E-CGM

Coupling Grooving Machine Manual

TOPFIBRA

EFFECTIVE FILAMENT WINDING® PIONEERS

E-CGM

Coupling Grooving Machine Manual

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1. INTRODUCTION

TOPFIBRA D.O.O. is an engineering company and it is indicated in the handbook with the name: Manufacturer.

The Company purchasing the machine is indicated in the handbook with the name: Customer.

The manufacturer recommends a training course for personnel responsible for operating and maintaining the machine to increase familiarity and knowledge of the various procedures.

This manual contains the features, performances, instructions for use, and references to the preventive and remedial operations of the machine.

The manufacturer compels the personnel in charge of operating and maintaining the machine, as well as the personnel in charge of transport and possible assembly operations, to read this document.

This document is the Operational Handbook for the:

E-CGM (Coupling Grooving Machine).

This Manual is to be considered an integral part of the system and is to be kept until final dismantling. It is to be kept by the person in charge of the machining service after the final installation.

2. GENERAL INFORMATION

This manual provides all the necessary information for the installation, use, and maintenance of your coupling grooving machine E-CGM. If you do not understand any specification or description of this manual, please contact our technicians.

We suggest that you read this manual in its entirety and scrupulously respect the instructions. Each procedure or warning that you will read, although seemingly obvious, is aimed at the total knowledge of the machine by the user and full implementation of the necessary condition for safe operation. All people working with E-CGM must know the information in the present manual.

2.1. General description

The E-CGM is made for the production of ND12 to ND120-inch couplings, the maximum workable length is 6 m. The couplings are used for joining GRP pipes. The couplings are made from the processing of "Pipes for couplings" coming from the manufacturing of pipes using the continuous line. The machine performs grooving, cutting, and internal machining of the couplings, where Reka gaskets are fitted. Its function is also to cut the coupling blanks.

IMPORTANT!

The machine shall not be used for different aims than the machining of GRP materials and sizes indicated in this manual. We decline any responsibility for any use other than the ones described in this manual.

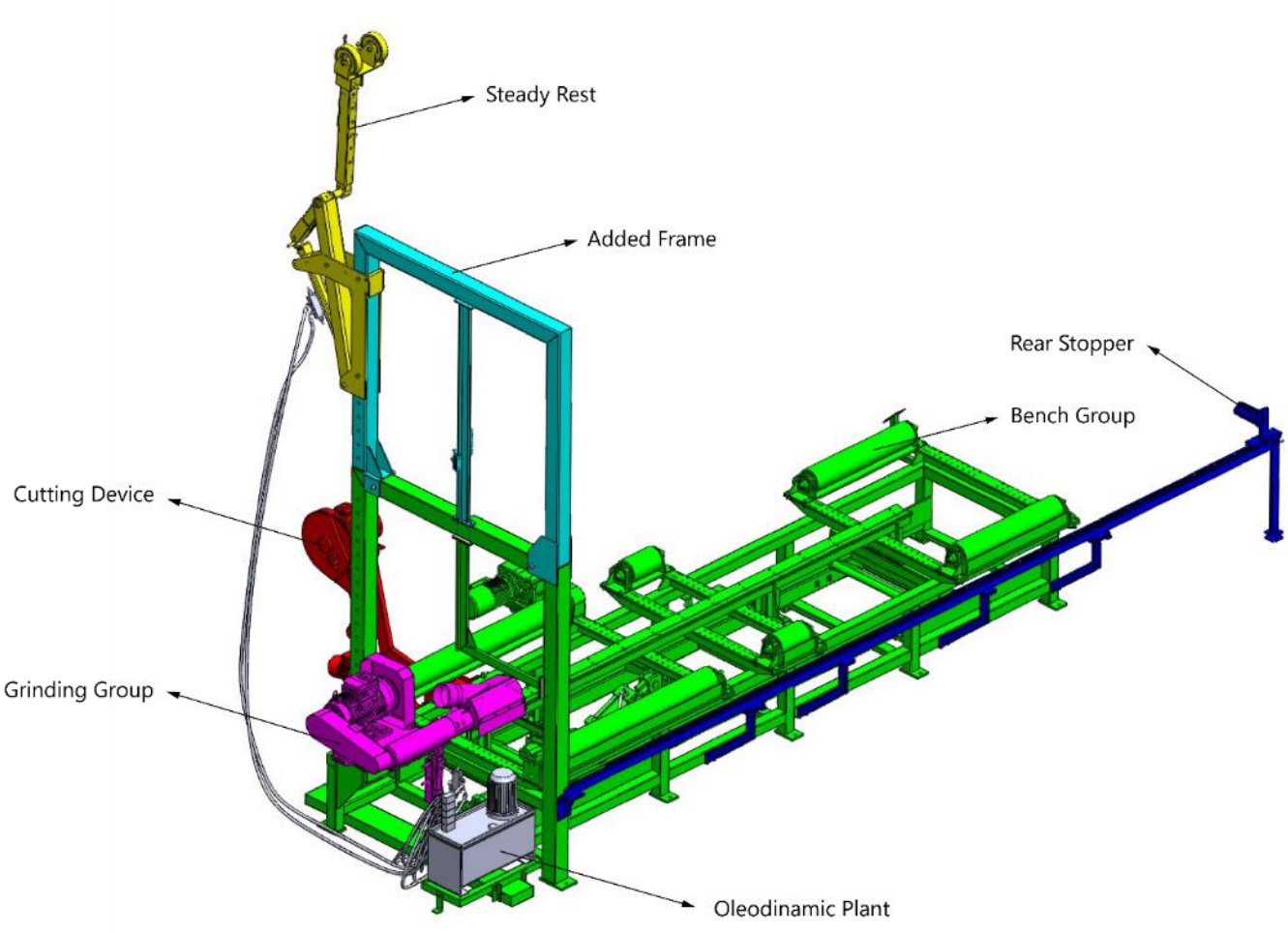

Figure 1

The CGM is composed of different items. The purpose of each item is described herewith:

2.1.1. Bench Group

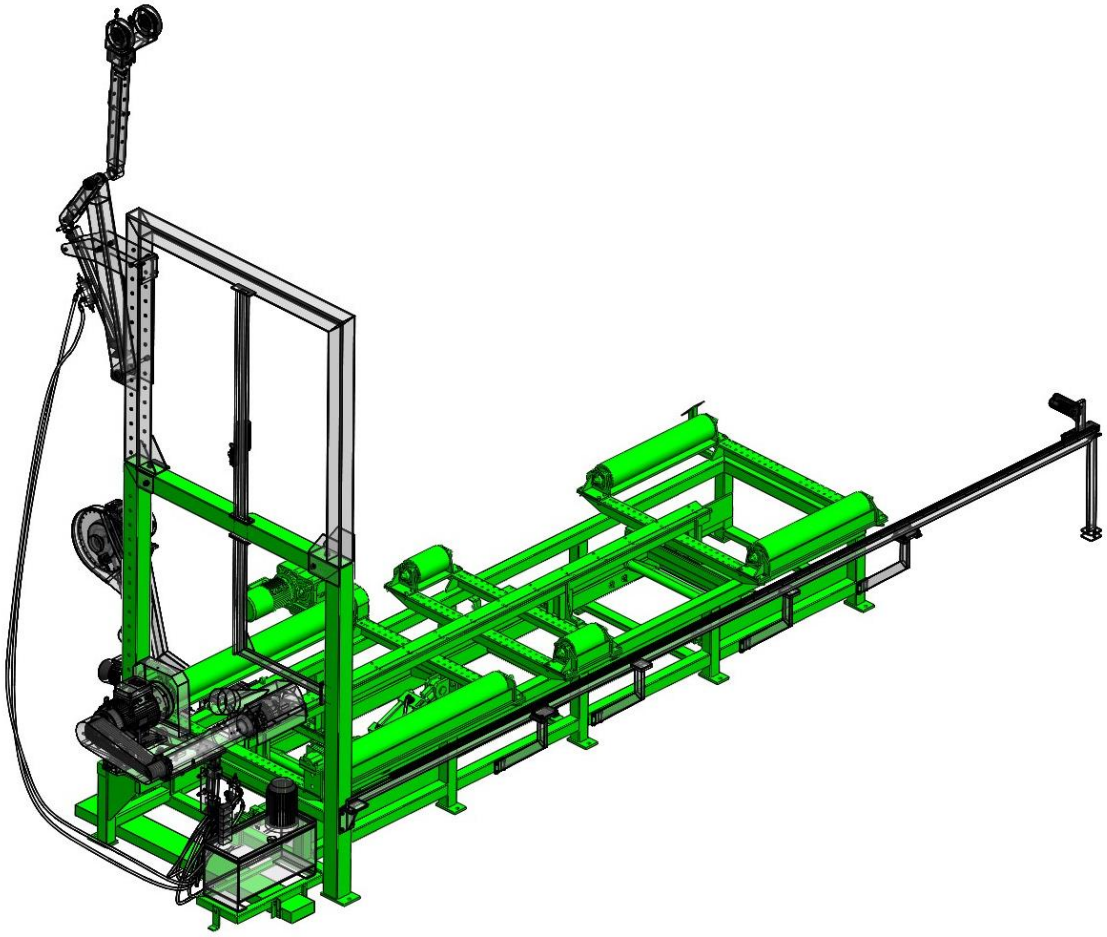

Figure 2

2.1.1.1. Support

This group consists of five polyurethane rollers and one motorized roller. To move it forward, the pipe is lifted using slide supports. The exact use of these supports and rollers is required for each size. For this reason, it is of primary importance to ensure that the rollers are properly positioned on a fixed frame concerning the size of coupling that is produced (for clarification on the positioning of rollers and supports with slides, see 4.3.2. Adjustment operations.

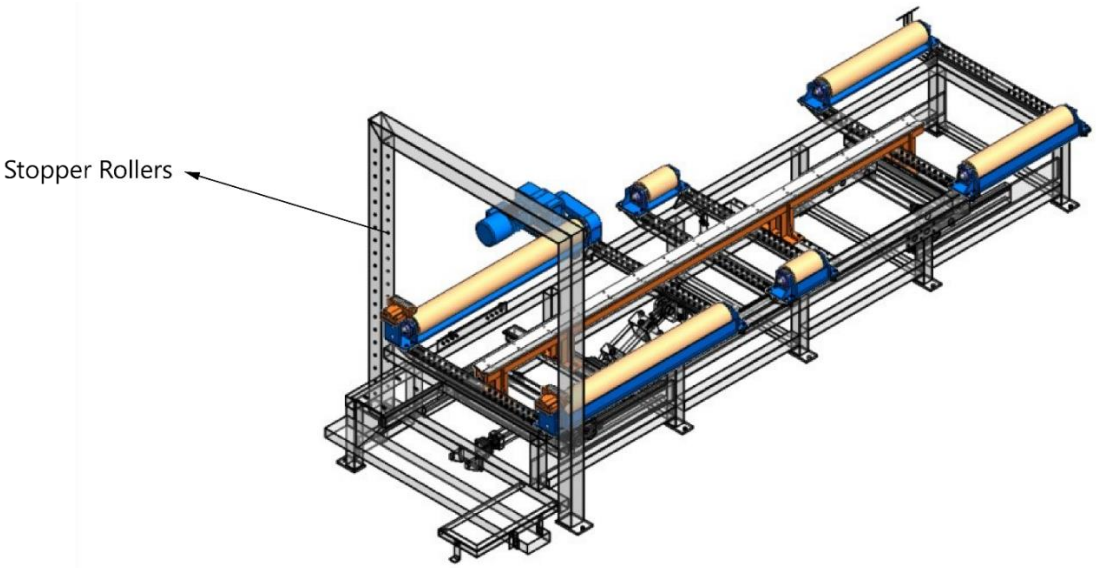

Figure 3

2.1.1.2. Rotation

The rotation is made by a motorized roller (Figure 4); the movement is made by 0, 75 kW gearboxes with adjustable rotation from 0 to 187 RPM.

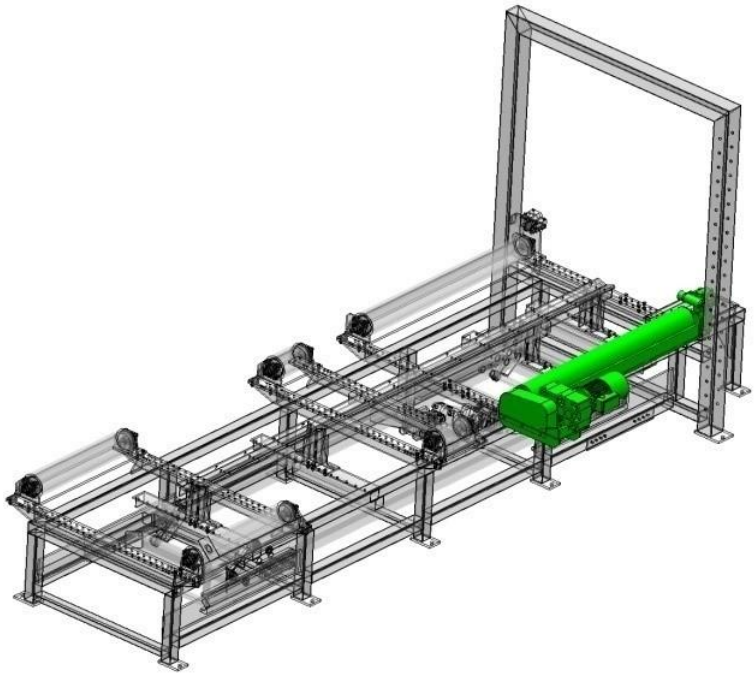

Figure 4

This rotation allows the execution of the machining on the pipe.

2.1.1.3. Forward movement

The forward movement is made by the "Pilgrin Process", which is the correct combination action of 2 hydraulic cylinders (Figure 5). The A Cylinder is fixed on the Fixed Frame of the machine; the front part is fixed on a mobile frame (A Mobile Frame) equipped with combined bearings wheels which run on rails welded into the fixed frame (HOESCH type).

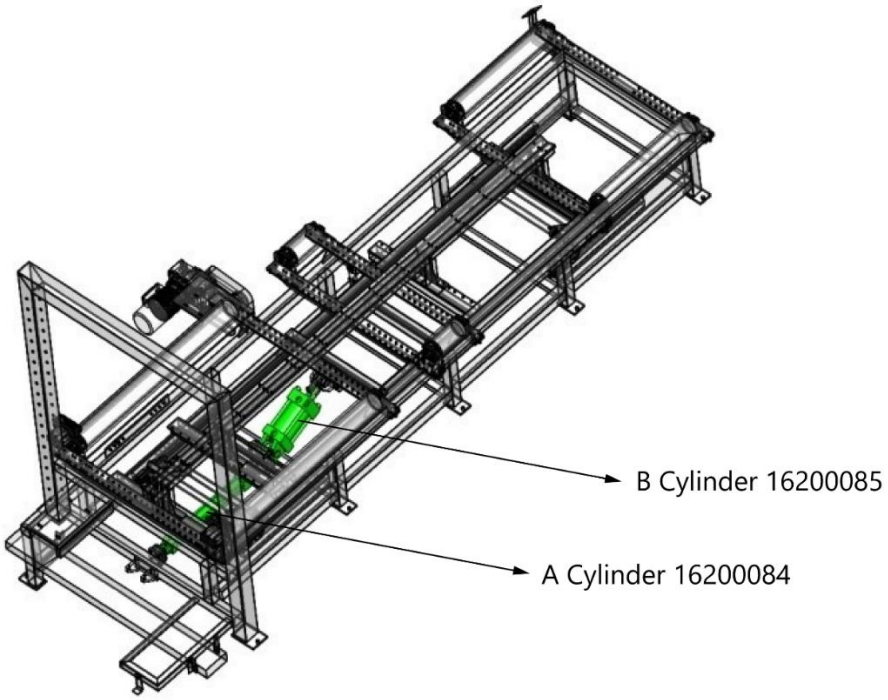

Figure 5

2.1.2. Grinding Group

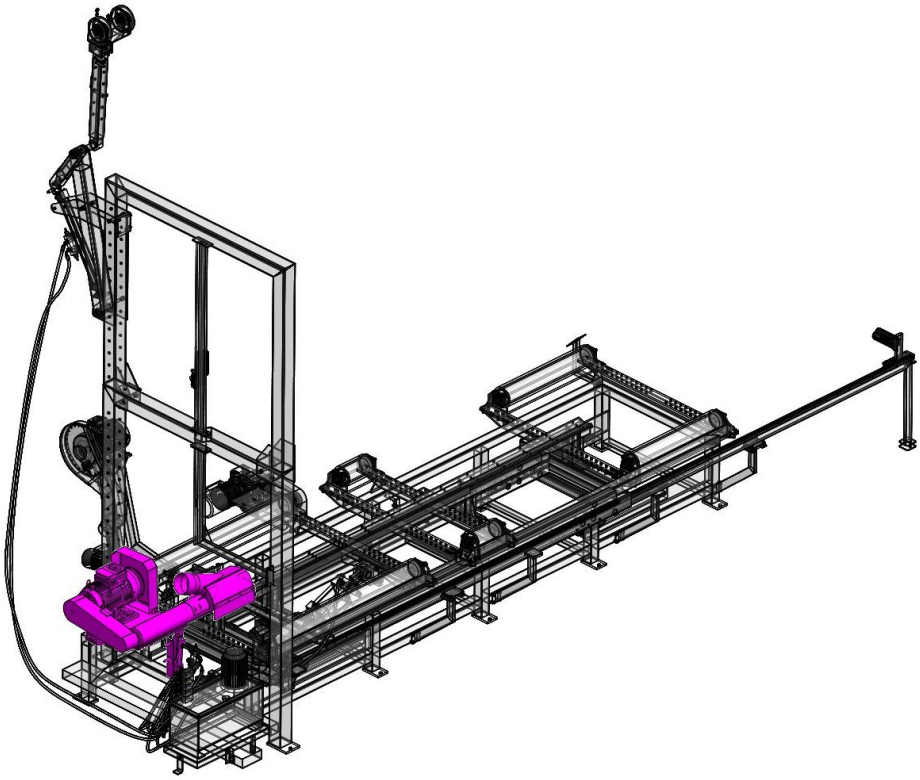

Figure 6

The purpose of this group is to form the slot for the gasket on the couplings. It is fixed at the front of the machine, as shown in the figure above.

