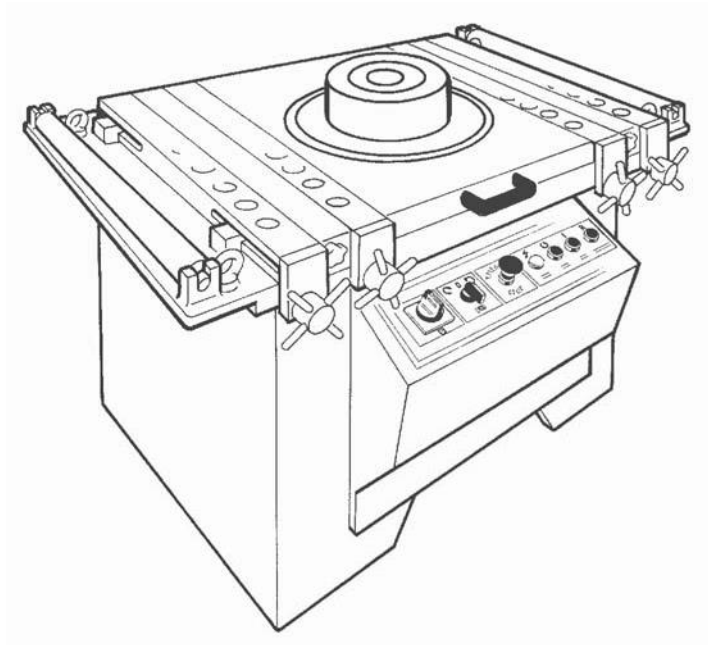


User manual

BENDING AND COMBINED MACHINE



CE

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Issue 1.5

DESCRIPTION OF THE BENDING MACHINE

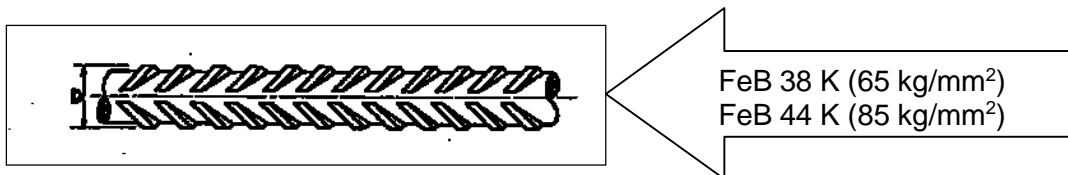
Applications

The machine is designed to bend steel bars for uses in the concrete industry.

Table with specifications of the diameters of rod irons (in mm) each model is capable of bending.

The diameters are specified according to the hardness to the material (R) and the number of rod irons to be bent simultaneously.

Ø mm	R. 65 Kg/mm ² 650 N/mm ²				R. 85 Kg/mm ² 850 N/mm ²				R P M	Motor	
	1	2	3	4	1	2	3	4		HP	kW
P26 P26 MF	22	18	14	12	20	16	14	10	13	2 MF2,5	1,5 MF1,8
P30	26	20	16	14	24	18	14	12	10	2	1,5
P32	28	22	18	16	26	20	16	12	9	3	2,2
P36	30	24	18	16	30	22	16	14	9	4	3
P42	36	28	24	18	34	26	22	16	6	4	3
P52	46	32	26	20	42	32	24	18	6	5,5	4
P55	48	32	26	-	44	30	24	-	5,5	5,5	4



Unsuitable applications

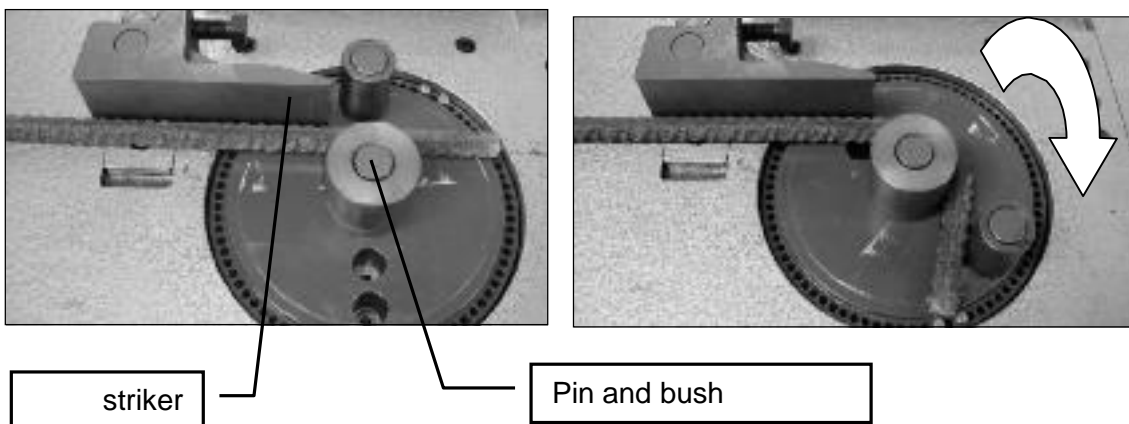
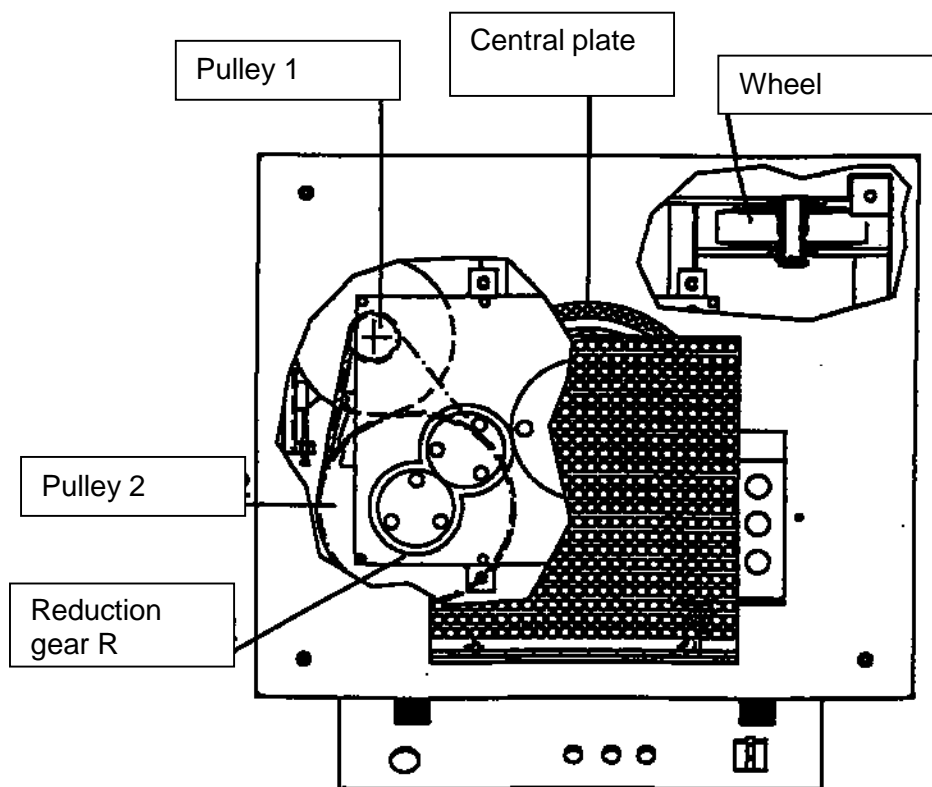
The machine is unsuitable for all uses not explicitly stated in *Applications*, in particular:

- Use of materials different from those specified.
- Use of materials with a diameter different from that specified.
- Use of the machine in an explosive environment.

