O P E R A T I N G M A N U A L

MicroFID™ II

Flame Ionization Detector

IPN 074-579-P1A

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Warning: Limitation of Liability

The ultimate responsibility of the consequences of use of toxic compounds rests with the user. INFICON's role is as a supplier of instrumentation to assist in the early detection of hazardous conditions involving such compounds.

It is vitally important to ensure that the MicroFID II is maintained in accordance with INFICON's instructions and that proper calibration is regularly performed.

MicroFID II service should be performed only by INFICON, Inc., or an authorized INFICON repair center. Unauthorized service may void the Intrinsic Safety Certifications.

As with any complex device, the MicroFID II is subject to failure and, while INFICON has taken, and continues to take, all possible precautions to (a) reduce the possibility of failure, and (b) warn the user in the event of failure, circumstances may occasionally occur in which there is a failure despite such precautions on INFICON's part. INFICON regrets that it cannot accept liability for damages of any kind caused as a result of either failure of the user to follow instructions or of the MicroFID II to perform.

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Release History

Part Number	Release	Publication Date
MN201103	A	6 September 2011
074-579-P1	A	16 October 2012

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Notices

The information contained in this document is subject to change without notice. INFICON makes no warranty of any kind with regard to the material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

INFICON shall not be liable for errors contained herein for incidental or consequential damages in connection with furnishing, performance or use of this material.

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For Your Safety

Strictly follow the Instructions for Use

Any use of this instrument requires a full understanding and strict adherence to these instructions.

The instrument is only to be used for the purposes specified in this manual.

Maintenance

The MicroFID II must be inspected and serviced by trained service personnel at regular intervals. Repair of the MicroFID II may only be carried out by INFICON factory authorized service personnel. Only authentic INFICON spare parts may be used for maintenance. Review the chapter “Maintenance Intervals.”

Use in areas subject to explosion hazards

The MicroFID II has been tested and approved according to EMI and intrinsic safety requirements defined by the US (FCC Pt. 15 and UL 913 5th edition). Declarations of conformity are found on page 11.

Modifications of components or the use of faulty or incomplete parts is not permitted. When making repairs to equipment or components of this type, Intrinsic Safety Certifications may be violated if the MicroFID II is serviced by individuals or organizations that are not INFICON factory certified for repair services.

Liability

The liability for the proper functioning of the MicroFID II is irrevocably transferred to the owner or operator to the extent that the instrument is improperly serviced or repaired by personnel not employed or authorized by INFICON, or if the MicroFID II is used in a manner not conforming to its intended use.

INFICON cannot be held responsible for damage caused by non-compliance with the recommendations given above.

The warranty and liability limitations provisions of the terms of sale and delivery of INFICON, are likewise not modified by the recommendations given above.

Copyright Information

Trademarks

Registered names, trademarks, etc. used in this document, even when not specifically marked as such, are protected by law.

Notices and Warnings

FCC Warning

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Subpart B, Class B of Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.

MicroFID II Intrinsic Safety Notice

THE MicroFID II IS CLASSIFIED FOR USE IN CLASS I, DIVISION 1, GROUPS A, B, C, D HAZARDOUS LOCATIONS. T4 (135°C) RATING.

The MicroFID II has been listed by Intertek, Inc., to comply with Underwriters Laboratories® Inc. UL® 913 Standard for Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, Division 1, Groups A, B, C, D Hazardous (Classified) Locations.

MicroFID II Safety Label

NOTE: The MicroFID II and MicroFID II are based on the same platform and contain the same components. The terms may be used interchangeably throughout this manual.

If there is any indication of physical damage to the MicroFID II after it has been dropped, the unit must be checked out by a service technician to ensure instrument integrity.

WARNING .

THE MicroFID II IS NOT INTENDED TO DETECT COMBUSTIBLE LEVELS OF GASES.

THE MicroFID II IS CLASSIFIED FOR USE IN ATMOSPHERES CONTAINING COMBUSTIBLE LEVELS OF GASES.

Do not use any other accessories with the MicroFID II in a hazardous location

Substitution of components may affect the safety rating.

WARNING

CAUTION

To reduce the risk of fire or injury to persons, read and follow these instructions:

1. All calibration, maintenance and servicing of this device, including battery charging, must be performed in a safe area away from hazardous locations. Disconnect all power before servicing.

2. There are no operator replaceable parts for the MicroFID II except the exhaust frit, and sample inlet filter.

3. There are no operator serviceable parts inside the MicroFID II.

WARNING

1. Do not dispose of the battery pack in a fire. The cells may explode. The battery pack must be disposed of properly. Check with local codes for possible special disposal instructions.

2. Do not open or mutilate the battery pack. If the MicroFID II is used in a manner not specified, the protection provided by the MicroFID II may be impaired.

3. Exercise care in handling battery packs in order not to short the terminals with conducting materials such as rings, bracelets and keys. The battery or conductor may overheat and cause burns.

4. Do not defeat proper polarity orientation between the battery pack and battery charger.

5. Charge the battery pack using the AC battery charger provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual. To charge the battery, use only the Universal Battery Charger Part No. A1201221. When using the battery charger, do not block access to the mains outlet in use with adapter. The AC battery charger is not to be used in a hazardous area.

WARNING

1. All calibration, maintenance and servicing of this device, including battery charging, must be performed in a safe area away from hazardous locations.

2. Disconnect all power before servicing.

3. Do not open the MicroFID II exhaust frit when the unit is operating.

Do not open the MicroFID II housings to access the internal components. This action will invalidate the Intrinsic Safety rating for these products

WARNING

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DECLARATION OF CONFORMITY

This is to certify that this equipment, designed and manufactured by:

INFICON Inc.
Two Technology Place
East Syracuse, NY 13057
USA

meets the essential safety requirements of the European Union and is placed on the market accordingly. It has been constructed in accordance with good engineering practice in safety matters in force in the Community and does not endanger the safety of persons, domestic animals or property when properly installed and maintained and used in applications for which it was made.

In addition, this is to certify that this equipment has also been designed and manufactured, having regard to the state of the art, to ensure compliance with the Protection Requirements of EMC directive 2004/108/EC.

A Technical Documentation File is also available for review by competent authorities and will be maintained for a period of ten years after the date on which the equipment was last manufactured. In addition to this file, technical, installation, maintenance and application information concerning this equipment can also be found in the Operating Manual(s) for this product or product family.

Equipment Description: MicroFID II, MicroFID II, SiteFID.

Applicable Directives:
2006/95/EC (LVD)
1999/5/EC (R&TTE / EMC)
2004/108/EC (General EMC)
2011/65/EC (RoHS)

Applicable Standards:

Safety:
UL 913, Fifth Edition; Dated February 21, 1997; with Revisions through and including February 24, 1997, *UL Standard for Safety for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations*

ANSI/UL 1203-2006; Fourth Edition; Dated September 15, 2006, *UL Standard for Safety for Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations*

ANSI/UL 61010-1-2008; Second Edition; Dated July 12, 2004, (UL Standard for Safety for Electrical Equipment for Measurement, Control and Laboratory Use)

Emissions:
EN 61326-1:2006: FCC 47 CFR Part 15 Subpart B
(Radiated & Conducted Emissions)

Class B: Emissions per Table 3
(EMC – Measurement, Control & Laboratory Equipment)

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RoHS: INFICON hereby declares that the above mentioned products are assigned to the classification of Category 9, Industrial Test and Measurement Equipment, it is exempt from the RoHS directive pursuant to Article 4, paragraph 4, section e), until 22 July 2017.

Immunity: EN 61000-4-5:1995+A1:1998+A2:2001

Electro Static Discharge (±4kV Contact discharge, ± 8kV Air discharge)

EN61000-4-4:2004

Radiated RF Susceptibility (80-270 MHz @ 3 V/m, 1kHz AM 80% Modulation)

Wireless Restrictions:

Countries	Restrictions
France	Outdoor use limited to 10mW e.i.r.p. within the band 2454 to 2483.5 MHz.
Italy	If used outside of own premises, general authorization is required.
Luxembourg	General authorization is required for public service.
Romania	On a secondary basis. Individual license required.
Austria, Denmark, Finland, Germany, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, The United Kingdom	None

CE Implementation Date: May 15, 2012

Authorized Representative: Stephen Chabot

Name: Stephen Chabot
Title: Vice President of Operations and Quality
Done at East Syracuse, NY USA

On 13 August 2012

ANY QUESTIONS RELATIVE TO THIS DECLARATION OR TO THE SAFETY OF INFICON'S PRODUCTS SHOULD BE DIRECTED, IN WRITING, TO THE VICE-PRESIDENT OF OPERATIONS AT THE ABOVE ADDRESS.

1. INTRODUCTION

About this Manual

This manual provides detailed instructions for the setup, operation and maintenance of the MicroFID II Portable Flame Ionization Detector.

NOTE: The MicroFID II and MicroFID II are based on the same platform and contain the same components. The terms may be used interchangeably throughout this manual.

Before unpacking the instrument, please read the **Warnings and Safety Practices**. This section describes possible hazards that may injure the user, damage the instrument or compromise its operation. Some general safety information is also provided.

The MicroFID II manual uses a few conventions for key names on the keypad and for text that is shown on the display.

UPPERCASE	Key names are denoted by uppercase text. An ARROW key is the collective name for the UP ARROW and DOWN ARROW keys.
"Display Text"	Text that appears on the MicroFID II display is in quotation marks.
<Angle Brackets>	Computer keyboard names are denoted by angle brackets, e.g. <Ctrl>.
FID	Text that must be typed in using the computer keyboard is shown in italics.

In the User Manual text various warnings and notes are displayed, including:

WARNING A warning indicates an operation that could cause personal injury if precautions are not followed.

CAUTION A caution indicates an operation that could cause damage to the instrument if precautions are not followed.

NOTE A note indicates significant information.

UNPACKING THE MicroFID II

The following accessories are included with your MicroFID II:

- MicroFID II Instrument CD Manual
- 70 Liter hydrogen cylinder
- MicroFID II Multi-Tool
- Universal Battery Charger with Line Cord
- Replacement Fluoropore Membrane Filters for Sample Inlet

Ensure all of these accessories have been included with the instrument. If any items are missing or damaged, contact INFICON immediately.

WARNINGS AND SAFETY PRACTICES

Please read this section before operating the MicroFID II**.**

Throughout this manual notes are provided to inform you of the limitations of usage for the MicroFID II.

Intended Use

WARNING

The MicroFID II only measures the concentration of airborne gases and vapors that can be ionized by a flame ionization detector.

The MicroFID II automatically displays and can record the concentration values.

The reading displayed represents the total concentration of all flame ionizable chemicals present in the sample. The MicroFID II can display concentration values in ppm and ppb.

Excessive Heat and Cold

WARNING

Do not expose the instrument to intense sunlight for prolonged periods. Exposure to excessive heat may result in erroneous readings.
At low temperatures, water vapor, a by-product of the hydrogen flame, may condense at the exhaust port. At sub-zero temperatures the water vapor will freeze and obstruct the exhaust port. If the exhaust port becomes obstructed, pump operation will be inhibited. Flame out may also result.

Flame Ionization Detector Operation

The MicroFID II uses a flame ionization detector for the measurement of combustible organic compounds in air at parts-per million levels. The permanent air gases (argon, carbon dioxide, nitrogen, oxygen, water vapor, etc.) are not ionized by the flame.

When the MicroFID II is flamed on, the internal pump draws air in through the MicroFID II inlet. This sample air provides the oxygen necessary for combustion in the hydrogen fed flame.

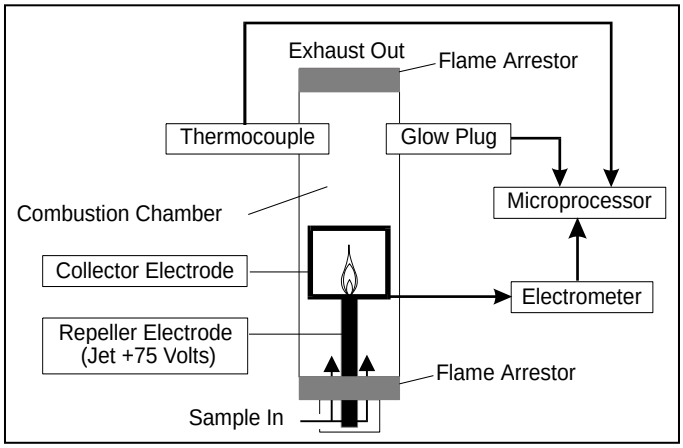


Figure 1. Flame Ionization Detector

When the proper ratio of hydrogen to air is present in the combustion chamber, the flame is started automatically with a glow plug. A thermocouple is used to monitor the status of the flame.

When the sample passes through the flame, the combustible organic compounds in the sample will be ionized. After the compounds have been ionized by the flame, the ionized particles are subjected to a continuous electric field between the repeller electrode at the jet (+75V) and the collector electrode.

The ions move in the electric field, generating a current, which is proportional to the concentration of the ionized molecules in the ionization chamber. An electrometer circuit converts the current to a voltage that is then fed to the microprocessor.

After the sample passes through the flame and has become ionized, it is vented from the detector through a flame arrestor. The flame arrestor prevents the flame from igniting any flammable gases present in the sampling location.

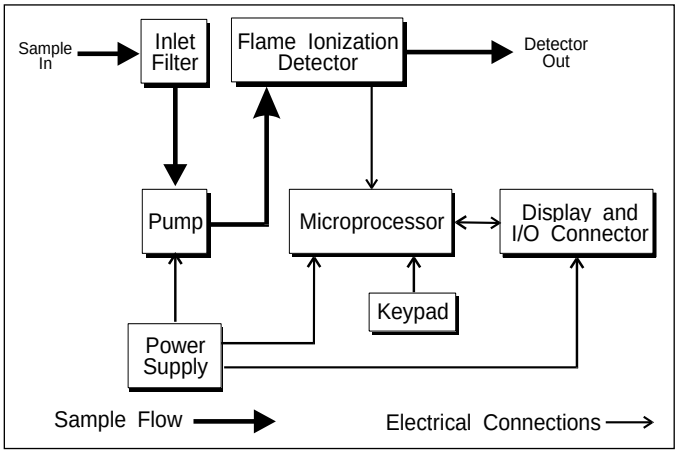


Figure 2. Block Diagram

Detector Response

The MicroFID II is strictly an organic compound detector. It does not respond to inorganic compounds. The MicroFID II*'s* sensitivity is highly dependent on chemical structure and bonding characteristics. The combustion efficiency of a compound determines its sensitivity.

Simple saturated hydrocarbons (methane, ethane etc.) possess high combustion efficiencies and are among the compounds that produce the highest MicroFID II response. Organic fuels (acetylene, refined petroleum products), burn easily and are also extremely well detected.

The presence of substituted functional groups (amino, hydroxyl, halogens) on a simple hydrocarbon reduces its combustion efficiency and thus MicroFID II's sensitivity to the compounds methanol and chloromethane, for example, are detectable with the MicroFID II but not as well as methane. A greater number of carbon atoms can offset this loss of sensitivity due to substitution. For example, the MicroFID II is more sensitive to n-butanol than it is to methanol.

NOTE: The FID Response Factors Technical Note is maintained on the INFICON web site: www.inficon.com.

Support Equipment and Consumables

Compressed Gases

Cylinders of compressed gas, such as hydrogen and calibration gas, must be handled with extreme care. When using the calibration gas bag adapter, take care not to kink or stress the tubing. For safety, the hydrogen and calibration gas cylinders must be secured before use.

Please observe the following handling procedures:

Do not mutilate cylinders.

Do not expose the cylinders to direct sunlight.

Do not heat the cylinders. The cylinders may rupture at high temperatures.

Use only the specified regulator for the calibration gas. Confirm regulator type and material with your specialty gas supplier.

Use only the MicroFID II Hydrogen Filling Station for the hydrogen cylinder, Part No. A1201222.

Always secure cylinders before removing the cylinder valve protection cap.

Do not drag or roll cylinders. Use a cylinder hand truck to move large cylinders.

Wear safety glasses when working with compressed gases.

Store cylinders in an upright position.

Do not store cylinders in a hazardous location.

Store cylinders away from possible sources of ignition.

Keep regulators and related equipment in the same gas service. Do not change service or adapt equipment without consulting your gas supplier.

Refer to local shipping regulations for hydrogen supply cylinder shipping instructions.

Regulators for Compressed Gases

When connecting a regulator to a large cylinder:

Ensure the cylinder valve and regulator connection match.

Ensure the regulator construction materials are compatible with the gas, and that the cylinder pressure gauge will withstand the cylinder pressure.

Never use the regulator as a shut-off valve. Close the cylinder valve when it is not in use.

Do not subject the regulator to an inlet pressure greater than recommended.

Do not move or detach the regulator when it is pressurized or when it is in use.

Before connection, ensure the gas cylinder valve and the regulator CGA connection are clean.

Turn the pressure control valve on the cylinder all the way out (close the cylinder). Turn the regulator outlet to off. Open the gas cylinder valve slowly and check for leaks. Adjust the delivery pressure and then open the regulator outlet valve.

Hydrogen Gas

The MicroFID II detector uses a hydrogen flame to ionize samples and produce Total Volatile Organic Compound (TVOC) readings. The quality and purity of the Hydrogen gas is very important to the accuracy of the detector.

WARNING

Hydrogen gas is a fire and explosion hazard when exposed to heat or flame. The lower explosive limit (LEL) is 4%. The lower explosive limit is the minimum concentration of gas or vapor in air that will ignite in the presence of a source of heat or sparks.

Refer to the Material Safety Data Sheet (MSDS) before handling this gas. The MSDS will be provided by the gas supplier when the gas is ordered.

You must obtain a tank of hydrogen from which you can fill the internal cylinder. When ordering hydrogen, specify ultra-high purity hydrogen, 99.999% pure. This grade of hydrogen is also referred to as Grade 5 or Ultra zero grade. The hydrogen must have less than 0.1 ppm hydrocarbon contamination.

You can obtain the hydrogen in various size cylinders and pressures. Specify a tank with no more than 2400 psig (16547 kPa).

The hydrogen cylinder must also have CGA 350, male outlet.

The MicroFID II Hydrogen Filling Station Part No.A1201222 is required to fill the MicroFID II hydrogen fuel cylinder. You cannot fill the MicroFID II hydrogen cylinder without the MicroFID II hydrogen filling station.

Calibration Gas

Adequate ventilation must be provided when the MicroFID II is being calibrated.

If compound threshold limit values (TLV) are exceeded, you should use a gas bag for sampling and calibration.

To determine the TLV of the compounds contained in the calibration gas, refer to the Material Safety Data Sheet (MSDS) supplied with your calibration gas cylinder.

Oxygen Concentration Limits

A minimum of 17% oxygen is required to start the hydrogen flame. The oxygen is supplied from the sample as it is drawn in by the pump. A minimum of 10% oxygen is required to maintain the hydrogen flame. An oxygen deficiency will reduce the height of the flame or cause the flame to be extinguished and may affect the displayed reading.

If the MicroFID II is used in a highly contaminated area where it is possible that the oxygen content is below 10%, watch for indications of reduced flame height such as lowered detection limits or a flame out fault.

Flammable Gases

High concentrations of flammable gases (gases within their flammable range) can act as an additional fuel source. When this happens, the flame height may increase beyond the confines of the combustion chamber. The hydrogen supply will then be cut off and the flame will go out.

