

Manual

Software OCCS2107-EMB-Scope V1.0

(PC software for Microsoft® Windows® Vista, XP, 2000, NT® 4.0, Me, 98, 95)

for color sensor OCCS2107-EMB

(Foto fehlt)

This manual describes the installation of the PC software for the OCCS2107-EMB color sensor. As a support for commissioning of the color sensor this manual explains the functional elements of the Windows® user interface.

The OCCS2107-EMB color sensor detects the radiation that is diffusely reflected by the target. The OCCS2107-EMB color sensor uses a white-light LED with adjustable power as a light source. A triple receiver for the RED, GREEN, and BLUE content of the light reflected from the target is used as a receiver.

The OCCS2107-EMB color sensor can be "taught" 2 colors. Evaluation always is performed with 12-bit accuracy.

Through the RS232 interface parameters and measured values can be exchanged between the PC and the OCCS2107-EMB color sensor. All the parameters for color detection can be stored in the non-volatile EEPROM of the OCCS2107-EMB color sensor. When parameterization is finished the color sensor continues to operate with the current parameters in "stand alone" mode without a PC.

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1 Installation of the OCCS2107-EMB-Scope software

Hardware requirements for successful installation of the OCCS2107-EMB-Scope software:

- IBM PC AT or compatible
- VGA graphics
- Microsoft® Windows® XP, Me, 2000, 98, NT® 4.0 or 95
- Serial RS232 interface at the PC
- Microsoft-compatible mouse
- Cable for the RS232 interface
- CD-ROM drive
- Approx. 5 MByte of free hard disk space

The OCCS2107-EMB-Scope software can only be installed under Windows. Windows must therefore be started first, if it is not yet running.

Please install the software as described below:

1. The software can be installed directly from the installation CD-ROM. To install the software, start the SETUP program in the INSTALL folder of the CD-ROM.
2. The installation program displays a dialog and suggests to install the software in the C:\FILENAME directory on the hard disk. You may accept this suggestion with **OK** or **[ENTER]**, or you may change the path as desired. Installation is then performed automatically.
3. During the installation process a new program group for the software is created in the Windows Program Manager. In the program group an icon for starting the software is created automatically. When installation is successfully completed the installation program displays "Setup OK".
4. After successful installation the software can be started with a left mouse button double-click on the icon.

Windows® is a trademark of the Microsoft Corp.

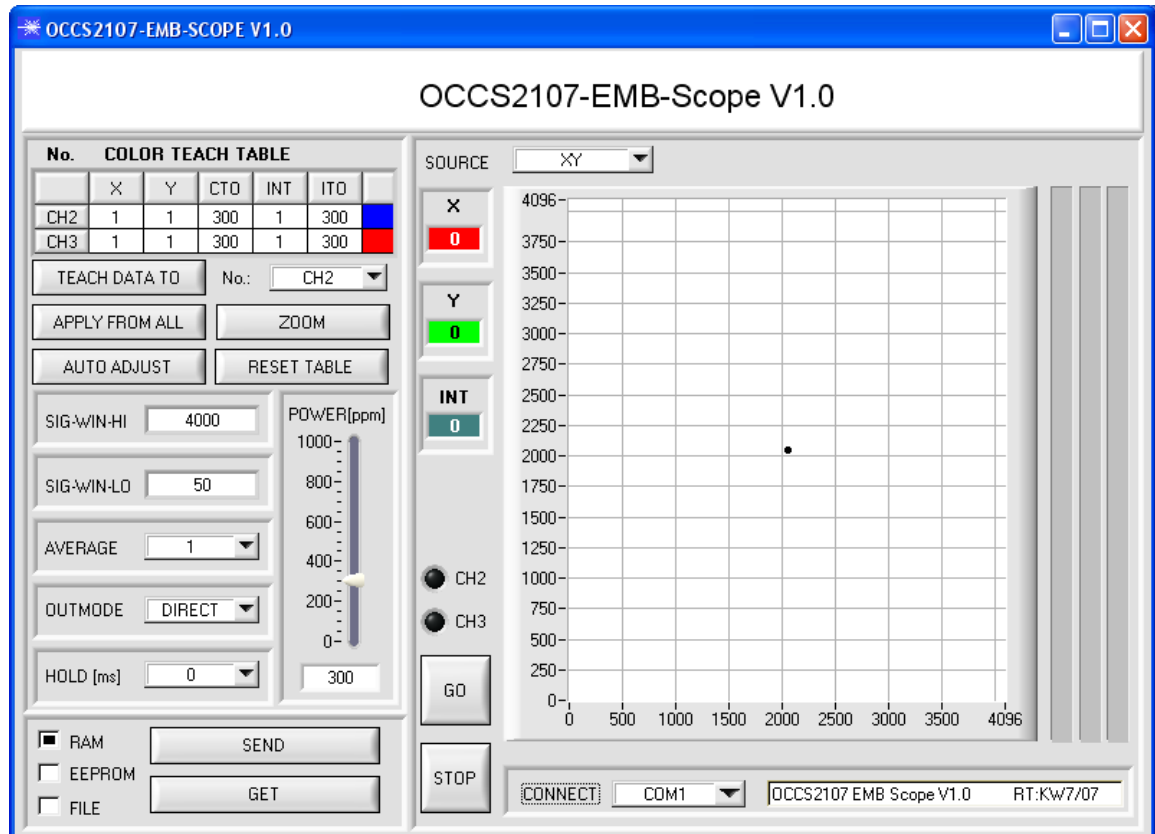
VGA™ is a trademark of the International Business Machines Corp.

