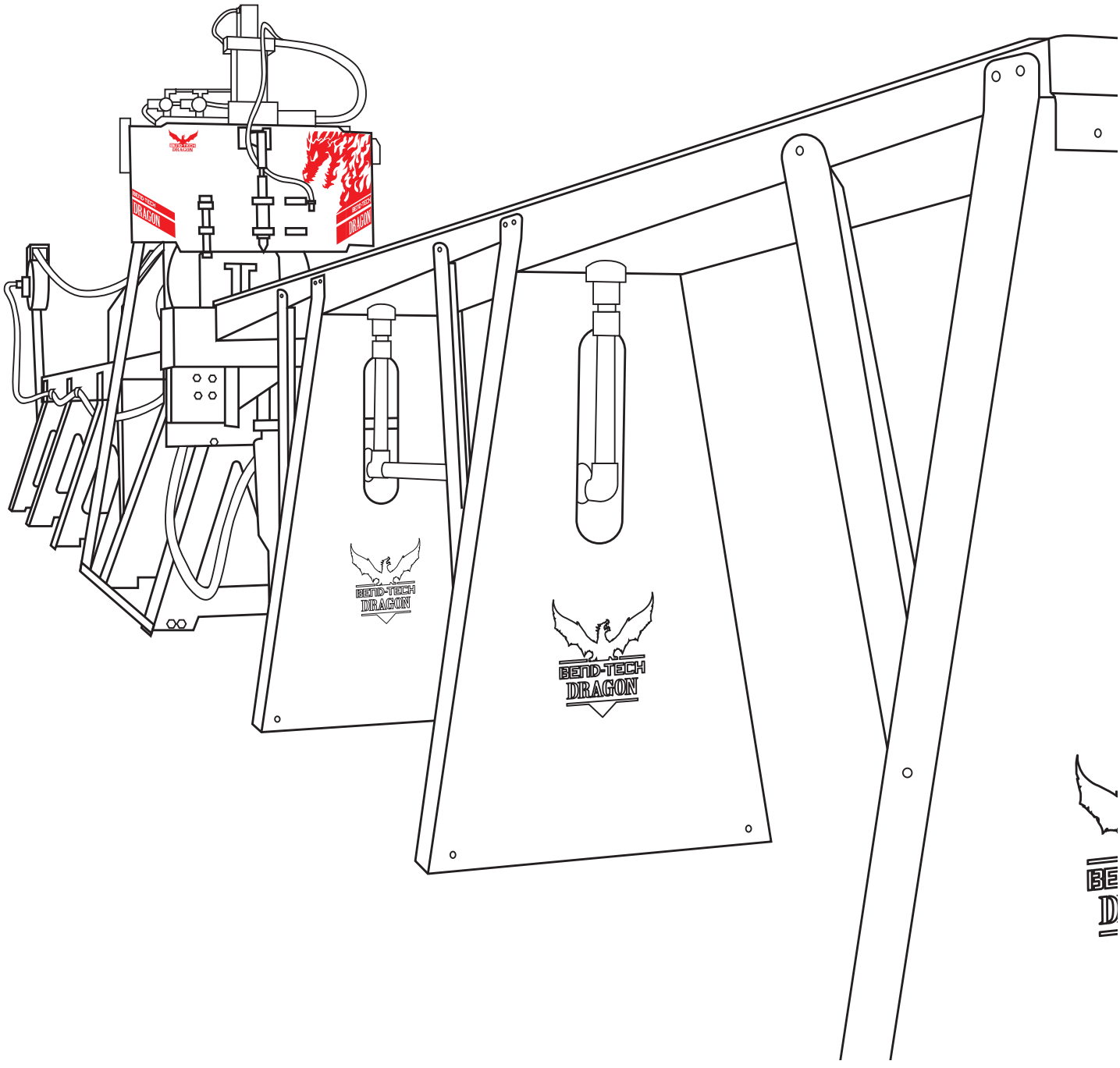
Part 1 of 1

BEND-TECH

DRAGON A400

Cooling System Assembly Manual



Version 3.1 | English

Dragon A400

Cooling System Assembly Manual

Version 3.1

English
Original Instructions

February 2020

Bend-Tech, LLC
729 Prospect Ave.
Osceola, WI 54020 USA

(651) 257-8715
www.bend-tech.com
support@bend-tech.com

Limited Warranty

Covering Bend-Tech Dragon

Bend-Tech, LLC provides a limited warranty on all new Dragon machines that are manufactured directly or under license by Bend-Tech, LLC, and sold by Bend-Tech, LLC or its approved distributors.

Warranty Coverage

Each Bend-Tech Dragon machine is warrantied by the manufacturer against defects in material workmanship for 12-months. The warranty period commences upon delivery of the Dragon machine to the customer's facility.

Repair or Replacement Only

The Manufacturer's sole liability, and the Customer's exclusive remedy under this warranty shall be limited to repairing or replacing the defective part. Repair or replacement of parts is at the sole discretion of the manufacturer. The Customer is responsible for warranty parts installation. Bend-Tech does not provide warranty service labor.

Limits

This warranty does not cover components subject to wear due to normal use of the machine such as belts, lights, tooling etc. This warranty is void if Bend-Tech, LLC has determined any failure is the result of mishandling, abuse, misuse, improper installation, improper storage, improper maintenance or unauthorized modification of the machine. The warranty does not cover damage due to natural disasters, fire, flood or other external factors.

Software

Dragon software is covered by a 2-year maintenance plan from the purchase date of the Dragon A400 machine. After the 2-year maintenance plan is expired, the Customer can purchase a maintenance plan. A maintenance plan will ensure the customer always has the newest version of Dragon software. The maintenance plan is critical to keeping Dragon software updated with the newest capabilities possible, and is critical to the servicing of the machine. Bend-Tech, LLC will contact the Customer regarding updates to the maintenance plan within 1-month of expiration. Contact Bend-Tech Support to ensure software is up to date: support@bend-tech.com.

Customer Service

Any questions or concerns regarding this manual can be directed to Bend-Tech, LLC representatives via the Dragon website, www.bend-tech.com. Click Contact in the menu bar for communication options and send your comments to the Dragon Customer Service department.

