OPERATOR'S MANUAL

CNC CANTILEVER ARM WATER JET

MODEL: WJ-85CNC

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Rev. 05/2016

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THANK YOU & WARRANTY

Thank you for your purchase of a machine from Baileigh Industrial. We hope that you find it productive and useful to you for a long time to come.

Inspection & Acceptance. Buyer shall inspect all Goods within ten (10) days after receipt thereof. Buyer's payment shall constitute final acceptance of the Goods and shall act as a waiver of the Buyer's rights to inspect or reject the goods unless otherwise agreed. If Buyer rejects any merchandise, Buyer must first obtain a Returned Goods Authorization ("RGA") number before returning any goods to Seller. Goods returned without a RGA will be refused. Seller will not be responsible for any freight costs, damages to goods, or any other costs or liabilities pertaining to goods returned without a RGA. Seller shall have the right to substitute a conforming tender. Buyer will be responsible for all freight costs to and from Buyer and repackaging costs, if any, if Buyer refuses to accept shipment. If Goods are returned in unsalable condition, Buyer shall be responsible for full value of the Goods. Buyer may not return any special order Goods. Any Goods returned hereunder shall be subject to a restocking fee equal to 30% of the invoice price.

Specifications. Seller may, at its option, make changes in the designs, specifications or components of the Goods to improve the safety of such Goods, or if in Seller's judgment, such changes will be beneficial to their operation or use. Buyer may not make any changes in the specifications for the Goods unless Seller approves of such changes in writing, in which event Seller may impose additional charges to implement such changes.

Limited Warranty. Seller warrants to the original end-user that the Goods manufactured or provided by Seller under this Agreement shall be free of defects in material or workmanship for a period of twelve (12) months from the date of purchase, provided that the Goods are installed, used, and maintained in accordance with any instruction manual or technical guidelines provided by the Seller or supplied with the Goods, if applicable. The original end-user must give written notice to Seller of any suspected defect in the Goods prior to the expiration of the warranty period. The original end-user must also obtain a RGA from Seller prior to returning any Goods to Seller for warranty service under this paragraph. Seller will not accept any responsibility for Goods returned without a RGA. The original end-user shall be responsible for all costs and expenses associated with returning the Goods to Seller for warranty service. In the event of a defect, Seller, at its sole option, shall repair or replace the defective Goods or refund to the original end-user the purchase price for such defective Goods. Goods are not eligible for replacement or return after a period of 30 days from date of receipt. The foregoing warranty is Seller's sole obligation, and the original end-user's exclusive remedy, with regard to any defective Goods. This limited warranty does not apply to: (a) die sets, tooling, and saw blades; (b) periodic or routine maintenance and setup, (c) repair or replacement of the Goods due to normal wear and tear, (d) defects or damage to the Goods resulting from misuse, abuse, neglect, or accidents, (f) defects or damage to the Goods resulting from improper or unauthorized alterations, modifications, or changes; and (f) any Goods that has not been installed and/or maintained in accordance with the instruction manual or technical guidelines provided by Seller.

EXCLUSION OF OTHER WARRANTIES. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. ANY AND ALL OTHER EXPRESS, STATUTORY OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. NO WARRANTY IS MADE WHICH EXTENDS BEYOND THAT WHICH IS EXPRESSLY CONTAINED HEREIN.

Limitation of Liability. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY OTHER PARTY FOR ANY INCIDENTIAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR DOWN TIME) ARISING FROM OR IN MANNER CONNECTED WITH THE GOODS, ANY BREACH BY SELLER OR ITS AGENTS OF THIS AGREEMENT, OR ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY OF LIABILITY. BUYER'S REMEDY WITH RESPECT TO ANY CLAIM ARISING UNDER THIS AGREEMENT IS STRICTLY LIMITED TO NO MORE THAN THE AMOUNT PAID BY THE BUYER FOR THE GOODS.

Force Majuere. Seller shall not be responsible for any delay in the delivery of, or failure to deliver, Goods due to causes beyond Seller's reasonable control including, without limitation, acts of God, acts of war or terrorism, enemy actions, hostilities, strikes, labor difficulties, embargoes, non-delivery or late delivery of materials, parts and equipment or transportation delays not caused by the fault of Seller, delays caused by civil authorities, governmental regulations or orders, fire, lightening, natural disasters or any other cause beyond Seller's reasonable control. In the event of any such delay, performance will be postponed by such length of time as may be reasonably necessary to compensate for the delay.

Installation. If Buyer purchases any Goods that require installation, Buyer shall, at its expense, make all arrangements and connections necessary to install and operate the Goods. Buyer shall install the Goods in accordance with any Seller instructions and shall indemnify Seller against any and all damages, demands, suits, causes of action, claims and expenses (including actual attorneys' fees and costs) arising directly or indirectly out of Buyer's failure to properly install the Goods.

Work By Others; Safety Devices. Unless agreed to in writing by Seller, Seller has no responsibility for labor or work performed by Buyer or others, of any nature, relating to design, manufacture, fabrication, use, installation or provision of Goods. Buyer is solely responsible for furnishing, and requiring its employees and customers to use all safety devices, guards and safe operating procedures required by law and/or as set forth in manuals and instruction sheets furnished by Seller. Buyer is responsible for consulting all operator's manuals, ANSI or comparable safety standards, OSHA regulations and other sources of safety standards and regulations applicable to the use and operation of the Goods.

Remedies. Each of the rights and remedies of Seller under this Agreement is cumulative and in addition to any other or further remedies provided under this Agreement or at law or equity.

Attorney's Fees. In the event legal action is necessary to recover monies due from Buyer or to enforce any provision of this Agreement, Buyer shall be liable to Seller for all costs and expenses associated therewith, including Seller's actual attorneys' fees and costs.

Governing Law/Venue. This Agreement shall be construed and governed under the laws of the State of Wisconsin, without application of conflict of law principles. Each party agrees that all actions or proceedings arising out of or in connection with this Agreement shall be commenced, tried, and litigated only in the state courts sitting in Manitowoc County, Wisconsin or the U.S. Federal Court for the Eastern District of Wisconsin. Each party waives any right it may have to assert the doctrine of "forum non conveniens" or to object to venue to the extent that any proceeding is brought in accordance with this section. Each party consents to and waives any objection to the exercise of personal jurisdiction over it by courts described in this section. Each party waives to the fullest extent permitted by applicable law the right to a trial by jury.

Summary of Return Policy.

- 10 Day acceptance period from date of delivery. Damage claims and order discrepancies will not be accepted after this time.
- You must obtain a Baileigh issued RGA number PRIOR to returning any materials.
- Returned materials must be received at Baileigh in new condition and in original packaging.
- Altered items are not eligible for return.
- Buyer is responsible for all shipping charges.
- A 30% re-stocking fee applies to all returns.

Baileigh Industrial makes every effort to ensure that our posted specifications, images, pricing and product availability are as correct and timely as possible. We apologize for any discrepancies that may occur. Baileigh Industrial reserves the right to make any and all changes deemed necessary in the course of business including but not limited to pricing, product specifications, quantities, and product availability.

For Customer Service & Technical Support:
Please contact one of our knowledgeable Sales and Service team members at:
(920) 684-4990 or e-mail us at sales@baileigh.com

INTRODUCTION

The quality and reliability of the components assembled on a Baileigh Industrial machine guarantee near perfect functioning, free from problems, even under the most demanding working conditions. However if a situation arises, refer to the manual first. If a solution cannot be found, contact the distributor where you purchased our product. Make sure you have the serial number and production year of the machine (stamped on the nameplate). For replacement parts refer to the assembly numbers on the parts list drawings.

Our technical staff will do their best to help you get your machine back in working order.

In this manual you will find: (when applicable)

- Safety procedures
- Correct installation guidelines
- Description of the functional parts of the machine
- Capacity charts
- Set-up and start-up instructions
- Machine operation
- Scheduled maintenance
- Parts lists

GENERAL NOTES

After receiving your equipment remove the protective container. Do a complete visual inspection, and if damage is noted, **photograph it for insurance claims** and contact your carrier at once, requesting inspection. Also contact Baileigh Industrial and inform them of the unexpected occurrence. Temporarily suspend installation.

Take necessary precautions while loading / unloading or moving the machine to avoid any injuries.

Your machine is designed and manufactured to work smoothly and efficiently. Following proper maintenance instructions will help ensure this. Try and use original spare parts, whenever possible, and most importantly; **DO NOT** overload the machine or make any modifications.

Note: *This symbol refers to useful information throughout the manual.*

IMPORTANT

PLEASE READ THIS OPERATORS MANUAL CAREFULLY

It contains important safety information, instructions, and necessary operating procedures. The continual observance of these procedures will help increase your production and extend the life of the equipment.

SAFETY INSTRUCTIONS

LEARN TO RECOGNIZE SAFETY INFORMATION

This is the safety alert symbol. When you see this symbol on your machine or in this manual, **BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY!**

Follow recommended precautions and safe operating practices.

UNDERSTAND SIGNAL WORDS

A signal word – **DANGER**, **WARNING**, or **CAUTION** is used with the safety alert symbol. **DANGER** identifies a hazard or unsafe practice that will result in severe **Injury or Death**.

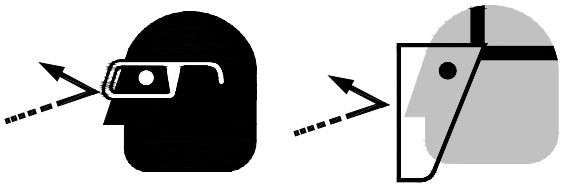
Safety signs with signal word **DANGER** or **WARNING** are typically near specific hazards.

General precautions are listed on **CAUTION** safety signs. **CAUTION** also calls attention to safety messages in this manual.

SAVE THESE INSTRUCTIONS.
Refer to them often and use them to instruct others.

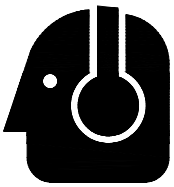
PROTECT EYES

Wear safety glasses or suitable eye protection when working on or around machinery.



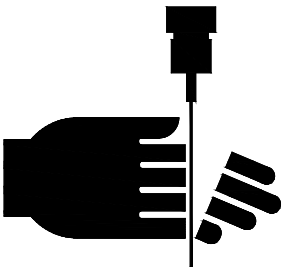
PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protective devices such as ear muffs or earplugs to protect against objectionable or uncomfortable loud noises.



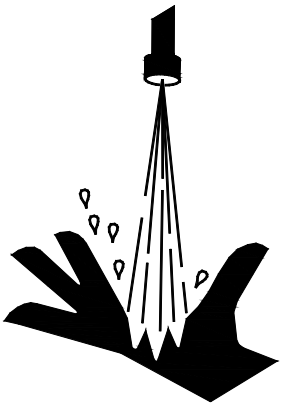
KEEP HANDS AWAY FROM JET

NEVER place your hands or fingers in the vicinity of the nozzle when cutting.



SKIN PUNCTURE

Injuries due to high pressure water jets are serious. **ALWAYS** seek immediate medical attention without delay.

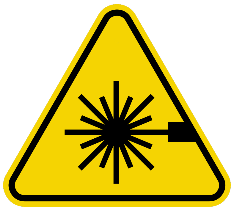


PROTECT HANDS

ALWAYS wear protective gloves if you have cuts or open wounds on your hands. Also when handling material with sharp edges.

CLASS 2M LASER

Laser radiation. The machine has an integrated laser sight. Never attempt to use the component outside its intended purpose, as described further on. Do not stare into beam or view directly with optical instruments. Looking into the sight whilst in operation is absolutely prohibited and may incur eye damage or completely loss of sight.

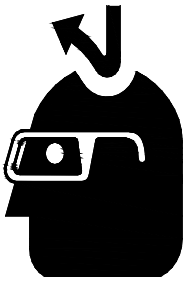


AUTOMATIC OPERATION

Once programmed to cut components the machine will make several automatic movements without warning. It is vital that the person operating the machine is fully conversant with the machine cycle. All personnel should maintain a safe distance from the machine whilst it is in operation and during the loading/unloading cycle. Failure to do so could result in injury. Always ensure the machine has finished its cycle before attending to the following process.

KEEP CLEAR OF MOVING OBJECTS

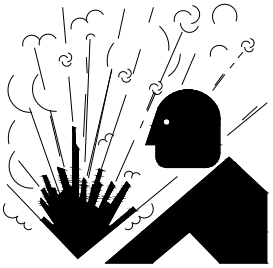
Always be aware of the position of the cantilever arm and head assembly. It is heavy and moves quickly and suddenly during operation. Being struck by the moving parts may cause serious body or head injuries.



KEEP GUARDS IN PLACE

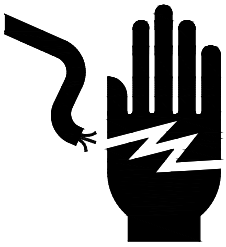
Never operate the machine with any of its protective guards or covers removed or rendered inoperative. Doing so might cause risk of serious injury or death in addition to machine damage. Never make unauthorized alterations to the equipment or components.

PRESSURISED COMPONENTS



Exercise **CAUTION** around all fittings and hoses in case of a hose or fitting failure.
This system contains pressure vessel and high pressure pumps. Attention must be given to avoid excess release of pressure or risk of explosion.
DO NOT subject pressure equipment to any pressure exceeding the maximum allowable working pressure or expose pressure vessels to high ambient temperatures. Failure to comply can result in severe injury or death.

HIGH VOLTAGE



USE CAUTION IN HIGH VOLTAGE AREAS. DO NOT assume the power to be off.
FOLLOW PROPER LOCKOUT PROCEDURES.

EMERGENCY STOP BUTTON

In the event of incorrect operation or dangerous conditions, the machine can be stopped immediately by pressing the **E-STOP** button. Twist the emergency stop button clockwise (cw) to reset. Note: Resetting the E-Stop will not start the machine.

SIGN DEFINITION

DANGER! MOVING MACHINERY. Informing personnel to keep away from moving machinery. Located on front of chassis and either side of bridge.

DANGER! 480V. Informing personnel that machine and underlying equipment operates with dangerous voltage. Located on control panel.

DANGER! HIGH VOLTAGE turn power off before servicing. Intended to inform personnel to isolate the machine from all energy sources before servicing. Failure to disconnect machine can cause bodily injury or death. Located on control panel.

WARNING! Keep hands away from jet. Due to high pressure water adequate distance is to be observed whilst in operation. Failure to do so might injure severe bodily injury or death. Located on front chassis.

DANGER! ELECTRICAL EQUIPMENT Authorized personnel only. Referring to limit unauthorized inspection or tempering of any of the machine components, especially electrically related. Failure to do so might injure severe bodily injury or death. Located on electrical supply entry to pump area.

WARNING! Keep guards in place. Moving pulley and belt can cause bodily injury or death if fingers, hands, loose fitting clothes, jewelry etc... catch whilst in motion. Located on pulley and belt guard.

WARNING! Loud noise and flying debris hazard. Hearing and eye protection must be worn in this area. Nature of operation with high pressure water and abrasive system leads to high noise levels and possible airborne debris. Failure to wearing necessary personal protective equipment may lead to serious injury, loss of sight and deafening. Located on front chassis cover.

WARNING! STAY CLEAR If you can read this sign, a cover is missing. Do NOT operate with cover missing. Visible when any chassis cover is removed. Intended to alert personnel that underlying hazardous moving parts or electrical components are present and is mandatory to place cover back in place to continue operation. Failure to do so might cause a sequence of events leading to serious injury or death. In addition, covers preserve the lifetime of equipment. Located under every removable chassis cover.

