

**VANDEWIELE**

**PROTECHNA**

PROTECHNA Herbst GmbH & Co KG  
Lilienthalstrasse 9  
85579 Neubiberg  
Germany

**Working Instructions**  
**PROTECHNA End Break Detector**  
**LASERSTOP 4180 STANDARD**  
**For Tricot and Raschel Machines**



  
**PROTECHNA**



B-E-0646/05.15/E



The functions described in this handbook relate exclusively to the use of the system at the yarn feed of Tricot and Raschel machines. The connected light barriers monitor the yarn sheet permanently when the machine is in operation.



Please ensure that the >> STANDARD << operating mode is set for all connected and activated light barriers.

If you change the operating mode, the system may not function properly any more. This setting was 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.

Copyright

**Copyright**

This handbook is protected by copyright. All rights are reserved. On no account may this document, nor any part of it, be copied, reproduced, minimised or translated with mechanical or electronic aids, without written permission from PROTECHNA Herbst GmbH & Co KG.

The information contained in this handbook has been carefully checked and found to be correct. PROTECHNA Herbst GmbH & Co KG, however, takes no responsibility for possible inaccuracies which may be found. This disclaimer renders PROTECHNA Herbst GmbH & Co KG, not liable for any direct, or unforeseeable damages which may result from possible faults or omissions in this handbook.

In the interest of continuous product development, PROTECHNA Herbst GmbH & Co KG reserves the right to carry out modifications of this handbook and of the products described in it at any time and without advance notice.

For further information, please contact:

**PROTECHNA Herbst GmbH & Co KG**

Lilienthalstrasse 9  
85579 Neubiberg  
Germany



Telephone	+49 (0)89 608 114-0
Fax	+49 (0)89 608 114-48
E-Mail	<a href="mailto:info@protechna.de">info@protechna.de</a>
Internet	<a href="http://www.protechna.de">www.protechna.de</a>

**PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines**

**List of Contents**

	<b>Page</b>		<b>Page</b>		<b>Page</b>
<b>Safety advice</b>	5	<b>Parameter Channel menu</b>	20	<b>Adjustment - Laser light barrier 480</b>	38
<b>Introduction</b>	6	- Laser level display	21	<b>Checking the functioning</b>	39
<b>Drawings</b>		- Noise level display	21	<b>Fault finding</b>	40
- Control unit 4180 - Front view	8	- Switching signal display	22	<b>Electrical connection</b>	
- Control unit 4180 - Rear view	9	- Channel status setting	22	- Control unit Laserstop 4180	42
- Laser light barrier type 480	10	- Switching level setting	23	- Blowing device	49
<b>General user information</b>	12	- Stop counter display	23	<b>Technical data</b>	50
<b>External display lamp</b>	12	<b>Channel settings - Basic menu</b>	24	<b>Laser classification</b>	52
<b>Displays during system start-up</b>	13	- Operating mode	25	<b>E.C. Conformity Declaration</b>	53
<b>Start screen</b>		- Response time	26	<b>Appendix</b>	
- Displays	14	- Stop contact	26	- Light barrier operating mode DUO	54
- Settings	16	<b>Signals – Diagnostic menu</b>	28	- Integrated Relay Box (I/O Circuit Board) (optionally available)	58
<b>General unit settings menu</b>	17	<b>Displays during operation</b>	29		
- Start delay	18	<b>Assembly</b>			
- Run signal mode	18	- List of components in the device	30		
- Synchro mode	18	- General instructions	31		
- Lamp mode	18	- Control unit 4180	31		
- Laser deactivation	19	- Laser light barrier type 480	32		
- Language	19	- Blowing device A	34		
		- Blowing device B	35		
		- Blowing device C	36		

### 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.

Devices with blowing equipment:

- ▶ Always follow all warnings and instructions situated on the blower itself or those which are referred to elsewhere.
- ▶ Please ensure that the voltage and frequency specified for the blower motor match the power supply and that the motor rotation is correct.
- ▶ Never try to push any object through or into any openings in the blower unit.



**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

A reliable and fast detection of broken threads in the yarn sheet helps to reduce damages. The PROTECHNA laser light barrier system LASERSTOP 4180 sets new standards in terms of reliability and safety when monitoring the yarn sheets on both Tricot and Raschel machines.

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 special features of the system are:

- Fast and reliable detection of thread breaks in the yarn sheet with yarns from as low as 12 dtex
- Compact design of the light channels
- Visible, safe red-light laser (laser class 1)
- Vibration insensitive receiver
- 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



The functions described in this handbook relate exclusively to the use of the system at the yarn feed of Tricot and Raschel Machines. The connected light barriers monitor the yarn sheet permanently when the machine is running.

### Light Barriers Series 480

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

The highly homogeneity 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.

The laser light barriers are mounted parallel to the yarn sheets. When a broken thread moves out of the yarn sheet, it breaks the laser beam. The resulting impulse is then further digitally processed in the control unit and the production machine is stopped without delay.

## Introduction

### Control Unit LASERSTOP 4180 with Digital Signal Evaluation

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

When a thread breaks, 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 robust membrane keypad directly at the control unit and are supported by intuitive user prompts on the screen.

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.

### Blower Device

To direct the broken thread through the laser beam, it may prove useful to install a blower system.

It comprises of a high pressure blower and plastic tubes which correspond with the width of the machine, as well as the necessary connecting pipes and air hoses. The tubes are provided with a row of holes to allow the air to be directed towards the yarn sheet.

---

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

PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines

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.

