



CAVIBLASTER®

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Operation & Maintenance Manual



Model 1222-E

WARNING

TO ENSURE OPERATOR SAFETY AND EFFICIENT USE OF THE CAVIBLASTER SYSTEM IT IS ESSENTIAL TO FOLLOW THESE INSTRUCTIONS

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I - Preparing the System Before Each Operation

- 1.- Inspect the CaviBlaster power unit, hoses and gun for any signs of damage.
- 2.- Inspect the inlet strainer (figure # 1) to ensure that it is not clogged, clean if necessary.
- 3.- Check oil level, proper oil level in pressure pump (figure # 2).

NOTE: If Needed, fill lubricating oil to proper level in the pressure pump filling port (figure # 4) per manufacturer operating manual.

- **Pressure pump oil is SAE 30W-non-Detergent (figure # 3)**

- 4.- Connect the 1" red rubber by-pass hose (figure # 5) to the cam-lock plug on the pressure regulating unloader (Figure # 6) The by-pass hose has a cam-lock socket on one end, direct the other end away from the working area and secure the hose.

The water source must supply water at a volume equal or greater than 12 gallons (45 liters) per minute at a maximum pressure of 70-psi (5 bar). Ensure that the feed hose is connected to the pressure pump and the water is on prior to starting the pressure pump.

- 5.- Connect the ½" High Pressure Hose (figure # 7) to the quick-connect plug under the pressure regulating unloader (figure # 8).

NOTE: Do not attach the ZT Gun (figure # 9) to the high-pressure hose, this hose has to be cleaned before connecting the gun. This unit can deliver the required pressure up to 300 feet or 100 mts with a ½" thermoplastic hose, using greater lengths or smaller diameters may degrade its performance.

- 6.- Connection of the water source.

A.- Feeding water with the Feed Pump provided:

- Connect the 1" diameter clear PVC feed hose (figure # 10) to the cam-lock plug on the inlet strainer (Figure # 11), This feed hose has the feed pump on one end and a cam-lock socket on the other end.

- Insert the electrical plug powering the feed pump into the waterproof electrical outlet on the control box of the unit (figure # 12), The plug cannot be wrongly connected because it will fit only in the correct position.
- Drop the feed pump one or two feet into the water and tie to something to avoid going any deeper, make sure the wiring splice is kept dry prior to starting the feed pump. Either fresh water or sea water can be used with this system.

NOTE: The feed pump has a neoprene check valve installed in the discharge, this valve will prevent water from draining out of the feed hose through the feed pump when the pump is turned off, however, this valve somewhat restricts the flow of water from the pump, if maximum water flow is required, this valve can be removed by removing the black hose barb fitting.

B.- Feeding with an alternate water source: This source must supply water at a volume greater than 12 gallons (45 liters) per minute at a maximum pressure of 70 psi. Connect the water source to the inlet of the pressure pump (Figure # 11), make sure the feed hose is connected to the pressure pump and water is present prior to starting the unit.



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II - Starting the CaviBlaster

The preparing steps (Checking and Connections) must be already done before this point.

1.- When using the feed pump, start the feed pump by turning the feed pump switch (figure # 13) on the control box, to the ON position, when using a supplied water source, open the valve to supply water to the system.

NOTE: Make sure the system is primed and that there are no leaks, this is a positive displacement pump and water must be supplied under pressure.

Failure to feed water may result in damage to the pump.

2.- Hold the end of the high-pressure hose away before starting the unit.

3.- Once the system is primed, push the Green Start button (figure # 14) for ignition, let the unit run for a few minutes to warm up and clean the interior of the high-pressure hose, to avoid particles of dirt going to the gun.

NOTE: If the unit does not start at first, wait for 10 seconds before trying again.

4.- Once the unit is warm and the high pressure hose is clean, turn off the unit pushing the Red Stop button and turn off the feed pump by turning the switch to the off position.

5.- Connect the ZT Gun (figure # 9), and submerge it into water, make sure the diver has the trigger pressed in the ON position before starting the unit again, this will prevent a pressure chock wave from damaging the pump in the instant that the engine is restarted.

6.- At this point is recommended to apply hearing protection to the operator and people near the unit prior to starting the engine.

7.- Let the diver get ready and in position to start cleaning.

8.- Once the diver is ready Restart the feed pump and the unit again.

