Loepfe

Instruction Manual
YarnMaster® EOS+ for K80/90

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Original manual

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1 About this document

1.1 Purpose of this document

This document guides you through the operation of the product. Please read the document thoroughly and keep it accessible.

If you have any uncertainties or questions, please contact the supplier.

1.2 Validity

This document applies to YarnMaster® EOS+ for Taitan K80 and K90.

1.3 Applicable documentation

This document is supplemented by the following information:

- Operating Manual YarnMaster® EOS+

1.4 Explanation of symbols

The following symbols and warning messages are used in these instructions.



⚠ DANGER

Indicates an imminently hazardous situation that will lead to death or severe injury.



⚠ WARNING

Indicates a potentially hazardous situation that can lead to death or severe injury.



⚠ CAUTION

Indicates a potentially hazardous situation that can lead to minor or moderate injury.

NOTE

Indicates a potentially hazardous situation that can lead to property damage.

2 Safety

2.1 General safety information

- Read all safety and installation instructions before installation or maintenance.
- Follow all safety and operating instructions precisely.
- Retain all documentation for later reference.
- Take note of all warnings on the device and in the documentation for the machine in which this device is installed or repaired.

2.2 Intended use

The YarnMaster® EOS+ system is intended solely for purposes of yarn quality control in open-end spinning processes. Any other use, or any use that goes beyond the intended purpose, is considered improper. Loepfe Brothers Ltd. shall not be liable for any damages that result from improper use.

This software is intended exclusively for use as a control, data evaluation and administration tool for sensing heads that are linked to the Loepfe central unit (LZE) of the spinning machine. Any other use, or any use that goes beyond the intended purpose, is considered improper. Loepfe Brothers Ltd. shall not be liable for any damages that result from improper use.

2.3 Qualified personnel

Unqualified personnel cannot recognize risks and therefore endanger themselves and others.

- Only use trained and qualified personnel for the activities specified in these instructions.
- Define and publicize the respective responsibilities for the activities and train the personnel regularly.

2.4 Electric shock

Failure to observe the 5 electrotechnical rules may result in serious injury and electric shock.

- Disconnect.
- Secure against restart.
- Secure absence of voltage.
- Ground and short-circuit.
- Cover or isolate adjacent live parts.

2.5 Electromagnetic compatibility

This equipment is intended for use in an industrial environment. Electromagnetic compatibility in other environments cannot be guaranteed due to conducted and radiated interference.

This equipment is not intended for use in residential areas.

2.6 Unexpected start-up

If the machine starts up unexpectedly, people may be seriously injured or die.

- Before carrying out any maintenance work, secure the machine against restarting.
- Only switch the machine back on when all safety devices are working and nobody is in the danger zone.

2.7 Falling of electrical devices

If electrical devices fall during transportation or installation, personnel may be injured and the devices themselves may be damaged.

- Ensure that no devices fall from the means of transportation.
- Use suitable lifting gear. Ensure that the devices are properly installed.
- Wear personal protective equipment.

2.8 Compressed air

Unexpected contact with compressed air can lead to injuries.

- Before any installation or maintenance, disconnect the compressed air supply and release the pressure from the machine's compressed air system.

2.9 Symbols on the product

Warning symbols



General warning symbol



Electric voltage warning



Flammable substances warning



Hot surfaces warning

Prohibition symbols



Switched on mobile phones not permitted



Operation with long hair not permitted

Instruction symbols



Disconnect power plug



Disconnect before maintenance or repair (disconnect power supply)



Ground before using

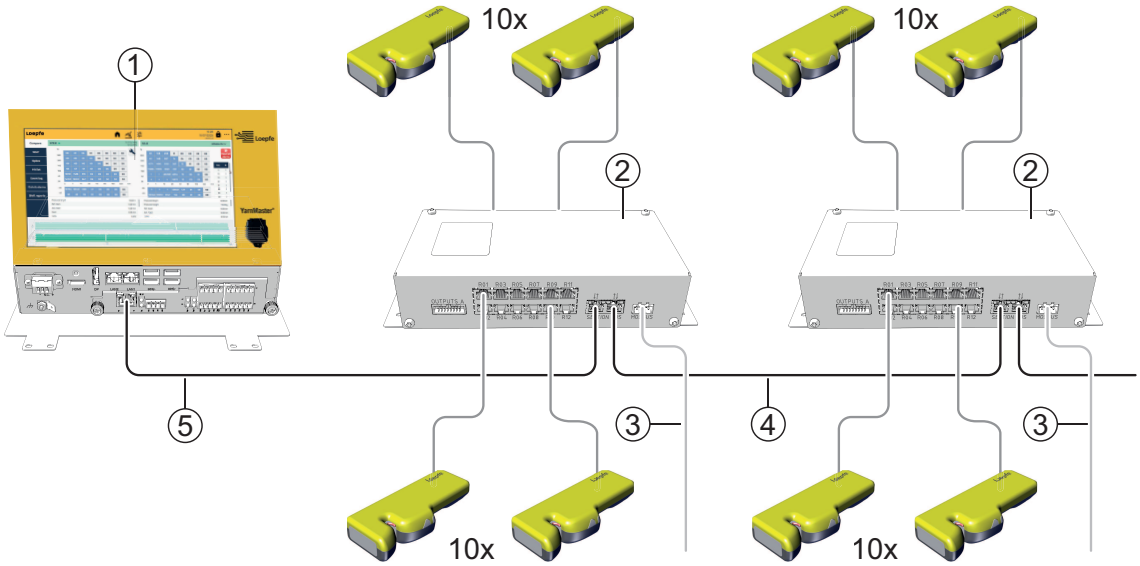
ESD symbol



Electrostatically sensitive components

3 Product description

3.1 Structure



Structure of EOS+

1	LZE (Loepfe Central Unit)	2	SI Box EOS+
3	Modbus cable	4	Cable: SI Box to SI Box Section Bus
5	Cable: LZE Q-Bus to SI Box Section Bus		

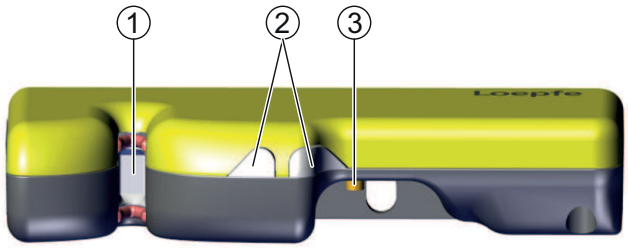
The LZE connections are located on the back of the device.

3.2 Function

The YarnMaster® EOS+ is used to clear yarn faults and to monitor quality during the spinning process. It can be installed on machines from various manufacturers.

3.2.1 Sensing head

The sensing heads are used in the spinning process to clear yarn faults. At the same time, the sensing heads continuously monitor the quality of the yarn and check for yarn faults.



YarnMaster® EOS+ sensing head

1	Optical sensor	2	Status LEDs
3	Unlock Button		

Alarms can be reset with the **Unlock Button**.

Unlock Button

Depending on the LZE settings, one of three unlock levels is available.

Unlock level 0: Alarms cannot be reset with the **Unlock button**.

Unlock level 1: The following alarms can be reset:

- Quality alarm
- Short count +/- alarm
- Moiré alarm
- Neps cluster alarm

Unlock level 2: All alarms from level 1 plus the following can be reset:

- Yarn count thick/thin alarm
- Reference mean alarm
- CV alarm
- IPI alarm

Status LEDs

The two status LEDs send so-called sensor messages. These serve as indicators for the yarn quality and the sensor status.

