Service manual

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INTRODUCTION

1.1 Overview

This is the Summa Service Manual for the S Class series cutters. It provides information for servicing the cutters. All repairs are to be made by, or under the direction of, authorised Summa service personnel.

There will be only one version of this manual. All changes will be send out as appendices or service aids.

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1.2 Manual organization

This manual is divided into the following sections:

- Table of Contents
- Introduction
- Replacement guidelines
- Calibrations
- Error messages
- Menu structure
- Maintenance and cleaning
- Figures - part numbers
- List recommended spare parts
- List of consumables

Replacement guidelines contains the following:

An overview of the removal and the replacement of various parts of the unit in the form of separate sections. It is advisable to carefully read the procedure described in each of the sections prior to removing or replacing a particular part. In addition to straightforward step by step procedures you will often find Notes and Cautions. Make sure you read these remarks as they will often facilitate re-installation and avoid malfunctioning.

Calibration contains the following

An overview of all the possible calibrations of the unit. Each time the machine is serviced check this section to see if any recalibration needs to be done.

Error messages contains the following:

This part contains an overview of the error messages that can appear on the touch screen and how to react.

Menu structure contains the following:

This part contains an overview of the various tests and configurations that can be accessed via the touch screen.

Maintenance contains the following:

An overview of the maintenance of various parts of the unit. It is advisable to carefully read the procedure described in each of the sections prior to removing or replacing a particular part. You will often find Notes and Cautions. Make sure you read these remarks as they will often avoid malfunctioning.

Figures - part numbers:

Detailed figures of the various parts and assemblies of the machine.

Spare parts list

An overview of all the recommended spare parts. Normally only the parts figuring on this list will be provided by Summa.

Consumables list:

An overview of all the consumables

1.3 Quick tour around the machine

1.3.1 The Cutter as viewed from the Front

FIG 1-1
1-1 S CLASS 2 CUTTER, FRONT VIEW

1. **Pinch rollers:** The pinch rollers clamp the media to the drive system to ensure accurate tracking. The S120(T) has one and the S160(T) and S 140(T) have two extra pinch rollers to ensure that wide media stays flat in the middle. The outer drive pinch rollers have a selectable pressure; the extra rollers in the middle can be enabled or disabled. Extra pinch rollers can be added.
2. **Touch panel:** All cutter activity can be initiated from the 320x240 dot touch panel. The panel displays information about the cutter's current status and/or actions that need to be taken.
3. **Pinch roller lever:** This lever is used to raise and lower the pinch rollers for media loading.
4. **Media drive sleeves:** The media drive sleeves move the media only when the pinch rollers are in the "down" position. The following table lists the number of sleeves installed on each model of the S CLASS 2 cutters.

Number of sleeves	S75 (T)	S120 (T)	S140 (T)	S160 (T)
Short sleeve	4	7	8	9
Long sleeve	1	1	1	1

5. **Tool carriage:** The tool carriage is the mount for the knife holder, pen or pouncing tool. It has also holds the Optical POSitioning sensor (OPOS) and a cut-off knife to cut a sheet from the roll when a job is finished.
6. **Cutting strip:** A self-healing orange strip helps avoid any damage to the knife tip when no media has been loaded. Since cutting is done on the cutting strip, it is essential that the strip remains intact.
7. **Pouncing strip:** An extra black strip to pounce on.
8. **Tool holder:** The left end cap has a rim so it can be used for tool storage.
9. **Screws to secure the cutter base:** Make sure all three screws are secured at each side before the cutter is used.
10. **Media basket:** The stand and linen media basket come standard with all S CLASS 2 cutters.

1.3.2 The Cutter as viewed from the Back

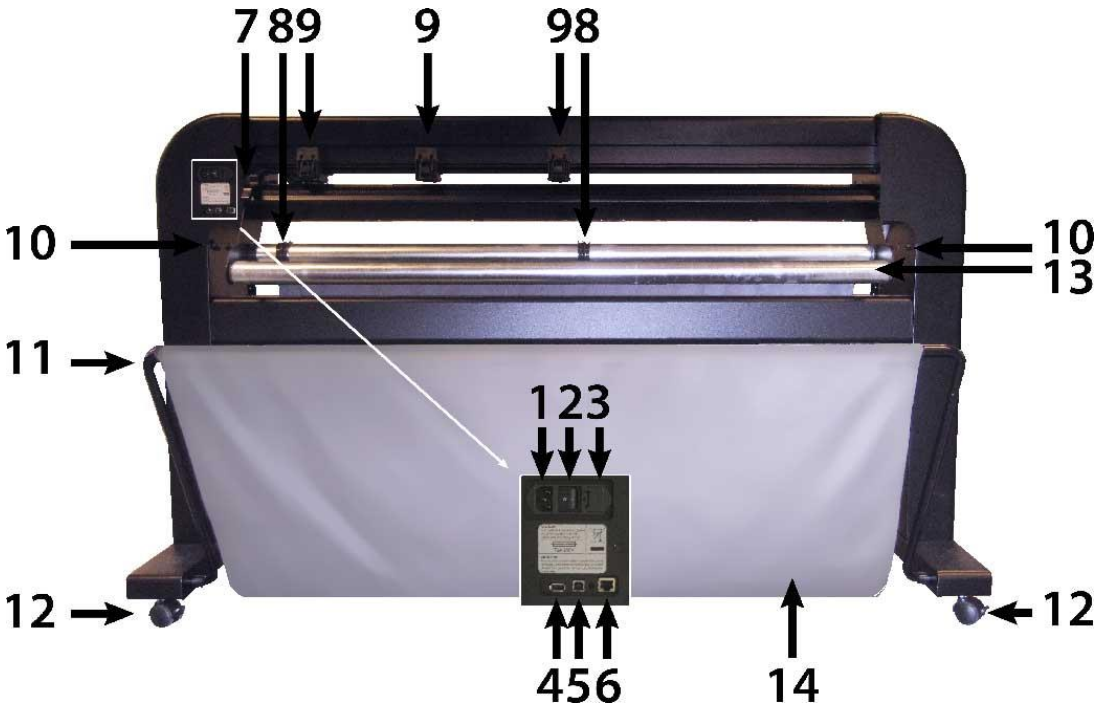


FIGURE 1-11:
S CLASS CUTTER, REAR VIEW

1. **AC power cord receptacle:** It is located at the left-hand side of the power entry module. The power-up procedure is explained in detail in Section 1.3. Always use a power cord that was delivered with your cutter.
2. **Power On/Off switch:** This rocker switch, in the middle of the power entry module, sets the cutter's power to ON or OFF. To switch on the power, press the "I" side of the rocker switch. To switch off the power, press the "O" side of the rocker switch.
3. **The fuse box:** The fuse is located at the right side of the power entry module. Check the specification section to see which fuse is used in the S CLASS 2 cutter.

WARNING: For continued protection against risk of fire, replace only with the same type and rating of fuse.

4. **USB port type A female:** For plugging in a USB stick.
5. **Ethernet port RJ45:** For connecting the cutter to the LAN.
6. **USB port Type B female:** This interface is based on the standards specified in Universal Serial Bus Specifications Revision 1.1. It allows a high-speed bi-directional communication between the host computer and the cutter.
7. **Pinch roller lever:** This lever is used to raise and lower the pinch rollers for media loading.
8. **Roll media guide bushes:** The two flange guides serve to keep the media roll in place when media is pulled from the roll.
9. **Pinch rollers:** The pinch rollers clamp the media to the drive system to ensure accurate tracking. The S120(T) has one and the SS160(T) and S 140(T) have two extra pinch rollers to ensure that wide media stays flat in the middle. The outer drive pinch rollers have a selectable pressure; the extra rollers in the middle can be enabled or disabled. Do not move the pinch roller assemblies while holding them from this side only.
10. **Screws to secure the cutter base:** Screws (3 left and 3 right) hold the cutter base to its stand. All the screws must be properly tightened before using the cutter.
11. **Tubes for media basket:** Tubes in the back and front hold the media basket. They can easily pulled outwards to put the basket in its place.
12. **Casters:** The casters on the stand are equipped with locking brakes. Once the cutter has been moved to its new location, press the brakes with your foot to lock the casters.
13. **Media support rollers:** Rotating support rollers for the media roll.
14. **Media basket:** The stand and linen media basket come as standard equipment with all S CLASS 2 cutters.

2 Replacements guidelines

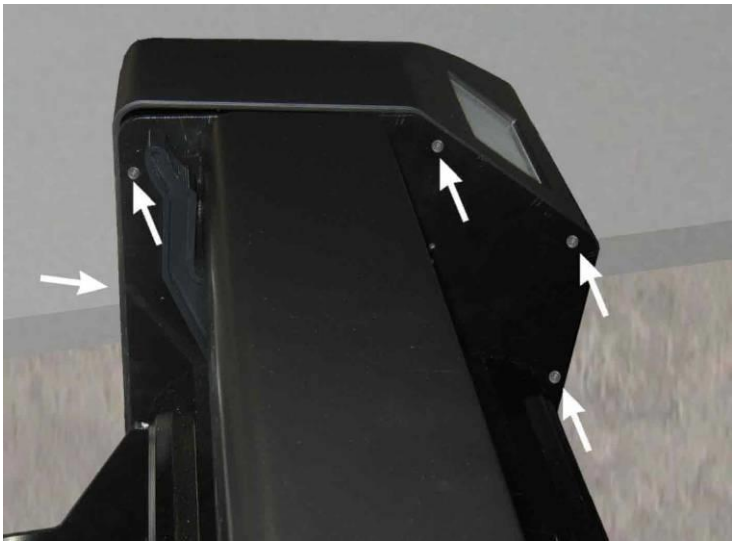
2.1 General

This section contains information on replacing defective parts and adjustment procedures. A step-by-step removal/assembly procedure is provided in this section. On the left page you will find drawings indicating the position of the parts. Use the last section of this manual for detailed assembly pictures.

2.2 Precautions

Observe simple, common sense rules and procedures whilst servicing the unit. They include, but are not limited to the following:

- The base of the unit has been assembled on a fixture to assure straightness all along the y-axis. To keep this: **DO NOT REMOVE THE SIDE PLATES NOR THE Y-GUIDING.**
- Unplug the line cords and host cables before transporting the unit to other places.
- Reassemble ALL parts (screws, ferrite shield, etc.) to maintain EMI integrity, and guide the loose wires afterwards with tie-wrap in the same manner they were before
- Watch for sharp edges on the metal strips etc.
- When testing the cutter, make sure that the base plate is horizontal (otherwise flat cable tool carriage will get caught).
- When the covers are off or open:
- The printed circuits boards are electrostatically sensitive; use the proper handling techniques. Make sure no screws or washer are left behind on the printing plate, they can cause short circuits which can damage the circuits boards.
- Keep sensors free of scratches and dirt.
- Keep the guiding, at least dirt free where the wheels of the carriage pass.



Left end cover	395-211	(without label)
Right end cover S2	395-212	(without touch screen)
Long screws	ND5000-9556	5L + 5R
Rozet	ND5000-9639	5L + 5R

2.3 Removing the left-hand cover

To remove the left-hand cover, proceed as follows:

1. Remove the five screws holding the left-hand cover in place. Three are located at the front, two at the rear. Pay close attention to where each of the screws goes. They should be returned to their original location when re-installed.
2. Gently tap the top of the cover, lift it and slide outwards.
3. Remove the cover.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

2.4 Removing the right-hand cover

To remove the right-hand cover, proceed as follows:

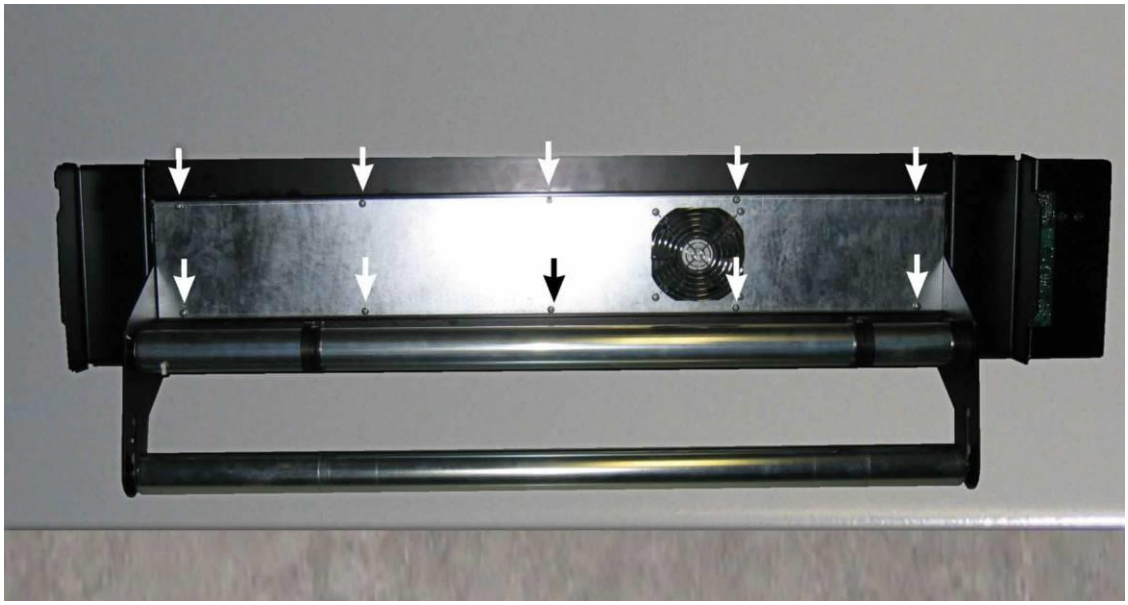
1. Remove the power cord and the communication cable.
2. Remove the 5 screws holding the left-hand cover in place. Three are located at the front, one at the rear and one just above the USB connection. Pay close attention to where each of the screws goes. They should be returned to their original location when re-installed.
3. Gently tap the top of the cover, lift it and slide outwards.

Note:
The touch screen is built in in the cover. It is connected with a flat cable to the main board. Before removing the cover locate the flat cable and disconnect. Do this by opening the cover first for app 2cm (3/4 inch) and look inside. The cover can be completely removed while the flat cable is attached, be careful though. It is easiest to re-install when the flat cable is loosened at the side of the cover. On both sides of the connector cover there is a small protuberance that you can pry up using a screwdriver. Gently pull the flat cable(s) out of the connector.

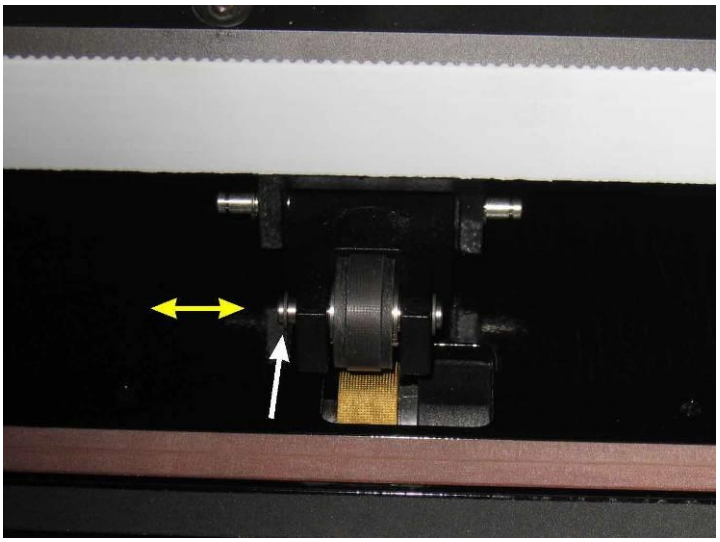
4. Remove the cover.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

Note:
Make sure that you do not jam any wires between the cover and the side plate as this may cause considerable damage.
Give special attention to the flat cables. Protruding parts inside the cover can partly unconnect the flat cables and inflict serious damage to several PCB's.



Bottom plate 75	395-363
120	395-373
140	395-383
160	395-353
screw	ND5000-9125 (# depends on type of machine)



Pinch wheel	391-326
Retaining ring 3.2mm	ND5000-9382
Pinchwhee(2)+circlips	392-401

2.5 Removing the bottom plate

To remove the bottom plate, proceed as follows:

1. Turn the unit upside down.
2. Remove the screws holding the bottom plate in place (the number of screws varies depending on the cutter type).
3. Carefully remove the bottom plate, mind the fan cable.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

> **Note:**
> **Make sure the bottom plate is placed correctly into the slots of the bottom plate.**

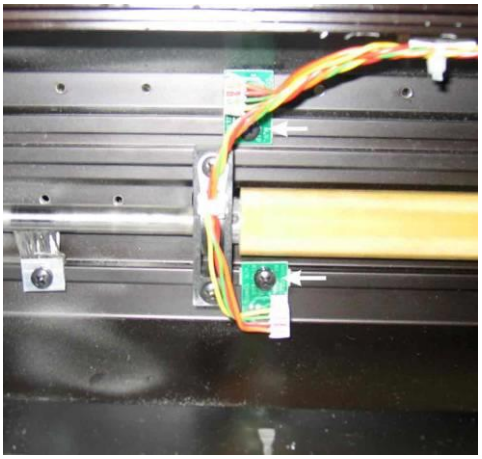
2.6 Replacing the pinch rollers

To replace the pinch rollers, proceed as follows:

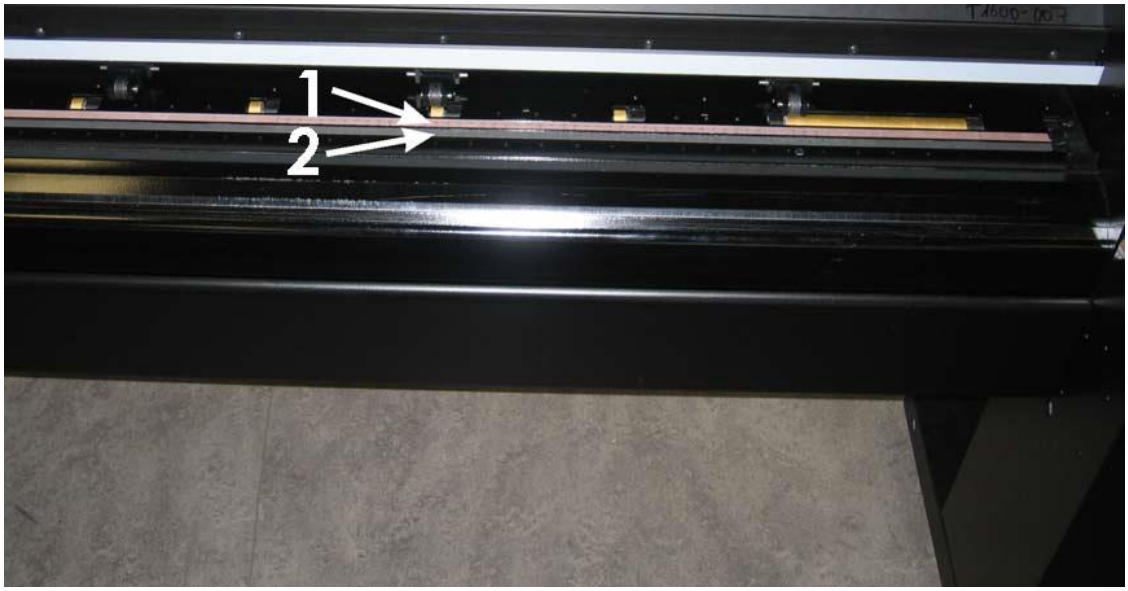
1. Remove the retaining ring at one side.
2. Remove the pinch roller shaft (push against the other side of the shaft).
3. Remove the pinch roller.

