

Application Note

AN2019

FLS-C

Moving target characteristic with SSI

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.



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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. While the FLS-C is measuring with 200Hz the “SSI” interface is the best choice to transfer the measured results to the host system. This digital interface is fast and has no additional noise.

In addition the analog output is updated with 200Hz also.

The disadvantage of the analog interface is the accuracy, that depends on the configured distance range. In addition noise will be added to the analog signal.

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

1.1 Feedback positioning

Fig. 1 shows a typical positioning application, that uses “Moving target characteristic”. In this application, the FLS-C laser distance sensor measures absolute distances, that can be used as real time feedback for the position controller implemented in the drive.

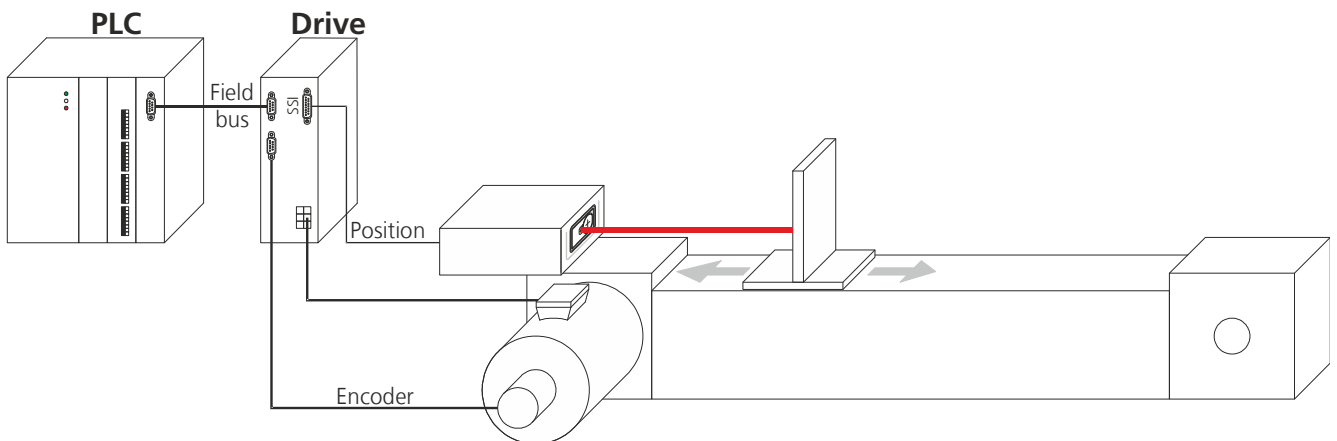


Fig. 1: Positioning application with feedback controller



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.

Sensor	Part No	Short description
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.

