

# NOAA / AOML Thermosalinograph (TSG) Manual (Based on MV Explorer TSG Installation)

## Contact Information

If you experience problems with the TSG which you cannot solve please contact either:

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## Leaving Port

When the ship is leaving a port, the TSG should be turned on once the ship is in blue water. Typically, a distance of three to five miles is sufficient to provide clean water to the system and prevent excess build up of biofoulant in the strainer.

To turn on the TSG:

1. Open the stainless steel ball valve located after the SBE38 remote temperature sensor just behind the sea chest (Fig. 1).

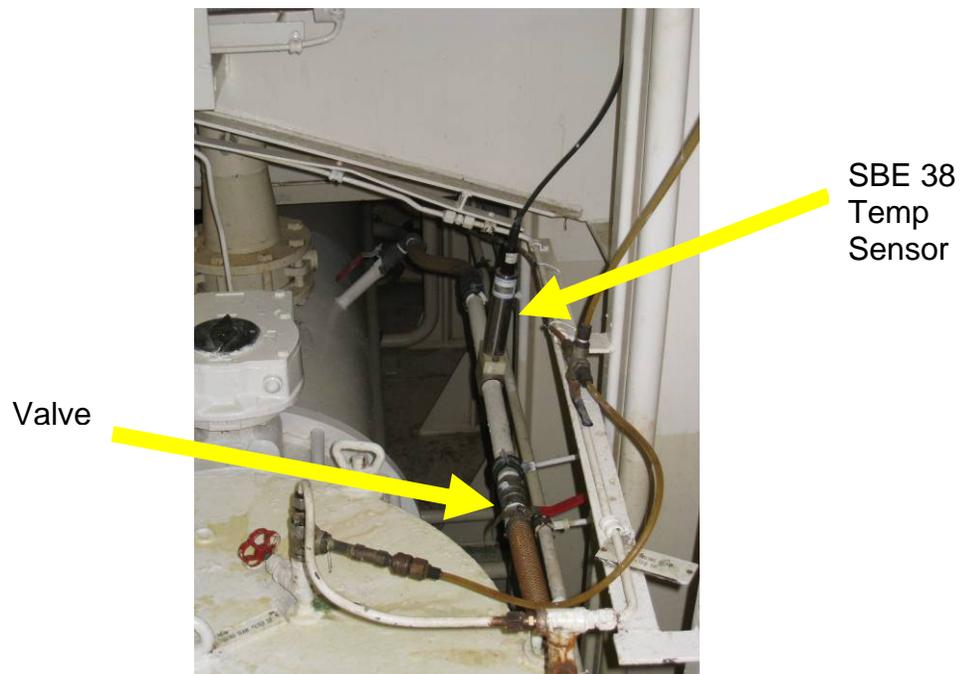


Figure 1. SBE 38 Temp. Sensor and Valve

2. Turn on power to the pump and TSG at the switch box located on the TSG rack (Fig. 2). Red power light will come on at switch, and lights at the TSG and Remote Temperature ports will begin to flash (Fig. 3).



ON - Up

OFF - Down

Figure 2. TSG Switch Box



Figure 3. TSG Data Interface Box

3. Verify that the flow and pressure are within the required limits. The pressure should read less than 50 psi (approximately 3 bars). The pressure can be regulated by turning the hex bolt on top of the pressure regulator (Fig. 4).

