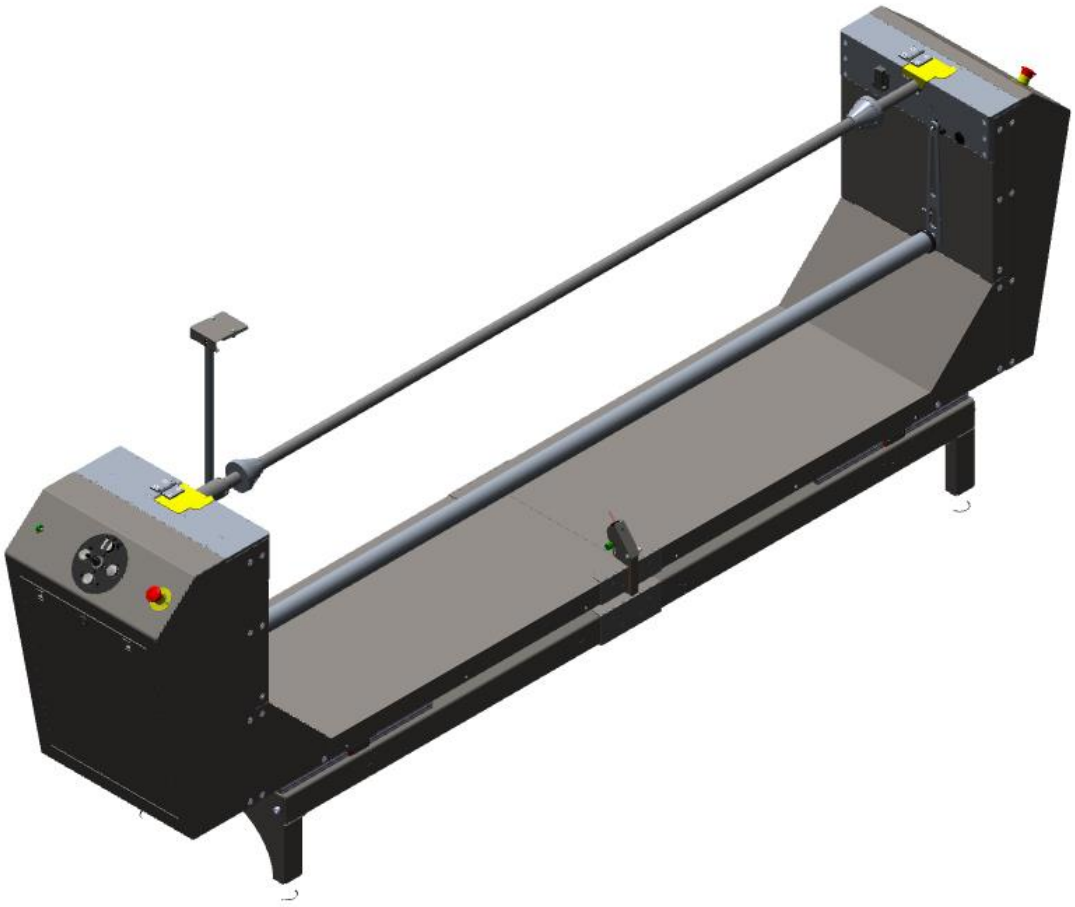
Unwinders



User Manual
Rev 003

Notice

Contact Information

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Revision history

Version	Reason for modification	Publication date	Author
001	Original version	March 2022	A.L.
002	Added Weight restrictions Updated chapter 6: Multitube air shaft Added fine-tuning detection (Droop Sensor)	November 2022	A.L.
002b	Added safety warning multitube air shaft	February 2023	A.L.
003	Updated 3 Positioning the Unwinder Updated 4.1.2 Control Panel Updated 5.1.2 Control Panel Added 7 KEYENCE Droop Sensor Updated 8 Multitube Air Shaft (optional) Updated 9 Loading Roll Material Onto The Unwinder Added 10 Feeding Material Into the Machine	March 2025	A.L.

Table of Contents

1 GENERAL DESCRIPTION

A motorised unwinder eliminates fabric distortion while cutting by securing a constant and stable fabric feed onto the cutting bed. As the roll unwinds, a loop is created to relax the material, reducing distortion, and secure an accurate cut. This loop is kept constant with the use of the droop sensor or the tension bar.

2 SAFETY INFORMATION

2.1 General

The unwinder is used for feeding the laser system with synthetic or natural materials. Using the unwinder for any other purpose is forbidden. Do not leave any safety covers open when operating.

WARNING: Frequent heavy lifting and handling of the rolls of fabric can cause back injuries. Use appropriate lifting and handling tools or ask assistance to reduce this risk.

Always turn off the unwinder before opening the safety covers or investigating a malfunction. Only authorised personal may then switch on the unwinder to investigate the problem.

Always turn off the unwinder before opening the electrics cabinet.

Do not move the unwinder when in operation. Space should be kept clear at both ends of the unwinder to allow for full travel of the upper frame. Do not lean anything against the unwinder.

WARNING: There is a risk of injury from being caught or trapped in moving machine parts. Keep hands, hair, clothing and jewellery away from moving parts. Do not wear jewellery, loose clothing, scarves or open jackets or shirtsleeves.

2.2 Residual Risks

The upper frame of the edge detection unwinder travels laterally if required to supply the laser cutter with fabric correctly. The timing of these movements cannot be anticipated, so great care should be taken when being around the unwinder during operation. Operator presence is not required during roll feeding. The lateral travel of the feed mechanism has a limited range.

