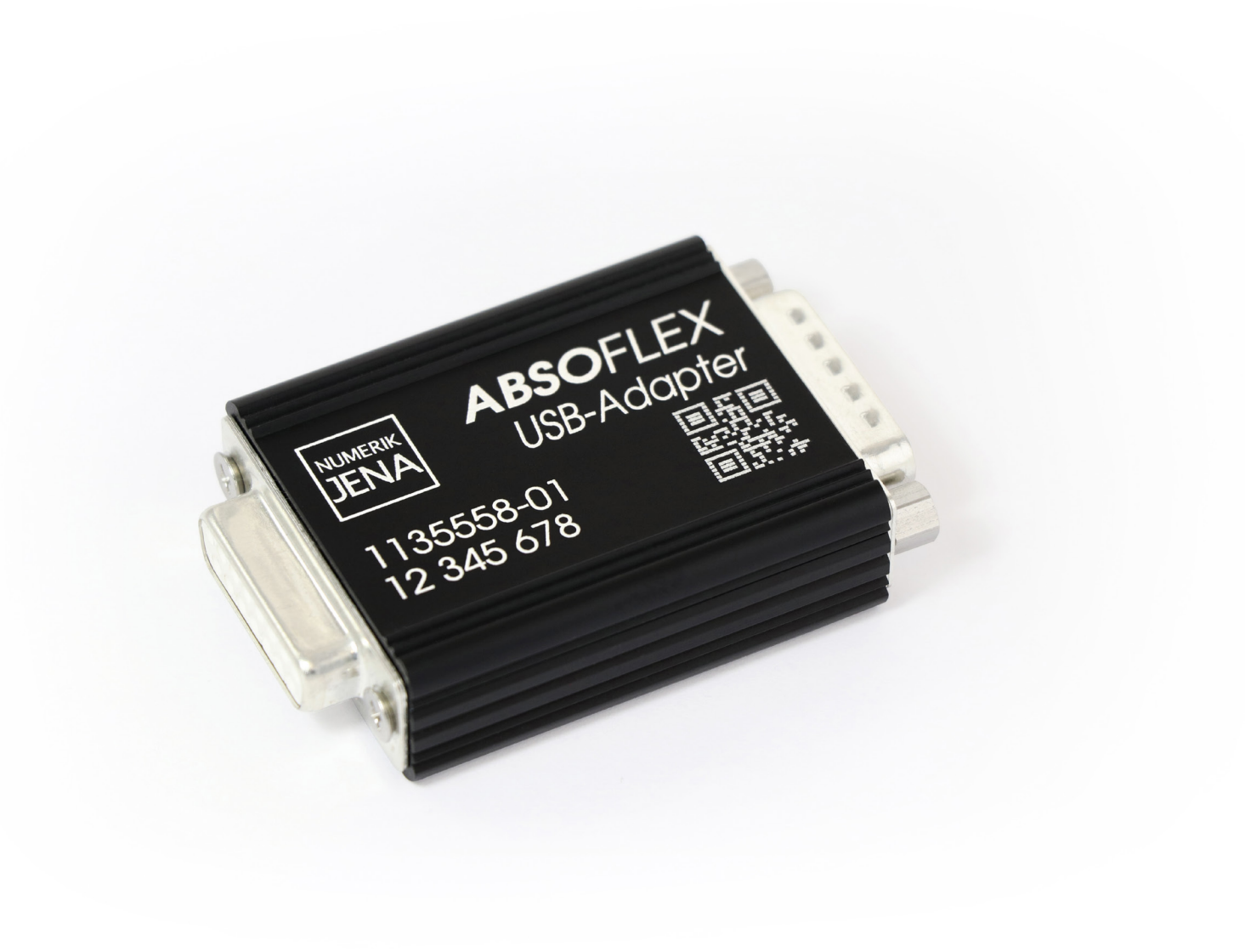
NUMERIK JENA



ABSOFLEX ADAPTER

Accessories for Absolute Encoders

10/2026 | English (en)

Instruction manual

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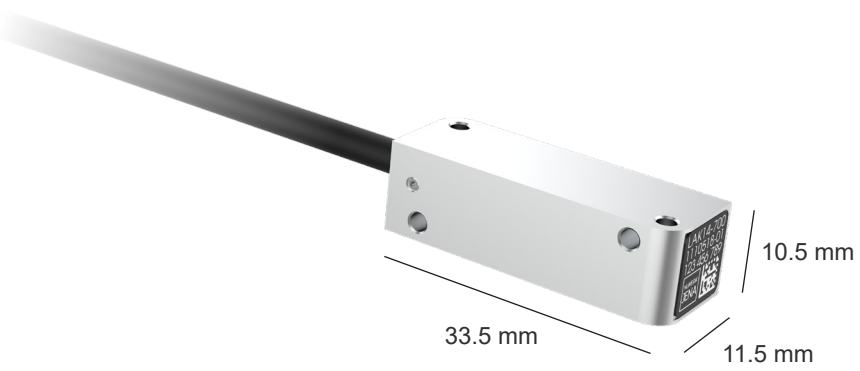
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1. Overview

Position encoders in drive systems have to meet high and controversial demands, especially in linear drive systems. The demands opposing each other are high accuracy and resolution on the one hand and low mass, small dimensions and high measuring speed on the other hand.

The LAK encoders from NUMERIK JENA are equipped with features that fulfill these high requirements in an ideal manner. The special combination of incremental and absolute encoder does not only guarantee stable operation but also enables high speed measuring with high resolution while still maintaining very small dimensions. Furthermore NUMERIK JENA set great value to customization possibilities during the development. Therefore the LAK measuring system offers a large number of customization options as well as various interfaces:

- Possibility of an electronic adjustment after mounting to reduce static mounting errors
- Select version for customer-specific housings/frames (available on request)
- Individual measuring lengths of the scales available (up to 1.20 m)
- Several interfaces usable
- Wide range of supply voltages to compensate conduction losses
- Extensive diagnostic and monitoring functions (e.g. read head temperature)
- High control dynamics due to low calculation time
- Two absolute tracks and two incremental sensors ensure high contamination immunity



2. Application Examples

- Production and inspection machines for the semiconductor industry
- Linear units and linear drives
- Coordinate tables
- Measuring machines and measuring microscopes
- Robotics
- Precision devices in reprography
- Precise machining
- Positioning and measuring devices in medical technology

3. Safety

3.1 General Information

- Make sure to familiarize yourself thoroughly with the contents of these installation instructions before installing and starting up the encoder!
- Please contact the support of NUMERIK JENA GmbH or an authorized representation for further information. Please visit the NUMERIK JENA website to get the contact information.
- NUMERIK JENA GmbH is not liable for damages caused by unauthorized handling of the encoders. Any unauthorized handling leads to forfeiture of all warranty claims.
- The encoders are guaranteed to function if the mounting and operating conditions are maintained as stated in these mounting instructions.
- Make sure to follow the right sequence of the mounting steps during mounting.
- NUMERIK JENA GmbH does not assume any liability for any damages or operating errors caused by incorrect installation or operation.
- The stated tolerances must be maintained in order to achieve the accuracies listed in the specifications!
- If the machine tolerances exceed the tolerances stated in the mounting instructions, errors can occur in both the operation and during measuring. NUMERIK JENA GmbH assumes no liability for this.
- Please refer to the operating manuals and safety instructions included with the devices to ensure the reliable operation of the encoder systems, especially pertaining to:

  - Auxiliary electronic units
  - Counters
  - Displays
  - Controllers
  - Encoders
  - Base mechanical devices (machine tools)

- Connect NUMERIK JENA encoders only to subsequent electronics whose power supply is generated from PELV systems (EN 50178).
- Please pay attention to the safety instructions and warning symbols!



