

OWNERS MANUAL

HF Oil Content Monitor (OCM)

HF scientific inc.
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Declaration of Conformity

Application of Council Directive

Standard to which Conformity is Declared:

Product Safety – Tested and Passed CE EN61010-1: 1990 + A1: 1992 (73/32 EEC)

Immunity and Emissions – Tested and Passed EN61326: 1998, Class A

Manufacturer's Name: HF scientific, inc.

Manufacturer's Address: 3170 Metro Parkway, Fort Myers, Florida 33916-7597

Importer's Name:

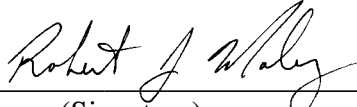
Importer's Address:

Type of Equipment: Oil Content Monitor

Model No: OCM 20075

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standard

Place: Fort Myers, Florida USA


(Signature)

Robert J. Maley, President

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Specifications

Measurement Range	0-30 PPM, Trending 30-50 PPM
Accuracy	Less than ± 5 PPM
Resolution	1 PPM
Response Time	Less than 20 seconds
Power Requirements	90-250 VAC, 47-90Hz, 6 VA
Display	Liquid Crystal Display
Two User Settable Alarms	120-240VAC 2A Form C Relay with suppressors, or 120-240VAC 1A Form A Zero –crossing Solid State Relay
Analog Output Signals	4 - 20 mA
Water Pressure	0.1 - 8 bar (1-116 psi.)
Flow Rate	1 Liter/min. regulated (.26 Gal/min)
Operating Temperature Range	0°C – 50°C (34°F – 122°F)
Sample Temperature Range	1°C – 50°C (34°F – 122°F)
Year 2000 Compliance Statement	This instrument is fully Year 2000 (Y2K) compliant; it does not use the date for operation in any form.
Regulatory/Measurement Compliance	I.M.O. resolution MEPC. 60(33)
Certifications	See appendix for approvals
Approximate Dimensions	175mm W x 310mm H x 225mm D (6 $\frac{7}{8}$ ” W x 12 $\frac{1}{4}$ ” H x 8” D)
Shipping Weight	2.5 kg (5.5 lbs.)
Warranty	1 Year from date of shipment

1.0 Using this Instruction Manual

Congratulations on your purchase of a new HF scientific inc. oil content monitor (OCM). This instrument has been designed for simple and easy measurement of bilge oil in water and conforms to the requirements of I.M.O. resolution MEPC. 60(33).

This manual contains simple steps to follow to ensure that your instrument operates properly. The following sections describe how to use and care for your new OCM. In certain instances **NOTES**, or reminders, have been added to give further clarification to the instructions. Refer to the *Table of Contents* to easily find specific topics.

2.0 Unpacking the Instrument

2.1 Packing List of Contents

<i>Item</i>	<i>Part#</i>	<i>Quantity</i>
OCM Bilge Alarm	19601	1
Instruction Manual (this manual)	22543	1
Male Quick Connectors	22519	2
Calibration Kit	19611	1
Black Nylon Tubing	22740	3 meters (10 ft.)
Desiccant Tubing	19610	1

2.2 Unpacking and Inspection of the Instrument and Accessories

Remove the instrument from the packing carton. Carefully inspect all items to ensure that no visible damage has occurred during shipment. If the items you received do not match your order, please immediately contact your local distributor or the HF scientific, inc. Customer Service department.

3.0 Installation

3.1 Mounting and Site Selection

The OCM is designed for wall mounting. If wall mounting is not practical, the instrument can be mounted on any suitable surface. Choose a location that is easily accessible for operation and service and ensure that the front display rests at eye level. The overall mounting dimensions of the instrument are shown in Figure 1. For ease of service there should be about 45cm (18”) free area above the OCM. This will ensure enough room for calibrations and for cleaning the optical well. The recommended mounting screws (four required) are M6 (or ¼”).

It is important that the OCM be mounted within 18 meters of the oily water separator to comply with the IMO requirement for a response time of 40 seconds.

3.2 Plumbing

The recommended plumbing for the instrument is shown in Figure 4. The OCM is designed with an integral flow regulator which limits the flow to between 0.8 – 1.3 liters/minute depending on the system backpressure. Ensure that you supply the OCM with a process flow capable of sustaining these levels. Quick-connect fittings are supplied on the inlet and outlet of the OCM. These fittings help speed up calibration procedures. The OCM is designed for use with semi-rigid tubing (¼” OD X .170” ID). Opaque tubing is recommended if the tubing will be exposed to sunlight. Using this semi-rigid tubing, the instrument should be installed within 18 meters of the sample line to comply with the IMO requirement for a response time of 40 seconds. A valve is supplied at the inlet side of the instrument to ease the calibration and cleaning procedures.

Note: The quick-connect fittings are designed with a special shut-off feature to prevent flow of the process through the OCM when the line is disconnected.

The optional clean water supply *must* be oil-free. The clean water connection, along with the optional drain connection, allows the OCM to be easily calibrated for the clean water condition. If your clean water supply is seawater, the OCM can be zero adjusted with the local seawater.

3.3 Electrical Connections

All of the electrical connections to the OCM are made at the field terminal box located on the lower section of the instrument. Wiring should be run in through the grommet closest to the connection terminal block. The cable diameter for these grommets is rated for 4.3 – 11.9 mm (0.170 – 0.470”).

To make connections, insert a 3mm(1/8”) flat blade screwdriver into the top slot of the terminal block. Pivoting the handle of the screwdriver up causes the clamp to lower. You can now insert the wire. Releasing the tension raises the clamp and tightens the connection. Please note that these terminal blocks will accept wire gauges AWG 24-14. As you read the following sections, please refer to Figure 3 for clarification of the electrical connections.

Please follow all local and government recommendations and methods for installation of electrical connections to and between the instrument and peripheral devices.

3.3.1 Power Source

The power source required is 90 – 250VAC, 47-90Hz. The power consumption is 6VA. Connections are made at the far right hand terminals.

Please observe safe wiring practices. It is recommended that a circuit breaker or switch be placed prior to the power connection to the OCM to allow for service.

Note: Only qualified electricians should be allowed to perform the installation of the instrument as it involves a line voltage that could endanger life.

3.3.2 Relay Connections

Relay connections for Alarm 1 and Alarm 2 are located next to the power connection. These relays are rated at 120-240VAC 2A for the mechanical. The optional solid state relays are rated at 120-240VAC 1A.

The Sensor Alarm connection is located to the left of Alarm 1. This relay is rated for up to 30VDC 2A.

3.3.3 4-20 mA Output

A 4-20 mA signal is provided. This output is referenced to the scale of 0-30 PPM as set at the factory but may be set to any portion of the scale of 0-50 PPM. Connections for the 4-20 mA are located next to the Sensor Alarm.

3.3.4 Unused Terminals

Located next to the 4-20mA outputs are some terminals that are not used in this instrument. These terminals are not connected inside the instrument and cannot be used.

3.4.5 Cabinet Integrity

To maintain the seal of the field terminal box, it is important to use suitable size cable through the compression fittings. If suitable size cable is not available, use vinyl tubing or electrical tape to make up the difference. Tighten all compression fittings by hand. Do not remove the plastic dowel plugs in unused fittings as these serve to complete the cabinet seal. When closing the lid, ensure that no wires are pinched and that the o-ring is in good condition. Tighten the four corner screws firmly.

4.0 Becoming Familiar with the Instrument

The user interface of the OCM has been designed with a 4 key Touch Pad and a digital user display with two rows of display information.

4.1 The Touch Pad

The **MODE** key is used to cycle between the four modes of the OCM: **AUTO (measurement) mode**, **CAL 0 ADJ (Zero Adjust Calibration) mode**, **SETUP (Instrument Configuration) mode**, and **CAL (Calibration) mode**. The ↵ key enters the option (or mode) that is highlighted or chosen. The ▲ and ▼ arrows are used to scroll through lists and to increase or decrease settings. Please refer to the Menu Flow Chart (Figure 8) while becoming familiar with the operation of the OCM.

