

## CHESAPEAKE BAY MARINE PUMPOUT SYSTEMS

*Rick Ball bought  
company in ~ 2000  
& moved to Sandusky, MI  
810-648-2205*

### OWNERS MANUAL

#### INTRODUCTION

Your new Chesapeake Bay Marine Pumpout System is designed to be an extremely "user-friendly" reliable machine. With proper care and maintenance, this system should provide you and your customers with many years of very satisfactory performance.

Your Warranty for your System is found at the end of this Manual.

Your Chesapeake Bay Marine Pumpout System is simply a transfer system to draw sewage from a boat's holding tank, portable toilet or dump station into the transfer tank. When the transfer tank is full, the system automatically pumps the sewage from the transfer tank to a sewer system or holding tank. The system consists of the transfer tank, a vacuum air pump, an air control valve with solenoid actuator, level sensors within the tank, control and indicator electronics, and associated plumbing. The transfer tank is not a pressure vessel and has a relief valve set for 15 psi.

The switches and lights you see on the front panel may initially appear somewhat complicated, but by following these instructions and going through the operation once or twice, you will see that it is actually very simple to operate.

Please pay special attention to the **WARNINGS** and **NOTES** posted on the system and listed throughout this manual.

## **WARNINGS AND GENERAL SAFETY PRECAUTIONS**

The manufacturer accepts no liability for damage, accidental or otherwise, caused by unauthorized, inappropriate or unintended operation or intentional misuse of this system.

The system must only be operated with 10 weight detergent oil (SAE 10) in the pump oiler. Any good Automotive Automatic Transmisson Fluid (ATF) is a recommended lubrication oil. This provides necessary lubrication to the pump and air control valve on the Discharge Cycle.

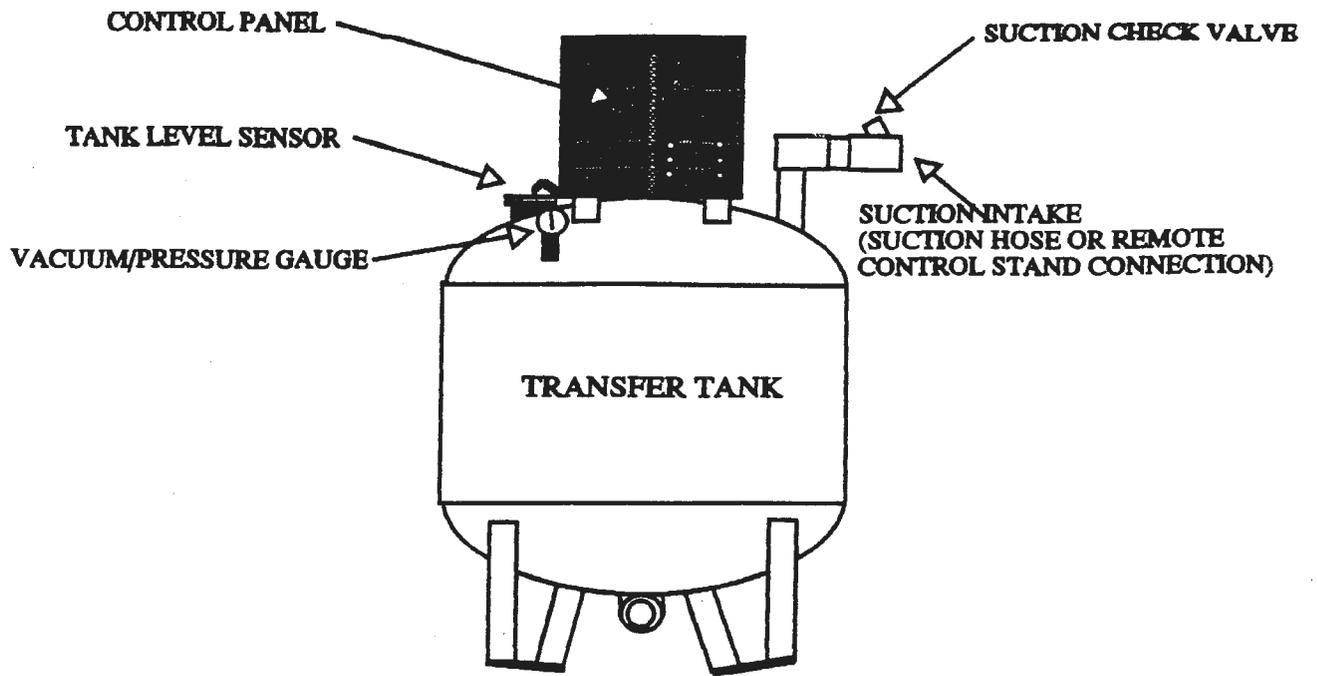
The system must be immediately secured on indication of SAFETY SHUTDOWN (lower red panel light). Operators should notify management immediately.

