



BM116 Instruction manual Maintenance



High-speed machine for cutting rootstock

Version: 11/2021

Original manual

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1 Servicing - Maintenance

1.1 Safety of maintenance operations

Prior to any maintenance or servicing operation, please read and observe all the safety instructions set out in **the instruction manual - General Information §** .

The machine must be stopped, please refer to **Safety instructions**.



Before carrying out maintenance work:

- ▶ Stop the machine
- ▶ Remove the mains plug.
- ▶ Remove the compressed air supply hoses.

If the machine is not unplugged, electric shock or injuries may occur.



Blade removal and adjustment can cause cuts.

It must be carried out with care

Gloves must be worn during these operations

1.2 Cleaning and maintenance.

1.2.1 Cleaning the machine

Cleaning the **BM116** according to the points in section **2.1**.

Before starting production, the machine must be cleaned so it can be used under the best possible conditions.

Daily maintenance:

- ▶ General blowing of the equipment.
- ▶ Clean the front of the blade.
- ▶ Empty the drop drawer.

Weekly maintenance:

- ▶ Remove the blade and the counter-blade for thorough cleaning.
- ▶ Remove the camera covers and clean the cover glass and camera lenses with a microfibre cloth.
- ▶ Clean the LEDs.

1.2.2 Empty the drop drawer regularly

The drop drawer of the **BM116** is located under the cutting blade. It recovers the debris generated when the cutting blade cuts the wood.

To empty the drop drawer, please observe the following steps:

- ▶ The machine must not be in production.
- ▶ Open the lower left side cover to access the drop drawer.



Figure 1 – Inner left side cover

- Empty the drop drawer.



Figure 2 – Drop drawer

- Reposition the drawer, push it in as far as it will go and close the lower left side cover.

1.2.3 Cleaning the vision system

The vision system must be cleaned several times a day to avoid errors, calibration problems, anomalies.

Tools: Clean microfibre cloth.

For a clean vision system, please observe the following steps:

- Clean the LED spotlights with a clean microfibre cloth.
- Clean the left and right cameras with a clean microfibre cloth.



To avoid scratching the camera glass, check the condition of the cloth.
The cloth must be clean, free of wood debris or other materials likely to scratch the cameras.

1.3 Blade and counter-blade maintenance



Blade removal and adjustment can cause cuts.
This must be carried out with care.
It is advisable to wear safety gloves during these operations.

1.3.1 Removal of the blades

The blade and counter-blade of the **BM116** must be maintained as they wear out during cutting.



A blade is worn if there are pits and grooves.
The counter-blade wears out faster than the blade of the **BM116** machine.

Hex keys no. 3; no. 4; no. 5; no. 6; Cutter; Mallet.

To maintain the blade of the **BM116** machine:

- ▶ Remove the left casing with hex key no. 6.
- ▶ Remove the blade casing with hex key no. 4.
- ▶ Remove the 3rd upper roller with hex key no. 6.

It is then possible to access the counter-blade using hex key no. 5.

- ▶ Remove the two screws holding the flange with hex key no. 5.
- ▶ Remove the counter-blade.
- ▶ Lock the blade with an iron rod or n+4 hex key.
- ▶ Remove the two screws with hex key no. 5.

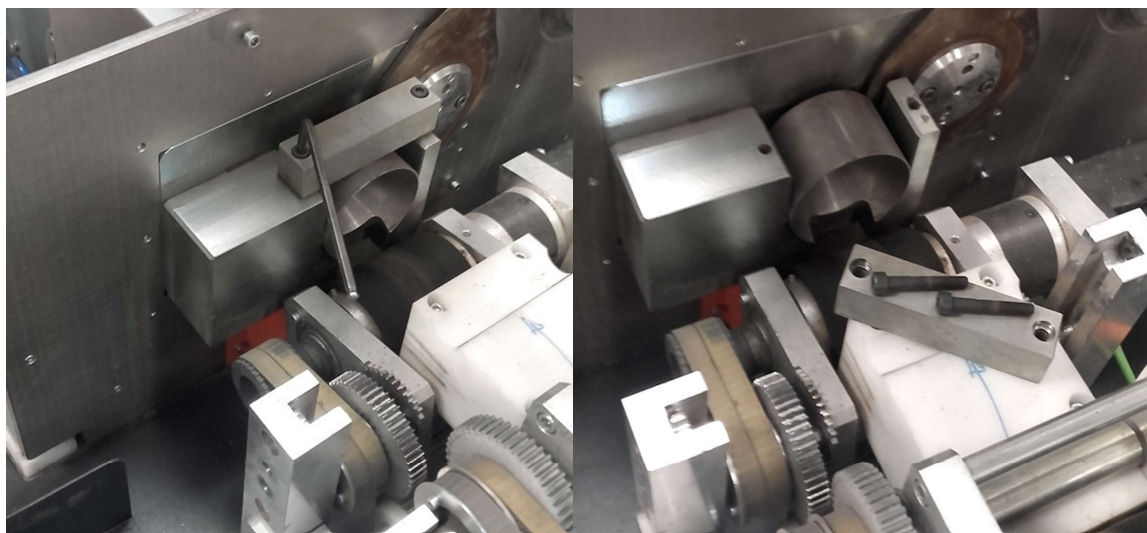


Figure 3 – Flange support screw

- ▶ Carefully remove the blade.

If it resists:

- Use one of the two screws holding the flange in place by screwing it into the centre of the blade washer to act as a puller to remove the blade.



Figure 4– Removing the blade

- Separate the washer from the blade using a mallet if necessary.
- Remove this screw.

Once the blade and counter-blade have been removed from the machine, they can be sharpened.

1.3.2 Blade sharpening

When the sharp edges of the blades are worn, they must be sharpened to restore the cutting profile.

Sharpening the cutting blade

Tools: Cloth; Oil stone.

To sharpen the cutting blade of the **BM116** machine:

- Remove the compensating screw with a hex key from either side if necessary.



The compensating screw is used to slightly stress the blade to offset flatness anomalies. It ensures effective contact between the blade and the counter-blade.

- Clean the sap off the blade with water by soaking or with a damp cloth.
- Place the blade on a flat surface.

