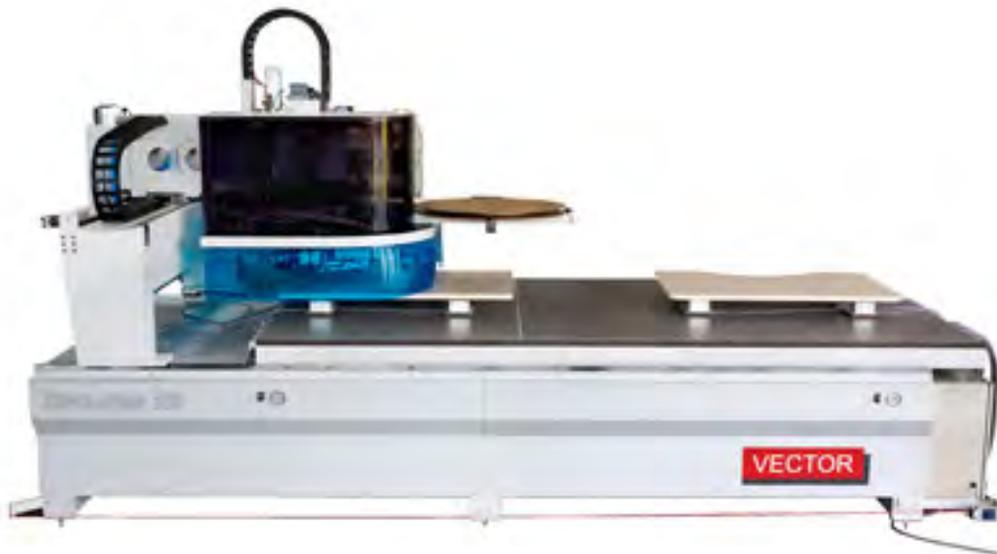


VECTOR

Revolution 180

Operating Manual



Relevance in print

When buying the Vector Revolution 180 you decided in favour of a model with an individual composition.

We ask for your understanding that there may be mentioned additional devices which you did not chose.

The high standard of quality and security is guaranteed by continual development. Therefore there can appear differences between these operating instructions and your unit. Also, errors cannot be totally excluded. Therefore we ask for your understanding that from descriptions, indications and illustrations there cannot be derived legal claims.

Order Information

Please supply the following information:

Title of document
Code number
Date of issue
Language

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NEW ZEALAND
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+64 = International prefix

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1.1 Characteristic Data

Machine designation: Contour Edgebander
 Model **Revolution 180**

Manufacturer *Vector Systems Ltd*
P O Box 78 331
Grey Lynn
AUCKLAND, NEW ZEALAND

Serial Number _____

Year of Manufacture _____

1.2 Weight

Model	Revolution 180
Weight (kg)	2500kg

1.3 Scope of application, operation and intended use.

1.3.1 Scope of application

This contour bander is for the automatic application of a wide range of banding materials to contoured panels.

1.3.2 Operation

The workpieces are clamped to the worksurface using vacuum cups and the control system positions the head against the panel and then follows the contour of the panel.

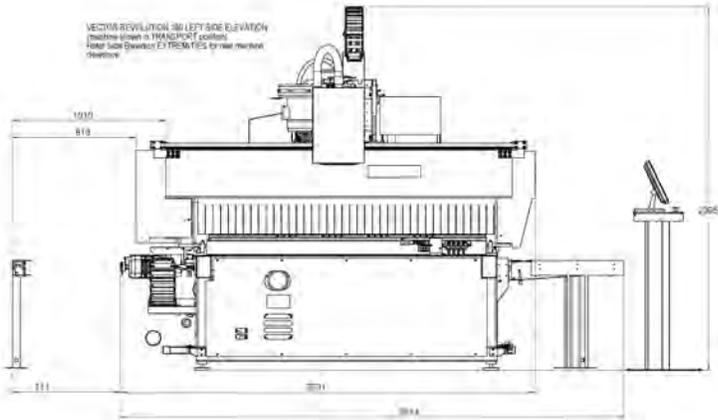
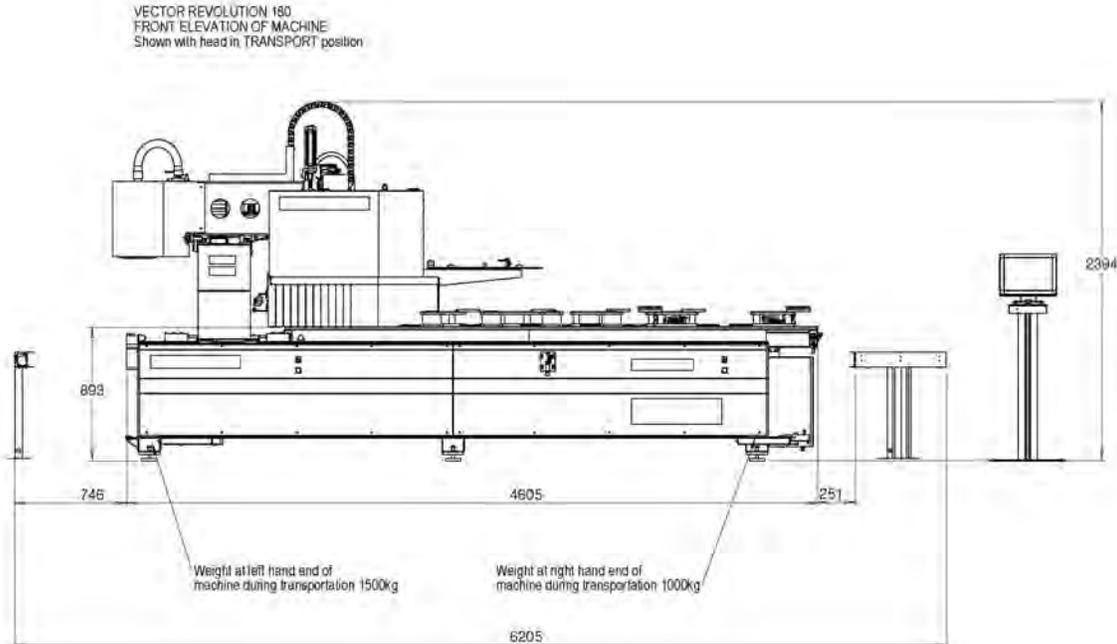
1.3.3 Intended Use

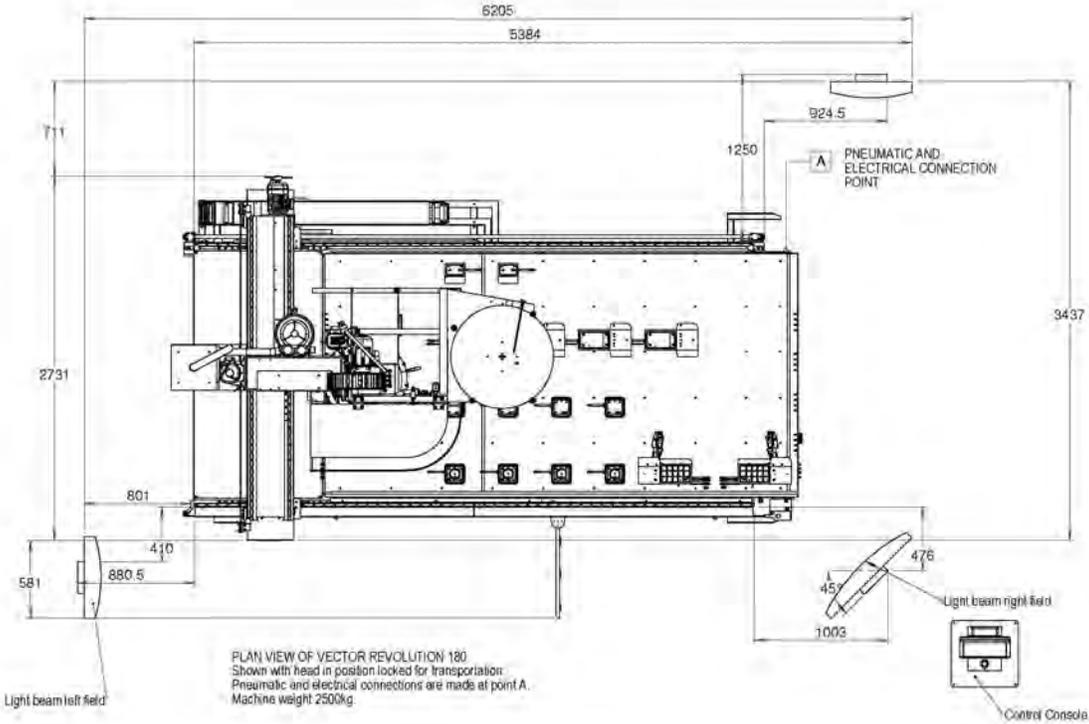
The Tangent machine is used to profile the unfinished corners which result from through-feed edgebanding. The cutter unit is mounted in a rotating suspension system and is controlled by a copy bearing and tracer pin.

For admissible working dimensions, see section 1.5 . Any other use is deemed incorrect. The manufacturer cannot accept liability for resultant damage. The user shall bear the risk alone.

1.4 Machine Dimensions

MODEL	VECTOR <i>Revolution 180</i>
WIDTH	2606mm
HEIGHT	2450mm
LENGTH	4600mm





1.5 Working Dimensions

CAUTION !

Pay attention to the restrictions for the working dimensions. See chapter - Technical Data - for the related operating instructions.

Model	VECTOR Revolution 180	
Workpiece thickness	min (mm)	16
	max (mm)	36
External radius	min (mm)	20
Internal radius	min (mm)	50

1.6 Connected Load (Basic machine + units)

(For total connected load of machine, see serial plate)

Model	VECTOR Revolution 180	
400V 50Hz Power (kW)	Machine	0.6
	Vacuum Pump	2.5
Control Voltage (V)	24VDC	

1.7 Ambient Conditions

1.7.1 Electronic Devices

Operating Temperature	5° to 50°
Storage Temperature	-10° to 50°

1.8 Compressed Air

Model	VECTOR Revolution 180
Compressed Air	
- Operating pressure	6 bar (6x10 ⁵ Pa)
- Limit Pressure	8 bar (8x10 ⁵ Pa)
Connection	1/2" BSP female thread

2.1 Symbol and explanation of directions

DANGER !

You will find this symbol next to all working safety directions given in these instructions for use that concern risks to the health and safety of personnel. Take note of these directions and be particularly careful in such cases. Pass on all working safety directions to other users. The generally valid rules for working safety and accident prevention shall be followed in addition to the directions stated in these instructions.

CAUTION !

The CAUTION! Appears in these instructions at those points which must be particularly noted in order to comply with the guidelines, specification, directions and correct sequence of operations, and to prevent damage and destruction of the machine/unit and/or other machine parts.

NOTICE

Text marked "NOTICE" provides technical information for the best and most efficient use of the machine/unit.

The abovementioned advice applies only to the section immediately following the notice.

2.2 Definitions

2.2.1 Correct use

By correct use is meant use in accordance with the manufacturer's specifications, or the use that can be regarded as conventional given the design, construction and function of the machine/unit.

2.2.2 Residual risk

Residual risk is a risk which is, despite all precautionary measures, unavoidable, inherent to the use of the machine/unit, and not obvious.

2.2.3 Expert personnel

Experts are persons who by dint of their professional training and experience have adequate knowledge in a specialised field and are familiar both with the relevant working safety and accident prevention regulations and with general rules of technology.

2.2.4 Proficient personnel

Proficient personnel are persons instructed by an expert in the duties entrusted to them and in the risks involved by incorrect actions, and informed about necessary safety features and protective measures.

2.2.5 Qualified personnel

Qualified personnel are persons who are expert or who have been sufficiently instructed.

2.2.6 Protective clothing, goggles and heat protection gloves

Protective clothing is personal protective equipment intended to protect the body from the residual risks entailed by the working process.

Responsibility for ensuring that the protective equipment conforms to equipment safety legislation lies with the user. When personal protective equipment is used is regulated by the relevant accident prevention regulations

Protective clothing must not in itself be apt to cause accidents. It must be made as close-fitting as possible

Protective goggles protect the eyes and the area surrounding them. They must be suited to the degree of danger expected to be encountered and should comply with the relevant safety regulations.

Heat-insulating gloves are specially made to protect the hands from thermal influences, especially heat by radiation and/or conduction by contact

2.3 Working safety directions

This machine/unit has been manufactured to the state of the art and is safe to operate. However, this machine/unit can be dangerous when operated incorrectly or used for the incorrect purpose by untrained personnel.

Use for the correct purpose also assumes compliance with the manufacturer's specifications regarding assembly, dismantling and reassemble, putting into service, operation and maintenance.

Every employee in the user's company involved in assembly, dismantling and reassemble, putting into service, operation and maintenance (inspection, servicing, repair) of the machine/unit must have read through and understood the complete operating instructions and in particular the "Safety" chapter. Employees not proficient in the language of the instructions must have the latter explained to them until they are fully comprehended. The user is recommended to have this confirmed in writing.

This machine/unit must only be operated, serviced and repaired by authorised, trained and proficient personnel. This personnel must be specifically told beforehand about the risks occurring. The responsibilities of the personnel for assembly, dismantling and reassemble, putting into service, operations and maintenance must be clearly defined and complied with in order to rule out any uncertainty regarding competence for safety aspects.

For all operations affecting assembly, dismantling and reassemble, putting into service, operation, readjustment, adaptation and maintenance, the shutdown procedures specified in the operating instructions must be complied with.

All procedures impairing the safety of the machine/unit must be refrained from.

The operator must help to ensure that no unauthorised personnel use the machine /unit.

The operator **undertakes** to report immediately any changes occurring at the machine/unit that affect safety.

The user must undertake to operate the machine/unit only when it is in fault-free condition.

The user's factory must ensure that the machine/unit workplace is kept clean and unobstructed by means of appropriate and checks.

Unauthorised conversions and modifications affecting the safety of the machine/unit are not permitted.

No work must be carried out on the machine/unit unless it is at a standstill.

Before starting work on the machine/unit, its drive units and additional features must be safe against inadvertent switch-on, for example by a padlock on the master switch.

Remove the safety equipment only when the machine has come to a standstill and the master switch has been secured.

Before starting, check whether all safety equipment is in place.

The load-carrying capacity of the lifting gear to be installed must be at least sufficient for the weight to be lifted.

After electrical fitting or repair work, the safety measures taken must be tested (e.g. earthing resistance)

The local safety and accident prevention regulations shall apply in any event for the operation of the machine/unit.

Ear protectors must be worn when the work involves a lot of noise.

Never reach into the machine/unit while it is in operation, nor behind panels, between the support table and the perspex front cover or into obscured areas.

Always comply with

- the pertinent accident prevention regulations
- the generally accepted technical safety rules and traffic regulations
- Country-specific regulations

2.4 Protective devices

The provision of safety hoods prevents the user from any danger of accident through contact with rotating tools.

Electric interlocks prevent incorrect operation.

EMERGENCY-OFF facility

2.5 Residual risks

Our machines harbour residual risks that are unavoidable despite the care taken in their design and manufacture, and that are inherent to operation of the machine.

DANGER !

Residual risks are:

Area around the trimmer unit.

Area around the end trimming unit.

In both instances, safety tools have been used which minimise the danger. Similarly guarding is provided which protect the operator from exposure to danger. However, it is important for operators to be aware of the dangers which exist around these two areas. Access to these areas should never be made when the machine is running.

The movements of the operating arm and axes is limited to below 25m/min minimising any risk of injury from this movement. A safety pull wire runs around the entire machine enabling emergency stopping in the event of danger.

However operators must be aware of the danger posed by the drive systems.

The design of the gluing system ensures there are minimal exposed areas providing risk of burning. However, with any hot melt glue, there is a risk to the operators from the glue itself which has a large thermal capacity and potential to burn deeply. It is recommended that insulating gloves are used when cleaning the glue system.

In the event of burns, run under cold water for at least 10 minutes and seek medical advice.

Even when the main isolator is switched off,

- the covered mains input terminals are still live,
- the pneumatic installation is still under pressure.

Exceeding the limiting pressure for pneumatic hoses.

Shattering of the air filter drain bowl (normally enclosed in rear core) if affected by substances such as cleaning fluids (see manufacturers recommendation supplied with this manual).

Noise and dust emission.

Oak and beech dust are under suspicion of causing cancer of the nose. Since these timbers can be worked using this machine/unit, the provisions of the German regulations governing hazardous substances dated 26.08.1986 must be met, As a general principle, the machine/unit must never be operated without a dust extraction system. The factory extraction system must be rated such that the air speed at the connection to the machine is at least 20 m/s.

The manufacturer of this machine shall not be liable for risks arising from the use of other agents (such as lubricants or cleaners) or from hooking up the machine to machines or products made by other manufacturers.

Protect yourself by wearing effective protective clothing.

Do not wear rings, chains, wristwatches or the like.

Long hair must be kept under a hair-net.

2.6 Emergency measures

2.6.1 General information

DANGER !

In an emergency, the machine should be isolated from the mains by switching off at the main isolator or by activating the EMERGENCY OFF device or other safety facilities which result in the isolation of the machine from the mains.

Before switching on the machine again, the malfunction should be corrected by qualified personnel.

2.6.2 Fire hazard

Fire fighting and extinguishing equipment to suit the size of the workshop or factory should be available and in usable condition to deal with a possible fire. Their readiness for use must not be impaired by atmospheric condition, vibrations or other external influences.

Hand-operated fire fighting equipment should always be kept within easy reach. If the fire fighting system is not automated or centrally activated, all locations where fire fighting equipment is available should be permanently marked.

2.6.3 First aid

The user is responsible for:

1. Provision of the facilities required for first aid measures, especially reporting facilities, stretcher, first aid facilities and equipment, as well as resuscitation equipment.
 2. Provision of equipment required for the purpose of saving life and health of affected personnel especially rescue and recovery facilities.
 3. Provision of trained first aid personnel to assist in cases where life or health is threatened.
 4. Making sure that first aid is available immediately and that the injured may be taken into medical care if necessary.
- All locations where first aid, resuscitation and/or stretcher facilities are available should be clearly and permanently marked.

3.1 Introduction

- This information has been written to be read, understood, and complied with in every respect by all personnel responsible for this machinery.
- The complete technical documentation must be kept at all times in the vicinity of this machine/unit.
- These instructions make special reference to particularly important details of the use of the machine/unit.
- Faults in the machine/unit can be avoided and trouble-free operation ensured only by familiarity with these instructions. For that reason, it is very important that these instructions are understood by the personnel responsible.
- We recommended that these instructions be read through carefully before the machine is operated, since we cannot accept any liability for damage and operating problems resulting from non-compliance with these instruction.
- If difficulties are nevertheless encountered, please contact our after-sales service department or one of our representatives, who will only be too glad to help.
- These instructions relate only to the machine/unit detailed in the Specifications.
- The right is reserved to make technical modifications to what is described and show in these instructions, if such modifications are necessary for improvement of the machine/unit.
- When the machine/unit has been customised, the description and the drawing may diverge from what is set out in these instructions for use. We do however attempt to enclose separate information with the instructions for use in the case of special versions.

3.2 Application

- This machine/unit is only rated for the application range stated in the specifications.
- Before the machine/unit is used outside its agreed application (see specifications), the after-sales service of Robertson and Sinclair Ltd must be consulted, otherwise the warranty shall no longer apply.

3.3 Copyright

The copyright to these instructions for use shall remain with Robertson and Sinclair Ltd. These instructions are intended for the assembly, operating and maintenance personnel. They contain regulations, photos and drawings of a technical nature that shall not be duplicated, distributed or used for the purposes of competition, nor communicated to third parties, without authorisation, whether in their entirety or in part.

3.4 Address

PO Box Address

Vector Systems Ltd
P O Box 78-331
Grey Lynn
Auckland
New Zealand

Email info@vectorsystems.co.nz
Telephone +64 9 950 4791
Fax +64 9 950 4792

3.5 Warranty

Our general terms of business shall apply with regard to warranty.
Spare parts are available either from your dealer or from the manufacturer.
Only genuine VECTOR spare parts may be used in VECTOR machines for warranty reasons.

4.1 General instructions

When the machine arrives please check both the packaging and the machine itself. Note down any damage in the presence of the forwarding agent; if the machine proves to be damaged in any way not recorded in the forwarding agent's documents, we must assume that the machine was damaged on site, which automatically rules out any claim for damages.

4.2 Space requirement

Please refer to the Specifications chapter for the machine dimensions. Please ensure when selecting the location site that it offers good accessibility to the machine from all sides.

Choose the machine location with a clearance between the side of the unit and the wall that allows the safety hood to be opened, and adjustment and tool resetting work on the units to be performed without hindrance. Select the clearance on the intake and discharge sides and on the lengthways operator's side on the basis of your biggest possible workpiece.

4.3 Setting up area

No foundation is necessary when the setting up area has a sufficient load-bearing capacity. The setting up area must be flat to allow levelling of the machine.

4.4 Sensitivity

When moving the unit, particular care must be exercised to prevent damage due to rough handling or carelessness when loading and offloading.

Depending on the type and duration of transport, appropriate transport safety devices are provided.

During transport, condensate formation due to high temperature fluctuations must be avoided, as well as all knocks.

The machine/unit itself must be treated with the usual care.

4.5 Ambient conditions

The temperature in the operating area should be at least 10°C to ensure consistent operation of the pneumatic/hydraulic components.

4.6 Transport routes

Check the load-bearing capacity of the floors along the transport routes. The doorways must be at least 20 cm wider than the machine units.

4.7 Interim storage

If interim storage of this machine/unit is necessary directly after delivery, it must be stored carefully at a protected spot, and also covered properly to keep out dust and moisture.

4.8 Cleaning

When the transportation time is greater than 2 weeks, the machine/unit is supplied with a preservative coating on its bright metal parts that will protect them for one year. If storage is for longer than this period, renewal of the preservative coating is necessary.

Clean the bright parts with diesel or paraffin and a soft cloth.

DANGER !

Do not use petrol or thinners! Danger of explosion!

4.9 Transport from packaging to location

4.9.1 Transport means

This machine is delivered partially disassembled and in a container for overseas delivery.

Please provide suitable handling equipment for offloading and conveying the machine to the storage area or assembly location. Please refer to the enclosed order sheet for the load-bearing capacities of the handling equipment.

A fork-lift or crane must be used, and lift trucks or conveyor rollers (reinforced types) are also suitable for conveying the machine to its location.

Please have the transport routes cleared before the machine is assembled and commissioned, so that the whole procedure can be completed without hitches.

4.9.2 Offloading

When shipped in a container, it is first necessary to pull the machine from the container. This can be done using a crane, forklift or similar.

The machine should first be untied. It is fixed in the container using 2 x 2500kg tie down straps (4) Fig 2. These are looped through the horizontal cross supports on each end of the machine and tied out to each corner hook point in the container. This provides lateral and fore – aft location for the machine during transportation. (The reverse process should be followed if re-transporting the machine).

In addition, the machine has 4 guide bars (1) Fig 1 (one on each corner of the machine) which guide the machine into and out of the container and also prevent any lateral movement of the machine during transportation in the container.

Fig 1



Fig 2



The machine should be pushed between 500 – 1000mm into the container clear of the doors so as to give the straps a good purchase.

At the rear of the container, three straps are used. One ties from the rear left of the container, forward and across behind the rear horizontal cross-member and looping back to the corner tie point.

The machine can be pulled from the container using the strop (4) which can also be used to support the end of the machine as it comes out through the container.

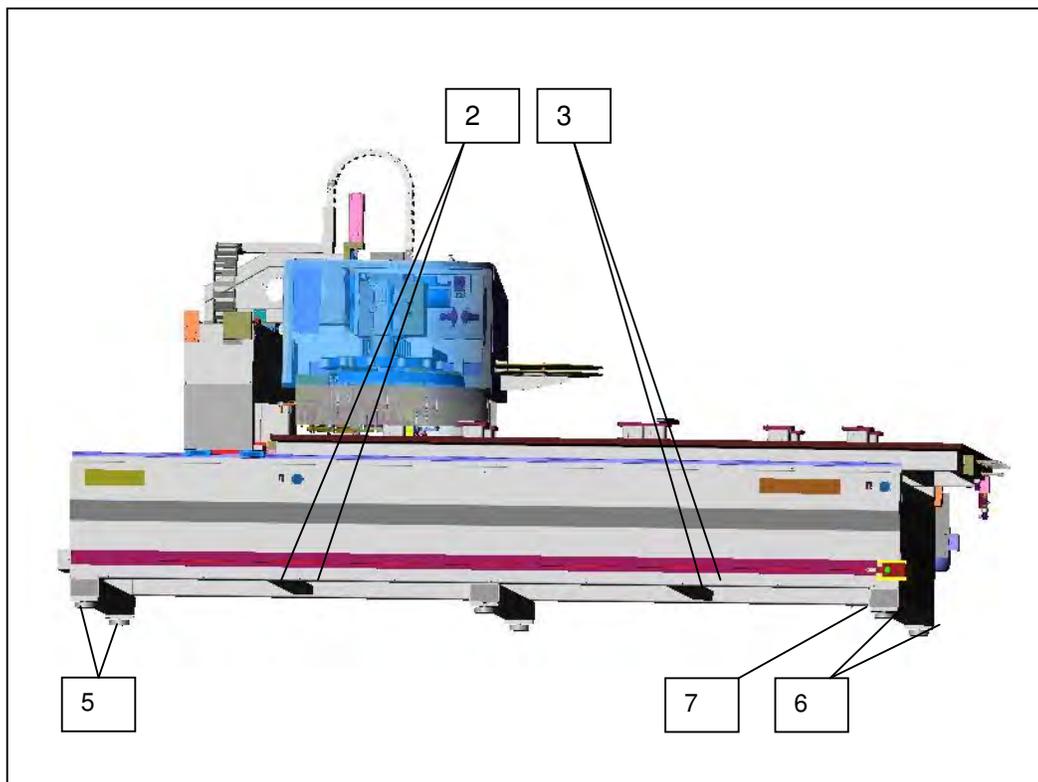
CAUTION !

The centre of gravity of the machine is at the outer end of the machine. Keep supported at all times.

It is preferable to jack the machine up onto suitable rolling skates to facilitate easy removal from the container.

The machine guide bars (1) will serve to keep the machine aligned as it is pulled from the container.

The machine can now be pulled further from the container until such time as the lifting points (3) are revealed. At this point, if a crane is being used, a second set of strops can be affixed enabling the entire machine to be lifted facilitating easy removal of the machine from the container.



When the machine is sufficiently removed from the container, it is recommended that it is lowered onto rolling elements or alternatively supported while crane strops are fixed under the outer lifting points (2).

DANGER !

Make sure that the machine does not tilt!

When lifting by crane, it is recommended to use 4 equal length fabric strops which should be looped through the frame in the four points indicated (2) and

(3). The strops should be drawn as high as possible above the machine so as to ensure no contact with any part of the arm and aggregate.

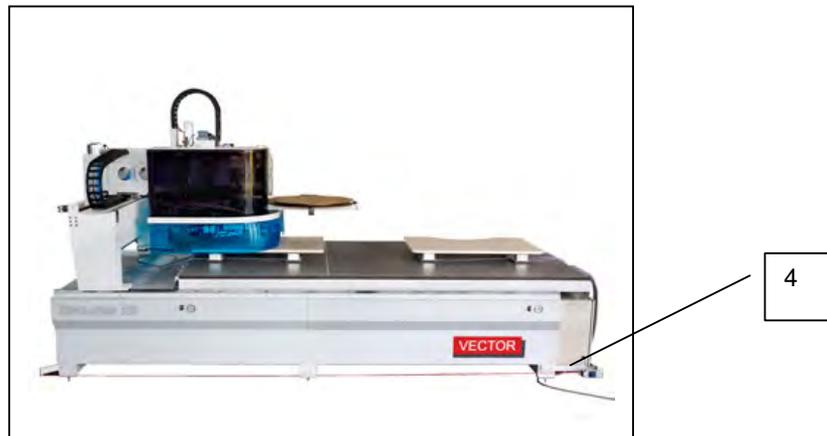
All additional components including the control console are tied onto the top of the machine so will be removed when the machine is removed.

CAUTION !

Care must be taken to ensure that the strop is not hooked around any of the cables, hoses or switchgear. It is also important that the strops do not pull against any part of the working head.

A block of wood or similar should be wedged under the strop as it loops up over the front cover so as to prevent damage to the covers and switchgear.

Care must also be taken when removing the machine finally from the container that it does not drop down onto the control cabinet which is affixed to the end of the machine and is not designed to support the machine.



A suitable forklift may also be used.

The fork-lift truck must have a load-bearing capacity sufficient to take up the weight of the machine (see Specifications on the order sheet) and ensure the forks do not crush any cables or hoses which pass underneath the frame of the machine.

Fork extensions should be used if necessary to ensure the forks safely extend beyond the furthest lifting point.

Please remember that this is a piece of precision machinery - so avoid knocking or abruptly lowering the machine during all handling operations. Do not carry the machine by its functional parts.

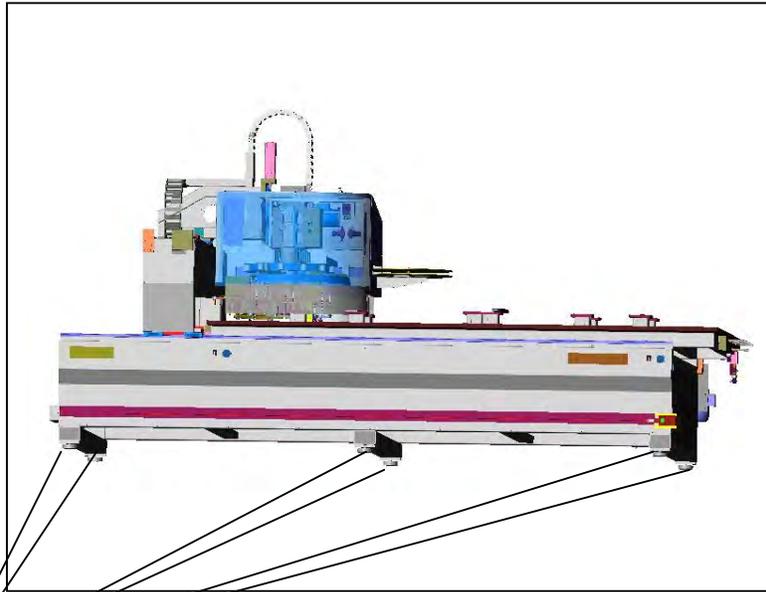
If a forklift and/or skates are being used, when the feet (6) are almost out of the container, the forklift can be brought in from the side to lift the entire machine and carefully negotiate the machine out of the container.

Alternatively the machine can be jacked onto skates positioned at (7) and rolled clear.

When transportation is by truck, it is recommended that the machine be lifted from the truck using a crane.

4.9.3 Levelling

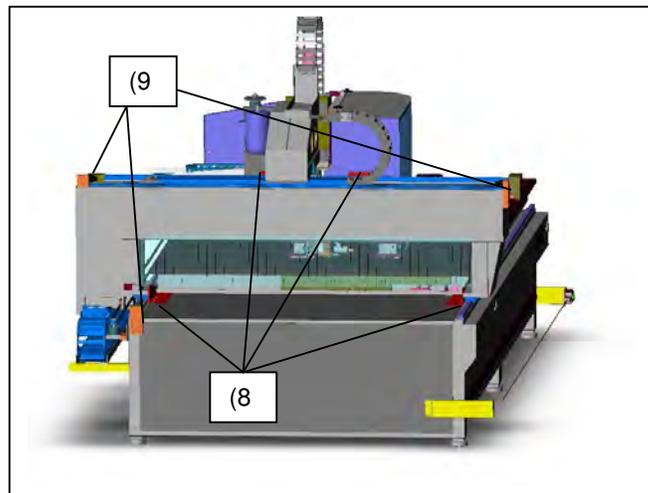
Level the machine using the six feet.(1).



(1)

DANGER !

The machine is transported partially disassembled. Do not remove any of the axis fixing brackets (8) until the travel limit brackets (9) are fitted! Refer Section 5



Assembly

5.1 General Instructions

We strongly recommend that you have assembly work on this machine/unit (for example after spare part delivery) performed by authorised and qualified after-sales service personnel. We cannot accept any liability for damage resulting from incorrect action.

The Vector Revolution 180 contour edgebander machine is usually supplied partially disassembled. This is to facilitate fitting the machine into the transport container.

5.2 Machine Assembly

5.2.1 Re-fitting of components removed for transportation

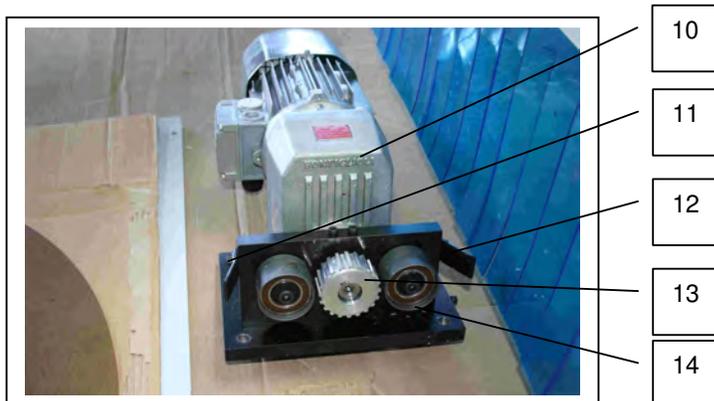
The following items are removed for the purpose of transporting the machine in a container. This is due to the limitations in width of the container. In the event that the machine is to be transported in such a way that the width limitations of a container are not present, it is not necessary to remove any of these components.

- X Axis Drive Motor
- X Axis Cable Chain and support
- Rear X Axis drive belt fixing
- X Axis counter
- X Axis Positive and Negative Limit Switches.
- Emergency Stop Pullwire
- Tape coil support
- Front and rear Y-Arm Covers

Re-assembly of these is as follows:

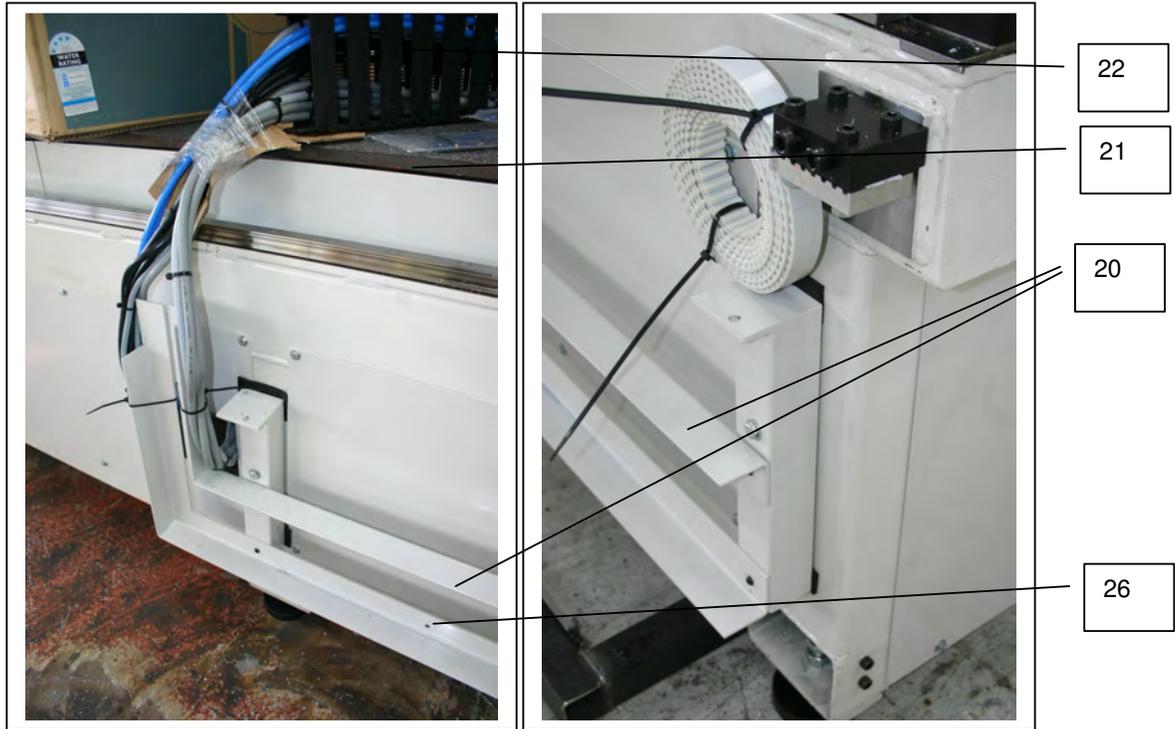
5.2.1.1 X Axis Drive Motor

The X axis drive motor is removed for transportation. It consists of the drive motor (10), mounting plate (11), belt wipers (12) and drive (13) and idler pulleys (14).



5.2.1.2 X Axis Cable Chain and Support

The X Axis cable chain support (20) should be unbolted from it's transportation position on the rear of the machine. A plastic bag contains the bolts used to fix it to the fixing points on the rear of the machine.



The X axis cable chain (22) must be removed from it's transportation position on top of the work surface (21) and fitted. It is critical when installing this that it is rolled in the correct direction off the table so as not to wind a twist into the cables. If on rolling into position, the cables do not sit easily and without tension, then reverse the process in the same direction back onto the table and then roll over again but in the opposite direction.

The X cable chain (22) is fixed to the cable chain support (20) via two fixing holes (26) at the left hand end and via the mounting bracket (25) on the motor mounting plate.

The Electrical Box D (23) is mounted to the rear of the Y arm (24) with the screws provided. See image on next page.

CAUTION !

Care must be taken to ensure the cables are not twisted and do not get pinched as these assemblies are fitted.



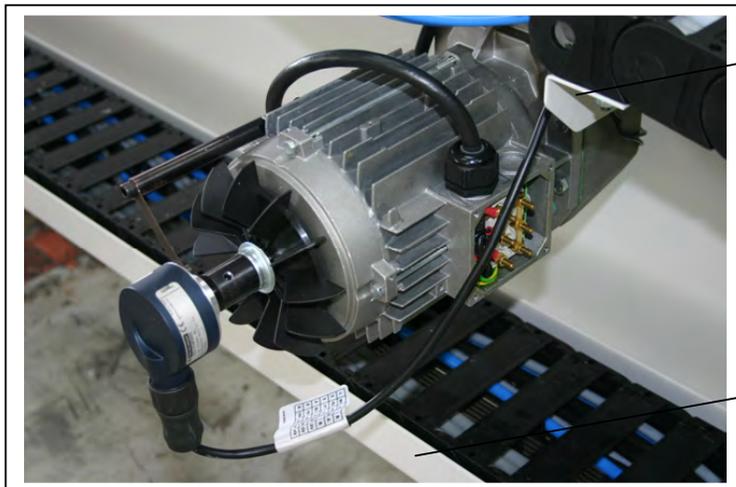
24

23

25

22

20

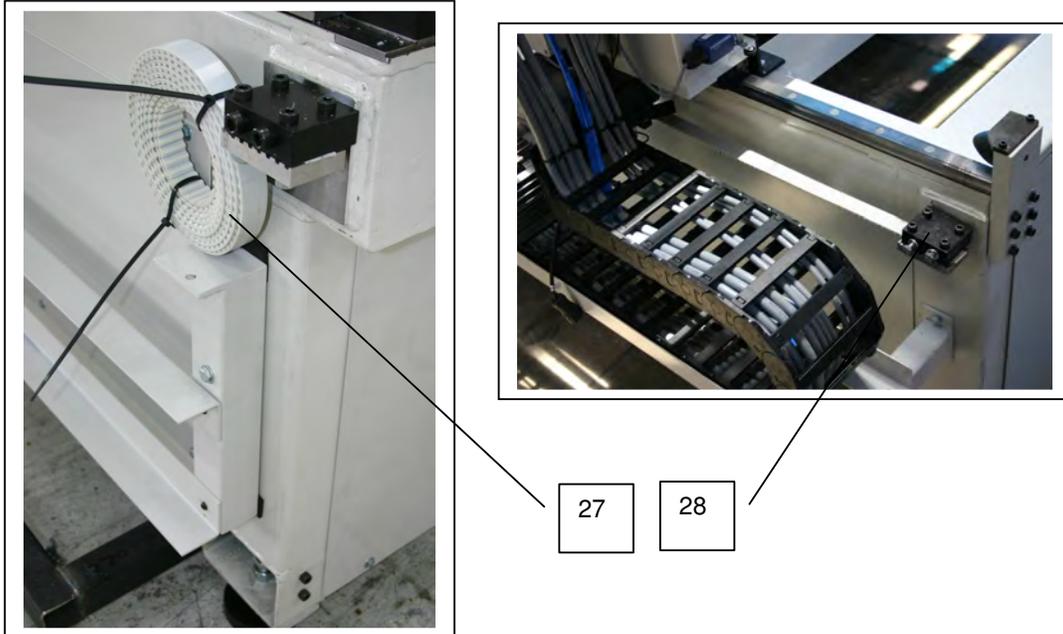


25

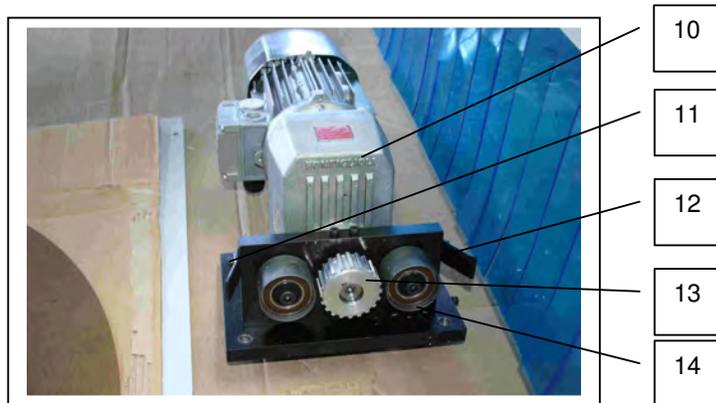
20

5.2.1.3 Fitting X Axis Drive Belt

The X Axis drive belt (27) can now be fitted. It remains connected to the X –ve belt clamp (28) at the end of the machine during transportation and should be unrolled and aligns in a tooth down orientation.



