Application Note

AN2020

D-Series / C-Series

Positioning with Dimetix distance sensor and SEW inverter

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Abstract

This application describes how to use the D-Series and C-Series laser sensor in a positioning application in conjunction with a SEW servo drive. The necessary configuration of the D-Series and C-Series laser sensor and the SEW inverter are described in this document. Further the wiring is also documented.

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1 Introduction

The laser distance sensor measures absolute distances. It is suitable for positioning applications to measure the actual feedback position. Figure 1 shows a general setup for such an application.

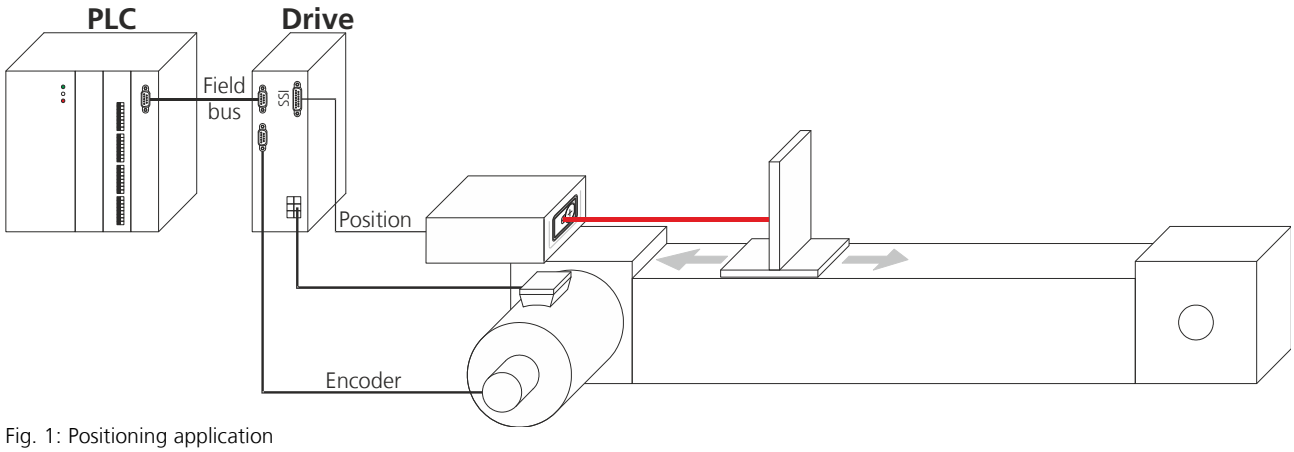


Fig. 1: Positioning application

In this application note a SEW Eurodrive inverter is used to control the motor. The position is measured by a D-Series or C-Series sensor of Dimetix. The setup of the sensor, the cable connection and the configuration of two product series (MOVIDRIVE® B, MOVIAXIS®) are described.

1.1 SEW-System requirements

Hardware:	MOVIDRIVE® B with encoder card DEU 21B or MOVIAXIS® with encoder card XGS		
Firmware versions:	MOVIDRIVE® B:	>=	18220916.15
	MOVIAXIS®	>=	.28
	DEU21B:	>=	.11
	XGS	>=	.12
	MOVITOOLS® MOTION STUDIO	>=	5.80 SP2 (Service-Pack2)

2 Configuration

This chapter is a step by step configuration example. Just do each single step described later in this to configure the sensor for the positioning application. For the C-Series sensor please change to chapter 2.2.

2.1 Setup of the D-Series sensor

2.1.1 Reset of D-Series sensor

Before proceeding, it is recommended to reset the sensor to its factory defaults. But keep in mind that all previously done settings will be lost when performing a factory reset.

Steps	Description
1	Switch off the power supply used for the device
2	Press the reset push button and keep it pressed
3	Switch on the power supply used for the device
4	Keep the reset push button pressed until all status LED's (POWER, ERROR, DO1, DO2) flash for a short time (about 0.5 seconds)
5	Release the reset push button
6	Switch off the power supply and wait 5 seconds
7	Switch on the power supply and wait until the green status LED (POWER) is on
8	Reset procedure executed successfully

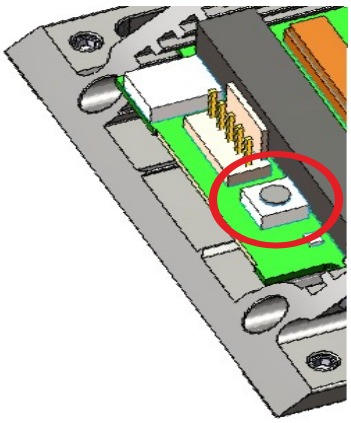
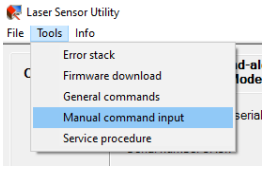
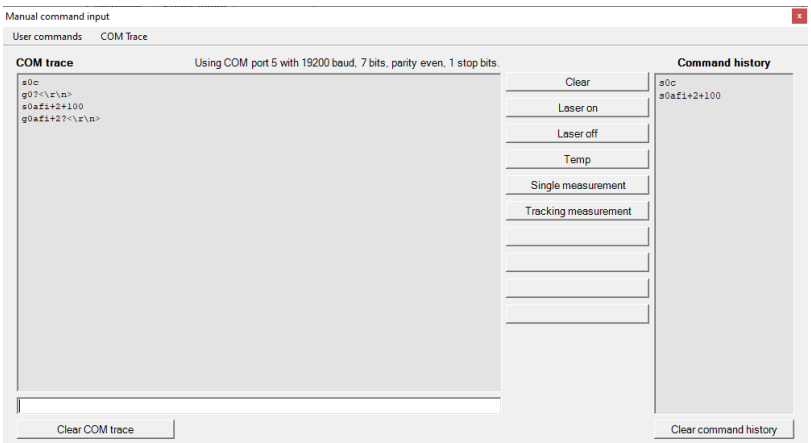


Fig. 2: Reset push button

2.1.2 Connection of Laser Sensor Utility with D-Series sensor

Steps	Description
1	Connect the laser sensor over USB or RS-232 to the PC, start the Laser Sensor Utility software and check the connection. Download and install the latest "Laser Sensor Utility" software (www.dimetix.com/UtilitySW).
2	If the **SSI frequency** only works at **125kHz**, please download the special firmware file in step **2a**. Otherwise, if the **SSI frequency is higher than 125kHz** (recommended is **1MHz**) jump to step **3**.
2a	Download the special interface board firmware for the sensor **(only for SSI with 125kHz)**: a) Menu Tools => Firmware download => Download interface board firmware file b) Select the following firmware file: "DSERIES_IF_FW_V99_11_PAR_V2_SSI_RevisedStartSequence.dls" c) Wait until download is finished and sensor is reconnected d) Close the download window
3	Download the configuration file "Dserie_10_SEW_24012023.cfg" with the "Laser Sensor Utility". Therefore click on Menu File => Download configuration file to device.
4	Select the configuration file: "Dserie_10_SEW_24012023.cfg"
5	Test the sensor with the SEW-System. If the measurements are not accurate enough for your control unit, a special filter can be activated: see steps 6-8.
6 optional	Connect the sensor again with the laser sensor utility. If needed, set the special moving target filter length. Therefore click on Menu Tools => Manual command input 
7 optional	Activate the special filter with the command: *Send:* **s0c** *Answer: g0?* *Send:* **s0afi+2+100** Description: 100 is the filter length, min. value: 1 and max. value: 400 *Answer: g0afi+2?* *Send:* **s0A+0** 
8	Close manual command window and try again.

optional	If needed, adjust the filter length s0afi+2+xxx with an other value (see steps 6-8)

2.1.3 Cable connection D-Series

The D-Series sensor must be connected to the DEU21B/XGS of the MOVIDRIVE® B or the MOVIAXIS®. Connect the D-Series sensor with the internal screw terminal.

