VANDEWIELE

PROTECHNA

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Working Instructions
PROTECHNA End Break Detector
LASERSTOP 4180 SYNCHRO
For Weaving Machines

PROTECHNA

CE

B-E-0648/07.15/E

The functions described in this handbook refer to the use of the system on weaving machines at the run -in of the warp and at the the weaving shed position.

Please ensure that either the >> STANDARD << operating mode for monitoring the run-in of the warp or the >> SYNCHRO << operating mode for monitoring the weaving shed position is set for all connected and activated light barriers.

If you change the operating mode, the system may not function properly any more. These settings were established prior to delivery or at the time of the installation of the system.

During the normal operation of the system, the screen light is switched off automatically after a pre-set time. This extends the operating life of the screen. To turn on the screen light again, please press any key.

The light remains on in the setting menus, when a warning is displayed or the machine is stopped because a thread break is detected.

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Safety Advice

Before placing the device into operation, please carefully read the following instructions for your own personal safety as well as the operational security of the equipment.

- ► Always observe warnings and other information labels on the control unit or provided in this handbook.
- ► Before any cleaning or to remove or replace an option, the device must always be disconnected from the power supply. For cleaning, no liquid cleaning agent or sprays are allowed, instead only a dry cloth must be used.
- ► Never use the equipment in areas where dangers are present, where water or other liquids could enter the device.
- ► The mounting position for the device must always be stable, as strong vibration could cause the unit to fall and be badly damaged.
- ► Always make sure that the correct voltage rating is used to match the power supply.
- ► Never try to push any objects through any openings in the device, as the interior voltage could cause short circuits or electrical shocks.
- ► With the exception of the detailed information in the instructions, you should never attempt to undertake any repair work yourself, otherwise you could place yourself in danger from contact with high voltage parts.
- ► Regardless of the fact that the laser light channels are not dangerous, direct eye contact with laser beams should be avoided.

The electrical connection must only be carried out by suitably qualified technical personnel.

Before the electrical connection, you must make absolutely sure that there is no danger to come into contact with any parts that might carry live electricity.

Introduction

General

The newly developed laser stop motion device LASERSTOP 4180 for weaving machines is designed to stop the machine immediately if:

a) clasping threads or ”nests” appear in the open weaving shed

and/or

b) broken yarn ends are detected at the run-in of the warp by the laser light channels fitted under and/or above the yarn sheet.

The utilisation of the actual laser technology for the light barriers and an evaluation with the most modern system of signal processing in the control unit has made it possible for the system to be used for a multitude of end uses.

The laser stop motion device LASERSTOP 4180 allows to control working widths of up to 20 metres.

The functions described in this instruction refer for the use of the system on weaving machines at the run-in of the warp and at the the weaving shed position.

The special features of the system are:

- Fast and reliable detection of thread breaks with yarns from as low as 12 dtex
- Various forms of the light barriers for different monitoring positions at a variety of different types of weaving machines
- Visible, safe red-light laser (laser class 1)
- Automatic switching off of the laser when the machine is stopped (selectable)
- Vibration insensitive receiver
- Impulse sensor to synchronise the monitoring device with the machine speed
- Synchronisation of the monitoring device with the machine speed also possible via an external signal
- Control unit with digital signal evaluation and computer supported automatic system control
- 4.3 inch colour screen to display the operating state of the light barriers
- Entry of the operating parameters via robust membrane keypad directly at the control unit
- Software update via USB connection

Introduction

Control Unit LASERSTOP 4180 with Digital Signal Evaluation

The LASERSTOP 4180 control unit contains all the necessary components to run the monitoring device and allows the connection of up to eight*) laser light barriers series 480.

When a thread breakes, the channel number is displayed on the 4.3 inch screen; when a fault occurs, a fault code is displayed, so the state of the system can be seen from far.

All settings are made at a resistant membrane keypad directly at the control unit and are supported by intuitive user prompts on the screen.

The setting of the start and end position for the shed monitoring fade-out range is carried out either directly at the control unit or via an external machine signal.

The software for the monitoring system is contained in a new type of memory chip, so that in case of an eventual update, the new software can be loaded via the USB socket. In this manner, the system is prepared for any future expansion in a most optimum way.

*) as an option. The standard version of the control unit allows the connection of up to four laser light barriers series 480.

Light Barriers Series 480

The light barriers operate using visible red light lasers (660 nm). These diode lasers are known for their long working life and low mechanical sensitivity.

The highly homogenousity of the laser light beam guarantees a constant sensitivity over the full working width. A newly developed measuring system is used in the receiver which due to the excellent performance, provides good results in terms of vibration unaffected sensitivity.

Transmitter and receiver are fitted at the run-in of the warp under the yarn sheet resp. at the centre of the open weaving shed. When a broken end or ”nest” is detected, the laser light beam is disturbed for a short time. This will produce an electronic signal. The signal is then passed through the micro processor inside the control unit and the weaving machine will be stopped.

Impulse Sensor

The impulse sensor is used to synchronise the monitoring device with the machine speed. The impulse sensor has to be mounted at a position on the machine where the revolutions of the machine are at a ratio of 1:1, so that with each revolution of the machine a short impulse can be detected. The impulse sensor works only for the fade-out channels.

External Fade-out

Instead of using an impulse sensor, the synchronisation of the monitoring device can also be carried out via an external signal from the machine. In this case the shed monitoring fade-out range is established with this external signal.

Control Unit 4180 - Front View

Button (⮌)
Pressing this button takes the user back to the start screen directly from any menu level.

Buttons (1) - (12)
The functions of these buttons depend on the available settings and displays. The functions of these buttons are displayed on screen (14).

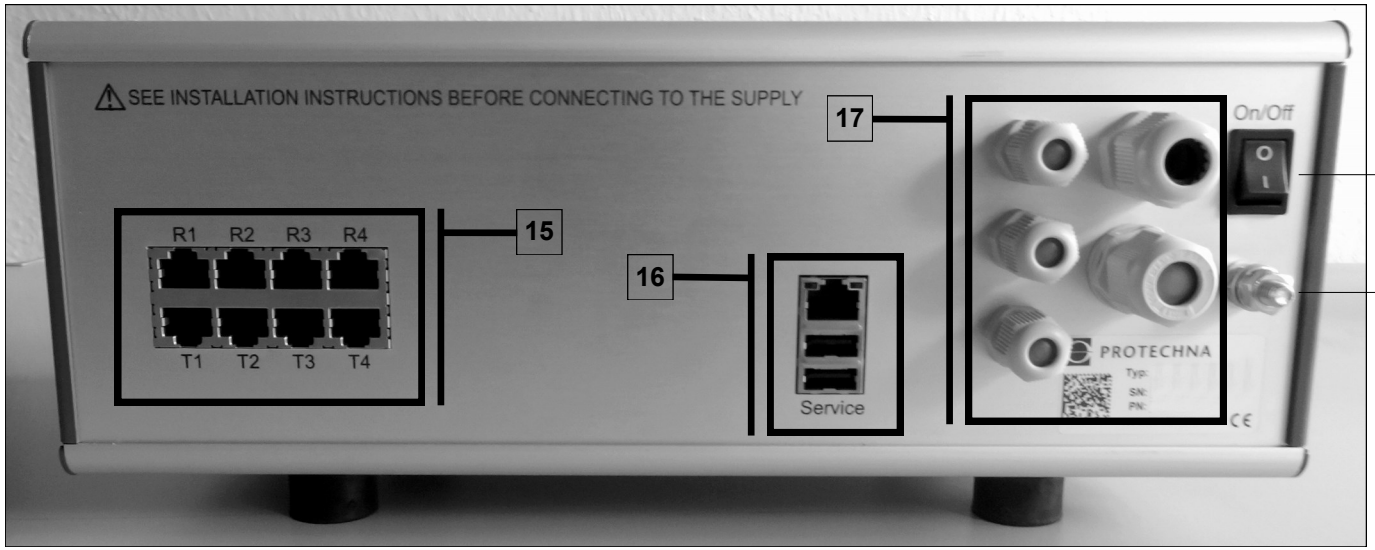
Screen (14)
4.3 inch colour screen displays the operating state of the light barriers and supports the entry of operating parameters.

Button (✓)
Pressing this button confirms changed entries. Changed entries will be discarded and not be adopted by the control unit unless this button is pressed. This button, however, is not used in all of the setup menus.

Status display (13)

Display	Meaning
Lights green	The unit works normally
Flasches yellow	A system fault has been detected
Lights yellow	The unit is conducting a self-test

Control Unit 4180 - Rear View



Terminal panel for the light barriers (15) *)

Sockets **R1** to **R4** for connecting the receiver cables of the laser light barriers and sockets **T1** to **T4** for connecting the transmitter cables of the laser light barriers

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

*) Standard version. Optionally, the control unit is also available for the connection of up to eight laser light barriers series 480.

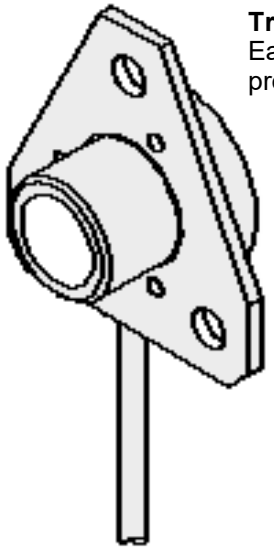
Service terminal panel (16)
USB and LAN terminals. These terminals are normally only used for service purposes.

