◀▶VANDEWIELE ———————— PROTECHNA————
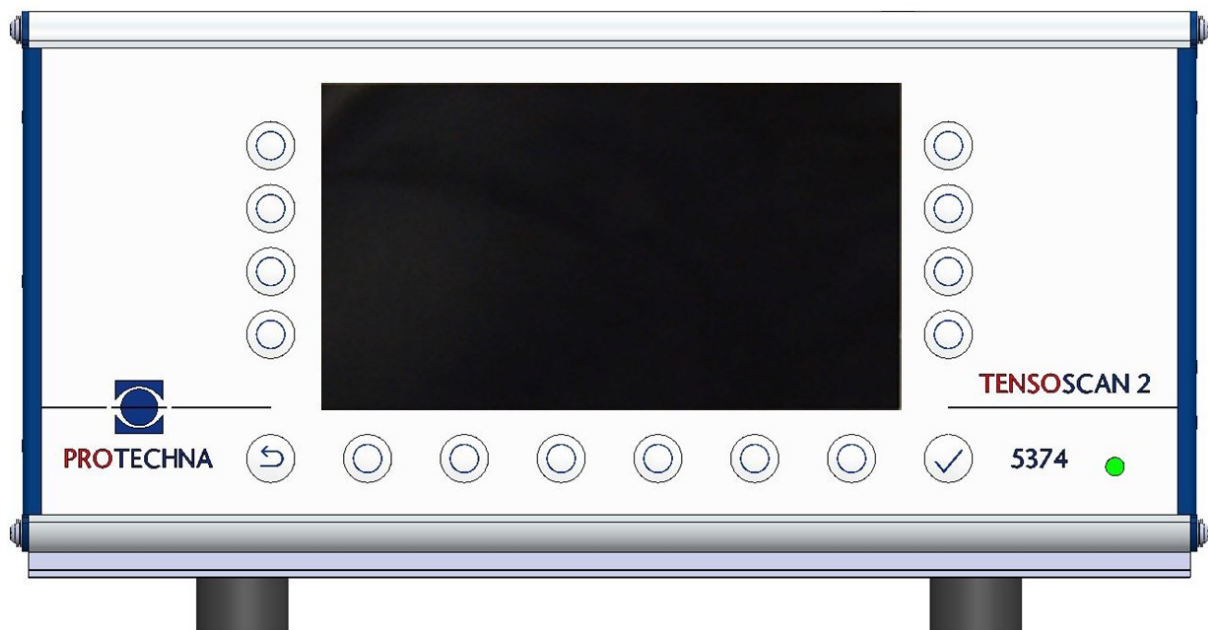
TENSOSCAN 2 5374

for warping machines
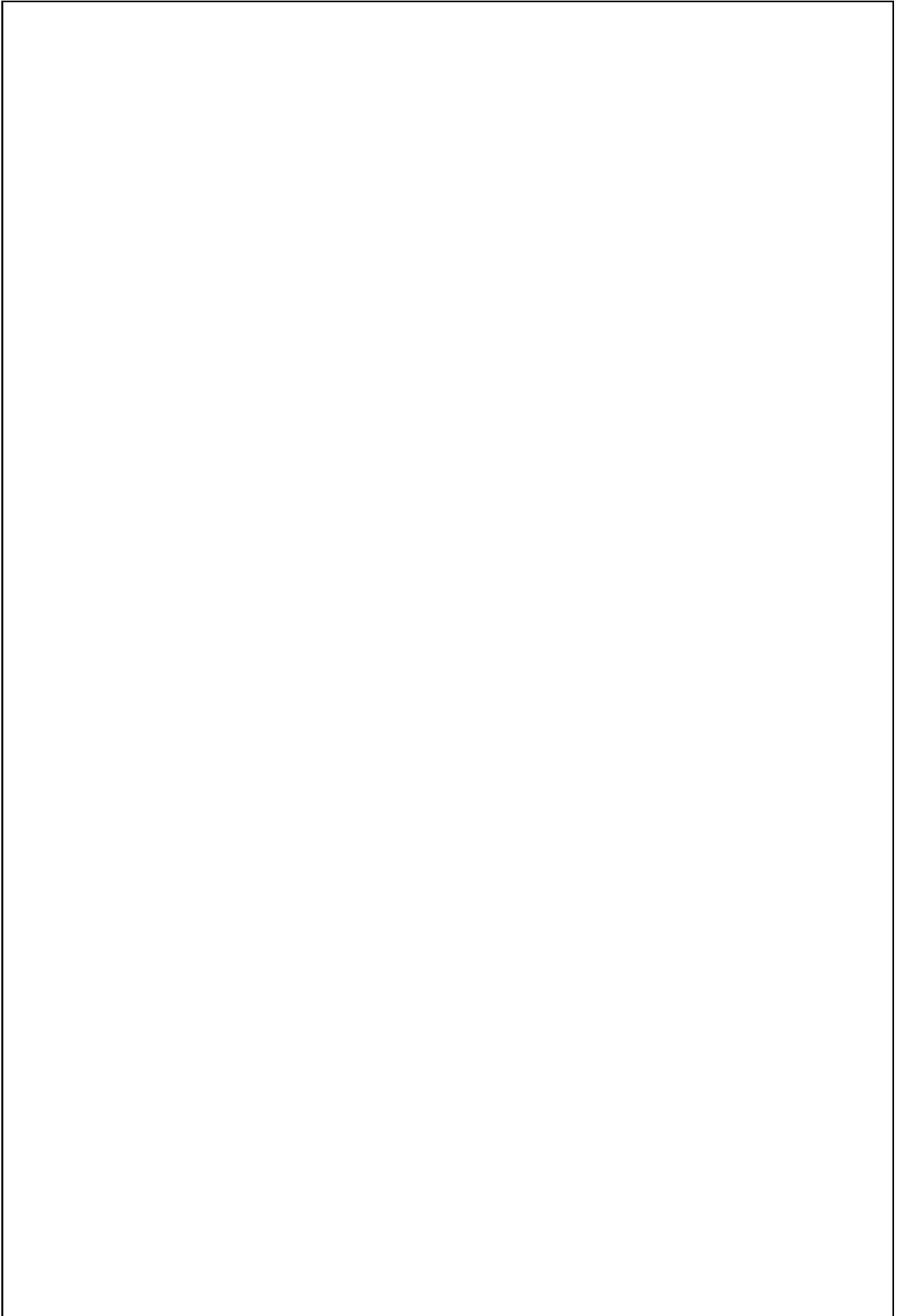
Software version for control unit from V2.40 as at January 2021
Software version for base station from V1.0 as at January 2021

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Content

Appendix

1   Safety instructions

- Always follow all warnings and information that is attached to the device itself or included in this manual.

- This device is sensitive to electrostatic discharge, which may cause damage to the interior of the device or affect its normal operation. Please observe the required precautions when handling components liable to damage through electrostatic discharge.

- The device must be always disconnected from the power supply before cleaning or for removing or installing an option.

- Do not use any liquid detergents or cleaning sprays for cleaning, but only a damp cloth.

- Never operate the device in locations where there is a risk of water or other liquids entering the device.

- The installation location for the device should be sufficiently stable, as the device can be severely damaged by significant vibrations, e.g. falling down.

- You must make sure that the power supply voltage values specified for the device are observed.

- Never try to insert objects into openings on the device, as short circuits or electric shock can be caused by the voltage present inside the device.

- You should never try to repair the device yourself, with the exception of the actions expressly stated in the manual. Otherwise, you risk touching parts that are under high voltage.

- Ensure that no foreign bodies can get into the moving parts of the TENSOSCAN 5374 monitoring system.

Electrical connection must only be performed by qualified personnel.

Before electrical connection, it must be ensured that there is no risk of coming into contact with live parts.

Intended use
as defined in paragraph 1.1.2.c
EC Machinery Directive

Item 1

The TENSOSCAN 5374 system is intended for measuring the tension of threads in yarn sheets on warping systems. If the thread tension is exceeded or undershot, the control unit can stop the warping system.

Item 2

The TENSOSCAN 5374 is mounted in a stationary position. It is operated via the control unit or a laptop.

Item 3

Installation work may only be carried out by PROTECHNA engineers or professional mechanical or electrical installation engineers.

2 Functional description

The TENSOSCAN 5374 performs continuous automatic monitoring of the tension of each individual thread of a yarn sheet. A measuring carriage moves over the entire width of the yarn sheet, measuring the tension of the threads and documenting this on an order-related basis. If limits are exceeded or undershot, the warping machine can be stopped.

3 General information

3.1 Information about the system

For optimum operation of the system, the following prerequisites must be met:

A. The system must be set up by professional mechanical and electrical installation engineers in accordance with the installation manual.

B. Switching on test mode on the control unit enables monitoring parameters to be optimised while the machine is running. The production machine is not switched off by the monitoring system in test mode.

C. Display of error statuses:
Both yarn defects and monitoring system malfunctions are displayed on the control unit through error messages. They are also indicated via the warning light, which is visible from a distance.

D. The monitoring area covers the entire width of the TENSOSCAN 5374 and cannot be changed. The inspection bed must be wide enough to ensure there is sufficient clearance to the left and/or right of the reed for the measuring carriage.

E. System configuration: Standard installation is described in the installation manual.

The carriage must be placed so that the status LEDs (1) on the carriage are facing the control unit. The figures show standard installation, against the production direction: The control unit (2) is fitted on the left-hand frame. The carriage is in parking position.

The control unit can also be fitted on the right-hand side. In this case, the carriage and the entire bed should be mounted with a 180 degree rotation.
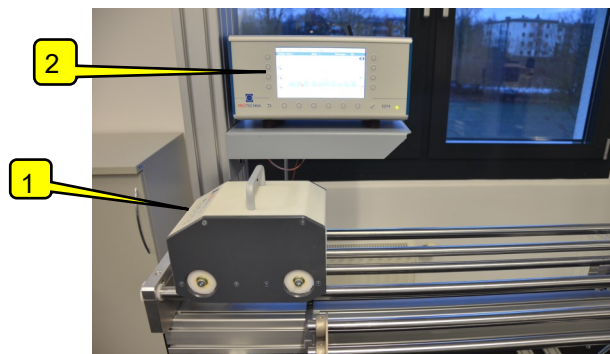
3.2 Information about the measuring carriage

The TENSOSCAN 5374 measuring carriage is connected to the control unit via WLAN. Power (24 V) is supplied via the two guiding tubes (1) and the graphite pins (2).

Underneath is the sensor unit (3) for scanning the thread tension.

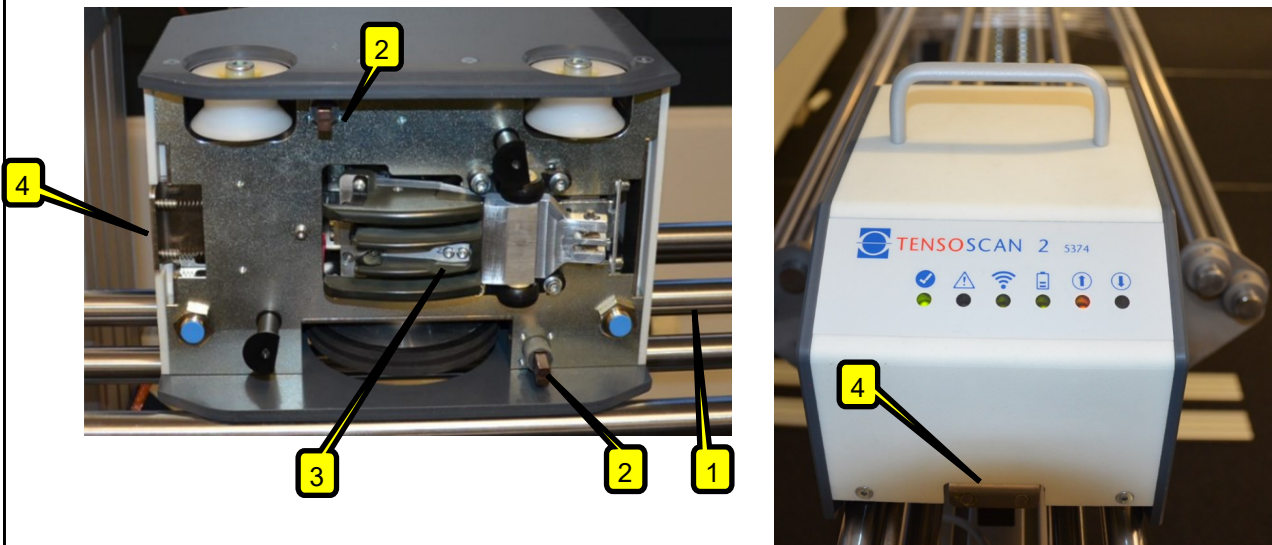⚠️ **NOTE**
The sensor is susceptible to mechanical stress. Do not touch the sensor and ensure that it never comes into contact with other parts. This could permanently damage the sensor.

