QG65 Configurator manual

V1.2

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Content

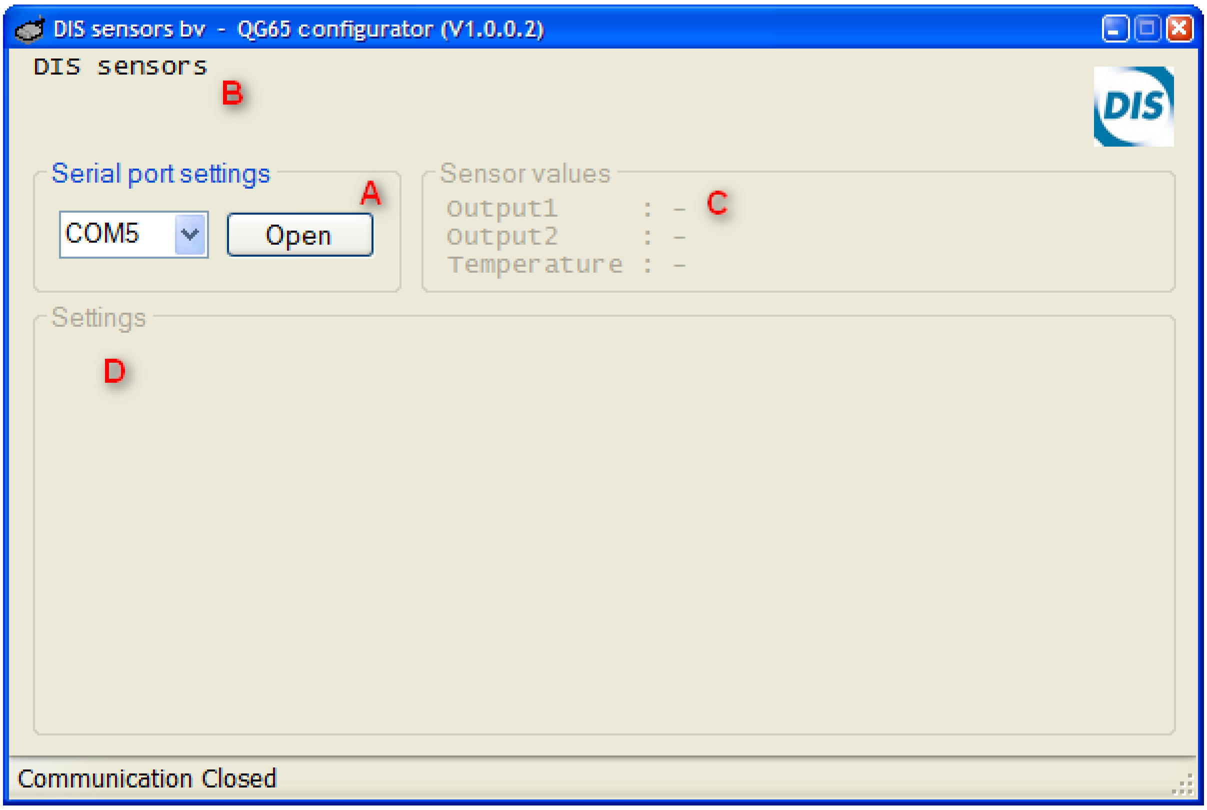
Introduction

The QG65 configurator is a tool which can be used to configure QG65 sensors with RS232 communication. The complete configuration of a QG65 sensor can be downloaded from the sensor to a file. At a later time the configuration of the sensor can be restored by uploading this configuration file to the sensor. The QG65 configurator tool can also be used to log the measuring values into a log file.

What is needed:
- PC running MS-Windows with the QG65 configurator tool installed
- Free serial port (COM port; RS232 port) or USB-to-serial converter
- Connection cable
- QG65 sensor with M12 8-pins connector

1. Getting started

After starting the application the following screen will be shown:



a. Serial port settings

Select the COM port which is connected to the QG65 sensor (COM1 to COM24 are supported) and press the Open button. The *QG65 configurator* will start communicating with the sensor. If no sensor is found 'Communication Error' is shown in red in the status bar at the bottom of the window. The QG65 sensor communicates at a fixed baud-rate of 38400 Baud.

b. Sensor information

This part of the window shows some information of the connected sensor. The following information is available: Device name, software version and serial number.

c. Sensor measurement values

This part of the window shows the output values of the connected sensor. Also the state of the output is shown behind the measured value.

