

## Application Note

### AN2018

#### FLS-C

## Moving target characteristic with RS-422

V 1.02

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#### **Abstract**

This application shows how to display a measured distance value on a standard external numeric digital display. Description of the wiring and sensor configuration are included as well as two samples are given.

This application note is provided as is without any warranty for any problems this sample may cause.



## Table of content

1 Introduction .....	3
1.1 Fast position monitoring.....	3
1.2 Usable sensors.....	3
2 Preparation .....	4
2.1 Connect the DLS/FLS UtilitySW with the FLS-C.....	5
3 Measurement characteristic configuration .....	6
4 Interface setup .....	7
4.1 General.....	7
4.2 RS-422.....	7
5 Measurement mode .....	9
5.1 Controlled mode.....	9
5.2 Manual start.....	12



# 1 Introduction

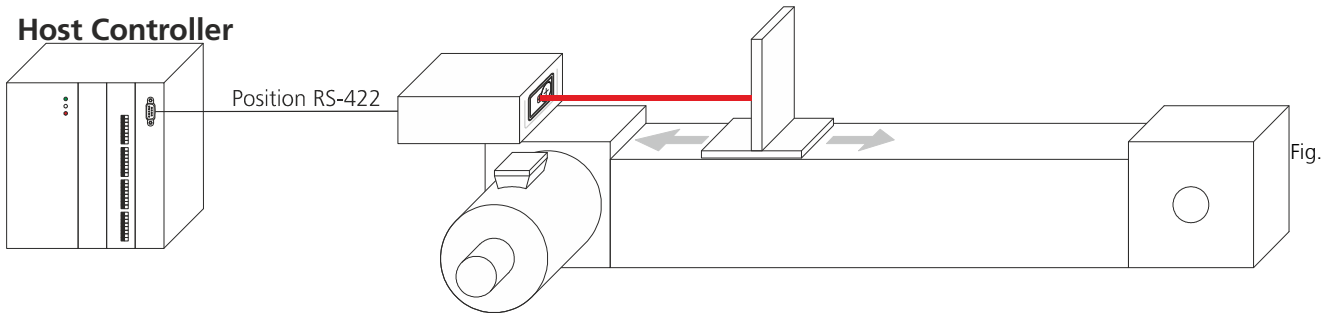
Different measurement characteristics are implemented into the FLS-C. This measurement characteristics provide the necessary flexibility to configure the FLS-C for various applications.

The FLS-C laser distance sensor is able to measure continuous moving targets with a speed of 200Hz, as long as there are no distance jumps. For the transfer of the measurement result the RS-422 interface can be used. The baud rate must be set to 115'200 baud to be able to transfer the measurement results with a speed of 200Hz. If the baud rate is set to a lower value, the output rate will be reduced.

This document describes the configuration and connection of the FLS-C for the use with the "Moving target characteristic" and the RS-422 interface. While this document provides step by step configuration instructions, the Technical Reference Manual gives a more detailed description.

## 1.1 Fast position monitoring

With the "Moving target characteristic", fast measuring of distances are possible, as long as the distance is moving continuously. Fig. 1 shows a possible setup for the mentioned measurements.



1: Position monitoring



**Ensure that no distance jumps occur in order to use the "Moving target characteristic".**

## 1.2 Usable sensors

The following sensors can be used for such kind of applications.

<b>Sensor</b>	<b>Part No</b>	<b>Short description</b>
FLS-C 10	600502	Distance sensor with an accuracy of +/-1mm, max Distance 500m, Temperature range -10..+50°C
FLS-C 30	600501	Distance sensor with an accuracy of +/-3mm, max Distance 500m, Temperature range -10..+50°C
FLS-CH 10	600504	Distance sensor with an accuracy of +/-1mm, max Distance 500m, Temperature range -40..+50°C
FLS-CH 30	600503	Distance sensor with an accuracy of +/-3mm, max Distance 500m, Temperature range -40..+50°C



## 2 Preparation

1. The following items are needed to do the configuration of the FLS-C.
  - RS-232 Configuration cable FLS / DLS (Part no. 500200)
  - 24V DC Power supply
2. Download the DLS/FLS UtilitySW from the website <http://www.dimetix.com/UtilitySW/> and install it on a PC.
3. Connect the FLS-C sensor to the PC and to the 24V DC Power supply as shown in Fig 2.