Flame out may also occur when the concentration of sample gas is so great that it causes an oxygen deficiency. This may occur when sampling enclosed or confined spaces where vapors and gases cannot escape. Watch for indications of increased flame height such as erratic readings or sudden high concentrations followed by a flame out fault.

ACCESSORIES

Computer

The MicroFID II will send information stored in its logged memory or will continuously stream data to a computer or PDA via Bluetooth wireless communication. This feature may be used if you need to prepare reports based on the MicroFID II recorded data.

Information prepared on a PC such as “routing or tag information” may be uploaded to the MicroFID II via Bluetooth as well.

The MicroFID II is not classified for use in hazardous locations with non-intrinsically safe rated computers.

WARNING

Gas Sampling Bag

A gas sampling bag can be used for calibration of the MicroFID II. If you are unsure of the quality of ambient air you should use an additional gas bag filled with zero air. Connect the sample bag to the inlet fitting with the gas bag adapter. See Calibration section for more information.

One sampling bag is included in the MicroFID II calibration kit Part No. MX396011. Additional gas bags are also available (Part No. MX396017).

Charcoal Filters

A charcoal filter (Part No.MX396022, package of 10) may be connected to the MicroFID II during calibration and sampling to provide clean air to the MicroFID II. The filter will remove hydrocarbon contamination from room air to provide zero grade air to the MicroFID II.

NOTE: The charcoal filter does not filter methane or ethane. If these compounds are present, you should use a gas bag with a supply of commercial zero air for calibration purposes.

To connect a charcoal filter:

1. Load the Teflon ferrules into the nut. The nut and ferrules are supplied with the filter. See Figure 3.

2. Connect the nut to the MicroFID II inlet. Do not tighten the nut.

CAUTION: Over-tightening the Teflon ferrules will result in damage to the ferrules.

3. Remove the charcoal filter from its plastic bag and insert it into the nut. Finger-tighten the nut onto the inlet. If the filter is not secure, ensure you have inserted the tube stub far enough into nut. Do not over-tighten the fitting.

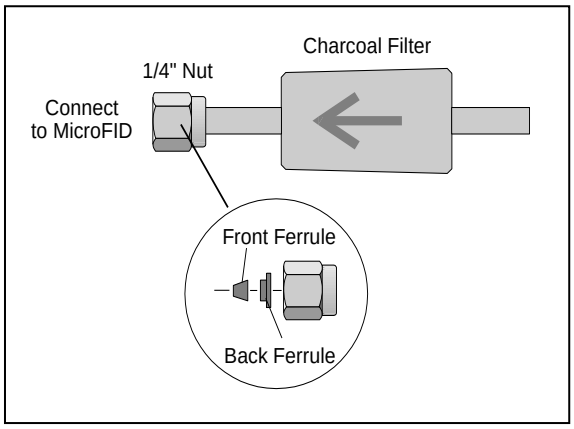


Figure 3 Connecting the Charcoal Filter

The charcoal filter will remove hydrocarbon contaminants for up to 4000 ppm hours. This means that the filter will be good for 1 hour removing 4000 ppm of hydrocarbon contaminants or will last for 4 hours removing 1000 ppm. The exact time will be determined by the operating environment. You will notice an increased hydrocarbon background when the filter requires replacement.

To replace the charcoal filter:

1. Loosen the nut on the MicroFID II inlet.

2. Remove the used filter.

3. Insert the new charcoal filter into the nut and finger-tighten the nut onto the inlet. Do not over-tighten the fitting.

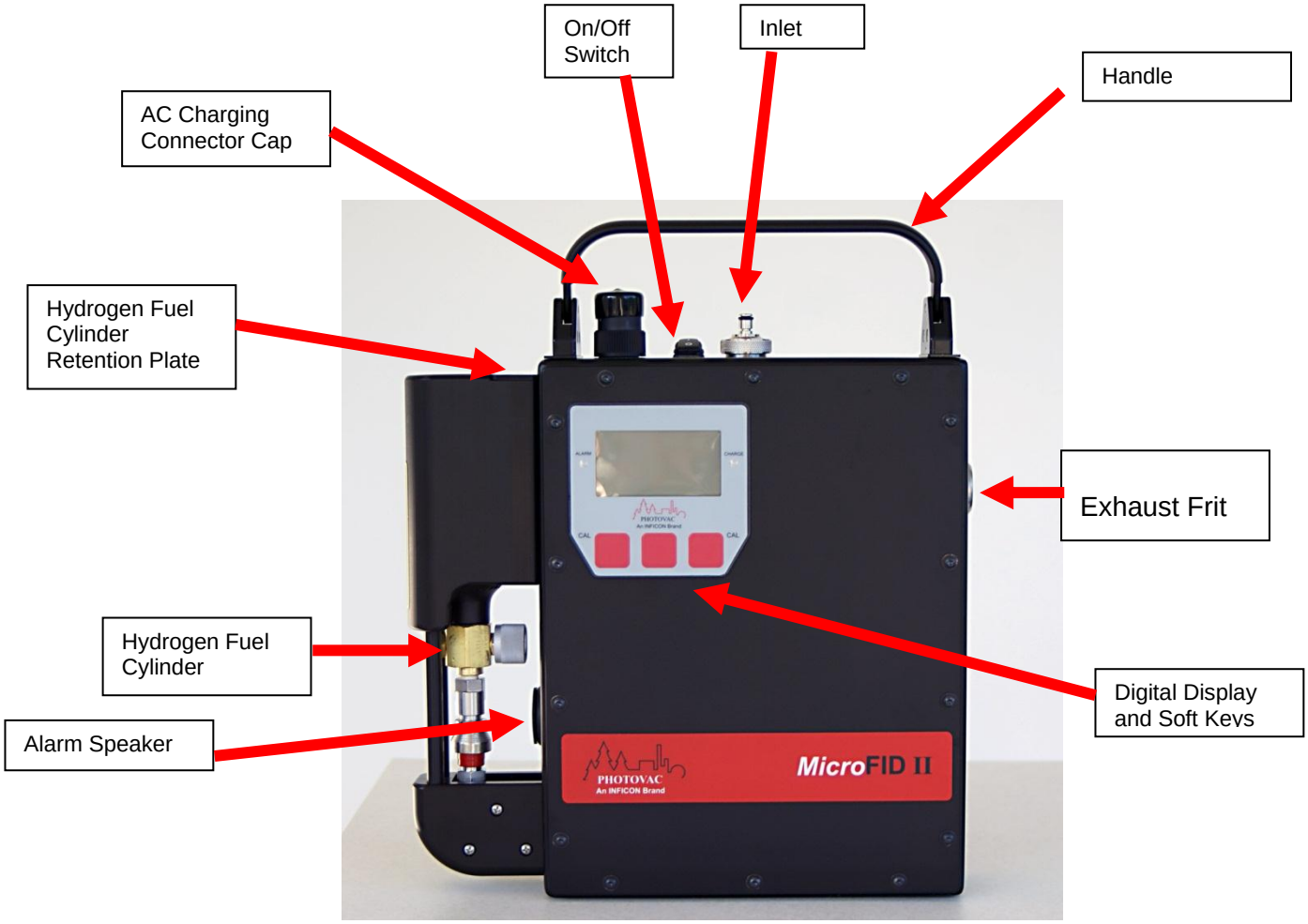
4. When the charcoal filter is not in use, place it in its plastic bag and store it in a clean, dry place.

2. USING THE MicroFID II

MicroFID II Feature Layout

The photograph below shows the basic layout of the MicroFID II Version components. The MicroFID II is also supplied with an optional telescoping probe that can be removed from its holder for access to hard to reach spaces.

NOTE: The cover must be attached for the MicroFID II to operate and to maintain the intrinsic safety rating.



MicroFID II with probe in probe holder position

MicroFID II with probe in telescoping position

Using the MicroFID II Battery Charger

READ THESE INSTRUCTIONS BEFORE USING THE CHARGER

The MicroFID II battery charger is only designed for indoor use and should not come into contact with water or dust. In order to avoid overheating, the charger should not be covered when it is in use.

The charger is turned on by connecting it to the mains socket.

Disconnecting it from the mains socket turns the charger off. If the charger is equipped with a mains cord, verify that the cord has not been damaged. If the cord is damaged, the charger must not be used.

The charger contains dangerous voltages and the cover should not be removed.

CHARGER FUNCTIONALITY

This charger is a fast charger for NiMH batteries. The charger will automatically charge the battery at a fast rate, and then charge to a slow rate near the end of the cycle. This prevents over-charging.

CAUTION: Do not charge batteries at too high or too low temperatures. Charge only in areas between 38-110°F (3-43°C).

HOW TO USE THE CHARGER

The Charger is started by connecting the battery pack to the charger. Once connected, the indicator LED will start Orange, for the Initialization and Analysis Phase, before switching to Red for the Fast Charge Phase. When the batteries are fully charged, the charger will go into a top-off charge mode before it goes over to trickle charge mode. During top-off charge, the LED will be Green with short intermittent Orange light. When the top-off charge is completed, the charger will go into trickle charge mode and the LED will be Green. The charge current is now reduced to a safe level, which allows the charger to stay connected to the NiMH batteries without damaging the battery. If the battery voltage is far below normal, the charger will cut off the fast charge current and go to trickle charge mode. The LED will then indicate 'error' by flickering Green and Red light. If the mains is turned off, the charger will reset and start a new charge cycle if the mains is turned on again. If new batteries are to be connected, the charger must idle for approximately 15 seconds to make sure all parameters in the microprocessor have been reset. The LED changing to Orange light shows this and a new charge cycle can begin.

.

CHARGE CYCLE AND LED INDICATIONS

LED	MODE
Orange	Battery not connected
Orange	Battery initialization & analysis
Red	Fast Charge
Green with intermittent orange flash	Top-off charge
Green	Trickle charge
Alternating red-green	Error

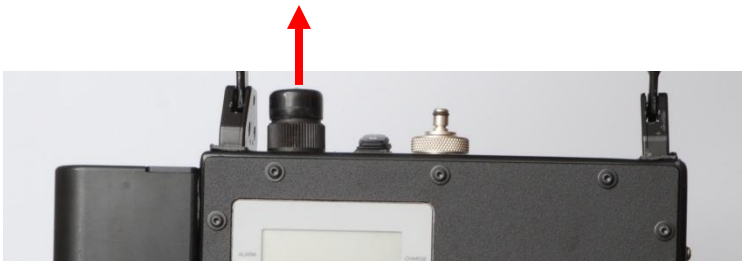
Table 1. Battery Charger Indications

With mains connected, the LED will be orange the first 5-7 seconds, and will be orange when the initialization and analysis starts. If a battery is connected, the actual charging will start a few seconds later when the LED changes to red.

CAUTION: Use only Battery Charger P/N 1201221 to charge the MicroFID II.

To Charge the Battery

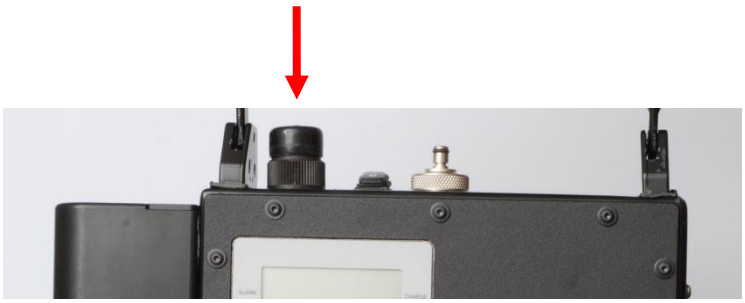
1. To charge the MicroFID II battery, unscrew the cover for the charging connector cap.



2. Connect the charge adapter to the MicroFID II charging connector.

3. When the battery charge indicates there is a full charge to the battery, disconnect the charge adapter from the MicroFID II charging connector

4. Install the charging connector cap to the charging connector.



NOTE: The MicroFID II will not operate without the charging connector cap in place.

NOTE: The MicroFID II will not operate with the AC Adapter plugged into the MicroFID II.

Repeat Charging with an AC Charger

If the AC charger has been plugged into an electrical outlet and has been used to charge a FID, and another charging operation is to be performed, please remove the charger from the unit and wait until the status LED on the charger changes from either **green** or **red** to **orange** before plugging it into the second unit.

NOTE: The status change will take up to 15 seconds and the orange LED indicates that the unit is ready to start a new charge cycle.

CAUTION: If the AC charger is not properly reset according to the above instructions, it is possible that the AC charger will remain in trickle charge mode and the FID battery will not receive a full charge. This will limit the FID's operating time and may cause problems in lighting the FID flame due to low voltage.

Filling the Hydrogen Fuel Cylinder

The MicroFID II hydrogen fuel cylinder is a metal hydride design that requires relatively low hydrogen pressure to fill it.

Figure 7. MicroFID II Hydrogen Cylinder

Hydrogen storage on the metal oxide is an Exothermic Reaction. The cylinder may become hot during the initial fill. Care must be taken to avoid injury.

WARNING

The hydrogen fuel cylinder (see Figure 7), when full, will provide the MicroFID II with up to 70 hours of continuous operation in a single fill. To fill the hydrogen fuel cylinder, the MicroFID II hydrogen filling station Part No. A1201222 is required (see Figure 8). The hydrogen fill station is outfitted with a CGA 350 adaptor for use with a high pressure hydrogen cylinder that contains at least 99.999% pure grade hydrogen (also known as ultra high purity hydrogen).

CAUTION: H_2S, SO_2, Cl_2, and CO are contaminating substances for the cylinder alloy. Do not expose the cylinder interior to these substances.

CAUTION: Lower grades of hydrogen will damage the fuel cell with impurities and decrease the overall longevity of the fuel cell. Ensure the hydrogen is ultra high purity.

CAUTION: Do not modify or alter the hydrogen cylinder or fittings.

DO NOT attempt to fill the hydrogen cylinder without a refill adapter..

WARNING

The Hydrogen Filling Station (Part No.A1201222) consists of an adapter fitting with a left-handed thread for cylinder attachment, an output valve and a hydrogen fuel cylinder quick connect. The Hydrogen Filling Station delivers a fixed 260 psi to the hydrogen fuel cylinder. The output valve is positioned to deliver gas from the cylinder to the hydrogen fuel cylinder. Additionally, in the final stages of filling the hydrogen fuel cylinder, the output valve is used to release gas held in the quick connect after filling.

The MicroFID II Hydrogen Fuel Cylinder is composed of metal hydride material. The process of filling this cylinder involves the low pressure adsorption of hydrogen on the metal hydride surface, rather than the high pressure filling process for conventional hydrogen cylinders. Table 2 illustrates the charge time versus fill time for the MicroFID II hydrogen cylinder.

A 5 minute charge provides 10 hours of usage. Other charge times versus usage are as follows:

5 minutes	10 hours of use
10 minutes	30 hours of use
30 minutes	50 hours of use
60 minutes	65 hours of use

The hydrogen fuel cylinder is over 85% full after one hour. Thereafter, the cylinder charges more slowly up to the full 70+ hours.

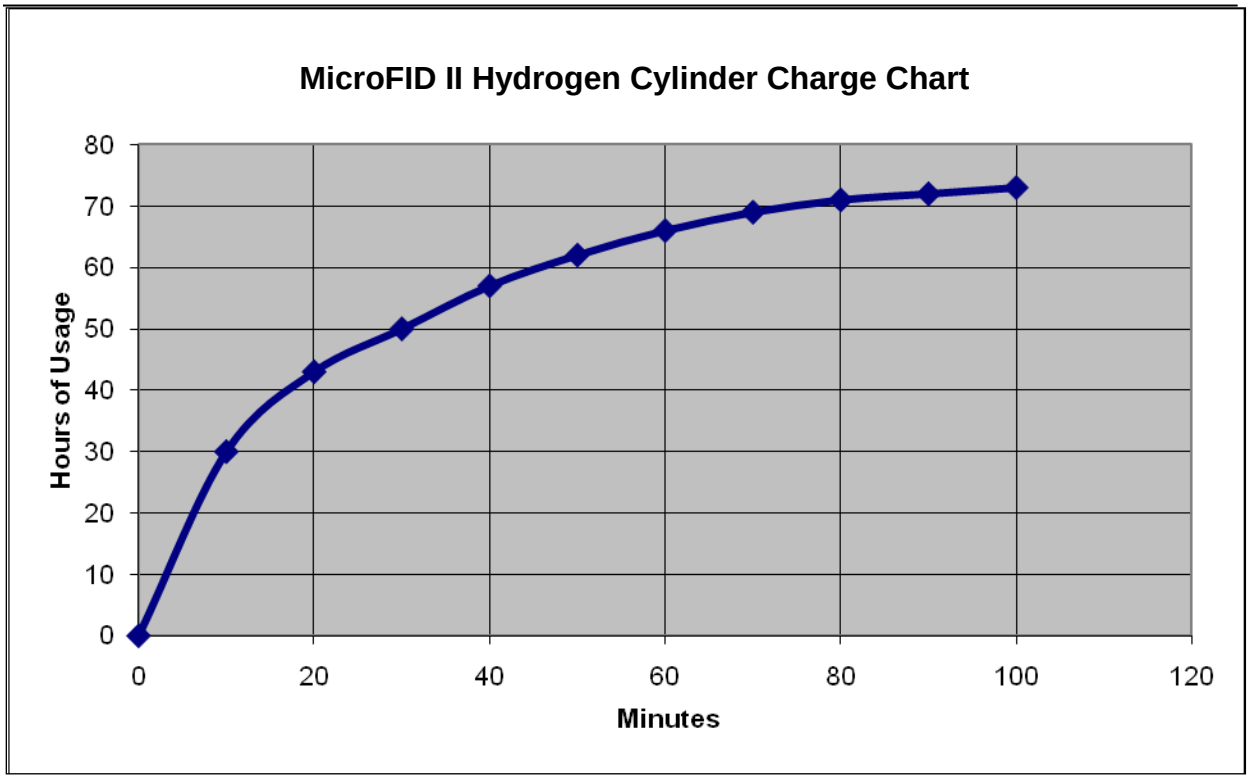


Table 2. Charging Time and Usage Time

Use only the MicroFID II Hydrogen Fill Station p/n A1201222 to fill the hydrogen cylinder. Use of any other filling device will void the warranty.

WARNING

The regulator pressure is set at the factory Do not adjust the regulator on the hydrogen filling station. Adjustment of the hydrogen filling station regulator will void the warranty.

WARNING

Do not exceed 260 psi when filling the MicroFID II Hydrogen Cylinder. The fuel cells in the hydrogen cylinder will be damaged and will void the warranty.

WARNING

CAUTION: When filling the MicroFID II Hydrogen Cylinder, ensure that the hydrogen cylinder on/off valve is completely open in the counterclockwise position.