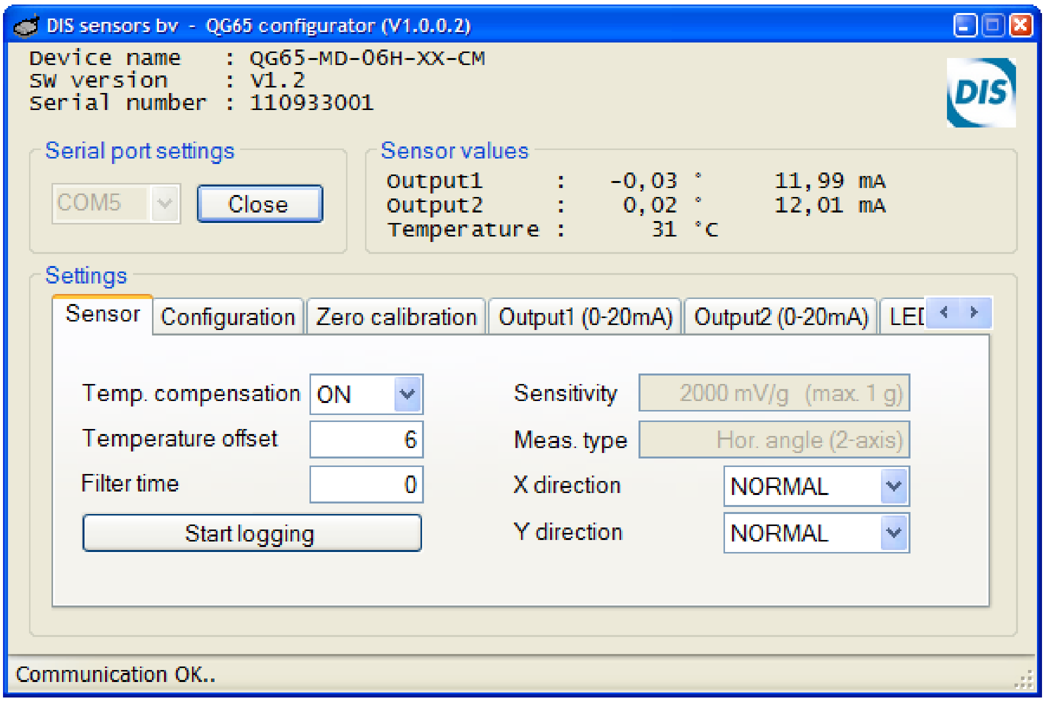
d. Settings

In this part of the screen some tab-pages are shown where the configuration parameters can be changed. Also the sensor configuration can be stored or restored to or from a file.

2. Settings

The following tab pages are available: Sensor, Configuration, Zero calibration, Output1, Output2 and LED's.

a. Sensor



In this tab page general sensor settings can be made.

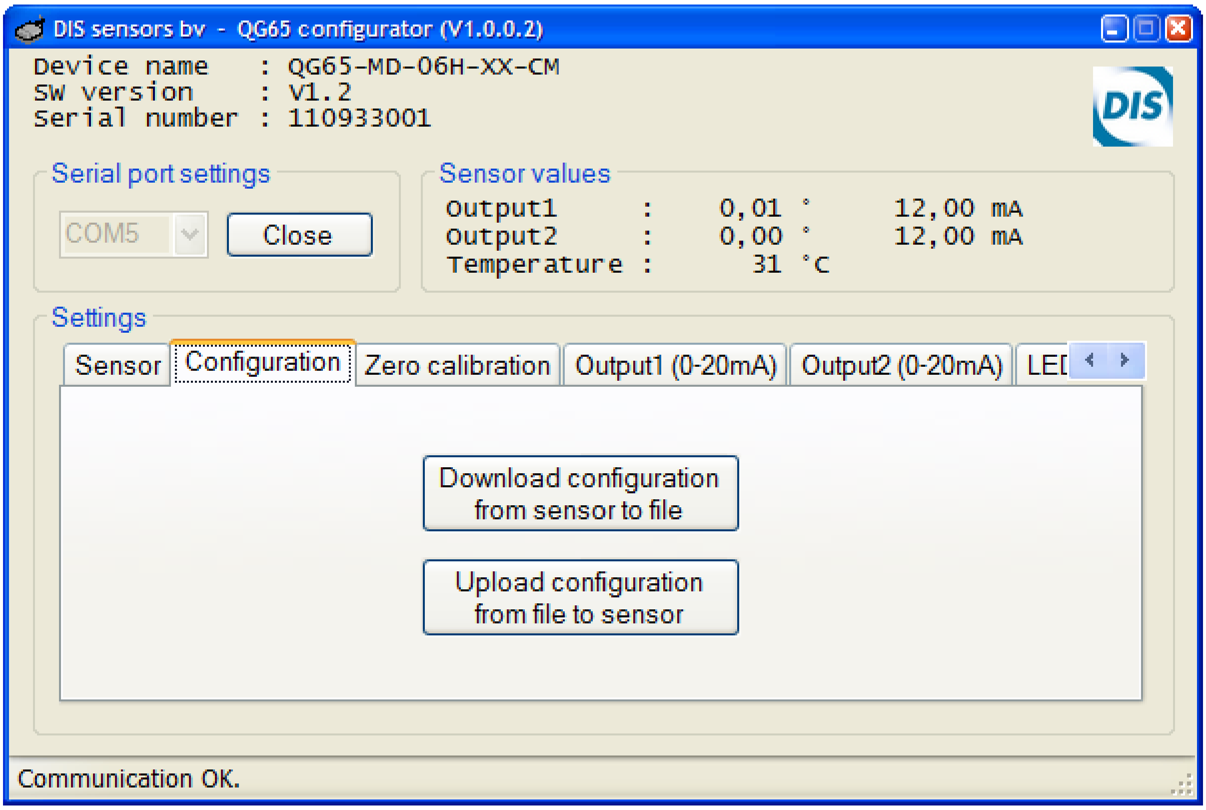
- Temp. Compensation: Switch OFF/ON the internal temperature compensation algorithm
- Temperature offset: The offset in degrees °C. Please keep in mind that the temperature is the internal sensor temperature. This temperature is about 8 to 10 degrees °C higher than the environment temperature.
- Filter time [ms]: Setting for the internal 1st order low-pass filter. The Filter time τ (RC time constant) is given in milliseconds. The cut-off (-3dB) frequency $F_{cut\text{-}off} = 1 / 2\pi\tau$. e.g. a filter time of 1000ms create a $F_{cut\text{-}off} = 1/ 2\pi = 0.16$Hz.
- Start/stop logging: By pressing the ‘Start logging’ button the sensor values are logged to a file. The file is in plain text format and the values are tab-separated. The log file can be easily imported in Microsoft Excel.

  Example:

```
09:51:30,11    00:00:00,07    1    0,36    0,02    31
09:51:30,21    00:00:00,17    2    0,31    0,02    31
09:51:30,30    00:00:00,26    3    0,37    0,01    31
09:51:30,39    00:00:00,35    4    0,32    0,03    31
09:51:30,49    00:00:00,45    5    0,33    0,00    31
```

  The following values are available:
  column1: absolute time of sample (hh:mm:ss,ss)
  column2: relative time of sample (hh:mm:ss,ss)
  column3: sample number
  column4: measurement value output1
  column5: measurement value output2
  column6: temperature in degrees °C
  The sample rate is approximately 10 Hz.
- Sensitivity: Reads the sensitivity of the internal g-sensor. This setting is read-only.
- Measurement type: Reads the measurement type of the sensor. The following measurement types are available: Horizontal angle (2-axis), Vertical angle (1-axis), Acceleration (2-axis). This setting is read-only.
- X/Y direction: With this setting the sign of the measurement value can be reversed.
- Output mode (1-axis): With this setting the output range of the measurement value can be switched from -180°-+180° to 0°-360°.