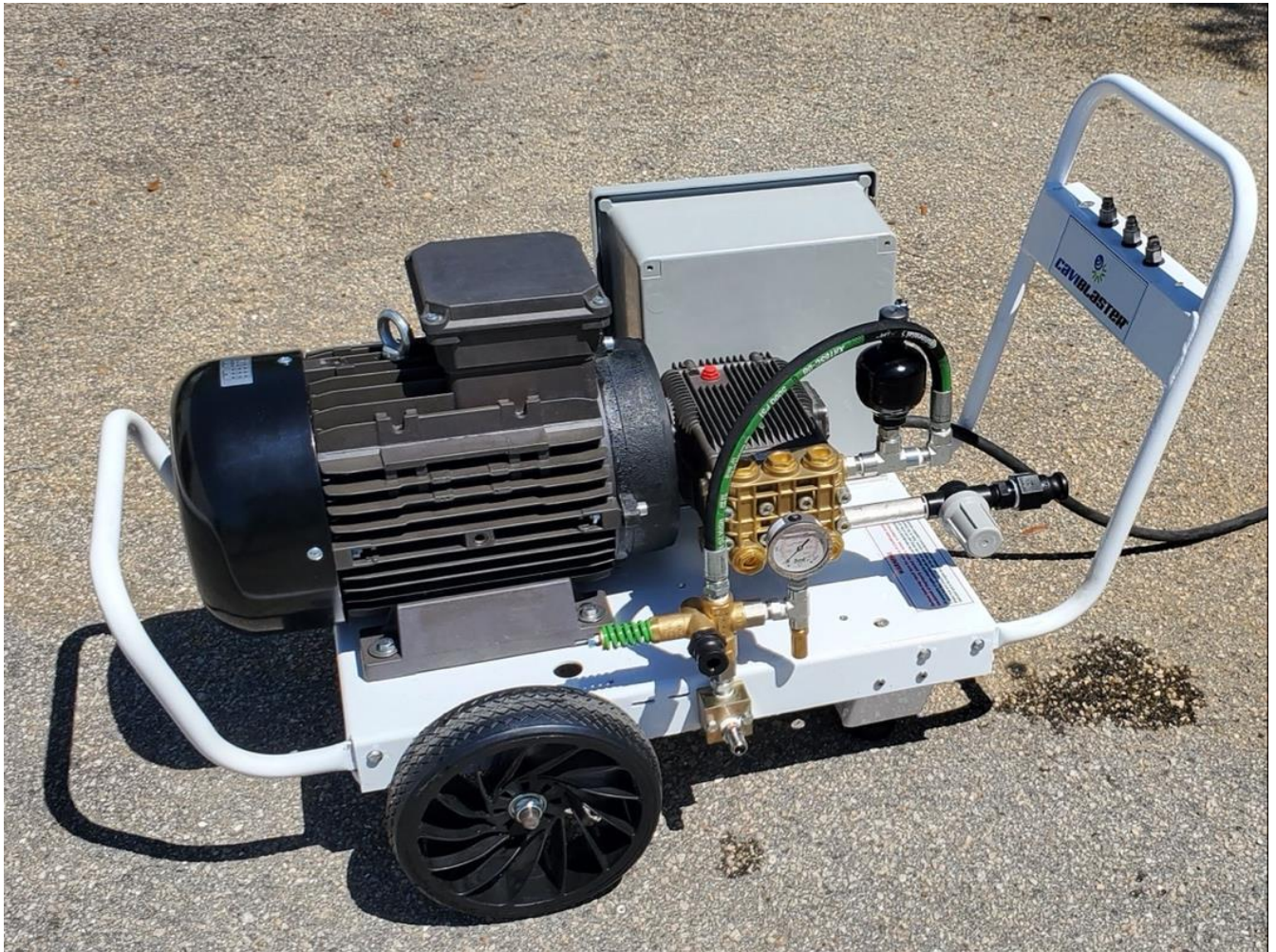
III - Shutting Down the CaviBlaster

- 1.- Shut off the engine by pushing the Red Stop button (figure # 15).
- 2.- Stop the feed pump by turning the switch to the off position.
- 3.- Squeeze the trigger on the gun to make sure all pressure is released while the gun is still submerged.
- 4.- Now is safe to remove the gun from the water.
- 5.- If it's the end of the day, flush and rinse the unit with fresh water for 5 minutes to clean all hoses and the complete system.



IV – Recommendations for Safety Operation of the System

- 1.- When the diver is ready to commence cleaning operations, **make sure that the gun is submerged in water**, before turning the unit On.
- 2.- Ensure that the power unit operator and other persons working in the vicinity of the unit **wear appropriate hearing protection** when the engine is running. If the diver is not wearing a helmet, hearing protection is recommended. CaviDyne recommends “Doc’s Pro-plugs” vented earplugs or equivalent for diver hearing protection.
- 3.- To activate the cleaning cavitation stream squeeze the trigger to the open or “ON” position, **use the most efficient operating technique** as explained in next chapter.
- 4.- The diver must **wear neoprene or rubber gloves** to protect the hands and follow all safety regulations that may be applicable to the work being performed.
- 5.- **Ensure that the gun is submerged** all the time the engine and pressure pump are operating.