2.1.4 Connection of D-Series

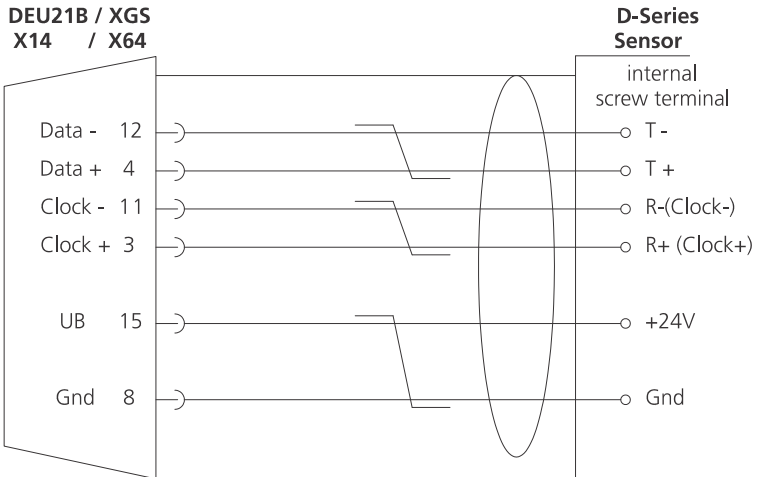


Fig. 3: Connection from D-Sub to screw terminal

2.1.5 Error handling D-Series

In the configuration for the D-Series Sensor the error behavior “Latest valid measurement value” is selected. In an error case (e.g. distance out or range E234) the last valid measurement is frozen until the sensor can measure again (without an error).

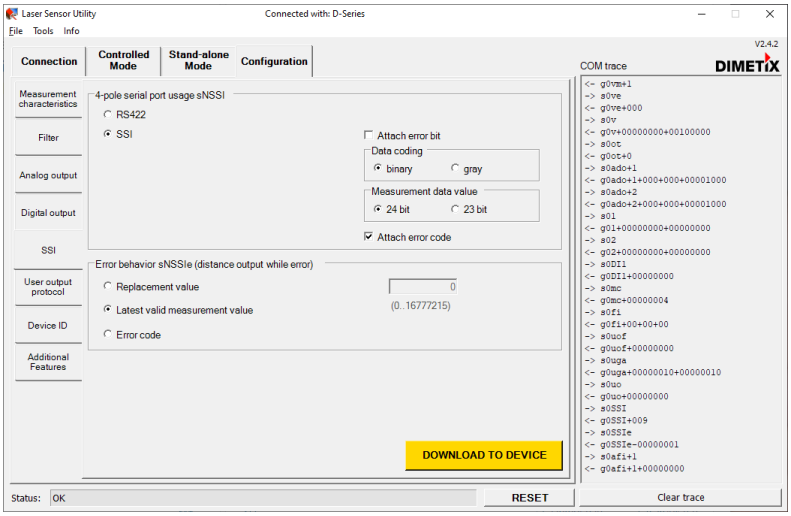


Fig. 4: Latest valid measurement value is selected

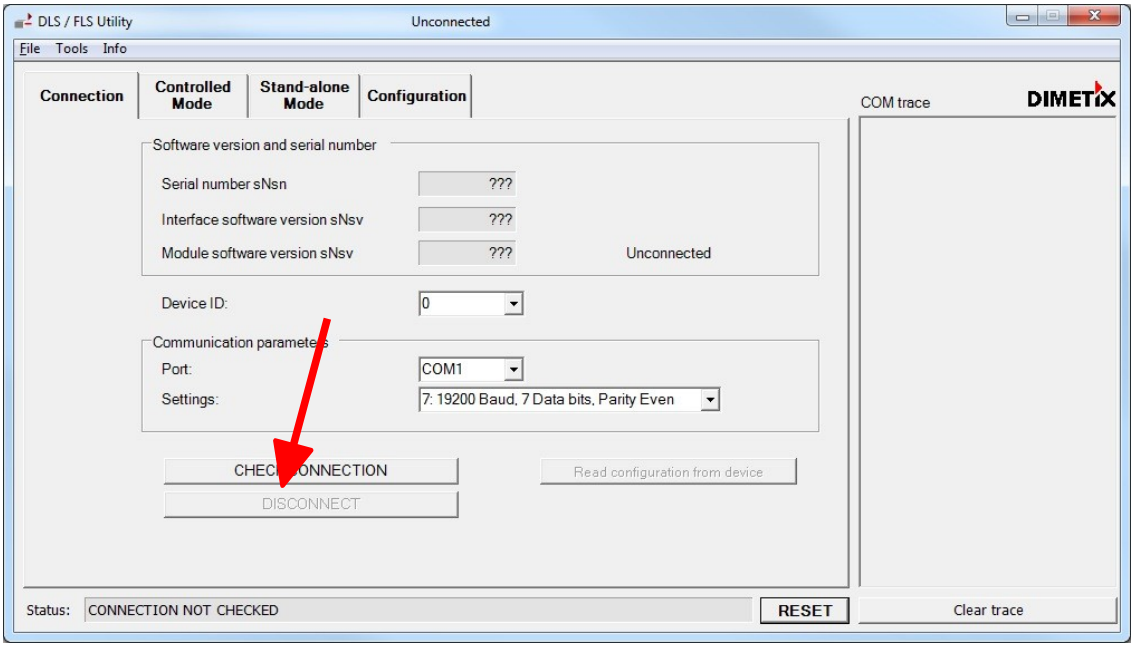
2.2 Setup of the FLS-C

2.2.1 Preparation FLS-C

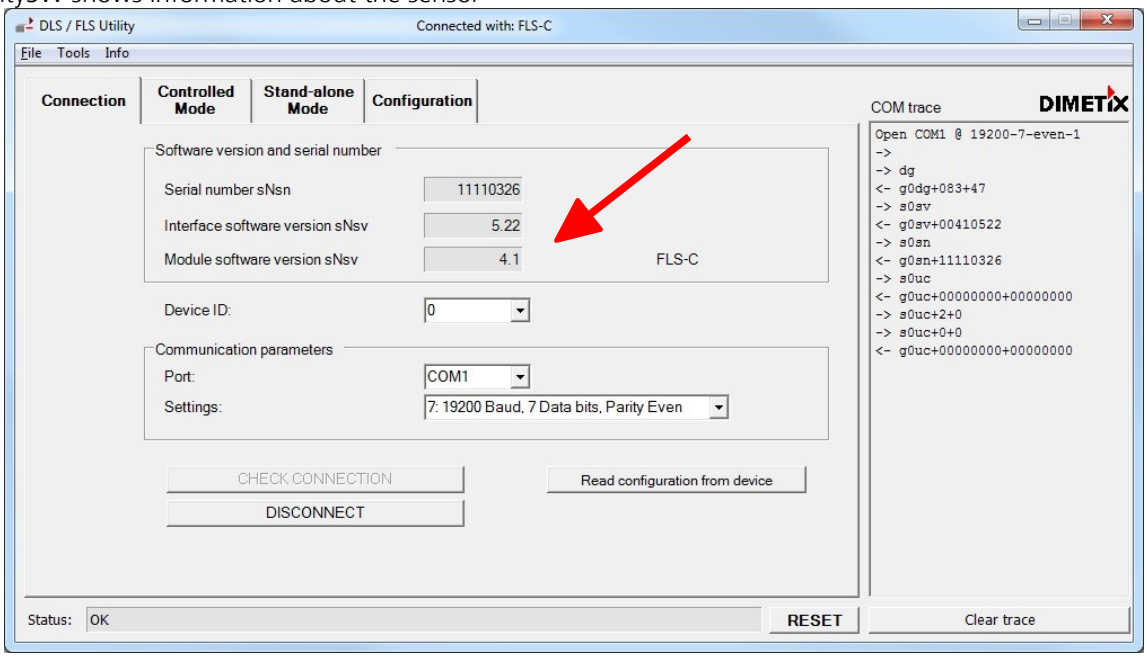
1. The following items are needed to do the configuration of the FLS-C.
   - RS-232 Configuration cable FLS / DLS (Part no. 500200)
   - 24V DC Power supply
2. Download the UtilitySW from the website www.dimetix.com/lnk/sew and install it on a PC.
3. Download the configuration file and safe it on the PC.

