Respiro®

CO/PRO®

CARBON MONOXIDE SHUTOFF SWITCH

3DA1 Installation Guide

V3.17

The latest and updated Installation Guide can be found on the Resources page on the Respiro-USA.com website.

A. Included Parts



CO/PRO 3DA1
(1)



Duct Tube/Mounting Plate
(1)

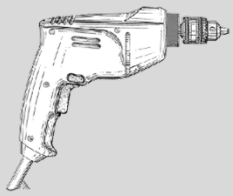


Mounting Screws
(2)



Informational Sticker
(1)

B. Necessary Tools – Not Included



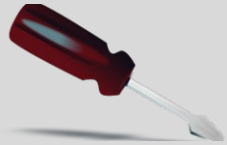
Drill



2” Step Bit
Or Equivalent



1/4” Socket



Flat Head
Screwdriver





18-22 AWG 4-wire, 2-wire, or equivalent
(solid core or stranded)



Wire Stripper

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CO/PRO – General Information/Intended Use

The CO/PRO attaches to furnaces and tank water heaters and turns them off when 25 ppm of carbon monoxide (CO) is detected.

- There can be multiple sources for carbon monoxide inside a home. The CO/PRO is NOT a replacement for, nor does it supersede, a state's requirement for carbon monoxide detectors.
- The CO/PRO only monitors appliances for the presence of carbon monoxide (CO) gas to avoid hazardous build-up. It is not a life-safety device. The CO/PRO is not designed, certified, sold, or authorized in applications where failure of this device could result in personal injury or death.
- The CO/PRO is equipped with two sensors—one for measuring CO in the ambient air and one for measuring CO in the HVAC duct air. The CO/PRO tests the duct sensor daily to determine the end-of-life for both CO sensors and the product.
- Do NOT install in areas where there is turbulent or moving air as it may prevent CO from reaching the CO/PRO's sensors.
- Do not install in areas where the temperature is above 158°F/70°C or less than 68°F/20°C, or in very high humidity areas.
- The CO sensors are not replaceable, and the entire unit should be replaced if a sensor fails.
- The CO/PRO must be mounted in the vertical orientation for horizontal ducts and mounted in a horizontal orientation for vertical ducts.
- The CO/PRO must be installed by a qualified and licensed electrician, HVAC, or plumbing professional. All wiring must comply with the National Electric Code (NEC) and local codes.
- Do NOT run wiring for the CO/PRO in the same conduit as AC power or with wiring used to supply highly inductive loads.
- Proper supply voltage and wiring connections are important to a successful installation. Ignoring the directions may damage the product and void the warranty.
- The CO/PRO's connectors support Respiro recommendation of using twisted pair of at least 22AWG.
- CO is a deadly gas created by fossil fuel burning sources. The CO/PRO is not designed to detect smoke, fire, or any gas other than CO.
- The CO/PRO monitors for the presence and concentration of carbon monoxide at 25 ppm (parts per million.)
- The CO/PRO must be installed at a minimum of 6 feet from the furnace to a location where the temperature in the ventilation is 158°F (70°C) or less. Failure to do so will void the warranty.
- Do not attempt to open, repair, or modify any portion of this device.
- The carbon monoxide sensor's useful lifespan has been rated up to 10 years. The actual lifespan of each sensor will vary by the environment which it operates in and can be impacted by temperature, humidity, dust, CO exposure, and other factors.
- Furnace air filter must be changed regularly to ensure the air is free of dust. Dust can impact the CO/PRO's ability to detect CO.
- Each CO sensor has been calibrated at the factory. From 0—25ppm, the accuracy of the CO sensor is +/- 5ppm.
- This installation guide may be updated periodically. The latest guide can be found at www.Respiro-USA.com/resources.
- The type of furnace, it's rated CFM, the duct size and configuration, and the location of the CO/pro can affect CO detection times.
- The CO sensors have an accuracy of +/- 5 ppm and the unit may display 0-5 ppm. Always validate CO readings with an independent professionally calibrated CO monitor.
- The CO/PRO's BLUE connector is associated with the ambient CO sensor and can be connected to an alarm panel or a water heater, not both. It will change to an open circuit to provide an alert to when CO has been detected in the ambient air.
- If 24V power is lost to the CO/PRO, then the CO/PRO cannot detect any CO levels, cannot alarm, and cannot shut off any appliances.
- Although the CO sensor supports up to 10,000 ppm, each sensor has been calibrated at the factory and limited to displaying 0-100 ppm. Given the sensor's wide range, values of 0-5 ppm can be considered as "0" and should always be verified with a calibrated CO monitor.
- Do not open the CO/PRO. There are no field-serviceable components inside.
- The CO/PRO duct tube is not rated for ultra-violet (UV) light and should be installed at least 6 feet from any UV source.

