Critical Environment Technologies™

Operation Manual



Rev. K | 2020.03 | For instrument firmware version 4.0.0 & up.

yesAIR **8-Channel IAQ Monitor**

www.critical-environment.com

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1 POLICIES

1.1 Important Notes

Read and understand this manual prior to using this instrument. Carefully read the warranty policy, service policy, notices, disclaimers and revisions on the following pages.

This instrument should be inspected and calibrated regularly by a qualified and trained technician.

This instrument has not been designed to be intrinsically safe. For your safety, **do not** use it in classified hazardous areas (explosion-rated environments).

This instrument is not intended for use in a clean room application.

INSTRUMENT SERIAL NUMBER:

_____

PURCHASE DATE:

_____

PURCHASED FROM:

_____

1.2 Warranty Policy

Critical Environment Technologies Canada Inc. (the manufacturer) warrants this gas monitoring instrument, (excluding sensors, battery packs, batteries, pumps and filters), to be free from defects in materials and workmanship for a period of **two years from the date of purchase from our facility**. The sensors have a warranty period of **one year on a pro-rated basis from the date of purchase from our facility**. This warranty is limited to the mechanics of the physical sensor components and as such, should the sensor become defective within this warranty period, we will repair or replace it at our discretion. This warranty does not extend to sensors that have been poisoned by external compounds such as, but not limited to, extreme gas concentrations, paint fumes, excessive dust, debris, etc. or to sensors that have been improperly zeroed, calibrated or altered in any way. If it is determined **within 90 days of purchase** that a sensor is malfunctioning or unable to remain calibrated due to no fault of its placement or treatment, the instrument may be sent back to the factory for a free calibration service.

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The warranty status may be affected if the instrument has not been operated, calibrated or maintained as per the instructions in the instrument's Operation Manual or if the instrument has been abused, damaged or altered in any way. This instrument is only to be used for purposes stated herein. The manufacturer is not liable for auxiliary interfaced equipment or consequential damage.

Due to ongoing research, development and product testing, the manufacturer reserves the right to change specifications without notice. The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data.

All goods must be shipped to the manufacturer by **prepaid freight**. All returned goods (whether under warranty or not) must be pre-authorized by obtaining a return merchandise authorization (RMA) number. Contact the manufacturer for an RMA number and the procedures required for product transport.

1.3 Service Policy

Critical Environment Technologies Canada Inc. (CETCI) maintains an instrument service facility at the factory. Some CETCI distributors / agents may also have repair facilities; however, CETCI assumes no liability for service performed by anyone other than CETCI personnel.

Repairs are warranted for 90 days after date of shipment (sensors, pumps, filters and batteries have individual warranties).

Should your instrument require non-warranty repair, you may contact the distributor from whom it was purchased or you may contact CETCI directly.

Prior to shipping equipment to CETCI, contact our office for an RMA #. All returned goods must be accompanied with an RMA number.

If CETCI is to do the repair work, you may send the instrument, prepaid, to:
Attention: Service Department
Critical Environment Technologies Canada Inc.
Unit 145, 7391 Vantage Way
Delta, BC, VGN 1M3

Always include your Returned Merchandise Authorization (RMA) number, address, telephone number, contact name, shipping / billing information, and a description of the defect as you perceive it. You will be contacted with a cost estimate for expected repairs, prior to the performance of any service work.

For liability reasons, CETCI has a policy of performing all needed repairs to restore the instrument to full operating condition.

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Pack the equipment well (in its original packing if possible), as we cannot be held responsible for any damage incurred during shipping to our facility.

1.4 Copyrights

This manual is subject to copyright protection; all rights are reserved. Under international and domestic copyright laws, this manual may not be copied or translated, in whole or in part, in any manner or format, without the written permission of CETCI.

All software which CETCI utilizes and / or distributes holds a proprietary interest and is also subject to copyright protection and all rights are reserved. No party may use or copy such software in any manner or format, except to the extent that CETCI grants them a license to do so. IF THIS SOFTWARE IS BEING LOADED ONTO

MORE THAN ONE COMPUTER, EXTRA SOFTWARE LICENSES MUST BE PURCHASED.

Reference important notes under 1.1 Important Notes and 6.2 Switching Instrument On / Off.

1.5 Disclaimer

Under no circumstances will CETCI be liable for any claims, losses or damages resulting from or arising out of the repair or modification of this equipment by a party other than CETCI Service Technicians, or by operation or use of the equipment other than in accordance with the printed instructions contained within this manual or if the equipment has been improperly maintained or subjected to neglect or accident. Any of the forgoing will void the warranty.

Under most local electrical codes, low voltage wires cannot be run within the same conduit as line voltage wires. It is CETCI policy that all wiring of our products meet this requirement. It is CETCI policy that all wiring be within properly grounded (earth or safety) conduit.

1.6 Revisions

This manual was written and published by CETCI (the manufacturer). The manufacturer makes no warranty or representation, expressed or implied including any warranty of merchantability or fitness for purpose, with respect to this manual.

All information contained in this manual is believed to be true and accurate at the time of printing. However, as part of its continuing efforts to improve its products and their documentation, the manufacturer reserves the right to make changes at any time without notice. Revised copies of this manual can be obtained by contacting CETCI or visiting www.critical-environment.com.

Should you detect any error or omission in this manual, please contact CETCI at the following address:

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Critical Environment Technologies Canada Inc.
Unit 145, 7391 Vantage Way
Delta, BC, V4G 1M3
Canada

Toll Free: +1.800.940.8741
Tel: +1.604.940.8741
Fax: +1.604.940.8745
Website: www.critical-environment.com

In no event will CETCI or its officers or employees be liable for any direct, special, incidental or consequential damages resulting from any defect in any manual, even if advised of the possibility of such damages.

2 INTRODUCTION

2.1 Contents

This checklist ensures that you have received everything required to run your IAQ monitor / logger.

If you do not receive any of the items listed below, contact the factory immediately:

- ☑ YESAIR multi-gas monitor / logger
- ☑ AC wall adapter 6 V @ 850 mA
- ☑ Nickel-metal hydride rechargeable batteries (3 x “AA”)
- ☑ Battery cover
- ☑ Calibration tubing with fitting
- ☑ Operation Manual
- ☑ YES Viewer Data Logging Software (optional)
- ☑ Communications cable (optional)
- ☑ Extended battery pack (optional, unless ordered the particulate sensor)

DATE:

_____

CHECKED BY:

_____

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2.2 General Description

Thank you for purchasing our YESAIR, a multi-sensor, battery powered, handheld air quality detection and data logging instrument designed for intermittent or continuous indoor air quality monitoring. It can be handheld, fixed to a wall or set on a desk or tripod.

The YESAIR is available three models:

YESAIR Pump that draws in sample air through a nozzle with an internal pump on the top of the unit.

YESAIR Diffusion that works by sample air passing through the sensor openings by natural circulation of air on top of the unit.

Dual Probe that draws in sample air using the internal pump, through an attached temperature and relative humidity probe and high humidity gas probe. This model is specifically for CO_2 and O_2 sampling in high humidity environments such incubator chambers and horticultural applications (greenhouses, mushroom farms, etc).

NOTE: Specific Dual Probe model information can be found in Section 10 in this manual. The rest of this manual is devoted to the Pump and Diffusion models and shared specifications of all three models.

The Pump and Diffusion YESAIR models are equipped with a top mounted temperature and relative humidity sensor to aid in verifying readings, providing a comprehensive indication of air quality. The Dual Probe model comes with a handheld temperature/relative humidity probe and a high humidity gas sampling probe, both of which attach to the top of the instrument.

Sensor readings, battery level and data logging status can be viewed live on the multi-line, backlit, LCD display. The YESAIR can reliably record time-based information, which can be downloaded via a USB port. Any computer capable of running Microsoft Windows 2000 or higher (with an available USB communications port) can accommodate CETCI's proprietary YES Viewer Software. The YES Viewer Software allows users to analyze and graph the data.

In addition to the temperature and RH sensors, the YESAIR can handle up to 5 additional internal plug & play sensors consisting of a maximum of 3 electrochemical toxic gas or oxygen sensors, and 2 high current draw sensors such as an infrared PID or catalytic sensor, plus 1 externally mounted particulate sensor. Choose from a selection of up to 30 different sensors to best suit your application specifications. Reference the list of available sensors under 4.2 Plug & Play Sensor Gas Types and 4.3 Particulate Sensor Options.

Most of the sensor modules can be changed in the field and are operable within minutes (accurate readings will require more time as each sensor type has a

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different warm up / stabilization period before they are able to perform to publish specifications).

An optional gas sampling probe is available with the Pump model. The probe has a 10 in / 25.4 cm wand and 30 in / 76 cm of tubing that fits onto the nozzle and allows you to reach into areas that are difficult to access.

Calibration and repairs are available at our manufacturing facility and through some of our authorized and trained Distributors.

If after reading through this manual, you have any questions, please do not hesitate to contact our Service Department for technical support.

2.3 Key Features

- Light weight, contoured and comfortable to hold.
- Flame rated ABS / Polycarbonate enclosure.
- Displays readings for all installed sensors simultaneously on backlit LCD display.
- Multi-function, easy to use menu.
- Operates from nickel metal hydride (NiMH) rechargeable batteries (standard), or alkaline batteries, or continuously from the plug-in power adapter.
- Hangs on a wall (rear slot molded in), mounts on a camera tripod or sits on a desk.
- Accommodates a standard cable lock for securing the instrument in place.
- Samples air with an internal sample draw pump or by diffusion.
- Accommodates electrochemical, catalytic, PID or infrared sensor types.
- 30 different plug & play sensors available to choose from.
- 2 externally mounted particulate sensors to choose from.
- Logs and stores information and events on an internal 2GB memory card
- USB data downloading and auxiliary up loading capability from remote probes
- Optional YES Viewer software is Windows XP, VISTA, 7, 8 & 10 compatible

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3 INSTRUMENT SPECIFICATIONS

3.1 Technical Specifications

MECHANICAL

Enclosure	Rugged ABS / Polycarbonate (UL94 rated)
Weight	567 g / 20 oz 655 g (23 oz) with particulate sensor installed
Size	19.7 x 7.8 x 8.9 cm / 7.8 x 3.06 x 3.5 in 25.4 x 12.7 x 8.9 cm / 10 x 5 x 3.5 in with particulate sensor installed
Covers	Sensor cover (removable; top of enclosure) Battery cover (removable; bottom of enclosure)
Security	Slot for cable lock (lower right side)

ELECTRICAL

Power	Standard	Rechargeable 3.6 V NiMH battery pack (8 hours continuous operation time c/w plug-in battery charger / wall adapter (100 - 240 V, 50 - 60 Hz). Note: A “protection diode” in the circuit provides safety protection when the batteries are accidently inserted with reversed polarity.
	Optional	Alkaline AA batteries x 3 See section 6.3 Battery & Battery Warnings.
	Continuous	Plug-in, 6VDC, Class-III, 2 A DC max. wall adapter
Sampling Modes	Pump	Internal, automatic sample pump draws in sample of target environment. (Pump and Dual Probe models)
	Diffusion	Sample air is diffused naturally over the sensors for quick, direct reading. (Diffusion model)
Memory		> 1 million data points data logging to SD memory card (optional)
Calibration		Automated through keypad
Information Recording		12 bit, multi-channel, user configurable with removable 2GB SD memory card. Optional YES Logger package includes: 2GB SD memory card and card reader, 6 foot USB cable and YES Viewer software.