- Note:**
- 1. While in the CAL or SETUP modes the relays are set in the alarm condition.**
 - 2. The instrument has an integral time-out feature that automatically returns the system operation to the AUTO mode from either the CAL or SETUP modes when more than 5 minutes have passed with no keypad activity.**

4.2 The Display

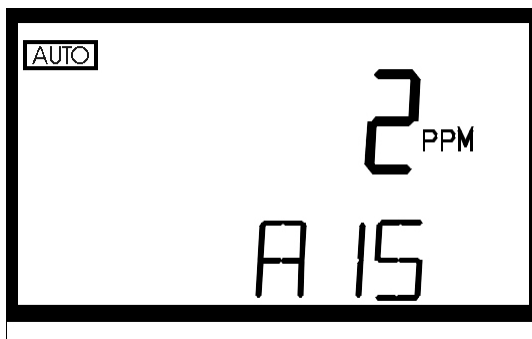
Figure 4 illustrates all the graphics on the user display. The upper row of the display (1) is used for reporting the oil concentration (in PPM) and to provide user guidance in the customer settings routine. The lower row of the display (2) is used to communicate error messages and also to provide user guidance. The display has several status indicators (3), which indicate the current operation mode of the instrument. Finally, several indicators around the screen provide guidance when the customer setting routine is being used and when the calibration routine is being used. Please note that not all of the indications on this screen will be used at any one time.

5.0 Routine Operation

The OCM is designed to measure and display the concentration of oil (in PPM by weight) in the bilge water according to I.M.O. resolution MEPC. 60(33). Readings above 50 PPM are outside of the range of this instrument.

5.1 Routine Measurement

During normal operation, the instrument will have the **AUTO** block highlighted with the current scale displayed on the right side of the display, the measured reading on the upper row of the display, and the current alarm level on the lower row of the display (see illustration below).



The following steps describe how to measure the oil content of a sample using the OCM:

1. Turn power on to the OCM. The instrument will be in the **AUTO** (measurement) mode (the “**AUTO**” block should be illuminated). Allow instrument to warm up for at least 45 minutes.
2. When a continuous process stream is flowing through the instrument, the instrument will report the oil content of the sample by displaying it on the LCD screen.
3. Pressing the **MODE** button will allow you to sequentially access the calibration routine (see section 6 for more information) and the configuration/setup routine (see section 7 for more information).

5.2 Security Access Feature

The OCM is equipped with a security access code feature that can be turned on or off when configuring the instrument. Three access codes are used in the instrument: one for instrument calibration (333), one for instrument configuration (444), and one to zero adjust the instrument (222). These codes are not changeable and are required as input whenever the customer presses the **MODE** button to access either the calibration routine or the setup routine if the security feature is enabled.

If the security feature is enabled, the screen shown in Figure 5 will be shown when you press the **MODE** button. The security code has three numbers that are selectable one at a time. Use the \blacktriangle \blacktriangledown arrows to select the first number in the code and then press the \blacktriangledown key to accept the number. Then repeat the process for the next two numbers in the access code. If you have selected a valid code the OCM will be directed to either the calibration, the zero adjust, or the user setup mode depending on the access code that was provided to the instrument. If the wrong access code is selected, the instrument will return to the **AUTO** mode.

6.0 Instrument Configuration (SETUP mode)

The OCM provides you the ability to customize your instrument according to your needs at any time during normal operation. This section describes how you can customize your instrument.

NOTE: To skip the selection of the SETUP mode, simply press the **MODE** key.

6.1 Configuring the Alarms

Enter the SETUP mode of the OCM by pressing the **MODE** key until **SETUP** is illuminated. The level at which the alarm(s) will activate is called the set point. On the OCM, the set point (S/P) can be set to either 5 or 15 ppm. The display will now indicate that the set point (S/P) for both alarm 1 and alarm 2 are set to 15 PPM. Use the \blacktriangle \blacktriangledown keys to select a set point of 5 or 15 ppm. Press the \blacktriangleleft key to accept each selection and to proceed to the next selection. Press \blacktriangleleft now to set up the alarms.

You may set delay times for initiating and disabling the alarm. The delay times are used to prevent relay chatter close to the alarm limit. The delay times are set at 0 seconds at the factory. The operations of the delays are:

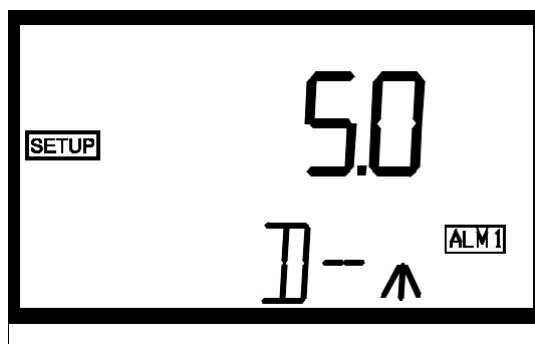
Delay On: Once an alarm condition is met, the process must remain in alarm condition for at least the time selected for the Delay On time level. If the delay on time level is set at 15 seconds and the alarm condition is met continuously for only 10 seconds, the alarm will not be initiated. However, if the alarm condition is met continuously for 15 seconds or more, the OCM will indicate an alarm condition.

Delay Off: Likewise, once the process water leaves the alarm condition levels it must remain out of the alarm condition for at least the time selected for the Delay off time level. If the delay off time level is set to 10 seconds and the process has exited out of the alarm condition, the alarm will be reset only if the process is out of the alarm condition for a continuous 10 seconds. Otherwise, the OCM will still signal an alarm condition.

6.1.1 Programming Alarm 1

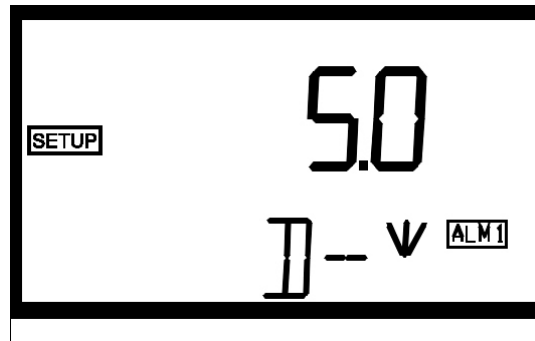
Alarm 1 Function: Alarm 1 is always active. This is the alarm that should be connected to the re-circulation apparatus. This alarm will activate when the oil concentration exceeds the set point longer than the “Delay On” time.

Alarm 1 Delay Times: *Delay On:* The following display will appear to allow you to select the number of seconds currently set for the “delay on” time.



The current selected number of seconds will be shown. You can select the desired number of seconds for the “delay on” time for this alarm using the ▲ and ▼ buttons. Once you have set the desired delay time, press the ↵ button to accept it.

Delay Off: Next, the following display will appear to allow you to select the number of seconds currently set for the “delay off” time.



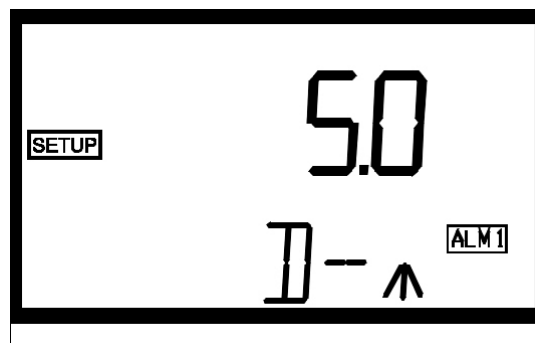
The current selected number of seconds will be shown. You can select the desired delay on time for this alarm using the ▲ and ▼ buttons. Once you have set the desired delay time, press the ↵ button to accept it.

6.1.2 Programming Alarm 2

Alarm 2 Function: Alarm 2 may be turned on, or off. This alarm could, for example, be wired into the control room as an early warning system for the oil levels in your process stream. You can use the ▲ or ▼ buttons to cycle through and select the desired function. Press the ↵ button to accept your selection.

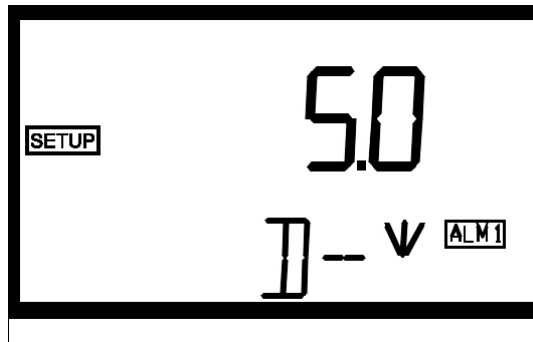
If you selected to turn the alarm OFF, you will be immediately prompted to set up the analog output for the instrument. If, on the other hand, you selected to turn the alarm on you will be prompted to set the delay times.

Alarm 2 Delay Times: *Delay On:* The following display will appear to allow you to select the number of seconds currently set for the “delay on” time.



The current selected number of seconds will be shown. You can select the desired number of seconds for the “delay on” time for this alarm using the ▲ and ▼ buttons. Once you have set the desired delay time, press the ↵ button to accept it.

Delay Off: Next, the following display will appear to allow you to select the number of seconds currently set for the “delay off” time.



The current selected number of seconds will be shown. You can select the desired delay on time for this alarm using the \blacktriangle and \blacktriangledown buttons. Once you have set the desired delay time, press the \blacktriangledown button to accept it.

