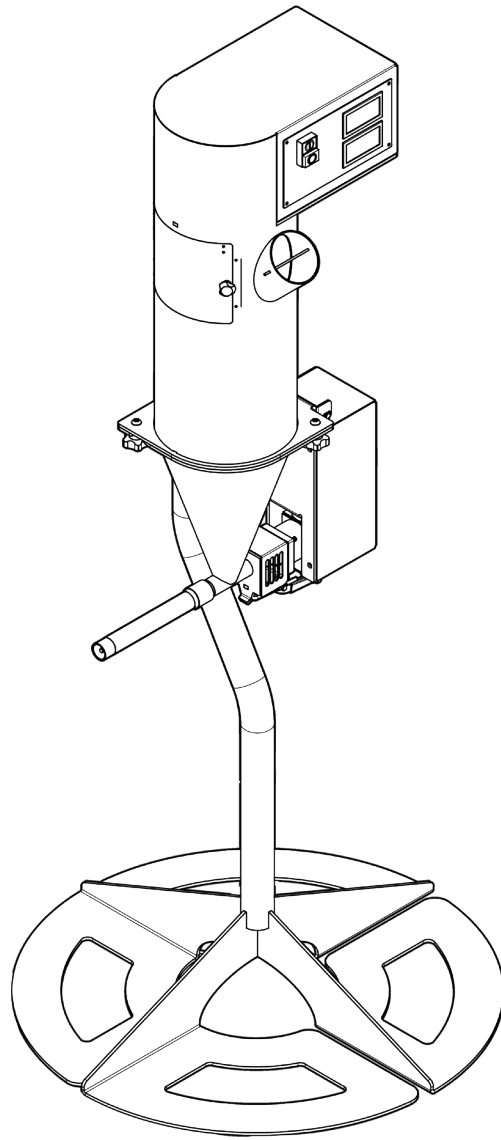


CONTINUOUS FEEDING SYSTEM

MANUAL OF USE AND MAINTENANCE



CLAY

ORIGINAL INSTRUCTIONS



CE

Disclaimer



IMPORTANT:

We kindly advise to read carefully and comprehend totally the content in this manual of Use and Maintenance.

The missing acknowledgment of the manual can be cause of personal injury, worst quality results or damages to the machine Continuous Feeding System. Always make sure that the personal using the feeder knows and understands the content of the manual in order to the best results from the Continuous Feeding.

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Revision	Reason for the revision	Revision date

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INTRODUCTION

The Continuous Feeding encompasses many technological innovations in the world of digital ceramics developed by WASP.

The Manufacturer declines any responsibility for accidental damages caused by products when non-correctly used.

WASP certifies the use of CONTINUOUS FEEDING SYSTEM with ceramic materials, in case of use of the system with different kind of materials, warranty and support may not be valid anymore.

WARNING

- Read accurately the instructions before the use
- Before any intervention in proximity or inside the mixing area, shut the machine by pushing the red switch on the front panel.
- Always keep the inspection door located on the left of the machine clean, in order to avoid the wrong closure of it.
- Do not introduce or lay hands or other parts of the body in proximity of the moving parts.
- Keep far from the presence of children.
- Make sure every fan is working while the machine is turned on.
- Make sure that the extruder is not clogged.
- Do not put fingers inside the horizontal pipe while the machine is running.
- Do not eat the extruded materials.
- Make sure that the pipe between the extruder and the feeder do not present any deformation.
- Verify there are no leaks between threaded hose and pipes
- Do not replace parts if not original and supplied by Manufacturer
- Only properly formed staff can use the machine
- Make sure the material you're leaving inside the machine is not going to get dry until the next usage
- Make sure there are no debris inside the material, who can clog the feeder
- Periodically check for the wear of the moving parts.
- Do not remove any safety device covering the moving parts
- In case of prolonged inactivity the system must be cleaned carefully

0 PREMISES

Aim of the instruction manual



IMPORTANT:

Before proceeding with installing and starting of the machine, the technician, the user, the maintainer and the safety responsible must read and understand the manual.

The manual must be considered as a fundamental part of the machine. The correct use and maintenance of the machine depends on the informations contained here.

It contains instructions that must be acknowledged by the personal devoted to the use, maintenance and transport of the machine, supposing the adequate experience, preparation and professional abilities as well as a psychophysical attitude.

For certain operations it may be necessary to ask for the intervention of the personal who have achieved a specific preparation.

It must always be available for consultation, in copy and by the recipient, on the machine itself or in its immediate vicinity. In the second case the location of the manual must be indicated on the machine clearly.

It is susceptible of updates which, appropriately classified, will be transmitted to the employer in order to update the consultation copy (s).

The recipient must ensure that the personnel authorized by him to start up, use, maintain and transport the machine have obtained adequate knowledge of the instructions contained in this manual.

The recipient must check that the maintenance operations, prescribed in the appropriate chapter, are carried out and recorded promptly and effectively.

We decline any damage or injury caused by the improper use of the machine.

We accept no responsibility for damage to persons or property resulting from improper use and / or omitted or inadequate maintenance.

The recipient has the right to request further information.

In case of loss and/or damage of the present manual it is responsibility of the recipient to ask for one or more copies.

0.1. How to read the manual of instructions

This manual is composed by:

COVER WITH MACHINE IDENTIFICATION

By consulting the cover you trace to the machine model covered in the manual and to the printer serial number in your possession.

ANALYTICAL INDEX

By consulting the index it is possible to identify to the chapter and to the paragraph on which all the notes relating to a given topic are reported.

NUMERATION FIGURES

Each figure is numbered progressively, indicating with the first digit the reference chapter and with the second the progressive image (example Fig. 3.4 is the fourth figure of chapter three)

0.2. Storage of the manual of instructions

It is mandatory to keep this manual and all attached documents in an easily accessible place near the machine and known to all users (operators and maintenance personnel).

Operators and maintenance technicians must be able to quickly find and consult the manual in any situation.

The manual is an integral part of the machine for security purposes.

Therefore:

- It must be kept intact (in all its parts);
- It must follow the machine until its disposal (even in case of travel, sale, rental, rent, etc.);
- It must be kept up to date and report any changes made to the machine.

0.3. Updating the manual of instructions

This manual must be regularly updated by attaching additional or altered parts.

The sending of any additional parts is the responsibility of the Manufacturer; the user is responsible for the replacement of parts that may be altered as a result of use, making a request directly to the Manufacturer.

1 GENERAL INFORMATION

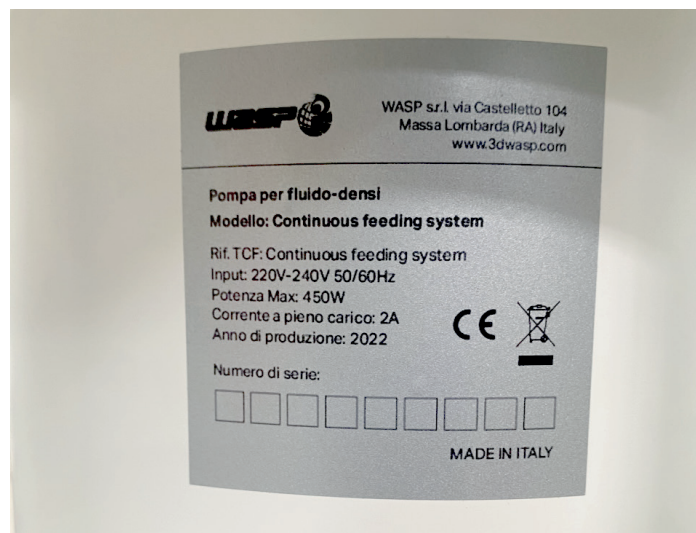
1.1. Manufacturer identification data

WASP S.r.l.
Via Castelletto, 104 - 48024 Massa Lombarda (RA) Italy
Tel. +39 0545 87858
info@3dwasp.com / www.3dwasp.com

1.2. Identification label

The machine is CE marked and complies with all relevant provisions:
Machinery Directive 2006/42 / EC, EMC Directive 2014/30 / EU and LVD Directive 2014/35 / EU
EN 55022
EN 55024
EN 60204-1

The marking can be identified by means of an identification plate of the Manufacturer as required by the Machinery Directive. In case of damage, the Recipient must commission a copy.



