PROMETHEUS

INLINE CASTING SYSTEM

⚠ This equipment has been designed in accordance with IEC 61010-1 and IEC 60825-1 safety regulations to prevent operator accidents if correctly and properly used. However, no engineering design can make this equipment safe if it is not used and maintained with due care and according to standards. This manual must be carefully and thoroughly read before performing any operation. Failure to follow the instructions and safety regulations can cause damage to the operator and to the equipment.

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Foreword

Purpose of the Operation and Maintenance Manual

This Operation and Maintenance Manual has been created to provide the user with a general understanding of the machine and to enable its safe operation.
This User and Maintenance Manual is an integral part of the machine and is intended to provide all the necessary information for:

1. The safe handling of the machine.;
2. Proper installation of the machine;
3. Knowledge of the technical specifications of the machine;
4. In-depth knowledge of its functioning and limitations;
5. An indication of the qualifications and specific training required of the machine operators and maintainers;
6. In-depth knowledge of intended, unintended and prohibited uses;
7. Its correct use under safe conditions;
8. Performing maintenance interventions correctly and safely;
9. The disposal of waste produced by the machine;
10. Decommissioning the machine under safe conditions and in compliance with the regulations in force to protect workers' health and the environment.

The responsible supervisor is obligated to ensure that the content of this Operation and Maintenance Manual has been read and understood by the personnel responsible for the operation and maintenance of the plant, for the sections relevant to their duties.

The instructions, drawings, and documentation contained in this User and Maintenance Manual are confidential technical material, strictly owned by the Manufacturer, and may not be reproduced in any form, either in whole or in part, without the Manufacturer's authorization.

Reading the operation and maintenance manual

In the drafting of this manual, the hierarchical criterion was adopted for the identification of contents.

1. SECTION "1" OF THE MANUAL

1.1 Chapter '1' of Section '1' of the manual

1.1.1 Paragraph "1" of Chapter "1" of Section "1" of the Manual

Intended audience

This Operation and Maintenance Manual is intended for:

- Operator in charge of normal use of machinery;
- Qualified personnel authorised to operate and maintain the machinery;
- Buyer's and Manufacturer's maintenance technicians;
- Transport and machinery handling workers.

The machine is intended for residential and professional use, so its use must be entrusted to people who:

- Have reached the age of majority;
- Are physically and mentally fit to perform tasks of particular technical complexity;
- Have been adequately trained in the use and maintenance of the machinery;
- Have been deemed fit by the employer to carry out the assigned task;
- Are capable of understanding and interpreting the Operation and Maintenance Manual and the safety instructions;
- Are familiar with emergency procedures and their implementation;
- Have understood the operational procedures defined by the Manufacturer of the machine.

Storage of the operation and maintenance manual

The Operation and Maintenance Manual must be carefully preserved and should accompany the machine through all ownership transfers during its lifecycle.
To ensure its preservation, handle the manual with care, using clean hands, and avoid placing it on dirty surfaces. No parts of the manual should be removed, torn, or arbitrarily modified.
The Operation and Maintenance Manual should be stored in an environment protected from moisture and heat, and kept in close proximity to the machine to which it refers.

Updating the operation and maintenance manual

The Manufacturer is responsible solely for the Operation and Maintenance Manual that has been drafted and validated by the Manufacturer (Original Instructions); any translations MUST always be correlated with the Original Instructions to ensure their conformity. In any case, the Manufacturer is not responsible for translations that have not been approved by the Manufacturer. Therefore, if any discrepancies are detected, attention should be paid to the original language, and the Manufacturer's sales office should be contacted if necessary, to make the appropriate corrections.
The Manufacturer reserves the right to make design changes, modifications/improvements to the machine, and updates to the User and Maintenance Manual without prior notice to Customers.
However, in the event of modifications to the machine installed at the Customer's premises, agreed upon with the Manufacturer and requiring updates to one or more sections of the Operation and Maintenance Manual, the Manufacturer will provide the Customer with the revised sections of the Manual affected by the changes, along with the new global revision model of the Manual.
It will be the Customer's responsibility, following the instructions accompanying the updated documentation, to replace the outdated parts in all copies they possess with the new ones.

Glossary and pictograms

This section describes the abbreviations used, the meaning of the pictograms used in the Operation and Maintenance Manual.

Glossary

HAZARD	A potential source of injury or damage to health.
DANGER ZONE*	Any zone within and/or around machinery in which a person is subject to a risk to his health or safety.
EXPOSED PERSON*	Any person wholly or partially in a danger zone.
OPERATOR*	The person or persons installing, operating, adjusting, maintaining, cleaning, repairing or moving machinery.
RISK*	A combination of the probability and the degree of an injury or damage to health that can arise in a hazardous situation.
GUARD*	A part of the machinery used specifically to provide protection by means of a physical barrier.
PROTECTIVE DEVICE*	A device (other than a guard) which reduces the risk, either alone or in conjunction with a guard.
INTENDED USE*	The use of machinery in accordance with the information provided in the instructions for use.
REASONABLY FORESEEABLE MISUSE *	The use of machinery in a way not intended in the instructions for use, but which may result from readily predictable human behaviour..
HUMAN-MACHINE INTERACTION	Any situation in which an operator interacts with the machine in any of its operational phases at any time during its life.

OPERATOR QUALIFICATION	The minimum level of skills the operator must possess to perform the described operation.
NUMBER OF OPERATORS	Adequate number of operators to carry out the described operation in an optimal manner and resulting from a careful analysis carried out by the Manufacturer, whereby the use of a different number of operators could prevent the expected result from being achieved or jeopardise the safety of the personnel involved.
MACHINE STATUS	The machine status includes the mode of operation (e.g. run in automatic, jog, stop, etc.), the condition of the machine's safeties such as protectors included, protectors excluded, emergency stop pressed, type of isolation of energy sources, etc. .
RESIDUAL RISK	Risks that remain despite the protective measures integrated into the design of the machine and despite the additional guards and protective measures adopted.
SAFETY COMPONENT	Component: • intended to perform a safety function; • the failure and/or malfunction of which endangers the safety of persons (e.g. lifting gear; fixed, movable, adjustable protector, etc., electrical, electronic, optical pneumatic, hydraulic device, which secures, i.e. interlocks, a protector, etc.).

Pictograms

The descriptions preceded by these symbols contain very important information/prescriptions, particularly with regard to safety.
Failure to comply may result in danger to the safety of operators.

Pictograms relating to operator qualification

SYMBOL	DESCRIPTION
	**MACHINE OPERATOR OR PROGRAMMER** Operator qualified to operate the machine manually and able to set and store work cycles. Cannot under any circumstances operate within the hazardous area.
	**MAINTENANCE TECHNICIAN** Qualified technician capable of performing operations of a complex nature with mechanical, electrical, electronic and software skills. He is qualified to work under safe conditions during all types of maintenance.

Symbols

	**NOTE** It report important indications or information contained in the Operation and Maintenance Manual to be read with particular attention for the best use of the equipment.
	**HAZARD** It indicates a situation that can lead to injury, even death, or serious damage to health. The pictogram corresponds to the actual hazard (e.g. electrical, mechanical, etc.)
	**WARNING** It indicates that particular attention must be paid to the indications. Non-observance of the warning could cause malfunctions or dangerous conditions or damage. Orotig S.p.A. will not be held liable in the event of damage to persons/animals/things resulting from failure to comply with this manual.
	**PROHIBITION** It indicates that a certain action cannot be performed.

Pictograms relating to machine status
The pictograms contained in a square/rectangle provide INFORMATION.

Safety pictograms

	Pictogram	Designation
HAZARD		Hazardous electrical voltage
		Hot surfaces
		Mechanical moving parts
PROHIBITION		Do not use water to extinguish fires on electrical parts
		Do not remove safety devices
		Prohibition to carry out work before de-energizing
PRESCRIPTION		Mandatory protective gloves
		Mandatory protective clothing
		Mandatory protective goggles
		Mandatory noise-reducing headphones where specified

Reference Standards

The applicable legislative references are:

- Machinery Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2014/30/EU

The main applied regulatory references are:

- EN ISO 12100 → Safety of machinery – General principles for design – Risk assessment an risk reduction
- CEI EN 60204-1 → Safety of machinery – Electrical equipment of machines – Part 1: General requirements
- CEI EN 61010-1 → Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements.

Technical assistance information

The machine is covered by a warranty as specified in the general sales conditions. If defective operation or failures of machine parts occur during the warranty period, and these issues fall within the warranty's coverage, the Manufacturer, after conducting the necessary inspections on the machine, will repair or replace the defective parts.
Please note that any modifications made by the user without the Manufacturer's explicit written authorization will void the warranty and release the Manufacturer from any liability for damages caused by a defective product. This is particularly true when such modifications are made to safety devices, thereby reducing their effectiveness. The same applies when non-original spare parts or parts not explicitly designated by the Manufacturer as "safety devices" are used.
We therefore recommend that our Customers contact our Service Department before performing any of the aforementioned interventions on the machine.
Any defects that are clearly and visibly present at the time of product delivery (such as aesthetic defects on visible parts, breakages, dents, operational defects, missing parts, etc.) must be immediately reported to the company.

Useful contacts

Orotig S.p.A.
Tel. +39 045 6400865
C.F./P.IVA 04283670232
info@orotig.com
www.orotig.com

Legal Headquarters:
Via XXV Aprile, 47
37014 Cavalcaselle di Castelnuovo del Garda (VR)
Italy

Safety

Personnel operating the machine must have read this Operation and Maintenance Manual, particularly the chapter concerning safety warnings and hazard indications, BEFORE starting any work.
The user is responsible for complying with the safety regulations.
Orotig S.p.A. disclaims any liability for accidents or damages to persons or property arising from non-compliance with both the safety regulations and the rules outlined in this Operation and Maintenance Manual (see section 1.7 "Applicable Regulations").

