



# Sima

- @ MANUAL DE INSTRUCCIONES ORIGINAL
- @ ORIGINAL USER GUIDE
- @ MANUEL ORIGINAL D'UTILISATION

**STAR-16 PRO**  
**STAR-20 PRO**

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## 1. GENERAL INFORMATION.

**WARNING: Please read and understand perfectly the present instruction before using the machine.**

SIMA S.A. thanks you for your trust in our products and for purchasing the BENDING OR COMBINED ELECTRICAL CUTTING/BENDING MACHINE.

This manual provides you with the necessary instructions to start, use, maintain and in your case, repair of the present machine. All aspects as far as the safety and health of the users is concerned have been stated.

Respecting all instructions and recommendations guarantees safety and low maintenance. As such, reading this manual carefully is compulsory for any person responsible for the use, maintenance or repair of this machine.

**It is recommended to have always this manual in an easily accessible place where the machine is being used.**

## 2. GENERAL DESCRIPTION OF THE MACHINE.

The STAR-16 PRO and STAR-20 PRO bending machines have been manufactured to bend flat and reinforced steel bars used for construction and passive steel armatures for structural concrete. The bending operation is done in cold using mandrels to guarantee the bending interior diameter is conforming to the European norms.

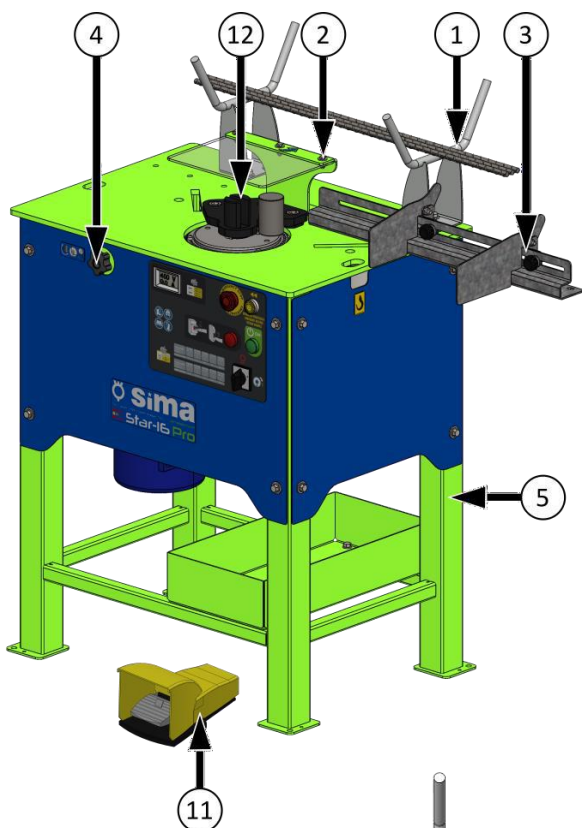
**Any other use of this machine is considered inadequate and can be dangerous. Thus, this is completely prohibited.**

- The gear box is the main element of the machine. It is responsible for transmitting the needed energy to carry out the steel bars bending.
- The machine is operated by an electrical motor that passes the movement, by a transmission to the bending mechanism in which the different mandrills are mounted.
- The bending angle can be decided by inserting the pivot in the bending plate. For a more precise bending, the ruler can be accurately adjusted by its handle.
- The commands panel is endowed with polyester, electrical knobs easily identified by pictograms.
- The machine is equipped with shutdown and backward movement buttons to facilitate its manoeuvre. The emergency knobs on both sides of the machine can be used in case of danger or incorrect manoeuvres.
- The general bars bending manoeuvre is performed in low-voltage (24V) according to the European standards.
- The original equipment (bolts, mandrels bending square) is heat-treated to withstand the tough type of work the machine performs.
- The machine is furnished with a pedal to confirm and execute the manoeuvre, thus avoiding the upper parts to be trapped while the machine is running.
- The work area is protected by a safety guard to limit possible accidents. This guard is transparent to allow observation of the material being bent, avoiding getting to the upper parts of the bending area.
- The main function of the machine is based on making stirrups, hooks, overlaps, reinforcing rings, anchors, fences and any polygonal figure using small-caliber rod up to 20 mm.
- The machine is painted in oven with a highly resistance, anti-corrosion epoxy polyester paint.
- The original, electrical equipment is in conformity with the EC safety norms.

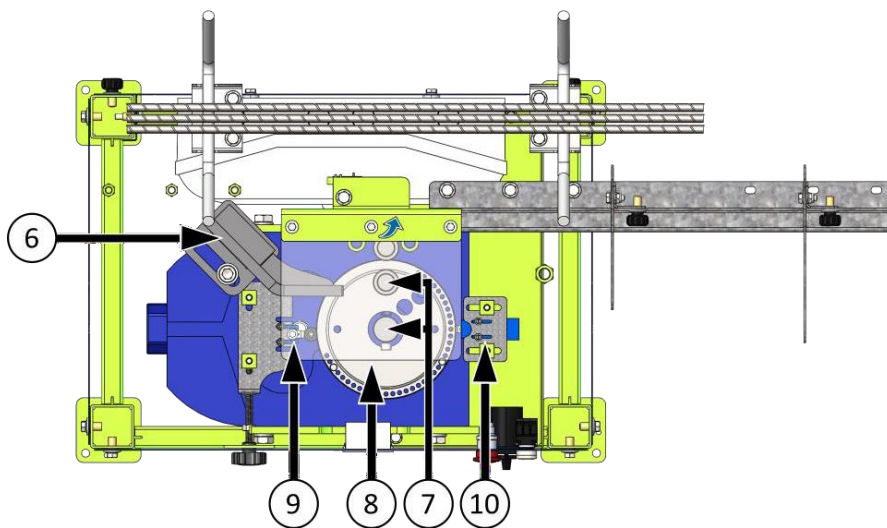
**Any use of the machine for applications other than those stated above is dangerous and therefore strictly prohibited.**

### 3. PARTS OF THE MACHINE.

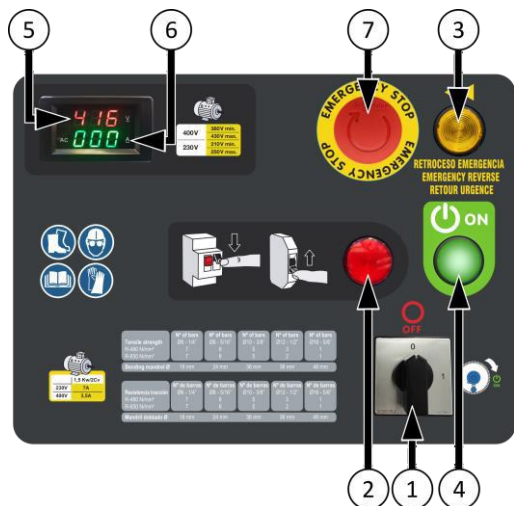
#### 3.1 STAR-16 PRO.



1. BAR SUPPORT.
2. BENDING PLATE PROTECTION.
3. BAR LENGTH MEASURER.
4. PRECISION ANGLE ADJUST.
5. CHASIS.
6. BENDING SUPPORT.
7. BENDING MANDRELS.
8. BENDING PLATE.
9. END OF BEND SENSOR.
10. MACHINE ZERO LIMIT SENSOR.
11. PEDAL.
12. STIRRUP DEVICE.

