

# User Manual



CE

**P74 EVO BENDING MACHINE**

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## DESCRIPTION OF THE MACHINE

### Intended Use

This machine is intended for bending steel bars for applications in the construction industry.

Table with specifications of rod diameters (in mm) that can be bent with the P74 Evolution. The diameters are specified according to the hardness of the material (R) and the number of rods that can be bent simultaneously.

∅ mm	R. 65 Kg/mm <sup>2</sup> FeB 38 K			R. 85 Kg/mm <sup>2</sup> FeB 44 K			Round/ min.	Motor	
	1	2	3	1	2	3		HP	KW
<b>P74 EVO</b>	60	40	34	50	36	30	5	10	7,5

### Unintended Use

Unintended uses are all those uses not explicitly indicated in *Intended uses*, especially:

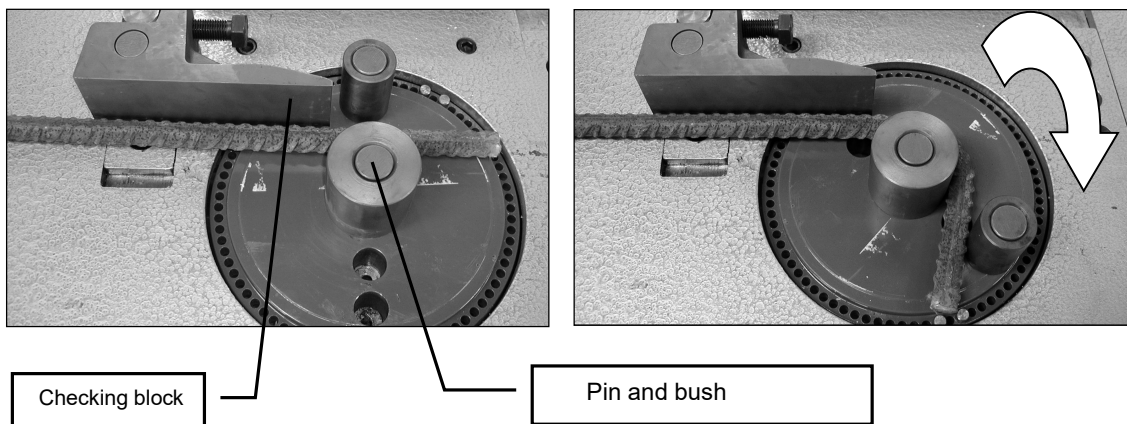
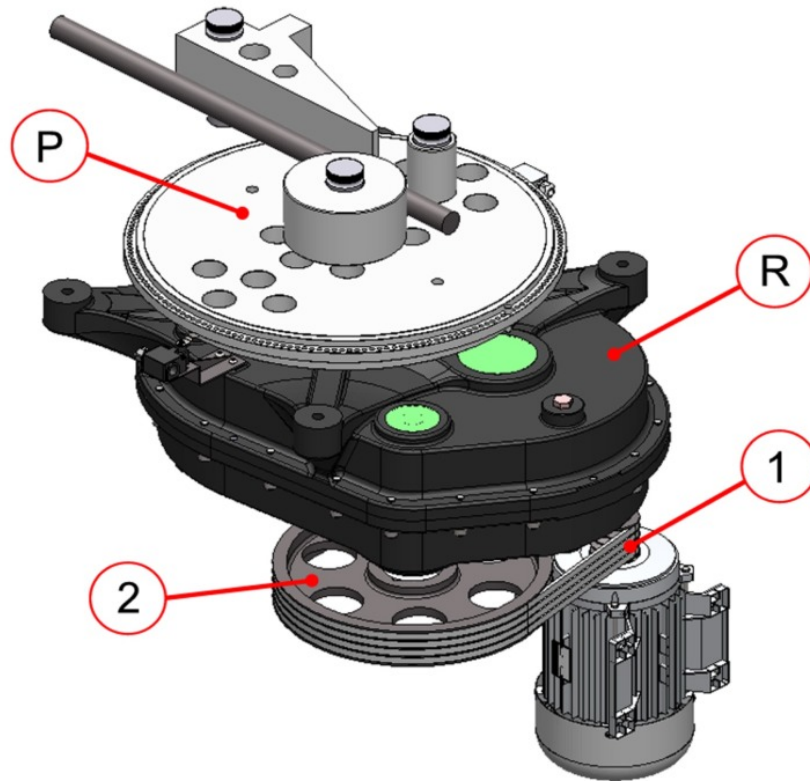
- Use of materials other than those specified.
- Use of materials with diameters other than those intended.
- Use of the machine in an explosive atmosphere.