**ALWAYS DISCONNECT POWER BEFORE REMOVING THE SYSTEM COVER SHROUD!**

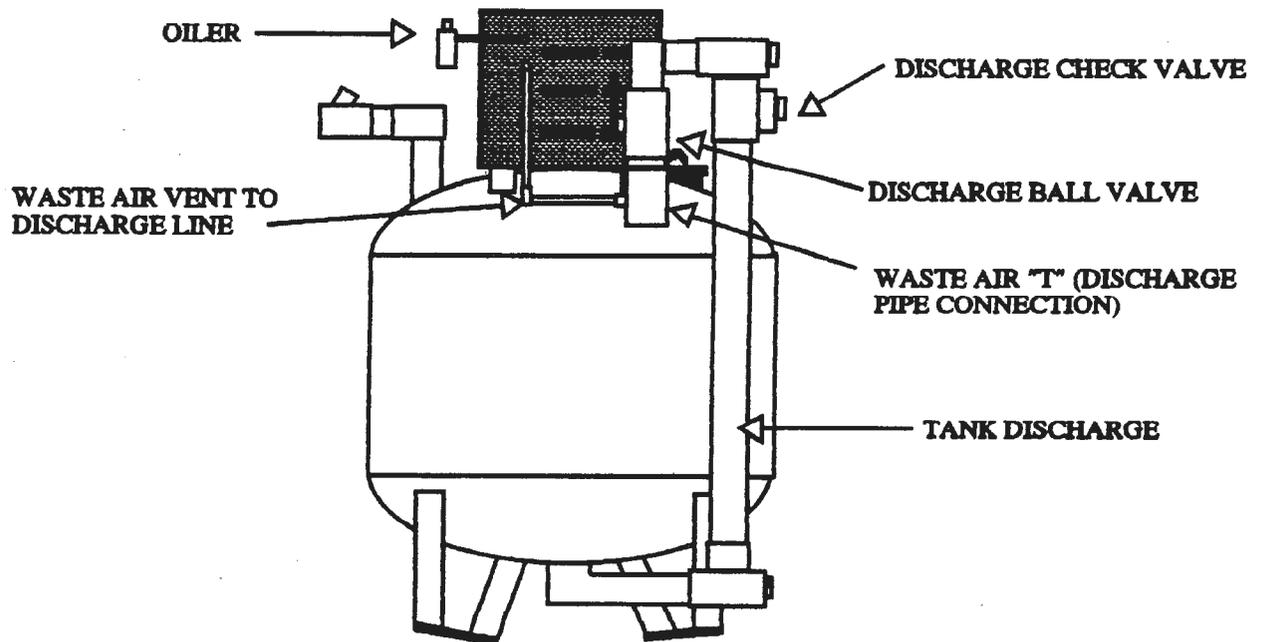
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# STANDARD MODELS CTI - 70 & CTI - 70HD



**FRONT VIEW**



**REAR VIEW**

# SYSTEM FRONT CONTROL PANEL

## CHESAPEAKE BAY PUMPOUT SYSTEMS

### OPERATING INSTRUCTIONS

#### TO PUMP IN AUTOMATIC OPERATION

1. INSURE SUCTION HOSE VALVE IS CLOSED. MOVE TOGGLE SWITCH TO "AUTO". "POWER" AND "SUCTION" LIGHTS ARE ON. PUMP WILL START AND BUILD VACUUM IN SUCTION HOSE.
2. CONNECT SUCTION HOSE TO BOAT DECK FITTING LABELED "WASTE".
3. SLOWLY OPEN SUCTION HOSE VALVE BY SLOWLY ALLOWING LEVER WITH HOSE. WASTE WILL BE DRAWN INTO SYSTEM TANK.
4. BOAT HOLDING TANK IS EMPTY WHEN NO WASTE IS OBSERVED IN CLEAR SECTION OF SUCTION HOSE.
5. CLOSE SUCTION HOSE VALVE AND MOVE TOGGLE SWITCH TO "OFF".
6. IF SYSTEM TANK FILLS UP DURING PUMP OUT, SUCTION WILL STOP. SYSTEM TANK WILL DISCHARGE AUTOMATICALLY WITH "DISCHARGING" LIGHT ON. WHEN TANK IS EMPTY, INDICATED BY "EMPTY" LIGHT, SUCTION WILL RESTART.
7. IF PUMP STOPS AND "TIMED SHUTDOWN" OR "SAFETY SHUTDOWN" RED LIGHTS ARE ON, MOVE TOGGLE SWITCH TO "OFF" AND NOTIFY MANAGEMENT.

#### TO MANUALLY DISCHARGE SYSTEM TANK

1. INSURE SUCTION HOSE VALVE IS CLOSED.
2. MOVE TOGGLE SWITCH TO "DISCHARGE ONLY". "POWER" AND "DISCHARGING" LIGHTS ARE ON AND SYSTEM TANK WILL EMPTY. "EMPTY" LIGHT INDICATES SYSTEM TANK IS NEARLY EMPTY.
3. MOVE TOGGLE SWITCH TO "AUTO" TO PUMP OR "OFF".

### WARNINGS

ONLY OPERATE THIS SYSTEM IN ACCORDANCE WITH THE POSTED INSTRUCTIONS AND WARNINGS. IMPROPER OPERATION OR ANY ABUSE OF THIS SYSTEM CAN CAUSE SERIOUS INJURY.

THIS SYSTEM IS DESIGNED FOR SEWAGE WASTE ONLY. DO NOT PUMP BLEBS, FLAMMABLE LIQUIDS OR ANY OTHER FLUIDS.

DO NOT OPERATE SYSTEM WITHOUT OIL IN OILER. CHECK DAILY. USE ONLY SAE #14 NON-DETERGENT OIL.

ALWAYS CHECK VESSEL HOLDING TANK VENT FOR OBSTRUCTIONS BEFORE PUMPING.

ALWAYS DISCONNECT POWER BEFORE REMOVING COVER SHROUD.

