YSI Multi-parameter Probe Demonstration

CARIWIN Advanced Course in IWRM
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Outline

- Background
- Data Collection
- Software Interface
- Uploading Data
- Interpreting Results
- Maintenance and Care
- Hands on Exercise

Background

YSI 556 MPS Handheld Multiparameter Instrument

Source: www.ysi.com

- Simultaneously measures DO, pH, conductivity, temperature, ORP and barometric pressure (optional)
- Field-replaceable electrodes
- Compatible with EcoWatch® for Windows® data analysis software
- Stores over 49,000 data sets, time and date stamped, interval or manual logging
- Three-year warranty on the instrument; one-year on the probes
- GLP assisting, records calibration data in memory
- Available with 4, 10, and 20-m cable lengths
- IP-67, impact-resistant, waterproof case
- Easy-to-use, screw-on cap DO membranes
- RS-232 interface for PC connection

5563 MPS Sensor Specifications

Dissolved Oxygen (% saturation)	Sensor Type	Steady state polarographic
	Range	0 to 500% air saturation
	Accuracy	0 to 200% air saturation, ± 2% of the reading or ±2% air saturation, whichever is greater; 200 to 500% air saturation, ± 6% of the reading
	Resolution	0.1% air saturation
Dissolved Oxygen (mg/L)	Sensor Type	Steady state polarographic
	Range	0 to 50 mg/L
	Accuracy	0 to 20 mg/L, ± 2% of the reading or ±0.2 mg/L, whichever is greater; 20 to 50 mg/L, ± 6% of the reading
	Resolution	0.01 mg/L
Temperature	Sensor Type	YSI Temperature Precision™ thermistor
	Range	-5 to 45°C
	Accuracy	± 0.15°C
	Resolution	0.1°C
Conductivity	Sensor Type	4-electrode cell with autoranging
	Range	0 to 200 mS/cm
	Accuracy	± 0.5% of reading or ± 0.001 mS/cm; whichever is greater (4-meter cable) ± 1.0% of reading or ± 0.001 mS/cm; whichever is greater (20-meter cable)
	Resolution	0.001 mS/cm to 0.1 mS/cm (range-dependent)
Salinity	Sensor Type	Calculated from conductivity and temperature
	Range	0 to 70 ppt
	Accuracy	± 1.0% of reading or ±0.1 ppt, whichever is greater
	Resolution	0.01 ppt
pH (optional)	Sensor Type	Glass combination electrode
	Range	0 to 14 units
	Accuracy	±0.2 units
	Resolution	0.01 units
ORP (optional)	Sensor Type	Platinum button
	Range	-999 to +999 mV
	Accuracy	± 20 mV
	Resolution	0.1 mV
Total Dissolved Solids (TDS)	Sensor Type	Calculated from conductivity (variable constant, default 0.65)
	Range	0 to 100 g/L
	Resolution	4 digits
Barometer (optional)	Range	500 to 800 mm Hg
	Accuracy	± 3 mm Hg within ± 15°C temperature range from calibration point
	Resolution	0.1 mm Hg

YSI 556 Instrument Specifications

Size	11.9 cm width x 22.9 cm lenth (4.7 in. x 9 in.)
Weight with batteries	2.1 lbs. (916 grams)
Power	4 alkaline C-cells; optional rechargeable pack
Cables	4-, 10-, and 20-m (13.1, 32.8, 65.6 ft.) lengths
Warranty	3-year instrument; 1-year probes and cables
Communication Port	RS-232 Serial
Data Logger	49,000 data sets, date and time stamp, manual or logging, with user-selectable intervals

Health & Safety

Buffer/Calibration Solutions

- Some contain harmful chemicals (i.e. formaldehyde, potassium ferriccyanide, etc.)

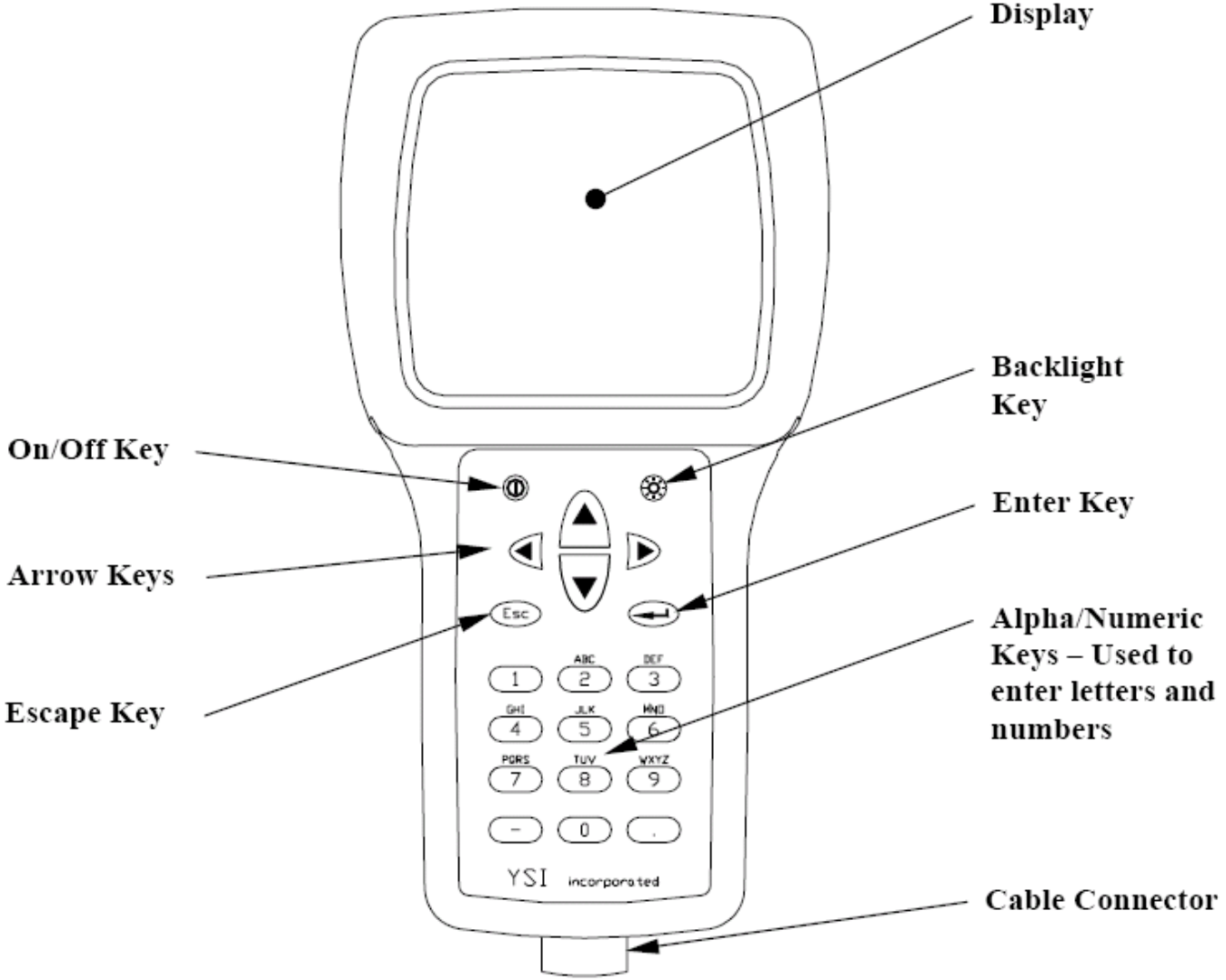
> ⚠ *CAUTION*: AVOID INHALATION, SKIN CONTACT, EYE CONTACT OR INGESTION. MAY EVOLVE TOXIC FUMES IN FIRE.