WARNING: Can expose you to Di(2-ethylhexyl)phthalate (DEHP), a carcinogen and reproductive toxicant. See www.P65Warnings.ca.gov

Warranty

The CO/PRO is warranted for one (1) year. The warranty is extended to two (2) years if the product is registered on the Respiro website within thirty (30) days of purchase. A copy of the full warranty can be found at www.Respiro-USA.com.

Product Registration

Product registration within thirty (30) days of installation is required for the two (2) warranty to be in effect. Not registering the device within thirty days of the installation date limits the products warranty to one (1) year from the time of purchase. Register the CO/PRO by scanning the QR code on the CO/PRO's back cover, scanning the QR code on the box sleeve, or on the Respiro-USA.com website.

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CO/PRO Overview

The CO/PRO 3DA1 has two carbon monoxide sensors for monitoring CO levels in the supply duct and the ambient air simultaneously. This is accomplished via two independent chambers inside the CO/PRO's housing: one chamber for the supply duct air sensor and the second chamber for the ambient air sensor.

When a sensor detects 25 ppm or greater, the level is evaluated over a 90-second window to eliminate false positives. The level must remain at 25 ppm or greater during the 90 second window to enter into an alarm condition. When 25 ppm of CO is detected by the duct sensor, the normally closed (NC) relay associated with the green connector (duct) opens its connection, cutting off power to the furnace. When 25 ppm of CO is detected by the ambient sensor, both relays associated with the blue (ambient) and green (duct) connectors open their contacts, cutting off power to the furnace and water heater.

For both the supply duct and ambient air sensors, when CO levels decrease to 15 ppm or less, the CO/PRO reapplies power to the appropriate connector/relays. Note: The process of exiting a CO condition is evaluated over a 10-minute window.