To setup the FLS-C sensor, connect the sensor to a serial interface of a PC and power the sensor with 24VDC. Start the UtilitySW and follow the steps below.

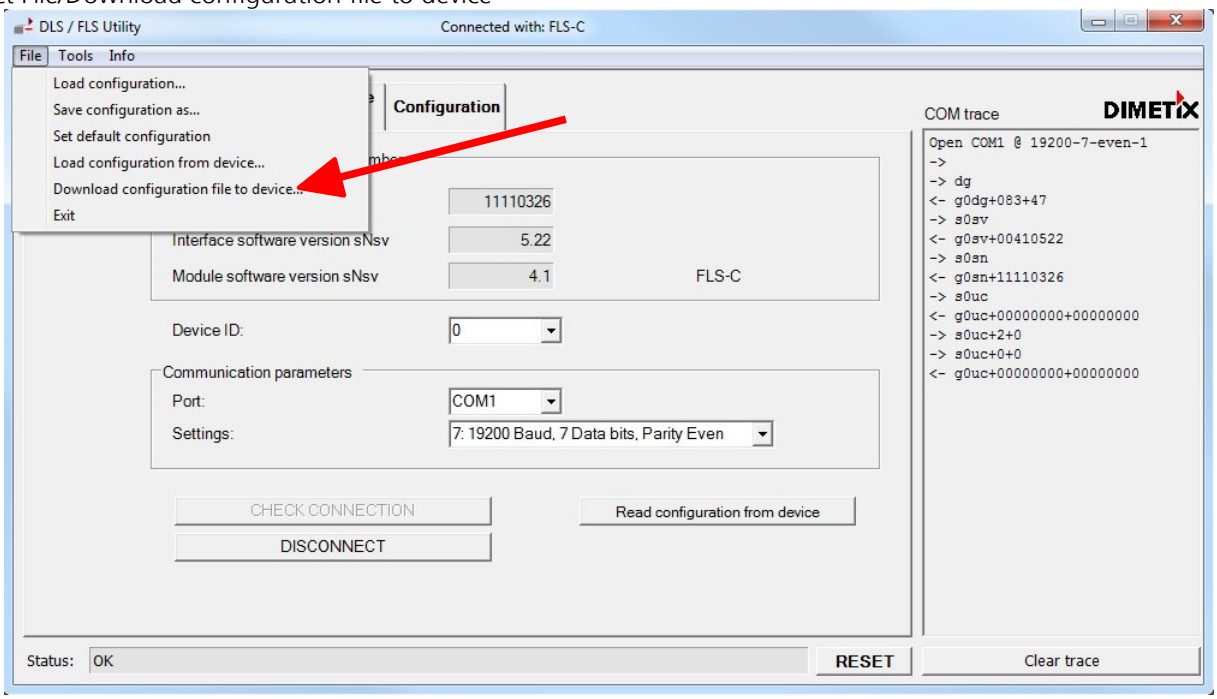
Check the connection to the sensor



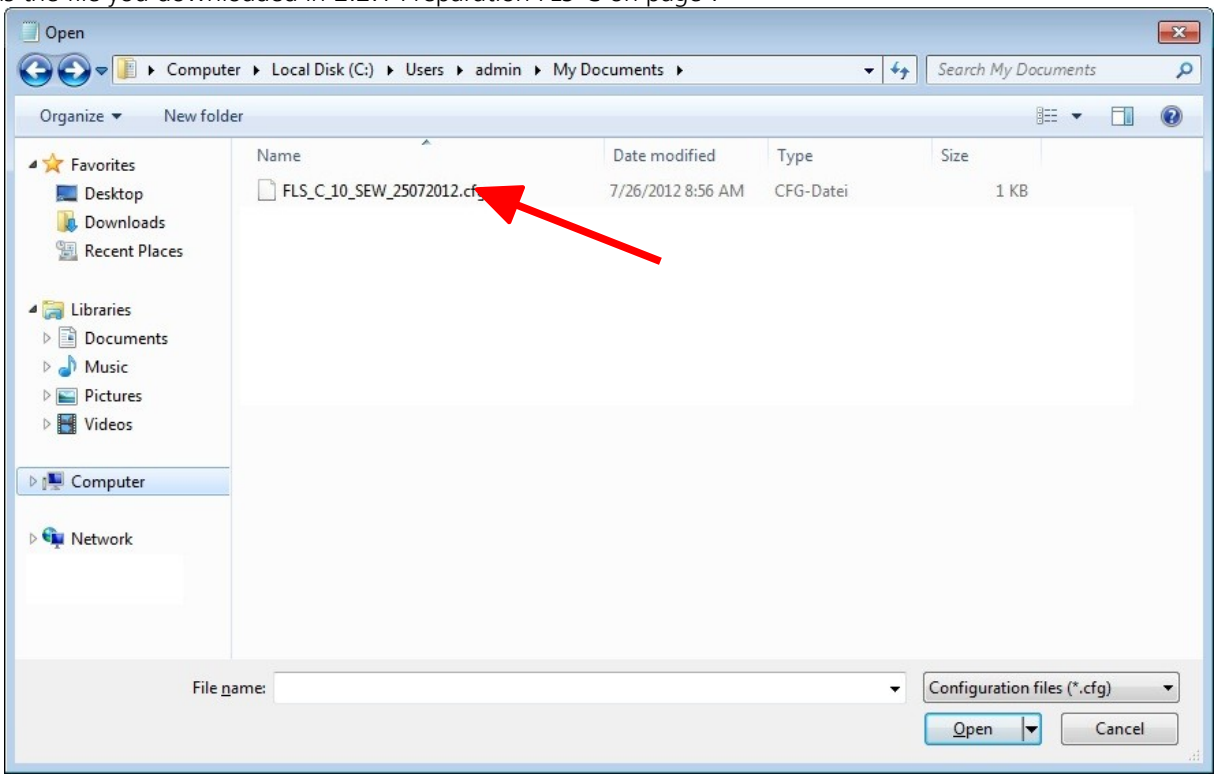
The UtilitySW shows information about the sensor