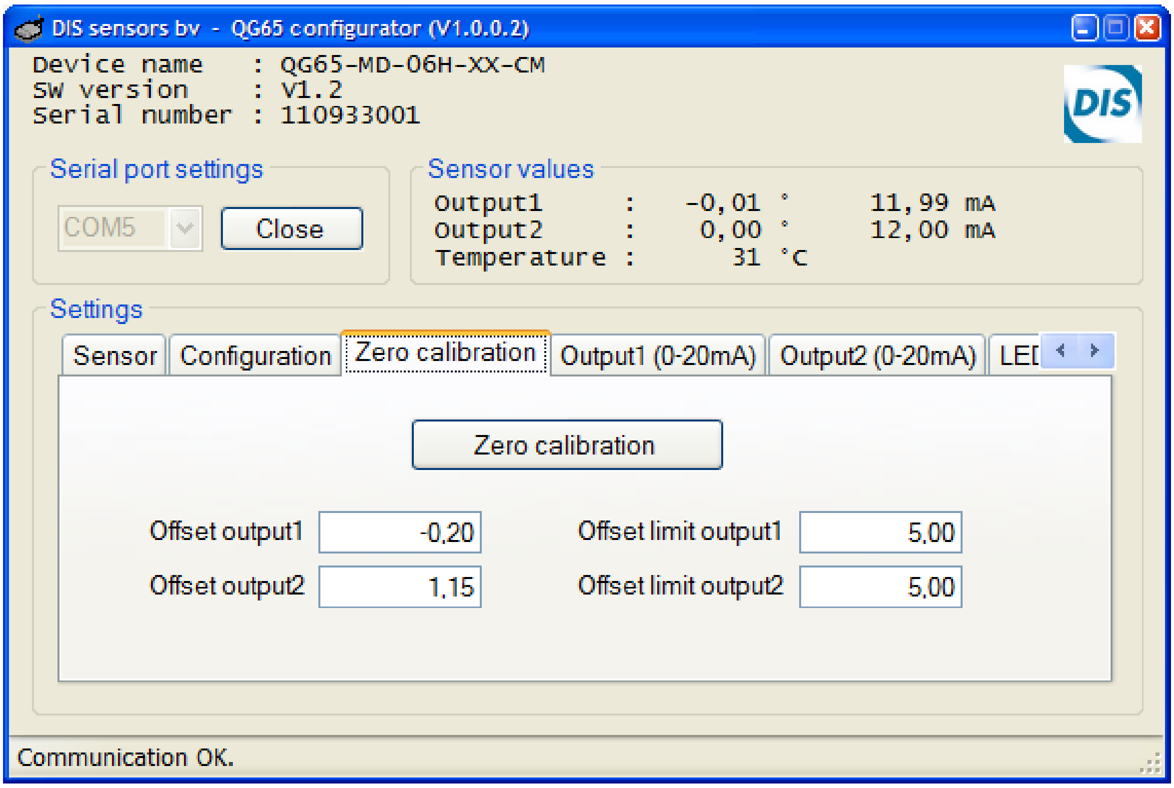
b. Configuration



With this tab page the complete configuration of a sensor can be stored/restored to/from a file. The serial number of the sensor is stored in the file. During a restore it is checked that the serial number matched with the configuration file. If there is a mismatch the user can choose to upload the configuration to the sensor, although some settings in the sensor will not be overwritten.

c. Zero calibration

(or called Center calibration for 1-axis 0° to 360°, because it calibrates the 180° point)



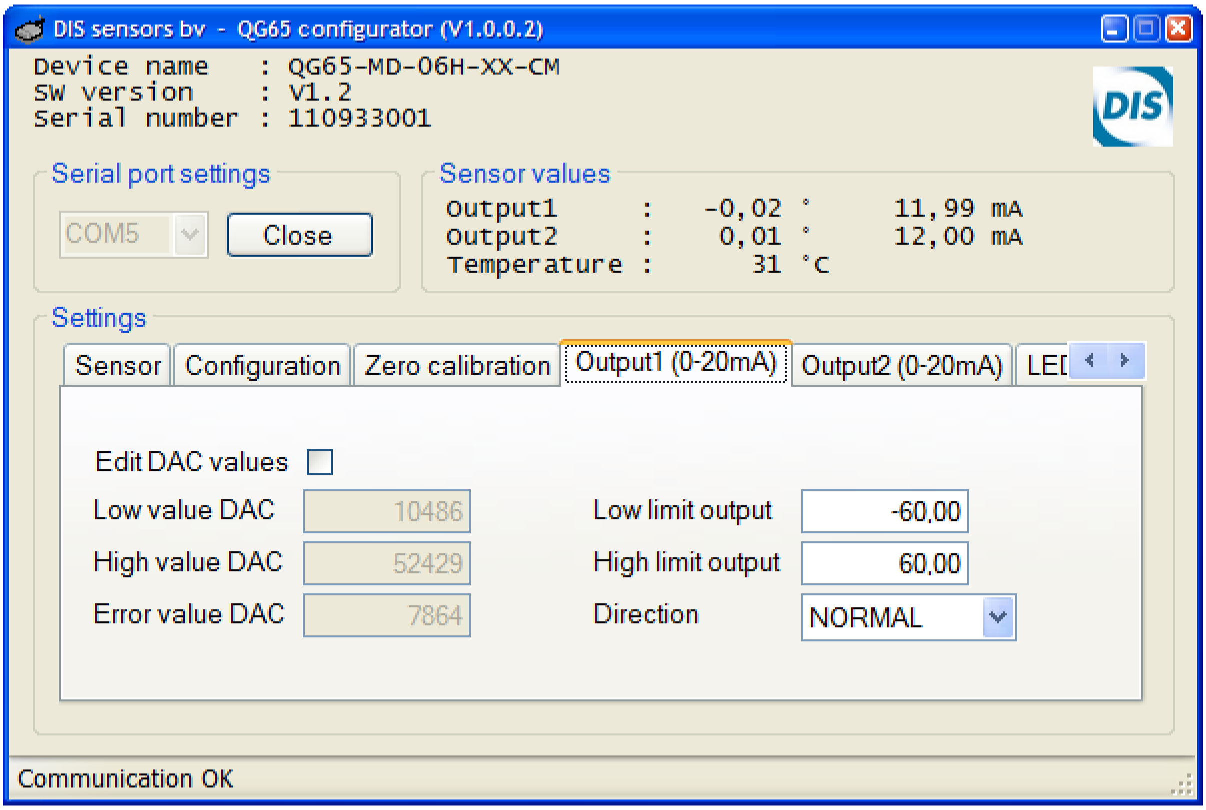
In this tab page the sensor can be calibrated.

