reporting the conductivity seen, but the reading does not accurately represent the value of the bulk solution. Errors will be most serious when low conductivity solutions are contaminated by carry-over from high conductivity solutions, and can then be of an order of magnitude or more.

Follow the cleaning instructions carefully before attempting low conductivity measurements with a cell of unknown history or one that has been previously used in higher value solutions.

An entirely different form of contamination sometimes occurs due to a buildup of foreign material directly on cell electrodes. While rare, such deposits have, on occasion, markedly reduced the effectiveness of the electrodes. The result is an erroneously low conductance reading.

Electrical-Noise Errors

Electrical noise can be a problem in any measurement range, but will contribute the most error and be the most difficult to eliminate when operating in the lowest ranges. The noise may be either line-conducted or radiated or both, and may require, grounding, shielding, or both.

Galvanic and Miscellaneous Effects

In addition to the error sources described above, there is another class of contributors that can be ignored for all but the most meticulous of laboratory measurements. These errors are always small and are generally completely masked by the error budget for cell-constant calibration, instrument accuracy, etc. Examples range from parasitic reactance associated with the solution container and its proximity to external objects to the minor galvanic effects resulting from oxide formation or deposition on electrodes. Only trial and error in the actual measurement environment can be suggested as an approach to reduce such errors. If the reading does not change as the setup is adjusted, errors due to such factors can be considered too small to see.

11.3 DISSOLVED OXYGEN PROBE PRECAUTIONS

1. Membrane life depends on usage. Membranes will last a long time if installed properly and treated with care. Erratic readings are a result of loose, wrinkled, damaged, or fouled membranes, or from large (more than 1/8" diameter) bubbles in the electrolyte reservoir. If erratic readings or evidence of membrane damage occurs, you should replace the membrane and the KCl solution. The average replacement interval is two to four weeks.

2. If the membrane is coated with oxygen consuming (e.g. bacteria) or oxygen evolving organisms (e.g. algae), erroneous readings may occur.

3. Chlorine, sulfur dioxide, nitric oxide, and nitrous oxide can affect readings by behaving like oxygen at the probe. If you suspect erroneous readings, it may be necessary to determine if these gases are the cause.

4. Avoid any environment that contains substances that may attack the probe materials. Some of these substances are concentrated acids, caustics, and strong solvents. The probe materials that come in contact with the sample include FEP Teflon, stainless steel, epoxy, polyetherimide and the polyurethane cable covering.

5. For correct probe operation, the gold cathode must always be bright. If it is tarnished (which can result from contact with certain gases) or plated with silver, the gold surface must be restored. To restore the cathode, you may either return the instrument to the factory or clean it using the YSI 5238 probe reconditioning kit. Never use chemicals or abrasives not supplied with this kit.

NOTE: Model 85 probes built before July, 1996 (serial numbers starting with 96F or lower), should be cleaned with the sanding disc mounted on a FLAT surface. Do NOT use the curved tool provided in the 5238 probe reconditioning kit on these probes.

6. It is also possible for the silver anode to become contaminated, which will prevent successful calibration. To clean the anode, remove the membrane and soak the probe overnight in 3% ammonium hydroxide. Next, rinse the sensor tip with deionized water, add new KCl solution, and install a new membrane. Turn the instrument on and allow the system to stabilize for at least 30 minutes. If, after several hours, you are still unable to calibrate, return the YSI Model 85 system to an authorized service center for service.

7. To keep the electrolyte from drying out, store the probe in the calibration chamber with the small piece of sponge.

SECTION 12 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	ACTION
1. Instrument will not turn on	A. Low battery voltage B. Batteries installed wrong C. Meter requires service	A. Replace batteries B. Check battery polarity. C. Return system for service
2. Instrument will not calibrate (Dissolved Oxygen)	A. Membrane is fouled or damaged B. Probe anode is fouled or dark C. Probe cathode is tarnished D. System requires service	A. Replace membrane & KCl B. Clean anode C. Clean cathode D. Return system for service
3. Instrument will not calibrate (Conductivity)	A. Cell is contaminated	A. See "Maintenance" Section
4. Instrument "locks up"	A. Instrument has rec'd a shock B. Batteries are low or damaged C. System requires service	A & B. Remove battery lid, wait 15 seconds for reset, replace lid. C. Return system for service
5. Instrument readings are inaccurate (Dissolved Oxygen)	A. Cal altitude is incorrect B. Probe not in 100% O_2 saturated air during Cal procedure C. Membrane fouled or damaged D. Probe anode is fouled or dark E. Probe cathode is tarnished F. System requires service	A. Recalibrate w/correct value B. Moisten sponge & place in Cal chamber w/ probe & Recal C. Replace membrane D. Clean anode E. Clean cathode F. Return system for service
6. Instrument readings are inaccurate (Conductivity)	A. Calibration is required B. Cell is contaminated C. Tempco is set incorrectly D. Reference temperature incorrect E. Readings are or are not temperature compensated.	A. See "Calibration" Section B. See "Maintenance" Section C. See "Advanced Setup" Section D. See "Advanced Setup" Section E. See "Making Measurements" Section
7..LCD displays "LO BAT" Main display flashes "off"	A. Batteries are low or damaged	A. Replace batteries
8. Main Display reads "OVEr" (Secondary display reads "ovr") (Secondary display reads "udr")	A. Conductivity reading is >200 mS B. Temperature reading is >65°C C. Temperature reading is <-5°C D. Salinity reading is >80 ppt E. User cell constant cal K is >5.25 F. DO temperature is >46°C G. DO % saturation is >200% H. DO concentration is >20 mg/L	In all cases, check calibration values and procedures; check advanced setup settings. If each of these are set correctly, return instrument for service.
9. Main display reads "Undr"	A. User cell constant cal K is <4.9 B. DO current too low to calibrate	A. Recalibrate instrument using known good conductivity standard. Follow cell cleaning procedure in the Maintenance section. B. Replace membrane, clean probe
10. Main display reads "rErr"	A. Reading exceeds user selected manual range.	A. Use the mode key to select a higher or lower manual range, or set system to autoranging.
11. Main display reads "PErr"	A. User cell constant cal K is 0.0 B. Incorrect sequence of keystrokes.	A. See "Advanced Setup" section. B. Refer to manual section for step by step instruction for the function you are attempting.

SYMPTOM	POSSIBLE CAUSE	ACTION
12. Main display reads "LErr"	A. In temperature compensated conductivity mode, temperature exceeds the values computed using user defined temperature coefficient and/or reference temperature. B. In cell constant cal mode, temperature exceeds the values computed using user defined temperature coefficient and/or reference temperature.	A. & B. Adjust user defined tempco or reference temperature. (pg. 10)
13. Main display reads "Err" (Secondary display reads "ra")	A. System has failed its RAM test check procedure.	A. Turn instrument OFF and back ON again. B. Return the system for service (pg. 26)
14. Main display reads "Err" (Secondary display reads "ro")	A. System has failed its ROM test check procedure.	A. Turn instrument OFF and back ON again. B. Return the system for service (pg. 26)
15. Secondary display reads "rEr"	A. Temperature jumper is set to °F and reading is >199.9°F but <203°F.	A. Return the system for service. (pg. 26)
16. Main display reads "FAIL" (Secondary display reads "eep")	A. EEPROM has failed to respond in time.	A. Return the system for service. (pg. 26)
17. Readings on main display don't change	A. Meter is in recall mode.	A. Press **MODE** button to return to Normal Operation (pg. 12)

SECTION 13 WARRANTY AND REPAIR

YSI Model 85 Handheld Meters are warranted for two years from date of purchase by the end user against defects in materials and workmanship. YSI Model 85 probes and cables are warranted for one year from date of purchase by the end user against defects in material and workmanship. Within the warranty period, YSI will repair or replace, at its sole discretion, free of charge, any product that YSI determines to be covered by this warranty.

To exercise this warranty, write or call your local YSI representative, or contact YSI Customer Service in Yellow Springs, Ohio. Send the product and proof of purchase, transportation prepaid, to the Authorized Service Center selected by YSI. Repair or replacement will be made and the product returned, transportation prepaid. Repaired or replaced products are warranted for the balance of the original warranty period, or at least 90 days from date of repair or replacement.

Limitation of Warranty

This Warranty does not apply to any YSI product damage or failure caused by (i) failure to install, operate or use the product in accordance with YSI's written instructions, (ii) abuse or misuse of the product, (iii) failure to maintain the product in accordance with YSI's written instructions or standard industry procedure, (iv) any improper repairs to the product, (v) use by you of defective or improper components or parts in servicing or repairing the product, or (vi) modification of the product in any way not expressly authorized by YSI.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. YSI's LIABILITY UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT, AND THIS SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY DEFECTIVE PRODUCT COVERED BY THIS WARRANTY. IN NO EVENT SHALL YSI BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECTIVE PRODUCT COVERED BY THIS WARRANTY.

