User's guide

English

Plastic Bending Machine

HRT/D

SHANNON

Plastic bending machine

HRT/D 300

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Introduction

Congratulations on purchasing the **Shannon HRT/D** plastic bending-machine.
Read this Guide completely before installing and using the machine.

We want to keep in contact and to know how you find the **HRT/D**. We are always willing to advise on the use of the machine and its accessories.

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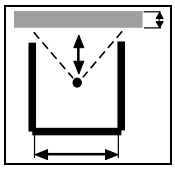
Description of the machine

The **Shannon HRT/D** plastic bending machine is a rapidly convertible machine for the production of very large series of items with multiple bends for the plastic sheet processing industry.

- The machine has three adjustable heating elements as standard. 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 work piece can be heated from one side and it is possible to bend sheet up to 8 mm thick.
- This machine is equipped with an easily adjustable and controllable transport- and feed system. Multiple feed belts transport the work piece over the heating elements from the right to the left of the working surface. This way all the sheets are equally heated and the full table length is in use.
- 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 co-ordinating the temperature, heated zone and heating time all kinds of thermoplastic can be processed.

Technical Data 2

model	HRT/D		
Assembly			
control	2 (max. 4)		
lower heating element	2 (max: 4 & min: 1), fitted with single filament		
Electrical			
	voltage	power	fuse
control unit	220/240 V~	1000 VA	5 AT
max. power requirement	4.000 VA		
network circuit breaker	max. 16 A		
network connection	CEE 7/4 16A 2P+PE		
filament	0-30 V, 0-19 A ~		
Driving motor Voltage	220 V		
Power	0,37 Kw		
Réglage de vitesse Voltage	220 V		
Power	0,37 Kw		
Horsepower	1.500 (R/pm)		
Mechanical			
gradation of stop	max 1000 mm		
dimensions	3390x1300x1092 mm (lxwxh)		
weight	550 Kg		
life of filament	Approx. 600 hours		
Functional			
bending width	3000 mm		
mutually extendible	20 - 1000 mm		
sheet thickness	1 - 8 mm (depending on heating element)		
temperature range filament	20-600 °C		
filament height adjustment bottom	1 - 6 mm		
Ambient			
temperature	18-30 °C		
humidity of the air	50-80 % (no condensed)		
Miscellaneous			
set of socket screw keys	2, 3, 5, 6mm 1 x		
spare fuse	6.3x32 5 AT 4 x		
spare filament	∅1.6 x 3150 mm 4 x		

SAFETY INSTRUCTIONS:

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 parts which are hot. Touching them will cause burns.

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

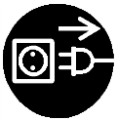
Never touch the filaments or the reflectors when the machine is in operation.

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!

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.

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

Never leave the machine unattended without switching it off.

4.1 ASSEMBLY

1. Remove packaging
2. Place the machine on a level floor with sufficient space around and above the machine.
3. Level the working surface of the machine, using shims under the feet if necessary.
4. Ensure there is adequate ventilation and lighting at the workplace.
5. Avoid draughts, in order to prevent uneven heating.

When moving the machine with a forklift truck ensure that the machine is supported right in the centre.
Also use sufficiently long prongs on the forklift truck.

4.2 CONNECTING POWER CABLE

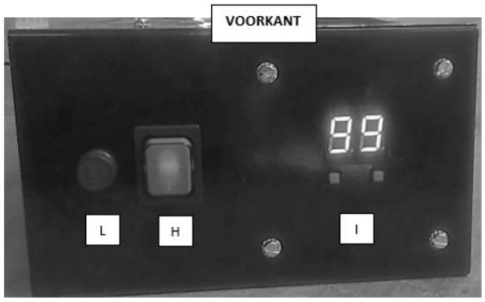
1. Check that the rating of the electrical system is adequate (see technical data).
2. Plug in the machine.

5.1 PREPARATION

1. Clear the working surface.
2. Check that all the heating elements are connected to the control units.
3. Check that no scraps of material remain in the reflectors.
4. Switch off all the control units (position "O").
5. Turn on the main switch (position **I**).