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Circuit	Microprocessor, user configurable.
Communication	Miniature USB port for changing settings and configuring logging functions and auxiliary port for connecting the externally mounted particulate sensor

USER INTERFACE

Display	Back-lit, multi-line LCD alphanumeric display
Buttons	3 tactile push buttons with audible sound for user access
Audible	Internal 80 Db @ 4ft / 1.2 m. One set point adjustment. Audible can be switched off through menu.

ENVIRONMENTAL *(sensor dependent)*

Operating Temperature	5°C to 50°C (41°F to 122°F)
Operating Humidity	0 - 99% RH non-condensing
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Storage Humidity	0 - 99% RH non-condensing

CERTIFICATION

CE Certified	CE standards for safety: CE standards for emissions: CE standards for immunity:	I .S. EN61010-1:2001 (Ed.2) EN 50270:2006 EN 50270:2006
Flammability	UL94 rating	

YES Viewer Data Logging Software (Optional, Purchased Separately)

Minimum system requirements to operate the optional YES Viewer Data Logging Software:

	Descriptions
Microprocessor	Personal computer with Pentium III class processor or better
RAM	512MB RAM (minimum)
Operating System	Windows XP, Vista, 7, 8 or 10
Disk Space	At least 1 MB of available disk space. Additional space is required to store logger files and graph files.
Interface	An available USB port

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3.2 Enclosure Dimensions





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3.3 Enclosure Dimensions with Particulate Sensor Installed



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4 SENSOR SPECIFICATIONS

4.1 Overview

The YESAIR has the capacity for 7 internal sensors – one temperature sensor, one RH sensor and 5 plug and play gas sensors; plus one externally mounted particulate sensor.

The particulate sensor is mounted on the side of the enclosure and connected via the auxiliary port. Choose between PM2.5 or PM10. The particulate sensor uses the YESAIR's data logging capabilities to record data and adds this information to the log file along with the YESAIR's data records.

NOTE: The YESAIR and the particulate sensor are intended for indoor air quality use.

The YESAIR has plug and play smart sensors and placement of those sensors is an important consideration. With the display facing you, look at the top of the YESAIR and you will see five gas sensor sockets. The three sockets closest to the back edge are for electrochemical toxic gas sensors, with SLOT 2 configured specifically for an Oxygen sensor. SLOTS 4 and 5, towards the front edge are for CO2, PID or combustible gas sensor types. If a Nitric oxide (NO) sensor requiring electronic bias within the circuit is used, it must be fitted to one specific sensor location (left rear position, determined by looking at the front of the instrument). Two sensors requiring bias cannot be fitted in the same instrument at the same time. Reference the photo in 9.2 Sensor Location Restrictions.

Sensors can be added or changed as required. However, an instrument that is configured for Nitric oxide, Hydrogen chloride, Ethylene oxide, Hydrazine or Formaldehyde cannot be swapped with a different sensor type without hardware modification and cannot be placed in any other socket than SLOT 1 or 3. If this change is desired, the unit needs to be sent back to the factory to be reconfigured.

Sticky gas sensors (ie. Chlorine (Cl_2), Hydrogen chloride (HCl), Ozone (O_3), Hydrogen fluoride (HF), Fluorine (F_2)) used in the Pump model should be installed in SLOT 1, closest to the inlet port for calibration. The shorter the distance the sticky gas needs to travel, the more accurate the calibration will be.

If the YESAIR is ordered with only a couple gas sensors, the unused sockets will be populated with a dummy sensor plug to ensure a good seal and circulation of air for sensing purposes. The dummy sensor plugs can be removed and replaced with gas sensors as mentioned above, and vice versa. To remove a dummy sensor plug, gently push inwards and turn, releasing the plug from the socket. See section 9.1 Dummy Sensor Plugs.

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4.2 Plug & Play Sensor Gas Types

SENSOR	TYPE	RANGE	PRODUCT CODE
Carbon dioxide (CO_2)	IR	0 - 5,000 ppm	PNP-A+
Carbon dioxide (CO_2)	IR	0 - 10,000 ppm	PNP-A1
Carbon dioxide (CO_2)	IR	0 - 20% volume	PNP-A2
Carbon dioxide (CO_2)	IR	0 - 5% volume	PNP-B
Carbon dioxide (CO_2)	IR	0 - 100% volume	PNP-B1
Methane (CH_4)	IR	0 - 5% volume	PNP-B+
Ammonia (NH_3)	EC	0 - 50 ppm	PNP-H
Arsine (AsH_3)	EC	0 - 2 ppm	PNP-R
Carbon monoxide (CO)	EC	0 - 50 ppm	PNP-C
Carbon monoxide (CO)	EC	0 - 50 ppm	PNP-C
Carbon monoxide (CO), H_2 compensated for use in H_2 background	EC	0 - 50 ppm	PNP-C1
Chlorine (Cl_2)	EC	0 - 5 ppm	PNP-I
Chlorine dioxide (ClO_2)	EC biased	0 - 1 ppm	PNP-J
Ethylene (C_2H_4)	EC	0 - 200 ppm	PNP-E1
Ethylene oxide (C_2H_4O)	EC	0 - 20 ppm	PNP-E2
Fluorine (F_2)	EC	0 - 2 ppm	PNP-S
Formaldehyde (CH_2O)	EC	0 - 5 ppm	PNP-Q
Hydrogen (H_2)	EC	0 - 1,000 ppm	PNP-K
Hydrogen chloride (HCl)	EC	0 - 30 ppm	PNP-M
Hydrogen cyanide (HCN)	EC	0 - 100 ppm	PNP-N
Hydrogen fluoride (HF)	EC	0 - 10 ppm	PNP-O
Hydrogen sulphide (H_2S)	EC	0 - 50 ppm	PNP-L
Nitric oxide (NO)	EC biased	0 - 100 ppm	PNP-E
Nitrogen dioxide (NO_2)	EC	0 - 5 ppm	PNP-D
Oxygen (O_2)	EC	0 - 25% volume	PNP-F
Ozone (O_3)	EC	0 - 1 ppm	PNP-G
Phosphine (PH_3)	EC	0 - 1 ppm	PNP-V

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Silane (SiH_4)	EC	0 - 50 ppm	PNP-W
Sulphur dioxide (SO_2)	EC	0 - 20 ppm	PNP-P
Combustibles (CH_4, H_2, C_3H_8)	CAT	0 - 100% LEL	PNP-X
TVOCs	PID	0 - 300 ppm	PNP-Y+
TVOCs	PID	0 - 30 ppm	PNP-Z+

Legend:
EC Electrochemical
CAT Catalytic
IR Infrared
PID Photo Ionization Detector

NOTES:

1. Not all of the above sensors are available from stock. Delivery time for sensors ordered will vary depending on which sensors are ordered, how many are ordered and measurement range desired.
2. Other measurement ranges are available for some sensors. Contact factory with desired range to confirm availability.
3. Some of these sensors must be calibrated with correlation gases because they are more readily available. If the customer wishes them to be calibrated with the exact target gas, extra charges will apply to acquire the specific gas if and when available. In these cases, customer will be required to take delivery of the special cylinder of span gas and dangerous goods and shipping costs will apply.
4. Some of the above sensors have cross sensitivities to other gases (interfering gases). Please refer to the sensor specification chart before ordering a specific sensor if your application may have some of the interfering gases present.

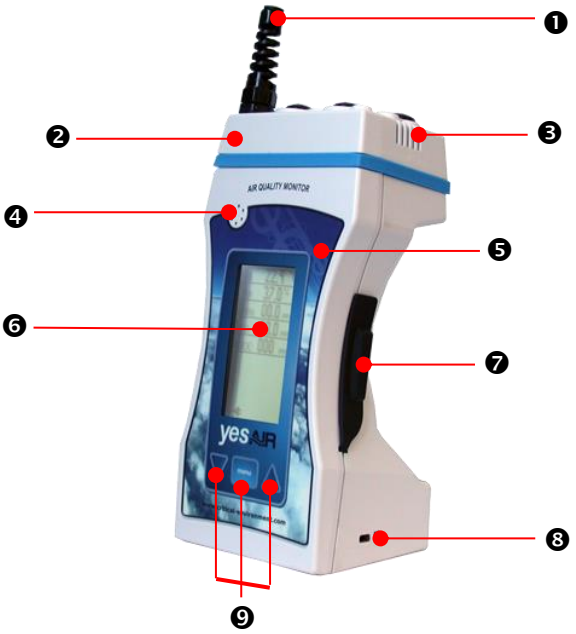
4.3 Particulate Sensor Options

SENSOR	MEASUREMENT	DETECTS	PRODUCT CODE
Particulate	2.5 µg/m3	Smoke, dust, pollen, spores, etc. particle concentrations in air	CET-PM2.5
Particulate	10 µg/m3		CET-PM10

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5 FEATURES & FUNCTIONS

5.1 Front View



NUMBER	FEATURE	FUNCTION
❶	Temperature / RH Sensor Shroud (Pump and Diffusion models only)	Protects from everyday ruggedness and responds quicker to changes in RH and temperature.
❷	Sensor Cover / Cap	Keeps sensors secured inside device.
❸	Air Vents	For venting heat build-up from internal sensors.
❹	Audible Alarm	Internal 80 dB @ 4ft / 1.2 m. One setpoint adjustment. Can be disabled through the menu.
❺	Lexan Label	Visually appealing, protects display, houses push buttons.
❻	Digital Display	User interface; Multi-line, back-lit, LCD, alphanumeric display
❼	Rubber Boot Cover	Covers the USB download slot, auxiliary upload slot and the SD memory card slot for data logging.

