Controls manual
CNC SYSTEM GIOTTO EVO

Edition 07/2022 R00

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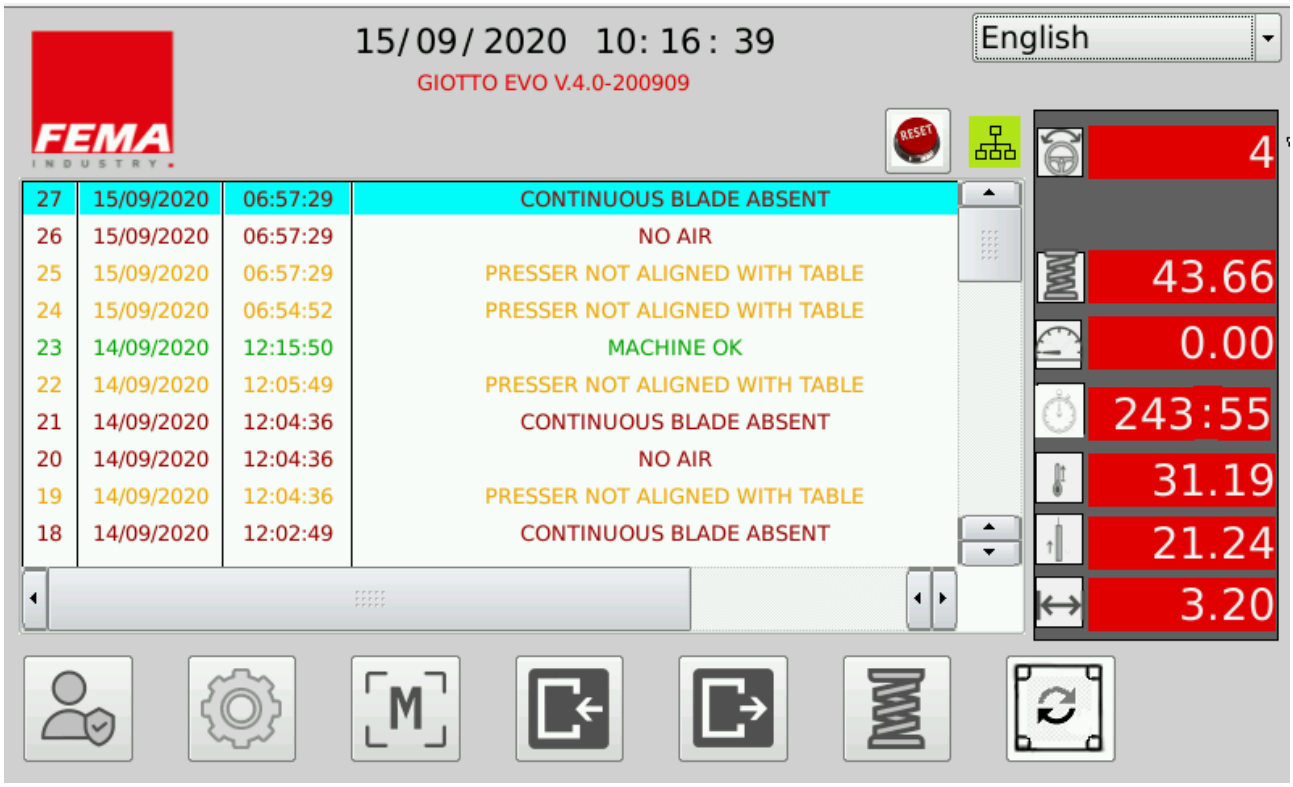
1. PLC STATUS

Using the PLC-GIOTTO icon on the desktop, the user can quickly access the PLC control screen, without the need to access it from LF2000. This function is only available for GIOTTO EVO models. By opening this program, the user will access its main screen, which will look like this:



This screen serves a viewing purpose, with the exception of some controls. In it are shown date, time and program version. Please note that not all controls may be available, because some of these devices are only available in certain models.
Here's the description of the visualization fields:

Central support:

Shows the current position of the central support. In order to change it, act on the LF2000 management software. In the event of a faulty system positioning (i.e. with the support in position 1 while differently shown in this screen) and for expert users only, this position can be manually edited. Press the "Ignore tool" button on the console, while clicking on this field at the same time. Then change the shown position with the actual correct one.

Block height:

If the size detection sensors are present, this shows the height of the block currently loaded.

Blade tensioning:

Shows the Kg currently present on the loading cell of the blade tensioning system.

Blade rotation speed:

Shows the rotation frequency on the blade on the flywheels, measured in Hz.

Blade life duration:

Shows the length of the blade life, measured in minutes. This counter is reset every time the user changes the blade, confirming it in the PLC screen. This control can also be pressed to access the blade duration visualization screen.

Blade temperature:

Shows the blade temperature in degrees Celsius (°C)

Elongation:

Shows the distance of the tensioned flywheel from its starting position, measured in mm. This parameter can be used to measure the elongation of the blade.

Blade width:

Shows the width of the blade, measured in mm.

Power button:

If the machine is not powered up, a green flashing button will appear, reminding the operator to press the green power button.

Network status:

This icon is green if the machine is correctly connected to a shared folder, and a red one if it's not.

Language

Shows the language currently set. The user can change it by simply clicking on the bar.

Status list

In the central area it's displayed a list of the last 100 status messages displayed by the machine. Errors or presumed ones are shown in red.

The remaining controls displayed are activatable buttons:

Reset: in the event of a temporary error, like a faulty sensor signal or a safety system's intervention later disabled, this button tries to reset the machine regular functioning. If the error is not solved or not temporary, the control has no effect.

Admin login: the user can input a password and gain administrator access to the settings page. Default password is **6666**.

Logout: if the user is logged in as Admin, pressing this button will log out and get back to standard mode. This button replaces the “Admin login” button.

Settings: gives access to the PLC settings screen.
This control is enabled in admin mode only, and should only be used by highly qualified personnel**.**

Manual management: gives access to the manual management of some controls and apparatuses.

Inputs: gives access to the PLC input screen.