WARNING! Watch your hands and fingers. Moving bridge can cause hazard of hand and finger entrapment. Lack of sign interpretation can lead to serious bodily injury or death. Located on either side of bridge.

CAUTION! Wear appropriate gloves. Protection against water bacteria. Protection when handling workpiece. Stagnant water is a breeding ground for bacteria and infectious insects. Water should be disinfected. Gloves are still required to be worn to protect any open grazes or wounds from coming in contact with water. Protective gloves are to be worn to avoid cuts when handling workpiece. Located on front chassis cover.

WARNING! Worn slats can collapse under load causing injury. Do not step, stand or walk on slats. Machine slats are not suitable of withstanding weight of any personnel. Failure to comply can lead to severe body injury or death. Located on front chassis cover.

IMPORTANT: If any of the above signs have been thorn, faded, or cannot properly convey their intended message due to prolonged use or material failure, new and fresh stickers are to be ordered as replacement. These are not to be substituted with any other type and are to be located in the same area.

SAFETY PRECAUTIONS

Metal working can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.
Safety equipment such as guards, hold-downs, safety glasses, dust masks and hearing protection can reduce your potential for injury. But even the best guard won't make up for poor judgment, carelessness or inattention. **Always use common sense** and exercise **caution** in the workshop. If a procedure feels dangerous, don't try it.
REMEMBER: Your personal safety is your responsibility.

WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

Dear Valued Customer:

- All Baileigh machines should be used only for their intended use.
- Baileigh does not recommend or endorse making any modifications or alterations to a Baileigh machine. Modifications or alterations to a machine may pose a substantial risk of injury to the operator or others and may do substantial damage to the machine.
- Any modifications or alterations to a Baileigh machine will invalidate the machine's warranty.

PLEASE ENJOY YOUR BAILEIGH MACHINE! ....PLEASE ENJOY IT SAFELY!

1. **FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE.** Learn the machine's application and limitations as well as the specific hazards.
2. **Only trained and qualified personnel can operate this machine.**
3. **Make sure guards are in place and in proper working order before operating machinery.**
4. **Remove any adjusting tools.** Before operating the machine, make sure any adjusting tools have been removed.
5. **Keep work area clean.** Cluttered areas invite injuries.
6. **Overloading machine.** By overloading the machine you may cause injury from flying parts. **DO NOT** exceed the specified machine capacities.

7. **Dressing material edges.** Always chamfer and deburr all sharp edges.
8. **Do not force tool.** Your machine will do a better and safer job if used as intended. **DO NOT** use inappropriate attachments in an attempt to exceed the machines rated capacity.
9. **Use the right tool for the job. DO NOT** attempt to force a small tool or attachment to do the work of a large industrial tool. **DO NOT** use a tool for a purpose for which it was not intended.
10. **Dress appropriate. DO NOT** wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
11. **Use eye and ear protection**. Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.
12. **Do not overreach**. Maintain proper footing and balance at all times. **DO NOT** reach over or across a running machine.
13. **Stay alert**. Watch what you are doing and use common sense. **DO NOT** operate any tool or machine when you are tired.
14. **Check for damaged parts**. Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
15. **Observe work area conditions**. **DO NOT** use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lighted. **DO NOT** use electrically powered tools in the presence of flammable gases or liquids.
16. **Keep children away**. Children must never be allowed in the work area. **DO NOT** let them handle machines, tools, or extension cords.
17. **Store idle equipment**. When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
18. **DO NOT operate machine if under the influence of alcohol or drugs**. Read warning labels on prescriptions. If there is any doubt, **DO NOT** operate the machine.
19. **Turn off** power before checking, cleaning, or replacing any parts.
20. Be sure **all** equipment is properly installed and grounded according to national, state, and local codes.
21. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. **Bare wiring can kill! DO NOT** touch live electrical components or parts.
22. **DO NOT** bypass or defeat any safety interlock systems.
23. Learn the function and controls of the controller, power supply, and the provided software packages. Know the location of the **ON - OFF** switch and the **"E"- STOP** button.
24. Keep visitors a safe distance from the work area.

TECHNICAL SPECIFICATIONS

Supply Power	480VAC, 3ph, 50/60hz
Main Motor Power	42hp (32kw)
Maximum Current	60A
Maximum Pump Pressure	55000psi (3800bar)
Weight	6063lbs (2750kgs)
Maximum Feed Rate - Cutting	315in/min (8000mm/min)
Maximum Feed Rate - Traverse	472in/min (12000mm/min)
X-Axis Range	98.4” (2500mm)
Y-Axis Range	59” (1500mm)
Z-Axis Range	6.69” (170mm)
Accuracy	±0.001” (±0.0254mm)
Repeatability	±0.001” (±0.0254mm)
Maximum Platform Holding Capacity	0.7psi (500kg/m2) [2500lbs evenly dispersed]
Maximum Sheet Thickness	3.94” (100mm)
Orifice Diameter	0.0137” (0.35mm)
Mixing Nozzle (OD x ID x L)	7.14Ø x 1.02Ø x 76.2mm
Hopper Capacity	330lbs (150kgs)
Abrasive Garnet Grade	80 mesh grade
Abrasive Garnet Mass Flow Rate	.66lbs/min (0.3kg/min)
Air Pressure Supply	90psi (6bar)
Air Flow Rate	1cfm (0.03m3/min)
Water Pressure Supply	30psi (2bar)
Water Flow Rate	3gpm (0.01m3/min)
Noise Level – Jet In Water	80dB
Noise Level – Jet Out of Water	>120dB
Operating System	Embedded Windows 8
CAM Post Processing Software	SheetCAM
Maximum Operating Temperature	104°F (40°C)

TECHNICAL SUPPORT

Our technical support department can be reached at 920.684.4990, and asking for the support desk for purchased machines. Tech Support handles questions on machine setup, schematics, warranty issues, and individual parts needs: (other than die sets and blades).

For specific application needs or future machine purchases contact the Sales Department at: sales@baileigh.com, Phone: 920.684.4990, or Fax: 920.684.3944.

***Note**: The photos and illustrations used in this manual are representative only and may not depict the actual color, labeling or accessories and may be intended to illustrate technique only.*

***Note:** The specifications and dimensions presented here are subject to change without prior notice due to improvements of our products.*

UNPACKING AND CHECKING CONTENTS

Your Baileigh machine is shipped complete. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.

WARNING: SUFFOCATION HAZARD! Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.
If any parts are missing, DO NOT place the machine into service until the missing parts are obtained and installed correctly.

Cleaning

WARNING: DO NOT USE gasoline or other petroleum products to clean the machine. They have low flash points and can explode or cause fire.

CAUTION: When using cleaning solvents work in a well-ventilated area. Many cleaning solvents are toxic if inhaled.

Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. For a more thorough cleaning, some parts will occasionally have to be removed. **DO NOT USE** acetone or brake cleaner as they may damage painted surfaces.
Follow manufacturer's label instructions when using any type of cleaning product. After cleaning, wipe unpainted metal surfaces with a light coating of quality oil or grease for protection.

Important: *This waxy coating is **NOT** a lubricant and will cause the machine to stick and lose performance as the coating continues to dry.*

TRANSPORTING AND LIFTING

IMPORTANT: *Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced.*

Follow these guidelines when lifting with truck or trolley:

- The lift truck must be able to lift at least 1.5 – 2 times the machines gross weight.
- Make sure the machine is balanced. While transporting, avoid rough or jerky motion, and maintain a safe clearance zone around the transport area.
- Use a fork lift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine.
- Remove the securing bolts that attach the machine to the pallet.
- Approaching the machine from the side, lift the machine on the frame taking care that there are no cables or pipes in the area of the forks.
- Move the machine to the required position and lower gently to the floor.
- Level the machine so that all the supporting feet are taking the weight of the machine and no rocking is taking place.

INSTALLATION

IMPORTANT:

Consider the following when looking for a suitable location to place the machine:

- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, work tables, or other machinery.
- Clearance from walls and other obstacles.
- Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any aisles.

- **LEVELING:** The machine should be sited on a level, concrete floor. Provisions for securing it should be in position prior to placing the machine. The accuracy of any machine depends on the precise placement of it to the mounting surface.
- **FLOOR:** This tool distributes a large amount of weight over a small area. Make certain that the floor is capable of supporting the weight of the machine, work stock, and the operator. The floor should also be a level surface. If the unit wobbles or rocks once in place, be sure to eliminate by using shims.
- **WORKING CLEARANCES:** Take into consideration the size of the material to be processed. Make sure that you allow enough space for you to operate the machine freely.
- **POWER SUPPLY PLACEMENT:** The power supply should be located close enough to the machine so that the power cord is not in an area where it would cause a tripping hazard. Be sure to observe all electrical codes if installing new circuits and/or outlets.

Water Quality Requirements

The pump water supply is not to have hardness levels greater than 170 ppm CaCO 3. If the water does not meet this specification, a water softening unit is to be installed. However, note that the hardness level must not drop lower than 90 ppm CaCO3.
The minimum water conductivity value should not drop further than 300µS/cm.

Machine preferred hydrological data:

Parameter	Units	Value
pH values	/	6.5 - 8.5
Sulphides	/	free
Chloride ions	ppm	<100
Sulphate ions	ppm	<100
Phosphate ions	ppm	<50
Iron	mg/l	0.5
Conductivity	µS/cm	<2200
Content solids	mg/l	<20

Particulate filter is added to the water intake. Changing of filters is to be part of the maintenance schedule. Filters should be suitable to filter out any particles larger than 1µm and concentrations of above 20mg/l. Included filters are of 10µm and 1µm respectively.

For further information, refer to details included in the high pressure pump manual supplied with the rest of the documentation.

Customer Supplied Items

IMPORTANT: *It shall be the responsibility of the customer to provide proper safety and regulatory compliance for the entire installation and operation. No statement with in the included and available manuals shall be taken as all inclusive.*

Because of the many variables of the specific installation and location, and because customer supplied items are generally available within a local area, these items are not included with the waterjet package as purchased.
All facility modifications and changes will be the customer's responsibility.
This will include items such as;

- Proper floor to carry the load.
- Proper, safe, and regulation compliant: work space, power supply, air supply, water supply with drainage etc..

Some other items would include hoses, piping, fittings, and connector, leveling devises, anchor bolts, guard, or shield to protect cords, cables and or air hoses from damage or becoming trip or entanglement hazards.

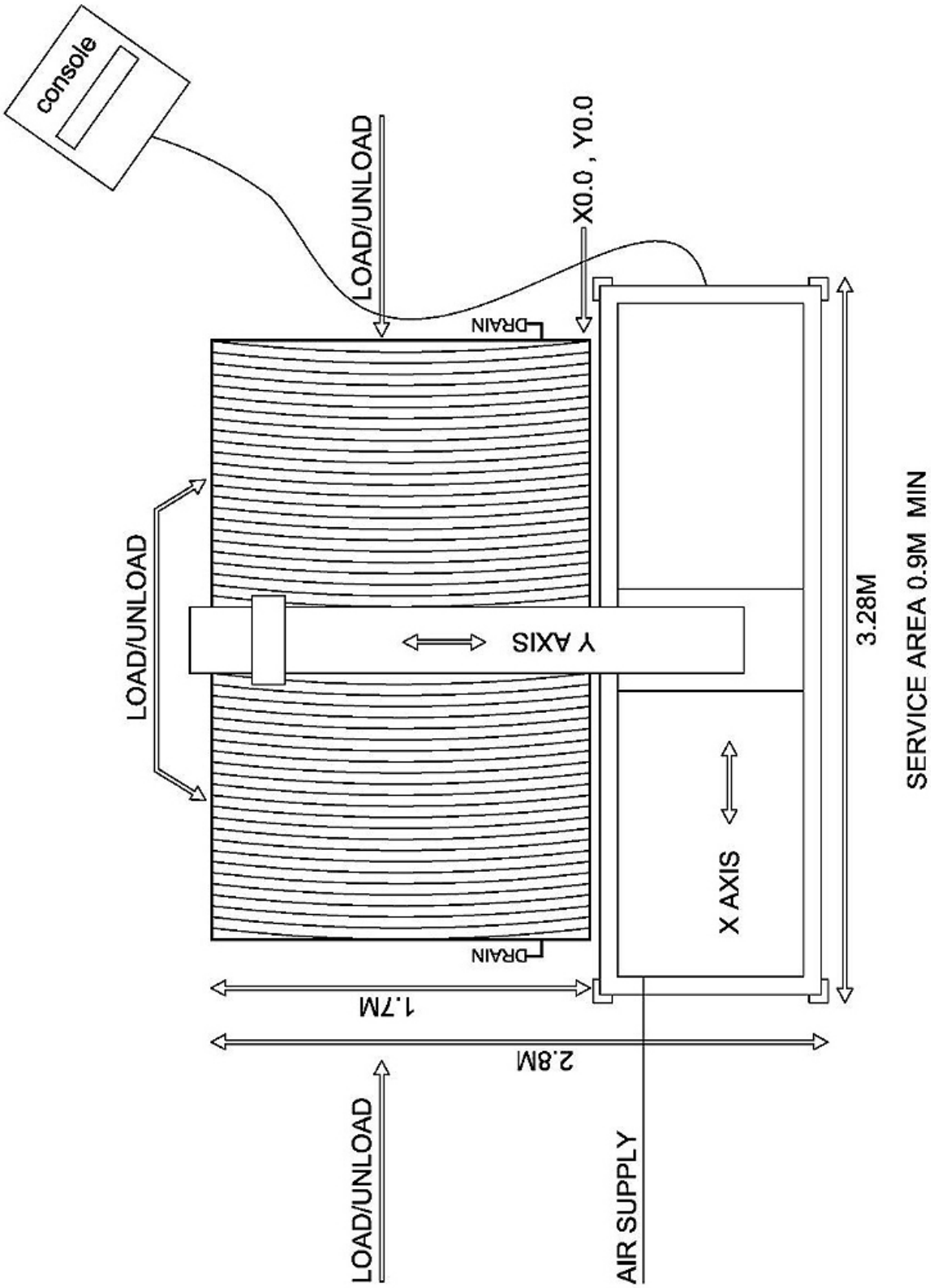
Normal Consumable items

Note*: This listing is a reference. Actual consumable life will depend upon actual usage and conditions. Variables such as the type and amount of abrasive will affect items differently, extending or shortening their life span.*

In addition to water and abrasive, items such as the water filters, orifice, nozzle, thread lubricant are normal consumable items. The amount of time and number of cuts between changing these items will vary depending upon several factors.

- Water will be used and therefore drained at 3gpm (0.01m3/min) while cutting.
- The abrasive maximum flow rate is 0.66lbs/min (0.3kg/min). This will a full hopper will be empty in 7 – 8 hours.
- The orifice will last from about 4 hours to 40 hours depending upon pierce cycles, pressure used, and water quality.
- The nozzle and abrasive intake tube service life will vary greatly depending upon if abrasive is used and the coarseness and quality of the abrasive.
- The water filters will vary greatly depending upon water quality. The water filters are monitored for flow and will display when service is needed.
- Other service items such as pump service will be covered within their specific manuals.