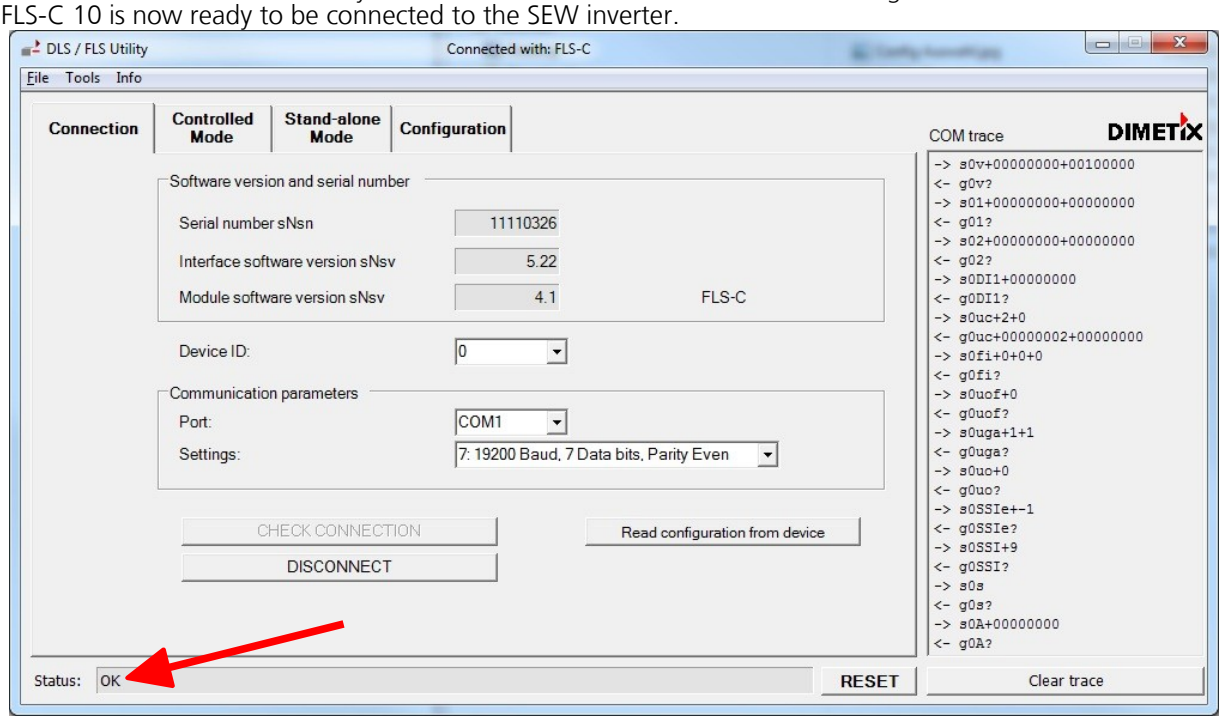
Select File/Download configuration file to device



Select the file FLS_C_10_SEW_25072012.cfg.
This is the file you downloaded in 2.2.1 Preparation FLS-C on page 7



An OK in the status line of the UtilitySW indicates a successful transfer of the configuration.
The FLS-C 10 is now ready to be connected to the SEW inverter.



2.2.2 Cable connection FLS-C

The FLS-C sensor must be connected to the DEU21B/XGS of the MOVIDRIVE® B or the MOVIAXIS®. Following different possibilities are documented. Connect the FLS-C sensor with a 15 pin D-sub connector or an internal screw terminal.

Connection of FLS-C (without heating)

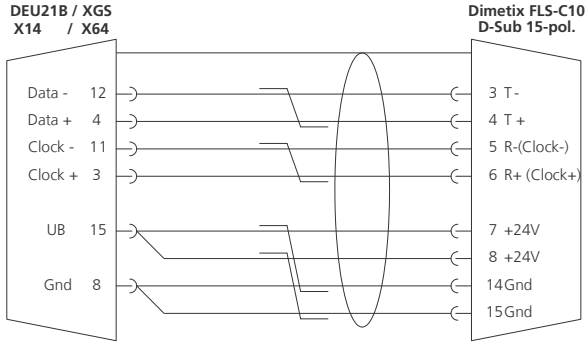


Fig 1: Connection from D-Sub to D-Sub

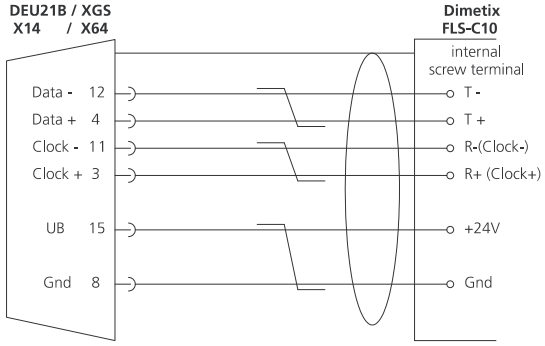


Fig 2: Connection from D-Sub to screw terminal

Connection of the FLS-CH (with heating)

If using a FLS-CH device with integrated heater, an external power supply must be used. Please do the wiring as shown in the following diagram.

The FLS-CH includes a heater and therefore the current consumption is up to 2.5A. As a result, the supply of power from the DEU21B/XGS is not possible.

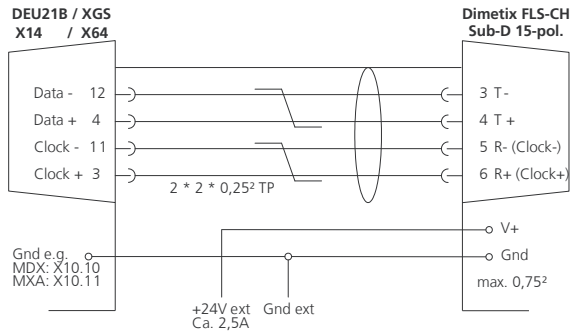


Fig 3: Connection from D-Sub to D-Sub

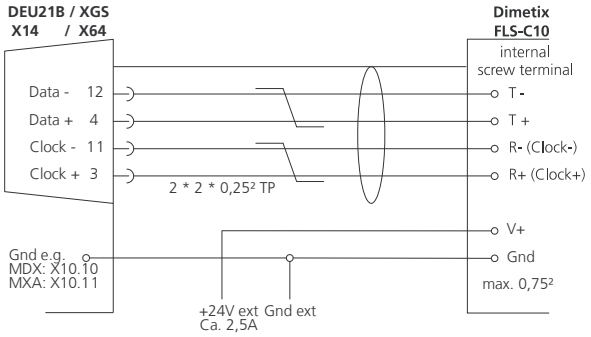
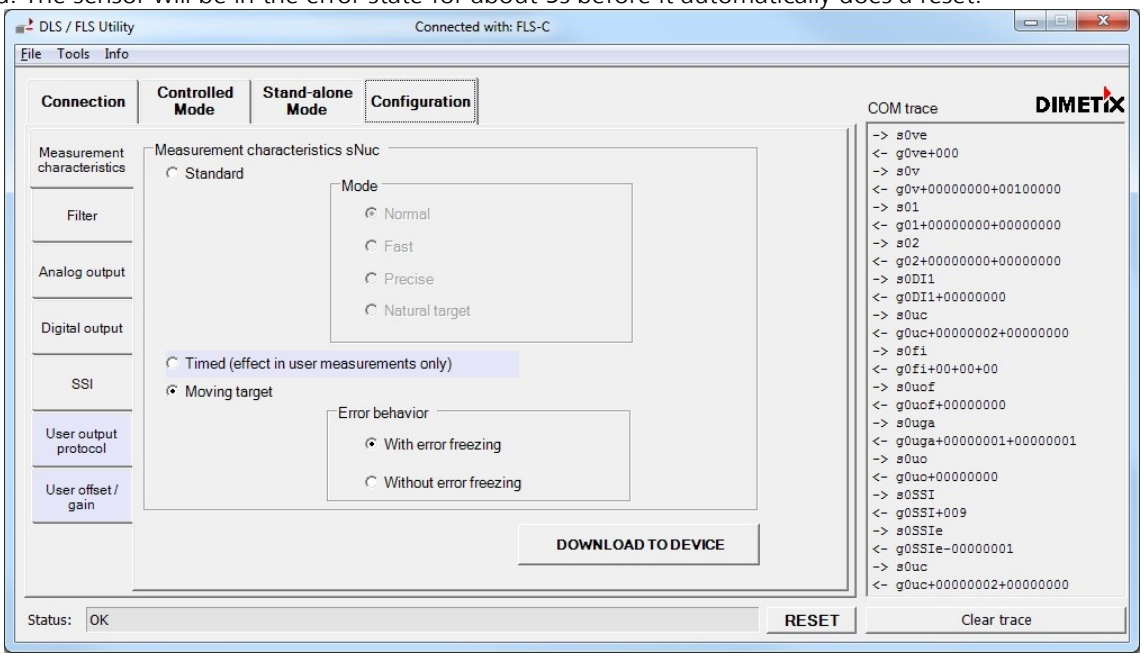