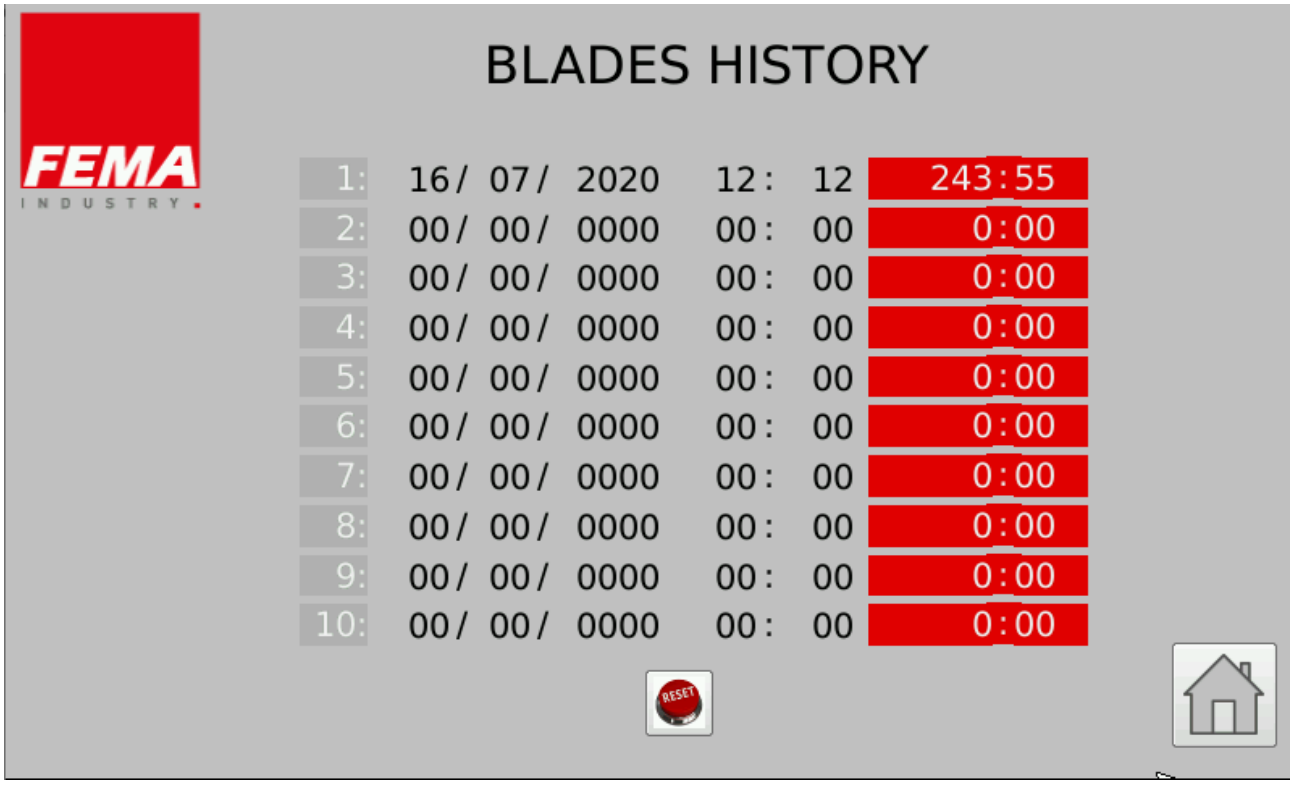
Outputs: gives access to the PLC output screen.

Release tension: brings the tensioning system down to its preload threshold.

Change blade: allows the user to force a blade change. This will simulate the conditions encountered in a blade break event. For more information, please refer to the change blade paragraph.

1.1 Blade history

By pressing the button, the user can access this screen, showing the history of the latest blades used, which will look like this:



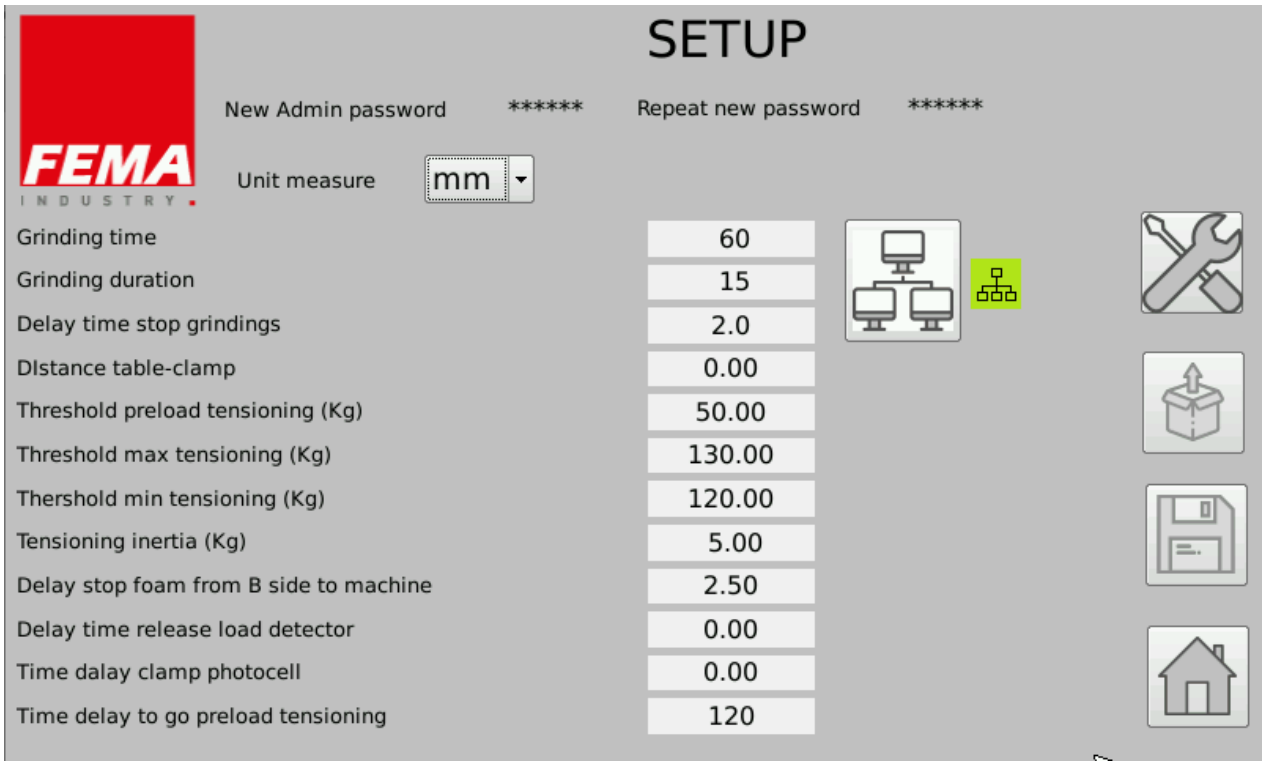
In this screen there are all installation dates of the blades and their corresponding duration. By pressing and holding the reset button, the log is cleared.

The home button quits to the main screen.

1.2 PLC settings - Setup

This control is enabled in admin mode only, and should only be used by highly qualified personnel.

The settings screen will look like this:



Grey parameters can be changed by FEMA personnel only.

Password: by clicking on both “Password” fields, the user can change the password for logging in as Admin. Passwords in these fields must match correctly.

Unit meas.:
Lets the user choose the unit of measurement between millimeters and inches.

Grinding time:

It indicates the time in seconds before activating the sharpener. Virtually every time the machine is turned on and the time specified in this parameter passes, the grindstones’ motors are activated automatically (provided the grinder selection is set to the AUTO sharpening position).

Grinding duration:

It indicates the sharpening duration in seconds. Virtually every time the machine is turned on and passes the specified time set for “Grinding Time”, the serrated roller is automatically operated (provided the selector is in AUTO sharpening position) and remains switched on for the time indicated by this parameter.

Time delay stop grinding:

Indicates the time required before powering down the grindstone in order to completely detach from the blade.