Correctly placing the measuring carriage into the parking position:
On the sloping side of the carriage is a pushbutton (4) for the locking mechanism. This prevents the carriage from slipping or falling over during operation. The pushbutton must be pressed to place or remove the carriage. Position the carriage with its wheels on the rails until it is straight, and then release the pushbutton. The carriage is now engaged into position.

Observe the specifications in chapter 3.1, point E.
If the carriage is incorrectly placed, it will not be supplied with power. All status LEDs are either permanently off or flash continuously (as long as the battery is charged). An error message is displayed on the control unit.

Correctly taking the measuring carriage out of the parking position:
Switching the machine off moves the carriage into the parking position. Only remove the carriage when it is in the parking position. To do this, press the lock button, remove the carriage and place it on a clean, even surface.

Please also observe the information about maintenance and cleaning in chapter 8.

The measuring carriage status LEDs.

(1) Operating status LED

- Green: Ready for operation.
- Flashing red: Sensor error.

(2) Error/warning status LED

- Flashing yellow: Warning, more information via the control unit.
- Flashing red: Error, more information via the control unit.

(3) WLAN status LED

- Red: WLAN module not initialised.
- Flashing red: Not connected to TENSOSCAN WLAN Access Point.
- Flashing yellow: Connected to TENSOSCAN WLAN Access Point but no communication with base station software.
- Green: Connected to base station software.
- Flashing green: Connected to base station software, measurement data traffic jam occurred.

(4) Charging status LED

- Red: Not ready, insufficient power in capacitor bank, insufficient power supply or carriage incorrectly placed.
- Green: Sufficient supply voltage.
- Yellow: Insufficient supply voltage.
- Flashing green or yellow: Capacitor bank not full but sufficiently charged for operation.
- Flashing red: Capacitor bank no longer sufficiently charged, stopping operation in a few seconds.

(5) End position 1 status LED

- Yellow: End position 1 detected.
- Red: Unlock button pressed.

(6) End position 2 status LED

- Yellow: End position 2 detected.
- Red: Unlock button pressed.

3.3 Information about yarn guidance

Correct yarn guidance is vital for the smooth functioning of the TENSOSCAN system.

Threads must run **straight and at a right angle** over the guide rods of the TENSOSCAN system.

The following diagrams show a schematic representation of the system as viewed from the above. The black arrows correspond to the threads to be monitored.

Inspection bed

INCORRECT!

Inspection bed

INCORRECT!

Inspection bed

INCORRECT!

Inspection bed

CORRECT!
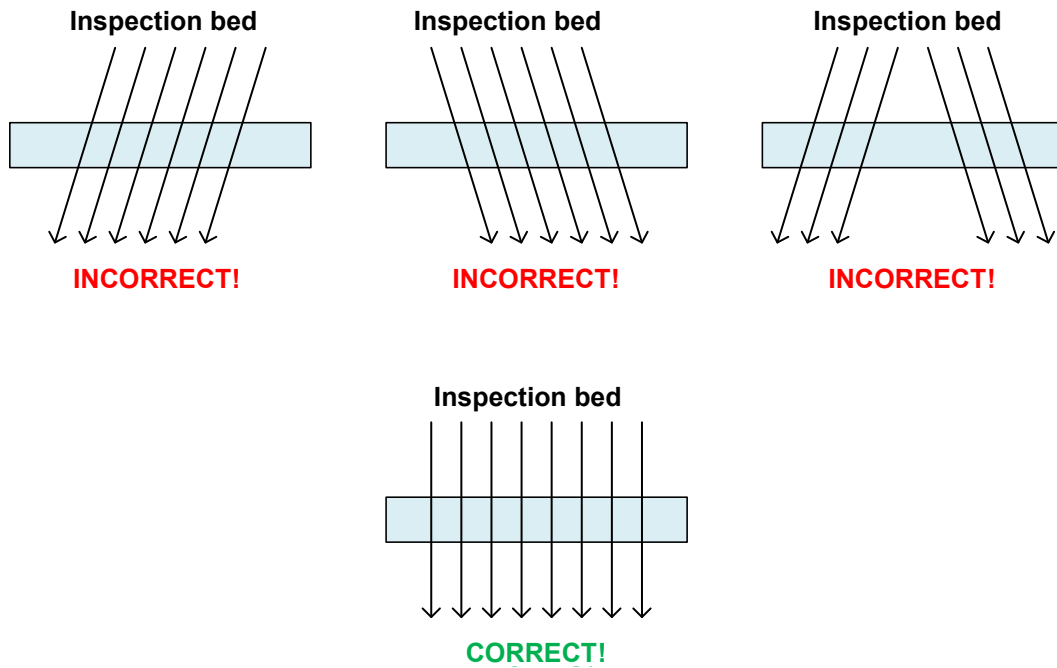
The operational principle of the TENSOSCAN 5374 requires **a parallelled yarn sheet on one level**.

Reeds are essential for separating the threads during the measuring process. These reeds are located inside the TENSOSCAN inspection bed.

Depending on the application, a single-row or double-row reed may be required. This depends on the thread density and thread tension.

To the warping machine

Yarn guide rods

Yarn guide rods

Reeds for separating the threads during the measuring process
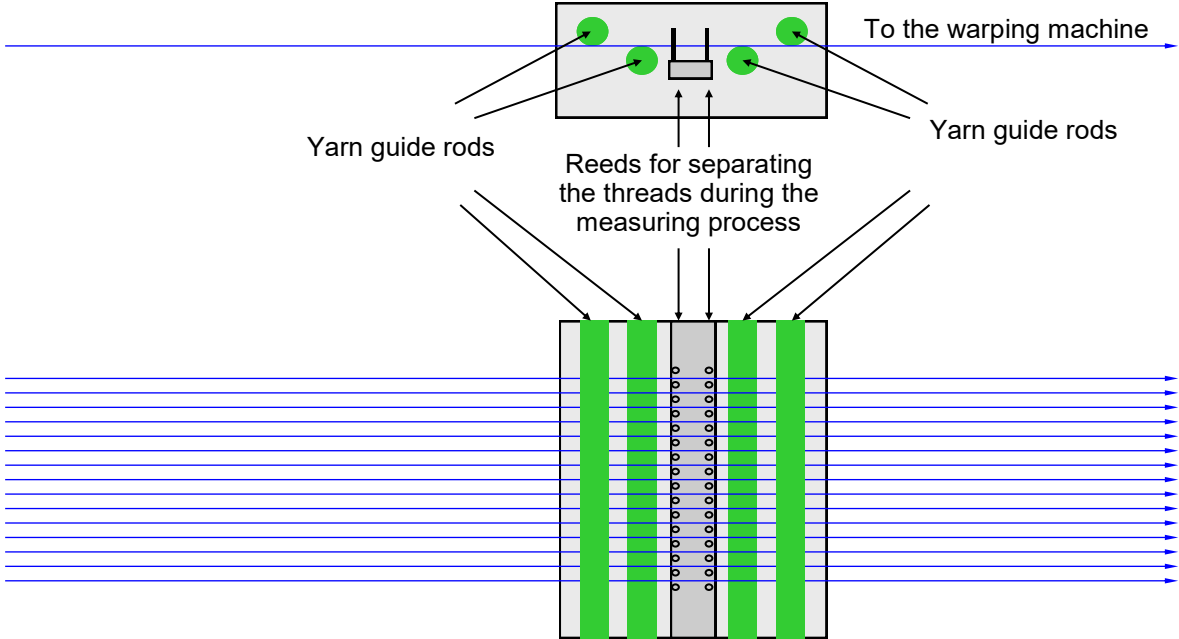
Optional guide rods for guiding the yarn sheet on one level

The upper yarn guide rods of the TENSOSCAN inspection bed are also attached only at the sides for wider inspection beds and just rest on top even if a central support is available. The rods therefore cannot absorb any forces from below (the threads press on the rods from below) and the yarn run must be set up so that this is prevented.

If the yarn sheet does not run on one level at the mounting position of the TENSOSCAN 5374, additional guide rods may be required to then absorb the corresponding forces.
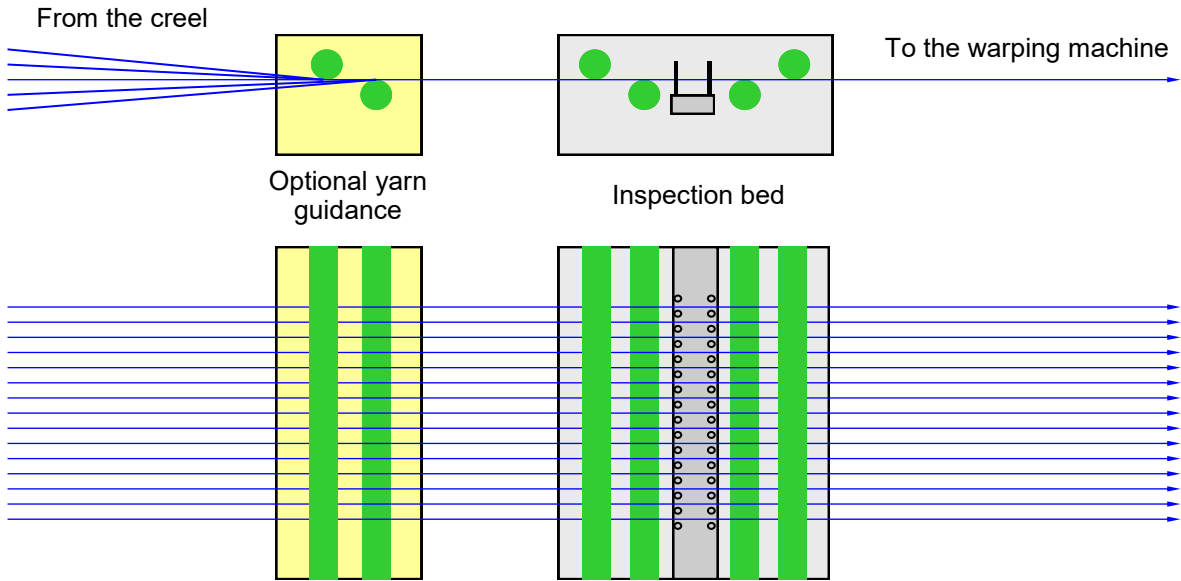
From the creel

To the warping machine

Optional yarn guidance

Inspection bed

Additional reeds for parallel guidance of the yarn sheet

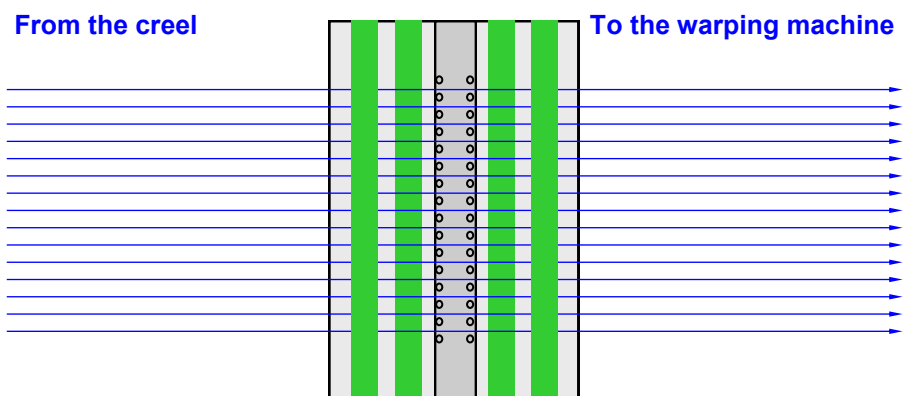All threads must be fed parallel and at a right angle over the TENSOSCAN inspection bed. If these prerequisites are not met, installation of additional reeds is required.

Version A

The yarn sheet is fed parallel and on one level.

The TENSOSCAN inspection bed in the standard version can be used; no additional reeds are required.

From the creel   **To the warping machine**

Version B

The yarn sheet runs in a v shape from the creel. The yarn run on the warping machine side is suitable for application of the TENSOSCAN 5374.

Through an additional reed and additional guide rods on the infeed side, the yarn sheet is fed parallel and on one level.