Connection terminal panel (17)
Connections for the standard power/control cable, the low voltage connection (optional) and the external stop display

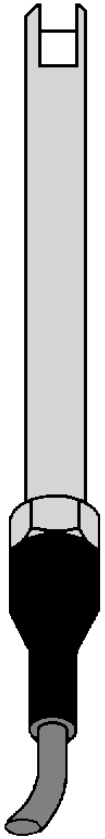
Mains switch (18)
Mains switch to turn the control unit on/off

Ground terminal (19)

Laser Light Channel Series 480

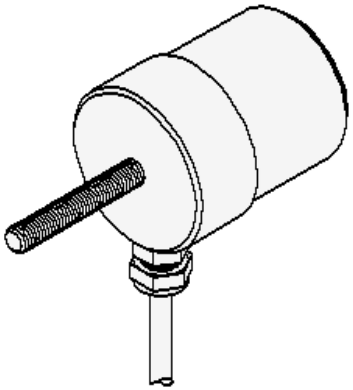


Transmitter 480
Each transmitter (laser) is provided with a mounting kit

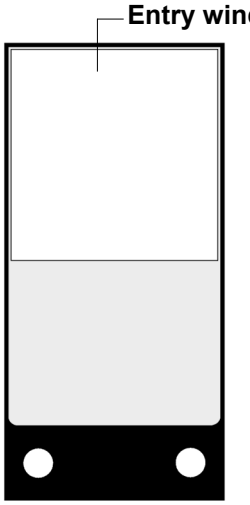


Transmitter 483
Each transmitter (laser) is provided with a mounting kit

Type	Use
480	For all applications without space restrictions
483	Predominating for weaving shed monitoring with high space restrictions



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



Receiver 486
Receiver - narrow style
(front view)

Type	Use
480	For all applications without space restrictions
485	Predominating for wide weaving machines without space restrictions
486	Predominating for weaving shed monitoring with high space restrictions

Notes

General User Information

- ► Before you first turn on the control unit, make certain that the correct required voltage rating for the device matches that of the power supply.
- ► Please make sure that all plug connections are firmly connected to the control unit. Loose connections could have a negative influence on the function of the monitoring system.
- ► Keep the optics of the laser light channels clean. Avoid finger prints on the optics of the laser light channels. Clean the optics using a dry lint free cloth only.
- ► When the monitoring device is switched to test operation, the machine cannot be stopped.
- ► Make sure that during normal operation of the machine that no loose threads hang through the laser light beams. Loose threads could lead to false stops.
- ► During the normal operation of the system, the screen light is switched off automatically after a pre-set time. This extends the operating life of the screen. To turn on the screen light again, please press any key.
- ► **Automatic laser deactivation function**
  When you have activated the automatic laser deactivation function, all activated lasers (transmitters) will be switched off when the machine is stopped. For adjustment or checking purposes the lasers can be switched on when the machine is stopped, by switching the device to its test mode operation.

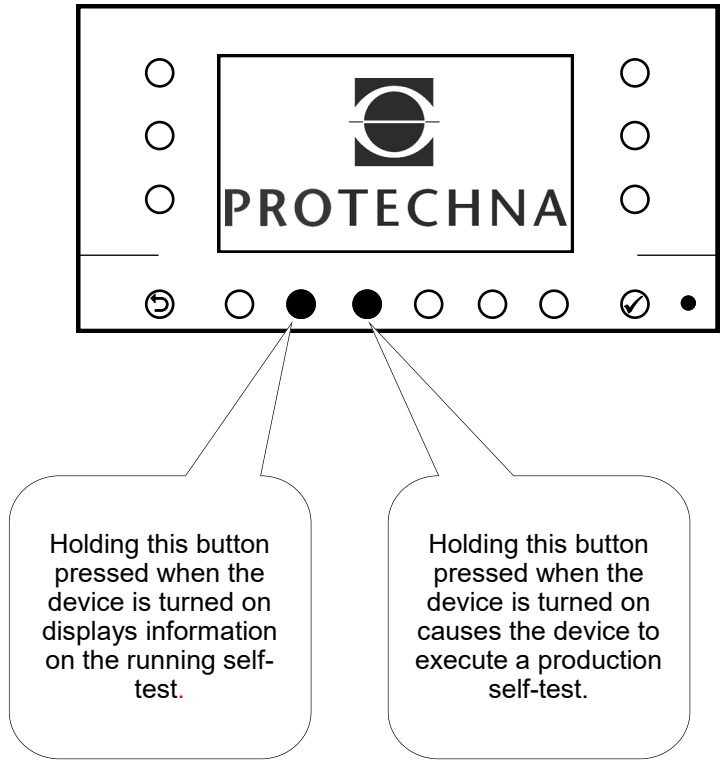
External display lamp

Lamp	Mode 4180	Mode 4035
lit	Machine stopped. The monitoring device did not stop the machine.	The monitoring device did stop machine.
not lit	a) Control unit is switched off b) Machine is in operation	All other operational conditions
flashes	a) Machine has been switched off by the monitoring device b) Monitoring device is in test mode operation	

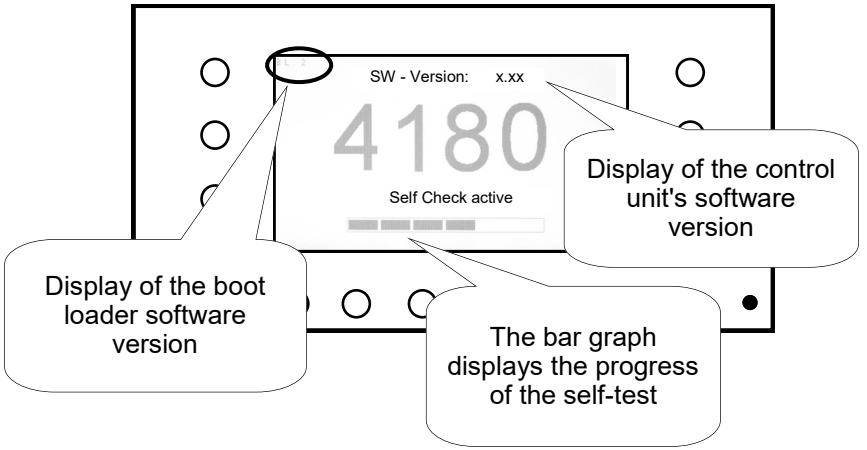
- ► **Impulse sensor**
  The cable of the impulse sensor is connected to the rear of the control unit.
- ► **External fade-out**
  Instead of using an impulse sensor, the synchronisation of the monitoring device can also be carried out via an external signal from the machine. The respective cable is connected to the rear of the control unit.

Displays during system start-up

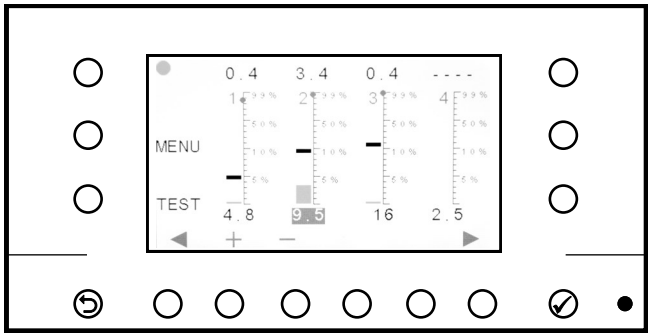
When the control unit is switched on, at first the following screen is displayed:



When no button is pressed the unit performs a self-test.

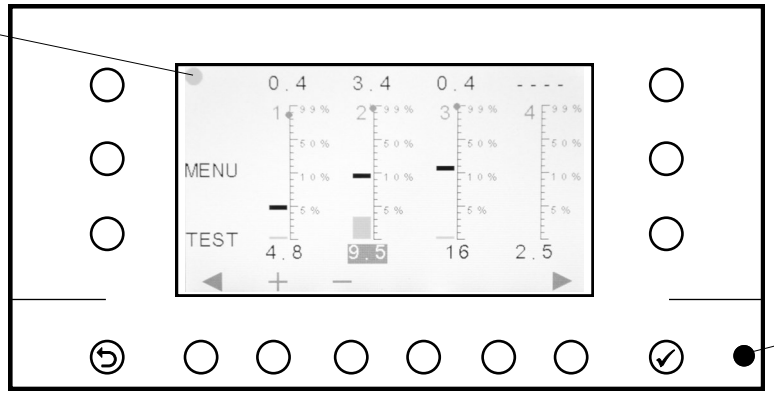


After a successful self-test, the following screen is displayed (start screen):



Start screen – Displays

Colour coded system display

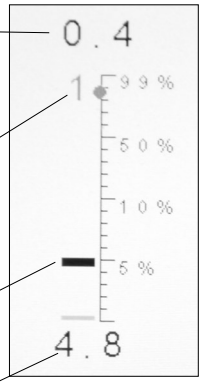


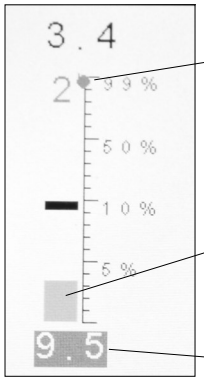
Status display

Noise level display
Numerical display: Noise level in %
- - - - : Channel is deactivated

Channel number

Switching level
Display (graphic and numerical) of the switching level setting (sensitivity)





Receiving level display
This dot should reach approx. 100% +/-10%

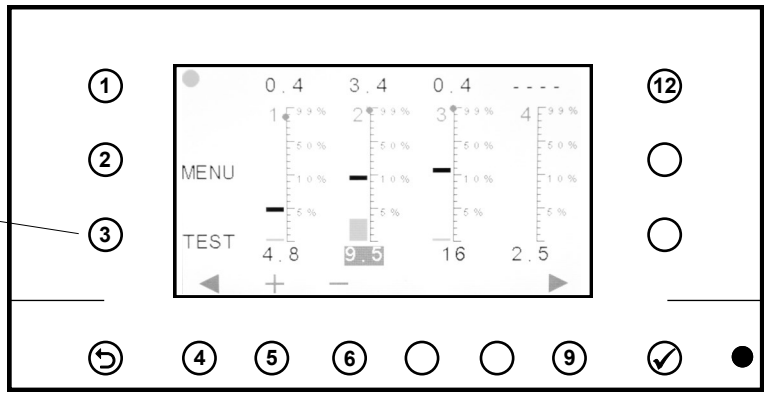
Noise level display
Graphic display: Noise level in %

Position marked blue (cursor)
The settings of the blue marked channel can be changed.

Start screen – Displays

Display	Meaning
Noise level	Display of the noise level for this channel in relation to the receiving level when the machine is running **and** Display of the signal height – when a thread passes the light barrier (thread signal) – for this channel in relation to the receiving level. These displays are also important for setting the different switching levels. Channels not activated are indicated by - - - -. There are no input possibilities.
Receiving level	Display of the receiving level of the connected and activated laser light barrier in relation to a pre-set reference level. The dot on in the display should reach approx. 100% +/-10%. This display is not available when channels are not activated. There are no input possibilities.
Switching level	Display of the switching level (sensitivity) of this channel in relation to the receiving level.
Colour coded system display	**Green**: The system is working normally **Green (flashing)**: The system is working normally; the machine is running **Yellow (flashing)**: The start delay is active **Red**: One of the laser light barriers has stopped the machine **Red (flashing)**: A system fault has occurred
Status display	**Green**: The unit is working normally **Yellow**: The unit is performing a self-test **Yellow (flashing)**: A system fault has occurred: - Module fault 1 and 2 - Loss of data (EEPROM) - Connecting cables of one ore more light barriers are not plugged in correctly.

Start screen – Settings



When the system is switched to test mode operation, the machine cannot be stopped by the monitoring system.

