User's Guide

English

Plastic bending machine

HRK 65-125

SHANNON

Plastic bending machine

HRK 65-125

Information contained in this User's Guide is subject to
change without notice

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Introduction

Congratulations on purchasing Shannon's plastic bending machine **HRK 65-125**. Red this guide completely before installing and using the machine.

We want to keep in contact and to know how you find the **HRK 65-125**. We are always willing to advice on the use of the machine and its accessories.

SHANNON BV

Turfschipper 11-13
2292 JC Wateringen
Postbus 84
2290 AB Wateringen
Nederland (EC)

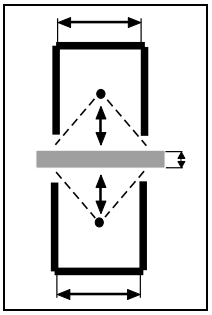
Tel. +31 (0)174 225240
Fax. +31 (0)174 225249
E-mail: info@shannon.nl
Website: www.shannon.nl

Description of the machine 1

The **Shannon HRK** bending machine is a rapidly convertible semi-automatic machine for the production of large series of items with multiple bends for the plastic sheet processing industry.

- The machine has four adjustable heating elements as standard. Four reflectors under or two under and two upperreflectors. The temperature of which can be adjusted independently by electronic controls.
- The filaments of the heating elements on the working surface are adjustable in height. The other elements, which are mounted in the pneumatically operated top frame which clamps the workpiece in place, are adjustable in height as a single unit in respect of the working surface.
- The workpiece can be heated from two sides, considerably reducing the production cycle time and making it possible to bend sheet up to 6 mm thick.
- The top frame is switched on independently of the control units and is controlled by an adjustable timer.
- The working surface is made of scratch-resistant solid core material with which the space between the zones to be heated can be filled to support the plastic sheet.

When heated, thermoplastics become so flexible that they can be shaped. When a plastic sheet is heated to its softening point in a narrow zone, if can be bent to any angle desired.



The bending radius is determined by the width of the heated zone. The zone is determined by the thickness of the material, the type of heating element and the distance between the plastic and the filament.

Every plastic has its specific softening point. By coordinating the temperature, heated zone and the heating time all kinds of thermoplastic can be processed.

Technical data

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type		HRK 65	HRK 125
Assembly			
Control unit	Max.	2x DB	4x DB
Upper heating element	Max	2	4
Lower heating element	Max	4	4
Pressure bars		2	4
Electrical			
Control unit	Voltage	220 – 240 V AC	
	Power	300 VA / 500 VA / 1000VA	
	Fuse	2,5 AT x2	5 AT x2
max. power:		1000VA	4000 VA
connection		CEE 7/4 16A 2P+A	
Filament		0-30 V, 0-13 A ~	
Network connection		CEE 7/4 16A 2P+A	
Network circuit breaker		Max. 16 A	
Pneumatic			
Air		Unlubricated clean dry air	
Maximum		6 bar	
Minimum		5 bar	
Operating pressure		6 bar	
Coupling		Quick action coupling	
Mechanical			
Gradation of stop		0-500 mm	
dimensions	[LxWxH]	860 x 750 x 380 mm	1470 x 850 x 275 mm
weight		85 Kg	120-140 kg**
Lifetime filament		±500 hour	
Functional			
Bending width		650 mm	1250 mm
Mutually extendible*		10-465 mm	10 - 610 mm
Sheet thickness*		1 - 10 mm	1 - 20 mm
Temperature filament	Max	20-600 ◦C	
Filament height adjustment	Bottom	1 - 6 mm	
	Top	6 - 25 mm	
Ambient			
Temperature		18-30 °C	
Humidity of the air		50-80 % (no condensed)	
Miscellaneous			
set of socket screws keys		1 set [1½, 3, 5 mm]	
Spare fuse		2 x [6.3x32 5 AT] each controller	
Spare filament		1 x [∅0.9 x 750 mm]	1 x [∅0.9 x 1350 mm]

* Depends on the heating element
** Depends on the amount of controllers

To ensure safety when using the machine you should read this User's Guide carefully and follow the safety instructions closely

Attention!
The machine contains a section where there is a risk of trapping.

