

Eagle Series

Oil-in-Water Monitor

User Manual

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Eagle Menu Training



Look to Section 3 for a hands on introduction to the keypad and menu functions of your Eagle

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EAGLE	User Manual	EAGLEUM15.doc	1.5

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1. EAGLE FUNCTION AND DESCRIPTION

1.1 Introduction

The Eagle Series monitor is a filter fluorescence photometer with a fixed excitation bandpass source/filter and an emission bandpass filter. It is designed specifically for the quantification of low ppm concentration measurements of aromatic petroleum based hydrocarbons (oil) in water.

The Eagle has many applications of use and will provide varying degrees of accuracy depending on it's set up.

- A Filter method allows field screening for hydrocarbons in water using pre-selected generic calibrations.
- A Solvent Extraction approach will provide an increased degree of accuracy by qualifying and clarifying the sample.
- Site specific calibrations will provide more accurate ppm values that target the type of compounds indicative to a specific application. Multiple calibrations may be stored into memory for both the Filter method and the Solvent Extraction method.

Remember that this instrument is based on light measurements relative to the calibration determined by the user. Choose the degree of accuracy required and follow the procedures consistently for best results.

Fluorescent emission output is not strictly linear, and it can be affected by numerous variables. If the procedures in this manual are followed closely, accurate concentration measurements can be made with a high degree of reliability.

1.2 Unpacking

Unwrap all packages carefully and compare contents with the packing list, making sure all items arrived. If any part is missing, contact your local sales office. Inspect all components for damage that may have occurred while the unit was in transit. If any part appears damaged, contact the carrier immediately. Be sure to keep all packing material for damage claims or for repacking should it become necessary to return the unit.

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1.3 Specifications

Power input	AC Power: 80-250 VAC, 47-63 Hz, via supplied transformer DC Power: 12 VDC, 2.5 amp
Fuse Value	T3.15a, 250v MICROFUSE
Measuring Range	0-100 PPM
Instrument Accuracy	± 0.1 PPM The accuracy is based on an oil type, calibration and operating consistence.
Resolution	0.1 PPM
Calibration Memory	10 Locations for Filter Method 10 Locations for Solvent Extraction Method
Calibration Curve	up to five concentration entry points per calibration
Light Source	Mercury lamp (expected life 5000 hr) Model # A00515 - 360 nm Model # A00516 - 254 nm
Emission Filter	Model # A00515 - 460 nm Model # A00516 - 350 nm
Environment	10-50 °C, dry area, away from intense light such as sunlight.
Humidity	0-99% non-condensing
Dimensions	280 mm x 360 mm x 182 mm high
Shipping Weight:	Approximately 1.2 kg (3.75 pounds)
Power Supply Unit:	UL3101-1, CSA C22.2 1010.1, CE

This declaration of conformity is valid only for the instrument when it is used in approved locations, and used as delivered from Arjay Engineering except for alterations described in the User Manual.

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1.4 Important Information

- Hexane, Pentane, and other solvents and samples can be hazardous.
- Wear gloves when handling.
- Disposal of solvents must comply with local regulations.
- Always unplug the instrument before removing the bottom panel or cleaning the instrument.
- Use and store the instrument away from direct sunlight and away from areas where the instrument may become wet.
- Allow 15 minutes for warm up each time it is switched on.
- Wipe the cuvet exterior before placing it into the well. Take care not to spill any liquid into the ports.
- Reliable results depend on measurement accuracy and consistency.
- The optical surfaces must remain clean in order to measure fluorescence accurately. Periodically clean the optical surfaces as described in the care and maintenance section.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Only accessories and parts approved or supplied by Arjay Engineering may be used for operating, maintaining, and servicing this product.

CAUTION Avoid direct contact with a UV lamp that is powered on. Always power the unit off before servicing or maintaining this instrument.

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2. FLUOROMETRY PRINCIPLES AND MEASUREMENT METHODS

2.1 Fluorescence Measurement

The fluorescence principle is based on the ability of a compound to be subjected to a specific wavelength of light (excitation) and to re-emit this light energy at one, or more, higher wavelengths (emission). The emission wavelengths are registered as peaks.

Aromatic hydrocarbons, when subjected to a specific wavelength, will fluoresce at a predictable wavelength that is selective to these compounds. Once the cuvet or filter disc is placed into the instrument, the sample is exposed to filtered UV light from a mercury lamp. This light excites the hydrocarbons, causing light to be emitted back at various higher wavelengths. An emission filter in front of the photodetector allows only fluorescence wavelengths indicative of hydrocarbons to register. Thus, the measured fluorescence is a direct indicator of the hydrocarbon concentration. The aromatic hydrocarbon concentration is then used as a proportional indicator of total hydrocarbons, which is displayed in ppm.