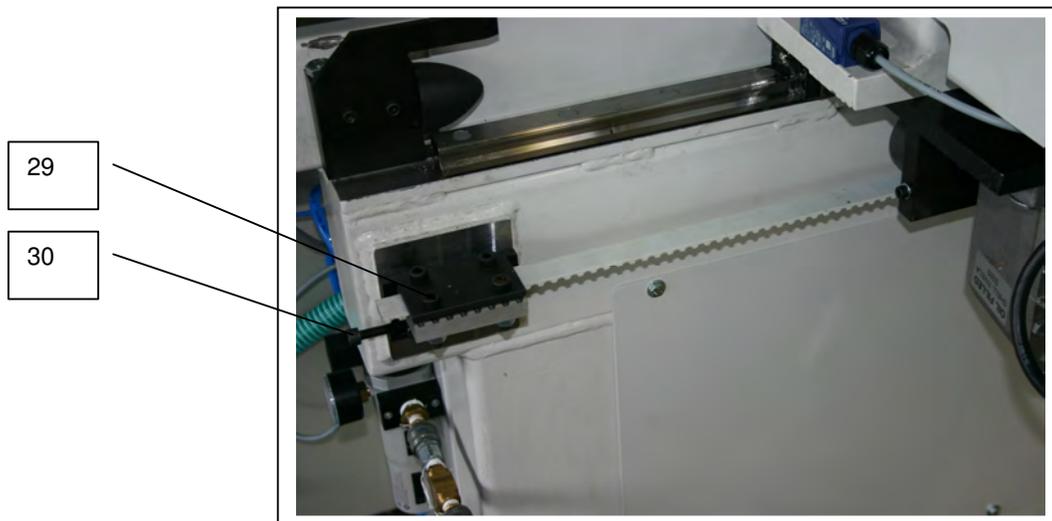
The belt can then be rolled along the length of the machine and fed through the pulleys of the motor. The belt is fed onto the rollers sideways running under the idler rollers (14) and up over the toothed pulley (13). The toothed pulley (13) can be rotated by hand or by pulling on the belt.



NOTE: It is important to ensure the belt is engaging correctly into the toothed sprocket with one belt tooth per sprocket tooth. Failure to do this will result in damage to the belt.

Now the fixing bracket (29) at the left hand end can be fitted and the belt tensioned. This is achieved by loosely fixing the bracket and then tensioning is achieved by winding the adjusting screw (30) at the left hand end until the belt is tight.

The belt tension should be such that the belt stretches 10mm. This can be measured by adjusting the clamping block so that the belt is pulled straight but not tight. Note the clamping block position. Now adjust the adjusting screw until the block has moved 10mm. This is the correct tension.



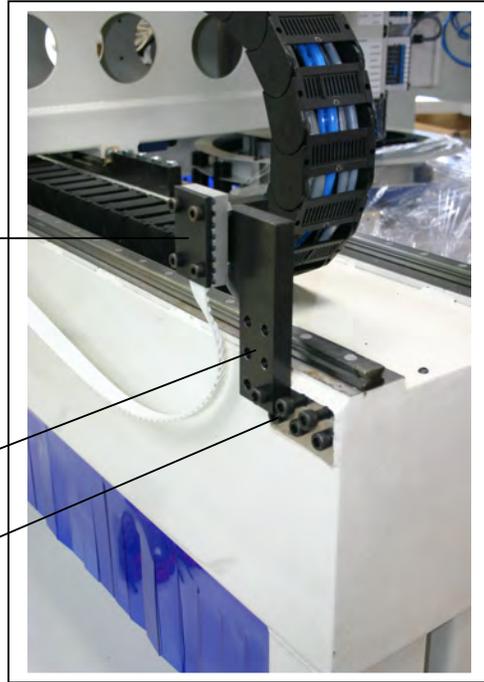
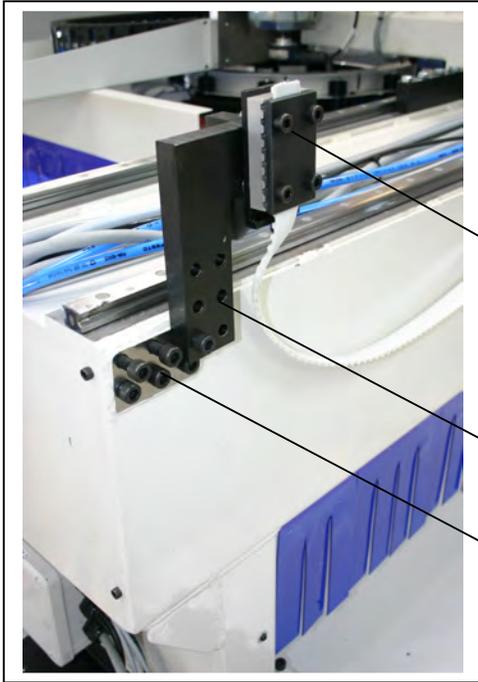
NOTICE: In the first weeks of operation, the timing belts of both axes may need re-tensioning due to some initial stretch in the belts.

5.2.1.4 Fitting Y Axis Drive Belt

The Y Axis drive belt is transported assembled but un-tensioned. The end fixing and tensioning brackets (32) for the Y Axis belt are released and re-positioned for transportation so as to allow them to fit in the container.

Simply release the fixing socket head screws (31), turn the belt clamp support brackets (32) down into the horizontal position and tighten firmly.

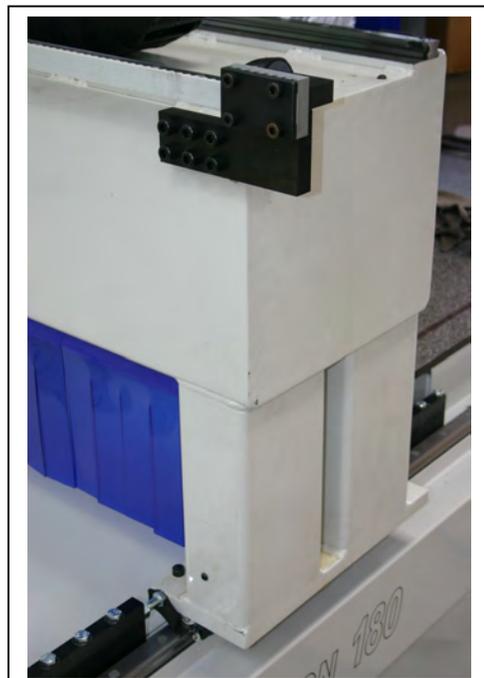
The front belt clamp (33) has an adjusting screw for tensioning the belt. The belt clamping bolts should be just loosened and the adjusting screw tensioned so that the belt has 10mm of stretch as per the procedure in 5.2.1.3 for the X axis tensioning.



- 33
- 32
- 31

Y Axis belt fixing rear end.

Y Axis belt fixing front end



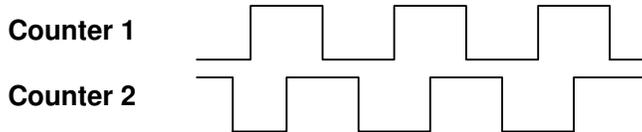
Y Axis belt fixing in position

Y Axis belt fixing front in position

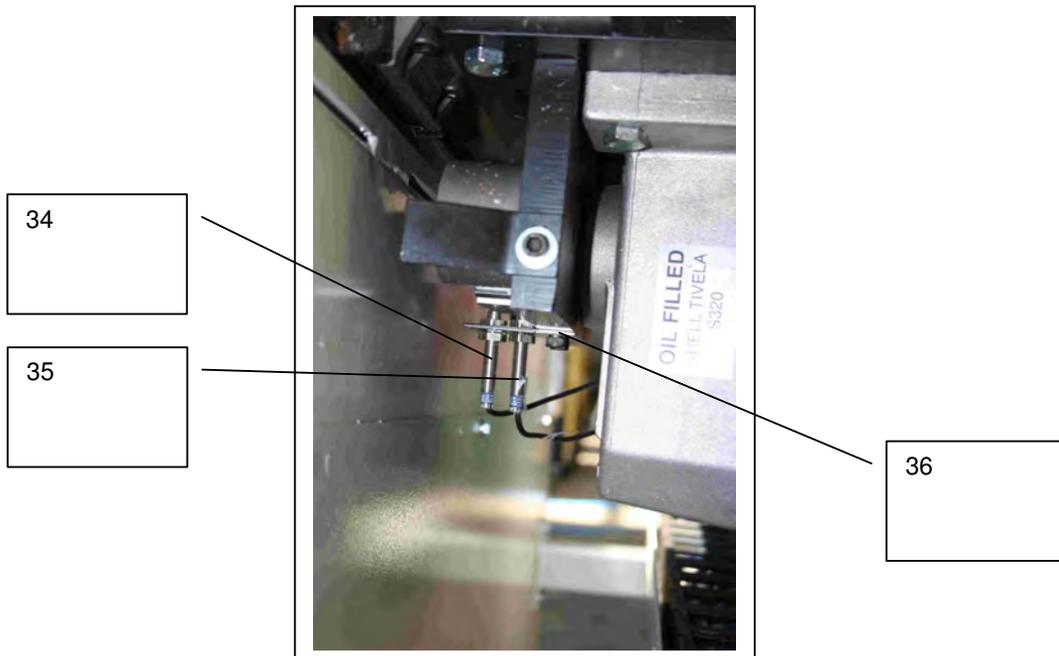
5.2.1.5 Fitting X Axis Counter

The X Axis counter which is still connected to the electrical box can now be fitted. This consists of 2 proximity switches which are aligned to measure off the teeth of the pulley. They count in a quadrature pattern (up, up, down, down) so that they up and down count.

Counting pattern:



These counters (34 + 35) are mounted on a bracket (36) and are factory set. These are bolted to the bottom of the mounting plate for the pulleys. It is essential to check that they are functioning correctly when the power is on the machine. The counting pattern is important as well as checking that the proximities count on every tooth. There are 20 teeth per revolution of the drive pulley. There are LED indicators on the proximities to indicate when they are ON.



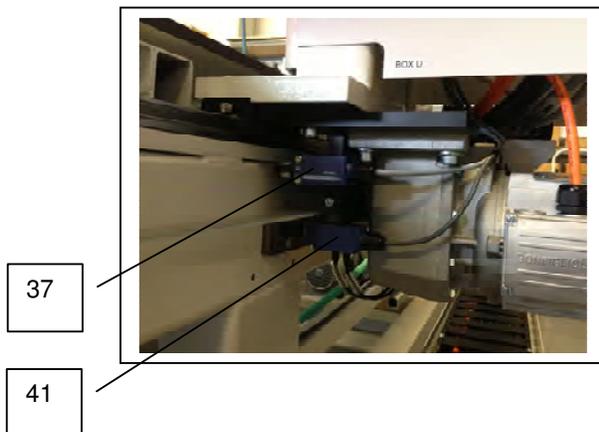
In the event the counter is reading in the wrong direction (as per the control screen [15]), the counters can be reversed in the electrical box – refer wiring diagram).



15

5.2.1.6 Fitting X Axis Positive and Negative Limit Switches

The X and Y axis positive (37) and negative (38) limit switches and the crossover switch (41) can now be fitted.



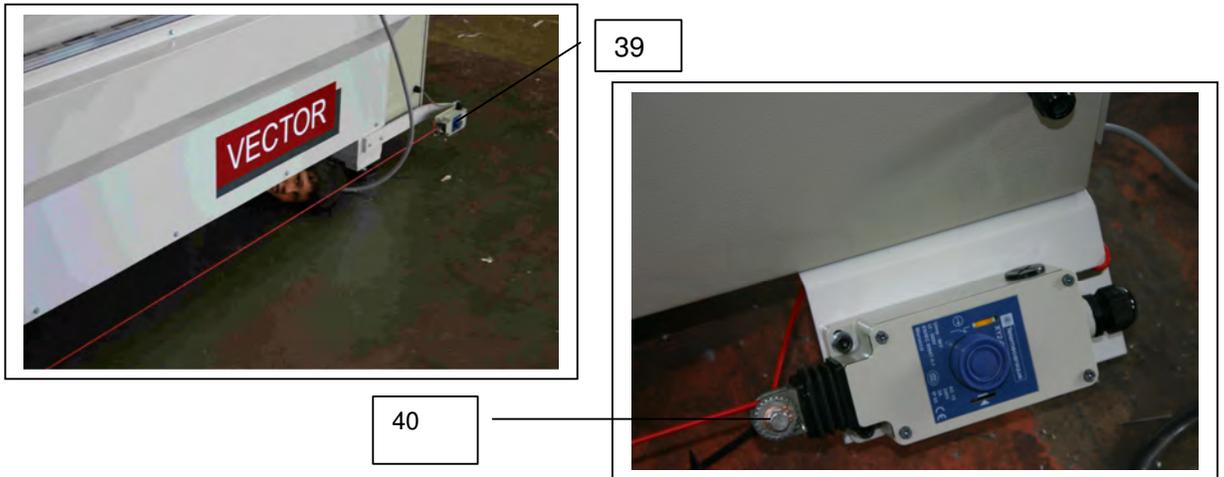
These switches have label markings to identify them.

5.2.1.7 Fitting the Emergency Stop Pullwire

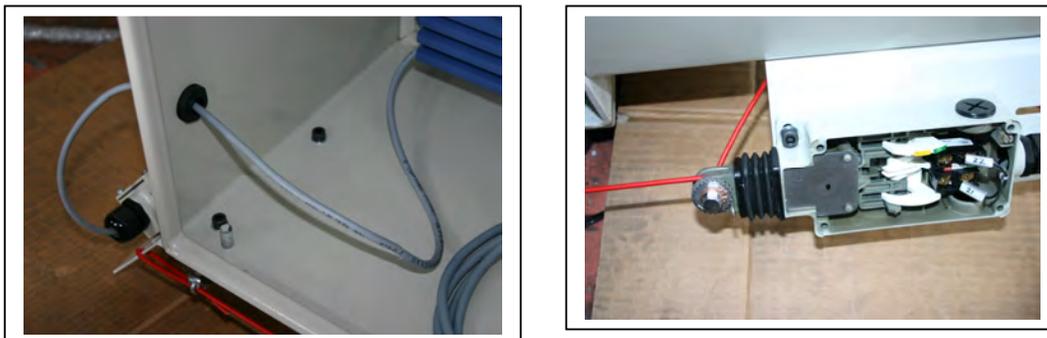
The emergency stop pullwire brackets must be fitted to each corner of the machine and the pullwire strung around and tensioned so that the switch locks when the reset button is pushed as indicated by a green band through the indicator lens.

NOTICE: The pullwire extends all the way around the machine and connects back onto the plate which supports the switch mechanism. Ensure the wire is sitting correctly in each pulley and test the operation.

Adjustment is by means of the ratchet drive (40) on the head of the unit.
 Note the switch will trip off either through over or under-tension, thus protecting against a wire breakage.

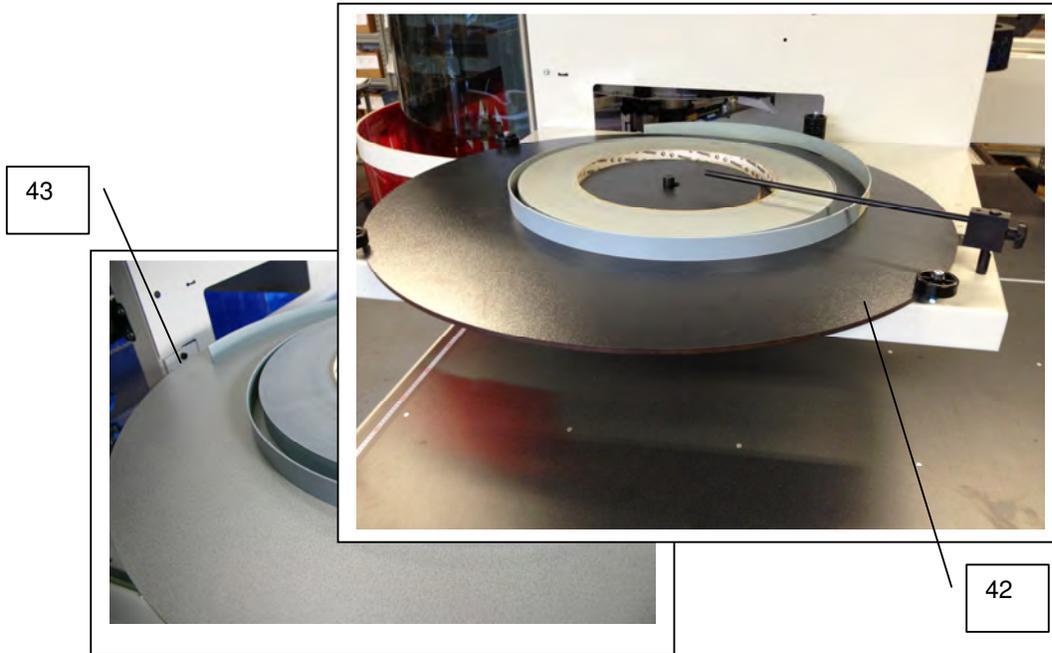


The cable for the emergency stop pullwire is inside already mounted in a gland (41) protruding from the control cabinet. This should be wired into the terminals as marked on the wires using the normally closed contacts 21 and 22.

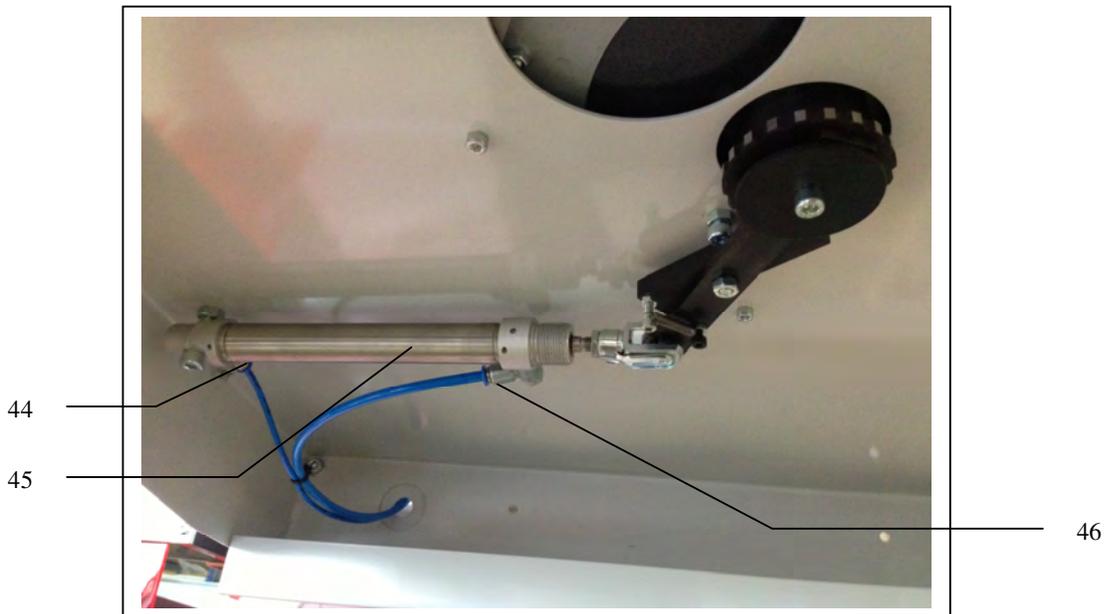


5.2.1.8 Fitting edgeband coil support

The edge-band coil support (42) is fixed to the side of the cover guard for the head using the screw at point (43).

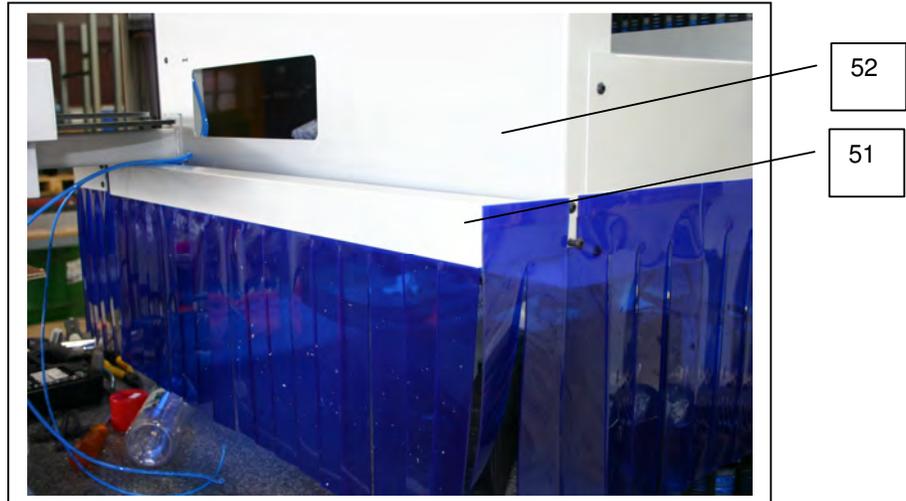


Run the pneumatic hoses which protrude from the side of the cover guard, through the cable ties and connect as per the pictures below. The hoses are 2 different sizes (4 and 6mm) so cannot be confused when installing.



The 4mm diameter hose (44) connects to the rear of the actuating cylinder (45) and the larger diameter 6mm hose (46) connects into the rod end of the cylinder (45). The Cylinder extends and retracts to drive a ratchet which rotates the tape coiler.

The side curtain (51) is also fitted to the side cover (52).



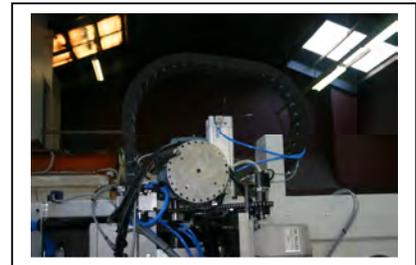
The remaining covers for the front and rear of the Y-arm can now be fitted and also the Z axis cable chain must be replaced (it is released and lowered for transportation to enable it to fit into the container).



Front cover



Rear Cover



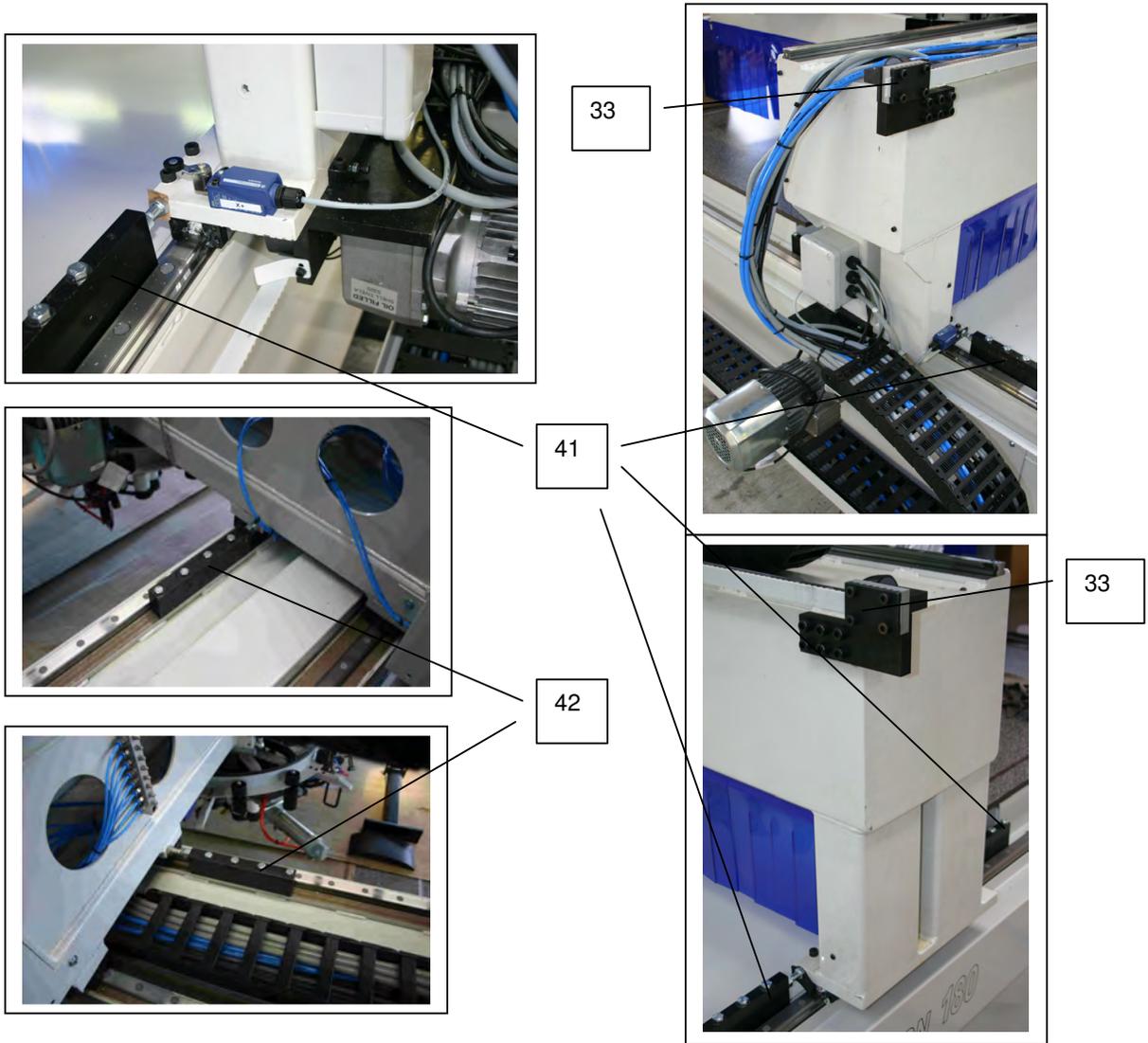
Z cable chain

5.2.2 Removing Axis Transportation Brackets

At this point it is possible to remove the axis transportation brackets after first checking that the axis end limits (33) IMPORTANT!!!

These should be stored for any future transportation requirement.

Brackets are shown below: There are brackets on the X rails (41), either side of the y-arm at the front and rear as well as brackets either side of the head on the y rails (42).



DANGER!

Failure to secure the end stops (33) prior to removing the axis transport brackets could result in death or severe injury due to the head running off the end of the rails.

Once the axis brackets are removed and all electrical connections are made by a qualified technician, it is now possible to connect power to the machine.

5.3 Machine Connections

5.3.1 Electrical

DANGER !

Work on electrical equipment or systems may only be performed by a qualified electrician, or by trained personnel under the direction and supervision of an electrician, in accordance with electrical engineering rules.

CAUTION!

Check that the rated voltage of the machine matches that on the serial plate on the back of the machine.

5.3.1.1 Cross section of connection cabling and input pre-fusing

Full-load current (A)	<16	<21	<30	<40	<55	<76	<96	<120	<144	<184
Connection: H07/RNF cable copper (Cu) Nom. section (mm ²)	2,5	2,5	4	6	10	16	25	35	50	70
Input Pre-fusing (A)	20	25	35	50	63	80	100	125	160	200

CAUTION !

- Comply with local regulations and conditions (such as VDE0100, parts 430 + 523, as well as supply conditions of the power supplier)
- Connect the machine in accordance with the connection circuit diagram.

5.3.2 Pneumatic

- Connect up the compressed air to the ½" BSP fitting on the air service unit
- Working pressure 6 bar (6 x 10⁵ Pa)
- Limit pressure 8 bar (8 x 10⁵ Pa)

NOTICE

The user units (cylinder, valves) are operated by oil-free dry air. Should the units be operated at any time by air containing oil, the air must then always be oil enriched in future.

Ensure the air supply is clean and dry. The filter does not eliminate the possibility of a poor air supply affecting the life of the pneumatic components. Consult your compressor manufacturer if in doubt.

5.3.3 Testing End-Limit Switches

It is important to check that the end limit switches are working properly. This should be done before checking the counters, as the X negative limit switch is also the X Axis zero reset for the counter.

To test the inputs for the end limit switches, go to the control screen and press the troubleshooting button (16)

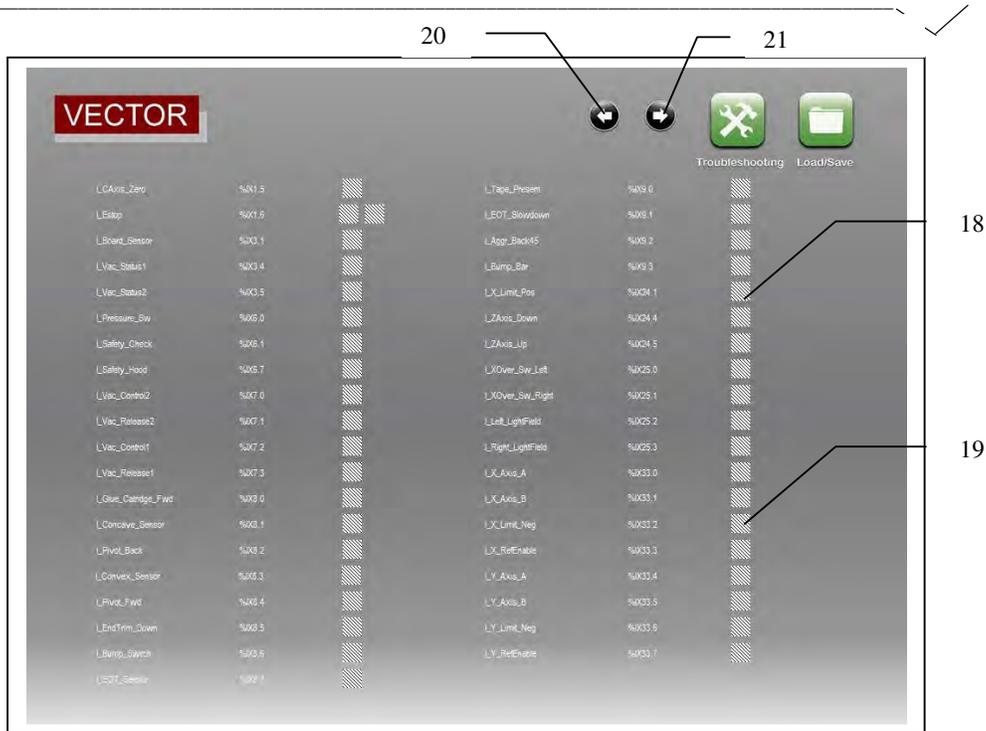


When in the troubleshooting page it is now possible to access the wiring diagrams and inputs and outputs pages using the Wiring Diagram icon (17)



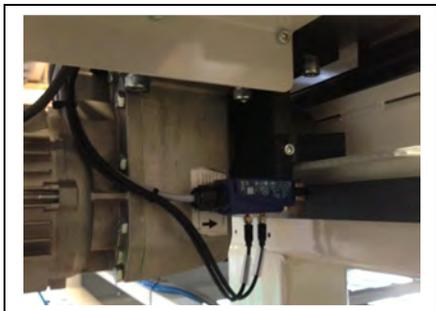
Throughout the wiring diagram and in/out pages, the relevant inputs and outputs are illuminated RED when on and Grey when off.

The image on the next page shows the first page of the wiring diagrams which displays all of the machine inputs. The X Axis limit switches are displayed in positions (18) and (19).



It is possible to move forwards and backwards through the wiring and pneumatic drawings using the forward key (21) and back (20)

Check both X (+/-) and Y (+/-) limit switches



Thus it is possible to activate the switches manually or by pushing the Y arm onto the respective limits to check their function.

IMPORTANT!!! This check must be made prior to performing a GENERAL SET.

5.3.4 Testing axis counting direction.

The counters are tested by viewing the X axis counter on the control screen (refer 5.2.1.5). When the head is pushed (manually) all the way left (viewed from the front) onto the negative limit switch, S33, the counter will automatically zero.

Now by pushing the machine along the machine to the right, the counter should be counting up. By running the machine all the way to the end of the machine in the positive direction until it just activates the positive microswitch, take the reading from the control screen.

Now move the machine back until it almost (but doesn't quite touch the zero switch) and then move all the way back to the right position. Check the number again to ensure no counts have been lost.

Note it is important not to touch the zero switch as otherwise it will re-zero (even if counts have been lost). If counts are being lost, watch the LED's on the counters while slowly moving the head to ensure 20 counts are being made on each tooth and that a good positive quadrature signal is being achieved (it should be a reasonably even spacing between each state change of a proximity).

Perform the same test for both X and Y axes.

5.4 Preparations for no-load tests without workpieces

After assembly, check the following:

5.4.1 Mechanical

Check all visible screw connections for firm seating.

Close the protective hoods.

DANGER !

Attach the necessary protective devices. Clear the machine of any extraneous material (wood, forgotten tools etc.).

5.4.2 Electrical work (provided by others)

Check that the electrical work has been performed correctly in accordance with the customer's and local regulations.

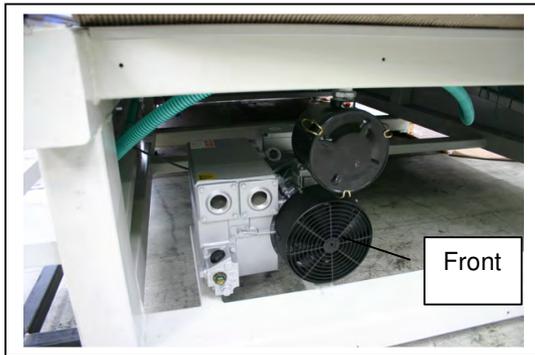
DANGER !

Check and adjust the protective devices

This includes the air pressure switch (30) and emergency stop pullwire

5.4.2.1 Checking the direction of rotation

All motors have been switched by the factory to the correct direction of rotation. To check the direction of rotation for the entire machine, jog the vacuum pump and check the fan direction to match the arrow on the fan cover.



Pump motor rotation clockwise when viewed from front

CAUTION!

If the direction of rotation is wrong, have the main connection corrected by an electrician.

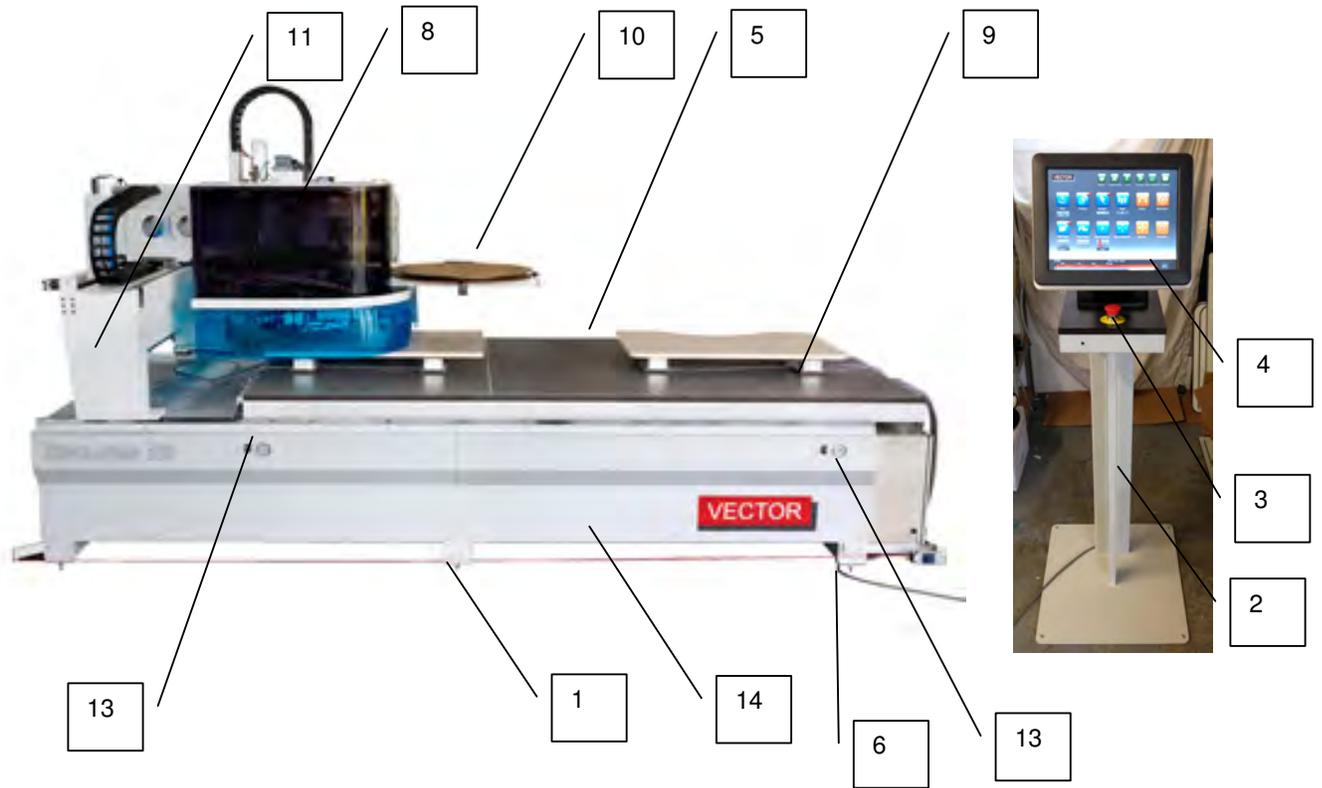
The machine is now ready for operation.

6.1 General Description

This machine is based on years of practical experience and incorporates the results of extensive studies in research and development.

6.2 Design

- | | | | |
|----|-------------------------|----|-------------------------|
| 1 | Feet | 2 | Plinth |
| 3 | Emergency Stop Mushroom | 4 | Control Console |
| 5 | Worktable | 6 | Emergency Stop Pullwire |
| 8 | Aggregate | 9 | Vacuum Pods |
| 10 | Tape Coil | 11 | Y Gantry Arm |
| 13 | Field Controls | 14 | Machine Base |



6.3 Mode of Operation

The VECTOR *Revolution 180* is intended exclusively for the applying of edging materials to pre-shaped panels having been previously shaped by other machines such as CNC machining centres.

The workpiece is placed on vacuum pods which are fixed to the worktable via a vacuum system. The Pods are placed appropriately to provide stable fixing for the panel without interfering with the performance of the machine.

The design is such that the exact positioning of the workpiece is not critical as the VECTOR *Revolution 180* automatically senses the shape of the panel and adjusts accordingly as it progresses.

The VECTOR *Revolution 180* uses the principle of Simultaneous Processing which means that the many different functions of the system are able to operate concurrently. For example, the tape coil and feed, gluing, pressing and trimming processes all occur at the same time.

7.1 Control fields / control elements



7.2 Definition of control elements

- | | | | |
|-----|----------------------------|-----|--------------------------------|
| 730 | Back to home page | 711 | Troubleshooting |
| 710 | Vacuum pump control | 713 | Functions page access |
| 712 | Z Lift (after em stop) | 715 | Load/Save page access |
| 713 | Start with glue off | 717 | Trimmer control |
| 716 | Scraper control | 719 | Start positions setting access |
| 718 | Glue control | 721 | 360 Panel Yes/No |
| 720 | Panel types setting access | 723 | C Axis manual control |
| 722 | Feed controls access | 725 | Move to position |
| 724 | Start/Pause cycle | 727 | Manual end cycle |
| 726 | Joystick control | 729 | Axis count status |
| 728 | Reset alarms | | |



731

By touching the control screen below each icon (732) it is possible to enter the advanced controls page for that icon.
 For example, by touching on the words GLUE below the Glue icon, it will open the page Advanced Controls Glue.
 The description of the Advanced controls functions is detailed in section 9.0

730

732

733

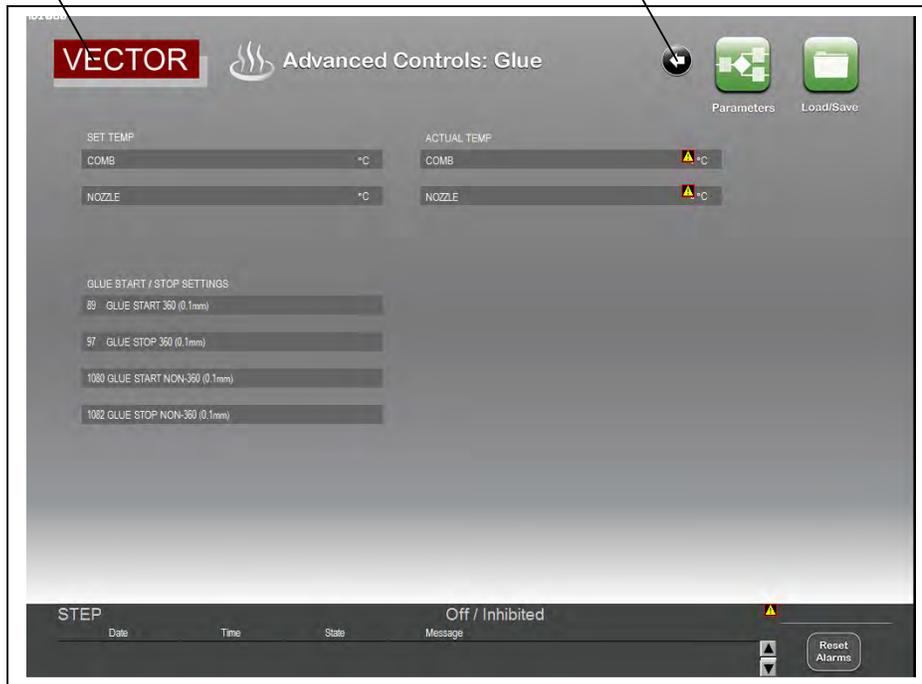


Status (such as glue temperature) and other settings are shown below the icon descriptions (733)

This image shows the advanced controls page for the Glue settings.