5.2 SWITCHING ON HEATING ELEMENTS

Each heating element can be switched on and controlled individually.



1. Switch on control unit with switch **H**.

5.3 SETTING THE 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.

5.4 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

5.5 SWITCHING ON TRANSPORTSYSTEM

Screen buttons[6]

Button	function
Esc	Cancel
+	Increase value
-	Decrease value
OK	Confirm
►	Move right
▼	Move down
▲	Move up
◄	Move left

Transport system:

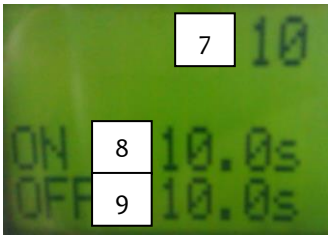
Before using the transport system, first turn the speed regulator[5] all the way to the left. To activate the transport system, switch the green button[4] so that it lights up. Then, turn the speed regulator[5] to regulate the speed. On the right you'll find a table which gives an indication on how fast the track goes from 1 end of the machine to the other, on each rotation of the knob.

Full knob rotation	Time (in seconds)
1	70
2	35
3	24
4	19
5	16
6	14
7	12.5
8	12
9	11.5
10	11

Feeding system:

1. Press the left green button[2] so that it lights up. The control system of the feeding system is now activated.

2. There are three numbers now on the display ranked from top to bottom as:
   a. [7] The number of cycles that the machine will operate (the number of plastic sheets that are loaded)
   b. [8] The time in seconds that the pusher is reloading a new piece of plastic.
   c. [9] The time in seconds that the feeding system is pushing a new piece of plastic.



3. For first time usage, set all the values on 10:
   a. Swap between values by using the ▼/▲ buttons.
   b. Increase or decrease the value by using +/-.
   c. Cancel the value by using he "ESC" button.
   d. Confirm the value by using the "OK" button.

4. Press the round red button[1] to stop the machine

5. Press the green round button[3] to active the pneumatics. The feeding system will begin working now.

6. The feeding system can be fine-tuned in the following ways:
   a. If the system stops too fast, increase the cycle number by increasing the top value in the display.
   b. If the reloading time is too long, decrease the second value on the display.
   c. If the pushing time is too long, decrease the third value on the display.

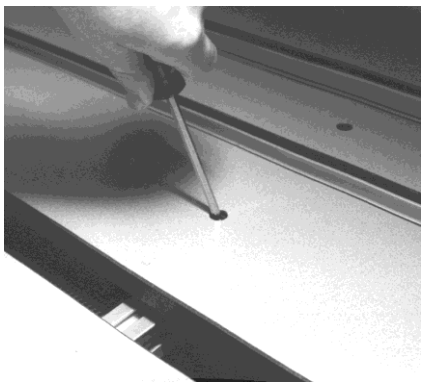
6.1 SAFETY MEASURES

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

1. Switch off the heating elements one at a time (Switch **H, page 10**).
2. Clear the working surface.
3. Allow the heating elements to cool for at least **10** minutes.

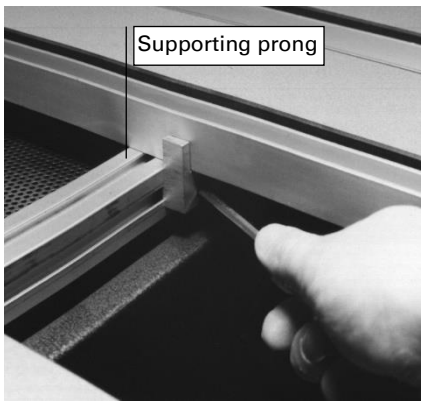
6.2 LOWER HEATING ELEMENT

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**).



