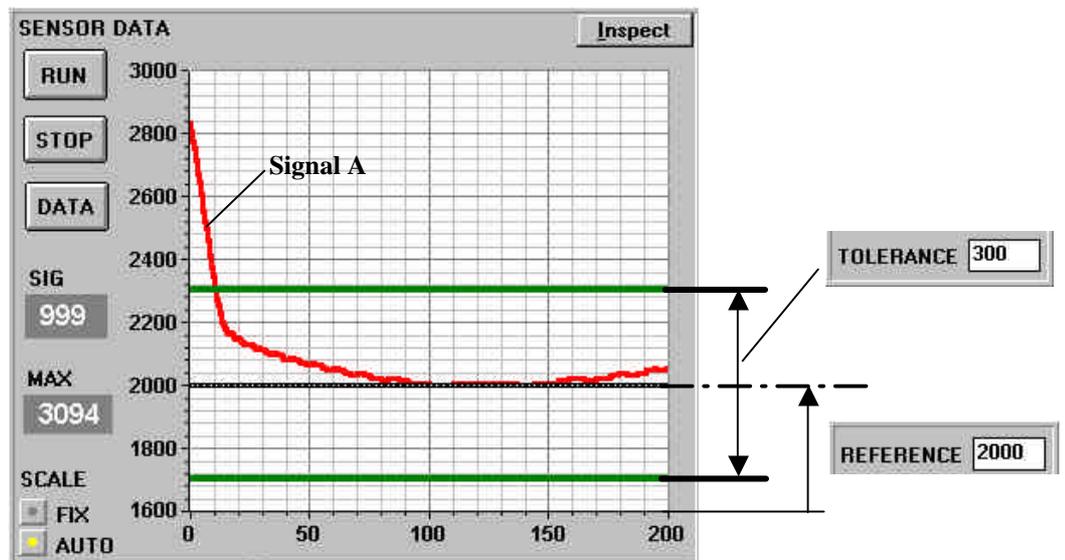


Measuring mode A:

In this mode the measurement data of the sensor at channel A are displayed with an accuracy of 12 bit. Upon activation of the **RUN** field the measurement data at channel A are displayed in numerical and in graphical form on the PC monitor. The chart displays the current 200 measured values (determined from the 1000 last raw data at channel A) in 12-bit resolution (0 ... 4095).

In measuring mode A a tolerance window can be selected in the range from 0 to 4095. The position of the window can be set by entering a numerical value in the **REFERENCE 2000** field, whereas the window size can be defined by entering a numerical value in the **TOLERANCE 300** field.

- RUN:**
Activates the display of current values
- STOP:**
Stops the display of current values
- DATA:**
Current value at channel A
- SIG:**
Numerical value of the current signal at channel A
- MAX:**
Current maximum value Amax



0 ... 200:
The display shows the last 200 values

With a click on the **SEND** field the current parameter set is sent to the SI-CON34 control unit!

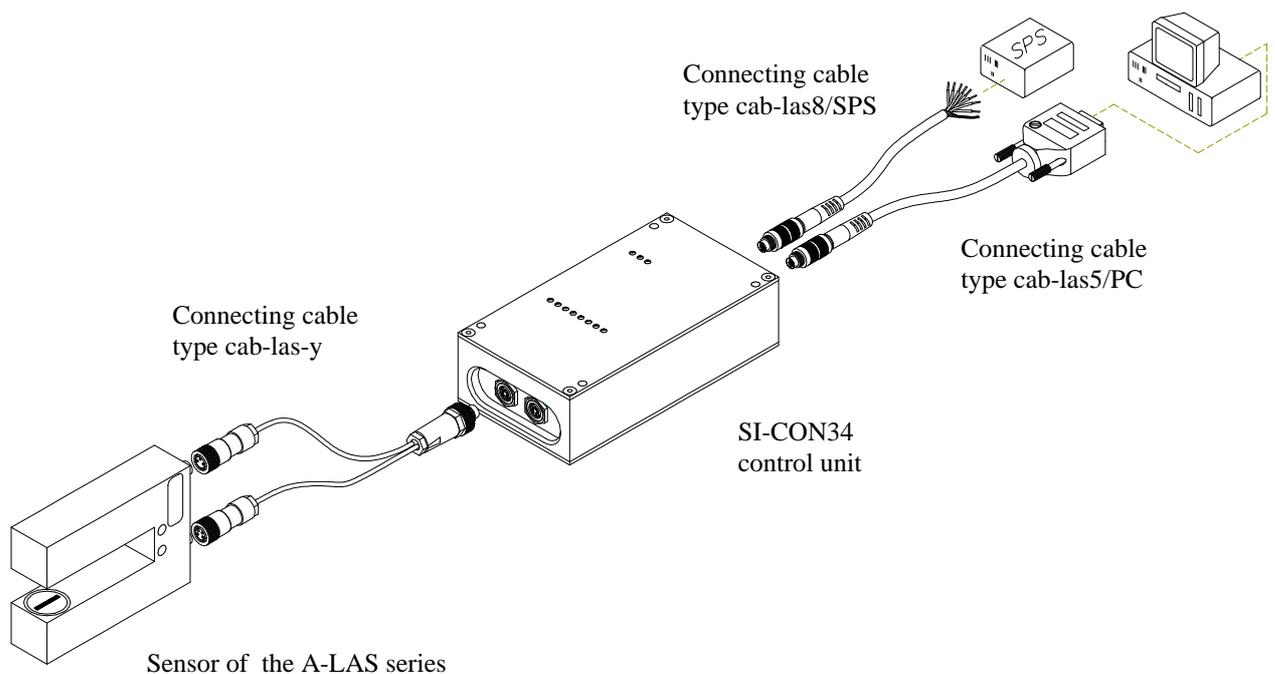
Measuring mode A now serves for checking whether the sensor signal at channel A lies within the measuring window, or whether the signal lies outside the measuring window.

