USER MANUAL

Honeywell BW™ Flex 4

MULTI-GAS MONITOR

Honeywell

Forward

This manual applies to all BW Flex 4 instruments with firmware v1.080 and later. The firmware is backward compatible with all previously released models. This manual includes significant updates to support dual and exotic toxic gas sensors, which may require specific hardware. Therefore, new sensors may not be backward compatible with existing hardware. Software tools like Safety Suite are also updated to support new functions.

Cautions and Warnings

Throughout this manual, each section includes the following references:

	**WARNING** Warnings indicate that users must follow guidance given. Any deviation is at the users own risk. If in doubt, ASK!
	**CAUTIONS** Cautions offer essential guidance for users to adopt appropriate industry best practices after considering their application and device configuration.

Warnings and Cautions are repeated in short form at the start of this manual and throughout the manual where appropriate. Irrespective of location, any caution or warning is considered to apply to all possible areas covered in the manual.

WARNING

- Users must read the manual and follow the guidance given.
- It is the user's responsibility to ensure correct operation before use.
- If any guidance needs to be clarified or understood, ASK for assistance.
- Ensure only qualified personnel use, service, and maintain the monitor.
- Equipment Integrity Risks
- Do not use damaged or faulty equipment.
- Inspect equipment for physical damage. Do not use if damaged.
- Ensure all filters are clear of obstruction/dirt.
- Replace filters regularly.
- Do not use a “lever” to open the instrument as this will damage the sealing.
- The user must configure instruments before use.
- Bump testing before use to ensure correct operation is recommended.
- Only use the equipment within the certified and operational limits specified.
- Calibrate the detector per recommendations for each sensor.
- Maintain bump/calibration records for later inspection.
- Only zero in fresh air or with controlled gas to correct baseline drift.
- Never attempt to zero an instrument in a hazardous environment.
- Ensure units are charged sufficiently for the day's use.
- Charge the device in a safe area within the temperature range of 0-45°C.
- Do not charge devices in direct sunlight.
- Do not tamper with, heat, or incinerate Li-ion batteries.
- Be aware of possible interference or cross-sensitivities to other gases.
- Ensure accessories used are compatible with gases to be detected.
- Do not expose sensors, inhibitors, or poisons.
- Always check the compatibility of accessories to the target gas being detected.
- Only use Honeywell-supplied parts. Alternates will invalidate the warranty.
- Do not modify the instrument beyond the limits of this manual.
- Replace sensors/batteries as needed to maintain performance.
- Spent batteries must be disposed of in compliance with local laws.
- Clean with a damp cloth using warm water only.

  Do not apply alcohol/solvent to the instrument; it may cause damage.
- Remove adhesive backing when fitted.

- Ensure instrument firmware/software updates are applied routinely.
- These identified risks should be addressed through careful adherence to the associated mitigations, ensuring safe usage and maintaining equipment integrity.


CAUTION

- Initiating BUMP or CALIBRATION without applying gas can result in a BUMP or CALIBRATION FAIL indication , accompanied by a flashing red LED next to any failed sensor. To clear the failure a SUCCESSFUL BUMP or CALIBRATION is required. Subject to Policy Enforcement, a user may be locked out until cleared. This is not an instrument FAULT.
- Zeroing or calibrating an instrument before sensor stabilization, in a background of target gas, or in the presence of interfering gases, may cause inaccurate readings, false alarms, unexpected drift, and possible faults.
- The exact operation may vary subject to configuration. Access to menus may be limited. This enables simplification in use and prevents tampering.
- Allow instruments to reach equilibrium with their surroundings before use. Condensing atmospheres should be avoided. Sudden changes in temperature and humidity may result in false readings and possible alarms. Such effects are usually transitory in nature, and devices recover quickly.
- If a detector is left switched ON and placed on charge, gas detection is disabled, and the high-power sensors are switched OFF automatically. This maximizes the operational life of the battery. Charging ceases once the instrument is at capacity. Further charging will only occur upon disconnecting/reconnecting the instrument to the charger.
- Ensure the white plastic backing, protecting the adhesive gasket and membrane, is removed from replacement filters. Failure to do so will prevent gas detection. Honeywell recommends bump testing to prevent such user error from presenting a dangerous situation in the field.
- Regularly check for firmware and software updates. Always update to the latest versions to maintain your equipment.

Table of Contents

CHAPTER

1 PRODUCT INTRODUCTION

With a choice of 14 different sensor types, the BW Flex protects you from multiple gas hazards in a small, rugged, and easy-to-use device. The BW FLEXibility safeguards the specialist operating in confined spaces or the occupied general worker, wherever simple safety compliance is needed. As light as a smartphone that can be used to configure the unit, a single charge gives up to 2 months operation. The modular design enables fast service and compatibility with IntelliDoX automatic test and calibration stations that make protecting workers easy, whatever they are doing.

- Easy to Use
  - Single pushbutton operation simplifies training of users, means more time to focus on safe working practices than complex instruments
  - Multiple display styles, easily configured with a free mobile app, allow remote monitoring and fast reporting of incidents in the field
- Flexible
  - Measure up to 5 sensors from 14 different gas types, enabling use in more applications with more to be added soon
  - Choice of LEL sensors, including catalytic bead for generally flammable gases or NDIR for hydrocarbon gases
  - Latest long life Pb free oxygen pumped sensor for environmental compliance including RoHS/WEE
  - Expanding the range of toxic gas sensors, including CO+H2S (COSH), CO, CO-H (low H2 response), H2S, SO2, Cl2, HCN, NO, NO2, and CO2
- Easily re-charged and serviceable to maximize useful operating life
  - Minimize downtime with fast charge and simple maintenance
  - NDIR LEL gives up to 2 months of operation on a single fast charge
  - 4 screws for quick access to all plug-in components (battery, sensor, filter)
- Compliance made simple
  - Compatible with IntelliDox automated calibration and test stations, even with external filters fitted, to provide proof of real-world operation (subject to gas types selected)

1.1 Intended Use

The BW Flex 4 is certified intrinsically safe for potentially explosive atmospheres, including Class 1 / Division 1, Zone 0, 1 & 2 designated areas. Independently tested to conform with IP66/68 dust and water protection, it is suitable for indoor, outdoor, mining, onshore, and offshore.

Certified by independent, nationally recognized test laboratories (NRTL) to stringent standards, including UL, CSA, IECEX, MED, SABS, INMETRO, FTZU, GOST, and KRS, the BW Flex 4 is used globally.

Honeywell is continually updating the detector's certifications. Please refer to section 8 *Certification* of this manual for details at the time of publication. For the latest updates, reach out to Honeywell, check out our corporate website, or contact an authorized distributor near you.

1.2 Standard Supply

BW Flex 4 is supplied, thoroughly tested, configured with default settings, calibrated, and partially charged from the factory. If the detector's battery has fully depleted in the supply chain and won't turn on, ensure it is fully re-charged and sensors allowed to stabilize overnight before use. Refer to *Storage and Use Considerations* section 3.1 and *Power and Battery Management* section 3.2.

Each unit supplied includes:

Quantity	Description	Part Number
1	Honeywell BW™ Flex 4 multi-gas monitor	See Ordering Section
1	USB-A / charger adaptor	CP-USB
1	Calibration cap	CP-TC-1
1	Calibration Certificate	N/A
1	Quick Reference Guide	M05-4002-001

Please contact Honeywell or an authorized distributor if these parts are missing.

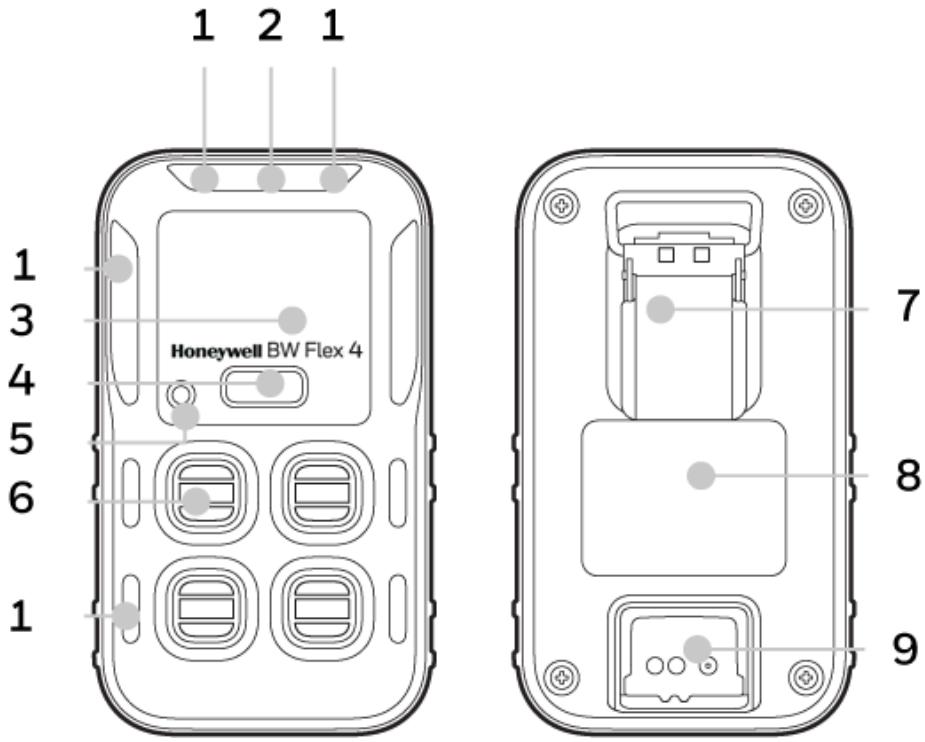
1.3 Optional Accesories

A wide range of accessories to suit different applications is available.

Description	Part Number
Mains 5-way charger	GA-PA-1-MC5-XX*
Wall Outlet Power Adaptor	GA-PA-1-XX*
USB Charger Cable	CP-USB
5-way cradle charger	CP-C01-5
IR connectivity kit for Safety Suite software	GA-USB1-IR
External Auxiliary Filter Kit	CP-AF-K3
Replacement External Filters (10pcs)	CP-SS-AF-K1
Manual aspirator pump included, probe and filter (0.3 m/1 ft.)	GA-AS02
Neck strap with safety release	GA-NS-1
Short strap (6 in./15.2 cm)	GA-LY-1
Extension strap (4 ft./1.2 m)	GA-ES-1
Chest Harness	GA-CH-2

* Replace "XX" with "NA" for North America, “UK” for the United Kingdom, and “EU” for Europe. Further options may be made available regionally.

1.4 User Interface



1	Alarm LED	6	Sensor
2	IntelliFlash	7	Crocodile Clip
3	Display	8	Certification label
4	Button	9	Charging IR data Port
5	Sounder		

FIGURE 1 -1: Main components

Combinations of vibrating, audible, and visual indicators provide the user with the status of their detector. Please refer to *Chapter 3 Routine Operation* for further information.

The display can show all information (OVERVIEW mode) or one channel at a time when in alarm (FOCUS mode). When all readings are "normal", i.e., no gas detected, the display can be configured to show the word "SAFE" (SAFE mode ON) or gas readings "0,0,0,20.9" (SAFE mode OFF). The DEFAULT configuration is "OVERVIEW mode ON / SAFE mode OFF" for maximum information.

1.5 Display Elements

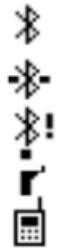
E.g.	DESCRIPTION
FL 10 %LEL	Gas: FL, FLIR, O2, CO, CO-H, H2S, SO2, Cl2, NO, NO2, HCN, CO2 Reading: X or X.X Units: %LEL, %VOL, ppm, m (mg/m3), u (micro-mol/mol)
	• Battery full • Battery half • Battery low (static), Battery critical (flashing) • Battery charging • Battery can't be charged
	• Bluetooth is on, but not connected • Bluetooth connected • Bluetooth fault • IR connected • Profile mode (reserved 3rd party device developments)
	• AVV failed (audio, visual, vibration) • Stealth mode (audio, visual disabled)
	• Calibration due or failed • Warning calibration is due soon
	• Bump test due or failed • Warning bump test is due soon
	• Wait, the detector is busy. • Warning: A critical issue must be addressed to proceed • All OK, gas detected during bump/calibration, pass • Gas not detected during bump/calibration, sensor turned off, fail
	• Press and hold the button to continue
	• Press the button once to go **Back** or **Forward**.

FIGURE 1 -2: Icons as displayed on the screen

1.6 Basic Operation and Menu Navigation

CAUTION
Initiating BUMP or CALIBRATION without applying gas can result in a BUMP or CALIBRATION FAIL indication . This is accompanied by a flashing red LED next to any failed sensor. To clear the failure requires a SUCCESSFUL BUMP or CALIBRATION. Subject to Policy Enforcement, a user may be locked out until cleared. This is not an instrument's FAULT. Zeroing or calibrating an instrument in the background of target gas or in the presence of interfering gases may cause inaccurate readings, false alarms, unexpected drift, and possible faults.

NOTES:

- The exact operation may vary from user to user. Access menus may be limited for field users subject to configuration. This enables managers to simplify use, prevent tampering, and allow parameter review in the field.

Basic operation and menu access may be done using the button on the front of the gas detector:

When in NORMAL operation:

- Power ON – 4s press and hold. The instrument verifies the firmware's digital signature when booting
- Power OFF – 4s press and hold with countdown
- Turn backlight ON – single button press
- Alarms, faults, and warnings must be cleared to reset
- Acknowledge latched alarm (if enabled) – 1 second press and hold
- Double press button to enter MENU Operation

When in MENU Operation:

- Move to the next option – single button press
- Select an option – 3 second press and hold
- To EXIT the menu/sub-menu either
    i. Select EXIT of any menu
    ii. Wait up to 10 seconds; the unit will revert to NORMAL Operation

1.7 Sub-Menu Structure (simplified)

Menu	Description
	**INFO** Includes detail about instrument settings including, firmware version, user/location, sensor types fitted, instantaneous STEL/TWA alarm settings, peak high/low/STEL/TWA readings, and ability to reset subject to configuration.
	**BUMP** Enables a user to apply a known gas concentration as a BUMP Test. This mode prevents such exposure from being counted towards STEL/TWA calculations. According to industry best practice, Honeywell recommends the bump testing of instruments by users before use.
	**ZERO** Sensors may drift with time; a user may quickly re-zero the instrument in “fresh air” while in the field. “Fresh air” is considered free of target gas or interfering gases and is of representative temperature/humidity of the intended use.
	**CALIBRATION** Instruments must be calibrated at pre-determined intervals that vary by sensor type and application environment. This includes controlled re-zeroing and span calibration for each gas type. Records for compliance are kept for later inspection.
	**EXIT** Example symbol used to reflect a manual EXIT from the menu system. Timeouts are also in place.

CHAPTER

2 CONFIGURATION

WARNING
This manual must be read and understood by users before use. Failure to carry out basic configuration may result in noncompliance with local requirements, present a potential nuisance, or cause an unsafe situation. It is the user responsibility to ensure they are fully conversant with the instrument and trained to recognize possible hazards associated with their application. If in doubt, ask!
CAUTION
This section summarizes the settings and defaults for BW Flex 4 instruments with firmware v1.080. Periodically, Honeywell updates the firmware and the associated tools used to configure instruments. Users should regularly review the product support pages of Honeywell for the latest firmware and software tools. Always update to the latest versions to maintain your equipment.

2.1 Available Methods of Configuration

There are three primary methods of configuring an instrument. These include:

- Device Configurator App for mobiles
- Safety Suite Device Configurator for PC
- Safety Suite Deluxe for PC

Each tool is intuitive to install with operations described in their separate manuals or the software once installed.

Please refer to Section 7, *Getting Started with Available Software*, for further information.

2.2 Instrument Configurable Options and Defaults

Every device delivered from Honeywell is supplied with a default configuration. Please contact Honeywell or our authorized distributor for further help.

Setting	Description	Default
Model Name	Not user configurable	BW Flex 4
Serial Number	Not user-configurable. Factory set. E.g. 5012BWF05214000127	Unit specific
Firmware Version	Update via software	v1.080 applies
Username	User configurable 16 characters	User 1
Location	User configurable 16 characters	Location 1
Messages	2 x 40-character user configurable message fields	For service contact Honeywell
Lockout on Self-Test	Prevents start-up should self-test fail	Disabled
Latching Alarm	Audible/visual alarms remain until the gas clears and the user presses the button.	Disabled
Disable the Power Off Button	Prevents field user from switching device off	Disabled
Confidence Beep	Beeps at the programmed interval to notify the user that all is well	Disabled
Confidence Beep Interval	User programmable 1-60 seconds	15s
IntelliFlash	LED status indication. Flash green good, amber warning, red for fault	Enabled
IntelliFlash Interval	User programmable 1-15 seconds	15s
Turn off IntelliFlash when charging	Limits distractions when many units are charging. If enabled, sensors remain active when charging.	Disabled
Cal Lock	When enabled, a user can't calibrate via the instrument menu using the button.	Disabled
STEL & TWA Backup	An instrument that is turned off, then on again, remembers its STEL/TWA values and includes them in the ongoing calculation.	Enabled

Setting	Description	Default
Stealth Mode	Turns off audible/visual alarms, leaving vibrating alarm only on for sensitive operations	Disabled
Flip Display	Allows the detector to be read “upside down” when fitted to chest harnesses or pockets	Disabled
Language	Select from English, Portuguese, Spanish, German, French, Chinese, Korean, Japanese, Dutch, Italian, Russian, Slovakian, Czech, Polish, Norwegian, Swedish, Finnish, Danish, and Turkish	English
Time Format	Select either 12- or 24-hour format	12-hour
Date & Time	Manually set or “sync” with PC/mobile	Per factory source
Time Zone	Users may select the time zone of use	Per factory source
Auto Adjust DST	User-selectable with start/end dates programmable. Software tools required,	OFF
User Interface Mode	Focusing Mode (1 reading at a time) vs Overview Model (all readings simultaneously)	Overview Mode
SAFE Mode	Shows “SAFE” when there are no alarms. Disabled to show zero readings (0, 0, 0, 20.9 for example)	Disabled
Event log type	Basic for the last 50 events (speed/back-compatibility). Enhanced for expanded capability up to 1 year.	Enhanced
Log Interval	User programmable 5 to 120 seconds	15s
Download since last	When enabled, the instrument only downloads what has not been downloaded before	Disabled
Forced on calibration	Policy Enforcement of calibration. When an instrument is turned on, the user MUST calibrate if due before they can use the instrument.	OFF
Forced on bump	Policy Enforcement of bump. When an instrument is turned on, the user MUST bump if due before they can use the instrument.	OFF
Recommendation	Warning to user that Honeywell recommends bump testing and to read the manual before use	OFF
Recurrence Time	User-programmable refresh time of countdown warnings to prevent nuisance warnings	00:00 (midnight)
Backlight duration	Users may program 1-30s. Note that this may affect run time if changed.	6s

2.3 Sensor Configurable Options and Defaults

The following table summarizes settings that can be made per gas sensor fitted to the BW Flex 4. Where “sensor dependent” is stated, refer to section 5.2 Standard Sensors Specification.

