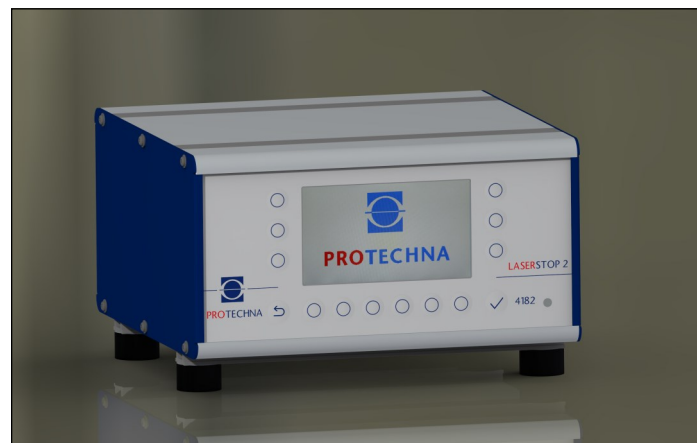


VANDEWIELE

PROTECHNA

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Operator Manual
PROTECHNA thread break detector
LASERSTOP 2 4182
for weaving machines




PROTECHNA





The functions described in this manual cover the use of the system on weaving machines at the yarn infeed and in the weaving sheds.



For all connected and activated laser light barriers, please set either the operating mode “STANDARD”, for thread monitoring at the yarn infeed, or the operating mode “SYNCHRO”, for thread monitoring in the weaving sheds.

If you change the settings for the operating mode, then the system may not work correctly in certain circumstances. These settings have been set at the factory or when commissioning the system.



During normal operation of the system, the screen backlighting is switched off automatically after a set time. This extends the service life of the display screen. Press any key to switch the backlighting back on.

The backlighting remains switched on in the menus for the settings, and for warnings or when the machine has been shut down as a result of a detected thread breakage.

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Safety instructions

Before using your unit for the first time, please read through the following information for your own safety and to ensure the operational safety of the unit.

- ▶ Always follow all warnings and notices that are affixed to the device itself or included in this manual.
- ▶ Always disconnect the device from mains power before cleaning, or before removing or installing a device option. Do not use any liquid cleaning agents or cleaning sprays for cleaning, use 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 could be severely damaged by powerful shocks, e.g. as caused by it falling over.
- ▶ Make sure that the power supply used matches the voltage values as specified for the device.
- ▶ Never attempt to insert objects into openings on the device, as short circuits or electric shock could result from the voltage present inside the device.
- ▶ Do not attempt to repair the device yourself. Only perform actions on the device as expressly instructed by the manual. Otherwise, you run the risk of coming into contact with parts that are under high voltage.
- ▶ Even though the output from the transmitter of the laser light barrier is not dangerous, direct eye contact with the laser light beam should be avoided.

Introduction

LASERSTOP 4182 control unit with digital signal processing

The LASERSTOP 4182 control unit includes all of the components necessary to operate the monitoring system and is suitable for connection to up to three¹ series 480 laser light barriers.

In the event of a thread breakage, the 4.3-inch colour display screen shows the channel number – and a corresponding error code for a malfunction – so that the status of the system is clearly visible, even at some distance from the screen.

All adjustments are made directly on the control unit by means of a wear-resistant membrane keypad and the user is guided by an easy-to-understand menu system on the colour display screen.

Adjustment of the start and end position for the faded-out area of shed monitoring is either completed on the control unit or by the machine, using an external control.

The software for the monitoring system is stored using modern flash memory, so that in the event of a software update, the new software merely needs to be loaded via the USB port. This means that the system is optimally prepared for future enhancements.

Series 480 light barriers

The light barriers work with visible red-light lasers (660nm). These diode lasers characteristically offer a long service life while also being mechanically robust.

The high homogeneity of the light beam guarantees uniform sensitivity across the entire working width. The receiver features an advanced measuring method that is characterised by its excellent behaviour in terms of vibration independence and sensitivity.

The transmitters and receivers for the laser light barriers are attached to the centre of the open shed and parallel to the yarn sheet on the warp infeed. If a broken thread falls out from the yarn sheet or a nest is formed, then a signal is generated by a brief interruption of the laser light beam. This signal is evaluated by the microprocessor in the control unit and the weaving machine is shut down.

Pulse generator

The pulse generator is used to synchronise the monitoring system with the speed of the machine and must be attached to a suitable place on the machine where the machine rotations are present in a 1:1 ratio. The pulse generator only affects the faded-out channels for shed monitoring.

External fade-out

Instead of using the pulse generator, the monitoring system can also be synchronised with the machine speed by using an external dynamic control from the machine. In this case, the faded-out area of shed monitoring is determined by this external dynamic control.

¹ as option. The standard version of the control unit can be connected to one or two series 480 laser light barriers.

Introduction

General

The modern LASERSTOP 2 4182 laser thread monitoring device for weaving machines is designed to shut down the weaving machine immediately if

a) clamping threads or nests can be detected in the open shed

and/or

b) thread breakage occurs at the warp infeed, which can be detected by the laser light barriers attached below and/or above the warp threads.

Thanks to the use of modern laser systems for the light barriers and evaluation with the latest methods of digital signal processing in the control unit, the system can be utilised for a wide range of application scenarios.

Working widths of up to 20m across can be monitored using the LASERSTOP 2 4182 laser thread monitoring device.



The functions described in this manual cover the use of the system on weaving machines at the yarn infeed and in the weaving sheds.

Key features of the system include the following:

- Rapid and reliable detection of thread breakage from 12 dtex up.
- Different light barrier designs for various monitoring positions, to support a wide range of weaving machine types.
- Visible, non-hazardous red-light laser (Class 1 laser).
- Laser switches off automatically when machine is at a standstill (configurable).
- Vibration-resistant receiver.
- Pulse generator to synchronise the monitoring system with the machine speed.
- Synchronisation of monitoring system with machine speed can also be achieved using an external dynamic control.
- Control unit with digital signal processing and computerised, automatic system monitoring.
- 4.3-inch colour display screen to show the operating state of the light barriers.
- Input of operating parameters directly on the control unit using a wear-resistant membrane keypad.
- Software update via USB port.

PROTECHNA LASERSTOP 4182 thread break detector for weaving machines

Control unit 4182 – front



Key (↶)

Press this key to go back to the home screen. This is always possible, wherever you are in the menu system.

Keys (1) – (12)

The functions of these keys change depending on available settings and views. The functions of these keys are shown on the display screen in each case (14).

Display screen (14)

4.3-inch colour display screen for showing the operating state of the light barriers and to help the user when inputting runtime parameters.

Key (✓)

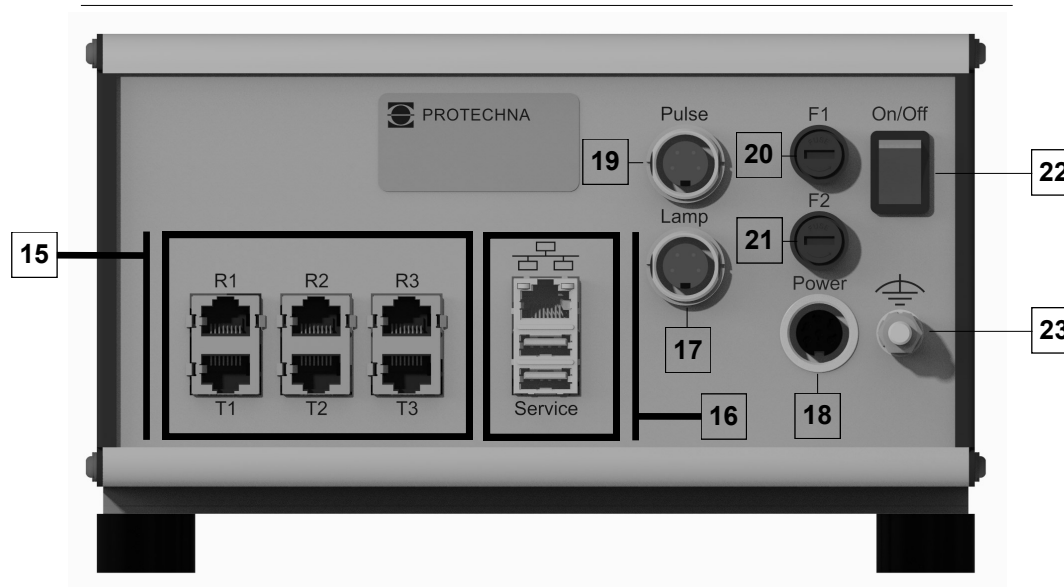
Use this key to confirm any settings you have changed. If this key is not pressed, changes to settings will not be applied to the control unit in some circumstances. However, this key is not used in all settings menus.