2 Installation of the OCCS2107-EMB-Scope software

Please read this chapter first before you start to adjust and parameterise the OCCS2107-EMB color sensor.

Pressing the right mouse button on an individual element will call up a short help text.

When the OCCS2107-EMB-Scope software is started, the following window appears on the Windows interface:



Functions of the individual OCCS2107-EMB-Scope control elements:

SIG-WIN-HI	4000
SIG-WIN-LO	0

SIG-WIN-HI:
SIG-WIN-LO:

The function fields SIG-WIN-LO and SIG-WIN-HI allow to check, whether the sensor works in the dynamic range or not.

If the calculated intensity lies within the window which is determined with SIG-WIN-LO (LOW) and SIG-WIN-HI (HIGH), the LED SIGNAL OK at the sensor housing lights, and also the output OUT1 is set to +24V.

AVERAGE

AVERAGE:

This function field is used for adjusting the number of scanning values (measurement values) over which the raw signal measured at the receiver is averaged. A higher AVERAGE default value reduces noise of the raw signals at the receiver unit and there will be a decrease of the maximal available switching frequency.

OUTMODE

OUTMODE:

This EDIT-BOX determines how the output pulse should be output at OUT0:

Direct:

When a counting event occurs, the outputs OUT3 and OUT4 changes from LOW (0V) to HIGH (+24V), until HOLD is over.

Inverse:

When a counting event occurs, output OUT0 changes from HIGH (+24V) to LOW (0V), until HOLD is over.

HOLD [ms]

HOLD:

The OCCS2107-EMB color sensor operates with minimum scanning times in the magnitude of less than 150µs. This is why most of the PLCs that are connected to the digital outputs OUT0 – OUT3 have difficulties with the safe detection of the resulting short switching state changes. For the digital outputs of the OCCS2107-EMB color sensor pulse lengthening of up to 100 ms can be set by selecting the corresponding HOLD value.

POWER[ppm]

1000
800
600
400
200
0

POWER[%]:

In this function field the intensity of the transmitter LED can be adjusted by using the slider or by entering a value in the edit box.

A value of 1000% means full intensity at the transmitter LED, a value of 0 stands for the lowest transmitter intensity adjustment!

The POWER slider is only effective in the PMOD STAT.

ATTENTION!

A change of the transmitter power only becomes effective at the color sensor after actuation of the SEND button in the MEM function field!



☒ RAM

☐ EEPROM

☐ FILE

MEM :

This group of buttons controls parameter exchange between PC and OCCS2107-EMB color sensor through the serial RS232 interface.

No. COLOR TEACH TABLE						
	X	Y	CTO	INT	ITO	
CH2	736	952	200	418	200	
CH3	1433	991	200	1156	200	
TEACH DATA TO			No.: CH3 ▼			
APPLY FROM ALL			ZOOM			
AUTO ADJUST			RESET TABLE			

COLOR TEACH TABLE:

The color teach table shows the currently set parameters.