2.3 Noise

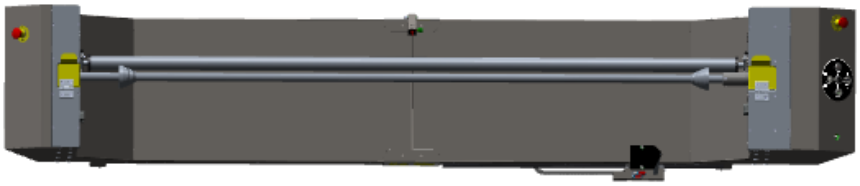
The noise level does not exceed 70 dBA.

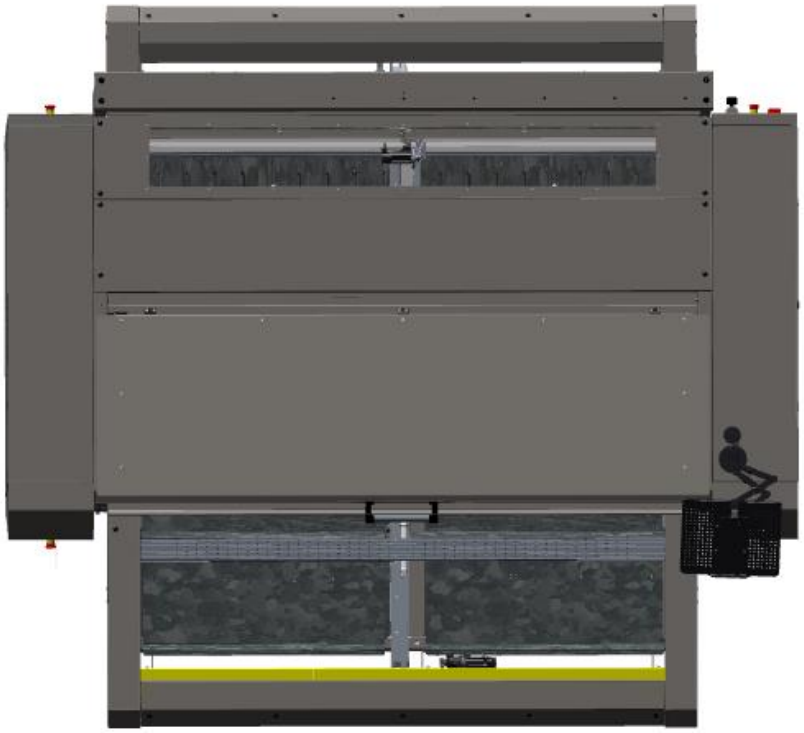
2.4 Symbols Used in This Manual

	Warning with dark (red) symbol: Refers to immediate threat that can cause serious injuries and effects on health and safety.
	Warning with light (yellow) symbol: Refers to a dangerous situation that can cause injuries and serious damage to the machine.
	Attention with dark (red) symbol: Refers to useful information to prevent damage to the equipment and prolong the service life of the machine.
	Attention with light (yellow) symbol: Refers to useful tips to enhance user-friendliness and make the work significantly easier.
	Note: Can be considered as a general tip, something that is useful to know.

3 POSITIONING THE UNWINDER

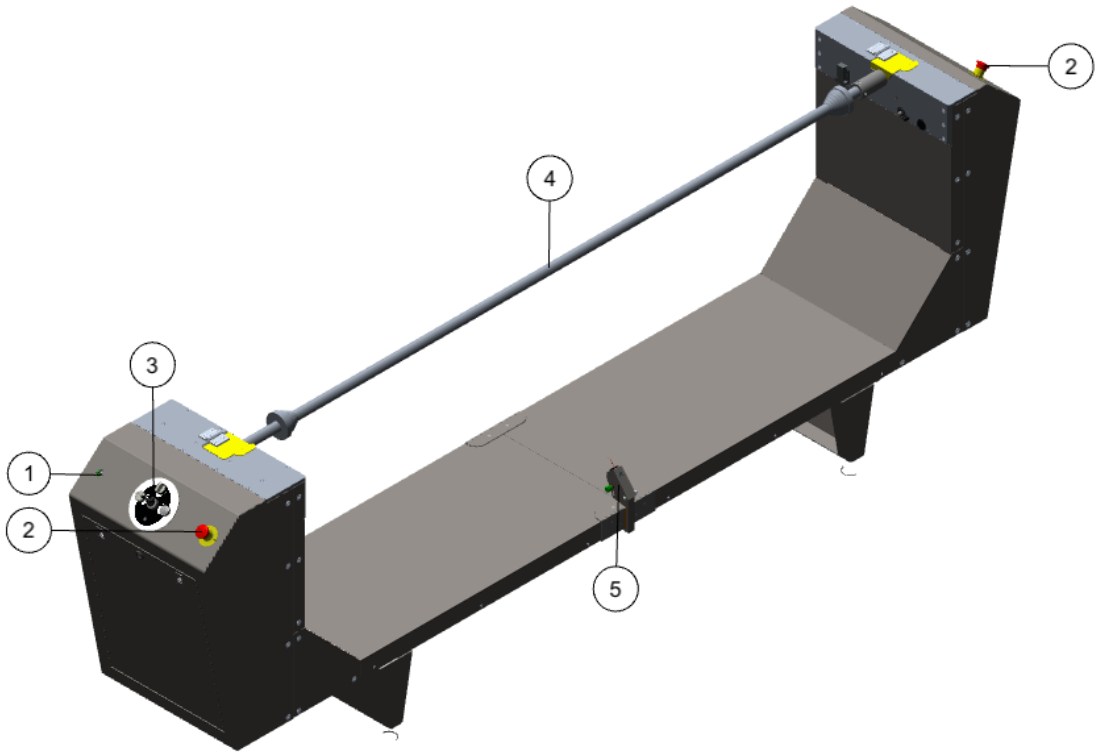
The unwinder can only be installed after the laser cutter has been installed. Correct placement of the unwinder is crucial for optimal operation. Position the unwinder parallel to the rear of the laser cutting machine, as centrally as possible and maintain a distance of approx. 0.5 meters (20 inches) between the unwinder and the laser cutter. The control panel must be on the same side as the laser cutter's touch control panel.