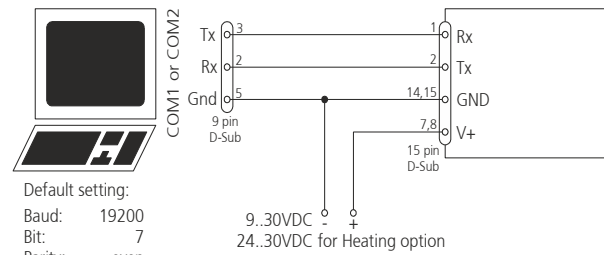


Fig. 2: Configuration connection

4. Start the DLS/FLS UtilitySW on the PC.



## 2.1 Connect the DLS/FLS UtilitySW with the FLS-C

After start-up of the DLS/FLS UtilitySW the window shown in Fig. 3 is visible. Set the “Communication parameters” corresponding to the connection of the FLS-C sensor and press the “CHECK CONNECTION” button.

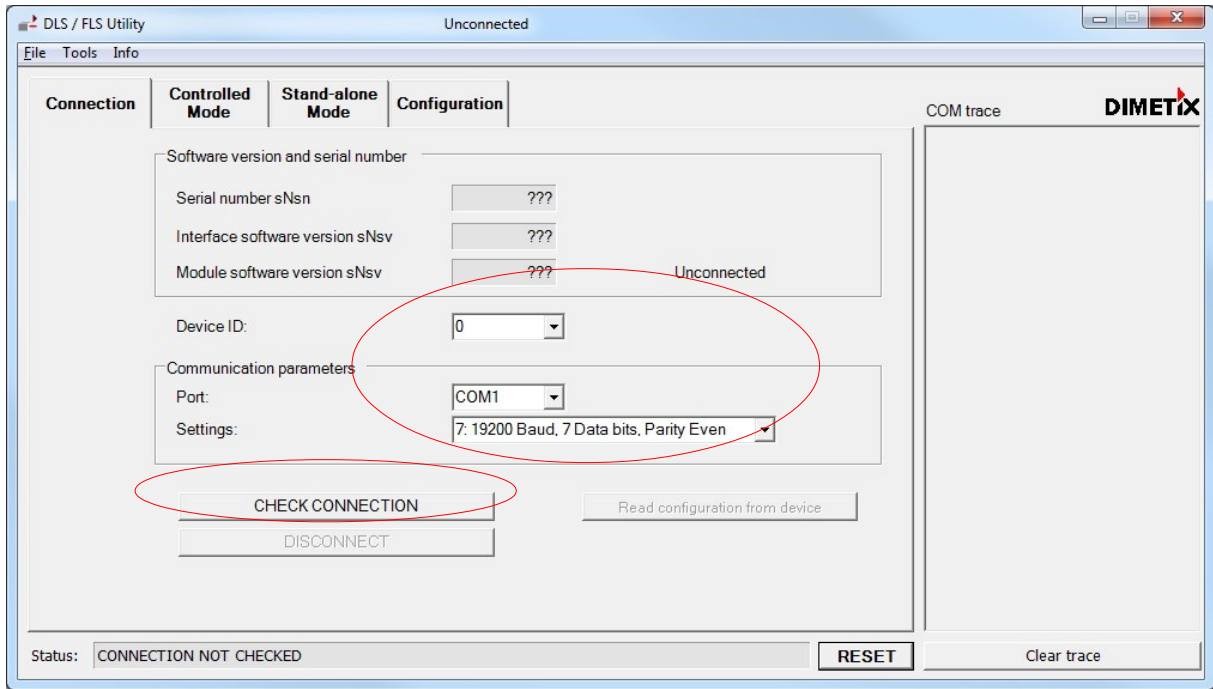


Fig. 3: Start window of the DLS/FLS UtilitySW

After the DLS/FLS UtilitySW connected successfully to the FLS-C sensor, the “Software version and serial number” section is updated as shown in Fig. 4. Further the “Status:” field at the bottom will show “OK”. If the DLS/FLS UtilitySW does not show the described information, the connection with the FLS-C is not done properly.

If the connection is not done properly, press the reset button and follow the description to reset the sensor. Then make sure that the Port setting is correct and press the “CHECK CONNECTION” Button again.