Distance table – clamp:

Indicates the actual distance, in millimeters, measured between table and clamp. Should it change for any reason, the user should update this parameter.

Threshold preload tensioning:

Indicates how many Kgs are present on the loading cell of the tensioning system when the machine is turned off.

Threshold max and min tensioning:

Indicates the maximum and minimum values present on the loading cell of the tensioning system during cutting procedures.

Tensioning inertia:

indicates how many Kgs the tensioning system will add or subtract, as a compensation of mechanical inertia. This allows the cell to load an actual Kg value closer to the expected one.

Delay stop foam from B side to machine

Indicates the time of further advancement needed for a block loaded from the B position (back conveyor) to be completely placed on the machine table. It's a compensating value to be applied on the signals registered by the photocells.

Delay time release load detector

Indicates the time delay between the block detection sensor activates and the actual stopping of the belt.

Time delay photocell clamp:

Indicates the time delay between the block detection sensor activates and the actual stopping of the clamp.

Time delay start preload tensioning:

Indicates how long the tensioning system will stay active after shutting the machine down or finishing a working cycle.

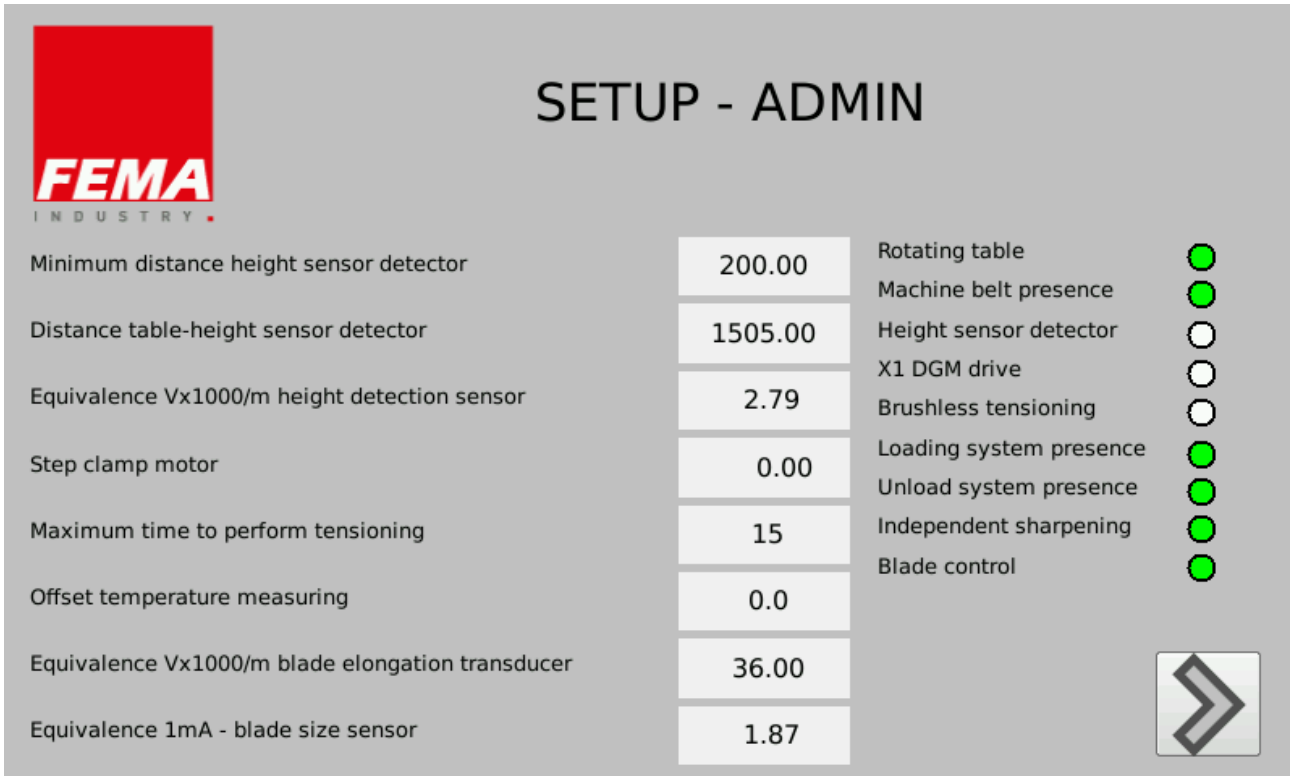
Finally, there are also these activatable controls:

	**Connection**: opens the panel for setting up a connection between the machine and a shared folder.
	**Settings:** opens a new panel with settings that can be changed by the admin only. This will be furtherly explained in the next chapter.
	**Home:** goes back to the main screen
These controls are available only with an inserted USB drive.	

	**Load:** loads a parameter configuration file from the USB drive.
	**Save:** saves a parameter configuration file on the USB drive.

1.2.1 Admin setup

This screen is only available if the admin access has been executed from the main screen. It will look like this:



Minimum distance height sensor detector

Indicates the minimum distance (in millimeters) that has to be kept between the block and the height sensor in order to get a correct and optimal reading.

Distance table – height sensor detector:

Indicates the actual distance, in millimeters, measured between sensor and conveyor.

Equivalence Vx1000/m height detection sensor

It's a multiplier necessary for an optimal conversion of the signal from the block height sensor. It converts the measured Volts into millimeters.

Step clamp motor:

It's a necessary parameter to convert the clamp motor movement pulses into mm.

Max time to perform tensioning:
Indicates the maximum time for the tensioning system to finish the loading cycle.

Offset temperature measuring:

Parameter needed to properly show the temperature of the blade, being an offset from the standard value.

Equivalence Vx1000/m blade elongation transducer

It's a multiplier necessary for an optimal conversion of the signal from the elongation transducer. It converts the measured Volts into millimeters.

Equivalence 1mA - blade size sensor

It's a multiplier necessary for an optimal conversion of the signal from the blade size measurement sensor. It converts the measured mA into millimeters.

In the right section there are more status controls. The only available values for those are ON (green) and OFF (white).

Rotating table:

Activate if the machine features a rotating table.

Conveyor presence:

Activate if the machine features conveyors.

Height sensor detector:

Activate if the machine features a size detection sensor.

X1 DGM Drive:

Activates/deactivates controls for different kinds of machine drivers.

Brushless tensioning:

Indicates whether the tensioning system features a regular or brushless motor.

Loading system presence:

Activate if the machine features load tables and conveyors.

Unloading system presence:

Activate if the machine features unload tables and conveyors.

