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Code **MUM\_RAFF\_00-0000001**



# Water system for Continuous Casting Line

## USE AND MAINTENANCE INSTRUCTION BOOK

-Translation of the Original Instructions-

Edition **00 – 06/2025**  
Language **English**

## MANUFACTURER AND LINE IDENTIFICATION DATA



### MANUFACTURER

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### LINE

|                    |   |
|--------------------|---|
| Machine            | <b>Water system for Continuous Casting Line</b> |
| Manufacturing year | <b>2025</b>                                     |
| Power voltage      | <b>400 V – 3 Ph / 50 Hz</b>                     |

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## GENERAL NOTICES



**It is necessary to carefully read general notices listed below to perform any operation, maintenance or other activity in complete safety.**

The operations and the events which imply danger are recognizable in the instruction book by the symbol:



The aim of this use and maintenance instruction book is to provide operators with instructions for the correct and safe use of the machine.

Keep a clear and clean the working area and the surfaces as well as the top of the framework platforms to prevent objects (raw material, equipment, rags, processing waste, etc.) from interfering with the free movement of operators and/or any substances (dust, oil, solvents, etc.) from dirtying the machine and the floor.



**WARNING:**

**Ensure the floor is not slippery. If required, clean before operating in the area.**

The machine manager should be aware of the safety devices installed and their proper use.

The machine manager is responsible for designating the operators who are authorized to operate and determining their respective skills and intervention limits. Only these operators are authorized to work on the machine.

The operators won't have to access dangerous areas or reach them with their upper limbs while the machine is running, particularly during start-up.



**WARNING:**

**The instructions in this use and maintenance instruction book assume that only qualified, specially trained and duly authorized operators are responsible for all machine operations.**

**WARNING:**

**Wearing a safety helmet is required for everyone operating or passing near the line.**

Before operating the machine, operators must thoroughly read and understand the contents of this use and maintenance instruction book.

It is important to keep this use and maintenance instruction book and any enclosed documents in their original condition and close to the machine as much as possible.

Unauthorised people cannot stay close to the machine, when running or under repair operations.

The manufacturer Bruno Presezzi S.p.A.. will not be held responsible for any damages to persons or property in the cases described below, which may immediately invalidate the terms and conditions of the warranty.

- **Failure to comply with accident prevention rules or tampering with safety devices.**
- **Wrong installation.**
- **Failure to read or comply with the operating and maintenance instructions described in this handbook.**
- **Use of non-original spare parts.**
- **Unauthorised modifications or interventions.**

**WARNING:**

**The tempering or unauthorized replacement of one or more components of the machine and the use of accessories, tools and materials different from those recommended by the Manufacturer may constitute a risk of injury and relieve the Manufacturer of any civil or criminal liability.**

## REQUEST FOR ASSISTANCE

Any request must be sent after having carefully checked inconvenient and causes.

In case of written request, please provide the following information:

- Machine model.
- Serial number.
- Detail of the occurred defects.
- Any performed check.
- Any adjustment and consequent result.
- Any other useful information.

Send the request to:

**BRUNO PRESEZZI S.p.A.**

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20875 - Burago di Molgora (MB) – ITALIA

**Tel.: +39 039 635021**

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## ORIGINAL INSTRUCTIONS



### TO WHOM THE INSTRUCTIONS ARE ADDRESSED

The translation of the original instructions in this use and maintenance instruction book is intended for all operators who handle, transport, install, assemble and operate the Continuous Casting Line, as well as perform any maintenance or repair operations on it.

This use and maintenance instruction book is intended for management, responsible and operating personnel of the working site where the line is installed. The manual should be specifically addressed and understood by:

- Production department personnel at all levels.
- Maintenance department personnel.
- Internal handling department personnel.
- First aid and internal intervention personnel.
- Supervisory personnel.

All supervisors, operators and qualified technicians operating in close proximity to and/or on the Continuous Casting Line, must be properly instructed on the operation of the line and on its each single machine, the operation of drives and safety devices, the residual risks associated with the use of machines and must be trained on measures to prevent any damage to themselves, third parties, property and the environment in general.

It is important for operators to be aware of all individual protection equipment that must be worn when operating in close proximity to hot areas and molten metal, which can pose a high level of risk due to their nature.

In addition, they must be informed about the first-aid measures to be taken when parts of the human body come into contact with molten metal and sources of danger, regardless of precautions.

The contents of this use and maintenance instruction book must be strictly followed.

Bruno Presezzi S.p.A. shall not be held responsible for any use not complying with the original use and maintenance instruction book.



## CONSTRAINTS OF THE ORIGINAL INSTRUCTIONS

It is important to note that the instruction book is not a complete replacement for the required technical knowledge and training of the user.

The instruction book is an integral part of the machine and is a necessary device to ensure the highest level of safety during all phases of operation and maintenance throughout the lifetime of the Continuous Casting Line.

This use and maintenance instruction book provides additional guidance and instructions on the use of the system but it is not meant to replace or modify any general or specific rules, regulations, decrees or laws in force in the installation site concerning safety, use and maintenance of the system.

The instruction book provides the Maintenance Department with information on how to manage plant interventions, but assumes that the maintenance personnel is technically skilled and duly trained on managing any problems in mechanical, pneumatic, hydraulic, water and electrical maintenance.

The use of chemicals requires specific training for maintenance personnel.

## WHERE AND HOW TO STORE THE ORIGINAL INSTRUCTIONS

A complete and intact copy of the original instructions must always be available for consultation near the Continuous Casting Line and must be stored in a safe and dry place, shielded from sunlight and heat sources to ensure its preservation.