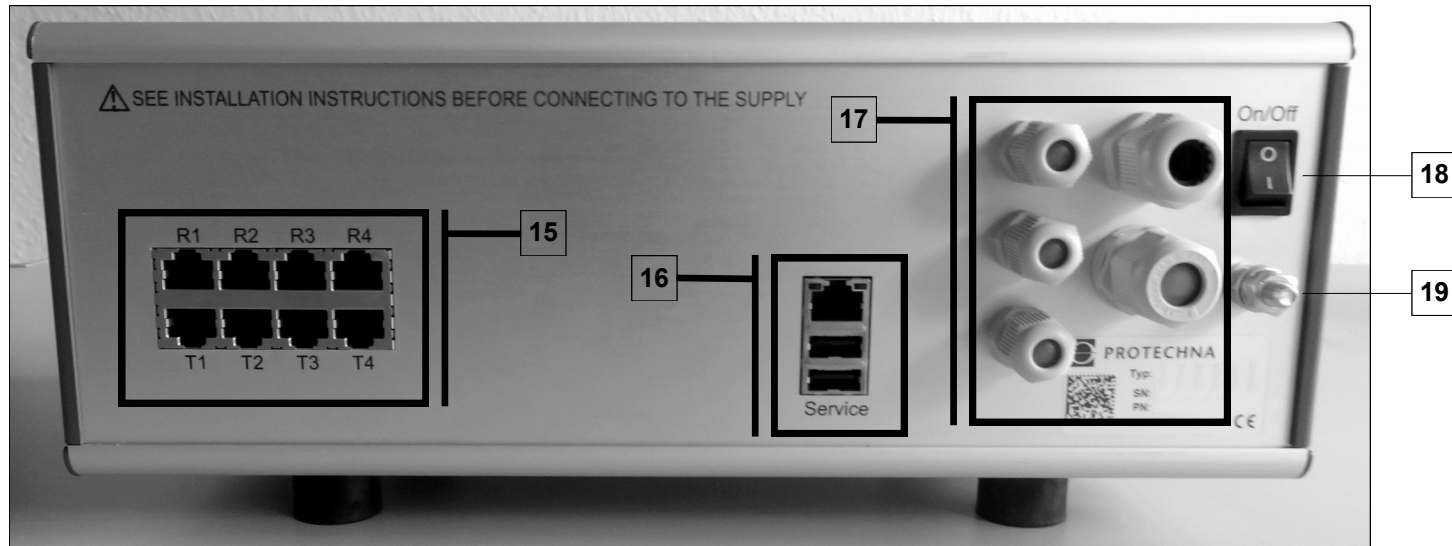
**Status display (13)**

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



## PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines

### 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)

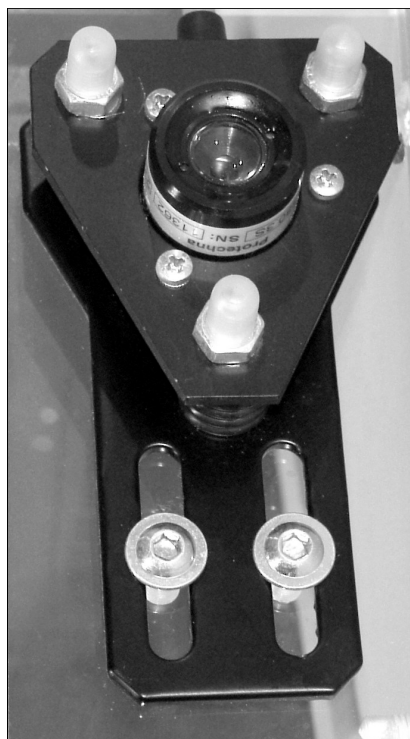
Connections for the standard power/control cable, the low voltage connection (optional) and the external stop display

#### Mains switch (18)

Mains switch to turn the control unit on/off

#### Ground terminal (19)

Laser Light Channel Type 480



Transmitter 480



Receiver 480

**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.
- ▶ When you operate the system with a blower unit, make sure that the power supply matches the voltage and frequency values specified for the blower motor and that the motor rotation is correct.
- ▶ 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.
- ▶ If you operate the device together with a blower unit, please make sure that both the blower tubes as well as the blower filter are cleaned at regular intervals.
- ▶ 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 move 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.

**External display lamp (Lamp mode 4180)**

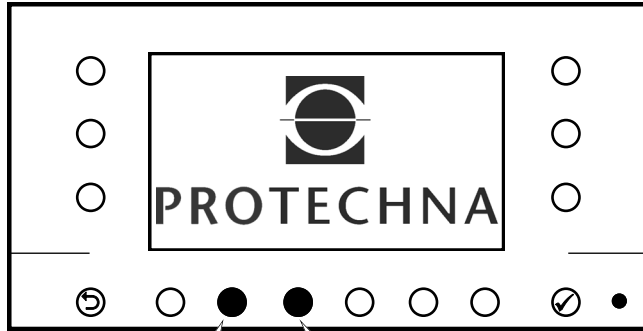
Display	Meaning
Lamp lights red	Machine is stopped. The machine was not stopped by the monitoring device.
Lamp does not light	a) Control unit is switched off b) Machine is in operation
Lamp flashes red	a) Machine has been stopped by the monitoring device b) The monitoring device is switched to test mode operation

▶ **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.