Key	Meaning
1	Opens the menu for the general settings of the device. The menu is password protected.
2	Opens the menu for the light barrier settings of the selected channel
3	Turns the test mode on / off
4	Moves the cursor (position marked blue) to the left

Key	Meaning
5	Increases the value of the setting of the selected channel
6	Decreases the value of the setting of the selected channel
9	Moves the cursor (position marked blue) to the right
12	Opens the menu for displaying different input and output signals and several service displays

Menu Common Parameters

When you press button (1) you are prompted to enter a code number.

Please press the buttons marked 3 1 4 2 5 in succession (according to the caption on the screen).

This opens the following screen:

Common Parameters

Start delay	x sec.
Run signal mode	external
Synchro mode	Pulser
Lamp mode	4180
Laser mode	ACTIVE
Language	English

◄ + – ▲ ▼ ►

The following buttons at the bottom of the screen are available for navigation and for changing the settings:

Button	Meaning
◄	Return to the previous page or exit the menu
+	Increase the highlighted value or change setting
–	Decrease the highlighted value or change setting
▲	Moves cursor up
▼	Moves cursor down
►	Go to next page or exit the menu

Menu Common Parameters

Start delay

Display and possibility of changing the setting for the start delay in seconds for all channels.

The setting of a start delay is important since the laser light barrier for monitoring the weaving shed must not be active before the machine has reached its normal operating speed.

The start delay allows the setting to be made between zero (switched off) and 99 seconds.

After starting the machine, the connected channels are not active for the time of the start delay period.

Run signal mode

Display and possibility of changing the function for the reset input of the control unit.

During the normal operation of the machine (machine is running) there must be a voltage present at the reset input of the control unit. During inching drive or when the machine is stopped there must not be a voltage present. When this electrical connection is possible, then the function >>external<< (standard setting) must be selected.

In exceptional cases where it is not possible to connect the reset input, the control unit can get the information ”Machine in Operation” with the help of a connected impulse sensor or respectively with the signal from an external drive. In this case the function >>internal<< must be selected.

Run signal mode

When the **>> internal <<** function is selected, please observe the following speeds for the operation of the control unit:

The speed at which the **Machine in operation** is recognised is **> 170 rpm**.

The speed at which the **Machine is stopped** is recognised is **< 140 rpm**.

Synchro mode

Display and alteration possibilities for the function of the fade-out method for the synchronisation of the monitoring device with the machine speed.

The fade-out function works for all laser light barrieres, that are used for monitoring the weaving shed.

Setting	Function
Pulser	The fade-out is driven via an impulse sensor. The fade-out range is set and displayed at the control unit.
Signal	The fade-out takes place via an external signal from the machine. The fade-out range is determined via this external signal.

Menu Common Parameters

Lamp mode

Displays and possibility of changing the type of indication of the external display lamp.

The lamp mode can be set between >>4180<< and >>4035<<. Please select the required mode from the table below.

Lamp	Lamp mode 4180	Lamp mode 4035
lit	Machine is stopped. The monitoring device did not stop the machine.	The monitoring device did stop machine.
not lit	a) Control unit is switched off b) Machine is in operation	All other operational situations
flashes	a) Machine has been switched off by the monitoring device b) Monitoring device is in test mode operation	

Laser mode

Display and possibility of changing the automatic laser deactivation whilst the machine is stopped.

When you have activated the automatic laser deactivation, the lasers will be switched off when the machine is stopped. An activated laser light barrier can in this case only be adjusted or checked when you have switched the device to its test mode operation.

The automatic laser deactivation operates on all connected and activated laser light barriers.

The function of the automatic laser deactivation is switched between >>ACTIVE<< and >>NOT ACTIVE<<.

Language

Possibility of changing the user language.

Please select an available language with the (+) and (-) buttons.

If a language is not available, please select another language in which you can work.

Menu Parameter Channel

Menu Parameter Channel x

When you press button (2) MENU, the following screen opens for the channel **previously** highlighted by the cursor:

Parameter Channel x		
Laser level	xxx	%
Noise level	xxx	%
Switch signal	xxx	%
Channel status	AKTIVE	
Switch level	xx.x	%
Stop counter	xxx	

◄ + – ▲ ▼ ►

The positions **Laser level**, **Noise level** and **Switch signal** are displays only and cannot be highlighted with the cursor nor can be changed.

The following buttons at the bottom of the screen are available for navigation and for changing the settings:

Button	Meaning
◄	Return to the previous page or exit the menu
+	Increase the highlighted value or change setting
–	Decrease the highlighted value or change setting
▲	Moves cursor up
▼	Moves cursor down
►	Go to the next page**) or exit the menu

**) The following displays or settings depend on the operating mode of the respective channel:

Operating mode is >> Standard <<
When you have entered the password for the “General unit settings” within the last 10 minutes, the "Channel settings - Basic" menu opens for the previously highlighted channel.

Operating mode is >> Synchro <<
You enter the menus for setting the fade-out range (graphical and numerical setting). Afterwards, when you have entered the password for the “General unit settings” within the last 10 minutes, the "Channel settings - Basic" menu opens for the previously highlighted channel.

Menu Parameter Channel

Display Laser level

Display of the receiving level of the connected and activated laser light barrier in relation to a pre-set reference value.

The display should be 100% +/-10%. When the channel is not activated, 0% is displayed.

The **Laser level** display cannot be selected with the cursor nor can be changed.

When the automatic laser deactivation function is enabled, the lasers are turned off when the machine is not in operation. This display is only available when the system is switched to test mode operation.

Display Noise level

Display of the noise level when the machine is running in relation to the receiving level

and

Display of the signal height – when a thread passes the light barrier (thread signal) – for this channel in relation to the receiving level.

When the channel is not activated, 0.0% is displayed.

These displays are also important for setting the individual switching levels.

The **Noise level** display cannot be selected with the cursor nor can be changed.

When the automatic laser deactivation function is enabled, the lasers are turned off when the machine is not in operation. This display is only available when the system is switched to test mode operation.

Menu Parameter Channel

Display Switch level

Display of the switching signal – when a thread passes the light barrier – in relation to the receiving level.

The switching signal can only be displayed when:
a) the channel is activated
b) the set switching level (sensitivity) of the channel is exceeded
c) the system is in normal operating mode (not in test mode)

The respective display remains on the screen until the next thread passes through the light barrier.

The **Switch level** display cannot be selected with the cursor nor can be changed.

Setting Channel status

Display and possibility of changing the channel status. The status can be switched between >>ACTIVE<< and >>NOT ACTIVE<< with the buttons (+) and (-).

When no laser light barrier is connected to this channel, the option >>NOT ACTIVE<< must be set.

When a laser light barrier is connected to this channel and the status is set to >>NOT ACTIVE<<, the transmitter (laser) does not shine.

When the automatic laser deactivation function is enabled, the lasers are turned off when the machine is not in operation. In this case an activated laser can only lit when the system is switched to test mode operation.

Menu Parameter Channel

Setting Switch level

Display and alteration possibilities for the switching level (sensitivity) of a channel in ratio to the receiving level.

The input range lies between 0,5% (high sensitivity) and 90,0 % (low sensitivity).

To determine the value, also see: **Display Noise level**

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

Example:

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

Display Stop counter

Display of the machine stops caused by this channel.

The stop counter will only be active after 10 seconds of machine operation. Operating times of less than 10 seconds are ignored.

The stop counter can be reset with the button (-).

Menu Fade-out Channel x

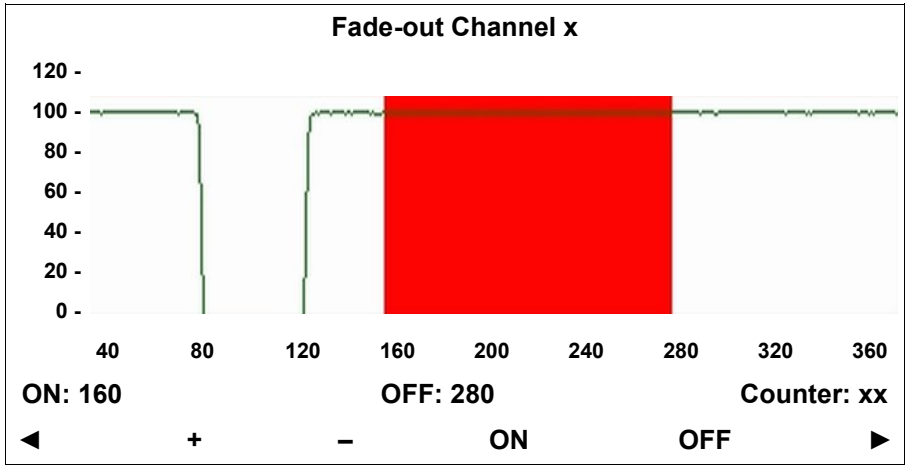
You reach this menu from the "Parameter channel" menu when the operating mode >> Synchro << is set for the corresponding channel. In the other operating modes, this setting is not necessary and therefore not available.

The operating mode >> Synchro << must only be used for light barriers, which are used for monitoring the weaving shed position.

This setting is only possible when the machine is running.

Please switch the device into test mode before you make this setting. After the correct range for all fade-out channels is set, please turn the test mode off again.

When the external fade-out is enabled (setting >> Signal <<), the settings "ON" and "OFF" for the fade-out range are disregarded by the control unit. These values are determined by the external fade-out signal.



In this example, the fade-out range (red mark) is **not yet** properly set.

The graph shows the course of the receiver signal during one machine revolution (360°).

In this example, the weaving shed change takes place between approx. 80° and approx. 120°. In this range, the receiver level drops down from approx. 100 to nearly 0, since the beam of the light barrier is almost completely covered by the intersecting threads.

The fade-out range must be set for the entire duration of the weaving shed change. Please keep in mind that during every weaving shed change alterations could be possible due to rushing ahead and/or lagging threads. Therefore, the fade-out range should be set slightly wider than indicated.

