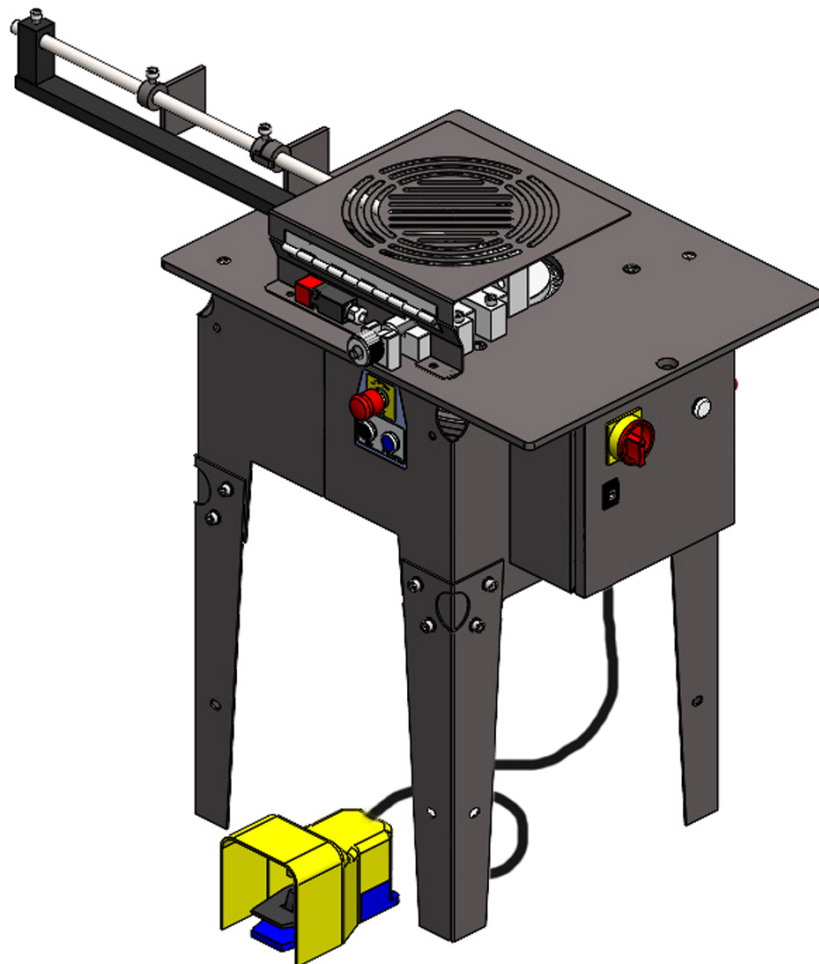


# Instructions Manual

“Traslation of the original Instructions”

## STIRRUP BENDING MACHINE

### ST 16 EVOLUTION



CE\*

\*only for “EC” model

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## DESCRIPTION OF BENDING MACHINE

### Applications



The ST16 Evo electromechanical stirrup bending machine is designed for high production of stirrups up to 18 mm. (R. 65 kg/mm<sup>2</sup>) diameter, for applications in the construction sector. Model of machine, as well as serial number and year of production are written on identification label.

### Unsuitable applications

Any uses not explicitly indicated in *Applications* are not allowed, in particular:

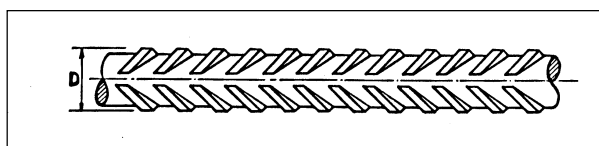
- Use of materials other than those specified.
- Use of materials with a diameter different from what specified.
- Use of machine in explosive environment.

### Technical Data

The following table shows the number and diameters of rods that can be bent.

Diameters are specified based on hardness of the material (R) and the number of rods that can be bent simultaneously :

Ø mm	R. 65 Kg/mm <sup>2</sup> 650 N/mm <sup>2</sup>				R. 85 Kg/mm <sup>2</sup> 850 N/mm <sup>2</sup>				r.p.m.	Motor		Dimensions Cm.	Weight Kg.
	Nr of rods	1Ø	2Ø	3Ø	4Ø	1Ø	2Ø	3Ø		4Ø	Hp		
ST16 Evo	18	12	10	8	16	10	8	6	18	3	2,2	77 x 61 x h.100	200



FeB 38 K (65 kg/mm<sup>2</sup>)  
FeB 44 K (85 kg/mm<sup>2</sup>)

### Power Supply and Warnings

An automatic protection device must be installed upstream of the machine's power supply circuit; its breaking capacity must be greater than the maximum short-circuit current *I<sub>cc</sub>* indicated in this manual.