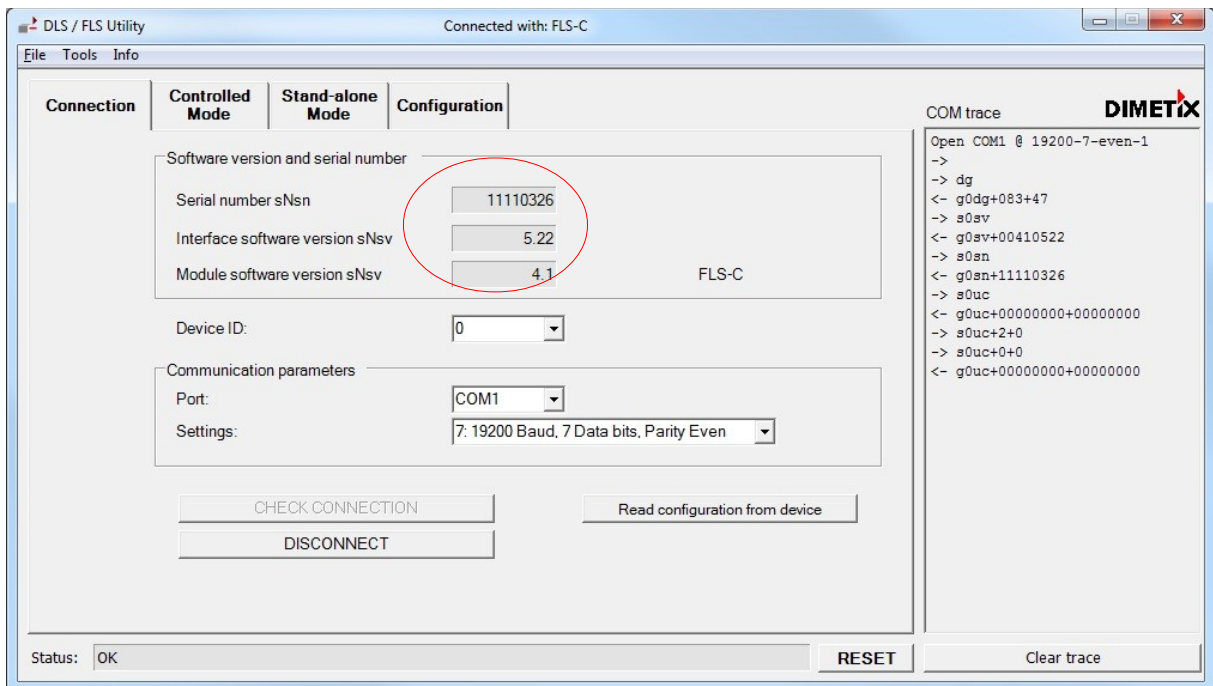


Fig. 4: Start window after "CHECK CONNECTION" procedure



### 3 Measurement characteristic configuration

Activate the "Moving target characteristic" to be able to measure with 200Hz. To do so, change to the "Configuration" tab and select the "Measurement characteristic" sub tab on the left, check "Moving target" and press the "DOWNLOAD TO DEVICE" button. Fig. 5 shows the mentioned settings.