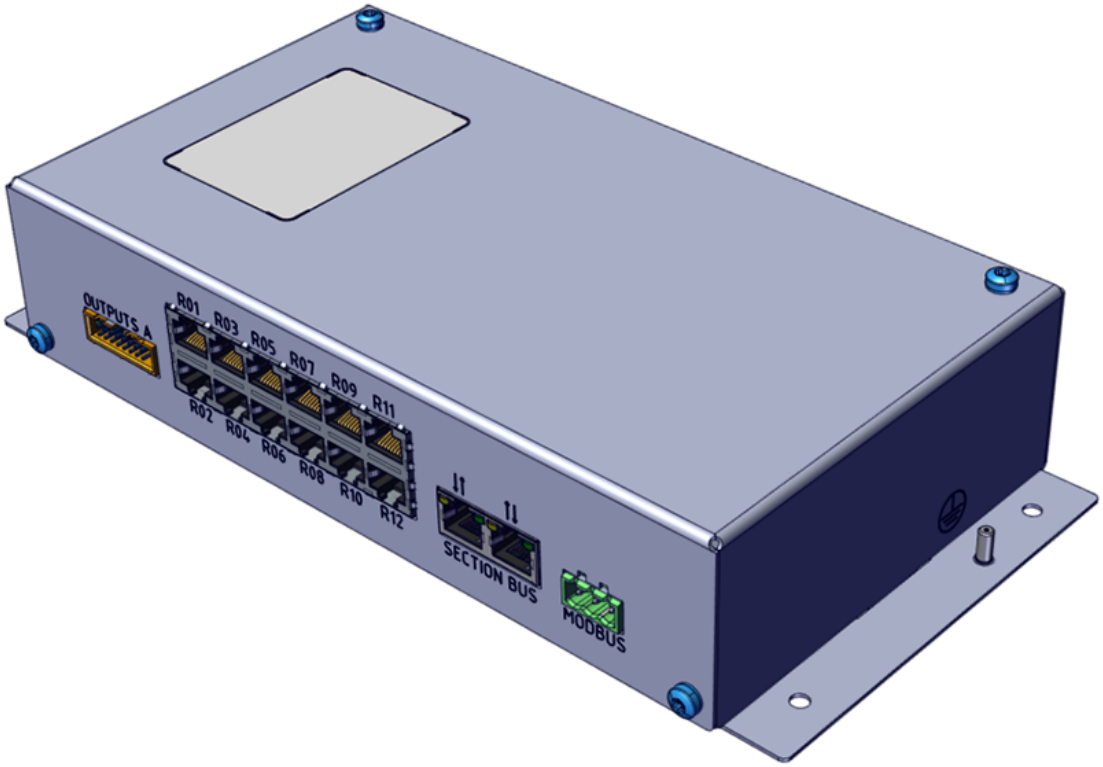
A list of all sensor messages can be found in a separate chapter Sensor Messages [36].

About locked spinning positions

- Locked spinning positions must be unlocked before the machine is restarted. This can be done via LZE or the button on the sensing head.
- On machines with a piecing robot, the piecing robot does not stop at locked spinning positions.
- Hardware alarms can only be unlocked via LZE.
- The spinning position can be locked in the event of repeated quality cuts, repeated short count cuts or a long count alarm. These alarm states require intervention by the machine operator.

3.2.2 SI Box (Section Interface Box)

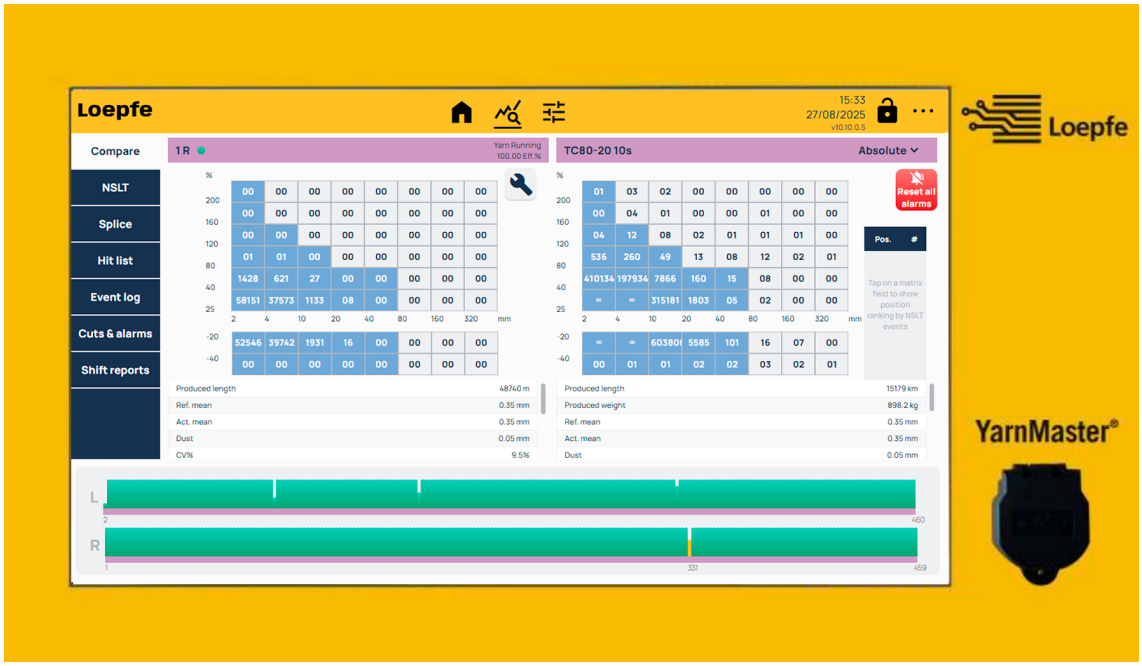
The SI Box is the communication interface between the sensing heads and the Section Bus that links them to the LZE. Other interfaces to the spinning machine can be connected via Modbus or Section Bus connectors.



SI Box EOS+

3.2.3 LZE (Loepfe Central Unit)

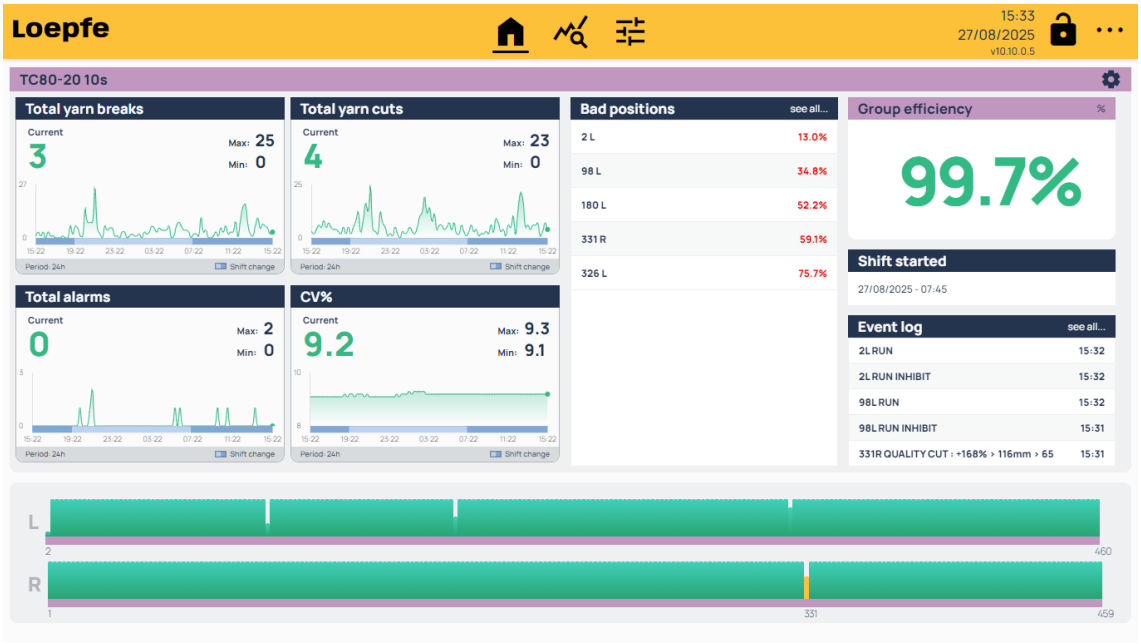
The LZE is used to process, log and store the measured data from the sensing heads and to define all the parameters required for the EOS+ yarn clearer system.



LZE

3.2.4 User interface

Settings can be made and production controlled via the user interface of YarnMaster® EOS+.