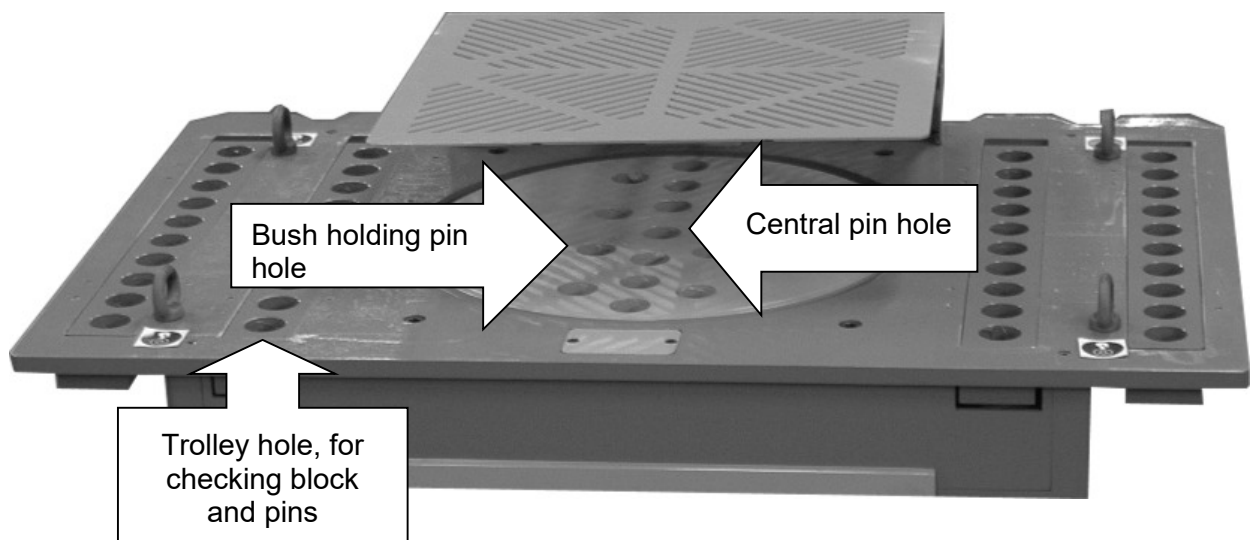
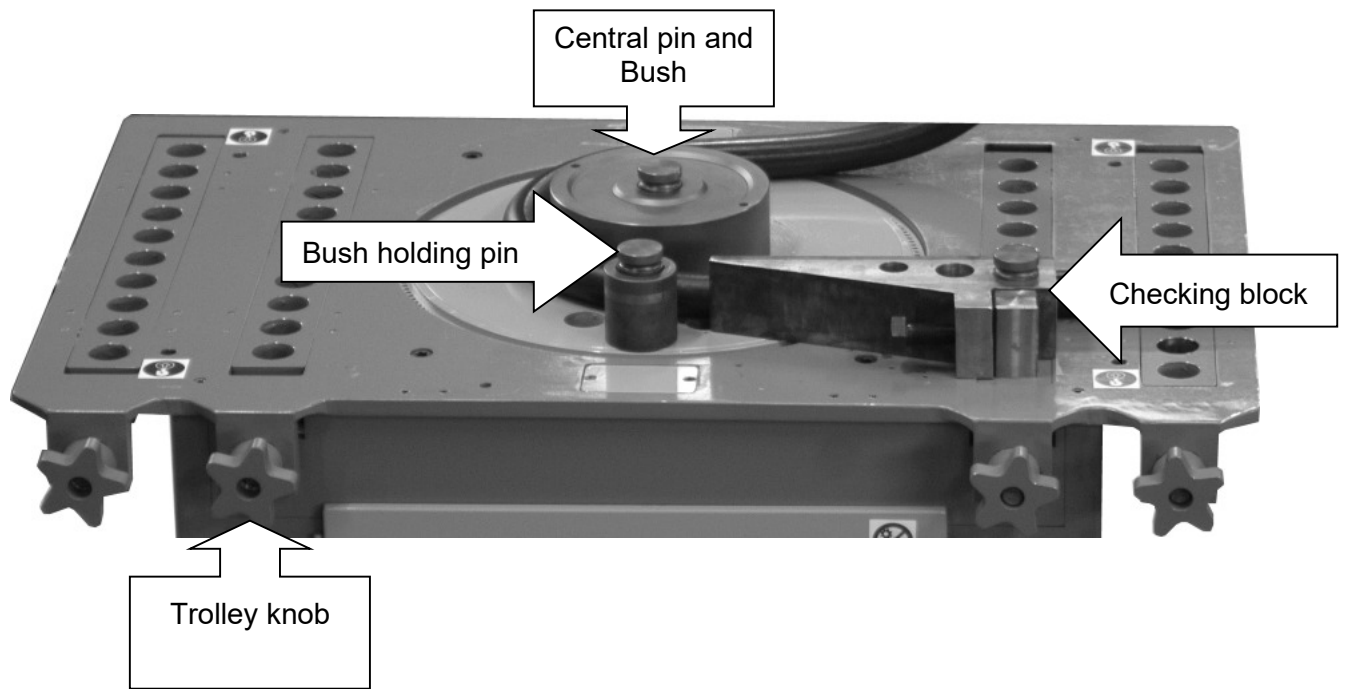


The purchased machine model, serial number and year of construction are indicated on the nameplate.