> **Note:**
> **a. Pinch rollers come in pairs. When one is malfunctioning or broken, both need to be replaced.**
> **b. The models 120 have three, the 140 and the 160 four pinch rollers. The centre pinch rollers are not matched with the two pinch cam rollers and can be installed independently.**

To re-install, proceed in the reverse order of removal.



Sensor board	399-965
screw	ND5000-9392



1	cutting strip 75 & 120	391-886
	160	400-565
2	pouncing strip 5m	391-598

2.7 Replacing the media sensors

Cutters are equipped with two media sensors. One is located at the front and the other at the rear of large sleeve.

> **Note:**
> **When one sensor is malfunctioning it is advisable to replace both sensors. Experience has shown that soon after replacing the broken sensor, the other sensor tends to start malfunctioning as well. Therefore, to prevent having to perform the same repair twice within a short span of time, it is advisable to replace both sensors. Both sensor assy's are the same.**

To replace the sensors, proceed as follows:

1. Remove the bottom plate (see Section 2.5, Removing the bottom plate).
2. Disconnect the cables from the sensor assy's.
3. Remove the screws holding the two sensors in place. Disconnect the other end of the sensor wire from the PCB.
4. Remove the sensors.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

> **Caution:**
> **Make sure the sensor wire does not touch the drum. The rotating drum may damage the wire and cause malfunctioning.**

2.8 Replacing the cutting/pouncing strip

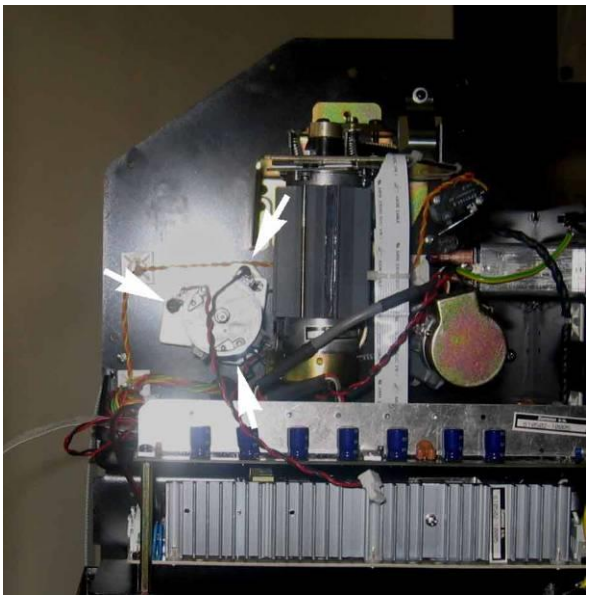
To replace the cutting strip, proceed as follows:

1. Loosen the cutting strip on the left-hand (or right-hand) side.
2. Gently pull the cutting strip out of the strip slot.

> **Note:**
> **There may be some debris left in the strip slot. Make sure the slot is complete clean before putting in the new strip**

3. Cut the new cutting strip to the correct length and stick it to the unit.

screw	ND5000- 9694(3 per motor)
X motor with encoder and pulley S2	395-602



screw	ND5000- 9694(3 per motor)
X motor without encoder with pulley	395-400

2.9 Replacing an X-motor

The S120, 140 and S160 are equipped with two X-motors. Although both motors are driven, only the one with the encoder is used for feedback.

2.9.1 Replacing the X-motor with the encoder

To replace the X-motor with the encoder, proceed as follows:

1. Remove the right-hand cover (see Section 2.4, removing the right-hand cover).
2. Loosen the screws of the power entry and pull it out leaving it hanging.
3. Locate the motor and follow the cables from the motor to the main board. Disconnect them.
4. Remove the three screws holding the motor in place (see picture for the exact position of the screws).
5. Carefully remove the motor leaving the belt hanging over the pulley.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

Note:
When re-installing, be extremely careful to plug the connector into the correct positions.
It is extremely important that the two rotating belts do not touch. Make sure to position each belt correctly to avoid malfunctioning.

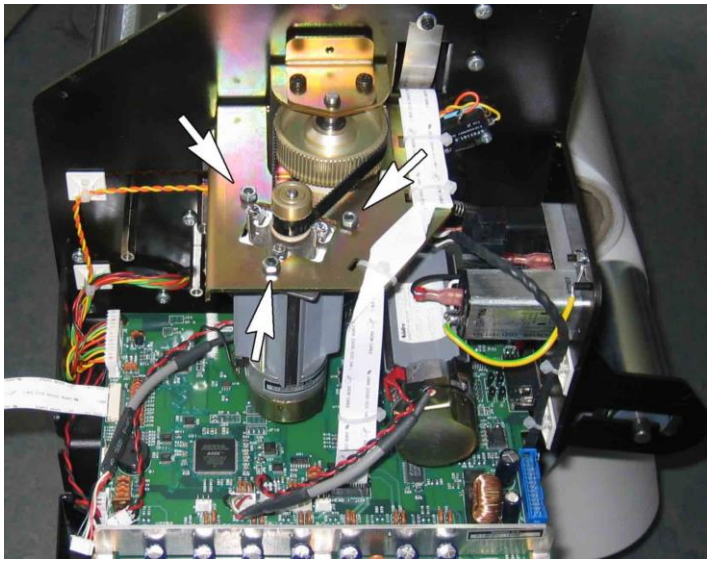
2.9.2 Replacing the X-motor without the encoder

To replace the X-motor without the encoder, proceed as follows:

1. Remove the right-hand cover (see Section 2.4, removing the right-hand cover).
2. Locate the motor and follow the cable from the motor to the main board. Disconnect it.
3. Remove the three screws holding the motor in place (see picture for the exact position of the screws).
4. Carefully remove the motor leaving the belt hanging over the pulley.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

Note:
It is extremely important that the two rotating belts do not touch. Make sure to position each belt correctly to avoid malfunctioning.



X motor with encoder and pulley S2 395-602

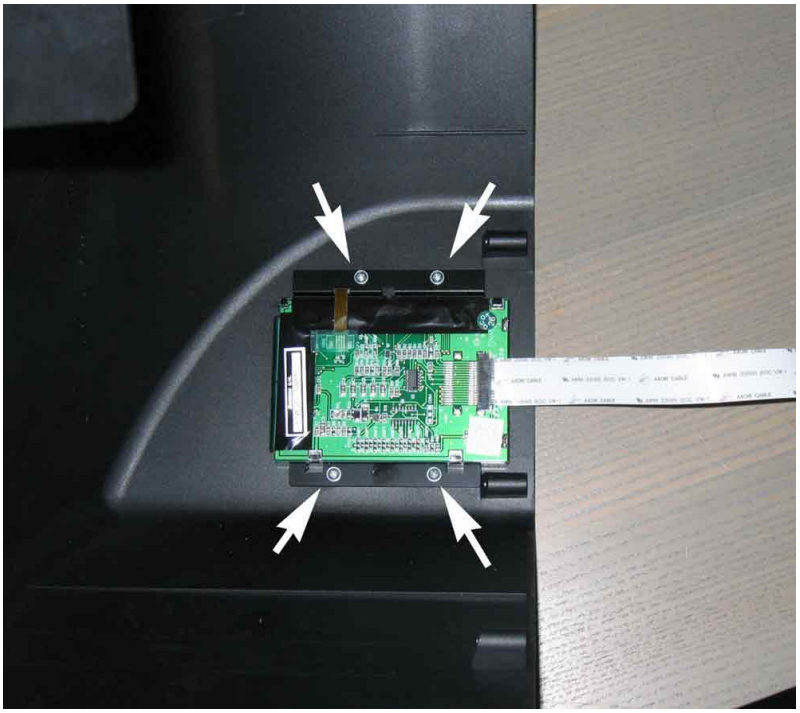
2.10 Replacing the Y-motor

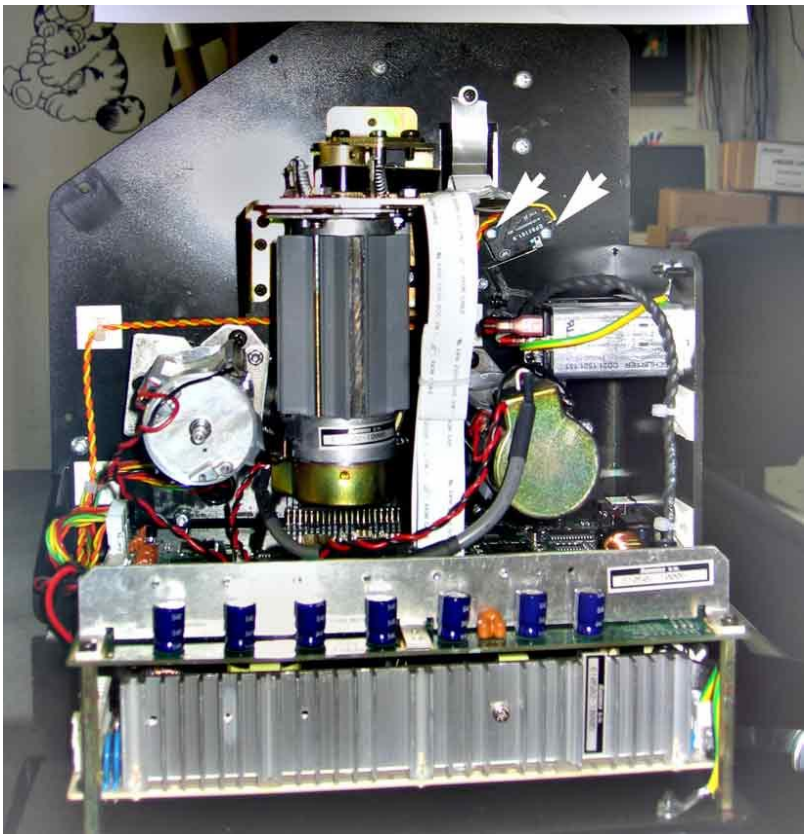
To replace the Y-motor, proceed as follows:

1. Remove the right-hand cover (see Section 2.4, removing the right-hand cover).
2. Loosen the screws of the power entry and pull it out leaving it hanging.
3. Remove the motor without encoder if machine type is 120, 140 or 160 (see 2.9.2)
4. Locate the motor and follow the cables from the motor to the main board. Disconnect them.
5. Remove the nuts holding the motor in place (see picture for the exact position of the nuts).
6. Carefully remove the motor leaving the belt hanging.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

> **Note:**
> **When re-installing, be extremely careful to plug the connector into the correct positions.**





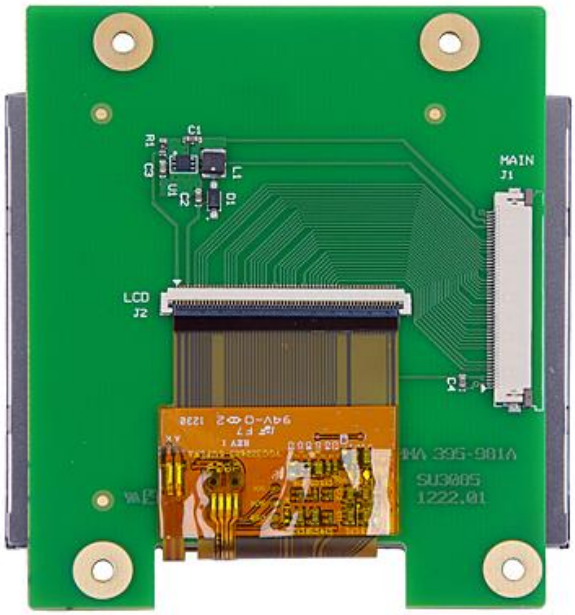
2.11 Replacing the touch screen

To replace the touch screen, proceed as follows:

1. Remove the right-hand cover (see Section 2.4, Removing the right-hand cover).
2. Remove flatcable of the touch screen.
3. Loosen the 4 screws of the touch screen.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

Note:
When re-installing, be extremely careful to plug the connector into the correct positions.



2.12 Replacing the pinch roller switch

To replace the pinch roller switch, proceed as follows:

1. Remove the right-hand cover (see Section 2.4, Removing the right-hand cover).
2. Remove tie wraps of the cable from the switch to the main board.
3. Disconnect the connector from the main board.
4. Loosen the 2 screws of then switch.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

> **Note:**
> **When re-installing, make sure that the cable cannot touch any moving parts**

2.13 Replacing the main PCB

This procedure describes how to replace the main board (reference number 395-990) in an S Class 2 series cutter.

2.13.1 Required Tools

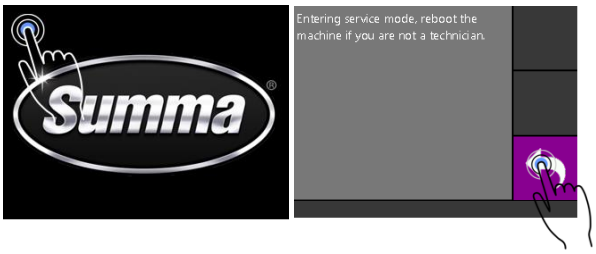
Philips screw driver #0, part number MT9004

2.13.2 Procedure

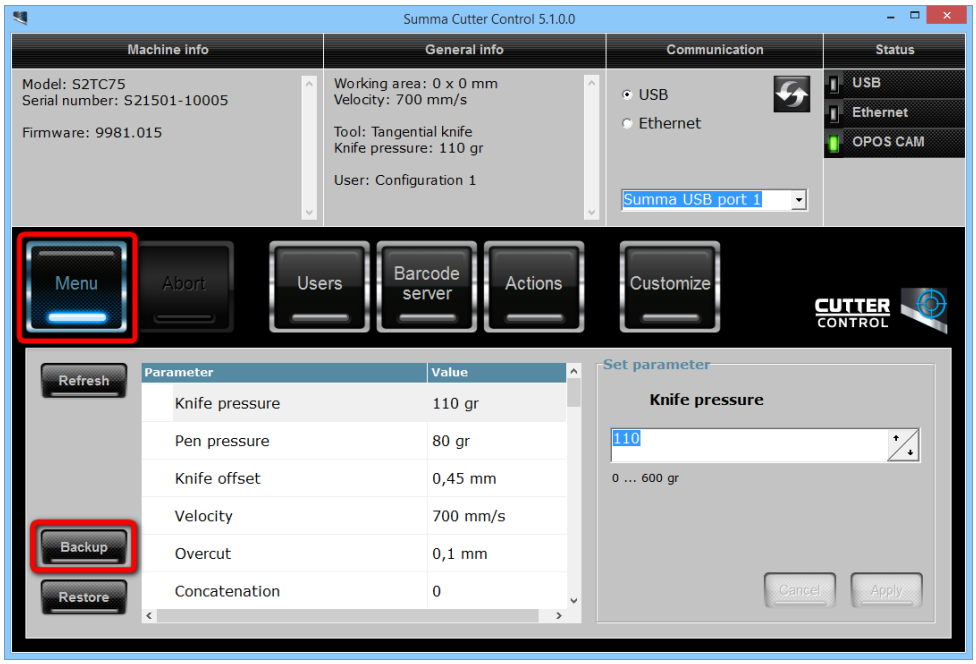
To replace the main board, proceed as follows:

1. In case communication with the cutter is still possible, then create a back-up of the parameters. Skip this step if communication is not possible.

1. Remove all media completely from the cutter.
2. Reboot the cutter.
3. Set the cutter in "*Service Mode*" by tapping and holding the top left corner of the display while the machine displays the Summa logo.
   Confirm by clicking the back key.

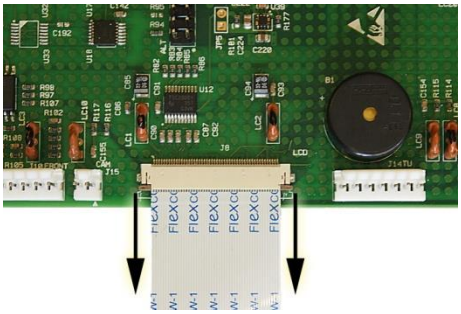


4. Connect the cutter with a computer. Verify communication parameters on cutter and computer to match.
5. Start Summa Cutter Control.
   Click [Menu], [Backup].
   By default, the serial number of the machine is used as the name of the backup file.

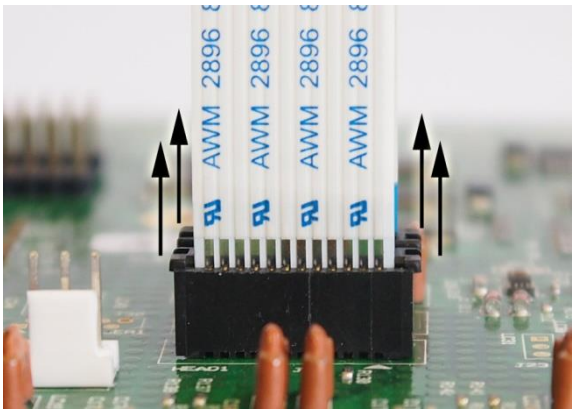


Remember the location where the backup is stored.

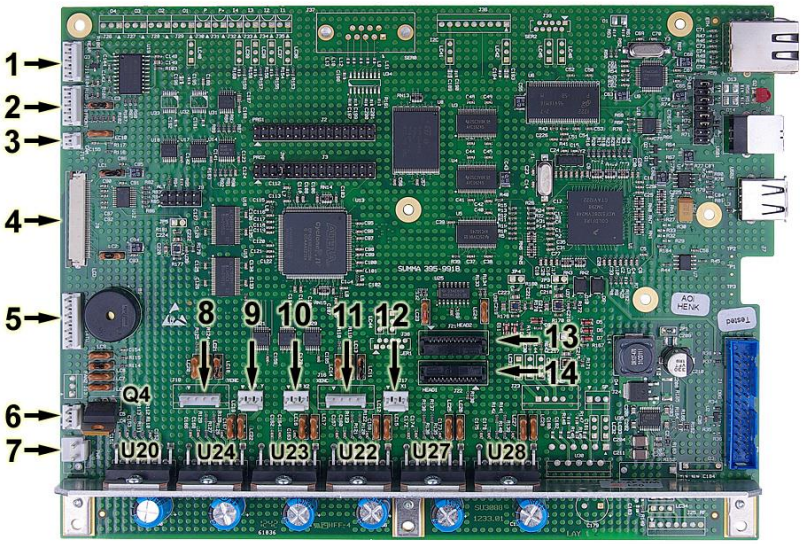
2. Disconnect the power cord and the USB and/or LAN connector. Remove the USB-stick.
3. Remove the right-hand cover. The cover is fixed by 5 screws. When sliding away the cover, take care for the flat cable running from the display to the main board. Remove this flat cable at the main board end by sliding away the latch on the connector, then pull gently on the flat cable.



4. Disconnect the various connectors from the main board. Pay close attention to the positioning of the connectors. They should be returned to their original location when re-installed.
5. Remove the flat cable(s) for the head by pulling the flat cable lock up. On both sides of the connector cover there is a small protuberance that you can pry up using a screwdriver. Gently pull the flat cable(s) out of the connector.



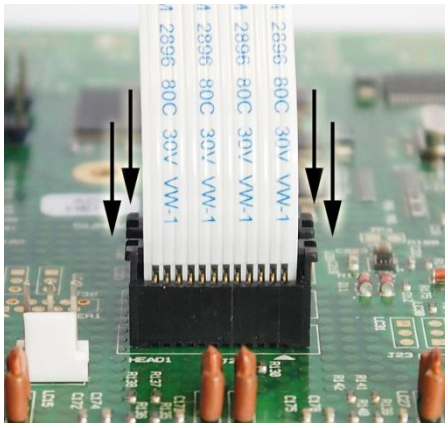
6. Remove the 4 screws holding the main board. Take the defective main board away.
7. Place the new main board over the 4 mounting studs and fix with the 4 screws.
8. Reconnect all cables to the new main board.