- Reduce the streaks of the blade by means of circular movements with the oil stone.



Figure 5- Sharpening the blade

- Sharpen the blade until the edge has been restored.
- Turn the blade to the other side and repeat the operation.

Sharpening the counter-blade

Oil stone; Hex key no. 3.

To sharpen the counter-blade of the **BM116** machine:

- Clean the sap off the counter-blade by soaking or with a damp cloth.
- Place the counter-blade on a flat surface.
Press the two ribs so that they lie flat for better sharpening.

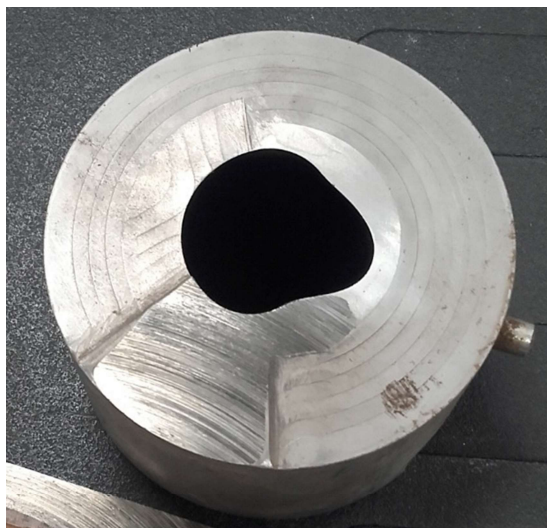


Figure 6- Positioning the counter-blade

- Reduce the streaks of the counter-blade by making circular movements with the oil stone.

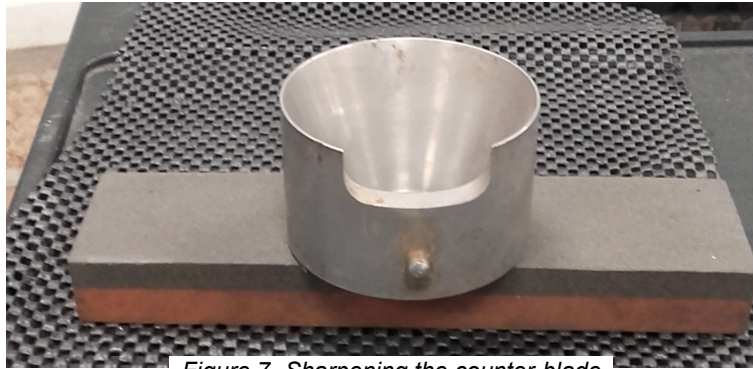


Figure 7- Sharpening the counter-blade

1.3.3 Reinstalling the blades

Once the sharpening operation has been completed, reinstall the blade and the counter-blade in the **BM116** machine.

Before re installation, scrape off the deposits which have collected on the holders with a cutter.
Clean the blade and counter-blade holders with a damp cloth.

Mallet; Cutter; Hex key no. 3.

To reinstall the blade and the counter-blade, please observe the following steps:

- Reinstall the washer using the mallet on the ribbed side of the blade.



Figure 8- Removing the washer

- Clean the blade and counter-blade holders with a damp cloth.
- Insert the blade into the machine by tapping the washer with the mallet.



Figure 9 - Inserting the blade

- Lock the blade with the hex key.



Figure 10- Locking the blade

- ▶ Tighten the two screws of the cutting blade.
- ▶ Insert the counter-blade into the machine.

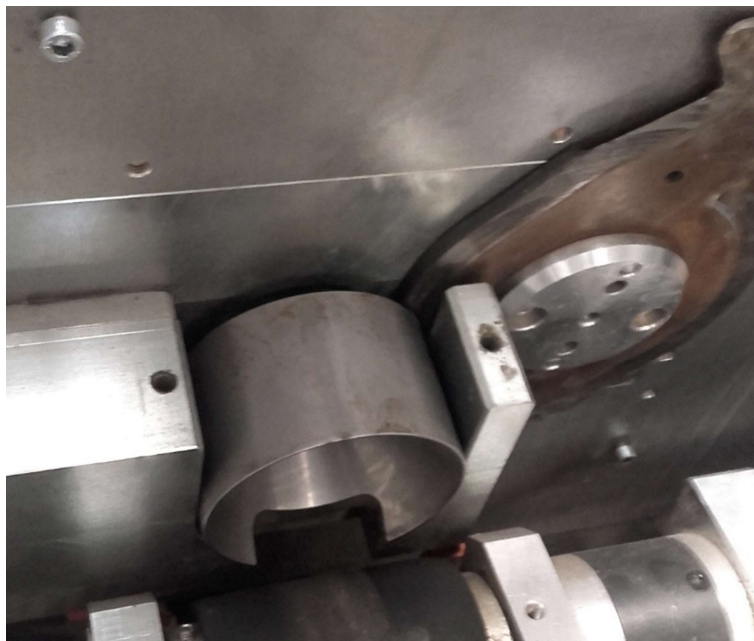


Figure 11- Inserting the counter-blade

- ▶ Reposition the flange and position the flange screws.
- ▶ Swivel the cutting blade towards the counter-blade to reach the cutting position.



Figure 12 - Placing in cutting position

- ▶ Place the counter-blade on the blade as shown in the picture above.
- ▶ Slightly tighten the flange while holding the counter-blade.



Figure 13 - Tightening the flange

- Rotate the cutting blade and check that the blade and the counter-blade are rubbing systematically.
- Tighten the flange.
- Reinstall the upper roller.

