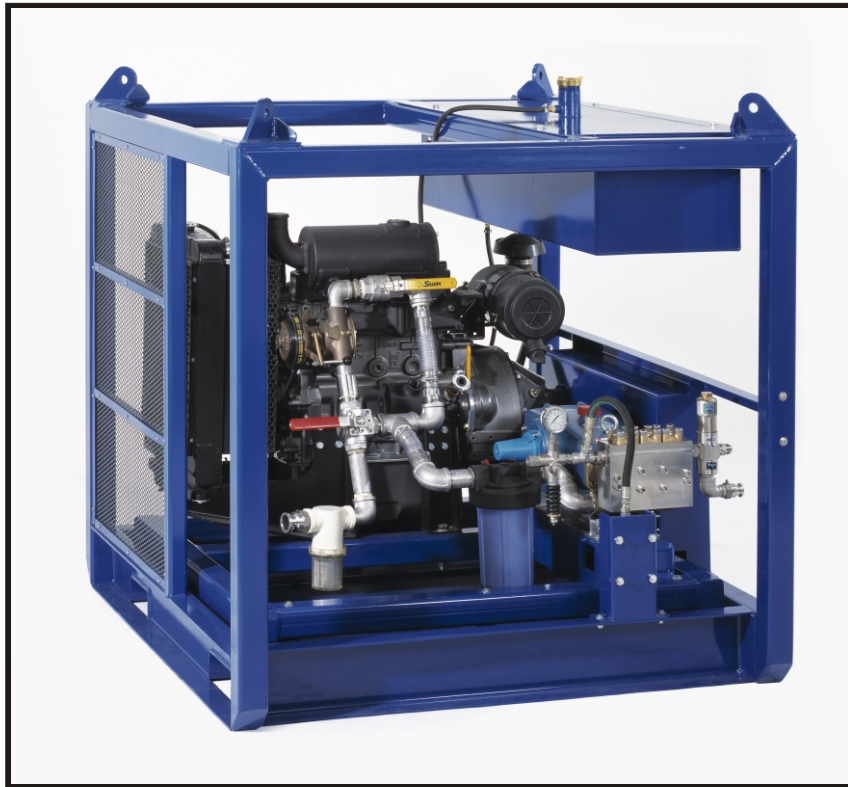




***CAVI*BLASTER™**



Model YC - 2040

Patent Pending

Operation & Maintenance Manual



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YC-2040 OPERATING INSTRUCTIONS

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

Preparing the CaviBlaster™ system for operation:

1. Inspect the CaviBlaster™ power unit, hoses and lance for any signs of damage.
2. Inspect inlet strainer (Figure 1) and inline filter (Figure 2) to ensure that they are not clogged. Clean if necessary.

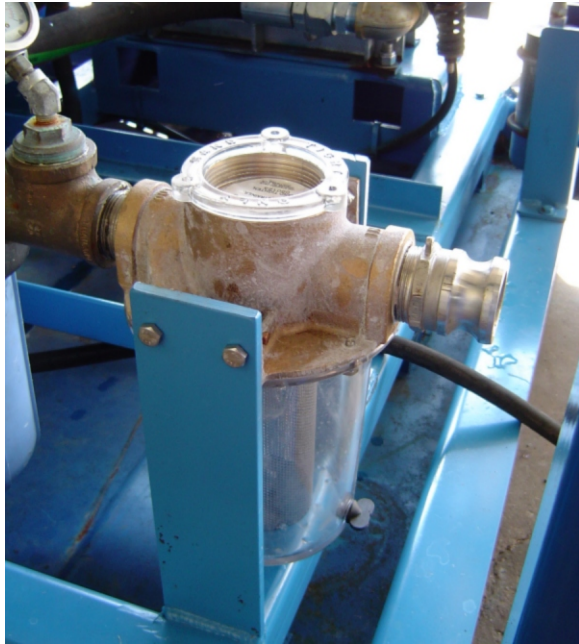


Figure 1



Figure 2

3. Check oil, coolant and fuel levels:
Proper oil level in the pressure pump (sight glass on back of pump) (Figure 3). Proper oil (Figure 4) and coolant (Figure 5) levels in the engine. Off-road diesel fuel level in fuel tank (Figure 6).
4. Make any required repairs and fill appropriate fluid(s) to proper levels as necessary and per pressure pump and engine manufacturers' operator manuals.