The model of the purchased machine, serial number and the year of manufacture are on the manufacturer's serial plate.

Operating principle

- A self-braking electric motor rotates pulley 1, which provides rotation to pulley 2 via three belts.
- The central plate is turned by reduction gear R.
- The rotation of the central plate bends the rod iron using pins inserted in the locating holes.



MACHINE DESCRIPTION

The dual function machine is a bending machine with a rod iron cutter designed to cut steel bars mounted on one side. The machine can therefore be used both to bend and cut bars.

The two functions can be used independently and are supplied on one machine for cost effectiveness and ease of use, carrying out two processes using one machine.

The technical specifications of the machine do not allow the user to cut and bend simultaneously.

The table shows rod iron diameters (mm) that can be used with each model.

Diameters are specified according to material hardness (R) and the number of rod irons which can be processed simultaneously. Each model is referred to using two numbers: the maximum cutting diameter and the maximum rod iron bending diameter with a hardness of R45 **Kg/mm²** (450 N/mm²).

For example: TP24/28 indicates the model designed to cut a rod iron with a 24mm diameter and to bend a rod iron of 28mm diameter with a hardness of R 45 kg/mm² (450 N/mm²). TP24/28 also allows the cutting of 2 rod irons of 16mm diameter or 3 rod irons of 14mm diameter (with the same hardness R) and so on.

Ø mm	R. 65 Kg/mm ² 650 N/mm ²				R. 85 Kg/mm ² 850 N/mm ²				R P M	Motor		
	1	2	3	4	1	2	3	4		HP	kW	
TP22/26 TP 22/26 MF	C	18	12	10	8	16	10	8	6	11	2 MF2,5	1,5 MF1,8
	B	24	18	14	12	22	14	12	10			
TP24/28	C	20	14	11	9	18	12	10	8	10	3	2,2
	B	25	18	14	12	22	16	12	10			
TP26/32	C	22	15	12	10	20	14	11	8	9	3	2,2
	B	28	22	18	16	26	20	16	14			
TP30/35	C	25	18	14	12	22	16	13	11	9	4	3
	B	30	24	22	20	28	22	20	18			
TP38/45	C	30	22	18	16	28	20	16	14	6	5,5	4
	B	40	32	26	-	36	28	25	-			

Unsuitable applications

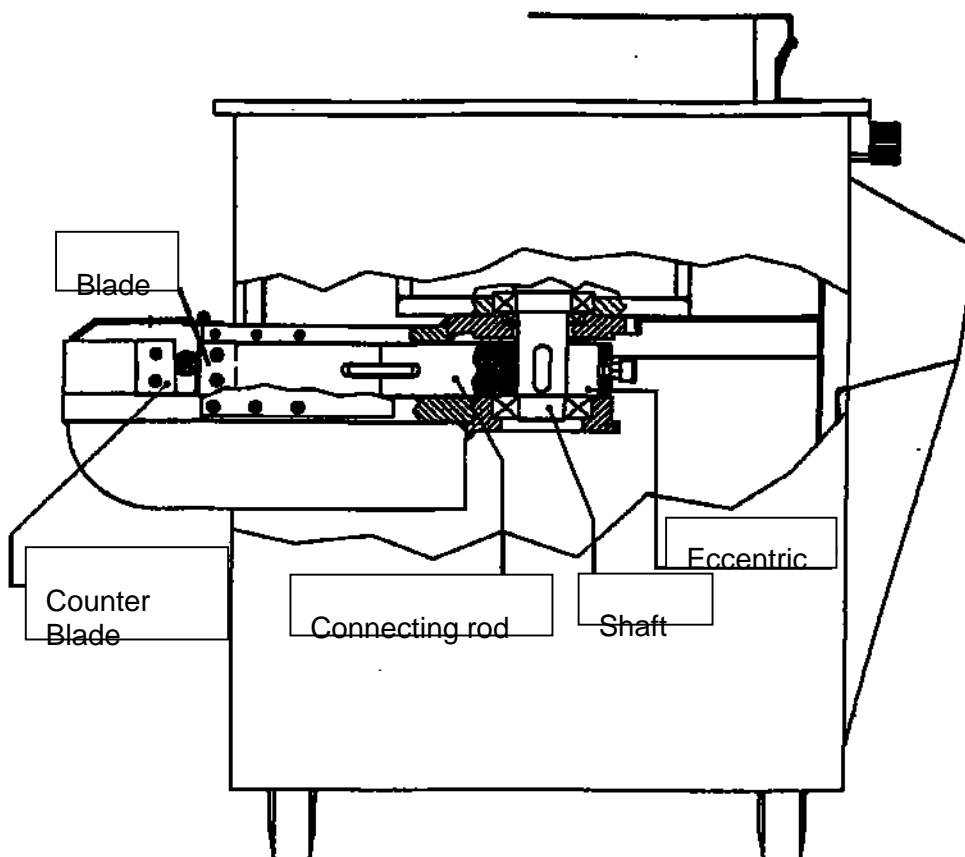
All uses not explicitly stated in *Applications* are unsuitable for this machine, in particular:

- Use of materials different to those specified.
- Use of materials with diameters different to those specified.
- Simultaneous use of cutting and bending functions.
- The use of the machine in an explosive environment.

The model of the purchased machine, serial number and the year of manufacture are on the manufacturer's serial plate.

Operating principle

- The machine consists of a bending machine (described in the previous paragraph) where the central shaft of the reduction gear turns the central plate as well as an eccentric shaft.
- This operates the connecting rod attached to the blade carrier slide where the blade is located.
- The linear movement of the blade up to the counter-blade on the arm of the cutter allows the cutting of rod irons.



SAFETY INFORMATION

Safety criteria

During the design and construction of this machine, precautions and safety criteria were adopted that satisfy the essential safety requirements of Machine Directive 2006/42/CE, 2014/30/UE & 2014/35/UE.