After a left mouse button double click (or a click on shortcut keybutton F2) on the respective field the default values can be changed by entering numerical values with the PC keyboard.

The color teach table is organized in rows, i.e. the individual parameters for the teach-in colors are arranged side by side in the respective row.

The OCCS2107-EMB color sensor is able to check 2 teach-in colors. The number of the respective teach-in color is given in the left column of the table.

- X** X-value of the teach-in color (in the color triangle numerical value on the x-axis: RED color content)

$$X = \frac{R}{R + G + B} * 4095$$
- Y** Y-value of the teach-in color (in the color triangle numerical value on the y-axis: GREEN color content)

$$Y = \frac{G}{R + G + B} * 4095$$
- CTO** Color tolerance: "Tolerance circles" around the teach color in the color triangle that is defined as an (X,Y) point. The sensor internally calculates a "hysteresis ring". The numerical value of CTO determines the radius of the "tolerance circle" around the teach color. Within the "tolerance circle" defined by this method, the current color is recognised as the teach color.
- INT** Teach-in value for the intensity of the respective color.

$$INT = \frac{R + G + B}{3}$$
Please note: For the detection of a teach-in color both criteria - color (X,Y) and intensity INT - must be fulfilled, i.e. the currently measured values for color and intensity must both lie within the respective preset tolerance limits CTO (color) and ITO (intensity).
- ITO** Default value for the permitted tolerance band around the intensity teach-in value (intensity tolerance).

No.: CH3 ▼

No.:

Selection of the current number of the teach-in color (CH2 or CH3) from the color table.

TEACH DATA TO

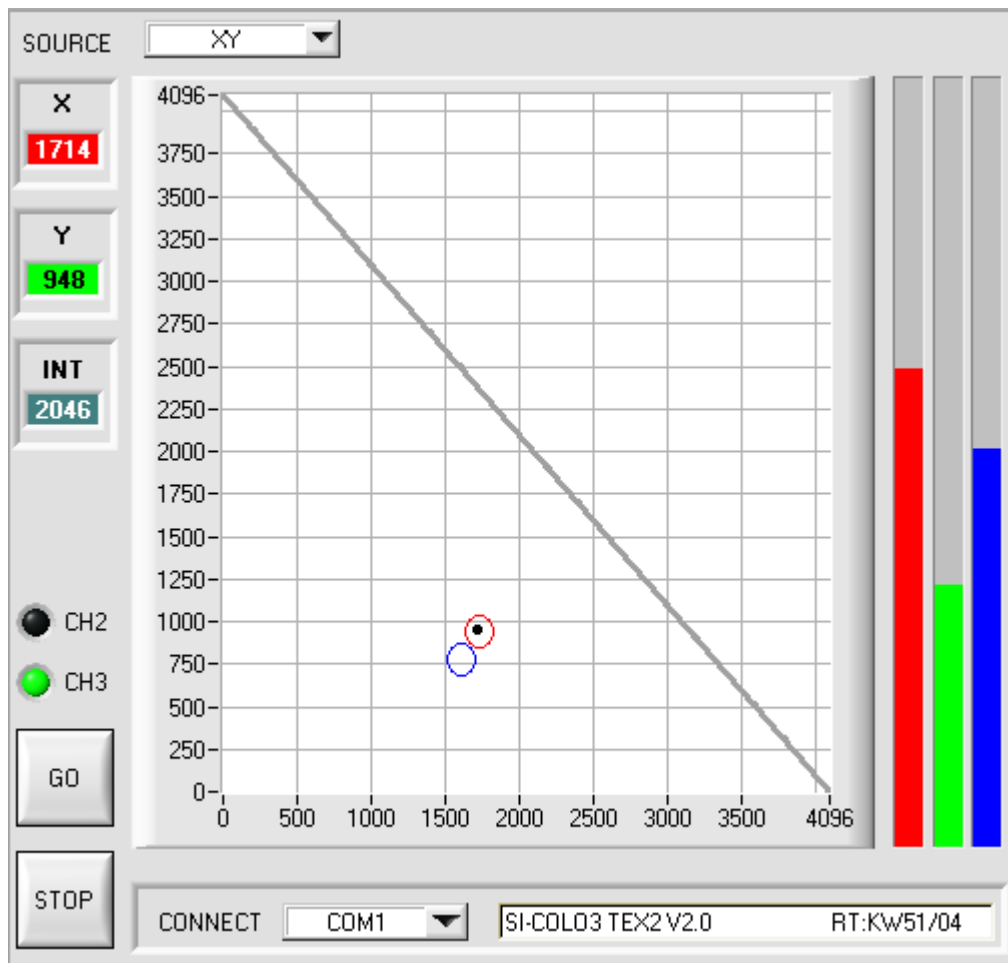
TEACH DATA TO:

A click on this button starts an automatic teach-in process. The current measured values are defined as teach-in values. The teach-in values are assigned to the teach-in color selected in the No.: function field.

APPLY FROM ALL

APPLY FROM ALL:

If X/Y is selected under SOURCE, a click on this button displays all the teach-in colors entered in the COLOR TEACH TABLE in the color triangle with the corresponding "tolerance circle" (radius=CTO). The picture below shows 2 color tolerance circles with the teach-in values (X,Y) and CTO (tolerance radius) preset in the color table.



AUTO ADJUST

AUTO ADJUST:

A click on this button initiates automatic adjustment of the circle tolerances (CTO).

A circle tolerance of max. 200 DIGITS is allowed in calculation.

Circles may overlap if they are definitely separated by the intensity (please note: ITO must be set first!)

When the CTO values have been adjusted, a large graphic window appears, displaying the color circles. This graph features a zoom function (see ZOOM).

ZOOM

ZOOM:

A click on the ZOOM button opens a large graphic window. This graphic window features a zoom function. For zooming, the cursor that is visualised by a cross in the graphic window, is moved to the desired position in the graph with the mouse or the arrow keys.

The graph can be exited either by pressing the right mouse button, or by pressing the APPLY FROM ALL button.

RESET TABLE

RESET TABLE:

A click on this button resets the COLOR TEACH TABLE (RESET value = 1).



F9

SEND:

When the SEND button is clicked (or shortcut keybutton F9 is pressed), all the currently set parameters are transferred between PC and OCCS2107-EMB color sensor. The target of the respective parameter transfer is determined by the selected button (RAM, EEPROM, or FILE).



F10

GET:

The currently set values can be interrogated from the OCCS2107-EMB color sensor by clicking on the GET button (or with shortcut keybutton F10). The source of data exchange is determined by the selected button (RAM, EEPROM, or FILE).

RAM: The current parameters are written into the RAM memory of the OCCS2107-EMB color sensors, or they are read from the RAM, **i.e. these parameters are lost when the voltage at the OCCS2107-EMB color sensor is switched off.**

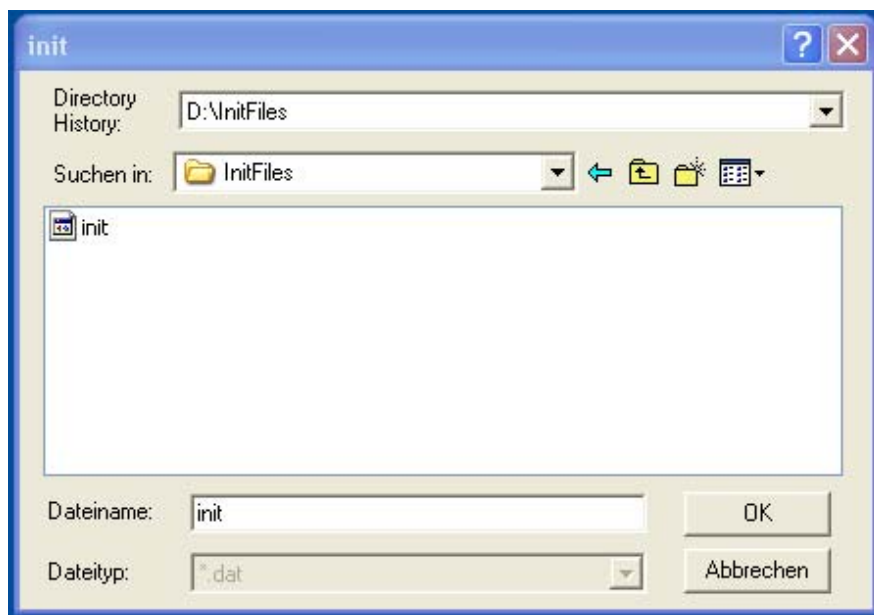
EEPROM: The current parameters are written into the non-volatile memory of the EEPROM in the OCCS2107-EMB color sensor, or they are read from the EEPROM, **i.e. the parameters in the internal EEPROM are stored when the voltage at the OCCS2107-EMB sensor is switched off.**