The diagram shows a control panel with the following components:
 

- POWER KEY SWITCH:** A rotary switch with positions for OFF, ON, REMOTE, and WINTERIZE.
- OPERATIONS KEY SWITCH:** A rotary switch with positions for NORMAL and WINTERIZE.
- FUNCTION TOGGLE SWITCH:** A rotary switch with positions for AUTO, OFF, and DISCHARGE ONLY.
- Indicator Lights:** POWER (yellow), SUCTION (green), DISCHARGING (amber), TIMED SHUTDOWN (red), SAFETY SHUTDOWN (red), and EMPTY (amber).
- Buttons:** POWER, SUCTION, DISCHARGING, DISCHARGE ONLY, SAFETY SHUTDOWN, and EMPTY.
- Oil Level Gauge:** A gauge with 'Full' and 'Empty' markings.
- Manufacturer Info:** MANUFACTURED BY COASTAL TECHNOLOGY, INC. GREENSBORO, NORTH CAROLINA.

### POWER KEY SWITCH

- "OFF" - TURNS OFF ALL POWER TO THE SYSTEM
- "ON" - TURNS ON POWER TO MAIN SYSTEM
- "REMOTE" - PROVIDES POWER & CONTROL TO REMOTE(S) IF INSTALLED

### OPERATIONS KEY SWITCH

- "NORMAL" - USUAL OPERATING POSITION
- "WINTERIZE" - PLACES MAIN SYSTEM IN "WINTERIZE" MODE

### FUNCTION TOGGLE SWITCH - OPERATIONAL WHEN POWER KEY SWITCH "ON"

- "AUTO" - TURNS SYSTEM ON IN AUTOMATIC CYCLE
- "OFF" - TURNS SYSTEM OFF
- "DISCHARGE ONLY" - TURNS SYSTEM ON IN DISCHARGE CYCLE

### LED INDICATOR LIGHTS

- "POWER" (YELLOW) - POWER TO SYSTEM IS ON (TURN ON FOR WINTERIZE)
- "SUCTION" (GREEN) - SYSTEM OPERATING IN SUCTION CYCLE
- "DISCHARGING" (AMBER) - SYSTEM OPERATING IN DISCHARGE CYCLE
- "TIMED SHUTDOWN" (RED) - SYSTEM SHUTDOWN DUE TO EXCESSIVE IDLE RUNTIME
- "SAFETY SHUTDOWN" (RED) - SYSTEM SHUTDOWN DUE TO OVERFILLING
- "EMPTY" (AMBER) - TANK EMPTY, ENTERING SUCTION CYCLE

## **HOW YOUR SYSTEM WORKS**

### **THE AUTOMATIC CYCLE**

When the FUNCTION (toggle) SWITCH is moved to the "AUTO" position, the system's VACUUM PUMP begins to draw air from the TRANSFER TANK through an AIR CONTROL VALVE and associated tubing thereby building a vacuum in the TRANSFER TANK. The SUCTION CHECK VALVE, mounted on the angled intake pipe on the top of the tank will begin to open as the vacuum builds and admits vacuum to the SUCTION HOSE ASSEMBLY or suction plumbing connected to the REMOTE CONTROL STAND. As you will see in the Operating Instructions, the SUCTION HOSE BALL VALVE should be closed while the system is building vacuum. The DISCHARGE CHECK VALVE, mounted on the vertical discharge plumbing on the back of the tank is sucked tight on its seat to prevent vacuum from escaping into the discharge plumbing.

After the system has built sufficient vacuum, the SUCTION HOSE is connected to the vessel's waste deck fitting and the SUCTION HOSE BALL VALVE is opened. Effluent will then begin to enter the TRANSFER TANK. As the fluid level rises in the TRANSFER TANK a sensor mounted in the tank signals the system that the TRANSFER TANK is no longer empty. At this point, the EMPTY LIGHT will go out. While the system is in its SUCTION CYCLE, waste air removed from the TRANSFER TANK is directed through the AIR CONTROL VALVE, then through the 3/8" WASTE AIR CHECK VALVE mounted behind the louvered back panel of the VACUUM PUMP HOUSING and down the discharge plumbing.

If the TRANSFER TANK is allowed to fill, the sensor signals the system that the TRANSFER TANK is full. At this point the system will automatically shift to its DISCHARGE CYCLE. The AIR CONTROL VALVE is shifted to its second position by a SOLENOID, where the valve then directs air from the VACUUM PUMP to the TRANSFER TANK, thereby pressurizing it. The SUCTION CHECK VALVE is closed and pressed against its seat to prevent pressure from escaping to the suction plumbing and the DISCHARGE CHECK VALVE is opened. The contents of the TRANSFER TANK are forced through its discharge plumbing and on to a discharge point such as a holding tank or sewer system. During the DISCHARGE CYCLE air is

drawn through the system's OILER, mounted off the right rear corner of the VACUUM PUMP HOUSING, through the AIR CONTROL VALVE and VACUUM PUMP to provide the system's lubrication.

As the fluid level drops in the tank, the sensor signals that the TRANSFER TANK is nearly empty, the EMPTY LIGHT is energized, the AIR CONTROL VALVE is moved to its first position by the SOLENOID and the system is returned to its SUCTION CYCLE.

As stated in the Operating Instructions, indicator lights on the front panel show the operating function of the system.

# OPERATING INSTRUCTIONS

## (SYSTEMS WITH REMOTE CONTROL STAND)

**BEFORE YOU START!** MAKE CERTAIN THERE IS FLUID IN THE SIGHT GLASS OF THE OILER! USE A GOOD QUALITY AUTOMOTIVE AUTOMATIC TRANSMISSION FLUID (ATF - DEXRON III OR EQUIVALENT) ONLY! See section on oiler for filling instructions.