From the creel   **To the warping machine**

Additional reeds for parallel guidance of the yarn sheet

All threads must be fed parallel and at a right angle over the TENSOSCAN inspection bed. If these prerequisites are not met, installation of additional reeds is required.
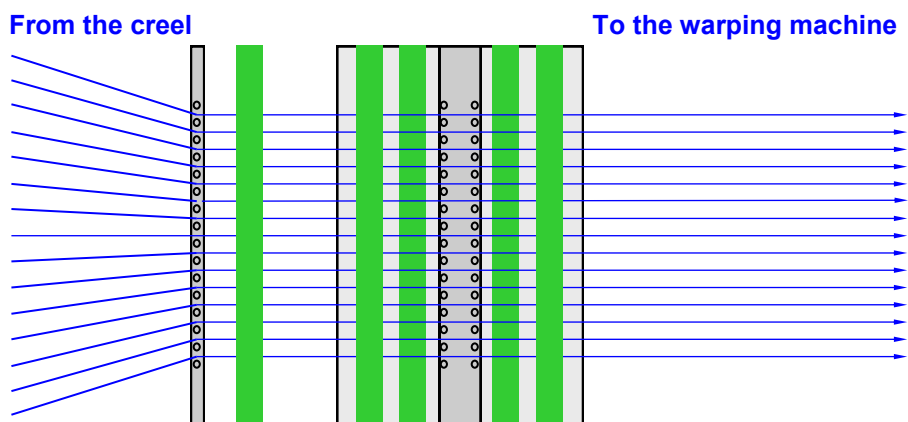
Version C

The yarn sheet runs in a v shape to the warping machine.

The yarn run on the creel side is suitable for application of the TENSOSCAN 5374.

Through an additional reed on the outfeed side, the yarn sheet is fed parallel.
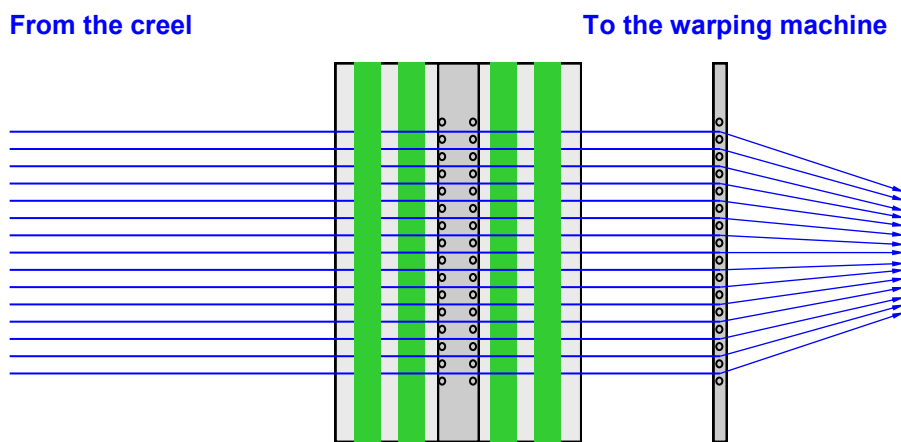
Version D

The yarn sheet runs in a v shape from the creel. On the warping machine side, the yarn run is also v-shaped.

Through two additional reeds and additional guide rods on the infeed side, the yarn sheet in the area of the TENSOSCAN 5374 is fed parallel and on one level.
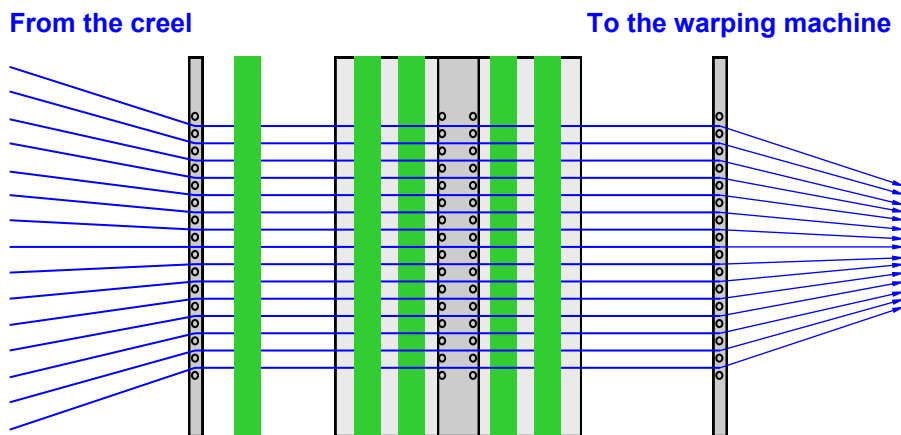
3.4   Information about yarn changeover

Remove the measuring carriage as described in chapter 3.2.

To make it easier to insert the threads into the reed when changing the yarn, the two external guide tubes (1) can be removed.

To do this, remove the two fastening screws (2) on each end of the TENSOSCAN 5374 and remove the clamping plates (3).

You can now remove the guide tubes.

After changing the material, refit the two guide tubes in the reverse order.
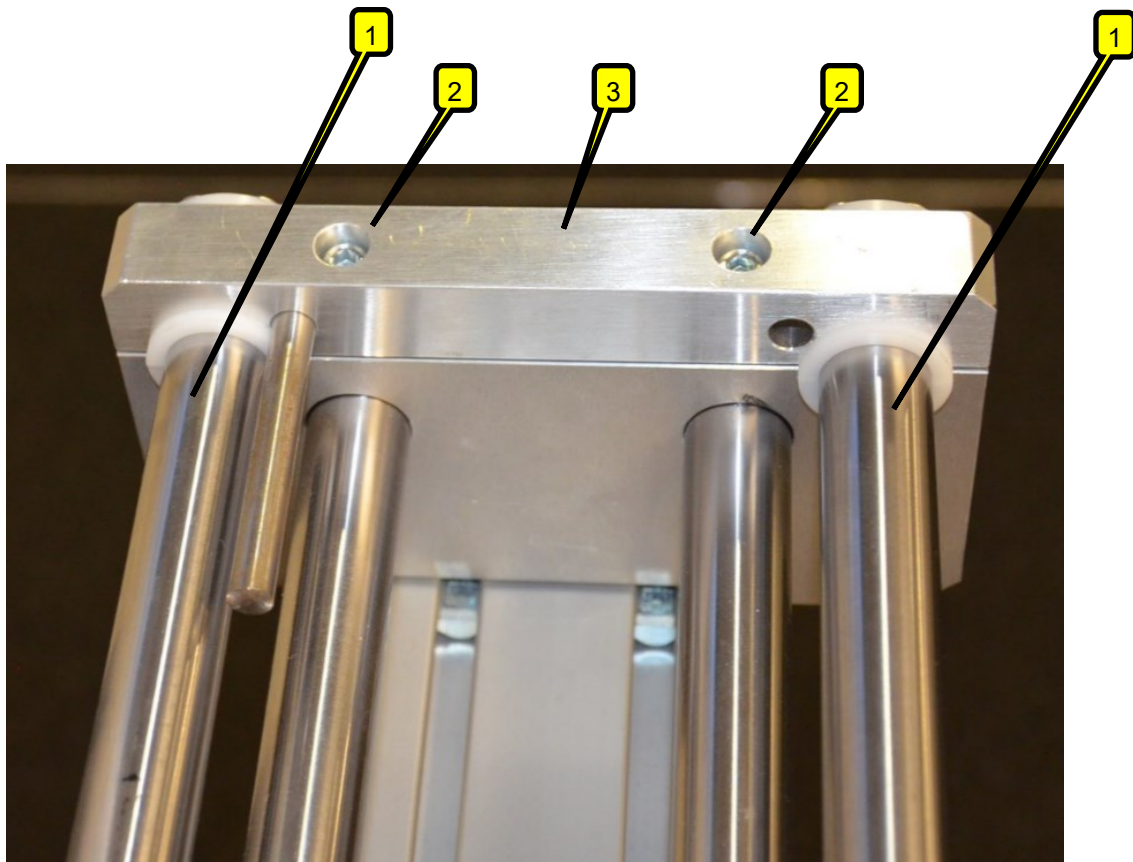
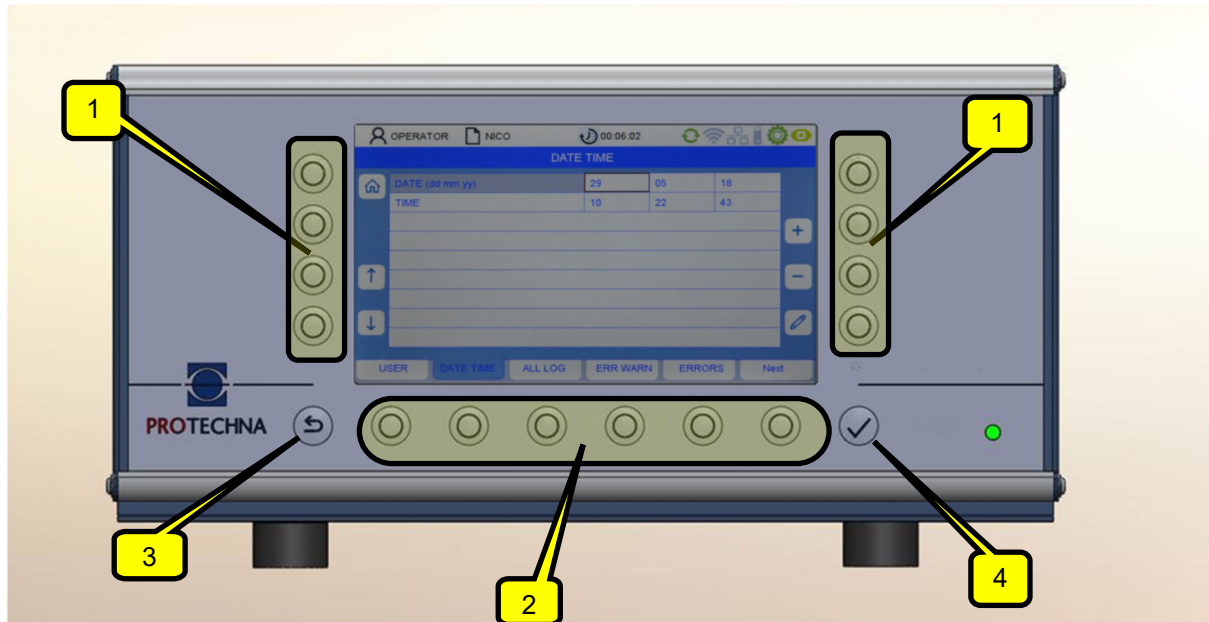# 4 Operating the control unit

The TENSOSCAN 5374 can be fully operated and programmed via the control unit. The following pages show and explain the corresponding screens.

4.1 Meaning of the buttons

Softkeys (1): The meaning of the buttons is shown on the screen.

Menu buttons (2): The meaning of the buttons is shown on the screen.

Buttons with fixed assignment: ESCAPE (3) and ENTER (4) button.

4.2 Menu navigation

At the bottom of the screen is a bar with the available submenus. Pressing a menu button takes you to the corresponding submenu.

Info	Settings	Data		Service	🌐

4.3 Submenu navigation

In the submenus, the available menu options are shown as tabs. The blue tab (see figure below) shows the currently selected submenu.
For some submenus, special authorisations are required, e.g. for the "Settings" and "Service" submenus. When the corresponding submenu is selected, a login menu appears, which prompts you to enter a password (see chapter 4.6).

Pressing the home button 🏠 (4) takes you back to the main menu. You also have the option to press the Escape button ↰ (5) to go one menu level up.

To edit a parameter, first select it from the relevant menu. The figure below gives an example of what to do:

Use the arrow buttons (3) to select the required parameter in the submenu. The current parameter is then highlighted with a brown border.

- If the parameter is a selection value, you can use the +/- buttons (1) to scroll in the selection.
- If the parameter is a number value, you can use the +/- buttons (1) or the pen button (2) to change the value. Use the pen button (2) to access a number input menu (see chapter "Entering numbers").

To apply a changed parameter value, it is not necessary to confirm this changed value individually. Changed values are applied automatically when you exit the relevant menu. All you need to do is press the button for one of the other submenus or go back with the home button (4). **This is the only way to transfer data to the system.**

To apply a changed parameter value to the article file, the relevant article must be saved (see chapter "Saving and loading article data").