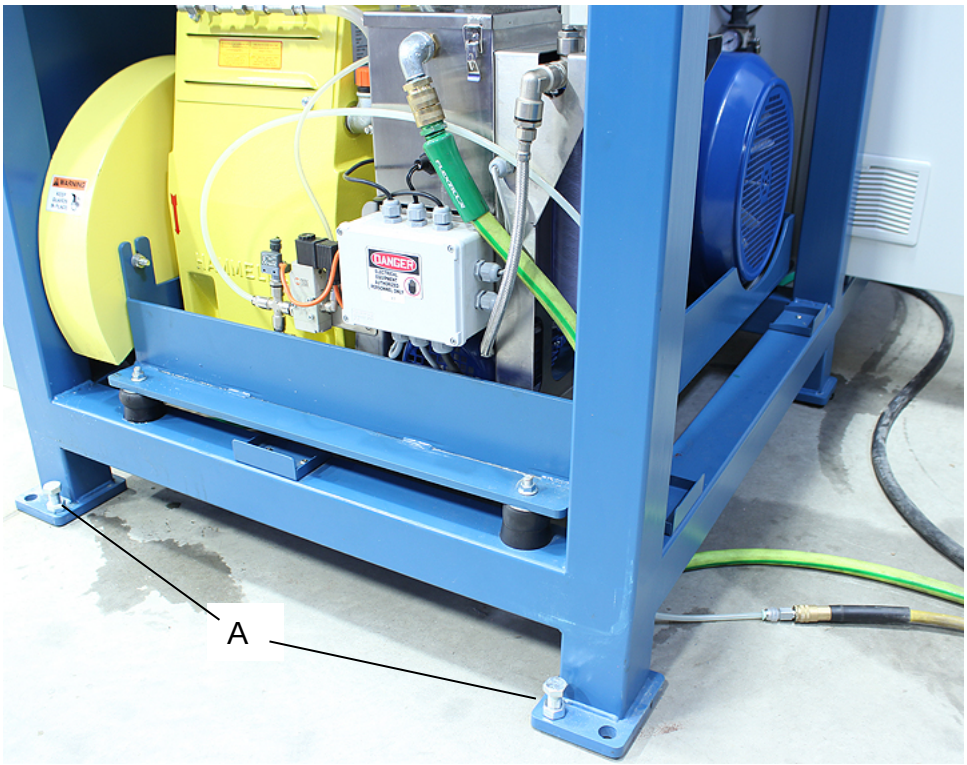
OVERALL DIMENSIONS



ASSEMBLY AND SET UP

WARNING: For your own safety, DO NOT connect the machine to the power source until the machine is completely assembled and you read and understand the entire instruction manual.

Chassis



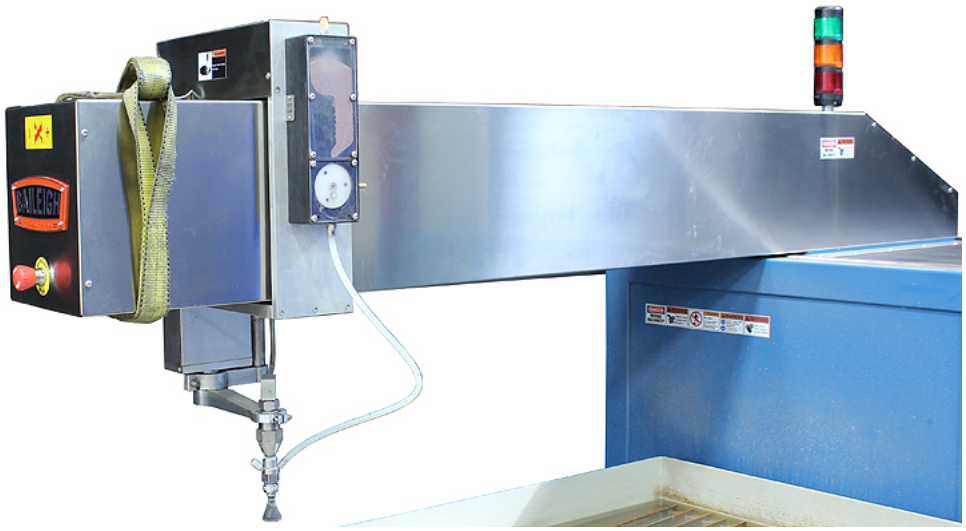
The chassis is the main structure of the waterjet table. It houses the electrical enclosure and associated electrical components; the water supply and filtration components; the cutting pump, motor, and drive components; and the abrasive supply components. Additionally, it supports the cantilever arm and the X, Y, and Z axis drive components.

1. This machine requires a solid floor such as concrete at a minimum of 4” (102mm) thick. 6” (153mm) minimum is preferred.
2. Using the overall dimension diagram, position the chassis to provide the proper clearances.
3. Level the chassis and ensure that it rests with even support on all of the floor pads. Lever the chassis using the leveling bolts (A) and shims as needed.
4. Once positioned, anchor the machine to the floor. Use bolts and expansion plugs or sunken tie rods that connect through and are sized for the holes in the base of the stand.

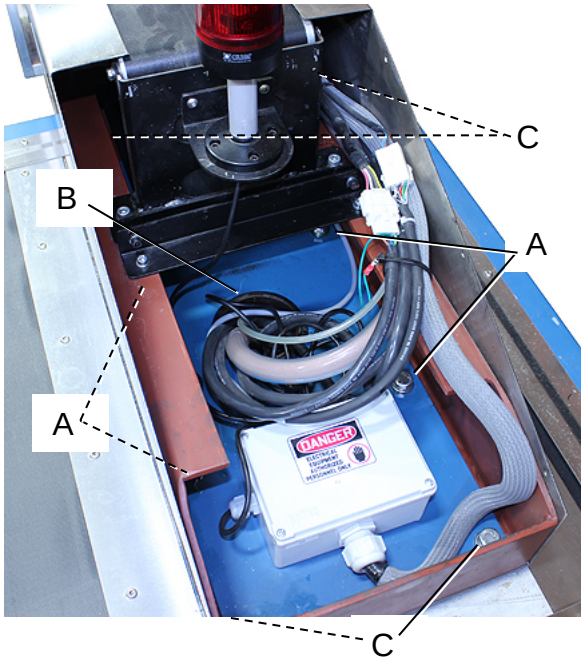
Cantilever Rotation

WARNING: Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. When lift the cantilever arm, attach the lifting straps carefully, making sure the arm is supported to remain level and well balanced. Place the straps toward the outboard end of the cantilever arm and secured so that it will not slip or slide off of the arm during repositioning.

The cantilever arm is rotated over the chassis during shipping and is held in position with four mounting bolts. The cantilever arm has a center pivot collar internal to the pivot point to assist with alignment when rotated. Four of the mounting bolts are used to secure the cantilever arm during shipping. The arm is secured with a total of eight bolts when mounted in its operating position.



Note: *The cantilever arm is shown rotated to its normal operating position. Shown with a lifting strap cinched around the cantilever arm.*



1. Using a suitable lifting strap(s) and lifting devise, lift the cantilever arm with just enough force to hold the arm secure and level when rotating.

IMPORTANT: *The cantilever arm uses a center pivot hub to assist in maintaining its location to the axis mounting plate. Hold the cantilever arm level. DO NOT over lift or under lift the arm. This will damage the hub and losing its location and possible damaging the wiring as well.*

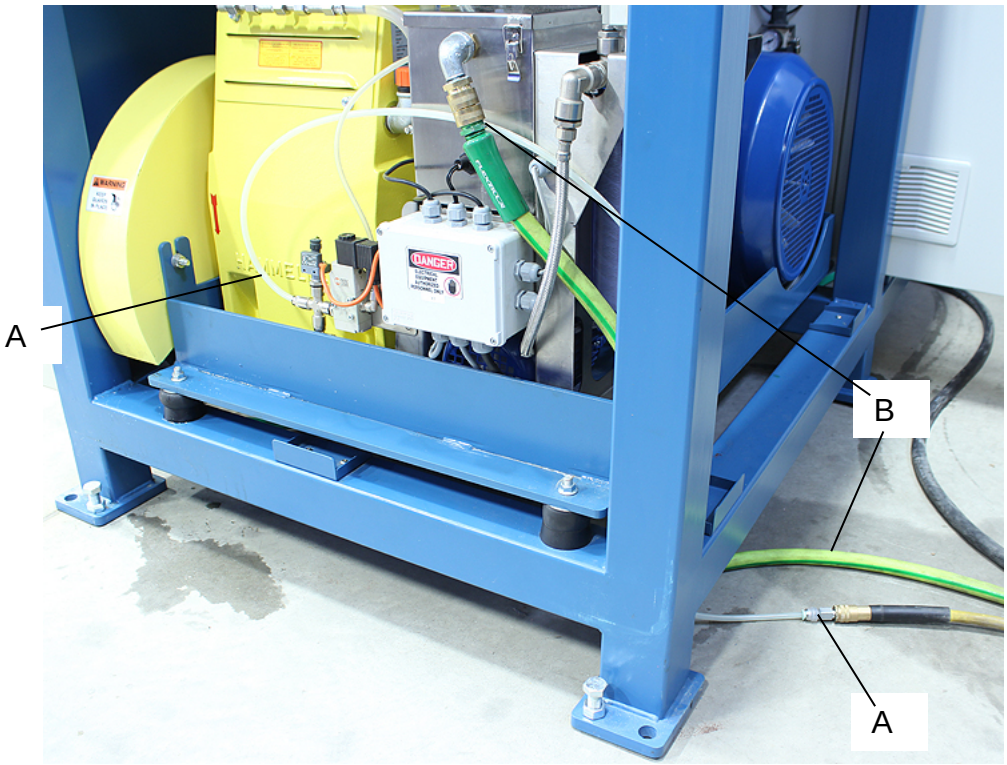
2. Remove the end cover on the arm to expose the mounting bolts.

3. Remove and retain the four mounting bolts (A) around the center pivot hub (B).
4. Rotate the arm 90° perpendicular to the chassis.
5. Install and fully tighten the eight mounting bolts (A and C).
6. Inspect the wiring and the connector that they are tight and not damaged during rotation.
7. Install and secure the end cover.

Water and Air Connections

1. If not already removed, remove all of the service access door from the chassis and store in a safe location until the table is fully set up and operational. When the setup and initial inspection is complete, install and lock all of the service panels into their proper locations.

⚠ WARNING: Do NOT operate with cover missing. Failure to do so might cause a sequence of events leading to serious injury or death. In addition, covers preserve the lifetime of equipment.



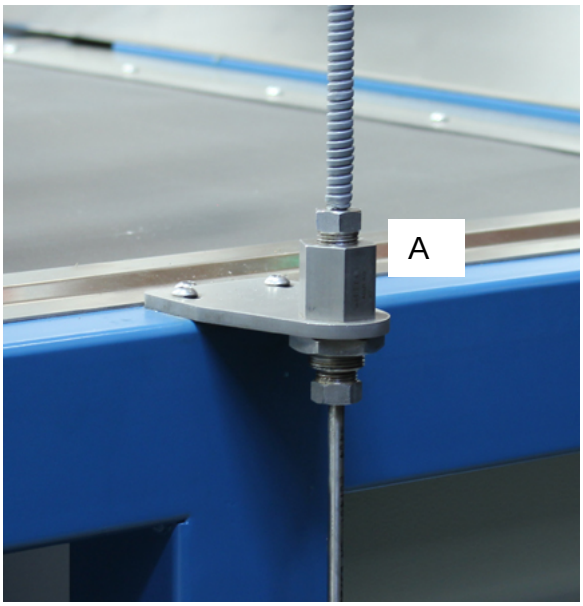
2. Route air and water to the chassis.
    a. Route the air and water lines so that it will NOT become entangled in the machine in any way.
    b. Route the lines to the air and water supply in a way that does NOT create a trip hazard.
3. Connect the air supply line to the air line (A) and route the line as needed to exit the chassis. This is typically routed under the frame rail as shown.
4. Turn on the air supply and inspect for leaks. Correct and leaks found before moving on.
5. Connect the water supply line to the end of the reservoir (B) and route the line as needed to exit the chassis. This is typically routed under the frame rail as shown.
6. Check that the water filters are installed and tight.
7. Turn on the water supply and allow the reservoir to fill. The internal float will stop the water flow when it reaches its operating level. Inspect for leaks. Correct and leaks found before moving on.
8. Using the supplied manual for the water pump, (if unavailable, a pdf copy can be provided) follow the pre-start instructions to check the crankcase oil level. The pump manual will list the type and quantity of oil to use.

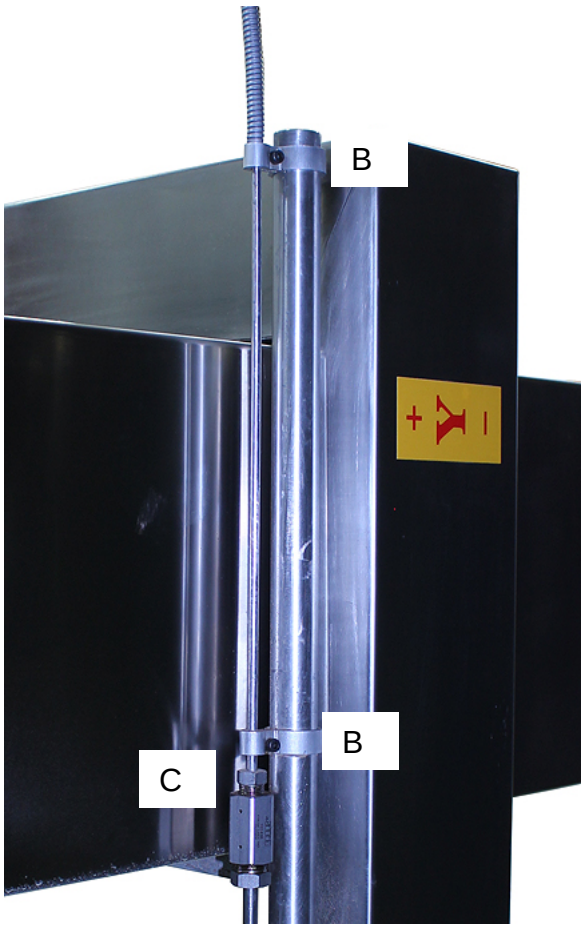
Note: *The specific items and components used to connect water and air to the machine will be provided by the customer to allow for a match to their specific conditions.*

Pressure Line and Nozzle Install

WARNING: DO NOT bend kink or place any sharp bends into the stainless-steel pressure tube. A broken cracked or damaged tube which leaks will cause serious penetration and cutting injuries.