AUTHORIZED U.S. SERVICE CENTERS

North and East Region

YSI Incorporated • Repair Center • 1725 Brannum Lane • Yellow Springs, Ohio • 45387 • Phone: (800) 765-4974 • (937) 767-7241• E-Mail: ysi@info.com

South Region

C.C. Lynch & Associates • 212 E. 2nd Street • Suite 203 • Pass Christian, Mississippi • 39571 • Phone: (800) 333-2252 • (228) 452-4612 • Fax: (228) 452-2563

West Region

EnviroServices & Repair • 1110 Burnett Avenue, Suite D • Concord, CA • 94520 • Phone: (800) 550-5875 • Fax: (510)674-8655

INTERNATIONAL SERVICE CENTERS

YSI Incorporated • Repair Center • 1725 Brannum Lane • Yellow Springs, Ohio • 45387 • Phone: (937) 767-7241• E-Mail: info@ysi.com

Lynchford House • Lynchford Lane • Farnborough • Hampshire • GU146LT • Phone: (44-1252) 514711 • Fax: (44-1252) 511855 • Tlx: 858210

Sakura – Building 6-5-6-13 • Shinjuku, Shinjuku-ku, Tokyo • 160 • Phone: (81-3) 5360-3561 • Fax: (81-3) 5360-3565

SPECIALTY SERVICE CENTERS

Aquaculture
Aquatic Eco Systems, Inc. • 1767 Benbow Court • Apopka, Florida • Phone: (407) 886-3939 • Fax: (407) 886-6787

Aquacenter • 166 Seven Oaks Road • Leland, Mississippi • 38756 • Phone: (601) 378-2861 • Fax: (601) 378-2862

Wastewater
Q.C. Services • P.O. Box 68 • Harrison, Maine • 04040 • Phone: (207) 583-2980

Q.C. Services • P.O. Box 14831 • Portland, Oregon • 97293 • Phone: (503) 236-2712

CLEANING INSTRUCTIONS

NOTE: Before they can be serviced, equipment exposed to biological, radioactive, or toxic materials must be cleaned and disinfected. Biological contamination is presumed for any instrument, probe, or other device that has been used with body fluids or tissues, or with wastewater. Radioactive contamination is presumed for any instrument, probe or other device that has been used near any radioactive source.

If an instrument, probe, or other part is returned or presented for service without a Cleaning Certificate, and if in our opinion it represents a potential biological or radioactive hazard, our service personnel reserve the right to withhold service until appropriate cleaning, decontamination, and certification has been completed. We will contact the sender for instructions as to the disposition of the equipment. Disposition costs will be the responsibility of the sender.

When service is required, either at the user's facility or at YSI, the following steps must be taken to insure the safety of our service personnel.

1. In a manner appropriate to each device, decontaminate all exposed surfaces, including any containers. 70% isopropyl alcohol or a solution of 1/4 cup bleach to 1-gallon tap water are suitable for most disinfecting. Instruments used with wastewater may be disinfected with .5% Lysol if this is more convenient to the user.
2. The user shall take normal precautions to prevent radioactive contamination and must use appropriate decontamination procedures should exposure occur.
3. If exposure has occurred, the customer must certify that decontamination has been accomplished and that no radioactivity is detectable by survey equipment.
4. Any product being returned to the YSI Repair Center, should be packed securely to prevent damage.
5. Cleaning must be completed and certified on any product before returning it to YSI.

PACKING INSTRUCTIONS

1. Clean and decontaminate items to insure the safety of the handler.
2. Complete and include the Cleaning Certificate.
3. Place the product in a plastic bag to keep out dirt and packing material.
4. Use a large carton, preferably the original, and surround the product completely with packing material.
5. Insure for the replacement value of the product.

Cleaning Certificate

Organization _____

Department _____

Address _____

City _____ State _ Zip _____

Country _____ Phone _____

Model No. of Device _ Lot Number _____

Contaminant (if known) _____

Cleaning Agent(s) used _____

Radioactive Decontamination Certified?

(Answer only if there has been radioactive exposure)

____ Yes _____ No

Cleaning Certified By _____

Name Date

SECTION 14 ACCESSORIES AND REPLACEMENT PARTS

The following parts and accessories are available from YSI or any Franchise Dealer authorized by YSI.

YSI ORDER NUMBER	DESCRIPTION
YSI 5906	Replacement Membrane Cap Kit (6 each)
YSI 5238	Probe Reconditioning Kit
YSI 3161	Conductivity Calibration Solution 1,000 µ/cm (1 Quart)
YSI 3163	Conductivity Calibration Solution 10,000 µ/cm (1 Quart)
YSI 3165	Conductivity Calibration Solution 100,000 µ/cm (1 Quart)
YSI 3167	Conductivity Calibration Solution 1,000 µ/cm (8 pints)
YSI 3168	Conductivity Calibration Solution 10,000 µ/cm (8 pints)
YSI 3169	Conductivity Calibration Solution 50,000 µ/cm (8 pints)
YSI 5520	Carrying Case
YSI 118510	Replacement Probe & Cable Assembly (10 feet)
YSI 118522	Replacement Probe & Cable Assembly (25 feet)
YSI 118527	Replacement Probe & Cable Assembly (50 feet)
YSI 118519	Replacement Probe and Cable Assembly (100 feet)
YSI 038501	Replacement Front Case Cover
YSI 055242	Replacement Rear Case Cover
YSI 055244	Replacement Battery Cover Kit
YSI 055204	Replacement Case Gasket and Screw
YSI 055219	Storage Chamber Sponge
YSI 030156	Main Board Assembly
YSI 038213	Replacement Electrode Cleaning Brush

APPENDIX A SPECIFICATIONS

Operating Environment

Medium: fresh, sea, or polluted water and most other liquid solutions.
Temperature: -5 to +65 °C
Depth: 0 to 10, 0 to 25, 0 to 50, or 0 to 100 feet (depending on cable length)

Storage Temperature: -10 to +50 °C

Material: ABS, Stainless Steel, and other materials

Dimensions:

Height:	9.5 inches	(24.13 cm)
Thickness:	2.2 inches	(5.6 cm)
Width:	3.5 inches max.	(8.89 cm)
Weight:	1.7 pounds (w/ 10' cable)	(.77 kg)
Display:	2.3"W x 1.5"L	(5.8cm W x 3.8cm L)

Power: 9 VDC -6 AA-size Alkaline Batteries (included)
Approximately 100 hours operation from each new set of batteries

Water Tightness: Meets or exceeds IP65 standards

Extensive testing of the YSI Model 85 indicates the following typical performance:

Measurement	Range	Resolution	Accuracy
Conductivity	0 to 499.9 µS/cm	0.1 µS/cm	± .5% FS
	0 to 4999 µS/cm	1.0 µS/cm	± .5% FS
	0 to 49.99 mS/cm	.01 mS/cm	± .5% FS
	0 to 200.0 mS/cm	0.1 mS/cm	± .5% FS
Salinity	0 to 80 ppt	.1 ppt	± 2%, or ± 0.1 ppt
Temperature	-5 to +65 °C	0.1 °C	± 0.1 °C (±1 lsd)
Dissolved Oxygen	0 to 200 % Air Sat.	0.1% Air Saturation	± 2% Air Saturation
	0 to 20 mg/L	0.01 mg/L	± 0.3 mg/L

Adjustable Conductivity Reference Temperature: 15°C to 25°C

Adjustable Temperature Compensation Factor for Conductivity: 0% to 4%

Temperature Compensation: Automatic

Range: Autoranging for Dissolved Oxygen

User selected or Autoranging for Conductivity

APPENDIX B - TEMPERATURE CORRECTION DATA

Temperature Correction Data for Typical Solutions

A. Potassium Chloride** (KCl)

Concentration: 1 mole/liter			Concentration: 1 x 10^{-1} mole/liter		
C	mS/cm	%/ C (to 25 C)	C	mS/cm	%/ C (to 25 C)
0	65.10	1.67	0	7.13	1.78
5	73.89	1.70	5	8.22	1.80
10	82.97	1.72	10	9.34	1.83
15	92.33	1.75	15	10.48	1.85
20	101.97	1.77	20	11.65	1.88
25	111.90	1.80	25	12.86	1.90
			30	14.10	1.93
			35	15.38	1.96
			37.5	16.04	1.98
			40	16.70	1.99
			45	18.05	2.02
			50	19.43	2.04

Concentration: 1 x 10^{-2} mole/liter			Concentration: 1 x 10^{-3} mole/liter		
C	mS/cm	%/ C (to 25 C)	C	mS/cm	%/ C (to 25 C)
0	0.773	1.81	0	0.080	1.84
5	0.892	1.84	5	0.092	1.88
10	1.015	1.87	10	0.105	1.92
15	1.143	1.90	15	0.119	1.96
20	1.275	1.93	20	0.133	1.99
25	1.412	1.96	25	0.147	2.02
30	1.553	1.99	30	0.162	2.05
35	1.697	2.02	35	0.178	2.07
37.5	1.771	2.03	37.5	0.186	2.08
40	1.845	2.05	40	0.194	2.09
45	1.997	2.07	45	0.210	2.11
50	2.151	2.09	50	0.226	2.13

** Charts developed by interpolating data from International Critical Tables, Vol. 6, pp. 229-253, McGraw-Hill Book Co., NY.