Independent sharpening:

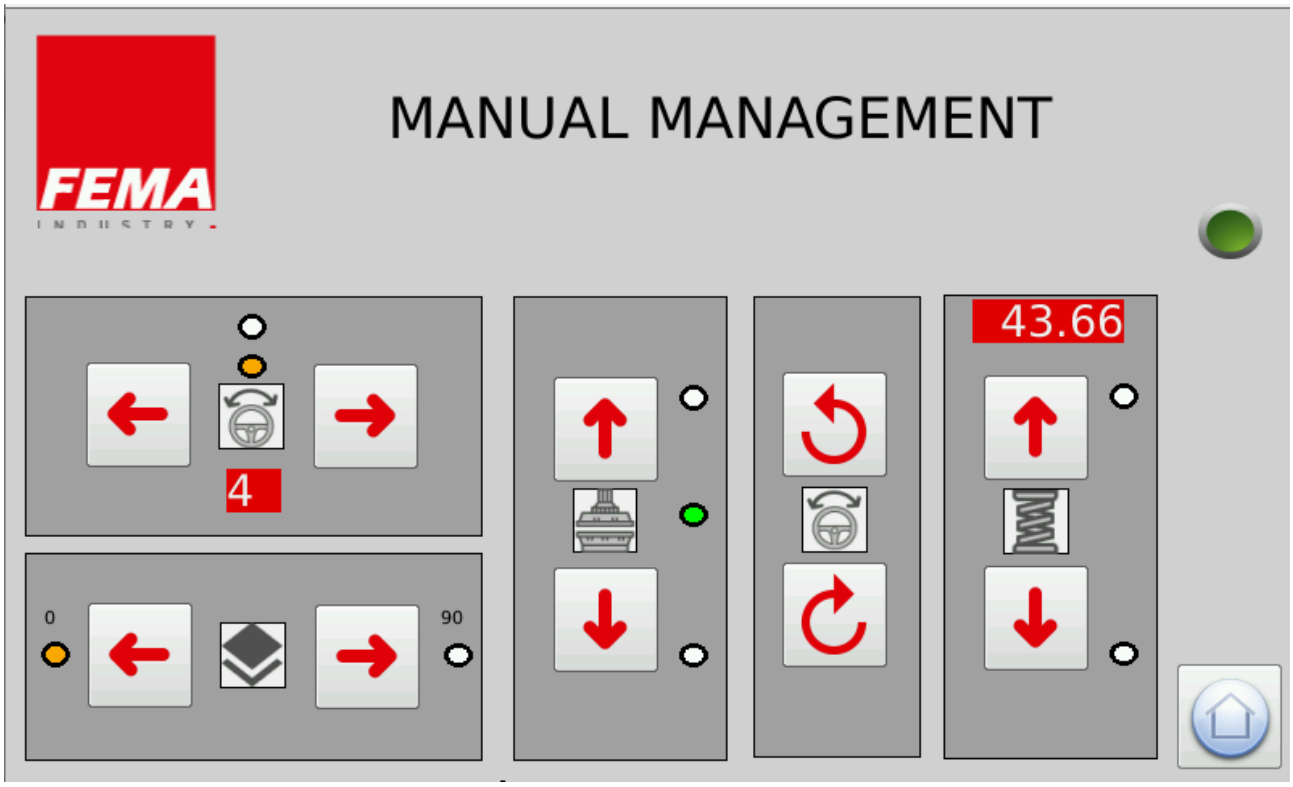
Activate if the safety can be bypassed to turn on the sharpening.

Blade control:

Activate if the machine is equipped with the blade control module.

1.3 Manual Management

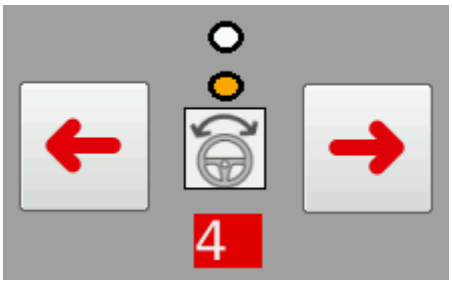
The PLC Manual Management screen looks like this:



This screen is divided into five sections, and each one controls a different apparatus.

Pressing this button will quit to the main screen.

1.3.1 Central Support

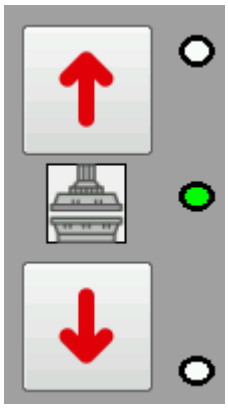


This section controls the central support. The dots on the top mimic the sensor which is being read. If at least one of the two circles is yellow, it means the central support is correctly placed in one of its four possible positions, as shown by the number in the bottom. If not, the user can manually change the central support position.
Pressing one of the arrows will move the arm left or right. By using them, the user can correct the position of the central support until a sensor is read and one or both circles turn yellow.
Caution: moving the central support freely may result in a crash with the hold-down device. If the user is trying to reach a different position than the one shown by the number, or if he's moving the central support for a long distance, he should **manually take the hold-down device in the full-frontal position before moving the central support.**

1.3.2 Table rotation

Using the arrows, the user can manually rotate the machine table.
Caution: before moving the table, it must be manually brought in the full-frontal position.
The circles indicate the position for the table. If the left one is yellow it means the table is in the straight 0° position. If the right one is yellow instead, it means the table is rotated by 90°. Pressing one of the arrows will switch the table's position to the other one.

1.3.3 Hold-down device



Using the arrows, the user can manually move the hold-down device. Pressing the Up arrow will move the device towards the back of the machine, while pressing the Down arrow will move it towards the front.

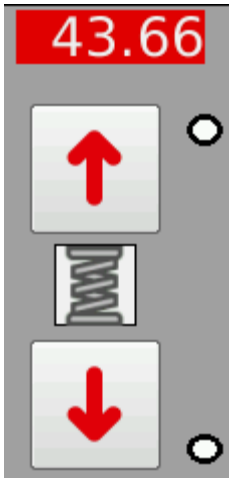
The circle in the middle turns green when the alignment with the table is reached, while the others turn yellow if the limit switch is reached.

1.3.4 Central support head

The user can manually move the central support cutting head clockwise or counterclockwise.

This should be done to ensure the central support cutting head is always aligned with the two side cutting heads. In order to do so, using the management software, set the machine heads to 180°, as reference. This can be done with the Manual Management function (F4 command) or by placing the heads in the blade changing position (F5+F1 commands). Then, using the circular arrows, move the central head until it's aligned. The central support head can also be aligned manually, as shown in the next chapters.