Article dashboard

4 Transport and storage

The following symbols are used on the package:

	Keep Dry
	Fragile
	This Side Up
	Stacking Height
	Recycling
	CE Marking

5 Installation

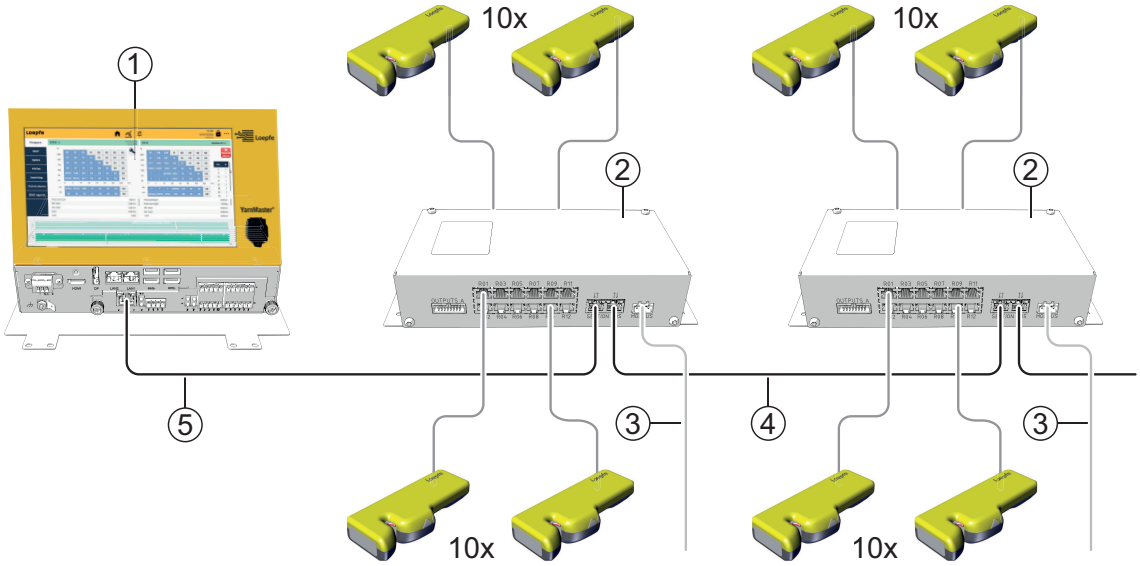
5.1 Overview

5.1.1 System specification

The sensor system is designed for the following machine:

- Machine type: Taitan K80 or K90
- Maximum number of sections: 30 (K80) or 32 (K90)
- Section size: 20 positions
- Maximum number of spindles: 600 (K80) or 640 (K90)
- Section per SI box: 1

5.1.2 Installation plan



Installation plan to connect LZE with SI BOX EOS+

1	LZE (Loepfe Central Unit)	2	SI Box EOS+
3	Cable: SI Box Modbus to RS30 or RS51 Modbus	4	Cable: SI Box to SI Box Section Bus
5	Cable: LZE Q-Bus to SI Box Section Bus		

5.1.3 Scope of delivery

YarnMaster® EOS+ consisting of:

- 1 LZE (Loepfe Central Unit)
- Up to 32 SI Boxes (Section Interface Boxes)
- Up to 640 Sensing heads
- 1 Cable per sensing head
- Further cables and accessories

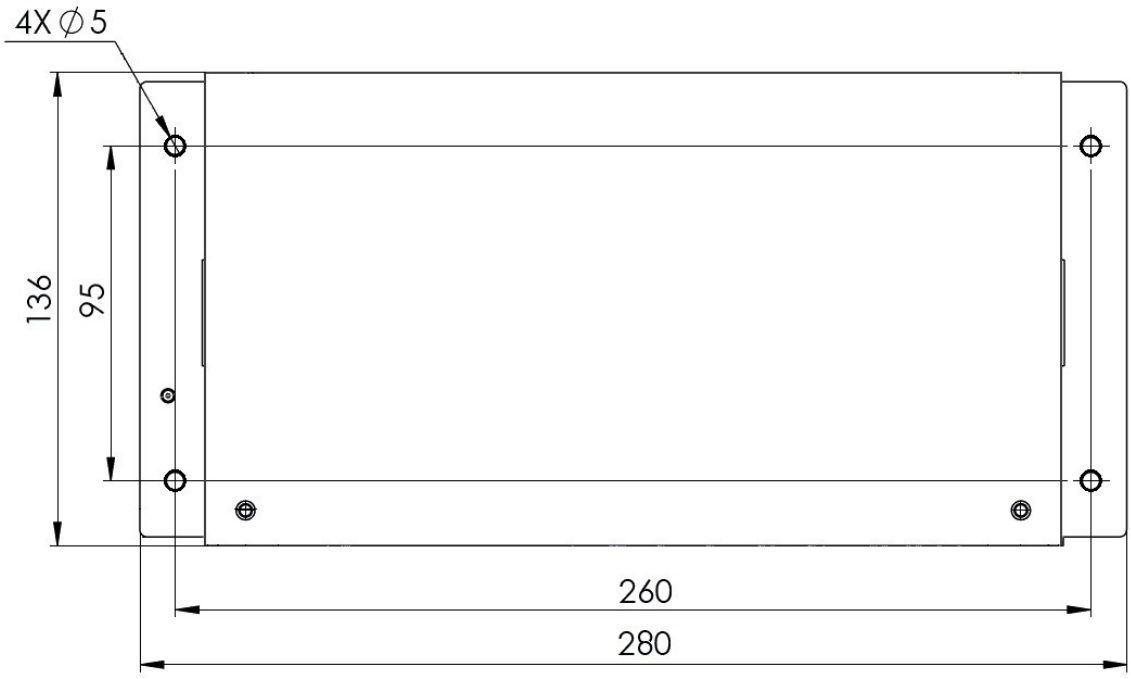
5.2 Installing sensing head

- ✓ The machine is switched off.
- ✓ The machine's compressed air supply is disconnected.
- ✓ The pressure from the machine's compressed air system is released.
- ✓ Cables are numbered.
- ✓ The cables are original cables from the manufacturer.

1. Lay the cable from the SI Box to the sensing head.
2. Fit the bracket for the sensing head.
3. Insert the cable into the sensing head.
4. Screw the sensing head to the bracket using an M4x20 screw with washer.
5. Align the sensing head to the correct yarn position using the tools provided by the machine manufacturer.
6. Tighten the screw.

5.3 Installing SI Box

5.3.1 Mounting SI Box



Mounting holes and dimensions of SI Box

1. Make sure that you have enough space at the machine frame to mount the SI Box.
2. Fasten SI Box with 4xM4 bolts and lockwasher.

5.3.2 Connecting SI Box

The connections for Output A and Ouput B are not used.

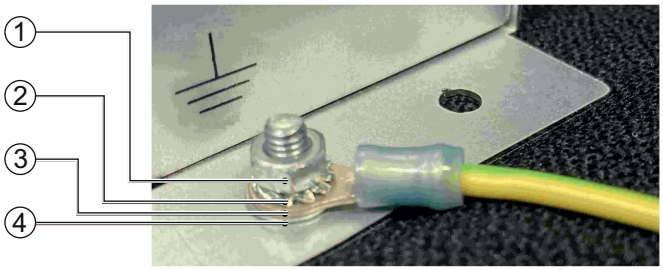
Earthing SI Box

The earthing of the SI Box is a functional earth connection.

NOTE

Damage to the device due to incorrect earthing.

- Functional earth must be connected before the power supply connection is made.
- Do not use the earth terminal of the SI box as earth bounding to other units.

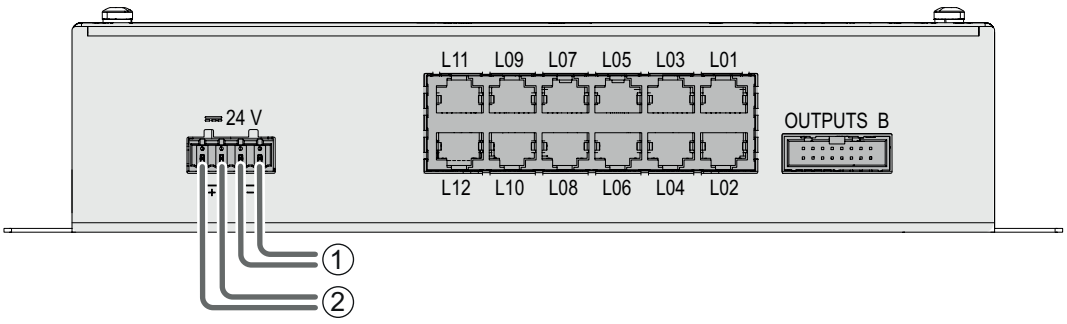


Mounting stack of earth connection SI Box

1	Nut	2	Lock washer
3	Ring terminal M4	4	Washer

1. Make sure the earth terminal wire has the same or a larger size than the supply wire, with a minimum of 0.75 mm^2.
2. Connect the earth terminal wire to the SI Box via ring terminal M4 and use an additional lockwasher, washer and nut.