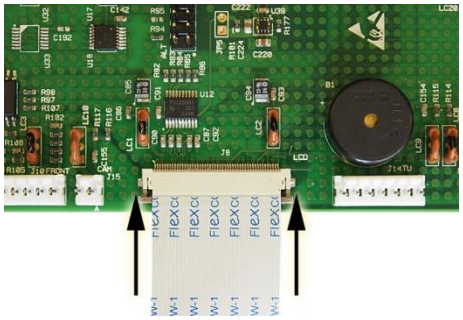
6. J11: Rear Media sensor
7. J10: Front Media sensor
8. J15: Cam position switch
9. J8: LCD flat cable
10. J14: Take up roll sensor and motor (Driven by U20)
11. J12: Fan (Driven by Q4)
12. J40: Power entry 48V
13. J19: Y-encoder
14. J20: Y-motor (Driven by U24)
15. J18: X2-motor (Driven by U23) (not used on model 75)
16. J16: X-encoder
17. J17: X1-motor (Driven by U22)
18. J21: Cutter head flat cable HEAD 2 : Z-motor and encoder (Driven by U28) (Tangential Head only)

19. J22: Cutter head flat cable HEAD 1 : Coil, up-down encoder, Cam sensor, OPOS (Driven by U27)

9. Secure the cutter head flat cables by sliding down the latch.

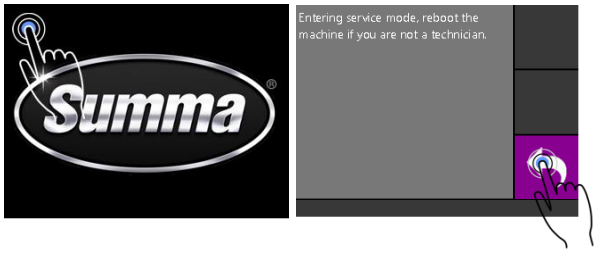


10. While sliding the right hand cover back over the main board, reconnect the flat cable from the display. Secure by sliding the latch. Fix the cover with the 5 screws.



11. Connect the cutter to the mains power and switch the cutter on.

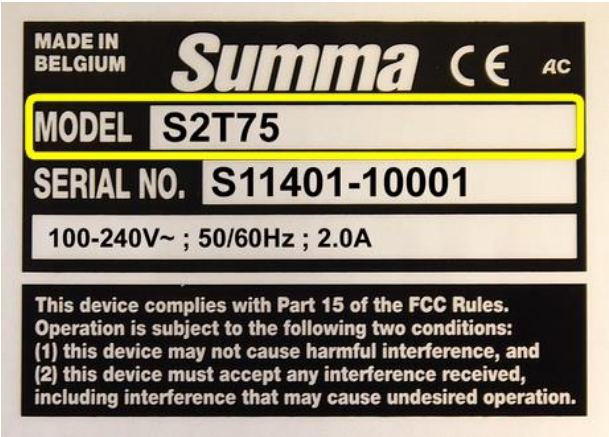
12. Set the cutter in "*Service Mode*" by tapping and holding the top left corner of the display while the machine displays the Summa logo.
Confirm with a click on the back button.



13. Set the correct machine type:

Click  , 

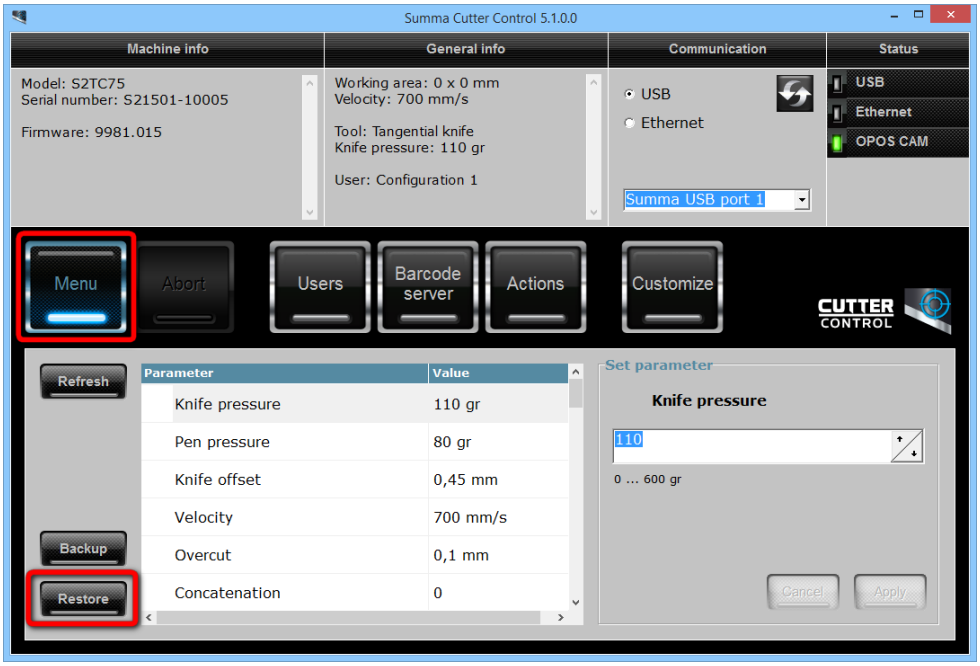
.
Select the correct machine type from the list.
S2Dxxx is to be used for machines equipped with a drag head.
S2Txxx is for machines with a tangential head and a standard OPOS-X sensor.
S2TXxxx is meant for tangential head machines equipped with an additional pen holder.
S2TCxxx is for machines with a tangential head and an OPOS-CAM sensor.
xxx represents the width of the machine (75, 120, 140 or 160).
The correct machine type is indicated on the serial number label:



14. Reboot the cutter.

15. Restore the previously made back-up:

20. Connect the cutter with a computer. Verify communication parameters on cutter and computer to match.
21. Start Summa Cutter Control.
22. Click [Settings], [Restore…].
23. Browse for the backup file previously made.
24. Wait 30 seconds for the configuration to be completed.



16. In case the creation of the backup was not possible, then the following configurations need to be done:

25. Touch screen calibration
26. Media sensor calibration
27. Coil setup
28. Knife calibration
29. OPOS offset calibration
30. Right margin calibration
31. Media length calibration
32. Extra pen offset calibration

17. Remove the right-hand cover (see Section 2.4, Removing the right-hand cover).

18. Disconnect the various connectors. Pay close attention to the positioning of the connectors. They should be returned to their original location when re-installed.

19. Remove the flat cable(s) for the head by pulling the flat cable connector up. On both sides of the connector cover there is a small protuberance that you can pry up using a screwdriver. Gently pull the flat cable(s) out of the connector.

> **Note:**
> **The D series has only one flatcable. The T series have two flatcables**

20. Remove 4 screws.

To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.

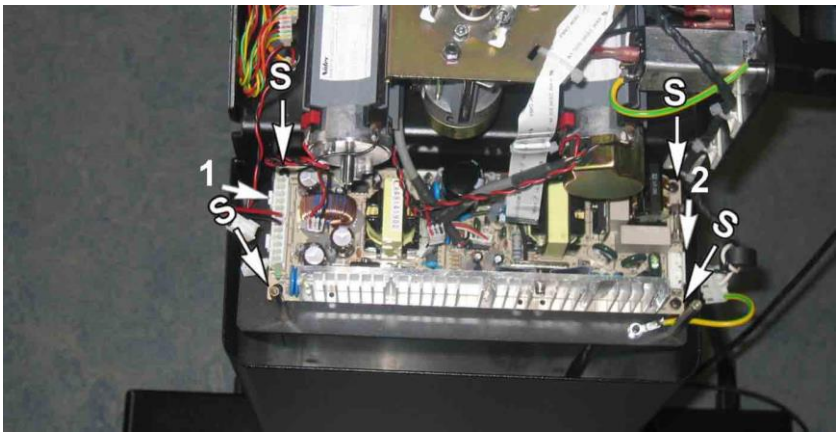
> **Note:**
> **Be very careful while reinstalling the flat cables. If they are not put back in correct, then both head and main board are irreversibly damaged.**

2.14 Replacing the Power Supply

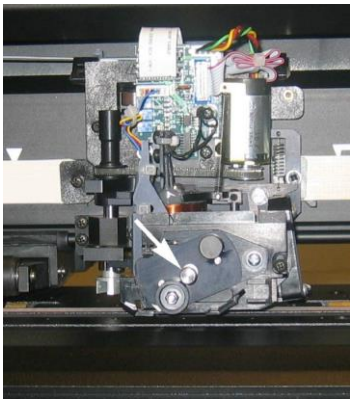
To replace the power supply, proceed as follows:

1. Remove the right-hand cover (see Section 2.4, Removing the right-hand cover).
2. Remove the main PCB (see Section 2.13, replacing the main board).
3. Disconnect the 2 connectors. Pay close attention to the positioning of the connectors. They should be returned to their original location when re-installed.
4. Remove 4 screws.

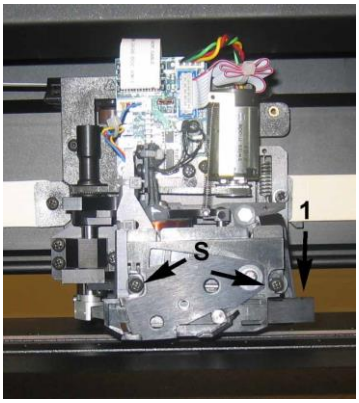
To re-install, proceed in the reverse order of removal. Make sure to firmly tighten all screws.



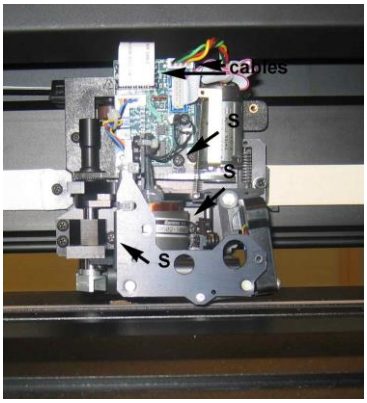
1 Cable PS main board
2 Input PS



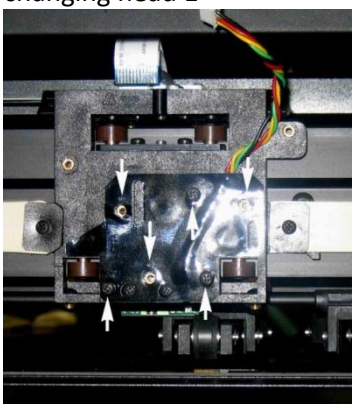
changing head 1



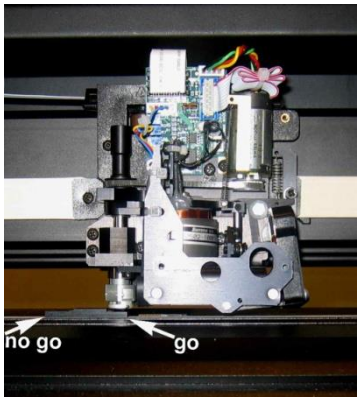
changing head 2



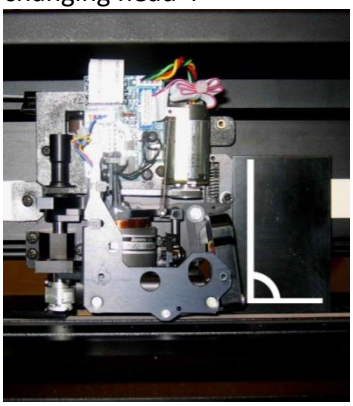
changing head 3



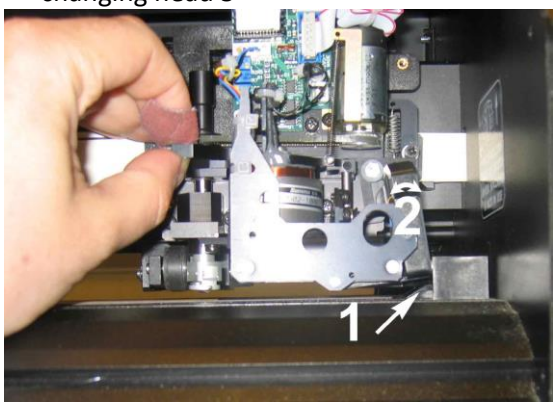
changing head 4



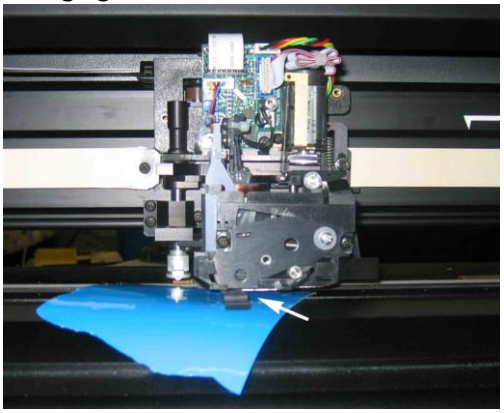
changing head 5



changing head 6



changing head 7



changing head 8

2.15 Replacing the toolhead

Below is the description for the replacement of a standard tangential head. The procedure described is also roughly applicable to the replacement of a drag head. The areas where the replacement procedure for the drag head differs are indicated between brackets and in italics.
The only major difference between replacing a drag knife and a tangential knife is the positioning of the screws on the carriage plate.

To remove the drag head, proceed as follows:

1. Take the knife holder out of the tangential head.
2. Remove the front cover of the tangential head by loosening the two screws.
3. Remove the cut off knife (changing head 1).
4. Remove the cut of knife assy. Make sure the assy is 'down'. Move the head all the way to the left to make sure it is completely down (removing head 2 S show the two screws that need to be loosened – 1 shows the position it has to be in) .
5. Loosen the flat cables by pulling the flat cable connector cover up. On both sides of the connector cover there is a small protuberance that you can pry up using a screwdriver. Gently pull the flat cable out of the connector (*the drag head has only one flatcable).* Then disconnect the connector for the pinchroller-position-sensor. (changing head 3 – 2 arrows point to cables)
6. Remove the head. To do this, loosen the three screws with two counterclockwise rotations using a small diameter screw driver and lift the head upwards to remove it from the screws. (changing head 3 arrows with s)
7. Positions of the 3 screws for the tangential head are shown with arrows pointing upwards. The arrows pointing downwards show position for the screws for the drag head.

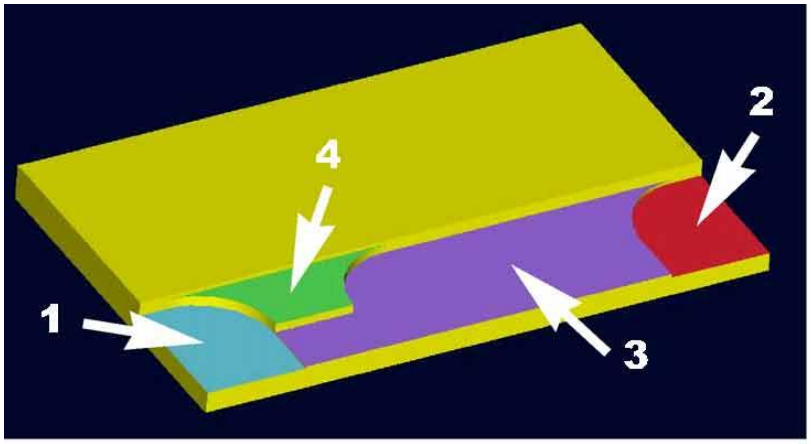
To re-install the drag head, proceed as follows:

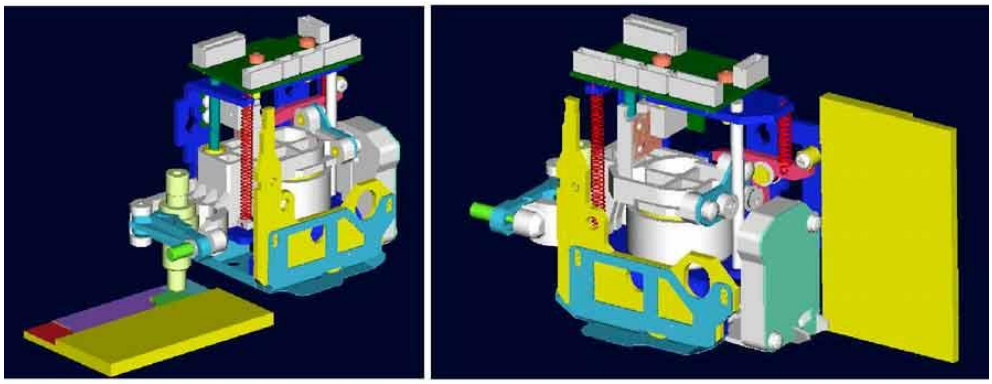
1. Place the head back onto the screws. Tighten the screws with a 1 1/2 clockwise rotation. Do not tighten them firmly because the height and position of the head still need to be adjusted.
2. Put the nose piece into the tangential head. (Put the knife holder into the drag head and secure the knife holder).

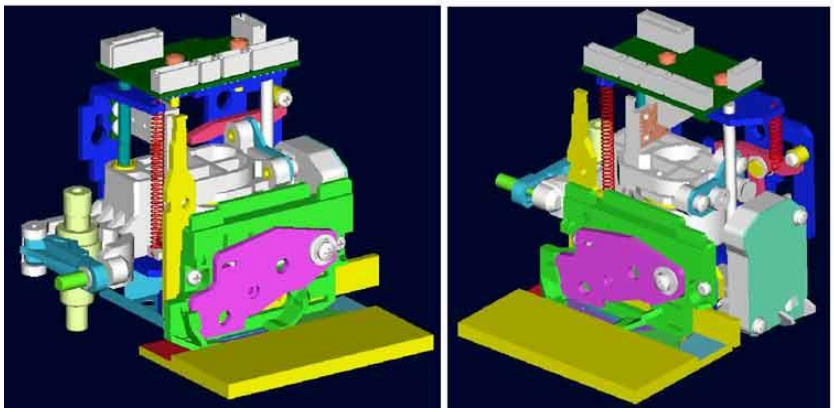
   Caution:
   Make sure the tip of the knife does not protrude.

3. Adjust the height and position of the head. Use parts 391-635 and 391-636 to do this. The height between the nose piece (*drag knife holder*) and the base must be between 2.7mm and 3mm (changing head 5). This means that one side of the tool slides easily underneath and the other part cannot slide under the nose piece (*dragknife holder*). Set the head perpendicular by using the other tool (changing head 6).

4. Replacing the head using tool version 2







1	2.95mm	Maximum height knife holder (nose piece)
2	2.65mm	Minimum height knife holder (nose piece)
3	3.2mm	Height floorplate
4	4.4mm	Height right side of separation knife

Caution:
While checking height of the head, be sure not to push the knife holder upwards.