Online Resources

- https://www.youtube.com/user/bendtech2020
- http://www.bend-tech.com/wiki7
- http://www.bend-tech.com
- https://www.facebook.com/2020ssi
- https://www.instagram.com/bend_tech

Customer Satisfaction Commitment

Congratulations on your purchase of the world's best CNC plasma tube and pipe cutting machine, the Dragon A400. Bend-Tech, LLC places great pride in customer satisfaction and it is our promise to offer you the best support available for your Dragon A400. We recognize that our support is a key factor in your success.

Contact Us

You can contact Bend-Tech, LLC customer service at 651-257-8715. Our support hours are Monday-Friday, 8:30-5:00 CST. E-mail Bend-Tech, LLC sales at: support@bend-tech.com. Our mailing address is: Bend-Tech LLC, 729 Prospect Ave., Osceola, WI 54020, U.S.A..

Warnings

This manual contains important statements that are called out from the regular text with an associated signal word: “Danger,” “Warning,” “Caution,” or “Note.” Each of these signal words is accompanied by its own icon. These signal words and icons indicate the severity of the condition and the warning. The machine operator should familiarize themselves with these warnings and read the statements before operating the machine.

Definitions & Examples

Danger

Danger indicates a serious condition that could cause severe injury or death to the operator or bystanders if the instructions are not followed.

Example

! Danger !

Exceeding the material weight limit of the Dragon A400 can result in serious injury to the operator and/or bystanders.

Warning

A Warning indicates there is a possibility for minor injury if the instructions are not followed correctly.

Example

! Warning !

Due to the extreme temperatures that result from the plasma cutting process, parts cooled in water in the parts catcher can still be extremely hot. Always use caution when handling newly-cut parts.

Caution

Caution warns the operator that minor injury or machine damage could occur if instructions are not followed. It could also mean that not following directions could affect the overall procedure being performed.

Example

! Caution !

Exceeding the material weight limit can affect performance and possibly damage the Dragon A400.

Note

A Note gives clarification or focuses on information that is critical or unique to an operation.

Example

Water Cooling system greatly reduces smoke and vapor emitted by the machine. Bend-Tech recommends use of the Water Cooling system whenever possible.

Glossary

A400
Indicates machine with 400-lb weight limit.

Axis
A fixed reference line used by the Dragon A400.

Bend-Tech 7X
Machine design software - CAD.

BOB
Breakout Board.

Material Support Lifter
The Material Support Lifter supports material to reduce sag.

Chuck
Located on the Trolley, the Chuck holds the material so it can be moved forward, backward and rotated.

Control Box
Connects Dragon Software Suite to the Dragon A400.

Coolant Tray
Cools cut parts as they are produced.

Drive Belt
The X Motor uses the Drive Belt to power the Trolley along the Rail. The Drive Belt is mounted stationary along the length of the machine.

Drive Belt Pulley
The X motor uses the Drive Belt Pulley to engage the Drive Belt and power the Trolley along the Rail.

E-Stop
Emergency stop.

ESS
Ethernet Smooth Stepper (Control Board).

Ethernet
System for connecting multiple computers via a Local Area Network.

Front Gate
The Gate supports the material at the front of the machine. It consists of two sets of self-centering roller jaws.

Gate Lead Screw
Controls operation and adjustment of the Gate.

Interface
Any particular screen display generated by Bend-Tech software.

Mach3
Machine driver software.

Parts Catcher
The parts catcher is placed at the front of the machine to catch parts as they are cut.

Rail
The Rail is the main structure of the Dragon A400. The Trolley rides on the Rail.

Tail
The Tail is located at the opposite end of the Head of the machine. The Tail arrives pre-assembled. The X Axis homing sensor, Drive Belt Adjustment Block and E-Stop are located at the Tail of the machine.

Toolhead
Operates the Marker, Engraver and Torch.

Trolley
The Trolley rides on the Rail, and carries the Chuck forward and backward along the length of the Rail Support Beam.

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01 Parts and Equipment

1.1 Parts List

Cooling System

- Plug Kit
- Aluminum Trays (3)
- Aluminum Support Legs (3)
- Parts Catcher/Control Box Cover Box
- Reservoir
- Hose Reel
- Hose Reel Mount

Cooling System Hardware (shipped inside water reservoir)

- Hardware Bag
- Material Rollers (3)
- Clear Silicone (1)
- PVC Cement (1)
- Cushion Clamps (6)
- Leveling Feet (6)
- Disposable Mesh Bags (2)
- 8 in. zip ties (8)

Fastener Bag

- Nuts (54)
- Washers (54)
- ¾ in. Button Head Hex Screws (40)
- 1 in. Button Head Hex Screws (14)

PVC Components

- Coupling (5)
- Union (3)
- Bung (4)
- Tee (2)
- Elbow (2)
- Pipe (11)

Reel and Hose Hardware

- ¼-20 T-nuts (6)
- ¼-20 ½ in. Hex head screws
- Flanged hex head screws (8)
- ⅜ nyloc nuts (4)
- ¾ in. FGHT x ½ in. FIP + Male Coupler

- ¾ in. FGHT x 1/8 in. FIP + Male Coupler
- ¾ in. Barb x ¾ in. FGHT w/rubber grommet
- Hose Clamps (2)

1.2 Tools and Equipment

Cooling System Tools List

- 3⁄16 in. Allen wrench
- Rubber Mallet
- 3⁄8 in. Ratchet
- 7⁄16 in. socket
- 9⁄16 in. socket
- Cordless drill or driver with 3⁄8 in. drive or adapter
- 9⁄16 in. wrench
- ½ in. wrench
- Flat head screwdriver

02 Cooling System Assembly

2.1 Overview

The Dragon A400 Cooling System enables the machine to achieve cleaner cuts with less burr and slag. The Cooling System also reduces plasma dust and toxic gas during the cutting process. While the Cooling System will help the Dragon A400 achieve cleaner cuts on any material, it is especially effective when cutting aluminum and stainless steel.