Model	Voltage Supply	Polarity	Grounding	Rated current	Circuit current
ST16 Evo TF	220/400 VAC 50/60 Hz	3P+PE	TT	10 A	6 kA
ST16 Evo MF	230 VAC 50 Hz	1P+N+PE	TT	10 A	6 kA

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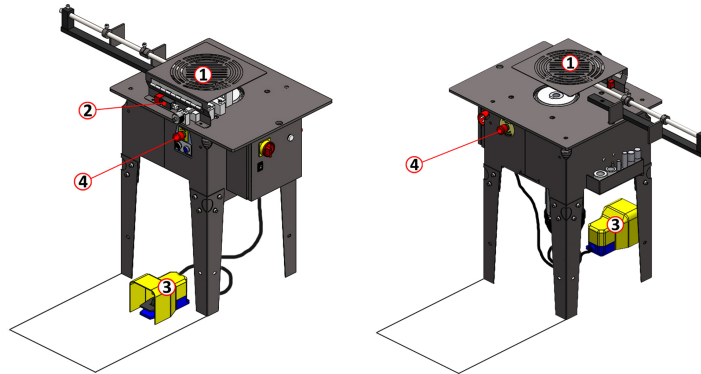
# SAFETY INFORMATION

## Safety criteria

In designing and construction of this machine criteria and cautions have been adopted that satisfy essential safety requirements of Machinery Directive 2006/42/EC.

## Workstation

Workstation during bending phase it's showed in following pictures.



## Protection devices for operator



Use gloves to move the rods in order to avoid risk of abrasions and cuts due to surface of material.



Wear a protective suit in order to avoid residual risks during processing



Use protective footwear in order to avoid injury to feet from falling of heavy stirrups.

## Noise

Equivalent continuous sound pressure level: 75 dB.  
Average value at a distance of 1 m from the machine.

## Protections

- Frame structure prevents access to gears and moving parts of transmission.
- **Only in the "CE" version,** moving guard (1) hinged to the frame, preventing the bending movement as long as the guard remains open by means of a microswitch (2) with key.
- Maintained pressure controls (also known as dead bending of stirrups):
  - button on control panel
  - guarded pedal (3) to prevent accidental pressure
- Fuses and thermal relay for electric motor.
- Two red emergency stop buttons (4).

## Residual risks and cautions



Danger of crushing fingers during bending!

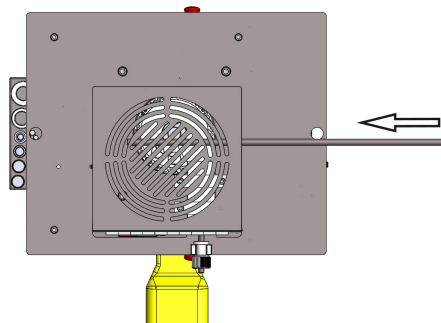


Danger of crushing feet from falling of heavy rods!



### Cautions

- The machine is intended for use with only one operator, other operators do not have to access the working area. Check that the working area is clear before accessing the machine and there are no rods to be bent loaded.
- Never try to reach bending area with hands.
- Provide a safe support and loading system for the rods to prevent the feet from being crushed during bending operations (e.g. modular roller benches). Hold the rod in place by using the clamping clamp, pins and bushes provided.
- Insert the rod in the direction indicated by the arrow.



- Do not load in the machine a number of rods greater than what indicated for different diameters.
- When bending multiple stirrups do not use your hands but hold them by pincers or other gripping tools
- **Only in the "CE" version,** do not remove safety guard or prevent its effectiveness



**Danger! Tampering of machine and removing guards or other parts of the machine endanger machine operator and persons exposed.**



**Machine must be protected from atmospheric agents.**



**Danger of electric shock!**



### Cautions:

- Carry out operations on the machine and maintenance only when machine is switched off, with power plug disconnected.
- Protection from electric shock is based on a correct connection to protective ground: the electrical system to which the machinery must be connected to must comply with current legislation.
- The socket that the machine is connected to must be protected upstream by the customer by means of a differential switch (operating threshold not exceeding 30mA).
- Use extensions suitable for the electrical power of the machine.
- Ensure that cables between the main plug and the machine are not in transit areas or in any case subject to damages and/or mechanical stress.