This group is driven by an electric motor by a system of pulleys and belts. This group moves a shaft housed in a special support.

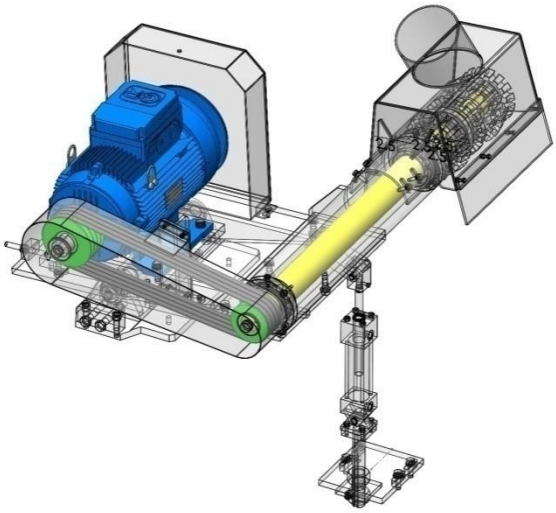

Figure 7

The group consists of 3 sets of 5 grinding wheels and spacers, assembled appropriately depending on the size of the coupling that is being produced (see section 4.3. Operating the device); grinding two mirrored slots for the housing of the gaskets and a central slot for the housing of the stopper. The three sets of grinding wheels have different sizes and distances and will be assembled depending on the coupling that is being produced (see section 4.3.).

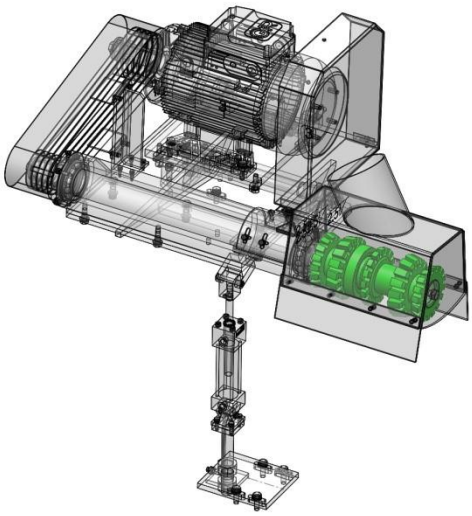

Figure 8

The grinding wheels are placed inside the pipe where the slots will be formed thanks to hinged movement to the inner surface. The lifting of the group is made up of a hydraulic actuator connected to the rear of an adjustable screw attached to the bench group. The front part is

connected to a special hinge & rod system. To execute, the process lowers the hydraulic cylinder, and the connecting rod causes the grinding wheels to lean inside the pipe and works by gravity (the cylinder does not pull the group towards the pipe).

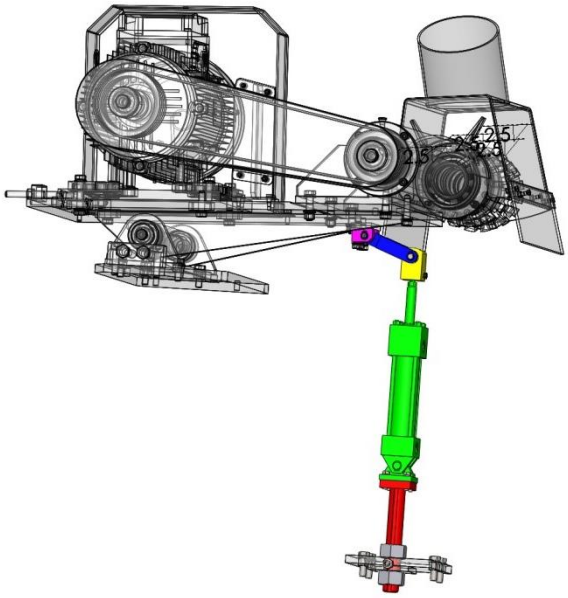

Figure 9

The dust generated from the process is sucked by a dust conveyor. There are two types of conveyors depending on the size of the manufactured coupling (see section 4.3.). A hose is inserted in the conveyors that are connected to the aspirator (not included in the scope of supply).

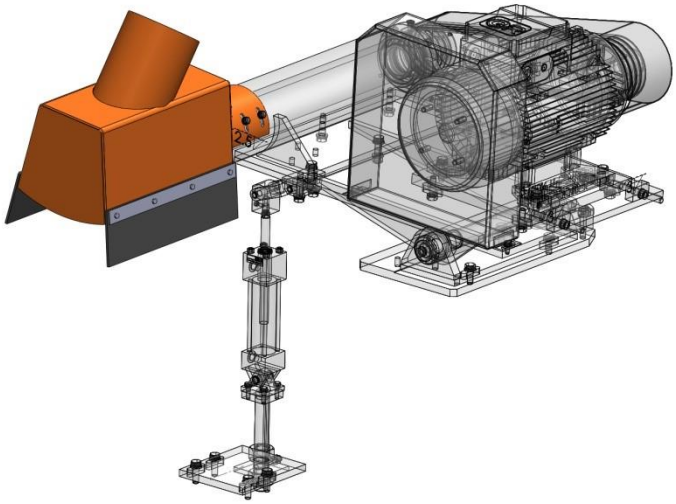

Figure 10

2.1.3. Cutting device group

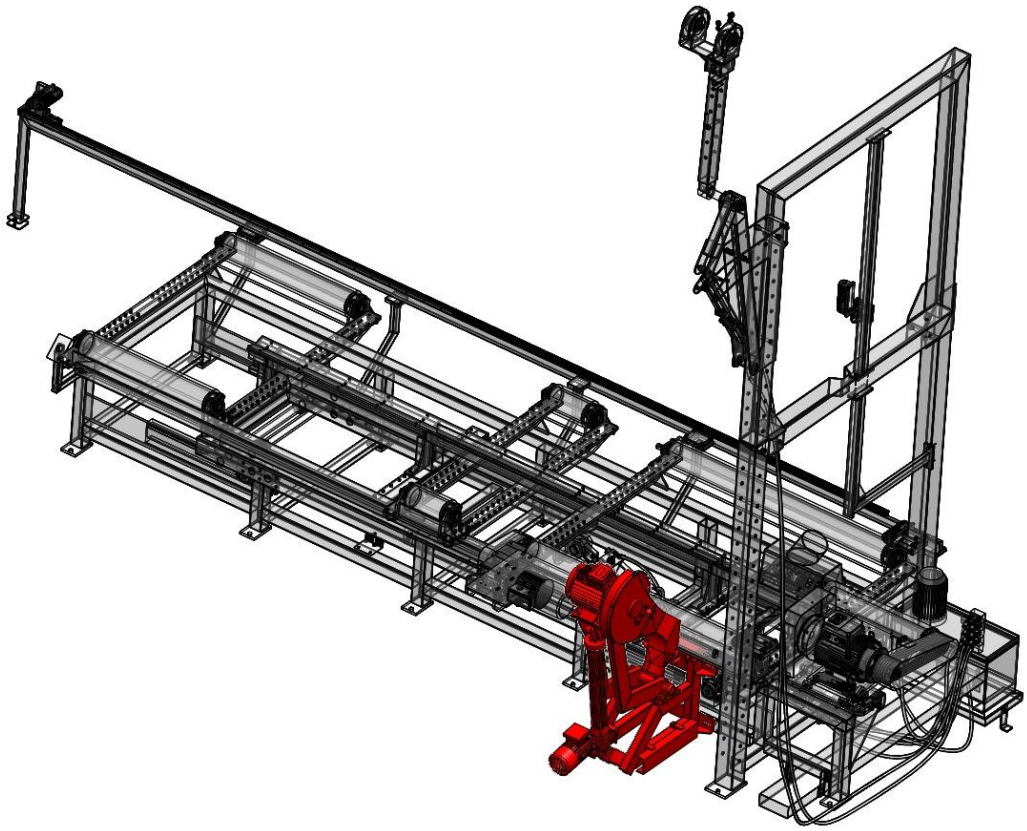

Figure 11

The purpose of the cutting device group is to cut the coupling at the length of the diameter requested after the milling operation. The cut is carried out by a blade attached directly to an electric motor; the blade is installed in a conveyor for dust suction.

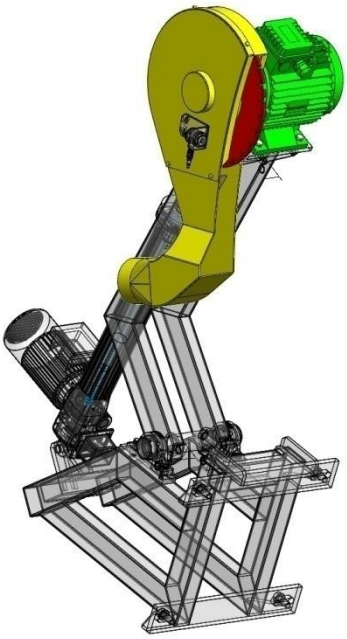

Figure 12

The cut of the blade on the pipe is made by the oscillating movement of the entire group described above. The group is fixed on a frame that is housed on two supports that allow the tilt, thanks to an electric actuator positioned between the fixed and mobile frame.

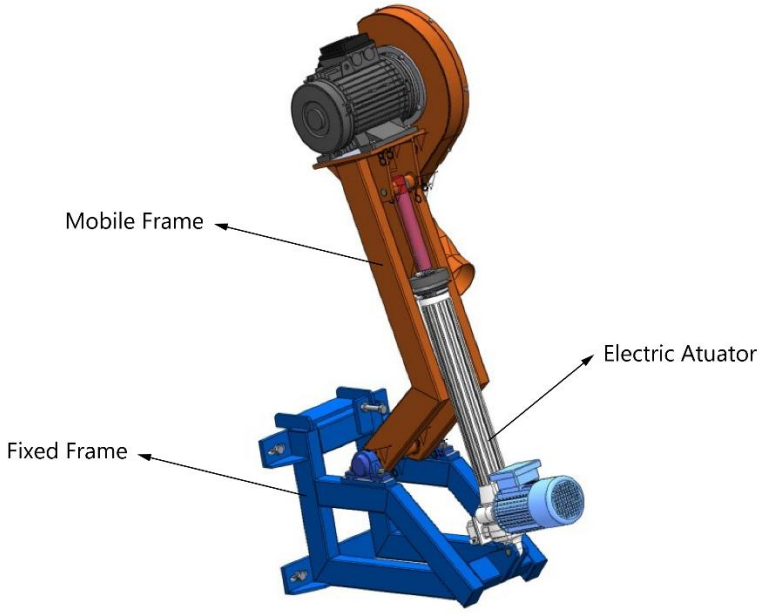

Figure 13

The fixed frame is fixed to the bench group with screws that have 4 slots allowing the adjustment of the cutting position unit onto the bench group. Moreover, the bench has 4x4 threaded holes to allow multiple mounting positions. For adjustment see section 4.3.2.5. Cutting Device Frame.

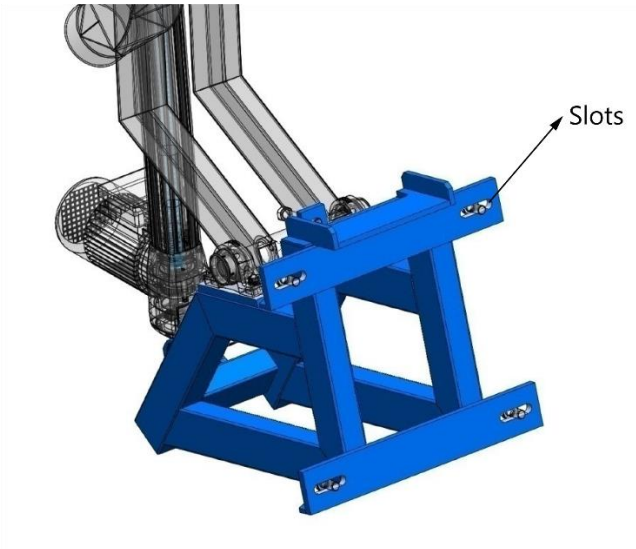

Figure 14

2.1.4. Steady rest group

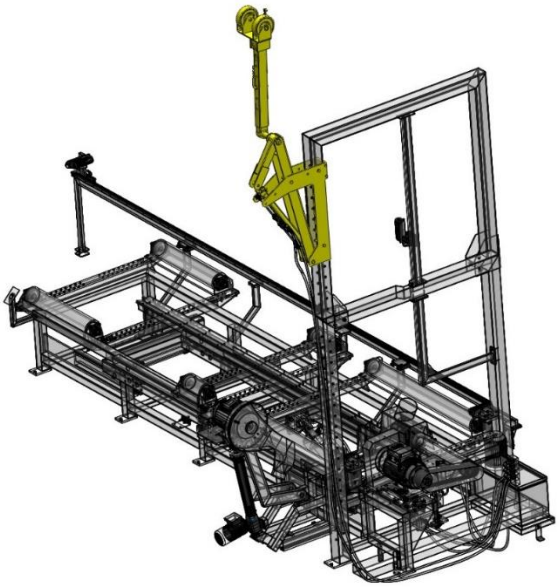

Figure 15

The purpose of this steady rest group is to create a force on the pipe, which is transmitted to the bench rollers and in particular to the roller drive. The above-mentioned force added to the weight of the pipe, allows the transmission of torque, thanks to the friction between the pipe and the rollers. This torque will keep the pipe in rotation during the grinding and cutting operations. The entire steady rest group is fixed to the bench for the small-diameter pipes. As far as the big diameter pipes are concerned, the entire steady rest group is fixed to an additional frame. Two wheels are fixed at the top of the steady rest group. The wheels exert pressure on the pipe. Moreover, the wheels must be tilted (up to 20 ° clockwise) to create also a small pushing force to push the pipe forward and will be blocked by three stoppers.

Figure 16

The group will be adjusted according to the size of the manufactured coupling. The adjustment is made by a pin inserted in the holes on the Support A and Support B. Make sure, that the cutter pin is inserted in the hole of the pin (see section 4.3.).

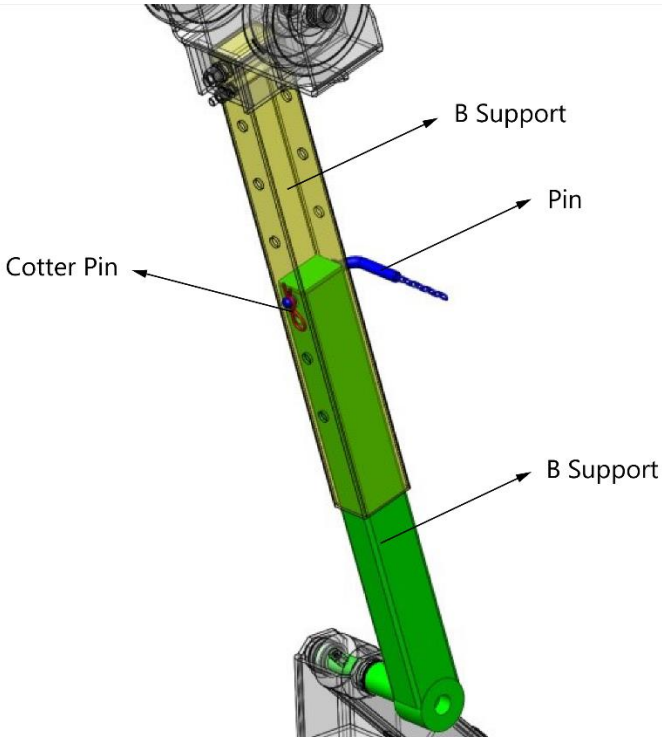

Figure 17

The pressure of the pipe on the Bench Group Rollers is given by a hydraulic cylinder.