1

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



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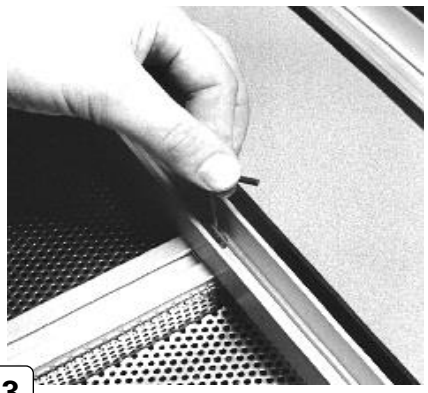
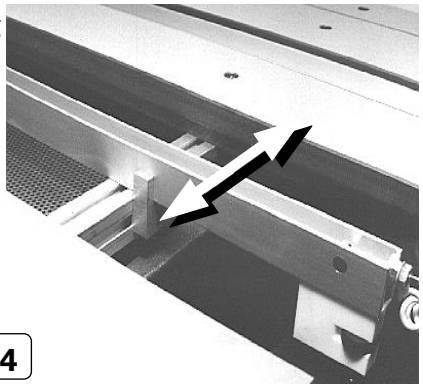
3. Loosen the socket head screw in the centre of the heating element one half turn.
(Use socket screw key **no. 3**)



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



5. Hand tighten the socket head screws, **starting** in the supporting prongs and **then** in the centre. 4

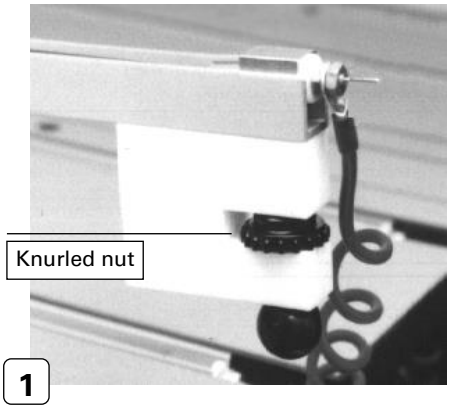
6. Position the other profiles in the same way if necessary.

7. 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**-profile roughly level with the holes and then lay the solid core strip on top.

8. Switch on the machine again as in Section **5**.

6.3 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.

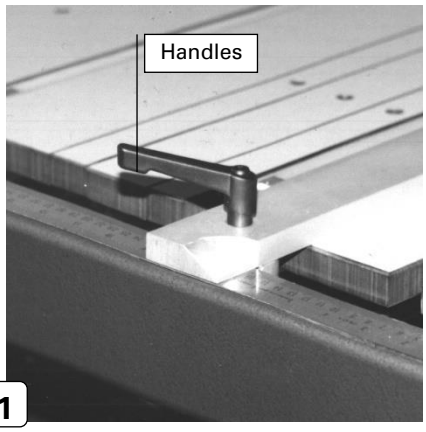


1

2. Start up the machine again as in Section **5**.

6.4 STOP

1. Loosen both the handles on the stop one half turn.

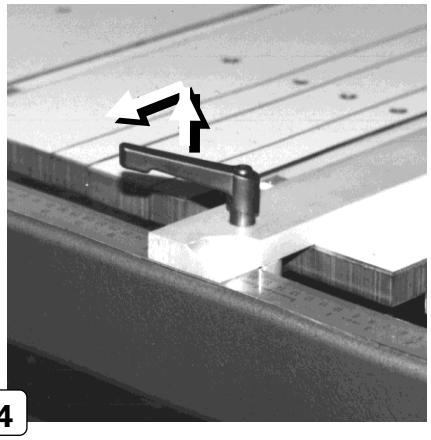


1

2. Slide the stop into the desired position.
Hold the guide parallel to the front of the machine. This stops the clamping blocks from binding.

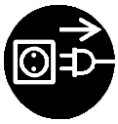
3. Tighten the handles.

4. Pull the handle upwards against the spring pressure and turn it outwards.


4

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

7.1 SAFETY PRECAUTIONS



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

7.2 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.