4 STANDARD UNWINDER

4.1 Components

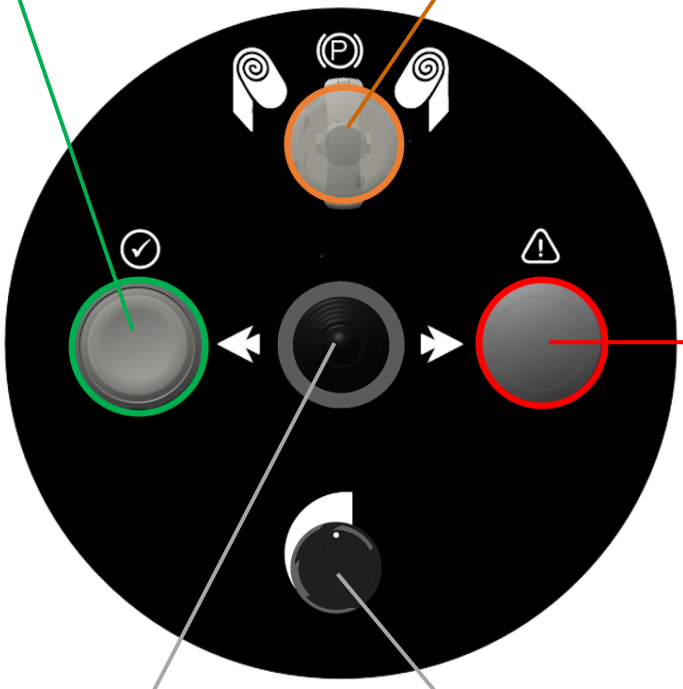


① ON/OFF buttons
② Emergency stop button
③ Control panel
④ Media shaft
⑤ Droop sensor

4.1.1 Emergency Stop Buttons

Pressing one of the emergency stop buttons will shut down the unwinder immediately. To restart operation, rotate the emergency stop button to release it and switch the unwinder back on.

4.1.2 Control Panel



System ready button:
- Press momentarily to acknowledge and clear the end of Roll detection error when both red and orange LED's are illuminated.
- Press for +1 second to reset the system to Loading Mode (EOR disabled until first trigger or detection of droop sensor).

Feed direction switch. Illuminated selector switch to select the direction in which the fabric feeds from the roll loaded onto the media shaft. Switch to the center to place the unwinder in park mode (standby).

The **Error LED** will illuminate for faults detected during operation. Refer to LED status chart.

Joystick for manually feeding (🡐) or retracting (🡒) material.

Whilst holding the joystick (🡐 or 🡒), press the **System Ready button** to activate feeding or retracting for one minute. Cancel this mode by pressing the **System Ready** button or by manipulating the joystick (🡐 or 🡒) again.

The **Speed Potentiometer** will set the desired speed of the Manual Feed and Retract when pressing the joystick 🡐 or 🡒.

NOTE: The automatic feeding will default to full speed and ignore the position of this potentiometer to prevent feed speed issues during operation.

4.1.2.1 LED legend and status

LED (Colour) Legend

LED off

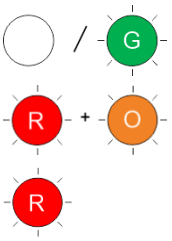
LED on + colour:

Green

Orange

Red

LED Status



System inactive/active

End of roll detected

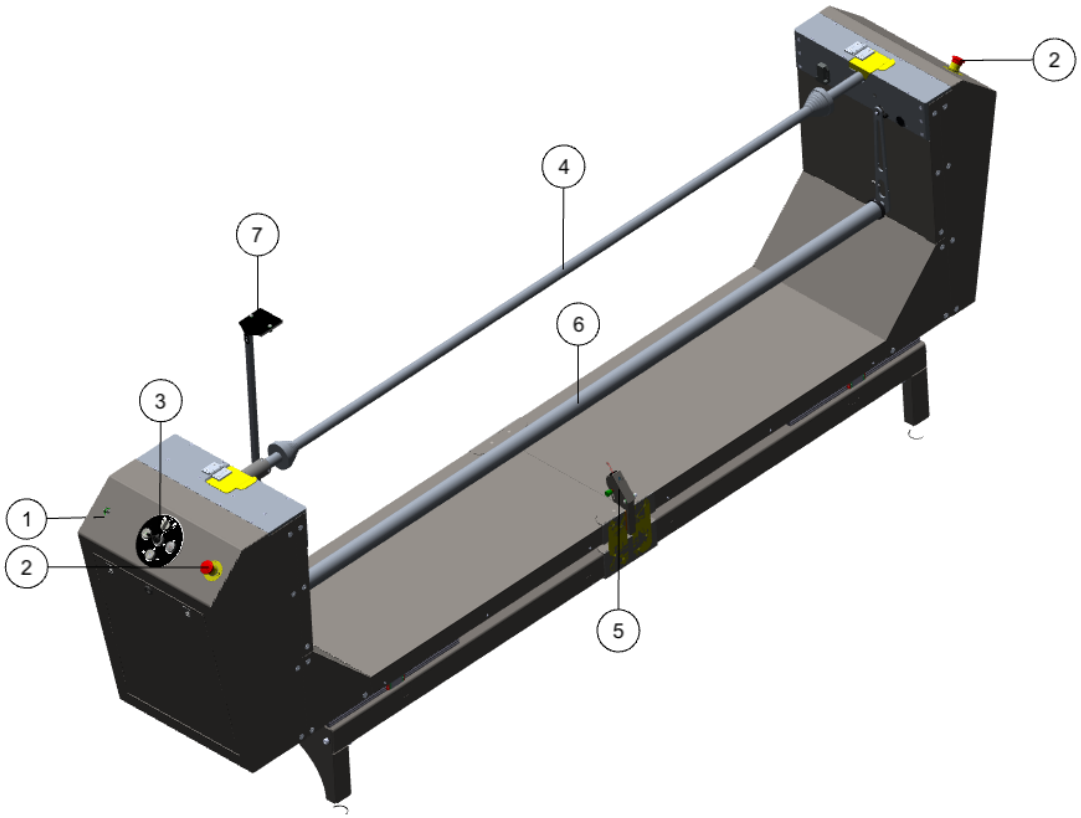
Interlock cover plate open

4.1.3 Droop Sensor

The droop sensor detects the material, so that it can determine when material may be automatically unwound to feed the laser cutter while maintaining a loop of relaxed material, reducing distortion, and securing an accurate cut. More information can be found on page 17 or 19, according to your sensor type.

5 EDGE DETECTION UNWINDER

5.1 Components

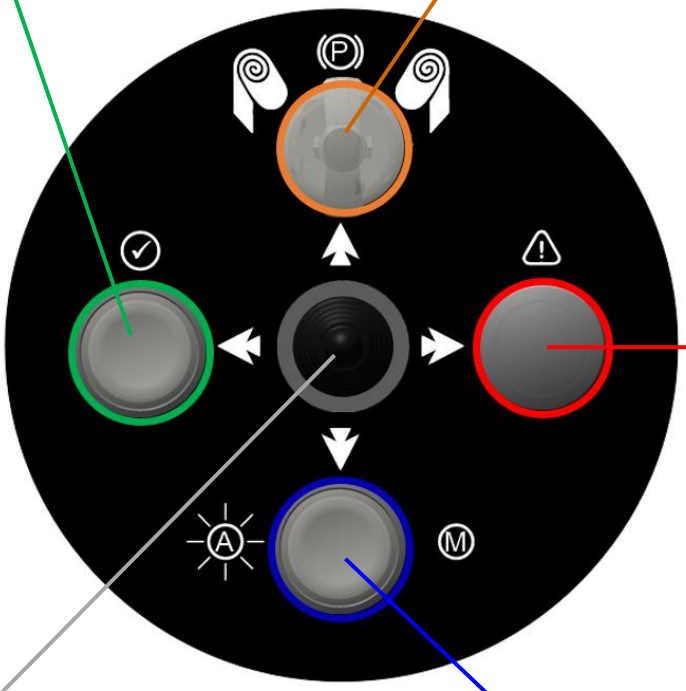


① ON/OFF buttons
② Emergency stop button
③ Control panel
④ Media shaft
⑤ Droop sensor
⑥ Tension bar
⑦ Edge detection sensor

5.1.1 Emergency Stop Buttons

Pressing one of the emergency stop buttons will shut down the unwinder immediately. To restart operation, rotate the emergency stop button to release it and switch the unwinder back on.

5.1.2 Control Panel



System ready button. Press momentarily when flashing to:

- Activate the unwinder
- Clear *End of Roll* error
- Reactivate after *Interlock Open*

Feed direction switch. Illuminated selector switch to select the direction in which the fabric feeds from the roll loaded onto the media shaft. Switch to the center to place the unwinder in park mode (standby).

The **Error LED** will flash for faults detected during operation. Refer to LED status chart.

Joystick for:

- Manually feeding (🡐) or retracting (🡒) material.
- Manually tracking the unwinder carriage laterally (🡑 or 🡓) into a suitable position during loading.

Whilst holding the joystick (🡐 or 🡒), press the **System Ready** button to activate automatic feeding or retracting for one minute. Cancel this mode by pressing the **System Ready** button or by manipulating the joystick (🡐 or 🡒) again.

Press 🡐 or 🡒 once for slow speed and twice for fast speed.

Auto/Manual Edge Detection button. Press to enable edge detection mode (only possible if the unwinder is not in park mode).

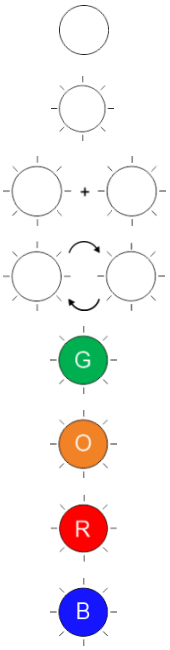
This mode will self-terminate if an *End of Roll*, *Interlock Open* or *Tracking Limit Detected* occurs.

To disable auto tracking mode, press one of the following buttons or switches:

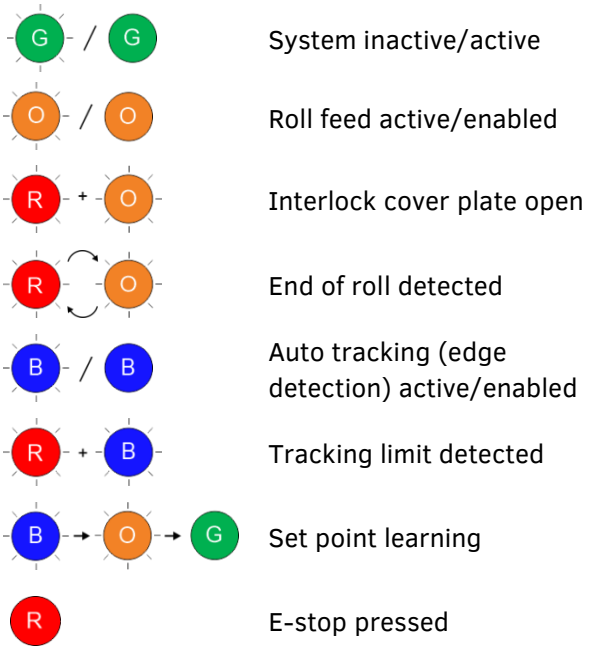
- Auto/Manual Edge Detection
- System ready
- Feed Direction Switch
- Power Off

5.1.2.1 LED legend and status

LED (Colour) Legend



LED Status



5.1.3 Droop Sensor and Tension Bar

The edge detection unwinder is equipped with both a droop sensor and a tension bar, allowing you to choose how to keep the loop of relaxed material constant. When the tension bar is being used, the droop sensor isn't, and vice versa.

