



# L3214 LASER CUTTER

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User Manual  
Rev 004

## Registering the laser cutter

Please register the L3214 laser cutter on the following link:

<https://www.summa.com/support/product-registration/>

Failure to register the L3214 laser cutter may result in a delayed response to warranty and service inquiries.

## Contact Information

All inquiries, comments or suggestions concerning this and other Summa manuals should be directed to:

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Website

[www.summa.com](http://www.summa.com)

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## **Congratulations on Your Purchase of the New L3214 Laser Cutter!**

Summa's professional laser cutting systems have been developed with years of experience in advanced finishing technology. Summa strives to empower you with laser cutting solutions to bring exceptional quality, smart processing, extended automation, and unsurpassed accuracy to your workflow.

Textile is one of the fastest growing markets, where on-demand digital printing proves to be the game changer many soft signage, sportswear and fashion brands are looking for. Printed textiles require flawless finishing and absolutely nothing cuts as accurately as lasers do.

The contactless cutting method of laser equipment means no fabric distortion, low to no dust generation, no tool wear and no fraying of textiles or fabrics thanks to perfectly sealed edges. Even most intricate details are a breeze to cut with Summa laser cutting technology.

Discover the many other advantages Summa laser cutting technology has to offer in this manual. Also, an overview of main components of the L3214, operating procedures and safety precautions are being explained in this manual.

All information in this manual must be read and understood before any attempt to operate the machine is made.

This manual was compiled based on the following revisions:  
Firmware 3011

## Revision history

Version	Reason for modification	Publication date	Author
001	Original version		N.D.
002	Updated content and layout	29 November 2021	A.L.
003	Updated content	14 July 2022	A.L.
004	Updated chapter 2.1.1.2 (Feed Button Distance) Deleted Unwinder chapter (now available as separate manual) Updated chapter 4.1.1.3 Updated chapter 4.4 Updated chapter 2.1 (Vision gantry light switches)	10 February 2023	A.L.

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# 1 SAFETY

## 1.1 Safety

### 1.1.1 General

The manufacturer has no direct control over the machine operation and application. Proper safety practice is the sole responsibility of the owner, user, and operator.

All instructions and safety warnings in this manual are based upon the use of this machine under proper operating conditions without alterations from the original design.

Any use of the laser cutter that is beyond the capabilities of the combination laser source/material is considered as improper use and may result in injury and/or serious damage to the machine and will lead to loss of warranty.

The installation of the machine, accessories, and spare parts must not be done by untrained or unauthorized persons. Also, the described maintenance procedures need to be followed and performed by trained personnel.

### 1.1.2 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.

### 1.1.3 Safety symbols on the machine

Safety labels are used on some parts of the machine. They are explained below.

**Caution**

Servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not open the equipment and do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Unplug this equipment when not used for an extended period of time.

**Caution**

Class 1 Laser Product.

Class 4 invisible laser radiation when open.

Avoid eye or skin exposure to direct or scattered radiation.

Class 2 laser pointer. Do not stare into the beam.

**Caution**

Moving parts. Risk of trapping. Keep hands, clothing, jewellery, and hair away.

**Caution**

This equipment should only be used in a well ventilated area.

Do not cover ventilation openings.

Periodic maintenance required.

Only use a CO<sub>2</sub> fire extinguisher on this equipment.

Compressed air hazard. Ensure that the air supply to the machine is disabled before disconnecting tubes.



Consult the user's manual.

Make sure to observe all the caution labels on the machine.

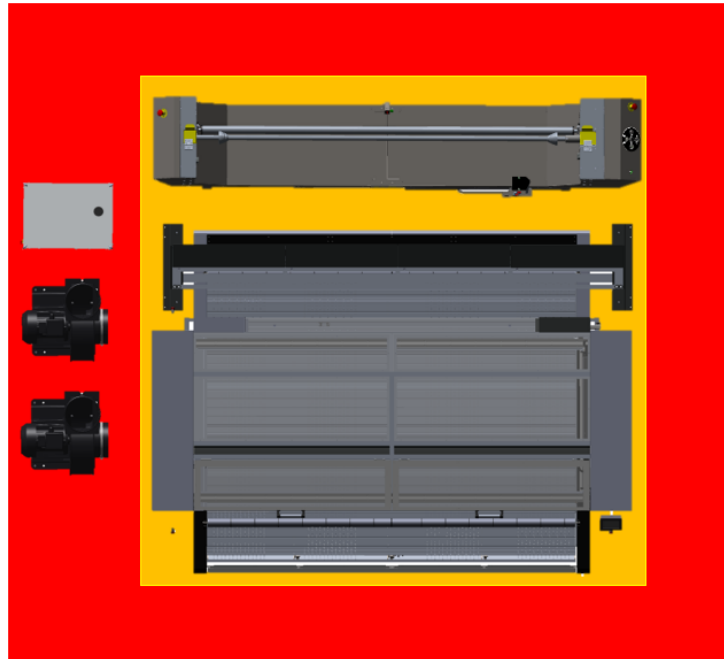


### 1.1.4 Safety precautions



**WARNING:** This equipment is not suitable for use in locations where children are likely to be present.

#### 1.1.4.1 Danger area during operation



The general danger area is the yellow area: the complete area where the conveyor is moving and the fabric roll is in motion. Anyone not operating the machine should keep a distance around the machine of at least one meter. Only the trained operator or fully trained personnel can be in this area. When the laser cutter is operating, do not leave it unattended at any time.

#### 1.1.4.2 Safety precautions related to movement



**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, open jackets or shirtsleeves.

#### 1.1.4.3 Safety precautions related to the built-in laser

The laser emits invisible class 4 laser radiation; avoid skin exposure to direct or scattered laser light and do not stare into the laser beam. Wear laser safety goggles.



**WARNING:** Safety goggles must be worn.

Any person or organization performing any modification to the L3214 laser cutting system is responsible for ensuring the reclassification and relabelling of the laser product.

#### 1.1.4.4 Safety precautions related to the system components

When closing the safety cover, ensure that no fingers or other items can be trapped between the safety cover and the side pod. When the safety cover is lifted, care must be taken to avoid bumping your head against it. The electrical enclosure (i.e. doors and cover pods, etc.) must only be opened by trained service personnel. The L3214 laser cutting system must not be operated with its shutter, guard, protective housings, or any of the safety interlocks removed.

#### 1.1.4.5 Safety precautions related to the extraction system

Before commencing any cutting procedure ensure that the fume extraction system is in good working order and operates correctly. Ensure that any fumes are extracted in accordance with health and safety requirements.

#### 1.1.4.6 Safety precautions related to the material

The L3214 laser cutter can process a broad range of materials. Choose only material types that do not generate harmful emission during the cutting process. Check with the material supplier or manufacturer before cutting. The following materials are not suitable for being laser-cut:

- Leather and artificial leather that contains chromium (VI)
- Carbon fibres (Carbon)
- Polyvinyl chloride (PVC)
- Polyvinyl butyral (PVB)
- Polytetrafluoroethylenes (PTFE / Teflon)
- Beryllium oxide
- Any materials containing halogens (fluorine, chlorine, bromine, iodine and astatine), epoxy or phenolic resins.



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**WARNING:** Respiratory equipment must be worn for airborne dust particles.

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#### 1.1.4.7 Safety precautions related to fire

The cutting area must be provided with a carbon dioxide fire extinguisher and any relevant personnel must be trained to use it in case of emergency.

### 1.1.5 Safety features

#### 1.1.5.1 Emergency stop buttons

Pressing an emergency stop button will shut down the machine immediately. The current cutting job will be lost. The system (and preferably the software as well) will have to be rebooted in order to restart the cutting process.

### 1.1.5.2 Safety covers

When the safety cover lid of the cutting area or the conveyor safety cover is opened, the laser stops firing and the cutting job is paused. A warning on the touch control panel pops up, prompting the operator to close the cover. The machine will resume operation when the covers have been closed.

### 1.1.6 Personal protective equipment

The required safety equipment depends on the material that needs to be processed. When operating or servicing the machine, the operator should wear appropriate protective equipment. This can include:

- Protective work clothing
- Respirator mask, in case of toxic fumes
- Safety goggles: when processing the material, harmful particles can be generated.

