

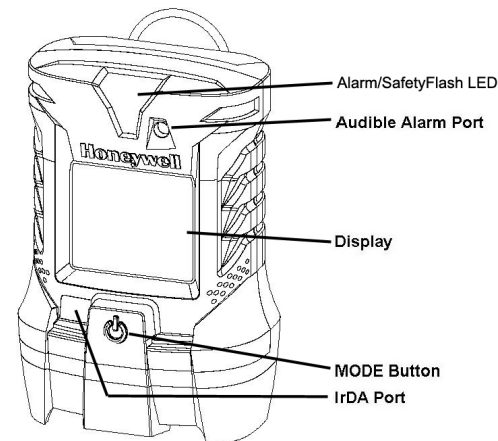
# IQ Force® Gas Monitor - Quick Reference Guide



## WARNING

This quick reference guide is not a substitute for the operator's manual. Read and understand the operator's manual before using this monitor.

## Description



The IQ Force is a multi-sensor gas detector that can be configured to meet a wide variety of user requirements. This section provides an overview of many of the features of the IQ Force. More detailed descriptions of the specific features of the IQ Force are contained in the subsequent sections of this manual.

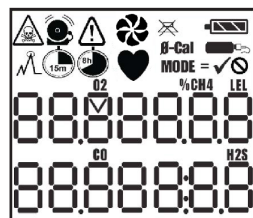
## Basic Operations

The IQ Force is a true one-button gas detector. The MODE button is located on the front of the instrument and controls all field-level operations including the following:

- Turning the IQ Force on and off
- Turning on the backlight
- Viewing the MAX, STEL, and TWA reading screens
- Initiating the calibration sequence
- Entering manual programming mode

## Turning the IQ Force On

To turn the IQ Force on, press and hold the MODE button for one second. The first screen shown will be the test screen for the LCD. All sections should be darkened.



## Turning the IQ Force Off

To turn the IQ Force off, press and hold the MODE button until the display indicates that the button should be released. Once the MODE button is released, the display will go blank and the unit will shut off.

## Li-Ion Battery Maintenance

The IQ Force is equipped with a rechargeable Lithium-Ion (Li-Ion) battery. Rechargeable batteries gradually lose their charge when not being used and may suffer irreversible damage if the battery reaches and remains in a state of complete discharge. Honeywell Analytics recommends fully charging the IQ Force Li-Ion battery at two-month intervals during storage to prevent damage to the battery. It will take a maximum of eight hours to fully charge the Li-Ion battery. The IQ Force may also be stored for long periods of time on a powered IQ Force charger with no ill effects.

Storage of Li-Ion batteries at temperatures above 30°C/86°F may damage the internal components of the battery and lead to reduced battery capacity and voltage.

## Charging the Li-Ion battery

The Li-Ion battery in the IQ Force should never be charged at temperatures lower than 5°C/40°F or higher than 30°C/86°F. Charging at temperature extremes can permanently damage the IQ Force Li-Ion battery.



## WARNING

The IQ Force must be located in a non-hazardous location during the charging cycle. The IQ Force's battery charger is not approved for use in hazardous locations.



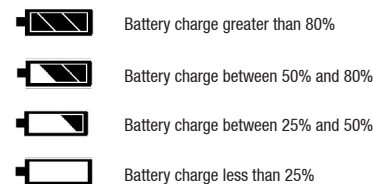
## WARNING

Do not charge the IQ Force with any charger other than the appropriate IQ Force charger, supplied with the instrument.

1. Verify that the instrument is turned off. (If it is not, press the MODE button for three seconds until a message appears that tells you to release it.)
2. Plug the power supply in. The red LED is labeled "Power" and will be lit whenever the charger is plugged into a power source.
3. Insert the IQ Force into the charging cradle bottom side down with the display facing forward. The green LED on the charger is labeled "Charge" and will be lit while the battery is charging.
4. When the battery is fully charged, the "Charge" LED will go out.

## Low battery alarms

The battery icon gives an indication of how much power is left in the battery. The illustration below shows the stages of the battery from full to empty (top to bottom).



To turn on the backlight press the MODE button once.

When there is approximately 25% battery charge left, the battery icon on the LCD will appear empty, which means that a low-battery condition exists.