Attention!
The machine contains parts, which are hot. Touching them will cause burns.

Allow hot parts to cool sufficiently (at least 10 minutes) before touching them.

Never touch the filaments or the reflectors when the machine is in operation.

Always wear close-fitting clothing.

Be particularly careful of sleeves and always tie back long hair.

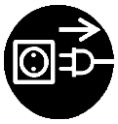
Never leave objects on the working surface.

The machine may only be used for heating narrow zones in flat plastic sheet.

Any other use could lead to very hazardous situations or cause damage to the machine!

The plastic sheets that have to be bent may never be thicker than 6 mm.

Before commissioning and servicing always check the connection cable and plug for defects.



When servicing switch off the machine and remove the plug from the socket.

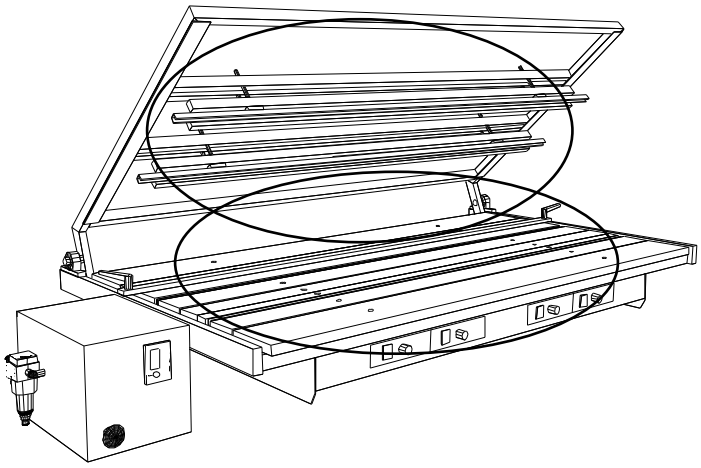
Before use always check that all the pressure bars and heating elements in the top frame are firmly attached.

Only switch on those heating elements which are needed.

Never operate the machine if anyone is standing close behind or beside it.

Never introduce objects or material into the machine from the rear.

Never leave the machine unattended without switching it off.



4.1 EMERGENCY STOP

There is an emergency stop button (**C**) at the front of the air/timer unit, which can be reached by the operator from the normal working position.

Pressing the emergency stop button switches off the timer and the top frame lifts up. The button remains pushed in.

Resetting of the emergency button comes to pass by turning the button to the right.

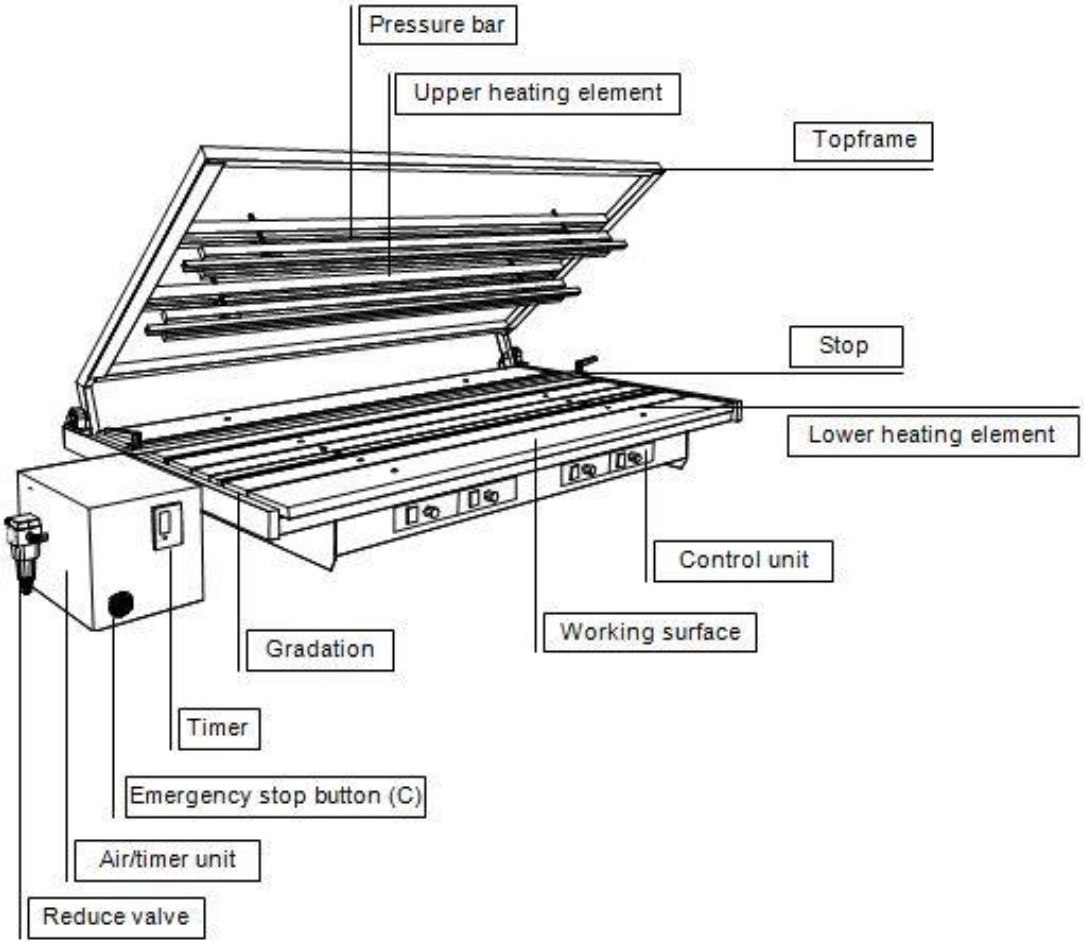
The machine is ready to use again.

