Macurco™ IAQ

Carbon Dioxide Detector
User Instructions

IMPORTANT: These User Instructions are to be provided to the homeowner/end user upon product installation. Each person installing or using this equipment must read and understand the information in these User Instructions before use. Installation of this equipment by untrained or unqualified persons, or use that is not in accordance with these User Instructions may adversely affect product performance and result in sickness or death. For proper use see User Instructions or call Macurco Technical Service.

Table of Contents

1 General Safety Information

The following instructions are intended to serve as a guideline for the use of the Macurco IAQ Indoor Air Quality Detector. This manual will refer to these devices as IAQ unless content is specific to a model. This manual is not to be considered all-inclusive, nor is it intended to replace the policy and procedures for your facility. If you have any doubts about the applicability of the equipment to your situation, consult an industrial hygienist or call Technical Support at 1-844-325-3050.

1.1 List of Warnings and Cautions

⚠ WARNING
Each person using this equipment must read and understand the information in this User manual before use. Use of this equipment by untrained or unqualified persons or use that is not in accordance with this user manual, may adversely affect product performance.
Use only for monitoring the gas which the sensor and monitor is designed to detect. Failure to do so may result in exposures to gases not detectable and cause serious injury or death. For proper use, see supervisor or user manual, or contact Technical Support at 1-844-325-3050.
IAQ may not function effectively below 32° F (0° C) or above 122° F (50° C). Using the equipment outside of this temperature range may adversely affect product.
Immediately exit any environment that causes an alarm condition on the sensor.
Do not disassemble unit or attempt to repair or modify any component of this instrument. This instrument contains no user serviceable parts, and substitution of components may adversely affect product performance and void product warranty.
Only qualified technicians should open the detector case and service the internal circuits. Ensure power is de-energized from the detector relays prior to servicing the unit. Failure to do so may result in electrical shock.

2 Use Instructions and Limitations

2.1 Use For

The IAQ is a low-voltage (12-24 VAC or VDC) detector of carbon dioxide (CO_2) designed to monitor and maintain adequate indoor air quality, aid energy savings, and mitigate stale, polluted air. The IAQ is designed for connection to fans and to building management systems (BMS). This carbon dioxide detector is designed to detect CO_2. It is NOT designed to detect smoke, fire, carbon monoxide, or any other gas.

⚠ WARNING
Use only for monitoring the gas that the sensor and detector are designed to monitor. Failure to do so may result in exposures to gases not detectable and **cause sickness or death**. For proper use, see supervisor or User Instructions, or call Macurco Technical Service.

2.2   Do Not Use For

The IAQ is not intended for use in hazardous locations or industrial applications such as refineries, chemical plants, etc. Do not mount the IAQ where the normal ambient temperature is below 32° F or exceeds 122° F (0° C or above 50° C). The IAQ mounts on a type 2S (single-gang) electrical box supplied by the contractor or it can be wall-mounted using an enclosure supplied by Macurco. Do not install the IAQ inside another enclosure unless it has good air flow through it.

2.3   General Description

The Macurco IAQ product family ensures you "Know Your Air" in indoor applications. The IAQ is an essential tool for maintaining adequate indoor air quality, aiding with energy savings and mitigating stale, polluted air. The family of products accurately monitors Carbon Dioxide (CO_2). The detector has options for either analog or digital outputs to control ventilation as CO2 and VOC values increase. There are various model options based on the need of the application. Common applications include but are not limited to classrooms, gymnasiums, malls, theaters, airports, concert venues, convention halls, office buildings, universities, shopping centers, and auditoriums.

2.4   Models

- IAQ-CO2-A-W   CO2 Analog Wall Mount
- IAQ-CO2-D-W   CO2 Digital Wall Mount
- IAQ-CO2/VOC-A-W   CO2/VOC Analog Wall Mount
- IAQ-CO2/VOC-D-W   CO2/VOC Digital Wall Mount

2.5   Features

- Easy installation to a single-gang box or on-wall enclosure
- Aesthetically pleasing — flush-mount or surface-mount options
- User-selectable settings via two-button interface
- 0.5A configurable normally open or normally closed (N.O. or N.C.) dry-contact relay to engage ventilation
- Versions with analog or digital output to send values to building management systems (BMS)
- Occupancy mode
- Adjustable setpoints
- End-of-life notification
- LCD display
- Last 30 days' historical events: Highest value, lowest value, and average per day

2.6   Specifications

- Size: 3.125" (H) x 5.125" (L) x 1.75" (W), 80 mm x 127mm x 44.5mm
- Shipping Weight: 1 pound (0.45 kg)
- Voltage: 12-24 VAC or VDC
- Current (normal/alarm): 15mA/35mA @ 12-24VDC
- CO_2 Range/Resolution: 0-2,000 ppm/10 ppm
- Operating Temperature Range: 32°F to 122°F (0°C to 50°C)
- Display: LCD 2x8 characters with backlight

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- Analog Current Loop: 4-20mA
- Mounting: flush to single-gang box or surface mount
- Relay: 0.5A Control Relay with user-adjustable settings
- Warranty: Two-Year Limited Warranty
- Life Expectancy: 10 Years

Installation & Operation Instructions

The following instructions are intended to serve as a guideline for the use of the Macurco IAQ Carbon Dioxide Detector. It is not to be considered all-inclusive, nor is it intended to replace the policies and procedures for each facility.

⚠WARNING
This detector helps monitor the presence and concentration level of certain specified airborne gases. Misuse may produce an inaccurate reading, which means that higher levels of the gas being monitored may be present and could result in overexposure and **cause sickness or death**. For proper use, see supervisor or User Instructions, or call Macurco Technical Service.

⚠WARNING
This product is intended for use in ordinary indoor locations such as: • Homes   • Schools and universities   • Conference rooms   • Theaters and concert venues   • Airports   • Museums   • Convention halls   • Office buildings   • Malls   The IAQ is not designed to measure compliance with Occupational Safety and Health Administration (OSHA) commercial or industrial standards.

Note: The IAQ performs automatic background calibration. Therefore, does not require field calibration.

2.7   Mounting Location

Carbon dioxide (CO2) can accumulate inside buildings, especially those that are designed to reduce drafts such as in cold climates, but also in homes, schools, offices, etc., where buildings are sealed to maintain air conditioning in warm climates. Carbon dioxide at levels that are unusually high indoors may cause occupants to grow drowsy, complain of eye irritation, to get headaches, or to function at lower activity levels. The IAQ detects CO2 and can control exhaust fans to bring in fresh air.

For best operation, mount the IAQ 4′ to 6′ (1.2m to 1.8m) off the floor. In addition, do not mount the IAQ within 10′ (3m) of an air outlet, and do not place the IAQ directly above or below an air outlet, regardless of distance. Also: Do not mount the IAQ within 10' (3m) of a door or window that can be opened. Drafts can affect readings.
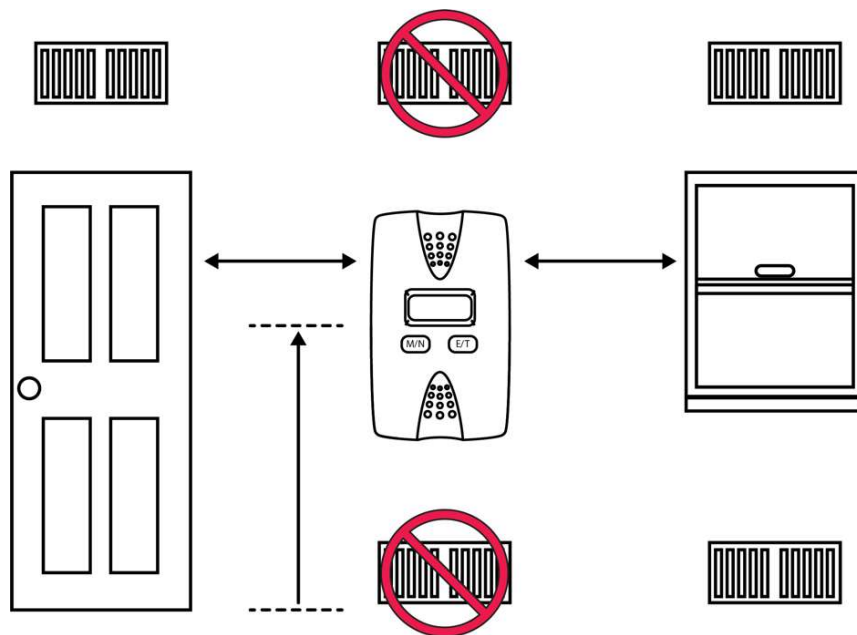
Do NOT mount the unit in a garage. Do NOT mount the IAQ where the normal ambient temperature is below 32°F (0°C) or exceeds 122°F (50°C), or within 5 feet (1.5 meters) of a cooking or heating appliance.

2.8 In-Wall Installation

The IAQ should be 4′ to 6′ (1.2m to 1.8m) off the floor. (Refer to section 2.7 for more details regarding installation locations and clearances.) Preferably, an in-wall single-gang (2S) electrical box should be installed vertically at each location so that the IAQ can be firmly mounted and the display easily readable. (Alternatively, an external enclosure can be used for mounting on the wall's surface. See instructions in section 2.9.)
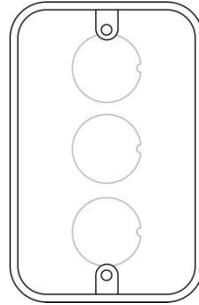
Important! Before starting, ensure all local ordinances and codes are followed.

- Run power and communication cables to each electrical box before performing installation of the IAQ detectors.
- Solid-core wire is preferred over stranded wire for easier connection to the IAQ.
- Make sure that about 6" to 8" (15cm to 20cm) of wire protrudes from the wall to make wiring the IAQ easier.

Note: For easier installation, run the wires through the box before installing the mounting plate.
Align the mounting plate's two screw holes over the threaded screw holes in the box.

Important! Make sure the arrow that indicates "UP" is at the top.

Align mounting plate's two screw holes with the threaded screw holes in the electrical box.
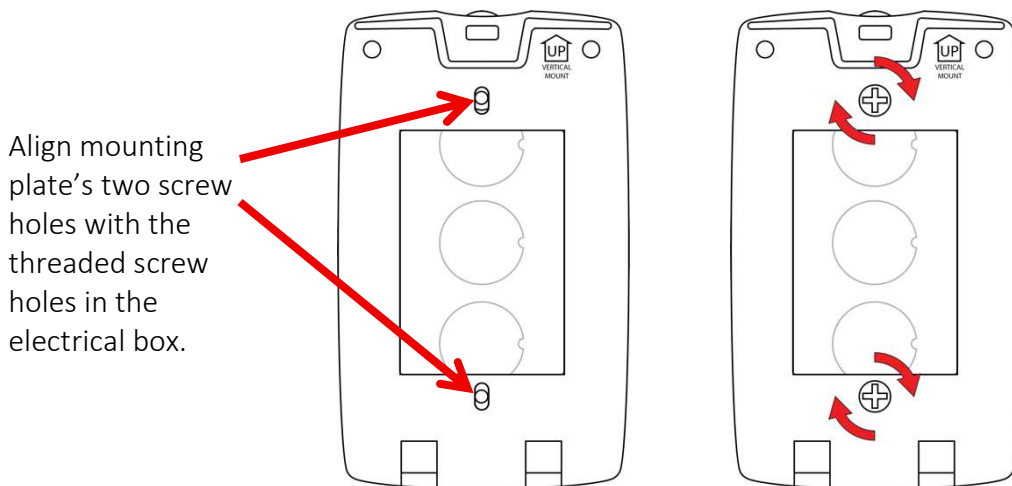
Insert the two screws and tighten them with a screwdriver. Do not overtighten.

www.macurco.com   1-877-367-7891   info@macurco.com   1504 W 51st St. Sioux Falls, SD 57105

2.9   On-Wall Installation

If in-wall electrical box is not used, use the supplied external enclosure. It must be firmly attached to the wall.
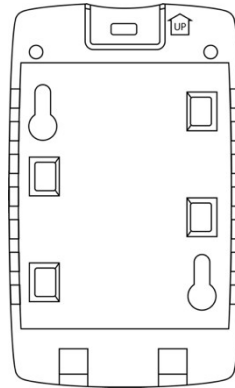
Locate the place where you plan to install the enclosure, between 4' and 6' above the floor, following details described in section 3.1.

Drill a hole in the wall for passing wires.

Note: The enclosure to be installed on the wall has large pass-through openings at the top and bottom, but no opening in the middle.
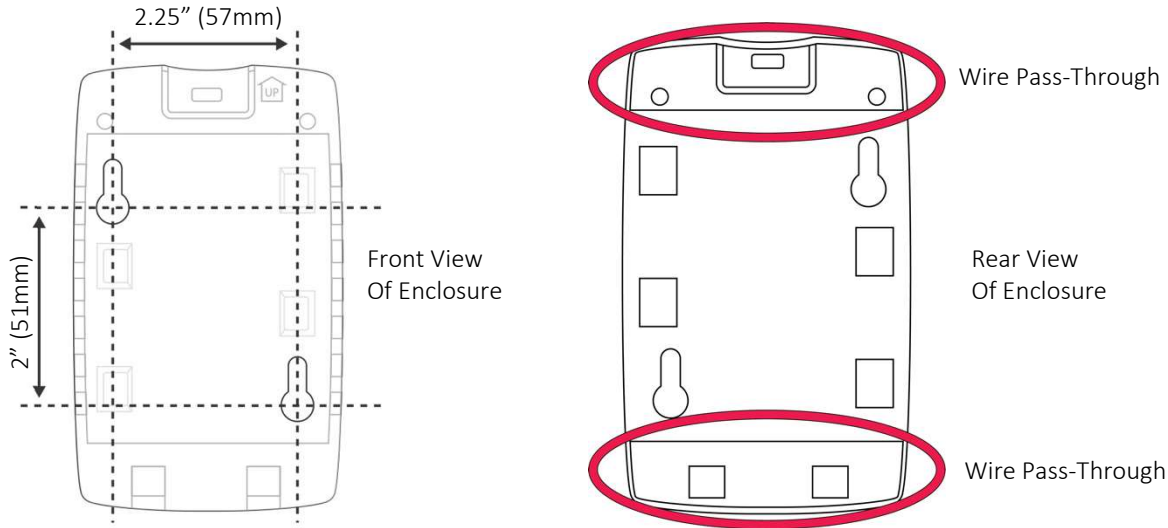
Mark the wall for drilling the two mounting screw holes. If you are drilling into drywall, you will likely need self-drilling drywall anchors for the screws to ensure that the box is held firmly in place. Follow the instructions for installing those.

