

OPERATING INSTRUCTIONS

WARNING: To ensure operator safety and efficient operation of the Caviblaster™, it is essential to follow these instructions.

Preparing the Caviblaster™ unit:

1. Inspect the Caviblaster™ power unit, hoses and lance for any signs of damage.
2. Check oil, coolant and fuel levels:
Proper oil level in pressure pump (sight glass on back of pump) (Figure 1). Proper oil (Figure 2) and coolant (Figure 3) levels in engine. Off-road diesel fuel level (Figure 4).



Figure 1



Figure 2



Figure 3



Figure 4

3. Fill appropriate fluid(s) to proper level(s) as necessary and per operator's manuals.

- When feeding the Caviblaster™ with the feed pump (Figure 5), connect the 1-1/2" diameter clear PVC feed hose to the inline strainer (Figure 6). The hose has a suction strainer on one end and a stainless steel female cam-lock on the other end. **Ensure that the feed hose is connected to the inline strainer and that the suction strainer is securely submerged in the water prior to starting the feed pump.** Either fresh water or seawater can be used with this unit.

When feeding the Caviblaster™ with a pressurized water source, the source must be able to supply water at a volume of over 20 gallons per minute at a maximum 70-psi. Connect the water source to the inline strainer (Figure 6). **Ensure that the feed hose is connected to the strainer prior to starting the pressure pump.**

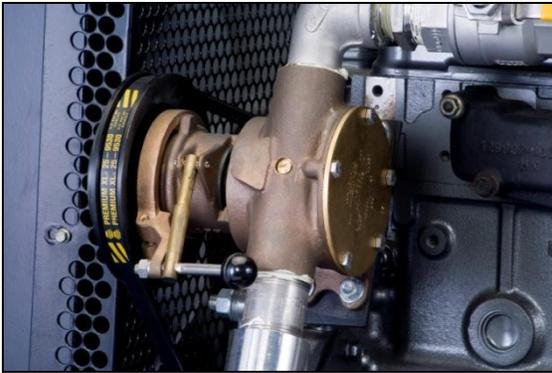


Figure 5



Figure 6

- Connect the 1" diameter red rubber bypass hose to the cam-lock plug under the pressure regulator (Figure 7). The hose has a stainless steel female cam-lock on one end. Direct the bypass hose away from the working area and secure the hose.
- Connect the 3/4" diameter black high-pressure hose to the male JIC fitting on the pressure regulator (Figure 7). The high-pressure hose has a stainless steel female JIC fitting on the end. The YC-2040 Caviblaster™ can deliver the required pressure utilizing up to 600 feet of 3/4" hose. Using greater lengths or smaller diameters of hose may degrade performance.



Figure 7

Starting the Caviblaster™ unit:

1. Ensure that the feed pump clutch and power takeoff (“PTO”) levers are in the “off” positions (Figures 5 and 8).
2. Open the fuel feed valve (Figure 9).

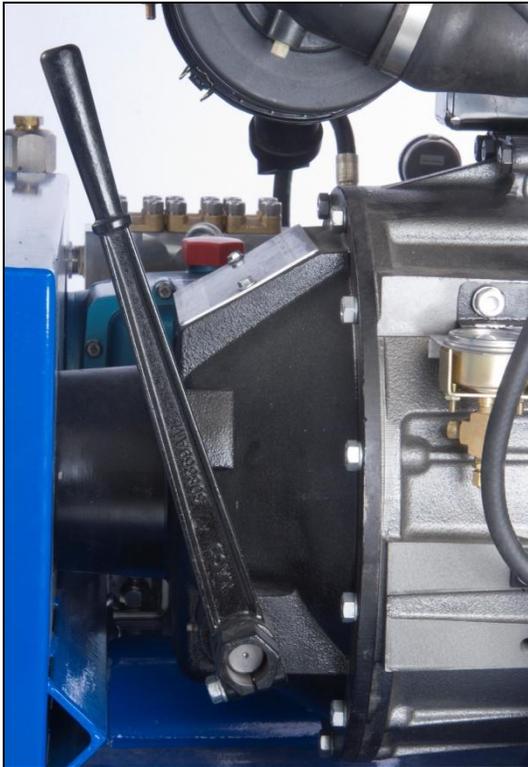
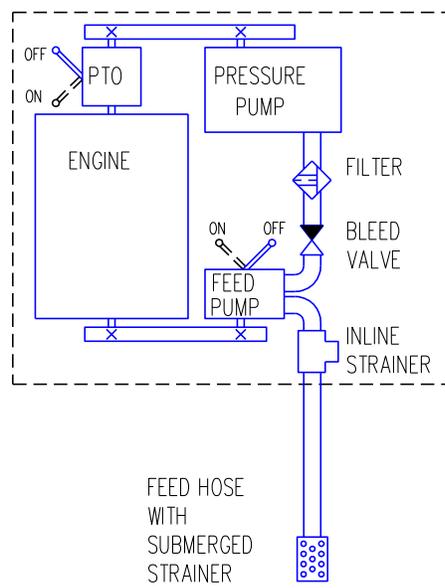