V – Recommendations for Better Results

1.- Once the unit is working and the trigger on the gun is pulled, the diver has to find the most effective distance between the gun nozzle and the surface to be cleaned.

The most efficient technique is to hold the tip of the nozzle 2-5 inches (5 – 12 cm) away from the surface to be cleaned at a 25-degree angle (figure # 16). The diver needs to observe the shape of the cavitation jet cone, at greater depths the pressure will make it smaller, please have in mind that the wider zone of the cone is the most efficient part of the cavitation jet. Placing the nozzle in less than 2 inches from the surface will not allow for efficient cavitation performance and will degrade the cleaning capability of the system.

Follow the safety regulations that may be applicable to the work being performed.

2.- If the diver operating the system must be replaced or the cleaning operation terminated, disengage the pressure pump by pushing the Red Stop button (figure # 15) and then release the remaining pressure in the hose by pressing the trigger of the gun to the open position, revert to step 1 of operating instructions to start the cleaning again.

WARNING: Although the CaviBlaster system is safe to use when submerged in water, the system generates a high- pressure (up to 2,200-psi) water stream, which can cause injury when the gun is out of the water. **ALWAYS** keep the gun submerged when the pressure pump is engaged.



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VI – Adjusting the System for Maximum Performance

1. Using the pressure gauge included with the CaviBlaster power unit, (figure # 17) the water pressure will need to be higher to account for sidewall friction loss in the pressure hose. The pressure at the pump should be 2,200-psi plus 0.75-psi per foot of pressure hose.

For example, if using the CaviBlaster with 100 feet of pressure hose, the pressure gauge located next to the pump should indicate 2,275-psi. Pressure adjustments are made in the pressure regulator by turning the nuts of the green spring. There should always be a trickle of water through the bypass when the gun trigger is in the open or “ON” position.

2. Using a calibration pressure gauge between the pressure hose and the CaviBlaster gun, (figure # 20) (*Not included with the unit*) the water pressure should be 2,200-psi with the gun submerged and the gun trigger in the open or “ON” position.

The pressure is adjusted by turning the nuts on the end of the pressure-regulating unloader (Figure # 19). This adjustment increases or decreases the flow of water through the bypass hose when the CaviBlaster gun trigger is in the open or “on” position.

The flow of water through the bypass hose, in turn, determines the flow of water through the pressure hose and the gun. Less flow through the bypass hose means more flow through the gun which translates to higher velocity and pressure. There should always be a trickle of water through the bypass when the gun trigger is in the open or “ON” position, this ensures that the bypass will open without a pressure shock wave damaging the pump when the gun trigger is released to the closed position.

3. Without a pressure gauge, close the pressure-regulating unloader until there is just a trickle of water (less than ¼ gallon per minute) coming out of the bypass with the gun trigger in the open or “ON” position.

VII – Routine Maintenance of the CaviBlaster System

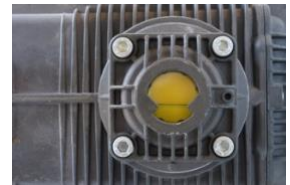
1. Empty and clean the inline strainer every day. (Figure # 1).
2. Check the oil level and consistency in the pressure pump every day. (Figure # 2).
3. Flush the system and rinse the power unit with fresh water after each day's use, for at least 5 minutes, to make sure all inside residuals are removed.
4. Change the oil in the pressure pump after the first 50 hours and every 500 hours thereafter. Use single-weight lubricating oil (SAE 30 weight non-detergent)
5. Change the spring for the gun trigger every 12 months or less if required. (Figure # 18)



VIII – Pump Oil Change of the CaviBlaster System

Pressure Pump Oil Change:

1. Open oil cap from top of the pump.
2. Set container to receive the used oil, under the pump
3. Remove oil cap from bottom of the pump
4. Let the oil drop for 20 Minutes
5. Close bottom cap
6. Put in one ¼ **Non-Detergent SAE 30 ISO100**.
7. Place oil cap again and check the level in the pump, the middle is perfect.



IX – Summarizing Daily Operating Instructions

1. Inspect the system for damage. Clean the inlet strainer. Check oil level.
2. Attach all hoses to the unit and connect the feed pump electrical cable.
3. Start the feed pump or alternate water supply and ensure that the system is primed.
4. Attach the gun to the pressure hose.
5. Make sure that the diver is ready to work and that the gun is submerged in the water.
6. Apply hearing protection, start the unit.
7. Activate the cleaning cavitation stream by squeezing the gun trigger to open or “on.”
8. Proceed with cleaning.
9. Stop the Unit then the feed pump.
10. Release pressure from the hose(s) by squeezing the gun trigger to the open or “ON” position while under water.
11. Remove the gun from the water.
12. Flush the system and rinse the outside of the power unit with fresh water.