Fig 4: Connection from D-Sub to screw terminal

Install a proper ground connection between the ground of the FLS-C and the MOVIDRIVE® B / MOVIAXIS®.

2.2.3 Error Handling FLS-C

In the configuration for the FLS-C "With error freezing" is selected. Therefore an error (e.g. a position jump) will be detected. The sensor will be in the error state for about 5s before it automatically does a reset.

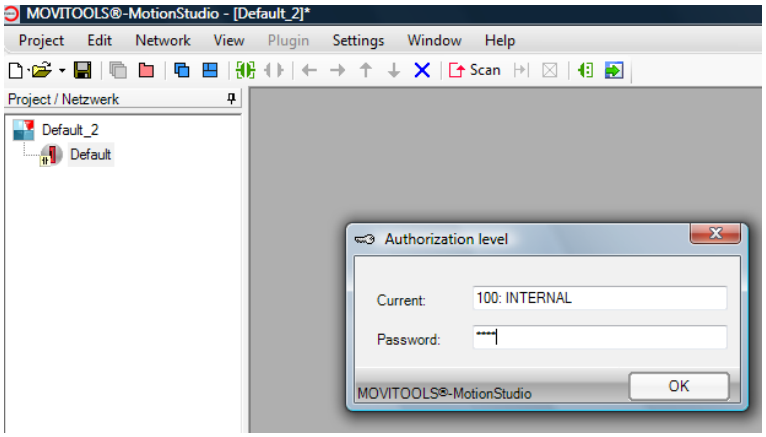


2.3 Error Handling MOVITOOLS® MOTION STUDIO

The MOVIDRIVE® B-inverter registers errors of the FLS-C Distance Sensor. Examine them in the Fault History of the inverter.

To display the error with the MOVITOOLS® MOTION STUDIO, change the settings of the MOVITOOLS® MOTION STUDIO to 'Internal mode'.

Activate this mode under Settings / Authorization level: Password = ****[1] -> OK.

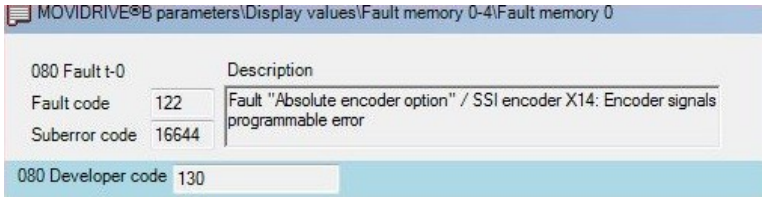


The encoder diagnostics via MOVITOOLS® MOTION STUDIO or PLC is only available with MOVIDRIVE® B. MOVIAXIS® does not support this function.

[1] To get the code, you may ask Dimetix (sales@dimetix.com).

The field 080 Developer code shows the error code. Add 200_{dec} to the displayed value to get the error code corresponding to the FLS-C Distance Sensor reference Manual.

In this example, the fault memory 0 (last fault) is shown in the picture.



The field 080 Developer code is 130. Add 200 to it to get error 330, which corresponds to the Dimetix Error 330 Distance jump.

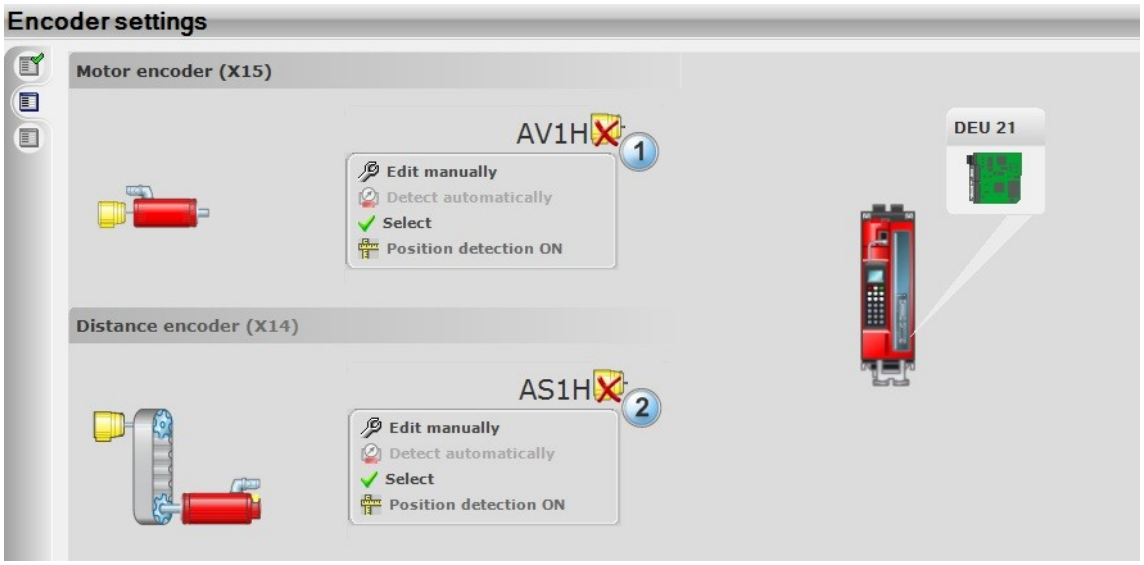
2.4 Error Handling PLC

Read out the error code with the parameter service of the PLC:

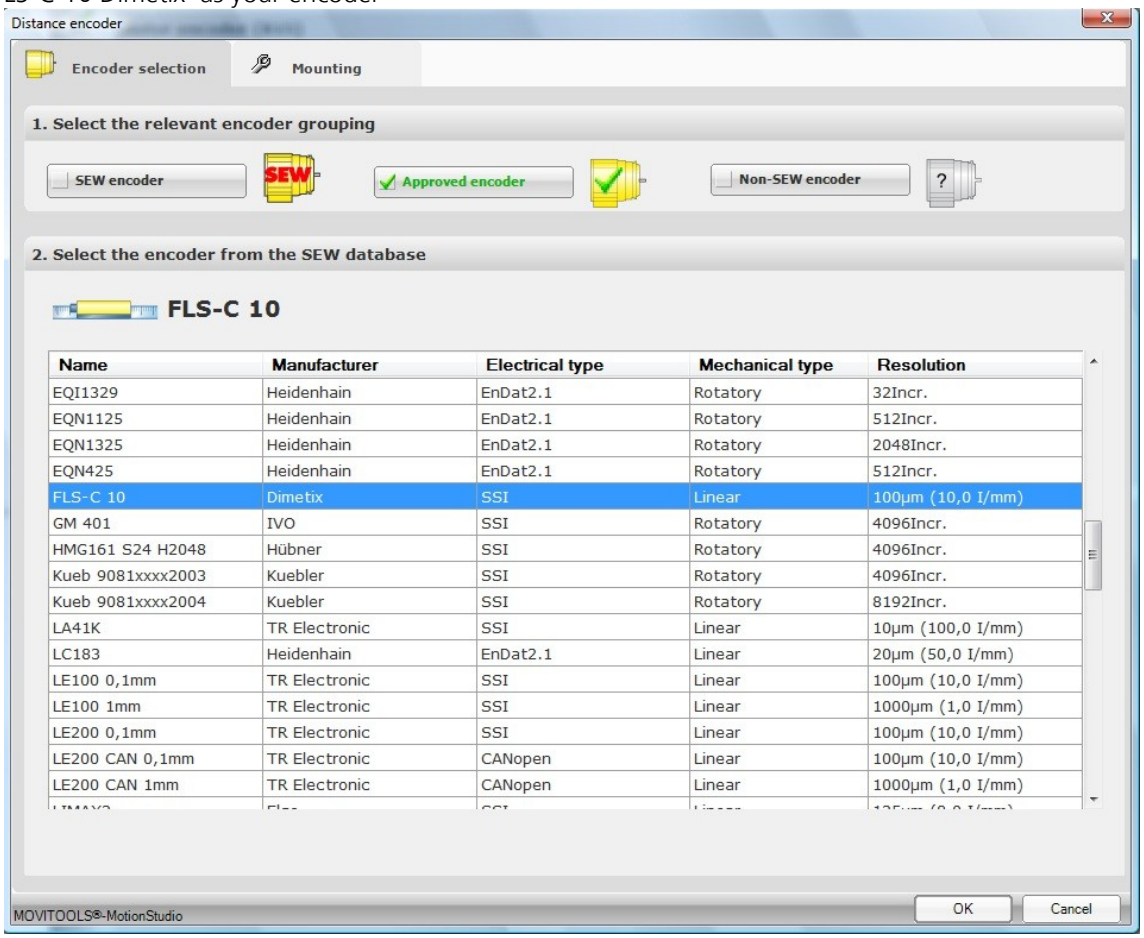
- Read the index 8883.0 of the MOVIDRIVE® B for remote diagnosis.
  Add 200_{dec} to get the error code corresponding to the Dimetix error list.

3 MOVIDRIVE® B Setup for D-Series and C-Series

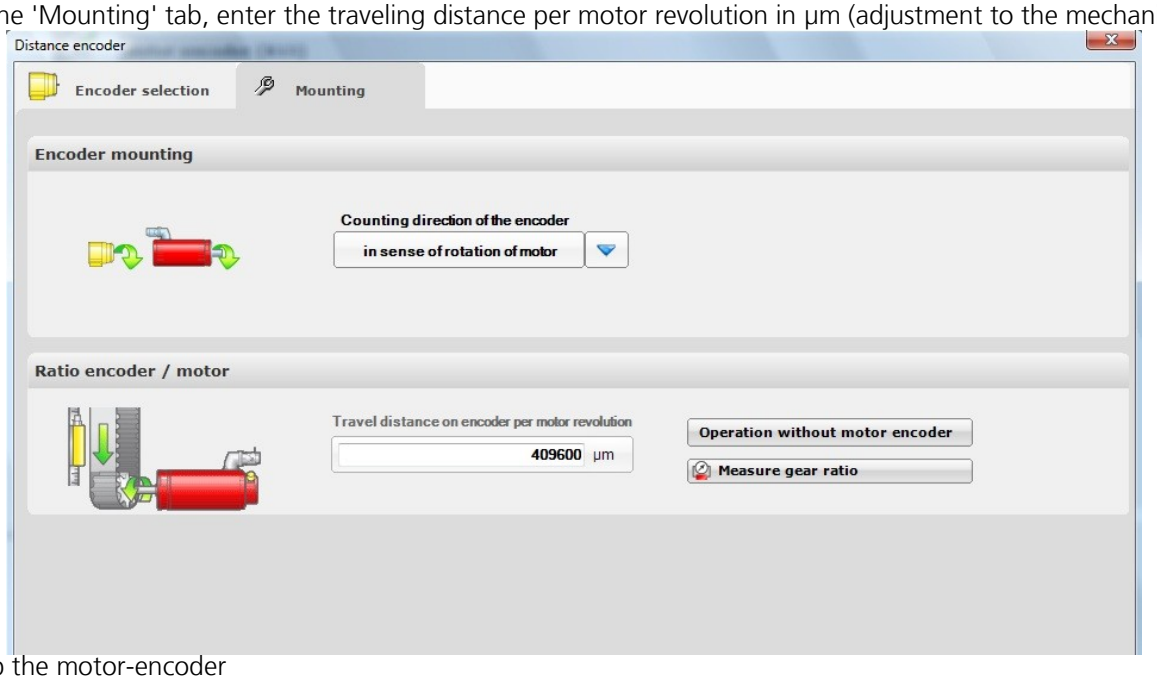
GUI: encoder start-up
Select distance measurement device



Select 'FLS-C 10 Dimetix' as your encoder

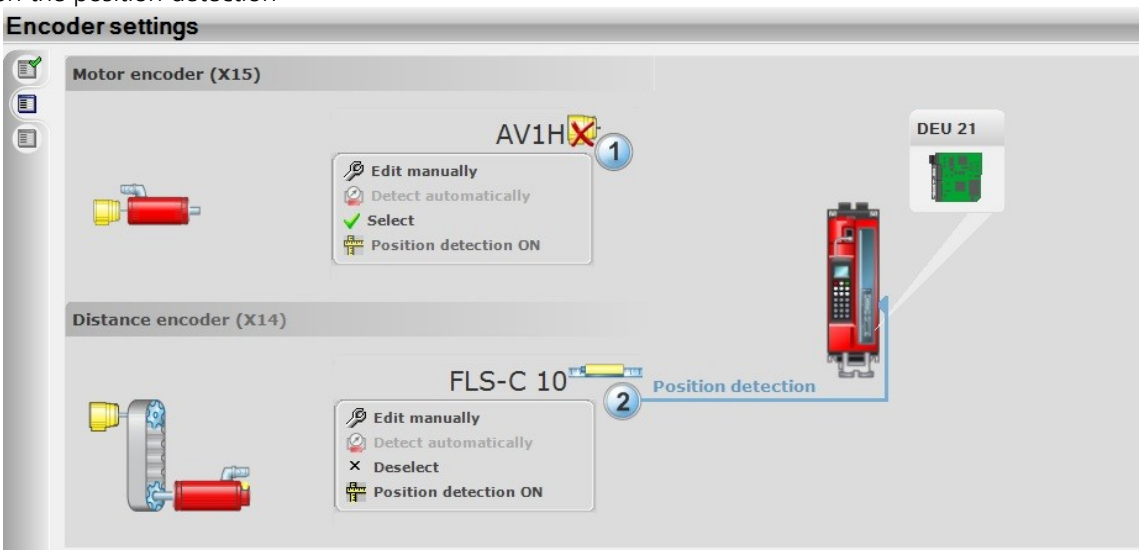


Select the 'Mounting' tab, enter the traveling distance per motor revolution in µm (adjustment to the mechanic)