Note: A system alarm will activate when an internal system failure occurs. Please note that the user settable relays are failsafe in that they will activate if an internal system failure or power loss occurs.

6.2 Setting 4-20mA Output

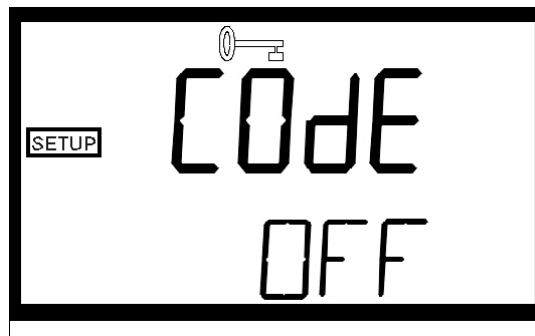
The output (O/P) selection allows you to turn the 4 – 20 mA analog output on, or off. You can select the desired analog output operation using the \blacktriangle and \blacktriangledown keys. Once you have set the desired operation, press the \blacktriangledown key to accept it.

If you selected to turn the 4-20 mA output on, you will be prompted to set the upper and lower oil content levels corresponding to the 4 mA and 20 mA output levels. First, you will be prompted with the oil content level assigned to the 4 mA output level (OLV on the *lower* row of the LCD display). Select the oil content level you wish to assign to the OLV using the \blacktriangle and \blacktriangledown keys. Once you have set the desired level, press the \blacktriangledown key to accept it.

Next, you will be prompted with the oil content level assigned to the 20 mA output level (OHV on the *lower row* of the LCD display). Select the oil content level you wish to assign to the OHV using the \blacktriangle and \blacktriangledown keys. Once you have set the desired level, press the \blacktriangledown key to accept it. At this point you will be prompted to set up the security access

6.3 Selecting the Security Access Option

The OCM is equipped with a security access option. If this option is turned on, the user must be able to input the correct access code for feature. The security key will be highlighted on this display at this time and the lower row the mode they wish to enter.



The three access codes used in the instrument: code 333 will provide access to instrument calibration, code 444 will provide access to instrument configuration, and 222 will provide access to the zero adjust calibration. See section 5.2 for more information on this security feature. The security key will be highlighted on this display at this time and the lower row of the display will indicate the operational status of the security access option (on or off). You can change the operational status of this option using the ▲ and ▼ keys. Once you have set the desired status, press the ↵ key to accept it. Pressing the ↵ key will forward you to the calibration mode of the instrument.

You have now completed the customer selectable parameters section of the instrument. You can enter this menu at any time to re-set, or change, any of the parameters.

7.0 Calibration Procedures

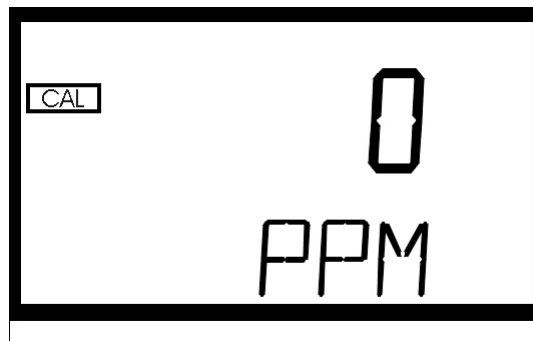
The OCM has been factory-calibrated at HF scientific, inc.. It is possible to use the instrument directly out of the box. However, re-calibration of the instrument using oil-free water and the supplied 15 PPM calibration standard is recommended to allow the user to become familiar with the operation of the instrument and the calibration procedures

7.1 Standard Calibration Procedure

Two calibration points are required for complete calibration of the OCM; oil-free water, and a 15 PPM calibration standard (available only from HF scientific, inc.). To ensure the accuracy of the instrument, please follow the instructions detailed in the following section.

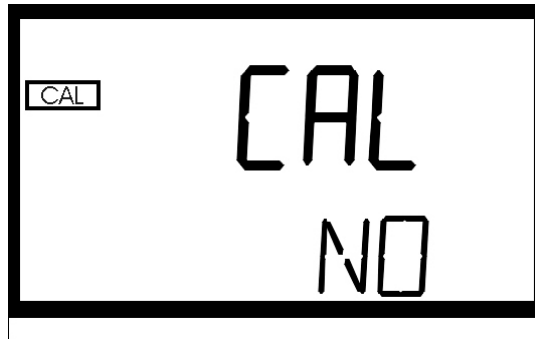
7.1.1 Clear Water (0 PPM) Calibration

1. Shut off flow to the OCM.
2. Disconnect the source tubing.
3. Remove the cleanout plug on the OCM.
4. Open the drain valve to remove the seawater from the sample tube.
5. Close the drain.
6. Pour enough oil-free water in to the sample tube to fill it. De-ionized or distilled water is recommended.
7. Open the drain.
8. Repeat steps 5 and 6 and then clean the sample tube using the cleaning brush supplied with the instrument.
9. Open the drain.
10. Repeat steps 8 and 9 two more times to completely clean the sample tube.
11. Close the drain and fill the sample tube with the oil-free water.
12. Replace cleanout plug.
13. Press the **MODE** key three times to enter the calibration mode. The “**CAL**” block will be illuminated and the display will read ”0 PPM” (see diagram).

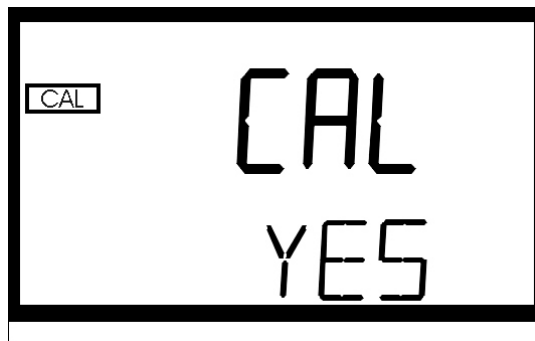


14. Press the ↵ key to initiate the calibration on 0 PPM water. The word **CAL** will appear on the *upper row* of the display and the word *NO* will appear on

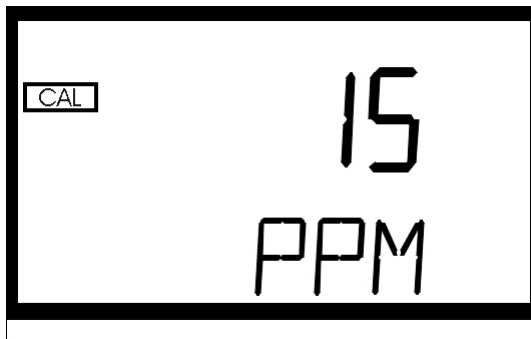
the *lower row* of the LCD display.



15. This is the final step for calibration at the 0 PPM level; if you wish to skip this step without calibrating the 0 PPM, simply press the \downarrow button. However, if you are satisfied and wish to complete calibration on the 0 PPM level use the \blacktriangle \blacktriangledown arrows to select the word *YES* on the lower row of the display and then press the \downarrow button to initiate calibration.



16. Both the **CAL** and **STORE** blocks will flash during the operation. When the calibration procedure for the 0 PPM level is complete the **CAL** and **STORE** blocks will stop flashing. Next you will proceed on to the 15 PPM Calibration.



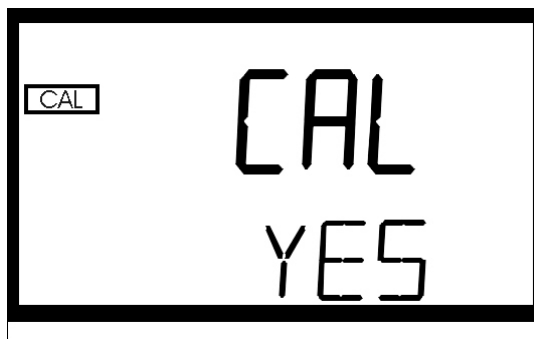
7.1.2 15 PPM Calibration

1. Remove the cleanout plug on the OCM.
2. Open the drain valve to remove the water from the sample tube.
3. Close the drain.
4. Pour the 15 PPM calibration standard into the well.

5. Replace the cleanout plug.
6. Press the ↵ key to initiate the calibration on 15 PPM water. The word CAL will appear on the *upper row* of the LCD display and the word NO will appear on the *lower row* of the LCD display.



7. This is the final step for calibration at the 15 PPM level; if you wish to exit without calibrating simply press the ↵ button. However, if you are satisfied and wish to complete calibration on the 15 PPM level use the ▲ ▼ arrows to select the word YES on the lower row of the display and then press the ↵ button to initiate calibration.