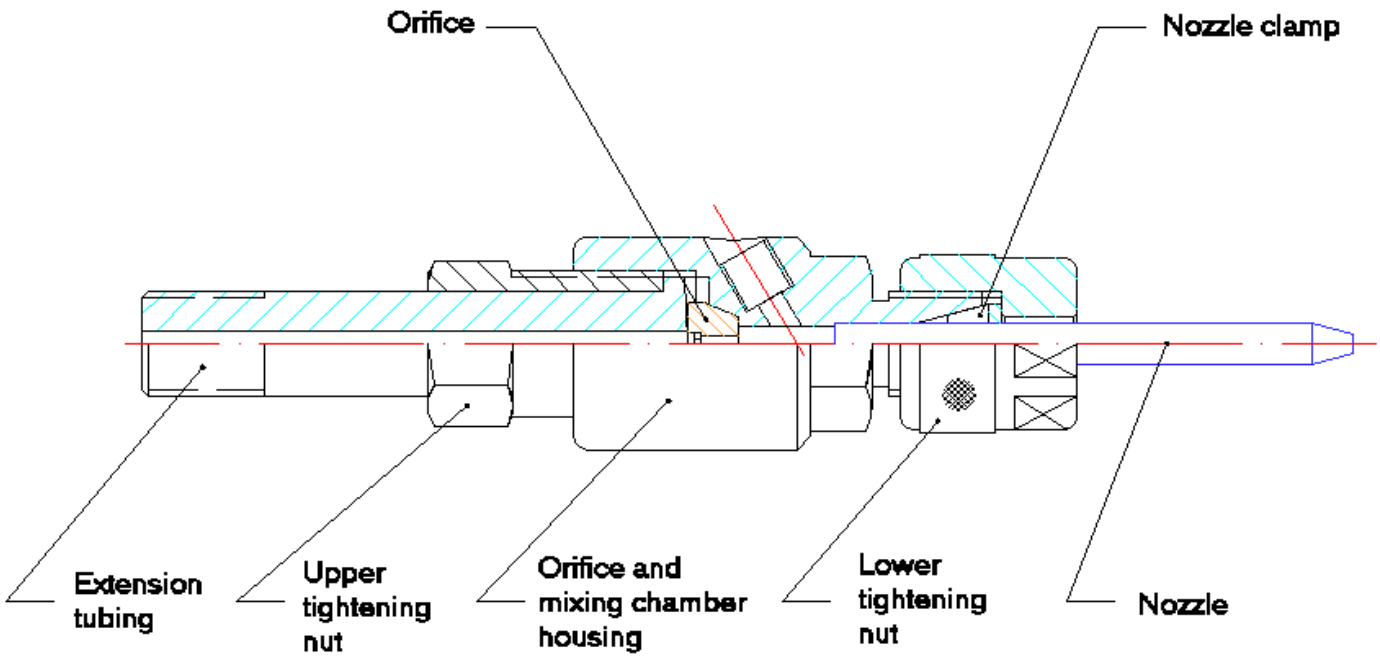
1. Install the high-pressure tube into the fitting (A) mounted at the center back of the chassis.
2. Route the wand to the nozzle.
3. Loosen the clamps (B) and route the tube through the small hole and into the fitting (C).





4. Once the fitting is installed and tightened, space the support clamps so that the lower clamp is between .75 and 1” (19 and 25mm) above the fitting and the upper clamp is approximately .5” (12.7mm) below the top of the support bar.

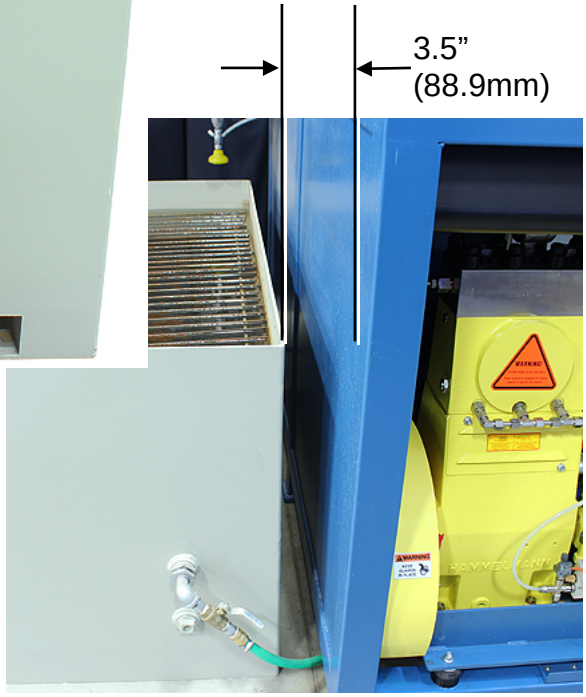
Install the Nozzle



1. The lower portion of the nozzle includes the orifice and mixing chamber housing, orifice, Injecting tubes, nozzle nut, nozzle clamp, and nozzle will need to be installed onto the head assembly.
2. Insert the orifice into the orifice and mixing chamber housing so that the tapper is pointing toward the nozzle side of the housing.
3. Apply a small amount of water resistant thread lubricant to the threads and screw the housing onto the head assembly and firmly and fully tighten.
4. Install the nozzle into the nozzle nut and nozzle clamp assembly so that the tapered tip will be pointing down when assembled to the mixing housing.
5. Tighten the nozzle nut by hand as tight as possible.
6. On one of the injection tubes will be a plastic cap. This cap must remain in place.
7. On the open injection tube, install the abrasive tube and route the tube up to the feed hopper and insert into the quick connect fitting.

Tank / Work Table Installation

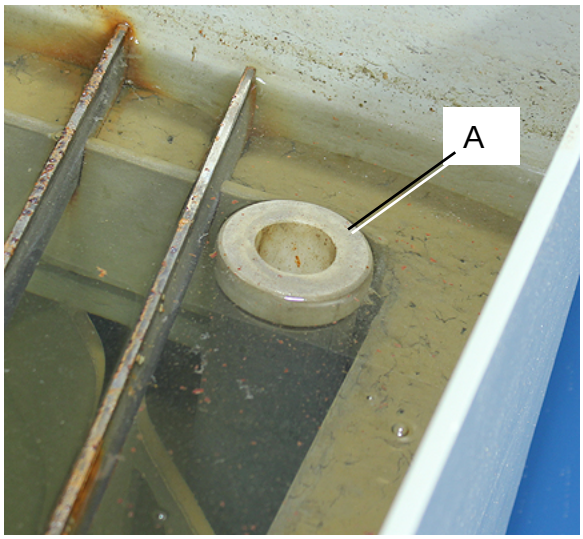
The work platform and tank is to be centered in front of the main chassis. This is to be filled with water just to the height of the support slats. Any access water is to be removed as the level increases. When a substantial amount of garnet is deposited at the bottom of the tank this is to be cleaned. It is advisable to empty the tank from as much water as possible before proceeding with tank cleaning. The tank can be handled with an appropriately sized fork lift. The garnet residue can be shoveled out and disposed of appropriately. The local authorities are to be advised what material have been cut during the service duration, since the water and sludge will be consequently contaminated.



1. Position the tank in front of the chassis so that the tanks drain plugs are positioned near the chassis.
2. Align the tank so that the center of the length of the tank is aligned with the center of the length of the chassis.
3. Space the tank to have a 3.5” even gap between the tank and the chassis.

4. The tank has draining ports on two side. Use the drain set that is most convenient for your application.
5. The upper fitting is for the surface drain. This port will drain the water from the table while the machine is cutting. Remove the plug and plumb the surface riser to the upper port chosen. Then plumb a drain line to this port and route it to a suitable drain.
    a. Route the drain line so that it will NOT become entangled in the machine in any way.
    b. Route the drain line to the drain system in a way that does NOT create a trip hazard.
6. The lower drain port is used to drain as much water off as possible when cleaning the tank. This may or may not be connected to a drain system with the tank in the operating position. Because the tank is movable, this may not necessarily be plumbed to a drain.
7. Once the tank is positioned and the drain plumbed and connected, fill the tank with water.
8. The water level within the tank can be controlled by lifting or lowering the plastic drain insert (A). The water level may be just below (3/64” – 5/64” [1 – 2mm]) the top of the support slats to approximately 1.5” (38mm) above the support slats.

    Depending upon the material thickness, this may have the nozzle tip below the water surface. This is acceptable. If the material is thicker / taller, then the nozzle will not be below the water surface during the cutting operation.



Note: *The specific items and components (fittings, valve, and plumbing supplies) used to connect the drain to the tank will be provided by the customer to allow for a match to their specific conditions.*

ELECTRICAL

WARNING: Baileigh Industrial is not responsible for any damage caused by wiring up to an alternative 3-phase power source other than direct 3-phase. If you are using an alternate power source, consult a certified electrician or contact Baileigh Industrial prior to energizing the machine.

CAUTION: HAVE ELECTRICAL UTILITIES CONNECTED TO MACHINE BY A CERTIFIED ELECTRICIAN!
Check if the available power supply is the same as listed on the machine nameplate.

WARNING: Make sure the grounding wire (green) is properly connected to avoid electric shock. DO NOT switch the position of the green grounding wire if any electrical plug wires are switched during hookup.

Power Specifications

Your tool is wired for 480 volts, 60Hz alternating current. Before connecting the tool to the power source, make sure the machine is cut off from power source.
Before switching on the power, you must check the voltage and frequency of the power to see if they meet with the requirement, the allowed range for the voltage is ±5%, and for the frequency is ±1%.

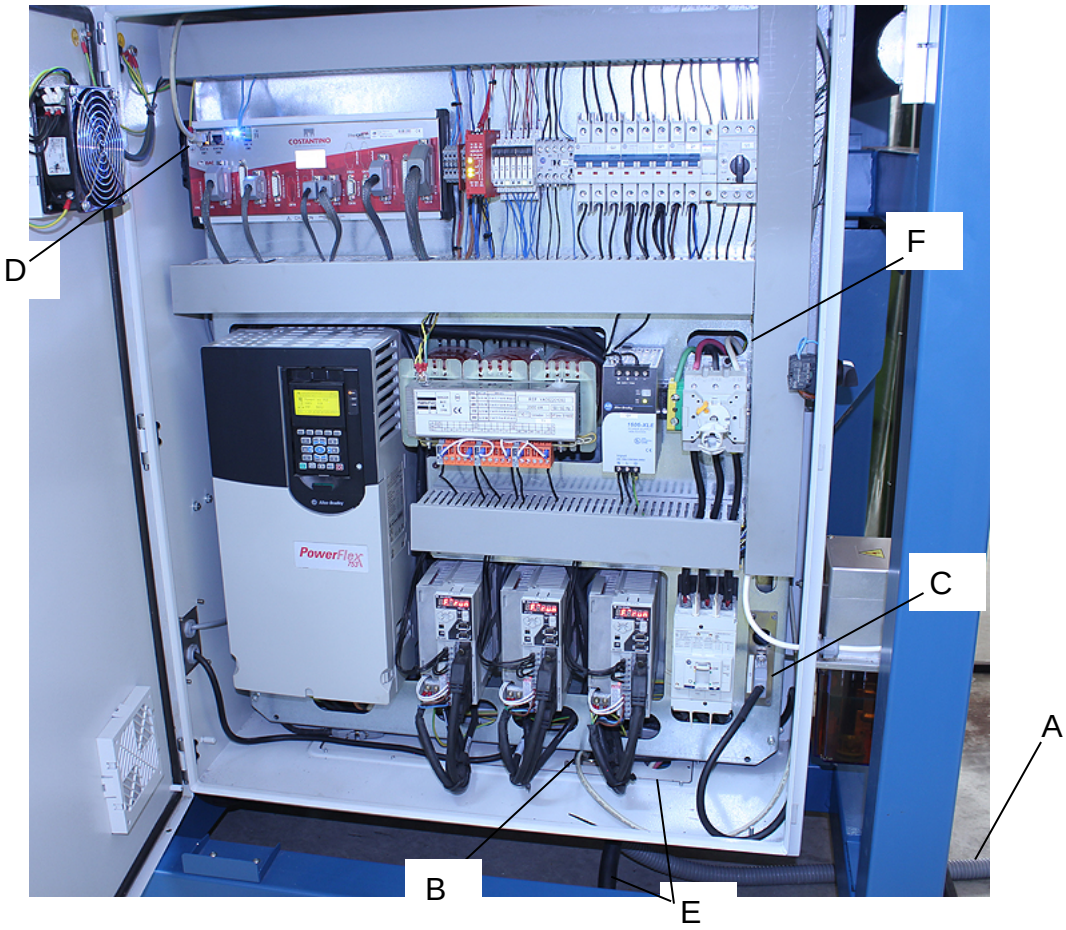
Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with a amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your tools. Before connecting the motor to the power line, make sure the switch is in the “OFF” position and be sure that the electric current is of the same characteristics as indicated on the tool.
- All line connections should make good contact. Running on low voltage will damage the motor.
- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

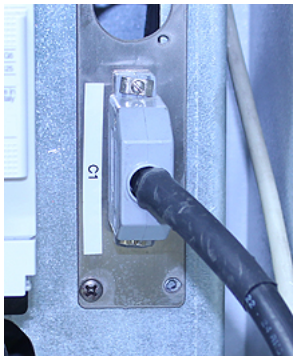
⚠ WARNING: In all cases, make certain the receptacle in question is properly grounded. If you are not sure, have a qualified electrician check the receptacle.

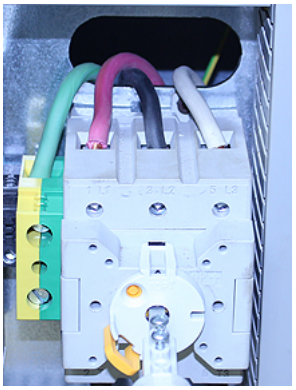
- Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.
- Repair or replace damaged or worn cord immediately.

Electrical Enclosure Connection



1. Turn the main disconnect switch on the control panel to the OFF position.
2. Unlock and open the electrical enclosure door.
3. Route the control console cable (A) under the frame rail and into the bottom of the enclosure (B).
4. Once installed into the enclosure, route the interface cable to the C1 connector (C) and secure in position.
5. Route the CAT5E cable around the outer edge of the enclosure and plug the RJ45 connector into the CN1 port (D) on the Ethernet interface.
6. Route the power cord (E) into the bottom of the electrical enclosure and behind the mounting panel up to the top of the main disconnect (F).
    a. Route the power cord so that it will NOT become entangled in the machine in any way.
    b. Route the cord to the power supply in a way that does NOT create a trip hazard.
7. Connect the three power wires terminals **L1, L2, & L3**. Connect the ground wire (typically green) to the **E** terminal.
8. Check that the power cord has not been damaged during installation.
9. Connect the power cord to the power supply and check that the power cord has not been damaged during installation.
10. When the machine is clear of any obstruction. The main power switch may be turn ON to test the operation. Turn the switch OFF when the machine is not in operation.



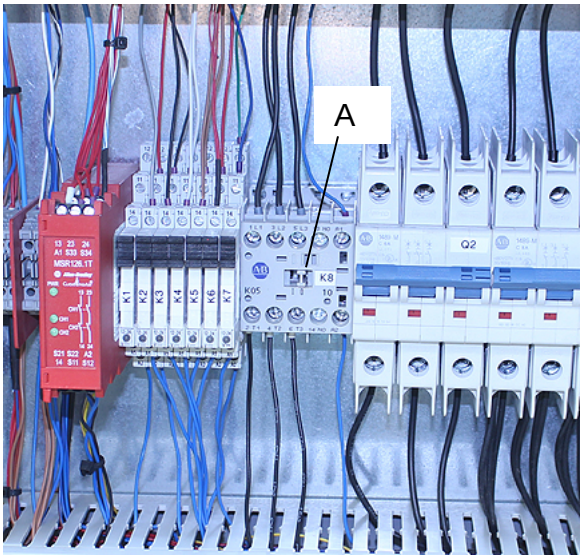


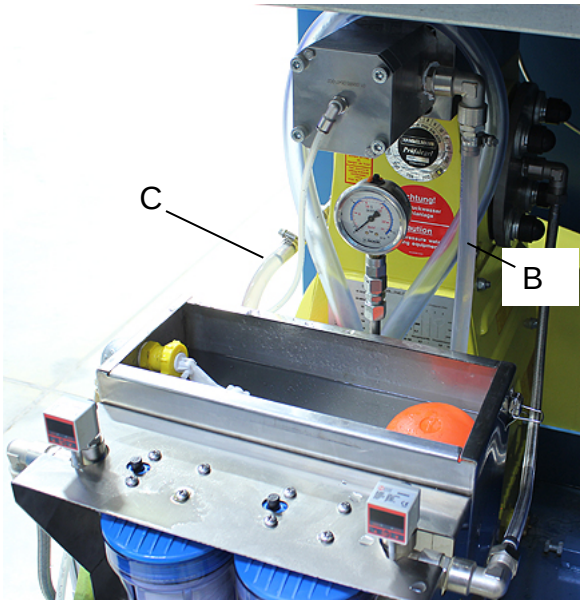
MOTOR ROTATION CHECK AND PUMP PRIMING

IMPORTANT: *This procedure has two functions. Step 1 is to check for and verify that the inlet water charge pump is rotating the correct direction. Step 2 is to prime the water supply to the main high pressure pump. Failure to complete both of these steps will damage the high-pressure pump and void the warranty.*

WARNING: HIGH VOLTAGE! Use caution completing this procedure. Failure to use care and good judgement will result in serious injury and or death.