## UPDATING OF THE ORIGINAL INSTRUCTIONS

The instruction book is accurate to the state of the-art at the time of the machine commercialization and it cannot be considered unsuitable just because it has not been updated to incorporate new technical developments.

Bruno Presezzi S.p.A. reserves the right to update the production and the instruction book without obligation to update previous productions and instruction books, except in special and agreed-upon cases.

## TRANSFER OF THE PLANT AND OF THE ORIGINAL INSTRUCTIONS

In case of transfer of the Continuous Casting Line, the user must provide the corresponding original instructions and inform the manufacturer of the new owner's address in order to make easier the transmission of eventual reports and additions to the instruction book. Otherwise, Bruno Presezzi S.p.A. will not be held responsible for any liability, for example in relation to:

- Improper use of machines or their use by untrained personnel.
- Use not in compliance with current requirements and regulations in force.
- Improper installation.
- Supply defects.
- Serious deficiencies in planned maintenance.
- Unauthorized modifications or interventions.
- Use of non-original and/or unsuitable spare parts.
- Total or partial failure to comply with the original instructions.

## CONTENTS OF THE ORIGINAL INSTRUCTIONS

The topics are treated to make the classification of the information and the professional address to which it is addressed easier, enabling more immediate and direct consultation of the content.

Each volume is divided into chapters and corresponding sections that cover, with detailed explanations in numbered sequences, the operational topics for properly installing, using and maintaining the Continuous Casting Line.

Each section starts with a status line with specific symbols stating the personnel authorized to intervene.

Symbols integrated with the text indicate the residual risk during the specific operation.

The instruction book uses graphic symbols to highlight and distinguish important information or suggestions that are important for safety and proper operation of the Continuous Casting Line.

Bruno Presezzi S.p.A. plans to use these measures to inform supervisors, operators, and qualified technicians about WARNINGS, CAUTIONS or REMARKS concerning them.

## DEFINITIONS

### MACHINERY DIRECTIVE 2006/42/EC (Article 2 Definitions)

**MANUFACTURER:** Means any natural or legal person who designs and/or manufactures machinery or partly completed machinery covered by this Directive and is responsible for the conformity of the machinery or the partly completed machinery with this Directive with a view to its being placed on the market, under his own name or trademark or for his own use. In the absence of a manufacturer as defined above, any natural or legal person who places on the market or puts into service machinery or partly completed machinery covered by this Directive shall be considered a manufacturer.

**PLACING ON THE MARKET:** Means making available for the first time in the Community machinery or partly completed machinery with a view to distribution or use, whether for reward or free of charge.

**PUTTING INTO SERVICE:** Means the first use, for its intended purpose, in the Community, of machinery covered by this Directive.

**SAFETY COMPONENT:** Means a component:

- which serves to fulfil a safety function;
- which is independently placed on the market;
- the failure and/or malfunction of which endangers the safety of persons, and which is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function.

**The first use of the machine covered by this Directive as authorized in the Community.**

### ANNEX I MACHINERY DIRECTIVE 2006/42/EC (p. 1.1.1 Definitions)

**HAZARD:** Means a potential source of injury or damage to health.

**DANGER ZONE:** Means any zone within and/or around machinery in which a person is subject to a risk to his health or safety

**EXPOSED PERSON:** Means any person wholly or partially in a danger zone

**OPERATOR:** Means the person or persons installing, operating, adjusting, maintaining, cleaning, repairing or moving machinery.

**RISK:** Means a combination of the probability and the degree of an injury or damage to health that can arise in a hazardous situation.

**GUARD:** Means a part of the machinery used specifically to provide protection by means of a physical barrier.

**PROTECTIVE DEVICE:** Means a device (other than a guard) which reduces the risk, either alone or in conjunction with a guard;

**INTENDED USE:** Means the use of machinery in accordance with the information provided in the instructions for use.

**REASONABLY FORESEEABLE MISUSE:** Means the use of machinery in a way not intended in the instructions for use, but which may result from readily predictable human behavior.

**RESIDUAL RISKS:** Where risks remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted.






**HYDRAULIC CYLINDER:** Hydraulic organ producing movement through the action of a fluid.

**ROLL:** cylindrical component which rotates around its axis.

**PASS LINE:** height at which the belt sliding surface is.




## QUALIFICATION REQUIREMENTS FOR INTERVENTION OPERATORS

To make the reading and understanding of this use and maintenance instruction book easier by outlining the intervention field and consequent responsibility for each operator based on their specific training and qualification, the definitions of occupational profiles and the corresponding pictogram below have been created to show the required qualification for each intervention covered in the instruction book.

| SIGN  | DEFINITION  |
|---|---|
| <b>MACHINE OPERATOR</b>   |   |
|    | <p>Identifies the category of skilled operator authorised to perform the operation.</p> <p>This qualification requires a complete understanding of the information covered in the manufacturer's use and maintenance instruction book, as well as the proper training and expertise in steel sector and metal continuous casting.</p>   |
| <b>HANDLING OPERATOR</b>  |   |
|   | <p>Identifies the category of skilled operator authorised to perform the operation.</p> <p>This qualification requires a complete understanding of the information covered in the manufacturer's use and maintenance instruction book, as well as specific skills in lifting equipment and methods, harness characteristics, safe machines handling.</p>  |
| <b>MECHANICAL MAINTENANCE TECHNICIAN</b>  |   |
|  | <p>Identifies the category of skilled operator authorised to perform the operation.</p> <p>This qualification requires a complete understanding of the information covered in the manufacturer's use and maintenance instruction book, as well as obtaining the required training and specific competence to perform routine maintenance operations after receiving proper training and certification from the manufacturer.</p>  |
| <b>ELECTRICAL MAINTENANCE TECHNICIAN</b>  |   |
|  | <p>Identifies the category of skilled operator authorised to perform the operation.</p> <p>This qualification requires a complete understanding of the information covered in the manufacturer's use and maintenance instruction book, as well as having acquired the required training and specific expertise to handle electrical and electronic adjustment, maintenance and repair.</p> <p>The operator is well-trained and able to operate in presence of voltage both in electrical cabinets and control panels.</p> |
| <b>EXTRAORDINARY OPERATIONS</b>   |   |
|  | <p>Identifies interventions that are exclusively reserved for Service technicians of Bruno Presezzi S.p.A. at the customer's site.</p>  |

