

INSTRUCTION MANUAL

Tumaker

3D PRINTERS

Designed and assembled by:



Original Manual

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Introduction and Objective of the Manual

The present manual provides all relevant information regarding the use of Tumaker products, with the clear objective of informing and addressing any possible user queries. The purpose of this manual is to provide users with clear and detailed information on the proper use, handling, and maintenance of Tumaker products. It is designed to help users familiarise themselves with the equipment, ensuring optimal performance and longevity.

The manual aims to:

- Offer guidance on the correct operation of Tumaker products.
- Address frequently asked questions and potential issues.
- Ensure user safety by outlining important precautions.
- Facilitate troubleshooting through step-by-step instructions.

This manual serves as a key resource for both new and experienced users to maximise the efficiency of their Tumaker products.

For any other matters related to technical support, you can contact us at:

Address:

Gabiria Kalea, 88
20305 Irun, Gipuzkoa

Email: soporte@indart3d.com

Tel.: 943 943 855

Please also remember that, in addition to this manual, you can consult our technical documentation, including explanatory videos and more, on our website.

CE Declaration

The Tumaker NX and BF Modular printers comply with the essential requirements and the following regulations:

- Machinery Directive 2006/42/EC
- RoHS Directive 2011/65/EU
- WEEE Directive 2012/19/EU
- EMC Directive 2014/30/EU

For further details, you can request the signed Declaration of Conformity via email at info@indart3d.com.

Intended Use and Reasonably Foreseeable Misuse

The machine is designed for the production of parts using various materials through the direct deposition of molten material onto the print bed.

The machine is not intended for printing parts with other types of materials or for performing any function other than the printing of the materials specified in the previous paragraph. If the user wishes to carry out any operation not indicated in the first installation, they must prepare the machine for that use and/or contact the manufacturer to establish the necessary safety measures for that usage.

The expected number of operators for this machine is 1.

The correct use of the machine involves:

- Producing plastic parts with the materials and characteristics specified in the machine's features.
- Not carrying out tasks other than those for which the machine is designed.
- Not taking measurements while the machine is in operation.
- Not exceeding the machine's working capacity (respecting part dimensions, maximum tool speed, etc.).
- Being operated by personnel who are trained and knowledgeable in its use.
- Working with the safety systems provided with the machine, ensuring they are checked and maintained according to the instruction manual.
- Using the personal protective equipment specified in the instruction manual.
- Not removing the warning or instruction plates from the machine. They must remain legible and in good condition at all times.
- Observing general safety measures that may affect work on the machine, both legally required and those specific to the workplace.
- Operating the machine from the designated workstations as indicated in the instruction manual.
- Using the different operational modes incorporated in the machine as specified in the instruction manual.

The waste generated may cause environmental issues, and its storage and disposal must comply with the current legislation in the country where the machine is being used.

Safety

Measures Taken Against Identified Hazards

Mechanical Hazards

- Hazards from handling operations:

This instruction manual provides detailed operational procedures, including the necessary Personal Protective Equipment (PPE) and preventive measures the operator must adopt when performing various handling operations. The safety features of the machine are also outlined in this manual.
- Hazards from sharp edges and corners:

The machine has been designed with inherent safety features, such as rounded corners and the avoidance of sharp parts, to minimise the risk of injury from physical contact.
- Hazards from moving transmission and working parts:

To ensure safe interaction with moving parts, the machine is protected by a combination of fixed and movable guards. The machine is enclosed on all four sides, and the top can either be closed or open. These guards may be transparent, allowing for visual monitoring of the part formation process. Access to the printing area is provided via a front door, and the top of the machine can also be opened.

Axis movements are permitted when the doors are open, but these movements occur at very slow, non-dangerous speeds, and the drives for these axes are calibrated to prevent the exertion of forces that could pose a crushing hazard to the operator.
- Hazards due to instability:

The machine has been designed with inherent stability in mind, following the guidelines set out in EN ISO 12100, to prevent any risk of collapse due to instability.
- Hazards from energy supply failure:

The machine has been designed in accordance with EN 60204-1, EN ISO 4413, and EN ISO 4414 safety standards, ensuring that variations in energy supply, restoration, or loss of power do not create dangerous situations for the operator.
- Hazards from failure to cut off power:

The machine is equipped with locking devices for each energy source, allowing for safe disconnection. This instruction manual provides the operational procedure for locking out different energy sources and the process for restoring power after the lockout procedure.
- Hazards from control system failure:

The control system is designed following EN 60204-1 electrical safety standards, ensuring that the start-up and shutdown of the machine's components always meet safety conditions. The control system parts that perform safety functions have been designed in compliance with EN ISO 13849-1. All safety functions have a Performance Level (PL) equal to or greater than the Required Performance Level (PLr).
- Hazards due to assembly errors:

This manual provides detailed procedures for various assembly operations to prevent errors.

Electrical Hazards

The electrical equipment is designed in accordance with EN 60204-1, ensuring that direct or indirect electrical contact is not possible.

Thermal Hazards

This manual informs operators of the risk of burns and outlines the correct operational procedures, PPE, and preventive measures to avoid burns from the print head, heated bed, or the part after 3D printing.

Noise Hazards

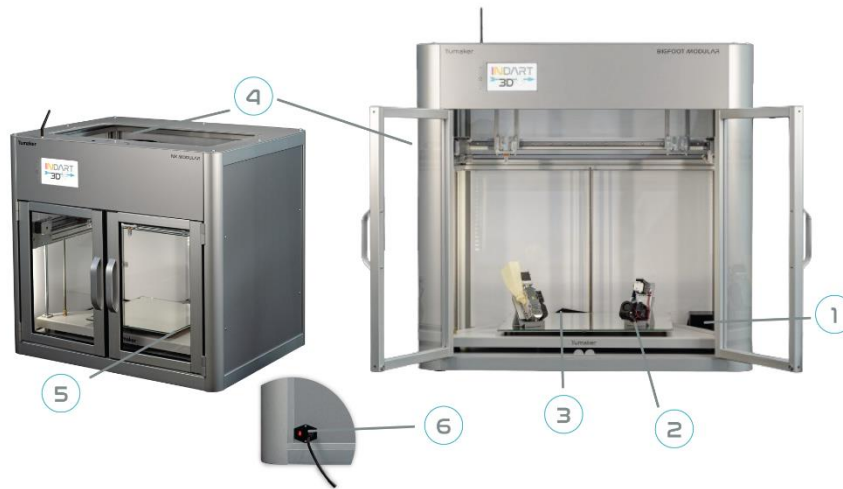
The machine has been designed with inherent safety to minimise noise at the source. Noise levels have been measured at various points, and the acoustic pressure levels reached are detailed in this manual. If necessary, users can take appropriate preventive measures for workers.