General precautions

- Before starting work, the operator must wear the required PPE, such as protective gloves and work coveralls;
- Always check the efficiency and integrity of the equipment;
- Do not use the equipment in the presence of flammable and/or explosive atmospheres. Do not use the equipment in damp and/or wet locations, and do not expose it to rain;
- Keep the work area tidy and free of obstacles;
- Do not allow unauthorized personnel to start, adjust, operate, or repair the machine;
- Do not tamper with the electrical system, pneumatic system, or any other mechanism for any reason;
- The user is required to keep all labels indicating instructions and warnings on the machine readable by cleaning them periodically or replacing them as necessary;
- In addition to the instructions provided in the Operation and Maintenance Manual, health and safety regulations in the workplace, as defined by current legislation, must be followed.

Personal protective equipment PPE

The following personal protective equipment must be worn by operators when operating the machine:

Heat-resistant protective gloves are mandatory

Protective goggles are mandatory, compliant with EN 171, code 4 - grade 9

Protective clothing is mandatory

Environmental conditions

The machine must be installed in a well-lit, ventilated area with a solid and level floor.
The environmental conditions required for the machine are those specified in the standard EN 61010-1:

- Indoor use only;
- Altitude up to 2.000 meters;
- Temperature between 5°C and 40°C;
- Maximum relative humidity of 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C;
- Mains voltage variations not exceeding ±10% of the nominal voltage;
- Pollution degree II.

The machine must not be used in environments that are:

- Dusty;
- Corrosive;
- At risk of fire;
- Explosive atmospheres (ATEX Directive does not apply).

Lighting

The lighting in the installation area must comply with the laws in the country where the machine is installed. It must ensure good visibility at all points, avoid creating dangerous reflections, and allow clear reading of control panels and identification of the emergency button.

Noise emissions

For noise levels, refer to the sound measurements taken within the work environment, in accordance with the regulations in force in the country of use.

Electromagnetic environment

The machine is designed to operate correctly in a residential electromagnetic environment, conforming to the emission and immunity limits specified by the following harmonized standards:

- EN 61326-1 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

Residual risks

Attention must be paid to the following residual risks which are present when using the machine and which cannot be eliminated.

Electrical voltage

Hot surfaces

Machine description

General description

The machine has been designed and built by Orotig S.p.A. for the casting of gold, silver, and platinum. It is a fully automatic benchtop furnace equipped with a casting chamber within the structure that can be tilted by pressing the button on the control panel.

It features an integrated air cooling system that supports:

- Two consecutive casting cycles for gold and silver;
- One casting cycle for platinum.

The front of the machine is equipped with a 7” touchscreen display, allowing the operator to monitor casting parameters in real time. Through the interface, it is possible to create customizable programs tailored to the operator's specific casting needs.

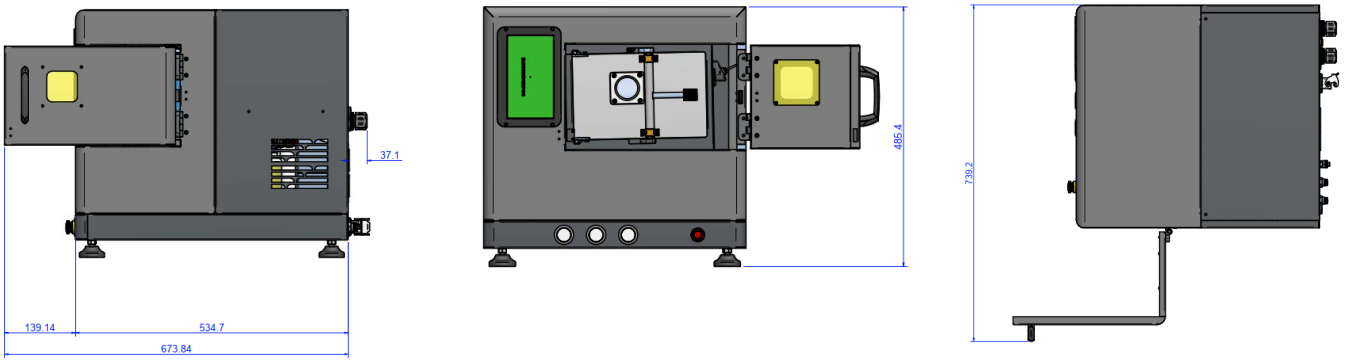
Identification data and nameplates

The machine features a CE label.
It is manufactured in compliance with the requirements of the Machinery Directive and is accompanied by a CE Declaration of Conformity (attached to this Operation and Maintenance Manual).

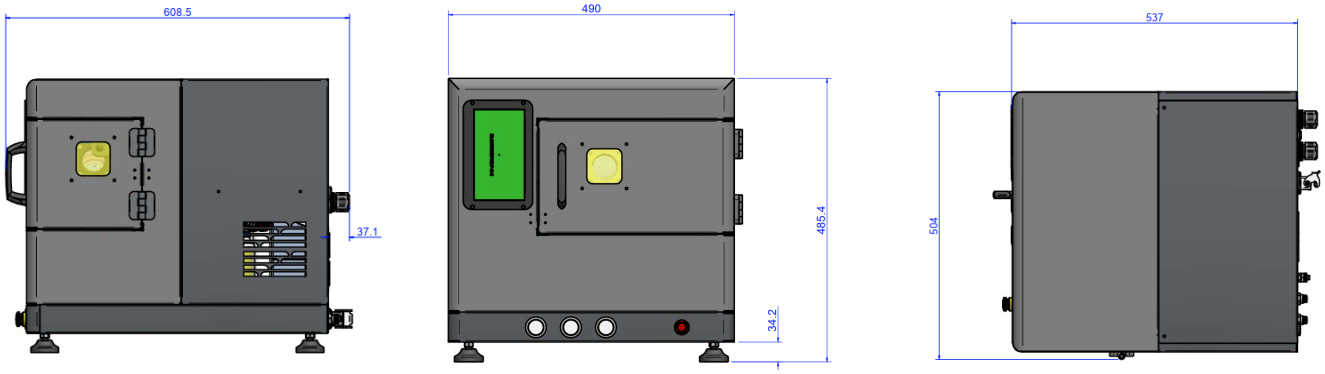
Before making the machine operational, carefully read the instructions contained in this Operation and Maintenance Manual and follow the guidelines provided. It is the employer's responsibility to ensure that the personnel operating the machine have read and understood the instructions in this Operation and Maintenance Manual.

Dimensions

The size of the machine with the hatch open



The size of the machine with the hatch closed



Technical Data

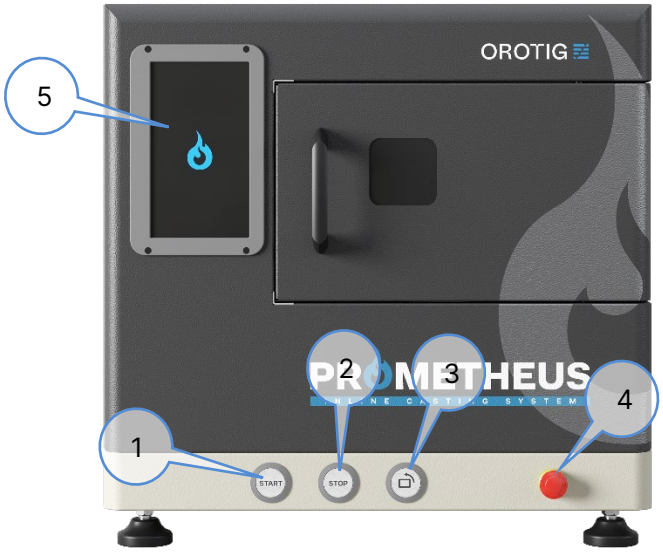
Characteristics/Model	Prometheus
Casting process	Induction with controlled atmosphere
Casting volumes	150 g (Au 18K) 90 g (Ag) 140 g (Pt)
Overpressure with gas	Inert gases (Argon or nitrogen) 2 bar
Vaccum	10^{-2} bar
Max flask size (h x Ø, mm)	90 x 100
Temperature control	Pyrometer, up to 2000°C
Flask blocking	Automatic
Flask filling	Automatic
Flask filling system	Tilting
Cooling system	Integrated air/water cooling system External water cooling system (optional)
Display	7” touchscreen
Power	230 Vac ± 10% 50/60 Hz single phase – max power consumption 3 kW

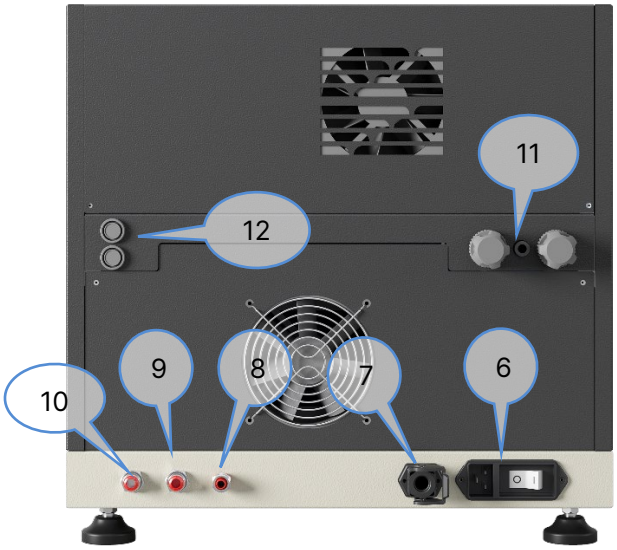
Regarding the temperature with the door open, four situations may arise:

1. **Empty Chamber**: When the chamber is empty, meaning no molds or material inside, the chamber temperature with the door open is equal to the ambient temperature;
2. **Molten Metal and Open Chamber for Mold Insertion**: When molten metal is present and the chamber is open for mold insertion, the metal crucible is covered by the induction coil, which is cooled with water. It is possible to come into contact with a part having a temperature < 45°C;
3. **Molten Metal and Open Chamber with Newly Inserted Mold**: When molten metal is present and the chamber is open with a mold just inserted, the mold is at 900°C. Contact with a part at 900°C is possible;
4. **Metal Inside the Mold and Open Chamber, End of Cycle**: When metal is inside the mold and the chamber is open at the end of the cycle, contact with a part at 900°C is possible.