Status indicator (13)

Indicator	Meaning
Green and steady	The device is working normally.
Yellow and flashing	A system error has occurred.
Yellow and steady	The device is performing a self-test.

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Control unit 4182 – back



Socket block for connecting light barriers (15) ²

Sockets **R1** to **R3** for connecting the receiver cables from the laser light barriers, and sockets **T1** to **T3** for connecting the transmitter cables from the laser light barriers.



Please take care to ensure that the individual laser light barriers are always plugged into the sockets with the same channel number (channel 1 into T1 and R1, channel 2 into T2 and R2, etc.).

² The figure shows the back of the control unit LASERSTOP 4182 K-3 (3-channel version). With the LASERSTOP 4182 K-2 (2-channel version), only the sockets R1, R2, T1 and T2 are present.

Service socket block (16)

USB and LAN ports. These ports are normally only used for service work.

Socket for warning lamp (17)

Socket for power supply and stop contact (18)

Socket for pulse generator (19)

Fuse for power supply (20)

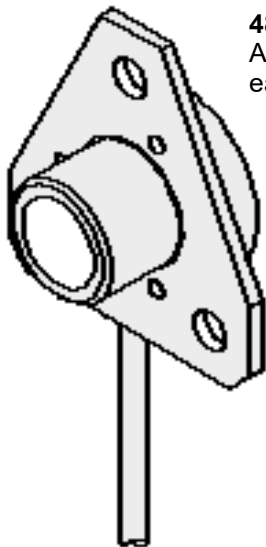
Fuse for stop contact (21)

Power switch (22)

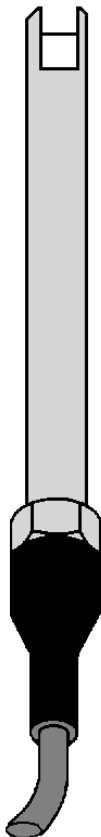
Power switch for switching the control unit on/off

Earth connection (23)

Series 480 laser light barrier

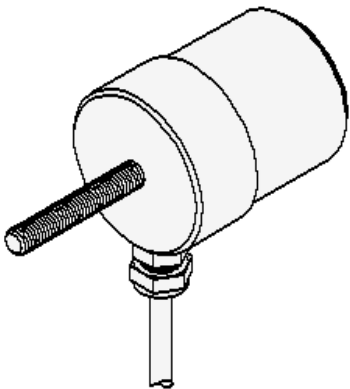


480 transmitter
An installation kit is provided for each transmitter (laser).

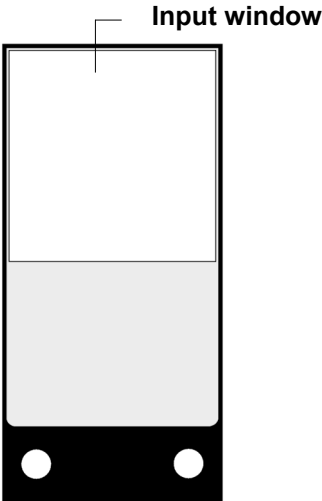


483 transmitter
An installation kit is provided for each

Type	Usage
480	For all applications with no space restrictions.
483	Mainly used for shed monitoring where space is very tight.



Receiver
Type 480: Standard receiver
Type 485: Receiver with enlarged lens



486 receiver
Narrow form factor receiver
(front view)

Type	Usage
480	For all applications with no space restrictions.
485	Mainly used on wide weaving machines with no space restrictions.
486	Mainly used for shed monitoring where space is very tight.

For your notes

General operating instructions

- ▶ Before you switch on the control unit for the first time, make sure that the power supply used matches the voltage values as specified for the device.
- ▶ Check to confirm that all plug connections are tightly connected to the control unit. Any loose plug connections can stop the monitoring system from working properly.
- ▶ Keep the lenses on the laser light barriers clean. Avoiding getting fingerprints on the lenses of the laser light barriers. Clean the lenses only with a dry and lint-free cloth.
- ▶ If the monitoring system is switched to test mode, it cannot shut down the machine.
- ▶ During normal operation of the machine, take care to ensure that no loose threads can pass through the light beam from the laser light barriers. Loose threads could cause false stops.
- ▶ During normal operation of the system, the screen backlighting is switched off automatically after a set time. This extends the service life of the display screen. Press any key to switch the backlighting back on.
- ▶ **Automatic laser switch-off**
If you have activated automatic laser switch-off, then the lasers are switched off when the machine is at a standstill. For adjustment or inspections, the lasers can be switched on when the machine is at a standstill by switching the system into test mode.

External indicator lamp

Lamp	Lamp – mode 4080	Lamp – mode 4035
On and steady	Machine is at a standstill. The machine was not switched off by the monitoring system.	Machine was switched off by the monitoring system.
Off	a) Control unit is switched off. b) Machine is in operation.	All other operating states.
On and flashing	a) Machine was switched off by the monitoring system. b) Monitoring system is running in test mode.	

▶ Pulse generator

The connection cable from the pulse generator is plugged into the “Pulse” socket on the back of the control unit.

▶ External fade-out

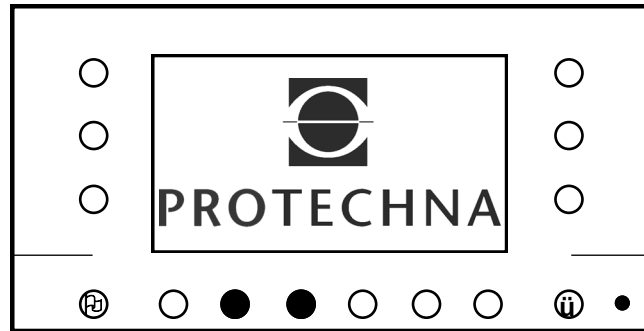
Instead of using the pulse generator, the monitoring system can also be synchronised with the machine speed by using an external dynamic control from the machine. The connection cable is plugged into the “Pulse” socket on the back of the control unit instead of the pulse generator.

▶ “Machine running” signal

If no synchronisation is required for the monitoring system, the connection cable with the “Machine running” signal is plugged into the “Pulse” socket on the back of the control unit.

Display during start-up of the system

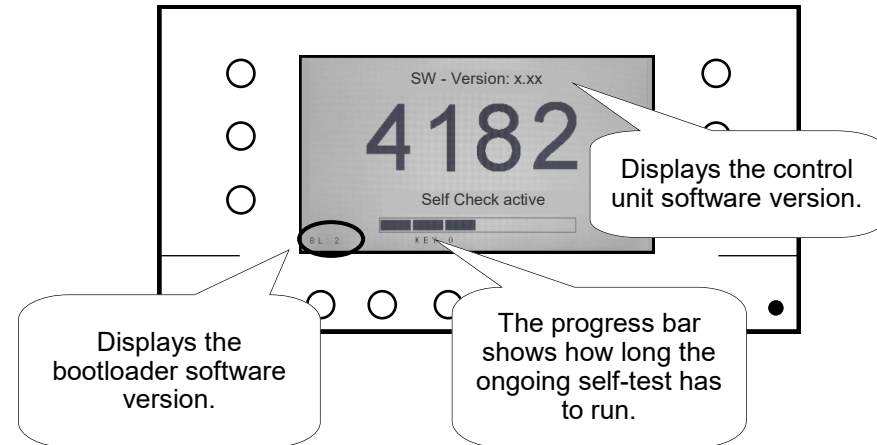
After switching on the control unit, the following is first shown on the screen:



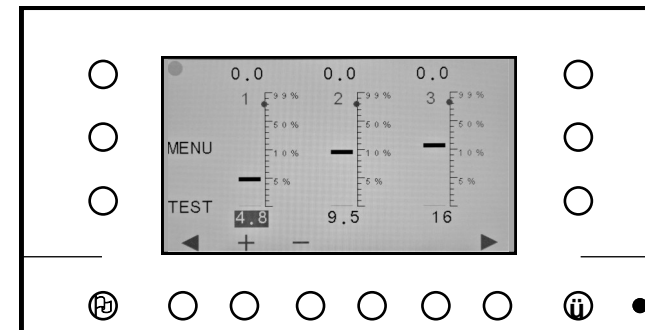
If this key is pressed and held during the boot-up procedure, information about the ongoing self-test is displayed.

If this key is pressed and held during the boot-up procedure, the control unit performs a production self-test.

If no keys are pressed, then the control unit performs a self-test.