FILE: A click on this button opens an info field with the file name of the current parameter file.

PLEASE NOTE:

The current parameters are only stored in the current output file, or retrieved from the current output file, when the SEND or GET button is activated with a mouse click.

If another output file should be accessed, the file button must first be activated with the mouse pointer. Another dialog field then opens, in which an existing output file can be selected, or in which a file name for a new output file can be entered.





[F11]

GO:

A click on this button (or pressing shortcut keybutton F11) starts data transfer from the OCCS2107-EMB color sensor to the PC through the serial RS232 interface.

If *X/Y* is selected under SOURCE, the *X/Y* coordinates of the current color are displayed in the graph.

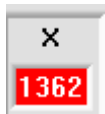
If *RAW INT* is selected under SOURCE, the intensity of the current color and the intensity window of the color set under No.: (CH2 or CH3) are visualised in the graph.



[F12]

STOP:

A click on this button (or pressing shortcut keybutton F12) stops data transfer from the OCCS2107-EMB color sensor to the PC through the serial RS232 interface.



X:

This numerical value output field displays the red content of the color currently arriving at the receiver.

Formula for calculation:

$$X = \frac{R}{R + G + B} * 4095$$


Y:

This numerical value output field displays the green content of the color currently arriving at the receiver.

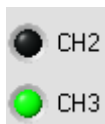
Formula for calculation:

$$Y = \frac{G}{R + G + B} * 4095$$


INT:

This numerical value output field displays the currently measured intensity (proportional to the average of the intensities at the triple receiver).

Formula for calculation:

$$INT = \frac{R + G + B}{3}$$


C-No.:

This numerical value output field displays the currently detected color number in accordance with the entry in the COLOR TABLE. The currently detected color number is sent to the digital outputs OUT0 – OUT3 as a corresponding bit pattern..

PLEASE NOTE: The above-mentioned 4 output fields are only updated when data transfer between PC and OCCS2107-EMB color sensor is active (POLL button pressed).

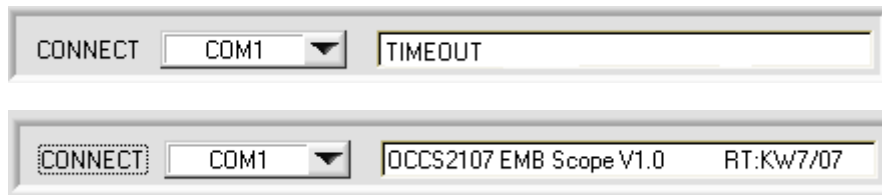


SOURCE:

A click on the arrow button opens a selection field for the selection of a display mode in the graphic display window.

- XY : Display of the color triangle and of the currently determined color.
- RAW RGB : The current raw signals of the 3-fold receiver (red, green, blue) are displayed.
- RAW R : The current raw signal for red is displayed
- RAW G : The current raw signal for green is displayed
- RAW B : The current raw signal for blue is displayed
- RAW INT : The currently determined total intensity is displayed.

The OCCS2107-EMB-Scope software starts with the standard configuration COM1 and the respective communication status.



The software provides the following status messages:

Init COM-PORT: The PC tries to establish a connection with the OCCS2107-EMB color sensor through the respective selected interface.

OCCS2107-EMB-Scope V1.0 RT:KW7/07 The connection between PC and OCCS2107-EMB color sensor could be established successfully.