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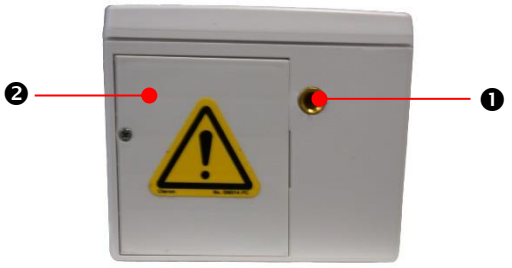
❽	Cable Lock Slot	Secures cable lock similar to what is typically used for laptop computers.
❾	Keypad	3 tactile push buttons with audible sound to maneuver through display menu.



NUMBER	FEATURE	FUNCTION
❶	Air Vent	For venting the air from the particulate sensor fan.
❷	Sensor Housing	Keeps sensor secured inside device.
❸	Cable Cover	Protects cable connecting sensor to auxiliary slot
❹	Rubber Boot Cover	Covers the USB download slot, auxiliary upload slot and the SD memory card slot for data logging.

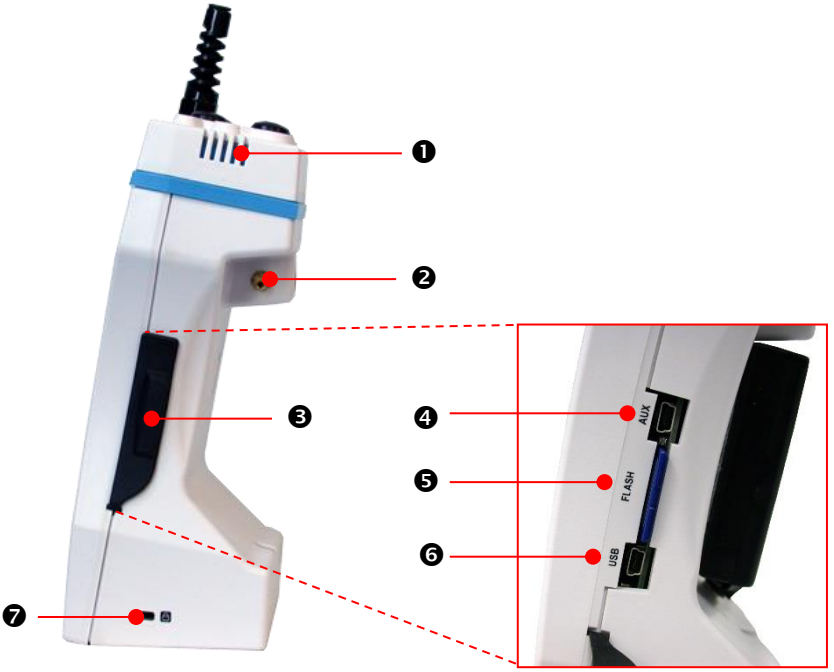
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5.2 Bottom View



NUMBER	FEATURE	FUNCTION
❶	Brass Thread	For camera tripod mounting
❷	Battery cover door	Secures batteries in the device

5.3 Left Side View



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NUMBER	FEATURE	FUNCTION
❶	Air Vents	For venting heat build-up from internal sensors.
❷	Exhaust Outlet (Pump model only)	Outlet for sampled air to leave the device.
❸	Rubber Boot Cover	Covers the USB download slot, auxiliary upload slot and SD memory card slot for data logging.
❹	Auxiliary Port	For connecting to the particulate sensor.
❺	Memory Card Slot	Holds the 2GB SD memory card.
❻	USB Port	For downloading data to the computer.
❼	Cable Lock Slot	Secures cable lock similar to what is typically used for laptop computers.

NOTE: The YESAIR can only accommodate up to a 2GB memory card. It is inadvisable to try to use a larger capacity memory card. Also, if you remove or insert the card without powering the unit OFF, this will cause data corruption and the card will need to be reformatted.

5.4 Rear View

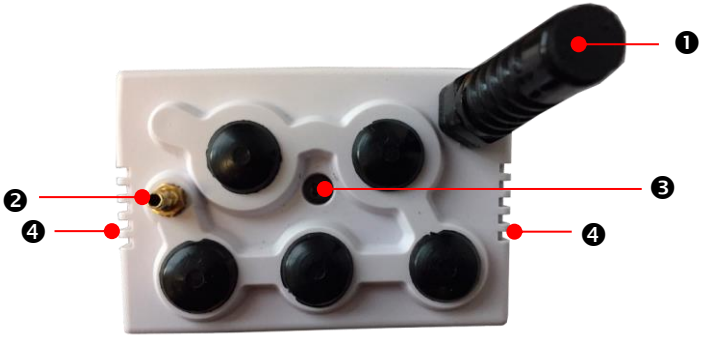


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NUMBER	FEATURE	FUNCTION
❶	Molded Slot	For hanging instrument on wall.
❷	Access Holes	Access to screws holing front & rear enclosure halves together. Three in total.
❸	Label	Identifies the model and serial number.
❹	Exhaust Outlet (Pump model only)	Outlet for sampled air to leave the device.

5.5 Top View of YESAIR Pump Model

The Pump model works by drawing in sample air through a nozzle ❷ on the top of the unit using an internal pump.



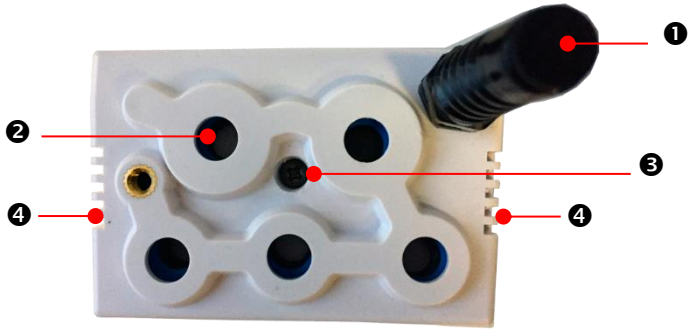
NUMBER	FEATURE	FUNCTION
❶	Temperature / RH Sensor Shroud	Protects the RH and Temperature sensors from being affected by the heat generated by the electronics and gas sensors.
❷	Sample Air Inlet (Pump and Dual Probe models only)	Connection for the calibration tubing or the handheld sample probe or the high humidity gas sampling probe.
❸	Securing Screw	For sensor cover. Do not over tighten.
❹	Air Vents	For venting heat build-up from internal sensors.

NOTE: The air vents on either side of the top surface allow heat build-up from the sensors to escape and should remain clear at all times.

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5.6 Top View of YESAIR Diffusion Model

The Diffusion model works by sample air passing through the sensor openings by diffusion on the top of the unit.



NUMBER	FEATURE	FUNCTION
❶	Temperature / RH Sensor Shroud	Protects from everyday ruggedness and responds quicker to changes in RH and temperature.
❷	Sensor air openings (Diffusion model only)	Allows air to pass/diffuse around the sensors
❸	Securing Screw	For sensor cover. Do not over tighten.
❹	Air Vents	For venting heat build-up from internal sensors.

NOTE: The air vents on either side of the top surface allow heat build-up from the sensors to escape and should remain clear at all times.

6 OPERATION

6.1 Initial Startup Instructions (with included rechargeable batteries)

- Taking notice of the + and – signs, correctly insert the batteries and install the battery cover.
- Plug one end of the AC wall adapter into the YESAIR and the other end into a wall outlet.
- A lightning bolt icon will appear, flashing on the screen indicating the unit is charging. When the icon disappears, the unit is fully charged.
- A full charge may take up to 8 hours, depending on the battery level at time of shipment.

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6.2 Display and Buttons

The YESAIR has an extensive menu system allowing the user to access a wide range of features and functionality. All features and functions can be set to meet the user's specific requirements.

BUTTON PRESSING

The three membrane push-buttons on the front face of the instrument should be pressed firmly and slowly. They have been designed such that an accidental light touch does not register and change something the user may be working on. Use the menu button to select and the up and down arrows to scroll through the menu items. The menu items can also be set using the YES Viewer Software installed on a computer. Each button press is accompanied by a sound, confirming the press has taken place.

SECURITY CODE

Some functions within the menu system are protected by a security code to prevent unauthorized or untrained personnel from accessing them and changing critical values within the instrument that might produce incorrect or unsafe readings. All YESAIR instruments are shipped from the factory with a generic security code:

1	2	3	4

It is recommended the user change this to a code known only to authorize personnel.

DISPLAY ICONS

In addition to menus and sensor readings, the LCD of the YESAIR may display icons to inform or alert the operator of certain operating conditions:

Icon	Name	Description
	Battery	This icon is displayed when the instrument is being powered by batteries. The black bar gets shorter as the batter power gets lower.
	Data Logging	This icon will appear when data logging is enabled.
Flashing 	Charging	This icon will continue flashing when the AC adapter is plugged into the wall, indicating that the unit is charging. This icon will disappear when the unit is fully charged.

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	Plug	This icon is displayed when the instrument is plugged into the wall using the AC wall adapter / charger
P	Pump	This icon flashes on and off to indicate that there is something wrong with the pump.
	Lock	This icon is displayed when the instrument is locked. To unlock the instrument, enter the 4-digit security code.
	Temperature	This icon is displayed next to the current temperature reading.

6.3 Switching Instrument On & Off

SWITCH ON Press “MENU” button down momentarily then release. The multi-line LCD will scroll through each of the information functions as it warms up.

SWITCH OFF Hold “MENU” button down for five to six seconds then release. The multi-line LCD will indicate “Shutting monitor off”.

Upon switch on, the LCD display indicates **“YESAIR, PORTABLE AIR QUALITY MONITOR”, then “WARMING UP UNIT PLEASE WAIT…”** and the inner sample draw pump starts automatically sampling the environment. A symbol at the bottom left corner of the display will indicate if the instrument is operating from batteries or the plug-in wall adapter. After warm up period (approximately 3-minutes), the LCD indicates all installed sensors and their current, real time readings and the cursor flashes.