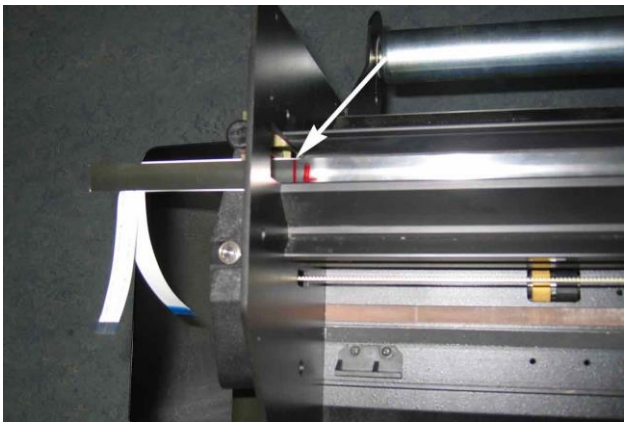
6. Move the head all the way to the right to check if the OPOS sensor is pushed upwards. The plastic part at the right side of the base plate should push the sensor 0.3mm to 0.5mm (movement visible in direction shown by 2 in changing head 7). If the OPOS sensor is not stirred, then the head has to be re-positioned.
7. All previous pictures do not show the floorplate that is mounted on the bottom of the head. The distance between this floorplate and de base should be 3.2mm. This is the same as the thickness of normal vinyl plus the thick side of the height fixture. Mount the cut of knife assy. Make sure there is no space between the assy and the floorplate. Afterwards check if there is no gap and check if the distance is correct. If not re-install the cut of knife assy. It is recommended to use tool version 2 (part number 395-111) to set floorplate height.
8. Firmly tighten all the screws once the head is properly positioned.
9. Put the flat cable(s) back into the connector and close the connector. To ensure good contact, the flat cable must be positioned as deeply as possible and in the middle of the connector. Put the sensor connector back.
10. Remount the front cover of the head and firmly tighten the screws.

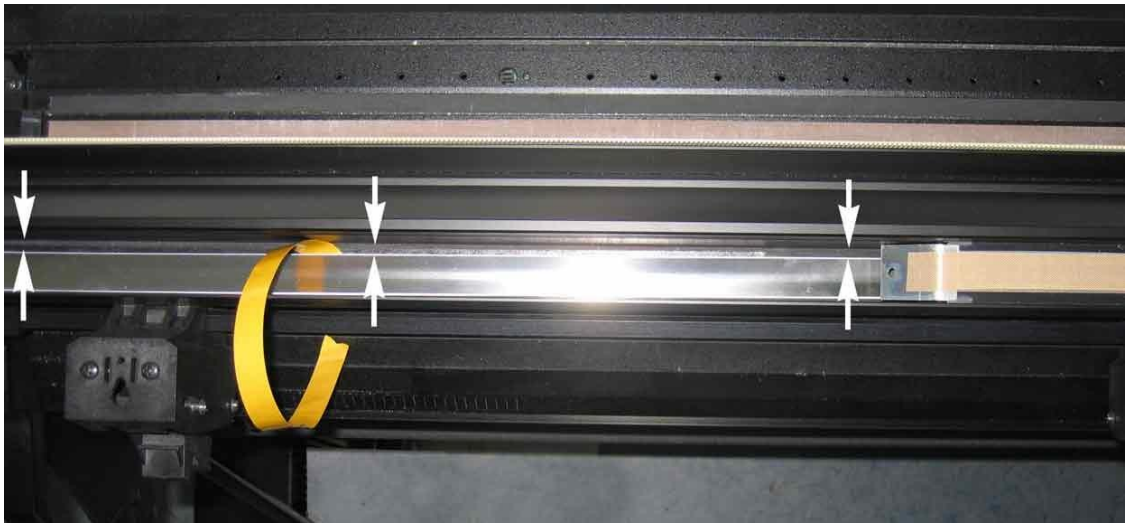
Note:
Now that you have replaced the head, it is extremely important that you bring the data stored on the PCB in line with the head and vice versa. A spare head is normally delivered with the correct settings. The section about calibration explains how to calibrate.

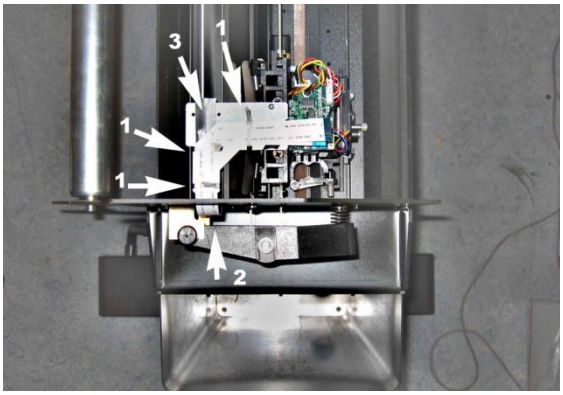
2.16 Replacing the pinch roller sensor

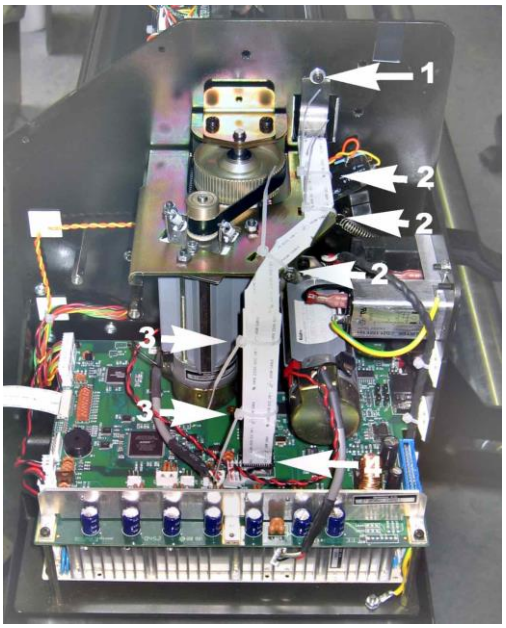
The pinch roller sensor is located on the rear side of the carriage. To replace the sensor, follow the procedure to change the head, then replace the sensor. The sensor is fixed with two screws at the bottom of the carriage.
Put a new sticker over the wires and then mount the head in its place.

Pictures are made for a Tangential flatcable assy. The procedure for a drag flatcable assy is similar.









2.17 Replacing the flatcable

Flatcables are sold as an assembly. Reason is that the metal guide is unusable after it has been removed. It is not recommended to buy flatcable and metal strip separately.

To replace the flatcable, proceed as follows:

1. Remove the right-hand cover (see Section 2.4, Removing the right-hand cover).
2. Remove the left-hand cover (see Section 2.3, Removing the left-hand cover).
3. Remove the top cover (left and right 3 screws).
4. Remove cover tool carriage (2 hex screws).
5. Loosen the flat cable(s) by pulling the flat cable connector cover up. On both sides of the connector cover there is a small protuberance that you can pry up using a screwdriver. Gently pull the flat cable out of the connector (both sides flatcable).
6. Remove all tie-wraps holding the flatcable.
7. Remove screws holding the metal strip (2 on tool carriage, one in side plate).
8. To re-install the flatcable, proceed as follows:

1. Place the flat cable assembly in the gutter of the Y guiding.
2. Make sure that the middle of the left marker is just left of the side plate.
3. Hold the assy on its place, remove the protection of the double backing tape and fix it in the gutter. Make sure the path is completely straight. If the distances, as shown in the figure, are not equal, then the flatcable will not run straight and wear down in a couple of months.
4. Fix the flatcable assy to the bracket of the tool carriage. Fix with 3 tie wraps (1). Check whether the loop does not touch the spring-loaded Y assy (2 – this is in fact a little too much play). Then secure the metal strip with two screws and flatwashers.
5. Then fix the flatcable at the right side. Cut metal strip if necessary and secure with flatwasher and screw (1). Then fold the flatcable as in the picture and secure with tie wraps on the motor bracket (2). Fold the rest of the flatcable together and secure with tie wraps (3). Then put the flatcable in the connectors (4). The flatcable that goes in to connector head1 is the flatcable that has the metal leads facing upwards at the side of the tool carriage.
6. Connect the flatcable in the PCB of the tool carriage.
7. Put all covers back in their place.

2.18 Replacing the Pinch Roller Handle

This procedure describes how to replace the cam handle.

2.18.1 Required Tools

Philips screwdriver #1

2.18.2 Required Parts

Cam Handle, part number 395-012

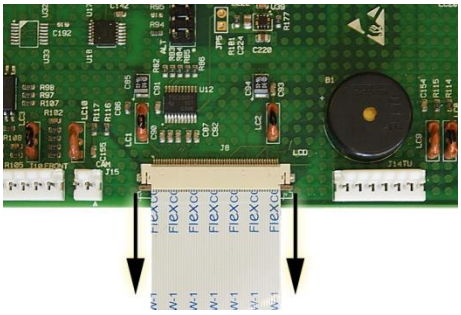
2.18.3 Procedure

To replace the cam handle, proceed as follows:

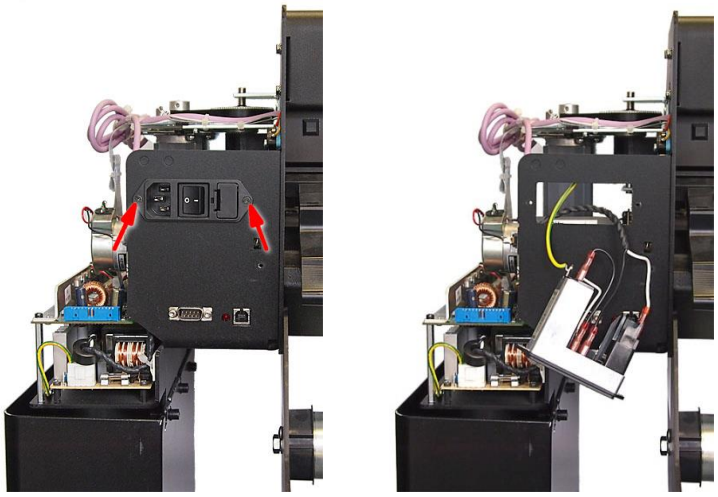
Switch the cutter off.

Disconnect the power cord and the USB, RS232 or LAN connector. Remove the USB-stick.

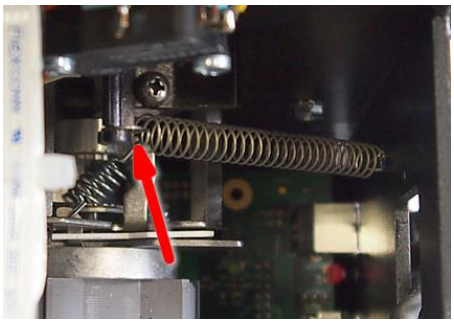
Remove the right-hand cover. The cover is fixed by 5 screws. When sliding away the cover, take care for the flat cable running from the display to the main board. Remove this flat cable at the main board end by sliding away the latch on the connector, then pull gently on the flat cable.



Raise the pinch rollers. Loosen the input filter (2 screws) and let it hang outside.

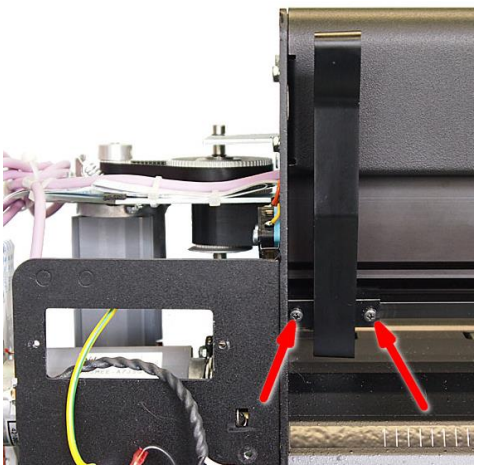


Remove spring from the switch actuator at the end of the pinch roller bar.



Lower the pinch rollers.

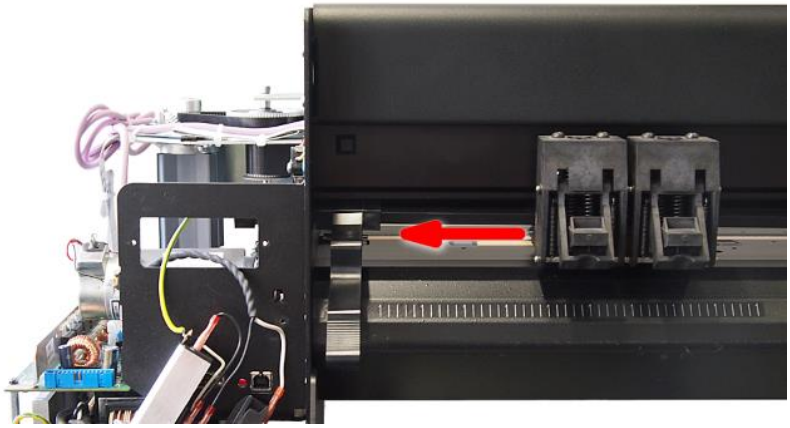
Remove the screws from the cam handle.



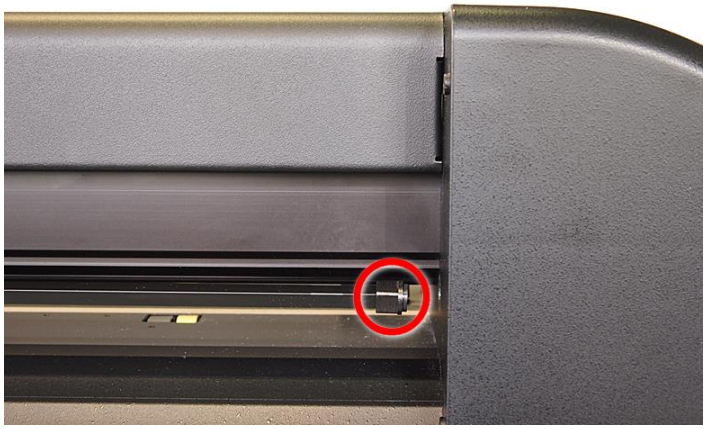
Raise the pinch rollers.

Slide the pinch roller blocks over the wide sleeve of the drive drum.

Slide the pinch roller bar 3 cm (1 inch) to the left.

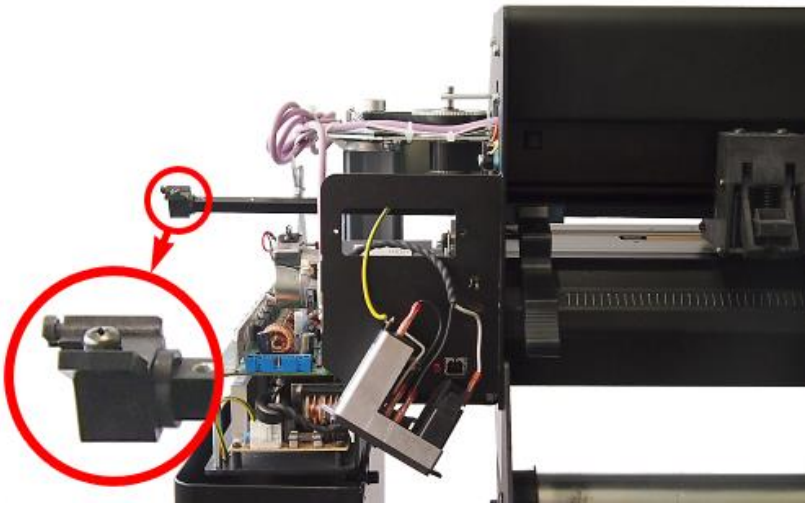


Remove the end piece from the pinch roller bar.



Slide the pinch roller bar out of the machine to remove the old cam handle.

Re-insert the pinch roller bar, while sliding the pinch roller bar in the new cam handle. Watch the position of the notch at the end of the pinch roller bar: the screw to fix the switch actuator should point upwards.



Slide the pinch roller bar in the pinch roller blocks.

Add the end piece to the pinch roller bar.

Slide the pinch roller bar to the end of the machine. You may need to lift the switch actuator to slide it in the side plate.

Lower the pinch rollers.

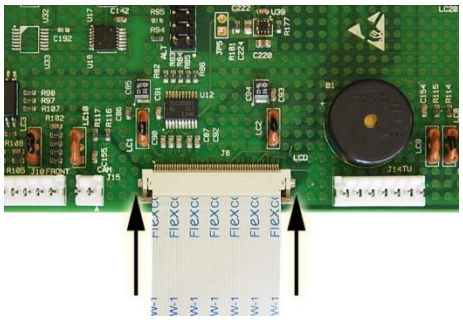
Fix the cam handle with the two screws while squeezing the cam handle and the switch actuator together.

Lift the pinch rollers.

Re-apply the spring to the switch actuator.

Fit the power entry module on the side plate.

While sliding the right hand cover back over the main board, reconnect the flat cable from the display. Secure by sliding the latch. Fix the cover with the 5 screws.



2.19 Replacing the drive drum

This procedure describes how to replace the drive drum in an S Class (2) series cutter.

As all the sleeves on the drive drum are matched to each other for an equal diameter, it is not possible to replace a single sleeve.

The new drive drum comes assembled with all necessary bearing blocks.

2.19.1 Required tools

Philips screw driver #0, part number MT9004

Philips screw driver #2

Hex Key 2 mm

Hex Key 4 mm, part number MT9006

2.19.2 Required parts

Depending on the machine type, you need one of below drive drums:

395-362S
(S75)

395-372S
(S120)

395-382S
(S140)

395-352S
(S160)

2.19.3 Prepare the machine

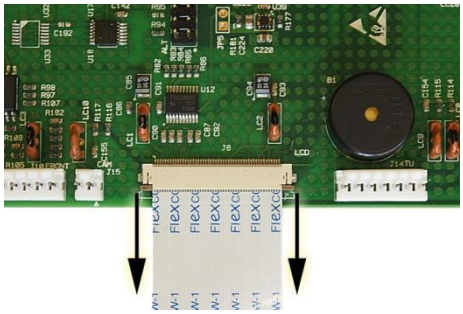
Remove the cutter from its stand:

- Disconnect from mains
- Disconnect communications cables
- Remove media from the machine
- Loose two rear screws which fix the machine on the stand, on both sides
- Remove front screw which fix the machine on the stand, left and right
- Lift machine from stand

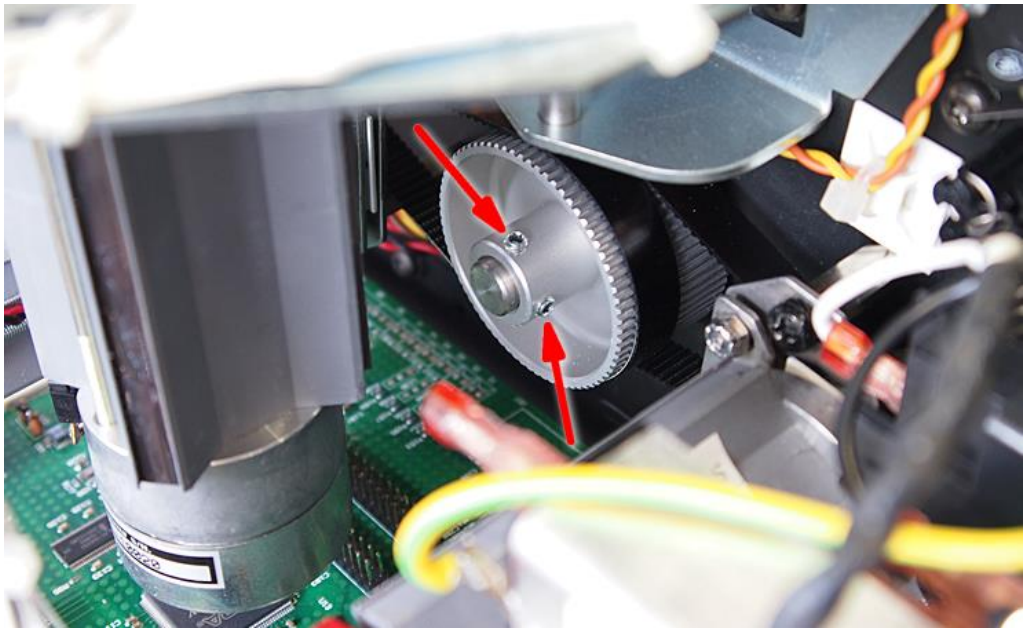
Put the machine on a table.