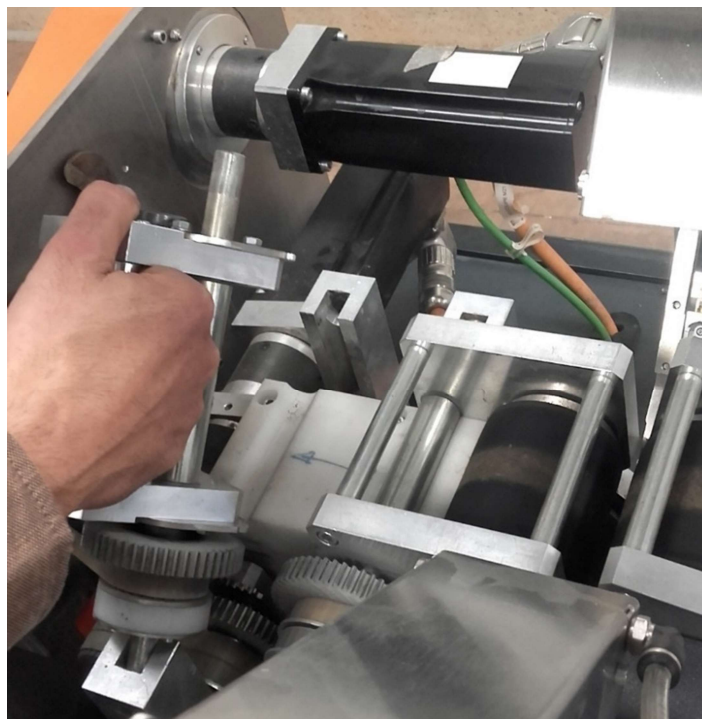


Figure 14- Removing the upper roller



Put the racks in the bottom notch and make sure that:
The top of the roller holder is horizontal when the rollers are closed.
The 1st notch at the top of the rack is on the outside.

- ▶ Reinstall the 2 screws at the top of the pin.
- ▶ Reinstall the 2 screws of the blade casing using hex key no. 4.



Figure 15- Reinstalling the protective cover

1.3.4 Indexing the blade

The blade must be indexed every time the belt has been removed.

To index the blade of the **BM116** machine:

- ▶ Remove the cutting blade casing.
- ▶ Close the machine covers.
press RESET.
- ▶ Go to the configuration/PLC menu.
- ▶ Click on the “Manual/Auto” button on the PLC configuration screen.
The motor will start and index the blade.
- ▶ Click on the button again to stop the motor.



The values at the bottom of the PLC configuration screen are only available with the manufacturer code.

- ▶ The blade will not be positioned, stopped in the correct position.
- ▶ To return the blade to the right position, add or remove degrees in the “Initial Blade Position” box of the PLC Configuration menu (see instruction manual - Touch Screen).
- ▶ Apply the new value by pressing the “Manual/Auto” button and continue until the locking holes of the blade are aligned.
- ▶ Press Return to exit the procedure.

1.4 Cleaning the water filter

The water filter of the **BM116** machine is located on the left in the pneumatic cabinet.

To clean the water filter:

- ▶ Turn off the air in the pneumatic box.
- ▶ Uncouple the filter.
- ▶ Check the filter for cleanliness.
- ▶ Clean/empty the filter if necessary.

1.5 Cleaning the ventilation filters

The ventilation filters of the **BM116** machine are located:

- ▶ On the door



Figure 16 - Door filter

- ▶ In the compressor unit.
Remove the strap to access the various filters.



Figure 17 - Compressor filter

To clean the ventilation filters:

- ▶ Remove the ventilation filters.
- ▶ Run the filters under water (preferably lukewarm) to clean them.
- ▶ After cleaning, allow the filters to dry and, if necessary, wipe them with a cloth to facilitate drying.
- ▶ Reinstall the ventilation filters once the filters are dry.

1.6 Access under the brush strip

If wood is jammed due to the accumulation rate, it is possible to access the brush strip to remove the debris.

To access and clean the brush strip:

- ▶ Lower the screen using the thumbwheel on the back.



Figure 18 - Lowering the screen

- ▶ Remove the upper casing.

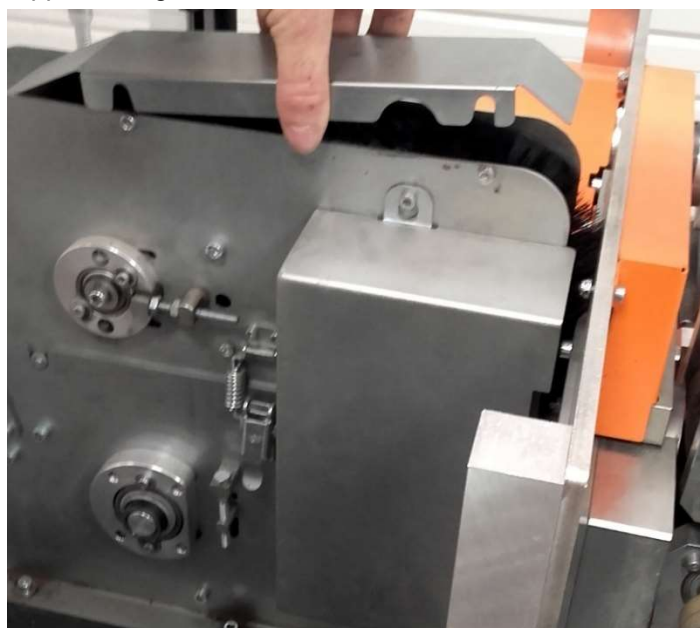


Figure 19- Removing the upper casing

- Remove the gearcase.



Figure 20- Reinstalling the gearcase

- Unlock the toggles on both sides of the machine.

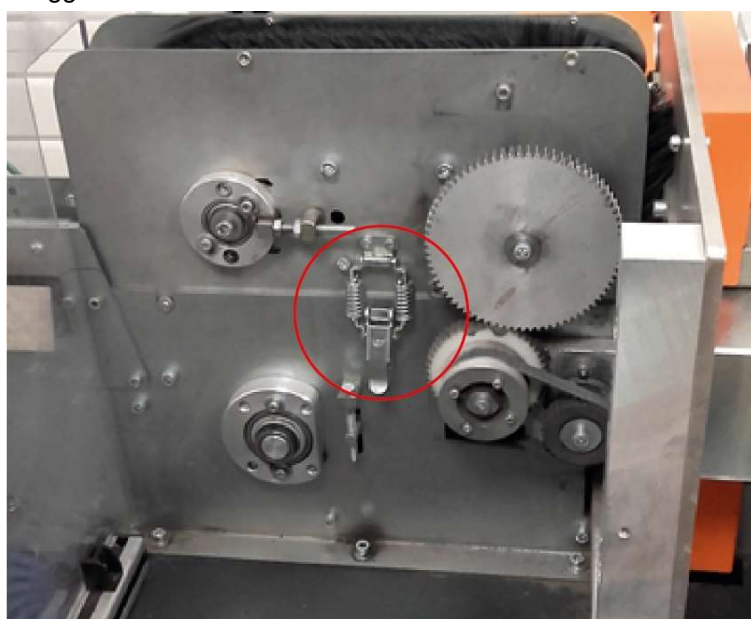


Figure 21 - Unlocking the toggles

- Lift the “brush” unit.