2.1.1 Cooling System Assembly Tools

Before assembling the Cooling System the Installer should ensure the required tools are available. The following tools are required to assemble the Cooling System:

Tools Needed

- 3⁄16 in. Allen wrench
- 9⁄16 in. Wrench
- 3⁄8 in. Ratchet
- 7⁄16 in. socket
- 9⁄16 in. socket
- Impact driver with 9⁄16 in. socket
- ½ in. Wrench
- Slotted or Flat blade screwdriver
- Punch or small Phillips screwdriver
- Utility knife
- Rubber mallet or plastic dead blow hammer
- Large channel lock pliers

2.2 Water Tray System Components

The Water Tray System is placed at the Head of the machine. The Water Tray System serves as both parts catcher and water drainback system for the Cooling System. Before beginning assembly, assure that all components of the Water Tray System are present. The Water Tray System consists of:

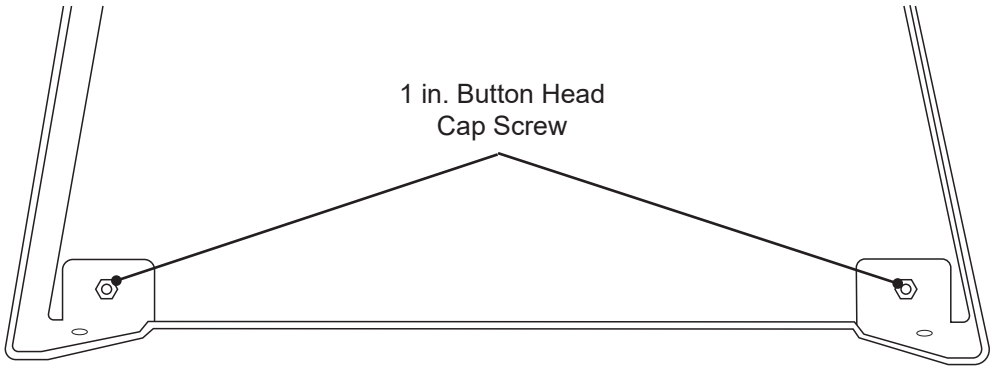
- Aluminum Trays (3)
- Aluminum Support Legs (3)
- Parts Catcher (1)
- Support Leg Braces (6)
- Parts Rollers (3)
- Leveling Feet (6)
- C Bracket (1)

2.2.1 Parts Catcher and Support Leg Removal

If the Installer is adding a Cooling System to a Dragon A400 machine that has already been assembled and run without a Cooling System, it will be necessary to remove the Parts Catcher, Parts Tray and Support Leg from the Beak of the machine. Use a 3⁄16 Allen wrench to remove the four screws that hold the Parts Catcher at the front and back end of the Beak. Remove the eight screws that hold the Parts Tray where the Beak mounts to the Head of the machine. Use a 3⁄16 in. Allen wrench to remove the four Support Leg screws and spacers.

2.2.2 Support Leg Gusset

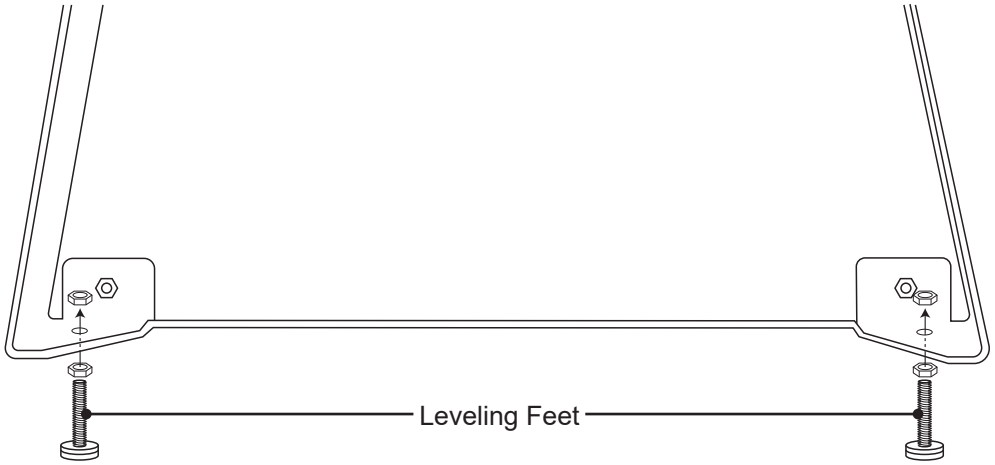
The bottom of each support leg is constructed with an integrated gusset design. In each corner, the Installer will be required to secure the gusset using a 1 in. Button Head Hex Screw, washers and nut. Place a washer on the 1 in. Button Head Cap Screw and insert into the hole in the Support Leg and gusset. Place a washer on the inside and thread a nut onto the Button Head Cap Screw. Use a 3⁄16 in. Allen wrench and 7⁄16 in. wrench or socket and ratchet to tighten the nut, securing the gusset.



2.2.3 Leveling Feet

Locate the Leveling Feet in the hardware bag. Thread a nut onto each leveling foot, leaving about an inch between the base of the foot and the nut. Insert a Leveling Foot into the hole at the bottom of each Aluminum Support Leg.

Thread a second nut onto the Leveling Foot after inserting it in the mounting hole on the bottom of the Aluminum Support Leg. Do not tighten. Leave space for adjustment of the Aluminum Support Leg.