TIMEOUT: A connection between OCCS2107-EMB color sensor and PC could not be established, or the connection is faulty. **In this case it should first be checked whether the OCCS2107-EMB color sensor is supplied with voltage, and whether the RS232 interface cable is correctly connected.**

If the interface assignment at the PC is not known, a selection can be made from COM1, COM2, ..., COM9 by clicking on the [↓] selection field in the CONNECT group.

Invalid port number: The selected interface is not available at the PC.

ATTENTION! The stable function of the RS232 interface („OCCS2107-EMB-Scope V1.0 RT:KW7/07 “ status message after program start) is a basic prerequisite for measured value transfer from the PC to the OCCS2107-EMB color sensor.



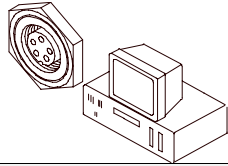
ATTENTION !

Due to the limited data transfer rate through the serial RS232 interface (19200 bit/s) only slow changes of the raw signals at the sensor front end can be observed in the graphic output window of the PC.

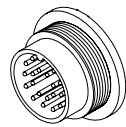
For maintaining maximum switching frequency at the OCCS2107-EMB color sensor data communication with the PC must be stopped (press the STOP button).

3 Connector assignment of color sensor OCCS2107-EMB

Connection of OCCS2107-EMB to PC:

5-pin female connector (type Binder 712) <i>OCCS2107-EMB/PC-RS232</i>		
Pin No.:		Assignment:
1		0V (GND)
2		TX0
3		RX0
4		Not connected
5		Not connected

Connection of OCCS2107-EMB to PLC:

8-pin female connector (type Binder 712) <i>OCCS2107-EMB/PLC</i>		
Pin	Color:	Assignment:
R	Brown	+24VDC (15 ... 30V)
P	Blue	GND (0V)
D	Red	IN1 – EXT TEACH
B	Violet	IN2 – ENABLE
K	White/Grey	IN3 – CH2
I	Grey/Brown	IN4 – CH3
C	Black	OUT1 – SIGNAL OK
A	Grey/Pink	Not connected
H	Yellow	OUT3 – CH2
L	Yellow/Brown	OUT4 – CH3

4. Technical data of color sensor OCCS2107-EMB

Mechanical Data

Design	2-channel compact device with external modulated illumination
Outer dimensions	L x W x H approx. 139 mm x 80 mm x 45 mm
Housing material	Aluminum (anodised in green)
Weight	approx. 450 g
Connector type	19-pole circular connector (voltage supply) 5-pole circular connector (RS232 to PC)
Fastening of the housing	M4 screw fastening in a 94 mm x 70 mm grid
Enclosure rating	Housing: IP64, optics: IP64
Temperature range	0 ... 40 °C