NOTES:

1. More accurate real-time readings will occur after the sensors have warmed up and stabilized a little longer.
2. Warm-up can be skipped by holding the MENU button for 3-5 seconds

6.4 Battery & Battery Warnings

The YESAIR can operate from three different power sources:

1. Rechargeable Nickel Metal Hydride (NiMH) batteries (3 x “AA”)
2. A plug-in wall adapter/battery charger
3. Disposable alkaline batteries (3 x “AA”)

The YESAIR is shipped with and configured for rechargeable batteries from the factory. Reference 3.3 Technical Specifications. Upon receipt, take notice of the + and – signs and correctly install the batteries and then the battery cover. Plug one end of the AC wall adapter / charger into the YESAIR and the other into the wall outlet. While charging a lightning bolt icon will flash. When the icon disappears, the

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unit is fully charged. A full charge may take up to 8 hours depending on the battery level at time of shipment.

The bar within the battery icon indicates the level of charge. It will reduce in length as the battery level gets lower, eventually disappearing, indicating the unit needs to be charged again.

Plug the YESAIR into the wall using the AC wall adapter / charger. While charging the lightning bolt icon will flash and when it disappears, the unit is fully charged.

You can charge the batteries with the YESAIR powered on or off. The batteries will charge slower if the unit is powered on. Charging will slow to a trickle as it approaches a full charge. If the unit is powered on, the readings will remain stable while charging.

CAUTION If the user wishes to change from one type of battery to another (eg. Rechargeable to Alkaline), you must change the battery type setting in the instrument menu. This ensures that when alkaline batteries are being used, the unit will know not to try to charge them when the unit is plugged into the wall and not cause damage to the batteries or unit.

When using rechargeable batteries, in order to charge them, you have to make sure the instrument is plugged into the wall using the adapter (which doubles as a battery charger). The unit can be left on or turned off while charging. If the unit is off, the charging time is less. It is recommended that when the unit is not in use, you keep it turned off and plugged in. This will keep the rechargeable batteries charged, the sensors warm and reduce the time it takes for the unit to power up and be ready to use.

WARNINGS Properly shutdown the YESAIR before removing the batteries. DO NOT remove the batteries while the YESAIR is running or the unit may not start properly on the next start-up. If this happens, remove and re-install the batteries or use the wall adapter to power the device. Once it has shutdown properly, it should operate correctly on start-up again.

Do not put a fully charged battery pack on a YESAIR with discharged batteries. The level of charge for the battery back and the internal batteries should be similar, full or discharged.

A yellow warning label has been placed on the battery door of the YESAIR. This is to alert the user to the fact that if alkaline batteries are installed by mistake and the user attempts to recharge them with the supplied wall adapter, damage could occur. Recharging alkaline batteries could cause them to leak thus creating potential harm and / or physical damage to the

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instrument. **DAMAGE CAUSED BY THIS TYPE OF ACTION IS NOT COVERED UNDER WARRANTY AND THE MANUFACTURER IS NOT RESPONSIBLE.**

6.5 Main Menu Function

Pressing the MENU button after the main sensor array is displayed allows the user to enter the extensive menu system. The first menu display includes:

PREVIOUS	ALARM
CALIBRATE	INFO
SETTINGS	USB
DATALOG	

NOTE: In all cases, use the ARROW DOWN or ARROW UP buttons to scroll through any displayed menu and use the MENU button to select any highlighted choices.

PREVIOUS Allows the user to go back to the previous function. Pressing the MENU button repeatedly at “PREVIOUS” will step the user back one menu at a time until you finally reach the main sensor real-time display. Alternatively, hold down the MENU button for approximately 6 to 7 seconds and the LCD will jump back to the main, real-time sensor display.

CALIBRATE Allows the user to enter the calibration section of the menu. This section is protected by a security code to prevent unauthorized people from attempting to calibrate the sensors. Reference section 8 Calibration Procedures.

SETTINGS This menu item provides the user with a number of instrument functions that can be set or modified to suit their personal use.

DATALOG This menu item allows the user to set up the internal data logger to suit their specific application. This function can also be achieved with the instrument connected to a computer. Set up and programming through a pc is faster but the YES Viewer data logging function can be completely set up through the menu in the instrument.

ALARM This menu item allows the user to set the alarm levels as well as which alarms are activated.

INFO Provides the user with information on the instrument such as serial number assigned and date of manufacture. It also provides the user with information on the installed sensors such as sensor serial number, date code, and calibration date information.

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USB Allows the user to reset the USB chip if the YESAIR will not communicate with YES Viewer software.

7 MENU FUNCTION DETAILS

7.1 Calibrate Menu

Pressing the MENU button at this menu function puts the user into the calibration section of the menu. The LCD immediately indicates “ENTER SECURITY CODE”. The user must input a 4-digit security code to access the calibration menu. This prevents unauthorized users from tampering with the calibration settings. All YESAIR instruments are shipped from the factory with a generic security code setting of “1234”. The user can easily change this code setting for extra security. Reference 7.2 Settings Menu.

NOTE: If the wrong security code has been entered, the display indicates “INVALID SECURITY CODE ENTERED’ and the display flips back to the menu list.

The calibration menu provides the user with two main functions to calibrate all gas sensors, SPAN and ZERO. Both of these functions are required as part of the regular instrument maintenance to achieve “best performance” from the sensors. **The Zero function must be performed before the span function.**

The frequency of calibration maintenance to expect best performance from installed sensors. Temperature and Relative humidity sensors should be calibrated once per year. All other toxic and combustible gas sensors should be calibrated once every six months for best performance and to meet published specifications.

Below are general guidelines for sensor calibration frequency for best performance.

Sensor Types	Calibration Frequency Recommendations
Photo Ionization Detection (PID) sensors for Total Volatile Organic Compounds (TVOCs)	Every 3 months*
Electrochemical toxic gas sensors	Every 6 months
O_2 sensors (use “clean” ambient environment)	Every 6 months
Infrared CO_2 or combustible gas sensors	Every 12 months
Temperature sensors (at factory)	Every 12 months
Relative humidity sensors (at factory)	Every 12 months
Particulate Sensor	n/a

*Depends on exposure amount and duration.

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NOTE: Total Volatile Organic Compound (TVOC) sensors measure the "total" response from all VOCs in the target area and cannot identify individual gases or chemicals.

Both zero and span functions are automated. Before span adjusting the sensor, the user must first tell the YESAIR what concentration of span gas is being used to span each sensor. This does not apply to temperature, RH or Oxygen sensors. Temperature and RH sensors must be calibrated using a controlled environment such as a chamber. With Oxygen sensors, it is assumed you will use the environment around you because it contains approximately 20.9% O_2. After that, push the menu button over the zero or span selection and follow the instructions on the LCD.

NOTE: For more information on calibration function, see section 8 Calibration Procedure in this manual.

7.2 Settings Menu

This menu item provides the user with the ability to configure much of the instrument functionality to suit their specific needs. Use the ARROW DOWN button to scroll to "SETTINGS" then push the MENU button to enter this menu and view the listed functions. Use the ARROW DOWN button to scroll to the function you wish to change and press the MENU button.

The functions available for modification are:

PREVIOUS	DISPLAY
SENSORS	PUMP
BATTERY	PASS CODE
KEYPAD	DEFAULT

PREVIOUS This menu item is used to return the user to the previous menu.

SENSORS This menu lists only the installed sensors that provide the user with the ability to adjust them from the menu.

The choices are:

- TEMP
- RH
- VOC (TVOCs)

TEMP: The options available are:

- DEGREES C
- DEGREES F
- ADJUST
- DISABLE

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TEMP This menu item allows the user to change the temperature unit from degrees C to degrees F or vice versa. The second function allows the user to adjust the temperature value slightly to align it with another device. The third function allows the user to adjust the RH value slightly to align with another device. The choice is –1% or +1% RH. The fourth function allows the user to disable the temperature reading.

Temperature adjust This menu allows the user to "tweak" the displayed temperature value slightly (±1 degree C or ±2 degrees F). This function can only be used once to prevent excessive adjustment of temperature sensor without the use of a calibration chamber. Using the ARROW DOWN button, scroll to "ADJUST" and press the MENU button. The LCD will ask the user to input the desired numeric value. Once the last digit has been entered, the new temperature value will be automatically saved.

RH adjust This menu function allows the user to adjust the RH value slightly to align with another device. The available RH option is: ADJUST. The choice is –1% or +1% RH. Use the ARROW DOWN button to scroll to the desired choice and push the MENU button.

VOC This menu allows the user to switch the units of measure for the PID sensor only. The choices are: "PPM" or "ug/m^3". **Note that the range in ug/m^3 is 9999.** Using the ARROW DOWN button, scroll down to the desired unit of measure and push the MENU button to accept.

BATTERY This menu item provides the user with two different battery options that can be selected. NOTE: The YESAIR is supplied from the factory, and configured for rechargeable NiMH batteries. If the user wishes to change from one type to another (eg. Rechargeable to Alkaline), they must first make the change through the "SETTINGS" menu. Reference 6.3 Battery & Battery Warnings. Battery types available are: "NIMH"(rechargeable) or "ALKALINE" (disposable). Using the ARROW DOWN button, scroll down to the battery type desired and press the MENU button to accept.

NOTE: The YESAIR is supplied from the factory with (and configured for) rechargeable NiMH batteries. If the user wishes to change from one type to another (e.g., rechargeable to alkaline), he must first make the change through the **SETTINGS** menu.

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KEYPAD This menu item allows the user to leave the keypad operational for anyone using the instrument or lock it so the settings cannot be changed by anyone. A lock symbol appears at the bottom of the LCD display to indicate the keypad lock has been engaged. Anyone trying to use the keypad will encounter a display requesting a four digit security code. The selections are “NORMAL” or “LOCKED”. The instrument is supplied with a generic security code for all lockable functions. It is “1, 2, 3, 4”. Using the ARROW DOWN button, scroll down to the desired selection and press the MENU button to accept.

DISPLAY The menu item provides the user with four settings that can be adjusted for the LCD, alpha-numeric, digital display. “BACKLIGHT”, “NORMAL”, “BLANK”, “CONTRAST”.

BACKLIGHT This menu item allows the user to set the LCD display backlight to ON or OFF. Switching it off saves on battery power. Use the ARROW DOWN button or ARROW UP button to scroll to the desired setting (ON or OFF) and press the MENU button to make the change. Once the backlight has been switched “ON” through the menu, it will remain on for about 30-seconds. After that, the user can then push any button momentarily to activate the backlight for short periods of time. The backlight will remain on for 30-seconds with each activation from an arrow button then automatically turn off to save battery power.