Setting	Description	Default
Slot 1- 4	Gas and units of measure, e.g., CO ppm. It is recommended that COSH be fitted to Slot 3. CO/H2S shown adjacent	Sensor dependent
Serial Number	Not configurable. This only applies to DIGITAL sensors	n/a
Firmware Version	Not configurable. This only applies to DIGITAL sensors	n/a
Manufacture Date	Not configurable. This only applies to DIGITAL sensors	n/a
Sensor Enable	Sensors that are fitted can be switched on/off, allowing devices to be used while waiting for replacements.	Enabled
Display Units	Depending on the sensor type, select %LEL, %VOL, ppm, m (mg/m3), u (micro-mol/mol)	Sensor dependent
Auto-zero on Startup	The instrument adjusts zero automatically on start-up of the instrument. Not available on NDIR type digital sensors	Disable
Diagnostic Mode	When enabled, all dead bands are disabled. Used for performance testing only and not required day-to-day.	Disable
Low Alarm Acknowledge	When enabled, the audible/vibrating alarm can be silenced by pressing the pushbutton for 1 second.	Disable
Correction Factor	Applies to catalytic bead sensors. Allows cross calibration with Methane when users want to scale readings for other specific gases. Select from the drop-down list or enter custom values.	1.0 (Methane)
Correction Curve	This applies to NDIR HC sensors only. It allows the user to correct for linearities in Methane (C1), Propane (C3), and Butane (C4). The sensor limits the dynamic range.	Methane 0-100% LEL
Last Calibration Date	Automatically updated upon successful completion of calibration. The format is YYYY-MM-DD and requires instrument time, date, and time zone to be set correctly for reporting and data synchronization.	n/a
Calibration Interval	User programmable for 1-365 days. Maximum time between calibration of a sensor before calibration warnings are given.	Sensor dependent
Cal. Due Countdown	User programmable for 0-365 days. When set to 0, the countdown is disabled. If set to, say, 5, then five days before the maximum calibration interval is due, a calibration due warning is displayed.	0 by default Disabled

Setting	Description	Default
Cal. Concentration (aka Span Gas)	This is the concentration of span gas to be used for calibration and bump testing. The device uses this value, and it MUST match the cylinders of gas used by the user when calibrating and bump testing via the menu/pushbutton manually. It is adjusted using software tools.	Sensor dependent
Last Bump Date	Automatically updated upon successful completion of the bump. The format is YYYY-MM-DD and requires instrument time, date, and time zone to be set correctly for reporting and data synchronization.	n/a
Bump Threshold (%)	% of Span Gas/Calibration Gas applied (see above) that the instrument must give to pass a bump test.	40%
Bump Interval	User programmable for 0-365 days. When set to 0, the bump requirement is disabled.	0 by default Disabled
Bump Due Countdown	User programmable for 0-365 days. When set to 0, the countdown is disabled. If set to 5, then 5 days before the next bump interval, bump-due warnings are given	0 by default Disabled
TWA Method	Users may select between OSHA or ACGIH methods of calculating TWA. Applies to toxic gases only.	OSHA
TWA Period (hrs)	User-programmable for 5-15 hours. This applies to toxic gases only.	8 hours
TWA Alarm	This applies to toxic gases only.	Sensor dependent
STEL Interval (mins)	User programmable 5-15 mins. This applies to toxic gases only.	15 minutes
STEL Alarm	This applies to toxic gases only.	Sensor dependent
Low Alarm	Applies to all gases.	Sensor dependent
High Alarm	Applies to all gases,	Sensor dependent
Decimal Display	User selectable to display X or X.X depending on sensor type.	Sensor dependent

2.4 Essential Settings REQUIRED Before Use

WARNING

Settings fundamentally affect the operation of your gas detector. Factory defaults MUST be updated to meet your local requirements and application of use. Failure to do so will lead to non-compliance with local rules or regulations and may result in an unsafe situation. If in doubt, ask!

Multi-gas monitors are safety equipment. They should be configured, used, and maintained by trained personnel. It is the responsibility of employers to keep their employees safe. It is the responsibility of employees to use the tools provided correctly. If in doubt, ask!

2.4.1 Set Language, Time, and Date

The Time Format (12/24 hour), Date & Time, Time Zone, and Automatic Adjustment for Daylight Savings Time (if applicable) MUST be set by the end user in the country of use. This information correctly records events and gas readings, including successful bumps and calibration.

Dates are also used to correctly present calibration and bump-due warnings to the user. Subject to Policy Enforcement settings, a device may not function if these settings are incorrect.

Should power be lost completely, for example, in the case of a battery replacement or extraordinarily long storage period, the instrument will recognize the loss of time, date, and language, prompting the user to reset it. This can be done manually by following the prompts on the device's display or via the software tools. Use of a software tool is recommended.

For manual setting of the language, time and date:

1. Ensure the detector is fully charged.
2. Turn ON the device, the *Setup Manually* screen is displayed.
3. Press and hold the button to proceed to language selection
    a. Single press the button to select the language you require
    b. Press and hold the button to set the language required
4. The Time setup screen is then displayed
    a. Single press to switch Hours, Minutes, and Seconds
    b. Press and hold the button to enter the setup.
    c. Single press the button to change the value.
    d. Once the correct value is reached, press and hold the button to set

5. The Date Menu is then displayed
    a. Single press to switch Month, Day, and Year
    b. Press and hold the button to enter the setup
    c. Single press the button to change the value.
    d. Once correct value reached, press and hold the button to set
6. After settings are complete, press and hold the button to return to normal operation.

2.4.2 Set Alarm Levels

Different regions and countries have national standards. These usually involve different permissible exposure levels (STEL/TWA/MEL/IDLH) to toxic gases. Further, instantaneous alarm levels may be adjusted for safe working practices locally.

It is essential that users are trained on how to react to the hazards they are likely to be exposed to, the use of life-saving equipment such as portable multi-gas monitors, and what to do in the event of detecting hazardous conditions. This includes faults, which should be treated with the same urgency as gas alarms.

It is the responsibility of employers to keep their employees safe. It is the responsibility of employees to use the tools provided correctly. If in doubt, ask! For further advice, contact Honeywell or our authorized distributor.

2.4.3 Setup for Calibration

Always use a good quality supplier of test and calibration gas. Always check the expiration date, shelf life, and pressure of your gas cylinders. Poor gas quality is the leading cause of incorrect calibrations, resulting in poor productivity and high rework.

The detector has, for each gas type, default span/calibration gas defined. Please refer to *Section 5.2 Sensor Specifications* for details.

When calibrating manually via the instrument menu, the gas applied must be the same as the instrument setting for span/calibration gas. The correct span gas to be used is given on the instrument menu during manual calibration. Always check that you are applying the right gas concentration.

Failure to correctly configure the span/calibration gas concentration could reduce or increase sensitivity to target gases. This may result in nuisance alarms or inaccurately low measurements, putting workers at risk.

Software tools or automated test equipment, such as IntelliDoX, enable the user to quickly check, adjust gas, and calibrate instruments in a safe, reproducible manner. For further advice, contact Honeywell or an authorized distributor.

2.4.4 Setup for Bump Test

The test gas used for bump testing is generally the same as the span/calibration gas used for calibration, i.e. The same default values are used. Regarding quality and configuration settings matching, the same cautions and warnings apply for bump testing as they do for calibration.

Unlike calibration, a bump test is intended to apply a known gas concentration, typically above alarm set points. The instrument automatically, or the user manually, verifies that the instrument raises audible, visual, and vibrating alarms, typically within the T50 response time of the detector. The threshold for automated pass/fail may be adjusted. By default, it is 40% of gas concentration applied, within the prescribed response time of the sensor.

The threshold may be adjusted by the user using the software tools.

2.4.5 Set reminders and policy enforcement

The user can set the Calibration Interval (default is sensor dependent) and Bump Test Interval (default off). Countdowns to calibration and bump due may also be set to warn operators in advance of due dates.

Policy Enforcement prevents a device from entering normal operation if a bump or calibration is due. Only once the bump or calibration is done will the unit turn on and operate normally.

2.4.6 Set user name and location

A username and work location of up to 16 characters each can be set. This information is used in events and data logs when downloaded for reporting.

2.4.7 Set display behavior

The BW Flex 4 display is configurable.

With no gas present:

- SAFE mode OFF (default) displays all four sensor readings simultaneously
- SAFE mode ON displays the word “SAFE” (white text/black background)

With gas present:

- OVERVIEW mode (default) shows all four gas readings simultaneously
- FOCUS mode shows gases one at a time full screen

2.4.8 Data and event logging

The detector logs both events as they occur and gas readings over time. The log interval is 15 seconds by default and can be configured using the software tools.

Data logging

A dynamic compression algorithm is used to store logged data. Zero or un-changing readings require little space while varying gas readings require more. Consequently, the period that the device can log may vary. Based on an 8-hour working day and subject to the log interval, the detector will capture data for 45 days at 15-second log intervals. The interval is user-programmable between 5s and 120s. Therefore, up to 360 information days can be logged depending on settings and actual gas exposure.

Event logging

There are two event logging modes: basic and enhanced. Existing devices in the field use the “basic” event log. This mode records the last 50 events with time and date stamps by assigned user and location. A user may select “enhanced” event logging operation at any time.

New instruments, supplied from the factory with v1.080 firmware, use enhanced event logging by default. This enables many more events to be recorded in extended memory, resulting in longer download times.

With “basic” or “enhanced” logging and the selection of “download since last”, users who regularly bump test and/or calibrate with IntelliDoX should not experience any significant slowdown in operation. Switching from “enhanced” to “basic” is also possible without losing data.

Records include:

- Alarms: Channel/sensor, Low, high, STEL, TWA, +OL (over range), -OL (negative drift), sensor fault, instrument fault.
- User actions: Zeroing, calibration (zero/span) and result, bump test and result, disabling of sensors.

CHAPTER

3 ROUTINE OPERATION

3.1 Storage and Use Considerations

 **CAUTION**
Allow instruments to reach equilibrium with their surroundings before use. Condensing atmospheres should be avoided. Sudden changes in temperature and humidity may result in false readings and possible alarms. Such effects are usually transitory in nature, and devices recover quickly. Continuous use at extremes of temperature and humidity is not recommended. This may cause instrument drift, which can be corrected with zeroing/re-calibration. Continued use in extremes can result in erratic sensor behavior. In extreme cases, sensors may be irrevocably damaged.

The BW Flex 4 is suitable for use in various environments. Absolute limits are dependent on the sensors fitted. See Section 5, Summary Specifications, for further details.

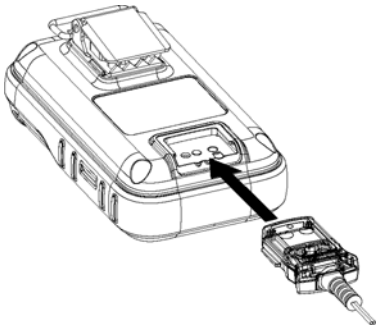
Users should consider how devices are stored between use and readiness for operation. For example, if stored in an air-conditioned space, workshop, or vehicle exposed to low temperatures overnight, allow time for the detector to stabilize in working conditions before use. For advice, contact Honeywell or an authorized distributor.

3.2 Power and Battery Management

WARNING
Li-ion batteries should not be disassembled, exposed to heat above 100°C, or incinerated. Spent batteries must be disposed of in compliance with local laws. Use a qualified recycler or hazardous materials handler. Only use Honeywell-supplied Li-ion battery packs specific to your device. Use of any other battery risks fire and explosion. Charge the device in a safe area within the temperature range of 0-45°C. Do not charge devices in direct sunlight.
CAUTION
If a detector is left switched ON and placed on charge, gas detection is disabled, and the high-power sensors are switched OFF automatically. This maximizes the operational life of the battery. Charging ceases once the instrument is at capacity. Further charging will only occur upon disconnecting and reconnecting the instrument to the charger.

BW Flex 4 uses a lithium-ion (Li-ion) battery. Li-ion batteries feature several advantages, such as high energy density, quick charge, low rate of self-discharge, and low operating temperatures.

Charge the detector using a USB Type-A 5VDC 500mA (2.5W) charger (NOT provided by Honeywell) in conjunction with the USB/Charging Cable provided (part number CP-USB).



Alternatively, use the following:

- Mains 5-way charger GA-PA-1-MC5-XX*
- Wall outlet power adaptor GA-PA-1-XX*
- 5-way cradle charger CP-C01-5

* Replace "XX" with "NA" for North America, “UK” for the United Kingdom, and “EU” for Europe. Further options may be made available regionally.

In compliance with transportation safety regulations, instruments ship with only a partial charge; they should be fully charged before use. Charging must only be done in a safe area, free from hazardous gas, at 0-45°C. Do not charge devices in direct sunlight. The detector may be warm during charging; this is normal.

The battery's charge status is shown on the instrument display:

	Battery full Battery half Battery low (static), battery critical (flashing/alarm): Recharge now Battery charging Battery can't be charged

Honeywell recommends charging the device when it is turned off. Recharging usually takes 4~6 hours, depending on starting conditions. The device should be switched off when not in use to preserve battery life.

The instrument battery run time will vary depending on the instrument configuration, sensors fitted, time in alarm each day, device age, backlight settings, and compliance with recommended bump testing. With default settings, assuming an 8-hour working day, with 2 minutes of alarm per day, then the expected operating time between charges will be:

- 4 gas sensors with catalytic bead LEL sensor, ~12 to 15 hours
- 4 gas sensors with NDIR HC LEL sensor, ~2 months or 40 working days

Throughout its life, a battery tends to hold and retain less power as it is exposed to the stresses of each charge/discharge cycle. As a battery ages, the capacity may reduce, and more frequent re-charging may be required. Batteries may be replaced periodically to maintain the performance of the gas detector.

Replace any battery in an instrument that:

- The operator reports a significant reduction in the device's runtime
- The battery is noticeably deformed, swollen, or discolored
- The battery or device is too hot to handle (a surface above 60°C / 140°F)

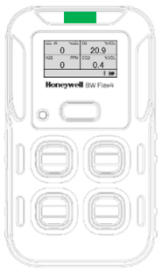
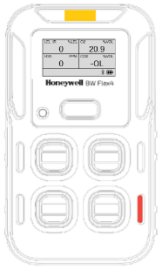
For improved battery life:

- Avoid allowing a battery to discharge below battery critical levels 
- Limit as much as possible, repetitive "top-up" charging
- Do not store devices fully depleted
- Recommended charge for long-term storage is half battery capacity
- Periodically check stored devices and recharge where appropriate
- Even when stored switched off, biased sensors consume a small amount of power. To maintain readiness, they should be checked periodically

3.3 Normal, Alarm, and Fault Indications

Alarms may occur individually or several at once. Subject to circumstance, it is essential that operators remove themselves from the potentially dangerous situation immediately

- A gas-detected event supersedes any other event.
- When more than one alarm occurs on one sensor, the highest priority is displayed: Over Range > TWA > STEL > High > Low > Negative
- When more than one sensor alarms, the alarm status is displayed as multi-alarm no matter what kind of gas alarms they are.

	**NORMAL** IntelliFlash Green 15s		**STEL ALARM** Display Reads “STEL” Alarm/Sensor LEDs flash alternately Beeps/Vibrates
	**NEGATIVE DRIFT** Display reads “-OL” Sensor LED Solid RED IntelliFlash Amber 1s		**TWA ALARM** Display Reads “TWA” Alarm/Sensor LEDs flash alternately Beeps/Vibrates
	**LOW ALARM** Display alternates “LOW”/”READING” Alarm/Sensor LEDs flash alternately Beeps/Vibrates		**OVER RANGE** Display Reads “+OL” Alarm/Sensor LEDs flash alternately Beeps/Vibrates
	**HIGH ALARM** Display alternates “HIGH”/”READING” Alarm/Sensor LEDs flash alternately Beeps/Vibrates		**MULTI-ALARM** Combinations of the above

CHAPTER

4 MAINTENANCE AND SERVICE

WARNING

Use, maintenance, and service of portable multi-gas monitors must only be carried out by trained individuals. Users should always read the manual thoroughly and understand the detector before use.

Sensors used in portable gas detectors may be affected by inhibitors and/or poisons. An inhibitor may temporarily stop a sensor from working but should recover once in fresh air. A poison will permanently damage a sensor and prevent it from detecting gas. Many everyday products contain such poisons or inhibitors. This includes but is not limited to:

- Halogen gas/halogenated HCs
- Brake cleaners
- Lubricants
- Rust inhibitors
- Window/glass cleaners
- Alcohol-based cleaners/tissues
- Methanol (fuel and antifreeze)
- Hand sanitizers
- Anionic detergents
- Dish soaps/citrus-based cleaners
- Any silicone-based product
- Cleaners
- Protectors
- Barrier creams
- Medicinal creams
- Adhesives
- Sealants
- Tissues/wipes
- Polishes
- Mold release agents

If you believe your detector has been exposed to such materials seek trained, professional, and experienced advice.

Do not use strong solvents on plastic surfaces as this may damage sensors and cause fatigue of plastic housings, which may not present immediately.

Honeywell recommends bump testing before use and routine calibration. Bump testing is the only method that proves filters are not blocked, sensors operate within specifications, and audible, visual, and vibrating alarms are fully functional. IntelliDoX is an automated bump test and calibration system. Contact Honeywell or an authorized distributor for more information.

Some sensors exhibit cross-sensitivity to other gases. This may be additive or negative in its effect. Additive cross sensitivities will result in premature nuisance alarms. Negative cross sensitivities behave like inhibitors and prevent a sensor from reading or alarming accurately. The presence of

interfering gases could also render calibration inaccurate or ineffective. For further advice, contact Honeywell or an authorized distributor.