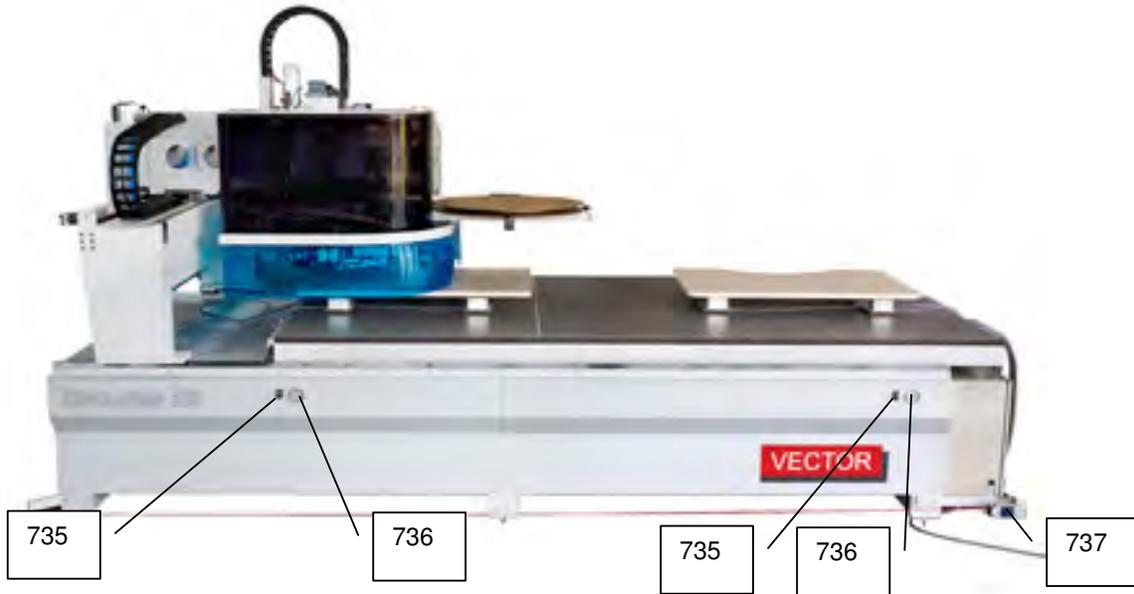
730

734



Touch on the VECTOR logo (730) to return to the home screen or the Back arrow (734) to go back one page.

The following image shows the control elements for vacuum and emergency stop on the machine frame.



- 735 Vacuum control switch(es)
- 736 Vacuum status display incorporating Vacuum OK output
- 737 Emergency stop pullwire

8.1 Putting the basic machine into service

8.1.1 Switching on

- Set the working pressure using the pressure control valve on the servicing unit (9) to the pressure gauge reading of 6 bar (0.6mpa).
- Ensure the machine is plugged into the supply socket and switched on.
- Switch the main isolator (801) on which is mounted on the left hand side of the control cabinet.
- After a time the Interface screen will present the Home Page (**refer 07 Operating Panel**).
- Enter on the Control Page button to bring the control page to screen.
- Ensure the emergency circuits are enabled by resetting the emergency stop mushroom pushbutton (823) and emergency stop pull wire (806). Both of these emergency switches remain off until manually reset at the device.

If the machine will not set, the following is a list of alarm interlocks:

Emergency Stop Mushroom on control Panel (823)	+
Safety Gate (optional)	+
Emergency Stop Pull Wire (806)	+
Air Pressure Switch (830)	+
Variable Speed Drives healthy	(inside control cabinet)

NOTE: The variable speed drives display an error on the screen when there is a drive fault detailing which drive has an error message.

Pressing the reset icon (828) on the control screen will clear all errors after they have been physically reset.

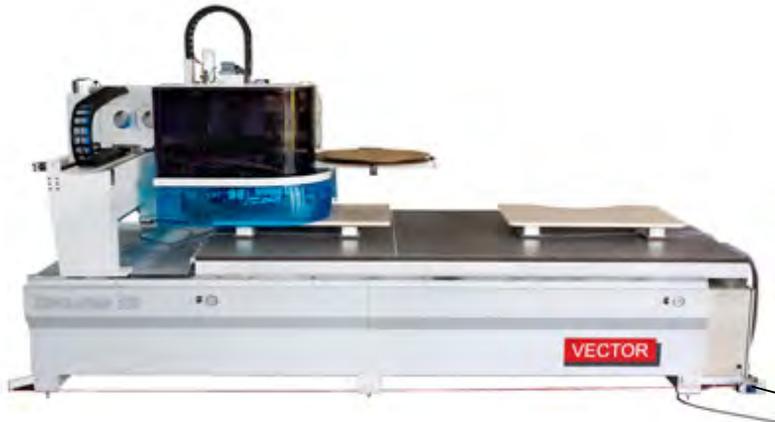
The pressure switch (830) is set to trip at 5 bar so check that the air pressure is always staying above this pressure.

The Drives can all be simply checked by opening the control cabinet door and inspecting the message on the control screen of each drive. **QUALIFIED PERSONNEL ONLY!**

DANGER !

THERE ARE DANGEROUS VOLTAGES INSIDE THE CONTROL CABINET. ONLY OBSERVE, DO NOT PUT HANDS OR OTHER EQUIPMENT INSIDE THE CABINET! IF IN DOUBT CALL YOUR SERVICE TECHNICIAN.

All drives should read RDY or similar. A fault will be indicated with an error message. **If such a fault is registered, call your technician!**



823

818

806

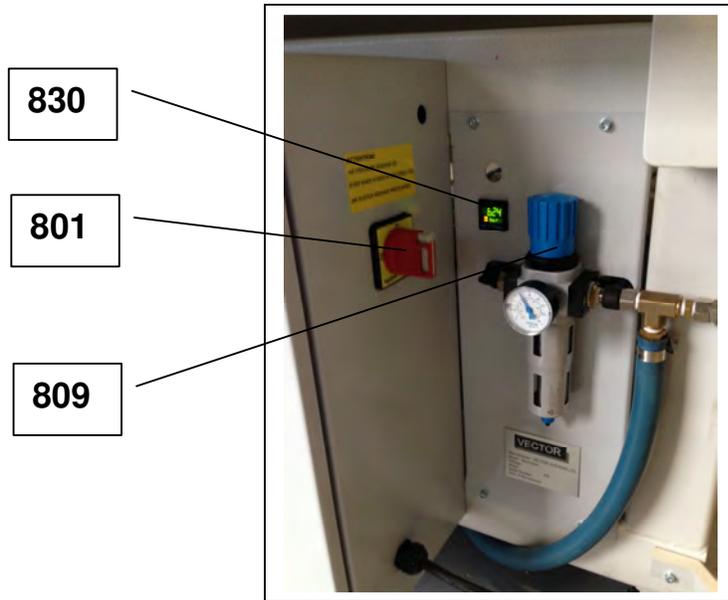


817

829

831

828



- Clear all error messages by pushing the screen RESET button (828).

The machine is now ready to start.

If starting from power up, a General Set will be required to set the axes (**refer 8.2 General Reset**).
If re-starting after an Emergency Stop Error the machine is now ready to run (no General Reset Required).

CAUTION !

Ensure that all axis movements are free from obstruction prior to performing a general set so as to avoid the possibility of damage.

8.1.2 Switching off

- Ensure the machine is stopped and in it's park position with the Aggregate in it's up position.
- Switch off the Vacuum Pump selector switch (817).
- Press the Emergency Stop Pushbutton (823) or Pull Wire (806)
- **Shut down the PC screen using the ON/OFF (818) on the front of the console.**
- When the screen has shut down, switch off the machine isolator (801)
- Turn off the power supply to the machine at the wall and release air pressure.

CAUTION !

The pneumatic system is not depressurised when the electrical systems are turned off.

8.1.3 Emergency cut-out

- Control panel emergency switch-off (823) mounted on front door of control cabinet
- Emergency Pull wire (806) mounted at front right hand corner of the machine with pull wire extending all the way around the machine.
- **In case of emergency, stop machine by switching off and disconnecting machine at wall or by pushing the large red emergency-off button (823) or tripping pull wire (806).**
- The red emergency-off button remains locked in the **OFF** position.
- The emergency pull wire is fail safe against wire breakage and remains off until reset manually.
- The machine may only be re-started after releasing the red button lock and clearing the error messages with the reset button (828)

8.1.4 Power failure

The machine is safety-protected and will not re-start on its own after a power failure (CE only)

8.2 General Reset

Upon startup from power off, when the emergency circuit is reset and all alarms are cleared (refer 8.1), a General Set must be performed. A General Set required message will blink on the screen.

This serves the purpose of setting the zero point for each of the axes X, Y and C and is critical to the correct functioning of the machine.

CAUTION !

Ensure that all axis movements are free from obstruction prior to performing a general set so as to avoid the possibility of damage.

Access to the General Set screen button is through the Functions Page. From the home screen, press the Functions Icon (829)

This will take you to the functions page where the General Set Icon is position (819)



Press the General Set screen button (819). Each of the axes will move slowly in a negative direction until they reach the zero switch for each axis. Upon reaching the appropriate zero limit switch, the axis will move slowly forward until it just comes off it's switch. This is the trigger point for setting the axis.

If the machine General Set message will not clear, it is because one or more of the axes has not set. Check for obstructions. Refer section 11 Trouble shooting.

It is possible to view the drive controls in the Troubleshooting page. Access to this information is via the troubleshooting icon (831) on the home page.

Viewing the 3 axis outputs on this troubleshooting page shows which axes are moving (or trying to move). If an axis is blocked from reaching it's limit switch, it will continue to show a drive speed value in these positions (832). This obstruction or faulty switch needs to be cleared.



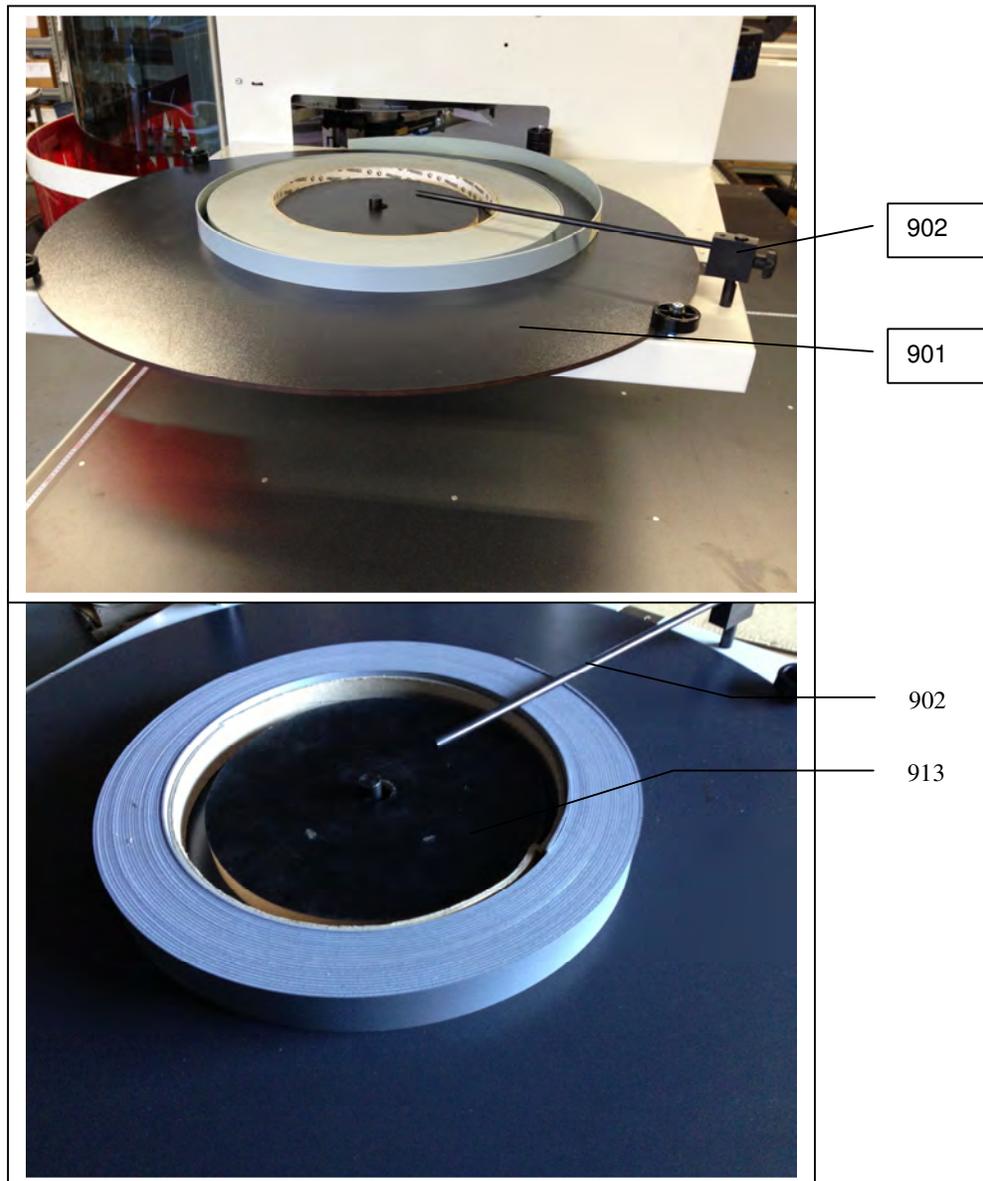
When the General Reset is completed, the machine is now ready to run.

9.1 Preparation for operation

9.1.1 Loading tape coil, feeding tape, setting guide height, setting infeed top bar.

Select the tape required for the job to be performed. Place the tape coil on the tape tray (901) such that the tape unwinds off the tray in an anti-clockwise direction when viewed from above. Place the top tape retainer (902) allowing a few millimetres for clearance.

It is usually preferred to make a disc (913) from particle board or mdf which fits inside the inner coil diameter to loosely centralise the tape coil. This ensures the coil unwinds freely.



There are two ways to prepare The C Axis position, in preparation For loading a new roll of band.

Either by using the control switch (988) (see 07 Control Panel), rotate the C Axis fully until it reaches it's clockwise limit (when viewed from above).

Alternatively it is possible to use the Tape Change function which can be found on the FUNCTIONS PAGE which is accessed via the functions icon (89)

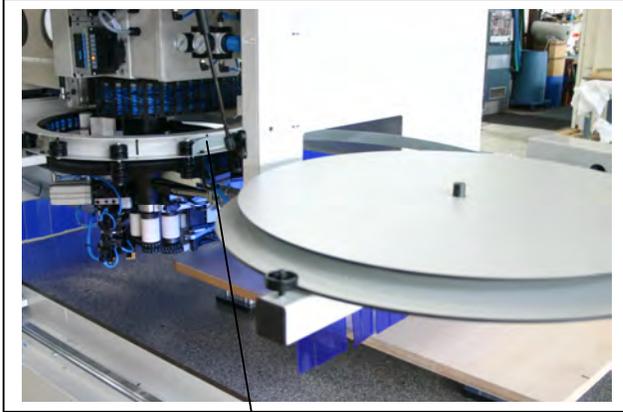


On the functions page, activate the Tape Change function (990). this will bring the head forward in Y to the front of the table and will wind the C Axis clockwise to its load position.

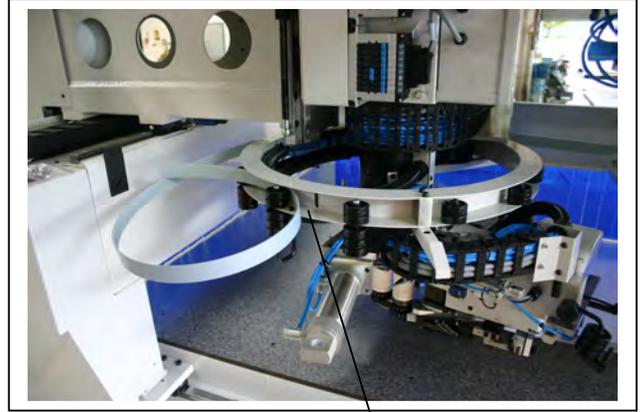


Run 9

Push the end of the edgeband into the tape winder ring (903) and rotate the head anti-clockwise to bring this band end around behind the winder.

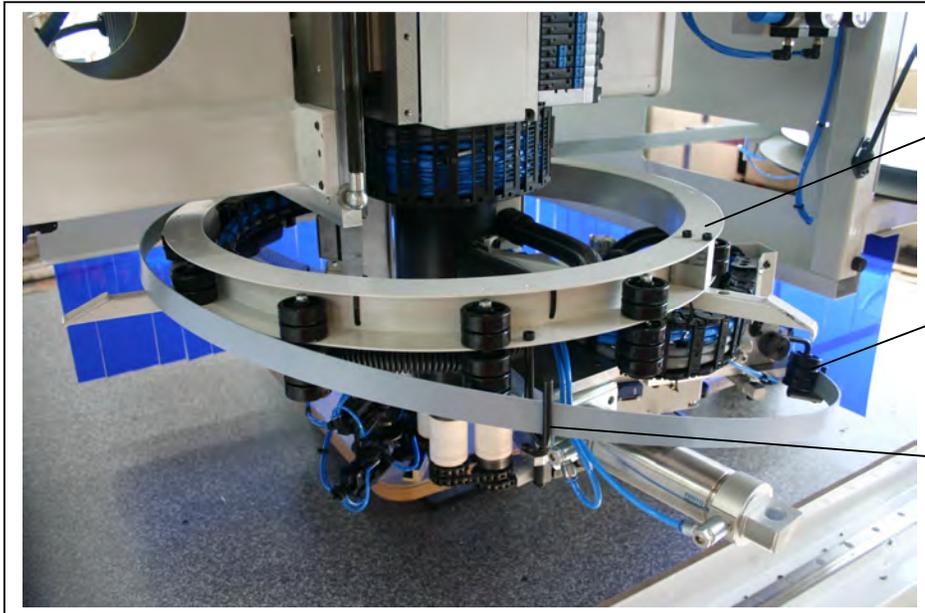


903



903

Lead the band from the tape coil directly through the loop (904), through the guide (905), behind the corner sensor guide (6) and into the infeed guide (7) – see next 2 photos.



903

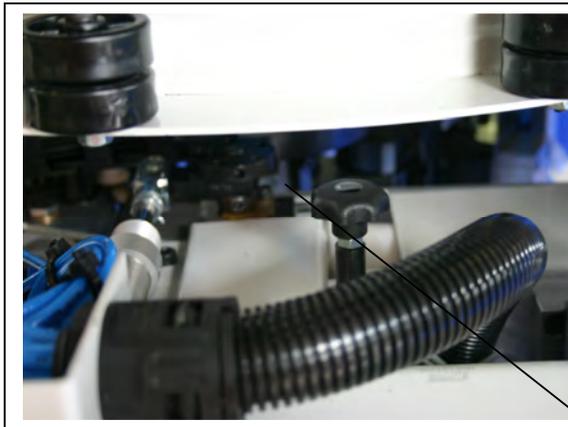
905

904

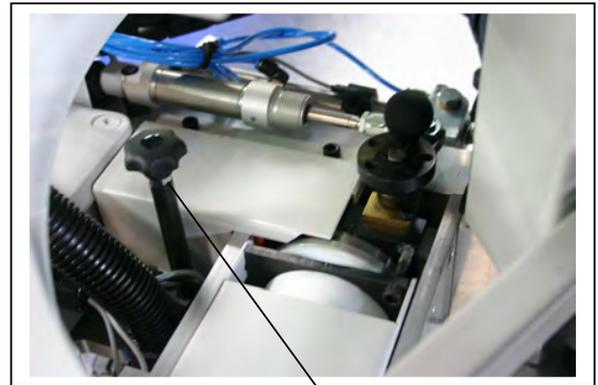


Note, the top infeed guide may require loosening to allow the band into the guide system.

The top infeed guide (908) should be adjusted using the adjuster screw (909) to allow the tape a free movement in the guide but such that the spring pressure of the tape guide keeps pressure down on the tape to allow for variations in tape width.

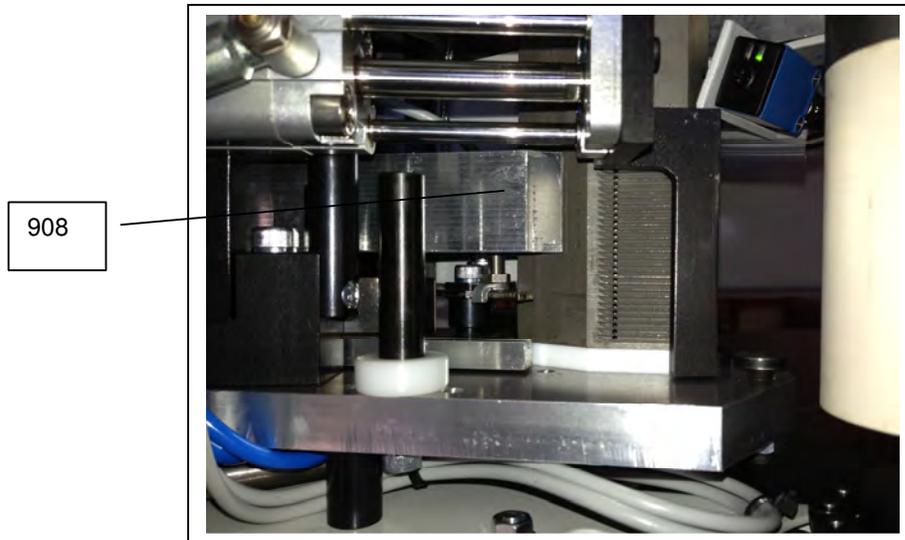


909



909

Note: it is possible to lift the top tape guide (908) by pulling up on the adjuster screw (909) against the spring pressure without unwinding it to allow the tape to be feed in. This is achieved by lifting the screw (909).



9.1.2 End trimming tape

When the band is slid into the guides, the adjuster (909) is wound down (anti-clockwise when viewed from above) until a positive amount of spring pressure is applied to the top of the tape to ensure that it always remains against the bottom guide and cannot float up and down.

IMPORTANT !

This adjustment is important. If too tight, the tape will bind in the guide. If too loose, the tape can ride up and down on the panel. This can especially cause problems if the leading edge is not sitting on the correct line when laying onto the panel. If this is so, it is likely the butt join sensor will not have an edge to reference and the butt join will be of poor quality.

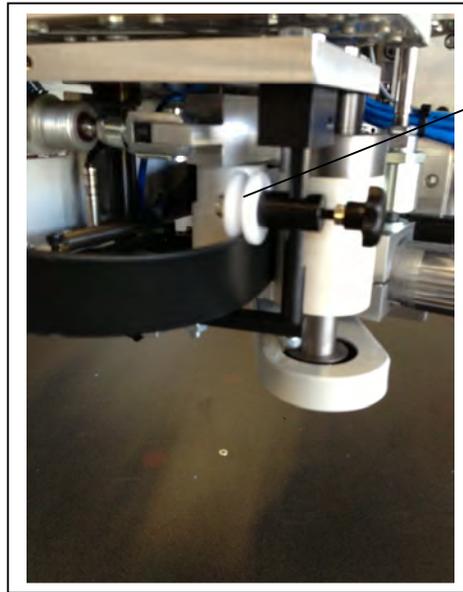
This adjustment can be easily checked by sliding the tape forwards and backwards in the guide to ensure it is firm but not too tight.

Now the top roller guide (910) of the infeed guide requires setting.

Ensure the tape is sitting flat against the bottom guide track and then lower the top guide pin/bearing onto the top of the tape.

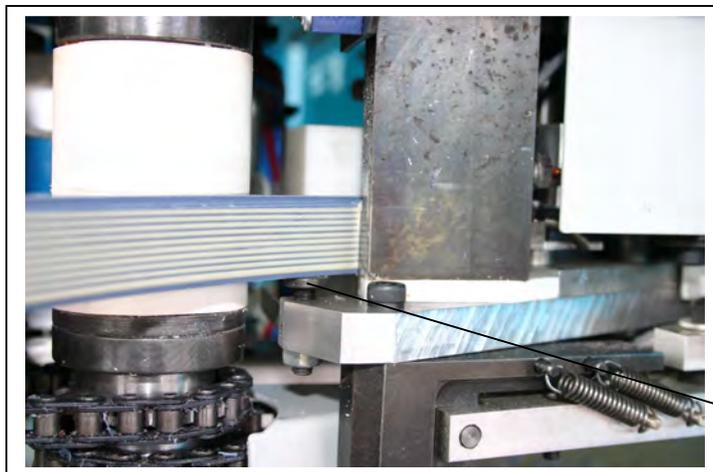
IMPORTANT !

This guide is very important to ensure reliable feeding of the tape and also square cut butt join. If this guide is set too high, the tape can ride up during the butt join cut and when the end trim rises up it will make a secondary cut on an angle which will result in a non parallel cut on the butt join.



It is also possible to check that this infeed roller (910) is set correctly by watching as the band feeds across the nozzle. It should just brush across the top of the guide pin (911) which is positioned just after the nozzle.

If the top tape guide (908) is too loose, or if the infeed roller (910) is pushing down too hard, the tape will not track perfectly along the top of this guide pin (975)



If the next workpiece has a butt joint (ie. A 360 degree banding of the top) then the end of the band needs to be trimmed manually so as to ensure a perfect join.

This is achieved by pushing the band right through past the glue nozzle and out the other side so as to allow the off-cut to be easily removed.

Then after checking that the end trim unit is free of obstruction and ensuring that no other person has their hands anywhere near the unit, a manual cut can be performed. This is achieved using the Saw Mode on the functions page.

The functions page is accessed via the Function icon (89) on the main page



Saw mode is then activated by pressing the Saw Mode button (992) on the functions page.

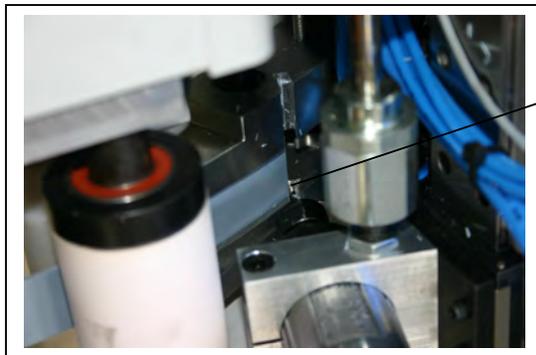
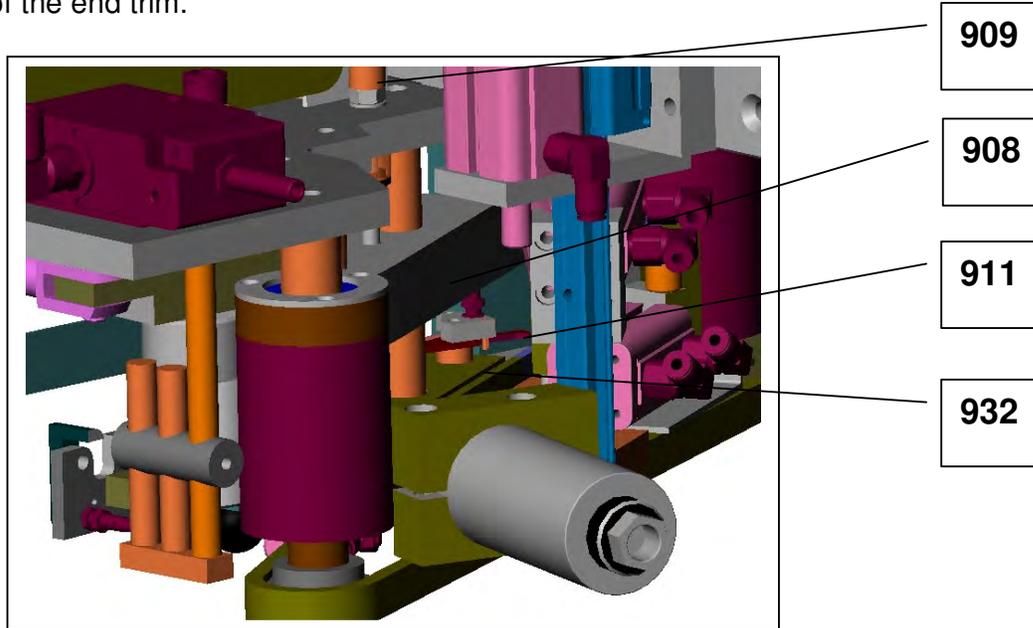


DANGER !

Danger of injury to personnel. Ensure all hands are clear of trimmer before performing manual trim operation!

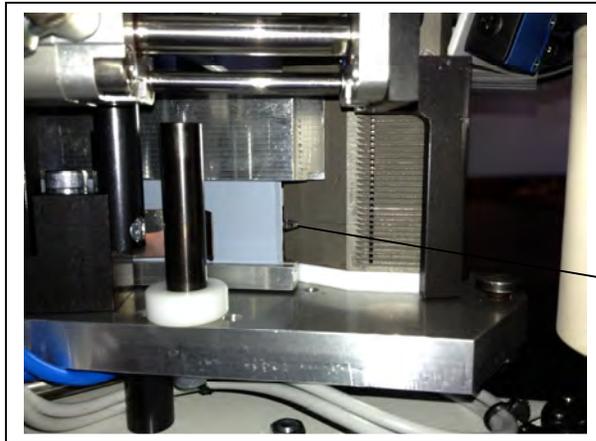
If a non-360 degree panel is to be performed, it is usually unnecessary to pre-trim the tape as the condition of the end of the tape is not important provide it is square.

For either cycle (360 or non-360) the tape should always start in line with the cut line (932) of the end trim.



Position tape should be at commencement of cycle.
Picture shown with end trim unit in "down" position.

Note: activating the tape present switch (911) will bring up the Clear Tape alarm on the screen. This can be cleared by pressing the screen button Reset Alarms when the tape has been cleared.

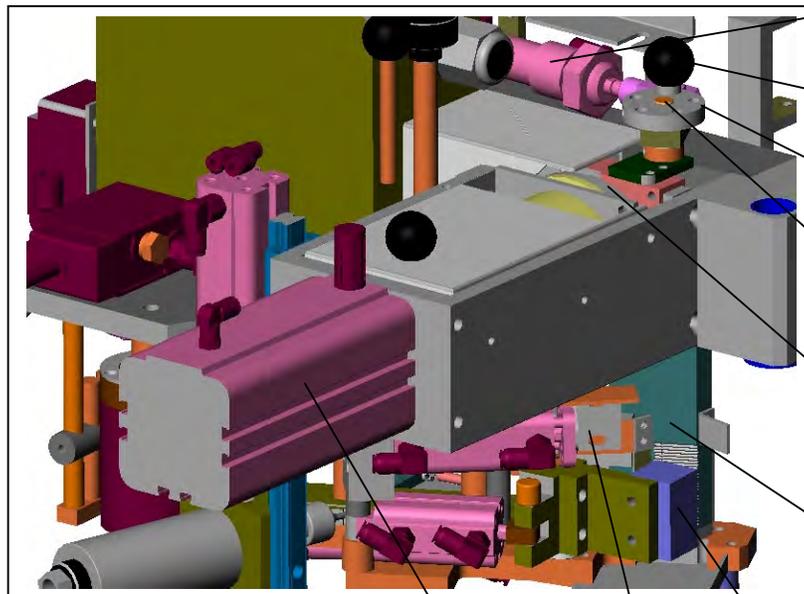


911

9.1.3 Turning on the glue and setting glue height to match panel thickness.

The glue nozzle comprises:

- | | | |
|-----|--------------------|--|
| 912 | Cartridge Cylinder | for pressing the cartridge of glue into the nozzle. |
| 913 | Element 1 | Comb element for melting the cartridge |
| 914 | Element 2 | Nozzle element |
| 915 | Dosing cylinder | for controlling the glue flow |
| 916 | Dosing bar | for metering the correct width of glue band onto the tape. |
| 917 | Dosing ring | for setting which slot is used on the dosing bar. |
| 918 | Dosing pin | used in conjunction with dosing ring. |
| 919 | Tape presser | for pressing the tape against the nozzle |
| 920 | Nozzle wiper | for wiping residual glue off the nozzle before each panel. |



915

918

917

916

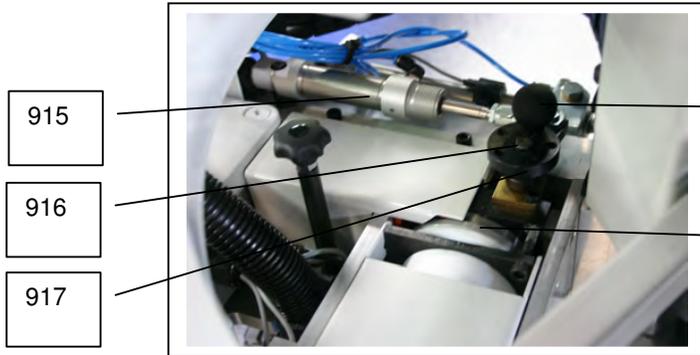
913

914

912

920

919



918
913



913

First check the temperature settings for the two elements. These should be set according to the characteristics of the glue used. Typically element 1 is set 5 degrees lower than the nozzle element which controls the final temperature of the glue onto the panel.

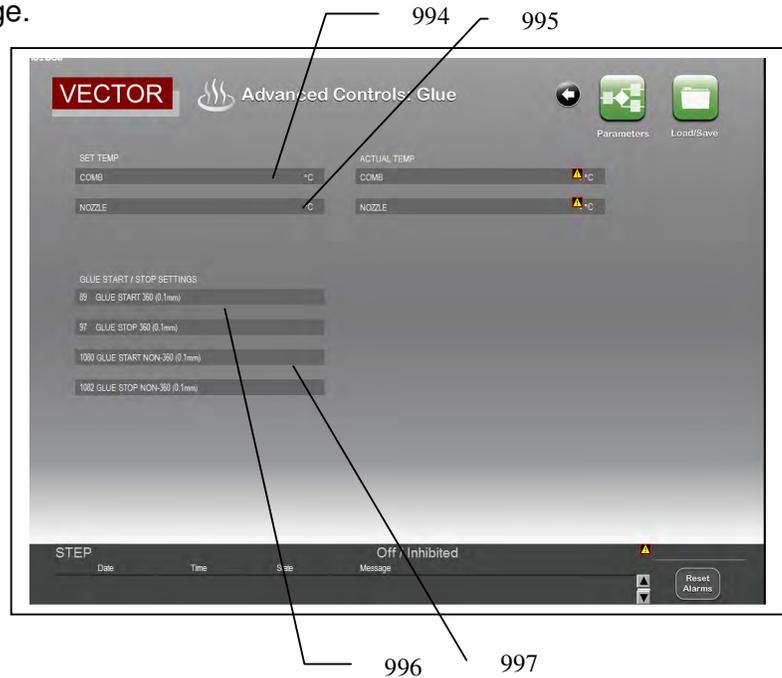
The temperature settings (923) are displayed on the control screen but are set in the advance controls for glue (993). Limits are factory set to the temperature range suitable for the glue. Should you require a different temperature range, please consult technical support.

The glue is turned on by pressing screen icon (926).



The icon will indicate with a tick when positive Temperature can be set by touching the bottom of the glue icon (993) which will take you to the Glue Advanced Controls page. comb temperature (994) is the temperature of the comb element against which the glue cartridge is pressed.

The Nozzle element (995) is the nozzle block which contains the dosing bar.



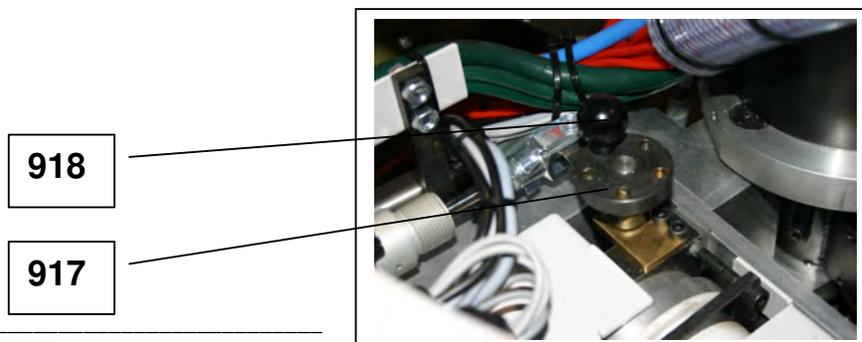
9.1.3.1 Setting the glue height to match panel thickness

The glue flow is controlled by the dosing cylinder and dosing bar. The dosing cylinder serves to rotate the dosing bar to align the appropriate slot of the dosing bar to the nozzle holes.

There are 5 holes around the dosing ring (917) representing each of the set panel thicknesses (example 16mm, 19mm, 25mm, 18mm and 30mm). These settings will be specific for each machine as ordered. If different sizes are required, these can be supplied as requested and simply fitted.

CAUTION ! To change this setting, the glue temperature must be above 160 degrees. Otherwise damage can occur.

This frees the dosing bar to be turned. Remove the pin (918) and use this pin to rotate the dosing ring (917) to align with the chosen panel thickness.

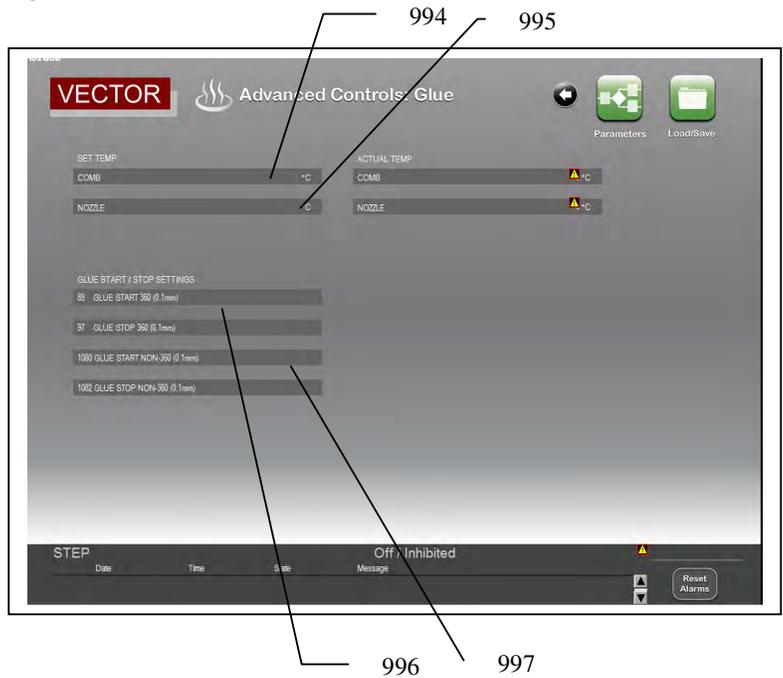


9.1.4 Setting glue start and stop adjustments.

During a running cycle, the edge band material is fed across the glue nozzle. Immediately prior to it passing over the nozzle, it activates the tape present switch (911).

There are two sets of settings on the control screen for adjusting the delay between the activation of this switch (911) and when the PLC activates the dosing bar air cylinder.

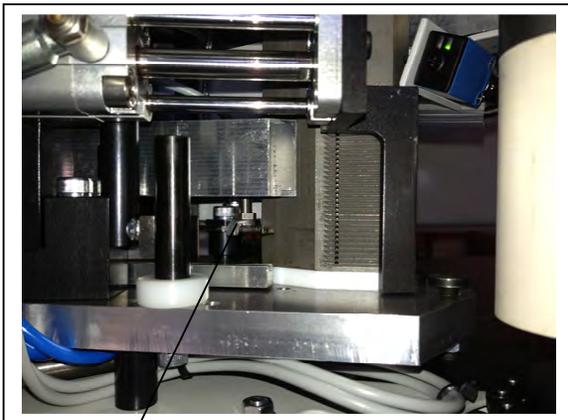
These are found on the Glue Advance controls screen at (996) and (997).



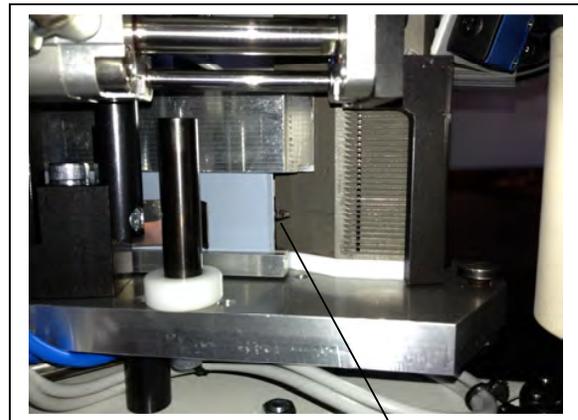
The start and stop settings at (996) control the glue start and glue stop for a 360 degree butt join panel.

