



IR-8400D Series

Continuous Gas Monitoring Analyzer

Operator's Manual

Revision 2.4

© **Infrared Industries**
25590 Seaboard Lane
Hayward, CA 94545
Phone 800.344.0321 • 510.782.8100
www.infraredindustries.com

Table of Contents

UNPACKING AND VISUAL INSPECTION	6
UNPACKING INSTRUCTIONS	6
REPORTING DAMAGE	6
INTRODUCTION	8
SPECIFICATIONS	10
SPECIFICATIONS	11
TOOLS, EQUIPMENT, AND SUPPLIES	12
Tools	12
Electronic Test Equipment	12
Zero And Calibration Gases	12
Gas Handling Equipment	12
GENERAL	14
PRECAUTIONS	14
MECHANICAL	14
ELECTRICAL	16
GAS CONNECTIONS	17
CONFIGURING THE ANALYZER	19
STANDBY	19
MEASURE	20
Menu	21
OPERATION AND CALIBRATION	23
GENERAL OPERATION	23
MEASURING GASES	23
CALIBRATION	23
RECOMMENDED CALIBRATION SCHEDULE	24
Auto Calibration (OPTIONAL)	24
IR SAMPLE CONDITIONER	29
IR1150/1151 SAMPLE CONDITIONER	29
INSTALLATION	31
INITIAL SETUP	31
OPERATION	31
FILTER REPLACEMENT	31
USB DATA CAPTURE OPTION	33
WARRANTY	35
Warranty for Analyzers and Accessories	35
WARRANTY EXCLUSIONS	35
LIMITATION OF DAMAGES	35
SERVICE	37
INSTRUMENT IDENTIFICATION SHEET	38

Unpacking and Visual Inspection

UNPACKING INSTRUCTIONS

Open the shipping container and carefully remove the analyzer from the container and packing materials. Inspect the instrument for any signs of damage, such as a broken window or mounting feet.

REPORTING DAMAGE

Should there be any apparent damage to the instrument inside or out, which has occurred due to shipping and handling, notify both the shipper and Infrared Industries immediately. If there is any visual damage to the shipping container or packing material, these items should be saved for inspection by the shipper.

Introduction

The gas analyzer operates by comparing the infrared transmission of distinct spectral bands through a single optical path. The spectral bands are centered in the absorption bands of the gas being measured. An additional spectral band is centered in a wavelength in which there is no gas absorption and is used as a reference for the other gases being measured. The difference in absorption of these infrared wavelengths is converted to an electrical signal by the IR detector. The signal from the detector is electronically processed to derive a direct measurement of the target gas in the sample stream.

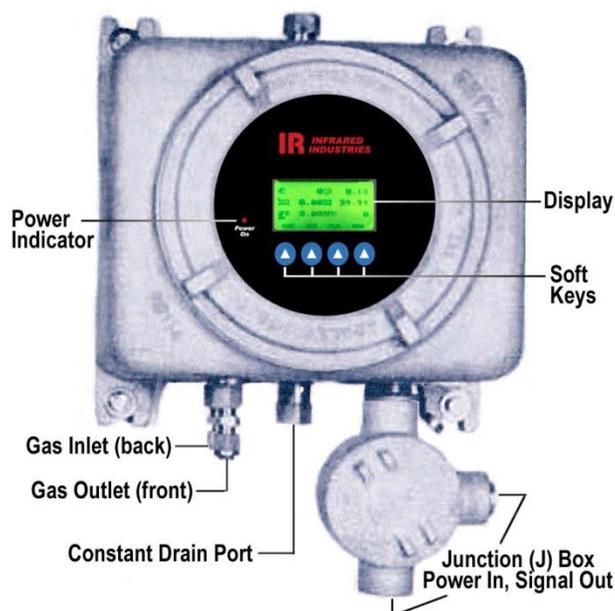


Figure 1: IR-8400D Series

The Infrared Industries IR-8400D series models are non-dispersive infrared (NDIR) gas analyzers, capable of continuously monitoring various gases in a sample stream for extended periods of time. The IR-8400D is designed specifically for the measurement of hydrocarbons. The IR-8400DC compensates the total hydrocarbon reading for the amount of methane present. Other non-standard gases are possible. Contact your IRI representative for further details. The ranges for the IR-8400D series are analyzers specified by the customer's requirements. The instrument is designed specifically for enhanced oil recovery applications as well as refineries and petroleum transfer stations. The analyzers are temperature and pressure compensated to achieve long-term stability and negate the need for frequent calibrations. The IR-8400D series is built to withstand hostile temperatures and is housed in an all-weather enclosure. The IR-8400D series can be read, interfaced, and configured through its non-contact LCD display.

Standard features include a solid-state detector, a direct-reading display, a low-energy infrared source, and many field-serviceable components. Standard outputs are a, 0~100mV, 0~1/0~5VDC, and a single isolated linear 4-20mA.*

* Additional isolated linear 4-20mA current outputs are optional.