1. Turn main disconnect to the ON position and allow the system to boot up. The visible indicators will be the illumination of the Ethernet interface, the PJC, and the servo drivers.
2. Verify that the water supply is turned ON and that the reservoir is 3/4 full.
3. Locate the K8 contactor in the middle of the top row of electrical components.
4. Slide and hold the override lever (A) to the left to engage the contactor and run the water charge pump.
5. At the same time, visually check for water flow in the high-pressure pump input line (B). The water flow needs to be up toward the high-pressure pump. If NOT, release the override lever and STOP charge pump. The pump is turning in the wrong rotation.
6. To correct the rotation, disconnect power to the machine, and switch the L1 and L3 wires. DO NOT move the ground wire.
7. Repeat the test steps again checking for water flowing up toward the high-pressure pump (B).
8. Once water is flowing up toward the pump, continue to run the pump in the override condition until full water flow with NO air bubble is seen on the return line (C). This may take 1 to 2 minutes.
9. Turn off the main disconnect and close the electrical enclosure door and install the service covers.

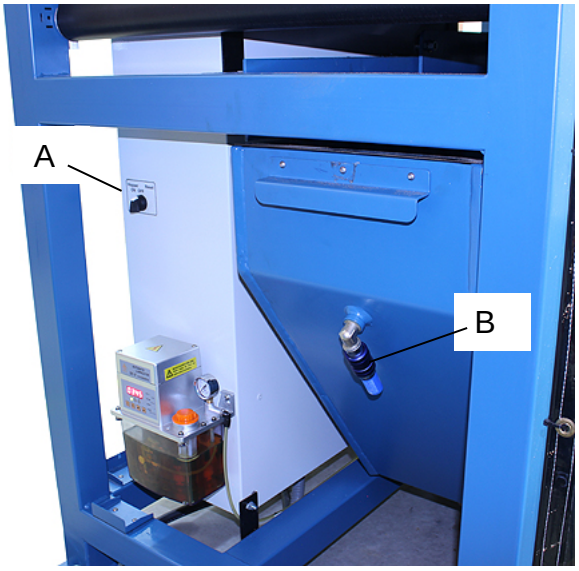


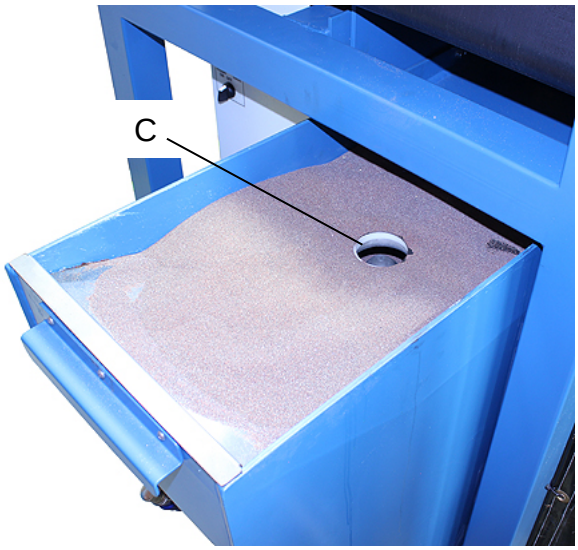


Abrasive Hopper

The abrasive hopper is located within the main chassis and is suspended on rollers to allow the hopper to be pulled out to provide access when adding abrasive.
This has a 330lbs (150kgs) garnet capacity.

1. To load the hopper, the side service panel has to be removed.
2. Turn the hopper control switch (A) to Off and slide the pressure valve collar (B) downward to release the air pressure from the hopper.
3. Pull the hopper outward and remove cover.
4. The filling poppet cone will be retracted into the hopper.
5. Pour the abrasive into the top of the hopper and direct the material into the hopper.





⚠ ***IMPORTANT:*** *DO NOT allow foreign material such as pieces of the packaging or other debris into the hopper. This will plug the system requiring an extensive cleaning process to clean all of the tubes and fittings.*

6. When filling is complete, quickly rub the cone and seal surfaces to remove any large accumulation of abrasive.
7. Turn the hopper control switch (A) to On and lift upward on the pressure valve collar (B) to allow the poppet cone to raise and the hopper to pressurize and seal the cone.

GETTING TO KNOW YOUR MACHINE

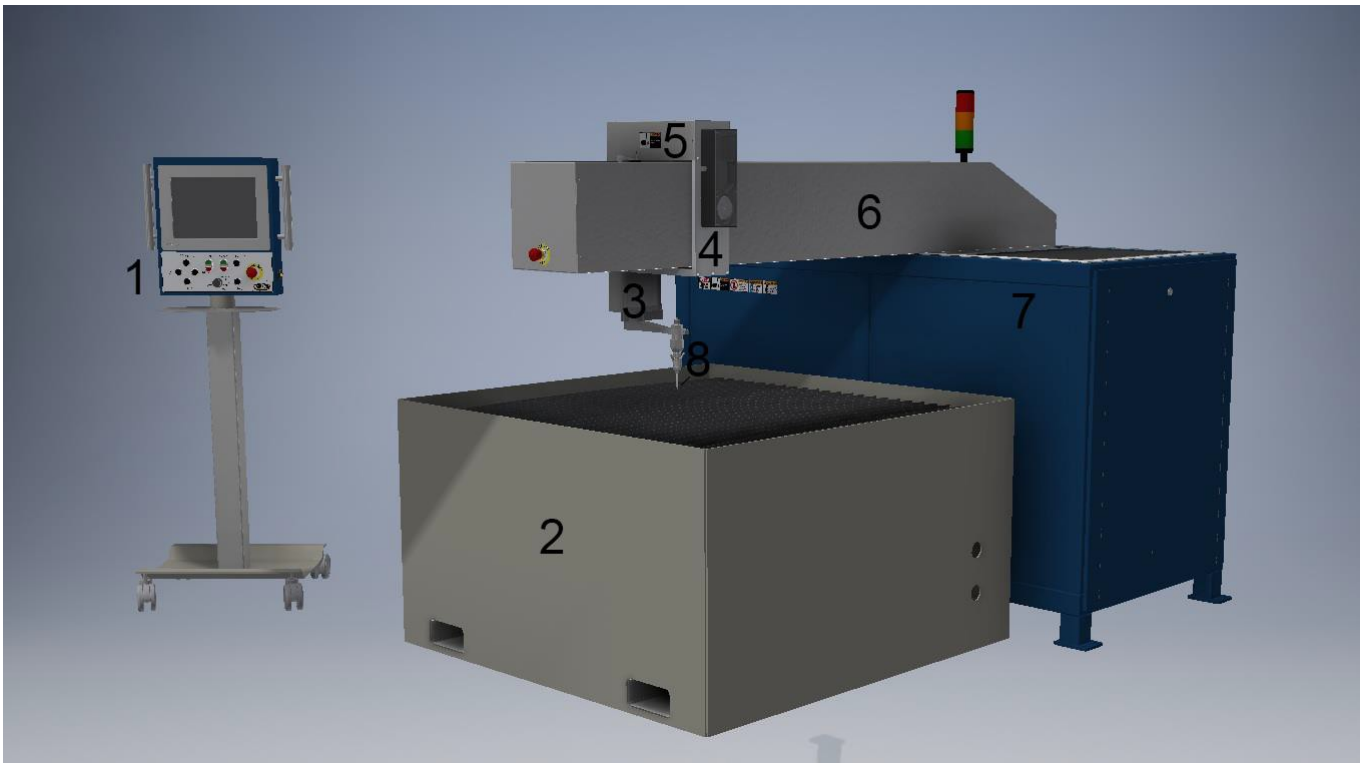
Overview

The WJ-85CNC waterjet is an industrial tool capable of cutting a wide variety of materials using a very high water pressure jet with an abrasive mixture. Thus, it is a waterjet machine with the additional abrasive mix. Abrasive is included in the mixture in order to cut hard materials such as metal or granite. The machine can be set to cut without any abrasive, but the penetration power and cut feed rate is drastically reduced. This is only recommended for soft materials such as wood or rubber. Otherwise, the garnet abrasive medium is suggested to be used as this allows faster cutting speeds.

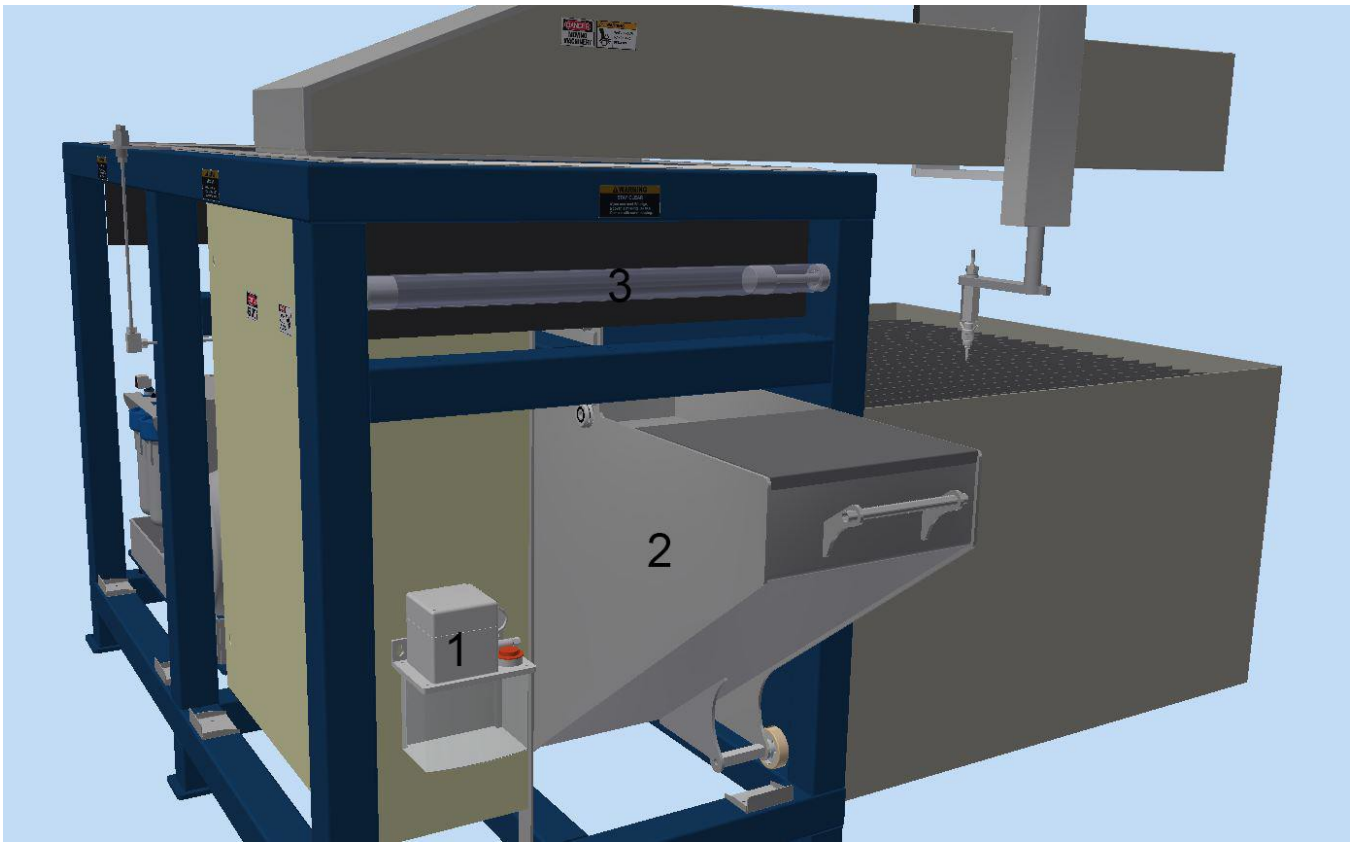
Abrasive jet cutting is often used for fabrication of machine parts. It is the preferred a method when the materials being cut are sensitive to the high temperatures, which are generated by other methods. Abrasive jet cutting is used in various industries including mining and aerospace for cutting, shaping, and reaming any desired type of profile.

The WJ-85CNC has been intended of cutting of metal, plastic, ceramic, glass, stone and composite materials. The manufacturer and seller of this machine are not responsible for any misuse of this machine.

Component identification



1	Console unit
2	Water tank and work platform
3	Nozzle head (Z-axis)
4	Proportional abrasive feeder
5	Turret head (Y-axis)
6	Bridge (X-axis)
7	Chassis
8	Nozzle

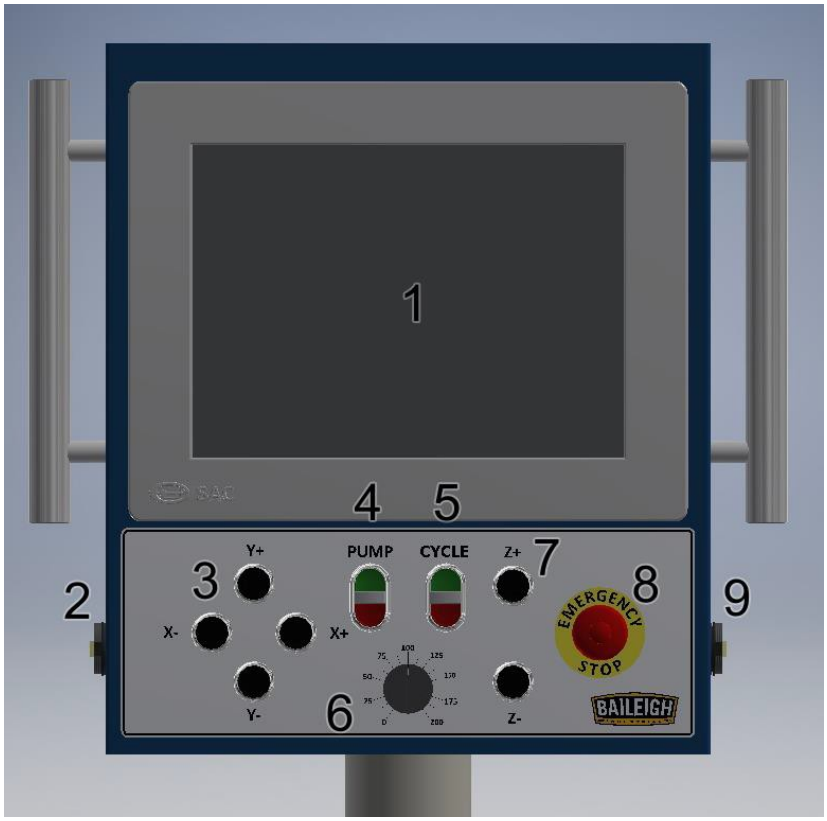


1	Lubrication pump and reservoir
2	Abrasive hopper
3	Retractable guards

1	High pressure pump
2	Water pre-conditioning (filter, tank, supply pump)
3	Electrical driving motor
4	Electrical control panel
5	Tower light

Console and Software Controller

The WJ-85CNC has been designed with an embedded PC based CNC controller with easy to navigate and an intuitive graphic user interface. It has the ability to utilize industry standard post processed CADCAM files.