- Zero calibration: By pressing this button a zero calibration is started. After a few seconds the calibration is done. The offset values for output1 and output2 are automatically updated. When the new calculated offset is outside limits, the old offset is used.
- Offset output1/2 These values are automatically updated by doing a zero calibration. Additionally these values can be changed when needed. The effect of the new offset can be noticed in the sensor values.
- Offset limit output1/2 During a zero calibration is checked if the new calculated offset is within this limit. A limit of 5.00° means that the offset may be between -5.00° and +5.00°. When the measurement type is “Vertical angle (1-axis)” this setting is not available.

d. Output 1/2

The QG65 sensor can be provided with a few different outputs. The output type is fixed and is determined during manufacturing. Different output types are: current output (0-20mA), voltage output (0-5V or 0-10V), PWM output or NPN alarm output.

i. Current output (0-20mA)



- Edit DAC values: To enable changes in the DAC settings. Normally this is not necessary. Please be careful when changing these values.
- Low value DAC: The lowest value that the output of the sensor can drive. The DAC resolution is 16 bits (0-65535). The lowest value corresponds with 0mA, the highest value corresponds with 25mA. The default value for this setting is 10486, which is 4mA.
- High value DAC: The highest value that the output of the sensor can drive. The default value for this setting is 52428, which is 20mA.
- Error value DAC: When an error occurs in the sensor, like a failing self-test or a EEPROM checksum error, the output of the sensor can be driven to a specific error value. The default value for this setting is 7864, which is 3mA.
- Low limit output: The lowest value the sensor can measure (normally the 4mA value)
- High limit output: The highest value the sensor can measure (normally the 20 mA value)
- Direction
  - Normal: low limit output is 4mA; high limit output is 20mA
  - Reversed: low limit output is 20mA; high limit output is 4mA