Menü Ausblendung Kanal x

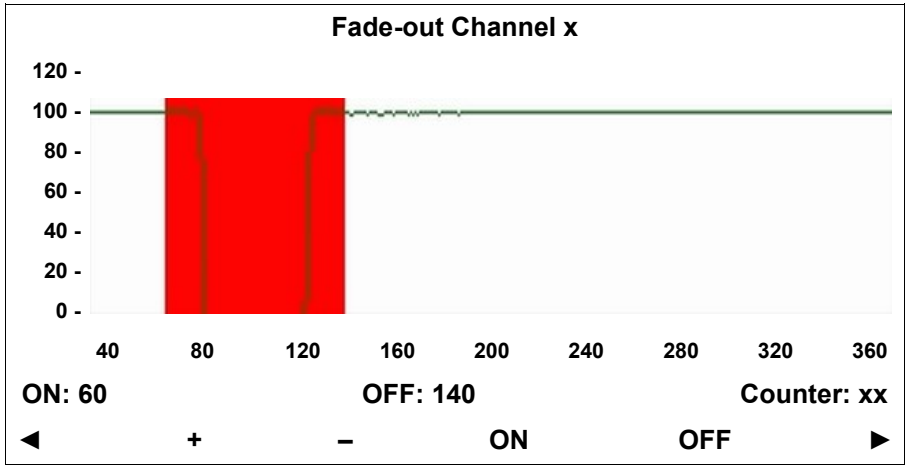
The following buttons at the bottom of the screen are available for navigation and for changing the settings:

Button	Meaning
◄	Return to the previous page
+	Increase the highlighted value
–	Decrease the highlighted value
ON	To set the start of the fade-out range
OFF	To set the end of the fade-out range
►	Go to the next page

To set the start of the fade-out range, please press the button **ON**. The value next to the display ON is marked in blue. Please change the value with the buttons **+** and **-** , so that a range of the curve is set **before** the receiver signal starts to drop down. In this example, this setting is approx. at 60°.

To set the end of the fade-out range, please press the button **OFF**. The value next to the display OFF is marked in blue. Please change the value with the buttons **+** and **-** , so that a range of the curve is set **after** the receiver signal has reached its normal value again. In this example, this setting is approx. at 140°.

If there are any signal disturbances visible caused by rushing ahead and/or lagging threads, these must be included in the fade-out range as well.

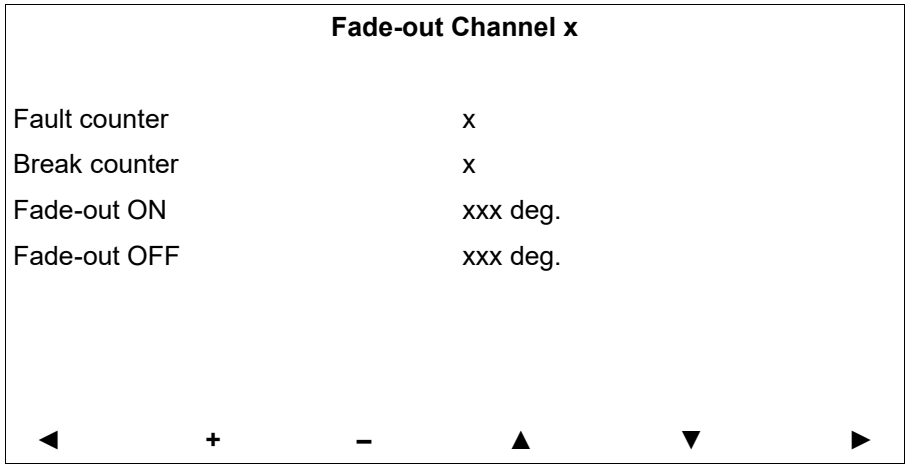


Display Counter

Here the correct function of the fault counter is displayed. The setting of the fault counter is described on the following page.

Fade-out Channel x

After pressing the button (►) you get the following display for the numeric setting of the fade-out range:



The following buttons at the bottom of the screen are available for navigation and for changing the settings:

Button	Meaning
◄	Return to the previous page
+	Increase the highlighted value
–	Decrease the highlighted value
▲	Moves cursor up
▼	Moves cursor down
►	Go to the next page**) or exit the menu

**) When you have entered the password for the “General unit settings” within the last 10 minutes, the "Channel settings - Basic" menu opens for the previously highlighted channel.

Fade-out Channel x

Fade-out ON / Fade-out OFF

If you know the values for the fade-out range, you can set them here numerical without the use of the graphical display.

This entry allows you also to make small corrections directly without having to use the graphical display.

Fault counter

Unintentional stoppages of the machine caused by threads hanging in the weaving shed only for a short moment can be prevented by means of the fault counter. The displayed value shows how often a recurring fault must be recognised before the machine will be stopped.

The setting depends very much on the behaviour of the threads and the weaving machine. However, a setting of 3 - 4 should be sufficient in most cases. The exact setting can only be determined by the empirical value when the machine is in operation.

The setting range lies between **1** (immediate stopping of the machine) and **100**.

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

Please be aware that an increase of the value of the fault counter will extend the reaction time of the respective channel.

Break counter

The displayed value specifies the number of shed changes during which the fault counter should be active. Doubling the value of the fault counter has proven itself in many cases. The exact setting can only be determined by the empirical value when the machine is in operation.

The setting range lies between **1** (immediate stopping of the machine) and **100**.

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

Please note that clasping threads sometimes appear only with every second shed movement. If you set in this case a too low number of shed changes, the fault counter cannot work correctly.

Example		
Fault counter	Break counter	Machine stops in case of
3	6	3 faults during 6 shed changes

Channel Parameter - Basic

This menu can be entered:

a) when you are in the "Parameter channel" menu or "Fade-out channel" menu on the last page, press the (►) button and have entered the password for the “General unit settings” within the last 10 minutes.

b) If you have not yet entered the password for the "General unit settings" menu, the program returns to the start screen when you press the (►) button.

   Now, please press the button (1). You will be prompted to enter a code number.

   Please press the buttons marked 3 1 4 2 5 in succession (according to the caption on the screen)

   Now you are in the "General unit settings" menu. Please exit this menu by pressing the (◄) button. Now you can enter the "Channel settings - Basic" menu as described under a).

Channel Parameter - Basic -

Channel	x
Mode	STANDARD
Response Time	4
Stop Contact	HV

◄ + – ▲ ▼ ►

The following buttons at the bottom of the screen are available for navigation and for changing the settings:

Button	Meaning
◄	Return to the previous page
+	Increase the highlighted value or change setting
–	Decrease the highlighted value or change setting
▲	Moves cursor up
▼	Moves cursor down
►	Exit the menu

The **Channel** display cannot be selected with the cursor nor can be changed.

Channel Parameter - Basic

Display Channel

Displays the selected channel in which the "Channel settings - Basic" can be checked or altered.

The **Channel** display cannot be selected with the cursor nor can be changed.

Mode

All functions described in this handbook relate to the operating modes **>> STANDARD <<** for monitoring the run-in of the warp threads or **>> SYNCHRO <<** for monitoring the weaving shed position. These settings were established prior to delivery or at the time of the installation of the system.

When you change these settings for the operating modes, the system may not work properly.

Please change the operating modes only when you want to use the control unit at another machine with different operating modes.

The following operating modes are available:

STANDARD Operating mode for the monitoring position at the run-in of the warp threads. The connected light barriers monitor the yarn sheet permanently when the machine is in operation.

DUO The basic function is the same as with **STANDARD**. To reduce the frequency of false stops of the machine in environmental conditions with lint and dust, two laser light barriers are set up parallel to the yarn sheet.

When a broken thread moves out of the yarn sheet, it interrupts both laser light barriers almost at the same time. The machine will only be stopped when the thread interrupts both light barriers within an adjustable time window.

SYNCHRO Operating mode for monitoring the weaving shed to stop the machine when clasping threads or ”nests” are detected.

WEFT Normally, the positions monitored at weft insertion machines are at the run-in of the warp threads and the weft thread monitoring respectively. The laser light barriers at the warp thread run-in monitor the yarn sheet permanently when the machine is in operation. The laser light barriers for the weft insertion threads monitor for missing threads and the pattern.

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

Channel Parameter - Basic -

Response Time

By changing the response time of the light barriers external optical interferences affecting the evaluation of the light barriers can be reduced. These interferences can be caused, for example, by xenon warning lamps.

To make the system less sensitive to such interferences, please increase the value to "5" and check to see if this setting is already sufficient. If not, please increase to "6", etc.

When you have found a satisfactory setting, please check to ensure that the system still detects a thread. If the setting of the response time is too high a thread may not reliably be detected.

Always change the setting by one step only at a time and then check whether this is already sufficient. **The standard setting for the response time is 4**.

Stop Contact

Normally, the machine is switched off by a contact of the stop relay in the high-voltage (HV) range.

In some cases this type of stopping the machine may not be available or another device may already occupy it.

The control unit offers an option by which the machine can also be stopped using a relay contact or a semiconductor output in the low-voltage (LV) range.

The following settings are available for the stop output of each channel:

HV The channel triggers only the relay contact in the high-voltage range (stop contact is a changeover contact)

LV The channel triggers the relay contact of the low-voltage relay (stop contact is a changeover contact) and the semiconductor output

HV + LV The cannel triggers all stop outputs

Notes

Menu Signals - Diagnostic

Pressing the button (12) in the start screen opens the following screen:

Signals - Diagnostic	
Run signal HV	O
Run signal NV	O
Stop signal HV	O
Stop signal NV	O
Pulser	O
Machine RPM	0 / min
◄	►

This page displays the functions of different signals. The displays cannot be highlighted with the cursor nor can be changed.

The following buttons at the bottom of the screen are available for navigation:

Button	Meaning
◄	Previous page or exit the menu
►	Next page

The displays [O] light either green or light or flash red. Green means that the signal is not active. When the display lights or flashes red (pulse generator), the signal is active.

Run signal HV
Signal at the reset input (high voltage connection)

Run signal LV
Signal at the reset input (low voltage connection)

Stop signal HV
Signal of the stop relay (high voltage connection)

Stop signal LV
Signal of the stop relay (low voltage connection) and the semiconductor output

Pulser
Signal of a connected impulse sensor. When no impulse sensor is installed the [O] display will remain green even when the machine is in operation.

Machine RPM
An impulse sensor is required for displaying the machine speed. When no impulse sensor is installed the display will remain at 0 / min even when the machine is in operation.

[►]
The displays on the following pages are only intended for service purposes and are not required for the normal operation of the device. Please press the buttons [◄] or [⮌] to exit these pages.

Control unit 4180 – Displays when the system is in operation

The following displays are shown in the center of the start screen.

The displays remain on-screen until the machine is restarted or a button is pressed.