Displays during system start-up

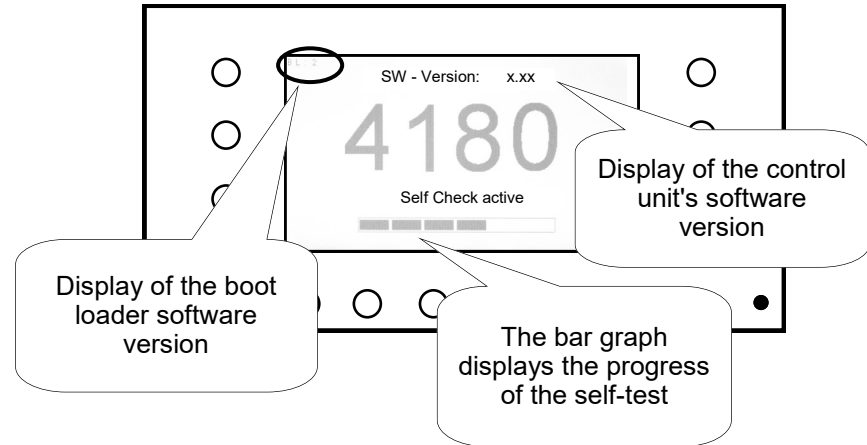
When the control unit is switched on, at first the following screen is displayed:



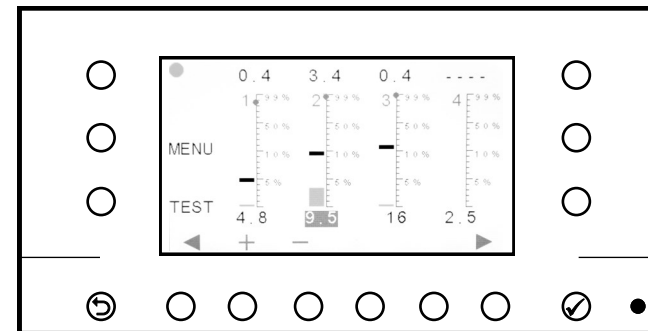
Holding this button pressed when the device is turned on displays information on the running self-test.

Holding this button pressed when the device is turned on causes the device to execute a production self-test.

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

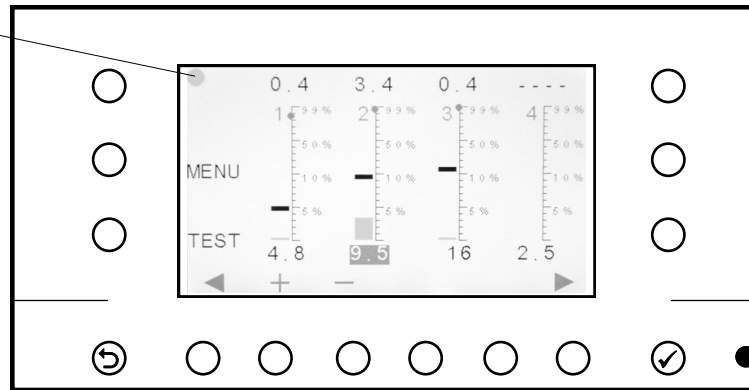


After a successful self-test, the following screen is displayed (start screen):



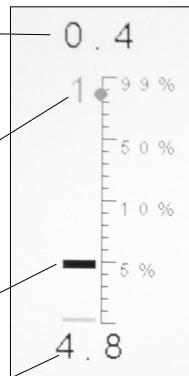
Start screen – Displays

Colour coded system display



Status display

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



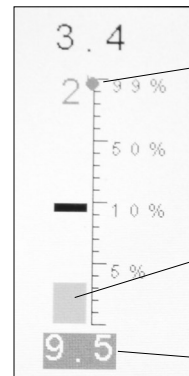
Channel number

**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.

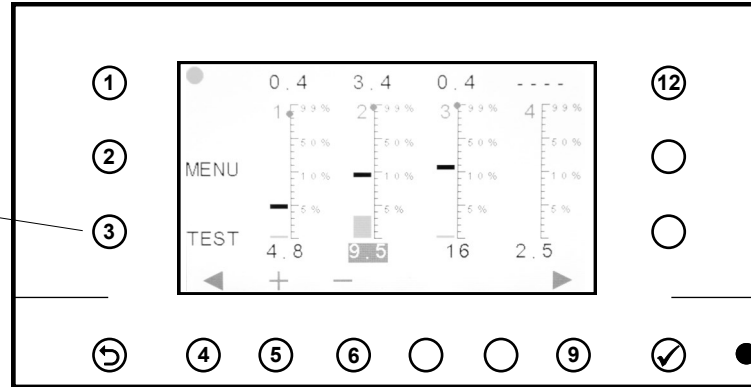


**PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines**

**Start screen – Displays**

<b>Display</b>	<b>Meaning</b>
<b>Noise level</b>	<p>Display of the noise level for this channel in relation to the receiving level when the machine is running</p> <p align="center"><b>and</b></p> <p>Display of the signal height – when a thread passes the light barrier (thread signal) – for this channel in relation to the receiving level.</p> <p>These displays are also important for setting the different switching levels. Channels not activated are indicated by - - - -.</p> <p>There are no input possibilities.</p>
<b>Receiving level</b>	<p>Display of the receiving level of the connected and activated laser light barrier in relation to a pre-set reference level.</p> <p>The dot on in the display should reach approx. 100% +/-10%. This display is not available when channels are not activated.</p> <p>There are no input possibilities.</p>
<b>Switching level</b>	<p>Display of the switching level (sensitivity) of this channel in relation to the receiving level.</p>
<b>Colour coded system display</b>	<p><b>Green:</b> The system is working normally  <b>Green (flashing):</b> The system is working normally; the machine is running  <b>Yellow (flashing):</b> The start delay is active  <b>Red:</b> One of the laser light barriers has stopped the machine  <b>Red (flashing):</b> A system fault has occurred</p>
<b>Status display</b>	<p><b>Green:</b> The unit is working normally  <b>Yellow:</b> The unit is performing a self-test  <b>Yellow (flashing):</b> A system fault has occurred:</p> <ul style="list-style-type: none"> <li>- Module fault 1 and 2</li> <li>- Loss of data (EEPROM)</li> <li>- Connecting cables of one ore more light barriers are not plugged in correctly.</li> </ul>

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**

**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:

<b>Common Parameters</b>	
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:

<b>Button</b>	<b>Meaning</b>
◀	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 for all channels in seconds.

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.

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**



Settings in the >> STANDARD << operating mode are not necessary because there are no fade-out ranges in this mode available.