This is also indicated by means of the LED row (integrated in the front side of the SI-CON34 control unit).

Depending on the trigger function (CONT, INT, EXT → see TRIGGER selection on page 16) the position of sensor signal A within the tolerance window is indicated by a green or yellow LED (with CONT the current sensor position is continuously displayed; with INT and EXT, however, the LED display only changes after a trigger event).

If, however, the sensor signal lies outside the tolerance window, a red LED indicates in which direction the tolerance window was exceeded (above or below the tolerance window).

Measuring set-up for mode A:





Measuring mode A/Amax:

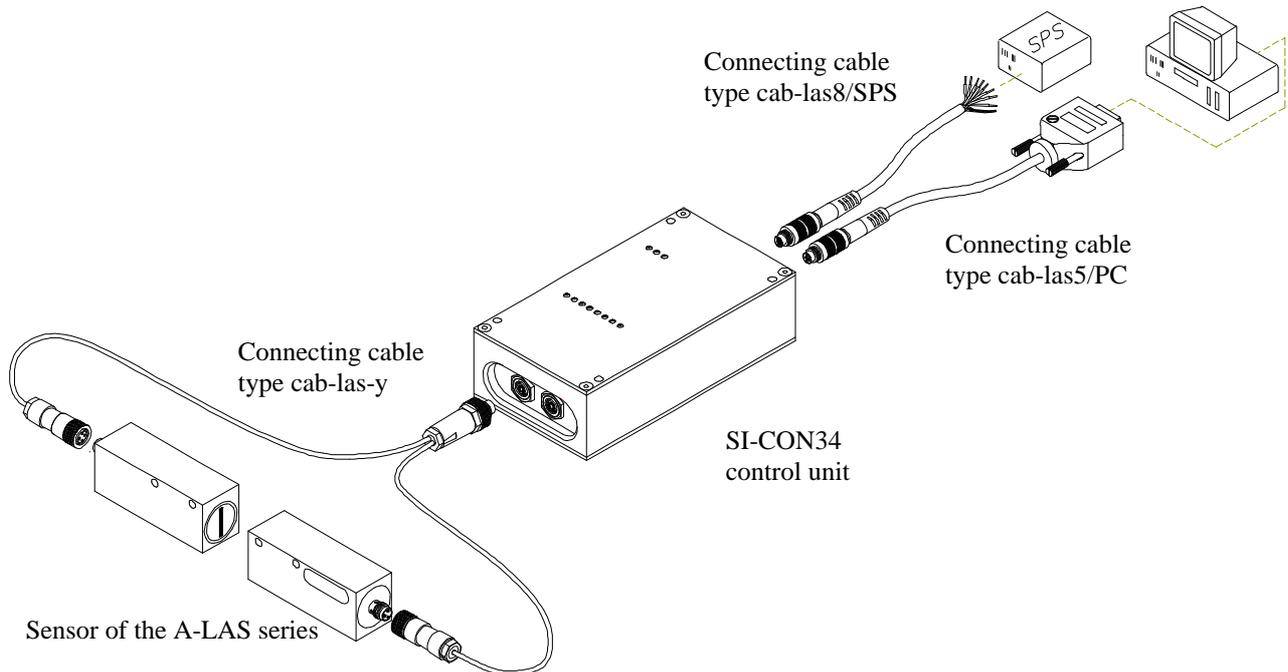
In this mode the graphical and numerical display is scaled from 0 (A=0) to 1000 (A=Amax).

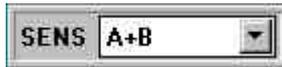
This mode offers the advantage that possible dirtying of the environment or of the optical unit is compensated, which means that measurement is performed independently of the intensity.

The procedure for setting a tolerance window is the same as with mode A, and the tolerance window is also visualised by means of the LED row at the SI-CON34 control unit.

When the tolerance range is exceeded, this is also indicated by way of a change of switching state at output OUT 0 and by the LED OUT 0.

