Backward-compatible mounting bracket

Figure 20 shows the detector's backward-compatible mounting bracket (used when replacing an SPM detector with an SPM Flex detector).
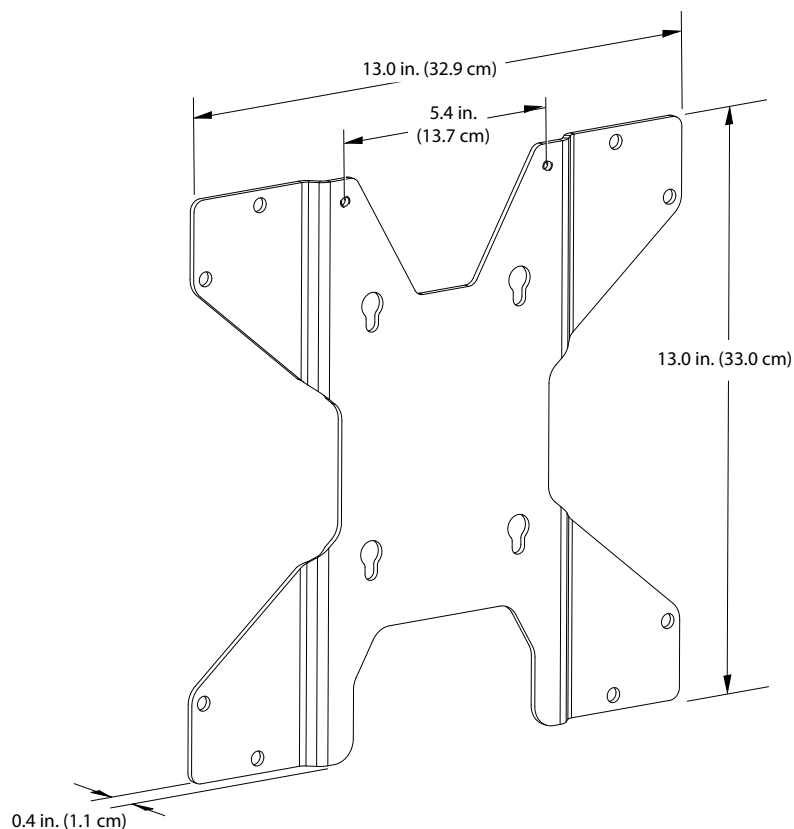

Figure 20. Backward-compatible mounting bracket

At least 2 screws must be used when mounting the backward-compatible bracket to a wall. Use the bracket as a template for determining the location of the holes to be drilled in the wall. See the Specifications section on page 52 for a description of the appropriate screws.

In-line filters

Use an external filter to protect the tubing and the detector from contamination. Use particulate filter part number 780248 for non-corrosive gases. Use filter 1991-0147 for corrosive gases. Refer to *Detectable Gases* on page 51 for specific gases. Filters should be replaced every 3 to 6 months of operation, depending on the cleanliness of the installation environment.

Optional sampling wand

The sampling wand is connected to the inlet port and used to detect toxic gas at specific locations[2]. An inlet filter is installed in the grip to prevent debris from entering the unit. All gas-wet surfaces are either Teflon-coated or made of Kynar to be compatible with sticky corrosive gases. An appropriate filter should be used for the gas type being monitored.
The sampling wand is supplied with the mounting bracket and required hardware.
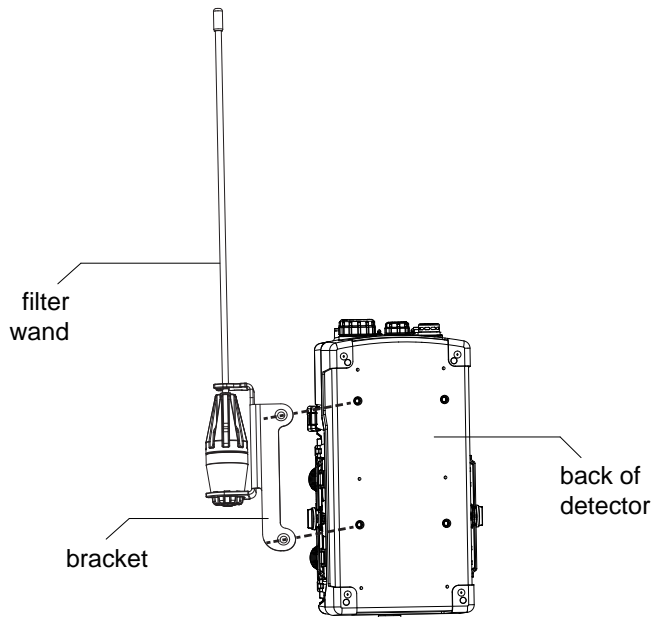
filter
wand