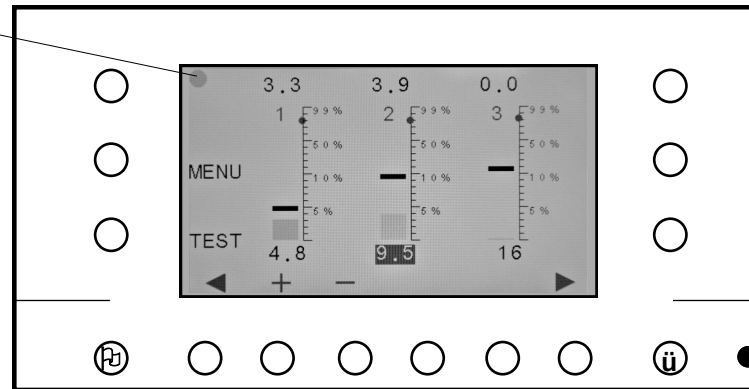
After a successful self-test, the following is then shown on the display screen (start screen):³



³ The figure shows the start screen for the LASERSTOP 4182 K-3 (3-channel version). With the LASERSTOP 4182 K-2 (2-channel version), only two channels are shown.

Start screen – indicators

Colour-coded system indicator

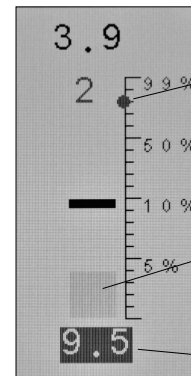
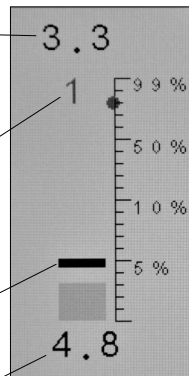


Status indicator

Noise level indicator
Numeric display: Noise level in %
---- : Channel is deactivated.

Channel number

Switching threshold
Indicator (graphical and numeric) for the configured switching threshold (sensitivity).



Receiver level indicator
The dot should be at approx. 100%
(+/-10%).

Noise level indicator
Graphical display: Noise level in %

Item with blue highlight (cursor)
Settings can be changed on the channel that is highlighted in blue.

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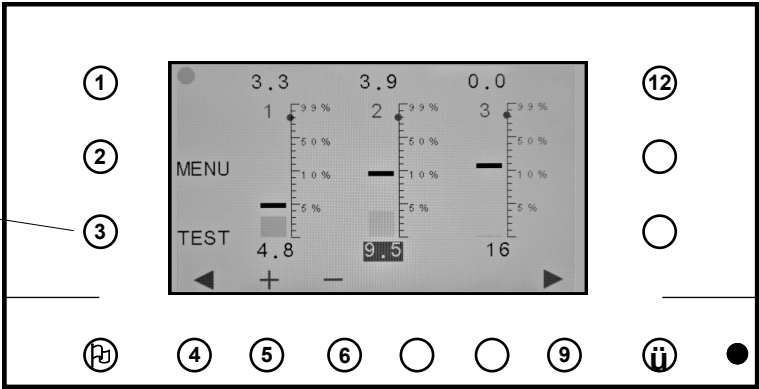
Start screen – indicators

Indicator	Meaning
Noise level	Indicates the noise level with the machine running for this channel in relation to the receiver level and Indicates the amplitude – when a thread passes through the light barrier (thread signal) – for this channel in relation to the receiver level. These indicators are also important for the configuration of the individual switching thresholds. Deactivated channels are indicated by “- - -”. No input can be made here.
Receiver level	Displays the receiver level for the connected and activated laser light barrier in relation to a pre-configured reference value. The dot on the indicator should be displayed at roughly 100% +/-10%. This display is not shown for deactivated channels. No input can be made here.
Switching threshold	Indicates the switching threshold (sensitivity) of this channel in relation to the receiver level.
Colour-coded system indicator	Green: The system is working normally. Green (flashing): The system is working normally, the machine is in operation. Yellow (flashing): The start delay is active. Red: One of the laser light barriers has shut down the machine. Red (flashing): A system error has occurred.
Status indicator	Green: The device is working normally. Yellow: The device is performing a self-test. Yellow (flashing): A system error has occurred: – Data loss (EEPROM). – Connection cables from two or more laser light barriers have been connected incorrectly.

Start screen – settings



If the system is running in test mode, the machine cannot be shut down by the monitoring system.



Key	Meaning
1	Opens the menu for general device settings. The menu is protected by a password.
2	Opens the menu for light barrier settings for the selected channel.
3	Switches test mode on and off.
4	Moves the cursor (item with blue highlight) to the left.

Key	Meaning
5	Increases the value being adjusted for the selected channel.
6	Decreases the value being adjusted for the selected channel.
9	Moves the cursor (item with blue highlight) to the right.
12	Opens the menu to display various input and output signals, as well as some service indicators.

Menu: General device settings

Menu: General device settings

After pressing the key (1) you are then asked to enter a code number.

Use the keys to enter the sequence 3 1 4 2 5 (according to the lettering shown on screen).

The following screen is then shown:

Common Parameters	
Start Delay	x sec.
Run signal mode	external
Synchro mode	pulser
Lamp mode	4080
Laser mode	AKTIV
Language	English
◀ + - ▲ ▼ ▶	

For navigation and to change values, the following keys are then available at the bottom edge of the screen:

Key	Meaning
◀	Go to previous page or exit the menu.
+	Increase selected value or change setting.
-	Decrease selected value or change setting.
▲	Move cursor selection up.
▼	Move cursor selection down.
▶	Go to next page or exit the menu.

Menu: General device settings

Start Delay

Display and option to input start delay for all channels, in seconds.

Specifying a start delay is very important: the faded-out laser light barriers can only become active when the machine has reached its normal final speed.

The start delay can be adjusted between 0 (switched off) and 99 seconds.

Once the machine has started, the connected channels are not active during the start delay time.

Synchro mode

Display and option to change fade-out, for synchronising the monitoring system with the machine speed.

Fade-out affects all laser light barriers that are configured for shed monitoring.

When the function “**Pulser**” or “**Signal**” is configured, the following speeds apply for the operation of the control unit:



The speed at which **machine in operation** is detected is **>170rpm**.

The speed at which **machine at a standstill** is detected is **<140rpm**.

If the “**Reset**” function is configured, then voltage must be present at the clear input during normal operation of the machine (machine running). Voltage must not be present at this input during creep speed operation or when the machine is at a standstill.

Setting	Function
Pulser	Fade-out is controlled dynamically by a pulse generator. The faded-out area is shown and configured on the control unit.
Signal	Fade-out is achieved using an external dynamic control from the machine. The faded-out area is determined using this external dynamic control.
Reset	No fade-out occurs. The “Pulse” socket is used as a clear input.

Menu: General device settings

Lamp mode

Display and option to change the method used to show the external indicator lamp.

The display mode can be switched between “4080” and “4035”. Please select the required mode by consulting the following table.

	Lamp – mode 4080	Lamp – mode 4035
On and steady	Machine is at a standstill. The machine was not switched off by the monitoring system.	Machine was switched off by the monitoring system.
Off	a) Control unit is switched off. b) Machine is in operation.	All other operating states.
On and flashing	a) Machine was switched off by the monitoring system. b) Monitoring system is running in test mode.	

Laser mode

Display and option to change the automatic laser switch-off with the machine at a standstill.

If you have activated automatic laser switch-off, then the lasers are switched off when the machine is at a standstill. In this case, an activated laser light barrier can only be adjusted or inspected if you switch the system to test mode.

Automatic laser switch-off affects all connected and activated laser light barriers.

The function for the automatic laser switch-off is switched between “ACTIVE” and “NOT ACTIVE”.

Language

Option for selecting a user language.

Please use the (+) and (-) keys to select one of the available languages.

If the specific required language is not available, please select another that you can use as a working language.

Menu: Channel parameters

Menu: Parameters for channel x

After pressing key (2) "MENU", the following screen is shown for the channel **previously** selected with the cursor:

Parameters Channel x		
Laser level	xxx	%
Noise level	xxx	%
Switch signal	xxx	%
Channel status	ACTIVE	
Switch level	xx.x	%
Stop counter	xxx	
◀ + - ▲ ▼ ▶		



The items **Laser level**, **Noise level** and **Switch signal** are read-only indicators, and cannot be selected or changed with the cursor.

For navigation and to change values, the following keys are then available at the bottom edge of the screen:

Key	Meaning
◀	Go to previous page or exit the menu.
+	Increase selected value or change setting.
-	Decrease selected value or change setting.
▲	Move cursor selection up.
▼	Move cursor selection down.
▶	Go to next page ⁴ or exit the menu.

⁴ The following indicators and settings depend on the operating mode for the corresponding channel:

Operating mode is "Standard"

If you have entered the password for the menu "General device settings" during the last 10 minutes, you are shown the menu "Channel settings – basic" for the channel as previously selected.

Operating mode is "Synchro"

You are shown the menu for the fade-out settings (graphical and numeric adjustment). If you have entered the password for the menu "General device settings" during the last 10 minutes, you are then shown the menu "Channel settings – basic" for the channel as previously selected.

Menu: Channel parameters

Level indicator

Displays the receiver level for the connected and activated laser light barrier in relation to a pre-configured reference value.