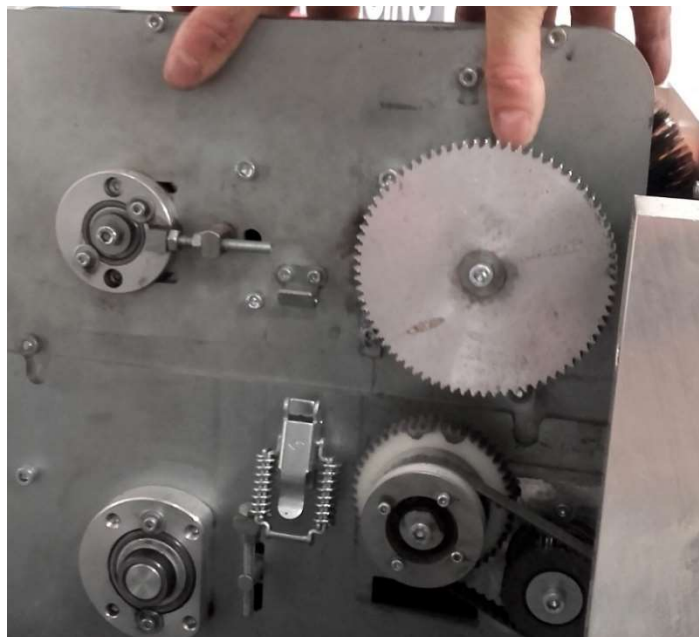


Figure 22- Removing the “brush” unit

- Clear debris from the belt.



Figure 23 - Removing debris

- Reposition the brush unit.



Figure 24- Positioning brush unit

- Re-lock the toggles on both sides of the machine.
- Replace the casings, the screen and the knurl in the opposite direction of disassembly.

1.7 Checkingbelts, gears and rollers

Before launching or after a production run, check the cleanliness of mechanical parts.

To clean the various mechanical parts:

- ▶ Visually check the condition of belts, gears and rollers.
- ▶ Blow on these parts.
- ▶ Remove wood debris.

1.8 Maintenance of roller assemblies

The maintenance of roller assemblies depends on the wear of their individual components.

Roller assemblies consist of the following components: Sleeve, Belt, Gear.

Carry out all or part of the operations below (§ 1.8.1 to § 1.8.6).

Tools: Hex key no. 6; Felt;



Entanglement hazard.

1.8.1 Dismantling of roller assemblies

To remove roller assemblies from the machine:

- ▶ Remove the screws from all blocks and tensioners on both sides using hex key no. 6.

