



# INSTRUCTIONS BOOK

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## NON-MANDREL TUBE AND PIPE BENDER

### CC60CNC

NS: 2025-437



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PRADA NARGESA, S.L

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# NARGESA CLIENTS

Prada Nargesa has more than 12.200 customers around the world. Some of our clients, those who offer service to third parties with the Nargesa machinery in their workshops, have been pleased to be part of this network that aims to connect them with possible future clients. In this way, all those people or companies that have a need for any part or tool that can be manufactured by using the Nargesa range of machinery, will be able to find a solution in their area to be able to satisfy their production requirements by hiring their services.



**We have more than 12.200 customers in 150 different countries around the world**

Discover its location on the interactive map on our website!

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Send an email to [nargesa@nargesa.com](mailto:nargesa@nargesa.com), include the following information and we will add you to this list.

We want to encourage all those who haven't participated yet in this great commercial network!

1. Company name
2. CIF/Tax Code
3. City
4. Country
5. Machine or machines

# PRADA NARGESA

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Prada Nargesa S.L. is a family business founded in 1970 located near Barcelona, Spain, with more than 50 years of experience in the sector of manufacturing of industrial machinery, and more than 10.000m<sup>2</sup> of facilities. Nargesa is a symbol of quality, reliability, warranty and innovation.

Our whole range of machines and accessories is manufactured entirely in Nargesa. We have a constant stock of 400 machines, and we have more than 16.800 machines sold all over the world.



## OUR RANGE OF MACHINERY

Ironworker Machines

Ring Roller Bender and Pipe Bender

Non-mandrel Tube and Pipe Bender

Twisting / Scroll Bending Machines

Horizontal Press Brakes

End Wrought Iron Machines

Gas Forges

Iron Embossing Machines

Hydraulic Shear Machines

Hydraulic Press Brakes

Presses for Locks

Broaching Machines

Power Hammers

# CERTIFICATES

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Prada Nargesa has several certifications that backup both, the design and manufacturing processes, as well as the journey through exporting our products around the world and the quality of the manufacturing components we use for our machines. These facts turn into real advantages for our customers:



## AUTHORIZED EXPORTER

- Faster customs procedures
- Reduction of tariff documentation
- Tariff preferences according to geographical location



## INNOVATIVE SME

- Development in innovation, design and manufacturing technologies
- Certification and audit of efficiency in product and service
- Ability to foresee customer needs



## R+D+I MANAGEMENT

- Manufacturing based on the R+D+I process
- Technological surveillance system

# SUCCESS STORIES

At Prada Nargesa we believe that the testimony of our clients is our best guarantee, and that is why we like to expose some of the success stories that we have witnessed around the world:



Discover its location on the interactive map on our website!

## DO YOU WANT TO PARTICIPATE?

Send an email to [nargesa@nargesa.com](mailto:nargesa@nargesa.com) including the following information and we will add you to our website:

Company name  
Testimonial name  
Post in the Company  
Country  
Descriptive text  
Photography with the machine

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## TECHNICAL ANNEXES

## 1. MACHINE DETAILS

### 1.1. Machine Identification

Make	NARGESA
Type	Non-Mandrel Pipe Bender
Model	CC60CNC

### 1.2. Dimensions

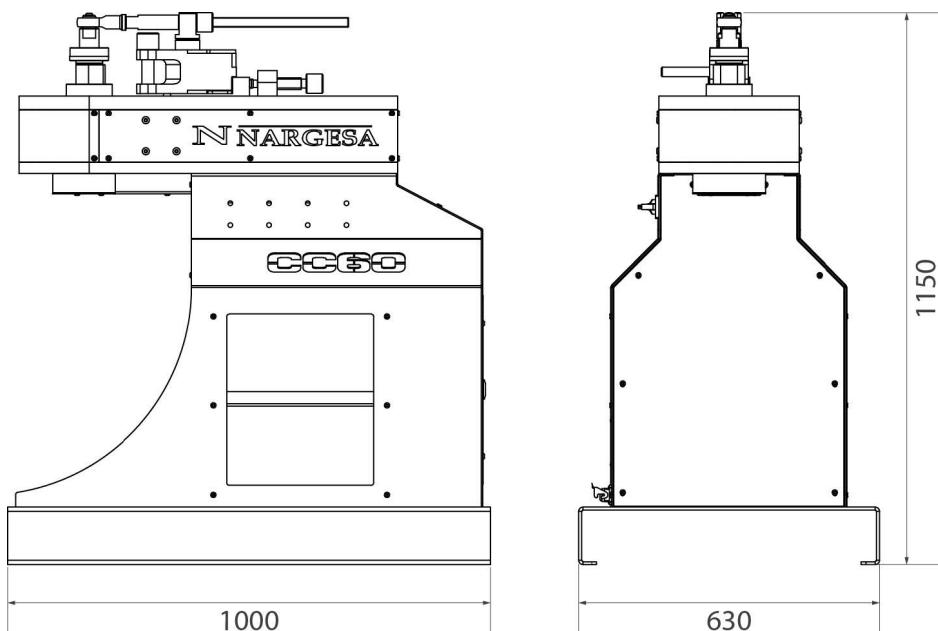


Figure 1.Outside Dimensions of Bender CC60CNC

### 1.3. Description of the Machine

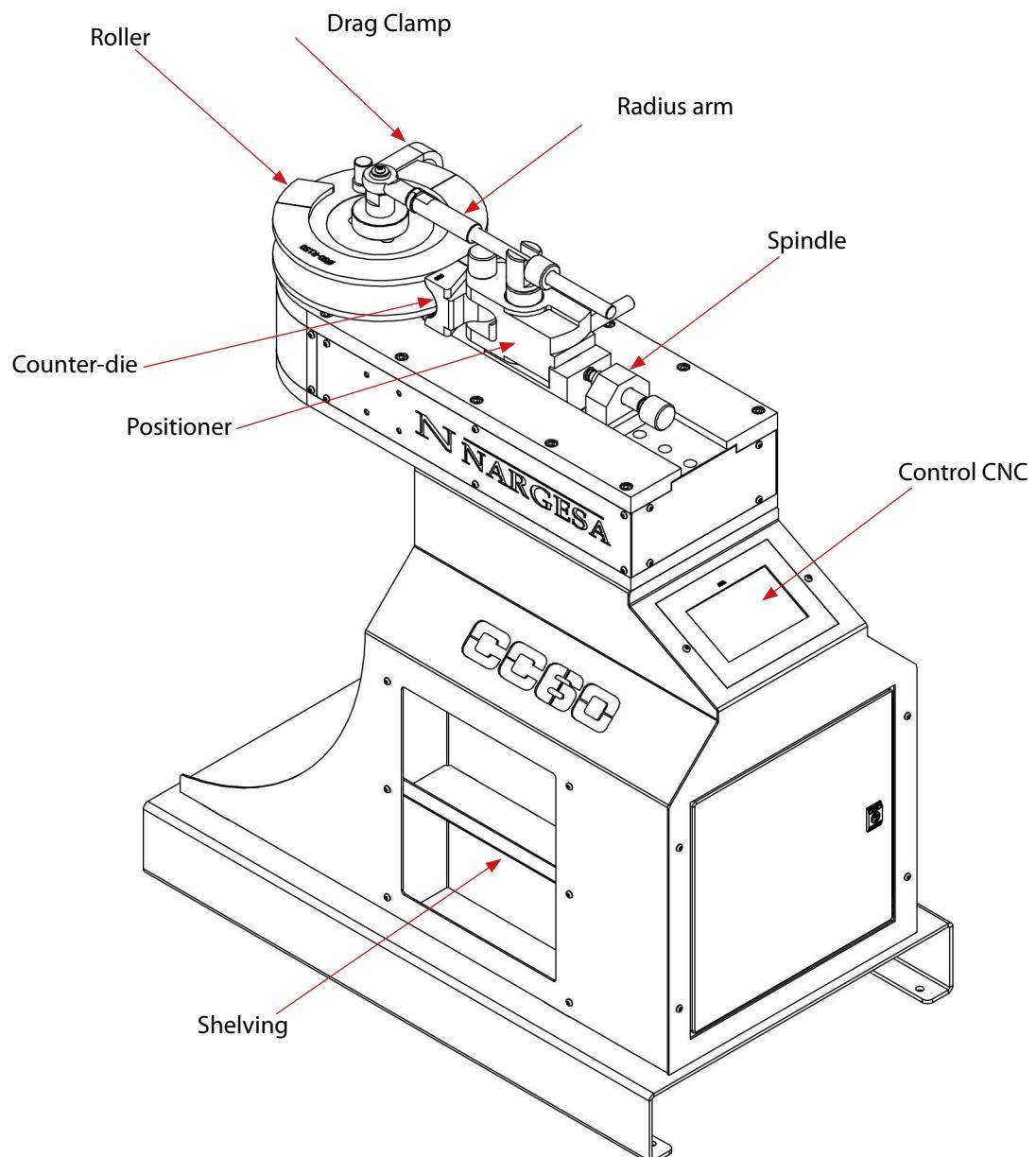
The non-mandrel pipe bender CC60CNC is a machine specifically designed to bend profiles, mainly metal ones, of different thicknesses and configurations: pipes, solid profiles, T-profiles, angles...

The bender comes standard with a radius arm that must be used to bend thicker pipes of larger diameters.

Besides standard rollers, PRADA NARGESA manufactures different types of additional rollers for all types of bending based on the configuration of the material to be worked.

**PRADA NARGESA S.L. is not liable for any damages that may be caused due to improper use or a breach of the safety rules by users.**

#### 1.4. Machine Parts





## 1.5. Características generales

<b>Reference</b>	<b>100-17-01-001</b>
<b>Engine power</b>	<b>1,1 KW / 1,5 CV</b>
<b>Single-phase tension</b>	<b>230 V Single-phase 50/60 Hz</b>
<b>Automatic rotation speed</b>	<b>From 1,1 a 3,5 r.p.m.</b>
<b>Intensity</b>	<b>4,5 A</b>
<b>Minimum radius of curvature</b>	<b>3 times the pipe diameter</b>
<b>Maximum radius of curvature</b>	<b>320 mm</b>
<b>Maximum working stroke on round steel pipe</b>	<b>60,3mm o 2" Schedule-40 o 2" 1/4 x 4mm.</b>
<b>Maximum angle of curvature</b>	<b>180°</b>
<b>Dimensions</b>	<b>630x1000x1150 mm</b>
<b>Weight</b>	<b>365 Kg</b>

## 1.6. Description of the Guards

The gear box and all the gears enabling the machine to operate are inside the main structure which protects the mechanisms.

Despite the fact the main moving parts are protected by the front cover, special precaution must be taken when bending to prevent entrapment between the die, counter-die and part.

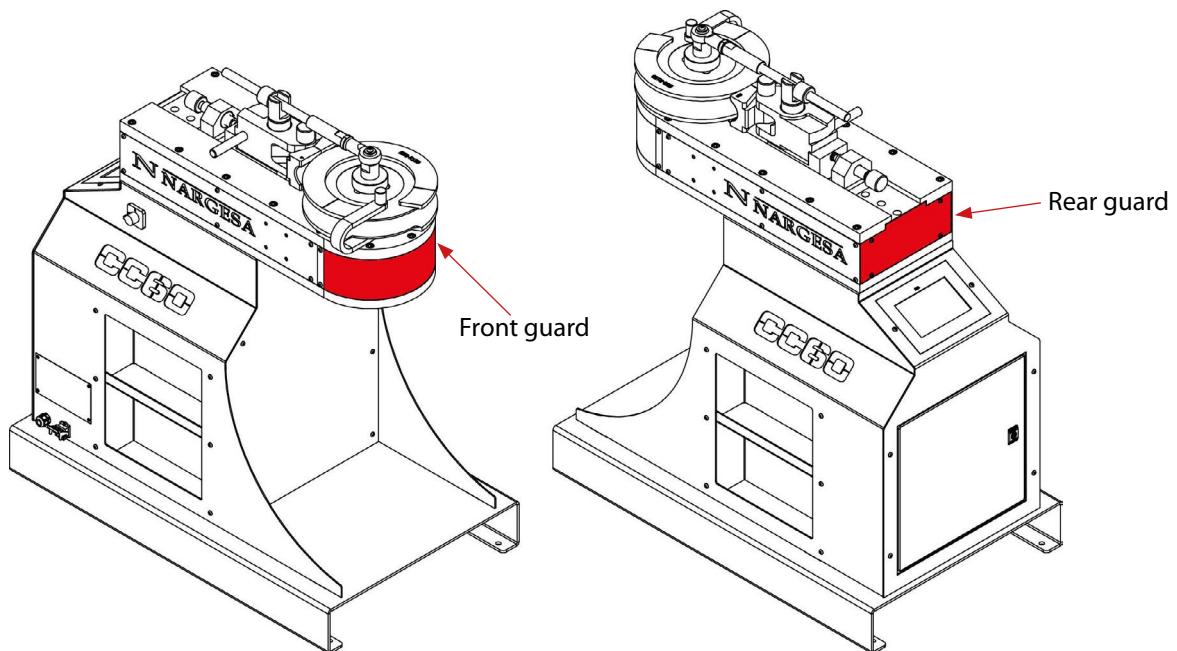


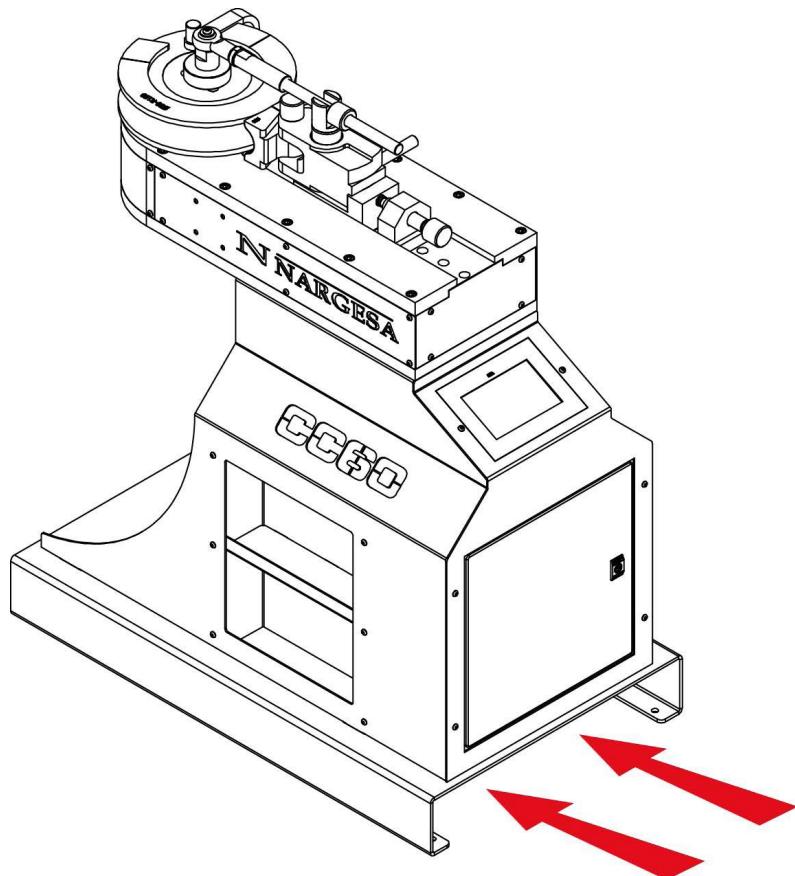
Figure 3. Mechanism Protection Guards

## 2. TRANSPORT AND STORAGE

### 2.1. Transport

The machine should be transported as follows:

- Along the bottom at the base of the machine using a forklift or lift truck as indicated in the illustration.
- Never raise the machine more than 200 mm off the ground or it may tip over.



*Figure 4. Transport of the machine*

### 2.2. Storage Conditions

The pipe bender may not be stored anywhere that does not meet the following requirements:

- Humidity of 30% to 95%
- A temperature of -25°C to 55°C or 75°C over periods not to exceed 24 hours (please remember these temperature are for storage conditions)
- Do not pile machines or place any heavy objects on top
- Do not dismantle for storage

### 3. MAINTENANCE

#### 3.1. Greasing the Moving Parts

Keeping the moving parts on the machine clean whenever possible is recommended to ensure proper operation and extend the service life.

To grease the pinions on the CC60CNC, do as follows:

- Remove the front guard and rear guard to access the pinions.
- Apply grease to the teeth of the pinions using a brush or spatula.
- Distribute the grease evenly without creating any excess or accumulation.
- Grease the machine periodically depending on the use. Recommended by the manufacturer: once a year.

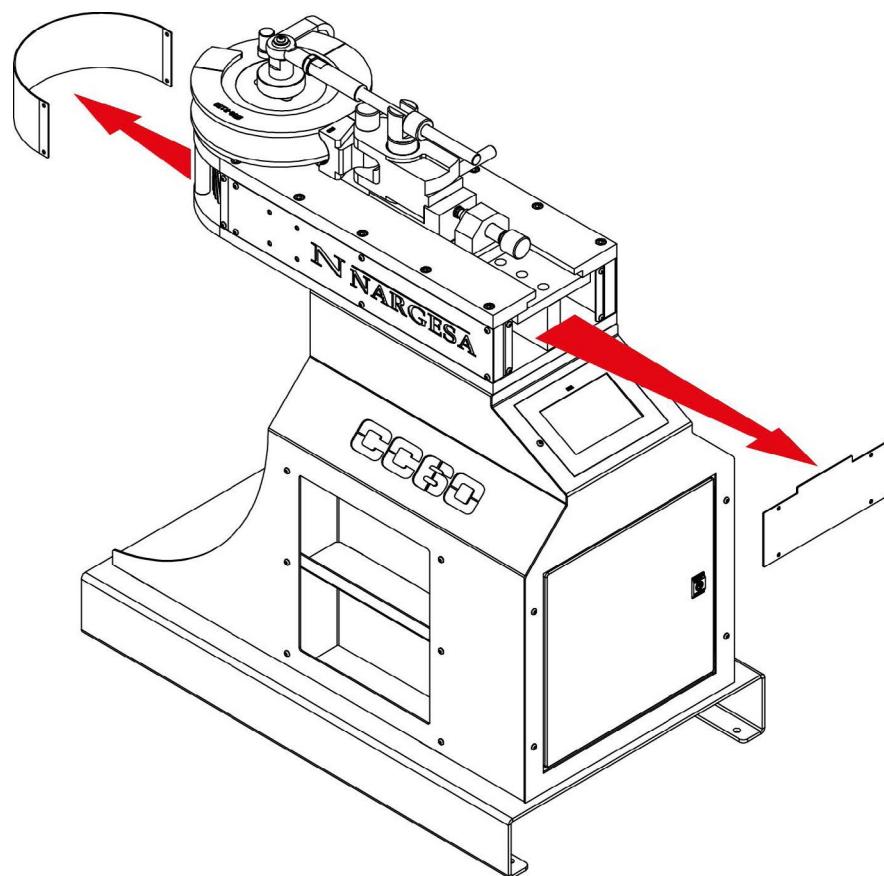


Figure 5. Greasing the Moving Parts

**ATTENTION: To grease the machine, you must stop the machine and press the "Emergency Stop" button.**

## 4. INSTALLATION AND START UP

### 4.1. Machine Location

Try to position the machine in the proper location so that it does not have to be moved; otherwise, following the steps described in the transport section (no. 2). Position over a smooth, level surface to prevent vibrations and movements during bending operations.