Note: If the wall is plywood or other hard material, or if drywall is backed by plywood, you can use other screws that don't require drywall anchors.

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Pass the wires through the back of the box and then attach the box to the wall by tightening the screws only until the box is held loosely. Do not fully tighten them. Press the box down so that the screws are at the top of the keyhole. Then tighten the screws until there is no free play.

Note: Screw shaft diameters should be less than 5/32" (4mm). Screw heads should be between 1/4" and 17/64" (6.35mm and 6.7mm) in diameter.
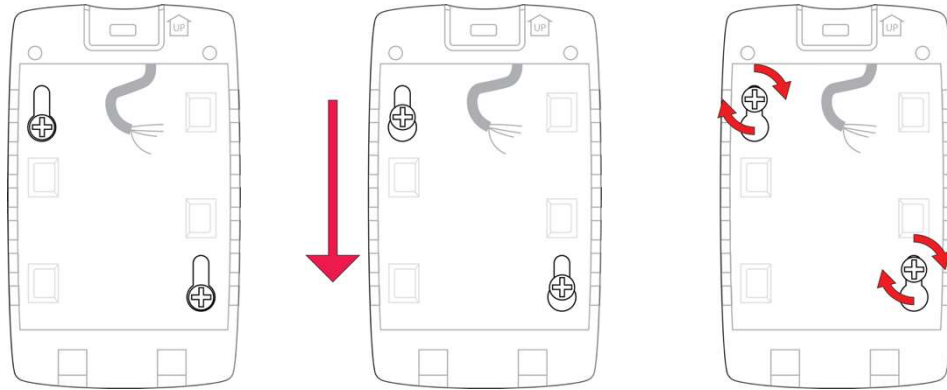
2.10 Attaching The IAQ To The External Enclosure Or Wall Plate
The IAQ attaches to the external enclosure or wall plate in the same way.
Insert the tabs at the bottom of the IAQ into the two mating points on the lower part of the external enclosure or wall plate:
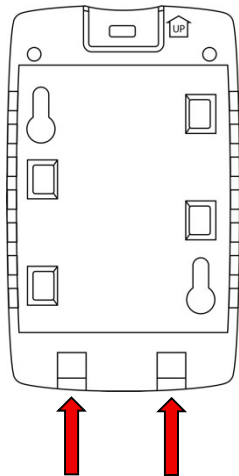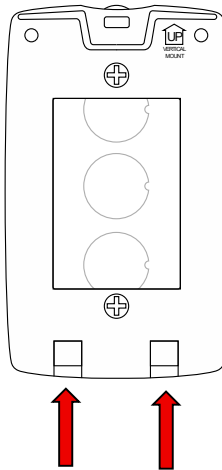
External Enclosure   Wall Plate   Bottom View (External Enclosure)
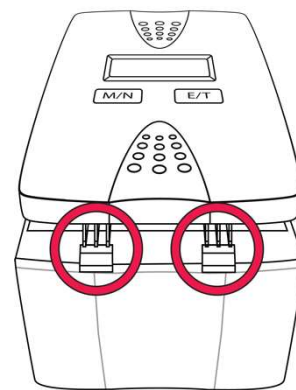
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Next, tilt the IAQ so that the capture tab at the top is inserted into the mating point. Make sure it is held secure.

External Enclosure   Wall Plate   Tilt Into Place
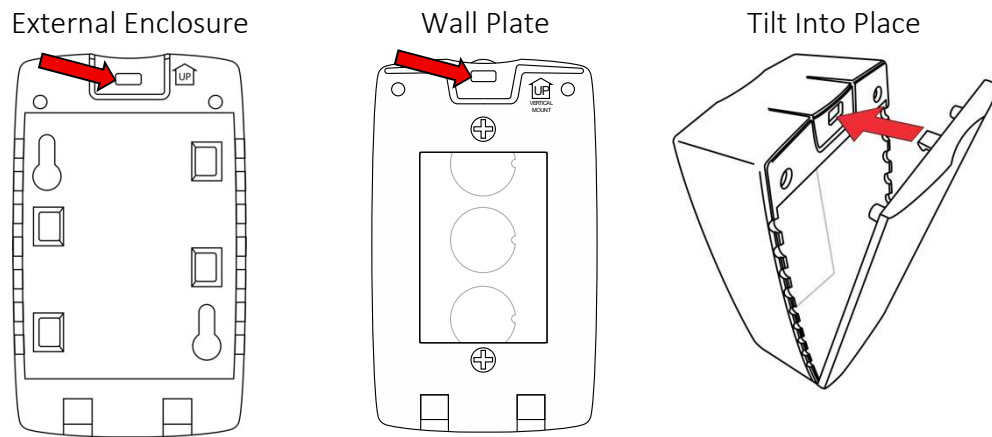
To release the IAQ from its mounted position, press down on the top center of either the external enclosure or the wall plate and while holding your finger down, tilt out the IAQ.

Press Down   Continue Pressing Down
                   And Tilt Front Panel Out
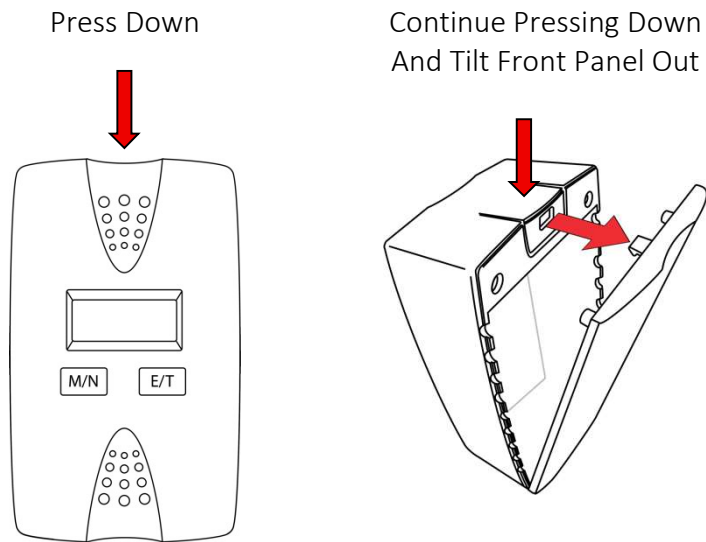
2.11 Wiring The IAQ

The IAQ is designed for simple wiring. All connections are at the terminal block, which is on the main PC board.
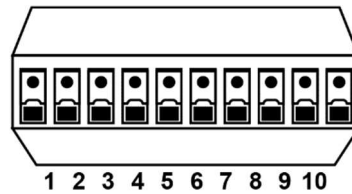
The terminal block is located on the main PC board as shown:
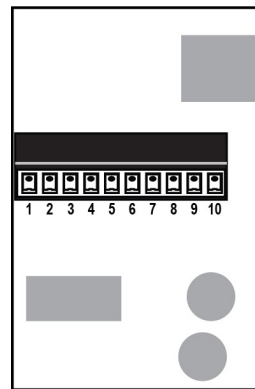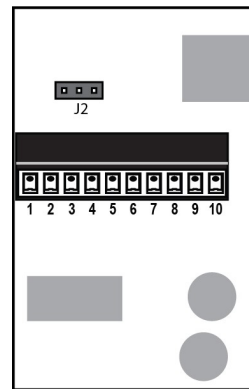
Analog IAQ Main PCB   Digital IAQ Main PCB

2.11.1 Connecting Wires To Terminals

1. Strip each wire back 1/4 in. (6.5 mm), exposing bare wire.
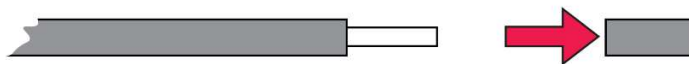
2. Press in on a release tab with the tip of a ballpoint pen (or similar tool).

Ballpoint Pen

Release Tabs
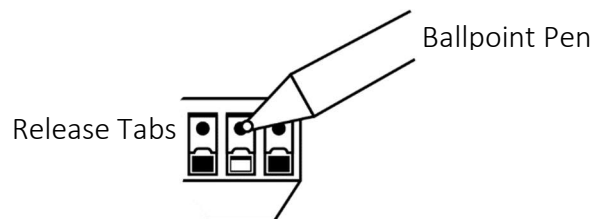
3. Fully insert the bare wire into the corresponding slot of the terminal block.
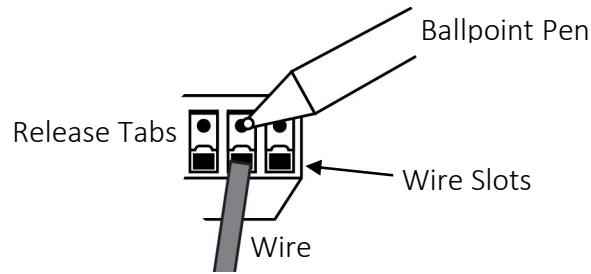
Note: When inserting the wire, make sure that the wire's insulation is not inhibiting the wire from contacting the contact point inside the terminal connector.

Note: When the wire is properly stripped and inserted in the terminal connector, there should not be any bare wire exposed.

4. Release the pen or other tool.
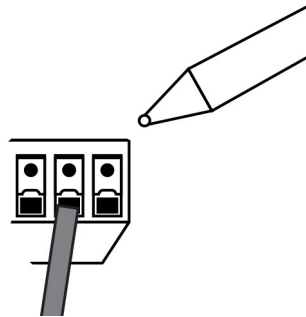
5. Check that the wire is secure and cannot be easily pulled out of the connector.

Not all slots are used when wiring the IAQ into a system. Regardless of whether it is an Analog IAQ or Digital IAQ, however, both are provided with power via slots 9 and 10. The IAQ accepts 12-30 volts DC, and either the "+" or "-" can be connected to either slot. The IAQ does not require specific polarity.
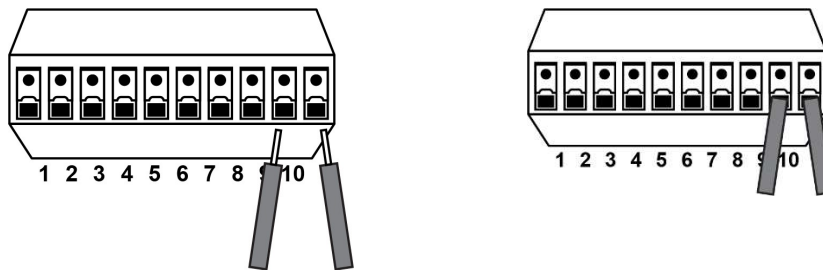
2.11.2 Wire Types

All wiring is done via the terminal block. The terminal block accepts wire gauges from 14 to 28 AWG. Solid wires of moderate or heavier gauge can be pushed directly into the appropriate slots in the block. For stranded wires, you must manually open the spring-loaded contact with the release tabs during wire insertion or have ferrules on the ends of the wires. Manually opening the contact also applies to thin solid wires.

When wiring the IAQ, the following wire types should be used:

Analog IAQ. 18 AWG for power, analog circuit, and relay connection.

Digital IAQ. For the power wire, 18 AWG 2-conductor signal wire is suggested. For Modbus wiring, 22 to 24 AWG is suggested. For best performance, use shielded 3-conductor wire with one twisted pair that provides a pair for signal (A & B), common (COM) and shield ground. The shield should be connected on each detector at the ground terminal along with the drain wire and connected to a ground terminal or chassis only at one end of the bus. An RS485 Modbus must use a balanced pair (for A & B) and a third wire (for Common).
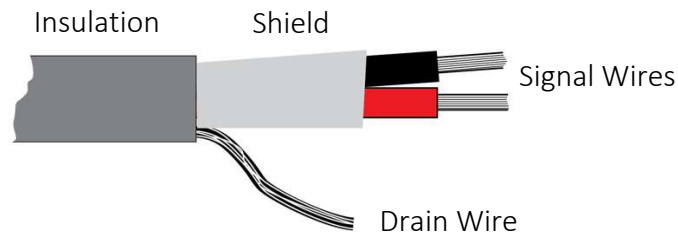
For RS-485 Modbus. For RS-485 Modbus configuration, the wire's gauge must be sufficient to permit the maximum length (3,281', or 1,000m). AWG 24 is always sufficient for carrying Modbus data. Category 5 cables may be employed for RS-485 Modbus, to a maximum length of 1968.5' (600m). For the balanced pairs used in an RS-485 system, wire with a characteristic impedance greater than 100 ohms may be preferred, especially for baud rates of 19200 and higher.

Note: Relay functions and Modbus can be used simultaneously.

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2.11.3 Terminal Block Connections

All connections are made at the terminal block, located on the main PC board. Follow the instructions in Section 2.11 for proper installation.

Note: Before inserting a wire into a slot in the terminal block, strip insulation back 1/4" (6.5 mm).

2.11.4 Analog (IAQ-CO2-A-W) Connections

The following shows the functions of each of the 10 slots, from left to right.