The start and stop settings at (997) control the glue start and glue stop for a non-360 degree panel. These are able to be set differently to a butt join panel. For thin tapes, it might be desirable to delay the glue start to allow it to pass under the pressure roller before the glue starts. This allows thin tapes to be pulled across the nozzle because in some cases, they do not have sufficient stiffness and the tape presser can cause the band to bunch under the tape presser.

These parameters are in 0.1mm increments so a value of 100 = 10mm



911 Tape Present Switch



911 Tape Present Switch with band about to touch

The Glue Start timer (996) and (997) is in 0.1mm counts and is the delay between when the tape present switch is activated and the glue is turned on.

Increasing this distance makes the glue start later and hence moves the glue start back from the front edge of the tape. Reducing this distance makes the glue start earlier and hence closer to the front edge of the tape.

The second timer is the Glue Off timer. This is the delay between when the tape present switch is released (at the end of the cycle after being cut off) and when the glue is turned off.

A reduction in this distance makes the glue turn off earlier and hence it finishes further from the end of the tape and similarly if the timer is increased, the glue will stop later and be closer to the end of the tape.

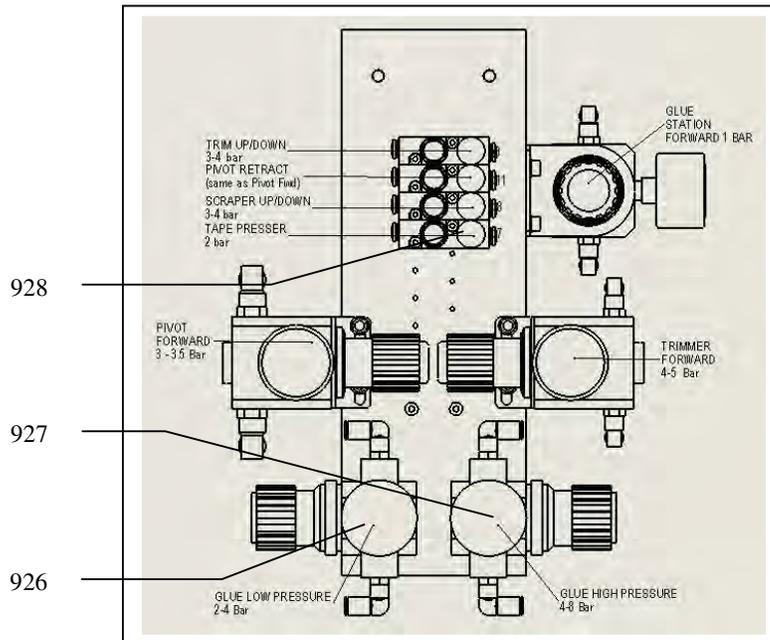
The easiest way to set this is by running a panel and watching closely as the tape comes through the nozzle before it makes contact with the board. It is possible to see where the glue has started and stopped in relation to the two ends of the tape.

If the glue appears to be right at the end of the tape, it is worth adjusting the timer to bring the tape away from the edge so as to be clear exactly where the glue is starting and stopping.

CAUTION ! If the glue is starting too early or stopping too late, residual glue will build up on the nozzle which is undesirable. Take time to set this correctly! Once set however, it should not require regular adjustment. Ensure the moving parts are all maintained however as resistance in the speed with which this mechanism activates will result in variation in these settings.

9.1.5 Setting Glue Pressures and Tape Presser.

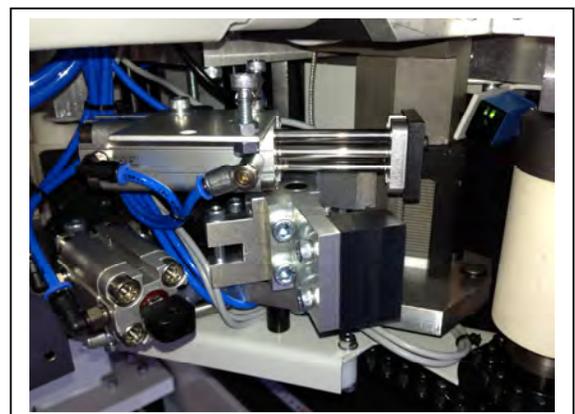
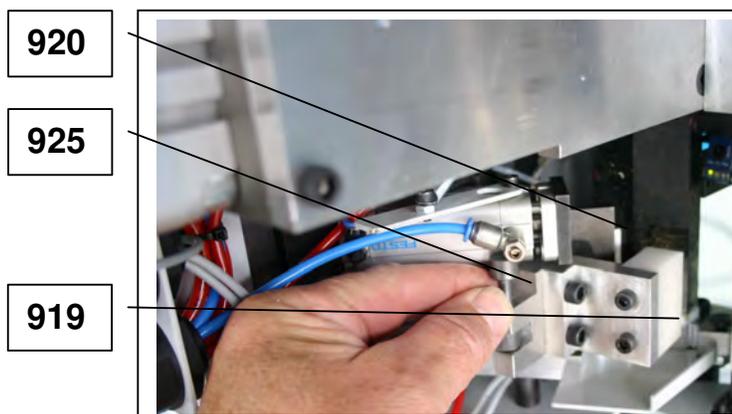
There are two regulators which control the pressure of the glue cartridge cylinder. Low pressure (926) and high pressure (927). These control the amount of glue applied to the edge material. Low pressure is automatically switched on when the speed reduces for corners. High pressure is used at higher speeds.



These pressure regulators can be adjusted so that a good covering of glue is applied to the tape without it spilling over the top and bottom of the tape.

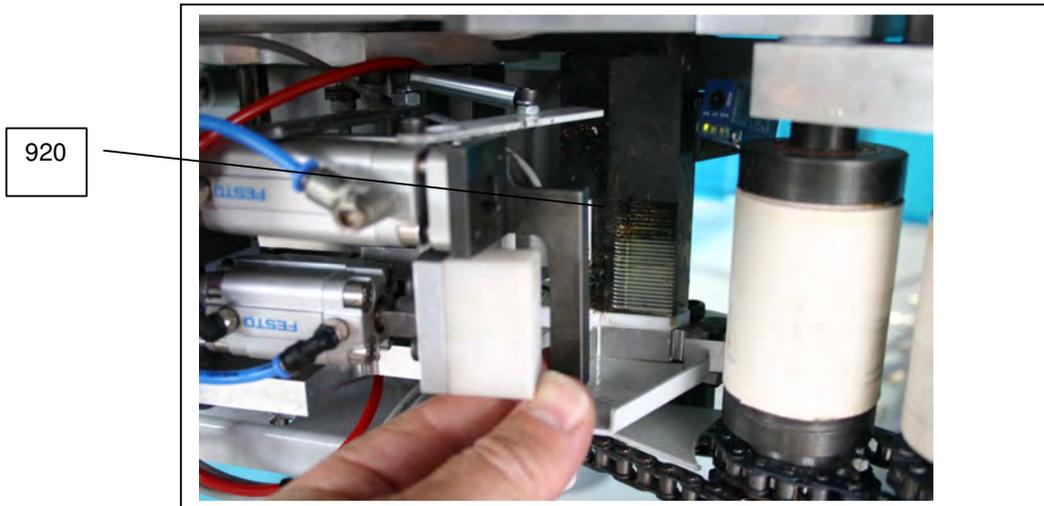
The tape presser (919) is a pneumatically operated shoe which presses the tape against the nozzle. It is activated in sync with the glue on/off. The pressure on this shoe is not normally adjusted but can be changed for different types of materials. The pressure is controlled by regulator (928).

By lifting the pin (925), it is simple to remove the actuating cylinder and swing the tape presser (919) clear of the nozzle for cleaning.



9.1.6 Setting the Glue Nozzle Wiper

A pneumatically operated wiper (20) passes a blade across the nozzle after each cycle and prior to the start of a new cycle. This is to remove any residual glue which could get on the front edge of the tape as it passes the nozzle and also serves to keep the nozzle free of burnt glue.



IMPORTANT!

The nozzle wiper plays a very important part in the consistency of butt joins. Make sure this wiper is kept clean and adjusted so that it removes all glue from the face of the nozzle such that when the edging material passes over the nozzle and lays on the panel, it is completely free of glue.

The nozzle wiper should be checked regularly for build up of glue and cleaned as necessary. This can simply be achieved by removing the tape presser pin (see tape presser in previous section 9.1.4). It is then a simple matter to access the wiper blade for cleaning.

The nozzle wiper can be manually operated from the Functions page .

From the home page, touch the Functions icon (989)

989

988



This opens the Functions page. The nozzle wiper (990) can now be turned on (note the nozzle temperature must be over 150 deg C for this to operate).



9.1.7 Loading a Glue Cartridge

Now that the tape is set and the glue settings are made a glue test can be run. This is a manual test which is used to ensure that the glue is flowing and the tape is feeding correctly.

Ensure a glue cartridge is loaded into the machine. This is achieved by lifting the glue cartridge cover (970) and pulling the glue cartridge piston (972) back manually. If sufficient of the previous cartridge is used, then a new cartridge (971) will fit inside the chamber.

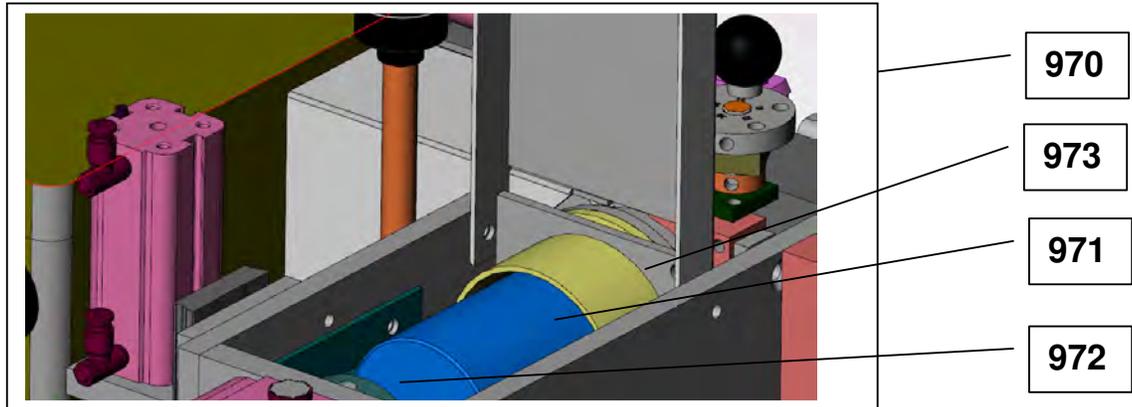
If not, close the lid and the glue piston will automatically return to push on the existing glue cartridge when the next cycle starts.

Some glue cartridges are moulded individually and have a moulded end on one end and a guillotined end on the other. The moulded end should be placed against the piston so that the cartridge is held square and not able to push on an angle.

Note a proximity switch automatically detects when a new cartridge is required during a cycle and a message **LOAD NEW GLUE CARTRIDGE** will appear on the screen. The cycle will complete however but a new cycle will not start until a new cartridge is loaded as per the above procedure.



When new cartridge is loaded, the alarm can be cleared by pressing Reset Alarms (974)



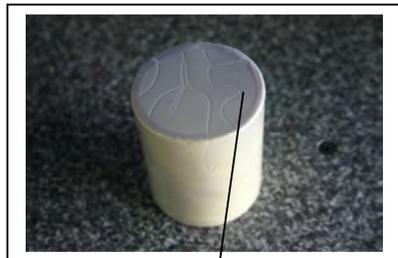
IMPORTANT!

It is important to use a glue of high quality. Failure to do so can result in problems with edge bond and glue nozzle function.

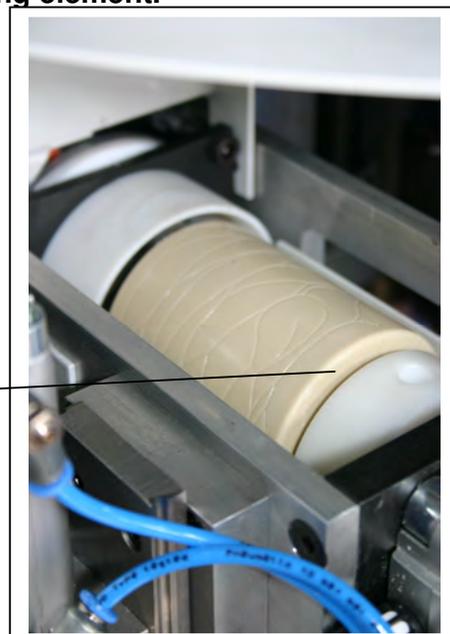
Below is a list of performance characteristics important to the function of the machine which will perform better in higher quality glues:

- Glue bond strength
- Dimensional tolerance of glue cartridges (diameter)
- Resistance to heat travelling along the cartridge causing sponginess in the non-molten body of the cartridge.
- No build-up on the face and in the grooves of the nozzle
- Good glue flow through the nozzle holes across the full temperature range specified for the glue

NOTE: The moulded face of the glue cartridge should be placed against the presser piston and the cut face should face the heating element.



Moulded face



Moulded face

Run 9

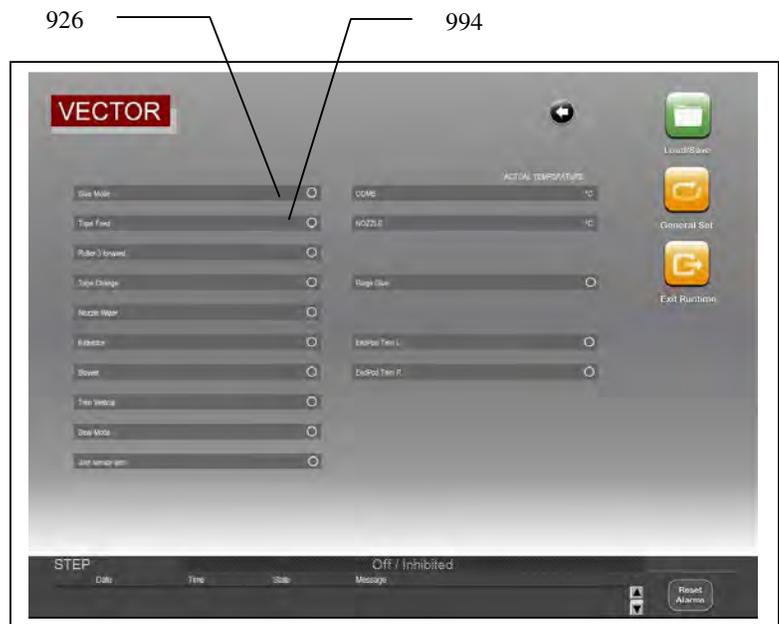
9.1.7.1 Running a glue-tape test

Load the tape (see 9.1.1) and turn on the glue (9.1.2)
Enter the Functions page using the icon (989)



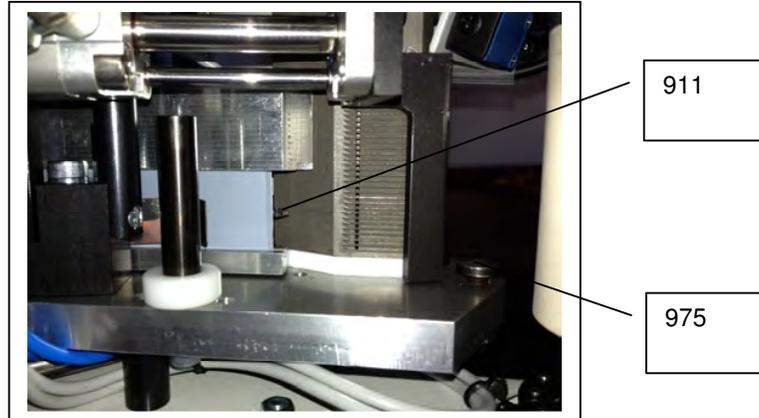
Ensure the Glue (926) is turned on and at temperature (ie now low glue temp alarm)

Turn on the Tape Feed (994)



The tape will be fed across the glue nozzle, triggering the tape present switch (911) and starting the glue. It will start at lower feed speed and then after about 300mm of travel jump to fast speed.

From this it is possible to check that the glue is flowing correctly, is the correct width and that the tape is sitting correctly on the exit guide pin (975) (to ensure laying on the panel at the correct height). The edge material should just brush this pin.



When sufficient tape has been run, the feed can be stopped by pressing the tape feed (994) on the Functions page again. This will exit the Function Page and return to the Controls page while also stopping the feed.

At this point, the edge material which has been fed over the nozzle remains pressed against the hot nozzle so should be cut off and removed promptly.

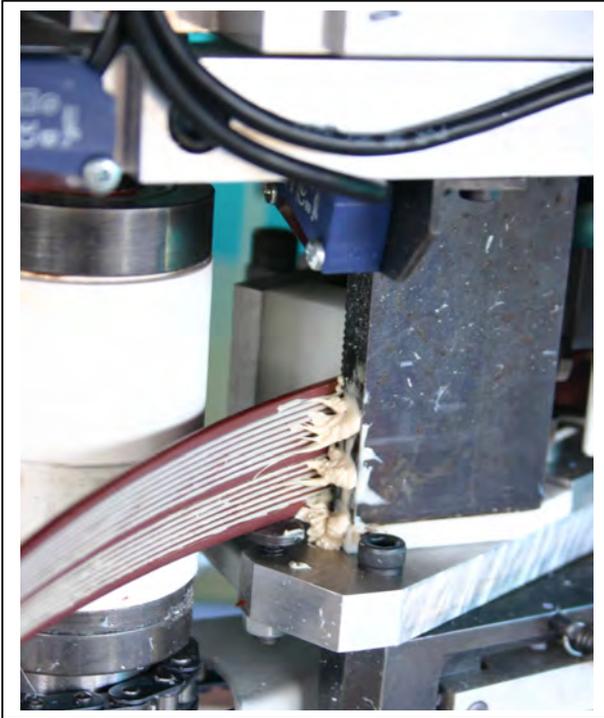
To cut off the edge material, follow the procedure in **9.1.2 Manual Saw cut**.

Having cut the material, remove the edgetape/glue line test piece from the nozzle by pulling firmly.

Note, it is important to remove this material promptly or the nozzle may soften the tape sufficiently that it will pull apart when being removed and leave a section of edge material in the guide.

The image below shows a good quality glue line.





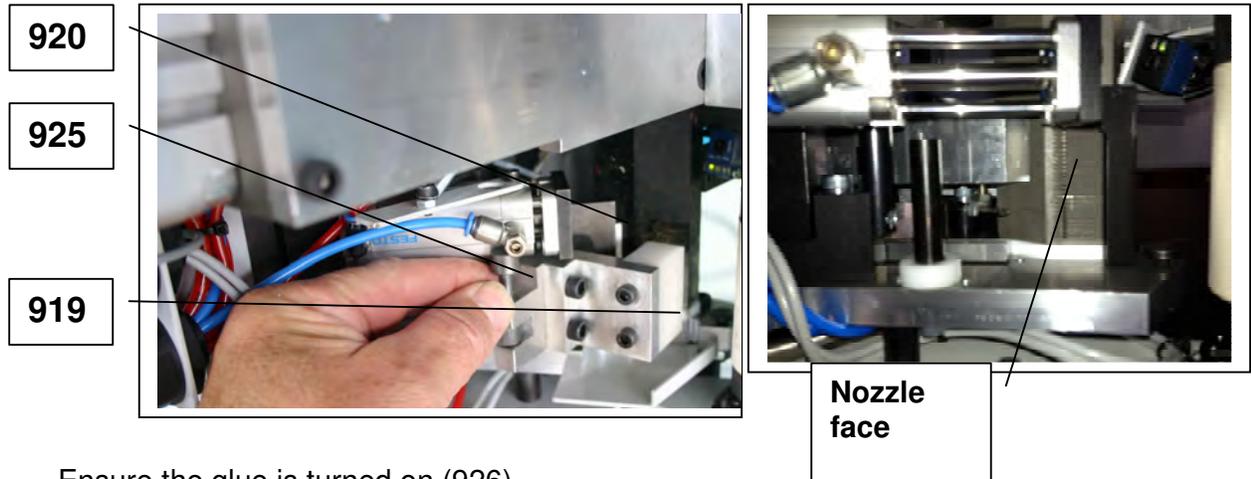
The image above shows a poor glue line with glue build-up on the nozzle at the point where the edge material leaves the nozzle.

This is caused by insufficient glue pressure at the cartridge and is usually due to the cartridge not being free to move in the teflon infeed guide (73) of the cartridge heater. It can also be caused by inferior quality glue which may have variable viscosity characteristics or excess filler.

Ensure high quality glue (of known quality) is used and allow longer after start up for the heat to normalise through the entire gluing system. This will usually free the glue cartridge after 10 minutes or so.

If this does not correct the issue, it is possible to manually purge the nozzle. This process applies pressure to the cartridge with the dosing bar open which when combined with heat and time, will cause the cartridge to free up and start flowing.

The tape presser shoe (919) should be released by removing the pin (925) and pushed back or removed



Ensure the glue is turned on (926)

Make a V-shaped piece of cardboard to pump the glue into. Corrugated box cardboard is good because it forms a V easily if folded along the corrugations and is firm enough to support the hot glue.

Now touch Purge Glue (951) which will activate the air cylinder which presses the glue cartridge and also opens the glue dosing bar (provided appropriate temperature is reached).

Glue will start to flow.

If the cartridge has not released from its teflon infeed tube, the glue flow will be slow. Leave the dosing bar open and glue pressure on and wait for the cartridge to release. This will be obvious when the glue starts to flow freely in creamy spaghetti like lines.

If necessary, switch off both pressure and dosing bar and replace the cardboard V with a fresh piece to check the flow.

DANGER!

Molten glue at approximately 200 degrees C is dangerous. Ensure it does not get on skin. Wearing of appropriate gloves is recommended when performing this procedure.

In the event of glue burns, Run under cold water for 10 minutes and seek medical advice.

NOTE

If the glue does still not flow correctly, it may be due to poor glue quality or nozzle maintenance issues. Refer trouble shooting glue nozzle Section 11.

When you are satisfied with the glue flow, run another glue-tape test (ref 9.1.7) to confirm.

9.1.8 Selecting 360 degree setting for butt joint or open board.

There are two modes of cycle operation, 360 degree (involving applying edge material all of the way around the panel and finishing with a butt join) or non-360 degree (involving the use of lead-in and lead-out pods to start the taping process for a square corner).

To select 360 degree mode of operation, touch the screen screen button (933).

When “Yes”, the machine is in 360 degree mode. (Indicated by red Tick on icon)
When “No”, the machine is in open board mode and will require Starting and Finishing pods.

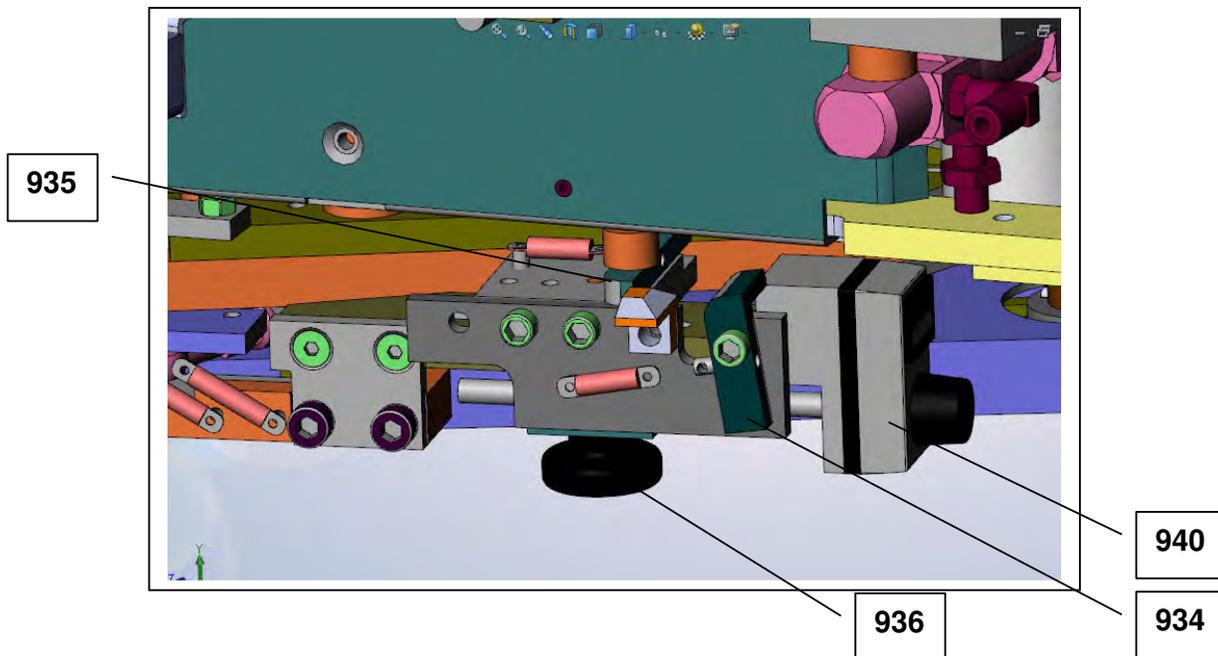


9.1.8.1 360 Degree Operation

When in 360 degree mode, the machine is set to start against the edge of the panel such that the tape start will begin in the desired place. When the aggregate has aligned itself against the panel, feed motor will begin progressing it around the panel. Tape feeding will commence immediately.

When the aggregate has almost completed the 360 degree circuit of the panel, the end of tape sensing arm (938) will automatically swing out and the feed speed will slow.

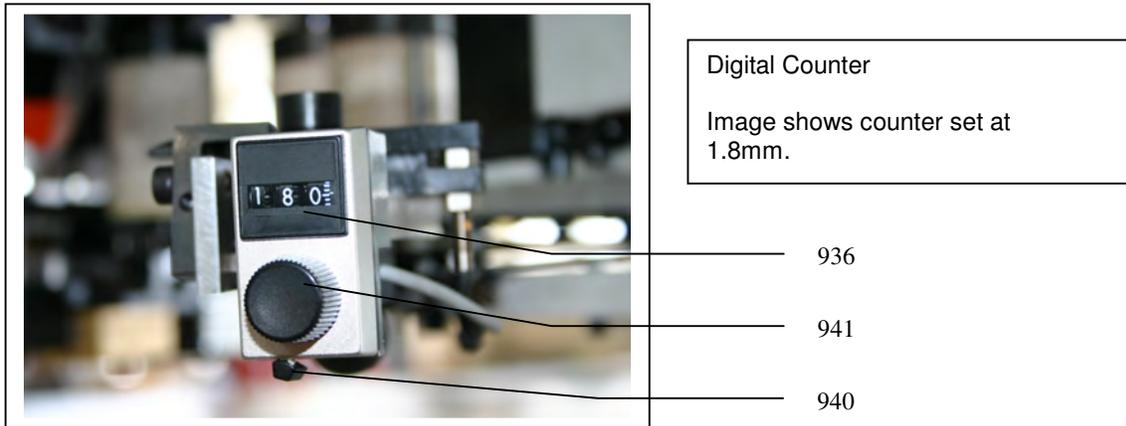
When the first sensing switch (934) is activated by the leading edge of the tape, the feed slows to a crawl. When the second switch (935) is activated, the feed stops and the end trim guillotine cuts the edge material.



Adjustment of the join is achieved by moving the switch block along the sensor arm and is controlled via a digital counter (940).

This is achieved by releasing the locking knob (936) and winding the counter in the direction desired. A larger number makes the gap wider. A smaller number makes the gap smaller.

There are 3 digits on the digital counter. They correspond to 1/100ths of a millimeter. It is appropriate however to ignore the right hand column and adjust in 10ths of a millimetre. The left hand digit represents millimetres.



Because there is some backlash in the adjusting screw, it is important to always make the final setting winding in a clockwise direction. Thus for example to close the gap on a joint, it is necessary to wind the digital counter past the desired target number by approximately 0.5mm so that the final adjustment clockwise takes up the backlash in the screw.

NOTE: It is recommended to make a record of the setting difference between a butt joint on a straight edge and each of the appropriate radii. For example, if the setting for a straight edge is 100 (1.0mm) and the setting for a 650mm radius joint is 5.0mm, then this difference should be recorded. Thus if for any reason the digital counter needs calibration, it is then a simple matter to re-calculate the settings for each radius.

NOTE.

It is essential for reliable butt joints to align the panel in such a way that the C Axis angle is within +/-5 degrees of one of either the X or Y axis when measuring for the cut. (IE. the axis should be on one of 0, 90,180,270 etc at the time of the cut).

This is because the axis drive is used to control the speed the head is travelling when measuring for the butt joint. This can only be achieved if the C axis is parallel to either the x or Y axes.

Some variation of the joints may occur if this process is not followed.

Thus for example, when performing butt joints on curved edges such as round shapes or those where it is desired to have the butt joint on a curve, the panel should be set up so that when the rollers align against the panel at the beginning of the cycle, they coincide with 0, 90,180,270 etc degrees of C axis rotation.

This following table contains approximate digital counter (940) settings for different radii. These are similar for all machines but exact settings need to be calculated and noted for each machine.

Radius (mm)	Radius (inches)	Counter setting
Straight		1.00
1200mm	47	3.60
1000	39	4.00
900	35.5	4.90
800	31	5.60
600	24	6.10

NOTE:

The digital counter is calibrated by making a butt join on a straight workpiece edge (making sure the edge is aligned in either the 0 degrees or 90 degrees position).

When calibrated correctly, the digital counter should read 1.00.

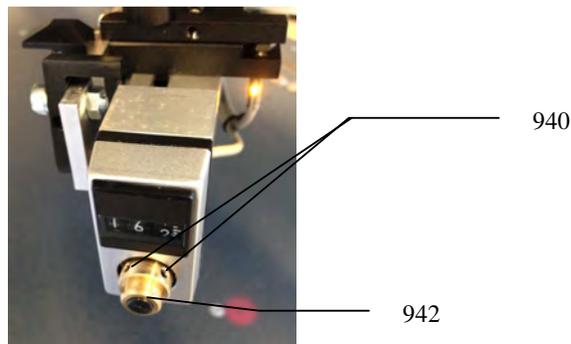
If it does not read 1.00, lock the locking knob (936) but make sure the digital counter locking lever is released.

Remove the black adjusting knob (941) by firmly pulling directly off (noting that it aligns via a flat on the inside of the knob)

Release the two small set screws (940) (using the 1.2mm allen key found in the tool kit) which lock the brass counter ring to the shaft. Because the shaft is locked by the locking knob (936), it is now possible to rotate the brass counter ring so that the digital counter reads 1.00.

Re-lock the brass counter ring (942) to the shaft.

Re-place the black knob aligning the flat inside the knob and the flat on the brass counter ring.



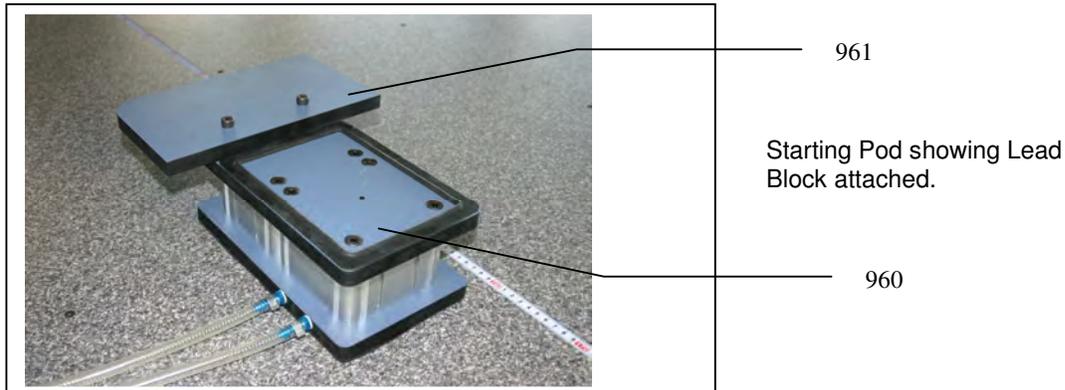
When this calibration is complete, the setting numbers for the above table will all be brought back into line.

9.1.8.2 Open Board (non-360 degree) Mode

This mode of operation is used where the contoured edge to be banded has square starting and finishing corners. It is selected on the control screen via the 360 Panel Icon (933)



In this mode of operation it is necessary to use the Starting and Finishing pods.



These pods (960) are similar to standard vacuum cups except they are longer and have a section which allows the fixing of starting and finishing blocks (961). The purpose of these blocks is to allow each process, tape feed, trimming and scraping all to be started prior to the edge of the workpiece and finish after the end of the workpiece.

The Starting block (961) provides a reference for the workpiece to be placed against and a position for the head to approach when starting a panel. Similarly the Finishing block provides a reference for the end of the panel and allows the

banding, trimming and scraping all to complete their process on the workpiece before the head retracts and lifts.

These blocks must be the same thickness as the workpiece. This ensures that prevents the trimmer cutters removing excess material when running onto and off of the workpiece.



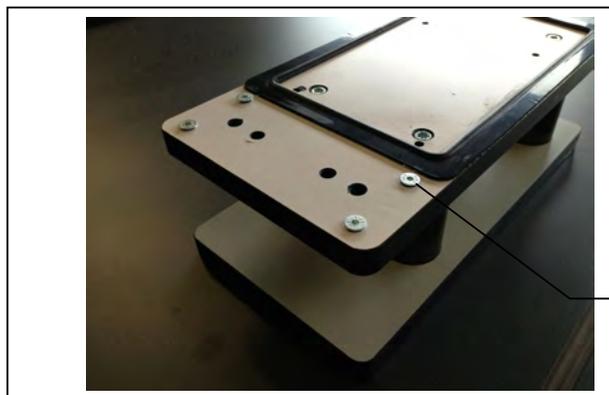
Lead block with panel butted up against it.

NOTE: The start/finish block must be the same thickness as the workpiece to ensure smooth transition of the cutters onto the panel without damaging the panel

The workpiece is proud of the face of the block by up to 1mm which ensures the band lays flat onto the workpiece. It should never be behind the edge of the lead block

This is because the outer cutter diameter is wider than the tracing shoe and as a result, the cutter is still on the panel when the shoe is just sitting on the Start or Finish blocks. As a result, if the block is thinner than the workpiece, the trimmer will drop down (or up – in the case of the lower trimmer) and the trimmer will shave the panel.

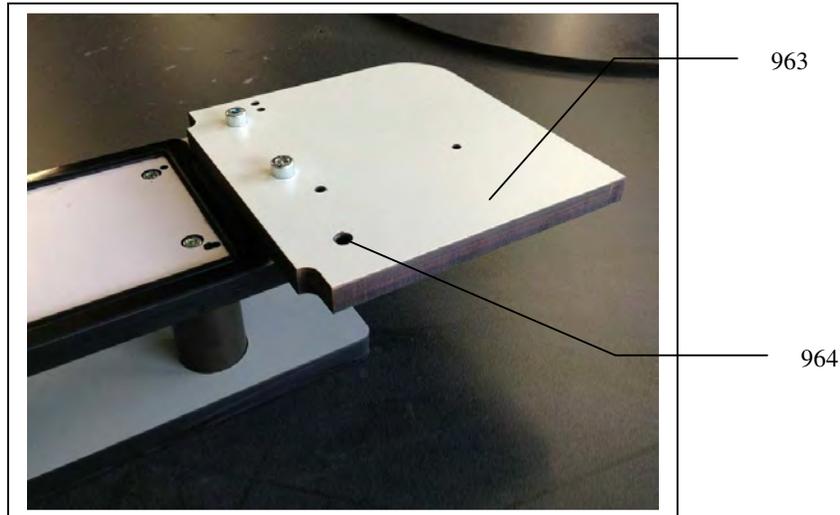
There are 4 countersunk adjusting screws (962) on the top plate in the position where the Start/Finish plates mount. This is to allow the height of the bottom surface to be adjusted to match the panel. Once this is done, it should not require adjustment for other panels because the bottom reference edge is the same for all panels.



962

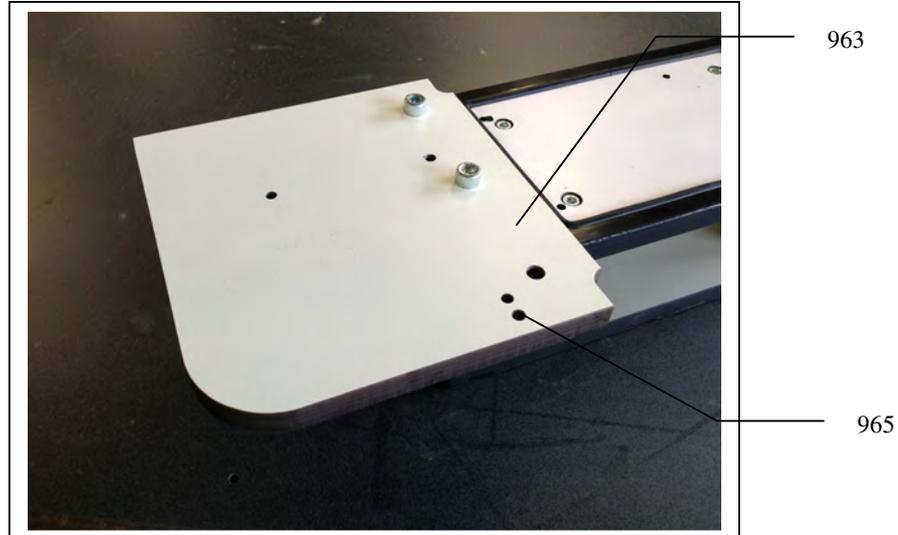
A universal pod plate (963) can be fitted to these pods to act as a Start of Finish pod in most circumstances. The universal single piece pod plate is 16mm thick. It can be used as a pattern to make pod plates of different thicknesses.

It is shown here positioned as a Start block.

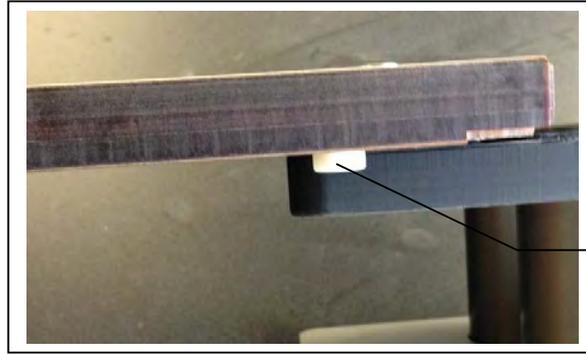


The same plate can be shifted laterally utilising the 3rd 8 diameter hole (964) so it can be fitted as a Finish Plate.

See below



The tapped hole (965) is for the trigger pin (966) which can be screwed in from below. This pin is used to sense the end point for the banding when in Non-360 mode when not using the Auto Length cut function. See later in this section



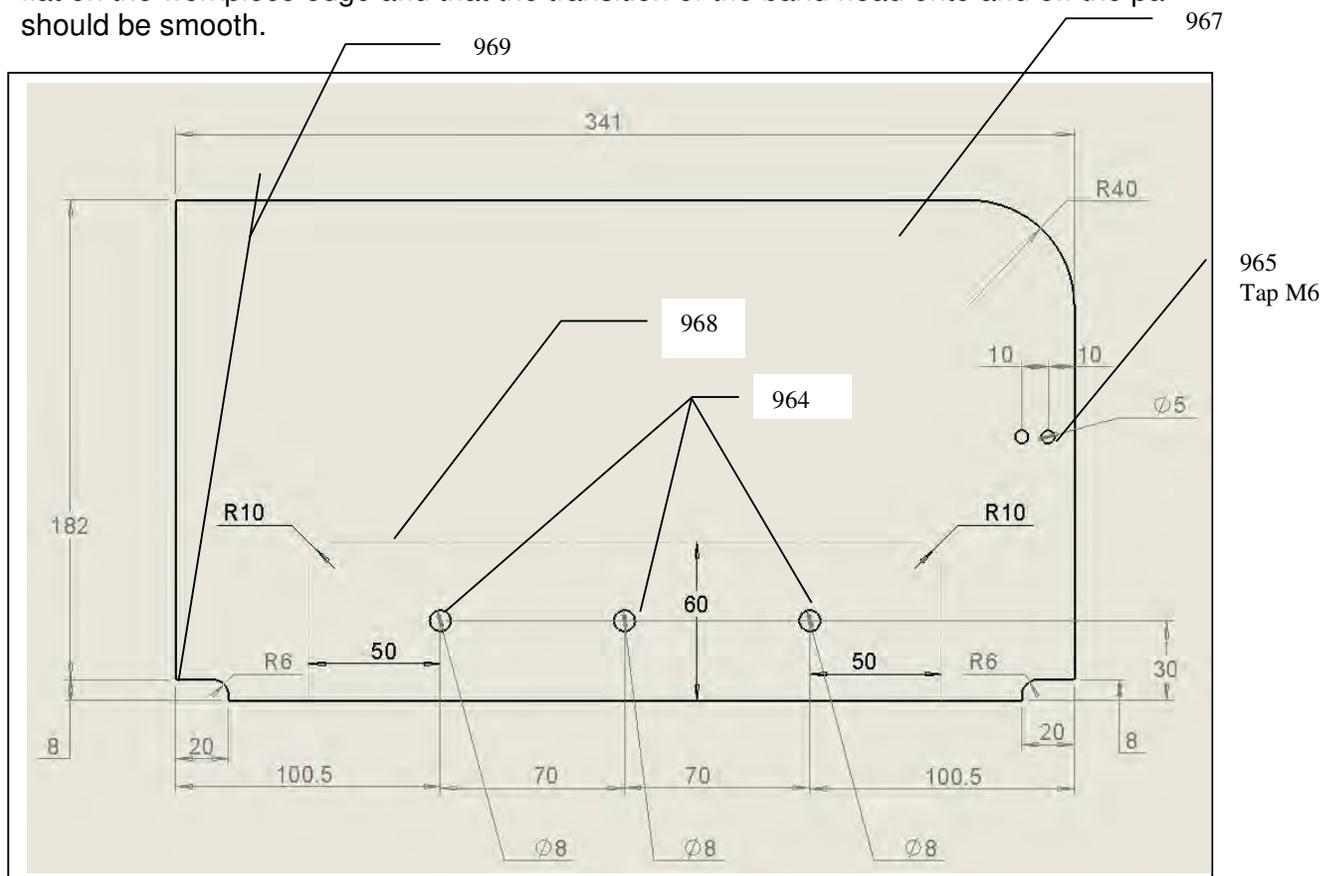
966

The following drawing shows a template for a universal Pod Plate (967) which can be manufactured as a blank with the 8 diameter holes and notches for end trimming.