Safety features

- The structure of the frame prevents access to gears, belts and moving parts of the transmission. The access door to the internal compartment has a safety microswitch which stops the machine if it is opened.
- A moving guard on the bending machine that is hinged to the frame is fitted with a microswitch that stops the bender being operated whilst the guard is open.
- On the dual function version, the moving guard on the cutter is fitted with a microswitch which stops the shear being operated whilst the guard is open.
- Continuously pressed safety controls (dead man) to allow the bending and cutting of rod irons:
 - a button on the control panel
 - a guarded pedal to prevent accidental operation.When a continuously pressed control is released, the bending action, and the cutting action, are stopped using an electromagnetic brake.
- The electromagnetic brake stops the motor and the moving parts as soon as the machine is stopped or the power to the motor is removed.
- Fuses and thermal relay for the electric motor.
- Two red emergency stop buttons.

Operator safety



Use gloves to move rod irons to avoid abrasions and cuts caused by the material surface.



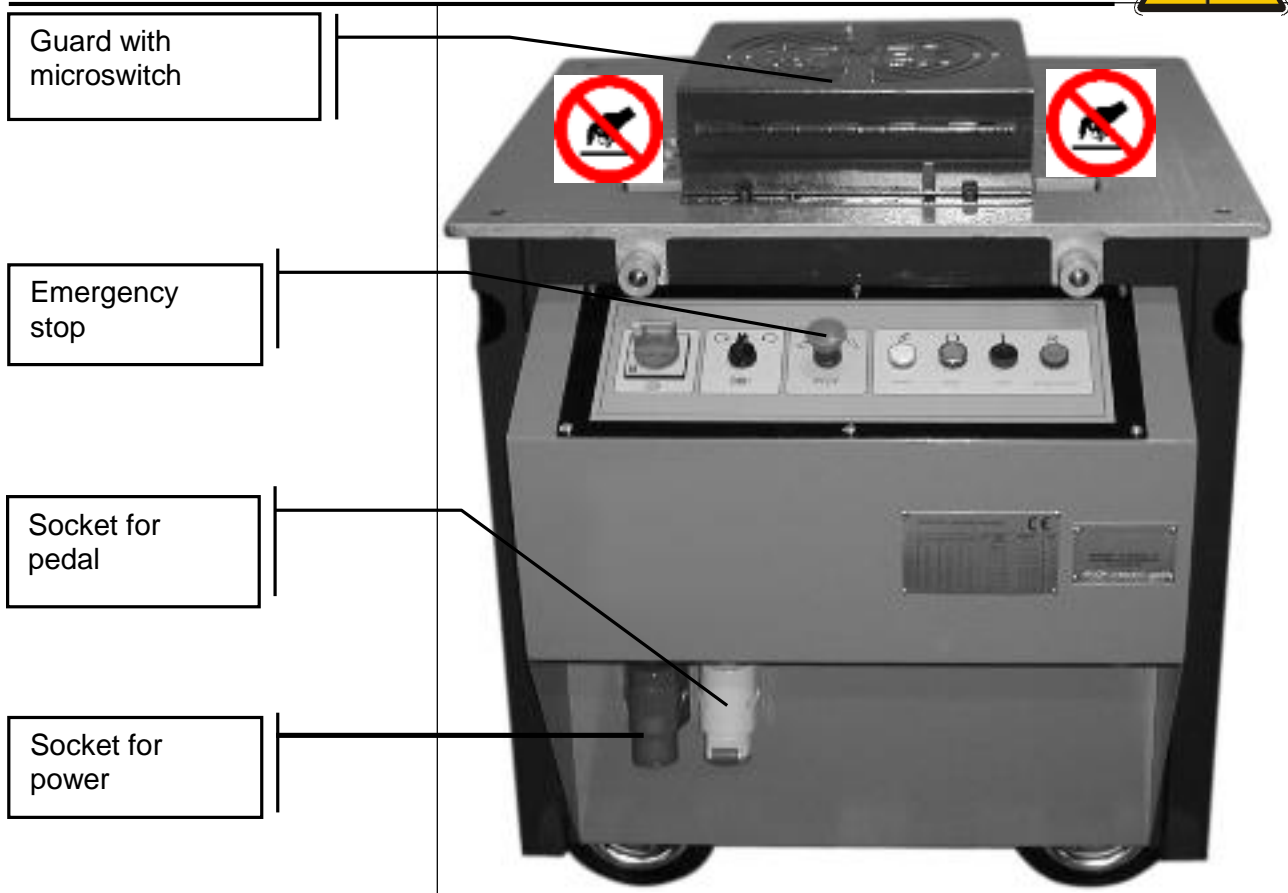
Use safety shoes to avoid injury to feet from falling heavy bars.

Noise

Equivalent of continuous acoustic noise level : 75 dB (A).
Average figure at a distance of 1 m from the machine.

Precautions

Danger of crushing and cutting of fingers during bending!