Figure 3

- When feeding the CaviBlaster™ with the air diaphragm feed pump (Figure 7), connect the 1-1/2" diameter clear PVC feed hose to the suction side on the air diaphragm pump and connect the black hose from the pump to the inline strainer (Figure 1). The feed hose has a suction strainer on one end and a stainless steel cam-lock socket on the other end. **Ensure that the suction strainer is securely submerged in the water prior to starting the diaphragm pump.** Either fresh water or seawater can be used with this unit.



Figure 4



Figure 5

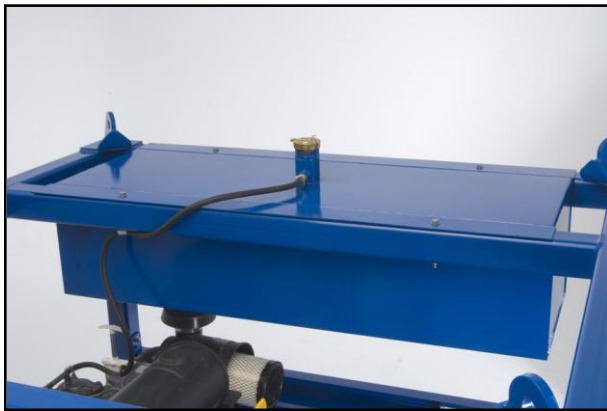


Figure 6



Figure 7

The source must be able to supply water at a volume of over 20 gallons per minute at a maximum pressure of 70-psi.

- Connect the 1" diameter red rubber bypass hose to the cam-lock plug under the pressure regulator (Figure 8). The bypass hose has a stainless steel cam-lock socket 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 8). 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.**

Starting the CaviBlaster™ power unit:

1. Ensure that the feed pump clutch and power takeoff (“PTO”) levers are in the “off” positions (Figures 7 and 9) and the throttle is at idle position (Figure 12).
2. Open the fuel feed valve (Figure 10).
3. Connect the compressed air hose to the air starter (Figure 11), open the valve (yellow handle) on the air starter, turn on the compressed air source to start the engine, leave the air supply to the air starter on, the feed pump needs the air to run.
4. Depress the button on the end of the throttle cable (Figure 12) and pull all the way out to adjust to operating speed. Tighten the thumb screw to hold the throttle cable in the operating speed position.



Figure 8



Figure 9



Figure 10



Figure 11



Figure 12

6. Engage diaphragm pump and insure that the system is primed with water and that there are no leaks in the system. Use the red bleed button on top of the filter (Figure 2) to bleed air out of the system. The pressure pump is a positive displacement type pump and water must be supplied to this pump.

Failure to pump water to the pressure pump will result in damage to the pump.

7. Connect the lance to the end of the black high-pressure hose (Figure 16) and submerge the lance in the water. Pull trigger on lance to bleed air out of hose BEFORE engaging PTO.
8. The system is now ready to operate.

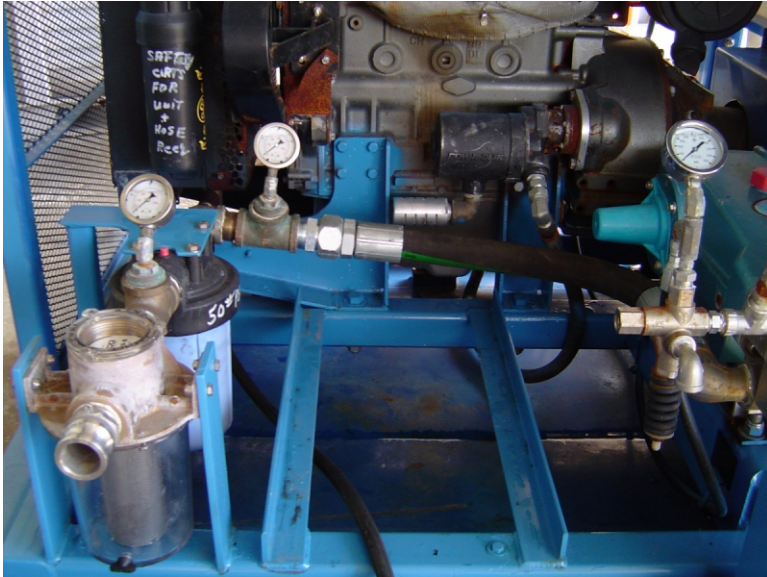


Figure 15



Figure 16

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.