**BEFORE YOU PUMP A VESSEL HOLDING TANK!** CHECK THE HOLDING TANK VENT FOR OBSTRUCTIONS! Pumping a holding tank with an obstructed vent could cause damage to the tank and related plumbing.

**DO NOT PUMP BILGES, FLAMMABLE LIQUIDS OR MATERIALS OTHER THAN BOAT SEWAGE WITH THIS EQUIPMENT! THIS EQUIPMENT IS NOT EXPLOSION PROOF! PUMPING BILGE WASTE, FLAMMABLE LIQUIDS AND PRODUCTS OTHER THAN SEWAGE WILL SEVERELY DAMAGE THE SYSTEM AND VOID ALL WARRANTIES.**

### PUMPING

#### ON THE REMOTE CONTROL STAND

Insure that the TOGGLE SWITCH on the remote stand is in the "OFF" position.

#### ON THE PUMP

Insure that the TOGGLE SWITCH is in the "OFF" position.

Turn the POWER KEY SWITCH (upper left side of switch panel) to "REMOTE". The POWER LIGHT should now be energized.

Insure that the OPERATIONS KEY SWITCH (upper right side of switch panel) is in the "NORMAL" position.

Insure that the DISCHARGE BALL VALVE, located behind the cover shroud, is open (lever in a vertical position in line with the piping).

## ON THE REMOTE CONTROL STAND

Close the SUCTION BALL VALVE by moving the lever handle so that it is positioned across the suction hose.

Move the TOGGLE SWITCH to "AUTO". The SUCTION LIGHT and EMPTY LIGHT should now be energized and vacuum will build indicated on the Remote Vacuum Gauge.

Connect the suction hose to the vessel's "WASTE" deck fitting with the correct size quick couple adapter or the universal deck fitting adapter. In the case of a porta-potty, use the porta-potty "wand" and insert it into the waste chamber of the porta-potty. Then **SLOWLY** open the SUCTION BALL VALVE by SLOWLY aligning the lever with the hose. You will note the holding tank or porta-potty contents moving through the clear section of the suction hose and when the transfer tank begins to fill the EMPTY LIGHT will extinguish.

**CAUTION: Rapidly opening the SUCTION HOSE BALL VALVE could cause damage to the vessel's holding tank and related plumbing.**

⇒ **NOTE:** For usable vacuum to draw sewage, the general rule is 1" of vacuum is required for each foot of lift to the transfer tank.

⇒ **NOTE:** For demonstration purposes, you may wish to open the SUCTION HOSE BALL VALVE and simply place the nozzle into the water and allow the system to completely fill and discharge in the "AUTO" cycle. This will familiarize you with the cycle, what noises to expect, what lights energize when, etc.

When the clear section of the suction hose shows no further effluent, the vessel's holding tank is empty. **Close the SUCTION BALL VALVE and move the TOGGLE SWITCH on the remote stand to "OFF"**. If your customer wishes to flush the holding tank, simply fill the holding tank with fresh water and re-pump as listed above.

⇒ **NOTE:** If the system's transfer tank fills to capacity during the pumpout process, suction will stop and the SUCTION LIGHT will extinguish. Close the SUCTION HOSE BALL VALVE. The DISCHARGING LIGHT will be energized and the system will automatically build pressure and empty itself. When the system has nearly emptied (there will normally be some effluent left in the system's transfer tank unless you elect to manually discharge it) the DISCHARGING LIGHT will extinguish and the EMPTY LIGHT and the SUCTION LIGHT will be energized and suction will resume. When the transfer tank begins to fill, the EMPTY LIGHT will extinguish.

To turn power off to the equipment or to prevent un-authorized use, turn the TOGGLE SWITCH to "OFF" and the POWER KEY SWITCH (on the pump) to "OFF" and remove the keys.

⇒ **NOTE:** Both keys are removable in any position.

### **MANUAL DISCHARGE**

There are a number of purposes that the MANUAL DISCHARGE function serves.

1. To completely empty the system's transfer tank and discharge plumbing to prevent damage from freezing.
2. To prevent sludge settlement and build-up during long idle periods.
3. To reduce the possibility of an interruption in the next pumpout when the transfer tank is partially full, should you feel that would pose a problem.
4. To completely flush and empty the system should opening the system for repairs become necessary.
5. To "Power Flush" the discharge check valve should you suspect it is not seating due to foreign material in the valve.

### **ON THE PUMP**

Insure that the POWER KEY SWITCH is in the "REMOTE" position, the OPERATIONS KEY SWITCH is in the "NORMAL" position, the TOGGLE SWITCH is "OFF" and the DISCHARGE BALL VALVE is open.

### **ON THE REMOTE STAND**

Insure that the SUCTION HOSE BALL VALVE is closed.

Move the TOGGLE SWITCH to "DISCHARGE ONLY". The DISCHARGING LIGHT should be energized.

If you wish to completely empty the system's transfer tank, run the system in the "DISCHARGE ONLY" cycle for at least 30 seconds after the "EMPTY" light is energized.

**Move the TOGGLE SWITCH to "OFF".**

Power Flushing the discharge check valve will be covered in the "Trouble Shooting" section.