Specifications

Measured gases (optional):	Butane, Methane, Propane (See identification sheet for specified gas configuration for a specific serial number)
Measurement range:	Specified by customer
Accuracy:	$\pm 1.0\%$ F.S. (Absolute) or $\pm 2\%$ of reading (Relative)
Repeatability:	$\pm 1\%$ of reading or $\pm 1\%$ F.S.
Stability:	24 Hour Period <ul style="list-style-type: none">▪ $\pm 0.5\%$ F.S. zero drift (Maximum)▪ $\pm 1\%$ F.S. span drift (Maximum) 90 Day Period <ul style="list-style-type: none">▪ $\pm 1\%$ F.S. zero drift (typical)▪ $\pm 2\%$ F.S. span drift (typical)
Suggested calibration:	Range: per customer specifications Interval: 6 – 12 months
Display:	0.7" high-visibility LCD
Output (linear):	4-20mA (isolated) Optional: 0-1VDC or 0-5VDC RS232 Bi-directional Digital Communication
Fault indication:	Zero signal fault indication optional
Output noise (RMS):	Less than 0.5% F.S.
Output response time (0 - 90%):	Less than 10 seconds (electronic).
Power required:	IR8400D(C)1: 110/120VAC, 50-60 Hz IR8400D(C)2: 220/240VAC, 50-60 Hz Maximum draw – 2.5 Amps
Warm-up time for specified performances:	Operational in 5 min, fully stabilized in less than 1 hour.
Sample flow rate:	0.5 - 2lpm (1lpm recommended)
Pressure rating (normal use):	1 – 5 psi
Pressure (Maximum):	25 psi
Materials of construction (wetted):	316 Stainless Steel, Sapphire, Teflon, Viton, and Polypropylene
Enclosure:	10.25 x 10.25 x 8.5 inch enclosure with display window and attached 3.50 dia. x 2.50 inch junction box. (See Figure 1)
Enclosure Rating:	NEMA 4 / NEMA 7 (Group C, D, E, Div 1, 2)
Gas Connections:	1/4" compression fitting, sample inlet; 3/8" or 1/4" compression fitting, sample outlet.
Weight:	28 lbs (12.7 kg)
IP Rating:	66

Specifications

Environmental Conditions:

Indoor/Outdoor use

Temperature range:

-40° to 140°F (-40° to 60°C)

Relative humidity:

Up to 100% non-condensing

Altitude:

under 2000 meters (6562 feet)

Mains Supply Voltage fluctuations:

+/- 10%

Over Voltage category:

2

Wet location:

Yes

Pollution Degree:

#3

The specifications as stated above are based on a sample stream that is free of particulates and condensable vapors and regulated to a flow of 1SLPM (standard liter per minute).

Tools, Equipment, and Supplies

The procedure for calibration and field service of the gas analyzer requires the following tools, test equipment, and expendable supplies:

TOOLS

- Magnetic Wand (provided).

ELECTRONIC TEST EQUIPMENT

- Oscilloscope, Tektronix Model 912B or equivalent.
- Digital Voltmeter, Fluke Model 8000A or equivalent.

ZERO AND CALIBRATION GASES

- Nitrogen in a pressurized cylinder (zero gas).
- Calibration gas, near full-scale concentration, with a nitrogen balance, in a pressurized, certified cylinder.

GAS HANDLING EQUIPMENT

- Pressure regulators for zero and span gas cylinders.
- Teflon TM* gas tubing or equivalent, 1/4 inch OD, 10 feet.
- An IR-1150/1151 sampling conditioner or equivalent.

*Teflon TM is a trademark of E. I. DuPont

Installation

GENERAL

The size of the analyzer allows for ease of installation and service. The analyzer was built to be robust and to handle rugged environmental conditions. The instructions below are for a typical installation. If you have any doubts or questions regarding a particular installation, consult our applications engineer at the factory at (800) 344-0321.

CAUTION: APPROPRIATE SAFETY PRECAUTIONS SHOULD BE OBSERVED WHEN INSTALLING IN A POTENTIALLY HAZARDOUS AREA.

PRECAUTIONS

To insure accurate operation of the instrument, the following precautions must be taken. The instrument should be shaded from mid-day sun conditions. Direct radiant sun energy on a hot day can cause overheating. Internal temperatures over 140°F (60°C) must be avoided. A sunshade, as discussed later, should be utilized.

Line voltage surge protectors are provided. Infrared Industries may include additional protection devices at the time of installation, if deemed necessary.

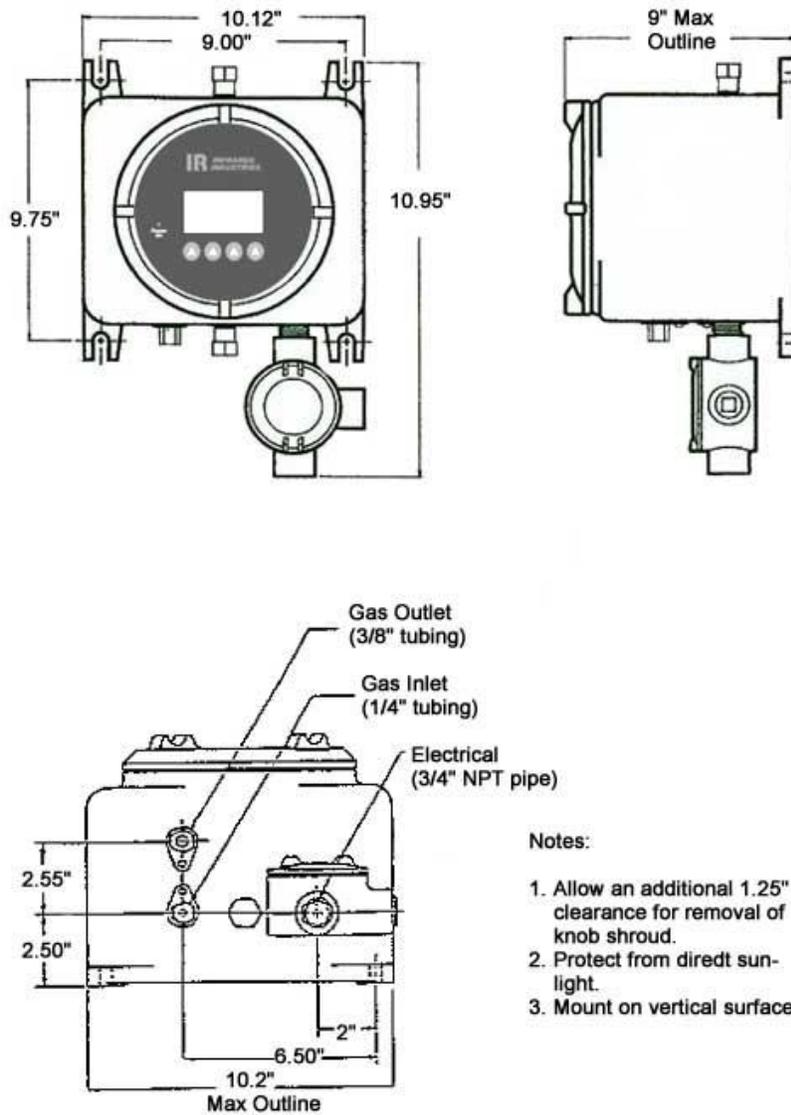
CAUTION: IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY INFRARED INDUSTRIES, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.