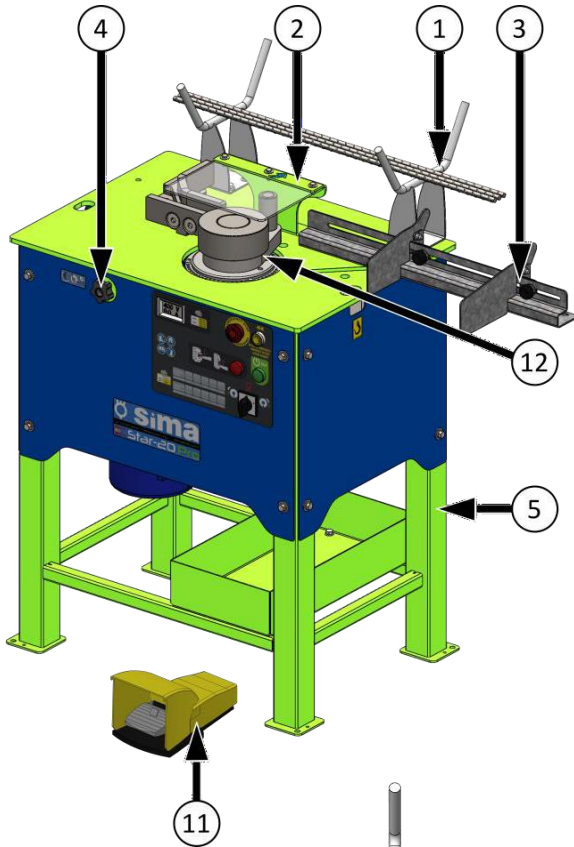


#### Control panel:

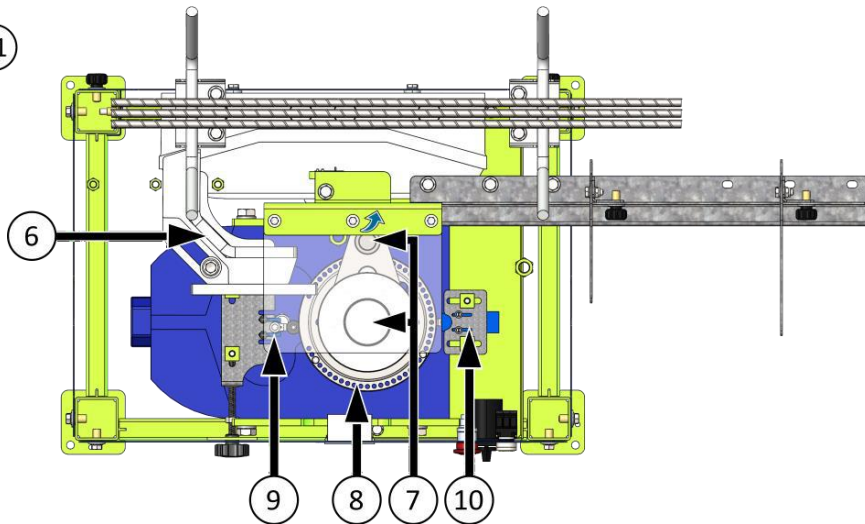


1. POWER SWITCH.
2. OVERLOAD LIGHT.
3. FORCE RETURN SWITCH.
4. ON LIGHT.
5. VOLTMETER.
6. AMPEREMETER.
7. EMERGENCY STOP BUTTON.

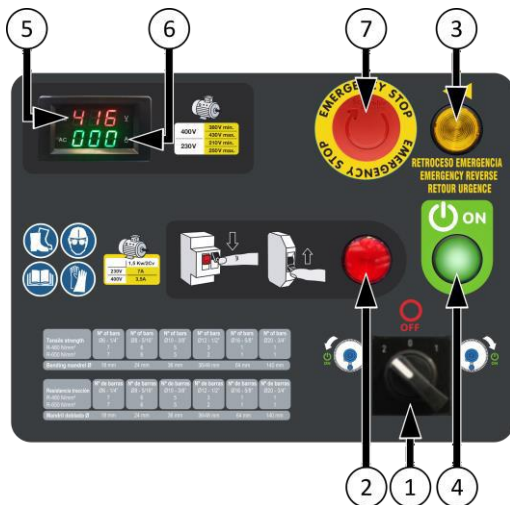
**3.2 STAR-20 PRO.**



1. BAR SUPPORT.
2. BENDING PLATE PROTECTION.
3. BAR LENGTH MEASURER.
4. PRECISION ANGLE ADJUST.
5. CHASIS.
6. BENDING SUPPORT.
7. BENDING MANDRELS.
8. BENDING PLATE.
9. END OF BEND SENSOR.
10. MACHINE ZERO LIMIT SENSOR.
11. PEDAL.
12. BENDING KIT FOR BIG DIAMETERS.

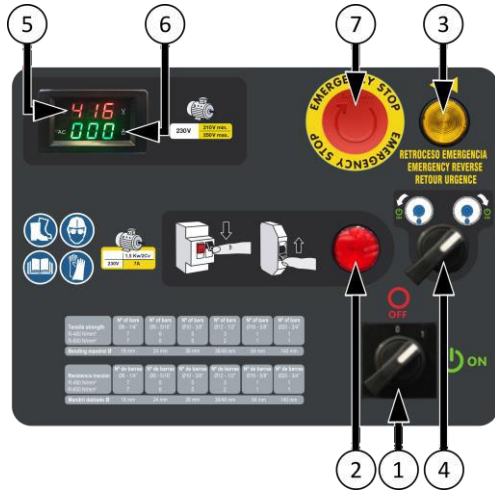


**Control panel:**



1. POWER / INVERSE SWITCH.
2. OVERLOAD LIGHT.
3. FORCE RETURN SWITCH.
4. ON LIGHT.
5. VOLTMETER.
6. AMPEREMETER.
7. EMERGENCY STOP BUTTON.

**Control panel STAR-20 PRO 1 Phase:**



1. POWER SWITCH.
2. OVERLOAD LIGHT.
3. FORCE RETURN SWITCH.
4. INVERSE SWITCH.
5. VOLTMETER.
6. AMPEREMETER.
7. EMERGENCY STOP BUTTON.

**4. TRANSPORT.**

The machine has been packed on a pallet that makes its transport with trucks or manual pallets transporters easy. Its weight and other dimensions (See the table of technical characteristics on the present manual) make it possible to transport the machine in light vehicles.

When it is needed to transport the machine for long distances by vehicles, cranes or other means of elevation, the latter should be safe.

By lifting the machine with cranes or hoists, normalised slings must be used. These are chosen in function of the required work load limit, the way of use and the nature of the load. The choice is correct if special norms of use are respected.

**WARNING:** To avoid any possible danger, stay away from elevated loads and be careful with their possible displacement during transport, whether during lifting or mooring. Therefore, it is essential to choose the correct slings and remain particularly vigilant in sensitive operations (elevation, coupling, mooring or discharging).

**IMPORTANT:** During the transport of the machine, the latter should never be reversed nor be put on either side. The machine is only to rest on its four feet.



**5. PICTOGRAMS.**

Pictograms included in the machine entail the following:



**MUST USE SAFETY BOOTS**



**IT IS ESSENTIAL TO WEAR SAFETY HELMET AND GOGGLES**

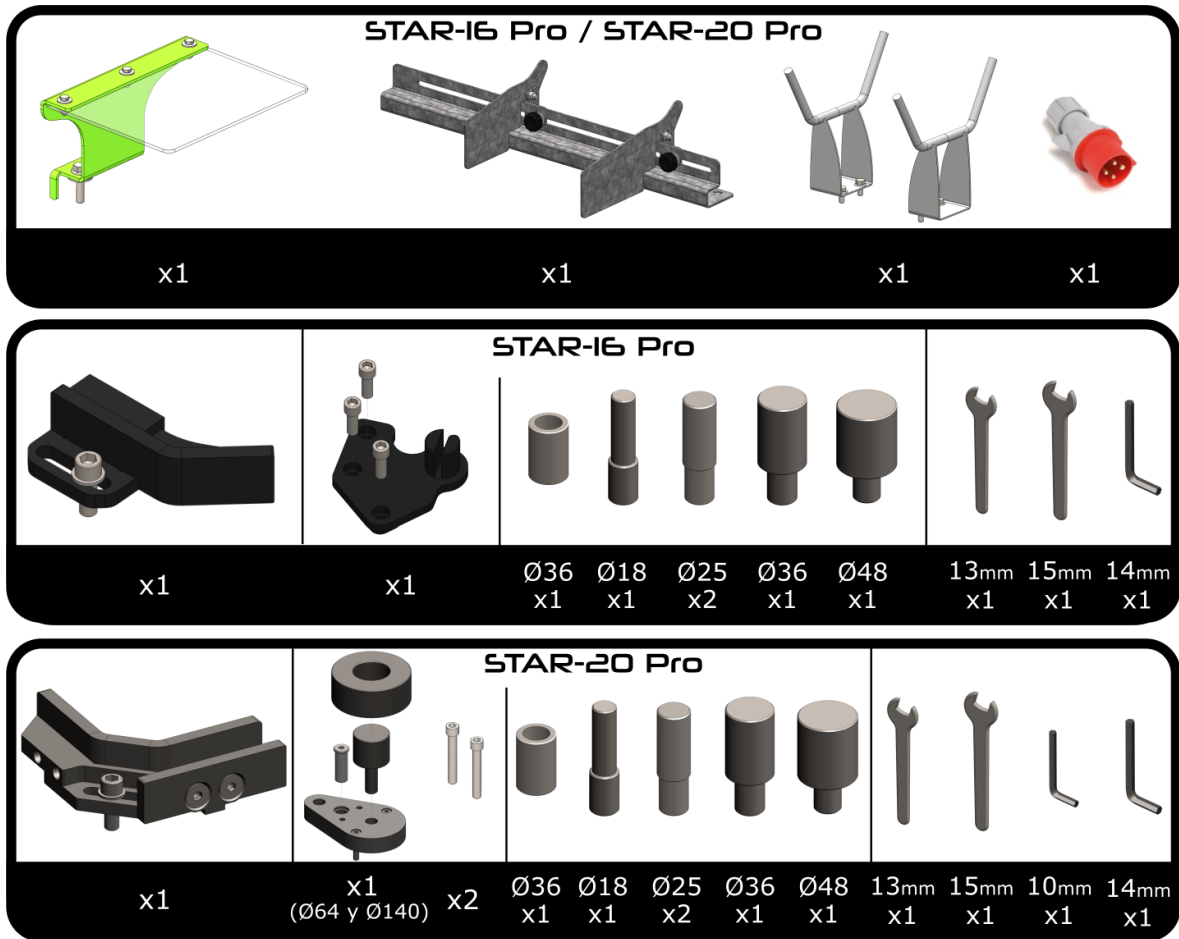


**READ INSTRUCTION MANUAL**



**IT IS ESSENTIAL TO WEAR GLOVES**

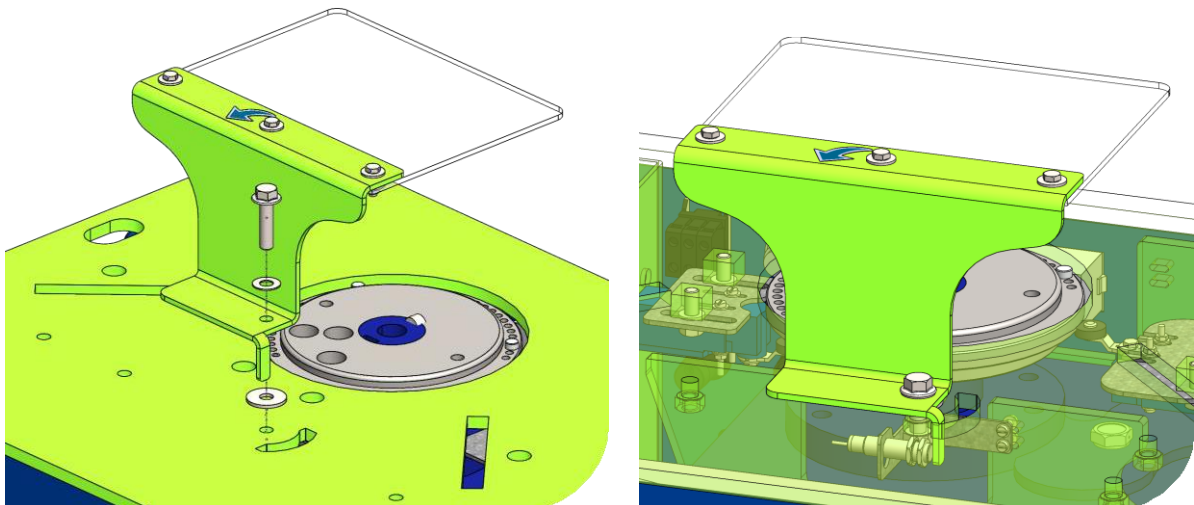
**6. SUPPLIED WITH MACHINE.**



**6.1 ASSEMBLY ACCESORIES.**

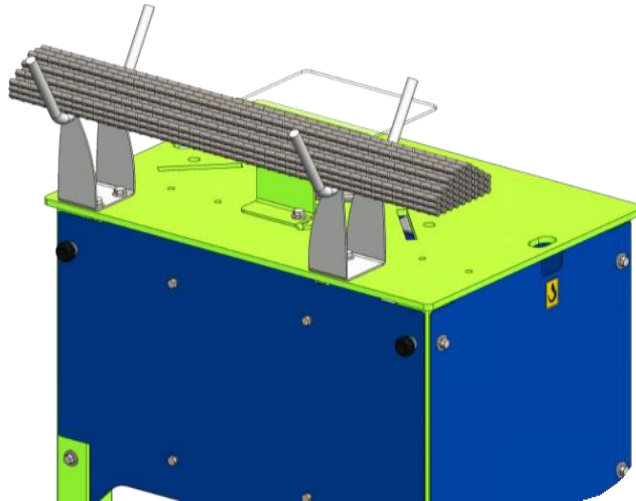
For transport reasons the machines are sent with the accessories uninstalled. Install the accessories as in the pictures.

**BENDING PLATE PROTECTION:** This needs to be assembled as indicated in the image: wide wing washer, plate protector, spring washer and screw. A nut must be placed on the underside of the table. The protection has a tab that is detected by the inductive safety sensor. If the guard is not in its lower position or if the guard is not mounted, the machine will not work.

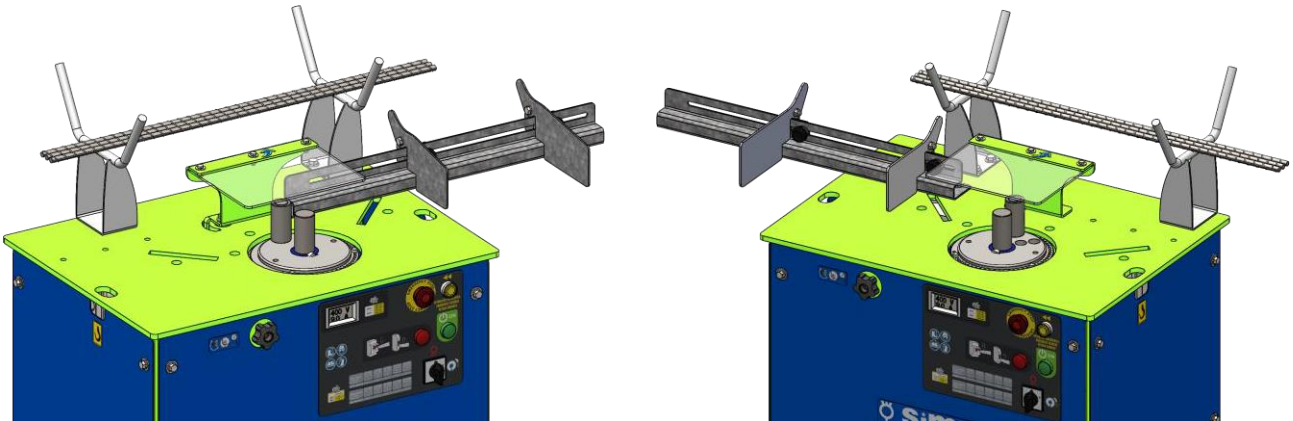




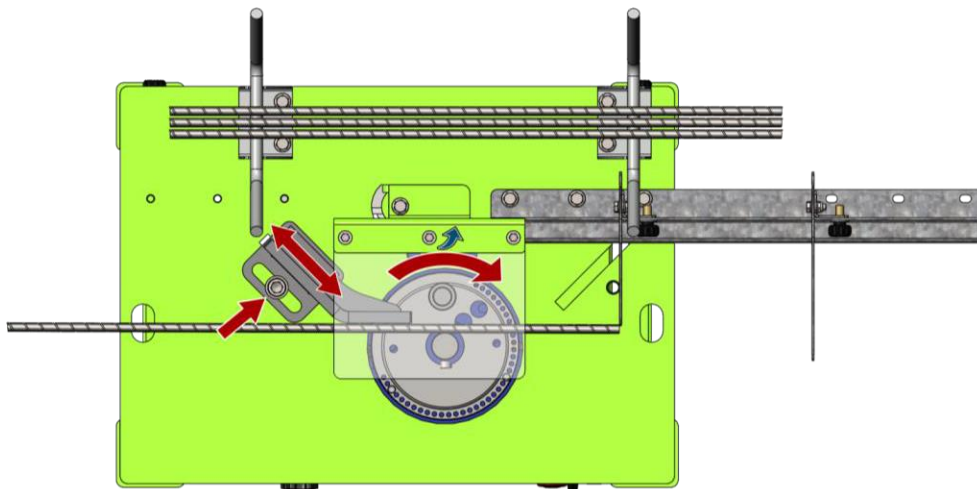
**BAR SUPPORT:** This is for convenience and speed of productivity.