Measuring set-up for mode A/Amax:





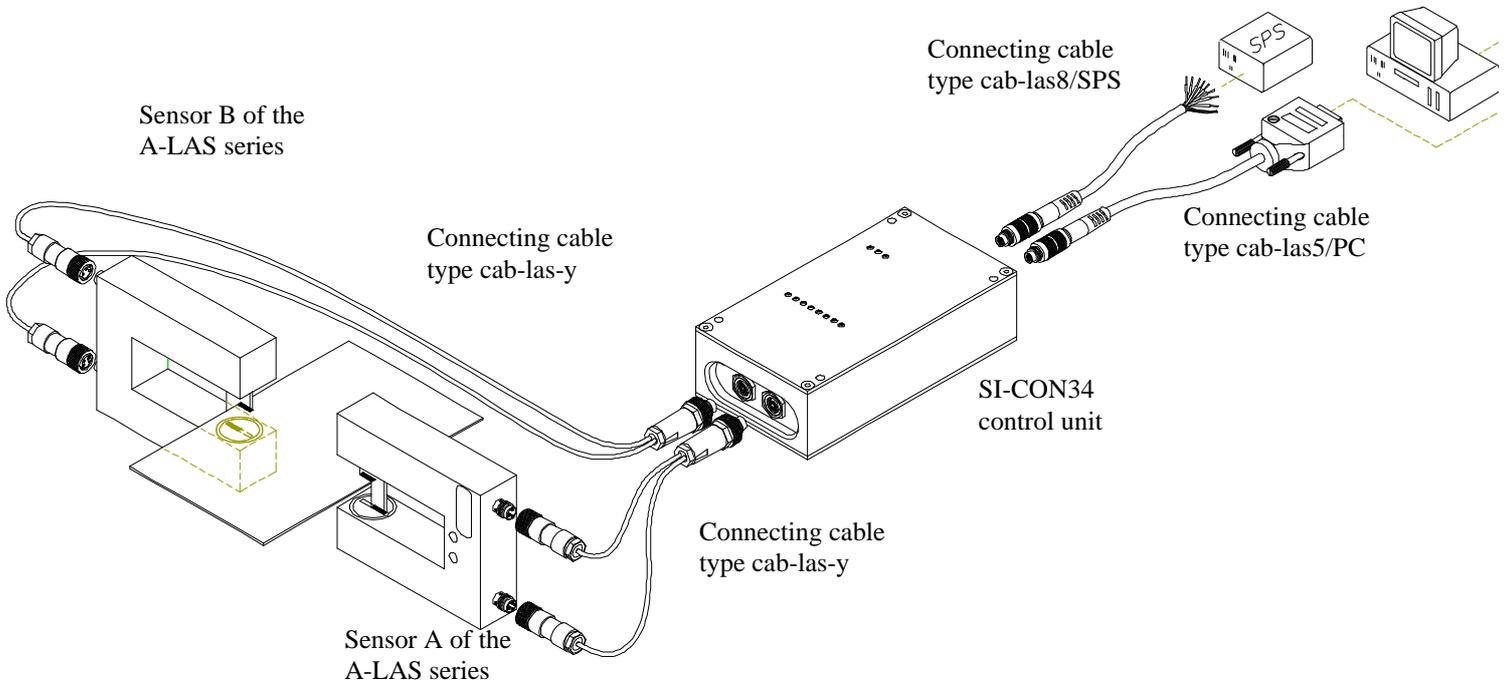
Measuring mode A+B:

In this mode the sum from sensor signal A and B is displayed graphically and numerically. A+B lies between 0 and 4095.

Tolerance window setting and LED display are the same as with mode A.

This mode is excellently suited for monitoring the width of objects (e.g. the width of sheet material).

Measuring set-up for mode A+B:





Measuring mode A-B/A+B:

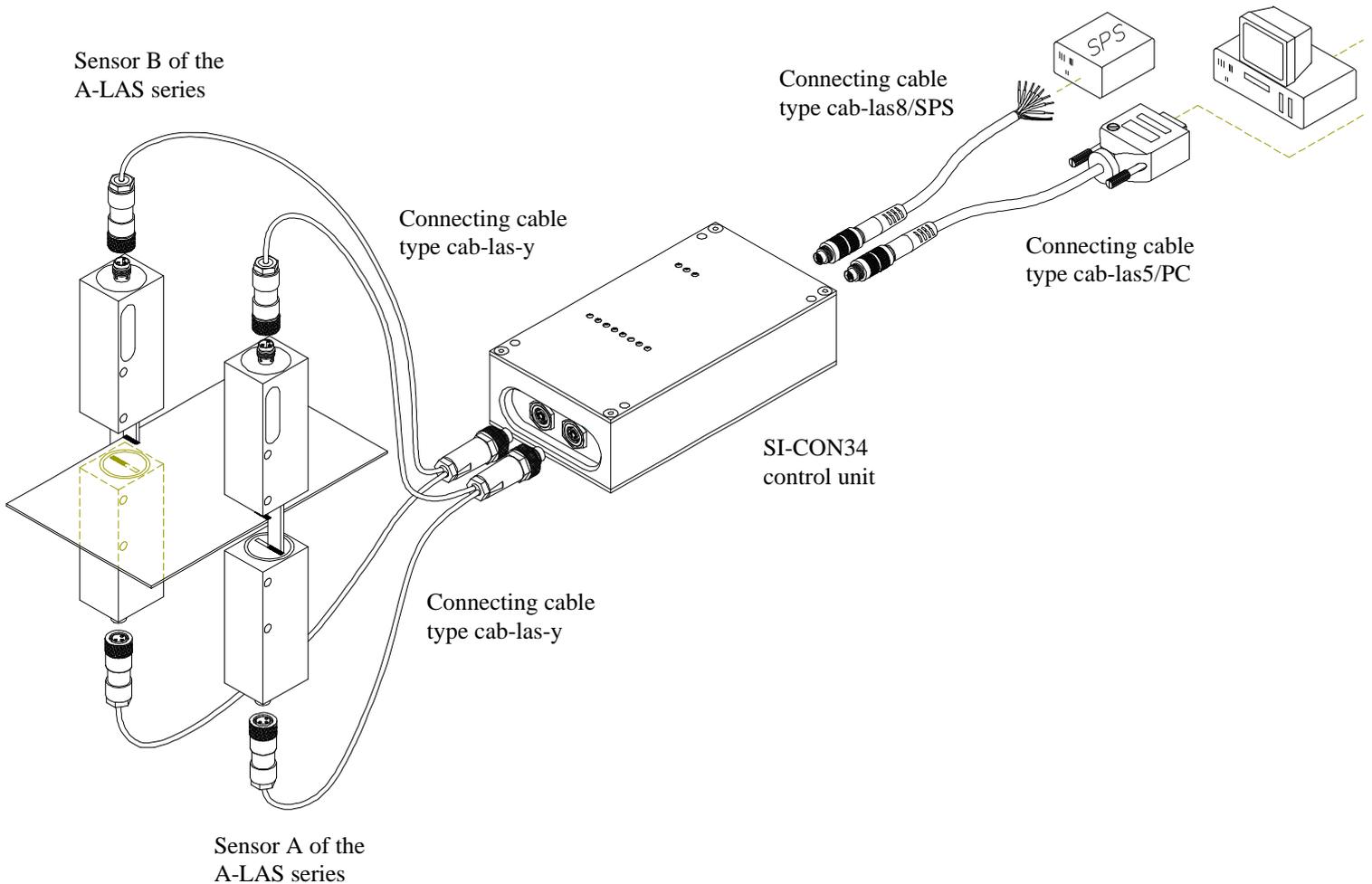
Similar to mode A/Amax the display is also scaled from 0 to 1000 in this mode.

