# Short instructions for the operation of color sensors of the SI-COLO3 series through software COLOR3-Scope V6.2

These instructions describe how to perform quick teaching of the color sensors of SI-COLO3 series with the **COLOR3-Scope V6.2** software interface.
Basically there are 2 methods of teaching a color. These methods can be set with CALCULATION MODE. The CALCULATION MODE X/Y/INT (or s/i/M) uses a color sphere in space with radius TOL. Contrary to this, the CALCULATION MODE X/Y INT or s/i M uses a color cylinder in space with radius CTO or siTO and with height ITO or M.
The teach process is the same for both methods.
Color evaluation according to s/i M uses the Lab calculation method.

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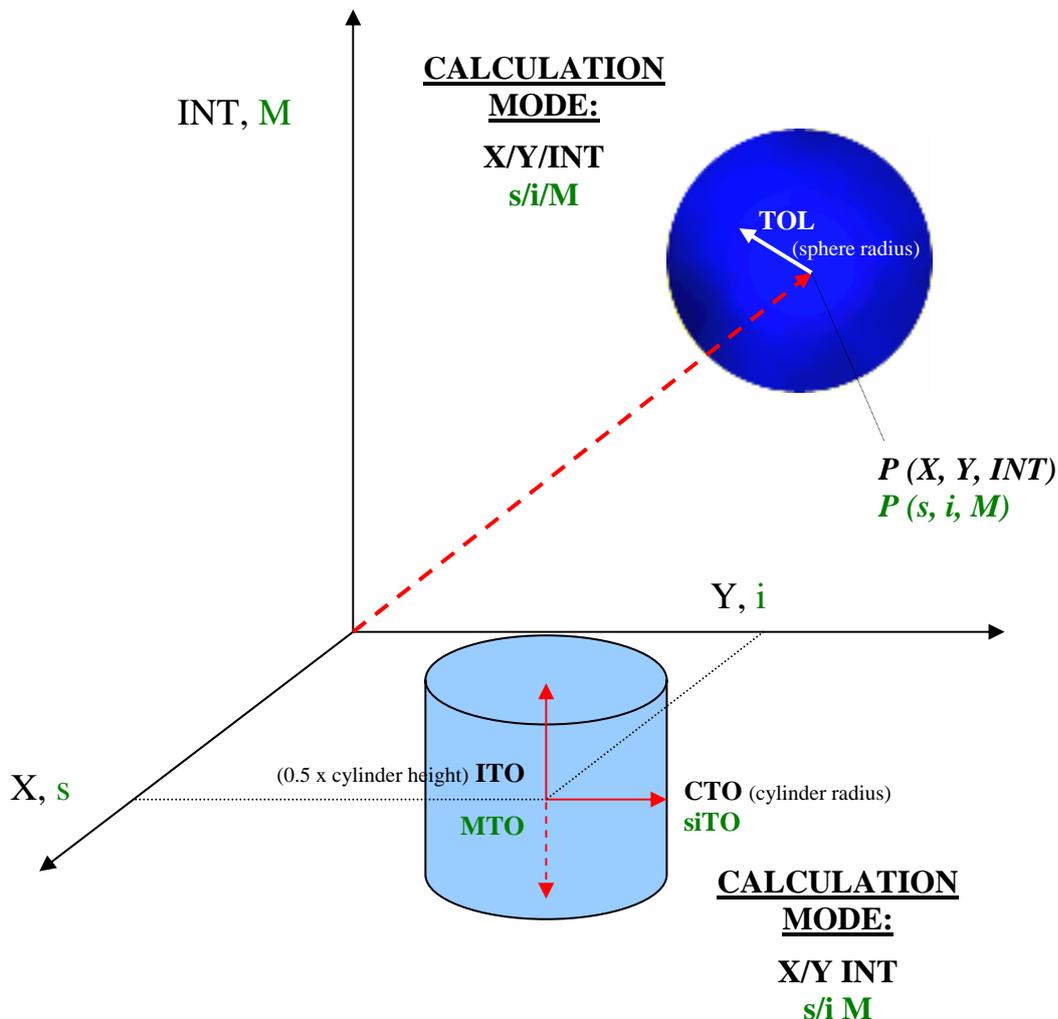
The text below describes a teach process with EVALUATION MODE = BEST HIT and CALCULATION MODE = X/Y/INT.