Connecting power supply

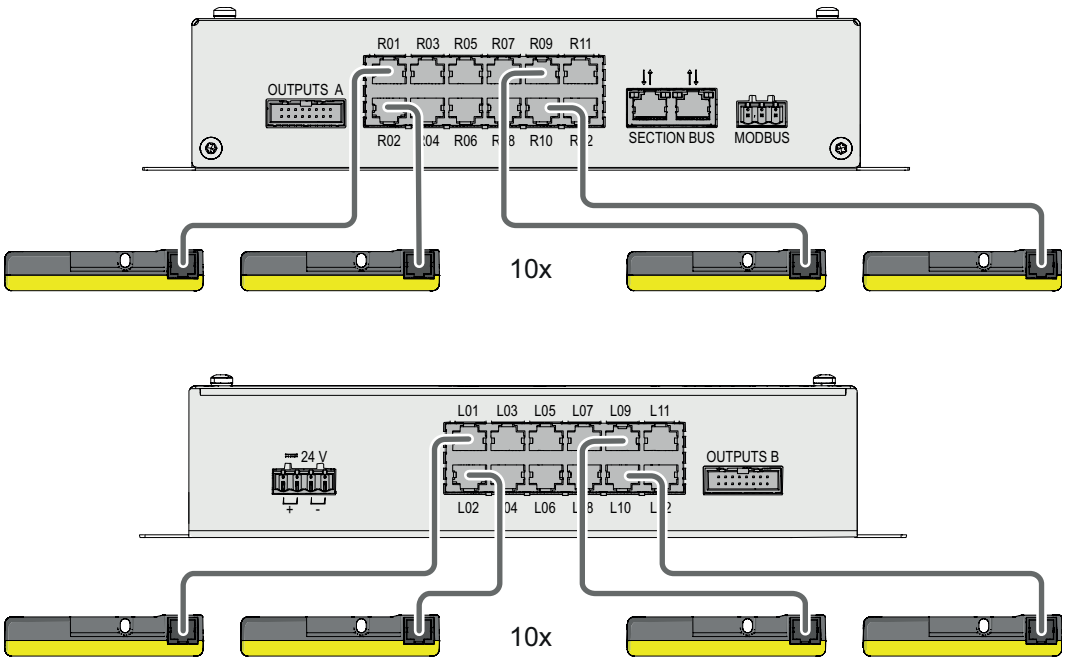


Pins for power connection SI Box

1 To power supply (-) 2 To power supply (+)

1. Make sure the size of the supply wire is at least 0.75 mm^2.
2. Ensure that there are no combustible materials within the range of at least 5 cm in all directions around the 24 V supply connector.
3. Connect one pin for the positive pole and one pin for the negative pole to the power supply. The second pins can be used for further connection with power supply.

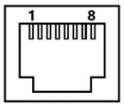
Connecting sensing heads



SI Box connections to sensing heads

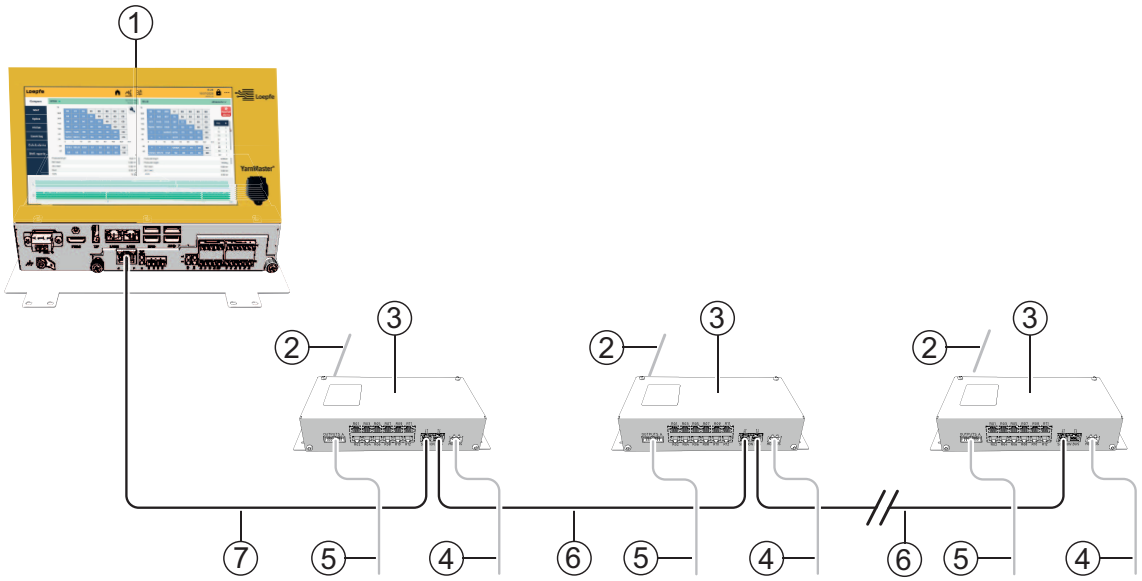
1. Make sure that the cables are original cables from the manufacturer.
2. Plug sensing head cables into the connections R01 to R10.
3. Plug sensing head cables into the connections L01 to L10.

Pin layout connector R01 to R10 and L01 to L10



Pin	Function
1	Not connected
2	Not connected
3	GND
4	CANL
5	CANH
6	6.5 V, max. 110 mA
7	Not connected
8	Not connected

Connecting SI Boxes



Connections between LZE and SI Boxes

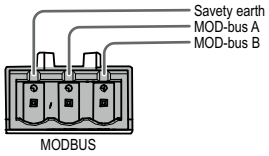
1	LZE	2	Cable: SI Box Outputs B to Taitan K80/90 section electronics
3	SI Box EOS+	4	Cable: SI Box Modbus to K90 Modbus
5	Cable: SI Box Outputs A to Taitan K80/90 section electronics	6	Cable: SI Box to SI Box Section Bus
7	Cable: LZE Q-Bus to SI Box Section Bus		

NOTE

Incorrect wire size causes communication problems

Observe the Section Bus specifications.

1. Connect LZE to the first SI Box (5).
2. Connect the first SI Box to the second SI Box.
3. Connect all other SI Boxes in the same way. Only the second connection for the Section Bus remains free on the last SI Box.
4. Connect cables to Outputs A and B.
5. For K90: Connect each SI Box to Modbus.



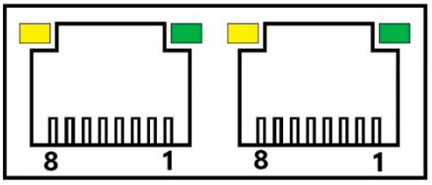
Modbus connector

Section Bus specification

Cable length and number of SI Boxes	
Max. cable length L1 between LZE and first SI Box	12 m
Max. cable length L2 between two SI Boxes	7 m
Max. number of SI Boxes on Section Bus if L2 = 5 m	40
Max. number of SI Boxes on Section Bus if L2 = 7 m	32

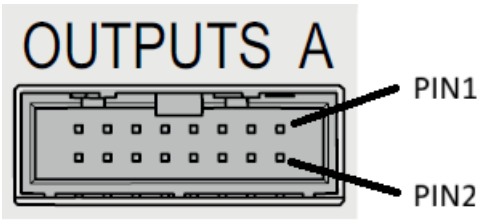
Patch cable properties	
Ethernet cable type	UTP
Subtype	CAT 5 or better
Wire size	AWG24 or lower / 0.2 mm^2 or higher
Max. termperature	60 °C or higher

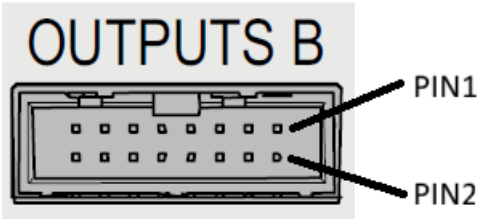
Pin layout Section Bus connectors



Function	Pin	Pin	Function
SBus CANH	1	1	SBus CANH
SBus CANL	2	2	SBus CANL
SBus GND	3	3	SBus GND
SBus GND	4	4	SBus GND
SBus GND	5	5	SBus GND
SBus DS-B	6	6	SBus DS-A
SBus 12 V	7	7	SBus 12 V
SBus 12 V	8	8	SBus 12 V