4.1 Honeywell Recommended Practices

- Train users in use, application, and awareness of likely gas hazards
- Consider an instrument fault and ensure correct practices are followed
- Ensure only qualified personnel service and maintain equipment
- Users must read the manual and follow the guidelines given
- Only use equipment within certified and operational limits specified
- Ensure accessories used are compatible with gases to be detected
- Inspect equipment for physical damage. Do not use damaged equipment
- Ensure all filters are clear of obstruction/dirt. Replace filters regularly
- Clean with a damp cloth using warm water only
- Do not use cleaning products that inhibit or poison sensors
- Ensure units are charged sufficiently for the day's use
- Check that settings comply with regulations. Standards may change over time
- Complete a "bump test" to ensure correct detector operation before use
- Re-zero in fresh air if necessary to correct baseline drift over time
- Calibrate the detector per recommendations for each sensor
- Maintain bump/calibration records for later inspection
- Replace sensors/batteries as needed to maintain performance
- Ensure instrument firmware and software updates are applied routinely

4.2 Considerations for Reactive Gases

Some gases are often referred to as “reactive” or “sticky”, while others are not. Reactive gases include Cl_2 and NO_2, for example. Some plastics and rubbers absorb such gases. They are water-soluble, so any condensation in sample lines may prevent gas from passing through them.

Consequently, these types of gases require special handling when bump testing or calibrating. Generally, they are unsuitable for legacy automated calibration and test stations such as IntelliDoX. Contact Honeywell for further advice regards the use of IntelliDoX with reactive gases.

Manual bump testing/calibration of these gases is recommended.

- Use high flow (1l/m) 316 stainless steel flow regulators (Reg-1.0316SS)
- Use PTFE/Teflon lined tubing (HOSE2-10/20/65)
- Minimize flow paths wherever possible to reduce surface absorption
- Ensure no water enters, or condensation occurs in the flow path
- Flow paths and all gas-contacted surfaces may require pre-conditioning

Accurate calibration of sensors requires applying a known concentration of gas and, when readings are stable, adjusting the span/scaling factors in the instrument. This is usually handled by the instrument automatically. Reactive gas sensors may show a slow speed of response due to absorption by materials in the gas path. As gas is applied longer, the path becomes saturated, and the reading stabilizes. This is known as “conditioning” the gas path. Poorly conditioned gas paths result in a slow, continuous “creeping” of the reading, seemingly never stabilizing.

If the sensor is calibrated BEFORE reaching its actual stable value, the instrument will be overly sensitive to gas in actual operation. While this errs on the side of caution, it can result in instability and false alarm. This may be exacerbated by sudden changes in environmental conditions when in use.

Contact Honeywell or an authorized distributor for further advice when bump testing or calibrating reactive gases.

4.3 Manual Bump Testing

CAUTION
Initiating BUMP or CALIBRATION without applying gas can result in a BUMP or CALIBRATION FAIL indication . This is accompanied by a flashing red LED next to any failed sensor. To clear the failure requires a SUCCESSFUL BUMP or CALIBRATION. Subject to Policy Enforcement, a user may be locked out until cleared. This is not a FAULT of the instrument.

Bump testing is the application of test gas to ensure your detector operates correctly. Industry practice and opinion vary regards bump testing of instruments. For this reason, bump Interval, countdown, and enforcement are programmable by the user.

Honeywell recommends bump testing portable multi-gas monitors before use. Bump testing is the only way to confirm that filters are not blocked, sensors can react to gas properly, and audible, visual, and vibrating alarms are fully operational.

Depending on instrument configuration, multi-gas mixes may be used to bump test all sensors simultaneously, or individual gases may be applied. It is generally recommended to bump non-reactive gases first, then reactive ones. For the correct sequence of gas application, further consideration should be given to cross sensitivities detailed in *Section 6 Special Considerations*.

This section describes a manual bump using the instrument menu. Please refer to Section 7 to use one of the software tools.

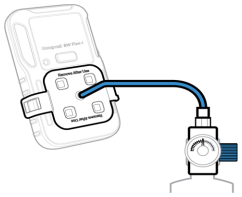
Before starting, ensure you have the materials to complete a successful bump.

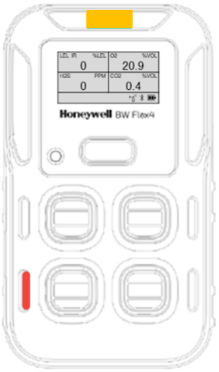
You will need:

- Test gas(es) – available from Honeywell authorized distributors
- Reminder: Test gas concentrations should match the instrument settings
- Fixed flow regulator – general purpose or stainless steel, 0.3l/m to 1l/m
- Tubing – Polyurethane (non-reactive) or PTFE/Teflon lined (reactive)
- Flow adaptor (CP-TC-1 supplied with instrument)

The procedure with the instrument already turned on:

1. Double press the button to enter MENU mode
2. Single press button to highlight BUMP
3. Press and hold the button to start the bump test
4. Sensor LEDs flash blue in sequence
5. Expected gas to be applied is shown on the display
6. Then shows “Apply Gas” with a 60s countdown
7. Fit the flow adaptor and turn the regulator on
8. Gas being applied is automatically detected
9. Test complete shows maximum gas reading
10. Bump SUCCESS then
    - Returns to normal mode
11. Bump FAIL (enforcement OFF), then
    - Warning icon is shown on the display
    - Associated sensor LED is RED
12. Bump FAIL (enforcement ON)
    - Reads “Bump Now” with 300s countdown
    - User must repeat the test successfully, or the instrument shuts down
13. A successful bump is REQUIRED to return to normal use





4.4 Manual Zero

WARNING

Before re-zeroing an instrument, the user MUST ensure they are in fresh air clear of target or interfering gas. Zeroing in the presence of such gases will reduce the device's accuracy. Users should never attempt to zero an instrument in potentially hazardous environments.

This section describes a manual zero using the instrument menu. Please refer to section 7 to use one of the software tools.

Over time, baselines may drift slightly. This may be seen as “-0” or a slight positive deviation; this is normal. Excessive drift is alarmed and logged. If a user is known to be in “fresh air”, free from target and interfering gases, they may re-zero the instrument in the field as follows:

- Double press the button to enter MENU mode
- Single press button to highlight ZERO
- Press and hold the button to initiate the zeroing
- Display reads “Zeroing”, and sensor LEDs flash blue sequentially
- SUCCESS shows “Zero Pass”, and all sensor LEDs light green
- FAILURE shows “Zero Fail”, and the relevant sensor LEDs light red
- A successful zero is REQUIRED to return to regular use

All sensors, except HC/CO_2 NDIR types, can be configured to automatically zero when the device is turned on. NDIR sensors must be allowed to reach equilibrium with their working environment after switching on. Zeroing within the first 5 minutes from switching on does not affect NDIR sensors.

By default, auto-zero on start-up for all sensors is disabled. Please refer to section 7 to use one of the software tools to enable it.

4.5 Manual Calibration

WARNING
Before calibration the user MUST ensure they are in fresh air, clear of target/interfering gas, or be prepared to use an appropriate zero gas cylinder. Zeroing in the presence of such gases will reduce the device's accuracy. Users should never attempt to zero an instrument in potentially hazardous environments.

This section describes a manual calibration using the instrument menu. Please refer to section 7 to use one of the software tools.

Calibration involves the zeroing of a detector, followed by span calibration with a known concentration of gas.

The procedure with the instrument already turned on:

1. Double press the button to enter MENU mode
2. Single press button to highlight CALIBRATION
3. Press and hold the button to start
4. Zero Calibration
    - Display reads “Zeroing”, sensor LEDS flash blue sequentially
    - SUCCESS shows “Zero Pass”, and all sensor LEDs light green
    - FAILURE shows “Zero Fail”, and the relevant sensor LED(s) light red
    - A successful zero is REQUIRED to continue to SPAN calibration
5. Span Calibration
    - Expected gas to be applied is shown on the display
    - To “skip” span calibration at this point, press and hold the button
    - Then shows “Apply Gas” with a 60s countdown
    - Fit the flow adaptor and turn the regulator on
    - Gas being applied is automatically detected
    - Display reads “Span Calibrating”, sensor LEDS flash blue sequentially
    - Maximum gas reading before adjustment is displayed
    - A user may press the button once to accept the span calibration, or the unit will determine its stability and automatically move forward
    - User is prompted to turn the gas off (remove the flow adaptor)
6. If SUCCESSFUL,
    - The display reads “Span Pass”. All sensor LEDs are green
    - Then next calibration due for each sensor is sequentially shown

- The device pauses while PURGING with flashing amber LEDs next to the sensors, and then returns to normal mode

7. If UNSUCCESSFUL,
   - The sensors that failed are indicated with an “X”
   - Display then reads “Span Fail”, failed sensor LEDs flash red
   - Detector then returns to normal mode
   - Cal Due/Fail warning icon shown on the display
   - LED of failed sensors remains flashing red
8. A successful calibration is REQUIRED to return to regular use

If policy enforcement is enabled for calibration, the display may read “Calibrate Now” with a 300s countdown. If the calibration procedure is not started within the countdown, the instrument shuts down.

4.6 Updating Firmware

Firmware updates can be done using the software tools detailed in section 7.

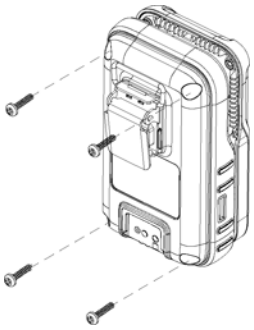
IntelliDoX (sold separately) can be configured to update the firmware of BW Flex 4 Series devices automatically. IntelliDoX may not be suitable for all gases available in BW Flex 4. Please refer to the IntelliDoX manual and contact Honeywell or an authorized distributor for further information.

4.7 Replacement of Parts

WARNING
Use, maintenance, and service of portable multi-gas monitors must only be carried out by trained individuals. Users should always read the manual thoroughly and understand the detector before use.

CAUTION
Open the detector with care. Do not lever the case open by inserting a screwdriver down the side of the yellow/black rubber; you will irrevocably damage the seal, and the case will need to be replaced.

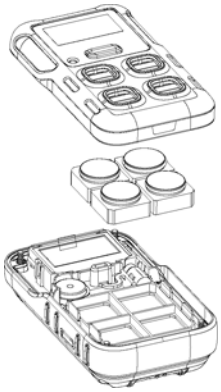
4.7.1 Opening the Detector



- Loosen the four screws from the back of the detector
- Once a screw is turned far enough, a “click” can be felt/heard as the screw turns in its socket
- Start at the bottom, finish at the top
- Ensure all other screws are disengaged
- Push the head of the final screw down firmly, using it to open the case (some practice is required)
- Be careful that the screwdriver does not slip and cause injury
- Gently pry the case apart with your fingers

4.7.2 Replacement of Sensors

Access to sensors and filters is possible with front/back covers separated.



- 1 Series sensors are used in BW Flex 4
- An O-ring holds the sensor in the front cover “turret”.
- Gently pull the sensors out from the “turret”.
- Replacement sensors may come with a metal shorting pin across contacts – this must be removed
- If not removed and the instrument is closed, damage may occur to the spring-loaded contacts on PCBA
- New sensors should be placed into the white sensor cradle and not forced into the “turret”.

Changing the sensor type with firmware v1.064 or earlier is impossible. Slots are numbered 1 to 4. Only replace sensors that are “like for like”, i.e., O2 for O2, CO for CO, etc.

With firmware v1.080, similar sensors may be exchanged. The sensor “types” that may be exchanged must be the same “type”, i.e., inflow/inflow, outflow/outflow, bias/bias, digital/digital (see next section). Fitting the wrong type of sensor will result in faults and failed calibrations. The new sensor settings must be correctly loaded using Safety Suite, and the instrument must then be calibrated.

4.7.3 Hardware Restrictions of PCB Assemblies

The PCB assemblies, or hardware, are sensor combination specific. Slot 1 is reserved for digital flammable sensors, slot 2 for Pb-free oxygen with biasing, and slots 3 and 4 are supplied in various combinations depending on whether the sensor is digital, biased, positive (inflow), or negative (outflow). The HARDWARE sub-menu details the PCBA, sensor slot types, and sensors fitted to the instrument. Compatibility limitations are detailed as follows:

Spare PCBA PN	PCBA No.	Slot No.	Gas Type
CP-MPCB4	1	3 (inflow)	CO, H_2S, SO_2, HCN, CO-H
		4 (inflow)	CO, H_2S, SO_2, HCN, CO-H
CP-MPCB5	2	3 (inflow)	CO, H_2S, SO_2, HCN, CO-H
		4 (outflow)	Cl_2, NO_2
CP-MPCB6	3	3 (inflow)	CO, H_2S, SO_2, HCN, CO-H
		4 (bias)	NO
CP-MPCB7	5	3 (outflow)	Cl_2, NO_2
		4 (bias)	NO
CP-MPCB8	7	3 (digital)	COSH, CO_2
		4 (inflow)	CO, H_2S, SO_2, HCN, CO-H

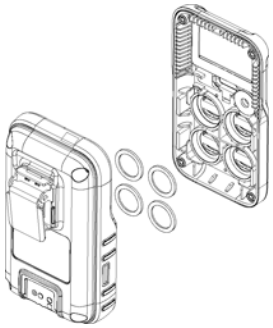
Spare PCBA PN	PCBA No.	Slot No.	Gas Type
CP-MPCB9	8	3 (digital)	COSH, CO_2
		4 (outflow)	Cl_2, NO_2
CP-MPCB10	9	3 (digital)	COSH, CO_2
		4 (bias)	NO
CP-MPCB11	10	3 (digital)	COSH, CO_2
		4 (digital)	CO_2

Contact Honeywell, or an authorized distributor, for service and spares advice.

4.7.4 Replacement of Filters

CAUTION

Ensure the white plastic backing, protecting the adhesive gasket and membrane, is removed from replacement filters. Failure to do so will prevent gas detection. Honeywell recommends bump testing to prevent such user error from presenting a dangerous situation in the field.



- Remove the sensors to access the filters
- Filters are essential to maintain ingress protection (IP66/68) from water, dust, and dirt
- Filters are gas-permeable, water-repellent membranes with adhesive-backed gaskets
- They should be replaced as required depending on the application/environment detectors are used in
- Ensure the white plastic backing, protecting the adhesive, is removed when fitted

Replacement filters are available in packs of 4 for one detector (part number CP-SS) or packs of 20 (CP-SS-K1).

Do not substitute filters from other manufacturers. This will invalidate the warranty and may allow more significant damage through ingress of water/dirt.

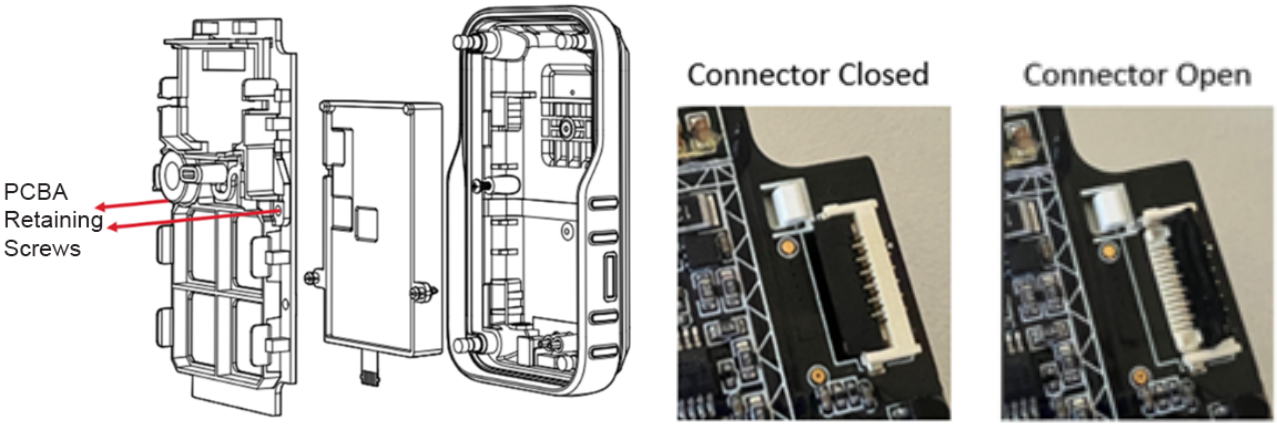
4.7.5 Replacement of Batteries

WARNING

Li-ion batteries should not be disassembled, exposed to heat above 100°C, or incinerated. Spent batteries must be disposed of in compliance with local laws. Use a qualified recycler or hazardous materials handler. Only use Honeywell-supplied Li-ion battery packs specific to your device. Use of any other battery risks fire and explosion. Charge the device in a safe area within the temperature range of 0-45°C. Do not charge devices in direct sunlight.

Do not insert a screwdriver or similar object between the PCBA and plastic housing to lever the PCBA/battery from the detector. The implement may damage the Li-Ion battery pouch, risking personal injury, fire, or explosion. Should battery packs become ruptured, immediately place them into a fireproof container, remove them to a well-ventilated space, and dispose of them following safe handling practices per local guidelines in the country of use.

Do not use metal implements/tools that could short-circuit the battery terminals or damage the insulation when inserting/removing the battery flex connector. Doing so may cause irrevocable damage to the detector.