Danger to the device or to the function of the device!



Pull the plug!



Highly inflammable!

3.2 Notes on Legal Requirements

- The NUMERIK JENA encoders conform to EC standards and carry the CE mark.
- NUMERIK JENA encoders fulfill the requirements of the (German) Product Safety Act (ProdSG) from November 8th, 2011.
- NUMERIK JENA encoders fulfill the requirements of standard IEC 61010-1 only if the power is supplied from a secondary circuit with current limitation as per IEC 61010 (3rd Ed.), Section 9.4 or with power limitation as per IEC 62368-1 (2nd Ed.), section 6.2.2.5 PS2 or from a Class 2 secondary circuit as specified in UL1310.*
- This user manual supersedes all previous editions, which thereby become invalid. The basis for ordering from NUMERIK JENA is always the user manual edition valid when the contract is made.
- Standards (ISO, EN, etc.) apply only where explicitly stated in the user manual.
- NUMERIK JENA has tested its products to ensure the use of non-hazardous materials in accordance with the European Directives 2011/65/EU (RoHS). The EU Declaration of Conformity can be requested at the following web address:

  https://www.numerikjena.com/numerikjena/contact/

3.3 Environmental Protection and Disposal

Environmental damage due to incorrect disposal of the product, accessories or peripherals!

- Do not dispose in domestic waste.
- Dispose only by authorized collection points. Electrical waste and electronic components are subject to special-waste regulations.
- Observe the applicable country-specific regulations.

More detailed information on legal regulations can be obtained from competent authorities.

3.4 Notes on Transport, Storage and Handling



Encoder

- Use the original packaging for transportation and storage only!

SINGLEFLEX Scale Tape

- Can be rolled up (minimum bending radius = 140 mm).
- No restrictions regarding to the length.

* In place of IEC 61010-1 (3rdEd.), Section 9.4, the corresponding sections of standards DIN EN 61010-1, EN61010-1, UL 61010-1 and CAN/CSA-C22.2 No. 61010-1 can be applied and in place of IEC 62368-1 (2nd Ed.), section 6.2.2.5 PS2 the corresponding sections of standards DIN EN62368-1, EN62368-1, UL62368-1, CAN/CSA-C22.2 No. 62368-1 can be applied.

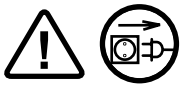
DOUBLEFLEX Scale Tape

- In no case the DOUBLEFLEX scale tape should be stored, transported or used when rolled up!
- Use only the original packaging for transportation!
  - Lengths up to 2.4 m - stretched out
  - Lengths above 2.4 m - tape laid down as a figure eight
- Use the original packaging for storage only!
- Damages to the adhesive layer between the scale tape and carrier tape must absolutely be avoided, since otherwise the measuring properties of the DOUBLEFLEX scale tape are lost.
- Only remove the DOUBLEFLEX scale tape from the packaging on site, directly before mounting.
- Do not separate the scale tape and carrier tape from each other! Avoid any unintentional separation of the scale tape from the carrier tape, even just partial separation.
- Avoid radial or axial offsetting between the scale tape and carrier tape.
- **If the scale tape should become partially or completely separated from the carrier tape - even for just a very short time - simply pressing them together again will not result in sufficient adhesion. In this case neither the operational reliability nor the metrological properties can be guaranteed anymore. Please return the scale tape to NUMERIK JENA GmbH for repair! Unfortunately a repair at the customer site is not possible.**
- When removing the DOUBLEFLEX scale tape from the packaging, the sag must not exceed more than 100 mm.
- After the removal, the greatest distance between two supports must not be more than 800 mm. Scale tapes up to 1,200 mm must be supported approx. 300 mm from the ends and longer scale tapes must be supported correspondingly.

3.5 Notes on Returning Complaints or Repairs

- In the event of a return due to a complaint or a necessary repair, the parts must be properly packaged.
- Customer complaints or repairs can be accepted and handled only if the product is delivered to NUMERIK JENA in a clean condition, properly packed, and transported in the correct manner.
- For the return shipment, we recommend packing the parts in a manner similar to that of the original package and in reverse order. New original packages can be ordered from NUMERIK JENA. Please contact our customer support. E-Mail: support@numerikjena.com
- In addition to the part, a detailed description of the failure that occurred or a request for repair needs to be communicated. Return the part direct to us or to the responsible HEIDENHAIN subsidiary in your country.

3.6 Notes on Operation



- Do not connect or disconnect plugs if the power is on!
- Only operate the encoder with the supply voltage stated in this product data sheet.
- Connect NUMERIK JENA encoders only to subsequent electronics whose power supply is generated from PELV systems (EN 50178).
- Comply with applicable PIN assignment if auxiliary electronic units are connected (e.g. controller or display)!
- Integrate exposed encoders in instruments, devices or machines in such a way that these are protected against contamination.
- Protect the graduated scale against mechanical damage.
- Protect the scanning head against shock, impact and humidity.

3.7 Notes on Maintenance



- The encoder requires no maintenance whatsoever, but must be cleaned occasionally, depending on the ambient conditions.
- Modifications and repairs of the encoder may only be carried out by NUMERIK JENA GmbH or appropriately authorized persons.
- NUMERIK JENA GmbH is not liable for damages caused by unauthorized handling of the encoder. All warranty claims are forfeited by unauthorized handling.
- Exposed measuring systems are sensitive to contamination, especially the scale surface and the scanning windows for the counting and reference tracks on the scanning head.
- Particularly critical are rough and irregular contamination and deposits (e.g. oil, grease or water).
- The user has to protect the encoder from contamination by way of appropriate design measures.
- **When cleaning the encoder, ensure that no solvent flows under the graduated scale!**
- **When cleaning the components, ensure that the scanning window and graduated scale are not scratched by any deposited particles!**

4. USB 2.0 Interface

USB 2.0 is integrated in the LAK read head, which allows to have access to the read head via diagnostic software.

An adapter can be used to connect the encoder to a PC for configuaration purposes. It is also possible to pick off data by an adapter between the LAK connector and the controller.

Once the connection is established the user has several options (please see chapter 7).

5. ABSOFLEX USB-Adapter

The absolute encoders from NUMERIK JENA provide a USB 2.0 interface which alows the user to connect it to a PC and use the ABSOFLEX Pro Software. The ABSOFLEX USB-Adapter allows to connect the encoders D-Sub connector directly to a USB port.



6. Adjustment and diagnostics with the ABSOFLEX adapter and ABSOFLEX Pro software

6.1 Requirements and notes

The following components are needed for the adjustment and diagnostics of NUMERIK JENA encoders:

- ABSOFLEX adapter
- ABSOFLEX Pro software

The **ABSOFLEX Pro software** is available for download free of charge.

- **www.numerikjena.com/downloads-en/documents-software/**
- Open the **Accessories** selection menu
- Download **ABSOFLEX Pro software**

For more information, please refer to the **ABSOFLEX Adapter Operating Instructions** .

- **www.numerikjena.com/downloads-en/documents-software/**
- Open the **Accessories** selection menu
- Download the **ABSOFLEX Adapter Operating Instructions**

Move the axis during signal adjustment without using a drive motor, if possible. If a drive motor is needed, then move the axis under manual control without feedback from the encoder.

During signal adjustment, do not use the encoder signals to control the drive motor. This can trigger faulty pulses, leading to faulty adjustment in the controller and disturbance of the drive system.