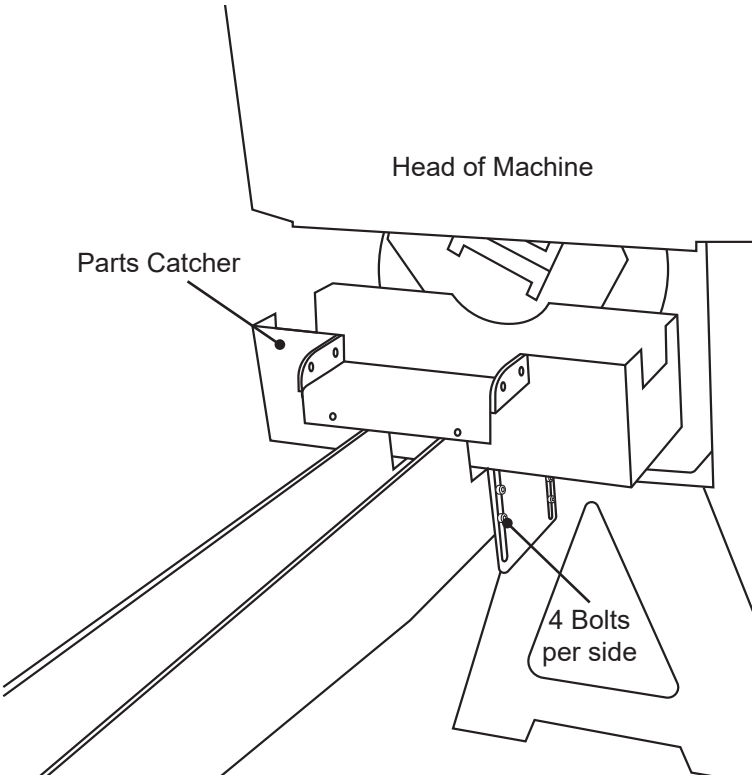


2.2.4 Parts Catcher

Place the Parts Catcher on the Beak at the Head of the machine, just in front of and under the Gate opening.

Locate eight ¾ in. button head screws, nuts and washers from the hardware bag. Insert the eight fasteners through the slotted opening in the Parts Catcher, aligning them with the holes in the Beak.

Ensure the screw heads are on the outside of the assembly and the nuts and washers are on the inside. Thread the nuts on and snug them down. Do not tighten the nuts at this time.

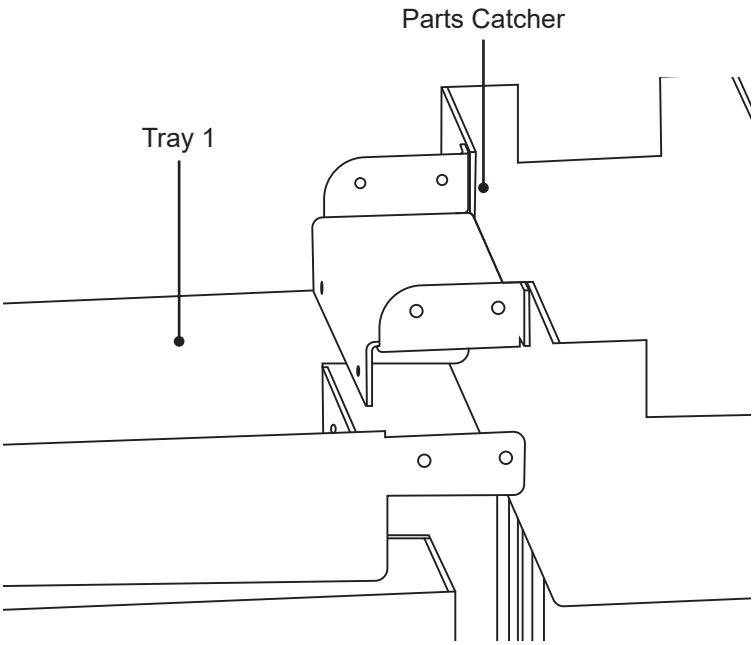


2.2.5 Attach Water Tray to Parts

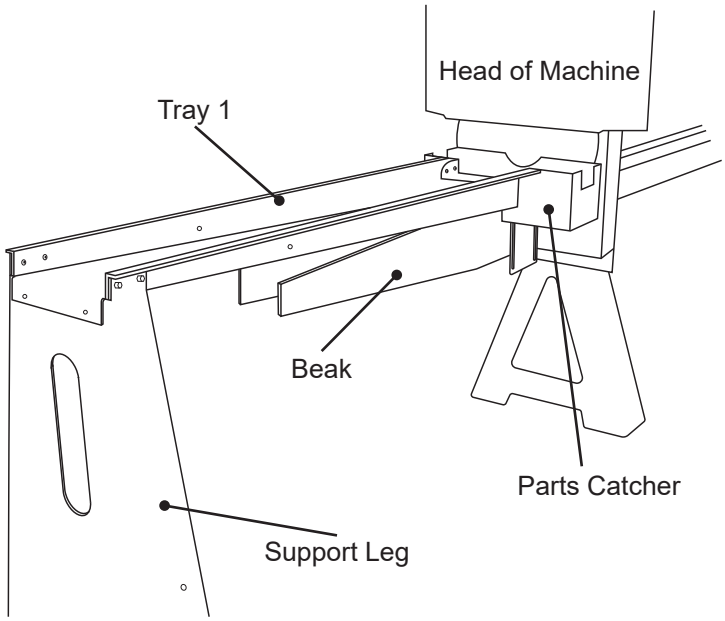
Bend-Tech recommends enlisting a helper when assembling the Water Tray System.

Catcher

When assembling the Water Tray System, the face of the Water Tray is placed behind the flange of the previous Water Tray. The first Water Tray will connect to the Parts Catcher in the same fashion. Position the first Water Tray behind the lip of the Parts Catcher.



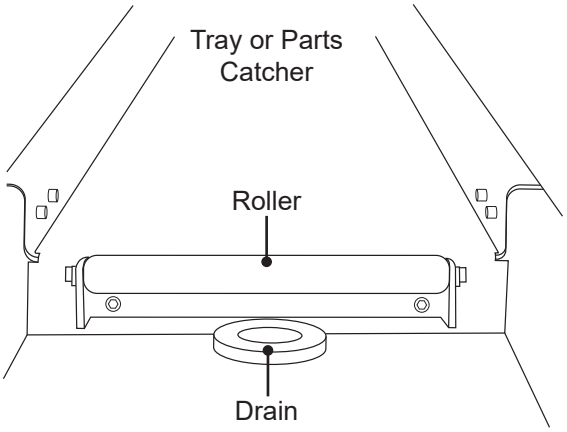
Use one of the Aluminum Support Legs to support the free end of the Water Tray. Use four ¾ in. button head screws, nuts and washers to attach the side tabs on the Water Tray to the Parts Catcher. Feed the screws through the side of the Water Tray so the head of the screw is inside the Water Tray and the nut and washer are on the outside.



Use a punch or small Phillips head screwdriver to help align the mounting holes in the Water Tray system.