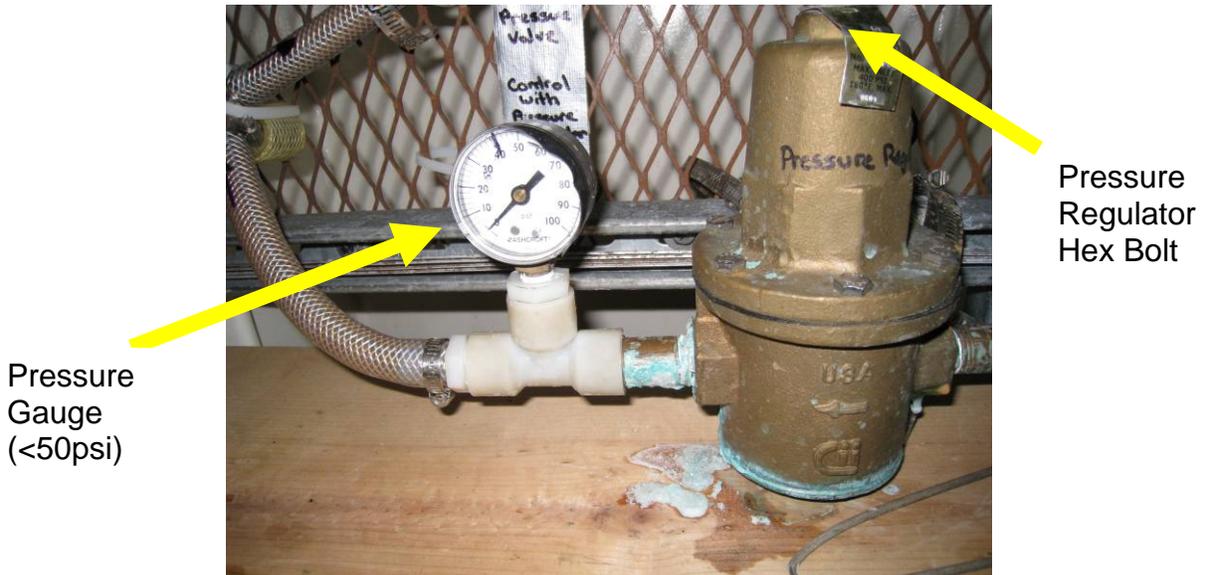


Figure 4. Pressure Gauge and Regulator

4. The flow rate should read between 10 and 30 gallons per hour. The flow rate can be adjusted in two places. First, the PVC ball valve labeled “TSG Flow Control” and second, the pinch valve in the bypass loop. Under typical conditions the pump will push more water than is safe for the TSG so the flow must be regulated in some way (Fig. 5).

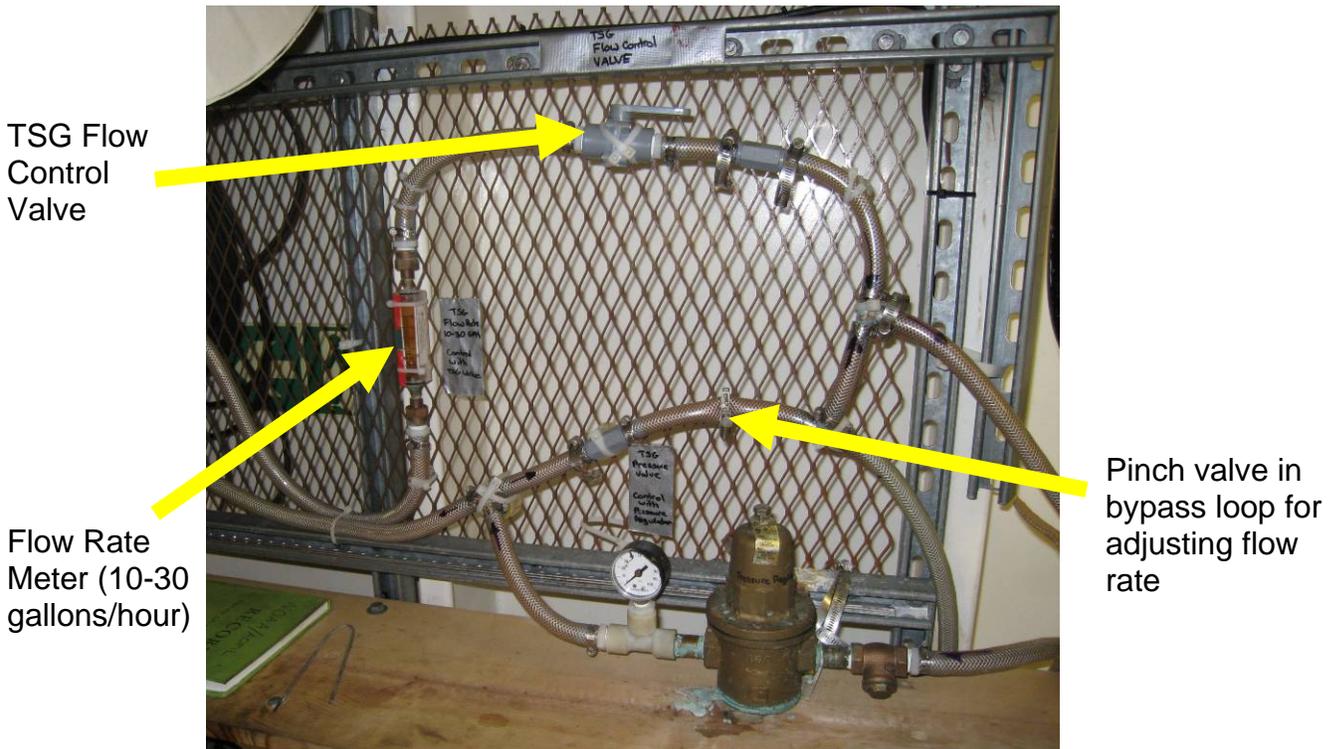


Figure 5. Flow and Pressure System

## Entering Port

The system should be shut down once the ship is within five miles of port. The system should be turned off following the procedures below.