Batteries

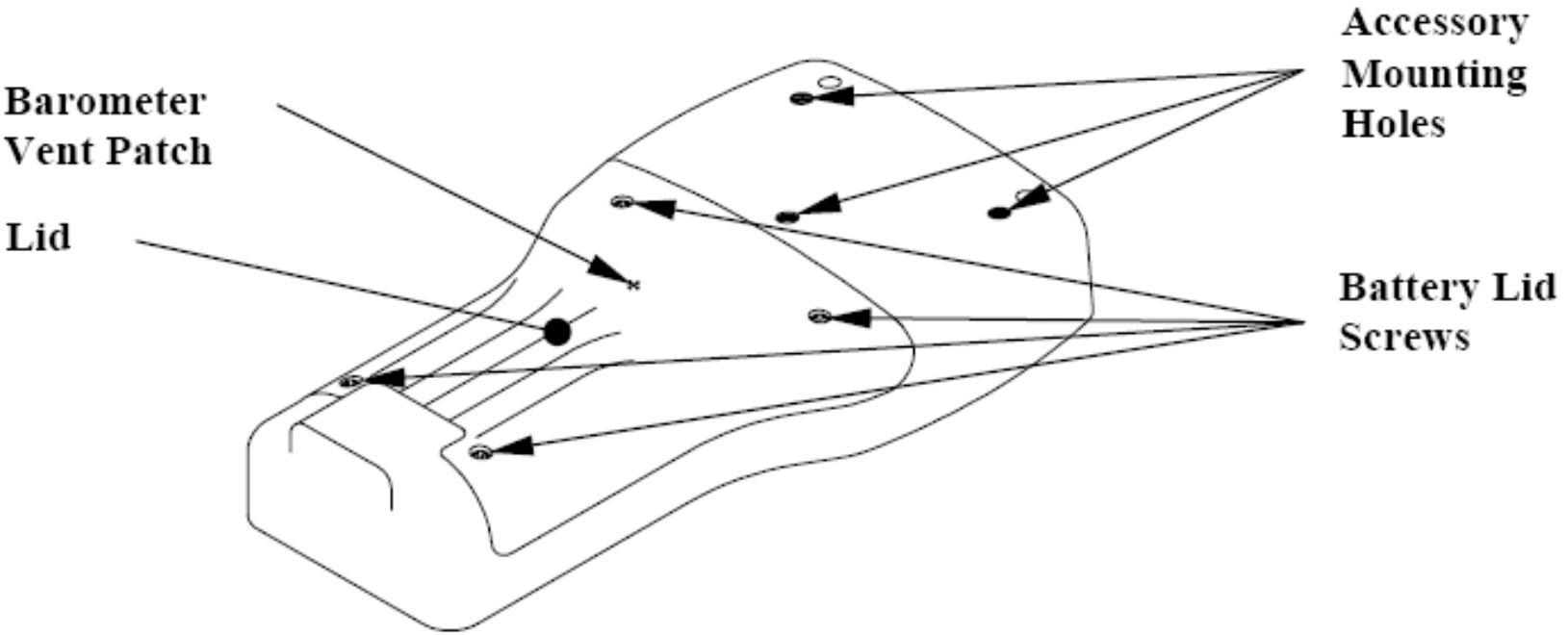
- Ensure proper disposal of all batteries
- Do not tamper with the batteries
- Keep batteries away from small children