MECHANICAL

This analyzer is designed to be mounted vertically on a wall or panel (see Figure 2: IR-8400D Series Outline Dimensions).

You must provide room for access to the instrument on both the bottom and right-hand side (as viewed from facing the front panel). This allows for connections to the gas sample inlet and outlet, and to the electrical junction box on the bottom.

A sunshade is required to protect the instrument from excessive radiant heating. Requirements for the sunshade will vary with geographical location. The primary consideration is shielding from the warmest or mid-day sun. Internal analyzer temperatures must not exceed 140°F (60°C).



Notes:

1. Allow an additional 1.25" clearance for removal of knob shroud.
2. Protect from direct sunlight.
3. Mount on vertical surface.

Figure 2: IR-8400D Series Outlying Dimensions

ELECTRICAL

All electrical interconnections are brought out to a convenient junction box for easy installation. The junction box has a cover, which is easily removed for access to the internal terminals. Two conduits are provided: one for the AC power and the second for the output signals (see Figure 3 for details).

CAUTION: ALL ELECTRICAL WIRING SHOULD COMPLY WITH THE NEC AND ANY LOCAL STANDARDS.

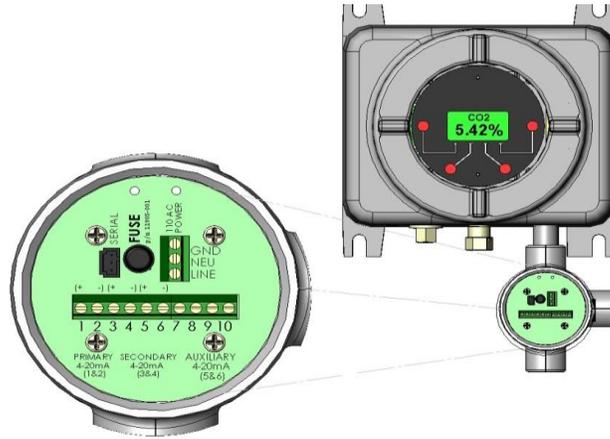


Figure 3: Junction Box Wiring

A switch or circuit breaker (size 5A) marked as the disconnecting device must be included in the building installation. This device should be in close proximity to the equipment and within easy reach of the operator.

A single-phase power source is required to operate the instrument. The IR8400D(C)1 models require 110 to 120 volts AC. The IR8400D(C)2 series of analyzers require 220 to 240 volts AC. The hot, neutral, and ground leads should be connected to the appropriate line power inputs using the insulated terminals provided with the instrument (P/N 11002-001).



THE INPUT WIRES SHOULD BE INSULATED TO GREATER THAN 90° CELSIUS.



RISK OF ELECTRICAL SHOCK. MAINS POWER TO THE EQUIPMENT SHOULD BE SHUT OFF DURING INSTALLATION, FIELD WIRING, & ALL MAINTENANCE.



PROTECTIVE EARTH GROUND MUST BE PROVIDED TO THE EQUIPMENT AT ALL TIMES. EARTHING CAN BE PROVIDED VIA MAINS SUPPLY TERMINAL LOCATED INSIDE THE J-BOX OR THE EARTHING STUD LOCATED OUTSIDE THE J-BOX.



LES FILS D'ENTRÉE DOIVENT ÊTRE ISOLÉS À PLUS DE 90° CELSIUS.



RISQUE DE CHOC ÉLECTRIQUE. L'ALIMENTATION SECTEUR DE L'ÉQUIPEMENT DOIT ÊTRE COUPÉE PENDANT L'INSTALLATION, LE CÂBLAGE SUR LE TERRAIN ET TOUTE L'ENTRETIEN.



UNE MISE À LA TERRE DE PROTECTION DOIT ÊTRE FOURNIE À L'ÉQUIPEMENT EN TOUT TEMPS. LA MISE À LA TERRE PEUT ÊTRE ASSURÉE VIA LA BORNE D'ALIMENTATION SECTEUR SITUÉE À L'INTÉRIEUR DE LA J-BOX OU LE GOUJON DE MISE À LA TERRE SITUÉ À L'EXTÉRIEUR DE LA J-BOX.

The junction box contains a 2.5 Amp fuse for the AC power. The fuse is not replaceable in the field. The outputs available from the junction box include the standard 4-20 mA isolated output and serial communication. This output can accommodate up to a 600 Ohm loop. Also available is a 0-100 mV DC output. Several optional ranges, such as 0-1, 0-5, or 0-10 VDC, are available. This output appears at the recorder plus and minus terminals. This signal should feed an input impedance of 1 mega-ohm or greater to prevent loading of the signal. A fault indicator circuit is used to monitor the analyzer. In the event of an instrument failure, this will result in a zero signal output condition, where the display and output signals out will go to zero, indicating an instrument fault.

As an option, the analyzer can be outfitted with set point alarms. These contain relay closure outputs with a maximum rating of 10 watts at 28 volts DC.

G A S C O N N E C T I O N S

Unless calibrated specifically for other pressures, the analyzer requires a feed of clean and dry sample gas at atmospheric pressure for analysis. The sample flow rate should not exceed 2lpm. Since the analyzer is usually calibrated with the sample cell at atmospheric pressure, pressurized gases must be reduced ahead of the analyzer. A typical gas handling system would include a pressure regulator, a coalescing particulate filter, a multiple inlet valve for introduction of calibration gases, and a flow meter with metering valve. A prepackaged sample system, such as the Infrared Industries IR-1150 series, may be provided. The conditioner and analyzer are usually mounted on the same plate.