## WARNINGS, CAUTIONS AND REMARKS

Specific symbols have been created to draw the attention of operators to particularly relevant information, highlighting residual hazards, risks or important technical remarks.











| SYMBOL  | DEFINITION  |
|---|---|
|    | <b>WARNING:</b><br>It shall alert the relevant personnel of the risk of exposure to residual risks and the possibility of damage to health or injury in case the operation described is not performed in accordance with the provided procedures and requirements which comply with safety regulations. |
|    | <b>CAUTION:</b><br>It shall alert the involved personnel of the risk of damage to the line and its components and of resulting risks for both the operator and the environment in case the operation described is not performed in accordance with the provided safety regulations and cautions.        |
|  | <b>REMARK:</b><br>It shall provide particularly relevant technical information related to the current operation.  |

## HAZARD, PROHIBITION AND MANDATORY SIGNS

The use of the following signs is intended to highlight the type of residual risk, prohibitions and precautions or to require the use of necessary individual protection equipment.





### HAZARD SIGNS

Along with the text, the following hazard signs alert the operator of the type of residual risk that may occur during the current operation.

| SIGN  | DEFINITION                                |
|---|---|
|    | General hazard.                           |
|    | High voltage and electric shock hazard.   |
|  | Moving parts hazard.                      |
|  | Hot surfaces and high temperature hazard. |
|  | Crush hazard.                             |
|  | Shearing hazard.                          |
|  | Splashing hot liquids hazard.             |
|  | Noise emission.                           |
|  | Laser beam hazard.                        |
|  | Crush hazard.                             |

## PROHIBITION SIGNS











Along with the text, the following prohibition signs alert the operator of the type of prohibition to be complied with during the current operation.

| SIGN  | DEFINITION   |
|---|--|
|  | Divieto di toccare o entrare in contatto                     |
|  | Divieto di rimuovere i ripari a macchina in funzione         |
|  | Divieto di lubrificazione o intervento a organi in movimento |
|  | Divieto di impiego di sollevatori a forche                   |



## MANDATORY SIGNS

Along with the text, the following mandatory signs alert the operator of the type of individual protection equipment required to perform a specific operation.

| SIGN  | DEFINITION   |
|---|--|
|    | Obligation to cut/isolate the supply voltage before intervening. |
|    | Safety gloves must be worn.                                      |
|    | Safety shoes must be worn.                                       |
|    | Protective clothing must be worn.                                |
|  | Obligation to connect an earth terminal to the ground.           |
|  | Eye protection must be worn.                                     |
|  | Hearing protection must be worn.                                 |
|  | Safety helmet with protective visor must be worn.                |
|  | Safety harness must be worn.                                     |
|  | High visibility clothing must be worn.                           |

## PRELIMINARY INFORMATION



Preliminary but important topics are covered in this part of the instruction book, to comply with operating as stated in the next sections.

## DELIVERY NOTE

The Continuous Casting Line has been designed and built in compliance with the European Directives 2006/42/EC, 2014/35/EU and 2014/30/EU.

The line does not pose any danger to the operator if operated according to the instructions provided by Bruno Presezzi S.p.A., as long as the safety devices are kept in a steady efficiency status.

This page aims to certify that upon receiving the line:

- safety devices are installed, enabled and efficient.
- The use and maintenance instruction book accompanying the line must be either a “Translation of the original instructions” in English and a copy of the “Original instructions” in Italian, to enable the user to check the original instructions in case of doubt about the accuracy of a translation.
- The customer shall be held responsible for adhering to the instruction book content and for ensuring that authorized operators, supervisors and qualified technicians are properly informed about the instruction book content and will properly comply with it during operation and intervention on this line.



### **WARNING:**

**This use and maintenance instruction book must be kept for the entire lifespan of the line and should always be accessible to the supervisor, operator and qualified technicians.**

The customer shall be held responsible for ensuring that the operators, supervisors and qualified technicians read, understand and comply with the contents of this use and maintenance instruction book before operating the line and performing any other operation.

The manufacturer shall not be held responsible for any modifications, tampering or operations that do not comply with the content of the written instructions and may result in damage to safety, the health of people, animals or property.

**It must be noted that the instructions, drawings and contents of all documentation are strictly confidential and the exclusive property of Bruno Presezzi S.p.A., who retains all rights and prevent third parties from obtaining, reproducing and providing them in any way.**

Bruno Presezzi S.p.A. expects that the line functions and performance can be fully operated. To receive more information or suggestions about this document, do not hesitate to contact the manufacturer's office.

## WARRANTY TERMS

To our complete satisfaction, the continuous casting line is a high-quality technological line, recognized and appreciated by those who already have it.

In case of malfunction, please contact the Bruno Presezzi S.p.A. service, providing the following information:

- full address.
- Line type and designation.
- Malfunction description.

Our technicians will intervene within the shortest possible time.

### Warranty

The general warranty conditions require reference to either the order confirmation issued by Bruno Presezzi S.p.A. or the specific terms of sale.

The warranty of the line will not be extended in the event of repair or replacement. However, the replaced parts are covered by a one-year warranty.