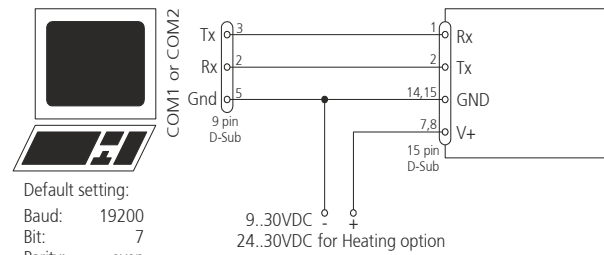


Fig. 2: Configuration connection

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



2.1 Connect 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.

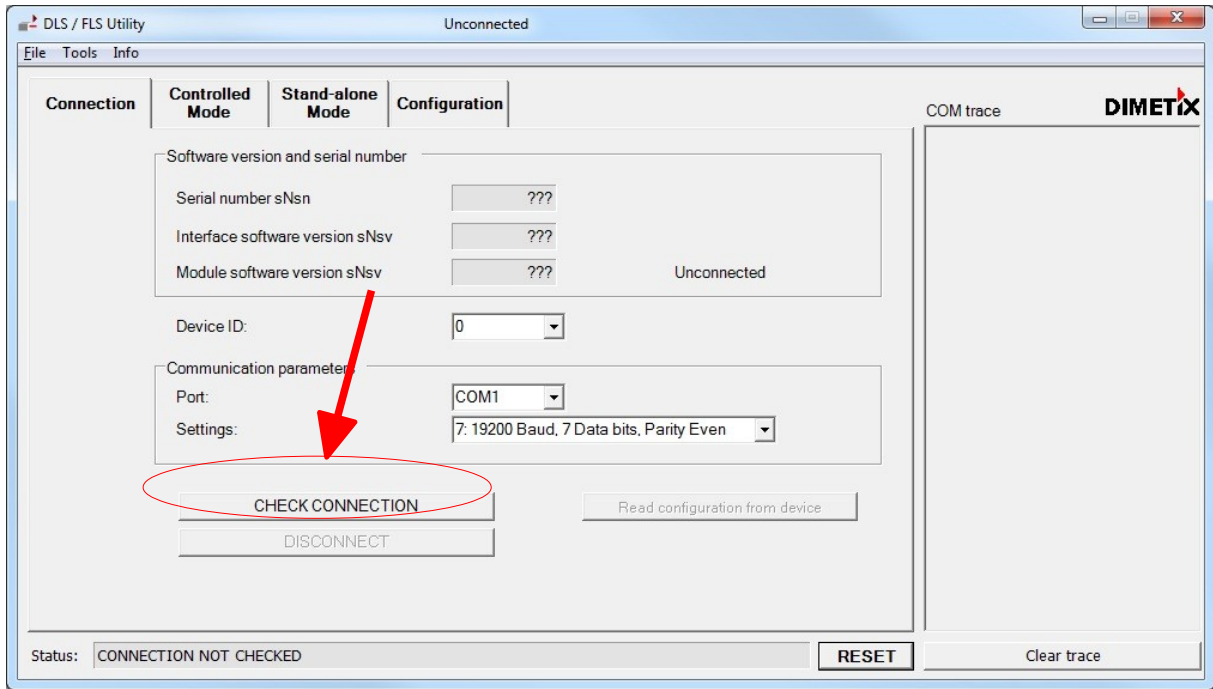


Fig. 3: Start window of the DLS/FLS UtilitySW

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.

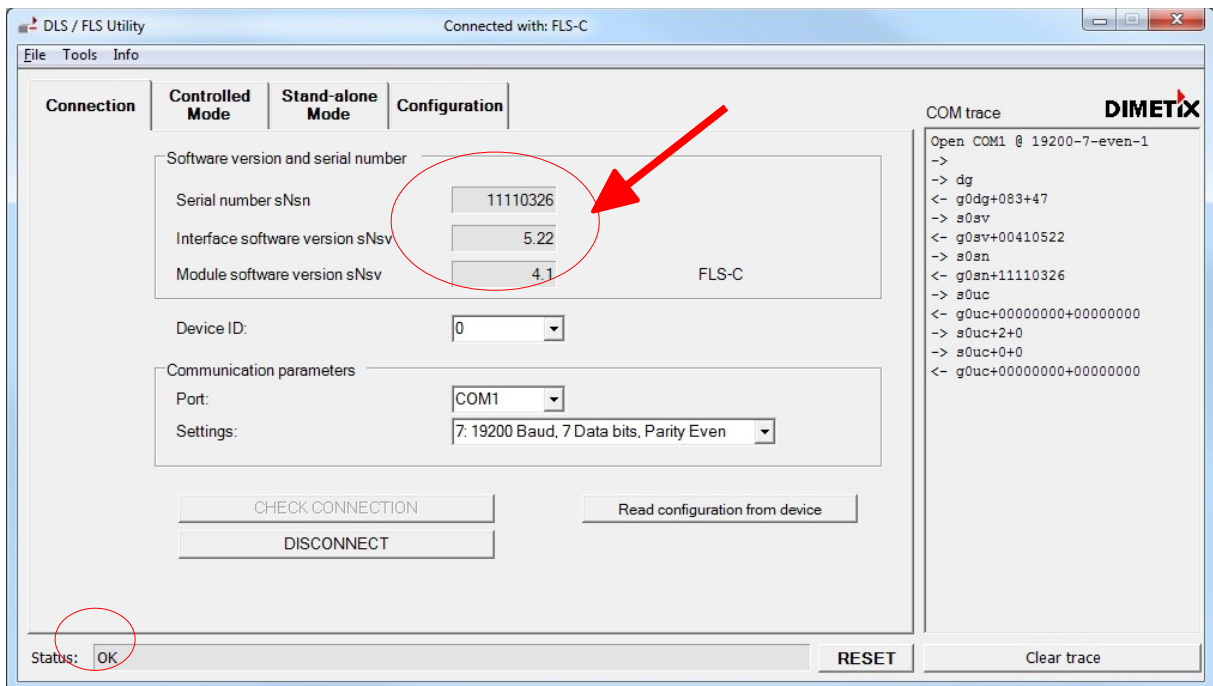


Fig. 4: Start window after "CHECK CONNECTION" procedure



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.