The ergonomic control console has all functions on-board to assist the operator in the setting up and processing of the desired work function. The touch sensitive embedded Microsoft Windows 8 operating system gives access only to the intended product function; the sole operation of the WJ-85CNC.

Operation initiates as the main screen loads and gives access to the complete functionality of the system. Navigating through the menu the operator can load a file from the accessible network location via Ethernet or through the USB port. Such files are preconfigured using SheetCAM CADCAM software.

1	Touch screen panel
2	USB socket
3	X-axis, Y-axis jog keys
4	Pump ON/OFF switches
5	Cycle START/STOP switches
6	Feed rate compensation knob
7	Z-axis jog keys
8	Emergency button
9	RJ 45 socket

OPERATION

⚠ CAUTION: Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges.
When handling large heavy materials make sure they are properly supported.

Start up

Once the WJ-85CNC is completely assembled with all required material and parameters:

1. Turn the main disconnect switch on the electrical enclosure to the ON position.
2. Close all side panels and allow the integrated console to start-up.
3. From the opening screen press the “DESKTOP” button and allow the embedded operating application to load.
4. Perform the necessary axes referencing procedure (as described in the following section) and press CYCLE START on the console.
5. Press and hold the PUMP START button to power up the pump. Release when the pump is up to rpm.
6. Once the selected workpiece profile has been selected, press BACK button to display the tool path screen.
7. Jog the head using the X and Y coordinate button to position the nozzle to the needed cutting process start location.
8. Once in position press ZERO COORDINATE button on screen and then the CYCLE START button to fix the absolute X and Y position.
9. The Z-axis position is to be similarly located around 7/64” – 5/32” (3 - 4mm) above the workpiece. When the Z axis is at the desired height, press CATCH POSITION OF Z button.
10. Pressing the TRIAL button and then the CYCLE START button the head will physically maneuver in the path described by the work file. (The pump does not need to be running to run in TRIAL mode.)
11. To initiate the actual cutting process start and run the pump and press CYCLE START button. This will start the full cutting process.

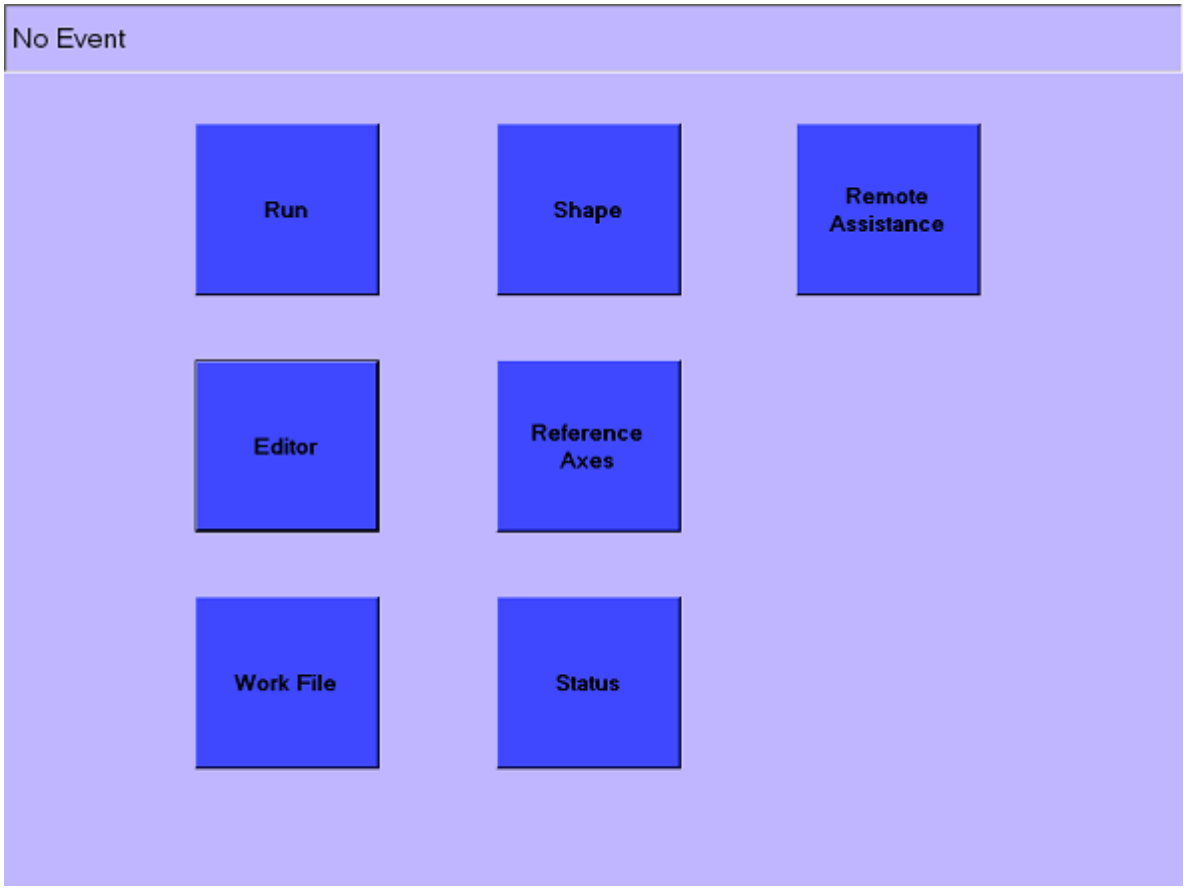
When the cutting process is over:

1. Press PUMP STOP button.
2. Use the jog keys to move the head aside to be able to collect the workpiece and remove any scrap material and clean the workspace.

Touch Screen Operation

Home page - selection screen

When machine is switched on, the embedded operating system loads directly to the home page, as in the below image.

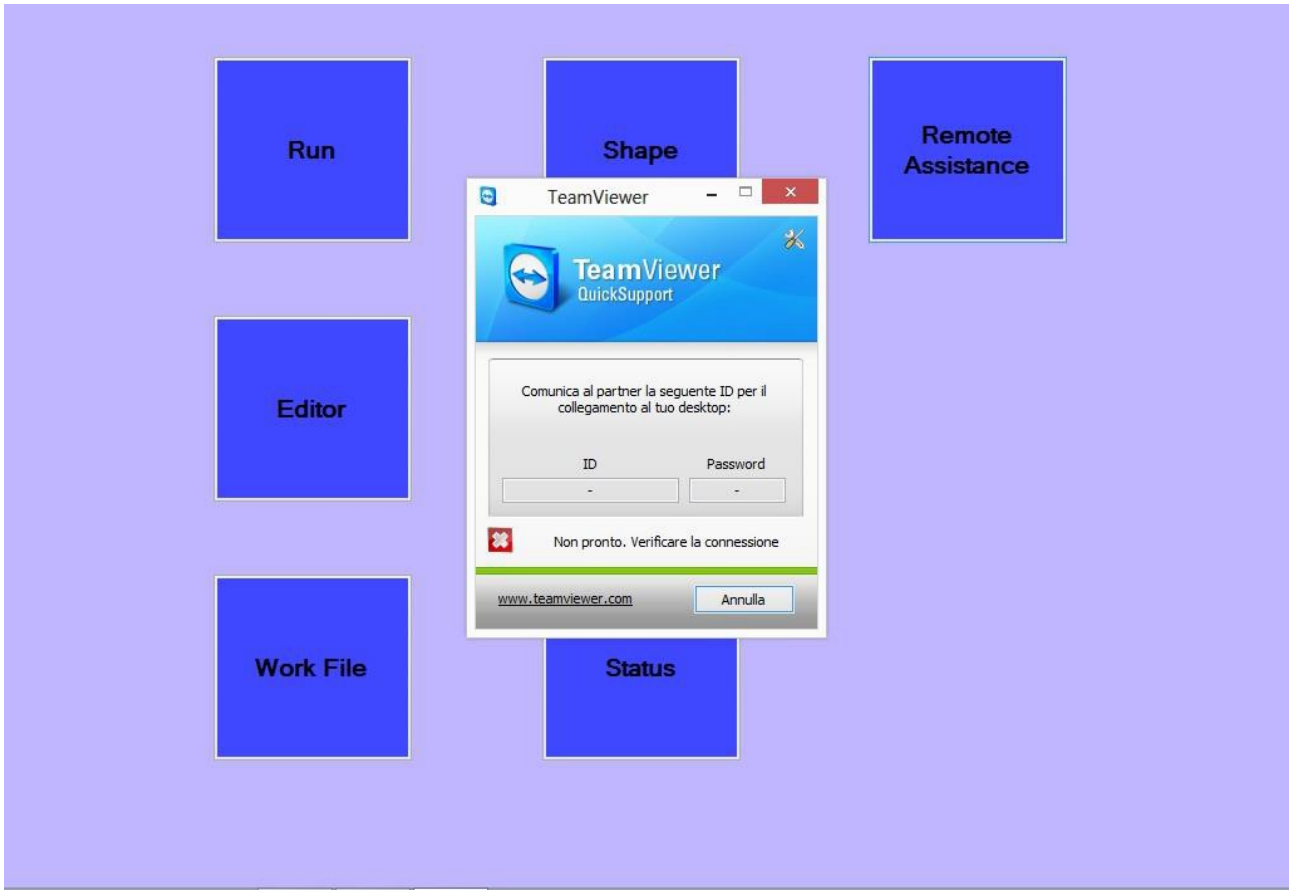


From the main page is possible to access the following sections that will be described in the next section of this document:

- RUN - In this section it is possible to visualize the intended workpiece program in addition to modifying the sequence settings.
- SHAPE - Access the preloaded shapes library through which it is possible to manipulate the shape files to obtain workpiece programs in ISO format that can run on ISAC software.
- EDITOR - in this section is possible to edit a part-program.
- REFERENCE AXES - Access this section to reference axes. This is to be selected upon initial startup.

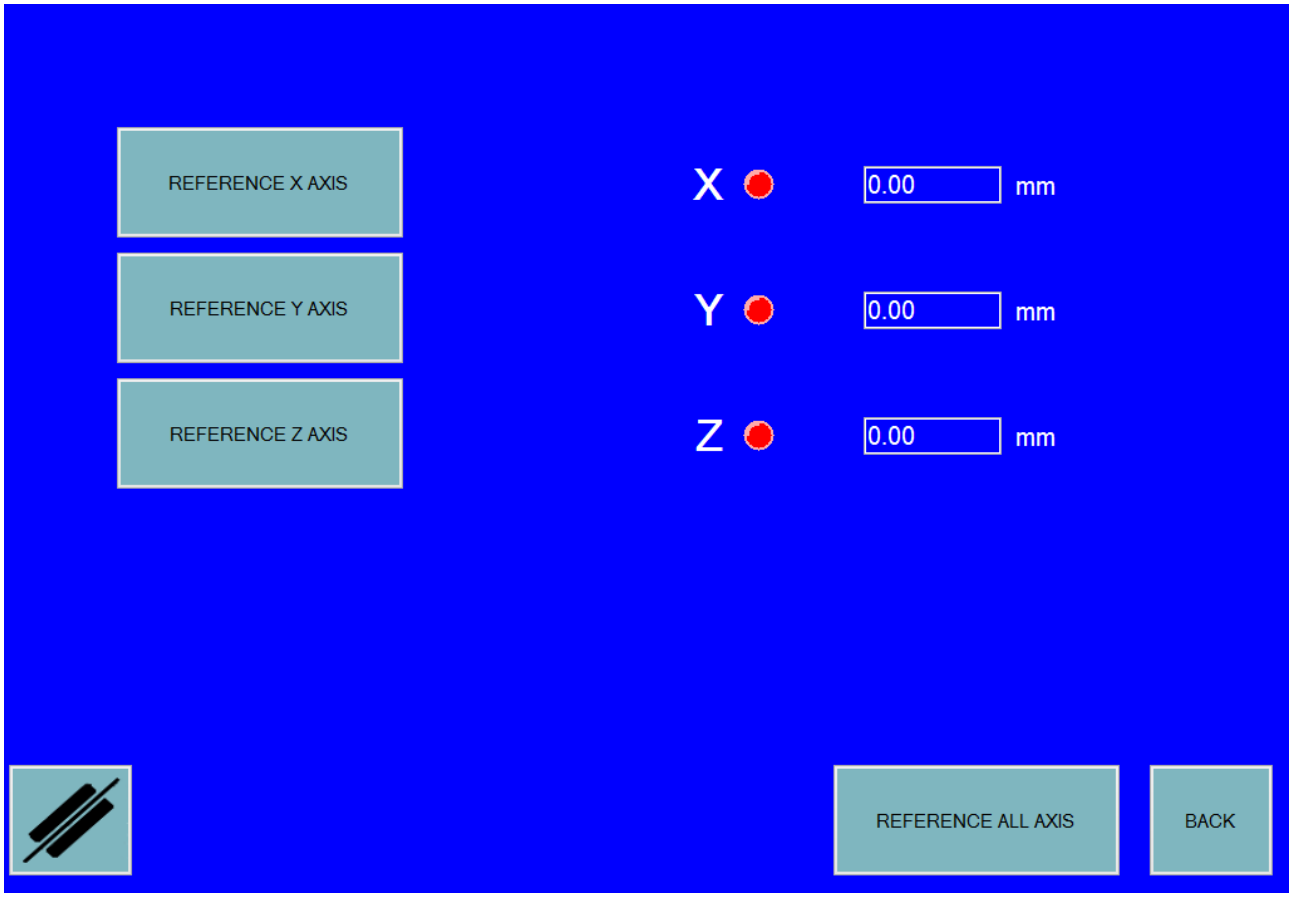
- WORK FILE - In this section it is possible to select the workpiece program to execute generated file generated from SheetCAM.
- STATUS - Press this button to load information on the machine status.
- REMOTE ASSISTANCE - The TeamViewer software is launched for the remote assistance. There is an ID number and a numerical password which should be communicated with your help center for remote assistance.

Note: *To access the remote assistance, the console must be connected to the internet. RJ45 connection is recommended.*



Reference axes

Upon every initial start-up, the axes have to be referenced. This can be done in the Reference Axes screen.



Should there be any active alarms, the reset button has to be pressed to clear any pending status. If the alarm is still active, this means that the fault/warning has not yet been sorted.

Prior to referencing the axes, the reset button has to be pressed. Axes can be referenced separately or in automatic sequence by selecting the reference all axis button.

When the axis has been referenced, press the CYCLE START button on the console and the adjacent radio buttons will turn green. In addition, the tower light will indicate an amber light. The nozzle can then be jogged to the desired location, or perform any other operation as necessary. For each axis the relative distance value is displayed. The back button will transfer you to the previous screen.