Locate one of the rollers from the parts bag. Using two 1 in. button head screws, nuts and washers, attach the roller on the inside face of the Water Tray where it connects to the Parts Catcher. Feed the button head screw through the roller and through the mounting holes in the Water Tray and the Parts Catcher. Ensure the roller is placed as far up as possible.

Tighten all fasteners finger tight.

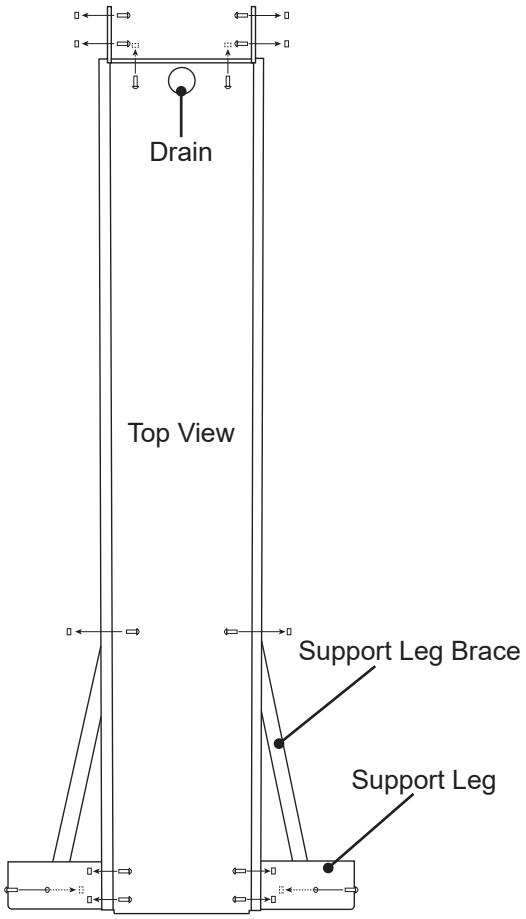


Do not tighten any fasteners on the Tray System Assembly until all components of the Tray System Assembly are connected.

2.2.6 Water Tray System Assembly

Position the second Water Tray behind the lip of the first Water Tray. Use a second Aluminum Support Leg to support the free end of the second Water Tray. Position the first Aluminum Support Leg so the mounting surface is on the outside of both water trays. Align the four mounting holes in the Aluminum Support Leg with the holes on the sides of the first Water Tray and the side tabs on the second Water Tray.

Fasten the sides of the Water Trays and Aluminum Support Leg together using four 1 in. button head screws, nuts and washers. Ensure the heads of the screws are on the inside of the water tray and the nuts and washers are on the outside. Do not tighten.

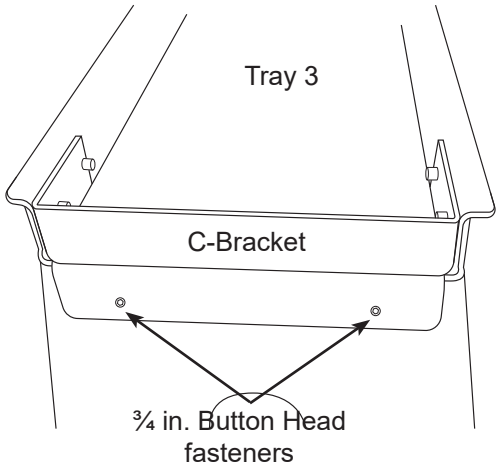


Using ¾ in. button head screws, attach a Parts Roller at the front of the Water Tray, feeding the button head screw through the roller, the flange of the first Water Tray and front of the second Water Tray. Place a washer and nut on each button head screw and tighten finger tight.

Repeat this process with the third Water Tray.

2.2.7 C Bracket

Place the C Bracket at the front end of Aluminum Tray No. 3. Align the mounting holes of the third Aluminum Support Leg with the holes in the Water Tray and C Bracket.

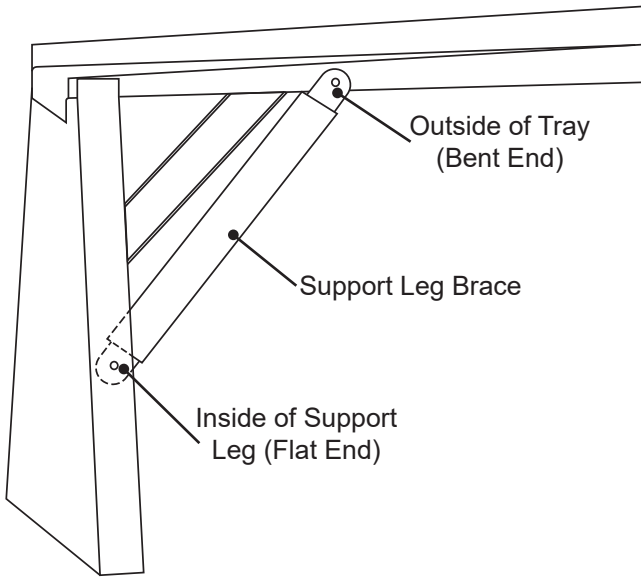


Insert four ¾ in. button head fasteners with the heads on the inside of the Water Tray and the nuts and washers on the outside of the Aluminum Support Leg. Tighten finger tight.

Below the C Bracket, insert two ¾ in. button head fasteners, with the heads on he outside of the tray flange and support leg and the nuts on the inside, to secure the third tray flange to the third Support Leg. Tighten finger tight.

2.2.8 Aluminum Support Leg Braces

Starting at the front of the system, use (12) ¾ in. button head screws, washers and nuts to attach the Aluminum Support Leg Braces to the Aluminum Support Legs and the Water Trays.



Attach the flat section of the Aluminum Support Leg Brace to the inside the of the Aluminum Support Leg, inserting the button head screws so the head is on the outside of the Aluminum Support Leg and nut and washer are on the inside.

Attach the bent end of the Aluminum Support Leg Brace to the outside of the Water Tray, feeding the button head screw from the inside of the Water Tray and the nut and washer are on the outside.