Fluorometers measure fluorescence in relative rather than absolute units. After zeroing with a "blank" (clean filter disc, hexane, pentane or other extraction agent), always initiate the monitor by calibrating the instrument to display the known concentration of a solution or standard.

2.2 Filter Method

This method is used for field screening as a low cost, solvent-free, fast and effective approach to determine the presence of hydrocarbons in a sample. A water sample is syringed through a special filter paper disc. The disc attracts oil molecules out of the water which concentrates the hydrocarbons evenly across the filter surface.

The emitted intensity of light at a determined filtered wavelength is proportional to the concentration of hydrocarbons on the disc. This intensity is correlated to a ppm value through the unit calibration.

Since many oil types and other fluorescing contaminants may accumulate on the filter surface during the syringe process, the resulting reading should be used as an indicator of the presence of hydrocarbons only.

2.3 Solvent Extraction Method

To provide the instrument with a stable conditioned sample for more accurate readings, the hydrocarbons are first extracted from the water sample. One such technique is known as a Solvent Extraction and will typically use N-Hexane, Pentane or other extractive liquid.

Certain solvents attract and bond to hydrocarbons. When hexane, for example, is added to a water sample and shaken vigorously, the hydrocarbon molecules will bond to the solvent molecules. When left to stand, the hexane then separates from the water to the surface and will bring the hydrocarbons with it. The upper hexane sample layer contains the extractable hydrocarbons and is tested in the instrument. Since the unit was originally zeroed using hexane, any fluorescence is a direct result of the hydrocarbons contained within it.

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This method to hydrocarbon extraction is confirmed in EPA Method 1664 (Rev. A) and indicated in ISO procedures.

A typical extraction procedure is as follows:

1. Take a 100 ml water sample. A jar etched with markings is provided.
2. Add 10 ml of solvent into the jar. (Use the bottle dispenser will provide the consistent measurements.)
3. Shake vigorously for 2 minutes. Use a timer or electric shaker for consistent extractions.
4. Allow the sample to stand for 2 minutes. The solvent will rise to the surface.
5. Use a disposable pipet and remove some solvent sample from the middle of the solvent surface layer.
6. Insert the extracted sample into the measuring cuvet to about 7/8 full. Wipe the cuvet of any fingerprints or grease.

Sample preservation and release of solubles is increased by keeping the sample below pH 2. This is indicated in EPA Method 1664 Rev A. If this is desirable, add 10 ml of HCL to the 100 ml water sample and shake to acidify the water prior to the hexane extraction procedure. If this method is to be used, this should be preformed for the initial calibration and for all ensuing sample tests.

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3. INSTRUMENT FUNCTIONS – AN INTRODUCCION

Note: This section offers a functional overview of the unit. It is recommended to have the unit and a power source available to you while you review this section.



Follow any commands beside the magnifying glass to guide you through the instrument menu functions.

3.1 Keypad Review

The keypad is used to select the initial setup options and to zero and calibrate the instrument. The following keys are available for use.

Numeric Keys <0>-<9> Use the numeric keypad to enter a calibration standard value or to choose menu options.

The **<DISPLAY>** key exits any menu to return to normal operating PPM display. While entering numeric values in the menus, the **<DISPLAY>** key will reverse an entry to allow a correction.

The **<CALIB>** key enters the menu to select the calibration from the stored calibration locations list or perform a new calibration.

The **<CONTROL>** key is used to choose the method (Filter or Solvent Extraction method)

The **<SETUP>** key accesses the user selected functions including diagnostics, display units, Lamp sleep mode, language of the display and sample averaging value.

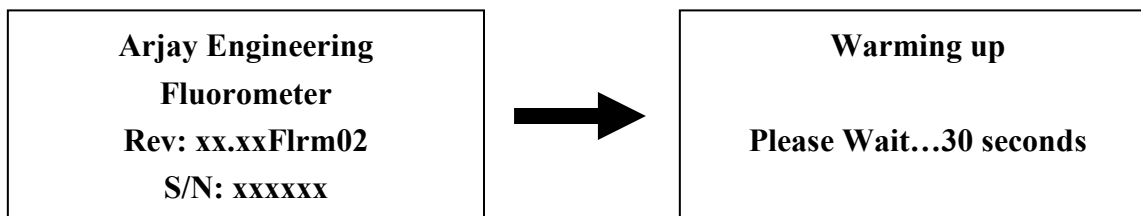
The **<ENTER>** key registers numeric values or advances to the next screen.