The replacement battery pack is mounted to the rear of the PCB assembly (PCBA)

1. Remove the two self-tapping screws as indicated in red
2. The PCBA and battery pack can now be removed from the back housing
3. The battery pack is connected to the PCBA via ribbon cable/connector
4. The connector cover must be carefully opened to free the ribbon cable
5. The battery pack “clips” to the PCBA and can now be carefully removed

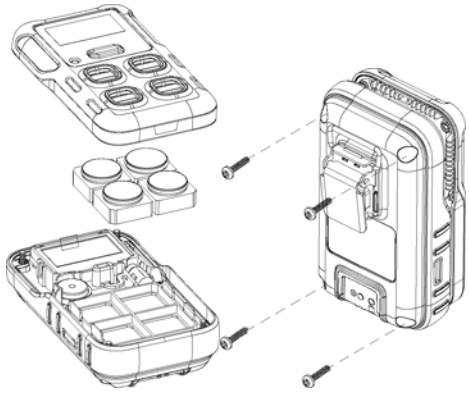
Fit the replacement battery pack, following steps in reverse

1. Ensure the ribbon cable is aligned and close the connector on the PCBA
2. Alignment/closure of the connector and ribbon cable is essential so that the detector works correctly

3. Refit the PCBA/battery pack into the back cover
4. Replace the two self-tapping screws taking care not to strip threads

4.7.6 Re-assembly of the Gas Detector

1. With the PCBA fitted to the back cover of the detector
2. Place sensors in the sensor cradle as shown
3. Fit the front cover to the back cover and sensor
4. Gently but firmly close the front/back covers
5. Fit the four screws holding the covers together
6. Ensure the screws and covers are secure



4.8 Troubleshooting Guide

ISSUE	POSSIBLE CAUSE	CORRECTIVE ACTION
Unit in alarm “out of the box” in a safe environment	Check if the calibration interval is exceeded for any sensor	Re-calibrate
	The battery only partially charged after being found entirely flat	Re-charge at least 6 hours, allow sensors to stabilize, reset time/date, re-calibrate
The instrument turns on, then immediately off.	Battery critically low	Re-charge now
The instrument does not turn on when the button is pressed	Battery fully depleted	Re-charge at least 6 hours, allow sensors to stabilize, reset time/date
	Too long in storage without charging	Re-charge at least 6 hours, allow sensors to stabilize, and reset time/date.
The battery charging icon is displayed, and the unit will not switch on	The instrument is designed not to switch on when being charged	Remove from the charger and turn on
IntelliFlash amber, sensor LED red, warning icon bump/cal. failed	Cal/bump failed; no policy enforcement was enabled	Re-bump successfully or re-calibrate. Enable policy enforcement as required.
	Gas is not applied when required.	Re-bump successfully or re-calibrate
“Bump Now”	Bump due with no policy enforcement	Complete a bump test/calibration
“Bump Now” 300s countdown & turns off	Bump due to policy enforcement	Complete a bump test/calibration
Bump Test Fails	Filters blocked	Replace filters
	Test gas out of date/empty.	Use quality gas on a date.
	Baseline drifted	Re-zero before bump
	The threshold is set too high.	Verify/change settings.
	Lost sensitivity	Re-calibrate the instrument
Error 1, display "---"	NDIR temperature out of range	Ensure operation within sensor/instrument temperature limits.

ISSUE	POSSIBLE CAUSE	CORRECTIVE ACTION
Error 2, 3, or 4, display "---"	"NDIR optical signal error. Possible condensation."	Allow instrument to stabilise with environmental conditions for up to 20 minutes. Switch off, place instrument in warm/dry environment 24 hours, switch on. Re-zero/calibrate. Replace the sensor.
Error 104, display "---"	Sensor sensitivity too low (end of life)	Bump/re-calibrate. If issue persists replace sensor.
Error 106, display "---"	Catalytic bead failure (open/short circuit)	Replace sensor
Error 108, display "---"	NDIR optical failure (source/detector)	Replace sensor
Error 111, display "---"	Sensor error (incorrect setting)	Replace sensor
Error 112	Temperature out of range	Ensure operation within sensor/instrument limits.
Error 1006	Failed temperature sensor	Replace PCBA
Error 1007	Data flash memory fail	Replace PCBA
Error 1008	BLE fail	Replace PCBA
Error 3001	RTC fail	Replace PCBA
Error 4004	Incorrect sensor fitted	Replace/reposition sensor
Error 4006	The wrong type of sensor was fitted for the slot	Check the sensor type fitted
	Reflex test failed	Replace sensor
	No digital sensor communication	Replace sensor
	Damaged electrical connection	Replace PCBA
End-of-life indication	The digital sensor at end-of-life	Replace sensor
	A digital sensor within operating life	Upgrade firmware to the latest version.
The display shows “-OL” continuously.	The instrument was zeroed in target/interfering gas, then drifted negative when moved to fresh air.	Re-zero in fresh air. If it persists, re-zero via software using 100% N2
The display shows “-OL” or “+OL” intermittently.	Possible partial short/open circuit depending on sensor type	Check moisture ingress, leaking sensor, and corrosion. Replace PCBA/sensor.
“Cal Now”	Cal due with no policy enforcement	Complete calibration
“Cal Now” 300s countdown & turns off	Cal due with policy enforcement	Complete calibration.

ISSUE	POSSIBLE CAUSE	CORRECTIVE ACTION
Calibration Fails	Filters blocked	Replace filters
	Test gas out of date/empty.	Use quality gas on a date.
	Sensors not stabilized/freshly replaced/bias not maintained.	Allow sensors to stabilize and then re-calibrate
	Lost more than 30% sensitivity	Replace sensor
	Incorrect sensor type fitted to slot	Check and replace the correct sensor type
NDIR sensor behaving erratic/intermittently, false alarm, +OL, -OL	Moisture condensing atmosphere, partial obscuration of optical paths	Allow the instrument to thermally equalize with the environment before use
	Re-zeroing has no effect.	Zeroing can't be performed on NDIR sensors in the first 5 minutes after switching on. Wait, re-try
	Calibration has no effect.	Calibration can't be performed on NDIR sensors in the first 5 minutes after switching on. Wait, re-try
	After waiting, time to dry out, still does not zero or calibrate	Replace sensor
Electrochemical sensor alarms unexpectedly	Possible target gas present	Evacuate, stay safe, proceed with caution
	A sudden step change in temperature or humidity	Sensors are affected by sudden changes. Effects tend to be short.
	Sensor calibrated before stabilized.	Re-calibrate
	Pre-conditioning of the gas path during calibration was not done. Results in over sensitivity (exotic gases primarily)	Ensure the gas path is pre-conditioned and re-calibrate again.
	Possible cross interference from other gases (additive effect)	Check application and possible interfering gases
Sensor fails to respond correctly to a known concentration of gas	Alarm settings incorrect or disabled	Check and reset settings
	Wrong type of sensor fitted to instrument slot	Check sensors, ensure settings are correct, re-calibrate
	Sensor poisoned or inhibited depending on sensor type	Check application and sensor type suitability
	Presence of interfering gas suppressing target gas readings	Check application and sensor type suitability

CHAPTER

5 SUMMARY SPECIFICATIONS

5.1 Instrument Specifications

Description	The multi-gas portable gas monitor detects explosive, oxygen, and toxic gas hazards. Suitable for use in potentially explosive atmospheres, indoors and outdoors. Fitted with up to 4 x 1 Series sensors selected from 14 different types for a wide range of safety applications
Size (ex. clip)	108.2mm × 61.5mm × 33.5mm 4.29in × 2.44in × 1.32in
Weight	170g (6.0oz) to 189g (6.7oz) depending on options
Temperature	Certified: -40°C to 60°C (-40°F to 140°F) Operating: Sensor dependent
Ingress Protection	Waterproof, independently tested IP66 & IP68 0-99%rH (non-condensing)
Alarm Type	Visual, vibrating, audible (95 dB), Low, High, TWA, STEL, Negative Drift, Over Limit, Battery.
Diagnostics	On start-up and Reflex sensor test.
Battery Run Time	NDIR LEL: Up to 2 months (40 working days) Catalytic LEL: Up to 15 hours Assumes 2 minutes alarm per day/8 hour working day Varies with use, age, and configuration of the instrument
Connectivity and Software	Bluetooth® Low Energy (BLE), Safety Communicator, Device Configurator, and Safety Suite Configurator. Windows PC, iOS, and Android compatible.
Certification and Approvals	FCC, EMC, RED, ROHS. Globally intrinsic safety approvals; suitable for use Zone 0, 1, 2, Class 1, Div1 & 2, explosive atmospheres. Approved for indoor, outdoor, onshore, offshore, and marine use. CSA/UL, IECEX, ATEX, MED, NKK, KRS, SABS. Performance approved CSA22.2 60079-29-1, IECEX/ATEX 60079-29-1, EN45544, EN 50104. Contact Honeywell for the latest updates.

5.2 Sensors Specifications

GAS TYPE	LEL-IR	NDIR-CO2	LEL-CB-F	LEL-CB-UF	O2
Identifier	**W5**	**B1**	**W6**	**W7**	**X1**
Spare Sensor	SR-W5-1S	SR-B1-1S	SR-W6-1S	SR-W7-1S	SR-X1-1S
Type	NDIR C1-C6 Hydrocarbons	NDIR CO2	Cat. Bead Filtered	Cat. Bead Unfiltered	Pb free Electrochemical
Interface	DIGITAL	DIGITAL	DIGITAL	DIGITAL	BIAS O2 PUMP
Operating Temperature	-20°C/+60°C -4°F/+140°F	-20°C/+60°C -4°F/+140°F	-20°C/+60°C -4°F/+140°F	-20°C/+60°C -4°F/+140°F	-40°C/+60°C -40°F/+140°F
Operating Humidity	0-99% rH (non condensing)	0-99% rH (non condensing)	0-95% rH (non condensing)	0-95% rH (non condensing)	5-95% rH (non condensing)
Recommended Operating Range	100%LEL	5%VOL (50,000ppm)	100%LEL	100%LEL	25%VOL
Maximum Over Range	100%LEL	5%VOL (50,000ppm)	100%LEL	100%LEL	30%VOL
Resolution	1%LEL	0.01%VOL (100ppm)	1%LEL	1%LEL	0.1%VOL
Default Units of Measure	%LEL	%VOL	%LEL	%LEL	%VOL
Configurable Alarm Range	0 (disable) to 100%LEL	0 (disable) to 5%VOL	0 (disable) to 100%LEL	0 (disable) to 100%LEL	0 (disable) to 30%VOL
Default Low Alarm	10%LEL	0.5%VOL (5000ppm)	10%LEL	10%LEL	19.5%VOL
Default High Alarm	20%LEL	3.0%VOL (30,000ppm)	20%LEL	20%LEL	23.5%VOL
Default STEL	n/a	3.0%VOL (30,000ppm)	n/a	n/a	n/a
Default TWA	n/a	0.5%VOL (5,000ppm)	n/a	n/a	n/a
Default Span Gas	50%LEL CH4 (2.2/2.5%VOL)	0.5%VOL (5,000ppm)	50%LEL CH4 (2.2/2.5%VOL)	50%LEL CH4 (2.2/2.5%VOL)	18%VOL
Maximum Calibration Interval	180 days	180 days	180 days	180 days	180 days
Expected Operating Life	3 to 5+ years	3 to 5+ years	3 to 5+ years	3 to 5+ years	3 to 5+ years

GAS TYPE	LEL-IR	NDIR-CO2	LEL-CB-F	LEL-CB-UF	O2
Calibration/ Span Gas Flow Rate	300-500cc/min	300-500cc/min	300-500cc/min	300-500cc/min	300-500cc/min
Reccomended Fittings, Tubing	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP
Regulator Type	General Purpose	General Purpose	General Purpose	General Purpose	General Purpose
Suitable Regulator	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50
Stabilization Time (new sensor)	n/a	30 min	30 min	30 min	60 min
Switch On Time (bias maintained)	<90s Wait 5 min to cal.	<90s Wait 5 min to cal.	<90s	<90s	<90s
Auto-zero on Start-up	No	No	Optional	Optional	Optional

GAS TYPE	H2S	COSH DUAL TOXIC		CO	CO-H
		H2S	CO		
Identifier	**H1**	HM		**M1**	M3
Spare Sensor	SR-H1-1S	SR-HM-1S		SR-M1-1S	SR-M3-1S
Type	Electrochemical	Electrochemical		Electrochemical	Electrochemical
Interface	INFLOW	DIGITAL		INFLOW	INFLOW
Operating Temperature	-40°C/+60°C -40°F/+140°F	-20°C/+50°C -4°F/+122°F		-40°C/+60°C -40°F/+140°F	-20°C/+50°C -4°F/+122°F
Operating Humidity	0-95% rH (non condensing)	15-90% rH (non condensing)		0-95% rH (non condensing)	15-90% rH (non condensing)
Recommen-ded Operating Range	200ppm	100ppm	1000ppm	1000ppm	1000ppm
Maximum Over Range	500ppm	400ppm	2000ppm	2000ppm	2000ppm
Resolution	0.1ppm	0.1ppm	1ppm	1ppm	0.1ppm
Default Units of Measure	ppm	ppm	ppm	ppm	ppm
Configurable Alarm Range	0 (disable) to 500ppm	0 (disable) to 400ppm	0 (disable) to 2000ppm	0 (disable) to 2000ppm	0 (disable) to 2000ppm
Default Low Alarm	10ppm	10ppm	35ppm	35ppm	35ppm
Default High Alarm	15ppm	15ppm	200ppm	200ppm	200ppm
Default STEL	15ppm	15ppm	50ppm	50ppm	50ppm
Default TWA	10ppm	10ppm	35ppm	35ppm	35ppm
Default Span Gas	25ppm	25ppm	100ppm	100ppm	100ppm
Maximum Calibration Interval	180 days	180 days	180 days	180 days	180 days
Calibration/ Span Gas Flow Rate	300-500cc/min	300-500cc/min	300-500cc/min	300-500cc/min	300-500cc/min
Expected Operating Life	3 to 5+ years	2+ years	2+ years	3 to 5+ years	2+ years
Recommended Fittings, Tubbing	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP
Regulator Type	General Purpose	General Purpose	General Purpose	General Purpose	General Purpose
Suitable Regulator	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50	Reg-0.30 Reg-0.50
Stabilization Time (new sensor)	30 min	30 min	30 min	30 min	30 min

GAS TYPE	H2S	COSH DUAL TOXIC		CO	CO-H
		H2S	CO		
Switch On Time (bias maintained)	<90s	<90s	<90s	<90s	<90s
Auto-zero on Start-up	Optional	Optional	Optional	Optional	Optional

GAS TYPE	SO2	NO	NO2	HCN	Cl2
Identifier	**S3**	**N3**	**D3**	**Z3**	**C3**
Spare Sensor	SR-S3-1S	SR-N3-1S	SR-D3-1S	SR-Z3-1S	SR-C3-1S
Type	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical
Interface	INFLOW	BIAS	OUTFLOW	INFLOW	OUTFLOW
Operating Temperature	-20°C/+50°C -4°F/+122°F	-20°C/+50°C -4°F/+122°F	-20°C/+50°C -4°F/+122°F	-10°C/+50°C 14°F/+122°F	-20°C/+50°C -4°F/+122°F
Operating Humidity	15-95% rH (non condensing)	15-90% rH (non condensing)	15-90% rH (non condensing)	15-90% rH (non condensing)	15-90% rH (non condensing)
Recommen-ded Operating Range	20ppm	100ppm	20ppm	50ppm	20ppm
Maximum Over Range	150ppm	400ppm	60ppm	250ppm	60ppm
Resolution	0.1ppm	0.1ppm	0.1ppm	<0.3ppm	0.1ppm
Default Units of Measure	ppm	ppm	ppm	ppm	ppm
Configurable Alarm Range	0 (disable) to 150ppm	0 (disable) to 400ppm	0 (disable) to 60ppm	0 (disable) to 250ppm	0 (disable) to 60ppm
Default Low Alarm	2ppm	25ppm	2ppm	4.7ppm	0.5ppm
Default High Alarm	5ppm	25ppm	5ppm	10ppm	1ppm
Default STEL	1ppm	25ppm	5ppm	10ppm	1ppm
Default TWA	0.5ppm	245ppm	2ppm	4.7ppm	0.5ppm
Default Span Gas	20ppm	50ppm	10ppm	15ppm	10ppm
Maximum Calibration Interval	180 days	180 days	180 days	180 days	180 days
Expected Operating Life	3 to 5+ years	2+ years	2+ years	1 to 2 years	1 to 2 years
Calibration/ Span Gas Flow Rate	300-500cc/min	500-1000cc/min	500-1000cc/min	500-1000cc/min	500-1000cc/min
Reccomended Fittings, Tubing	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, PU/FEP	PVDF, FEP
Regulator Type	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel

GAS TYPE	SO2	NO	NO2	HCN	Cl2
Suitable Regulator	Reg-0.30 Reg-0.50	Reg-0.5SS316 Reg-1.0316SS	Reg-0.5SS316 Reg-1.0316SS	Reg-0.5SS316 Reg-1.0316SS	Reg-0.5SS316 Reg-1.0316SS
Stabilization Time (new sensor)	30 min	24 hours	120 min	120 min	120 min
Switch On Time (bias maintained)	<90s	<90s	<90s	<90s	<90s
Auto-zero on Start-up	Optional	Optional	Optional	Optional	Optional

CHAPTER

6 SPECIAL CONSIDERATIONS

Different gas hazards are monitored using different sensing technologies. Hazards fall into the following groups:

1. Risk of explosion or fire from flammable gases that burn or explode
2. Exposure of workers to toxic gases or vapors that can poison or suffocate
3. Asphyxiation due to oxygen depletion by displacement or consumption
4. Oxygen enrichment, which increases the risk of spontaneous combustion

Full training regards application awareness, product, and technology selection is available from Honeywell and its authorized distributors. Regular courses are run worldwide, and all materials are available online.

The following sections do not replace such training. The intent is to identify critical points users should consider in selecting and configuring their BW Flex multi-gas monitor for personal safety and use.

For further advice, contact Honeywell.

6.1 Flammable Sensor Type

The BW Flex 4 uses two different sensing technologies to detect flammable gases.

1. Catalytic bead flammable gas sensor
2. Non-dispersive infrared (NDIR) hydrocarbon gas sensor

Each sensor type has pros and cons which need careful evaluation to determine the most appropriate sensor for the application.

This evaluation requires engineers knowledgeable in the processes and risks of a particular operation, experienced product specialists conversant with equipment being considered, and safety officers responsible for ensuring safe worker practices complying with industry best practices and laws.

To identify which type of flammable sensor is fitted, refer to the certification label on the back of the detector. Under the model, “BW Flex” is a 17-digit part code, e.g., CPD-W6X1H1M1-Y-00. The 5th and 6th characters, in this case “W6”, correspond to the type of flammable sensor fitted to the device.

ID	DISPLAY	SENSOR TYPE	FURTHER INFO
W5	LEL IR	NDIR Hydrocarbon C1-C6, LEL	N/A
W6	LEL	Catalytic Bead Filtered, LEL	iLEL75C
W7	LEL	Catalytic Bead Unfiltered, LEL	iLEL75

Alternatively, enter the MENU mode (double press the button), select INFO, step through the sub-menu, and the flammable sensor type and its correction factor/correction curve chosen will be displayed.

Sensor types and their configuration can also be viewed using associated software tools.

6.1.1 Catalytic Bead vs NDIR in Summary

Both technologies measure common flammable gases in the range 0-100%LEL of those gases. The LEL (Lower Explosive Limit varies from one gas to another). Key differences are highlighted below.