6.2 Connecting the encoder to the ABSOFLEX Pro software

Connecting the encoder

NOTICE

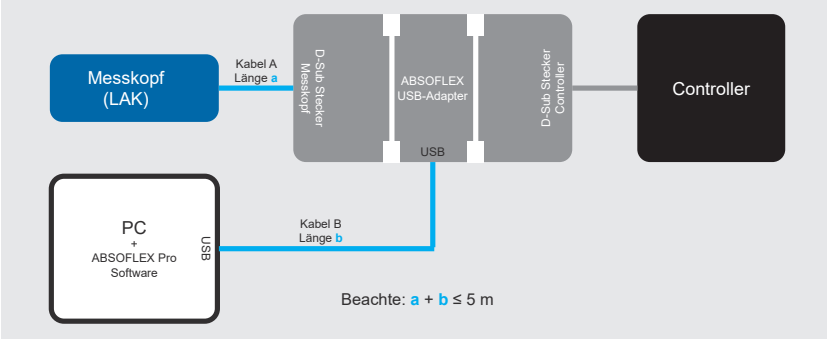
Damage from multiple supply voltages

If you simultaneously connect the USB interface and the D-sub interface to live equipment, then this can cause damage to the ABSOFLEX adapter.

- Switch off all participating devices before connecting
- Ensure that only one supply voltage is applied
- Connect or disconnect connections only when they are not under power

- Connect the encoder to the **ABSOFLEX adapter**
- Connect the **ABSOFLEX adapter** to the PC

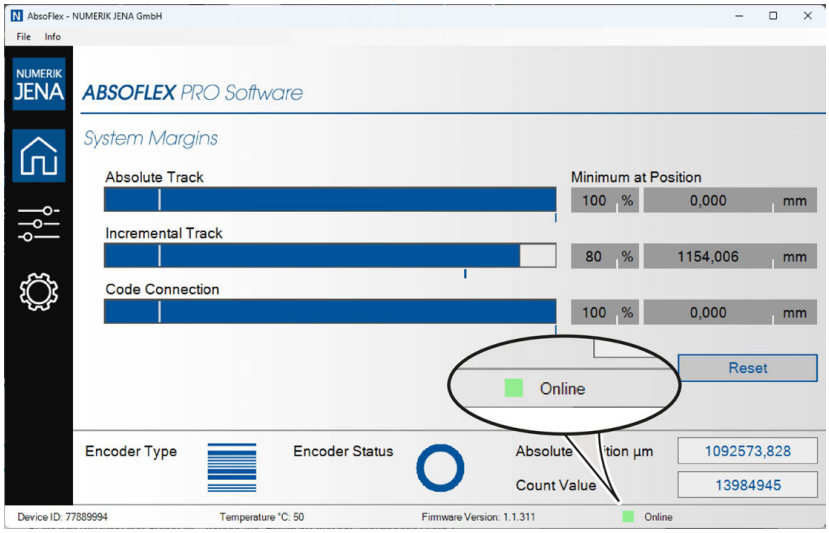
Comply with the maximum cable lengths.



Connecting the encoder to the ABSOFLEX Pro software

- Open the ABSOFLEX Pro software
> The home screen opens.
- Check the connection status
  - Green: The connection has been set up
  - Red: No connection

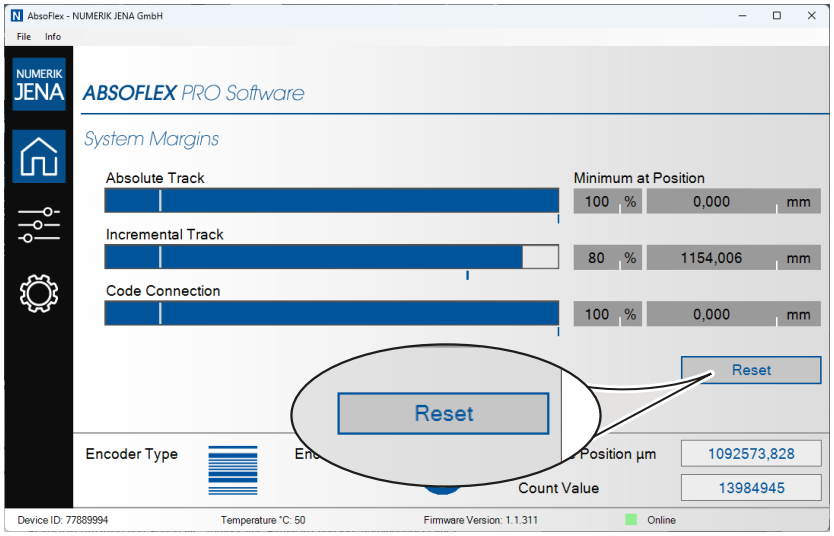
If there is no connection, make sure all cables and connectors are securely plugged in.



6.3 Adjusting the scanning head

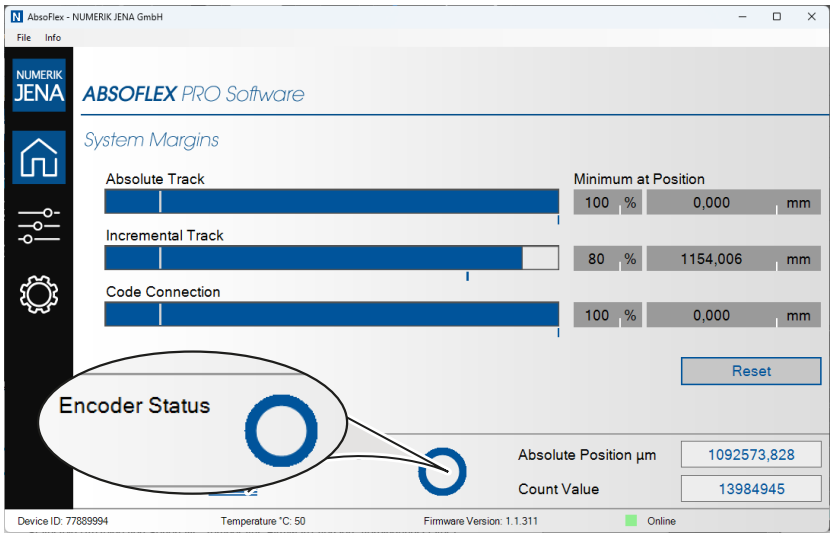
Evaluating the signal quality

- ▶ Click **Reset**
- ▶ Traverse the scanning head multiple times over the entire length of the scale tape at a speed of 10 mm/s to 100 mm/s
- > Three bars show the current **function reserve status** of the scanning process.
- > **Encoder Status** is displayed.



- ▶ Check the **encoder status**

The accumulated system status is shown in **Encoder Status**. **Encoder Status** changes from **blue** to **red** if an error occurs.



- ▶ Check the **function reserve status**

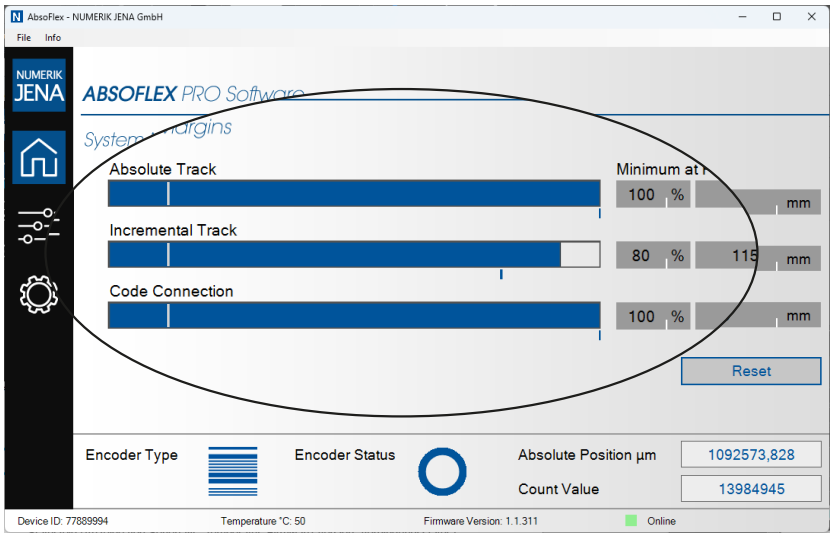
Three bars show the current function reserve status of the scanning process:

- **Absolute Track**
- **Incremental Track**
- **Code Connection**

Adjustment is recommended in all cases, even if the function reserve status of the scanning process is 100%.