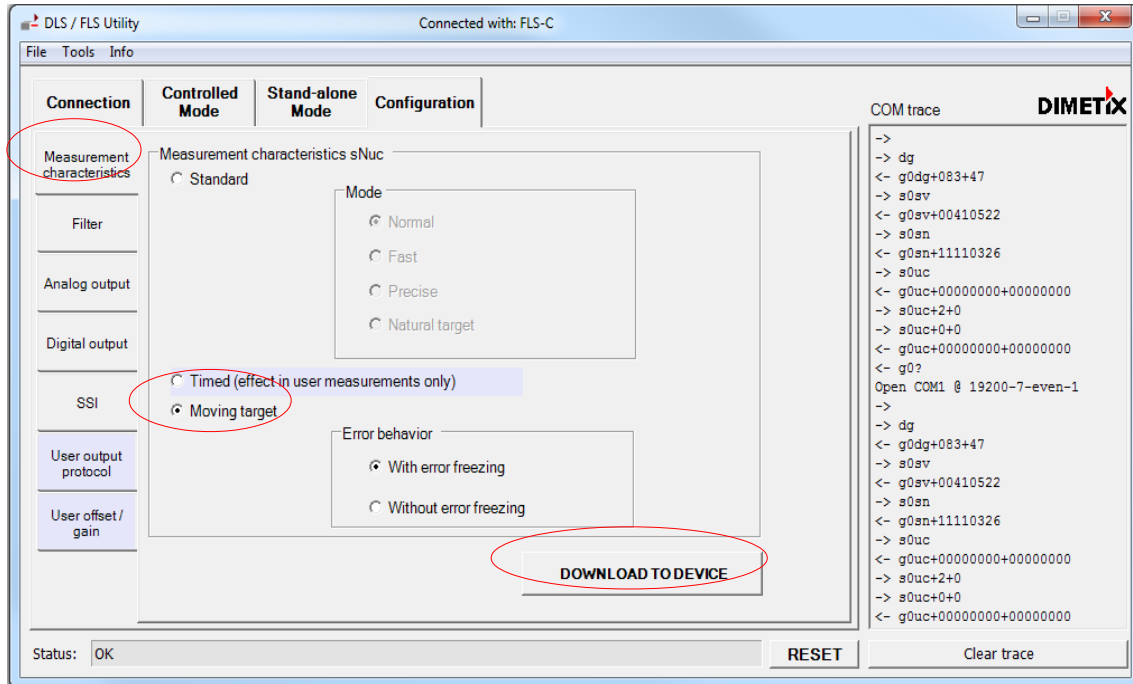


Fig. 5: Configuration of the "Moving target characteristic"



4 Interface setup

4.1 General

While the FLS-C measures with “Moving target characteristic” the measured distances are available on all interfaces. The following examples show the use of different interfaces.

4.2 SSI

The FLS-C device contains a SSI interface, that operates as SSI slave. This interface shares the connection pins with the integrated RS422 interface. Hence the RS422 and the SSI interface can not be used at the same time. While the FLS-C device is a SSI-slave the host has to be the SSI-master, which generates the clock.



**Never connect the FLS-C to a SSI master before the interface is configured as SSI.
Always configure the interface before connecting to the master.**

4.2.1 Configuration of the SSI output

On the “Configuration” tab, select the “SSI” sub tab on the left. In the “4-pole serial port usage sNSSI” area select SSI to deactivate the RS-422 interface and activate the SSI interface and set the SSI configuration corresponding to the configuration of the SSI master.

Further define the output value in case of an error as shown in Fig. 6. After configuring all options press the “DOWNLOAD TO DEVICE” button to save the settings in the FLS-C.