Figure 8



Figure 9



Schematic 1



Figure 10

3. Connect the air hose to the air starter (Figure 10), open the valve, start the engine, shut off air supply to the air starter, close the valve and adjust the throttle to operating speed (Figure 11).



Figure 11



Figure 12

4. If using the feed pump, ensure that the three-way valve is set to route water to the feed pump (red handle horizontal) and that the ball valve after the feed pump is open (yellow handle horizontal) (Figure 12). Start the feed pump by moving the clutch lever to the “on” or up position (Figures 12 and 13).

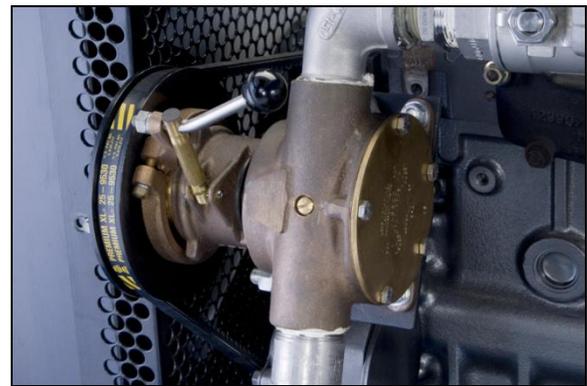


Figure 13

If using a supplied water source, ensure that the three-way valve is set to bypass the feed pump (red handle vertical) and that the ball valve after the feed pump is closed (yellow handle vertical) (Figure 14). Open the valve or start the supply pump to provide water to the system but **do not engage the feed pump**.

5. Ensure that the system is primed with water and that there are no leaks in the system. Use the red bleed button on the top of the filter to bleed air out of the system (Figure 15). The pressure pump is a positive displacement pump and water must be supplied to this pump. **Failure to pump feed water to the pressure pump will result in damage to the pump.**



Figure 14



Figure 15

6. Connect the lance (Figure 16) to the end of the black high-pressure hose and submerge the lance in the water.
7. The system is now ready to operate.

WARNING: Even though the Caviblaster™ system is safe to use when submerged in water, it generates a high-pressure (up to 3,500-psi) water stream, which can cause injury when out of the water. ALWAYS keep the lance submerged when the pressure pump is on.



Figure 16

Operating the Caviblaster™ unit:

1. When the diver is ready to commence cleaning operations, ensure that the lance trigger is in the open or “on” position (Schematic 2), the lance is submerged in water and the feed pump is operating prior to engaging the pressure pump.
2. Engage the pressure pump by moving the PTO lever toward the engine to the “on” position (Figure 17).
3. **The most efficient operating technique is to hold the lance 2 - 3 inches away from the surface to be cleaned and at a 25-45 degree angle to the surface being cleaned (Schematic 2).** Placing the lance closer than 2 - 3 inches from the surface being cleaned will not allow for efficient cavitation performance and will degrade the cleaning capability of the Caviblaster™ system.
4. Follow all safety regulations that may be applicable to the work being performed.