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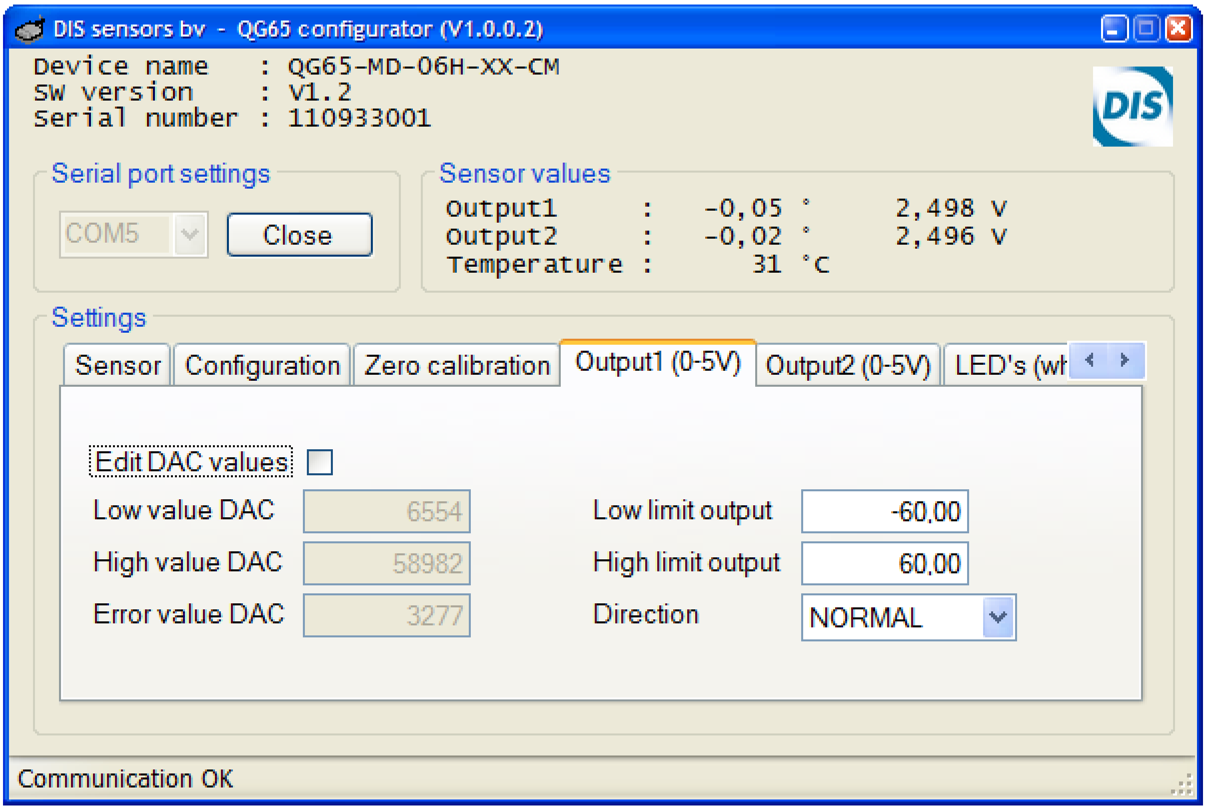
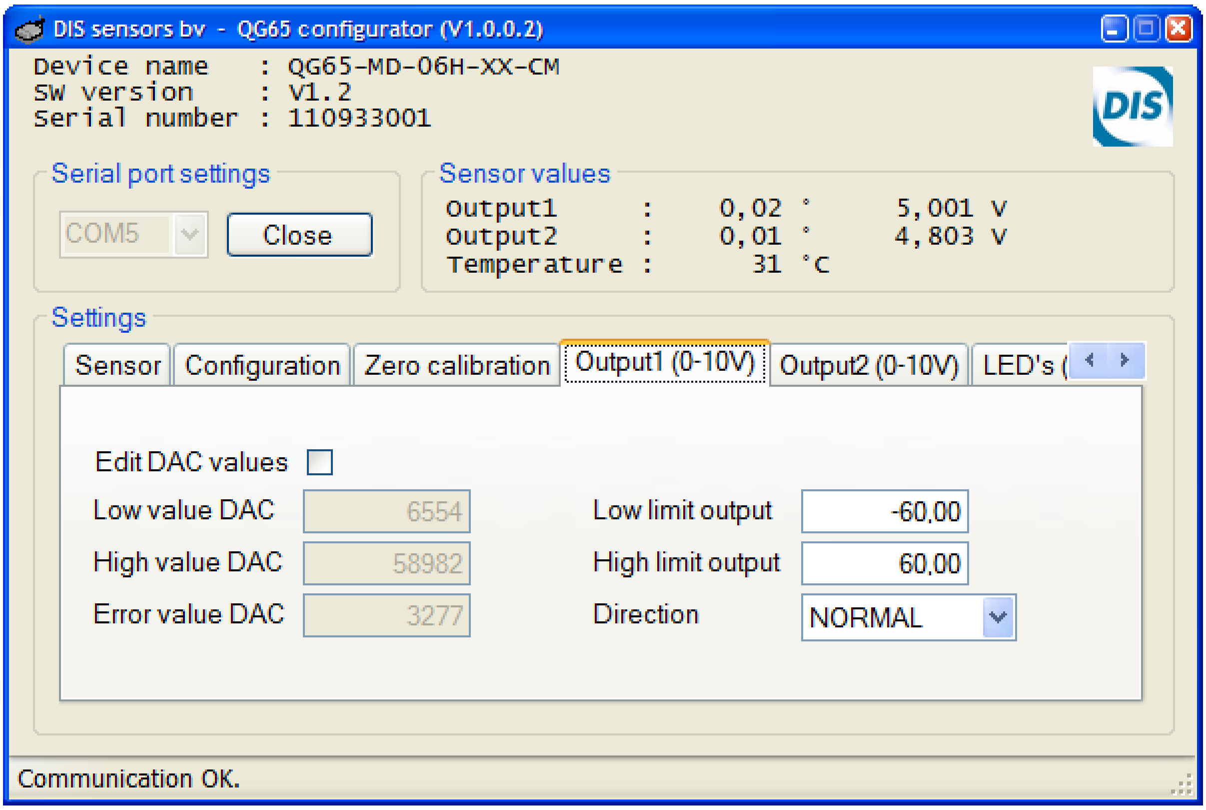
ii. Voltage output (0-5V)



- Edit DAC values: To enable changes in the DAC settings. Normally this is not necessary. Please be careful when changing these values.
- Low value DAC: The lowest value that the output of the sensor can drive. The DAC resolution is 16 bits (0-65535). The lowest value corresponds with 0V, the highest value corresponds with 5V. The default value for this setting is 6554, which is 0,5V.
- High value DAC: The highest value that the output of the sensor can drive. The default value for this setting is 58982, which is 4,5V.
- Error value DAC: When an error occurs in the sensor, like a failing self-test or a EEPROM checksum error, the output of the sensor can be driven to a specific error value. The default value for this setting is 3277, which is 0,25V.
- Low limit output: The lowest value the sensor can measure (normally the 0,5V value)
- High limit output: The highest value the sensor can measure (normally the 4,5V value)
- Direction: Normal: low limit output is 0,5V; high limit output is 4,5V
  Reversed: low limit output is 4,5V; high limit output is 0,5V
-

iii. Voltage output (0-10V)



- Edit DAC values: To enable changes in the DAC settings. Normally this is not necessary. Please be careful when changing these values.
- Low value DAC: The lowest value that the output of the sensor can drive. The DAC resolution is 16 bits (0-65535). The lowest value corresponds with 0V, the highest value corresponds with 10V. The default value for this setting is 6554, which is 1,0V.
- High value DAC The highest value that the output of the sensor can drive. The default value for this setting is 58982, which is 9,0V.
- Error value DAC When an error occurs in the sensor, like a failing self-test or a EEPROM checksum error, the output of the sensor can be driven to a specific error value. The default value for this setting is 3277, which is 0,5V.
- Low limit output The lowest value the sensor can measure (normally the 1,0V value)
- High limit output The highest value the sensor can measure (normally the 9,0V value)
- Direction Normal: low limit output is 1,0V; high limit output is 9,0V
  Reversed: low limit output is 9,0V; high limit output is 1,0V