Panels and buttons

The machine features a control panel on the front for starting the machine, stopping it, and tilting the chamber.





1. **SART**: Start the casting process once the recipe has been set on the display.
2. **STOP**: Stop the casting cycle.
3. **Ribaltamento**: Allows the tilting of the chamber once the material inside has been melted.
4. **Emergency button**: Disconnects power to all electrical/electronic components of the equipment, instantly shutting it down.
5. **Display**: 7” touchscreen display for setting recipes and controlling work parameters.
6. **Switch**: main power socket with SWITCH button for switching on the machine.
7. **Vacuum pump power connection**
8. **Vacuum pump tube connection** (internal Ø7.5 mm, external Ø10 mm)
9. **I nert gas (Argon or nitrogen) hose connection** (internal Ø5.5 mm, external Ø8 mm)
10. **Chiller IN connection** (internal Ø5.5 mm, external Ø8 mm) Only to be used if external cooling system is to be used
11. **Chiller OUT connection** (internal Ø5.5 mm, external Ø8 mm)
12. Only to be used when the external cooling system is to be used
13. **Fuse**

Intended use

	**MACHINE OPERATOR OR PROGRAMMER**

The machine was designed and built by Orotig S.p.A. for casting precious metals.

The use of products/materials other than those specified by the Manufacturer, which may cause damage to the machine and create safety hazards for the operator and/or individuals nearby, is considered incorrect or improper.

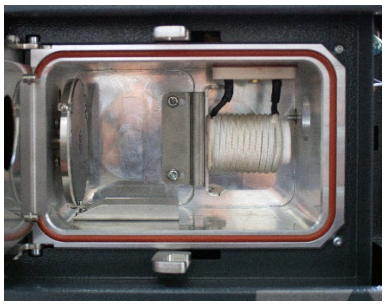
Reasonably foreseeable improper use includes injecting metal into the crucible without placing it inside the casting chamber or incorrectly setting the machine parameters.

Contraindications for use

The machine must not be used:

- For purposes other than those outlined in the previous section or for uses not mentioned in this Operation and Maintenance Manual;
- In areas unsuitable for casting operations;
- With demineralized or deionized water;
- In explosive atmospheres or at risk of fire;
- Exposed to the elements;
- With safety devices removed or not functioning;
- With electrical jumpers and/or mechanical means that bypass the machine's components;
- With technical gases other than inert gases (Argon or Nitrogen).

Hazardous area

Hazardous area	Photo	Hazard
Casting chamber		• High temperatures • Burn • Electromagnetic fields • Electrocution • Projection of material into the eyes

Safety devices

Device	Description associated with the device
Emergency Stop	Disconnects power to all electrical/electronic components of the equipment, causing an instant shutdown
Interlocks	There are two interlocks on the access door to the induction chamber that stop the machine if the door is opened

Signage

The signage installed near the machine is as follows:

Warning Signs		Location of placement
	Caution: Dangerous Electrical Voltage	Machine structure
	Hot surfaces	Casting chamber
	High-frequency system! The electric fields, magnetic and electromagnetic fields that occur in operating conditions in the immediate vicinity of the product may be dangerous for pacemaker wearers, impiants, or similar	Machine structure
	Moving parts	Machine structure

Prescriptions signs		Location of placement
	Mandatory use of protective eyewear	Machine structure
	Mandatory use of gloves	Machine structure

Prohibition Signs		Location of placement
	Prohibition of use by pacemaker wearers	Machine structure

Installation

Transport

The instructions in this section must be followed during the transportation phases of the equipment.
The machine is typically supplied with appropriate packaging that facilitates easy transport and handling.
The packaging consists of a cardboard box, a base, and an upper frame made of Stratocell or foam.
It is recommended to keep the original packaging for future use.

Handling the crate with lifting equipment must be done with the utmost caution, strictly adhering to the orientation indicated on the packaging. Take normal and logical precautions to avoid impacts and tipping over.
When storing the machine in its packaging, do not tilt, position it vertically, or overturn it.
Protect the equipment and any accessories from environmental elements.
Water and humidity can oxidize some components of the equipment, causing irreversible damage.

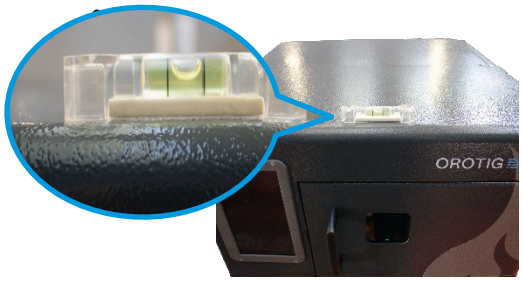
Receiving inspection

Check the TILT-WATCH label on the packaging. If it appears RED, the packaging has been damaged, and a claim can be made against the carrier. If it appears GREEN, the transport was carried out correctly, and you may proceed to open the packaging.
After removing the packaging, ensure the machine's integrity by checking for any visibly damaged parts. If in doubt, DO NOT use the casting machine and contact the Manufacturer.

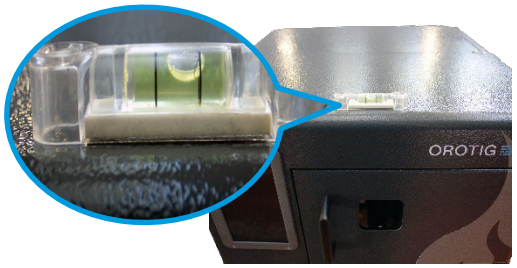
Positioning

The equipment must be placed in a location and environment suitable for its intended use; this placement should be performed by qualified personnel.
When positioning the machine, keep the following recommendations in mind:

- Place the equipment on a flat and stable surface.
- Ensure sufficient space around the machine to allow for adequate ventilation.
- Avoid placing the equipment in locations subject to sudden changes in temperature and humidity. Keep the machine away from direct sunlight, intense light sources, and heat sources.
- Avoid positioning the machine near other equipment that generates moisture, dust, or heat.
- Place the equipment near an electrical outlet within a maximum distance of 1.5 meters.
- Ensure the space around the machine allows for easy opening of the machine's door.



Machine in **CORRECT** position

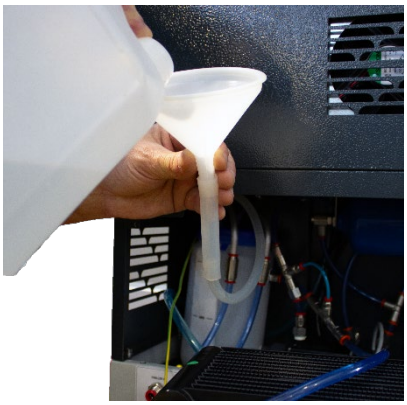


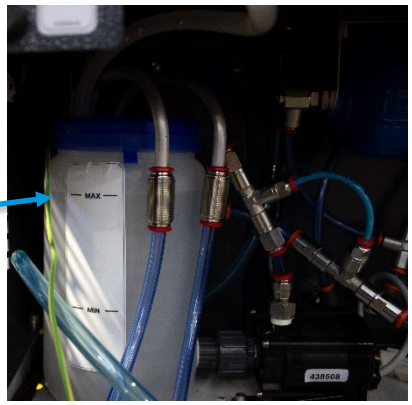
Machine in **INCORRECT** position

Coolant tank filling

The machine is shipped without internal fluids; therefore, upon initial installation, the cooling system must be filled with tap water

- Remove the lower rear panel and add tap water through the tube attached to the reservoir cap until it reaches the MAX level;
- Turn on the machine and wait for a couple of minutes;
- Turn off the machine;
- Add more water to the reservoir until it reaches the MAX level.





Electrical connection

Before connecting the power cable, ensure that an appropriate power outlet is available. Verify the electrical specifications indicated on the label affixed to the machine and refer to the "Technical Data" section of this Operation and Maintenance Manual for further details..
Consult your trusted Installer/Maintainer before connecting the equipment.

Ensure that the power outlet is of the Schuko type; the equipment has a maximum power consumption of 3 kW.
The disconnecting device should be paired with an overcurrent protection device equipped with a residual current circuit breaker (RCCB). The specifications of these devices must comply with the current regulations of the country where the installation is being carried out and be appropriately rated based on the equipment's characteristics.

Vacuum pump connection

To connect the vacuum pump to the machine, use the designated inlet located at the rear of the machine.

Gas connection

To connect the inert gas (argon or nitrogen) to the machine, the dedicated inlet located at the rear of the machine should be used.

Optional chiller connections chiller in and chiller out

To connect the optional chiller to the machine (chiller in and chiller out), use the designated ports located on the rear of the unit. This connection is required only when an external cooling system is used.