Note: Either "+" or "−" can be connected to slots 9 and 10. There is no polarity requirement.

Slot 1: Relay
Slot 2: Relay
Slot 3: NA
Slot 4: Analog Output
Slot 5: ISO GND (for analog channel and RS485)
Slot 6: NA
Slot 7: NA
Slot 8: NA
Slot 9: Power (+ or −)
Slot 10: Power (+ or −)
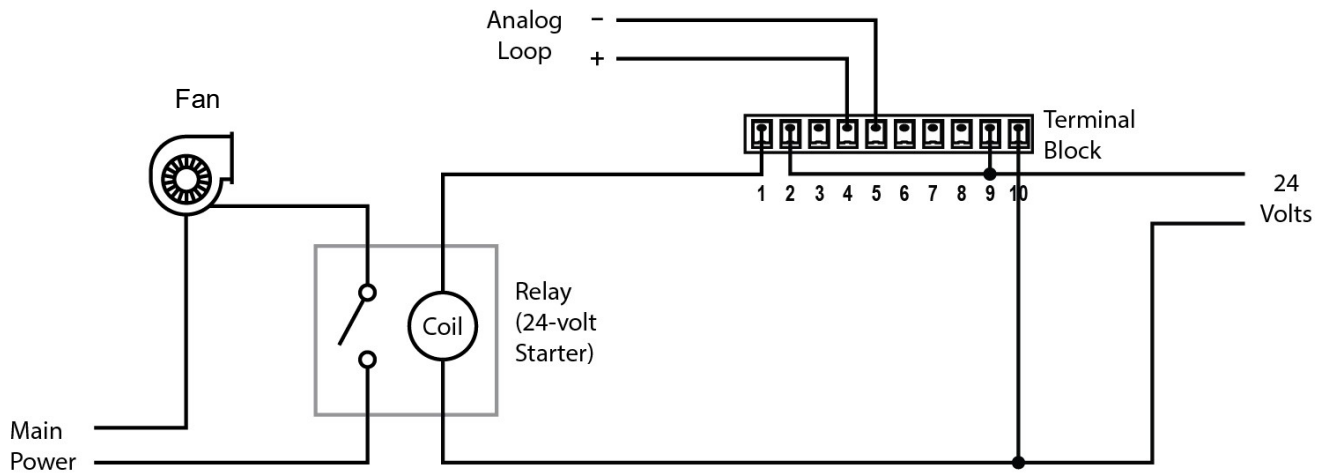
Analog IAQ system wiring.

Note: A variable drive fan is a type of fan that can change speed based on signals corresponding to CO_2 levels and can be connected to the analog loop.

2.11.5 Digital (IAQ-CO2-D-W) Connections

The following shows the functions of each of the 10 slots, from left to right.

Note: Either "+" or "−" can be connected to slots 9 and 10. There is no polarity requirement.

Digital (Left to Right):
Slot 1: Relay
Slot 2: Relay
Slot 3: NA
Slot 4: NA
Slot 5: ISO GND (for analog channel and RS485)
Slot 6: A
Slot 7: B
Slot 8: NA
Slot 9: Power (+ or −)
Slot 10: Power (+ or −)
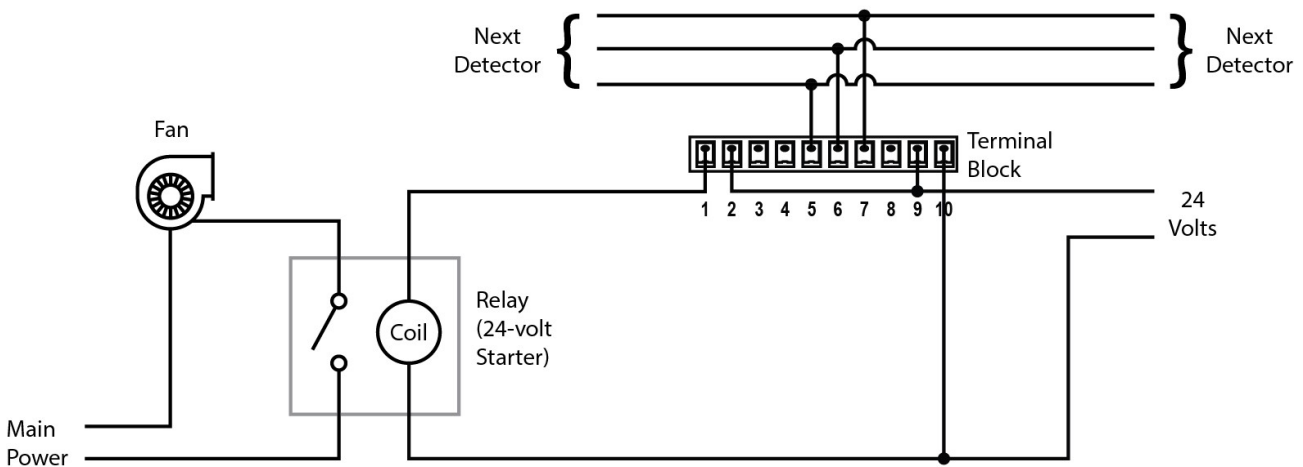
Digital IAQ system wiring, single unit.
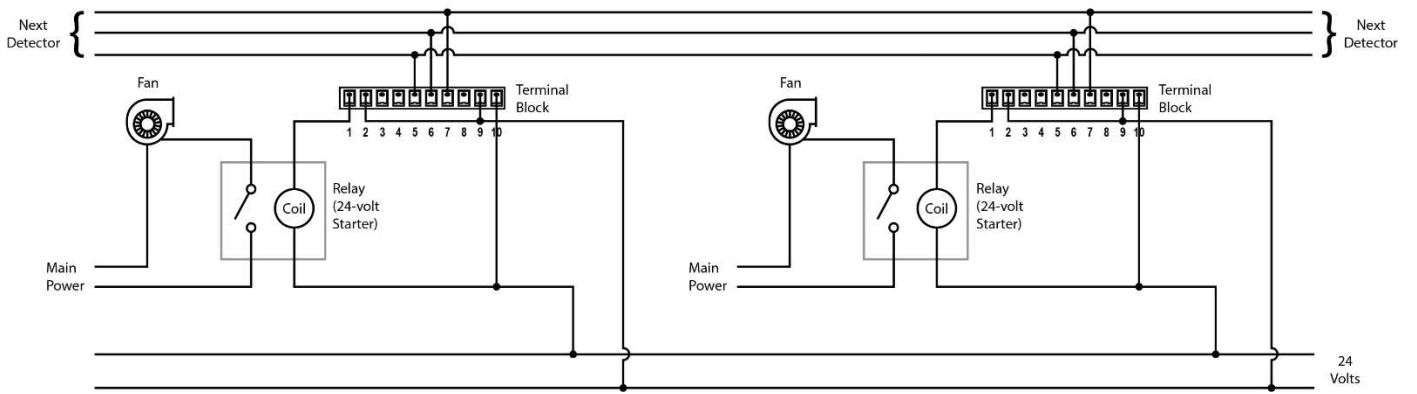
Digital IAQ wiring with multiple units.
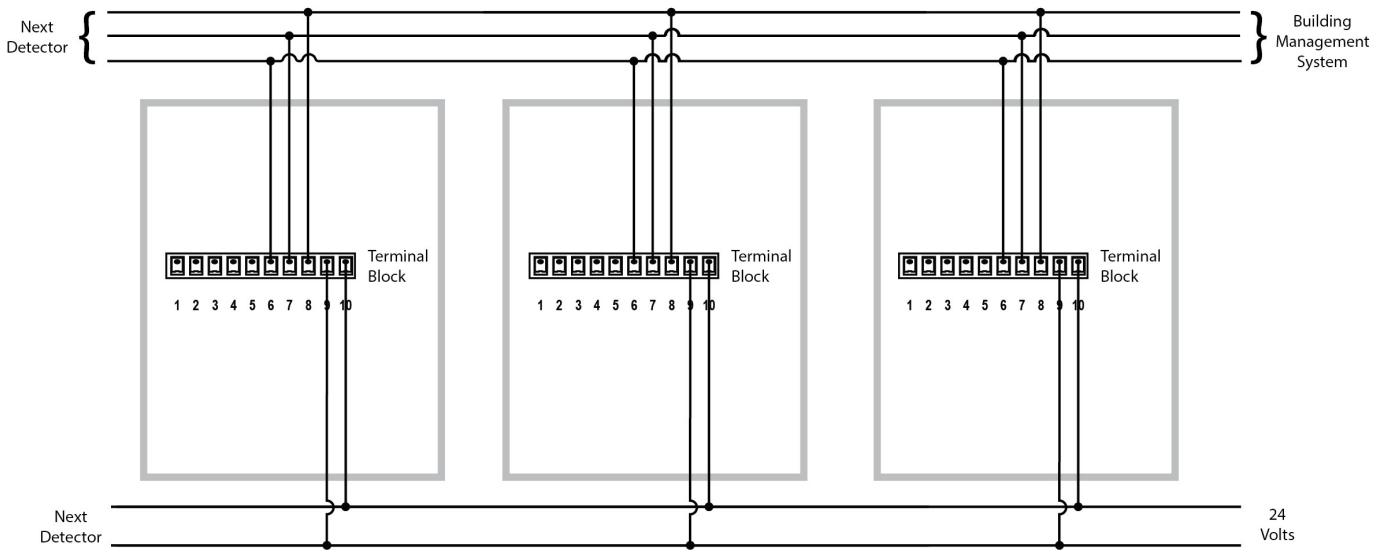
Multiple Digital IAQs in a Modbus daisy-chain configuration connected to a building management system.

Note: In this configuration, up to 247 addresses can be employed. Refer to section 0 for details on how to set addresses.

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2.11.6 RS-485 Termination Jumper (Digital IAQ Only)

The Digital IAQ has a jumper for placing a 120-ohm termination resistor in place to reduce reflections in the signal lines when used with RS-485 communication.
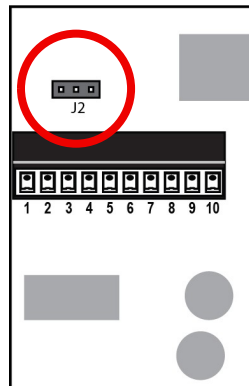
Jumper location on Digital IAQ PC board.

Important! This jumper should only be used on the last IAQ in the line.

The following describe the jumper positions:

- No jumper = Same as jumper on Pin 1 & 2 (has no effect)
- Jumper on Pins 1 & 2 = Used to hold the jumper (has no effect)
- Jumper on Pins 2 & 3 = provides 120-ohm resistor for termination
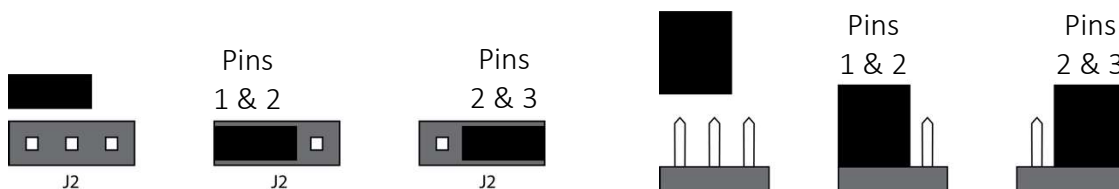
Top view showing jumper positions. With the jumper on pins 1 and 2 or with the jumper completely removed, no termination takes place. When the jumper is on pins 2 and 3, termination is set.

End view showing jumper positions.

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2.12 User Interface
The IAQ has two buttons and a two-line LCD. The buttons are labeled:

> M/N = Menu/Next
> E/T = Enter/Test

The display indicates settings and functions and has adjustable contrast, backlighting level, and backlighting time. Refer to 0 for details on display settings.

2.13 Power Up
When the IAQ is initially powered up, the display illuminates and briefly shows this:

Power Applied

Then it shows this message for five seconds:

Analog IAQ:

> IAQ_A
> VX.XX.XX

Or Digital IAQ:

> IAQ_D
> VX.XX.XX

In both cases, X.XX.XX indicates the current firmware version.

If the date and time were set previously, they are shown in this format (AM/PM and hours/minutes/seconds):

> Time AM   or   Time PM
> HH:MM:SS   11:02:22

Until the date is set, press M/N to view the date that has been set in the system:

> Date MDY
> MM-DD-YY

Until the date is set, press M/N and see:

> Return

Press E/T to enter Normal mode (or enter a warm-up countdown if within 60 seconds of power-up). Alternatively, press M/N to return to the Time Set screen.

If no buttons are pressed in the first five minutes after power-up, the IAQ enters Normal mode and uses the last time and date settings as the starting time and date for the new session.

If the time- and date-setting menu has been entered but no button is pressed for 30 seconds, the main display is shown (normal mode is entered).

For Analog IAQ: Registration levels will be output from 15 seconds to 21 seconds after power-up.

2.13.1 Power-Up Test
If the power-up test is set to "On," the following take place (the power-up test is set by default):

- Relay will be engaged for 10 seconds shortly after power-up.
- For an Analog IAQ, the analog output goes to 16mA from 40 to 60 seconds after power-up.

2.14 Operation
With the IAQ powered up, it starts monitoring the air using the default settings. If settings have been changed, it uses those instead. Basic navigation is simple because it follows consistent rules.

To get started:

- Press the M/N or E/T button to turn on the backlight. The display is now illuminated, and the main (normal) display is shown. It tells you the air quality (Good, Fair, Poor, Bad), along with the reading in parts per million (ppm):

  L   Good
          790ppm

  Note: If the concentration exceeds 2300ppm, then the display will change to ">2310".

  One of the following is displayed in the upper left corner of the screen:

  T   The time and date are not set
  W   Logging has not yet completed one day of data collection
  L   Data is ready for review in the History menu

To the right of that is a general condition of the air quality, and below that is a reading of the measured CO_2 in the air, in ppm (parts per million).