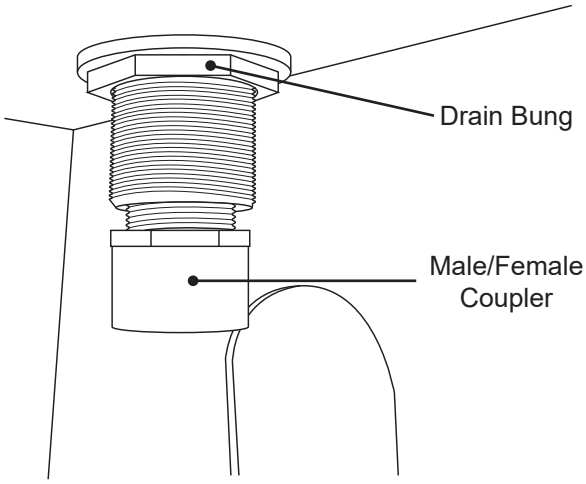
2.2.9 Finishing the Tray System Assembly

Finish the Tray System Assembly by first positioning the Parts Catcher in the desired position on the Head of the machine and tightening securely. Working front to back, use a 3⁄16 in. Allen wrench and 7⁄16 in. wrench to tighten all fasteners on the Aluminum Trays and the Support Leg Braces. Tighten securely. Take care to position the rollers so they sit above the surface of the Tray System, adjusted as high as possible.

When in use, the rollers should keep parts from resting on the bottom of the Tray System.

2.3 Water Tray Drain System

The Cooling System's Water Tray Drain System collects water from the Tray System, holds it in the Cooling System Reservoir and recirculates it back through the material.



2.3.1 Bung Installation

Locate the four drain bungs in the PVC parts bag. Remove the coupling nuts from each drain bung. Insert a bung into the drain hole in each Aluminum Tray and in the Parts Catcher. Thread the nuts back onto each bung underneath the Aluminum Tray and tighten securely using a large channel lock pliers. Locate the male/female couplers in the PVC parts bag. Thread one PVC male/female coupler into each drain bung.

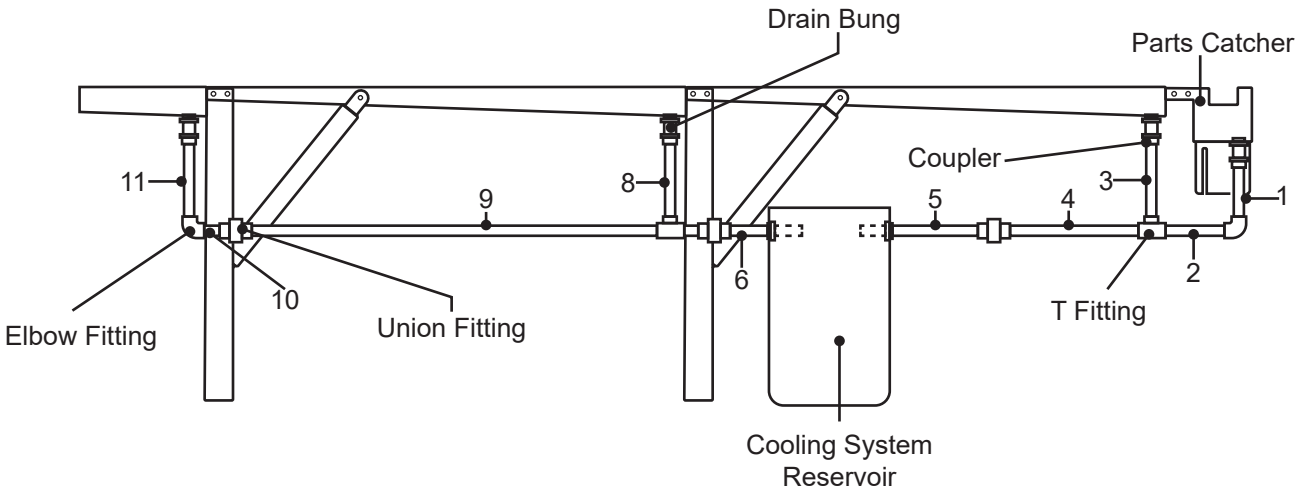
Also thread one PVC coupler into the bung inside the parts catcher. This will allow the Parts Catcher to hold water to help cool parts.

Teflon tape or plumber's tape can help seal the male/female coupler in the drain bung.

2.3.2 PVC Drain Installation

The PVC drain system is installed beginning at the Parts Catcher and then working to the end of the Tray System. The PVC Parts are numbered in order of installation. During this process the Installer will also place and connect the Cooling System Reservoir. Using PVC cement, install the parts per diagram 2.3.3.

2.3.3 Tray System Drain Diagram



2.3.4 Placing the Cooling System Reservoir

Place the Cooling System Reservoir according the diagram in section 2.3.3. Install the screens on the drains feeding into the Cooling System Reservoir. Secure using zip ties.

Fit the No. 5 and No. 6 PVC pieces through the grommets in the reservoir.

Depending on the size of the the water pump used, the pump may need to be placed into the reservoir prior to connecting the reservoir to the rest of the PVC drain system.

2.4 Water Pump

The Cooling System requires the addition of a water pump to be operational. Because customer needs can vary, Bend-Tech does not supply a water pump with the Cooling System. The Customer will be required to supply a water pump to complete the Cooling System. Refer to section 2.4.1 for water pump specifications.

2.4.1 Water Pump Requirements

The water pump must be submersible and able to fit inside the Cooling System Reservoir. The pump must have the capacity to adapt to ¾ in. GHT (garden hose) fittings.

2.4.2 Water Pump Specifications

Water Pump Specifications

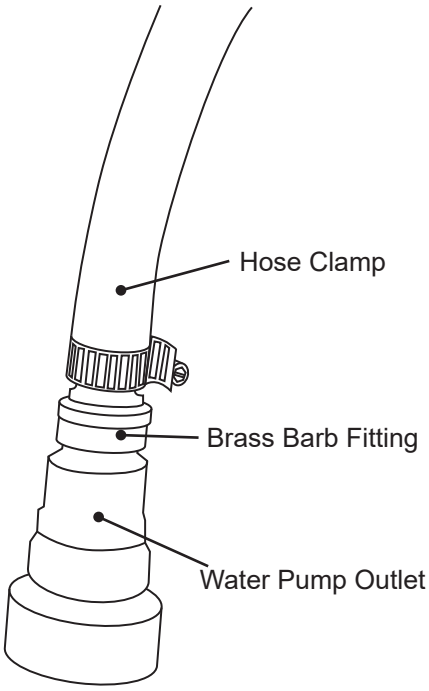
Voltage	120VAC
Running Amps	6.5
Horsepower	.5
Volume	57GPM/3420GPH

2.5 Hose System

The Cooling System uses a Hose System to transport water from the Cooling System Reservoir back through the material.