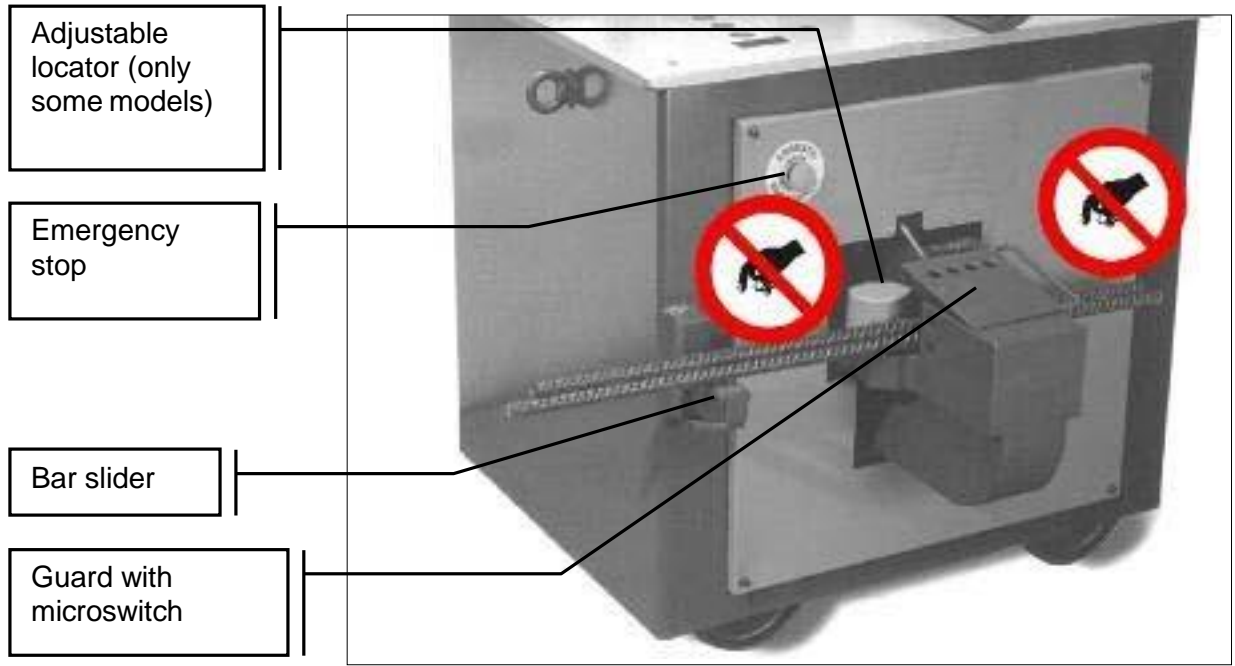


Precautions



- It is forbidden to reach the bending area with hands.
- Keep the rod iron in place using the striker, pins and bush supplied.
- Do not remove the safety guard or compromise its efficiency and stay behind it during the operations.
- On the combined version ensure the cutting area is clear and the guard is down.
- Carry out work on the machine and maintenance only when the machine is off, with the power plug removed.
- Build a table of 12 meters in which you can let a bigger amount of bars roll over, diminishing the discomfort of getting up and down the bars one by one.
- To avoid the back pain, there should be 2 people when operating: 1 who starts the machine, another 1 who holds the bar; otherwise, it should be installed a double-command input (not included).

Danger of crushing and severing of fingers during cutting! (dual function only)!



Precautions



- It is forbidden to reach the bending area with hands.
- Keep the rod iron in place using the adjustable striker (if mounted). Keep hands away from the cutting area and place the rod iron on the bar sliding roller, as the blade action tends to push the bar towards the frame of the machine.
- To cut several rods, do not hold with your hands but use tongs or other gripping instruments. Do not insert a greater number of rods into the machine that that indicated according to the various measurements.
- Plan the collection of the rod iron that has been cut according to the size of the cut in order to avoid the heavier pieces falling on to feet.
- Do not remove the safety guard or compromise its effectiveness.
- On the version fitted with a shear, check that the cutting area is clear, without pins, bushes and other accessories and the guard is lowered.
- Carry out work on the machine and carry out maintenance only when the machine is off, with the power plug removed.

Danger! Tampering with the machine or removal or safety equipment or parts of the machine endangers the machine operator and those in the vicinity.

Danger of electric shock!



Precautions

- Protection from electric shock is based on correct connection to the protective earth: the electrical system which the machinery is to be connected to must conform to current legislation.
- The socket that the machine is connected to must be protected upstream by the installer with a residual current circuit breaker (operating threshold not more than 30mA).
- Do not use extensions.
- Ensure that cables between the mains plug and the machine are not in areas of movement and nevertheless, not damaged or trapped.
- Carry out work on the machine and maintenance only when the machine is off, with the power plug removed.

TRANSPORT

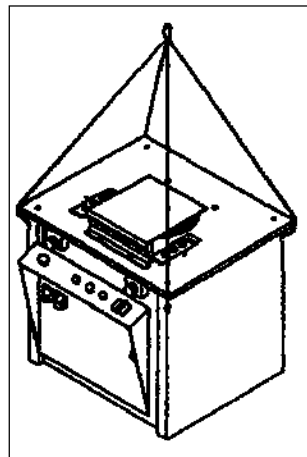
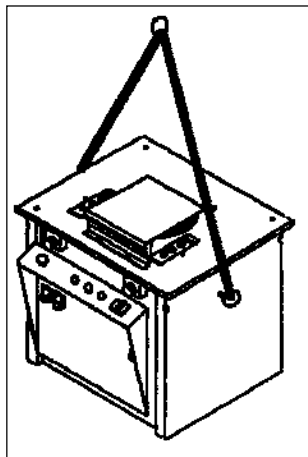
The machine is supplied on a wooden pallet covered in cellophane.

The machine must be protected from the elements.

The machine is supplied with:

- 4 holes at the corners of the frame, for lifting
 - Two eye bolts on the side as an alternative
 - Wheels for short movements around the working area.
-

Danger! Remove the accessories from the drawer, to avoid them accidentally falling out and check it is closed when lifting.



- Use ropes or chains of sufficient strength for the model to be lifted, using hooks in the holes or the eye bolts, depending on the version ordered.
- Initially, only lift a few centimetres from the ground and ensure the machine is raised level with the ground and the load is balanced.
- Only use the wheels for short movements and for positioning the machine on an even and smooth surface.
- When transporting and when positioning check the machine's wheels to avoid unwanted movements.

Danger! Do not attempt to move the machine up or down slopes as the weight of the machine can cause loss of control.

Table of bending machine dimensions and weights

Model	Dimensions L x P x A (cm)	Weight kg
P26	75 x 83x 84	312
P30	81 x 90 x 85	340
P32	84 x 90 x 85	382
P36	86 x 90 x 85	410
P42	104 x 100 x 89	608
P52	104 x 100x 89	636
P55	104 x 100 x 89	660

Table of dimensions and weights of machines with shearing tool

Model	Dimensions L x P x A (cm)	Weight kg
TP 22/26	75 x 102 x 84	370
TP 24/28	81 x 102 x 85	420
TP 26/32	85 x 106 x 85	470
TP 30/35	86 x 106 x 85	488
TP 38/45	104 x 122 x 89	802

INSTALLATION

Description of the supply

The following are supplied, in the drawer inside the machine:

1. control pedal,
2. striker,
3. square pin, the correct size for the supplied model,
4. bracket bending pin, the correct size for the supplied model,
5. three pins and various bushes, the correct size for the supplied model,
6. three Allen keys for maintenance,
7. user manual.

Before positioning and after each time the machine is transported, check that no damage has occurred to the machine structure as a result of knocks or falls during transportation, that could affect the operation and reliability of the machine.

Positioning

As well as the actual area required for the machine the following requirements must be satisfied:

- The electric power source must be near to the siting of the machine.
- The standing surface for the machine must be strong enough to support its weight and smooth and level to allow stable positioning.
- The environment must be well lit to allow safe use and maintenance of the machine
- The area must be sufficient for the machine and the material which is to be loaded and processed. A distance of at least 1 m from a wall must be maintained to safely carry out normal operation and maintenance. It must always be possible to reach the control panel and the cutting area.
- Normal operating temperature: -5°C to $+40^{\circ}\text{C}$.
- Relative humidity limits: 30% to 90% (at 20°C).
- The area must be protected from the elements; in particular, rain and snow.

Position stops under the wheels to avoid unwanted movements.

Checking the electrical specification

The machine is supplied with the electrical system requested by the customer.

Always check the figures on the plate on the motor are compatible with the electrical system before connecting the power supply. The voltage (in Volts), the frequency (in Hz), the current (in A) or power (in kW) must correspond with the electrical power supply.