The indicator should show 100% +/-10%. The value 0% is displayed if this channel is not activated.

The **Level** indicator cannot be selected or changed with the cursor.



If you have activated automatic laser switch-off, then the lasers are switched off when the machine is at a standstill. In this case, the indicator can be shown only if you have switched the system to test mode.

Noise indicator

Indicates the noise level with the machine running in relation to the receiver level

and

Indicates the amplitude – when a thread passes through the light barrier (thread signal) – in relation to the receiver level.

The value 0.0% is displayed if this channel is not activated.

These indicators are important for the configuration of the individual switching thresholds.

The **Noise** indicator cannot be selected or changed with the cursor.



If you have activated automatic laser switch-off, then the lasers are switched off when the machine is at a standstill. In this case, the indicator can be shown only if you have switched the system to test mode.

Menu: Channel parameters

Switch-off signal indicator

Displays the switch signal – when a thread passes through a light barrier – in relation to the receiver level.

A switch signal can be displayed only if the following is true:

- a) The channel is activated.
- b) The switching threshold (sensitivity) configured for the channel has been exceeded.
- c) The system is running in normal mode (not in test mode).

The respective indicator is shown until the next time a thread passes through.



The **Switch-off signal** indicator cannot be selected or changed with the cursor.

Adjust status channel

Display and option to change the status channel. The (+) and (-) keys are used to switch the status between “ACTIVE” and “NOT ACTIVE”.

If you have not configured a laser light barrier for this channel, then the option “NOT ACTIVE” must be set.

If a laser light barrier is plugged into this channel and the status “NOT ACTIVE” has been selected, then the transmitter (laser) does not fire.



If you have activated automatic laser switch-off, then the lasers are switched off when the machine is at a standstill. In this case, an activated laser can only fire if you have switched the system to test mode.

Menu: Channel parameters

Adjustment switching threshold

Display and option to input the switching threshold (sensitivity) of the channel in relation to the receiver level.

A value can be input between 0.5% (high sensitivity) and 90.0% (low sensitivity).

To determine the value for the switching threshold, see also: **Noise indicator**

The switching threshold (sensitivity) must be set between the values for the noise level and the thread signal.

Example:

Noise level	1%
Thread signal	10%
Switching threshold	approx. 6%–8%

Stop counter indicator

Displays the machine stops that have been triggered by this channel.

The stop counter is not active until the machine has been running for 10 seconds. Machine run times of less than 10 seconds are not counted.

To reset the stop counter, press the (-) key.

Menu: Fade-out for channel x

This menu is accessed from the “Channel parameters” menu if the operating mode “Synchro” is configured for the corresponding channel.

“Synchro” operating mode should only be used for light barriers that are utilised for shed monitoring.



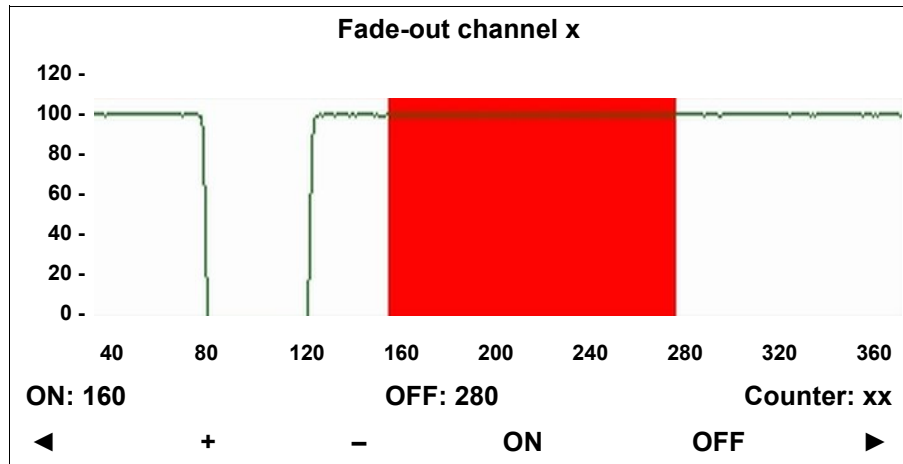
This adjustment can only be made while the machine is running.



Before adjusting the setting, please switch the device into test mode. Once the correct area has been adjusted for all faded-out channels, you can then switch test mode off again.



If you have activated external fade-out (“Signal” setting), then the settings “Fade-out ON” and “Fade-out OFF” will be ignored by the control unit. These values are determined by the external fade-out function.



In this example, the faded-out area (shown in red) has **not** yet been correctly adjusted.

The figure shows the receiver signal curve during one machine rotation (360°).

In this example the shed change takes place between approximately 80° and 120°. Within this range, the receiver level drops from approximately 100 to virtually 0, since the light beam from the light barrier is covered almost completely by the threads as they cross over.

Fade-out must therefore be set for the entire range of this shed change. Please note that, for each shed change, changes can occur provoked by threads appearing earlier and/or later. As a result, the faded-out area should be set to be slightly larger than the area shown here.

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Menu: Fade-out for channel x

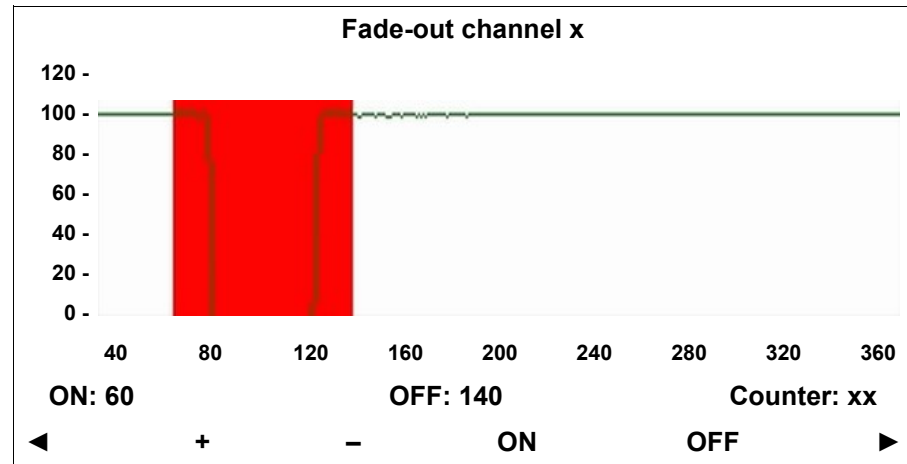
For navigation and to change values, the following keys are then available at the bottom edge of the screen:

Key	Meaning
◀	Go back one page.
+	Increase the selected value.
-	Decrease the selected value.
ON	Set the start of the faded-out area.
OFF	Set the end of the faded-out area.
▶	Go to next page.

To set the start of the faded-out area, press the **ON** key. The value next to the ON indicator is highlighted in blue. Use the **+** and **-** keys to change the value so that an area of the curve is covered **before** the receiver signal starts to drop off. In this example, this setting is made at 60°.

To set the end of the faded-out area, press the **OFF** key. The value next to the OFF indicator is highlighted in blue. Use the **+** and **-** keys to change the value so that an area of the curve is covered **after** the receiver signal has returned to its normal value. In this example, this setting is made at 140°.

In case that faults are detected, provoked by threads appearing earlier and/or later, these faults must be covered by the faded-out area as well.



Counter indicator

The correct function of the fault counter can be checked here. The configuration of the fault counter is described on the following pages.

PROTECHNA LASERSTOP 4182 thread break detector for weaving machines

Menu: Fade-out for channel x

After pressing key (▶), the following screen is shown for the numeric adjustment of fade-out:

Fade Out channel : x	
Fault counter	x
Break counter	x
Fade out ON	xxx deg.
Fade out OFF	xxx deg.

For navigation and to change values, the following keys are then available at the bottom edge of the screen:

Key	Meaning
◀	Go back one page.
+	Increase the selected value.
–	Decrease the selected value.
▲	Move cursor selection up.
▼	Move cursor selection down.
▶	Go to next page ⁵ or exit the menu.

⁵ If you have entered the password for the menu “General device settings” during the last 10 minutes, you are shown the menu “Channel settings – Basic” for the channel as previously selected.

Menu: Fade-out for channel x

Fade out ON / Fade out OFF

If you are familiar with the values for the faded-out area, then you can set them here numerically without needing to use the graphical indicators.

This input field also means that small corrections can be made directly without needing to use the graphical indicators.

Fault counter

Accidental shutdown of the machine as a result of threads hanging briefly in the shed is prevented by the fault counter function. The value displayed indicates how many times a fault needs to be consecutively registered before the machine is shut down.

The setting is very dependent on the behaviour of the threads or weaving machine. A setting of 3–4 has proven useful in many cases. However, the exact setting can be determined only by empirical values gained while operating the system.

Values can be input between **1** (immediate machine shutdown) and **100**.