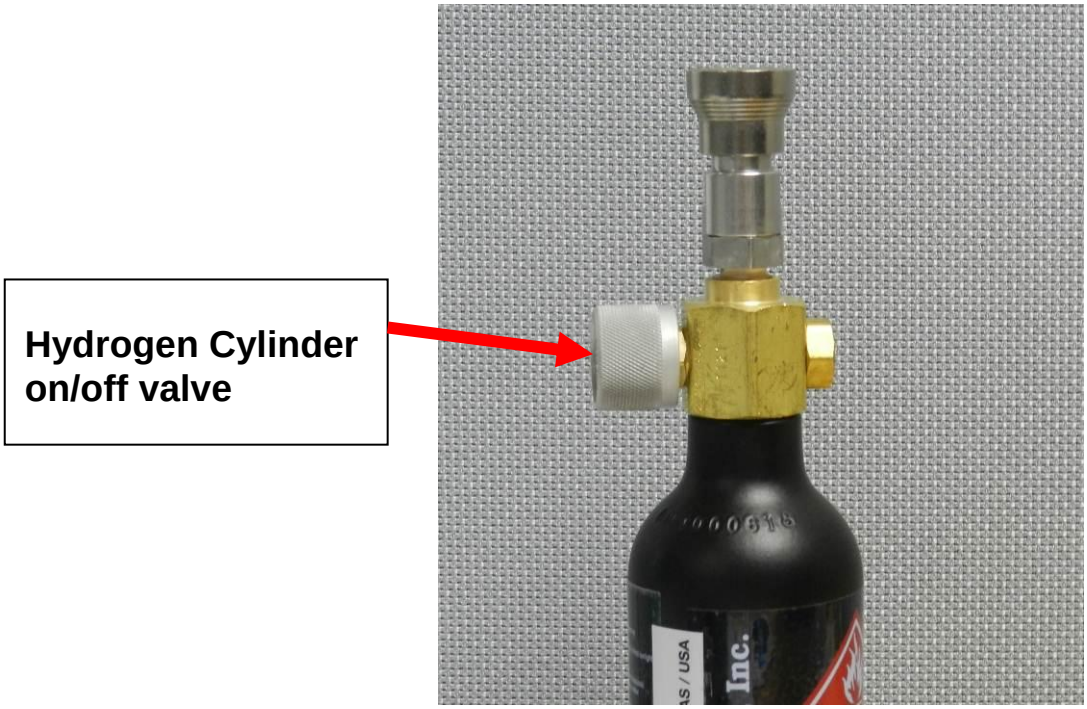


Figure 8. Hydrogen fuel cylinder on/off valve

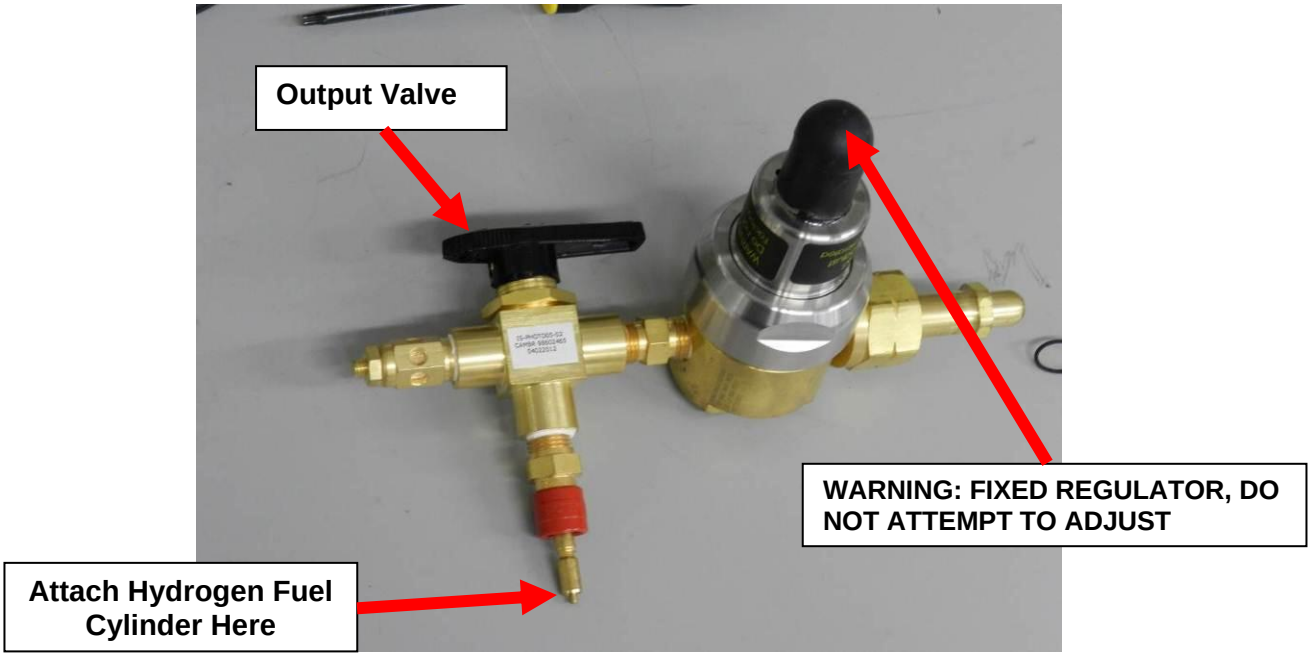


Figure 9. Hydrogen Fuel Cylinder Filling Station

NOTE: Read through this section before filling the hydrogen fuel cylinder.

Store the hydrogen supply tank in a well ventilated area, well away from heat or possible ignition sources.

Hydrogen gas is a fire and explosion hazard when exposed to heat or flame. The lower explosive limit is 4%

WARNING

Directions for Attaching the Hydrogen Filling Station to the Hydrogen Supply Tank

1. Connect the hydrogen fuel cylinder filling station to the tank of hydrogen. Hydrogen is supplied with a CGA 350 cylinder valve outlet. The filling station is supplied with the matching fitting for ease of connection. The threads of the adaptor will tighten counterclockwise.

NOTE: Do not force the connection. Do not use Teflon tape with CGA fittings. In general, these fittings are designed for metal to metal sealing.

Do not use adapters to connect one CGA fitting to another type of CGA fitting. If the refill adapter does not match the outlet on your hydrogen tank, contact INFICON.

2. Tighten the hydrogen cylinder filling station onto the tank with a wrench. Do not over tighten.

DO NOT Use an open flame to test for leaks!

WARNING

DO NOT fill the hydrogen cylinder in a hazardous location.

WARNING

Filling the Hydrogen Fuel Cylinder

1. Rotate the output valve to point toward the main cylinder of hydrogen (Filling Position)

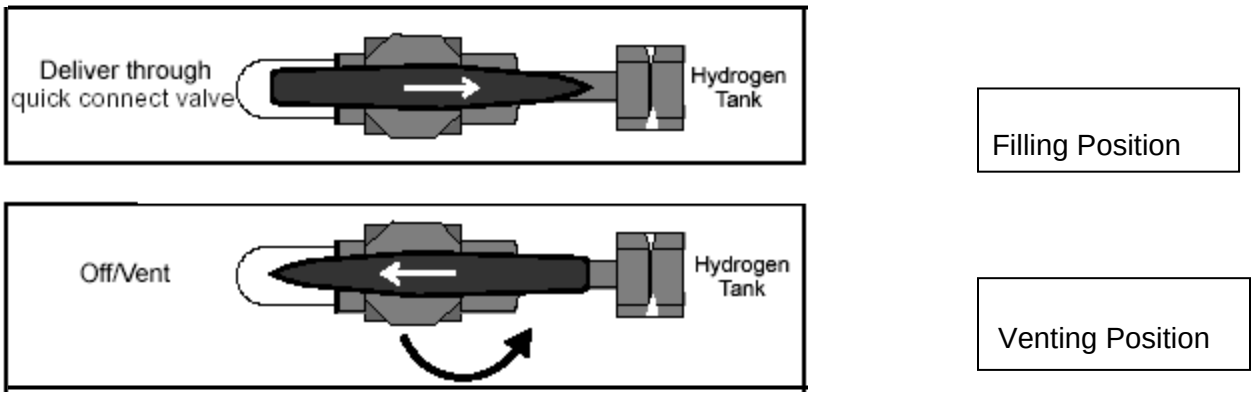


Figure 9. Output Valve

2. Attach the MicroFID II hydrogen fuel cylinder to the quick connect mate on the hydrogen filling station (see Figures 8 and 10).

3. Open the on/off valve on the hydrogen fuel cylinder. See Figure 8.

4. Open the valve on the hydrogen supply tank.

5. Allow the unit to fill for the amount of usage time required as per the above chart.

NOTE: The hydrogen fuel cylinder will become warm during the filling process and will be warm to the touch. Once the fuel cells are full, the cylinder will begin to cool down and become room temperature. Hydrogen cylinders that are only partly depleted of hydrogen may take less time to fill.

6. Close the valve on the main cylinder of hydrogen

7. Rotate the output valve to point away from the main cylinder of hydrogen, (Venting Position)

8. Wait approximately 5 seconds, and then rotate the output valve once again toward the main cylinder of hydrogen. (Filling Position)

9. Disconnect the full hydrogen fuel cylinder from the quick connect on the filling station by holding the release ring of the hydrogen fuel cylinder with one hand and holding the red release ring with the other. Push up the hydrogen fuel cylinder release ring and the hydrogen fuel cylinder will be separated from the hydrogen fill station. The hydrogen fuel cylinder will be cool to the touch when it is remove from the hydrogen fill station. With time, the hydrogen fuel cylinder will become room temperature.

10. Ensure the main hydrogen supply tank valve is closed.

11. If the hydrogen cylinder will not be used immediately after the filling process is complete, close the hydrogen cylinder by turning the on/off valve completely clockwise.

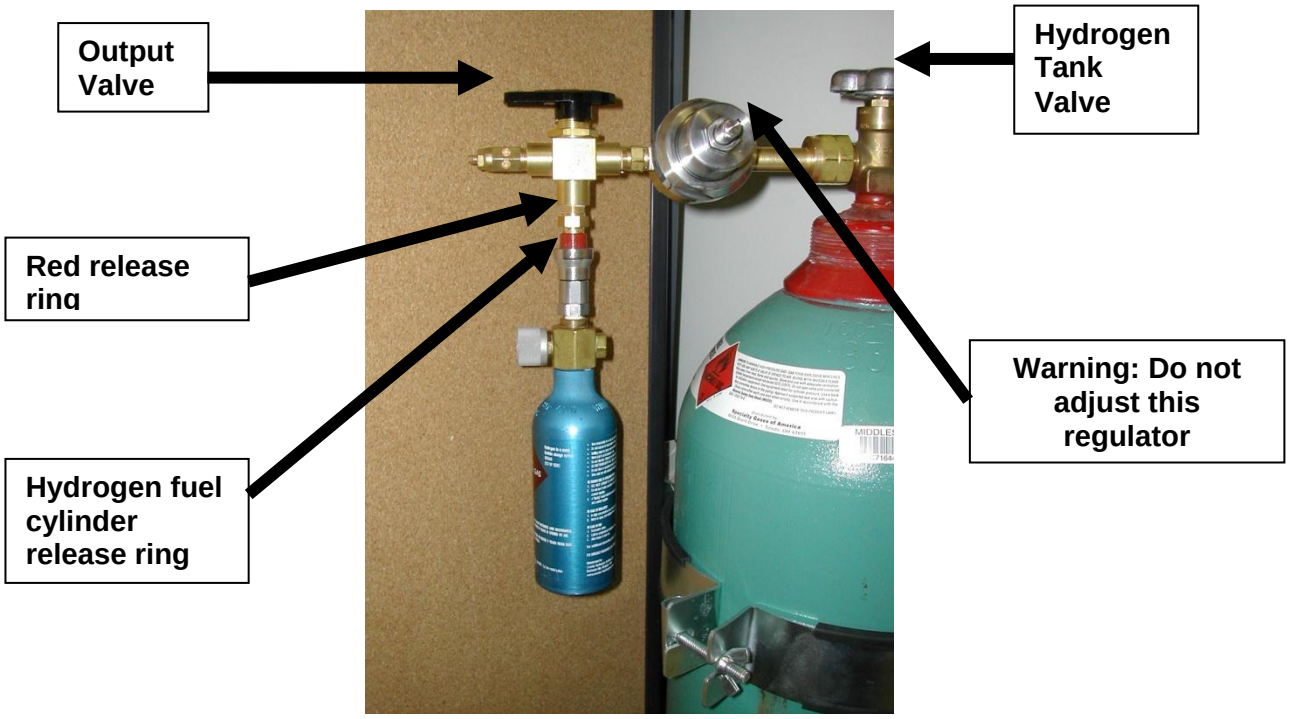
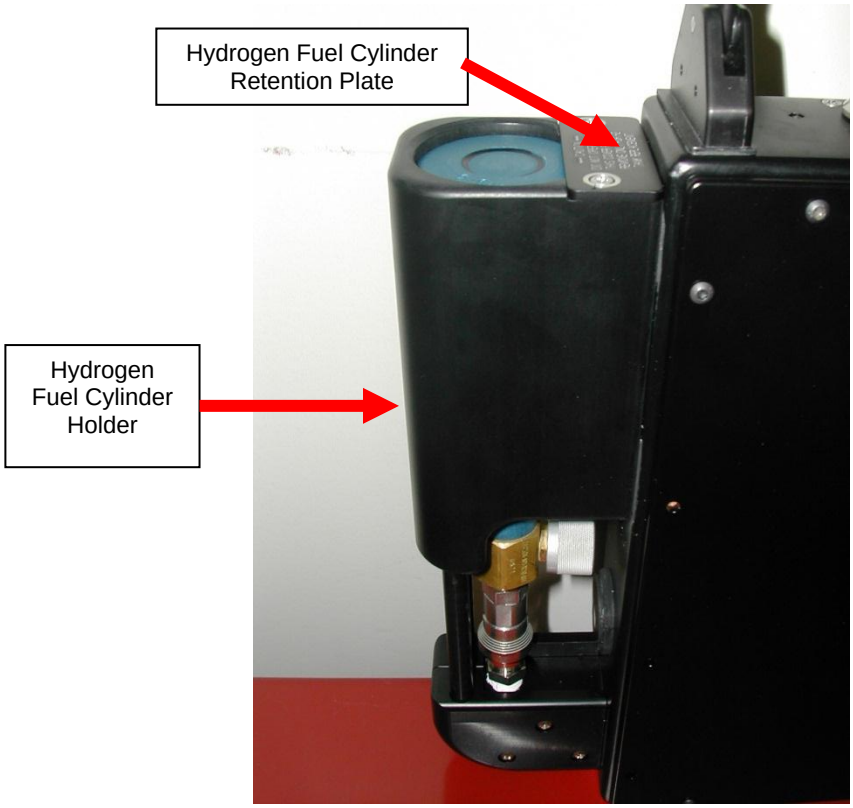


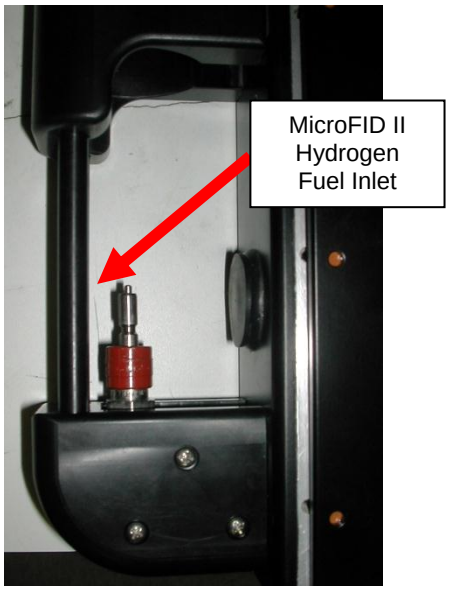
Figure 10. Hydrogen Fuel Cylinder Connected to Filling Station

Installing the Hydrogen Fuel Cylinder in the MicroFID II

1. If the hydrogen fuel cylinder retention plate is installed on the MicroFID II, remove it and set it aside.



2. Insert the hydrogen fuel cylinder into the hydrogen fuel cylinder holder.
3. Guide the hydrogen fuel inlet into the MicroFID II hydrogen fuel inlet.
4. Push the hydrogen fuel cylinder until you hear a distinct click.
5. Attach the hydrogen fuel cylinder retention plate with the two set screws.



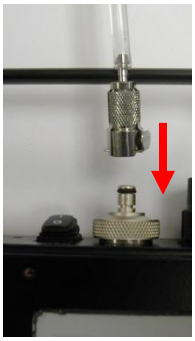
The hydrogen fuel cylinder retention plate MUST be installed on the MicroFID II to retain the intrinsic safety rating.

WARNING

6. Open the hydrogen fuel cylinder on/off valve if monitoring is to be started.

Attaching the Telescoping Probe to the MicroFID II

1.. The Telescoping Probe has a knurled nut fitting. Simply screw in the knurled nut into the MicroFID II inlet.



Basic Operating Instructions

The following steps should be followed to operate the basic functions of the MicroFID II.

1. Ensure that the MicroFID II battery has been fully charged.

2. Attach the hydrogen cylinder to the left side of MicroFID II instrument body. The cylinder slides through an open holder, and the swage connector engages the cylinder with the instrument. A distinct click will be heard when this occurs.

3. Install the hydrogen cylinder holding plate with the two screws that are attached.

4. Turn on the hydrogen fuel cylinder on/off valve (see Figure 8) by rotating the knob counter-clockwise. Wait a few minutes for the hydrogen fuel to flow to the MicroFID II detector.

5. Turn on the MicroFID II using the “OFF /ON” power switch on the top right of MicroFID II instrument body. On is the symbol” **I**” and off is the symbol “**o**”.

I

O

6. The display screen on the probe will show the “Top Level Menu” depicted in the Section: User Menu Functions.

7. The MicroFID II body display has three red soft keys (see Figure 6) that operate all menu functions facilitating single handed use of the instrument.

8. The MicroFID II will automatically start with “MicroFID II Setup” on the main display. Simply press the middle red soft key (“meas”) to initiate the “Flame ON Procedure.” After a few moments, measurements in ppm should be shown on the display, and the flame icon should be present.

9. The calibration function is initiated by pressing both the left and right soft keys at the same time.

NOTE: See Calibration section immediately following these steps for a full discussion on the calibration process.

10. To turn off the MicroFID II, follow the steps shown on the Shut Down MicroFID II Menu, Figure 15 in Chapter 3 User Functions.”

Calibration

The MicroFID II must be calibrated in order to display concentration in ppm units equivalent to the calibration gas. See the section on calibration starting on page 59 for a full description of calibration procedures for the MicroFID II. The MicroFID II must be operated in an upright position during calibration.

Data Communication

The MicroFID II links to external devices via Bluetooth. This wireless technology is used as the communication link to external PC’s used for uploading information to the MicroFID II and for downloading measurement data collected during the process of field monitoring activity. It can also communicate with external PDA’s which may be used for Method 21 LDAR monitoring

Refer to Chapter 4 for more information regarding Bluetooth communication set-up and operation.

Response Factors for Gases and Vapors

To use the response factors:

1. Press the CAL key and enter the response factor for the specific compound.

2. Calibrate the MicroFID II with zero air and 500 ppm methane as described in the section on calibration

3. Expose the MicroFID II to the sample. The displayed reading is the approximate concentration of the specific compound.

The response factors on the INFICON web site serve as a guide to concentrations measured by the MicroFID II.

NOTE: It does not matter which Cal Memory is selected or which response factor is entered, MicroFID II’s response is not specific to any one compound. The displayed reading represents the total concentration of all ionizable compounds in the sample.