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1. Press M/N to advance from the main screen to Config.
2. Press M/N to advance to Test.
3. Press M/N to advance to History.
4. Press M/N to return to the main display.

At any of the screens (Config., Test, History), if you do not press M/N again within 30 seconds, the main display is shown.
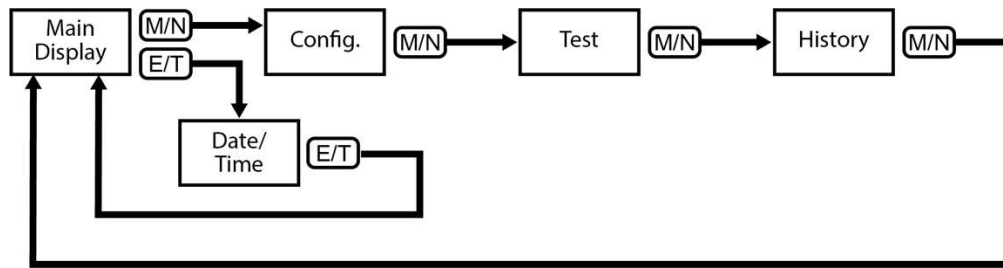
2.14.1 Checking Time And Date
The time and date set in the IAQ's internal clock can be accessed from the main display.

1. At the main display, press M/N or E/T to illuminate the display.
2. Press E/T from the main display to enter the Date/Time screen. Time and date are shown in the formats set in the IAQ.
3. Press E/T to exit Time/Date and return to the main display.

If you do not press E/T again within 30 seconds, the main display is shown.

2.14.2 Setting Time & Date
Following the first power-up of the system with the IAQ, set the time and date. Also, to ensure maximum accuracy if the power to the system is disrupted, check the time and date and correct their parameters if necessary.

Note: When power is restored after a disruption, the time and date restart from the point where the power was interrupted. For example, if the power is disrupted at 12:14:10 and is off for 10 minutes, then the time will resume from 12:14:10, but it will then be 10 minutes behind the actual time of 12:24:10.
the time and date restart from the point where the power was interrupted. For example, if the power is disrupted at 12:14:10 and is off for 10 minutes, then the time will resume from 12:14:10, but it will then be 10 minutes behind the actual time of 12:24:10.

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2.14.2.1 Setting The Time

Time should be set in the IAQ so that history events can be accurately captured and logged.

Note: To ensure maximum accuracy, if the power to the system is disrupted, check the time and date and correct their parameters if necessary. When power is restored after a disruption, the time and date restart from the point where the power was interrupted. For example, if the power is disrupted at 12:14:10 and is off for 10 minutes, then the time will resume from 12:14:10, but it will then be 10 minutes behind the actual time of 12:24:10.

Time is shown as follows:

> Time   AM
> 11:16:05

To change the time:

1. Press E/T and either "AM" or "PM" will blink continuously, depending on the current setting.
2. Press M/N to toggle between "AM" and "PM."
3. Press E/T and the **hours** number blinks.
4. Press M/N to advance through the numbers one at a time or press and hold M/N to cycle through the numbers.

   Note: When "12" is reached, the next number is "01."

5. Press E/T, and the **minutes** number blinks.
6. Press M/N to advance through the numbers one at a time or press and hold M/N to cycle through the numbers. When "59" is reached, the next number is "00."
7. Press E/T and the **seconds** number blinks.
8. Press M/N to advance through the numbers one at a time or press and hold M/N to cycle through the numbers. When "59" is reached, the next number is "00."
9. When you are done setting the time, the last item you changed will continue to blink. After 30 seconds, the main display is shown.

2.14.2.2 Setting The Date

The date is shown in this format:

> Date   MDY
> 10-06-22

To change the date:

1. Press E/T. The two-digit year blinks continuously.

2. Press M/N to advance through the numbers one at a time or press or press and hold M/N to cycle through the numbers.

   Note: When "40" is reached (representing the year 2040), it cycles back to "21," for 2021. Press M/N to increase the number.

3. Press E/T to advance to the two-digit month. The number blinks continuously.
4. Press M/N to advance through the numbers one at a time or press and hold M/N to cycle through the numbers.

   Note: When "12" is reached, the next number is "01" (wrap-around feature).

5. Press E/T to advance to the two-digit day. The number blinks continuously.
6. Press M/N to advance through the numbers one at a time or press and hold M/N to cycle through the numbers.

   Note: When "31" is reached, the next number is "01" (wrap-around feature).

- If you want to make a correction, press E/T and follow the instructions again.
- If you are satisfied with the date you have set, wait 30 seconds, and the display returns to the main display.

2.15 Programming The IAQ

Following the standard navigation outlined in 2.14, at each of the screens (Config., Test, History) you can enter the menus to check and/or set parameters. Instead of pressing M/N to advance to the next screen, press E/T to enter the menu.

Note: At any point, if you do not press a button for 30 seconds, the IAQ reverts to its main display.

Press E/T at any of the three main steps (Config., Test, History) to enter their menus. As you advance through the menus in Config., there is access to submenus, as shown here:
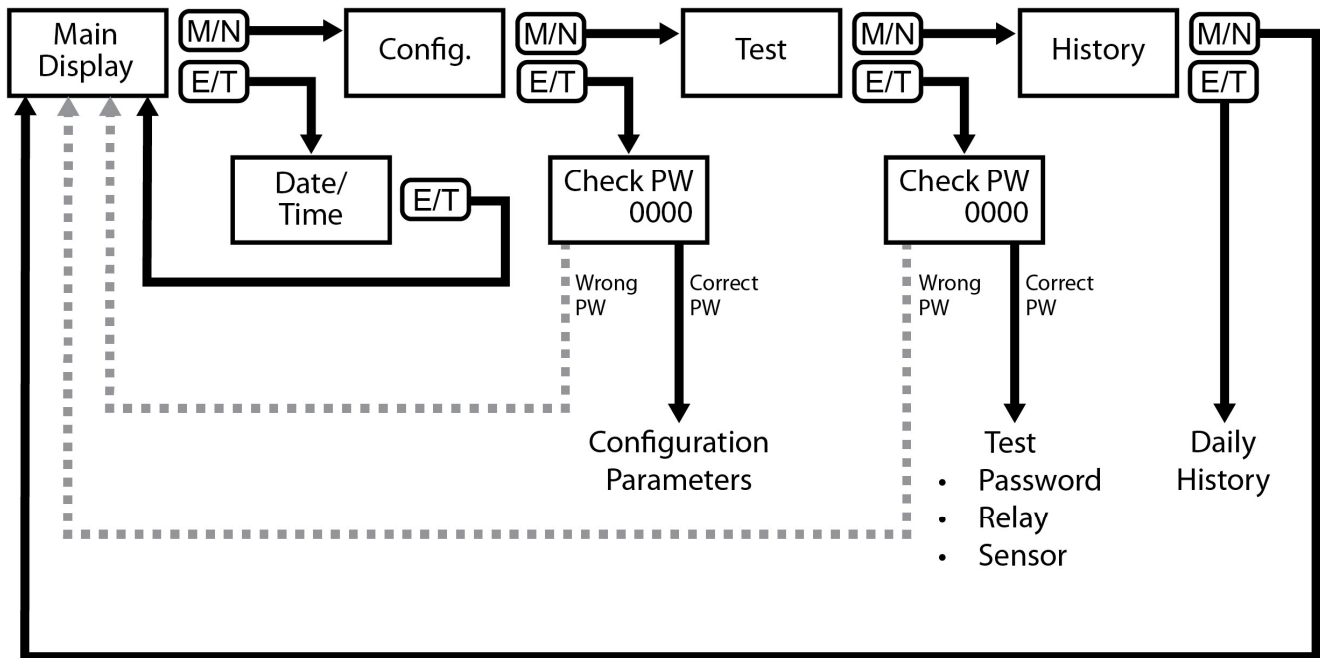
Note: ◀▪▪▪▪▪▪ indicates automatic return to main display.

If you select Config. or Test and you already set a password when the IAQ was first powered up, you must provide that password. If you provide a wrong password or if you do not enter a previous password, it returns to the main display after 30 seconds.

Important! Once you have set a password, write it down or otherwise make note of it and save it in a place where you can find it for future reference, in case you forget it. If the password has been forgotten the backdoor password is 7891.

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To enter the password:

1. At the first blinking digit, press M/N to increase the number from 0 to 1, 2, etc. (press M/N again to "wrap" back to 0).
2. Press E/T to advance to the second digit.
3. Press M/N to increase the number.
4. Press E/T to advance to the third digit.
5. Press M/N to increase the number.
6. Press E/T to advance to the fourth digit.
7. Press M/N to increase the number.
8. Press E/T to register the password.

If you have input the correct password, then you will see the menu screen for Config. or Test.

2.15.1 Config. Navigation

The Config. section includes all configurable parameters for the IAQ.

If a password has been set on initial power-up, you must provide the password when entering Config. Otherwise, the IAQ directs you back to the main display:
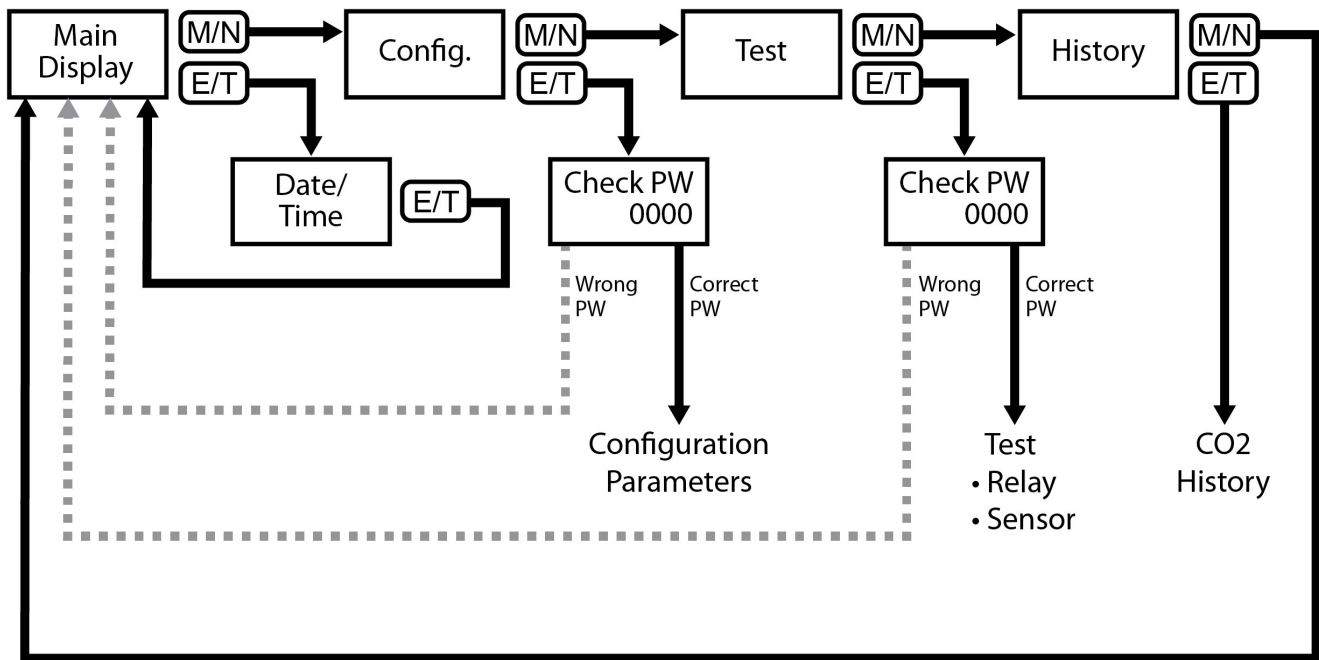
Note: ◀▪▪▪▪▪ indicates automatic return to main display.

Note: If you do not press a key in 30 seconds, the IAQ reverts to the main display.