If the battery icon is empty, leave the area immediately, proceed to an area that is known to be safe (containing fresh air with no contaminants and no combustible gases) and recharge the battery.

Once there is 15 to 30 minutes of battery charge, the IQ Force will go into a 15-minute battery alarm. The warning alarm will sound and the screen will display a flashing empty battery icon, along with the warning and alarm icons. The user will need to acknowledge the low-battery condition by pressing the MODE button before the instrument will resume monitoring. Once the MODE button is pressed, the empty battery cell and the caution icon will flash. After 15 minutes, the warning will sound again to indicate that there is now at most an additional 15 minutes of battery life left. Once the second 15-minute period has elapsed, the instrument will go into alarm for the last time, notify the user that it is shutting itself down with a 5-second countdown, and then proceed to turn itself off.

## Calibration

The accuracy of the IQ Force should be verified on a regular basis\*. Verification can be as simple as performing a calibration accuracy check or bump check. The IQForce has been shipped with a default calibration interval of 30 days. The 30-day calibration interval provides the IQManagement software with the multiple sensor sensitivity datapoints required for effective predictive maintenance features. If you are not using the predictive maintenance features in IQManagement system, or do not wish to calibrate your detector as often, Honeywell Analytics recommends that the detector be calibrated at least once every 180 days.



## WARNING

The Canadian Standards Association requires the LEL sensor to be accuracy checked prior to each day's use with calibration gas containing between 25% and 50% LEL.

If exposure to fresh air yields an oxygen reading of less than 20.7% or greater than 21.1% or a toxic or LEL sensor reading of anything other than 0, then a Fresh Air/Zero Calibration should be performed.

If exposure to a known concentration calibration gas shows that LEL or toxic sensor readings are not between 90% and 120% of the value given on the calibration gas cylinder, then the Span Calibration should be performed.



## WARNING

The Canadian Standards Association (CSA) requires the instrument to undergo calibration when the displayed LEL value during a bump test fails to fall between 100% and 120% of the expected value for the gas.

## Calibration/Accuracy Verification

The accuracy of the IQ Force may be verified at any time by performing a simple calibration/accuracy check.

To perform this check, do the following:

1. Turn the IQ Force on and wait at least three minutes to allow the readings to fully stabilize. If any of the sensors have just been replaced, the new sensor(s) must be allowed to stabilize prior to use.
2. Make sure the instrument is located in fresh air.
3. Verify that the current gas readings match the concentrations present in fresh air. The oxygen (O<sub>2</sub>) sensor should read 20.9% (±0.2% vol.). The readings for the LEL sensor should be 0% LEL and toxic sensors should read 0 or 0.0 parts-per-million (ppm) in fresh air. If the readings deviate from the expected levels in a fresh-air environment, perform the fresh-air calibration adjustment then proceed to step 4.

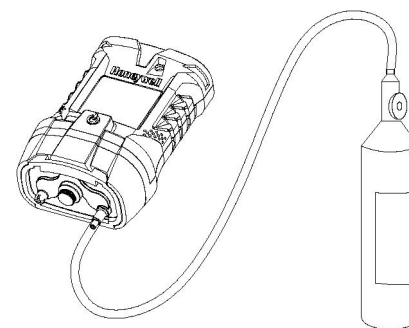


Figure 1. Bump Test/Span Calibration setup

Attach the calibration adapter and connect the calibration cylinder to the IQ Force as shown in Figure 1. Flow gas to the sensors using a standard 0.5 L/min regulator.

4. Wait for the readings to stabilize. (Forty-five seconds to one minute is usually sufficient.)
5. Note the readings. Toxic and LEL sensor readings are considered accurate in a bump test if they are between 90%\* and 120% of the expected reading as shown on the calibration cylinder. If the readings are considered accurate, then the instrument may be used without further adjustment. If toxic or LEL readings do not fall within 90%\* and 120% of the expected reading as shown on the calibration cylinder, then the readings are considered inaccurate. If readings are inaccurate, perform the span calibration.



## WARNING

The Canadian Standards Association (CSA) requires the instrument to undergo calibration when the displayed LEL value during an accuracy check fails to fall between 100% and 120% of the expected value for the gas.

Honeywell Analytics' multi-calibration gas mixtures contain approximately 18% oxygen. During the bump test, the oxygen sensor should read within ±0.5% (absolute) of the level shown on the calibration cylinder.