Functions of the physical console buttons can be used. These include:

- AXES JOG KEYS – These are used to move the head and bridge accordingly according to the intended direction. The rate of movement is determined by the feed rate.
- FEED RATE OVERRIDE – The rate of movement can be determined at any time by adjusting the knob. The rate can be increased to 200% that set but never exceeding the machine maximum traverse speed.
- EMERGENCY BUTTON – This is to be pressed at any stage to halt the machine from all operations. All the equipment will terminate except for the console. When this is triggered and reset to return to normal operation, the machine references are to be set again. In addition, any pending events are to be resolved prior to proceeding with normal operation.

Work file

Pressing the button Work File in the home page, the following window appears:

The left-hand box; Destination is the path where the file can be found. The list contains the folders and the files of the directory as appropriate. Arrows help navigate through this list, up, down, top or bottom of list accordingly.

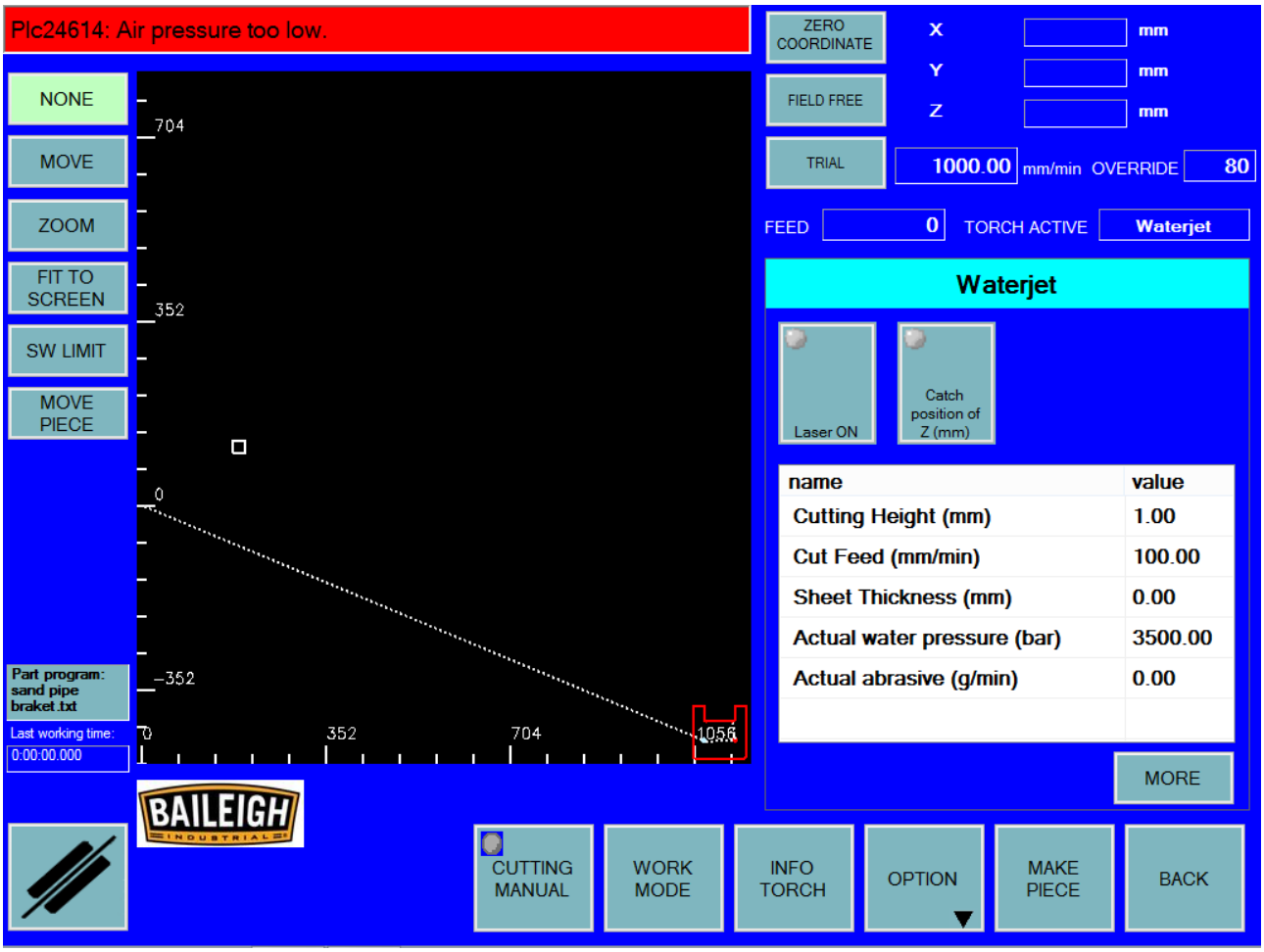
On the right is displayed the console default folder D:\ISAC\pp. When connected to a LAN, this can be also accessed through this screen. Similarly, the arrows allow navigation in the embedded system. The red buttons between the two lists allow transfer to and from the system respectively one the source file has been selected.

Other useful commands on this screen are:

- DELETE - Press to delete a selected file from the console directory.
- RENAME - Press to rename a selected file in the console directory.
- SELECT ALL - Press to select all the files in the console directory.
- SELECT NONE - Press to de-select all the files in the console directory.
- SELECT INVERT - Press to invert the selection. That is to select the files that are not currently selected.
- OK - Press to confirm the transfer of the workpiece program selected.

Run screen

Once the Run screen is selected, various functions can be selected, in addition to having a 2D visual of the workpiece program selected.



- NONE - When this button is pressed, all the operations on the preview are deselected.
- MOVE - This button allows to move the image on the screen.
- ZOOM - Use this button to enlarge or diminish the dimension of the image in the preview.
- FIT TO SCREEN - By pressing this button the preview shows the whole workpiece.
- SW LIMIT - When pressed the pre-programmed soft limits are shown as a border on the screen.
- MOVE PIECE – With this option selected, the workpiece contour can be shifted within the SW LIMIT boundary and thus re-locate it on the worktable.

The graphical representation of the working table gives an idea of the working area with in the software limit. The selected workpiece program is displayed in various colors. The contour to cut along is colored in red while rapid traverse movement in white. All blocks (segments or arcs) that have at least a portion outside of the soft boundary limits are colored in violet.

In such a case, this can be solved by:

- Changing the workpiece program zero coordinates
- Changing the orientation, scale, or offsetting the workpiece, using the MAKE PIECE button Having sections of the workpiece outside the boundaries will not allow the program to start in real or trial mode. Any portion outside the sheet area is colored in yellow for easy identification.

- TRIAL – This feature allows for a preview of the actual cutting cycle without the actual execution taking place. During this mode, the waterjet:
  - Moves the axes at a higher speed, shown as the TRIAL SPEED.
  - The actual path by the head and bridge are performed in the X and Y axis.
  - The Z axis will remain stationary.
  - The preview coloring is active.

The trial mode is useful in order to know if the workpiece program can be executed within the metal plate especially if this has an irregular area.

Note: *If the software limits checks are enabled these are automatically performed by the preview window. Thus the trial mode is unnecessary. Moreover, since in trial mode the cut is not actually performed, the feedrate can be higher than for the real cutting process.*

- WORKING FIELDS – Defines the usable area. This has to be modified for every job if the area is altered.

The parameters to be set are:

- SIZE X – The width of the working field.
- SIZE Y – The depth of the working field.
- OFFSET X – The width offset relative to the working field
- OFFSET Y – The depth offset relative to the working field
- MARGINS X - Internal margin along the width between the working field and the workpiece. All machining should be inside the metal plate minus margin.
- MARGINS Y - Internal margin along the depth between the working field and the workpiece. All machining should be inside the metal plate minus margin.

Use the BACK button to close the window and save settings.

Any modification to the offset can be previewed in GRAPHIC CONTROL screen.

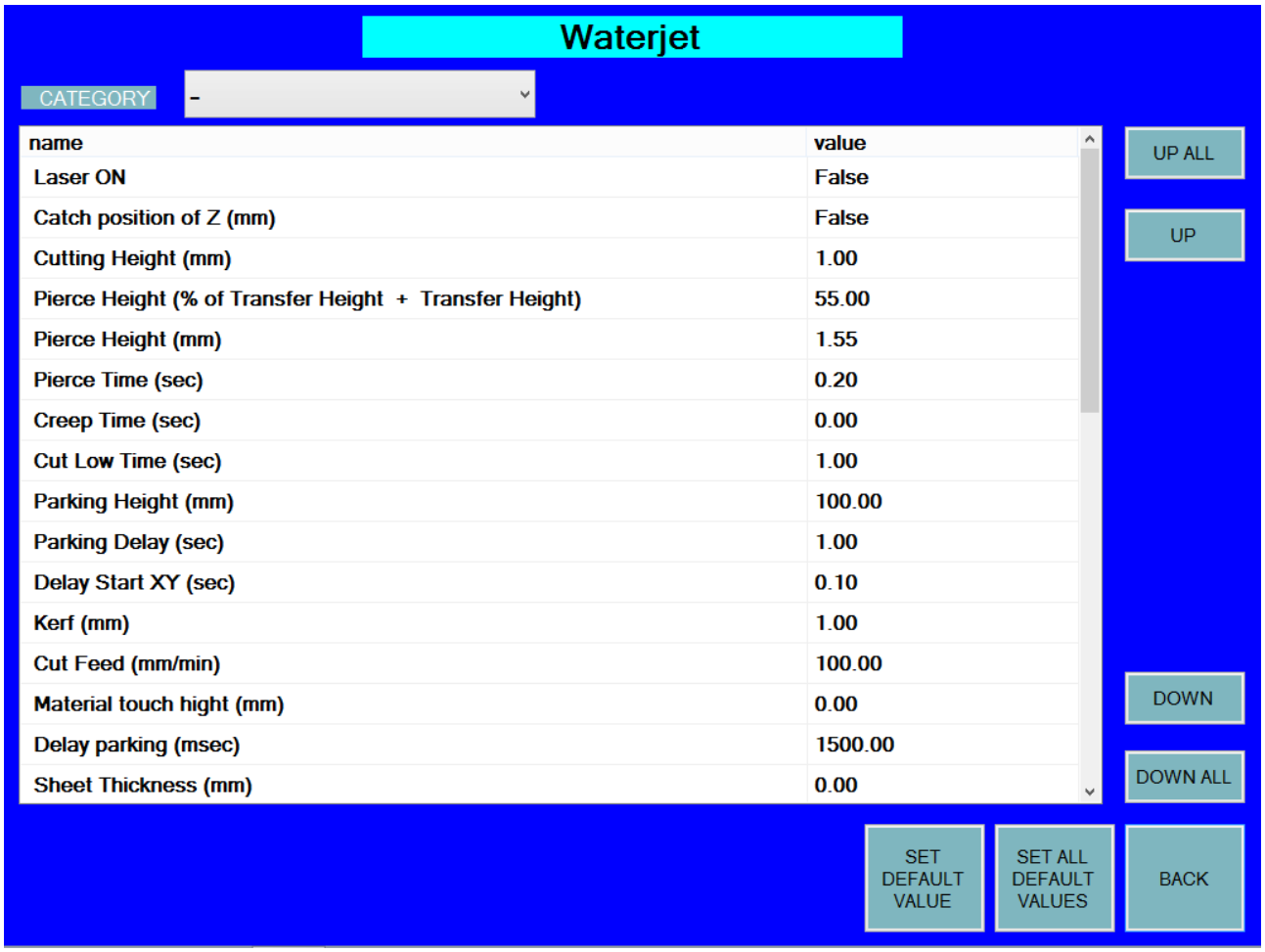
Note: *When the working field selected, this can be FIELD FREE or FIELD FREE OFFSET*

There are 6 types of working fields:

- FIELD FREE - The workpiece program is always executed starting from the axes initial position.
- FIELD 1, 2, 3, 4 - The workpiece program is executed in function of the selected FIELD.
- FIELD ORIGIN OFFSET - When this working FIELD is selected, the first time a workpiece program is executed, the position of the axes is saved in a CNC origin. When it is executed again, the workpiece program starts from the point previously saved.

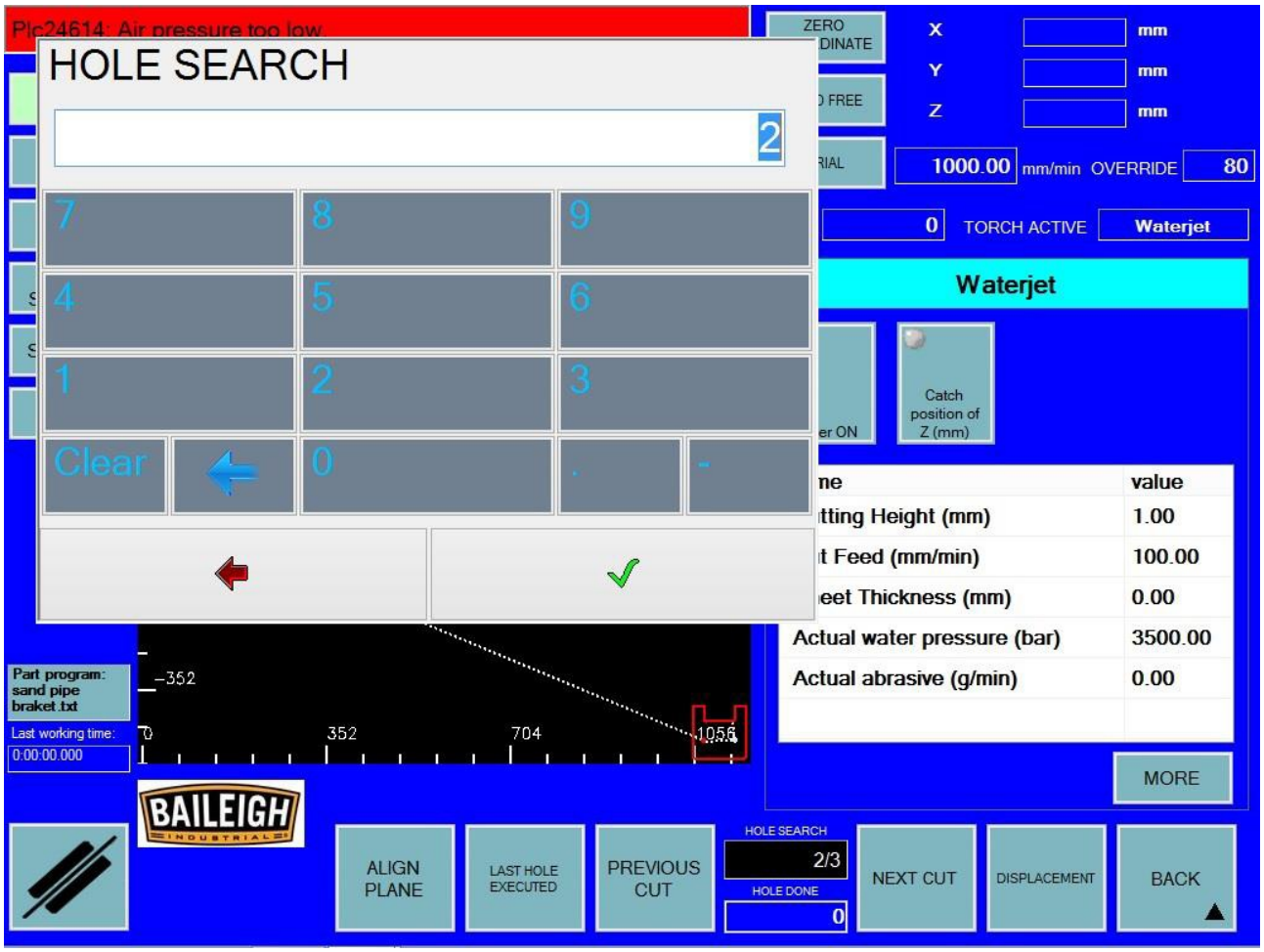
In addition, it is possible to move X and Y axes by ΔX and ΔY with respect to the saved position. To do this, when the workpiece program is in execution, press HOLD and jog X and/or Y axis. The current workpiece program can be deleted or concluded by pressing again START. In this last case, the workpiece program restarts from the new shifted position. This process is incremental.