Preparing for Field Operation

Field Check List

The following items should be carried into the field to reduce or eliminate instrument down time. If you will be in the field for a single 8-10 hour day, you should include the following accessories:

- Calibration kit(s) (Part No. MX396011)
- Tank(s) of calibration gas (Part No. MX396028)
- Spare gas bag for zero air (Part No. MX396017)
- Gas bag adapter for zero air (Part No. MX396010)
- Supply of commercial zero air
- Charcoal filters (Part No. MX396022, pkg. 10)
- Spare inlet filters (Part No. MX396015, pkg. 25)
- MicroFID II Operating Manual (Part No. 074-579-P1)

Table 3. Check List for Field Operation

If you will be in the field for more than one day you should include the following additional items:

- Battery charger (Part No.A1201221)
- Hydrogen Filling Station (Part No. A1201222)
- Hydrogen fuel (Part No. MX754112)
- Computer or PDA

Table 4. Additional Field Items

Operational Check List

Before beginning field work, set up and calibrate the MicroFID II for your particular application. Ensure the instrument is in working order before heading into the field.

To prepare the MicroFID II for field work

1. You should not transport the MicroFID II with the hydrogen fuel cylinder attached to the MicroFID II**.** Remove the hydrogen fuel cylinder from the MicroFID II and package it individually for transport.

2. Press the SETUP key and ensure the correct date and time are entered.

3. Program and calibrate all the Cal Memories you will be using. After calibration is complete, sample the bag of calibration gas and the bag of zero air to ensure the MicroFID II has been calibrated correctly.

4. If you are using an averaging interval, you may also want to delete all events from the datalogger to avoid confusion between different days' data and to avoid running out of space in the datalogger.

5. If you are performing Method 21 monitoring, ensure you have programmed and calibrated all the Cal Memories. You must also program your monitoring schedule.

3. USER FUNCTIONS

Display

The MicroFID II has a graphic display for reporting detected concentrations and to guide you through configuration options. All functions of the MicroFID II will be reported on the display.

Graphic Display

The MicroFID II uses an 8 line graphic display. The display will always be used for reporting detected concentration. In order to accommodate the range of concentrations the MicroFID II can detect, the meter reading will be reported using one of three resolutions. A resolution of 0.01 ppm will be used for concentrations below 10 ppm, a resolution of 0.1 ppm will be used for concentrations between 10 ppm and 999.9 ppm, and a resolution of 1 ppm will be used above 1000 ppm.

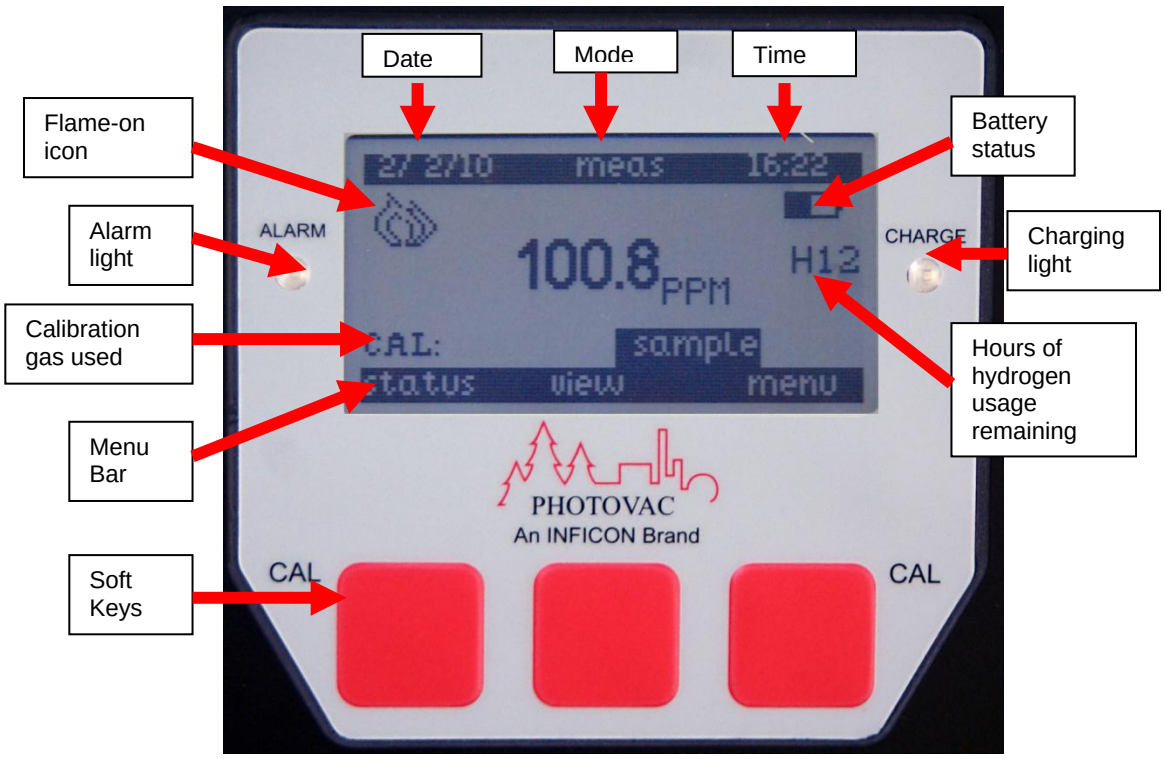


Figure 11. MicroFID II Display

Menu Function Displays

Figure 12. The MicroFID II Main Menu Display

The display reports instantaneous concentrations at all times when the flame is on. There are four User modes: Logging Off, Interval, Location, and Method 21. In all four modes, the display will report instantaneous concentrations.

The MicroFID II is designed for ease of use with a logically organized internal menu structure/user interface.

The four submenus for the MicroFID II are expanded in Figures 13, 14, 15, and 16.

The MicroFID II has three soft keys, and they are located under the graphic LCD display. Each display screen will always show the available functions of the soft keys.

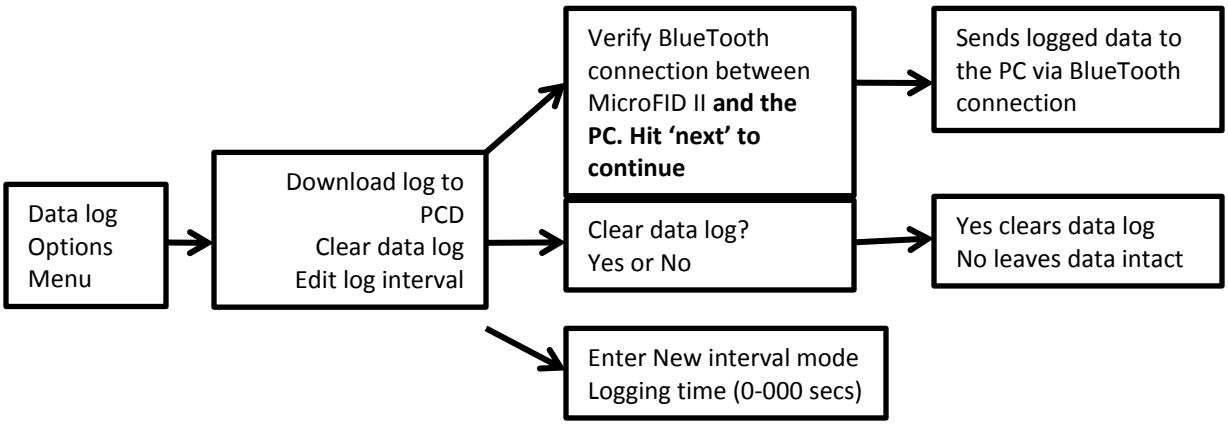


Figure 13. Data Log Options Menu

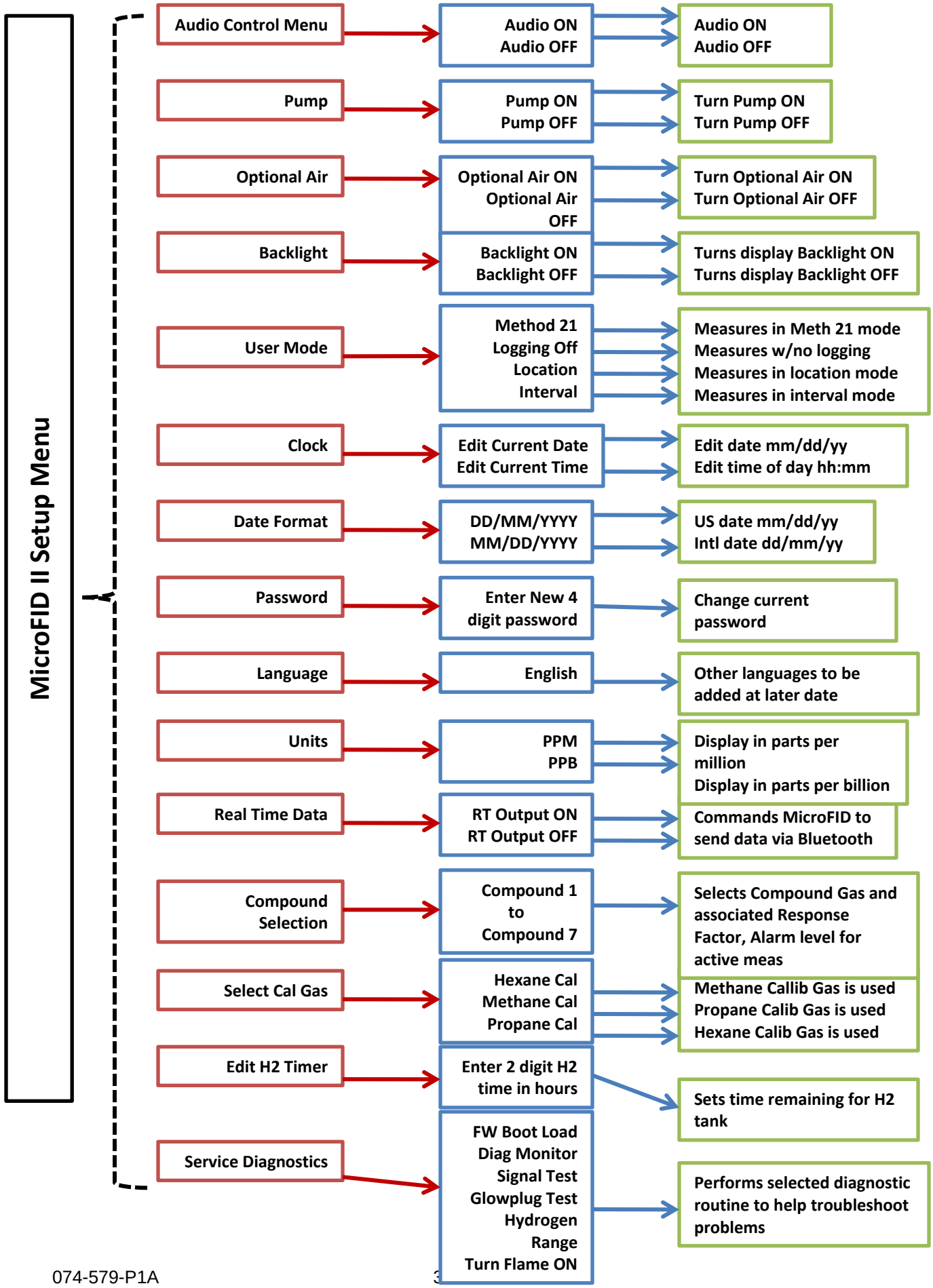


Figure 14. MicroFID II Setup Menu

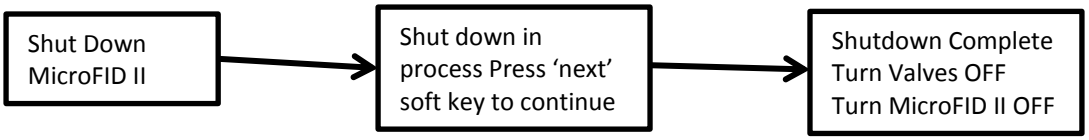


Figure 15. Shut Down MicroFID II Menu

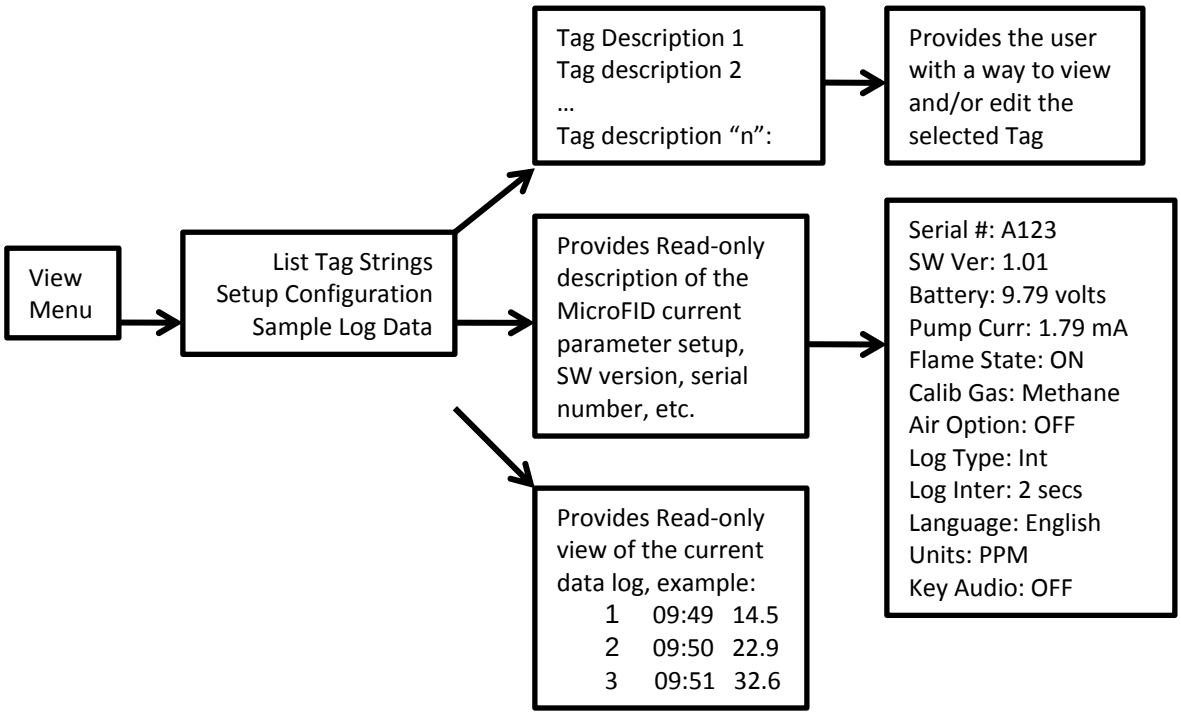


Figure 16. View Menu

Keys

Fixed ON/OFF Key

The ON/OFF key is used to both power on to the MicroFID II and to power off the MicroFID II. To turn on the MicroFID II, press the ON/OFF key. To turn off the power, press the ON/OFF key. It is recommended that the Shutdown MicroFID II option in the Main Menu be used to ensure proper shutdown before pressing the OFF key.

Soft Keys

Three soft keys are located directly below the display. Each of these soft keys has varying functions for configuring the MicroFID II, editing the data, and controlling the display. Since only three soft keys are available, each function is broken down into a path. Maps, showing each path and the resulting functions, are shown in Figures 13, 14, 15, and 16.

Beginning Operation

Turning on the MicroFID II

1. Turn the MicroFID II on by pressing the ON/OFF key. See Figure 5 for the location of the ON/OFF key.

2. The MicroFID II will display the instrument's software version number. Next, the MicroFID II will proceed to the Main menu display.

3. For maximum accuracy and stability, allow the MicroFID II to warm-up for 20 minutes prior to calibration.

Default Display

The MicroFID II always starts in the Main menu after start up. The unit's setup will be restored to the previous entries at the time it was powered down. The Up and Down arrows (soft key 1 and 3) provide a way for the user to choose from the 4 main options: (MicroFID II Setup, Data Log Options, Shutdown MicroFID II, and View Menu). The Measure function (soft key 2) provides a way for the user to start or return to TVOC measuring mode.

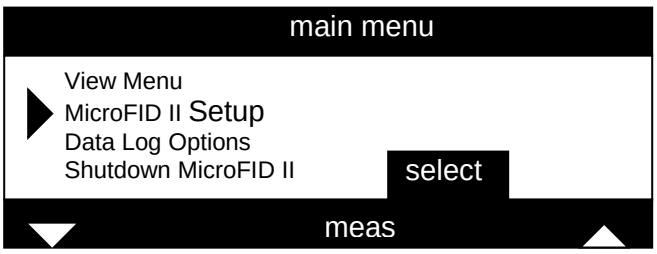


Figure 17. Main Menu Display

Numeric Value, Duration, Time and Date Entry

In cases where the system requires the user to enter a number, duration, time, or date, the following mechanism is used. The number of digits to be entered depends on the type of value being entered. In some cases, units may be specified (e.g., ppm or hh:mm); in others there may be no units. Upon entering a value entry screen, see Figure 18, a bar icon below the left most digit highlights it as the active digit. The up (middle soft key) and down (left soft key) arrows are used to increase/decrease the digit. The bar icon is moved to the next digit to the right using the right soft key. The 'done' soft key (probe trigger key or soft keys 2 and 3 simultaneously) is pressed once the user has finished entering the value and the new value is stored into memory.

No cancel option is available to the user. If a user decides against editing, then simply pressing the done key (probe trigger) will exit with no changes to the current value.

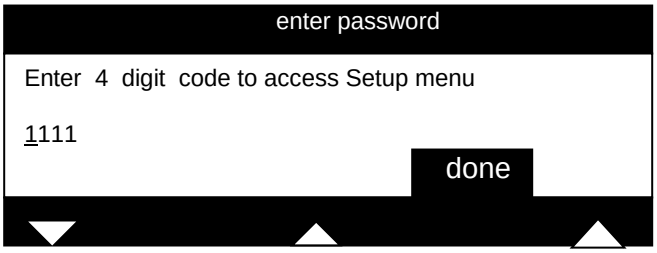


Figure 18. Numeric Value Display

Instrument Status

The instrument status is shown on the left of the first line, lower left of the last line, or with various message screens that will display the status of the MicroFID II. Each status has a priority assigned to it. If more than one status is in effect, then the status with the highest priority is displayed until the condition is corrected or until the option is turned off. Table 5 is a list of the possible system alerts.

MicroFID II Display	Description
Flame Icon with line through it	Flame has been extinguished and needs to be relit
TVOC high level alarm screen	TVOC concentration alarm exceeded set value for selected compound
Low Battery Icon	Low battery
Pump Error	Pump fault
Displayed value blinking ON and OFF	TVOC concentration over instrument operating range
TVOC Display Max Err	TVOC concentration over instrument operating range
Hi Chamber temp	Chamber temperature too high
Recommend H2 Fill	Hydrogen cylinder has 10 hours of use remaining
H2 Critically Low!	Hydrogen Cylinder has 5 hours of use remaining
Sending log data to the PC	Instrument sending log data to PC
Cal Zero Error	Zero value too high during calibration
Span Gas Error	Span gas too low during calibration

Table 5. System Alerts

System Alerts and Alarms

While operating the instrument, system alerts can occur. To accurately identify the source of the alarm, each type of alarm has been given a unique status.

In addition to the status, the MicroFID II also has an audio alarm and an alarm LED. A soft key is used for acknowledging alarms and is named “Accept”. To clear the alarm, press the “Accept” key. Once acknowledged, the alarm indicators are cleared. The alarm status will remain until the alarm condition clears.

The MicroFID II updates the instantaneous concentration once every second. Following every update, the instantaneous concentration is compared to the selected compounds high alarm level, and if exceeded, an alarm is triggered.