1. Turn off power to the pumps and TSG at the switch box located on the TSG rack (Fig. 2).
2. Close the stainless steel ball valve located after the SBE38 remote temperature sensor just behind the sea chest (Fig. 1).

## Daily Watch

Ideally the engineering watch staff will be able to monitor the status of the system twice per day. Daily maintenance should include:

1. Checking for leaks at each of the valves and at the strainer and pump. If leaks are detected, the fittings should be tightened.
2. Log the date, time, pressure and flow rate in the green log book provided. Verify that the flow and pressure are within the required limits. The pressure should read less than 50 psi (approximately 3 bars). The pressure can be regulated by turning the hex bolt on top of the pressure regulator (Fig. 4). The flow rate should read between 10 and 30 gallons per hour. The flow rate can be adjusted in two places. First, the PVC ball valve labeled "TSG Flow Control" and second, the pinch valve in the bypass loop (Fig. 5). Under typical conditions the pump will push more water than is safe for the TSG so the flow must be regulated in some way.
3. Check for air in the system. If air is visible the system may need to be bled. The bleeder valve is located the left of the strainer. The bleeder valve outlet should flow into the bucket (Fig. 6).
4. Check the strainer (Fig. 7). The strainer should stay relatively clear and free of debris. If the strainer is full of marine debris the basket will need to be cleaned. The procedures for cleaning the strainer are described in the next section.
5. Check that the lights are flashing (labeled SBE38 and SBE45) on the data interface box (Fig. 3).
6. Check that the water flowing through the system is clear. If any debris is visible in the lines, shutdown the system until the ship is clear of the dirty water.

