PGT-13-S Emulator Mode

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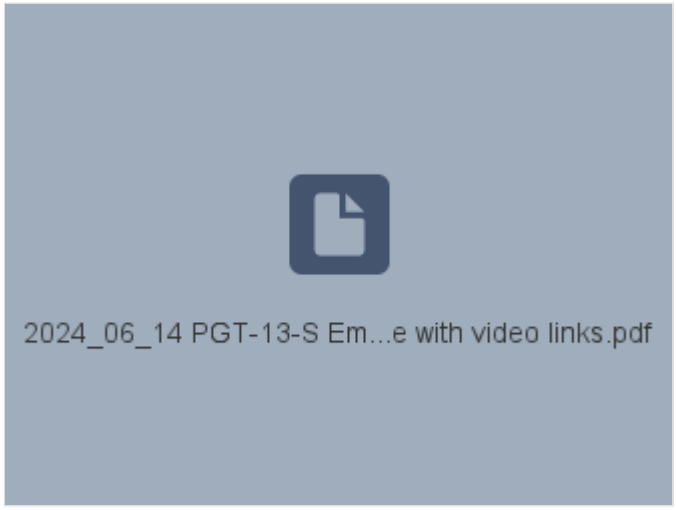
Overview

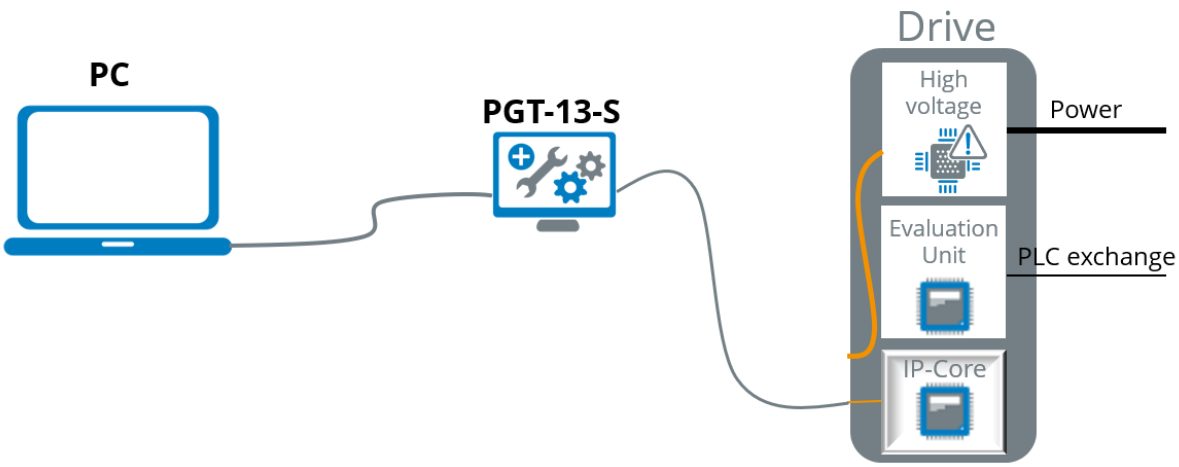
pdf print of the page	All Video Links
	General Information https://video.sick.com/media/t/0_440qrm1y How to get the emulator Mode https://video.sick.com/media/t/0_ceh5grxp General Configuration https://video.sick.com/media/t/0_dazohsva RDB Configurator https://video.sick.com/media/t/0_qdqyd1nf Position Generator https://video.sick.com/media/t/0_e2hd37gy Position Profiler https://video.sick.com/media/t/0_4uh0dfmy Encoder Status https://video.sick.com/media/t/0_nxm3bngv Fault Insertion https://video.sick.com/media/t/0_a5ifjgnw

General Information

https://video.sick.com/media/t/0_440qrm1y

Definition (purpose)

The purpose of the Emulator mode is to "emulate" an encoder. This emulated encoder can be connected to a drive, during development, to test several encoder behaviors, which is not able to simulate with a real encoder (error conditions, safety functions, ...).



Functions, which can be emulated

- Emulate an encoder with a random name
  - The default name of the encoder is "PGT13-S123456789ab"
  - It is possible to load type configurations of existing SICK Hiperface DSL encoders
- Emulate all the existing Identification resources to read out the encoder's boundaries
- Adjust the resolution of the Position value
- Emulate the position value (Fast Position, Safe Position 1, Safe Position 2)
- It is possible to create generic resources
- Set encoder errors, to verify, if the drive recognize the errors in the right way
- create faults to validate the safety functions of the drive
  - This functionality is Safety certified and can be used to validate the drive in front of the TÜV

What is Missing in the Emulator mode?

- The data field handling is not part of the Emulator mode. The drive is not able to read, write and change data fields. To test this functionality, the customer has to use a "real" Hiperface DSL encoder.
- The counter functionality is missing
- Histogram values
- It is not possible to adjust values like
  - operating time (remaining time)
  - shaft rotations
  - ...

The hardware connector for the emulator mode

To connect a device on Hiperface DSL side to the PGT-13-S, the tool uses a connector from the company "TE connectivity".

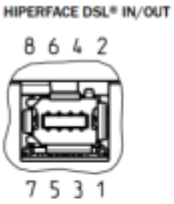
The type of the connector is this: connector

The Document below, shows how to assemble the connector:

TE Connector.pdf

The connection to the drive

The below picture shows, which pins are used for the Hiperface DSL connection:

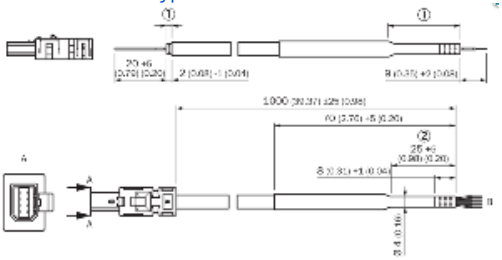


PIN	Signal	Description
1	n.c.	Not connected
2	U_S/DSL+	12 V supply/HIPERFACE DSL® data to slave
3	GND/DSL-	Ground/HIPERFACE DSL® data to slave
4	n.c.	Not connected
5	n.c.	Not connected
6	DSL+	HIPERFACE DSL® data to master
7	DSL-	HIPERFACE DSL® data to master
8	n.c.	Not connected