The tension bar swings back and forth according to the material's tension inside the material loop, to guide the material onto the conveyor without exerting too much tension on it.

NOTE: The tension bar always exerts a small amount of tension, however slight, making it less suitable to use with very stretchy materials.

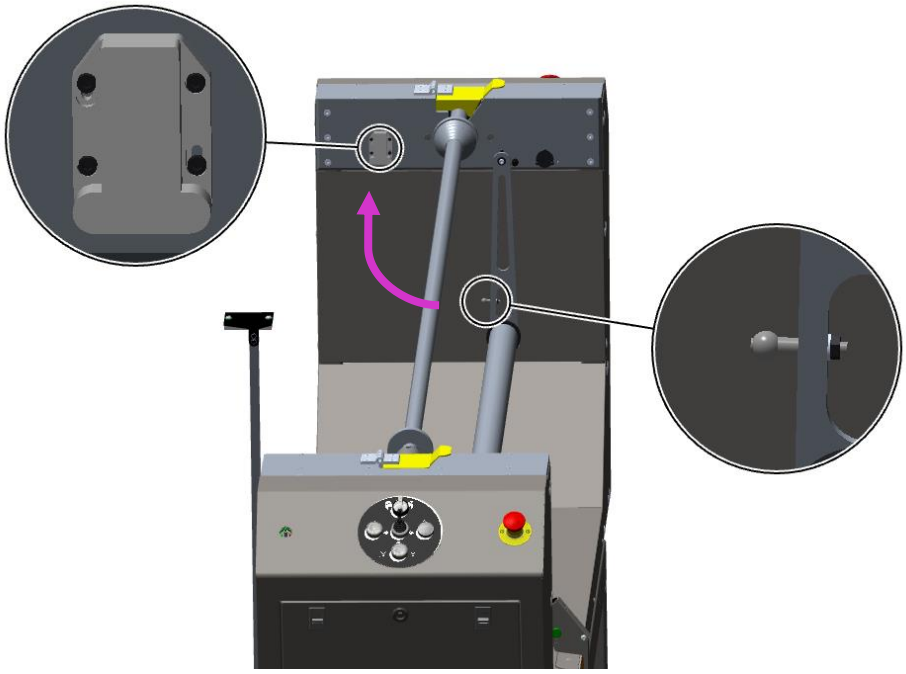
ATTENTION: Do not lean on the tension bar when it is locked as this may damage the tension bar and the locking system.

The droop sensor detects the material, so that it can determine when material may be automatically unwound to feed the laser cutter while maintaining a loop of relaxed material, reducing distortion, and securing an accurate cut. More information can be found on page 17 or 19, according to your sensor type.

In any case, as the roll of material unwinds, a loop is created to relax the material, reducing distortion, and securing an accurate cut.

5.1.3.1 Switching from using the tension bar to using the droop sensor

Before using the droop sensor, the tension bar must be locked. To do so, pull the tension bar upwards and click the tension bar's locking pin in the bottom of the push latch to secure it.



5.1.3.2 Tension bar set point learning

If the set point is incorrect, the unwinder may feed slowly or not feed at all when the tension bar is being used. This requires a reset of the set point position.

1. Allow the tension bar to hang free in the down position.
2. Power on the unwinder.
3. Press and hold the **System Ready** and the **Auto/Mannual Edge Detection** buttons for 10 seconds. The system will flash orange/blue, then green, to indicate the current set point has cleared.
4. Reboot the unwinder to learn the new set point.

NOTE: The system cannot be activated if the Set Point is clear.

5.1.4 Edge Detection Sensor

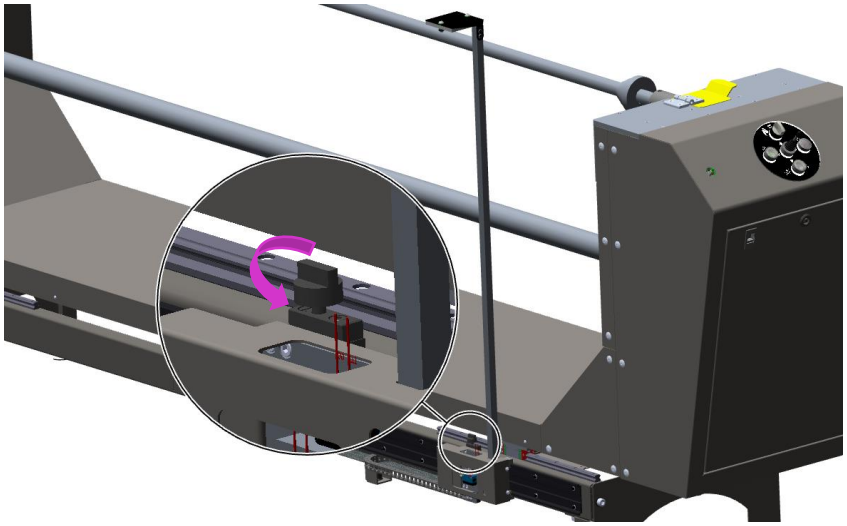
The edge detection sensor detects the edge of your material and triggers lateral movement of the unwinder carriage (with the roll of material) to ensure the material stays within the width of the conveyor.