### Operating principle

- A self-braking electric motor spins a pulley **1** , which transmits motion via three belts to a pulley **2**
- The center plate **P** rotates through the gearbox **R**
- The rod is bent by the rotation of the center plate through the action of the pins inserted into the housing holes.





## SAFETY INFORMATION

### Safety information

In designing and building this machine, criteria and measures have been adopted to meet the essential safety requirements outlined in Machine Directive 98/37/CEE.

### Protections

- 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 is hinged to the frame on the bending machine fitted by a microswitch preventing the vending movement whilst the guard is open.
- Hands-on controls to allow the bending of rods:
  - a button on the control panel
  - a guarded pedal to prevent accidental operation.

When a hands-on control is released the bending operation stops immediately thanks to the electromagnetic brake.

- Electromagnetic brake stopping the motor and its components in motion when the stop command is given or as soon as the power supply to the engine is removed.
- Protection fuses and thermal relay for electric motor.
- Two red emergency stop buttons.



**Danger!** Tampering with the machine and removing guards or parts of the machine causes hazards to machine users and exposed persons.

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### Operator protection devices



Use gloves to handle the rods and prevent any risk of abrasion and cuts.



Use protective footwear to prevent feet being crushed by the falling of heavy rods.

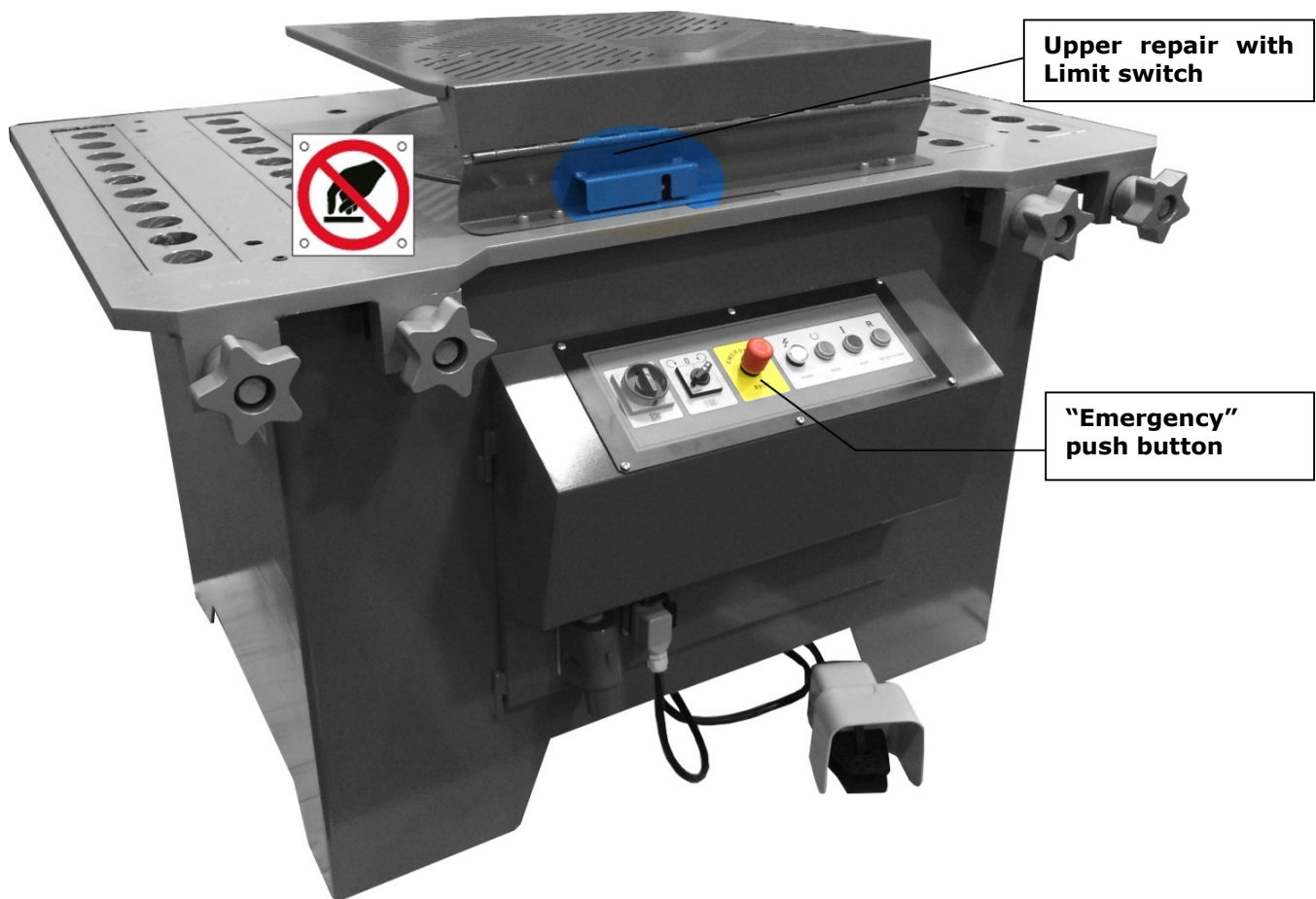
### Noise

Continuous equivalent sound pressure level: 75 dB (A).  
Average level at a distance of 1 m from the machine.

**Precautions on i**



Danger to the fingers of the hands when bending!



- Prohibition to reach the bending zone with the hands.
- Hold the rod in place by using the checking block, pins and bushes provided.
- Do not remove the protective guard or prevent its effectiveness.
- Carry out the interventions on the machine and the maintenance operations only when the machine is switched off, with the power socket disconnected.



Electric shock hazard!



### Precautions

- The electric shock protection is based on correct connection to the earth lead: the power system to which the machine is connected must comply with the applicable legislation.
- The socket to which the machine is connected must be protected upstream by the customer using a residual current circuit breaker (tripping threshold not above 30mA).
- Do not use extensions.
- Make sure that the cables between the plug and the machine are not in transit areas, or subject to damage or mechanical stress.