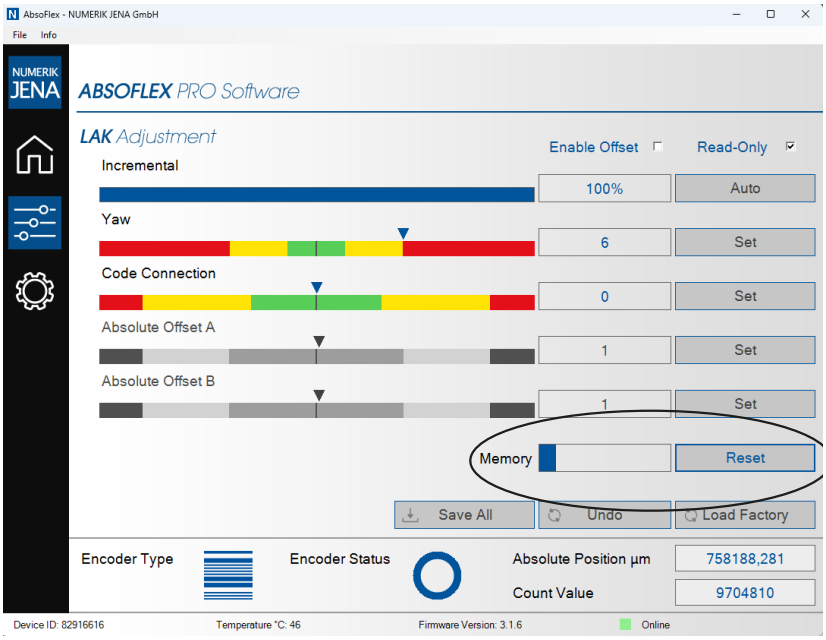
- ▶ Click **Adjustment**
- > The **Adjustment** menu opens.



Automatic signal adjustment

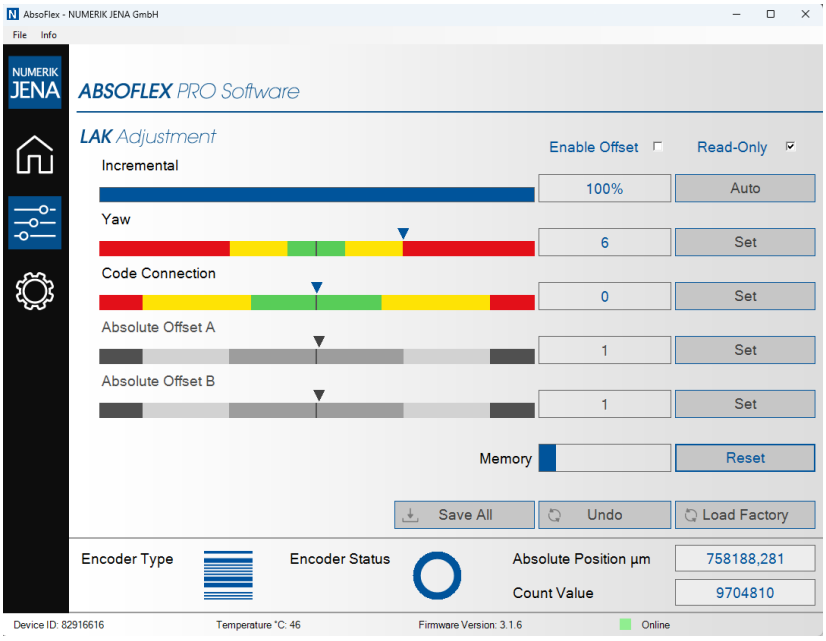
Clearing the memory

- ▶ Click **Reset**
- > The memory is cleared.



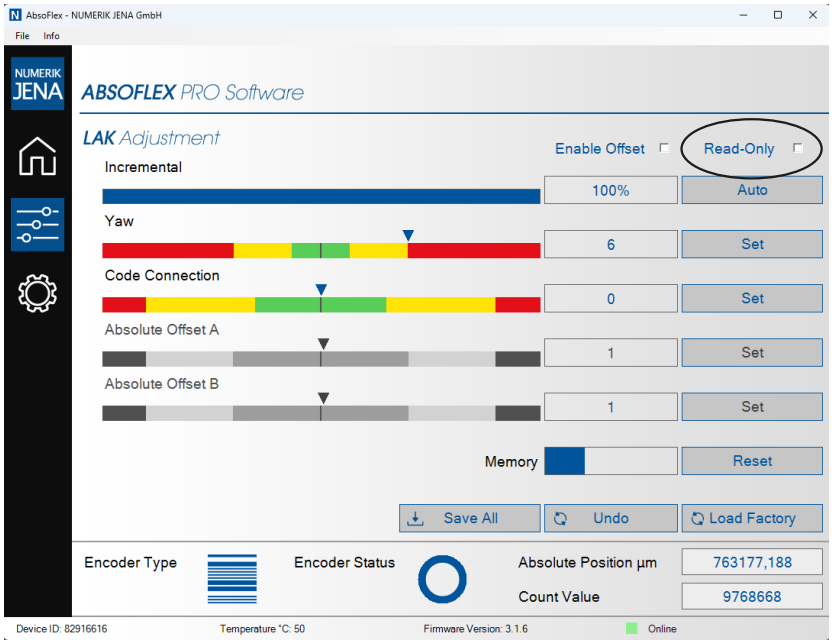
Checking the mechanical mounting conditions

- ▶ Traverse the scanning head multiple times over the entire length of the scale tape at a speed of 10 mm/s to 100 mm/s
- > The bar graph shows the function reserve of the incremental track (**Incremental** bar) at the current position, the yaw angle (**Yaw** bar), the code connection (**Code Connection** bar), and the offset of the absolute tracks A and B (**Absolute Offset A and Absolute Offset B** bars).



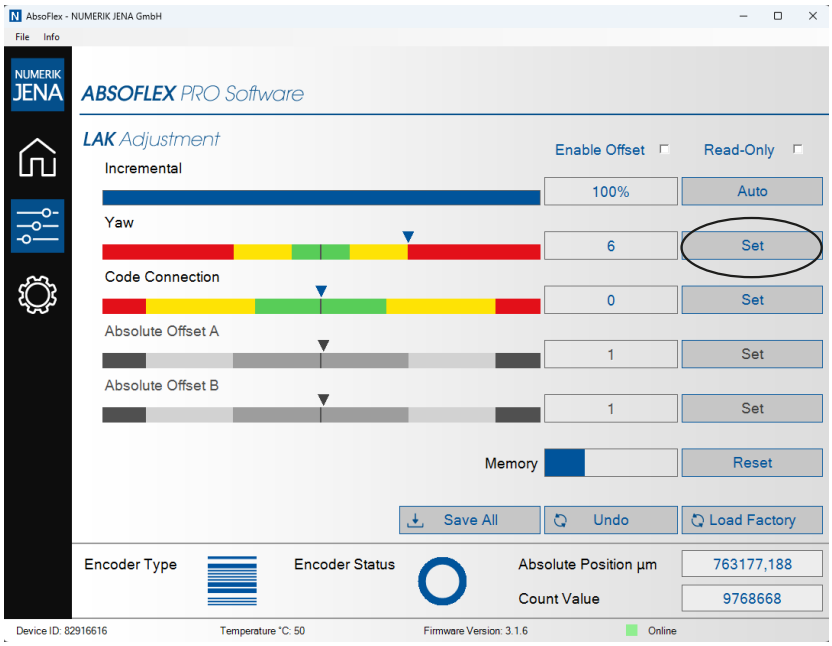
Adjusting the incremental track (Incremental bar)