Translation:

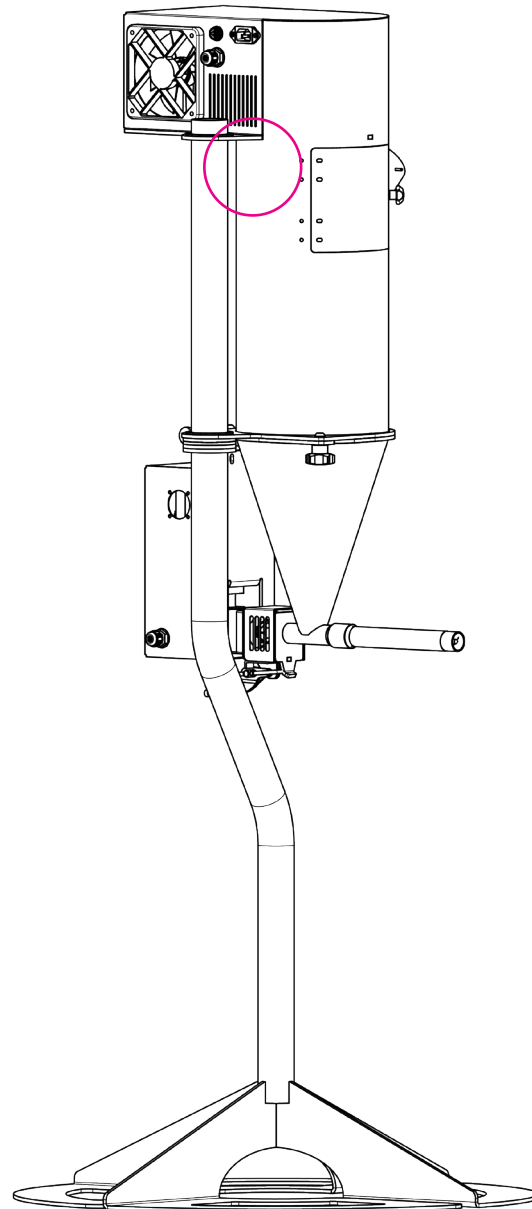
1. Modello: Model
2. Rif. TCF: Reference
3. Input: Power input
4. Potenza Max: Maximum power
5. Corrente a pieno carico: Current under full load
6. Numero di serie: Serial number

1.2.1. Position of the label on the machine



IMPORTANT:

The label of identification of the machine is placed on the back of the machine.



1.3. Testing

The feeder is tested directly by the Manufacturer during the phase of mounting and post mounting.

1.4. Warranty

The machines built by WASP S.r.l. are covered by a warranty for a period of 12 months for companies or VAT and 24 months for individuals, according to the specifications set out in the sales contract.

If during the period of validity, defective operations or faults of parts of the machine that fall within the cases indicated in the warranty occur, WASP S.r.l. (after the appropriate checks) will repair or replace the defective parts.

The defective parts under warranty are repaired or replaced free of charge by WASP S.r.l. .

The costs of transport and / or shipment are always charged to the Customer, as well as the return / return travel expenses related to the intervention of the Manufacturer's technicians at the Customer's premises.

The labor costs related to the intervention of the Manufacturer's technicians at the Customer's premises, for the removal of defects under warranty are the responsibility of the Manufacturer, except in cases where the nature of the defect is such that it can be easily removed on site by part of the Customer.

All consumables are excluded from the warranty, possibly supplied by the manufacturer together with the machines.



NOTE:

The guarantee lapses in the following cases:

- In case of default or other contractual non-fulfillment;
- Improper use of the machine
- Failure to comply with the standards and maintenance intervals
- Tampering
- The machine is returned to the Manufacturer in a different packaging from the one supplied at the time of purchase;
- Use of non-original spare parts, and not supplied directly by the Manufacturer;
- Extraordinary interventions not carried out by personnel not sent by the Manufacturer;
- Any variation and / or non-observance of what is indicated in the technical documents and in this manual entails the forfeiture of the technical and functional guarantees, and release the Manufacturer of the machine from any responsibility.

1.5. General safety warnings



CAUTION:

Any intervention must be performed on the machine, requires particular caution on the part of the operator.



NOTE:

Any intervention on the machine must be carried out in strict compliance with the operational skills (see paragraph 1.6.1 "Identification of Operational Personnel"). WASP S.r.l. declines any responsibility in case of non-compliance with these skills.

The purpose of this chapter is to indicate which are the specific points and measures to avoid incurring any kind of accidents, which may be defined as residual risks, which are the minimum essential safety provisions to be maintained, which characteristics must have the personnel assigned to the normal assembly operations and which must be the characteristics of the maintenance personnel.

We are not responsible for unspecified operations, as they are considered strictly pertinent to technical assistance personnel or for operations performed differently from what we described in the documentation presented.

Possible operations on the machine are:

- Mechanics
- Electrical



MECHANICAL NATURE INTERVENTIONS

Any intervention of a mechanical nature must be carried out in strict compliance with the directives required by current safety regulations. It is absolutely forbidden to perform any type of mechanical maintenance intervention on the machine during the operating cycle or in any case with parts of the machine moving.

Every mechanical adjustment operation must be carried out with the machine stopped and only and exclusively by the mechanical maintenance technician, qualified to operate in conditions of protection disconnected (see paragraph 1.6.1 "Identification of the operating personnel").

Maintenance work must only be performed with the machine disconnected from the mains and taking all the safety measures required by current regulations.



ATTENTION:

The components that grant the safety of the operator during the use of the machine must not be disassembled or compromised for any reason. (Fig. 1.5 a and Fig 1.5 b)

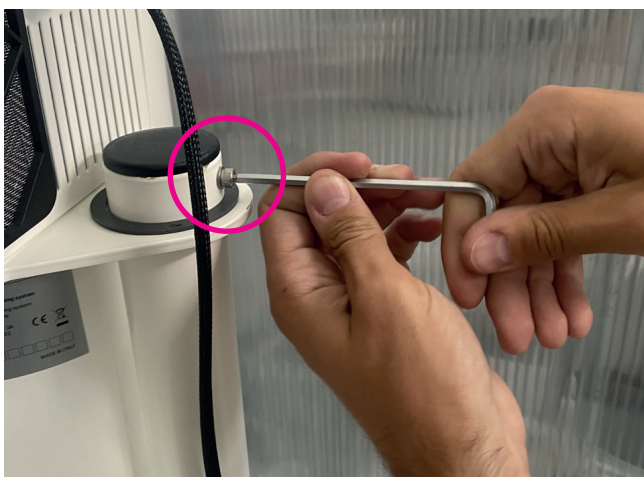


Fig. 1.5 a - Make sure this screw is well tightened

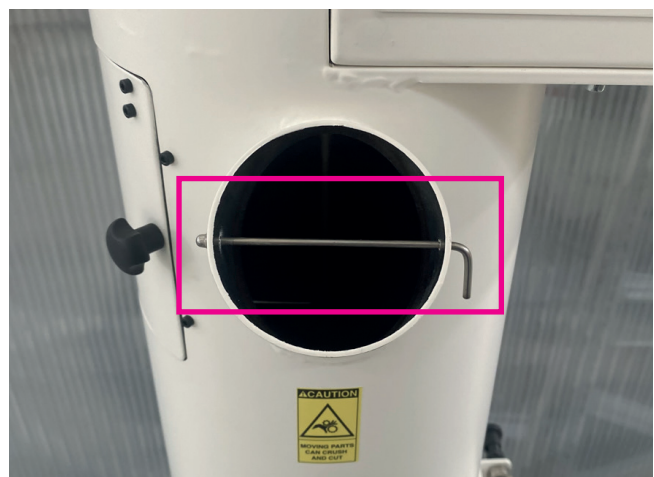


Fig. 1.5 b - Do not remove the material intake protection



ELECTRICAL NATURE INTERVENTIONS

Every electrical adjustment operation must be carried out taking all the safety measures required by current regulations.

1.5.1. Personal protective equipment

It is mandatory to use the specific personal protection devices (PPE) to the current operations made available by the company (in relation to the risk attached to the performance of certain processes), even if not directly concerning the use of the plant.

1.5.2. Operators for whom the manual is intended

The manual is written for:

- The operators involved in using the machine (in the continuation of the manual will be briefly called "users");
- Mechanical maintenance workers: trained and authorized operators for the maintenance of mechanical parts and oil-hydraulic systems;
- Electrician maintenance technicians: trained and authorized operators for the maintenance of electrical and / or electronic parts and systems;
- Qualified technicians (employees of the Manufacturer or authorized service center), special maintenance staff and operations of a complex and / or particular nature.



ATTENTION:

The user must not perform operations reserved for maintenance personnel or qualified technicians.
The manufacturer is not liable for damages deriving from failure to observe this prohibition.

1.5.3. Residual risks

Residual risk of injury

Do not put hands inside of the continuous feeding system while it's working.



CAUTION:

Moving parts: possibility of cutting and crushing



ATTENTION:

Watch your head, risk of injury.

Residual risk of electrocution



CAUTION:

It is present tension on the superior part of the machine.

Maintenance / Cleaning

Maintenance / Cleaning operations must be carried out by trained and authorized personnel. Operations must be performed in a safe stop condition, disconnecting the printer from power sources. Refer to paragraphs 7.2.1 "Cleaning" and 7.2.2 "Maintenance".

1.5.4. Safety stickers

The safety stickers shown below are applied to the machine. Before using the machine, check the integrity of these adhesives and assimilate the instructions. Refer to paragraph 1.6 "Glossary and pictograms". If the meaning is not clearly understood, contact the Manufacturer.



ATTENTION:

The labels and stickers applied to the machine must be replaced before they become illegible. If one or more plates (stickers) are missing or illegible, the operator must not use the feeder until the new plates (stickers) have been applied.



Fig. 1.5.4 - Safety stickers on the machine

1.6. Glossary and pictograms

1.6.1. Identification of operating personnel

The operator responsible for the operation or maintenance of the machine must possess the specific professional requirements for each intended operation.

The operator must be instructed and therefore be aware of the tasks entrusted to him who has responsibility for the job.

Below there is a description of the professional profiles for the operators involved in the machine.

User

Qualified personnel, able to perform simple tasks, trained on using the machine.

It supervises the proper functioning of the same and the eventual first intervention in case an alarm condition occurs.

Mechanical maintenance technician

Qualified technician able to conduct the machine under normal conditions, to intervene on the mechanical parts to carry out all the necessary adjustments, maintenance interventions and repairs.