- Only work on the machine and perform maintenance operations when it is shut off and unplugged.

## TRANSPORT

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



The machine must be protected from the elements.

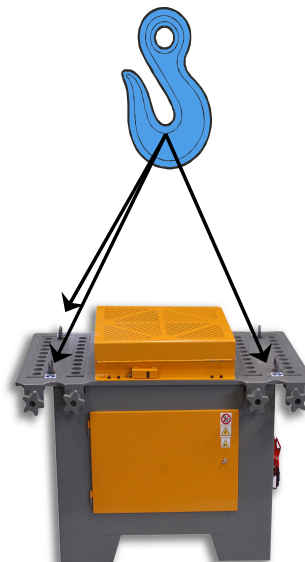
The machine is provided with:

- 4 holes on the top plate for mounting eyebolts (M22)
- Use ropes or chains of sufficient strength for the model to be lifted.
- Initially, only lift a few centimetres from the ground and ensure the machine is raised level with the ground and the load is balanced.



**Danger!** Remove accessories from the drawer, to avoid them accidentally falling out when lifting. Check that the door is closed.

Dimensions L x P x A (cm)	Weight kg
160 x 116 x 96	1600





## INSTALLATION

### Description of supply

The following are supplied in the drawer inside the machine:

- 1 control pedal
- 1 checking block
- 1 square pin
- 1 stirrup vending pin
- 5 bush holding pins
- 6 bushes of different diameters
- 5 Allen keys for maintenance
- Instruction manual



Before placing and after transporting, make sure that the machine structure has not been damaged by knocks or fallings during transport that could affect machine operation and reliability.

### Placing

Besides taking into account the overall dimensions of the machine, instructions below must always be followed:

- Power sources must be provided near the machine installation area.
- The supporting surface must have a capacity suitable for the weight of the machine and must be smooth and horizontal to provide a stable support.
- The working environment must be adequately lit so that the machine can be operated and serviced in total safety.
- The area must be of a suitable size for the machine and material to be loaded. To safely operate and service the machine, it must be positioned at a distance of at least one metre from the walls. The control switchboard and the working area must always be easily accessible.
- Acceptable operating temperature: from -5°C to +40°C.
- Acceptable relative humidity: 30% to 90% (at 20°C).
- The area must be protected from atmospheric agents as rain and snow.

## Electrical data verification

The machine is supplied with an electrical system suited to customer's requirements. Before connecting the machine always make sure that data on the control switchboard correspond to those of the power system. In particular the voltage (V), frequency (Hz) and current (A) or power (kW) values must correspond to those of the power system.

## Electrical connections

The supplied power cable and plug (32 A, 400 V) must be connected to the earth lead.