**BEND LENGTH MEASURER:** The bar length measurer can be mounted on the left or right of the machine. There are two measuring plates for adjusting length of bend.



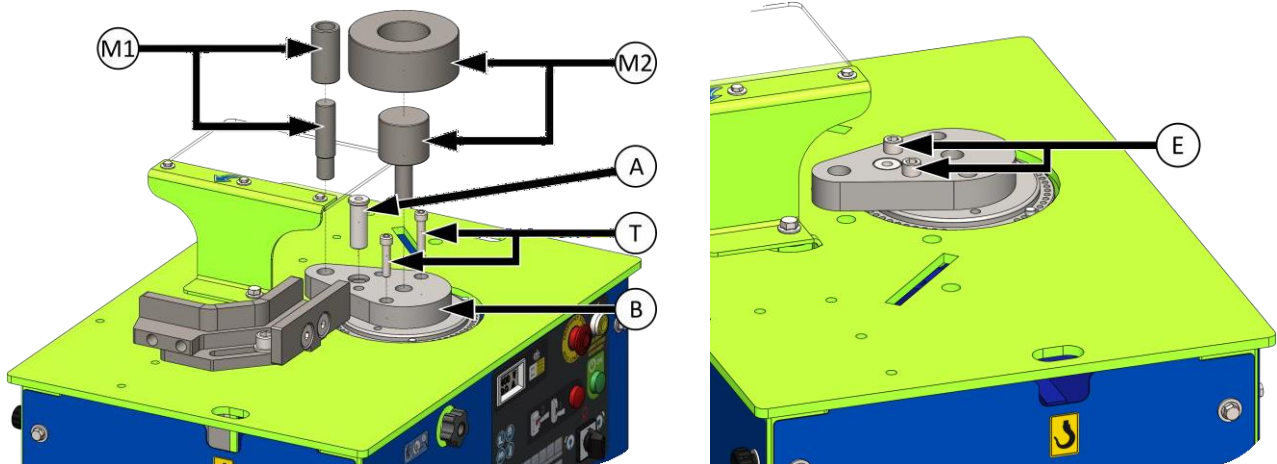
**BENDING SUPPORT (STAR-16 PRO):** The bending support is used for supporting multiple bars for the bend. The STAR-16 PRO stirrup bender only rotates clockwise, so the bending support must be mounted to the left of the bending plate as shown in the figure. To distance the bending square according to the bar that we use, we must loosen the screw and slide it over the slot. To reposition the bending support according to the bar that we use, loosen the screw and slide the support along.



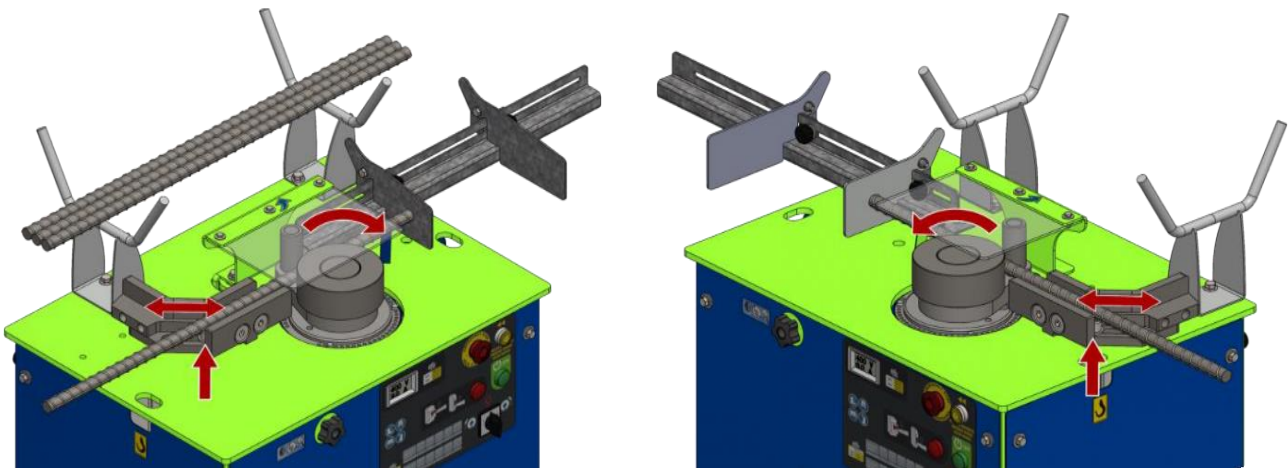
**BENDING SUPPORT AND BENDING KIT FOR BIG DIAMETERS (STAR-20 PRO):** The STAR-20 PRO model has a different square than the STAR-16 PRO, which allows bending of larger diameter bars thanks to the fact that it has a bending kit for big diameters.

If  $\varnothing 16$  mm or  $\varnothing 20$  mm bars are to be bent, the bending kit for big diameters must be used. The bending kit for big diameters "B" is placed on the bending plate and is fixed with 2 screws "T", as shown in the image. Next, drive pin "A" is inserted. Finally, the mandrels "M1" and the bending mandrels "M2" are placed depending on the diameter of the bar to be bent.

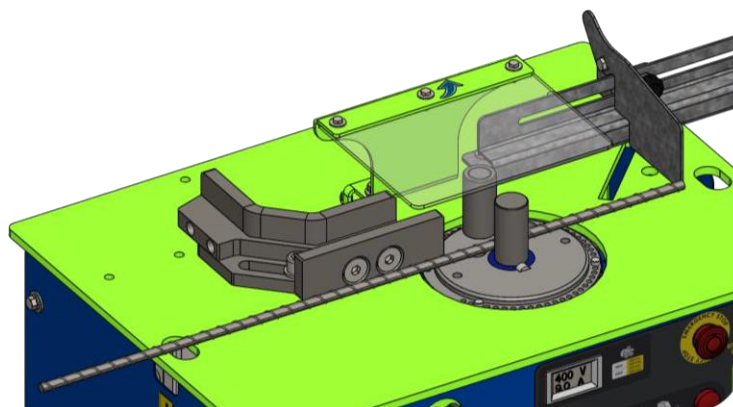
The kit for big diameters includes 2 screws "E" to facilitate the removal of it if it gets stuck and cannot be easily removed.



Next, the bending support is placed, which can be mounted on the right or left side, according to selected direction of rotation. This bending support has a screwed outer part, which must be placed according to the side on which the bending support has been mounted with respect to the plate. This outer screwed part does not need to be fitted when using the kit for big diameters.