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If no password was set upon initial power-up, then you can advance through the Config. steps by pressing M/N until you reach the parameter you want to check or change.
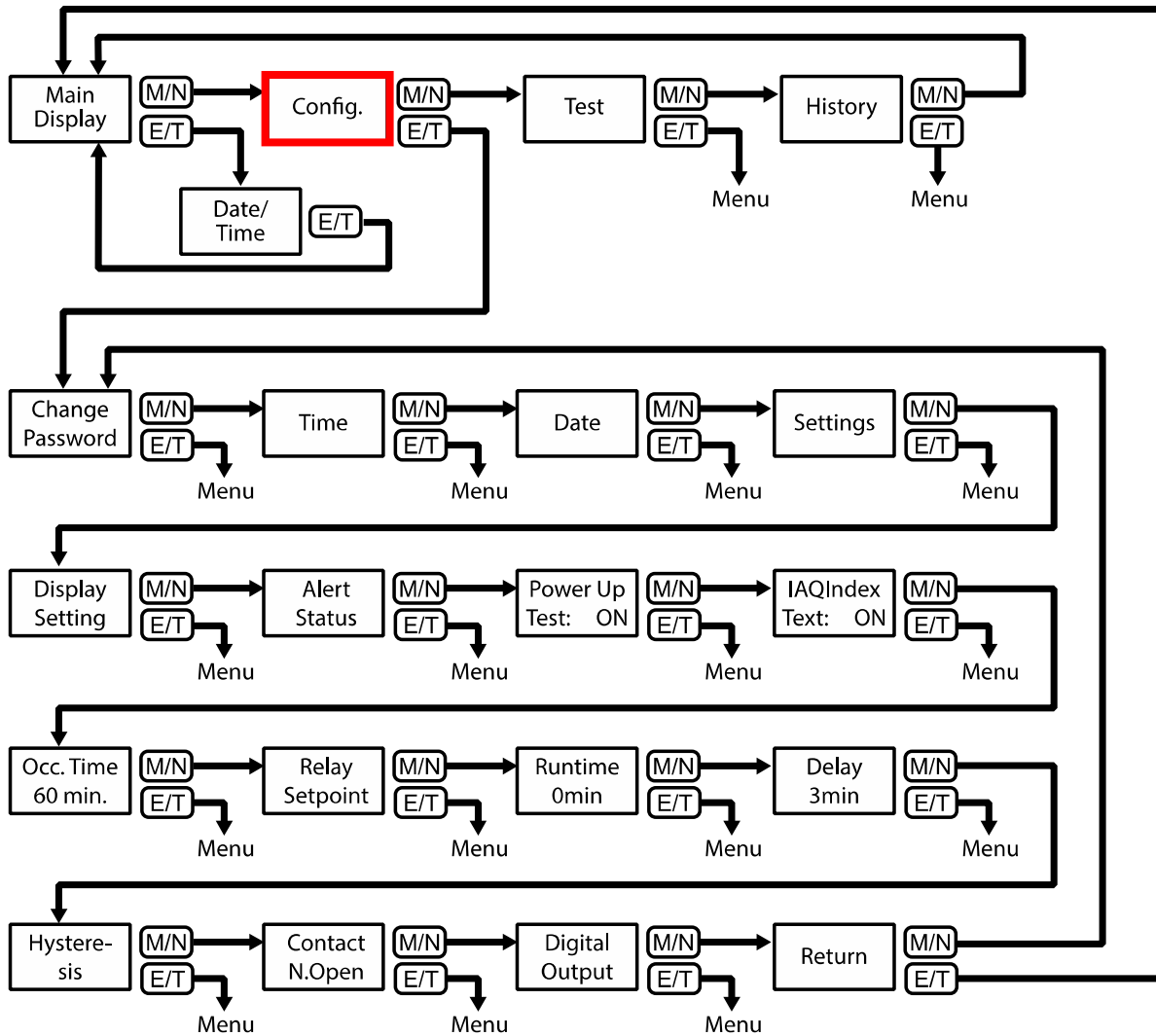
The current setting is shown at the first screen of these configuration menus:

- Time
- Date
- Settings (default or custom)
- Power Up Test (on or off)
- IAQ Index Text (on or off)
- Occupancy Time
- Runtime (shown in minutes)
- Delay (shown in minutes)
- Contact (normally open or normally closed)

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2.15.2 Config.

Configuration consists of 14 sets of parameters, each with menus. The Digital IAQ has an added 15th set of parameters, labeled Digital Output. Detailed flowcharts showing how to navigate Configuration begin on page 46.

Tip: Once you are in Config., you can bypass menus to get to a specific menu by pressing M/N repeatedly until the desired menu is reached.
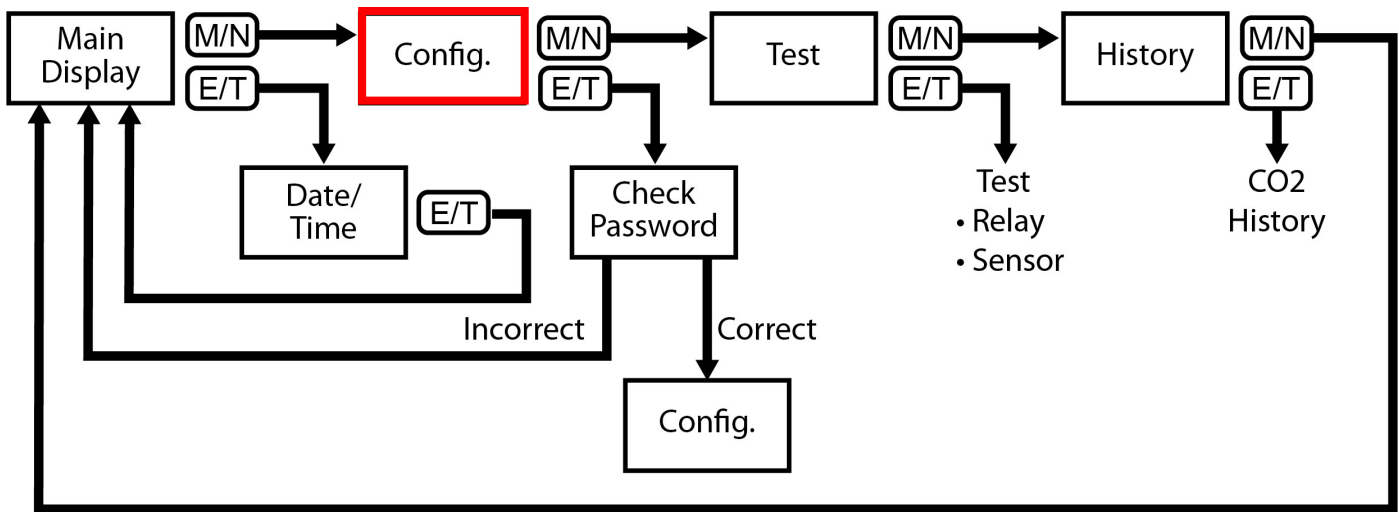
2.15.2.1 Change Password

The current setting is shown, with the first digit blinking (0000 in this example):

New PW
0000

1. At the first blinking digit, press M/N to increase the number from 0 to 1, 2, etc. (press M/N again to "wrap" back to 0).
2. Press E/T to advance to the second digit.
3. Press M/N to increase the number.
4. Press E/T to advance to the third digit.
5. Press M/N to increase the number.
6. Press E/T to advance to the fourth digit.
7. Press M/N to increase the number.
8. Press E/T to register the password.

The default password is 0000. This value allows you to access/change any parameters without having to enter the password. Any other value for the password requires you to enter the password each time you try to make a change. It will remember that you've entered the password when you try to do multiple changes (without exiting the configuration menu), but it will ask you to enter password again if you exit the configuration menu and enter it again.

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2.15.2.2 Settings

When you reach Settings, the word "Default" or "Custom" appears below the heading:

Settings   Settings
Default   Custom

If settings have not been changed, then "Settings Default" is shown.

Note: The exceptions are Time and Date. If they have been set or changed, this is not reflected as "custom," and Settings is still shown as "Default."

This "Settings Default" screen is read-only. Pressing E/T does nothing. Pressing M/N advances to the Display Setting screen.

If any settings (except Time and Date), have been changed, then "Settings Custom" is shown. This includes the Password.

To return the IAQ to its default values, when you see:

Settings
Custom

Press E/T.

The display blinks this message:

Leave
Custom

- If you press E/T, all custom settings will remain and the default values will not be restored.
- If you press M/N, the display blinks this message:

Set
Default

Once you have decided to either set the default values or leave the custom settings, press E/T.

If you selected the custom settings, the display stops blinking and shows:

Settings
Custom

If you selected to revert to default values, the display stops blinking and shows:

Settings
Default

Important! If you reset the IAQ to its default settings, its history is not erased or reverted to a default value. History data is retained.

2.15.2.3 Display Setting
You can change the following parameters in Display Setting:

- Contrast
- Bright
- Bcklight
- Display

Contrast. The contrast between the text and the background can be set from 0% (the minimum) to 100% (maximum).

Caution! Very low contrast can make it difficult to read the display.

To make changes:

1. Press E/T and the number blinks.
2. Press M/N to increase the number in increments of 5 (5, 10, 15, etc.). To scroll through the numbers, press and hold M/N. Once 100 is reached, pressing again "wraps" back to 0.
3. Press E/T when you are done making a change. The change is saved.
4. Press M/N to advance to Bright.

Bright. The display's brightness can be set from 0% (off, the minimum) to 100% (maximum brightness).

1. Press E/T and the number blinks.
2. Press M/N to increase the number in increments of 5 (5, 10, 15, etc.). To scroll through the numbers, press and hold M/N. Once 100 is reached, pressing again "wraps" back to 0.
3. Press E/T when you are done making a change. The change is saved.
4. Press M/N to advance to Bcklight.

Bcklight. This is the amount of time the display's backlight stays lit when a button is pressed.

To make changes:

1. Press E/T and the number blinks.
2. Press M/N to increase the number by 1 (1, 2, 3, etc.) (seconds). To scroll through the numbers, press and hold M/N. Once 10 is reached, pressing again "wraps" back to 0.

   Note: A setting of 0 means the backlight does not turn on when a button is pressed. The display stays dark.

3. Press E/T when you are done making a change. The change is saved.
4. Press M/N to advance to Display.

Display. This determines whether the main display shows information or is blank when it is not backlit. In the OFF setting, the display shows no information. In the ON setting, information is shown even if the backlight is not illuminated.

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To make changes:

1. Press E/T and the current setting (ON or OFF) blinks.
2. Press M/N to toggle from ON to OFF or OFF to ON.
3. Press E/T when you are done making a change. The change is saved.
4. Press M/N and "Return" is shown.
5. Press M/N or E/T to return to "Display Setting."

2.15.2.4 Alert Status

When CO_2 levels exceeds a limit set in the IAQ, alerts at the display can be triggered. Alert Status has two submenus:

- BckFlash
- TxtFlash

These separately set the concentration that activates the backlight flash alert and the text flash alert. When the level is exceeded, the backlight or the text flashes on and off continuously to alert anyone in the location of the detector. The level for both can be set between 600 and 1500 ppm in 10 ppm increments. There is also a "Disabled" setting. This is the default setting. When it is disabled, the display shows:

BckFlash	or	TxtFlash
Disabled		Disabled

To make changes to BckFlash:

1. Press E/T and the text or number blinks.
2. Press M/N to increase the concentration value in increments of 10, starting at 600 (610, 620, etc.). To scroll through the numbers, press and hold M/N. Once 1500 is reached, pressing again "wraps" back to "Disabled." Pressing M/N again starts numbering at 600.
3. Press E/T when you are done making a change. The change is saved.
4. Press E/T to return to BckFlash or press M/N to advance to TxtFlash.

To make changes to TxtFlash:

1. Press E/T and the number blinks.
2. Press M/N to increase the concentration value in increments of 10, starting at 600 (610, 620, etc.). To scroll through the numbers, press and hold M/N. Once 1500 is reached, pressing again "wraps" back to "Disabled." Pressing M/N again starts numbering at 600.
3. Press E/T when you are done making a change. The change is saved.
4. Press E/T to return to TxtFlash or press M/N to see "Return."
5. Press E/T to return to Alert Status or press M/N to return to BckFlash.

To exit Alert Status and advance to Power Up Test:

At Alert Status, press M/N. This bypasses the Alert Status submenus and advances to the Power Up Test screen.

2.15.2.5 Power Up Test

The IAQ can perform a self-test when the instrument is powered up. This function can be set so that each time power is applied, the test is performed.

The display shows the current setting:

       Power Up   or   Power Up
       Test: ON   Test: OFF

To make changes:

1. Press E/T and the current setting (ON or OFF) blinks.
2. Press M/N to toggle from ON to OFF or OFF to ON.
3. Press E/T when you are done making a change. The change is saved.
4. Press M/N and "Return" is shown.
5. Press M/N or E/T to return to "Power Up Test."

2.15.2.6 IAQIndex Text

The IAQ provides a quick, at-a-glance assessment of the air quality, divided into five ranges of parts per million (ppm) concentration:

CO_2 ppm	Air Quality
1600 - 2100	Bad
1100 - 1500	Poor
900 - 1000	Fair
700 - 800	Good
400 - 600	Great

Note: All values below 400ppm are considered Great, and values above 2100 are considered bad.

IAQIndex   Or   IAQIndex
Text: ON   Text: OFF

To make changes:

1. Press E/T and the current setting (ON or OFF) blinks.
2. Press M/N to toggle from ON to OFF or OFF to ON.
3. Press E/T when you are done making a change. The change is saved.
4. Press E/T to return to "IAQIndex Text."
5. Press M/N to advance to "Occ. Time."

2.15.2.7 Occ. Time

The Occupancy Time parameter sets the amount of time the IAQ's relay is triggered from its Normally Open or Normally Closed state without any CO_2 threshold being surpassed. When Occupancy time is activated, the letter "O" is displayed before the relay, giving a visual indication that it has been activated. The "O" is shown until the preset time has passed.

In Occupancy Mode, the display and buttons read and behave the same as normal, with "OR" shown in the upper left corner of the display (right after the logging status letter of "W" or "L"). This indicates that it is in Occupancy Mode ("O") and the relay is activated ("R"). The IAQ comes out of Occupancy Mode after Occupancy Time has elapsed. The "OR" indication is no longer shown on the display.

From the main screen, when the IAQ is in normal operating mode, Occupancy Mode can be invoked by holding down both buttons for five seconds. When the relay toggles, you hear a "click." The relay remains in the Occupancy Mode state until the duration set in Occ. Time has elapsed. It then returns to its prior state.

To cancel the Occupancy Time function once it is invoked, hold both buttons down for five seconds. When the relay toggles, you can hear a "click." The relay returns to its preset state.

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If the relay controls a ventilation fan, for example, Occupancy Mode can be used to manually run the fans, for instance, to clear the air in a room (such as between sessions, etc.).

To set Occ. Time:
1. At Occ. Time, press E/T. The time already set will flash.

   Occ. Time
        15min

2. While the number is flashing, press M/N to increase the duration. The time can be set between 0 and 480 minutes in 15-minute increments. Once 480 is reached, pressing M/N again returns it to 0.

   Note: The default value is 60 minutes.

3. Press E/T to save the new value.
4. Press M/N to advance to Relay Setpoint.

2.15.2.8 Relay Setpoint
The Relay Setpoint sets a CO_2 concentration threshold in parts per million. When the threshold is exceeded, the relay is triggered.