Step 1:

Please make sure that the sensor is properly connected and supplied with power. Furthermore the sensor head must be directed onto the brightest surface (paper, leather, glass, etc.) of the color to be taught. This is absolutely necessary for being able to set a suitable POWER value for the sensor.

Step 2:

Start the COLOR3-Scope V6.*2* software. Please check whether the status line at the right bottom displays the „SI-COLO3 V6.*2* RT:KW*xx/xx* " message.
Info: Moving the mouse cursor to a control element and clicking with the right mouse button displays a short info on the respective individual control element.
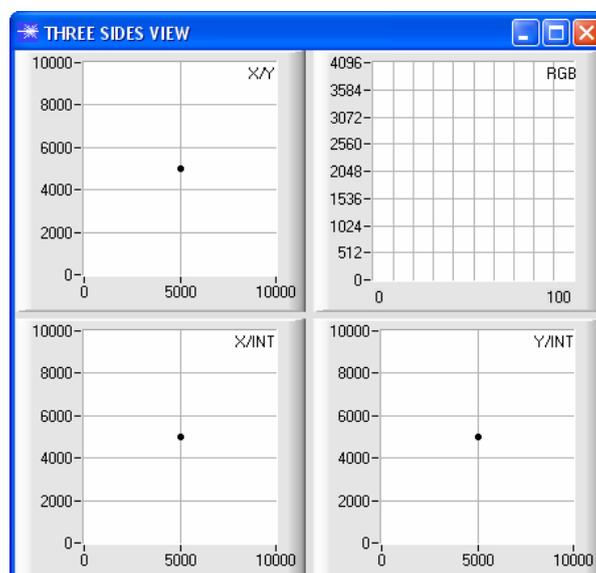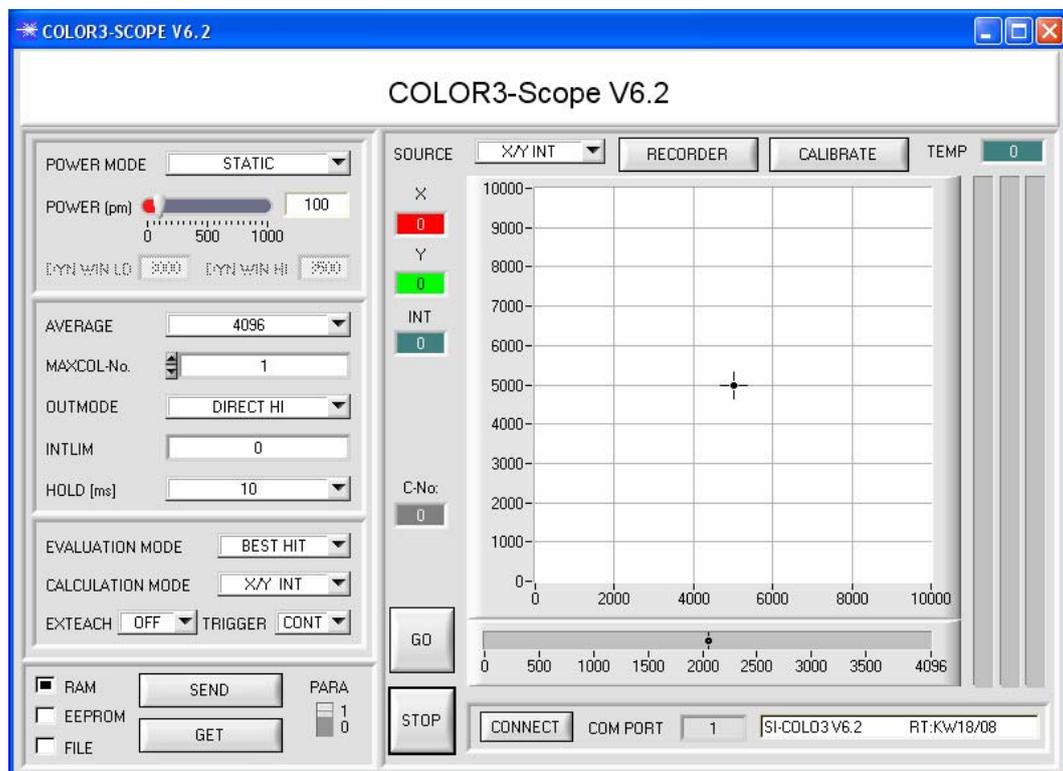
Step 3:

Please make sure that for the time being RAM and not EEPROM is selected for the data exchange with the sensor (RAM is a volatile memory in the sensor, i.e. the data will be lost when power is turned off. EEPROM is a non-volatile memory in the sensor, i.e. the data will not be lost when power is turned off.)
All the other parameters should be set as shown in the picture below. (See the FILE function in the manual.)
Now press the GO button. Data exchange between sensor and PC will then start. The contents for RED, GREEN, and BLUE that are diffusely reflected from the surface are represented as bars on the software interface. Set the POWER value in such a way that at least one of the three bars is in the upper third of its dynamic range, but none of them is in saturation.

ATTENTION: The sensor must be informed when you have changed the POWER value. Press the SEND button to send this information to the sensor. Check the bars by pressing GO again. Repeat this process until you have a suitable POWER value.
Optimally the three bars should be at approximately the same level on white paper.
If the bars vary too much, you need to perform white light balancing.
(For white light balancing see the "COLOR3-Scope" manual on the supplied CD.)

Tip! There is a trick for finding a suitable power value in no time at all. Set POWER MODE = DYNAMIC. The sensor then tries to find a suitable power value. Check this by pressing GO. Press STOP when the bars have "levelled out". Then press GET. The power value that was found now is shown in the POWER function field. Now set POWER MODE = STATIC, and press SEND.
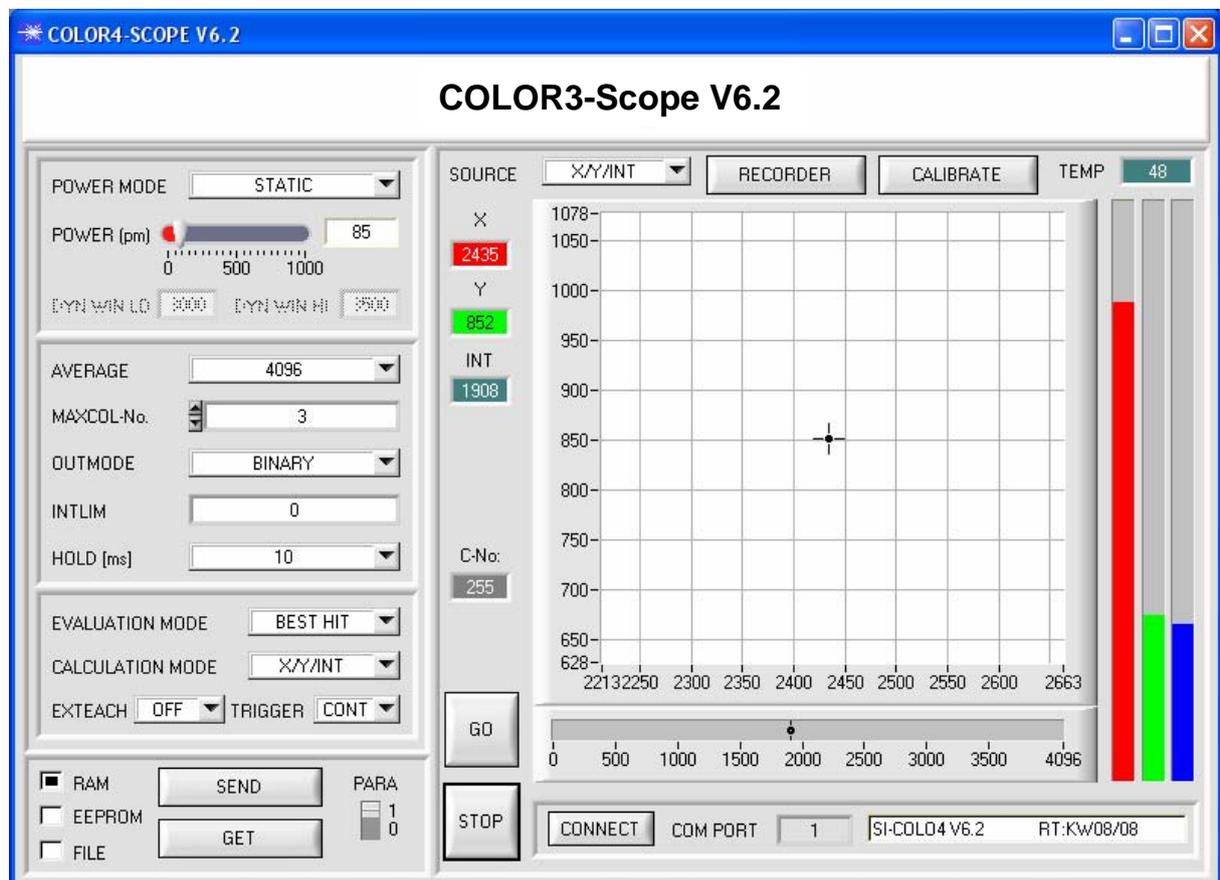
Step 4:

An X and a Y coordinate as well as an intensity INT are calculated from the red, green, and blue data.
$X = (R*4095) / (R+G+B)$
$Y = (G*4095) / (R+G+B)$
$INT = (R+G+B) / 3$

Press the GO button once again to read out the current data.
Press STOP to stop the data exchange.
Now use PARA to switch to the COLOR TEACH TABLE.
Select a row under No.: to which the currently present color should be taught.
(ATTENTION: Only the rows marked with green numbers are evaluated by the sensor. If you want to teach more colors, use the MAXCOL-No. parameter to select how many colors you want to teach.)
Now press the TEACH DATA TO button. The calculated values for X, Y, and INT are transferred to the COLOR TEACH TABLE in the row that was selected under NO.:.
The graphic display then shows a circle. This is the tolerance circle for the color. The radius of this circle can be set under TOL (tolerance). To change the TOL value please double-click on the corresponding cell in the COLOR TEACH TABE with the left mouse button. In the small graph the current intensity INT with the tolerance window set under No.: is displayed in turquoise.
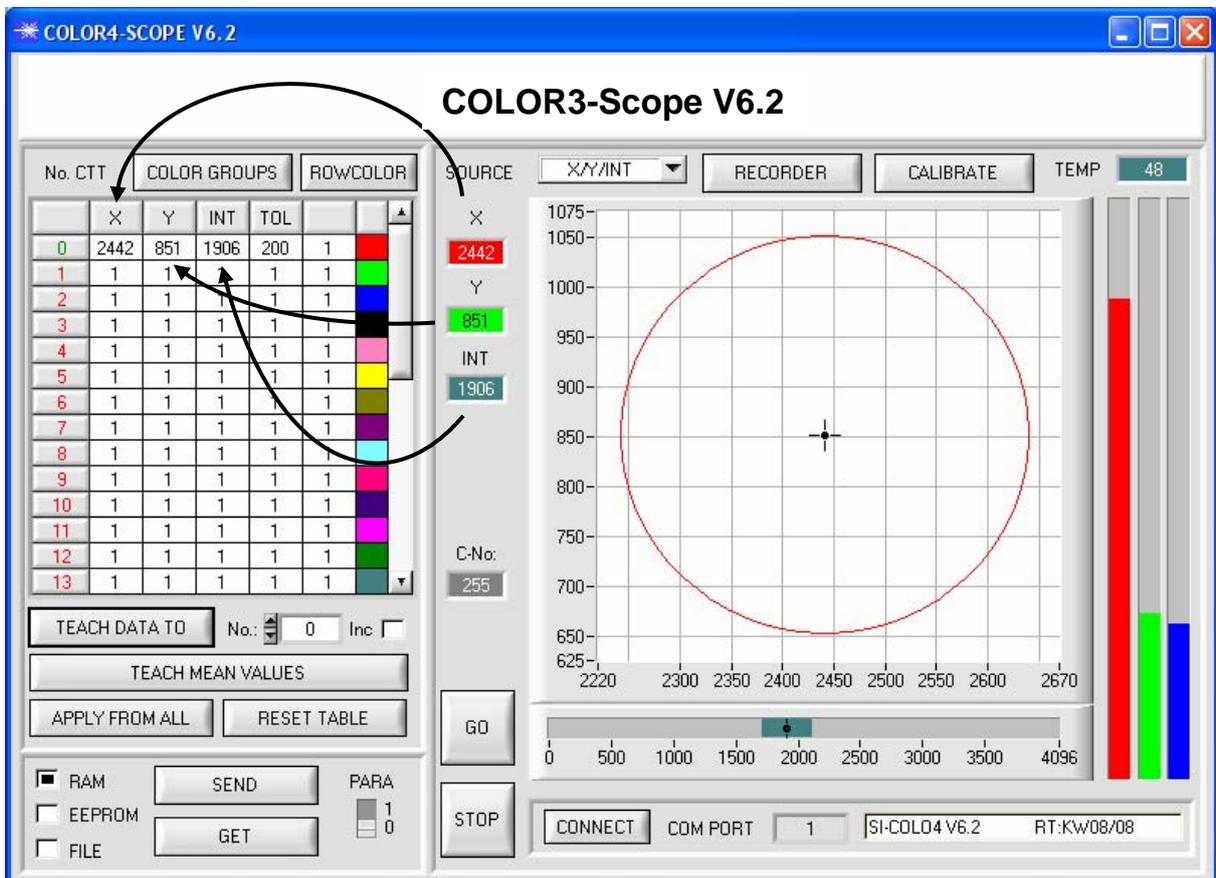
Now press the SEND button again to inform the sensor about the taught color. Then activate the GO mode again. When the sensor recognises a row vector (color), the corresponding row number is visualised on the software interface under C-No:. A value of 255 means that none of the taught colors were recognised.