- ⇒ **NOTE:** The above procedure will NOT clear the suction lines between the remote stand and the pump and MAY NOT clear the discharge plumbing from the pump to your discharge point. See the "WINTERIZING" section of this manual.
- ⇒ **NOTE:** Insure that the TOGGLE SWITCH is turned "OFF" when you have completed pumping. **DO NOT ALLOW THE SYSTEM TO RUN UNTIL "TIMED SHUTDOWN"**. Refer to the Section on TIMED SHUTDOWN.

## OILER OPERATION AND ADJUSTMENT

The oiler, located at the right rear corner of the cover shroud, has been adjusted at the factory for a flow of approximately 1 drop every 8 to 9 seconds and has been filled with a good quality Automotive Automatic Transmission Fluid (ATF - DEXRON III or equivalent), however,

**IT IS EXTREMELY IMPORTANT THAT THE FLUID LEVEL IS CHECKED IN THE OILER BEFORE YOU START THE EQUIPMENT AND THE DRIP RATE CHECKED FOR PROPER ADJUSTMENT BEFORE THE SYSTEM IS PLACED INTO SERVICE AND AT FREQUENT INTERVALS!**

To check the fluid level, simply look at the sight glass on the rear of the oiler and examine the oiler closely to insure that it has not been damaged during transit or system installation.

If the oiler needs filling, simply remove the slotted fill plug located on the top of the oiler next to the DRIP RATE ADJUSTER ASSEMBLY. The DRIP RATE ADJUSTER ASSEMBLY is the small clear plastic dome which has a red (or green) locking ring and black adjusting knob mounted on its top. Use a 9/16" deep socket or box end wrench to remove the plug, taking care not to break the adjuster. Fill the oiler to the top of the sight glass but DO NOT OVERFILL! Use a good grade Automotive Automatic Transmission Fluid (ATF).

To check for proper operation, observe the clear plastic dome under the DRIP RATE ADJUSTER on the top of the oiler during the first suction cycle. There should be NO dripping taking place during this cycle. When the machine goes into its discharge cycle you should note approximately 1 drop every 8 to 9 seconds. If this is not the case:

First, stop the equipment and release the DRIP RATE ADJUSTER KNOB (black) by cutting the seal wire (or removing the rubber "O" ring, if so equipped) and pulling the red (or green) LOCKING RING up. Next, turn the DRIP RATE ADJUSTER KNOB clockwise with your thumb and index finger until it stops. DO NOT USE PLIERS OR OTHER TOOLS ON THE DRIP RATE ADJUSTER ASSEMBLY!

Place the system into a DISCHARGE ONLY mode by first insuring that the DISCHARGE BALL VALVE located behind the cover shroud is open (lever in a vertical position). Now, turn the POWER KEY SWITCH to "ON", the OPERATIONS KEY SWITCH to "NORMAL" and the TOGGLE SWITCH to "DISCHARGE ONLY". You will hear a loud "CLAP", which is the AIR VALVE CONTROL SOLENOID closing. You will also hear the vacuum pump motor start.

Now, observe the drip rate through the clear plastic dome under the DRIP RATE ADJUSTER KNOB for the proper flow. Turn the black adjuster knob counter-clockwise slowly until you reach the proper drip rate. Again, it is approximately 1 drop every 8 to 9 seconds. Once you are satisfied with the flow rate, push the red (or green) LOCKING RING down until it snaps into place. Insert a 15/16 x 3/4 x 3/32 #14 "O" ring between the black DRIP RATE ADJUSTER KNOB and the red (or green) LOCKING RING to prevent unauthorized oiler adjustment.

There is no hurry to obtain the proper rate of flow. The equipment has been pre-lubricated at the factory during testing, but it should be accomplished before the system is placed into service.

Thereafter, **check the fluid level daily and monitor the flow rate as a matter of course whenever the system is operating.** In addition, it is a good practice to open the drain cock located on the bottom of the oiler monthly to check for water that may have accumulated in the reservoir. Simply allow the water to drain into a jar or cup until ATF fluid appears in the flow. If ATF fluid first appears at the drain cock, there is no need to drain any further.

## "WINTERIZE" POSITION ON KEY SWITCH (ALL MODELS)

The "WINTERIZE" function is a unique feature we have built into the system that is designed to eliminate problems associated with long idle periods. Those idle periods are normally over the winter months however, there are marinas that have been required to install these systems that will use them on a very limited basis. If your pumpout requirements fall into this category and you suspect you will be using the system less than once in two weeks, this is a feature you should become familiar with. Basically it is designed to run the equipment automatically once every nine days for a few minutes in the DISCHARGE mode to lubricate the pump and air valve. Without this feature, the internal parts of these components would eventually corrode, creating a number of maintenance problems and shorten the life of the equipment.

⇒ **NOTE:** The following procedure is designed to substantially reduce the possibility of maintenance problems that may otherwise be experienced by marinas that will use the pumpout system less than once in two weeks. **IT IS NOT A WINTERIZING PROCEDURE.** Winterizing will be covered in detail in the "WINTERIZING" section of this manual.

To activate the "WINTERIZE" function, first manually discharge the system and wait at least 30 seconds after the EMPTY LIGHT is energized to insure the system's transfer tank is completely empty.

Turn the POWER KEY SWITCH (left) to "ON".

Turn the OPERATIONS KEY SWITCH (right) to "WINTERIZE".

**LEAVE THE DISCHARGE BALL VALVE OPEN AND THE POWER CONNECTED!**

You may now remove both keys. The equipment will start automatically once every nine days.