During calibration, all alarms are disabled. Once the calibration is complete, the alarms are re-enabled.

User Interface – Basic Menu

The MicroFID II is designed for ease of use with a logically organized internal menu structure/user interface. The MicroFID II's Main Menu options are shown in Figures 13, 14, 15, and 16.

The MicroFID II has three soft keys under the graphic LCD display which always show available functions of the soft keys in any screen.

Passcode

The MicroFID II allows setup data to be saved and accessed only through the use of a password.

Figure 19. Enter Password Display

When the MicroFID II Setup menu is selected, the next display will ask for the operator to enter a 4 digit code to access the Setup menu. The default passcode is 1111

User Modes

The four User Modes of the MicroFID II can be selected in the MicroFID II Setup menu by selecting the User Mode option (See MicroFID II Setup). The MicroFID II's default User mode is the Interval mode with a default interval of 15 seconds. The user can select any one of the four options:

- Location
- Interval
- Logging Off

The MicroFID II can power up in the Interval, Location, Method 21, or Logging Off User Mode depending on the mode that was set by the previous user prior to power down. While the user is in one of these four modes, the resolution of the display changes with the magnitude of the reading. A resolution of 0.01 ppm will be used for concentrations below 10 ppm, a resolution of 0.1 ppm will be used for concentrations between 10 ppm and 999.9 ppm, and a resolution of 1 ppm will be used above 1000 ppm.

Each of the four modes is described in the following sections.

Location Mode

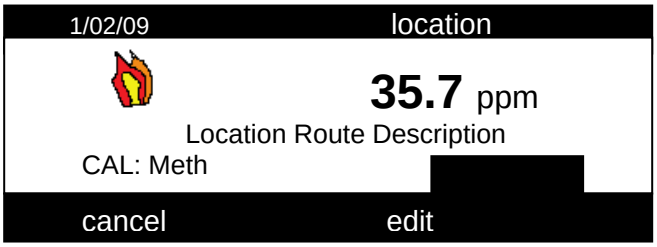


Figure 20. Location Mode Display

Location mode is identified by the 20 character Location string on the line below the current TVOC value being displayed. Location mode will continuously display the instantaneous concentration of total volatile compounds. Location mode also allows the user to manually location and log readings. Location mode allows the user to datalog a reading by pressing the accept key (soft keys 2 and 3 together).

Location strings are loaded into the MicroFID II via a PC using the INFICON ProComm software. In Location mode, the soft keys are CANCEL, EDIT, and MENU.

CANCEL exits Location user mode and returns to the default Interval user mode.

EDIT selects “Modify Location numb”, “Edit current Location”, or “Insert new Location”.

MENU selects the MicroFID II’s Main menu.

Interval Mode

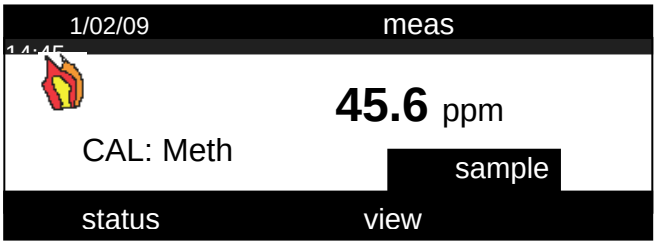


Figure 21. Interval Mode Display

Interval displays the instantaneous readings. Interval mode also automatically stores these readings in the MicroFID II’s memory at a preset interval selected by the user. In Interval mode, the soft keys are STATUS, VIEW, and MENU.

STATUS displays a read-only version of the important setup parameters.

VIEW displays a read-only view of the current data log.

MENU returns to the MicroFID II’s Main menu while continuing to measure in the background.

Method 21 Mode

This section describes Method 21 setup if the user chooses to perform Method 21 readings without a PDA.

The Method 21 user mode displays the current detected concentration. The reading is updated once a second. The MicroFID II can also store the maximum background and maximum component concentrations for a selected component. At the end of every interval, one entry is placed in the log.

To enter the Method 21 logging mode, the MicroFID II Setup menu must be entered. After entering the 4 digit pass code, scroll down to the User Mode entry and press the select mode on the display. Then, scroll down to Meth 21 log mode and press the select mode on the display. Hit the *back* soft key to return to the main menu and press the "*meas"* soft key to start taking measurements in the Method 21 logging format.

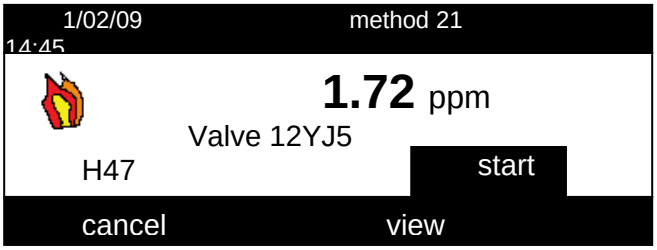


Figure 22. Method 21 Mode Background - Start

The first Method 21 screen is shown in Figure 22. The purpose of this step is to take a BACKGROUND reading. When the user is ready to begin measuring a BACKGROUND value simply press the ‘start’ soft key. The screen will change to that shown in Figure 23.

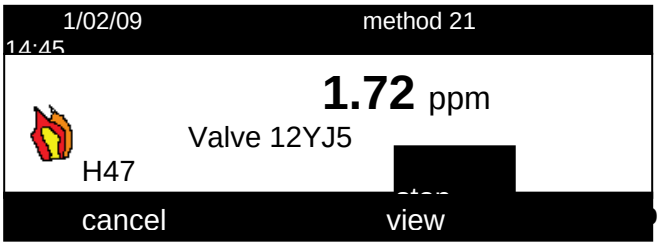


Figure 23. Method 21 Mode Component - Backround

When the user has a valid BACKGROUND reading on the display, simply press the ‘stop’ soft key. The maximum value measured between ‘start’ and ‘stop’ will be saved into the log associated with the current Method 21 tag. The screen will change to that shown in Figure 24.

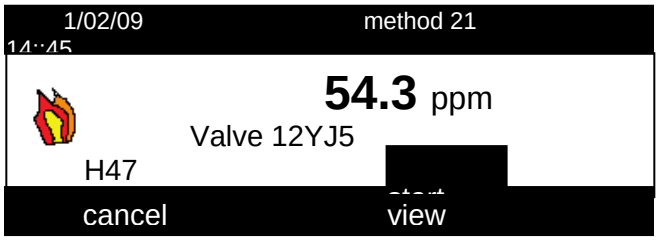


Figure 24. Method 21 Mode Component - Start

Now that the Background value has been successfully logged, the COMPONENT value must be measured for the current tag. When the user is ready to begin measuring a COMPONENT value, press the ‘start’ soft key. The screen will change to that shown in Figure 25.

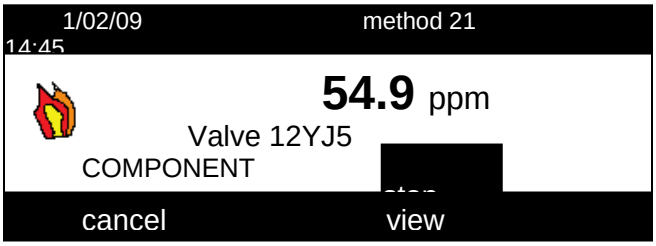


Figure 25. Method 21 Mode Component - Stop

When the user has a valid COMPONENT reading on the display, press the ‘stop’ soft key. The maximum value measured ‘start’ and ‘stop’ will be saved into the log associated with the current Method 21 tag. The screen will change to that shown in Figure 26.

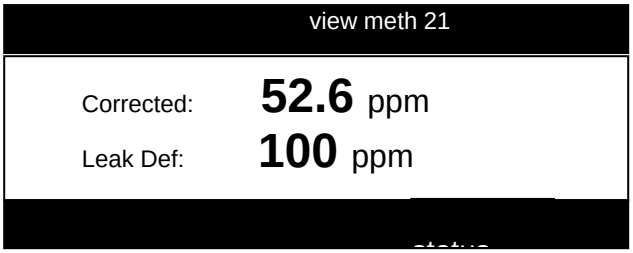


Figure 26. Method 21 Mode Component - Results

This view displays the Corrected value which is the maximum COMPONENT value minus the BACKGROUND max value. It also displays the Leak Definition for the current tag and allows the

user to compare the Leak Definition with the Corrected value. Once the comparison is performed, the status key should be selected by pressing the ‘status’ soft key. The screen will change to that shown in Figure 27.

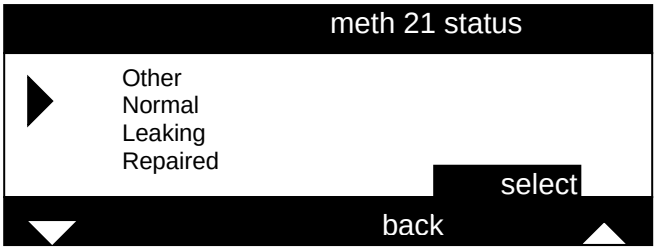


Figure 27. Method 21 Mode Status Display

The user can choose the status for the current tag by first moving the cursor up or down to the proper status designation and then press the ‘select’ soft key. Once a status designation is chosen for the current tag, the MicroFID II automatically increments to the next tag and the whole process is repeated starting with Figure 22.

If a repeat reading for the same tag is needed, press the ‘view’ soft key and select the specific tag by moving the cursor to the appropriate location. Then, press the ‘select’ soft key. The display as shown in Figure 22 will be presented.

Logging Off

In the Logging Off mode, the MicroFID II will display the current TVOC reading but will not log any values or display any Location strings. Logging Off will continuously display the concentration of total volatile compounds present that the MicroFID II can ionize. The reading is updated approximately once per second. Logging Off mode has the same display format as the Interval Mode.

Data Logging

The MicroFID II reading is updated once a second. In the background, the MicroFID II is sampling the concentration and logging the average concentration for either a selected time period (Interval) or at the time the trigger key on the probe is pressed (Location and Method 21). All logs record the date, time, status, and TVOC reading. In the Location and Method 21 modes, a character string up to twenty characters is also recorded. In addition, Method 21 mode adds more details to a log which are described in the ‘Method 21 Operation’ section.

The MicroFID II has the ability to change log modes without erasing the log. In other words, if the user switches User modes from Interval mode to Location mode the previous Interval log entries are NOT erased as in older style instruments.

The MicroFID II also operates in a ‘circular-logging’ mode. This means that the log will never fill and stop logging but will loop back to the first entry and start logging at entry number 1.

Interval Mode - Data Logging

Interval mode logs readings at user selected intervals of 1 second to 999 seconds. The microprocessor accumulates all readings in an averaging interval that you select, and determines the average reading. It stores this number along with the highest priority instrument status and the current time and date.

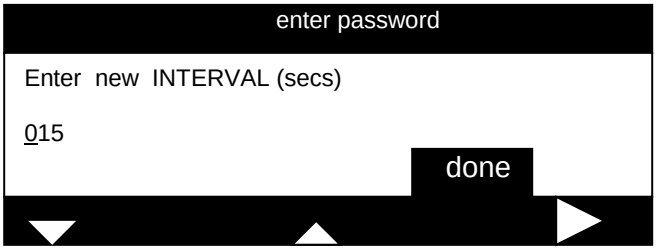


Figure 28. Interval time adjustment

Location Operation – Data Logging

In the Location mode of operation, data is logged only when the ‘accept’ soft key on the probe trigger is pressed. The date, time, average reading at the time the trigger is pressed, along with the current tag string that is currently on the display are also stored.

Clearing or Downloading Data

There are two options for data manipulation under the Data Log Options selection.

The first option is the “Clear Data Log” option which deletes all readings in the MicroFID II memory.

NOTE: Deleted information cannot be recovered. You should download the contents of the datalogger before deleting any information.

To delete data logged in the MicroFID II

1. Press the MENU key.
2. Use the DOWN ARROW key to choose “Data Log Options”, and then press the SELECT key.
3. Choose “Clear Data Log”, and then press the SELECT key.
4. Press either the YES or NO key in response to “Are you sure you want to clear all data?”.

The second option is the “Download to PC” which begins the download of stored data from the MicroFID II to the PC. The Bluetooth connection between the MicroFID II and the PC must be established and active before beginning the data download. Prepare for Hyperterminal connection with your computer or, the MicroFID II software package, ProComm, must be installed and running on the PC prior to download.

To download data

1. Press the MENU key.
2. Use the DOWN ARROW key to choose “Data Log Options” the press the SELECT key.
3. Use the DOWN ARROW key to choose “Download to PC”, then, press the SELECT key.
4. Press the NEXT key at the “Connect Instrument to PC” prompt.
5. The display will show “Downloading Data” and data will now download to the PC. Press the DONE key once the download has completed.

Uploading Pre-Set Data from a computer to the MicroFID II

Upload <u>Compound</u> Entry from PC

1) Single Compound Entry Description

A single Compound list entry will take place in the following manner:
<memslot> <list#> <”Compound name”> <Response Factor> <Alarm Level> <Formula Weight> <CR> <LF>
where:
a) ***memslot*** = keyword that must appear at the start of every line in order for MicroFID II to recognize an entry.
b) ***list#*** = Compound number in the list.
c) ***”Compound name”*** = 21 character (max) Compound description that must be surrounded by quotes (" ").

d) ***Response Factor*** =
e) ***Alarm Level*** =
f) ***Formula Weight*** =
g) ***CR LF*** = Carriage Return and Line Feed are accomplished by pressing the 'Enter' key at the end of each line.
NOTE: <> are used as separators and are NOT included in the text file.

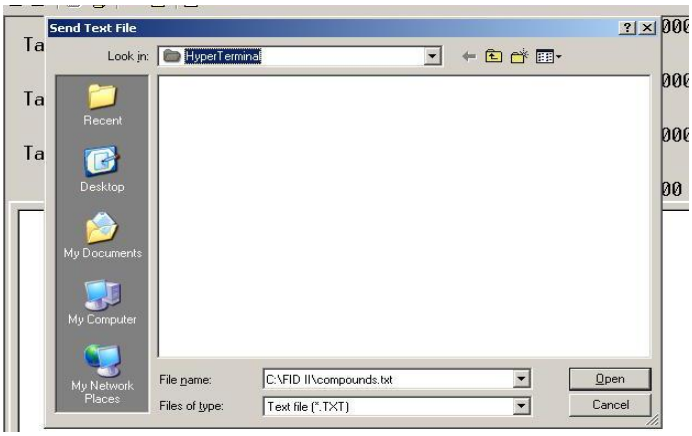
2) Example Compound File

The following is an example of how a compound file will look with multiple Compound list entries:
memslot 1 "Methane " 1.0 1000.0 16.0
memslot 2 "Hexane" 0.9 200.0 8.7
memslot 3 "Methane2" 1.0 1000.0 16.0
memslot 4 "Propanol" 1.6 500.0 6.1
memslot 5 "Isobutyl" 4.3 750.0 27.8
memslot 6 "Benzene" 7.9 250.0 37.9

3) Sending the compound list file from a PC to the MicroFID II***.***

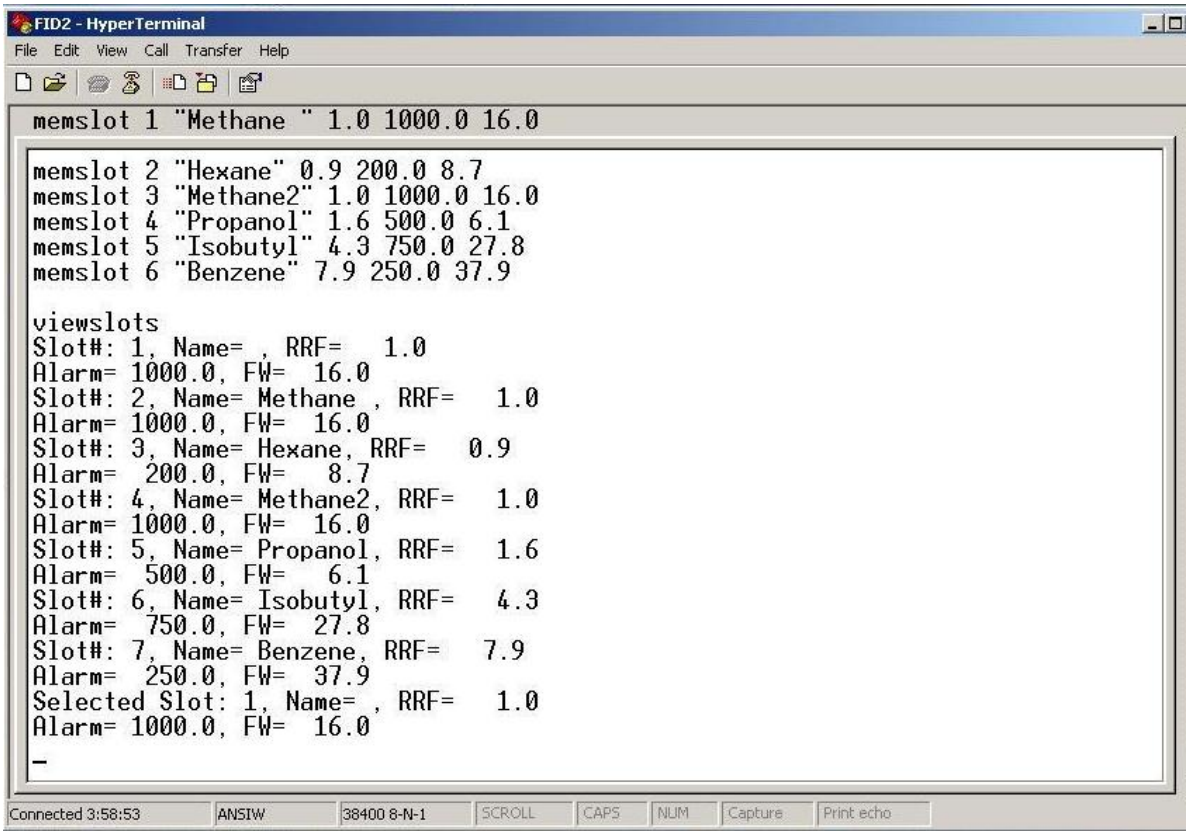
The following is a PC screen snapshot of how a Compound list text file is sent from a PC to the MicroFID II:

a) The first step is to open a PC terminal program such as Hyper Terminal.
b) The next step is to select 'Send Text File' from the 'Transfer' menu.
c) Find the previously created Compound text file and select it by choosing the 'Open' option.



4) Viewing the compound list in the MicroFID II

In order to verify that the Compound list was successfully transferred to the MicroFID II from the PC, the 'viewslots' command can be typed in, resulting in the following response from the MicroFID II to the PC:



MicroFID II Setup Functions

MicroFID II Setup functions are used to select the MicroFID II features (See Figure 14). There are fourteen functions which can be set on the MicroFID II; **Pump, Optional Air, Backlight, User Mode, Clock, Date Format, Password, Language, Units of Measure, Blue Tooth, Compound Selection, Select Cal Gas, Service Diagnostics, and Audio Control Menu.** Figure 14 shows a menu detailing the MicroFID II Setup functions. Press the MENU key in any operating mode to access “MicroFID II Setup” When prompted, enter the correct 4-digit password. Once the correct password is entered, the user will be allowed to enter the MicroFID II Setup menu.

Pump

The Pump function turns the pump on and off.