4.4 Text input

If fields allow the input of alphanumeric characters, pressing the pen button calls up a virtual keyboard.
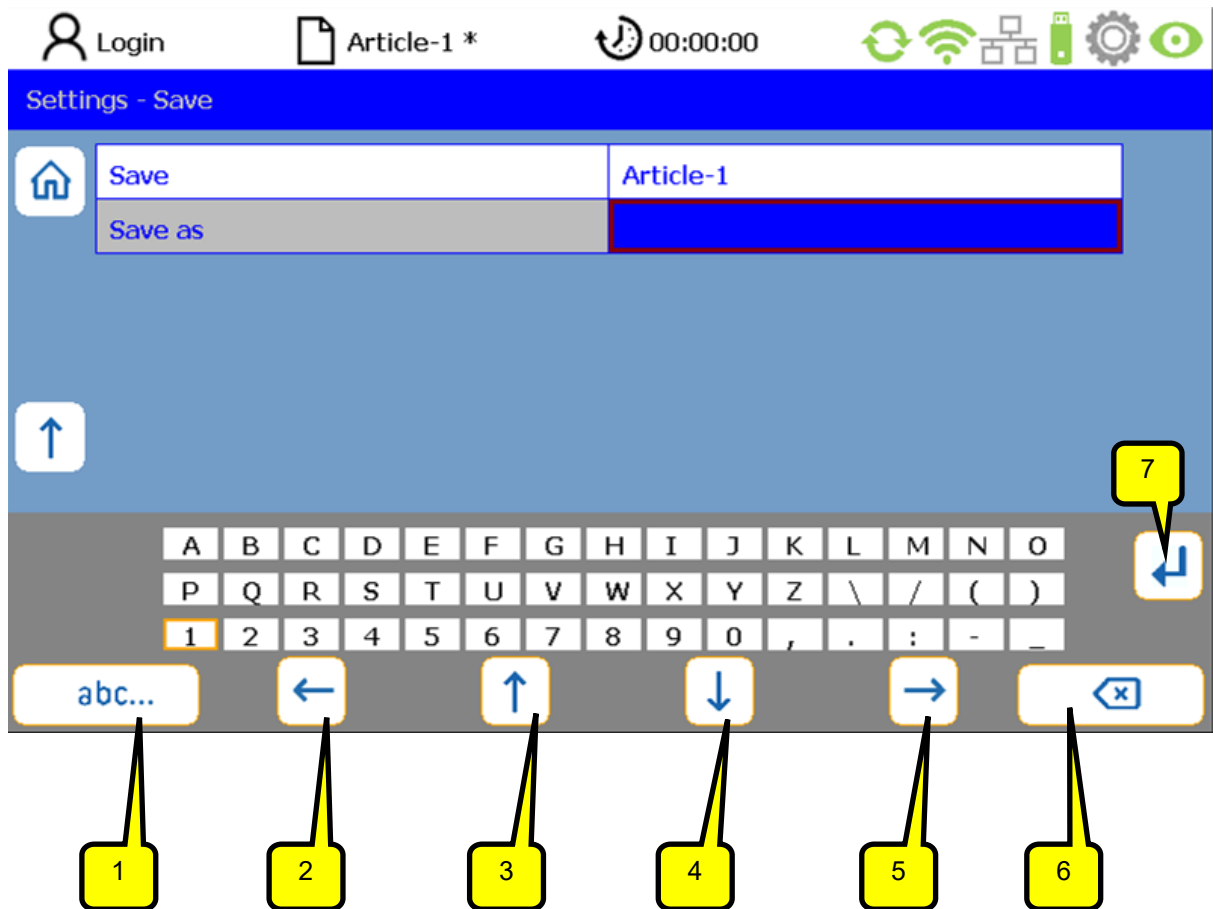
- The DELETE button (6) deletes the characters in the selected field.
- Use the arrow buttons (2-5) to select a character on the screen matrix. The active character is indicated with a brown border.
- Press button (1) to toggle the keyboard panel (e.g. from upper to lower case).
- Press RETURN (7) to apply the relevant selected letter.
- Use ENTER ✔ to apply the entered characters.
- Any input text not saved with ENTER ✔ will be lost.

4.5   Number input
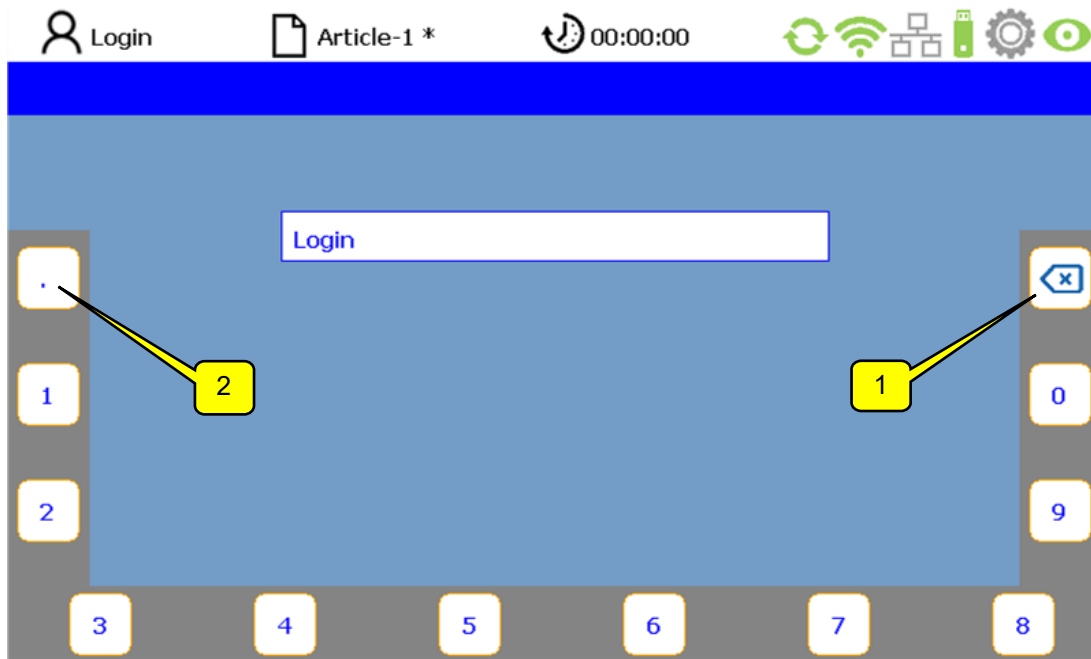
- Use the DELETE button (1) to delete the numbers from right to left.
- To enter floating-point numbers, use the button (2) for the decimal point.
- When you press the ENTER button, the new digit sequence is applied. The virtual number keyboard disappears and you are then in the current submenu.

4.6   Operator login

When not logged in, the operator is automatically prompted to enter a password for submenu requiring authorisation. The password for the operator is preset at the factory to "11111".
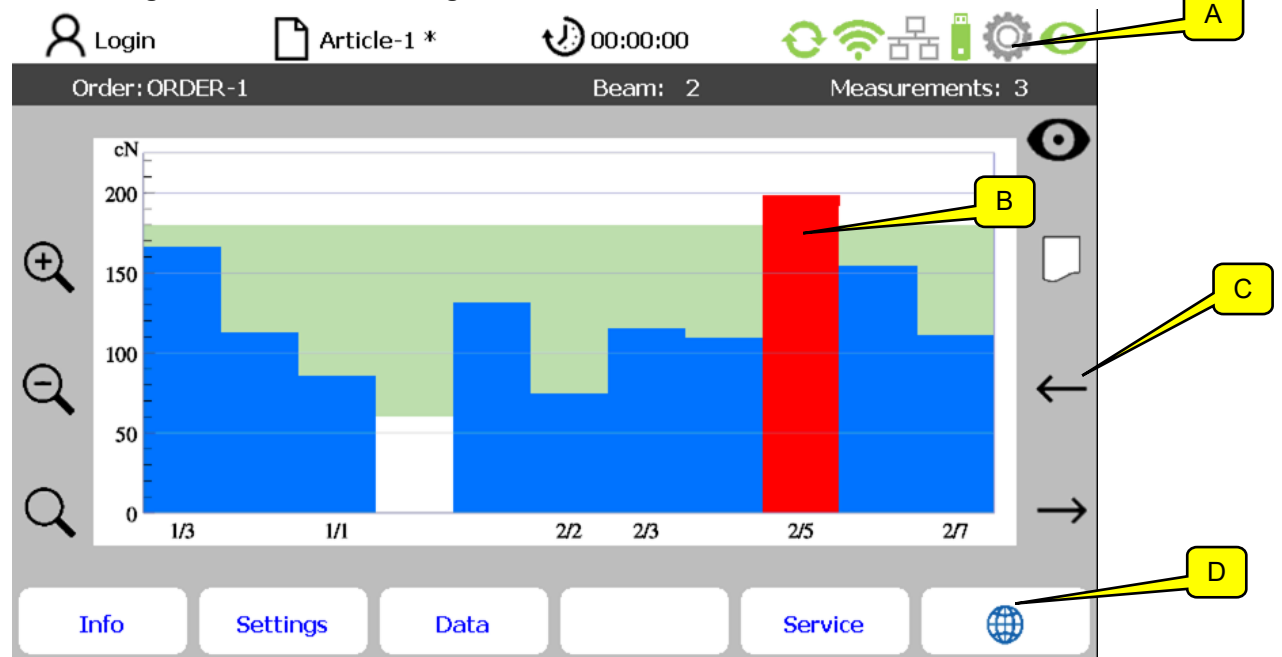

Pressing the buttons assigned to the numbers around the edge of the screen allows the operator to enter a password (combination of numbers) (also see chapter "Number input").

If the password was entered incorrectly, the PIN field shows the message "Incorrect password".

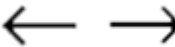The password can then be entered again.

5 Overview screen
5.1 Using the thread tension diagram

The overview screen comprises a status area divided into two sections (A), a display of tensions per thread (B), the button symbols (C) and the submenu options (D).

Symbol	Description
Protechna	Indicates the operator currently logged in.
ARTIKEL-1	Indicates the currently active article (* means: Changes to settings not yet saved in the article).
00:02:52	Indicates start delay when starting the machine, otherwise indicates the runtime since the machine was last started.
(refresh icon)	Indicates the status of communication with the measuring carriage (Green = OK).
(WiFi icon)	Indicates the communication status of the integrated WiFi module (Green = OK).
(network icon)	Indicates the communication status of the integrated network connection (Green = Network cable connected).
(USB icon)	Status of the integrated USB connection (Green = USB stick plugged in).
(gear icon)	Indicates the machine status (Green = Machine running).
(eye icon)	Indicates test mode (Flashing yellow = Test mode active/without stopping the machine).

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Symbol	Description
	Button to toggle the thread tension diagram between short-term and long-term measuring.
← →	Button to move the thread tension diagram left/right (only active after zooming in on the diagram).
⊕ ⊖	Button to zoom in/out on the thread tension diagram (Zoom in / Zoom out).
🔍	Button for full display of the thread tension diagram (100% view).

The lower section of the status display shows the current order number and beam number, as well as the current number of measurement runs for the current beam.

5.2 Displaying measurement values

5.2.1 Short-term measuring
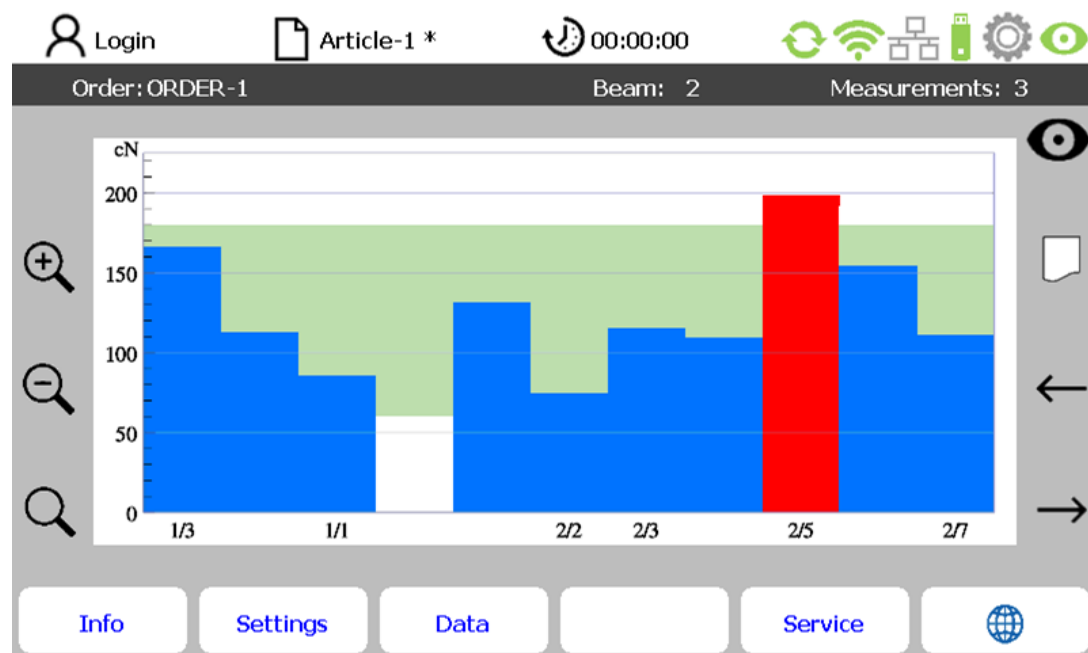
Measurements are displayed in a bar chart. You can increase or reduce the size of the displayed area of the x axis (thread numbers) or move it on the screen. Each of the displayed bars corresponds to a detected thread.

The horizontal axis label corresponds to the thread number. The height of the bar indicates the measured thread tension.

Meaning of the colours:

Blue bar Measured thread tension is within the permissible range.
Red bar Measured thread tension is outside the permissible range.

The permissible thread tension range is highlighted light green on the measurement diagram and can be specified in the "Settings" menu. If the tension of one or more threads is outside this range and if there is an adequate number of valid measurement runs, the machine is switched off. The prerequisite for this is that the system was connected accordingly to the machine and is not in test mode.