NOTE: The edge detection sensors are not suitable to use in combination with mesh material. Additional sensors and equipment must be fitted to the unwinder if you need to use mesh material (or material with holes).

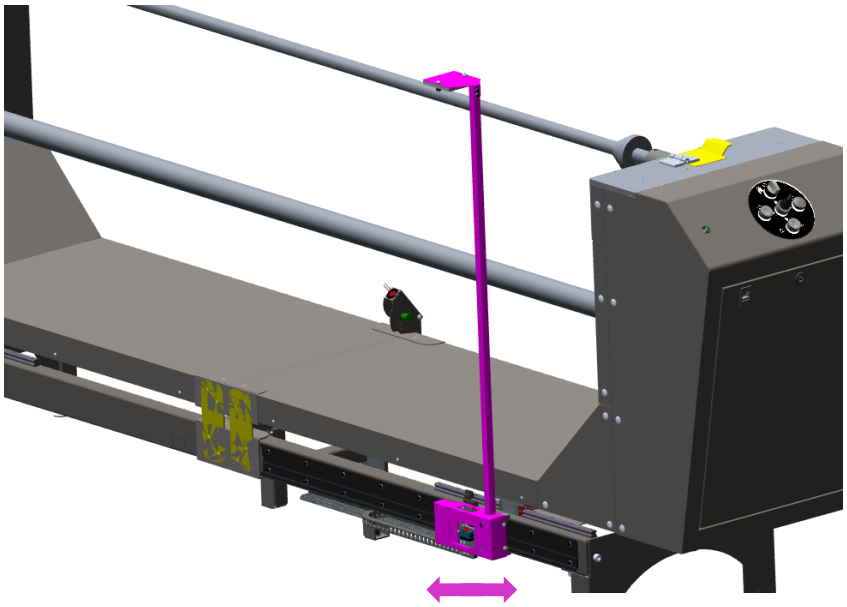
5.1.4.1 Repositioning the Edge Detection Sensors

In some cases, you may need to reposition the edge detection sensors, for example if you replace the roll of material with a smaller size and the edge of material therefore needs to be detected elsewhere.

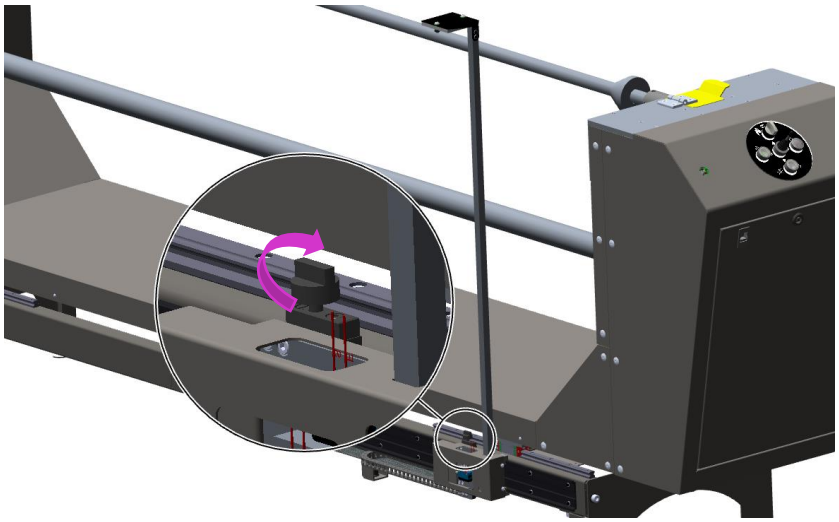
1. Loosen the carriage by turning the knob.



2. Move the edge detection sensors carriage.

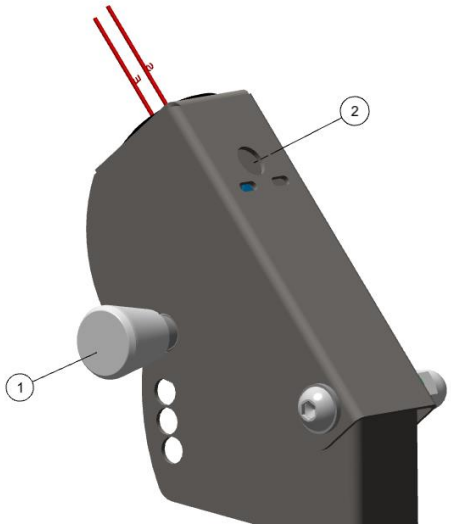


3. Secure the carriage by turning the knob again.



6 SICK DROOP SENSOR

The droop sensor detects the material, so that it can determine when material may be automatically unwound to feed the laser cutter while maintaining a loop of relaxed material, reducing distortion, and securing an accurate cut.



6.1 Setting Up and Fine-Tuning the Sensor

The index plunger ① allows adjusting the vertical alignment of the detection by changing the angle of the droop sensor. To change the detection angle, pull the knob, then raise or lower, and release in one of the other holes.

The small, black screw ② allows adjusting the sensor's sensitivity. Turning to the right increases sensor sensitivity. We recommend starting at maximum sensitivity, and, if necessary, then turning the screw little by little to the left until the sensor detects the material as required for optimal unwinding and feeding on the conveyor.

NOTE: The full range of the sensitivity adjustment screw is only ¾ of a turn, meaning it concerns minor adjustments.

To detect the material correctly, the droop sensor must be correctly fine-tuned, by means of the sensitivity screw and/or the index plunger. If the standard fine-tuning proves unsuitable for the material you are working with (e.g. dark materials or materials that do not reflect well), you will need to readjust the sensor.