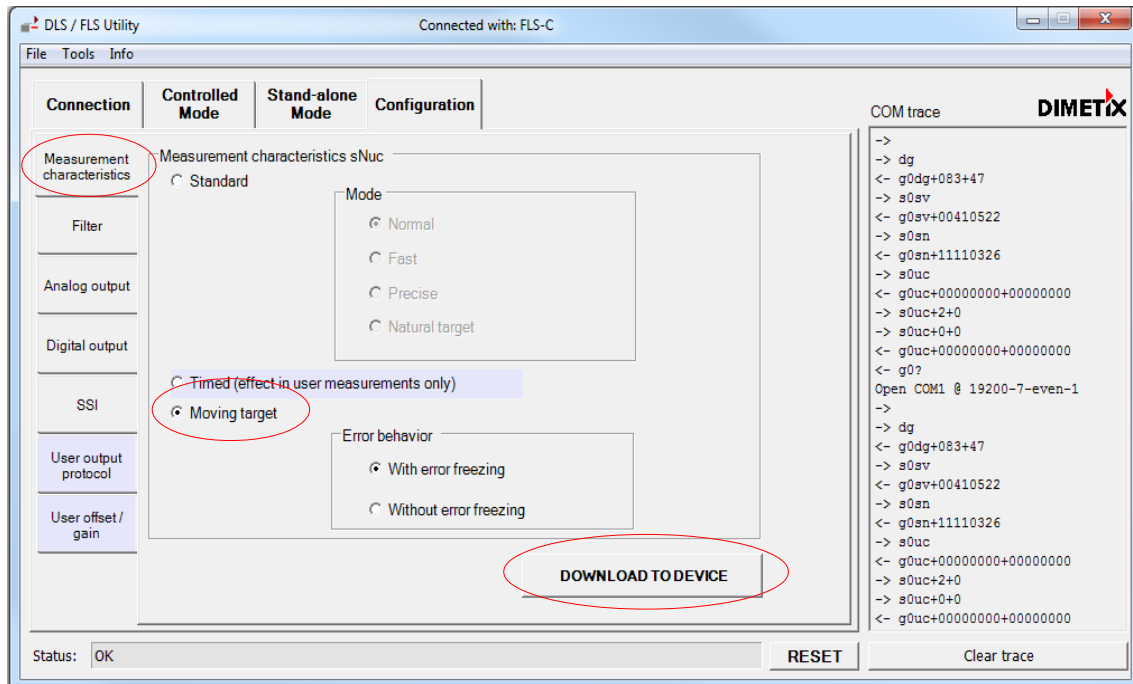


Fig. 5: Configuration of the "Moving target characteristic"

## 4 Interface setup

### 4.1 General

While the FLS-C measures in “Moving target characteristic” the measured distances are available on all interfaces. The following example shows the use of the RS-422 interface.

### 4.2 RS-422

The RS-422 is designed to connect multiple sensors to on line. Therefore the FLS-C can not send measurement results autonomously. However the “Single Sensor tracking” sends the measurement results automatically to the RS-422 interface. Please see 5 Measurement mode later in this document.



**For this example, do not connect more than one device to the RS-422 line.**

#### 4.2.1 Configuration of the RS-422

On the “Configuration” tab, select the “SSI” sub tab on the left. In the “4-pole serial port usage sNSSI” area select RS-422 to activate the RS-422 interface and deactivate the SSI interface as shown in Fig. 6. After configuring all options press the “DOWNLOAD TO DEVICE” button to save the settings in the FLS-C.

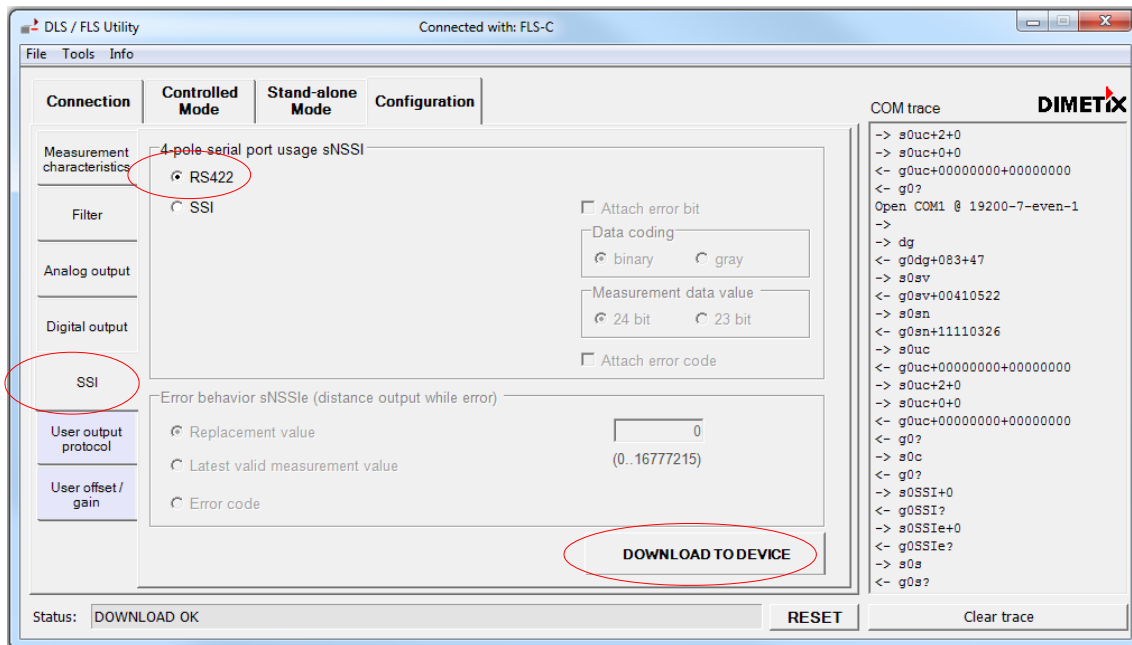


Fig. 6: RS-422 configuration



To be able to transfer the measurement result with a sufficient speed, the baud rate must be set to 115'200 baud. Select the "Connection" tab as shown in Fig 7. In the "Communication parameters" section change "Settings" to "11: 115200 Baud, 7 Data bits, Parity Even".