The machine can be secured with bolts as it comes with a base or pedestal on the bottom with four holes as shown in the following figure.

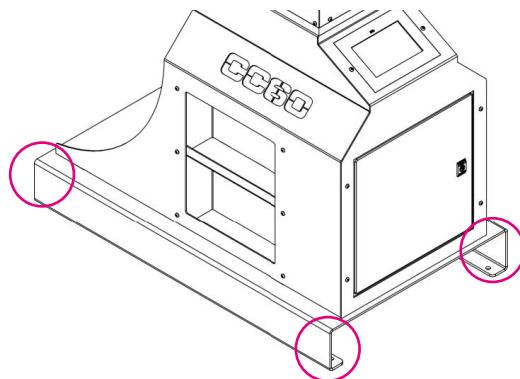


Figure 6. Anchoring points on the machine

### 4.2. Dimensions and Work Area

Take the dimensions, operator work area and the lengths of any materials to be worked into consideration when positioning the machine.

The pipe bender may be used by a single operator who must stand on one of the two sides of the machine to control the materials during processing.

Before starting the bending process, the operator shall adjust the roller and counter-die to the material while the machine is off.

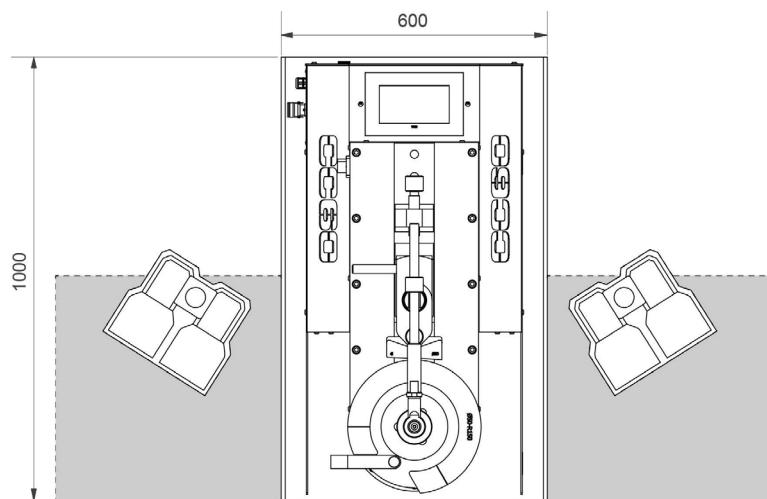


Figure 7. Operator's work area

### 4.3. Acceptable External Conditions

- A room temperature of between +5 °C and +40 °C without exceeding an average temperature of +35 °C over 24 hours.
- Moisture between 30% and 90% without water condensation.

#### 4.4. Instructions for Electrical Connection

**IMPORTANT**

**This machine must be connected to an earthed socket.**

The pipe bender CC60CNC is equipped with a 230 V 1.1 kw engine for operation with the Roller. The machine must be connected to 220 V compatible supply voltage compliant with the requirements specified.

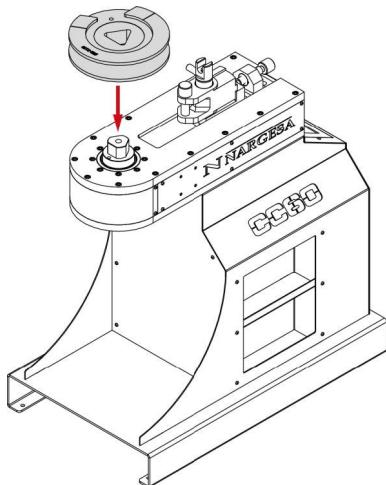
**Before making any change in the wiring or the electric panel,  
you need to make sure the machine is not connected to the power supply system.**

## 5. INSTRUCTIONS FOR USE

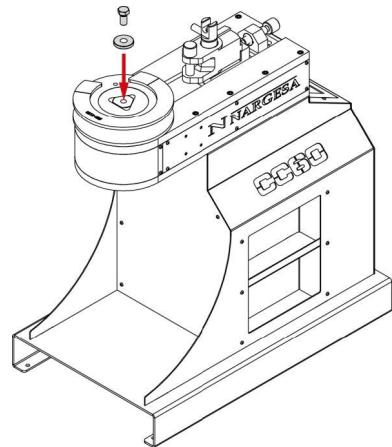
### 5.1. Assembling the Roller and Counter-Die

The roller shall be assembled as follows:

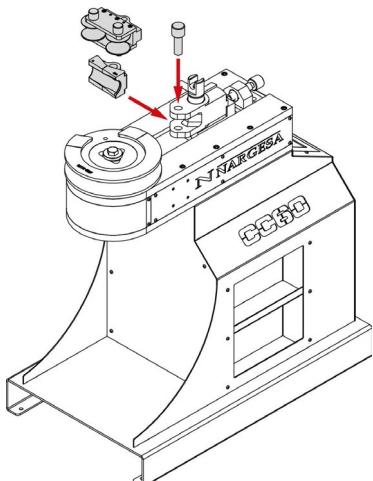
1. Place the roller in the machine axis. The built-in centring pin will prevent an incorrect position.



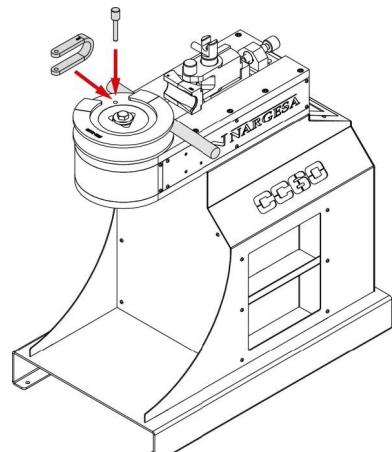
2. Secure the roller with the washer and screw.



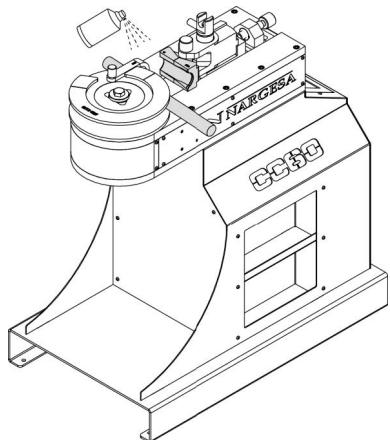
3. Put the counter-die or support rollers in the positioner and secure.



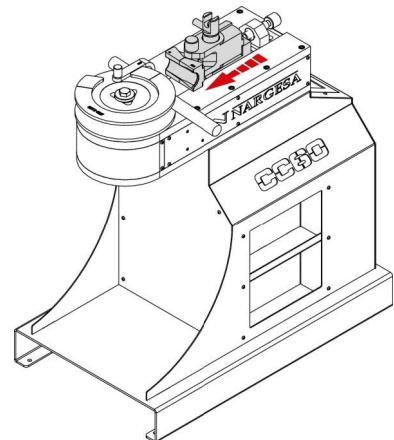
4. Put the material in the roller guide and secure to the drag clamp.



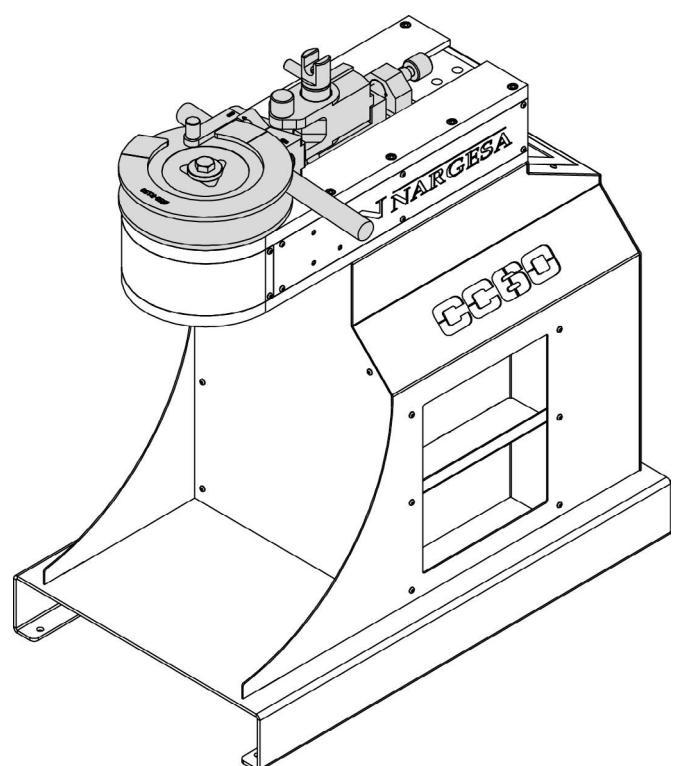
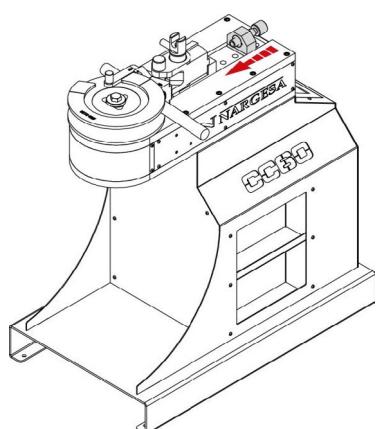
5. Lubricate the pipe and the counter-die with BEND8 spray.



6. Slide the counter-die positioner until adjusted to the material.



7. Secure the positioning spindle with your hands to the machine table.



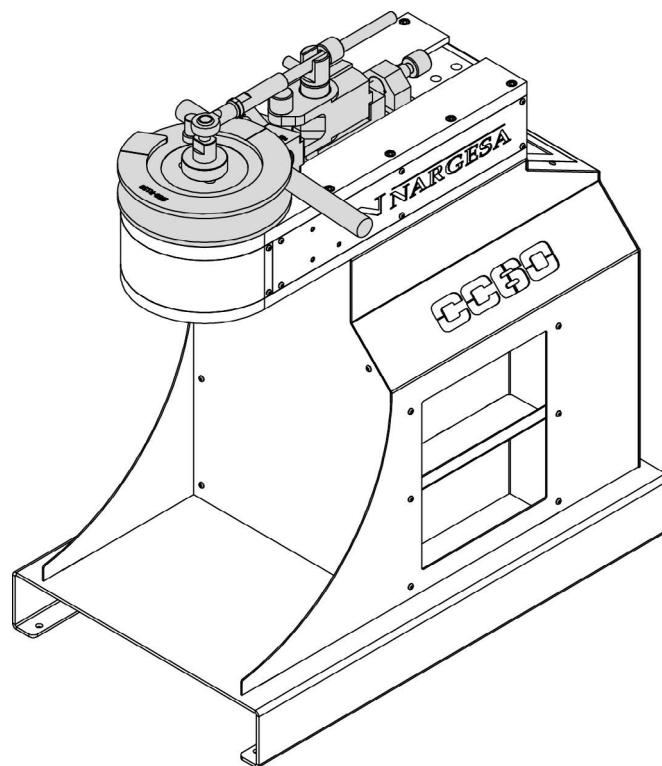
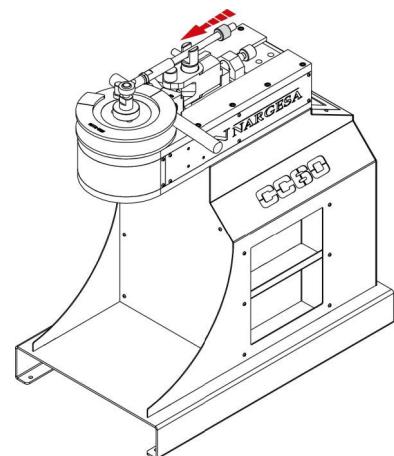
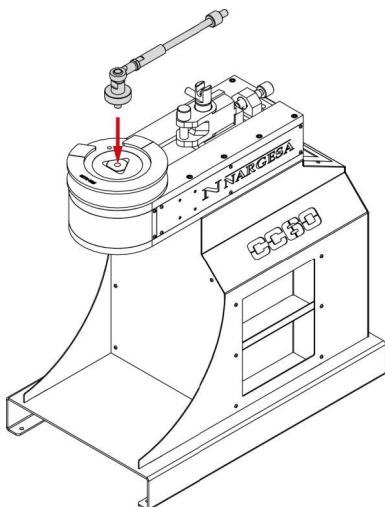
## 5.2. Assembling the Radius Arm

If the radius arm must be used, switch step 2 with 2A as explained below.

And follow step 7 with number 8 as explained below.

2A. Secure the roller with the radius arm.

8. Place the radius arm in the positioner channel and adjust the nut with your hands until secure and fixed.

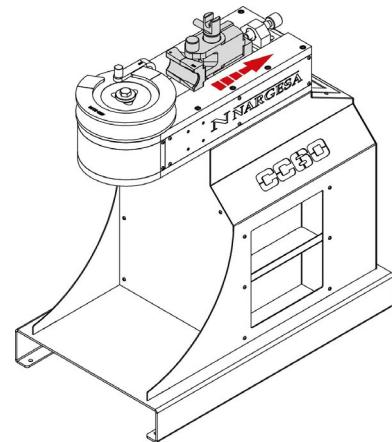
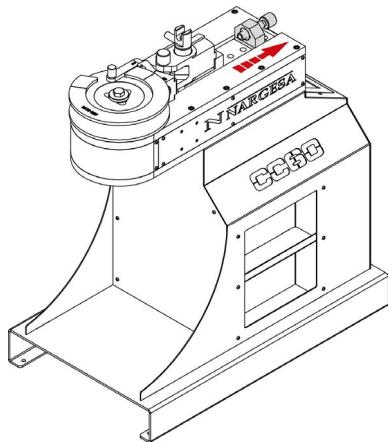


### 5.3. Changing the Rotation Direction

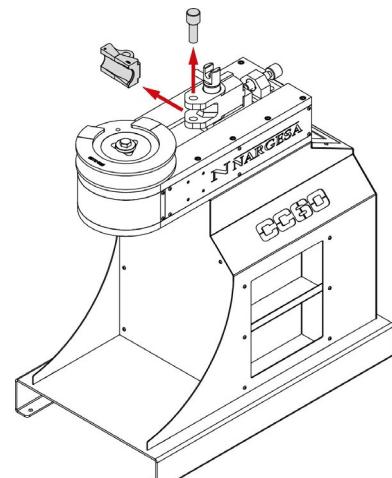
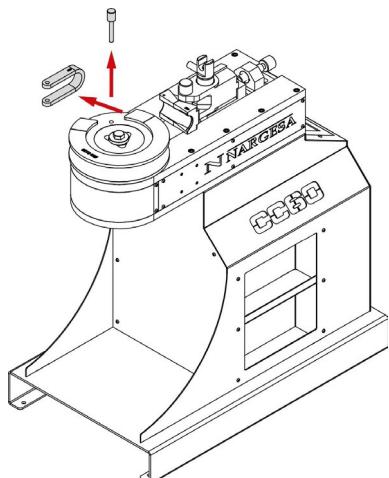
The non-mandrel pipe bender CC60CNC is programmed to rotate counter-clockwise. When the rotation direction must be changed, make the following position changes:

**IMPORTANT**  
**Remove the material from the machine to make this change.**

1. Remove the positioning spindle.
2. Remove the positioner and counter-die.



3. Remove the drag clamp.
4. Remove the counter-die.

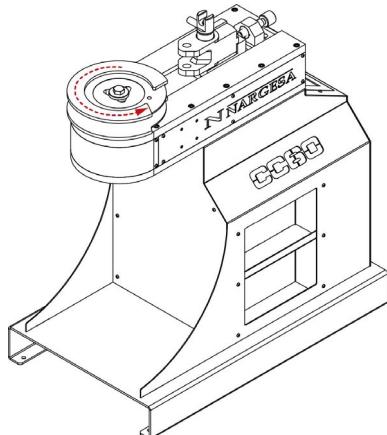


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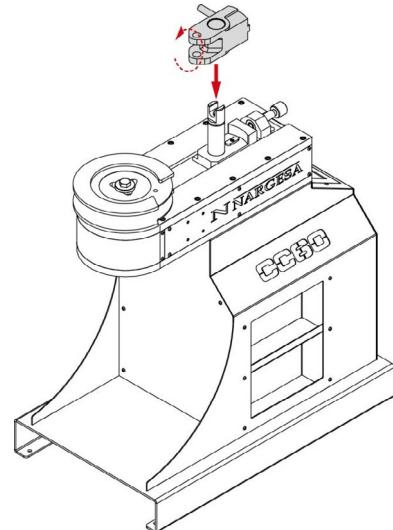
## NON-MANDREL TUBE AND PIPE BENDER CC60CNC

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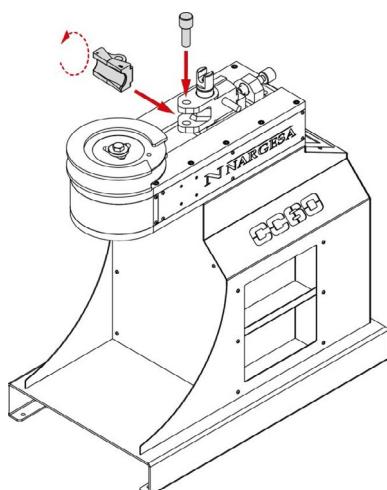
5. Position the roller with the CNC. See section 5.8. Rotation Direction.



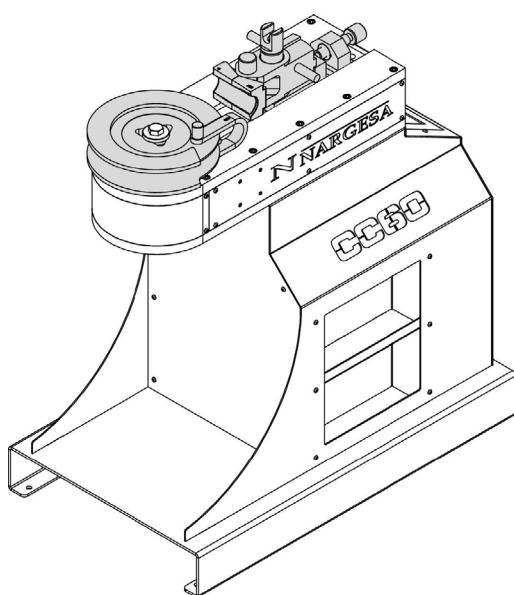
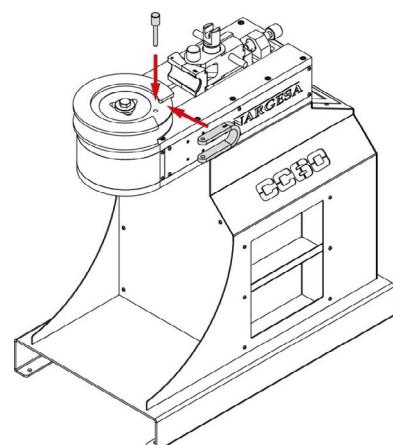
6. Turn the positioner 180° degrees and insert it back in the carriage.