It is not enabled to work on electrical systems in the presence of voltage.

Electrical maintenance engineer

Qualified technician able to conduct the machine in normal conditions; it is in charge of all the electrical interventions of regulation, maintenance and repair. It is able to operate in the presence of voltage inside enclosures and junction boxes

Manufacturer Technician

Qualified technician provided by WASP S.r.l. to carry out operations of a complex nature in particular situations or in any case according to what has been agreed with the user.

1.6.2. Editorial pictograms

To ensure a deeper knowledge of the machine, the text of this manual is accompanied by indications that complete it, providing additional information, indispensable attention or particularly significant hazards to consider; in this regard, the following notation is used:



DANGER:

Indicates situations or operations that must necessarily be performed or information to which particular attention must be paid to avoid harm to people.



WARNING:

Indicates situations or operations in which there is the possibility of causing damage to the machine, to the equipment connected to it.



ENVIRONMENTAL NOTE:

Indicates situations or operations in which there is the possibility of causing damage to the environment.



NOTE:

Indicate the notes, warnings, suggestions and other points on which you want to draw the reader's attention or complete the explanation with further information.

Personal protective equipment (PPE)

The graphic symbols used in this manual are indicated below to indicate the need to wear certain PPE.



PROTECTIVE GAUNTLETS:

Indicates the need to use suitable protective gloves to perform the described operation (possibly dielectrics for carrying out work on the electrical system).



SAFETY SHOES:

Indicates the need to use safety shoes suitable for performing the described operation.



PROTECTIVE WORKWEAR:

Indicates the need to use protective clothing to perform the operation described.



PROTECTIVE HELMET:

Indicates the need to use a safety helmet to perform the operation described.

2 DESCRIPTION OF THE CONTINUOUS FEEDING

The Continuous Feeding System (or CFS for short) is the new WASP product for the ceramic sector.

The CFS is the world's first continuous supply system for dense fluid materials for additive manufacturing that replaces the limited capacity tank with a virtually infinite power system.

The CFS can be fed continuously without ever interrupting the printing process. The material, after being mixed and brought to the correct consistency for printing, can then be introduced before the start of the system from the circular inlet hole during the printing phase.

However, it no longer matters that the material is compacted and degassed before being introduced, since the continuous movement of the mixer can easily remove all the air bubbles. An outcome that is difficult to achieve with standard tanks.

The lower transport area has an auger that has the task of pushing the material up to the extruder mounted on the printer. The connection PTFE/INOX tube is in fact solid enough to work in harmony with the whole system without creating any particular effort either for the 3D printer or for the CFS.

All areas exposed to contact with the wet material are made of resistant stainless steel in order to prevent oxidation. The system can be easily disassembled and is precisely designed for cleaning and maintenance.

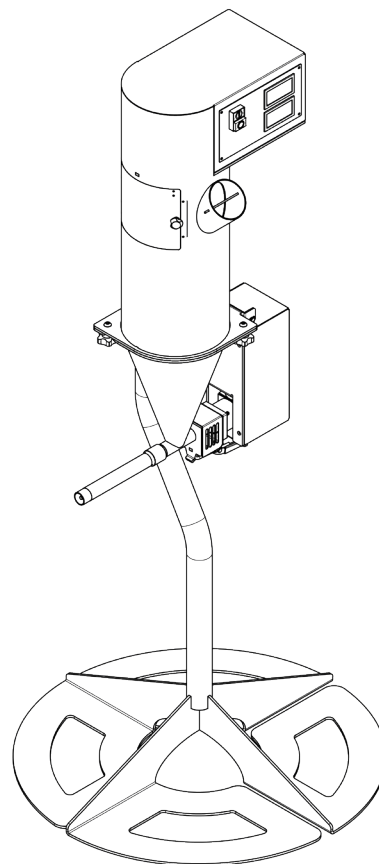


Fig. 2 - Continuous feeder

2.1. Main view

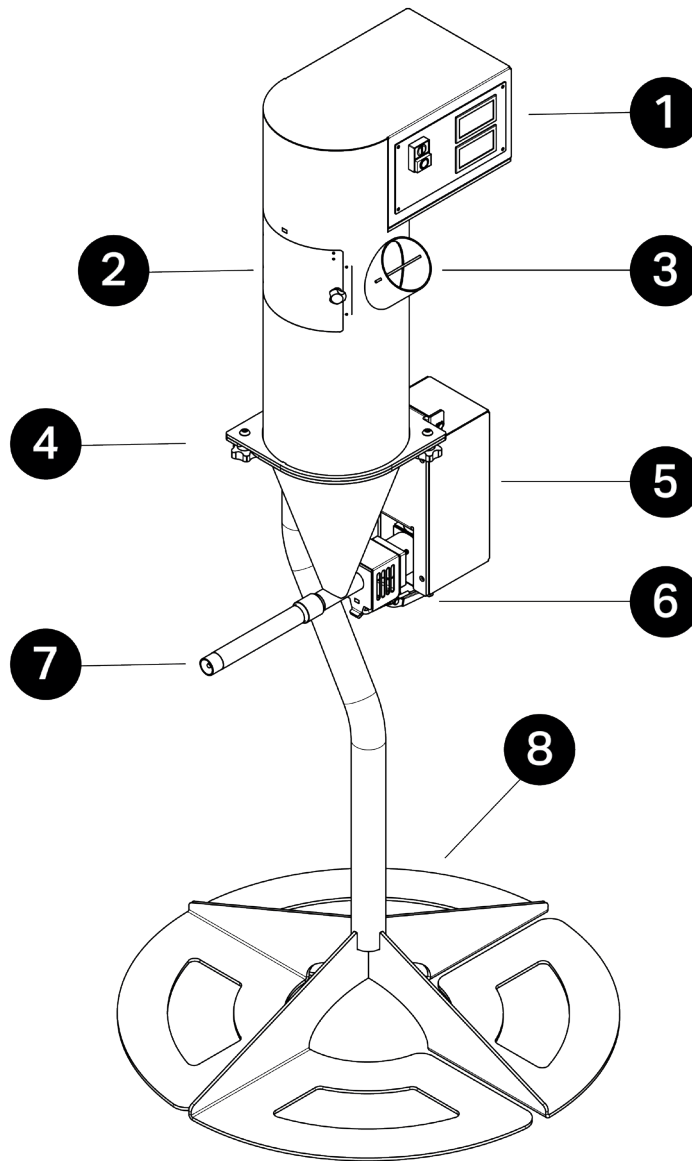


Fig. 2.1 - Main view

Legend:

1. ON/OFF button and user interface (view 5.2 User Interface)
2. Inspection window
3. Material intake
4. Locking knobs
5. Rotating brushless motor
6. Clamp
7. Output pipe
8. Basement

2.2. Rear view

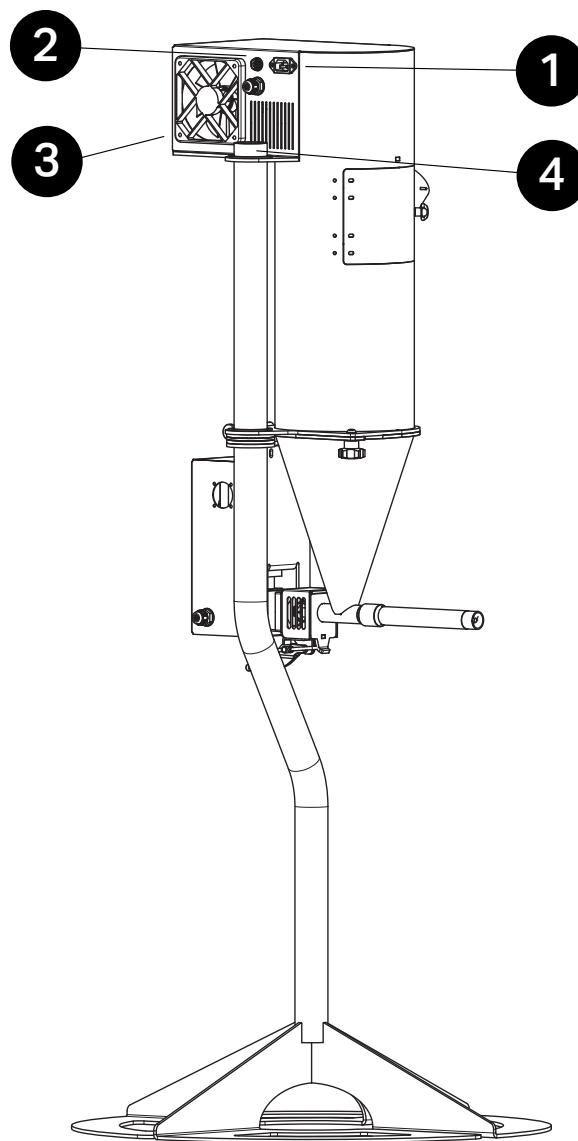


Fig. 2.2 - Rear view

Legend:

- 1. 220/110v Current input
- 2. Signal input
- 3. Fan filter
- 4. Security screw

2.3. Technical data

All WASP machines and 3D printers are characterized by considerable robustness and working precision. Their mechanics allows for greater precision and stability, guaranteeing greater production speeds. A further advantage is the possibility of restarting the production of the piece from the point where it may have been interrupted for some reason.