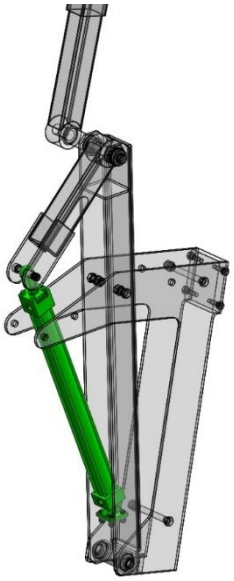

Figure 18

2.1.5. Upper frame group

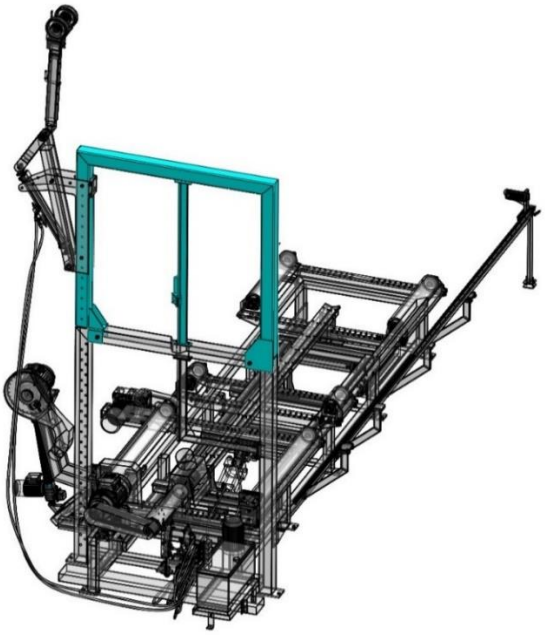

Figure 19

The above-added frame group has the purpose to fix the Steady Group (see section 2.). Moreover, the added frame group supports the pack-bearing stopper (see section 4.3.).

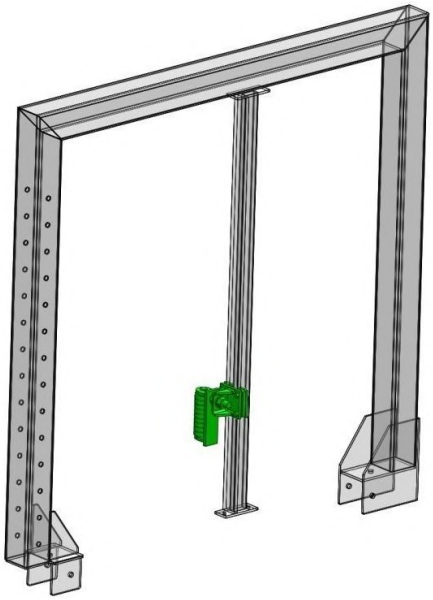

Figure 20

2.1.6. Rear stopper group

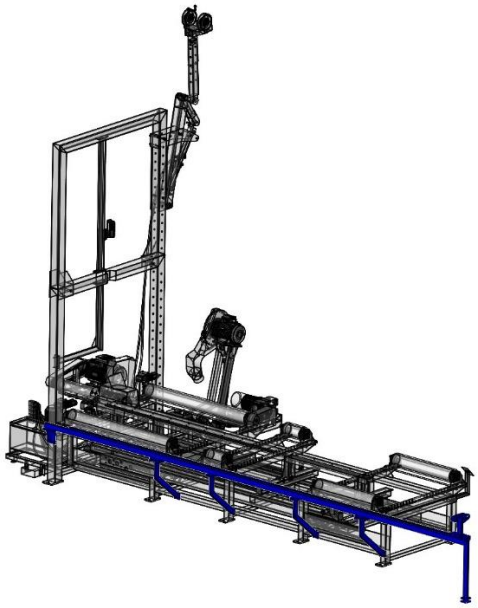

Figure 21

The rear stopper group has the purpose to stop the possible forces that may bring the pipe back.

It consists of a main support fixed to the Bench Group and one foot laying on the ground. Moreover, the rear stopper group has a guide fixed to the support. Finally, the rear stopper group has support with a set of bearings that runs on the guide.

The position of the entire group varies depending on the manufactured coupling (see section 4.3.).

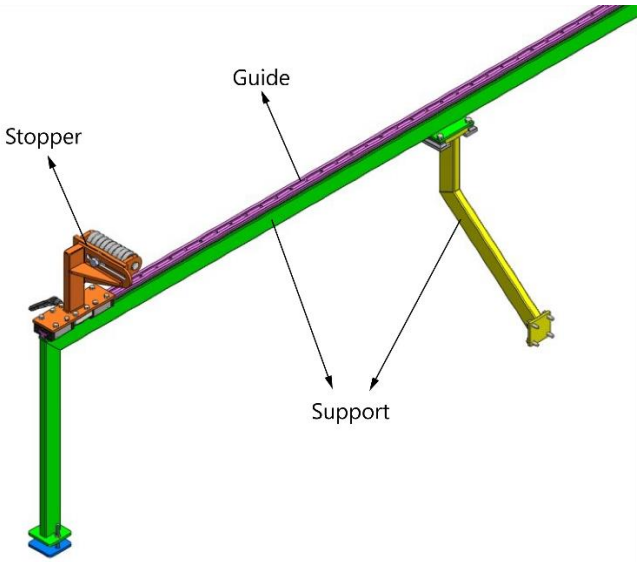

Figure 22

2.2. Technical data

2.2.1. Bench Group

Motorized roller gearboxes:

Power: 0,75 kW
Roller RPM: 0÷187 RPM

Hydraulic cylinder A:

Bore: 63 mm
Ø Rod: 28 mm
Stroke: 630 mm

Hydraulic cylinder B:

Bore: 125 mm
Ø Rod: 56 mm
Stroke: 160 mm

2.2.2. Grinding Group

Electrical motor:

Power: 15 kW
Grinding wheels: 4000 RPM

Hydraulic cylinder:

Bore: 40mm
Ø Rod: 18 mm
Stroke: 125 mm

2.2.3. Cutting Group

Electrical motor:

Power: 11 kW
Blade: 3500 RPM

Electric actuator:

Maximum force:	1200 N
Speed:	15 mm/s
Stroke:	500 mm

2.2.4. Steady rest group

Hydraulic cylinder:

Bore:	40 mm
Ø Rod:	18 mm
Stroke:	630 mm

3. SAFETY INSTRUCTIONS

3.1. General

Please, find here the risks and precautions connected to the use of E-CGM.

The safety of the machine is based on a safe control circuit that stops the movement of the machine when an emergency pushbutton is pressed or the gate of the fence is open.

Once the emergency stop circuit is triggered, to restore the machine, the safe control circuit must be acknowledged with the button on the console. This rearms the conditions to start again the machine but does not start any motor.

In case of a failure of the mains, the main switch of the machine is set to off. When the panel is powered again, no movements are performed and the main switch on the machine's panel must be closed again.

3.1.1. Cutting blade

The blade rotates in a guard conveyor for dust suction. The conveyor is equipped with a cover; the cover should not be removed for any reason during the work phase of the machine.

3.1.2. Tools for grinding

Grinding wheels work inside a conveyor for dust suction. The conveyor should not be removed for any reason in the work machine.

3.1.3. Dust of machining

It is unavoidable that some dust will not be sucked from the cutting and grinding wheel conveyors. To avoid inhalation or eye irritation, it is strongly recommended to wear a face mask and goggles.

		

The noise of machining:

It is unavoidable that cutting and grinding causes noise, and this carries the risk of hearing problems. It is strongly recommended to wear earplugs.

		

3.1.4. Transmission

From motor to grinding wheels: the grinding wheels rotate thanks to electrical motors, pulleys and belts (see section 1.2.2); the belts are inside a protective cover. You must not remove the cover while the machine is in operation.

		

3.1.5. Coupling rotation

The coupling rotates thanks to a motorized roller, and it's supported by 5 rollers (see section 1.2.1). This rotation causes the risk of hand crushing and/or gripping of clothes.

		

3.1.6. General Precautions

It is prohibited for non-experts persons to access the operational area of the E-CGM; moreover, the manpower working on the E-CGM shall wear protective gloves, helmets and safety shoes.

			

4. INSTALLATION

4.1. Transport

Only for transport purposes, the E-CGM will be dismantled as follows: Cutting Device Group, Steady Rest Group, Rear Stopper Group and Added Frame Group; the weight of the remaining items is ~ 2700 kg.

Please, find below some suggested guidelines for proper lifting.

LOCATION AND DIMENSIONS OF CENTRE OF GRAVITY

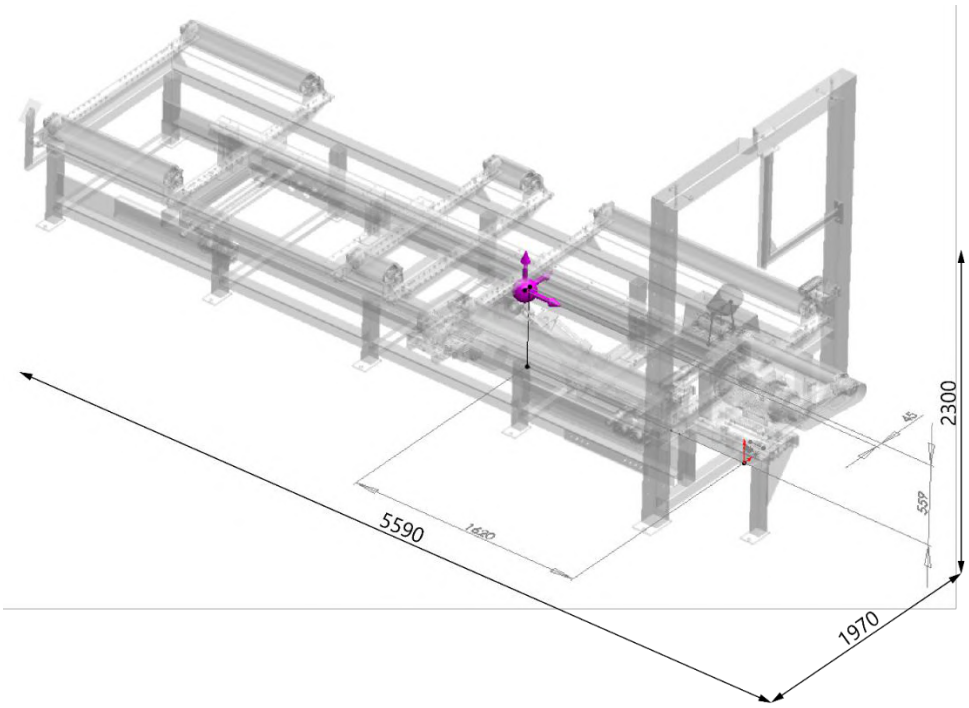

Figure 23

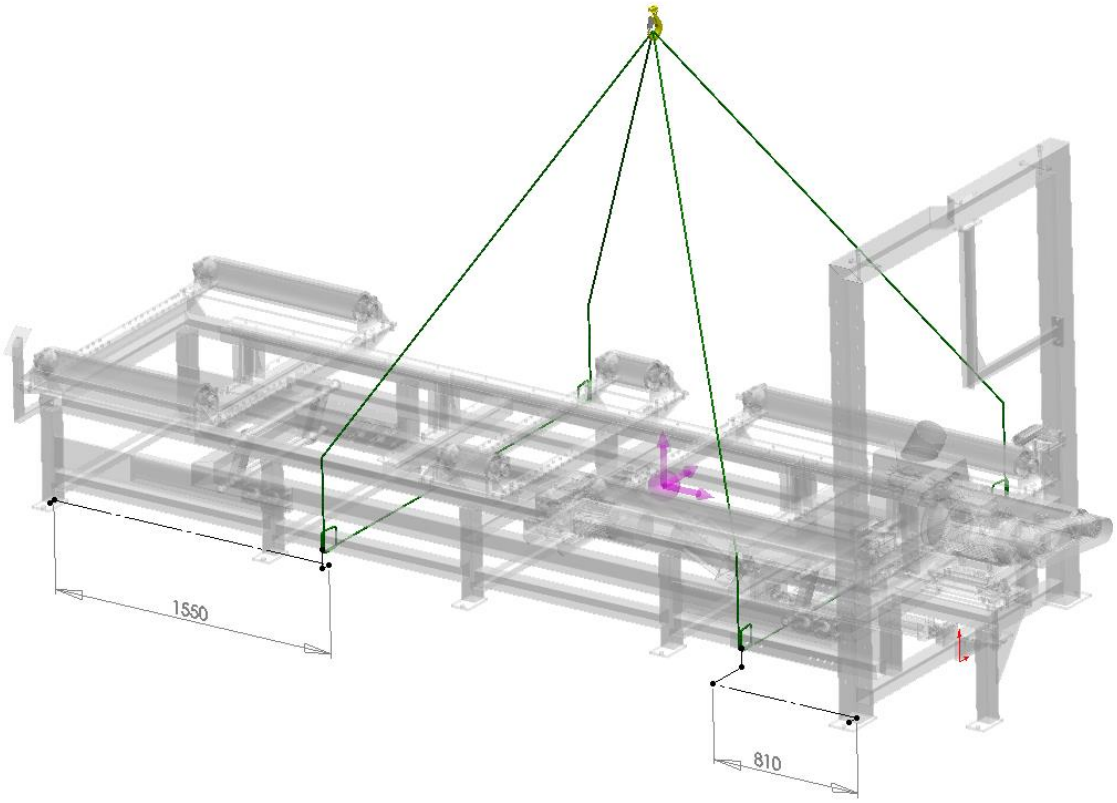

Figure 24

NOTE:

Ropes and hooks are not under TOPFIBRA supply.

4.2. Positioning, fixing and connecting

The machine is positioned as shown in the specific layout of each job. However, we suggest placing it inside a room with soundproof walls and doors.

TOPFIBRA supplies the anchors for fixing the machine; the anchors are FRIULSIDER ATS 18/25-M12 type. You have to follow the instructions specified in the datasheet for the installation. You must have a drill bit for concrete Ø18.

The machine must be reassembled with the remaining groups (those dismantled for transport) and the pneumatic hose (see section 3.3.2.).

4.3. Diagrams

4.3.1. Electric diagram

See the file attached to the manual

5. OPERATING INSTRUCTIONS

5.1. Preparation before use

We also recommend before starting to use the machine, verify the proper lubrication of the items (see section 5.1.), the oil levels (see section 5.1.2.), any wear on the tool (see section 5.1.) and the correct operation of the suction system (not supplied with the E-CGM).

5.2. Start-up procedure

Below you can find the step-by-step starting procedure of E-CGM.

1. Place the main switch on **1**.
2. Verify that the emergency is not operated.
3. Press the “push button”.
4. If there are no problems, the "push button" turns on and the pilot light of the emergency turns off.
5. Now you can use the unit panel.

5.3. Operating the device

In this chapter, we will describe step-by-step the standard work cycle of E-CGM: **movements and positioning**.

Movements mean actions made by motors and actuators on the machine.

Positioning mean: the preparation of E-CGM in its correct "Configuration" before the production (related to the size of the coupling to be manufactured).

5.3.1. MOVEMENTS

5.3.1.1. Positioning of a new pipe

In this phase, the forward cylinder and lift cylinder of the Bench Group must be in the open position (fully extended); the actuator of the Cutting Group must be in the back position (fully closed); the cylinder of the Grinding Group must be open (fully extended); the cylinder of the Steady Rest Group must be completely closed.

NOTE:

The coupling pipe can be positioned using a forklift or overhead crane or other lifting equipment.

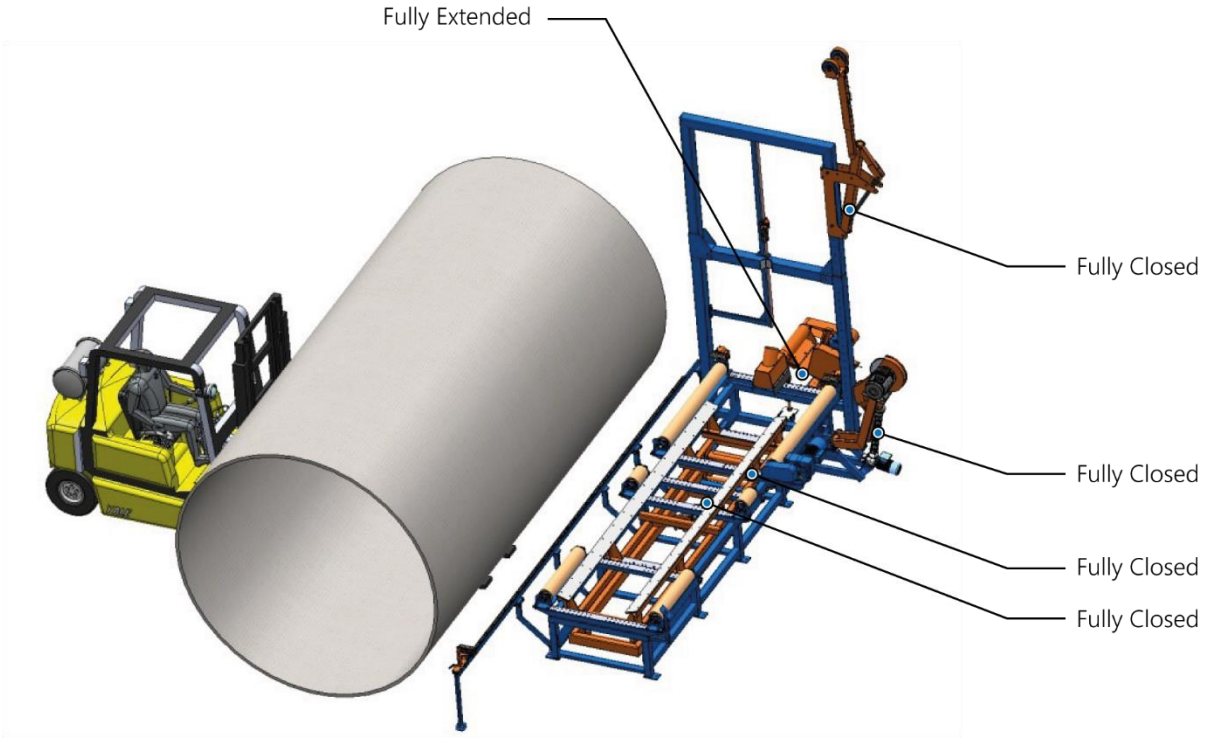

Figure 25

5.3.1.2. Support of a new pipe

In this phase, the coupling pipe is lowered on the slide supports.