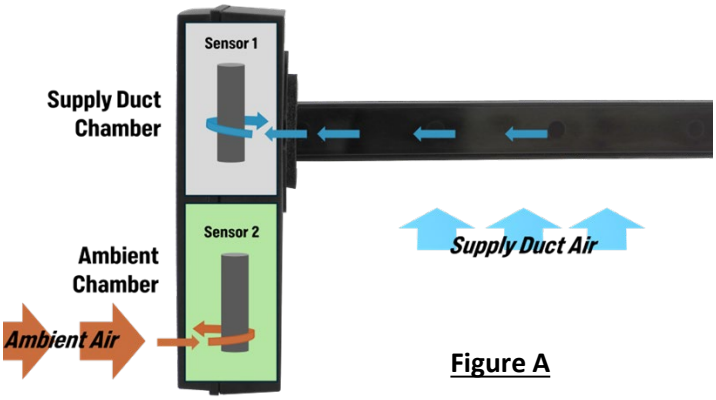


Figure A

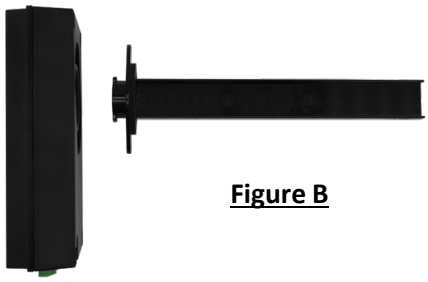


Figure B

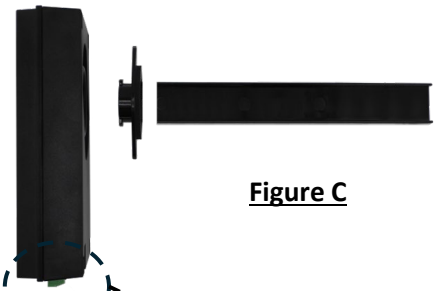


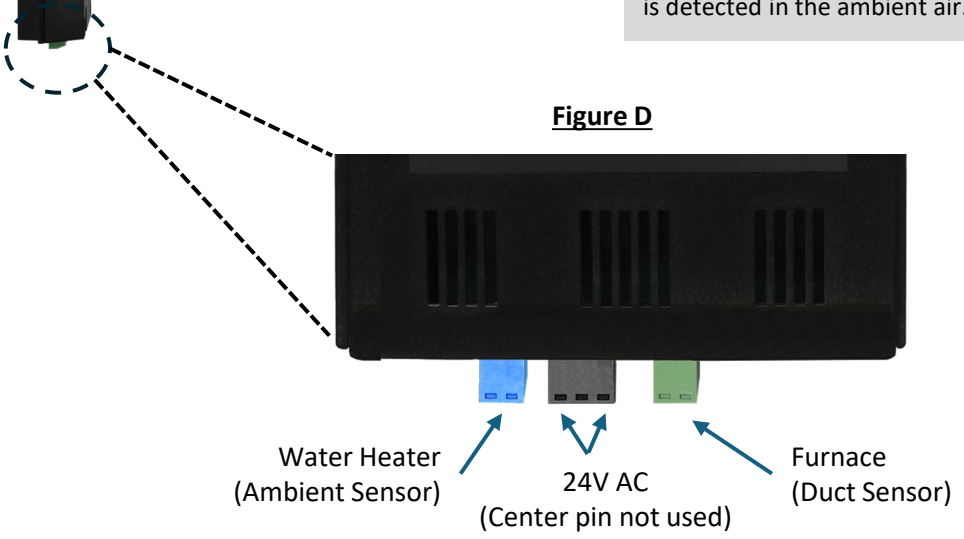
Figure C

For dual monitoring applications, the duct tube will be inserted into a hole drilled into the duct and mounted into position using two screws in a vertical orientation as shown in Figure B (see detailed instructions). Both the green (duct/furnace) and blue connectors (ambient/water heater) will be used (see Figure D).

For monitoring just the ambient air (i.e., water heater or boiler operations), the duct tube "I-beam" portion can be cut off, leaving just the wall mount component (see Figure C). Only the blue connector will be used in this configuration.

For installations that only require monitoring the CO levels in the supply duct, use just the green connector. However, the connectors for the ambient air can be used for monitoring the ambient air and connected to a home alarm system. The closed contact relay is a normally closed (NC) relay that opens when CO is detected in the ambient air.