**Danger!** The electrical safety of the machine depends on correct connection to the earth lead.

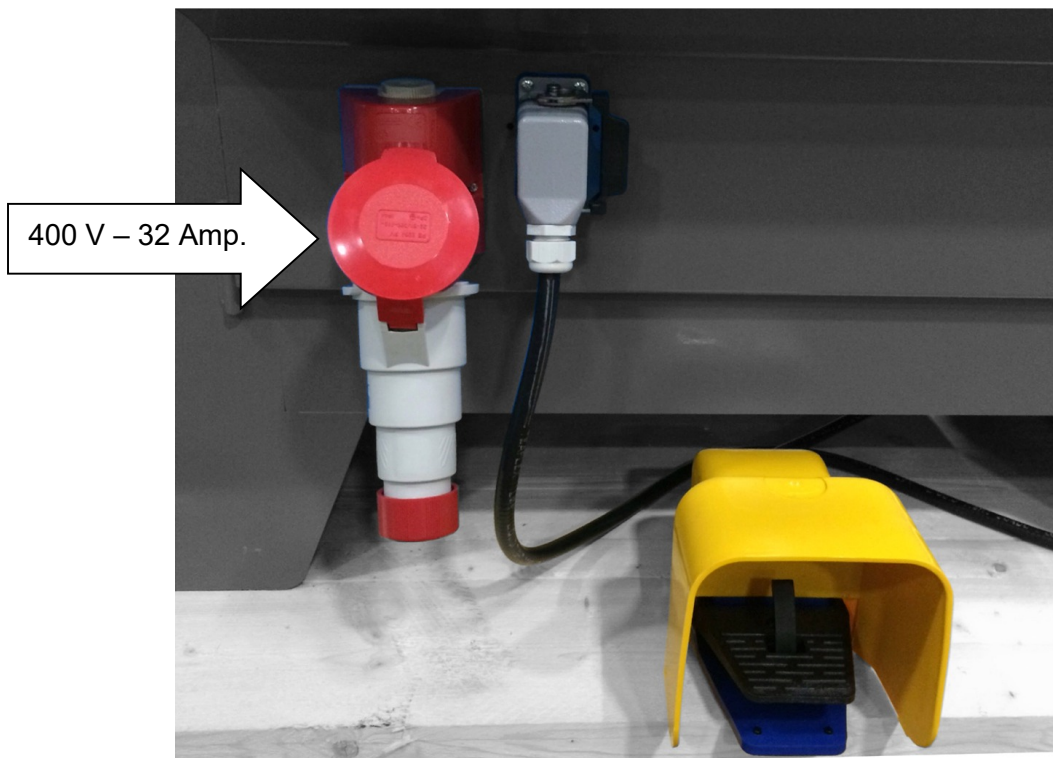


A specific ground clamp is provided to be used when the ground resistance of the power cord is excessive or when this value is not certain.

- Connect the end of a naked copper plait (section of at least 16 mm<sup>2</sup>) to the screw placed inside the frame, then use a nut to fix.
- Connect the other end to an earth lead. The earth lead must be set deep in a fairly damp and conductive area, or it can be a copper plate, buried deep underground.

To connect to the power supply, use a cable:





- with socket suitable for the type of plug installed
- of adequate capacity (minimum cross-section of 10 mm<sup>2</sup> per conductor)
- adequately insulated from the operating environment
- Connect the control pedal to the correct socket on the control side









## USE

### Control panel

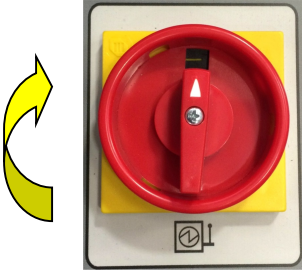




<p><b>MAIN SWITCH</b></p>		<p>0: OFF I: ON</p>
<p><b>SELECTOR</b> Direction of motor rotation</p>		<p>The selector switch allows to choose the direction of rotation of the turntable without having to work on the power supply cables. The arrows are only indicative since the true direction of rotation depends on the connection of the power supply phases. (It is a good rule to check and have the indicative arrows matching with the phases of alim. electricity)</p>
<p><b>POWER</b></p>		<p>White light button indicating power on</p>
<p><b>READY</b></p>		<p>Green light button for power supply to the machine controls. Green light on indicates the presence of power supply.</p>

<b>START</b>		<p><b>Start button.</b>                      Continuous pressure safety button: the button must be constantly pressed to allow rotation. The rotation stops immediately if the button is released.                      When the rotation reversal point is reached the return movement is automatic.</p>
		<p><b>Control pedal.</b>                      With same function and mode of operation as the start button.</p>
<b>RETURN</b>		<p><b>Return button.</b>                      To control the return of the rotating table to the zero point of rotation.</p>
<b>SELECTOR MAN - AUTO</b>		<p><b>MAN:</b> MANUAL mode (without ANGLE CONTROL).                      0: OFF  <b>AUTO:</b> AUTOMATIC mode (with ANGLE CONTROL).</p>
<b>ANGLE CONTROL (optional)</b>		<p>Riferirsi al manuale istruzioni per "ANGLE CONTROL".                      Il pulsante START verrà disabilitato nella modalità "AUTO" (automatica)</p>
<b>EMERGENCY BUTTON</b>		<p><b>Pulsante di emergenza:</b>                      when pressed the machine stops instantaneously.</p>