In that case, perform the following steps:

1. Make sure the unwinder is in standby mode (see section 4.1.2).
2. Make sure the unwinder is positioned correctly (see section 3).
3. Manually unwind some material off the roll and lay it on the laser cutter conveyor. Try to create as suitable a loop as possible.
4. Make sure the sensitivity adjustment screw of the droop sensor is turned completely to the right (maximum sensitivity).
5. Check de droop sensor LED indicator status:

The system is active. The sensor does not detect any material. Readjust the detection angle by means of the index plunger (see 4.1.2.1).

The system is active. The sensor detects the material but fine-tuning until steady lit is recommended.

The system is active. The sensor detects the material correctly. Continue with the next step.

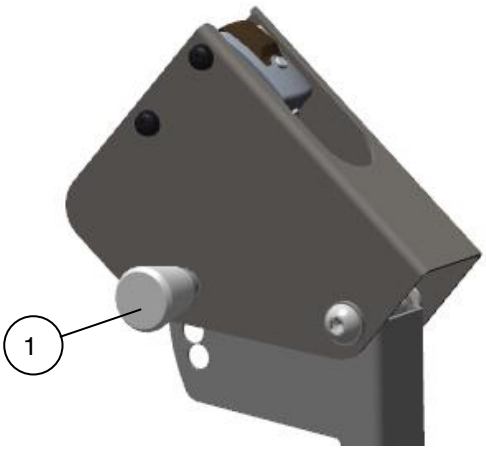
6. Get the unwinder out of standby mode by switching the selector switch to the left or the right (depending on the required unwind direction) on the control panel.
7. Press the **Feed** button at the rear of the laser cutter to feed the material and check the fine-tuning of the droop sensor in relation to the material. The unwinder should automatically unwind material in an even loop when material is required on the moving conveyor.

7 KEYENCE DROOP SENSOR

The droop sensor detects the material, so that it can determine when material may be automatically unwound to feed the laser cutter while maintaining a loop of relaxed material, reducing distortion, and securing an accurate cut.

7.1 Setting Up and Fine-Tuning the Sensor

The index plunger ① allows adjusting the vertical alignment of the detection by changing the angle of the droop sensor. To change the detection angle, pull the knob, then raise or lower, and release in one of the other holes.



It is possible to alter the sensor's sensitivity to suit a particular material or application. In most cases the default setting of 95 will work but in some circumstances this may need to be lowered slightly between 0 and 95.

To alter this setting, perform the following steps:

1. Press ② (SET) for 3 seconds to enter calibration mode.
2. Press ③ (UP) or ④ (DOWN) to alter the setting.
3. Leave the unit for 3 seconds. The new value will then be applied.

The default value is 95. Usually, a lower value can improve the sensitivity to detect material if required.

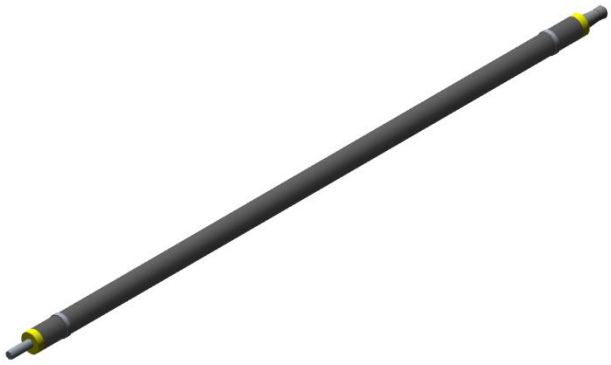
ATTENTION: It is recommended not to go below 0 or above 100 with this setting.

8 MULTITUBE AIR SHAFT (OPTIONAL)

The optional multitube air shaft can be expanded by means of air, thus preventing even the slightest play of the roll of material on the media shaft.

WARNING: The recommended air pressure is 0.2 MPA to 0.4 MPA, with an absolute upper limit of 0.6 MPA.

WARNING: Wear safety gloves when manipulating the air shaft to avoid cuts.



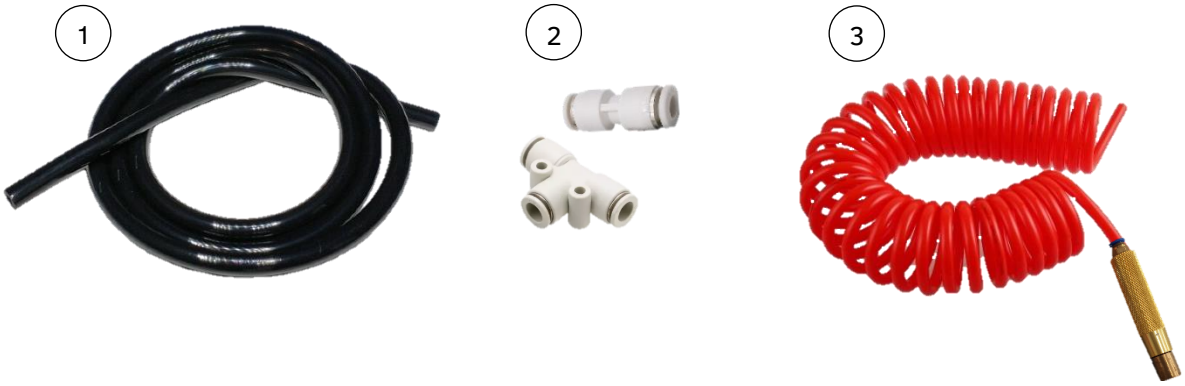
Expanding shaft for the L1810 series

Expanding shaft for the L3214 series

Information on how to load the roll of material onto the shaft can be found on page 22.