8. Pressing the ↵ button will complete calibration. The system will automatically return to the AUTO mode

Notes: If you wish to exit the calibration mode you may do so at any time, prior to initiating a calibration, by simply pressing the MODE key.

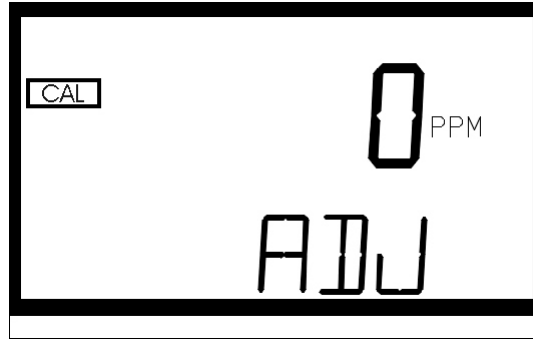
It is normal for the system to count up to and display 13-17 PPM, in the AUTO mode, immediately following the 15 PPM calibration as the calibration solution is still in the sample tube.

7.2 Zero Adjust (0 ADJ) Calibration

In certain instances, the oil free water (seawater) leaving the bilge has different scattering characteristics than the clear water used for calibration. The OCM has been designed to allow for you to account for this variation by adjusting the zero calibration with your oil free water. Follow the steps below for this calibration procedure:

1. Ensure that there is a good flow of oil-free sample to the OCM.
2. Press the **MODE** key once to enter the zero adjust calibration mode. The “CAL” block will be illuminated on the display with “0 ADJ” shown on the display (see

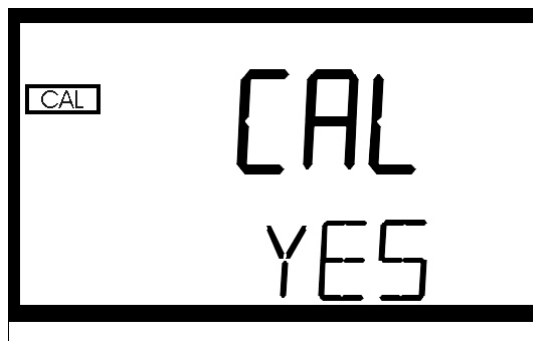
below)



Press the ↵ key to initiate the zero adjust calibration on your oil-free sample. The word CAL will appear on the *upper row* of the LCD display and the word NO will appear on the *lower row* of the LCD display.



This is the final step for calibration for the zero adjust; if you wish to exit without calibrating simply press the ↵ button. However, if you are satisfied and wish to complete calibration on the zero adjust use the ▲ ▼ arrows to select the word YES on the lower row of the display and then press the ↵ button to initiate calibration.



Both the CAL and STORE blocks will flash during the operation. When the calibration procedure for the zero adjust is complete the CAL and STORE blocks will stop flashing. The program will return you to the automatic measurement mode.

8.0 Self-Diagnostics: System Troubleshooting

8.1 System Warning Message(s)

Automatic warning messages are generated by the OCM to provide you with specific diagnostic information about the instrument. These are only messages and they do not indicate failure of any component in the instrument. The following table lists the warning messages and their associated meanings:

WARNING	ASSOCIATED MEANING	TYPICAL CAUSE
W01	Lamp Failure	Lamp has too low an output. The lamp must be replaced followed by a calibration.
W02	Calibration Failure	The wrong standard was used or there is an internal failure.
W03	Analog Loop Failure	The 4-20mA is activated and the loop is open.
W05	Water used for 0 ADJ is too cloudy	The 0 ADJ water was determined to be too cloudy for the instrument to operate properly. Replace water and calibrate again.
O-r	Sample Over-Range	The sample presented to the OCM is over 50 PPM.
WNG	Multiple Warning conditions are met	A combination of the above warning conditions has been met.

If any of the above conditions occurs, the sensor relay will automatically be set to the alarm position.

8.2 System Failure Error

The instrument is indicating an error when “SFE” is displayed on the lower row of the display. This is a general system failure. When this message is observed, contact the HF scientific, inc. Technical Services department to determine a resolution to the problem.

If any of the above conditions occurs, the sensor relay will automatically be set to the alarm position.

9.0 Routine Maintenance

9.1 Cleaning the Optical Chamber (Sample Tube)

Proper measurement of the oil content of sample water requires that the sample tube be free of debris. Cleaning the sample tube is accomplished by first purging the system:

1. Stop the flow of sample water to the OCM.
2. Run oil free water for several minutes through the instrument and then shut off the flow to the instrument (ensure that the sample tube remains full with clean water).
3. Remove the cleanout plug and then clean the interior of the sample with the brush provided. If necessary, you may use any common non-abrasive detergent to help in the removal of any residual buildup on the sample tube.
4. Empty the sample chamber to drain and then re-attach the flow of sample water to the OCM.

Once cleaned, the OCM can be put back into operation.

9.2 Replacing the Desiccant Cartridge

Proper use of the supplied desiccant cartridge is essential in maintaining the performance of the instrument. The desiccant cartridge has been designed to have a long life. The desiccant cartridge should be replaced when the color of the desiccant (as viewed through the sight glass) has turned pink.

To remove the old desiccant cartridge, simply unscrew the cartridge from the front of the case by rotating the cartridge counter-clockwise (see Figure 6). Once removed, place the new cartridge into the instrument with the reverse movements. Then continue using the instrument as normally instructed.

9.3 Replacing the Source Lamp

Periodically the source lamp will require replacement. Please note that a failed lamp will indicate a W01 on the LCD screen.

To replace the lamp:

Note: Refer to Figure 7 when following these steps.

1. Open the sensor portion of the OCM by unscrewing the four sensor cover screws. These screws should remain captive in the sensor cover even when fully loosened.
2. Pull the electronics module out enough to reach the lamp setscrew on the optic ring. If you pull the module out too far, simply realign the board with the marked slots and push back in.
3. Use a .050" Allen wrench to loosen the lamp setscrew on the right side of the large optic ring. Do **NOT** loosen the setscrew on the lamp collar.
4. Pull the lamp and collar out.
5. Undo the lamp terminal connections by flipping up the terminal block levers.
6. Discard the lamp.
7. Insert the new lamp. Note that the collar controls the alignment of the replacement lamp. The lamp will only fit in place when the pin of the collar fits into the hole of the optic ring. Tighten the lamp setscrew.
8. Attach the leads to the terminal block (lamp is not polarity sensitive). Lock the levers down firmly.
9. Ensure that the lamp is on. Light should be shining into the optic ring.

10. Push the electronics module back in and tighten the four sensor cover screws.

Please note that the OCM will require a complete calibration as described in sections 6.1.1 and 6.1.2.

10.0 Technical Assistance, Replacement Parts and Warranty Claims

<i>Accessory or Replacement Part</i>	<i>HF scientific Part Number</i>
Calibration Kit	19611
White Light Source	19940
Desiccant cartridge	19610
OCM Electronics and Touch pad	19612

If for any reason you need technical assistance regarding this instrument please do not hesitate to contact the HF Technical Services Department:

HF scientific, inc.
3170 Metro Parkway
Fort Myers, Florida 33916-7597
Phone: (239) 337-2116 Fax: (239) 332-7643
Email: info@hfscientific.com

11.0 Warranty

HF scientific, inc., as manufacturer, warrants to the original purchaser of this instrument that it will 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 normally require periodic replacement, consistent with normal maintenance, specifically lamps (including the LCD backlight), calibration standards, desiccant, sensors, 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 set forth above.