## TIMED SHUT-DOWN

This feature was designed to eliminate un-attended operation either by inattention or accident by the user or intent by vandals. If the equipment is left running in any mode for longer than 10 minutes, it will automatically stop, leaving the TIMED SHUT-DOWN LIGHT energized.

Should you find the system in a TIMED SHUT-DOWN, move the TOGGLE SWITCH to "OFF" to reset the system. The TIMED SHUT-DOWN LIGHT will extinguish and the equipment will be ready to use.

Insure that the TOGGLE SWITCH is turned "OFF" after each pumpout operation. DO NOT ALLOW THE SYSTEM TO RUN UNTIL "TIMED SHUTDOWN" AS A MEANS TO TURN THE SYSTEM OFF. To run the system for 10 minutes in the suction cycle without lubrication, places stress on the air pump vanes and could cause early deterioration and possible failure of these vanes. This could void the system warranty.

## SAFETY SHUT-DOWN

This feature was designed to eliminate the possibility of fluid entering the air pump and air control valve due to a main sensor or solenoid failure. If the fluid level exceeds the normal upper level point in the transfer tank, this feature will disable the pump until the problem has been corrected.

Should you find the system in a SAFETY SHUT-DOWN, turn the equipment off by moving the TOGGLE SWITCH and the POWER KEY SWITCH to "OFF". Remove both keys to prevent further use and see the "TROUBLE SHOOTING" section of this manual.

## WINTERIZING

The object of this procedure is to empty the plumbing to and from the pumpout system and the system's transfer tank to protect your entire system against damage from freezing. After you have evacuated the system, you may wish to vacuum in and discharge a few gallons of a 50/50 mixture of antifreeze and water for insurance purposes if you think your plumbing arrangement may retain some fluid in bends, traps, etc. The exact amount of the antifreeze mixture is a judgment call based on the length of your plumbing and your estimate of the possibilities of fluid being retained in it.

Once you are reasonably certain that frozen pipes will not be a problem you will have to face next spring, you simply leave the system with power connected and in the "WINTERIZE" mode as described below and you can expect that it will be ready to go back to work when you are.

To winterize your pumpout system, first evacuate the suction hose assembly and the suction plumbing from the remote stand to the pump as follows:

### ON THE PUMP

Insure that the OPERATIONS KEY SWITCH is in the "NORMAL" position, the POWER KEY SWITCH is in the "REMOTE" position and the TOGGLE SWITCH is "OFF". *See CORRECTED Guide Lines ON. DATED 1/19, 1996.*

### ON THE REMOTE

Open the SUCTION HOSE BALL VALVE and move the TOGGLE SWITCH to "AUTO".

Lay the suction hose flat on the deck and allow the system to operate in the "AUTO" mode one minute for each 100 feet of suction plumbing between the remote stand and pump. If there is a grade (lift) between the remote stand and pump, estimate the amount of that lift and add:

### FOR MODEL CTI-70

- 15 seconds per 100 ft. of suction plumbing for a 5 ft. lift.
- 20 seconds per 100 ft. of suction plumbing for a 10 ft. lift.
- 90 seconds per 100 ft. of suction plumbing for a 15 ft. lift.
- 4 minutes per 100 ft. of suction plumbing for a 20 ft. lift.

### FOR MODEL CTI-70HD OR CTI-130

Since these models move twice the air of the CTI-70:

**Subtract** 20 seconds per 100 ft. of suction plumbing for a 5 ft. to 10 ft. lift.

**Add** 15 seconds per 100 ft. of suction plumbing for a 15 ft. lift.

**Add** 90 seconds per 100 ft. of suction plumbing for a 20 ft. lift.

Having done that, you may wish to "blow" your suction plumbing using the following procedure:

**CAUTION: Do NOT use this procedure until you have emptied your suction plumbing using the sequence described above. If a "slug" of sewage or a weak joint is present in your suction plumbing, the procedure described below could damage it. Likewise, if there is a blockage in your suction plumbing, this procedure is not recommended.**

Allow the system to build about 15 inches of vacuum with the SUCTION BALL VALVE closed and then rapidly open the valve to provide a rush of air through your suction plumbing. Do this two or three times, again for insurance purposes.

Now your suction plumbing should be reasonably dry. To empty your discharge plumbing, simply place a second individual in a position to observe the end of your discharge run.

Move the TOGGLE SWITCH to "DISCHARGE ONLY" and allow the system to run in that mode for at least 30 seconds after no further effluent is evident at your discharge point.

Having accomplished the above, you may wish to "blow" your discharge plumbing, using the following procedure:

**CAUTION: Do NOT use this procedure until you have emptied your discharge plumbing using the sequence described above. If a "slug" of sewage or a weak joint is present in your discharge plumbing, the procedure described below could damage it. Likewise, if there is a blockage in your discharge plumbing or your discharge point is submerged, this procedure is not recommended.**

⇒ **NOTE:** You may find that this procedure can be accomplished somewhat easier by moving control of the system from the remote stand to the pump. To accomplish this:

## **ON THE REMOTE**

Close the SUCTION HOSE BALL VALVE and move the TOGGLE SWITCH to "OFF".

## **ON THE PUMP**

Turn the POWER KEY SWITCH from "REMOTE" to "ON" and insure that the OPERATIONS KEY SWITCH is in the "NORMAL" position.

Close the DISCHARGE BALL VALVE (located behind the cover shroud) by moving its lever to a horizontal position.

Move the TOGGLE SWITCH to "DISCHARGE ONLY" and allow the system to build up 10 lbs. of pressure.