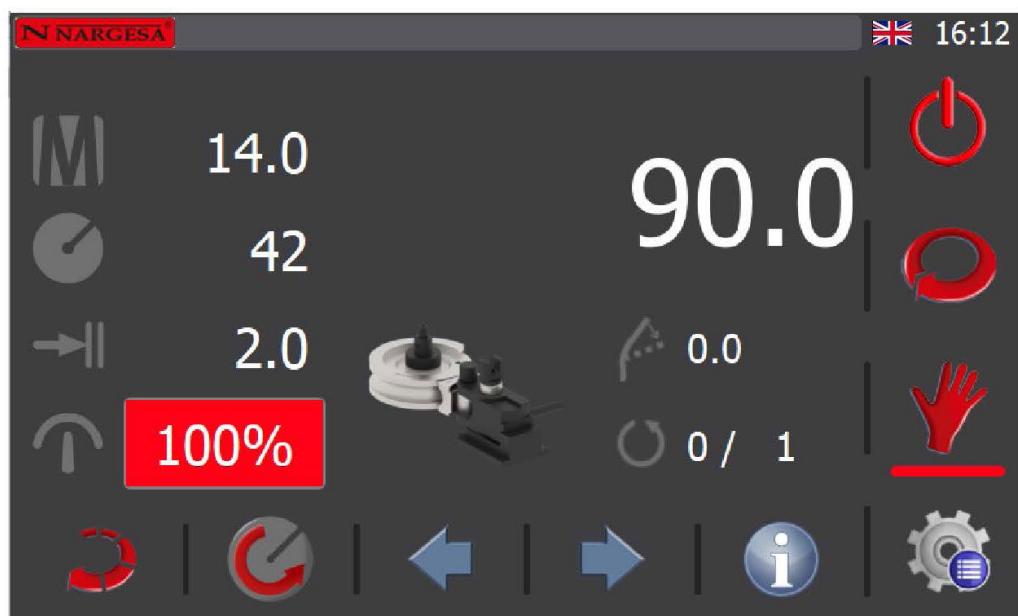
7. Rotate the counter-die 180° and secure with the pin.



8. Put the drag clamp back on.



#### 5.4. Control Panel



 On

 Diameter of the material

 Automatic

 Roller Radius

 Manual

 Operating speed

 Menu

 Thickness of the material

 Manual rotation to the right

 Corrector

 Rotation direction to the left

 Part counter

 Rotation direction to the right

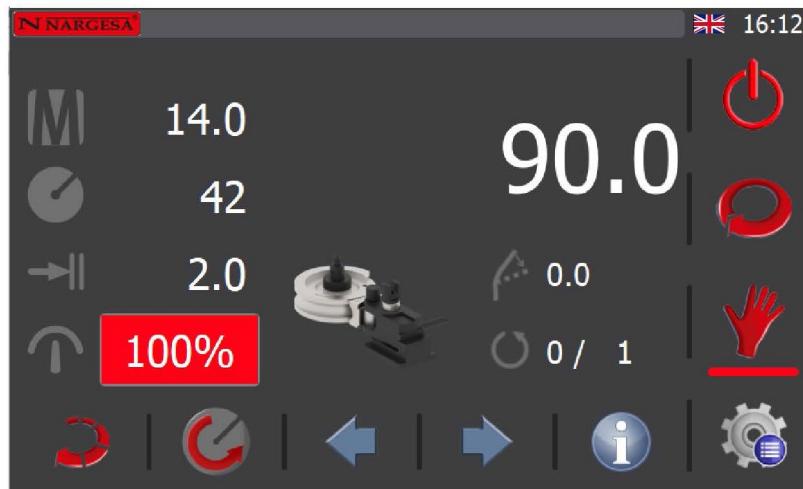
 Repetitions

 Automatic unlocking

 Manual rotation to the left

## 5.5. Manual Mode

To turn on the machine, place the Start Switch in the Connected position. The initial interface appears on the screen:



The machine is now in Standby; in other words, the machine is active yet at rest waiting for any operation order.

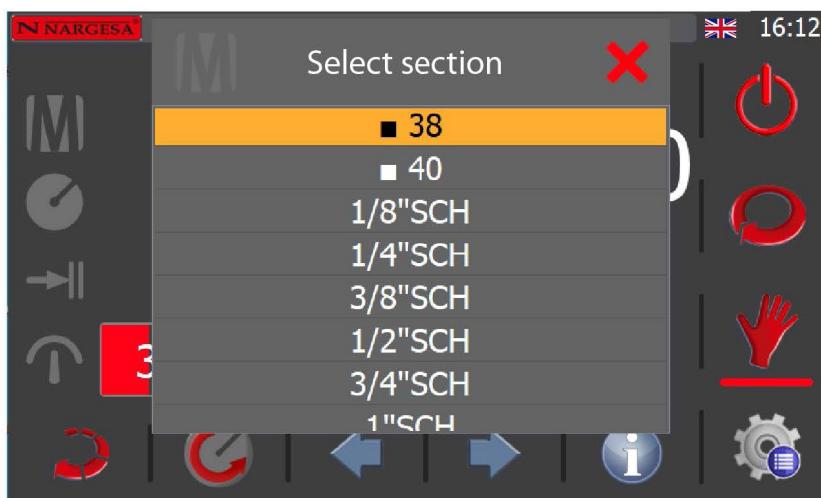
The CC60CNC is already started and in Standby. To activate it, follow the steps indicated below.

Enter the following operating details:

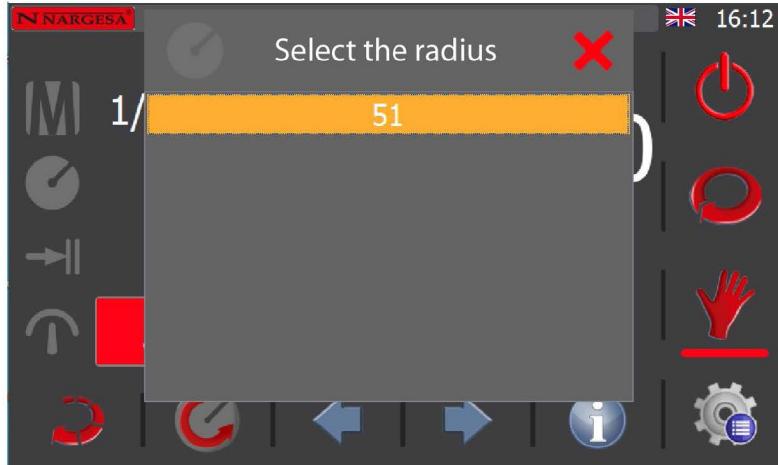
- Diameter of the material
- Roller radius
- Thickness of the material
- Bending angle

Press each of the items on the screen to enter all these parameters.

Press **M** the key to choose the diameter of the material to be curved:



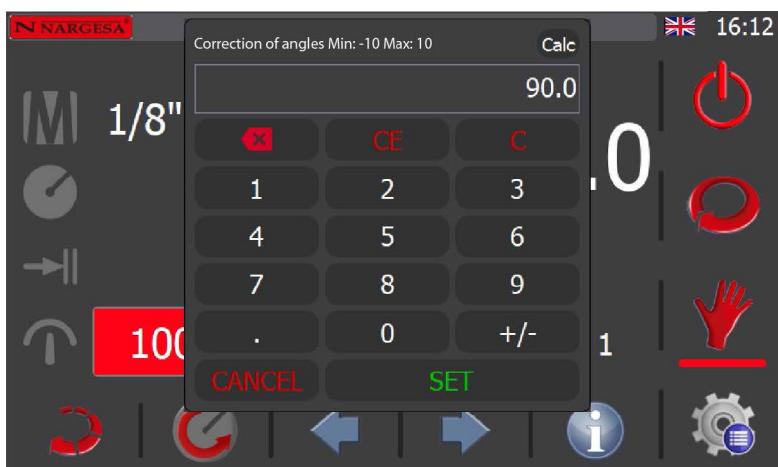
Press  to choose the roller radius.



Press  to choose the thickness of the material:



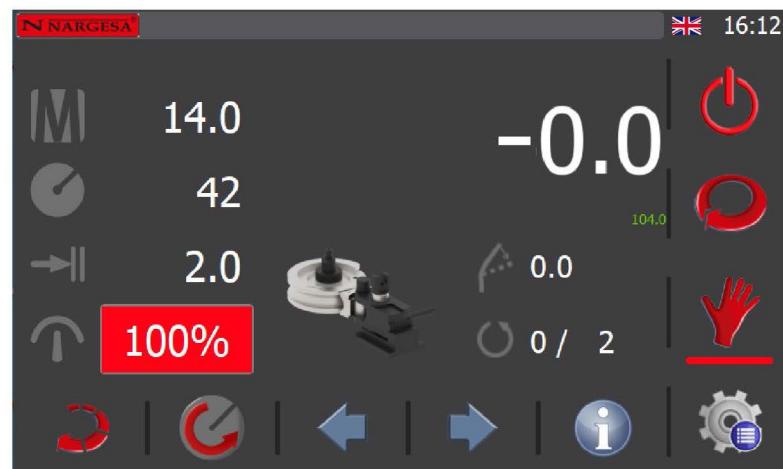
To determine the bending angle, press the number that appears at the top right of the screen and enter the value; in this case, 90 degrees. Press  to accept and  to start the machine.





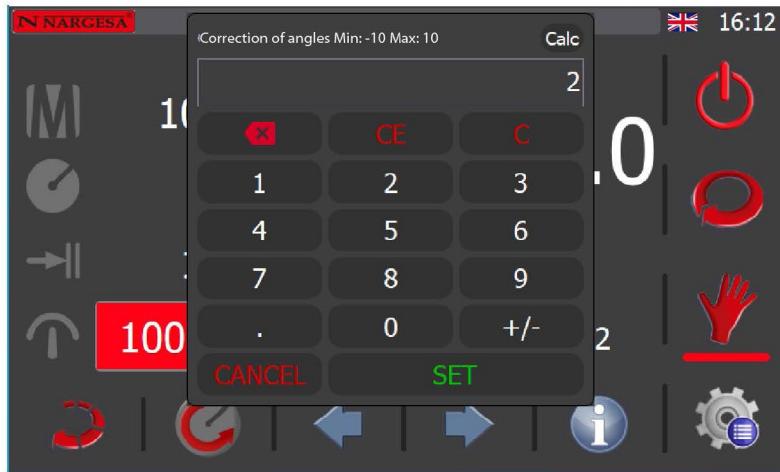
The machine will work at minimum speed based on the parameters entered.

If necessary, enable the automatic unlocking option by pressing the icon . This means the machine will automatically unlock by rotating in the opposite bending direction, going back to the starting point. If it is not necessary, disable this icon.



## 5.6. Angle Correction

If the curving angle needs to be corrected, you must stop the curving process and indicate the necessary correction. Press the icon and enter the number of degrees required for correction; in this case, 2 degrees.



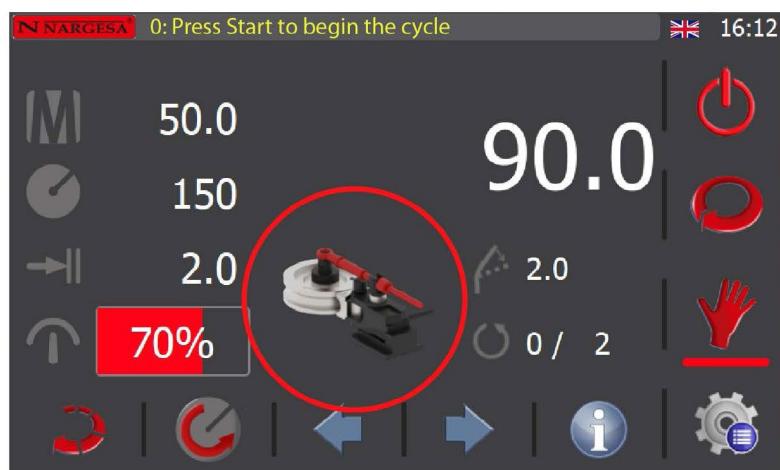
Confirm by pressing the key **SET** and proceed with another curve. You must press  again to start the cycle

## 5.7. Radius Arm

If a large-size pipe is selected, the machine indicates you must install the radius arm. Example:

A pipe with a diameter of 50 mm, a roller radius of 150 and pipe thickness of 2 mm .

If this part must be installed, the icon indicated will appear on the screen:



Install the Radius arm by following the instructions in Section 5.2. Assembling the Radius Arm.

**IMPORTANT: Whenever the machine indicates the Radius arm is necessary, it must be installed.**  
**Not installing it could cause irreparable damages to the machine.**

## 5.8. Part Counter

Another function on the machine is the part counter.

To activate it, press the number that appears to the right of the icon  and add the number of curves you wish to make. In this case, 25.

Confirm by pressing the  key.



The second number in this field indicates the curves already made

If the part counter is not used, enter a 0 for this parameter. The machine will do the same curve an infinite number of times.

## 5.9. Rotation Direction

Bender CC60CNC is unique in that it can operate in the two rotation directions. This feature is essential for parts that may collide against the machine.

**IMPORTANT:** Before making the rotation change, you must remove the Counter-die and Drag Clamp to make sure there is no pipe in the machine.

To proceed with the change in rotation direction, press the rotation direction change key. .



Confirm by pressing.  A message appears indicating that you must move the roller to position 0.



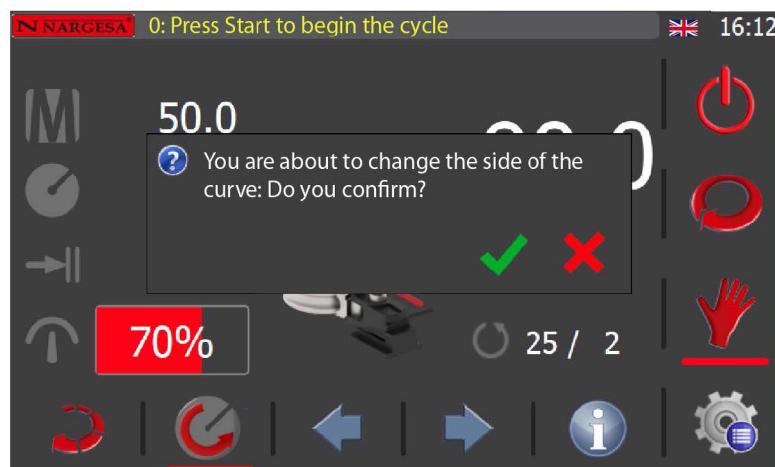
Press the  key so the roller rotates to the zero position



Upon making the rotation change, the machine maintains the same program and the same parameters; it only changes the direction of rotation.

**IMPORTANT:** once the rotation change is made, the counter-die and drag clamp must be installed for curving. See section **5.3. Rotation Direction Change**.

If you want to reverse the rotation direction, just repeat the process by pressing the  key..



Accept and proceed in the same way by pressing the  key until the machine reaches the zero position.

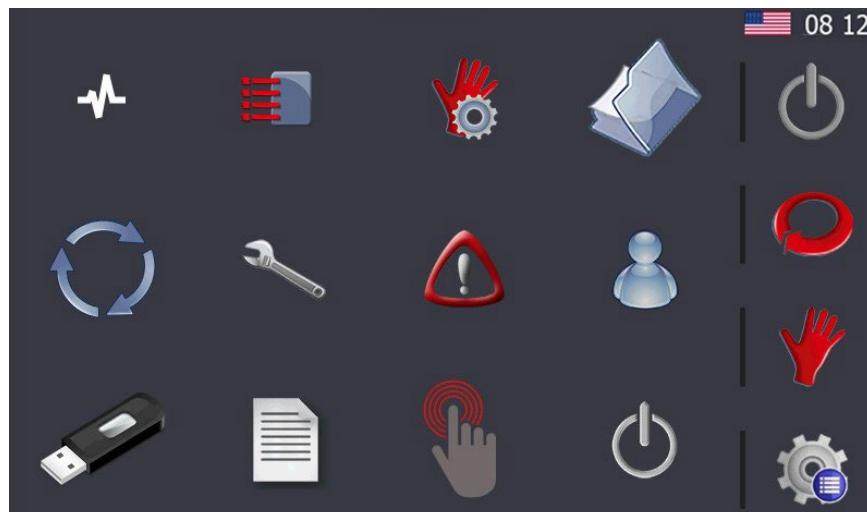
**ATTENTION:** if you do not complete all the steps in the rotation change process, the machine will continue using the previously set rotation direction.

## 5.10. Correction Tables

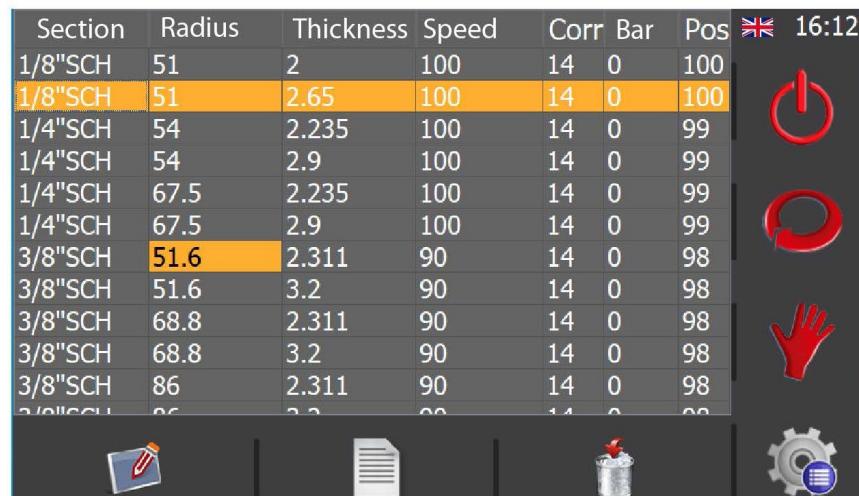
**IMPORTANT:** Pipes come in different thicknesses and roughnesses depending on the pipe manufacturer and the country where they are manufactured.

Nargesa has added a capability table to the machine which may be edited and updated. This table may be modified by the customer to adjust the correction levels based on the material processed.

To access the corrections table, press the  key. The following screen will appear:



Press the  key to access the corrections menu:



Section	Radius	Thickness	Speed	Corr	Bar	Pos	UK	16:12
1/8"SCH	51	2	100	14	0	100		
1/8"SCH	51	2.65	100	14	0	100		
1/4"SCH	54	2.235	100	14	0	99		
1/4"SCH	54	2.9	100	14	0	99		
1/4"SCH	67.5	2.235	100	14	0	99		
1/4"SCH	67.5	2.9	100	14	0	99		
3/8"SCH	51.6	2.311	90	14	0	98		
3/8"SCH	51.6	3.2	90	14	0	98		
3/8"SCH	68.8	2.311	90	14	0	98		
3/8"SCH	68.8	3.2	90	14	0	98		
3/8"SCH	86	2.311	90	14	0	98		
3/8"SCH	86	3.2	90	14	0	98		

This screen shows the factory-set parameters: Section, Radius, Thickness, Speed, Corrector, Bar and Position.

Pipes can be corrected with these tables.

To add the parameters for a new pipe, press the key  and complete the fields:

Section	Radius	Thickness	Speed	Corr	Bar	Pos	UK 16:12
1/8"SCH	51	2	100	14	0	100	
1/8"SCH	51					100	
1/4"SCH	54					99	
1/4"SCH	54					99	
1/4"SCH	67.5					99	
1/4"SCH	67.5					99	
3/8"SCH	51.6					98	
3/8"SCH	51.6					98	
3/8"SCH	68.8					98	
3/8"SCH	68.8					98	
3/8"SCH	86					98	
2/8"SCH	86					98	

Section  
 Radius  
 Thickness  
 Speed  
 Corr  
 Bar  
 Pos










Section: refers to the pipe diameter.

Radius: refers to the radius of the roller.

Thickness: refers to the pipe thickness.