The warranty obligations are fully fulfilled by repairing or replacing defective parts. The parts deemed defective remain the property of Bruno Presezzi S.p.A. until they are replaced under warranty.

The defective parts must be returned to Bruno Presezzi S.p.A., which reserves the right to inspect them in order to detect the actual defect or any external reason that may have caused the damage.

In case the parts are not defective, the manufacturer has the right to invoice the full cost both of the parts and the intervention previously performed under warranty.

#### **The following are not covered by the guarantee obligations:**

- The transport costs and risks of defective, repaired or replacement parts, including any customs charges.
- Any direct or indirect damage caused by the defect or failure to function and, specifically, any missing production.
- All parts and materials under normal consumption and wear.
- All parts damaged by neglect or negligence in use, improper maintenance, transport or any other situation not related to an operating or manufacturing malfunction.

**Terms of warranty expiration:**

- The warranty shall be invalidated in case the customer uses, without prior written authorization from Bruno Presezzi S.p.A. and at his own discretion, non-original spare parts and/or performs unauthorised modifications or alterations.
- Improper use or misuse, as well as failure to comply with this use and maintenance instruction manual, will result in the warranty being invalidated.

**Warranty expiration and no-responsibility disclaimer**

Bruno Presezzi S.p.A will not be held responsible for any damages to machines, people or property in cases described below:

- Improper use of machines.
- Use of machines by not properly trained personnel.
- Use of machines without complying with the laws in force in the country of installation.
- Improper installation, if performed without Bruno Presezzi S.p.A. personnel supervision.
- Improper maintenance or performed by untrained personnel; use of non-original or unsuitable spare parts.
- Non-compliance, even partial, with information provided by the original instructions.
- Exceptional events.
- Failure to adopt customer-borne safety devices.

## General rules upon receipt

The following applies exclusively when materials, components, and machines are received and installed without Bruno Presezzi S.p.A. personnel supervision.

Checking the containers, crates and packaging prepared for shipment is required before opening to detect any damage caused by transport.

If any obvious damage is detected, the freight forwarder and Bruno Presezzi S.p.A. about the specific findings. (Please also refer to the order confirmation terms).

Upon opening the packaging:

- Ensure that any part of the line have been damaged.
- Ensure that the components received match the item, wording and quantity as stated on the shipping documents or packing list.

In case of any non-conformity, promptly notify both the freight forwarder and Bruno Presezzi S.p.A. about the specific findings.

## FORESEEN AND UNFORESEEN USE OF THE MACHINE



The system is meant to be used exclusively for processing type of products it has been designed and built for.

**BRUNO PRESEZZI S.p.A.** is not responsible for unauthorized use of the machine beyond its intended use.

The system has been designed and built for the purposes stated in this use and maintenance instruction book.



### **WARNING:**

**Any other use, processing or type of product are strictly forbidden.**

## SYSTEM DESCRIPTION



The system has been designed and built to provide cooling and heating water to the casting rolls of continuous casting lines.

The system also provides cooling water to the casting line services, including:

1. Auxiliaries hydraulic power unit.
2. AGC hydraulic power unit.
3. Pinch-Roll rolls.
4. Deflector roll.

Water circulation in the body-outer liner coupling section is enabled by the internal channels circuit of the casting rolls. This system has a dual function:

**Preheating:** to prevent the metal from sticking to the roll during the line start-up, it is necessary to preheat the outer liner. For this reason, the circuit requires the circulation of water coming from the preheating plant.

**Cooling:** the line normal operation requires removing from the outer liner the heat released by the metal during its solidification. Cold water must therefore be circulated in this phase.

The system mainly consists of the following components:

### **Butterfly/Ball valves**

These components are aimed at:

- ☐ Isolating the cold-water supply pumps to the casting rolls cooling circuit.
- ☐ Isolating the casting rolls preheating circuit.
- ☐ Isolating the cold-water supply circuit to the casting services.

Refer to the specific enclosures for additional information on valve operation and maintenance.

### **Heat exchanger**

The heat exchanger is responsible for cooling the water coming from the supply pumps before it is sent to the casting rolls circuit.

Refer to the specific enclosures for additional information on heat exchanger operation and maintenance.

### **Water supply pumps to casting lines**

The circuit consists of two water supply pumps to the casting rolls, one in operation and one in stand-by mode. They are responsible for ensuring the cooling water flow rate to the casting rolls.

If required, the standby pump can automatically start to support or replace the one currently in use.

Refer to the specific enclosures for additional information on water supply pumps operation and maintenance.

### **Services water circulation pumps**

The fluid circulation pumps are responsible for ensuring cooling water circulation to the hydraulic power units of the casting line.

Refer to the specific enclosures for additional information on water circulation pumps operation and maintenance.



## TECHNICAL DATA



### Flow rate, temperature and pressure values

- Maximum flow rate to the casting rolls: **290 m<sup>3</sup>/h**
- Inlet water maximum temperature: **30° ±2 °C**
- Outlet water temperature: **32° ±2 °C**
- Heat transfer rate: **761 kW**
- Working pressure: **400 kPa**

### Electric energy absorption

- Motor power of casting water pumps: **2 x 45 kW**
- Motor power of services water circulation pumps: **2 x 11 kW**
- Total installed power: **144 kW**

### Power supply

- Power supply: **400 Vac**
- Phases: **3 Phases + T**
- Frequency: **50 Hz**
- Simultaneity Factor: **60 – 70 %**

## Required fluids (cooling treated water)

- Filtration: **100  $\mu$**
- Water hardness: **5,6 German degrees**
- Water hardness: **10 French degrees**
- Ph: **6.8 – 7.2**
- Conductivity: **50 ÷ 300  $\mu$ S/cm**
- Total dissolved solids: **200 ppm**
- Suspended Solids: **10 ppm**

## Demineralized water

The line is fitted with a demineralized water supply/cooling circuit for the control integration of the units concerned.