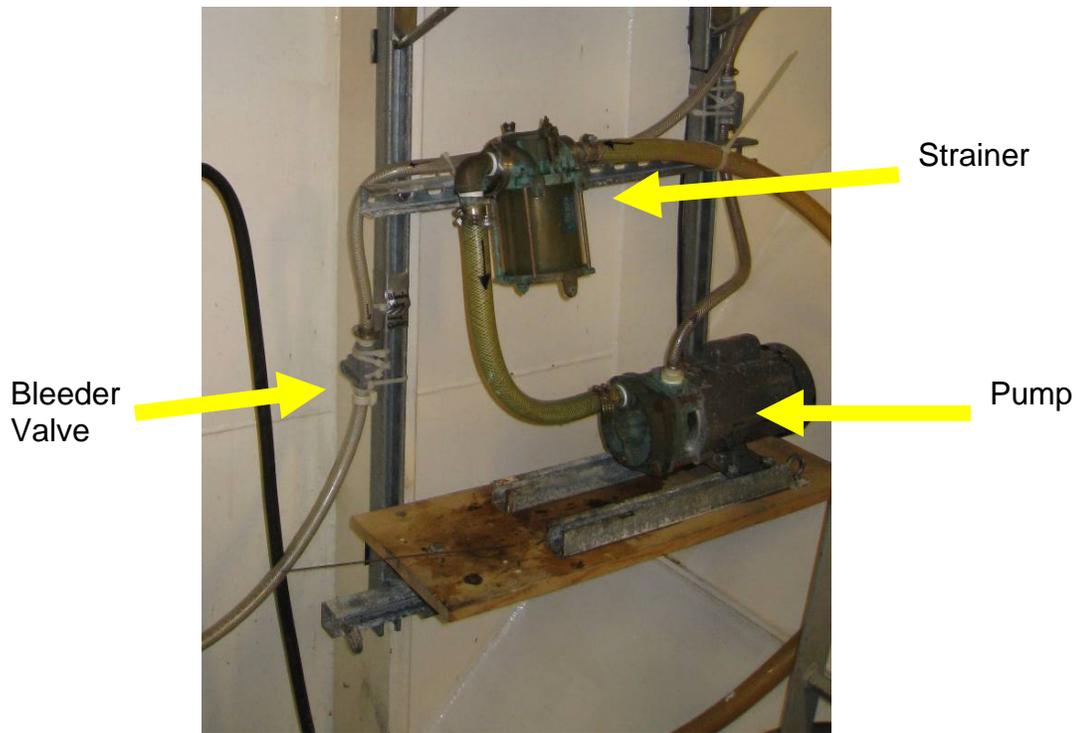


Figure 6. Strainer and bleeder valve

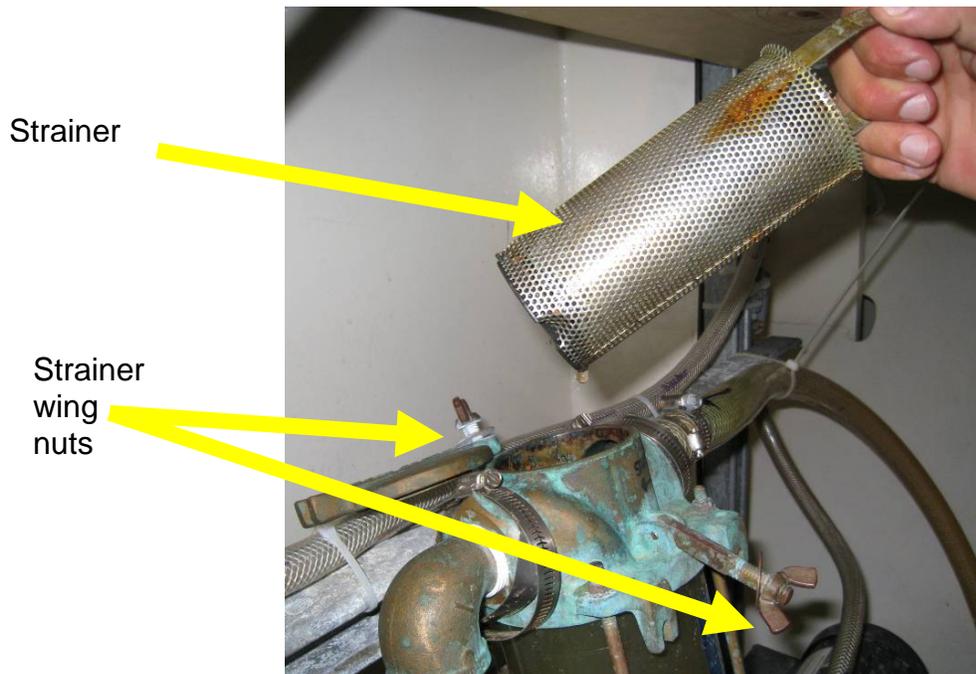


Figure 7. Strainer

## Cleaning the Strainer

If the strainer is full of marine debris and the basket is not visible it will need to be cleaned. To clean the strainer, follow the procedures below:

1. Turn off power to the pumps and TSG at the switch box located on the TSG rack (Fig 2.).
2. Close the stainless steel ball valve located after the SBE38 remote temperature sensor just behind the sea chest (Fig. 1).
3. Close the PVC ball valve just behind the strainer (Fig. 6).
4. Remove the strainer cap by twisting the wing nuts on top of the strainer (Fig 7).
5. Remove the strainer basket and clean the basket. The basket should be rinsed with clean water and the debris removed.
6. Replace the strainer basket and secure the strainer top.
7. Open the two valves and power on the system.
8. Check for leaks around the strainer to ensure that the top was secured properly.
9. Note the time and date that the strainer was cleaned in the green log book.

## Computer / Data Acquisition

The PC “Shuttle” computer system (Fig. 8), with Furuno GPS (Fig. 9) and Iridium satellite data transmission equipment, is located in the A/V Room.

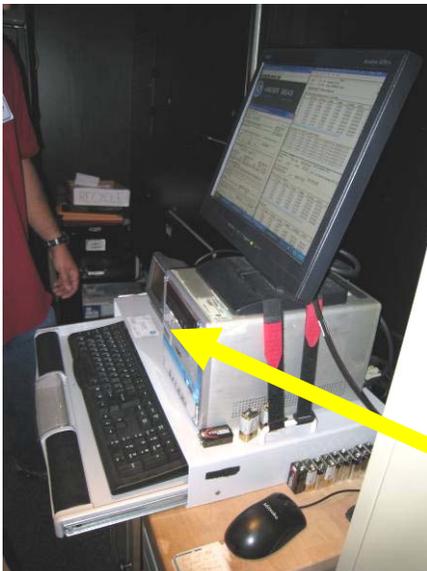


Figure 8. TSG Shuttle PC



Figure 9. Furuno GPS

PC Power  
Button

The system should always be automatically running the AMVERSEAS program, which will start *automatically* when the computer is powered. The AMVERSEAS UTC Time, TS-GUI and XTSG Xmissions on TSG Computer windows will open automatically (Fig. 10). They can be minimized, but must be running.