The measurement values are stored continuously, on an order basis, and are also available when the control unit is restarted.

The displayed measurement value always corresponds to the average of the last measurements carried out. You can define the number of measurements used for averaging via the "Settings" menu.

If only a small number of measurements are used for averaging, this increases the possibility of false stops as a result of measuring inaccuracies (e.g. due to vibrations). In contrast, if more measurement runs are used for averaging, this results in a more stable measuring signal, preventing shutdowns due to individual measuring inaccuracies, but also delays machine shutdown in the event of an actual defect.

As the best compromise between accuracy and delayed shutdown, an average from **three** measurements has proven practical for determining thread tension.

5.2.2 Long-term measuring

Press the button [ ] to display long-term measuring. [ ]
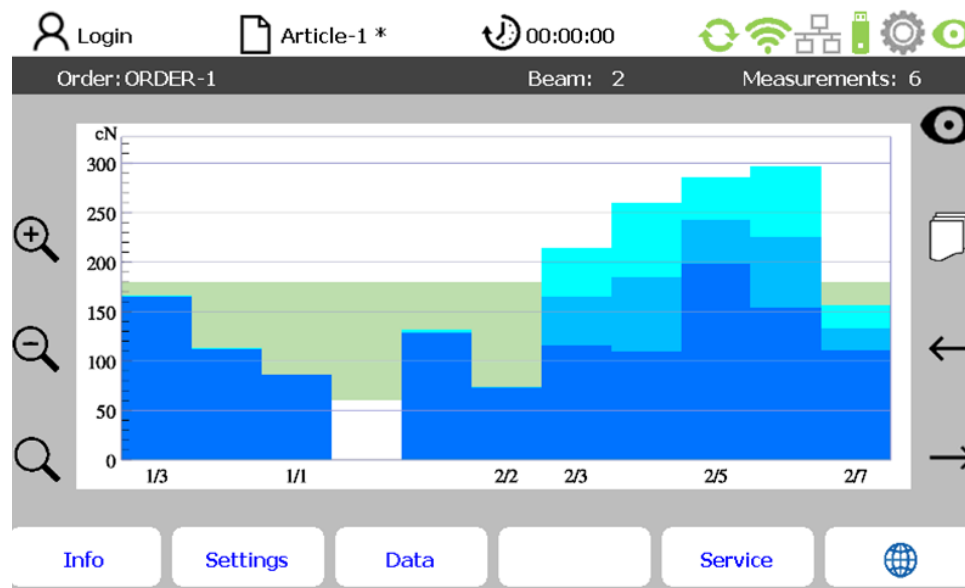
The bar chart shows the average of all recorded measurement values for each thread since the beam was last changed.

The display of the calculated thread count and the counting method can be set in the "Data" menu. The measurement values here are the results of the short-term measuring averaged over the specified number of measurement runs.

Meaning of the colours:

Dark blue bar: Indicates the minimum measured thread tension per thread number.

Blue bar: Indicates the average of all measured thread tensions per thread number.

Light blue bar: Indicates the maximum measured thread tension per thread number.

In the example on page 24, the measured yarn sheet comprises 2 zones with a direction of counting from in to out. 2/7 means: Zone 2 / Thread number 7.

This display can be adjusted in the "Data - Overview" menu.

5.3   Changing the order/beam

A new order (including beam number) is entered via the "Data" menu (see 6.2). Please consider whether the permissible thread tension range also needs to be changed ("Settings" menu).

The measurement values are stored on an order basis in corresponding directories. The relevant file name includes data relating to the machine name and order/beam number, as well as date and time.

It is therefore important, for each beam, to ensure the correct order designation and correct beam number are entered, as this data is absolutely necessary to retrieve the archived measurement data at a later time.

These entries must be made at the start of the measurement or **at the latest during the measurement**. The beam number increases automatically every time the beam is changed (for this, the beam changeover signal must be installed and active) so that you only have to specify the beam name for a new order.
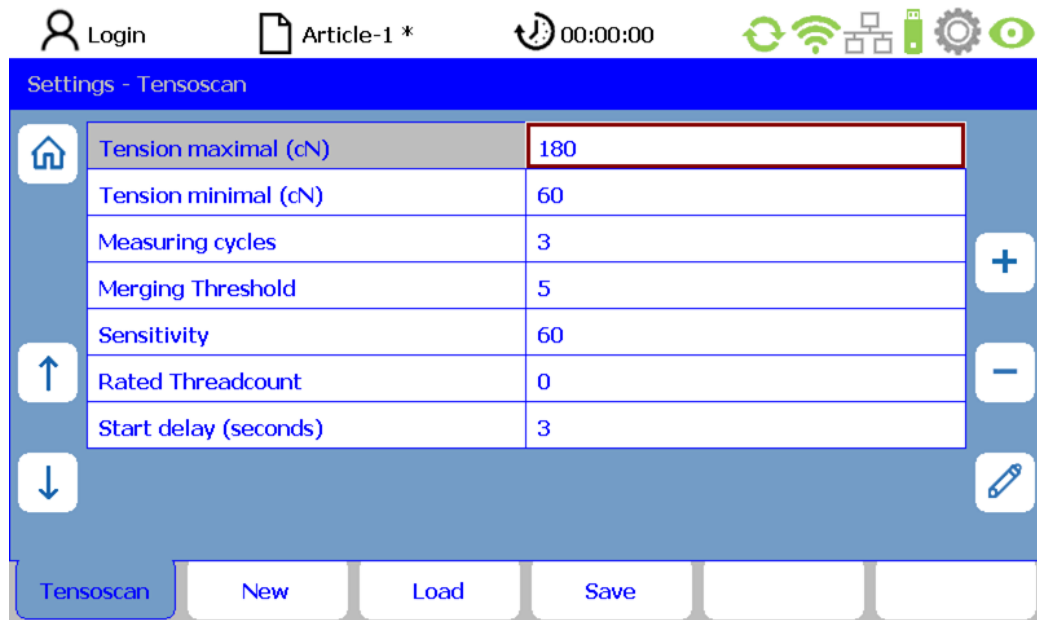
To ensure correct assignment of the data when the order is changed, it is important that the beam is changed first and then the new order is created.

6 Article and order creation

6.1 Article-specific settings (in Settings submenu)

Select the "**Settings**" menu from the menu bar on the main screen. This takes you to the "**TENSOSCAN**" submenu.

Note: The path to a submenu is displayed in line 2 of the relevant submenu.

6.2 Order-specific settings (in Data submenu)

Thread tension maximal (cN)	Defines the upper limit of the valid thread tension tolerance range.
Thread tension minimal (cN)	Defines the lower limit of the valid thread tension tolerance range.
Measuring cycles	Defines the number of measurements used to average a measurement value. There are three different levels to choose from (1 / 3 / 5), with the standard being the averaging of three measurements.
Merging threshold	Defines the threshold as of which the adjacent signal peaks are merged into one thread signal. The more uneven the spacing between the threads, the higher the threshold value has to be set. For regular spacing between the threads, we recommend keeping the default setting of 10.
Sensitivity	Defines the threshold value that is used for detection of the threads. If, despite a predefined target thread count, insufficient threads are counted, the sensitivity must be reduced. If the thread count is too high, this can be counteracted with a higher sensitivity.
Rated thread count	Defines the number of threads pulled from the creel for the current order. If the value is set to 0, the TENSOSCAN 5374 attempts to determine the thread count automatically.
Start delay (s)	Defines the delay with which the TENSOSCAN 5374 starts working after the machine is started. The start delay should be long enough to ensure that the machine has reached at least the target speed.

Select the "**Data**" menu from the menu bar on the main screen. This takes you to the "**Overview**" submenu.
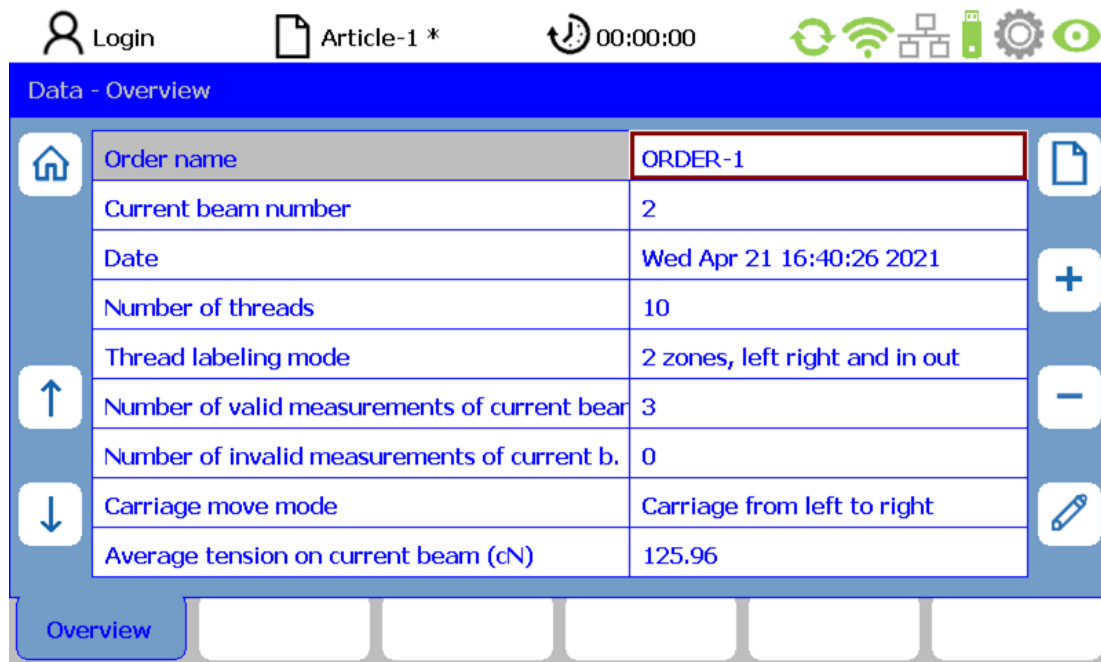
Press the button to enter a new order number.

Order number	Entry and display of the current order number.
Current beam number	Entry and display of the current beam number. This increases automatically every time the beam is changed when a beam changeover signal is connected.
Date	Date of the last time the order was changed.
Number of threads	Display of the measured total thread count.
Thread labelling mode	Entry and display of the zones and direction of counting; see following explanation on page 28.
Valid measurements of current beam	Number of valid measurement runs for the current beam.
Invalid measurements of current beam	Number of invalid measurement runs for the current beam.
Measuring carriage move mode	Entry and display of the direction in which the measuring carriage measures (with front view looking towards the control unit/two options).
Ø Average thread tension on current beam [cN]	Display of the average value across all thread measurements of a beam.

Note: The measurement values are continuously saved, on an article and order basis, with the date, each time in a separate register on the integrated memory card and are available when the control unit is switched on again. Aside from the measurement data, the file also includes the article and order number.

Explanation of thread counting mode

The table shows the possible counting methods. 2 zones require a reliable detection of the separating gap.

Parameter field	Example of counting method (40 threads per zone)
One zone, from left to right	‖‖ 1 40
One zone, from right to left	‖‖ 40 1
2 zones, from left to right	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ 1/1 1/40 2/1 2/40
2 zones, from right to left	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ 2/40 2/1 1/40 1/1
2 zones, left right, in out	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ 1/40 1/1 2/1 2/40
2 zones, left right, out in	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ 1/1 1/40 2/40 2/1
2 zones, right left, in out	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ 2/40 2/1 1/1 1/40
2 zones, right left, out in	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ 2/1 2/40 1/40 1/1

6.3 Saving and loading article data

All parameters in the "Settings" menu can be saved as articles and later reloaded.

If a similar article has already been produced before, you can select the relevant data set and save it under a new name for the new article to be produced.

To transfer the monitoring system to the basic settings, a "Default" article file exists. When this file is loaded, the monitoring system is in the basic settings.

Loading article data

Select the "**Settings**" menu from the menu bar on the main screen. If you have not yet logged in, enter the user password. Select the "**Load**" submenu.

The arrow buttons can be used to select the required article. Press **ENTER** to load the selected article. All settings in the "Settings" menu are then replaced with the settings saved in the article.

Deleting an article

Press the **DELETE** button (1) to delete the current article. ATTENTION: For the time being you will not be asked if you are sure.

Note: The default article cannot be deleted.

Saving article data under the same name

Starting on the main screen, select **"Settings - Save"**.

Pressing the ENTER button will save the article under the same name after a confirmation prompt.

Note: In the "Save" line, the file name of the current article is displayed. This corresponds to the display of the article in the status line. An asterisk * indicates that changes have been made under this article but not yet saved.

Saving article data under a new name

Select the line "Save as" and press the pen button (screenshot 1).