Ergonomic Hazards

The machine is designed according to EN 614-1 and EN 614-2 ergonomics standards. It is accessible and considers human anatomy to ensure the operator can perform tasks comfortably. The machine is also equipped with lighting in the work area, providing a light level of 500 lux.

Guards and Safety Devices

Location on the machine



Nº :	Guard	Type	Function
1	Embellisher	Fixed	Allows protection and concealment of electrical wiring
2	Thermal protector	Fixed	In addition to having a distinguishing colour to differentiate between nozzle sizes, it prevents potential burns from accidental contact.
3	Cable chain	Mobile	Keeps the wiring neatly organised.
4	Door	Mobile	Protects the part during printing and prevents possible entrapment.
5	Clip	Mobile	Holds the print bed glass securely, preventing displacement and breakage.
6	Power Switch	Fixed	If the machine needs to be turned off, an analogue button is located at the rear right side to cut off the power supply.

The primary objective of the guards is to protect and prevent the risks associated with the use of the machine. Therefore, it is strictly prohibited to tamper with any of these safety features, as doing so would compromise the safe operation of the printer.

Replacement

In the event of wear or damage that requires the replacement of guards, please consult the technical support indicated at the beginning of this document. They will provide the necessary information and components for appropriate replacement.

Residual Risks

- Handling and Assembly Risks: Safety measures must be observed during handling and assembly operations, as specified in the workplace safety protocols.
- Moving Elements: Risks associated with moving parts have been minimised as much as possible. However, given the concern that safety devices may be bypassed or disabled, the instruction manual explicitly prohibits the disabling or deactivation of any safety device. Additionally, if fixed guards are removed for any reason, it is mandatory to reattach them before starting the machine.

- **Safety Devices and Systems:** The instruction manual states that it is mandatory to regularly check the guards, devices, and safety systems provided with the machine. A list of these devices should be included in the manual. If any safety device is found to be malfunctioning, it must be replaced immediately before the machine is restarted.
- **Slip and Fall Hazards:** The instruction manual includes warnings about the risk of slipping and falling and emphasises the importance of keeping the floor clear of obstacles.
- **Personal Protective Equipment (PPE):** The instruction manual mandates the use of all required personal protective equipment. For example, gloves should be worn when handling printed parts and their supporting structures.
- **Electrical Hazards:** Only qualified electrical personnel should access any electrical installations. It is also necessary to periodically check the condition of the electrical equipment (insulation, signage, wiring, grounding, etc.).
- **Lighting:** The supplementary lighting device provided in the electrical cabinet should be periodically checked to ensure it is functioning correctly. If it is not working, immediate replacement is required.

By adhering to these guidelines, operators can minimise risks and ensure the safe operation of the machine.

Signage

1) Hot Surfaces

The platform and the nozzle of the print head can be heated up to 100°C and 300°C, respectively, depending on the printing material. Therefore, caution is advised.



2) Risk of entanglement

Do not handle any mechanical components of the printer while it is in operation.



3) Generic Label

Provides general information about the machine, including compliance with European regulations, the required power rating, the manufacturer, and the prohibition against disposing of the product in general waste.

tumaker

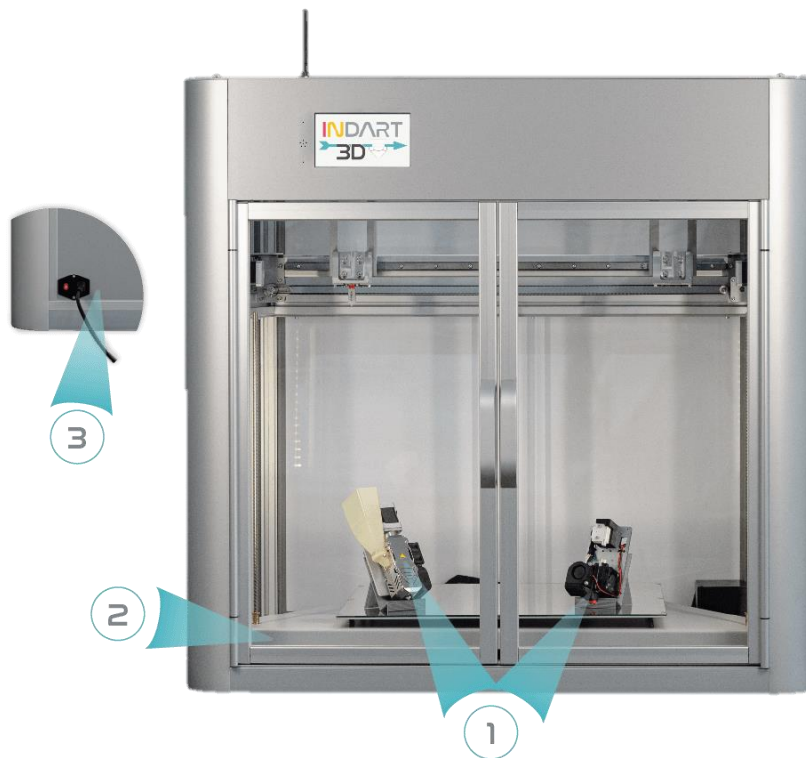
Designed and assembled in Irun, Basque Country, Spain

Power: 115V / 220V, 150W - 2000W 24vdc   

Indart3D S.Coop. Gabiria 88, 20305 Irun,
Gipuzkoa, Basque Country, Spain.

www.indart3d.com

Location on the machine



Basic Recommendations

- ✓ Place the printer on a stable surface that is free from vibrations.
- ✓ Position the printer in an environment without drafts, maintaining an ambient temperature between 15°C and 25°C.
- ✓ Follow the installation and startup instructions for the printer.
- ✓ Use materials recommended by Indart3D to ensure proper operation of the printer.
- ✓ Perform general cleaning and lubrication of the printer every six months.
- ✓ Clean the print head every 100 hours of printing. Depending on the material, it may be advisable to do this more frequently.
- ✓ The replacement of the nozzle depends on the usage of the equipment and the materials being processed. Contact us, and we will provide you with the necessary replacement.
- ✓ Carry out your prints following the recommendations and parameters provided by Indart3D.
- ✓ Adhere to maintenance recommendations to ensure optimal printer performance and increase its longevity.

Noise levels

A noise emission of 44dB (decibels) has been detected when the machine is in operation (printing). This level decreases to 40dB when the printer is completely closed. Measurements were taken by professionals using a sound level meter.

The cited values represent noise emission levels and are not necessarily safe sound levels for work. While there is a correlation between emission levels and exposure levels, this should not be used reliably to determine whether additional precautions are necessary. Factors influencing actual exposure levels for personnel include workspace characteristics,

noise from other sources, etc., including the number of machines and adjacent processes. Additionally, permissible exposure levels may vary from country to country. This information allows the machine user to make a better assessment of hazards and risks.