## Power on

### Start up procedure

<p>Turn the main switch to I.</p>	
<p>Turn the rotation direction 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 <b>[POWER]</b> indicator lights up.</p>	
<p>Press the <b>[READY]</b> button to power controls: the green indicator will light up. If one of the emergency stop buttons is pressed or the control panel door is open, the controls cannot be powered and the indicator does not light up.</p>	

### Checking direction of rotation

The switch 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 switch are for indication only because the actual direction of rotation depends on the electrical phase

### Procedure

- Follow the procedure in the *Power on* section.
- Select **[MAN]** (MANUAL) mode.
- Check that the work surface is clear and the work surface protection guard is down.  
If the guard is not in place movement is not allowed.
- Give a short push with the start button **[START]** to check the direction of rotation of the central plate.
- Press the **[RETURN]** button to control the return to “zero” position.

## Bending - 1 -

Select [MAN] (MANUAL) mode.

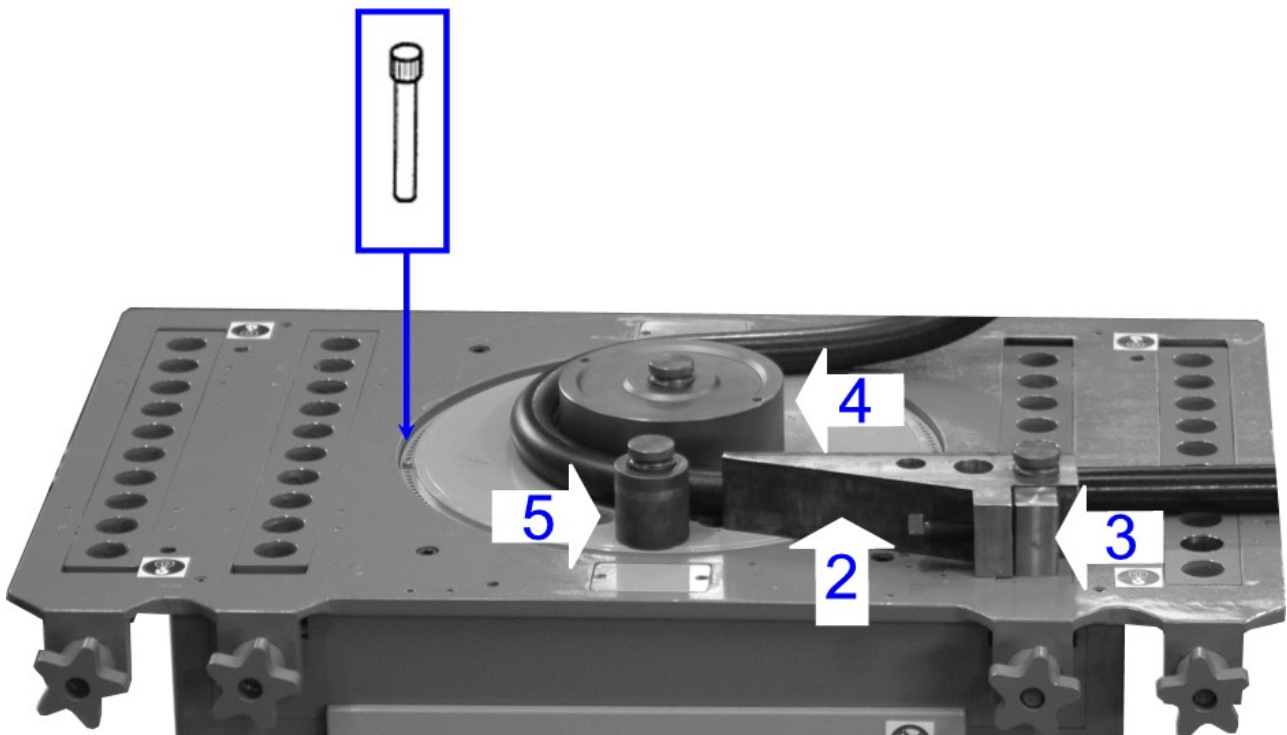
It is advisable to use the checking block to bend bars up only to a diameter of 25 mm. For greater diameters it is better to use a pin with a bush to avoid friction during bending.

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



Check that the centre plate is at the zero point. If needed, press the return button [R] to control the positioning of the plate at zero point.

- 1.** Lift the safety guard.
- 2.** Insert the checking block 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 rotating plate.
- 4.** Insert the pin and any bushes in the required eccentric hole depending on the curve to be made.
- 5.** Always leave at least 2 mm more than the diameter of the rod to be bent between the central pin and the eccentric pin.
- 6.** Insert the reversing pin in the peripheral hole of the central plate, chosen according to the bending angle required.