Speed: refers to the maximum pipe curving speed.

Corr: refers to the correction required for the roller.

Bar: refers to the need to use the radius arm.

Pos: refers to the position of this new pipe on the list of materials.

Section	Radius	Thickness	Speed	Corr	Bar	Pos	UK 16:12
1/8"SCH	51	2	100	14	0	100	
1/8"SCH	51					100	
1/4"SCH	54					99	
1/4"SCH	54					99	
1/4"SCH	67.5					99	
1/4"SCH	67.5					99	
3/8"SCH	51.6					98	
3/8"SCH	51.6					98	
3/8"SCH	68.8					98	
3/8"SCH	68.8					98	
3/8"SCH	86					98	
2/8"SCH	86					98	

Section  
 Radius  
 Thickness  
 Speed  
 Corr  
 Bar  
 Pos







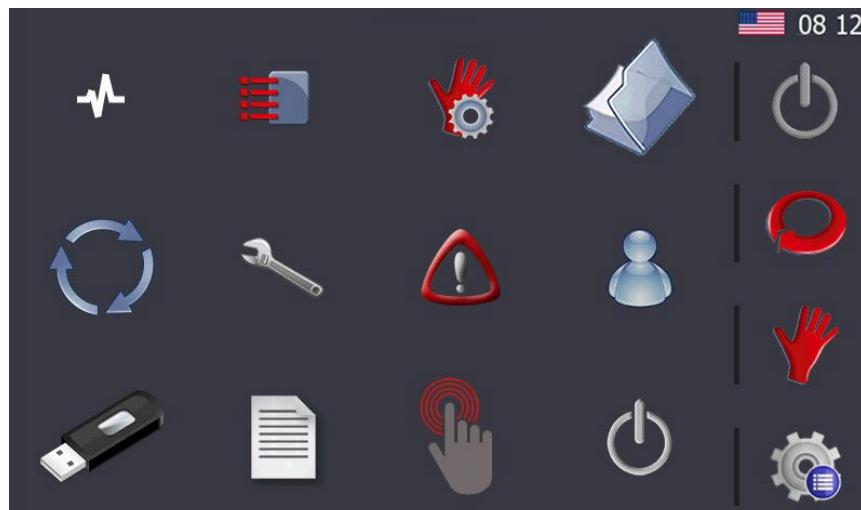



The changes are saved upon accepting and will be effective immediately.

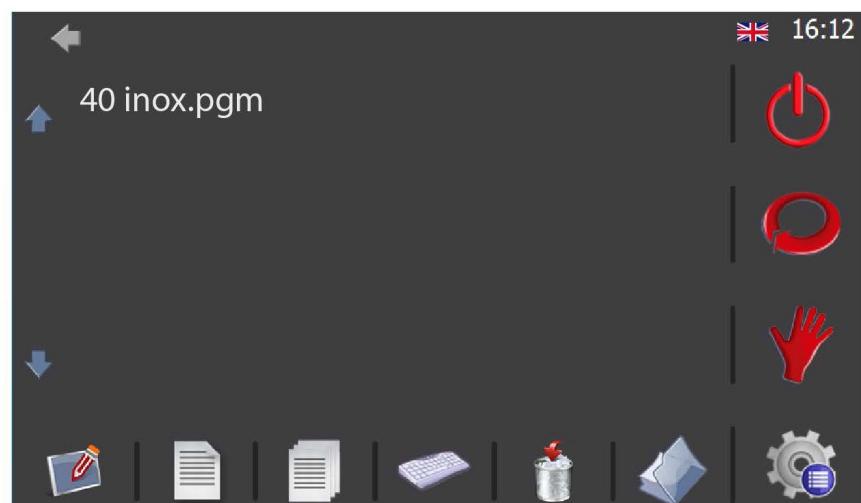
## 5.11. Automatic Mode

This operating mode makes it possible to make curves with different curve angles on the same piece. This model also enables saving programs in the CNC to be used whenever needed.

To generate a new program, press the  key and this screen will appear:

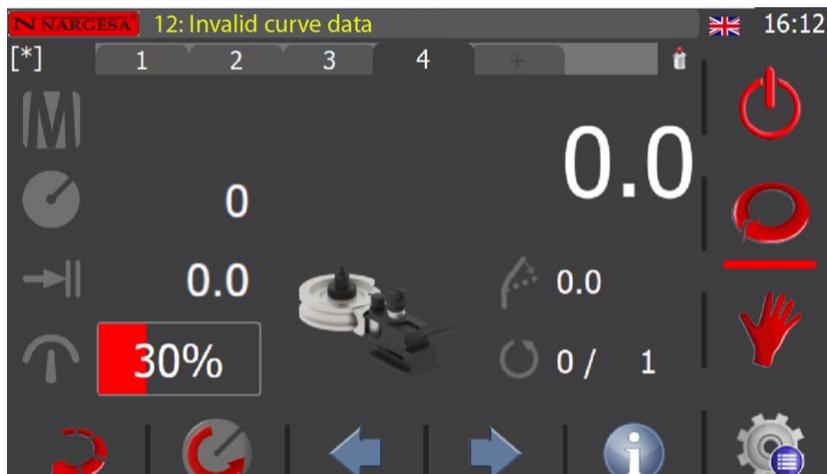


Press the  key and this will appear on the screen:



Edit the programs from the interface: generate a new program, modify it, generate new folders or delete them.

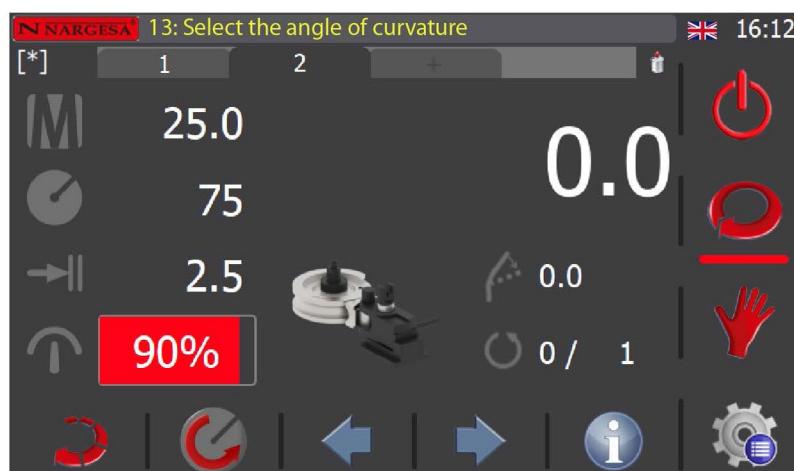
To generate a new program, press the  key. After pressing it, this screen will appear:



Complete the parameters just like in Manual Mode: enter the pipe section, the radius of the roller, the pipe thickness, the number of pieces needed and the curve angle.



Now add a new curve in the same program. To do so, press the + key at the top of the screen.



**IMPORTANT:** The general data are the same for the entire program; in other words, if they are changed for a specific curve, they will be changed for the entire program.

Enter the angle at which you wish to make the curve in the second operation; in this case, 45 degrees.

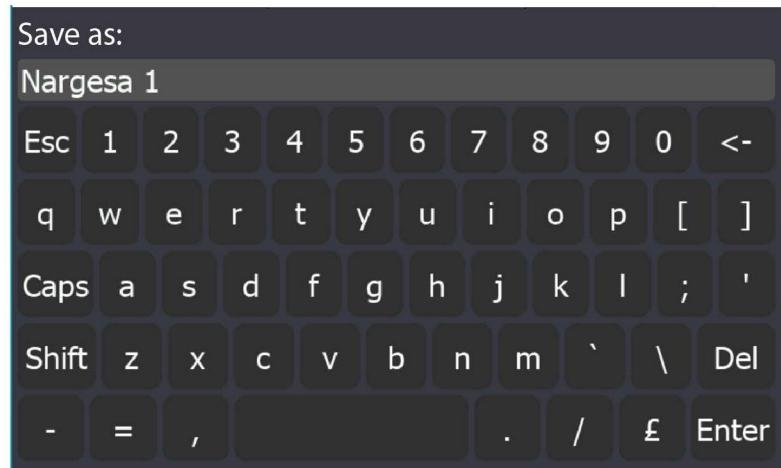
Now, the program has two curves programmed, the first at 90 degrees and the second at 45 degrees.

Add all curves needed by pressing the + key and enter a new radius of curving.



For cases where you must make two curves at the same degrees, a new operation does not need to be added to the program. Use the repetition tool by pressing the  icon and add the number of times this curve should be repeated. In this case, the machine will make 3 curves at 45 degrees as part of the number 2 curving in the program.

Save the program by pressing the [\*] icon at the top right of the screen.

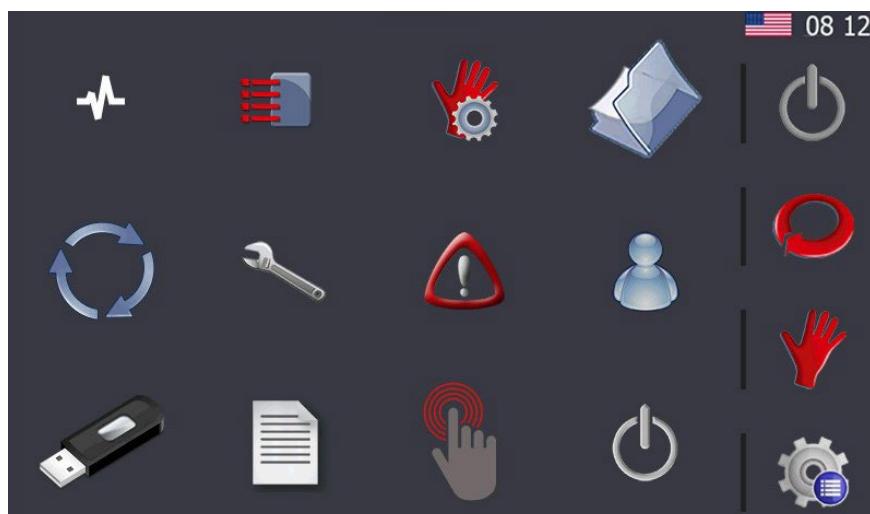


Enter a name for the program and press Enter.

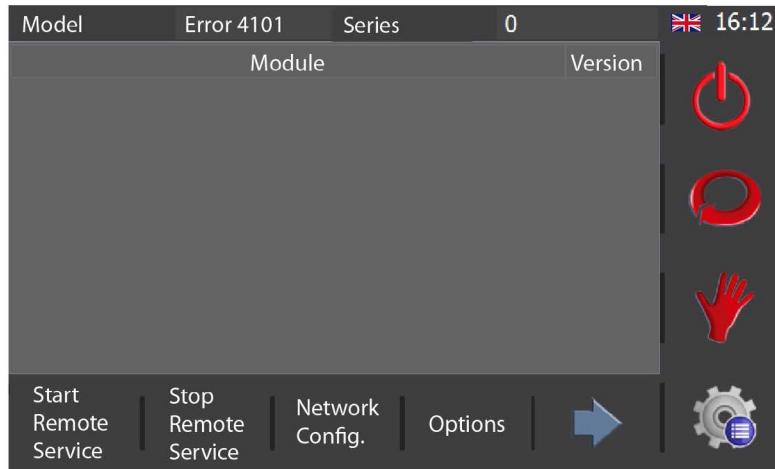
### 5.12. Remote Service

The bender is ready to be connected to ethernet via the cable supplied for this purpose. The IP address in the local network is 10.10.51.110, which is factory-set. This also makes it possible to configure a remote service for the machine.

This service allows Nargesa, as the bender manufacturer, to connect remotely to the machine to resolve technical incidents and provide the end customer with distance training.



To activate the remote service, press the  key to access the menu window.

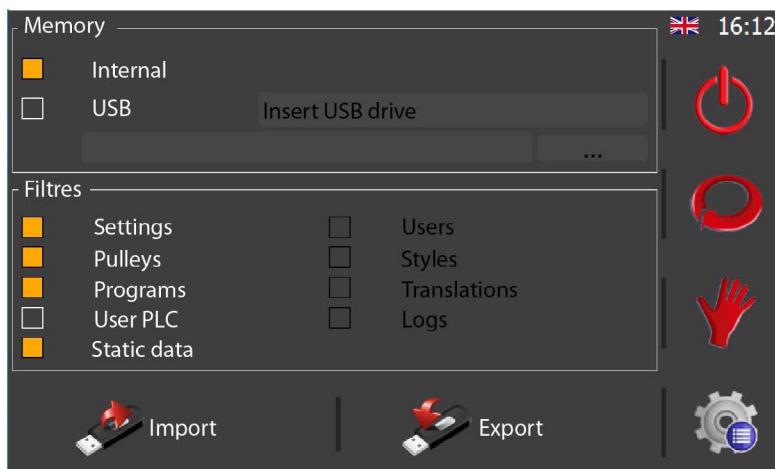


The information shown in the figure above refers to the model and serial number for the bender control as well as the versions of the different digital libraries used in the user interface.

To activate the remote service so the Nargesa technical assistance department may connect to the machine to resolve incidents and/or provide distance training, you need to press .

### 5.13. Import/Export Parameters, Materials and Programs

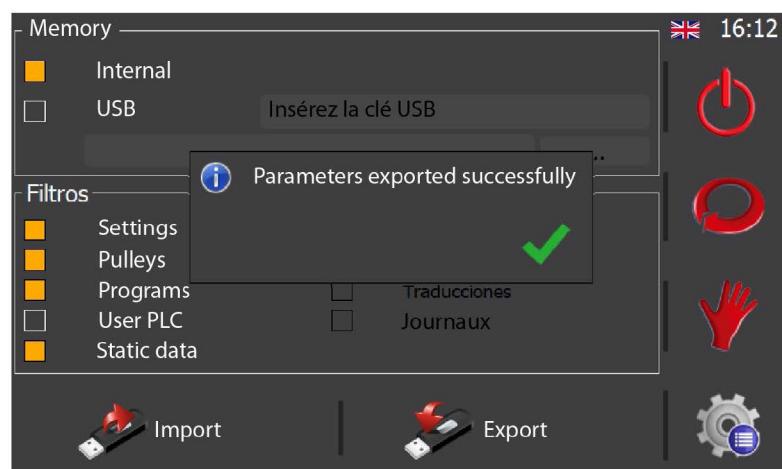
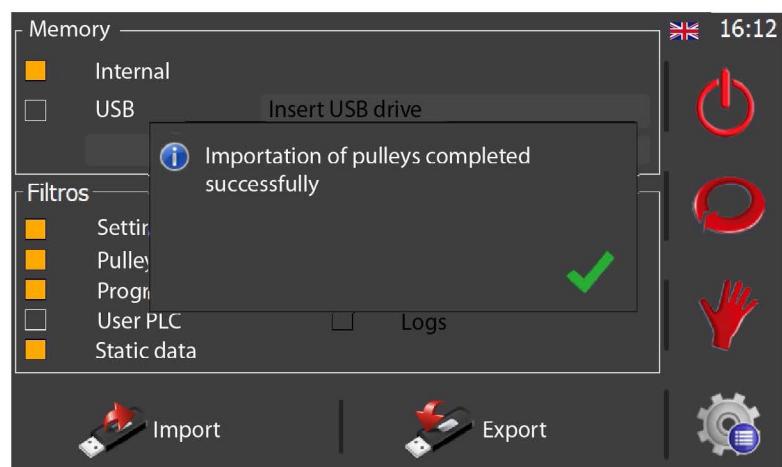
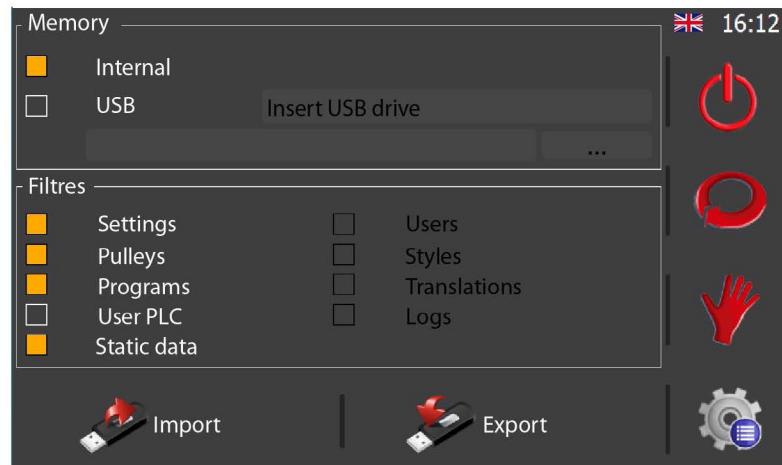
All the bender configuration parameters as well as the materials defined and programs created can be imported and exported to create backup copies.



To access the window shown in the figure above, you must press the  key. Once you access the menu screen, you must press the key .

All filters are activated by default as well as the internal memory option. If you now press , all the parameters, materials and programs will be saved in the internal shear control memory and a backup copy will be made. If you would like to make a backup copy on an external device such as a USB flash drive, you must mark the USB option and press again.

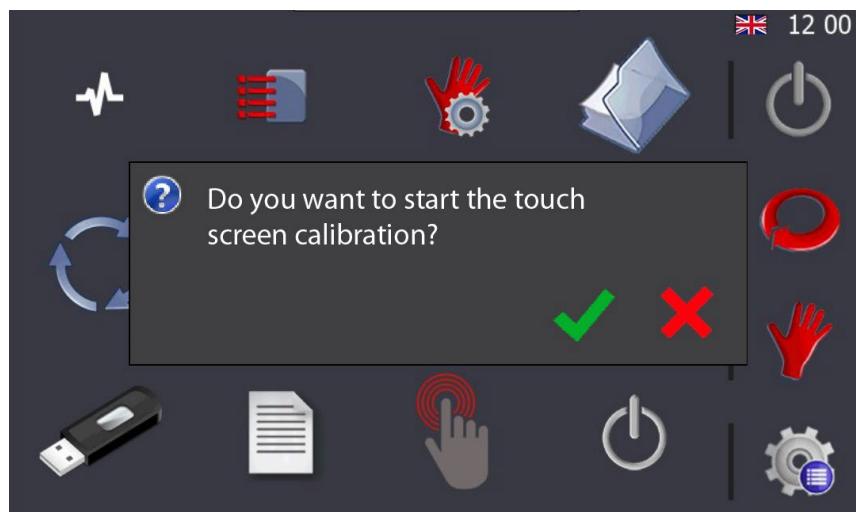
It's important to make backup copies frequently to ensure you have the parameters, materials and programs created saved. If you need to recover all or part of this information at any time, just select the data source (internal memory or USB flash drive) and press  . Upon doing so, the sequence of information present on the screen will be as follows:



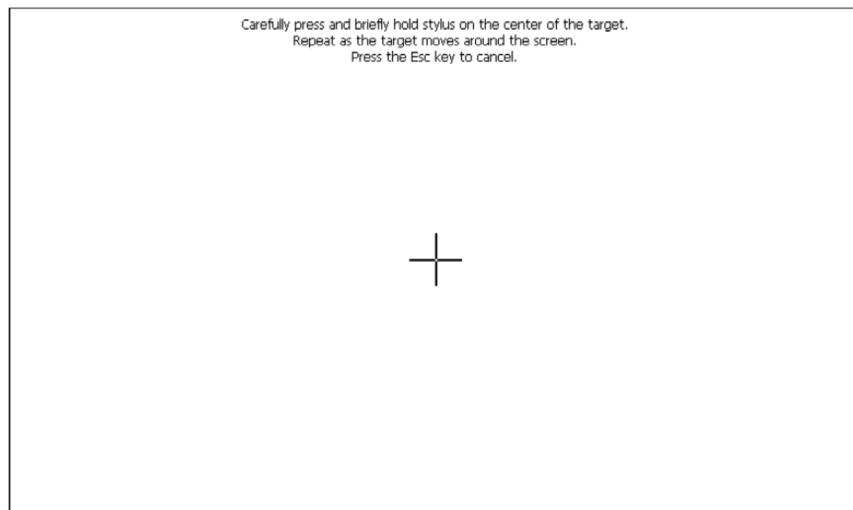
## 5.14. Calibrating the Touchscreen

The touchscreen is factory-calibrated for use. However, it may need to be calibrated if it does not accurately respond to the actions of the operator using it.