NORMAL This menu item sets the display to the normal view of all installed sensors and their real time gas values. Example: If a user has blanked the LCD display or locked the keypad to prevent tampering, the “normal” function resets everything.

BLANK This menu item allows the user to ‘blank” the LCD display so nobody can view the real time readings. This does not affect the data logging function at all. Using the ARROW DOWN button, scroll to the desired setting and push the MENU button to accept. The LCD goes completely blank. To view the LCD display again, push the MENU button and you will be required to enter the security code.

CONTRAST This menu item allows the user to adjust the contrast of the LCD display. There are seven settings available and they are listed as: “ONE, TWO, THREE, FOUR, FIVE, SIX, SEVEN”. Using the ARROW DOWN button, scroll down to the desired value and push the MENU button to accept.

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PUMP This menu item allows the user to select “REG FLOW” (regular flow) or “HIGH FLOW” for the pump. Use the HIGH FLOW setting when a hose and probe is attached. The higher flow rate helps to overcome the resistance of the hose and probe to maintain an adequate flow of air into the instrument. Using the ARROW DOWN button, scroll to the desired setting and push the MENU button to accept.

PASSCODE This menu item allows the user to set a security pass code to prevent other people from changing the instrument settings. Pressing the MENU button at this option takes the user to the pass code set up screen. The user is required to enter the existing pass code first. Use the ARROW UP or ARROW DOWN buttons to input the existing pass code then push the MENU button. The display then indicates it is ready for a new pass code to be entered. Use the ARROW UP or ARROW DOWN buttons to set the desired numbers for a pass code. Pressing the MENU button at this point saves the new pass code. With the display indicating “NEW PASS CODE HAS BEEN SAVED”.

DEFAULT This menu item allows the user to quickly set up the instrument operating parameters. Pressing the MENU button at this menu function saves the default settings and the following message appears on the LCD: “DEFAULT SET UP HAS BEEN APPLIED”.

7.3 Datalog Menu

This menu item allows the user to set up the information gathering (data logging) function that instructs the microprocessor what and how to write information to the SD memory card. The selections are: ”DEFAULT”, “SET UP”, “ACTIVATE”, “STOP LOG”, “LOCATION”, “MEM CARD”.

DEFAULT This menu item provides the end user with a quick set up option for the data logging function. It sets up basic parameters for the information gathering function. The end user can still enter other menus to manually set up or change all parameters of the information gathering if desired for customizing it to their application. The LCD indicates “DEFAULT SETUP HAS BEEN SAVED”

DEFAULT SETUP 1 min sample rate, Start logging on startup, End logging when file full, Location = NONE

SET UP This menu item allows the user to select the sampling rate. Seven sampling rates are available to choose between, from once every 10-seconds to once every 30-minutes.

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Sampling rates available: 10-secs, 30-secs, 1-min, 2-min, 5-min, 15-min, 30-min. After the sampling rate has been selected, the logger START method must be selected: “STARTUP” or “SET TIME”.

STARTUP Logging will start when the YESAIR is turned on and ACTIVATE has been selected from the DATALOG menu

SET TIME User can set the time and date to start logging.

After the START method has been selected the END method must be selected: “FILE FULL”, “FIXED”, or “SET TIME”

FILE FULL Logging will stop when the SD card memory is full.

FIXED User selects how many samples to take before logging is stopped.

SET TIME User can set the time and date to stop logging.

After the END method has been selected, the logging location must be selected. The selections available in the “LOC” (location) menu are:

NONE
SETUP
<EMPTY>
<EMPTY>

<EMPTY>
<EMPTY>
<EMPTY>
<EMPTY>

Choosing NONE will not set a location for logging.

ACTIVATE This menu item allows the user to enable the data log (information recording) session. Press the MENU button at this item and the LCD indicates “DATA LOG HAS BEEN ENABLED”

NOTES:

1. Once the data logger has been set up, it will not start until “ACTIVATE” has been selected from the DATALOG menu.
2. If the user experiences an error message “MEMORY CARD CORRUPT”, the SD card must be formatted with a PC using Windows FAT32 file system.
3. If memory card is not installed before “activate” is selected, the user will experience an error message “PLEASE INSTALL MEMORY CARD”. The display will then flip back to the data log menu, awaiting further instructions.

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4. DO NOT use a memory card with a capacity larger than 2GB.

STOP LOG This menu item allows the user to turn off the data log session. Press the MENU button at this item and the LCD indicates “DATA LOG HAS BEEN STOPPED”.

LOCATION This menu item allows the user to enter names or identifiers (alpha / numeric) for up to six locations for logging purposes. Names are limited to eight characters.

Example:
NONE
SETUP
KOREA
CONF RM5
<ENMPTY>

MEM CARD This menu function provides the user with information about the memory card.

INFO This menu function indicates the size of the SD card memory and the number of CSV files stored, if any.

ALARM This menu item allows the user to set up alarm set points that would activate the audible alarm. The menu choices are:
ALARM
SET ALARM

The menu choices at this point are:
OFF
ALL
NEXT…
CO
CO_2

NOTE: Only installed sensors show on this menu, eg. CO, CO_2, etc. This menu will only display temperature and RH sensors if an alarm point has been set for them. Go to “SET ALARM” to reference setting alarm set points.

OFF This menu item removes all asterisks in front of all sensors listed (installed) indicating they have been de-selected and will not be included in the alarm set list. Press the MENU button at this menu item and the LCD indicates “ALARM SET UP HAS BEEN SAVED”. The display then goes back to the alarm menu screen.

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ALL This menu item puts an asterisk in front of all sensors listed (installed) indicating they have been selected to have an alarm set point. Press the MENU button at this menu item and the LCD indicates “ALARM SET UP HAS BEEN SAVED”. The display then goes back to the alarm menu screen.

7.4 Alarm Menu

NEXT Select next after you have highlighted only the sensors you want to have alarm set points for. Press the MENU button at this menu item and the LCD indicates “ALARM SET UP HAS BEEN SAVED”. The LCD then goes back to the alarm menu.

TEMP This menu item puts an asterisk in front of the temperature sensor (installed) indicating it has been selected to have an alarm set point

HUMIDITY This menu item puts an asterisk in front of the humidity sensor (installed) indicating it has been selected to have an alarm set point.

CO This menu item puts an asterisk in front of the CO sensor (installed) indicating it has been selected to have an alarm set point

CO_2 This menu item puts an asterisk in front of the CO_2 sensor (installed) indicating it has been selected to have an alarm set point.

NOTE: Other sensors may be indicated here. Only installed sensors will be on this list. Pressing the MENU button at any of the sensors listed, puts an asterisk in front of the gas name, indicating it has been selected to activate the audible alarm if real-time gas values are above preset alarm levels.

SET ALARM This menu item allows the user to enter an alarm set point for any installed sensor. The user must first enter a four digit security code. Use the UP ARROW or DOWN ARROW and MENU buttons to enter the desired numbers of the security code. When finished push the MENU button and the LCD will accept the code if it was entered correctly and display the list of installed sensors

Using the ARROW DOWN button, scroll down to the first sensor that you wish you enter an alarm set point for then push the MENU button. The display will indicate “ENTER ALARM VALUE”. Use the ARROW UP and / or ARROW DOWN buttons to enter the desired numbers then press the MENU button to accept the new value.

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The LCD will indicate “NEW ALARM VALUE ENTERED” and go back to the list of installed sensors.

Once again, use the ARROW DOWN button to scroll down to the next sensor that is to have an alarm set point and repeat the procedure. Each time the MENU button is pressed to accept the new alarm set point, the LCD will go back to the list of sensors and the default cursor position is “PREVIOUS”. When finished, press the MENU button at “PREVIOUS” and the alarm menu will be displayed.

7.5 Info Menu

This menu item provides the user with information about the instrument. The choices are for the instrument and installed sensors with serial numbers (does not include temperature and RH sensors as they do not have serial numbers).

Examples of choices are:

MONITOR LCD indicates instrument serial number and date of manufacture.

CO LCD indicates sensor serial number, sensor date code, and calibration information: span and zero dates

CO_2 LCD indicates sensor serial number, sensor date code, and calibration information: span and zero dates

To access this information, scroll down to the desired sensor choice and using the ARROW DOWN button and press the MENU button. Once the information has been viewed, press the MENU button to return to the previous menu.

7.6 USB Menu

This menu item allows the user to reset the USB chip if any problems are experienced while trying to communicate with YES Viewer software. After selecting RESET from this menu, the user will receive the message “USB HAS BEEN RESET”

NOTE: If you remove the USB cable before shutting down the “YES Viewer” program, the YESAIR may continue to display “PC Mode”. Press and hold the MENU button to clear this and return to normal measurement mode.

8 CALIBRATION PROCEDURES

This section details the calibration procedure and is an extension of the description from 7.1 Calibrate Menu of this manual.

NOTE: Calibration should always be performed by a trained and experienced technician. Temperature and Relative Humidity sensors must be calibrated using

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a special chamber and therefore field calibration is not permitted. Only gas sensors can be field calibrated.

8.1 Requirements & Cautions

1. Always ensure batteries are fully charged (if rechargeable batteries are installed) or fresh alkaline batteries are installed. This is especially important when calibrating sensors that are more “current hungry” such as infrared, combustible and PID for TVOCs.

2. Allow a twenty (20) minute warm up period before attempting calibration of any gas sensors. This allows all sensors time to fully warm up and stabilize and produces the most accurate results for calibration.

3. Always perform both zero (null) and span functions on all sensors. Zero function involves flowing 100% Nitrogen into the inlet port of the instrument.

4. Cylinders of Nitrogen and appropriate span gases are required for calibration. Ensure the cylinder regulator has a minimum flow rate of 0.3 LPM to a maximum of 1.0 LPM. The pump inside the YESAIR must not be “drawn down” because of a low flow rate from a cylinder regulator. The result will be inaccurate calibration values. Span gas values should preferably be approximately 40% to 60% of the installed sensor measurement ranges. Always remove cylinder regulators from air and gas cylinders before storing.

5. When calibrating “sticky gases” such as Chlorine, Fluorine, Hydrogen Chloride, Hydrogen fluoride and Ozone, use Teflon lined tubing no longer than 3 ft (0.91 m) in length.