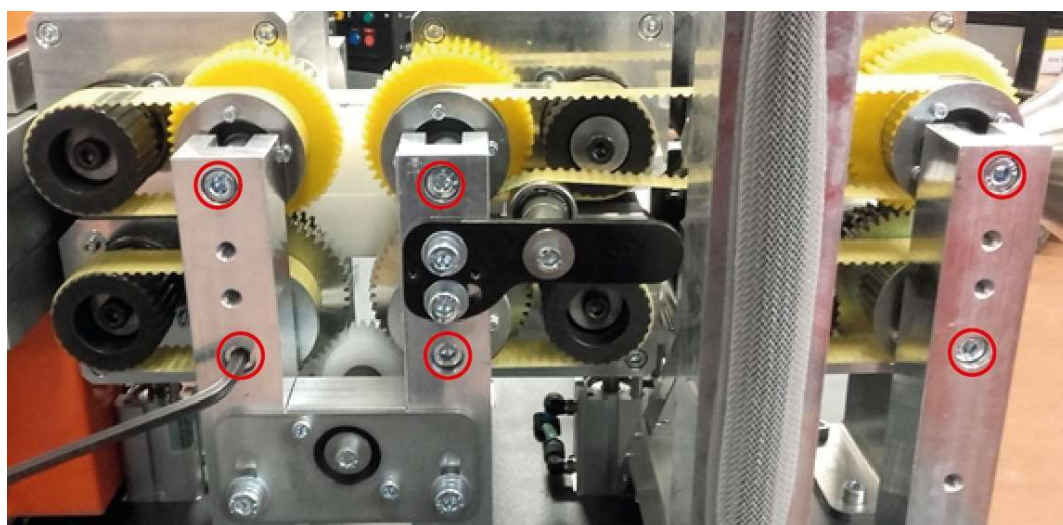


Figure 25 - Screw position for each block

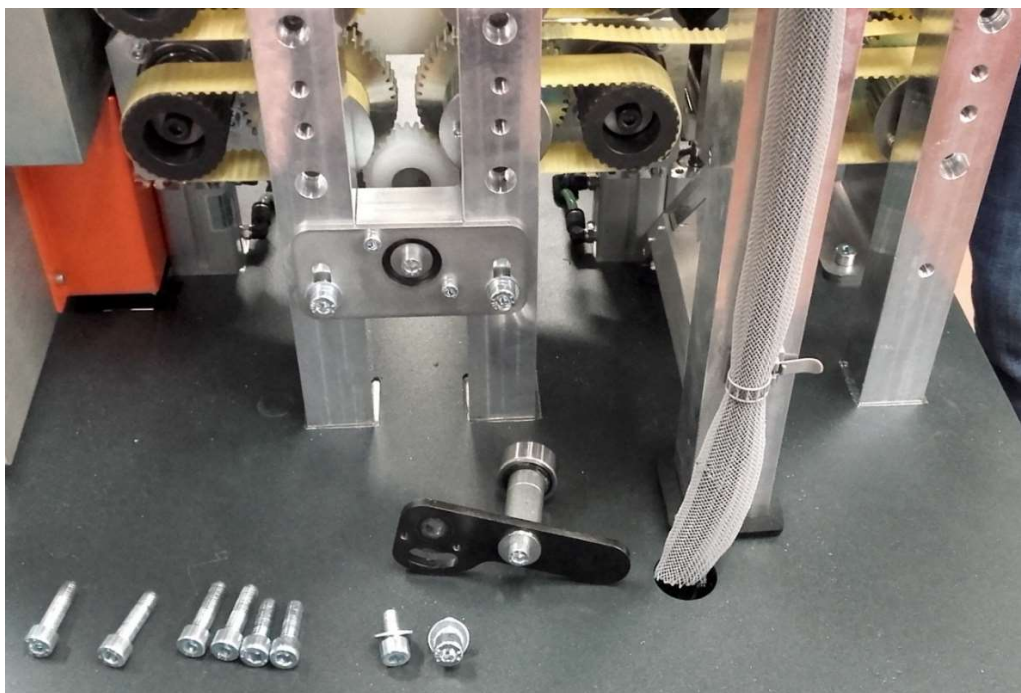


Figure 26 - Undoing of screws for each block

- Remove the upper blocks by loosening the belts.

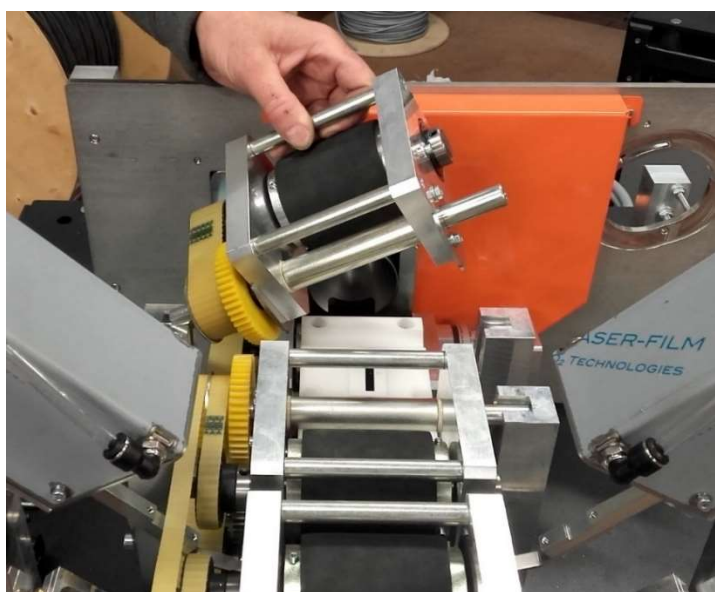


Figure 27 - Removing the upper block

- Remove the long belt.

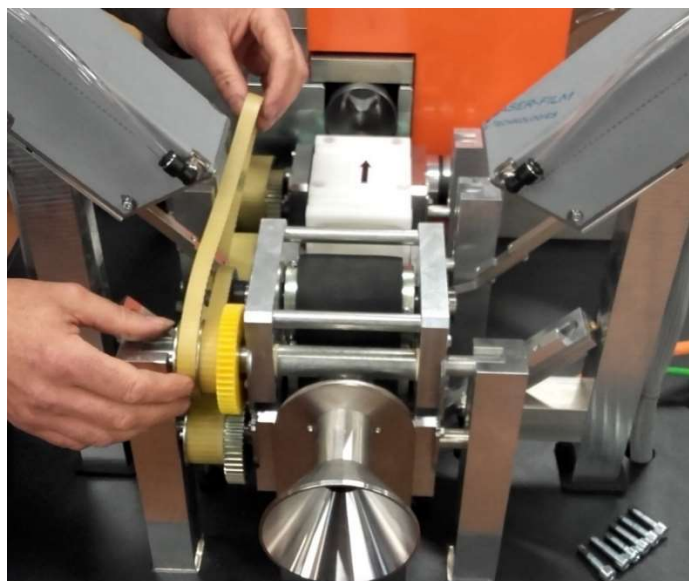


Figure 28 - Removing the long belt

- Remove the white corridor.
The corridor is not fixed.

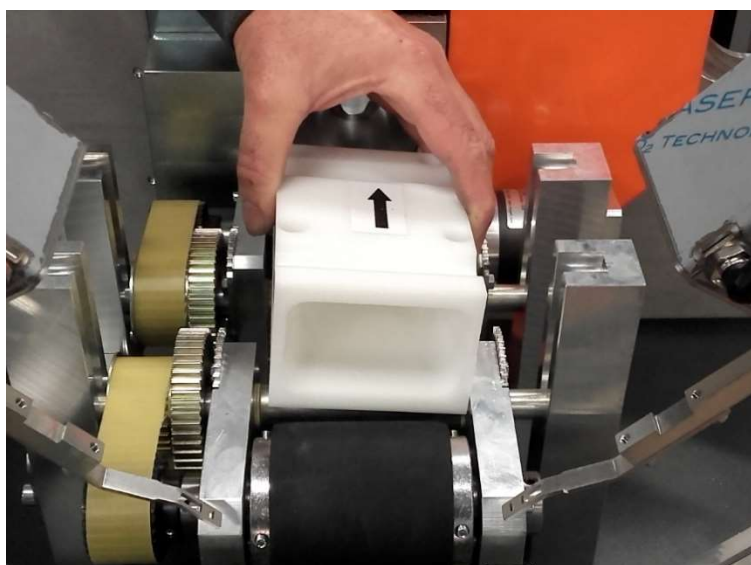


Figure 29- Removing the white corridor



It is strongly advised to mark the top and bottom blocks with a marker pen for re installation.

- Unscrew and remove the funnel.