To proceed adequately, first press the key  to access the menu window. Once here, press the key  . Upon doing so, the message shown below will appear on the screen:



If you accept by press-  , sing: the touchscreen calibration process begins. The information on the screen will change to this:



There is a cross in the middle of the window which must be pressed for a few seconds until it moves to a new position. This process is repeated at different points on the screen until the touchscreen calibration has finished.

## 6. ACCESSORIES

### 6.1. Optional accessories

#### 400 ml bottle of BEND8 lubricant.

This is a high-additive and low-viscosity aerosol oil. Contains PTFE. Does not contain silicone.



- Enables the finish on the outer bend
- Inhibits roughness and inner marks
- Reduces wear of the tooling
- Especially designed for tubes of small thickness
- Lubricates to reduce friction
- Avoids and dissolves corrosion
- Gives shine and protects
- Cleans up and removes dirt

---

REF.	Description	Quantity	Weight
060-SPR-00003	400 ml bottle	400ml	0,39Kg
060-SPR-00004	Box of 12 400 ml bottles	12x400ml	4,83Kg

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## Technical Data Sheet for the product BEND8

### A. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND COMPANY OR SUPPLIER

#### A.1. Product identification

BEND8 aerosol

#### A.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant uses: Lubricant

Uses advised against: Anything not specified in this section or section 7.3.

#### A.3. Details of the supplier of the Safety Data Sheet

Prada Nargesa, S.L.

Ctra. De Garrigàs a Sant Miquel, s/n

17476 Palau de Santa Eulàlida, Girona, Spain

Tel. +34 972568085

nargesa@nargesa.com

www.nargesa.com

#### A.4. Emergency telephone number

+34936629911

### B. HAZARD IDENTIFICATION

#### B.1. Classification of the substance or mixture

Regulation EC No. 1272/2008 (CLP)

This product has been classified pursuant to Regulation No. 1272/2008 (CLP).

Aerosol 1: Pressure vessel: It may explode if heated, H229

Aerosol 1: Aerosols, category 1, H222

#### B.2. Label elements

Regulation No. 1272/2008 (CLP)

Danger



Hazard instructions:

Aerosol 1: H229 - Pressure vessel: It may explode if heated

Aerosol 1: H222 - Extremely flammable aerosol

Precautionary statements:

P101: If medical advice is needed, have product container or label at hand

P102: Keep out of reach of children

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

P211: Do not spray on an open flame or other ignition source.

P251: Do not pierce or burn, even after use.

P410+P412: Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F

P501: Dispose of contents/container to the local selective waste system.

#### B.3. Other Hazards

The product does not meet PBT/vPvB criteria

**C. COMPOSITION / INFORMATION ON THE COMPONENTS****C.1. Substance**

Not applicable

**C.2. Mixtures**

**Chemical description:** Mixture of mineral oils and additives

**Components:** Pursuant to Annex II of Regulation (EC) no. 1907/2006 (point 3), the product contains:

Identificación		Nombre químico/clasificación		Concentración
CAS: 112-34-5 CE: 203-961-6 Index: 603-096-00-8 REACH: 01-2119475104-44-XXXX	2-(2-butoxietoxi)etanol <sup>1</sup>	Reglamento 1272/2008	Eye Irrit. 2: H319 - Atención	ATP CLP00 <0,05 %
CAS: 1330-20-7 CE: 215-535-7 Index: 601-022-00-9 REACH: 01-2119488216-32-XXXX	Xileno <sup>1</sup>	Reglamento 1272/2008	Acute Tox. 4: H312+H332; Flam. Liq. 3: H226; Skin Irrit. 2: H315 - Atención	ATP CLP00 <0,05 %
CAS: 100-41-4 CE: 202-849-4 Index: 601-023-00-4 REACH: 01-2119489370-35-XXXX	Etilbenceno <sup>1</sup>	Reglamento 1272/2008	Acute Tox. 4: H332; Aquatic Chronic 3: H412; Asp. Tox. 1: H304; Flam. Liq. 2: H225; STOT RE 2: H373 - Peligro	Autoclasificada <0,05 %

<sup>1</sup> Substance subject to a workplace exposure limit

For more information on the hazards of the substances, see sections 8, 11, 12, 15 and 16.

**D. FIRST AID****D.1. Description of first aid measures**

Symptoms of intoxication may appear long after exposure. When in doubt, seek medical attention and show them the SDS for this product after direct exposure to the chemical product or if discomfort persists.

**Inhalation:** This product is not classified as an inhalation hazard; however, remove the victim from the exposure site, supply them with clean air and allow them to rest if any intoxication symptoms appear. Seek medical attention if the symptoms persist.

Customers must equip their pipe bender with a specific die to get the desired curving.

The diameter and thickness of the pipe as well as the radius of curvature must be taken into account when choosing a roller.

**Part Characteristics:**

**Main Roller** made of highly resistant steel which has been thermally hardened with carbonitriding for 50-54 HRC hardness; this roller guide perfectly adapts to the pipe for excellent results.

**Counter-shape** designed by the Nargesa R+D department which reduces friction and ensures optimal curving. It's made of a highly resistant aluminum bronze alloy and mechanized in 3D.

**Clamp with a fastener** to firmly secure the material during the bending process.

**Two Support holders** made of highly resistant steel which has been thermally treated with carbonitriding for 50-54 HRC hardness; these rollers reduce the surface of contact, therefore, reduces friction.

**Accessories for round pipes in millimeters · 12 to 60 mm**

*Rollers made of treated Steel. Units suitable for bending all types of round pipes 12 to 60 millimeters. The following is supplied with the unit: A main roller, a counter-shape, a clamp with a fastener. Check with the manufacturer for other dimensions*

Diam. Ext.	Radius	Min. thickness	Max. thickness	Weight
<b>Set diameter 12mm Radius 60</b>				<b>REF: 140-17-01-10012</b>
12 mm	60 mm	1 mm	5 mm	3,26 Kg
<b>Set diameter 15mm Radius 60</b>				<b>REF: 140-17-01-10001</b>
15 mm	4D=60 mm	1 mm	5 mm	3,18 Kg
<b>Set diameter 18mm Radius 60</b>				<b>REF: 140-17-01-10010</b>
18 mm	60 mm	1 mm	5 mm	3,11 Kg
<b>Set diameter 20mm Radius 60</b>				<b>REF: 140-17-01-10002</b>
20 mm	3D=60 mm	1 mm	5 mm	3,22 Kg
<b>Set diameter 22mm Radius 66</b>				<b>REF: 140-17-01-10014</b>
22 mm	3D=66 mm	1 mm	5 mm	4,10 Kg
<b>Set diameter 25mm Radius 75</b>				<b>REF: 140-17-01-10003</b>
25 mm	3D=75 mm	1,2 mm	5 mm	5,55 Kg
<b>Set diameter 28mm Radius 84</b>				<b>REF: 140-17-01-10011</b>
28 mm	3D=84 mm	1,2 mm	5 mm	7,28 Kg
<b>Set diameter 30mm Radius 90</b>				<b>REF: 140-17-01-10004</b>
30 mm	3D=90 mm	1,2 mm	5 mm	8,29 Kg
<b>Set diameter 32mm Radius 98</b>				<b>REF: 140-17-01-10013</b>
32 mm	3D=98 mm	1,5 mm	5 mm	10,16 Kg
<b>Set diameter 35mm Radius 105</b>				<b>REF: 140-17-01-10005</b>
35 mm	3D=105 mm	1,5 mm	5 mm	12,14 Kg
<b>Set diameter 40mm Radius 120</b>				<b>REF: 140-17-01-10006</b>
40 mm	3D=120 mm	1,5 mm	5 mm	17,11 Kg
<b>Set diameter 50mm Radius 150</b>				<b>REF: 140-17-01-10007</b>
50 mm	3D=150 mm	2 mm	5 mm	31,41 Kg
<b>Set diameter 60mm Radius 180</b>				<b>REF: 140-17-01-10008</b>
60 mm	3D=180 mm	2 mm	2,5 mm	40,88 Kg

## Accessories for 60mm round pipes



*Rollers made of treated steel. Suitable kit to bend 60mm tube of 3mm wall thickness or thicker.*

*The following is supplied with the unit: A main roller, a clamp with a fastener, a support holder.*

*Check with the manufacturer for other dimensions  
Supporting Roller Kit REF: 140-17-01-00002 is required*

Ø Ext.	Radius	Min. thickness	Max. thickness	Weight
<b>Set diameter 60mm Radius 180 with support holder</b>				<b>REF: 140-17-01-10009</b>
60 mm	3D=180 mm	3mm	4 mm	40,58 Kg

## Accessories for round pipes 3/8" to 1" 1/2 Schedule



*Rollers made of treated Steel. Units suitable for bending all types of round pipes 3/8" to 1" 1/2 Schedule*

*The following is supplied with the unit: A main roller, a counter-shape, a clamp with a fastener.*

*Check with the manufacturer for other dimensions*

Ø Ext.	Ø Ext.	Radius	SCH10	SCH40	SCH80	SCH160	Weight
<b>Set diameter 17,10mm Radius 60mm Diameter 3/8" Schedule</b>							<b>REF: 140-17-01-20001</b>
3/8"	17,1 mm	60 mm	1,65 mm	2,31 mm	3,20 mm	--	4,22 Kg
<b>Set diameter 21,30mm Radius 63,9mm Diameter 1/2" Schedule</b>							<b>REF: 140-17-01-20002</b>
1/2"	21,3 mm	3D=63,9 mm	2,11 mm	2,77 mm	3,73 mm	4,78 mm	3,56 Kg
<b>Set diameter 26,90mm Radius 80,1mm Diameter 3/4" Schedule</b>							<b>REF: 140-17-01-20003</b>
3/4"	26,9 mm	3D=80,1 mm	2,11 mm	2,87 mm	3,91 mm	5,56 mm	6,74 Kg
<b>Set diameter 33,70mm Radius 101,1mm Diameter 1" Schedule</b>							<b>REF: 140-17-01-20004</b>
1"	33,7 mm	3D=101,1 mm	2,77 mm	3,38 mm	4,55 mm	6,35 mm	11,18 Kg
<b>Set diameter 42,40mm Radius 127,2mm Diameter 1" 1/4 Schedule</b>							<b>REF: 140-17-01-20005</b>
1" 1/4	42,4 mm	3D=127,2 mm	2,77 mm	3,56 mm	4,85 mm	6,35 mm	18,86 Kg
<b>Set diameter 48,30mm Radius 144,9mm Diameter 1" 1/2 Schedule</b>							<b>REF: 140-17-01-20006</b>
1" 1/2	48,3 mm	3D=144,9 mm	2,77 mm	3,68 mm	5,08 mm	--	27,05 Kg

## Accessories for 2" Schedule round pipes



*Rollers made of treated steel. Suitable kit to bend 2" tube of 2,77mm wall thickness or thicker.*

*The following is supplied with the unit: A main roller, a clamp with a fastener, a support holder.*

*Check with the manufacturer for other dimensions*

Ø Ext.	Ø Ext.	Radius	SCH10	SCH40	SCH80	SCH160	Weight
<b>Set diameter 60,3mm Radius 180,9mm Diameter 2" Schedule</b>							<b>REF: 140-17-01-20007</b>
2"	60,3 mm	3D=180,9 mm	2,77 mm	3,91 mm	--	--	45,75 Kg

*\* All capacities are based on the norm of carbon steel tubes according to ASTM, Standard A-53 grade A with a maximum resistance strength of 330MPa. The walls with more thickness to the established one and the materials with more resistance, reduce the capacities of the machine. Check with your material supplier for the specifications of this one.*

## Accessories for round pipes in inches · 1/2" to 2" 1/4 inches



*Rollers made of treated Steel. Units suitable for bending all types of round pipes 1/2" to 2" 1/4 inches.*

*The following is supplied with the unit: A main roller, a counter-shape, a clamp with a fastener*

*Check with the manufacturer for other dimensions*

Diam. Ext.	Diam. Ext.	Radius	Min. thickness	Max. thickness	Weight
<b>Set diameter 12,7mm Radius 60mm Diameter 1/2" inches</b>					<b>REF: 140-17-01-30012</b>
3/8"	9,52 mm	60 mm	1 mm	4 mm	3,40 Kg
<b>Set diameter 15,88mm Radius 60mm Diameter 5/8" inches</b>					<b>REF: 140-17-01-30011</b>
1/2"	12,7 mm	60 mm	1 mm	4 mm	3,37 Kg
<b>Set diameter 19,05mm Radius 60mm Diameter 3/4" inches</b>					<b>REF: 140-17-01-30001</b>
5/8"	15,88 mm	60 mm	1 mm	4 mm	3,61 Kg
<b>Set diameter 22,22mm Radius 66mm Diameter 7/8" inches</b>					<b>REF: 140-17-01-30002</b>
3/4"	19,05 mm	66 mm	1 mm	4 mm	2,79 Kg
<b>Set diameter 25,40mm Radius 76,20mm Diameter 1" inches</b>					<b>REF: 140-17-01-10014</b>
7/8"	22,22 mm	66 mm	1 mm	5 mm	4,10 Kg
<b>Set diameter 31,75mm Radius 95,25mm Diameter 1" 1/4 inches</b>					<b>REF: 140-17-01-30003</b>
1"	25,40 mm	3D=76,2 mm	1,2 mm	5 mm	5,72 Kg
<b>Set diameter 38,10mm Radius 114,30mm Diameter 1" 1/2 inches</b>					<b>REF: 140-17-01-30009</b>
1" 1/8	28,57 mm	3D=85,7 mm	1,5 mm	5 mm	7,70 Kg
<b>Set diameter 44,45mm Radius 133,35mm Diameter 1" 3/4 inches</b>					<b>REF: 140-17-01-30004</b>
1" 1/4	31,75 mm	3D=95,25 mm	1,5 mm	6 mm	10,21 Kg
<b>Set diameter 50,8mm Radius 152,4mm Diameter 2" inches</b>					<b>REF: 140-17-01-30005</b>
1" 1/2	38,10 mm	3D=114,3 mm	1,5 mm	7 mm	15,69 Kg
<b>Set diameter 57,15mm Radius 171,45mm Diameter 2" 1/4 inches</b>					<b>REF: 140-17-01-30010</b>
1" 3/4	44,45 mm	3D=133,35 mm	2 mm	5 mm	21,86 Kg
<b>Conjunto Matriz Diámetro 50,8mm Radio 152,4mm Diámetro 2"</b>					<b>REF: 140-17-01-30006</b>
2"	50,80 mm	3D=152,4 mm	2 mm	5 mm	32,24 Kg
<b>Conjunto Matriz Diámetro 57,15mm Radio 171,45mm Diámetro 2" 1/4</b>					<b>REF: 140-17-01-30007</b>
2" 1/4	57,15 mm	3D=171,45 mm	2 mm	2,5 mm	36,13 Kg

## Accessories for 2" 1/4 round pipes



*Rollers made of treated Steel. Suitable kit to bend 2" 1/4 tube of 3mm wall thickness or thicker.*

*The following is supplied with the unit: A main roller, a clamp with a fastener, a support holder.*

*Check with the manufacturer for other dimensions*

Diam. Ext.	Diam. Ext.	Radius	Min. thickness	Max. thickness	Weight
<b>Set diameter 57,15mm Radius 171,45mm Diameter 2" 1/4 with support holder</b>					<b>REF: 140-17-01-30008</b>
2" 1/4	57,15 mm	3D=171,45 mm	3 mm	4 mm	35,91 Kg

*\* The walls with more thickness to the established one and the materials with more resistance, reduce the capacities of the*

## Supporting Roller Kit CC60CNC



**REF: 140-17-01-00002**

The CC60CNC Supporting Roller Kit is used to bend:

- 60mm tube of 3mm wall thickness or thicker
- 2" Schedule tube of 2,77mm wall thickness or thicker
- 2" 1/4 tube of 3mm wall thickness or thicker

**Weight: 9,85 Kg.**

## Accessories for square pipes in millimeters · 20 to 40 mm



*Rollers made of treated Steel. Units suitable for bending all types of square pipes 20 to 40mm. The following is supplied with the unit: A main roller, a counter-shape, a clamp with a fastener*

*Check with the manufacturer for other dimensions*

Section	Radius	Min. thickness	Max. thickness	Weight
<b>Square Tube Die Set 20mm Radius 100mm</b>				<b>REF: 140-17-01-10101</b>
20x20 mm	5D=100 mm	1,5 mm	4 mm	11,1 Kg
<b>Square Tube Die Set 25mm Radius 115mm</b>				<b>REF: 140-17-01-10102</b>
25x25 mm	115 mm	2 mm	4 mm	14,75 Kg
<b>Square Tube Die Set 30mm Radius 135mm</b>				<b>REF: 140-17-01-10103</b>
30x30 mm	135 mm	2 mm	4 mm	22 Kg
<b>Square Tube Die Set 40mm Radius 165mm</b>				<b>REF: 140-17-01-10104</b>
40x40 mm	165 mm	2 mm	5 mm	34,15 Kg

## Accessories for square pipes in inches · 3/4" to 1" 1/2 inches



*Rollers made of treated Steel. Units suitable for bending all types of square pipes 3/4" to 1" 1/2 inches.*

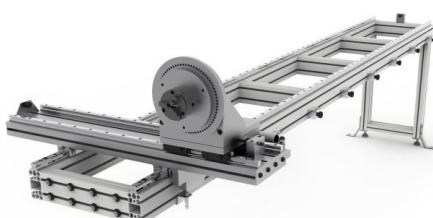
*The following is supplied with the unit: A main roller, a counter-shape, a clamp with a fastener*

*Check with the manufacturer for other dimensions*

Section	Section	Radius	Radius	Min. Thick.	Max. Thick.	Weight
<b>Square Tube Die Set 3/4" (19,05mm) Radius 4" (101,6mm)</b>						<b>REF: 140-17-01-30101</b>
3/4"x3/4"	19,05x19,05mm	4"	101,6mm	1,5 mm	4 mm	11,5 Kg
<b>Square Tube Die Set 1" (25,4mm) Radius 4,5" (114,3mm)</b>						<b>REF: 140-17-01-30102</b>
1"x1"	25,4x25,4mm	4" 1/2	114,3mm	2 mm	4 mm	14,6 Kg
<b>Square Tube Die Set 1" 1/4 (31,75mm) Radius 5,5" (139,7mm)</b>						<b>REF: 140-17-01-30103</b>
1" 1/4x1" 1/4	31,75x31,75mm	5" 1/2	139,7mm	2 mm	4 mm	23,3 Kg
<b>Square Tube Die Set 1" 1/2 (38,1mm) Radius 6,5" (165,1mm)</b>						<b>REF: 140-17-01-30104</b>
1" 1/2x1" 1/2	38,1x38,1mm	6" 1/2	165,1mm	2 mm	5 mm	34,6 Kg