NOTE:

The rear stopper must be removed when you position the new pipe.

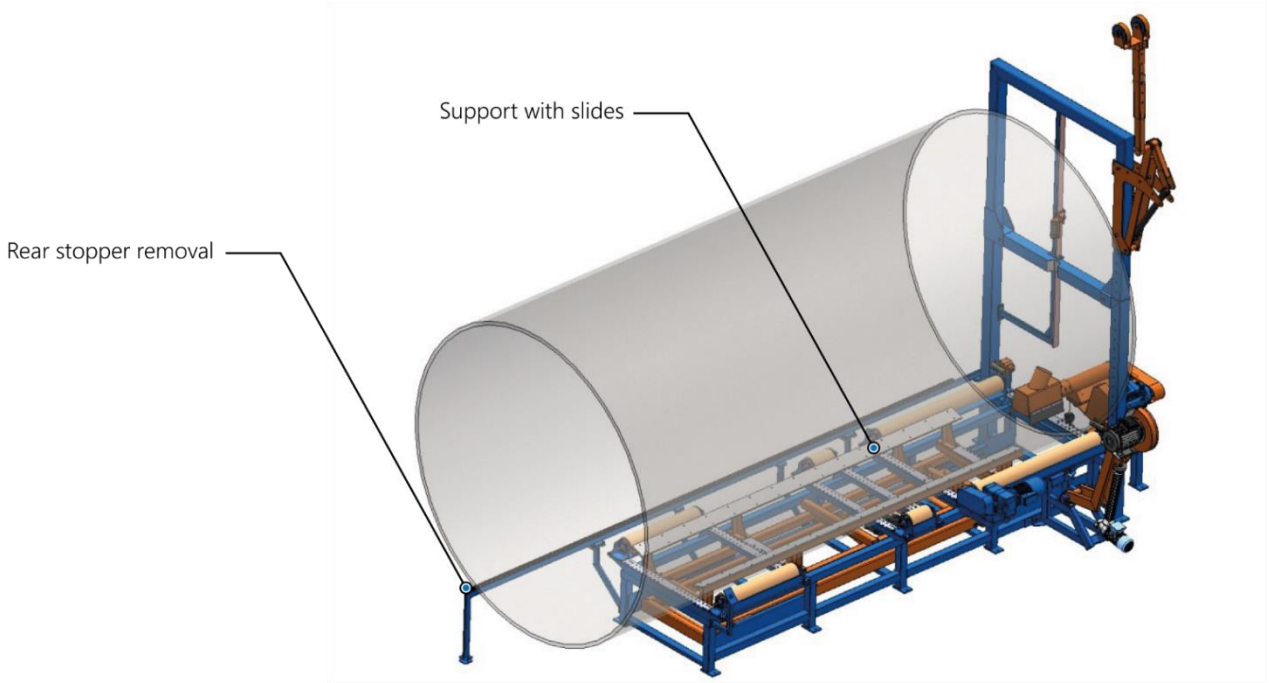

Figure 26

5.3.1.3. Pipe backward

In the backward phase, the forward cylinder is fully retracted forward (stroke 630 mm); at this point, the pipe is supported by the slide supports.

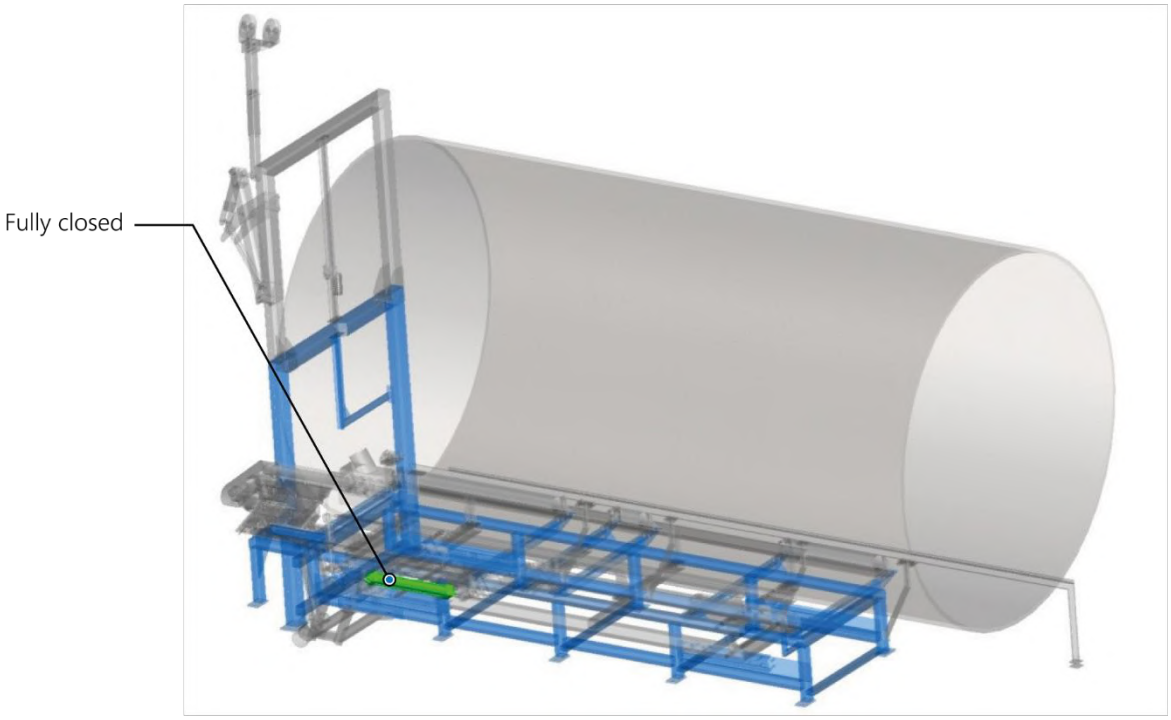

Figure 27

5.3.1.4. Descent of pipe

In this phase, the lift cylinder goes down (stroke 160 mm); at this point, the pipe is supported on roller supports.

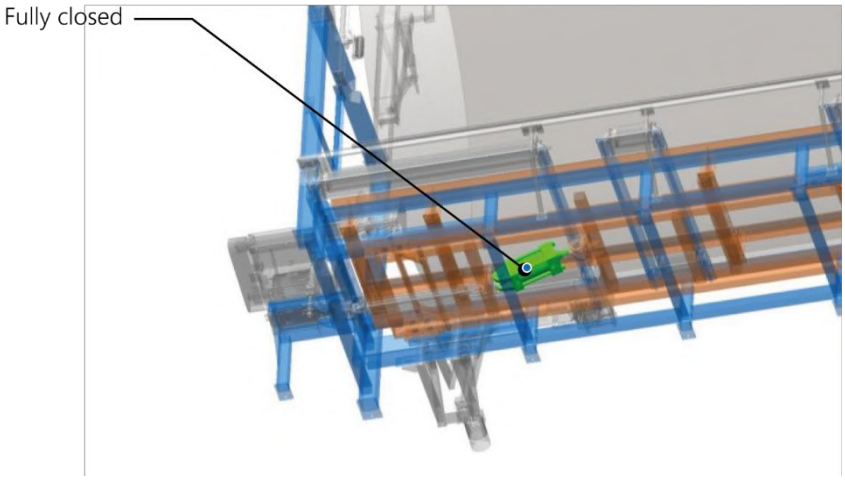

Figure 28

5.3.1.5. Pipe forward

In this phase, the forward cylinder is fully open; at this point, the pipe is supported on roller support.

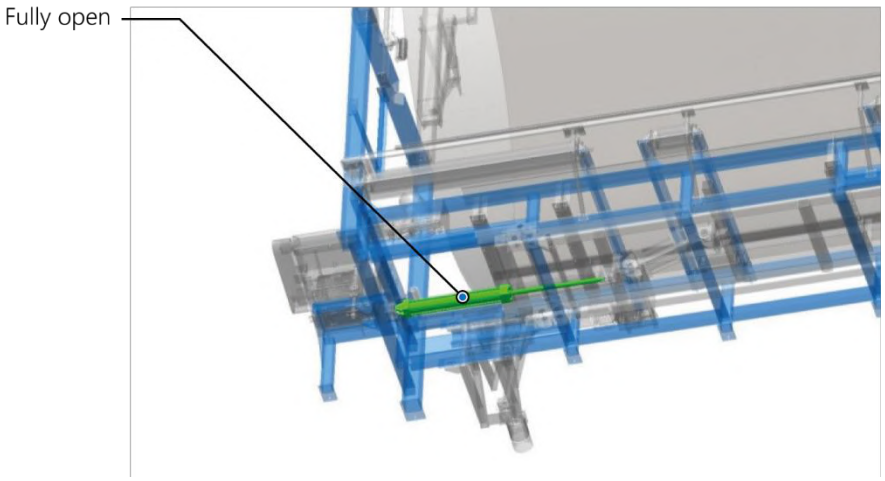

Figure 29

5.3.1.6. Lifting of pipe

In this phase, the lifting cylinder is fully open; at this point, the pipe is supported on slide supports.

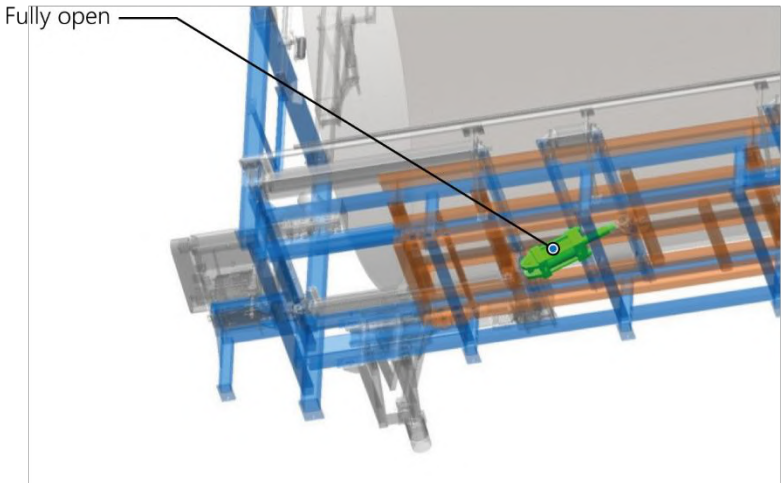

Figure 30

5.3.1.7. Pipe backdown

In this phase, the forward cylinder is fully retracted; at this point, the pipe is supported by slide supports and will touch the stoppers.

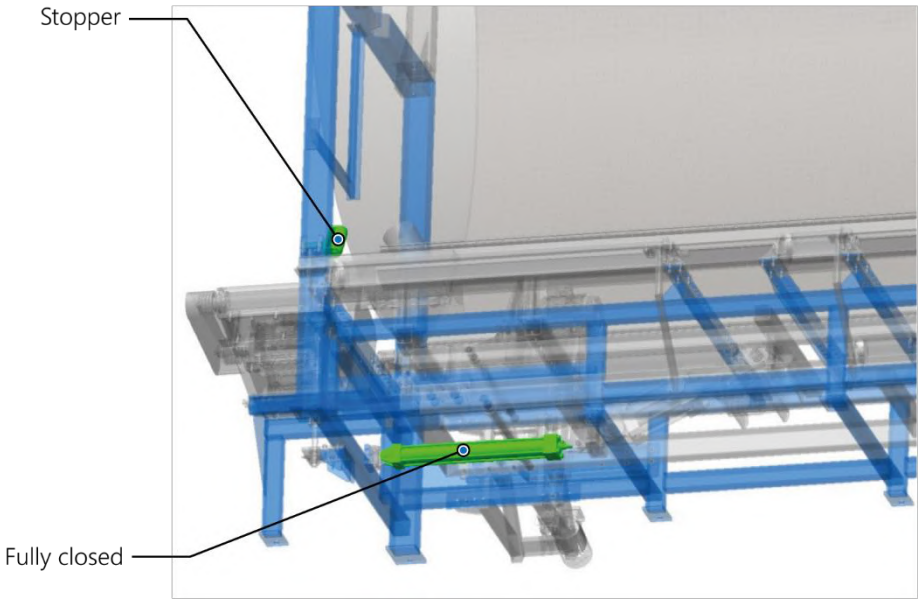

Figure 31

5.3.1.8. Descent of pipe

In this phase, the lift cylinder goes down; at this point, the pipe is supported on rollers support.

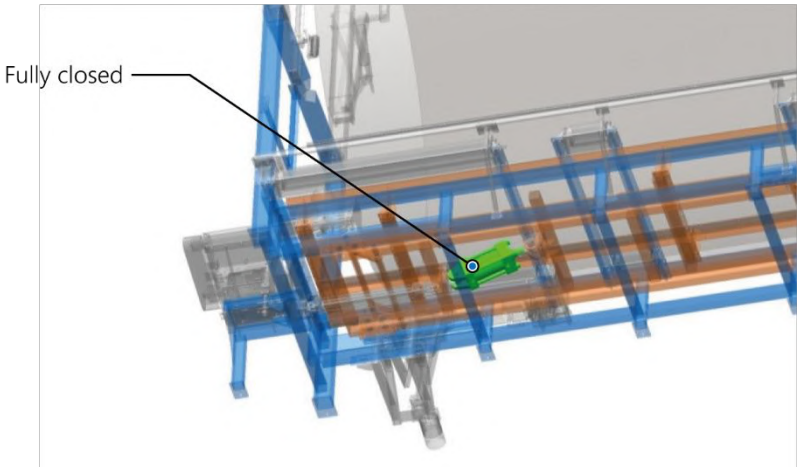

Figure 32

5.3.1.9. Rear locking pipe

At this point, you must position the rear stopper and lock it in contact with the pipe.

Figure 33

5.3.1.10. Steady rest lock

At this point the steady rest cylinder is open, causing a pressure between the rollers of the steady rest and the pipe.

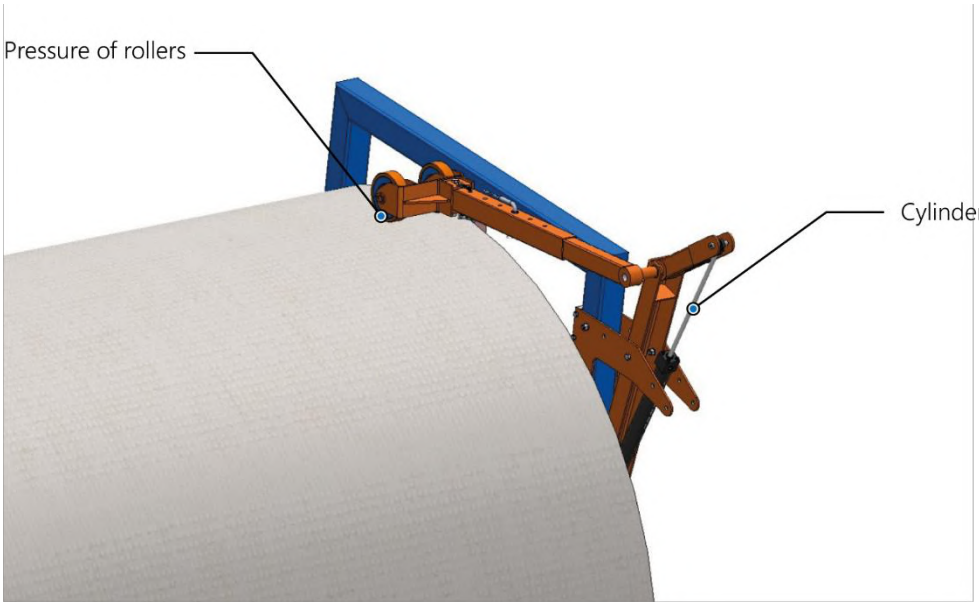

Figure 34

5.3.1.11. Rotation of the pipe

In this phase the motorized roller motor is started; this causes the rotation of the pipe.

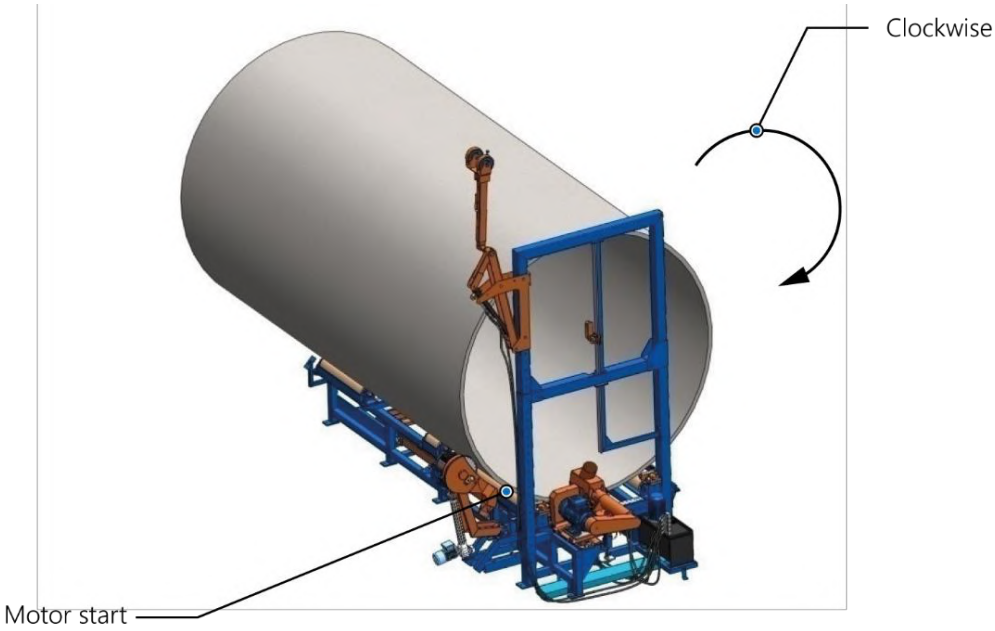

Figure 35

5.3.1.12. Coupling grooves

At this point, the grinding wheels motor is started and the cylinder is sent down; now the grinding wheels are in contact with the inside of the pipe; this contact causes circular machining inside the pipe.