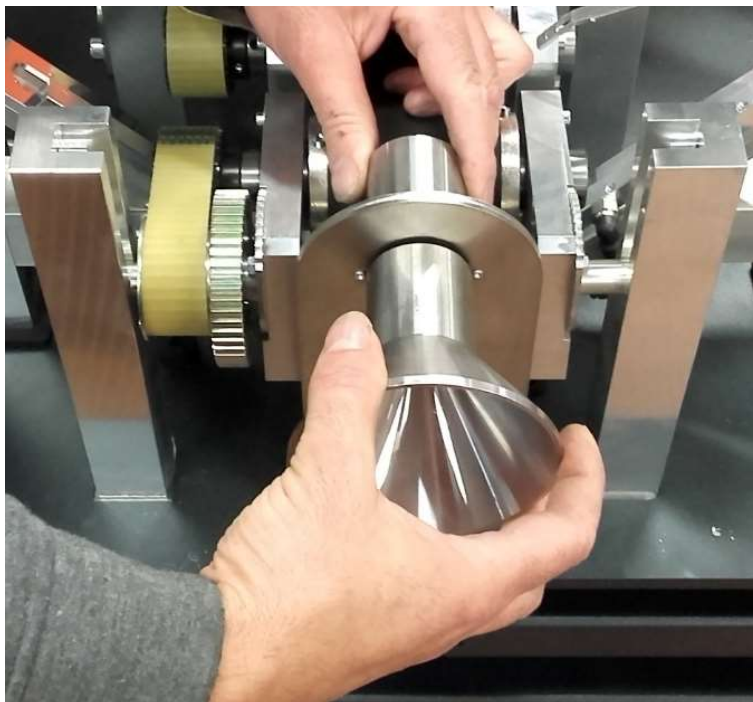


Figure 30- Removing the funnel

- Remove the lower blocks, taking care not to damage the fixed standards.

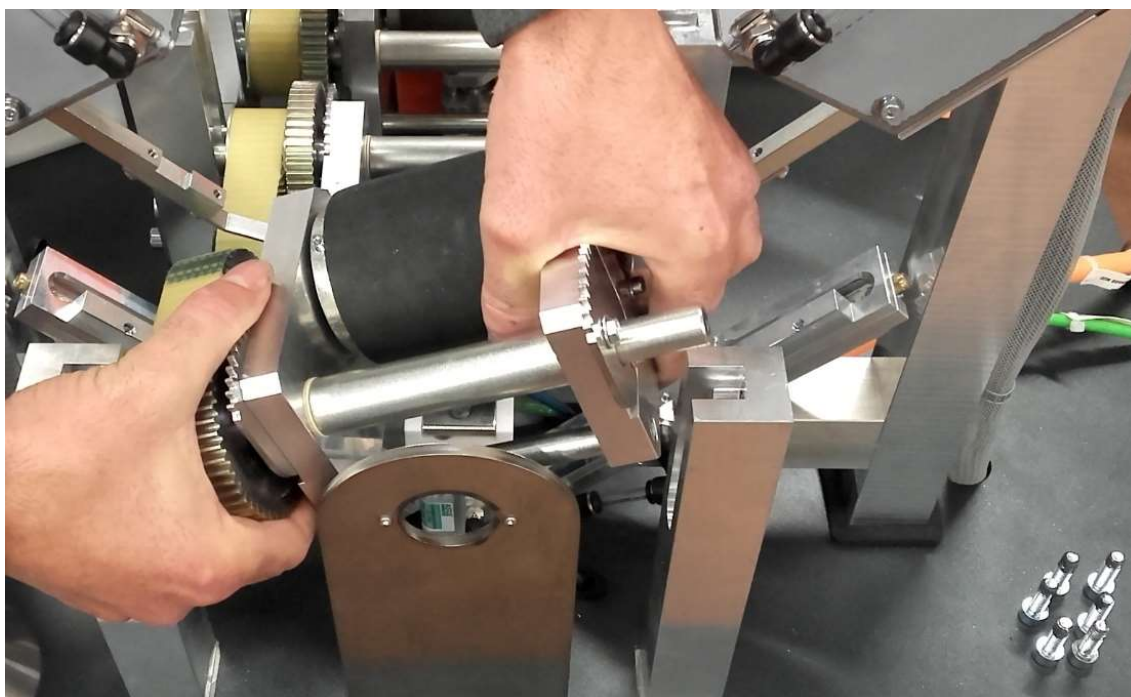


Figure 31- Removing the bottom blocks

- For the 3rd block from the bottom, located towards the counter-blade, unscrew the 2 motor cables, making sure you disconnect them.



Figure 32 - Disconnecting the motor cables



Do not disconnect the lower block/motor cables if the machine is powered on.

- Remove the 3rd lower block and motor assembly.

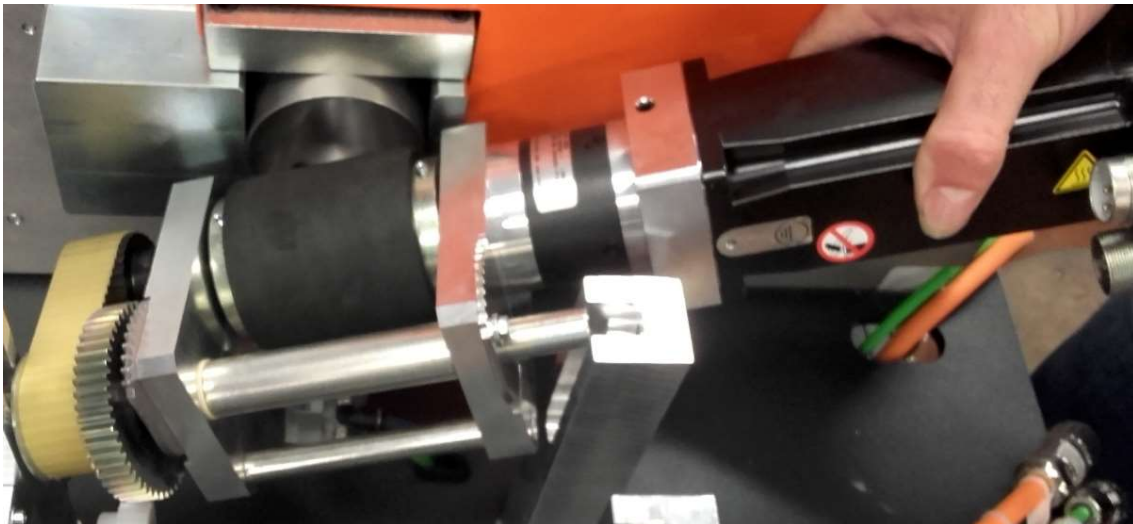


Figure 33- Removing the motor blocks

- Access to the jacks underneath.