Electrical connections

The power cable and power plug provide connection to a protective earth.

Danger! Electrical safety of the machine is based on correct connection to a protective earth.



The use of an separate earth is required when the power cable's resistance to earth is excessive or there is doubt over this value.

- Connect the end of a length of bare copper (a section of at least 16 mm²) to the screw inside the frame using a nut to clamp it in position.
- Connect the other end to an earth. The earth must be fixed deep in the ground and somewhere fairly humid and conductive, or it can be a strip of copper, buried very deep in the ground.

For connection to the electrical system, use a cable with the following characteristics:

- With a plug of the correct type to fit the socket to be used
- Of sufficient capacity (allow a minimum section of 2,5 mm² as conductor)
- Sufficiently isolated from the surrounding environment.

Connect the control pedal to the correct socket on the control side.

Control panel

Main switch	Motor rotation direction selector switch	Emergency stop
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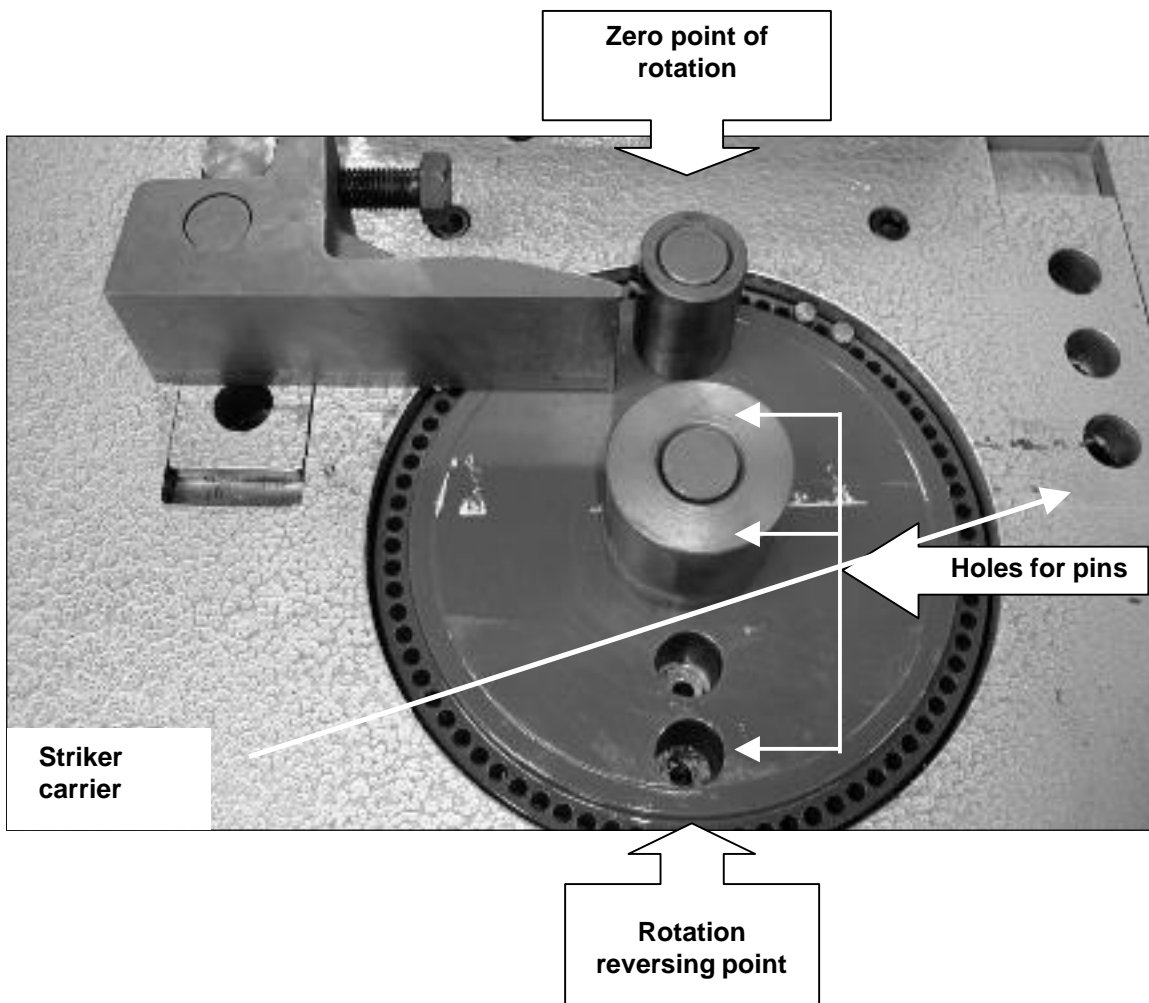
POWER	READY	START	RETURN
Voltage indicator	Control power button with indicator	Start button	Return movement button

READY	Control power button with indicator	The button gives power to the control circuits of the machine. When the indicator is lit there is power
START	Start button	Continuous pressure safety button: the button must be constantly pressed to allow the rotation action. The rotation stops immediately if the button is released. When the point of reversing the rotation is reached the return movement is automatic.
	Control pedal	This operates in the same way as the start button.
RETURN	Return button	The button controls the return of the central plate to the zero point of the rotation.

Starting the machine

Start up procedure

- Turn the main switch to **I**.
- Turn the motor rotation direction selector switch to the left or right so that it is pointing to one of the two arrows. When the switch is on one of the two arrows the **[POWER]** indicator lights up.
- Press the **[READY]** button to power the other controls: its green indicator then lights up. If one of the emergency stop buttons is pressed or the control guard is open, it is impossible to operate the controls and the indicator does not light up.



Checking direction of rotation

The button on the control panel allows the user to select the direction of rotation of the central plate without having to alter the electrical connection. The arrows on the button are for indication only because the actual direction of rotation depends on the electrical phase.

Procedure for checking direction of rotation

- Follow the procedure outlined in the *Start-up* paragraph.
- Check the work surface is clear and the surface safety guard and the cutting guard (on the shear version) are lowered. If the guards are not in place it is not possible to carry out the actions.
- Press the **[START]** button briefly to check the direction of rotation of the central plate.
- Press the **[RETURN]** button to return the central plate to the zero point.