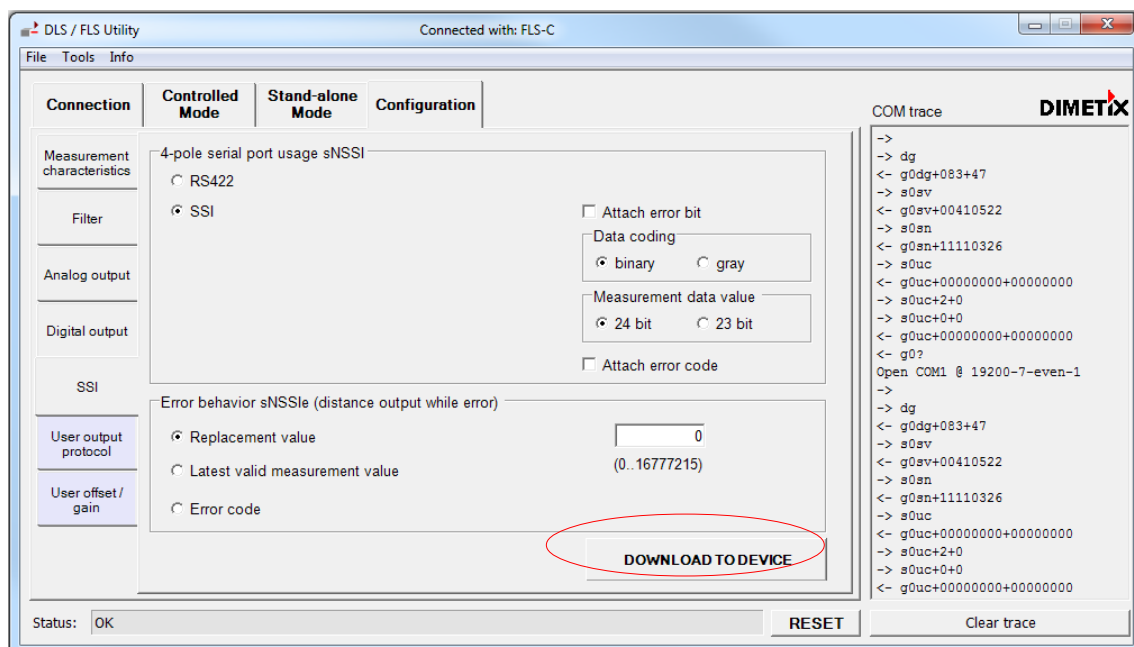


Fig. 6: SSI interface configuration



Data format

The following figure shows the format of the output with the maximum length. Error code and Error bit can be switched of and the data can be reduced to 23 bit. The data can be either binary or gray coded.



Error behavior

In case of an error the data field contains a replacement value, the last valid distance or the error code, depending on the configuration.

4.2.2 Wiring



**Never connect the FLS-C to a SSI master before the interface is configured as SSI.
Always configure the interface before connecting to the master.**

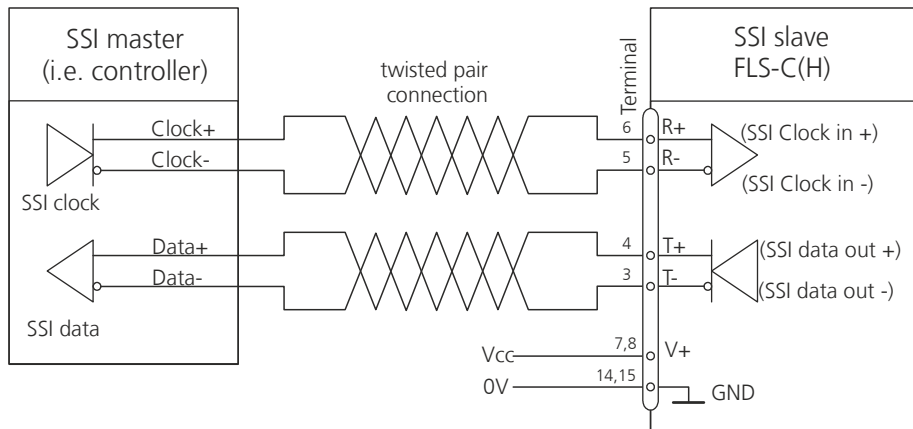


Fig. 7: SSI interface connection

Connect the SSI interface to the SSI master as shown in Fig. 7. As soon as the master activates the clock, the FLS-C returns the SSI data. For more detailed information about the SSI interface see the Technical Reference Manual and AN2002 FLS-C SSI Interface.



4.3 Analog / Digital

The analog and digital outputs are updated after each measurement executed by the FLS-C. The scaling of the analog output and the switching limits of the digital outputs can be configured with the DLS/FLS UtilitySW.

4.3.1 Configuration of the analog output

In the DLS/FLS UtilitySW select the "Configuration" tab and open the "Analog output" sub tab on the left. Fig. 8 shows the configuration of the analog output for the following settings.

