



Robo SawJet 3.0

Pre-Installation Document



Overview of Installation Requirements

Topic	Overview
Robot Controller Power	480 V, 80 A, 3 PHASE, 60 HZ dedicated drop. Appropriately Sized Copper Wire MUST Be Used. Customer is required to consult with a licensed electrician to provide power drop & install the supplied ground rod.
Waterjet Pump Power	480 V, 100 A, 3 PHASE, 60 HZ dedicated drop. Appropriately Sized Copper Wire MUST Be Used. Customer is required to consult with a licensed electrician to provide power drop.
Internet Connection	Hard-Wired Cat 5 high-speed internet connection for remote administration using TeamViewer. No WIFI. Customer Supplied
Filtered Cutting Water	1/2" NPT female fitting (optional #8 BSP 60deg Male). Minimum filtered flow of 4 GPM at 40PSI. Piping/fittings must be PVC, stainless steel or copper. Customer Supplied.
Cooling Water In	1/2" NPT female fitting. Minimum inlet pressure 40 PSI / 2-4 GPM. Maximum temperature of 65° F. Customer Supplied.
Cooling Water Drain	1/2" NPT female fitting. Valve used to throttle water flow should be placed on the outlet, not the inlet. This can be routed to the gray water system. Customer Supplied.
Bleed Down Out	1/2" NPT female fitting. Drain hose can be routed to the gray water system. Customer Supplied.
Saw Water	3/4" NPT female fitting. Minimum 5 GPM @ 35 PSI. Filter to 50 microns. Added benefit at up to 12 GPM.
Air Supply	Customer Supplied Air Drops: 1 cfm @ 85-100 psi for Robot & 3 cfm @ 60 -100 psi for bulk garnet hopper. All air supplied must be dry & filtered to minimum of 40 microns.
Robot Foundation	minimum 8" thick concrete floor with available space measuring 54" x 54". Do not cross over seams/joints in concrete. The surface must be flat, and quality of the concrete should meet the requirements of the C20/25 standard. There cannot be any steel reinforcement bars or other obstructions in the material that would prevent drilling into the foundation using a concrete drill bit. Customer must verify that there are no power lines located where the robot base will be drilled.
Table Foundation	The table(s) need to be mounted on a flat floor. The slope must not exceed 1" difference from one end to the other.
Temperature	The system is designed to operate within a temperature range of 50° F - 113° F
Hydraulic Oil	55 gallons. Chevron Rando HD Oil ISO 46, Conoco Megaflow AW ISO 46, Mobile DTE-25 Medium, Shell Telus S2 M ISO 46, Agip Arnica ISO 46, AW ISO 46. Customer is responsible for supply and filling of the pump.
Tank Water Drain	The waterjet tanks have (2) 2" NPT drain connections, one plug and one elbow. Customer is responsible for routing piping to discharge water into trench or other desired location.
Equipment	Customer supplied forklift must have a 8,000 lbs. payload capacity. The forks shall not be larger than 6.5" wide, 2.5" tall and a minimum of 6.0' long with a minimum spread of 26" from inside of the left fork to the inside of the right fork. Customer shall provide an 8' step ladder.

Customer is responsible to have all utilities listed above connected & ready on the first day of the installation. Any delay could impact the length of time to conclude install and thus could result in additional travel and labor expenses.

Overview Of Installation Schedule		
Day	Work Performed	Customer Supplied Resources Required
Mon	<ul style="list-style-type: none"> Anchor robot Place tanks Erect safety fencing 	<ul style="list-style-type: none"> Area of system location should be completely clear of debris by 8:00 AM Power disconnect box should be located near machine Concrete Foundation
Tues	<ul style="list-style-type: none"> Finish installing safety fence if necessary Place all peripheral equipment Start routing cables for equipment 	<ul style="list-style-type: none"> Electrician on site by 8:30 A.M. for final power drops to electrical panels 2 Air connections must be provided Plumbing must be complete CAT5 Internet connection to control cabinet by the end of the day Water discharge piping should be done today
Wed	<ul style="list-style-type: none"> Continue installation Lay HP tubing Fill tanks with water 	<ul style="list-style-type: none"> Hydraulic fluid on site Garnet should be onsite by the end of the day
Thurs	<ul style="list-style-type: none"> Finish installing cables & high pressure test system Start calibration process 	
Fri	<ul style="list-style-type: none"> Complete calibrations 	<ul style="list-style-type: none"> Scrap stone for test cuts

Overview Of Training Schedule	
Day	
Mon	<ul style="list-style-type: none"> Verify installation is done properly, tables are calibrated, & systems are working optimally Review Robocut & Robo Commander Calibrate blade diameter H2O pump purge Calibrate blade trim & plumb Calibrate waterjet B & C angles Camera calibrations Cut test pieces – 4" X 4" (same & opposing) & 10" x 10" Set waterjet/saw kerf & waterjet fat
Tues	<ul style="list-style-type: none"> Practice & review calibrations Run vs resume Overview of emergency stops & safety light curtains Overview of tool control operation Overview of bulk/mini hopper operation & maintenance Review air & water quality requirements Adjust camera calibrations Cut production jobs Diagnostics
Wed	<ul style="list-style-type: none"> Practice & review calibrations Overview of waterjet & pump operation – Intensifier, high pressure, cutting head, nozzles & common troubleshooting Introduction to Vein Match Cut production jobs
Thurs	<ul style="list-style-type: none"> Practice & review calibrations Saw water flow and waterjet garnet sensor operation Bypass settings Robot Teach Pendant Robot maintenance, help desk & parts department
Fri	<ul style="list-style-type: none"> Review topics as needed.