## Fresh Air/Zero Calibration

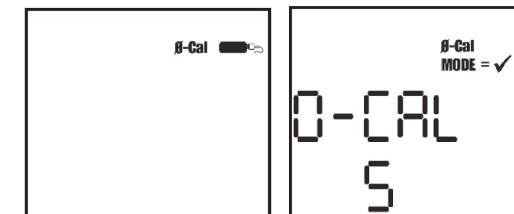


## WARNING

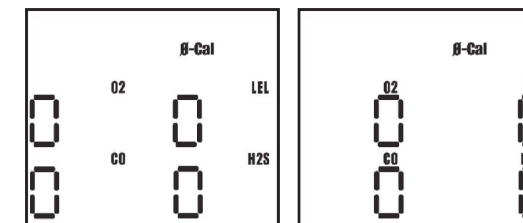
Fresh air/zero calibrations may only be performed in an atmosphere that is known to contain 20.9% oxygen, 0% LEL, and 0 ppm toxic gas.

To initiate the fresh air/zero calibration:

1. Make sure that the instrument is in an atmosphere known to contain 20.9% oxygen, 0% LEL, and 0 ppm toxic gas. If the quality of the atmosphere is suspect, a cylinder of "zero air," available from Honeywell Analytics, may be used. Zero air is clean air that is known to contain no contaminants. Apply zero air as shown in Figure 4.1.
2. Press the MODE button three times within two seconds to begin the fresh air/zero calibration sequence. The IQ Force will briefly display AUTO CAL and then begin a 5-second countdown.



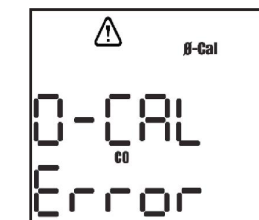
3. Press the MODE button before the end of the 5-second countdown to begin the fresh air/zero calibration. The fresh air/zero calibration has been initiated when the IQ Force shows cascading zeros:



4. The fresh air/zero calibration is complete when the instrument begins another 5-second countdown for the span calibration. If span calibration is not required, allow the countdown to reach 0 without pressing the MODE button.

## Fresh air/zero calibration failure

In the event of a fresh air/zero calibration failure, the alarms will be activated and the instrument will display the following screen:



continued...

Note that the sensor(s) that fail the zero calibration are shown (in this case, CO).

After 3 seconds, the IQ Force will return to the current gas readings screen and the visual and audible alarms will cease.

When fresh air/zero calibration is due, the IQ Force's display will show the warning symbol while intermittently displaying the 0-CAL icon in the gas readings screen until a successful fresh air calibration is performed. If a specific sensor has failed the fresh air/zero calibration, it will be displayed with the 0-Cal icon.

If a successful fresh air/zero calibration is not performed prior to instrument shut down, the IQ Force will show that fresh air calibration is due during instrument start up.

#### Possible causes and solutions

1. The atmosphere in which the instrument is located is contaminated (or was contaminated at the time the instrument was last fresh air calibrated).
2. A new sensor has just been installed.
3. Instrument has been dropped or otherwise damaged since last turned on.
4. There has been a significant change in temperature since the instrument was last used.

#### Recommended action:

Take the instrument to fresh air and allow readings to stabilize. Perform the fresh air/zero adjustment again. If the fresh air/zero procedure fails to correct the problem, perform the manual fresh air/zero calibration procedure as described below.

## Manual fresh air/zero calibration

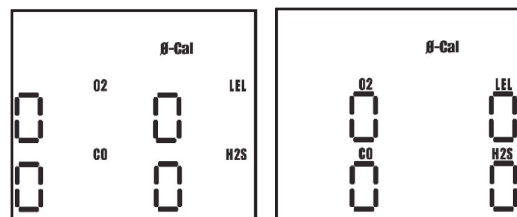
The IQ Force includes safeguards to prevent fresh air calibration in contaminated environments. If the standard fresh air/zero calibration fails a second time, the instrument may be "forced" to accept the fresh air calibration by performing the manual fresh air/zero calibration.