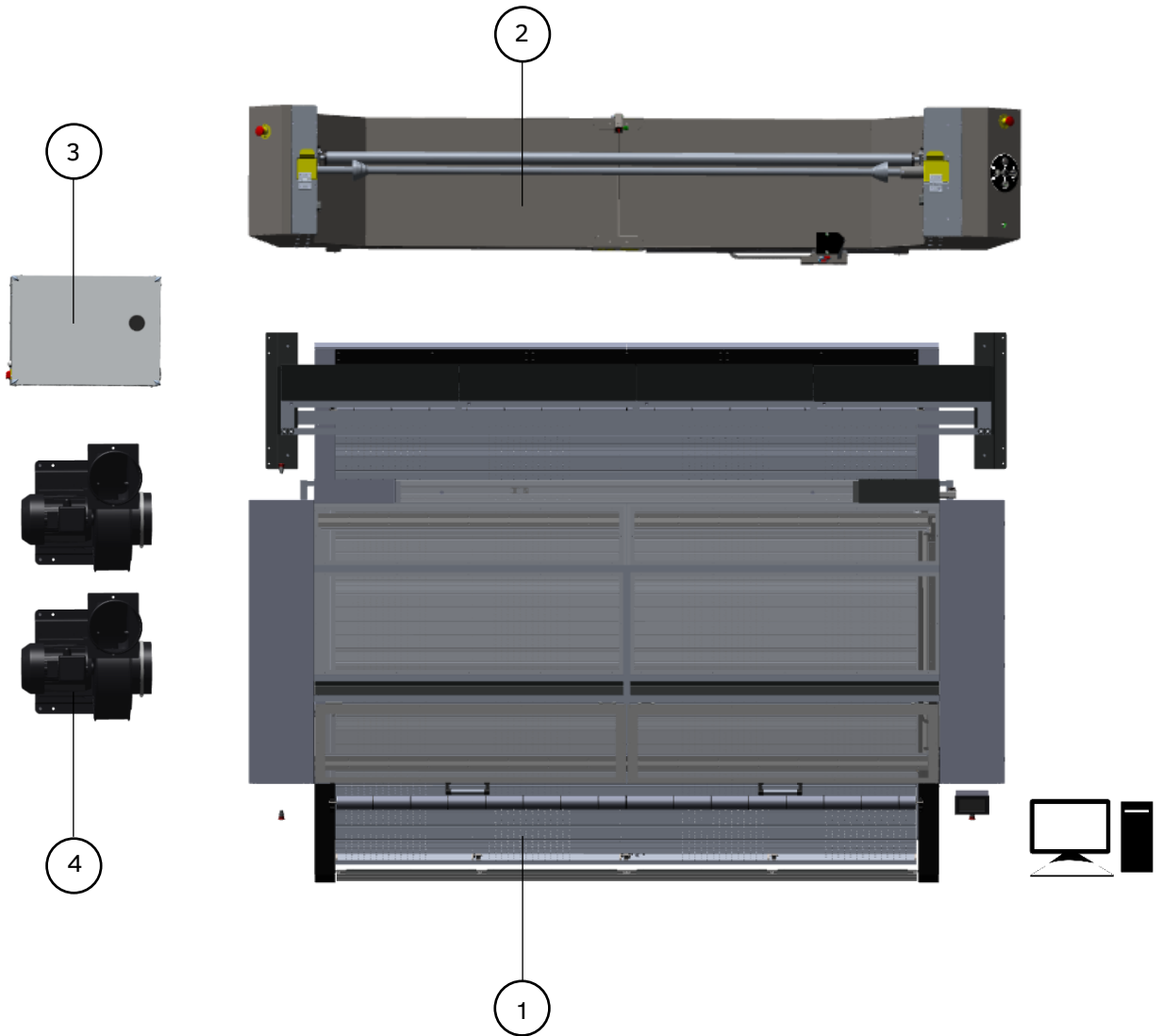
## 1.2 Operating environment

Environmental conditions can significantly affect the machine's performance. Most restrictions or recommendations for the ideal operating environment are already described in the site preparation document. The environmental conditions of the machine (without media) are as follows:

<b>Operating Temperature</b>	15 to 32° C	59 to 90° F
<b>Storage temperature</b>	-30 to 70° C	-22 to 158° F
<b>Relative humidity</b>	10 - 85 %, non-condensing	10 - 85 %, non-condensing

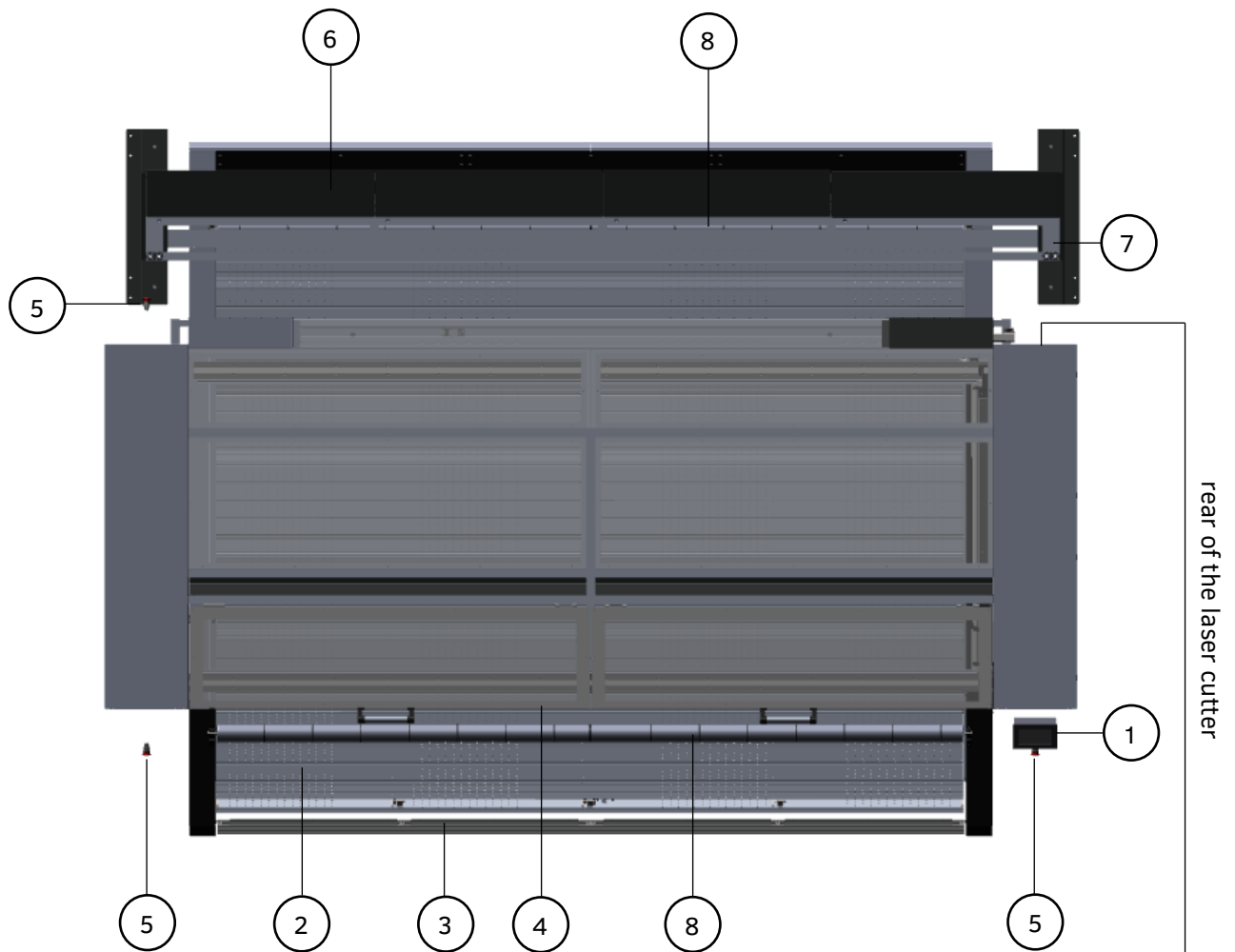
It is possible that the environmental conditions of the used media are stricter than those of the machine itself. Please refer to the documentation about the used media. Also, make sure that the media has had enough time to acclimatize.