The **<.>** key represents a decimal point for numeric entries.

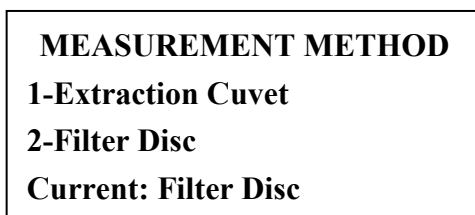
3.2 Power Up



Plug in the power supply to an AC source. **Plug in** the DC jack into the back of the Eagle unit and turn on the power switch. A screen will momentarily flash with the Hardware and Software version. A countdown will begin to allow the lamp to warm up and stabilize.



When complete the display will read similar to:



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Press <1> for Extraction Cuve (Solvent Extraction Method), or press <2> for Filter Disc (Filter Method).

<p>Please select one</p> <p>1-Perform a zero</p> <p>2-Calibration</p> <p>3-View Readings</p>
--

1. **Perform a Zero:** A Zero is only performed when the lamp ages. This is fast and easy procedure to compensate the lamp aging.
2. **Calibration:** This will allow you to choose the previous calibrations saved in the memory locations, or enter a new calibration. The menu display is same as when press the <CALIB>.
3. **View Readings:** This will return to the main display screen for taking samples. The menu display is same as when press the <DISPLAY>.

3.3 Main Keystroke

<DISPLAY>



Press the <DISPLAY> key to bring the instrument to the measuring display mode. Since the unit continuously sees a fluorescence response from the sensor, a ppm reading will be indicated whether or not a sample is in place. If at any time the user wishes to exit from another menu, pressing the DISPLAY will return the instrument to this normal operating display function.

<p>OIL CONCENTRATION</p> <p>Filter Disc</p> <p>Cal: Diesel-f</p> <p>30 ppm</p>
--

This is the normal display that will be used by the operator for the routine measurement of samples.

The second line will indicate which port is to be used for the present method that has been selected. This will read Filter Disc or Extraction Cuvet. If it reads Filter Disc, you must use the filter method to take a measurement. This can be changed depending on the type of sample you wish take.

The third line indicates the current calibration location.

The fourth line indicates the current concentration of the sample.

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<CALIB> (calibrate)

Press the <CALIB> key This will allow you to choose the calibration location from the stored calibration locations list, or enter a new calibration.

SELECT CALIBRATION
Filter Dsc: DIESEL-f
1-Select from list
2-Perform new Cal



The present Method and Calibration location is indicated.

Press <1> for **Select from list** This provides a menu of factory calibrations and user site calibration locations:

- 0 = diesel
- 1 = crude
- 2 = gasoline
- 3 = transformer oil
- 4-9 = user stored calibrations

Note: The factory calibrations are based on factory sourced oils. Actual oils at your site may indicate a different response. The factory calibrations should only be used as an indication of oil presence and not an actual value.

Press <0> to <9> to select the calibration location from the stored calibration locations list, and then press <ENTER>.to the main display screen.

Press <2> for **Perform new Cal** This will allow the operator enter a new calibration into the menu. If the Measurement Method is not correct, it may be changed through the <Control> key. Detailed calibration procedures are reviewed in Section 4: Eagle Calibration and Use.

<CONTROL>



Press the <Control> Key This will allow you to change the Measurement Method between the Solvent Extraction method and the Filter method It will indicate which method is presently called up.

MEASUREMENT METHOD
1-Extraction Cuvet
2-Filter Disc
Current: Filter Disc

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Press <1> for Extraction Cuvet (Solvent Extraction method) or press <2> for Filter Disc (Filter method)



Please select one

1-Perform a zero
2-Calibration
3-View Readings

1. **Perform a Zero:** A Zero is only performed when the lamp ages. This is fast and easy procedure to compensate the lamp aging.
2. **Calibration:** This will allow you to select the calibration from the stored calibration locations list, or perform a new calibration. The menu display is same as when press the <CALIB>.
3. **View Readings:** This will return to the main display screen for taking samples.

<SETUP>



Press the <SETUP> key This display offers a menu of diagnostics and user selectable operation settings. These are configured when first receiving the instrument and may be changed at any time.

SETUP

1-AmpSig 2-UnampSig
3-Min/Max 4-Settings




Press <1> for AmpSig This will display the amplified fluorescence and lamp readings that the sensor is receiving. These are real time values. The unit amplifies the raw signal from the sensors to provide a suitable signal strength for unit stability and accuracy. The degree of amplification is factory set but may be changed to suit specialty applications.