## CC60CNC 2-axis positioning gauge

*The gauge of the CC60CNC allows to make mass produced parts, much faster, more accurate and repetitively.*



- Adjustable longitudinal positioning with 6 positions
- Angular head rotation every 5 degrees
- Four-clamp plate adjustable to round and square tube
- Longitudinal movement with high precision linear guides
- Automatic anti-collision control
- Easy handling and preparation for difficult parts

REF.	Gauge length	Maximum capacity	Weight
140-17-01-50000	3000mm	60,3mm, 2" Schedule	125Kg

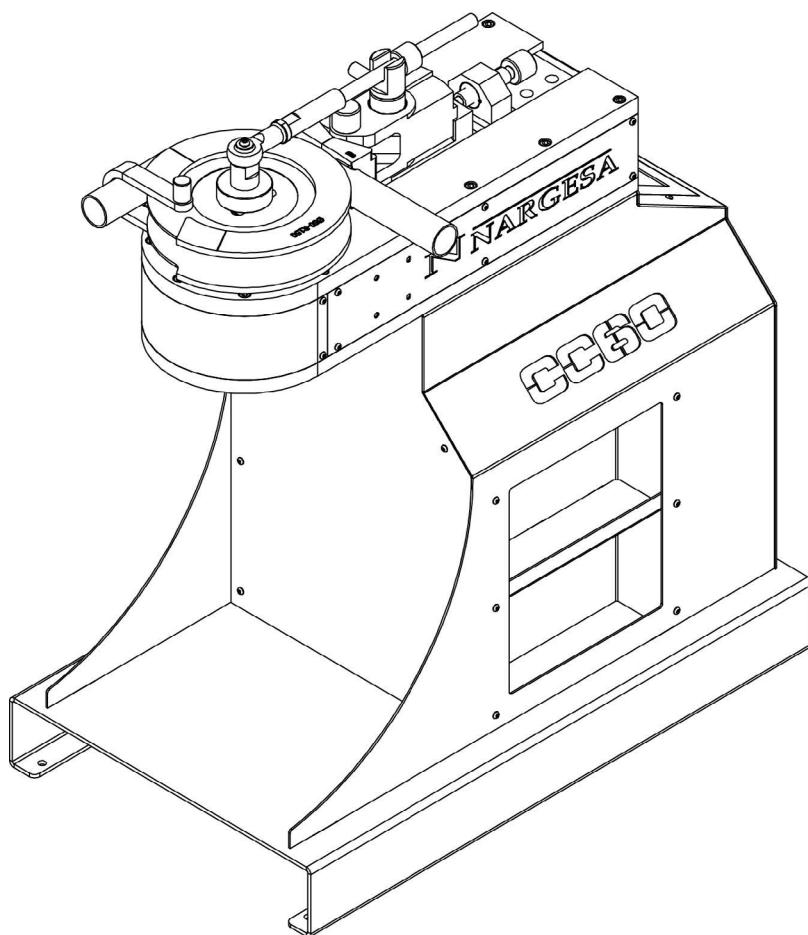
## 7. TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Internal wrinkle	The pipe moved out of the clamp	Make sure the clamp is in good conditions
Internal wrinkle	Counter-die with low pressure	Tighten the counter-die
Internal wrinkle	Lack of lubrication	Use BEND8 or another similar
Internal wrinkle	The diameter of the die is too small for the pipe thickness	Increase the pipe thickness a little or buy a die with a diameter of more than 3 times the pipe diameter
Internal wrinkle	Worn counter-die	Buy a new counter-die
Excessive final deformation on the	Counter-die with too much pressure	Loosen the counter-die
Flattening on the outside of the bend	Counter-die with too much pressure	Loosen the counter-die
Flattening on the outside of the bend	Pipe not thick enough	Increase the pipe wall
The machine can't bend	The material hardness is much higher than recommended by the	Contact the pipe manufacturer
The machine can't	Lack of lubrication	Use BEND8 to reduce friction



## TECHNICAL ANNEX

### Non-mandrel Tube and Pipe Bender CC60CNC



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PRADA NARGESA, S.L.

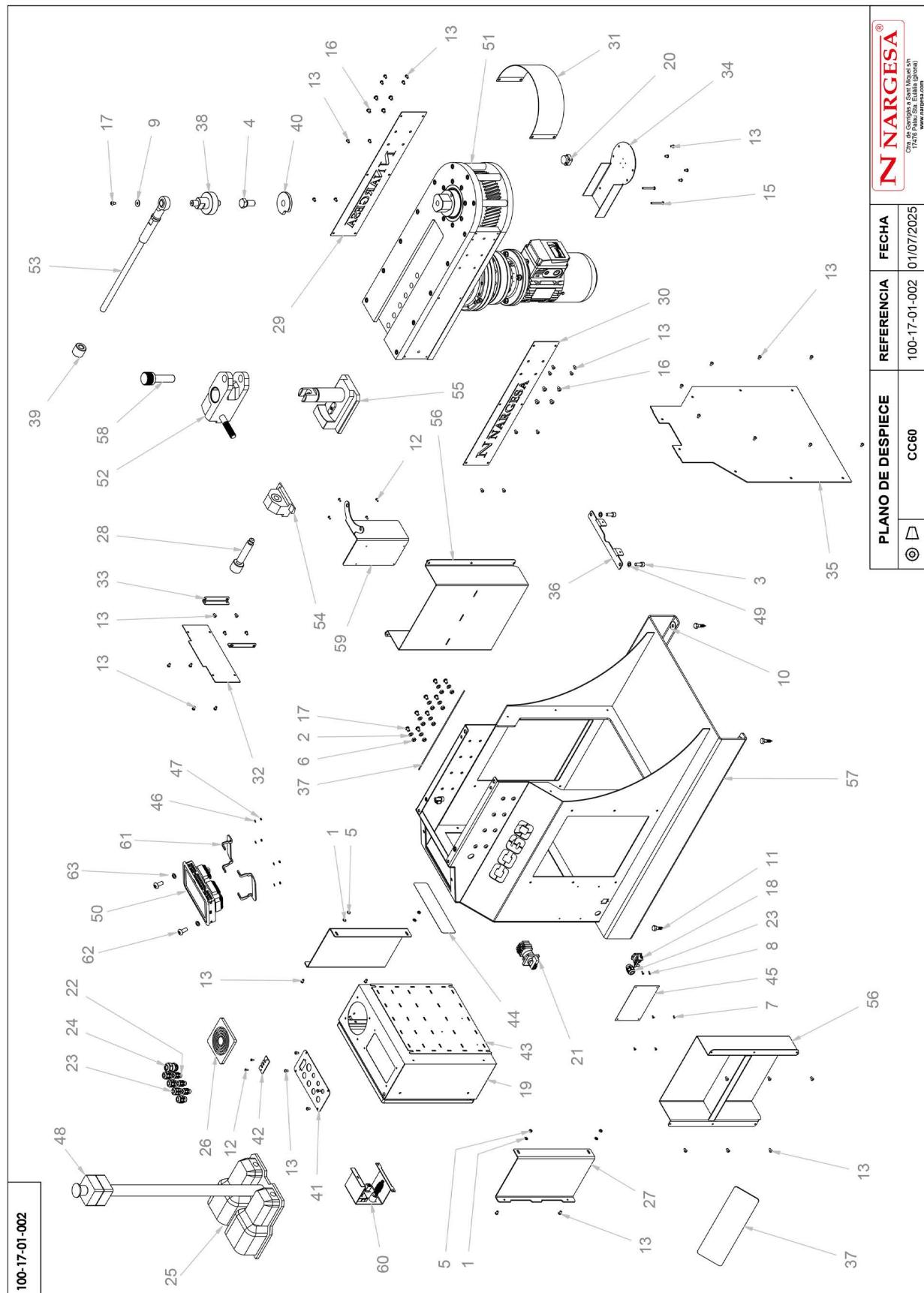
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## A1. General Exploded View



**ANEXO TÉCNICO - CURVADORA DE TUBOS SIN MANDRIL CC60CNC**

Elemento	Miniatura	Nº de pieza	Descripción	CTDAD
1		020-D125B-M6	ARANDELA BISELADA DIN125B PARA M6	4
2		020-D125B-M8	Arandela Biselada DIN125B Para M8	8
3		020-D912-M10X25	Tornillo Allen DIN912 M10X25	4
4		020-D933-M20X40	TORNILLO HEXAGONAL DIN 933 M20X40	1
5		020-D934-M6	Tuerca Hexagonal DIN934 M6	4
6		020-D934-M8	TUERCA HEXAGONAL DIN934 M8	8
7		020-D7337-3X8	Remache De Clavo DIN7337 De Al D3X8	4
8		020-D7985-M3X10	TORNILLO DIN7985 M3X10 Zincado	2
9		020-D9021-M8	ARANDELA ANCHA DIN9021 PARA M8	1
10		020-D9021-M10	ARANDELA DIN 9021 M10	4
11		020-DIN571-10X40	Tornillo Hexagonal Para Madera	4
12		020-I7380-M4X10	Tornillo Allen ISO 7380 M4X10	2
13		020-I7380-M6X10	Tornillo Allen Abombado ISO 7380 M6X10	64
14		020-I7380-M6X25	TORNILLO ALLEN ABOMBADO ISO7380 M6X25	2
15		020-I7380-M6X50	Tornillo Allen Abombado ISO7380 M6X50	2
16		020-I7380-M8X10	Tornillo Allen Abombado ISO7380 M8X10	8

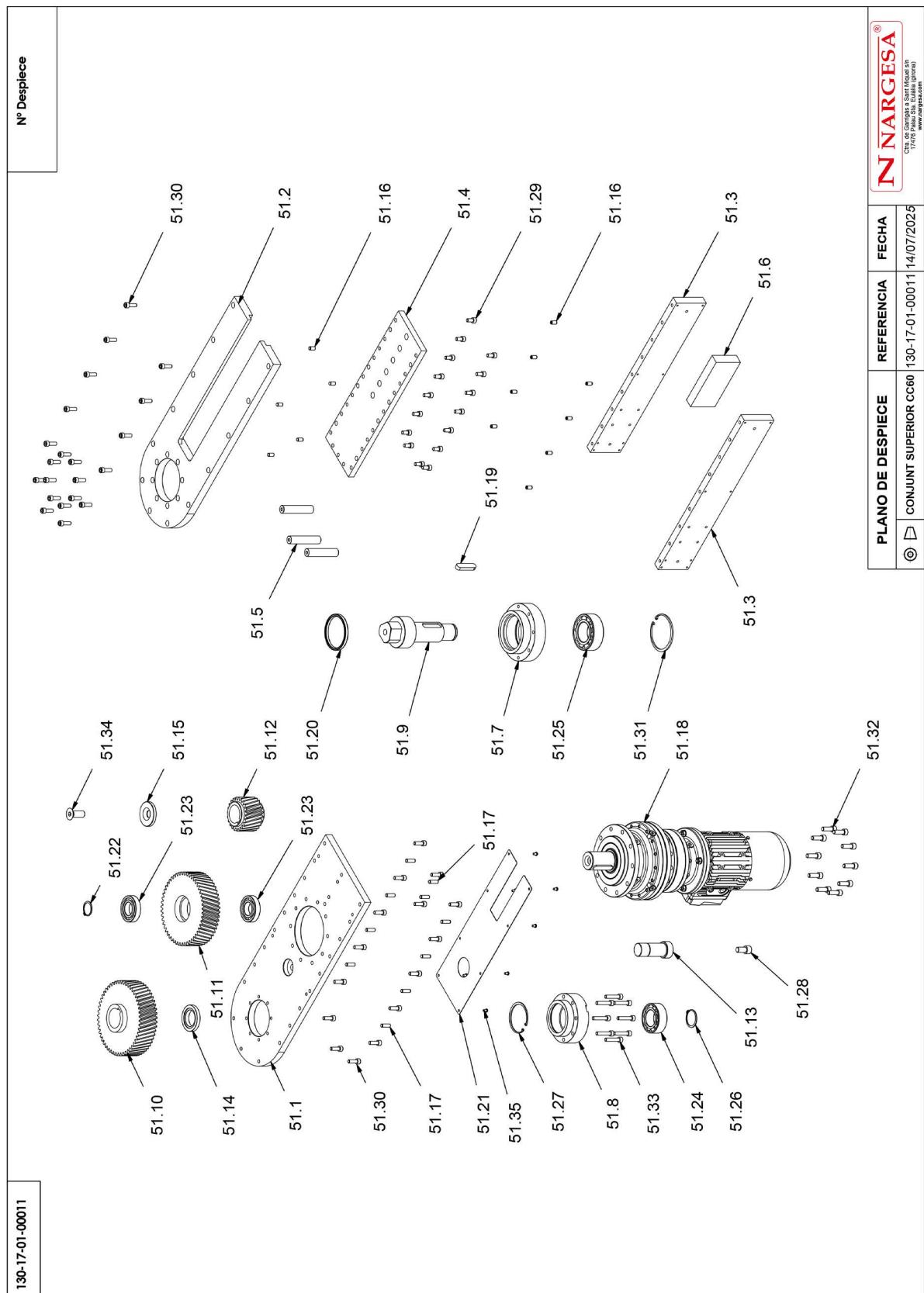
Elemento	Miniatura	Nº de pieza	Descripción	CTDAD
17		020-I7380-M8X12	Tornillo Allen Abombado ISO7380 M8X12	9
18		050-BE-00003	Zocalo Recto Ck03I	1
19		050-COAL-00012	Armario Eléctrico CC60	1
20		050-ENC-00007	ENCODER QR30N	1
21		050-IG-00001	Interruptor General Kg10Ak300	1
22		050-PE-00002	Prensaestopa PG9 Negro	3
23		050-PE-00003	Prensaestopa GFPT 212 50043 M20X150 PG13.5	5
24		050-PE-00008	PRENSAESTOPA M25	1
25		050-PED-00013	Pedal Doble PX10110+KIT30	1
26		050-TAPVENT-00001	TAPA VENTILADOR	2
27		120-17-01-00025	SOPORTE CUADRO ELECTRICO CC60	2
28		120-17-01-00029	TORNILLO APRIETE CC60	1
29		120-17-01-00034	ANAGRAMA NARGESA 2 CC60	1
30		120-17-01-00035	ANAGRAMA NARGESA CC60	1
31		120-17-01-00036	ENVOLVENTE DE CHAPA CC60	1
32		120-17-01-00037	ENVOLVENTE POSTERIOR CC60	1

**ANEXO TÉCNICO - CURVADORA DE TUBOS SIN MANDRIL CC60CNC**

Elemento	Miniatura	Nº de pieza	Descripción	CTDAD
33		120-17-01-00038	SOPORTE ENVOLVENTE TRASERO CC60	2
34		120-17-01-00039	TAPA ENCODER CC60	1
35		120-17-01-00040	Tapa Trasera CC60	1
36		120-17-01-00041	CHAPA FIJACION REDUCTOR Y TAPA CC60	1
37		120-17-01-00043	Metacrilato Negro CC60	2
38		120-17-01-00049	FIJACION RULINA BRAZO REACCION CC60	1
39		120-17-01-00052	TUERCA BRAZO REACCION CC60	1
40		120-17-01-00054	FIJACION RULINA CC60	1
41		120-17-01-00055	CHAPA SUPERIOR CUADRO ELECTRICO CC60	1
42		120-17-01-00057	PLACA PASACABLES CONTROL CC60	1
43		120-17-02-00059	CHAPA MONTAJE ELECTRICO CC90	1
44		122-CAL-1101-002	Calca MC, CC i NOA	1
45		122-PLC-0000-001	Placa Caracteristicas General	1
46		020-D125B-M4	Arandela Biselada DIN125B Para M4	8
47		020-D934-M4	Tuerca Hexagonal DIN934 M4	8
48		050-PED-00016	Paro de Emergencia + KIT32	1

Elemento	Miniatura	Nº de pieza	Descripción	CTDAD
49		020-D127-M10	ARANDELA GLOWER DIN127 PARA M10	4
50		050-CNC-00007	Pantalla ESA S820	1
51		130-17-01-00011	CONJUNT SUPERIOR CC60	1
52		130-17-01-00010	CONJUNTO PORTA GUIAS CC60	1
53		130-17-01-00009	CONJUNTO BRAZO REACCION CC60	1
54		130-17-01-00007	CONJUNTO EMPUJE CARRO CC60	1
55		130-17-01-00006	CONJUNTO CARRO PORTAGUIAS CC60	1
56		130-17-01-00003	CONJUNTO ESTANTERIA CC60	2
57		130-17-01-00015	ESTRUCTURA CC60	1
58		130-17-01-00004	CONJUNTO EJE FIJACION PORTAGUIAS CC60	1
59		120-17-01-00062	Soporte Variador	1
60		120-17-01-00076	Soporte consola variador y conectores	1
61		120-17-02-00071	Soporte Sujecion pantalla	2
62		020-I7380-M6X40	Tornillo Allen Abombado ISO7380 M6X40	2
63		020-AET-M6	Arandela Especial para DIN912 AET - M6	2