General features	
Length	32 cm
Width	36 cm
Height	90 cm (158 cm with basement)
Approximated weight	60 kg (30kg maximum weight of a single component)
Noisiness	< 70 db (A)
Mechanical features	
Frame and cover	Metal sheet and stainless steel
Movement	Rotation on thrust bearing and Igus bearings
Motors	ISV57 brushless
Electrical features	
Input	220/240 V - 50/60 Hz (110 V on request)
Absorbed power	450W
Use features	
Environment of use	15-30 °C
Warehouse	0-30 °C
Continuous feeding informations	
Technology	LDM
Max output	30 kg/h (measured with earthenware and 8mm nozzle)
Compatible nozzles	4, 6, 8 mm
Interface	Built-in dual PWM controller/synchronous cable control*
Tank capacity	11 l
Suitable materials	Earthenware, Stoneware, Porcelain, mixtures

*only supported with compatible Delta WASP 40100 Clay models. Contact support@3dwasp.com for more info

2.4. Noisiness

The noise emitted by the machine only is inferior than 70 dB(A).

The presence of more machines and printers in the same area can increase the global noise.



ATTENTION:

It is the responsibility of the customer to carry out an assessment of the noise risk of his activity as prescribed by the legislation in force in the place where the machine is installed, and to equip the operators with adequate Personal Protective Equipment (such as headphones for hearing protection).

2.5. Intended use of the continuous feeding

The machine has been designed and built to feed a 3D printer with ceramic mixtures. It is possible to use materials such as porcelain, earthenware, stoneware, etc.

Any use of the machine with materials other than those supplied will void the warranty and the responsibility of the Manufacturer.

2.6. Improper use of the feeder

The following machine uses are prohibited:

- Using the machine to perform operations other than those for which it was designed and constructed described in paragraphs 2.3 "Technical Data" and 2.5 "Intended use of the machine";
- Failure to comply with safety regulations;
- Operation of the machine with procedures other than those described in this manual;
- Use components not provided for in the design phase;
- Failure to comply with established maintenance schedules;
- Perform work on the machine that involves the modification of components or parameters that affect the work cycle;
- Use of the machine outside the permitted working temperatures;
- The use without authorization of non-original spare parts or components not approved by the Manufacturer;
- The execution of any modification or structural intervention without the Manufacturer's authorization;



NOTE:

Each of the improper uses or negligence previously listed causes:

- the immediate cancellation of the guarantee stipulated with the Manufacturer at the time of the purchase of the machine;
- the cancellation of the Manufacturer's Responsibility for damages caused to people, things or animals.



ATTENTION

Improper use can damage the machine which consequently can cause dangerous situations for the personnel responsible for its operation and maintenance.

3 TRANSPORT AND HANDLING

3.1. General warnings

The reading of this chapter assumes, in order to use the machine safely, the knowledge of the contents of paragraph 1.6 "General safety warnings".

Furthermore, the specific requirements for safe interaction with the machine, related to this chapter, are detailed in the following paragraphs.



ATTENTION:

The operations related to these activities must be performed by authorized and professionally qualified personnel.



ATTENTION:

During operations, the operator must wear all the necessary Personal Protective Equipment (PPE).



3.1.1. Delivery of the machine

Upon receipt, make sure that:

- The machine has not been damaged during transport;
- Any packaging has not been tampered with consequent removal of parts from the inside;
- The supply corresponds to the order specifications.



NOTE:

If the machine needs to be stored for a certain period of time before installing it, it is recommended to protect it adequately and store it in a suitable environment (with a temperature between 5 ° C and 40 ° C and relative humidity between 20 % and 60% non-condensing) and protected from atmospheric agents in order to avoid deterioration.



ATTENTION:

During storage, never stack the boxes containing the equipment.

3.2. Unpacking

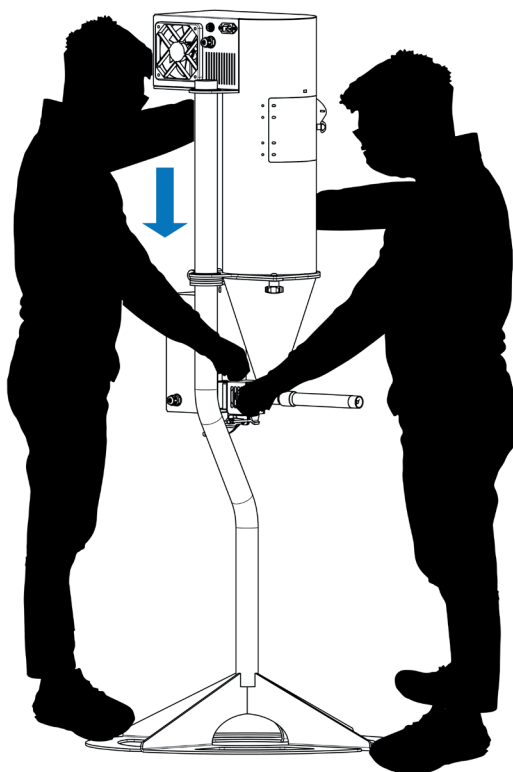


ENVIRONMENTAL NOTE:

Once the packaging has been removed from the machine it is recommended to keep it for any requests for assistance from the Manufacturer.

The machine will be delivered in a horizontally oriented wooden box.

After removing the machine from the case, you must assemble first the basement and then join the vertical pipe .



NOTE:

To perform this procedure it is required the presence of two operators.

Together they will take care of lifting and guiding the holes of the main body through the pipe.

Ensure there are Icus bearings in place into the holes and the thrust bearing seated between the machine and basement ring.

3.3. Content

The machine is supplied with:

- Signal cable
- Power cable
- Stainless steel braided hose 3/4" BSPT thread (female-female)
- Hose purging tool 3/4"-1/4" BSPT thread (male-male) (requires pressure water)
- WASP LDM XL 3.0 Extruder
- Spare nozzles

3.4. Lifting and handling of the machine



ATTENTION:

The weight of the machine is shown in paragraph 2.3 "Technical data". It is therefore necessary to use the lifting equipment whose expected flow is adequate for the weight to be lifted.



ATTENTION:

As long as the machine is not completely raised, it is advisable to check the correct balance of the same. During lifting, all the area around the machine is considered dangerous.



ATTENTION:

All small components that exceeds the weight of 25 kg must be transported with the appropriate equipment, or manually (if not exceeding 50Kg) by two qualified operators.

4.2. Electrical connection



ATTENTION:

The operations related to these activities must be performed by authorized and professionally qualified personnel.



ATTENTION:

It is up to the user to protect the cable mechanically against any crushing or sources of wear according to the type of installation made.



ATTENTION:

The machine must be powered by a power plant compliant with laws and regulations on safety.



NOTE:

All the data concerning the electrical characteristics of the machine can be found in the manual, see paragraph 2.3 "Technical data".

Before connecting the machine's power cord to the electrical outlet, check that the system's power consumption and voltages are suitable.

5 PREPARING TO USE THE CONTINUOUS FEEDING

5.1. General warnings

The reading of this chapter assumes, in order to use the machine safely, the knowledge of the contents of paragraph 1.5 "General safety warnings".

Furthermore, the specific requirements for safe interaction with the machine, related to this chapter, are detailed in the following paragraphs.



ATTENTION:

The operations related to these activities must be performed by authorized and professionally qualified personnel.



ATTENTION:

During operations, the operator must wear all the necessary Personal Protective Equipment (PPE).



5.2. User interface

5.2.1. Main board

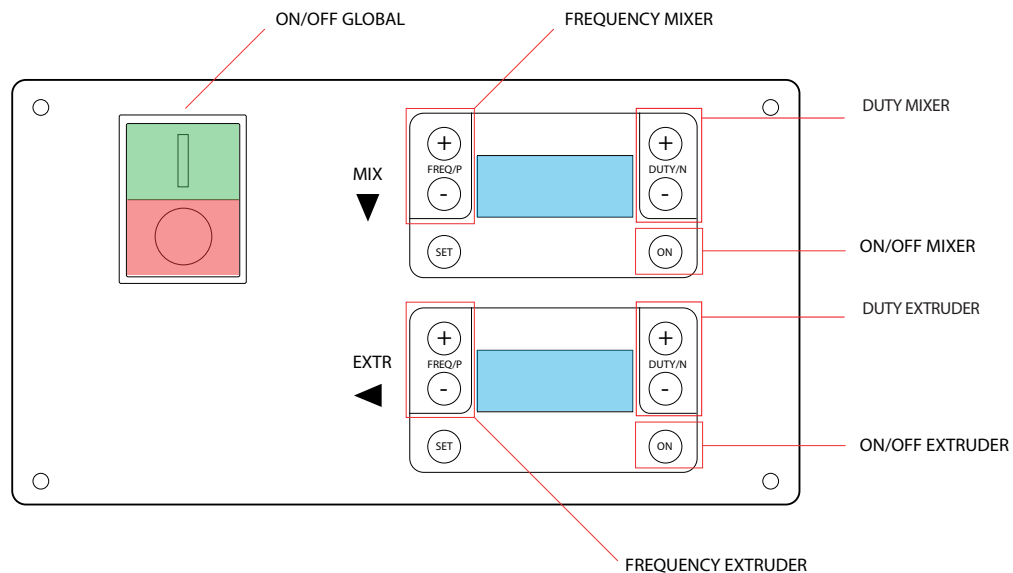


Fig. 5.2.1 - Main board

Legend:

1. ON/OFF Global: Use the green button to turn on the machine. Remember that as the system is turned on the components will start moving. The red button serves as shutdown and also as emergency button.
2. ON/OFF Mixer: The mixer is automatically turned on with the global green button. You can use this button to manually switch on and off the movement of the mixing unit.
3. ON/OFF Extruder: The extruder is automatically turned on with the global green button in case the machine is not connected by cable to the 3D printer. You can use this button to manually switch on and off the movement of the mixing unit.
4. FREQUENCY MIXER: Adjust the frequency of movement of the mixing unit. Reasonable values between 1.000 and 15.000
5. FREQUENCY EXTRUDER: Adjust the frequency of movement of the mixing unit. Reasonable values between 1.000 and 15.000
6. DUTY MIXER: Do not modify this value if you are not instructed to do so. By default is 50%. Reasonable values between 20 and 50.
7. DUTY EXTRUDER: Do not modify this value if you are not instructed to do so. By default is 50%. Reasonable values between 20 and 50.