1.8.2 Replacing roller sleeves

See instruction manual - Spare parts

1.8.3 Replacing a gear

See instruction manual - Spare parts

1.8.4 Replacing the gearbox and/or motor

See instruction manual - Spare parts

1.8.5 Replacing a belt

See instruction manual - Spare parts

To replace a belt on roller assemblies:

- ▶ Remove/cut the worn belt.
- ▶ Place the new belt on the rollers.
- ▶ Gradually replace the belt by turning the gear by hand.

1.8.6 Reinstalling the roller assemblies

To reinstall the roller assemblies:

- ▶ Put the lower blocks back in place.
Start with the lower roller-motor block.
Place a screw on the left side to avoid the motor moving.
Put the second lower roller block.
Put the third lower roller block.
- ▶ Reinstall the funnel using the notches to position it.
- ▶ Screw on the front part of the funnel.
- ▶ Put the white corridor back in place.
Check the direction of the arrow.
- ▶ Put the upper blocks back in place.

WARNING: Between blocks 1 and 2, install the long belt.

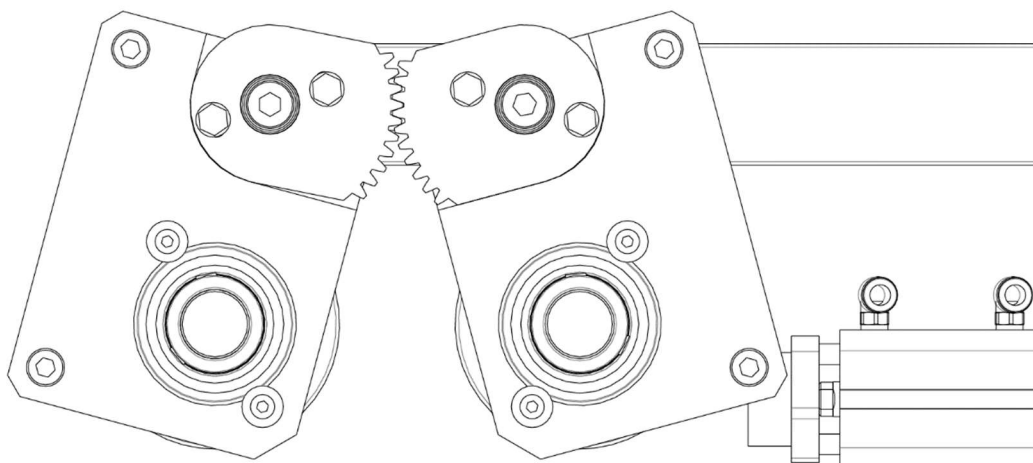


Figure 34 - Installing the top blocks

- ▶ Once closed, check that the top of the blocks is horizontally aligned.
- ▶ Place the pin screws.
- ▶ Position the tensioner under the belt.
- ▶ Place the screws on the other side.
- ▶ Tighten all pre-tensioned screws that are installed.
- ▶ Adjust the position of the tensioner by hand and tighten the screws.
- ▶ Reconnect the motor cables.



Do not damage the standards when reinstalling the lower rollers.
Pay attention to the direction of the roller blocks when reassembling.



Thin belts at the top
Offset rack => top

1.9 Camera maintenance

To keep your vision system in good working order, it is essential to regularly check the cleanliness of the camera glass.

In the event of "Camera calibration fault":

- ▶ Check that there is no wood or other debris in the field of vision by manually turning on the LED spotlights (see instruction manual - Touch Screen).
- ▶ Blow with a blower to remove wood debris.
Check the camera footage again. (Only the two lines of the fixed standard should appear).
- ▶ Click on "Acknowledge" after cleaning the cameras with a correct image.



If the problem persists, the machine's cameras must be calibrated.



Depending on the machine version, the standard guide and the calibration procedures differ.
Follow the chapter 1.9.1 or the chapter 1.9.2.

1.9.1 Calibration of cameras – first generation standard guide



Cameras can only be calibrated with the "Maintainer" profile.

Camera calibration tools: moving standard; first generation standard guide (white).



Use only the standard supplied by **SFERE BM** packaging to perform calibration. (Photo below)



Figure 35 - Moving standard and first generation standard guide

To calibrate the cameras, please observe the following steps:

- ▶ Access the Camera Settings menu.
- ▶ Login with the "Maintainer" profile code.



A red field means there is debris in the field of view of a camera.
An orange field means that Calibration must be performed.
Process all red fields first to make the Calibration procedure possible.

- ▶ Remove the funnel (2 sections).



- Screw on the standard guide.



Figure 36 - Installing the standard guide

- Close the covers.
- Insert the mobile standard up to the 1st roller without bringing it into the field of view of the cameras.
- Press the "Calibration" button in the bottom right corner of the screen.
- Press "OK".