⇒ Note: The system is limited to a maximum of 15 lbs. of pressure by a relief valve.

Open the discharge valve quickly to provide a rush of air through your discharge plumbing. Repeat that procedure two or three times as you did for your suction plumbing.

At this point your entire system should be almost dry. Residual liquid (if any) is likely to be in bends or traps in either your suction or discharge plumbing. If you feel it would be wise to run some antifreeze through the system, by all means do so. There is something to be said for being "Better safe than sorry"! If you are confident that freezing temperatures will not pose a threat to your system, ignore the procedure for installing antifreeze and see the instructions immediately following.

If you have moved control of your system from the remote stand to the pump, you should return the control to the remote stand. To accomplish this:

## **ON THE PUMP**

Turn the POWER KEY SWITCH from "ON" to "REMOTE" and insure that the OPERATIONS KEY SWITCH is in the "NORMAL" position.

Move the TOGGLE SWITCH to "OFF".

Now, mix up a reasonable batch of a 50/50 mixture of antifreeze to water and submerge the end of the suction hose in the mixture. Again, the exact amount of the antifreeze depends on your estimation of how much it will take to do the job. All you

are trying to accomplish is to replace any fluid that may have settled in low spots and traps, etc. with the antifreeze. Move the TOGGLE SWITCH on the remote stand to "AUTO". Allow the system to vacuum in the entire batch of antifreeze and add or subtract the time given in the previous table according to your system's suction plumbing length and lift. Then move the TOGGLE SWITCH to "OFF". Your batch of antifreeze should now be in the system's transfer tank having flushed out or mixed with any residual liquid that would have otherwise remained untreated in your suction plumbing.

Place a second individual in a position to observe the end of your discharge run. Insure that the DISCHARGE BALL VALVE is open and move the TOGGLE SWITCH to "DISCHARGE ONLY". When the antifreeze reaches your discharge point, move the TOGGLE SWITCH to "OFF". Antifreeze should now be present in those spots along your discharge plumbing that may have collected un-treated fluid.

#### **ON THE REMOTE**

Insure that the TOGGLE SWITCH is in the "OFF" position.

Leave the SUCTION HOSE BALL VALVE OPEN.

#### **ON THE PUMP**

Move the POWER KEY SWITCH to "ON", the OPERATIONS KEY SWITCH to "WINTERIZE" and remove both keys.

**LEAVE THE DISCHARGE BALL VALVE OPEN AND THE POWER CONNECTED!**

The unit will now start automatically once every nine days in its discharge mode to lubricate the pump and air control valve assembly. Since it will not be discharging anything but a small amount of air, antifreeze (if installed) should remain in low spots and traps along your discharge plumbing.

## MAINTENANCE

Chesapeake Bay Marine Pump Out Systems have been designed so that very little maintenance is required to keep these systems operating in peak performance.

The only true maintenance is to see that the oiler, as described in the Operating Section of this Manual, contains oil and that the flow rate is approximately one drop every 8 to 9 seconds when the system is in discharge.

**CHECK THE FLUID LEVEL AND OPERATION OF THE OILER FREQUENTLY. SOMEONE COULD CHANGE THE FLOW SETTING ON THE TOP OF THE OILER!**

Monthly during the operating season, check the oiler for water in the reservoir as described in the Operations - Oiler section.

Spray marine silicone lubricant into key switches once a year.

### **IF YOUR MARINA IS A SEASONAL OPERATION:**

#### **At the beginning of each season:**

- 1) Fill oiler.
- 2) Turn OPERATIONS KEY SWITCH from "WINTERIZE" to "NORMAL" and remove key.
- 3) Exercise your system with water to insure that all functions operate normally.
- 4) Check oiler flow rate and adjust as necessary.

#### **At the end of each season:**

- 1) Winterize your system as described in the "Winterize" section of this manual.
- 2) Insure that the oiler is full and has the proper flow rate.

## **PROBLEM ANALYSIS**

### **SYMPTOMS - CAUSES - CURE**

#### **I. Power Light will not energize; pump will not start.**

A. Shore power problems - Check the power at the pumpout system receptacle.

B. Blown fuse in control circuitry (1 amp) - The control circuitry controls the entire system, thus the pump relay will not start without this power. Replace the 1 Amp fuse (Fuse 1) and if the power light still does not energize, call the factory for instructions.

#### **II. Power Light on -**

##### **A. Pump will not start -**

1. Low supply voltage.
2. Blown pump motor fuse.
3. Stuck rotor or vanes.
4. Loose wires - inspect all wire connections for tight connection.
5. Motor problems - Call factory.
6. Defective relay - Call factory.

##### **B. Pump starts but will not build vacuum (suction light on) or slow vacuum -**

1. Hose ball valve open or leak in hose/remote line.
2. Discharge check valve fouled; refer to Attachment A.

##### **C. Pump starts but will not build pressure (Discharge light on) or slow pressure -**

1. Suction check valve fouled.
2. Solenoid fuse blown or inoperative solenoid - Call factory for instructions.

##### **D. Pump empty light will not de-energize with sewage entering tank -**

1. Sensor system problems - Flush several cycles with water. If not corrected, call factory for instructions.

E. Pump starts, system builds vacuum but will not draw sewage

1. Blockage in suction line.
2. Vessel holding tank level gage is inoperative and the holding tank is empty.
3. Vessel holding tank vent is plugged.