Consult the Owners Manual for a Complete Guide

Features – Front View



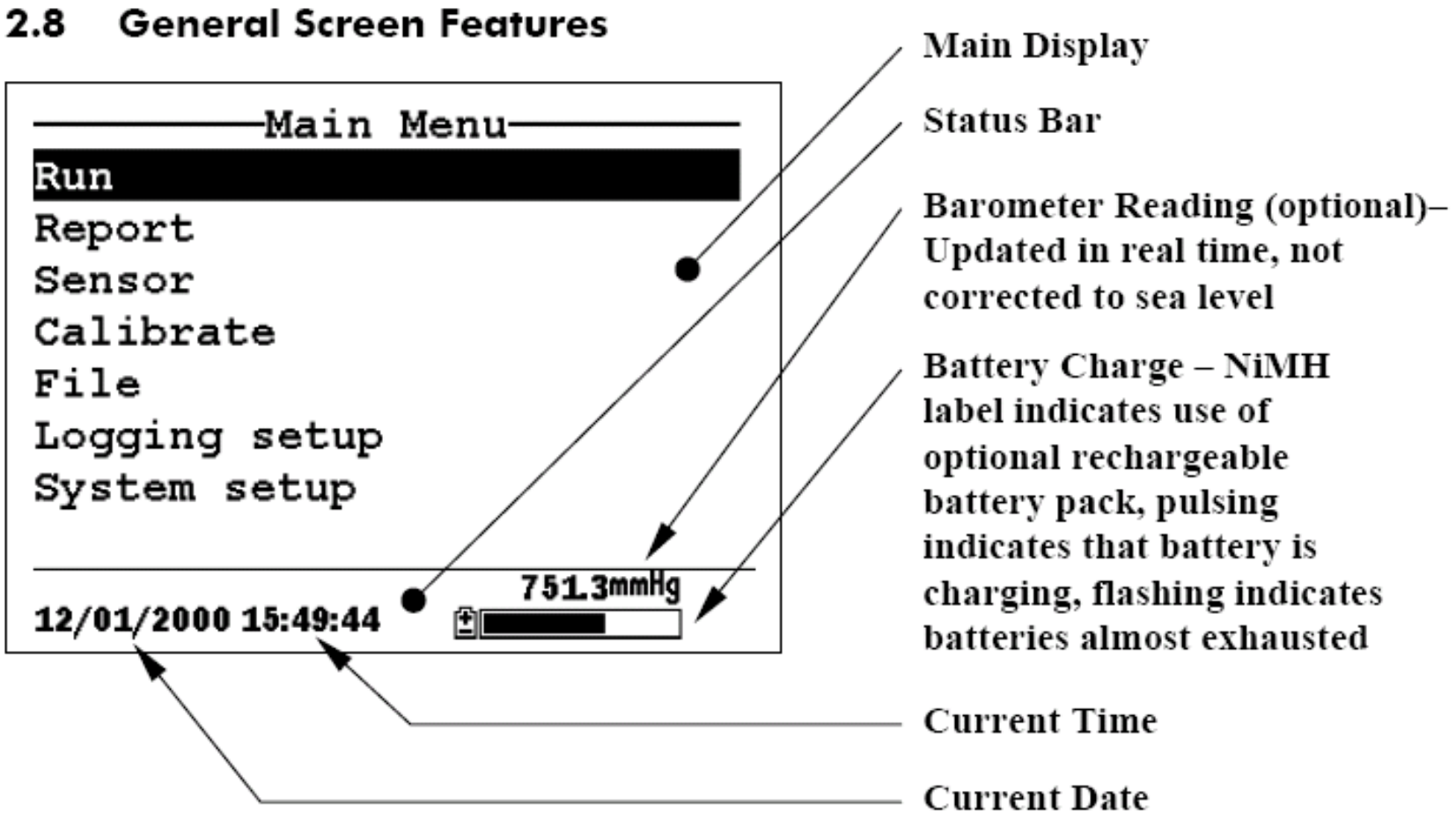
Features – Back View



Batteries

- 4 C cell alkaline batteries – operational for 180 continuous hours
- To reset device: remove batteries and then reinstall