Emergency Situations

Entrapment. A protocol is in place for rescuing individuals who may become caught or trapped; however, this is a general guideline and should be adapted to the specific circumstances of each case.

1. Quickly assess the situation to react appropriately.
2. Stop the machine. There is a switch, operational at all times, at the rear of the machine for shutting it down. However, using the emergency stop on the screen allows for the cooling of hot areas if they are in use.
3. Remove yourself from affected objects. Be aware that even with the machine powered off, if hot areas were in operation, they will take several minutes to cool down, especially if the machine is off.
4. Evaluate damages. Assess both the person and the machine. Failing to check affected components may lead to further damage to the machine, resulting in malfunction or even breakage of parts.

Fires. Like the previous case, each situation requires specific actions depending on the progress of the fire. A generic protocol is outlined below to guide you in responding each time.

1. Alert and notify. Assessing the situation and the environment where the machine is located, it is recommended to immediately notify the safety personnel or even the fire department.
2. Evacuate and ensure personal safety. If the fire spreads or is out of control, activate the workplace evacuation plan and alert all individuals in the area to safely leave the premises.
3. Isolate and disconnect. If it is safe to do so and there is no immediate risk to physical integrity, try to isolate the affected machine from the power supply. Unplugging the power cable can provide additional safety.
4. Use fire extinguishers. If the fire is small and contained, attempt to control it using an appropriate fire extinguisher for the type of fire. In this case, as it would be an electrical fire, a chemical powder or CO2 extinguisher should be used, as they do not damage electronic components.
 - a. **DO NOT USE WATER ON ELECTRICAL FIRES:** This can worsen the situation and increase the risk of electric shocks.

It is important to remember that these protocols for machines are only basic guidelines. It is essential to have specific safety protocols and emergency procedures established in each workplace, as well as to provide regular training on fire safety and evacuation procedures for all employees.

Warranty

INDART3D S. COOP. ("Indart3D") provides this Limited Warranty to purchasers of the Tumaker product(s) included in the sales package ("Product"). Indart3D guarantees that during the warranty period, Indart3D or an authorized service company will remedy defects in materials, design, and manufacturing within a commercially reasonable time frame by repairing or, if Indart3D deems it necessary at its discretion, replacing the Product in accordance with this Limited Warranty (unless otherwise provided by law). This Limited Warranty will only be valid and in effect in the country where the Product was purchased, as long as Indart3D has designated the Product for sale in that country. However, if the Product was purchased in a member state of the European Union, this Limited Warranty will be valid and in effect.

Some limitations may apply to the warranty service due to specific elements of each country present in the Products.

Indart3D's obligation regarding its products under warranty is limited to the replacement of parts or repair at its discretion, either at Indart3D's facilities or at those of an authorized Indart3D seller. If parts need to be replaced at the customer's location, this will be done after the acceptance of a cost estimate for travel and labor.

Products and accessories that require assembly, configuration, and manipulation by the purchaser are not covered by this warranty.

Warranty Period

The warranty period begins at the time of the original purchase of the Product by the first end-user.

Tumaker products are not consumer goods; they are intended for professional and industrial use. Indart3D offers a warranty period of **1 year** provided there is no misuse or failure to perform the necessary periodic maintenance and inspections required for the product to function correctly. This warranty will be voided in cases specified in the section "What is not covered by the limited warranty?".

To the extent permitted by the laws of your country, the Warranty Period will not be extended, renewed, or otherwise affected by any subsequent resale, repair, or replacement of the Product authorized by Indart3D. However, any repaired part(s) or replacement products provided during the Warranty Period will be warranted for the remainder of the original Warranty Period. The purchaser has the option to obtain "warranty extensions" that expand warranty coverage..

How to obtain Warranty Service

If you wish to make a claim under this Limited Warranty, please send your Product (or the affected part when not involving the complete Product) to an authorized service company designated by Indart3D. For more information on how to make a claim, visit Indart3D Contact. In the sales package or local Indart3D websites, where available, you may find information about customer service centers and authorized service companies.

Any claim made under this Limited Warranty is subject to your notification of the alleged defect to Indart3D or an authorized service company within a reasonable time frame from its discovery and, in any case, no later than the expiration date of the Warranty Period.

When making a claim under this Limited Warranty, you must provide: a) the Product (or the affected part) and b) the original purchase receipt, clearly indicating the name and address of the seller, the date and place of purchase, the type of product, and the serial number.

What is not covered by the Limited Warranty?

1. User manuals and software: User manuals, software, content, third-party data or links, configurations included or downloaded onto the Product during installation, assembly, or shipping, as well as those incorporated at any other stage of the delivery chain or acquired in any other way. Indart3D does not guarantee that its software meets your needs or functions in conjunction with hardware or software provided by third-party suppliers.
2. Normal wear and tear: The warranty does not cover normal wear and tear, including, but not limited to, the wear of moving parts, as well as defects caused by improper handling (for example, damage from sharp objects, bending, compression, drops, etc.) or by use contrary to the instructions provided by Indart3D.
3. Improper use: Defects caused by the use of the Product with or in relation to any product, equipment, software, or service not manufactured or supplied by Indart3D, or used in any way other than its intended purpose, are not covered.
4. Inadequate environmental conditions: The warranty does not cover deterioration of the Product if it has been exposed to unsuitable environmental conditions, such as humidity, corrosion, oxidation, spillage of food or liquids, or chemical influences.
5. Different firmware and print base: The warranty does not cover the use of firmware different from that provided or the use of a print base other than the recommended one.
6. Unauthorised printing material: Damage resulting from the use of printing material other than that supplied by Indart3D or from the use of consumables in an unsuitable condition (with residues, grease, etc.) is not covered.
7. Improper transport: Deterioration caused by improper transport or the use of packaging other than the original is not covered.
8. Connection to improper voltage: Coverage is not provided if the connection is made to a voltage different from that configured by the manufacturer.
9. Unauthorised repairs: Coverage is not provided if Tumaker products have been repaired or altered by unauthorised personnel.
10. Lack of documentation: Coverage is not provided if the documentation and information requested by Indart3D are not submitted.
11. Maintenance not carried out: Coverage is not provided if elements that require periodic maintenance have not been attended to.
12. Lack of knowledge: The warranty does not cover cases where lack of functionality results from the buyer's lack of knowledge.

Returns

Timeframe: You have 7 working days to return a Tumaker product from the date you receive your order. The postmark or shipping company's stamp will be used to verify the return date.

