

## OPERATIONAL CHECK OFF LIST

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### START UP

- 1: FILL FUEL TANK'S (ONE OR BOTH)
- 2: FILL FRESH WATER TANK TO OVERFLOW AT TOP OF TANK. (1/4" OVERFLOW HOLE) SOME OVERFLOW WILL BE EXPERIENCED DURING RUN UP.
- 3: OPEN STACK RAIN CAP AT TOP OF UNIT.
- 4: OPEN FUEL VALVE (ONE OR BOTH SIDES)
- 5: SET OVERBOARD FEED PUMP IN WATER .
- 6: CONNECT WATER SUPPLY DISCHARGE FROM PUMP TO HEATER INLET.
- 7: PLUG OVER BOARD FEED PUMP INTO PROVIDED PLUG ON RIGHT SIDE OF THE CONTROL BOX OR SOME EXTERNAL POWER SUPPLY. (ALWAYS USE AN EXTERNAL GFCI)
- 8: PLUG DIVER HEATER UNIT INTO AN EXTERNAL GFCI AND THEN A POWER SOURCE RATED AT 15 AMPS. (TRY TO USE AS HEAVY AN EXTENSION CORD AS YOU CAN)
- 9: TURN ON OVERBOARD FEED PUMP SWITCH LOCATED ON THE CONTROL PANEL, AND CHECK FOR FLOW THROUGH THE DISCHARGE VALVES.
- 10: TURN ON BURNER SWITCH LOCATED ON THE CONTROL PANEL, BURNER WILL LIGHT OFF. CHECK FUEL PRESSURE (SHOULD BE 80 TO 90 psi)
- 11: CRACK AIR BLEED VALVE TILL YOU HEAR THE AIR BUBBLING IN THE FRESH WATER TANK.
- 12: LET UNIT RUN UNTIL DIVER'S WATER TEMP AT MANIFOLD IS UP TO 120 DEGREES FAHRENHEIT, THEN CHECK TEMP. AT DIVERS HOT WATER HOSE DISCHARGE. "AT NO TIME SHOULD THE DIVERS WATER TEMP. EXCEED 110 DEGREES F. UNLESS THE DIVER CALLS FOR MORE".
- 13: ADJUST AQUASTATS TO OBTAIN DESIRED TEMP. HOT WATER USED TO HEAT OTHER EQUIPMENT ( CHAMBER'S- UNDER WATER HABITAT, ECT.) MAY REQUIRE HIGHER TEMP. AND SHOULD BE ADJUSTED TO NEED'S AS PER (AQUASTAT ADJUSTMENT THIS TEXT)

**Gary Herman Companies, LLC**  
**dba Alpha Rentals**



**3114 Vet. Mem. Blvd, Abbeville, LA**  
**E-mail: 4rentals@earthlink.net**

## **SHUT DOWN PROCEDURES**

- 1: TURN OFF BURNER SWITCH.
  - 2: TURN OFF FEED PUMP SWITCH.
  - 3: DRAIN SUPPLY PUMP HOSE.
  - 4: DRAIN HEAT EXCHANGER CIRCUIT BY OPENING DICHARGE VALVE. AFTER DIVERS HOT WATER HOSE HAS BEEN DISCONNECTED. AIR MAY BE USED TO BLOW DOWN CIRCUIT ONLY IF A REGULATOR IS USED AND SET BELOW 50 psi.
  - 5: IF THE UNIT IS TO BE STOWED OR SHIPPED, FRESH WATER MAY BE DRAINED ATER COOL DOWN, BY DRAINING AT BACK-BOTTOM OF FRESH WATER TANK.
  - 6: ROLL UP ELECTRIC CORD AND SECURING LINE AND STOW SUPPLY PUMP.
  - 7: CLOSE ALL FUEL VALVES AND DRAIN TANKS IF NEEDED. DRAIN'S ARE LOCATED AT THE BOTTOM OF EACH TANK.
  - 8: MAKE SURE ALL SWITCHES ARE IN THE OFF POSITION (DOWN)
  - 9: WASH WITH SOAP AND FRESHWATER INSIDE AND OUT- LET DRAIN AND DRY.
  - 10: STOW-TRANSPORT, ECT.
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## **AQUASTAT ADJUSTMENT**

1: TO ADJUST AQUASTAT'S FOLLOWING **START UP** PROCEDURE (1) TO (11) THEN:

A: INSERT COMMON SCREWDRIVER INTO OPENING ON AQUASTAT AND ROTATE LEFT TO INCREASE AND RIGHT TO DECREASE TO DESIRED TEMP. USE AS LITTLE PRESSURE AS POSSIBLE SINCE THIS IS A PRESSURE SENSITIVE SWITCH AND WILL REACT TO PRESSURE ON THE ADJUSTMENT SCREW. IT MAY BE NECESSARY TO RE ADJUST UNTIL CORRECT TEMP. ARE ACHIEVED