- Minimum pressure: **3 bar**



### REMARK:

The supply water must be demineralized and have a hardness between 5 and 6 German degrees.

## SAFETY INDICATIONS



**WARNING DANGER!**



**CAREFULLY READ THIS SECTION**  
before operating

This section covers very important topics related to safety and how to safely operate the line. Therefore, it is important to strictly follow these simple principles and rules throughout the entire lifespan of the machine.

The machine has been designed and built taking into account the risks that operators may face and is equipped with safety protections and signals to prevent accidents to operators during the various stages of processing.

## HANDLING AND TRANSPORT



### WARNING DANGER



**TRANSPORT, UNLOADING AND ERECTION OF THE LINE  
must be performed by skilled and authorized personnel only**

## SHIPPING INDICATIONS

The machine is delivered in machine groups that have been finished and fully assembled, according to the country of destination and/or the packaging or shipping method that has been agreed upon with the customer.

The official Bruno Presezzi S.p.A. packing-list is provided with a detailed document to identify the supply packages of the entire order.

- All mechanical parts are encased within proper safety protections.
- Hygroscopic salt envelopes are used to protect electrical and electronic equipment against moisture.
- Plastic barriers are used to protect all machine groups and control integration units.
- Suitable packaging is used for the supply packages.
- Shipping packages should be marked with specific signs providing details about weight, points and lifting devices required for a safe handling.

## HANDLING

Proper lifting and transport means, suitable in terms of type and capacity, must be used for handling, lifting and positioning the machine groups within the erection site. Provide proper room for maneuver for lifting means and overhead loads. Upon receiving the supply, it is necessary to handle and store the machine groups in a closed, dry, and protected area with a walking surface that can withstand the large weight.



### **WARNING:**

**Using lifting devices or means that are not suitable in terms of type, capacity and efficiency is strictly forbidden. Use only the gripping points provided by the manufacturer to lift the supply packages. DANGER OF IMBALANCE AND/OR LOSS OF THE LOAD.**

To avoid any damage to the plant or dangerous situation, carefully follow the instructions below:

- At least two operators trained in loads harness, lifting and handling must perform handling operations.
- The operators involved must wear proper individual protection equipment, in particular safety gloves and safety shoes.
- Ensure that the hooks, ropes, crane and all lifting and handling devices are suitable for the purpose.
- Ensure that the lifting devices has the permissible capacity, breaking loads and efficiency status before starting.
- Harness the machine groups on the lifting points provided by the manufacturer using proper lifting devices with a suitable capacity.
- Ensure that there are no people or vehicles passing through the maneuvering area before starting the lifting maneuver. Report with the required procedures that such operations are in place.
- Ensure that all safety requirements for lifting and handling are met by checking the lifting devices at a reasonable distance before operating.
- Be mindful of any protruding parts of the plant, particularly if the machine starts rotating along its vertical axis upon being lifted from the ground.
- After confirming that the erection site is suitable and free from any obstacles, both fixed and movable, start storing the load at minimum speed while paying extreme attention and caution.
- The operator who remotely controls the lifting device must always have a clear view of the load and any other operators involved in current handling operations.

## PACKAGING AND STORAGE

The following only applies when the machines components are received and then installed without the supervision of Bruno Presezzi S.p.A. personnel.

To detect any damage caused by transport, containers, crates and packaging must be checked before opening.

Immediately notify the freight forwarder and Bruno Presezzi S.p.A. about any obvious damage and specific reports (please also refer to the general conditions of order confirmation).

Upon opening the packages, ensure that the machine different parts are not damaged and that the components received match the item, wording and quantity listed on the shipping documents or packing list.

Immediately notify the freight forwarder and Bruno Presezzi S.p.A. about any non-conformity and specific reports.

## FINISHING AND SUPPLY PACKAGING

Except for specific contractual indications, the external parts of the plant are painted with epoxy and synthetic enamel. These finishing are suitable for standard industrial environments. Special paints (to be decided in advance) must be used when there are particular aggressive environmental conditions.

Anti-corrosion inhibitors that can withstand marine and tropical climates are employed to protect the machine tool machined parts for a time period of one year.

The shipment packaging is defined with the customer according to the place of destination and the type of transport. There are three types of packaging with different characteristics:

- Wooden crate packaging with plastic film.
- Wooden crate packaging with barrier bag.
- Container packaging with barrier bag.

## STORAGE

The plant must be stored and packed in a safe, clean, covered, dry, vibration-free environment, unaffected by high temperature and humidity excursions. Special polyethylene bags are required to wrap the machine groups when not packed.

### **Storage with wooden crate packaging and plastic film**

- Expected lifetime in a safe marine environment: 3 months.
- Expected lifetime in a safe earth environment: 6 months.

The packaging and the protective materials must be verified and renewed at the end of the above-mentioned period.

### **Storage with wooden crate packaging and barrier bag**

- Expected lifetime in a safe marine environment: 6 months.
- Expected lifetime in a safe earth environment: 12 months.

The packaging and the protective materials must be verified and renewed at the end of the above-mentioned period.

### **Storage with container packaging and barrier bag**

- Expected lifetime in a safe marine environment: 6 months.
- Expected lifetime in a safe earth environment: 12 months.

The packaging and the protective materials must be verified and renewed at the end of the above-mentioned period.

### **Storage without packaging**

When the machine groups are stored without packaging, it is necessary to:

- Protect all machined surfaces with anti-corrosion inhibitors that can withstand marine and tropical climates.
- Fill the bearings with suitable lubricating grease.
- Protect the outer shafts seals with suitable lubricating grease.
- Wrap the machine groups with suitable polyethylene bags to protect them from dust and external agents.