Delay **3**	Display after the machine is started. The displayed value decrements towards zero. During this time the connected laser light barriers are not activated. Afterwards the display is switched off.
STOP **2** Signal: xx%	One of the connected laser light barriers has stopped the machine. The size of the signal that caused the stop is displayed on the line "Signal".
Fault **1** LEVEL	When the receiving level of a connected and activated laser light barrier drops below 25% a warning is displayed for the respective channel. Please check, clean, adjust the setting or replace the corresponding laser light barrier.
Fault **Module fault x**	Module fault 1 and 2. Replace control unit.
Fault **Loss of data**	Loss of data (EEPROM). All settings should be checked and if needed re-set. The machine remains isolated by the switched on control unit until it has been checked.
Fault **Pulser**	When the control unit detects that the signals of a connected pulse sensor are missing, a warning is displayed. Please check, adjust the set-up of the pulse sensor or replace it. This display is only available when the "Reset" function in the "General unit settings" menu is set to >>external<<.
Fault **Laser** Channel x	The connecting cables of one ore more light barriers are not plugged in correctly. Please turn the control unit off, connect the cables to the correct sockets and turn the control unit on again.

List of Components

A monitoring device LASERSTOP 4180 comprises of the following parts:

- a control unit LASERSTOP 4180
- a mounting angle for the control unit
- up to eight*) laser light barriers series 480, each comprising of a transmitter and a receiver
- a set of mounting parts for each transmitter and receiver
- an external display lamp, complete with connecting cable
- a power/control cable, 7 pin [1)]
- an extension cable for each transmitter, 3-pin socket [1) 3)]
- an extension cable for each receiver, 3-pin plug [1) 3)]
- a connecting cable for the low voltage connections and the semiconductor output
- an impulse sensor with connecting cable [2)]
- mounting plates and assembly material, dependent on the machine type and purchasing order

*) as an option. The standard version of the control unit can be used for connecting up to four laser light barriers series 480.

[1)] The cable length depend upon the type of machine the monitoring device has been ordered for.

[2)] When the fade-out is carried out with an external signal from the machine, only the connecting cable is required.

[3)] The pin configuration of the extension cables are not identical and therefore the cables can be used either only for the transmitter or only for the receiver.

Assembly - General Advise / Control Unit and Impulse Sensor

Assembly

The assembly and initial operation of the PROTECHNA monitoring device LASERSTOP 4180 for weaving machines, normally takes place in the following sequence:

1) Mount the control unit
2) Mount the impulse sensor
3) Electrical connection
4) Mount the laser light barrier(s)
5) Adjustment of the laser light barrier(s)
6) Setting the parameters
7) Checking the function when the machine is running

Assembly - Service

We strongly advise that at least the first installation of the PROTECHNA devices are carried out using one of our own service technicians. In this way, the customer can be sure of a competent assembly and setting of the device as well as instruction as to the correct use.

This assembly service is carried out at the lowest possible cost and is normally available everywhere. Overseas customers should make enquiries concerning assembly services with the respective PROTECHNA agent.

Service

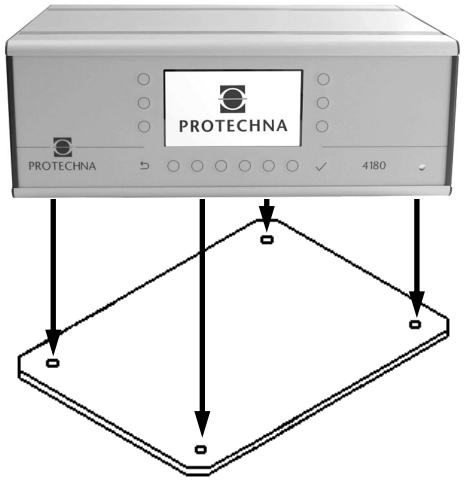
Service technicians are available an special request to check the PROTECHNA monitoring device LASERSTOP 4180 if required.

Generally however, small problems can be rectified by a telephone call or a letter, without the need for a visit by the technician.

Assembly - Control Unit LASERSTOP 4180

The mounting position chosen for the control unit should always be absolutely stable, as any strong vibration or shaking could cause the unit to fall and cause a lot of damage to it.

The assembly of the control unit should be carried out in a position at the switchbox of the machine. It may happen that it might be necessary to make use of the mounting bracket supplied with the unit.



Assembly - Impulse Sensor

The assembly of the Impulse sensor is carried out at a position on the machine where the revolutions of the machine are at a ratio of 1:1, so that with each revolution of the machine a short impulse can be detected.

The working range of the impulse sensor lies between 0 mm and 1,6 mm.

External Fade-Out

In case of using an external signal from the machine instead of the impulse sensor, then only the connecting cable must be connected at the rear of the control unit.

Assembly - Laser Light Barrier Series 480

Regardless of the fact that the laser light barrier transmitter performance rating is not dangerous, direct eye contact with the laser light beam should be avoided.

During the installation of the laser light barriers, please mark the extension cables for the transmitters and the receivers so that they are not mixed up when you connect them to the control unit.

When assembling the light barriers please make sure that during the normal operation of the machine no loose threads interfere with the laser light beam. Loose threads could lead to false stops.

Transmitter and receiver are fitted at the run-in of the warp yarn sheet resp. at the centre of the open weaving shed.

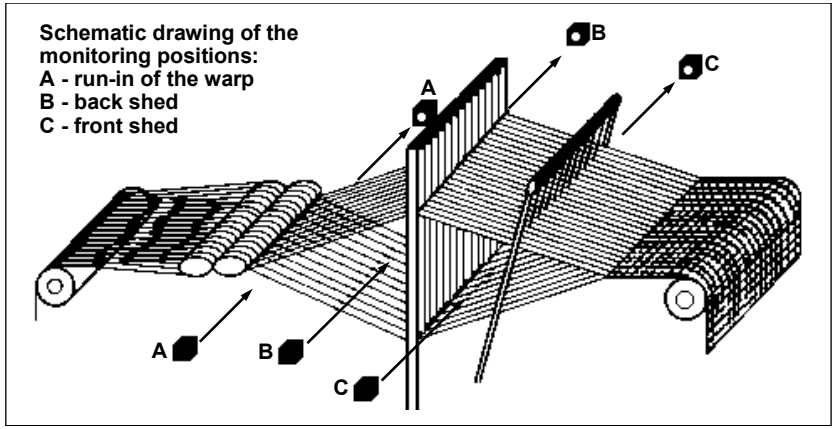
When a broken end or ”nest” is detected, the laser light beam must be interrupted for a short time.

The side of the machine at which the transmitters / receivers are installed depends on the available space and the delivered extension cables. Please note that all transmitters and receivers must be installed on the same side of the machine.

With most machine types, a mounting plate (included in the delivery) must at first be fixed to the machine frame. The transmitters / receivers are then mounted onto that plate.

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

The transmitter should, at this point in the assembly work, be placed in the planned position to match with the receiver. In order to make this setting easier, it may prove helpful - before mounting the transmitter - to carry out the electrical connection. As the light beam from the transmitter is visible, the path of the beam can be controlled and adjusted after the control unit has been switched on.



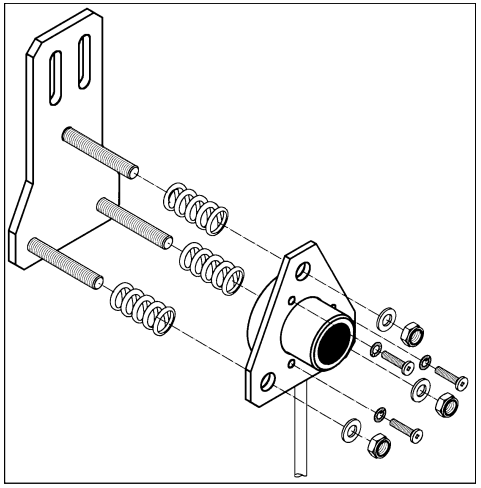
Assembly - Laser Light Barrier Series 480

Transmitter 480 with adjustable assembly device

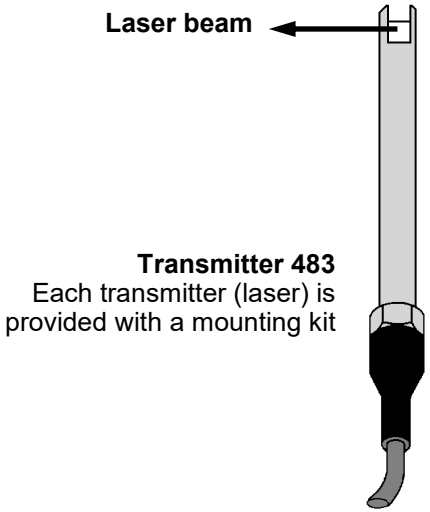
At first the mounting holes for the assembly device must be drilled in the mounting plate on the machine frame. Please use the fixing plate as a drilling template before you assemble the transmitter.

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

Please tighten all the nuts, so that the springs are almost fully compressed.



Transmitter 483



Transmitter 483
Each transmitter (laser) is provided with a mounting kit

Assembly - Laser Light Barrier Series 480

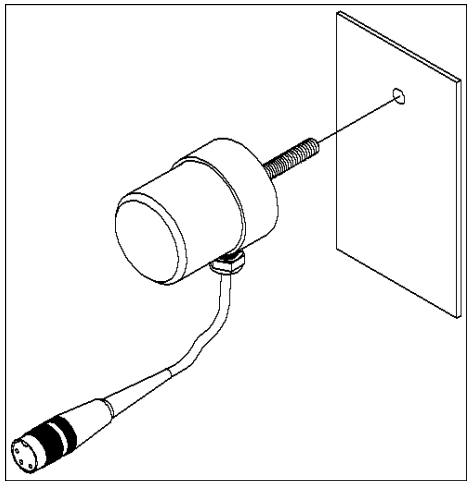
Receiver 480/485

When mounting the receiver, please make sure that the deviance to the light beam from the transmitter does not vary more than +/- 5°.

The receiver can already be firmly fixed, as it will not need moving again during the later adjustment of the laser light barriers.

At first the mounting holes for attaching the receiver to the mounting plate must be drilled in the machine side frame.

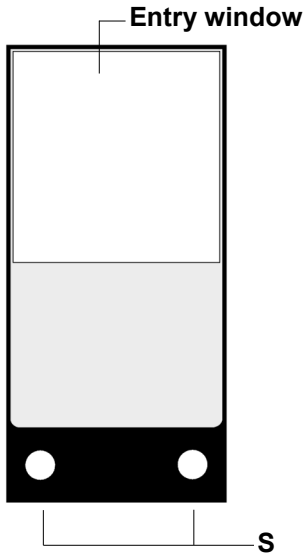
The receiver is then fixed in place using the nuts supplied.



Receiver 486

The receiver is fixed in place using the screws supplied.

(S = fastening holes)



Receiver 486

Adjustment - Laser Light Barrier Series 480

Regardless of the fact that that the laser light transmitter performance is not dangerous, direct eye contact with the laser light beam should be avoided.