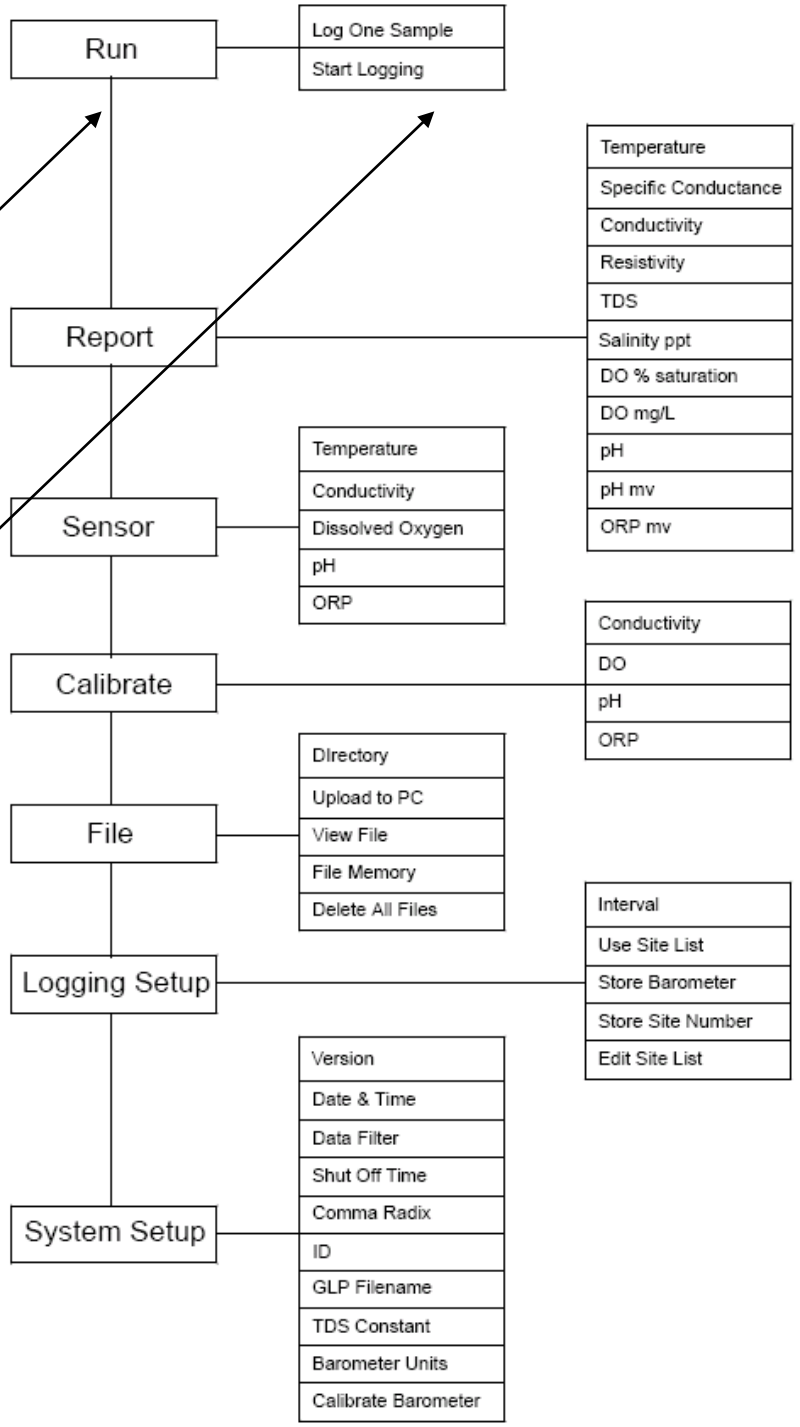
Main Menu Screen



Menu Flow Chart

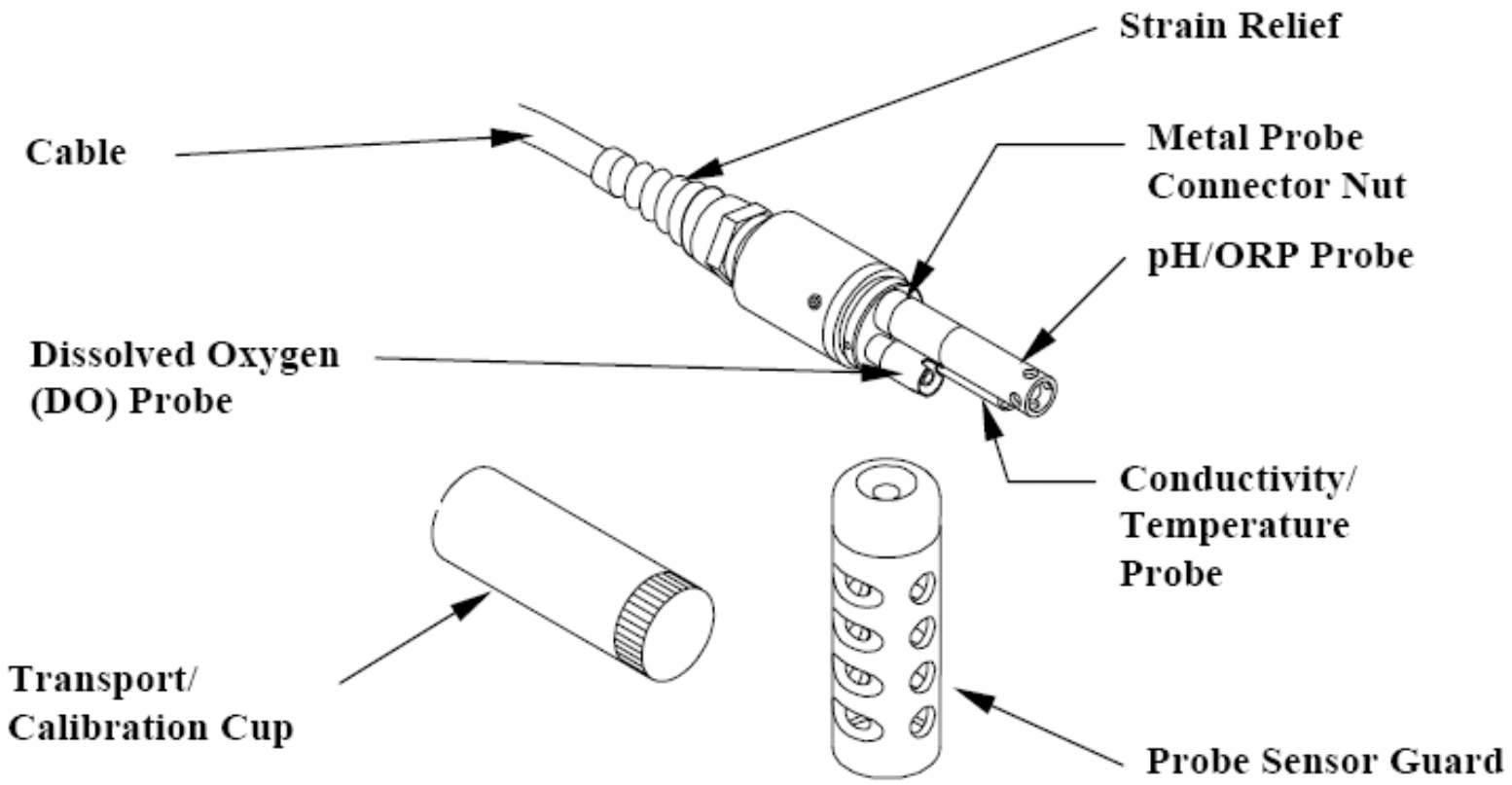
Main Menu Options

Secondary Options



YSI 5563 Probe

- Measures DO, temperature, conductivity, pH and ORP

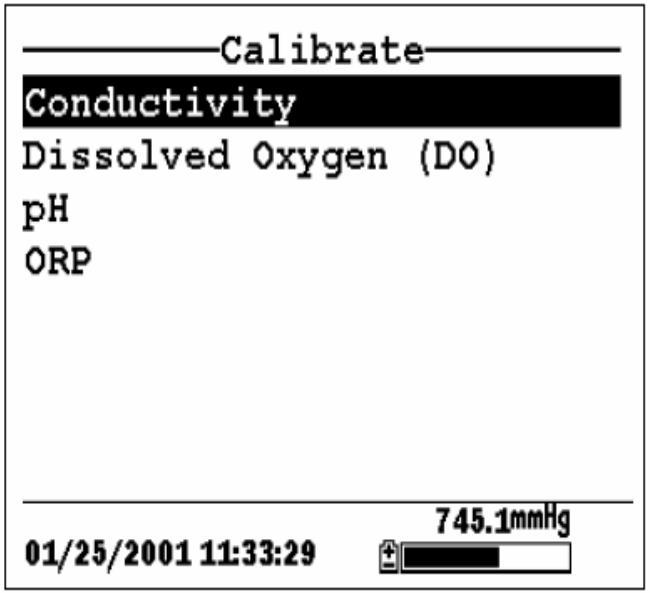


Calibration Procedure

Note: All sensors except Temp. require periodic calibration to maintain accuracy

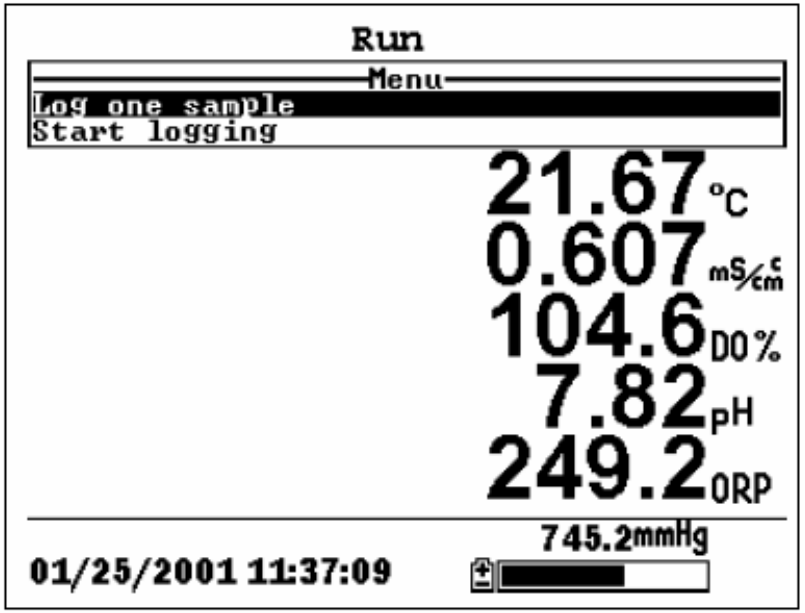
Procedure

1. Turn on unit
2. Press *Escape* to access the Main Menu
3. Select *Calibrate*