B. Sodium Chloride* (NaCl)

Saturated solutions at all temperatures			Concentration: 0.5 mole/liter		
C	mS/cm	%/ C (to 25 C)	C	mS/cm	%/ C (to 25 C)
0	134.50	1.86	0	25.90	1.78
5	155.55	1.91	5	29.64	1.82
10	177.90	1.95	10	33.61	1.86
15	201.40	1.99	15	37.79	1.90
20	225.92	2.02	20	42.14	1.93
25	251.30	2.05	25	46.65	1.96
30	277.40	2.08	30	51.28	1.99
			35	56.01	2.01
			37.5	58.40	2.02
			40	60.81	2.02
			45	65.65	2.04
			50	70.50	2.05

Concentration: 1×10^{-1} mole/liter			Concentration: 1×10^{-2} mole/liter		
C	mS/cm	%/ C (to 25 C)	C	mS/cm	%/ C (to 25 C)
0	5.77	1.83	0	0.632	1.87
5	6.65	1.88	5	0.731	1.92
10	7.58	1.92	10	0.836	1.97
15	8.57	1.96	15	0.948	2.01
20	9.60	1.99	20	1.064	2.05
25	10.66	2.02	25	1.186	2.09
30	11.75	2.04	30	1.312	2.12
35	12.86	2.06	35	1.442	2.16
37.5	13.42	2.07	37.5	1.508	2.17
40	13.99	2.08	40	1.575	2.19
45	15.14	2.10	45	1.711	2.21
50	16.30	2.12	50	1.850	2.24

Concentration: 1×10^{-3} mole/liter		
C	mS/cm	%/ C (to 25 C)
0	0.066	1.88
5	0.076	1.93
10	0.087	1.98
15	0.099	2.02
20	0.111	2.07
25	0.124	2.11
30	0.137	2.15
35	0.151	2.19
37.5	0.158	2.20
40	0.165	2.22
45	0.180	2.25
50	0.195	2.29

* Charts developed by interpolating data from the CRC Handbook of Chemistry and Physics, 42nd ed., p. 2606, The Chemical Rubber Company, Cleveland.

C. Lithium Chloride * (LiCl)

Concentration: 1 mole/liter			Concentration: 1 x 10^{-1} mole/liter		
C	mS/cm	% C (to 25 C)	C	mS/cm	% C (to 25 C)
0	39.85	1.82	0	5.07	1.87
5	46.01	1.85	5	5.98	1.85
10	52.42	1.89	10	6.87	1.85
15	59.07	1.92	15	7.75	1.85
20	65.97	1.95	20	8.62	1.85
25	73.10	1.98	25	9.50	1.86
30	80.47	2.02	30	10.40	1.88
35	88.08	2.05	35	11.31	1.91
37.5	91.97	2.07	37.5	11.78	1.92
40	95.92	2.08	40	12.26	1.94
45	103.99	2.11	45	13.26	1.98
50	112.30	2.15	50	14.30	2.02

Concentration: 1 x 10^{-2} mole/liter			Concentration: 1 x 10^{-3} mole/liter		
C	mS/cm	% C (to 25 C)	C	mS/cm	% C (to 25 C)
0	0.567	1.88	0	0.059	1.93
5	0.659	1.92	5	0.068	2.03
10	0.755	1.96	10	0.078	2.12
15	0.856	2.00	15	0.089	2.19
20	0.961	2.04	20	0.101	2.25
25	1.070	2.08	25	0.114	2.28
30	1.183	2.12	30	0.127	2.31
35	1.301	2.16	35	0.140	2.32
37.5	1.362	2.18	37.5	0.147	2.32
40	1.423	2.20	40	0.154	2.31
45	1.549	2.24	45	0.166	2.29
50	1.680	2.28	50	0.178	2.25

D. Potassium Nitrate ** (KNO_3)

Concentration: 1 x 10^{-1} mole/liter			Concentration: 1 x 10^{-2} mole/liter		
C	mS/cm	% C (to 25 C)	C	mS/cm	% C (to 25 C)
0	6.68	1.78	0	0.756	1.77
5	7.71	1.79	5	0.868	1.80
10	8.75	1.81	10	0.984	1.83
15	9.81	1.83	15	1.105	1.86
20	10.90	1.85	20	1.229	1.88
25	12.01	1.87	25	1.357	1.90
30	13.15	1.90	30	1.488	1.93
35	14.32	1.92	35	1.622	1.95
37.5	14.92	1.94	37.5	1.690	1.96
40	15.52	1.95	40	1.759	1.97
45	16.75	1.97	45	1.898	1.99
50	18.00	2.00	50	2.040	2.01

* Charts developed by interpolating data from the CRC Handbook of Chemistry and Physics, 42nd ed., p. 2606, The Chemical Rubber Company, Cleveland.
** Charts developed by interpolating data from International Critical Tables. Vol. 6. pp. 229-253, McGraw-Hill Book Co., NY.

E. Ammonium Chloride* (NH_4Cl)

Concentration: 1 mole/liter			Concentration: 1 x 10^{-1} mole/liter		
C	mS/cm	%/ C (to 25 C)	C	mS/cm	%/ C (to 25 C)
0	64.10	1.60	0	6.96	1.82
5	74.36	1.53	5	7.98	1.88
10	83.77	1.45	10	9.09	1.93
15	92.35	1.37	15	10.27	1.97
20	100.10	1.29	20	11.50	2.00
25	107.00	1.21	25	12.78	2.03
			30	14.09	2.06
			35	15.43	2.07
			37.5	16.10	2.08
			40	16.78	2.08
			45	18.12	2.09
			50	19.45	2.09

Concentration: 1 x 10^{-2} mole/liter			Concentration: 1 x 10^{-3} mole/liter		
C	mS/cm	%/ C (to 25 C)	C	mS/cm	%/ C (to 25 C)
0	0.764	1.84	0	0.078	1.88
5	0.889	1.86	5	0.092	1.90
10	1.015	1.88	10	0.105	1.91
15	1.144	1.91	15	0.119	1.93
20	1.277	1.94	20	0.133	1.95
25	1.414	1.97	25	0.148	1.98
30	1.557	2.02	30	0.162	2.01
35	1.706	2.06	35	0.178	2.04
37.5	1.782	2.08	37.5	0.186	2.06
40	1.860	2.10	40	0.194	2.07
45	2.020	2.14	45	0.210	2.11
50	2.186	2.18	50	0.227	2.15

* Charts developed by interpolating data from the CRC Handbook of Chemistry and Physics, 42nd ed., p. 2606, The Chemical Rubber Company, Cleveland.

APPENDIX C REQUIRED NOTICE

The Federal Communications Commission defines this product as a computing device and requires the following notice:

This equipment generates and uses radio frequency energy and if not installed and used properly, may cause interference to radio and television reception. There is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- re-orient the receiving antenna
- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet, prepared by the Federal Communications Commission, helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 0004-000-00345-4.

APPENDIX D CONVERSION CHART

TO CONVERT FROM	TO	EQUATION
Feet	Meters	Multiply by 0.3048
Meters	Feet	Multiply by 3.2808399
Degrees Celsius	Degrees Fahrenheit	(9/5 °C)+32
Degrees Fahrenheit	Degrees Celsius	5/9 (°F-32)
Milligrams per liter (mg/l)	Parts per million (ppm)	Multiply by 1

APPENDIX E OXYGEN SOLUBILITY TABLE

Table A: Solubility of Oxygen in mg/l in Water Exposed to Water-Saturated Air at 760 mm Hg Pressure.
Salinity = Measure of quantity of dissolved salts in water.
Chlorinity = Measure of chloride content, by mass, of water.
S(‰) = 1.80655 x Chlorinity (‰)