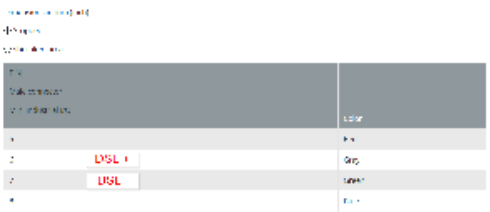
(pin 2 and pin3 are used if the PGT-13-S is used in the Host Mode)

pin 6 and pin 7 are used if the PGT-13-S is used in the Emulator mode

Important!! the PGT-13-S uses different pins for the Master Mode and for the Emulator Mode. This means, it is also important to use different cables:
Master Mode: Typ: YFJSA4-010EG1MMIA8 Art-Nr.: 2117790 with JST connector (in scope of delivery at the PGT-13-S)
Emulator Mode: Type: YMMIA8-010EG1XLEAX Part no.: 2124124 with open wires



Dimensional drawing



The loopback connector (to get familiar with the emulator mode)

It is also possible to use one PGT-13-S at the same time as Master and as a Emulator.
This means you analyze with the PGT-13-S Master, what you emulate with the PGT-13-S Emulator.

This is a good solution to get familiar with functionality of the PGT-13-S Emulator Mode.

To enable this, you have to create a kind of short circuit connector, which looks like this:

HIPERFACE DSL® IN/OUT

PIN	Signal	Description
1	n.c.	Not connected
2	U_S/DSL+	12 V supply/HIPERFACE DSL® data to slave
3	GND/DSL-	Ground/HIPERFACE DSL® data to slave
4	n.c.	Not connected
5	n.c.	Not connected
6	DSL+	HIPERFACE DSL® data to master
7	DSL-	HIPERFACE DSL® data to master
8	n.c.	Not connected

Make a wire bridge between:
pin 2 pin 6
pin 3 pin 7

How to get the Emulator Mode?

If you order a PGT-13-S, you only get the PGT-13-S hardware where the **Master Mode** is included. The Emulator mode must be ordered separately and must be unlocked on the already bought device.
The order code for the Emulator Mode is: Type: PGT-13-S Emulator Mode Part no.: 1129100
Please keep in mind: The Type: PGT-13-S Emulator Mode Part no.: 1129100 is only a Software part where no hardware is included. To run this Software part, you need also to order the PGT-13-S (if you not have already one).

It is 1 license required each PGT-13-S. It is a lifetime license for the PGT-13-S (including updates).

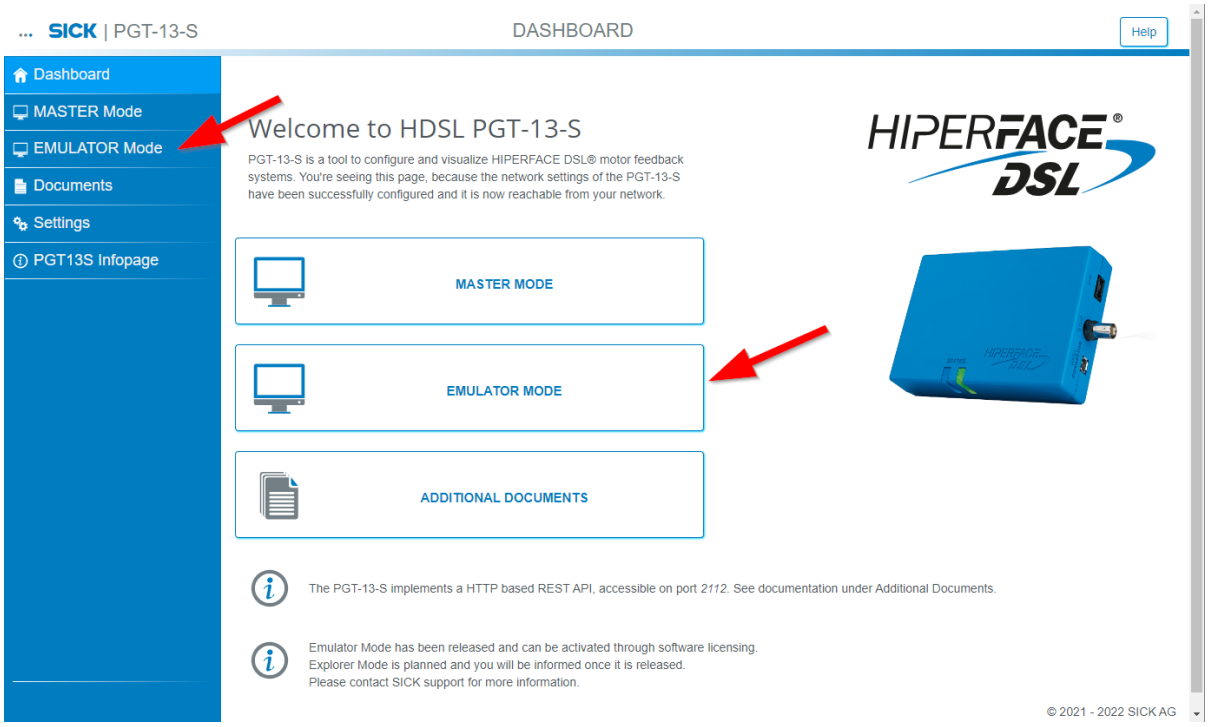
https://video.sick.com/media/t/0_ceh5grxp

How to use the PGT-13-S Emulator Mode

Getting Startet

Open the PGT-13-S Dashboard with your Browser (we recommend to use the "Microsoft Edge").

If you have successfully unlocked the Emulator Mode, you should see an additional tab in the Dashboard.



You can directly open the Emulator mode by clicking the button.

Please keep in mind:

After starting the Emulator mode, the PGT-13-S does automatically emulate an encoder. But the Hiperface DSL connection is **not yet enabled**.
It is necessary to switch on the Hiperface DSL connection by pressing **"Enable"** below "HDSL Slave Output"

After closing the browser, the connection keeps going. You can disable the connection or do a power cycle to disable the connection at the PGT-13-S.