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

To adjust the laser light channel, the adjustment device supplied is needed. Please place this adjustment device onto the receiver lens.

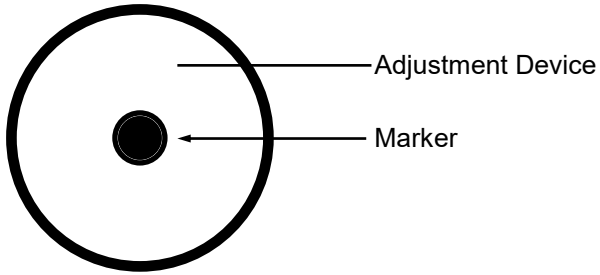
Now switch on the control unit. After completion of the initialising of the device, the transmitter (laser) should be illuminated.

Now adjust the transmitter, so that the laser light beam is directed to the centre of the receiver optic. This position is marked with a whithe marker on the adjustment device.

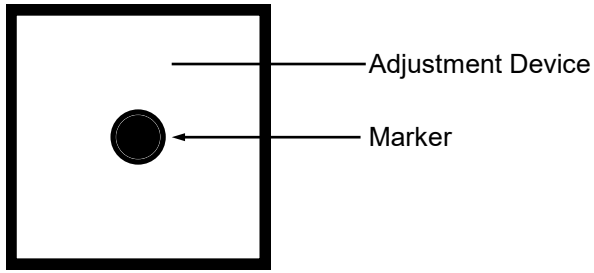
An adjustment of the receiver is not required.

To adjust further light barriers, please carry out the procedure as described above.

Adjustment Device 480/485



Adjustment Device 486



Checking the Functioning

Before you can check the functioning of the monitoring device you must first of all have set the operational parameters for the device and its connected laser light barriers.

Please remember that the monitoring device does not stop the machine when you switch to the test operation mode.

At this stage the monitoring device should have been completely installed, electrically connected, adjustment carried out and set. Please check once again the following points:

- Are the connected laser light barriers activated?
- Are the receiving levels of the connected laser channels in order?
- Are all the cables correctly plugged in and the plug connectors screwed tight?
- Have you carried out the sensitivity setting for each light barrier?
- Is the range for the fade-out set correctly?
- Is the setting for the start delay period correctly?

Please switch the control unit to test mode operation (TEST button).

Please start the machine and check the respective noise level of the connected laser light channels.

If the noise level is too high, please check the adjustment of the corresponding light barrier. The light beam must **not** leave the area of the receiving optics.

When everything is in order, please switch the system back to normal operating mode by switching off the test mode (TEST button).

To check whether the machine will be stopped during a thread break, please pass a thread or test wire of the corresponding thickness of the material being used through one of the laser light beams. The machine should stop immediately. Repeat this test for all the connected light channels.

Please remember that - depending on the setting for the respective fault counter - the light barrier for monitoring the weaving shed position might stop the machine delayed.

Should the machine not be stopped, please check again the settings of the light barriers and/or the electrical connections of the control unit.

Fault Finding

Laser (transmitter) not illuminated
- Supply cable to transmitter not plugged in
- Supply cable to transmitter wrongly plugged in
- Channel not activated
- Laser defect

Deviation of the receiver level signal more than -10%
- Supply cable to transmitter and/or receiver wrongly plugged in
- Light channel out of adjustment
- Light channel optics dirty
- Laser defect
- Receiver defect

No receiving level signal
- Supply cable to transmitter and/or receiver not plugged in
- Supply cable to transmitter and/or receiver wrongly plugged in
- Light barriers not adjusted
- Light barriers out of adjustment
- Light beam blocked
- Laser defect
- Receiver defect
- Fault in control unit

Machine noise level higher than thread signal
- Light barriers out of adjustment
- Optics are dirty
- Supply cable to transmitter and/or receiver wrongly plugged in
- Connecting plug to transmitter and/or receiver is loose
- Loose threads in the light beam
- Laser defect
- Receiver defect

No thread signal
- Channel is not activated
- Supply cable to transmitter and/or receiver not plugged in
- Supply cable to transmitter and/or receiver wrongly plugged in
- Laser defect
- Receiver defect

Low level warning Channel x
- Supply cable to transmitter and/or receiver wrongly plugged in
- Light barrier out of adjustment
- Light barrier optics are dirty
- The light beam is partially interrupted (machine is standing)
- Laser defect
- Receiver defect

No level present at Channel x
- Supply cable to transmitter and/or receiver not plugged in
- Supply cable transformer and/or receiver wrongly plugged in
- Channel activated but no light barriers connected
- The light beam is interrupted (machine is standing)
- Light barrier not adjusted
- Light barrier out of adjustment
- Light beam blocked
- Laser defect
- Receiver defect

Fault Finding

Machine does not stop when a thread breaks

- Device is in test operation
- Sensitivity level setting incorrect
- Channel not activated
- Supply cable to transmitter and/or receiver wrongly plugged in
- Thread has got caught and did not fall through the laser light barrier
- Stopping contact wrongly connected
- Impulse sensor defect
- Fade-out range wrongly set
- Thread broke during the start delay phase
- Fault in the control unit

False Stops

- Foreign object in the monitoring area
- Loose threads
- Sensitivity setting is incorrect
- Supply cable to transmitter and/or receiver wrongly plugged in
- Connection plug from transmitter and /or receiver not screwed in tight
- Light channel out of adjustment
- Light barrier optics are dirty
- Electrical connection is not correct
- Impulse sensor defect
- Fade-out not activated
- Fade-out range wrongly set
- Laser defect
- Receiver defect
- Fault in the control unit

Notes

Notes

Electrical Connection - Control Unit Laserstop 4180

The electrical connection must only be carried out by suitably qualified technical personnel.

Before electrical connection, you must make absolutely sure that there is no danger to come into contact with any parts that might carry live electricity.

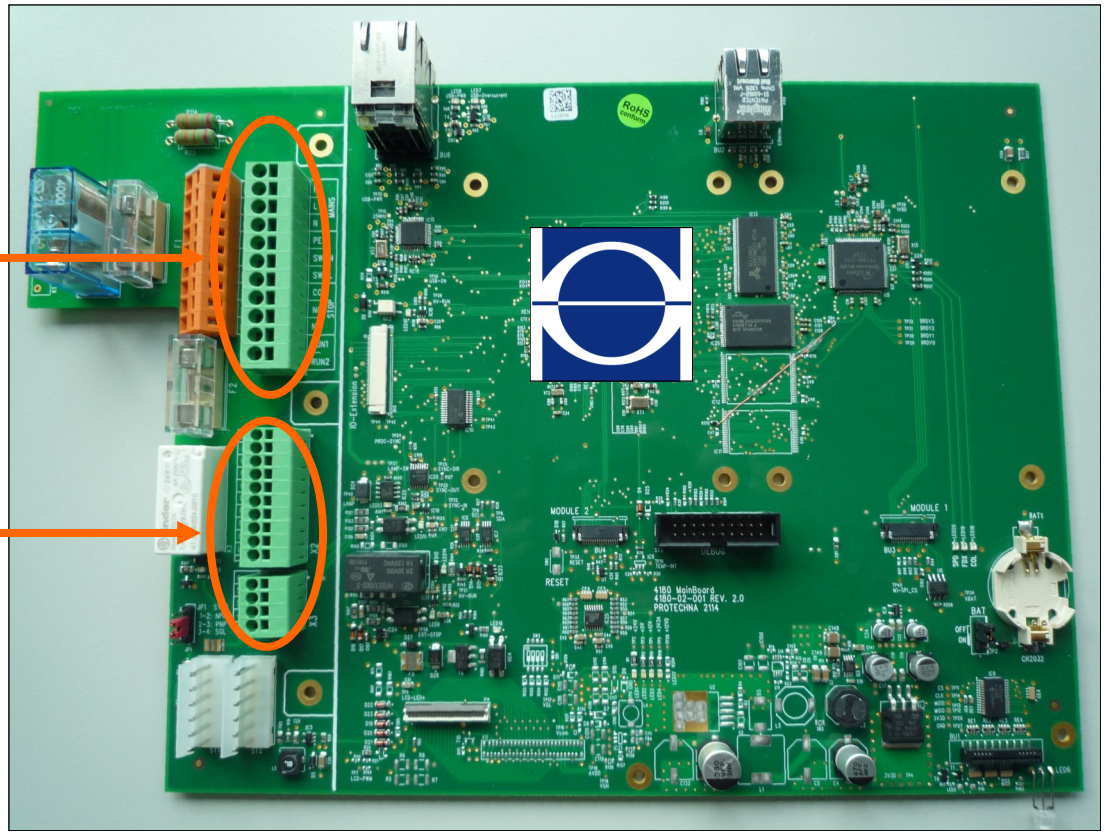
To make the electrical connection, it is necessary to remove the top cover of the control unit. The cover is fixed with three screws on the right and left side of the housing.

When you have finished the electrical connection, please do not forget to reinstall the top cover and fasten it with the screws.

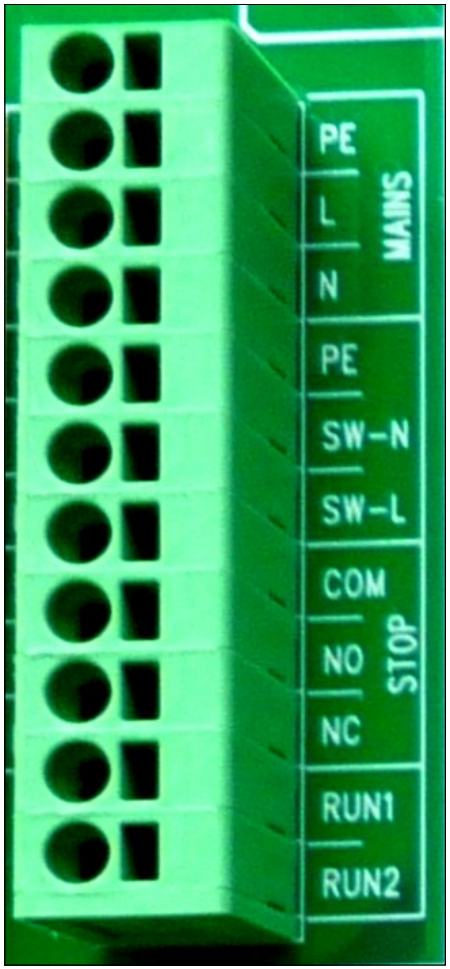
Electrical Connection - Control Unit Laserstop 4180

High voltage connection
(standard connection)

Low voltage connection
(additional connections)



High Voltage Connection (Standard Connection)



Power Supply (MAINS)	
PE	Protective earth
L	Power supply (Phase)
N	Power supply (Neutral)

Additional Connections	
PE	Protective earth
SW-N	Not used
SW-L	Not used

Stop Contact (Relay) (STOP)	
COM	Common
NC	Normally closed
NO	Normally open

Reset Input	
RUN 1	Switched high voltage
RUN 2	Switched high voltage

High Voltage Connection (Standard Connection)

Power supply

Please connect the control unit at the terminals **L** (phase) and **N** (neutral) to an alternating power supply between 100 V and 240 V and a frequency of 50 Hz to 60 Hz.