The packaging and the protective materials must be verified and renewed at the end of the 3-months storage period.

## PREPARATION AFTER STORAGE

To prepare and restore the machine groups at the end of the storage period and before the commissioning, proceed as follows:



**WARNING:**

**Avoid using scrapers, tools or abrasive materials on machined surfaces as it could damage surface treatments and roughness.**

- Use a brush and diesel to remove the protective antioxidant from machined surfaces.
- Remove, where possible, the filling grease from the bearings and wash the piste using diesel.
- Remove and dry any diesel oil residue from the machine surfaces and clean them using anti-oxidant washing liquids.
- Perform manual greasing and lubrication.



## LINE INSTALLATION



### INSTALLATION SITE REQUIREMENTS

The water plant requires installation inside covered and closed working environments matching the characteristics stated in the foundation layout and summarized below.

**Floors and walls:** to ensure a proper plant erection, the line should be installed in a covered and closed room, the flooring should be made of non-slip material, resistant to wear and fire (reaction class 0 - non-combustible) and easy to clean. Floors must be free of holes or gaps that are not connected. The walls should be painted with light-shade colours and large windows should be present to ensure suitable natural lighting.

**Lighting:** the installation site requires a suitable system of artificial lighting, both general and in close proximity of the machines, as well as emergency lights and corresponding safety warnings.

**Ventilation:** to comply with workplace hygiene and health regulations, the installation site must have enough ventilation openings and appropriate ventilation and fume extraction systems.

**Microclimatic conditions:** ensure that the installation site has the following conditions.

Unless otherwise stated, the following conditions must be met:

- |   |  |
|---|--|
| • Altitude between                                      | <b>0 e 1000 MT a.s.l.</b>              |
| • Relative humidity below                               | <b>65%</b>                             |
| • Tolerance on Venom power supply voltage:              | <b>+/- 10%</b>                         |
| • Environmental temperature                             | <b>Within a range of +10 and +40°C</b> |
| • Relative humidity with a temperature of +20°C (+60°F) | <b>Within a range of 50 and 80% RH</b> |
| • Pressure  | <b>Atmospheric</b>                     |
| • No strong draught                                     |  |

The systems are supplied without operating fluid.

## Interconnections with neighbouring plants

The machine interconnects with:

- the casting line rolls.
- High and low-pressure plants.
- The water supply circuit of your premises.
- Water system control cabinet.

## Connections

The use of treated water is expected to:

- the casting rolls cooling.
- The circulation within the heat exchanger for oil cooling in the hydraulic power unit plants.

## Unit positioning

The units can be anchored by mounting them on bases with arranged fixing holes or by clamping them with external elements not included in the supply.

The system must be anchored on a horizontal and stable plane, other positions must be specifically requested.

N.B. To make maintenance easier, ensure that the installation can be accessed from at least three sides.

To prevent dangerous situations for the maintenance personnel, it is recommended to provide suitable safety protections (protective casings) for moving parts in close proximity to the system.

Arrange for each group to be properly clamped and levelled.

## Pipes

The pipes must be thoroughly cleaned before installation to remove any dirt.

It is prohibited to use sealing materials like hemp as they can produce impurities that can result in operational malfunctions.

Connections and/or connecting flanges require careful assembly by skilled personnel.

To prevent dust or dirt from entering, ensure the users openings are closed with the specific caps until the connection.

## SYSTEMS CONNECTION

### Electrical system connection



**WARNING:**

**Only skilled operators, qualified to operate on electrical installation, can perform this operation.**

The systems fitting with the machine can be connected once it has been positioned and installed.

The electrical system of the water conditioning system is centralized in the control cabinet C03 and from this all service and connection lines are distributed on the deviation boxes (Jbox) installed on board machine.

To connect the control panel to all branch lines of the plant, proceed as follows:

- Feed the control cabinet connecting cables through the service boxes on board the machines in the specific metal cable raceways, ensuring to separate them according to their corresponding tensions.



**WARNING:**

**For the connection of cables, follow the steps indicated in the diagrams to respect the direction of rotation of the motors.**

- Ensure that the cables (marked with specific numbering) are connected to the terminal blocks of each individual utility.
- Connect all specific symbol-marked points to the grounding line.
- Close the power connection boxes.

## Water circuit supply



### **WARNING:**

**Only skilled operators, qualified to operate on hydraulic installation, can perform this operation.**

The water supply circuit requires a closed-loop control unit fitted with a waste water cooling tower and two pump units, one currently working and the other in standby.

The mains water must undergo proper treatment according to the hardness values measured by setting up a demineralization system with output values between 5° and 6° German degrees (dH).

To connect the water circuit delivery and drainage lines, proceed as follows in accordance with the enclosed diagrams:

- The water supply and drainage circuit should have shut-off valves to prevent water pressure drop.
- Install and connect water supply and drainage hoses is required to supply the following units:
  - Casting rolls water preheating unit.
  - Casting rolls cooling.
  - High-pressure hydraulic power unit water/oil exchanger.
  - Low-pressure hydraulic power unit water/oil exchanger.
- Install manual shut-off valves on the intended utilities for components maintenance or replacement.
- Connect the units.
- Connect and tighten the flexible pipes for the water coming from the preheating unit to the corresponding casting rolls rotary joints.

**The water system connection has been completed.**

## COMMISSIONING



The system final commissioning requires all tests to be completed and a positive result to be obtained, proceeding as follows:

- Ensure that all circuit components have been installed and are ready for use.
- Ensure that all pipes are properly connected and that connections and flanges are properly tightened to prevent damage to things and/or people.
- The water circuit pumps must be filled with water to ensure their operation (this is only required during the first starting).
- Start the pumps and ensure that the pressures displayed by the pressure gauges fitting the different connections meet the values stated below.