DIFFERENTIATOR	NDIR	CATALYTIC BEAD	
Identifier/Type	1-Series (W5)	1 Series (W6) filtered	1 Series (W7) unfiltered
Typical gases detected	C1-C6	H2, C1-C6 & flammable	H2, C1-C9 & flammable
Hydrocarbon detection	Light to medium	Light to medium	Light to heavy
Detects H2	No	Yes	
Works in inert atmospheres (very low O2 levels)	Yes	No	
Use for hot work (presence of Acetylene)	No	Yes	
Works with increased levels of CO2	Yes	Subject to O2 depletion ~10%VOL O2 (NOT inert levels)	
Gas mixtures	Yes heavier = higher response	Yes lighter = higher response	
Output to different gases	Non linear correction	Linear correction	
Environmental robustness	Weak (not heated = condensation)	Strong (heated all time)	
Poison resistance	Excellent	Good	Fair
Detectable failure?	Yes	No	
Power	Very Low	Very high	
Portable battery run time	Months	Days	
Operating life	5-10 Years	3-5 Years	2-3 Years
Output	Digital		
Interchangeable	Yes		

6.1.2 Interfering Gas, Poisons, and Inhibitors

Catalytic bead sensors operate as matched pairs (active/inactive) and run hot at around 400°C (752°F). As combustible gases reach the catalytic surface, they are oxidized (burned), and the temperature of one the pair increases, as does resistance. The resulting differential change is directly proportional to flammable gas concentration.

Some chemicals inhibit or poison the catalyst function of these sensors.

- Inhibitors temporarily reduce sensitivity to flammable gas but recover
  - E.g., Halogenated hydrocarbons or chlorinated compounds
- Poisons permanently reduce sensitivity to flammable gas
  - E.g., Silicones used in adhesives, barrier creams, or lubricants

NDIR-based hydrocarbon detectors are broadly immune to such inhibitors and poisons. However, the optical technique of measuring the absorption of infrared light is not without its challenges.

NDIR measures the absorption of infrared light by the H-C bond. The more bonds, the heavier the HC, the more signal is absorbed. Two wavelengths of light are used; the H-C actively absorbs one, and the other does not, which acts as a reference. Once again, a differential measurement system is created.

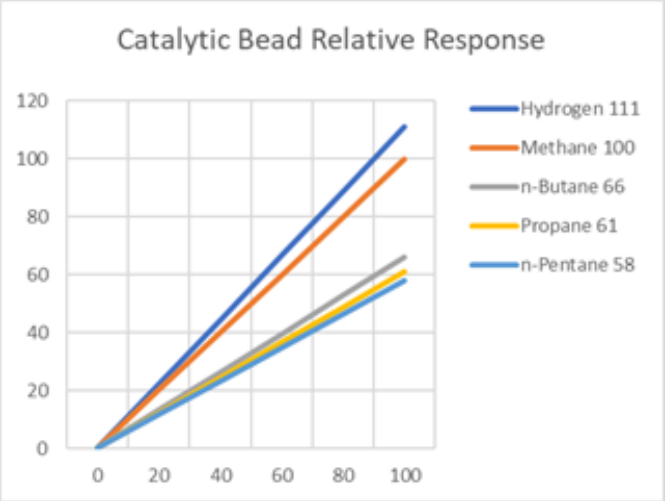
Interference, as opposed to inhibitors and poisons, is the concern. Valid gas measurements may be suppressed or result in negative readings if a gas that absorbs light at the reference wavelength is present at the same time as the target H-C gases.

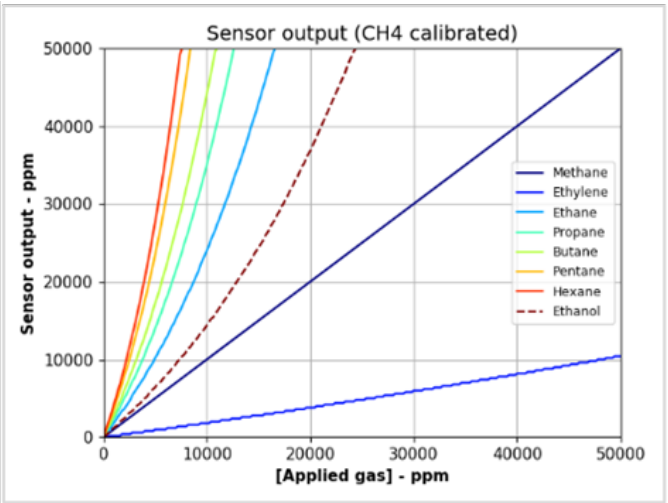
NDIR is lower power and, by its very nature, unheated. As the sensor works at ambient temperature, if left in a cool location and then used immediately in a warmer, more humid one, there is a risk of “condensation on the optics”. This can affect both active and reference wavelengths, making the sensors unreliable until they have reached equilibrium in temperature with their surroundings.

The trade-off between the technologies relates to gas sensing capability in varying environmental conditions vs long operating life and lower power.

6.1.3 Relative Response of Flammable Sensors

Another important consideration is the technologies' relative response to gas mixtures. Often, blends of gas need to be measured. For example, for many years, town gas has been a combination of natural gas (methane) and slightly heavier hydrocarbons, including propane and butane. The plots below are to illustrate the difference between the sensor's behaviors. Do not scale from these pictures.





- Catalytic bead (on the left) is generally linear and in two groups, i.e., hydrogen/methane vs. propane/butane/pentane
  - Hydrogen/methane gives a higher output vs propane/butane/pentane
- NDIR on the right is non-linear in its response. NDIR does not detect H2, and the grouping of propane/butane/pentane is similar
  - Propane/butane/pentane give a higher output vs methane

In the case of a "mixed gas" with a catalytic bead, units would be calibrated with pentane because the other gases would give a "bigger" reading if present, i.e., calibrate with the least sensitive gas.

The reverse is true for NDIR. The least sensitive gas is methane, with all others responding much more strongly. Calibration with methane would be proposed on a similar basis that the other gases would react more.

Users moving between NDIR and catalytic bead technologies should know the potential need to change calibration practices.

Catalytic Bead Sensor Information

Catalytic bead flammable sensors are available in filtered (W6) and unfiltered. (W7) versions.

The filtered LEL (iLEL75C) sensor provides enhanced resistance to sensor poisons such as high mobility silicone vapors or high hydrogen sulfide gas concentrations. This sensor is generally suitable for H2, C1-C6 hydrocarbons and acetylene.

The unfiltered LEL sensor (iLEL75) detects heavier and more complex molecules. This sensor is more sensitive to such gases but may need to be replaced more often.

The following table is intended for guidance only.

Explosive Gas/Vapor	Catalytic Bead	
	Non Filtered W7	Filtered W6
Hydrogen (H2)	X	X
Methane (CH4)	X	X
Ethane (C2H6)	X	X
Propane (C3H8)	X	X
n-Butane (C4H10)	X	X
n-Pentane (C5H12)	X	X
n-Hexane (C6H14)	X	X
n-Heptane (C7H16)	X	
n-Octane (C8H18)	X	
n-Nonane (C9H20)	X	
Methanol (CH3OH)	X	
Ethanol (C2H6O)	X	
Iso-propyl alcohol (C3H8O)	X	
Acetylene (C2H2)	X	X
1, 3 Butadiene (C4H6)	X	X
Carbon monoxide (CO)	X	X
Acetone (C3H6O)	X	
Methyl ethyl ketone (C4H8O)	X	
Toluene (C7H8)	X	
Ethyl acetate (C4H8O2)	X	
Ammonia (NH3)	X	X
Cyclohexane (C6H12)	X	X
Gasoline	X	
Ethylene (C2H4)	X	X
Benzene (C6H6)	X	

WARNING

- Catalytic bead sensors are typically not recommended to detect combustible gases with flash points greater than 37.8°C/100°F.
- Consider that some flammable gases are highly toxic or carcinogenic at very low levels vs relatively higher levels required to support combustion.
- Always consider the requirements of a given application regarding gas flammability, toxicity, and their effect on oxygen or by oxygen.
- Increased oxygen raises the risk of combustion. Gas may displace oxygen, and fire will consume oxygen, thereby increasing the risk of suffocation.

Common Catalytic Bead Correction Factors

This table applies to filtered (W6) and unfiltered (W7) catalytic bead sensors. Due to varying practices in defining flammable limits, the correction factor (CF) varies subject to local adoption of standards. Default Correction Factors, or adding custom ones, are possible via software tools.

GAS	NORTH AMERICA (EN50054)			EUROPE (EN 60079-29-1)		
	100%LEL in %VOL	Relative Sensitivity	CF Value vs Methane	100%LEL in %VOL	Relative Sensitivity	CF Value vs Methane
n-Butane	1.5	66	1.52	1.4	70	1.43
Hydrogen	5.0	111	0.90	4.0	126	0.79
Methane	5.0	100	1.00	4.4	100	1.00
n-Pentane	1.4	58	1.72	1.4	66	1.52
Propane	2.0	61	1.64	1.7	56	1.79

Assuming the instrument is calibrated 0-100%LEL Methane, then under EN50054, generally used in North America, the calculated response to 50%LEL Propane applied is:

$$reading = \frac{61}{100} * 50\% = 30.5\% LEL$$

In this way, instrument cross-calibration may be performed by imputing adjusted values of surrogate gases.

For maximum accuracy, Honeywell recommends using target gas to be detected to calibrate wherever possible.

HC LEL NDIR Relative Response

SENSOR CALIBRATED 0-100%LEL CH4		
GAS	**%LEL Applied**	**Estimated Response**
Propane	4.2%	15% to 35% LEL
Butane	3.6%	15% to 35% LEL
Pentane	3.0%	18% to 25% LEL
Hexane	2.2%	10% to 30% LEL
Methanol	13.4%	25% to 40% LEL
Ethanol	6.6%	10% to 30% LEL
Hydrogen	8.5%	No response
Acetylene	5.0%	Negative response (supressed)

- HC NDIR sensor is optimized to detect 0-100% LEL Methane (5%VOL)
- Due to the nonlinear nature of the output and variability from sensor to sensor, the relative output is shown
- The use of a curve correction and calibration with target gas improves accuracy. The hardware of the sensor limits the range

6.2 Toxic & Oxygen Gas Sensors

Toxic and Oxygen sensors are often referred to together as having “similar properties”. However, they work in quite different ways. For this manual, their behavior is similar and so grouped.

The exception is NDIR for 0-5%VOL CO_2, which has proven more successful than historical electrochemical sensors designed for the gas. CO_2 NDIR is “tuned” to wavelengths absorbed by the CO_2 gas, similar to the HC NDIR discussed earlier. It is also low power and has the same challenges with environmental robustness, which we would refer you to in the earlier section.

Oxygen and Toxic electrochemical sensors are generally degraded over time. Catalysts and electrolytes “fade”, and eventually, the sensors must be replaced. Operating life varies from as little as one year with continuous low-level gas presence to more than three years. O_2, CO, H_2S, and SO_2 are designed to last even longer.

Water management in electrochemical sensors is very important to consider. Sensors absorb and expel water, in their operation. Continued use at extremes of temperature or humidity causes baselines to shift through water absorption or drying out. This can be corrected through re-zeroing, but the adjustment may become too great over time. Sensors then behave erratically, causing false alarms or faults. At that point, the sensors should be replaced.

Persistent use at elevated temperature/humidity may result in the electrolyte leaking from the sensor as its internal pressure overcomes seals. This can be quite costly, as the acidic electrolyte may corrode contacts on the PCB, requiring the replacement of the whole PCBA.

People use instruments. Generally, they move indoors to outdoors, with varying temperatures and humidities. This helps the sensors reach an equilibrium with their working environment and assists in water management. That said, rapidly changing temperature or humidity may cause “glitching”, i.e. Sudden spikes as the user transitions from one environment to another. This usually dissipates quickly. If it persists, re-zero/calibrate the device. Contact Honeywell for further advice.

6.2.1 Sensor Types & Interfaces

There are four types of interfaces. This is driven by the specific sensor design.

- Digital: HC CH4 LEL NDIR, catalytic bead LEL, CO2 NDIR, COSH (CO+H2S) dual toxic.
- Analog, inflow (positive output): CO, CO-H, H_2S, SO_2, HCN
- Analog, outflow (negative output): NO_2, Cl_2
- Analog bias (require fixed reference voltage): O_2, NO

The PCB assemblies, or hardware, are sensor combination specific. Slot 1 is reserved for digital flammable sensors, slot 2 is for Pb-free oxygen with biasing, and slots 3 and 4 are supplied in various combinations depending on whether the sensor is digital, biased, inflow, or outflow. The ordering information in section 9 and the sensor specification summaries in section 5 provide further information. Contact Honeywell, or an authorized distributor, for service/spares advice.

6.2.2 Cross Sensitivities

WARNING

Some sensors exhibit cross-sensitivity to other gases. This may be additive or negative in its effect. Additive cross sensitivities will result in premature nuisance alarms. Negative cross sensitivities behave like inhibitors and prevent a sensor from reading or alarming accurately. The presence of interfering gases could also render calibration inaccurate or ineffective. For further advice, contact Honeywell or an authorized distributor.

KEY

BLANK	No data / not tested - do not assume there are no cross sensitivities
GRAY	For information. Some effect but within expected performance limits
YELLOW	Warning - additive effect, potential false positive alarms
RED	Combination not allowed due to negative interference / high additive effects

Cross Sensitivity By Sensor Type				Applied Gas						
Model	Part No.	Type	Gas	CO	H2S	SO2	HCN	NO	NO2	Cl2
1Series	SR-M1-1S	Inflow	CO		8%	0.1%	0.1%	28%	4%	0.1%
1Series	SR-H1-1S	Inflow	H2S	0.3%		10%	0.1%	6%	-20%	0.1%
1Series	SR-S3-1S	Inflow	SO2	0.1%	0.1%		86%	6%	-126%	6%
1Series	SR-Z3-1S	Inflow	HCN	0.1%	50%	25%		-1%	-120%	-40%
1Series	SR-N3-1S	Bias	NO	0.1%	5%	0.5%	0.1%		5%	5%
1Series	SR-D3-1S	Outflow	NO2	0.1%	-200%	-3%	0.1%	5%		120%
1Series	SR-C3-1S	Outflow	Cl2	0.1%	-200%	-3%	0.1%	0.5%	120%	
1Series	SR-M3-1S	Inflow	CO-H		0.1%	0.1%	0.1%	120%	6%	0.1%
1 Series	SR-HM-1S	Digital	COSH-CO		8%	0.1%	0.1%	50%	0.1%	0.1%
1 Series	SR-HM-1S	Digital	COSH-H2S	2%		10%	0.1%	10%	-10%	-10%

NOTES

- All figures are indicative and given for guidance only, batch to batch variation is not considered.
- All data is based on representative samples available at time of test.

- Measurements all made at prevailing ambient conditions (~20°C / 1013 mBar)
- Users should verify suitability for their application, through trial if necessary.

6.2.3 Poisons and Inhibitors

WARNING

Sensors in portable gas detectors may be affected by inhibitors and poisons. An inhibitor may temporarily stop a sensor from working but should recover once in fresh air. A poison will permanently damage a sensor and prevent it from detecting gas. Many everyday products contain such poisons or inhibitors. This includes but is not limited to:

- Halogen gas/halogenated HCs
- Brake cleaners
- Lubricants
- Rust inhibitors
- Window/glass cleaners
- Alcohol-based cleaners/tissues
- Methanol (fuel and antifreeze)
- Hand sanitizers
- Anionic detergents
- Dish soaps/citrus-based cleaners
- Any silicone-based product
- Cleaners
- Protectors
- Barrier cream
- Medicinal creams
- Adhesives
- Sealants
- Tissues/wipes
- Polishes
- Mold release agents

Alcohols, such as methanol and ethanol, adversely affect electrochemical CO/CO-H sensors. Prolonged exposure will cause CO sensors to alarm and/or go over limit (+OL). They may not recover for at least 12 hours.

Do not use strong solvents on plastic surfaces as this may damage sensors and cause fatigue of plastic housings, which may not present immediately.

Honeywell recommends bump testing before use and routine calibration. Bump testing is the only method that proves filters are not blocked, sensors operate within specifications, and audible, visual, and vibrating alarms are fully functional. IntelliDoX is an automated bump test and calibration system. Contact Honeywell or an authorized distributor for more information.

CHAPTER

7 GET STARTED WITH AVAILABLE SOFTWARE

The following sections describe how users may obtain, access, and use available software tools to configure their instrument.

All software and firmware are referenced for download from the Honeywell Industrial Automation website:

~~Industrial Automation | Honeywell~~

Click on the link or copy the full address to your browser. Select “SOFTWARE” and then “Detection, Measurement, and Control”.

“Gas Detection Software & Firmware” refers to specific instruments when updates are made available. “Safety Suite” is a dedicated subsite.

There are 3 primary methods of configuring an instrument. These include:

1. Safety Suite Deluxe for PC (Windows only)

2. Safety Suite Device Configurator for PC (Windows only)

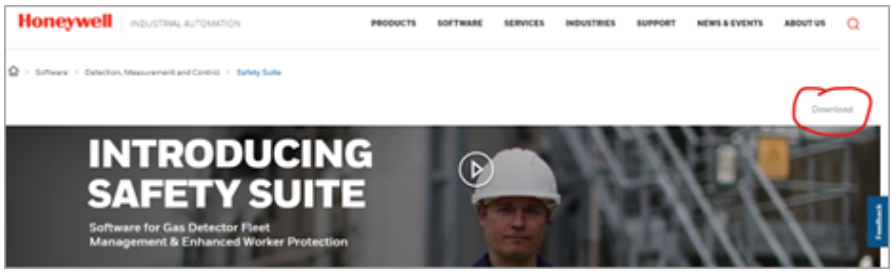
3. Device Configurator App for mobile devices (iOS and Android)

Always check the website or follow automatic prompts from the software to maintain and update instrument firmware and system software to “current” levels. Updates include new functionality and potential bug fixes essential to your safety system's correct operation.

This manual refers to functions current at the time of its production.

7.1 Safety Suite Deluxe for PC (windows Only)

After following the links to "Safety Suite", familiarize yourself with the system overviews provided. Click "**Download**"...



Safety Suite Deluxe software may be installed and used from the "*cloud*" or "*on-premise*". If you are unsure what to select, contact a Honeywell representative for further advice. User registration and account activation are required.