- 0 is displayed, if $A \neq 0$ and $B = 0$,
- 500 is displayed, if $A = B$,
- 1000 is displayed, if $A = 0$ and $B \neq 0$.

Tolerance band setting and LED display are the same as with mode A.

This mode is ideally suited for positioning tasks. Intensity-independent evaluation offers great advantages here.

Measuring set-up for mode A-B/A+B:





RAW measuring mode:

After activation of the RAW mode the raw data of channel A and channel B are transferred from the *SI-CON34* control unit to the PC through the serial RS-232 interface.

After a click on the RUN button the current measurement data of channel A (red curve) and of channel B (green curve) are shown in the graphic display window in "scroll mode" with a ring memory of 100 values, i.e. the most recent measurement data pass through the graphic display window from the right (index x=100) to the left (index x=0).

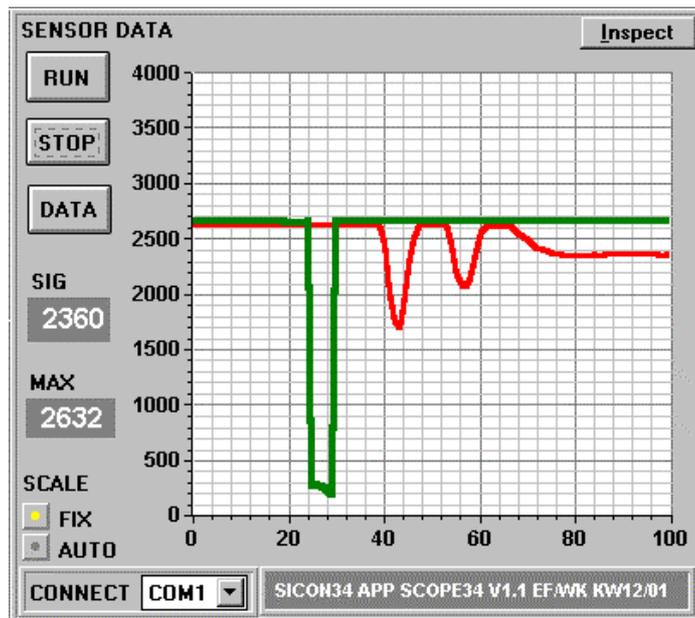
In the *SI-CON34* control unit the analog measurement values of channel A (red) and channel B (green) are digitised with a 12-bit analog-digital converter. This 12-bit A/D conversion results in a value range of 0 ... 4095 A/D units. Therefore the scaling of the y-axis in the graphic display window is fixed to this value range (0 ... 4000).



Activates measurement data transfer.



Stops measurement data transfer.

