

# Short instructions for the operation of gloss sensors of the RLS-GD series through software RLS-GD-Scope V4.5

These instructions describe how to perform quick teaching of the gloss sensors of RLS-G\_D series with the **RLS-GD-Scope V4.5** software interface.

The sensor is equipped with an internal light source and with 3 receivers. Depending on the type, the receivers are arranged at different angles, and they provide the signals CH\_REF (reference channel), CH\_DIR (direct reflection), and CH\_DIF (diffuse reflection).

Basically the sensor can be operated with two evaluation modes that can be set by way of **EVALUATION MODE**.

In **EVALUATION MODE GLOSS** (cf. page 2) the sensor operates as a **measuring device** that **measures** the gloss factor of a certain surface and displays this gloss factor. For this purpose it uses the **CH\_REF** and **CH\_DIR** channels, from which the gloss factor of a surface is determined. Up to 31 gloss factors can be taught to a **TEACH TABLE**. A tolerance **GF TOL** can be set for every gloss factor. The gloss factor and its respective tolerance are referred to as a **VECTOR** below. Each vector corresponds with a row. When a taught vector (gloss factor) is recognised again, the row number of the vector is sent to 5 digital outputs (OUT0 ... OUT4). In addition the value of the gloss factor in analog form is sent to a 0 - 10V voltage output and to a 4 - 20mA current output. In