For "cloud" based installation, select either.

Non-European Union: http://ss.honeywell.com/#/trial

European Union: http://sseu.honeywell.com/#/trial

For "on-premise" installation, select "DOWNLOAD SAFETY SUITE PLANT".

Follow the instructions given to complete installation and registration.

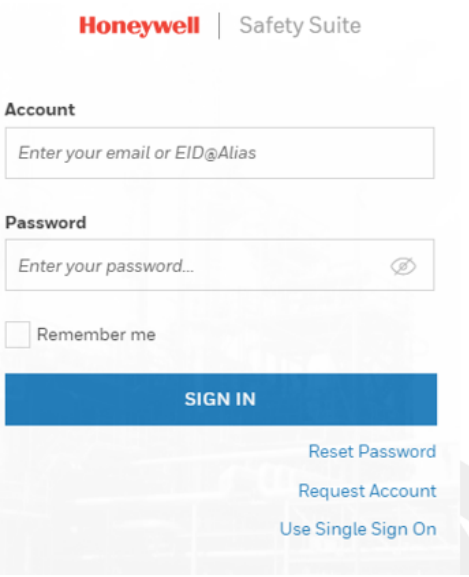
Note: Both versions install the "Safety Suite Gateway Utility" (blue icon). By default, it starts automatically and runs in the background to enable and monitor connectivity. This should not be confused with software access.

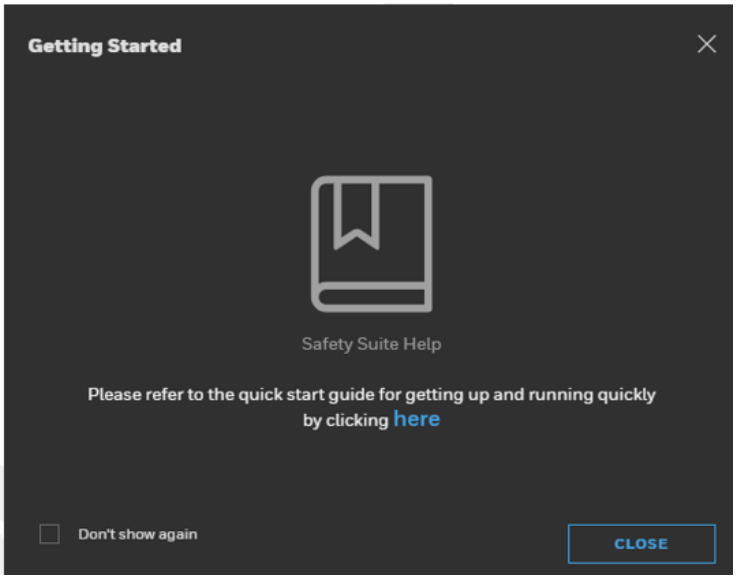
Routinely, the "on-premise" version is accessed by double-clicking the desktop's red "Safety Suite Plant" icon. The "cloud" version is accessed from your browser. The URL for access, as before, subject to your location, is:

Non-European Union: http://ss.honeywell.com/#/trial

European Union: http://sseu.honeywell.com/#/login

Log in with the credentials and account already set up. New users should refer to the "quick start guide" to get up and running quickly.



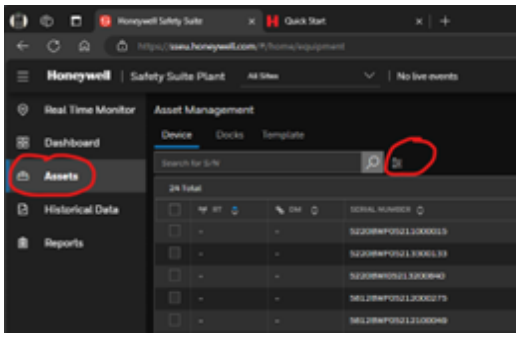


The user guide can be accessed from within the software by clicking the question mark in the circle at the top right on all pages. 

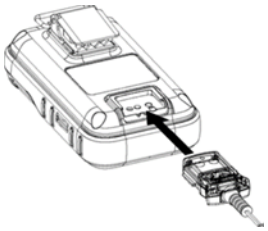
Safety Suite includes many advanced functions. Here, we will focus on connecting to the device for initial set-up and use.

Select "**Assets**" from the sidebar. Depending on filter settings, you will be presented with a list of devices your system knows. Select filters and then check the "**Connected**" box under "DM connection".

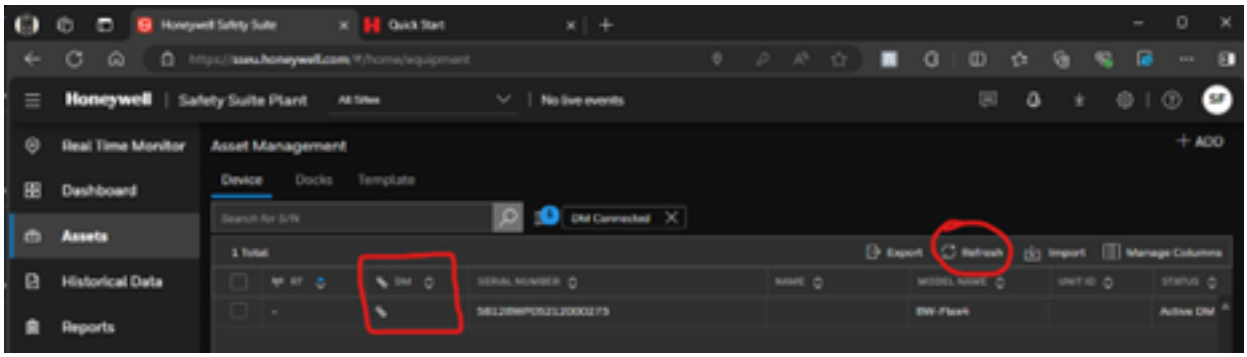
No devices will be shown.



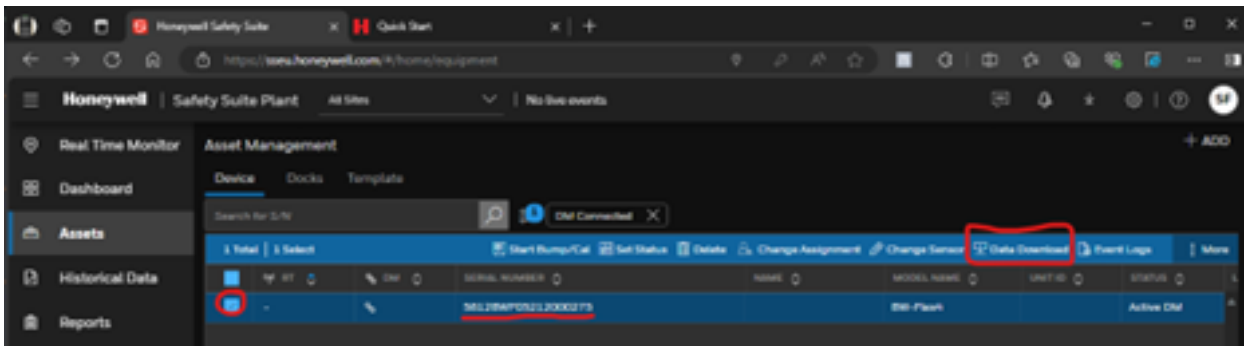
Using the IR connectivity kit ordered separately (part# GA-USB1-IR), connect the USB-A cable to your computer and the other end to your gas detector via the IR dongle included in the kit. The instrument is not charged when connected via the dongle; it is for data connection only. Make sure the gas detector is turned on before connecting.



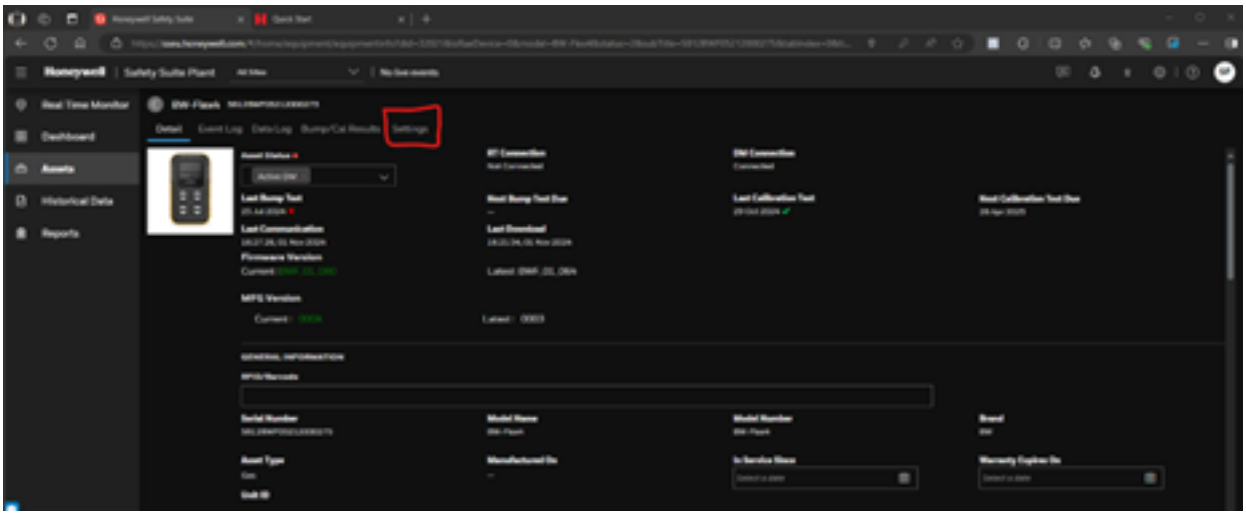
If the device does not automatically appear in the list, select "**refresh**". The software scans all available ports to find devices. If necessary, this may be configured to speed up instrument recognition. Once the connection is established, the DM-connected symbol is shown.



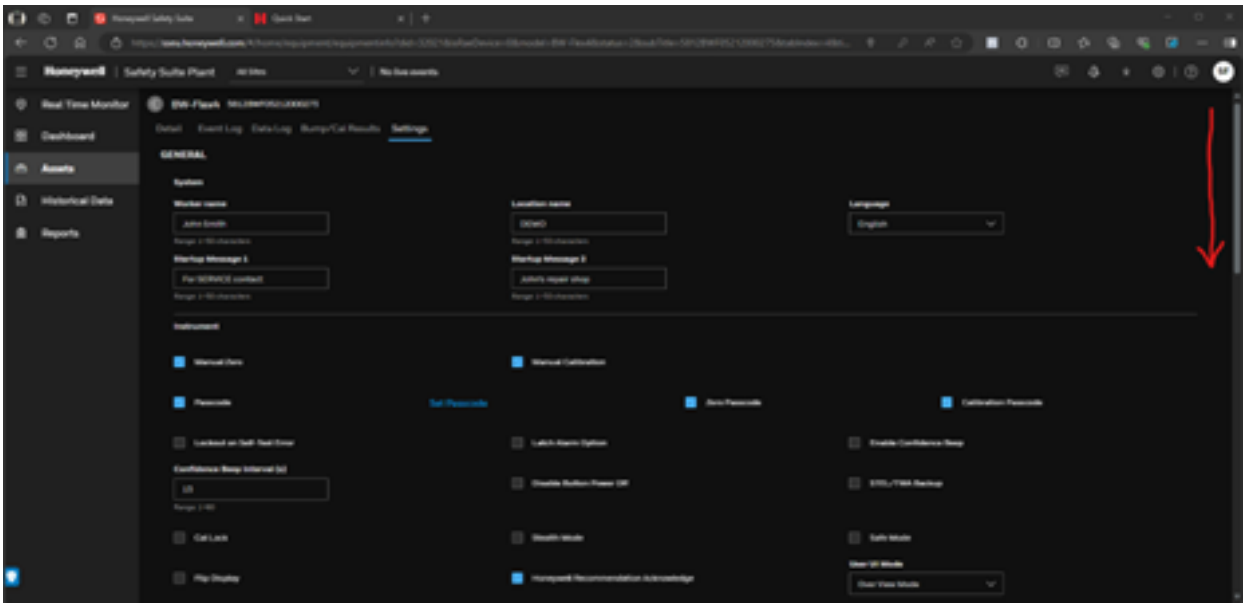
Selecting the check box to the left enables quick access to several functions. For example, select "**Data Download**" to synchronize logged information in the instrument to Safety Suite.



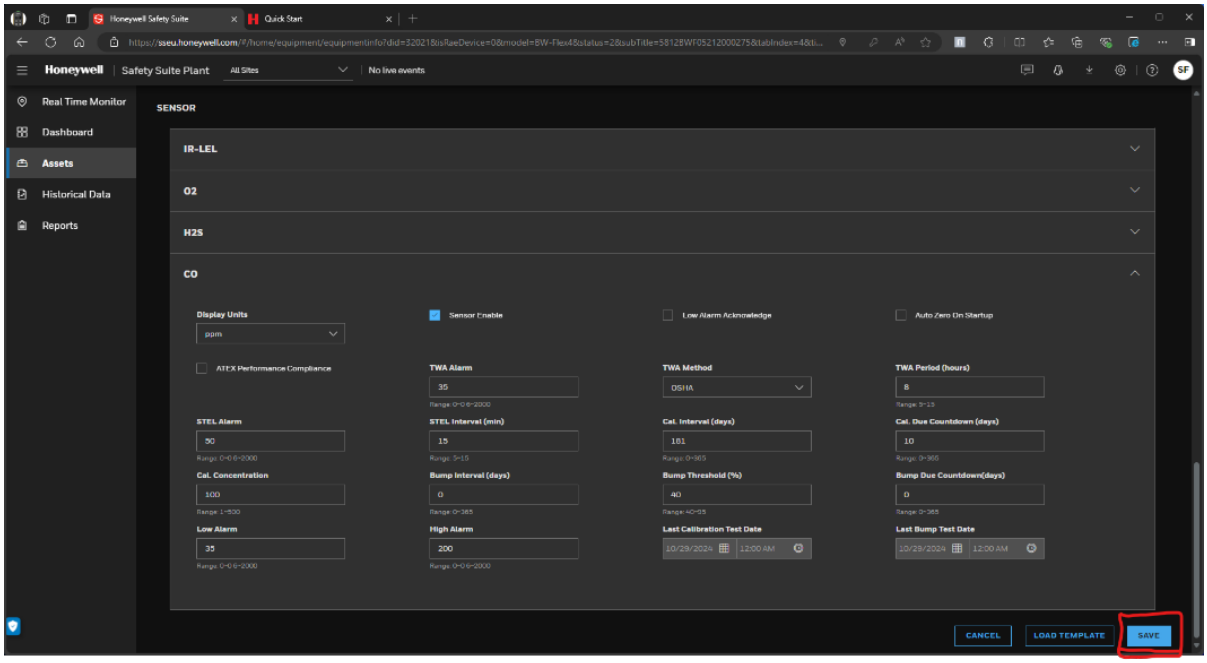
Clicking on the connected device's serial number allows the user to access the detector's detailed information. Then, select "**Settings**" to make changes.



Scroll up/down on the right to review all instrument settings.



Example: SENSOR settings. Once changes are made, select "**SAVE**" to transfer the settings to the instrument.



Refer to section 2 of this manual for settings that users can adjust. Ensure essential settings are complete per local requirements before first use.

7.2 Safety Suite Device Configurator for PC (SSDC)

Safety Suite Device Configurator is a configuration tool used with legacy gas detection equipment. It is maintained to support the installed park of historical instruments.

Honeywell recommends using Safety Suite Deluxe moving forward due to its increased flexibility and configurable options. Unlike Deluxe, Safety Suite Device Configurator is only available for local installation.

Following the links, scroll down to “Safety Suite Device Configurator” and select “LEARN MORE”. A dedicated page for the software is opened. Scroll down and select “DOWNLOAD SOFTWARE”. Alternatively, follow this link or cut and paste this full link to your web browser:

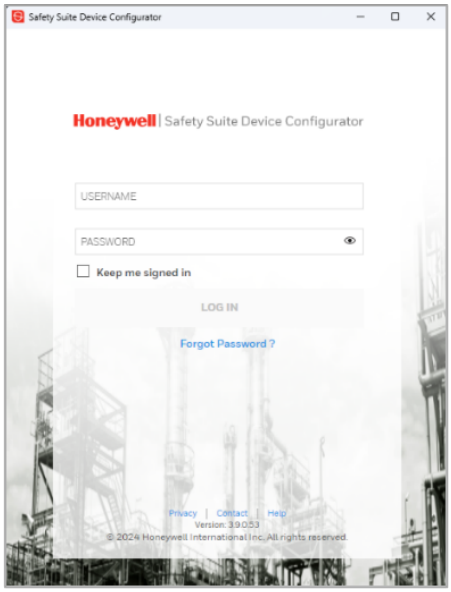
Safety Suite Solution | Honeywell

https://automation.honeywell.com/us/en/software/detection-measurement-and-control/safety-suite/safety-suite-device-configurator

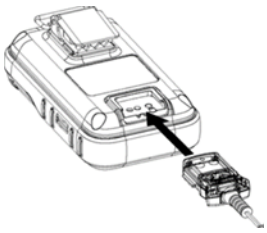
The Safety Suite Device Configurator User Guide is at the same location.

Once installed, the Safety Suite Device Configurator icon should be visible on your desktop. Double-click to open the program.

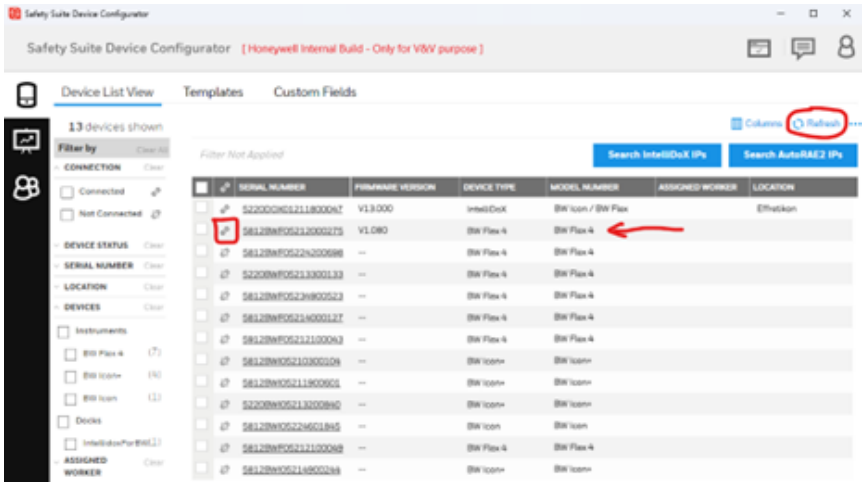
The default username is “**administrator**”, and the password is “**Default123**”.