Temp °C	Chlorinity:0 Salinity:0	5.0 ppt 9.0 ppt	10.0 ppt 18.1 ppt	15.0 ppt 27.1 ppt	20.0 ppt 36.1 ppt	25.0 ppt 45.2 ppt
0.0	14.62	13.73	12.89	12.10	11.36	10.66
1.0	14.22	13.36	12.55	11.78	11.07	10.39
2.0	13.83	13.00	12.22	11.48	10.79	10.14
3.0	13.46	12.66	11.91	11.20	10.53	9.90
4.0	13.11	12.34	11.61	10.92	10.27	9.66
5.0	12.77	12.02	11.32	10.66	10.03	9.44
6.0	12.45	11.73	11.05	10.40	9.80	9.23
7.0	12.14	11.44	10.78	10.16	9.58	9.02
8.0	11.84	11.17	10.53	9.93	9.36	8.83
9.0	11.56	10.91	10.29	9.71	9.16	8.64
10.0	11.29	10.66	10.06	9.49	8.96	8.45
11.0	11.03	10.42	9.84	9.29	8.77	8.28
12.0	10.78	10.18	9.62	9.09	8.59	8.11
13.0	10.54	9.96	9.42	8.90	8.41	7.95
14.0	10.31	9.75	9.22	8.72	8.24	7.79
15.0	10.08	9.54	9.03	8.54	8.08	7.64
16.0	9.87	9.34	8.84	8.37	7.92	7.50
17.0	9.67	9.15	8.67	8.21	7.77	7.36
18.0	9.47	8.97	8.50	8.05	7.62	7.22
19.0	9.28	8.79	8.33	7.90	7.48	7.09
20.0	9.09	8.62	8.17	7.75	7.35	6.96
21.0	8.92	8.46	8.02	7.61	7.21	6.84
22.0	8.74	8.30	7.87	7.47	7.09	6.72
23.0	8.58	8.14	7.73	7.34	6.96	6.61

Temp °C	Chlorinity:0 Salinity:0	5.0 ppt 9.0 ppt	10.0 ppt 18.1 ppt	15.0 ppt 27.1 ppt	20.0 ppt 36.1 ppt	25.0 ppt 45.2 ppt
24.0	8.42	7.99	7.59	7.21	6.84	6.50
25.0	8.26	7.85	7.46	7.08	6.72	6.39
26.0	8.11	7.71	7.33	6.96	6.62	6.28
27.0	7.97	7.58	7.20	6.85	6.51	6.18
28.0	7.83	7.44	7.08	6.73	6.40	6.09
29.0	7.69	7.32	6.96	6.62	6.30	5.99
30.0	7.56	7.19	6.85	6.51	6.20	5.90
31.0	7.43	7.07	6.73	6.41	6.10	5.81
32.0	7.31	6.96	6.62	6.31	6.01	5.72
33.0	7.18	6.84	6.52	6.21	5.91	5.63
34.0	7.07	6.73	6.42	6.11	5.82	5.55
35.0	6.95	6.62	6.31	6.02	5.73	5.46
36.0	6.84	3.52	6.22	5.93	5.65	5.38
37.0	6.73	6.42	6.12	5.84	5.56	5.31
38.0	6.62	6.32	6.03	5.75	5.48	5.23
39.0	6.52	6.22	5.98	5.66	5.40	5.15
40.0	6.41	6.12	5.84	5.58	5.32	5.08
41.0	6.31	6.03	5.75	5.49	5.24	5.01
42.0	6.21	5.93	5.67	5.41	5.17	4.93
43.0	6.12	5.84	5.58	5.33	5.09	4.86
44.0	6.02	5.75	5.50	5.25	5.02	4.79
45.0	5.93	5.67	5.41	5.17	4.94	4.72

* This table is provided for your information only. It is **NOT** required when calibrating the Model 85 in accordance with the instructions outlined in the section entitled Calibration.

APPENDIX F CALIBRATION VALUES TABLE

Table A: Calibration values for various atmospheric pressures and altitudes.
Note: This table is for your information only. It is not required for calibration.

Pressure Inches of Hg	Pressure mm Hg	Pressure kPA	Altitude in feet	Altitude in meters	Calibration Value in %
30.23	768	102.3	-276	-84	101
29.92	760	101.3	0	0	100
29.61	752	100.3	278	85	99
29.33	745	99.3	558	170	98
29.02	737	98.3	841	256	97
28.74	730	97.3	1126	343	96
28.43	722	96.3	1413	431	95
28.11	714	95.2	1703	519	94
27.83	707	94.2	1995	608	93
27.52	699	93.2	2290	698	92
27.24	692	92.2	2587	789	91
26.93	684	91.2	2887	880	90
26.61	676	90.2	3190	972	89
26.34	669	89.2	3496	1066	88
26.02	661	88.2	3804	1160	87
25.75	654	87.1	4115	1254	86
25.43	646	86.1	4430	1350	85
25.12	638	85.1	4747	1447	84
24.84	631	84.1	5067	1544	83
24.53	623	83.1	5391	1643	82
24.25	616	82.1	5717	1743	81
23.94	608	81.1	6047	1843	80
23.62	600	80.0	6381	1945	79
23.35	593	79.0	6717	2047	78
23.03	585	78.0	7058	2151	77
22.76	578	77.0	7401	2256	76
22.44	570	76.0	7749	2362	75
22.13	562	75.0	8100	2469	74
21.85	555	74.0	8455	2577	73
21.54	547	73.0	8815	2687	72
21.26	540	71.9	9178	2797	71
20.94	532	70.9	9545	2909	70
20.63	524	69.9	9917	3023	69
20.35	517	68.9	10293	3137	68

YSI *incorporated*

1700/1725 Brannum Lane
Yellow Springs, Ohio 45387
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Website: http://www.YSI.com

ITEM # 038503
DRW # A38503
Revision D
November 1998

APPENDIX D

DRT – 15CE OPERATING & MAINTENANCE MANUAL

DRT-15CE
PORTABLE TURBIDIMETER
OPERATING & MAINTENANCE
MANUAL

HF scientific, inc.
3170 Metro Parkway
Ft. Myers, FL 33916-7597
Phone: (800) 798-2116 (941) 337-2116
Fax: (941) 332-7643
Email: info@hfscientific.com
www.hfscientific.com

DRT-15CE (11/93)

FOREWORD

HF turbidimeters are manufactured to meet design criteria for nephelometers as described in Standard Methods For Examination of Water and Wastewater. HF turbidimeters are approved by the U.S. EPA* as a means to measure the turbidity of potable water, waste water, and other liquids.

HF turbidimeters provide a linear display of turbidity, throughout all ranges, in Nephelometric Turbidity Units (NTU). HF turbidimeters use solid state electronic components because they resist thermal variation and are not affected by normal line voltage fluctuations.

HF turbidimeters can be calibrated using HF scientific factory certified Secondary Standards or Formazin. Factory calibration is accomplished using HF scientific Secondary Standards, which are factory certified traceable to formazin, therefore, this instruction manual describes the proper procedures for calibration of HF turbidimeters using Secondary Standards.

HF turbidimeters use Formazin as the primary standard for calibration. Therefore, this instruction manual describes the proper procedures for calibration of HF turbidimeters using Formazin standards.

HF turbidimeter manuals are designed to assist the user in taking full advantage of the instrument in a majority of its applications. However, in the event that unusual circumstances or problems, not covered by this manual, arise please feel free to contact our local distributor or the manufacturer.

HF scientific, inc.
3170 Metro Parkway
Fort Myers, Florida 33916-7597
Phone:(941)337-2116
FAX: (941)332-7643

Our engineering staff is available to help you with your specific needs.

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I. SPECIFICATIONS FOR DRT-15CE

Ranges NTU	3 Ranges: 0-10, 0-100, 0 - 1000 NTU
Linearity	(+ or -) 1% /10, 5%/100, 10%/1000 of full scale
Repeatability	(+ or -) 1% of Full Scale on either range
Response	Virtually immediate in all ranges
Power Supply	6 Volt battery. 4.0 amp hours 120/240 VAC, 50/60 Battery Charger
Controls	Combination Range Switch for: ON/OFF and Range Selection. Reference Adjust
Recorder Output	0-1mA (user adjustable), 100Ω maximum resistance
Reference Standard	0.02 NTU (Nominal)
Dimensions	11" x 9 1/4" x 5 1/2" (27 cm) x (22.7 cm) x (13.5 cm)
Weight	4.5 lbs.(2.05 kilograms)
Operating Temperature	0 - 50°C (32 - 122°F)

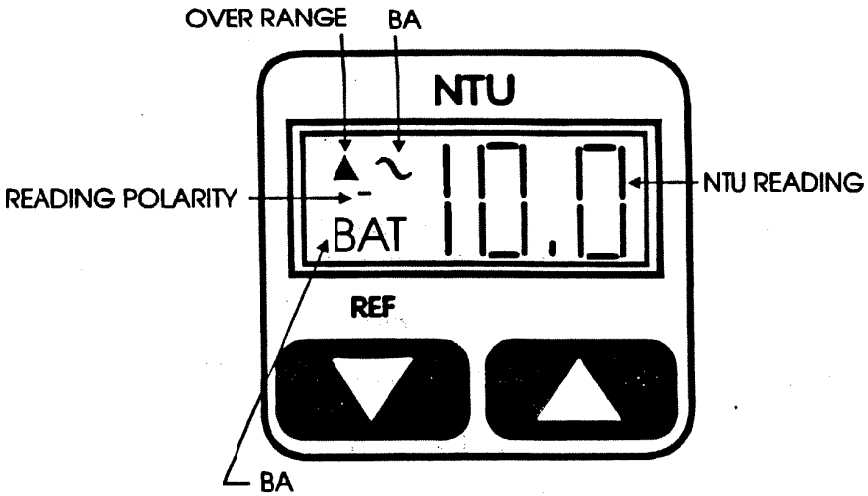
II. PACKING LIST FOR THE DRT-15CE

QTY.	DESCRIPTION
1	Instruction Manual
1	Reference Standard 0.02 NTU (Nominal)
1	Battery Charger 120 V 60 Hz (US style) OR Battery Charger 240 V 60 Hz (European style)
1	Cuvettes complete with screw top (Reorder Cat. #50051)
1	Recorder Plug

A complete listing of spare parts is on page 11 of this manual.