The FLR (Fluorescence) reading measures the sample response and will display between 0 and 5000. The REF (Reference) value monitors the lamp intensity and will be between 0 and 2400. A reading below 400 indicates a weak lamp that should be replaced. A maintenance display message will automatically occur if the lamp reading drops below 400. A reading of 2500 indicates that the Reference Diode is not installed on this version.

REF & AMPLIFIED FLR

REF 2500
FLR 229


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 **Press <SETUP>** key to return to the menu.

Press <2> for UnampSig This will display the unamplified (raw) fluorescence reading that the sensor is receiving. This is a real time value. The factory set Gain values are also displayed. There are two gain values. The Fixed Gain is a factory set gain of a 1.9 multiplier to the raw reading. The Pot Gain is a second gain multiplier that has been set to suit the standard application of hydrocarbon monitoring. The degree of amplification is factory set but may be changed to suit specialty applications.


The Total Gain combines the two gains to indicate the total signal gain.

FLR input	150.00 mV
Total Gain:	1.9
Fixed Gain:	1.9
Pot Gain:	1.0 @ 0

 **Press the <SETUP>** key to return to the menu


Press <3> for Min/Max This will display the most recent maximum and minimum fluorescence and reference values received by the sensor. This provides an indication of the stability of the sample, lamp and sensor. A stable reading with a sample in place should have a difference of less than 5 mV. A stable reading with the Test Block should have a difference of less than 3 mV.

	REF	FLR
min	2500	163
max	2500	165
diff	0	2

 **Press the <SETUP>** key to return to the menu

Press <4> Settings This display offers a menu of user configurable features. These can be changed at any time. Factory defaults have been entered which are typical to many applications.

*****SETTINGS*****	
1-Auto Off	2-Filter
3-Language	4-Units
Rev: Eagle13L	

 **Press <1> for Auto Off** This will prompt you to enter a time, in seconds, for the lamp to wait without activity before going into sleep mode. This is to conserve the lamp life and allows the

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unit to be powered up continuously. To turn the lamp on again, any key is pressed. The factory setting is 6000 seconds.



Press <SETUP> key to return to the menu. **Press <4> for Settings**

Press <2> for Filter This provides some stability to the sample reading by averaging a number of readings and presenting the Eagle with one reading. This filters out jumpy or spiked readings. The Eagle takes 200 readings per second. Filtering is selectable to average 1 to 1000 readings. Factory setting is 500.



Press <SETUP> key to return to the menu. **Press <4> for Settings**

Press <3> for Language The LCD display may be available in languages other than English. If additional languages have been included in this software, they will be offered on this menu.



Press <SETUP> key to return to the menu. **Press <4> for Settings**

Press <4> for Units The concentration reading will typically be displayed in ppm. From this menu, the user may also select FLR (raw fluorescence) values. The unit does not convert from one type of units to another after calibration. During calibration, concentration values must be entered using the display units indicated.

This completes the introduction to the keypad and menu functions. User calibration procedures will be described in Section 4.

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4. EAGLE CALIBRATION AND USE

Users familiar with sample preparation and this instrument can refer to the laminated Quick Reference card for an abbreviated guide to measure the concentration of an unknown sample.

4.1 Initial Calibration

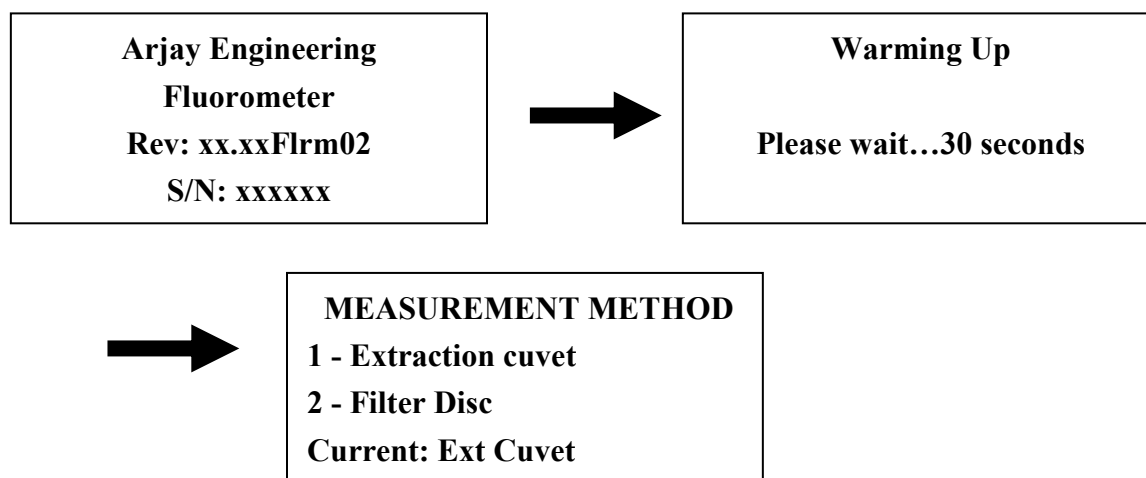
Determine the Measurement Method (Extraction Cuvet or Filter Disc) to be used and if a site specific calibration is to be done. If a site specific calibration is to be done, up to 4 prepared known samples can be used or unknown samples can be used and sent to lab for analysis immediately following the calibration procedure. For calibration, the Eagle can accept 5 sample points (one 0 ppm and four oil in water samples) to draw a calibration curve. The more points entered, the better the accuracy. A calibration curve is used because some samples may not be linear as concentrations increase.