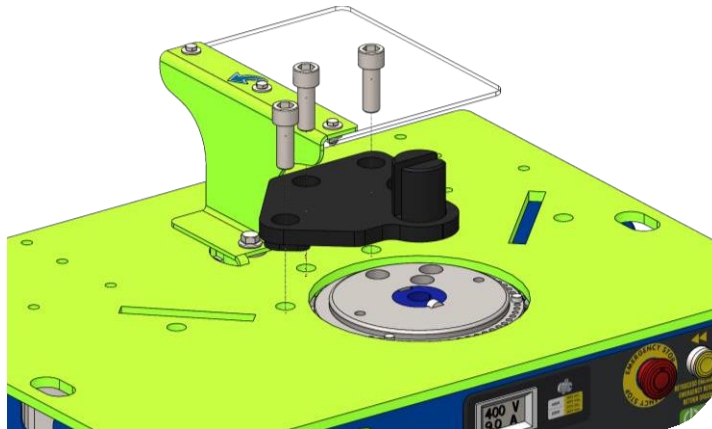


If the bars to be bent have a diameter smaller than  $\varnothing 16$ mm, the bending is done without the bending kit for big diameters, as shown in the following image:



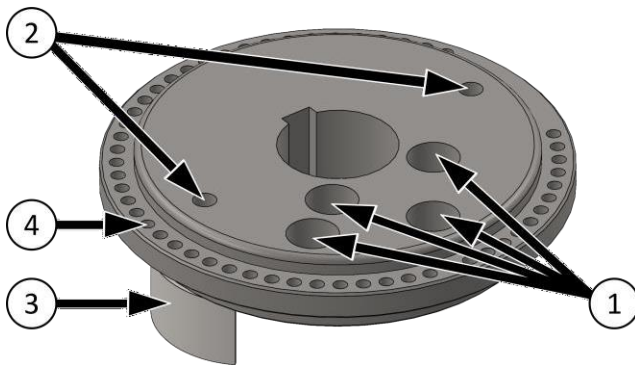
**STIRRUP DEVICE (STAR-16 PRO):** The STAR-16 PRO model has a device that allows you to make stirrups with bars up to Ø10mm in a simpler and faster way than with the bending support.

Its placement is simple, just place it on the bending plate and screw in the 3 screws it has on the table, as seen in the image:



**6.2 PARTS OF THE BENDING PLATE.**

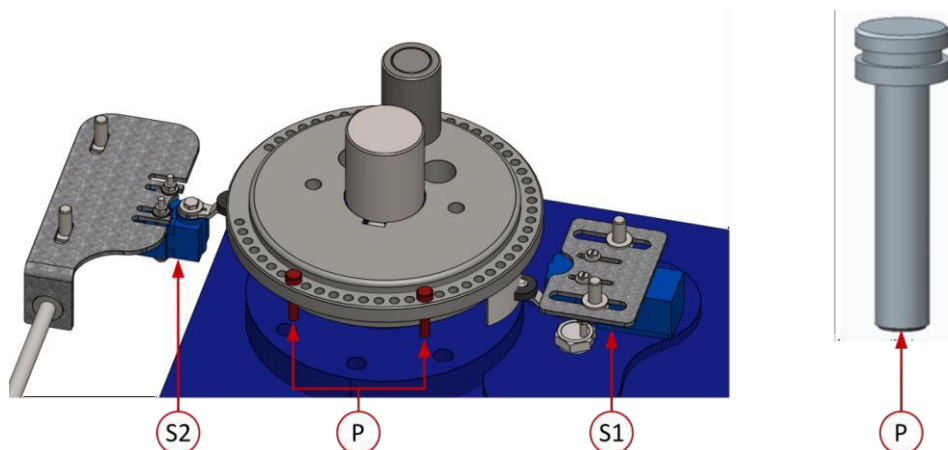
The plate has many holes for different purposes.



- 1. Holes for pushing mandrel. Depending on the size of bar the mandrel can be put in different positions.
- 2. Screw holes for extracting the bending plate.
- 3. Micro plate for stopping.
- 4. Holes for the pivot bending pin.

**6.3 INVERSION PIN TO CONTROL THE BENDING ANGLE.**

The inversion pin "P" is how we select the bending angle of the plate. Depending on if the plate is moving clockwise or counterclockwise, we must put the pin on the left or the right of the limit switch "S2".



The limit switch S2, it to stop the plate turning when the inversion pin P touches it.  
 The limit switch S1, is for stopping the plate when it returns to its original position.

## 7. GETTING STARTED.

**WARNING:** All safety recommendations must be followed, either the ones mentioned in the present user manual or those complying with all labour risks prevention norms in every location.

**WHEELWORK:** SIMA bending and combined machines do not need any wheelwork operations as they are specially designed to obtain the maximum performance from start.

**NORMAL USE OF THE MACHINE:**

The bending machines have been designed for bending flat and reinforced steel bars for use in the structure and other construction components. Each other use that has not been expressly indicated is considered abnormal. Any tool or accessory added or amended without written authorization from the manufacturer is considered inappropriate and dangerous. If any damage or injury is caused as a result thereof or by misuse of the machine, SIMA S.A. exempts all responsibility as manufacturer. The machine must be installed on a plane, firm and horizontal surface and the ground should not be soft.



**This machine MUST NOT BE USED IN THE RAIN. Cover with waterproof materials. If the machine has been exposed in the rain, check before connecting the electrical parts are not wet. Always work with good lighting conditions.**

### 7.1 CONNECTING TO THE SUPPLY.

The extension cable used to feed the machine needs to have a minimum section of 4x2.5 mm<sup>2</sup> up to 25 meters long. For a superior distance 4x4 mm<sup>2</sup> can be used. In one of its ends, it is needed to connect a base normalized aerial of 3P+T or 3P+N+T compatible with the machine switch and in the other end, one normalized aerial pin of 3P+T ó 3P+N+T compatible with switchboard exit.

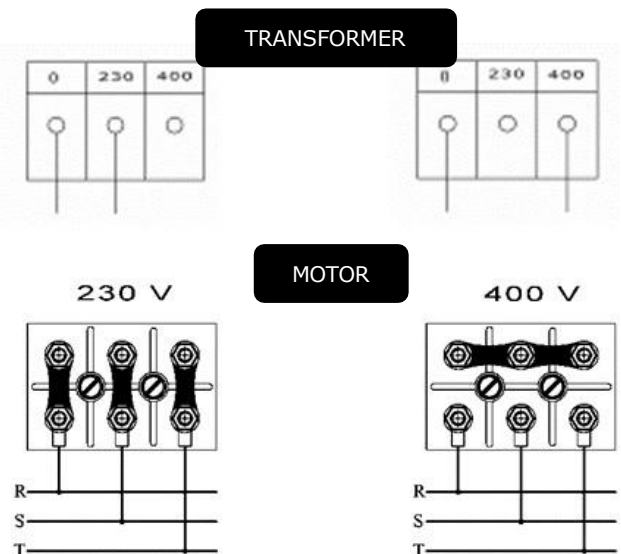


**Machines with electrical motor should always be connected to a normalized switchboard that disposes of a magneto-thermal switch and a differential in accordance with the characteristics of the motor:**

- 1.5Kw, three-phase at 400V, 4A magneto-thermal and 4A/30mA differential.
- 1.5Kw, three-phase at 230V, 10A magneto-thermal and 10A/30mA differential.
- 1.5Kw, single-phase at 230V, 15A magneto-thermal and 15A/30mA differential.



**WARNING:** Do not plug the machine to the electricity if you are not sure of the available electrical tension. If the tension is not correct, the engine will undergo irreparable harm or out of service.



Don't connect the machine unless you are sure of the stability of the electricity supply.



Do not change any electrical configuration in the machine as this may result in irreparable damage.

**VERY IMPORTANT, make sure earth is connected before connected.**

**7.2 CONNECTING TO ELECTRICITY SOURCE.**

The machine has a display so that the user can see the voltage supplied to the machine before the voltage reached the electrical components and causes any damage.

To connect the machine, do the following.

1. Connect the socket to the electrical box socket. This way the electricity will not reach the motor and you can see the voltage coming into the machine.