The inlet gas connection on the analyzer is a 1/4" compression fitting. The standard outlet gas connection is 3/8" compression. It is recommended that the outlet be vented away from the instrument to ambient air. The tubing length and number of bends should be minimized in the vent line to reduce the backpressure in the analyzers sample cell.

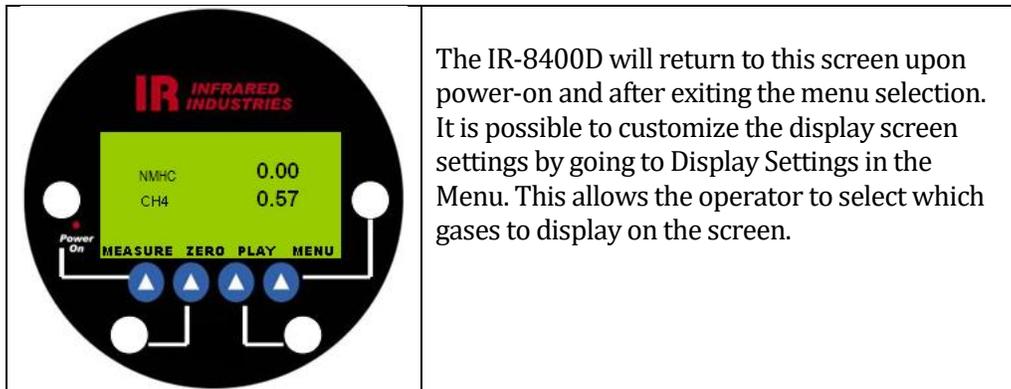
CAUTION: VENTED GAS MAY BE HAZARDOUS (EXPLOSIVE) AND SHOULD BE TREATED ACCORDINGLY.

ATTENTION: LE GAZ VENTILÉ PEUT ÊTRE DANGEREUX (EXPLOSIF) ET DOIT ÊTRE TRAITÉ EN CONSÉQUENCE.

Configuring the Analyzer

After connecting power to the IR-8400D series the "Power Indicator" will be illuminated confirming that there is power to the analyzer. The analyzer will automatically turn on once power is supplied. When warm-up is complete, the Measure Screen will appear.

STANDBY



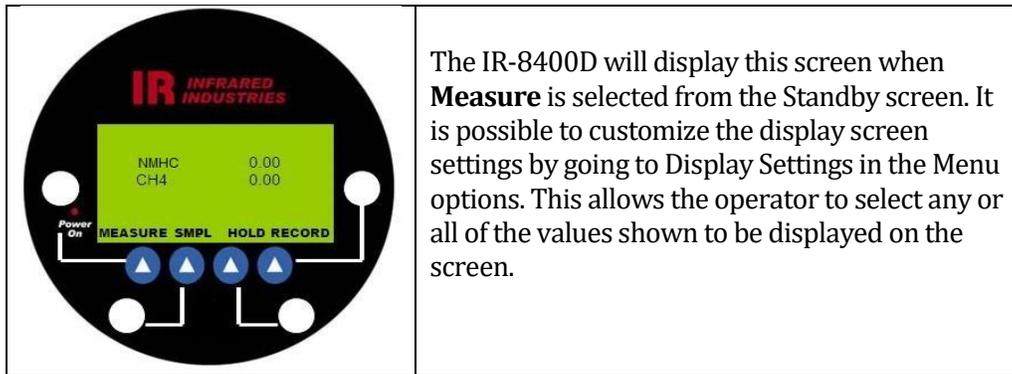
MEASURE – Allows for more advanced features: selecting gas input port, freezing the display and recording to a USB flash drive if that option is installed.

ZERO – Zeros the analyzer for approximately 75 seconds.

PLAY – Not used.

MENU – Use this button to access menu options.

MEASURE



MEASURE – Selecting **MEASURE** returns the analyzer to the Standby screen.

SMPL – Selects which input port to activate. This feature is only available if the auto-calibration option is purchased with the analyzer. Pressing this button will rotate between the following choices:

SMPL – sample gas

PURGE – purge gas

CAL1 – calibration gas 1

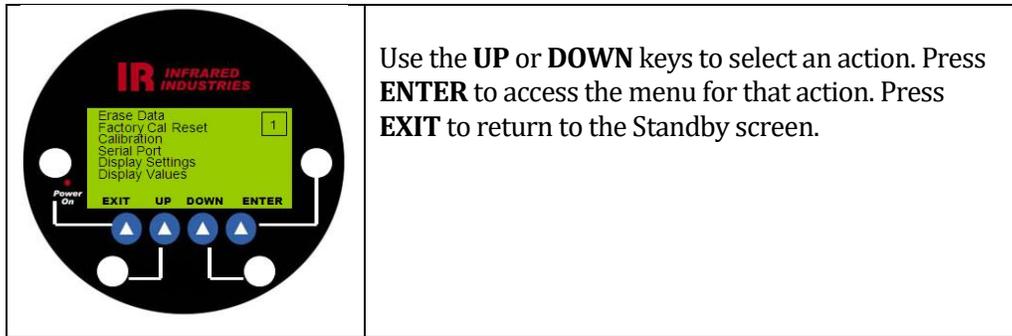
CAL2 – calibration gas 2

HOLD / RESUME – Selecting the **HOLD** key will lock the display values to capture that moment in time. Once the **HOLD** key has been initiated the **HOLD** enunciator will change from **HOLD** to **RESUME**.

To return to normal operation press the “**RESUME**” key and return to a live display.

RECORD – Starts and Stops recording to the USB flash drive (option must be purchased). At power-on this option is automatically selected.

M E N U



Use the **UP** or **DOWN** keys to select an action. Press **ENTER** to access the menu for that action. Press **EXIT** to return to the Standby screen.