- ▶ Deselect **Read-Only** mode
- > Signal adjustment is now enabled and can be selected.
- ▶ Click **Auto**
- ▶ Traverse the scanning head multiple times over the entire length of the scale tape at a speed of 10 mm/s to 100 mm/s until the bar is shown in blue
- > The incremental track is automatically adjusted.
- > The incremental track value is ≥ 80%. Adjustment is complete.
- ▶ Continue with **yaw angle** adjustment
- > The incremental track value is less than 80%.
- ▶ Repeat the incremental track adjustment
- > The incremental track value is still less than 80%.
- ▶ Check the mounting conditions and repeat the incremental track adjustment

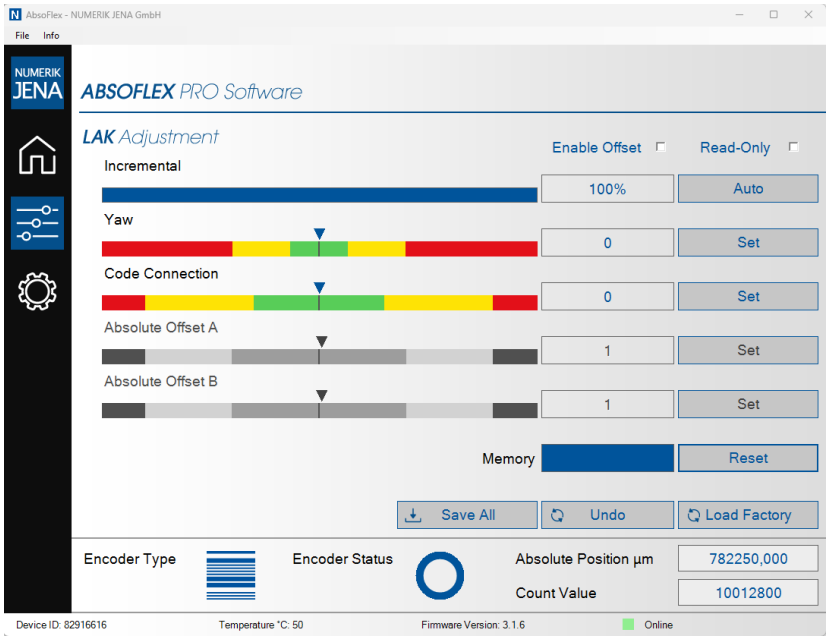


Adjusting the yaw angle (Yaw bar)

- ▶ Click **Set**
- > The yaw angle error is automatically adjusted.

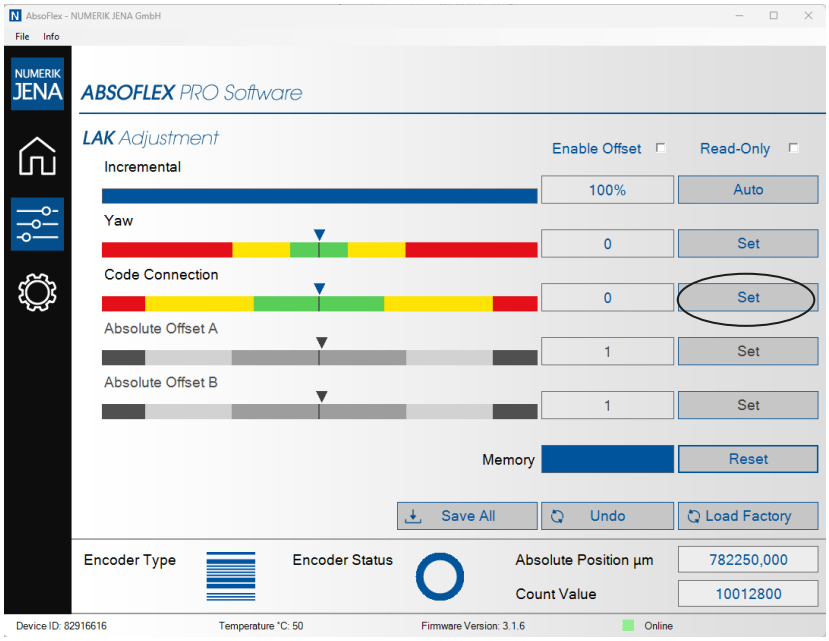


- ▶ Click **Reset**
- > The memory is cleared.
- ▶ Traverse the scanning head multiple times over the entire length of the scale tape at a speed of 10 mm/s to 100 mm/s
- > The value is within the green range (optimum). Adjustment is complete.
- ▶ Continue with **code connection** adjustment
- > The value is outside the green range.
- ▶ Repeat the **yaw angle** adjustment
- > The value is still outside the green range.
- ▶ Check the mounting conditions and repeat the **yaw angle** adjustment

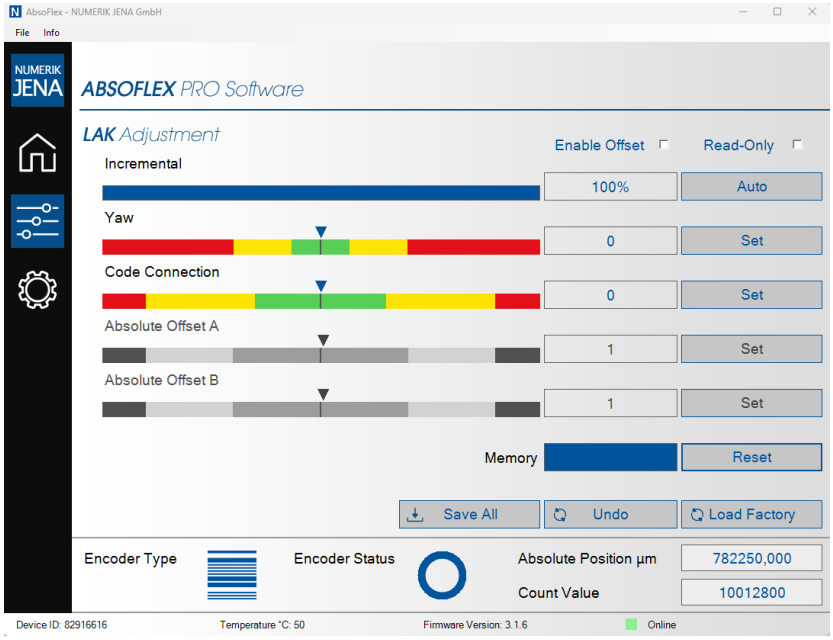


Adjusting the code connection (Code Connection bar)

- ▶ Click **Set**
- > The code connection error is automatically adjusted.