**WARNING: the transformer has a tolerance of  $\pm 10\%$  over and below the specified tension requirement. If these limits are passed, then you will break the transformer.**

**Machine 400V = 360V min / Max 440V max**  
**Machine 230V = 207V min / Max 253V max**

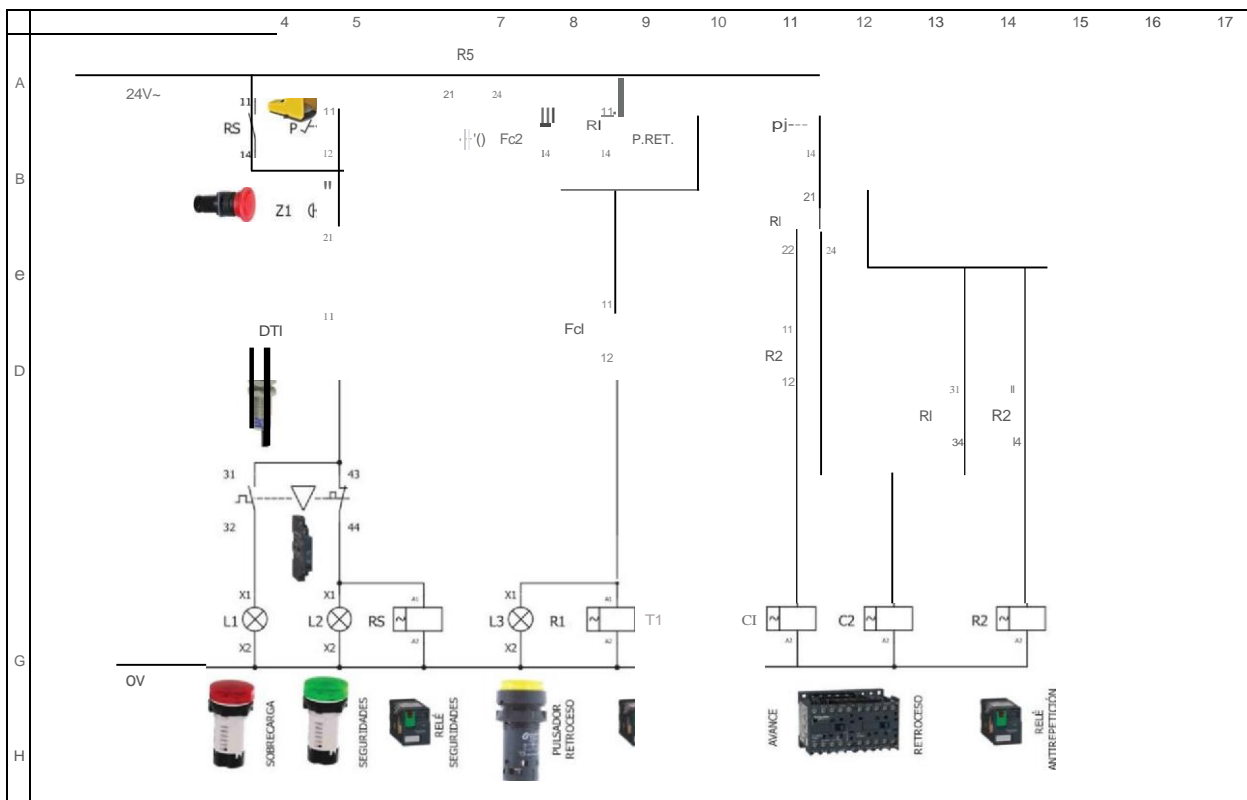
2. Turn the power switch (STAR-16 PRO) or switch selecting the bending direction (STAR-20 PRO) and the green light will light up. If the voltage appears on the display, but the green light does not light up, it is because there is an active alarm: the emergency stop button is pressed or the bending plate protection is not in its working position. If the red light is on, it is due to an overload in the motor.
3. Step on the pedal to check which way the plate is turning. MAKE SURE THERE ARE NO MANDRELS OR ACCESSORIES ON TOP OF THE MACHINE.



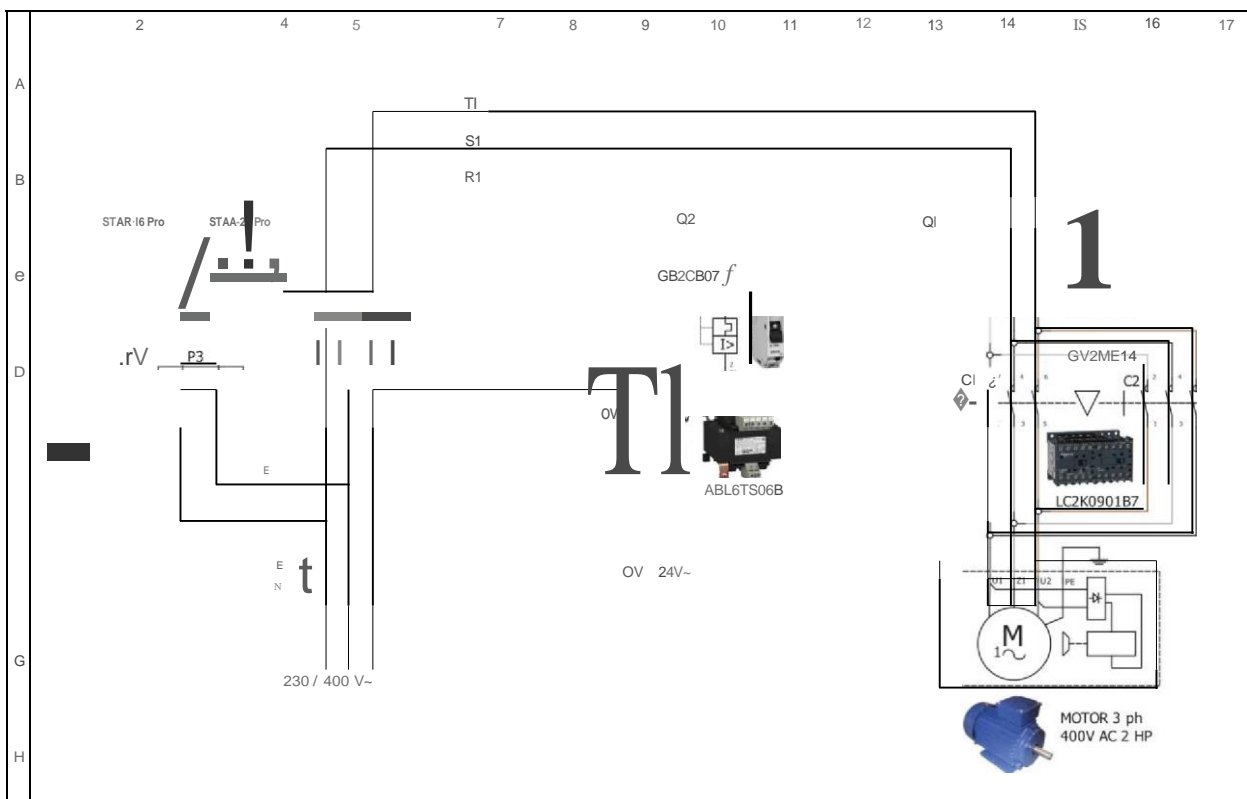
- Position 0.** Machine disconnected.
- Position 1.** Connected machine with clockwise turn bending plate.
- Position 2.** Connected machine with counterclockwise turn bending plate (STAR-20 PRO).

**When connecting the machine, make sure the machine is turning in the way the sticker indicates, this will avoid accidents with the accessories on the bending plate.**  
**If it doesn't turn the right way, please change the phases.**