<i>Distance</i>	<i>Current</i>	<i>Situation</i>	<i>Current</i>
10m	20mA	Error	2mA
0m	4mA	Cable break	0mA

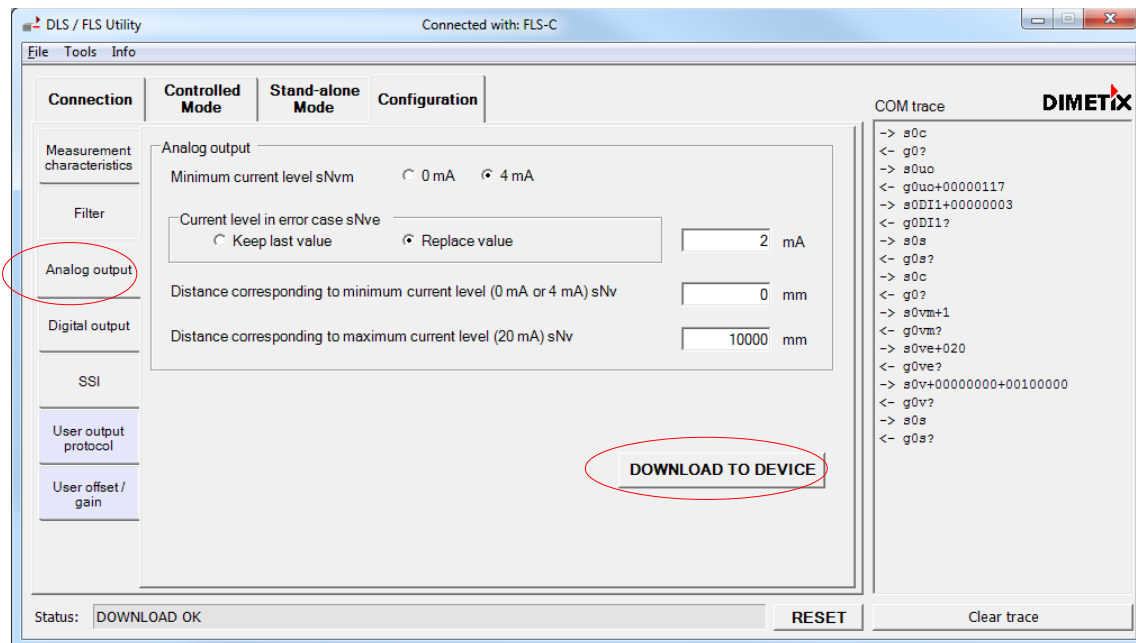


Fig. 8: Analog output configuration

After setting the values as shown in Fig 8 press the "DOWNLOAD TO DEVICE" button to save the configuration in the FLS-C.

4.3.2 Configuration of the digital output

Fig. 9 shows a possible configuration of the digital outputs. In this example, the digital output 2 will switch off, if the distance is over 1005mm and switch on if below 995mm, hence the hysteresis is 10mm.

On the "Configuration" tab, select the "Digital output" sub tab on the left and set the values as shown in Fig. 9. After configuring all options press the "DOWNLOAD TO DEVICE" button to save the settings in the FLS-C.

If you use manual start (see Fehler: Referenz nicht gefunden Fehler: Referenz nicht gefunden), digital output 1 can not be used, since this pin will be used as digital input to trigger the measurement.