Initial startup and operational check

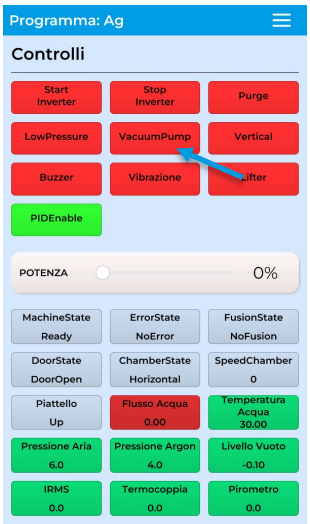
After connecting the machine as previously instructed and filling the water tank:

1. Close any open doors;
2. Turn on the machine by pressing the rear SWITCH button;
3. Verify that there are no gas or water alarms.

Upon startup, the fusion box will automatically rotate to the horizontal position.

4. Access the ”SERVICE” page through the menu at the top right.

5. Access the ”CONTROLS” page.

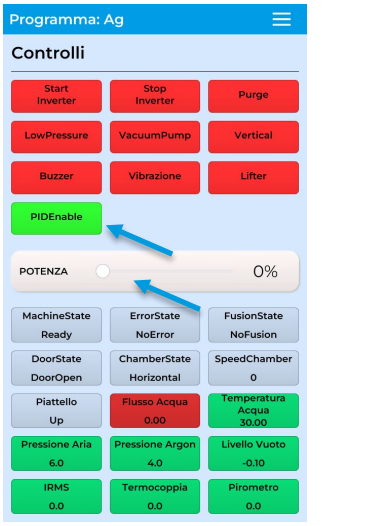


6. Press the "VACUUM PUMP" button to turn on the vacuum pump;
7. Press the button again to turn off the pump.

At this point, the machine is in the correct position. If there are no alarms, perform a vacuum fusion test, which involves running the machine without the cylinder and metal.

8. Access the ”SERVICE” page through the menu at the top right.

9. Access the ”CONTROLS” page.



10. Disable the PID function by pressing the 'PIDEnable' button. The command should turn red, and set the power bar below to 0%.

11. Press the "HOME" button.

12. Press the "START" button located at the bottom of the front panel.

13. The machine starts the cycle by creating a vacuum.
14. The vacuum value exceeds 0.8 mBar.
15. The vacuum value then decreases to 0.7 mBar.

16. Press the ”START” button located at the bottom of the front panel.

17. The box automatically rotates to the vertical position, applies overpressure, and then proceeds with cooling.

18. The box returns to the horizontal position, completing the cycle.

At this point, the machine is ready for melting.

Use of the machine

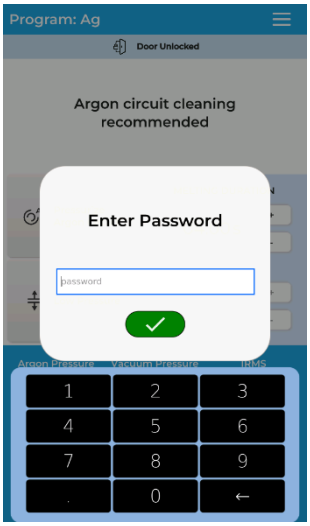
Before proceeding with the regular use of the equipment, ensure that it has been properly installed and is in suitable working condition. Check that its parts are not defective, damaged, or worn; perform any necessary routine or extraordinary maintenance as needed.

Exercise caution regarding the risk of electric shocks, both from direct contacts and indirect contacts caused by unforeseen electrical system faults.

In the event of visible structural damage, DO NOT use the machine and notify the supervisor immediately.

Display screens

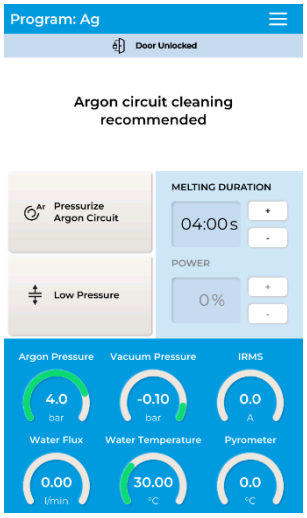
Below are details of the screens in the software.



USE PASSWORD

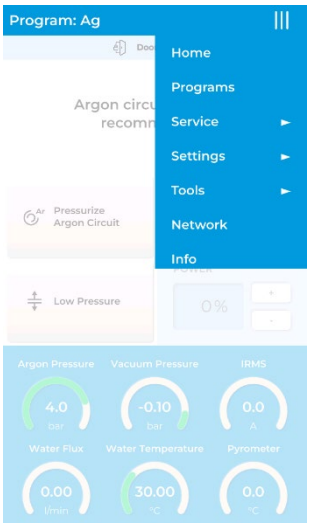
Before accessing the home screen of the program, you will be prompted to enter a PIN.

Default PIN: Enter 0000 as the default PIN.
PIN Change: In the settings, you can change the access PIN to a new one.



INITIAL SCREEN

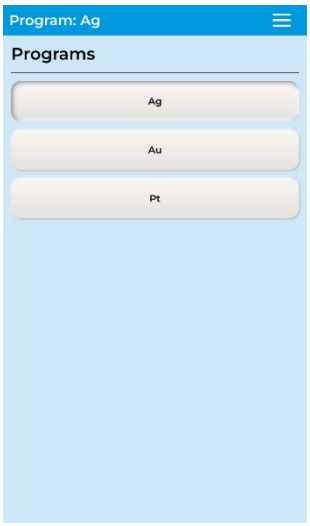
This is the main screen that appears when the machine is powered on.
Once the work program is set, the selected program will be displayed at the top of the screen.
When the START button is pressed, the following information will be shown: status of the work cycle, real-time pressures, amount of cooling water, gas pressures and metal temperature.



MENU

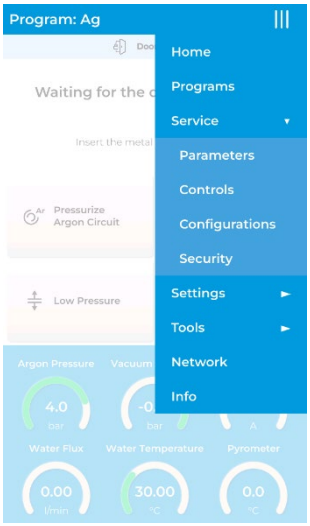
On the right side, there is a dropdown menu with the following settings:

- Programs
- Service
- Settings
- Tools
- Network
- Info.



PROGRAMS

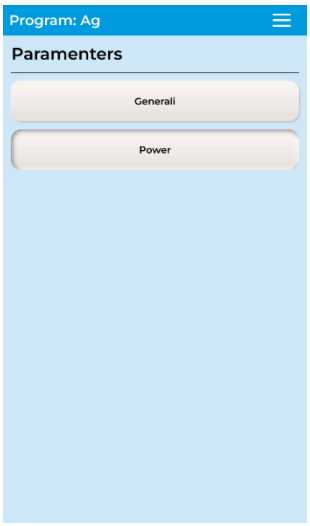
Within the Programs screen, you can define the work cycle based on the material to be melted.



SERVICE

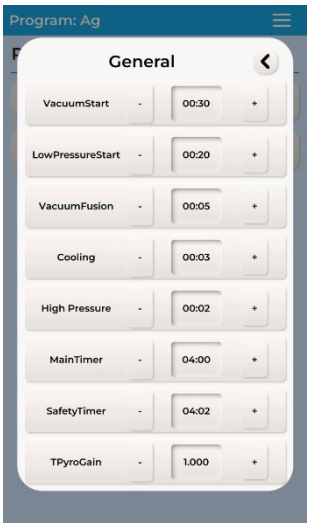
Within this menu, you can manage the following screens:

- Parameters
- Controls
- Configurations
- Security.



PARAMETERS

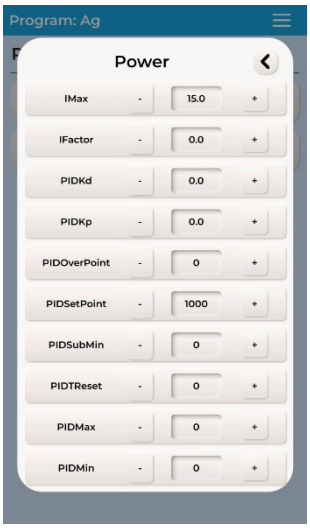
From this screen, you can view the GENERAL and POWER parameters of the machine.
In the Power page, you can adjust the maximum casting temperature of the metal being processed.



GENERAL

In this section, you can modify the timing for the following parameters:

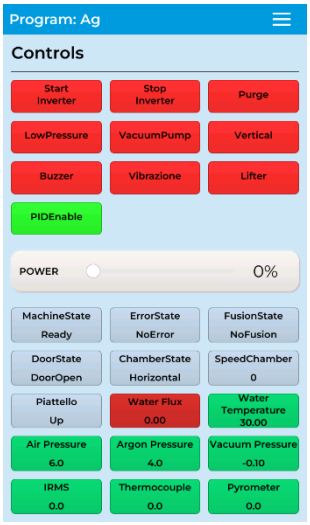
- Vacuum Start: Delay before vacuum starts
- Low Pressure Start: Delay before pressure starts
- Vacuum Fusion: Time for vacuum before rotation
- Cooling: Cooling time before horizontal rotation
- High Pressure: Time for high pressure
- Main Timer: Maximum casting time
- Safety Timer: Safety casting time (must be greater than Main Timer)
- T Pyro Gain: (**DO NOT MODIFY**).