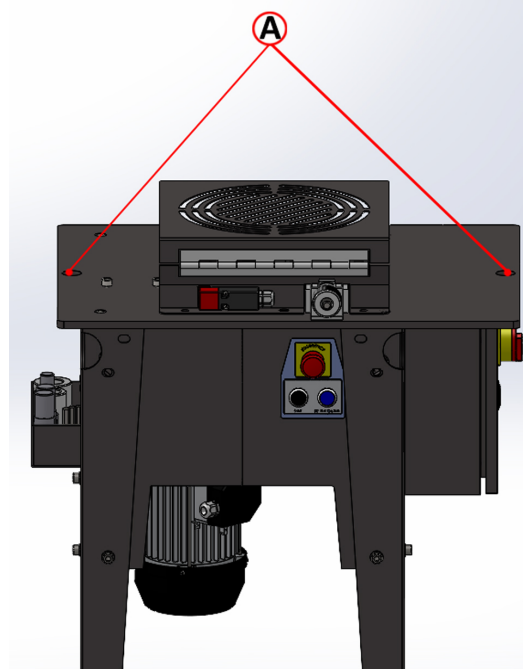
## TRANSPORT

Dimensions and weight of the machine are indicated in Technical Data section.  
The machine is supplied on a wooden pallet covered in cellophane.



**Danger! When handling pay attention to accessory compartment to prevent them from accidentally falling out**

- The machine is equipped with 2 fixing holes (A) for lifting
- Initially only lift a few centimetres, ensure the machine is raised level to the ground and the load is balanced
- Remove all accessories on turning table and stirrup linear measurer before moving the machine, hook the base of pedal to appropriate housing
- Legs are to be removed during transport
- Use ropes or chains of adequate capacity



## INSTALLATION

### Supply description

The following are provided in the drawer of the machine:

1 Hardened Bush, 3 Hardened Pins bearing bushes, 1 Hardened Stirrup Bending Pin Ø22 mm, 1 Hardened Stirrup Bending Pin Ø16 mm, 1 Control Pedal, 1 Stirrup Linear Measurer, 1 User Manual



Before each positioning and after each transportation check that no damages have occurred to the machine structure as a result of knocks or falls during transportation that could affect functionality and reliability of the machine

### Positioning

In addition to overall dimensions of the machine following requirements must be satisfied:

- Electric power sources must be arranged close to installation area.
- The environment must be well lit to ensure safe use and maintenance of the machine.
- Installation area must be of a size appropriate to the machine and the material to be loaded and processed. A distance of at least 1 m from the walls must be kept in order to safely carry out operation and maintenance. Easy reaching of working area with material to be processed and electric control panel has to be always guaranteed.
- Installation area must be protected from weather, such as rain and snow, better under a canopy.
- Standard operating temperature: -5°C / +40°C.
- Relative humidity limits: 30% / 90% (at 20°C).
- The surface where the machine lays must be of adequate capacity for its weight, smooth and horizontal to allow a stable positioning
- Mount the four legs by fixing them with the screws and bolts provided.
- Place two work benches side by side with the stirrup bender as long as the longest of the molded parts to be produced. In this way the operator can work all the material with no need to turn the bars.



A functional machine location means less fatigue and therefore more operator efficiency and output  
Position the machine next to the stock of iron to be processed.

### Checking electrical specifications

Machine is supplied with the electrical system as per customer's requirements.

Before connecting the machine to power supply always check that values shown on the electrical panel are compatible with power supply. In particular, the voltage (in Volts), frequency (in Hz) and current (in A) or power (in kW) values shall correspond to the values of the electrical power supply.

## Characteristics of power supply

Power supply shall have following characteristics:

- Operating voltage: +/- 10% of nominal voltage;
- Frequency: +/- 1% of rated frequency continuously for a short time.

For other power supply characteristics, such as harmonics, voltage imbalances, interruptions and voltage dips, refer to the EN 60204-1 standard.

