Simulation Diagnostic Tools Basic Manufacturer Instructions

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1. Personal CO Detector



Purpose

The Personal Carbon Monoxide (CO) Detector is used to monitor CO levels in the surrounding environment to ensure safe working conditions. ***Note: The personal CO detector can monitor CO of the test environment while using the other safety equipment/tools.***

Basic Operation

Turning On

- Press and hold the power button to turn the device ON.
- When done using the tool, return to the toolbox.

Zeroing the Device

- Ensure you are in a clean, fresh air environment.

- Turn on the device and allow it to complete its startup sequence before entering the building.

Normal Use

- Clip or place the detector within the breathing zone.
- Monitor displayed CO levels continuously.
- Respond immediately to any alarm conditions.

Alarms

- Audible and visual alarms will activate when CO exceeds safe thresholds.
- Evacuate the area and follow safety procedures.

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2. Combustible Gas Detector



Purpose

The Combustible Gas Detector is used to detect the presence of flammable gases such as natural gas or propane.

Basic Operation

Turning On

- Press the power button to turn ON.

- When done using the tool, return to the toolbox.

Zeroing the Device

- Turn on the detector in a known clean air environment.
- Allow the device to complete its automatic zeroing process before entering the building.

Switching Units

- Use the unit button to adjust between PPM and LEL%.

Detection Use

- Slowly move the probe along potential leak points (joints, fittings, valves).
- Listen to audible changes or observe visual indicators of gas presence.
    - The only way to disable audible tick rate is to place the tool back in the toolbox.

Alarms

- Increasing beep frequency or visual indicators signal higher gas concentrations.
- Follow safety procedures immediately if gas is detected.

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3. Combustion Analyzer



Purpose

The Combustion Analyzer measures combustion efficiency and flue gas concentrations in space heating or water heating systems.

Basic Operation

Turning On/Turning Off

- Press the power button to turn ON.
- Allow the analyzer to complete its warm-up cycle.

Zeroing the Device

- Ensure the probe is in a clean, fresh air environment.
- Turn on the analyzer and allow it to auto-zero during startup before entering the building.
- Do not insert the probe into flue gases until zeroing is complete.

Switching Modes

- Use the mode button to navigate between measurement screens (e.g., CO As Measured, CO Air Free, Efficiency %).

Taking Measurements

- Turn on the pump by pressing the Start/Stop Button
    - You will hear an audible sound indicating pump operation.
- Insert the probe into the appropriate test location.
    - Furnace; place probe in the test port
    - Water Heater; place probe into the throat of the appliance before dilution air
    - Oven; place probe into the vent of the appliance before dilution air
- Allow readings to stabilize before recording data.

Note: the audible sound of the pump running can be turned off by pressing the start/stop button after testing is complete.

Post-Use Purge

- Remove the probe from the flue.
- When done using the tool, return to the toolbox.

4. Digital Manometer



Purpose

The Digital Manometer is used to measure pressure differences, and air flow. It supports diagnostic testing such as blower door testing, CAZ (Combustion Appliance Zone) testing, and exhaust fan airflow measurements.

Basic Operation

Turning On/Turning Off

- Press one of the three modes to turn ON.
- When done using the tool, return to the toolbox.

Connecting Hoses

- Connect tubing to the appropriate input or reference (ref) ports (e.g., Channel A / Channel B, + / -).
- Ensure secure connections to avoid leaks or inaccurate readings.

Taking Measurements

- Place hoses in the appropriate locations for the test setup.
- Ensure you're in the correct test mode.
- Allow readings to stabilize before recording data.
- Monitor values throughout the test for consistency and accuracy.

Common Uses

- Blower door testing
    - Zone pressure differential test
- Pressure pan test CAZ depressurization testing Exhaust fan flow measurements

Switching Measurement Modes

- Use the mode or select button to navigate between measurement types (e.g., pressure, pressure/flow, exhaust fan flow).
- Confirm correct setup for the test being performed (blower door, zone pressure, CAZ, exhaust fan flow, pressure pan).

Post-Use

- Disconnect tubing.
- Place hoses and the device properly in the toolbox.

Diagnostic Testing Instructions

Blower Door Test

- Configure the house and blower door system for testing.
- Adjust for the Baseline: Connect the hose(s)
    - Channel A – The port is open to the house and referenced outdoors.
    - Channel B – The Reference port is open to house and input port to the fan

When using the manometer, pay attention to the location of the input and ref ports on channels A and B.

- Confirm that you are in the correct mode (Pressure/Flow)
- Push the baseline button to set the baseline (the baseline will be displayed within the baseline button)
- Remove the fan cover.
- Press fan off button to select desired cruise pressure.

Zone Pressure Differential Test

- Identify the zone to be tested. ***Note: For the purpose of the simulation exam, the garage is the only zone that can be tested and there is no baseline adjustment required.***
- With the blower door fan cruising, change the mode to pressure.
- Reconfigure the hoses.
    - Disconnect the hoses from the manometer.

    - Click channel A or B tap and place the hose to the zone being tested.
- Channel A or B will display the zone pressure differential.

Pressure Pan Test

- Confirm you are in Pressure mode.
- Reconfigure the hoses.
    - Disconnect the hoses from the manometer.
    - Click channel A or B tap and place the hose to the pressure pan.
    - Place the pressure pan over the register being tested.

Exhaust Fan Flow

- Select Exhaust Fan Flow mode.
- Configure the hoses.
    - Click or select channel A or B input to connect hose to exhaust fan flow meter box.
- To adjust the gate setting of the flow box, click on it to enable the meter door.
    - The pressure range of this device for accurate readings is 10 pascals
    - Select Gate 1, 2 or 3.
- Turn exhaust fan on.
- Place flow box over exhaust fan.

CAZ Depressurization Test

- Configure the house, equipment/appliances and tubing for testing. ***Note: For the purpose of this simulation exam, the manometer will be located outside of the CAZ and the baseline function will not be enabled on the manometer during the combustion analysis section, but you will observe a baseline reading on channel A or B.***
- Select Pressure mode.
- Begin testing.

When using the manometer, pay attention to the location of the input and ref ports on channels A and B.

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5. General Safety Notes

- Always follow manufacturer-specific instructions when in the field and use these instructions for the simulation exam.

- Perform regular calibration and maintenance per manufacturer guidelines.
- Do not use instruments without proper training and familiarizing yourself with these instructions.
- Replace batteries or charge devices as needed to ensure proper operation when in the field, for the exam simulation, assume all equipment is charged and ready for use for the duration of your exam.

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