4. The following screen appears
5. Proceed by following the specific instructions for each parameter (from owners manual- pg 41-55)



Reading Measurements

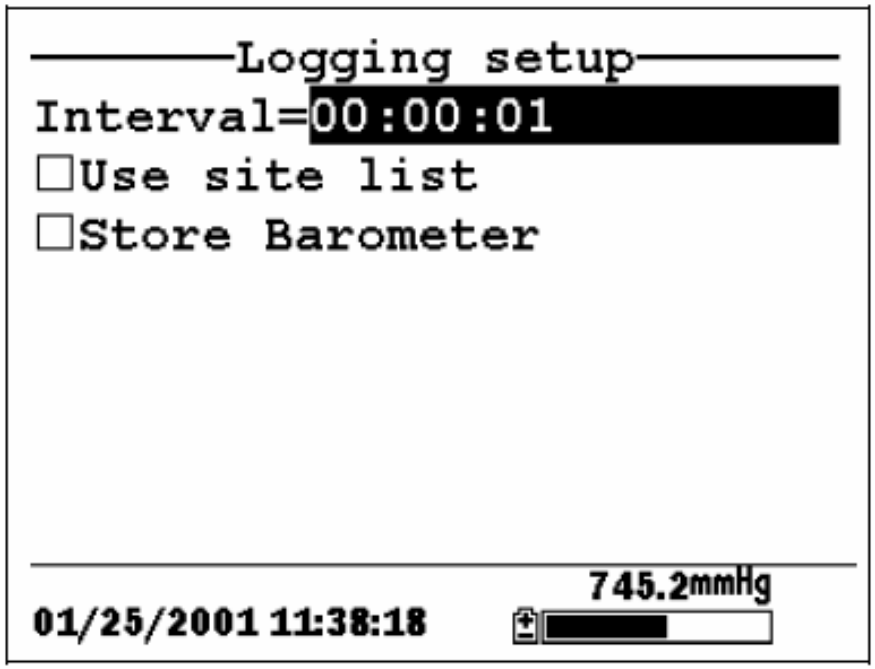
- The *Run* screen displays data from the sensors in real-time and allows you to log or store the data
- Fully immerse the probes in the water when taking measurement
- Rapidly, yet carefully move the probe through the water
- Watch the readings on the display until they stabilize, then take your measurement