6. When calibrating the Pump model and the Dual Probe model, a demand flow regulator is required.

7. The process used to calibrated the Pump model, is the same as the Dual Probe model.

8.2 Calibration Process: Zero

Press the MENU button on the instrument to enter the main menu. Using the ARROW DOWN button scroll down to “CALIBRATE” and press the MENU button. The LCD will indicate “(CODE) ENTER SECURITY CODE”. The calibration function is security code protected to prevent unauthorized personnel or personnel that have not been trained, from performing this important function.

Enter the security code correctly and the LCD indicates “CAL” and the next menu selections “PREVIOUS”, “SPAN” “ZERO”.

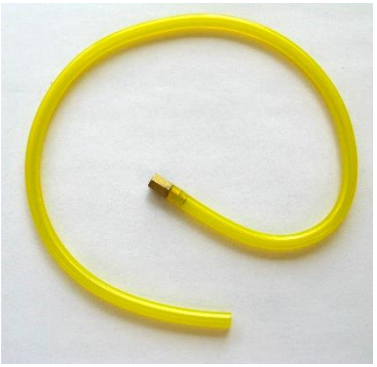
NOTE: If incorrect code is input the LCD INDICATES “INVALID SECURITY CODE ENTERED” and the user is taken back to the basic menu.

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Step	Zero Procedure
1.	Use the ARROW DOWN button to scroll down to the ZERO function and press the MENU button to select it. The LCD then indicates **PREVIOUS** and **ALL**, and lists all installed sensors.
2.	Use the ARROW DOWN button to scroll to the desired sensor then push the MENU button to select. The LCD then indicates **ZERO** and **APPLY GAS NOW**.
3.	Attach the cylinder flow regulator to the cylinder of 100% nitrogen.
4.	Open the valve fully.
5.	Attach the brass fitting to the inlet fitting of the YESAIR.
6.	Verify that a bar appears along the bottom of the LCD indicating the progress. At 100% it indicates **ZEROING SENSOR** and another bar indicates the progress. Upon completion, the LCD indicates **ZERO HAS BEEN UPDATED** and the LCD returns to the CAL menu.
7.	Repeat this procedure for all installed sensors.

NOTE: If the user neglects to flow 100% nitrogen over CO_2 and O_2 sensors or zero air over all other sensors, the instrument indicates an error. Catalytic sensors require clean air (contains Oxygen) to achieve zero.

Using Calibration Tubing Supplied for Pump and the Dual Probe Models:

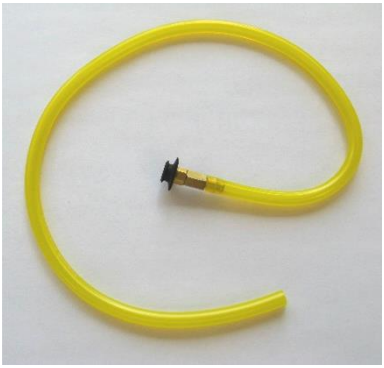


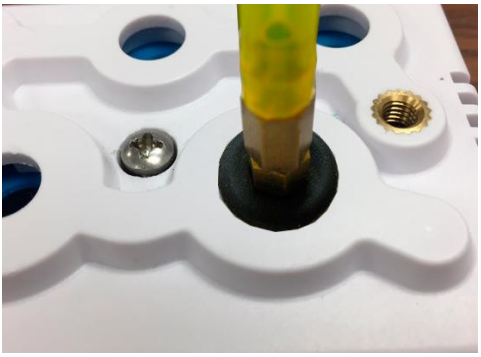


Attach the cylinder flow regulator to the cylinder of 100% Nitrogen. Attach the end of the calibration tubing into the regulator. Open the valve fully and attach the brass fitting of the calibration tubing included with the YESAIR onto the inlet fitting on the top of the YESAIR.

Using Calibration Tubing Supplied for Diffusion Model:
Attach the cylinder flow regulator to the cylinder of 100% Nitrogen. Attach the end of the calibration tubing the regulator. Open the valve fully and attach rubber plug of the calibration tubing included with the YESAIR into the appropriate sensor opening of the YESAIR.

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Repeat this procedure for all installed sensors.

Selecting the span procedure is the same as selecting the zero procedure. Simply use the ARROW DOWN button to scroll to “SPAN” then push the MENU button to select. From the “CAL” menu, use the ARROW DOWN button to scroll to the desired sensor then push the MENU button to select. The LCD indicates “SPAN” and the sensor selected and the gas value last used to span the selected sensor. Using the ARROW UP and / or ARROW DOWN button to set the value, one digit at a time. Next press the MENU button and the LCD indicates “SPAN” and “APPLY GAS NOW” and the bar along the bottom of the LCD indicates the progress.

NOTE: Pressing the MENU button during the first stage of this procedure results in a cancelation of the span procedure.

8.3 Calibration Process: 3-Point Span (For CO_2 sensors only)

YESAIR provides a 3-point span calibration for infrared CO_2 sensors **ONLY**, to provide maximum accuracy. For ALL other sensors, follow the single point calibration procedure indicated in Section 8.4 Calibration Process: 1-Point Span.

Step	3-Point Span Procedure
1.	First, complete the zero calibration as indicated in Section 8.2 Calibration Process: Zero.
2.	Press the MENU button on the instrument to enter the main menu. Using the ARROW DOWN button scroll down to **CALIBRATE** and press the MENU button. The LCD will indicate **(CODE) ENTER SECURITY CODE**. The calibration function is security code protected to prevent unauthorized personnel or personnel that have not been trained, from performing this important function. The default security code is 1234.
3.	Enter the security code correctly and the LCD indicates **CAL**. Using the DOWN ARROW scroll to **SPAN** and push the MENU button. The next menu indicates installed gas sensors.

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Step	3-Point Span Procedure
4.	The LCD indicates the list of installed sensors. Use the ARROW DOWN button to scroll to the CO_2 sensor (or combustible sensor) and press the MENU button again.
5.	The LCD moves to the **SPAN** menu and indicates **ENTER 1ST GAS VALUE**. The cursor flashes over the first of four digits indicating the user must set the correct 1st span gas value (approximately 1000 ppm). This value must match the gas concentration on the cylinder of span gas for that specific sensor, and then press the MENU button.
6.	The LCD indicates **APPLY GAS NOW….** A scroll bar at the bottom of the LCD indicates the progress on a scale of 0 to 100% as the instrument waits for sensor to stabilize to the span gas. Then the LCD indicates **SPANNING CO2**. Once again the scroll bar at the bottom of the LCD indicates the span progress on a scale of 0 to 100%.
7.	Upon completion, the LCD indicates **ENTER 2nd GAS VALUE** and cursor flashes over the first of four digits indicating the user must set the correct 2nd span gas value (approximately 2000 ppm). This value must match the gas concentration on the cylinder of span gas for that specific sensor, and then press the MENU button.
8.	The LCD indicates **APPLY GAS NOW….** A scroll bar at the bottom of the LCD indicates the progress on a scale of 0 to 100% as the instrument waits for sensor to stabilize to the span gas. Then the LCD indicates **SPANNING CO2**. Once again the scroll bar at the bottom of the LCD indicates the span progress on a scale of 0 to 100%. Upon completion, the LCD indicates **ENTER 3rd GAS VALUE** and cursor flashes over the first of four digits indicating the user must set the correct 3rd span gas value (approximately 4000 ppm). This value must match the gas concentration on the cylinder of span gas for that specific sensor. Then, press the MENU button.
9.	The LCD indicates **APPLY GAS NOW….** A scroll bar at the bottom of the LCD indicates the progress on a scale of 0 to 100% as the instrument waits for sensor to stabilize to the span gas. Then the LCD indicates **SPANNING CO2**. Once again the scroll bar at the bottom of the LCD indicates the span progress on a scale of 0 to 100%. Upon completion, the LCD indicates **SPAN HAS BEEN UPDATED** and returns to the CAL menu.

NOTE: If for any reason the user doesn't want all three points' calibration, any of the points can be overridden by pressing and holding the ARROW UP button until the next screen appears.

8.4 Calibration Process: 1-Point Span

NOTE: This procedure is for all sensors *except* CO_2.

First complete the zero calibration procedure as indicated in 8.2 Calibration Process: Zero.

Next, press the MENU button on the instrument to enter the main menu. Using the ARROW DOWN button scroll down to "CALIBRATE" and press the MENU button. The LCD will indicate "(CODE) ENTER SECURITY CODE". The calibration

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function is security code protected to prevent unauthorized personnel or personnel that have not been trained, from performing this important function.

Enter the security code correctly and the LCD indicates “CAL”. Using the DOWN ARROW scroll to “SPAN” and push the MENU button. The next menu indicates installed gas sensors.

The LCD indicates the list of installed sensors. Use the ARROW DOWN button to scroll to the first sensor to be span adjusted and press the MENU button again.

The LCD moves to the “SPAN” menu and indicates “SPAN GAS VALUE”. The cursor flashes over the first of four digits indicating the user must set the correct span gas value. This value must match the gas concentration on the cylinder of span gas for that specific sensor. Use the ARROW UP, ARROW DOWN and MENU button to set the span gas value then press the MENU button. If the span gas concentration is 50 (example) the value should read “050.0”.

The LCD moves to the SPAN menu and indicates “APPLY GAS NOW…” A scroll bar at the bottom of the LCD indicates the progress on a scale of 0 to 100% as the instrument waits for sensor to stabilize to the span gas. Then the LCD indicates “SPANNING CO”. Once again the scroll bar at the bottom of the LCD indicates the span progress on a scale of 0 to 100%. Upon completion, the LCD indicates “SPAN HAS BEEN UPDATED” and goes back to the “CAL” menu.

Repeat this procedure for all installed sensors.

NOTES:

1. If the user neglects to flow 100% Nitrogen over CO_2 and O_2 sensors or zero air over all other sensors, the instrument indicates an error.
2. The O_2 sensor does not indicate the first span menu screen (APPLY GAS NOW). For this reason, ensure any Oxygen span gas utilized is connected and flowing to the sensor before entering the span menu. Alternatively, use the ambient environment as a source of 20.9% volume O_2 but make sure you do not exhale in the direction of the pump inlet fitting. The CO_2 you exhale will influence the value of the Oxygen reading. It is the only sensor that skips the first span calibration menu screen.