## 2 LASER CUTTING SYSTEM COMPONENTS

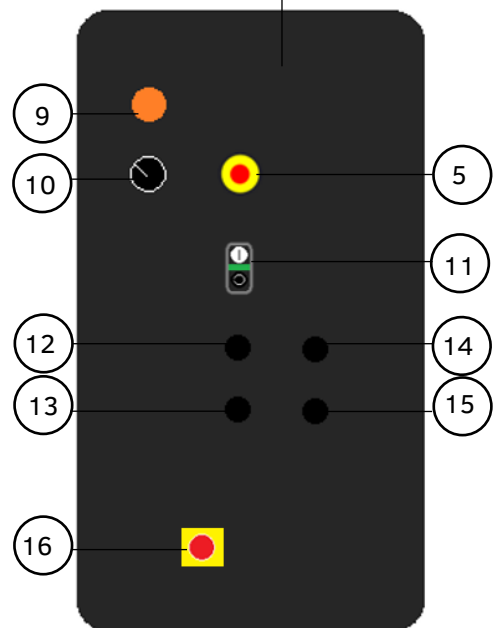


- ① Laser cutter
- ② Edge detection unwinder
- ③ Water chiller
- ④ Extractor fans (vacuum and fume extraction)

2.1 Laser Cutter



- (1) Touch control panel
- (2) Conveyor system with vacuum and fume extraction system underneath
- (3) Finger safety conveyor cover
- (4) Safety cover lid
- (5) Emergency stop buttons
- (6) Vision camera gantry
- (7) Vision camera gantry LED strips selector switch
- (8) Pressure rollers
- (9) Feed button
- (10) Vision camera gantry and cutting area lighting switch
- (11) ON/OFF buttons
- (12) Vision cameras connection
- (13) Unwinder connection
- (14) Vision gantry light connection
- (15) Ethernet connection
- (16) Main power switch



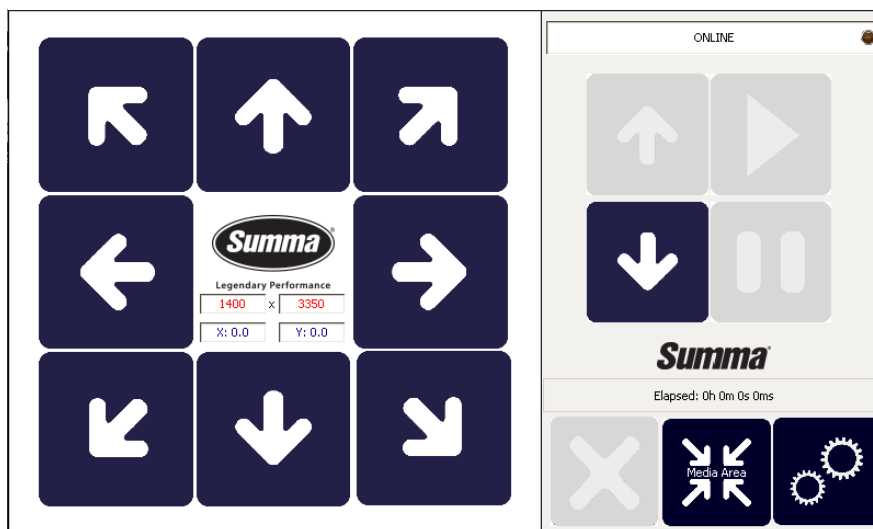
### 2.1.1 Touch control panel

The touch control panel is a unique interface system providing detailed cutter information and offering a flexible and powerful control of the cutter's configuration.

If applicable, tips or advice will be shown here. After a certain period of inactivity of the panel, the screensaver appears. Touching the screen once disables the screensaver. After starting up the machine, the home screen is initialised.

#### 2.1.1.1 Home screen

The screen is split into two sections. The working parameter limits of the machine are displayed in mm. On the top right, the cutter's status is indicated.



Use the arrow keys in the left section to move the cutting head around the cutting area. Use the arrow keys in the right section to control the conveyor movement: forward (down arrow) and backward (up arrow). The up arrow is disabled by default: this is only available when performing maintenance.



Tap to pause the cutting process.



Tap to cancel the current cutting job. This button becomes available after the system has been paused and the cutting head has stopped moving.

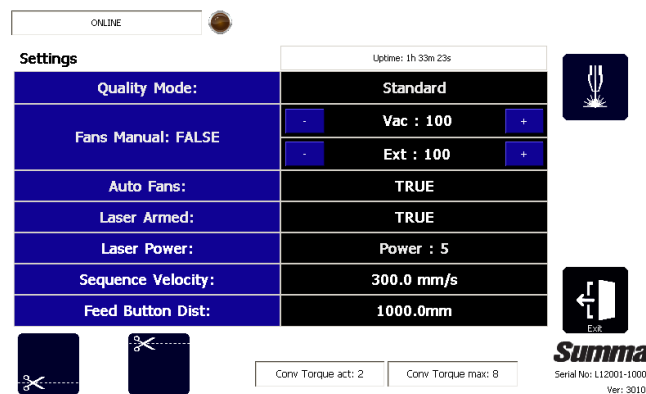


Tap to access the **Media Area** screen. This button is only available when the cutter is idle and not partway through a job.



Tap to access the **Settings** screen.

## 2.1.1.2 Settings screen





This screen allows viewing and changing the basic settings.

## 2.1.1.2.1 Parameters

- **Quality Mode:** The system supports three different quality modes: *Standard*, *Quality*, and *Fine Detail*. You can switch between these modes by clicking the current one.



**NOTE:** Cutting in *Fine Detail* quality mode requires a low speed setting.

- **Fans Manual:** *TRUE* or *FALSE*. Tap the current setting to change it.
  - **Vac** and **Ext:** Use  and  to change vacuum and extraction intensity, displayed inbetween these buttons. The system does not allow the vacuum setting to exceed the extraction setting.
- **Auto Fans:** *TRUE* or *FALSE*. Tap the current setting to change it.
- **Laser Armed:** *TRUE* or *FALSE*. Tap the current setting to change it.
- **Laser Power:** Tap the current setting to change it.
- **Sequence Velocity:** The speed at which the cutting head moves. Tap the current setting to change it.
- **Feed Button Dist:** Tap the current setting to change the distance that will be fed to the conveyor upon pressing the feed button at the back of the laser cutter.



Tap to return to the home screen.



Tap to access the **Laser Test Fire** screen (see p. 16).

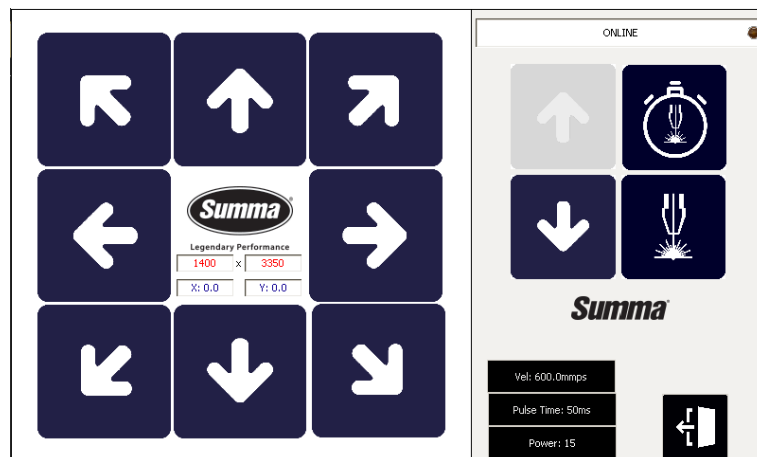


Tap to immediately cut off the media at the front of the working area.



Tap to immediately cut off the media at the back of the working area.

## 2.1.1.3 Laser Test Fire Screen



This screen is used to test-fire the laser and to cut straight lines manually.



Tap to activate the move-and-fire action, then use the arrow keys in the left section to move the head around the cutting area while the laser is firing. Tap again to stop the move-and-fire action.



Tap to fire the laser once in its current position (“spot-fire”).



Tap to return to the [Settings](#) screen. In case a move-and-fire action is ongoing, it will be stopped.