There is also on the drawing a dotted line (968) representing the EndPOD on which the Universal Pod Plate sits. It is important that there is 45mm clearance from this baseplate to allow the trimmer tracer shoes clearance.

From this universal plate however, it is possible to for example, cut an angle (969) on the appropriate side to make a lead-in to more closely match the lead of the workpiece.

Note however, it is not critical that they exactly match, simply that the banding should lay flat on the workpiece edge and that the transition of the band head onto and off the panel should be smooth.



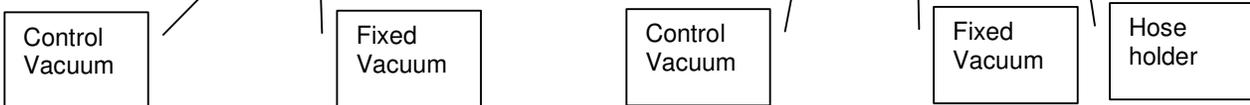
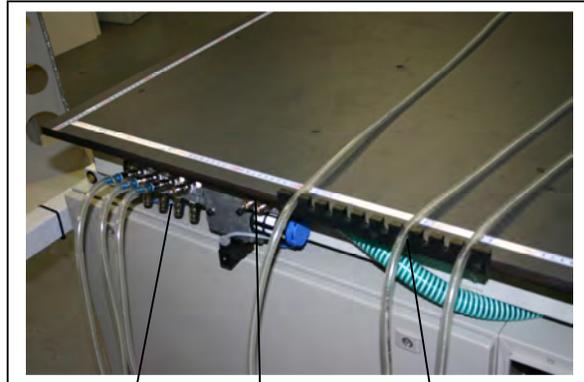
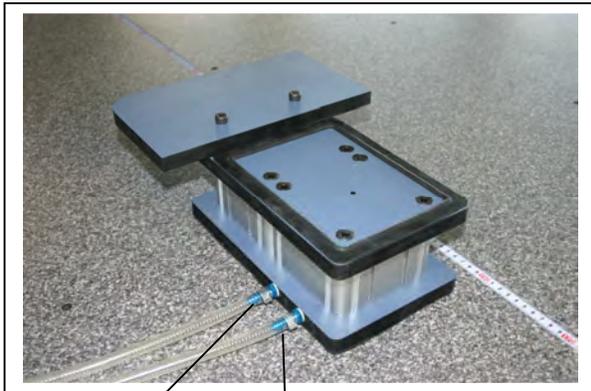
This drawing is available in dxf format on request.

The reason that there are 3 holes (964) for fixing is that this plate is universal. The left hand side of the plate above is straight and is used when needed as a start block. Therefore only the two left hand 8mm holes (964) are required and in fact the entire right hand side can be cut off if unnecessary or obstructing in some way.

Similarly when making a finish block, the right hand side is used and the two right hand 8 dia holes (964) are used.

The radius on the end of this surface allows the head to travel around the end when completing the trimming and scraping function.

These vacuum pods have two hoses for the vacuum. One is connected to the permanent vacuum rail (lower) of the vacuum manifold and serves to hold the vacuum pod to the bed of the machine even when the control vacuum is switched. The second hose is connected to the control vacuum (upper) rail of the vacuum manifold and is turned on and off with the vacuum control switch (945) on the front panel.



In **non-360 DEGREE MODE**, the cycle has some differences to when running in 360 DEGREE MODE.

Firstly, on pressing the Start Cycle button, the tape will commence feeding at the same time as the z axis is lowering. This pre-feeds the tape into the tape guide so that it feeds earlier onto the panel (requiring a shorter starting block).

This cycle is distinguishable from the 360-Degree Mode because when the z axis reaches its lower limit, the head will pause to allow the tape to finish pre-feeding, before it commences movement towards the workpiece.

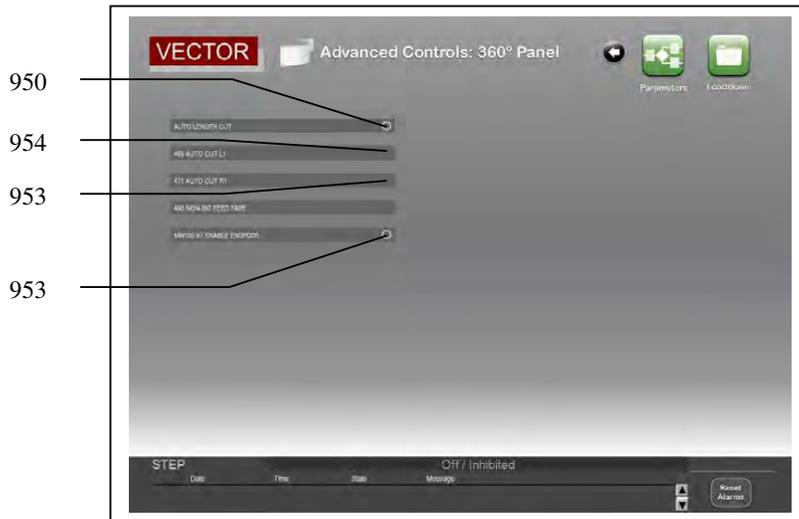
When in non-360 degree mode, it is possible to select from two operating states by choosing LENGTH CUT ON/OFF (950).



When the indicator (950) is RED, the mode LENGTH CUT is ON. When it is GREY, the mode LENGTH CUT is OFF.

To turn the LENGTH CUT on or off, it is necessary to go into the advanced controls page which is accessed by touching the 360 Panel wording (951) which is situated below the icon.

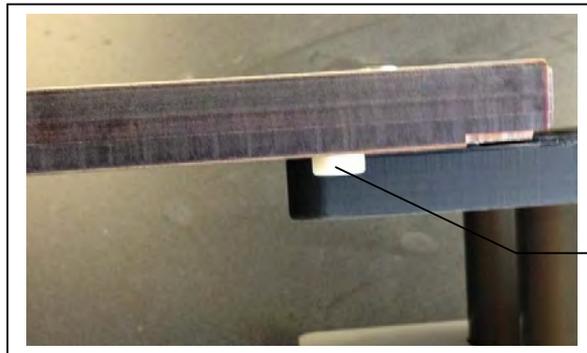
This opens the Advanced Controls: 360 Panel page and on this page it is possible to change the status of the LENGTH CUT setting using the radio button (950).



When LENGTH CUT “OFF” is selected, the butt joint sensing arm (938) swings out and remains out (though it will retract automatically when the convex sensor is off) running along the edge of the panel feeling for the sensing cam (966) on the finishing pod.



938
934



966

This sensing trigger (966) is a plastic screw which screws into the M6 hole in the FINISHING BLOCK. When the butt joint sensor switch (934) contacts this cam, the feed stops, edge tape is cut and then the head continues laying the edge material and trims until the trimmer and scraper run off the workpiece.

This distance of travel for the trimmer and scraper can be controlled by the operator (refer section 9.3) If the finish point of the tape cut is to be changed, this is effected by moving the position of the cam.

When LENGTH CUT "ON" is selected, the cycle starts in the same way as above with the difference being that the sensing arm (938) does not swing out. There is a length cut distance on the screen (953 and 954) which set the distance that the head will travel (cm) before automatically stopping and performing the end cut.

The LENGTH CUT distance is controlled by parameter Length Cut L (954) when using the L field start position and is controlled by parameter Length Cut R (953) when using the R field start position. This value can be manually entered, pulled from a previous setting programme or alternatively taught to the machine by the operator.

This teach function is achieved by first manually entering the number 99999. This is a number larger than any panel length and hence will not make a premature cut. The cycle is then run and at the point where the head reaches the position where it is appropriate to cut the edgetape, the manual END CYCLE button (959) is pushed. This automatically sets the count measure which will now be displayed on the screen.

The autocut parameter will set for each workzone independently allowing different cut lengths in each field. **Refer section 9.1.9 Setting Vacuum Cups and workzones.**

This AUTOCUT DISTANCE can now be manually adjusted on the screen by changing the parameter (58a or 58b) up or down as appropriate. The counts are approximately in cm.



9.2 Commencing a cycle

9.2.1 Setting vacuum cups and lead –in and lead – out pods.

The machine can operate in single or pendulum mode. When in single mode, the vacuum systems operates as one large field 3550mm x 1830mm. The vacuum control switches at each end of the machine perform the same function of raising the panel lifters and switching on the vacuum (it does not matter which switch is operated).

The worktables is divided into two fields L (944) and R (945). L is at the left hand end of the machine and R is at the right when in Pendulum operation. In Single field operation, the machine bed is one large field and both L and R can be placed anywhere within the bounds of the field.

When in pendulum mode, the vacuum field is separated into two fields and the control switches only activate the field adjacent. The modes Single or Pendulum are selected from the control screen by modifying the field (941).



The Vacuum pods (942) are able to be placed anywhere on the worktable (947) so as to support the workpiece. The hoses from the vacuum pods are plugged into the couplings on each end of the worktable and are switched via the control switch (945).

The vacuum pods are automatically locked in position when the vacuum is turned on.



942

947



945

946



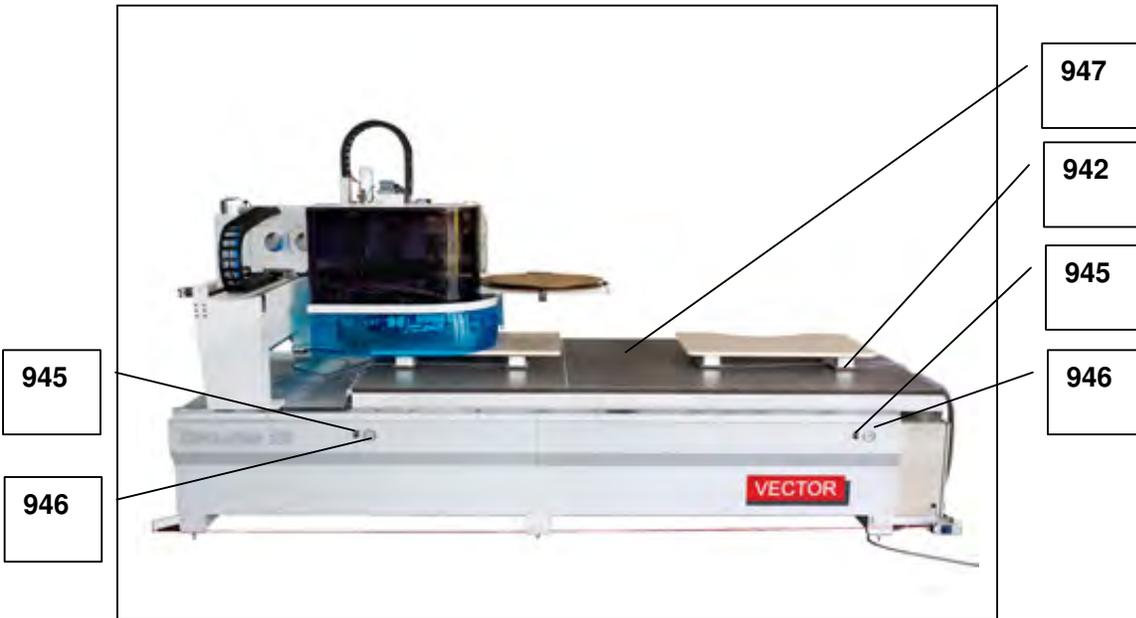
943

To facilitate positioning the pods and workpiece, lifting pins (944) built into a number of the pods. These are automatically controlled by the control switch (945) and lower when the vacuum is turned on.

This control switch (945) has two “spring return” positions. In its central position, the vacuum and panel lifters remain in their existing state. When switched to the left the vacuum is released. In the right position, the vacuum is switched on. In each case a return to the central position leaves the system in its “new state”.

The vacuum pump can be turned on from the main screen (943) , or will automatically start when the vacuum control (945) is operated.

The vacuum gauge (946) in each field registers the vacuum in it's specific field. Even in pendulum mode, the gauge is registering for its appropriate section of the machine. In the event of a loss of vacuum during a cycle, the machine will stop on emergency.



There is no requirement for absolute accuracy in positioning the panel as the principle of operation of the Vector Revolution senses the edge of the panel.

When placing the panel on the machine, it is important to consider the rotational capability of the aggregate to ensure that it will not exceed it's clockwise or anti-clockwise limits during a cycle as this will cause an alarm shut down.

It is also important to consider the alignment of the head when doing a butt join so as to be aligned in either the X or y axis. (Refer section 9.1.8.1)

It is also important to understand that when the head approaches a panel, it always does so in either the X or the Y axis direction. Thus although it is not critical that the face on which it makes contact first is aligned in the X or the Y, it is important from the view of setting the start position so as to achieve the desired contact point with the panel.

It is also important to consider the end conditions for when the head is going to retract away from the panel. This also is performed exclusively in the X or the Y direction so consideration must be made for which way this will occur. At 45 degrees, the direction transitions from one axis to the other.

If the retract distance reaches the axis limit, the head will automatically lift provided none of the board sensor, convex sensor, bump bar or bump switch is activated at the time (indicating the head is not clear of the panel). This should also be taken into account when setting the panel position.

CAUTION!

It is possible in some extreme circumstances for the head to retract sufficiently for the board sensor, convex sensor and bump bar all to be clear of the panel but for example for the trimmer to still remain close to part of the panel which could result in damage if the head lifts.

It is the operators responsibility to ensure that the head will retract sufficiently to clear the panel before lifting and to reposition the start position if this is likely to occur.

It is also possible to stop the machine in EMERGENCY STOP if it appears that lifting will cause damage to the head or workpiece. In this instance it is important to STOP before the lift has commenced because once the head has lifted off its lower limit switch, it will retract upwards on Emergency.

9.2.2 Saving start positions

On the control screen, there are two settable position fields (944 & 945). The current or active field position is the one that is highlighted in red. It is possible to toggle between the two settable positions by touching either field area (944 or 945). When the icon Move to Position (942) is pressed, the machine will move until the actual position matches the "current" target position (946).

The screen message (947) will state "Moving to position". When all axes (X, Y and C) are within their deadband range of this target position, the machine will cease moving and the screen message will read "Start when ready".



CAUTION !

Ensure that all axes are free of obstruction and personnel are clear of the machine before pressing the Move to Position key!

It is possible to change the start position settings two ways.

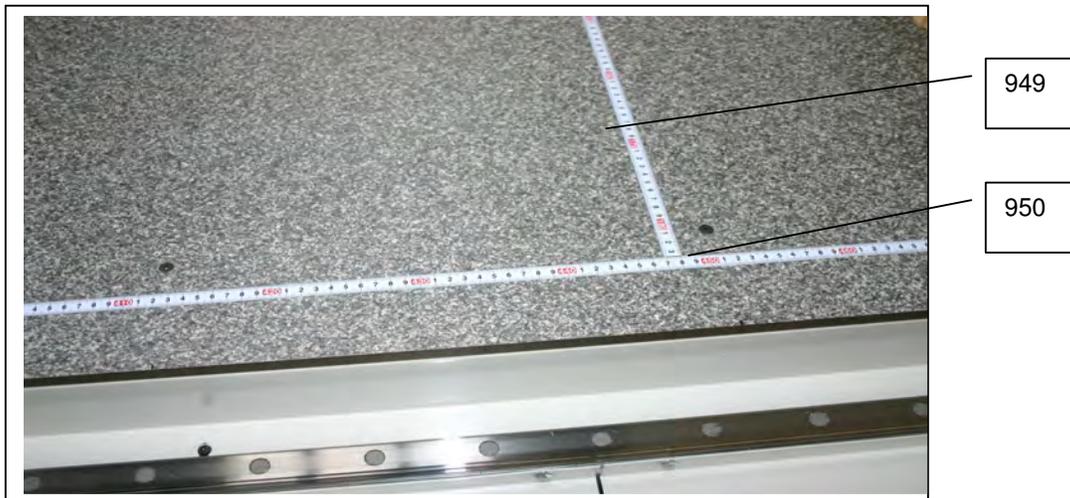
Method 1:

One is by modifying the settings in the appropriate target field (944 or 945). This can be done by modifying the number(s) in the field by touching the field number and modifying using the popup keyboard.

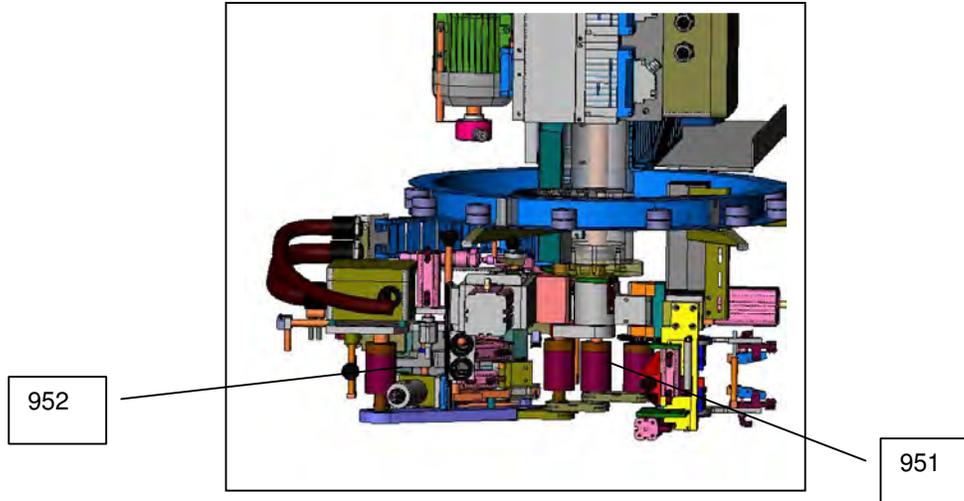
This is achieved by touching the wording (955) below the Start Positions icon which takes you into the Advanced Controls: Start Positions



It is a simple matter to read the desired starting position from the measuring scales which are placed on the bed of the machine in the X (950) and Y (949)s directions.



These scales are calibrated to match the position of the central axis of the C shaft which corresponds to the second pressure roller (951).



Thus for example, if an X position of 150 is set, Y position 100 and C 0 degrees, the head will move so that the C roller (951) will move to this position and the head will rotate to the 0 degrees position which is facing the right hand side of the panel.

NOTE: If a butt joint (360 degree) panel is being performed, the butt joint will be offset by 23 (23cm) from the C roller. This obviously depends on the angle the head is facing, so if the start is at 0 degrees in C, then the butt joint will be offset in the Y + direction. Similarly if the C angle is 90 degrees, the butt joint will be offset in the C negative direction.

This is because the edgeband starts the cycle positioned at the end trim point (952) in the tape guide and as the cycle starts, the head moves and lays the tape down 23 cm after the start position of the C roller.

Method 2:

The second method is to manually move the aggregate using the joy stick (919) and C Axis control switch (918) to the desired position and save the position using the Save position key (956).

A combination of these two methods can be used together in conjunction with the toggle between fields key (943) to easily set start and park positions for the machine.

At the completion of each cycle, the target position automatically toggles to the other position. For example; if the target position is presently in the second position (945), then on completion of the cycle, the target position will automatically toggle to the first position (944) and the aggregate will move there on completion of the cycle.

Conversely, if the initial target position is (944) then on completion of the cycle it will toggle to position (945) and move there and sit.



This method enables either for two panels to be loaded in pendulum with the aggregate automatically moving to the second panel on completion of the first (cycling back and forth thereafter).

Alternatively for large panels, a park position can be set for position 2 that will move the head away from the panel on completion to allow unloading and loading a new panel. When the new panel is loaded, pressing the switch field key (943) followed by the Move to Position key (942) will move the aggregate back into the start position.

CAUTION !

Always ensure that the aggregate is positioned clear of the workpiece and any other table obstructions such as vacuum cups before commencing a cycle to prevent damage to the aggregate.

9.2.3 Single or Pendulum

The machine is equipped with two vacuum manifolds which can either be used as a large single field or as two individual fields to allow one to be loaded/unloaded while the other is still working.



If the box (941) is set to SINGLE, then both vacuum fields operate as one with either vacuum control switch (945) working both fields. In this case, during a cycle, neither vacuum field will be released if the control switch is activated.

If the box (941) is set to PENDULUM, then the vacuum fields operate individually. Thus in the image above, the left field (944) is highlighted by the RED box indicating that this is the active field.

Pressing the Move to Position key (942) will move the head to the position highlighted. The cycle will not start unless the head is in this position.

On completion of the cycle, the head will automatically toggle to the opposite field position (945) set on the screen.

NOTE: When in SINGLE mode, either field can be set anywhere on the worktable. This allows a start position and a park position to be placed anywhere giving maximum flexibility for large panels.

Typically the right field on the screen (945) is used for the start position and the park position is set in the left field on the screen (944). This is because usually the head is parked away to the left of the workpiece giving easiest access to the panel and is therefore intuitive.

When in PENDULUM mode, the machine automatically limits the positions for the fields to the appropriate areas on the machine. If a setting is entered which is outside this range, the screen will flash a SETPOINT OUTSIDE RANGE error and automatically reset this value to the maximum allowed.

9.2.4 Start Cycle.

When the panel is sucked down onto the vacuum pods, the aggregate is in the start position and all the settings are as desired (including glue temperature reached), a cycle can begin.

To start a cycle, upon pressing the Start cycle pushbutton (960), provided all of the “Start Prevent” conditions are met (see section 9.2.5.1) the cycle will start.

NOTE: If the cycle does not start, push and hold the start pushbutton (960) and a message (947) will appear on the screen status bar advising the reason.



The cycle will commence with the aggregate lowering onto its z-down stop. Depending on the angle which it is facing at this point, it will move at a slow speed until the sensor S28 Board sensor detects the edge of the panel. The Screen message Approach Work will appear on the screen until the workpiece is detected.

Note: the direction of travel to approach the board switches at 45 degree increments. Thus for example when the C axis reads up to 45 degrees, the approach to the board will be in the negative X direction. When above 45 degrees the approach to the board will be in the negative Y direction and similarly all the way around the panel.

This needs to be considered when setting the start angle for the aggregate.

An explanation of the different automatic functions during a cycle are detailed in the section 9.3.

CAUTION !

Ensure all personnel are clear of the machine and that there is no possibility for the aggregate to drop onto any objects on the worktable causing damage.

9.2.4.1 Start Prevent Messages

The following is a list of the Start Prevent Messages which will appear when the Machine State is START WHEN READY but when the Start Button (960) is pressed, there are conditions required for operation which are not met.



NOTE: If the cycle does not start, push and hold the start pushbutton (960) and a message (947) will appear on the screen status bar advising the reason.

Message	Cause	Remedy
No Vacuum	Vacuum status low	Turn on Vacuum
Not in Position	X Y and C not at target	Press Move to Position. Check for obstruction.
Glue Off	Glue not on	Either turn glue on or press Start With Glue OFF.
Hood not closed	Hood open	Close Hood
Light Barriers broken		Clear light barriers
Pivot Not back	3 rd Roller forward	Check for obstruction or faulty sensor
Clean Switches	Join arm switches	Make sure join arm switch levers clear and sensors are in ON state.
Pressure bar off	Bump bar not ON	Clear obstruction or check bump bar sensor.
Moving position	Not in position	Press move to position

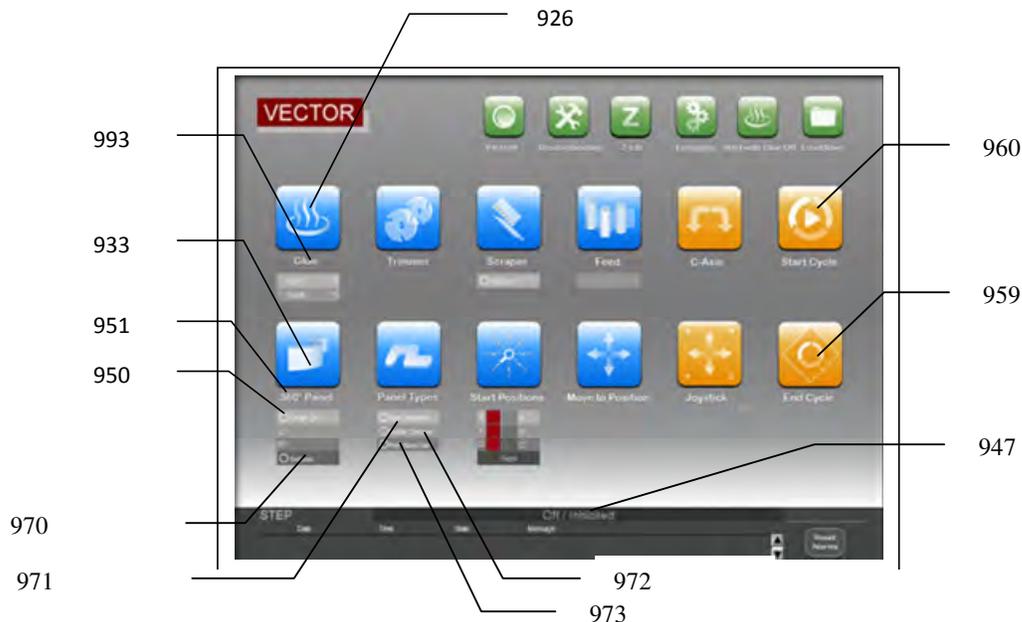
Example of Start Prevent message



9.2.5 Applying edge material only (without trimming or scraping)

Refer to section 9.1.2.1 for how to turn on the glue. For the purposes of this test, turn the glue on, trimming off, 360 degree cycle – YES, scraping off (note if the trimmer is turned off, the scraper is automatically disabled).

Also turn all of the other functions off for the purpose of running a edgetape application test without trimming or scraping on a simple rectangular shape with radiused corners on a 360 degree panel with butt join.



(993) Glue on	ON
(933) 360 degree panel	ON
(950) Length Cut	OFF
(970) Endpods	OFF
(971) Special sequence	OFF
(972) Enable Concave	OFF
(973) Retract on Bump bar	OFF

NOTE!

The above functions have been disabled only because the shape is simple. If running test edgetape gluing on complex shapes, the above functions can be turned on as required (see section 9.3 cycle functions for information on how these can be used).

Do this test on a panel of a reasonable size such as 1000mm long by 600mm wide with radius corners.

IMPORTANT!

This should only be performed under supervision unless you have achieved qualified operator status.

The purpose of this test is to check that the tape is applying correctly and to ensure there is a glue bead on the top and bottom edges of the panel, that the edge material is applied with even overhang on the bottom (approx 2mm) and that the edge bond is tight around all corners as well as to prepare a panel for testing the setup of the trimmers and scrapers.

See troubleshooting section 11 to resolve any issues with this edgebanding.

9.2.6 Trimming the edge material only (without applying edge material or scraping).

Using the panel created when testing the gluing and edge material application in section 9.4, it is now possible to start the cycle with the glue turned off for the purpose of testing the trimming setup.

The Vector Revolution has a patented trimming unit which travels with the gluing and taping aggregate and performs the top and bottom radius trimming in the same pass as the tape application.

The trimmer is supported on hinge pivot mechanism and is controlled against the panel via the PLC and pneumatic systems.

The settings of the cutters are controlled via horizontal and vertical tracer shoes. These are both adjustable.

Start the cycle as per section 9.2.4 but with the glue turned off and the trimming turned on. See section 9.2.1.1 for explanation on changing the settings. Leave all other functions turned off as per the test in 9.2.4 and use the same simple rectangular panel which was edge taped in this test.

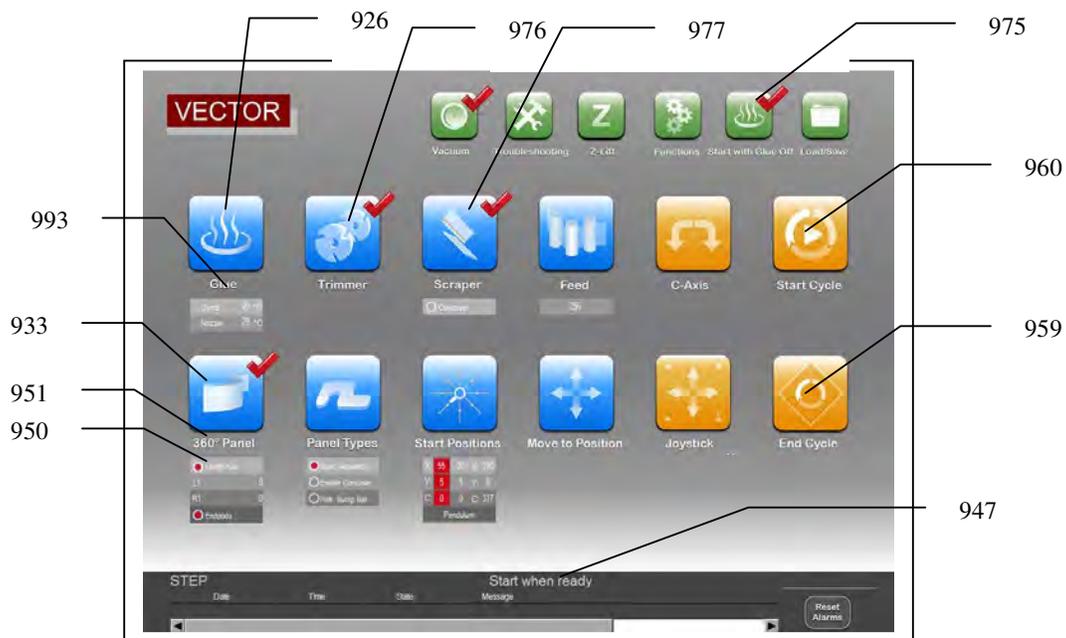
NOTE!

It is not possible to start the cycle with the glue turned off by simply pushing the start cycle button. This is to prevent the possibility of inadvertently starting a cycle without the glue on. If this is done when there is no edge material on the panel, the trimmers will cut the panel.

Thus it is required to be a deliberate action to start a cycle without glue and requires also that the Start with Glue OFF key (975) is first pushed. After this is set, the Start Cycle (960) button will commence the cycle provided there are no Start Prevent errors.

Because the glue is turned off, the cycle will start without feeding any edge material. The trimmer will start automatically and trim the panel.

For the purpose of testing the setup of the trimmer however, allow the trimmer to trim for about 300mm and then turn the trimmer off using the Trimmer key (976). Now to finish the cycle prematurely, push the End Cycle button (959). This will simulate an guillotine cut of the edge material, finish out the cycle and return to the “ready for cycle” position.



It is also possible to start and stop the feed rollers by pressing the start button (960) while traversing the panel. Pressing the start button again will re-commence the feed.
NOTE: if this is done during a gluing cycle, the pause must be very short because the heat from the glue nozzle will deform the band material depending on the characteristics of the band.

It is now possible to check the results of the test trim to determine if any adjustment is required for the trimmer. This will mean that only a small section of tape is trimmed and can be checked. Further adjustment can then be made and the same panel can be used to further check the setup.

This means in most cases the trimmer can be set using only a single panel. On completion of this setup, retain this panel for testing the scraper setup (ref section 9.1.9)

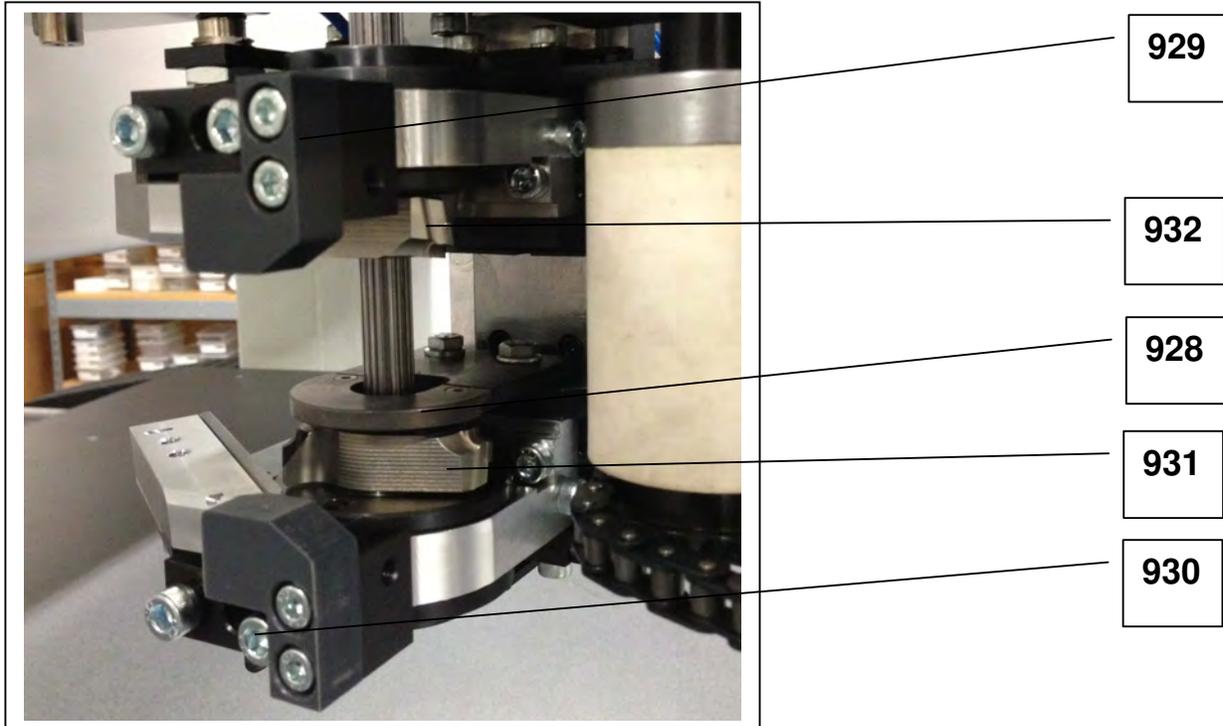
NOTE

This process can be performed any time to trim panels without applying edge material. For the purpose of the above test, a simple rectangular panel was used which meant that the functions listed in 9.2.4 were all turned off. However, if it is desired to “trim only” a more complex shape, then the above procedure should be repeated but with any appropriate functions turned on. See section 9.3 for information on how these functions can be used.

9.2.7 Setting Trimmer Shoes

9.2.7.1 Setting the horizontal tracer shoe

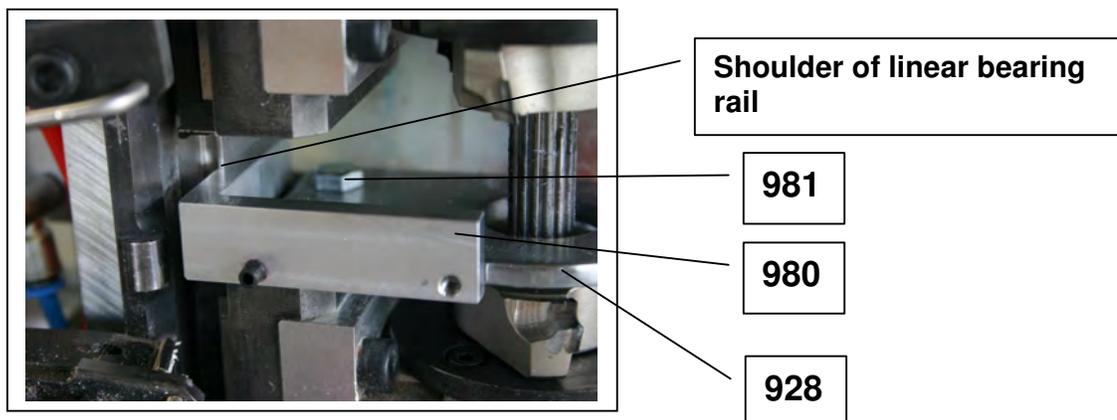
The horizontal shoe (928) controls the horizontal position of the cutters and operates for both the top (932) and bottom (931) cutter heads.

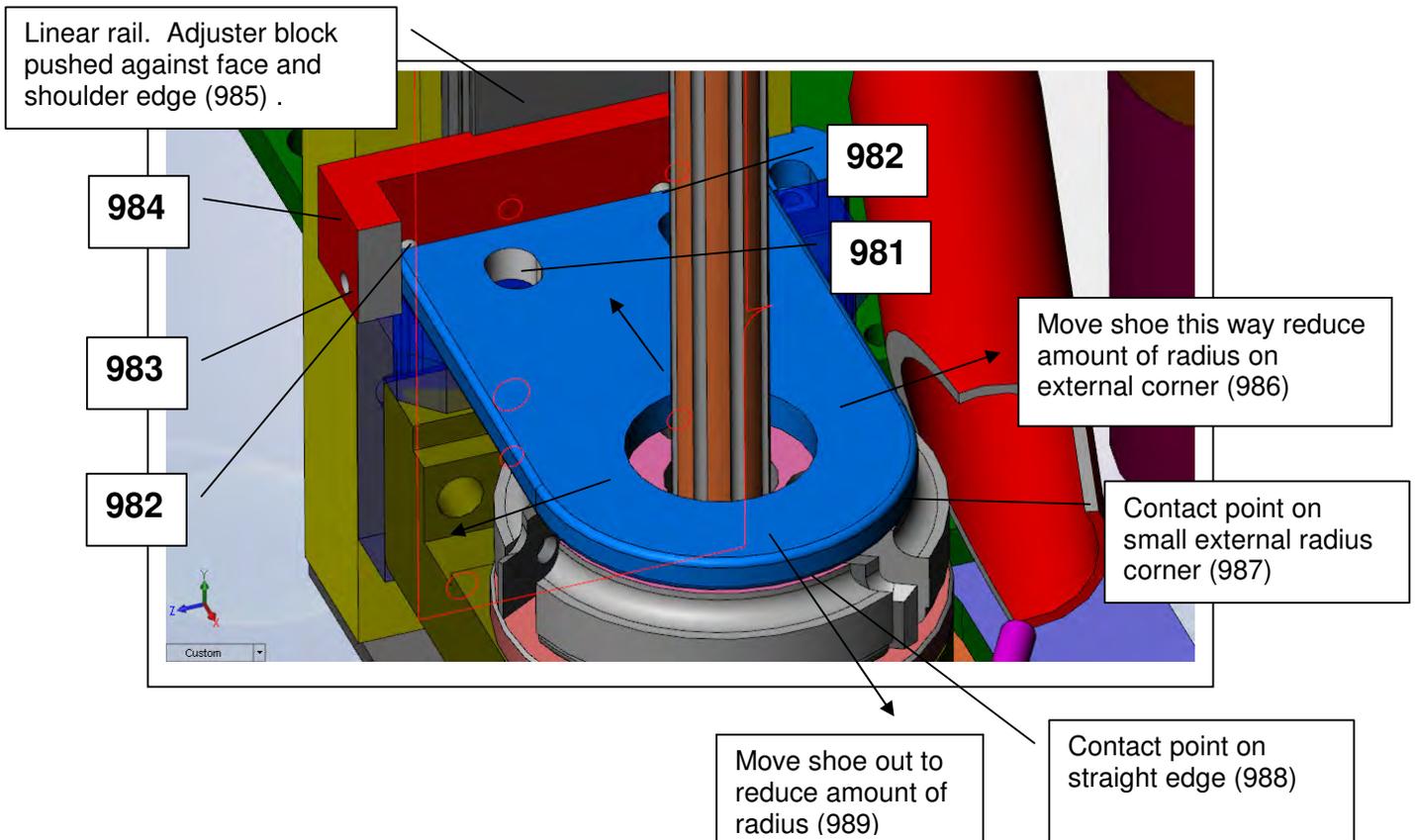


The horizontal tracer shoe (928) serves to control the basic shape of the radius. Moving the shoe outward past the end of the cutter will reduce the amount of radius which is formed on the edge material. Moving it back will create more shape.

It is usual to concentrate on setting the shape of the radius before adjusting the vertical shoes to achieve a close trim to the top and bottom surfaces of the panel.