The **PE** terminal must be connected to the ground connection of the machine's switch box.

Stop contact

Please connect the **COM** and **NC** (break contact) or **COM** and **NO** (make contact) to the stopping device of the machine.

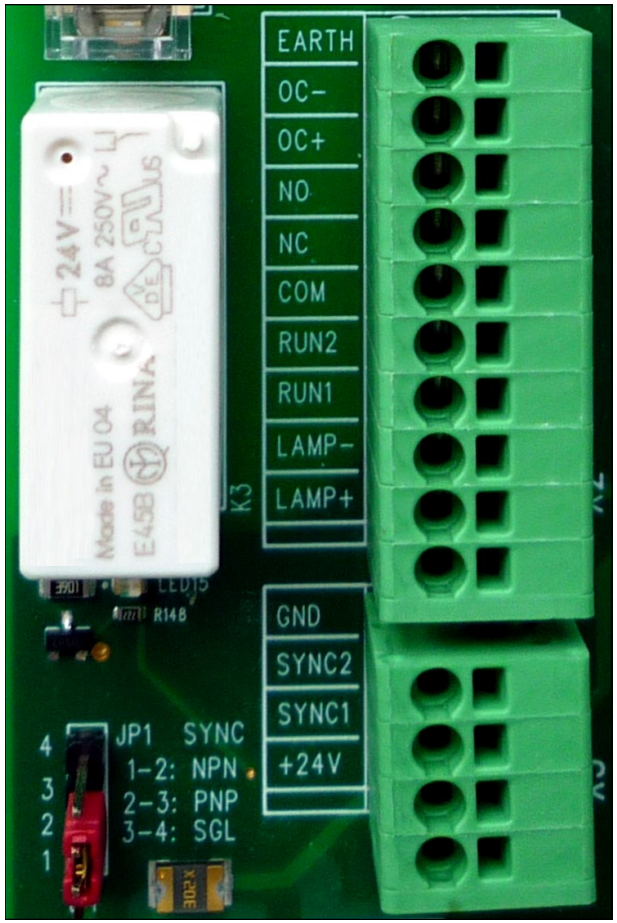
They connect to a potential-free relay contact, which is triggered when a fault occurs.

Reset input

A voltage of 100 V to 240 V AC must be supplied to the terminals **RUN 1** and **RUN 2** when the machine is in normal operating mode (machine is running).

No voltage must be supplied to these terminals when the machine is in inching mode or at standstill.

Low Voltage Connection (Additional Connections)



Jumper JP1	Function
1 and 2	Impulse sensor output NPN
2 and 3	Impulse sensor output PNP
3 and 4	Signal from machine

Semiconductor Output	
EARTH	Earth
OC -	Semiconductor output (-)
OC +	Semiconductor output (+)
Stop Contact (Low Voltage Relay)	
NO	Normally open
NC	Normally closed
COM	Common
Reset Input (Low Voltage Reset)	
RUN 2	Switched low voltage
RUN 1	Switched low voltage
External Display Lamp	
LAMP -	Power supply 0V
LAMP +	Power supply +24V

Impulse Sensor	
GND	Impulse sensor - Power supply 0V
SYNC 2	Signal from machine
SYNC 1	Impulse sensor - Signal
+24 V	Impulse sensor - Power supply +24V

Low Voltage Connection (Additional Connections)

Stop contact (Semiconductor output) **)

The terminals **OC +** (plus) and **OC -** (minus) should be connected with the electronic stopping device of the machine.

They serve to provide a potential-free semi conductor output with the following data: U_{max} = 30 V DC, I_{max} = 0,25 A, NO contact.

Stop contact (Low voltage relay) **)

Please connect the **COM** and **NC** (break contact) or **COM** and **NO** (make contact) to the stopping device of the machine.

They connect to a potential-free relay contact, which is triggered when a fault occurs. The data of this contact is as follows:
U_{max} = 30 V DC, I_{max} = 1 A.

**) These connections are not required for a standard machine connection.

Reset input (Low voltage reset) **)

A voltage of 24 V AC/DC +/-20% must be supplied to the terminals **RUN 1** and **RUN 2** when the machine is in normal operating mode (machine is running). The polarity is of no relevance when direct voltage is supplied.

No voltage must be supplied to these terminals when the machine is in inching mode or at standstill.

The high-voltage reset input must **not** be connected when a low-voltage reset is made.

External display lamp

Please connect the cable for the external indicator lamp to the terminals **LAMP +** (+24 V DC) and **LAMP -** (0 V).

The maximum load of this lamp output is 5 Watt.

Low Voltage Connection (Additional Connections)

Impulse sensor

Please connect the impulse sensor power supply cable to the terminals **+24V** and **GND**.

Please use these terminals only for the power supply of the impulse sensor.

Please connect the impulse sensor signal cable to the terminal **SYNC 1**.

Please also observe the adjoining notes under **Jumper JP1**.

Signal from the machine control

This connection is only necessary when the external fade-out function is activated.

Instead of using an impulse sensor, the synchronisation of the monitoring device can also be carried out via an external signal from the machine control. In this case, the fade-out range for a shed monitoring function will be established via this external signal.

The signal from the external control must be connected to the terminals **SYNC 1** (24 V DC signal) und **SYNC 2** (0 V).

Please note that the shed monitoring function is active during the time a 24 V DC signal is present.

Please also observe the adjoining notes under **Jumper JP1**.

Jumper JP1

When using an impulse sensor, please set the jumper according to the type of output of the impulse sensor.

NPN output: pins **1** and **2**
PNP output: pins **2** and **3** (factory setting)

When using an external signal from the machine control instead of an impulse sensor, please set the jumper on the pins **3** and **4**.

Notes

Technical Data

Control Unit 4180	
Environmental conditions	
Operation	0° C to 50° C
Humidity	max. 95 % RH non-condensing
Storage	-20° C to +70° C
Power supply	
Continuous	100 V to 240 V +/- 10% 47 Hz to 63 Hz
Start-up peak (230 V)	max. 40 A
Fuses	
Power supply	4 AT
Stop contact	2 AT
Stop contact	
Relay output	U_{max} = 230 V AC, I_{max} = 2 A
Performance rating	
with 4 light barriers and warning light	< 25 VA
Measurements	
Width / Height / Depth	325 mm / 140 mm / 250 mm
Weight	4 kg
Safety classification	IP 40

Impulse Sensor	
Environmental conditions	
Operation	0° C to 50° C
Humidity	max. 95 % RH
Storage	-20° C to +70° C
Measurements	
Length	70 mm
Ø Body	12 mm
Ø incl. cable radius and connection	85 mm
Nominal switching distance	2 mm
Measuring principal	induktive
Weight	0,15 kg
Safety classification	IP 54

Technical Data

Transmitter		
Environmental conditions		
Operation	0° C to 50° C	
Humidity	max. 95 % RH	
Storage	-20° C to +70° C	
Power supply		
via control unit 4180	8 V AC	
Performance rating	< 0,5 VA	
Laser (Class I)		
Wave length	660 nm +/-10 nm	
Beam Ø	< 5 mm	
Beam divergence	0,08 mrad	
Frequency modulation	24 kHz	
Measurements		
Type	**480**	**483**
Length	31 mm	110 mm
Ø Body	40 mm	10 mm
Ø incl. cable radius and connection	80 mm	
Length incl. cable radius and connection		160 mm
Weight	0,1 kg	0,08 kg
Safety classification	IP 65	

Receiver			
Environmental conditions			
Operation	0° C to 50° C		
Humidity	max. 95 % RH		
Storage	-20° C to +70° C		
Measurements			
Type	**480**	**485**	**486**
Length + Threaded Bolt	48 mm + 25 mm	68 mm + 25 mm	
Ø Body	40 mm	58 mm	
Ø incl. cable radius and connection	80 mm	98 mm	
Length/ Width			68 mm/ 33 mm
Height at fastening part			10 mm
Height at entry window			4 mm
Weight	0,12 kg	0,20 kg	0,07 kg
Safety classification	IP 65		

Laser Classification

Device Description: Laser Light Barrier

Type: LLi 480

Laser Type: Semi conductor Laser 660 nm

With this device the Laser power output meets the

Class 1
according to DIN EN 60825-1

VDE 0837
Part 1

Maximum Laser power output 0,22 Milliwatt

Protechna Herbst GmbH & Co KG, Ottobrunn, 20.01.1995
Development

Dipl. Ing. W. Bühler
Development Manager

Warranty Exclusion: When used for other purposes, structural changes and manipulation of the device.

E.C.- Conformity Declaration

We hereby declare,

Protechna Herbst GmbH & Co KG
Lilienthalstrasse 9
85579 Neubiberg
Germany

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

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

Description of the product: **Thread Break Detector**

Type: **Laserstop**

Model - No.: **4180**

Relevant E.C. Directives:

E.C. - Directive relating to Electro-Magnetic Tolerance (89/336/EEC) followed by 93/31/EEC

E.C. - Low Voltage Directive (73/23/EEC)

Applied co-ordinating standards, in particular:

DIN EN 61000-6-4	Electromagnetic Tolerance (EMV) technical base standard interference emission
DIN EN 61000-6-2	Electromagnetic Tolerance (EMV) technical base standard inteference strength
DIN EN 60 204	Electrical equipment on industrial machines
DIN EN 61 010	Safety regulations for measuring, controlling, regulating and laboratory equipment

Applied national standards and technical specifications, in particular:

DIN VDE 0100

Signature of manufacturer: Rico Wellnitz

Details of signatee: Development Manager

Date: 6.7.2015

Appendix - Light Barrier Operating Mode DUO

Please note that the >>DUO<< operating mode must only be used for permanent monitoring channels, which normally work in the >>STANDARD<< operating mode. Channels, which normally work in the operating modes >>SYNCHRO<< or >>WEFT<< cannot be used for the >>DUO<< operating mode.