When the pump and the detector are off, the meter display will continue to read normally but the instantaneous reading is at 0.0. Turn the pump and flame off when concentration measurements are not necessary, and the MicroFID II will only be used for setup or reviewing data. By operating the instrument with the pump and flame off when you do not need them, you will conserve the battery and the hydrogen.

To turn on the pump:

1. Press the MENU soft key, “MicroFID II Setup”, press SELECT, “Pump”, press SELECT, “On”, then press SELECT.

To turn off the pump:

2. Press the MENU soft key, “MicroFID II Setup”, press SELECT, “Pump”, press SELECT, “Off”, then press SELECT.

Backlight

The Backlight function is used to switch the backlighting on and off when there is insufficient light to read the display.

To switch the Backlighting on and off:

1. Press the MENU soft key and select “MicroFID II Setup”.

2. Select BACKLIGHT and then press the SELECT soft key. Press the DOWN ARROW soft key to either turn the backlight on or off.

3. Press SELECT soft key to return to the main display.

To extend the operating life of the battery pack, turn the backlighting off when it is not required.

User Mode

User mode selects one of the three logging modes. The four logging modes are Logging Off, Location, and Interval mode.

Logging Off mode displays instantaneous readings only. The display is updated continuously and readings are not logged.

Location mode displays instantaneous readings. The user has the option to manually store the instantaneous reading as either a data point with a tag and a sample reading.

Interval mode displays the instantaneous reading. In interval mode data is logged at a user selected interval value between 1 second and 999 seconds.

To access the User Mode Section:

1. Press the MENU soft key and select “MicroFID II Setup”.

2. Select User Mode and then press the SELECT soft key. Press the UP or DOWN ARROW soft key to choose the applicable User Mode, that is, Logging Off, Location, Interval, or Method 21.

3. Press SELECT soft key to return to the main display.

Clock

The Clock function is used to set both the current date and time.

Entering Numbers with the Soft Keys to Set the Clock

For all information entry in clock mode, the left, center and right soft keys correspond to the up, down, and right arrow. See Figure 29. The up and down arrows are used to change the character highlighted by the cursor. The right arrow is used to advance the cursor to the next character on the right. To accept the changes, press the DONE soft key.

Figure 29. Setting the Time

To Set The Time And Date

1. From the MicroFID II Setup, use the Up or Down arrow soft key to select the Clock option. Press the SELECT soft key. This allows you to edit the current time and to edit the current date.

   The up and down arrow soft keys are used to change the character underlined by the cursor. The right arrow is used to advance the cursor to the next character on the right. When the cursor is advanced past the right most character, it wraps around to the first character again. Formatting characters, such as the colon (:) in the time, the decimal (.) in a concentration, and the slash (/) in date are skipped when advancing the cursor.

   Use the “arrow keys” to enter the correct time. The time is formatted as Hour:Minute.

2. Press the DONE soft key to confirm the time and move to the date option.

3. When setting the date, the MicroFID II prompts you for the current date formatted as Month/Day/Year. Use the ARROW KEYS to enter the correct date.

4. Press the DONE soft key to confirm the date and the display will return to the main screen.

Date Format

The date format can be expressed either as **MM/DD/YYYY**, or as **DD/MM/YYYY**. Using either the Up or Down arrow soft key, choose either option via the SELECT soft key.

Password

Sensitive options are those which can affect the MicroFID II's readings. These options are located within the MicroFID II Setup menu. Whenever the MicroFID II Setup menu is selected, the MicroFID II will prompt you to enter a 4-digit password before you can access the functions.

The unit always has a password in force. When shipped from the factory, the code is 1111. To change the MicroFID II password:

1. Use the DOWN ARROW soft key to point to PASSWORD, the press the SELECT soft key.

2. You will be prompted with the current password. Using the UP, DOWN and RIGHT ARROW soft keys, enter the new password. Press the DONE soft key when finished.

NOTE: If the incorrect password is entered, the menu reverts back to MicroFID II Setup and does not allow you to go further into the MicroFID II Menu.

CAUTION: If you change the password, make sure you record the setting. If you cannot remember your password once the instrument is locked, there is no way to unlock it without sending the unit back to INFICON.

Language – This feature is not available.

Units

The MicroFID II can display readings in two units of measure: PPM (parts per million) or PPB (parts per billion). On selecting Units from the MENU, the two choices will appear as a list. Using either the Up or Down arrow soft key, highlight the desired Units of Measure and use the SELECT soft key to set the choice.

Real Time Data

When the MicroFID II is being used in conjunction with a Computer or a PDA, the current TVOC reading can be sent to a PDA only if the Real Time Data option is ON. The Real Time Data function is used to switch on and off the Bluetooth message transmission. To switch the Bluetooth messaging to the PDA on and off:

1. From the Main Menu display, select the "MicroFID II Setup" option.

2. Select the Real Time Data option and then press the SELECT soft key. Press the DOWN ARROW soft key to either turn the Bluetooth messaging to the Computer/PDA on or off.

3. Press SELECT soft key to return to the MicroFID II Setup menu display.

Compound Selection and Response Factors

The response of a flame ionization detector to a compound is dependent on its ionization potential. In certain situations when the user is confident that only a single specific compound exists, they can set up the MicroFID II using a Methane, Hexane, or Propane calibration to mimic the MicroFID II response as if the MicroFID II was calibrated using that specific single compound.

The MicroFID II's 6 memory slots can be used to store compound information for 6 different gases. A 7th memory slot exists as Memory Slot 1 but it is reserved for TVOC and its default settings are that of Methane. The TVOC slot appears when this option is selected. The TVOC memory slot 1 appears with the Compound name as a blank, Response Factor set to 1.0, Alarm Level set to 1000.0, and a Formula Weight of 16.0.

The MicroFID II's other 6 memory slots can be used to store compound information for 6 different gases. By using the Up and Down arrow soft keys, the current values for these compounds can be viewed one at a time. When the desired compound appears on the screen, the select soft key can be used to choose that compound and its associated parameters (Response Factor, Alarm Level, Formula Weight) as the active compound in which all measurements are performed. See Figure 30.

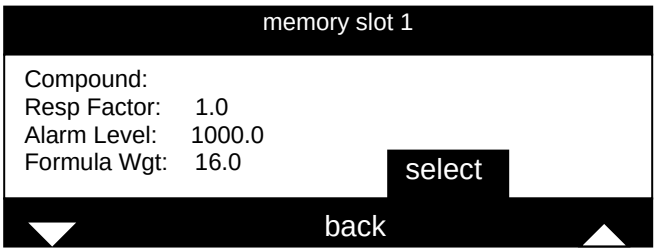


Figure 30. Setting the Compound Memory

Select Calibration Gas

There are three Gas types of which any one can be used to perform a MicroFID II calibration. On selecting 'Select Cal Gas', the three calibration type gases will appear as a list. They are Methane, Propane, and Hexane. Using either the Up or Down arrow soft key, highlight the desired calibration gas and use the SELECT soft key to set the gas.

Edit H2 Timer

The H2 Timer is used to count down the number of hours of use remaing in the hydrogen fule cylinder. Each time the hydrogen fuel cylinder is filled, the timer should be set to 50 (reprsenting 50 hours reaming of hydrogen fuel use). Shorter periods of use can be enterd if the hydrogen fuel cylinder is connected to the hydrogen supply for short amounts of time (See Table 2 Charging Time and Usaje Time).

1. On selecting Edit H2 Timer from the MENU, the choice of entering 2 digits in hours will appear. The up and down arrow soft keys are used to change the character underlined by the cursor. The right arrow is used to advance the cursor to the next character on the right. When the cursor is advanced past the right most character, it wraps around to the first character again.

   Use the “arrow keys” to enter the correct hours.

2. Press the DONE soft key to confirm the time and move to the date option.

Service Diagnostics

If problems with the MicroFID II‘s operation ever occur in the field, this menu provides the user or service technician with a way to troubleshoot the problem. These options are Diagnostics Monitor, Signal Test, Glow Plug Test, Hydrogen test, Range Test, and Turn Flame ON. On selecting ‘Service Diagnostics’, these options will appear as a list. Using either the Up or Down arrow soft key, highlight the desired troubleshooting operation and use the SELECT soft key to perform the diagnostic routine.

Audio Control Menu

The Audio Control function is used to switch the keypad beeper on and off whenever a user selects a key or presses a key. To switch the Audio key beeping function on and off:

1. From the Main Menu display, select the “MicroFID II Setup” option.

2. When prompted, enter the correct 4-digit password. Once the correct password is entered, the user will be allowed to enter the MicroFID II Setup menu.

3. Select Audio Control Menu and then press the SELECT soft key. Press the DOWN ARROW soft key to either turn the Audio key beep function on or off.

4. Press SELECT soft key to return to the MicroFID II Setup menu display.

Calibration Technical Description

The MicroFID II will always detect all ionizable compounds present in a sample regardless of the response factor (RF) selected.

NOTE: Even if the MicroFID II has been calibrated with a specific compound, its response is not specific and the presence of another ionizable impurity may render the numerical result invalid.

It is often impractical to carry a range of different standards into the field. Approximate results can be obtained by calibrating the MicroFID II with the recommended span gas and entering the appropriate response factor. The response factor is based on the ratio of the response of the specific compound to the response of the span gas. The response factor multiplies the MicroFID II'S reading, then displays and records it.

NOTE: The MicroFID II is a total VOC instrument and will **ALWAYS** respond to all ionizable compounds present in a sample. The MicroFID II will NOT respond only to a specific compound if an RF is programmed. It is the responsibility of the user to be aware of the limitations of Flame Ionization Detection instruments.

Calibration is required for the MicroFID II to compensate for temperature/climate changes as well as output changes due to inlet filter restrictions, ionization chamber cleanliness, sample pump wear and other factors. It is also needed in order to display concentration in ppm units equivalent to the calibration gas.

During calibration, the MicroFID II is first exposed to zero air which contains no ionizable gases or vapors. It is used to set the MicroFID II's zero point. A small signal is generated and the zero signal is stored by the microprocessor.

MicroFID II is next exposed to span gas. This span gas signal is stored by the microprocessor. The microprocessor subtracts the zero signal from the span gas signal and divides the difference by the user-entered span gas concentration. The resulting sensitivity is stored in the selected Cal Memory with the zero signal and the alarm level. This number is then multiplied by the response factor and displayed.

MicroFID II readings are always relative to the calibration gas. After calibration with a span gas, MicroFID II will respond directly in units equivalent to that span gas. Almost all combustible organic compounds will be detected by MicroFID II. It cannot distinguish between the selected calibration gas and other ionizable compounds. A reading of 10 ppm indicates all ionizable compounds that are present have generated an ion current proportional to 10 ppm of the selected calibration gas. MicroFID II readings give an indication of the total ionizables present and their concentration relative the calibration gas.

Due to the MicroFID II's sensitivity, outdoor air is usually unsuitable for calibration. A charcoal filter (Part No. MX396022) may be connected to the instrument to produce clean air from otherwise unsuitable ambient air. For best results, use a commercial source of zero grade air and a second sampling bag. Zero air should have not more than 0.1 ppm total hydrocarbons (THC).

Methane in air is recommended as span gas. However, Hexane or Propane can also be used as span gas. The choice is made from the Calibration Menu – Select Span Gas. The concentration of the calibration gas will depend on the application. When ordering calibration gas, specify methane or any compound to be calibrated with in hydrocarbon free air. Balance air should have not more than 0.1 ppm total hydrocarbons (THC).

NOTE: Method 21 protocol requires that commercial cylinders of calibration gas be analyzed and certified to be within +/- 2% accuracy and that a shelf life must be specified on the cylinder. At the end of the shelf life, the cylinder must be replaced or re-analyzed.

NOTE: It is advisable to allow the unit to warm for at least 20 minutes before calibrating to insure accurate calibration.

Calibration Accessories and Preparing for Calibration

It is best to prepare the accessories and the necessary equipment before the user will calibrate. Following the procedures outlined here will make the actual calibration step easier for the user.

Calibration Techniques

There are two techniques to calibrate a MicroFID II:

- Direct connection of the calibration gas to the MicroFID II through a flow match regulator, which is the preferred technique and provides good accuracy
- Fill a Tedlar bag with the calibration gas and then connect the bag to the MicroFID II, which is less preferred due to potential error introduced when the bag is pushed or squeezed.

These two connection techniques will be discussed followed by the general calibration procedure.

Connecting the MicroFID II with the Flow-Match Regulator

1. Ensure the MicroFID II and the calibration gas cylinder is in the upright position.
2. Connect the regulator to the calibration gas cylinder.
3. If a portable tank of 500 ppm methane calibration gas (Part No. MX396028) is used, connect the regulator (Part No. MX704210) directly to the tank. Other calibration gas compounds and concentrations can be used as necessary.
4. When the regulator is connected properly, the cylinder pressure can be read from the regulator gauge.
5. Connect the adapter tubing to the regulator, and connect the other end of the tubing to the MicroFID II inlet.

6. Open the regulator by turning the valve counter clockwise, until the ball is approximately 1/8” (3 mm) from its rest position.

Figure 31. Calibration with Flow-Match Regulator

Observe proper handling techniques for all gases!

WARNING

Alternative Calibration with Gas Bag

Preparing the Calibration Gas Bag and the Zero Air Bag

Connecting the MicroFID II with calibration kit (Part No. MX396011) as follows:

Observe proper handling techniques for all gases! See Compressed Gases section

WARNING

1. Connect the regulator to the calibration gas cylinder.

If you are using a portable tank of calibration gas, connect the regulator supplied with the calibration kit.

If you are using a large cylinder of calibration gas, you must obtain a high purity regulator. Be sure to match a regulator with the gas tank fitting. Connect the regulator to the tank of calibration gas.

NOTE: Do not force the connection. Do not use Teflon tape with CGA fittings. In general, these fittings are designed for metal to metal sealing. Do not use adapters to connect one CGA fitting to another type of CGA fitting. If the regulator does not match the outlet on your calibration tank, contact your specialty gas supplier.

2. Tighten the regulator onto the tank with a wrench. Do not over-tighten.

3. Attach the knurled nut on the gas bag adapter to the regulator. Finger-tighten the fitting

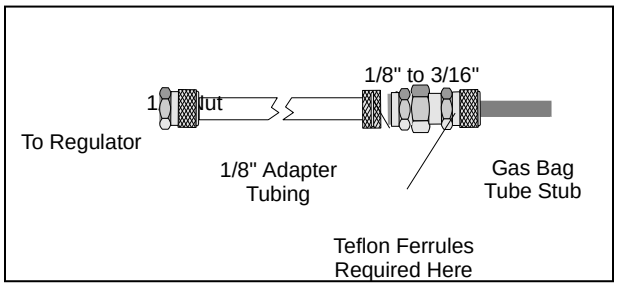


Figure 32. Gas Bag Adapter

4. Loosen the knurled nut on the reducing union of the bag adapter.

NOTE: Do not remove the nut from the union, as the Teflon ferrules contained inside the nut may be lost.

5. Insert the tube stub from the gas bag into the knurled nut. Tighten the knurled nut and ensure the tube stub is secure. If the gas bag is not secure, ensure you have inserted the tube stub far enough into the knurled nut. Do not over tighten the fitting.

Over-tightening the Teflon ferrules will result in damage to the ferrules.

WARNING

6. The union should be connected to the gas bag adapter. If it is not, then tighten the nut on the adapter tube to the union.

7. Open the gas bag valve. Turn the knurled plastic knob counter clockwise to loosen it, then use the knurled collar on the valve tube to gently push the valve tube toward the bag.

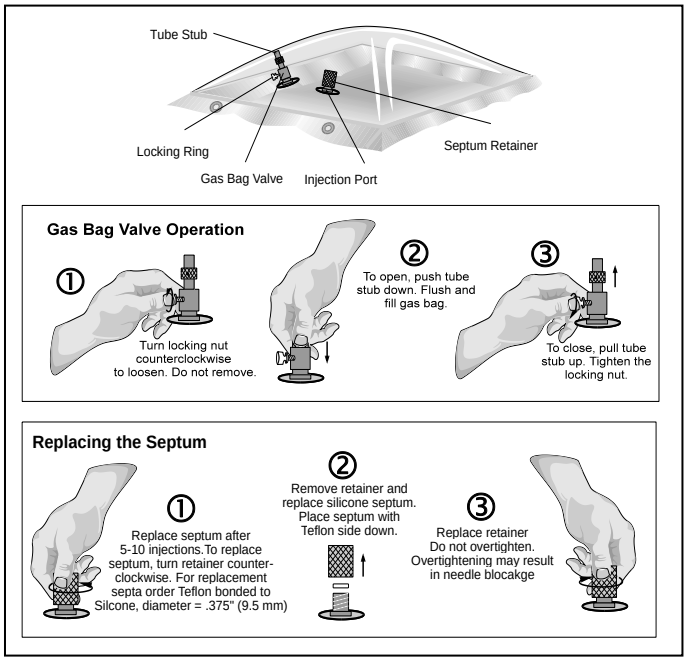


Figure 33. Using the Gas Bag

8. Turn the regulator knob counter clockwise about half a turn to start the flow of gas. Fill the gas bag about half full and then close the regulator.

9. Disconnect the gas bag from the gas bag adapter and empty the bag. Flush the bag a few times with the calibration gas and then fill it.

10. Close the gas bag valve. Gently pull the valve tube away from the bag, and then turn the knurled plastic knob clockwise to tighten it against the valve tube.

11. Remove the knurled nut on the adapter tube from the regulator.

12. Repeat this procedure, if necessary, to prepare a bag of zero air.

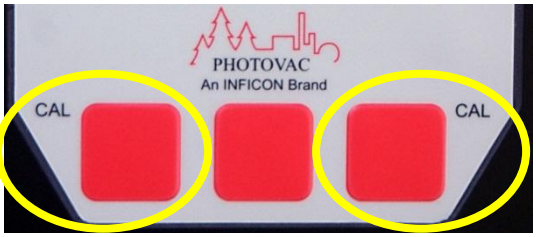
NOTE: Do not use the same gas bag or gas bag adapter for the bag of zero air. You will contaminate the bag of zero air.

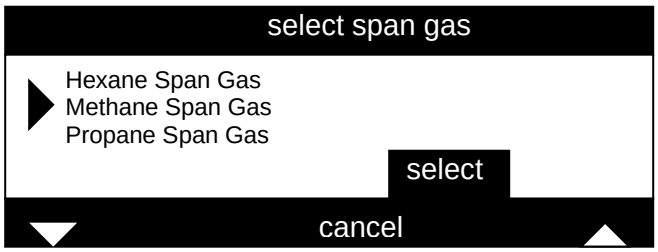
General Procedure to Calibrate the MicroFID II

Before calibration begins, make sure the MicroFID II is turned on and is in measure mode.