Return conditions: The product must be in its original packaging, in new and complete condition (including all accessories, manuals, cables, etc.), and accompanied by the invoice or delivery note. The merchandise must be returned in perfect condition. Incomplete, damaged, or deteriorated items will not be accepted.

Responsibility for shipping: The loss or damage of the item during shipping will be the customer's responsibility. It is recommended to return items via registered mail or courier service with insurance for the value of the product.

Refund: If all requirements are met, a refund for the amount of the returned item will be processed using the same payment method used for the order, excluding shipping costs for the return and any fees paid for training, installation, or other services. If the device has any damage, the cost of its repair will be deducted from the refund amount.

Liability

Indart3D will not be liable to the Buyer for the failure or inability of Tumaker products to function correctly, nor for any losses, damages, injuries, or expenses caused directly or indirectly by such products. If it is necessary to send the Product to Indart3D's facilities, it is recommended that the product be sent under insurance to cover potential loss or damage. In any case, any transport-related incident will be the buyer's responsibility, and Indart3D is not responsible for its stations being unable to print geometries not previously analysed by its technical service.

Exempt Elements

The following list includes some elements that are not covered by the limited warranty:

Consumables:

- Filaments for 3D printing
- Print platform
- Hotend assembly
- Fans
- Sensors
- Resistors
- Heating block
- Nozzles
- Fittings
- Bowden tube
- Accessories

Training

Instructions for Personnel Operating the Machine/Installation

Before taking charge of the machine/installation, personnel must be qualified or trained (having received specific training) in its operation, including the hazards presented by the installation, the safety measures to be adopted and observed, as well as the protective clothing that must be worn and the incorrect usage of the machine/installation.

Furthermore, they must be accredited personnel in the operation of lifting and load handling systems to properly carry out the loading and unloading operations of the parts to be machined. For specific training of sling operators, information can be found in the ISO standards 9926-1, ISO 12480-1, and ISO 15513.

Instructions for Personnel Maintaining or Repairing the Machine/Installation

Personnel who repair and maintain the machine/installation must be qualified and possess the necessary knowledge of mechanics, pneumatics, hydraulics, electricity, and electronics. Depending on their specific knowledge, they should be able to carry out the assigned maintenance and repair tasks.

Additionally, they must be instructed in the operation of the machine/installation, its different parts, regular maintenance, and common faults. They should study the diagrams, schematics, and the relevant information provided in the instruction manual.

Training must also include safety aspects, highlighting potential hazards that may arise during these tasks and the safety measures to be adopted, including the personal protective equipment that must be used.

Instructions for Personnel Transporting the Machine/Installation

Personnel who transport the machine/installation or parts thereof must be qualified and have verified knowledge in the operation of lifting and load handling systems. They must also be instructed in the knowledge of the various parts of the machine/installation and have studied the diagrams and the relevant information provided in the instruction manual.

They must also be trained in safety aspects, understanding the hazards and the safety measures to be taken, including the personal protective equipment they must use.

Instructions for Personnel Installing and Commissioning the Machine

Personnel who install and commission the machine/installation or parts thereof must be qualified and have verified knowledge in the operation of lifting and load handling systems. They must also possess the necessary knowledge of the various types of technologies that the machine uses (mechanical, electrical, hydraulic, pneumatic, electronic, etc.).

Moreover, they must be instructed in the operation of the machine/installation and its different parts. They should study the diagrams and schematics and the information provided in the instruction manual.

They must also be trained in safety aspects, understanding the hazards and the safety measures to be taken, including the personal protective equipment they must use.

Instructions for Personnel Dismantling the Machine/Installation

Personnel who dismantle the machine/installation or parts thereof must be qualified and have verified knowledge in the operation of lifting and load handling systems. They must also be instructed in the knowledge of the various parts of the machine/installation and have studied the diagrams and the relevant information provided in the instruction manual.

They must also be trained in safety aspects, understanding the hazards and the safety measures to be taken, including the personal protective equipment they must use.

Machine Description

Generic specifications

DETAILS	
Layer resolution	10µm
Bed levelling	Semi-automatic and automatic
Hot bed	45°C - 100°C
Power	600W(NX MODULAR) , 1350W(BF MODULAR)
Noise	44 dB(machine closed, 40 dB)
Screen	7" colour touch screen and Monitor in Web Control Mode
Software	Software Profesional Simplify3D y compatible con otros softwares
Connectivity	Wifi, USB, Ethernet
Warranty	1 year limited warranty

Printers specifications

	NX MODULAR	BIGFOOT MODULAR
Printing volume (mm)	300 x 300 x 250	500 x 500 x 500
Printer size (mm)	840 x 635 x 805	1040 x 835 x 1004
Packing size (mm)	953 x 800 x 957	1153 x 1000 x 1197
Printer weight (kg)	60	92
Weight with packaging (kg)	114	160

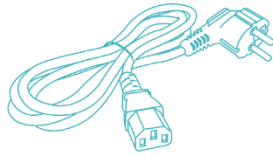
Head specifications

	HR HEAD	PL HEAD
Nozzle diameters	0.15 - 0.25 - 0.4 - 0.6 - 0.8 mm	0.4 - 0.6 - 0.8 - 2.0 - 4.0 - 5.0 mm
Dimensions (mm)	78 x 150,5 x 90	92,5 x 213 x 76
Weight (kg)	0.5	1
Material loading	Direct extrusion of coils up to 6kg	Direct feed up to 10L
DETAILS		
Optimised filaments	ABS, ASA, NYLON, PET-G, PLA, PP, XT-CF20, TPU, PLA-3D870, PVA	
Recommended pellet size	Circulares de 3-5 mm	
Working temperature	45°C - 300°C	

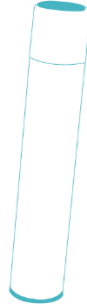
Items included with the printer

All machines must include the following items in their box:

Power cable



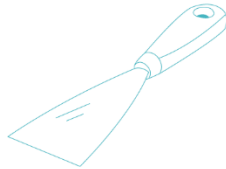
Fixing lacquer



Wi-Fi Antenna



Spatula

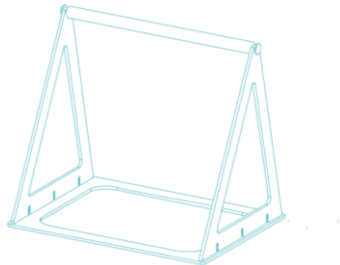


Mirror

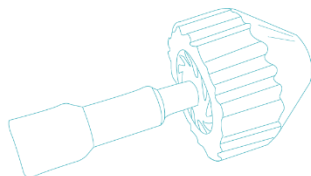


Also included, depending on the printhead:

HEMERA; Coil holder



PELLETS: Nozzle change tool



Please make sure that you have received the items that match your printer together with the printer. If not, please contact us.