4.2 ONLY USE THE EMERGENCY STOP BUTTON WHEN:

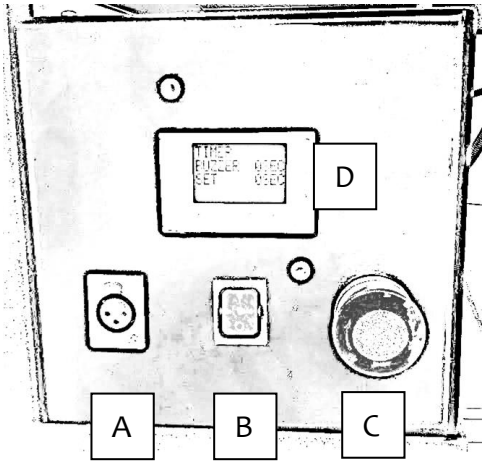
- Risk of trapped limbs.
- Defects in the timer, so the machine fails to open after the pre-set time.
- An outbreak of fire or situations involving a risk of fire.
- Any situation that might present a risk to people or animals.
- Any other situation, that might present a risk or cause, damage to the machine and/or objects.

5.1 SUMMARY

The legend of the entire machine



5.2 AIR/TIMER UNIT



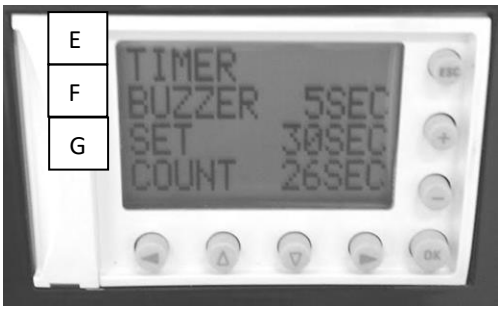
The air/timer unit is a combined unit for the control of the topframe and to set the cycle time.

The machine closes, when the foot switch is used. The timer will start when the machine is proper closed. The machine opens again when the time reached its value. The timer will reset back to zero

A. Connection foot switch
B. On/off switch
C. Emergency button
D. Timer unit

5.3 TIMER UNIT

Button	Function
Esc	cancel
+	increase value
-	decrease value
OK	confirm
►	move right
▼	move down
▲	move up
◄	move left



There are three numbers on the screen. From E to G the number means:

E. The time that the machine will buzz

F. The time that the machine is closed. The time will start when the machine is entirely closed.

G. The time till the machine opens again.

5.4 CONTROL UNITS

The control unit contains an electronic controller that can be used to set the temperature of the filament