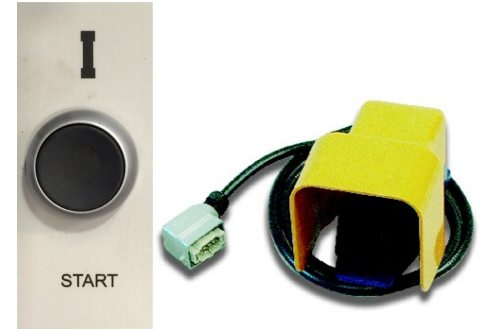




Insert the safety pin behind the reversing pin, leaving two free holes between the two.

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7. Insert the bar between the two pins.
8. Lower the safety guard. If the guard is not lowered the machine will not function.
9. To operate the machine
  - press and hold the start button **I**
  - press and hold the control pedal



Check that the iron bar is bent correctly

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10. Should the button or pedal be 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!

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12. Should any correction be needed move the pin one or more holes forward if the angle is too large, one or more holes backwards if the angle is too narrow.



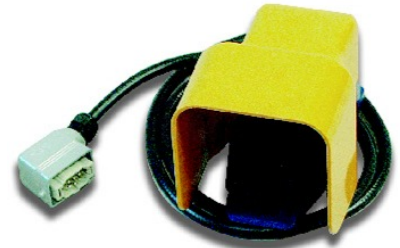
**Bending - 2 -**

Select [**AUTO**] (AUTOMATIC) mode.



Follow instructions in ANGLE CONTROL manual to configure the bending parameters.

- 1.** Lift up the safety guard
- 2.** See as MANUAL mode (pg. **Errore. Il segnalibro non è definito.**)
- 3.** Insert pins and any bushes
- 4.** Lower the safety guard. If the guard is not lowered the machine will not start.
- 5.** To operate the machine press and hold the control pedal. In [**AUTO**] (AUTOMATIC) mode, the [**START**] button is disabled



- 
- 6.** Check that the iron bar is bent correctly
- 
- 7.** Should the button or pedal be released the machine is stopped immediately by the electromagnetic brake.
  - 8.** Once the set bending angle has been reached the plate reverses direction of rotation and automatically returns to the zero position.
- 



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

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## Emergency stop

Two emergency stops are available - red “mushroom” buttons:

1. On the control panel
2. on the side opposite the control panel, at the rear of the machine

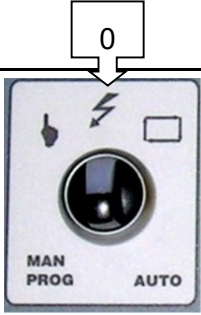


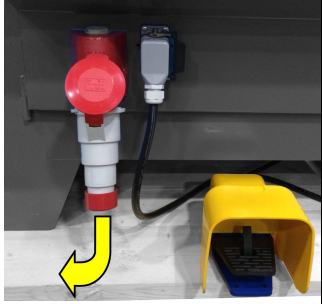


Emergency stop buttons stop moving parts but do not cut off the power supply. To remove power to the entire machine, turn the main switch to **0** and disconnect the plug.

## Reboot after an emergency stop

<p>Pull out the button by turning it clockwise.</p>	
<p>Press the <b>[READY]</b> button: the indicator lights up</p>	
<p>If needed return to the zero point of the central plate,</p> <p>Move the selector to <b>[MAN]</b> MANUAL mode</p> <p>Press the <b>[RETURN]</b> button</p>	

**Switching off**

<p>Turn the <b>[AUTO / MAN]</b> selector to <b>0</b> position.</p>	
<p>Switch off the engine by turning the phase selector switch to <b>0 position</b></p>	
<p>Turn the main switch to <b>0</b>.</p>	
<p>Disconnect the plug to electrically isolate the machine.</p>	



Disconnect the machine from the site power system at the end of each day.



If the machine is not indoors, cover it with a waterproof sheet.

## DIAGNOSTICS

Problem	Action
The voltage indicator does not light when the selector of motor rotation direction is turned and the machine does not operate.	<ul style="list-style-type: none"> <li>• Check that the power plug is inserted.</li> <li>• Check that all the input phases are connected</li> <li>• Check that the safety cut-out switch has not been activated.</li> </ul>
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"> <li>• Check that any of the emergency buttons is not pressed</li> <li>• Check that the door is closed.</li> <li>• Check that any phase is not missing.</li> <li>• Check that the circuit breaker has not tripped.</li> <li>• Check the site power supply panel.</li> <li>• Check the connection of the cables to the terminal block, plugs and sockets.</li> </ul>
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	Check the tension of the belts. Should they be slack slightly unscrew the motor retaining nuts then tighten the belts using the tensioner provided and tighten the nuts.
The central plate turns but it does not return and stops after the pin has reached the point of the reversing microswitch si ferma dopo che i piolino ha raggiunto il punto del microinterruttore di inversione	Dismantle the top plate by 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 pg. 21</i> ). Check the position of the stop limit switch.
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 performed by skilled personnel in compliance with all applicable safety regulations.