POTENZA

In this section, you can modify the values for the following parameters:

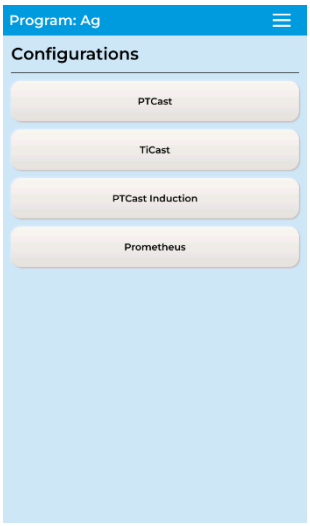
- IMax: (**DO NOT MODIFY**)
- IFactor: (**DO NOT MODIFY**)
- PIDKd: (**DO NOT MODIFY**)
- PIDKp: (**DO NOT MODIFY**)
- PIDOverPoint: Maximum casting temperature
- PIDSetPoint: Casting temperature
- PIDSubMin: (**DO NOT MODIFY**)
- PIDTReset: (**DO NOT MODIFY**)
- PIDMax: (**DO NOT MODIFY**)
- PIDMin: (**DO NOT MODIFY**)



CONTROLS

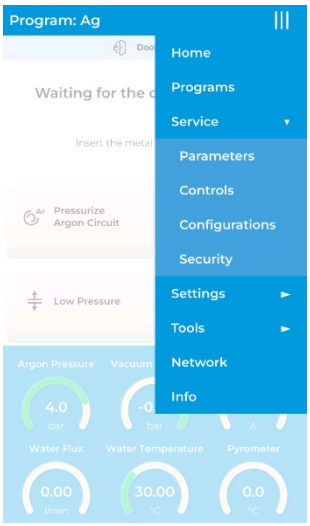
In this section, you can activate or deactivate the following commands:

- **START INVERTER**: Manual activation of the generator
- **STOP INVERTER**: Manual stop of the generator
- **PURGE**: Manual high-pressure command
- **LOW PRESSURE**: Manual low-pressure command
- **VACUUM PUMP**: Manual control of the vacuum pump
- **VERTICAL**: Manual vertical rotation of the box
- **BUZZER**: Manual control of the buzzer
- **VIBRATION**: Manual control of vibration
- **LIFTER**: Manual control of the cylinder locking
- **PIDENABLE**: Enables or disables the PID function (green means enabled) for both automatic and manual operation
- **POWER**: Power bar, can also be adjusted manually
- **MACHINE STATE**: Indicates if the machine is ready
- **ERROR STATE**: Indicates if there are any alarms
- **FUSION STATE**: Indicates the state of the fusion process
- **DOOR STATE**: Indicates if the doors are open or closed
- **CHAMBER STATE**: Indicates the position of the fusion chamber
- **PLATFORM**: Indicates the position of the platform that locks the mold
- **WATER FLOW**: Displays the amount of cooling water
- **WATER TEMPERATURE**: Displays the temperature of the cooling water
- **AIR PRESSURE**: Displays the pressure of the gas for pneumatic movements
- **ARGON PRESSURE**: Displays the pressure of the gas for low and high pressure inside the chamber
- **VACUUM LEVEL**: Displays the vacuum level inside the chamber
- **IRMS**: Displays the generator's current absorption in Amperes
- **PYROMETER**: Displays the metal temperature.



CONFIGURATIONS

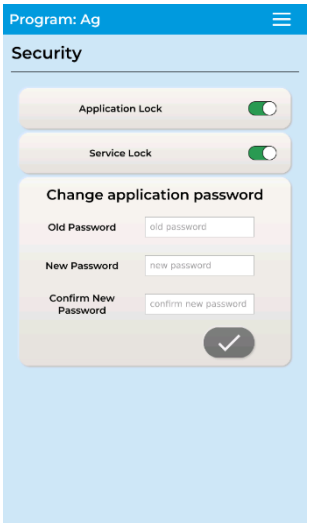
Page of casting machine configurations.



SETTING

Within this section, you can manage the following screens:

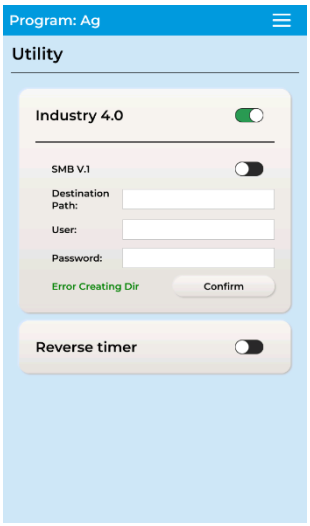
- Security
- Utility
- Languages.



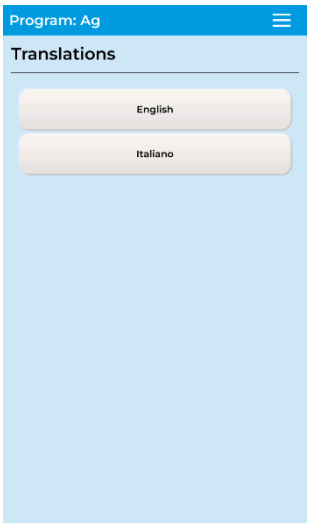
SECURITY

Within this screen, you can:

- Change Access Password: update the password required to access the machine.
- Enable Application Lock: activating this option will require entering a PIN each time the equipment is started

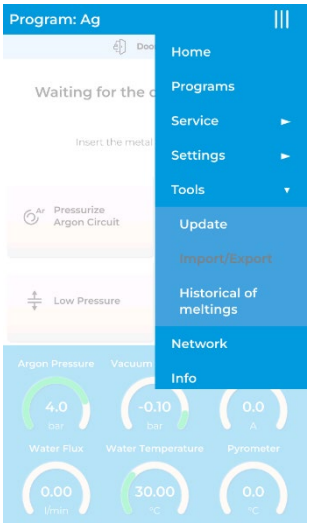


UTILITY



LANGUAGE

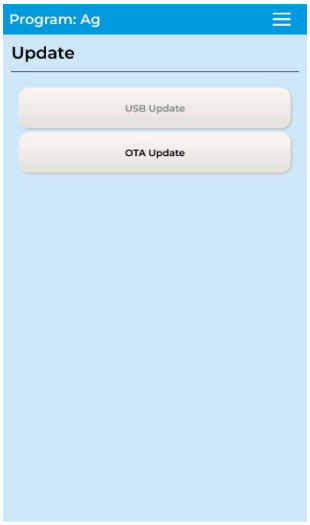
You can change the application language in this section.



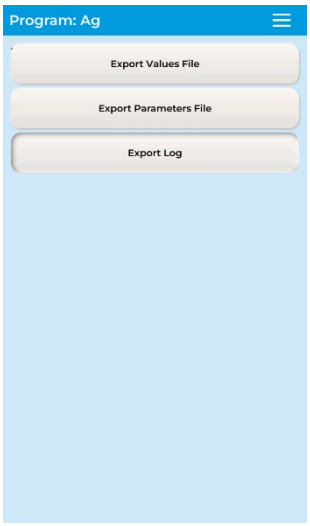
TOOLS

Within this section, you can manage the following screens:

- Update
- Import/export
- Historical of castings.



UPDATE



IMPORT / EXPORT

NETWORK

The equipment can be connected via Wi-Fi or through a wired network.

WIRED

You can manually configure the network by selecting "Manual" from the IP Configuration dropdown menu. Then, you can enter the network details in the fields for ***IPv4 Address, Netmask, Domain, IPv4 Gateway, and Server Name.***

DNS SERVER CONFIGURATION

Within this screen, you can enter the DNS server details.

IPv4 CONFIGURATION

WI-FI

INFORMATION

In this screen, the following information is displayed:

- The firmware installed on the display and microprocessor board.
- The IP address to which the machine is connected.

The number of fusion cycles performed.

Starting the machine

	**MACHINE OPERATOR OR PROGRAMMER**

To operate the machine, follow these steps:

1. Turn on the machine by setting the SWITCH to “I” on the rear of the machine;
2. Wait for the display to power up and check for any alarms;
3. Open the fusion chamber and insert the crucible with the material to be melted and the preheated mold;
4. Close the chamber using the designated handle and the front door;
5. Set the fusion recipe on the display;
6. Once the display shows "READY FOR FUSION," press the START button located at the bottom to begin the casting cycle.
7. When the material is melted, press the camera tilting button at the bottom next to the STOP button. The chamber will rotate to a vertical position to pour the material into the mold;
8. After the material has cooled in the mold, the chamber will return to the horizontal position for END OF CYCLE.

The operator can then open the front cover and the chamber door to remove the mold.

Machine shutdown

The machine automatically stops once the processing is complete. Alternatively, you can stop the machine manually by pressing the STOP button on the control panel.

Operatig modes

The machine operates automatically once the recipe is set through the display.

It is not possible to perform more than two consecutive cycles for gold and silver unless the optional chiller is installed.

Normal stop

The machine features a normal shutdown button located at the rear. Pressing this button cuts off power to the machine.

Emergency stop

To perform an emergency shutdown of the machine, press the red mushroom-shaped "Emergency" button. This action will cause an immediate stop of the machine.

Resetting

	**MACHINE OPERATOR OR PROGRAMMER**

Before re-arming the emergency devices, the machinery must be inspected to determine the reason for the activation.

After manually resetting the emergency stop button by rotating it clockwise by approximately 30 degrees, the machine can be restarted normally according to the designated procedure.

Decommissioning

	**MAINTENANCE TECHNICIAN**

During extended periods of inactivity, it is necessary to disconnect the power supply from the main electrical panel and all other necessary supplies (pneumatic and/or hydraulic) for the machine.