evaluation mode GLOSS the sensor, just like any other measuring device, must be calibrated from time to time. An RLS-GD-CAL calibration unit is available for this purpose. For calibrating the sensor, please follow the instructions under **Tab CALIBRATE** in the RLS-GD-Scope V4.4 manual.

In **EVALUATION MODE NORM\_INT** (cf. page 4) the sensor operates as a **control system**. A **NORM** and an **INT** (intensity) are calculated from the **CH\_DIR** and **CH-DIF** channels. These two values are characteristic for a certain surface. For both the **NORM** and **INT** value a respective **N TOL** and **I TOL** tolerance can be set. The information comprising **NORM**, **N TOL**, **INT** and **ITOL** again is referred to as a **VECTOR** below. A total of 31 vectors can be taught in the **TEACH TABLE**. When in a row-by-row comparison a vector is recognised again, this vector is sent to the digital outputs. In addition the value of **NORM** in analog form is sent to the voltage and current output.

The following pages describe a teach process with both evaluation modes.

# EVALUATION MODE GLOSS

## Step 1:

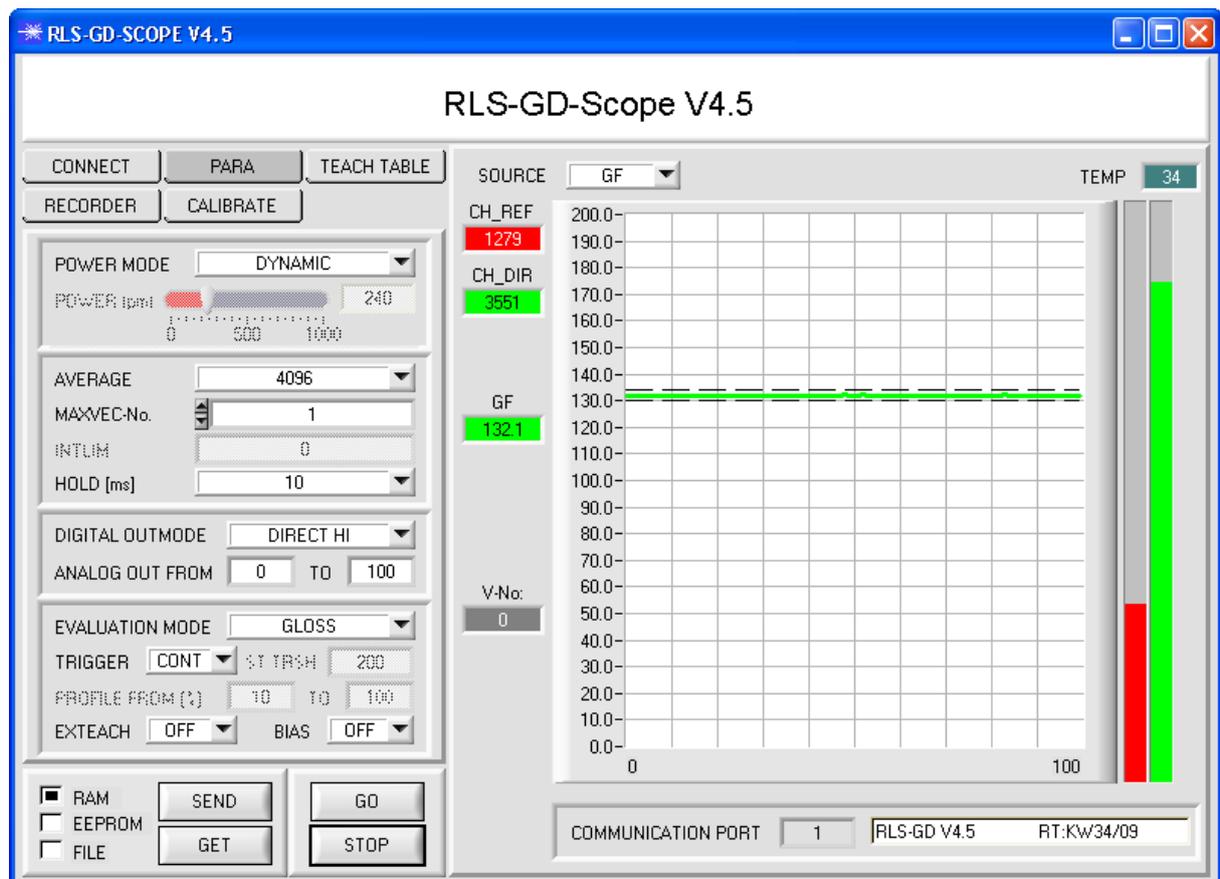
Prior to the use of the software aids (graphic display of sensor signals) the sensor must be manually adjusted to the respective target or background as accurately as possible. The reference distance of the sensor to the target is defined in the data sheet of the respective sensor.