The value for the fault counter cannot be set higher than the value for the break counter.

Please note that by increasing the value for the fault counter, the response time for this channel is correspondingly extended.

Break counter

The value displayed indicates the number of shed changes during which the fault counter should be active. Setting a value that is twice the fault counter value has proven useful in many cases. However, the exact setting can be determined only by empirical values gained while operating the system.

Values can be input between **1** (immediate machine shutdown) and **100**.



The value for the break counter cannot be set lower than the value for the fault counter.

Please note that clamping threads sometimes only occur with every second shed movement. If you set a number of shed changes that is too low in this case, then the fault counter cannot work properly.

Example		
Fault counter	Break counter	Machine stops at
3	6	3 faults during 6 shed changes

Channel settings – Basic

How to access this menu:

- a) If you are in the “Channel parameters” or “Channel fade-out” menu, press the (►) key on the last page of the menu and have entered the password for the menu “General device settings” during the last 10 minutes.
- b) If you have not yet entered the password for the menu “General device settings”, then you can return to the start screen by pressing the (►) key.

Now press the key (1). You are now asked to enter a code number.

Use the keys to enter the sequence 3 1 4 2 5 (according to the lettering shown on screen).

You are now in the menu “General device settings”. To exit this menu, use the (◀) key. You can then access the menu “Channel settings – Basic” as described under a).

For navigation and to change values, the following keys are then available at the bottom edge of the screen:

Key	Meaning
◀	Go back one page.
+	Increase selected value or change setting.
–	Decrease selected value or change setting.
▲	Move cursor selection up.
▼	Move cursor selection down.
►	Exit the menu.



The **Channel** item is an indicator only and therefore cannot be selected or changed with the cursor.

Channel settings – Basic

Channel	x
Mode	SYNCHRO
Response Time	4

◀
+
–
▲
▼
►

Channel settings – Basic

Channel indicator

Shows the selected channel for which the “Channel settings – Basic” can be currently checked or changed.



The **Channel** item is an indicator only and therefore cannot be selected or changed with the cursor.

Operating mode

All of the functions described in this manual relate to the operating mode “**STANDARD**”, for thread monitoring at the yarn infeed, or the operating mode “**SYNCHRO**”, for thread monitoring in the weaving sheds. These settings have been set at the factory or when commissioning the system.

If you change the settings for the operating modes, then the system may not work correctly in certain circumstances.



Please change the operating modes only if absolutely necessary – for example, when the control unit needs to be used on a different machine.

The following operating modes are available:

STANDARD Operating mode for thread break detection on weaving machines at the warp infeed. The connected laser light barriers monitor the yarn sheet continuously while the machine is running.

DUO

Basic functionality as for **STANDARD**. To reduce false stops on machines that produce a lot of fluff, two laser light barriers are attached parallel to the yarn sheet per channel.

If a broken thread falls out from the yarn sheet, this thread interrupts both laser light barriers at almost the same time. The machine is switched off only if the thread interrupts both light barriers within a configurable time window.

SYNCHRO

Operating mode for monitoring in the weaving sheds, so as to shut down the weaving machine if clamping threads or nests are detectable in the open shed.

WEFT

Monitoring here is typically performed on weft insertion machines at the warp infeed or alternatively as weft monitoring. The laser light barriers at the warp infeed monitor the yarn sheet continuously while the machine is running. The laser light barriers for the weft insertion threads monitor the threads for completeness and pattern.



Please note that this operating mode is designed exclusively for warp knitting machines. This operating mode is not suitable for weaving machines.

Channel settings – Basic

Response Time

By changing the light barrier response time, this offers the option of reducing external, optical factors that can have a negative impact on the evaluation of light barrier signals. These faults can be caused by xenon warning lamps, for example.

To make the system less sensitive to these kinds of external factors, increase the value to “5” and check to confirm that this setting is now adequate. If not, you should increase the value to “6” (etc.).

Once you have found a satisfactory setting, you should check to confirm that a thread can still be detected by the system. If the value for the response time is set too high, it is possible that a thread can no longer be reliably detected.



Please always change the value only by one step at a time and then check to confirm that the setting is already adequate.
The normal setting for the response time is “4”.

For your notes

Menu: Diagnostic signals

Menu: Diagnostic signals

After pressing key (12) on the start screen, the following screen is shown:

Diagnostic signals	
Lamp output	O
Run Signal LV	O
Stop Signal LV	O
Pulser	O
Machine RPM	0 / min

This page displays the functions for various signals. As these are indicators only, the items cannot be selected or changed with the cursor.

For navigation, the following keys are then available at the bottom edge of the screen:

Key	Meaning
◀	Go to previous page or exit the menu.
▶	Go to next page.

The indicators [O] are either green and steady or red and steady/flashing. Green means that the signal is not active. If an indicator is red and steady or red and flashing (pulse generator), the signal is active.

Lamp output

Signal from warning lamp.

Run Signal LV

Signal at clear input (low-voltage connection).

Stop Signal LV

Signal from switch-off relay (low-voltage connection).

Pulser

Signal from pulse generator. If no pulse generator is installed, the indicator [O] stays green even when the machine is running.

Machine RPM

A pulse generator is required to display the machine speed. If no pulse generator is installed, the indicator stays at 0/min even when the machine is running.

[▶]

The indicators on the following pages are for service use only and are not necessary for the normal operation of the device. Use the keys [▶] or [⏪] to exit these pages.

Control unit 4182 – indicators during operation of the system



The following indicators are displayed in the centre of the start screen.

The indicators continue to be displayed until the machine is restarted or a button is pressed.

Delay

3

Indicator shown after the machine is started. The value displayed counts down to zero. During this time, the connected laser light barriers are not active. This indicator then disappears.

STOP

2

Signal: xx%

One of the connected laser light barriers has shut down the machine. The amplitude of the last switch-off signal is displayed in the "Signal" row.

Fault

1

LEVEL

If the receiver level for a connected and activated laser light barrier drops below 25%, a warning is displayed for this channel. Please check, clean, adjust or replace the corresponding laser light barrier.

Fault

Loss of data

Data loss (EEPROM). Check all settings and readjust as necessary. With the control unit switched on, the machine remains locked out until it is checked.

Fault

Pulser

If the control unit detects an absence of signals from a connected pulse generator, then a warning is displayed. Please check, adjust or replace the pulse generator.



This indicator can only be shown if the reset function is configured to "external" in the menu "General device settings".

Fault

Laser

Channel x

You have incorrectly connected the connection cables from two or more laser light barriers. Please switch off the control unit and plug the connection cables into the correct sockets. Then switch the control unit back on.

Parts of the system

A LASERSTOP 2 4182 monitoring system consists of the following parts:

- A LASERSTOP 4182 control unit
- A mounting bracket for the control unit
- Up to three series 480 laser light barriers ⁶, each consisting of one transmitter and one receiver
- An assembly kit for each transmitter and receiver
- An external indicator lamp, complete with connection cable
- A connection cable for the power supply/the stop contact, 6-pin circular socket ⁷
- A connection cable for each transmitter, RJ45 plug/3-pin circular socket ^{7 8}
- A connection cable for each receiver, RJ45 plug/3-pin circular connector ^{7 8}
- A pulse generator with a connection cable, 4-pin circular connector ⁹
- Assembly panels and assembly material, depending on the machine type and the purchase order

⁶ For the LASERSTOP 4182 K-3 (3-channel version). One or two series 480 laser light barriers for the LASERSTOP 4182 K-2 (2-channel version).

⁷ The cable lengths depend on the respective machine type for which the monitoring system has been ordered.

⁸ The connection cables are wired differently and can therefore be used either only for the transmitters or only for the receivers.

⁹ If the fade-out is achieved using an external dynamic control by the machine, only this connection cable is required.

PROTECHNA LASERSTOP 4182 thread break detector for weaving machines

General installation instructions/installation of control unit and pulse generator

Installation

Installation and start-up of the PROTECHNA LASERSTOP 2 4182 monitoring system for weaving machines normally follows the sequence as given below:

- 1) Install control unit.
- 2) Install pulse generator.
- 3) Make electrical connections.
- 4) Install laser light barrier(s).
- 5) Adjust laser light barrier(s).
- 6) Set operating data.
- 7) Check to confirm functionality with machine running.

Installation service/servicing

We strongly recommend having at least the initial installation of PROTECHNA devices completed by one of our service technicians. This ensures that the customer enjoys professional device installation and adjustment as well as initial training for correct use.