Logging Measurements

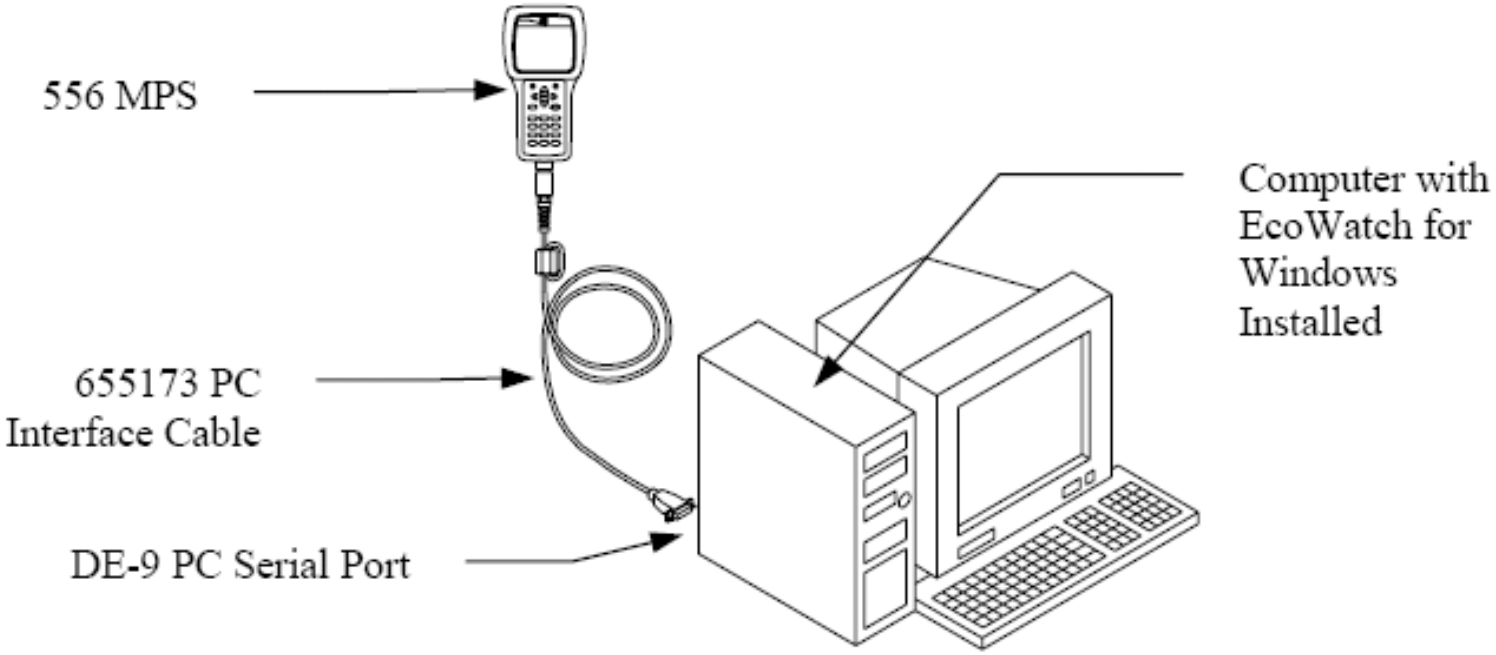
Procedure

1. Select *Logging Setup* from the Main Menu screen
2. An interval of 1sec-15min is permitted
3. If desired, barometer measurements may be stored
4. Site specific measurement are possible



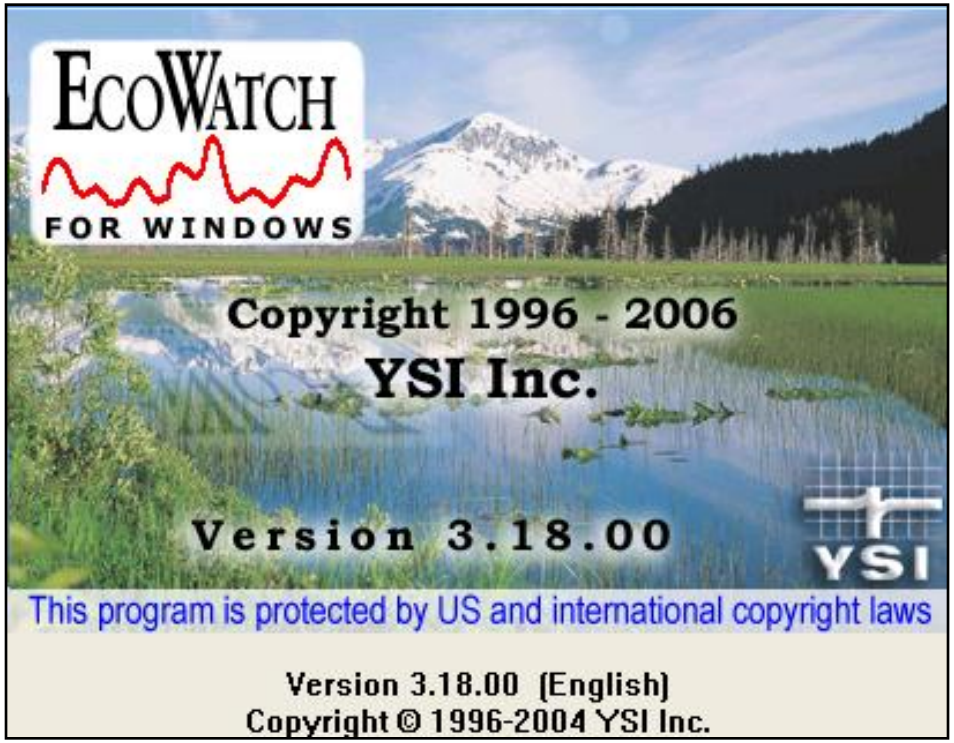
Upload Procedure

- Disconnect the YSI 5563 probe module from the 566 MPS device
- Connect the YSI 556 MPS to a serial (Com) port of your computer via the YSI 655173 PC Interface Cable



Software Interface

- **EcoWatch** is used as the software Interface
  - Windows based
  - Free download at: www.ysi.com
  - Registration required – no purchase necessary