1.3.5 Tensioning system

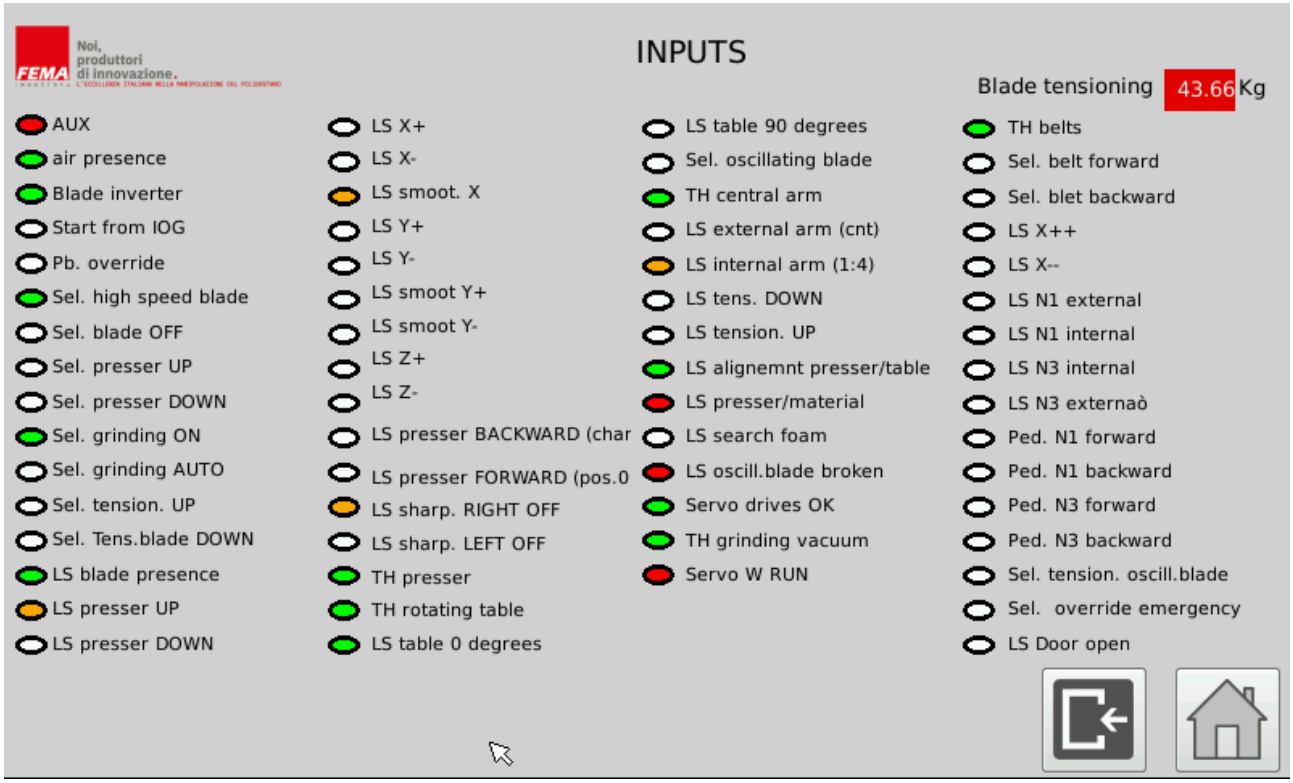


Using the arrows, the user can manually move the tensioning system. Pressing the Up arrow will move the device upwards, increasing the tension, while pressing the Down arrow will decrease it, moving it downwards.

The circles turn yellow if one of the limit switches is reached.

1.4 Inputs

The PLC input screen looks like this:



It shows all input signals of the PLC, each with a description and with an indicator which displays its current status:

- White: Inactive
- Green: OK
- Red: Problem
- Orange: Possible problem

This last case represents, for example, limit switches.

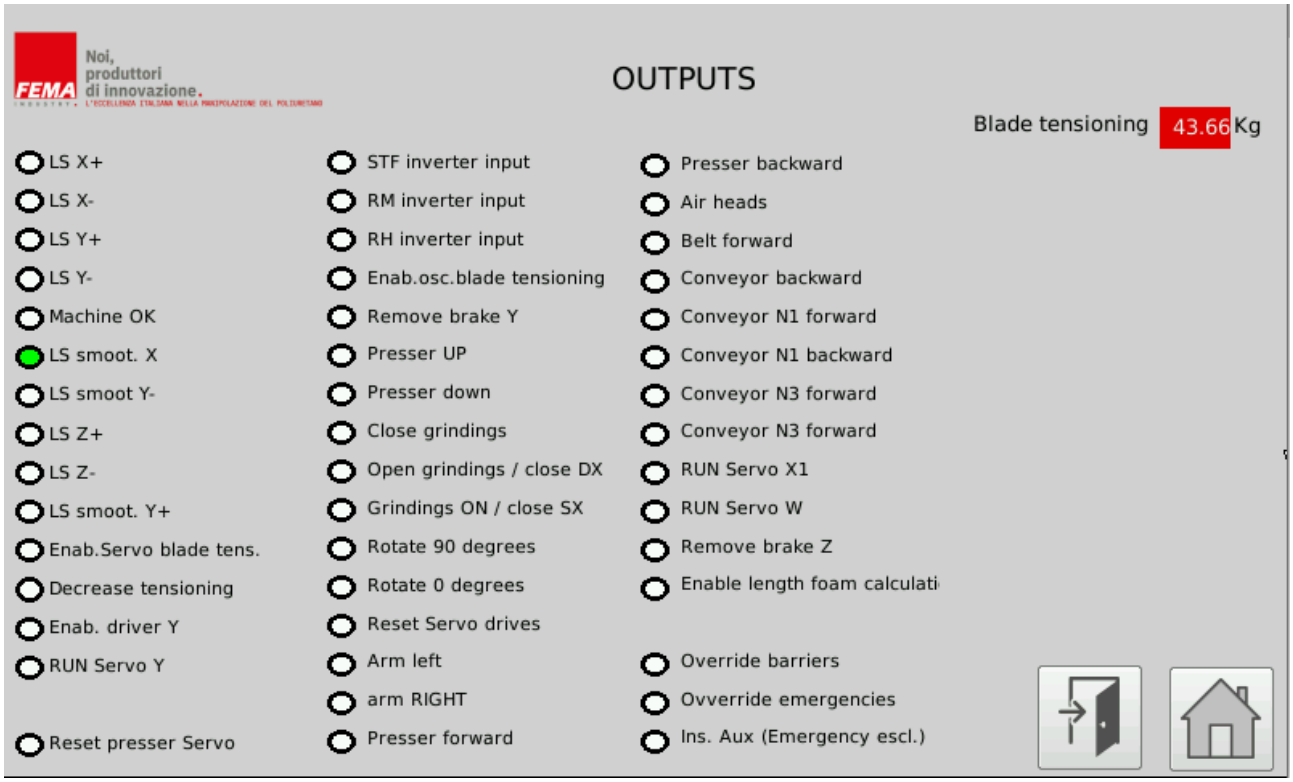
There are also two activatable controls:

Home: goes back to the main screen

Outputs: gives access to the PLC output screen.

1.5 Outputs

The PLC output screen looks like this:



It shows all output signals of the PLC, each with a description and with an indicator. The only possible statuses in this case are **Green – ON** and **White – OFF.**
There are also two activatable controls:

Home: goes back to the main screen

Inputs: gives access to the PLC input screen.