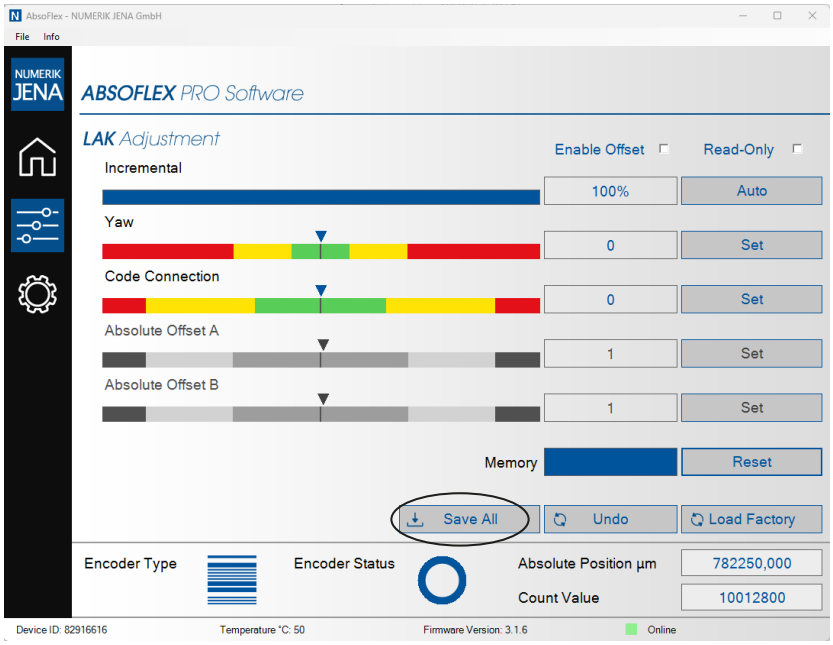


- ▶ Click **Reset**
- > The memory is cleared.
- ▶ Traverse the scanning head multiple times over the entire length of the scale tape at a speed of 10 mm/s to 100 mm/s
- > The value is within the green range (optimum). Adjustment is complete.
- > The value is outside the green range.
- ▶ Repeat the **code connection** adjustment
- > The value is still outside the green range.
- ▶ Check the mounting conditions and repeat the **code connection** adjustment



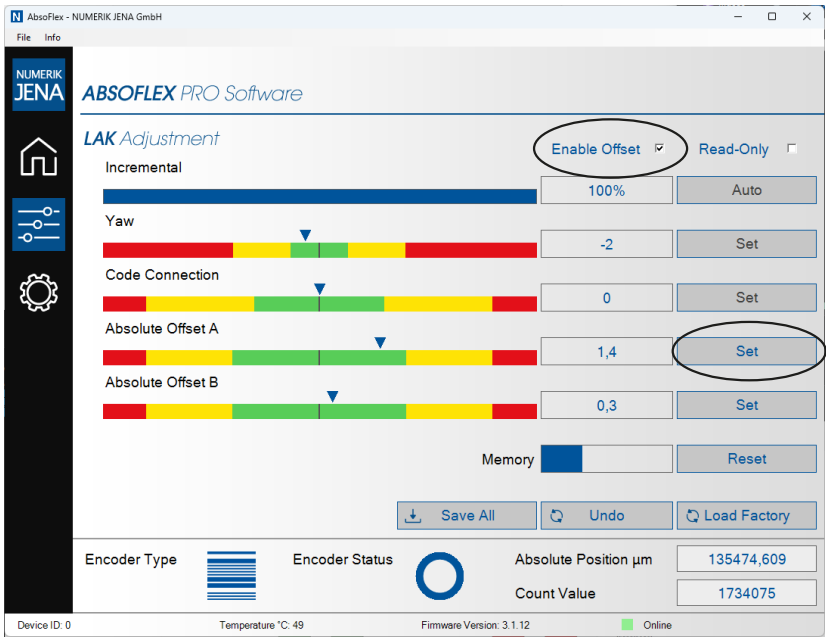
Saving the setting parameters

- ▶ Click **Save All**
- > The setting parameters are saved.
- ▶ Continue with the adjustment of the **offsets of the absolute tracks A and B**



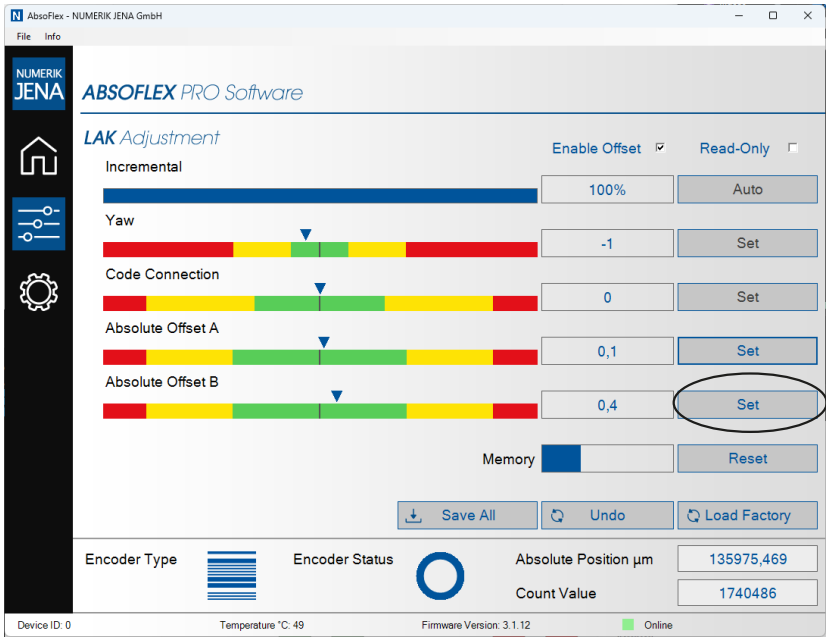
Adjusting the offset of the absolute track A (Absolute Offset A bar)

- ▶ Select **Enable Offset**
- > Signal adjustment of the offset limits is now enabled and can be selected.
- ▶ Click **Set**
- > The **offset of the absolute track A** is automatically adjusted.
- ▶ Click **Reset**
- > The memory is cleared.
- ▶ Traverse the scanning head multiple times over the entire length of the scale tape at a speed of 10 mm/s to 100 mm/s
- > The value is within the green range (optimum). Adjustment is complete.
- ▶ Continue with the adjustment of the **offset of the absolute track B**
- > The value is outside the green range.
- ▶ Repeat the adjustment of the **offset of the absolute track A**
- > The value is still outside the green range.
- ▶ Check the mounting conditions and repeat the adjustment of the **offset of the absolute track A**



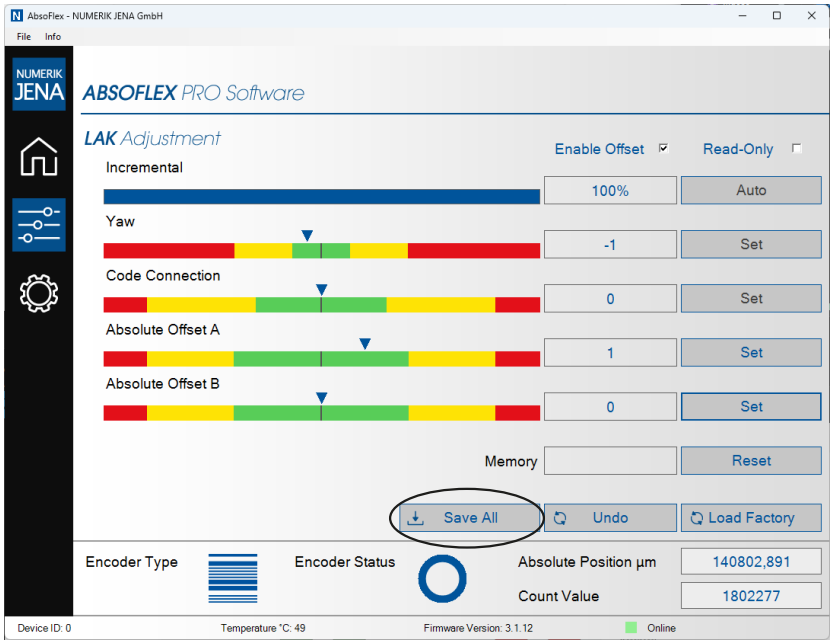
Adjusting the offset of the absolute track B (Absolute Offset B bar)