Additional run screen features



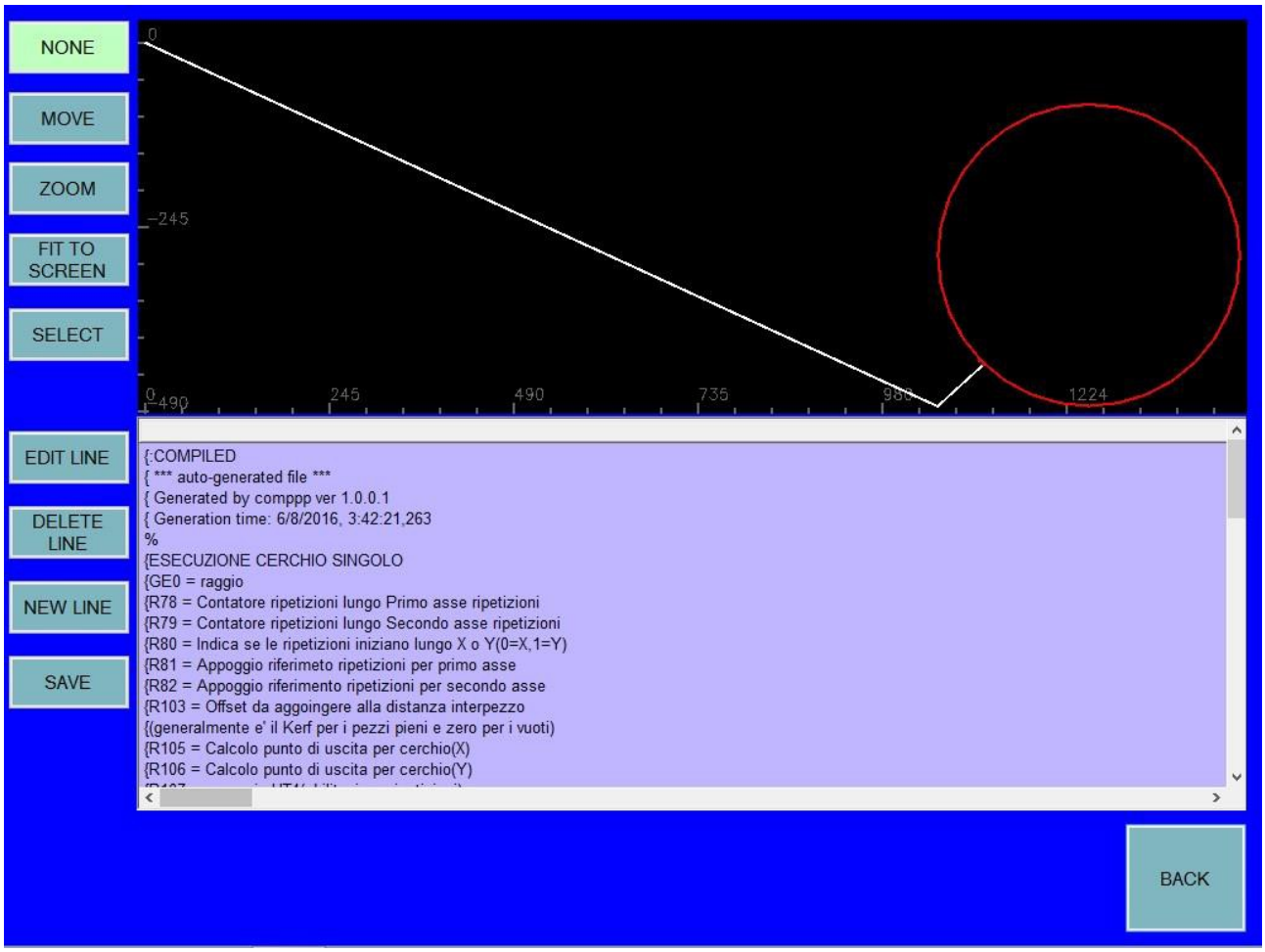
Additional parameters can be found in the run screen by selecting the MORE button. This allows confirmation and medication of parameters accordingly. In addition, values such as the pump temperature, pressure etc. can be found on this screen.

When there are multiple workpieces in the same program, the software allows to search for a particular workpiece by selecting the HOLE SEARCH button. Giving in the correct figure will display the cutting cursor to the respective hole within the whole program cycle.



Editor screen

Once initiated from the home page one could go through the actual execution script, viewing the G- code format of the whole workpiece process. In addition to viewing the details, the process can be modified from this screen using ISO6983 code syntax.



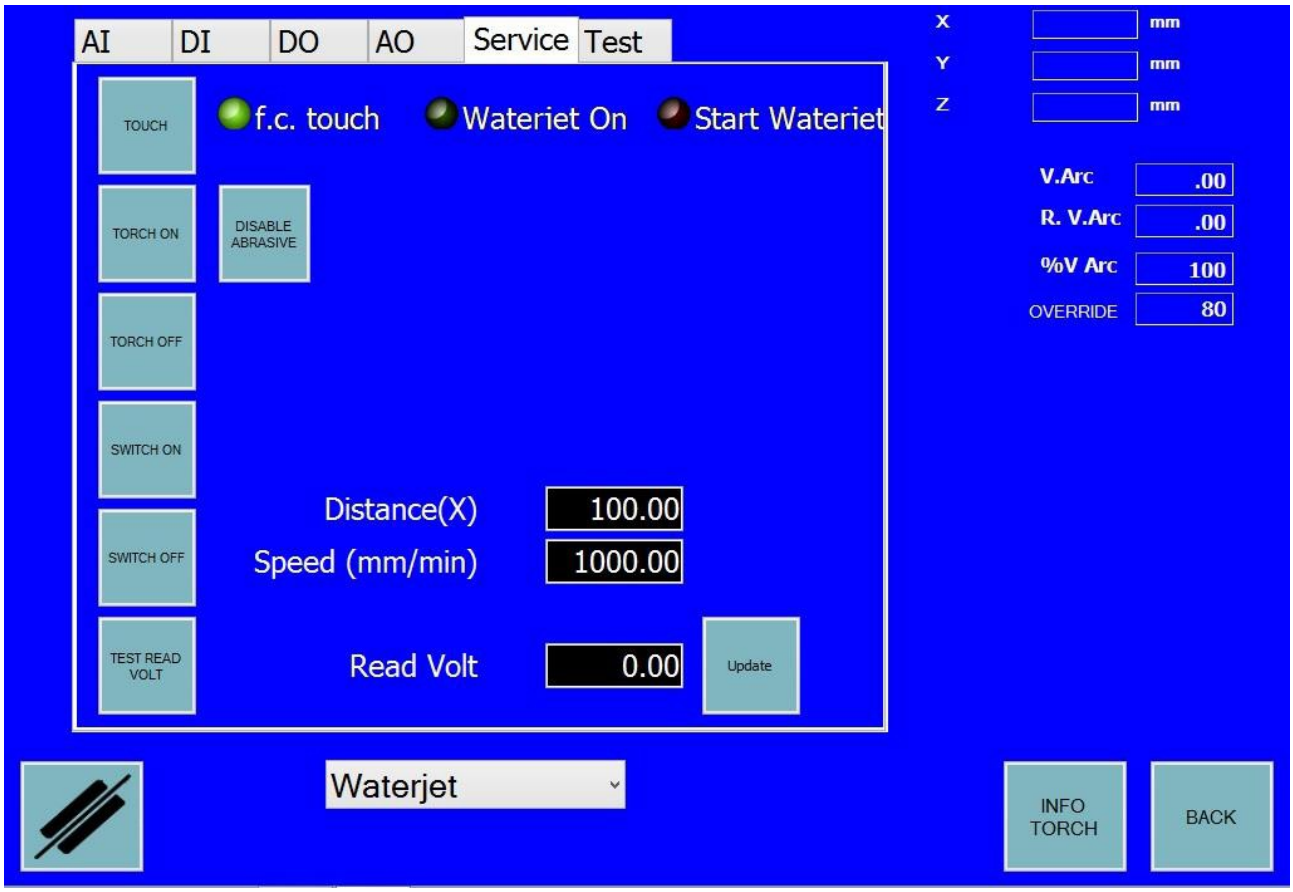
Status screen

Pressing the button STATUS in the Home Page, the following window appears

In the status screens one can observe the:

- Analogue inputs
- Analogue outputs
- Digital inputs
- Digital outputs

Values displayed through the various tabs can be observed for confirmation of the correct function of the machine.


AI
DI
DO
AO
Service
Test
TOUCH
f.c. touch
Wateriet On
Start Wateriet
TORCH ON
DISABLE ABRASIVE
TORCH OFF
SWITCH ON
SWITCH OFF
TEST READ VOLT
Distance(X)
100.00
Speed (mm/min)
1000.00
Read Volt
0.00
Update
X
Y
Z
mm
mm
mm
V.Arc
.00
R. V.Arc
.00
%V Arc
100
OVERRIDE
80
Waterjet
INFO TORCH
BACK

LUBRICATION AND MAINTENANCE

⚠ WARNING: Make sure the electrical disconnect is OFF before working on the machine.
Maintenance should be performed on a regular basis by qualified personnel.
Always follow proper safety precautions when working on or around any machinery.

Pneumatic Care

Start with clean and dry. Follow your compressor manufacturer's instructions for proper maintenance, filtering, and moisture control and removal.

Schedule Maintenance

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- On a weekly basis clean the machine and the area around it.
- Lubricate threaded components and sliding devices.
- Apply rust inhibitive lubricant to all non-painted surfaces.
- Emergency switches: Upon every start up, or every 24 hours if continuously used.
- Water filter: Every 6 months or earlier due to differential pressure alarm.
- Screws Tightening: Every 6 months.
- Greasing: ball screws, Every 6 months.
- Lubrication oil: Check regularly for level. Use Shell Tellus S2 M HM/46 or equivalent.
- Check the state of the flexible cables: Once a year.
- Pump oil change: Initially after 1000hrs of operation. Further changes every 4000hrs or once a year. Refer to high pressure pump manual for detailed procedure, under the maintenance chapter.
- Bacterial control: Greatly dependent on local climatic conditions. Maintain suitable hygiene requirements. Ask competent personnel for further information on maintaining water hygiene.
- Hopper pressure relief valve: Confirm pressure release every year. This should not be tested in the hopper, but dismantled appropriately.
- Nozzle: This will require replacement from time to time. Although work lifetime is significant, the declared nozzle lifetime is of 8hrs.

Upkeep

- Slats: Are to be replaced when severely weekend by cutting process. These can be completely replaced or partially replaced according to localized level of wear.
- Nozzle cone: The nozzle cone is made of rubber and will erode according to use. Replace this as necessary in order to minimize excessive splashing and airborne abrasive.
- Motor belt: Tensioning the motor belt might be required from time to time. The tension must be enough for it to deflect around .25” - .375” (6 - 10mm) at its midpoint of the longest edge. Additionally, inspect for cracks or excessive wear. Replace immediately if noted.
- Retracting covers: Must be maintained clean as much as possible. If broken, cracked or excessively frayed, these must be replaced.
- Hopper: Since the hopper is effectively a pressure vessel, attention must be given to locate and identify any corrosion and propagating cracks that might lead to loss of pressure or rupture.

Machine Elapsed Operating Time

The elapsed operating time can be monitored by reading the time value of the main pump drive display. This display is located on the VFD (Variable Frequency Drive).

1. With the main disconnect switch in the OFF position, unlock and open the electrical control cabinet.
2. Turn on the machine by manually operating the main disconnect switch.

⚠ WARNING: USE EXTREME CARE. THE COMPONENTS AND CONNECTIONS WITHIN THE CABINET ARE ELECTRICALLY ENERGIZED AND ACTIVE!

3. Press the second button from the top row on panel of the Power Flex 753 motor drive shown.
    a. The total elapsed main water pump time is displayed in hours.
    b. Once value is noted, manually turn of the main switch and close the control panel.

TROUBLESHOOTING

⚠ WARNING: Make sure the electrical disconnect is OFF before working on the machine.

1. Rough cut are observed	
Check orifice Check pressure pump pressure Check feed rate Check nozzle height Out of abrasive	Make sure you have a good orifice. If not replace the orifice. Pump pressure should be around 3500bar. Lower feed rate Lower nozzle towards workpiece to around 4mm. 1. No abrasive in proportional dispenser 2. Proportional abrasive dispenser jammed or not working
2. Servomotor does not start	
Power not connected Loose connection Connector external wiring incorrect Servomotor disconnected	1. Correct the power circuit. 2. Check fuses/MCBs. Tighten any loose parts. Refer to connection diagram and correct wiring. Reconnect wiring or replace cable. Cable may be broken in cable carrier.
3. Servomotor not functioning	
Ambient temperature too high Servomotor surface dirty	Reduce ambient temperature to 40°C (104°F) max. Clean dust and oil from motor surface.
4. Abnormal noise	
Mechanical mounting Bearing defective	1. Tighten mounting screws. 2. Centre coupling. 3. Balance coupling. 1. Check noise and vibration near bearing. 2. Call for service.
5. Vibrations are observed	
Machine causing vibrations	1. Check the clearance between the pump/motor plate and the frame. 2. Make sure the machine frame is level and steady. 3. Make sure the catcher tank and grate are secure.
6. Nozzle not moving	
Emergency button pressed Servo motors not functioning	Reset system and re-initialize coordinate system Refer to troubleshoot point #3
7. Part dimensions not as intended	
Confirm part dimensions	1. Make sure that design and system are working in

Workpiece has not been secured in place firmly whilst cut Machine limits have been reached	metric or both imperial systems respectively. 2. Otherwise make sure that the programming compensations have been input correctly. This can be confirmed in the editor screen. Use heavier stoppers. Clamp where necessary. Take note to keep workpiece level and always touching to slats. 1.Make sure workpiece is within machine limits 2.Reset machine software limits
8. No water coming out of nozzle	
Nozzle blocked	Nozzle might be blocked with garnet. Dismantle and clean nozzle
9. No abrasive coming out of nozzle	
Abrasive level low No air pressure Nozzle blocked	Check abrasive level Check air pressure Nozzle might be blocked with garnet. Dismantle and clean nozzle
10. Water tank has a foul odor	
Bacteria is growing in tank	Take immediate action and disinfect tank from bacteria
11. Console not working	
Software system might be stuck or locked up	Reset / reboot the system
12. Actual pump pressure lower than the setting	
Orifice may be worn out	Replace orifice with a new one
13. Water in the abrasive tube	
Orifice may be worn out	Replace orifice with a new one

NOTES

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