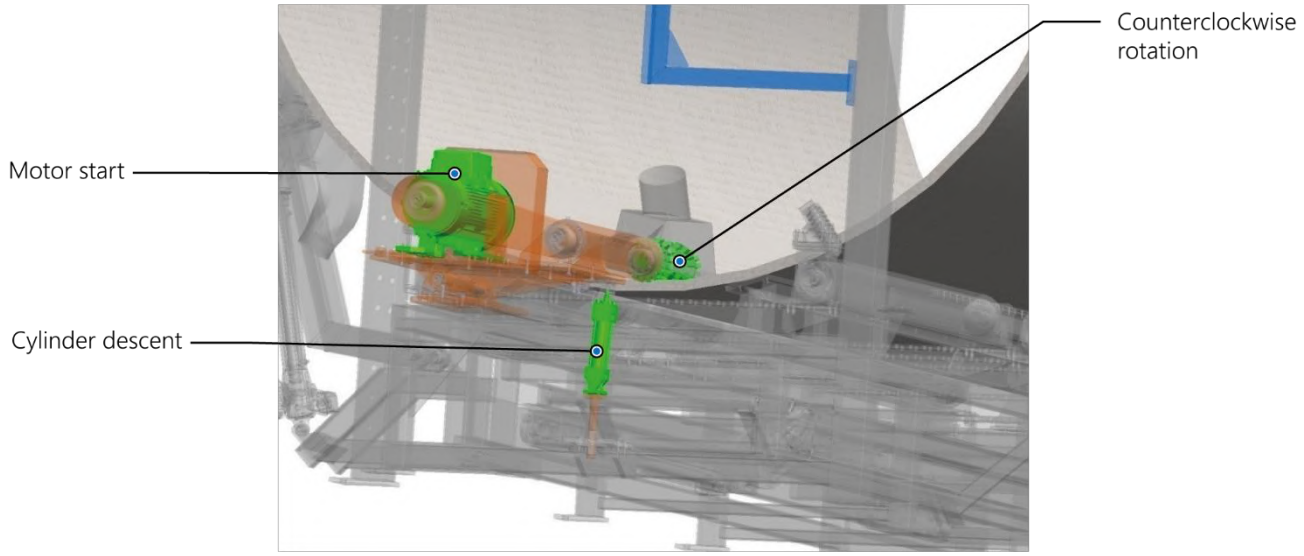

Figure 36

5.3.1.13. Cutting of the coupling

At this point, the cutting device motor is started and the electric actuator is progressing.

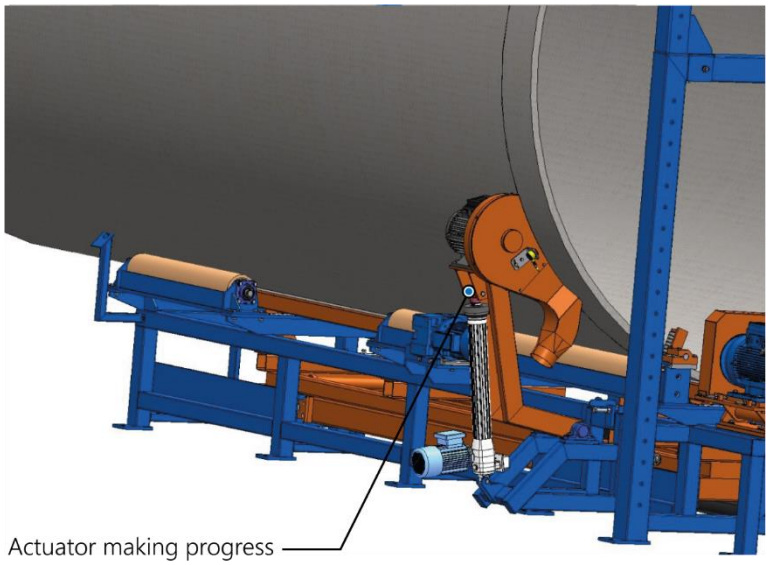

Figure 37

5.3.1.14. Removal of the cut coupling

At this stage, the coupling is cut. Before removing the coupling, take care to lift back the cutting device actuator. The grinding group cylinder must go up and the steady rest cylinder must close.

NOTE

For the coupling removal, TOPFIBRA suggests that you install a jib crane close to the E-CGM, also useful for positioning the steady rest.

Figure 38

5.3.2. ADJUSTMENT OPERATIONS

As mentioned, the E-CGM is suitable for the manufacture of ND300 up to ND3000 coupling couplings. To allow the production of this wide range of diameters, it is necessary to follow some adjustments and/or settings of various devices on the machine.

Please, find herewith the list of the units, rules and reasons for adjustments and positioning relative to each size of coupling.

5.3.2.1. Rollers and Bench Group Supports

You have to adjust the position of the support idler rollers, the motorized roller and support with slides. The machine is equipped with two sets of slide supports: one for diameters from ND12" up to ND24", and the other for ND28" up to ND120". The support rollers and motor

rollers are fixed busing holes in the fixed frame (see figure). On the other hand, the support with slides is made using holes in the mobile frame (see figure). The fastening is obtained by using M12 fixing screws, so you will need to unscrew with a no. 19 key.

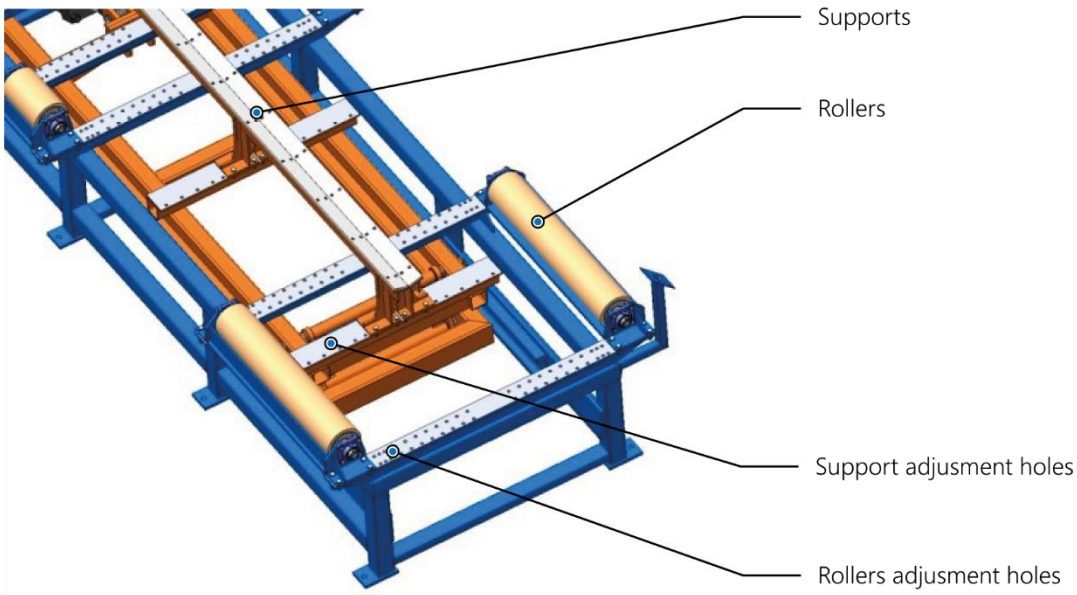

Figure 39

5.3.2.2. Front Stoppers & Added Frame

We shall adjust the positioning of the front stopper of the bench group and the position of the front stopper of the added frame. These simple adjustments must be done at the start-up of the production. Use a no. 17 key for the M10 screw for the positioning of the bench group stopper. Use a no. 17 key for the M10 screw for the added frame stopper. The use of added frame stopper is provided from ND32" up to ND120" coupling pipe.

Figure 40

Figure 41

5.3.2.3. Grinding Wheels Group

Assembling of grinding wheels and spacers according to the diameter under production. Follow the instructions provided by assembling the drawing (see section 5.1.7.).

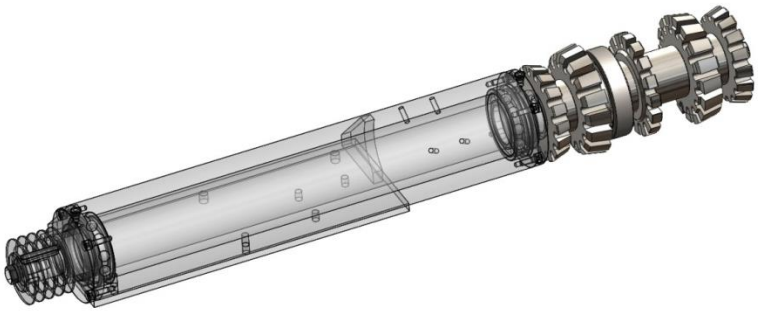

Figure 42

5.3.2.4. Conveyor Grinding Wheels Group

Assemble the conveyor according to the required diameter coupling; there are only two conveyors: one for diameters ND12" up to ND28", and one for diameters from ND32" up to ND120". The utilized screws are four M8, using no.13 key.

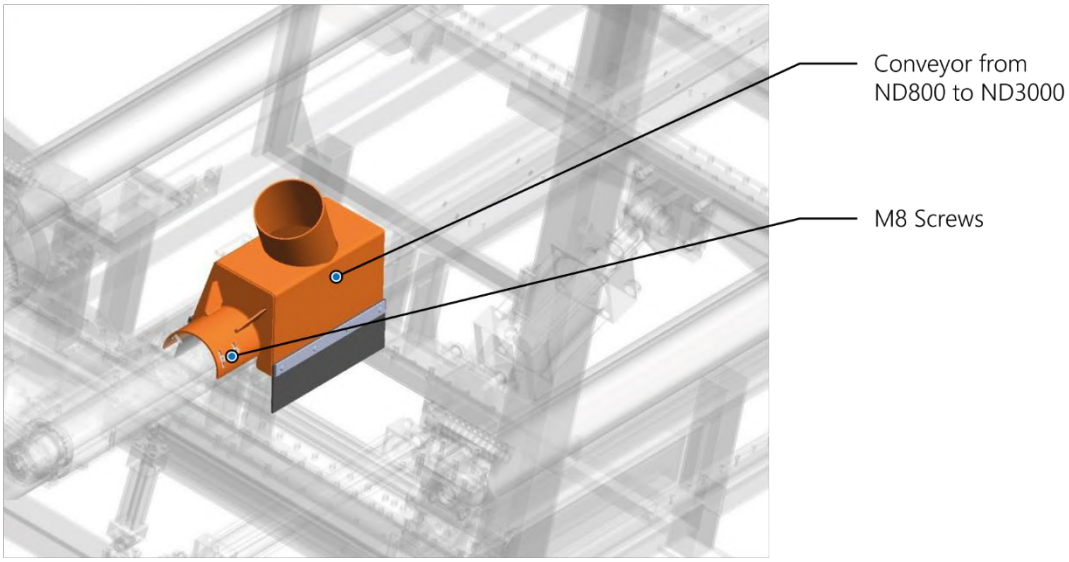

Figure 43

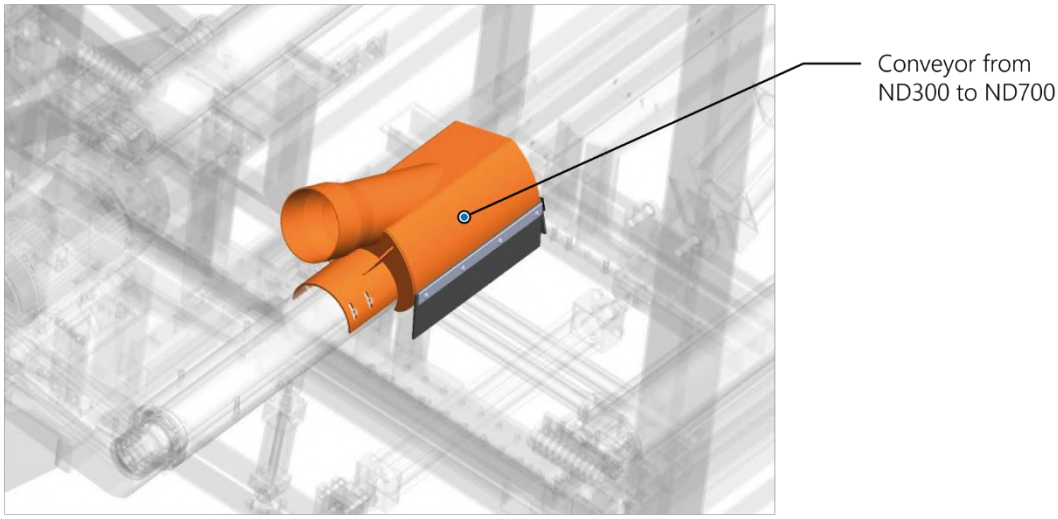

Figure 44

5.3.2.5. Cutting Device Frame

Put the cutting device frame according to the set of installed grinding wheels. To set the correct position, follow the slots on the cutting device frame, and threaded holes in the bench group frame. The utilized screws are M16 – key no. 24. The position in the drawing is indicative. Check the position of the blade by measuring the distance between the front blade plane and the axis of the intermediate grinding wheel. This distance must be equal to half-length coupling (L / 2). Make fine adjustments with the two screws M16x160.

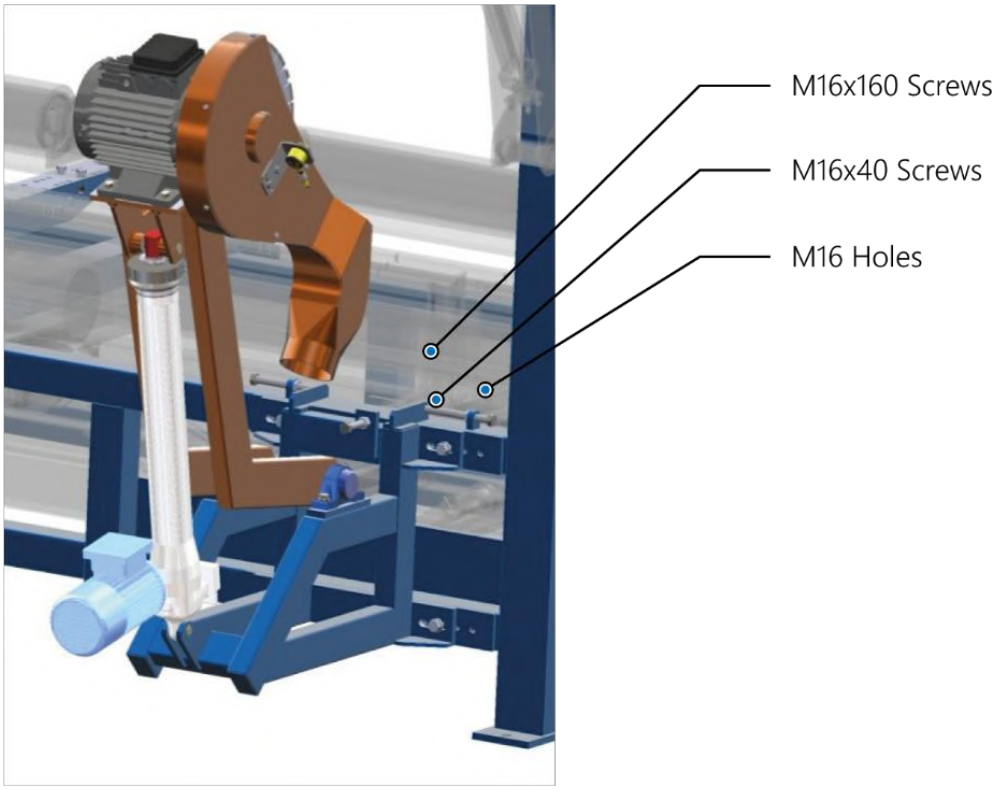

Figure 45

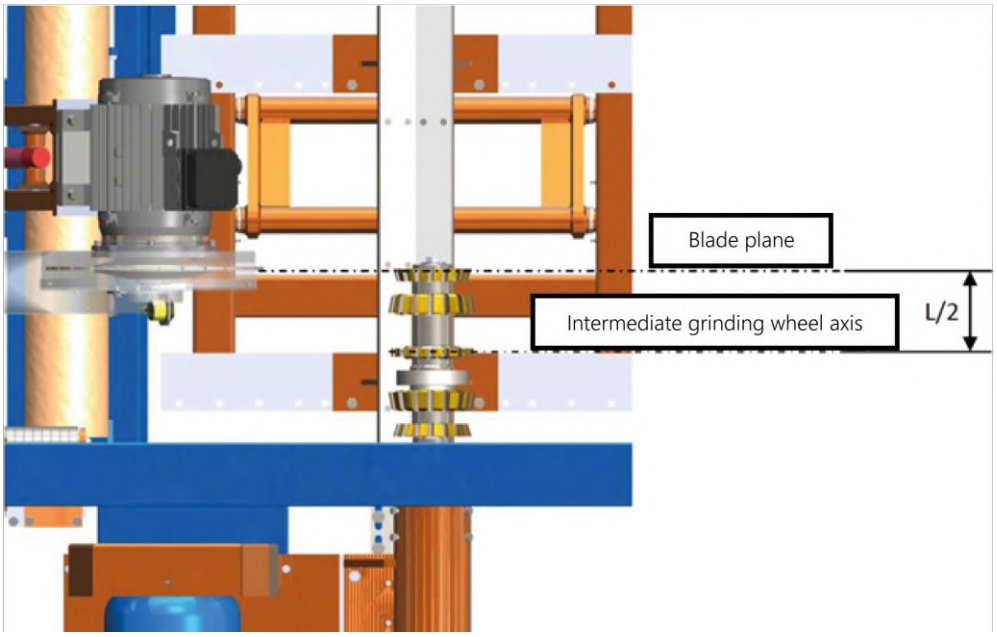

Figure 46

5.3.2.6. Steady Rest Group

Put the steady rest group in the right position according to the diameter of the coupling which is being manufactured. The fixing of the steady rest group is made on the bench group or in the added frame group using holes. On the arm of the steady rest group, you will find four holes which are used to obtain a variation of inclination. This procedure shall be followed at every diameter change. The telescopic system shall be adjusted according to the required diameter, the roller supports shall be fixed by using a screw and no. 19 key. This group is used for all sizes of manufactured coupling couplings.