- |                                |                |
|--------------------------------|----------------|
| ▪ Rolls supply pressure:       | <b>400 kPa</b> |
| ▪ Auxiliaries supply pressure: | <b>300 kPa</b> |

- Ensure that the supply voltages are the ones provided and in accordance with the indications stated in the "Technical data" section.
- Visually check that the electric motor is rotating in the correct direction.

## Processing cycles

The line has been designed to be operated semi-automatically. The operator is not required to perform any special adjustments during the working phase, but he can perform any required adjustments using the water supply valves.

The sequences of operations that enable the line operating can be grouped into the following cycles:

- Casting rolls cooling.
- Casting rolls heating.

## **Casting rolls cooling**

- ✓ Preliminary inspection of the hot water supply valves closing.
- ✓ Preliminary inspection of the cold water supply valves opening.
- ✓ Preliminary inspection of the supply valves opening of the water supply pumps to the casting rolls.

## **Casting rolls heating**

- ✓ Preliminary inspection of the cold water supply valves closing.
- ✓ Preliminary inspection of the hot water supply valves opening.
- ✓ Once the casting rolls preheating has been completed, stop the hot water circulation pump.

## MAINTENANCE AND ADJUSTMENT

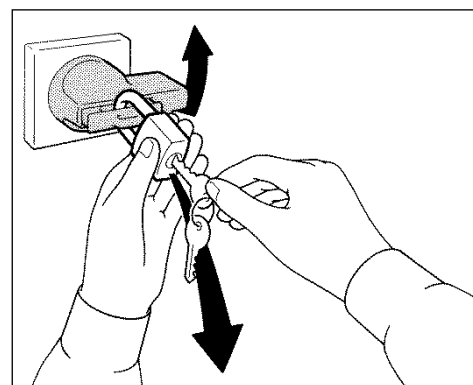
### RULES FOR MAINTENANCE AND INTERVENTIONS ON THE LINE

It is important to note that all maintenance, cleaning and repair operations must be exclusively performed by skilled personnel, specially trained and duly authorised. Only these operators shall be entrusted with the locking devices of the electric panels and the keys of the power sectioning devices and of several selector switches.

Before any intervention, proceed as follows:

- Remove the power to the electric cabinet using the specific switch disconnecter.

- Lock the handle of the switch disconnecter in position "O/OFF" and remove the key. An authorised operator must store the key for the entire duration of the operation.



- Disconnect the pneumatic power supply.

- Place a clearly visible sign with the notice **"MACHINES IN MAINTENANCE"** and block off the area where the operation will be performed.

To operate the line with protections removed or open for technical reasons, any operation must be performed with extreme caution and compliance with all safety rules, both general and specific to the case.



#### **WARNING:**

Equip maintenance personnel with devices to light hidden or poorly lit areas.

As for operations that require motors' start-up, it is advisable to insert the voltage at every single operation and disconnect it immediately after.

**Perform interventions in high temperature areas only once the complete cooling has been reached.**

**Wearing heat resistant safety gloves and avoiding contact with high-temperature areas is required when cleaning hot machines.**



**WARNING:**  
**Monthly check the efficiency of safety devices.**



## IMPORTANT REQUIREMENT FOR THE MAINTENANCE OF PIPES AND/OR JOINTS IN TEMPERATURE



### **WARNING:**

The operations requiring the disconnection of pipes and/or water joints and/or oil pipes whose fluids are subject to the heating, **MUST ABSOLUTELY BE PERFORMED** with the machines off and cold and without pressures of the same fluids.



### **WARNING:**

Failure to comply with this requirement exposes the operator to burn risks for contact with hot fluids.

## ROUTINE SCHEDULED MAINTENANCE

The routine maintenance program has been developed to preserve the natural life of the most wear-and-tear parts to ensure full-efficient operation of the line and to guarantee the quality of the final product.



### **WARNING:**

**Only trained and skilled technicians can perform line maintenance operations.**

**Maintenance operations require the following conditions to be met:**

- the line must be switched off.
- Power sources should be cut and secured with a suitable safety lock. Corresponding keys should be removed and stored.
- Release the pneumatic system residual pressures.
- Wait for hot surfaces cooling (max. 40°C).
- Wear suitable individual protection equipment (safety gloves, safety shoes, face shield).

The required preventive routine maintenance and corresponding interval are stated in the table below.

| STRUCTURAL PARTS MAINTENANCE          |   |
|---------------------------------------|---|
| MAINTENANCE OPERATION                 | INTERVAL  |
| CHECKING OF NUTS AND BOLTS TIGHTENING | 1st intervention: 3 months<br>Afterwards, every 6 months. |

| COOLING WATER CIRCUIT MAINTENANCE                      |          |
|--|----------|
| MAINTENANCE OPERATION                                  | INTERVAL |
| ROLLS CONDITIONING CIRCUIT                             | 1 week   |
| CHECKING OF ROTARY JOINTS LEAKS                        | 1 week   |
| COOLING CIRCUIT OF THE CASTING ROLLS LUBRICATING UNITS | 1 week   |
| HYDRAULIC POWER UNITS COOLING CIRCUIT                  | 1 week   |
| ELECTRICAL SYSTEM MAINTENANCE                          |          |
| MAINTENANCE OPERATION                                  | INTERVAL |
| CHECKING OF TERMINALS TIGHTENING                       | 1 year   |

## Checking of emergency stop push-buttons

Frequency of intervention: at least once every 6 months.



### **WARNING:**

**This maintenance requires the following conditions to be met:**

The machine surfaces must be cool (max. 40°C).