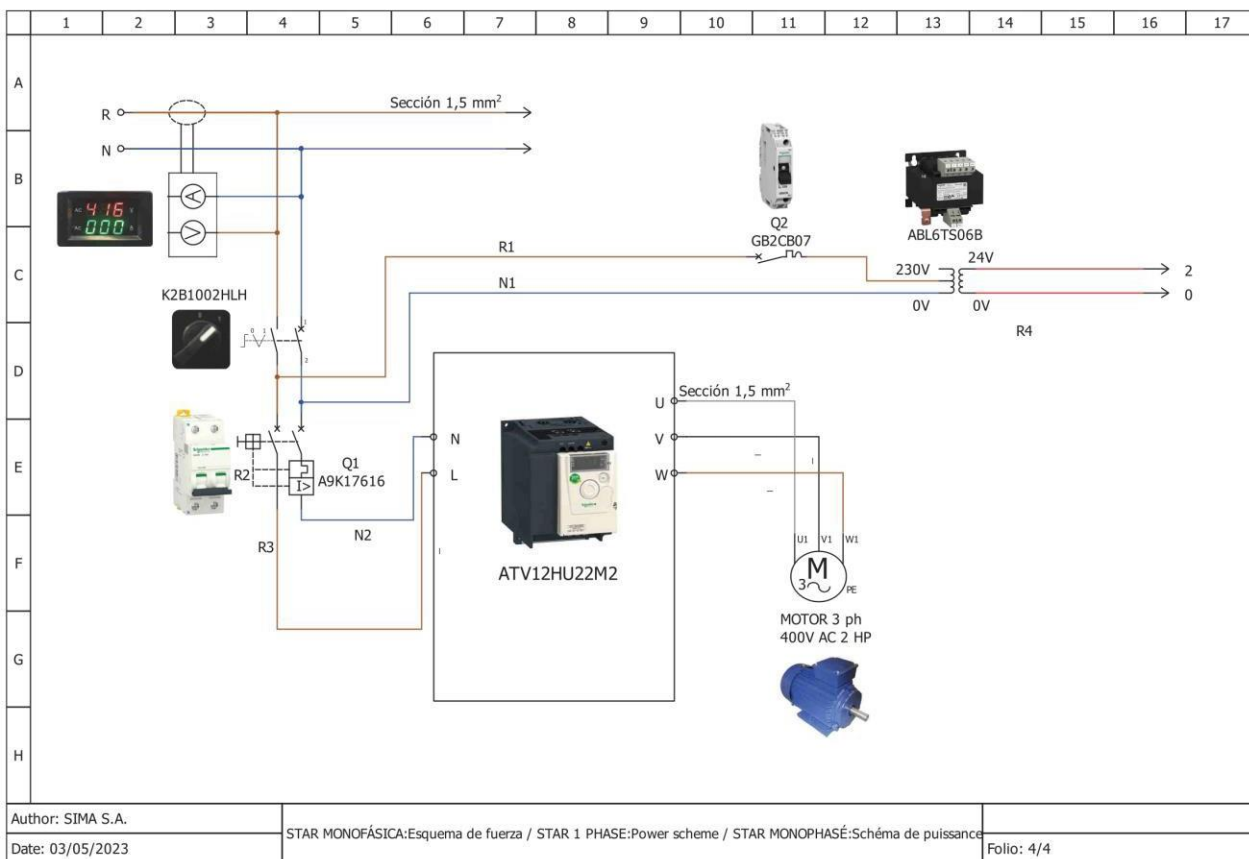
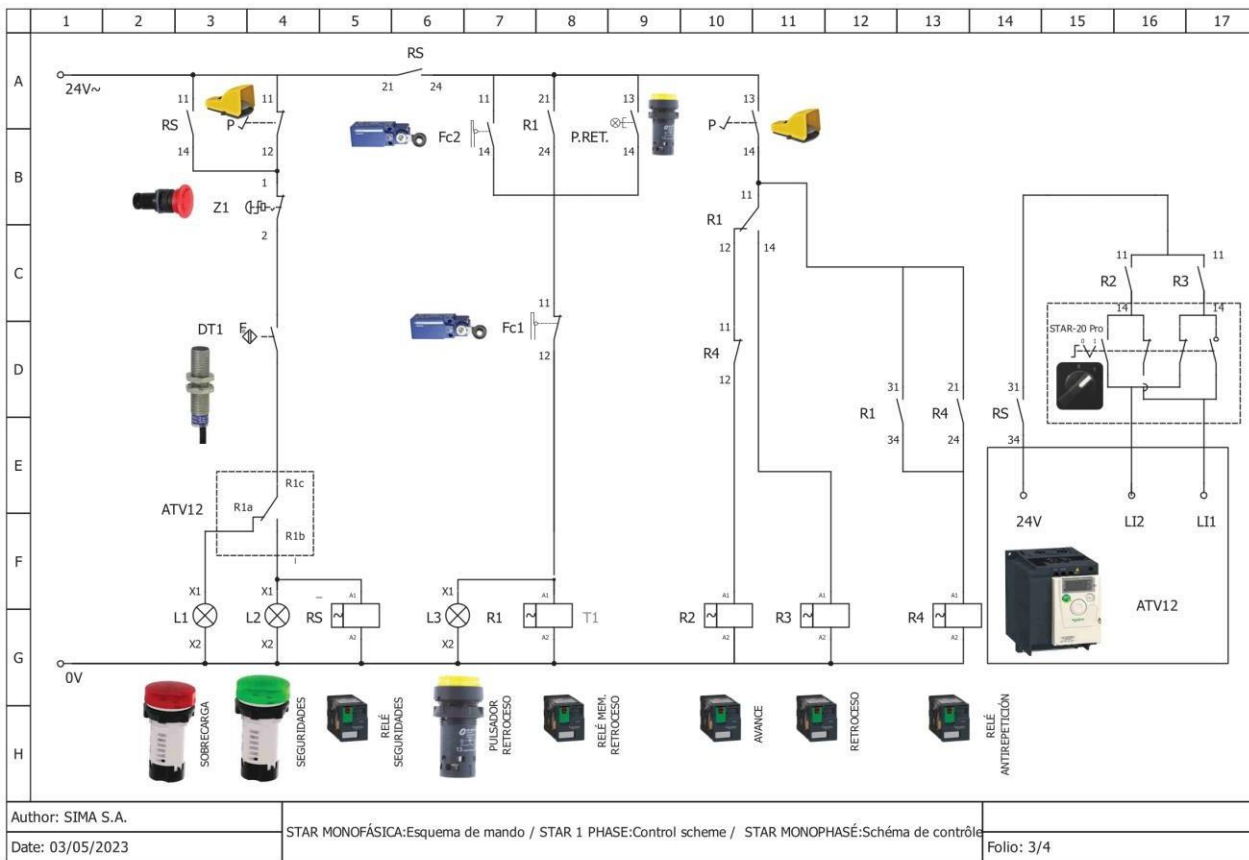
7.3 CIRCUIT DIAGRAMS.



Author: SIMA S.A.  
 F-----ISTAR TRIFÁS.JCA:Esquema de mando/ STAR 3 PHASE:Control scheme / STAR TRIPHASÉ:Schéma de contrôle  
 Date: 03/05/2023 Folio: 1/4



Author: SIMA S.A.  
 F-----ISTAR TRIFÁS.JCA:Esquema de fue12a/ STAR 3 PHASE:Power scheme / STAR TRIPHASÉ:Schéma de puissance  
 Date: 03/05/2023 Folio: 2/4



**MANUAL EMERGENCY RETURN OF BENDING PLATE.**

If during the bend you want to stop the process press the RETURN button and use the pedal to return to a previous position or to the start.



**7.4 CHANGING PHASES TO ESTABLISH CORRECT BENDING DIRECTION (THREE-PHASE VERSIONS).**

To change the direction of the bend you will have to open the connecting socket and interchange the wires as shown in the image.

3P + T



3P+N+T



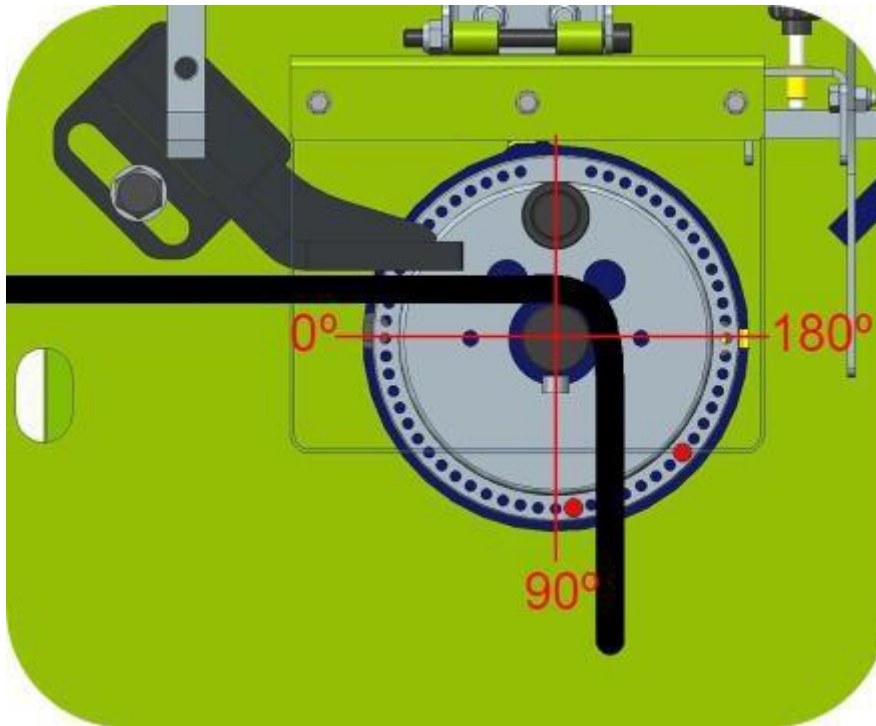


## 8. MAKING A BEND.



**Before starting to bend a rebar make some bends without any accessories on the machine until you are comfortable with the movement.**