Handling

Unpacking

BF MODULAR

Step 1: Dismantle the Box Completely

- Unscrew all the fixing screws, starting with the top cover, followed by the four side panels.

Step 2: Remove Protective Foam Padding

- Carefully take out all foam protectors surrounding the machine.

Step 3: Retain the Base of the Box

- You may keep the base of the box as a support stand, which can facilitate handling and manipulation of the machine.
- The base is compatible with palletized transport systems and can also be used for easier lifting if at least four people are involved.

Step 4: Place the Machine in a Safe and Level Location

- Ensure that the surface is flat and stable to prevent any risk of tipping or damage.

NX MODULAR

Step 1: Dismantle the Box Completely

- Unscrew all the fixing screws, starting with the top cover, followed by the four side panels.

Step 2: Remove Protective Foam Padding

- Carefully take out all foam protectors surrounding the machine.

Step 3: Retain the Base of the Box

- You may keep the base of the box as a support stand, which can facilitate handling and manipulation of the machine.
- The base is compatible with palletized transport systems and can also be used for easier lifting if at least two or three people are involved.

Step 4: Place the Machine in a Safe and Level Location

- Ensure that the surface is flat and stable to prevent any risk of tipping or damage.

Transport

For safe and efficient transport, the recommended method is using lifting accessories from the designated lifting points located on the underside of the machine. However, if no such accessories are available:

The BF model should be handled by four people, and the NX model by two or three people, as described in the previous section.

The maximum load a single person can lift, respecting ergonomic limits, is 25 kg. Thus, when lifting with two people, the combined maximum load should be 2/3 of their total individual capacity, which equates to around 33 kg (2/3 of 50 kg). Please note that some Tumaker machines exceed this weight, so extra caution is needed.

Additionally, pay close attention to the center of gravity, located at the middle of the machine's base.

For external transport by vehicle, the safest option is to keep the printer in its original packaging to prevent any damage.

Storage

For optimal protection and to extend the machine's lifespan, follow these guidelines:

Disconnect the machine from the electrical network.

Store it in its original box if available. If the original packaging is not available, ensure the printer is well-covered, free from dust, and protected from impacts.

Instalation

Machine Positioning

Ensure there is a **minimum clearance of 600 mm** (preferably 800 mm) between the machine and any adjacent structures (other machines, walls, etc.). This space is necessary for operators to perform their tasks ergonomically and safely.



Startup Procedure

1. Wiring

To begin the installation and start-up of the machine:
Connect the power cable to the sockets located on the rear side of the printer.
Plug it into the electrical network.
Turn on the printer by pressing the power switch.



2. Wireless Access to the Machine

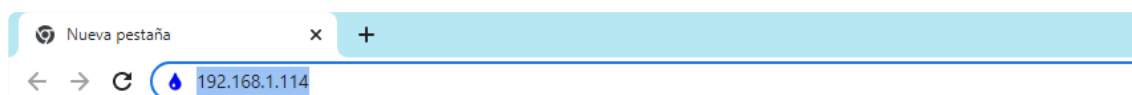
Connect your device to the Wi-Fi network broadcasted by the printer:

- WiFi SSID: INDART3D_XXXXXX*

(*Replace with the machine's serial number)

- Password: indart3d
- Access IP: 192.168.1.114

Open your web browser and enter the IP address to access the printer's web interface.



OPCIONAL: Conectar la impresora a su RED.

Si quiere conectar la impresora en la red y acceder a ella desde cualquier dispositivo de la misma red, siga los siguientes pasos:

1. Vaya a Macros > Otros > Conectar a una Network
2. Ejecuta la macro y siga las instrucciones en pantalla.

Operation

Quick Guide

Manual Bed Levelling

Before starting any calibration, please ensure that:

- The bed is heated to the desired printing temperature.
- The nozzle is clean.

To level the print bed manually go to *Macros > Calibrations > Bed > Guided manual calibration* and run the file.

Follow the on-screen instructions.

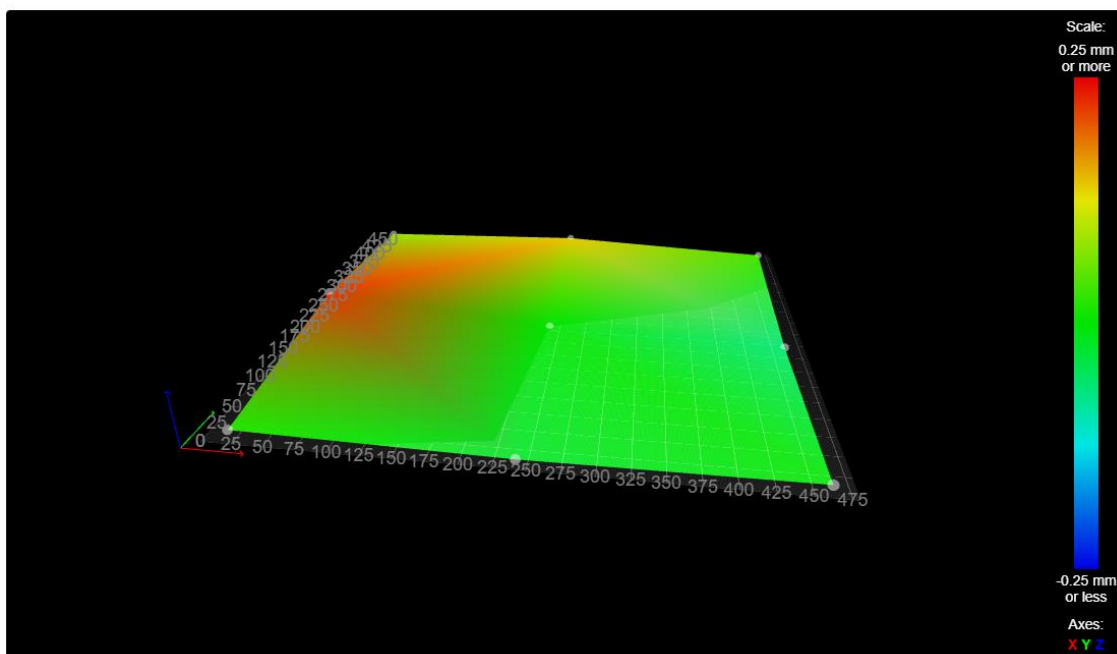
- Adjust the print bed using the knurled nuts located underneath the bed.
- For the initial calibration, you may need to repeat this process to achieve higher precision.

Digital Compensation

Automatic Calibration, also known as automatic bed compensation, is designed to adjust the Z-axis during printing to account for any slight deviations detected in the measured points.

Execute the macro found in *Macros > Calibrations > Bed > Digital compensation*.