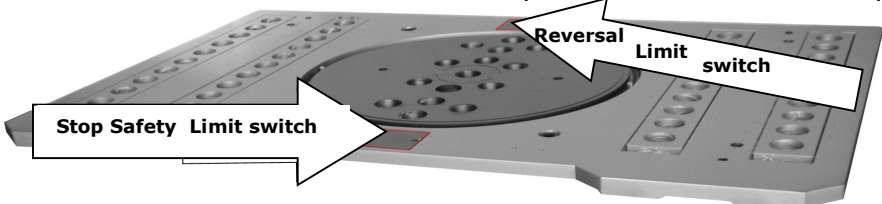
### Danger of electric shock!

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 resetting the circuit breaker



### Maintenance program

Schedule	Action
Daily	Keep the work area clean.
Every 200 hours	Cleaning the gearbox (see <i>Cleaning</i> section)
Every 200 hours	Cleaning and checking the position of the STOP and REVERSE micros. The micros are located under the metal plates visible on the worktop. 
Every 200 hours	Check the oil level in the gearbox. If needed top up via the filling cap on top.
Every 2 years	Complete oil replacement.

### Cleaning



**Danger!** Switch off the machine and disconnect the power plug.

- 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.

**Oil characteristics**

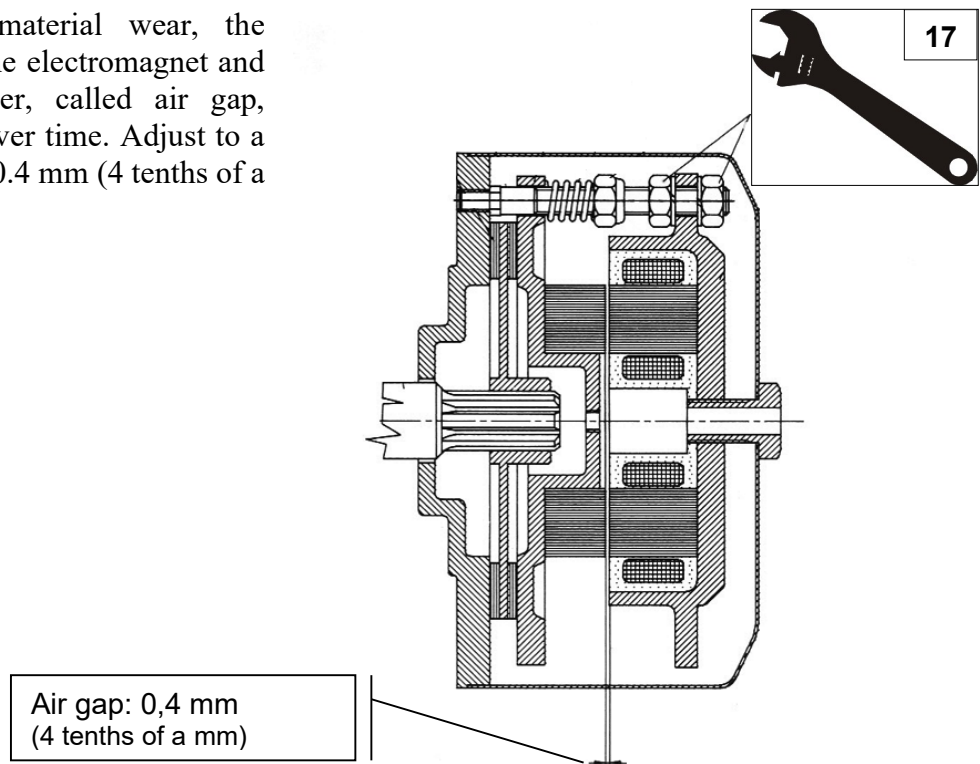
Quantity liters	Oil type
25	Viscosity cST 140 (a 40°C)



Do not dispose of oil and grease in the environment. Deliver to authorised firms for disposal through approved channels.

**Electromagnetic brake adjustment**

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



## Machine decommissioning

Once the machine has reached the end of its technical and operating life, it must be decommissioned, ensuring that the component raw materials can be recycled.

Procedure to be followed to decommission the machine without residual risks:

- Switch off the machine and disconnect the power plug. Cut the plug from the power cord.
- Drain the lubrication oil. Collect the oil from the drain hole under the machine in a suitable container.
- Should transport be required, follow the procedure in the *Transport* chapter.
- Dispose of the machine through an approved waste collection centre.