**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	

**Menu Common Parameters**

**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.

**Notes**

**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

\*\*) 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 (-).

**Channel Parameter - Basic -**

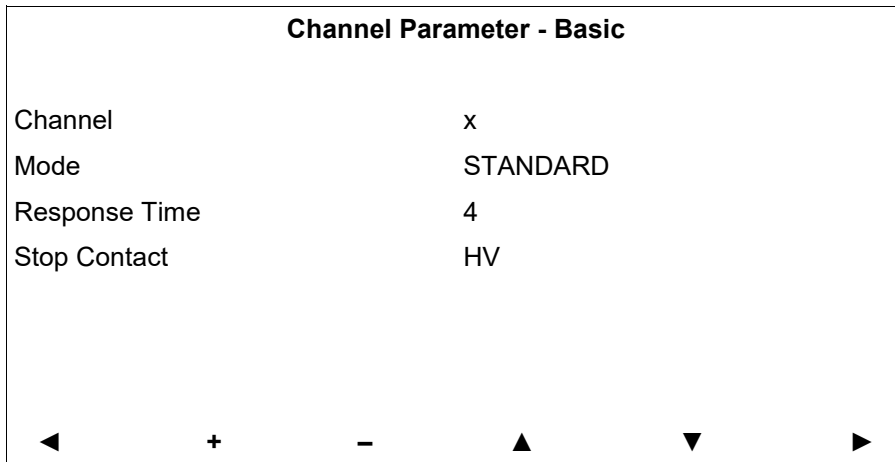
This menu can be entered:

- 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).



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 exclusively to the >> **STANDARD** << 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.



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

The following operating modes are available:

**STANDARD** Normally, the monitoring position is at the yarn feed of a Tricot or Raschel machine. 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 for every guide bar.

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**

Normally, the positions monitored at weaving machines is at the thread feed or in the open sheds of the weaving machines that the weaving machines is stopped immediately when (a) threads cling to each other or nests of threads are detected in the open shed position or (b) threads are broken at the warp feed, which are detected by laser light barriers below and/or above the warp.

**WEFT**

Normally, the positions monitored at weft insertion machines are at the feed of the warp threads and the weft thread monitoring respectively. The laser light barriers at the warp thread feed 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 pattern.

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 channel triggers all stop outputs

**Notes**

---

**Menu Signals - Diagnostic**

**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**

An impulse sensor is normally not required in the >> STANDARD << operating mode and is therefore not installed. The [ O ] display will therefore remain green even when the machine is in operation.

**Machine RPM**

An impulse sensor is required for displaying the machine speed. Because an pulse generator is normally not required in the >> STANDARD << operating mode and is therefore not 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.



A pulse sensor is normally not required in the >> STANDARD << operating mode and is therefore not installed.

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 <sup>1)</sup>
- an extension cable for each transmitter, 3-pin socket <sup>1)3)</sup>
- an extension cable for each receiver, 3-pin plug <sup>1)3)</sup>
- mounting plates and assembly material, dependent on the machine type and purchasing order

- a blower device <sup>2)</sup> comprising of:
  - a high pressure blower
  - plastic tubing according to the width of the machine, with a row of holes to control the air passage
  - the necessary connecting pipes and tubes
  - a 6 pin connecting cable <sup>1)</sup>
  - a blower filter

<sup>1)</sup> The cable length depend upon the type of machine the monitoring device has been ordered for.

<sup>2)</sup> The use of a blower device depends on the machine type. With some machine types it is not necessary to use a blower device.

<sup>3)</sup> 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.

---

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

**Assembly - General Advise and Control Unit**

**Assembly**

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

- 1) Mounting the control unit
- 2) Mounting the blower unit \*)
- 3) Electrical connection
- 4) Mounting 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

\*) The use of a blower unit is dependent on the type of the machine. With some machine types it is not necessary to have to use a blower.

**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**

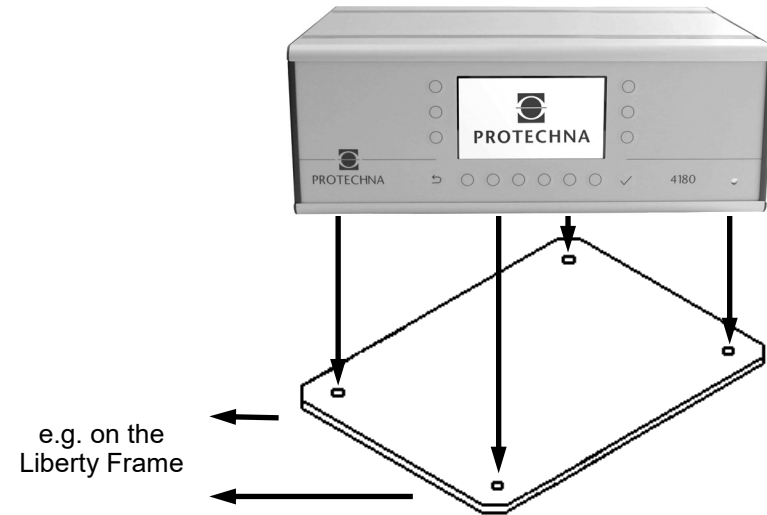
Service technicians are available on special request to check the PROTECHNA monitoring device LASERSTOP 4180 if required.

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

The laser light channels are mounted parallel to the yarn sheet. If a broken thread moves out of the yarn sheet, it must be in a position to break the laser light beam.

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.