The result of this procedure is a height map (heightmap.csv), which you can view in the web control interface.



**In this case, the Z-axis would compensate for the red zone by lowering the bed as the nozzle passes over it.*

REMEMBER: If the machine is restarted at any point after performing the digital compensation, the defined compensation will be deactivated. It must be reactivated to keep it in use.

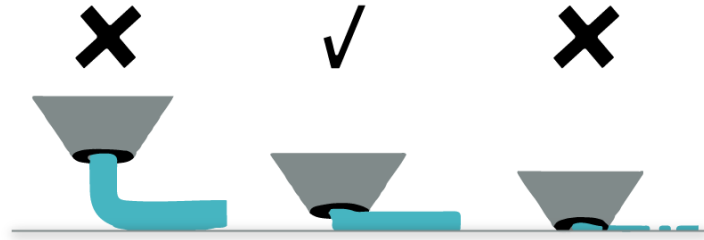
Macros > Calibrations > Bed > Activate digital compensation

Babystepping

If needed, in addition to the previous calibrations, you also have the option of instant calibration during printing. This is a fine-tuning adjustment using the Z-axis movement to raise or lower the bed relative to the nozzle, ensuring proper adhesion.

It can be accessed in the "Current Job Status."

Refer to the following diagram to determine the ideal height for perfect adhesion.



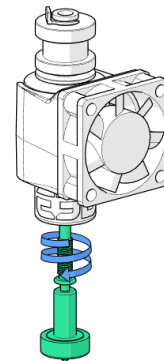
Nozzle Change

There are two methods for changing the nozzle, depending on the printing format.

Filament

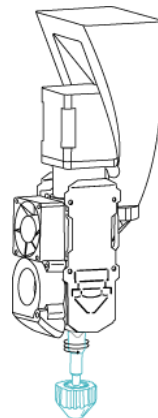
1. Remove the material from the print head using the Macro.
2. With the print head cold, unscrew the nozzle by hand.
3. Remove the nozzle and place the new one.
4. Ensure the nozzle tip is tightly fitted to the print head and properly secured.

REMEMBER: If you have changed the nozzle diameter, update it in the slicing software.



Pellet

1. No need to remove the material, just heat the print head to the temperature of the loaded material.
2. Retract 10 mm at 5 m/s to prevent material dripping.
3. Remove the nozzle using the nozzle change tool.
4. Unscrew it completely.
5. Using the same tool, insert the new nozzle.
6. Turn until the torque wrench clicks and prevents further tightening.



Loading/Unloading Material

Filament

Before loading:

- ✓ Ensure the print bed is at least 10 mm away from the nozzle.
- ✓ Insert the filament as far as it will go into the print head.

1. Go to Macros > Load – Unload Material > Filament and select the head where you want to change the material.
2. Choose the desired material.

Pellets

- ✓ 3D printing with pellets is different from using filament spools. It involves continuous extrusion, so there is no specific option for unloading the material. Instead, the remaining material in the hopper is fully extruded.
- ✓ It is a digital loading and unloading process where only the extrusion temperatures for the material to be used are defined.

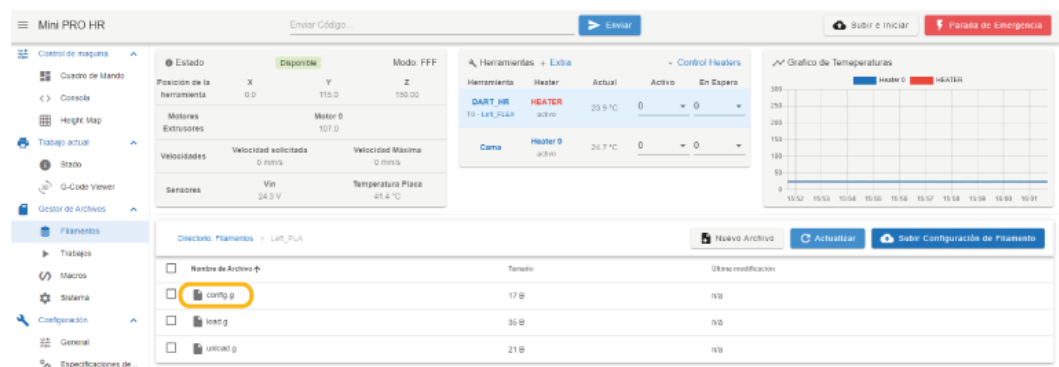
1. Go to Macros > Load – Unload Material > Pellet.
2. Select the material to use.

NOTE: The material is already loaded; however, it is recommended to extrude until the nozzle ejects the previously loaded material to ensure proper extrusion at the start of printing.

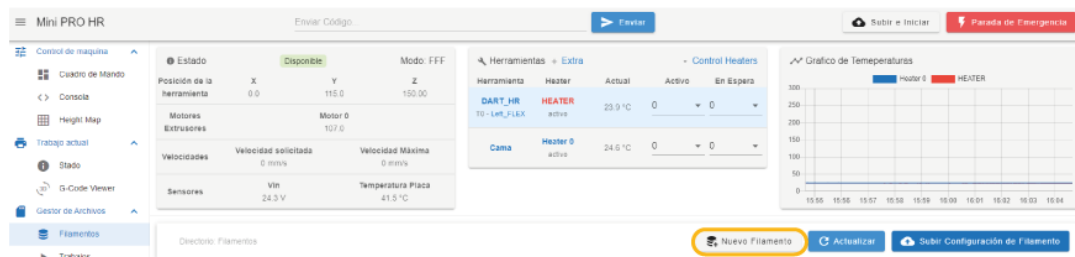
Adjust Pellet Parameters

As previously mentioned, in the case of pellet material, if it's not one of the predefined materials, a new one must be defined. To do this:

1. Access the config.g of a predefined material.



2. Copy the content.
3. Create a "New Filament."



4. Paste and modify the config.g according to the characteristics of the new material.
 - a. You can change the flow rate, as well as the temperatures of the two measurement points(the hotend and the bed).

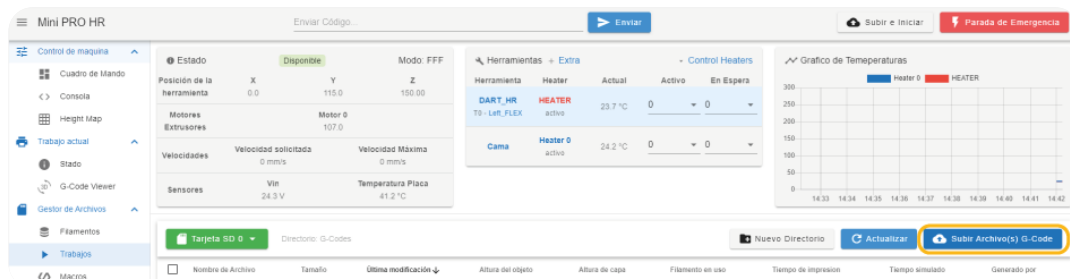
Cleaning the Pellet Head

<260°C: For materials with an extrusion temperature of less than 260°C, use polypropylene. Start extruding until no trace of the previously used material remains. Once this point is reached, gradually reduce the temperature to 210°C.