III. PRE-OPERATION CHECK-OUT

Extreme care should be taken when handling the Reference Standard or sample cuvettes as surface scratches or finger smudges will cause analysis errors. Handle these items by the top only.



The battery, when new, usually requires several cycles of discharging and recharging in order to obtain optimum rated life between charges.

The turbidimeter provides up to 20 hours of continuous operation as a portable battery operated unit between recharges.

It is recommended that the unit be turned off between readings in order to obtain longer battery life between recharges. If used as a stationary unit leave the charger plugged in, but TURN OFF INSTRUMENT WHEN NOT IN USE. This will keep the battery at an optimum level at all times.

If for some reason the battery has been completely discharged, the display may not come "on" at all. If this happens turn the unit "off" and recharge the battery with the battery charger. To establish that the unit may be used while charging it, turn the unit on periodically and observe the lower left corner of the display for the word "BAT". When it goes off, (can no longer be seen while the rest of the display is on), the instrument may be used while the charger "tops off" the battery. Depending on the state of discharge of the battery, it may take as long as 6 - 8 hrs. to fully charge it. If the "BAT" indicator is "on", when the charger is not connected, the battery requires charging.

IV. OPERATION AND DESCRIPTION

To operate the turbidimeter, it is first necessary to standardize the instrument. Switch to the "10" range and place the Reference Standard (0.02 NTU) in the optical well.

The EPA recommends that cuvettes used for instrument calibration or sample measurement be indexed. For quick and repeatable indexing of the Reference Standard, an indexing ring and locator pin are included with this instrument.

When shipped, the white locator pin is installed in the collar ring around the optical well of your turbidimeter. The indexing ring is included in the accessory section of this instrument.

To index your Reference Standard, slowly rotate the Reference Standard, at least one complete revolution, while observing the reading, and locate the position of the lowest reading. Without moving the Reference Standard, install the indexing ring over the ridged cap of the Reference Standard, install the indexing ring over the ridged cap of the Reference Standard such that the notch on the ring aligns with the locator pin.

When indexing the Reference Standard in the future, simply insert the Reference Standard and rotate it until the notch on the indexing ring faces the locator pin. Please note that this Reference Standard is only indexed to the turbidimeter for which it was aligned.

To standardize, first index the Reference Standard as above. Then adjust the Reference Adjust in the appropriate direction to cause the display to read 0.02 NTU. The unit is now ready for use on any range.

To make a measurement of a sample, clean one of the cuvettes and fill it to within approximately 1/2" (12 mm) of the top with the sample to be measured. Place the cap on the cuvette and carefully clean the outside surface of the cuvette with a lint free wiper such as "Kimwipes". Place the sample in the well and take NTU reading directly from display. Select the appropriate range for best readability.

If the instrument has been subjected to cold (below 10 degrees Celsius) and then brought indoors, it should be allowed to warm up before use, since condensation may form on the various lenses. Warm up can be aided by leaving the case open and the instrument on for approximately a half hour.

V. RECORDER OUTPUT

The DRT-15CE has a 0-1 mA Recorder Output. The jack is located on right side of the chassis (refer to J2 on figure 2). To use, connect the 1/8" miniplug provided to your recorder. Adjust R17 (pot nearest jack) to obtain a full scale output compatible to a full scale reading on the DRT-15CE. Once this adjustment is made, the DRT-15CE will always be set up for this recorder. Use 10, 100 or 1000 NTU standard in appropriate range.

VI. CRITICAL MEASURING AREA

The critical measuring area of the sample cuvettes is the 3/4" wide band starting 5/8" above the bottom. Keep this area clean and free of scratches or abrasion. Handle by the top part only. (See Figure 1).

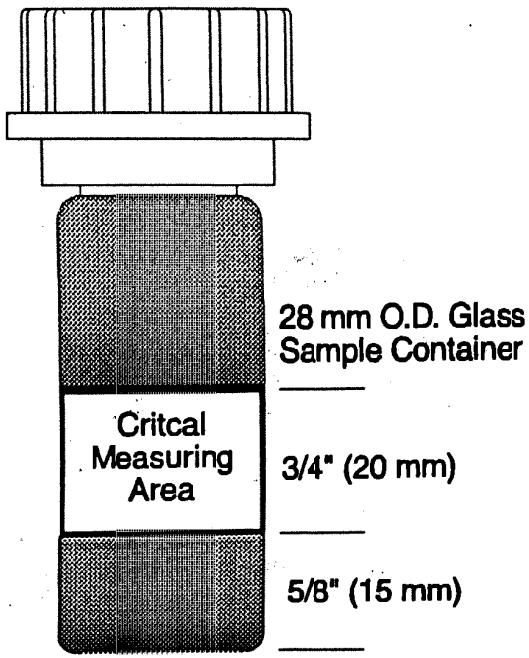


Figure 1

VII. CALIBRATION PROCEDURES

1. Calibration Standards

A. Secondary Standard Set (optional) Catalog No. 19071

HF Secondary Standards are recommended and certified by HF scientific. They are traceable to freshly prepared formazin primary standards. These standards are very easy to use off the shelf anytime without preparation making them an ideal turbidity standard. A Certificate of Traceability is available on request to HF scientific Customer Service Department. HF Secondary Standards may be used for calibration of HF turbidimeters. Order from HF scientific, inc.

NOTE: Do not freeze standards.
Do not leave standards in the measuring well for extended periods.
Do not shake standards.

Specific instructions for using certified Secondary Standards are included with the kit.

Each Secondary Standard Kit contains:

- Instructions
- 0.02 Reference Standard
- Certified Secondary Standards 10.00, 100.0, 1000 NTU Standards are contained in preselected cuvettes with light shield caps.
- A sturdy storage case

B. Standard Formazin Solutions

Calibration of this instrument is based on Formazin, a material which is made by polymerization.

Calibration samples may be obtained by diluting Formazin stock suspension using "Turbidity-Free" water. Formazin stock suspension can be prepared by the user (Reference Standard Methods For Examination of Water and Wastewater) or a kit can be purchased from, HF scientific, inc., Catalog No. 50040.

Each kit contains:

- -- Instruction manual
- -- 1 liter of 4000 NTU Stock Suspension
- -- 1 Gallon (3.79 liters) turbidity-free water
- -- 4 Sample cuvettes (28 mm)
- -- 4 Light Shield Caps
- -- Graduated Pipettes 1 ea. in 1 ml, 10 ml, & 25 ml
- -- 1 Reference Standard

The following table gives the recommended dilutions of the stock suspension. Be sure to adequately mix the stock suspension prior to removing a portion for dilution.

PROCEDURE

NTU Value	Pipette	Amount	Base Formazin	Volumetric Flask
10.0 NTU	10.0ml	2.5ml	of 4000 NTU	1000ml
100.0 NTU	10.0ml	5.0ml	of 4000 NTU	200ml
1000.0 NTU	25.0ml	25.0ml	of 4000 NTU	100ml

NOTE: 1. When the prepared samples start to flocculate, they are unreliable and fresh ones must be made. This will occur more rapidly for the lower value diluted suspensions. Prepare 40 NTU and lower standards daily.

2. ELECTRONIC CALIBRATION USING FACTORY CERTIFIED SECONDARY STANDARDS (CAT. NO. 19071)

The DRT Turbidimeters have been carefully calibrated at the factory. However, should the Electronic P.C. Board, the Photo Detectors, or the Light Source be replaced recalibration may be easily accomplished at your facility.