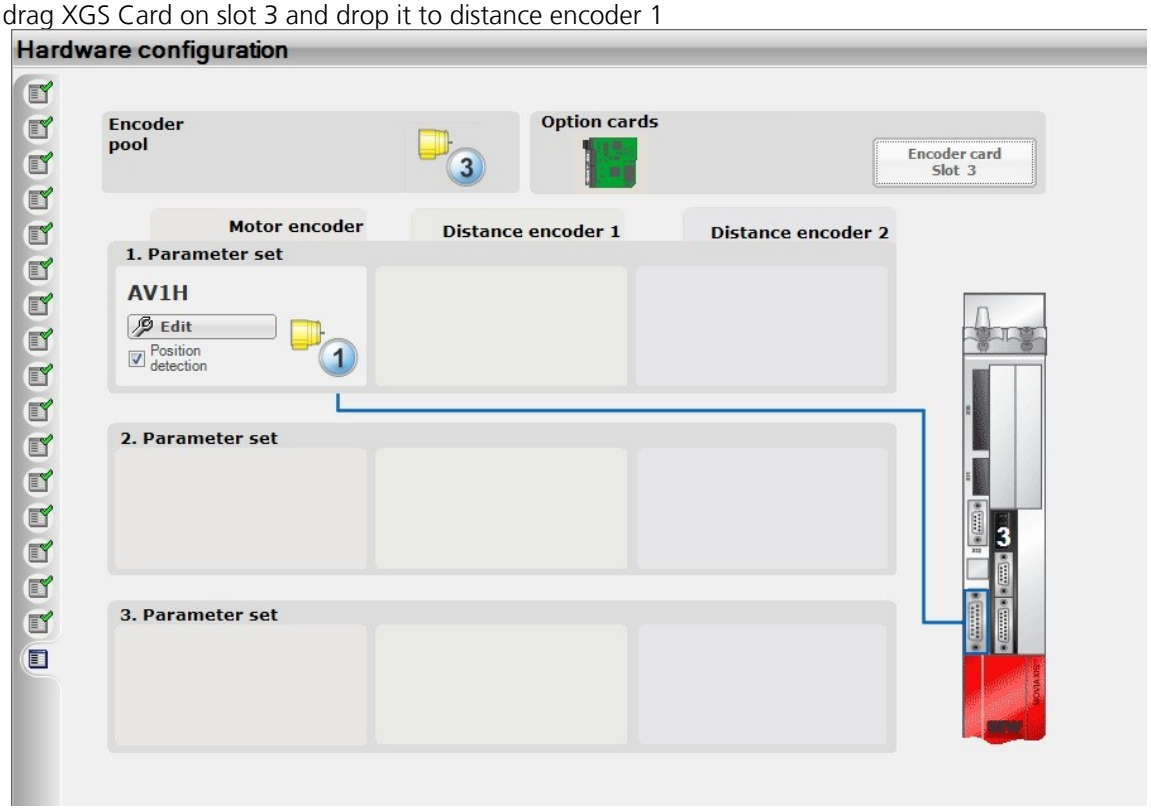
Start-up the motor-encoder

Switch on the position detection

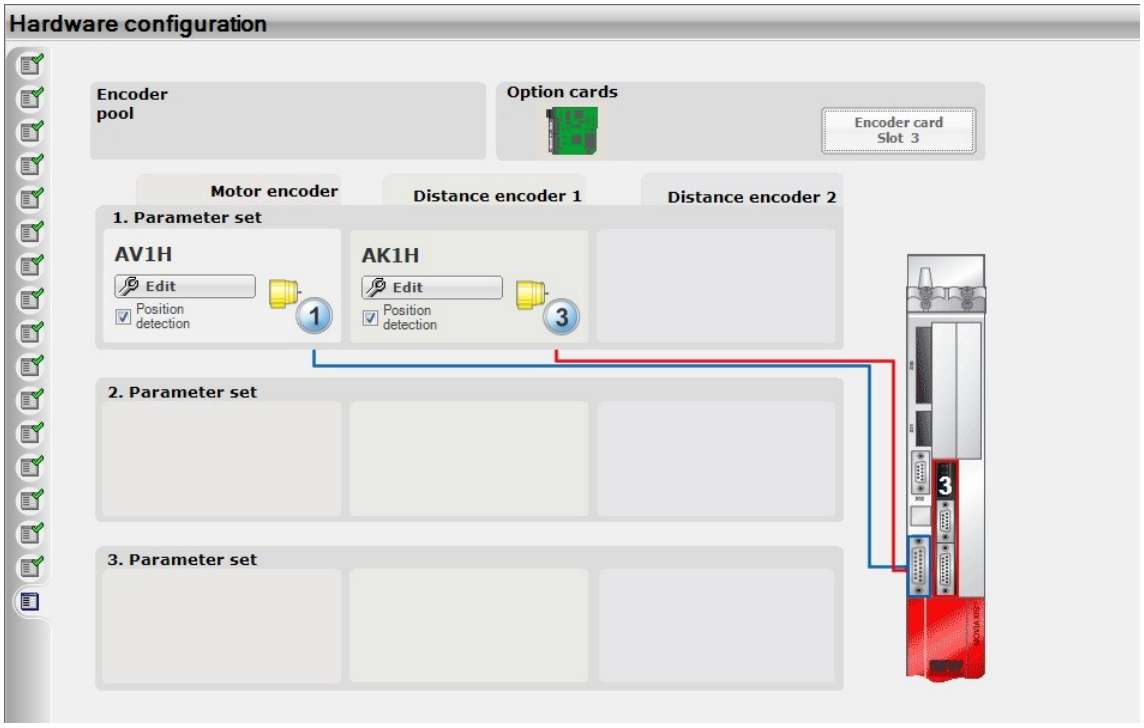


4 MOVIAXIS® Setup for D-Series and C-Series

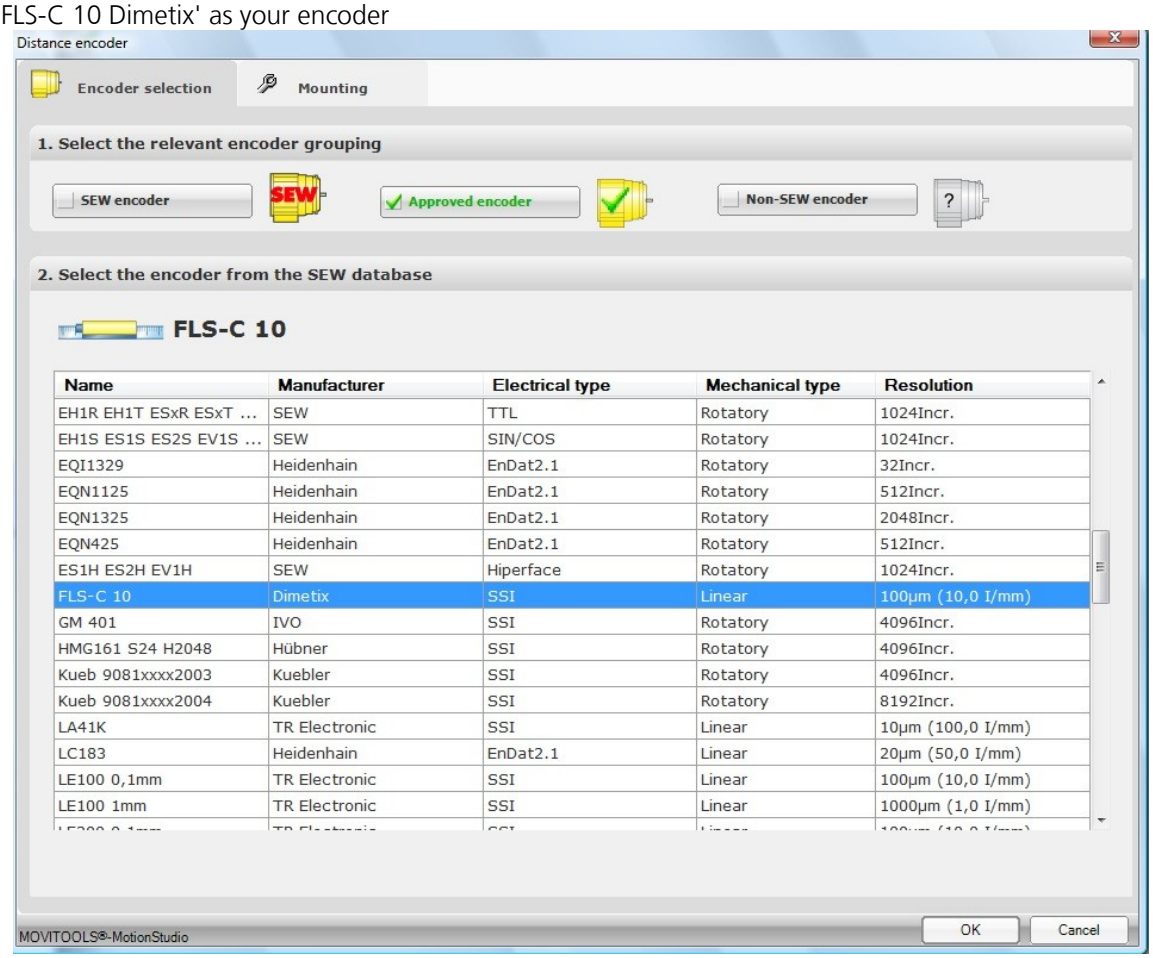
In GUI: drag XGS Card on slot 3 and drop it to distance encoder 1



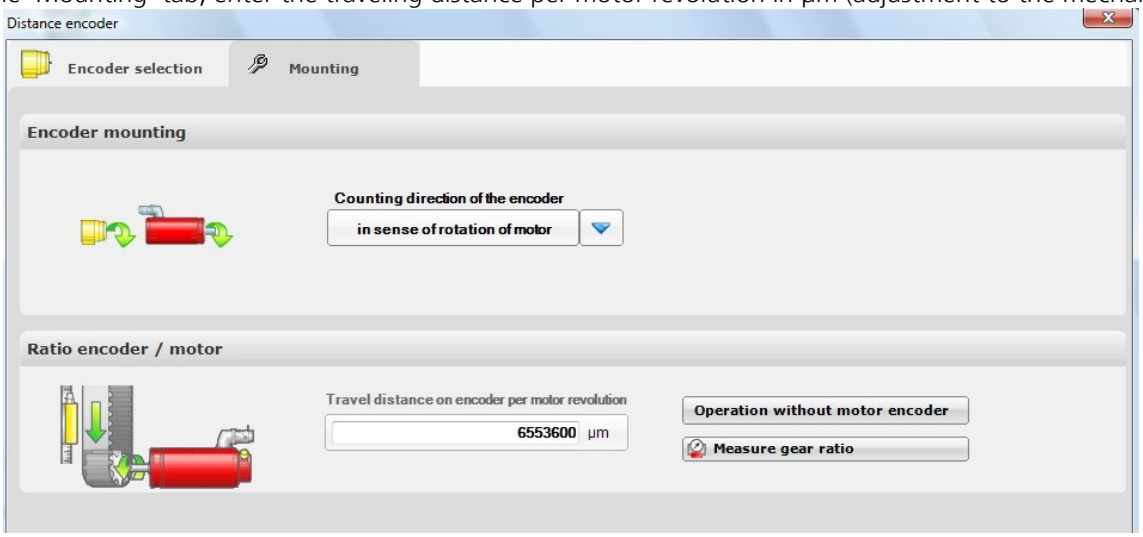