6 FIRST USE OF THE MACHINE

6.1. General warnings

The reading of this chapter assumes, in order to use the machine safely, the knowledge of the contents of paragraph 1.5 "General safety warnings".

Furthermore, the specific requirements for safe interaction with the machine, related to this chapter, are detailed in the following paragraphs.



ATTENTION:

The operations related to these activities must be performed by authorized and professionally qualified personnel.



ATTENTION:

During operations, the operator must wear all the necessary Personal Protective Equipment (PPE).



6.2. Joints and alignments checks



NOTE:

The first step to do before turning on the Continuous Feeding is checking that every moving and rotating component is jointed correctly and aligned.



ATTENTION:

The operations related to these activities must be performed while the power cable is not connected to the power source.

Carry out the following checks before turning on the machine:

1. **Check bearing and alignment:** verify the joint looks like in Fig 6.2.a
Make sure that the set screw and nut are well tightened.
If this joint is not properly assembled the mixing unit won't work correctly.
Make sure there are no gaps between the components of the bearing.
2. **Check tightening and alignment of the knobs** as in Fig 6.2 b
Make sure that the washer is properly present between knob and flange.
3. **Check joint interpenetration** as displayed in Fig 6.2 c
If the components are not joined correctly rotate manually the screw so that they will match.
4. **Check that the clamp is properly closed** as in Fig 6.2 d.
When closing the clamp must not be overstressed otherwise it may misalign the joints.

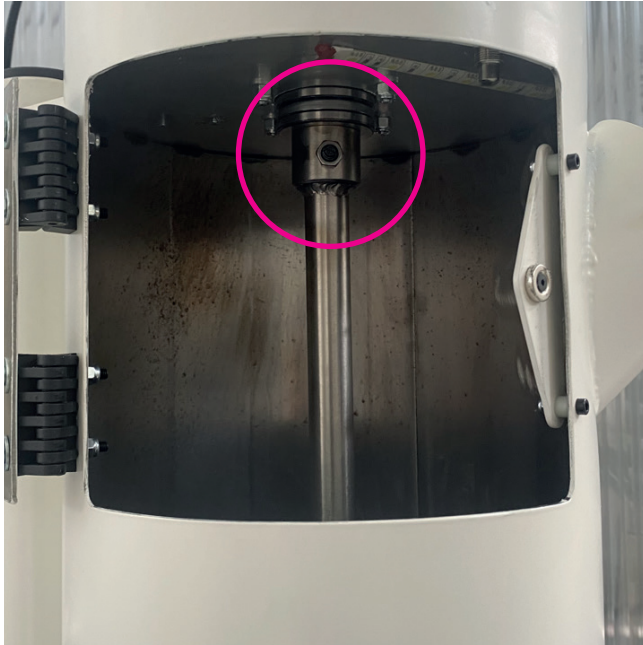


Fig. 6.2 a - Check bearing and alignment



Fig. 6.2 b - Check tightening and alignment

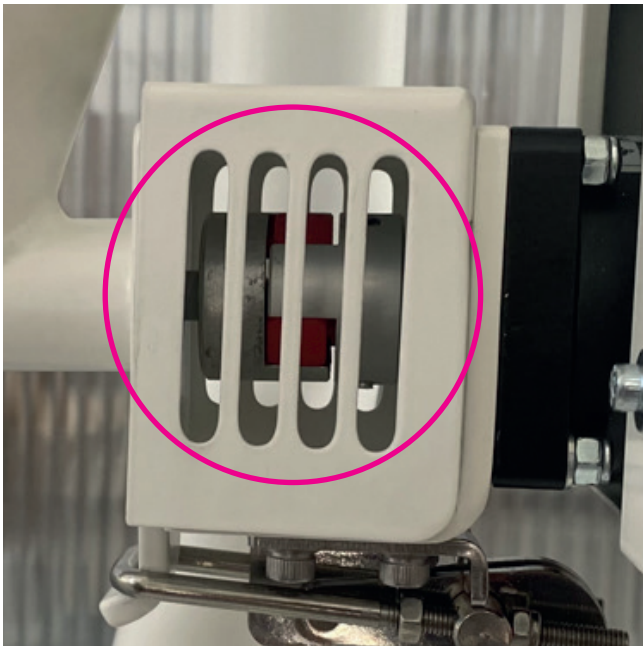


Fig. 6.2 c - Check joint interpenetration

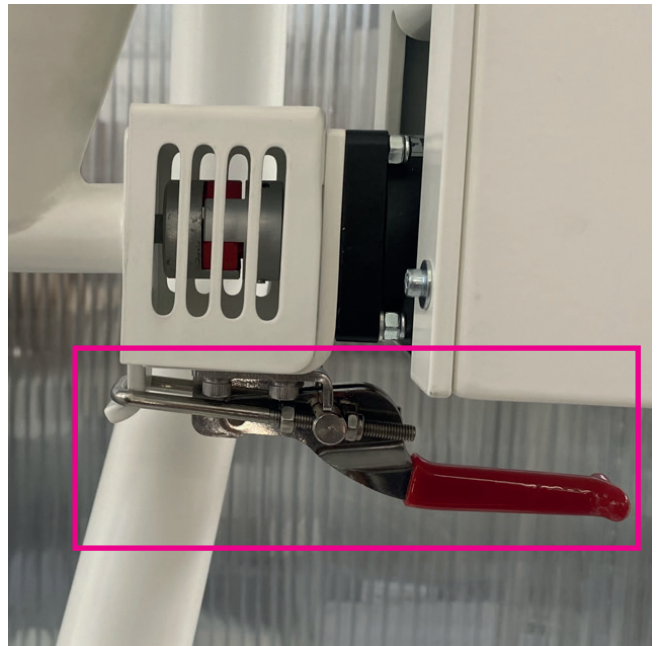


Fig. 6.2 d - Check clamp closure

Fig. 6.2 - Setup and pre-operational checks

6.3. Connecting the Continuous Feeding to the 3D printer



NOTE:

This paragraph shows the connection of the system to a compatible Delta WASP 40100 Clay. If you are not in possession of such machine ignore this paragraph.

PLACEMENT

Before connecting the machine to the 3D printer make sure that the relative position of the two is correct as displayed below in Fig 6.3.

If the cables get tensioned or the hose gets excessively bent during the print it's possible that the placement of the machine is not correct.

CONNECTION

To connect the machine to the 3D printer follow the steps below:

1. Fix the hose to the pipe, make sure its not too tightened (Fig 6.3 a)
No tightening additional to the one that can be done by hand is required or advised.
If you have problem in screwing the part they are probably misaligned. Try to lift the hose.
Adding some grease on the thread can help the unscrewing.
2. Fix the hose to the extruder. (Fig 6.3 b)
No tightening additional to the one that can be done by hand is required or advised.
If you have problem in screwing the part they are probably misaligned. Try to lift the hose.
Adding some grease on the thread can help the unscrewing.
3. Insert signal cable in the socket on the back of the machine. (Fig. 6.3 c)
Make sure to secure it with the threaded crown.
4. Insert signal cable in the socket on the side of the 3D printer. (Fig. 6.3 d)
Make sure to secure it with the threaded crown.
Make sure the machine is close enough to the 3D printer to prevent tensions on the cable.