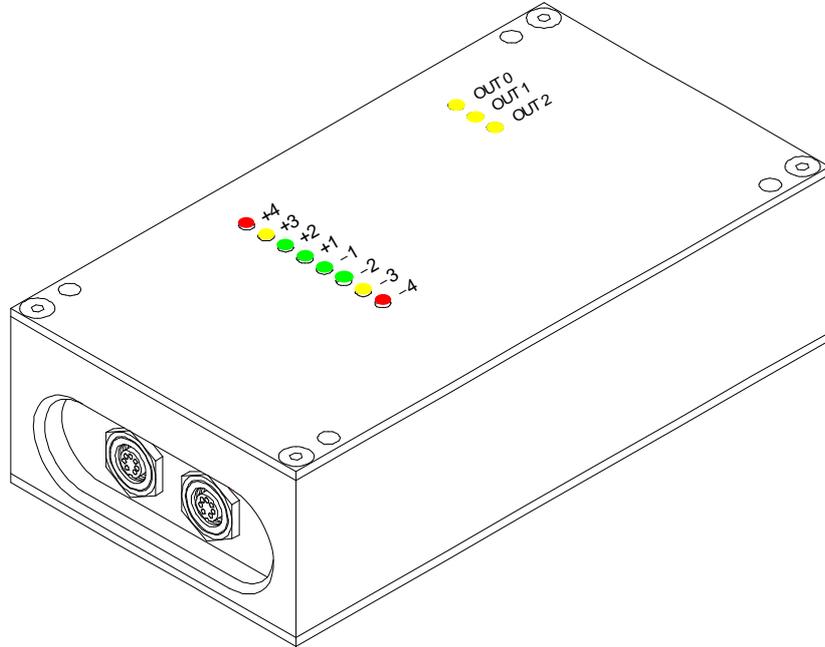


The RAW measuring mode primarily serves for diagnostic purposes (oscilloscope function). In "scroll mode" the raw signals from the two measuring channels can be simultaneously observed at the PC. This mode can provide useful information, for example for sensor unit adjustment, or for checking the current degree of covering of the sensor unit. The numerical values displayed in the RAW measuring mode are proportional to the analog input signals of channel A and channel B. If, for example, the laser power is increased with the POWER slide, this has the effect that the analog input signals become higher; on the other hand a reduction of the laser power leads to a lowering of the RAW signals.



The numerical display field SIG shows the most recent measurement value of channel A (red curve).

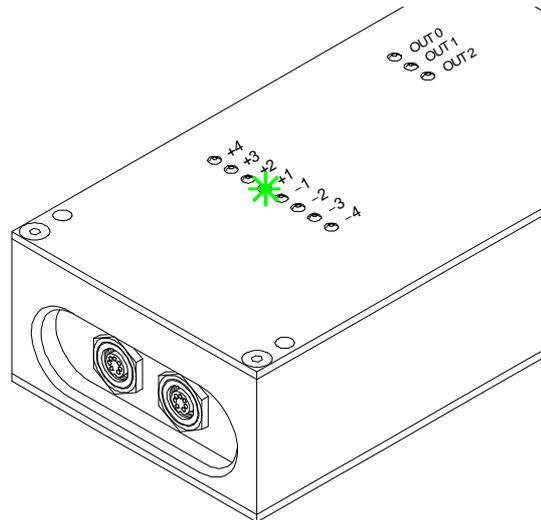
LED row (at the SI-CON34 control unit):

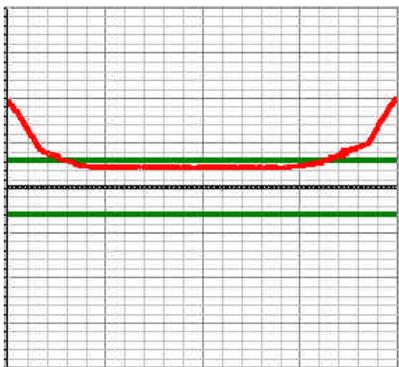


Examples:

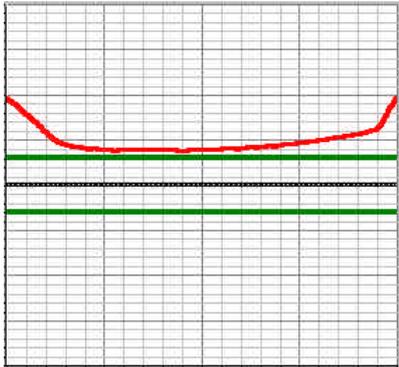
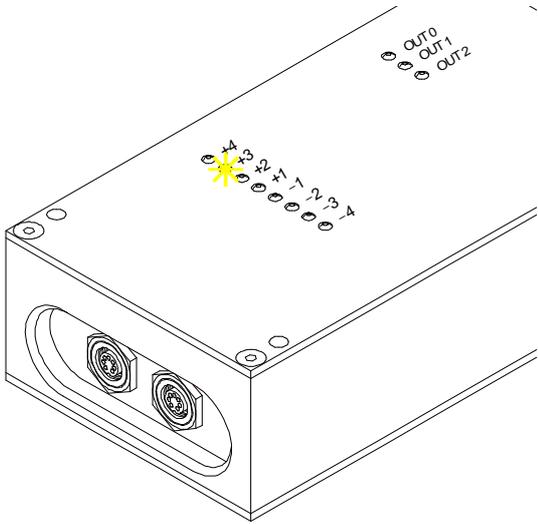


Example 1:
Sensor signal A lies in the middle of the tolerance window → the green LED lights up