1. ELECTRICAL REQUIREMENTS

- RSJ requires two (2) separate power circuits & internet connection. Electrical services must be routed to the dedicated machine utility locations before scheduled installation date by the customer. The customer is required to provide the following services & connections. It is the customer's responsibility to contract a qualified licensed electrician to run & connect the electrical power to the machine & install the supplied ground rod. BACA Systems installers are prohibited from performing any electrical work in connecting from the facility to the machinery.
- **Robot Controller Power:** 480 VAC, 3 phase, protected circuit breaker / fused disconnect for 80 amps. If customer facility has a lower voltage, the customer is responsible for a step-up transformer. Consult with a licensed electrician. Must be appropriately sized copper. Terminal lugs are not large enough to handle aluminum. See Figure 2.
- **Waterjet Pump Power:** 480 VAC, 3 phase, protected by a circuit breaker / fused disconnect for 100 amps. If customer facility has a lower voltage, the customer is responsible for a step-up transformer. Consult with a licensed electrician. Must be appropriately sized copper. Terminal lugs are not large enough to handle aluminum. See Figure 3.
- **Internet Connection:** A high-speed hard-wired internet connection is needed. The Cat 5 cable will be landed in the control panel. Access through customer's firewall shall allow for remote administration using Team Viewer. Team Viewer is supplied by BACA.



Figure 1: 480VAC Electric Disconnects

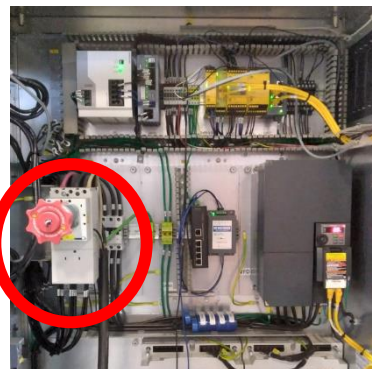


Figure 2: Robot Controller Panel

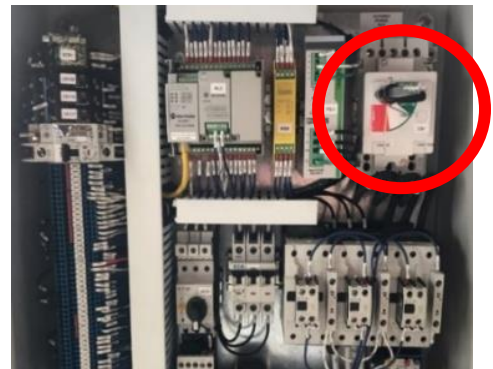


Figure 3: Waterjet Pump Panel

2. WATER REQUIREMENTS

- RSJ requires three (3) separate water utilities. The customer is responsible for providing water sources & connecting to the machine as required. We highly recommend having your water tested to guarantee it meets the water quality requirements listed in this document. Failure to meet the requirements could lead to premature equipment failure.



Figure 4: Waterjet Pump Connections



Figure 5: Waterjet Pump Plumbed (Example)

- **Intensifier Cutting Water In:** Inlet water is pressurized by the intensifier pump & delivered to the cutting nozzle. The cutting water supplied must maintain a minimum of 40 PSI @ 4 GPM. Failure to satisfy requirements will lead to operation faults. ½” NPT connection for Cutting Water In at the rear of the pump. See figure_. Pipe/fittings must be PVC, stainless steel, or copper. Customer must route 1” supply line & or larger & reduce only at the pump. Good water quality will significantly improve the performance life of high-pressure components. Recommended quality standards as follows.

Water Quality Standards			
Constituent (mg/l)	Minimum Requirement	Better	Best
Alkalinity	50	25	10
Calcium	25	5	0.5
Chloride	100	15	1
Free Chlorine	1	.5	0.05
Iron	0.2	0.1	0.01
Magnesium as Mg	0.5	0.1	0.1
Manganese as Mn	0.1	0.1	0.1
Nitrate	25	25	10
Silica	15	10	1
Sodium	50	10	1
Sulfate	25	25	1
TDS*	350	100	50**
Total Hardness	25	10	1
pH	6.5-8.5	6.5-8.5	6.5-8.5
Turbidity (NTU)	5	5	1