9 ADDING OR CHANGING PLUG & PLAY GAS SENSORS

The YESAIR accommodates up to seven sensors. Two of those sensors are temperature and relative humidity and these sensors are permanently installed in all instruments as a standard. Five of the sensor locations accommodate only gas sensors. Three of the sensor locations visible along the back edge of the sensor cover accommodate only electrochemical toxic gas and/or Oxygen sensors. There are two sensor locations located along the front edge of the sensor cover. Each of

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the two front edge sensor locations can accommodate either the infrared CO_2 sensor, the PID sensor or the catalytic combustible (flammable) gas sensor. See 9.2 Sensor Location Restrictions.

Most of the YESAIR gas sensors are plug and play smart sensors that can be added or changed at any time.

An instrument that is configured for Nitric oxide, Hydrogen chloride, Ethylene oxide, Hydrazine or Formaldehyde cannot be swapped with a different sensor type without hardware modification and cannot be placed in any other socket than SLOT 1 or 3. If this change is desired, the unit needs to be sent back to the factory to be reconfigured.

Sticky gas sensors (ie. Chlorine (Cl_2), Hydrogen chloride (HCl), Ozone (O_3), Hydrogen fluoride (HF), Fluorine (F_2)) used in the Pump model should be installed in SLOT 1, closest to the inlet port for calibration. The shorter the distance the sticky gas needs to travel, the more accurate the calibration will be.

The procedure to add or change a sensor is as follows:

1. **Shut the instrument off. If the power adapter is plugged in, UNPLUG IT BEFORE PROCEDING.**

   WARNING: LEAVING AC ADAPTER PLUGGED IN WHILE CHANGING SENSORS CAN SERIOUSLY DAMAGE SENSORS. THIS DAMAGE WILL NOT BE COVERED UNDER WARRANTY.

2. Loosen the single securing screw in the center of the sensor cover on the top of the instrument. Carefully remove the cover.

3. If you are removing a sensor, identify the one to be removed by the label on the side of the sensor then carefully grasp the sensor by the sides and pull upwards with a slight rocking motion to unplug it from the sensor sockets in the transmitter circuit board. DO NOT DROP the sensor (permanent damage could occur). The removed sensor should be stored in a clean, dry container, preferably with anti-static foam.

4. If another sensor is to be installed in its place, ensure it is of the same “type” (electrochemical, infrared, PID / Catalytic), to be accommodated by the sensor location recently vacated. Carefully grasp the new sensor by the sides and line up all of the pins on the smart sensor board attached to the bottom of the sensor with the sockets on the transmitter board. Once the pins are all aligned, gently push the sensor down into the sockets in the transmitter circuit board. If it does not seem to be easy to insert the new sensor, DO NOT FORCE it. Double check the pin to socket alignment and try again.

5. If a sensor socket is being left without a sensor in it, you will need to insert a dummy sensor plug into the cap as indicated in 9.1 Dummy Sensor Plugs.

6. Reattach the sensor cover and tighten the securing screw. DO NOT OVER TIGHTEN.

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7. Switch the instrument on and allow at least 20 to 30 minutes of warm up time before using.
8. Once the sensor has been warmed / stabilized, perform a zero function using the push buttons on the front of the instrument. This function is part of the calibration procedure indicated in 7.4 Alarm Menu. This can be performed in room air if you know the air in the environment is clean. If the sensor is CO_2 or O_2, 100% Nitrogen (N_2) must be flowed over the sensor as part of the zero function.

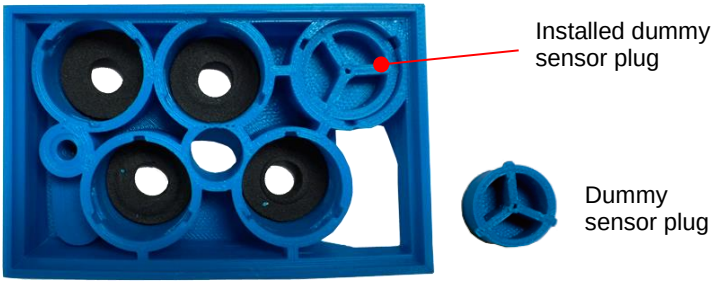
NOTE:

1. If the newly installed sensor is not zero adjusted after installation, as outlined above, the display may indicate a slight reading of the target gas even in a clean environment.
2. For best accuracy, all gas sensors should be zero adjusted and bump tested after being installed.

9.1 Dummy Sensor Plugs

For the Pump and the Dual Probe models, if a sensor socket is being left without a sensor in it, you will need to insert a dummy sensor plug into the cap so the device can maintain an air tight seal for the pump operation and allow the sampled air to reach all the sensor locations.

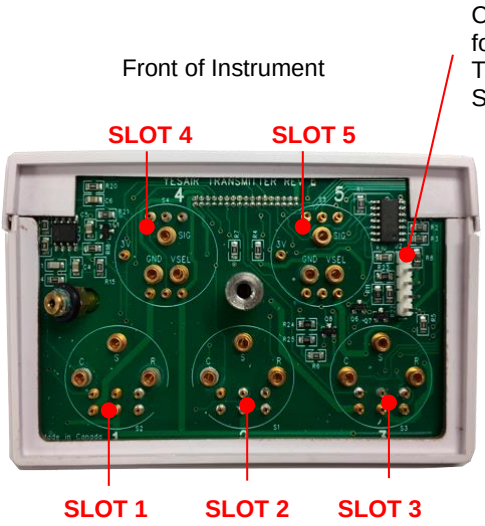
Install the dummy sensor plug by dropping it into the sensor opening of the cap, lining up the three tabs with the three cutouts and while gently pushing, twist it a half turn to lock it in place.



Dummy sensor plugs are also used in the Diffusion model to block the unused sensor openings in the cap so the circuit board is not directly exposed to dust and debris.

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9.2 Sensor Location Restrictions



View looking down on the top where the sensors are installed, holding the device with the backside towards you



	Location Restrictions
SLOT 1	Toxic gas sensor that does not require bias voltage. If available, sticky gas sensors ie. Chlorine (Cl_2), Hydrogen chloride (HCl), Ozone (O_3), Hydrogen fluoride (HF), Fluorine (F_2) when used in the Pump model.
SLOT 2	O_2 (if used) MUST use this slot. Otherwise, it may contain a toxic gas sensor that does not require bias voltage.
SLOT 3	Toxic gas sensor that requires bias voltage (if used) MUST use this slot (e.g., NO). Otherwise, this slot may contain a toxic gas sensor that does not require bias voltage.
SLOT 4, 5	CO_2, PID, or catalytic gas sensors only.

For a YESAIR Pump model, with a stick gas sensor (ie. Chlorine (Cl_2), Hydrogen chloride (HCl), Ozone (O_3), Hydrogen fluoride (HF), Fluorine (F_2)), use SLOT 1 if it is available. If it isn't, use SLOT 2, then 3, 5 and lastly 4. Sticky gases like to stick to surfaces. The farther the sample air or calibration gas has to travel around the air canal inside the cover, the less gas that will reach the sensor, potentially making the readings less accurate.

If the YESAIR was not originally ordered with the sensors listed below and you want to install any one or more of these types of gas sensors, the unit must be sent back to the factory to be re-configured:

- Ethylene oxide (C_2H_4O)
- Hydrogen chloride (HCl)
- Hydrazine (N_2H_4)

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- Nitric Oxide (NO)
- Formaldehyde (CH_2O)
- Hydrogen sulphide (H_2S)

10 YESAIR DUAL PROBE MODEL

A Dual Probe model of the YESAIR is available for applications that require remote monitoring of gas, temperature, and relative humidity. Applications that are well-suited for the Dual Probe YESAIR have the following similarities, though they are not exclusive prerequisites of using the Dual Probe version:

- High humidity environments
- Measurement of Carbon dioxide gas levels
- Impractical or impossible to physically relocate the standard “single probe” instrument (and its built-in temperature and humidity sensor) into the environment being measured.

High-humidity applications that require CO_2 monitoring may include research incubators and horticulture applications (e.g., greenhouses, mushroom farms, etc.).



For example, the YESAIR can be used to monitor key environmental levels within lab incubators commonly used in medical and research facilities. Lab incubators need to provide constant temperature, humidity, and carbon dioxide (CO_2) levels to control the correct atmosphere for cell or tissue cultures, embryos for IVF, and stem cell research applications. The incubator units typically have a built-in monitoring system for CO_2 while more sophisticated units have additional monitoring for oxygen (O_2) levels. Because it is critical that these levels are kept constant, the incubators require a way to verify that the levels shown by the internal monitoring system are correct. CETCI’s YESAIR provides this verification.

The YESAIR accurately and reliably monitors key environmental levels within incubator chambers. It uses a remote sample probe to quickly confirm the CO_2 (and O_2 if installed) through the CO_2 sample port built into the incubator. With built-in sensors at the tip of the temperature / RH probe, the relative humidity (RH) and

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temperature levels are sampled to confirm the internal chamber readings. With the optional YES Viewer software and data logging kit, all instrument readings can be stored for reference.

10.1 Probes

The probes included with the Dual Probe model of the YESAIR are summarized in the following table.

	High Humidity Gas Sample	Temperature/RH	Calibration/Sample Adapter
Photo			
P/N	1509-0021	1509-0024	1509-0022
Use	Dual Probe Only	Dual Probe Only	Common to Pump and Dual Probe models
Length	42 in / 106 cm / 3.5 ft	36 in / 91 cm / 3 ft	13 in / 33 cm / 1.08 ft
Filter	Yes	N/A	No
Fitting	Brass, threaded	DIN-6 connector	Brass, threaded

The high humidity gas sample probe is approximately 3.5 feet in length and consists of a rigid clear plastic tube, a combination of Nafion® and flexible tubing, and a dry filter between them. The Nafion tubing is used to prove more accurate readings by (a) eliminating moisture from within the tube, and (b) equalizing the relative humidity inside and outside of the tube.

The calibration / sample adapter is common to the Pump model and the Dual Probe model of the YESAIR. It connects to the threaded brass fitting which is located on the top of either instrument.

The temperature / RH probe is an electrical probe that has temperature and relative humidity sensors on one end and a DIN-6 electrical connection on the other. This probe connects to the mating DIN-6 connector located on the top pf the Dual Probe YESAIR.

IMPORTANT: During operation, the temperature/RH probe *must* be installed, otherwise the gas readings may be compromised.

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10.2 Instrument Kits for Dual Probe Applications

Application specific versions of the YESAIR Dual Probe models are available in kits.