Bending

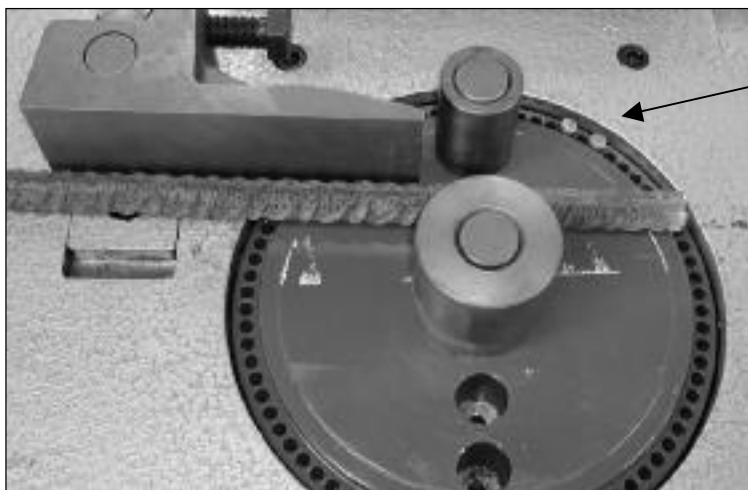
It is advisable to use the striker to bend bars up to a diameter of 25 mm. For greater diameters it is better to use a pin with a bush to avoid friction during bending.

When a bush is used on the pin in the central hole of the rotating plate (to create slow curves) a bush should be chosen with an external diameter 3 to 5 times greater than the diameter of the bar to be bent..

To bend brackets, insert the bracket bending pin in the central hole of the rotating plate.

Check the central plate is at the zero point. If necessary return it to the zero point by pressing the R button.

- 1.** Lift the safety guard
- 2.** Insert the striker in the pair of holes in the carrier and use the square pin to secure it. Turn the corresponding handle located above the control panel to position each carrier
- 3.** Insert the pin and any bushes in the central hole of the central rotating plate.
- 4.** Insert the pin and any bushes in the required eccentric hole, depending on the radius required.
- 5.** Always leave at least 2 mm more than the diameter of the rod iron to be bent between the central pin and the eccentric pin.
- 6.** Insert the reversing pin in a peripheral hole of the central plate, chosen according to the bending angle required.



Insert the safety pin behind the reversing pin, leaving two free holes between the two.

- 7.** Insert the rod iron between the two pins.

8. Lower the safety guard. If the guard is not lowered the machine will not function. For the machine fitted with a shearing unit:

- Check there are no rod irons in the cutting area
- Check that the shearing unit guard is also lowered.

9. To operate the machine press and hold down the **I** button or the control pedal

Check that the rod iron is bent correctly.

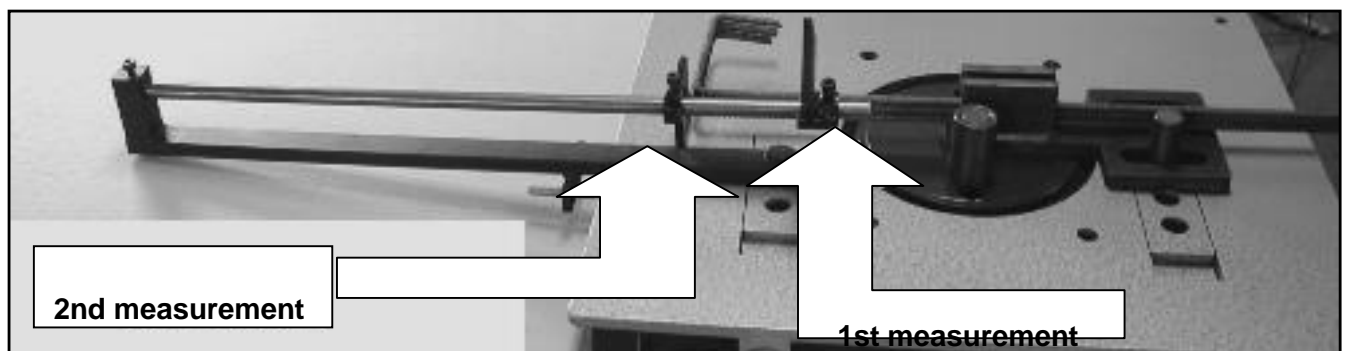
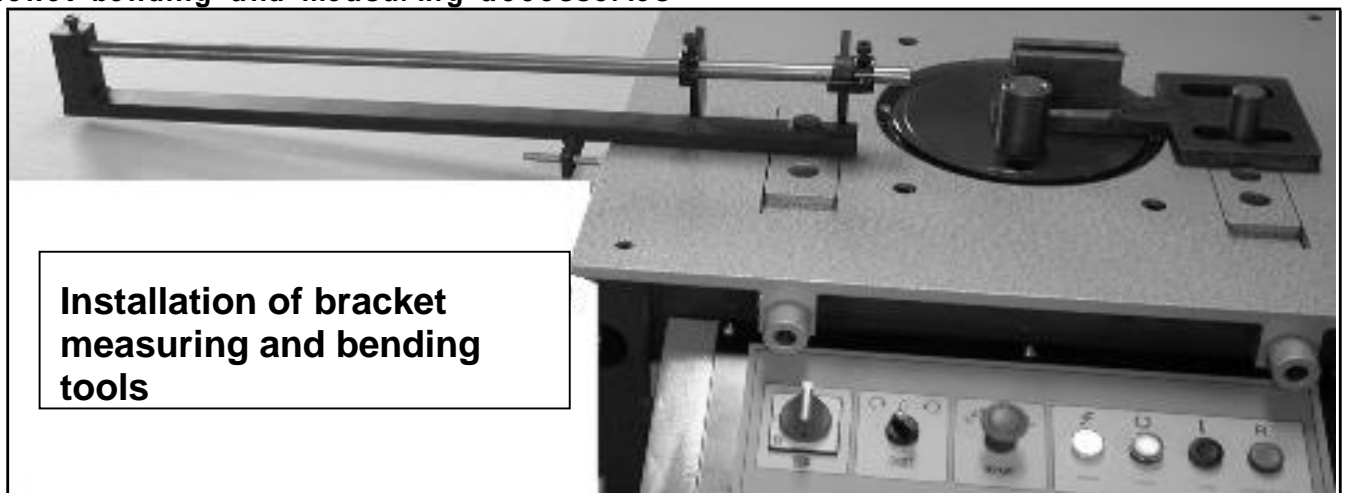
10. If the button or pedal is released the machine is stopped immediately by the electromagnetic brake.

11. When the safety pin activates the motor reverse microswitch, the direction of rotation reverses and it automatically returns to the zero point.