Vel: 600.0mmps

The speed at which the cutting head moves during the move-and-fire action. Tap to change the current setting.

Pulse Time: 50ms

Displays the pulse time of the laser for the spot-fire action. Tap to change the current setting.

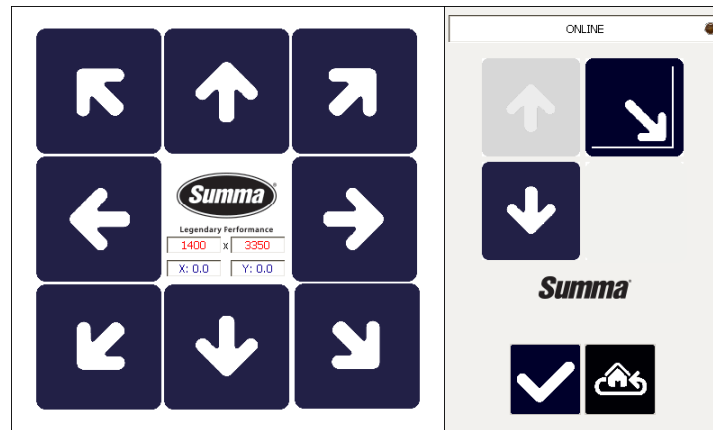
Power: 15

Displays the laser power intensity (in %). Tap to change the current setting.



## 2.1.1.4 Media Area Screen

You can create a smaller cutting window within the main bed area. This is very useful when you're cutting on standard format cardboard, paper, or when cutting a fabric sample. It allows you to place the material on the cutting bed and then set the working area according to the dimensions of the material.



1. Use the arrow keys in the left section to move the cutting head to the bottom right corner of the material.



2. Press  to confirm.

3. Use the arrow keys in the left section to move the cutting head to the upper left corner of the material.



4. Press  to confirm.



**NOTE:** Setting the upper left corner of the working area is not required. If you do not set the upper left corner, the system will automatically use the remainder of the bed area.

The new working area has now been set and the cutting head moves back to the bottom right corner of the working area. The working area values are shown below the Summa logo.



Tap to confirm and apply your changes.



Tap to reset to the default (entire) working area.

### 2.1.2 Conveyor system

The conveyor system, equipped with blade planks, transports the material through the working area and then out of the machine. The material is held down by the vacuum/extraction system underneath the conveyor bed, resulting in a clean cut and precise material transport.



**ATTENTION:** Do not lean on the conveyor planks as this can cause deflection.

### 2.1.3 Finger safety conveyor cover

More information can be found in chapter 1.1.5.2 *Safety covers* on page 11.

### 2.1.4 Safety cover lid

More information can be found in chapter 1.1.5.2 *Safety covers* on page 11.

### 2.1.5 Emergency stop buttons

More information can be found in chapter 1.1.5.1 *Emergency stop buttons* on page 10.

### 2.1.6 Vision camera gantry

The L3214 laser cutter is equipped with the Vision camera gantry. The Vision camera system uses integrated cameras to scan marks, black outlines, or barcodes, fast and accurately. It is also possible to scan, feed and cut at the same time. This camera system supports the following advanced work methods:

- Cut-to-Frame (also known as Fixed Size cutting)
- Barcode workflow (requires Pro Pack)
- Trace & Cut
- Cut-on-the-Fly

More information on the advanced work methods can be found in the Go Produce Laser Edition user manual.

### 2.1.7 Vision camera gantry light selector switch

This selector switch allows you to choose between one or two LED strips lighting the conveyor.

### 2.1.8 Pressure rollers

There are two pressure rollers available: one on the front and one on the rear of the conveyor bed. They should be placed in the lower recess to improve traction of the material on the conveyor when cutting.

### 2.1.9 Feed button

When this button is pressed, the conveyor will immediately advance a preset distance (value in mm). This distance can only be set in service mode.

### 2.1.10 Light switch Vision camera gantry and cutting area

One light switch to switch on or off the light of the Vision gantry and the light in the cutting area.

### 2.1.11 ON/OFF buttons



**WARNING:** Using the OFF button will not cut all the power in the machine! Before opening any covers to perform service or maintenance, always switch off power using the main power switch.

### 2.1.12 Ethernet connection

Summa provides a computer in the right cabinet of the cutter, connected to the Ethernet connection on the rear of the cutter.

### 2.1.13 Main power switch



**WARNING:** Using the OFF button will not cut all the power in the machine! Before opening any covers to perform service or maintenance, always switch off power using the main power switch.

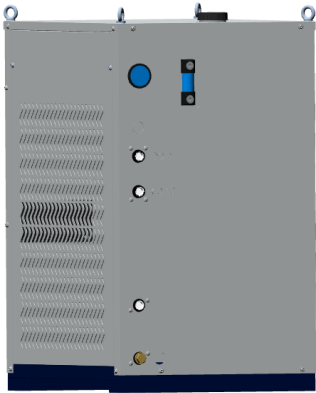
## 2.2 Edge detection unwinder

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.

The user manual of the unwinders is available for download on our website ([www.summa.com/en/support/user-manuals/](http://www.summa.com/en/support/user-manuals/)).

## 2.3 Water Chiller

### 2.3.1 General Description



A specialised laser water chiller performs water circulation cooling on the machine's laser source and regulates its temperature to prolong its life.



**ATTENTION:** Do not cover the cooler. Always make sure that air can enter the left-side filter and exit the right side unimpeded.

### 2.3.2 Temperature

The thermostat controller uses a setpoint which is the target temperature, i.e. the water temperature that is maintained in the reservoir. When the laser cutter is in operation and the cooler reservoir temperature reaches the setpoint + 2°C, the water chiller starts operating and cools the reservoir down until the temperature setpoint - 2°C is reached, after which it stops operating.

The recommended target temperature is the ambient temperature of the surroundings (this is usually around 20 °C). This setpoint is preset and should not normally be changed, but it can be by pressing the **Set** button and adjusting the temperature using the arrow keys. The normal coolant temperature ranges from 18°C to 25°C.

If the water temperature falls below the surroundings temperature, condensation will form on the pipes and on the laser tube, which can result in water dripping into the laser PSU and onto the electrical terminals inside the laser cabinet. When this happens, power off the machine immediately and check the chiller setting, wipe the affected areas dry and allow the water in the chiller to warm for 30 minutes before resuming cutting.



**ATTENTION:** Under no circumstances should the water temperature be allowed to reach or fall below dew point.



**ATTENTION:** Operating the cooler unit at temperatures lower than those specified may result in serious damage to the laser due to condensation. This type of damage is not covered by manufacturer warranty.

### 2.3.3 Safety precautions

The laser system is equipped with its own thermal cutoff to avoid damage to the laser, in case the operating temperature exceeds 50°C.

## 2.4 Vacuum and fume extraction system



**WARNING:** Before commencing any cutting procedure, ensure that the fume extraction and vacuum system is in good working order and operates correctly. Some materials may produce hazardous fumes if laser cut – check with the material supplier or manufacturer before cutting. Ensure that any fumes are extracted in accordance with health and safety requirements.

The vacuum and fume extraction system will automatically start operating during the cutting process if it is set to **Fans Manual: FALSE** in the **Settings** screen. If you want to control the vacuum and fume extraction system's operation manually, tap the setting to change it to **Fans: Manual: TRUE**. The system will then immediately start operating. Tap again to turn off.

### 2.4.1 Extraction pump

For safety and environmental reasons, fumes from around the cutting area are extracted by the extraction system underneath the conveyor bed. The unfiltered air should be led outside by means of pipework.

### 2.4.2 Vacuum pump

The material on the conveyor bed is held down by means of the vacuum system to ensure a clean cut and precise material transport. The vacuum pump is not connected to an air vent pipe: the clean air can be released in the working area.

### 3 STARTING UP THE LASER CUTTER

1. Check whether maintenance tasks need to be performed. For more information, see chapter 4 *Maintenance* on page 24.
2. Make sure the power supply to the laser cutter is switched on.
3. Power on the laser cutter.  
  
The loading screen is displayed, and the motion system moves to its home position.  
  
Then, the home screen is displayed.
4. Load the roll of material on the unwinder (more information on working with the unwinder can be found in the unwinder user manual).
5. Open GoProduce Laser Edition to start your cutting job (more information on working with the software can be found in the GoProduce Laser Edition user manual).