Please make sure that the sensor is properly connected and supplied with power.

## Step 2:

Start the RLS-GD-Scope V4.5 software. Please check whether the status line at the right bottom displays the „RLS-GD V4.5 RT:KWxx/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 above. Press the tab **PARA** to show the parameters. (See the FILE function in the manual.)

Now press the **GO** button. Data exchange between sensor and PC will then start. The contents for **CH\_REF** and **CH\_DIR** that are diffusely reflected from the surface are represented as bars on the software interface. The gloss factor **GF** is shown in a display and in the graph.

Please note: The sensor must be informed when you have changed the parameter values. Press the **SEND** button to send this information to the sensor.

The gloss factor **GF** has a value range of 0 to 2000. A double-click with the left mouse button on the graph starts automatic scaling. A single-click with the left mouse button turns auto-scaling off again.

The signal that should be displayed can be selected under Source.

**Step 4:**

The gloss factor **GF** is calculated from the **CH\_REF** and **CH\_DIR** data.

Press the **GO** button once again to read out the current data.

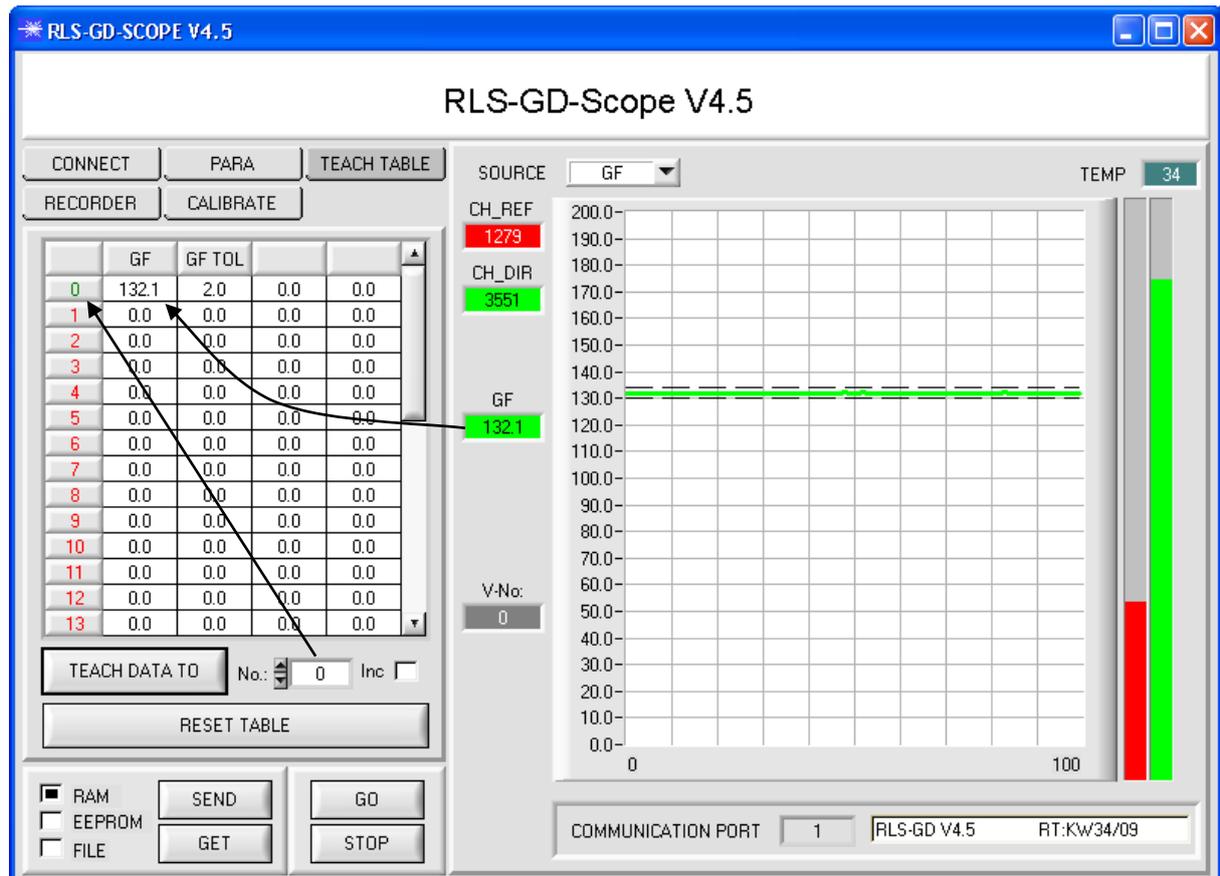
Press **STOP** to stop the data exchange.

Now use the tab **TEACH TABLE** to switch to the TEACH TABLE.

Select a row under **No.:** to which the currently present gloss factor should be taught.

(ATTENTION: Only the rows marked with green numbers are evaluated by the sensor. If you want to teach more vectors, use the **MAXVEC-No.** parameter to select how many vectors you want to teach.)

Now press the **TEACH DATA TO** button. The calculated gloss factor is transferred to the **TEACH TABLE** in the row that was selected under **No.:**. If necessary, adapt the **GF TOL** tolerance by selecting the respective cell in the **TEACH TABLE** and pressing F2, or by double-clicking on the respective cell. The graphic display shows the current gloss factor with the tolerance window set under **No.:**.



Now press the **SEND** button to inform the sensor about the taught vector. Then activate the **GO** mode again. When the sensor recognises a row vector, the corresponding row number is visualised on the software interface under **V-No.:**. A value of 255 means that none of the taught vectors were recognised.



A gloss factor only is recognised if it lies within the tolerance window.

**Step 5:**

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

**Step 6:**

When you have taught all the vectors, 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.