As you know the X/Y/INT mode uses a color sphere in space. To provide a better visual representation of this sphere, an additional panel is displayed here that shows the color sphere in a three-side view with the axes X/Y, X/INT, and Y/INT (see below).
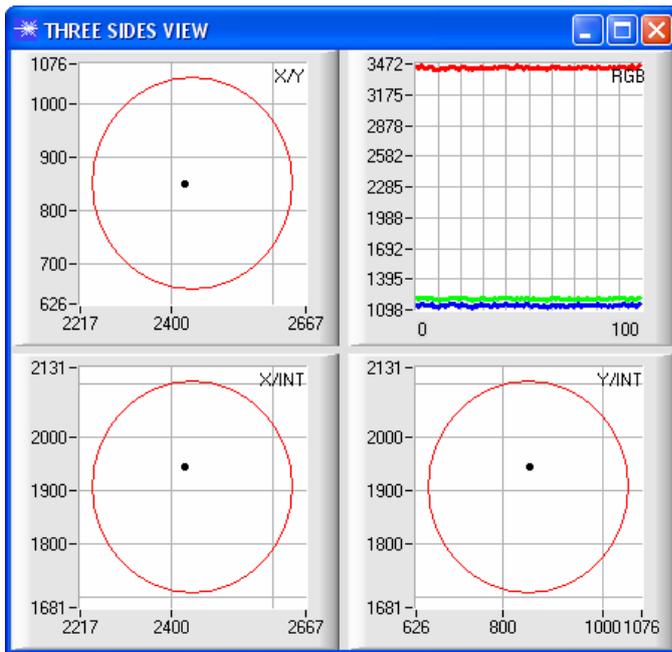
A color is only recognised if its current coordinates lie in the tolerance circle.

Step 5:

For teaching additional colors please make sure that the sensor head is directed onto the respective color.
Then repeat the procedure starting from step 4.

Step 6:

When you have taught all the channels, please select EEPROM and press SEND to save the data to the non-volatile memory of the sensor.

For the meaning and handling of the remaining parameters please refer to the manual.