The machine must operate in no-load condition (without any material being processed).

The involved operators must wear suitable individual protection equipment.

Checking procedure:

- Push an emergency stop push-button.
- Ensure that all machine devices immediately stop
- Ensure that there are no sections of the machine that can be started.
- Restore the emergency stop push-button turning the mushroom head.
- Push the AUXILIARY RESET push-button
- Once the power is restored, ensure that no section of the line is restarted except for auxiliaries.
- Repeat the same procedure for all emergency stop push-buttons.

In case of improper intervention of the emergency device, inspect for and repair the failure to ensure efficient system operation.



### **WARNING:**

**In case a safety circuit device is replaced, ensure the spare part is identical to the one to be replaced. If this is not the case, please seek assistance from the manufacturer.**

## WATER COOLING CIRCUIT MAINTENANCE

The line must meet the following initial condition before cooling water circuit maintenance:

- The line must be switched off.
- Power sources should be cut and secured with a suitable safety lock. Corresponding keys should be removed and stored.
- Release the pneumatic system residual pressures.
- Wait for hot surfaces cooling (max. 40°C).
- Wear suitable individual protection equipment (safety gloves, safety shoes, face shield).



### **WARNING:**

**Only trained and skilled technicians can perform line maintenance operations.**

## CHECKING THERMOMETERS AND THERMOCOUPLES OPERATION

This checking procedure requires the simple reading of thermometers or, for thermocouples, to check on the operator panel that the temperature values meet the ones set for calibration.

In case there is a discrepancy between temperature values on the same line, replace the thermometer or the thermocouple.

## CHECKING THE PRESSURE GAUGES PRESSURES

This checking procedure requires the simple reading of pressure gauges and to check that the pressure values meet the ones of normal calibration.

In case there is a discrepancy between pressure values on the same line, replace the pressure gauge.

## CHECKING THE PUMPS OPERATING STATUS

This checking must be performed with the system at a standstill.

Start the pump electric control motor and listen for any abnormal noises produced by either the motor (bearings), the joint (elastic pin) or the pump (cavitation due to clogged filters). If they occur, inspect the specific components and, if required, replace them.

## CHECKING THE LEAKAGES ALONG THE SUPPLY LINES TO THE USERS

All rigid and flexible pipes require visual inspection and cleaning of connections. In case of any leakage, tighten the ring nuts or the connections screws.

### Rolls conditioning circuit

Inspect the water supply area in the cooling pump room, starting from the inlet pipe flange and going through the pipes up to the water pre-heating system in the rolls replacement area, to ensure that there are no oil stains due to leakage on the cover, under the frame and at the connection points of oil inlet and outlet pipes.

In case of minor leaks or losses, perform a simple cleaning of the parts with suitable degreasing agents to eliminate oil stains. and restore clean surfaces. This allows for further leak detection.

In case of more significant losses, it is important to replace pipes or seals affected by the leak within the shortest possible time.

## Checking of rotary joints leaks

Inspect the rotary joints for water distribution in casting rolls, directly installed on the rolls, to ensure there are no coolant leaks or losses in flexible hoses and their connections.

In case of minor leaks or losses, perform a simple cleaning of the parts with suitable degreasing agents to eliminate oil stains. and restore clean surfaces. This allows for further leak detection.

In case of more significant losses, it is important to replace pipes or seals affected by the leak within the shortest possible time.

## RESIDUAL RISKS

All possible hazards for personnel working on the machine have been eliminated or reduced following a thorough risk analysis during the design phase. The customer is responsible for providing and installing the fixed safety protections surrounding the line and the interlocks installed on their openings/doors.

A list of residual risks and the proper ways to manage them is stated below:

### SIGNAGE RISKS

All operators (production, maintenance, inspection etc.) are required to pay close attention to the signs on the machines, control panels and to the visual signalling lamps.

It is required for these operators to receive specific instruction on how to handle the above-mentioned signs.

### RISKS ABOUT MOVING PARTS

It is important to note that the moving parts are the following ones:

- a) Cold water supply pumps to casting rolls.
- b) Cold water supply pumps to the hydraulic power units.

The presence of suitable safety protections ensures that such movements are not dangerous in normal operation.

During cleaning or maintenance operations that require the opening of safety protections, movement poses a serious danger.

The operator working on the machine must carefully check all the preliminary conditions for securing the circuit.

At least two maintenance technicians must always be present to repair and/or clean the machine and they must proceed as follows before starting any operation:

- ✓ Ensure that the operator responsible for activating the controls has complete visibility.
- ✓ Place a clearly visible sign with the notice **"ONGOING MAINTENANCE"** on the control panels and push-button panels.
- ✓ Properly indicate with signs and/or light/sound warning devices that maintenance operations are currently underway with suspended safety devices.

Constantly check that no one comes in close proximity to the dangerous areas. Once all the operations have been completed, it is required to reassemble all safety protections that have been removed for maintenance reasons. Prediction and evidence of this must be provided by the functional testing.

## **RISKS ABOUT FLUIDS EJECTIONS**

This risk exists in all hydraulic circuits. Before performing any intervention, it is required for maintenance operators to ensure that there are no remaining pressures within the circuits on which they have to operate.

To detect any residual pressures, the first parts to be removed should be loosen slowly.

## **RISKS DUE TO OPERATOR ERRORS**

In order to operate on the circuit (production, maintenance and control operator), it is important to have proper training, read and understand the contents of this use and maintenance instruction book and have emergency response skills.



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**SPARE PARTS**

- SPARE PARTS WATER ELECTRICAL CABINE

**LINE DIAGRAMS**

60-05-62<sup>a</sup>-001 – COOLING DIAGRAM