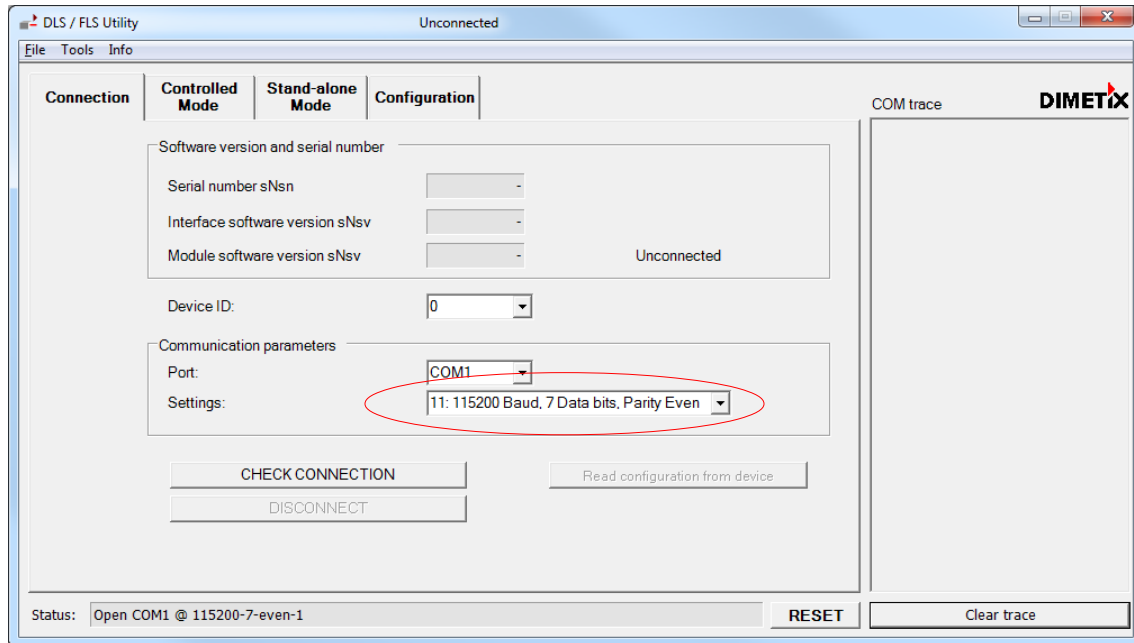


Fig. 7: Change the baud rate with the DLS/FLS UtilitySW

The DLS/FLS UtilitySW shows the window as in Fig 8. Press "Yes" to confirm, that the baud rate of the FLS-C should also be changed.

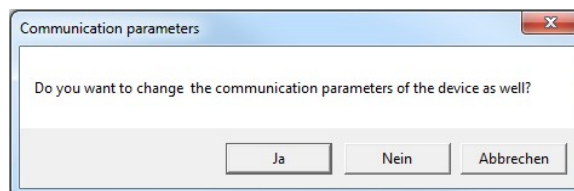


Fig. 8: Change communication parameters

Additional warning windows (Fig. 9 and Fig. 10) pop up. Press "OK" until the process is finished

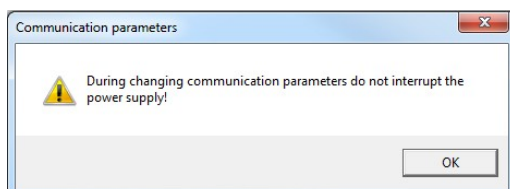


Fig. 9: Do not disconnect the power

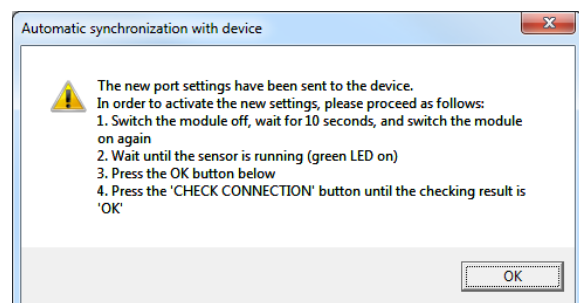


Fig. 10: Restart the FLS-C

Restart (Power off and on) the FLS-C as advised in Fig. 10 to activate the new baud rate settings.





### 4.2.2 Wiring

Connect the FLS-C to a host as shown in Fig. 11. Do not connect multiple sensors to the RS-422 interface.