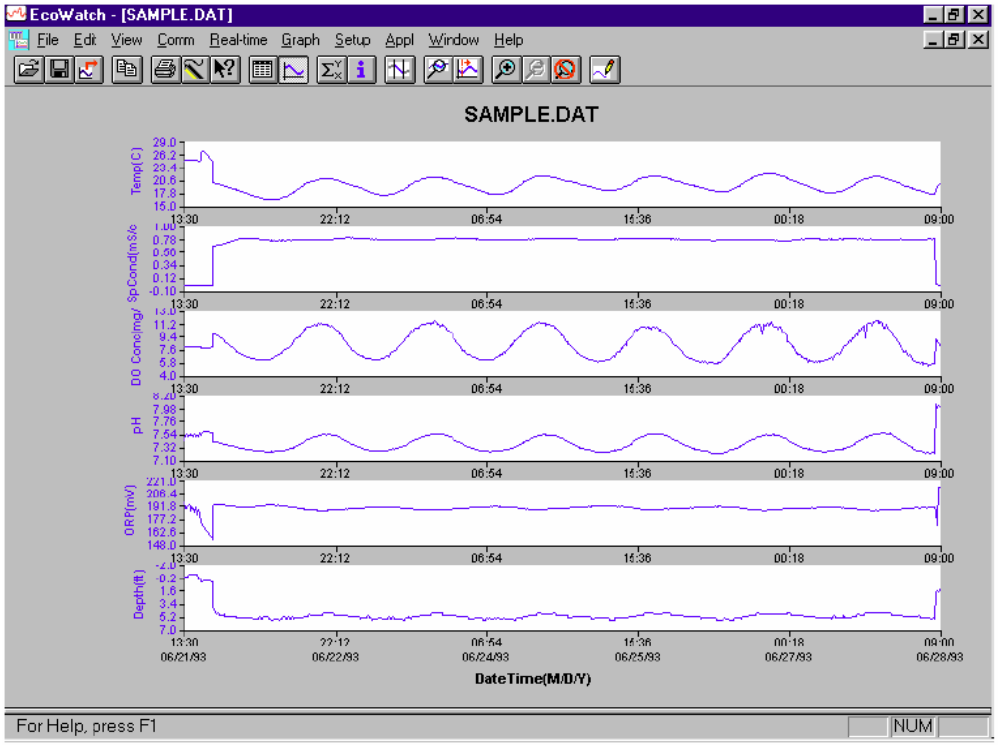


Data Retrieval

Procedure

- Within EcoWatch select the *File* menu button and locate your saved project – select it