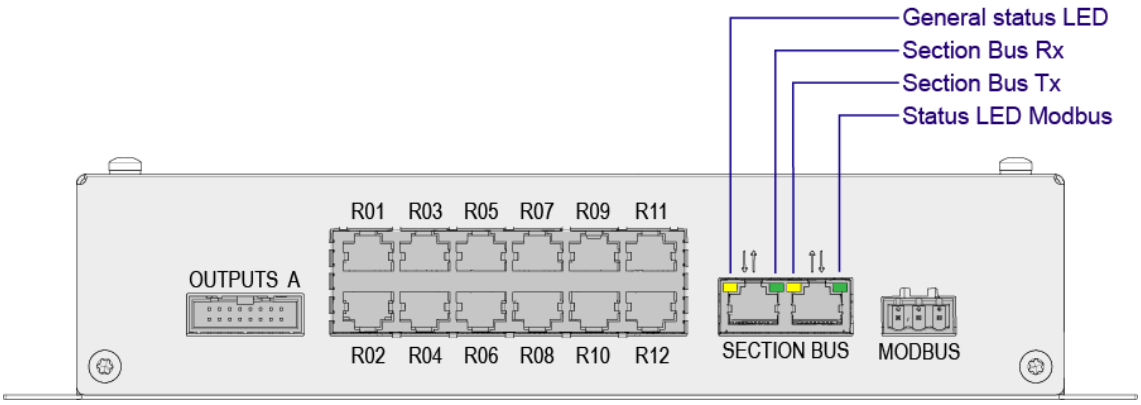
Pin layout Outputs A and B





Taitan K80 Section pos.	Output	Pin	Taitan K80 Section pos.	Output	Pin
1	A	3	2	A	1
3	A	7	4	A	5
5	A	11	6	A	9
7	A	15	8	A	13
9	A	4	10	A	2
11	A	8	12	A	6
13	B	3	14	B	1
15	B	7	16	B	5
17	B	11	18	B	9
19	B	15	20	B	13
NC	B	4	NC	B	2
NC	B	8	NC	B	6

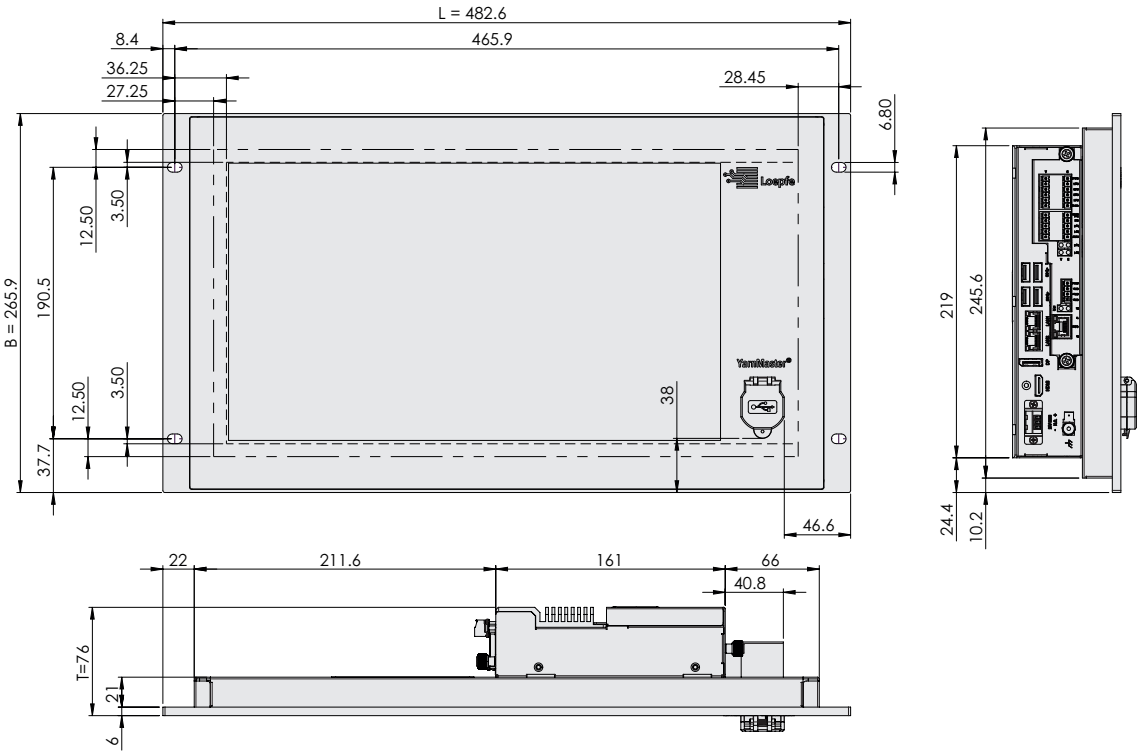
Functional description of LEDs



LED	Color	Function	Description
General status LED	Yellow	Off	No power or CPU does not run
		Slow blinking	Normal run
		Fast blinking	Bootloader waiting for software update
		Very fast blinking	Bootloader receiving update
Section Bus Rx	Green	Blinking	Data received from Section Bus
Section Bus Tx	Yellow	Blinking	Data transmitted to LZE
Status LED Modbus	Green	Off	No Modubus communication
		Blinking	Modbus communication

5.4 Installing Loepfe Central Unit (LZE)

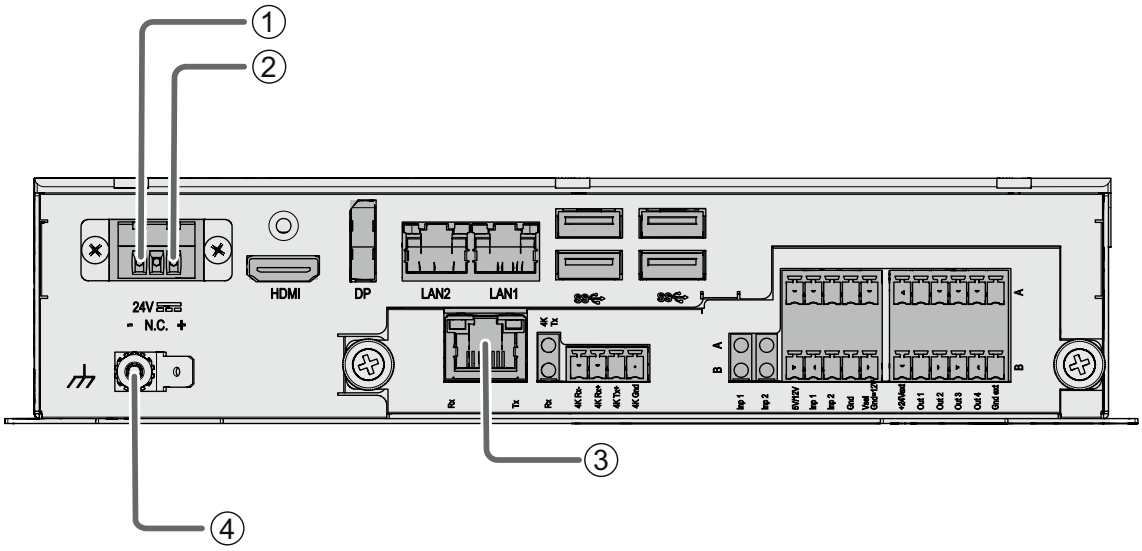
5.4.1 Mounting LZE



Dimensions of the LZE

1. Make sure that there is enough space for the LZE in the control cabinet of the machine.
2. Integrate the LZE into the control cabinet of the machine by fastening it with 4 screws.

5.4.2 Connecting LZE



Connections of LZE

1	to power supply (-)	2	to power supply (+)
3	to SI Box	4	Earth connection Faston

1. Connect LZE to the first SI Box.
2. Connect LZE to the power supply.
3. Earth the LZE using a ground cable with Faston.