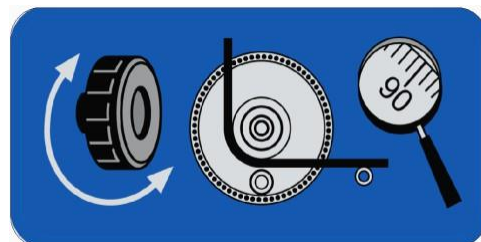
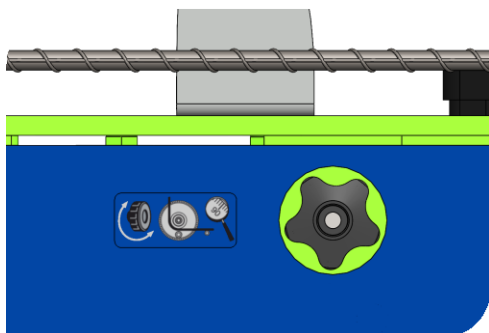
1. Divide the bending plate into 4 imaginary 90° sections.
2. Select bending direction with the control panel button.
3. Insert the plate pin to the left of 0° so achieve an angle of 90 °.
4. Step on the pedal and don't lift off. The bending plate will move until the pin reaches the inversion switch.
5. To make the plate return lift your foot off the pedal and press again and the plate will return.



### FINAL BENDING ANGLE ADJUSTMENT.

If you haven't achieved the bending angle, you require with the pin and you need to make a small adjustment you can use the black metal handles on the side of the machine to move the support mandrels.

**Turn the handle to push the mandrel further away to make a tighter angle and bring it towards to make a wider angle.**





## 9. MAINTENANCE.




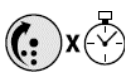



- 1 First oil change after 1000 hours of use if mineral oil is used and then again after 3000/4000 hours if the oil used is synthetic or after 3 years of use if these hours aren't reached. If synthetic oil is used, change oil after 20,000 hours.
- 2 Grease the holes where the pins and mandrels go and also the bottom of the pins and mandrels, this will also help avoid build up of rust.
- 3 At the end of the day disconnect the machine.
- 4 Cover the machine at night to protect from rain.
- 5 When possible, remove debris from the inside of the machine.
- 6 Clean the exterior and grease pins and mandrels frequently.
- 7 Check oil level in the gear box (**every month**) if the level has gone down be sure to fill up.

 <b>ENGRANAJ. HP-460</b>	 <b>SUPER TAURO-460</b>	 <b>SPARTAN EP-460</b>	 <b>MOBIL GEAR-634</b>	 <b>OMALA-460</b>	 <b>ENERGOL GR-XP</b>
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### 10. TROUBLE SHOOTING.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Machine won't bend the bar.	Not enough voltage.	Check supply.
	Not enough motor power.	Check motor is not burnt.
The plate bends but doesn't return to its position.	End of bend limit switch.	Check the limit switch and its continuity (1 open 0 closed).
The green on light doesn't switch on.	Check cables to the machine, check supply.	Check cables to the machine, check supply.
Pilot light is on, but machine doesn't work.	Machine is not well connected.	Machine is only connected in a single phase, make sure it is correctly connected.
Connection is correct at 230 or 400 but the machine isn't moving.	Unstable supply.	Machine is only connected in a single phase, make sure it is correctly connected.
During the return after bending, the bending plate does not stop at the starting point.	Start limit switch.	Check the limit switch and its continuity (1 open 0 closed).

### 11. DATA SHEET.

					
<b>STAR-16 PRO</b>	1,5Kw Single.	230V 	216 Kg.	17	7,5
	1,5Kw Three.	400V / 230V	214 Kg.	17	7,5
<b>STAR-20 PRO</b>	1,5Kw Single.	230V 	216 Kg.	17	7,5
	1,5Kw Three.	400V / 230V	214 Kg.	17	7,5

### 12. BENDING CAPACITY.

	Traction resistance R-480 N/mm <sup>2</sup> R-650 N/mm <sup>2</sup>	Nº of bars Ø6 - 1/4"	Nº of bars Ø8 - 5/16"	Nº of bars Ø10 - 3/8"	Nº of bars Ø12 - 1/2"	Nº of bars Ø16 - 5/8"	Nº of bars Ø20 - 3/4"
		7	6	5	3	1	1
		7	6	5	2	1	1
Ø bending MANDREL	<b>STAR-16 PRO</b>	18 mm	24 mm	36 mm	36 mm	48 mm	-
	<b>STAR-20 PRO</b>	18 mm	24 mm	36 mm	36/48 mm	64 mm	140 mm

### 13. SAFETY RECOMMENDATIONS.

Bending and combined (bending/cutting) machines should be used by trained people or people familiarized with their operation.

- Before starting up the machine please read the instructions and make sure safety norms are respected. Learn how to stop the machine in a fast and safe way.
- Place the machine on a plane surface. Connect the machine to the electricity only when you are sure of its stability.
- Start the machine only when you have mounted the safety guards that come with the machine.
- It is recommended to use safety glasses, safety boots, gloves etc. Please always use approved materials.
- Always use Individual Protection Equipment (IPE) in accordance with the type of work you are effectuating.
- Prohibit strangers to access the place of work of the machine.
- Work clothes are not supposed to have loose articles that can cling into movable parts of the machine.
- When you have to move the machine, unplug the electricity cables and block the moving parts of the machine.
- Always keep protection elements and the safety guards in their correct positions.
- **Attention:** Before placing the bolts, mandrills and the bending squares, check the direction of rotation of the bending plate. You can then install the suitable accessories for the type of work you want to make.
- The damaged electrical cables should be urgently replaced.
- Unplug the machine from the electricity and never manipulate nor operate on the mechanical nor electrical elements of the machine while the engine is on.
- Never use the machine for purposes other than those it has been designed for.

**VERY IMPORTANT: Earth should always be connected** before switching on the machine.

- Use correct connection cable.
- Check the electricity supply to the machine and make sure it is the same as indicated on the serial number plaque or sticker.
- Make sure the cable is secure from direct heat, oil, footfall.
- Don't use pressurised water to clean the machine as this may get into the electrical components.

**ATTENTION: You are to follow all safety recommendations mentioned in the present user manual and comply with all labour risks prevention norms in every location.**

**SIMA, S.A. is not responsible for the consequences possibly generated but the inadequate use of the bending or the combined (bending/cutting) machine.**

## 14. WARRANTY.

SIMA, S.A. the manufacturer of light machinery for construction possesses a net of technical services "SERVI-SIMA".

Repairs under warranty made by SERVÍ-SIMA are subject to some strict condition to guaranty a high quality and service.

SIMA S. A. guarantees all its products against any manufacturing defect; to take into account the conditions stated in the attached document "WARRANTY CONDITIONS". The latter would cease in case of failure to comply with the established payment terms. SIMA S.A. reserves its right to bring modifications and changes to its products without prior notice.

## 15. SPARE PARTS.

The spare parts for the bending and combined machines, manufactured by SIMA, S.A. are to be found in the spare parts plan, attached to this manual.

To order any spare part, please contact our alter-sales service clearly indicating the serial number of the machine, **model, manufacturing number and year of manufacturing that show on the serial number plaque or sticker.**

## 16. ENVIRONMENT PROTECTION.



Raw materials have to be collected instead of throwing away residuals. Instruments, accessories, fluids and packages have to be sent into specific places for ecological reuse. Plastic components are marked for selective recycling.



**R.A.E.E. Residuals arising of electrical and electronic instruments have to be stored into specific places for selective collection.**

## 17. DECALARATIONS ON NOISE.

The acoustic levels emitted by the MACHINE are inferior to 70 dB(A).

## 18. DECLARATIONS ON MECHANIAL VIBRATIONS.

The machine does not present any source of mechanical vibrations that cause risks to the health or safety of the operator.



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FABRICACIÓN DE MAQUINARIA PARA LA CONSTRUCCIÓN

ESPAÑA