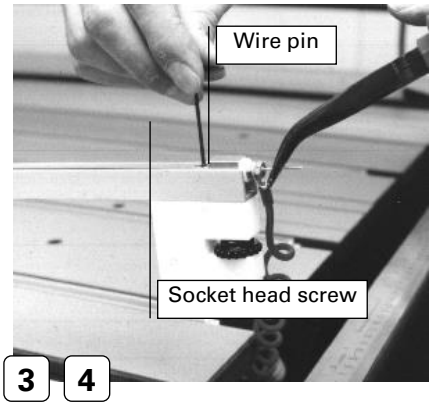
8.1 SAFETY MEASURES

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

1. Clear the working surface.
2. Switch off the control units one at a time (switch **H**).
3. Turn off the main switch
4. Allow the heating elements to cool for at least **10** minutes.

8.2 TENSIONING

1. Turn the filament to the lowest position.
2. Hold the end of the wire on the right with pliers and undo screw in the wire pin.
   (Use socket screw key **no. 2**)
3. Pull the wire taut with pliers and tension the spring.
4. Tighten the socket head screw firmly again.

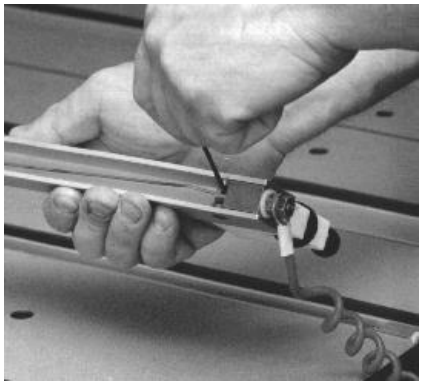


5. Cut off the end of the filament. Always leave 8-10 mm projecting in order to be able to tension the filament again.
   Bend the projecting piece down.

Attention! The end of the filament is sharp**.**

8.3 CHANGING

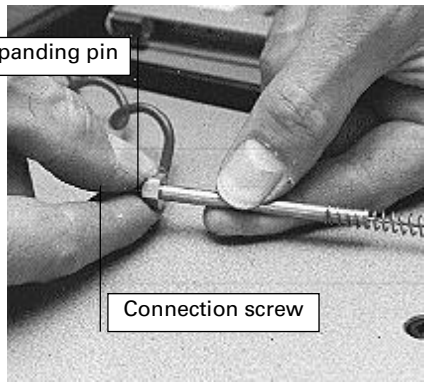
1. Turn the filament to the lowest position.
2. Unscrew socket head screw in the wire pin on the right. (Use socket screw key **no.2**).



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

2

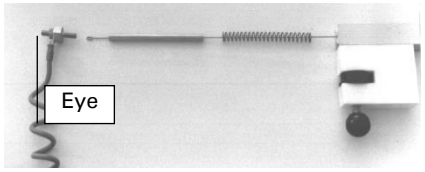
4. Slide the spring off the expanding pin.
5. Unscrew the expanding pin from the connection screw (incl. connection wire).



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

5

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



7

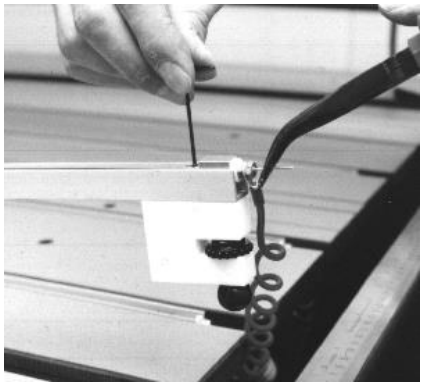
8. Screw the expanding pin on the connection screw (incl. connection wire) and attach firmly.

Take care 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.



11

12. Tighten the socket head screw.
(Use socket screw key **no. 2**).

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

The filament will then glow red.

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

14. Take hold of the end of the filament with pliers and loosen the socket head screw one half turn. (Use socket screw key **no. 2**).