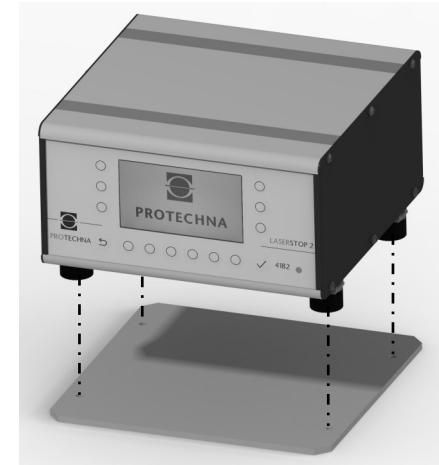
Service technicians are also available on request to carry out inspections of your PROTECHNA LASERSTOP 2 4182 monitoring system.

Often, however, minor issues can be clarified by a phone call or an email, without a technician needing to make a site visit.

Installation of LASERSTOP 4182 control unit

The installation location for the control unit should be sufficiently stable, as the unit could be severely damaged by powerful shocks, e.g. as caused by it falling over.

The control unit is typically installed on the machine's switch box. The supplied retaining plate may be required for installation.



Installation of pulse generator

The pulse generator is installed at a suitable place on the machine, where the machine rotations are present in a 1:1 ratio and where a short pulse can be recorded for each rotation of the machine.

The working range for the pulse generator is between 0mm and 1.6mm.

External fade-out

If you use an external dynamic control from the machine instead of the pulse generator, only the connection cable needs to be plugged into the back of the control unit.

Installation of series 480 laser light barrier



Even though the output from the transmitter of the laser light barrier is not dangerous, direct eye contact with the laser light beam should be avoided.



When installing the laser light barriers, mark the extension cables for the transmitters and the receivers, so as not to mix up the cables when plugging them into the control unit.



During installation, take care to ensure that no loose threads can pass through the light beam from the laser light barriers while the machine is operating normally. Loose threads can cause false stops.

The transmitters and receivers for the laser light barriers are attached to the centre of the open shed resp. parallel to the yarn sheet on the warp infeed.

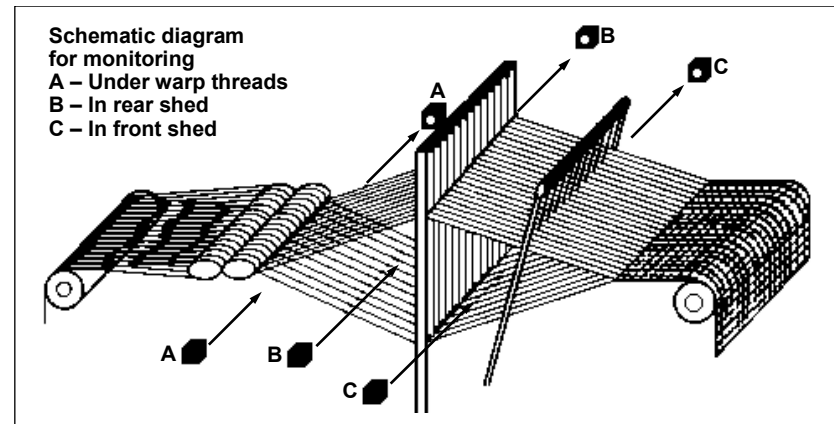
If a broken thread falls out from the yarn sheet or a nest is formed, then this event must result in a brief interruption to the laser light beam.

The side of the machine that the transmitters or receivers are installed on depends primarily on available space as well as the extension cables supplied. However, please ensure that all transmitters and receivers are each mounted on the same side of the machine.

For most machine types, you will first need to install a retaining plate (included in delivery) onto the machine frame. The transmitters and receivers are then attached to this retaining plate.

The following figures illustrate the assembly and installation of the laser light barriers.

The transmitters should be adjusted to the intended location of the receivers during installation. To make adjustment easier, it is helpful to have the electrical connections completed before installing the transmitters. As the light beam of the transmitters is visible, the beam path can be checked and corrected after switching on the control unit.



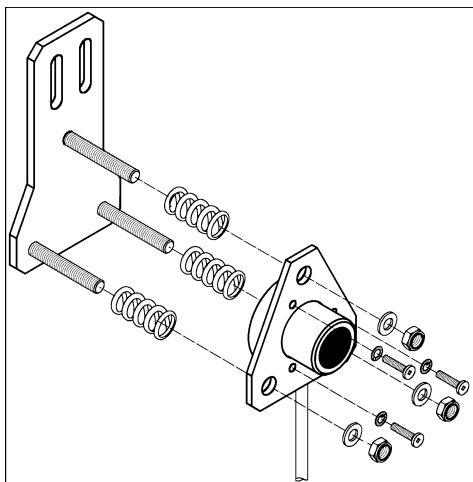
Installation of series 480 laser light barrier

Transmitter 480 with movable installation jig

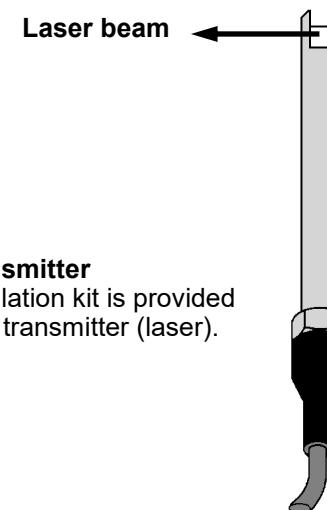
First of all, the mounting holes for the installation jig must be drilled into the retaining plate on the machine frame. Use the base plate as a drilling template before installing the transmitter.

Make sure that the nuts for later adjustment of the transmitter remain accessible.

Tighten all of the nuts so that the springs are almost completely pressed together.



483 transmitter



483 transmitter

An installation kit is provided for each transmitter (laser).

Installation of series 480 laser light barrier

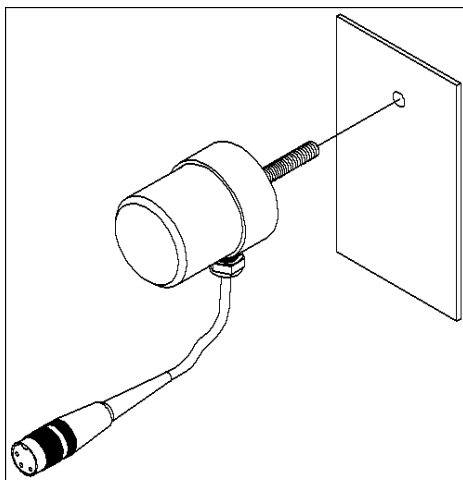
480/485 receiver

When installing the receivers, make sure that the deviation from the transmitter light beam is no more than $\pm 5^\circ$.

The receivers can already be screwed fully tight, as they do not need to be adjusted further during the later adjustment of the laser light barriers.

First of all, the mounting holes for the installation jig must be drilled into the retaining plate on the machine frame.

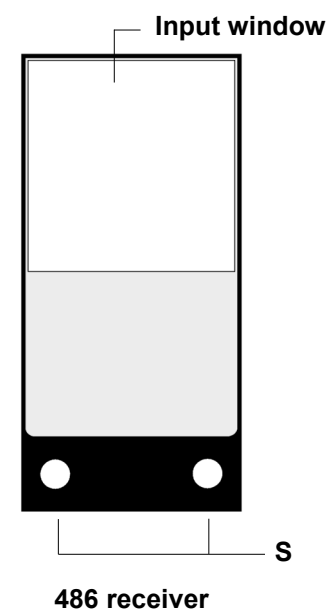
The receivers are screwed into place using the supplied nuts.



486 receiver

The receivers are screwed into place using the supplied bolts.

(S = fixing holes)



Adjustment of series 480 laser light barrier



Even though the output from the transmitter of the laser light barrier is not dangerous, direct eye contact with the laser light beam should be avoided.



Before adjusting the laser light barrier, the control unit must be electrically connected and all of the cables from the light barriers must be plugged into the control unit. The channels for the connected light barriers must be activated.

The supplied adjustment tool is required for adjusting the laser light barrier. Attach this adjustment tool to the receiver.

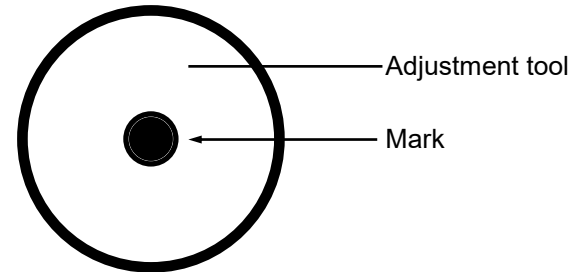
Switch on the control unit. Once initialisation of the system is complete, the light barrier transmitter (laser) must fire.

Adjust the transmitter so that the laser light beam hits the centre of the receiver lens. This position is indicated by a white mark on the adjustment tool.

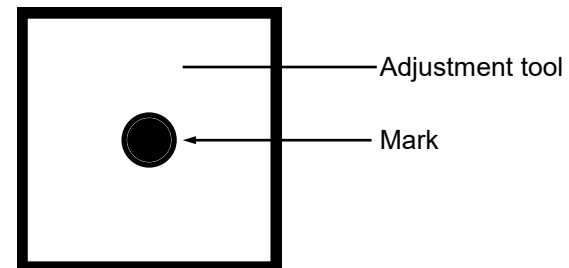
The receiver does not need to be adjusted.