F. Pump starts, system builds pressure but will not discharge - Call factory for instructions.

III. Timed shutdown light energizes, system turns off.

A. Return TOGGLE SWITCH to "OFF" and back to desired function. Refer to TIMED SHUTDOWN in the Operations Section.

IV. Safety shutdown light energizes, system stops and will not restart. Turn all switches to "OFF" and call factory for instructions.

V. Turn "OPERATIONS KEY SWITCH" to "WINTERIZE" and system does not automatically start.

A. Insure that POWER KEY SWITCH is "ON".

B. Problems with WINTERIZE circuit - Call factory for instructions.

## ATTACHMENT A

### LOW OR NO VACUUM

The usual cause for low or no vacuum is dried toilet paper or foreign material of some description preventing the DISCHARGE CHECK VALVE from seating. To determine if this is indeed the cause:

1. Start the system in "DISCHARGE ONLY" and run it until the EMPTY INDICATOR LIGHT is energized. Then stop the system.
2. Close the DISCHARGE BALL VALVE located on the vertical plumbing on the back of the tank and the SUCTION HOSE BALL VALVE by moving the handles so that they are positioned across the plumbing or hose. The SUCTION HOSE BALL VALVE should be kept in the closed position when not in use.
3. Start the system again in the AUTO CYCLE and observe the VACUUM/PRESSURE GAGE on the tank. If the vacuum rises to the normal level for your installation or above, the problem is probably in the DISCHARGE CHECK VALVE.

"Power Flushing" the DISCHARGE CHECK VALVE will usually resolve this particular problem.

**CAUTION:** You should be certain that your discharge plumbing is sound before doing a "Power Flush". Weak connections or hoses (in the case of connections to floating docks) could be broken using this procedure.

To "Power Flush" the DISCHARGE CHECK VALVE:

1. First stop the pump and release the vacuum on the system by opening the SUCTION HOSE BALL VALVE.
2. Restart the equipment in the AUTO CYCLE with the SUCTION HOSE submerged in the water, the SUCTION HOSE BALL VALVE open and the DISCHARGE BALL VALVE closed. Allow the TRANSFER TANK to fill and the system to shift to its DISCHARGE CYCLE.
3. Observe the VACUUM/PRESSURE GAGE on the TRANSFER TANK and allow the system to build 10 lbs. of pressure.

4. Rapidly open the DISCHARGE BALL VALVE and allow the pressure to drop. You should be able to repeat this procedure at least once more time before the system empties and returns to its SUCTION CYCLE.
5. Stop the equipment and open the DISCHARGE BALL VALVE and close the SUCTION HOSE BALL VALVE.
6. Restart the system in the AUTO CYCLE and observe the VACUUM/PRESSURE GAGE for normal vacuum.
7. If normal vacuum is not obtained after a few "Power Flush" procedures, it will be necessary to remove the cap from the DISCHARGE CHECK VALVE and remove the obstruction from inside the valve.

If the first three steps under "LOW OR NO VACUUM" have indicated that the DISCHARGE CHECK VALVE is NOT the problem, the next step is to isolate and test the individual components of your installation as follows:

1. Disconnect the suction main from the SUCTION CHECK VALVE on the TRANSFER TANK and install a 1 1/2" plug in the SUCTION CHECK VALVE. You should use this procedure even if a valve has been installed in the suction main just before the SUCTION CHECK VALVE since there it could be that the valve is the problem.
2. Start the equipment in the AUTO CYCLE and insure that the SUCTION INDICATOR LIGHT is energized.
3. Observe the VACUUM/PRESSURE GAGE on the TRANSFER TANK and allow the vacuum to build to 10 inches.
4. Move the TOGGLE SWITCH to "OFF" and determine if there is a significant vacuum loss.

If there is no significant vacuum loss (total loss of vacuum in less than 5 minutes) the problem is in the suction plumbing. The most efficient way to accomplish this is to pressurize the suction plumbing with an outside source and look for leaks.



# COASTAL TECHNOLOGY, INC.

421 S. LYNNHAVEN ROAD, SUITE 103 • VIRGINIA BEACH, VA 23452 • (757) 340-8507

## CHESAPEAKE BAY MARINE PUMPOUT SYSTEMS BY COASTAL TECHNOLOGY OF VIRGINIA

### LIMITED WARRANTY

Coastal Technology, Inc. warrants the Chesapeake Bay Marine Pumpout System to the original owner against defective material or workmanship for a period of TWO YEARS from the date of purchase as specified below.

Coastal Technology's responsibility under this warranty is limited to parts and labor for the repair or replacement of defective part or parts, under the conditions that all equipment is installed, operated and maintained in accordance with our manufacturer's manual requirements. The purchaser will ship the system or specific components to the factory in Virginia Beach, Virginia at his expense. All other costs including transportation, postage and other incidental services are the responsibility of the owner. This limited warranty specifically does not cover or include damage resulting from shipping, negligent handling, lack of reasonable care, or natural causes beyond our control.

The unit must be installed, operated and maintained in accordance with instructions provided. Any modifications to the system or abuse will void this limited warranty.

This limited warranty does not cover the painted or otherwise finished surfaces of the products. Although Coastal Technology makes every effort to produce a durable marine finish on product surfaces, the end use and/or any abuse is beyond our control.

Coastal Technology or its agents assume no liability what so ever at any time for personal injury, property damage, or for any indirect or consequential damage of any kind arising from the installation or use of products manufactured and/or distributed by Coastal Technology.

This warranty is strictly limited to its terms and is in lieu of any and all other warranties and conditions, written or oral, whether expressed or implied.