Figure D



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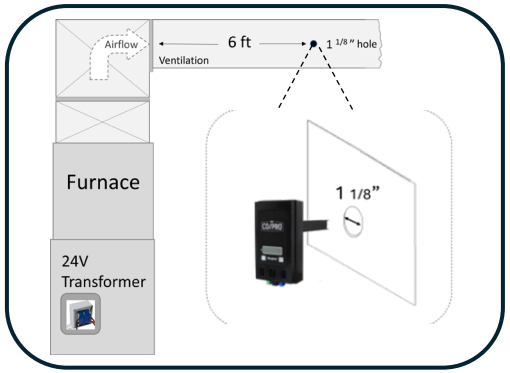
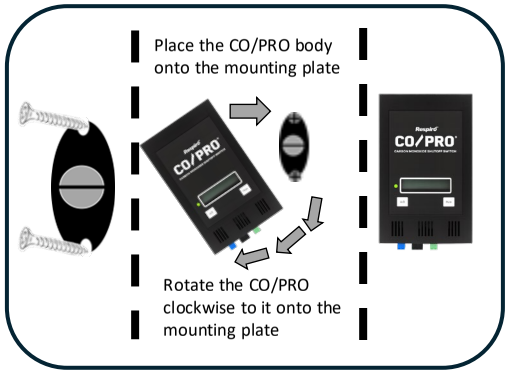
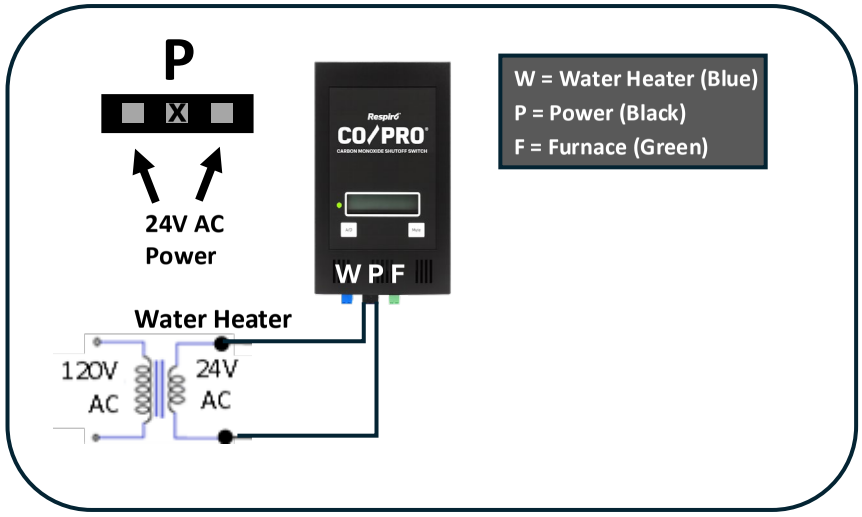
Step 1: Power off the furnace, boiler, and water heater.



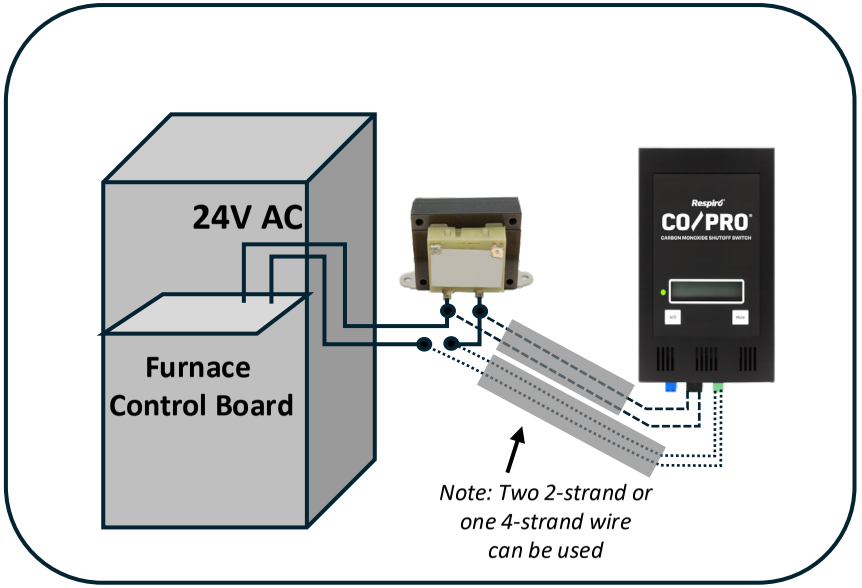
Step 2: Drill a $1^{1/8}$" hole in the ventilation about 6 feet from the furnace.



Step 3: Secure the duct tube's mounting plate to the duct using the supplied screws.



Step 4a: Use an existing or new 120/24 VAC transformer to bring 24V AC to the CO/PRO's black power connector. Only use the two outer sockets.



Step 4b: Cut one of the 24V wires going from the transformer to the control board. Using wire, bring each end of the cut wire to the Green connector as shown in the diagram.