General Configuration

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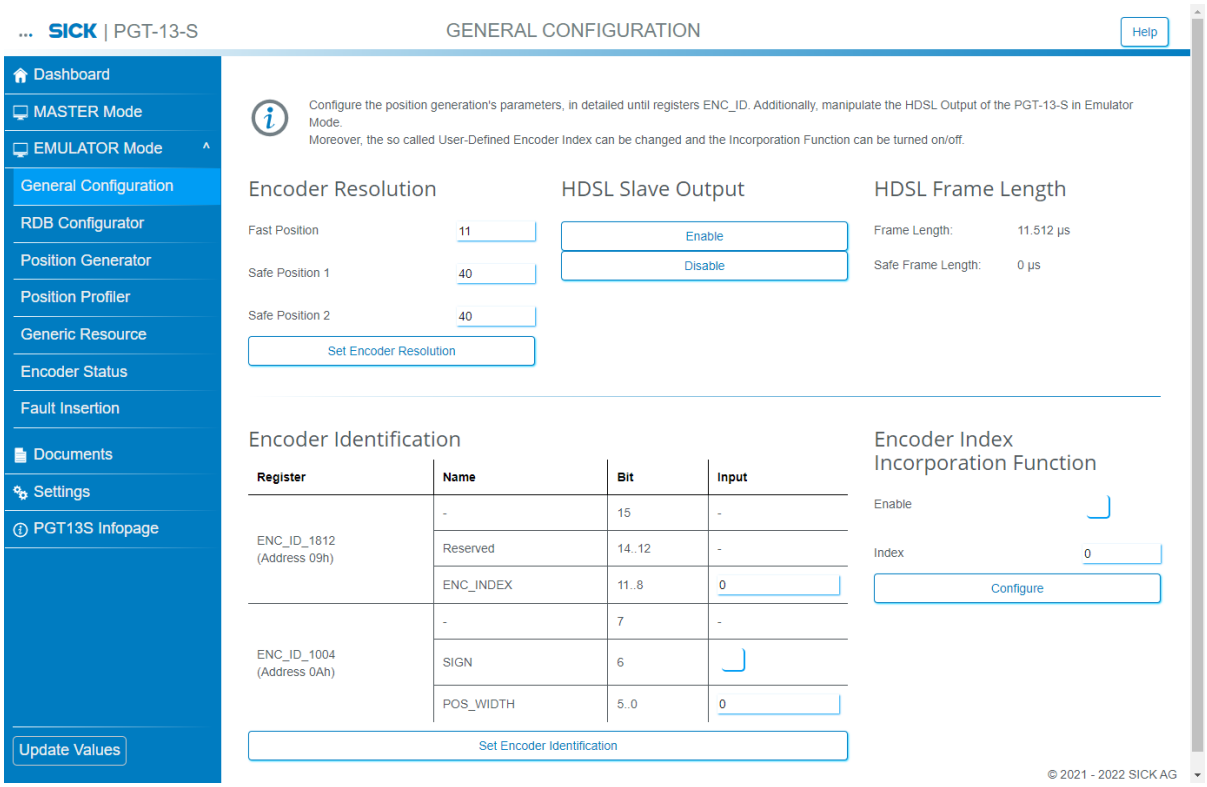

Encoder Resolution

In this area, you can adjust the HDSL resolution of the position value, wich is transmit to the Hiperface DSL Master.
The default settings, which you see, are the HDSL Slave default settings. Usually the encoder adjusts this by itself. In the Emulator mode of the PGT-13-S, this has to be done manually.

Please adjust the resolution of the Encoder which you want to emulate. Here some examples:

Encoder	single	multi
EEx37	15 / 17 bit	27 / 29 bit
EKx36	18 / 20 bit	30 / 32 bit
EFx50	21 / 23 bit	33 / 35 bit
EDx35	20 / 24 bit	32 / 36 bit
ETL70	24 bit	--

HDSL Slave Output

With those 2 buttons, you can "Enable" and "Disable" the Hiperface DSL connection.

> There is no feedback (not at the hardware or in the software) if the Hiperface DSL connection is active or not. You only see this in the connected Hiperface DSL Master.
>
> This is technically not possible.

HDSL Frame Length

Shows the current measured Hiperface DSL communication speed. How fast requested from the master)

Frame Length: Time to update a "Fast Position"

Safe Frame Length: Time to update a "safe Position" (Frame Length * 8)

Encoder Identification

Defines the content of the Hiperface DSL Encoder ID Registers.

The registers are named from the slave side (table left side). But the reaction is visible on the master side (table right side).

It is possible to edit the red marked areas.

Hiperface DSL Slave (encoder side)				**Hiperface DSL Master (drive side)**		
default	**Register**	**Bit**	**Name**	**Name**	**Bit**	**Register**
		--	--	not implemented (1 Bit)	23	Encoder ID, byte 2 (Register 0FD)
		--	--	SCI (3 Bit)	22 .. 20	
0	ENC_ID_1812 (Address 09h)	15	not implemented (1 Bit)	Continue (1 Bit)	19	
--		14 .. 12	Reserved (3 Bit)		18 .. 16	
0		11 .. 8	User defined Encoder Index (4 Bit)		15 .. 12	Encoder ID, byte 1 (Register 0Eh)
0	ENC_ID_1004 (Address 0Ah)	7	not implemented (1 Bit)	Reserved (1 Bit)	11	
0		6	Sign (1 Bit)		10	
11		5 .. 0	POS_WIDTH (6 Bit)	#Pos-#Acc (6 Bit)	9 .. 4	Encoder ID, byte 0 (Register 0Fh)
		--	--	#Acc-8 (4 Bit)	3 .. 0	

Encoder Index Incorporation Function

Setzt den Encoder Index in der "Safe Position 2" SAFEDSL022 Functionality of the EDx35.
This functionality has no influence to the resource 111h, which is usually used for this functionality. With this, you can create an error (different index between the resource 111h and Safe Position 2).

Important: the encoder index in the Safe Position 2 is shown inverted like the whole Safe Position 2.