Remove the right end cover. The cover is fixed by 5 screws. When sliding away the cover, take care for the flat cable running from the display to the main board. Remove

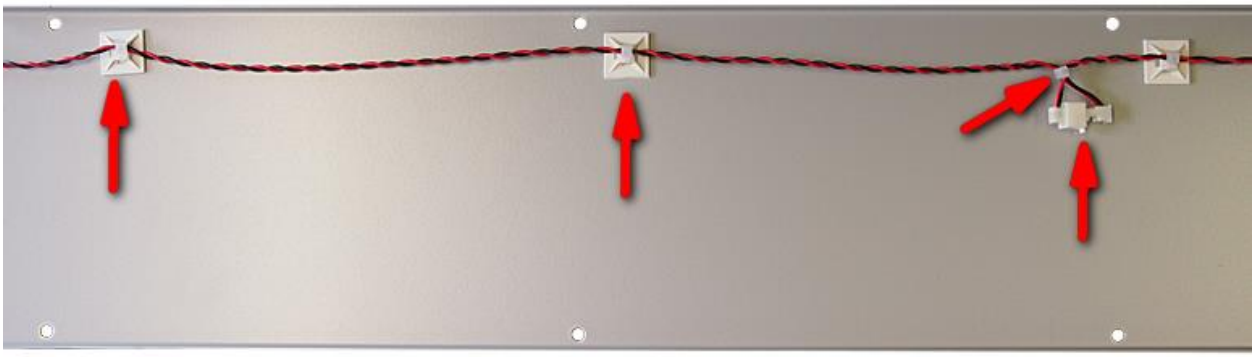
this flat cable at the main board end by sliding away the latch on the connector, then pull gently on the flat cable.



Optionally remove the left end cover (5 screws) and the top cover (3 screws on each side). In case the left end cover and top cover are not removed, you may protect it from scratches. Slide the cutter head to the left of the machine to prevent the flat cable from dropping out.
Remove the pulley from the drive shaft: loose the 2 setscrews M4 with the 'Hex Key 2 mm'. Note the distance between the pulley and the side plate.

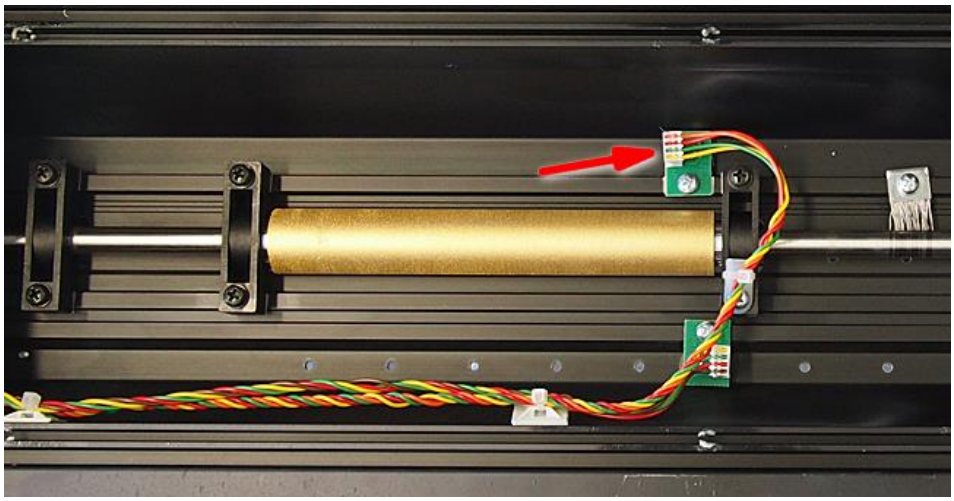


Put the machine upside down.
Remove the bottom cover (10 to 16 screws, depending on machine size). The wire from the vacuum fan is fixed to the bottom plate with ty-wraps. Cut the ty-wraps closest to the main board. Cut the ty-wrap coupling the two cables. Disconnect the fan.

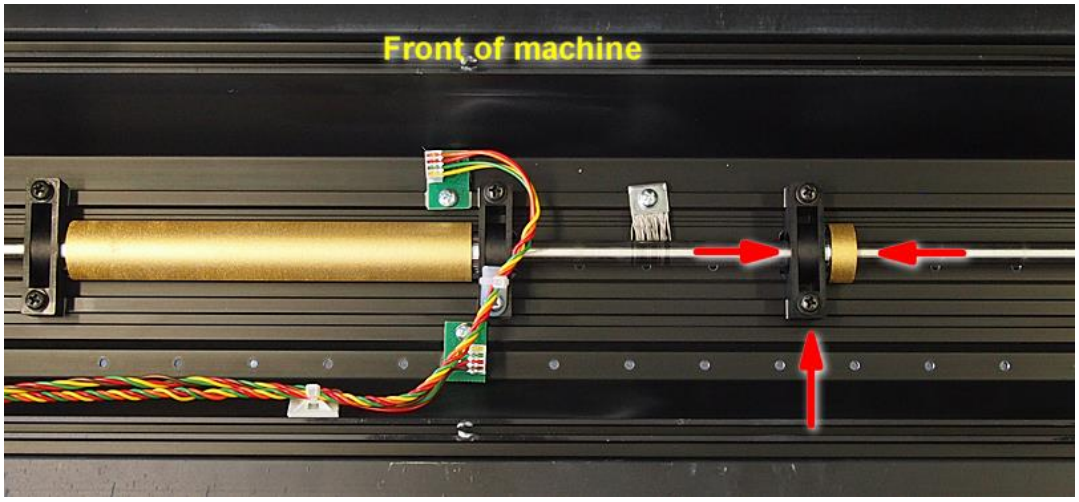


2.19.4 Replace the drive drum

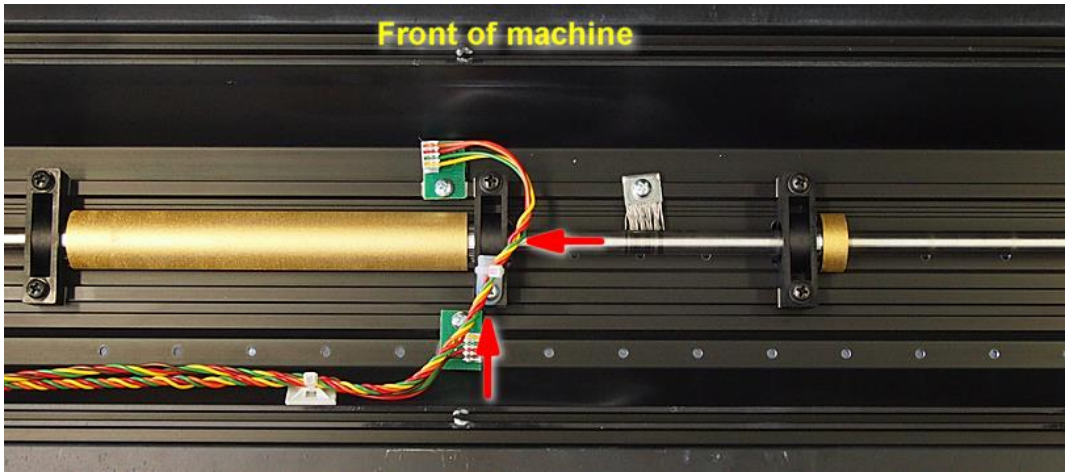
Remove all screws used to fix the bearing blocks (14 to 24 screws, depending on machine size). In case spacers were mounted between the bearing blocks and the bottom plate, then they need to be re-used.
Disconnect the cable from the front media sensor.



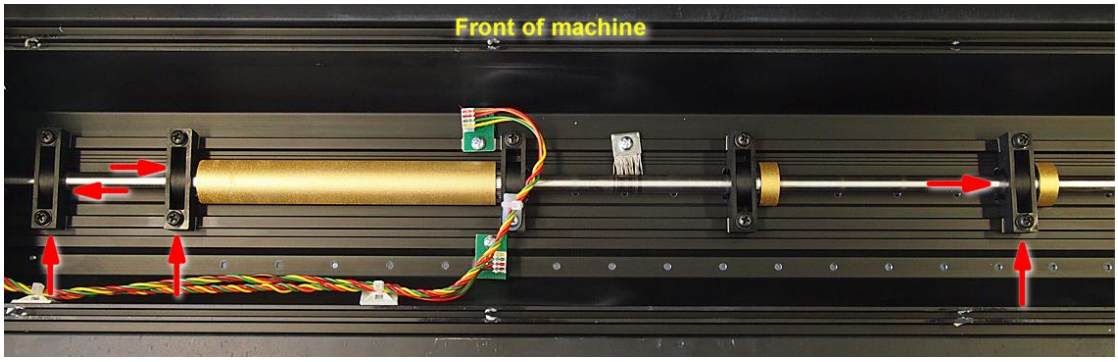
Remove the drive drum while letting the spacers on the base plate.
Put the new drive drum in the machine while holding the bearing blocks with the flat side up. In case spacers were used with the old drive drum, then they need to be used with the new drive drum too.
Put all screws in place to hold the bearing blocks. Do not tighten the screws.
Hold the bearing block matching the first small sleeve next to the wide sleeve and squeeze it together with its sleeve. Shift the bearing block and the sleeve left and right to find the center of the workout in the baseplate. Push the bearing block to the front of the machine. Fix the bearing block with the two screws.



Push the bearing block to the right of the wide sleeve towards the wide sleeve (to the left), while pushing the bearing block to the front of the machine. Fix the bearing block with the black and white screw (ty-wrap holder becomes between the white screw and the bearing block). This prevents the drive drum from shifting left to right.



Now firmly tighten the screws of the other bearing blocks. Make sure they are positioned straight and to the front of the machine, and that they do not have any play. Gently press the bearing blocks against the sleeves when tightening the screws. Check if none of the small sleeves touch the sides of the holes in the base plate. If so, reposition the whole drum left or right. Work from the left side of the drive drum to the right side.

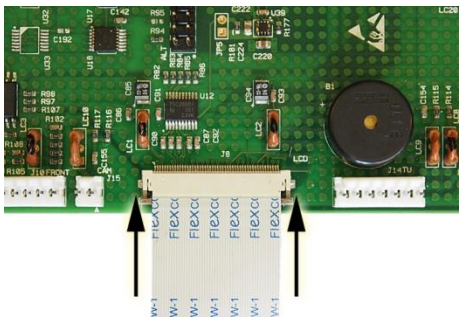


Reconnect the front media sensor.

2.19.5 Reassemble the parts

Re-install the bottom plate. Attach some ty-wraps on the fan cable. Reconnect the fan-connector.
Turn the unit the right side up again.
Push the pulley back into its place. Make sure the distance between the pulley and the side plate are the same as before and that the setscrews are positioned correctly so that it locks itself into the slot on the drive drum. Firmly tighten the screws of the drive drum pulley. Check for the belts between the pulleys on the drive drum and the motors.

While sliding the right end cover back over the main board, reconnect the flat cable from the display. Secure by sliding the latch. Fix the cover with the 5 screws.



In case the left end cover and top cover were removed, fix them again to the machine.

General

This section contains information on the calibration of replaced parts and on the recalibration of worn down parts. Most of the calibrations have already been explained earlier in the manual, however this is a resume of all calibration and with each calibration it is explained when it has to be done. So each time a unit is serviced, check this section to see which calibration has to be or can be done.

Below is a quick reference of the calibrations that need to be done if a certain part was changed.

	Machine type	Length calibration	Head calibration	Media sensor calibration	OPOS calibration	Right margin calibration	Touch screen calibration
Replacing pinch rollers		x					
Replacing media sensors				x			
Replacing cutting strip			x				
Replacing motor							
Replacing PCB	x	x	x	x	x	x	x
Replacing PS							
Replacing toolhead			x		x		
Replacing pinch roller sensor			x			x	
Replacing drive drum		x					
Replacing touch screen							x

3.1 Machine type

The machine type can be set by either Summa Cutter Control or via the touch panel. It is not advised to change the machine type via touch panel. This means entering service mode.

> **Caution:**
> **Service mode is reserved for technician trained by Summa.**

3.1.1 The machine type has to be reset when:

The PCB has been changed

3.1.2 Configuration of the PCB:

3.1.2.1 Via keyboard:

1. Initiate a start-up in Service Mode. Do this by switching on the unit while pressing tin the upper left corner of the display until a warning message appears on the touch screen.

> **Caution:**
> **When starting in service mode, no load procedure is carried out. To make the unit operational, a load procedure has to be carried out (see User's Manual). If this load procedure is not carried out, the unit may crash.**

2. Service mode activates an extra menu in the configuration menu.
3. To change machine type, go into this menu, select sub “menu machine” type and set machine type correct.

> **Caution:**
> **If the machine type is not set correct then the unit may crash.**

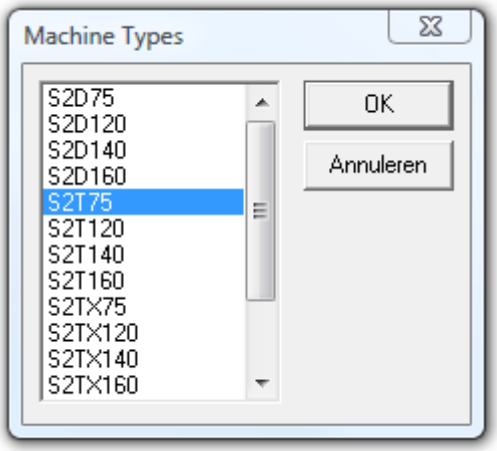
In service mode the following extra items appear under service menu:

a. Calibrate margin
b. Selection Machine type
c. System registers
d. Burn in
e. OPOS monitor
f. hardware test
g. flash used
h. monitor

Caution:
Do not use the system tests if you do not fully understand them. Be extremely careful while in that mode and follow given guidelines to the letter. You can inflict serious damage beyond repair to the machine if the wrong parameters are changed.

3.1.2.2 Via computer:

1. Start the summa cutter control program
2. press “Alt”, “Ctrl, “Shift” and “m”
3. Choose the right machine type and click “OK”.



3.2 Length calibration

3.2.1 The unit has to be recalibrated when:

a drum has been replaced

the pinchrollers have been replaced

the PCB has been replaced or defaulted

The media calibration can be done by either Summa Cutter Control or via the touch panel. Media calibration is user depended. So if a user is changed, then length calibration can be different. When calibrating in user mode, then only the X direction can be calibrated via the touch panel. When calibrating in service mode, then both X and Y axis can be calibrated.

NOTE: One of the characteristics of a drum driven machine is that different thicknesses of media give different results while calibrating in the x-direction. If a high accuracy is needed, the unit has to be recalibrated when different thicknesses of material are used.

3.2.2 Calibration via touch panel:

1. Power on the cutter, load media, and mount knife.

NOTE: The wider and longer the loaded media, the more accurate the calibration will be. Use a piece of vinyl of maximum width and a length that is approximately 1.5 times the width.

2. Press 

.
3. The main menu will appear on the screen.
4. Press 

.
5. More menu options appear on screen.
6. Press 

.

   The cutter will reload the media and perform the length calibration test. Take out the media and measure the length of the cut line with a ruler (measuring device). The length that has to be entered is the distance between line 1 and line 2 as shown in the figure.

FIG 3-1
3-1 LENGTH CALIBRATION PATTERN

NOTE: The cutter will only be as accurate as the accuracy of the calibration. If the ruler (measuring device) is inaccurate, then re-calibrating may make the cutter's accuracy worse. The accuracy of calibration will be directly reflected in the cuts. Set the cutter to Metric to do the calibration. It is more accurate than the English unit system.

7. Press 

to proceed with the calibration, press 

to stop.

8. Use  or  to change to the value of the measured length between the two cut lines down the length of the vinyl roll.

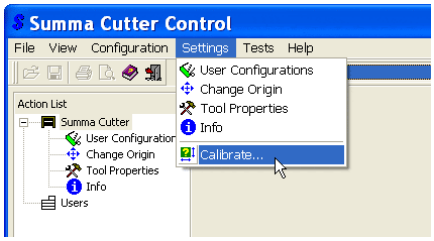
9. Press 

to confirm the value of the measured length.

TIP: Once this user is calibrated, change the user name. This makes it easy for future reference.

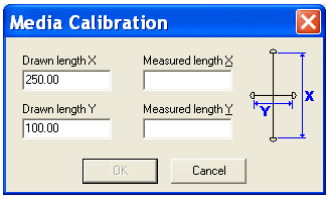
3.2.3 Calibration via Summa Cutter Control:

1. Load media in the machine (the wider the media, the more accurate the calibration).
2. Start the Summa Cutter Control program.
3. Select Settings -> Calibrate.



The cutter will reload the media and perform the length calibration test. Take the media and measure the length of the cut line with a ruler (measuring device). The length that has to be entered is the distance as shown in the figure.

4. Measure the test pattern and enter the measurements it in the dialogue box.



5. Switch the machine on and off so that the new calibration parameters will come into effect.

3.3 Head calibration

3.3.1 Knife calibration

3.3.1.1 The knife has to be calibrated when:

a knife is replaced.

the tool carriage has been replaced

the PCB has been replaced or defaulted

3.3.1.2 Pressure calibration (drag and tangential):

The pressure calibration is only for the drag knife important for the knife depth. The knife depth of a tangential knife should be set mechanically (amount the knife tip protrude between the two rollers of the nose piece).

1. Power on the cutter, load media, and mount knife.
2. Press 

.
3. Press 

button.
4. The current tool pressure will appear on screen.
5. Use  or  to change the pressure.
   The new value (in bold) will change.

   1. Press 

to perform the internal tool pressure test.
   2. Press 

to confirm and leave the tool pressure menu.
   3. Press 

to leave the pressure unchanged.

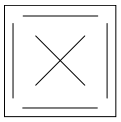


FIGURE 1-30:
KNIFE PRESSURE TEST PATTERN

Peel out the rectangle and inspect the backing.

The knife depth is set correct when the test pattern is visible on the front side of the media backing, however the knife may not have cut in the media backing.

3.3.1.3 Knife offset calibration (drag only):

Typical knife offset for Summa knifes is 0.41-0.45 for standard knives and 0.9-0.97 for sandblast knives.

1. Power on the cutter, load media, and mount knife.
2. Press 

.
3. Press 

.
4. The current knife offset will appear on screen.
5. Use  or  to change the knife offset.
   The new value (in bold) will change.
   1. Press 

to perform the internal knife offset test.
   2. Press 

to confirm and leave the knife offset menu.
   3. Press 

to leave the knife offset unchanged.

When the knife offset is set correct then the test pattern looks like this:

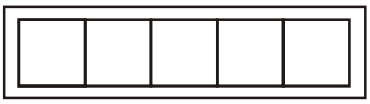
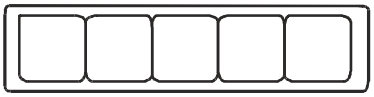
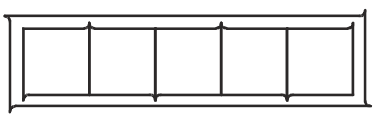


FIGURE 2-3
CORRECT KNIFE OFFSET PATTERN

When the knife offset is too low then the test pattern looks like this:



When the knife offset is too high then the test pattern looks like this:



3.3.1.4 Knife calibration (tangential only):

The purpose of the knife calibration routine is to detect and, if need be, to correct problems related with the concentricity of the tangential knife blade.