Operating the CaviBlaster™ system:

1. When the diver is ready to commence cleaning operations, ensure that the lance trigger is in the open or “ON” position (Figure 17), the lance is submerged in water, and the feed pump is operating or water is being supplied prior to engaging the pressure pump.

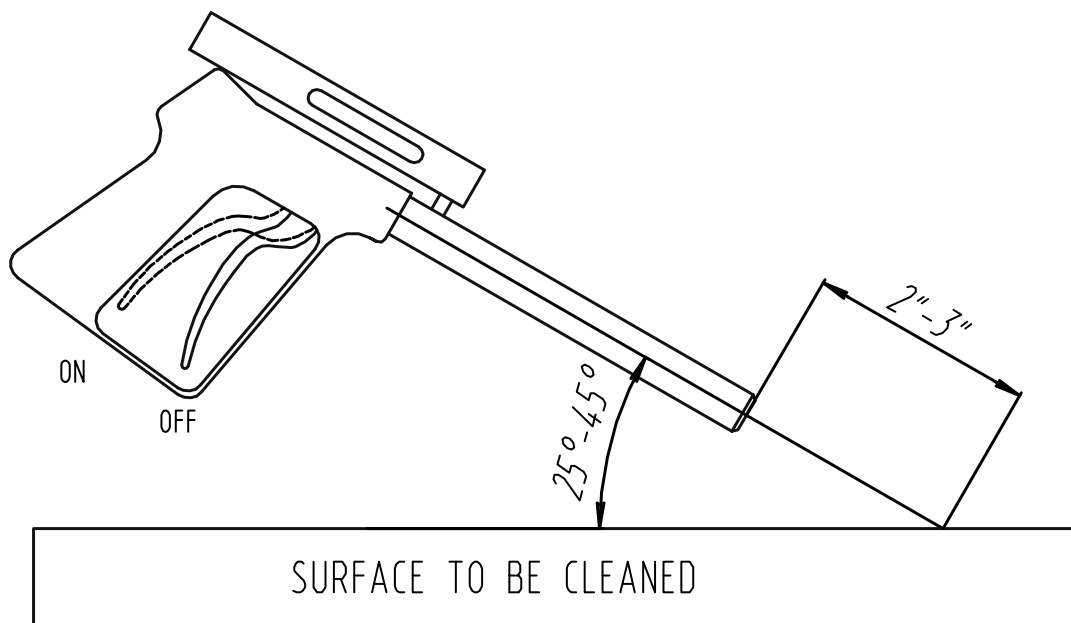


Figure 17

2. Engage the pressure pump by moving the PTO lever toward the engine to the “on” position (Figure 18).
3. The most efficient operating technique is to hold the lance 2 – 3 inches away from and at a 25 – 45 degree angle to the surface being cleaned (Figure 17). 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.
5. **If the diver operating the CaviBlaster™ lance must be replaced or the cleaning operation terminated, disengage the pressure pump by moving the PTO lever to the “off” position (Figure 9) and release the water pressure in the hose(s) by moving the lance trigger to the open or “off” position (Figure 17) while under water.** Revert back to step 1 of these operating instructions when the diver is ready to continue cleaning.



Figure 18

6. **Ensure that the lance is submerged any time the pressure pump is operating.**

Shutting down the CaviBlaster™ system:

1. Stop the pressure pump by moving the PTO lever to the “off” position (Figure 9).
2. Squeeze the lance trigger to the open or “on” position (Figure 17) to release water pressure remaining in the hose(s).
3. Stop the diaphragm pump.