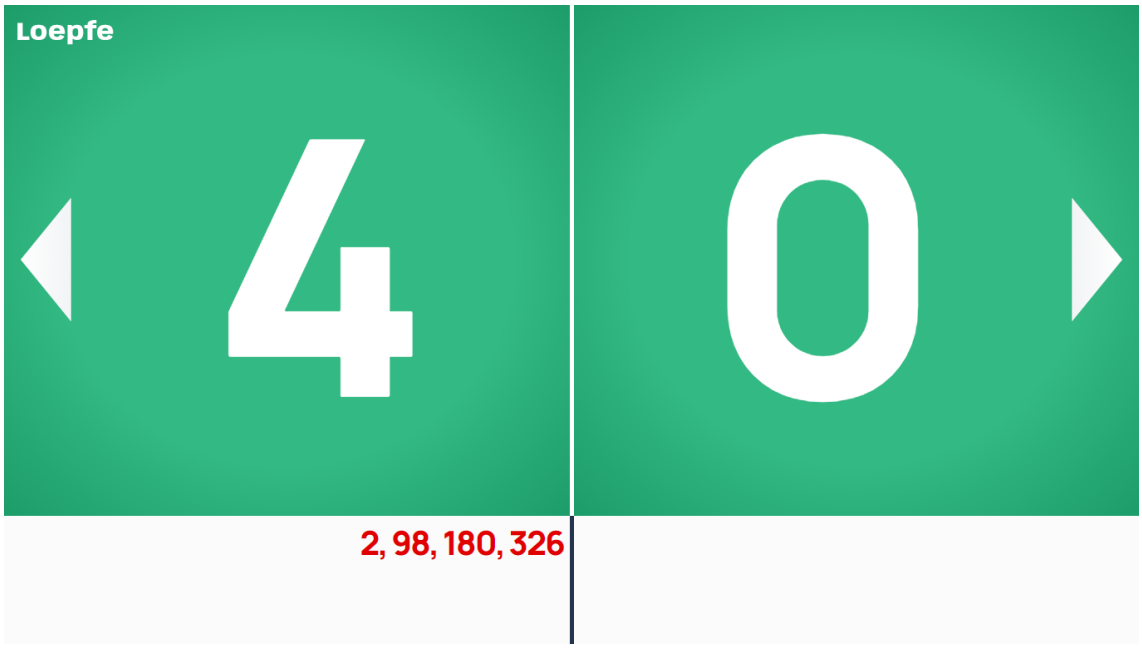
6 Commissioning

6.1 Calling up the article dashboard

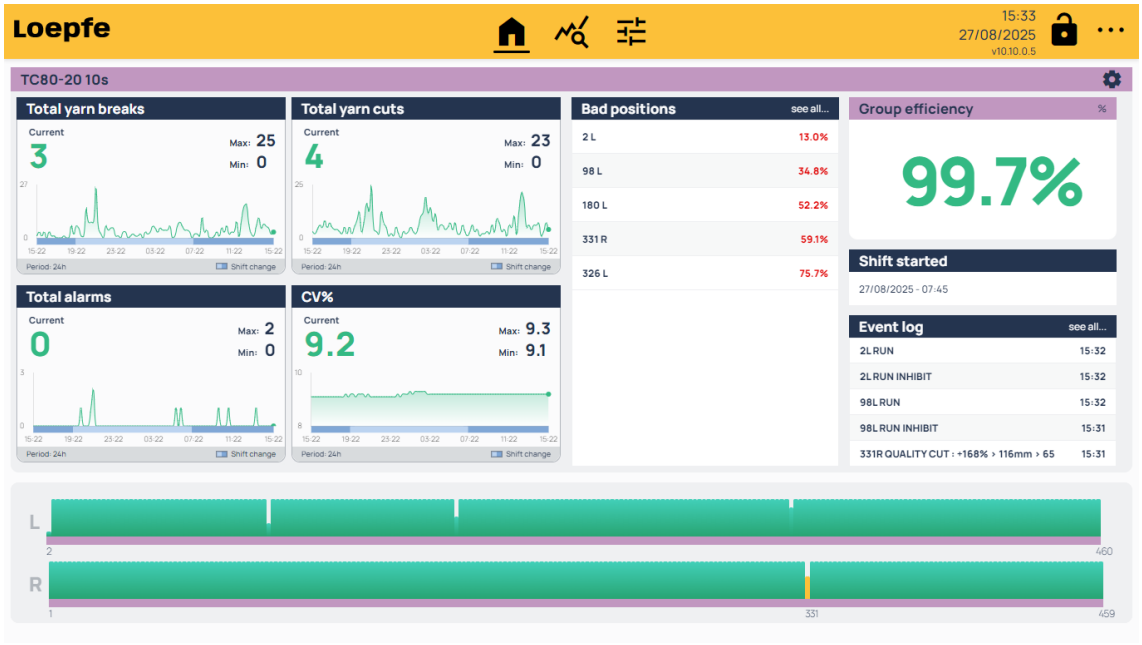
The article dashboard is the home screen of the YarnMaster® EOS+ user interface and it shows the efficiency and faults for a specific article.

✓ The machine with the software and the LZE is running.

1. If the screensaver is visible, tap on the screen.



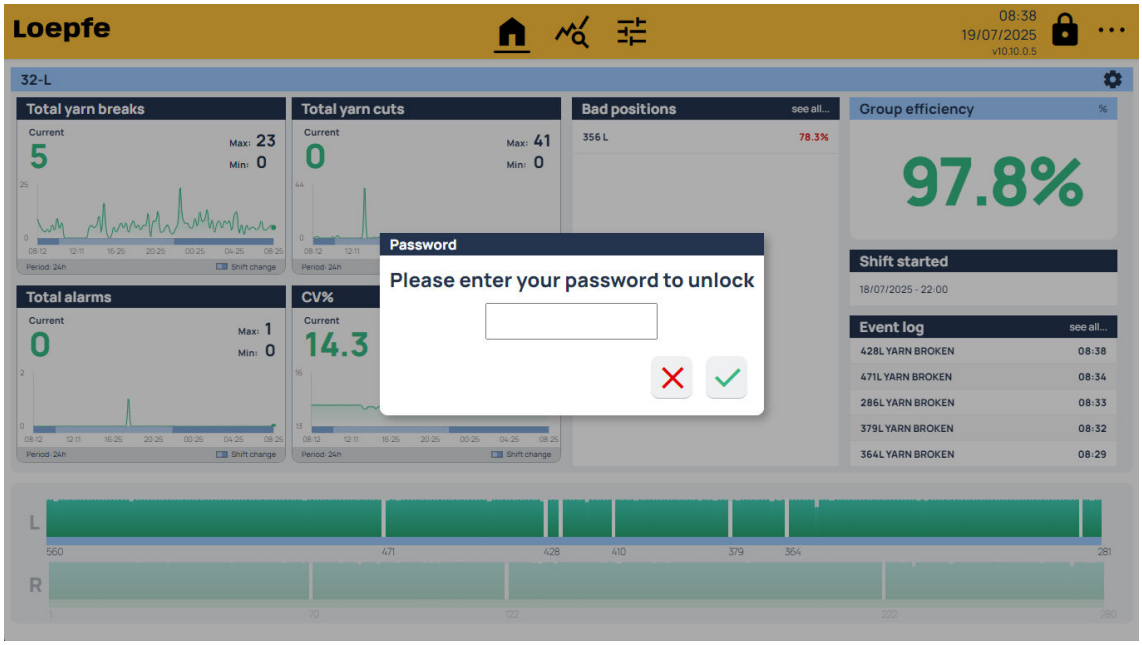
⇨ The article dashboard appears for the article selected.



6.2 Logging in with password

If you want to change articles or settings, you have to log in with a password.

1. Tap on the lock icon in the dashboard toolbar.

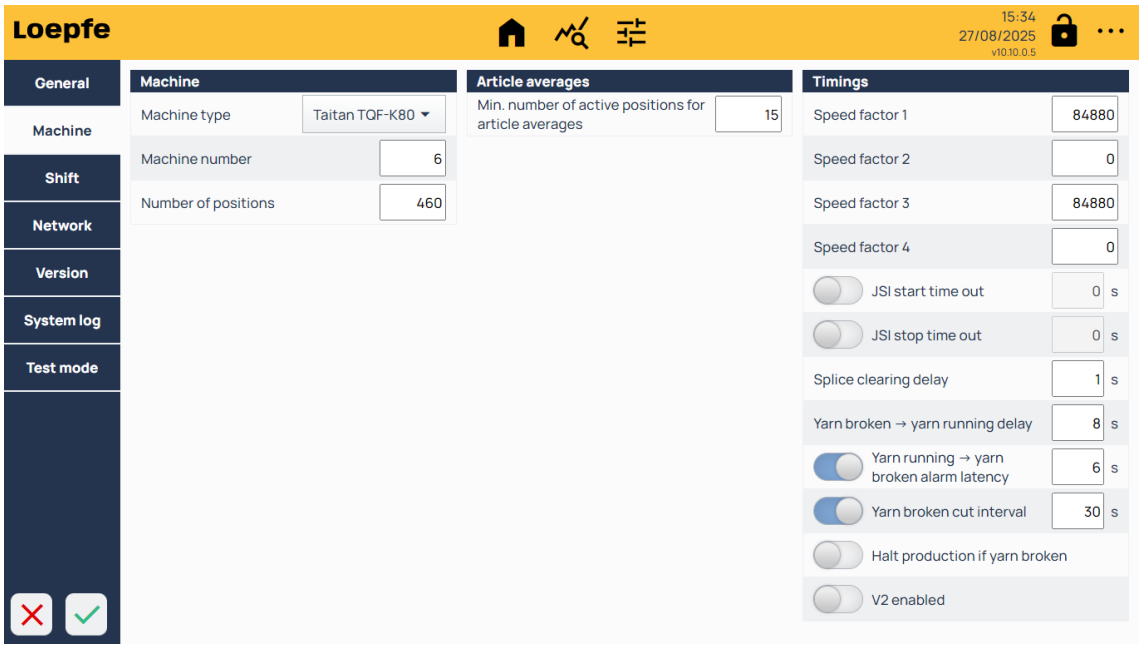


2. Enter password "1, 2, 3," and confirm by tapping on the green tick.

6.3 Setting machine data

By setting the following parameters, the specific data for your machine can be used.