Note: The triggering can be turned off by setting the Relay Setpoint to "Disabled" instead of a numerical value.

To make changes:

1. At Relay Setpoint, press E/T. The concentration number already set will flash.

        CO2
            750ppm

2. While the number is flashing, press M/N to increase the duration. The time can be set between 600 and 1500 ppm in 10 ppm increments. Once 1500 is reached, pressing M/N again advances to "Disabled." (When it the Relay Setpoint is Disabled, the relay is not triggered at any CO_2 level.) Pressing M/N again starts the number sequence, starting at 0, again in increments of 10.

   Note: The default value is 750 ppm.

3. Press E/T to save the new value.
4. Press M/N to advance to Runtime.

2.15.2.9 Runtime

Runtime is the length of time the relay is in the state reached when it is triggered. For example, if the relay is configured to be Normally Open, when it is triggered, it closes and remains closed until the total Runtime duration has expired.

Note: If the relay is triggered and another triggering event occurs, it does not interrupt the first trigger and it does not start a new runtime.

To set Runtime:

1. At Runtime, press E/T. The time already set will flash.

   Runtime

   15min

2. While the number is flashing, press M/N to increase the duration. The time can be set between 0 and 30 minutes in 1-minute increments. Once 30 is reached, pressing M/N again returns it to 0.

   Note: The default value is 0 minutes.

3. Press E/T to save the new value.
4. Press M/N to advance to Delay.

2.15.2.10   Delay

Set a delay time from 0 to 30 minutes to tell the relay to wait before triggering and following the time set in Runtime. Setting the time to a value of 0 means that there is no delay when the CO_2 level exceeds a threshold and triggers the relay.

To set Delay time:

1. At Delay, press E/T. The time already set will flash.

   Delay

   15min

2. While the number is flashing, press M/N to increase the duration. The time can be set between 0 and 30 minutes in 1-minute increments. Once 30 is reached, pressing M/N again returns it to 0.

   Note: The default value is 3 minutes.

3. Press E/T to save the new value.
4. Press M/N to advance to Hysteresis.

2.15.2.11   Hysteresis

Hysteresis is a valuable parameter because it allows setting a "buffer" that keeps the IAQ from triggering when it is exposed to a momentary change in CO2 levels. This prevents "nuisance" triggering that might activate fans, alarms, etc., and can be set at a threshold value from 0 to 400 ppm.

To set Hysteresis:

1. At Hysteresis, press E/T. The time already set will flash.

   CO2
   　　50ppm

2. While the number is flashing, press M/N to increase the concentration number. The number can be set between 0 and 400 ppm in 10 ppm increments. Once 400 is reached, pressing M/N again returns it to 0.

   Note: The default value is 50 ppm.

3. Press E/T to save the new value.
4. Press M/N to advance to Contact.

2.15.2.12   Contact

This sets the relay's contact to Normally Open (N.Open) or Normally Closed (N.Closed).

The display shows the currently selected relay function:

   Contact　　　or　　　Contact
   　N.Open　　　　　　　N.Closed

To set the Contact:

1. Press E/T and the current setting (N.Open or N.Closed) blinks.
2. Press M/N to toggle from N.Open to N.Closed or N.Closed to N.Open.
3. Press E/T when you are done making a change. The change is saved.
4. Press M/N and "Return" is shown.
5. On a Digital IAQ, press M/N to return to "Digital Output." On an Analog IAQ, press M/N to return to the main (normal) screen.

2.15.2.13   Digital Output (Digital IAQ only)

The information shown in this section pertains to the Digital IAQ only. If you have an Analog IAQ, please skip this section and proceed to the next section, "Return."

There are five submenus in the Digital Output menu:

- Protocol
- Address
- DeviceID
- BaudRate
- Parity

When Digital Output's menu is selected, press E/T to advance to the first submenu, Protocol. To skip through the submenus, press M/N to advance one at a time. To change any submenu's settings, press E/T. The first character flashes, meaning you can make changes.

Protocol

The communications protocol is set to Modbus. If other protocols are offered by Macurco in the future, they will be selectable through settings here.

- Press E/T and the word "Modbus" flashes, but it cannot be changed. (There are no options.)
- Press M/N to advance to Address.

Address

The address consists of three numerical characters. Each IAQ in a network must have a unique address. Otherwise, there will be a signal error. Therefore, make sure each IAQ has a unique Address. The default value is 001.

- Press E/T to edit the address. The first digit of the 3-digit address flashes.
- Press M/N to increase the number (0 through 9).
- Press E/T to select the second digit.
- Press M/N to increase the number (0 through 9).
- Press E/T to select the third digit.
- Press M/N to increase the number (0 through 9).
- Press E/T to save the 3-digit address.

Press E/T again to return to the first digit for editing or press M/N to go to DeviceID.

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DeviceID

Up to eight characters can be input to give each IAQ a unique DeviceID. For example:

- Rm 201
- Bldg6Rm2
- EAST_STR

Note: Since each IAQ's DeviceID is set individually, duplication of a DeviceID in a network is possible, although it is usually not desirable. If the DeviceID is duplicated, the IAQ will not show an error. However, an error may or may not be shown on a system's device that is reading the IAQ data. (It is also possible to get no error indication in some conditions.) Consult the device manufacturer's manual or technical support to confirm whether duplicated DeviceIDs will produce an error or are not allowed.

Important! The default value is blank.

To make changes:

- Press M/N to step through the characters. To advance through characters quickly, press and hold M/N.
- Press E/T to step through the eight characters one at a time.

The following characters are available, starting with a space (blank, shown as a blinking underscore) and proceeding through these sets of characters in this order:

- Space (blank)

- ! " # $ % & ' ( ) * + , - . /

- 0 through 9

- : ; < = > ? @

- A through Z   (upper-case letters)

- [¥] ^ _ \

- a through z   (lower-case letters)

- { | }

When the first character is flashing, press M/N to change the first character of the DeviceID. The default is a blank space.

Press E/T to select the flashing value.
Press M/N to scroll through characters. The default value is blank.

BaudRate

BaudRate is the rate at which information is transferred in a communication channel between the IAQ and any external equipment. It must match the BaudRate at which the gateway, Building Management System, RS-485 master, etc., are set at. In this context, "1200Bd" means that the IAQ's communication port can transfer a maximum of 1200 bits per second, "2400Bd" means communication transfer of 2400 bits per second, etc.

At very high baud rates, the maximum cable length may need to be reduced. The higher the baud rate, the more sensitive the cable becomes to the quality of installation.

- 1200Bd
- 2400Bd
- 4800Bd
- 9600Bd
- 19200Bd (default)
- 38400Bd
- 57600Bd
- 115200Bd

To make a change:

- When the current selection is flashing, press M/N to choose the baud rate.
- Press E/T to select the flashing value as the setting.
- Press E/T to make another BaudRate selection.
- Press M/N to go to Parity.

Parity

The parity bit is used in serial communications to determine if the data being transmitted is correctly received by the remote device. Check the required settings on other devices such as the gateway, Building Management System, RS-485 master, etc., that the IAQ is networked with, and then set the IAQ's parity to match their requirements.

There are three possible Parity settings on the IAQ:

- Even (default)
- Odd
- None

- When the current selection is flashing, press M/N to choose the parity.
- Press E/T to select the flashing value as the setting.
- Press E/T to make another Parity selection.
- Press M/N to go to "Return."

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2.15.2.14   Return
- To return to the first editable menu (Change Password), press M/N.
- To exit to the Main Display (normal) screen, press E/T.

2.15.3 Test
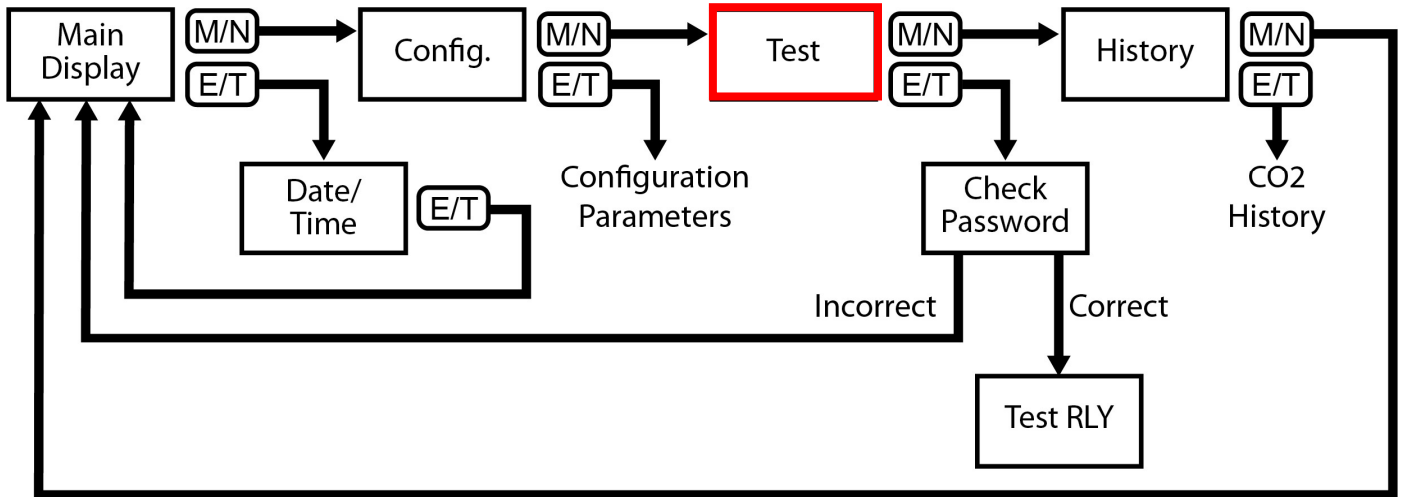
The IAQ provides two tests:

- Test Relay
- Test CO2

A detailed description of how to navigate Test is shown on in the flowcharts beginning on page 46.

Enter Test by providing the password (the IAQ uses a single password for Config. and Test).

Test Relay
After you provide the correct password, the display shows this:

Test RLY

Press E/T to initiate a relay test (or press M/N to skip the relay test and go to Test CO2). When the relay test begins, the word "Closed" is shown and "Test RLY" flashes:

Test RLY
  Closed

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After five seconds, the word "Open" is shown and "Test RLY" continues to flash:

      Test RLY
         Open

Note: Each time the relay toggles from open to closed or closed to open, there is an audible "click."

When the relay test is complete, the display shows "Test RLY," but it no longer flashes. You can proceed to testing the CO_2 sensor by pressing M/N once. If you do not press any button for 30 seconds, it returns to the main (normal) screen.

Test CO2

The IAQ can test the CO_2 sensor by running through simulated tests that correspond to CO_2 concentrations from 0ppm to 2000ppm, in increments of 125ppm (numbers ending with "5" are rounded up).

Note: No challenge with calibration gas is required for this test.

While the IAQ performs its CO_2 sensor test, "Test CO2" flashes. The test takes 90 seconds. The sensor is tested in increments of simulated CO_2 readings for 5 seconds starting at 0 and going in 125 ppm increments (rounded up when ending in "5") to 2000 ppm.

When the test is complete, the display shows "Test CO2" and no longer flashes.

- Press M/N to see "Return."
- Press E/T to run the CO_2 sensor test again.

If you do not press any key, the IAQ returns to the main (normal) screen.

When the word "Return" is showing, you have two options:

- Press E/T to return to the main (normal) screen
- Press M/N to go to "Test RLY."

If you do not press any key, the IAQ returns to the main (normal) screen.

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2.15.4 History

The IAQ keeps a running history of CO_2 levels on a day-by-day basis, making it simple to reference the data. Data for each day includes Low, High, and Average CO_2 levels detected by the IAQ. Data are stored for up to 30 days. After 30 days, new history data overwrites old data, beginning with Day 1 and proceeding to Day 2, Day 3, etc.

Accessing And Navigating History

No password is necessary to read the IAQ's history because it is read-only. From "History," press E/T to see Day 1.
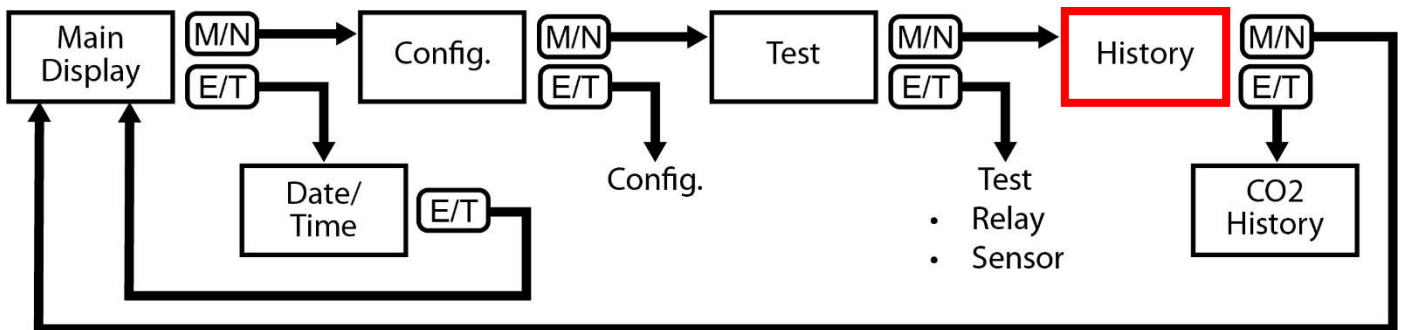
Important! You cannot reset or otherwise change any data stored in History. The IAQ displays all history data captured for up to 30 days, based on the IAQ's current date and time. A new record is saved only if data for a full 24 hours is collected. The IAQ waits for the clock to be at 0:00:00 and starts collecting data until the next 0:00:00 is reached. It then saves the information for those 24 hours as one day's history.