HF scientific, inc.
3170 Metro Parkway
Fort Myers, Florida 33916-7597
Phone: (239) 337-2116
Fax: (239) 332-7643

12.0 Figures

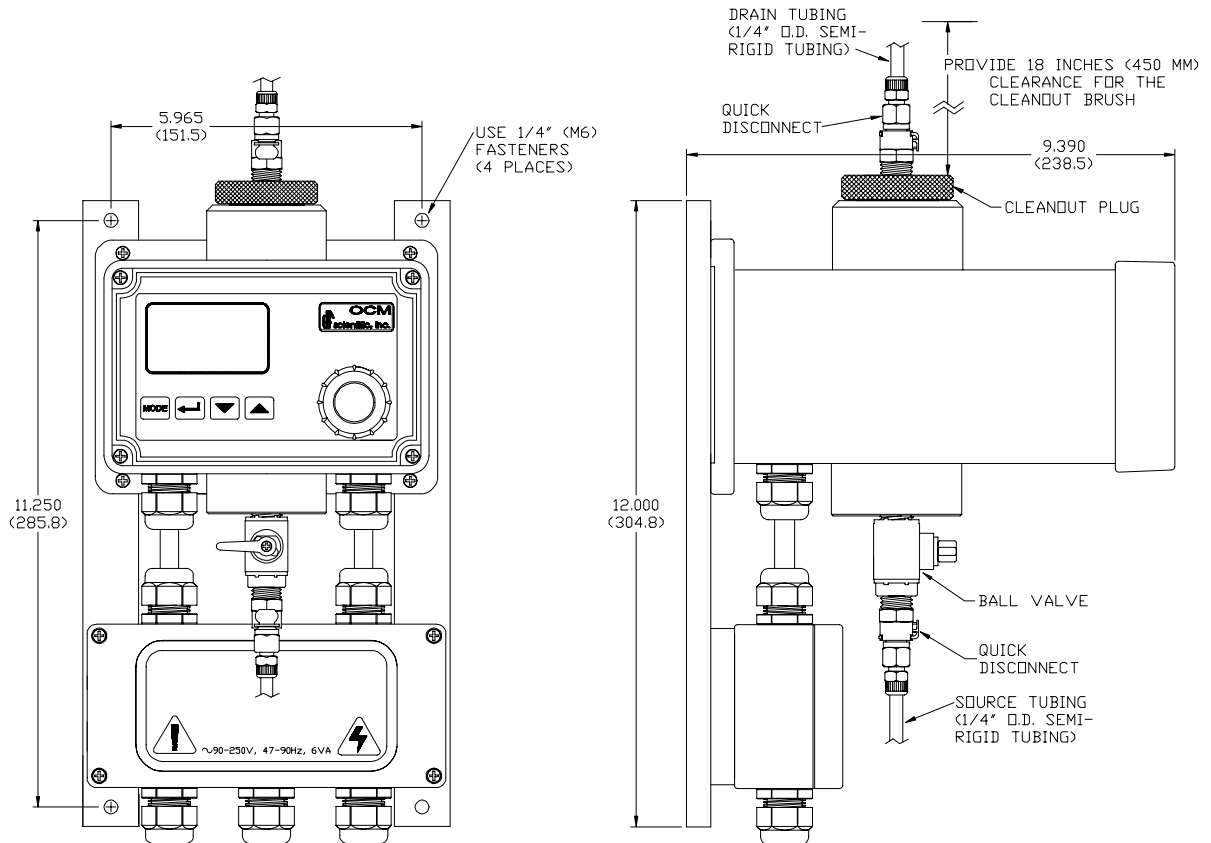


Figure 1: Mounting Dimensions for the instrument [inches (mm)]

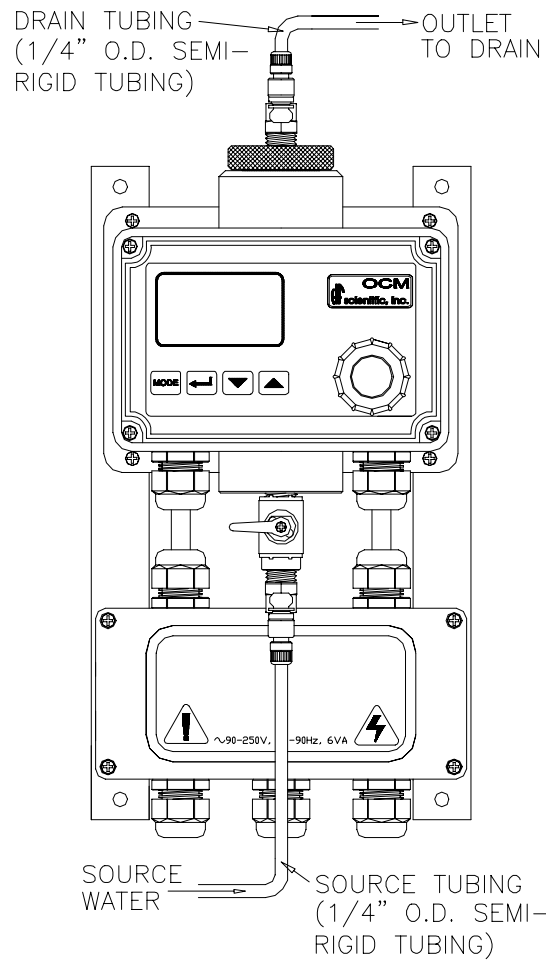


Figure 2: Recommended Plumbing for the instrument.

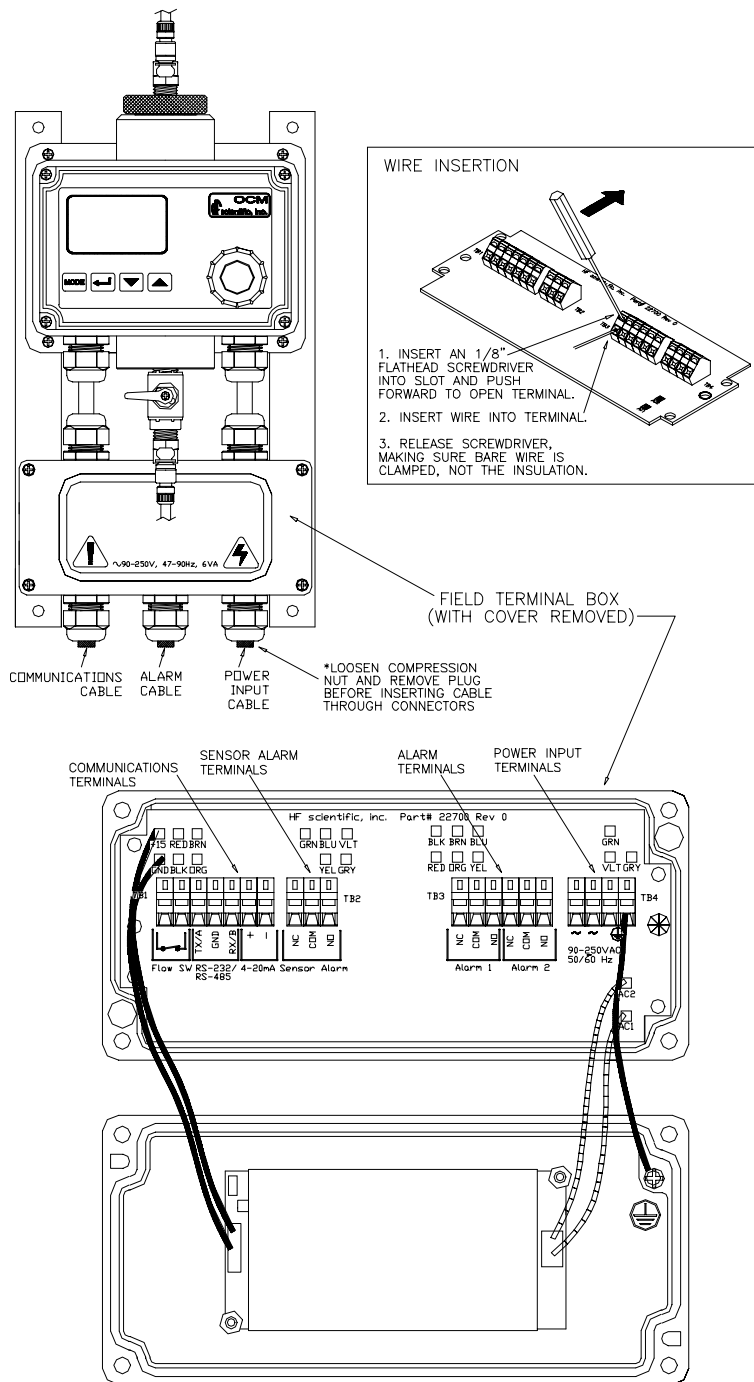


Figure 3: Electrical connections for the instrument.

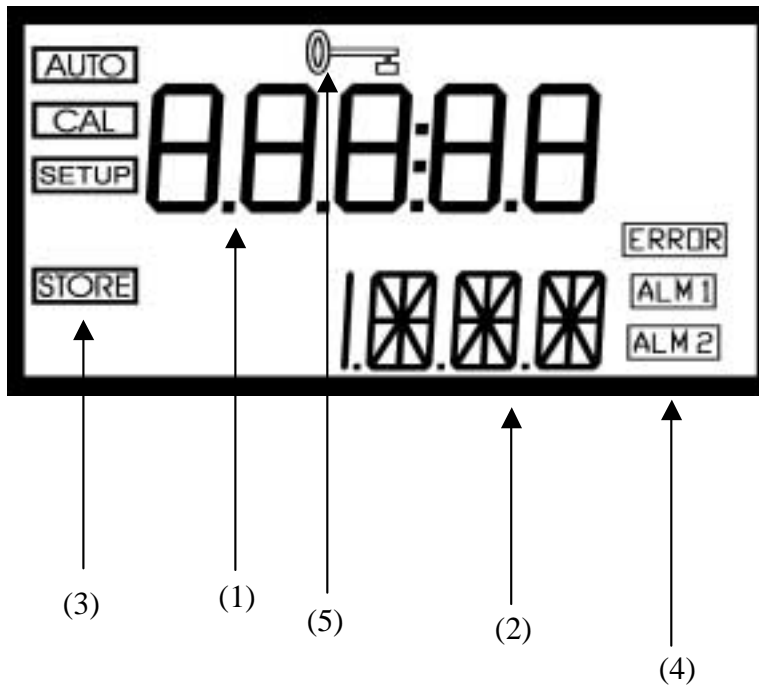


Figure 4: Graphics of the LCD Display. The upper row of the display is identified as item (1). The lower row of the display is identified as item (2). Several status indicators are identified as item (3). Several other indicators are shown as item (4). Finally, the prompt for the security access code is shown as item (5).