- ▶ Click **Set**
- > The **offset of the absolute track B** is automatically adjusted.
- ▶ Click **Reset**
- > The memory is cleared.
- ▶ Traverse the scanning head multiple times over the entire length of the scale tape at a speed of 10 mm/s to 100 mm/s
- > The value is within the green range (optimum). Adjustment is complete.
- > The value is outside the green range.
- ▶ Repeat the adjustment of the **offset of the absolute track B**
- > The value is still outside the green range.
- ▶ Check the mounting conditions and repeat the adjustment of the **offset of the absolute track B**



Saving the setting parameters

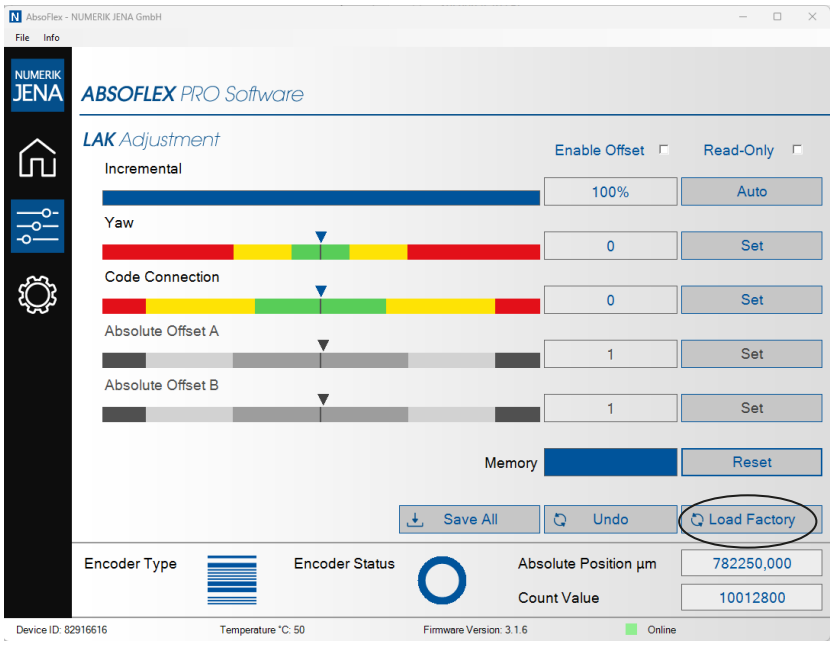
- ▶ Click **Save All**
- > The setting parameters are saved.
- > The encoder has been adjusted successfully.



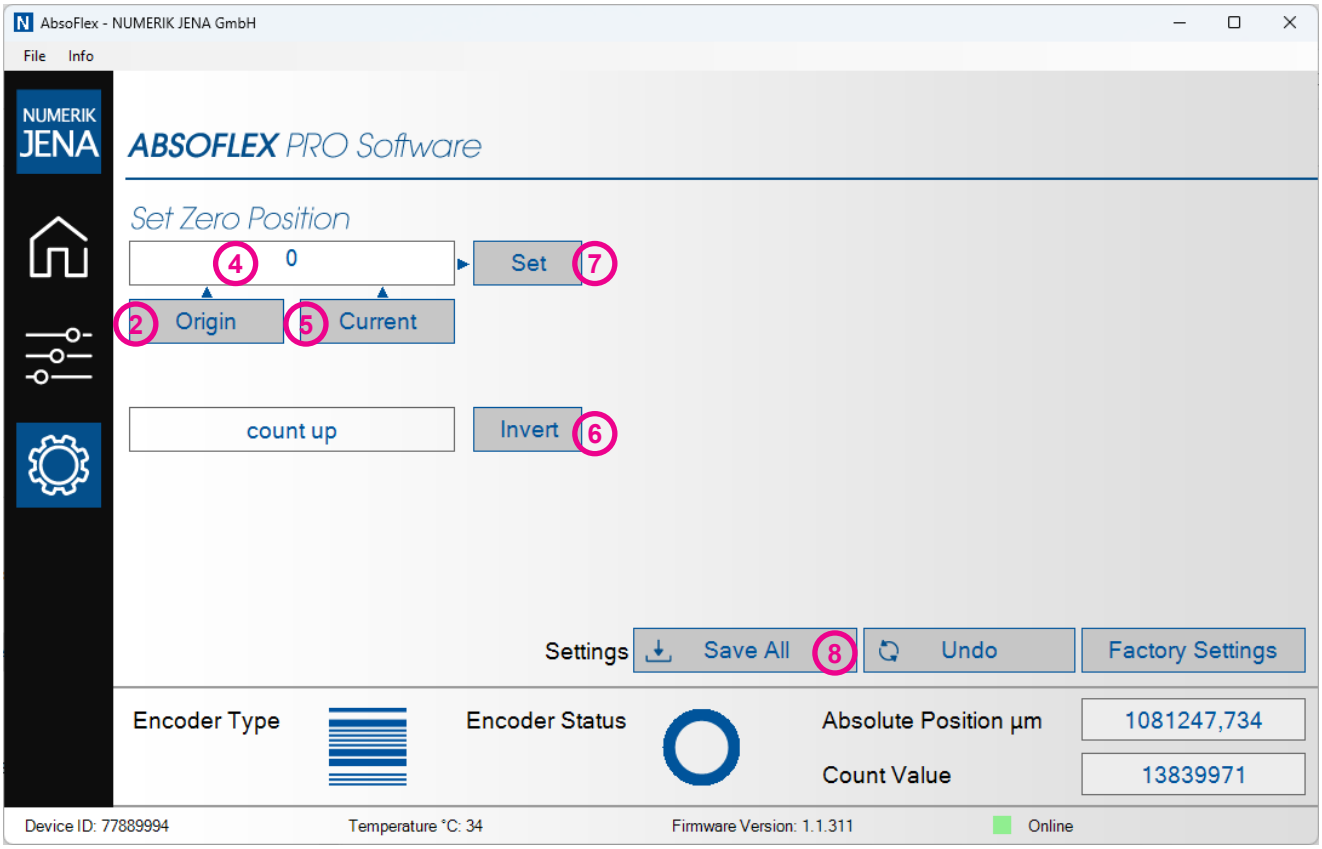
Problems during adjustment

If problems occur during signal adjustment or the adjustment cannot be performed, the sensor parameters may need to be reset to the factor default settings.

- ▶ Click **Load Factory**
- > The sensor parameters are reset to the factory default settings.
- ▶ Repeat the adjustment



6.4 Programming of the Logic Zero-Position and Counting Direction



Programming of the Logic Zero-Position*

Absolute measuring systems of NUMERIK JENA work with two separate internal position: 1. Physical position which is derived from the code on the scale tape and 2. Logical position which is passed to the interface. It is possible to shift the logical position in regard to the physical position. This is achieved by setting a logical zero-position.