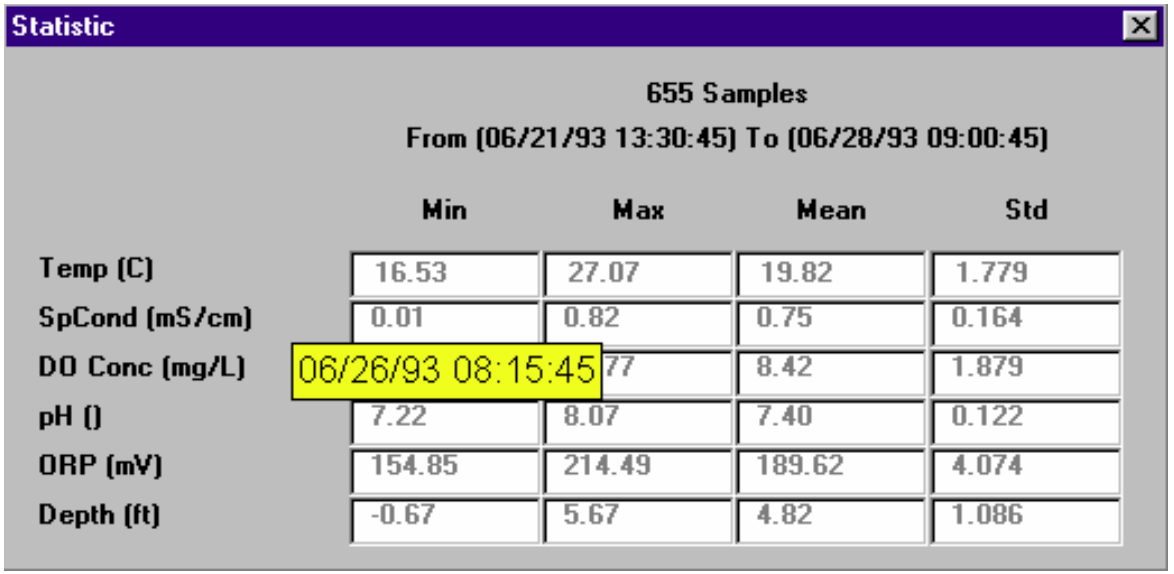
The following display will appear



Viewing Data-Interpreting Results

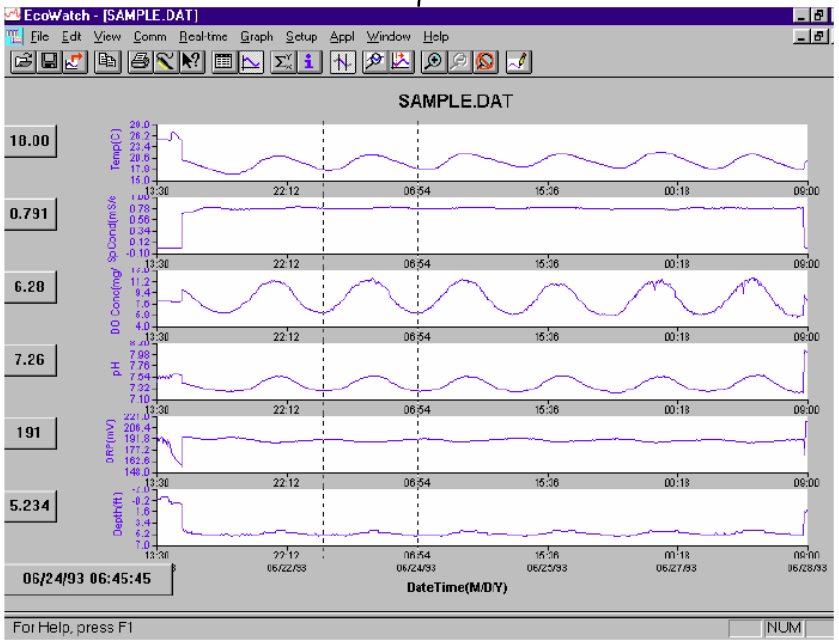
Procedure

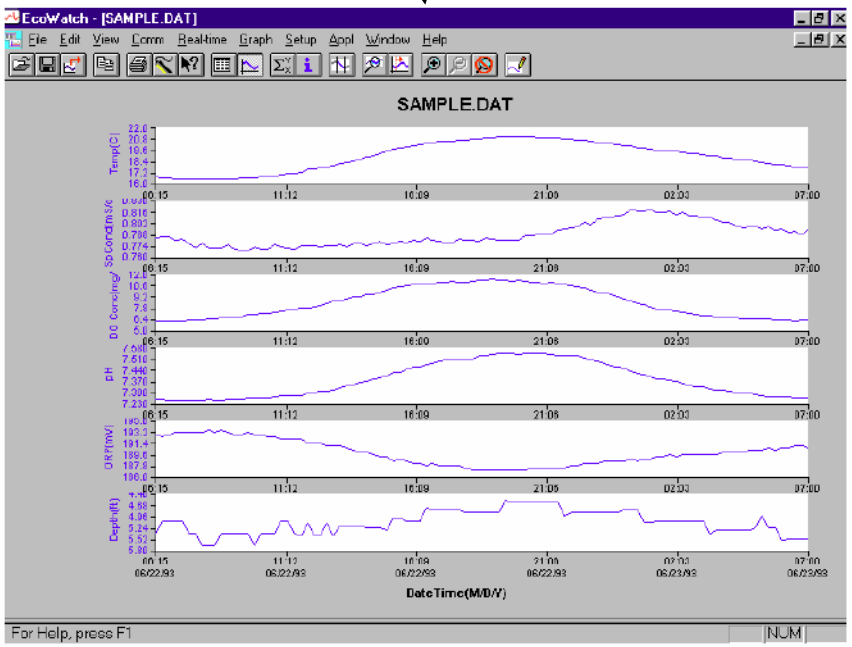
1. You can display both graphical and tabular results by selecting the  and  buttons, respectively
- You can view statistical data for the study by selecting the  buttons



Interpret Results (Con't)

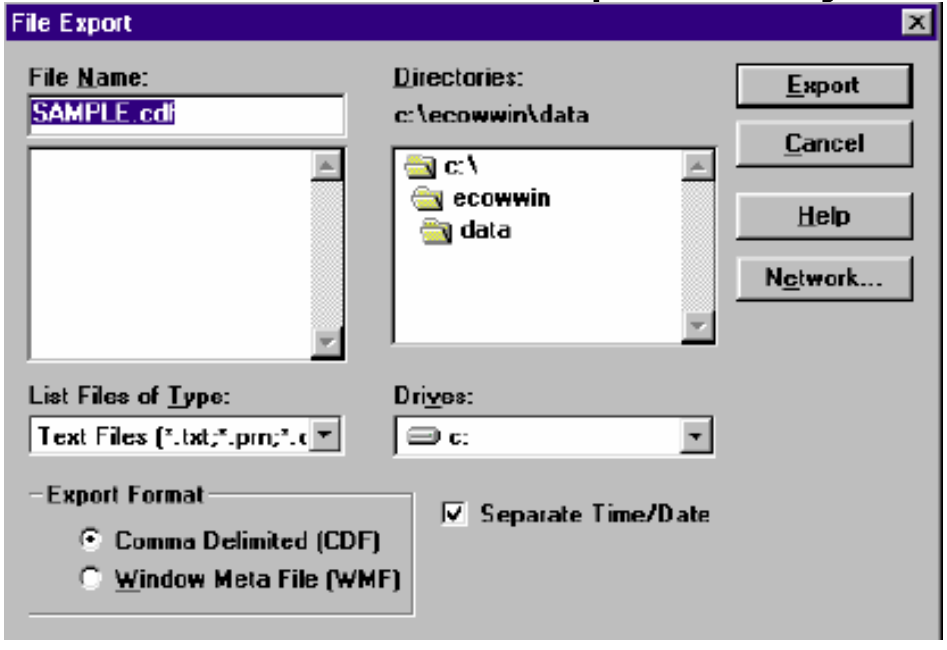
- The time period for interpretation can be modified by selecting the delimiter button
- This examines the selected period in higher resolution





Exporting Results

- Results may be exported to another spreadsheet management program such as MS Excel
- First, the .dat file must be saved as a .cdf file so that MS Excel can recognize the file
- To do this select the  icon from the toolbar and save the .dat file to a .cdf file – this file can now be opened by MS Excel



Maintenance and Care

DO Sensor

- For best results, we recommend that the KCl solution and the membrane cap be changed at least once every 30 days
- If erratic readings or evidence of membrane damage occurs, you should replace the membrane and the electrolyte solution. The average replacement interval is two to four weeks.
- The silver anode on the sensor may become coated with AgCl – this can be cleaned either mechanically or chemically (pg 102).
- The gold cathode may become tarnished – this can be cleaned mechanically (pg 103)
- To keep the electrolyte from drying out, store the sensor in the transport/calibration cup with at least 1/8″ of water.

Maintenance and Care

pH/ORP Sensor

- Cleaning is required whenever deposits are visible on the sensor glass or platinum finishes, or when response time is slow.

Most often the problem can be fixed by:

1. Removing the sensor from the probe module.
2. Simply using clean water and a soft clean cloth, lens cleaning tissue, or cotton swab to remove all foreign material from the glass bulb and platinum button. Then use a moistened cotton swab to carefully remove any material that may exist.

Note: If this doesn't work consult the owners manual (pg 105).

Maintenance and Care

Temperature/Conductivity Sensor

- Cleaning is required on a frequent basis.

Most often the problem can be fixed by:

1. Inserting the cleaning brush (from maintenance kit) into clean water and then inserting it into each hole 15-20 times.
2. Then rinse the cell thoroughly with clean tap water or deionized water.

Note: If this doesn't work consult the owners manual (pg 107).

Maintenance and Care

Storage

Proper storage preserves the life of the sensors and allows for quick and easy operation of the machine when required.

Short-term: place approx. 1/2 inch of tap water in the transport/calibration cup and by placing the probe module with all of the sensors installed into the cup.

> ⚠ **CAUTION:** The water level has to be low enough so that none of the sensors are actually under water. Check the transport/calibration cup periodically to make certain that the water is still present or the sponge is still moist.

Long-term: **Refer to the owners manual (pg 111) for instructions.**