To adjust additional light barriers, proceed as described above.

480/485 adjustment tool



486 adjustment tool



Functional test



Before you can check the monitoring system, you must have entered the operating parameters for the system and the connected laser light barriers.



Please note that the monitoring system does not shut down the machine if the system is switched to test mode.

At this point in time, the monitoring system must have been fully installed, electrically connected, adjusted and set. If necessary, please work through the following checklist:

- Are the channels activated for the connected laser light barriers?
- Are the receiver levels correct for the connected laser light barriers?
- Are all cables plugged in correctly and the connections screwed into place?
- Have you adjusted the sensitivity for each light barrier?
- Is the area for the fade-out correctly adjusted?
- Is the switch-on delay correctly adjusted?

Switch the control unit to test mode (TEST key).

Switch on the machine and check the individual noise level for each of the connected laser light barriers.

If a noise level is too high, please check the adjustment for the corresponding light barrier. The light beam must **not** leave the surface of the receiver lens.

If everything is okay, please switch the system back to normal mode by switching off test mode (TEST key).

To check whether the machine is shut down in the event of a thread breakage, please move a thread or test wire (corresponding to the thread thickness of the material to be monitored) through a laser light barrier. The machine should be shut down immediately. Repeat the test for all connected light barriers.

Please note that the laser light barriers that are installed for shed monitoring will shut down the machine with a delay, depending on the settings for the corresponding fault counter.

If the machine does not stop, please recheck the settings for the light barrier and/or the electrical connection on the control unit.

Troubleshooting

Laser (transmitter) not firing

- Supply cable to transmitter not plugged in.
- Supply cable to transmitter not plugged in correctly.
- Channel not activated.
- Faulty laser.

Deviation of receiver level indicator greater than -10%

- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Light barrier misaligned.
- Lenses on light barriers dirty.
- Faulty laser.
- Faulty receiver.

No receiver level indicator

- Supply cable to the transmitter and/or receiver not plugged in.
- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Light barrier not adjusted.
- Light barrier misaligned.
- Light beam blocked.
- Faulty laser.
- Faulty receiver.
- Fault in control unit.

Machine noise higher than thread signal

- Light barrier misaligned.
- Lenses dirty.
- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Loose connector plug to transmitter and/or receiver.
- Loose threads in light beam.
- Faulty laser.
- Faulty receiver.

No thread signal

- Channel not activated.
- Supply cable to the transmitter and/or receiver not plugged in.
- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Faulty laser.
- Faulty receiver.

Level fault indicator channel x

- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Light barrier misaligned.
- Lenses on light barriers dirty.
- The light beam is partially covered when the machine is at a standstill.
- Faulty laser.
- Faulty receiver.

No level present channel x

- Supply cable to the transmitter and/or receiver not plugged in.
- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Channel activated but no light barrier connected.
- The light beam is fully covered when the machine is at a standstill.
- Light barrier not adjusted.
- Light barrier misaligned.
- Light beam blocked.
- Faulty laser.
- Faulty receiver.

Troubleshooting

Machine is not shut down on thread breakage

- System is running in test mode.
- Sensitivity setting is incorrect.
- Channel not activated.
- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Thread has got trapped and has not fallen through the laser light barrier.
- Stop contact not connected correctly.
- Pulse generator faulty.
- Fade-out area adjusted incorrectly.
- Thread breakage occurred during the switch-on delay.
- Fault in control unit.

False stops

- Foreign object in monitoring range.
- Loose threads.
- Sensitivity setting is incorrect.
- Supply cable to the transmitter and/or receiver not plugged in correctly.
- Connector plug from transmitter and/or receiver not screwed into place.
- Light barrier misaligned.
- Lenses on light barrier dirty.
- Incorrect electrical connection.
- Pulse generator faulty.
- Fade-out not activated.
- Fade-out area adjusted incorrectly.
- Faulty laser.
- Faulty receiver.
- Fault in control unit.

For your notes

For your notes

Electrical connection

Power supply (power socket)

The control unit is connected to DC voltage of between 15V and 48V or AC voltage of between 15V and 35V at wires 1 (white) and 2 (brown).

Polarity is unimportant in the case of DC voltage.

The shielding on the power cable must be connected to the earth on the switch box.

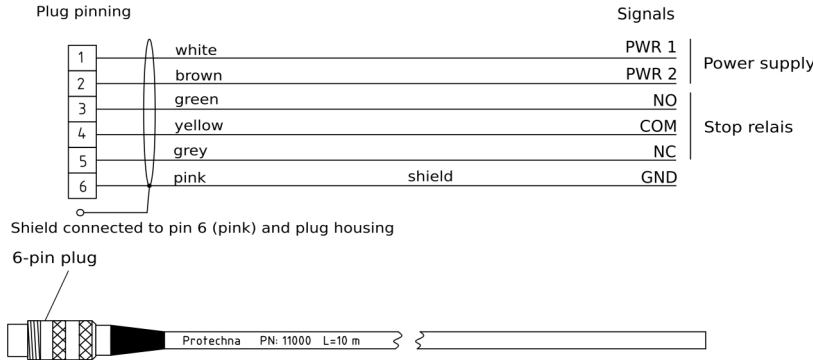
Stop contact (power socket)

Wires 3 (green), 4 (yellow) and 5 (grey) terminate in a volt-free relay contact in the control unit. This contact is activated in the event of a fault.

Wires 3 and 4: make contact.
Wires 4 and 5: break contact.

Please connect the stop contact that is required for your machine.

Pin-out for “Power” cable



External indicator lamp (LAMP socket)

Please plug the external indicator lamp into the LAMP socket.

The maximum wattage for this lamp output is 5W.

Pulse input (pulse socket)

This socket depends on the monitoring mode configured for the laser light barriers and on the use of an external pulse generator or dynamic control from the machine.

A) All channels, standard monitoring (mode: STANDARD):

A volt-free contact must be connected to wires 3 (green) and 4 (yellow), and this contact must be closed during normal operation of the machine (machine running).
Wires 1 (white) and 2 (brown) must be connected together.

B) One channel with fade-out functionality (mode: SYNCHRO):
Variant 1:

Plug the connection cable from the external pulse generator directly into the pulse socket. Once the machine is started, the control unit can now identify that the machine is in operation by the presence of the pulse.

Variant 2:

Instead of using the pulse generator, the monitoring system can also be synchronised with the machine by using an external dynamic control from the machine.

Voltage must not be present at wires 1 (white) and 3 (green) during the fade-out period.

Voltage must not be present at this input during creep speed operation or when the machine is at a standstill.

Electrical connection

Pin-out for “Pulse” cable

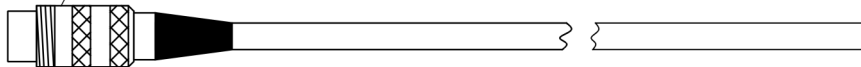
Plug pinning

1	white	SYNC1
2	brown	+12V
3	green	SYNC3
4	yellow	GND



Shield connected to plug housing

4-pin plug



For your notes

PROTECHNA LASERSTOP 4182 thread break detector for weaving machines

Technical data

Control unit 4182	
Ambient conditions	
Operation	0°C to 50°C
Humidity	max. 90%rH, non-condensing
Storage	-20°C to +70°C
Power supply	
Voltage range	15–48VDC 15–35VAC
Power consumption with 3 light barriers and warning lamp	≤20VA
Fuse protection	
Power supply (F1)	2A slow-blow
Stop contact (F2)	2A slow-blow
Stop contact	
Relay output	$U_{\max} = 30\text{VAC/DC}$ $I_{\max} = 2\text{A}$
Dimensions	
Width/height/depth	225mm/140mm/250mm
Weight	2.8kg
IP rating	IP40

Pulse generator	
Ambient conditions	
Operation	0°C to 50°C
Humidity	max. 95%rH
Storage	-20°C to +70°C
Dimensions	
Length	70mm
Ø Body	12mm
Ø incl. strain relief and cable connection	85mm
Nominal switching distance	2mm
Measurement principle	Inductive
Weight	0.15kg
IP rating	IP54

PROTECHNA LASERSTOP 4182 thread break detector for weaving machines

Technical data

Transmitter		
Ambient conditions		
Operation	0°C to 50°C	
Humidity	max. 95% rH	
Storage	−20°C to +70°C	
Power supply		
via control unit 4182	8VAC	
Power consumption	<0.5VA	
Laser (Class I)		
Wavelength	660nm +/-10nm	
Beam Ø	<5mm	
Beam divergence	0.08mrad	
Modulation frequency	24kHz	
Dimensions		
Type	480	483
Length	31mm	110mm
Ø Body	40mm	10mm
Ø incl. strain relief and cable bending radius	80mm	
Length incl. strain relief and cable bending radius		160mm
Weight	0.1kg	0.08kg
IP rating	IP65	

Receiver			
Ambient conditions			
Operation	0°C to 50°C		
Humidity	max. 95% rH		
Storage	-20°C to +70°C		
Dimensions			
Type	480	485	486
Length + Threaded pin	48mm + 25mm	68mm + 25mm	
Ø Body	40mm	58mm	
Ø incl. strain relief and cable bending radius	80mm	98mm	
Length/ width			68mm 33mm
Height at fixing part			10mm
Height at input window			4mm
Weight	0.12kg	0.20kg	0.07kg
IP rating	IP65		

Laser classification

Device designation: Laser light barrier

Type: LLi 480

Laser type: Semiconductor laser 660nm

The power of the laser used in this system equals

Class I
according to DIN EN 60825-1

VDE 0837
Part 1

Maximal laser power exiting device: 0.22mW

Protechna Herbst GmbH & Co KG, Ottobrunn, 20 Jan 1995
Development



Dipl. Ing. W. Bühler
Head of Development

Disclaimer: No liability is accepted in the event of misuse, or if the device is structurally modified or tampered with.