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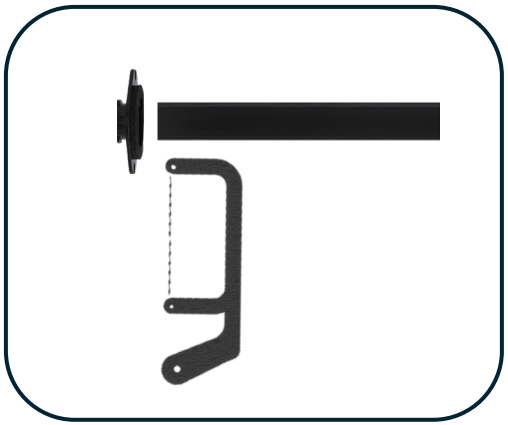
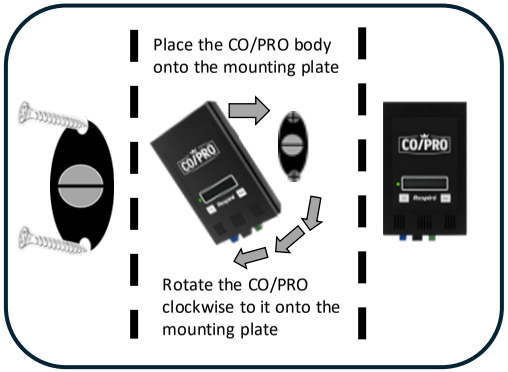
INSTALLATION GUIDE – WATER HEATER



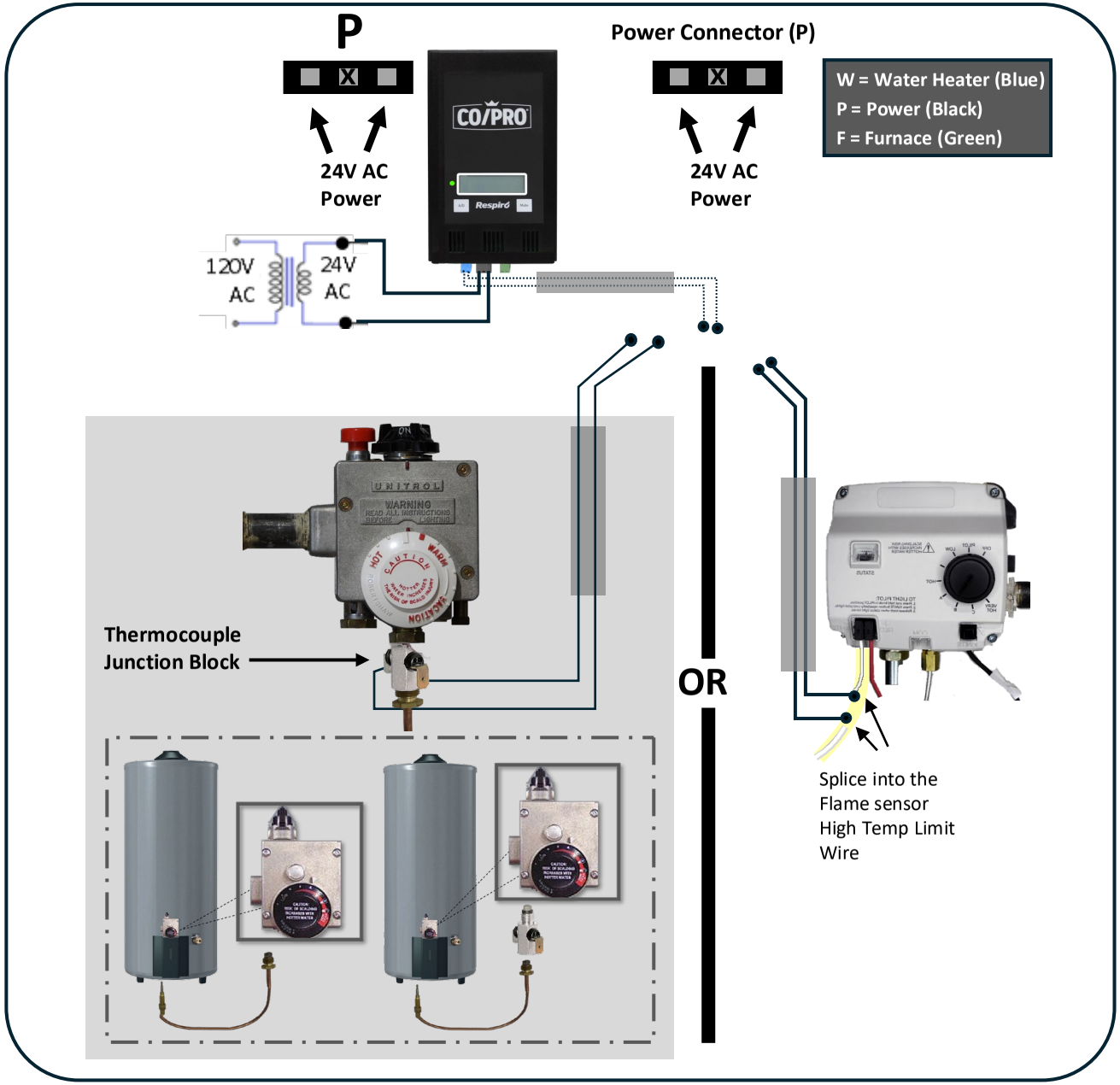
Step 1: Power off the furnace, boiler, and water heater.