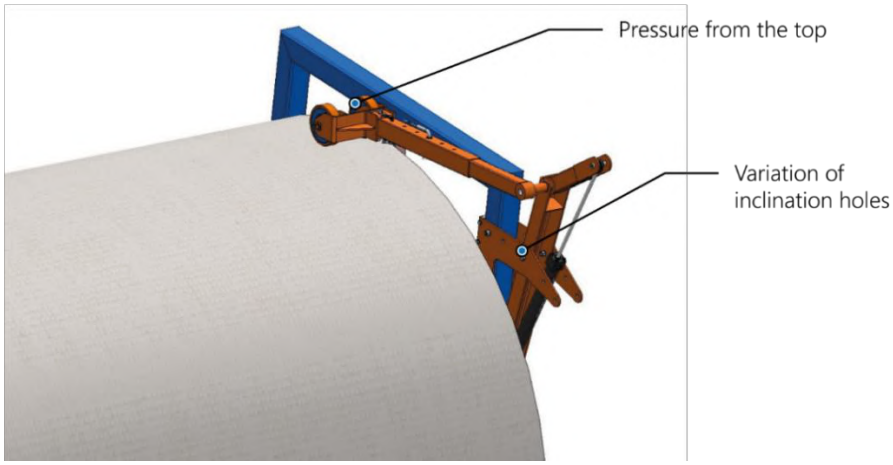

Figure 47

5.3.2.7. Rear Stopper Positioning

Put into the right position the rear stopper group according to the manufacture coupling diameter. Ensure the contact of the stopper on the rear face of the pipe (see - manual operation). The positioning of the group can be of two types: either assembled on the external supports (see picture), using sizes from ND108" up to ND120"; or assembled in the "central part of the fixed frame" (see picture), using sizes from ND12" up to ND104". Use the M10 screw and key no. 17 for fixing the entire group. For fixing the stopper, tighten the lever integrated into the linear guide.

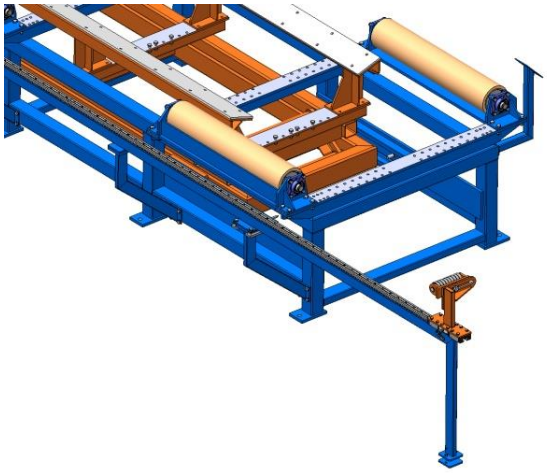

Figure 48

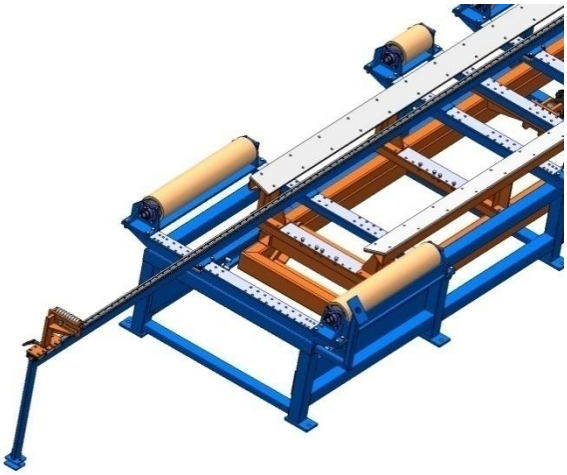

Figure 49

6. OPERATING THE MACHINE

6.1. General electric control panel

The control panel contains all the components that control the machine. In the upper area there are some indicator lights, push bottoms and selectors.

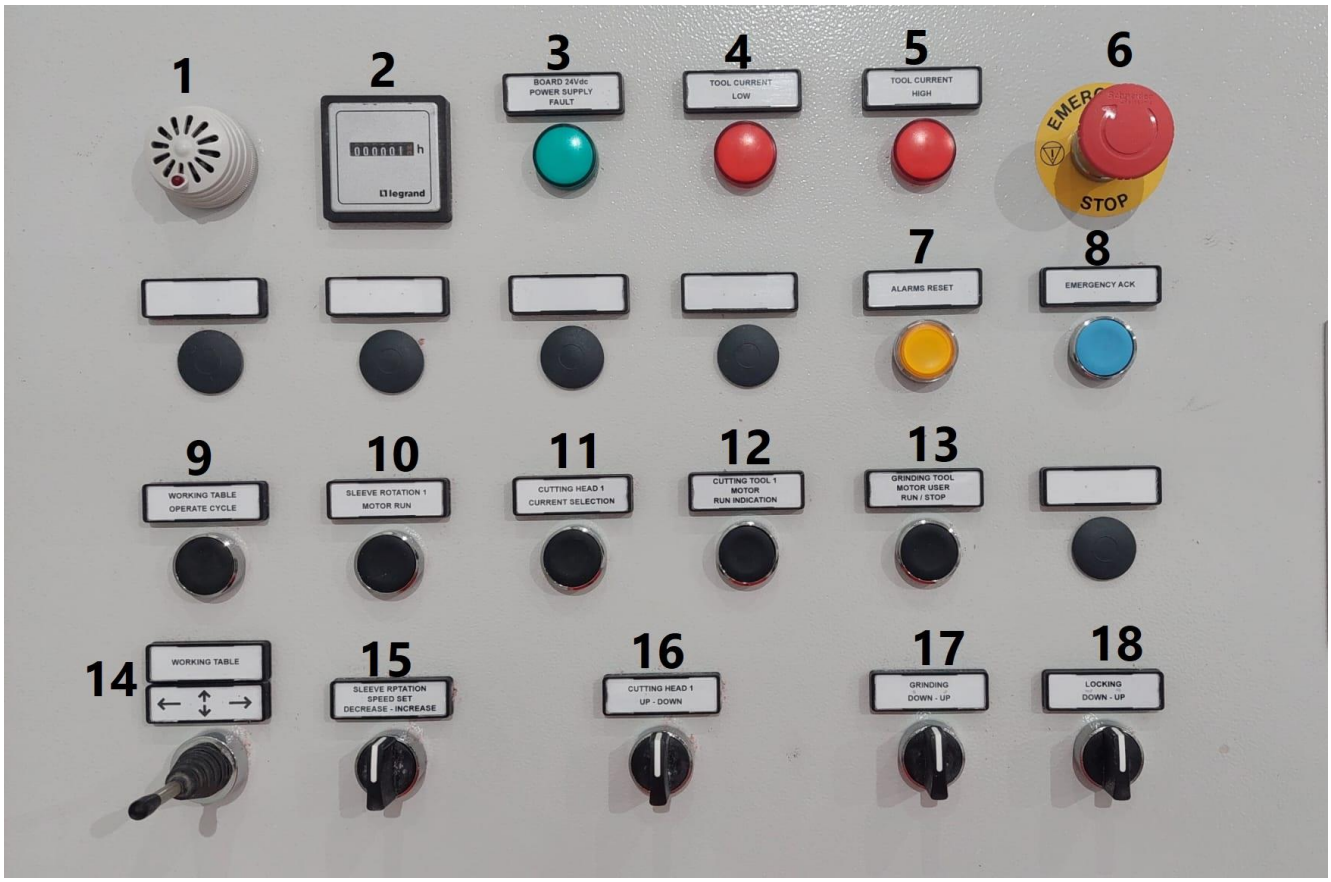

Figure 50

1. Buzzer.
2. Hour counter.
3. Green light - 24 V D.C. Power supply indication.
4. Red light – Tool in use, low current indication.
5. Red light - Tool in use, low current indication.
6. Red button: Emergency Stop.
7. Orange button: Alarm reset.
8. Blue button: Emergency acknowledge.

9. Black button: Working table Operate cycle.
10. Black button: Coupling rotation – run the motor.
11. Black button: Cutting head selection.
12. Black button: Cutting tool – run the motor.
13. Black button: Grinding tool – run motor.
14. Jog to move the blank for couplings.
15. Coupling rotation speed – increase – decrease.
16. Cutting head movement – up/down.
17. Grinding head movement – up/down.
18. Locking – up/down.

6.2. Power the machine on

The machine is powered on with the switch mounted on the lower right part of the panel. Before switching ON, the switch must be in the OFF position. The switch may be in an intermediate position if, for any reason, has tripped due to an overload or a fault in the electrical circuit. If this happens, to reset the switch, you would need to manually switch it back to its original position, which is often referred to as "resetting the breaker" or "re-energizing the circuit". This is a safety feature designed to protect electrical equipment and prevent fires or electrical hazards.

Once the power is switched on, the 24V presence is indicated by the lamp in the first row of the console.

Figure 51

If everything is in order, the control system will boot in about the 60s. The beeper will start to sound.

Figure 52

As a first step, you must engage the Emergency Stop circuit to enable all the units.

Then press the Alarms reset button until all alarms disappear.

Figure 53

Check the alarm list on the panel and follow the 'Alarm list' guide to solve the issues for alarms that are not possible to clear.

6.3. Hydraulic unit

There is no need to switch on the hydraulic unit. The hydraulic unit starts when required by the different commands. When the hydraulic starts, a green box on the HMI is shown. The hydraulic unit doesn't stop immediately after a command but runs for about 5s more.

6.4. Table movement

The joystick lets move the working table supporting the blank for coupling in four directions (up, down, forward the tools, band backwards the back of the machine).

Figure 54

Pressing the button 'Working table automatic cycle'.

Figure 55

A cycle starts to move the pipe towards the stoppers near the grinding shaft.

The working table must be in the lower position to be able to start the coupling blank rotation and use the tools. The table can't be moved if the tools are being used.

6.5. Rotation of pipe

The button 'Coupling rotation motor run' will start the rotation of the pipe.

Figure 56

The 'Coupling rotation' box on the HMI will change to green and an estimated external speed is shown. To adjust the speed, use the selector 'Coupling rotation speed set'. It is possible to reverse the direction of rotation from the HMI panel by pressing the 'virtual' push button showing the actual direction.

6.6. Grinding table movement

The grinding table is moved with the selector on the console. The movement is done by a hydraulic actuator. The down movement is controlled by the operator that can set the amount of ground material for each turn. The up-movement will move the table to the top position. The table can be moved down if the main table is in the down position.

6.7. Cutting tool movement

The position of the cutting head is controlled by a selector on the console, an electrical actuator and a distance sensor.

Figure 57

The distance sensor is used to set the working advancement of the cutting head and to stop the advancement of the head to the limit. The approaching speed and the working speed can be adjusted on the 'Configuration' page of the HMI. The distance sensor can be tuned on the Configuration page too.

6.8. Tools start and stop

The motors of the tools are started and stopped using the button on the console.

Figure 58

The status of the tools is shown on the main HMI page together with the value of the current they are requiring.

6.9. Selection of the working current

With the button "Head current selection",

Figure 59

the operator can set a limit value that he does not want to exceed during the cutting or grinding. When the value of the current is exceeded, a RED light will turn on the console. One light is for the cutting head and one for the grinding head.

The select value limit, LOW-MID-HIGH, is shown on the HMI. On the HMI the value of the current is also shown as a bar under each box status (Grinding/Cutting). The values of the limits are freely configurable (see Configuration).

6.10. Locking device

The locking device can be moved with the selector on the console. Only the up position is detected. To move the table, the locking device must be in the up position. A box on the HMI shows the up-position in green.

Figure 60

6.11. Configuration of parameters

Some settings can be changed on the HMI panel. On the panel, press the 'High speed' box to open the intermediate page for the configuration.

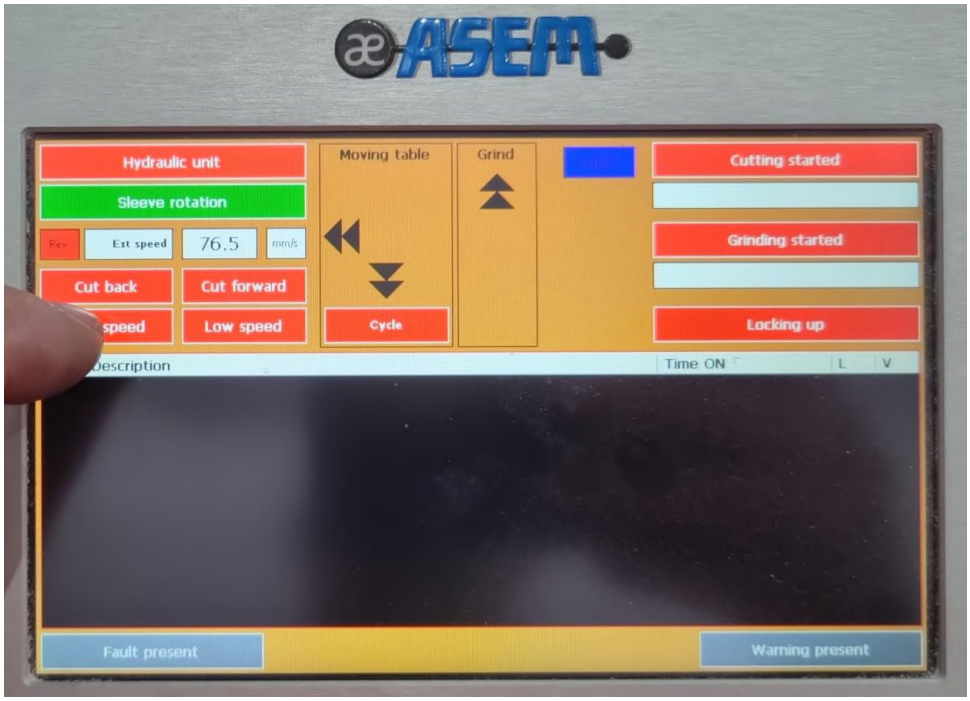

Figure 61

On the intermediate page, press the lower right area to access the real configuration page.

Figure 62

To exit from the configuration page, press the red box on the upper right margin of the page.

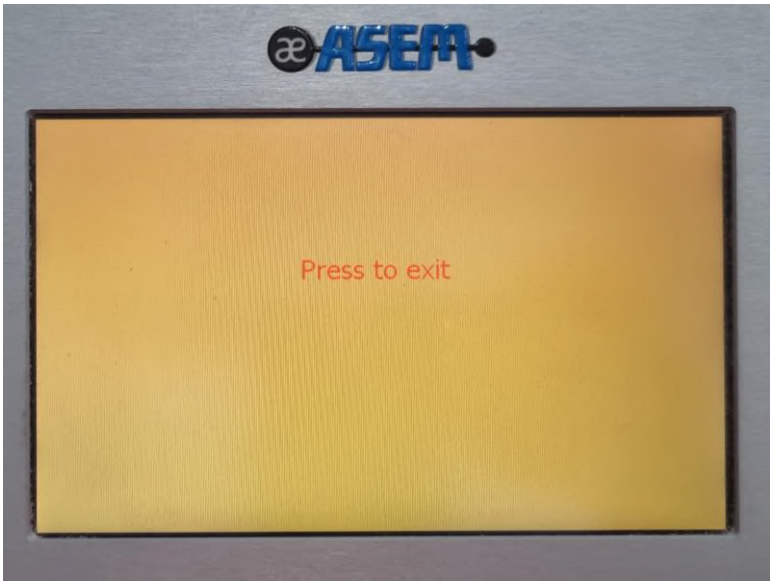

Figure 63

6.12. Cutting head

For the cutting head, the customer can adjust the position values for the slow limit and the stop limit. Values are in the range 0-10000. The current value of the relative position of the head is shown in the top line. The customer can also adjust the standard speed of the head and the approaching speed. Values are in turns per minute.