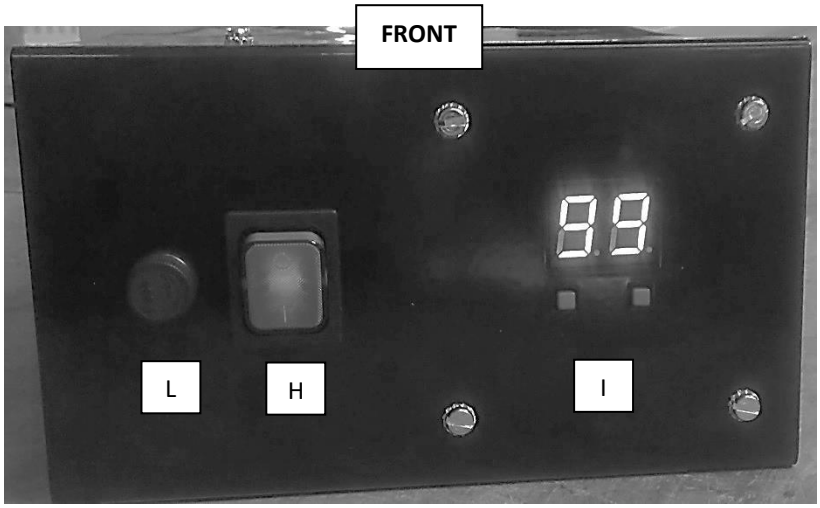
H. On/off switch

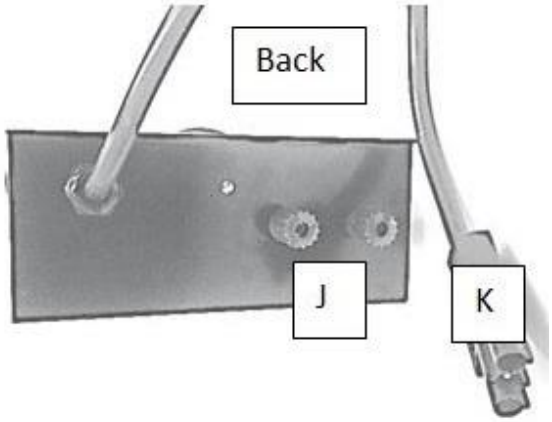
I. Temperature adjustment

J. Connection to filaments

K. Connection to 220 V AC

L. Fuse





6.1 ASSEMBLY

1. Remove packaging and blocking of top frame.
2. Place the machine on a level floor with sufficient space around and above the machine.
3. Ensure there is adequate ventilation and lighting at the workplace.
4. Avoid draughts, in order to prevent uneven heating.

6.2 CONNECTING AIR/TIMER UNIT

A black tube that is coming out of the machine has one air tube. Connect the tube to the corresponding number of the air/timer unit (at the backside).

6.3 CONNECTING FOOT SWITCH

Connect the plug of the foot switch on the corresponding socket (a) at the front side of the timer unit. See 5.2

6.4 CONNECTING COMPRESSED AIR

1. Check that all heating elements and pressure bars in the top frame are firmly attached.
2. Using a quick-action coupling connect the rear of the machine to your compressed air system or compressor.

6.5 CONNECTING POWER

1. Check that all switches of the control units are in the 0-position.
2. Put the plug into the socket.

7.1 PREPARATION

1. Check that the air pressure is connected
2. Clear the working surface
3. Check that all the heating elements are connected to the control units.
4. Check that no scraps of material remain in the reflectors.
5. Check that all the upper heating elements and pressure bars are firmly attached to the top frame.

7.2 SWITCHING ON HEATING ELEMENTS

Each heating element can be switched on and controlled individually.

1. Switch on the desired control unit with switch (**H**). See 5.4

7.3 SETTING TEMPERATURE

The temperature of the filament can be set using the temperature control.

1. When turning on the on/off switch, the display will show the value that was last saved (keeping the machine on a certain value for >20 seconds will make it remember this value).
2. Press the right button (arrow up) to increase the value, up to 99 (keeping this pressed in will make the value cycle much faster)
3. Press the left button (arrow down) to decrease the value, down to 00 (keeping this pressed in will make the value cycle much faster)
4. Press both buttons at the same time to go directly to 00. Doing this also resets the machine.