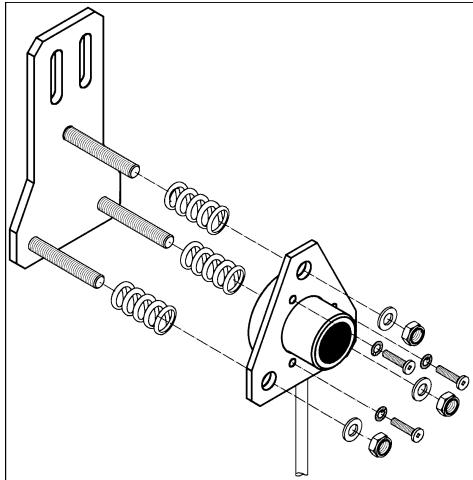
**Assembly - Laser Light Barrier Series 480**

**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.



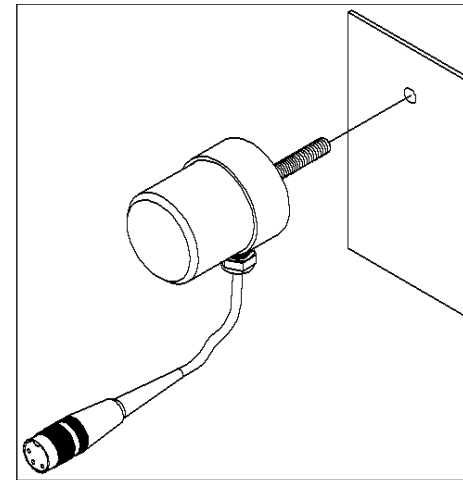
**Receiver 480**

When mounting the receiver, please make sure that the deviation to the light beam from the transmitter does not vary more than  $\pm 5^\circ$ .

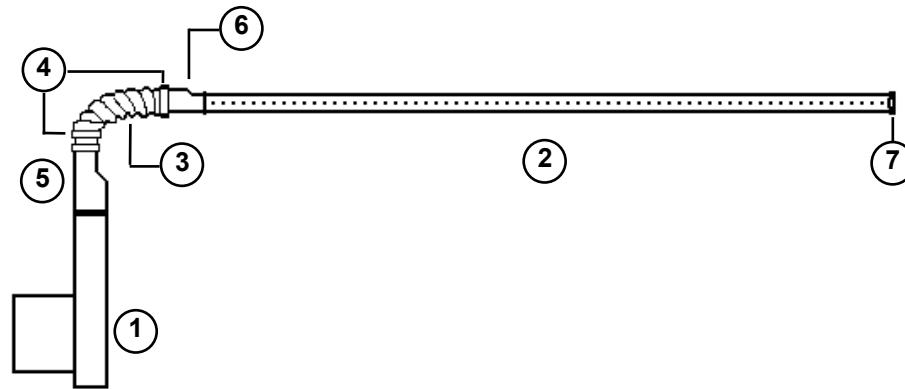
The receiver can already be firmly fixed, as it will not need moving again during the later adjustment of the laser light barriers.

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.



Assembly - Blower Unit A \*)



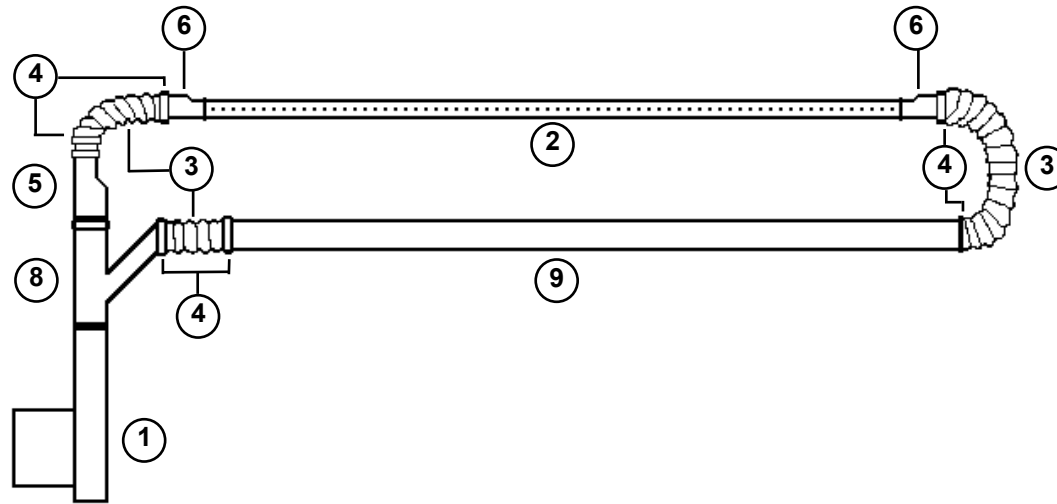
1. Blower
2. Blower tube 30 mm Dia., drilled
3. Flexible tube 50mm Dia
4. Hose clamp
5. Reduction piece 70/50 mm Dia.
6. Reduction piece 50/30 mm Dia.
7. End cap 30 mm Dia.

The blower tube should be mounted behind the first yarn sheet. Please arrange the blower tube so that a broken thread will be moved into the path of the laser light beam.

The above shown version of assembly may vary slightly when using different blower types.

\*) The use of a blower device is dependent on the type of machine being used. With some types of machine it may not be necessary to use a blower device.