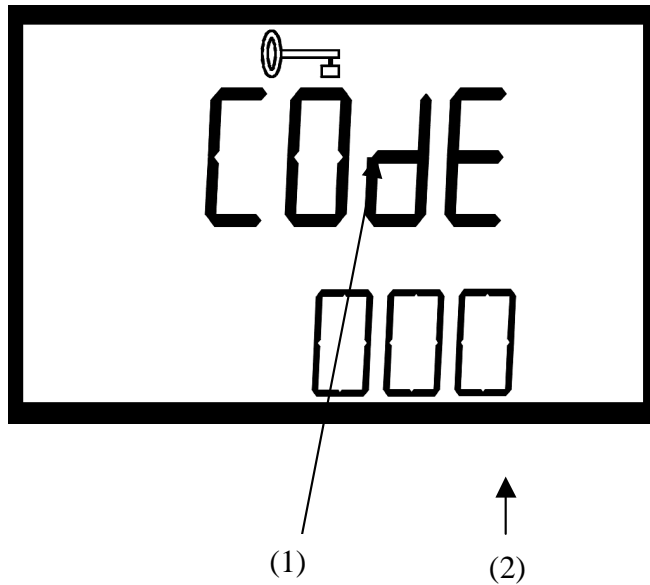


Figure 5: The LCD Display shown when the security code is to be entered. The prompt for the security access code is shown as item (1). The three digits that are modified to the correct access code are shown as item (2). The code that is to be modified will flash until you accept the value you select.

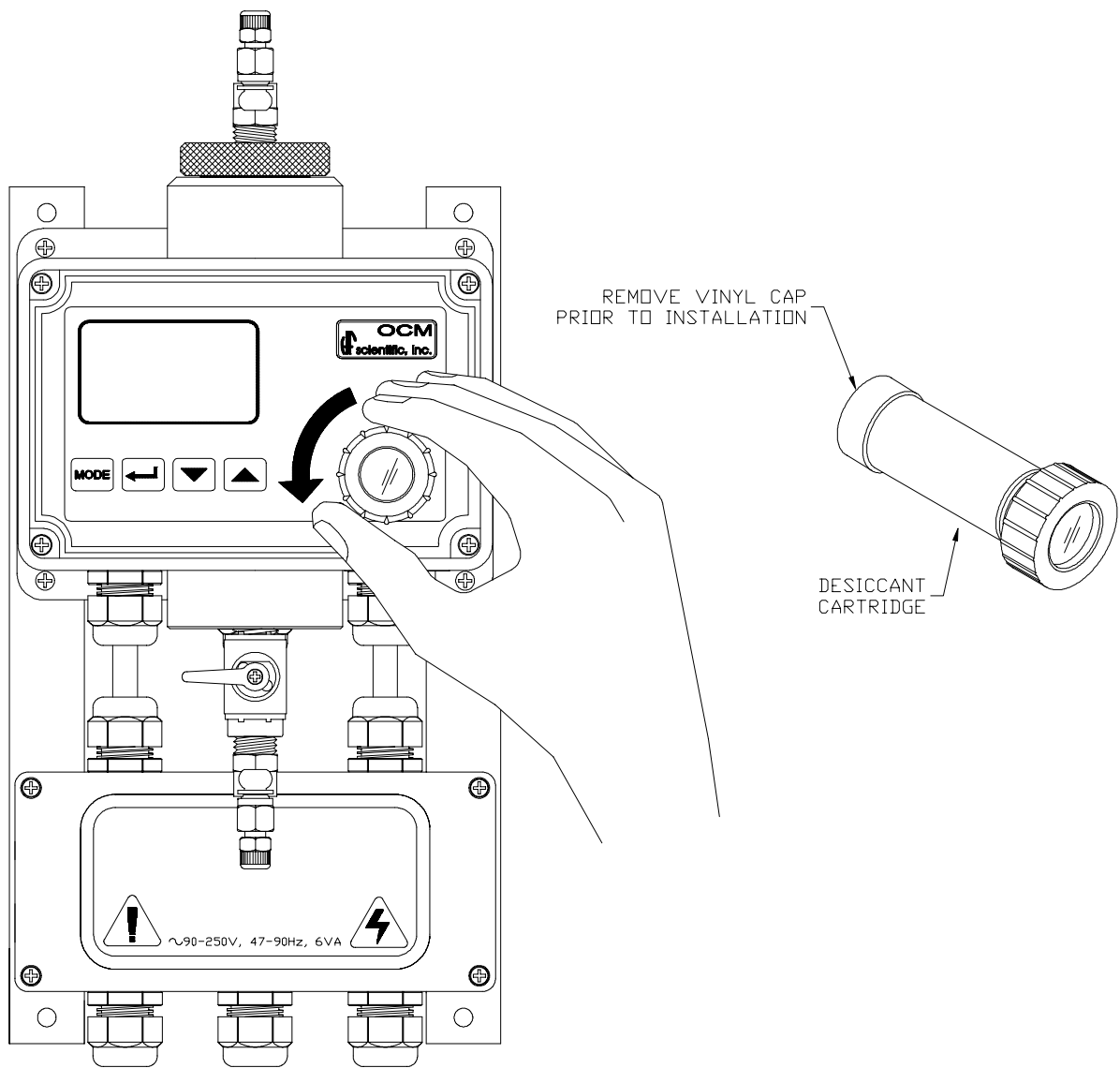


Figure 6: Location and removal of the desiccant cartridge on the instrument.