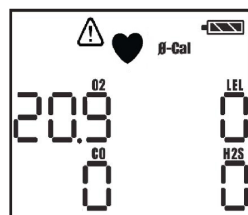
### WARNING

**Fresh air/zero calibrations may only be performed in an atmosphere that is known to contain 20.9% oxygen, 0% LEL, and 0 ppm toxic gas.**

1. Initiate the standard fresh air/zero calibration sequence by pressing the MODE button three times in rapid succession. The 5-second countdown will begin.
2. Press the MODE button before the end of the 5-second countdown and continue to hold the MODE button. As in the standard fresh air/zero calibration, the IQ Force will show cascading zeros:



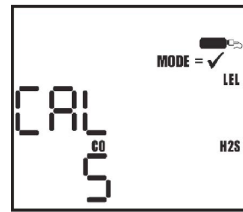
3. The fresh air/zero calibration is complete when the instrument begins another 5-second countdown for the span calibration. If span calibration is not required, allow the countdown to reach 0 without pressing the MODE button.



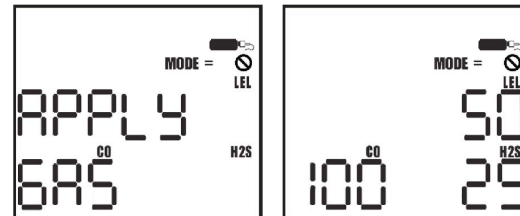
If the IQ Force still fails to calibrate after attempting to force the fresh air/zero calibration, contact the local service center.

## Span Calibration

Once the fresh air/zero calibration has been successfully completed, the IQ Force will automatically proceed to the automatic span calibration countdown screen.



Press the MODE button before the countdown is complete to initiate the span calibration. The screen will immediately show "APPLY GAS" and then list the sensors for calibration and the expected levels of calibration gas.



#### NOTE

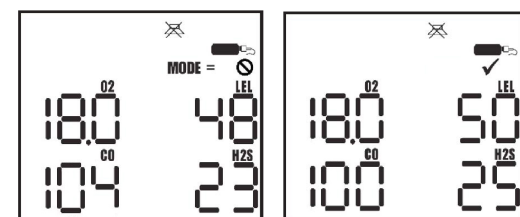
Honeywell Analytics recommends the use of multi-component calibration gas for calibrating the IQ Force.

Apply calibration gas as shown above. The readout will change to a numerical display almost immediately and will continue to display the current readings.

The actual calibration of the oxygen sensor to 20.9% occurs during the fresh air calibration, but the oxygen sensor is tested for response to diminished oxygen levels during span calibration. Honeywell Analytics calibration gas cylinders typically contain approximately 18.0% oxygen. In order to pass the span calibration, the instrument must register an oxygen reading below 18.7% during span calibration.

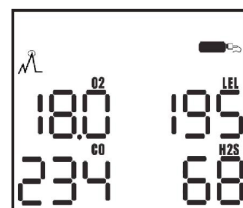
See the Span calibration failure section below if the oxygen sensor does not detect the drop in oxygen level and fails the span calibration.

The calibration is fully automatic from this point on. Upon successful calibration of a sensor, the IQ Force will beep, show the adjusted reading for the calibrated sensor, and then move on to the next sensor.



Once the calibration of all sensors is successfully completed, the IQ Force will briefly show the maximum adjustment values screen.

The maximum adjustment values for the LEL and toxic sensors give an indication of the remaining sensitivity of the sensors. As sensitivity decreases, the maximum possible adjustment will decrease to approach the expected concentration of the calibration gas.



#### NOTE

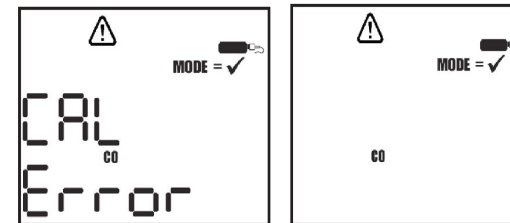
Once the calibration cycle is completed, the IQ Force will automatically turn off. Disconnect the calibration assembly prior to turning the instrument back on.

The LEL channel on the IQ Force can be configured to display a scale of %LEL or vol% methane (CH<sub>4</sub>). In the latter case, the degree of precision is 0.05% CH<sub>4</sub>. This is normally sufficient for applications where methane needs to be monitored on a volumetric basis.