A2. Upper Ensemble



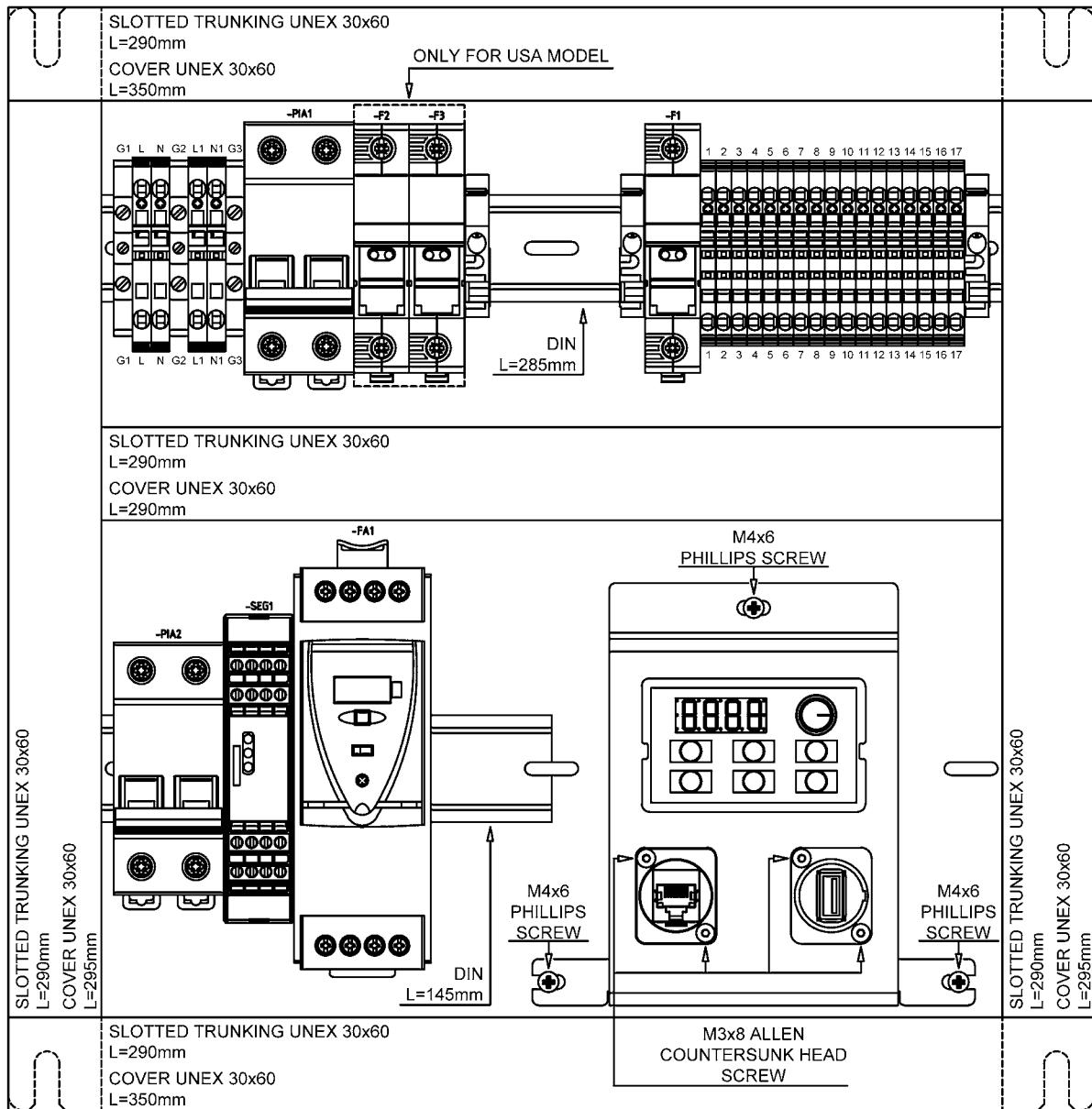
Elemento	Miniatura	Nº de pieza	Descripción	CTDAD
51.1		120-17-01-00059	PLACA BASE CC60	1
51.2		120-17-01-00002	PLACA SUPERIOR CC60	1
51.3		120-17-01-00003	PASAMANO LATERAL REDUCTOR CC60	2
51.4		120-17-01-00004	SOPORTE GUIA INFERIOR CC60	1
51.5		120-17-01-00005	SEPARADOR ESTRUCTURA CC60	3
51.6		120-17-01-00006	REFUERZO INTERIOR CC60	1
51.7		120-17-01-00007	CASQUILLO PORTA COJINETE CC60	1
51.8		120-17-01-00008	CASQUILLO PORTA COJINETE INFERIOR CC60	1
51.9		120-17-01-00009	EJE ENGRANAJE Z53 CC60	1
51.10		120-17-01-00010	ENGRANAJE HELICOIDAL Z53 M4 CC60	1
51.11		120-17-01-00011	ENGRANAJE HELICOIDAL Z52 M4 CC60	1
51.12		120-17-01-00012	ENGRANAJE HELICOIDAL Z23 M4 CC60	1
51.13		120-17-01-00060	EJE ENGRANAJE Z52 CC60	1
51.14		120-17-01-00014	SEPARADOR ENGRANAJE Z53 CC60	1
51.15		120-17-01-00015	ARANDELA FIJACIÓN PIÑÓN CC60	1
51.16		030-D7979D-00024	PASADOR CILINDRICO ROSCA INT. DIN7979/D D10X20	13

**ANEXO TÉCNICO - CURVADORA DE TUBOS SIN MANDRIL CC60CNC**

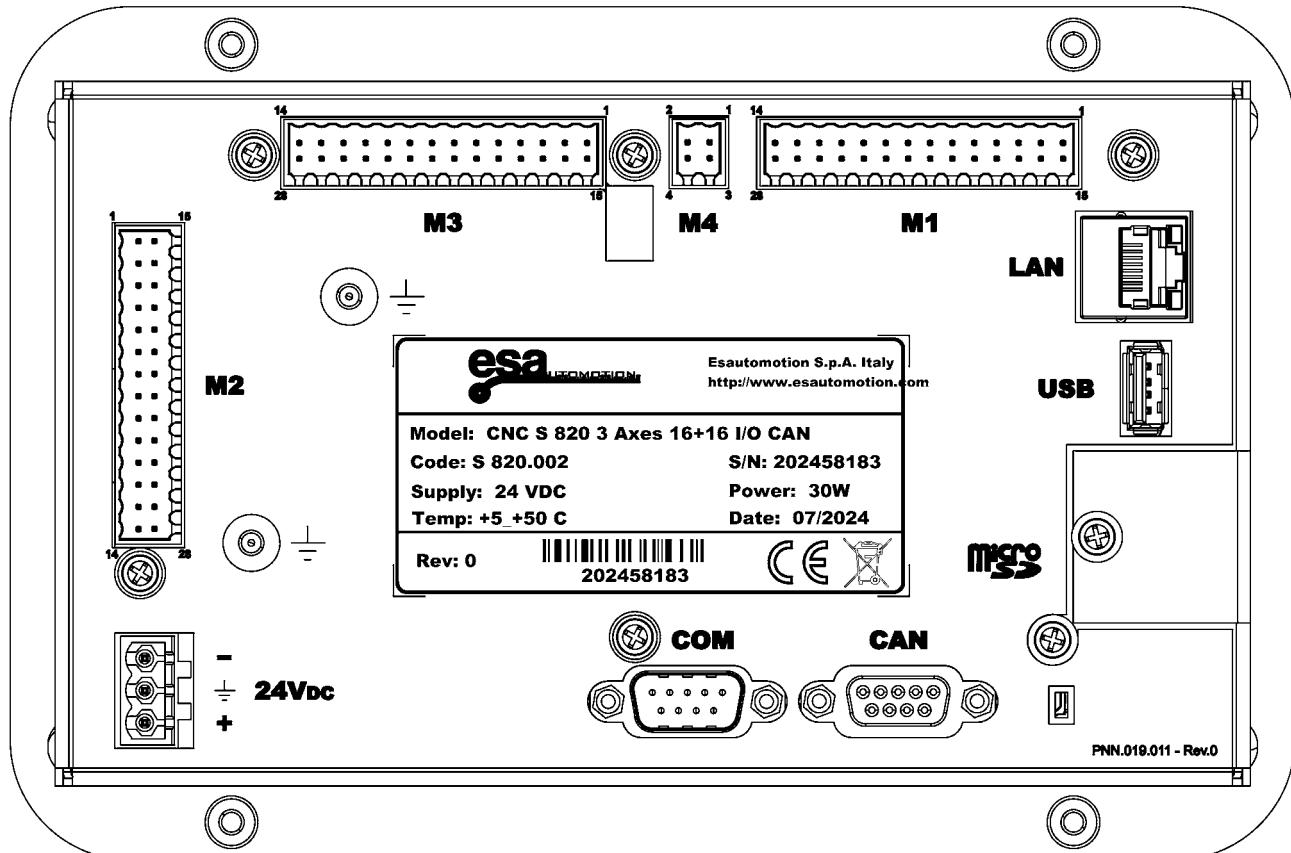
Elemento	Miniatura	Nº de pieza	Descripción	CTDAD
51.19		030-D6885A-00040	CHAVETA DIN 6885A 18x11x70	1
51.20		040-RET-00016	RETEN D95XD110X10	1
51.21		120-17-01-00061	CHAPA ANTICAIDA PASADORES	1
51.22		030-D471-00005	Circlip de Eje DIN 471 D40	1
51.23		030-CJ-00031	RODAMIENTO DE BOLAS 6208 2RS	2
51.24		030-CJ-00032	RODAMIENTO DE BOLAS 3210 2RS	1
51.25		030-CJ-00033	RODAMIENTO DE BOLAS 3212 2RS	1
51.26		030-D471-00011	CIRCLIP EJE DIN471 D50	1
51.27		030-D472-00007	CIRCLIP AGUJERO DIN472 D90	1
51.28		020-D912-M16X30	TORNILLO ALLEN DIN 912 M16X30	1
51.29		020-D912-M10X20	Tornillo Allen DIN912 M10X20	16
51.30		020-D912-M10X30	Tornillo Allen DIN 912 M10X30	36
51.31		030-D472-00019	CIRCLIP AGUJERO DIN472 D110	1
51.32		020-D912-M12X35	TORNILLO ALLEN DIN 912 M12X35	10
51.33		020-D912-M10X50	TORNILLO ALLEN DIN 912 M10X50	8
51.34		020-D7991-M20X50	TORNILLO ALLEN AVELLANADO DIN7991 M20X50	1
51.35		020-I7380-M6X10	Tornillo Allen Abombado ISO 7380 M6X10	8

### A3. Electrical Cabinet

PLACE THE LABELS ON THE TOP OF THE TERMINALS.  
PLACE THE TERMINALS WITH THE OPEN SIDE TO THE LEFT.



-CONTROL1



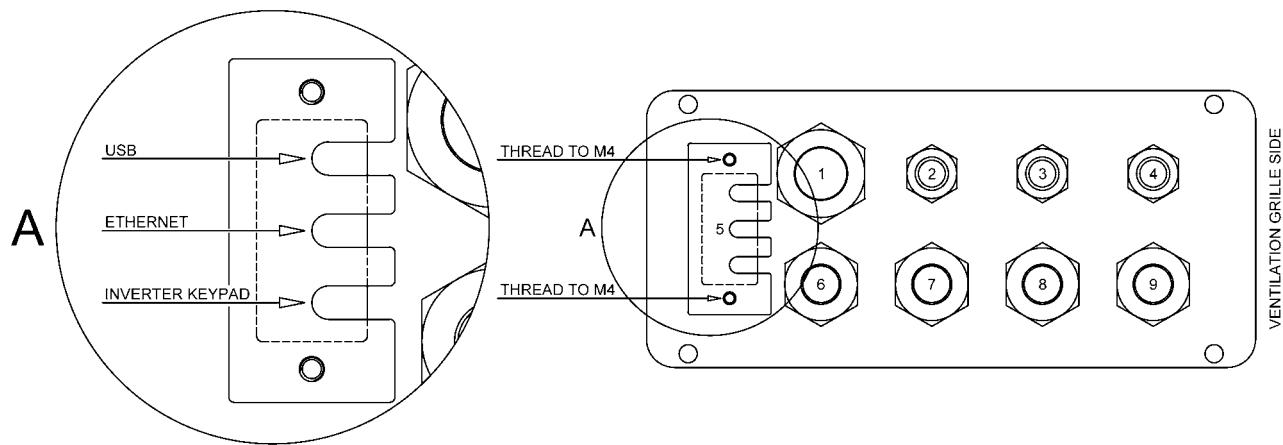
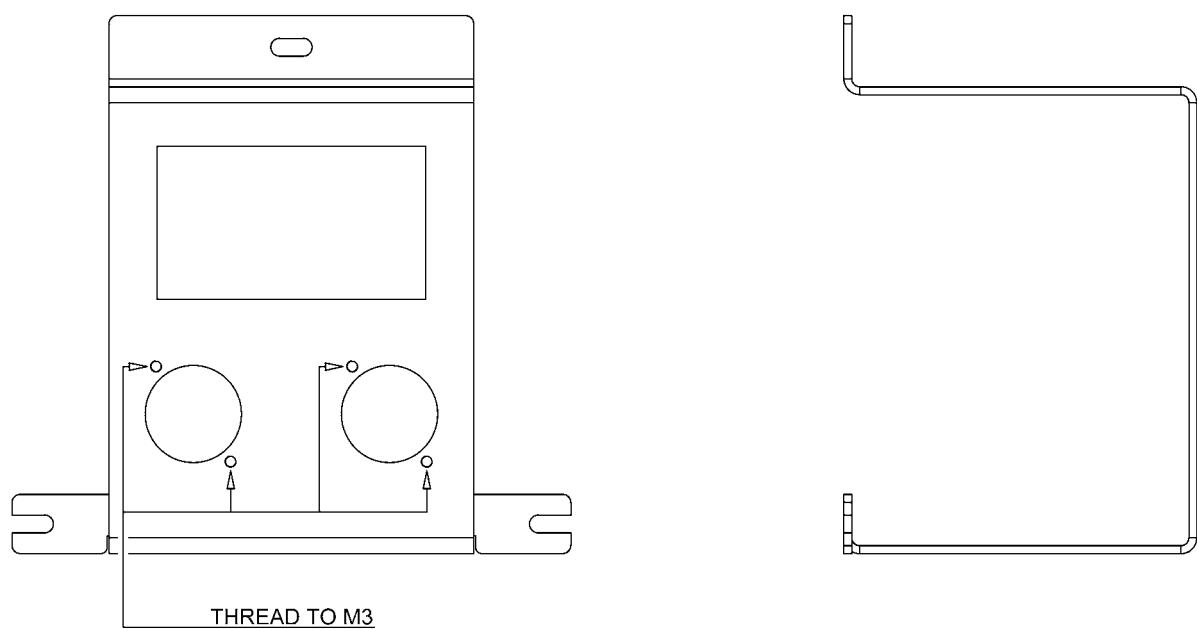
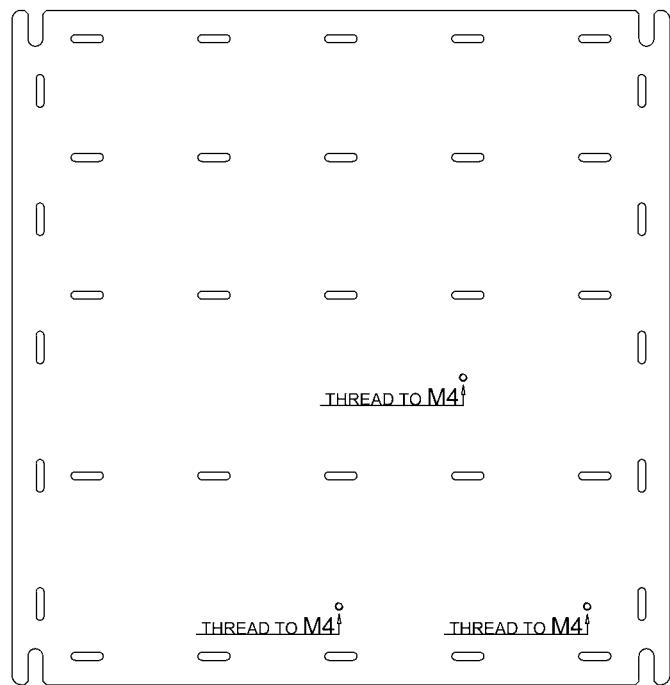
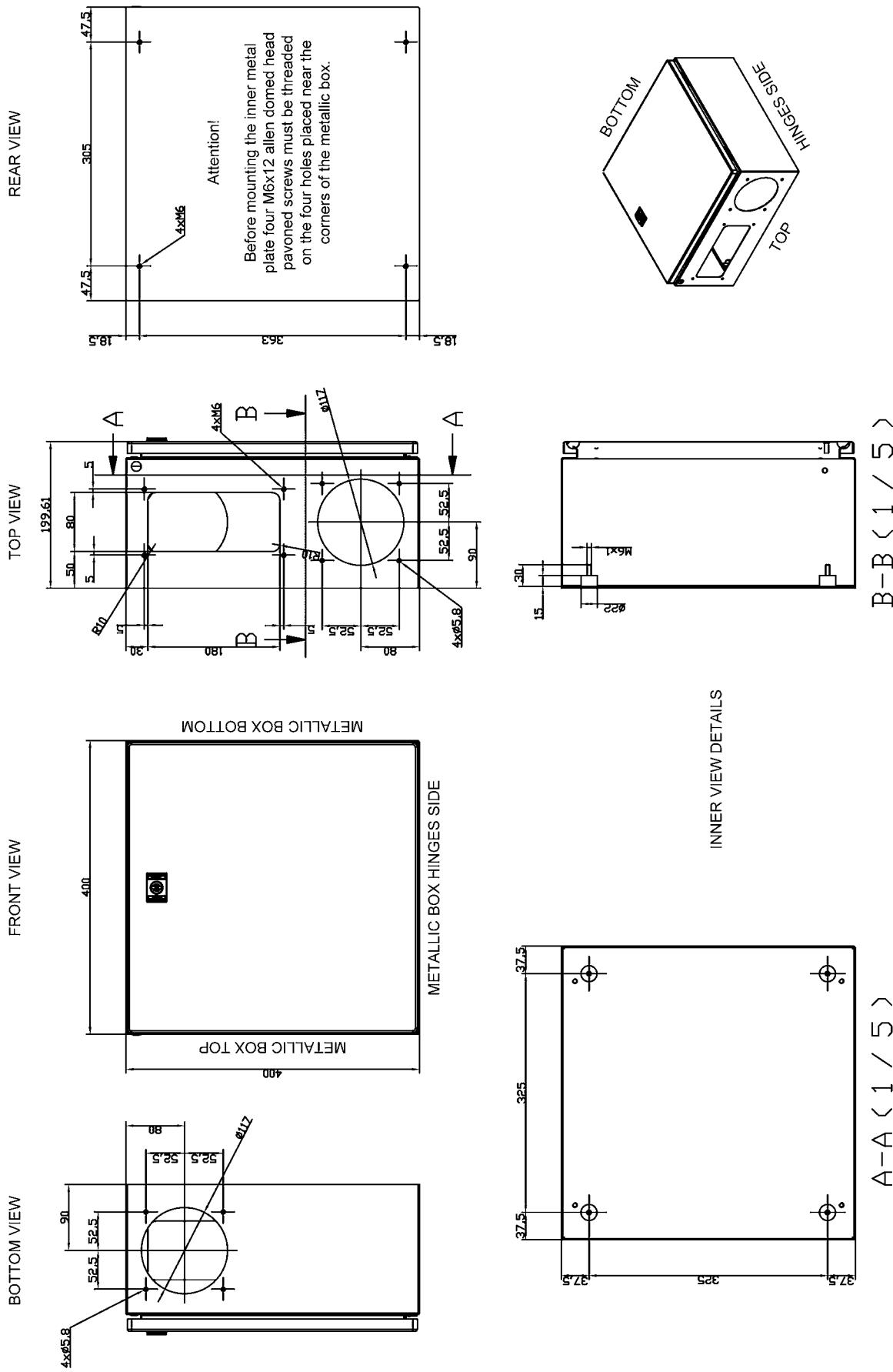