8.1 Inflating the Air Shaft

The following items are provided with the expansion shaft:



1. Cut the pneumatic tube between the compressor and the compressed air regulator on the machine.
2. Install the tee fitting ② between the two tubes.
3. Connect the provided pneumatic tube ① to the tee fitting ②.
4. Use the straight fitting ② to connect the recoil air hose with the air gun ③ to the pneumatic tube ①.
5. Press the air gun outlet on the air valve of the expansion shaft to inflate the air shaft.

8.2 Deflating the Air Shaft

To deflate the expansion shaft, press on the air valve of the expansion shaft.

9 LOADING ROLL MATERIAL ONTO THE UNWINDER

WARNING: We recommend that two people handle the media shaft.

WARNING: Wear safety gloves when manipulating the air shaft to avoid cuts.

WARNING: For safety reasons, always perform this procedure with the unwinder switched off.

Perform the following steps to load the roll of material on the unwinder:

1. Open the yellow safety covers on both sides of the media shaft and take the media shaft out of the unwinder.
2. In case of a standard media shaft, remove one of the media shaft core holders using a hex key. In case of an air pressure media shaft, this step is not applicable (continue with step 3).
3. Place the roll of fabric over the media shaft and try positioning it as central as possible on the shaft.

WARNING: The maximum permissible total weight of the shaft and material combined is 80 kg.

4. In case of a standard media shaft, place the core holders into the core of the roll and secure them using a hex key. In case of an air pressure media shaft, inflate the shaft using the provided air gun.

WARNING: The recommended air pressure is 0.2 MPA to 0.4 MPA, with an absolute upper limit of 0.6 MPA.

5. Close the yellow safety covers on both sides of the media shaft.
6. To feed your roll material into the machine, continue with the next section.

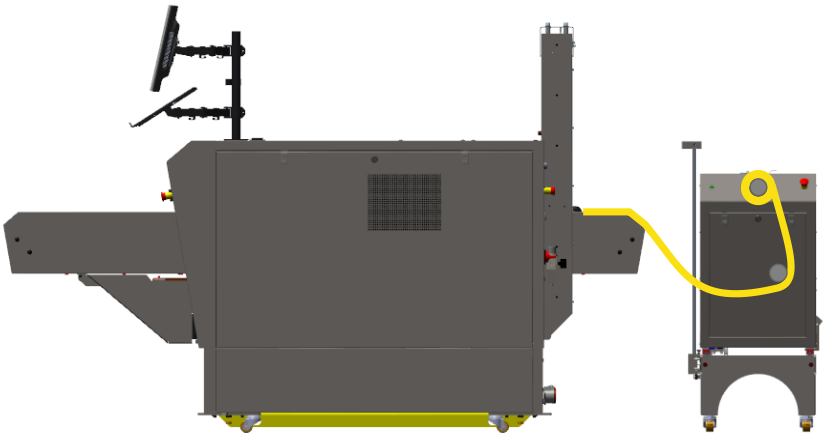
10 FEEDING MATERIAL INTO THE MACHINE

WARNING: We recommend that this procedure be performed by two people.

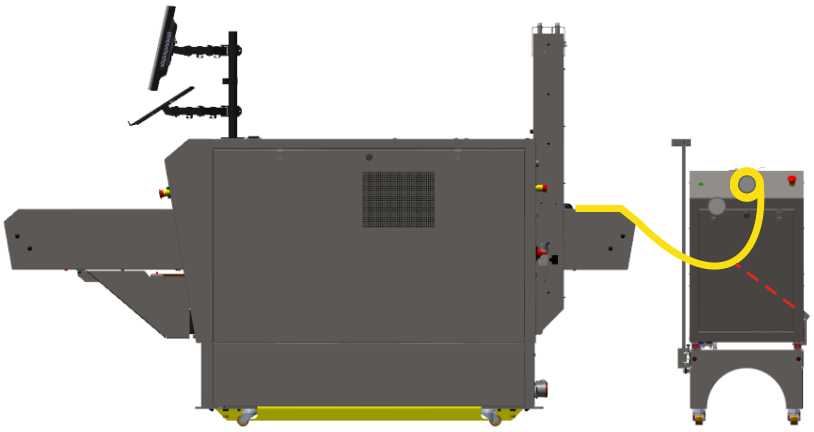
1. Ensure the pressure bar of the laser cutter is positioned in the supports and does not touch the material.
2. Position the material on the conveyor, centring it as accurately as possible. If performing this procedure alone (not recommended), secure one end of the material to the conveyor bed by placing the pressure bar onto it, move to the opposite end of the material, then position the other end of the pressure bar onto this end of the material.
3. Make sure the fabric lies flat on the conveyor surface.
4. Power on the unwinder and put it in park mode.
5. When properly adjusted, the droop sensor will accurately detect insufficient material and trigger the unwinding mechanism until it detects an adequate amount of slack.
6. Feed material into the laser cutter. You can do this either by using the touch screen (navigate to **Actions** > **Feed** and use the arrows) or by pressing the feed button on the rear of the laser cutter to advance the material by a preset distance.

ATTENTION: When the unwinder stops unwinding (e.g., at the end of the roll) and the sensor remains uncovered, the Error LED will signal. In this case, you must manually unwind material yourself.

7. If applicable, press the automatic edge detection button. If necessary, refer to 5.1.4.1 *Repositioning the Edge Detection Sensors* on page 15.
8. Check that the material is under controlled tension:
   - Forward movement is driven by the conveyor and simultaneous back tension is maintained by the unwinder.
   - A consistent, even material loop should be formed.
   - The material should move smoothly into the machine, with no resistance or jerking during feed.
   - Loop height and shape should be uniform and stable.
9. Position the pressure bar onto the material and set the feed direction switch correctly. You are now ready to begin your cutting job.



Media path when using the tension bar



Media path when using the droop sensor