1. Tap on the three dots in the dashboard toolbar and select the cog icon
    .
2. Select the **Machine** menu item.



3. Select the **Machine type**.
4. Enter the **Machine number**.
5. Enter the **Number of positions**.
6. Save the settings by tapping on the green tick.
   

⇨ If the machine number has been changed and saved, the LZE restarts.

6.4 Performing system test

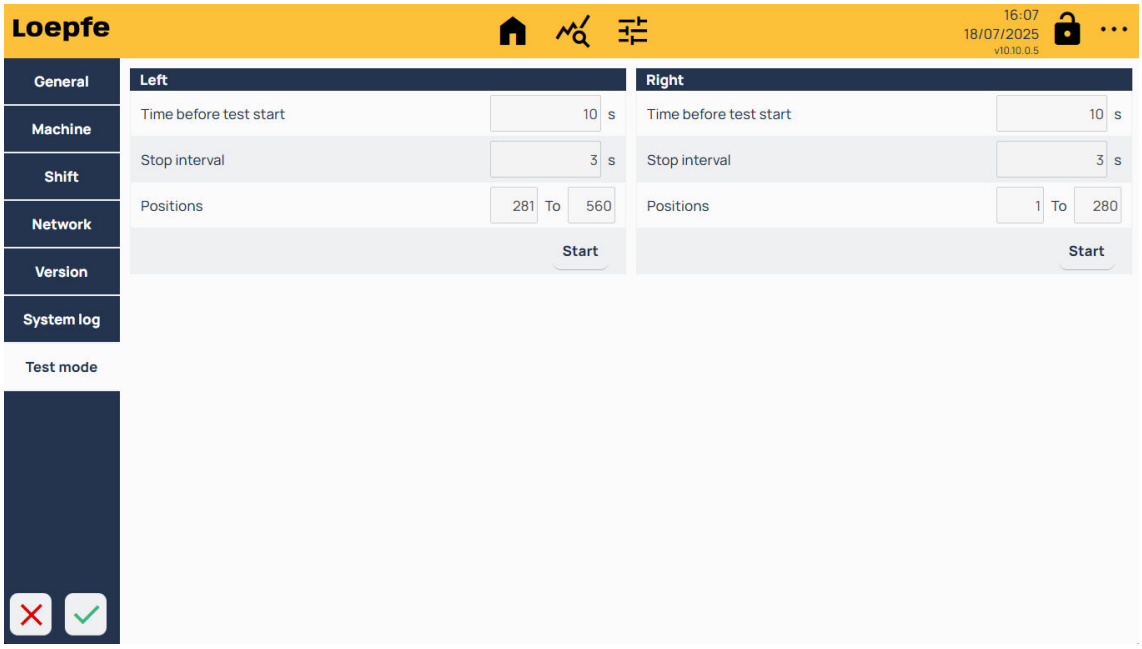
1. Tap on the three dots in the dashboard toolbar.

2. Select the cog icon.

3. Select the **Test mode** menu item.



4. With how much delay after the start should the test actually begin? Enter the number of seconds in the **Time before test start** field.
5. How quickly should the test switch from one sensing head to the other? Enter the **Stop interval** in seconds.
6. Enter the position range of the sensing heads you want to test for the side of the machine you want to test. By default, the position fields display the first and last positions with connected sensing heads for each machine side.
7. Start the test by tapping the **Start** button.

7 Maintenance

7.1 Software update

✓ You have entered your password.

✓ A USB stick with the latest version of the software is plugged into the LZE central unit.

1. Tap on the three dots in the toolbar.



2. Select the USB icon and choose **Update system**.



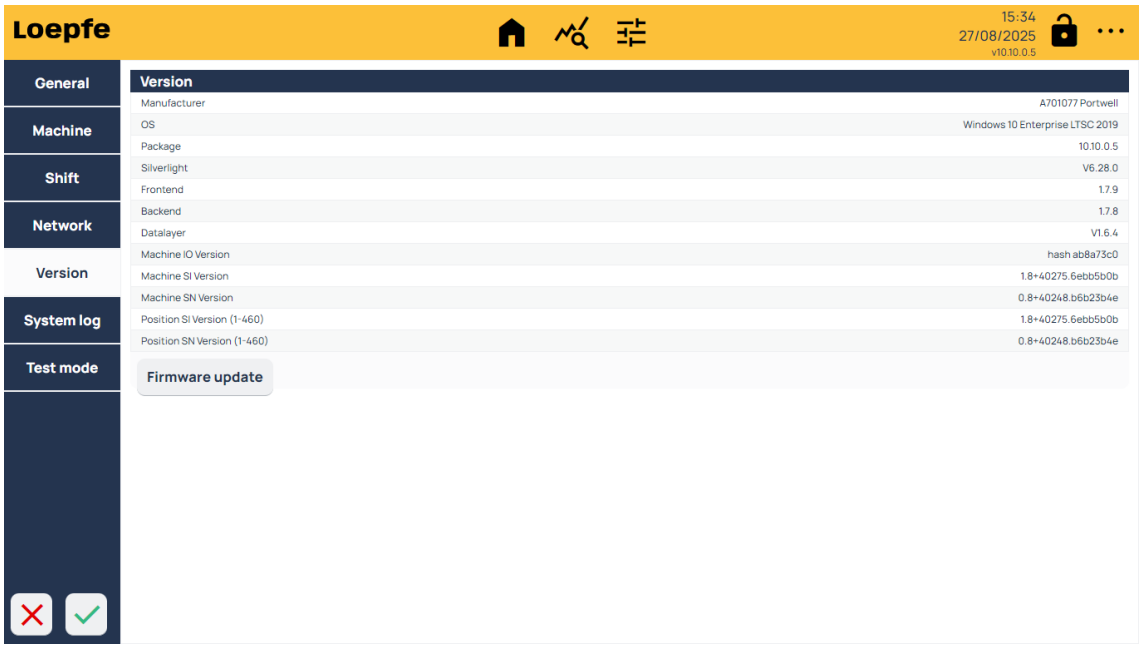
3. Tap on the three dots in the toolbar.



4. Select the settings wheel.



5. Select the **Version** menu item.



6. Tap on **Firmware update**.
7. Confirm by tapping on the green tick.



7.2 Cleaning sensing head



⚠ WARNING

Sudden emergence of flames

Use and ignition of flammable cleaning agents (e.g. Coleman fuel)

- Before cleaning: Turn off the machine and wait until it is cooled down.
- Electrostatic sensitive areas: Do not enter without proper static grounding equipment.



⚠ WARNING

Some cleaning agents are harmful and irritating

- Observe the warnings on the container.

NOTE

Damage to the sensors due to the use of prohibited cleaning agents

No warranty is given for damage caused by using prohibited cleaning agents.

Only use permitted and recommended cleaning agents.

- Prohibited cleaning agents include:
  - ⇨ all alcohols, such as methanol and ethanol, etc.
  - ⇨ all gasolines, such as car or aviation gasoline, and
  - ⇨ other substances, such as benzene, toluene, acetone and methylated spirits

Dust contamination in the sensor area affects the clearing performance and can be the cause of an increased number of cuts and misclassifications.