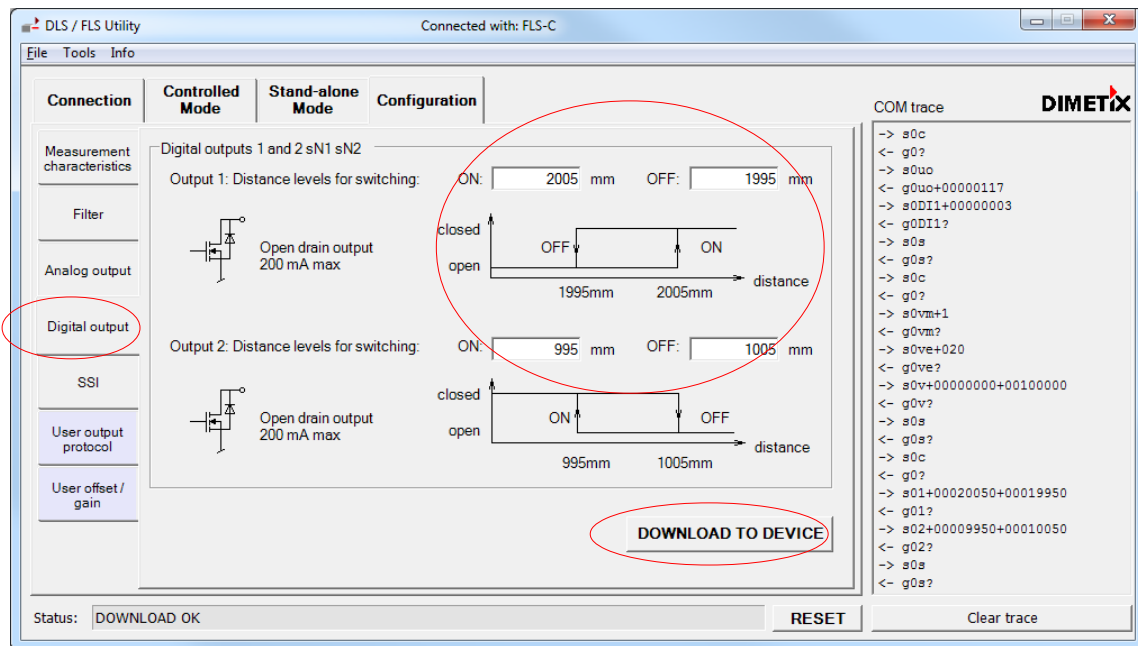


Fig. 9: Digital output configuration

4.3.3 Wiring

Fig 10 shows how to connect the analog and digital output.



If you use "Manual start" configuration (see Fehler: Referenz nicht gefunden Fehler: Referenz nicht gefunden) do not use DO1 as output.

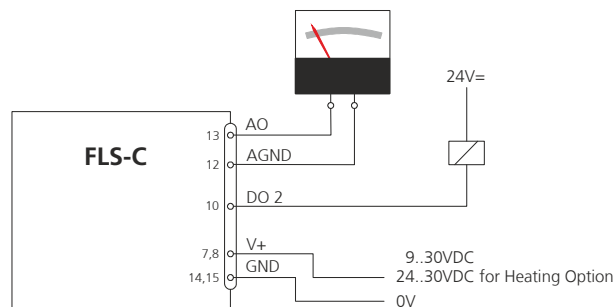


Fig. 10: Analog and digital output connection



5 Measurement mode

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

Auto start	Manual start
The FLS-C is configured to start measuring after power on automatically.	The FLS-C is configured to start measuring depending on the signal on the digital input.

5.1 Auto start

Use this configuration if the sensor should start measuring automatically after every power on.