DISPLAY SETTINGS – Allows the operator to set Backlight and degree of Contrast. Select the Light key to turn on/off the backlight. Use the Up key for more contrast, and the Down key for less contrast. Select **EXIT** to return to the Measure screen.

FACTORY CAL RESET – Select “**Yes**” to reset the factory calibration settings and automatically return to the Measure screen or “**No**” to go directly back to Measure.

CALIBRATION – Select to perform a Span of the analyzer (See Operation and Calibration).

4-20 Output – This option allows the operator to select which gas values will be output on each 4-20 channel. First select the channel (1 – 4) then select the gas.

ADJUST ANALOG – This option allows the operator to make fine-tune adjustments to the analog outputs. First select the analog channel (1 – 4). Next enter zero gas into the analyzer. When the gas has stabilized use the “+” or “-” to adjust the zero value. When the zero is accurate enter the span gas into the analyzer. When stabilized use the “+” or “-” to adjust the span setting.

O2 ZERO – Zeros the O2 cell (if present).

SERIAL PORT – This option defines what is connected to the serial port. The two choices are **PC** (to connect to a PC) or **USB** to connect to the USB flash drive (if present)

DISPLAY VALUES – Allows the operator to customize the display on the Standby screen. Use the ENTER key to select the desired position and the + key to scroll to the desired value using --- to indicate no value to be displayed.

SYSTEM INFORMATION – This screen contains information about your system: PEF (propane equivalency factor), the serial number and software version. Press “**DONE**” to return to the Measure screen.

RECORD TIME – Only valid when using the USB flash drive record option. This time specifies the interval (in seconds) between each recording to the flash drive.

ERASE DATA – Not used.

Operation and Calibration

GENERAL OPERATION

In addition to the Power Indicator, there are four soft keys on the IR-8400D Series Gas Analyzer. These keys allow you to select actions and change the display accordingly. Each key corresponds to a select position on the screen. When you change screens, the key designators will change to indicate the function of that key.

MEASURING GASES

You can begin measuring gas concentrations once the sample supply line has been connected to the ¼ inch Sample Inlet Fitting located on the analyzer. By rotating the gas selector valve located on your sampling conditioner you can select your Sample gas, Cal gas, or Zero gas, to flow to your analyzer. Once you have selected your desired gas then allow 30 seconds for the gas to stabilize in the sample cell. While the **MEASURE** is on, you can hold or freeze the display values by pressing the corresponding Soft Key.

CALIBRATION

The calibration of the analyzer is straightforward and easily accomplished. It does require a cylinder of compressed nitrogen for zeroing the instrument. Clean, dry air may be used as an alternative to nitrogen. Spanning of the instrument requires a cylinder of certified compressed calibration gas with a nitrogen balance. In the absence of state or federal directives; it is recommended that a range of calibration gas be no less than 10% above your average system reading and no greater than 100% of the calibrated range of the analyzer. For example, if the instrument is factory calibrated for a 0-50% measurement and your average reading is 35%, the calibration gas range for spanning the instrument should be between 38.5% and 50%.

After sufficient warm-up, turn the gas selector to **ZERO** on the sample conditioning unit and allow the zero gas to flow through the analyzer for 1 minute prior to entering the calibration process. To initiate the calibration process, press the “**MENU**” key. Once you have entered the **MENU** field, press the “**DOWN**” key until **CALIBRATION** is highlighted. Select this field by pressing “**ENTER**” once this field is highlighted. When calibration is selected, the instrument will zero itself. Make sure the gas selector on the conditioning unit is still set to zero and zero gas is running through the instrument at this time.

Once the analyzer has zeroed, the display will prompt you to **ENTER TAG VALUES**. The tag values are the concentrations listed on your calibration gas bottle. Enter the values using the corresponding soft keys. The **GAS** key selects the desired gas to be set. This is only used if the analyzer is configured to measure

more than one gas. The **NEXT** key moves the highlighted cursor from right to left allowing you to select the digit or numeral to be adjusted. The + key will allow you to scroll through the selected numerical value until the desired numeral is reached. When all the tag values are correctly set, press “**CONTINUE**” and you will be prompted to **TURN ON THE CALIBRATION GAS**. At this time turn your selector switch on the sampling unit from **ZERO** to **CAL GAS**. Watch the display on the analyzer; you will see the gas values rise as the calibration gas enters the analyzer.

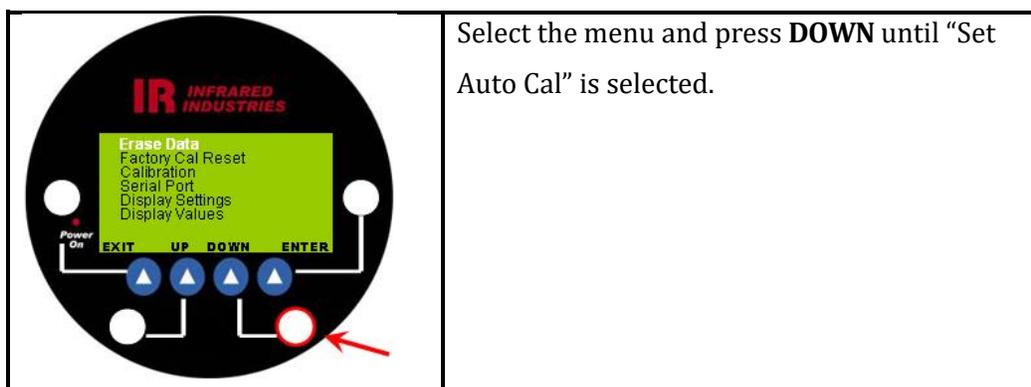
When the values have stabilized press “**CONTINUE**”. The word **CALIBRATING** will appear at the top of the screen while the analyzer is performing the calibration. When the calibration is complete, the **CALIBRATING** prompt will go out. Rotate the gas selector from **CAL GAS** to **ZERO GAS** and wait for the display value to drop to “0”. At this time turn off the **ZERO GAS** and the analyzer will then be ready to go back into service mode. Return the analyzer to service by selecting **SAMPLE GAS** on your sampling conditioners gas selector.