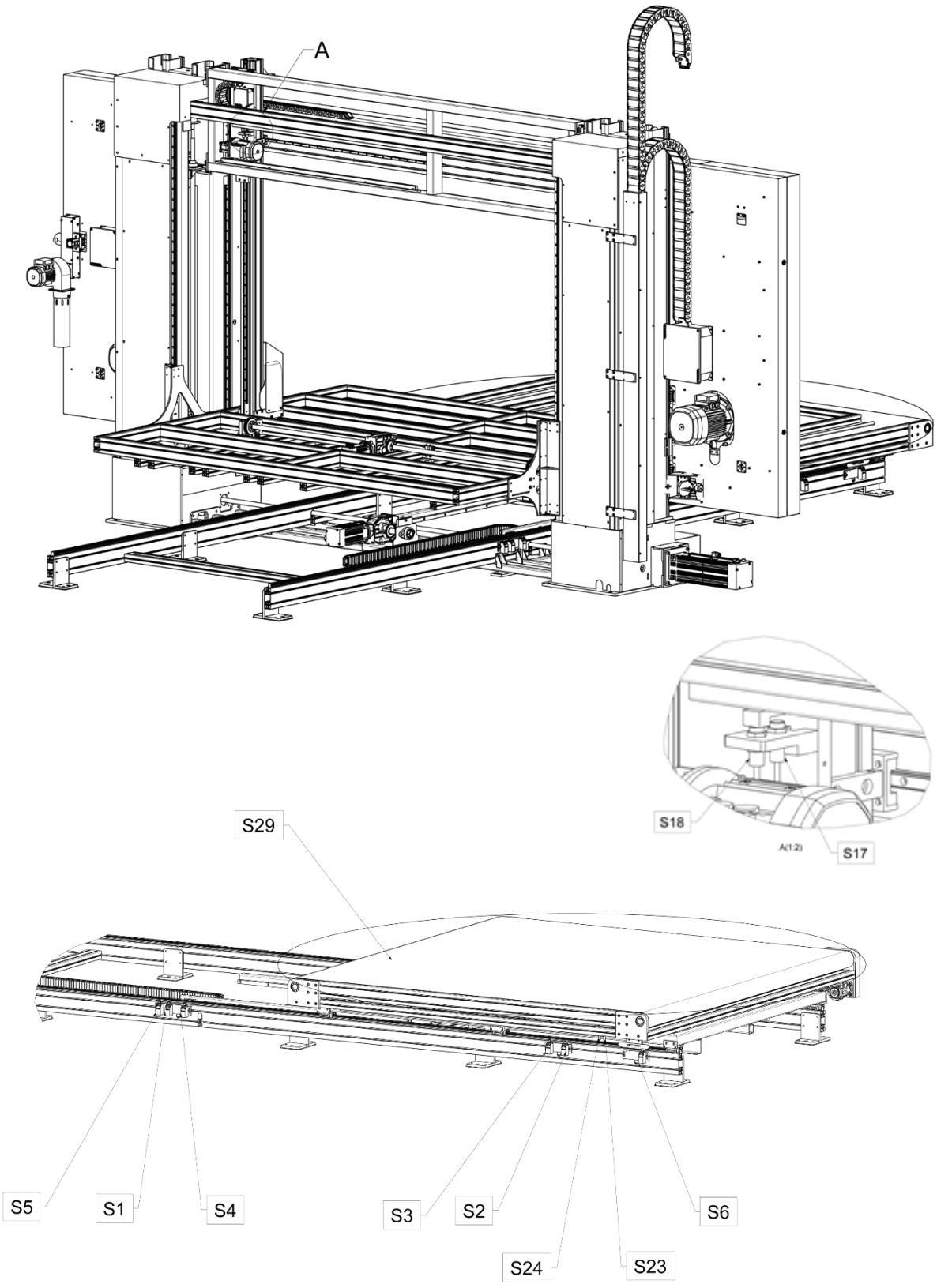
1.6 Blade change

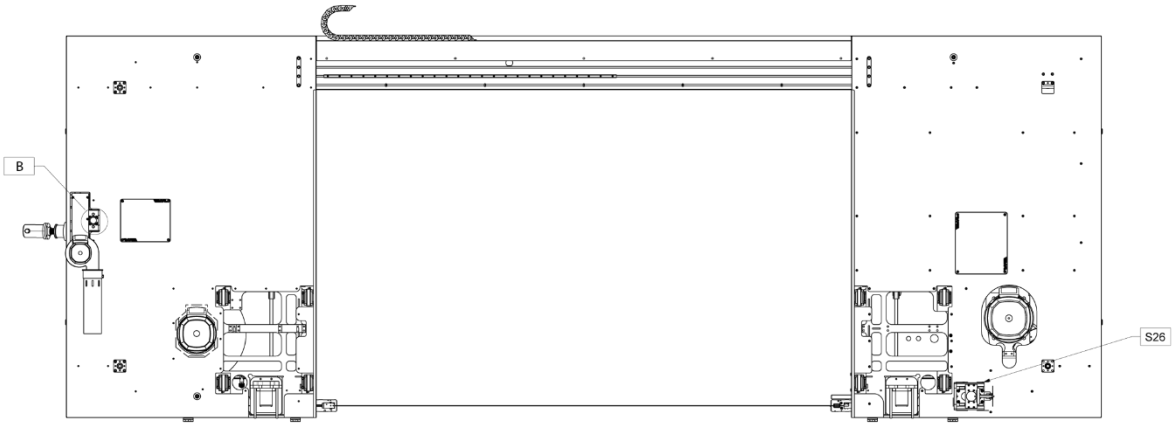
This CNC system is equipped with a sensor which detects the presence/absence of the blade. This is also a safety device, as shown in the next chapters. If the blade were to break, the sensor wouldn't detect its presence and the machine would be immediately stopped.
In an event such as this, the PLC will show an alert message like this:

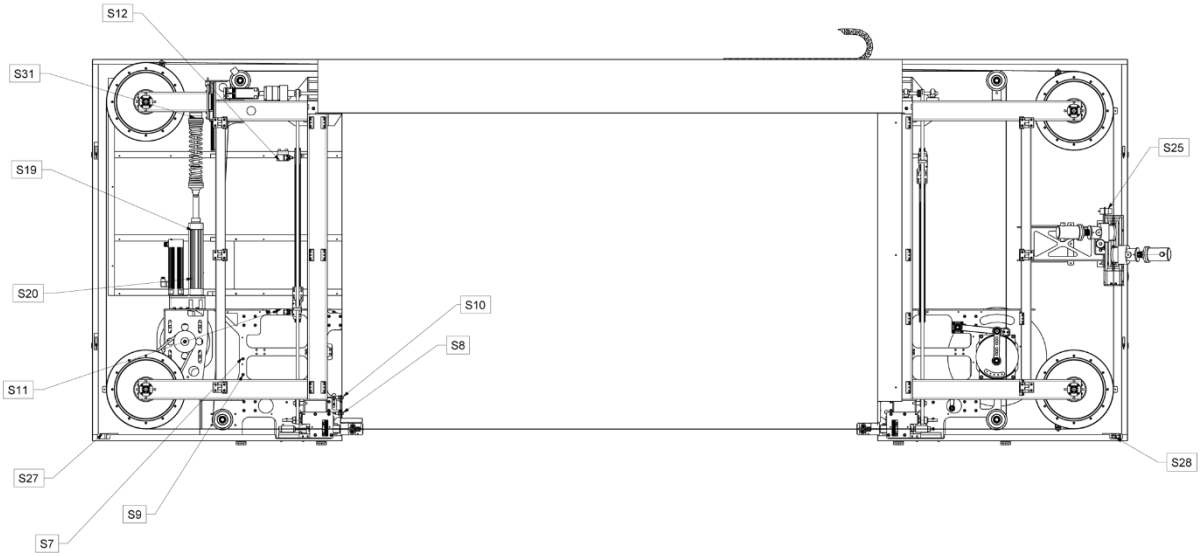
By selecting **confirm** the user will signal that a blade change is actually in progress, so the data of the blade which is being removed will be stored in the blade history screen.
By selecting **abort** instead, the user signals that no change is actually taking place, therefore all will remain unchanged.