>260°C: For materials with an extrusion temperature greater than 260°C, use ABS or other common materials with a similar melting temperature range. Start extruding until no trace of the previously used material remains. Once this point is reached, gradually reduce the temperature to 250°C.

Load G-Code

In the "Jobs" section, from the file manager in the left column, the "Upload G-Code File(s)" button will appear. By clicking it, a window from your device will open to upload the file.



Removing Printed Part

At the end of a print, it is recommended to wait until the heater temperatures cool down to room temperature. This will make it easier to remove the part. Depending on the type of bed used, whether it is the magnetic sheet or glass, remove the flexible base or use a spatula to assist in removing the part. Finally, proceed to collect the printed part by hand.

If you wish to print another part immediately, make sure to place the flexible base back or apply spray adhesive to the glass bed, depending on the bed you are using.

Printing Software

Printing software refers to a set of programs designed to manage and control the printing process. It provides an interface between the computer and the printer, allowing users to efficiently send documents and files for printing with professional quality.

The printing software offers a wide range of functions and features that facilitate the management of printing tasks. Some common functions include:

1. **Printer Drivers:** The printing software provides the necessary drivers for the printer to communicate correctly with the computer. Drivers ensure compatibility and allow users to configure specific printing options.
2. **Printing Options Configuration:** The software provides an interface to adjust printing preferences. This includes options such as piece orientation, print quality, material, and other customized settings.
3. **Print Preview:** Many printing software programs offer a preview feature that allows users to see how the part will be printed before actually printing it. This helps avoid errors and ensures that the final result meets expectations.
4. **Monitoring and Diagnostics:** Some printing software includes tools to monitor the printer's status and performance. This can include detecting connection issues and troubleshooting basic problems.

In summary, printing software is essential for maximizing the capabilities of a printer. It facilitates job management, provides configuration options, and improves overall printing efficiency. By using it, users can achieve high-quality prints more quickly and easily.

From Indart3D, profiles for the following software have been created and made available to users to provide comfortable handling of both open-source and licensed code:

Simplify 3D: A paid, exclusive software that translates 3D models into instructions and a language understandable by the printer. It also provides additional services and features. The key principle here is "better instructions lead to better prints," emphasizing the importance of precise and detailed configuration for optimal printing results.



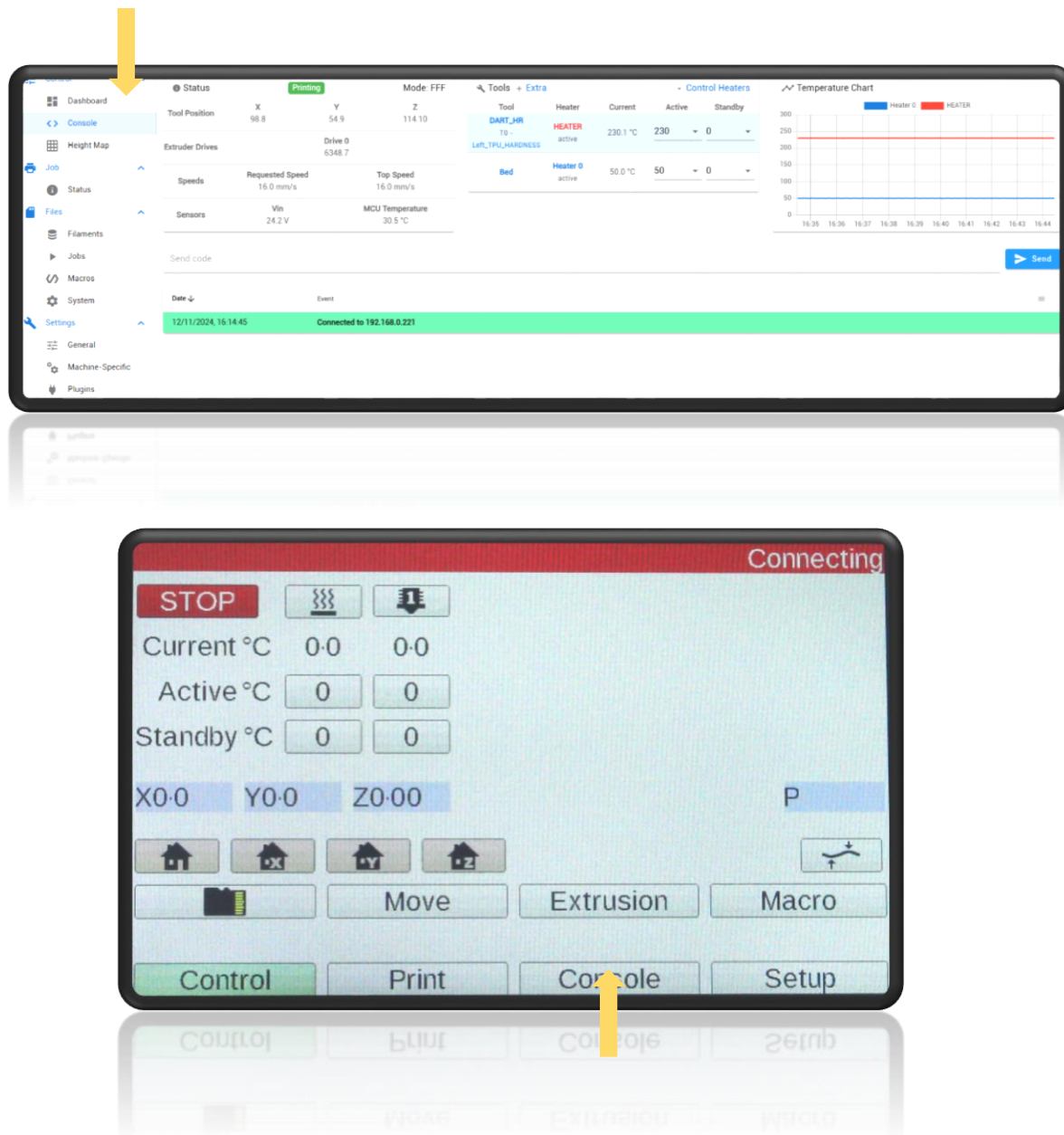
SuperSlicer: An open-source software that offers a wide range of configurable settings, allowing users to define features such as support structures, multiple materials, and much more.