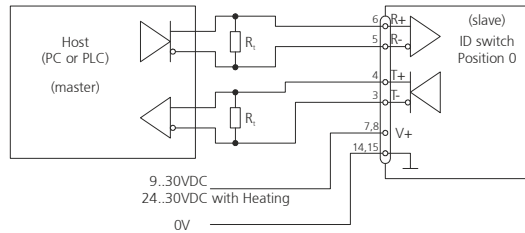


Fig. 11: Single sensor connection

## 5 Measurement mode

After the configuring the Measurement characteristic and the interfaces, the start for the measurement must be configured. The table below outlines the two different possibilities.

Controlled mode	Manual start
The measurement of the FLS-C is controlled with commands from the host. No special configuration is necessary.	The FLS-C is configured to start measuring depending on the signal on the digital input.

### 5.1 Controlled mode

In this mode, the host sends the corresponding command to start and stop the measurement.

The table below outlines a command sequence to start and stop the measurement.

No.	Action	Comment	Command
1	Set ID switch	Changes to the Device ID are activated after a power cycle. <i>Example for device 0:</i> Change the ID Switch to position 0 <i>Example for device 1:</i> Change the ID Switch to position 1	Set ID switch to position 0 Power OFF; Wait 10s; Power ON Set ID switch to position 1 Power OFF; Wait 10s; Power ON
2	Set controlled mode	Set the DLS-C(H)/FLS-C(H) to the controlled mode, if not already in controlled mode. <i>Example for device 0:</i> Set to controlled mode by means of the stop command.	$s0c < t_{rm} > ^{1)}$
4	Start single sensor tracking	Start the measurement. <i>Example for device 0:</i>	$s0h < t_{rm} > ^{1)}$
5	Stop the measurement	Stop the measurement. <i>Example for device 0:</i>	



No.	Action	Comment	Command
			s0c<trm> <sup>1)</sup>

The DLS/FLS UtilitySW can also be used as terminal to send commands to the FLS-C. You may follow the steps below to start the measurement and later stop it.

In the DLS/FLS UtilitySW select the menu "Tools\Manual command input" as shown in Fig. 12

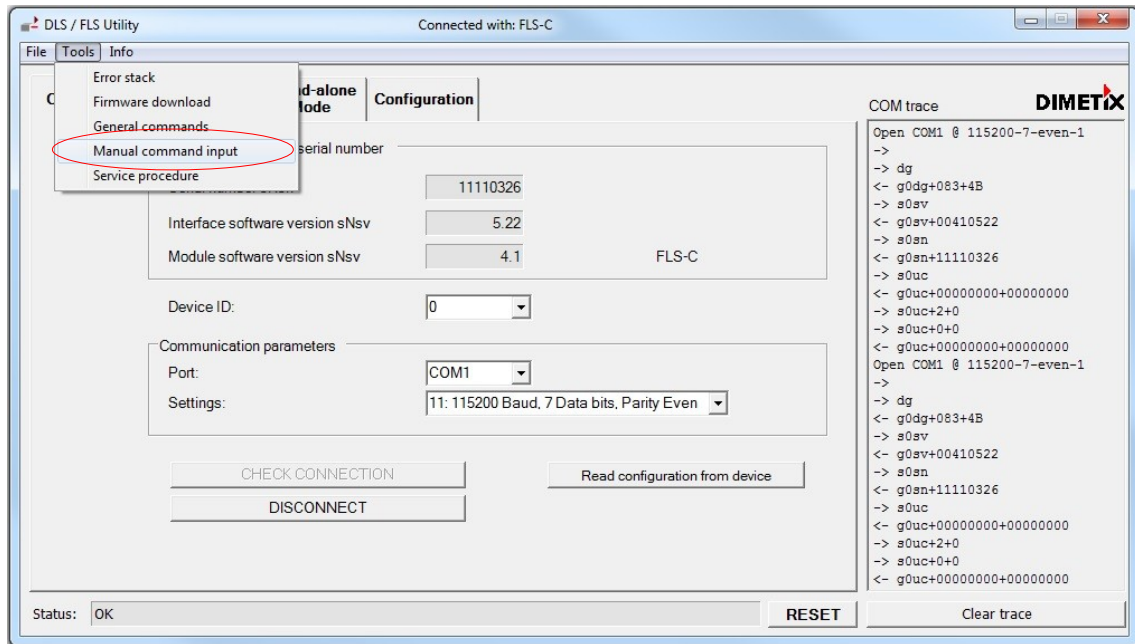


Fig. 12: Manual command input

Fig. 13 shows the "Manual command input" window. Enter the commands in the input field at the bottom of the window and press enter to execute the command. All executed commands will be displayed in the "Command history" at the right side of the window. The figure shows the window after the command `s0c` and `s0h` are executed. The "COM trace" shows the measurement results of the FLS-C.