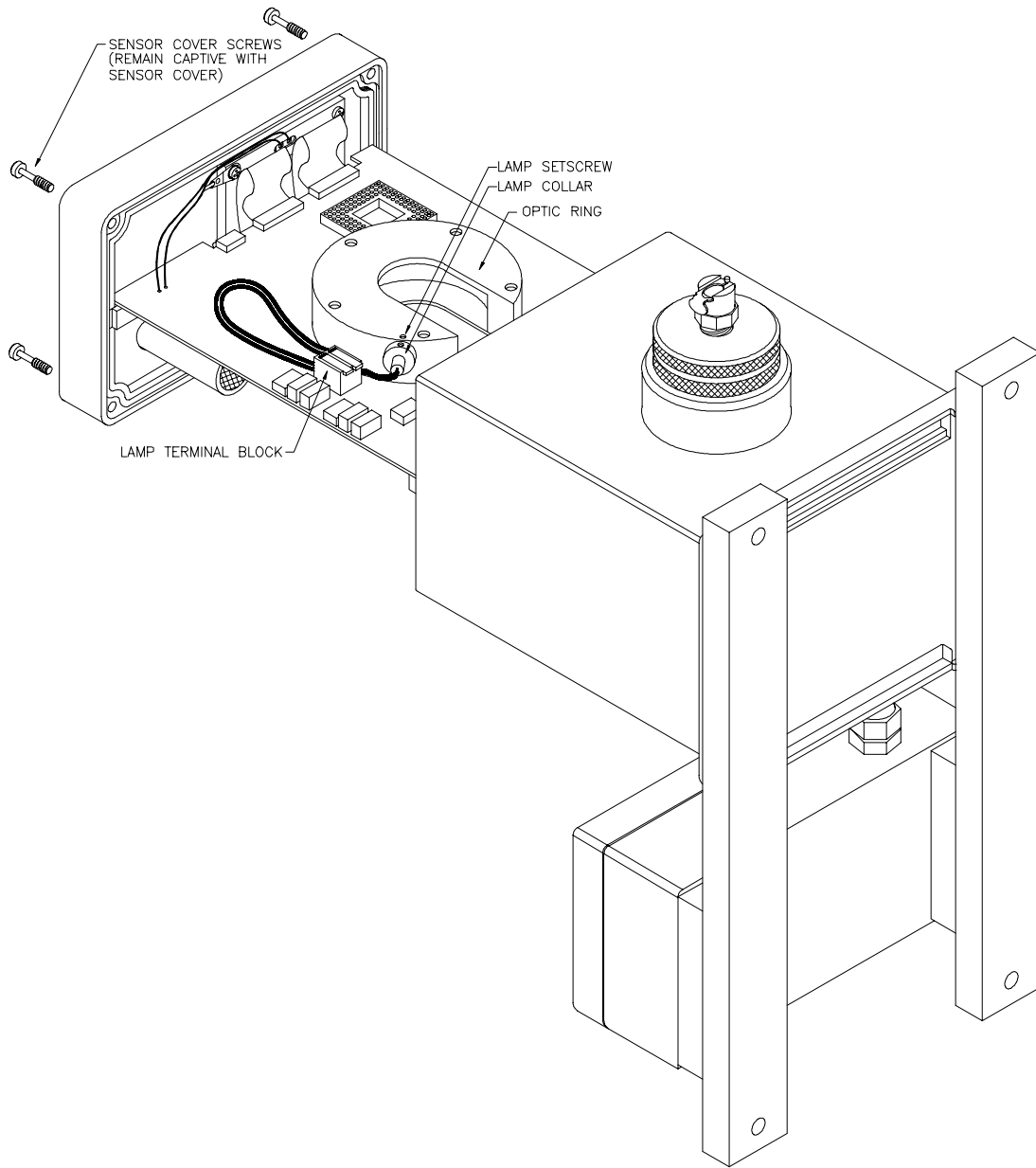


Figure 7: Lamp Replacement.

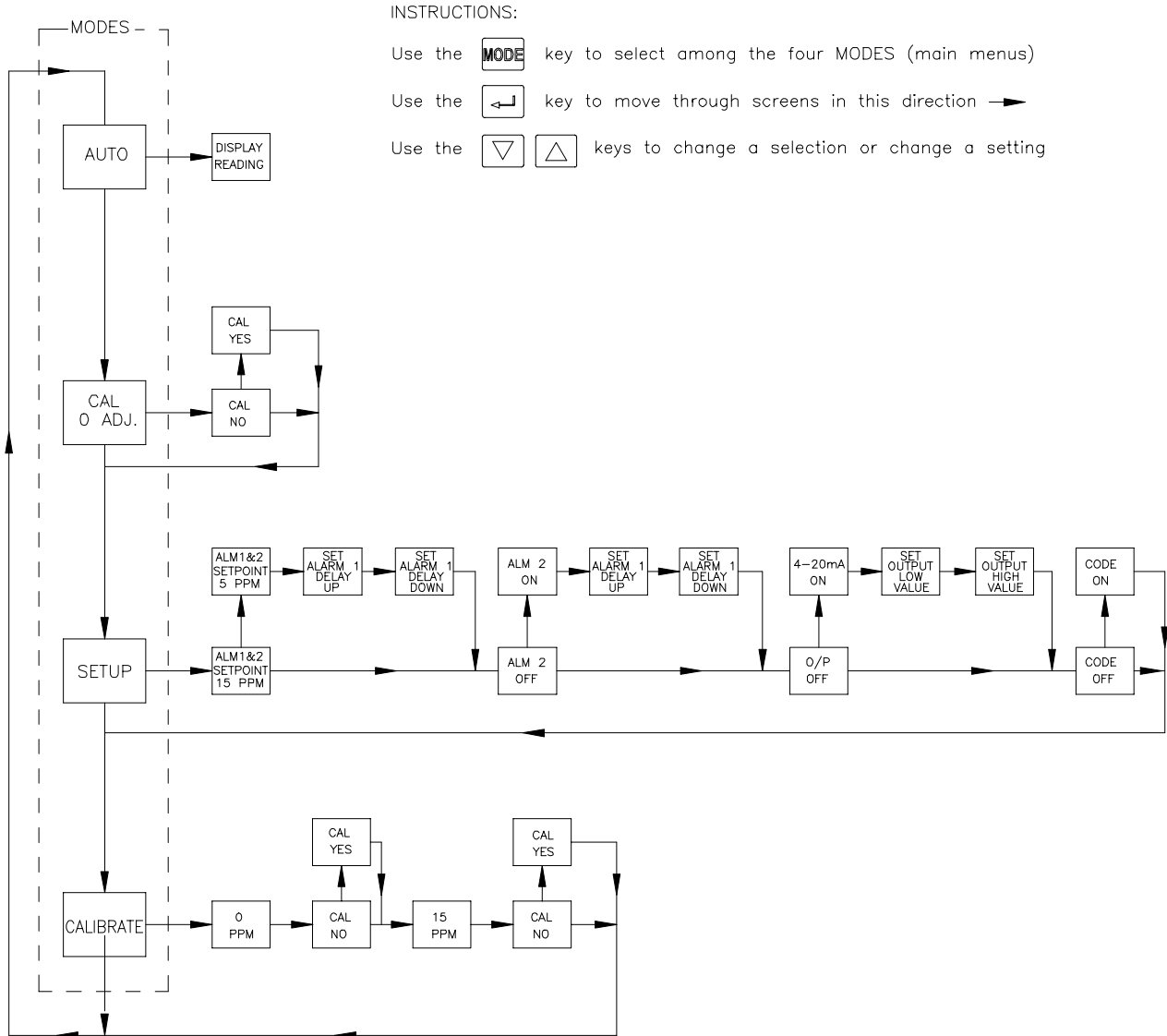


Figure 8: Menu Flow Chart

13.0 Approvals



Certificate number BA-0016
 Certificat numéro

CERTIFICATE OF TYPE TEST FOR OIL CONTENT METERS INTENDED FOR BILGE ALARMS
CERTIFICAT D'AGRÈMENT PAR TYPE DES DÉTECTEURS D'HYDROCARBURES DESTINÉS AUX ALARMES POUR EAUX DE CALE
 ✕ - 15 ppm alarm ✕ - 15 ppm alarme

This is to certify that the oil content meter, comprising the equipment listed, below has been examined and tested in accordance with the requirements of the Specification contained in Part II of the Annex to the Guidelines and Specifications contained in IMO resolution MEPC 60 (33). This Certificate is valid only for an oil content meter referred to below.

Il est certifié que le détecteur d'hydrocarbures comprenant les éléments ci-après a été examiné et soumis à des essais conformément aux dispositions des spécifications qui font l'objet de la Partie II de l'annexe aux Directives et spécifications contenue dans la résolution 60 (33) de l'OMI. Le présent certificat n'est valable que pour un détecteur d'hydrocarbures du type décrit ci-dessous.

Oil content meter supplied by <i>Détecteur d'hydrocarbures fourni par</i>	_____
under type and model designation <i>type et désignation du modèle:</i>	_____
and incorporating: <i>comprenant:</i>	_____
Oil content meter analysing unit manufactured by <i>Dispositif d'analyse du détecteur d'hydrocarbures fabriqué par</i>	_____
to specification/drawing numbers <i>conformément à la spécification/au schéma n°</i>	_____
Electronic section of oil content meter manufactured by <i>Éléments électronique du détecteur d'hydrocarbures fabriqué par</i>	_____
to specification/drawing numbers <i>conformément à la spécification/au schéma n°</i>	_____
* Sample feed pump manufactured by <i>Pompe d'échantillonnage fabriqué par</i>	_____
to specification/drawing numbers <i>conformément à la spécification/au schéma n°</i>	_____
* Sample conditioning unit manufactured by <i>Dispositif de conditionnement de l'échantillon fabriqué par</i>	_____
to specification/drawing numbers <i>conformément au schéma n°</i>	_____

THE SYSTEM IS ACCEPTABLE FOR THE FOLLOWING APPLICATION (* DELETE AS APPROPRIATE)
 LE DISPOSITIF EST CONÇU POUR LES UTILISATIONS SUIVANTES (* RAYER LA MENTION INUTILE)

The oil content meter is acceptable for use with a 15 ppm bilge alarm in accordance with regulation 16(5)
 Le détecteur d'hydrocarbures est acceptable et peut être utilisé avec une alarme à 15 ppm pour eaux de cale conformément à la règle 16(5).

* This Bilge Alarm meets the specification for a 5 ppm unit, as contained in the "Standard for Performance and Test Specifications for Bilge Alarms for Use in Canadian Inland Waters," in accordance with the Oil Pollution Prevention Regulations.

* Cette alarme pour eaux de cale satisfait aux spécifications pour une unité à 5 ppm, selon la "Norme de rendement et spécifications d'essais de dispositif d'alarme pour eaux de cale utilisés sur les navires naviguant dans les eaux intérieures canadiennes", conformément au Règlement sur la Prévention de la pollution par les hydrocarbures.