Maintenance

Machine isolation

	**MAINTENANCE TECHNICIAN**

Before performing any type of maintenance or repair, it is essential to isolate the machine from all sources of energy by disconnecting the electrical power cable and the inert gas supply line (Argon or nitrogen).

Special precautions

	**MAINTENANCE TECHNICIAN**

All maintenance, whether routine or extraordinary, must be carried out by qualified and adequately trained personnel.

When performing maintenance or repair work, ensure that:

- The machine's condition matches the specifications outlined by the Manufacturer in this Operation and Maintenance Manual;
- The Personal Protective Equipment (PPE) available is in good condition.

If a malfunction is detected, the fault finding and potential replacement of defective components should only be performed by experienced and competent personnel. Alternatively, contact the Manufacturer or an authorized dealer to request technical assistance.
The machine is designed to minimize maintenance needs.
It is the operator's responsibility to cease machine operation whenever an irregular or suboptimal performance is detected or observed.

Only the use of original spare parts is permitted. Otherwise, the Manufacturer is exempt from all liability.

The Manufacturer will not be held responsible for non-compliance with the listed recommendations or for any use that deviates from or is not mentioned in these instructions.

Cleaning

	**MACHINE OPERATOR OR PROGRAMMER**

For cleaning the external surfaces of the machine, use a soft cloth.
For cleaning the internal surfaces of the casting chamber, in case of spillage of molten material, please contact the Manufacturer.

Perform cleaning operations with the machine turned off.

Routine maintenance

	**MAINTENANCE TECHNICIAN**

Routine maintenance includes all operations necessary to maintain the optimal efficiency of functional and control equipment.

General guidelines

- Check the functionality of the Emergency Stop once a month by operating the machine without load and ensuring that the Emergency Stop properly halts the machine.
- If any malfunction is detected, troubleshooting should be performed only by qualified personnel, or the Manufacturer's technical support should be contacted.
- Regularly inspect the condition of individual machine components, ensuring there are no alterations due to wear, structural failures, or deformations.
- Every six months, verify the condition and legibility of safety labels and the data plate. Contact the Manufacturer if they are faded or unreadable.

Always use the appropriate PPE during the operation or maintenance of the machine:

Cut-resistant gloves	Protective goggles
	

Manutenzione programmata

The following operations must be performed according to the specified schedule.

Failure to comply with these requirements releases the Manufacturer from any liability concerning the Warranty.

Although these tasks are straightforward, they must be carried out by Qualified Personnel.
Scheduled preventive maintenance includes inspections, checks, and interventions that systematically monitor the condition of parts subject to wear, thereby preventing stoppages and malfunctions.

Scheduled Maintenance Table:

For all routine maintenance activities, it is mandatory to disconnect the 230V power supply cable.

MAINTENANCE	TIMELINE	DESCRIPTION
Cleaning of the fusion chamber	At the end of each cycle	Clean using a vacuum cleaner or brush. Clean the inspection window glass using a damp cloth or paper. Clean the door seal.
Oil level check	Monthly	Check the oil level of the vacuum pump through the cap/window located at the bottom of the pump. The level should reach halfway up the window.
Coolant level check	Monthly	Check the coolant level in the reservoir located at the back of the machine. The level should be above the minimum mark.
Vacuum pump oil change	Semi-annualy	To drain the used oil, first open the lower inspection cap or sight glass, and then the upper cap. After allowing all the oil to drain out, close the lower cap or sight glass. Then, add new oil until it reaches the halfway mark of the lower cap or sight glass, and finally, close the upper cap.
Coolant refill	Semi-annualy	After opening the lower rear panel by removing the two upper screws, drain the tank by disconnecting the tube at the bottom and removing the red cap. Once the tank is emptied, replace the red cap and refill the tank to the maximum level.

Extraordinary maintenance

MAINTENANCE TECHNICIAN

During normal machine operation, no additional interventions beyond those described in the previous section are necessary. However, situations may arise where the replacement of one or more components becomes necessary.
For any extraordinary maintenance, replacements, revisions, or repairs needed on the machine, please contact the manufacturer or an authorized distributor for technical assistance.

Error list

Error code	Error description	Check	Solution
FLUX ERROR	Coolant flow error	Check the refrigerant liquid level inside the container located at the rear	Add liquid
		Check the operation of the refrigerant liquid pump	Contact technical support
		Check for any liquid leaks in or under the machine	Contact technical support
		The pump is running but the alarm persists	Contact technical support
EMRG	Emergency button error	Check the emergency button	Reset the emergency button
TEMP H2O ERROR	Coolant temperature error	Check the refrigerant liquid level inside the container located at the rear	If below the minimum level, add liquid
		Operation without chiller: consecutive number of melts exceeds the recommended number of melts	Wait for the machine to cool down
		Operation without chiller: external temperature above 40°C	Wait for the machine to cool down
		Operation with external chiller: the chiller is powered by an external plug, the chiller liquid level is okay, and the button is in the ON position	Check the operation of the chiller; if necessary, contact technical support
		Thermocouple for refrigerant liquid temperature faulty	Contact technical support
PVAC ERROR	Vacuum pressure	Check if the vacuum pump is operating and if its cooling fan is rotating clockwise	If necessary, contact technical support
		Check if the vacuum pump power connector is properly attached	Disconnect and then reconnect the connector correctly
		Check if the pump switch is in the ON position	Set the switch to the ON position
		Check the connection of the tube between the vacuum pump and the machine	Secure the tube properly
		Check the door seals	Clean the seals and ensure that the door closure is correct
		Vacuum sensor faulty	Contact technical support
PAIR ERROR		Check if the gas cylinder is empty	Replace the cylinder

	Gas pressure for pneumatic movements	Check the connection of the tube between the gas cylinder, the system, or the machine	Secure the tube properly
		The pressure of the gas cylinder is below 6 bar.	Adjust the pressure to above 6 bar.
		Il sensore gas per movimenti pneumatici è guasto	Contact technical support
PARG ERROR	Inert gas pressure	Check if the gas cylinder is empty	Replace the cylinder
		Check the connection of the tube between the gas cylinder, the system, or the machine	Secure the tube properly
		The pressure of the gas cylinder is below 6 bar.	Adjust the pressure to above 6 bar.
		The gas sensor for pneumatic movements is faulty	Contact technical support
GENER	Inductive generator in STOP	Refrigerant Temperature Too High	Wait for the machine to cool down
		Protective fuse failure	Contact technical support
		Generator out of order	Contact technical support
		Check the three-phase power supply	Contact technical support

Supplementary instructions

It is the responsibility of the user, according to the laws in their respective country, to ensure proper disposal of the waste produced by the machine during operation.
Disposal of lubricants and replaced parts must be carried out in compliance with the regulations in force in the country where the machine is used.

Packaging

If the casting machine needs to be shipped for servicing or any other reason, use the packaging provided with the machine.

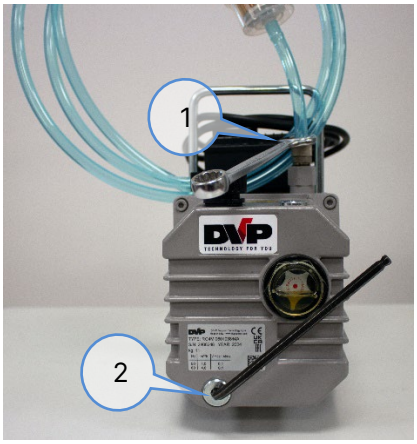
Tank Emptying

Before turning off the machine, ensure that the melting chamber is positioned vertically. You can do this by pressing the "**Tilting** (1)" button.

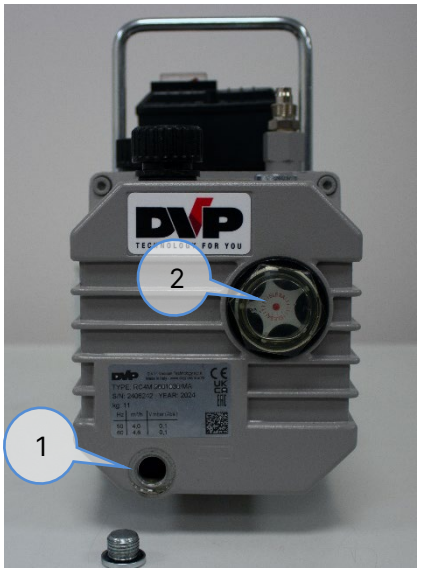
Completely empty the machine's tank using the hose located at the back.

Remove the red cap located at the end of the hose.
Place a container under the machine and tilt the hose downward.
Wait until the tank is completely empty. When no more water is coming out, reattach the red cap to the end of the hose and insert the hose back into the machine.

Oil Pump Emptying



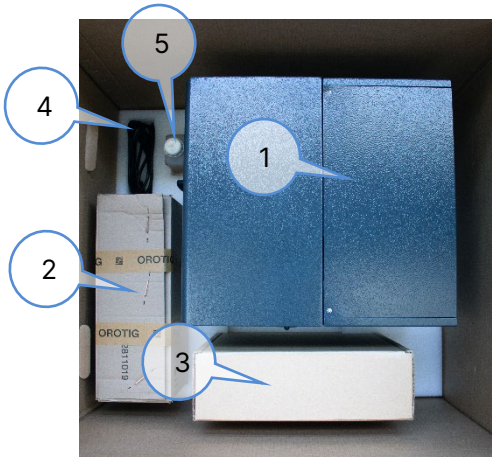
Before storing the pump in its packaging, disconnect the hose with the filter using a 14 mm combination wrench (1).
Next, empty the pump by unscrewing the fitting with a 6 mm hex key (2).