## 4 MAINTENANCE

This chapter explains all maintenance works that need to be performed on the laser cutting system. A complete overview can be found on page 44.



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**WARNING:** Before performing any maintenance, disconnect the laser cutter from the main power supply.

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### 4.1 Laser cutter

There are no user-serviceable parts inside the laser cutter. For servicing, refer to qualified personnel only. Turn off the machine and contact a service representative in any of the following cases:

- There is visible mechanical damage.
- The power cord is damaged.
- The machine (or parts of it) has (have) been damaged by an impact
- Liquid was spilt on the machine or conveyor.
- There is a strange noise, smoke or an unusual smell coming from the machine.

Keep the laser cutter as clean as possible. When necessary, clean outside panels of the unit with a soft damp cloth.



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**ATTENTION:** Do not use abrasives or solvent-based cleaners on the polycarbonate safety cover.

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**WARNING:** If liquid-based cleaners are used, ensure that the units are completely dry before switching on.

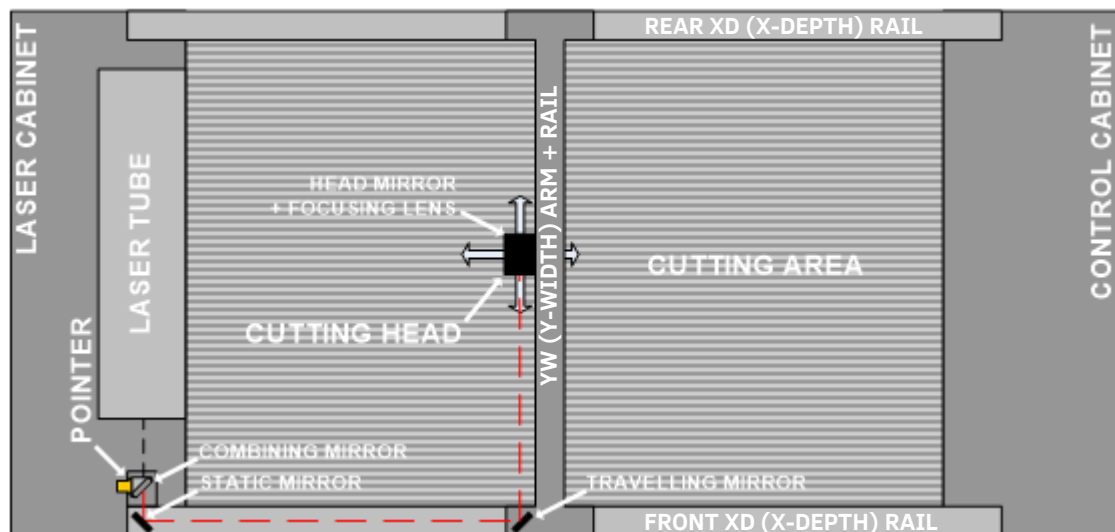
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The maintenance and cleaning tasks are listed in the maintenance overview (p. 44), with the allowable periods between checks. However, the laser cutter should be checked thoroughly every time it is used, so that minor faults can be corrected without serious damage occurring.



### 4.1.1 Optical components

To achieve maximum output from the laser cutter, the system's optical components must be in good working order.



The optics must be handled with care and cleaned only with optical cleaning solution and an optical grade polishing cloth. They must not be subjected to abrasives, etc. The working surfaces must not be handled directly. Ideally, gloves or finger cots should be used to avoid fingerprints on the surfaces. Optical cleaning equipment is supplied in the tool kit and further supplies may be obtained from the distributor.

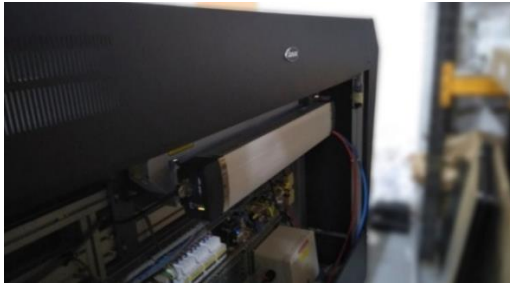
- 1 Gloves
- 2 IPA cleaning solution
- 3 2.5mm hexagonal hex key
- 4 4mm hexagonal hex key
- 5 Lens-cleaning cloth (lint-free)



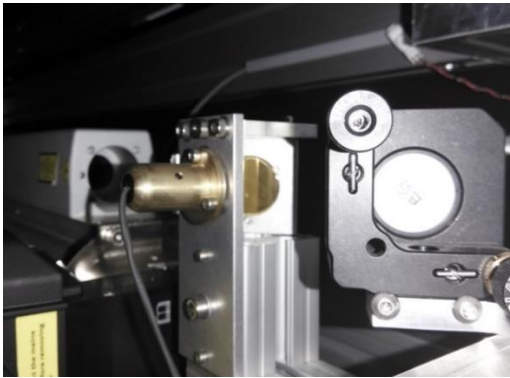
**NOTE:** After having cleaned all the optical components, check the laser beam alignment.

#### 4.1.1.1 Cleaning the static mirror

1. Remove the left-hand side cover of the laser cutter using the control cabinet key to gain access to the static mirror.



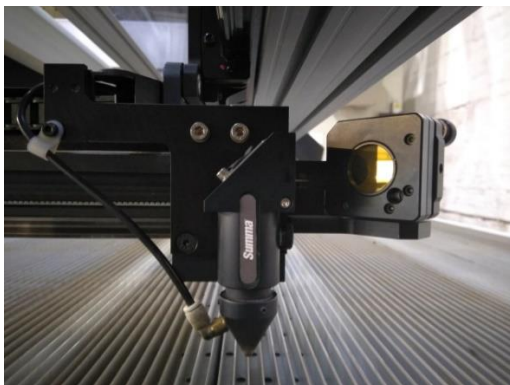
2. Apply a small amount of IPA optical cleaning solution onto the cleaning cloth provided in the tool kit and clean the mirror while in position. Ensure not to adjust the mirror position or apply too much pressure to the mirror so the bracket does not move out of alignment.



#### 4.1.1.2 Cleaning the travelling mirror

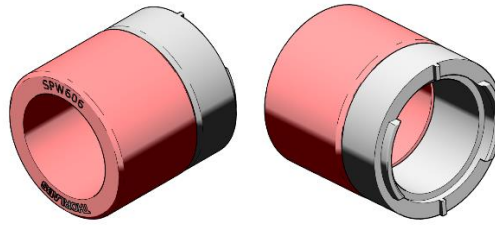
The travelling mirror is firmly attached to the Y-axis arm at the front of the laser cutting system.

1. Apply a small amount of IPA optical cleaning solution onto the cleaning cloth provided in the tool kit and clean the mirror while in position. Ensure not to adjust the mirror position or apply too much pressure to the mirror so the bracket does not move out of alignment.



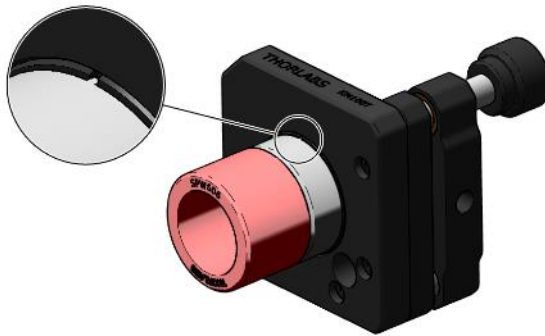
#### 4.1.1.3 (Un)Installing the static and travelling mirrors

For removing the static and travelling mirrors from their mount (e.g., in the event of a defect) and installing them again, use the spanner wrench (delivered in the toolbox).



##### 4.1.1.3.1 Removing the mirror

1. Place the spanner wrench on the mirror retaining ring so that the notches fit together.



2. Turn the wrench to loosen the retaining ring then remove the ring. The mirror is now loose.
3. Gently remove the mirror.