2.6 Connect the Pump

Locate the brass ¾ in. FGHT to ¾ in. barb fitting and attach to the water pump. Using a hose clamp from the hose attachment bag, place the clamp over the end of the long hose and slip the hose onto the barbed fitting. Tighten the hose clamps securely.

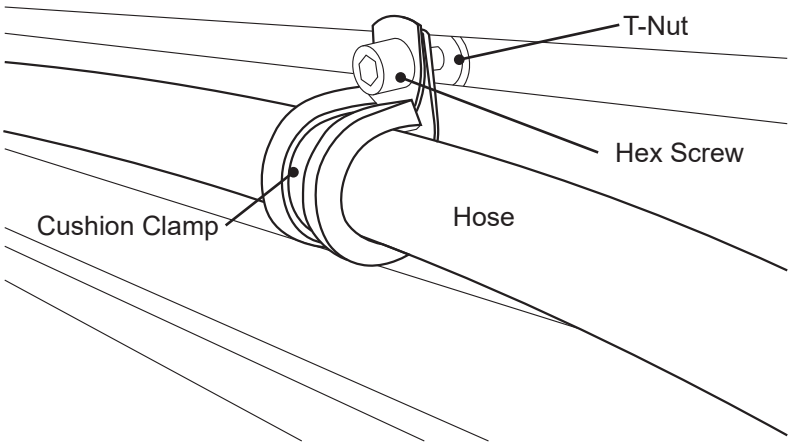


2.7 Install the Water Pump

With the hose attached to the pump, set the pump inside the Cooling System Reservoir. Install the cover on the Cooling System Reservoir, routing the water pump power cord and hose through the opening in the cover. Attach the wireless remote-control outlet to the water pump power cord, and then the yellow GFCI power cable to the remote-control outlet.

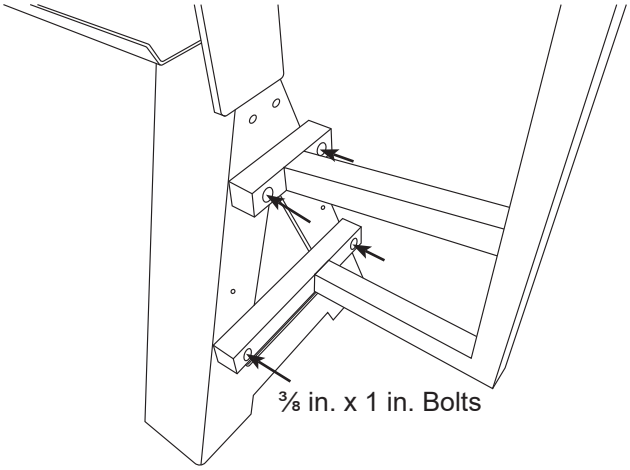
2.8 Attaching the Hose to the Rail Beam

Locate six T-nuts and six ½ in. hex screws from the hardware bag, along with six cushion clamps. Loop the cushion clamps around the hose, spacing evenly at intervals along the Rail Beam. Attach the cushion clamps to the Rail Beam using the T-nuts and hex screws.



2.9 Hose Reel Mount

Attach the hose reel mount to the Tail of the machine. The mount bolts to the outside of the last leg of the machine using four ⅜ in. x 1 in. hex bolts. Tighten the bolts securely using a 9⁄16 in. socket and ratchet.

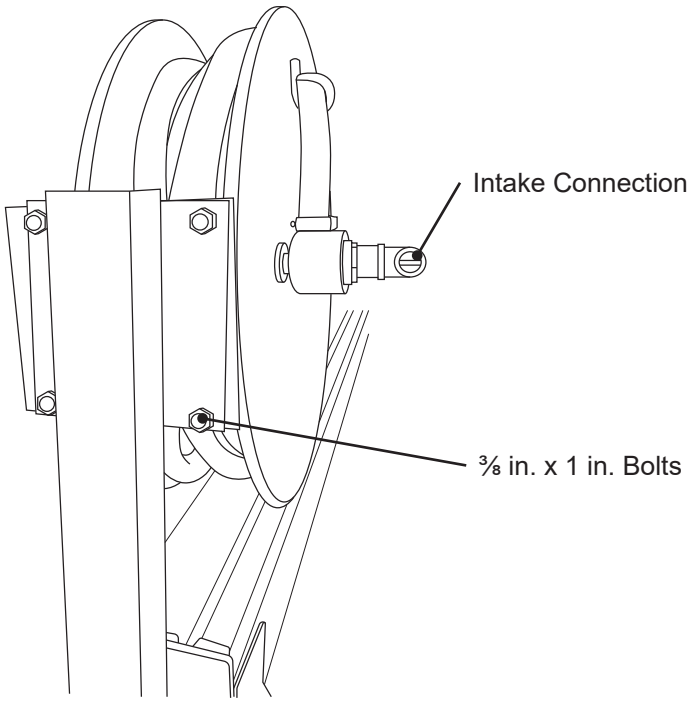


2.10 Hose Reel

The Hose Reel is heavy, enlist help during the mounting process.

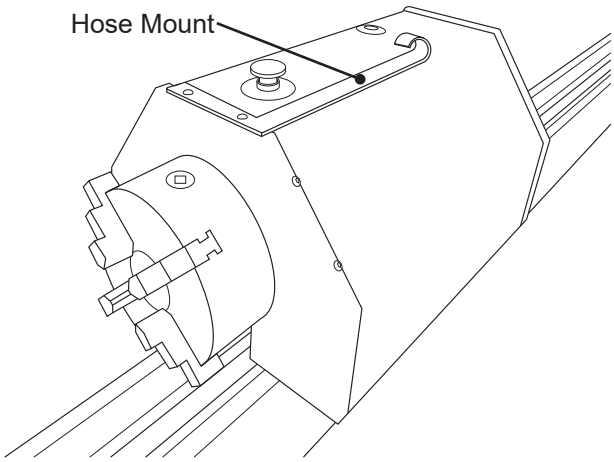
Locate four ⅜ in. x 1 in. hex bolts and four nyloc nuts in the hardware bag. Position the hose reel in place on the hose reel mount, aligning the four mounting holes. Insert the ⅜ in. x 1 in. hex bolts one at a time, with the head on the hose reel side. Thread the nyloc nuts on until they hit the nylon insert. When all four bolts are in, tighten securely using a ⁹⁄₁₆ in. wrench and socket.