To carry out a complete calibration the following Secondary Standard values are required:

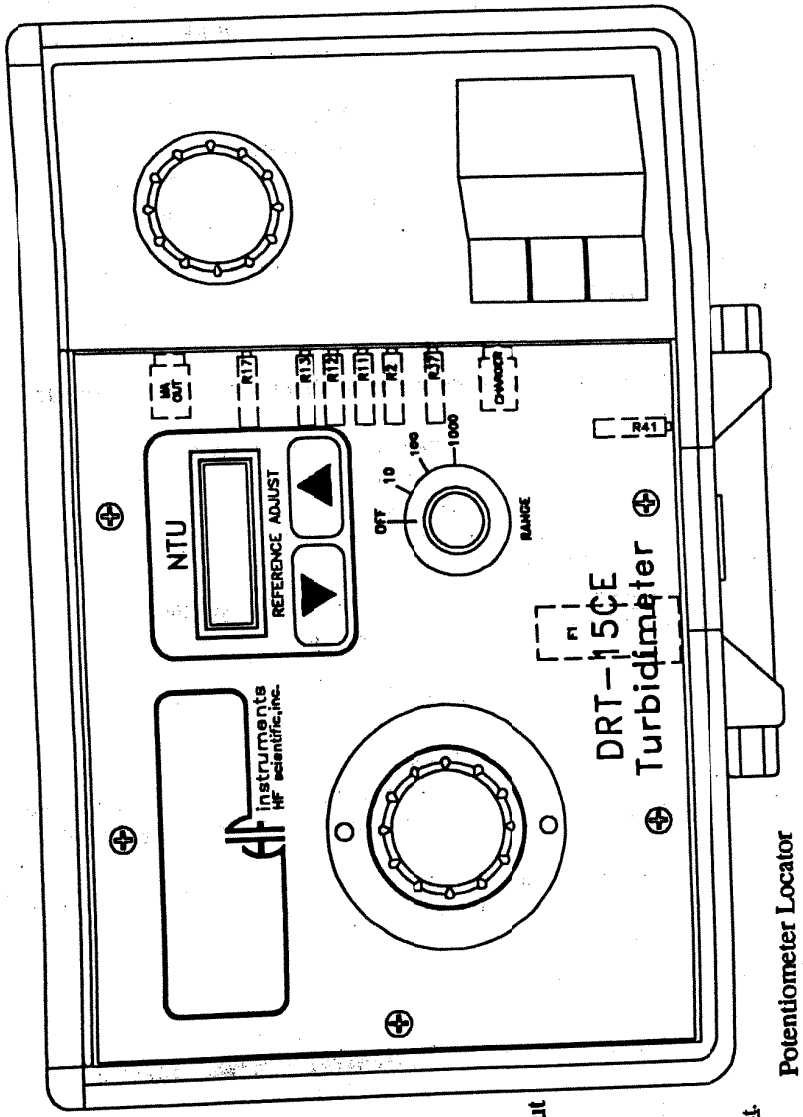
1000 NTU, 100 NTU & 10 NTU

- Keep the outside surface of cuvettes clean.
- When placing any standards in the well, always use the screw cap/ shield to cover the well in order to keep out ambient light.

To gain access to the trimpots, remove the accessories from the foam holder. Refer to figure 2 for trimpot identification during the next few steps.

1. Turn the DRT-15CE to the 0 - 10 Range.
2. Insert the reference standard and index as described in "Operation and Description".
3. Set the Reference Adjust to the maximum "up" position.
4. Adjust R2, Ref. Offset trimpot, until the display reads 0.18 NTU.
5. Set the Reference Adjust to 0.02 NTU.
6. Insert the 10 NTU standard and index. Adjust R11 (0 - 10 NTU gain) to obtain a reading of 10.00 NTU.
7. Rotate the range switch to the 100 NTU range. Replace the 10 NTU standard with the 100 NTU standard and index.
8. Adjust R12 (0 - 100 gain) to obtain a reading of 100.0 NTU.
9. Rotate the range switch to the 1000 NTU range. Replace the 100 NTU standard with the 1000 NTU standard and index.
10. Adjust R13 (0 - 1000 gain) to obtain a reading of 1000 NTU.
11. It is not necessary to adjust R37 (low battery indicator). This is factory set to indicate a low battery condition when the battery voltage is below 5.6 V.
12. **WARNING:** R41 is factory set. Adjustment of this trimpot could cause damage to battery and/or DRT-15CE.

This completes the calibration of the DRT-15CE.



R17 - Recorder Output
R13 - 0 - 1000 Gain
R12 - 0 - 100 Gain
R11 - 0 - 10 Gain
R2 - Ref. Offset
R37 - Low Battery
R41 - Charge Volts*
*Factory set, do not adjust.

Potentiometer Locator
Figure 2

VIII. TROUBLE SHOOTING

Symptom

Meter does not respond when a sample is set into the well.

Possible Cause

1. Lamp is burned out. Replace the lamp and recalibrate.
2. Printed Circuit Board failure. Replace Printed Circuit Board.
3. Battery is low. Charge battery.

In the case of 1 or 2 the instrument should be recalibrated. The lamp is an exceedingly long life lamp and therefore replacement is infrequent.

Symptom

Reference Adjust does not have enough travel to adjust for the reference standard value.

Possible Cause

1. Scratched or rubbed reference standard container or aged reference standard. Replace the standard.
2. Optics have aged. Recalibrate.
3. Faulty lamp. Replace the lamp and recalibrate.

Symptom

The display will not stabilize with the reference standard in the well.

Possible Cause

1. Battery voltage too low. "BAT" indicator is "ON" when the battery requires recharging. When the battery is discharged, the voltage will drop off causing the meter display to drift. Recharge battery.
2. Cold sample can cause condensation on the cuvette. Clean and dry cuvette.
3. Unit has not been given sufficient time to stabilize at ambient temperature. Allow time for instrument to stabilize.

Symptom

No display on instrument at all.

Possible Cause

1. Battery is dead. Recharge battery.
2. Fuse has blown. Check battery connections and replace fuse with 1A fast acting 5x 20 mm.

Symptom

Low battery indicator on after 8 hour charge.

Possible Cause

1. Battery is defective. Replace battery.
2. Charger is defective or is not connected to a valid power source. Check for "~" indication on display.

IX. MAINTENANCE

The DRT-15CE is not designed for field servicing. It should be returned to your local distributor or to HF scientific for any service requirements. Be sure to obtain return authorization prior to return. This will facilitate prompt servicing of the unit. The exceptions are Battery and Lamp Assembly replacement. This can be done in the field provided the new battery is installed in the same manner as the battery being replaced.

A. BATTERY REPLACEMENT

Should the battery (HF catalog #70008) fail, it can be user replaced. Make certain the instrument is turned off. Remove all the accessories in the foam holder. Next, remove the foam insert by placing a finger in the cuvette hole and pulling the rear of the foam forward, then up. The five phillips head chassis screws should be removed. Remove the chassis from the case by sliding the chassis all the way to the right then pulling up. The two screws under the right side of the chassis need to be removed now. This will allow for the removal of the battery clamp and the old battery. Replace the battery by reversing the procedures described above. When connecting the battery, be certain that you connect the red wire to the terminal marked (+) and the black wire to the terminal marked (-). If these wires are inadvertently reversed the fuse will blow and must be replaced (see Figure 2).

B. LAMP REPLACEMENT

The lamp source (HF catalog #21084) used in the DRT-15CE has an extremely long life. Before replacing the lamp, make certain that the battery is not in need of a charge and is not defective. Prior to replacing the lamp, remove the battery as described in battery replacement. Remove the lamp wires at terminal block. To remove the lamp, loosen the two set screws on the outermost barrel with a 5/64" hex wrench and pull the lamp straight out. Replace the lamp in the reverse order. Make sure the lamp is pushed all the way in. The set screws should be snugged up; excess pressure could damage the lamp. Replace the battery. Replace the chassis in the case and recalibrate as described in **CALIBRATION PROCEDURES SECTION VII**, page 5 in this manual.

X. PARTS & ACCESSORIES

HF scientific, inc.
PARTS AND ACCESSORIES FOR
DRT-15CE

CAT. NO.	DESCRIPTION
60002	Reference Standard 0.02 NTU (replace annually)
21805	Instruction Manual DRT-15CE
50051	Cuvettes - Screw Top, 3/pk.
21084	Lamp Source Assembly 2/pk.
70008	Battery - 6 volt
70050	Battery Charger - 120 volt (US style)
20850	Photo Diode
19046	Battery Charger, 240 Volt (European style)
21904	LCD Display
20495	Printed Circuit Board Complete
50040	Formazin Stock Solution Kit
70900	Cuvette Cleaning/Conditioning Solution
20956	Fuse, 1A, 5 x 20 mm
19071	Secondary Calibration Standards -1 ea.10, 100, 1000 NTU, (Replace annually)
19045	Auto Adapter 12V
50091	Anti-fog kit

HF scientific, inc.
3170 Metro Parkway
Fort Myers, FL 33916-7597
Phone:(941)337-2116
FAX: (941)332-7643

XI. WARRANTY

HF scientific, inc., as vendor, warrants to the original purchaser of the instruments to be free of defects in material and workmanship, in normal use and service, for a period of one year from date of delivery to the original purchaser. HF scientific, inc.'s, obligation under this warranty is limited to replacing, at its factory, the instrument or any part thereof. Parts which by their nature are normally required to be replaced periodically, consistent with normal maintenance, specifically lamps, and fuses are excluded. Also excluded are accessories and supply type items.