Test date and results As per certificate of approval No. 162.050/3025/0 issued by United States Coast Guard dated June 16, 2004.
 Les données et résultats des essais:

A COPY OF THIS TEST CERTIFICATE SHOULD BE CARRIED ABOARD A VESSEL FITTED WITH THIS EQUIPMENT AT ALL TIMES
 UN EXEMPLAIRE DU PRÉSENT CERTIFICAT D'ESSAIS DEVRAIT SE TROUVER EN PERMANENCE A BORD D'UN NAVIRE ÉQUIPÉ DE CE MATÉRIEL



AMSE - C030(06-94)

David T. Ford

 (SIGNATURE OF AUTHORIZED INSPECTOR / SIGNATURE DE L'INSPECTEUR AUTORISÉ)
 DATED THIS 21 DAY OF OCTOBER 19 99
 DATE CE JOUR DE

Canada



格式 CP165
Form

中国船级社

CHINA CLASSIFICATION SOCIETY

编号 BJT99610012
No.

舱底水报警油份计型式认可证书
CERTIFICATE OF TYPE APPROVAL FOR OIL CONTENT
METERS INTENDED FOR BILGE ALARMS

(15ppm alarm)

This is to certify that the oil content meter, comprising the equipment listed below, has been examined and tested in accordance with the requirements of the Specifications contained in part 2 of the annex to the guidelines and Specifications contained in IMO Resolution MEPC 60(33). This Certificate is valid only for an oil content meter referred to below.

Oil content meter supplied by H.F. Scientific, Inc.

under type and model designation: Model 20075

and incorporating:

Oil content meter analysing unit manufactured by H.F. Scientific, Inc.

to specification/assembly drawing No. 22540-A-01 date May 03, 1999

Electronic section of oil content meter manufactured by H.F. Scientific, Inc.

to specification/assembly drawing No. 22540-A-03 date May 03, 1999

*Sample feed pump manufactured by _____

to specification/assembly drawing No. _____ date _____

*Sample conditioning unit manufactured by _____

to specification/assembly drawing No. _____ date _____

The oil content meter is acceptable for use with a 15ppm bilge alarm in accordance with Regulation 16 (5).

A copy of this Certificate should be carried aboard a vessel fitted with this equipment at all times.

Test data and results attached as appendix.



Signed 秦海岩 (Qin Haiyan)

China Classification Society

Dated this Sep. 1 day of 1999

*Delete as appropriate.



中国船级社
CHINA CLASSIFICATION SOCIETY

编号 BJT99610012
No

船用产品型式认可证书

CERTIFICATE OF TYPE APPROVAL FOR MARINE PRODUCT

产品名称 Description	<u>Oil Content Monitor (15 ppm Alarm)</u>	制造厂名 Manufacturer	<u>H.F. Scientific, Inc.</u>
产品型号 Model	<u>Model No. 20075</u>	厂址 Address	<u>3170 Metro Parkway Ft. Myers, FL 33916-7597, U.S.A.</u>
图纸批准号 Approval No. of drawing	<u>BJA99610009</u>		

产品明细 Particulars

Measuring range:	0 to 30 ppm
Measuring accuracy:	Less than ±5 ppm
Measuring Pressure:	0.01 to 0.8 MPa
Response time:	Less than 20 seconds

兹证明本社验船师根据本社规范和有关规则,对上述产品的图纸和技术文件进行了审查,并于 _____ 年 _____ 月 _____ 日
_____ 产品图纸和试验结果均符合本社规范和
_____ 现予认可。

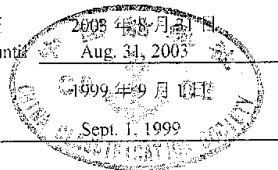
型式认可后,该产品仍需按本社规定进行检验和发证。

THIS IS TO CERTIFY that the Surveyor to this Society has, in accordance with the Rules and relevant Regulations of this Society, examined the drawings and technical documents of the a.m. product, and Carried out relevant test and field audit on July 21, 1999 and that both the Drawings and test results are found to be in compliance with the Rules of this Society and IMO Res.MEPC60(33). The Type Approval for the subject product is hereby granted.

After the Type Approval, the subject product is also required to be surveyed and certified in accordance with the requirements of this Society.

本证书有效期限至
This Cert. is valid until 2003年8月31日
Aug. 31, 2003

发证日期
Date of issue 1999年9月1日
Sept. 1, 1999





ABS®

TYPE APPROVAL PROGRAM

2 November 1999

99-11683

ATTACHMENT TO CERTIFICATE NUMBER _____ DATE _____

1 OF _____

PAGE _____

COMPANY HF Scientific Inc.

ADDRESS 3170 Metro Parkway

TELEPHONE 941-337-2116 FAX 941-332-7643

EQUIPMENT Oil Content Meter-15 PPM Bilge Alarm

MODEL 20075

DESCRIPTION Oil Content Meter fitted with light scatter type sensor

INTENDED SERVICE Oil content meter for bilge alarms in machinery space, bilge systems of ships

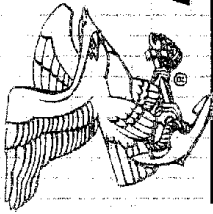
RATINGS 15 PPM Equipment

STANDARDS IMO Resolution MEPC.60(33), Guidelines and specifications for pollution prevention equipment for machinery spaces bilges of ships.

SERVICE RESTRICTIONS _____

COMMENTS _____

SURVEYOR Patrick O'Halloran SIGNATURE 



TYPE APPROVAL PROGRAM

ABS®

99-11683
CERTIFICATE NUMBER

2 November 1999
DATE

Fort Meyers, Florida
PLANT LOCATION
Tampa, Florida
PORT OFFICE

CERTIFICATE OF
Type Approval
HF Scientific Inc.

This is to Certify

that a representative of this Bureau did, at the request of the Company, attend their facilities on the date and location noted above, in order to carry out survey of the facilities and associated quality procedures. The facility is considered capable of manufacturing a product which meets the designated standards. The equipment listed on the Attachment is eligible to be placed on this Bureau's **List of Type Approved Equipment**, subject to annual facility surveys by a representative of this Bureau and renewal of this Certificate after five (5) years.

EQUIPMENT DESCRIPTION Oil Content Meter-15 PPM Bilge Alarm

ISSUE DATE 2 November 1999 EXPIRATION DATE 2 November 2004

SURVEYOR'S SIGNATURE

Patrick O'Halloran

Patrick O'Halloran

ABS 27 (498) 1 A

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, Standards or other criteria of American Bureau of Shipping or a statutory, industrial or manufacturer's standard and is issued solely for the use of the Bureau, its committees, its clients or other authorized entities. This certificate is governed by the terms and conditions on the reverse side hereof.

NY7986 97095 CTAC01
1/4 2004



U.S. Department of Transportation
United States Coast Guard

Certificate of Approval

COAST GUARD APPROVAL NO: 162.050/3025/0

EXPIRES: JUNE 16, 2004

OIL POLLUTION PREVENTION EQUIPMENT

HF SCIENTIFIC INC
3170 METRO PARKWAY
FORT MYERS, FL 33916-7597

Model 20075 Oil content meter - 15 ppm bilge alarm:

This is to certify that the oil content meter comprising the equipment listed has been examined and tested in accordance with the requirements of the specifications contained in part 2 of the annex to the guidelines and specifications contained in IMO resolution MEPC.60(33). This certificate is valid only for the oil content meter referred to in this certificate. Oil content meter analysing unit manufactured by HF Scientific to drawing no. 22540-A-01.

Electronic section manufactured by HF Scientific to drawing no. 22540-A-03.

The oil content meter is acceptable for use with a 15 ppm bilge alarm in accordance with regulation 16(5) of Annex I to MARPOL 73/78.

A copy of this Certificate should be carried aboard a vessel fitted with this equipment at all times. IMO Certificates of Type Approval do not expire and are valid for equipment manufactured at any time during the period of validity of this Certificate.

Test data and results attached as appendix.

*** END ***

THIS IS TO CERTIFY THAT the above named manufacturer has submitted to the undersigned satisfactory evidence that the item specified herein complies with the applicable laws and regulations as outlined on the reverse side of this Certificate, and approval is hereby given. This approval shall be in effect until the expiration date hereon unless sooner canceled or suspended by proper authority.



GIVEN UNDER MY HAND THIS 16TH DAY OF
JUNE 1999, AT WASHINGTON D.C.

P. A. Richardson

P. A. RICHARDSON, CAPT
CHIEF, SYSTEMS ENGINEERING DIVISION
BY DIRECTION OF THE COMMANDANT, U.S.C.G.

DEPT. OF TRANSP., USCG, CGHQ-10030 (R. 1-86)
PREVIOUS EDITION MAY BE USED

ORIGINAL - Manufacturer Copy