Adjustment of the horizontal shoe (928) is made easy with the use of the adjustment gauge (980) which is provided in the toolkit of the machine





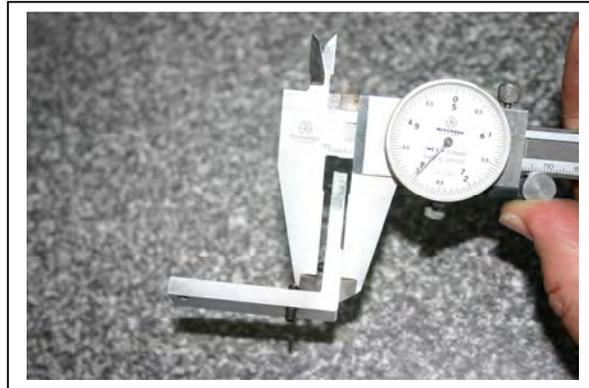
This horizontal adjuster block (984) is an L shaped device which has a machined rear face with 2 in/out adjusting set screws (982) and a side face with 1 set screw (983).

The rear face also has a machined shoulder which pushes up against the side of the vertical linear bearing rail on which the cutter blocks move up and down.

By placing the adjuster block flush against the face of the linear bearing rail and the shoulder against the side of the rail, it is possible to use the screws to make small accurate adjustments to the tracer shoe.

This is done by adjusting the screws until they just touch the tracer shoe. If for example the it is desired to move the shoe outwards (89), then remove the adjuster block and make an appropriate adjustment to the two rear set screws (82). These screws are metric M4 with a 0.7mm pitch. This means that one full turn of the screw will move it 0.7mm. Thus a $\frac{1}{4}$ turn will achieve just under 0.2mm.

It is also a simple matter to measure the setting using callipers as in the image below.



Adjustment can be made to the set screws and a measurement taken to check the change in setting.

Now release the two locking screws (981) on top of the horizontal shoe, replace the adjuster block (with it's new set screw settings) and push the horizontal shoe back against the two screws and sideways against the single lateral screw.

Lock down the screws (981) again. This will have set the new position for the shoe.

Adjusting the shoe in and out will increase or reduce the radius shape.
Adjusting the shoe sideways will not affect the shape of the radius except on a corner.

The reason for this is that as the shoe travels around tight corners, the contact point of the shoe against the panel changes slightly. For example on a small radius external corner, the contact point of the shoe rolls around closer toward the front (87) of the shoe.

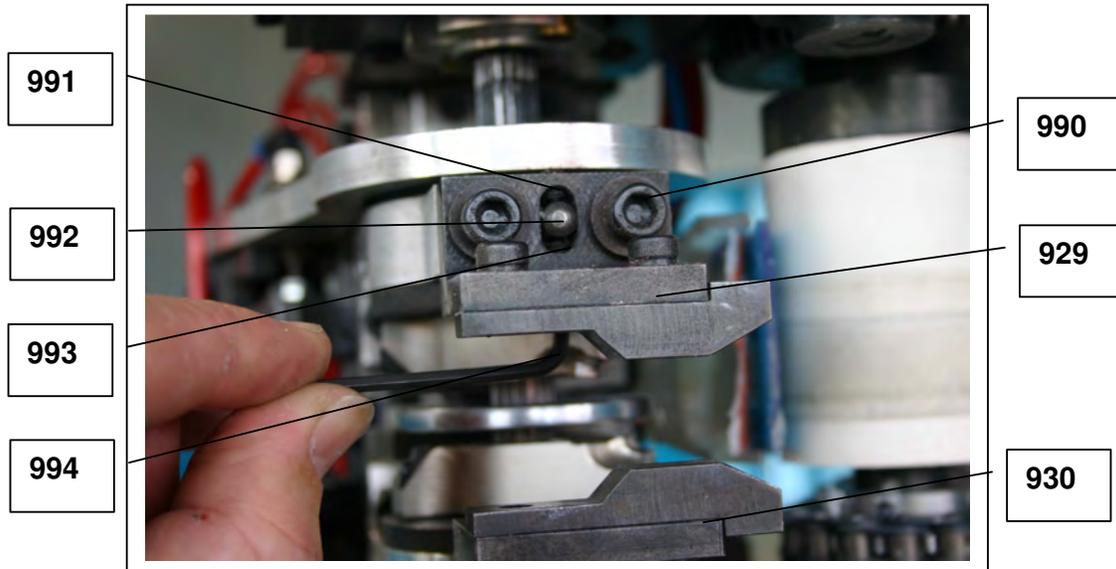
Thus moving the shoe in this direction will reduce the radius shape on the external corner. Conversely moving the shoe away in the opposite direction (toward the scraper unit) will increase the radius.

Trial and error will find the correct position to maintain an even radius around corners which matches the radius along straight or sweeping edges.

When you are satisfied with the shape of the radius, it is time to set the vertical tracer shoes which controls how close the trimmers cut on the top and bottom surfaces of the panel.

9.2.7.2 Setting the vertical tracer shoes.

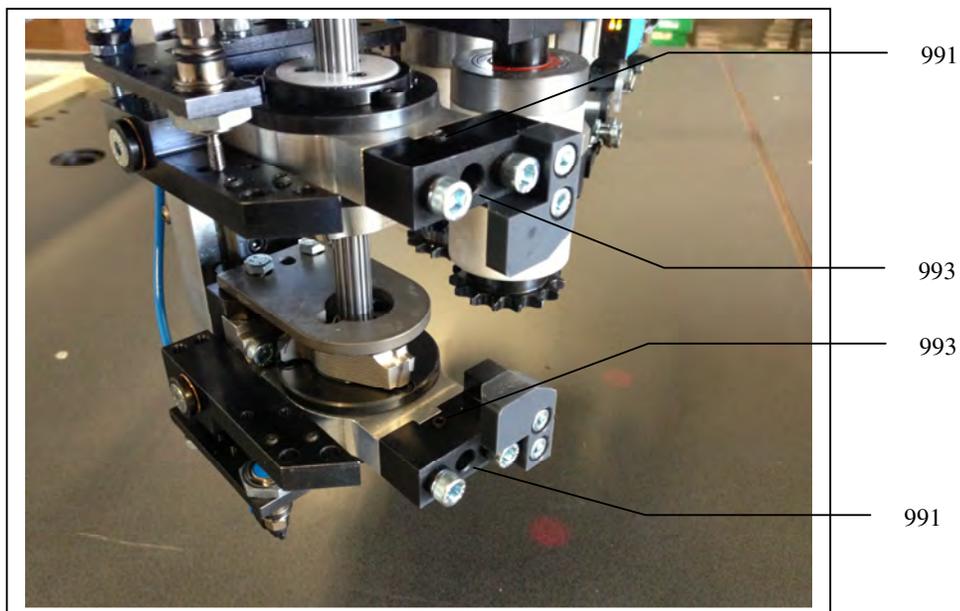
The vertical position of the trimmers in relation to the panel are controlled by one top vertical tracer shoe (929) and a lower vertical tracer shoe (930).



Adjusting the vertical shoe upwards allows the cutter block to cut closer to the panel. Conversely, moving the shoe downwards lifts the cutter away from the panel leaving more overhanging edge material.

To adjustment system for both the upper and lower blocks is the same but operates in opposite directions due to one being on top and one under the panel.

The scraper knife holder blocks (904) must be removed to get access to the adjusting screws for the vertical trimmer shoes.



There are 2 locking screws (990) on each block, one fixed pin (992) and an upper (991) and lower (993) adjusting screw. The shoe is restrained from tilting by a machined tongue and groove arrangement on their mating faces.

Firstly release the locking screws (990) and then finger tighten them so they provide some resistance to movement.

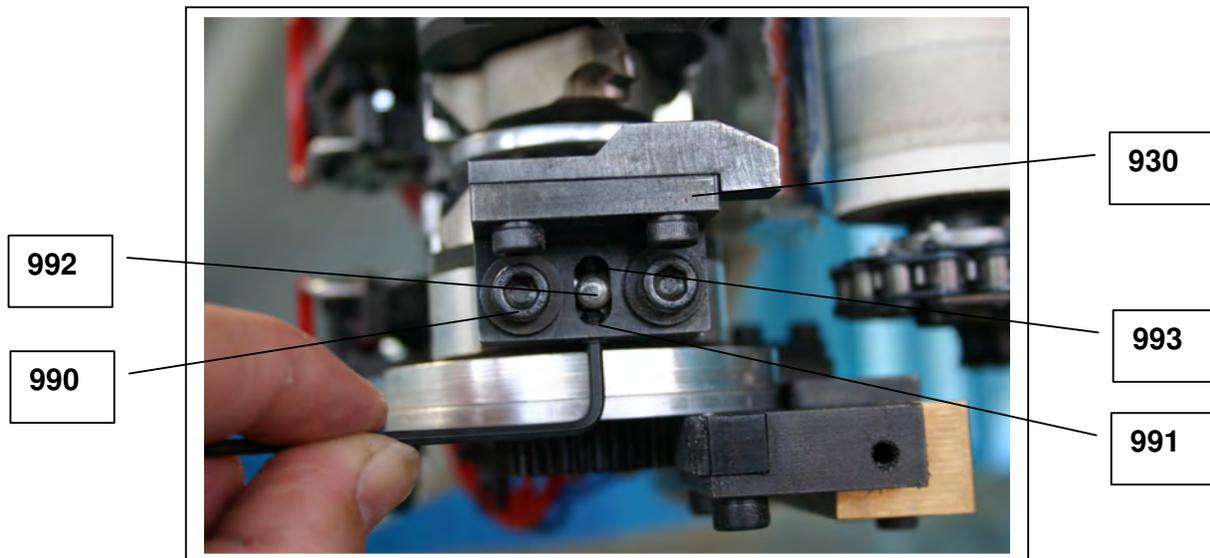
Now release the set screw which is resisting movement in the direction which you wish to move the shoe. For example, if you wish to move the top shoe upward, release the screw (993) by the amount you wish to move the shoe.

These set screws are M5 x 0.8mm pitch. Thus one full turn amounts to 0.8mm. A ¼ turn amounts to 0.2mm.

Now tighten the top set screw (991) which will pull the vertical shoe upward until the lower set screw (993) makes contact again with the fixed pin (992). Lock the screws (990) on the shoe.

For the lower cutter block the same principal applies although the directions are reversed.

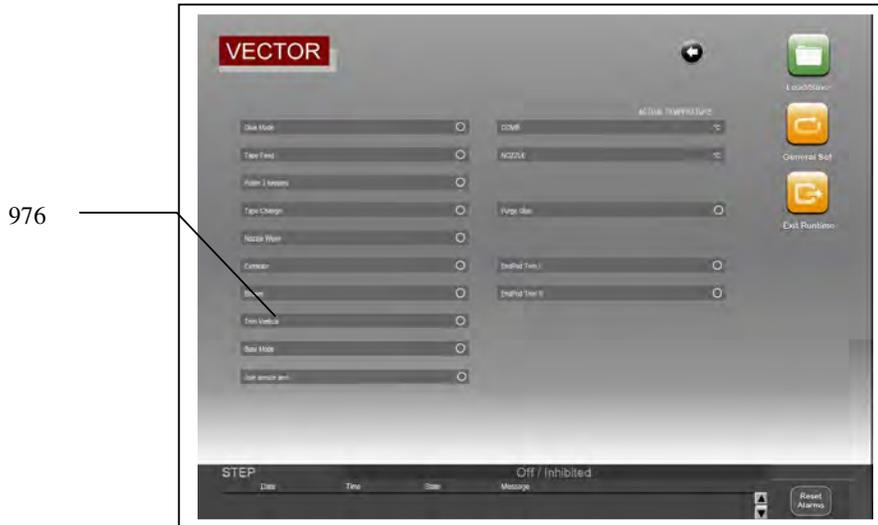
For example to raise the tracer shoe (exposing less cutter) so that the cutter removes less material, then release screw (991) the desired amount and pull the shoe up with screw (993). Re-lock locking screws (990) as per procedure for top cutter block.



When you have completed reading the manual and are ready to run, it is possible to perform a single panel test to set the trimmers.

It may be convenient to bring the trimmers together when making adjustments. This may give better access to the adjusting screws and also allow a measuring calliper to measure the spacing between the tracer shoes for reference. From this it is possible to measure the adjustment changes made.

The trimmer blocks can be brought together by going into the functions page and activating the Trimmer Vertical button. (976).



9.2.8 Performing a complete cycle with trimming and scraping but without gluing. (used to test setup of scraper).

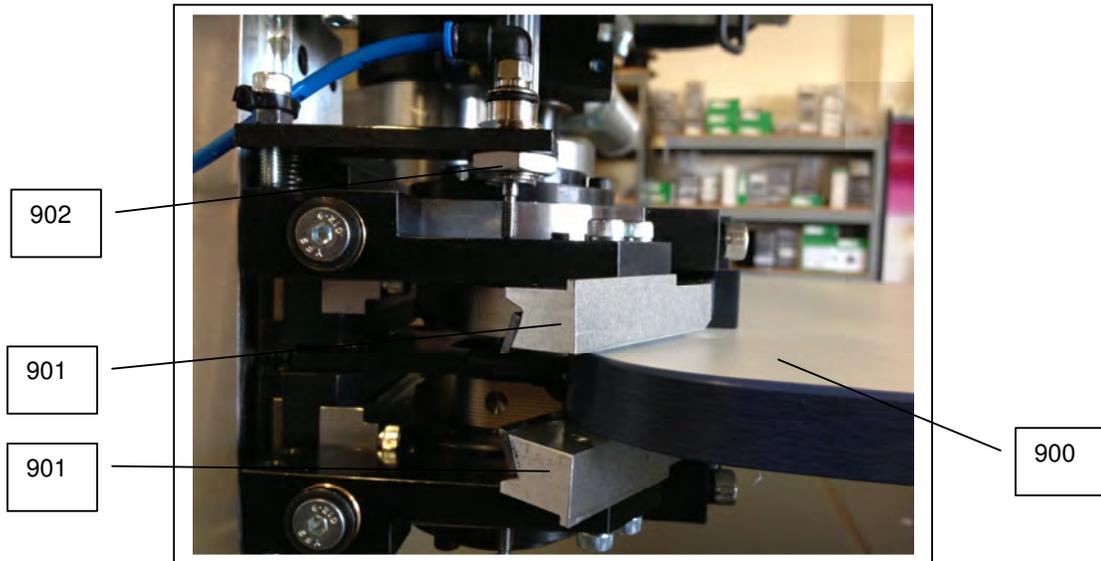
Using the panel created when testing the gluing and edge material application in section 9.4, it is now possible to start the cycle with the glue turned off for the purpose of testing the scraping setup. This is exactly as for running with the trimming on and glue off as in section 9.2.5 with the addition that the scraper is turned on. See 9.2.1.1 on how to turn the scraper on.

Because the trimming process has already been performed, the trimmer will not remove any material so this test is used to test the performance of the scraper.

Test by starting the cycle and after running for approximately 300 mm, turn the scraper off and complete a manual end cycle (ref section 9.2.5). Check the scraper performance and adjust as necessary as per the next section.

9.2.8.1 Setting the Glue Joint (surface) Scraper

The glue joint surface scraper (901) is a unit suspended from the trimming unit with a pneumatic cartridge cylinder (902) pressing the scraper knife arm down onto the panel (900)



The knife has adjustments which allow its pressure, flatness to the panel and angle of attack to be adjusted.

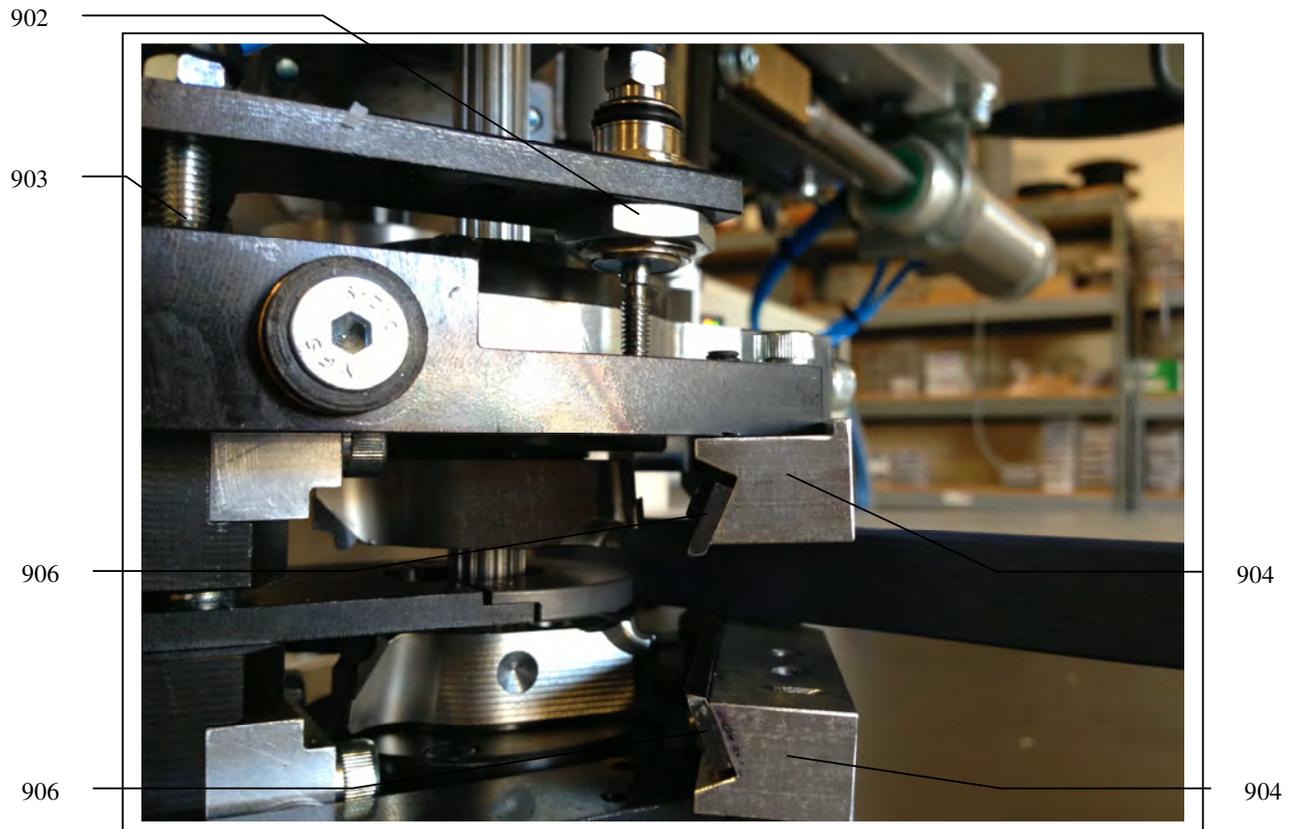
This is achieved by commencing a cycle on a panel which has had banding applied already without trimming. This enables the head to be stopped and started as it travels around the panel using the start button.

The cycle is started with the trimmer and scraper on. Allow the head to travel around the panel until it is in a position giving good access to the scraper system. At this point, stop the cycle using the START/HOLD button (960).

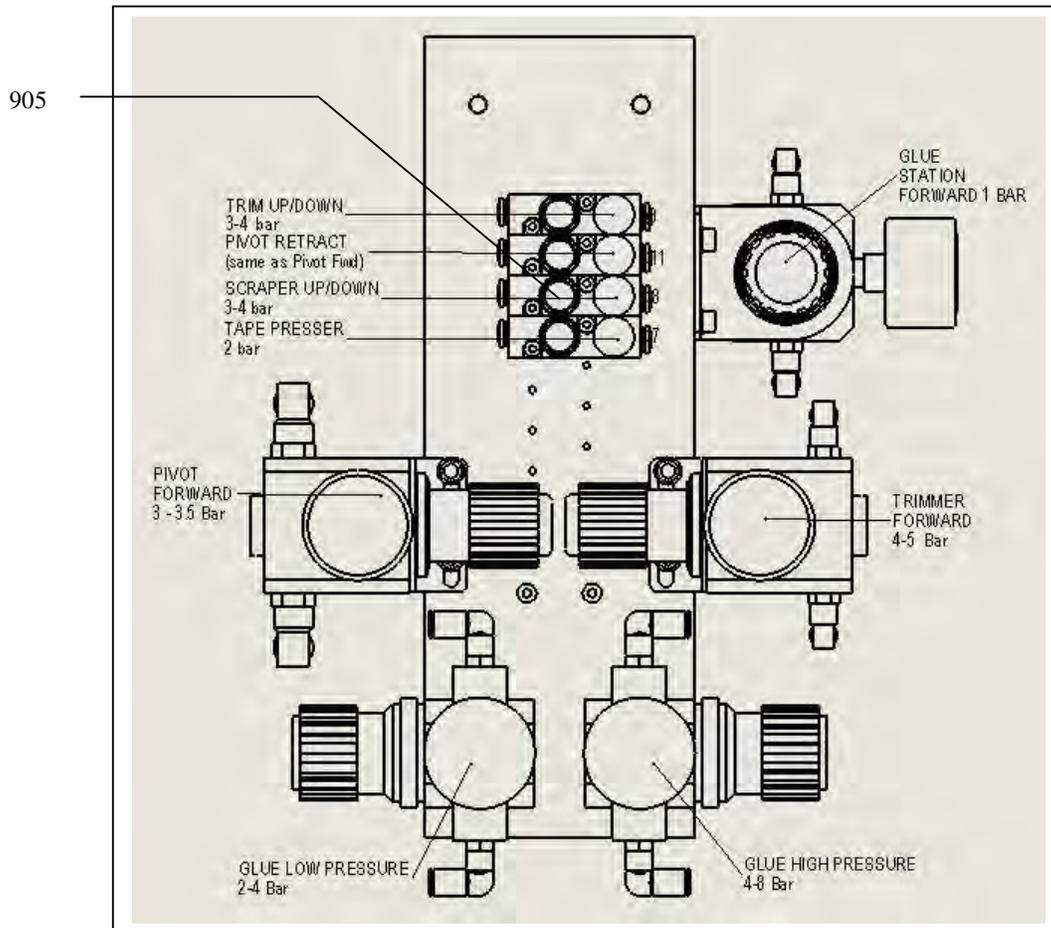
DANGER!

Opening the front hood will now disable the trimmer. The trimmer is electronically braked and will slow quickly but it is good practice to make sure the trimmer is fully stopped before approaching.

If the scraping is not performing as desired it is possible to make adjustments. It is recommended to do these in the following step order.



1. Ensure that the travel limiter screw(s) (903) are not preventing the scraper knife applying pressure to the workpiece. The knife should be able to travel 0.5 – 1mm past the surface of the workpiece.
2. The pressure for the vertical pneumatic cylinder (902) is controlled by the regulator (905).



Typically this pressure is set at 3 bar. If the scraper is not performing correctly, the first adjustment is to increase this pressure to say 4 bar. Harder banding materials may require a little more pressure.

Note however, that increased pressure could also cause the knife to damage fragile surface materials.

3. If the scraper is still not scraping correctly, next check the horizontal angle of the knife in relation to the panel. The knife (906) makes contact with the panel at the glue joint but should be slightly raised at the inside end so a visible light gap is present (approximately 0.25mm). See Fig 10 below at position (907)

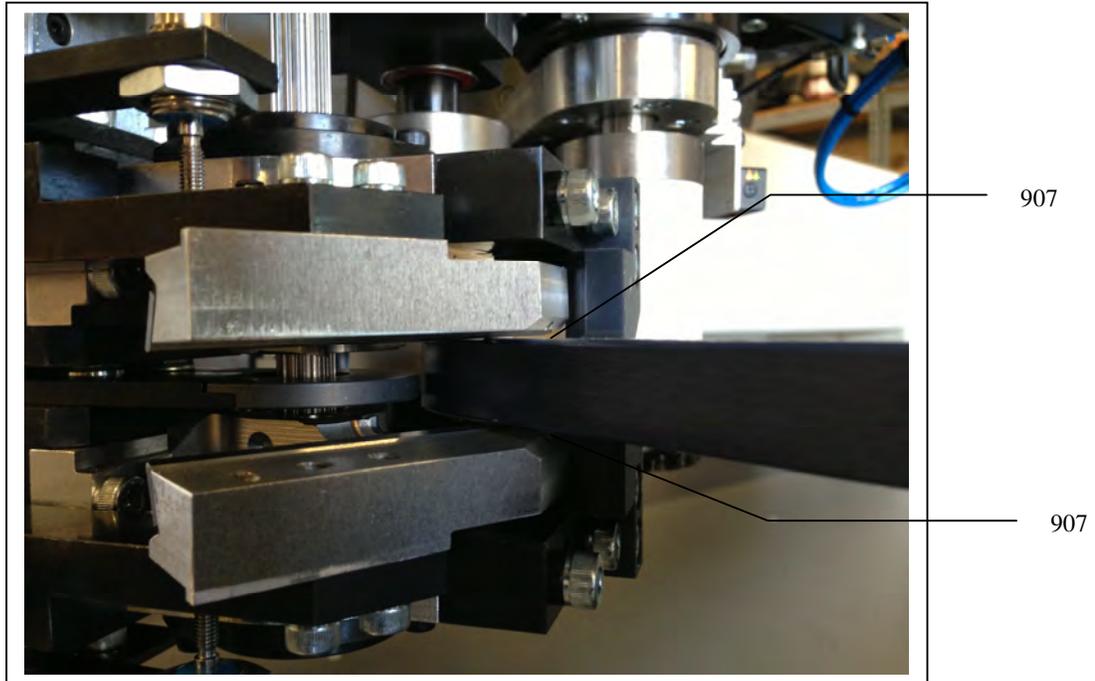
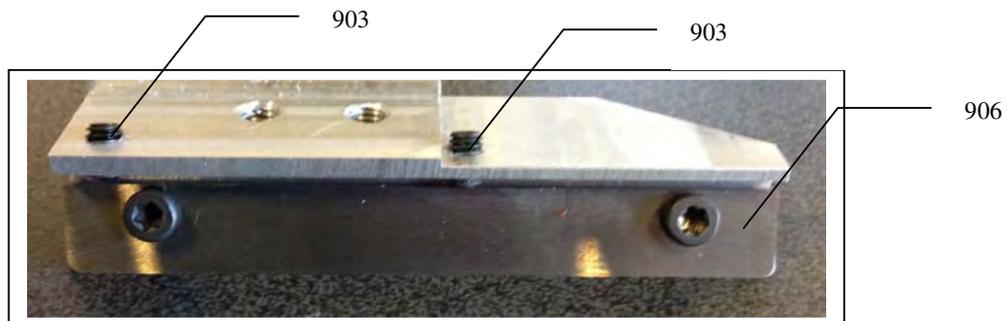


Fig 10

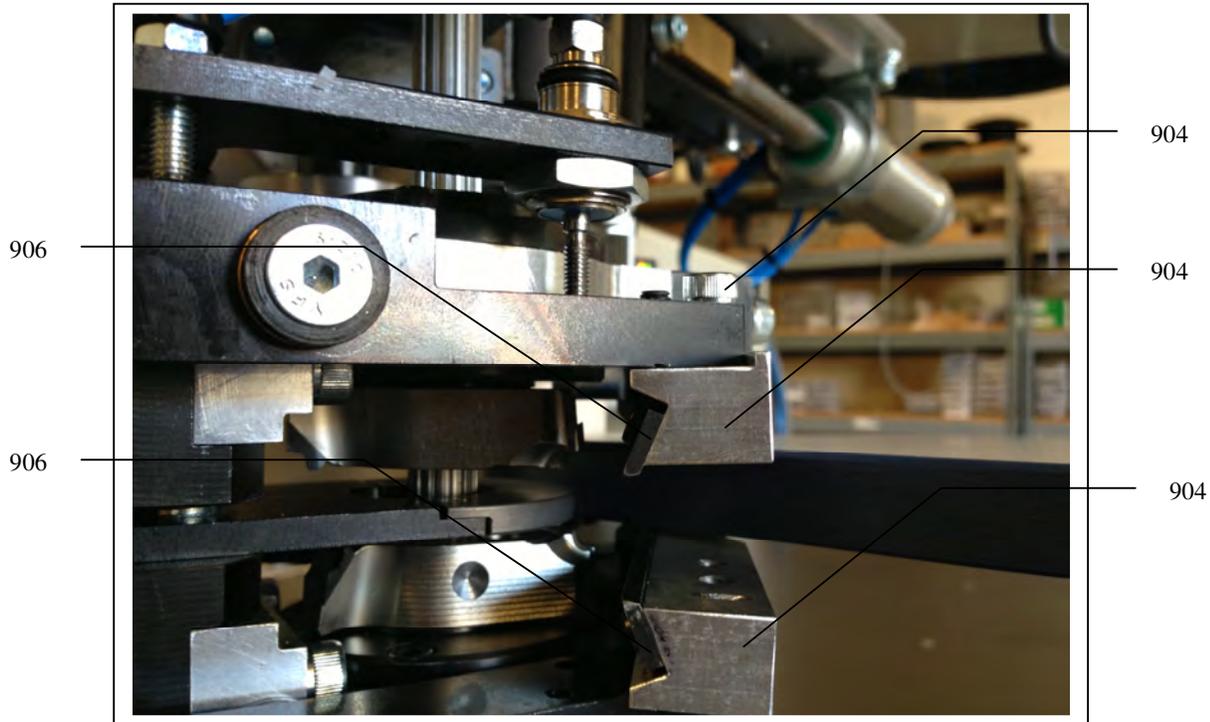
If adjustment is required, this can be made on the knife holder block (904). The knife (906) is loosened and the two set screws (903) are adjusted to alter the angle of the knife to achieve the desired light gap.



When this adjustment is made, commence another scraper test to check the performance of the scraper knife.

4. If the scraping performance is still not satisfactory, it is possible to adjust the attack angle of the knife.

This is achieved by adjusting the two set screws (906) to tilt the knife block (904) on a greater angle causing the knife to cut more aggressively into the glue edge.

**NOTE!**

The scraper is designed to remove the squeezed glue bead and a small sliver of edgeband material. If the amount of trim overhang is greater than approx 0.2mm, the trimmer should be adjusted so the scraper is removing an appropriate amount. This will vary depending on the band material and the flatness of the workpiece. If the workpiece is badly distorted, it will be necessary to set the trimmers further away and hence have the scraper do more cutting. The ability to achieve this will depend on the materials being used.

The final adjustment for the scraper is the Travel Limiter (908). This screw is set so that the scraper is able to travel approximately 0.5 - .0mm beyond the worksurface. If this adjustment is set too high, the scraper will be held off the panel and not perform correctly. It is designed that in the event the trimmer is pushed away from the panel by a misplaced vacuum pod, the scraper will slide back onto the panel due to the radiused end of the knife. If the overtravel is too great, this will not happen and the scraper knife may damage the banding material.

9.3 Advanced Controls.

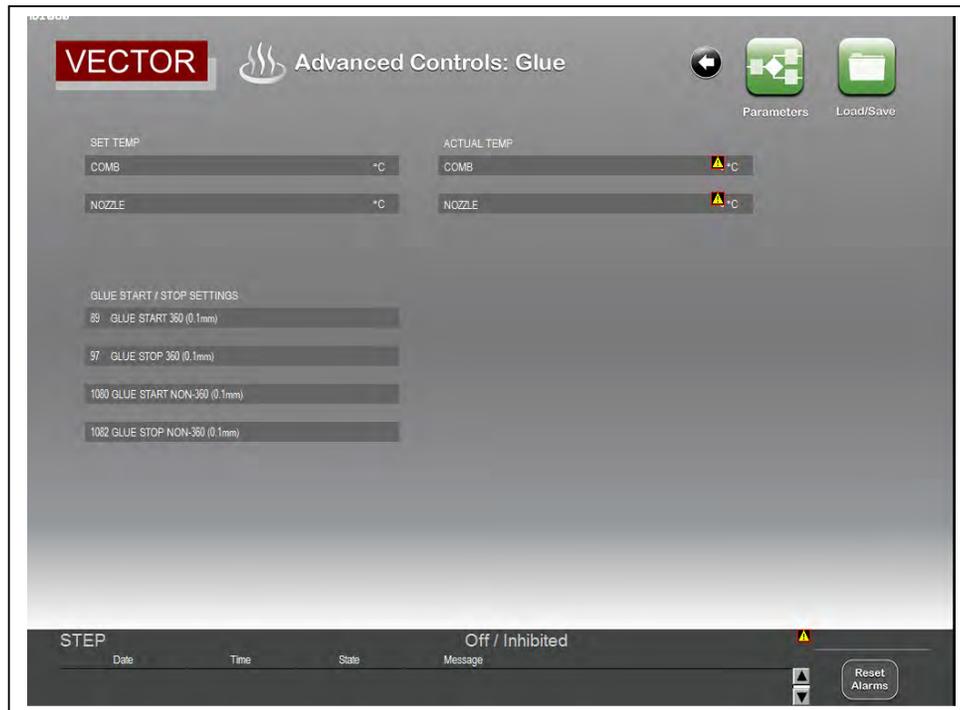
There are a set of Advanced Controls for each icon on the control screen. These advanced controls give extra ability for the operator to make setting adjustments according to specific conditions.

Usually these advanced controls remain hidden as they are not required for machine running and they are accessed as needed.

The advanced controls are accessed by touching the wording below each icon. For example, to access the Glue Advanced controls, touch the screen as shown at (993)



9.3.1 Advanced Controls: Glue



These settings are:

Set Temp	Comb	Set temperature for the comb (cartridge) element
	Nozzle	Set temperature for the nozzle element
Actual Temp	Comb	Display of the actual comb temperature
	Nozzle	Display of the actual nozzle temperature
Glue Start 360 (0.1mm)		Distance from tape present switch to glue start. Increasing this distance moves the glue away from the leading edge of the band for a 360 degree panel.
Glue Stop 360 (0.1mm)		Distance from when the end of the band falls off the tape present switch to when the glue turns off. Reducing this count moves the glue finish away from the trailing edge of the band
Glue Start non-360		Distance from tape present switch to glue start. Increasing this distance moves the glue away from the leading edge of the band for a 360 degree panel. For thin tapes, it can be advantageous to allow the band under the 1 st pressure roller before starting glue so it pulls the band across the nozzle.
Glue Stop non-360		Distance from when the end of the band falls off the tape present switch to when the glue turns off. Reducing this count moves the glue finish away from the trailing edge of the band

9.3.2 Advanced Controls: Trimmer



These settings are:

- | | |
|-------------------------|--|
| Trim Forward Pressure | When set to OFF, trimmer advance pressure is OFF when trimmer is turned OFF. This can be useful if producing shapes outside specification where the banding can be performed but the trimmer will interfere. This allows the trimmer to float. |
| Start Trim 360 (0.1mm) | Distance from commencement of edgeband to the point where the trimmer starts trimming for a 360 degree (butt join) panel. Note the trimmer must start after the band start to leave a clear underhang for the butt join arm to measure. |
| Trim run on 360 (0.1mm) | Distance from the end of the band to when the trimmer and scraper finish. |
| Start trim non-360 | Distance from commencement of edgeband to the point where the trimmer starts trimming for a non-360 degree (open) panel. |
| Trim run on non-360 | Distance from the end of the band to when the trimmer and scraper finish. |

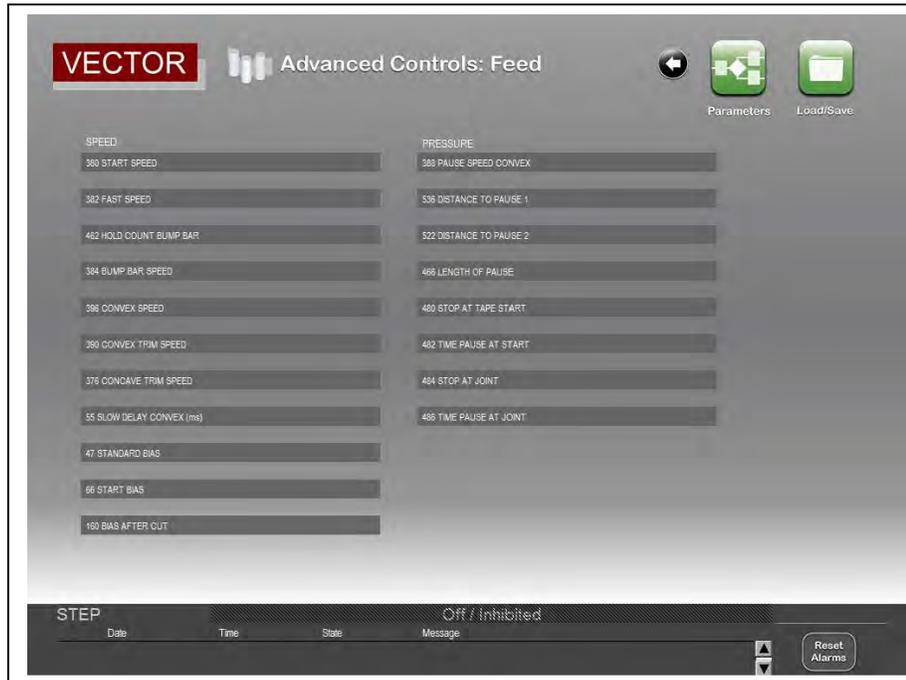
9.3.3 Advanced Controls: Scraper



These settings are:

Concave Scrape When this is set to OFF, the scraper will automatically lift off when the curve becomes concave. It will automatically recommence when the edge straightens again or goes convex. On internal radii less than 300mm, the scraper will move over the panel away from the edge and on fragile surfaces, this may mark the surface, hence it is possible to turn the scraper off in this situation.

9.3.4 Advanced Controls: Feed



These settings are:

Start Speed	Feed speed when laying tape at commencement of cycle
Fast Speed	Maximum speed attained on straight edges
Hold count bump bar	Distance after bump bar is released before speed, bias and roller pressure return to standard.
Bump bar speed	Feed speed when bump bar is touched (this will be overridden by slower speeds such as corner speeds). This speed will be retained until the Hold Count bump bar turns off after the bump bar returns to position
Convex Speed	Speed around tight convex corners (as determined by the convex sensor dropping off the panel). If the convex sensor remains on the panel, such as in a big external radius, this speed will not be used.
Convex Trim Speed	Second stage of convex corner to bring the trimmer around the corner at other than Fast Speed
Concave Trim Speed	Second stage of concave corner to bring the trimmer around the corner at slow speed to ensure quality of trimming. Note concave banding speed is not operator adjustable.
Slow Delay Convex (ms)	Timer after the convex sensor drops off the panel before the speed slows. If set to zero, the section of band which will be wrapped around the corner remains longer on the nozzle which puts more heat into the band material.

Standard Bias	Bias is the force applied by the patented VECTOR Revolution process in the direction of travel. This assists the head along the workpiece.
Start Bias	Bias along the direction of travel as the band is first being laid on the workpiece. Some banding materials (in particular in a hot environment) may slip a little as they are being laid on the workpiece. If the banding is sliding along the workpiece in the direction of travel, reduce the bias.
Bias after cut	If the banding is sliding under the rollers, increase the bias. On some difficult materials, in particular on small diameter round panels, it can be that the banding bunches as the head accelerates back to speed after performing the end trim in preparation for the butt join. Increasing this parameter can eliminate this banding issue.

On difficult materials and small radius external corners, it is possible that there can be some gapping of the band at the transition into and out of the radius. It is possible to use this pause function to slow the feed at the two transition points to ensure tighter glue bonds.

Pause speed convex	Speed of pause. 0 = slowest possible speed which is set by the motor controller. Same as speed at butt joins.
Distance to pause 1	Distance after convex sensor drops off panel to the point where the creep speed 1 applies. These positions can be adjusted so the feed slows at the correct position desired on the corner.
Distance to pause 2	Distance after convex sensor drops off panel to the point where the creep speed 2 applies
Length of pause	This is the distance in (0.1mm) for which the creep speed applies. If this value is set to 0, the corner pauses are disabled. If this distance is set to 100, the feed will creep for 10mm at positions 1 and 2 above.

On small diameter circular panels, it may be desirable to pause the feed at the point where the banding is first laid on the panel and also when the end of the band is laid to make the butt join so as to ensure a flat butt join. This can be achieved using the following setup.

Stop at tape start (0.1mm) Position where feed will pause to hold down tape at tape start.

Time pause at start (0.1s) Length of time for the pause at the start

Stop at joint (0.1mm) Position where feed will pause to hold down tape at the joint.

Time pause at joint (0.1s) Length of time for the pause at the joint.