6.13. Tools current limit values

Here the customer can adjust the limits for tool current for the different, low-mid-high, levels. Values are expressed in percent of the maximum value.

The customer can also set the delay, in milliseconds, when the 'idle' current is sampled for the motor tool and a dead band to light the lamp ON-OFF.

6.14. Shutdown procedure

There is no shutdown procedure. If the machine is left powered, we advise you to press an emergency button to avoid unwanted starts of devices.

6.15. Alarm list

ID	Fault text	Hints
FLT000	Reset emergency circuits	Check FLT011, FLT012, and FLT013 to be OFF. Press the EMERGENCY ACK button to reset the emergency circuit
FLT001	Firmware data error	Call Topfibra.
FLT002	Firmware error	Call Topfibra.
FLT003	Firmware data not saved	Call Topfibra.
FLT004	Pipe rotation unit 1 fault	Check =A2-F1, =A2-A1 on the panel.
FLT005	Cutting head movement fault	Check =H1-F1, =H1-A1 on the panel.
FLT006	Grinding head movement fault	Check the circuit =H5 on the panel, sensors, sensor distance, field circuit, and hydraulic valves. Check that =A1-M1 (hydraulic unit motor) is running. Check the hydraulics.
FLT007	Hydraulic unit fault	Check the =A1-M1 motor circuit (-QM1,-KM1, 24V presence, output and input cards of PLC).
FLT008	Pipe rotation unit 2 fault	Call Topfibra.
FLT009	Trolley motor fault	Call Topfibra.
FLT010	24V lines fault	An automatic breaker for the 24V supply is open. Check =AA1. Check for short circuits on 24V lines.
FLT011	The machine emergency push button pressed	The emergency button on the machine is pressed or the cable connecting the switch is broken or the contacts of the switch are not working. Release the button, and check the circuit =AE1-SA2. Check the input card =LE1-D01.11 – Beckhoff EL1904.
FLT012	The console emergency push button pressed	The emergency button on the console is pressed or the cable connecting the switch is broken or the contacts of the

		switch are not working. Release the button, and check the circuit =AE1-SA3. Check the input card =LE1-D01.12 – Beckhoff EL1904.
FLT013	The gate is open.	The gate of the fence is open or the cable connecting the switch is broken or the contacts of the switch are not working. Close the gate, and check the circuit =AE1 'Safe gate'. Check the input card =LE1-D01.12 – Beckhoff EL1904.
FLT014	Power supply missing or sequence fault	The value of the power supply is too low (450V) or the phase order is wrong. Check circuit =AF1. Check =AF1-A2. Check =AF1-FU1.
FLT015	Coupling rotation 1 fan fault	Check the circuit =A2-QM1, =A2-KM1. Check 24V presence, input and output cards of PLC.
FLT016	Grinding tool fault	Check the circuit of =Z1. Troubleshoot the soft start. Check 24V presence. Check input and output cards.
FLT017	Cutting tool fault	Check the circuit of =Z2. Troubleshoot the soft start. Check 24V presence. Check input and output cards.
FLT018	Ethercat bus error	Check the integrity of the EtherCAT bus cable =LE1-W20, =LE1-W21 (ETH2), =A2-W20 (ETH3).
FLT019	Dust suction fault	Check circuit =V1. Check the cables to/from the dust suction unit. Check the response signal from the dust unit.
FLT020	Test mode enabled	Call Topfibra.
FLT021	Moving table fault moving	Check the circuit =H3 on the panel, sensors, sensor distance, field circuit, and hydraulic valves. Check that =A1-

		M1 (hydraulic unit motor) is running. Check the hydraulics.
FLT022	Locking device fault up	Check the circuit =H4 on the panel, sensors, sensor distance, field circuit, and hydraulic valves. Check that =A1-M1 (hydraulic unit motor) is running. Check the hydraulics.
FLT023	Locking device fault down	Check the circuit =H4 on the panel, sensors, sensor distance, field circuit, and hydraulics valves. Check that =A1-M1 (hydraulic unit motor) is running. Check the hydraulics.
FLT024	UPS fault	Call Topfibra

7. MAINTENANCE

7.1. Preventive and periodic maintenance operations

The actions listed in this chapter shall be followed regularly to prevent shutdowns and replacements of damaged parts. We have added at every listed item, the estimated number of hours after which inspections and replacement of fluids are necessary.

7.1.1. Greasing

The E-CGM is provided with grease nipples, which should be regularly greased.

Herewith, the components that shall be regularly greased the type of grease to be used, the periodicity of refilling and the estimated quantity. We recall that TOPFIBRA will carry out the "First Filling".

7.1.1.1. SKF support for rollers (12 pieces)

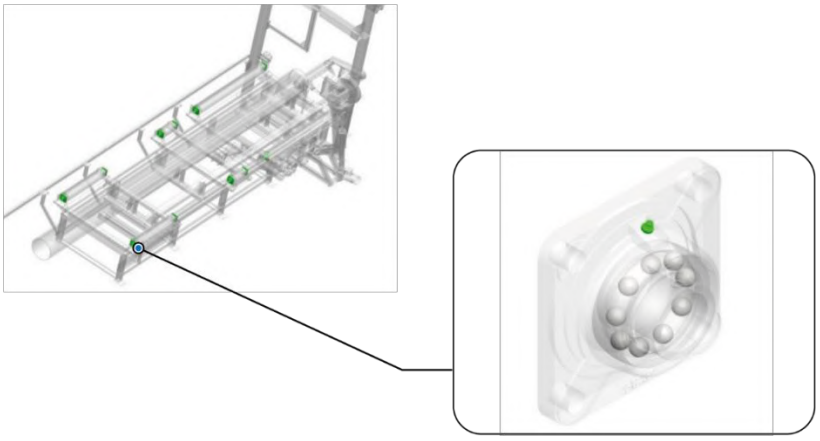

Figure 64

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200266 KF LGMT 2	-30	120	0,001	4500

7.1.1.2. Forward cylinder (1 piece)

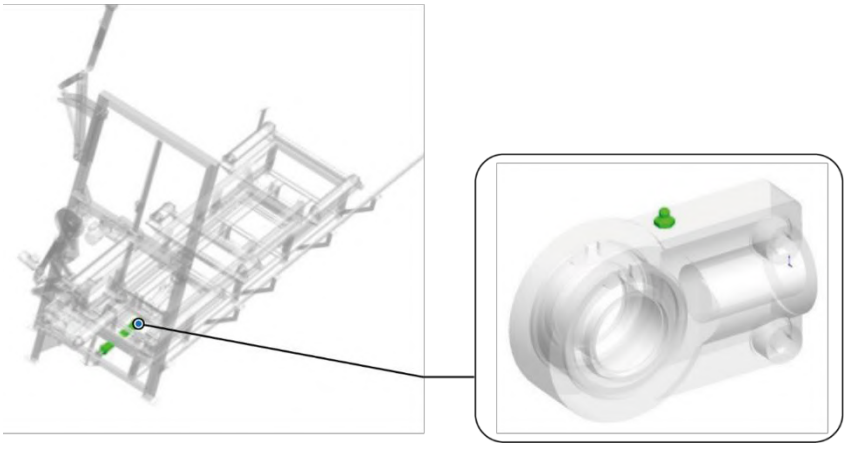

Figure 65

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200266 KF LGMT 2	-30	120	0,001	4500

7.1.1.3. Lifting cylinder (1 piece)

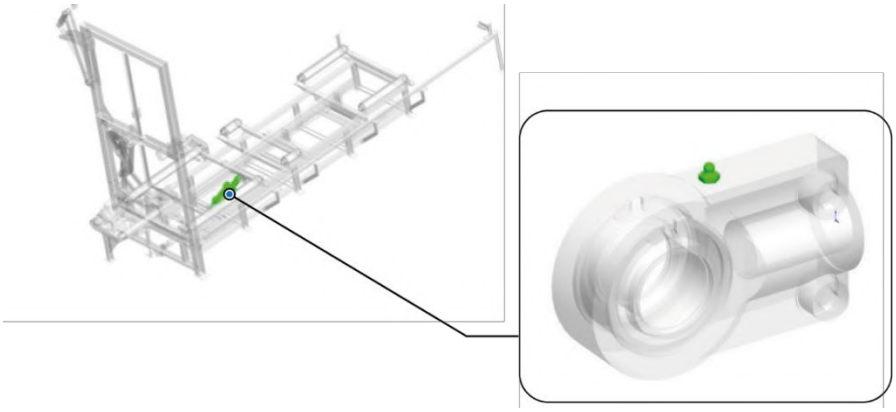

Figure 66

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200266 KF LGMT 2	-30	120	0,001	4500

7.1.1.4. Steady rest cylinder (1 piece)

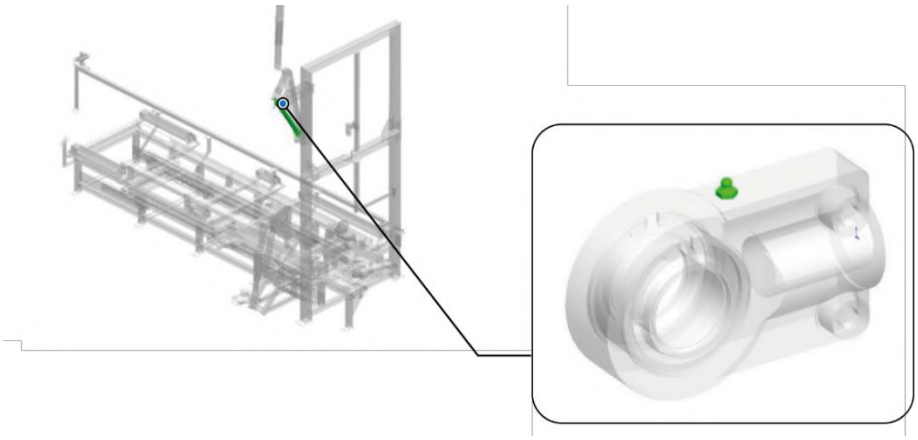

Figure 67

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200266 KF LGMT 2	-30	120	0,001	4500

7.1.1.5. Combined bearing wheels (4x2 pieces)

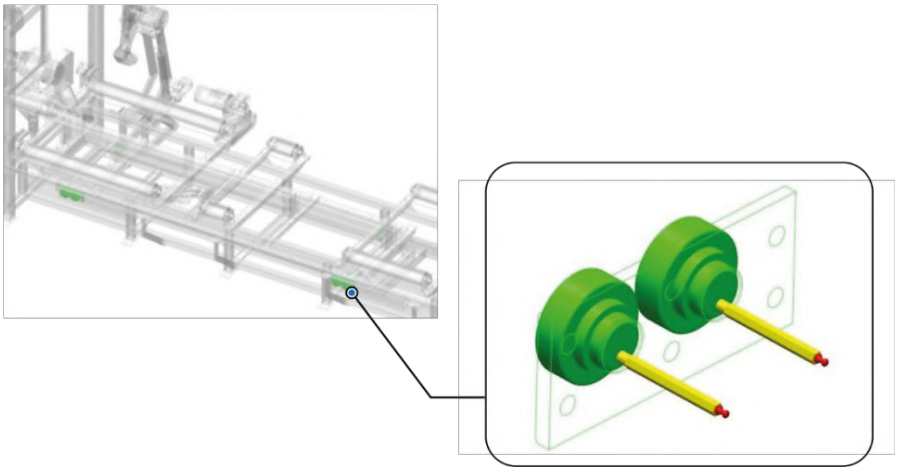

Figure 68

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200266 KF LGMT 2	-30	120	0,001	4500

7.1.1.6. SKF supports of cutting device assembly (2 pieces)

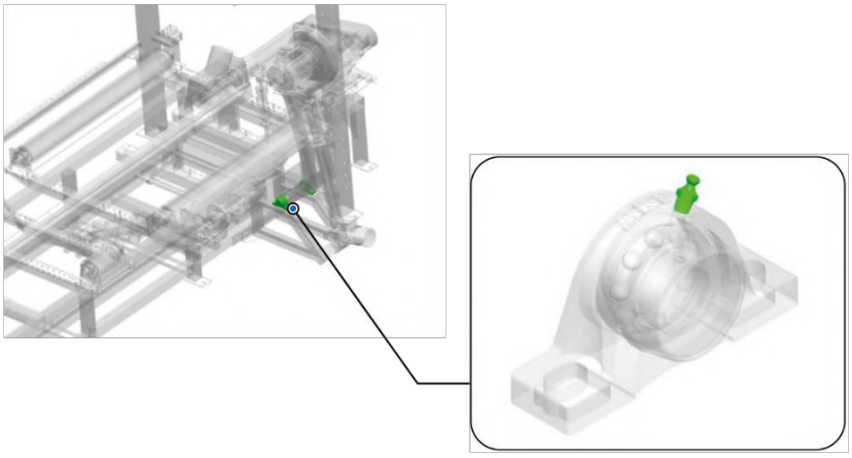

Figure 69

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200266 KF LGMT 2	-30	120	0,001	4500

7.1.1.7. Grinding wheels shaft bearings (2 pieces)

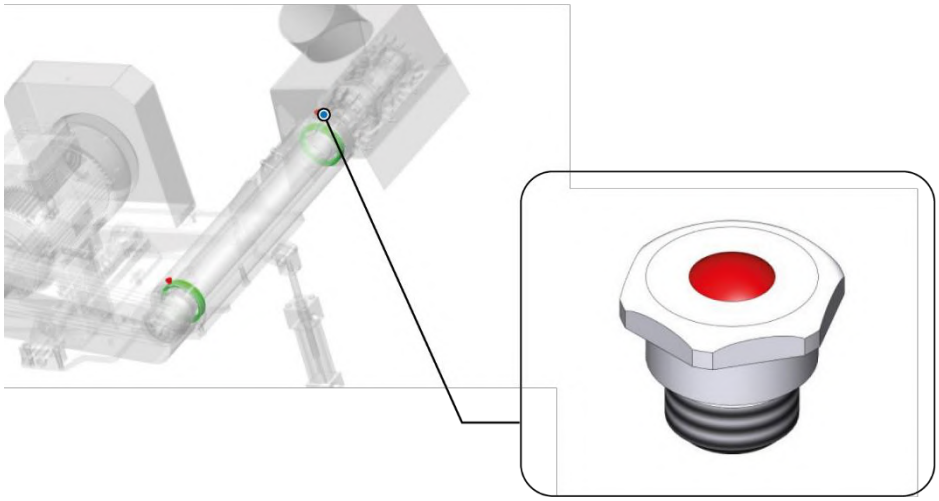

Figure 70

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200266 KF LGMT 2	-30	120	2,00	4500

7.1.2. Oil fill

The E-CGM is provided with oil-filling indicators to help with the use of a type of grease, the period of refilling and the estimated quantity. We recall that TOPFIBRA will carry out the "First Filling".

7.1.2.1. Gear motor of motor roller (1 piece)

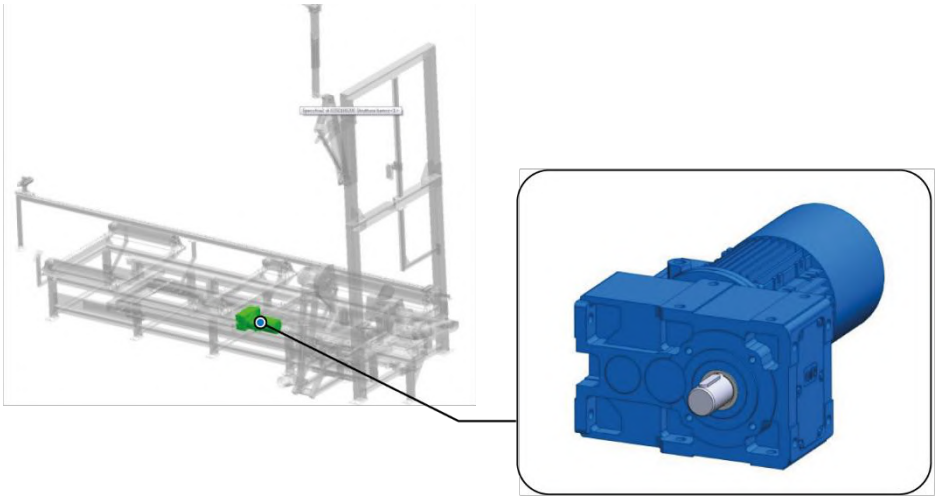

Figure 71

Brand & grease type	Operating temperature (°C)		Quantity (Kg)	Grease substitution (Working hours)
	Min	Max		
18200275 KLÜBER KLÜBERSYNTH GH 6-220	-20	50	1,3	12500

7.1.2.2. Hydraulic unit (1 piece)

Oil type	Operating temperature (°C)		Quantity (l)	Oil substitution (Working hours)
	Normal	Max		
HLP ISO VG46	45	65	50	See the tech datasheet

Pay careful attention to the listed preventative maintenance checks. Please refer to "Power unit preventive checks", and take note of the following codes.