7.4 TROUBLE SHOOTING

Error message	Meaning	Solution
E1	The wire is loose (not connected)	Turn off the machine, check the filament, and reset the machine (see **§9.1** for changing filament) **Note: Between the values 00 and 04, this fault cannot be detected**
E2	The wire is loose (spark detection)	Check the connection of the filament Check the filament, and reset the machine This fault can also be reset by the arrow down button (see **§9.1** for changing filament)
E9	Broken circuit board	Contact the supplier for a new circuit board
Empty display	No power	Alert a maintenance engineer Check the fuse (see **§10.1**) Check the power supply cable Contact the supplier if necessary

7.5 SETTING CYCLE TIME

The time during which the machine is closed to heat the plastic sheet on two sides can be set on the timer unit.

At first use of the machine, set E = 5 and F = 20 (See 5.3)

1. Switch between values with the ▼▲buttons.
2. Increase or decrease the value with the +/- buttons.
3. Cancel the value with the "ESC" button.
4. Confirm the value with the "OK" button.

7.6 FOOT SWITCH

The top frame is served by pressure on the pedal of the foot switch.

7.7 SETTING AIR PRESSURE

The pressure for the system is adjusted by the factory on the right value (6 bar)

8.1 SAFETY PRECAUTIONS

Always take the following safety precautions before adjusting the heating elements:

1. ensure that the upper heating element and pressure bars are firmly attached

2. Switch off the heating elements one by one (Switch **H**).

3. Clear the working surface

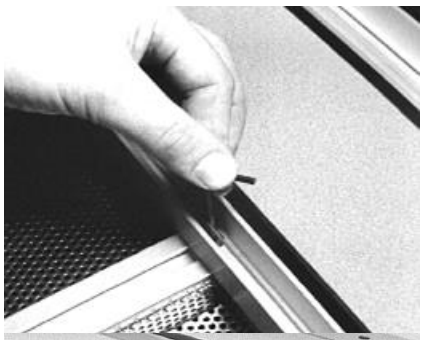
4. Allow the heating elements to cool for at least **10** minutes

8.2 LOWER HEATING ELEMENT

1. Remove the strips of solid core material next to the heating element to be adjusted by loosening the two socket head screws (use socket screw key **no. 5**).

2. Loosen the socket head screws in the supporting prongs on the left and right of the heating element, one half turn.

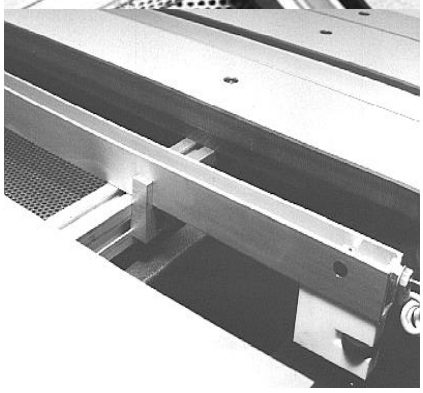
3. Loosen the socket head screw in the centre of the heating element one half turn (use socket screw key **no. 3**).



4. Take the heating element with both hands close to the supporting prongs on the left and right and slide it into the desired position.

5. Hold the heating element parallel to the front of the machine and the supporting prongs. This prevents the notched nuts in the **X**-profiles from binding.

6. Hand tighten the socket head screws, **starting** in the supporting prongs and **then** in the centre.



7. Position the other profiles in the same way if necessary.

8. Fill up the space between the heating elements as far as possible with solid core strips and hand tighten them. First slide the notched nuts into the aluminium **X**-profiles, roughly level with the holes and then lay the solid core strip on top.

9. Switch on the machine again as in Section 7.

8.3 UPPER HEATING ELEMENTS AND PRESSURE BAR

1. Disengage the air connection

2. The top frame will then slowly lower while air escapes

3. Loosen the socket head screws on the support bar clamps one turn

4. Hold the heating element at the sides, left and right, and slide it into the desired position. Move the support bar parallel to the front of the top frame, so that you position the top filament above the bottom one.

5. Tighten the support bar clamps again.

6. Switch on the machine again as in Section 7.

The upper heating elements and pressure bar may fall out of the top frame if they are loose or not properly attached.