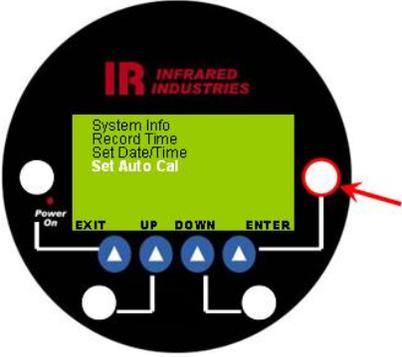
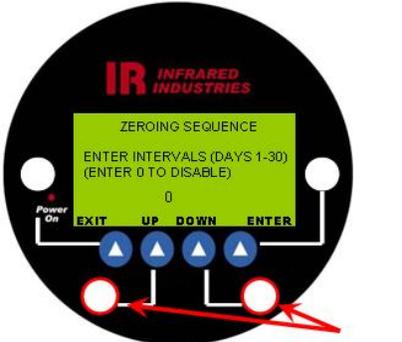
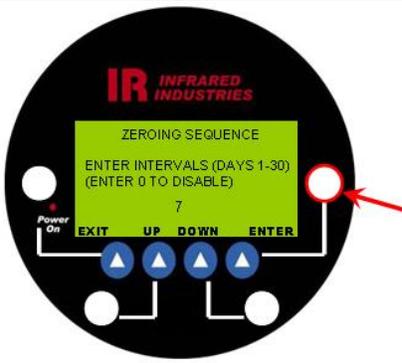
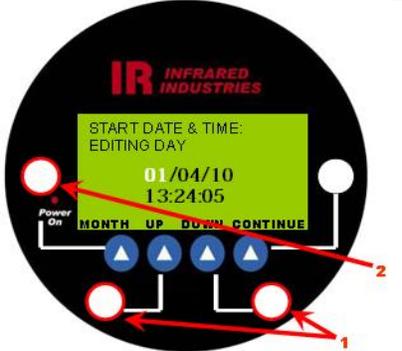
RECOMMENDED CALIBRATION SCHEDULE

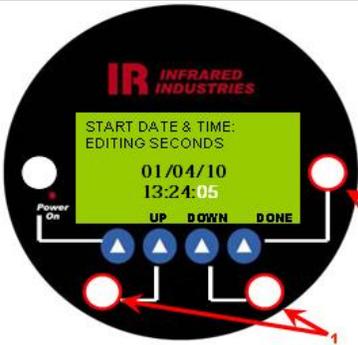
Calibration schedules are typically set forth by the state compliance standard for the jurisdiction of the monitoring site or by federal standards for your industry. For those areas without federal or state requirements IRI recommends a periodic calibration schedule of every 90 days or upon re-initiation of any disruption of service.

AUTO CALIBRATION (OPTIONAL)

A manual calibration must be performed before setting up the auto calibration routine or anytime the calibration gas values change. The auto calibration will take the tag values from the last manual calibration.



	<p>Press ENTER to start the Auto Calibration configuration.</p>
	<p>Using the UP and DOWN buttons you will set the frequency (in days) for the auto zeroing feature to run. This must be a value between 1 and 30.</p>
	<p>Once you have set the interval press CONTINUE.</p>
	<p>Set the start date and time for the first auto-zero. The date is displayed as day/month/year. Use the UP and DOWN buttons to select the day. When the day is selected press MONTH to select the month.</p>
	<p>Select the month by pressing the UP and DOWN buttons. When done select YEAR to edit the year.</p>

	<p>Select the year by pressing the UP and DOWN buttons. When done select HOUR to set the hour.</p>
	<p>The time is displayed in a twenty-four hour clock as hh:mm:ss. Select the hour by pressing the UP and DOWN buttons. When done select MINUTE to set the minutes.</p>
	<p>Select the minute by pressing the up and down buttons. When done select "Seconds" to set the seconds.</p>
	<p>Select the seconds by pressing the up and down buttons. When done select "Continue" to continue.</p>
	<p>Using the UP and DOWN buttons you will set the frequency (in days) for the auto calibrating feature to run. This must be a value between 1 and 30 and be a multiple of the number of days between auto-zeroing. The calibration will immediately follow the auto-zero. A value of zero will disable auto-calibration. Select Done when complete.</p>

IR Sample Conditioner

IR 1150 / 1151 SAMPLE CONDITIONER

The IR-1150/1151 sample conditioner provides a clean, dry sample to the analyzer at a constant flow rate, for sample pressures greater than 15 psig. The sample conditioner consists of:

- a) A particulate filter and liquids trap with input valve and auto-drain.
- b) A pressure regulator with safety relief valve.
- c) A second particulate filter and liquids trap with manual drain.
- d) A gas selector valve for zero, span and sample gases.
- e) A flow indicator with valve for adjusting the sample flow.
- f) All stainless steel construction.

The plate, on which the sample conditioner components are mounted, provides space and mounting hardware for installing the IR-8400D series. Refer to figure 4: IR-1150/1151 Sample Conditioner.