Once all the oil has drained out, which will be evident because no more oil is coming out (1) and the inspection ring will be empty (2), screw the fitting back in and store the pump in its packaging.

Positioning the Machine in the Packaging

Before placing the previously prepared components into the packaging, ensure that the packaging is positioned on the pallet.
Next, insert the machine components and the machine itself inside, ensuring that they are correctly placed in their designated spots, as shown in the photo.
Finally, once everything is in place, close the packaging.



1. Prometheus
2. Oil Pump
3. Accessory Box
4. Power Cable
5. Oil

Dismantling

During dismantling, it is necessary to separate parts made of plastic, metal, and electrical components, which must be sent to separate waste collection in compliance with current regulations.
For the metallic mass of the machine, simply separate ferrous parts from those made of other metals or alloys for proper recycling through casting.
Electrical and electronic components of the equipment constitute WEEE (Waste Electrical and Electronic Equipment) and should be disposed of according to specific methods and with correct separation of parts based on their WEEE class.

Attachments

EC Declaration of Conformity

CE

DECLARATION OF CONFORMITY

The manufacturer:
OROTIG S.p.a.
Viale Dell' Elettronica, 5
37139 Bassone (VR), Italy

☎ 045 640 0865
e-mail: info@orotig.com

Declares under its own responsibility that the equipment model:

FI020250
PROMETHEUS CASTING MACHINE

Serial number **FI00055** *manufactured in: Viale Dell' Elettronica 5, Bassone (VERONA), ITALY, has been built according to dispositions contained in the following European Directives and Harmonised Standards Reference:*

2006/42/EC	*Machinery Directive.*
2014/30/EC	*Electromagnetic Compatibility.*
EN 60204-1:2018	*Safety of machinery. Electrical equipment of machines. Part 1: General requirements.*
EN IEC 61326:2021	*Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*
EN 61010-1/A1:2019	*Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements.*
EN ISO 12100:2010	*Safety of machinery - General principles for design - Risk assessment and risk reduction.*

CE mark was affixed on the product: **2024**

NAME AND ADDRESS OF THE AUTHORIZED TO FORM THE RELEVANT TECHNICAL DOCUMENTATION THAT MUST BE ESTABLISHED IN THE COMMUNITY:

Manufacturer
Stamp Signature

Name/Surname: *Tommaso Romanelli*
Title: Chief Executeve Officier CEO

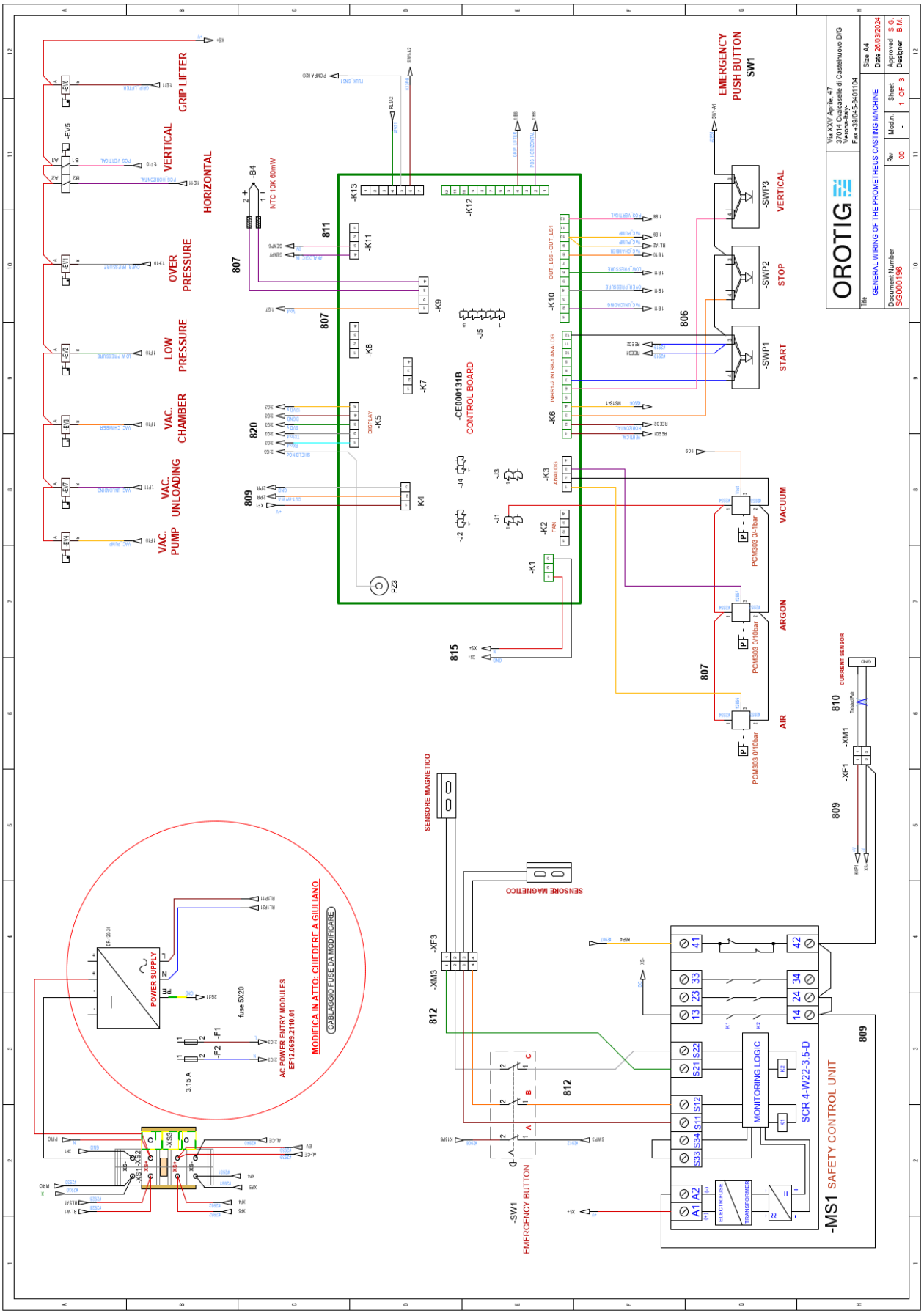
Technical file available from EU Representative:

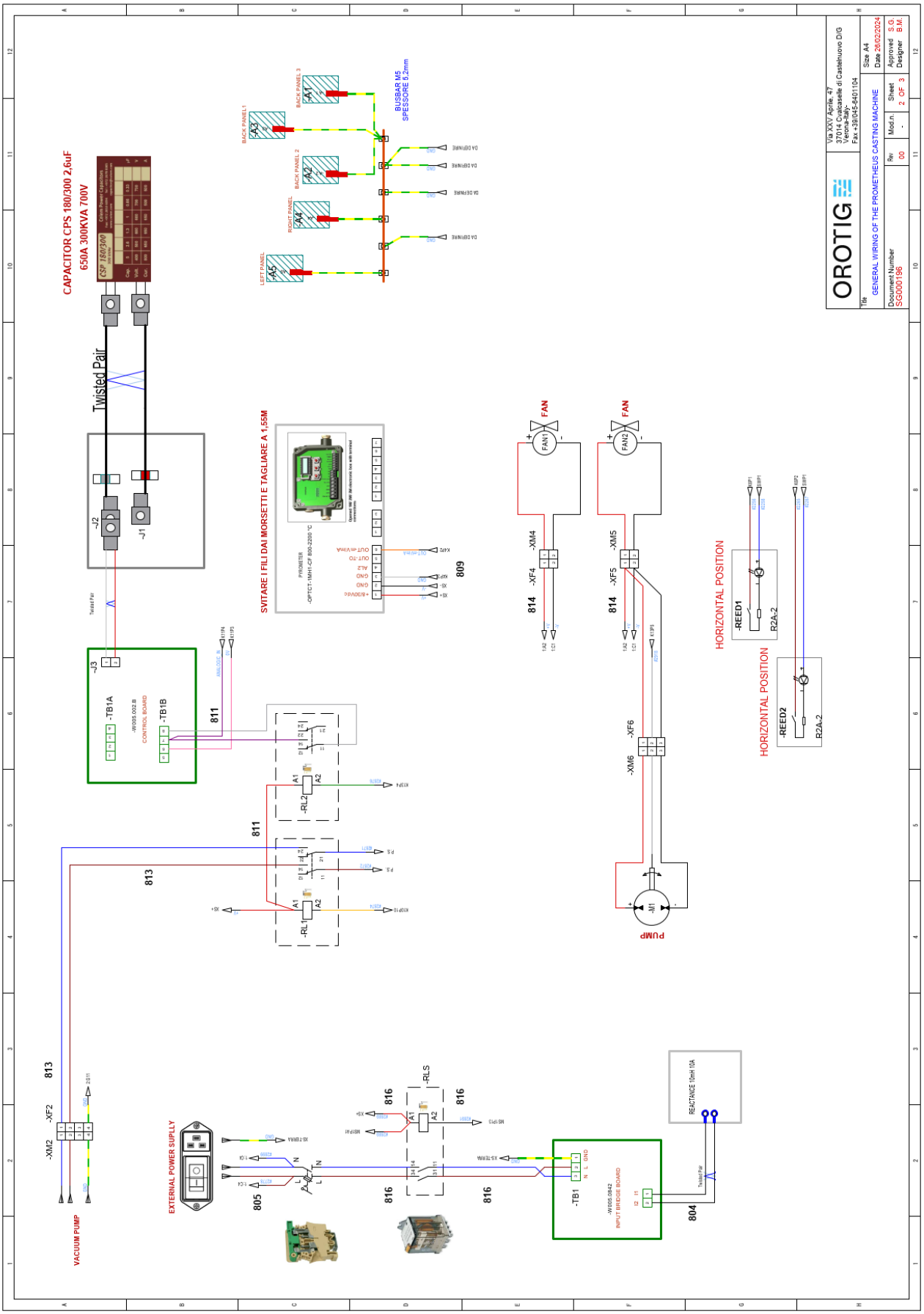
Name/Surname: *Tommaso Romanelli*
Company: *Orotig SpA*
Address: Viale Dell'elettronica 5 Bassone *(VR) – Italy*