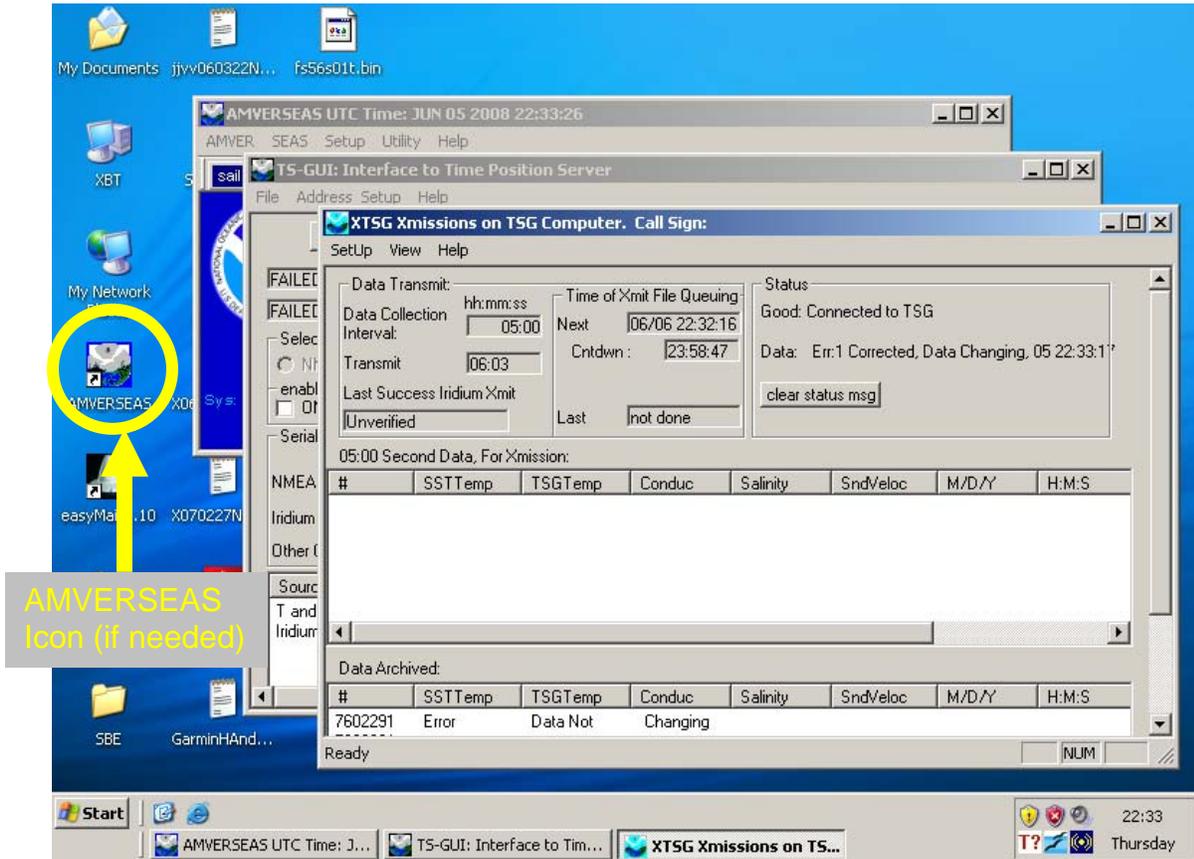


Figure 10. Necessary AMVERSEAS TSG Screens

If AMVERSEAS is not running, manually start it by double clicking the AMVERSEAS icon on the desktop (Fig. 10).

### IRIDIUM FREEZE-UP:

Occasionally the Iridium system will freeze-up (Fig. 11). NOAA has installed a digital timer to the Iridium power supply to cycle the power at 0000h and 1200h and clear any freezes. If there are still freeze-ups, manually cycle the Iridium power by powering off/on the handset. If still frozen, unplug from power strip and replug in.



Figure 11. Iridium modem and handset

**AMVERSEAS FREEZE-UP:**

If AMVERSEAS freezes, restart the computer using START>Shutdown (on Windows Desktop), or manually restart it with the power button on front of PC (Fig. 8). AMVERSEAS will then start automatically.

**BLACKOUT:**

If there is a blackout, the computer will turn off. When the emergency is over, turn on the computer with PC power button (Fig. 8) and AMVERSEAS should start automatically, with no further action needed. If not, manually start from Windows Desktop – AMVERSEAS icon (Fig. 10).

Thank you for your participation in NOAA's Ship of Opportunity Program (SOOP). The data you are providing is important to us and we appreciate your involvement.

For more information on SOOP please see:

[http://www.aoml.noaa.gov/phod/goos/docs/goos\\_brochure\\_latest.pdf](http://www.aoml.noaa.gov/phod/goos/docs/goos_brochure_latest.pdf)