Using the IR connectivity kit ordered separately (part# GA-USB1-IR), connect the USB-A cable to your computer and the other end to your gas detector via the IR dongle included in the kit. The instrument is not charged when connected via the dongle; it is for data connection only. Make sure the gas detector is turned on before connecting.

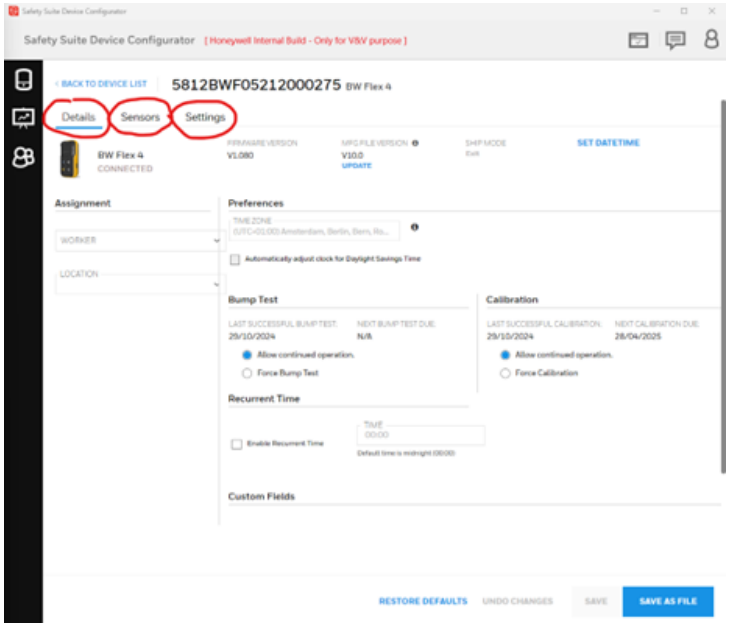


If the device does not automatically appear in the list, select “**refresh**”. The software scans all available ports to find devices. This may be configured to speed up instrument recognition if required. Selecting different filters by checking the relevant boxes in the left-hand navigation may assist in locating your device if you are managing many devices. Once the connection is established, the “**linked**” symbol is shown.



Selecting the check box to the left enables quick access to several functions. Select “**Download Data**” to synchronize logged information in the instrument to Safety Suite, for example.

Click on the serial number of the device connected to see the detailed view of the instrument.



Select “**Details**”, “**Sensors**”, and “**Settings**” to review and change options for your gas detector. If changes are made, the user is reminded to select “**SAVE**” to the instrument or “**SAVE AS FILE**” for later use. Alternatively, changes may be “DISCARDED”.

Refer to section 2 of this manual for details of the settings that users can adjust. Ensure essential settings are complete per local requirements before first use.

7.3 Device Configurator App for mobiles (DC APP)

Users may connect and control their BW Flex 4 Series gas detector via Bluetooth and the Device Configurator App (DC App).

The app is available for iOS and Android. The app is free to download from the following online stores:

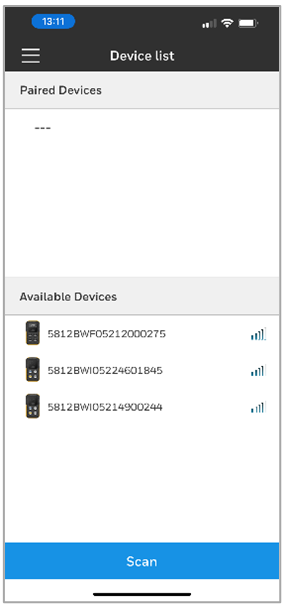
IOS: https://apps.apple.com/us/app/device-configurator/id1194056427

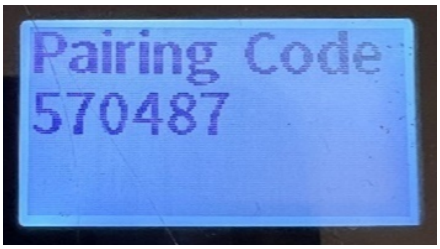
Android: https://play.google.com/store/apps/details?id=com.honeywell.his.ha.dc&hl=en&gl=US

The DCApp may be used with your BW Flex 4 Series gas detector in "Guest Mode". Users may also connect DCApp to their optional Safety Suite Deluxe account, enabling easy data synchronization and notifications about system updates.

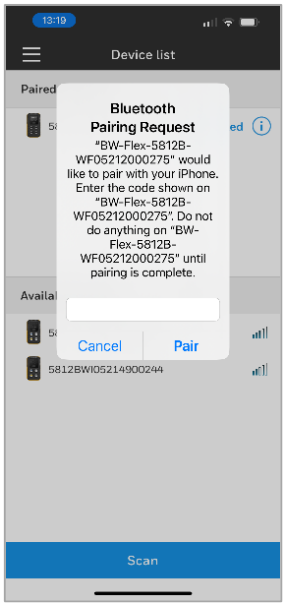
Pairing is required for first use. Upon starting DCApp, it searches nearby instruments via Bluetooth and presents a list of available devices to pair with.

Select the BW Flex 4 device you wish to pair with. The 6-digit "Pairing Code" appears on the gas detector's display.

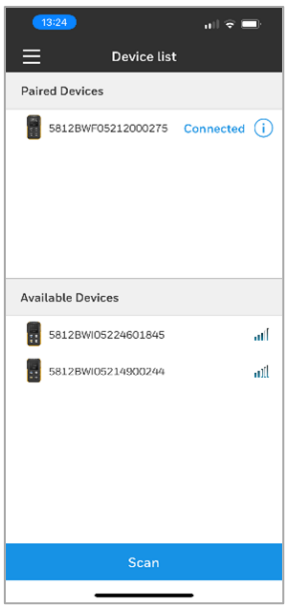




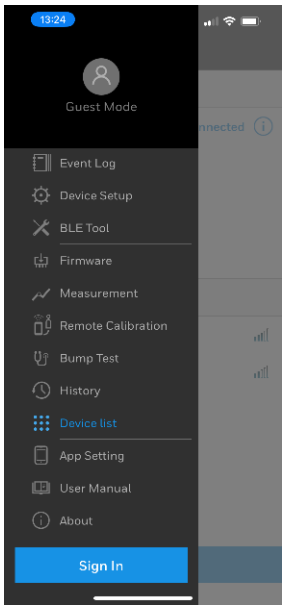
Enter the code into the DCApp to complete the pairing sequence. Pairing will not be necessary again in the future.



For initial use and awareness select the DCApp menu (the "three lines" top left of the display). Swipe up and down to scroll. Select the "User Manual", scroll and select "Features", a list of compatible devices is shown, scroll and select "BW Icon and BW Flex Side Menu". Take your time to familiarize yourself with the DCApp interaction and the instrument.

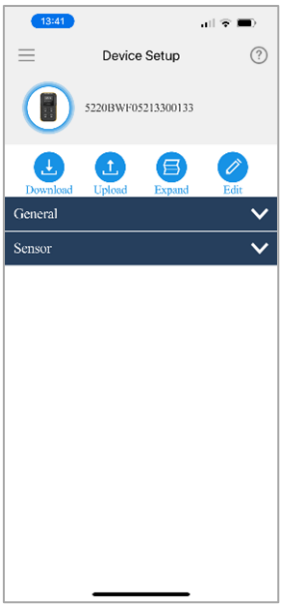


Select the paired device from the "Device List" and "Device Setup" to review a device setting in the side menu. Select "Download", and the instrument settings are shown after a short pause.



You can review details by pressing the down arrow to the right of "General" or "Sensor". By default, settings are read-only.

To change a device setting, select "Edit". Individual parameters can now be changed if the user has access rights enabled. Individual users' access rights and/or device menus can be configured using Safety Suite software. This includes read/write privileges of the DCApp, too.



Changes only take effect if the user selects "**Upload**". A password may be required, subject to access rights. A list of changes is presented to the user for final check before they select "**Restore**", "**Upload**", or "**Cancel**".

Refer to section 2 of this manual for details of the settings that users can adjust. Ensure essential settings are complete per local requirements before first use.

7.4 Security Considerations for Software Installation

This section provides information on system identification and risk management in connected infrastructures. It applies to a system with the following components:

- Safety Suite Device Configurator
- Safety Suite Deluxe
- IntelliDoX Docking Station
- Gas Detection Instruments

Our systems are built with controls such as custom operating systems, encrypted data for firmware updates, and the elimination of confidential data from the system (if designated as confidential by the customer).

Additional controls could also be taken by our customers as follows

- Operate Safety Suite behind a sufficiently robust and up-to-date company firewall to minimize unauthorized external access to the system.
- Ensure virus protection is installed, signature files are up-to-date, and subscriptions are active as per applicable IT policies.
- Allow only digitally signed software from trusted sources to run on a PC where Safety Suite is installed.
- Limit physical access to authorized personnel only where possible to minimize tampering with docking stations, instruments, and PCs.

It is recommended to perform regular security inspections of the system and review authorized access to data.

Honeywell does not represent that the software is compatible with any specific third-party hardware or software other than as expressly specified by Honeywell. The Customer is responsible for providing and maintaining an operating environment with at least the minimum standards specified by Honeywell.

The Customer understands and warrants that the Customer must implement and maintain reasonable and appropriate security measures relating to the software, the information used therein, and the network environment. This obligation includes complying with applicable cybersecurity standards and best practices including, but not limited to, the Federal Trade Commission consent decrees and other declarations of reasonable and appropriate security measures, the National Institute of Standards and Technology (“NIST”), Cybersecurity Framework and NIST Alerts, InfraGard Alerts, and the United States Computer Emergency Readiness Team (“US-CERT”) Alerts and Bulletins, and their equivalents.

The software is provided “as is” without express or implied warranties. Honeywell, its affiliated companies, and licensors expressly disclaim any implied warranty of merchantability, warranty of fitness for a particular purpose, and warranty of non-infringement. In no event are Honeywell, its affiliates, and licensors liable for any loss of data, loss of profit, or any loss or damage, whether direct, indirect, incidental, special, or consequential, however arising, because of accessing or using the software. So long as this provision is enforceable in the Customer’s jurisdiction, the foregoing limitations, exclusions, and disclaimers apply to the fullest extent permitted by law, even if any remedy fails of its essential purpose.

CHAPTER

8 CERTIFICATIONS

8.1 Global

IECEx: SIR 20.0020X

With IR sensor installed:

Ex ia op is I Ma Ex ia op is IIC T4 Ga, -40°C≤ Tamb ≤ 60°C

With LEL sensor installed:

Ex da ia I Ma Ex da ia IIC T4 Ga, -40°C≤ Tamb ≤ 60°C

With IR and LEL sensors installed:

Ex da ia op is I Ma Ex da ia op is IIC T4 Ga, -40°C≤ Tamb ≤ 60°C

Without IR and LEL sensors installed:

Ex ia I Ma Ex ia IIC T4 Ga, -40°C≤ Tamb ≤ 60°C

8.2 Europe

UKEx – CSAE21UKEX2042X

CSAE21UKEX2049X

ATEX: Sira 20ATEX2012X

With IR sensor installed: Ⓔx I M1 Ex ia op is I Ma, -40°C≤ Tamb ≤ 60°C

Ⓔx II 1G Ex ia op is IIC T4 Ga, -40°C≤ Tamb ≤ 60°C

With LEL sensor installed:

Ⓔx I M1 Ex da ia I Ma, -40°C≤ Tamb ≤ 60°C

Ⓔx II 1G Ex da ia IIC T4 Ga, -40°C≤ Tamb ≤ 60°C

With IR and LEL sensors installed:

Ⓔx I M1 Ex da ia op is I Ma, -40°C≤ Tamb ≤ 60°C

Ⓔx II 1G Ex da ia op is IIC T4 Ga, -40°C≤ Tamb ≤ 60°C

Without IR and LEL sensors installed:

Ⓔx I M1 Ex ia I Ma, -40°C≤ Tamb ≤ 60°C

Ⓔx II 1G Ex ia IIC T4 Ga, -40°C≤ Tamb ≤ 60° CEN 60079-29-1:2016

UKCA 0518 / CE 2813

EN 50104:2019, EN 50271:2018

EMC Directive 2014/30/EU, RED Directive 2014/53/EU

ROHS Directive (EU) 2015/863 amending 2011/65/EU

IP: IP66, IP68 (1.2 meters for 45 minutes).

8.2.1 EU Declarations

EU Declaration of Conformity

In accordance with EN ISO / IEC 17050-1:2010

BW ICON, BW ICON+, BW Flex-I, BW Flex4, BW Flex5

Declaration Number: 2004Y0151_04

Description: Portable Gas Detector
Intended Use: Monitoring of gas in potentially explosive atmospheres

Manufacturer: **Honeywell Analytics Limited,** Hatch Pond House, 4 Stinsford Road, Nuffield Estate, Poole Dorset BH17 0RZ UK

Trading Company: **Life Safety Distribution GmbH**, Z.A. La Piece 16, 1180 Rolle, Switzerland

We hereby declare that the product identified above meets the requirements of the following EU Directives and therefore qualifies for free movement within markets comprising the European Union (EU) and the European Economic Area (EEA). This declaration is issued under the sole responsibility of the manufacturer.

ATEX Directive 2014/34/EU

ATEX Hazardous

Notified Body: CSA Group Netherlands B.V. Utrechtseweg 310, Building B42, 6812AR, Netherlands.
Notified Body Number: 2813
EC Certificate Number: Sira 20ATEX2012X

Conforms to:

EN IEC 60079-0:2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-11:2012	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
EN 60079-28:2015	Explosive atmospheres - Part 28 - Protection of equipment and transmission systems using optical radiation
EN 60079-1:2014	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
EN 60079-26:2015	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

Type Approval:	**BW Icon & BW Icon+**	**BW Icon & BW Icon+**
	I M1 Ex ia I Ma	II 1G Ex ia IIC T4 Ga
	With NDIR Sensor:	With NDIR Sensor:
	Ex ia op is I Ma	Ex ia op is IIC T4 Ga
	Ta = -40ºC to +60°C	Ta = -40ºC to +60°C

ECN-00029358 *2004Y0151*

Type Approval:

BW Flex-I, BW Flex4 & BW Flex5

I M1 Ex ia I Ma II 1G Ex ia IIC T4 Ga

With NDIR Sensor

I M1 Ex ia op is I Ma II 1G Ex ia op is IIC T4 Ga

With LEL Sensor

I M1 Ex da ia I Ma II 1G Ex da ia IIC T4 Ga

With NDIR & LEL Sensor

I M1 Ex da ia op is I Ma II 1G Ex da ia op is IIC T4 Ga

Ta = -40°C to +60°C for all models

ATEX Measuring Function

Notified Body: Physical-Technical Testing Institute, s.p., Pikartska 1337/7, 716 07 Ostrava – Radvanice, Czech Republic
Notified Body Number: 1026
EC Certificate Number: FTZU 22 ATEX 0031X

BW Flex-I, BW Flex4, BW Flex5

Conforms to:

EN 60079-29-1:2016	Explosive atmospheres. Gas Detectors. Performance requirements of detectors for flammable gases
EN 50271:2018	Electrical apparatus for the detection and measurement of combustible gases, toxic gases and oxygen. Requirements and tests for apparatus using software and/or digital technologies

Production Quality Assurance

Notified Body: CSA Group Netherlands
Utrechtseweg 310, Building B42, 6812 AR ARNHEM, Nederland
Notified Body Number: 2813
QA Notification Number: Sira 11 ATEX M518

Conforms to:

IEC 80079-34:2018	Explosive atmospheres - Part 34: Application of quality management systems for Ex Product manufacture

ECN-00029358 *2004Y0151*

Honeywell

Radio Equipment Directive 2014/53/EU

Conforms to:

EN 62479:2010	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
EN 50663:2017	Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (10 MHz - 300 GHz)
EN 50270:2015	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 301 489-1 V2.2.3	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for Electromagnetic Compatibility
EN 300 328 V2.1.1	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

RoHS Directive 2015/863/EU

Consideration given to:

EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Signature: Richard King

Name: **Richard King**
Senior Quality Engineer

Date: 23rd January 2023

For and on behalf of: ***Honeywell Analytics Limited,*** *Hatch Pond House, 4 Stinsford Road, Nuffield Estate, Poole, Dorset, BH17 0RZ, UK*

ECN-00029358 *2004Y0151*

EU Declaration of Conformity

In accordance with EN ISO / IEC 17050-1:2010

BW ICON, BW ICON+, BW Flex-i, BW Flex4, BW Flex5

Declaration Number: 2004Y0156_02

Description: Portable Gas Detector
Intended Use: Monitoring of gas in potentially explosive atmospheres

Manufacturer: **RAE Systems Inc. A Honeywell Company,** 1349 Moffett Park Drive, Sunnyvale, California 94089, USA

Trading Company: **Life Safety Distribution GmbH**, Z.A. La Piece 16, 1180 Rolle, Switzerland

We hereby declare that the product identified above meets the requirements of the following EU Directives and therefore qualifies for free movement within markets comprising the European Union (EU) and the European Economic Area (EEA). This declaration is issued under the sole responsibility of the manufacturer.