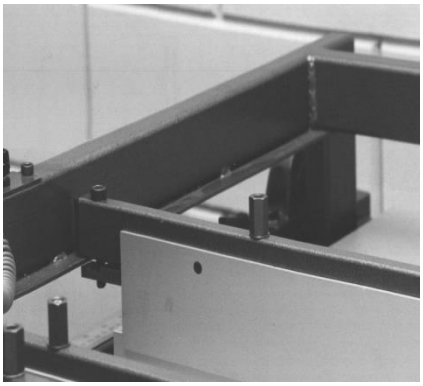
8.4 LOWER FILAMENT HEIGHT

1. Adjust the height of the filament using the knurled nut. These can be reached from the sides. Make sure that the filament height is the same on both sides.

2. Start up the machine again as in Section 7.

8.5 UPPER FILAMENT HEIGHT

Make sure that the lower and upper heating elements and the pressure bars are in the correct position.



1. Set the timer (**D**) to at least **60** sec. (**6x10**)
2. With this time setting the machine will remain closed for long enough to adjust the filament height.
3. Place a test piece of the plastic to be processed on the working surface
4. Lower the top frame (foot switch)
5. Adjust the height of the filament using the adjusting nuts on the upper heating elements
6. You can set the filaments to a minimum of 6 mm above the plastic
7. Adjust the height so that the element is clear of the plastic
8. Open the top frame by pressing the emergency stop (**C**)
9. Reset the emergency stop
10. Adjust the timer (**D**) again
11. Start the machine again as in section 7.

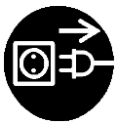
8.6 STOP

1. Loosen both the handles on the stop one half turn
2. Slide the stop into the desires position
3. Hold the guide parallel to the front of the machine. This stops the clamping blocks from binding
4. Tighten the handles

Always ensure that the stop is placed in such a way that heating elements or pressure bars cannot hit the stop as they are lowered.

This machine needs little maintenance. Remove loose dirt once in a while.

9.1 SAFETY PRECAUTIONS



1. Switch of all regulating units (switch **H**)
2. Clear the working surface
3. Disengage the air connection
4. Remove the plug from the socket

9.2 LUBRICATION POINTS

The following points should be lubricated with a drop of oil or grease once a year:

1. Bearing cylinder: underside (The lubrication point can be accesses from the rear of the machine.

3. Bearing cylinder: upperside (The lubrication point can be reached by removing the solid core strips on the middle of the machine.

9.3 PROFILES

The heating elements work more effectively when they are clean. Remove dirt and deposits from the heating elements regularly. Blow away loose dirt and brush them clean.

9.4 WATER SEPARATOR

Check if there is water in the water separator and remove it if necessary. The water separator is situated on the left of the air/timer unit. If there is water in the flass holder, it should be drained off.

1. Disengage the air connection
2. The top frame will lower slowly
3. Hold a container under the nipple and slowly open the nipple. All the water will then run out of the glass holder
4. Close the drain nipple by hand
5. Switch the machine on again as described in section 7.

10.1 SAFETY PRECAUTIONS

Before tensioning and changing the filament always take the following safety precautions:

1. Put the foot switch into a place where it can't be pushed accidentally

2. Clear the working surface

3. Switch off the control units (switch **H**)

4. Check that the heating elements and pressure bars in the top frame are firmly attached

5. Allow the heating elements to cool for at least **10** minutes

10.2 TENSIONING

1. Turn the filament to the lowest position (only bottom heating)

2. Hold the end of the wire on the right with pliers and undo the screw in the wire pin (use socket screw key **no. 1½**)

3. Pull the wire taut with pliers and tension the spring

4. Tighten the socket head screw firmly again

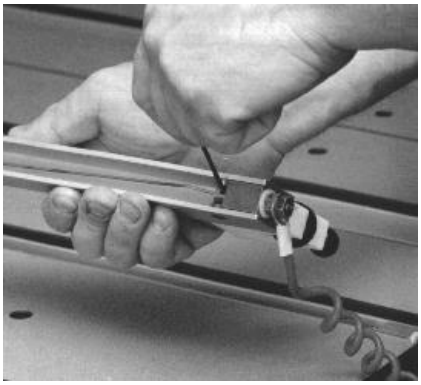
5. Cut off the end of the filament. Always leave **8-10** mm projecting in order to be able to tension the filament again

6. Bend the projecting piece down

Attention! The end of t he filament is sharp.