Save as: Screenshot 1   Save as: Screenshot 2

A virtual keyboard is then displayed (screenshot 2). Follow the same process here as described in chapter "Text input". As soon as you have entered the new article name, save it by pressing the Enter button. The new article name is now the current one.

You can also create a new article via the menu: "Settings - New". Pressing the pen button opens the virtual keyboard and you can enter the name of the article. Pressing the ENTER button creates and saves the new article.

7. Service functions

7.1 Version information

Select the "**Info**" menu from the menu bar on the main screen. This takes you to the "**Version**" sub-menu.
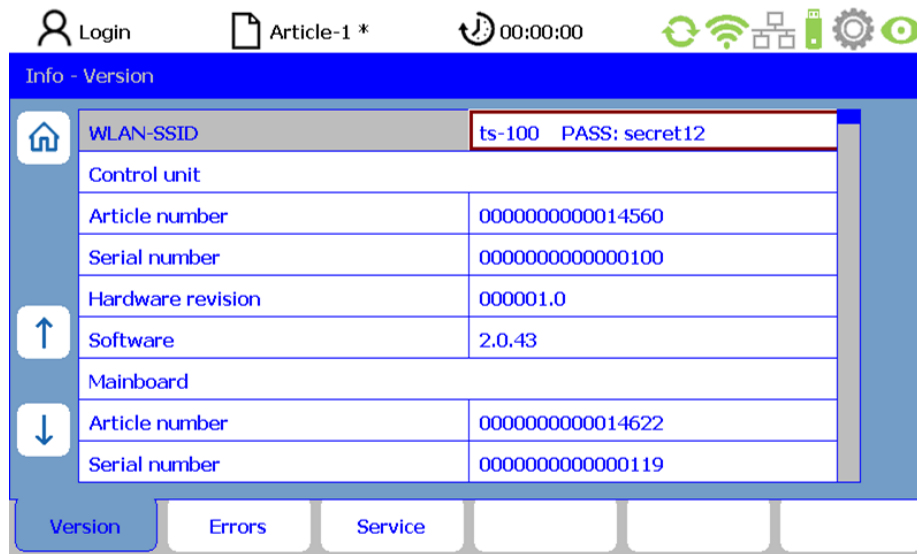
The following information about the control unit is stored here (read only):

WLAN-SSID	SSID of the WLAN network made available by the TENSOSCAN control unit.
Control unit	
Article number	PROTECHNA article number of the control unit.
Serial number	Serial number of the control unit.
Hardware version	Hardware version of the control unit.
Software version	Software version installed on the control unit.
Mainboard	
Article number	PROTECHNA article number of the mainboard installed in the control unit.
Serial number	Serial number of the mainboard.
Hardware version	Hardware version of the mainboard.
Base station	
Article number	PROTECHNA article number of the base station board installed in the control unit.
Serial number	Serial number of the base station board.
Hardware version	Hardware version of the base station board.
Software version	Software version installed on the base station board.

7.2   Logging errors

Select the "**Info**" menu from the menu bar on the main screen. Then select the "**Errors**" submenu.

Here, errors are displayed in reverse chronological order (from top to bottom).

The format of an error message is as follows:

Time	Error number	Error text

If there are more error messages than can be displayed on one page, use the arrow buttons to scroll up or down.

7.3   Saving service files

Select the "**Info**" menu from the menu bar on the main screen. Then select the "**Service**" submenu. Plug a USB stick into the USB service port (on the back of the control unit). If no USB stick is plugged in, an error message appears.

You now have the option to manage the size of the service file via the service file parameter. The following variants are available:

Small	Current configuration / TENSOSCAN log data / system log data / system information / current short-term measurement data.
Standard	Additional: measurement data (including cluster data) from the last 10 short-term measurements.
Complete	Additional: measurement data (including cluster data) from the last 20 measurement runs/any existing error data.

To generate the service file, press the button next to the USB stick symbol.

8.   Maintenance and cleaning

8.1   Cleaning

- **General:** Before cleaning all components of the TENSOSCAN 5374 or to remove or install an option, the control unit should always be disconnected from the mains. Do not use any liquid detergents or cleaning sprays for cleaning, but only a damp cloth.

- **Measuring carriage:**
  Regularly remove **dust deposits from the sensor unit (1)** on the underside of the measuring carriage using compressed air (max. 6 bar, min. 2 mm outlet, min. 10 cm distance). Do not touch the force sensor (2). This may permanently damage the sensor.
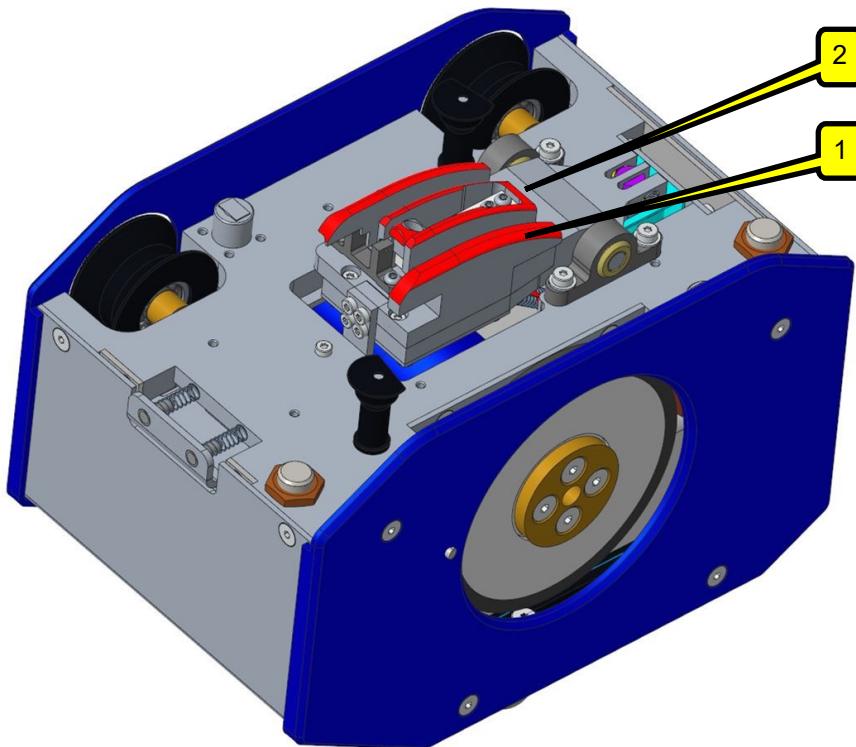
- Always ensure that the **reed is clean**. Dust deposits and fluff in the reed may lead to malfunctioning. Also ensure that the reed pins are not bent.

8.2   Checking the yarn guidance

- It is important to ensure **parallel guidance of the yarn sheet**, which must run precisely at a right angle over the TENSOSCAN inspection bed. Ensure the threads are separated correctly by the reed, i.e. only 1 thread should be in each gap.

- Ensure that the reed is adjusted correctly. **The reed should never come into contact with the measuring carriage**.

- If the guide tubes show signs of wear like grooves caused by the threads, rotate the guide tubes slightly or replace them completely if necessary.

9. Operating the system via laptop (web GUI)

The TENSOSCAN 5374 has an integrated WiFi module, which it uses to provide a WLAN network to connect to via laptop/tablet/smartphone. This gives you access to the integrated web server, which provides an HTML operating interface for operation of the TENSOSCAN 5374 as an alternative for operation with the control unit.

9.1 Connecting to the TENSOSCAN WLAN network

The WLAN network provided by the TENSOSCAN control unit has a corresponding SSID, which comprises "ts-" and the suffix serial number of the control unit (e.g. ts-100). This SSID is also displayed in the "**Info**" menu for the relevant control unit.

Open the dialogue box on your mobile device to connect to a WLAN network and select the relevant network for the TENSOSCAN 5374 (if you are operating multiple TENSOSCAN 5374 devices, the list may contain multiple TENSOSCAN control unit entries). The password for connecting to the network is "**secret12**".

9.2 Calling up the TENSOSCAN homepage

Once you are connected to the TENSOSCAN 5374 network, open the browser on your mobile device and enter the URL shown below. Then press the ENTER button to call up the TENSOSCAN 5374 homepage.
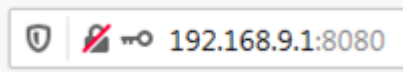
9.3 General web GUI configuration

The web GUI for the TENSOSCAN 5374 is divided into four sections to access all functions of the operating interface.
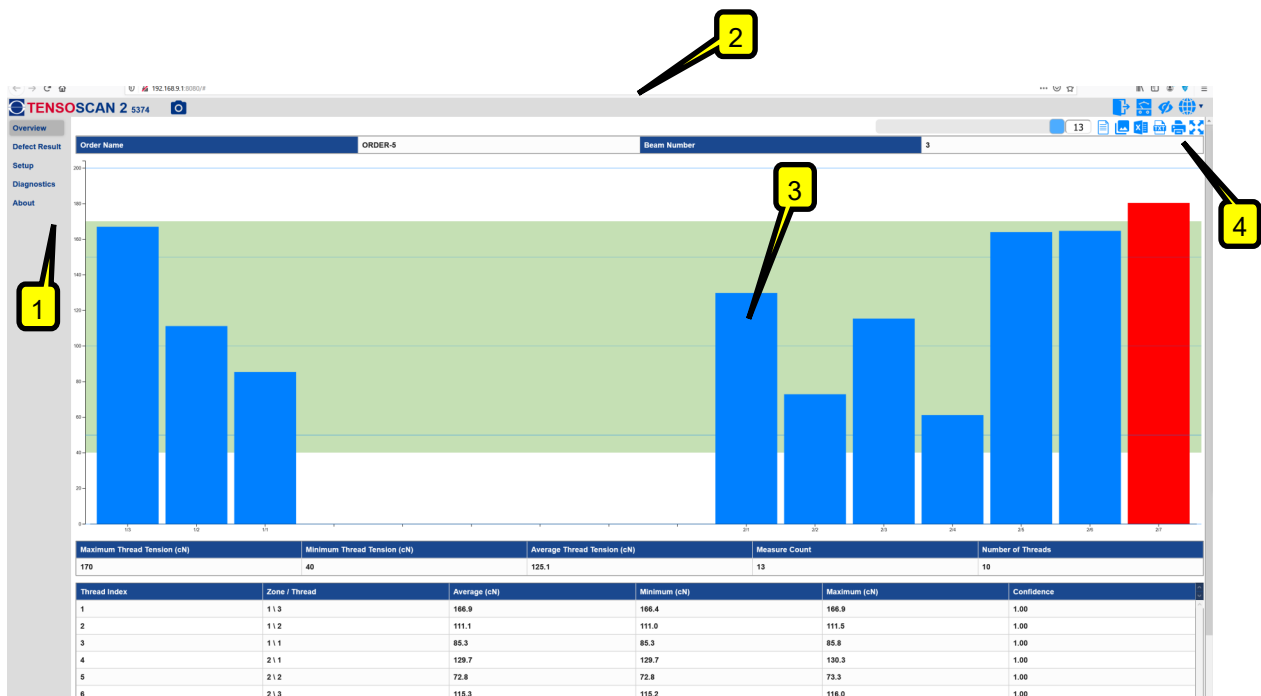
(1) Menu bar

The menu bar allows you to access the key areas of the web GUI at any time:

- **Overview:** The overview page provides all important status information for the TENSOSCAN 5374 and displays it at a glance.

- **Defect Result:** This gives you a visual indication of all deviations detected by the TENSOSCAN 5374 where the thread tension is outside the specified tolerance.

- **Setup:** Here, you can change the key parameters for the correct functioning of the TENSOSCAN 5374.

- **Diagnostics:** Here, you have various tools available for checking and analysing the functions of the TENSOSCAN 5374 in detail.

- **About:** This page provides various information about the current software version running on the TENSOSCAN 5374.
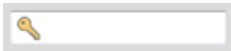
(2) Header

The header provides access to some global functions and information that are always available.

- **Operating mode indicator:** The web GUI gives you access to the current measurement values of the TENSOSCAN 5374, but can also be used to open and view archived data from the data archive. The indicator indicates which operating mode is currently active.

	The TENSOSCAN 5374 web GUI is in so-called live mode, i.e. the measurement values for the current order/beam are displayed and visualised.
	The TENSOSCAN 5374 web GUI is in archive mode. The displayed data belong to the data archive that you opened via the archive function. The displayed order/beam name also belongs to the corresponding archive.

- **Password entry:** Some web GUI functions can only be accessed by entering a password.

	To log in, enter the relevant password in this field and press the ENTER button to confirm

- **Login status:** This status symbol indicates whether a user is currently logged in, or whether the web GUI is open without user authorisations.

	No user is currently logged in. By entering a valid password, you can log into the system.
	A user is currently logged into the system. Clicking on the button logs the current user out again.

- **Operating mode selection:** This button is used to switch the web GUI operating mode.