Fault location and machine repairs

Error Messages and Important Repairs

During the use of the equipment, warnings may appear on both the web console and the machine panel for various reasons such as incompatibility or errors.



These warnings are usually descriptive and serve to help understand what is happening. However, if the message persists and there is a malfunction, you can consult the support section on our [website](#) for further information.

If the error continues, do not hesitate to contact our technical support team at sopORTE@indart3d.com- To do so, you will need to provide the following information:

- Machine serial number
- Installed head
- Description of the problem

Preventive maintenance

Preventive maintenance for Tumaker 3D printers manufactured by INDART3D is essential to ensure optimal performance and prolong the lifespan of the machines. Below are the key points of a preventive maintenance plan for these printers, considering that the frequency may vary depending on usage and materials. For more information, please refer to the support documentation available on our [website](#).

General Cleaning of the Machine

Frequency: Monthly

Action: Clean the filament, pellet, dust, and dirt residues from the print bed, the print heads, and other exposed surfaces to avoid blockages or interference during the printing process.

Safety System Inspection

Inspect the safety elements protecting the user, as specified in the safety section, ensuring all protection mechanisms are functioning correctly.

Lubrication of the Axes

- Frequency: Every 3 months or every 1500-2000 printing hours
- Action: Apply lubricant to the X, Y, and Z axes, as well as the bearings, to ensure smooth and precise movement. Use lubricants specifically designed for 3D printers, such as Teflon or silicone oil, and avoid using grease.

Belt Inspection

- Frequency: Every 6 months
- Action: Inspect the drive belts for signs of wear or loosening. Adjust or replace the belts if necessary to avoid misalignment of the axes' movements.

Extruder Maintenance

- Frequency: Every 3-6 months
- Action: Clean the extrusion system, removing any filament or pellet residue accumulated in the feed gear. It is also recommended to check the tightness of the connections.

Ventilation System Inspection

- Frequency: Every 3-6 months
- Action: Ensure the fans are functioning correctly and are not obstructed by dust or debris. Proper cooling is crucial to avoid overheating.

Drive and Signaling Components

- Frequency: Monthly
- Action: Check the proper operation and clear identification of the movement and stop action buttons.

Filter

- Frequency: Every 3-6 months
- Action: Replace the filter to maintain optimal gas cleaning capacity.

Consumables Inspection

Nozzle Inspection

- Frequency: Every 1500-2000 printing hours, depending on usage and materials
- Action: Check that the nozzles are not clogged. If there are signs of blockages, use an appropriate cleaning needle or perform a purge with filament or pellets.

Print Bed

- Frequency: Monthly or when misalignment is observed
- Action: Recalibrate the print bed to ensure it is level. This prevents first layer adhesion issues, which can affect print quality.

Replacement of Worn Parts

- Frequency: Annually or as needed
- Action: Evaluate and replace parts showing signs of wear, such as bearings, belts, or nozzles, to ensure continuous operation without interruptions.

Updates

Printer Firmware

- Frequency: Whenever a new version is available
- Action: Keep the printer's firmware updated to take advantage of performance improvements and new features.

Printing Software

- Frequency: Whenever a new version is available
- Action: Installing new versions of the printing software will improve the use and capabilities of the printer.

Electrical Inspection

Hardware

- Frequency: Every 12 months
- Action: Inspect the wiring and electrical connections, paying attention to any potential damage or wear in the connectors and cables.

This preventive maintenance plan is crucial for ensuring continuous and prolonged operation of your Tumaker printer, allowing for high-quality prints to be made efficiently and without interruptions.

Control System

The control system refers to the components responsible for managing the machine. On one side, there is the display, which can control the machine as a whole. This includes the movement of the axes, heaters, printing operations, and other macro functions, among others. On the other side, there is the web interface, which allows for more comprehensive and advanced control of the machine. This can include programming and editing the printer's settings and parameters. Finally, there is the rear switch, which has the sole function of interrupting the power supply to the printer.

Electrical Equipment

The electrical equipment that comprises the machine is essential for its operation and control, while also ensuring its protection. The various components are interconnected and managed through electronic systems and programming developed by Duet3D.

First and foremost, the electrical components are responsible for operating the machine. This involves supplying the necessary power for its operation, controlling the motors, and activating the various systems of the machine. For example, this may include power supplies, motor controllers, relays, and other devices that allow for the efficient transfer and distribution of electrical energy.

In addition to their primary function of operating the machine, the electrical equipment also plays a vital role in protecting it. This involves implementing electrical safety measures to prevent damage to components and minimize the risks of short circuits, overloads, or electrical failures. These safety measures may include fuses, circuit breakers, surge protection systems, and other safety devices.

The management of all these electrical components is carried out through electronic systems, which act as the brain of the machine. These electronic systems include interface controllers and control units that receive input signals and data, processing them to control and coordinate the operation of the various electrical components. These controllers can interpret commands from a human operator or execute preset programs.

In addition to the electronic systems, the programming developed by Duet3D plays a crucial role in the operation and control of the machine. Duet3D is a specific development and programming platform for machines, offering a wide range of functionalities and control capabilities. Through the custom programming done by Indar3D for each Tumaker machine, it is possible to define movements, speeds, sequences, and other parameters necessary to carry out specific tasks and optimize the machine's performance.

Machine Shutdown

To disconnect the machine, simply press the power switch located on the rear right side of the machine. For added safety, you can also unplug the power cable from the electrical outlet directly.

Waste Disposal

It is mandatory to comply with the current legislation of the country of use regarding the disposal of waste and substances. Safety measures outlined in the safety data sheets for the products used in the machine must be followed, both for operation and for cleaning and maintenance, as well as for disposal from a safety perspective. Instructions should be provided regarding the preventive measures that the user must adopt, including, where appropriate, the personal protective equipment to be considered.

Dismantling, Decommissioning, and Scrapping

Tumaker machines are primarily composed of aluminum. If the printer stops functioning permanently, it is recommended to take it directly to a recycling point where it can be processed. Most of the components are aluminum; however, if they are to be disposed of separately, they can be categorized into the following types of materials: aluminum sheets, steel sheets, electronic components, and plastics.



Dismantling for Recycling

A key part of recycling electrical appliances is the manual dismantling of each product. Dismantling removes hazardous components and sorts reusable parts. Procedures vary and depend on the type of appliance. The number of hazardous components that can be removed also depends on the type of appliance. Low rates of hazardous component removal reduce the recyclability of valuable materials. Each type of appliance has its own set of characteristics and components, making the characterization of appliances essential for classifying and separating parts. Research into the dismantling of electrical appliances has become an active area, with the aim of helping recycling achieve maximum efficiency.