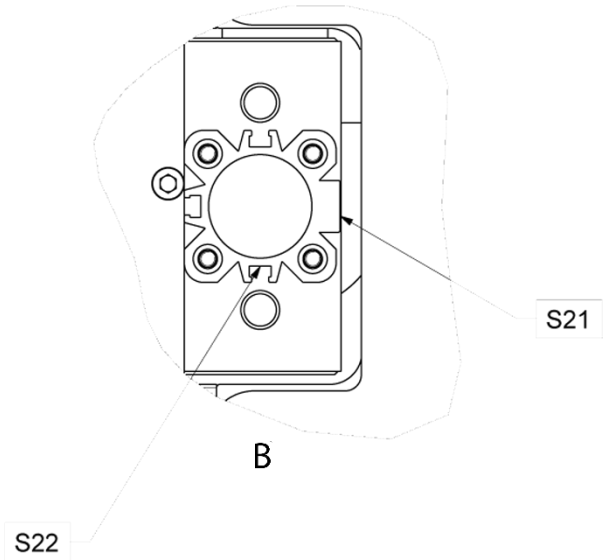
In addition to the sensor signal mentioned above, it's possible to force the blade change signaling and updating the blade history. As shown in the previous chapters, this can be done by pressing the blade change button  in the main screen. Doing that will trigger this screen.