	The TENSOSCAN 5374 web GUI is currently in live mode. Click on the button to switch to archive mode.
	The TENSOSCAN 5374 web GUI is now in archive mode. Click on the button to switch back to live mode.

- **Test mode:** Use this button to activate TENSOSCAN 5374 test mode. In test mode, only measurement is carried out, but the machine is not stopped.

	The TENSOSCAN 5374 web GUI is in so-called live mode, i.e. the measurement values for the current order/beam are displayed and visualised.
	The TENSOSCAN 5374 web GUI is in archive mode. The displayed data belong to the data archive that you opened via the archive function. The displayed order name/beam number also belongs to the corresponding archive.

- **Language toggle:** This button can be used to change the web GUI user language.

|	Clicking on the globe opens a menu with the available user languages.
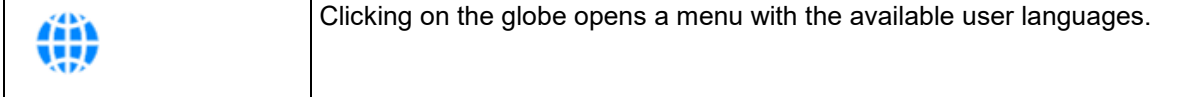
(3) Detailed view

The detailed view contains the relevant information for the corresponding selected menu entry (see "Menu bar"), which is represented either as a chart or a table. The details of the individual menu sections are explained on the following pages of the operating manual.

(4) Function bar

The function bar contains specific functions for the relevant detailed view and are also explained on the following pages.

9.4 "Overview" menu area

The "Overview" area gives you an overview of the beam currently running on the machine and the corresponding measurement values. These are displayed in a thread tension diagram. They are also available in a table and can be exported.
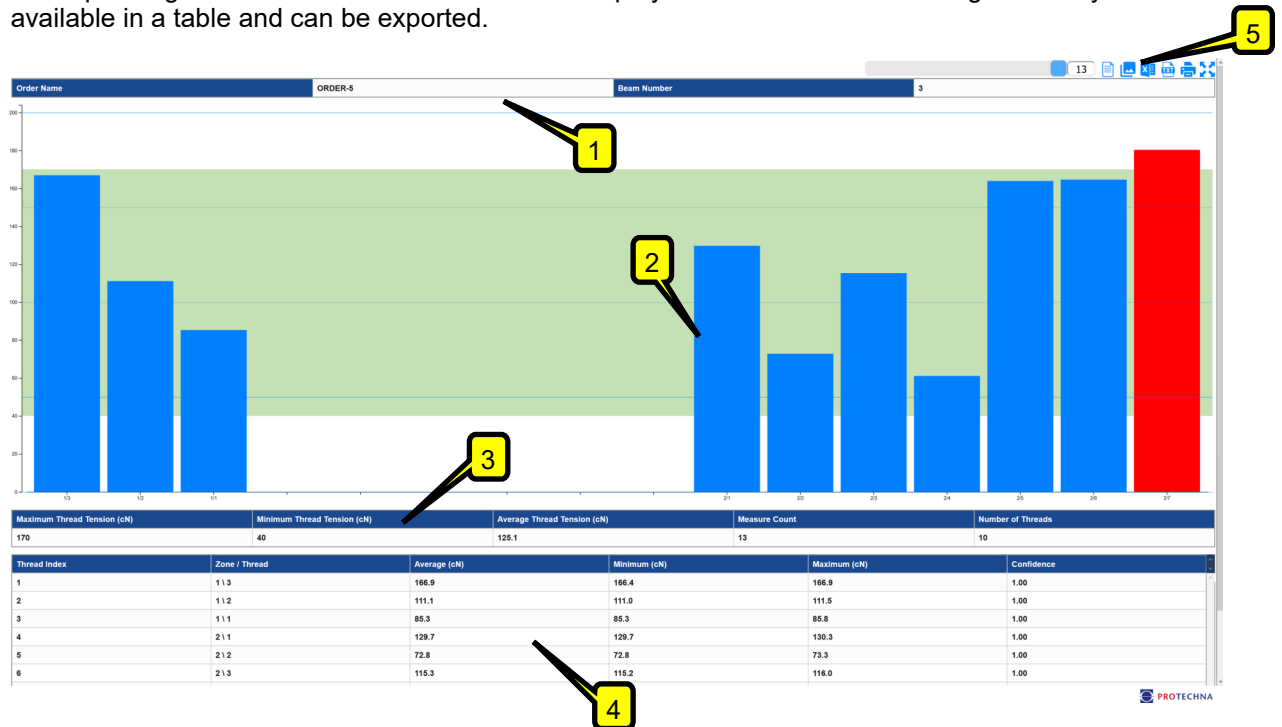
(1) Current order details: Here, you will see information about the order currently running on the machine. You can edit the order name directly here.

(2) Thread tension diagram: The diagram contains the thread tension values for the current beam. The specified tolerance range has a coloured background, threads outside the tolerance are shown in red. Use the mouse wheel to zoom in/out on the diagram.

(3) Summary: The table contains a summary of the measurement values belonging to the current beam.

(4) Measurement value table: The table contains a line for each thread of the current beam, with details about the relevant measured thread tension values. Click on the relevant column heading to sort the table.

(5) Function bar: The relevant function bar contains the functions described below.

- **Selection of measurement run:** As the TENSOSCAN 5374 measures continuously, one beam generally has several measurement runs. The data from the individual measurement runs is saved by the TENSOSCAN 5374 and can be called up here.

	The number of the measurement run you want to call up can either be entered directly or selected using the slider.

- **Short-term/long-term measuring:** In the thread tension diagram, either the result of the last short-term measurement or a summary of all previous measurement runs is displayed (analogous to the control unit).

	Short-term measurement display is active. Clicking on the symbol activates long-term measurement.
	The display of the long-term measurement is active. Clicking on the symbol activates short-term measurement.

- **Thread tension diagram active:** If necessary, the thread tension diagram can be hidden, then only a tabular display of results is active.

	The thread tension diagram is displayed. Clicking on the symbol hides the diagram.
	The thread tension diagram is not displayed. Clicking on the symbol shows the diagram.

- **Export to Excel:** The measurement results of the current beam are exported to an Excel file.

	Clicking on the symbol starts the export to an Excel file.

- **Export to text file:** The measurement results of the current beam are exported to a text file.

	Clicking on the symbol starts the export to a text file.

- **Print:** The measurement results are printed out. Using a PDF printer driver, you can print them as a PDF file.

	The printout of the measurement data is started.

- **Full screen:** The browser display is switched to full screen view.

	Clicking on the symbol activates the full screen view.

9.5 "Defect Result" menu area

In the "Defect Result" area, you can see the measurement results for the current beam, arranged in chronological order in a bar diagram.
The diagram allows you to identify the time at which (during which measurement run) the tension of a thread changed so much that it left the tolerance range.

(1) Current order details: Here, you will see information about the order currently running on the machine. You can edit the order name directly here.

(2) Defect diagram: The diagram contains a chronological display of the individual measurement runs for the current beam.
Blue sections represent measurement results within the specified thread tension range. Red sections represent measurement results outside the tolerance.
In order to keep the diagram clear, you always see only a section of the measurement results (max. 25 measurement runs), however, the displayed section can be moved to a different time.

(3) Summary: The table contains a summary of the measurement values belonging to the current beam.

(4) Defect table: The table contains an entry for each thread that recorded a thread tension outside the valid tolerance range during at least one measurement run. It also shows the position of the thread and specifies the measurement run during which the thread tension was not in the normal range.

(5) Function bar: The relevant function bar contains the functions described below.

- **Selection of measurement run:** As max. 25 measurement runs are displayed in the defect diagram, if the current beam includes more than 25 measurement runs, you can jump with the input field to a defined measurement run.

21	You can enter the measurement run number directly or select it with the slide control.

- **Short-term/long-term measuring:** For the "Defect Result" display, it is possible to toggle between short-term and long-term view. In the long-term view, for all threads with a thread tension that left the tolerance range during the run, a separate bar is displayed in each case, which shows the fluctuation range of the thread tension for the relevant thread (minimum / average / maximum).

	Short-term measurement display is active. Clicking on the symbol activates long-term measurement.
	The display of the long-term measurement is active. Clicking on the symbol activates short-term measurement.

- **Defect diagram active:** If necessary, the thread tension diagram can be hidden, then only a tabular display of results is active.

	The thread tension diagram is displayed. Clicking on the symbol hides the diagram.
	The thread tension diagram is not displayed. Clicking on the symbol shows the diagram.

- **Export to Excel:** The measurement results of the current beam are exported to an Excel file.

	Clicking on the symbol starts the export to an Excel file.

- **Export to text file:** The measurement results of the current beam are exported to a text file.

	Clicking on the symbol starts the export to a text file.

- **Print:** The measurement results are printed out. Using a PDF printer driver, you can print them as a PDF file.

	The printout of the measurement data is started.

- **Full screen:** The browser display is switched to full screen view.

	Clicking on the symbol activates the full screen view.

9.6 "Settings" menu area

The "Settings" area shows the most important parameters that can be used to adjust the functions of the TENSOSCAN 5374 to the current article, as well as parameters that determine the general function of the TENSOSCAN 5374. The parameters can be entered directly and are active immediately after they have been entered. The available parameters are explained below.

(1) Order Details: The details (order name/beam number) of the current order can be adjusted here.
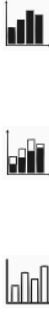
Order Name	You can change the name of the order directly here. Changing the order name does not trigger an order change. This must be entered separately.
Beam Number	You can change the number of the current beam directly here. Usually, the beam number is counted up automatically when the beam is changed.

(2) Setup: The article-specific settings can be changed directly here.

Threads	Defines the number of threads pulled from the creel for the current order. If the value is set to 0, the TENSOSCAN 5374 attempts to determine the thread count automatically.
Maximum Thread Tension (cN)	Defines the upper limit of the valid thread tension tolerance range.
Minimum Thread Tension (cN)	Defines the lower limit of the valid thread tension tolerance range.
Average Count Short-Term Measuring	Defines how many measurement runs are merged as one short-term measurement. If Standard is selected, 3 measurement runs are merged in the standard delivered condition, while if Long is selected, 5 measurement runs are merged.
Average Count -Standard-	Defines how many measurement runs are merged if "Average Count Short-Term Measuring" is set to "Standard".
Average Count -Long-	Defines how many measurement runs are merged if "Average Count Short-Term Measuring" is set to "Long".

Start Delay (s)	Defines the delay with which the TENSOSCAN 5374 starts after the machine is started.
Merging Threshold For Data	Defines the threshold as of which adjacent signal peaks are merged into one thread signal. The more uneven the spacing between the threads, the higher the threshold has to be set. For regular spacing between the threads, we recommend keeping the default setting of 10.
Sensitivity	Defines the threshold that is used for detection of the threads. If, despite a predefined target thread count, insufficient threads are counted, the sensitivity must be reduced. If the determined thread count is too high, this can be counteracted with a higher sensitivity.

(3) Configuration: The general configuration of the TENSOSCAN 5374 can be adjusted here.

Drive Mode Measuring Carriage	Defines the direction of travel in which the measuring carriage carries out measurements. The measurement run always starts at the parking position, which is normally defined by the installation position of the control unit (also see 6.2).
Counting Direction	Sets out the order in which the threads and (if available) the two sections are counted (also see 6.2).
Display Mode Statistical Confidence	To detect individual threads, the TENSOSCAN 5374 uses a statistical method. Each thread therefore has a statistical confidence (between 0% and 100%), which indicates how reliably the thread is detected. The display mode defines how the individual threads, depending on their current statistical confidence level, are displayed on the thread tension diagram. • If the thread statistical confidence level is above the "Threshold Statistical Confidence", the thread is shown, otherwise it is hidden. • If the thread statistical confidence level is above the "Threshold Statistical Confidence", the thread is normally shown, otherwise it is shown in light and dark grey. The dark grey section of the bar indicates the level of the statistical confidence. • If the thread statistical confidence level is above the "Threshold Statistical Confidence", the thread is normally shown, otherwise it is shown in light grey. **Attention:** With a clean yarn sheet, all threads should be detected with a confidence close to 100%, so the various display modes have no effect. These are only a tool in case problems occur with the detection of the threads. The display mode can only be changed once a corresponding password has been entered (only for authorised service personnel).
Threshold Statistical Confidence	Defines the statistical confidence threshold as of which the thread is considered "reliably detected". The default value of 0.75 (75%) should not generally be changed.

(4) Function bar: The relevant function bar contains the functions described below.

- **Order changeover:** A new order is created with the preferred name, and the beam number is reset to "1".

	To create a new order please proceed as follows: 1. Enter the new order name in the input field on the left of the order changeover symbol. 2. Clicking on the symbol creates the new order and renames it according to the user's setting. 3. The beam number is reset automatically to "1". ATTENTION: An order changeover can only be carried out when the machine is idle.