# EVALUATION MODE NORM\_INT

## Step 1:

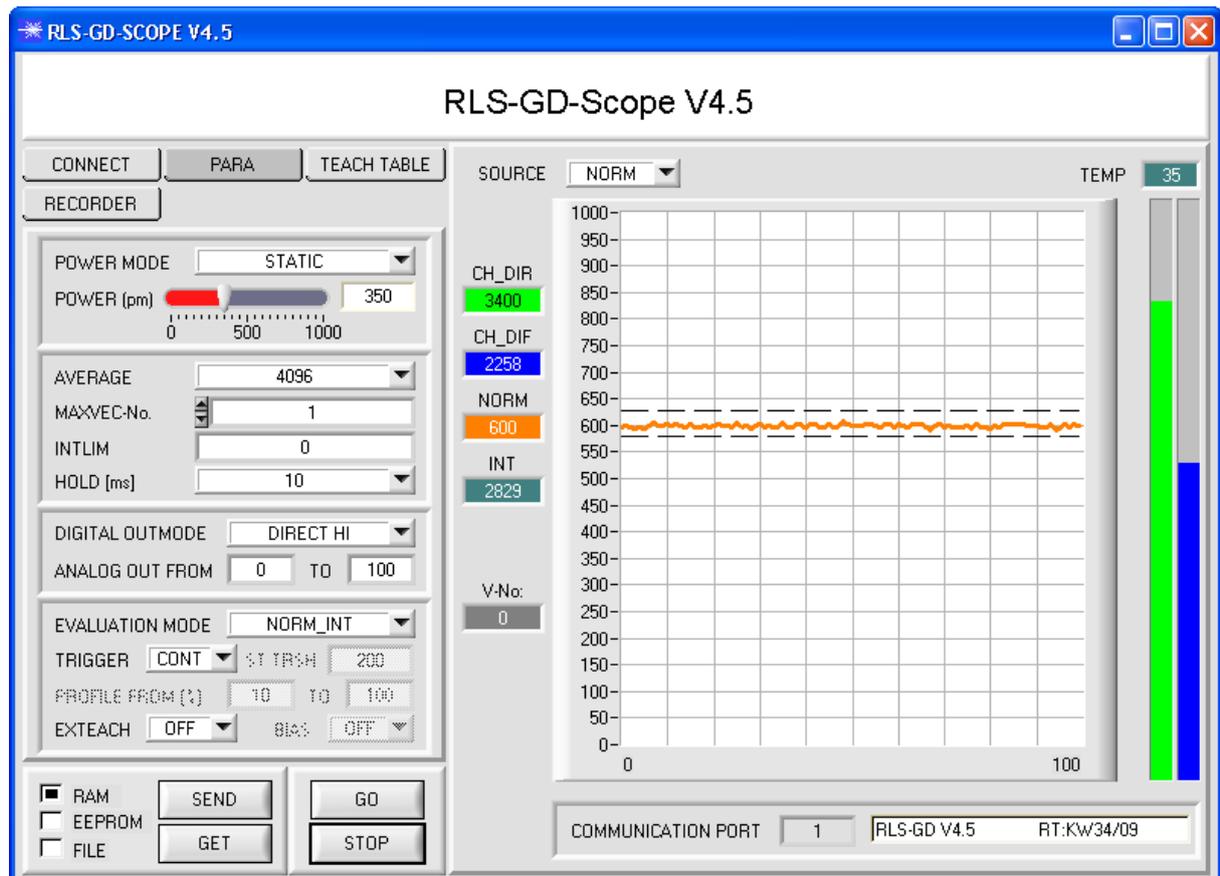
Prior to the use of the software aids (graphic display of sensor signals) the sensor must be manually adjusted to the respective target or background as accurately as possible. The reference distance of the sensor to the target is defined in the data sheet of the respective sensor.

Please make sure that the sensor is properly connected and supplied with power.

## Step 2:

Start the RLS-GD-Scope V4.5 software. Please check whether the status line at the right bottom displays the „RLS-GD V4.5 RT:KWxx/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 above. Press the tab **PARA** to show the parameters. (See the FILE function in the manual.)

Now press the **GO** button. Data exchange between sensor and PC will then start. The contents for **CH\_DIR** and **CH\_DIF** that is diffusely reflected from the surface are represented as bars on the software interface. **NORM** and **INT** are shown in a display and in the graph.

Set the **POWER** value such that at least one of the two bars lies in the upper third of its dynamic range, but that none of them is saturated.

**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.

**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:**

From the data of **CH\_DIR** and **CH\_DIF**, **NORM** and **INT** are calculated acc. to the following formulas:

$$NORM = \frac{CH\_DIR}{CH\_DIR + CH\_DIF} * 1000$$

$$INT = \frac{CH\_DIR + CH\_DIF}{2}$$

Press the **GO** button once again to read out the current data.

Press **STOP** to stop the data exchange.

Now use the tab **TEACH TABLE** to switch to the TEACH TABLE.