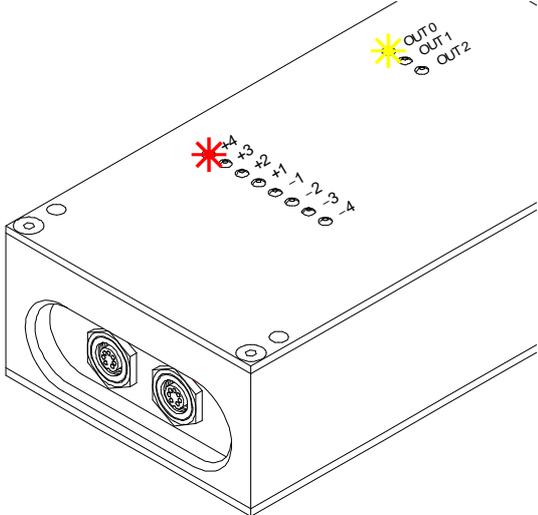


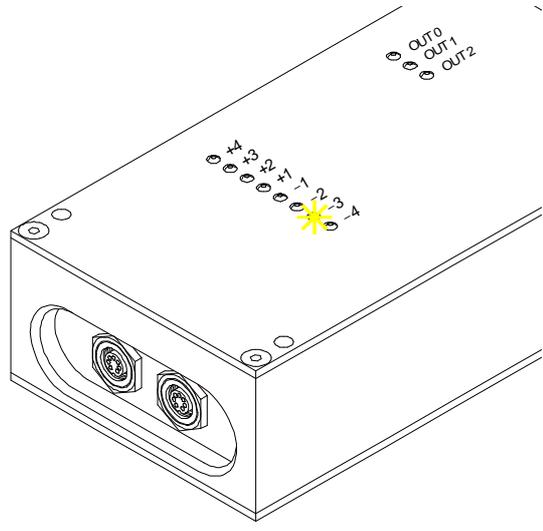
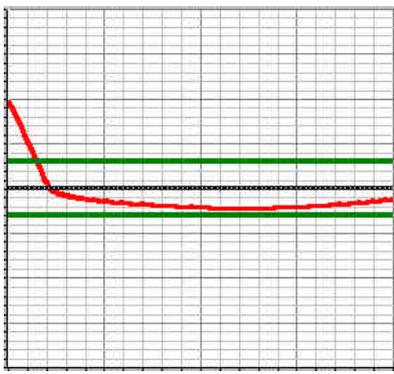


Example 2:
Sensor signal A lies near the upper limit of the tolerance range (but still within the tolerance window) → the yellow LED lights up

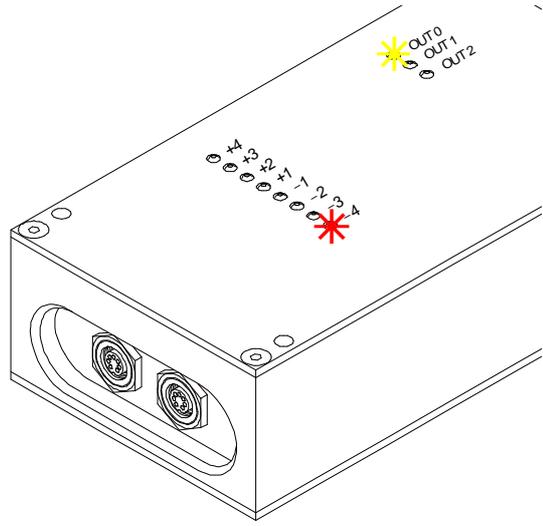
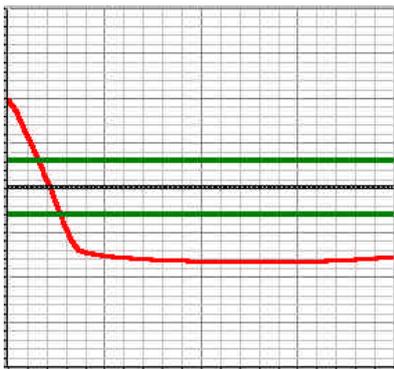


Example 3:
Sensor signal A lies above the tolerance window → the red LED lights up



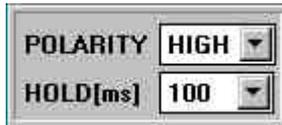


Example 4:
Sensor signal A lies near the lower limit of the tolerance range (but still within the tolerance window) → the yellow LED lights up



Example 5:
Sensor signal A lies below the tolerance window → the red LED lights up

As shown in example 3 and 5, output OUT 0 is also activated when the tolerance window is exceeded, which is indicated by an LED.



Setting polarity and hold time of digital output OUT 0:

LOW: The switching state at digital output OUT 0 is 0V, when the measured value lies within the tolerance window.

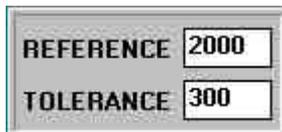
HIGH: The switching state at digital output OUT 0 is +24V, when the measured value lies within the tolerance window.

HOLD: The hold time of digital output OUT 0 can be extended by HOLD[ms]. The maximum available value is 200 ms!



Setting the switching hysteresis:

The hysteresis can be set as required in order to suppress oscillation of the switching output when the measured value rises above or drops below the tolerance limits. The switching state is then changed with a hysteresis value shift, depending on whether the threshold is exceeded in downward or upward direction.