Original purchaser is responsible for return of the instruments, or parts thereof, to HF scientific, inc.'s factory. This includes all freight charges incurred in shipping to and from HF-scientific, inc.'s factory.

HF scientific, inc. is not responsible for damage to the instrument, or parts thereof, resulting from misuse, negligence or accident, or defects resulting from repairs, alterations or installation made by any person or company not authorized by HF scientific, inc.

HF scientific, inc. assumes no liability for consequential damage of any kind, and the original purchaser, by placement of any order for the instrument, or parts thereof, shall be deemed liable for any and all damages incurred by the use or misuse of the instruments, or parts thereof, by the purchaser, its employees, or others, following receipt thereof.

Carefully inspect this product for shipping damage, if damaged, immediately notify the shipping company and arrange an on-site inspection. HF scientific, inc. cannot be responsible for damage in shipment and cannot assist with claims without an on-site inspection of the damage.

This warranty is given expressly and in lieu of all other warranties, expressed or implied. Purchaser agrees that there is no warranty on merchantability and that there are no other warranties, expressed or implied. No agent is authorized to assume for HF scientific, inc. any liability except as above set forth.

HF scientific, inc.
3170 Metro Parkway
Fort Myers, Florida 33916-7597
Phone:(941)337-2116
FAX: (941)332-7643

APPENDIX E

HEALTH AND SAFETY PLAN

LAWGIBB GROUP

SITE HEALTH AND SAFETY PLAN

Project: Sunset Acres Case Study

Project Number: 40700-1-2681

Location: Mile marker 92.3, Tavernier, FL

Personnel: Ted Couillard, Pattie Gertenbach, and Kathleen Sullivan Sealy

REVIEW AND APPROVAL

Health and Safety Officer	Pattie Gertenbach	Date
Principal Engineer/Scientist	Scott Evanson ~~Nadia Locke~~	Date
Field Safety Coordinator	Ted Couillard	Date
Project Manager	Pattie Gertenbach	Date

DATE OF PLAN PREPARATION

2/1/02

DATES OF PLANNED FIELD ACTIVITIES

2/7/02 – 12/31/02

MEDICAL SURVEILLANCE

Law Engineering and Environmental Services, Inc. (LAW) environmental field personnel participate in the corporate medical surveillance program.

DESCRIPTION OF WORK

Perform water sampling in the canals and adjacent bay of the Sunset Acres development. This work will be conducted in a small watercraft provided and piloted by Monroe county personnel. There are approximately six sample locations; five of which are within the canal system and one in Florida bay (within 300 yards of the mouth of the canal system). Samples will be collected from the side of the watercraft utilizing a YSI® meter (a suction hose from the meter is lowered into the water), surface sampling bucket, and a sampling bottle (Wildco® water bottle or equivalent).

EMERGENCY PHONE NUMBERS

Emergency phone numbers, directors to the nearest phone and medical center are to be determined by Field Safety Coordinator prior to beginning work.

HOSPITAL: Mariners Hospital
91500 Overseas Highway, Tavernier, FL 33070
305-852-4418
FIRE: 911
POLICE: 911
HEALTH AND SAFETY: (305) 852-4418 (hospital general number)

SITE INFORMATION

HAZARDOUS/TOXIC MATERIAL (Known or suspected)

Not applicable

HAZARD ASSESSMENT

Not applicable.

EMERGENCY PROCEDURES

This work does not involve contaminated or hazardous materials. The work is being conducted by boat (no Scuba) and life vest will be worn at all times. There are hazards associated with water activities and the environment: sunburn, dehydration, exhaustion, inclement weather and water-related hazards. These hazards are to be addressed as follows:

- Sunburn – This is preventable. Wear a hat when out of the water. Use sunscreen or a long sleeve shirt.
- Currents – Currents at Sunset Acres and adjoining Florida Bay are typically static, rarely exceeding 1 knot. Boating is to proceed with caution – evaluate current before proceeding into water and abort survey if currents are too strong, or if they become too strong (although this is not anticipated).
- Inclement weather – Weather in Florida can change in a moment's notice. Check the local weather forecast prior to sampling departure and be aware of signs of approaching storms, e.g. sudden drops in temperature or a significant shift in prevailing wind direction. If a lightening strike is spotted in the region, work should cease immediately and shelter should be sought. Common sense is the basic rule here.
- Dehydration – This is preventable. Drink plenty of fluids throughout the day. Do not consume drinks with caffeine or alcohol, water or a sports drink are best.
- Exhaustion – If you become tired or feel uncomfortable for any reason, stop what you're doing and rest, catch your breath. If you still feel uncomfortable once you've caught your breath, return to the shore.

OPEN WATER PROCEDURES

Because survey activities extend into open water, special precautions must be taken to ensure safety.

- Use of a boat will require (at least) two persons aboard with a minimum of one life vest per person, an emergency throw line with attached floatation device, and a first aid kit. When possible, boat should be tethered to the shore.

- CPR should be administered immediately in the event of any water related emergency where a person appears to stop breathing. As CPR is being administered, emergency contacts should be called and/or the person be rushed to the Mariners Hospital at 91500 Overseas Highway (See maps and contact information next page).

- Cell phones should be taken in the field and be accessible at all times. A GPS unit should also be available to provide helpful information in the event of an emergency.

WORK PROCEDURES

PLANNED FIELD ACTIVITIES

Water sampling at six stations in the canals and adjacent bay waters of Sunset Acres.

CLOTHING AND PROTECTIVE GEAR REQUIRED

1. Life vests to be worn at all times.

DECONTAMINATION PROCEDURES

Not applicable.

WORK PRECAUTIONS

1. Prior to going to the work site, the Field Safety Coordinator will review readily available data and information pertaining to site conditions, potential contaminants, and work to be accomplished.

2. Prior to beginning any work on the site, the Field Safety Coordinator shall brief field personnel on the contents of this plan.

PERSONNEL

By initialing and dating this form, the listed individual acknowledges that he has read and understands and will comply with the requirements of this Health and Safety Plan.

Personnel Authorized to Enter Site	Date	Initials of Personnel
1. Pattie Gertenbach	3/19/02	[illegible]
2. Ted Couillard		
3. Kathleen Sullivan Sealy		
4. RICARDO BASTIDA	3/19/02	RB
5. Wendy Lomard	3/19/02	WCL
6.		
7.		
8.		

DIRECTIONS TO MARINERS HOSPITAL (MAP ATTACHED)

Exit Sunset Acres and proceed south on Overseas Highway (U.S. 1). Proceed approximately 1.4 miles to the entrance of Mariners Hospital (MM 91.5) located on the Florida Bay side of the highway.

Mariners Hospital
91500 Overseas Highway, Tavernier, FL 33070
305-852-4418

FIRE: 911
POLICE: 911
HEALTH AND SAFETY: (305) 852-4418 (hospital general number)

FIELD SAFETY COORDINATOR'S SUMMARY

(To be completed by Field Safety Coordinator after completion of field work, and returned to Health and Safety Officer).

During the work and covered by the Safety Plan, there were:

a. No violations of the Safety Plan provisions and no obvious contamination of LAW employees or subcontractors.

b. The following violations of the Safety Plan provisions or obvious contamination of LAW personnel or subcontractors. (Give details of who, when, type of contamination, circumstances, first aid or medical assistance).