Acquire up to 4 samples with a ppm value that is typical of samples to be taken. For example, if typical samples range from 0 to 50 ppm, calibration values of 10 ppm to 40 ppm would be appropriate. If samples of 10 ppm are more common, calibration samples of 5 ppm to 15 ppm would be more appropriate.

Using an actual contaminated water sample for calibration will provide the most reliable calibration. Prepared sample standards may not be indicative of actual process conditions of oil type, oil dispersion, and background contaminants. Prepared samples may be unstable and retention of oil injected into the water can be difficult. If preparing a standard, use glass containers only (plastic containers draw oil out of the water). Using a carrying agent, such as acetone, to help disperse the oil into the water prior to the extraction.

4.2 Routine Use and Calibration of the Instrument:

Power on the instrument. The screen will indicate a lamp warming count down.



If unit is already power on, press <CONTROL> to reach the above screen.

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Select by pressing <1> for Extraction cuvet (Solvent Extraction method) or press <2> for Filter Disc (Filter method).

4.2.1 Calibration in Solvent Extraction Method

Press <1> for Extraction cuvet (Solvent Extraction method).

<p>Please select one</p> <p>1-Perform a zero</p> <p>2-Calibration</p> <p>3-View Readings</p>
--

Press <2> or Press the main key <CALIB> to the calibration menu.

<p>SELECT CALIBRATION</p> <p>Cuvet Ext: Cal 4</p> <p>1-Select from list</p> <p>2-Perform new Cal</p>
--

Press <2> to perform a new calibration.

<p>NEW CALIBRATION</p> <p>Method: Cuvet Ext</p> <p>For: Cal 4</p> <p>Press 4-9 then ENTER</p>

If the current calibration Location is correct, then press <ENTER>. If not, press <4> to <9> to select the right calibration location, then press <ENTER>. Locations 0-3 are reserved for Factory Calibrations and cannot be changed.

<p>Cuvet Ext: Cal 4</p> <p>1-Auto 2-Manual</p> <p>3-Set REF 4-Set Gain</p> <p>5-View Zero Value</p>

The display will offer a menu of calibration entry methods.

1-Auto will calibrate the unit based on the user presently having contaminated water samples (the ppm value may be known or unknown)

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2-Manual will allow you to view and change the ppm and mv values that were entered during the Auto calibration mode. This is used to correct temporary ppm values after the laboratory results are received.

3-Set REF: This is used for circuits that employ a Reference diode to compensate for lamp variations. Factory setting is 2500.

4-Set Gain: This amplifies the raw sample signal to compensate for low fluorescent yields of certain hydrocarbons. The standard factory is 1.9.

5-View Zero Value: This indicates the stored zero value.

Press <1> for **Auto**.

<p>AUTO CAL: Cal 4 Enter=Do cal point 1 0=Calibration done 1st pt: Must be 0ppm</p>
--

The first calibration point must be 0 ppm. Press <Enter> to proceed.

Insert a cuvet containing clean extraction solvent only. Fill the cuvet to about 7/8 full. Always insert the cuvet such that the clear flat surface is toward the front. Lower the swing arm over the sample. Wait a few seconds for the reading to stabilize and then Press <ENTER>.

The display will now prompt to enter Cal point 2. Press <Enter> to continue calibration.