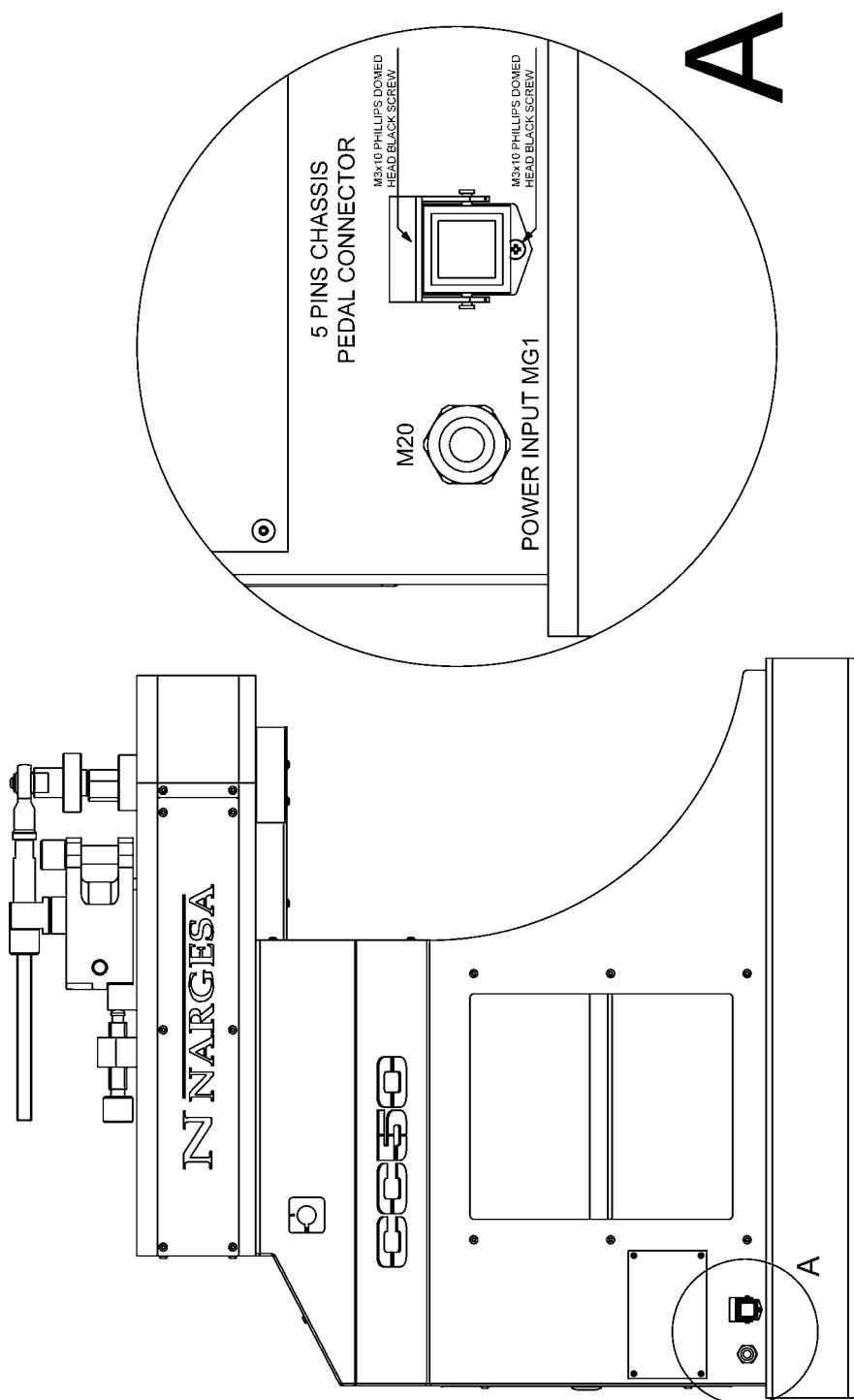
PLATE HOLE NUMBER	PLASTIC CABLE GLAND	ELECTRIC WIRE	DESCRIPTION
1	M25	MULTIPLE	MESH WITH SIGNAL WIRES
2	PG9	UNUSED	---
3	PG9	MG12	INVERTER EMERGENCY
4	PG9	UNUSED	---
5	---	MG14, MG9, ---	USB, ETHERNET AND INVERTER KEYPAD
6	M20	MG5	PEDAL
7	M20	UNUSED	---
8	M20	MG11	INVERTER SUPPLY
9	M20	MG2	POWER INPUT AFTER MAIN SWITCH -S1

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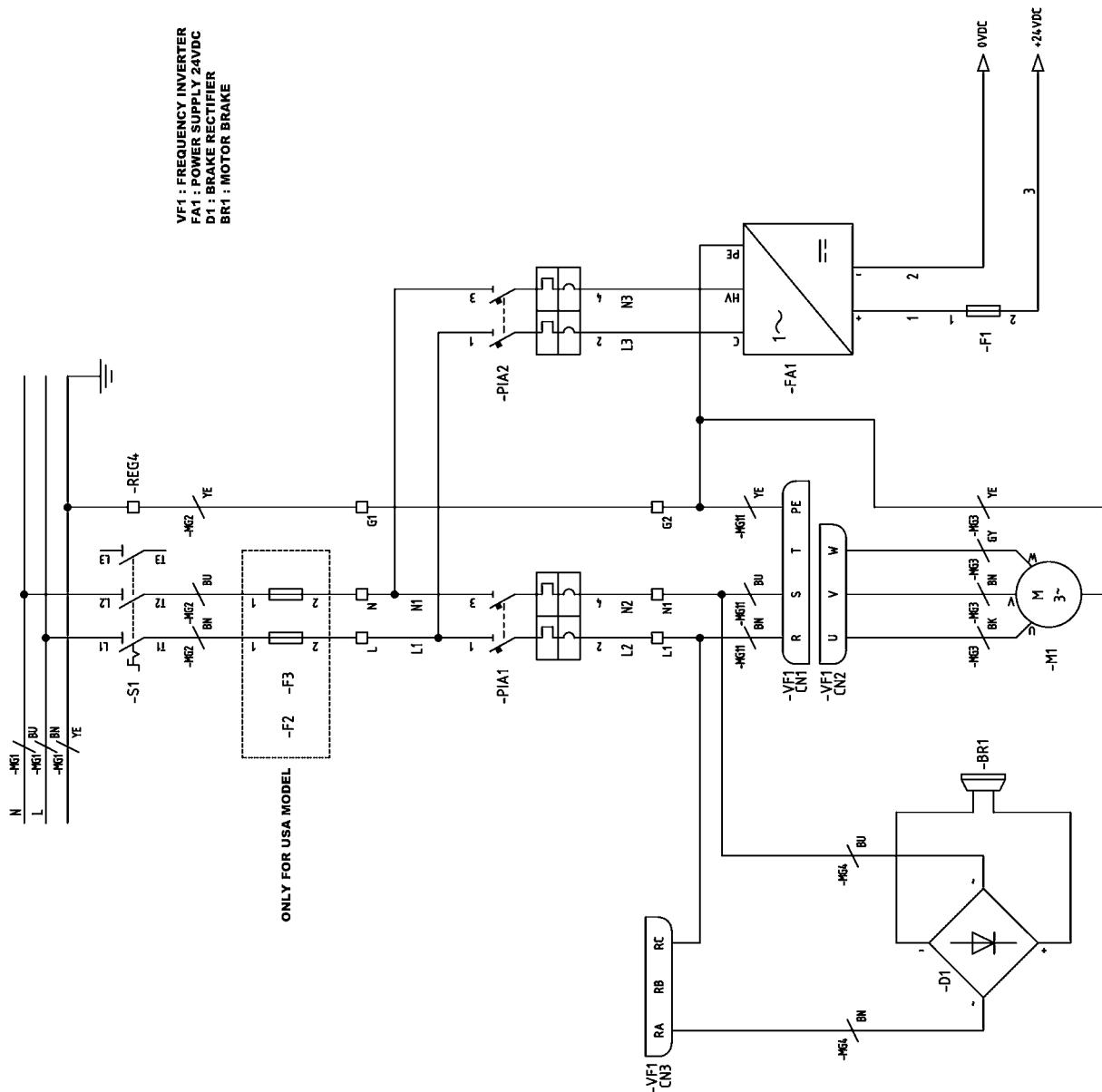
ANEXO TÉCNICO - CURVADORA DE TUBOS SIN MANDRIL CC60CNC

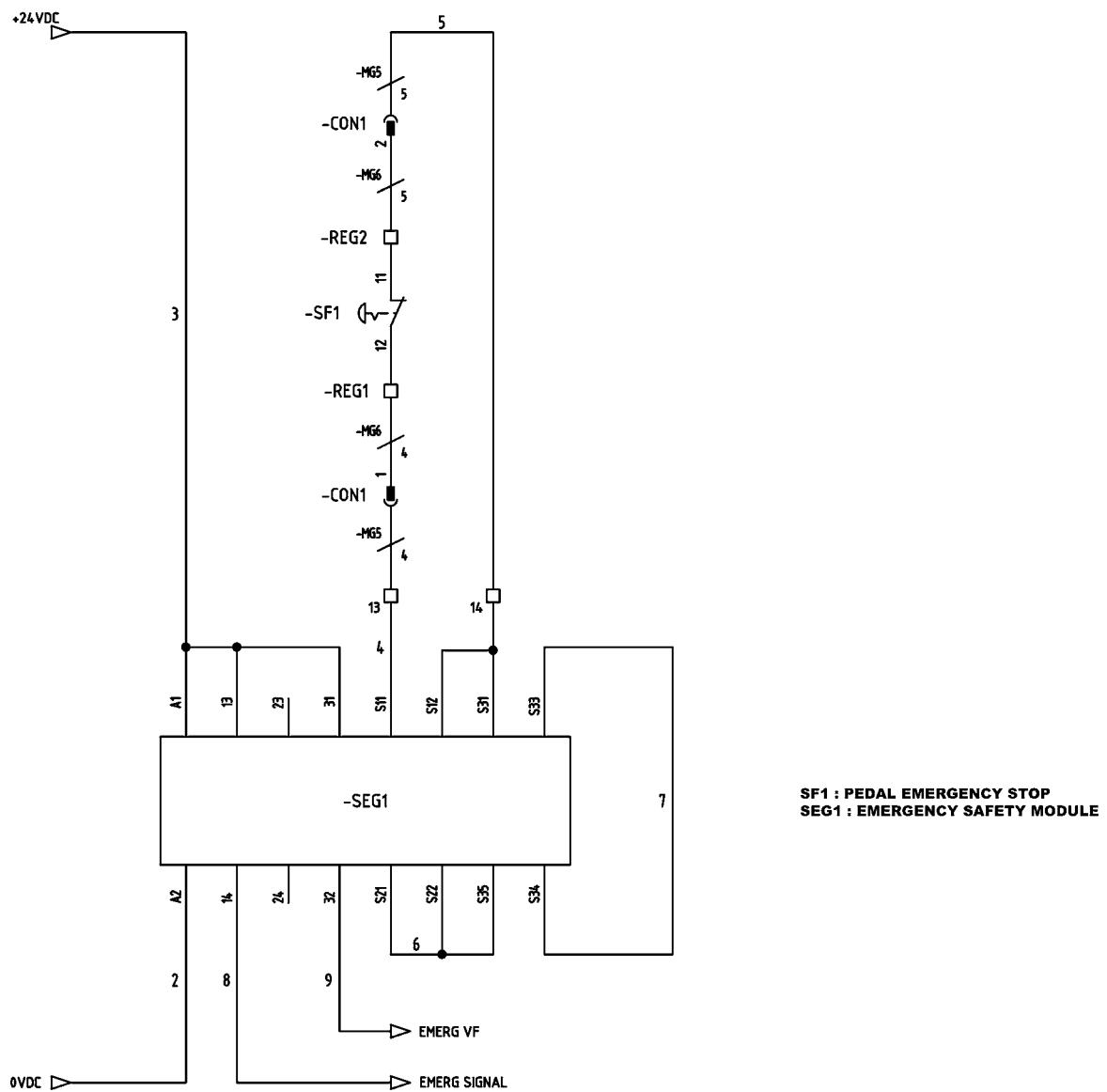


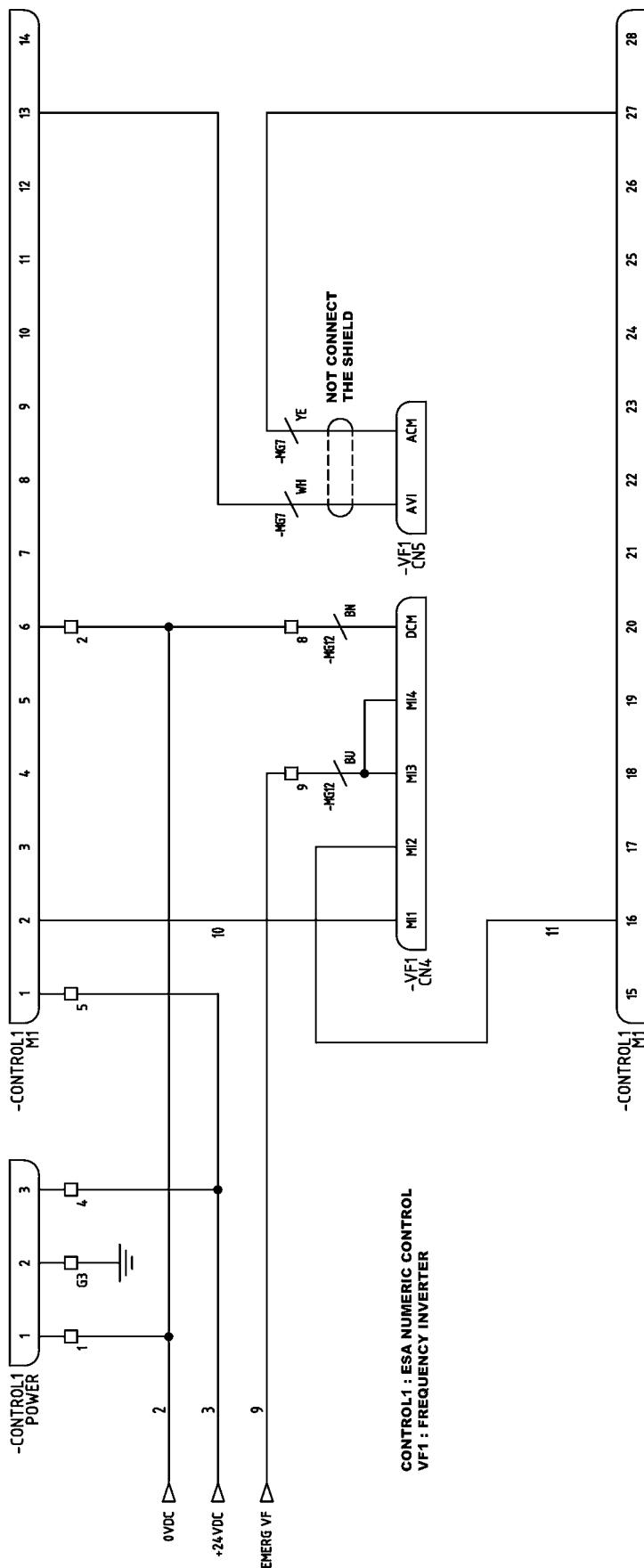


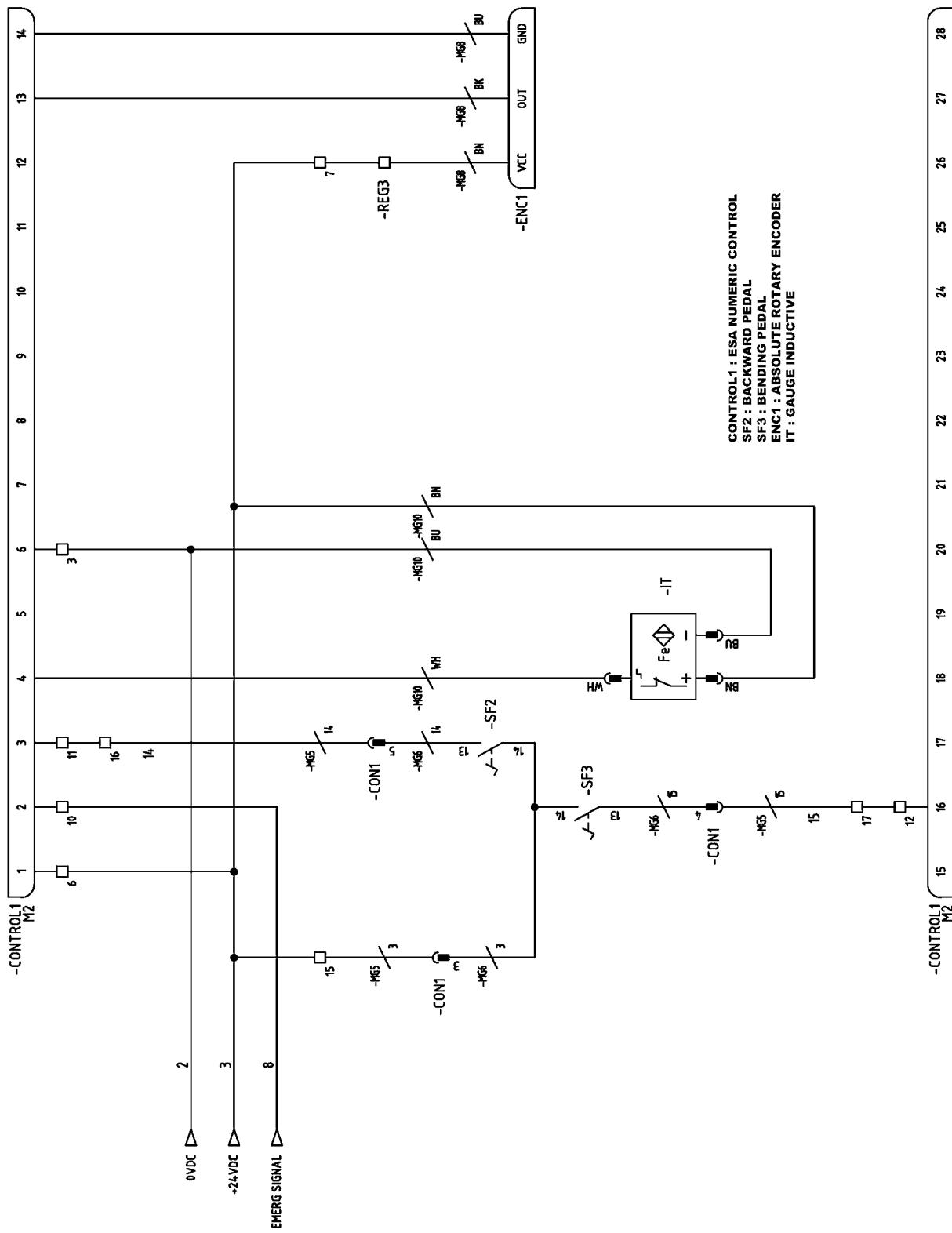


## A4. Wiring Diagrams

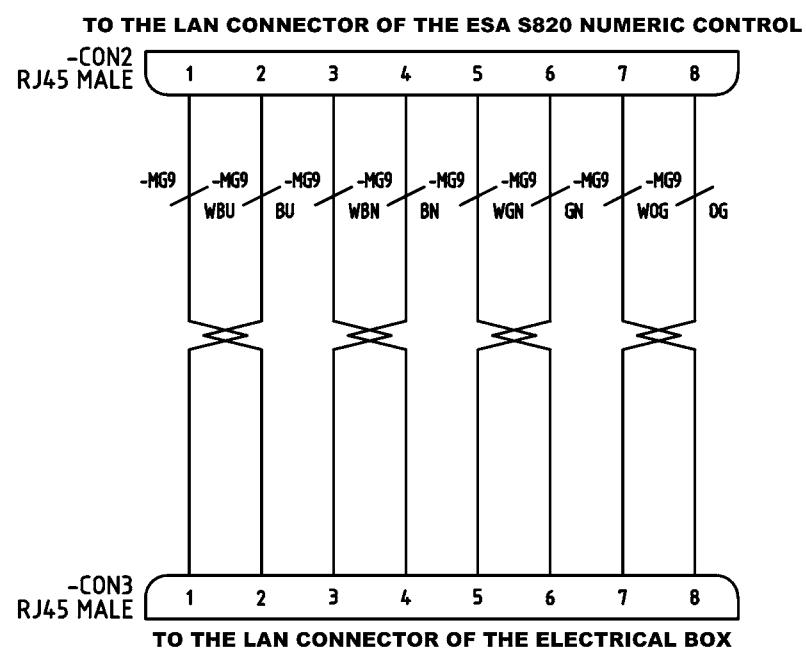








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