Step 2a: For water heater or boiler installations, cut the tube from the mounting plate.
Step 2b: For furnace & water heater installations, follow the same instructions as in step 2 for Furnace Installations.



Step 3: Secure the mounting plate to a flat surface using the supplied screws.



Step 4: Use an existing or new 120/24 VAC transformer to bring 24V (AC) to power the CO/PRO. Manual pilot water heaters require a thermocouple junction block (not included) be inserted between the thermocouple and the water heater's control box (see picture above) to connect to the CO/PRO. For automatic pilot water heaters, splice into the Flame Sensor High Temp wire and connect each end to the CO/PRO. **Go To Step 5.**

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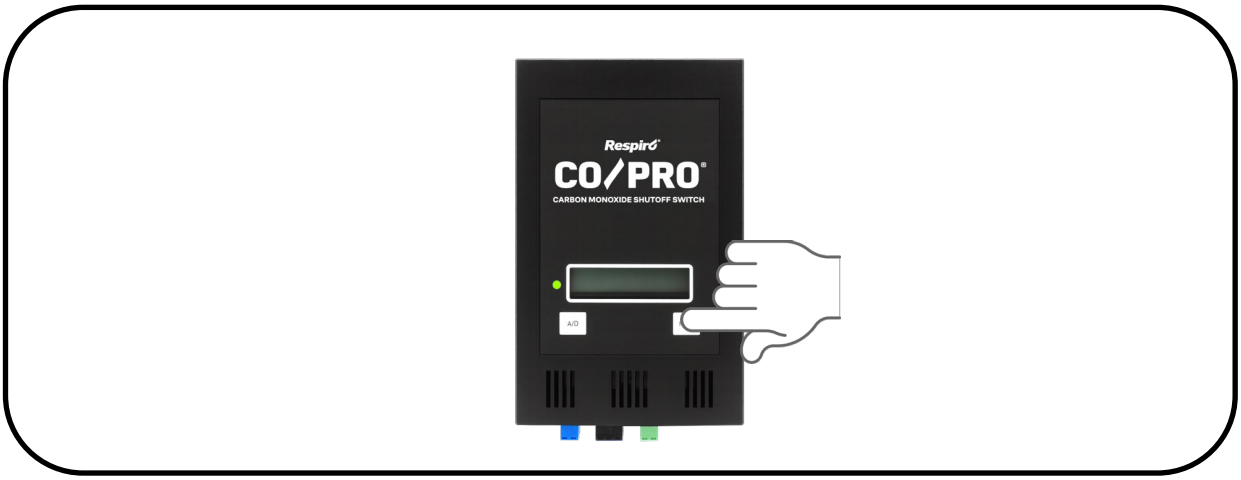
Step 5: Turn the power back on to the fuel-burning appliances that were turned off in Step 1.



Step 6: The CO/PRO will take approximately 1 minute to go through its warm-up process.