With the contaminated water sample perform an Extraction as follows:

1. Take a 100 ml water sample. A jar etched with markings is provided.
2. Add 10 ml of extraction solvent into the jar. (Use the bottle dispenser will provide the consistent measurements.)
3. Shake vigorously for 2 minutes. Use a timer or electric shaker for consistent extractions.
4. Allow the sample to stand for 2 minutes. The solvent will rise to the surface.
5. Use a disposable pipet and remove some solvent sample from the middle of the solvent surface layer.
6. Insert the extracted sample into the cuvet to about 7/8 full. Wipe the cuvet of any fingerprints or grease.

Insert the cuvet into the port and lower the arm over the sample and wait a few seconds for the reading to stabilize. Enter the value of the concentration (in ppm), and press <ENTER>. If the ppm value is not known, enter a random ppm value of the expected concentration. This will be

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corrected later. If an unknown ppm sample was used, immediately send a sample of the same contaminated water (not extracted) to a local laboratory for analysis.

The display will now prompt to enter Cal point 3. If another sample is available to increase the points on the calibration curve, press <ENTER> to continue and repeat the above procedures for each sample.

If no more sample points are to be entered press <0> for Calibration Done.

Calibration is complete. Press the <DISPLAY> key to exit the Calibration Menu.

If you entered a random ppm values: When the actual ppm value is determined, follow the following menus to correct the random ppm value you entered.

Press the <CALIB> key

Press <2> for Perform new Cal

Confirm the Calibration Location, then press <ENTER>.

Press <2> for Manual

These are now the values held in memory from your random calibration.

Press <ENTER> to view the First Point 0 ppm.

Press <ENTER> to accept the First Point FLR reading.

Press <ENTER> to view the 2nd ppm value entered. Key in the correct value received from the laboratory. Press <ENTER>.

Press <ENTER> to accept the Second Point FLR reading.

Follow this procedure for any further calibration points entered or press <0> for Calibration done.

Calibration is now complete. Press the <DISPLAY> key to exit the Calibration Menu.

4.2.2 Calibration in Filter Method

Power on unit, or if unit is already power on, press <CONTROL> to reach the following screen:

<p>MEASUREMENT METHOD</p> <p>1 - Extraction cuvet</p> <p>2 - Filter Disc</p> <p>Current: Ext Cuvet</p>
--

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Press <2> for Filter Disc (Filter method)

<p style="text-align: center;">Please select one</p> <p>1-Perform a zero</p> <p>2-Calibration</p> <p>3-View Readings</p>
--

Press <2> or Press the main key <CALIB> to the calibration menu.

<p style="text-align: center;">SELECT CALIBRATION</p> <p>Flter Dsc: Cal 4</p> <p>1-Select from list</p> <p>2-Perform new Cal</p>
--

Press <2> to perform a new calibration.

<p style="text-align: center;">NEW CALIBRATION</p> <p>Method: Flter Dsc</p> <p>For: Cal 4</p> <p>Press 4-9 then ENTER</p>

If the current calibration Location is correct, then press <ENTER>. If not, press <4> to <9> to select the right calibration location, then press <ENTER>. Locations 0-3 are reserved for Factory Calibrations and cannot be changed.

<p style="text-align: center;">Flter Dsc: Cal 4</p> <p>1-Auto 2-Manual</p> <p>3-Set REF 4-Set Gain</p> <p>5-View Zero Value</p>

The display will offer a menu of calibration entry methods.

1-Auto will calibrate the unit based on the user presently having contaminated water samples (the ppm value may be known or unknown)

2-Manual will allow you to view and change the ppm and mv values that were entered during the Auto calibration mode. This is used to correct temporary ppm values after the laboratory results are received.

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3-Set REF: This is used for circuits that employ a Reference diode to compensate for lamp variations. Factory setting is 2500.

4-Set Gain: This amplifies the raw sample signal to compensate for low fluorescent yields of certain hydrocarbons. The standard factory is 1.9.

5-View Zero Value: This indicates the stored zero value.

Press <1> for Auto.

<p>AUTO CAL: Cal 4 Enter=Do cal point 1 0=Calibration done 1st pt: Must be 0ppm</p>
--

The first calibration point must be 0 ppm. Press <Enter> to proceed.

Syringe 20 ml clean water free of hydrocarbons through a fresh filter paper with the Clean Water Syringe and disc. Remove the top plastic cap and screen and place the bottom disc with exposed filter paper into the disc port. Move the swing arm over the sample. Wait a few seconds for the reading to stabilize and then Press <ENTER>.

The display will now prompt to enter Cal point 2. Press <ENTER> to continue.

Place a clean filter paper into the filter holder and twist the assembly onto the syringe.

Fill the syringe to with 20 ml of contaminated water. Slowly expel the sample through paper (about 5 seconds to complete). This expelled water may discarded.