Press E/T to see the first day's CO_2 History menu screen:

> Day –1
> 11–12–22

Press E/T to see "Low" (the lowest level, in ppm, of CO_2 detected on that day):

> Low
>   430ppm

Press M/N to see "High" (the highest level, in ppm, of CO_2 detected on that day):

> High
>   2310ppm

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Press M/N again to see "Average" (the average level, in ppm, of CO_2 detected on that day):

> Average
> 580ppm

Press M/N to see "Return."

- Press M/N to cycle back to "Low" for the same date.
- Press E/T to return to the day's menu screen:

> Day −1
> 11−12−22

Press M/N to go to Day 2, which is the next earliest date:

> Day −2
> 11−11−22

Press M/N to go to the next day.
Press E/T to return to the main (normal) screen. Alternatively, if you do not press a button for 30 seconds, it returns to the main (normal) screen.

Every day's navigation structure is the same, with Low, High, and Average.

Note: When you reach Day 30 or the last day with captured data, if you press M/N, you see "Return." Press M/N to return to the first day (Day 1). If you press E/T or do not press a button for 30 seconds, it returns to the main (normal) screen.

3 End Of Life And Error Indicators

3.1 End-Of-Life Indicator

Every time the main display is reached (normal), the IAQ checks how much of the detector's life is left.

If 3,622 days (10 years minus 31 days) have elapsed, this message will be displayed:

> EOL
> DD days

"DD" stands for days of power-up remaining until end of life. At this point, a daily countdown beginning at 31 days is shown until end of life is reached.

Once 3,653 days (10 years) have elapsed since the IAQ was first powered up, it shows this end-of-life message:

> EOL
> Replace

The IAQ is at the end of its life and should be replaced. Discard in e-waste according to local regulations.

3.2 Errors

The IAQ continuously monitors various internal operating parameters. If a problem is found, the unit shows an error message on the display. This may be a temporary issue, or it might be more important. If an error occurs, remove power to the unit, wait a few seconds, and then reapply power. If the problem persists, your detector requires repair. Discontinue using the IAQ and contact the installer or Macurco Tech Support for advice. If repair is required, return the unit to manufacturer to comply with warranty.

⚠ WARNING
Do not disassemble unit or attempt to repair or modify any component of this detector. This detector contains no user serviceable parts, and substitution of components may adversely affect product performance and **result in sickness or death**.

The IAQ has an expiration function associated with the installation date which will cause the unit to indicate "end-of-life" when the sensor has expired. See section "End-of-life Indicator" (page **Error! Bookmark not defined.**). All maintenance and repair of products manufactured by Macurco are to be performed at the Macurco Service Center. Macurco does not sanction any third-party repair facilities.

There are factory errors that are explained in the Manufacturing Process Instructions. The Other errors have to do with memory errors, calibration errors, communication errors and crystal (sensor?) errors.

Macurco IAQ Carbon Dioxide Detector

Note: Two strings separated by a slash (for example, Trbl Err / Cause?) indicates the display alternates between the strings.

- NVM = Non-volatile memory
- EOL = End-of-Life
- HFXO = Crystal

Trbl Err / Cause? – Unknown Error
Bit 0 - NVM load / def:yyyy*****(see below) Bit 1 -NVM Err / zzzz
Bit 2 – No cal. / factory
Bit 3 – PCBATest / Failed Bit4–Sensor/RDErr
Bit 5 – Under / Range Bit6–SetAuto/Cal.Err
Bit7–EOL
Bit 8 – HFXO / Failed
Bit 9 – Differen / tBoard
Bit 10 – Failed / BumpTest Bit11–Bad/HFXO

******For NVM errors - depending on yyyy: Bit 0 – Load / History
Bit 1 - LoadFact / oryCal
Bit 2 – LoadFiel / dCal

Bit 3 – LoadPCBA / TestResu Bit 4 – LoadRunT / imeCount Bit 5 – SaveFiel / dCal
Bit 6 – SaveFact / oryCal

Bit 7 – SaveHist / Ory
Bit 8 – SaveConf / ig
Bit 9 – Repack
Bit 10 – InitHist / ory
Bit 11 – ReadTota / lRunTime Bit 12 – SaveTota / lRuntimel

4   Maintenance

Other than occasional inspection, cleaning, and testing, the IAQ requires very little care. The sensor is not replaceable, so when it reaches its end of life, the entire unit should be replaced.

4.1   Testing

The IAQ monitor uses an automated background calibration program to set the clean air level on a regular basis. Using CO2 test gas or exhaling directly on the unit will cause the CO2 values to increase.

⚠ WARNING
CAUTION: This detector will only indicate the presence of carbon dioxide gas at the sensor. Carbon dioxide gas may be present in other areas. Accommodation spaces should be well ventilated when household cleaning supplies or similar contaminants are used.

4.2   Cleaning

The IAQ should be cleaned occasionally using a soft brush attachment on a vacuum cleaner. After cleaning, test the IAQ to ensure that it is operating normally.

CAUTION

Avoid using harsh cleaning materials, abrasives, and organic solvents. Such materials may permanently scratch or otherwise damage the surface, damage the sensor, or damage the labels or instrument housing.

If you have any questions about the applicability of the IAQ to your situation, consult an industrial hygienist or call Macurco Technical Service.

5   Appendix A – Detailed Navigation Of The IAQ

The following pages include detailed flowcharts of the IAQ's navigation, broken up by menus.

Notes

These symbols are used throughout:

(M/N)	Menu / Next Button
(E/T)	Enter / Test Button
(30)	Wait for 30 seconds
(XX)	Wait for XX seconds
(OT)	Wait for Occupancy Time

1.   The main screen is labeled as "Normal."
2.   E/T shown in red indicates where changes are made to the configuration.
3.   Quotation marks indicate what is shown on the display. Two strings within quotation marks separated by a slash (for example, " /_On") indicates the display alternates between the strings.
4.   In most instances, if no button is pressed in 30 seconds, the IAQ returns to the main screen (normal).

F

- Normal
- OT
- M/N and E/T pressed for 5 secs → "LORSSSSS CCCCCppm"
- M/N and E/T pressed for 5 secs
- E/T → Date/Time
- Normal Mode
- M/N
- Has 3653 days of power up time elapsed? — Yes → "EOL Replace" — No
- M/N, 30, E/T
- No
- Has 3622 days of power up time elapsed? — Yes → "EOL DD days"
- Is there Trouble Fault? — Yes → TF
- 30 → "Config." → E/T → Config 1
- M/N
- 30 → "Test" → E/T → tst
- M/N
- 30 → "History" → E/T → HIS
- M/N
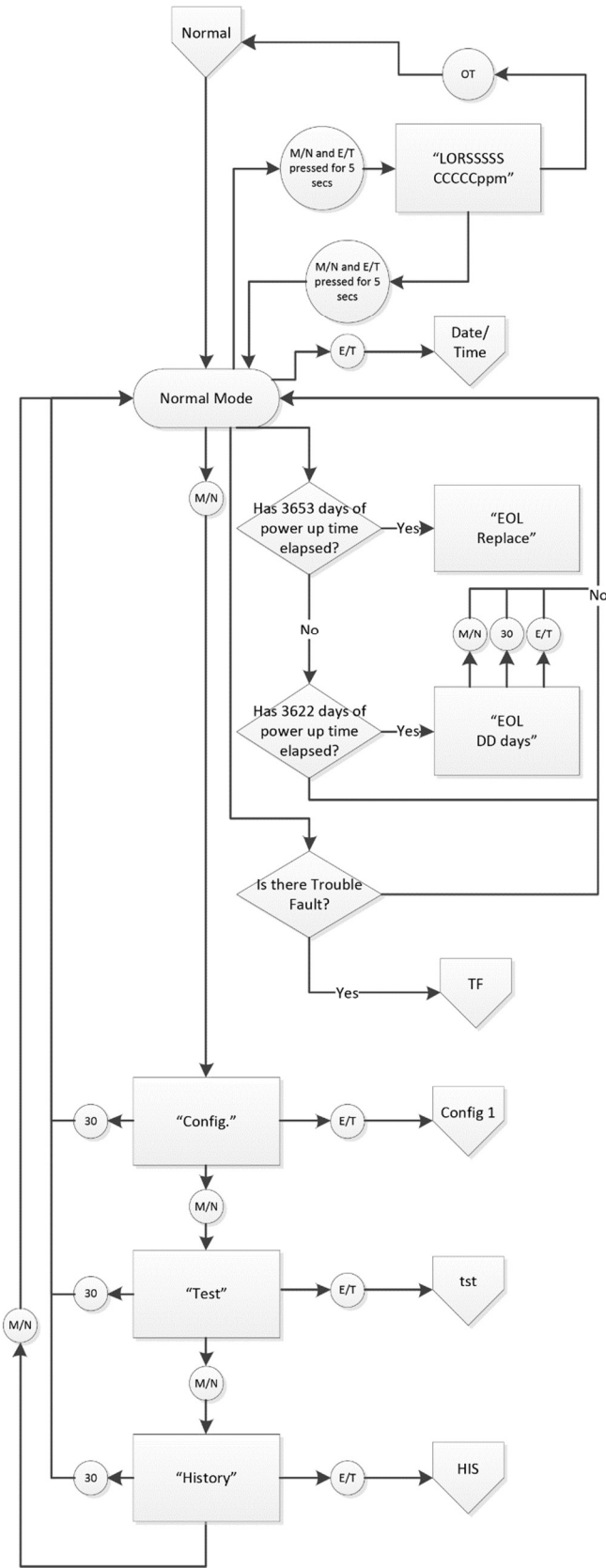
Notes:

In Normal mode, the display reads:

L SSSS
CCCCCppm

- SSSSS is the CO_2 level (Great, Good, Fair, Poor, Bad).
- CCCCC is the Concentration in ppm.
- L is the logging status:

"T" is displayed if the time and date are not set.
"W" is displayed if the logging has not yet completed one day of data.
"L" is displayed once there is data ready in the History menu to review.

If the concentration is greater than 2300, CCCC changes to >2310.

In Occupancy Mode, the display and buttons read and behave the same as normal, with "OR" in the upper left corner of the display (right after the logging status letter of "W" or "L"). This indicates that it is in Occupancy Mode ("O") and the relay is activated ("R"). The device will come out of occupancy mode after Occupancy Time (shown as "OT" in the flowchart).

If the relay is activated without Occupancy Mode being activated, just the "R" will be displayed right after the logging status letter.

- If the display is set to "OFF," pressing either button wakes up the IAQ in Normal mode.
- If no button is pressed within 30 seconds, the display turns off again.

Throughout this document if the display is off, one button press will turn it on before the action shown here will occur in the subsequent button press.

Throughout the firmware when there is a selection to be made the characters to be selected are flashing. M/N increments the characters(s) and E/T selects the character(s) and moves on to the next set of characters to be selected on the screen (if any) until all the selections on the screen have been made.

Holding the M/N Button down allows rapid scrolling through the available options.

After 3622 days of power up time, the message "EOL DD days" is displayed. "DD" is the number of days of power up remaining until the end of life. This can be silenced for 48 hours at a time by pressing either button to return to normal mode. Once 3653 days have elapsed, the message "EOL Replace" appears and the device ceases operating.

Flowchart Notes:

1. E/T shown in red indicates where changes are made to the configuration.
2. Quotation marks indicate what is shown on the display. Two strings within quotation marks separated by a slash (for example, " /_On") indicates the display alternates between the strings.

- M/N — Menu / Next Button
- E/T — Enter / Test Button
- 30 — Wait for 30 seconds
- XX — Wait for XX seconds
- OT — Wait for Occupancy Time

INITIAL DATE AND TIME CHECK
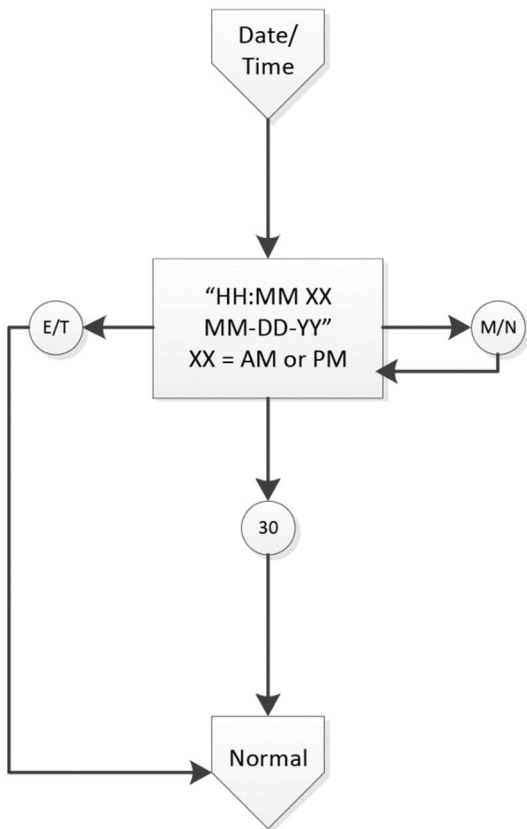
Date & Time Notes:

1. E/T shown in red indicates where changes are made to the configuration.
2. Quotation marks indicate what is shown on the display. HH:MM = two-digit hours and two-digit minutes. MM-DD-YY = two-digit month, two-digit day, and two-digit year (2021 to 2040, represented by numbers 21 through 40).

```
        Date/
        Time
          |
          v
  E/T <-- "HH:MM XX     --> M/N
          MM-DD-YY"     <--
  |       XX = AM or PM
  |          |
  |          v
  |         (30)
  |          |
  |          v
  +----->  Normal
```

Configurations

Config 1

Password Set? → **Y** → **Password Entered?** → **N** → **"Check PW 0000/_000"** → **Password correct?** → **N** → **30**

Password Set? → **N**

Password Entered? → **Y**

Password correct? → **Y**

"Change Password" → **E/T** → **"New PW _000/0000"** → **30**

Current Password is shown. Example: 0000.
M/N changes the flashing character and E/T advances to the next character.