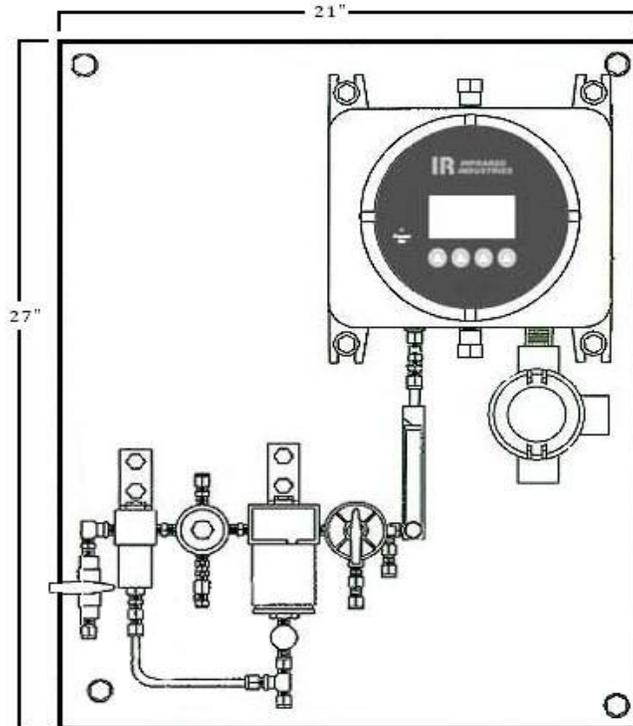


Figure 4: Panel mounted IR8400D Series and IR1151

The sample-in and sample-out connections are made through 3/8-inch compression tube fittings, while the span and zero gas inputs are made at the selector valve through 1/4-inch compression tube fittings. To install tubing to these fittings, cut the tubing square, and deburr as necessary. Insert the tubing into the fitting cap (cap in place) as far as it will go. Use one open-end wrench to hold the body of the fitting, and another to rotate the cap 1 1/4 turns past finger-tight. DO NOT OVER TIGHTEN. When reinstalling the tubing, rotate the cap no more than 1/8 turn past finger-tight.

In operation, the sample conditioner is designed to remove particulates and condensed vapors from the sample gas. The pressure regulator reduces the sample pressure to approximately 8 psig while the pressure relief valve limits the pressure to the flow meter to approximately 15 psig in case of regulator failure. The flow meter monitors and is used to adjust the flow of gas to the analyzer to approximately 1 SCFH.

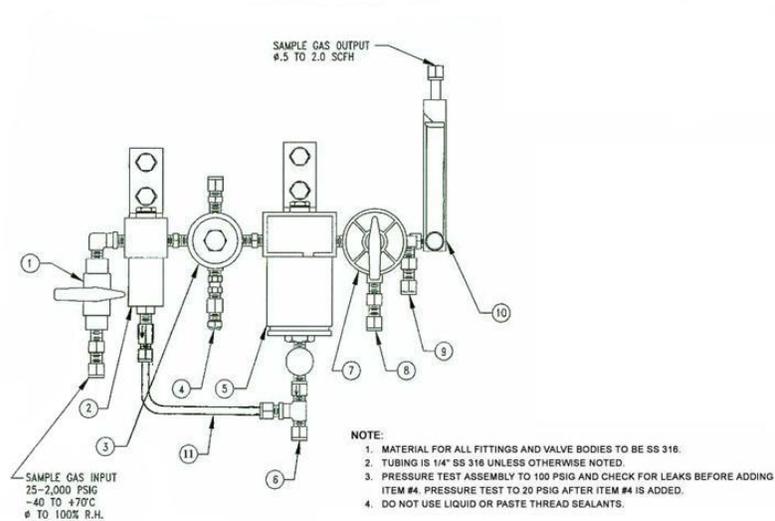


Figure 5: IR1150/1151 Sample Conditioner

- 1) Input Gas Shut-Off Valve
- 2) High-Pressure Filter with Constant Drain Port
- 3) Pressure Regulator (5-15 PSI, set @ 10 PSI)
- 4) Pressure Relief Valve (set @ 20 PSI)
- 5) Low Pressure Filter
- 6) Water Drain
- 7) 4-Way Sample/Cal/Zero Valve
- 8) Zero Gas Input (5-10 PSI, set @ 10 PSIG)
- 9) Cal Gas Input (5-10 PSI, set @ 10 PSIG)
- 10) Flow Regulator (0-5.0 SCFH, set @ 2 SCFH)
- 11) 3/8" SS Tubing (316)

Installation

Mount the analyzer to the conditioner, using the SS hardware attached to the mounting plate. Mount the conditioner and analyzer to a firm, flat, vertical surface, protected from direct radiation by the sun. Use a sun shield, if necessary. Attach the tubing from the flow meter to the analyzer inlet, and tighten the compression fitting 1/8 turn past finger-tight. Install the zero and span gas lines to the selector valve at the appropriate fittings. Attach the bypass, drain, and sample-out gas lines and route to an area away from the analyzer.

***Note:** Both the zero and span gases should have regulators set for approximately 8 psig. With the sample inlet valve closed, attach the sample line to the sample inlet valve attached to the small filter holder.*

INITIAL SETUP

Slowly open the sample inlet valve. With the selector valve in the SAMPLE position, as the flow increases, adjust the valve on the flow meter as necessary to maintain an indicated flow of 1 SLPM. Rotate the gas selector valve to the ZERO position and adjust the pressure regulator on the zero gas bottle for an indicated flow of 1 SLPM. Rotate the gas selector valve to the SPAN position, and adjust the pressure regulator on the span gas bottle for an indicated flow of 1 SLPM. Return the selector valve to the **ZERO** or OFF position. The system is now ready to operate.

OPERATION

Follow the CALIBRATION AND OPERATION instructions provided earlier in this manual. Use the gas selector valve to select the various gases. Open the drain valve located below the larger filter holder (if supplied) when liquid accumulates in the bowl.

FILTER REPLACEMENT

If the flow to the analyzer drops significantly, indicating a clogged particulate filter, both the filter elements need to be replaced. To replace the element in the smaller filter holder, first turn off the sample inlet valve and remove the compression tube fitting attached at the bottom of the filter holder to free the filter bowl. Rotate the filter bowl clockwise (as viewed from the top) and remove the filter bowl and element. Check the condition of the automatic drain orifice, and clean if necessary, using .010 to .012 inch wire. Replace the filter element with a new one (Infrared Industries part no. 11457-001) and reinstall the filter bowl in the reverse order as above.