RDB Configurator

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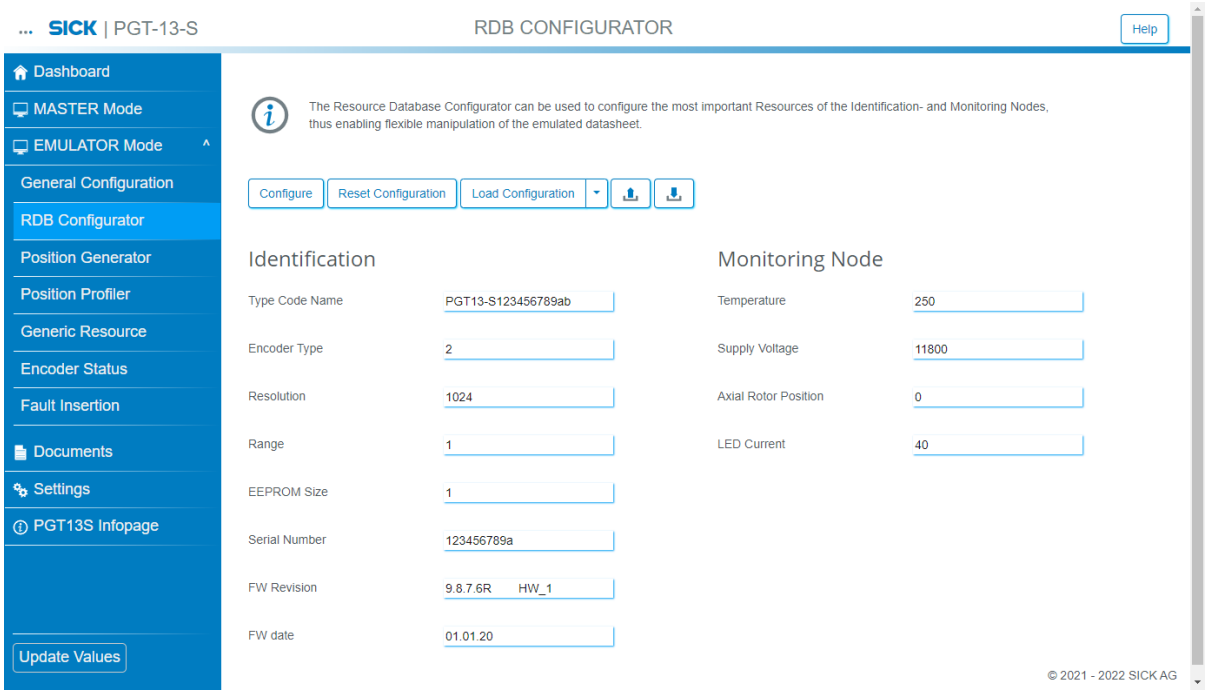
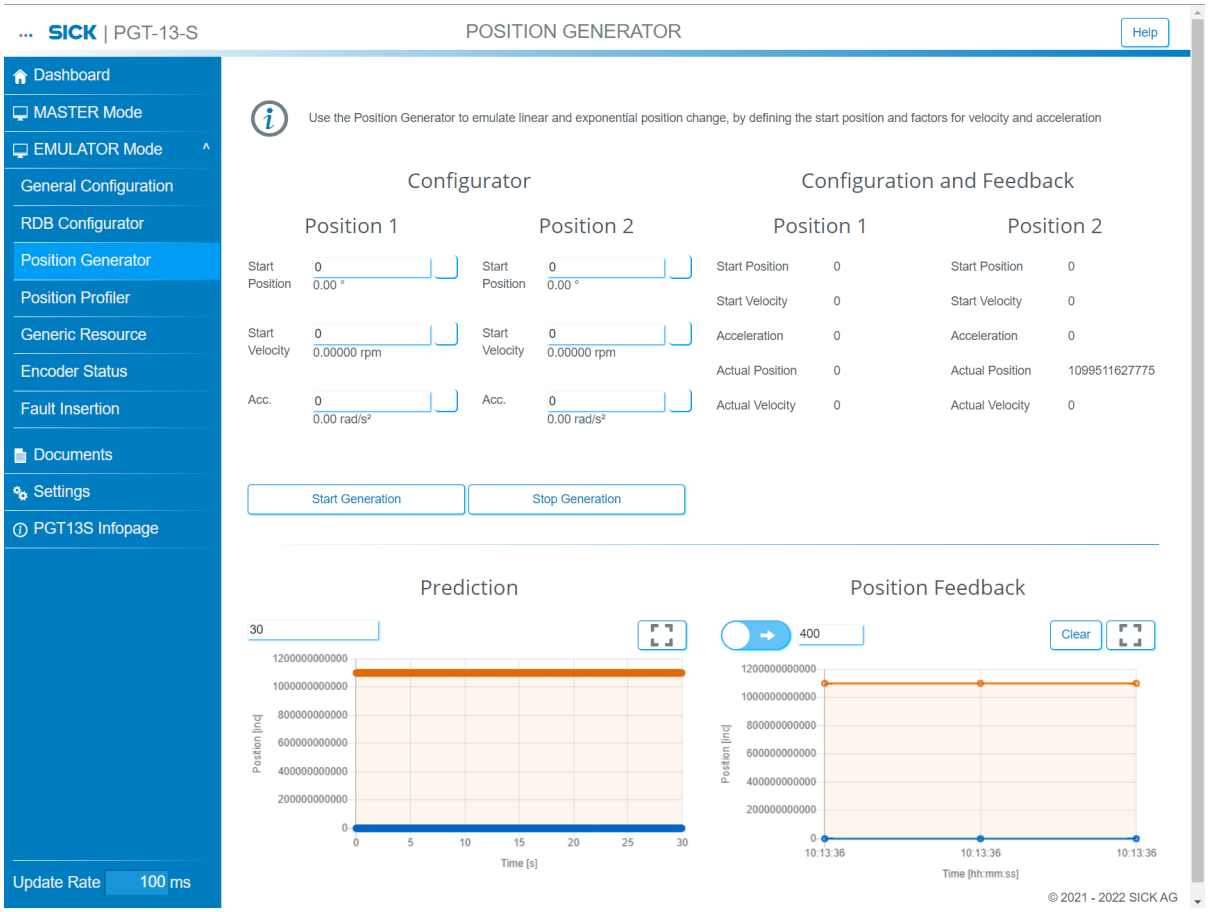


In this tab, it is possible to adjust the name of the emulated encoder. The default name is "PGT-13...". This means, this is, what the Hiperface DSL Master is reading from the Emulator.

It is possible to "Load" settings from several encoders. If you choose a setting with "Load Configuration" it is important to confirm this with "Configure". The several values can be edited manually. Each setting has to be confirmed with "Configure".

Position Generator

https://video.sick.com/media/t/0_e2hd37gy



The Position 1 and 2 can be emulated separately. The Fast Position is always the same as the Position 1.