**Since “electric generators” do not always fulfil these requirements, it is preferable to power the machine with the fixed electricity network.**

Using inadequate power supply reduces the performance of the machine and can irreversibly damage it. Damage caused by inadequate power supply is not covered by the warranty

## Protective grounding

Supplied power cord and power plug provide a protective earth connection



**Danger! Electrical safety of the machine is based on correct connection to protective grounding.**

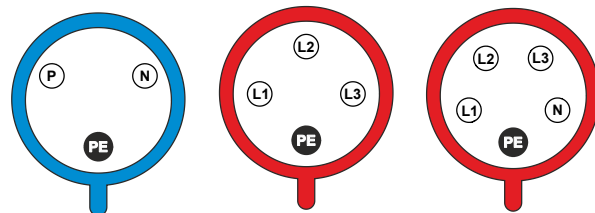


- Connect the end of a length of bare copper braid (section of at least 16 mm<sup>2</sup>) to the screw inside the frame, then use a nut to clamp it in position.
- Connect the other end to a ground diffuser. The diffuser should be planted deeply in a fairly humid and conductive area, or it can be a strip of copper, buried very deep in the ground.

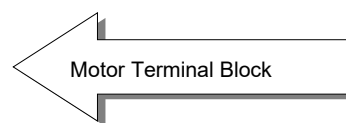
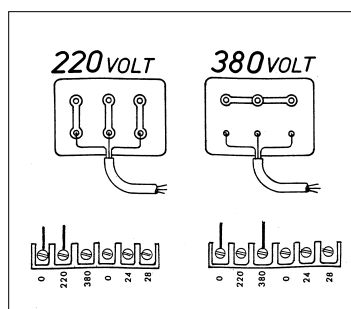
## Connection to electrical system

To connect to power supply a cable with following features must be used:

- appropriate socket for the type of plug installed (IEC 60309 P+N+PE / 3P+PE / 3P+N+PE)
- section, length, quality and state of conservation able to guarantee a voltage drop of less than 10%
- isolated from operating environment



## Electrical connection on motor





## Switching on and checking direction of rotation of the motor

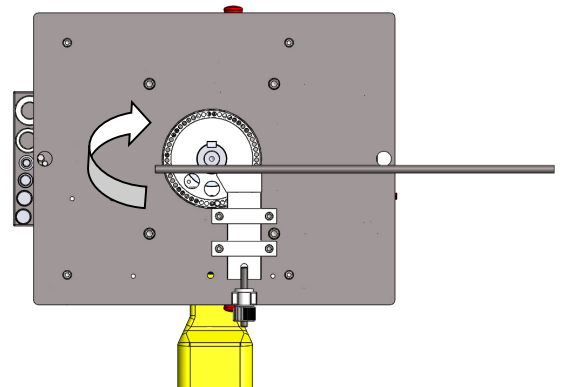
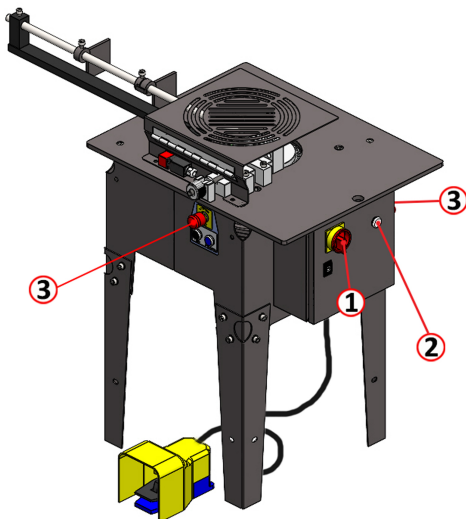
Once electrical connection has been made switch on and check that direction of rotation is correct:

- Power on via the main switch **1**. The voltage presence light **2** will light up: in this way control circuits will be powered.
- In case one of the emergency stop buttons **3** is pressed or the control panel is open, controls cannot be powered and warning light does not light on.
- Check that working table is clear and safety guards are lowered.
- Use the **[START]** button or the control pedal to give a short pulse to check the direction of rotation of the central plate.
- The central plate rotating clockwise means that the connection has been made correctly. If not it is possible to invert two phase wires on the power socket.
- Once direction of rotation has been verified as correct press **[RETURN]** button to get the central plate back to “zero” position.