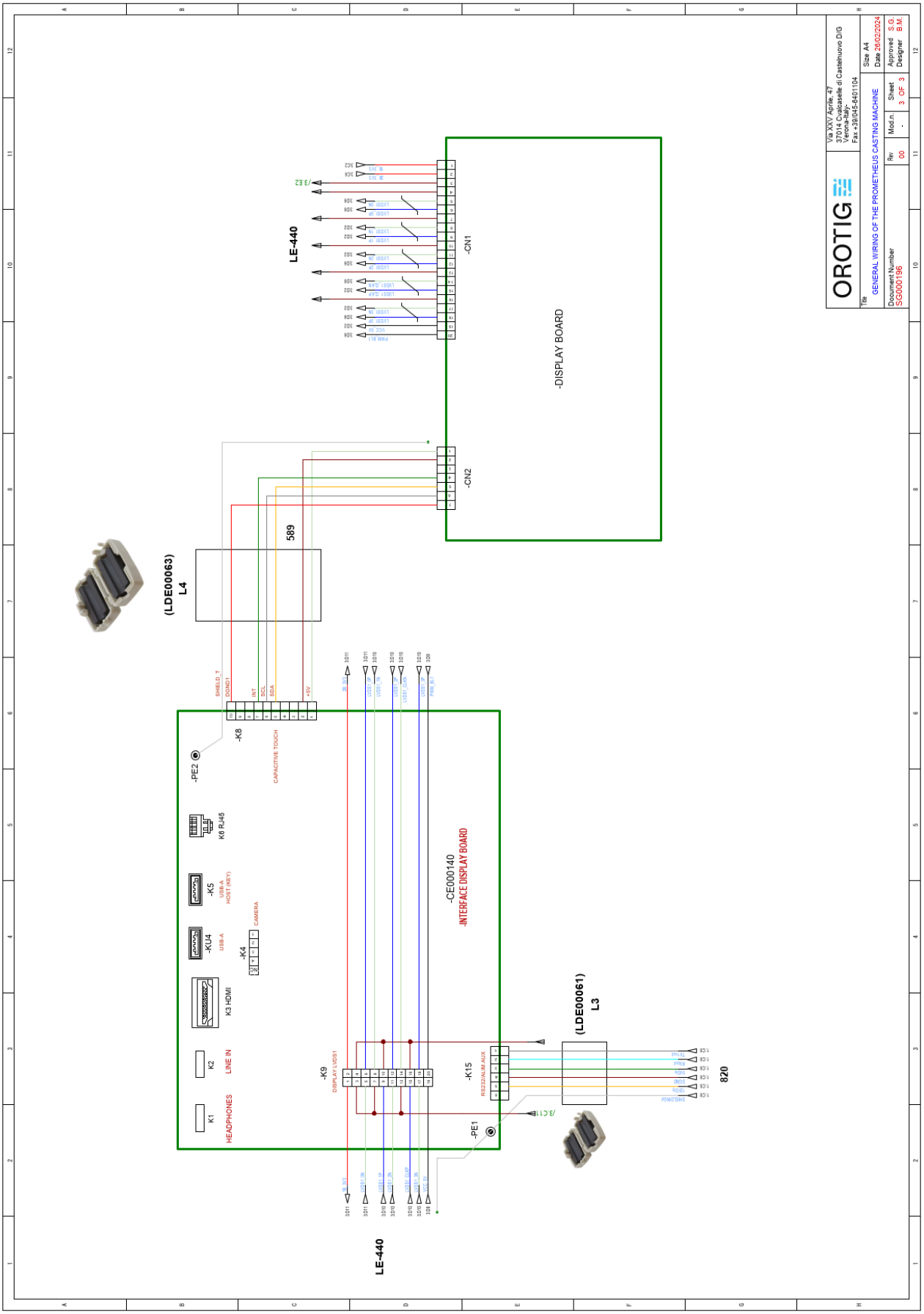
Bassone (VR), li ***30/08/2024***

Dic CE Rev. 5 - EN

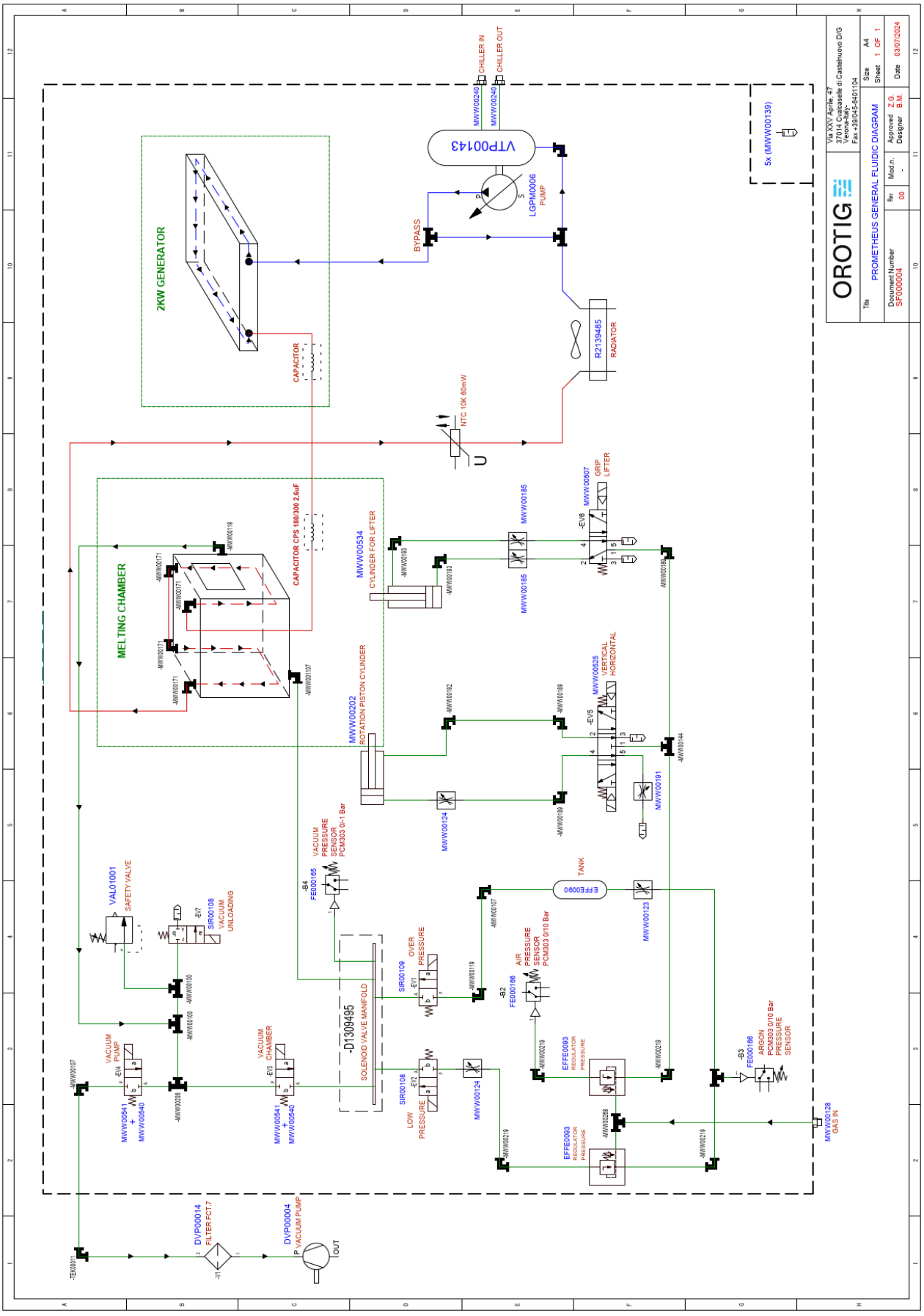
Wiring diagram







Fluidic diagram



Spare parts list

Article code	Description	Photo
D1435249	Crucible for platinum (150 g)	
D1437090	Crucible for platinum (50 g)	
D1432896	Crucible for gold (140 g 18K) or silver (90 g)	
D1433640	Crucible protection jacket	
FAC00108	Steel flask Ø = 60 mm, h = 90 mm	
FAC00105	Steel flask Ø = 76 mm, h = 90 mm	
FAC00106	Steel flask Ø = 85 mm, h = 90 mm	
FAC00132	Rubber gasket Ø 60 mm	
FAC00133	Rubber gasket Ø 76 mm	
FAC00139	Rubber gasket Ø 85 mm	

D1412269	Flask support Ø 60 mm	
D1418714	Flask support Ø 76 mm	
D1416951	Flask support Ø 85 mm	
FAC00160	Graphite gasket Ø 110 mm	
FAC00141	Nomex gasket Ø 110 mm	

Note

Revision:	Issue date	
00	11/09/2024	S.P.
01	31/10/2024	S.P.
02	08/11/2024	S.P.