Assembly - Blower Unit B \*)



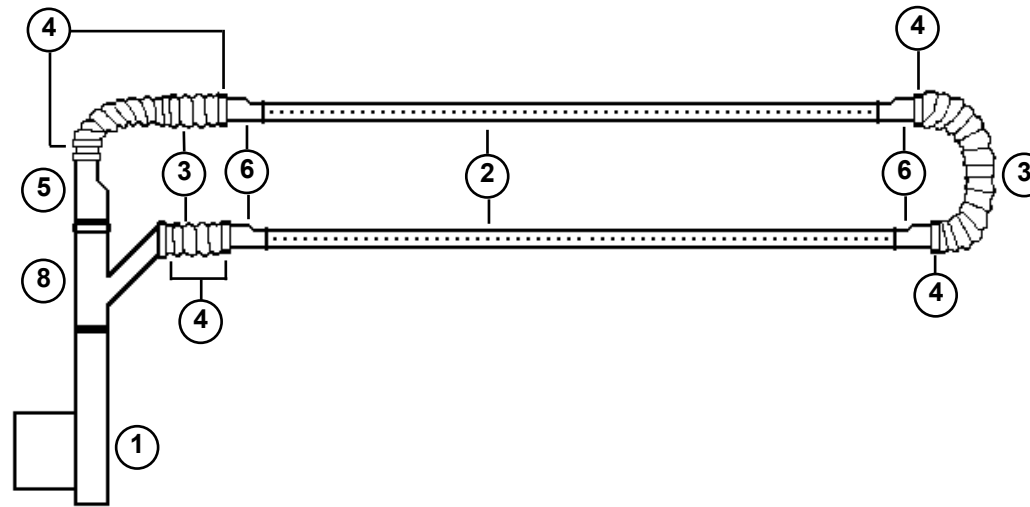
1. Blower
2. Blower tube 30 mm Dia., drilled
3. Flexible tube 50 mm Dia.
4. Hose clamp
5. Reduction piece 70/50 mm Dia.
6. Reduction piece 50/30 mm Dia.
8. Forked piece 70/70/50 mm Dia.
9. Deviation tube 50 mm Dia.

The blower tube should be mounted behind the first yarn sheet. Please arrange the blower tube so that a broken thread will be moved into the path of the laser light beam. The deviation tube should be placed in its correct position - i.e. at the rear of the machine.

The above shown version of assembly may vary slightly when using different blower types.

\*) The use of a blower device is dependent on the type of machine being used. With some types of machine it may not be necessary to use a blower device.

Assembly - Blower Unit C \*)



1. Blower
2. Blower tube 30 mm Dia., drilled
3. Flexible tube 50 mm Dia.
4. Hose clamp
5. Reduction piece 70/50 mm Dia.
6. Reduction piece 50/30 mm Dia.
8. Forked piece 70/70/50 mm Dia.

The blower tubes should be mounted behind the first yarn sheet at each side of the machine. Please arrange the blower tube so that a broken thread will be moved into the path of the laser light beam.

The above shown version of assembly may vary slightly when using different blower types.

\*) The use of a blower device is dependent on the type of machine being used. With some types of machine it may not be necessary to use a blower device.

**Notes**

---

Adjustment - Laser Light Barrier 480



Regardless of the fact 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.

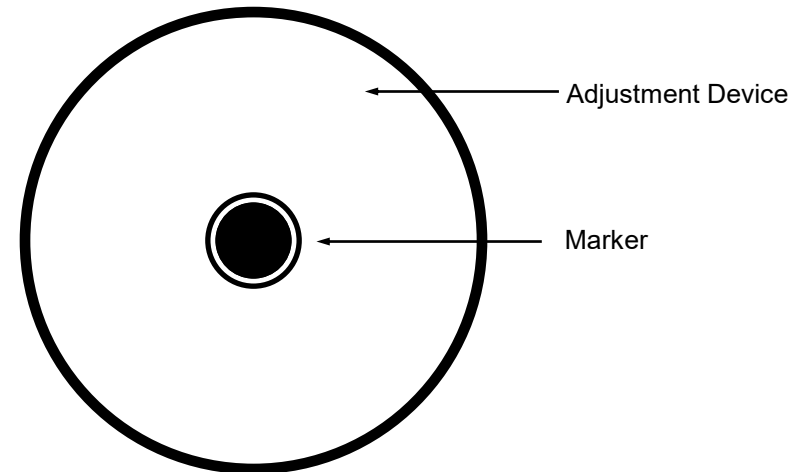
To adjust the laser light channel, the adjustment device supplied is needed. Please place this adjustment device onto the receiver lens.

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 white 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.



### 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 it necessary - on the grounds of the machine conditions - to set up a start-up delay?

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.

Should the machine not be stopped, please check again the sensitivity levels 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 got stuck and did not pass through the laser light barrier (e.g., thread caught by neighbouring needle)
- Stopping contact wrongly connected
- Thread broke during the start delay phase
- Blower device dirty
- 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
- Laser defect
- Receiver defect
- Fault in the control unit