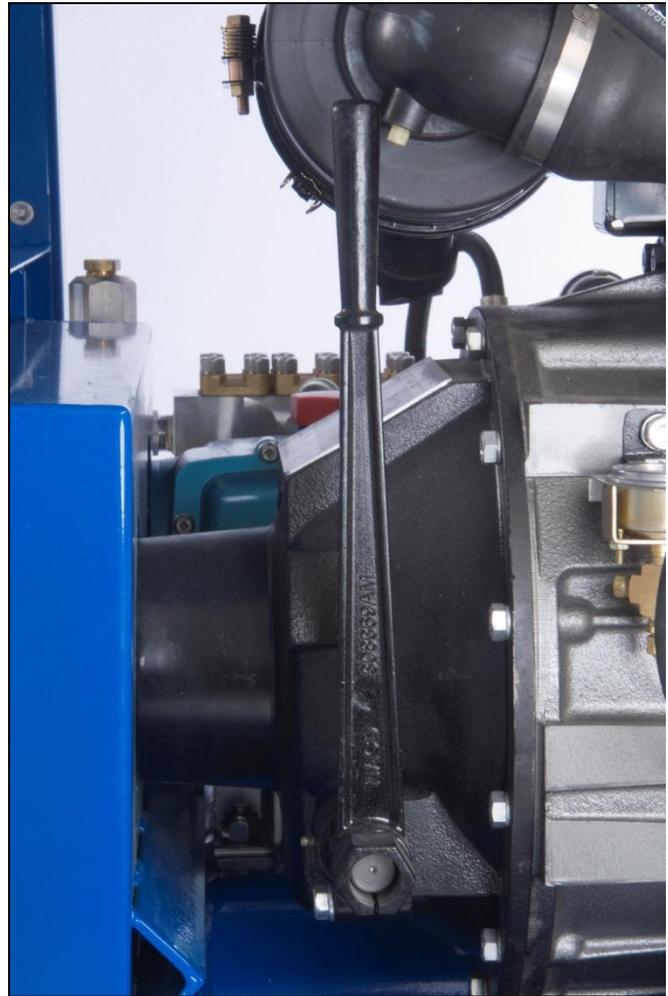
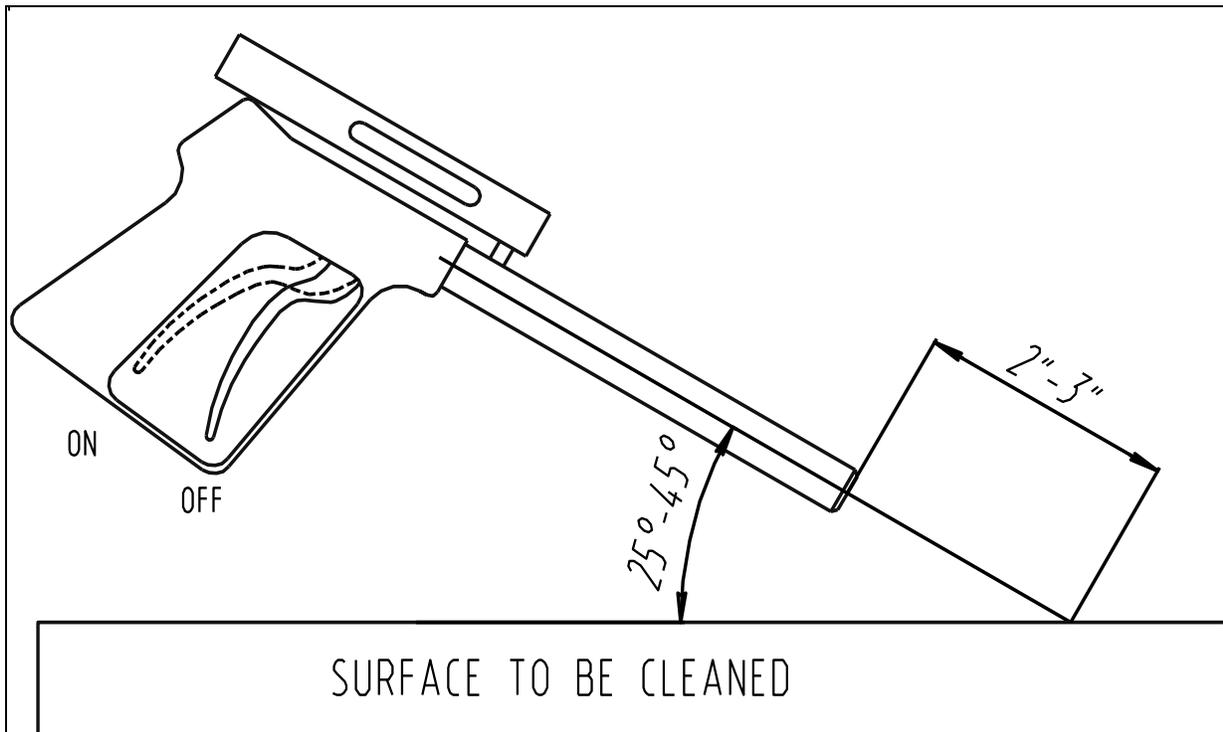


Figure 17



Schematic 2

5. If the diver operating the Caviblaster™ unit must be replaced or the cleaning operation must be terminated, disengage the pressure pump by moving the PTO lever to the “off” position (Figure 8) and release the water pressure in the system by moving the lance trigger to the open or “on” position (Schematic 2) while under water. Revert back to step 1 of the operating instructions when the replacement diver is ready to continue cleaning.
6. Ensure that the lance is submerged any time the pressure pump is operating.