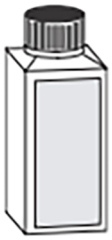
When using marking paint, paraffin, grease and antistatic oils, the measuring slot must be cleaned at shorter intervals.

Materials required

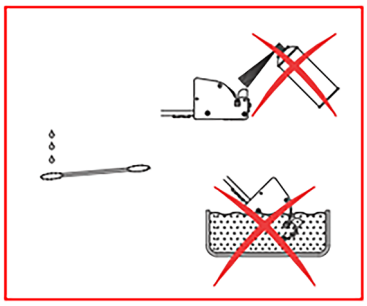
- Cotton swabs

Suitable cleaning agents

- TK-Clean from Loepfe Brothers Ltd.
- Drinking water
- Distilled water

Loepfe cleaning agent to order	Name	Article number
	Loepfe TK Clean	14359900

Important notes on cleaning



- Clean the sensors with the utmost care.
- Clean the sensors with cotton swabs.
- Do not immerse the sensing head in cleaning agents!
- Do not spray cleaning solutions directly in the measuring slot!
- Do not use hard objects!
- Do not use cutters or abrasive objects!
- Do not use tools other than cotton swabs!

Cleaning procedure

1. Lightly wet a cotton swab with cleaning agent.
2. Pull the cotton swab several times through the entire sensor area.
3. Repeat step 1 and 2 with a dry cotton swab to dry the slot.
   ⇨ The sensors are properly cleaned when the cotton swab is free of dirt.

7.3 Replacing sensing head

1. Switch off the machine and secure it against being switched on again.
2. Unscrew the sensing head.
3. Pull the sensing head slightly forwards and mark it as defective.
4. Secure cable against slipping back.
5. Unplug the cable.
6. Plug in new sensing head and reattach.
7. If software is up to date: Green LED on sensing head flashes and then lights up for 30 seconds. The sensor is ready for operation.
8. If the software is not up to date, the green LED does not light up and the message **No communication** is visible on the LZE under the corresponding sensing head.
   To update the software, select the **Version** menu item in the system settings and update the firmware using the corresponding button.

8 Troubleshooting

Problem	Possible Cause	Recommended Action
The LZE display shows “No Communication”	Firmware is incompatible.	■ Check latest software or firmware update.
	SI bus cable or SI Box is defective.	■ Check SI Bus cables. ■ Replace SI Box.
	Sensing head or sensing head cable is defective.	■ Check sensing head cable. ■ Replace sensing head.
Too many cuts distributed over the entire article or group	Settings are too tight.	■ Check all settings for the article.
	Yarn has a large number of defects.	■ Check slivers. ■ Check spinning components.
	Lot change was forgotten.	■ Stop group or article. ■ Carry out lot change. ■ Restart.
Too many cuts or alarms on individual spinning positions	Sliver is bad.	■ Check sliver for this position.
	Spinning unit is defective.	■ Check spinning components for this position.
	Sensor is mounted incorrectly or too loosely.	■ Check sensor mounting.
	Sensing head or sensing head cable is defective.	■ Check sensing head cable. ■ Replace sensing head.

9 Sensor Messages

Sensor messages are indicated by two LEDs:

- The green LED acts as a sensing head health state indicator.
- The red LED acts as a yarn quality warning indicator.

LED status indicator code	Description
Time scale in seconds	
Sensing Head health states:	
Normal operation/yarn broken	All OK
Normal operation/yarn running	All OK
Not ready or dirty	Not ready
System alarm	Sensor system Alarm
Yarn quality warning states:	
Yarn running, broken or matrix cut	All OK
Short count cut	Yarn quality not good
Long count alarm	Yarn quality not good
Repeated cuts or alarms	Yarn quality not good
System Alarm	Sensor system Alarm

Normal operation conditions	Description
Yarn clearer active – No operator intervention required	
Yarn Running	All OK
Yarn broken or Yarn cut	All OK

Yarn Alarm States	Operator action
Yarn clearer in Alarm -- Yarn production locked -- Operator intervention required	
Short count cut	Remove defect from cone 9 meter
Long count alarm	Remove long defect from cone 100 meter Check and remove some sliver
repeated cuts or alarms	Remove cone Remove sliver

Sensor not ready states	Maintenance intervention
Yarn clearer not ready -- Maintenance intervention required when the condition persists	
Sensing head is waiting for cleaning – Dust cut or alarm	Clean this sensing head
Sensing head is waiting for connection to LZE	Reset system
Sensing head is waiting for settings from LZE	Redo article lot change
Sensing head in system alarm	Reset alarm, check troubleshooting
Sensing head has lost power	Restore power/Change sensing head

10 Spare parts and accessories

Name	No.
Sensing head YarnMaster® EOS+	47199000
EOS+ SH CABLE 1500mm	47205000
EOS+ SH CABLE 2000mm	47206000
EOS+ SH CABLE 2500mm	47207000
CABLE YM OE RJ45S 8M 8M 8000MM	47338000
CABLE YM OE RJ45S 8M 8M 5000MM	50428100
CABLE 3N1 Q-STOP/QB LP2 L=1250	47193000
LZE Central Unit	47234000
SI BOX KOMPL. YM EOS+	47233000
Loepfe TK clean	14359900

11 Dismantling and disposal

11.1 Dismantling

1. Shut down the machine and secure it against restarting.
2. Disassemble all sensing heads, SI Boxes and the Loepfe Central Unit (LZE).

11.2 Disposal

1. Dispose of the devices in accordance with national and regional regulations.
2. Do not dispose of devices in household waste.



12 Technical data

System ambient conditions	
Operating temperature	5 – 45 °C
Humidity (relative)	10 – 95 % rH, non-condensing
Storage temperature	0 – 60 °C
Transport temperature	-25 – 70 °C
Pollution degree	Pollution degree 2

The system is intended for indoor use.

Sensors	
YarnMaster® EOS+	1 optical sensor
Range of application	Yarn count: Nm 5—160
Voltage Ground of supply cannot be used as protective earth connection.	< 6.5 V ±0.5, max. 110 mA
Yarn speed	30 – 720 m/min
Mounting	With machine specific bracket, max. torque of attaching screw 2.5 Nm

SI Box	
Output stop signals:	
Auxiliary supply stop signals	Outputs A and Outputs B
Output voltage	12 V ±5 %
Maximum output current of auxiliary supply	100 mA / connector
Type of output	Open collector NPN-transistor output
Max. output current / output	25 mA
Max. output voltage when output is active	1.5 V
Communication interfaces:	
Modbus interface	Non galvanic isolated from unit supply
Section Bus interface	Functional galvanic isolated from unit supply
SBus supply	12 V, 0.06 A max.

Loepfe Central Unit	
User interface	Multilingual
Power	24 V DC ±10 % /1100 mA or with AC/DC converter with 90-264 V AC/50-60 Hz
Overvoltage catergorie	Overvoltage categorie 1
Dimensions WxHxD	234.5x231x50 mm
Weight	2.7 kg
Individual assembly	In the machine head
Articles and groups	
Articles	10
Groups	2

Classification

Class length of clearer matrix	**Default setting**	**Range to set**
	4 mm	2 – 8 mm
	10 mm	6 – 18 mm
	20 mm	12 – to 38 mm
	40 mm	22 – 78 mm
	80 mm	42 – 158 mm
	160 mm	82 – 318 mm
	320 mm	162 – 840 mm

Class treshold of clearer matrix:	**Default setting**	**Range to set**
	-40 %	-26 – -50 %
	-20 %	-20 – -34 %
	25 %	25 – 34 %
	40 %	31 – 74 %
	80 %	46 –114 %
	120 %	86 – 154 %
	160 %	126 – 195 %
	200 %	166 – 350 %

Piercer sensitivity:	50 – 100 %

Short count	
Length thin and thick segment	1 – 9 m
Diameter variation thin segment	-30 – -2 %
Diameter variation thick segment	2 – 30 %

Long count alarm	
Length thin and thick segment	10 – 1000 m
Diameter variation thin segment	-20 – -0.3 %
Diameter variation thick segment	0.3 – 20 %

Nep cluster (pearls)	
Neps with respect to the reference mean	5 – 170 %

Alarm function	
Quality alarm	1 – 9 stops per 1000 – 16000 m
Short count alarm	1 – 9 stops per 1000 – 16000 m
Neps alarm	1 – 9 stops per 1000 – 16000 m
Long count article average alarm	4 – 30 %
CV alarm	-50 – -4 %, 4 – 50 %

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