

Quick Start Guide for the MultiRAE Plus

This document serves as a quick reference guide and is not intended to replace the user manual. It is recommended to consult the user manual for more detail. Geotechnics has relied on the information in the user manual to develop this guide and makes no representation of warranty as to the accuracy of the guide.

1. About the MultiRAE Plus

The MultiRAE Plus is a 5-gas portable gas detector with a built-in pump which allows sampling from potentially dangerous areas. This instrument measures the standard confined space gases as well as volatile organic compounds.

Gases measured:

- Oxygen (OXY)
- Carbon Monoxide (Tox1)
- Hydrogen Sulphide (Tox2)
- Methane (LEL)
- Volatile Organic Compounds (VOC)

2. Turning the MultiRAE Plus on

- Make sure a water trap filter is installed, twist it clockwise to install and lock it in place. Turn it counter-clockwise to remove the filter.
- The MultiRAE Plus has three buttons:
 - Y/+
 - N/-
 - MODE
- Press and hold down the 'MODE' button. Release when a 'beep' is heard. The unit will run through its warm-up sequence.
- Allow the unit to warm up its sensors

3. Zero Gas/Fresh Air Calibration

- Only perform a 'Fresh Air Calibration' in a clean, uncontaminated atmosphere free from toxic or combustible gases
- The display will prompt for a Fresh Air Calibration after its warm up sequence. Press the Y/+ button to perform a 'Fresh Air Calibration'.

4. Measuring Mode Screen

- a. The unit is ready to use when the home screen displays the following:
 - Tox1: 0
 - Tox2: 0
 - LEL: 0
 - OXY: 20.9
 - VOC: 0
- b. Tox1 is CO (ppm), Tox2 is H₂S (ppm), LEL is set to CH₄ (%LEL), OXY is in % and VOC in ppm.

5. Turning the MultiRAE Plus Off

- a. Press and hold the 'MODE' button to begin the shut-down timer.
- b. Release the 'MODE' button when a long 'beep' is heard. The unit has turned off.

6. Alarms

The MultiRAE Plus has audible and visual alarms set to trigger at specified gas concentrations.

- a. STEL is short-term exposure limit
- b. TWA is time-weighted average
- c. Tox1 is Carbon Monoxide (CO)
- d. Tox2 is Hydrogen Sulphide (H₂S)
- e. VOC is Volatile Organic Compounds (VOC)

Sensor	HIGH	LOW	STEL	TWA
LEL %	20	10	-	-
OXY %	23	19.5	-	-
TOX1 ppm	200	35	75	35
TOX2 ppm	20	10	15	10
VOC ppm	100	50	25	10

- 6.1 Testing the Alarms
 - a. On the 'Home' screen, press and hold the Y/+ button to activate the audible and visual alarms.
 - b. Release the button to stop the test.

7. Tips

- 7.1 Pump/Flow Integrity Test
 - a. Place a finger over the inlet of the water trap filter.
The pump should stall, activating the alarm.
 - b. Remove your finger from the water trap filter and press Y/+ button to reset the alarm and restart the pump.
- 7.2 Testing the VOC Sensor
 - a. Expose the writing tip of a felt-tip sharpie and hold close to the water-trap filter inlet without touching it.
 - b. Observe the 'VOC' readings rise and fall.
 - c. Place the cap over the sharpie and the readings should fall.
Wait for the readings to stabilise at close to zero before use.
- 7.3 Testing the Oxygen Sensor
 - a. Exhale near the tip of the attached water trap filter. Keep this going until 'OXY' registers 19.5% and the alarms are activated.
 - b. Press the Y/- button to silence the alarm and wait for the readings to return to 20.9% before using.

8. Calibration and Correction Factors

The MultiRAE Plus's combustible and VOC sensors are calibrated to Methane (50 %LEL) and Isobutylene (100 ppm) respectively. The VOC sensor, however, is not selective to the calibration gas and will detect other VOCs. Correction factors have been developed for this purpose to obtain readings in the units of the compounds of interest.

9. Troubleshooting

Symptom	Possible Cause(s)	Recommended Actions
1. Unit cannot turn on	Flat/Defective battery	<ol style="list-style-type: none"> 1. Disconnect and re-connect battery pack 2. Charge the lithium-ion batteries 3. Use the alkaline battery pack
2. Abnormally high readings after turning on at 'Home' screen	Dirty water-trap filter Incorrect calibration gas	<ol style="list-style-type: none"> 1. Replace water-trap filter 2. Dry the sensor module (silver cap with black probe inlet) 3. Return to Geotechnics to recalibrate
3. Alarms are activated at 'Home' screen Pump icon is flashing or 'Pump failed' message is displayed	Pump flow failed/ blocked	<ol style="list-style-type: none"> 1. Turn unit off 2. Replace water-trap filter, turn on 3. Check if inlet probe is blocked
4. 'NEG' flashing next to VOC	Current atmosphere is 'cleaner' than fresh air calibration for the VOC sensor	<ol style="list-style-type: none"> 1. Turn unit off & on again. Repeat the fresh air calibration
5. Battery icon flashing	Low battery	<ol style="list-style-type: none"> 1. Charge battery or replace with alkaline battery pack
6. 'Lamp' flashing when power on	PID lamp failure or low ion concentration inside lamp in cold environment	<ol style="list-style-type: none"> 1. Turn unit off & on 2. Return to Geotechnics to rectify
7. Readings not registering	Leak in the sample train Pump diaphragm damaged	<ol style="list-style-type: none"> 1. Check flow integrity 2. Return to Geotechnics to rectify