**Notes**

**Electrical Connection - Control Unit Laserstop 4180**



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



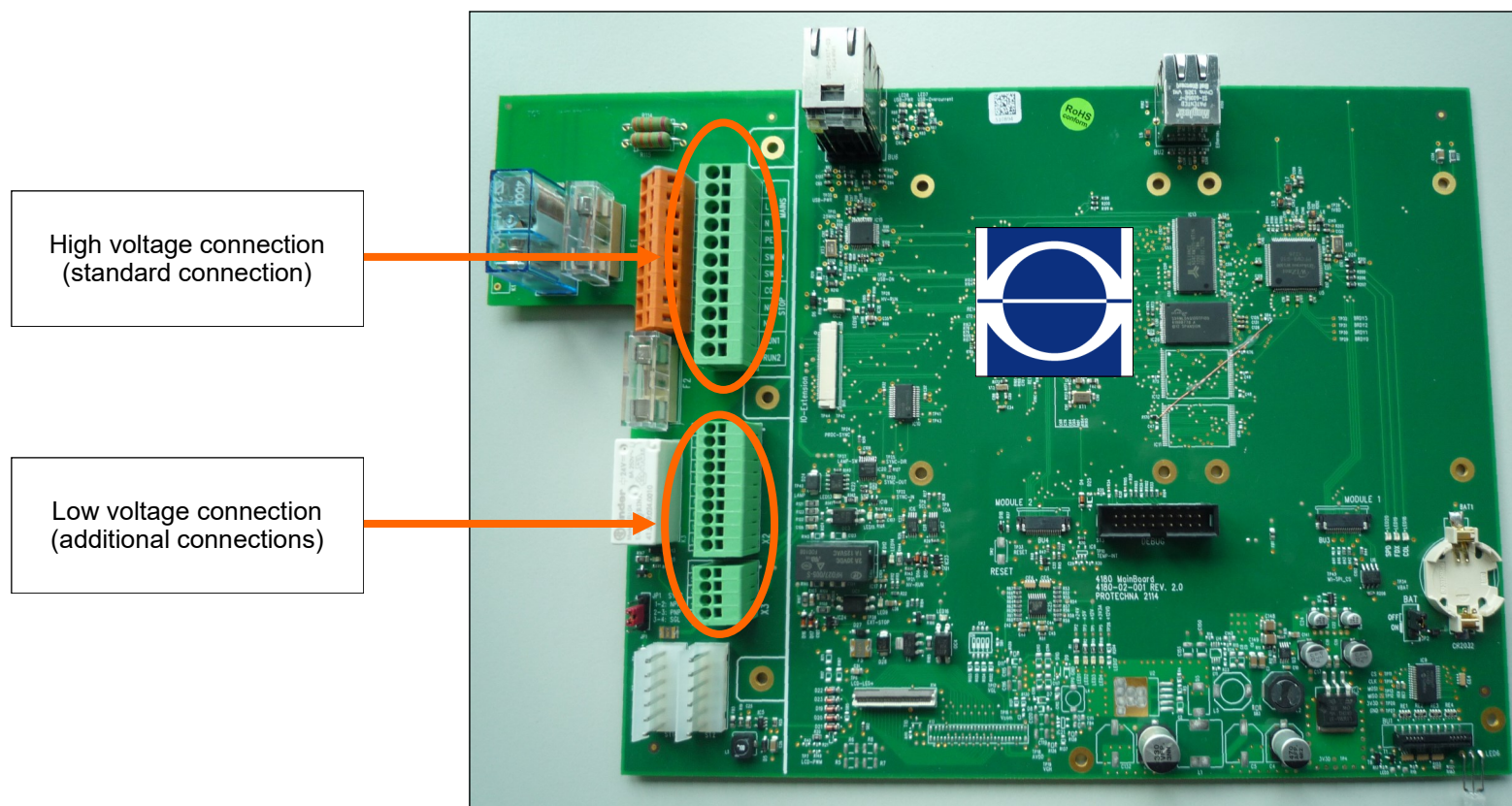
**Before electrical connection, you must make absolutely sure that there is no danger to come into contact with any parts that might carry live electricity.**



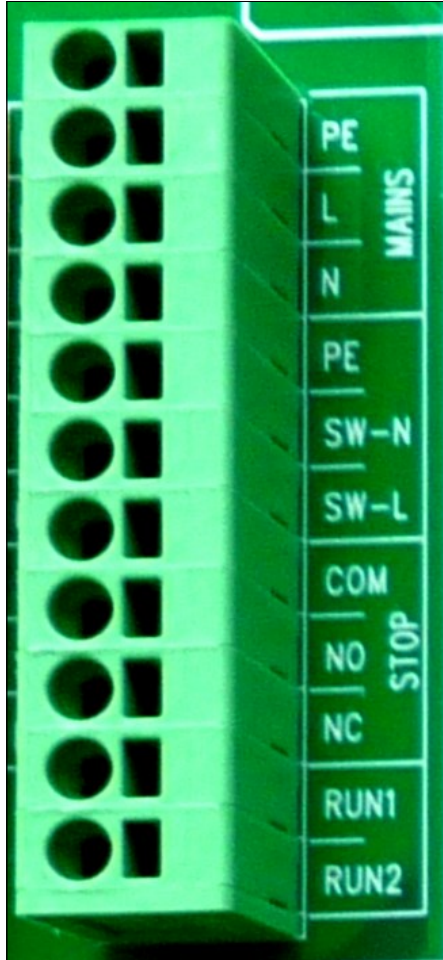
**To make the electrical connection, it is necessary to remove the top cover of the control unit. The cover is fixed with three screws on the right and left side of the housing.**

**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)



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.

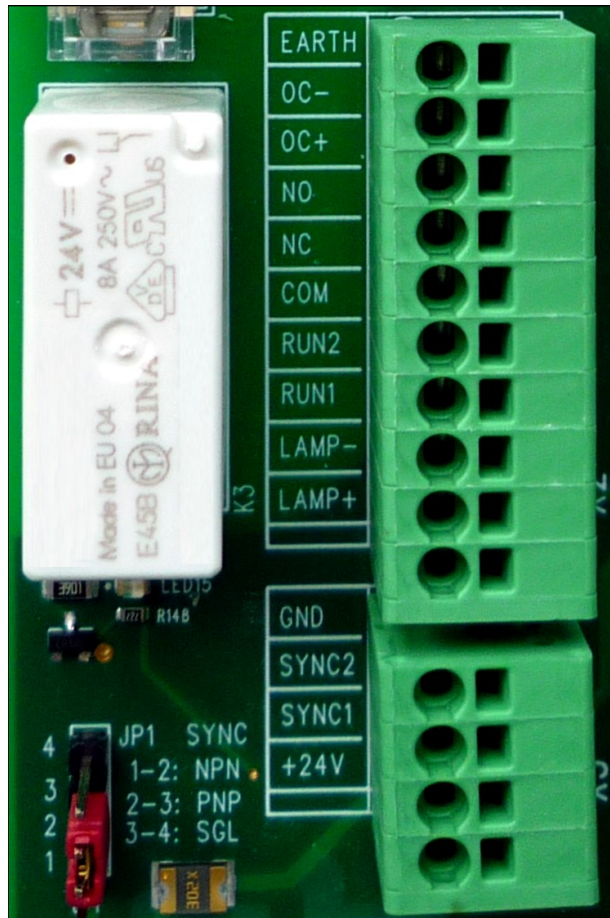
They connect to a potential-free relay contact, which is triggered when a fault occurs.