Connect the water hose to the brass connection on the side of the hose reel and secure with a hose clamp



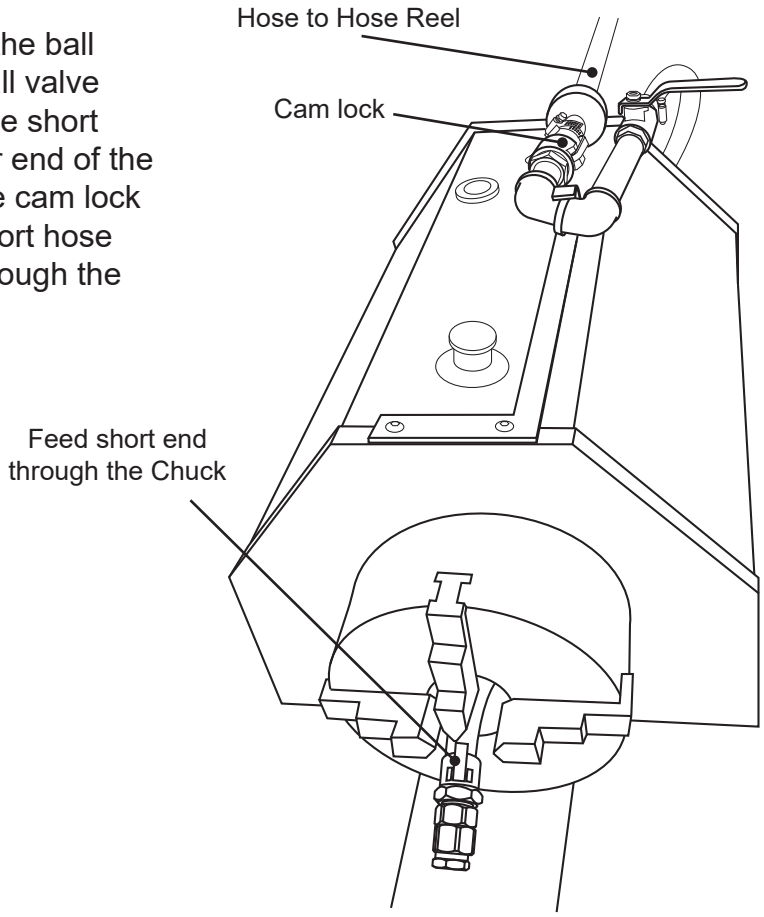
2.11 Trolley Hose Mount

Remove the two screws at the front of the Trolley cover, just above the Chuck. Place the Trolley hose mount on the Trolley cover. Fasten to the Trolley cover using the two Trolley cover screws.



2.12 Connect the Hose

Feed the hose from the Hose Reel to the ball valve on the Trolley. Connect to the ball valve using the cam lock coupling. Locate the short section of hose and attach to the other end of the ball valve and pipe assembly using the cam lock coupling. Feed the other end of the short hose through the back of the Trolley and through the Chuck.



2.13 Leveling the Aluminum Tray System

To ensure even water flow in the Aluminum Tray System it is important the Aluminum Tray System is level side-to-side and front to back. Use a bubble level placed on the edges of the Aluminum Tray System to determine if the system is level. Adjust the system using the Leveling Feet. Use a 7⁄16 in. wrench to turn the bottom nut on each leveling foot to adjust. Once level, tighten the top nut on the leveling foot.

2.14 Sealing the Aluminum Tray System

Using the silicone sealant, place a bead of silicone around all gaps and seams in the Water Tray System. Use a finger to spread the silicone evenly along the gaps and seams. Allow to cure before using the Coolant System.

2.15 Control Box Cover

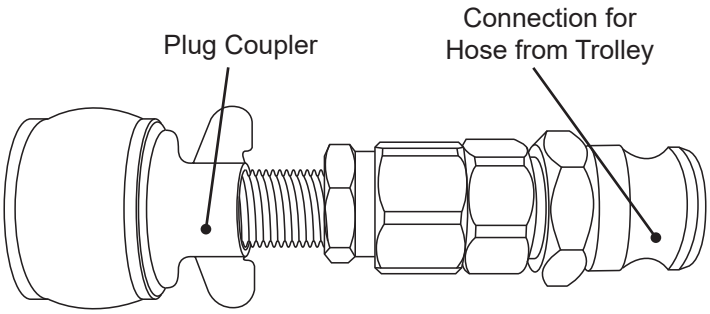
Fit the Control Box Cover in the space above the Control Box. The Control Box Cover fits tightly in the space above the Control Box with no fasteners. Bend-Tech recommends applying silicone around the edges of the Control Box Cover to help seal out water that may spill onto it. Apply silicone where the Rail sections join above the Control Box.

2.16 Fill the Reservoir

Fill the reservoir to within six inches of the top with clean tap water. Plug in the water pump.

2.17 Male Plug Coupler

With the Water System complete, choose the appropriate plug coupler for the size material being processed in the machine. There are two plug coupler adapters provided with the Cooling System, one for larger plug couplers and one for smaller plug coupler. Choose the appropriate plug coupler adapter and connect to the short hose using the cam lock coupler. After feeding the material through the Gate, insert the plug coupler inside the material, making sure it seals to the inside of the material. Feed the material into the Chuck taking care not to upset the plug coupler seal. Take care not to damage or kink the hose.



The Cooling System is now ready for operation.

Bend-Tech, LLC

729 Prospect Ave. Osceola, WI 54020
1-651-257-8715

sales@bend-tech.com
www.bend-tech.com