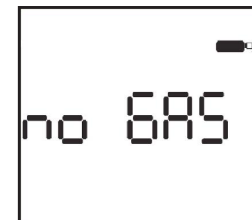
However, it should be noted that when using BioTrak software to set up LEL channel calibration setpoints and alarm levels, the degree of precision allowed is 0.01% CH<sub>4</sub>.

## Span calibration failure: Toxic and LEL sensors

When there is a span calibration failure, the display will show CAL Error and display the sensor that has failed calibration.



If the instrument fails to recognize the correct type or sufficient concentration of calibration gas, it will show "no GAS".



When span calibration is due, the IQ Force's display will show the warning symbol while intermittently displaying the calibration bottle in the gas readings screen.

The IQ Force will also display a "Needs Cal" message for any sensors that are currently due for calibration during instrument start-up.

#### Possible causes of span calibration failure and remedies:

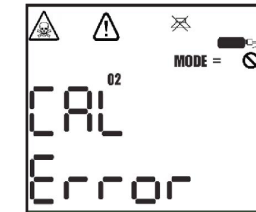
1. Empty calibration gas cylinder. Verify that there is calibration gas in the cylinder.
2. Expired calibration gas cylinder. Verify that the expiration date on the cylinder has not passed.
3. Calibration gas setting does not correspond to calibration gas concentration. The default calibration gas settings are 50% LEL, 100 ppm CO, and 25 ppm H<sub>2</sub>S. If the values on the calibration cylinder are different from the instrument's calibration gas settings, the IQ Force's calibration gas settings must be changed to match the new values. Calibration gas values can be changed with the BioTrak programming software (available separately) or by accessing the setup menus with the MODE button.
4. LEL only: Type of calibration gas (standard) has changed significantly. LEL calibration gas may be based on several different response standards; methane, propane and pentane are the most common. If using a new cylinder of calibration gas, make sure that the type and amount of combustible gas is identical to that of the previous bottle. Honeywell Analytics offers calibration gases in Methane, Propane Equivalent and Pentane Equivalent.
5. Dead sensor. Replace sensor.
6. Instrument problem. Contact the local service center. Refer to the phone number on page ii of this manual.

## Span calibration failure: Oxygen sensors

Honeywell Analytics' multi-calibration gas cylinders contain approximately 18.0% oxygen. The reduced oxygen level in the calibration gas cylinder allows the oxygen sensor's response to be tested in the same manner as the toxic and LEL sensors.

If the O<sub>2</sub> sensor fails to register a reading below 18.7% during the span calibration, the display will show "O2 Too Low" followed by the "O2 CAL Error" screen immediately after the failed calibration attempt.

Press MODE to acknowledge the warning and turn the instrument off.



If the oxygen sensor fails to register the drop in oxygen during the span calibration while being challenged with calibration gas containing less than 19.0% oxygen, it should be considered out of tolerance and retired from service immediately.



### WARNING

**A sensor that cannot be calibrated or is found to be out of tolerance should be replaced immediately. An instrument that fails calibration may not be used until testing with known concentration test gas determines that accuracy has been restored, and the instrument is once again fit for use.**

#### Possible causes and remedies for oxygen sensor failure:

1. Calibration gas cylinder does not contain a reduced level of oxygen. Verify that the cylinder contains less than 18.0% oxygen.
- To challenge the oxygen sensor without calibration gas, hold your breath for about 10 seconds (or more), and then slowly exhale directly onto the face of the sensor (in the same way you would attempt to fog up a piece of glass). If the descending oxygen alarm is set to 19.5%, the instrument should go into alarm after a few seconds.
2. Oxygen sensor has just been replaced and has not had time to stabilize.

## Maintenance



### WARNING

**To prevent ignition of flammable or combustible atmospheres, do not perform any maintenance operations on the IQ Force while in a hazardous location.**

## Cleaning

The exterior surfaces of the IQ Force may be cleaned using a damp cloth only. Do not use cleaning agents of any kind. The introduction of cleaning agents to the detector may affect instrument functionality.

## Storage

IQ Force detectors may be stored for long periods in a fresh air environment at temperatures between 10°C/50°F and 30°C/86°F.

The IQ Force is powered by a Li-Ion rechargeable battery. See the operator's manual for specific instructions concerning the storage and maintenance of Li-Ion batteries.