**Always check the correct direction of rotation of the motor every time the machine is moved and connected to another socket.**








**Plate must turn ONLY clockwise! (as seen from working place)**



# USE

## Control panel

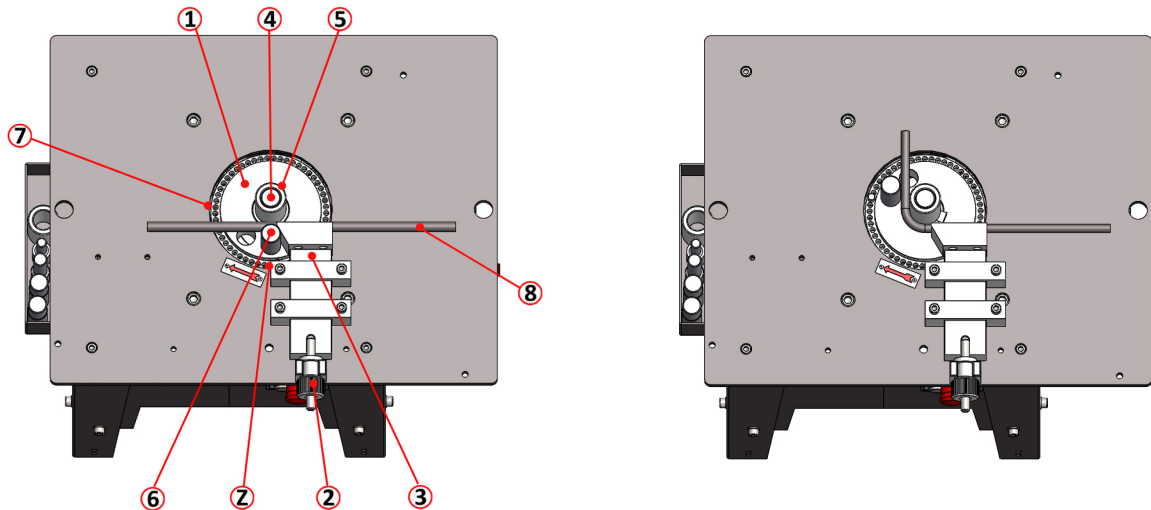


COMMAND		FUNCTION
MAIN SWITCH		<b>0</b> : machine off <b>I</b> : machine on
EMERGENCY STOP		Emergency stop button
PILOT LIGHT Tension Presence		Light indicating power supply of circuits
START BUTTON		Hold-down button: it must be pressed for the rotation movement to proceed. If released, rotation stops. When the rotation inversion point is reached, the return movement is automatic
PEDAL		Same function and operating mode as START button
RETURN		Button controlling return of central plate to the “zero” point of rotation

## Bending operation



Check that central plate **1** is at “zero” point **Z**. If needed return it to zero point by pressing **[RETURN]** button.



1. **Only in the "CE" version,** lift the safety guard
2. By using knob **2**, move / retract the feedback clamp **3** depending on the diameter of the bar
3. Insert pin **4** and any bushes **5** in the central hole of the rotating plate according to the bending angle required
4. Insert pin **6** and any bushes in the required eccentric hole to get closer to the bar to be bent
5. Always leave a space of at least 2 mm more than the diameter of the bar to be bent between the central pin **4** and the eccentric pin **6**
6. Insert reversing pin **7** in the peripheral hole of the central plate, chosen according to the bending angle
7. Insert the bar **8** between the pins
8. **Only in the "CE" version,** lower the safety guard. If the guard is not lowered the machine will not work
9. To operate the machine:
  - Press and hold down the **[START]** button or
  - Press and hold down the control pedal



Check that the rod iron is bent according to desired angle of bending.

10. If the button or pedai is released the machine stops
11. When the pin activates the motor reverse microswitch the plate reverses the direction of rotation and it automatically returns to zero position.



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
13. To repeat once again the bending cycle release the finger from the button and press it again. The same for the control pedal: release the foot and press the pedal again. The electric panel is equipped with an anti-repeat relay which requires the operation described above.

### Emergency stop

14. There are two red buttons emergency stop:

- One on the control panel
- One on the side of the machine opposite to the control panel



Emergency stop buttons only halt the moving parts of the machine without disconnecting electric power. To switch off power to the whole machine turn the main switch to **0** and unplug

### Restarting after an emergency stop

15. Pull the button out by twisting it clockwise.
16. If needed, return the central plate to the zero point by pressing the **[RETURN]** button.