Remove the filter assembly from the syringe, unscrew the top portion plastic ring and carefully remove the plastic screen disc leaving the filter paper exposed on the filter base.

Place the filter base with exposed paper into the Disc Port. Raise the swing arm over the sample.

Enter the value of the concentration (in ppm), and press <ENTER>. If the ppm value is not known, enter a random ppm value of the expected concentration. Immediately send a water sample acquired at the same time (not filtered) to a local laboratory for analysis.

The display will now prompt to enter Cal point 3. If another sample is available to increase the points on the calibration curve, press <ENTER> to continue and repeat the above procedures. If no more sample points are to be entered press <0> for Calibration Done.

Calibration is complete. Press the <DISPLAY> key to exit the Calibration Menu.

If you entered a random ppm values: When the actual ppm value is determined, follow the following menus to correct the random ppm value you entered.

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Press the <CALIB> key

Press <2> for Perform new Cal

Confirm the Calibration Location, then press <ENTER>.

Press <2> for Manual

These are now the values held in memory from your random calibration.

Press <ENTER> to view the First Point 0 ppm.

Press <ENTER> to accept the First Point FLR reading.

Press <ENTER> to view the 2nd ppm value entered. Key in the correct value received from the laboratory. Press <ENTER>.

Press <ENTER> to accept the Second Point FLR reading.

Follow this procedure for any further calibration points entered or press <0> for Cal Entries done.

Calibration is now complete. Press the <DISPLAY> key and proceed to Part B.

4.2.3 Measure a Sample

If want to change the current method, please follow the following procedure:

Press <CONTROL>, press <1> for Extraction Cuvet (Solvent Extraction method) or press <2> for Filter Disc (Filter method), then press <3> to the main display menu.

If stay in the current method, Press the <DISPLAY> key to the main display screen.

A. Filter Method

Place a clean filter paper into the filter holder and twist the assembly onto the syringe.

Fill the syringe with 20 ml of water to be tested. Slowly expel the sample through paper (about 5 seconds to complete). This expelled water may discarded.

Remove the filter assembly from the syringe, unscrew the top portion plastic ring and carefully remove the plastic screen disc. Leave the filter paper exposed on the filter base.

Place the filter base with exposed paper into the Disc Port. Raise the swing arm over the sample.

The ppm reading will read automatically.

B. Solvent Extraction Method

Always wipe the cuvet with a clean tissue to remove and contaminants from handling prior to placement into the port

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Perform an extraction as follows:

1. Take a 100 ml water sample. A jar etched with markings is provided.
2. Add 10 ml of solvent into the jar. (Use the bottle dispenser will provide the consistent measurements.)
3. Shake vigorously for 2 minutes. Use a timer or electric shaker for consistent extractions.
4. Allow the sample to stand for 2 minutes. The solvent will rise to the surface.
5. Use a disposable pipet and remove some solvent sample from the middle of the solvent surface layer.
6. Insert the extracted sample into the measuring cuvet to about 7/8 full. Wipe the cuvet of any fingerprints or grease.

(To comply with EPA Method 1664 Rev.A.: if the pH is suspected above 2, add about 10 ml of HCL to the 100 ml water sample and shake to acidify the water prior to the solvent extraction procedure. Discard a portion of the water mixture to prepare for the extraction with 100 ml).

Place the cuvet into the instrument port. Lower the arm. The sample will read automatically.

4.3 Important Measurement Notes

1. Accurate measurements of water and solvent are critical. Be consistent.
2. Consistent shaking for the prescribed time is important to the extraction process.
3. Turn the lamp on 15 minutes before use to allow the lamp and sample compartment temperature to stabilize.
4. Zero the unit with a Zero cuvet of solvent or wetted Filter disc frequently.
5. Always orientate the cuvet holder the same way.
6. Clean the cuvetts with a low-lint tissue prior to inserting.
7. Repeat the measurement of each sample concentration to verify that the results are reproducible.

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5. CARE AND MAINTENANCE

5.1 Cleaning

To clean the exterior, wipe the unit with a damp cloth. Never use abrasive cleansers or solvents. The only user-serviceable component is the optical block. The optical block assembly is described in the cleaning section below.

Optical block This contains the lamp, filter, and photodetector sensor board. The following procedure is used to replace a lamp and/or clean the instrument.

CAUTION Avoid direct contact with a UV lamp that is powered on. Always power the unit off before servicing or maintaining this instrument.