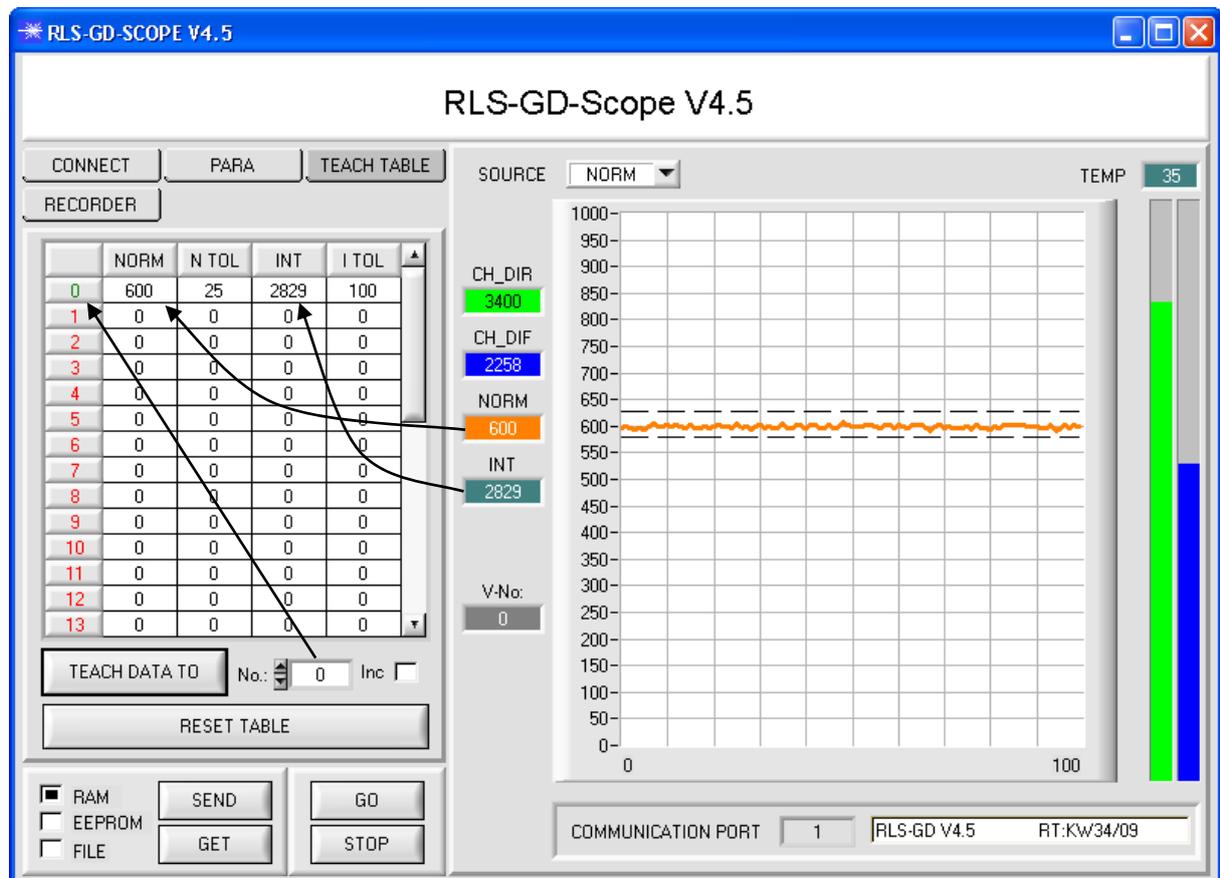
Select a row under **No.:** to which the currently present gloss factor should be taught.

(ATTENTION: Only the rows marked with green numbers are evaluated by the sensor. If you want to teach more vectors, use the **MAXVEC-No.** parameter to select how many vectors you want to teach.)

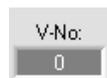
Now press the **TEACH DATA TO** button. The calculated **NORM** and **INT** are transferred to the **TEACH TABLE** in the row that was selected under **No.:**. If necessary, adapt the **N TOL** and **I TOL** tolerances by selecting the respective cell in the TEACH TABLE and pressing F2, or by double-clicking on the respective cell.

The graphic display shows the current **NORM** with the tolerance window set under No.:

Select **INT** under **SOURCE** to visualise the intensity with its tolerance window.



Now press the **SEND** button to inform the sensor about the taught vector. Then activate the **GO** mode again. When the sensor recognises a row vector, the corresponding row number is visualised on the software interface under **V-No.:**. A value of 255 means that none of the taught vectors were recognised.



A teach vector only is recognised if it lies within the tolerance window for **NORM** and **INT**.

**Step 5:**

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

**Step 6:**

When you have taught all the vectors, 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.