To calibrate the MicroFID II:

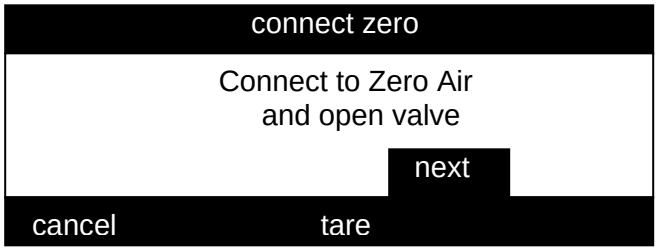
1. Press both the left and right user keypad keys together. This will initialize the MicroFID II. Calibration Mode Screen





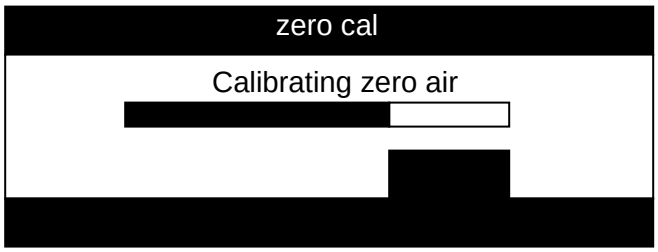
2. Select the desired Calibration Gas. The MicroFID II has 3 Calibration Memories and can be calibrated with 3 different span gases or response factors if desired. Only one Cal Memory can be used at a time.

3. Connect the supply of zero air and press Next to set the Zero Point for calibration

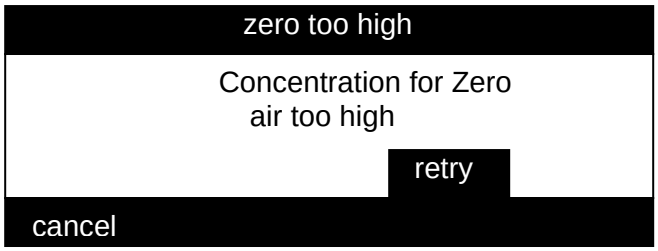


4. If you are using a charcoal filter, connect the filter as outlined in the Accessories section in Chapter 1, Introduction. Press Next and the MicroFID II will set its zero point. NOTE: The charcoal filter does not filter methane or ethane. If these compounds are present, use a gas bag with a supply of commercial zero air.

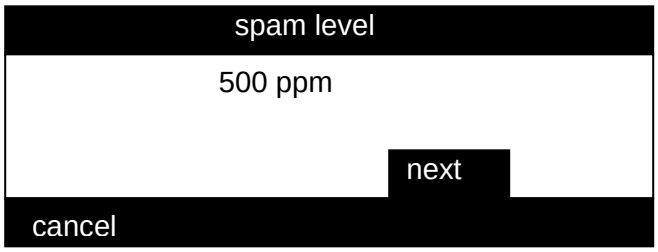
5. If you are using a gas bag with zero air, connect the gas bag adapter to the inlet. Open the bag and press Next and MicroFID II sets its zero point.



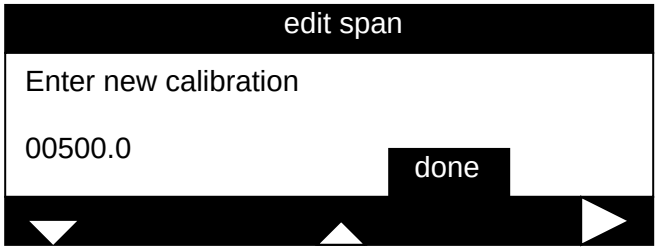
Should a fault condition arise such as Concentration for Zero Air too high the user will be prompted to Retry the Zero point for calibration again. Users should also look to the Troubleshooting Section to further investigate causes for fault conditions



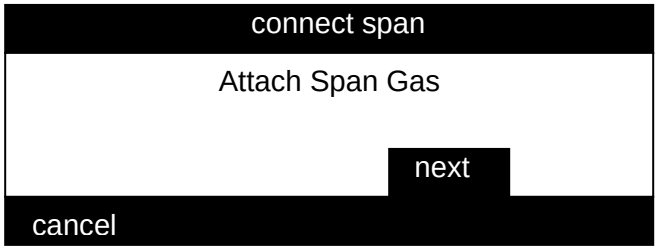
6. The MicroFID II then asks for the span gas concentration. Enter the known concentration or select New to enter a different span gas concentration and then connect the gas bag adapter to the inlet.



Selecting New will prompt the user to reset the digits for the span gas value. The left and center keys will change the corresponding values up or down while the right key will move the place holder over to the right. If the place holder moves too far to the right, press the right arrow key until the cursor moves back to the left to edit changes. Once the selection has been edited, select the trigger key to accept the changes and continue to the Span segment of calibration.

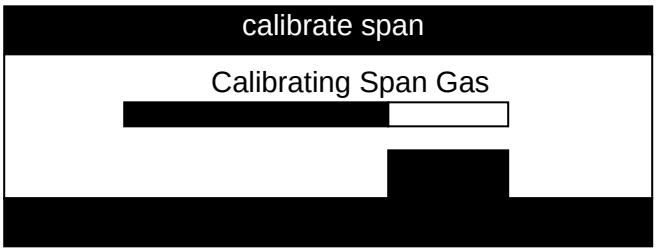


7. Open the span gas (bag/regulator) and press Next

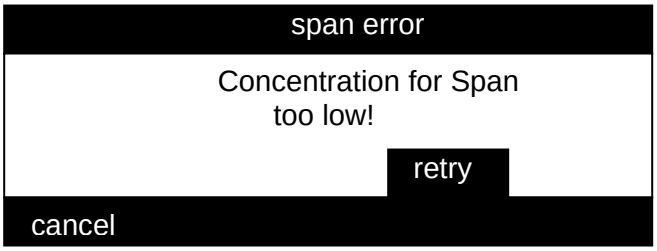


8. The unit will now begin setting its sensitivity to the entered calibration span value.

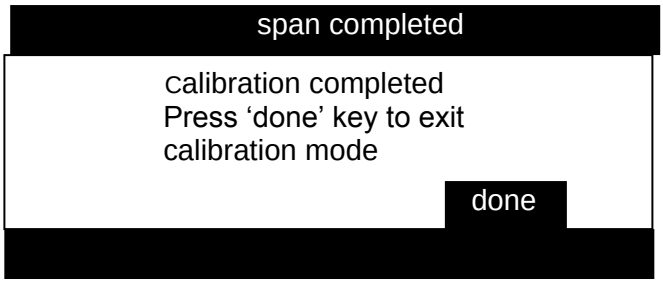
NOTE: Readings may fluctuate slightly as the gas bag empties. Do not allow the MicroFID II to evacuate the bag completely.



Should a fault condition arise such as Concentration for Span Too Low the user will be prompted to Retry the Span point for calibration again. Users should also look to the Troubleshooting Section to further investigate causes for fault conditions



9. When the MicroFID II has completed the calibration cycle the user will prompted to select Done.



10. The MicroFID II is now calibrated and ready for use. Remove the span gas bag or regulator from the inlet.

NOTE: Calibration does not bring a user into the Run Mode automatically. After pressing the ‘done’ soft key, the user is returned to the screen that was displayed before performing the calibration.

Example: If the user is in the User Mode screen while editing an Interval timing and the unit flames out, all you simply need to do is press the 2 Cal keys, invoke the calibration cycle and,

upon completion of calibration, the unit will revert to the User Mode edit Interval timing screen again.

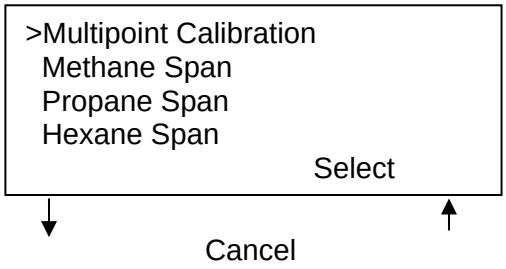
If the user wishes to go into the Run mode screen at any time, all you need to do is select 'meas' and the Run Mode screen will appear.

Multi-Point Calibration

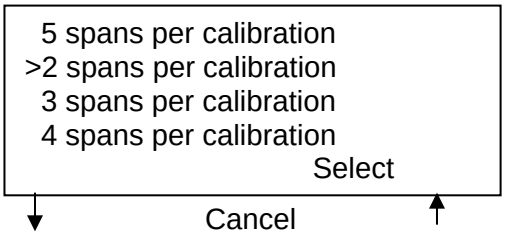
In multi-point calibration mode, the MicroFID II can calibrate up to 5 leak definitions, plus zero. The MicroFID II will walk you through the calibration process. The first item to decide is how many leak definitions will be required during the monitoring session. Once the number of leak definitions is determined, the operator should enter the concentrations sequentially, starting with the lowest concentration first.

1. Let the MicroFID II warm up for 20 minutes before calibration begins. This allows the FID detector to achieve optimal operating temperature and to clear out any residual VOC's that may be in the detector.

2. After the MicroFID II has warmed up, simultaneously push the red CAL keys on the MicroFID II display. This will start up the calibration process and the following screen will appear:

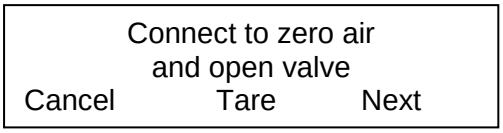


3. Select Multipoint Calibration by pressing the two right hand red keys simultaneously and the following screen will appear:



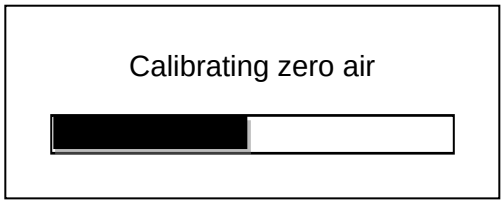
Move the cursor up or down with the up or down arrow keys to select the number of span (leak definition) points, then press select (two right hand red keys). For this example, we will use 2 leak definitions (spans).

4. The following screen will appear:

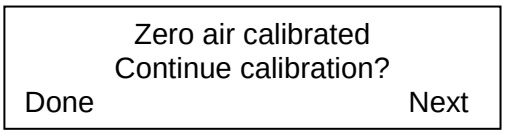


Connect the MicroFID II to your zero air supply and open the valve to the zero air supply. Then, press the next key (right hand red key). The optional tare key will be explained at the end of this instruction.

5**.** The MicroFID II will automatically zero.

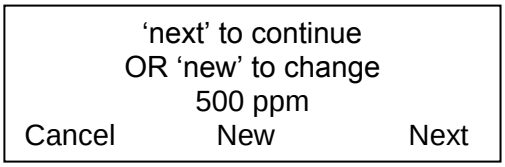


6. The MicroFID II will indicate that zero has been calibrated. If there is a problem with the zeroing process, the MicroFID II will inform you, e.g. zero is too high.

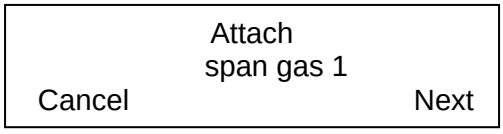


If you only want to perform a zero calibration, hit Done. If span calibrations are required, press the Next key to continue to the span concentrations.

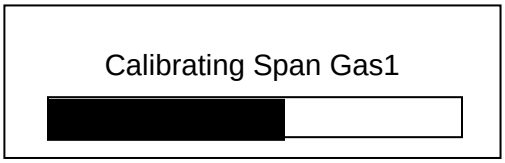
7. The previously used calibration concentration will appear on the screen. If this is the first required concentration, press next. If it is not the desired value, press the new key, and use the up, down, and forward cursors to enter in the desired value.



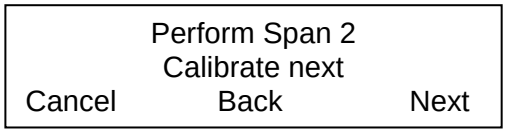
8. This screen will automatically appear: Press next once you attach the first span gas.



9. The MicroFID II will automatically enter the span value. If there is a problem with the span gas process, the MicroFID II will inform you, e.g. concentration for span gas too low.

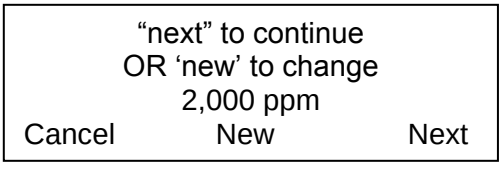


10**.** Once the first span gas calibration is complete, the following screen will appear:



To go back to the first calibration step, press the back key, otherwise press next.

11. This screen will appear. Keep this second value by pressing next, or change it by pressing new.



12. Attach span gas as instructed.

Attach Span Gas 2 Cancel Next

13. The MicroFID II will automatically enter span gas 2.

Calibrating Span Gas 2

14. Once the last calibration step is performed, you will see this display:

.

Calibration Completed Press ‘done’ key to exit calibration mode Done

15. Once the Done key is pushed, the MicroFID II will automatically return to measurement mode (see below).

TARE selection

It is not unusual that, under normal operating conditions, the zero setting on the MicroFID II may drift below zero. To readjust the display to zero, press the TARE key, and the display will be re-set at 0.0.

4. WIRELESS COMMUNICATION

The MicroFID II uses a Bluetooth communication chip as the means to download and upload information to and from the MicroFID II memory. The users must be sure that the Bluetooth communication device software and Bluetooth device are running, paired and active when trying to communicate with the MicroFID II.

NOTE: When the unit has been powered off, the computer or PDA must reinitiate communication with the Bluetooth chip in the MicroFID II. This must be done each time the unit has been powered off.

Wireless Communication Range

Most Bluetooth devices are capable of transmission approximately 30 feet away from the send/receive device (in this case the computer or PDA to the MicroFID II and vice versa). Users should be aware that the signals sent from the MicroFID II and the computer/ PDA are not capable of transmissions through such items as steel doors and floors which disperse and block the transmission signal. Most manufacturers will provide some sort of signal strength meter within their software that will advise the user if a communications link between the receiving device and the sending device is functioning and, in some cases, the signal strength.

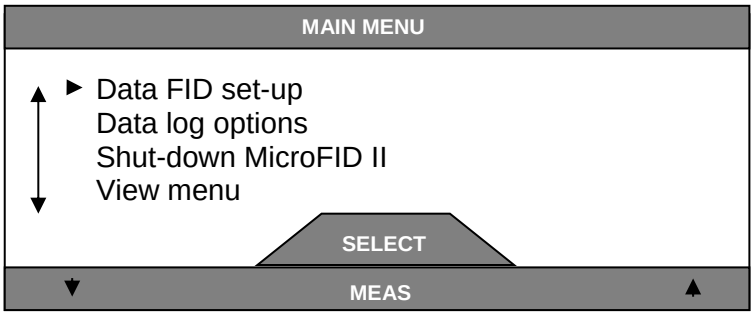
Pairing

Bluetooth-enabled instruments need to be paired with the receiving or sending base which is typically a computer or PDA. The pairing protocol will create a communications port for the computer linking device, and will then begin a search for Bluetooth serial communications devices. This pairing will occur during a send receive from the unit setup within the computer/PDA when the user selects a specific device serial number from within the MicroFID II unit. Most software programs from Bluetooth-enabled devices will find available MicroFID II units with the sending unit. This serial number will not be the INFICON MicroFID II serial number which is etched into the casing but rather the serial number of the Bluetooth send/receive chip within the MicroFID II. For instance, MicroFID II unit serial number AZ300505 has a Bluetooth chip within it having the serial number ending in: C001. Users should rename and add in the MicroFID II serial number to the information for the Bluetooth serial number as to not confuse the data transmission and download or upload from other units accessing the Bluetooth software program.

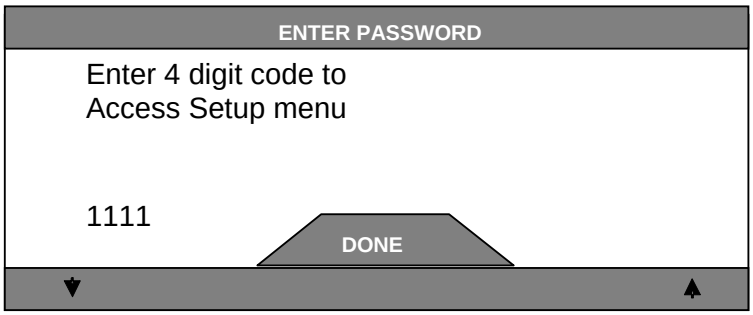
Enabling Blue Tooth Communication

Users of Computer/PDA datalogging software programs will need to perform the following steps in order for the MicroFID II to emit a real-time VOC reading when the unit is actively measuring (i.e., Flame is On).

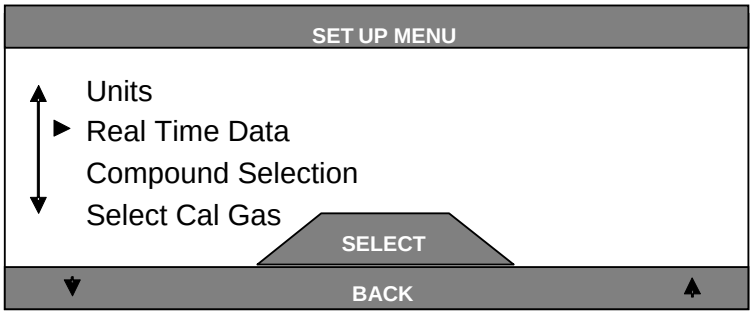
Select MicroFID II Setup.



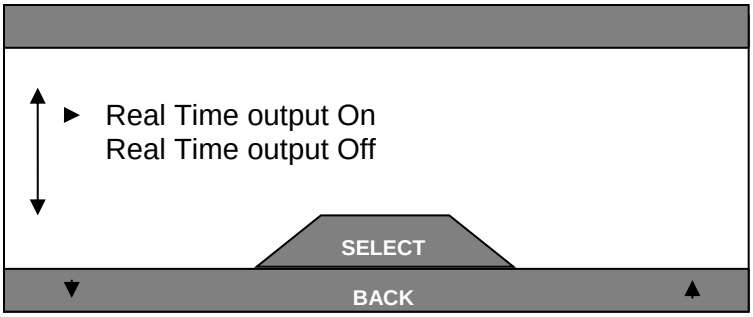
Enter the password when the “enter password” screen appears



Scroll down using the arrow keys to the Real Time Data option and enter Select



Select Real Time Data output ON, then select the Back option 2 times to enter the top level menu or select Measure to resume direct measuring.



Once the Real Time Data output has been turned to the ON position the MicroFID II will begin sending a transmission which will become auto-detected by most computer Bluetooth enabled communication software programs.

5. ROUTINE MAINTENANCE

The following section outlines the procedures for proper maintenance of the MicroFID II.

Maintenance Intervals

Maintenance intervals are a function of the total use of the instrument and can be broken down into the cumulative hours that the unit has been used and the need to ensure proper running performance of the unit.

It is advised that the MicroFID II should have filters changed and an inspection calibration performed at least once a month along with daily calibrations of the unit before use in the field. Of course, filter change-out and calibration are a function of use in the field, conditions of the sampling environment (dusty, etc.) and the critical nature of the measurements.

Battery Charging

The MicroFID II battery pack must be charged for 8 to 12 hours prior to using the instrument to ensure proper charge/discharge timing with future uses.

A fully charged battery powers the MicroFID II for approximately 15 hours.

When the instrument status displays “Low Battery Error!”, the battery pack requires charging. When the “Low Battery Error!” status is displayed, you have a few minutes of operation left. The MicroFID II will turn itself off before the battery pack becomes critically low.

CAUTION: Do not connect the battery charger to the MicroFID II in a hazardous location.

Upon return from field work, charge the battery pack as outlined in Chapter 2. You will need one charger for each battery pack. Use only the MicroFID II battery charger.

NOTE: Do not leave battery packs uncharged for an extended period of time. This will result in damage to the battery packs.

The charger automatically charges at a high charge rate until the battery pack is fully charged. It then maintains the full charge with a low continuous charge rate indefinitely so there is no danger of over-charging.