10.3 CHANGING THE FILAMENT

1. Turn the filament to the lowest position (Only for bottom heating)



2. Unscrew the socket head screw in the wire pin on the right (use socket screw key **no. 1½**)

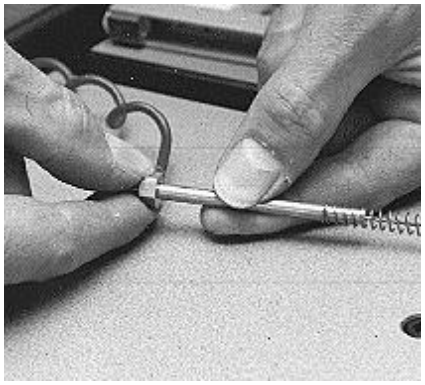
3. On the left side, slide the expanding pin with the spring out of the pin block

4. Slide the spring off the expanding pin

5. Unscrew the expanding pin from the connection screw (incl. connection wire)

6. Remove the filament from the expanding pin, and the wire pin

7. Slide a new filament into the expanding pin and make sure that the eye is pulled well into the pin



8. Screw the expanding pin onto the connection screw (incl. connection wire) and attach firmly

Be careful not to damage the expanding pin. Tightening firmly by hand is sufficient.

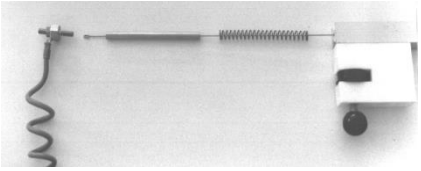
9. Slide the spring over the filament and slide the filament through to the expanding pin

10. Slide the filament with expanding pin through the white insulation sleeve of the pin block, and pull it through as far as possible

11. Then insert the end of the filament in the wire pin. Pull it taut and tension the spring with pliers

12. Tighten the socket head screw (use socket screw key **no. 1½**)

13. Switch on the machine and the control unit, corresponding to the replaced filament (switch **H**). then turn the temperature control (**I**) to the highest position (position **99**).



14. The filament will then glow red

Never touch the filaments and the reflectors when the machine is in operation.

15. Hold the end of the filament with pliers and loosen the socket head screw one turn (use socket screw key **no. 1½**)

16. Pull the filament taut and tighten the socket head screw. Check that the filament is straight. If not, repeat this operation

A maintenance engineer should **always** be alerted when a fuse blows. Do not replace the fuse until the short circuit has been corrected.

11.1 SAFETY PRECAUTIONS

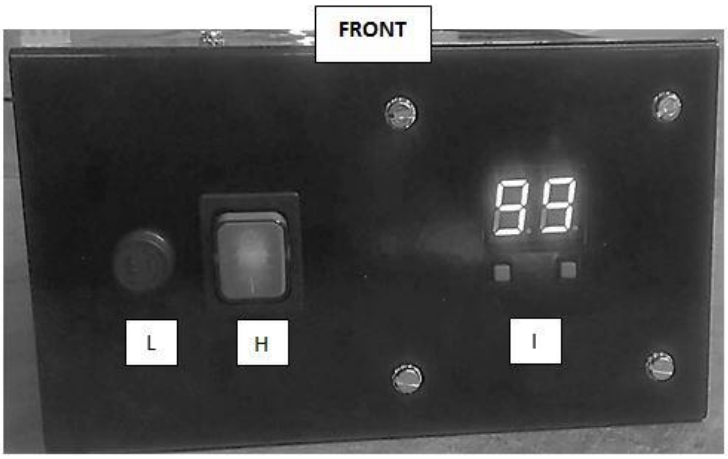
Before replacing a fuse, always take the following safety precautions:

1. Switch off the control units (switch **H**)
2. Remove the plug from the socket

11.2 FUSES CONTROL UNIT

1. Open the fuse holder (**L**) by pushing it in and turn to the left. The fuse will come out.
2. Verify and replace the fuse if necessary, in the reversed order.