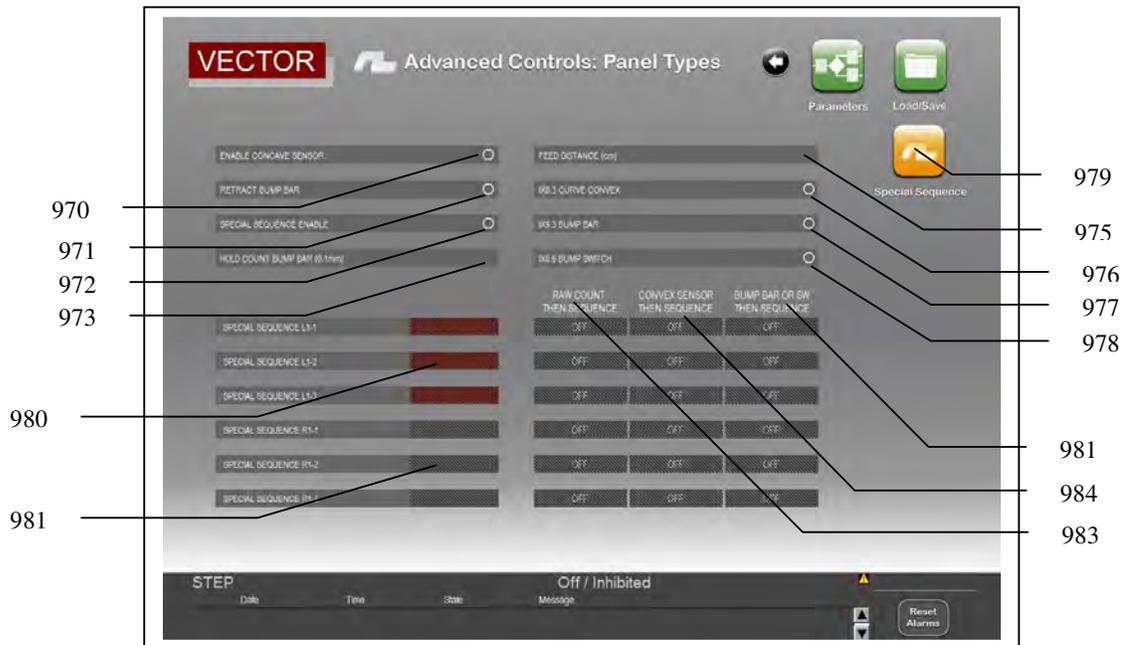
9.3.5 Advanced Controls: 360° Panel



These settings are:

- Auto Length Cut** When "ON", the distance travelled in a non-360 degree (open) panel is controlled by Auto Cut L1 for the left field, and Auto Cut R1 for the right field. See section 9.3
- Autocut L1** Distance travelled before automatically stopping and end trimming. Can be set by entering distance value in to screen, or by setting large number 9999 and then pressing End Cycle at appropriate time. This saves the correct distance. **Refer 9.1.8.2**
- Autocut R1** As for Autocut L1 but applies to RIGHT working field. **Refer 9.1.8.2**
- Non-360 feed tape** Pre-feed distance for band on non-360 panel. This is the distance the band feeds during the z-lower. It should be set so that it does not quite reach the tape present switch.
- Enable EndPODS** Turning this on enables the AutoTrim EndPOD manifolds. Thus on a non-360 panel, if the endpods are connected they will operate in the field which they are connected. Refer separate endpod operating manual.

9.3.6 Advanced Controls: Panel Shapes



- | | | |
|----------|-------------------------|--|
| 970 | Enable Concave Sensor | Turning this on enables the concave sensor which is required to be activated for tight concave (internals corners) less than 70mm. Refer section 9.4.3 |
| 971 | Retract on Bump Bar | Turning this on makes the bump bar retract when touched. It will remain retracted until the Hold Count Bump Bar (973) counts out. Refer 9.4.2 |
| 972 | Enable Special Sequence | Turning this on enables special sequences. Refer section 9.4.1 |
| 973 | Hold count bump bar | Distance after bump bar is released before speed, bias and roller pressure return to standard. |
| 975 | Feed distance (cm) | Display of feed distance in cm from start of edgeband. |
| 976 | Curve convex | Display of convex sensor status. Red means sensor is Sensing the panel. Grey means it has dropped off and therefore had detected an external corner. Refer 9.4 |
| 977 | Bump Bar | Display of bump bar status. Red means bar is at rest. Grey means the bump bar has been activated. Refer 9.4 |
| 978 | Bump Switch | Display of bump switch status. Read means switch has been activated. Refer 9.4 |
| 979– 983 | Special Sequence | Refer section 9.4.4 Special Sequence use and setup. |

9.4 Cycle functions.

The patented Vector Revolution 180 system is set up to automatically anticipate impending conditions and adapt it's settings accordingly to ensure optimum performance.

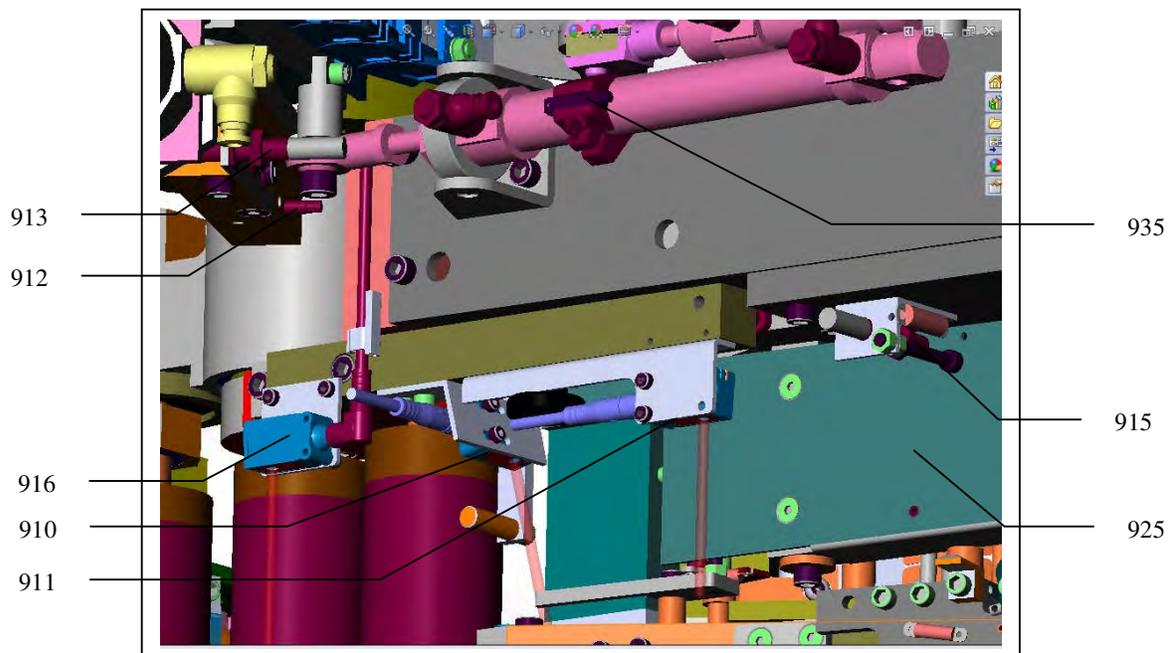
Standard conditions are considered to be principally straight edges or gently curving edges.

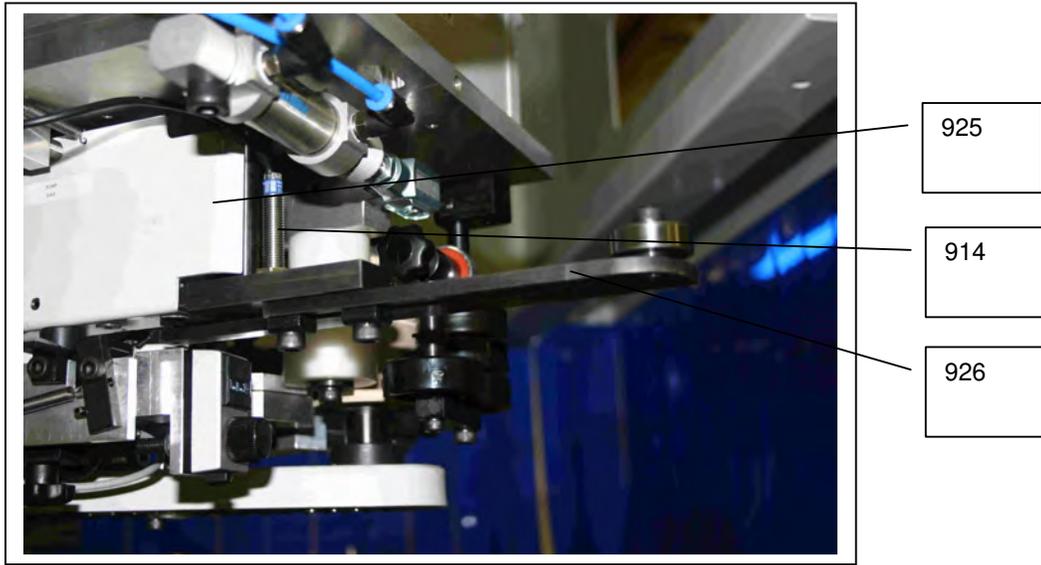
Special conditions are deemed to be tight convex (external) corners, tight concave (external) corners and large radius concave corners.

The design of the Vector Revolution 180 is such that little operator setting is required to handle these conditions. The settings which are required are set from the control screen (refer section 9.2.2). As the aggregate progresses around the panel, it anticipates the differing conditions via a series of sensors.

LIST OF SENSORS

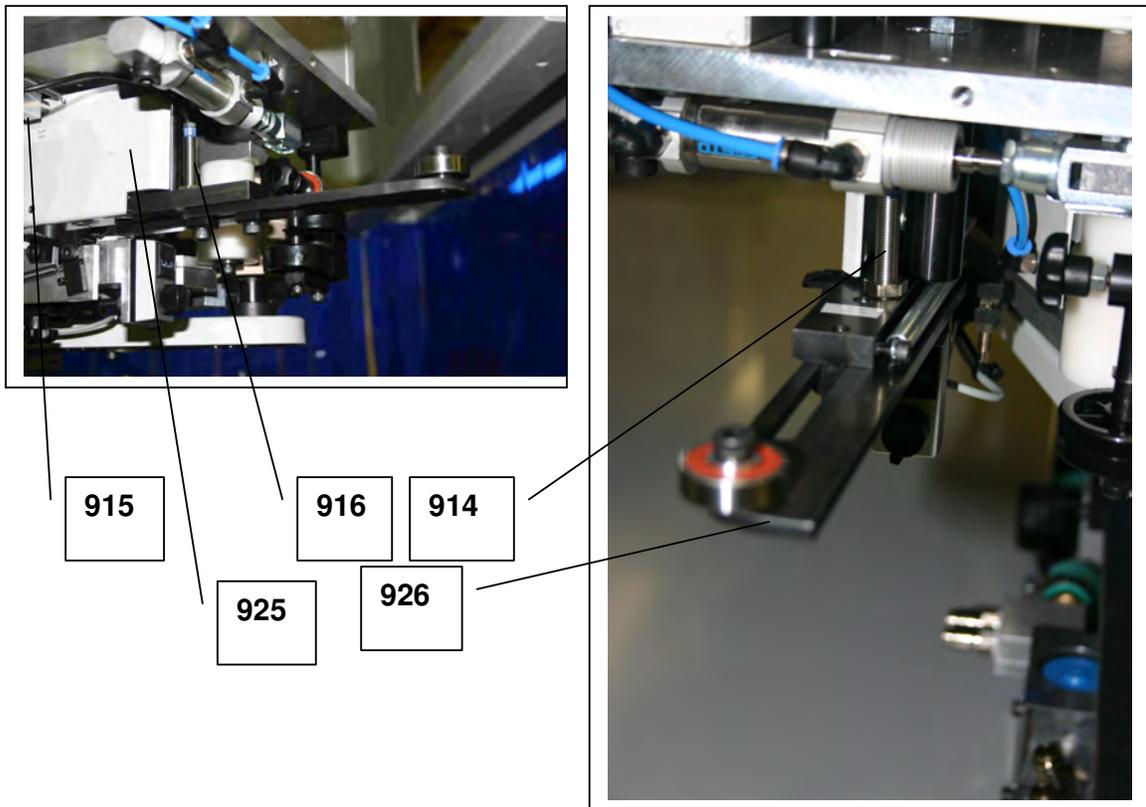
910	S21	Concave Sensor
911	S24	Convex Sensor
912	S23	Pivot Back
913	S25	Pivot Forward
914	S27	Bump Switch (for tight 90 degree internal corners)
915	S32	Bump Sensor (for gentle and non-90 degree internal corners)
916	S28	Board Sensor
925		Bump Bar Plate
926		Bump switch slide lever
935	S45	Glue Station back 45 degrees sensor





The bump bar/switch mechanism has two motions. The first is simply to push the bump bar back causing it to release the sensor (915 – bump bar). This releases the glue station for shallow internal corners.

The second mechanism is when the bump bar/switch is contacted end on causing the end of the bump bar/switch to slide. This activates the bump switch (914)



9.4.1 Standard Conditions

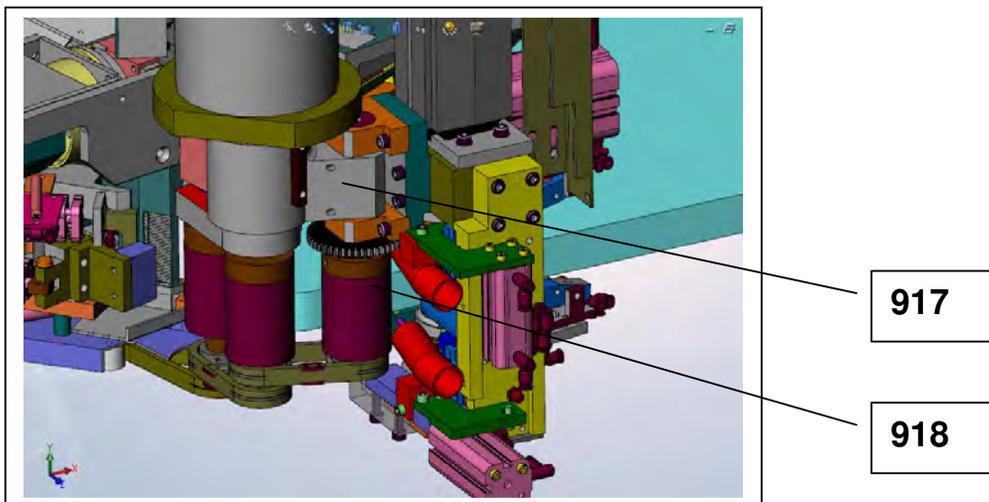
When progressing along a straight edge where the convex sensor (911) is detecting the panel and the bump bar (915) and bump switch (914) are not activated, fast speed is maintained as are the standard pressures against the edge.

9.4.2 Convex Corner

The convex sensor (911) is a photo-eye which senses the panel at all times except when a convex corner of sufficient radius is reached. At this point the sensor ceases to detect the panel until the convex corner is completed.

At the time the convex corner sensor ceases to detect the following sequence occurs.

1. After a time delay (refer 9.3.4 Slow Delay Convex – Advanced Controls: Feed), the feed motor slows to convex corner speed.
2. As the rollers progress around the corner, the pivot (917) and trailing roller (918) effectively swing forward. Provided the corner is tight enough, the pivot forward sensor (913) will activate at the apex of the corner. This initiates the application of Convex Corner Bias. The extra bias applied at this point assists the rollers around the corner.
3. As the rollers progress further around the corner, the convex corner sensor (911) will reach back over the panel sensing the end of the convex corner or alternatively the Pivot Forward sensor (913) will cease to make and the bias will be turned off.
4. On completion of the corner after a delay, the feed will return to fast speed.



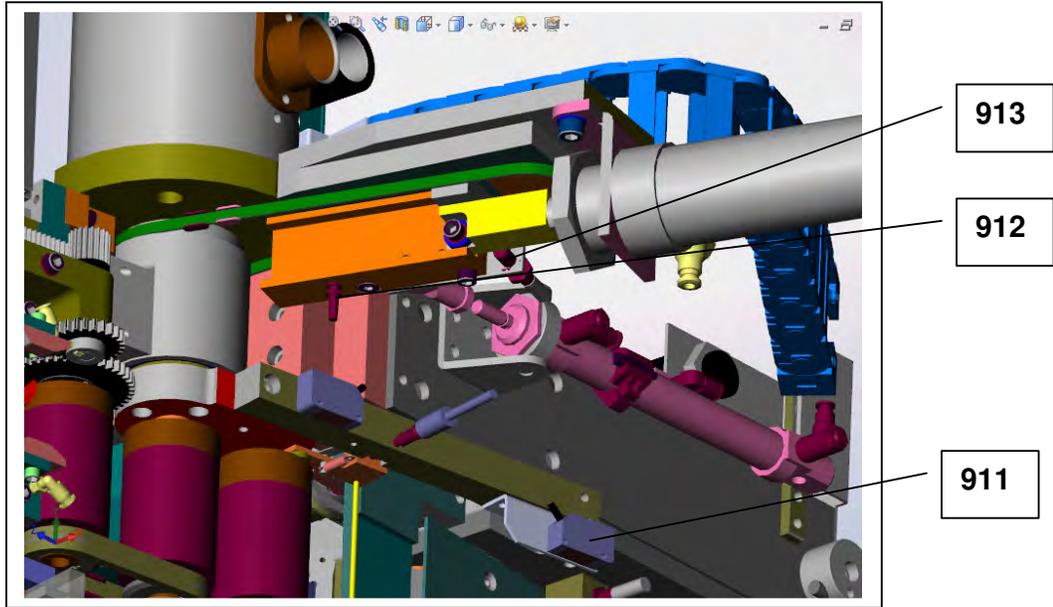
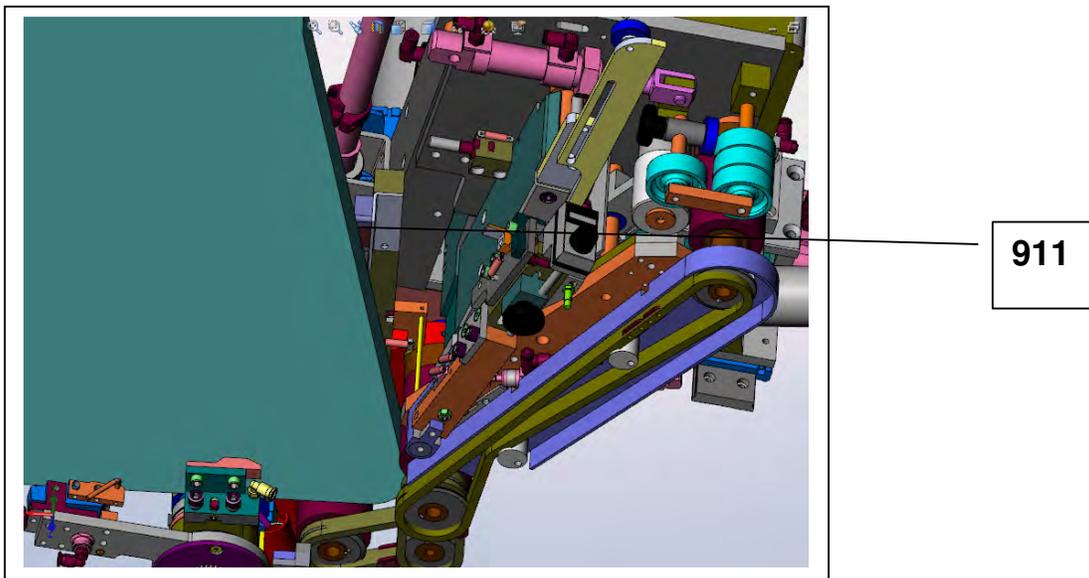


Image showing convex corner almost complete with convex sensor (911) swinging back over the top of the panel.



Usually it is not necessary to make any machine setting changes for convex corners. However the following highlights some possible operator changes:

Convex corner speed (refer 9.3.4 Advanced Controls Feed). This is the speed of the laying of the band on a convex corner. Typically this is set at approximately 2000 – 2500 which is a good universal speed which allows the banding time to set before the rollers move on, even on smaller radius corners.

When the banding does not naturally conform to the curve (ie, it requires force to hold it tight to the curve of the corner, especially at the transition from straight to curve), then a slower speed will allow the glue time to go off as it presses the band before moving on to the next section.

With larger radius corners (typically where the banding will naturally curve to the shape without having to be forced), it is possible to go much faster and consequently if large runs are being made with a certain panel, cycle times can be reduced by increasing corner speed.

Pause Convex (Refer 9.3.4 Advanced Controls Feed)

An explanation is given in this section 9.3.4 relating to using the pause function on the corners to press the band down at the transition from the straight edge into the radius and similarly the radius back to the straight edge. This gives extra ability to hold the band tight at these points with difficult materials.

Slow Delay Convex (Refer 9.3.4 Advanced Controls Feed)

Usually this is set at 5 (0.5 seconds) which allows the roller to reach the corner before slowing the feed. However, setting this to 0 will mean an instantaneous slowdown when the convex sensor drops off the board which means that the band which will lay on the corner passes slower over the glue nozzle applying more heat and making it more flexible.

Convex Sensor bracket.

This bracket is able to be swung through an arc. It is usually situated in its outer position as shown here.

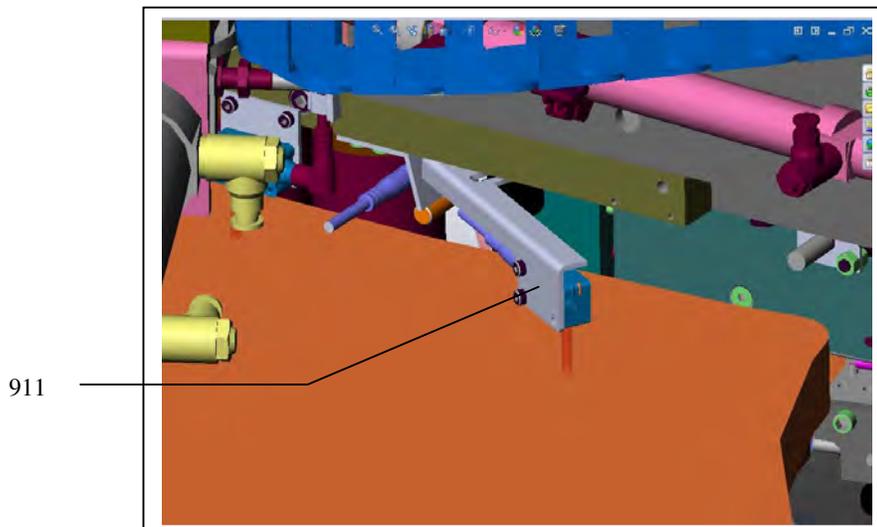


Fig 1.

This ensures the convex sensor does not detect a round workpiece such as a 600mm diameter and treat it as a convex corner.

However there are certain shapes such as wireways which require the convex detector to be retracted so that they fall inside the wireway and cause the feed to slow.

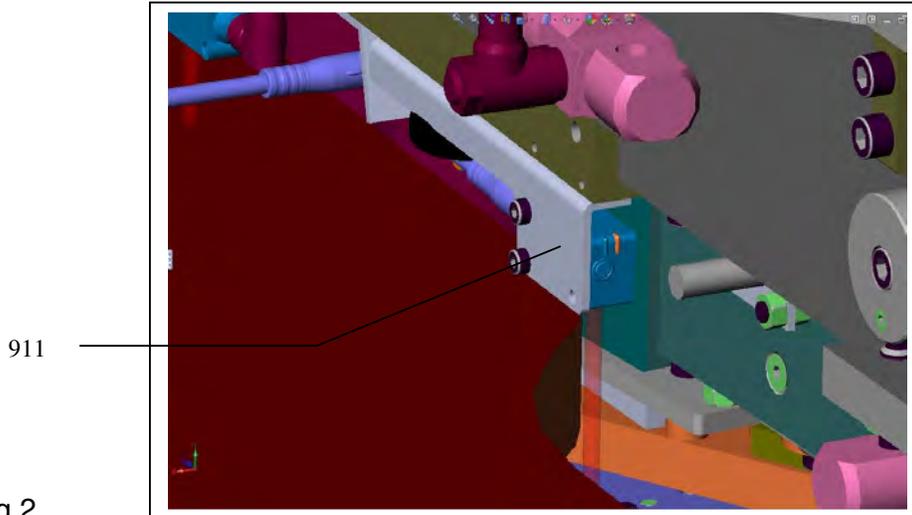


Fig 2.

Note: if the convex sensor does not detect panel for a certain distance, it will assume it is a round workpiece and will automatically jump back to fast speed. However, in the case of a half round D shaped panel, this may not be desirable as it will not slow when it reaches the radius at the end of the D unless the convex sensor first senses the edge. Hence it is necessary to swing the convex sensor out as shown in Fig 1.

Should a panel shape occur where it is not possible to find the correct sensor position for all conditions, the Special Sequence function should then be used. Refer 9.4.3 Special Sequences

9.4.3 Concave Corner

There are two principal considerations when dealing with concave corners.

Depending on the type of curve being encountered, the glue station (920) will either be pushed back naturally by the bump bar (925) or alternatively the aggregate needs to be swung back via an input from the sliding bump switch (914). The operator must decide which action will apply prior to the panel being run.

The decision is made based on the contact point of the bump bar (915) against the panel edge (919).

9.4.3.1 Aggregate pushed back by bump bar.

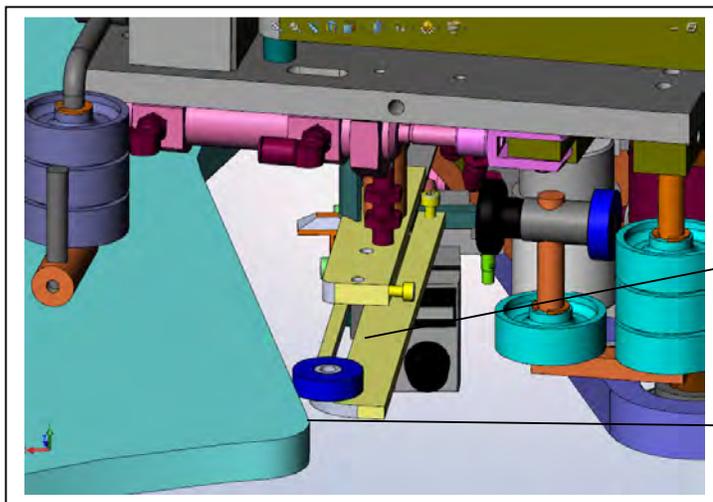
If the angle is sufficient (about 45 degrees) then the panel will aggregate (920) will push back naturally and it is recommended to set the “enable concave sensor” setting (970) to NO. Refer 9.3.6 Advanced Controls: Panel Shapes

This disables the bump switch (914) and prevents inadvertent operation during a cycle.

Thus, when the aggregate approaches the concave condition, the bump bar (915) makes contact with the panel. This sends a signal to the PLC to change automatically a number of machine states.

- The speed changes to bump bar speed (see 9.3.5 Advanced Controls: Feed),
- The bias force changes to bump bar bias

These changes are held on by Hold Count Bump bar, so when the bump bar stops touching the panel, there will be a distance travelled as defined by this count, until the speed and bias return to normal.

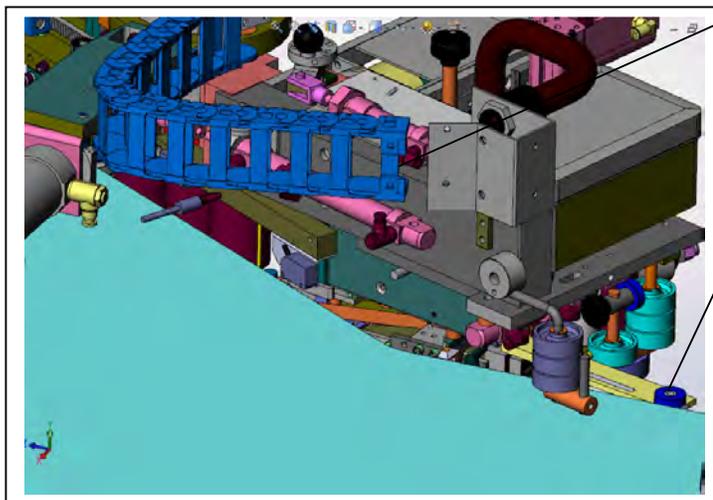


Aggregate showing bump bar making initial contact with panel

925

919

Fig 3



920

925

Aggregate (920) being pushed back by bump bar (915)

Fig 4

If the internal curve is large (say greater than 300mm radius) then it is not necessary to slow the feed on bump bar particularly so a speed of say 3500 to 4500 is common.

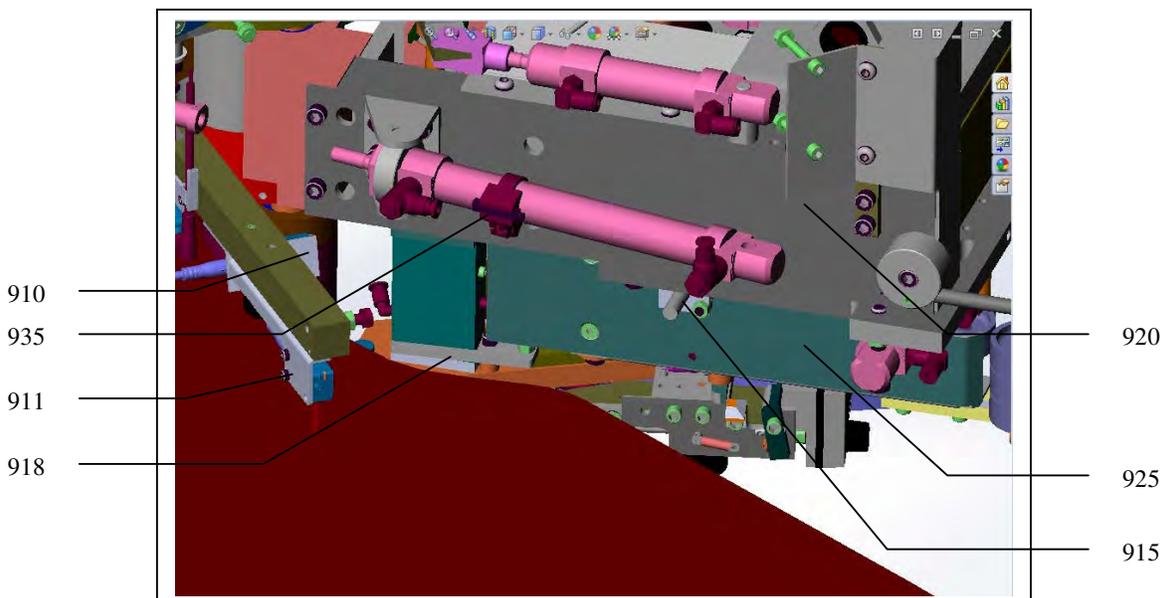
If the internal curve is tighter such as the small radius internal as shown in figures 3 and 4, then a slower speed will be necessary to ensure the band sits tightly in the small radius. In this situation a bump bar speed of say 2000 may be appropriate. The hold count needs to be set so that this speed is maintained through the laying of tape and maybe also controlling the trimmer speed.

9.4.3.2 Aggregate (920) retracted by bump bar.

In certain situations it may be desirable to have the glue station (920) (aggregate) retract fully rather than just float on the bump bar.

For example in some wireways, it might be desirable to prevent the glue station from pressing against the panel. There is a small deflector bar (918) but in any event, if it is preferred, it is possible to force the glue unit back on the bump bar by activating the setting: Retract on Bump bar (971). Refer 9.3.6 Advanced Controls: Panel Shapes

In this situation, when the bump bar (915) is touched, instead of just floating, the glue unit will swing back until it touches the sensor (935) on the glue station (920) retract cylinder.



When the glue unit reaches this sensor (935), it will float until the setting Hold Count Bump Bar counts out and then swing forward naturally.

It is possible to adjust the position of the sensor (917) by releasing the screw in its supporting collar and sliding the collar along the air cylinder.

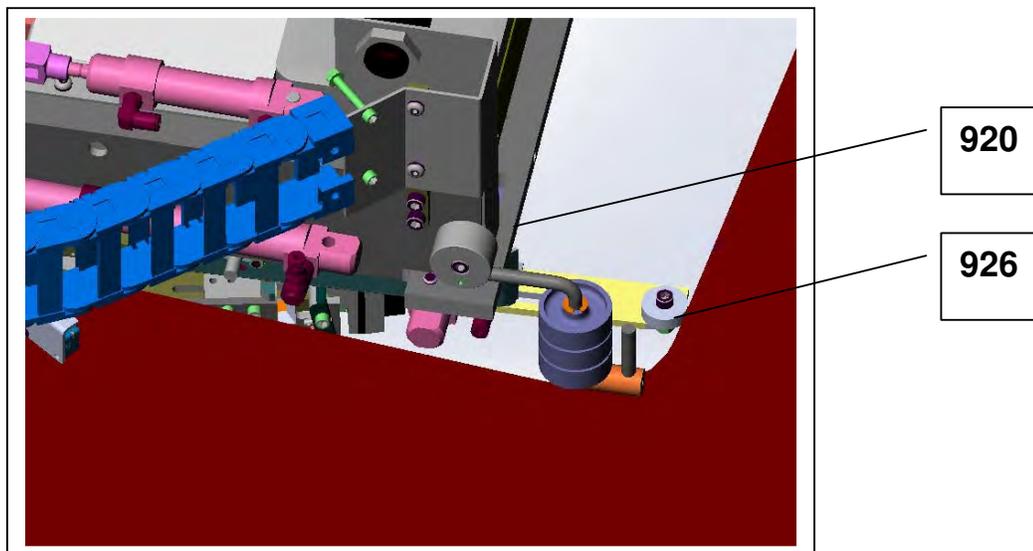
It must be noted that usually however, this use of the Retract on Bump Bar setting is unnecessary as the glue unit will naturally float along the panel edge.

9.4.3.3 Aggregate pushed back by bump switch (914)

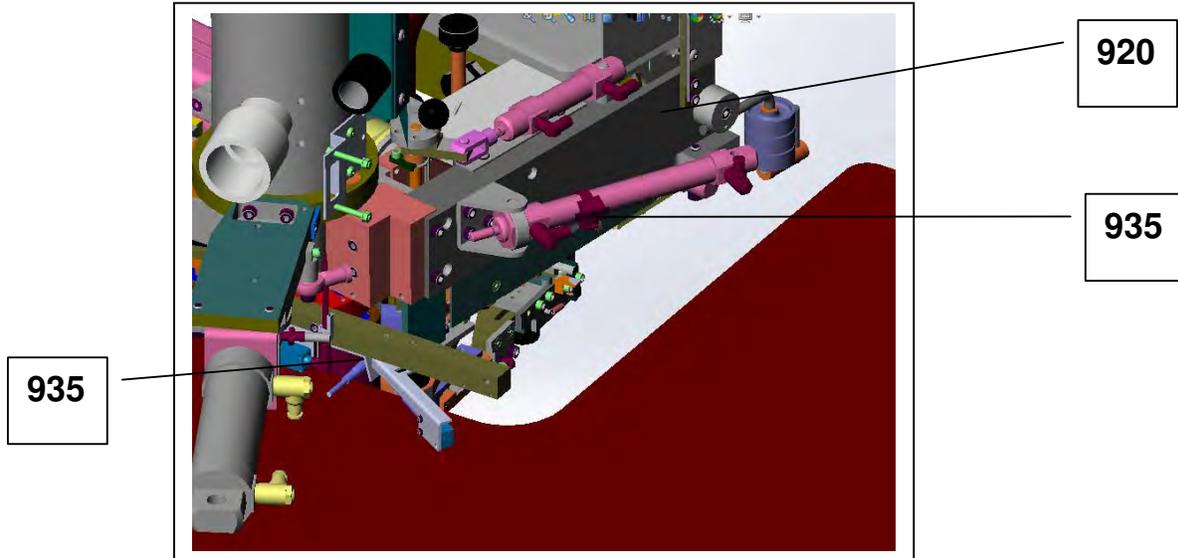
If the shape of the panel is such that the aggregate will not be pushed back naturally by the shallow shape of the panel, it is necessary to Enable the Concave Sensor (970). Refer 9.3.6 Advanced Controls: Panel Shapes. This serves the dual purpose of enabling the Concave Sensor (910) and also the Bump Switch (914). Refer 9.4



The bump switch is activated when the shape of the panel pushes on the end of the Bump Switch slide lever (926) causing it to activate the bump switch sensor.

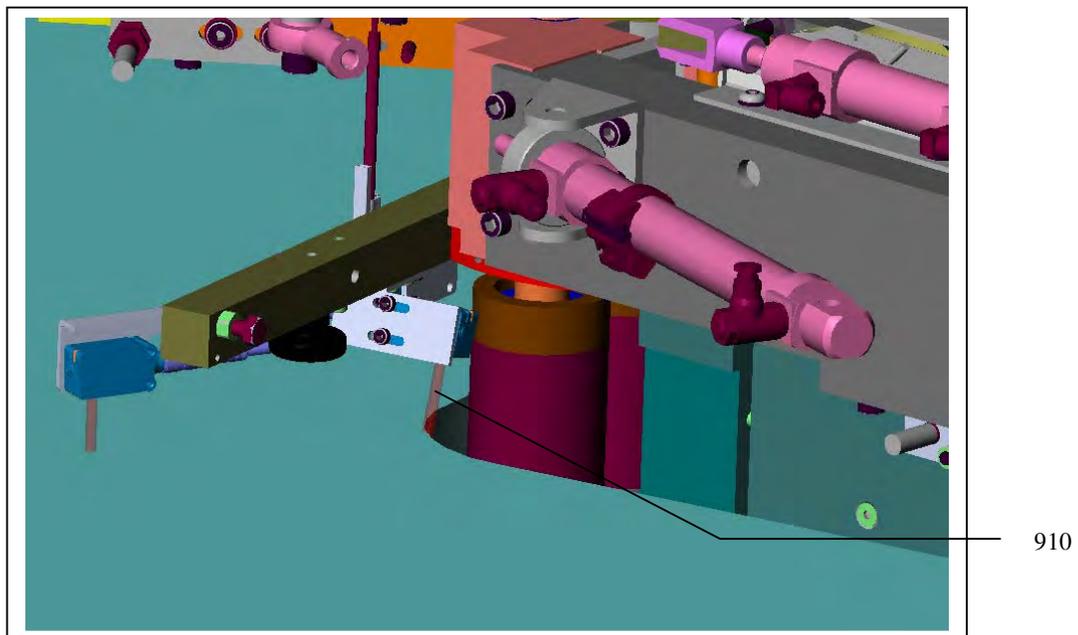


Upon activation of the bump switch (914), a sequence of events takes place. Firstly the aggregate (920) swings back.



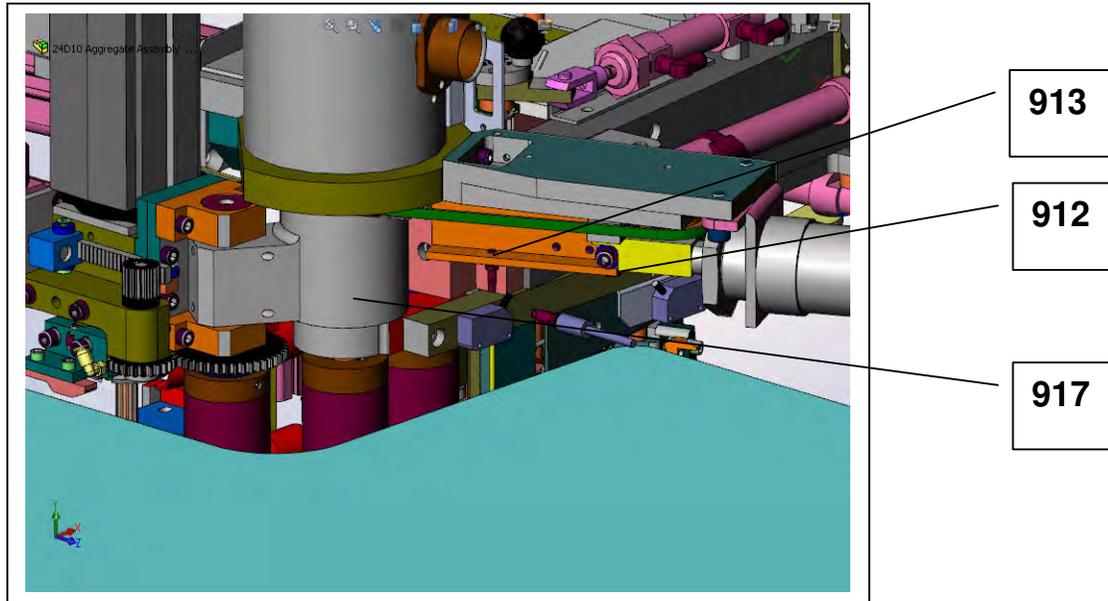
The feed automatically slows until the glue station has swung back to about a 45 degree angle at which point the Glue back 45 sensor (935) is activated. Now the glue station is floating.

As the aggregate (920) enters the corner, the concave corner sensor (910) will detect the panel inside curve of the workpiece.



At this point, the feed will slow noticeably as the banding is pressed tightly into the concave corner.

The glue station will also begin to swing forward.



A CONCAVE CORNER message will also appear on the status bar on the screen.

The speeds and pressures will automatically be controlled until the trimmer has been brought through the concave corner.

It is also advisable to turn the Concave Scrape OFF in this cycle (refer 9.3.3 Advanced Controls: Scraper) so that the scraper is automatically lifted as it goes through this corner. The reason is that the scraper geometry will not allow it to trace the edge band perfectly and it will in fact travel over the surface of the panel with the potential to mark delicate surfaces.

In some instances, it may be that the tight concave corner is immediately followed by a convex (see Fig 5) such that the Bump Switch (926) lever does not touch on the workpiece.

In this instance it is possible to also turn on Retract on Bump Bar. (971). Refer 9.3.6 Advanced Controls: Panel Shapes

This will mean that when the bump bar is touched, it will cause the Glue Station (920) to retract as though it has touched the bump switch (911). Because Enable Concave is turned ON, the concave sensor will be enabled and hence detect the concave corner and the correct pressures and speeds will be applied.