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X – List of Figures



Figure # 1 – Inlet Water Strainer

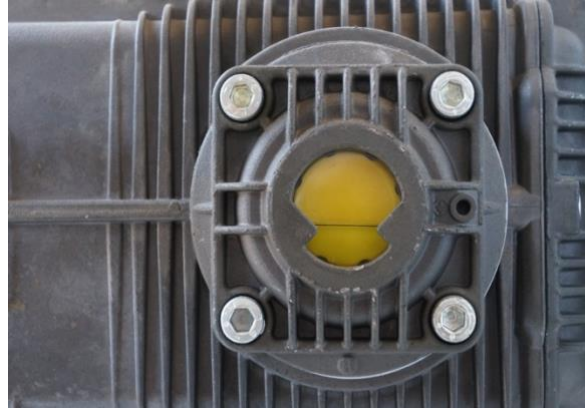


Figure # 2 – Oil level in pressure pump



Figure # 3 – Non-Detergent Pump Oil



Figure # 4 – Fill Port in Pump



Figure # 5 – Red Rubber By-Pass Hose



Figure # 6 – By-Pass Hose connection



Figure # 7 – High Pressure Hose



Figure # 8 – High Pressure Hose connection



Figure # 9 – Zero Thrust GUN



Figure # 10 – Feed hose with bilge pump



Figure # 11 – Feed Hose Connection



Figure # 12 – Feed pump connection



Figure # 13 – Feed pump On/Off Switch



Figure # 14 – Green Start Button



Figure # 15 – Red Stop Button

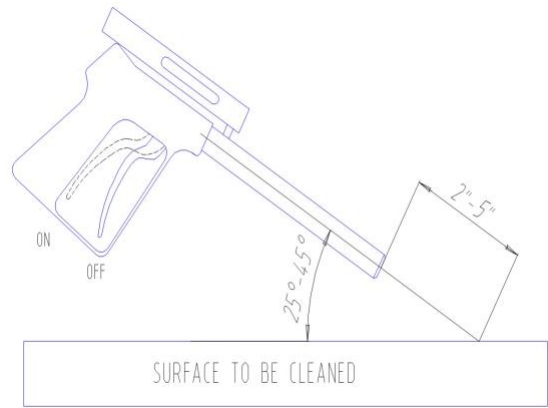


Figure # 16 – Gun position for better results



Figure # 17 – Pressure Gauge



Figure # 18 – Gun Trigger - Spring



Figure # 19 – Pressure Regulator Unloader

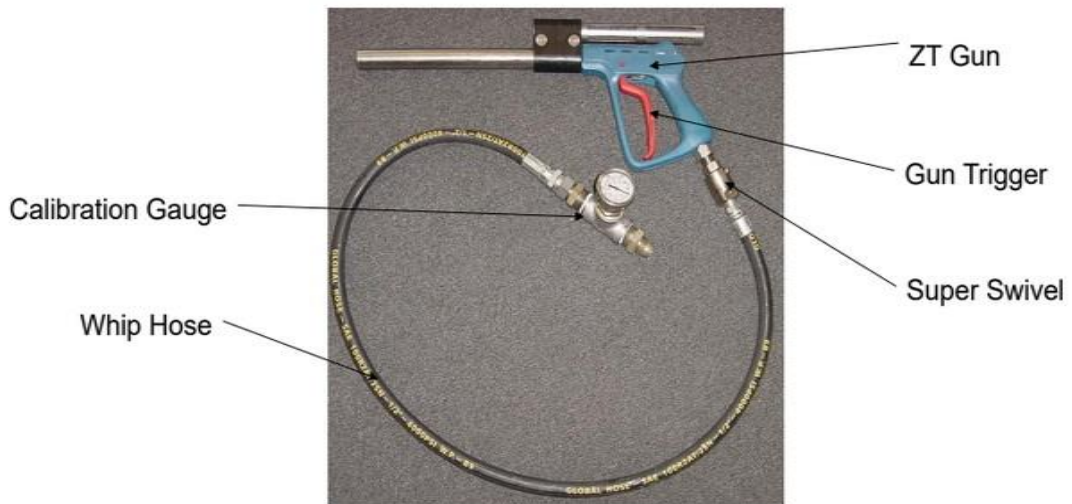


Figure # 20 – Additional calibration gauge (not provided).

CaviBlaster 1222-E

Complete System Assembled



WARNING

While the CaviBlaster system is very safe, operators should exercise care when using the equipment. The cavitation “flame” can be safely passed over the operators’ skin at normal operating distances of 2” – 3” from the tip of the nozzle. However, at very close distances (typically less than 1”) both nozzles 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 gun 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 gun.**

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 shock wave when the gun 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 manufacturers’ 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) 275-5319 with any questions.



CAUTION: DO NOT USE IT TO CLEAN SENSITIVE SURFACES as LED-Lights, Underwater Lights, Electronic Equipment, Etc.