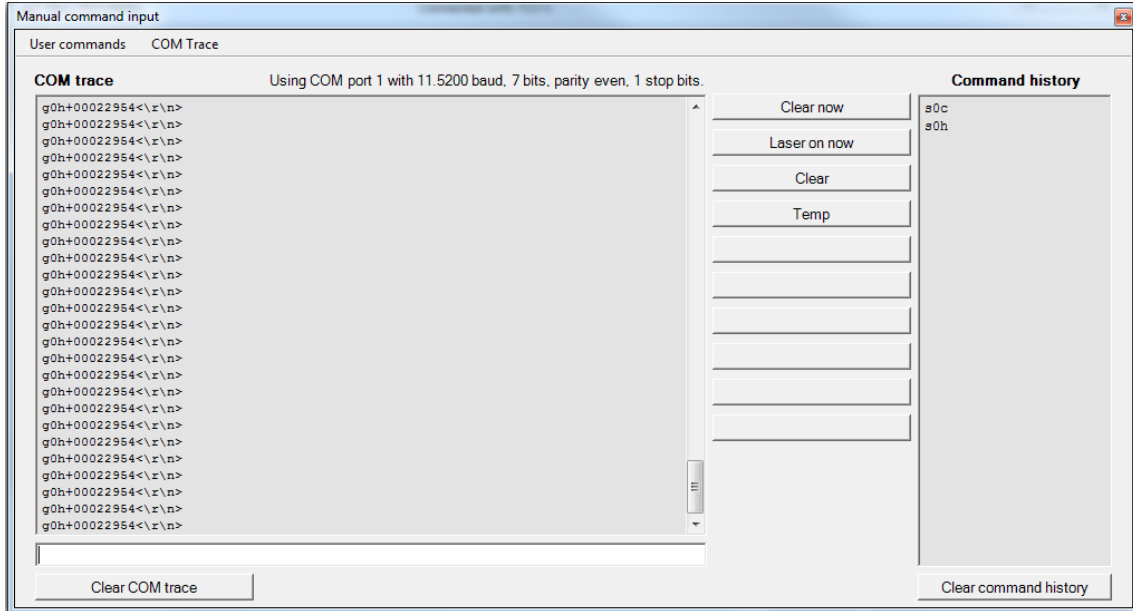


Fig. 13: Manual command input

Fig. 14 shows the "Manual command input" window after the stop command `s0c` was executed. The measurement is now stopped.