Operative state codes	
DF	During operation
DA	During stop

Time codes	
G	Day
S	Week
M	Month
A	Year

POWER UNIT PREVENTIVE CHECKS			
Items	Inspection/Test	Operative state	Time
Oil tank	Check level & temperatures	DF	G
Pressure valves	Losses	DF	G
Lines	Areas of fiction on pipe	DF	G
Filters	Visual inspection of clogging indicator	DF	G/S
	Replacing cartridge for clogging	DF	-
	Check	DA	3M
Pumps, motors, joints	Pressure check	DF	G
	Pump noise check	DF	G
	Pumps temperature check	DF	G
Safety valves	Switching the solenoid valve on/off	DF	M
	Voltage & current measurement	DF	M
Piping	Check the tightness of connections	DF	G
Fluid	Oil chemical analysis	DF	M/A

7.1.3. Cutting blade wear

Blades & grinding wheels are the consumable parts of the E-CGM. It is good practice to keep the wear under control and to replace blades when the blade shows signs of wear. This practice will ensure good and quality functioning.

The check shall be visual and auditory. An anomalous sound indicates the incorrect processing of the blade and the grinding wheels.

7.1.3.1. Auditory control

If an anomalous or suspicious sound is heard, it is strongly recommended to perform a visual inspection.

7.1.3.2. Visual inspection

The grinding wheels and the blades have a diamond coating that shall have the presence of a minimum of 50% diamond compared to a new tool. This is only a guide and the control cannot be fully granted with this operation. The operator's experience is essential in this phase. A

second check shall be made to verify the absence of any cracks. It is recommended to carry out visual inspections connected with anomalous sounds. According to TOPFIBRA's experience, the operator shall carry out a general check every 40 hours of operation on the diamond tools and every 8 hours on the machine, checking constantly the quality of the performed machining on coupling (cutting and grinding).

7.1.4. Wear rollers

Pay attention to the wear of the bench group's polyurethane rollers. The wear could cause bad rotation of the pipe that consequently affects the quality of the coupling machining.

7.1.5. Belts

7.1.5.1. Transmission belt

The grinding wheels are moved by the motor via the transmission belt (see section 1.2.2.). We recommend checking the tension of the belts every ~ 1000 working hours; if the belt is loose, TOPFIBRA recommends tensioning them using tensioning a device that comes with the supply of the E-CGM (see picture below).

Figure 72

NOTE:

Check the tension only when the machine is off (only by qualified personnel).

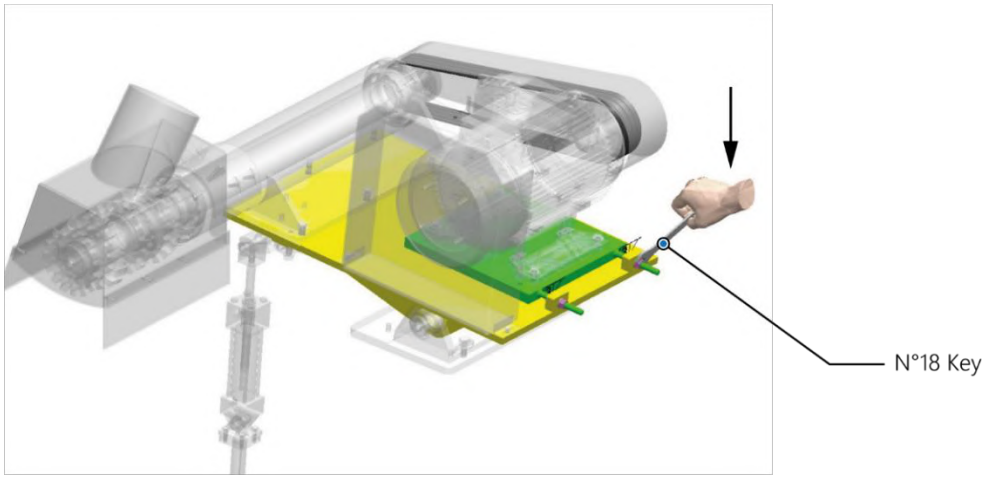

Figure 73

7.1.6. Sensors

The machine is provided with sensors:

1. Forward / Reverse bench group mobile frame.
2. High / Low bench group mobile frame.
3. High / Low cutting device group.
4. High / Low grinding group support.
5. Closed cylinder of steady rest group.

The sensors are provided by TOPFIBRA personnel duly calibrated. We recommend checking them, as the machine is subject to vibration. We recommend checking every ~ 9000 working hours, and tightening the sensors immediately if found to be loose.

7.1.7. Removal of the device

The chapter lists the instructions for the replacement of consumable parts (grinding wheels and blades).

Before you start dismantling these parts, make sure that the motors are not powered on (switch off).

7.1.7.1. Grinding wheels replacement

Before dismantling, please, wear protective gloves.

Removal of conveyor: take a no. 13 key - remove the no. 4 screws M8 and the washers as shown. Manually remove the conveyor (15 kg).

NOTE:

Be careful – do not lose the parts that you are dismantling.

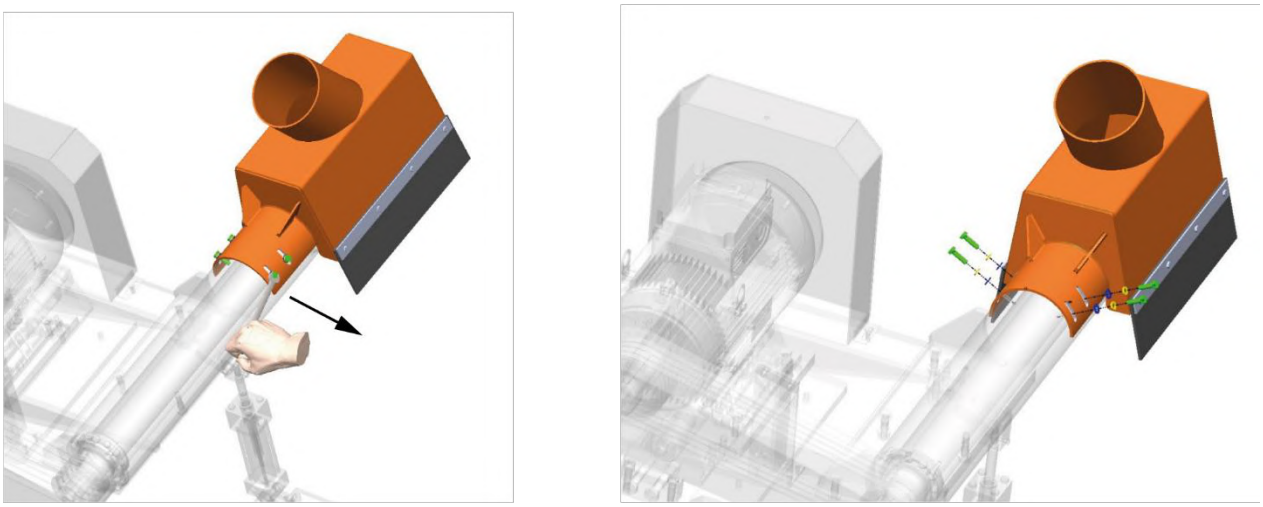

Figure 74

Removal of washer grinding wheels: take a no. 24 key - unscrew M16 - as shown in the figure.

NOTE:

Be careful - do not lose the dismantled items.

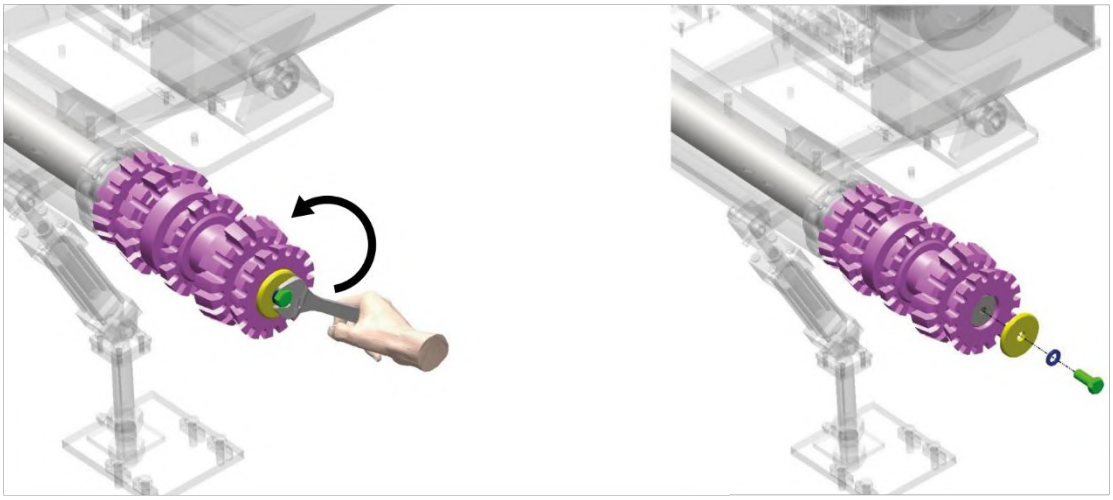

Figure 75

Removal of grinding wheels: this step is performed manually (weight 2 kg max).

NOTE:

Be careful - do not lose the dismantled items.

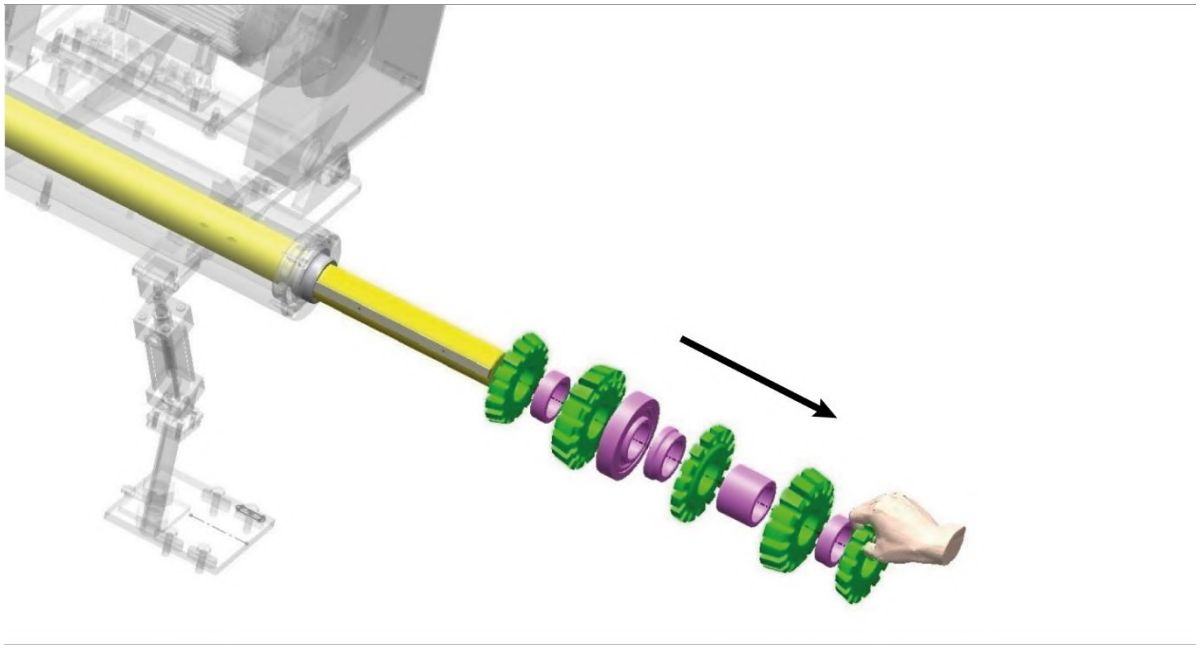

Figure 76

7.1.7.2. Cutting blade replacement

Removal of conveyor cover: take a no. 10 key - remove the no. 6 M6 screws - and washers as shown. Manually remove the cover conveyor with the sensor (weight 4 kg).

NOTE:

Be careful - do not lose the dismantled items.

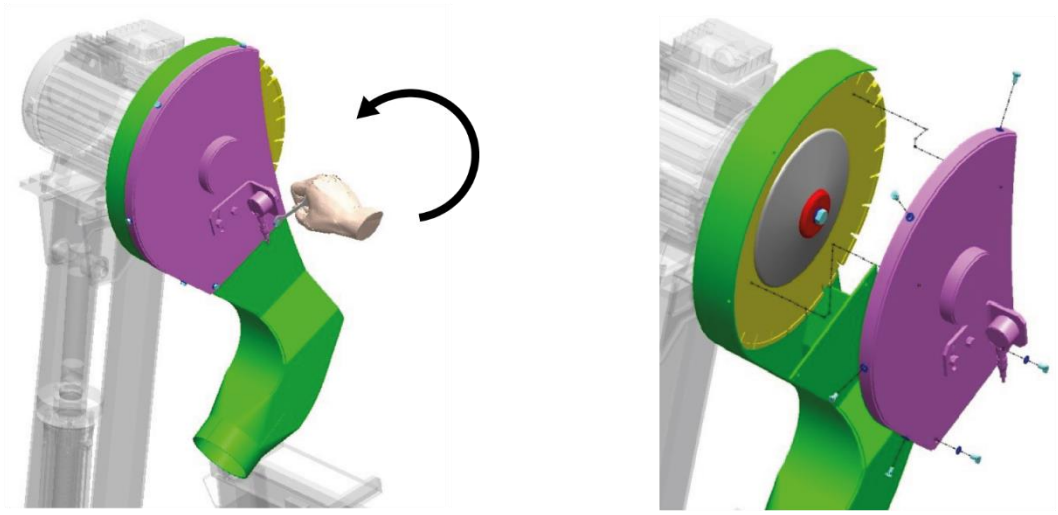

Figure 77

Removing the washer and closing the flange: take the no. 19 key - unscrew the M12 as shown - remove the washer. Remove the closing flange of the cutting blade (weight 5 kg max).

NOTE:

Be careful - do not lose the dismantled items.

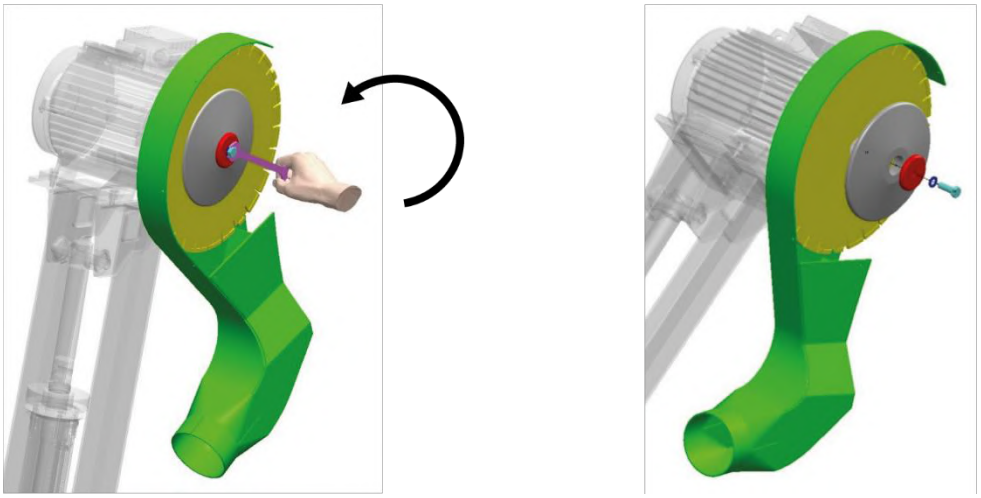

Figure 78

Removing the cutting blade: this step is performed manually (weight 0.5 kg).

NOTE:

Be careful - do not lose the dismantled items.

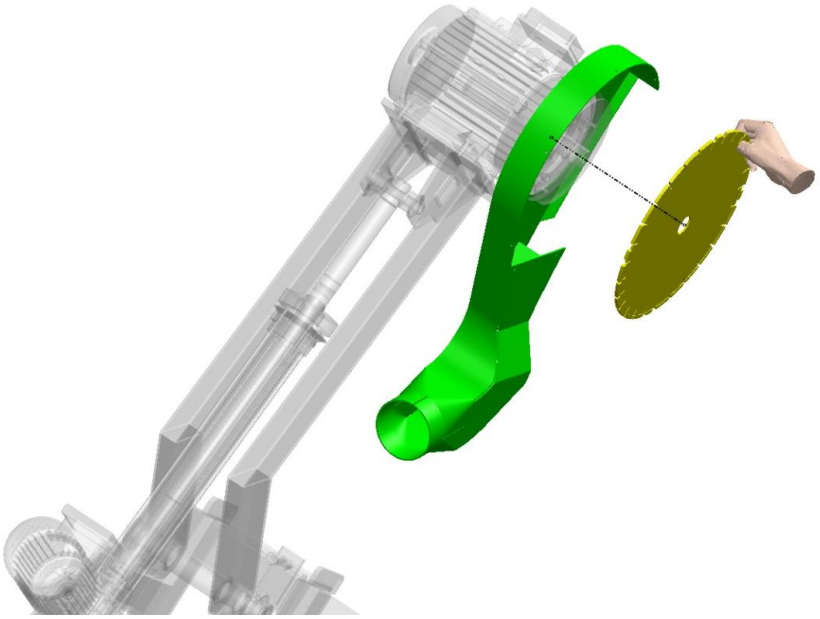

Figure 79

Assembly: proceed oppositely for mounting the new blade.

7.1.8. Maintenance of electrical panel and electrical items

The cabinets have many parts under voltage. For this reason, internal maintenance can only be performed by qualified personnel.

The danger of electric shock!

In addition, qualified personnel must carry out maintenance on all electrical cables.

For more information contact us at

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