- **Beam changeover:** A new beam is created, and the beam number is counted up automatically.

	Click on the symbol to create a new beam; the beam number is counted up automatically. ATTENTION: A beam changeover can only be carried out when the machine is idle.

- **Factory reset:** A reset is carried out, and all settings are reset to the delivered condition.

	Click on the symbol to reset all settings to the delivered condition. Click on the symbol again to confirm the action. **ATTENTION:** The current settings are lost. Only carry out the factory reset if you are absolutely sure! The reset may mean that the system no longer functions correctly! ATTENTION: A factory reset can only be carried out when the machine is idle.

- **Export to Excel:** The current system settings are exported to an Excel file.

	Clicking on the symbol starts the export to an Excel file.

- **Print:** The current settings are printed out. Using a PDF printer driver, you can print them as a PDF file.

	The printout of the measurement data is started.

- **Full screen:** The browser display is switched to full screen view.

|	Clicking on the symbol activates the full screen view.

9.7 "Diagnostics" menu area

In the "Diagnostics" area, a service file can be saved. It also gives you access to the current log file for the system and additional information about the installed software version.
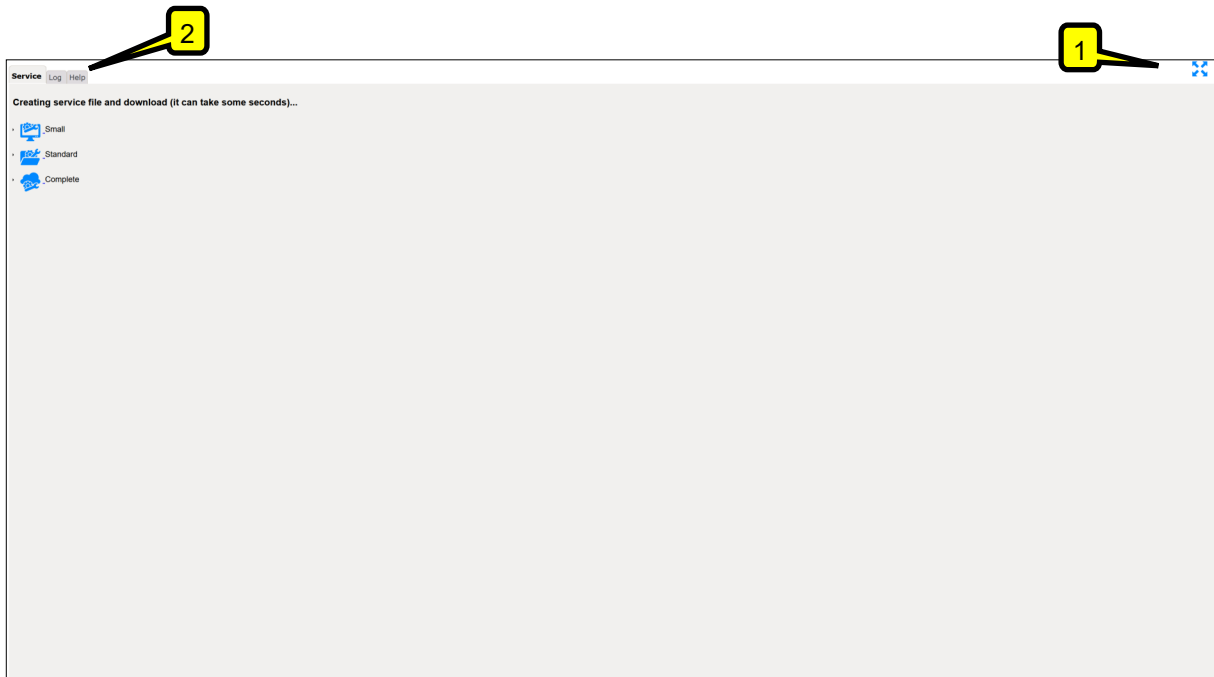
(1) Function bar: The relevant function bar contains the functions described below.

- **Full screen:** The browser display is switched to full screen view.

⤢	Clicking on the symbol activates the full screen view.
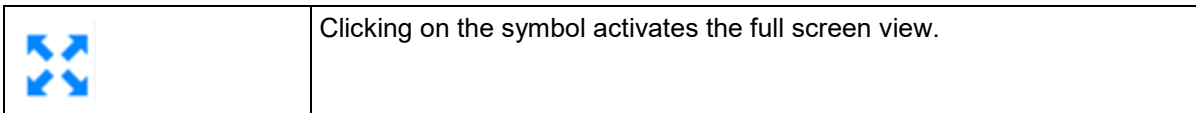
(2) Category selection: The tabs allow you to switch between the three sub-categories "Service", "Log" and "Help", which are described in more detail in the next chapter.

9.7.1 Service

In the "Service" area, a service file can be saved, which can be stored in the event of a service and sent to PROTECHNA. Using the information it contains, PROTECHNA can check the system status and provide support.

The service file is available in three different versions, which differ in terms of content and file size:

- **Small:** Contains necessary basic information (log data/configuration/system information); the generated file remains compact and can be transferred easily.

- **Standard:** Also contains the measurement data of the last 10 measurement runs and corresponding cluster information. The service file may then be considerably larger.

- **Complete:** Contains the measurement and cluster data of the last 20 measurement runs, as well as any available error information of the Linux operating system. The file may be extremely large.

To save the service file, click on the relevant symbol on the left of the service file name. A dialogue box then opens for saving the file.

> ⚠️ Depending on the file size, it may take some time to generate and transfer the service file. Please only click once on the relevant symbol to generate the file and then wait. If the web browser you are using generates a message that the website is no longer responding, do not cancel the action, but continue to wait!

9.7.2 Log

In this section, you can access the "Current Activity Log", as well as the "Update Log" of the TENSOSCAN 5374 system. Both logs can contain important information in the event of a malfunction, but can generally only be interpreted by PROTECHNA qualified personnel and are available in the event of a service. Both logs are also included in the service files.

9.7.3 Help

The "Help" section contains internal information to support PROTECHNA service in the event of problems.

- **Sercos parameter list**: List of all communication parameters used by the TENSOSCAN 5374.

9.8 "Data archive" menu area

9.8.1 General

As described in 9.3, you can switch to archive mode by selecting the operating mode and then access the data archive, where previous measurement data is archived and can be opened and displayed.

	Live mode - display of the current measurement data / clicking exits live mode and activates archive mode.
	Archive mode - display of the measurement data loaded from the data archive / clicking exits archive mode and activates live mode.

As soon as you switch to archive mode, the operating mode indicator in the web GUI header changes and indicates that archive mode is active.

|	
	The TENSOSCAN 5374 web GUI is in so-called live mode, i.e. the measurement values for the current order/beam are displayed and visualised.
	The TENSOSCAN 5374 web GUI is in archive mode. The displayed data belong to the data archive that you opened via the archive function. The displayed order name/beam number also belongs to the corresponding archive.

To view the current measurement data again, first exit archive mode by selecting the operating mode and switch back to live mode. The operating mode indicator shows the changeover accordingly.

9.8.2 Loading data from the archive

When you switch the TENSOSCAN 5374 to archive mode by selecting the operating mode, the left menu bar will show an additional entry with the name "Data Archive". Selecting the menu entry, you will open the data archive.
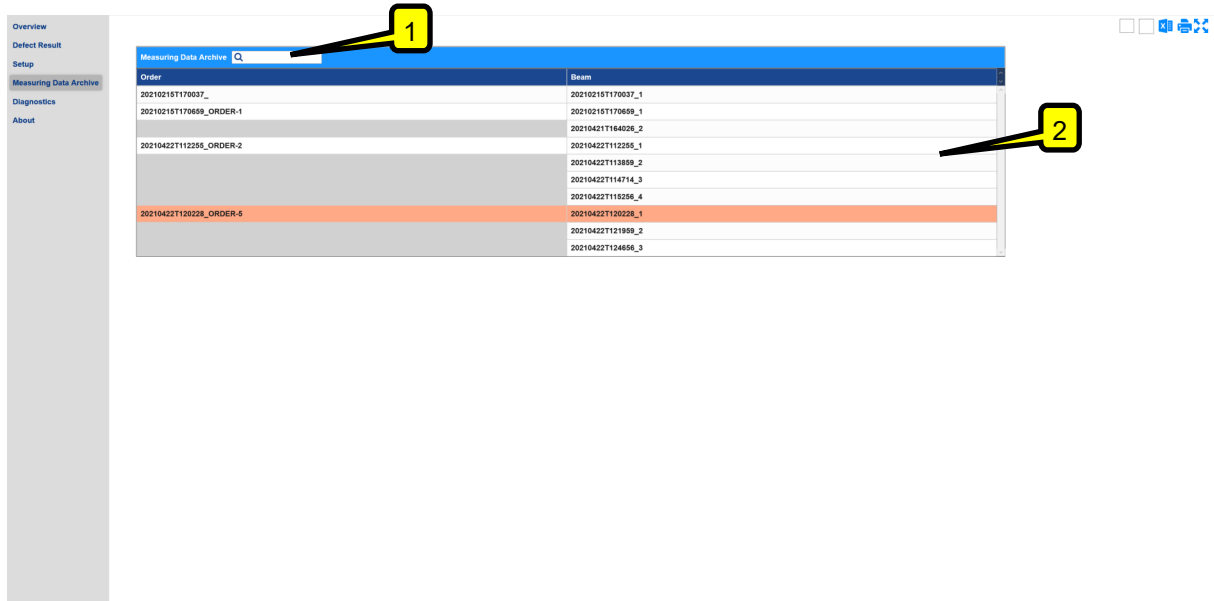
Here, you will see a list of all archived orders/sectional beams in chronological order. You can use the search field (1) to search for required orders/sectional beams or scroll easily through the list using the scroll bar (2) on the right-hand side.

To load a data set, simply click on an entry in the list. This is then highlighted in colour and loaded automatically. If you now switch back to the overview screen, you will see the loaded measurement data, and if required, the results of the individual measurement runs can also be viewed (see 9.4 "Overview" menu area).

To view the current measurement data again, exit archive mode by selecting the operating mode and switch back to live mode. The operating mode indicator shows the changeover accordingly.

For your notes

A   Declaration of Conformity

E.C. Conformity Declaration

We hereby declare,

PROTECHNA Herbst GmbH & Co. KG
Lilienthalstrasse 9
85579 Neubiberg
Germany

That the product to the following description insofar as its original design and construction and also the model now dispatched by us, corresponds to the relevant safety and health requirements laid down by the E.C. Directives.

Any alternation of the product carried out without permission nullifies this declaration.

Description of the product: **"TENSOSCAN 2 5374" Thread Tension Measuring Device**

Type: **Control unit TENSOSCAN 5374 (article no: 14560)**
          Measuring carriage TENSOSCAN 5374 (article no: 14410)
          Sensor unit TENSOSCAN 5374 (article no: 14809)
          Inspection bed-21" TENSOSCAN 5374 (article no: 14411)
          Inspection bed-50" TENSOSCAN 5374 (article no: 14412)
          Inspection bed-65" TENSOSCAN 5374 (article no: 14413)
          Inspection bed-75"-84" TENSOSCAN 5374 (article no: 14414)

Relevant E.C. Directives:

E.C. – Machinery Directive (89/392/EWG) followed by 2006/42/EC

E.C. – Directive relating to Electro-Magnetic Tolerance (89/336/EEC) followed by 2014/30/EU

E.C. – Low Voltage Directive (73/23/EEC) followed by 2014/35/EU

Applied coordinating standards, in particular:

DIN EN 292-1:2000-06	Safety of machinery
DIN EN 292-2:1991-11	Safety of machinery
DIN EN 294:1992-08	Safety of machinery
DIN EN 414:1994-04	Safety of machinery
DIN EN 61000-6-4:2011	Electromagnetic Tolerance (EMV) Technical base standard interference emission
DIN EN 61000-6-2:2006+A1:2010	Electromagnetic Tolerance (EMV) Technical base standard interference strength
DIN EN 60 204:2007	Electrical equipment on industrial machines
DIN EN 61010:2005	Safety regulations for measuring, controlling, regulating and laboratory equipment

Applied national standards and technical specifications, in particular: DIN VDE 0100:2001

Signature of manufacturer: _i.V. Rico Wellnitz_
                             Rico Wellnitz

Details of signee: Manager R & D

Date: 27/01/2021

B   Technical data

Environmental conditions
Operation: 0°C to 50°C
Humidity: max. 95% non-condensing
Storage: -40°C to +60°C

Electrical connection
Power supply: 100 V - 240 V AC, 47 - 63 Hz
Power consumption: 1.8 A - 1.0 A

Operation
Mechanical scanning

Dimensions and weight
Control unit: H 170 x W 315 x D 230 mm, weight 5.5 kg
Measuring carriage: H 183 x W 230 x D 150 mm, weight 5.43 kg