_____
_____
_____
_____
_____
_____

Signature _____ Date _____
Field Safety Coordinator

RETURN TO HEALTH AND SAFETY OFFICER

ALL ACCIDENTS AND INCIDENTS CAUSING POTENTIAL EXPOSURE TO HAZARDOUS MATERIALS MUST BE REPORTED AS SOON AS POSSIBLE TO:

HEALTH AND SAFETY OFFICER;
PROJECT MANAGER;
CHIEF ENGINEER/SCIENTIST; OR
BRANCH MANAGER

JOB NAME _____
JOB NUMBER _____
DATES IN FIELD _____
NEXT PHASE OF WORK SCHEDULED FOR _____

LAW EMPLOYEE
TAILGATE SAFETY MEETING LOG

Name	Date	Comments

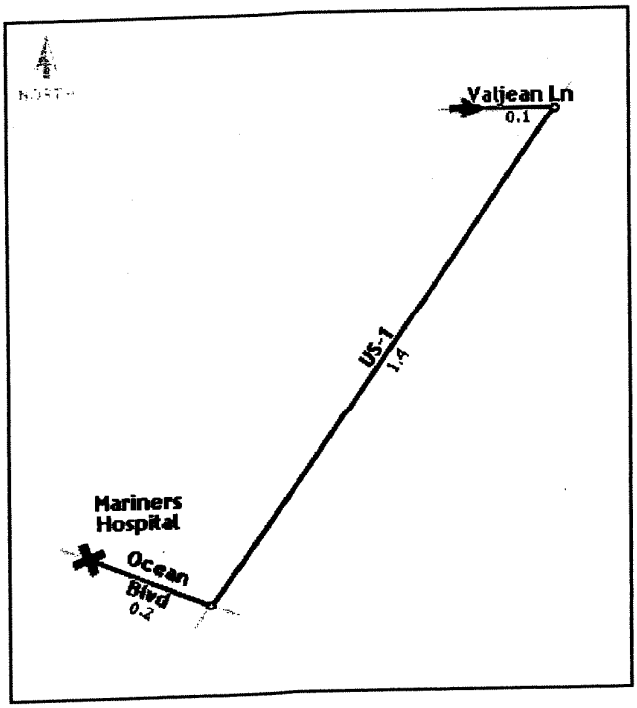
MAPBLAST!
Everyone needs a little direction in life

From: Lat: 25.020087
Lon: -80.512401

To: Mariners Hospital
Mm 91.5
Tavernier, FL

91500 Overseas Hwy

The estimated travel time is 3 minutes for 1.51 miles of travel, total of 3 steps.

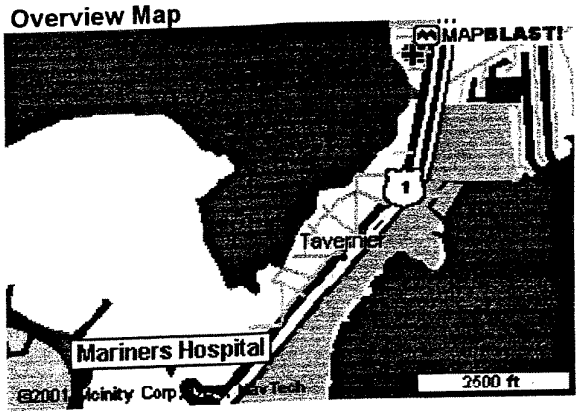


Directions	Elapsed Distance
1 Begin on **Valjean Ln** and go **East** for 400 feet	0.1
2 Turn right on **US-1,SR-5,Overseas Hwy** and go Southwest for 1.3 miles	1.4
3 Turn right on **Ocean Blvd** and go Northwest for 700 feet to **Mariners Hospital**	1.5

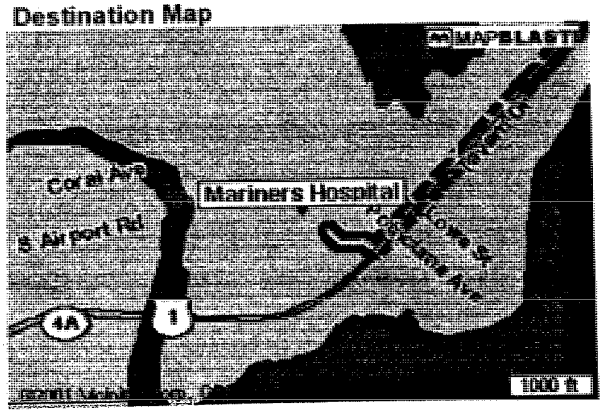
These driving directions are provided only as a rough guideline.
Please be sure to call ahead to verify the location and directions.

NAVTECH ON BOARD

Overview Map



Destination Map

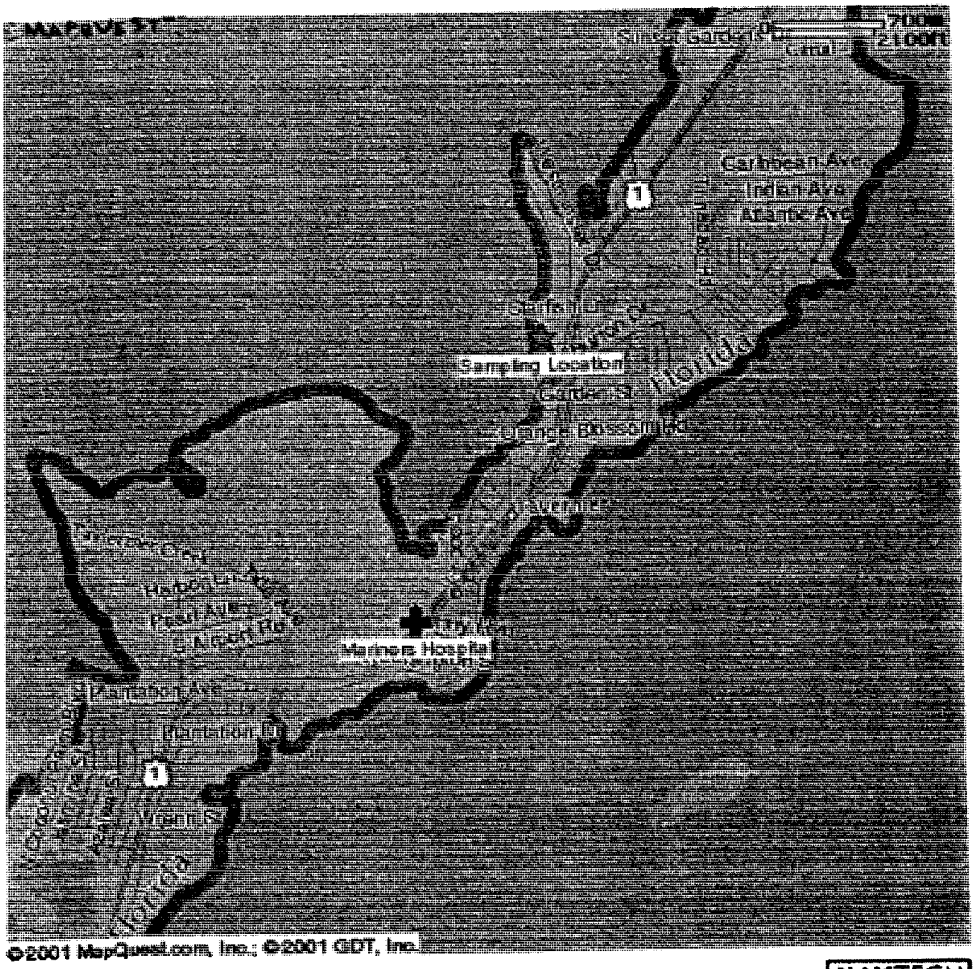


MAPQUEST.

91500 Overseas Hwy, Tavernier, FL, 33070-2547, US

SEND TO PRINTER

Back



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MAPS | DRIVING DIRECTIONS | ROAD TRIP PLANNER | YELLOW PAGES

Yellow Pages

Add or update your business listing in the Yellow Pages.

Yellow Pages > Search Results > Hospitals

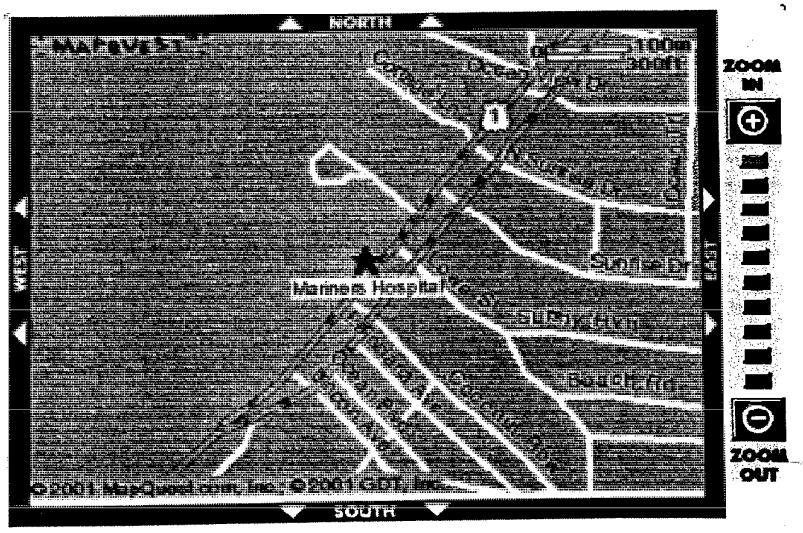
New Search | Help
Back to Search Results

Mariners Hospital

Overview

Mariners Hospital
91500 Overseas Hwy
Tavernier, FL 33070
305-852-4418
Fax: 305-852-8201
Driving Directions | What's Nearby?

- E-mail this listing



CLICKING ON MAP WILL: Zoom In Re-center

Is the information for this listing incorrect? Click here to update.

See more information about this business:

- Overview

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Microsoft TerraServer **Display Image** **USGS Aerial Photograph**

Tavernier, Florida, United States 21 Feb 1999