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

Impulse Sensor	
<b>GND</b>	Impulse sensor - Power supply 0V
<b>SYNC 2</b>	Signal from machine
<b>SYNC 1</b>	Impulse sensor - Signal
<b>+24 V</b>	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:  $U_{\max} = 30 \text{ V DC}$ ,  $I_{\max} = 0,25 \text{ A}$ , 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:  
 $U_{\max} = 30 \text{ V DC}$ ,  $I_{\max} = 1 \text{ A}$ .

**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.

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

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 \*\*)**

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.

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



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**.

\*) A pulse sensor is normally not required in the << STANDARD >> operating mode and is therefore not installed.

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



**Electrical Connection - Blower Device \*) (Elektror Blower)**



Please ensure that the voltage and the frequency specified for the blower motor match the power supply and that the motor rotation is correct.



The electrical connection between the blower and the switch box is carried out via the 6 pin blower cable.

**Electrical Connection - Blower**

Wires 1, 2 and 3 - Motor  
Wires 4 and 5 - Thermal Contact  
Yellow/Green - Earth

**Electrical Connection - Switch box of the machine**

**Power supply**

The blower is connected using the blower cables 1, 2 and 3. Make sure that the blower motor is provided with the correct voltage and frequency and that it turns in the correct direction.

A voltage must be present at these wires during the normal operation of the machine (machine is running). During the inching slow speed or when the machine is stopped there must be no voltage present.

The yellow/green wire must be connected together with the earth of the blower and the switch box.

**Thermal Contact**

The terminals 4 and 5 are normally connected **in series** with the stopping contact of the control unit.

They provide a potential free bimetal contact, which is activated when the blower motor is overheating. This contact is supplied as an **break** type contact (NC).

\*) The use of a blower device is dependent on the type of machine being used. With some types of machine it may not be necessary to use a blower device.

**PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines**

**Technical Data**

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

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

**PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines**

**Technical Data**

<b>Receiver 480</b>	
<b>Environmental conditions</b>	
Operation	0° C to 50° C
Humidity	max. 95 % RH
Storage	-20° C to +70° C
<b>Measurements</b>	
Length + threaded bolt	48 mm + 33 mm
Ø Body	40 mm
Ø incl. cable radius and connection	80 mm
<b>Weight</b>	0,12 kg
<b>Safety classification</b>	IP 65

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

**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.

PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines

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 interference 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.

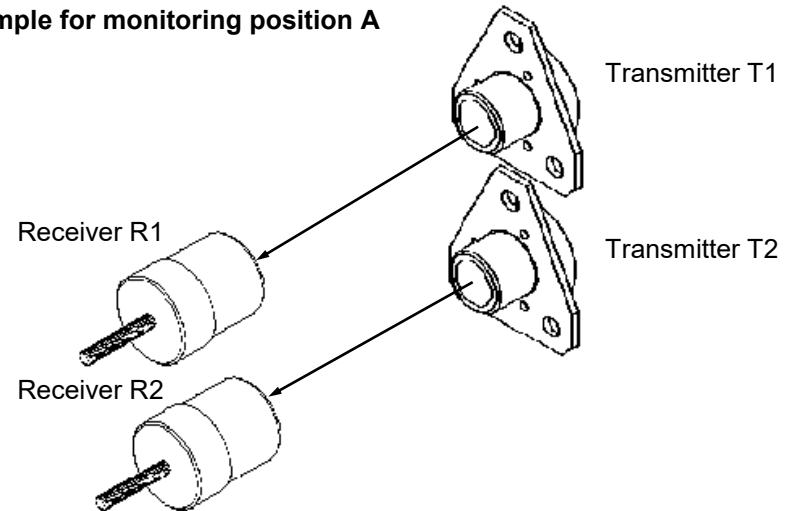
When both signals occurred during an adjustable time slot, the production machine is switched off. If only one laser light barrier delivers a signal, the machine will not be stopped.

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.
<span>◀</span> <span>+</span> <span>-</span> <span>▲</span> <span>▼</span> <span>▶</span>	

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 possibility 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**

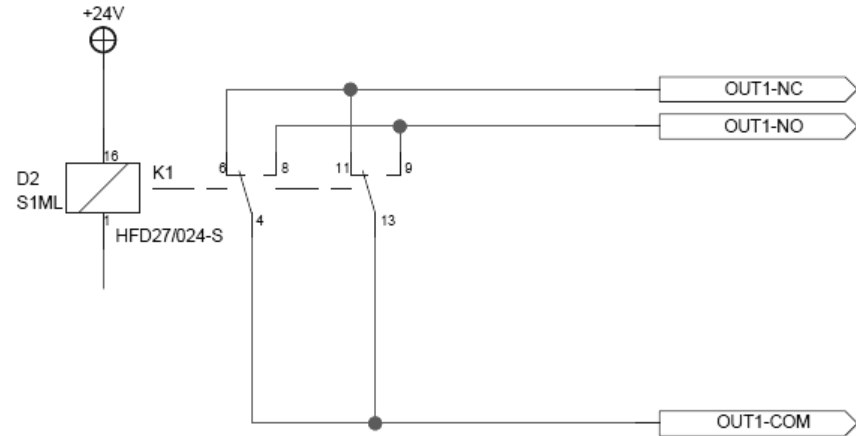
- 0** The I/O circuit board is installed; the relay is not activated.
- 1** The relay is activated. The relay remains switched for a thread fault until the machine is restarted.
- 2** The relay is activated. The relay is clocked switched for a thread fault until the machine is restarted (for example, 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.

PROTECHNA End Break Detector LASERSTOP 4180 Standard for Tricot and Raschel Machines

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	All other connections are not used.			
>>>				
25				
[ # ]	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