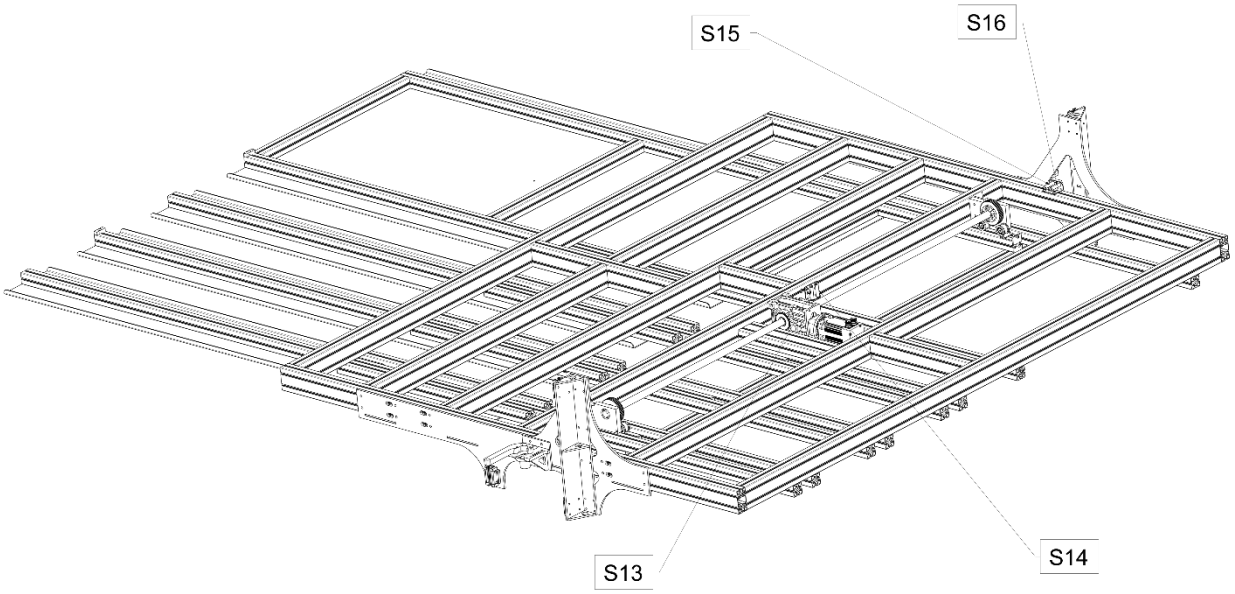
2. SENSORS

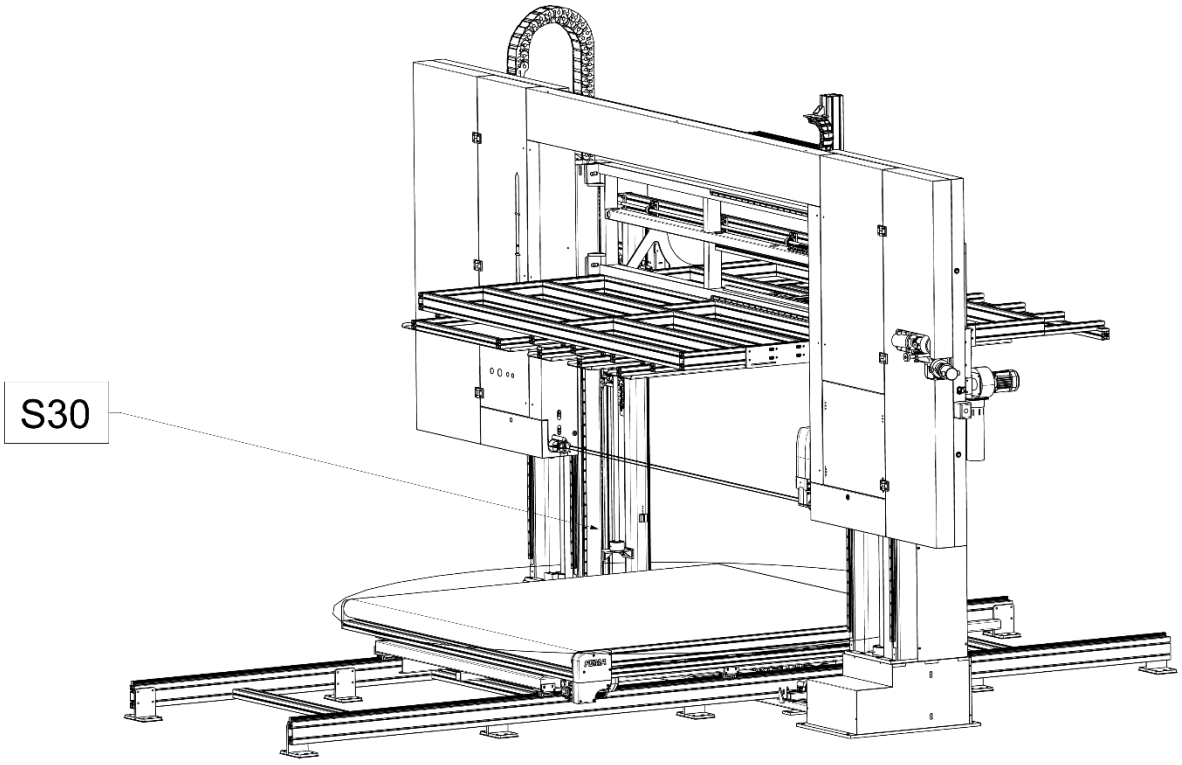


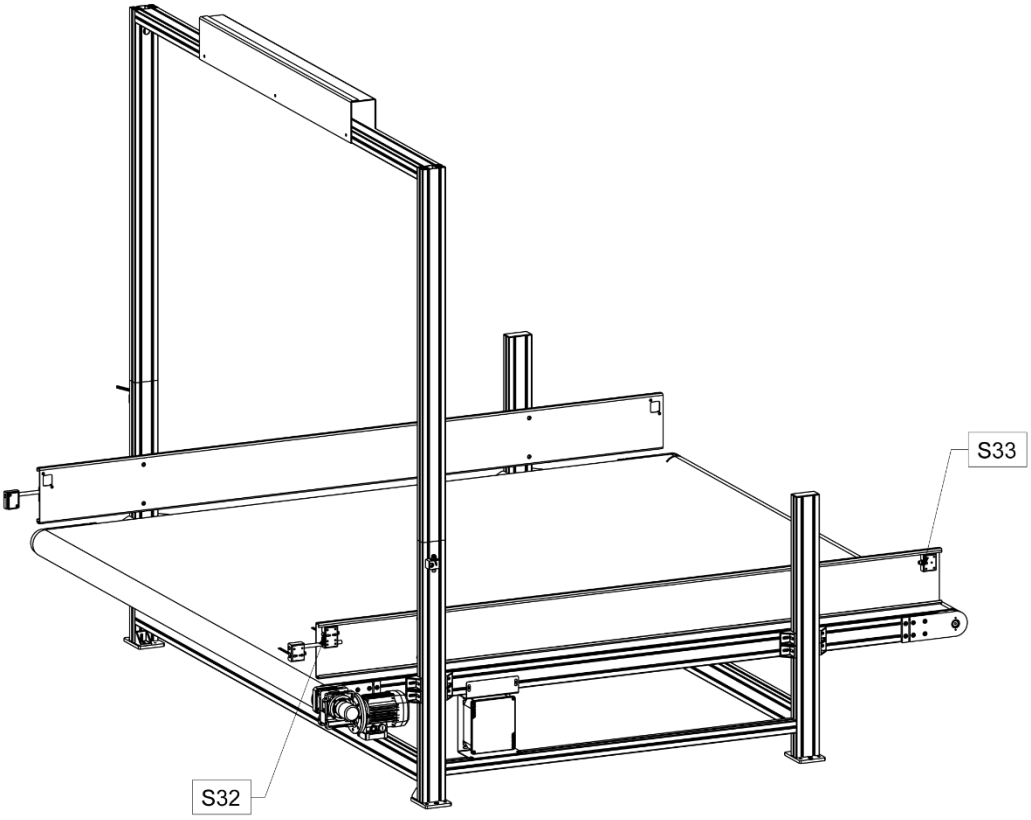

B
S26

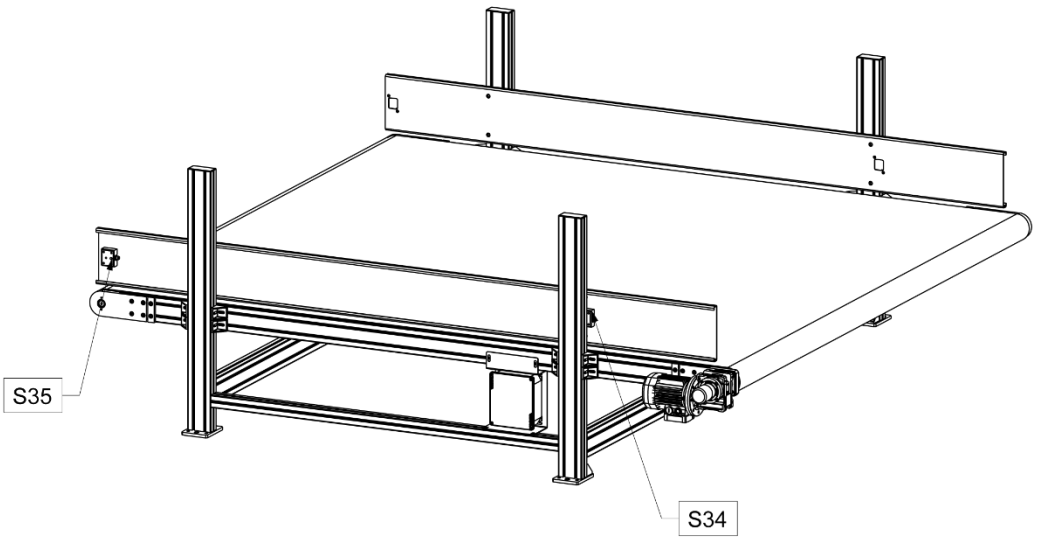

S12
S31
S19
S20
S11
S27
S7
S9
S10
S8
S25
S28


S21
B
S22


S15
S16
S13
S14


S30


S33
S32


S35
S34

Code	Description	Area/Function
S1	LS X-	TABLE FORWARD/BACK
S2	LS X+	
S3	LS SLOW X+	
S4	LS SLOW X-	
S5	LS X --	
S6	LSX ++	
S7	LS Y-	ARC UP AND DOWN
S8	LS Y+	
S9	LS RALL Y-	
S10	LS RALL Y+	
S11	LS Z+	HEADS ROTATION
S12	LS Z-	
S13	LS X1-	PRESS FORWARD AND BACK
S14	LS X1+	
S15	LS PRESS UP	PRESS UP AND DOWN
S16	LS PRESS DOWN	
S17	LS CENTRAL SUPPORT 1	MOVE CENTRAL SUPPORT
S18	LS CENTRAL SUPPORT 2	
S19	LS TENSIONING UP	
S20	LS TENSIONING DOWN	
S21	LS SHARPENING FORWARD	
S22	LS SHARPENING INBACK	
S23	LS TURN TABLE 0°	
S24	LS TURN TABLE 90°	
S25	CONTINUOUS BLADE PRESENCE	
S26	OSCILLATING BLADE BROKEN	
S27	DOORS SAFETY 1	
S28	DOORS SAFETY 2	
S29	PHOTOCELL PRESS ALIGNMENT	
S30	PHOTOCELL FOR BLOCK SEARCH	
S31	LOADING CELL	
S32	PHOTOCELL INTERNAL CONVEYOR 1	
S33	PHOTOCELL EXTERNAL CONVEYOR 1	
S34	PHOTOCELL INTERNAL CONVEYOR 2	
S35	PHOTOCELL EXTERNAL CONVEYOR 2	