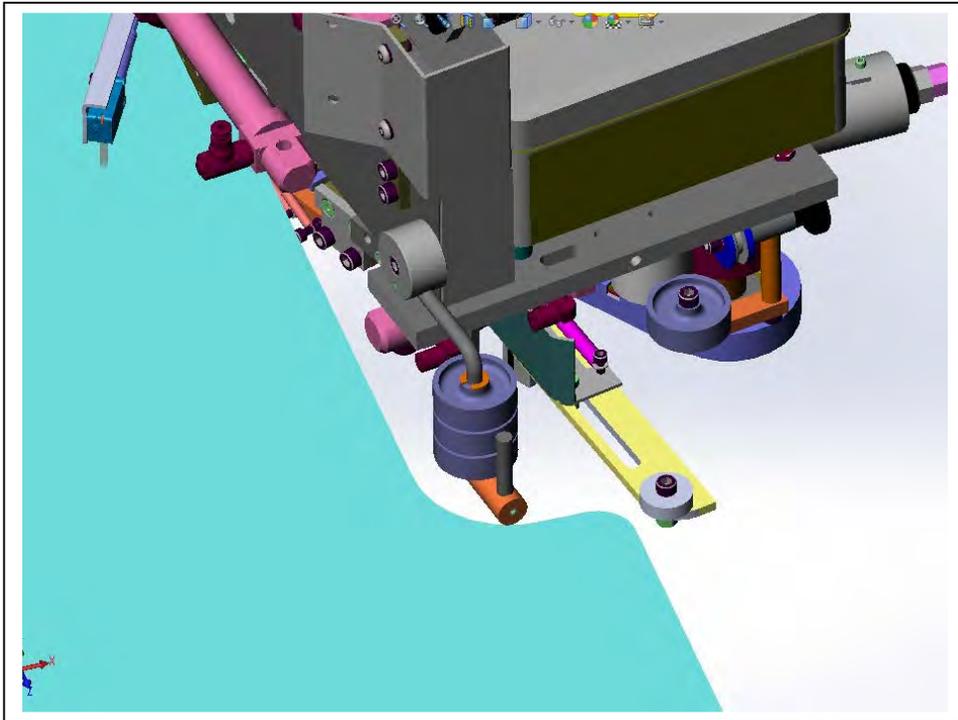


Fig 5

Shows situation where concave corner cannot be detected by bump switch slide lever being depressed on its end

NOTE: There is an infinite number of possible combinations of Concave followed by Convex such as one might find in a wireway. Which combination of Enable Concave and Retract on bump bar is used is dependent on the shape so if you are having trouble with a shape, then it is ok to try different combinations.

In the event simple results are not able to be achieved, then it is recommended to use the Special Sequence function (refer 9.4.3)

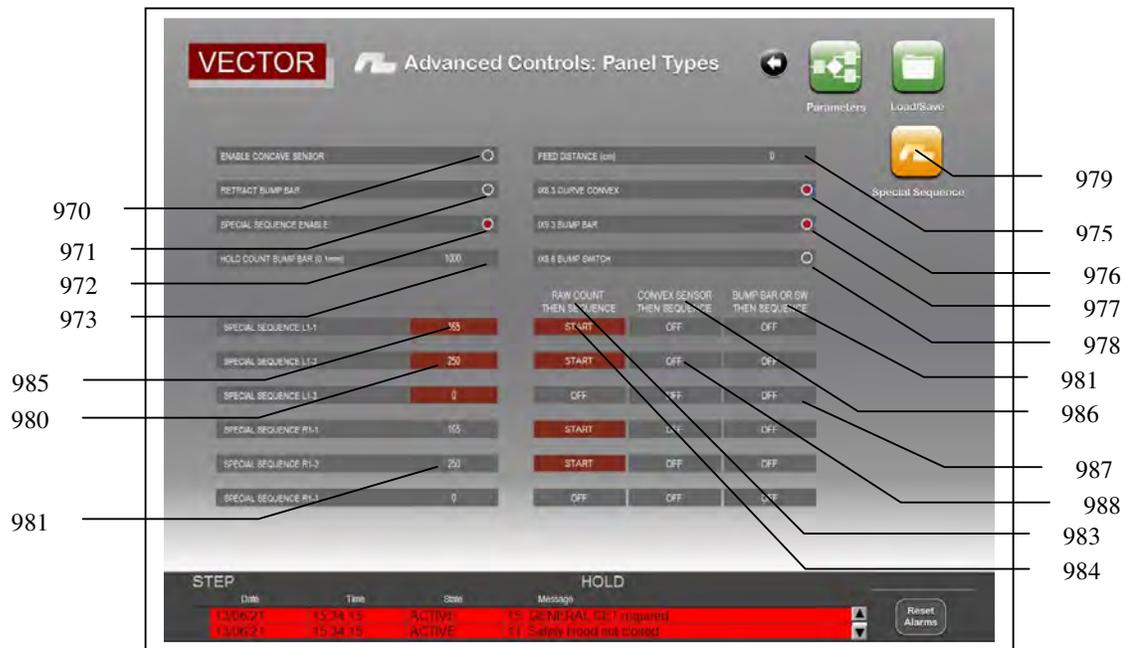
9.4.4 Special Sequences

Because there are an infinite number of possible shapes for a non-rectangular panel, there can in some instances be a desire to over-ride the internal algorithms which control the patented VECTOR Revolution process.

For example, when there is a complex series of convex and concave corners in a short space, it may be very difficult to bend the banding to conform naturally to the shape. Consequently this will put extra demands on the adhesive to hold the band in shape while it is being applied.

In this case we use the Special Sequences matrix which can be found in the icon Panel Shapes. Refer section 9.3 for accessing Advanced Controls and 9.3.6 for Advanced Controls: Panel Shapes.

The Advanced Controls: Panel Shapes is shown here:



Firstly it is necessary to Enable Special Sequences (972). Red is ON.

Special Sequences enables the operator to over-ride the machine determined settings for the Glue Station, Join Sensor L1 Arm, Speed, Bias, and Roller 1 pressure.

There are two considerations for setting up the Special sequences.

- It is possible to set 3 left field positions (980) and/or 3 right field positions (981) around the panel where the special sequences will perform which are set by a feed distance
- The 3 set points in each field can be triggered either by Raw Count (983), Convex Sensor trigger (984) or the Bump Bar/Switch (981).

9.4.4.1 Setting Trigger points for Special Sequences

To set up a new special sequence, we firstly run around the workpiece with no gluing or trimming turned on. Refer 9.2.7 Starting with Glue Off.

It is now possible to run around the workpiece and press the Start/Pause button (960) again to pause the feed.

This allows us to accurately determine the feed count at which we want to apply the special sequence.

If we are using the Raw Count (983) to initiate the special sequence, touch the screen button below the Raw Count which corresponds to the field we are working in. For example touching the On/Off button (984) for the left field will then populate the field (985) with the present feed count as shown in (975).

It is also possible to manually type this number into the field (985)

This can be repeated in the two left field special sequence lines below it and similarly for 3 special sequence field lines for the right field (981).

Thus when the feed count reaches the value according to the corresponding Special Sequence field value (980 or 981), it will initiate the Special Sequence as setup and explained later in this section.

If we are using the Convex Sensor then Special Sequence (986) option, we must set the feed count so that it is on the edge prior to where the special sequence is required. It will then look for the next time that the Convex Sensor drops off the panel. So for example, we would set the feed count such that it is on the straight edge prior to the wireway and the special sequence will be enabled when the convex sensor drops into the wireway.

Setting the feed count is exactly the same as for setting on Raw count as above except we touch on the Convex Sensor Then Special Sequence button –for example (988).

If we are using the Bump Bar/Switch then Special Sequence (981) option, we must set the feed count so that it is on the edge prior to where the special sequence is required. It will then look for the next time that the Bump bar OR Bump Switch are activated. So for example, we would set the feed count such that it is on the straight edge prior to the special shape and the special sequence will be enabled when the bump bar or bump switch touch.

Setting the feed count is exactly the same as for setting on Raw count as above except we touch on the Bump Bar/Switch Then Special Sequence button –for example (987).

The most common and accurate option is the to use the Convex Sensor option. This means the special sequence is triggered when it reaches the condition. The Raw Count

method is less accurate as it depends on the position of the panel on the pods as to exactly where the count starts. The Raw Count or Bump Bar/Switch options are usually used only when the specific panel shape precludes the use of the Convex Sensor option.

9.4.4.2 Setting up Special Sequences

Once the trigger points have been set, open the Special Sequences page by touching on the Special Sequence Icon (979)

This opens the Special Sequences page.



Provided the Special Sequence Enable (970) is ON, and a feed value is set in the field positions (980 or 981 depending on which field is being used), then when the trigger value (980 or 981) is reached, the appropriate Trigger (987, 988 or 989) will light up on this screen.

When this happens, the Snapshot distance (990) will snap to 0 and start counting.

Using the Start/Pause button, jog the Banding Head until it reaches the point where you desire to over-ride the existing machine settings.

Enter the feed count value (990) into the first column header at (991)
This will now live in the column below (991).

By turning on any combination of the options in this column, the corresponding row value will over-ride the existing machine settings.

For example, by turning on the Glue Back function (992), the Glue Station will retract until further notice.

Similarly by turning on Speed 1 at (993), the speed will be over-ridden by the value you enter into the Speed field at (994).

These values will be maintained until either, the Auto Off position is reached (995) or the second column (996) is initiated.

Any combinations of the line items are able to be turned on at each countdown point and so it is possible for example to maintain speed 1 through each count downpoint while turning the glue station back, on and off.

If the column count value eg (996) is 0, it is ignored.

The Auto Off position (995) is set by determining when you wish the entire Special Sequence to finish (by jogging through the condition) and the inserting the feed count (990) for this position.

This will reset the entire Special Sequence in preparation for future Special Sequences.

The following is a description of each of the Special Sequence control items:

Glue Fwd	When ON, the Glue Station is forced forward.
Glue Back	When ON, the Glue station retracts until it reaches the glue back 45 sensor and will then float with pressure on both sides of the air cylinder.
Join Sensor Arm	When OFF, the join sensor arm will remain retracted.
Speed 1	When ON , Speed 1 setting (994) is maintained
Speed 2	When ON , Speed 2 setting (930) is maintained
Bias 1	When ON , Bias 1 setting (931) is maintained
Bias 2	When ON , Bias 2 setting (932) is maintained
C Pressure 1	When ON , C Pressure 1 setting (933) is maintained
C Pressure 2	When ON , C Pressure 2 setting (934) is maintained

9.5 Functions Page

The functions page allows manual override of some functions. To access the Functions Page, touch the Functions ICON,

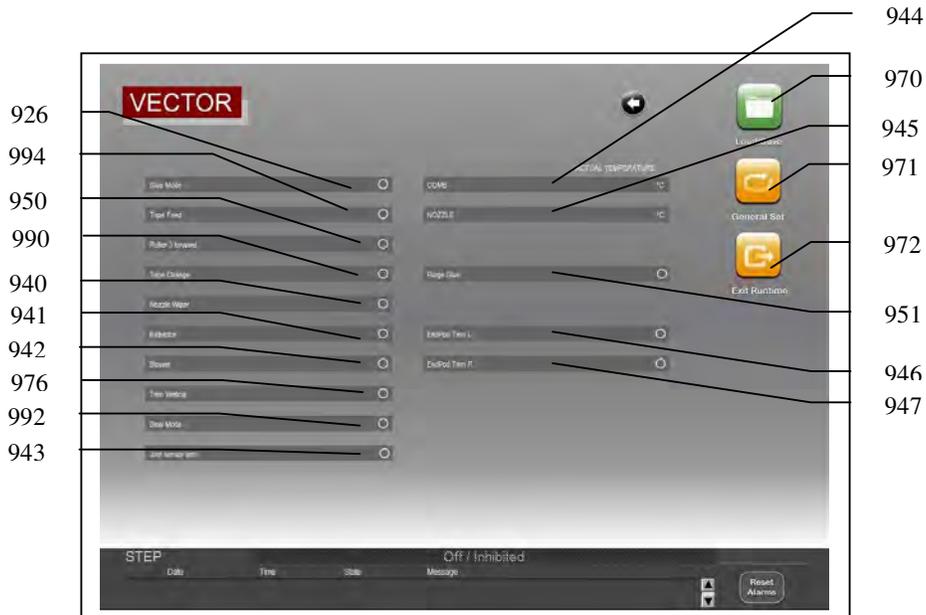
Enter the Functions page using the icon (989).

989

988



This opens the Functions page.



Available functions are:

926	Glue On Off	
994	Tape Feed	Starts feed rollers. If Glue is turned on, tape will feed and apply glue to band.
950	Roller 3 Fwd	Swings third roller forward to allow access to glue unit
990	Tape Change	Brings head to front of machine and rotates C axis into tape load position
940	Nozzle Wiper	Pushes nozzle wiper out provided temperature > 150 degC
941	Extractor	Turns on shavings extractor fan
942	Blower	Activates air blower (optional)
976	Trim Vertical	Brings the trimmer unit together
992	Saw Mode	Performs an end trim function.
943	Join Sensor Arm	Swings the join sensor arm out for ease of adjustment
951	Purge Glue	Purges glue through the nozzle provided at set temp
946	Auto EndTrim L	Manual operation of the Left Field Endtrim manifold
947	Auto EndTrim R	Manual operation of the Right Field Endtrim Manifold

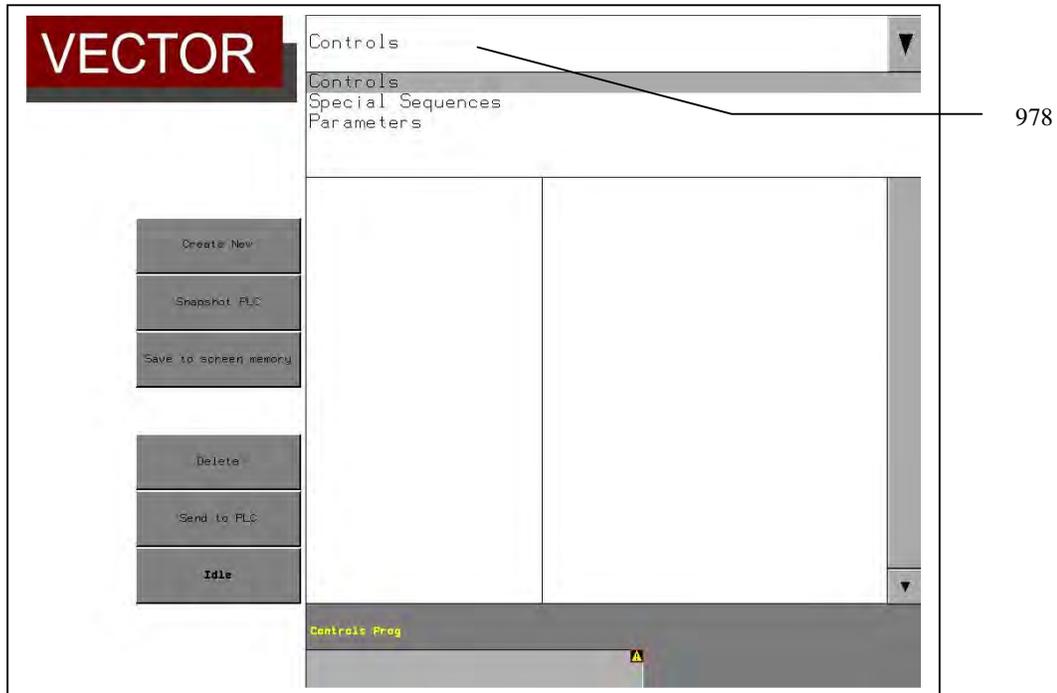
All of the above functions automatically reset to their normal state (except glue) when exiting the functions page.

944	Comb Element	Display of actual temperature
945	Nozzle Element	Display of actual temperature
970	Load/Save	Access to the Load/Save page. Refer 9.6
971	General Set	Zero set for X, Y and C axes when first powering machine. Refer Manual section 8.2 General Set
972	Exit Runtime	Press and hold for 2 seconds to exit the Machine runtime and go back to the Windows Desktop Double Click the Vijeo Runtime icon on the desktop to return to the Machine Runtime screen.

9.6 Save / Load settings.

It is possible to save screen settings into settings folders via the Save Load Settings page. This is accessed by touching the Save /Load settings icon which is found in the top right corner of most pages such as (970) on the Functions page above.

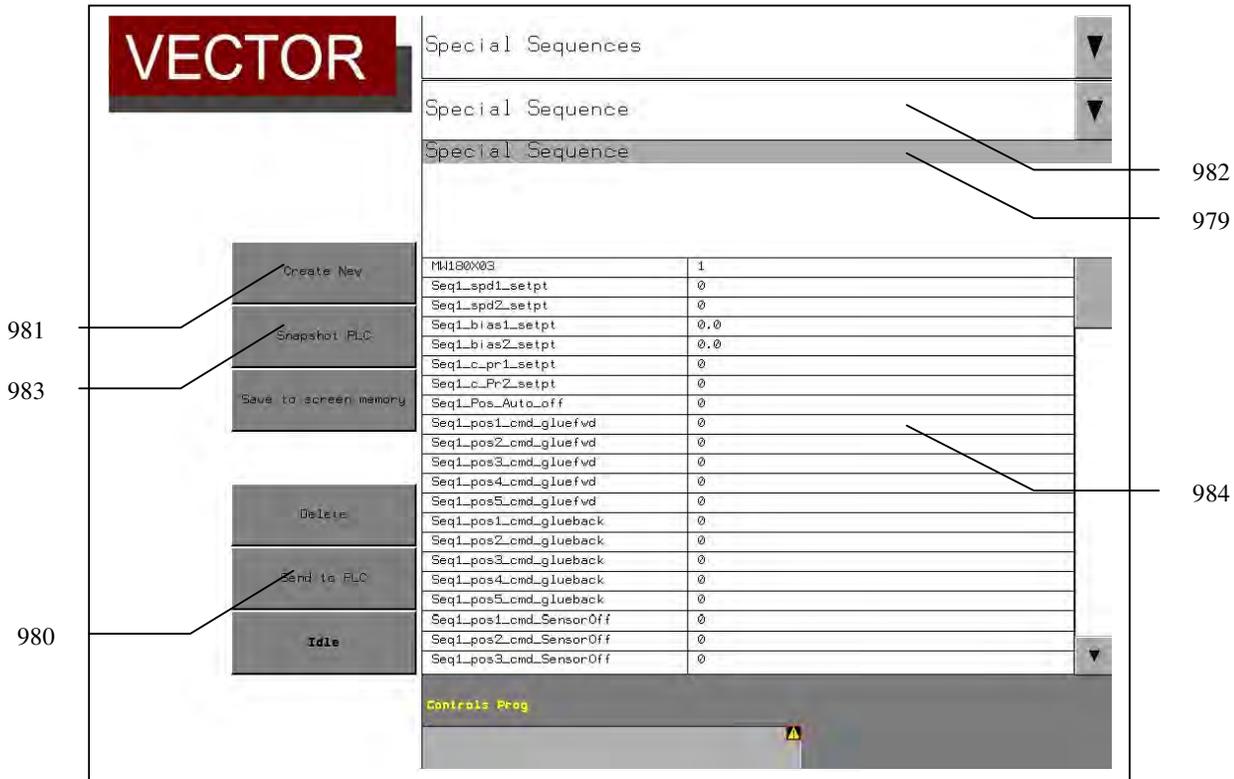
This will open the following page:



Touching the header (978) drops down a menu of 3 options.

Controls	saves all the settings on the Main page and all Advanced Controls pages
Special Sequences	Saves all the settings on the Advanced Controls: Panel Shapes and Special Sequences pages.
Parameters	Saves all the password protected parameters pages. This is for Service Technicians only.

Entering on one of these headings will insert that section into the header line (978) and provide below a drop down menu (979) of all the existing settings programmes saved.



To send an exiting settings programme to the PLC, simply select the desired setting programme and touch the Send to PLC button.

To create a new programme with settings which you have made on the Main screen or any of the Advanced Controls screens;

- Touch Create New (981)
- Type the name you wish to call the new setting programme in the heading box (982)
- Touch Snapshot PLC (983) which will update all the settings into the fields in the setting programme (984)
- This may take a minute or so.
- Touch Save to Screen Memory to save for future use.

To update an existing setting programme with new settings from the PLC, open the existing settings programme which you wish to modify.

- Touch Snapshot PLC (983)
- This will update the fields (984).
- Touch Save to Screen Memory to save for future use.

9.7 Alarms

There is an alarm banner (919) at the bottom of most screen pages.



When the cause of the alarm is cleared, in most instances it is required that the RESET button (974) is pressed to remove the screen alarm message.

Common operation alarms able to resolved by operators are:

Alarm	Cause	Remedy
Emergency Stop	E Stop Circuit broken	Reset E stop and/or pullwire
General set required	Home machine	Press Gen Set (functions page)
Vac fail in cycle	Vac status low in cycle	Check vacuum pods for leaks
Air Pressure Low	Supply air press low.	Check supply air
Safety hood not closed	Hood open	Close hood
Board sensor during z up	Head too close to panel on Z lift	Drive clear of panel then z lift
Tape not cut	End trim cut not complete	Check end trim cutter and travel.
CW limit reached	C Axis over limit	Re-position panel
CCW limit reached	C Axis neg overlimit	Re-position panel
Setpoint outside range	Start position set issue	Re-set start position within limits
Glue temp low	Glue heating	Auto reset
Load new glue cartridge	Glue cartridge low	Load new glue cartridge
Clear tape	Tape in guide	Remove tape from present switch
Z Axis not down	Z not completely down	Remove obstruction

A more comprehensive alarms list is found in section 11 Troubleshooting

10.1 General instructions

DANGER !

Refer to the chapter “Safety” during maintenance and inspection work.

The power must be disconnected from the machine at its supply socket before work is started on the machine.

Depressurise the pneumatic supply system!

- Clean the machine/unit daily.
- Remove shavings with a suitable brush or with an approved extractor system suitable for PVC shavings where applicable.
- When blowing the machine clean using compressed air, do not aim the air jet into the bearings or guideways.
- Lightly grease all moving parts such as sliding surfaces, adjusting spindles and guides whenever required.

Pollution of the environment.

Waste material of all kinds should be disposed of in an environmentally friendly way and in compliance with local recycling and disposal procedures.

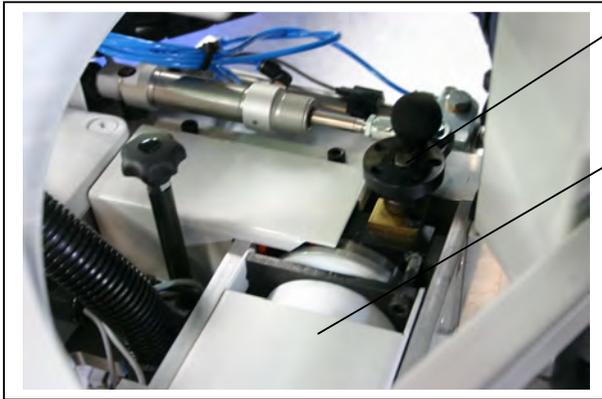
10.2 Maintenance chart

In single-shift operation, the operating hours correspond to a certain lubrication cycle.

2000 hrs ----- Every year
 1000 hrs ----- Every six months
 160 hrs ----- Every month
 40 hrs ----- Every week
 8 hrs ----- Every day

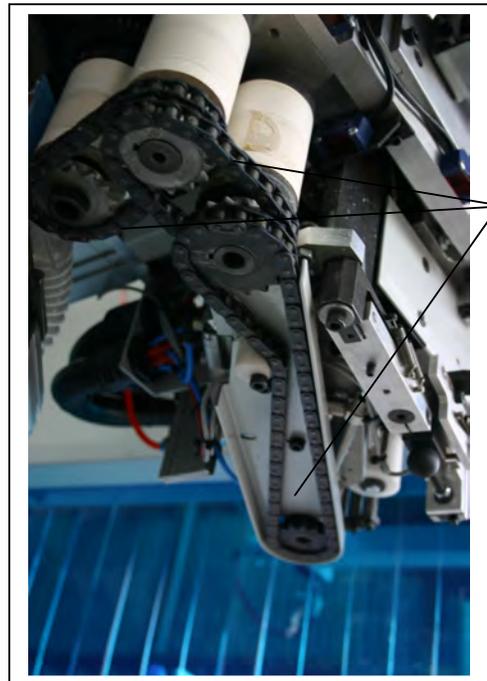
Item	Maintenance point	Interval	Maintenance Work	Lubricant	Remarks
A	Glue System	8 hrs	Clean glue nozzle face as often as required but as a minimum, at the end of every day. Clean around cartridge.		Keeping the glue system clean is critical to good operation of the machine
B	Air motor	8 hrs	Remove air connection and 1 drop of oil into air fitting	Light air oil.	
C	Linear bearings trimmer unit and spline	8 hrs	Drip of light oil on rails and spline daily		Trimmer unit should move vertically easily
D	Air service Unit	8 hrs	Check for any condensate. Drain if necessary. Ensure automatic drain is working correctly		Ensure air supply to machine is clean and dry as air drier will not capture excessive water and particulate.
E	Trimmer bearings	320 hrs	Check for noisy bearings. Replace as necessary		Damaged bearings can cause premature and motor failure!
F	Axis belt tension	160 hrs	Check belts for tension. Tighten as necessary		Belts should not be loose but similarly not rigid.
G	Chains	160 hrs	Check tension Lubricate lightly	Castrol Optimol KL23 or equivalent	
I	Dosing Bar	40 hrs	Put a drop of light oil on top of the dosing bar		The oil will travel down the bar lubricating it's movement.
J	Vacuum Pump	40 hrs	Check oil level and clear filter	Castrol Aircol PD100 Shell Corena P100	Top up as necessary

K	Axis bearings X axis, Y axis and Z axis.	160 hrs	Lubricate grease nipples on all 4 linear motion bearings on each axis X, Y and Z.	Kluber ISOFLEX NBU15	
M	Top tape guide	160 hrs	Lubricate guide bars with light oil.		Guide must spring freely up and down.
N	Motor Bearings	320 hrs	Check for noisy bearings. Replace as necessary		Damaged bearings can cause premature and motor failure!
O	Vacuum pump	1000 hrs	Full service	Castrol Aircol PD100 Shell Corena P100	Regular service
P	Gear Motor	1000 hrs	Check for noise		Unserviceable
	NOTES				



I

A



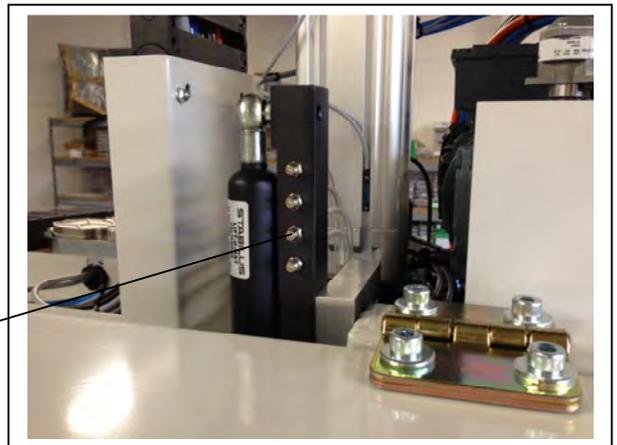
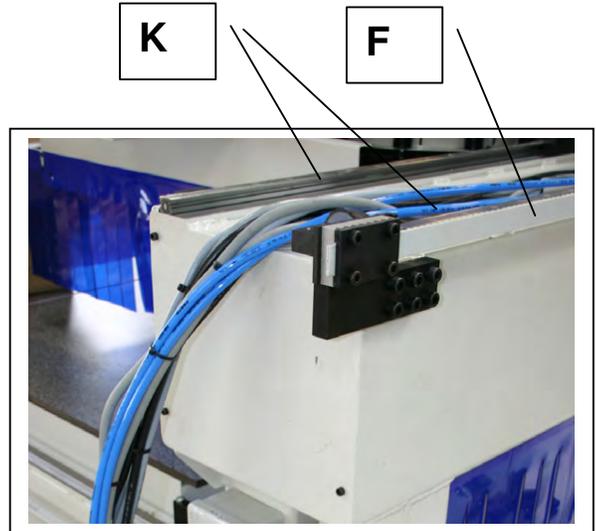
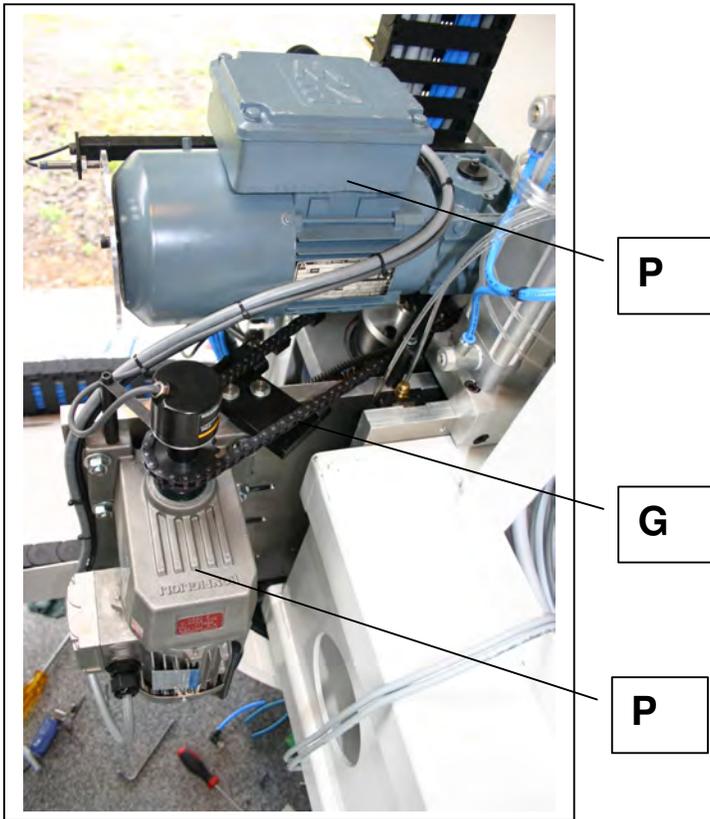
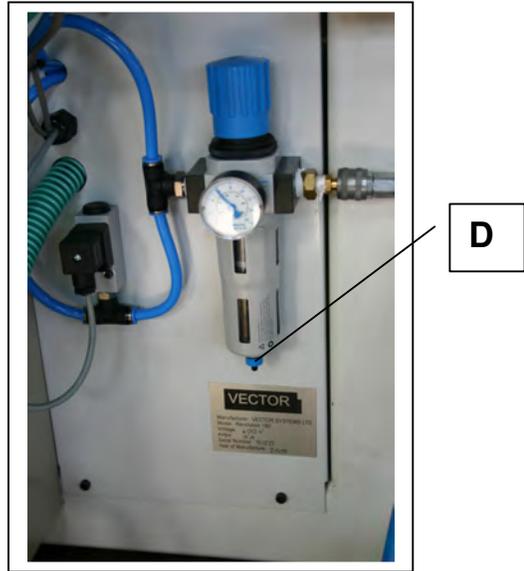
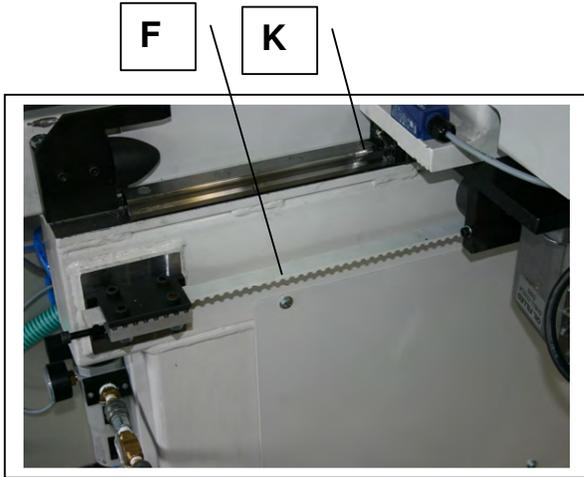
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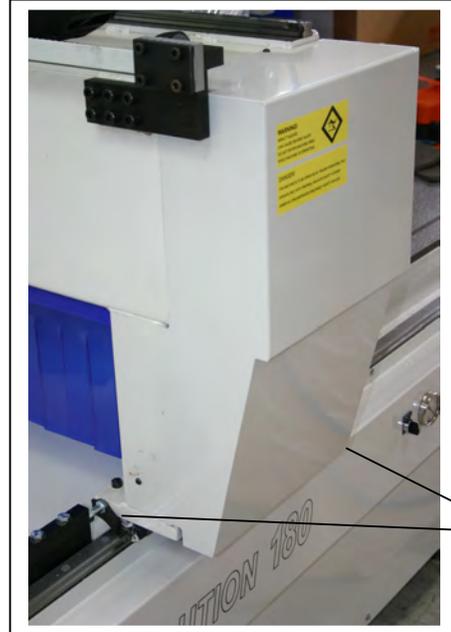
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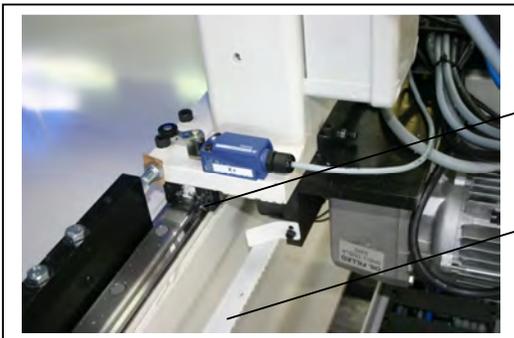


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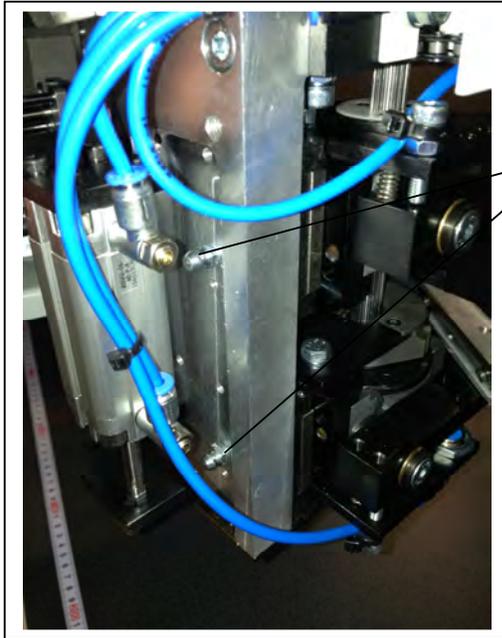


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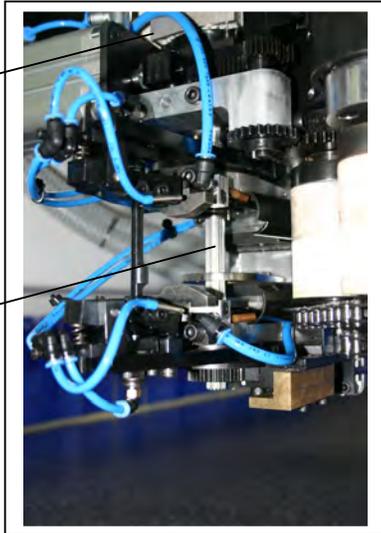


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C

N



C



O



J

DANGER !

Repairs to electrical equipment must not be performed except by an electrician, or by trained personnel under the direction and supervision of an electrician, in accordance with electrical engineering rules.

11.1 SIMPLE FAULT SCHEDULE

- This table is intended for rectification of simple problems.

No.	Fault	Possible cause	Remedy
1	Machine will not set (Set light pushbutton will not illuminate)	No power connection Emergency stop switch (activated) Pull wire activated and not reset Door safety switch (if applicable) not closed. Faulty contactor KA0	Check supply turned on Reset Reset Close door Replace contactor (qualified tech req'd)
2	Machine will not set (Set light pushbutton is lit but screen message "emergency stop" will not clear.	Insufficient air pressure at air maintenance unit Variable Speed Drive fault	Adjust pressure setting or check supply system. Check VSD error messages. Turn off power to clear error. If fault persists, call tech.
3	Machine will not perform a General Set	Emergency stop circuit not set An obstruction is preventing one or more of the axes moving One or more of the zero limit switches or proximities is faulty or incorrectly positioned preventing the axis from reaching it.	Reset emergency stop circuit Remove the obstruction Re-position or replace the offending switch or proximity.
4	Glue will not heat	Glue temperature low Circuit breaker tripped Faulty contactor Faulty element or wiring connection	Check screen setting for temperature Check for fault and reset Call technician Call technician

5	Trimmer will not start	Circuit breaker tripped VSD showing fault Mechanical fault with drive spline	Check for faults and reset Turn off power and restart. If fault doesn't clear call technician Repair or replace
6	Feed motor will not start	Circuit breaker tripped VSD showing fault Brake not releasing Mechanical fault with drive	Check for faults and reset Turn off power and restart. If fault doesn't clear call technician Call technician Call technician
7	Drive wheels slipping on tape	Rubber wheels dirty An obstruction is preventing axis from moving freely C Axis angle not correct	Clean Clear obstruction Check encoder connection
8	Glue not sticking to tape	Glue flow too low due to obstruction of cartridge	See 9 Glue not flowing
9	Glue not flowing	Cartridge sticking to inside of teflon tube. Glue pressure set too low Glue temperature too low Problem with priming of tape	Use purge function until glue flows freely Adjust pressure settings Raise glue temperature Replace tape
10	Tape not feeding correctly	Guides not adjusted correctly Guides and tape presser not clean Tape winder and coil obstructed Tape feed roller not pressing fully Tape feed parameter not	Adjust Clean Clear Adjust Adjust parameter 420

	Tape not feeding (continued)	set correctly	(continued next page) Password protected refer technical support
11	Glue remaining on after tape has passed	Screen setting is set too long Glue and debris is obstructing the tape present switch holding it on	Reset Clean switch
8	Glue not flowing	Cartridge sticking to inside of teflon tube.	Use purge function until glue flows freely

11.2 LIST OF ALARMS

These are alarms which appear on the control screen, their causes and remedies
When fault has been remedied, the screen error is cleared by pressing the RESET function key on the screen.

These messages appear at the bottom of the Control Screen and are blinking red.

1	Emergency stop	See SIMPLE FAULT SCHEDULE 1 + 2	
2	X Axis overspeed	Axis movement exceeds limit speed. Check for drive faults and reset	
3	Y Axis overspeed	Axis movement exceeds limit speed. Check for drive faults and reset	
4	Set Point outside range	Positioning set point outside acceptable range. Choose new position	
5	Glue temperature low	This fault appears until min operating temperature is reached then automatically clears.	
6	Load new glue cartridge	Glue piston has reached proximity switch indicating need to load a new glue cartridge	
7	Clear tape	The Tape Present switch (S30 %I5.15) is still activated indicating either tape still in guide or faulty operation of the switch	
8	Z Axis not down	Z Axis has not lowered within the allowable time. Check for obstruction or fault	
9	Z Axis not up	Z Axis has not raised within the allowable time. Check for obstruction or fault	
10	Board sensor trip	The board sensor (S28 %I1.9) has sensed no board present during a cycle causing the machine to stop.	
11	Board sensor at Z up	Board sensor still detecting when Z axis is instructed to lift after a cycle indicating not	

		clear of panel.	
12	General set required	Machine will not run until General Set performed.	
13	Head Lift Required	Z Axis down and needs to be lifted to set for a cycle.	
14	X Axis negative limit	Axis limit reached during cycle. Reset cycle and move panel within machine limits	
15	X Axis positive limit	Axis limit reached during cycle. Reset cycle and move panel within machine limits	
16	Y Axis negative limit	Axis limit reached during cycle. Reset cycle and move panel within machine limits	
17	Y Axis positive limit	Axis limit reached during cycle. Reset cycle and move panel within machine limits	
18	C Axis CW limit	Axis limit reached during cycle. Reset cycle and move panel within machine limits	
19	C Axis CCW limit	Axis limit reached during cycle. Reset cycle and move panel within machine limits	
20	Tape not cut!	Tape still present in sensor after run on after end of cycle.	

11.3 START PREVENT ALARMS.

These messages appear just above the alarm section on the control screen and indicate the present status of the machine cycle and also state any Start Prevent alarms.

These are logic reasons as to why the cycle will not proceed as required when the start button is pushed.

1	Pivot not back	S23 %I5.9 not activated indicating pivot not back.	
2	Panel Lifters Up	Panel lifter switch S17 %I5.3 on	
3	Vac Switch Off	Vacuum switch S3 %I5.2 not on	
4	No Vacuum	Insufficient vacuum S47 %I1.15 not on	
5	Clean switches	Butt Joint sensor S29 %I5.14 and End of Tape slow down sensor S31 %I5.26 not on. These proximities are normally on and turn off when activating at end of cycle.	
6			
7	Move to position	Aggregate is moving to position	
8	Hold	Hold pushbutton S12 %I5.1 activated	
9	Light Barrier	Light barrier broken or zone crossover switch indicates head is in occupied field.	

Other inputs required for Start Cycle but for which there are no screen messages are:

1	Machine not zeroed	General Set machine	
2	Joystick activated	S13, %I1.4 or %I1.5 or %I1.6 or %I1.7 are on	
3	C Axis switch activated	S12, %I1.10 or %I1.11 are on	