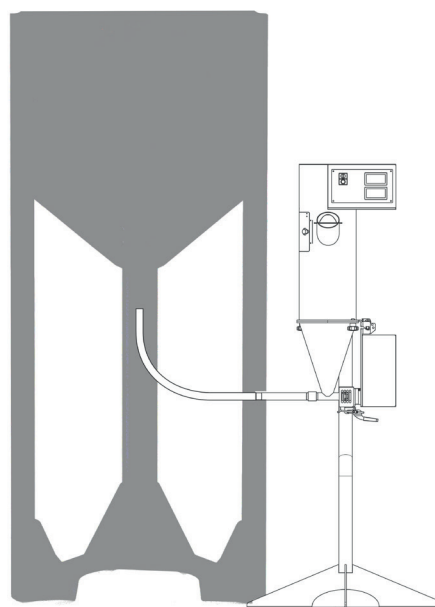


Fig. 6.3 - Correct placement of the machine near the 3D printer

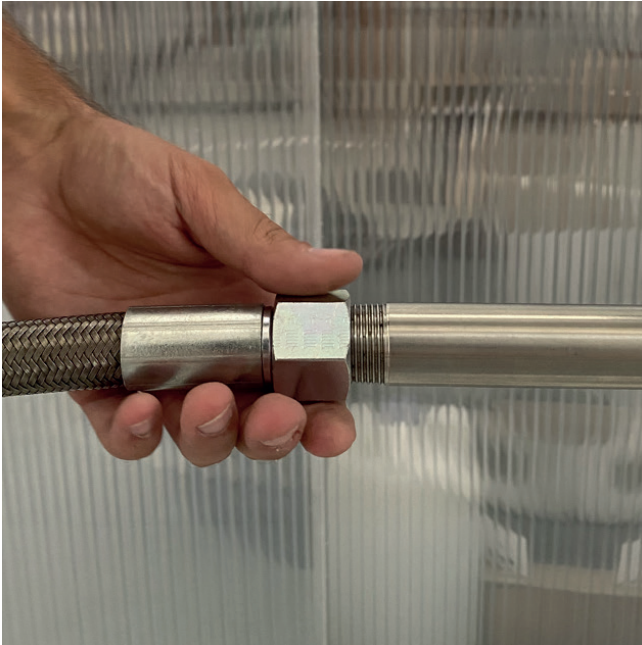


Fig. 6.3 a - Fix the hose to the pipe



Fig. 6.3 b - Fix the hose to the extruder



Fig. 6.3 c - Insert the signal cable in the socket



Fig. 6.3 d - Insert the signal cable in the printer socket

Fig. 6.3 - Connecting the Continuous feeding System to the 3D printer

6.4. Loading of material

**ATTENTION:**

The machine is not capable of working any mixture. For the compatible materials check the paragraph 2.3 Technical Data.

**NOTE:**

The consistency of the mixture is crucial for the proper functioning of the system.

Dough with too high consistency can block the system by overstressing the mechanics.

Mixtures that are not homogeneously mixed can tend to separate from water.

The presence of aggregates, grog, fibers depending on their nature and size can compromise the correct functioning of the system.

To perform the loading of the material proceed as described:

1. Turn on the machine using the green button on the global switch. (Fig 6.4 a)
2. After preparing a suitable mixture produce some cylindrical shapes of the average diameter of 5 cm. (Fig 6.4 b)
3. Feed the tank by pushing the cylinders one by one inside the material intake. (Fig 6.4 c)

The cylinder must be cut in half by the safety protection.

This is:

- the safest way of operating
 - preventing the material fed from sticking to the walls of the intake
4. Leave some time to the machine to degas and compress the mixture through the tank before evaluating the level of the material.

The maximum material capacity is reached when the mixture is close to the upper cut element as displayed in Fig 6.4 d



Fig. 6.4 a - Turn on the machine



Fig. 6.4 b - 5cm cylindrical dough



Fig. 6.4 c - Material pushed through the intake



Fig. 6.4 d - Max material level

Fig. 6.4 - Loading of material

6.5. First extrusion

To perform the first extrusion proceed as described:

1. Make sure the hose is correctly tightened to the pipe of the machine and is not connected to the extruder on the other side. (Fig 6.5 a)

2. Check that the material is present inside the machine with the inspection window.

Remember to close the inspection window. (Fig. 6.5 b)

If the material is to be loaded follow the procedure displayed in paragraph 6.4 "Loading the material"

3. Turn OFF the 3D printer connected to the machine in case there is one.

4. Turn ON the machine using the green button on the global switch of the machine. (Fig. 6.5 c)

5. Wait until the material is coming out of the hose with a consistent flow. (Fig. 6.5 d)

After a good extrusion you can turn OFF the extrusion unit using the relative ON/OFF button. (see 5.2 "User Interface)

6. Clean the excess of the material extruded. (Fig. 6.5 e)

7. Tighten the hose with the extruder (Fig. 6.5 f)

Make sure to check the threads are clean before proceeding.

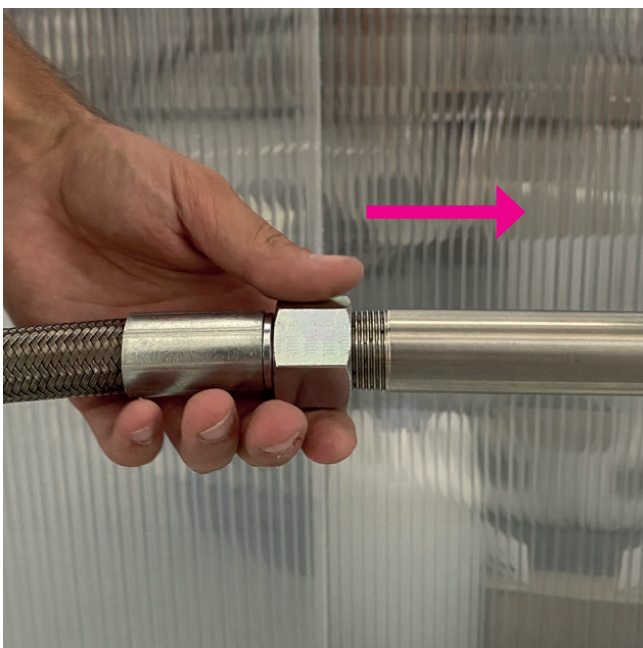


Fig. 6.5 a - Fix the hose to the pipe

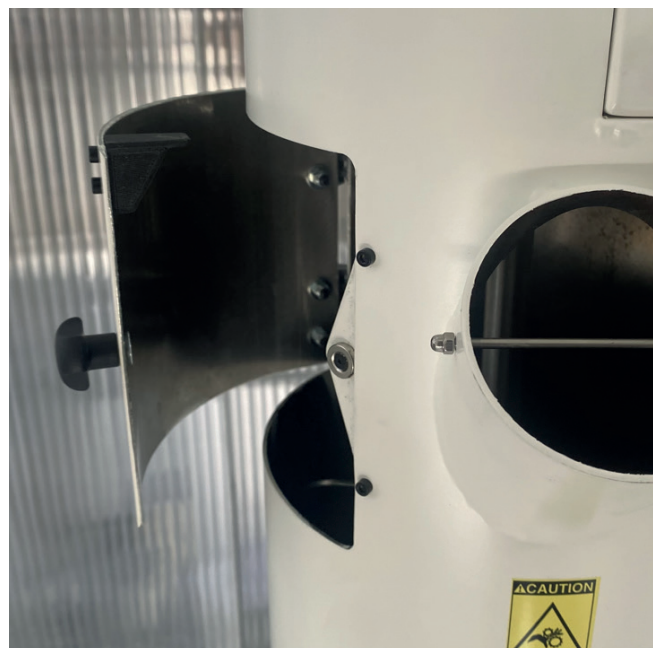


Fig. 6.5 b - Close the inspection window



Fig. 6.5 c - Turn on the machine



Fig. 6.5 d - Check the material getting out



Fig. 6.5 e - Cleaning the seat of the thread

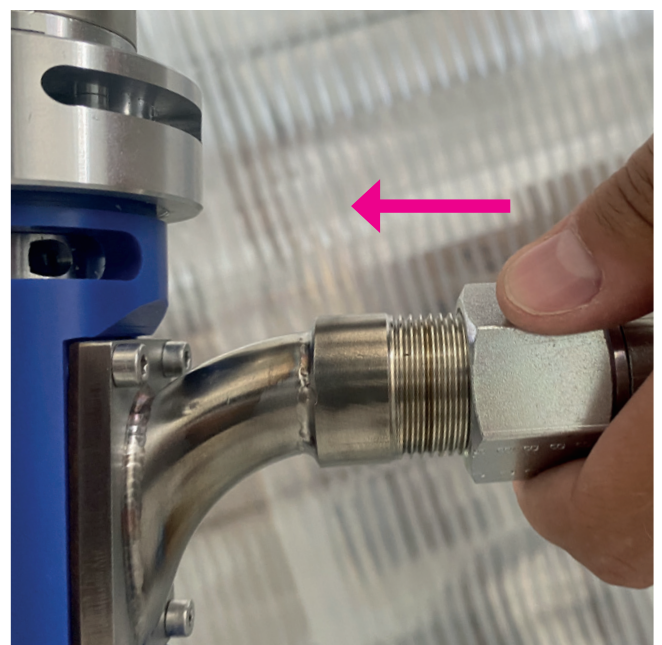


Fig. 6.5 f - Tighten the hose with the extruder

Fig. 6.5 - First extrusion

6.6. Synchronized use with 3D printer



NOTE:

This paragraph shows the synchronization of the system to a compatible Delta WASP 40100 Clay. If you are not in posses of such machine ignore this paragraph.

After the machine has been properly connected to the 3D printer as displayed in paragraph 6.3 "Connecting the Continuous Feeding to the 3D printer" it's necessary to understand the parameters that allow a good synchronization of the two.

By default when connected with the signal cable the 3D printer will send over to the extrusion unit on the Continuous Feeding System the same extrusion value (E) that is in use on the extruder of the printer itself.

FEEDING REDUCT: The Feeding Reduct value is a value available in the main menu of the interface of the 3D printer. By default is set to 1. Increasing the value will reduce the ratio of the extrusion unit on the Continuous Feeding System, making it turn slowed and feeding less material.

Note: Consider using it in case you have an excess of extrusion during the printing or material leaks from the upper slots extruder.

EXTRUDE MATERIAL: The Extrude material command accessible in the main menu of the 3D printer.