CAUTION: THE GASES AND LIQUIDS IN CONTACT WITH THE FILTER ELEMENTS MAY BE CORROSIVE AND TOXIC. CARE SHOULD BE TAKEN WHILE

HANDLING THE ELEMENTS OR WHEN VENTING OFF THE RESIDUAL GAS LEFT IN THE FILTER HOLDERS.

To replace the larger filter element, remove the compression fitting attached at the bottom of the filter holder to free the filter bowl. Remove the nut attached to the bottom and remove the filter bowl and element. If supplied, clean the automatic drain orifice as above. Replace the filter element with a new one (Infrared Industries part no. 11637-002) and reinstall the filter bowl in the reverse order as above.

USB Data Capture Option

This option allows the analyzer to record the data readings to a USB flash drive. The interval between recording the readings is set through the “Record Interval” setting in the Menu items. The default value for the record interval is 10 seconds. The analyzer constantly monitors if the USB flash drive is inserted and will record data when the drive is detected. Therefore the flash drive can be removed and re-inserted when the analyzer is operational.

Data is recorded in a csv format. Each day a new file is started. The name of the file has the format YYMMDD.csv.

YY = last two digits of the year

MM = Month

DD = Day

The contents of the file are demonstrated in the diagram below. It contains a Date and Time stamp, Gas Readings, Temperature Readings and the Absolute Pressure reading. Gas concentrations are reported in percent or ppm depending on the analyzer calibration. See the **Instrument Identification Sheet** at the end of this manual.

	A	B	C	D	E	F	G	H	I
1	Date	Time	NMHC CONC	CH4 CONC	THC CONC	GAS TEMP	PCB TEMP	DET TEMP	ABS PRESS
2	10/22/2018	15:14:53	0.014568	-0.002487	0.013723	34.226868	33.438599	58.452938	767.535095
3	10/23/2018	15:15:03	0.017781	-0.002487	0.017145	34.292908	33.381767	57.838654	767.471191
4	10/24/2018	15:15:13	0.018171	-0.002488	0.017612	34.333717	33.297596	57.611855	767.484009
5	10/25/2018	15:15:23	0.017355	-0.002488	0.017669	34.33848	33.297596	58.009121	767.471191
6	10/26/2018	15:15:33	0.016807	-0.002488	0.016899	34.310539	33.288219	58.42633	767.47119

**Notice to Buyer and/or user of the analyzer:
Exclusion of warranties and limitation of damages and remedies**

WARRANTY FOR ANALYZERS AND ACCESSORIES

This analyzer is warranted against defects in materials and workmanship under normal use and service for one year from the date of shipment to the original purchaser.

The sole obligation of the seller and/or manufacturer under this warranty is limited to repairing or replacing as the seller or manufacturer may elect, free of charge at the place of business of the seller or manufacturer, any parts that prove, in the seller or manufacturers judgment, to be defective in materials or workmanship within one year after shipment to the original purchaser.

This warranty shall not apply and is void if, in the opinion of the seller and/or manufacturer, the portable analyzer or any component thereof has been damaged by accident, other causes not arising out of defects in materials or workmanship.

Before purchasing and using this analyzer, the user should determine the suitability of the product for his or her intended use and, the user assumes all risks and liabilities whatsoever in connection therewith.

WARRANTY EXCLUSIONS

THIS WARRANTY AND THE SELLER AND/OR MANUFACTURER'S OBLIGATION HEREUNDER IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER REPRESENTATIONS CONCERNING THE SALE, USE AND/OR PERFORMANCE OF THE ANALYZER.

No person is authorized to give any other warranties or to assume any other liability on behalf of the seller or manufacturer. This warranty shall not be extended, altered or varied except by written agreement signed by the seller and the buyer.

LIMITATION OF DAMAGES

IN NO EVENT SHALL THE MANUFACTURER OR SELLER OF THE ANALYZER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH ANY OBLIGATION IMPOSED UPON THE SELLER OR MANUFACTURER IN CONNECTION WITH THIS WARRANTY. SUCH INCIDENTAL AND CONSEQUENTIAL DAMAGES SHALL INCLUDE, WITHOUT LIMITATION, LOSS OF USE, LOSS OF INCOME, LOSS OF PROFIT (INCLUDING LOSSES TO BUSINESS INTERRUPTION), LOSSES SUSTAINED AS

THE RESULT OF INJURY (INCLUDING DEATH) TO ANY PERSON, AND LOSS OF OR DAMAGE TO PROPERTY. THE LIABILITY OF THE SELLER AND/OR MANUFACTURER ON THIS WARRANTY IS LIMITED TO ACCEPTING RETURN OF THE ANALYZER, REFUNDING ANY AMOUNT PAID THEREON AND CANCELING ANY BALANCE STILL OWING ON THE EQUIPMENT. THIS REMEDY IS EXCLUSIVE-REPAIR OR REPLACEMENT PROCEDURE.

If a product malfunction should occur, you may contact the seller or the manufacturer at:

Infrared Industries, Inc.

25590 Seaboard Lane

Hayward, Ca. 94545 – USA

Phone: 510-782-8100

Fax: 510-782-8101

USA only: 800-344-0321

E-mail: service@infraredindustries.com

If it is necessary to return the gas analyzer, notify the analyzer seller in your area or Infrared Industries at the address above. Package the instrument carefully and securely. Contact Infrared Industries for an RMA number, which is your authorization to send the unit. Note it carefully on the address label. Then proceed to ship the complete instrument with freight prepaid to the above address. Please include a written description of any observations of the malfunction.

Repaired instruments shall remain subject to the one-year warranty period. However, all replacement parts and service are warranted, subject to the limitations stated above, for 90 days from the date of shipment of the repaired instrument to the original buyer.

Instrument Identification Sheet

SALES ORDER NUMBER: _____

MODEL NUMBER: _____

SERIAL NUMBER: _____

GAS: _____

FULL SCALE VALUE: _____

RECORDER OUTPUT: _____

SPECIAL DATA: _____

ORIGINAL PURCHASER: _____

DATE OF ORIGINAL SHIPMENT: _____