Shutting down the Caviblaster™ unit:

1. Stop the pressure pump by moving the PTO lever to the “off” position (Figure 8).
2. Squeeze the lance trigger to the open or “on” position (Schematic 2) to release water pressure remaining in the hoses.
3. Stop the feed pump by moving the feed pump clutch lever to the “off” or down position (Figure 5).
4. Shut down the engine by pressing the engine shutdown plunger (Figure 18).
5. It is now safe to remove the lance from the water.

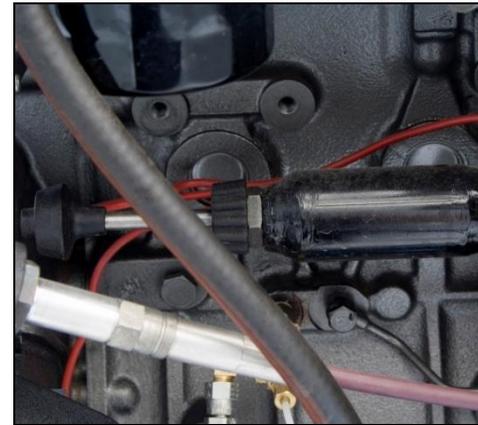


Figure 18



Figure 19

Emergency shutdown of the Caviblaster™ unit:

1. Close the emergency air intake shutdown valve (“**ESV**”) (Figure 19) mounted on the air intake hose by pushing the handle down.
2. If the diver is able, release the pressure in the hoses by pulling the lance trigger to the open or “on” position (Schematic 2).
3. Prior to restarting the unit, disengage the pressure and feed pumps by moving both levers to the “off” positions (Figures 8 and 5) and open the ESV (Figure 19).

Maintenance of the Caviblaster™ unit:

1. Empty and clean the inline strainer (Figure 6) and filter cartridge (Figure 15) every day.
2. Check the oil levels in the pressure pump (Figure 1) and engine (Figure 2) every 8 hours.
3. Inspect the pump drive belts on a daily basis and replace the belts when cracking appears.
4. Change the engine oil and oil filter (Figure 2) every 150 hours.
5. Change the oil in the pressure pump every 500 hours.
6. Change the spring in the lance (Figure 16) every six months or as required.

Summarizing the operating instructions:

1. Check oil, fuel and coolant levels and ensure that the inline strainer and filter are clean.
2. Attach all hoses to the unit.
3. Make sure that both feed pump and power takeoff levers are in the “off” position.
4. Start the engine, remove air supply and adjust throttle.
5. Engage the feed pump or turn on the alternate water source, make sure the system is primed, and disengage the feed pump or shut off alternate water source.
6. Inspect the lance (including the reverse-thrust nozzle guard) and attach to the pressure hose.
7. Make sure the diver is ready to work and the lance is submerged in water.
8. Start the feed pump or alternate water source to supply water to the pressure pump.
9. Engage the pressure pump to supply water to the lance.
10. Proceed with cleaning.
11. Disengage the pressure pump.
12. Release pressure from the system by pulling the lance trigger to the open or “on” position.
13. Stop the feed pump.
14. Shut down the engine.
15. Remove the lance from the water.

WARNING

While the Caviblaster™ system is very safe, operators should exercise care when using the equipment. The cavitation “flame” and reverse-thrust jet can be safely passed over the operators’ skin at normal operating distances of 3” – 5” from the tips of the nozzles. However, at very close distances (typically less than 1” – 1-1/2”) they are capable of causing harm to the operator, particularly in the initial instant that the system is activated. For that reason, **operators should exercise caution when operating the lance with the nozzles in close proximity to the body. The operators should also ensure that the reverse-thrust nozzle guard is secured in the correct position prior to operating the lance.**

The operators of the Caviblaster™ system should always wear neoprene or heavy rubber gloves to provide protection to the hands and, in particular, to the nails. The gloves will absorb most of the energy produced by bursting cavitation bubbles and prevent the cavitation bubbles from contacting the operators’ hands. The gloves will also protect operators’ hands from the initial shockwave when the lance is activated.

Serious harm and injury may result from the misuse of Caviblaster™ system equipment or improperly selected fittings, hoses or attachments. All components of the system should be checked against the manufacturer’s instructions to ensure that they are compatible with the pressures being used and of the correct thread type and pressure rating for the intended service. Refer to these Operating Instructions and to the engine and pressure pump manufacturers’ operation manuals for instructions or call Cavidyne, LLC at (352) 384-0961 with any questions.