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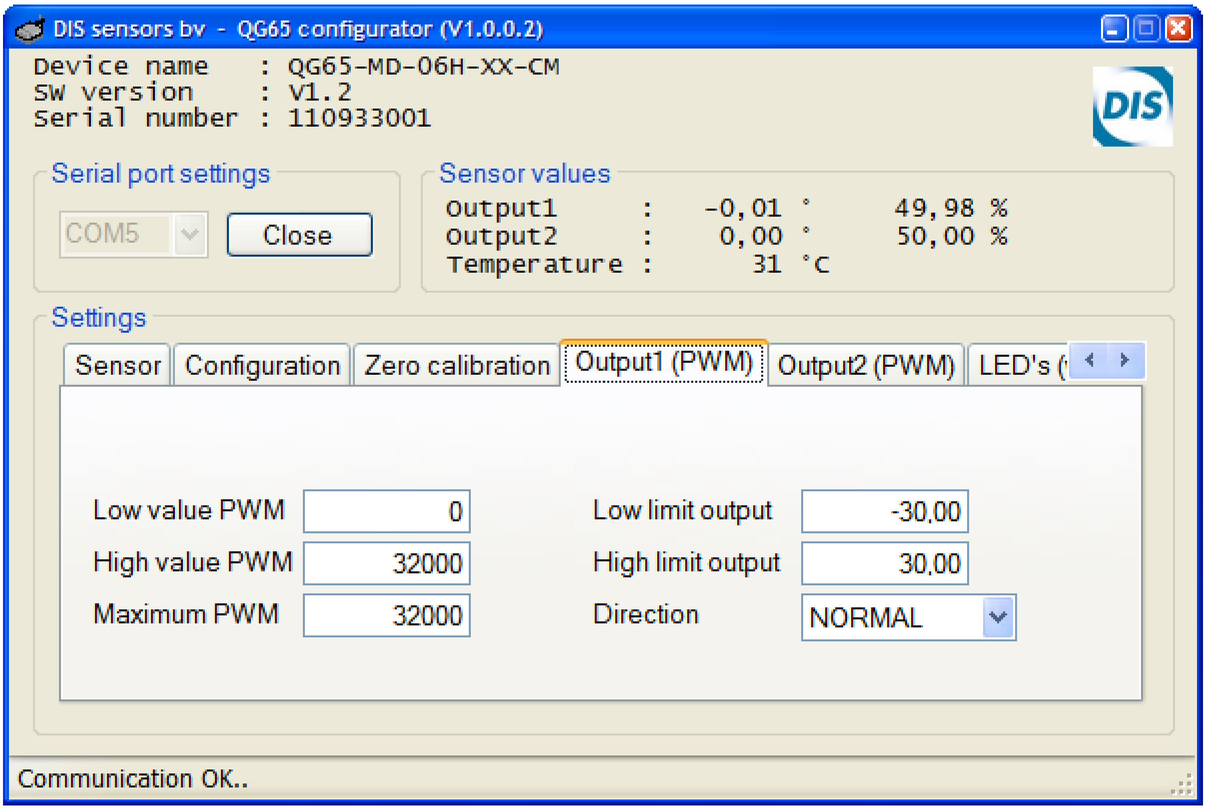
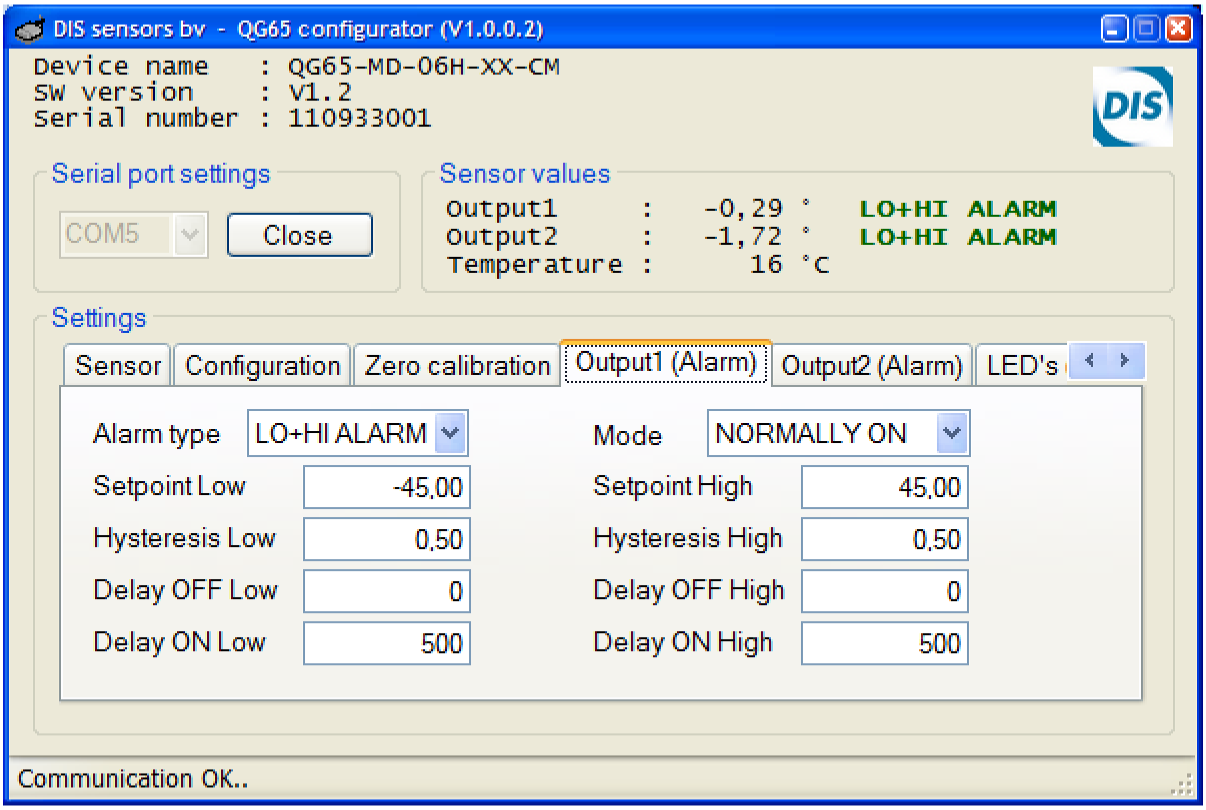
iv. PWM output