Edit the encoder



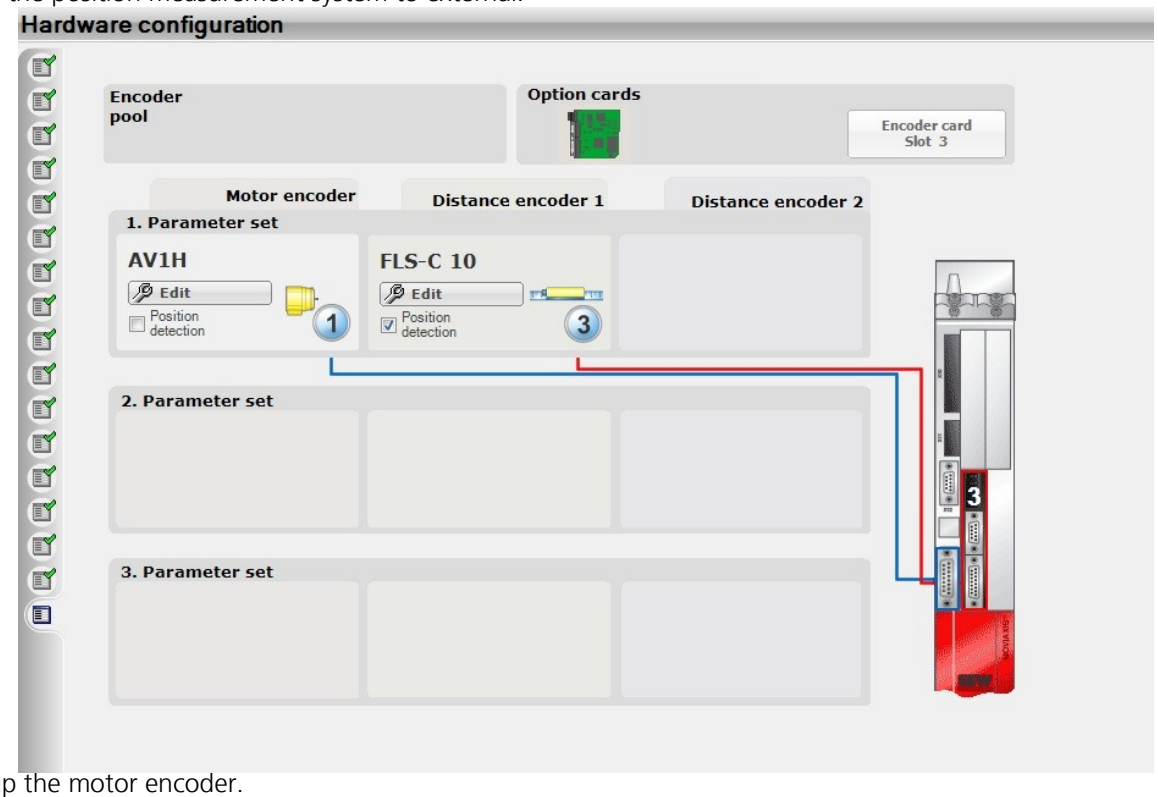
Select 'FLS-C 10 Dimetix' as your encoder



Select the 'Mounting' tab, enter the traveling distance per motor revolution in µm (adjustment to the mechanic)



Switch the position measurement system to external.



Start-up the motor encoder.