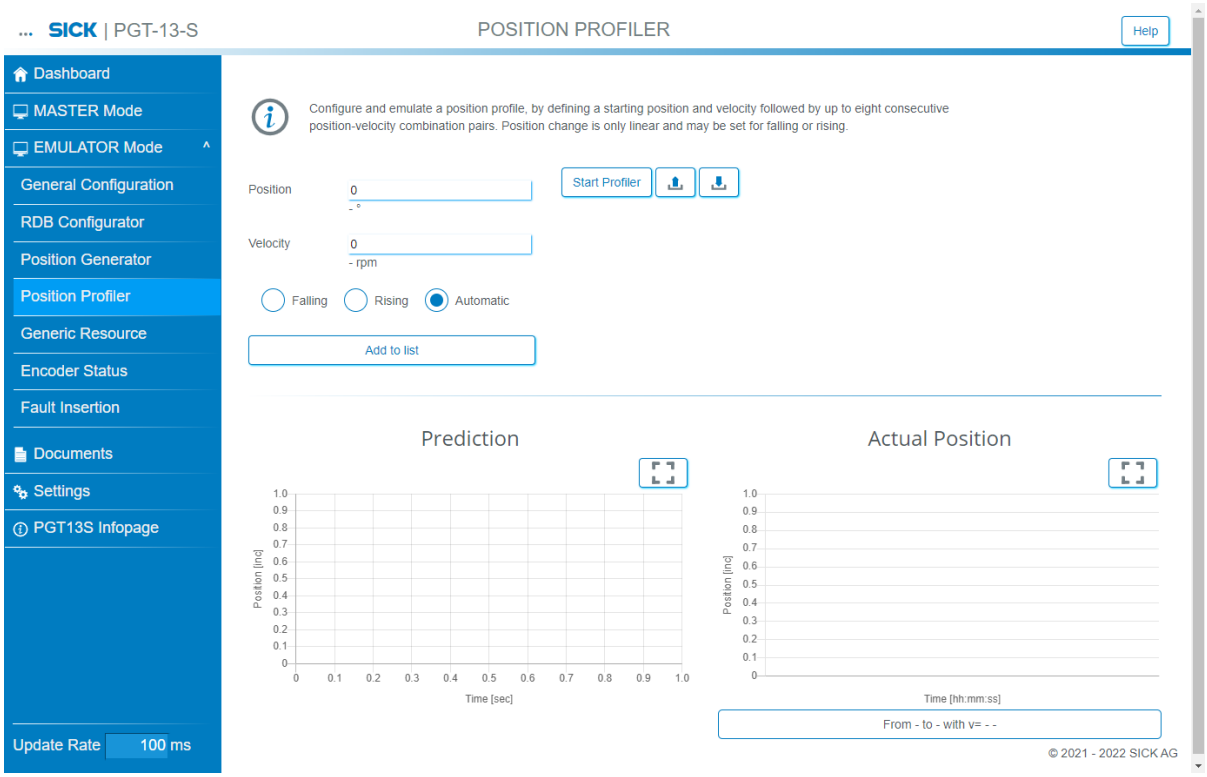
The movement of the position can be adjusted with the following attributes:

- Start position
- Start Velocity
- Acceleration

The combination of those values results in a defined position movement.

Position Profiler

https://video.sick.com/media/t/0_4uh0dfmy

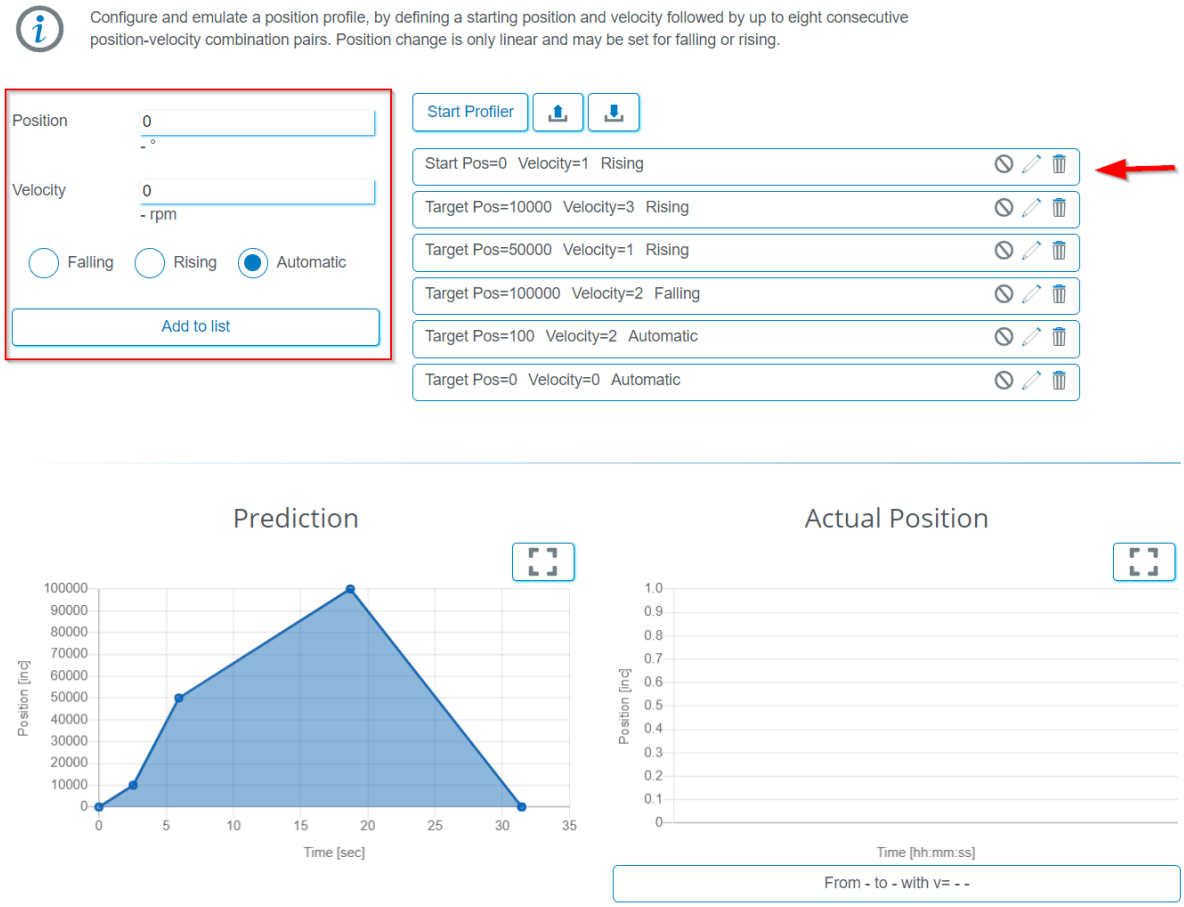


In the Position Profiler, it is possible to adjust a movement profile.