- Low value PWM: The lowest value that the output of the sensor can drive in PWM counts. Default is 0 (0% duty-cycle).
- High value PWM: The highest value that the output of the sensor can drive in PWM counts. Default is Maximum PWM (100% duty-cycle).
- Maximum PWM: With this parameter the resolution and the frequency of the PWM signal is set. The higher the resolution, the lower the output frequency. This maximum value is 65535 (16-bit resolution).The output frequency can be calculated as follows:
  f_{output} = 8MHz / Maximum PWM (In the screenshot above, f = 250Hz)
- Low limit output: The lowest value the sensor can measure (normally the lowest duty-cycle)
- High limit output: The highest value the sensor can measure (normally the highest duty-cycle)
- Direction: Normal: low limit output is lowest duty-cycle
  high limit output is highest duty-cycle
  Reversed: low limit output is highest duty-cycle
  high limit output is lowest duty-cycle

v. Alarm output (NPN)



- Alarm type: Low alarm, high alarm, low + high alarm, or disabled.
- Setpoint low: The switching point of the low alarm. When the sensor value is lower than this value the alarm is activated.
- Hysteresis low: When the sensor value becomes higher than setpoint low + hysteresis low the alarm is deactivated.
- Delay OFF low: Delay time in milliseconds before the output is deactivated when a low alarm situation has disappeared.
- Delay ON low: Delay time in milliseconds before the output is activated when a low alarm situation has appeared.
- Mode: Normally OFF
    - No alarm: NPN output is not conducting
    - Alarm active: NPN output is conducting

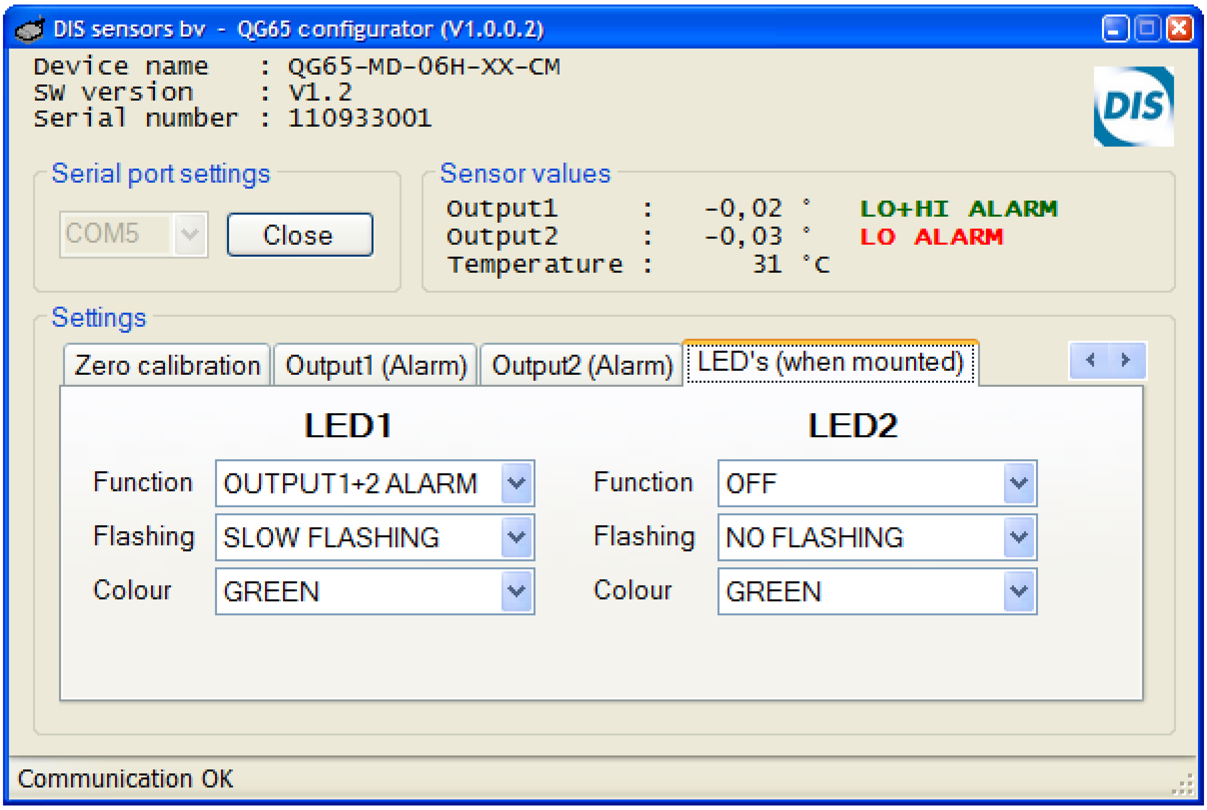
  Normally ON

    - No alarm: NPN output is conducting
    - Alarm active: NPN output is not conducting
- Setpoint High The switching point of the High alarm. When the sensor value is higher than this value the alarm is activated.

-	Hysteresis High:	When the sensor value becomes lower than setpoint high - hysteresis high the alarm is deactivated.
-	Delay OFF High	Delay time in milliseconds before the output is deactivated when an high alarm situation has disappeared.
-	Delay ON High	Delay time in milliseconds before the output is activated when an high alarm situation has appeared.