1. Power on the cutter, load media, and mount tangential knife (see section 1).
2. Press 

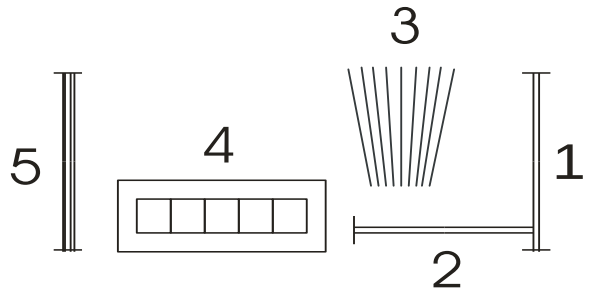
.
3. The main menu will appear on the screen.
4. Press 

.
5. The three knife parameters will appear on screen.
6. Select the parameter to be changed.
7. The selected parameter will be highlighted on the touch screen.
8. Use  or  to change the parameter.
   The value (inverse) will change.
   1. Press 

to perform the internal knife calibration test.
   2. Press 

to confirm and exit the knife calibration menu.

When the knife offset is set correctly, the test pattern looks like this:



3-2 CORRECT TANGENTIAL KNIFE CALIBRATION TEST

Rectangle 1 and 2 should weed out (remove) smoothly without sticking to the rest of the vinyl.
The fan shaped pattern 3 should have a clear cut line in the middle; the ones at the sides show burs.
The squares in 4 should be aligned and equal in size.
The 4 vertical cuts in 5 should be clear without any burs and straight all the way from top to bottom (not rounded near the horizontal lines).

NOTE: It is possible that not all test patterns come out perfect (depends on the type of vinyl). Test pattern 1 and 4 are the most important test patterns. They should be as close to perfect as possible.

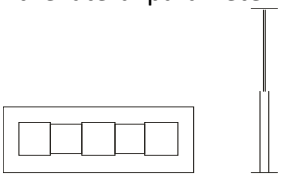
Start with the setting of the origin, then set the other parameters

Origin correction

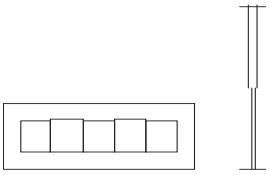
If the clear cut line in test pattern 3 is to the right, then increase the value of the origin, begin in steps of 20, and lower the steps when nearing the correct origin setting.
It helps sometimes to gently feel the pattern to find out which side has the clear-cut line.
If the clear cut line in test pattern 3 is to the left, then decrease the value of the origin, begin in steps of 20, and lower the steps when nearing the correct origin setting.

Lateral correction

Weedout (remove) the rectangle in pattern 1 and in pattern 4, if the test pattern is like the one below, decrease the value of the lateral parameter to correct the closing lines cut.



However, if the test cut resembles the pattern below, increase the value of the lateral parameter to correct the closing lines cut.



Longitudinal correction

Weed (remove) out the rectangle and, if you obtained a pattern like the one below, decrease the value of the longitudinal parameter to correct the closing lines cut.

However, if the test cut resembles the pattern below, increase the value of the longitudinal parameter to correct the closing lines cut.

Each time a parameter is changed, press 

to perform the internal knife calibration test.

3.3.2 Coil calibration

3.3.2.1 The coil has to be recalibrated when:

the cut quality is dubious.

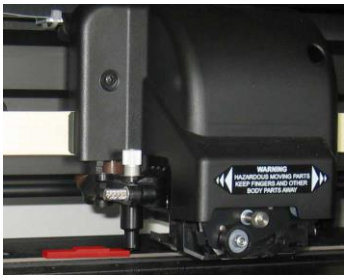
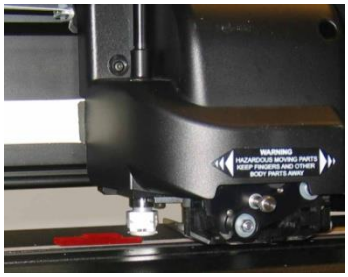
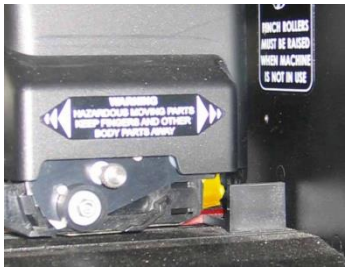
the tool carriage has been replaced

the PCB has been replaced or defaulted

3.3.2.2 Calibration:

Before setting doing the coil setup, it is imperative to check the height of the carriage. If the height is not correct, then setting coil will not be correct.

With the power switched off, check the clearance between the knife holder (nose piece) and base. It should be 2.6mm – 2.9mm, use the special tool for quick reference (is made red in figure **warning:** do not push knife holder upwards while testing!). While checking tool height, check also the height of OPOS. Move the carriage all the way to the right the part on the base (made red) should push the OPOS sensor (made yellow) about 0.3 to 0.5mm. This together with the height check is also an indication of the perpendicularity of the carriage.

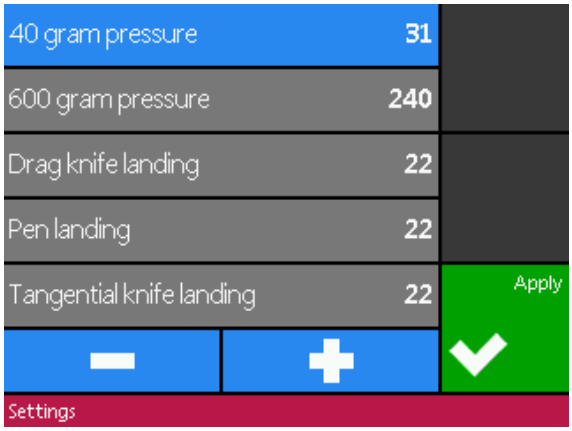
If the height is not correct, then reset the carriage.

1. Power on the cutter, load media, and mount tangential knife.
2. Press 

.
3. The main menu will appear on the screen.
4. Press 

to advance to the next screen.
5. Press 

6. The coil setup menu with the different parameters will appear on screen.



Click on the parameters you like to change and use  or  to change the value of the highlighted parameter.

Press 

to terminate this setup.

Setting 40g pressure and 600g (400g) pressure.
To execute this test, a tension gauge of ± 100 gr and ± 600 gr is required.

Measure the pressure on the knife with the tension gauge. Use  or  to change the value of the parameter so that the readout on the tension gauge matches the value on the touch screen (40g, 400g or 600g depending on the parameter that is calibrated).

Setting the landing
The landing determines, among other things, the force at which the tool hits the media. When calibrating the landing, the tool holder with the knife must be inserted in the head. Be sure that the knife does not protrude.

Use  to lower the landing value until the tool is in the “up” position. Then use  to raise the value of the parameter. With each unit of change, continue checking if the tool is completely down yet. Once the tool is completely down, raise the value back up two units, and this becomes the proper setting.

3.4 Media sensor calibration

3.4.1 The media sensors have to be recalibrated when:

sensors have been changed.

the PCB has been replaced or defaulted

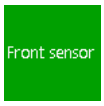
3.4.2 Calibration of the media sensors:

Do the sensor calibration with a pinchroller assy above the rear sensor and a piece of media with good reflecting backing. In case there is a problem with a certain type of media (e.g. with black backing) then use this media, however check it afterwards again with media with normal backing.

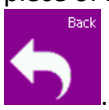
1. Power on the cutter, press 

.
2. The main menu will appear on the screen.
3. Press two times 

.
4. Press 

.
5. Press 

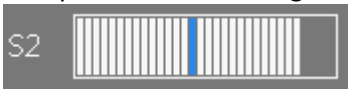
or 

to select the sensor that will be tested.
6. Put a piece of media half on the chosen sensor and under the two outer pinch rollers. Press 

.
7. There are five levels of sensitivity to choose from.
8. Use  or  to change sensitivity level.

After choosing a sensitivity level, there will be a rectangle next to the sensitivity. When the sensor is covered then the rectangle will be (completely) filled with black squares. When the senor is uncovered, there will be (almost) no black squares in the rectangle.

Sensor uncovered



Sensor covered

The black stripe in the rectangle is the trigger level at which the cutter decides whether there is media in the machine or not.

9. Use  and  to change the trigger level if necessary.

Ideally there would be 2 to 4 black squares when the sensor is uncovered, the rectangle is completely filled when it is covered, and the trigger level is set in the middle.

3.5 OPOS Calibration

3.5.1 OPOS has to be recalibrated when:

the knife has been changed.

the tool carriage has been replaced

the PCB has been replaced or defaulted

There are three basic OPOS calibrations:

1. Hardware electronic calibration of the sensor (calibrating potentiometers on head)
2. Calibration of de distance between the sensor and the knife tip.
3. Media calibration for OPOS.

The only calibration that will be used is the second one. The first calibration is normally done at the factory. The third calibration is only needed when the sensor cannot see the difference between the marker color and the media color. So practical when changing head or main board, check calibration 1 and do calibration 2.

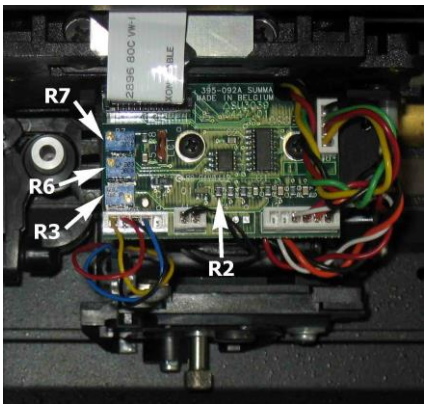
3.5.2 Setting of potentiometers

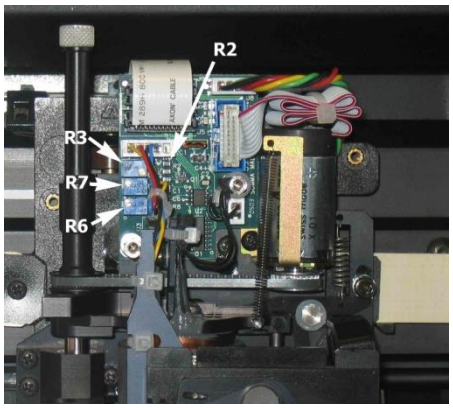
To calibrate the potentiometers exactly, use MI 9104. This is printed out with the exact colors to calibrate OPOS. The media used in MI9104 is 3M cast white vinyl. Black is printed with a thermal transfer printer from Summa. Gray is 20% black printed 50 lpi ellipse.

1. Power on the cutter in Service Mode, press 

.
2. The service menu will appear on the screen.
3. Press 

.
4. The monitor screen will appear.





5. Put white vinyl underneath the senor (make sure the sensor stays upright). Turn on R6 until the touch screen reads 120.

6. Put the black square underneath the sensor and turn on R7 until the readout is 1940.
7. Put the gray underneath the sensor. The readout should be between 400 and 700. If not turn on potentiometer R3 until the value is above 400.
8. Then repeat steps 4-6 until value on gray is correct.

3.5.3 OPOS calibration

This calibration learns the cutter the exact distance between the knife tip and the senor.

1. Switch the cutter on and load black vinyl with white backing.

NOTE: Black vinyl with white backing MUST be used when calibrating OPOS.

2. Set the head's origin above a clean, blank part of the vinyl.
3. Press 

.
The main menu will appear on screen.
4. Press 

.
5. More menu options will appear on screen.
6. Press 

.
7. The different OPOS configuration menus will appear on screen.
8. Press 

.
The cutter will cut out a square measuring approximately 9.5x9.5mm and move the square forward. "Weed out Rectangle" will appear on the display.
9. Carefully weed the square, making sure the edges stay intact. Press 

.
OPOS will read the edges of the square and calibrate itself accordingly.

3.5.4 Media calibration for OPOS

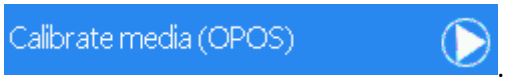
Media calibration will usually not be necessary, use this only for a specific media marker color combination. If this media is not used any more, then set it back to default. This parameter is NOT user depended. Print a square measuring at least 4x4cm on the media that will be used. Be sure to use the same ink that will be used when creating the registration markers.

1. Turn on the cutter and load the vinyl with the printed square.
2. Press 

.
3. The main menu will appear on screen.

4. Press 

, then press 

.
5. The different OPOS configuration menus will appear on screen.
6. Press 

.

   The cutter allows the user to choose to either measure the media or to fill in a previously recorded value.

NOTE: If a combination of media color – marker color has already been calibrated and recorded, then 

can be used to enter this value directly, without having to re-measure it.

7. Press 

.

   The cutter will lower the sensor. On the display, the message "put knife on white area" will appear.
8. Use 
, 
, 
or 
to maneuver the knife on top of a white area (the area should be at least 3 by 3 cm or 1" by 1").
9. Press 

to confirm.

   The cutter will make a circular movement while it measures the reflection of the media. It will briefly display the measured values and display the message "put knife on black area."
10. Use 
, 
, 
or 
to maneuver the knife on top of a black area (approximately in the middle and slightly to the bottom right).
11. Press 

to confirm.

    The cutter will make a circular movement while it measures the reflection of the marker color. It will briefly display the measured values, then it will show a value that is characteristic for this media color – marker color combination. Store this value for future reference.

3.6 Right margin calibration

3.6.1 The margin has to be recalibrated when:

Pinchroller sensor on head was changed.

The PCB has been replaced or defaulted.

3.6.2 Margin calibration

1. Turn on the cutter in Service Mode and load vinyl.
2. Press 

, then press 

.
3. Press 

, then press 
.
   Now the cutter cuts a line in the X axis left of the imprint of the pinch roller. Check the position of that line in reference to the imprint.
4. Use  or  to move the origin of the carriage so that the line is just left of the imprint (not in the imprint, but not too far from it also).

3.7 Touch screen calibration

3.7.1 The touch screen has to be recalibrated when:

Touch screen was changed.

The PCB has been replaced or defaulted.

3.7.2 Touch screen calibration

1. Power on the cutter.
2. Press 

.
3. The main menu will appear on the screen.
4. Press two times 

.
5. Press 

.
6. Follow instructions on screen.
7. Press 

.

3.7.3 Alternative method

1. Power on the cutter.
2. Touch and hold the upper right corner of the display while the Summa logo is displayed.
3. Release the screen when the touch screen calibration image appears.
4. Follow the onscreen instructions:
   With a pen, tip once on the four crosses.
5. Press 

.
6. A new image appears. Tap all crosses with a pen to verify calibration. The X and Y values should correspond to the value indicated with each cross. A deviation of up to 10 units on some crosses may occur.
7. Press  to return to the normal operation mode.

4 Basic Operation

4.1 Touch Screen

The 320x240 dot touch screen provides a unique interface system allowing detailed cutter status information and a more flexible and powerful control of the configuration of the cutter.
All screen and optional panel controls on the touch screen are easily formatted to allow quick access to the most common cutter settings.
Next to the status messages and/or menu options displayed on touch screen, symbols of buttons are displayed that can be pressed to change menu items or to change the value for a given submenu/parameter.

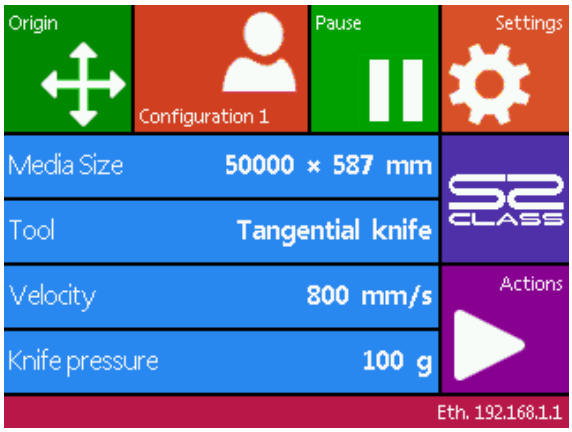


FIGURE 2-1:
TOUCH SCREEN

Each keystroke can initiate an internal test and movement of head or media.

WARNING
KEEP FINGERS AND OTHER BODY PARTS AWAY FROM THE CUTTING AREA. THERE ARE HAZARDOUS MOVING PARTS.

4.1.1 Touch screen familiarization

The touch screen provides information and lets the user change the cutter's parameters.

➢ ***Most common buttons on touch screen:***

Normally, the status or current value is visible on the left side of the screen, while the control buttons appear on the right side.

There are five main control buttons: 

, 

, 

, 

and 

.

If a menu is entered, 3 navigation buttons: 

, 

and 

may appear.

Press 

to return to the status screen. If media is loaded in the cutter, then the cutter will come online and be ready to cut a job sent from the computer.

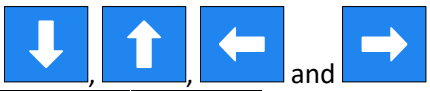
Press 

for more menu options. If there are more than six options for the chosen menu, then pressing this button will reveal the rest of the options onscreen.

Press 

to return one step in the menu structure.

➢ ***Other buttons that will appear on the screen are:***


,
,
and
arrow buttons to move tool carriage or media or


to change the values of parameters.


to scroll through a list of settings for a certain parameter.

to cancel an instruction or change in parameter.

to apply a change in parameter.

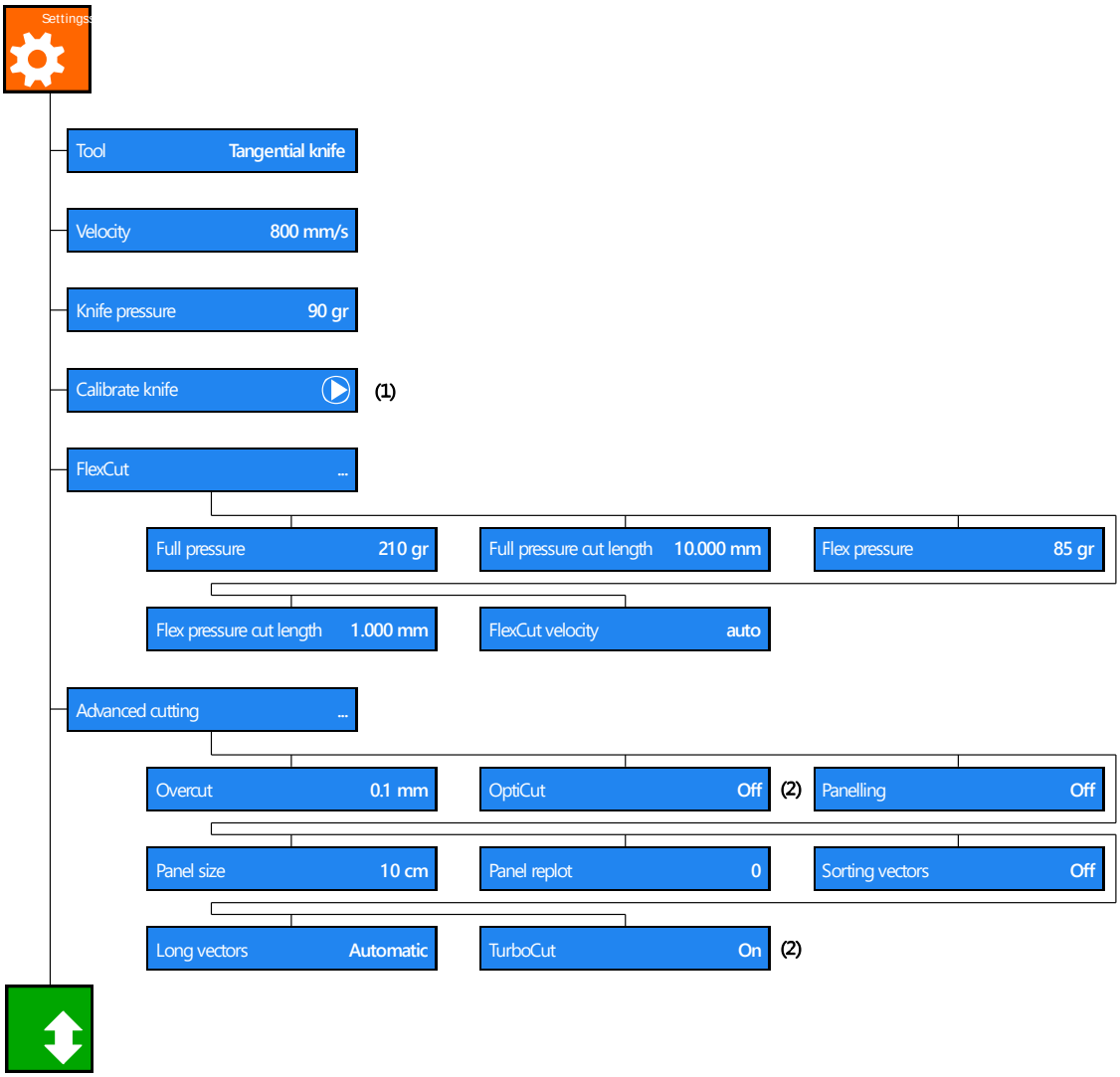
to initiate an internal test.