It's necessary to use it before operating the machine after the procedure displayed in paragraph 6.5 "First Extrusion". By running the command and increasing the value the screw of the extruder on the 3D printer will be forced to move and consequently it will fill the body of the extruder.

Note: Starting a print without operating this step will bring to missed extrusion for the first layers.

TUNING THE FLOW: After setting the right Feeding Reduct value as already described it's possible to correct minor flow adjustments with the Flow parameter.

This command is inside the Tune menu when the 3D printer is printing.

By default the value is 100 and makes reference to the values provided by the .gcode.

Increasing the value will increase the flow. Reducing the value will reduce the flow.

Note: the Feeding Reduct is a ratio and it will automatically update the material fed by the Continuous Feeding System each time the Flow value is tuned.

7 ORDINARY AND EXTRAORDINARY MAINTENANCE

7.1. General warnings

The reading of this chapter assumes, for a safe use of the machine, the knowledge of what is contained in chapter 1.5 "General safety warnings".

Moreover, the specific prescriptions for interacting in a safe way with the printer, relative to this chapter, are detailed in the next paragraphs.



ATTENTION:

The operations related to these activities must be performed by authorized and professionally qualified personnel.



ATTENTION:

During operations, the operator must wear all the necessary Personal Protective Equipment (PPE).



- Before operating on the machine make sure that this is in safety condition
- Do not wear rings, watches, bracelets, chains
- Verify periodically the wear of the connection pipes
- Check that there are no constrictions on the pipes
- Check periodically that the threaded bars and the internal of the handles are not damaged.

7.2. Cleaning

7.2.1. Machine cleaning



ATTENTION:

Cleaning the machine after the use is a crucial part of the maintenance and will extend the lifetime of the product.



ATTENTION:

Avoid any chemicals, solvents and very abrasive tools when cleaning the machine to prevent unwanted damages and wearing.

The cleaning procedure must be carried out when the 3D printer is not working

In case the machine is not connected to a 3D printer turn OFF the extrusion unit using the relative ON/OFF button before proceeding. (see 5.2 "User Interface")

To perform a correct cleaning of the machine proceed this way:

1. Unscrew the hose from the extruder. (Fig. 7.2.1 a)

Note: If after this operation the material starts flowing out of the hose it means you missed step 1.

2. Turn OFF the 3D printer and the extrusion unit should automatically start to purge the material (Fig 7.2.1 b)

In case the machine is not connected to a 3D printer turn ON the extrusion unit using the relative ON/OFF button (see 5.3 "User Interface").

Wait until there's no more material coming out from the hose.

3. Turn off the machine by unplugging the power cable (Fig. 7.2.1 c)

4. Unscrew the hose from the pipe of the machine (Fig. 7.2.1 d)

5a. Open the clamp and lift the extrusion motor (Fig 7.2.1 e)

5b. Use the secure to fix in position the extrusion motor (Fig. 7.2.1 f)

6. Extract the screw from the pipe by pulling it on the side of the motor (Fig. 7.2.1 g)

7. Loosen the two black knobs without completely removing them (Fig. 7.2.1 h)

8. Rotate clockwise the lower component than is cone-shaped (Fig. 7.2.1 i)

9. Pull down the lower component to remove it from the assembly. (Fig. 7.2.1 l)

Note: when there's still material inside the procedure can be helped by gently rotating the component to help it slide down.

10. Open the inspection window and pull down the mixed by grabbing it together with the bearing. (Fig. 7.2.1 m)

Note. Be careful not to lose the bearing during this step.

11. Separate the bearing from the screw and save it. (7.2.1 n)



Fig. 7.2.1 a - Remove the hose from the extruder



Fig. 7.2.1 b - Purging the material out



Fig. 7.2.1 c - Unplug the power cable



Fig. 7.2.1 d - Unscrew the hose from the pipe

Fig. 7.2.1 - Cleaning

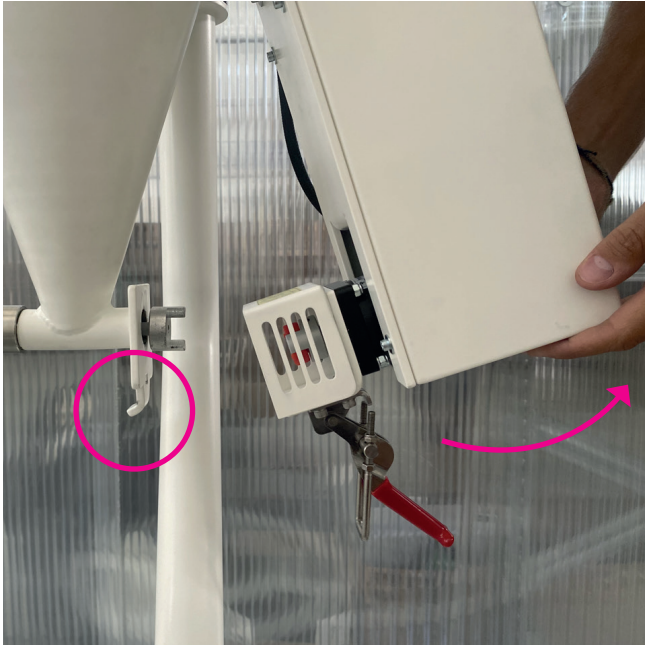


Fig. 7.2.1 e - Lift and secure the extrusion motor



Fig. 7.2.1 f - Secure the extrusion motor



Fig. 7.2.1 g - Extract the screw

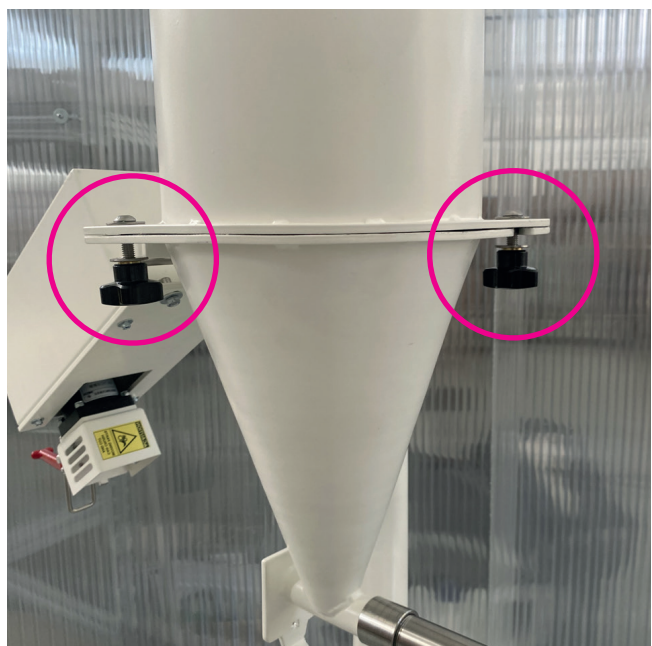


Fig. 7.2.1 h - Loosen the two black knobs

Fig. 7.2.1 - Cleaning



Fig. 7.2.1 i - Rotate to unlock the lower component

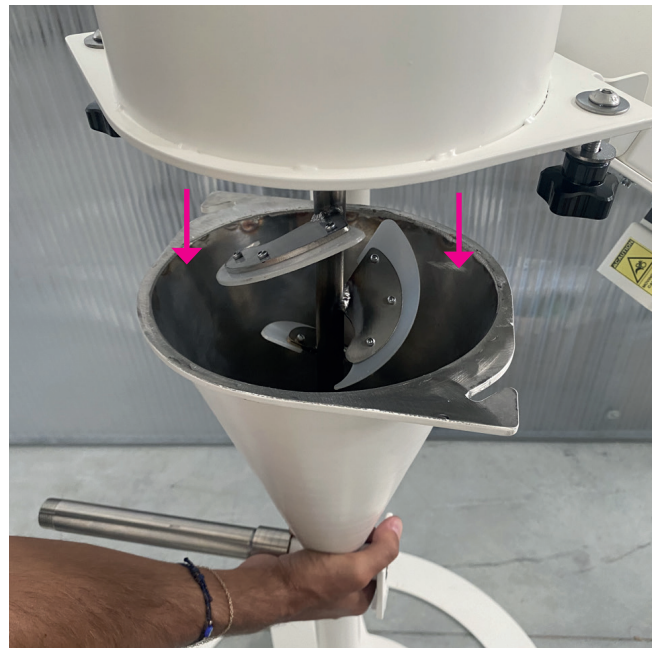


Fig. 7.2.1 l - Pull down the lower component

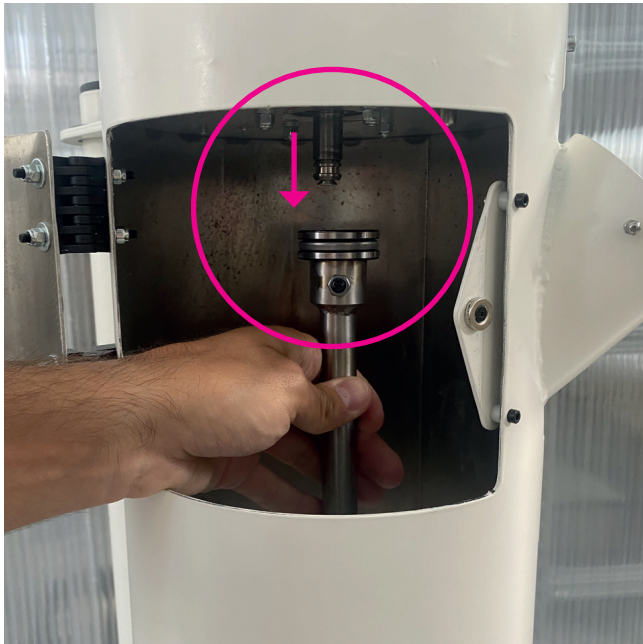


Fig. 7.2.1 m - Pull down the mixer together with all the bearing



Fig. 7.2.1 n - Separate the bearing from the mixer

Fig. 7.2.1 -Cleaning



Fig. 7.2.1 o - Thread size reducer to 1/4"

Fig. 7.2.1 -Cleaning

12. Clean the parts as indicated:

Mixer:

Clean the part with water and sponge or brush.
Pressure washer can be used as well.