Entering reference and tolerance values:

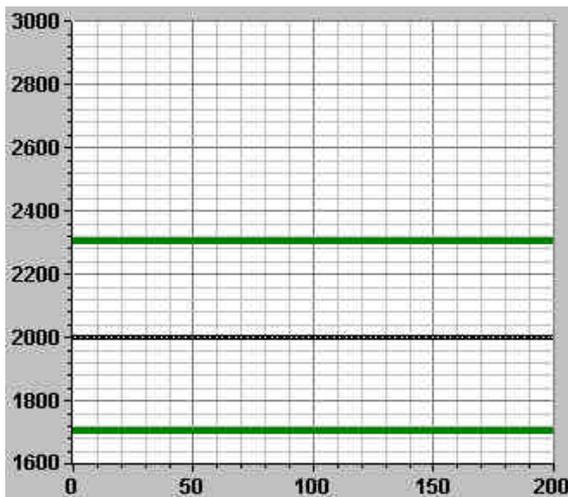
These two parameters are used in all the measuring modes.

The reference value defines the position of the window, whereas the tolerance value sets the window range.

Depending on the measuring mode the reference value can be set from 0 to 1000, or from 0 to 4095.



If the reference value lies near the edge range, the tolerance window may be limited on one side, depending on the set value of the tolerance window!



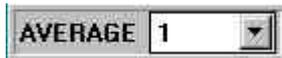
With \pm tolerance value a tolerance window is applied around the reference value

← Upper tolerance limit
(REFERENCE+TOLERANCE)



The reference value lies in the middle of the tolerance window

← Lower tolerance limit
(REFERENCE-TOLERANCE)



Entering the number of values to be averaged:

Up to 4096 values in direct succession are used for averaging. This increases the accuracy, but it must be taken into consideration that the switching frequency decreases with increasing AVERAGE values.



Selecting tolerance thresholds:

In addition to the normally used WIN window mode – in which both thresholds (upper and lower threshold) are used – it is also possible to use the thresholds separately:

In HI mode only the upper tolerance limit is used, whereas LOW mode only uses the lower tolerance threshold.

The following applies to both modes: When the threshold is exceeded in upward or downward direction, this leads to a change of switching state at digital output OUT 0, depending on the measuring mode.

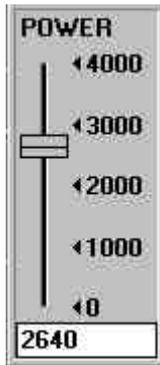


Parameter and data transfer through the serial interface:

MEM :

This function key group serves for exchanging parameters between the PC and the *SI-CON34* control unit through the serial RS232 interface.

- SEND: When the SEND button is clicked, all the currently set parameters are transferred from the PC to the *SI-CON34* control unit or into an output file. The target of the respective parameter transfer is determined by the marked selection button (RAM, EE, or FILE).
- GET: With a click on the GET button the current setting values can be read from the *SI-CON34* control unit. The source of data exchange is determined by the respective marked selection button (RAM, EE, or FILE).
- RAM: The current parameters are written to the RAM memory of the *SI-CON34* control unit, or they are read from its RAM, **i.e. these parameters are lost when the supply voltage at the *SI-CON34* control unit is switched off !**
- EE: The current parameters are written to the non-volatile EEPROM memory of the *SI-CON34* control unit, or they are read from its EEPROM, **i.e. the parameters saved in the internal EEPROM are stored when the voltage at the *SI-CON34* control unit is switched off !**
- FILE: A click on this selection button opens an info field with the file name of the current parameter file.
PLEASE NOTE: The current parameters are only saved in the current output file or read from the current output file after a click on the SEND or GET button.



Setting the laser power for sensors A and B:

In some applications part of the laser radiation in the transmitter or receiver section is masked out, absorbed, or scattered, which means that more laser power is required for utilising the whole dynamic range of the receiver.

The laser power can be adjusted under Windows® by means of a software slide. The maximum value (4095) represents maximum laser power.



Selecting the trigger function:

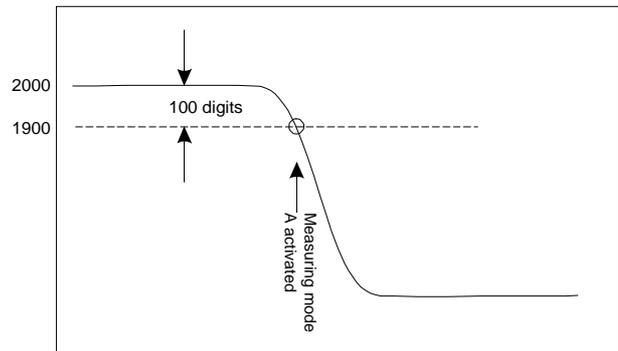
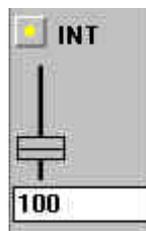
CONT **continuous**

In this trigger mode the respective measuring mode (A, A/Amax, A+B, A-B/A+B) is continuously activated. The scan frequency depends on the respective AVERAGE value.

INT **internal**

When this trigger mode is activated, measuring mode A is started when the current maximum value at channel A drops below the number of digits set with the software slide.

e.g.:



Measurement is stopped when the preset trigger threshold is exceeded again, or when a maximum number of measured values has been recorded.

The determined minimum value is checked for tolerance observance.