* **Note:** Total dissolved solids

****Note:** Do not reduce the TDS beyond this amount or the water will be too aggressive.

- **Cooling Water In:** The cooling requirement for the pump is approximately 35,000 BTU/hr. The unit can be cooled with clean city water or with a chiller. Cooling Water In must maintain 3-5 GPM @ 65°F. 1/2” NPT connection at the rear of the pump. See Figures 4 & 5. Recycled water is not recommended as cooling water. Pump seal life will be reduced if water temperature exceeds 65°F.
- **Cooling Water Out:** To control the flow of the cooling water, a ball valve is recommended on the cooling water outlet. Controlling flow at this point will ensure the heat exchanger is saturated. Cooling Water Out should be plumbed back to the chiller if present, or the water recycling system. 1/2” NPT connection at the rear of the pump. See Figures 4 & 5.
- **Bleed Down:** Only active when the system is depressurized. <1 qt of water per discharge. 1/2” NPT fitting at the rear of the pump. Can be recycled into the gray water system. See Figures 4 & 5.
- **Saw Water:** This water is used to cool the saw blade. It can be clean city water or recycled process water. Must be filtered to 50 microns. Supplemental filtration may be required. A minimum of 5 GPM @ 35 PSI is required with benefit up to 12 GPM. 3/4” NPT & hose barb connection at the robot unit. 50’ of 3/4” ID Supply Hose Provided By BACA.
- **Tank Overflow:** Adequate drainage should be provided to accommodate overflow & spillage of the tanks. There are two 2” NPT bulkheads on each tank acting as overflow drain. BACA provides a plug & 90-degree elbow on each tank. The customer is responsible for piping to drain to the desired location.

3. AIR REQUIREMENTS

- The RSJ requires two (2) separate air connections. Dry air is critical to the performance of the system. Poor air quality can lead to premature component failure & increased garnet flow disruption.
- **Robot Air:** Robot system requires 1 cfm@ 85-100 PSI. This customer supplied connection is a ¼ quick disconnect fitting on the pneumatic regulator mounted on the system perimeter.
- **Bulk Garnet Hopper Air:** The bulk garnet hopper requires 3 cfm at 60-100 PSI. This customer supplied connection is a ¼ quick disconnect fitting on the side of the garnet hopper.

4. ENVIRONMENT REQUIRMENTS

- The RSJ is designed to operate in a temperature range between 41° & 113° F. Additional climate control equipment may be required for facilities that have conditions outside of this range.
- Refer to system configuration layouts for floorplan and elevation details to ensure a proper location for the system in the customer’s production environment.

5. FOUNDATION REQUIREMENTS

- The RSJ Robot requires 8” thick concrete area measuring 54” x 54”. The robot cannot be raised or placed over a seam/joint in the concrete. Must meet the requirements of C20/25 standard. There cannot be reinforcement bars or obstructions that would prevent drilling into the foundation with a standard concrete drill bit. The floor does not have to be level but must be flat, particularly under the robot base. The RSJ can compensate for a slight slope but exceeding 1” slope across the machine footprint should be discussed with BACA Systems. Customer supplied leveling shims may be required. System layout drawings provided by BACA. Location of the system must be determined before the arrival of installers. Customer is responsible for ensuring placement of the machine as provided in the drawing. Customer must verify & confirm that there are no utilities (power, water, air, heat, etc.) in the floor under the system. See Figure 6 for foundation drill pattern. Refer to configuration standards and/or job specific layout for additional spatial references.

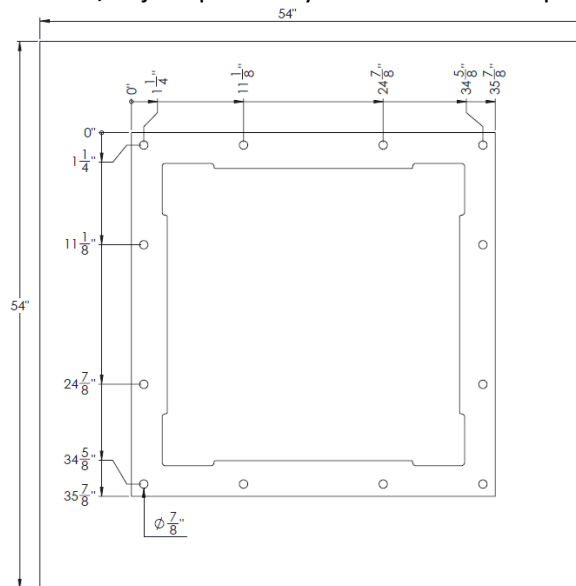


Figure 6: Robot base foundation detail

6. ADDITIONAL CUSTOMER RESPONSIBILITIES

- Approx. 55 gallons of hydraulic oil required. Customer is responsible to supply & fill pump. Acceptable oil types include Chevron Rando HD Oil ISO 46, Conoco Megaflo AW ISO 46, Mobile DTE-25 Medium, Shell Telus S2 M ISO 46, Agip Arnica ISO 46, AW ISO 46. Alternatives are acceptable if they meet or exceeds the specifications of the options listed.
- Customer supplied forklift must have 8,000 lb. payload capacity. The forks no larger than 6.5" x 2.5", a minimum length of 6' & minimum spread of 26" from inside of the left fork to inside of the right fork. Customer must be prepared for the system to arrive on a 48' curtain side truck/trailer & prepared to unload from both sides. Robot to be unloaded using the fork pockets of the base structure. Prepare for a 12' wide table to enter the building if the truck is unloaded outside. Fork pockets on the tables are only present on the wide side.