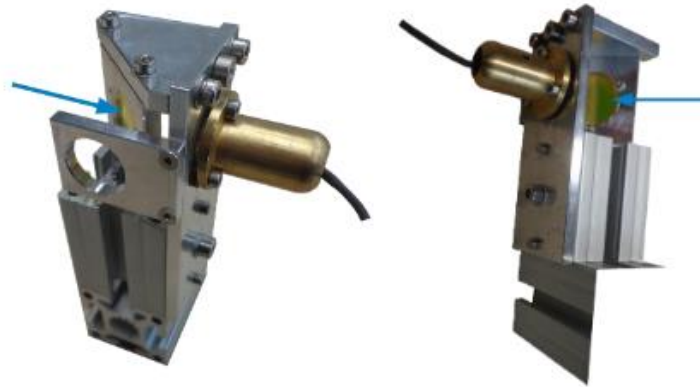
##### 4.1.1.3.2 Installing the mirror

1. Wearing gloves or finger cots to avoid fingerprints on the surface, gently place the mirror in the mirror mount.
2. Place the mirror retaining ring on the spanner wrench so that the notches fit together.
3. Place the spanner wrench against the mirror mount and turn the wrench (by hand) to secure the mirror.

#### 4.1.1.4 Cleaning the combining mirror

The combining mirror is located in between the laser source and the primary mirror. Its purpose is to redirect the laser pointer into the same path as the cutting laser.

1. Remove the left-hand side cover of the laser cutter using the control cabinet key.
2. Apply a small amount of IPA optical cleaning solution onto the cleaning cloth provided in the tool kit.
3. Gently clean both surfaces of the combining mirror.



#### 4.1.1.5 Cleaning the cutting head lens

The cutting head lens coating is fragile; do not drop the lens onto any hard surface or touch the lens with any sharp objects as this may damage the lens and reduce cutting efficiency. Always use cloths that are moistened with IPA optical cleaning solution; never use dry materials.

1. Remove the cutting head by releasing the M3 cap head screw and detaching the air irrigation tube.



2. Place the cutting head onto a clean surface and unscrew the black focusing screw from the lens barrel.



- Slide the barrel out.



- Remove the securing brass retaining screw by pressing your thumb against the brass and turning it counterclockwise.



- Carefully remove the rubber O-ring using a blunt plastic instrument, such as a tie wrap, or turn the tube upside down on to a clean moist cloth for the O-ring and lens to fall out.



**WARNING:** Ensure that the area is sufficiently ventilated. The solvent should be kept away from heat or flames. Wear appropriate clothing and safety goggles. Do not breathe in the fumes. Avoid contact with skin and eyes. If you get solvent on your skin or in your eyes, rinse thoroughly with clean, cold water and seek medical advice. Solvents are poisonous! If swallowed, get medical advice.



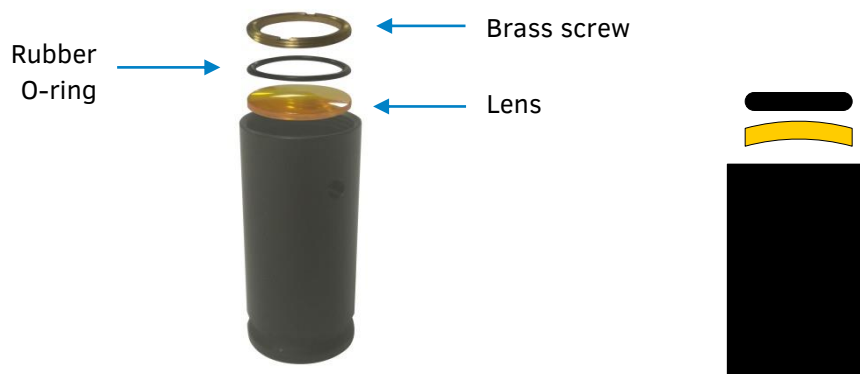
**WARNING:** Do not clean the optics on the machine bed! Any IPA spillage onto the bed must be left for at least two hours to allow complete evaporation. Using the laser cutter with IPA on the bed will cause a fire!

6. Apply IPA to the surface of the lens, allow the IPA to work into the dirt and gently wipe in one direction, then again at 90 degrees. Repeat this for both sides of the lens.
7. Clean the surface or lip where the lens sits inside the barrel, any dust on this surface will cause the lens to seat incorrectly and may affect the alignment of the laser.
8. After cleaning, hold the edges of the lens, with the convex surface facing upward and carefully replace it into the machined recess of the barrel.



Lens convex surface uppermost

9. Ensure the lens is seated correctly such that the convex surface is facing upwards.



10. Place the O-ring into the barrel, on top of the lens, and secure with the brass screw. Do not over tighten, finger tight is sufficient. Overtightening will crush the O-ring and potentially damage the lens.
11. Refit the barrel into the cutting head.
12. Check the laser beam alignment.



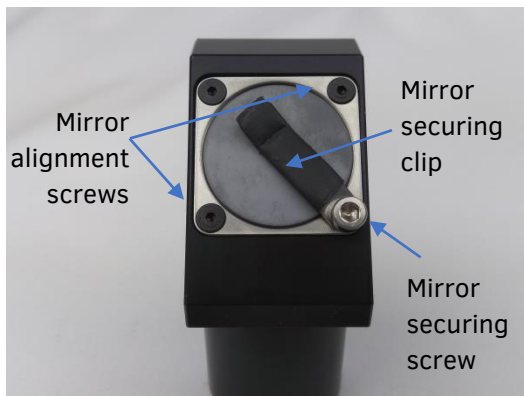
**NOTE:** The lens can be soaked in the solution for a few seconds to remove any stubborn residue.



**NOTE:** Do not touch the polished surfaces when handling the lens.

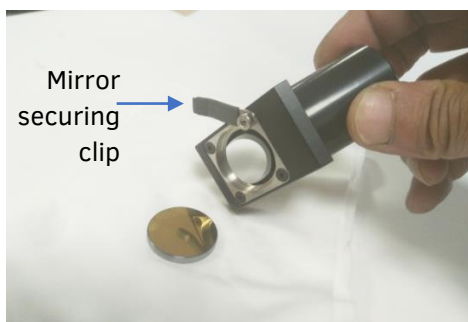
#### 4.1.1.6 Cleaning the cutting head mirror

1. Release (do not remove) the mirror securing screw holding the mirror securing clip, rotate the clip to release the mirror and place the cutting head on a clean flat surface.



**NOTE:** Only adjust the alignment screws if mirror alignment is required.

2. Gently rotate the head so that the mirror falls out onto the cleaning cloth.



3. Apply IPA optical cleaning solution to the mirror face and let it soak for a few seconds.
4. Gently lay an optical cleaning solution cloth on one edge of the mirror and gently draw the cloth right across the mirror in one continuous movement.



5. Any residue particles may be gently removed using a cleaning solution moistened cloth.



6. Clean the nozzle while it's out and remove any debris on the inside and outside.



7. Inspect the mirror housing and clean the surface or lip where the mirror sits. Any dust on this surface will cause the mirror to seat incorrectly and may affect the alignment of the laser.
8. Replace the mirror in the housing and secure it with the mirror securing clip and the mirror securing screw. Ensure that the securing clip has a slight bend in it to ensure that the mirror is secured correctly. Do not overtighten the mirror securing screw!
9. Ensure the mating faces of the head and head bracket are clean, any debris between these two faces may affect the alignment. Attach the cutting head to the machine and secure fully with the M3 cap head fixing screw.
10. Reattach the air irrigation tube and set the nozzle focal height.
11. Check the laser beam alignment.

#### 4.1.1.7 Cleaning the Vision camera lenses

The lenses of the Vision cameras in the gantry are accessible at any time; they are not covered. Use the air blower and/or soft brush to dust the lenses.



## 4.1.2 Pneumatics

### 4.1.2.1 Cleaning the nozzle

To ensure proper airflow while cutting, the nozzle needs to be free of dirt. This step is preferably done with the barrel disassembled and the lens removed.

1. Remove the cutting head by releasing the M3 cap head screw and detaching the pneumatic tube.



2. Clean the hole using a wooden toothpick. Use paper towel or a cloth to clean up the loose dirt and the outside of the nozzle. Use some IPA cleaning solution for stubborn residue.



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**WARNING:** Do not use an optical cleaning cloth as this may cause contamination.