In the red marked area, you can select the attributes for the single movements, which are then showed on the right side (red arrow).
Each row is a movement, which consists the following attributes:

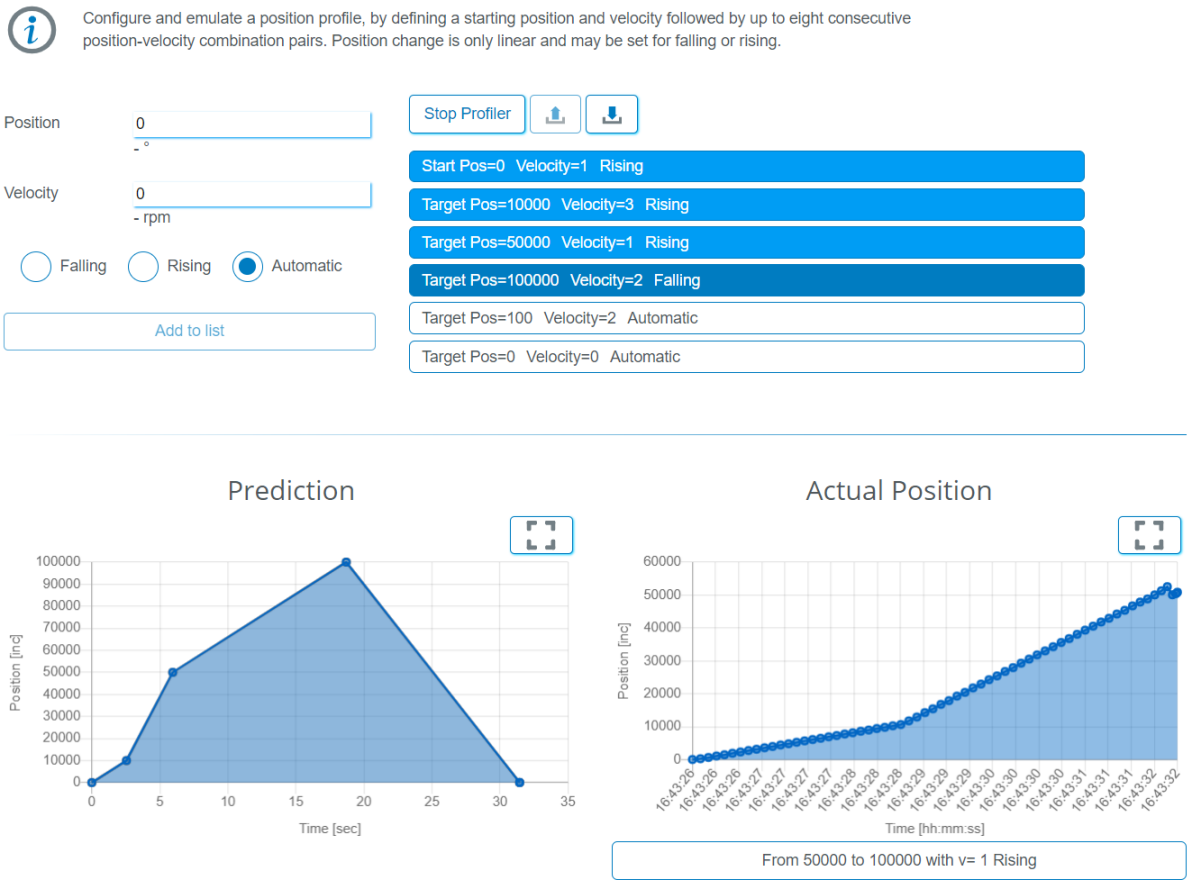
- target position which the previous row has to reach (1st row: start position)
- Velocity which is used, after the position is reached (velocity to the next position value)
- rising or falling movement automatic detects directly the direction of movement (because of the next position)
  you can use rising or falling for a movement in the last row into the eternity
- "add to list" sets the row

The "Prediction" shows a preview of the movement.