E/T ← **"New PW 123_/1234"**

The final change is 1234 in this example.

M/N

"Time XM HH:MM:SS" → **E/T** → **"Time PM 01:23:45"** → **30**

Current Time setting is shown. Example: 1:23:45 PM.
M/N changes the flashing set of characters (AM/PM, HH, MM, SS) and E/T advances to the next set of characters.

E/T ← **"Time AM 02:46:08"**

The final change is 2:46:08 AM in this example.

M/N

"Date MDY MM-DD-YY" → **E/T** → **"Date MDY 9-09-21/9-09-__"** → **30**

Current Date setting is shown. Example: 9-9-21.
M/N changes the flashing set of characters (YY, MM, DD) and E/T advances to the next set of characters.

E/T ← **"Date MDY 10-15-21/10-__-21"**

The final change is 10-15-21 in this example.

M/N

Normal

Config 2

Macurco IAQ Carbon Dioxide Detector

In this example, "Settings Custom" is shown, indicating that the settings have been changed from their default values.

If the settings have not been changed, "Settings Default" is displayed.

If settings have been changed from their default value(s), they can be set back to their default value(s). Doing so sets all values back to their defaults.

If no changes were made to the default settings and the menu screen reads "Settings Default," no changes can be made here.

Config 3

"Display Setting"

E/T → "Contrast 100%"

E/T → "Contrast 100%/_____"

30

Press E/T to make a change. When the value flashes, the M/N Button can be used to change the contrast level in 5% increments from 0 to 100% (100% is the default). Press E/T to select the flashing value as the setting.

M/N

E/T

"Bright 75%"

E/T → "Bright 75%/_____"

30

Press E/T to make a change. When the value flashes, the M/N Button can be used to change the brightness level in 5% increments from 0 to 100% (75% is the default). Press E/T to select the flashing value as the setting.

M/N

E/T

"Bcklight 1min"

E/T → "Bcklight 1min/_____"

30

Press E/T to make a change. When the value flashes, M/N Button can be used to change the duration of backlight stays on, in 1-minute increments from 0 to 10 minutes (1 minute is the default). Press E/T to select the flashing value as the setting.

M/N

E/T

"Display ON"

E/T → "Display ON/_____"

30

Press E/T to make a change. When the value flashes, M/N Button can be used to alternate the display to be ON or OFF (ON is the default). Press E/T to select the flashing value as the setting.

M/N

M/N

E/T

"Return"

E/T

M/N

Config 4

Normal

Config 4

"Alert Status" → E/T → "BckFlash Disabled" → E/T → "Contrast Disabled/____"

30

When selection is flashing, the M/N Button can be used to change the concentration that activates the Backlight flash alert. The level can be set between 600 and 1500 ppm in 10 ppm increments. There is also a Disabled setting (this is the default).

M/N

E/T

"TxtFlash Disabled" → E/T → "TxtFlash Disabled/____"

30

When selection is flashing, the M/N Button can be used to change the concentration that activates the Text flash alert. The level can be set between 600 and 1500 ppm in 10 ppm increments. There is also a Disabled setting (this is the default).

M/N

E/T

"Return"

30

M/N

E/T

30

"Power Up Test: On" → E/T → "Power Up Test: On/___"

When selection is flashing, the M/N Button can be used to change the Power up test to On or Off.

The default is On.

M/N

E/T

30

"IAQIndex Text: On" → E/T → "IAQIndex Text: ON/IAQIndex Text: "

When selection is flashing, the M/N Button can be used to change the IAQIndex Text to On or Off.

The default is On.

M/N

E/T

30

"Occ.Time 15 min" → E/T → "Occ.Time 15min/__min"

When selection is flashing, the M/N Button can be used to change the duration of the Occupancy Mode. The time can be set between 0 and 480 minutes in 15-minute increments. The default is 60 minutes.

M/N

E/T

Normal

Config 5

Config 5

"Relay Setpoint" → E/T → "CO2 750ppm" → E/T → "CO2 750ppm/_____ppm"

M/N

Return

E/T

M/N

M/N

"CO2 1000ppm/_____ppm"

E/T

M/N

30

When selection is flashing, the M/N button can be used to change the concentration that activates the Relay. The level can be set between 600 and 1500 ppm in 10 ppm increments. There is also a Disabled setting.

The default is 750 ppm.

M/N

30

"Runtime 0min" → E/T → "Runtime 0min/___min"

E/T

When selection is flashing, the M/N button can be used to change the minimum relay Runtime. The duration can be set between 0 and 30 minutes in 1-minute increments.

The default is 0 min.

M/N

30

"Delay 0min" → E/T → "Delay 3min/___min"

E/T

M/N

When selection is flashing, the M/N button can be used to change the relay Delay time. The duration can be set between 0 and 30 minutes in 1-minute increments.

The default is 3 min.

Config 6

Normal

Config 6

"Hystere-Sis"

E/T

"CO2 50ppm"

E/T

"CO2 50ppm/_____ppm"

M/N

M/N

M/N

M/N

M/N

Return

E/T

E/T

"CO2 100ppm/_____ppm"

30

When selection is flashing, the M/N button can be used to change the Hysteresis. The level can be set between 0 and 400 ppm in 10 ppm increments.

The default is 50 ppm.

30

"Contact N.Open"

E/T

"Contact N.Open/Contact _____"

M/N

E/T

When selection is flashing, the M/N button can be used to change the relay Contact state. It can be set to N.Open (Normally Open) or N.Closed (Normally Closed).

The default is N.Open.

Config 7

Normal

IMPORTANT! For Digital IAQ Only!
Analog IAQ: skip "Digital Output."

Config 7

"Digital Output" → E/T → "Protocol Modbus"

M/N

"Address 001" → E/T → "Address 001/___"

When selection is flashing, the M/N button can be used to change each of the three characters in the Address (default is 001). Pressing E/T selects the flashing value as the setting for each character.

"DeviceID" → E/T → "Device ID/___"

When selection is flashing, the M/N Button can be used to change the DeviceID. The default is blank. Press E/T to select the flashing value. Press M/N to scroll through characters.

"BaudrRate 19200Bd" → E/T → "Baudrate 19200Bd/___"

When selection is flashing, the M/N Button can be used to choose the Baudrate: 1200, 2400, 4800, 9600, 19200 (default), 38400, 57600, 115200. Pressing E/T will select the flashing value as the setting.

"Parity Even" → E/T → "Parity Even/___"

When selection is flashing, the M/N Button can be used to change the parity to Even, Odd, or None. Even is the default. Pressing E/T selects the flashing value as the setting.

"Return"

"Return"

Config 1

Normal

TEST Test the Relay and CO_2 sensor.

tst

Password Set?

Y

N

"Check PW 0000/_000"

Password correct?

30

N

30

Y

E/T

"Test RLY"

E/T

"Test RLY/_____ Closed"

M/N

5

5

"Test RLY/_____ Open"

M/N

Test the relay: Press E/T. The relay is tested both closed and open. "Test RLY" flashes while testing. When testing is complete, "Test RLY" stops flashing.

M/N

30

85

"Test CO2"

E/T

"Test CO2/_____ XXXX ppm"

M/N

E/T

Test the CO_2 sensor: Press E/T. The sensor is tested in increments of simulated CO_2 readings for 5 seconds starting at 0 and going in 125 ppm increments (rounded up when ending in "5") to 2000 ppm.

M/N

M/N

Return"

30

E/T

Normal

Normal

HISTORY Check history for each day. Data for each day, including Low, High, and Average, are stored for up to 30 days. After stepping through the days to the end, it returns to either CO2 History or the Normal (Main) screen.

TF
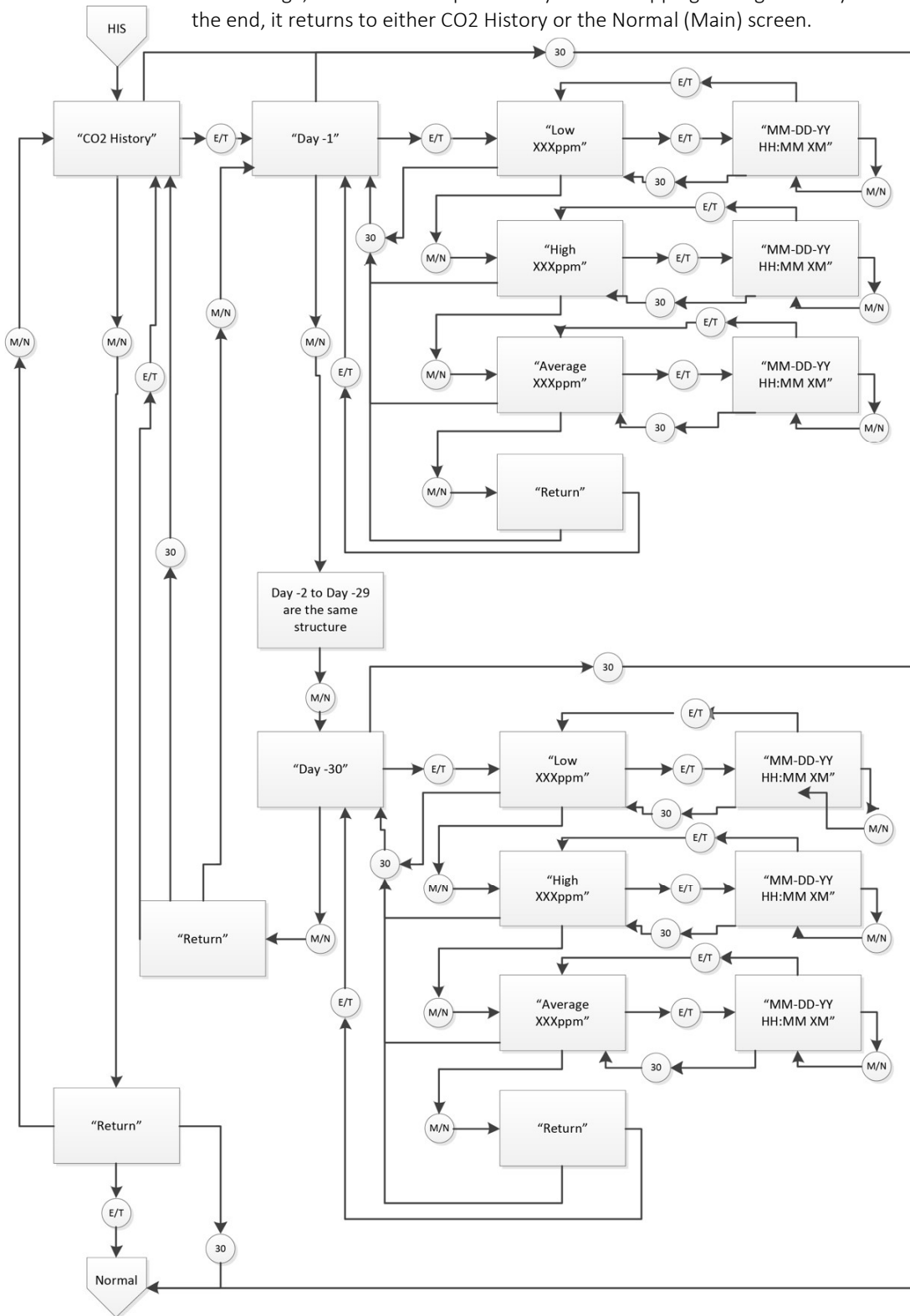
TROUBLE FAULT If an error occurs, including EOL (end of life) for the IAQ, the error is summarized and shown on the display.

There are factory errors that are explained in the Manufacturing Process Instructions. The Other errors have to do with memory errors, calibration errors, communication errors and crystal (sensor?) errors.

Note: Two strings separated by a slash (for example, Trbl Err / Cause?) indicates the display alternates between the strings.

- NVM = Non-volatile memory
- EOL = End-of-Life
- HFXO = Crystal

Trbl Err / Cause? – Unknown Error
Bit 0 - NVM load / def:yyyy*****(see below) Bit 1 -NVM Err / zzzz
Bit 2 – No cal. / factory
Bit 3 – PCBATest / Failed Bit4–Sensor/RDErr
Bit 5 – Under / Range Bit6–SetAuto/Cal.Err
Bit7–EOL
Bit 8 – HFXO / Failed
Bit 9 – Differen / tBoard
Bit 10 – Failed / BumpTest Bit11–Bad/HFXO

******For NVM errors - depending on yyyy: Bit 0 – Load / History
Bit 1 - LoadFact / oryCal
Bit 2 – LoadFiel / dCal

Bit 3 – LoadPCBA / TestResu Bit 4 – LoadRunT / imeCount Bit 5 – SaveFiel / dCal
Bit 6 – SaveFact / oryCal

Bit 7 – SaveHist / Ory
Bit 8 – SaveConf / ig
Bit 9 – Repack
Bit 10 – InitHist / ory
Bit 11 – ReadTota / lRunTime Bit 12 – SaveTota / lRuntimel

6 Macurco Gas Detection Product limited warranty

Macurco warrants the IAQ gas detector will be free from defective materials and workmanship for a period of two (2) years from the date of manufacture (indicated on inside cover of the IAQ), provided it is maintained and used in accordance with Macurco instructions and/or recommendations. If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF TWO (2) YEARS FROM THE PURCHASE DATE. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty, express or implied, arising out of or related to the use of said gas detector. The manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are the return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.

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