ATEX Directive 2014/34/EU

ATEX Hazardous

Notified Body: CSA Group Netherlands B.V
Utrechtseweg 310, Building B42, 6812AR, Netherlands

Notified Body Number: 2813

EC Certificate Number: Sira 20ATEX2008X

Conforms to:

EN IEC 60079-0:2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-11:2012	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
EN 60079-28:2015	Explosive atmospheres - Part 28 - Protection of equipment and transmission systems using optical radiation
EN 60079-1:2014	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
EN 60079-26:2015	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

BW Icon and BW Icon+

Type Approval:	I M1 Ex ia I Ma		II 1G Ex ia IIC T4 Ga
	With NDIR Sensor:		With NDIR Sensor:
	Ex ia op is I Ma		Ex ia op is IIC T4 Ga
	Ta = -40ºC to +60°C		Ta = -40ºC to +60°C

ECN00003587 *2004Y0156*

BW Flex-i, BW Flex4 and BW Flex5

I M1 Ex ia I Ma II 1G Ex ia IIC T4 Ga

With NDIR Sensor:

I M1 Ex ia op is I Ma II 1G Ex ia op is IIC T4 Ga

With LEL Sensor:

I M1 Ex da ia I Ma II 1G Ex da ia IIC T4 Ga

With NDIR & LEL Sensor:

I M1 Ex da ia op is I Ma II 1G Ex da ia op is IIC T4 Ga

TA = -40ºC to +60°C for all models

Production Quality Assurance

Notified Body:	DNV GL Nemko Presafe AS Veritasveien 3 1363 Høvik, Norway
Notified Body Number:	2460
QA Notification Number:	Presafe 16 ATEX 7788Q

Conforms to:

ISO/IEC 80079-34:2018	Explosive atmospheres. Application of quality systems for equipment manufacture

Radio Equipment Directive 2014/53/EU

Conforms to:

EN 62479:2010	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
EN 50663:2017	Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (10 MHz - 300 GHz)
EN 50270:2015	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 301 489-1 V2.2.3	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for Electromagnetic Compatibility
EN 301 489-17 V3.2.4	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for Electromagnetic Compatibility
EN 300 328 V2.1.1	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

ECN00003587 *2004Y0156*

RoHS Directive 2015/863/EU

Consideration given to:

EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Signature:

Name: **James Pan** **Date:** 15th July 2021

Quality Engineer

For and on behalf of: *RAE Systems Inc. A Honeywell Company, 1349 Moffett Park Drive, Sunnyvale, California 94089, USA*

ECN00003587 *2004Y0156*

8.3 North America

CSA: 20CA80028223X

With IR sensor installed:

Class I, Division 1, Groups A, B, C and D, T4

Class I, Zone 0, AEx ia op is IIC T4 Ga; Ex ia op is IIC T4 Ga

With LEL sensor installed:

Class I, Division 1, Groups A, B, C and D, T4

Class I, Zone 0, AEx da ia IIC T4 Ga; Ex da ia IIC T4 Ga

With IR & LEL sensor installed:

Class I, Division 1, Groups A, B, C and D, T4

Class I, Zone 0, AEx da ia op is IIC T4 Ga; Ex da ia op is IIC T4 Ga

MET: TL21052E

CSA C22.2 No.60079-29-1

UL60079-29-1

8.3.1 North America Flammable Gas Performance

Honeywell BW™ Flex 4 is performance tested only for 0-5% methane in air as 0-100% LEL based on CSA 60079-29-1 and UL 60079-29-1.

Only the Honeywell BW™ Flex 4 infrared and catalytic sensors were evaluated for CSA 60079-29-1 and UL 60079-29-1.

The evaluation is valid with a flow rate of 500ml/min, CH4 (Methane) gas, and manual calibration in the CSA lab test. The other options are outside the scope of CSA 60079-29-1.

To comply with CSA 60079-29-1, the adjustable alarm point shall not exceed 1%LEL to 60 %LEL.

The highest alarm shall be configured as a latching alarm, and the user can turn on/off the alarm by Safety Suite Device Configurator or Device Configurator.

Honeywell BW™ Flex 4 was pressure tested for 80 to 120 kPa, temperature tested for -40°C to 60°C, humidity tested for 5% to 90% RH, gas tested for 2.5%VOL CH4=50%LEL and air velocity less than 6m/s in CSA lab test.

The battery voltage is 3.7V, and the manufacturer verifies the duration time until the low battery condition mentioned; CSA lab verified 480min duration according to clause 5.4.17.1 a) of CSA 60079-29-1 (due to the product having an on/off switch), as well as performance under low battery duration.

The maximum power consumption of the BW™ Flex series is 680mW. Infrared CH4 sensor and catalytic LEL sensor warm-up time are less than the 90s, CSA lab calibrates after warm-up for 1 hour, and test gas application time is 60s.

T90<30s for 50%LEL CH4 gas in diffusion mode. To check reaction time, apply gas and the reading on the screen. The reaction time starts from the time the attached hose or applied gas ends when reading over 90% of the calibration gas concentration.

Performance Test Temperature Dependence:

Infrared CH4 sensor

-20 to 60°C, ±5%LEL or ±10% of reading at 20°C, whichever value is greater

-40 to -21°C, ±10%LEL or ±20% of reading at 20°C, whichever value is greater

Catalytic LEL sensor

-20 to 60°C, ±5%LEL or ±10% of reading at 20°C, whichever value is greater

Reading shows 0%LEL below 3%LEL and indicates a Negative alarm once reading below -5%LEL. Use the utility of manufacture to disable the suppression of reading.

Where it is necessary to apply LFL and UFL values for CSA 60079-29-1 and UL 60079-29-1, reference shall be made to ANSI/NFPA 497.

If necessary, read IEC 60079-29-2 for a particular calibration procedure.

8.3.2 FCC Compliance Statement

This Detector complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This Detector may not cause harmful interference, and (2) this Detector must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital Detector, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Contains FCC ID: SU3RMBLED

Contains IC: 20969-RMBLED

CAN ICES-3(A)/NMB-3(A)

8.4 South America

INMETRO: DNV 21.0104 X

Com sensor de infravermelhos instalado:

Ex ia op is I Ma, Ex ia op is IIC T4 Ga, - 40 °C≤ Tamb ≤ +60 °C

Com o sensor de LEL instalado:

Ex da ia I Ma, Ex da ia IIC T4 Ga, -40 °C≤ Tamb ≤ +60 °C

Com o sensor de IV e LEL instalado:

Ex da ia op is I Ma, Ex da ia op is IIC T4 Ga, - 40 °C≤ Tamb ≤ +60 °C

Sem o sensor de IV e LEL instalado:

Ex ia I Ma, Ex ia IIC T4 Ga, -40 °C≤ Tamb ≤ +60 °C

Modelo: RMBLED. Made in China

Este equipamento nao tem direito a protecao contra interferencia prejudicial e nao pode causar interferencia em sistemas devidamente autorizados.

Para maiores informacoes, consulte o site da ANATEL - www.gov.br/anatel/pt-br

ANATEL: 03951-21-06496

INMETRO DNV 21.0104 X

8.5 Further Approvals

Korea - KC: 21-GA4BO-0570X

Japan - JPEx: DEK21.0059X / DEK21.0060X

India - ETA: SD-20200906189

UAE - ER93810_21

South Africa - SABS: MASX MS / 21-9012X / MASC MS / 21-9012X

CHAPTER

9 ORDERING INFORMATION

9.1 Instrument Configurations

All variants are not available in all regions of the world. Availability is subject to local approvals and point of sale. Further, combinations of some sensors may be blocked due to the expected cross-sensitivity of sensors to different gases.

Sensor 3	
None - dummy sensor (IN) inflow	00
H2S (Hydrogen Sulphide) inflow	H1
CO (carbon monoxide) inflow	M1
CO-H (H2 resistant CO) inflow	M3
SO2 (Sulfur Dioxide) inflow	S3
HCN (Hydrogen Cyanide) inflow	Z3
None - dummy sensor (OU) outflow	10
CL2 (Chlorine) outflow	C3
NO2 (Nitrogen Dioxide) outflow	D3
None - dummy sensor (DI) digital	20
CO2 (Carbon Dioxide) digital	B1
COSH (Carbon Monoxide+Hydrogen Sulphide) digital	HM

Sensor 2	
None (dummy sensor)	00
O2(Oxygen)	X1

Sensor 1 - Combustible Gases	
None (dummy sensor)	00
%LEL (combustibles), Infrared Low Power	W5
%LEL (combustibles), catalytic, filtered	W6
%LEL (combustibles), catalytic, unfiltered	W7

Base Unit	
Base unit	CPD

Sensor 4	
00	None - dummy sensor (IN) inflow
H1	H2S (Hydrogen Sulphide) inflow
M1	CO (carbon monoxide) inflow
M3	CO-H (H2 resistant CO) inflow
S3	SO2 (Sulfur Dioxide) inflow
Z3	HCN (Hydrogen Cyanide) inflow
10	None - dummy sensor (OU) outflow
C3	CL2 (Chlorine) outflow
D3	NO2 (Nitrogen Dioxide) outflow
20	None - dummy sensor (DI) digital
B1	CO2 (Carbon Dioxide) digital
30	None - dummy sensor (BI)
N3	NO (Nitrogen Oxide)

Housing	
B	Black housing
Y	Yellow housing

Region	
00	Global
BR	Brazil - InMetro
EU	MED/ATEX with Performance (LEL/O2)
SA	South Africa Mining
AP	Asia Pacific
JP	Japan
RU	Russia
UR	Ukraine
CN	China
MA	China Mining Approval

CPD - W5 X1 HM B1 - Y - 00

Options should be selected from the lists in the order shown (top to bottom). Where a sensor can be selected in either slot 3 or slot 4, follow the alphabetical sequence, e.g., H1 before M1 in Slot 3, and so on.

- IR LEL sensors do not detect hydrogen, should not be used in the presence of acetylene, and are not recommended for potentially condensing atmospheres. Use catalytic LEL sensors.
- Catalytic LEL sensors should be used with an oxygen (O_2) sensor. Oxygen is required for the detection of combustible gases. A catalytic LEL sensor may not detect combustible hazards in an oxygen-deprived environment. IR LEL Sensors are better suited to oxygen-deprived environments
- For further information regarding the effectiveness and suitability of the types of LEL combustibles sensors for your target gas and application, please contact your local Honeywell Sales Representative
- The following combinations of sensors are NOT ALLOWED due to cross sensitivities and the risk of inhibiting operation or causing nuisance alarms.

  H2S/HCN, CO-H/NO, H2S/NO2, NO2/SO2, H2S/Cl2, NO2/HCN, HCN/Cl2, NO2/Cl2, HCN/SO2
- Please contact Honeywell for possible exceptions

9.2 Base Units and Spare PCBAs

When ordering, please be aware that hardware is specific to sensor combinations.

Part Numbers		Sensor Slot Type			
Base Unit	**Spare PCBA**	**1**	**2**	**3**	**4**
CPD-00000000-E-FF	CP-MPCB4	DIgital	OXygen	INflow	INflow
CPD-00000010-E-FF	CP-MPCB5	DIgital	OXygen	INflow	OUtflow
CPD-00000030-E-FF	CP-MPCB6	DIgital	OXygen	INflow	BIas
CPD-00001030-E-FF	CP-MPCB7	DIgital	OXygen	OUtflow	BIas
CPD-00002000-E-FF	CP-MPCB8	DIgital	OXygen	DIgital	INflow
CPD-00002010-E-FF	CP-MPCB9	DIgital	OXygen	DIgital	OUtflow
CPD-00002030-E-FF	CP-MPCB10	DIgital	OXygen	DIgital	BIas
CPD-00002020-E-FF	CP-MPCB11	DIgital	OXygen	DIgital	DIgital

For more information, please contact Honeywell or an authorized distributor.

9.3 Spares and Accesories

WARNING
Some accessories may not be compatible with reactive gases (aka “sticky” gases). Users should verify that an accessory does not impact the detector’s ability to measure the target gas. If in doubt, ASK!

DESCRIPTION	PART#
ACCESSORIES (CARRYING/TRANSPORT)	
Confined Space Kit Suitable for Flex 4, MicroClip XL, and X3. Includes manual aspirator kit, IR connectivity kit, calibration cap with 1 ft. / 0.3 m hose, 0.5 LPM regulator, sampling probe, leather carrying case, auxiliary filter, and carrying case with foam insert.	MC-CK-DL*
Carrying Cases suitable for Flex 4, MicroClip XL, and X3 with foam and lid inserts.	MC-CK-CC*
*Detector and calibration gas are sold separately.	
Neck strap with safety release	GA-NS-1
Short strap (6 in./15.2 cm)	GA-LY-1
Extension strap (4 ft./1.2 m)	GA-ES-1
Chest Harness	GA-CH-2
ACCESSORIES (CHARGERS)	
Mains 5-way charger, BW ICON/ICON+/FLEX	GA-PA-1-MC5-XX*
Wall outlet power adaptor with flying lead to standard connector	GA-PA-1-XX*
* Replace "XX" with "NA" for North America, “UK” for the United Kingdom, and “-EU” for Europe. Further options may be made available regionally.	
USB Charger Cable	CP-USB
Vehicle 12-24VDC power adaptor with plug	GA-VPA-1
Vehicle 12-24VDC power adaptor direct wired	GA-PA-3
5-way cradle charger for BW ICON/ICON+/FLEX 4	CP-C01-5
ACCESSORIES (CONNECTED)	
IR connectivity kit for Safety Suite software	GA-USB1-IR
IntelliDoX Automated Calibration & Test Station	
IntelliDox for use with BW Icon/Icon+/Flex 4	DX-CP
Honeywell IntelliDox enabler kit (1 required per bank of up to 5 IDoX)	DX-ENBL-XX*
* Replace "XX" with "NA" for North America, “UK” for the United Kingdom, and “-EU” for Europe. Further options may be made available regionally.	
Nest upgrade for existing IntelliDoX to Icon/Icon+/Flex 4	DX-NEST-CP
ACCESSORIES (SAMPLING) **NOT COMPATIBLE WITH ALL GAS TYPES**	

Manual aspirator pump kit with probe and filter (0.3 m/1 ft.)	GA-AS02
Manual aspirator pump kit with 3 m / 10 ft. sampling hose without flow adaptor/probe	D4-AS01
Sampling Probe Kit with a hydrophobic and particulate filter (0.3m/1ft)	GA-PROB1-1
Sampling Probe Replacement Filter and Gasket for GA-PROB1-1	GA-PROB-FIL-K1
Sampling Probe Replacement Syringe for GA-PROB1-1	GA-SFIL
Sampling Probe Replacement Syringe (kit of 20) for GA-PROB1-1	GA-SFIL-K1
Sampling Probe Replacement particulate filter (kit of 25)	GA-PROB-PFIL-K25
Sampling Probe Collapsible Sample Probe 1m	GA-CPROB1
Sampling Probe Collapsible Sample Probe 1.8m	GA-CPROB2
Metallic sintered particulate filter	GA-MFILTER
Sampling float	GA-FLOAT
Hydrophobic filter replacement	D4-WT-1
Water trap with barbed connectors	WT-2 D2
CALIBRATION ACCESSORIES	
For calibration gas, contact Honeywell or an authorized distributor.	
Manual regulator 0.3l/m, non-reactive gases only	Reg-0.30
Manual regulator 0.5l/m, non-reactive gases only	Reg-0.50
Manual regulator 0.5l/m, reactive gases	Reg-0.5SS316
Manual regulator 1l/m, reactive gases	Reg-1.0SS316
ACCESSORIES (TUBING)	
Sampling hose (10 ft. / 3 m)	HOSE1-10
Sampling hose (20 ft. / 6.1 m)	HOSE1-20
Sampling hose (65 ft. / 19.8 m)	HOSE1-65
Sampling hose (10 ft. / 3 m) Teflon lined for reactive gases	HOSE2-10
Sampling hose (20 ft. / 6.1 m) Teflon lined for reactive gases	HOSE2-20
Sampling hose (65 ft. / 19.8 m) Teflon lined for reactive gases	HOSE2-65
All hoses are nominal 1/8 in ID and 1/4 in OD, including connectors and three particulate filters.	
CONSUMABLES (FILTERS)	
External Auxiliary Filter Kit (generic)	CP-AF-K3
Replacement External Filters (10pcs)	CP-SS-AF-K1
Replacement sensor membrane - kit of 4 (1 complete unit)	CP-SS
Replacement sensor membrane - kit of 20 (5 full units)	CP-SS-K1
CONSUMABLES (SENSORS)	
Replacement LEL IR sensor, 1 series	SR-W5-1S
Replacement LEL sensor, 1 series, cat. bead filtered	SR-W6-1S

Replacement LEL sensor, 1 series, cat. bead unfiltered	SR-W7-1S
Replacement O2 sensor, 1 series	SR-X1-1S
Replacement H2S sensor, 1 series	SR-H1-1S
Replacement CO sensor, 1 series	SR-M1-1S
Replacement SO2 sensor, 1 series	SR-S3-1S
Replacement CO-H sensor, 1 series	SR-M3-1S
Replacement COSH (CO+H2S) dual toxic, 1 series	SR-HM-1S
Replacement Cl2 sensor, 1 series	SR-C3-1S
Replacement NO sensor, 1 series	SR-N3-1S
Replacement NO2 sensor, 1 series	SR-D3-1S
Replacement HCN sensor, 1 series	SR-Z3-1S
Replacement CO2 IR sensor, 1 series	SR-B1-1S
Replacement Dummy sensor, 1 series	SR-DUMM-1S
SPARES	
Calibration cap/flow adaptor	CP-TC-1
Replacement Battery	CP-BAT
Replacement vibration motor	CP-VM-1
Replacement Alligator Clip	CP-AG
Replacement Klick Fast Stud	CP-KF
Replacement LCD Kit, BW FLEX	CP-LCD-K1
Replacement LCD frame, BW Flex	CP-SF2
Replacement screws(20pcs)	CP-SCREW-K1
Replacement front enclosure, BW FLEX4	CP-FC4
Replacement back shell, Yellow (contact Honeywell)	CP-BC1
Replacement back shell, Black (contact Honeywell)	CP-BC1B
Replacement multi-colored labels pack LEL, O2, CO, H2S, SO2, BLANK for Icon, Icon+, Flex 4 (1 set)	CP-LBL-1
Replacement multi-coloured labels, LEL,O2 ,CO, H2S, SO2, CO-H, Cl2, NO, NO2, COSH, HCN, CO2, BLANK for Flex 4/5 (1 set)	CP-LBL-2
Replacement multi-coloured labels, LEL,O2 ,CO, H2S, SO2, CO-H, Cl2, NO, NO2, COSH, HCN, CO2, BLANK for Flex 4/5 (5 sets)	CP-LBL-4
PCBA w/ SCREWS, BW FLEX (IN/IN)	CP-MPCB4
PCBA w/ SCREWS, BW FLEX (IN/OU)	CP-MPCB5
PCBA w/ SCREWS, BW FLEX (IN/BI)	CP-MPCB6
PCBA w/ SCREWS, BW FLEX (OU/BI)	CP-MPCB7
PCBA w/ SCREWS, BW FLEX (DI/IN)	CP-MPCB8
PCBA w/ SCREWS, BW FLEX (DI/OU)	CP-MPCB9

PCBA w/ SCREWS, BW FLEX (DI/BI)	CP-MPCB10
PCBA w/ SCREWS, BW FLEX (DI/DI)	CP-MPCB11