PROTECHNA LASERSTOP 4182 thread break detector for weaving machines

EU Declaration of Conformity

We,

**Protechna Herbst GmbH & Co KG
Lilienthalstrasse 9
85579 Neubiberg
Germany**

hereby declare that the product as designated below meets the basic requirements for safety from EU legislation as a result of its design and form factor, and the product model as placed on the market by ourselves.

This Declaration shall be invalidated by any change to the product made without our prior agreement.

Product designation: **Thread break detector**

Type: **Laserstop**

Product no.: **4182**

Applicable EU legislation:

Electromagnetic Compatibility (EMC) Directive (2014/30/EU)

Low Voltage Directive (2014/35/EU)

Applied harmonised standards, in particular:

DIN EN IEC 61000-6-4:2020-09
Electromagnetic Compatibility (EMC)
Generic standards – Emission standard

DIN EN IEC 61000-6-2:2019-11
Electromagnetic Compatibility (EMC)
Generic standards – Immunity standard

DIN EN 60204-1:2019-06
Safety of machinery
Electrical equipment of industrial machines
General requirements

DIN EN 61010-1:2020-03
Safety requirements for electrical equipment for measurement, control, and laboratory use
General requirements

Applied national standards and technical specifications, in particular:

DIN VDE 0100
Erection of low voltage installations

Manufacturer signature:



Rico Wellnitz

Position of signatory:

Head of Development

Date:

5 Dec 2023

Appendix – DUO operating mode for light barriers



Please note that the operating mode “DUO” can only be used for continuously monitoring channels that normally work in the “STANDARD” operating mode. Channels that work in the “SYNCHRO” or “WEFT” operating modes cannot be operated in the “DUO” operating mode.

To reduce false stops – on machines that produce a lot of fluff, for example – two laser light barriers can be attached parallel to the yarn sheet per monitoring position.

If a broken thread falls out from the yarn sheet, this thread interrupts both laser light barriers at almost the same time. The signals generated are then processed digitally in the control unit.

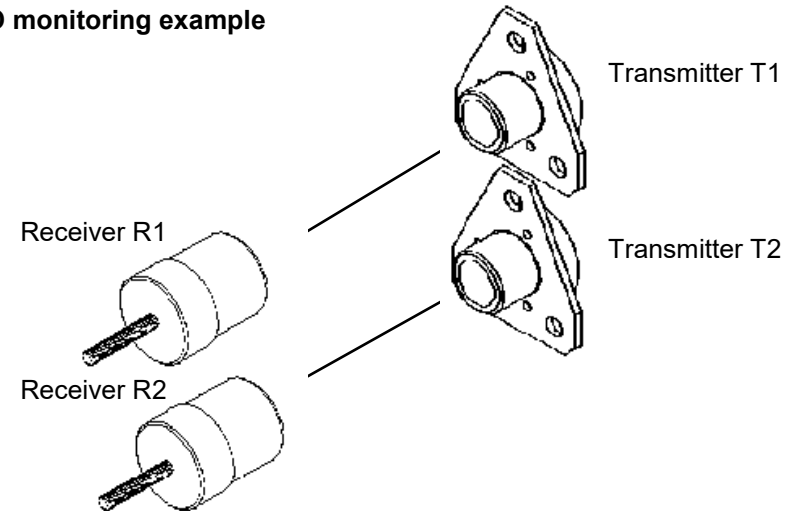
If both signals occur during a configurable time window, the production machine is switched off. If only one of the laser light barriers transmits a signal, however, the machine continues to run.

The laser light barriers are attached in pairs and parallel to the yarn sheet (see figure).



If a broken thread falls out from the yarn sheet, this thread must be able to move through both light barriers on a DUO channel.

DUO monitoring example



Please note that for the 3-channel control unit (4182 K-3), only channel 1 and channel 2 **or** channel 2 and channel 3 are possible as a DUO monitoring position.

Appendix – DUO operating mode for light barriers

The settings for the “DUO” operating mode are made in the menu “**Channel parameters - Basic**” for the respective light barrier. How to access this menu:

- If you are in the “Channel parameters” menu for a channel, press the (▶) key and have entered the password for the menu “General device settings” during the last 10 minutes.
- If you have not yet entered the password for the menu “General device settings”, then you can return to the start screen by pressing the (▶) key.

Now press the key (1). You are now asked to enter a code number. Use the keys to enter the sequence 3 1 4 2 5 (according to the lettering shown on screen).

You are now in the menu “General device settings”. To exit this menu, use the (◀) key. You can then access the menu “Channel settings – Basic” as described under a).

Channel parameters – Basic	
Channel	1
Mode	DUO
Response Time	4
DUO-TIME	x.x sec.
◀ + – ▲ ▼ ▶	

For navigation and to change values, the following keys are then available at the bottom edge of the screen:

Key	Meaning
◀	Go back one page.
+	Increase selected value or change setting.
–	Decrease selected value or change setting.
▲	Move cursor selection up.
▼	Move cursor selection down.
▶	Exit the menu.



The **Channel** item is an indicator only and therefore cannot be selected or changed with the cursor.



The **DUO-TIME** item is available only if the “DUO” operating mode has been activated for this channel.

Appendix – DUO operating mode for light barriers

Channel indicator

Shows the selected channel for which the “Channel parameters – Basic” can be currently checked or changed.



The **Channel** item is an indicator only and therefore cannot be selected or changed with the cursor.

Operating mode

All of the functions described in this appendix relate to the operating mode “**DUO**”. This setting has been made at the factory or when commissioning the system.

If you change the setting for the operating mode, then the system may not work correctly in certain circumstances. This applies in particular if only one light barrier has been assigned a duo function.



Please change the operating modes only if absolutely necessary – for example, when the control unit needs to be used on a different machine.



If you use the operating mode “DUO” for one monitoring position, **2 channels** must always be set to the “DUO” operating mode at a time:
with the 3-channel control unit (4182 K-3), channel 1 and channel 2 **or** channel 2 and channel 3.

Response Time

Please follow the instructions given in the section “**Channel parameters – Basic**” for this setting.



For a duo light barrier configuration, please note that any change to the light barrier response time must be made using identical values for **both** channels.

Appendix – DUO operating mode for light barriers

DUO time



This setting is available only if the “DUO” operating mode has been activated for this channel.

Display and option to input the time window for the DUO function for the light barriers.

To reduce false stops on machines that produce a lot of fluff, two laser light barriers can be grouped together as a single DUO channel per monitoring position.

If a broken thread falls out from the yarn sheet, this thread interrupts both laser light barriers at almost the same time. The maximum period of time in which the thread can pass through both laser light barriers is set by configuring a time window (DUO time).

The time window can be adjusted within a range of 0.2 seconds to 1.0 second. The default setting is 0.5 seconds.

Due to the large number of machine types and materials, a specific value for the time window cannot be given here. Please conduct tests to determine the correct setting for your application.

If the machine does not stop, the DUO time is usually set too short. If false stops occur, the DUO time is usually set too long.



Please note that any change to the DUO time must be made using identical values for **both** channels in a duo light barrier.

Channel indicator for machine stop

If a duo light barrier has switched off the machine, the first channel number in a duo light barrier is always displayed.

Additional information

- Please note that a machine shutdown only occurs if the broken thread has moved through both laser light barriers within the configured time window. If the broken thread moves through only one laser light barrier or moves too slowly through both laser light barriers in a DUO channel, then no machine shutdown can occur.
- If the machine is not shut down even though the conditions have been met for broken thread, please recheck the settings for the light barriers and/or the electrical connection on the control unit.