NB. Fuse **6,3x32mm; 2,5 AT** for HRK65, **5 AT** for HRK 125, 1 piece per control unit.



Spares

Part	HRK 65	HRK 125
Filament	∅ 0,9x750 mm	∅ 0,9x1350 mm
Fuse	2,5 AT	5 AT
Wire tensioning set	0.9 mm	

ACCESSORIES

Shannon can supply various accessories and production equipment for the processing of plastic sheets.

Working length adjusting set

Working length adjusting set for heating one or more zones per bending line.

Thin sheet bending profile

A contact profile with anti-stick coating suitable for bending thin sheets from 0.3 – 2 mm.

Profile length:	500, 650, 1000 and 1250 mm
Ridge widths:	1 to 10 mm
Number of ridge widths:	Single and double
Special version:	On request

Mould

In which to allow the bent product to cool. Adjustable to any desired angle.

Available lengths:	650, 1.250, 2.200 and 3.000 mm.

EQUIPMENT

Flame polishing equipment

To provide a glossy finish to edges, holes and slots in clear acrylic sheets.

Diamons polishing machines

To provide a glossy finish to edges of acrylic sheets, etc, to a thickness of 20 mm or 100 mm.

Annex

Bending machines

Type **HR**

Standard; 1 regulating unit and 1 underreflector with heating wire that is adjustable in height
Working lengths; **500, 1.250, 2.200** and **3.000** mm.

Type **HRT**

Standard; 2 regulating units and 2 underreflectors with heating wire that is adjustable in heigh
Reflectors and stop adjustable with scale calibration.
Easily extendable up to 4 regulating units with 4 underreflectors.
Working lengths; **650, 1.250, 2.200** and **3.000** mm.

Type **HRK**

Standard; 4 regulating units and 4 adjustable under reflectors with heating wire that's adjustable in height.
2 upperreflectors, pneumatic pressuresystem and stop, all adjustable.
Easily extendable up to 4 regulating units with 4 under- and 4 upperreflectors.
Working lengths; **650** and **1.250** mm.

Type **HRP/S**

Standard; 4 regulating units and 2 adjustable under reflectors with heating wire that is adjustable in height.
2 upperreflectors, pneumatic pressuresystem and stop, all adjustable.
Easily extendable up to 4 regulating units with 4 under- and 2 upperreflectors.
Working lengths; **2.200** and **3.000** mm.

Type **HRP**

Standard; 4 regulating units and 2 adjustable under reflectors with heating wire that is adjustable in height.
2 upperreflectors, pneumatic pressuresystem and stop, all adjustable.
Easily extendable up to 8 regulating units with 4 under- and 4 upperreflectors.
Working lengths; **2.200** and **3.000** mm.

Type **HRT/D**

Standard; automatic feed- and transport system for equal heating of big productions.
2 regulating units and 2 adjustable underreflectors with heating wire that is adjustable in height.
2 adjustable parallel stops.
Can also be used as a normal HRT machine.
Easily extendable up to 4 regulating units and 4 underreflectors.
Working length; **3.000** mm.

Type **HRP/D**

Standard; automatic feed- and transport system for equal heating of big productions.
4 regulating units and 2 adjustable underreflectors with heating wire that is adjustable in height.
2 upperreflectors, pneumatic pressure system, rollers and parallel stops, all adjustable.
Can also be used as a normal HRP machine
Easily extendable up to 8 regulating units with 4 under- and 4 upperreflectors.
Working length; **3.000 under** and **2.000** mm. **upper**.

Type **FBM**

Standard; automatic bending- and transportsystem for big productions of thin foils (0,4 to 1 mm.)
2 regulating units with 2 upperreflectors with an adjustable distance between from 45 mm. up to 420 mm.
Also provided with a vacuum feed system
Working lengths; **650** mm.

Special versions on request.

SERVICE AND WARRANTY

Shannon gives one year's warranty on all parts with the exception of the filaments and/or heating elements.
This warranty is inclusive of parts, call-out charge and labour.

The maximum replacement time for the control units is one working day. The user will then have to install and remove the unit himself.