To reduce the possibility of false stopping of the machine due to dust or fluff, two laser light barriers are mounted parallel to the yarn sheet at every monitoring position.

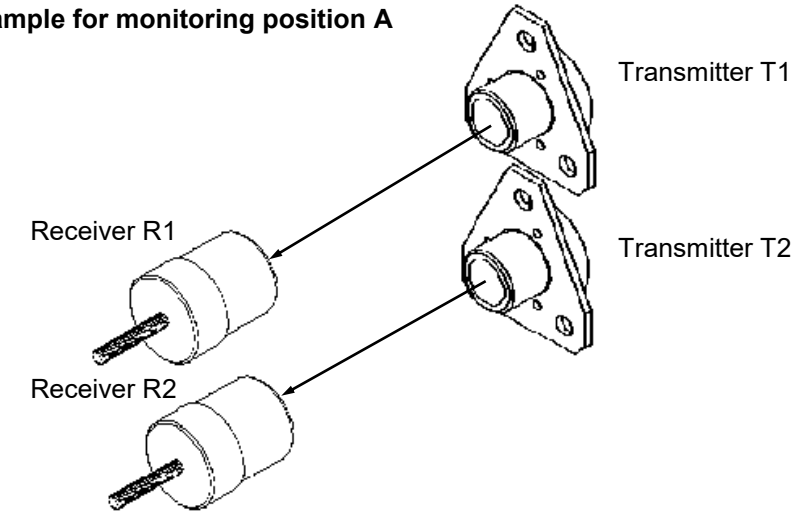
When a broken thread moves out of the yarn sheet, it does interrupt the laser beams of both light barriers nearly at the same time. The resulting signals are then digitally processed in the control unit.

When both signals occured during an adjustable time slot, the production machine is switched off. If only one laser light barrier delivers a signal, the machine will not be stopped.

The lasers light barriers are mounted in pairs and parallel at the yarn sheet (see drawing).

When a broken thread moves out of the yarn sheet, it must be in a position to interrupt the laser light beams of both light barriers of a DUO channel.

Example for monitoring position A



Please note that only the following channel combinations are possible for each of the monitoring positions.

4 channel control unit (standard version)
Channel 1 and Channel 2: monitoring position A
Channel 3 and Channel 4: monitoring position B

8 channel control unit (optional version)
Channel 1 and Channel 2: monitoring position A
Channel 3 and Channel 4: monitoring position B
Channel 5 and Channel 6: monitoring position C
Channel 7 and Channel 8: monitoring position D

Appendix - Light Barrier Operating Mode DUO

The settings for the >> DUO << operating mode are carried out in the "**Channel Parameter - Basic**" menu for the respective laser light barrier. This menu can be entered:

a) when you are in the "Parameter channel" menu of a channel, press the (►) button and have entered the password for the “General unit settings” within the last 10 minutes.

b) If you have not yet entered the password for the "General unit settings" menu, the program returns to the start screen when you press the (►) button.

   Now, please press the button (1). You will be prompted to enter a code number. Please enter successively 3 1 4 2 5 (according to the caption on the screen).

   Now you are in the "General unit settings" menu. Please exit this menu by pressing the (◄) button. Now you can enter the "Channel settings - Basic" menu as described under a).

Channel Parameter - Basic

Channel	1
Mode	DUO
Response Time	4
Stop Contact	HV
DUO-Time	x.x sec.

◄ + – ▲ ▼ ►

The following buttons at the bottom of the screen are available for navigation and for changing the settings:

Button	Meaning
◄	Return to the previous page
+	Increase the highlighted value or change setting
–	Decrease the highlighted value or change setting
▲	Moves cursor up
▼	Moves cursor down
►	Exit the menu

The **Channel** display cannot be selected with the cursor nor can be changed.

The **DUO-Time** setting is only available when the >>DUO<< operating mode is activated for this channel.

Appendix - Light Barrier Operating Mode DUO

Display Channel

Displays the selected channel in which the "Channel settings - Basic" can be checked or altered.

The **Channel** display cannot be selected with the cursor nor can be changed.

Mode

All functions described in this appendix refer exclusively to the **>> DUO <<** operating mode. This setting was established prior to delivery or at the time of the installation of the system.

When you change the setting for the operating mode, the system may not work properly. This applies in particular when the Duo function is associated for only one light barrier.

Please change the operating mode only when you want to use the control unit at another machine with a different operating mode.

When the >> DUO << operating mode is used for a monitoring position, always **2 channels** must be set to the >> DUO << operating mode.

4 channel control unit (standard version)
Channel 1 and Channel 2: monitoring position A
Channel 3 and Channel 4: monitoring position B

8 channel control unit (optional version)
Channel 1 and Channel 2: monitoring position A
Channel 3 and Channel 4: monitoring position B
Channel 5 and Channel 6: monitoring position C
Channel 7 and Channel 8: monitoring position D

Response Time and Stop Contact

Please refer to the information in chapter "**Channel Parameter - Basic**" for these two settings.

Please note that a change of the response time and the stop contact must be carried out with identical values for **both** channels of a Duo light barrier.

Appendix - Light Barrier Operating Mode DUO

DUO-Time

This setting is only available when the >> DUO << operating mode is activated for this channel.

Display and input possibilitiy for the time slot setting for the Duo function of a light barrier.

To reduce the possibility of false stopping of the machine due to dust or fluff, two laser light barriers are combined as one functional DUO channel at one monitoring position.

When a broken thread moves out of the yarn sheet, it does interrupt the laser beams of both light barriers nearly at the same time. The maximum time period during which the thread has to cross both light beams is determined by the setting of the time slot (DUO-Time).

The time slot can be set between 0.2 seconds and 1.0 second. The standard setting is 0.5 seconds.

Due to the variety of machine types and materials, a recommended setting cannot be given. The exact setting can only be determined by the empirical value when the machine is in operation.

When the machine is not stopped, the DUO-Time is most likely set too short. When too many false stops occur, the DUO-Time is most likely set too long.

Please note that a change of the DUO-Time must be carried out with identical values for **both** channels of a Duo light barrier.

Channel display at a machine stop

When a Duo light barrier has stopped the machine, always the first channel number of a Duo light barrier will be displayed.

4 channel control unit (standard version)
Monitoring position A: Stop display is channel 1
Monitoring position B: Stop display is channel 3

8 channel control unit (optional version)
Monitoring position A: Stop display is channel 1
Monitoring position B: Stop display is channel 3
Monitoring position C: Stop display is channel 5
Monitoring position D: Stop display is channel 7

Additional information

- Please note that the machine will only be stopped when the broken thread moves through both laser light barriers within the preset time slot. Should the broken thread move only through one laser light barrier or too slow through both laser light barriers of one DUO channel, the machine will not be stopped.

- Should the machine not stop although the conditions for a broken thread are applicable, please check once again the settings for the light barriers and/or the electrical connection of the control unit.

Appendix - Integrated Relay Box - (I/O Circuit Board) - optional

With the help of the integrated relay box (optional), it is possible to connect additional displays to the control unit, which are then assigned to the respective channel, in addition to the external indicator lamp.

The integrated relay box has 3 connections:

I/O 5 - 8 Relay outputs for the channels 5 to 8 [#]
I/O 1 - 4 Relay outputs for the channels 1 to 4
CAN This connection is currently not used.

[#] as an option. The standard version of the control unit has 4 channels.

The pin assignments for the individual channels are to be found on the next page.

Please note that the relay outputs of the integrated relay box are not suitable for switching off the machine, since these relay outputs can react with a time delay.

Please set the required function for the corresponding relay output (Relay Mode) for each channel in the **Channel Parameters - Basic** menu.

Please note that this setting is only displayed when an I/O circuit board is installed.

Relay Mode

0 The I/O circuit board is installed; the relay is not activated.

1 The relay is activated. The relay remains switched for a thread fault until the machine is restarted.

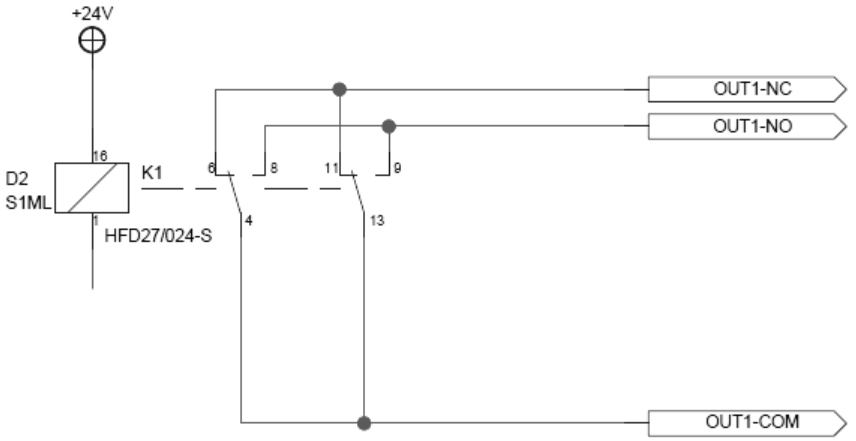
2 The relay is activated. The relay is clocked switched for a thread fault until the machine is restarted (for example, for a channel-dependent flashing indicator lamp).

3 **ATTENTION!** With this setting the corresponding stop outputs of the control unit (relay output and semiconductor output) are **NOT** activated, but **ONLY** the corresponding relay on the I/O circuit board. The monitoring function is **NOT** interrupted by a thread fault. This setting is only possible for the **>> STANDARD <<** operating mode:

The relay is activated. The relay is switched for approx. 0.5 seconds for each thread fault and then reset again.

Appendix - Integrated Relay Box - (I/O Circuit Board) - optional

Socket	Description	Channel (I/O 1 - 4)	Channel (I/O 5 - 8) [#]	Colour
1	NO	Channel 1	Channel 5	white
2	COM	Channel 1	Channel 5	brown
3	NC	Channel 1	Channel 5	green
4	NO	Channel 2	Channel 6	yellow
5	COM	Channel 2	Channel 6	grey
6	NC	Channel 2	Channel 6	pink
7	NO	Channel 3	Channel 7	blue
8	COM	Channel 3	Channel 7	red
9	NC	Channel 3	Channel 7	black
10	NO	Channel 4	Channel 8	violet
11	COM	Channel 4	Channel 8	grey/pink
12	NC	Channel 4	Channel 8	red/blue
13 >>> 25	All other connections are not used.			
[#]	as an option. The standard version of the control unit has 4 channels.			



Relay Contact Specification	
Rated Voltage	30 V AC / DC
Rated Current	2 A
min. Switching Load	10 mW
Contact Material	AgNi + Au