**"IMPORTANT"** ALWAYS ADJUST BOTH AQUASTATS AT THE SAME TIME AND TO THE SAME SETTING'S. THEY ARE WIRED TO WORK TOGETHER AND IF BOTH ARE NOT ADJUSTED TO THE SAME TEMP.\* IT IS SOMETIMES NECESSARY TO HAVE THE FRESH WATER TEMP ADJUSTED HIGHER THAN THE DIVERS WATER TEMP DEPENDING ON THE TEMP OF FEED WATER. THIS MUST BE COORDINATED TO GIVE THE DESIRED TEMP AT THE WORKSITE. THE AQUASTATS ARE DESIGNED TO MAINTAIN A 2 DEGREE TEMP VARIANT.

**ONCE SET TO THE JOB NEEDS, NO OTHER SETTING'S SHOULD BE NEEDED.**

B **"NOTE"** IT MAY BE EASIER TO ROTATE ONE AQUASTAT UP OR DOWN ALL THE WAY AND ROTATE THE OTHER UNTIL THE DESIRED SEQUENCE (START OR STOP) HAPPENS, THEN ADJUST THE SECOND AQUASTAT TO WORK WITH THE FIRST ONE. PAY CLOSE ATTENTION TO BOTH TEMP. GAGES AND AQUASTAT'S.

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**(337) 892-9960**

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**\*SAFETY\*WARNINGS\*CAUTION'S\***

- 1: SINCE THIS UNIT IS NOT A PRESSURE VESSEL IT WILL NOT BUILD UP PRESSURE AND EXPLODE. IT COULD HOWEVER BOIL AWAY ALL THE FRESH WATER AND CAUSE THE UNIT SOME DAMAGE. THE FRESH WATER IS A BUFFER AS WELL AS A SOURCE OF HEAT. THE WATER LEVEL SHOULD BE CHECKED DAILY AND FILLED TO SPEC. REF.
- 2: IF THE UNIT SHUT'S DOWN FOR WHATEVER REASON, YOU HAVE 10 TO 20 MINUTES (DEPENDING ON THE FEED WAER TEMP.) OF RESERVE HOT WATER. AFTER THIS THE TEMP. WILL GRADUALLY COOL DOWN AS THE STORED HEAT IN THE FRESH WATER BATH IS DISSIPATED THROUGH EXCHANGE
  - (A) REFER TO TROUBLE SHOOTING GUIDE—MAKE NECESSARY REPAIRS
  - (B) IF SUPPLY PUMP DOES NOT RUN—UNPLUG FROM UNIT AND FIND A SECOND SOURCE AND TRY. IF PUMP THEN RUNS YOU HAVE 10 TO 20 MINUTE'S RESERVE TO MAKE REPAIRS.
  - (C) IF PUMP WILL NOT RUN, FIND ANOTHER SOURCE OF WATER SUPPLY. A BACK UP SUPPLY WATER IS ADVISED AND SHOULD BE ON HAND AT ALL TIMES.
- 3: IF BURNER WILL NOT SHUT OFF FOR WHATEVER REASON THE FOLLOWING STEPS SHOULD BE TAKEN UNITL DIVER OR USER CAN BE ATTENDED TO.
  - (A) TURN BYPASS VALVE TO HALF OPEN AND TURN BURNER SWITCH OFF. THE TEMP MAY BE REGULATED BY PARTIALY OPENING AND CLOSING THE BYPASS VALVE AND SWITCHING THE BURNER SWITCH ON AND OFF TO MAINTAIN FRESH WATER BATH TEMP. JUST BELOW BOILING (212 deg) UNTIL ACTION IS TAKEN TO MAKE REPAIRS. CONSULT THE TROUBLE SHOOTING GUIDE IN THIS MANUAL.
  - (B) IF BURNER WILL NOT GO OFF, UNPLUG FROM ELECTRICAL SOURCE AND OPERATE AS IN THE PARAGRAPH ABOVE. CONSULT THE TROUBLE SHOOTING GUILDE IN THIS MANUEL.
- 4: USE ONLY # 2 GRADE FUEL OIL OR DIESEL FUEL'S **"NEVER NEVER" USE GASOLINE OR OTHER VOLATILE FUELS**, AS THEY WILL CAUSE THE UNIT TO CATCH FIRE.
- 5: CERTAIN TYPES OF GLYCOL BASED ANTIFREEZE SOLUTINS MAY BE USED IN THE FRESH WATER BATH SO LONG AS THEY SUITABLE FOR OPEN AIR USE. CAUTION SHOULD BE TAKEN TO NOT TO SPILL OR OVERFLOW THE FRESH WATER BATH.
- 6: EYE AND EAR PROTECTION SHOULD BE WORN WHEN OPERATING THIS UNIT.
- 7: UNPLUG UNIT FROM ELECTRICAL SERVICE BEFORE LEAVING UNIT UNATTENED.

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