These kits include:

- The YESAIR equipped with an internal pump and two sample ports
- Gas sampling probe for CO_2 and O_2 with inline water / dust filter
- Temperature / relative humidity sensor probe
- Calibration tubing
- Three 'AA' NiMH rechargeable batteries
- AC adapter / charger
- Operation Manual

Part Number	Description
1540-0009	YESAIR CO_2 (0 - 20%), pump, comes with remote sample probes for temperature/RH, CO_2, no data logging
1540-2009	YESAIR CO_2 (0 - 20%) and O_2, pump, comes with remote sample probes for temperature/RH, CO_2, O_2, no data logging

NOTE: Specific incubator versions of the YESAIR must be ordered through their respective incubator application kit numbers (above). The standard Pump or Diffusion YESAIR models cannot be changed to Dual Probe models in the field.



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10.3 Application Setup and Configuration

Operation of the YESAIR Dual Probe model requires minimal setup prior to use.

This setup involves:

- Connecting the temperature/RH probe
- Connecting the high humidity gas sample probe
- Configuring/verifying menu items.

Step	Dual-Probe Application: Setup and Configuration Procedure	
1.	Locate the temperature / RH probe and connect it to the DIN-6 connector on the top of the YESAIR. The probe has a sintered filter on one end and a male mini DIN-6 connector on the other.	
2.	Locate the high humidity gas sample probe and connect it to port on the top of the YESAIR. The high humidity probe connector on the YESAIR is the threaded brass connector.	
3.	Turn on the instrument and wait for the warm-up cycle to complete.	
4.	From the **SETTINGS** → **PUMP** menu, verify that the pump is configured for **LOW FLOW**. **NOTE:** Your high-humidity YESAIR is factory-set with appropriate default settings. However, always verify your settings for proper configuration.	
5.	Return to the main monitoring menu using the **PREVIOUS** buttons, then configure the instrument as appropriate for your application and preferences (e.g., alarming, data logging, etc.).	
6.	Position the temperature probe and gas/RH sample hose appropriately for your application.	
7.	Use your YESAIR normally as outlined earlier in this manual.	

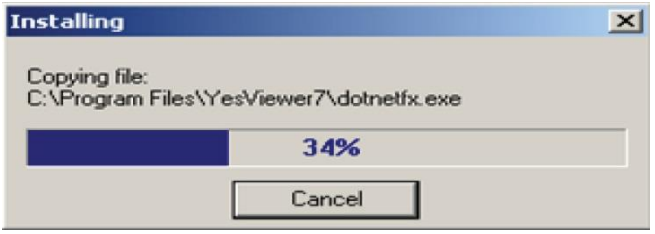
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11 INSTALLING THE YES VIEWER SOFTWARE

The YES Viewer is an optional software package that can be purchased at any time. The YES Viewer is a datalogging management software tool for use with the YESAIR.

For complete instructions on how to install the YES Viewer Software, refer to the YES Viewer Software Manual. The manual includes instructions on configuration, retrieving and graphing data, adjusting RH and temperature, changing the date and time and troubleshooting.

1. Insert the supplied USB flash drive into the USB port on your computer.
2. Accept the terms and conditions.
3. Follow the instructions.
4. Finally complete the installation by clicking on Finish tab.



After Installation the YES Viewer Icon will appear automatically on your computer desktop. Double click on YES Viewer Icon on your Desktop to open the software program.



Once the YES Viewer software program is on your computer, you can use it for configuration, retrieving and graphing data, adjusting RH and temperature and troubleshooting.

IMPORTANT: OPEN the YES Viewer application on the computer BEFORE connecting the YESAIR to the computer. Similarly, CLOSE the YES Viewer program on the computer BEFORE disconnecting the YESAIR from the computer.

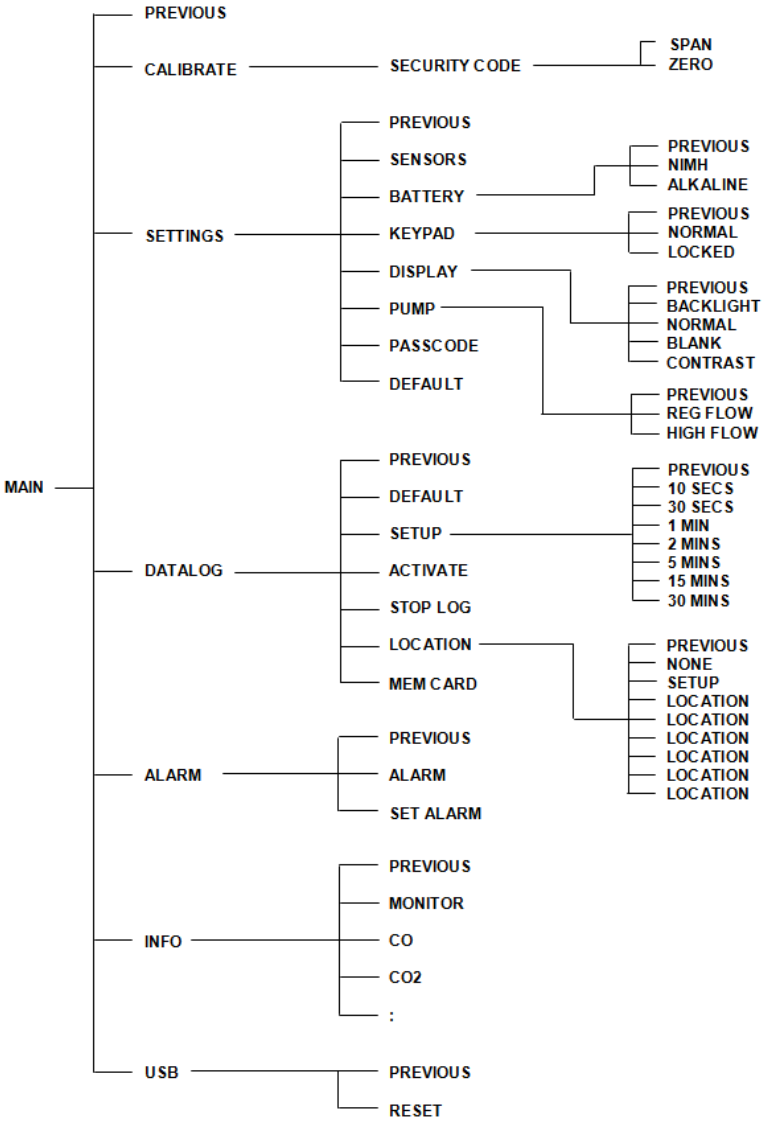
The YESAIR stops data logging when it is connected to a computer.

ALWAYS TURN OFF THE YESAIR BEFORE removing the SD card or the data will be corrupted.

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12 MENU ARCHITECTURE

Below is a high-level architecture diagram of the YESAIR menu system.



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13 MAINTENANCE

Externally, the YESAIR requires only cleaning with a damp cloth, wiping off the exterior surface and basic inspection for obvious damage or problems. Internally, sensors should be maintained because they have a specific life span. As they age, they must be calibrated (null and span adjusted) for accuracy. If one or more sensors do not respond to span gas, check the age of the sensor as they may have expired. Refer to the sensor replacement and calibration sections of this manual for more details. Contact the factory for service to replace expired sensors or any other parts that are required.

14 TROUBLE SHOOTING

Problem: YESAIR does not communicate with YES Viewer software.

Solution:
YESAIR must be switched on and have completed the warm up cycle to be able to communicate with the YES Viewer software. It must be in the normal display mode indicating all installed sensors on the LCD.

Problem: YESAIR displays “PC MODE” when it is not communicating with the YES Viewer software”.

Solution:
Hold down the MENU button for 5-seconds to bring the YESAIR back to the main sensor display window.

If the YESAIR still indicates “PC MODE”, unplug the 6V adapter from the YESAIR and remove the batteries.

Plug the 6V adapter into the YESAIR and hold the MENU button in for 3-seconds to start the instrument. Insert the batteries when unit has started.

Problem: YESAIR fails to start, the pump is running at half speed.

Solution:
Unit was improperly shutdown and may be fixed by re-installing the batteries or starting with AC power and performing a proper shutdown.

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15 ACCESSORIES

15.1 External Battery Pack for Extended Operation

Product Code: YES-AIR BATT OPTION

To increase the operating time to almost double, the external battery pack is attached to the YESAIR and comes with rechargeable batteries installed from the factory. The wall adapter may be used to recharge the rechargeable batteries in the external battery pack at the same time as recharging the rechargeable batteries in the YESAIR unit. *Remember: you must use the same battery type in both locations and make sure the menu is set to that battery type.* If you want to use alkaline batteries, you much change the menu setting and ensure alkaline batteries are installed in the external battery pack and the YESAIR unit.

For configurations that include two high powered sensors such as two infrared sensors or one infrared and one combustible sensor, an external battery pack should be used.

For configurations that include the particulate sensor, the battery pack is automatically included.

The external battery pack attaches to rear of YESAIR with Velcro and plugs into a port at rear of instrument.

NOTE:

1. YESAIR must be ordered with this accessory. It cannot be installed in the field. Instruments in use can be shipped back to be factory retrofitted.

External battery pack, plugs into the port on the backside of the YESAIR and remains in place with Velcro



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15.2 YESAIR Pump Handheld Gas Sample Probe

Product Code: YES-HHPROBE-10

An optional handheld sampling probe is available with the YESAIR Pump model. The probe has a 10” wand and 30” of tubing that fits onto the nozzle and allows you to reach into and sample areas that are difficult to access.



NOTE: Remote sampling probe is for gases only. Temperature and RH sensors are mounted on top of the YESAIR Pump and do not connect to this probe.

15.3 YES Logger Package

Product Code: YESAIR-LGR PKG

YES logger package for YESAIR or YES Plus LGA contains a 2GB SD memory card, 6 foot USB cable, USB multi card reader, 512 MB USB flash drive with the YES Viewer Software and the Yes Viewer Software Manual.

NOTE: The YESAIR can only accommodate up to a 2GB memory card. Do not try to use a larger capacity memory card. Also, if you remove or insert the card without powering the unit OFF, this will cause data corruption and the card will need to be reformatted.



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15.4 YES Viewer Software

Product Code: YES-SFTWR

The YES Viewer Software is a proprietary data logging management software program developed by CETCI for the battery powered, portable IAQ monitors. YES Viewer can be used with the YESAIR and YES Plus LGA air quality monitoring instruments manufactured by CETCI. The software is available on a 2GB USB flash drive.

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