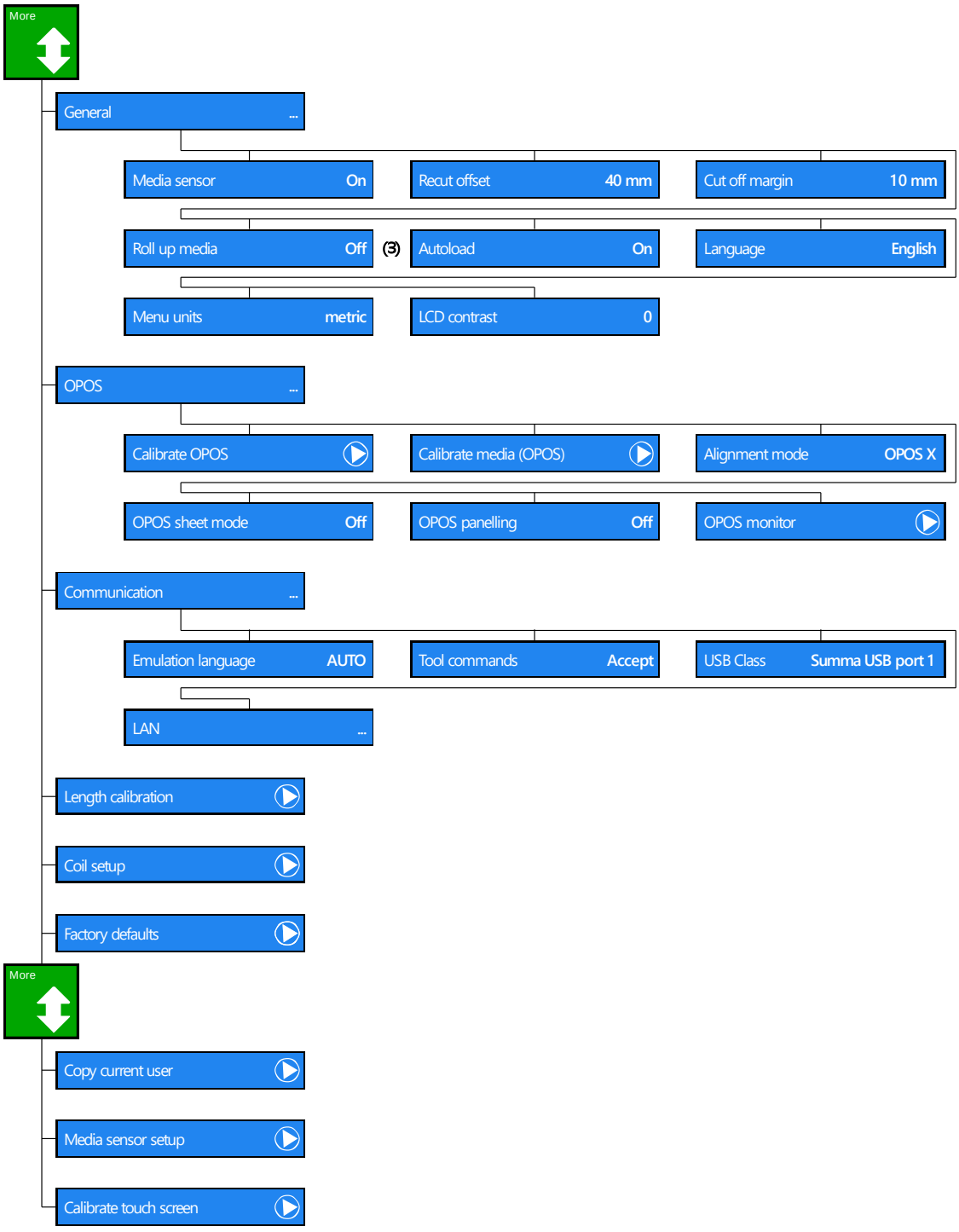
➢ ***Status line:***

The bottom line gives extra information on the way the cutter is connected to the computer.
If it is connected through the Ethernet connection, then the IP address is shown.
In other cases, the current USB class is shown.
When in menu mode, it shows which menu the machine is in.

4.2 Configuration Menu

The Settings button gives access to the main menu. Pressing this button will cause the cutter to go offline and suspend all operations in progress. The main menu contains all submenus and access to tests and calibration routines.
The chosen tool will influence the displayed configuration.





(1) Depends on tool setting.
(2) Not visible if tool is not drag knife.
(3) Only visible if roll up option is installed.

CONFIGURATION MENU

4.2.1 Service

This bundles the entire menu only visible in service mode.

4.2.1.1 Calibrate margin

The calibrate margin submenu is used to set the mechanical origin so that the cutter does not cut inside the track the pinch rollers make in normal use.

4.2.1.2 Select machine

The selection machine type submenu is used to set the machine type correct. This is very important. If machine type is set incorrect, then it will be impossible to load media. This submenu also takes care of the motor parameters en maximum velocities.

4.2.1.3 System registers

The system registry submenu is used to show the value of all registries. It is not advised to make changes in the registry values. This submenu can be used to troubleshoot problems together with a Summa technician over the phone. It is possible that some values will be asked.

NOTE: Do not change values without first checking with a summa employee.

4.2.1.4 Install roll up system?

On roll-up option installation, this menu item needs to be used to enable the roll-up.

4.2.1.5 Check media weight

This menu option can be used to determine which X-axis motor may need to be replaced.

4.2.1.6 Monitor

The monitor submenu is a very handy tool that shows the output levels all all sensors and encoder on one screen.

4.2.1.7 Burn in

The burn in submenu is used in the factory to start a test that takes 16 hours, but tests all mechanical parts.

NOTE: Do not use this test in the field without first checking with a summa employee.

4.2.1.8 Hardware test

The hardware test submenu is used to test all hardware of the cutter. During this test certain actions will be asked. This test needs the USB interface connected to a computer. The roll-up is also needed.

4.2.2 Settings

This bundles all the settings of the S Class 2 cutters.

4.2.2.1 Tool Selection

The Tool submenu is used to select the default tool at power up.

> **NOTE:** Do not forget to check and or recalibrate the tool settings when a tool has been changed (see section 3.3.1). Also OPOS calibration has to be redone (see section 3.5.3).

4.2.2.2 Velocity

Changes the tool velocity (the combined parameter).

4.2.2.3 Calibrate Knife

The purpose of the knife calibration routine is to detect and, if need be, to correct problems related with the concentricity of the tangential knife blade.

NOTE: Knife calibration should be done each time the knife is changed and should be checked if the knife shows signs of wear.

Knife calibration errors may be due to any of the following causes:

- **Concentricity misalignment**. The knife tip is slightly rotated in relation to its theoretical 0° angle. This error can be corrected by adjusting the origin.

- **Horizontal misalignment**. The knife tip deviates from its theoretical longitudinal center. This error can be corrected by adjusting the longitudinal parameter.

- **Vertical misalignment**. The knife tip deviates from its theoretical lateral center. This error can be corrected by adjusting the longitudinal parameter.

4.2.2.4 FlexCut:

FlexCut can be set to OFF, to Mode 1 or Mode 2. When the cutter is set to mode 1 or mode 2, it will alternately cut a certain length with full pressure, and a certain length with reduced pressure. The feature FlexCut offers the advantage that it cuts completely through the material, yet allowing the material to stay together by means of the small media bridges.

MODE 1 is the quickest mode, but it is less precise because the pressure changes during the cutting.
MODE 2 is a lot slower, but at the same time it is much more precise, as the cutter stops at every change of pressure.

There are 3 typical FlexCut parameters:
1. *Full pressure Cut length*: This parameter determines the length that is cut with full pressure. Usually the length that will be cut all the way through.
2. *Flex pressure cut length*: This parameter determines the length that will be cut with reduced pressure or without pressure. Usually a much smaller value than the full pressure cut length – this is the length of the media bridges.
3. *FlexCut pressure*: This parameter determines the pressure of the Flex pressure cut length. Usually a reduced pressure so that the knife only scratches the media or just cuts it only halfway through.

4.2.2.5 Advanced Cutting

Cutting groups the different parameters to optimize the cutting quality.

4.2.2.5.1 Overcut:

The Overcut submenu enables you to generate an overcut in order to facilitate weeding the cut. Each time the knife goes up or down, the cutter cuts a bit further. Figure below shows what overcut does with a tangential knife. An example cut out with a drag knife would show fewer overcuts, since there would be less up/downs (usually only one per curve/letter).
The overcut setting can be disabled (=0) or set to any value between 0 (=off) and 10. One unit is about 0.1 mm or 0.004 ".

OVERCUT

The default overcut is set to 1.

4.2.2.5.2 OptiCut:

OptiCut increases the cutting quality in case the knife is worn-out or not calibrated correctly. OptiCut is default set to off.

4.2.2.5.3 Paneling

Use **Panelling** submenu to enable or disable the internal paneling function of the cutter. Paneling is used for several different applications most common are FlexCut and long jobs with or without the roll up option.

4.2.2.5.4 Panel Size

Use the **Panel size** submenu to set the size of the panel.

4.2.2.5.5 Panel Replot

This parameter determines if the design has to be cut more than once on top of itself, this per panel. Panel replot is used for thick media and media which is difficult to cut. The value of this parameter is disregarded if panelling is set to off. If this parameter is set at 0, then the cutter will cut each panel only once. If it is set at 1, it will cut each panel twice…

4.2.2.5.6 Sorting Vectors

There are three options in this menu.

1. ***Off****:* When vector sorting is set of, then the cutter does no optimizing of the vectors. This is used when the intelligence of the cutter driver is preferred.
2. ***Directional****:* If set to directional, then the vectors are optimized for cutting direction (media movement). This used when the cutting pressure has to be set relatively high (for example with cutting through).
3. ***Starting point****:* This option optimizes the starting point for closed curves. This is used when the users sees that the curves do not close as they should.

4.2.2.5.7 Long Vectors

Some vinyls have the tendency to buckle when large designs (long vectors) are cut out. To avoid this, the speed needs to be reduced. This option does this automatic so that the speed and accelerations of small vectors are not affected when the speed is brought down.

4.2.2.5.8 TurboCut:

TurboCut increases throughput without raising the overall speed of the plotter by speeding up the drag movement. Especially when cutting small detailed designs the cutting time reduction is huge. Some thicker materials might need this feature to be set off.
TurboCut is by default activated.

4.2.2.6 General

4.2.2.6.1 Media Sensor:

The media sensors detect whether media is loaded or detect the end of media. The sensors prevent damage to the cutting strip and knife tip. The sensors can be activated or deactivated (both or front only) with this menu.
When the sensors are activated then the cutter searches for the front end of the media during the loading procedure. If it does not find it after returning the media for 1m (+/- 3 feet), it stops returning the media and sets the origin in the x-axis there. It will also stop, during the loading procedure or while it is cutting, if the rear sensor detects the end of media. The cutter does not search for the front end of the media and assumes that the loaded
The default setting for the media sensors is on.

4.2.2.6.2 Recut Offset:

The recut offset submenu is used to set or modify the distances between the jobs when making multiple recuts. This parameter is also used when using the automated OPOS options. The default value is 40mm.

4.2.2.6.3 Cut off margin:

The recut offset submenu is used to set or modify the distance the media moves forwards after the last job before it is cut off.
Default value is 10mm.

4.2.2.6.4 Roll up media:

The roll up media submenu is used to set or modify the parameters of the roll up system.
Default value is off.

4.2.2.6.5 Autoload:

The Autoload option enables the user to change how the vinyl unrolls. When Autoload is on, the cutter will automatically unroll the vinyl when needed. When the Autoload option is set off, the operator himself should unroll enough media before starting to cut.
The default setting is on.

Note: Tracking is not guaranteed when Autoload is set to off.

4.2.2.6.6 Language:

This submenu is used to set or modify the dialogue language on the touch screen. When the machine is new, it asks the user to choose a language. If this setting was set wrong by mistake, then the language can be changed with this option.
The information on the touch screen can be displayed in English, French, German, Spanish, Italian, Dutch or Polish.
The default language is chosen when the cutter is switched on for the first time.

4.2.2.6.7 Menu Units:

The setting of these options determines whether the speed and size values are displayed in the metric measure system or ENG/US measure system.
The panel units are chosen when the cutter is switched on for the first time.

4.2.2.6.8 LCD contrast

The **LCD contrast** submenu is used to adjust the contrast (or intensity) of the touch screen. The firmware automatically rejects values that would make the touch screen too dark to be able to use it.

4.2.2.7 OPOS

4.2.2.7.1 Calibrate OPOS:

This test calculates automatically the distance between the center of the knife and the OPOS sensor. This test should be done on black vinyl with white backing (to have the most contrast between vinyl and backing).

4.2.2.7.2 Calibrate media (OPOS):

This test is used when the OPOS sensor has difficulties reading the sensors.
It checks if it can clearly see the difference between marker color and media. If necessary it changes an internal parameter also.

4.2.2.7.3 Alignment mode:

There are six alignment methods available on all S class cutters:
X-Alignment, XY-Alignment and XY-Adjustment, OPOS-X, OPSO-XY and OPOS-Barcode. The first three alignment methods can be used if the combination of marker color – media color cannot be read by the OPOS sensor. These alignment methods require that the user manually register markers using the cutter's keypad. Most cutting software can automatically put these markers around the printed graphic.

X-Alignment compensates for errors in media alignment, and therefore graphic rotation, by rotating the graphic's contour. This alignment method requires that the user specify the Origin and one point along the X-Axis. Distance parameters are not required. X-Alignment is the simplest alignment method.

XY-Alignment compensates for errors in graphic rotation and skewness. Skewness errors occur when the graphic's X and Y Axes are not perpendicular. This alignment method requires that the Origin and one point along both the X and Y Axes be specified.

XY-Adjustment compensates for errors in graphic rotation, skewness, and scale. Scale errors occur when the graphic's printed size is different from the graphic's original size as created in the imaging software. X-Distance and Y-Distance parameters are required. These parameters define the distance between the Origin and X-Axis point, and between the Origin and Y-Axis point. XY-Adjustment is the most accurate manual alignment method.

OPOS-X is an automated system which reads markers along the X axis to compensate for errors in graphic rotation, skewness, and scale per measured marker.

OPOS-XY is the same as OPOS X but also has the ability to compensate for Y axis errors in the graphic.

OPOS-Barcode can read the barcode at the beginning of a job and send this information to the computer driving the machine. The job is then cut using the OPOS-XY method.

Default alignment method is OPOS.

4.2.2.7.4 OPOS sheet mode:

This option is to automate multiple identical OPOS jobs on sheet media.

4.2.2.7.5 OPOS paneling:

This submenu shows the actual OPOS parameters. Size of markers, distance between markers and number of markers. Can be used to troubleshoot OPOS problems or to set them if no OPOS dedicated software is used.

4.2.2.7.6 OPOS monitor:

This submenu shows the actual value of the reflection that is picked up by the OPOS sensor, is used while calibrating OPOS.

4.2.2.8 Communication

4.2.2.8.1 Tool Commands

TOOL COMMAND is used to determine whether the DM/PL and HP-GL tool commands (pen select pressure and velocity) are ignored or accepted.

4.2.2.8.2 USB Class

USB class can be set to Summa USB port 1, Summa USB port 2, Summa USB port 3, Summa USB port 4 or Printer Uni.
Printer Uni is for using the windows printer spooler.
Because of the different USB id's, the computer can make a distinction between several cutters attached to it (maximum 4).

4.2.2.8.3 LAN

A couple of parameters have to be set when connecting a cutter to the Ethernet. It is best to check a couple of network settings or ask the network administrator for following info:
Is the network working with DHCP server or not?
If so, what is the lease time and what is the IP pool range of the DHCP server.
If not, then find out what the used IP range is.
Also ask for the value for the subnet mask.

4.2.2.9 Calibrate X(/Y)

Calibrate X(/Y) allows the length of the lines cut to be adjusted to within the specifications. For instance, if a cut line should measure 100 mm exactly, the cutter can be adjusted for any discrepancy.

NOTE: The cutter will only be as accurate as the accuracy that is used while calibrating. If the ruler is inaccurate, then it is possible that re-calibrating makes the cutter's accuracy worse. The accuracy used while calibrating is going to be directly reflected to the cuts. It is recommended to set the cutter to Metric to do the calibration. It is more accurate than the English system.

Check the calibration section for the exact calibration description

4.2.2.10 Coil Setup

This test is used to calibrate knife and pen pressure and to set the knife and pen "landing". The cut quality is seriously affected by wrong landing settings. Before changing these values, write them down, there is no default setting for these parameters.
After adjustment, the value is saved in the system's non-volatile RAM.

4.2.2.11 Factory defaults

This option defaults all user parameters to factory default. The parameters that require calibrating are not reset.

4.2.2.12 Copy current user

Press the button to copy the user parameters from the current user to all the other users. It is recommended to do this only when the current user is user 1.

4.2.2.13 Media Sensor Setup

The Media Sensor Setup option is a useful routine to check whether or not the front and rear media sensors are functioning properly and whether the switching levels of these sensors are correctly set.

4.2.2.14 Calibrate Touch Screen

This option makes it possible to calibrate the touch screen. Perform this calibration if the illustration of the button on the touch screen does not match the area that needs to be pressed to activate the button.
Press button to start the calibration and follow guidelines on screen.

4.2.3 Actions

4.2.3.1 Load

The Load instruction is used to initiate a load sequence. There are three different load methods (roll, sheet, extended). OPOS barcode initiates the barcode reading routine. Roll up roll the rest of the media up.

4.2.3.2 Reset

This is used to interrupt an ongoing job. It clears the internal buffer and communication ports.

4.2.3.3 Replot

Each job is stored in the cutter's memory until a new job is sent. Pressing replot allows the job to be replotted. After this button is pressed, the user may choose the number of replots. The replot button does not work if there is no job in the memory, or if the previous job was larger than the cutter's memory.

4.2.3.4 Cut Sheets

Use this function to cut off a defined number of sheets from a roll with a fixed length.

4.2.3.5 Open file

Use this to cut directly from the USB flash drive or to upgrade the firmware of the cutter.

4.2.3.6 Confidence test

The Confidence test performs a quick electrical and mechanical test of the cutter to make sure that the cutter is fully operational. A media sheet of at least A3/B- size should be used for this plot. This test is always cut at the left side of the loaded media.

4.2.3.7 DIN A4 Test

The DIN A4 Test also performs an electrical and mechanical test of the cutter, in order to check the cut quality, but also provides the user with feedback on knife setting, knife pressure, knife offset and cutting depth.

This cut is always run as a DIN A4 portrait/A-size image, regardless of the actual size of the media loaded. If the media loaded is smaller than DIN A4/A-size, part of the outer box will be clipped (not cut).

4.2.4 ROM REVISION

Press the button to view information about the cutter's ROM revision. This information is often helpful to technicians when diagnosing problems over the telephone.