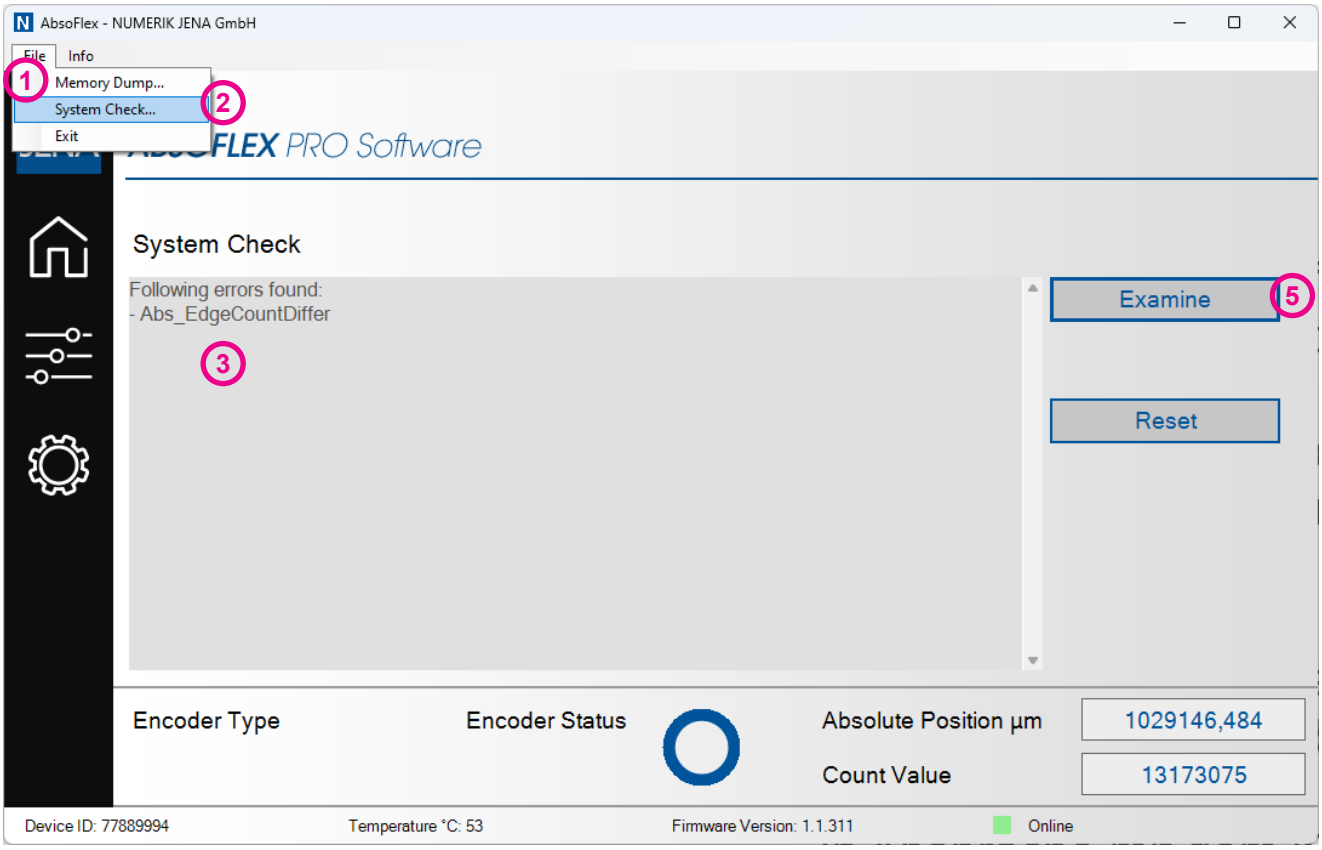
1. It is possible to save a physical position which is equivalent to the logical zero **(4)**.
   Any counter value, that represents a valid physical position, can be entered here.
   Alternatively, by clicking the **Origin - Button (2)** this value can be set to zero or the current position can be entered by clicking the **Current - Button (5)**.
2. The **Set - Button (7)** transmits the entered value to the measuring system.
3. Save all changes by clicking the **Save All - Button (8)**!

Programming of the Logical Counting Direction*

1. By clicking the **Invert - Button (6)** the counting direction of the measuring system can be inverted.
2. **Please note:** After changing the counting direction the logical zero-position has to be programmed as well!
3. Save all changes by clicking the **Save All - Button (8)**.

* Not in combination with EnDat 2.2

6.5 Extended error diagnosis with the ABSOFLEX Pro Software



If system errors occur, the ABSOFLEX Pro software offers the option of extended error diagnostics.

A diagnostics interface is called up via the menu item “File” -> “System Check” **(2)**.

IMPORTANT: The measuring device has to be stationary in order to perform the diagnosis correctly.

By pressing the **Examine - Button (5)** the diagnose starts and a measuring system analysis is carried out.

The results are listed in the gray log window **(3)**. Below is an overview of the error messages with possible causes and how to rectify them.

Forward this error information to NUMERIK JENA Technical Support or to authorized representatives. In consultation with customer service, a memory image of the measuring head can be created via the menu item “File” -> “Memory Dump” **(1)**.

6.6 Overview ABSOFLEX Pro Software Errors

Error	Possible causes	Solution
Abs_ScaleOrientationWrong	• Scale tape upside down	• Turn scale tape or measuring head 180°
Abs_TooManyX	• Too many errors detected during decoding	• Clean scale tape and/or measuring head
Abs_EdgeCountDiffer	• Number of edges between the two lines differs too much	• Check mechanical mounting, probably pitch or roll angle
Abs_YawErrorTooLarge	• Yaw too large	• Check mechanical mounting, check yaw
Abs_SensorErrorLisA	• Mechanical mounting error or heavy scale tape contamination	• Check mechanical mounting and clean scale tape
Abs_SensorErrorLisB	• Mechanical mounting error or heavy scale tape contamination	• Check mechanical mounting and clean scale tape
Incr_1VppVoltageTooLow	• Incremental signal below limit	• Check power supply or cable connection?
Incr_1VppVoltageTooHigh	• Incremental signal over limit	• Check power supply or cable connection?
Incr_iPosInterMismatch	• Interpolation and index position do not match	• Please report the error to NUMERIK JENA Technical Support including memory dump

Chart 1

7. Ordering Key

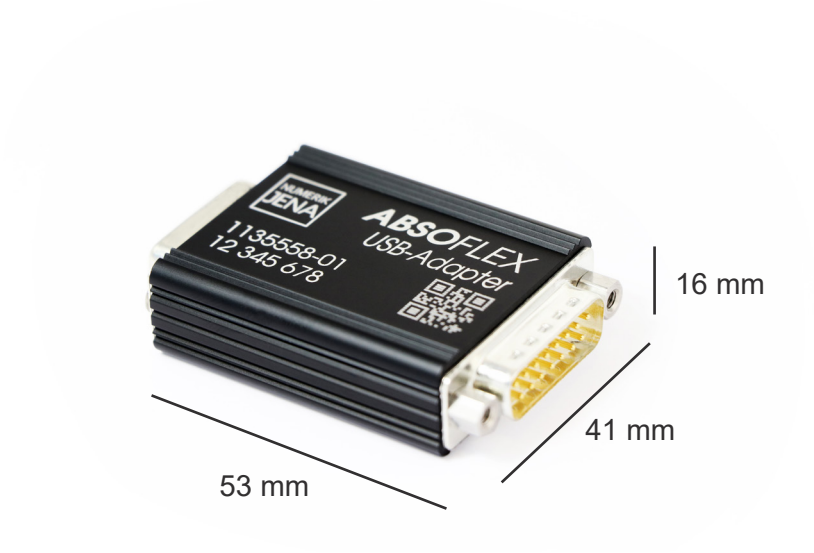
7.1 ABSOFLEX Adapter

Description	Order-no.
ABSOFLEX USB-Adapter	1135558-01
USB-Kabel (1.8 m; Typ A to Mini-USB Typ B)	687661-01

Chart 2

7.2 ABSOFLEX Pro Software

The ABSOFLEX Pro Software (incl. driver package) can be downloaded for free on the NUMERIK JENA website. Visit the LAKgo/ LAKselect product page or the download section.



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