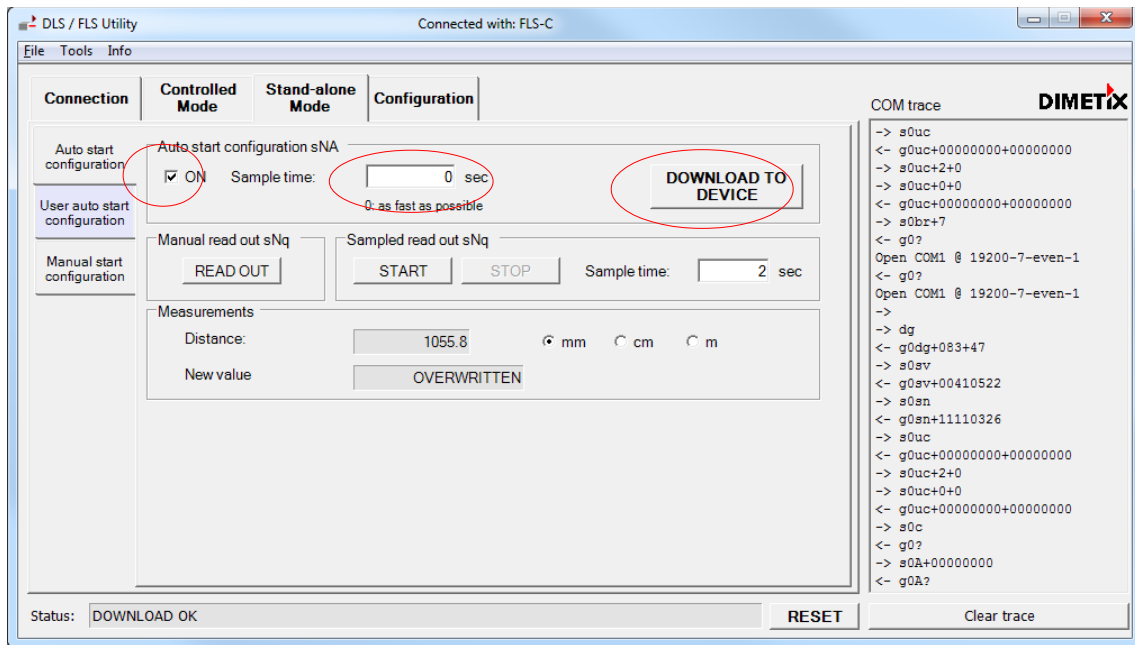


Fig. 11: Auto start configuration

In the “Stand-alone Mode” tab, select “Auto start configuration” sub tab on the left. As shown in Fig. 11, check the “ON” box and set the “Sample time” input field to 0 sec for fastest possible measurement.

As soon as you press the “DOWNLOAD TO DEVICE” button, the device starts to measure. Now the FLS-C is configured to start measuring every time after power on.

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. 12.

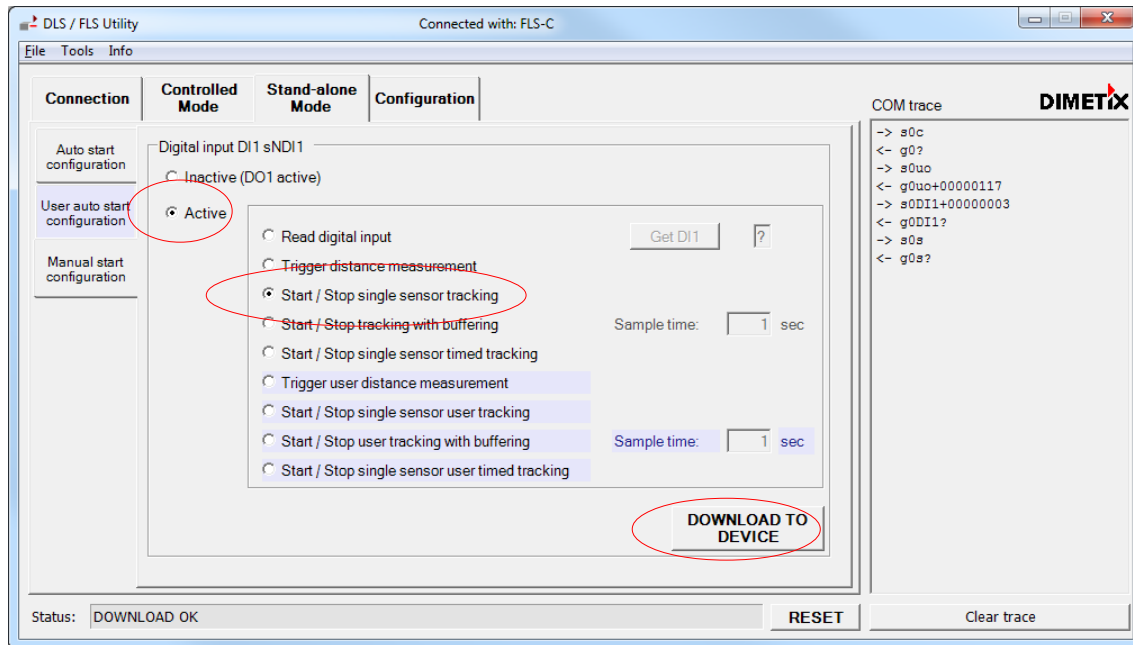


Fig. 12: Manual start configuration (Digital input)

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. 13, the measurement of the sensor can be controlled with an external switch or relays.

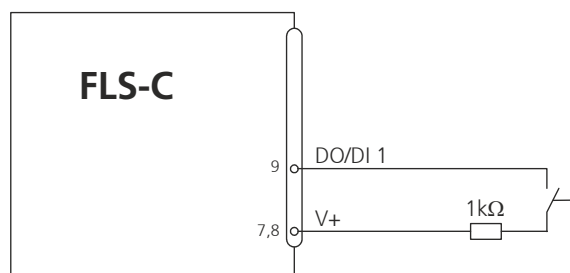


Fig. 13: Digital input wiring