### Switching off

- Turn the main switch to **0**.
- Unplug to switch off power to the machine

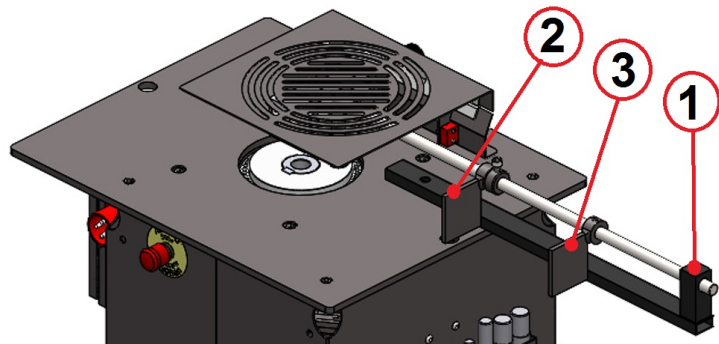


At the end of each working day, disconnect the machine from the site's electrical supply. If the machine is not located under cover, protect it from the elements with a waterproof sheet.

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### Stirrup Linear Measurer

1. Stirrup Linear Measurer
2. 1<sup>st</sup> Measure
3. 2<sup>nd</sup> Measure



## DIAGNOSTICS

Problem	Action
The voltage indicator lamp doesn't turn on and machine doesn't work	<ul style="list-style-type: none"> <li>• Check that none of the emergency stop buttons have been pressed.</li> <li>• Check there is power supply on site.</li> <li>• Check the power supply socket.</li> <li>• Check fuses in electrical panel: unscrew the panel and extract it.</li> </ul>
The voltage indicator lamp turns on but machine doesn't work	<ul style="list-style-type: none"> <li>• Check presence of 3 input phases.</li> <li>• Check power supply on site.</li> <li>• Check connection of cables to terminal block, sockets and plugs.</li> <li>• Only in the "CE" version, check that upper safety guard is lowered.</li> <li>• If the guard is lowered one of the limit switches may be faulty.</li> </ul>
Lack of power in bending phase	<ul style="list-style-type: none"> <li>• Check that power cable from site panel to the machine has section, length and state of preservation able to ensure a voltage drop of less than 10%.</li> </ul>
The central plate rotates but it doesn't return and stops when the reversing pin reaches the micro switch reverse point	<ul style="list-style-type: none"> <li>• Remove the top plate and check reverse micro-switch.</li> <li>• If needed disassemble the reverse micro-switch to check that contacts are well closed and that the supply voltage is flowing.</li> </ul>
The central plate does not stop exactly at the zero point.	<ul style="list-style-type: none"> <li>• Check the position of the stop limit switch.</li> </ul>
For models with 230V single-phase connection: despite presence of voltage the machine doesn't have enough power in bending phase	<ul style="list-style-type: none"> <li>• If voltage is lower than 220V the machine cannot work.</li> <li>• A current stabilizer is recommended.</li> </ul>
Oil leakage from the bottom of the machine	<ul style="list-style-type: none"> <li>• Check oil seal caps, identify which of the 2 caps leaks.</li> <li>• Replace the cap by refitting an original one and applying a thin layer of silicone sealant.</li> </ul>

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## MAINTENANCE



Maintenance operations must be carried out by qualified personnel in compliance with all applicable safety standards.



**Danger of electric shock !**

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

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### Maintenance schedule

Frequency	Task
Daily	Keep working area clean.
Every 150 hours	<ul style="list-style-type: none"><li>• Clean the reduction gear (see paragraph <i>Cleaning</i>)</li><li>• Check oil level in the reduction gear by using oil level control cap.</li><li>• If needed top up.</li></ul>
Yearly	<ul style="list-style-type: none"><li>• Total oil replacement.</li></ul>

### Cleaning and Deactivation of the machine

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

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- Unscrew the four screws fitted to the frame by using the Allen keys supplied in the toolbox.
- Lift and move the frame plate.
- Check the condition of limit switches and clean the reduction gear from deposited calamine.
- When finished reposition the frame plate in its position and tighten the four screws.
- Once the end of technical and working life of the machine has been reached the machine must be deactivated according to following procedure:
  - Switch off the machine and unplug power plug. Cut the plug from power cord.
  - If transport is needed please follow procedures indicated in *TRANSPORT*.
  - Dispose of the machine in an authorized waste collection center.



Do not release oil and grease into the environment.  
Dispose of them by delivering to authorized Body for collection of exhausted oils.