NOTE: Leaving the MicroFID II for more than 3 months without turning it on may result in the loss of recorded data and setup parameters. If the MicroFID II is not used for long periods of time, turn on the instrument for a few hours every month to avoid loss of data.

Maintenance of the Flame Ionization Detector

The MicroFID II detector is a not a field replaceable unit (FRU) and should not be serviced by the user. Any problems which are occurring with the detector should be directed to INFICON Service.

Replacing Inlet Filter

The MicroFID II uses a filters located in the instrument inlet. The filter is designed to remove dust and water to reduce detector contamination. As the filter collects dust, the MicroFID II's inlet flow rate and sensitivity decrease. The filter will not allow water to pass through, but the filter will not stop all solvents.

NOTE: Do not aspirate liquid samples with MicroFID II!

Replace the filter on a monthly basis, or more frequently if the MicroFID II is used in a dusty or wet environment. You must replace the filter if the MicroFID II has been exposed to liquid water. The pump will sound labored when the filter requires replacement.

CAUTION: Do not replace the inlet filter in a hazardous location.

1. Turn off the instrument. Unscrew the filter housing from the probe housing or unit housing. Be careful not to lose the O-ring seal. See Figure 35

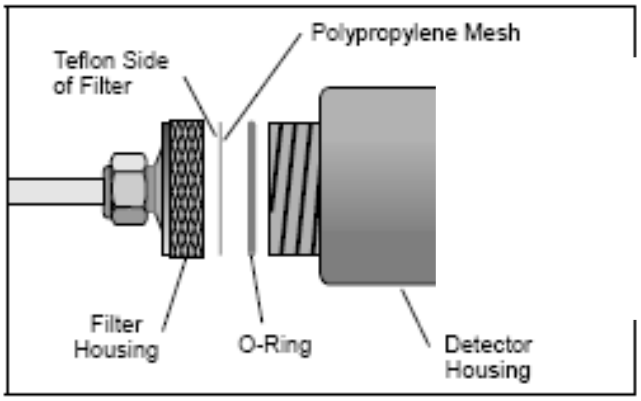


Figure 34. Inlet Filter

2. Remove the Teflon/Polypropylene filter and install the new filter (Part No. MX396015). Place the filter in the filter housing with the Teflon side facing outward in the filter housing and the polypropylene mesh side facing the MicroFID II unit. Handle the filter disk only by the edges. The mesh may be damaged or contaminated by excessive handling. Use forceps if possible.

NOTE: Each filter is protected by a piece of blue plastic. Remove the plastic before installing the filter in MicroFID II.

3. Replace the filter housing.

4. Calibrate all Cal Memories that you are using before continuing operation.

NOTE: Do not operate the MicroFID II without an inlet filter.

Replacing the Sintered Filter (Exhaust Filter)

Through normal use of the MicroFID II, the exhaust frit and cap (Part No. A3201116) can become clogged with fine carbon ash from continuous burning of vapors and gases which exit from the detector. It is vital that this piece be replaced often and a supply should be kept on hand. One of the principle reasons this part needs to be changed out is from excess humidity in the air while the unit is being used. Excess water saturation of the filter element can cause the element to trap and bind particulates from the burn process more easily and accelerate the clogging process. It is suggested that the filter be changed at least once a month to maintain data and machine integrity if sampling is done in a hot and humid condition or when sampling high concentrations of organic vapors and gases. If the use of the MicroFID II is infrequent, the filter can be changed once every six months.

1. Turn off the unit power and close the hydrogen valve.

2. Locate the exhaust frit and cap on the main unit, identified as “Exhaust”. (See Figure 34)

3. Use the multi-tool to unscrew the old exhaust element counterclockwise and replace the exhaust element with a new one (Part No. A3201116).

4. The old exhaust frit and cap can be cleaned and reused. Use methanol or alcohol in an ultrasonic bath.

Calibration

Daily Calibration

The MicroFID II should be calibrated on a daily basis before use.

It is necessary to calibrate the MicroFID II at the temperature at which the unit will be used to minimize the effects of vapor pressure changes with temperature. Performing calibration at the same temperature allows the calibration gas and the sample gas to have equal ionization in the detector.

Monthly Quality Check

Calibration of the MicroFID II as a routine maintenance activity should include measuring the machine against a known standard of good quality gas, and then comparing the result before the calibration. This quality check is most commonly known as a "bump test" and helps define the unit linearity and whether cleaning of the detector collector electrode is necessary. The unit’s performance should be within 20% of the calibration level used. This should be performed once a month and recorded to verify if any changes in the quality check have changed and if the unit should be sent in for service.

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Yearly Service Evaluation

INFICON advises that the MicroFID II be sent to INFICON Service once a year for preventive maintenance and calibration. Sending the unit to INFICON on a yearly basis allows the user to receive upgrades to software, preventive maintenance, cleaning and calibration, along with a calibration certificate. Contact INFICON Customer Service for information on ProCare™ Annual Maintenance.

Maintenance Schedule Table

Item/Operation	Frequency/Usage
Battery Pack Charging	For 8 hours of use, charge 4 hours
Hydrogen Cylinder Filling	5 minutes for 10 hours of use (see Table 2 for cell charge times)
Inlet Filter Replacement	When dirty or once per week
Sintered Filter Replacement	Once every month in wet/concentrated environments
Calibration - Daily	In condition unit will be used
Calibration - Monthly	Record readings. Send to INFICON Service if inaccuracy consistently over 20%

Waste Electrical and Electronic Equipment (WEEE)

EU regulations for the disposal of electric and electronic appliances that have been defined in the EU Directive 2002/96/EC and in national laws became effective in August 2005 and apply to this device.

Common household appliances can be disposed of using special collecting and recycling facilities. However, as the MicroFID II has not been registered for household usage, it must not be disposed of through those means. The device can be returned to your national vendor/sales organization for disposal. Please do not hesitate to contact your vendor/sales organization if there are any questions on this issue.

7. TROUBLE SHOOTING

General Information

If you have a service related question about the MicroFID II**,** consult this manual first. If you cannot find the answer in this documentation, contact the INFICON Service Department.

When you call, you should have your MicroFID II in front of you. You should also have this manual at hand.

Lastly, please have the following information ready:

1. A description of what happened and what you were doing when the problem occurred.

2. Any corrective action that has been taken.

3. The exact wording of any messages that appeared on the display.

Do not service the MicroFID II in a hazardous location.

WARNING

MicroFID II Fault Messages

When the “Check” status is displayed, the MicroFID II’s operation is compromised. Go to the “View menu – List error codes” menu selection to obtain a description of the fault. One exception is the flame out fault. When a Flame-out fault occurs, the instrument display will show “flame out”.

Fault: Detector flame has gone out.

Cause: The hydrogen gas has run out.

Action: Ensure the shut-off valve is open.

Action: Refill the hydrogen cylinder if necessary

Cause: Oxygen supply is deficient.

Action: Ensure there is an adequate supply of oxygen. If you are sampling very high concentrations, it is possible you are sampling above the flame out concentration. The flame out concentration for methane is approximately 52,000 ppm (5.2% methane in air).

A minimum of 17% oxygen is required to start the hydrogen flame. The oxygen is supplied from the sample as it is drawn in by the pump. A minimum of 10% oxygen is required to maintain the hydrogen flame.

Flame out may also occur when sampling enclosed or confined spaces where vapors and gases cannot escape. Watch for indications of increased flame height such as erratic readings or sudden high concentrations followed by a flame out fault.

If you will be using the MicroFID II in a highly contaminated area where it is possible the oxygen content is below 10%, watch for indications of reduced flame height such as lowered detection limits or a flame out fault.

Cause: High concentrations of flammable gases (gases within their flammable range) are present. High concentrations of flammable gases can act as an additional fuel source. When this happens, the flame height may increase beyond the confines of the combustion chamber. The hydrogen supply will then be cut off and the flame will go out.

Action: Move to a location where there is an adequate supply of air and restart the flame. See the information above. Watch for indications of increased flame height such as erratic readings or sudden high concentrations followed by a flame out fault.

Cause: Exhaust port is blocked.

Action: At low temperatures, water vapor, a by-product of the hydrogen flame, may condense at the exhaust port. At sub-zero temperatures, the water vapor will freeze and obstruct the exhaust port. If the exhaust port becomes obstructed, pump operation will be inhibited. Flame out may also result. Operate the MicroFID II within the operating temperature range of 32°F (0°C) to 122°F (50°C).

Action: Replace the exhaust filter with a new or unblocked one. If this does not solve the flame out issue, contact INFICON local service personnel.

Cause: Sample line is blocked.

Action: Ensure the sample line is not obstructed in any way

Cause: Inlet filter is plugged.
Action: Replace inlet filter. See Replacing Filters. See Replacing Inlet Filter section under Routine Maintenance chapter.

Fault: Signal from zero gas is too high.

Cause: Contamination of sample line or fittings before the detector.
Action: Clean or replace the sample line or the inlet filter. See Replacing Inlet Filter section under Routine Maintenance chapter

Cause: Span gas and zero air mixed up.

Action: Ensure clean gas is used to zero the MicroFID II. Mark the calibration and zero gas bags clearly.

Cause: Ambient air is contaminated.

Action: If you are unsure about the quality of the ambient air, use a charcoal filter or a supply of commercial zero grade air.

Cause: Hydrogen supply is contaminated

Action: Hydrogen may react with the carbon in the steel, inside the tank to produce methane. This will only occur if the cylinder is in poor condition and if the hydrogen has a high moisture content. Replace the hydrogen tank. Empty and refill the MicroFID II hydrogen fuel cylinder with fresh hydrogen.

Fault: Signal from span gas is too small.

Cause: Span gas and zero air mixed up.

Action: Ensure calibration gas is used to calibrate the MicroFID II**.** Mark the calibration and zero gas bags clearly.

Action: Ensure the span gas is of a reliable concentration.

Fault: Detector field voltage is low

Cause: Internal fault in the electronics.

Action: Contact the Service Department.

MicroFID II Troubleshooting

Problem: No instrument response detected, yet compounds are known to be present.

Cause: The MicroFID II has not been calibrated properly.

Action: Ensure calibration gas is of a reliable concentration and then calibrate the instrument as outlined in Chapter 3. After the instrument has been calibrated, sample the bag of calibration gas. A reading equivalent to the calibration gas should be displayed. If not, contact the Service Department.

Cause: Background contamination from the hydrogen.

Action: It is possible that the hydrogen has become contaminated and is contributing a high background signal, and the hydrogen supply should be replaced with a new cylinder. When ordering hydrogen, specify ultra high purity hydrogen, 99.999% pure. Empty Refill the hydrogen fuel cylinder with the clean hydrogen supply.

Cause: There is an undetermined problem.

Action: Contact the Service Department.

Problem: Date and time settings are not retained.

Cause: The MicroFID II has not been used for 3 months or more and the internal battery has been discharged.

Action: Turn the MicroFID II on and allow it to run until a “LoBatt” status appears. This will take approximately 15 hours. Remove the battery pack and recharge it overnight. Repeat this procedure for 3 or 4 days. While the MicroFID II is running the internal battery is charging.

Problem: Cannot fill the hydrogen fuel cylinder.

Cause: The hydrogen supply tank has insufficient pressure. You can only fill the internal cylinder to a pressure of less than or equal to the tank pressure.

Action: Fill the hydrogen fuel cylinder or replace the hydrogen fuel cylinder with a full one.

Cause: There is a problem with the refill adapter.

Action: Contact the Service Department.

WARNING

DO NOT modify or disassemble the refill adapter! If you have any problems, the unit must be returned for repair or replacement.

Problem: Instrument status shows “Over”.

Cause: Rapid change in signal level. The detector electronics have been momentarily saturated.

Action: Wait a few seconds for the status to return to “Ready”.

Cause: The detector has become saturated.

Action: Move the MicroFID II to a location where it can sample clean air. Sample zero air until the reading stabilizes around 0.

Problem: Display is blank

Cause: Battery pack is critically low.

Action: Recharge the battery pack.

Cause: The battery pack is not connected to the instrument properly.

Action: Ensure the battery pack charger connection is attached properly to the MicroFID II.

Problem: Sample flow rate varies from 600 ml/min. +/- 10%.

Cause: Inlet filter has not been installed.

Action: Install an inlet filter into the inlet filter cap.

Cause: Inlet filter cap has not been tightened onto the detector cap.

Action: Finger-tighten the filter cap.

Cause: Inlet filter is plugged.

Action: Replace the inlet filter

Cause: Pump has been damaged.

Action: Contact the Service Department.

Cause: Exhaust port is blocked.

Action: At low temperatures, water vapor, a by-product of the hydrogen flame, may condense at the exhaust port. At sub zero temperatures the water vapor will freeze and obstruct the exhaust port. If the exhaust port becomes obstructed, pump operation will be inhibited. Flame out may also result. Operate the MicroFID II within the operating temperature range of 32°F (0°C) to 122°F (50°C).

Action: The exhaust frit has become plugged. Contact the Service Department.

Problem: Flame will not ignite.

Cause: The hydrogen gas has run out.

Action: Ensure the shut-off valve is open.

Action: Refill the hydrogen cylinder if necessary.

Cause: Oxygen supply is deficient.

Action: Ensure there is an adequate supply of oxygen. Do not attempt to ignite the flame in a location where there is greater than 10,000 ppm methane or the equivalent concentration of a flammable gas. Move to a location where there are lower concentrations and start the flame and then begin sampling higher concentrations.

If the flame goes out while you are sampling very high concentrations, it is possible that you are sampling above the flame out concentration. The flame out concentration for methane is approximately 52,000 ppm (5.2% methane in air).

A minimum of 17% oxygen is required to start the hydrogen flame. Oxygen is supplied from the sample as it is drawn in by the pump. A minimum of 10% oxygen is required to maintain the hydrogen flame.

If you will be using the MicroFID II in a highly contaminated area where it is possible the oxygen content is below 10%, watch for indications of reduced flame height such as lowered detection limits or a flame out fault.

Cause: Exhaust port is blocked.

Action: At low temperatures, water vapor, a by-product of the hydrogen flame, may condense at the exhaust port. At sub zero temperatures the water vapor will freeze and obstruct the exhaust port. If the exhaust port becomes obstructed, pump operation will be inhibited. Flame out may also result. Operate the MicroFID II within the operating temperature range of 32°F (0°C) to 122°F (50°C).

Action: Replace the exhaust filter with a new or unblocked one. If this does not solve the flame out issue, contact INFICON local service personnel.

Cause: Hydrogen supply lines are full of air.

Action: If the MicroFID II has not been used for some time, it is possible that the hydrogen supply lines contain air. Fill the hydrogen cylinder and then open the hydrogen shut-off valve. Allow the hydrogen to purge the system for about 5 minutes and then turn on the MicroFID II to start the flame.

Cause: Hydrogen supply lines are blocked.

Action: Contact the Service Department.

Problem: Liquid has been aspirated.

Cause: The MicroFID II has been exposed to a liquid or condensing vapor that can pass through the Teflon/Polypropylene filter.

Action: Contact the Service Department.

8. APPENDICES

MicroFID II Specifications

OperatingTemperature Range	32°F (0°C) to 122°F (50°C)
Operating Humidity Range	0 to 100% (non-condensing)
L x W x H	13 in. x 12 in. x 3 in. (330 mm x 305 mm x 76.2 mm)
Weight:	11.0 lb. (5 kg).
Battery:	15 hours operation, Nickel metal hydride (NiMH)
Keypad:	Three menu keys
Display:	Large 2.8 in. (7.1 cm) diagonal active area. Backlight manually activated
Alarm:	Audible at 85 dB, visual red LED on instrument body
Connectivity:	Bluetooth technology embedded for wireless data connection
Detector:	Flame ionization Detector (FID)
Response Time:	90% of full scale in < 3 seconds
Operating Concentration Range:	0.1 ppm to 50,000 ppm
Repeatability:	±2%
Calibration Standards:	Methane, hexane or propane
Fuel:	99.999% UHP (Ultra High Purity) Hydrogen
Fuel Cylinder:	Metal hydride, 70 liters capacity, 80 PSI cylinder pressure, 70 hour discharge time / recharge 60 minutes, UN3468 classified for air cargo shipments
Fuel Cylinder Weight:	1.9 lb. (0.8 kg)
Fuel Cylinder Dimensions:	6.5 in. (165 mm), 8 in. (203 mm) with coupling, 2 in. diameter (51 mm)
Intrinsic Safety:	Class 1, Division 1, Groups A,B,C & D (UL 913)
FCC:	Class B digital device, pursuant to Subpart B, class B of Part 15 of the FCC rules

PHOTOVAC
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Monitoring Software

Monitoring software compatibility: .....Communicates wirelessly with INFICON's FirstFID software system.

Hand-held device requirements for FirstFID Software: .....Windows ® Mobile 6 or above, 64MB RAM, Bluetooth 2.0 and 480 x 640 screen resolution. Contact INFICON for details,

PHOTOVAC
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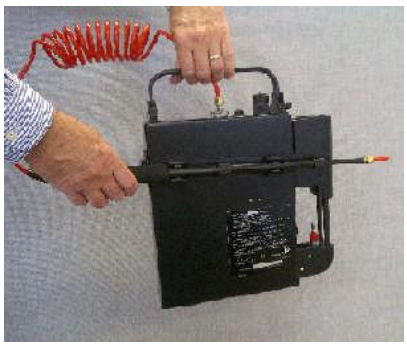
MicroFID II Telescoping Probe Holder Installation Guide

1. Position the MicroFID II so that the back of the instrument is facing you.

2. Peel the adhesive tape off the back of the telescoping probe holder.

3. Position and firmly place the telescoping probe holder tape side down on the back of the MicroFID II.

4. MicroFID II with telescoping probe in the probe holder.



PHOTOVAC
An INFICON Brand

MicroFID II Shoulder Strap Adaptor Kit Installation Guide

1. Kit Includes:
    a. One Shoulder Strap
    b. Two Clip Adapters
    c. Four Screws

2. The shoulder strap adapter will be installed on both sides of the MicroFID II handle.

3. Screw in the adapter from the outside of the handle base. Do this for both sides of the handle base.

4. Install the shoulder strap fastener on the adapters.

Warranty

The MicroFID II is warranted for one year against defects in materials and workmanship.

INFICON warrants that its manufactured product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment to the Customer. This may be voided if, in the opinion of INFICON, the product has been abused or treated in a negligent manner so as to cause damage or failure. Negligent use includes, but is not limited to, exposure of the internal parts of the equipment to water. Damage caused thereby is expressly excluded from this Warranty. Consumable supplies and parts routinely replaced are not warranted.

INFICON and its vendors disclaim any implied warranty of merchantability or fitness for a particular purpose. INFICON and its vendors will not be liable for any indirect, special, incidental, or consequential damages, irrespective of whether INFICON or the vendor has advance notice of the possibility of such damages.

INFICON's sole liability under this warranty is limited to the repair or replacement of the product at its Service/Repair facility and return to the Customer.

When INFICON is made aware of a problem, which would be eligible for remedy under Warranty, it will issue a Return Authorization Number (RMA) to the Customer. No return will be accepted unless such authorization has been obtained. The customer is responsible for insurance and shipping to the designated Service/Repair facility.

Contacting INFICON

To place an order, check the status of an order, obtain current pricing and availability Service and repair of your instrument Applications Assistance Customer Service	**315-434-1100** **www.inficon.com**

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