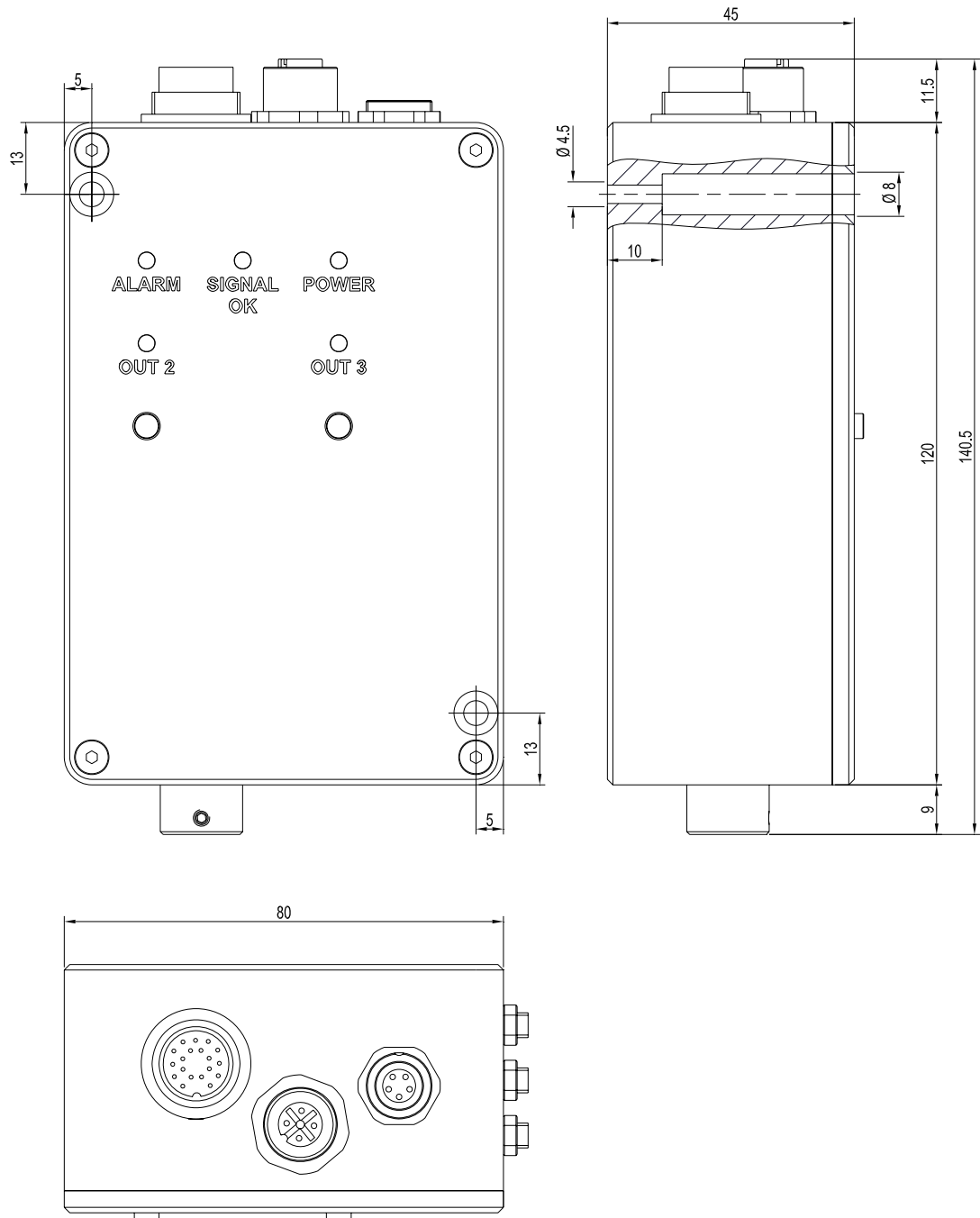
Electrical Data

Distribution voltage	15 V ... 30 V, reversed polarity protected
LED for POWER indication	green
Residual ripple	± 10%
Power input (unloaded outputs with illumination)	approx. 8 W
Modulation frequency	100 kHz
Service life of illumination	typ. 100 000 h
Inputs programming (IN1, IN2, IN3, IN4)	PNP 24 V DC
Input level	low ≤ 1 V DC high ≥ 12 V DC
Output color detected (OUT2, OUT3)	PNP / NPN
LED for OUTPUT indication	yellow
Output alarm (OUT2 ALARM)	PNP / NPN
LED for ALARM indication	red
LED for SIGNAL OK	green
Output level	low ≤ 2,5 V DC high UB - 1 V DC
Output load	max. 300 mA, short-circuit proof
Computer interface (service data)	RS232
Setting of color references	learnable via key button TEACH-IN
Color references	2, 3
Color detection (continuous)	by way of setpoint/actual value comparison with taught color reference within the set tolerances (software)
Object dwell time	min 1 ms
Evaluation time	1 ms
Measuring length	0 ... 1000 µs

Optical Data

Measuring principle	Three-color process on transmission or diffuse reflection basis. By means of fibre-optic scanning specified by the sensor head type (400 ... 700 nm)
Number of sensor heads	1
Measuring distance	Diffuse reflection (depending on the sensor head): 3 ... 80 mm Transmission (depending on the sensor head): 5 ... 1000 mm Triangulation (depending on the sensor head): 50 ... 1000 mm
Distance tolerance	depending on color selectivity and sensor head focus: max. ± 50 %
Measuring spot	depending on the sensor head: min. Ø 0,7 mm

5. Dimensions of color sensor OCCS2107-EMB



All dimensions in mm