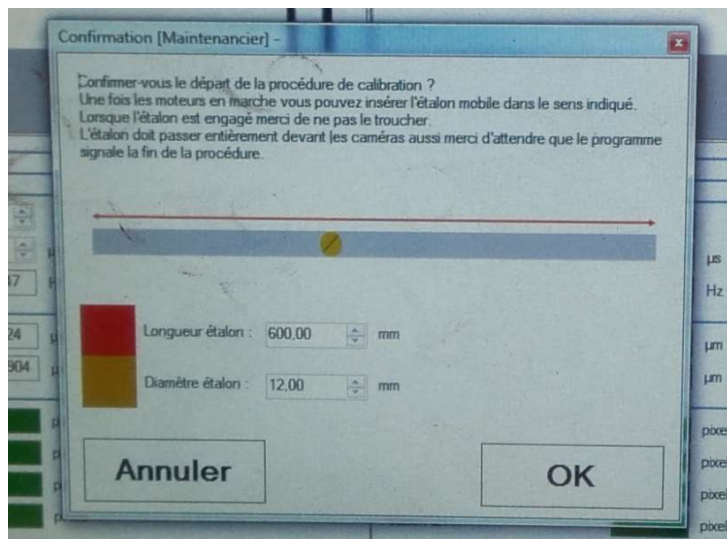


Figure 37 - Calibration screen

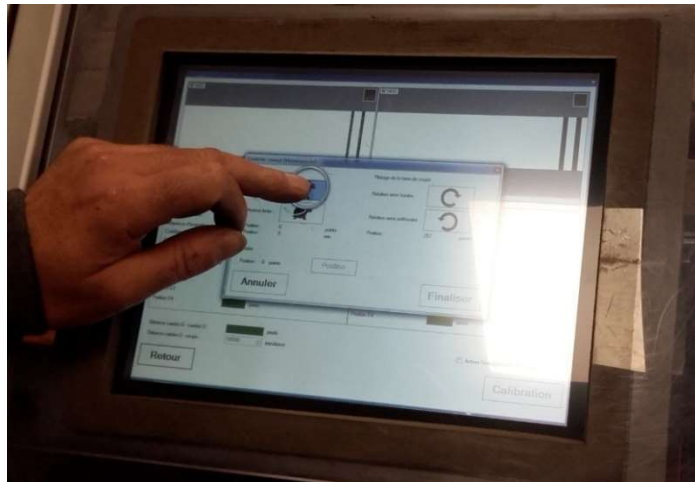


Figure 38 - "Rabbit" button

- ▶ Press and hold the "rabbit" button until the mobile standard the last set of rollers.
- ▶ Press and hold on one of the blade rotating buttons in order to position the blade edge along the axis of the moving standard.
- ▶ Press and hold on the "tortoise" button until the bar comes into contact with the blade (slight movement of cutting plane).
- ▶ Press and hold on the "position" button (the system then stores the strike-camera distance)
- ▶ Press and hold on one of the blade rotating buttons in order to move it away from the axis of the moving standard.
- ▶ Press and hold the "rabbit" button until the last set of rollers falls.
- ▶ Release the button and press on "finalise" calibration.
- ▶ Retrieve the standard through the debris hatch.



Figure 39 - Retrieving the moving standard



The standard must be retrieved as there is a risk of projection the next time you start up

- ▶ Calibration values are displayed on screen in pixels. Check there is a small gap between the two cameras (a few pixels).
X: [88 ;92].
Y: [109 ;111].
- ▶ The left and right camera fields appear in green.

The values of both cameras must be very close. If they are not or if calibration values are out of range, contact the customer service department.

- ▶ Reinstall the funnel on the machine.
- ▶ Click on the "Return" button to return to the production screen.

1.9.2 Calibration of cameras – first generation standard guide



Cameras can only be calibrated with the “Maintainer” profile.

Camera calibration tools: moving standard; standard guide (white).



Use only the standard supplied by **SFERE BM** packaging to perform calibration. (Photo below)



Figure 40 - Moving standard

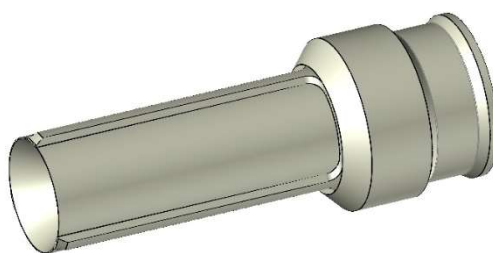


Figure 41 - Second generation standard guide to insert into the funnel

To calibrate the cameras, please observe the following steps:

- ▶ Access the Camera Settings menu.
- ▶ Login with the “Maintainer” profile code.



A red field means there is debris in the field of view of a camera.
An orange field means that Calibration must be performed.
Process all red fields first to make the Calibration procedure possible.

- ▶ Clean the funnel using a damp cloth, in order to remove any sap and other impurities.
- ▶ Position the standard guide inside the funnel.



Figure 42 - Standard guide inserted into the funnel

- ▶ Check the covers are properly closed.
- ▶ Insert the mobile standard up to the 1st roller without bringing it into the field of view of the cameras.
- ▶ Press the “Calibration” button in the bottom right corner of the screen.
- ▶ Press “OK”.

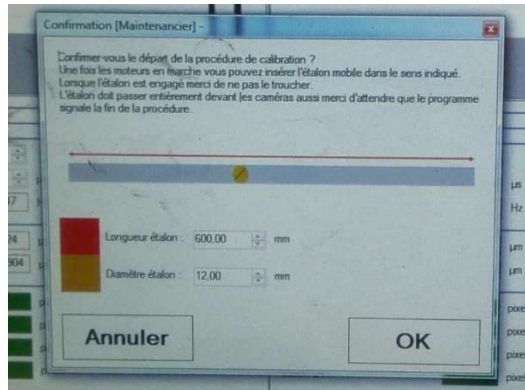


Figure 43 - Calibration screen



Figure 44 - “Rabbit” button

- ▶ Press and hold the “rabbit” button until the mobile standard the last set of rollers.
- ▶ Press and hold on one of the blade rotating buttons in order to position the blade edge along the axis of the moving standard.
- ▶ Press and hold on the “tortoise” button until the bar comes into contact with the blade (slight movement of cutting plane).
- ▶ Press and hold on the “position” button (the system then stores the strike-camera distance)
- ▶ Press and hold on one of the blade rotating buttons in order to move it away from the axis of the moving standard.
- ▶ Press and hold the “rabbit” button until the last set of rollers falls.
- ▶ Release the button and press on “finalise” calibration.
- ▶ Retrieve the standard through the debris hatch.
- ▶ Do not release the button until the third roller assembly has been lowered.
End of standard passage.
- ▶ Release the button and press on finalise calibration.
- ▶ Retrieve the standard through the debris hatch.



Figure 45 - Retrieving the moving standard



The standard must be retrieved as there is a risk of projection the next time you start up

- ▶ Calibration values are displayed on screen in pixels. Check there is a small gap between the two cameras (a few pixels).
X: [88 ;92].
Y: [109 ;111].
- ▶ The left and right camera fields appear in green.

The values of both cameras must be very close. If they are not or if calibration values are out of range, contact the customer service department.

- ▶ Remove standard guide from the funnel.
- ▶ Click on the "Return" button to return to the production screen.

2 Appendices

2.1 Revision history

Revision	Date	Details
01	11/2021	Manual divisions