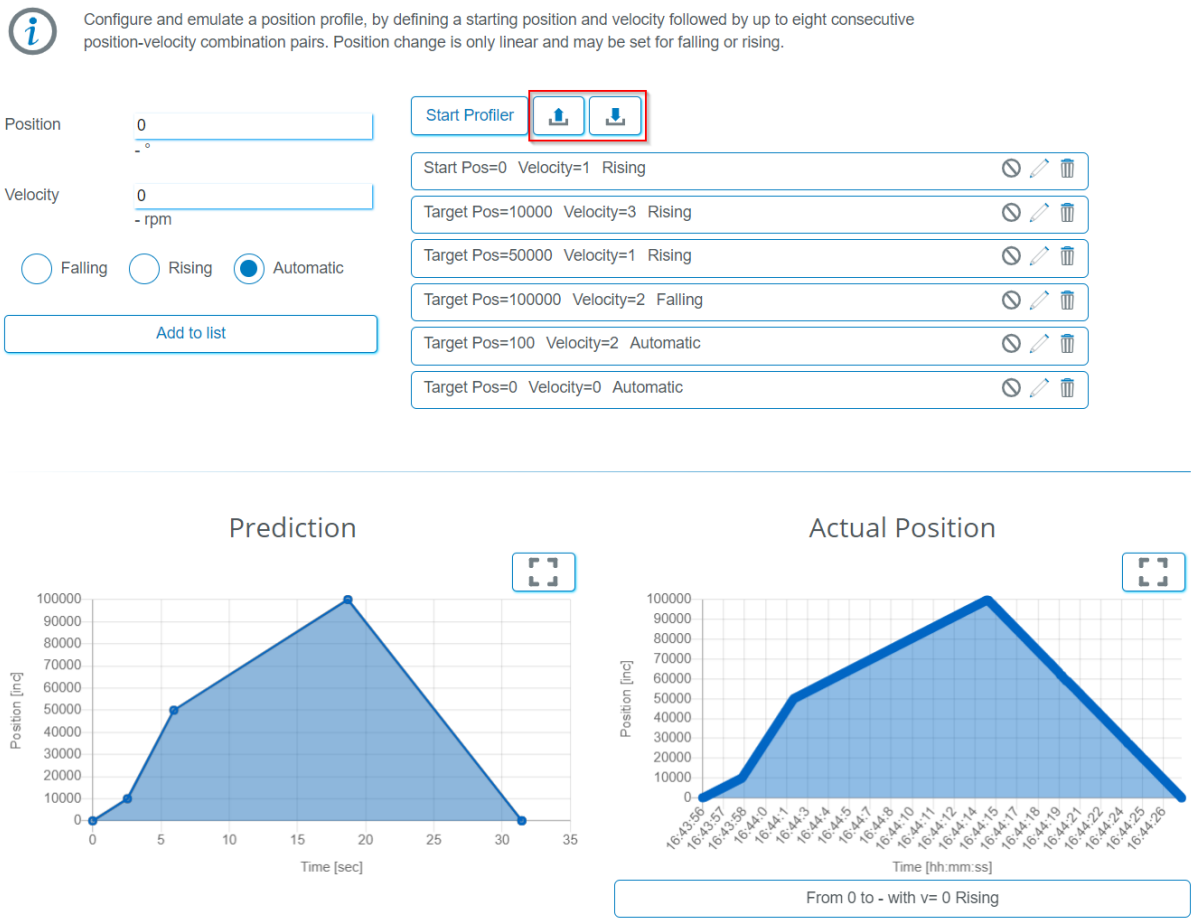


With "Start Profiler" you start the movement.

In "Actual Position" the movement is shown. You also see in the rows, which movement is passed active and yet to come:

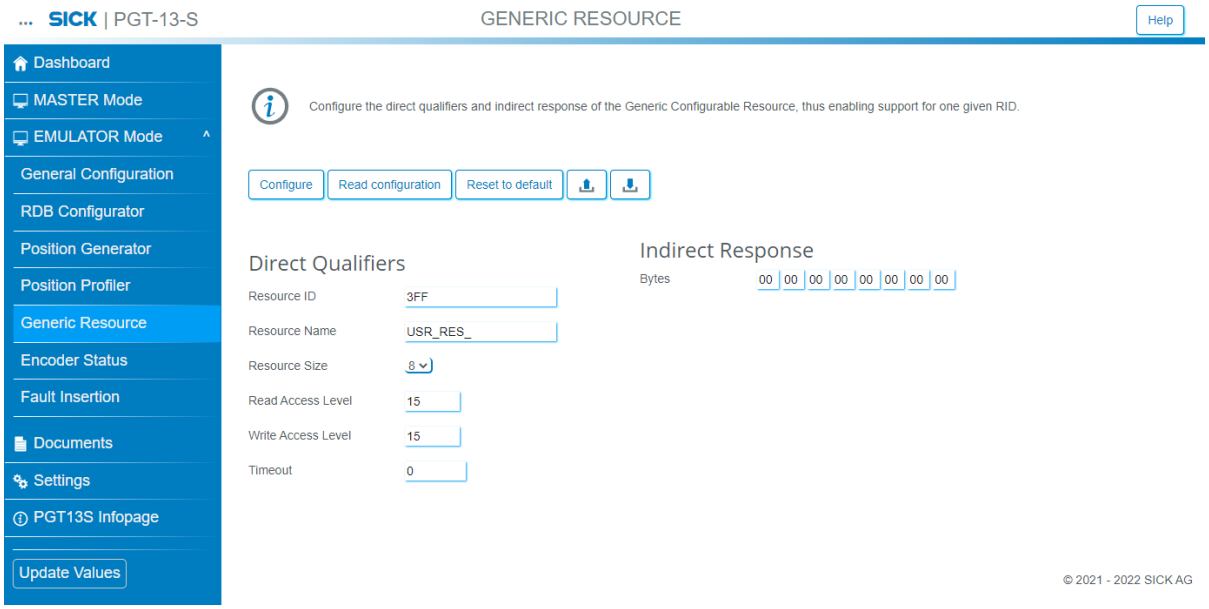


With the 2 Buttons "Download (right)" and "Upload (left)" you can import and export movement profiles as a *.json file.



Here a example of a PositionProfiler.json file:
(the file can be read with a text editor)

Generic Resource



If a drive manufacturer wants to test individual resources, which are not existing so far, or resources which are not existing in the PGT-13-S.

Note: There is no direct Offset functionality available. There can be only 8 Bytes transmit.
But it is possible to read out 2 x 4 Bytes (or 4 x 2 Bytes) to test the Offset.
Also it the Resource is direct read out, the Offset is working.

Encoder Status

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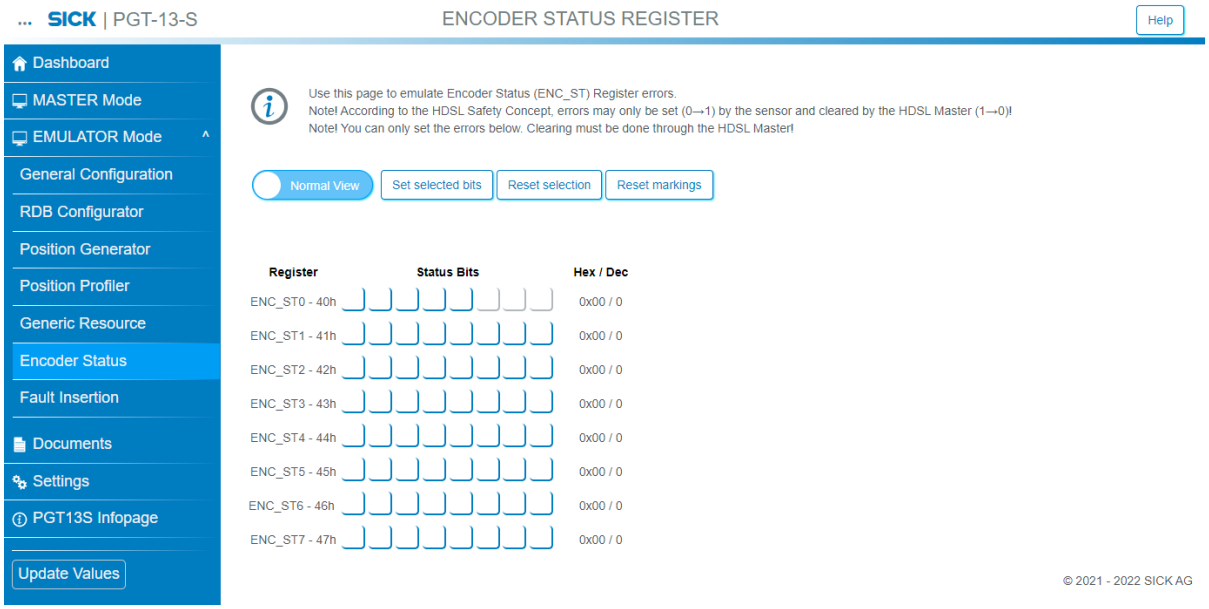

This area is to simulate encoder errors. A normal encoder will not send any error messages as long everything is working OK.
Here it is possible to set each single error bit.