EXT **external**

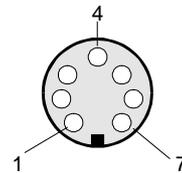
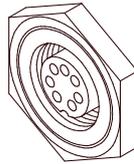
When this trigger mode is activated, the selected measuring mode (A, A/Amax, A+B, A-B/A+B) is started simultaneously with a change of switching state at digital input IN 0 (rising edge), i.e. during the positive edge change the value determined in the respective measuring mode is checked for tolerance observance, and digital switching output OUT 0 is accordingly activated. Switching output OUT 0 is only overwritten again when there is another positive change of switching state.

4 Connector pin assignment

A-LAS CHANNEL A / SI-CON34

7-pole socket Binder 712

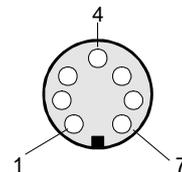
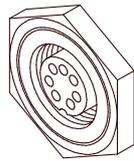
Pin:	Assignment:
1	GND
2	+5V TRANS
3	I-CONTROL
4	+10V REC
5	ANALOG (0V..+5V)
6	n.c.
7	GND



A-LAS CHANNEL B / SI-CON34

7-pole socket Binder 712

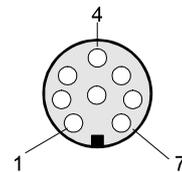
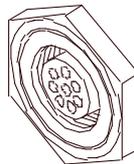
Pin:	Assignment:
1	GND
2	+5V TRANS
3	I-CONTROL
4	+10V REC
5	ANALOG (0V..+5V)
6	n.c.
7	GND



SI-CON34 / SPS

8-pole socket Binder 712

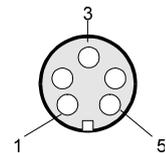
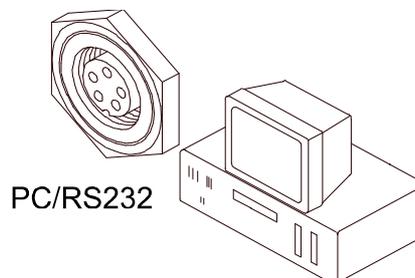
Pin:	Assignment:
1	GND
2	+24VDC ($\pm 10\%$)
3	IN0
4	IN1
5	IN2
6	OUT0
7	OUT1
8	OUT2



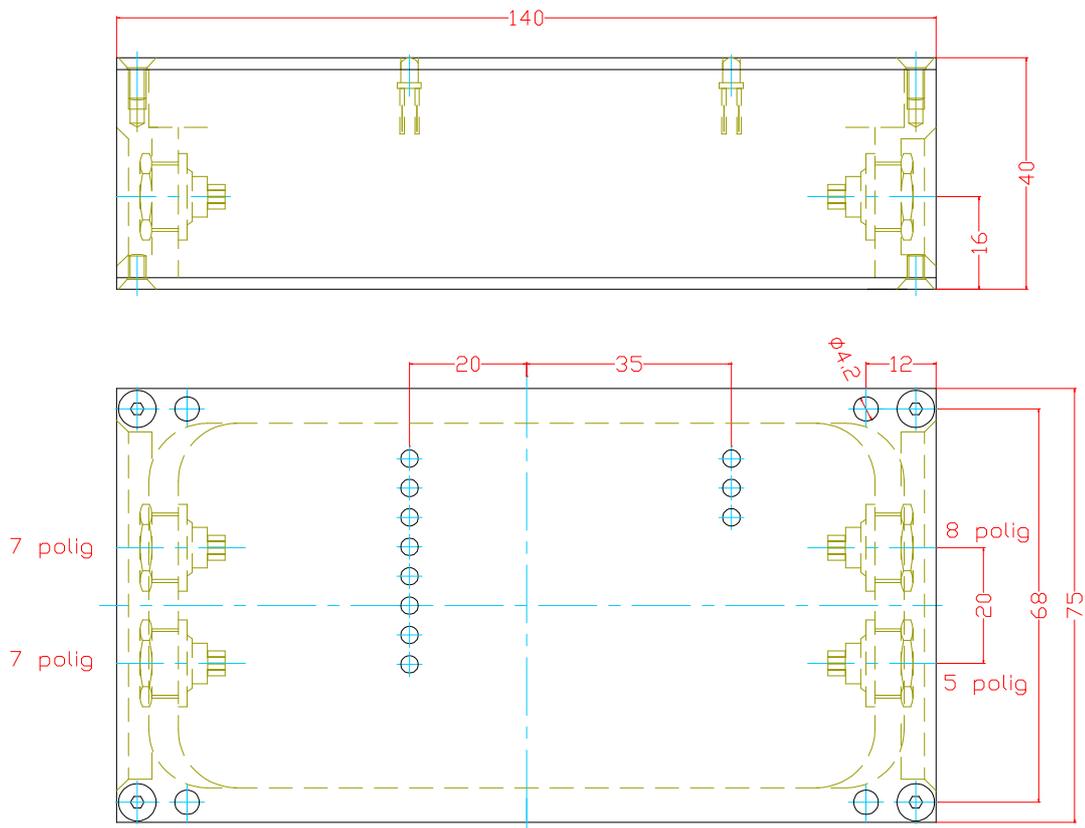
SI-CON34 / PC

7-pole socket Binder 712

Pin:	Assignment:
1	GND
2	TX0
3	RX0
4	n.c.
5	n.c.



5 Dimensions



(All dimensions in mm)