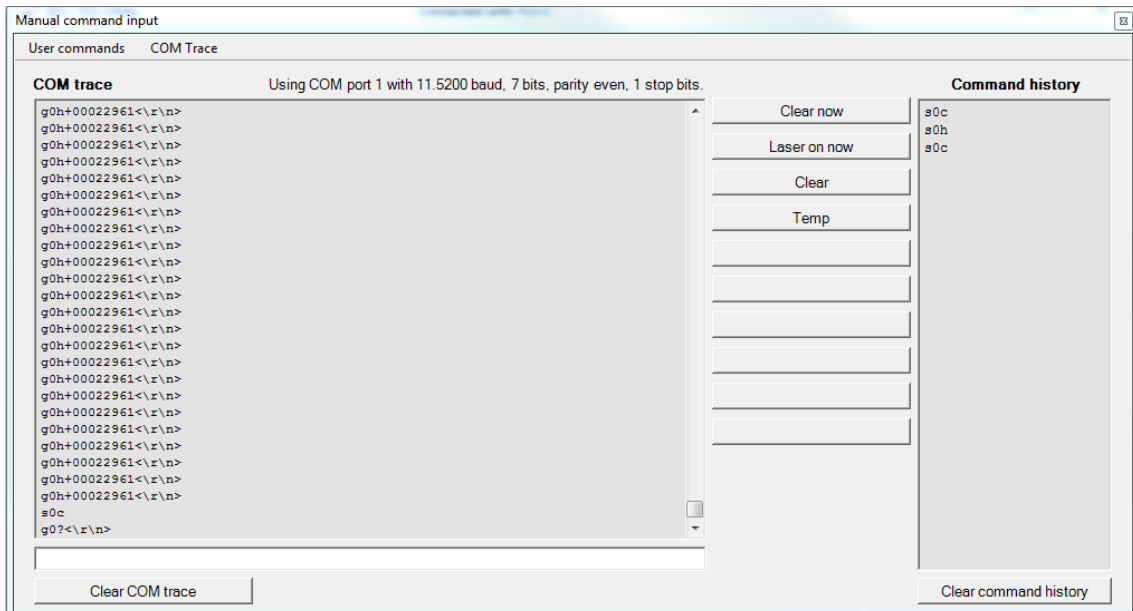


Fig. 14: Manual command input after stop command

## 5.2 Manual start

In Manual start operation, the measurement is controlled by the digital input of the FLS-C. The function of the digital input can be configured with the DLS/FLS UtilitySW as shown in Fig. 15.

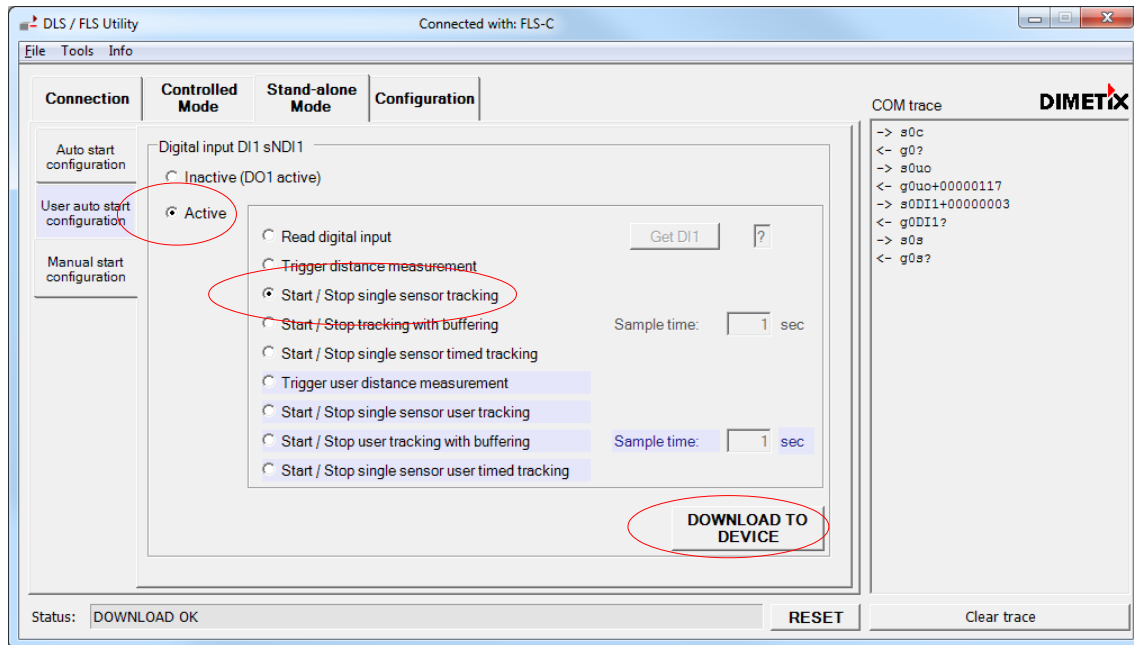


Fig. 15: Manual start configuration (Digital input)

On the "Stand-alone Mode" tab, select the sub tab "Manual start configuration", select "Active" in the "Digital input DI1 sNDI1" area. Additionally select "Start / Stop single sensor tracking". Then press the "DOWNLOAD TO DEVICE" button. Now the sensor starts measuring when the digital input goes to high level and stops measuring if the digital input goes to low level.

### 5.2.1 Digital input connection

After the digital input is configured and connected as shown in Fig. 16. The measurement of the sensor can be controlled with an external switch or relays.

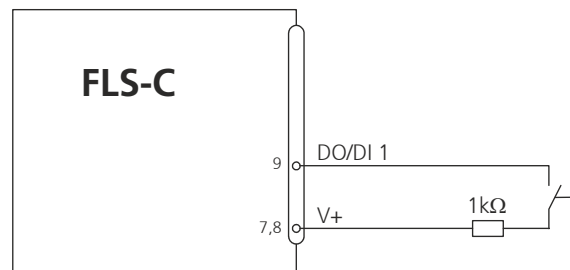


Fig. 16: Digital input wiring