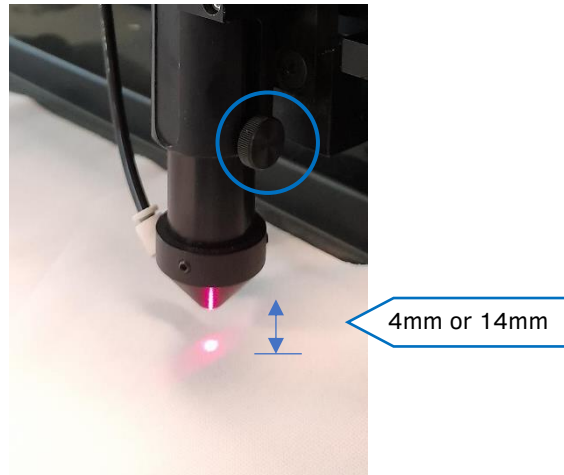
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3. Refit all components.

#### 4.1.2.2 Setting the nozzle height

To have a clean cut a good focus of the laser beam is required. Depending on the nozzle, the thickness and the type of the material that is processed, height may vary.

1. Loosen the thumb screw to adjust the height.



2. Place the focusing gauge between the nozzle and the material. When using a high-pressure nozzle, set the focus distance at 4mm from the surface of the media to be cut. When using a standard nozzle, the focus distance should be set at 14mm. Fix the thumb screw when the correct height is set.

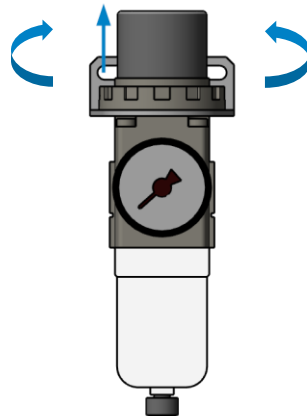
### 4.1.2.3 Adjusting airflow

Depending on the type of material being processed, an appropriate airflow must be present.

1. Find the pressure regulator in the right cabinet of the machine.
2. Check if all pneumatics tubes are still connected properly.
3. Check the pressure gauge to see if it is set properly: range between 0.5 bar (7.2psi) and 3 bar (43.51psi).

Inlet pressure (bar)	2 mm nozzle	
	l/min	l/h
0.5 (7.2psi)	45.4	2724
1	64.2	3852
1.5	80.3	4815
2	96.3	5778
2.5	112.4	6741
3 (43.51psi)	128.4	7704

4. Adjust the pressure by lifting the knob to unlock it. Then rotate until the desired pressure is achieved.



### 4.1.2.4 Emptying the water collection bowl

The water collection bowl on the compressed air regulator should be checked and emptied if required.



**ATTENTION:** Not emptying the water collection bowl will cause water coming out of the cutting head.

1. Release the grey valve to drain the water from the collection bowl.
2. Retighten the grey valve.

### 4.1.3 Cutting head drive belt

The cutting head drive belt is a toothed belt that carries the cutting head. It needs to be checked and cleaned periodically to ensure cleanliness.

1. Remove the rear polycarbonate cover for access to the Y-axis gearbox.
2. Apply a small amount of light machine oil to a clean cloth and wipe the oil onto the toothed side of the white drive belt.
3. Slowly move the cutting head towards the rear by pulling the belt towards you and lubricate the dry areas of the belt.
4. Try to apply a thin layer of oil to the entire belt. Parts that are inaccessible or missed will eventually have oil transferred to it from passing over the pulleys, so don't be too concerned about missed spots.

### 4.1.4 Conveyor planks

To ensure proper fume extraction and vacuum for material transportation, the conveyor planks need to be free of dust and lint.

1. Open the safety cover lid and visually inspect the conveyor planks for cleanliness and damage.
2. Remove large pieces of material by hand, then vacuum the planks.
3. Close the safety cover lid and feed the conveyor until an uncleaned set of planks is accessible.
4. Repeat all the above steps until all planks are clean.

### 4.1.5 Water-cooled laser unit

The water-cooled laser unit has been designed to be low maintenance. Internal routine maintenance procedures are not required. The system's sealed construction and limited number of moving parts ensure trouble-free and reliable operation.

1. Open the left cover using the control cabinet key to gain access to the laser unit.
2. The external surfaces of the system can be cleaned with a mild detergent. It is advisable to use a damp cloth to facilitate the cleaning of the external cabinets.

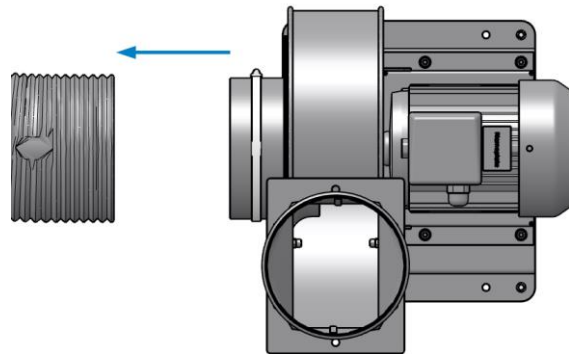


**WARNING:** Take care not to allow entry of water into any of the electrical cabinets or onto the output window or primary beam delivery optic.

## 4.2 Extraction system

To ensure proper fume extraction and vacuum in the cutting area, the extraction hoses need free of dust and debris.

1. Remove the vacuum hose from the extraction system (extraction fan, BOFA, or own system).



*Illustration purely indicative*

2. Visually inspect the inside of the fan and extraction hose. Remove any debris and/or large pieces of fabric.
3. Refit the extraction pipe.



**NOTE:** If the vacuum fails and the pump is spinning, there is a blockage in the system. If there is a strong vacuum (but no airflow) between the pump and the machine, the extraction pipe between the pump and the outside world/factory vent network is blocked. If there is a loss of vacuum in the chamber, there's a blockage between the machine and the pump.

## 4.3 Chiller

The laser unit is cooled with deionised water, to avoid bacterial infestation.

### 4.3.1.1 Water level

The chiller needs a controlled water level to deliver full cooling capacity.

1. Check the water level through the inspection glass. The water level should be at least halfway.



*Insufficient*



*Sufficient*

2. If it is any lower than that, remove the reservoir cap and add deionised water until an appropriate level is reached.



3. Close the reservoir cap.



#### 4.3.1.2 Water quality

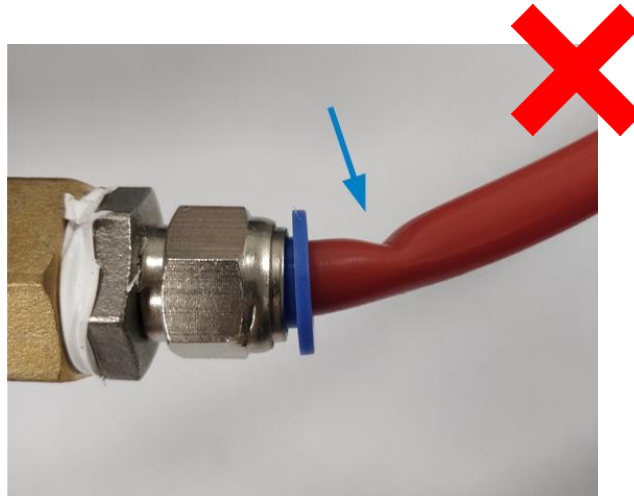
Over time, the chiller water can become cloudy. Cloudy chiller water is no longer good for use. Replace with deionised water only.

1. Remove the reservoir cap.
2. Open the valve at the bottom of the chiller to drain all the chiller water.
3. Unplug the blue tube. Use compressed air (max 2 bar) to blow out the remaining water in the laser unit.
4. Plug the blue tube back in.
5. Flush the chiller with clean tap water once, then close the drain valve.
6. Refill the chiller with demineralized water. The reservoir holds approximately 22 litres.
7. Close the reservoir cap.

If desired, glycol can be added to the water to reduce bacteria growth. The ratio is 1 part glycol to 10 parts water.

#### 4.3.1.3 Water pipes

To ensure proper water flow, the water hoses need to be in good condition and without kinks or sharp bends.



1. Close the *IN* and *OUT* valves on the chiller.



2. Drain the water from the damaged water hose.
3. Replace the water hose with a new one of the same length.
4. Refit the water hose into the chiller and open both valves completely.