Important

- Clean the optical block frequently
- Turn the power off and unplug the power cord
- The optical surfaces are easily scratched. Handle with extreme care and polish gently
- Wear gloves when servicing the optical block. This protects both the technician from hazardous materials that may have been spilled and protects the optical surfaces from fingerprints
- Use only isopropanol on a clean soft cloth to clean the optical surfaces.

5.2 Optical Block Disassembly and Assembly

1. Unplug the power cord. Spread a soft cloth over the work area. Wear gloves, both to protect yourself and the optical surfaces.
2. Remove the plastic shroud covering the swing arm by removing the four plastic capped screws. Now remove the lid on the aluminum optical block. (6 screws)
3. The circuit board and lamp will be visible. Lift off the circuit board (2 screws).
4. Clean the optical surfaces well with alcohol wetted cotton swabs. If required, gently polish with a dry soft cloth. Remove all particles. Allow to air dry. All surfaces must be completely clean for accurate measurements.
5. Handle the lamp with care. Do not turn on power while the lamp is exposed. If replacing the lamp, disconnect the old lamp wiring. Remove the lamp and discard. Place the new lamp snugly into the lamp tube and reconnect the wiring. The wiring does not have a polarity.

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6. Re-assemble the components.

The unit is now ready for use.

CAUTION Avoid direct contact with a UV lamp that is powered on. Always power the unit off before servicing or maintaining this instrument.

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6. TROUBLESHOOTING

Always be sure to:

- Operate the unit in a location isolated from equipment that radiates high-frequency electromagnetic interference.
- Operate the unit away from direct sunlight.
- Take care not to spill any liquid into the cuvet well.

6.1 Symptoms

Fluorescence values drift

- Sample solutions must be a stable and ambient temperature for consistent readings. (Fluorescence decreases as temperature increases).
- Protect test samples and the Calibration Standard from light to prevent photobleaching.
- Take readings immediately after sample preparation. Oil will deteriorate over time.
- If air bubbles are present, the reading will first drift upward as the light is scattered by the bubbles until they move out of the beam range or dissipate.
- If particulates are present, the reading may suddenly rise as a particulate drifts in the light path, then drop as it moves out of the beam range.

Wide fluctuations in fluorescence or ppm values

- Wipe the outside of the cuvet before placing it into the sample chamber.
- Use consistent measurement techniques, timing of the solvent mix, and the point in the solvent layer that you extract from the sample bottle.

Readings negative or lower than expected

- Use a freshly prepared hexane sample at ambient temperatures to set the zero and for all subsequent measurements.

Readings are higher than expected

- Fluorescent enhancement may result from high levels of detergents or background contaminants. When preparing the sample be sure to consistently shake the sample for 5 minutes and allow the sample to stand still for several minutes prior to extraction.

6.2 Maintenance, Error and Other Messages

Warming up Please Wait

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- The unit has been turned on or the Lamp Sleep mode had been activated. This message reports that the lamp is being turned on.

Error Identical levels

- During calibration, two identical ppm values were attempted to be entered for different sample concentrations, or different ppm values were attempted to be entered for the same sample concentration

Low Lamp

- The lamp intensity is reaching low levels and the lamp should be replaced.

No XTR Signal

- The sensor is not responding. Call the Arjay Engineering Technical Service Department.

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7. CUSTOMER SERVICE INFORMATION

Arjay Engineering offers complete technical support for all our products. If you have any questions about how to use this product, or would like to arrange to repair it, please call, fax, or e-mail Arjay or your local Arjay representative.

Ordering Information

Listed below are consumable and replacement parts necessary for the continued operation of your instrument.

Replacement Parts

Lamp, 365 nm for unit #A00515	A00532
Lamp, 254nm for unit #A00516	A00531
Filter 460nm for Unit #A00515	A00552
Filter 350nm for Unit #A00516	A00553
110-240VAC Power Adapter	A00554

Accessories

Filter Papers (50 pack)	A00534
Filter Papers (100 pack)	A00537
Filter Disc Holder	A00535
Quartz Cuvet	A00391
Disposable Cuvet	A00392
Disposable Pipets (50 pack)	A00213
Disposable Pipets (500 pack)	A00538
6 OZ/ 100 ml Sample Bottle	A00219
50 CC Syringe	A00551
Filter /Extraction Kit Box	A00536
Bottle Dispenser	A00216
Digital Countdown Timer	A00217
Electric Shaker	A00364
Hexane (1L)	A00215
User Manual	A00549
Quick Guide Card	A00550

Base Eagle Unit

365nm unit to target Crude Aromatic Hydrocarbons	A00515
254nm unit to measure refined and unrefined	A00516

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