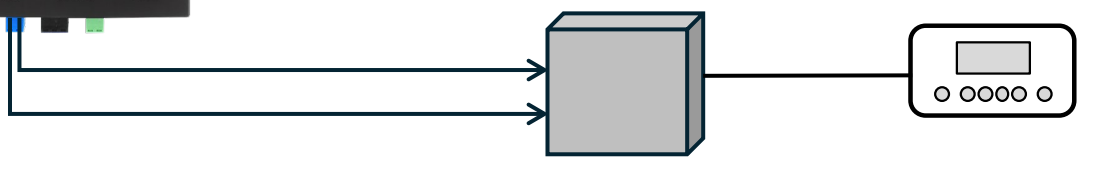
Once the CO/PRO is ready, press the "Mute" button for greater than 6 seconds to activate the test mode. Verify that the audible alarm is working, the red light is flashing, and that all connected devices (furnace and water heater) were powered off by the CO/PRO. When the CO/PRO's operation has been validated, press the "Mute" button for greater than 6 seconds to put the CO/PRO into its ready state.

Connecting the CO/PRO to an Alarm System



If the CO/PRO is only being used to only monitor the supply air from a furnace (green connector), then the CO/PRO's ambient air sensor (blue connector) can be used to monitor the CO in the ambient air and provide a signal to an alarm panel that accepts a normally closed (NC) contact. The CO/PRO's connector is a normally closed contact relay (NC) that will "open" when 25 ppm or greater of CO is detected, thereby providing an alert to CO in the ambient air. When the CO level decreases to 15 ppm or less, the alarm will be cleared, and the CO/PRO's contact will return to a normally closed state (NC).

Using the ambient air sensor (blue connector) does not provide an alarm when 25 ppm of CO or greater is detected in the supply duct.



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Display, LED, and Button Functions



Display Position 1
A = Ambient **d** = duct

LED
= (see LED Color Description below)

Display Position 2
__ = Current CO (PPM) **P** = Peak CO (PPM)

Function Buttons
A/D = Ambient / Duct select
Mute = Mute alarm, Self Test

Display Positions 3 & 4
= CO Level (PPM), range 0-99

Mute Indicator
- = Audible alarm is muted
= Audible alarm is not muted

Small Display
= Current temperature measured by the selected sensor (°F)

Button Function Description

A/D	Single press (1 sec)	Switch between the current Ambient (A) CO value to the current Duct (d) CO value.
A/D	Single press (>3 sec)	Switch between displaying the selected sensor's current reading and it's recorded "Peak" value since the last power cycle, reset, or when the peak value was cleared.
A/D	Single press (>6 sec)	Clears the peak value for the selected sensor.
Mute	Single press (1-5 sec)	Mutes the audible alarm until a power cycle, reset, or until the CO level drops into a non-alarm condition(≤15 ppm)
Mute	Single press (>6 sec)	Initiates **Test Mode**, changes relays from "closed" to "open", initiates audible alarm and LED. Used to verify the device is working properly and wired correctly. Pressing again for >6 seconds takes the device out of Test Mode.
A/D + Mute	Simultaneous (>3 sec)	Manually resets the device, clears the peak values, and relays return to a "closed" non-alarm state.

LED Color Description

Green (Solid)	Device passed self-test and is operational
Green (Flashing)	Device is in the process of a self-test
Yellow (Solid)	The device is in an alarm state and is in the process of evaluating changing to a non-alarm state. 15 ppm or less of CO has been detected by the alarming sensor.
Yellow (Flashing)	The device is in a non-alarm state. One or both CO sensors have detected 25 ppm or greater of CO gas. The device is in the process of evaluating if it will change to an alarm state.
Alternate Yellow and Green (Flashing)	The device is in a non-alarm state but was previously in an alarm state. Call your HVAC company as soon as possible.
Alternate Yellow and Red (Flashing)	The device is in an alarm state and was previously in an alarm state. Call your HVAC company as soon as possible.
Red (Single Flashing)	The device is in an alarm state. 25 ppm or greater of CO was detected. Call your HVAC company as soon as possible.
Red (Three Flashes Repeating)	A CO sensor failure has occurred. Call your HVAC company as soon as possible.

Sensor Failure/Error Codes

AbAd	The Ambient sensor has failed. Call your HVAC company as soon as possible.
dBAd	The duct sensor has failed. Call your HVAC company as soon as possible.

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