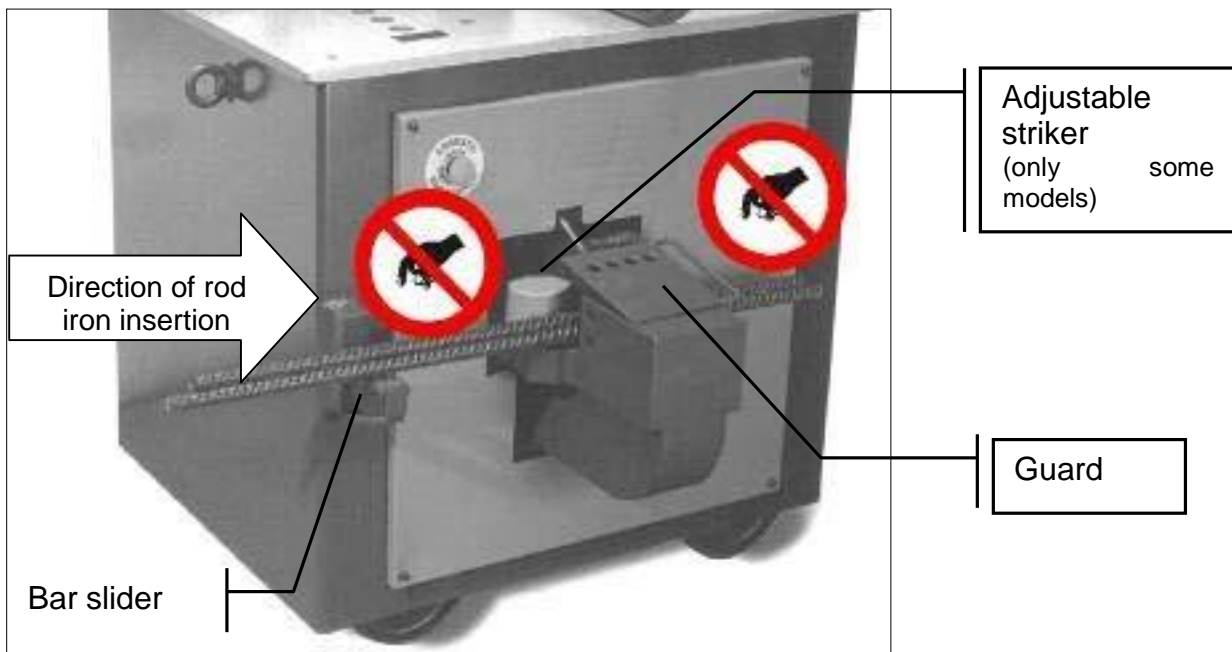
Danger of crushing hands! Do not try to intervene during the automatic return movement.

12. To make corrections move the pin one or more holes forward if the angle is too large, one or more holes backwards if the angle is too small.

Bracket bending and measuring accessories

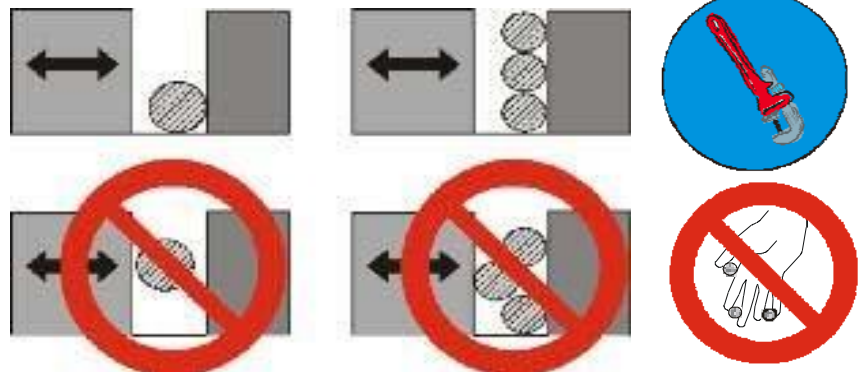


Cutting rod irons (when shear unit is fitted)



Precautions

- Do not insert a greater number of rods into the machine than that indicated according to the various measurements.
- To cut several rods, do not hold with your hands but use tongs or other gripping instruments.



According to the size of the pieces to be cut, the following must be provided:

- Collection of the small pieces under the cut-off side.
- Adequate support for the cut-off side if long rod irons are cut.

Check the central plate rotates clockwise in relation to the control panel. This ensures better operation and longer working life of the machine. Check the central plate is clear: detach the striker, remove pins and accessories.

- 1.** Insert the reversing pin in the central plate at the zero point, so that the blades come together for the cut.
- 2.** Lift the shear unit guard.
- 3.** Insert the rod iron between the shear blade and the fixed blade, positioning it where the cut is required. On models with the adjustable striker, adjust so the material remains in-line with the

blades. If the rod iron is long and difficult to handle, use the bar sliding roller as a rest to facilitate positioning the material up to the required point.

Danger of crushing hands! The length of the rod iron must ensure the user's hand does not get too close to the cutting area. Avoid placing the hand holding the rod iron between the blade and bar sliding roller.

4. Lower the shear unit guard.
5. Press and hold down the pedal to operate the shear unit.
6. When the reversing point is reached the blade withdraws automatically.

Adjust the position of the pin on the central plate according to the dimensions of the rod iron to improve processing time.

Emergency stop

There are two red emergency stop buttons for stopping the machine in an emergency:

1. one on the control panel
 2. one on the side of the machine opposite the control panel, which with machines fitted with a shear unit, corresponds to the shear unit side.
-

Emergency stop buttons only halt the moving parts of the machine, they do not disconnect the electric current. To electrically isolate the whole machine, turn the main switch to **0** and remove the plug.

Restarting after an emergency stop

1. Pull the button out by twisting it clockwise.
2. Press the **[READY]** button to power on the controls: the indicator lights up
3. If necessary, return the central plate to the zero point by pressing the **[RETURN]** button.

Switching off

- Switch off the motor by turning the phase selector switch to **0**.
 - Turn the main switch to **0**.
 - Remove the plug to electrically isolate the machine.
-

At the end of each working day, disconnect the machine from the site's electrical supply. If the machine is not located under cover, protect it from the elements with a waterproof sheet.

DIAGNOSTICS

Problem	Action
The voltage indicator does not light when the motor rotation direction selector switch is turned and the machine does not operate.	<ul style="list-style-type: none"> • Check that the power plug is inserted. • Check that all the input phases are connected. • Check that the safety cut-out switch has not been activated.
The voltage indicator is lit but the control power button indicator does not light when the button is pressed and the machine does not operate.	<ul style="list-style-type: none"> • Check that none of the emergency stop buttons have been pressed. • Check that the door is closed. • Check that a phase has been selected. • Check that the safety cut-out switch has not been activated. • Check there is power to the site. • Check that the cables are connected to the terminal box, the plugs and sockets.
The machine does not work when the start button or the pedal are pressed. The button indicator is lit and the voltage and power supply indicators are lit.	Check that the guards are lowered. If the guards are lowered one of the microswitches may be faulty.
Lack of power when bending and/or when cutting (on shear unit version).	Check the tension of the belts. If they are slack, unscrew the motor retaining nuts slightly, tighten the belts using the tensioner provided and tighten the nuts.
The central plate turns but it does not return and stops when the reversing pin reaches the microswitch reverse point	Dismantle the top plate, removing the 8 screws, and check the reverse microswitch, the contacts may not be good or there is no voltage.
The central plate does not stop exactly at the zero point.	Adjust the air gap of the electromagnetic brake (see <i>Maintenance</i>). Check the position of the stop limit switch.
Only for models with 230V single phase connection. Even with voltage, the machine has insufficient power	If the voltage is less than 220V the machine will not work. A current regulator is advisable.
The machine leaks oil from the bottom of the reduction gear.	The oil seal for the pulley pinion is worn, remove the pulley and the flange. Replace the oil seal and re-fit using a thin layer of sealant.