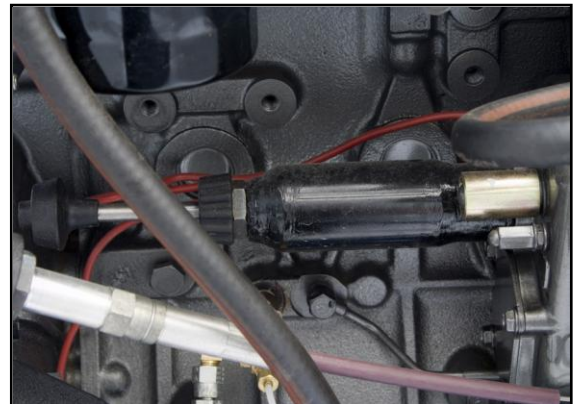


Figure 19

4. Adjust the engine speed to idle by loosening the thumb screw on the throttle cable (Figure 12), depressing the button on the end of the cable and pushing the cable all the way in.
5. Shut down the engine by pressing the engine shutdown plunger (Figure 19).
6. It is now safe to remove the lance from the water.

Emergency shutdown of the CaviBlaster™ system:

1. Close the emergency air intake shutdown valve (“ESV”) (Figure 20) mounted on the air intake hose by pushing the handle down.
2. If the diver is able to safely do so, release the pressure in the hose(s) by pulling the lance trigger to the open or “on” position (Figure 17).
3. Prior to restarting the unit, disengage the feed and pressure pumps by moving both clutch levers to the “off” positions (Figures 7 and 9), adjust the engine speed to idle by pushing the throttle lever all the way in (Figure 12) and open the ESV by pulling it all the way up (Figure 20).



Figure 20

Maintenance of the CaviBlaster™ system:

1. Empty and clean the inline strainer (Figure 1) and filter cartridge (Figure 2) every day.
2. Check the oil levels in the pressure pump (Figure 3) and engine (Figure 4) every day.
3. Inspect the fan belt and pressure pump (Figure 21) drive belts every day and replace the belts when cracking appears.
4. Change the engine oil (Figure 22) and oil filter (Figure 4) every 150 hours.
5. Change the oil in the pressure pump every 500 hours.
6. Change the spring in the lance handle (Figure 16) every six months or as required.

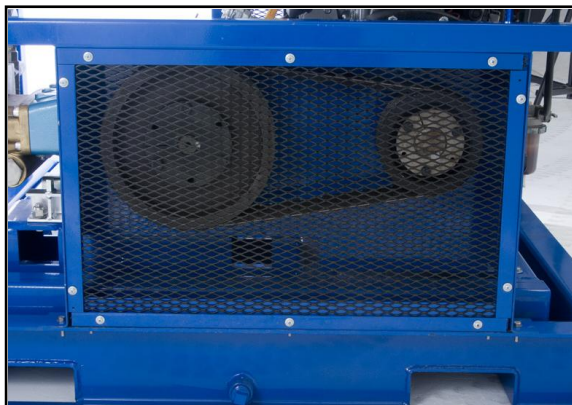


Figure 21



Figure 22

Summarizing the CaviBlaster™ operating instructions:

1. Ensure that the inline strainer and filter are clean.
2. Check engine and pressure pump oil, fuel and coolant levels.
3. Attach all hoses to the CaviBlaster™ power unit.
4. Ensure that the pressure pump PTO lever is in the “off” positions and the throttle is adjusted to idle speed.
5. Apply appropriate hearing protection and ensure that personnel working in the vicinity of the power unit are wearing hearing protection.
6. Connect an air hose to the air starter, start the engine.
7. Inspect the lance (including the zero-thrust nozzle guard) and attach it to the end of the pressure hose(s).
8. Ensure that the diver is prepared to work and that the lance is submerged in the water.
9. Adjust the throttle to operating speed.
10. Start the diaphragm pump to supply water to the pressure pump.
Ensure that the pressure pump is primed with water.
11. Pull the lance trigger to the open or “ON” position to bleed air in hose THEN engage the pressure pump PTO to supply water to the lance. Make sure lance is submerged.
12. Proceed with cleaning.
13. Disengage the pressure pump PTO.
14. Stop the diaphragm pump.
15. Release pressure from the hose(s) by pulling the lance trigger to the open or “on” position.
16. Adjust the engine speed to idle and shut down the engine.
17. Remove the lance from the water.
18. If using seawater, flush the feed system, pressure pump, pressure hose(s) and lance with fresh water. Rinse all equipment with fresh water if used in a salt environment.

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 Gary Herman Companies at (337) 367-2880 with any questions.

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