1. mark the error s you want to set
2. activate the errors with "set selected bits. The error condition of the error is directly set back to "0" (but you see the last set errors in light green)

With "Reset selection" you can reset selected error bits, which are not activated yet.
With "Reset markings" you can reset the light green area.

Fault Insertion

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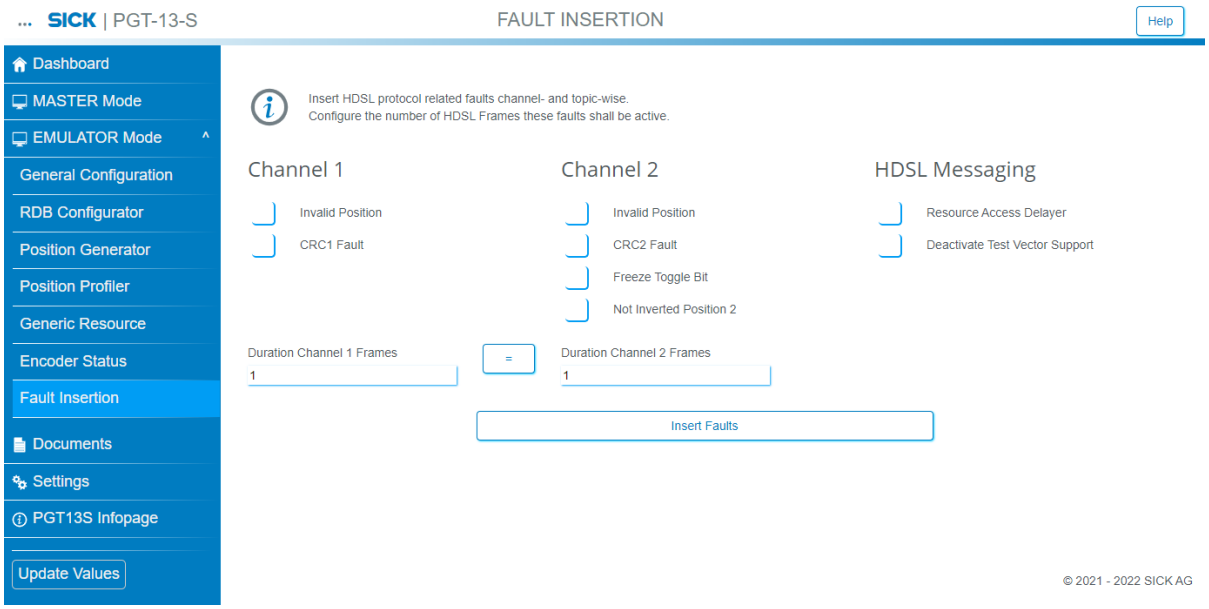

Fault Duration

Adjust, how many DSL Frames the "Fault" is active.
The maximum adjustable value is **"255"**.
Length of a DSL Frame see "General Configuration" in "HDSL Frame Length"

Channel 1 Frames

- Disturbs the "Drive Interface" and the "Safe 1 Interface".
- 1 "Frame" is 1 updated "Fast Position"
- 8 "Frames" is 8 updated "Fast Positions" and 1 updated "Safe Position 1"

Channel 2 Frames

- Disturbs the "Safe 2 Interface"
- 1 "Frame" is 1 updated "Safe Position 2"
- Thus "8 Frames Channel 1" = "1 Frame Channel 2"

Insert Faults

Activates the adjusted Fault conditions for the amount of Frames

Channel 1

Invalid Position

Replaces the current position value of the emulator to a defined other position value:

dec	1,090,888,007,165
hex	FD FDFD FDFD
bin	1111 1101 1111 1101 1111 1101 1111 1101 1111 1101

The CRC1 will fit to the wrong Position 1

This functionality is to test the "Position Cross Check". **SAFEDSL008**

Keep in mind that a minimum of 8 Frames must be disturbed to get "Invalid Safe Position" or "CRC1 Fault"

CRC1 Fault

Inverts the current CRC, so that it is wrong.

For the CRC 1 Check. **SAFEDSL009**

> Keep in mind that a minimum of 8 Frames must be disturbed to get "Invalid Safe Position" or "CRC1 Fault"

Channel 2

Invalid Position

Replaces the current position value of the emulator to a defined other position value:

dec	1,082,264,386,555
hex	FB FBFB FBFB
bin	1111 1011 1111 1011 1111 1011 1111 1011 1111 1011

The CRC2 will fit to the wrong Position 2

This functionality is to test the "Position Cross Check". **SAFEDSL008**

CRC2 Fault

Inverts the current CRC, so that it is wrong.

For the CRC 2 Check. **SAFEDSL009**

Freeze Toggle Bit

Freezes the toggle bit for the adjusted amount of frames.

To recognize "Stuck at" situations. **SAFEDSL024**

If this functionality is activated, the Toggle Bit keeps it's last state, as long the functionality is active.

Not Inverted Position

As long this fault condition is active, the position 2 is not inverted to the position 1. During this time, it has exactly the same value as the position 1.
The drive should recognize this in the position cross check. **SAFEDSL009**

HDSL Messaging

Resource Access Delayer

This Functionality blocks a "Long Message" for at least 2 seconds. This means, a requested long message is delayed.

Deactivate Test Vector Support

For the safety versions of the EKx36 and EFx50, it is necessary to send test messages **(SAFEDSL010)**.
(The EDx35 supports this feature, but it is not necessary to execute it)
This function disables the encoder functionality to react to a test message. The drive must react to a failed test message.