MAINTENANCE

Maintenance operations must be carried out by qualified personnel in accordance with all current legislation.

Electrocution risk !

Carry out work on the machine and maintenance only when the machine is off, with the power plug removed.

Switch off the machine and disconnect the power plug before changing a fuse or re-setting of the magneto-thermal safety plug



Maintenance guide

Frequency	Task
Daily	Keep work area clean.
40 hours	Only for version with shear unit: grease at the lubrication nipples situated on the connecting rod and on the plate closing the plate carrier slide.
200 hours	Clean the reduction gear (see paragraph <i>Cleaning</i>)
200 hours	Check the oil level in the reduction gear. If necessary, top up using the filler hole situated on the top face.
Every 2 years	Change the oil.

Cleaning

Danger! Turn off the machine and unplug from the electrical supply.

- Unscrew the four screws fitted to the frame and the four screws on the box using the Allen keys supplied in the toolbox.
- Lift and move the frame plate.
- Check the condition of the limit switches and remove the scale deposit on the reduction gear.
- Afterwards, replace the frame plate in the correct position using the eight screws.

Oils

Models	Oil Litres	Type of oil: viscosity cST 220 (at 40°C)
P26, P30, TP 22/26 TP 24/28	5	
P32-P36, TP 25/30, TP30/35, TP26/32	8	
P42 - P52 - P55, TP 38/45	13	

Do not release oil and grease into the environment. Dispose of by contacting the service authorised to deal with used oil.

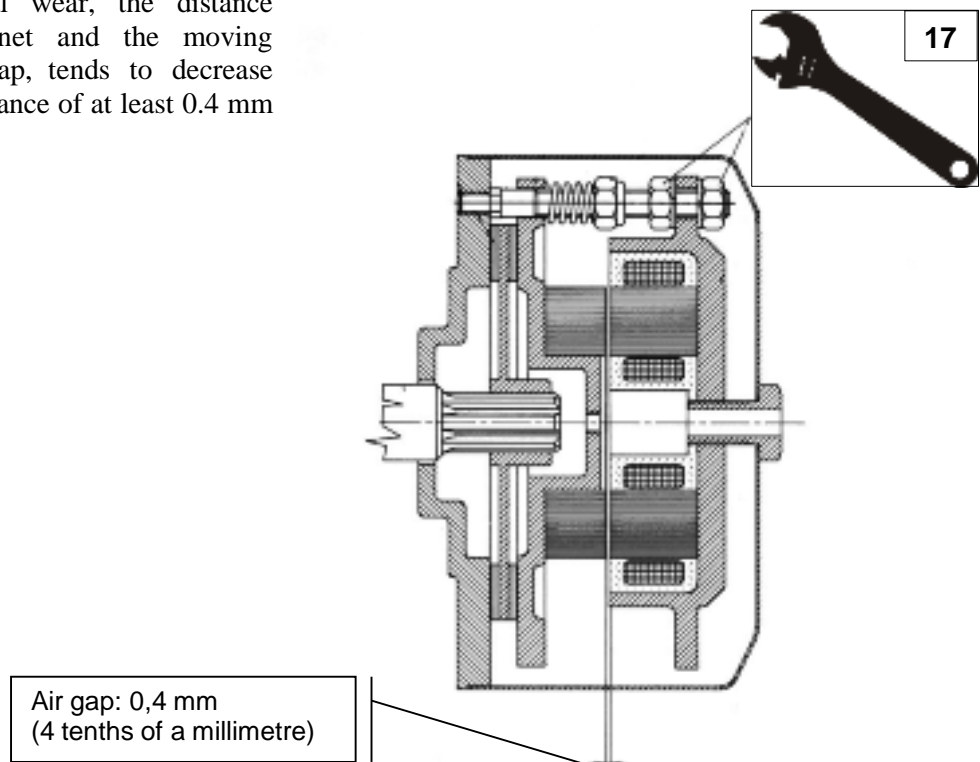
Blade replacement

The blade must be withdrawn in order for it to be dismantled and replaced:

- Lower the guard.
- Press the start button until the blade has returned fully and the fixing screws are accessible.
- Switch the machine off and remove the power plug before continuing.
- Using the Allen key supplied, unscrew the fixing screws and replace both the fixed blade and moving shear blade,.
- Mount the two blades so the cutting edges correspond.

Electromagnetic brake adjustment

Due to friction material wear, the distance between the electromagnet and the moving retainer, called the air gap, tends to decrease over time. Adjust to a distance of at least 0.4 mm (4 tenths of a millimetre).



Removal from service and recycling

When the technical and operating life of the machine is finished, the machine must be deactivated. Although removing it from service so it can no longer be used for what it was intended, it should still be possible to recycle the primary materials.

To safely deactivate the machine follow this procedure:

- Turn off the machine and remove the power plug. Cut the power plug from the cable.
- Empty the lubricating oil. Collect the oil from the drain plug under the machine in a suitable container.
- Remove the wheels. Follow the procedures given in *Transport* if the machine is to be moved.
- Dispose of the machine at an authorised refuse collection centre.

Do not release oil and grease into the environment. Dispose of by contacting the service authorised to deal with used oil.

Available accessories

This page may also be used to order any accessories required. Specify the model for which the part is required when ordering, as parts are mechanically different.

Accessory	Quantity	Machine model										
Bracket, measuring unit												
Bracket, bending accessory												
Equipment to create spiral bends												
Electronic bending, angle check												
Arm to allow greater curvature radius, only available for the models listed		<table border="1" style="margin: auto;"> <tr> <td>P32</td> <td>TP 26/32</td> </tr> <tr> <td>P36</td> <td>TP 30/35</td> </tr> <tr> <td>P42</td> <td>TP 38/45</td> </tr> <tr> <td>P52</td> <td></td> </tr> <tr> <td>P55</td> <td></td> </tr> </table>	P32	TP 26/32	P36	TP 30/35	P42	TP 38/45	P52		P55	
	P32	TP 26/32										
	P36	TP 30/35										
	P42	TP 38/45										
	P52											
P55												
		Ring around the model used										
Bushes for large curvature radius												
Ø 150												
Ø 180												
Ø 228												
Ø 256												
Ø 288												
Ø 336												
Ø 400												
Ø 500												