4.2.5 Configuration (Quick parameter change)

The S class cutters include 8 user configurations, all of which consist of the same parameters. Each configuration can have unique parameter settings. This allows the cutter to be quickly and easily reconfigured for different types of jobs or media.

NOTE: Factory default values for the different users are set all the same.

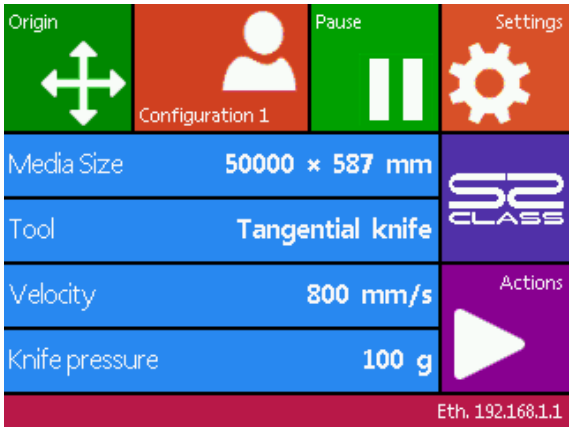
NOTE: The touch screen can be used to change user configurations. User configuration names can only be modified through Summa Cutter Control (PC only).

Tip: Use easy names to recognize quickly for what the user was configured.
Common used names are: Normal; Pen; Slow; Sandblast; Pouncer; Red intermediate vinyl…..

4.2.6 Pause (Online/Offline)

Online and offline are two important concepts when using the S Class cutters. The cutter is online only when the status of the touch screen is similar to the below figure.

When online, the cutter can be addressed by the host computer, which means that the cutter will execute cutting or plotting instructions issued by the host computer's application software. As soon as a button is pressed the cutters comes offline.



If the Pause button is pressed, then the tool can be moved around the working area with arrow buttons.

5 Maintenance and Cleaning

5.1 Introduction

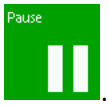
The S Class cutter range has a number of sliding surfaces made of smooth metals and plastics. They are virtually friction-free and require no lubrication. They will, however, collect dust and lint that may affect the performance of the cutter. Keep the cutter as clean as possible by using a dust cover. When necessary, clean the unit with a soft cloth dampened with isopropyl alcohol or mild detergent. Do not use abrasives.

5.2 Cleaning the Drive System

Over time, the sleeves of the drive drum may become clogged with accumulated residue from the media liner. This may cause the media to slip between the pinch rollers and the drive sleeves, decreasing traction.

Cleaning the drive system:

> WARNING
> KEEP FINGERS AND OTHER BODY PARTS AWAY FROM THE CUTTING AREA. THERE ARE HAZARDOUS MOVING PARTS.

1. Make sure there is no media loaded in the cutter.
2. Disable the sensors through the cutter's touch screen or cover them up.
3. Put a pinch roller above the sleeve that needs to be cleaned. Make sure it is the outer left or the outer right sleeve (otherwise there is not enough pressure).
4. Lower pinch roller and wait until the loading sequence is finished.
5. Put the cutter offline 

.
6. Press  until the sleeve has turned at least one turn.
7. Remove the backing from a piece of vinyl. Push pinch roller up by lifting part 1 and pushing on part 2. Place the piece on vinyl between a pinchroller and drive sleeve with the tacky side down. Release the pinchroller at the back.

FIG 5-1A
LIFTING THE PINCH ROLLER

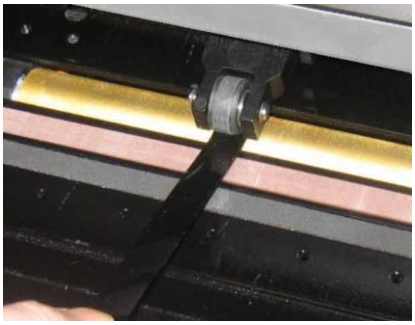


FIG 5-1B
PLACEMENT OF VINYL STRIP

8. Use  and  to move the piece of vinyl back and forth several times until all residue is removed from the drive sleeves.
9. Repeat for the other drive sleeves.

5.3 Cleaning the Media Sensors

Over time, the media sensors may become dirty with accumulated residue from the media. This may cause the cutter to malfunction.

Clean the media sensors by wiping them out with cotton swabs.

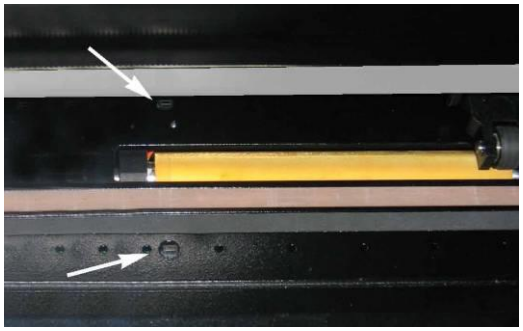


FIG 5-2
MEDIA SENSORS S CLASS CUTTERS

5.4 Cleaning the Y guiding

There are 4 areas on the y guiding on which the tools carriage slides from left to right.
Two areas (1) are visible on the front side of the guising. The other 2 surfaces (2) are on the back of the guiding, directly after the areas that are visible at the front.
Figure below shows the areas. Even though the shape of the y guiding may differ from model to model, the areas stay located on the same place at the top and bottom of the guiding.

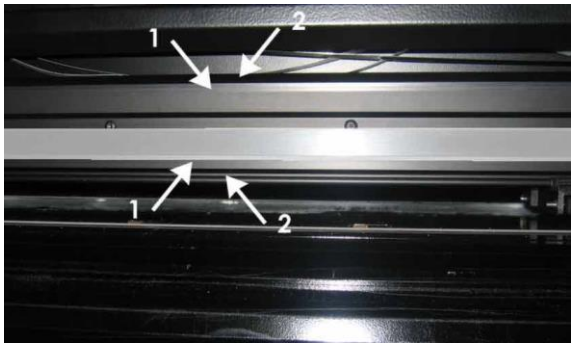


FIG 5-3
SLIDING SURFACES ON Y-GUIDING

Over time, there may be some accumulated residue on these sliding surfaces and on the rollers of the tool carriage.

Cleaning the sliding surfaces of the Y guiding:

1. Switch machine of.
2. Take a soft cloth dampened with isopropyl alcohol or mild detergent.
3. Clean surfaces, when the tool carriage is in the way, push it gently to the left or right.

5.5 Cleaning the nose piece (tangential machine only)

The nosepiece may accumulate residue from the vinyl that will result in poor cut quality. Typical for a dirty nosepiece is an interruption of the cut line every 12mm (0.5”).

Cleaning the nose piece:

1. Gently remove the knife by turning the knife holder counterclockwise.
2. Observe the orientation of the nosepiece and then push it out of its holder.
3. Remove any remaining vinyl residue using a brush or a pair of tweezers.
4. Replace the nosepiece.
5. Install the knife.

5.6 Cleaning the OPOS system.

The optical system will collect dust. Therefore, the small hole in the sensor should be cleaned regularly with a cotton-tipped swab.

Cleaning the OPOS system:

Locate the hole in the OPOS sensor holder at the left side of the tool carriage.

Remove the sticker from over the hole.

Clean by wiping it out with cotton swabs.

Do not forget to replace sticker again afterwards.

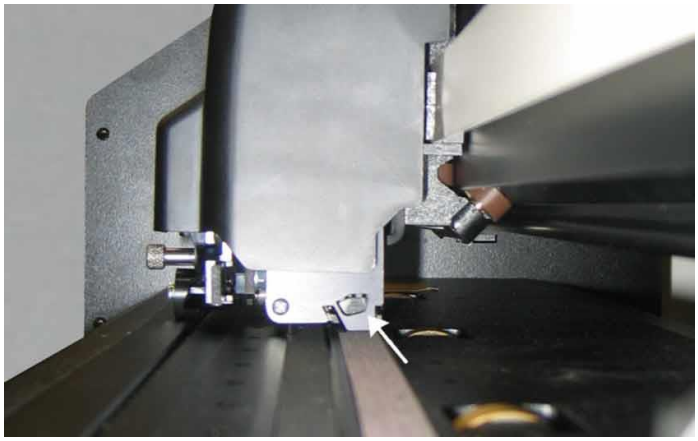


FIG 5-1
5-1 CLEANING OPOS SENSOR

5.7 Changing the fuse

CAUTION: Before changing the fuse, make sure that the cutter is completely disconnected from its power source.

CAUTION: For continued protection against risk of fire, replace only with the same type and rating of fuse: T2.0A, 250V SCHURTER SPT OR EQUIVALENT.

- To remove the fuse (3), lightly pry the fuse holder release clip in the direction opposite the power switch. The fuse holder will pop free.

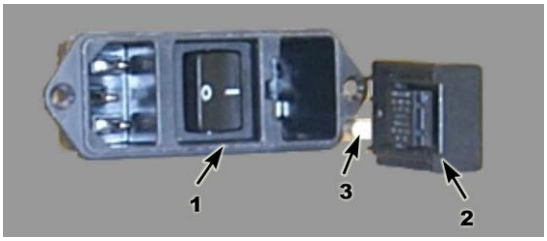


FIG 5-2
5-2 POWER ENTRY MODULE

1. Remove the fuse holder.
2. Pull the fuse from the holder.
3. Put new fuse in the holder and clip the holder back into place.

6 Error codes

This section contains information on the most common error codes which can appear on the touch screen. A step-by-step procedure is provided to prevent this error.

6.1 X-axis error! Overflow or Overcurrent!

Cause:

The drum motor cannot move to the required position. This is a fatal error. It can only be solved by turning the power off and then on again. This error is usually caused by a media crash in the machine.

Action:

1. Remove the crashed media and restart the machine. Should this happen rather frequently, the cause can be :
    - knife depth or pressure is not well set.
    - bad tracking because an unstabilized media type is used.
    - bad tracking because the humidity is too high or too low.
    - bad tracking because an unapproved type of media is used.
    - the media hits something on the floor while cutting.
    - the media shows already different tracks, so that the media does not know which track to follow.
2. Lower the speed of the media.
3. Check whether the drive drum turns smoothly (first turn the power off and place the cam rollers in the up-position).
4. If the error in the x-axis happens at start-up, check the x-axis motor, the encoder connectors and the cables.
5. Replace the X-motor encoder.
6. Replace the PCB.

6.2 Y-axis error! Overflow or overcurrent!

Cause:

The motor driving the machine head cannot move to the position wanted. This is a fatal error. It can only be solved by turning the power off and then on again. This error is usually caused by a media crash.

Action:

1. Remove the crashed media and restart the machine.
2. Lower the speed and/or the knife pressure.
3. Check whether the head moves smoothly (first turn the power off and position the cam rollers on the outer edges of the media).
4. Check the y-axis motor and the encoder cables.
5. Replace the Y-motor.
6. Replace the PCB.

6.3 Cutter is unable to find the knife home position

Cause:

The machine doesn't find the home position for the tangential knife.

Action:

1. Check whether the knife holder turns smoothly when the power is switched off. If not, something is wrong with the T-head. Replace the head or check the mechanical parts of the head.
2. Check the connection cable, which runs from the head to the PCB.
3. Check the machine with another head.
4. Replace the flat cable which runs from the head to the PCB.
5. Replace the main PCB.

6.4 Up down encoder not working

Cause:

The encoder which speeds up up/down movement does not function.

Action:

1. Check whether the knife holder goes up and down smoothly when the power is switched off. If not, something is wrong with the head. Replace the head or check the mechanical parts of the head.
2. Check the connection cable, which runs from the head to the PCB.
3. Up/down encoder is not working, replace encoder
4. Check the machine with another head.
5. Replace the flat cable which runs from the head to the PCB.
6. Replace the main PCB.

6.5 Unable to lower OPOS

Cause:

The encoder which speeds up up/down movement does not function.

Action:

1. Check whether the knife holder goes up and down smoothly when the power is switched off, also check whether OPOS lowers when knife is pulled up. If not, something is wrong with the head. Replace the head or check the mechanical parts of the head.
2. Check the connection cable, which runs from the head to the PCB.
3. Up/down encoder is not working, replace encoder
4. Check the machine with another head.
5. Replace the flat cable which runs from the head to the PCB.
6. Replace the main PCB.

6.6 OPOS sensing errors

Marker distance doesn't match with theoretical value,
Markers not sensed properly,
Marker not found,
Loading media failed,
Markers exceed sheet size,

Cause:

OPOS does not sense markers, or senses values with which it cannot work.

Action:

1. Check the OPOS parameters and compare them to the printout. Set parameters correct.
2. Check whether there is dust on the sensor tip.
3. Set media calibration OPOS to default (30) and do OPOS test that is on the manual CD.
4. Check the connection cable, which runs from the head to the PCB.
5. Check the machine with another head (OPOS).
6. Check reflection values with OPOS monitor.
7. Check the flat cable going from the head to the PCB.
8. Should there still be problems, change OPOS.
9. Replace the flat cable which runs from the head to the PCB.
10. Replace the main PCB.

6.7 Illegal plot command

Cause:

For ***DMPL,*** when a wrong set of instruction is sent to the machine. This message only appears when the machine is configured to report DMPL ERRORS.

Action:

1. If the cut result is not satisfactory, lower the baud rate at the machine side and at the computer side. If the parallel interface is used, make the cable shorter.
2. Check the cut file for unknown dm/pl commands.

6.8 Syntax error

Cause:

Syntax errors occur when an incorrect ***HPGL*** command is received by the machine.
The next table gives an overview:

Error Number	Meaning
1	Instruction is not recognised.
2	Wrong number of parameters.
3	Parameter is out of range or illegal character.
5	Unknown character set.
7	Buffer overflow for polygons or downloadable characters.
10-18	Problems with Device Control Instruction.

Action:

1. Change the data sent to the machine.
2. Refer to the HPGL supported commands.

6.9 NVRAM failures and messages

Non-fatal errors:

System NVRAM has been defaulted due to ROM upgrade,
User NVRAM has been defaulted due to ROM upgrade

Action:

1. Message appears when rebooting the machine for the first time after an upgrade of the ROM's. The configuration of the machine will be defaulted. After answering the questions on the display, this message should no longer appear when the machine is switched on.
2. If it does replace PCB.

Fatal errors:

System NVRAM checksum failure - system NVRAM has been defaulted try to reboot machine,
User NVRAM checksum failure,
System NVRAM would not accept value written to it,
User NVRAM would not accept value written to it.
NVRAM update unknown

Action:

1. The preceding messages warn for a problem with the (NV)RAM. Important information can be lost, such as calibration, landing pressure.
2. Replace the main PCB if problem persists.

6.10 Internal errors

Cause:

Happens when there is a Firmware problem or a problem with the main board (address bus or data bus), the following list gives an overview:

Error Number	Meaning
1	bus error
2	address error
3	illegal instruction
4	zero division
5	chk instruction
6	trapv instruction
7	line 1010
8	line 1111

Action:

1. This is an internal error. The cause of this error may be an unknown firmware problem in the machine's FlashROM’s. Do the internal confidence test. If this test is OK, check the data sent to the machine.
2. Reflash the FlashROM’s on the main board.
3. Replace the main PCB.

6.11 Upgrade errors and messages

Could not erase Flash memory! Reboot...,
Corrupted file or communication problem! Reboot...,
Upgrade file does not match the machine type! Reboot...,
Reboot machine before upgrading and try again!",
Could not write to flash memory!",
Flash device not found!

Action:

1. Those are fatal errors. If they occur during an upgrade reboot and try again.
2. Download the flashfile again from the internet, file could be corrupt and check if the flashfile is for the S Class 2 cutters (MD9981).
3. Try different connection with the computer (LAN or USB).
4. Change main PCB.

6.12 RAM ERROR

Cause:

RAM's are going bad.

Action:

Replace the main PCB.

7 Identification Plates

395-702	LOGO STICKER S2D120	
395-703	LOGO STICKER S2D140	
395-704	LOGO STICKER S2D160	
395-705	LOGO STICKER S2D75	
395-706	LOGO STICKER S2TC140	
395-707	LOGO STICKER S2TC160	
395-708	LOGO STICKER S2TC75	
395-709	LOGO STICKER S2T120	

395-710	LOGO STICKER S2T140	
395-711	LOGO STICKER S2T160	
395-712	LOGO STICKER S2T75	
420-618	SUMMA NAMEPLATE BLACK	

8 Cutter accessories and consumables

Below table lists the accessories and consumables. Some of those parts comes standard with the cutter, depending on the model.

DESCRIPTION	REFERENCE	PICTURE
Power cable (Regional differences, contact local dealer for exact part number)		
USB cable	**399-111**	
Media flanges (set of 2)	**391-510**	
Extended Media Flanges (set of 2)	**395-622**	
Pinch rollers (set of 2, with 4 clips)	**395-401**	
Tangential knife holder	**395-322**	
Drag knife holder for tangential head	**395-323**	

DESCRIPTION	REFERENCE	PICTURE
Knife plate	395-415	
Razor blade (set of 10)	391-146	
Standard tangential knife 36° (set of 5)	390-534	
Sandblast tangential knife 60°	390-550	
Double sided tangential knife 36°	390-551	
Double wedge tangential knife 45°	390-560	
Insertion tool for tangential knife	390-553	
Nose piece for standard knife	395-348	
Nose piece for sandblast knife	395-347	

DESCRIPTION	REFERENCE	PICTURE
Nose piece drag knife (not for cutter with head for drag knife)	395-330	
Ballpoint pen holder	395-324	
Ballpoint	395-325	
Tangential pouncing pin holder with pouncing pin	395-315	
Plotter pen (set of 4)	MP06BK	
Standard drag knife holder for drag head	391-332	
Specialty drag knife 60°	391-231	
Standard drag knife 36° (set of 5)	391-360	
Drag knife holder for sandblast knife	391-363	

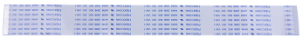
DESCRIPTION	REFERENCE	PICTURE
Sandblast drag knife 55° (set of 5)	391-358	
Roller ball black (set of 4)	395-430	
Roller ball blue (set of 4)	395-431	
Universal pen holder	395-434	
Drag pouncing pin holder with pouncing pin	395-313	
Pouncing pin	391-592	
Cutting Strip S140 - S160	400-565	
Pouncing strip	391-598	

9 First Aid Kit for S Class 2

It is recommended to have the First Aid Kit at hand to be able to help the customer as soon as possible.
The kit contains the most common parts needed to service the cutter.

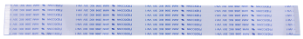
9.1 KIT S2 CLASS

DESCRIPTION	AMOUNT	PICTURE
PINCH ROLLERS (2PCS.) & CLIPS	1	
ASSY, MOTOR WITH ENCODER & PULLEY	1	
ASSY, T HEAD	1	
ASSY, D HEAD	1	
ASSY, PINCH ROLLER SENSOR	1	
POWER SUPPLY S CLASS	1	

DESCRIPTION	AMOUNT	PICTURE
FLAT CABLE COLOR TOUCH SCREEN	1	
COLOR TOUCH SCREEN	1	
ASSY, MAIN BOARD S CLASS 2	1	

9.2 KIT S2 T

DESCRIPTION	AMOUNT	PICTURE
PINCH ROLLERS (2PCS.) & CLIPS	1	
ASSY, MOTOR WITH ENCODER & PULLEY	1	
ASSY, T HEAD	1	
ASSY, PINCH ROLLER SENSOR	1	

DESCRIPTION	AMOUNT	PICTURE
POWER SUPPLY S CLASS	1	
FLAT CABLE COLOR TOUCH SCREEN	1	
COLOR TOUCH SCREEN	1	
ASSY, MAIN BOARD S CLASS 2	1