#### 4.3.1.4 Air filter

To ensure proper airflow through the chiller, the grid and the air filter need to be free of dust. The filter can be easily removed by hand.

1. Lift the filter and tilt outwards to slide it out.



2. Use a vacuum cleaner and/or pressured air to clean the air filter.
3. Refit the air filter.

## 4.4 Maintenance Overview



**ATTENTION:** Make sure the power supply to the laser cutter is switched off before starting maintenance tasks!

**ATTENTION:** The following tables list the maximum allowable intervals between maintenance tasks:



- One day or 8 operating hours\*
- One week or 40 operating hours\*
- One month or 170 operating hours\*
- Six months or 1,000 operating hours\*
- One year or 2,000 operating hours\*
- Two years or 4,000 operating hours\*

\*Whichever is reached first.

If a component requires the performance of a maintenance task sooner than indicated below, do not delay.

LASER CUTTER				
Component	Task	By	Max. Interval	Reference
Travelling Mirror	Clean	End User	1 Day	Page 26
Head Mirror	Clean	End User	1 Day	Page 32
Head Lens	Clean	End User	1 Day	Page 29
Nozzle	Clean	End User	1 Day	Page 35
Airflow Nozzle	Check	End User	1 Day	Page 37
Water collection bowl (compressed air regulator)	Check/Empty	End User	1 Day	Page 37
Nozzle Height	Check	End User	1 Day	Page 36
Conveyor Planks	Check/Clean	End User	1 Week	Page 38
Vision Camera Lenses	Clean	End User	1 Week	Page 34
Static Mirror	Clean	End User	1 Month	Page 26
Combiner	Clean	End User	1 Month	Page 28
Emergency Stops	Check	End User	1 Month	
Laser Beam Alignment	Check	Dealer	1 Year	
Cutting Head Drive Belt	Clean and Lubricate	Dealer	1 Year	
Vision Camera Lens and Scanning Camera UV Filter	Calibration check/Clean	Dealer	1 Year	
Overall Machine Service (all the above)	Check	Dealer	1 Year	
All Optical Components	Replace	Dealer	2 Years	
Reprocess Laser Unit	Reprocess	Dealer	15 – 20K hours	

CHILLER				
Component	Task	By	Max. Interval	Reference
Water Level	Check	End User	1 Week	Page 40
Water Quality	Check	End User	1 Week	Page 41
Water Pipes	Check	End User	4 Weeks	Page 41
Air Filter	Clean	End User	4 Weeks	Page 43
Water	Replace	Dealer	6 Months	Page 41
Service	Service	Local ICS Dealer	1 Year	

EXTRACTION SYSTEMS				
Component	Task	By	Max. Interval	Reference
Extraction Hoses	Clean	End User	2 Weeks	Page 39
Extraction Fan	Clean	End User	4 Weeks	
Extraction Fan Inside	Clean	Dealer	6 Months	
Vacuum Chamber	Clean	Dealer	6 Months	

## 5 CONSUMABLES

The following accessories and consumables are available for the L3214 Laser Cutting System.

Part description	Part number	Picture
Standard 2.5" FL Lens	600-6028	
Standard FB Mirror	600-6029	
Diode Beam Combiner	600-6030	
Optical Cleaning Fluid	600-6034	
Optics Cleaning Cloth	600-6035	
Alignment Kit: <ul style="list-style-type: none"> <li>• Nozzle Alignment Tool</li> <li>• Mirror Alignment Tool</li> <li>• Alignment Targets</li> </ul>	600-6133	
Focus Height Tools	600-6054	
Laser Safety Glasses	600-6055	
High Pressure Nozzle Kit	600-6122	
Unwinder Roll Support Wheel	600-6132	
Extruded Blade Slat	600-6128	

## 6 TROUBLESHOOTING

The laser is not cutting well in all areas of the bed:

- The focus height is incorrect.
- The lens is upside down.
- The optics are in a poor state of cleanliness.
- The cutting nozzle is blocked with dirt.
- The wrong material has been chosen from the material manager
- The beam alignment has moved for some reason.
- Laser power has dropped.
- The 48V laser power supply has failed.

The laser is not cutting in the corners:

The minimum power in the material setting is too low.

The laser is burning the corners of thin material:

The minimum power in the material setting is too high.

The motion system is working but the laser is not firing:

- Check the status lights on the back of the laser.
- Check the chiller:
  - Water level
  - Water pressure
  - Water pipes
  - Flow and return pipes have been exchanged.
  - Service or re-gas needed

The laser cutter switches on but the screen doesn't display anything:

The 3 amp fuse on the main electrical panel has blown.

The laser won't switch on:

- No mains power into the machine
- The mains isolator switch at the back of the machine is off
- One of the 4 emergency stops is pressed
- The 1 amp fuse on the main electric panel for the 24V start circuit has blown
- The 24V MCB has tripped to the off-position

There are no errors, still the cutting head won't move to the 0/0 origin position:

- There is an obstruction somewhere in the motion system
- The linear rails haven't been maintained correctly and are dirty or sticky
- One of the motion system motors is tight or seized up

The conveyor is making a banging noise and is jamming:

- Check if the obstruction is in a repeatable position. If so, a fixing screw holding the bed planks in place may have come loose. Remove the 2 side covers and retighten.
- Material got caught somewhere in the conveyor.
- Remove the rear cover and remove any debris.
- The Z-axis drive belt has come loose over time and requires adjustment.

## 6.1 Error Messages

Error Message	Possible Cause	Checks
ERROR – FEED INTERLOCK	The conveyor cover (with sensor) is open.	Check if the front cover is closed.
		Check if the left and right switches are being actuated correctly when closing the cover.
		Check if the cover is damaged.
COVER IS OPEN	The lid is up.	Check if the lid is fully closed.
		Check if the interlock lever is correctly actuating the shutter.
		Check if the shutter actuates the switches when it slides.
ERROR X AXIS: xxxxxx	Axis error with error code.	Check for any loose connections to the motor.
ERROR Y AXIS: xxxxxx		Check for loose connections at the Beckhoff terminals.
ERROR Z AXIS: xxxxxx		Check for loose connections between the Beckhoff terminal side contacts.
HOMING INTERRUPTED	The lid is up during the homing sequence.	Check if the covers close properly.
		Check the switches.
CANNOT INIT – LID UP	The lid is up before the homing sequence.	Check if the covers close properly.
		Check the switches.
CANNOT INIT – FRONT COVER	Cover is open before the homing sequence.	Check if the covers close properly.
		Check the switches.
ERROR – FEED OVER CURRENT	The conveyor is stuck, or the Z-axis torque is set to the wrong set value.	Check the torque value: Default = 450 Nominal = 600 High (but acceptable) = 800 Too high > 801
		Check for loose material trapped inside the bed.
		Check for damaged and jammed planks.
Z-AXIS OVER OVERTORQUE CLICK TO RE-INITIALISE		Check for loose screws.
CONVEYOR GUARD TRIGGERED CLICK TO RE-INITIALISE	The conveyor cover is open.	Check if the covers close properly.
		Check the switches.
CONVEYOR GUARD TRIGGERED AND Z-AXIS OVER OVERTORQUE CLICK TO RE-INITIALISE	The conveyor cover is open, and the conveyor is stuck.	Check the torque value: Default = 450 Nominal = 600 High (but acceptable) = 800 Too high > 801
		Check for loose material trapped inside the bed.
		Check for damaged and jammed planks.
		Check for loose screws.



## 7 GOCARE

The GoCare software allows upgrading the laser cutter firmware, making device and Vision camera backups, and restoring machine settings.

The user manual of GoCare is available for download on our website ([www.summa.com/en/support/user-manuals/](http://www.summa.com/en/support/user-manuals/)).

## 8 GO PRODUCE LASER EDITION

Summa GoProduce Laser Edition is a Windows-based production software that integrates the L-Series into the workflow. It is the perfect link between the design station, RIP station, printers and cutting devices. Once the workflow is set up, macros automate the process. Consequently, the number of times the operator has to intervene to start the next job is reduced to a minimum, as is the downtime of the machine.

The user manual of GoProduce Laser Edition is available for download on our website ([www.summa.com/en/support/user-manuals/](http://www.summa.com/en/support/user-manuals/)).