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

Fuse 9

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

9.1 SAFETY MEASURES

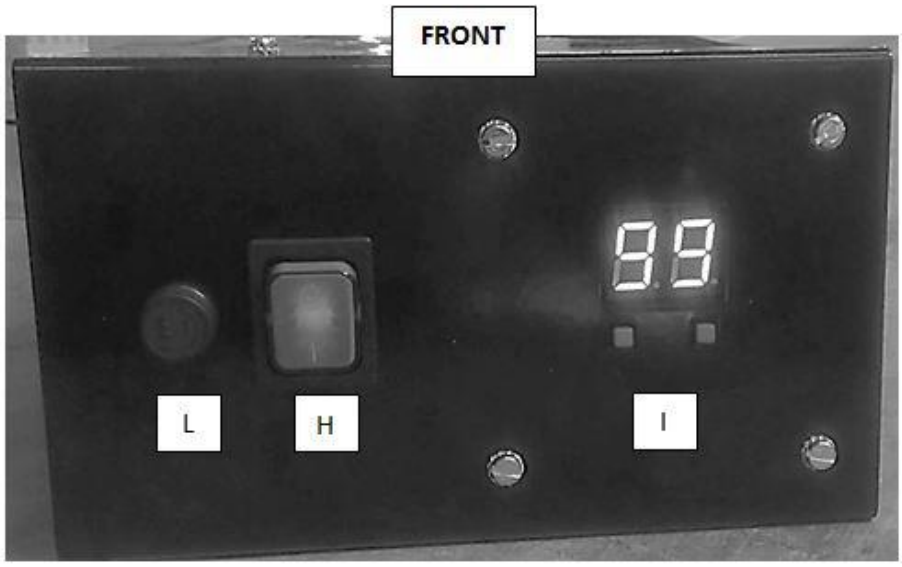
Before replacing a fuse always take the following safety measures:

1. Clear the working surface.
2. Switch the control units off one by one (switch **H**).
3. Switch off the main switch.
4. Remove plug from socket.
5. Allow the heating elements to cool for at least **10** minutes.

9.2 CONTROL UNIT FUSE

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 of necessary, in the reversed order.

N.B. Fuse **6,3x32mm; 5 AT,** 1 piece a control unit.



9.3 RESTORING CIRCUIT BREAKER

1. Remove a number of solid core strips in the centre of the machine.

The circuit breaker which is at the front of the main switch box is now visible. When the switch is down ("**off**"), the circuit breaker is switched off.

2. Switch on the circuit breaker by pushing the switch up.

2

OPTIONS

Additional heating elements can easily be fitted to the machine.
All extensions and accessories are easy for the customer to mount and connect.
Non-standard sizes and quantities on request.

Regulating units

Maximum number of controls per machine is **4**
Each regulating unit controls one filament.

Heating elements

Heating elements are available in a variety of widths and with 1 or 2 filaments.
Heating elements with 2 filaments are suitable for heating wide zones and for obtaining a large radius.

Maximum number of heating elements: **4**

Number of filaments per heating element	Profile width*(internal)
1 filament	20 40
2 filaments	50
3 filaments	78

*measuring in mm

All heating elements are provided with fastening material and connecting cables.

Service Contract

Shannon offers you an opportunity to take out a service contract. Let us tell you about it.

Spares

Part	Size/value
Filament	∅1,6 x 3.150 mm.
Fuse	5 AT
Wire tensioning set	1,6 mm

ACCESSORIES

Shannon Machines BV can supply various accessories and production equipment for the processing of plastic sheet.

Working width of reducing set

Working width of reducing set for heating one or more zones per bending line.

Foil bending profile

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

Profile lengths: 500, 650, 1000 en 1250 mm
Ridge widths: 1 to 10mm
Number of ridge widths: single and double
Special versions: on request

Mould

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

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

EQUIPMENT

FLAME POLISHING EQUIPMENT

To provide a glossy finish to sharp and round edges, holes and slots in clear acrylic sheets up to a thickness of 15mm with a single passage.

DIAMOND POLISHING MACHINES

To professionally provide a glossy finish to edges of acrylic sheet
up to 20 mm. and 100 mm. thickness.

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 height.
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 2 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 tot 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.