e. LED functions

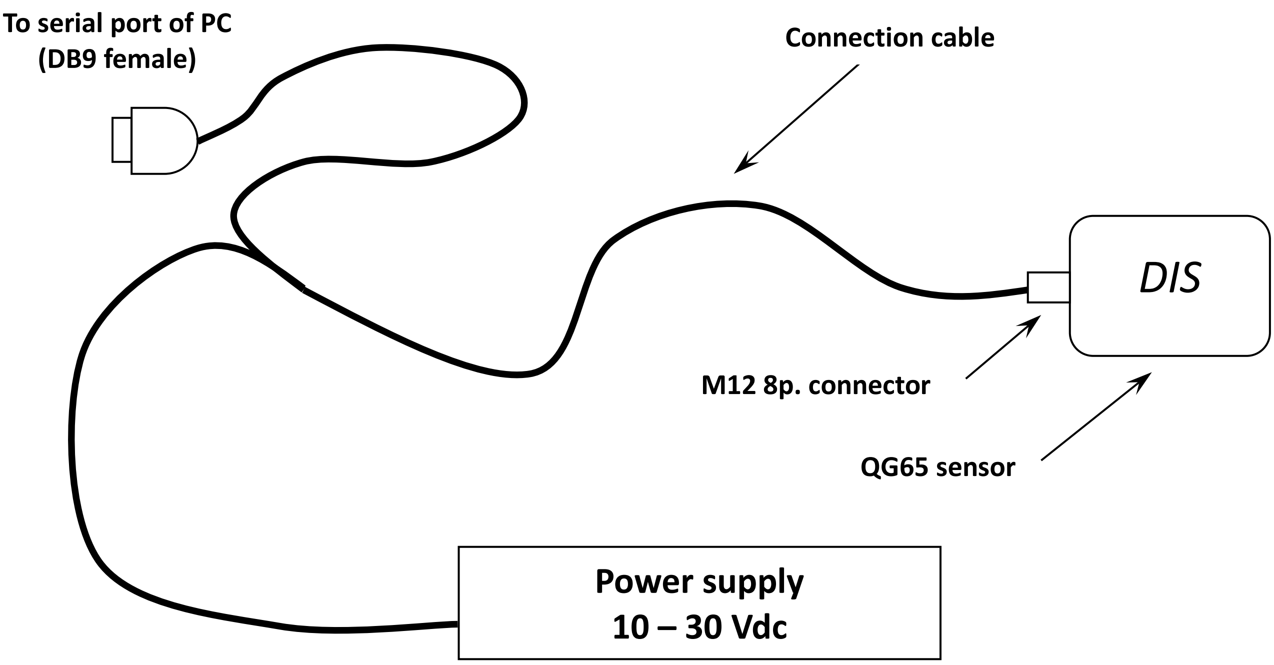
The LED functions have become obsolete and are not longer supported. Please don't make use of the screen below.



Specifications

Supported Operating Systems: Windows NT, Windows XP, Windows Vista, Windows 7, windows 10.
To use the *QG65 configurator* utility at least one free serial port (COM) is needed. If a serial port is not available, an USB-to-serial converter can be used.
The *QG65 configurator* is a MS-Windows application written in C# with Microsoft Visual Studio 2008. The *.NET framework 3.5* has to be installed. The installer will check if the correct *.NET framework* is installed. It will download and install a newer version of the *.NET framework* if necessary.

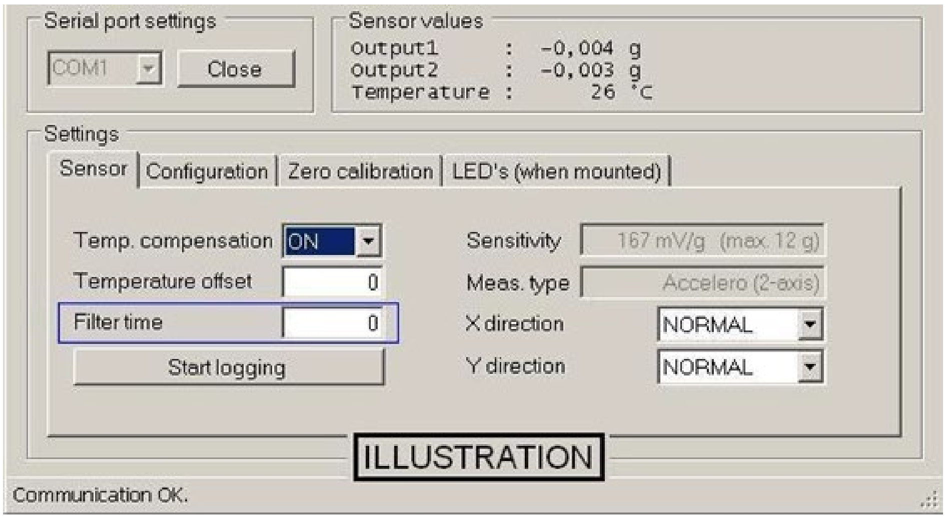
Connection diagram:



(External power supply is not included)

Filter functionality for acceleration sensors

With a high pass filter, first order, for acceleration sensors, you can change a static sensor into a dynamic one. See picture below.

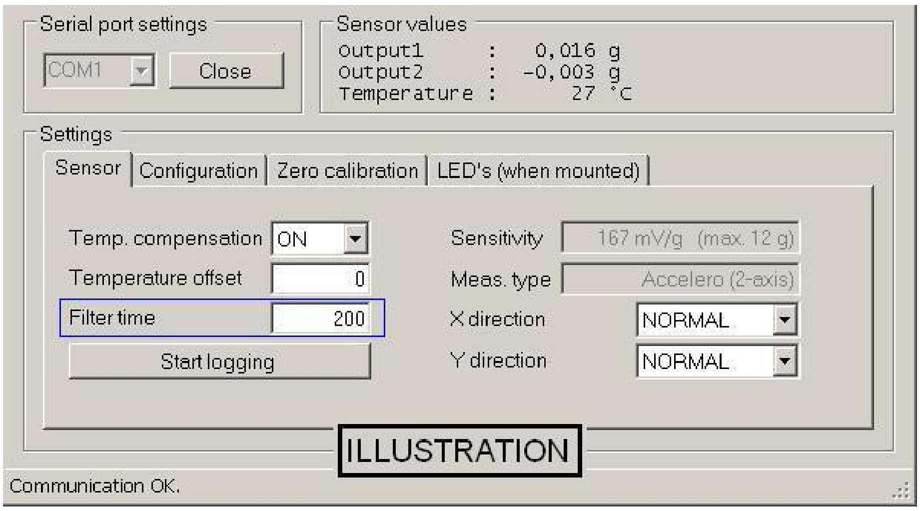


With the software program " QGxx Configurator, the " period time" of the high pas filter can be set. The program works with milliseconds (1/1000 of a second).

To simplify things, the correct filter time can be calculated as follow:

Filter time = 1000 / $2\pi F_{cut\text{-}off}$

For example, if you want a high pass filter at 0,79Hz, the filter time will be: 1000 / (2π*0,79) = 200. (see picture below)



To turn off the high pass filter, filter time must be zero (0)!