Lower component (Cone) and pipe:

Clean the part with water and sponge or brush.
Pressure washer can be used as well.

Main component:

Clean the part with water and sponge or brush.
Note: pay attention to the upper part, especially to the LED, the microswitch and the cable.
Do not use current water on the main part.

Screw:

Clean the part with water and sponge or brush.
Pressure washer can be used as well.

Hose:

1. Connect the Thread size reducer as displayed in Fig. 7.2.1 o
 2. Connect the reducer to a water pressure output. (Do not exceed the 80 BARS)
 3. Provide water until the material is out. Stay away from the hose during the operation.
- Note: Cleaning the hose by penetrating with a second part can lead to wear and damage

7.2.2. Extruder and 3D printer cleaning

**NOTE:**

For a complete documentation of the cleaning of the extruder and 3D printer consult the official Manual of Use and Maintenance of the 3D printer.

Cleaning the Extruder

1. Separate the body of the extruder (blue part) from the motor by unscrewing it.
2. Clean the body and screw with water and sponge or brush.
3. Just if necessary clean the motor delicately with a wet tissue.

**ATTENTION:**

Do not submerge the motor in water or wash it with current water for any reason.

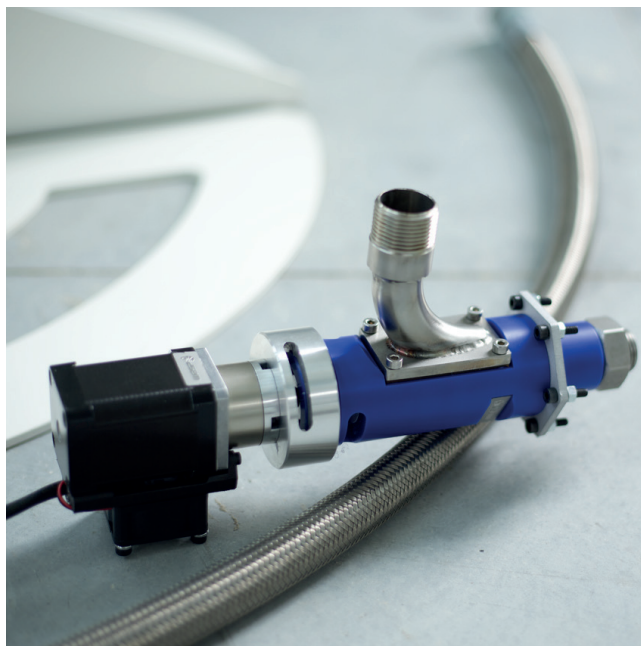


Fig. 7.2.2 - Extruder and 3D printer cleaning

7.3. Ordinary maintenance



ATTENTION:

Cleaning and lubing the parts after the use is a crucial part of the maintenance and will extend the lifetime of the product.



ATTENTION:

Avoid any chemicals, solvents and very abrasive tools when cleaning the machine to prevent unwanted damages and wearing.

Part	Kind of intervention	Period	Procedure
Extrusion screw	Wearing check	80 h	Par 7.3.1
Mixer	Wearing check	80 h	Par 7.3.2
Fan filter	Dust check	40 h	Par 7.3.3
Mixer bearing	Lubing	80 h	Par 7.3.4
Mixer shaft	Lubing	80 h	Par 7.3.5
Support bearing	Lubing	80h	Par 7.3.6



Fig. 7.3.1 - Check the wear of the screw



Fig. 7.3.2 - Check the overall wearing of the mixer

Fig. 7.3 -Maintenance

7.3.1. Extrusion screw

After cleaning the screw check the wearing . (Fig 7.3.1)

If the screw is very damaged contact the Manufacturer for a replacement.

7.3.2. Mixer

After cleaning the mixer check the wearing . (Fig 7.3.2)

If the mixer is very damaged contact the Manufacturer for a replacement.

7.3.3. Fan filter

Remove the plastic cover protecting the filter of the fan placed on the back of the interface of the machine. (Fig 7.3.3)

In case the filter is dirty clean it with compressed air.

After the check place it back in its place.

7.3.4. Mixer bearing

Lubricate the Mixer bearing with silicone-based lubricant. (Fig 7.3.4)

Clean it before the operation in case it's dirty.

7.3.5. Mixer shaft

Lubricate the Mixer shaft with silicone-based lubricant. (Fig 7.3.5)

Clean it before the operation in case it's dirty.

7.3.6. Support bearing

Lubricate the Support bearing with silicone-based lubricant. (Fig 7.3.6)

Clean it before the operation in case it's dirty.



Fig. 7.3.3 - Fan filter dust check and cleaning



Fig. 7.3.4 - Mixer bearing lubing

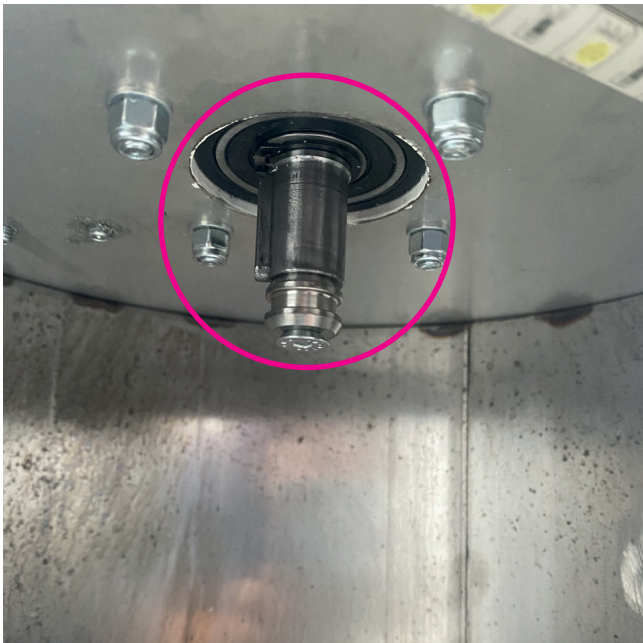


Fig. 7.3.5 - Mixer shaft lubing



Fig. 7.3.6 - Support bearing lubing

Fig. 7.3 - Ordinary Maintenance

8 ADDITIONAL INSTRUCTIONS

8.1. General warnings

The reading of this chapter assumes, in order to use the machine safely, the knowledge of the contents of paragraph 1.5 "General safety warnings".

Furthermore, the specific requirements for safe interaction with the machine, related to this chapter, are detailed in the following paragraphs.



ATTENTION:

The operations related to these activities must be performed by authorized and professionally qualified personnel.



ATTENTION:

During operations, the operator must wear all the necessary Personal Protective Equipment (PPE).



8.2. Decommissioning and dismantling

In the event that the machine should be taken out of service for a prolonged period while waiting for the dismantling, it is advisable to indicate its presence, preventing unauthorized access to the machine. Before starting the dismantling operations, it is necessary to create around the machine a sufficiently large and orderly space in order to allow all the necessary movements without risk created by the surrounding environment.



ATTENTION:

Observe the requirements imposed by the laws in force and by the authorities in charge of the country in which the demolition takes place.

If the mechanical parts have to be dismantled, keep in mind that they consist of different types of material. The user is therefore obliged to consider disassembling the machine in its parts in order to facilitate a differentiated disposal aimed at recycling the various materials and products, in full compliance with all the regulations in force on the spot.



NOTE:

The dismantling of the machine must be performed by a qualified mechanical maintenance technician.



ATTENTION:

Before carrying out any type of disassembly on the machine, make sure that the power supply is disconnected.



ATTENTION:

Danger crushing hands, falling materials, cuts and abrasions. Obligation to use clothing appropriate to the operation to be performed.



NOTE:

It is absolutely necessary to apply the regulations in force in the country of destination, concerning the disposal of waste, so it is forbidden to disperse in the environment any type of processing residue, oils, etc... subdividing the dismantled parts by type for a correct separate collection of materials.



NOTE:

Within the European Community, electrical equipment must be disposed of as prescribed by the European Community Directive 2012/19 / EU on waste electrical and electronic equipment (WEEE).



ATTENTION:

The user is obliged to dispose of the equipment in the consortia and collection centers for the treatment and recovery of "WEEE".

8.3. Instructions for emergency situations



ATTENTION:

In the event of a fire, the operator must immediately give the alarm and move away from the area to allow the intervention of trained personnel equipped with suitable protective and operational means.

Electrical parts

In case of fire of electrical parts, intervene with CO2 extinguishers to limit the damages

In general

Use ABC + Nitrogen powder extinguishers to quickly extinguish fires delimited to parts or areas without electrical parts.