back of
detector

bracket

Figure 21. Attaching the sampling wand bracket to the detector

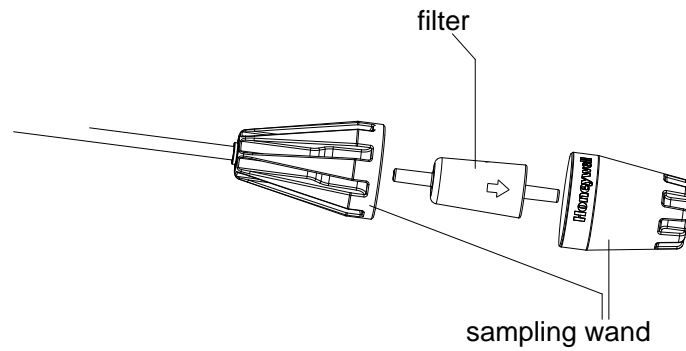2 Do not use the sampling wand with diisocyanates.

Figure 22. Wand with sampling filter

Sampling filters are replaced by unscrewing the halves of the wand's grip. They will fit in only one orientation.

Attaching the shoulder strap

If the optional shoulder strap is to be used with a portable detector, attach its spring clips to each of the rings on the detector's handle. The strap must be laundered before use in clean-room applications.

Operation

> ## ⚠ WARNING
>
> - Protection afforded by the SPM Flex gas detector may be impaired if it is not used according to the manufacturer's instructions.
>
> - Do not operate two-way radios near the detector.

Power

Before operation, verify that external power is present (the blue LED will be on) or that the internal battery is charged (indicated by the icon shown in the illustration on the following page). The physical power switch, located under the Chemcassette access door, should be on. Typically, it is recommended to leave the physical switch in the on position unless transporting/shipping the unit where there is a possibility of the detector accidentally being turned on with the soft power switch.

When the detector's startup sequence ends, an "In Monitor," or "Out of Monitor" display (depending on how it is configured in the Setup menu) will appear, depending on the mode the detector was in when it was turned off. The default startup mode can be configured under Power Options (Setup/General).

Most options will require acknowledgment (i.e., pressing the Select button). Those that don't will be displayed for 3 seconds. Pressing the Power button briefly will return the user to the previous screen. Do not power up the detector with a flash drive attached.

To turn the unit off, hold the Power button for 5 seconds while on the main display. This will bring up the power off options. Alternately, the power off mode can be accessed via the menu. The user must have the appropriate security level to access.

The detector can be used intermittently as long as the Chemcassette cartridge is removed and stored according to manufacturer's guidelines.

Controls

The arrows are used to scroll up and down through lists of options, highlighting one at a time. The select button is used to select a highlighted selection. During operation, the power button will cancel a command or, when pressed for more than 3 seconds, will display the main menu.

The Open/Close Gate function (see *Maintenance* on page 46) can be used to open the gate and remove the cartridge for storage.

The detector provides tactile and visual feedback (clicks and the unit's LCD display) to all key presses. The display reflects key presses by illuminating icons representing each of the buttons.

The blinking green LED indicates that the unit is on. The green LED blink rate is faster during bootup. The yellow LED indicates a fault; it blinks during instrument

faults and is steady during maintenance faults. The red LED indicates alarms; a steady light indicates an Alarm 1, a blinking LED indicates and Alarm 2. The blue LED indicates that the unit is receiving external power.

The concentration level of the gas is displayed with the name of the gas below the left side of the display and the units of concentration below its right side.

> ⚠️ **CAUTION**
>
> Do not leave the optics gate of fixed units open. Doing so may allow pressurized gases to escape through the tubing into the unit and then into the local environment.

Time

There is a real-time clock in the header bar. The real-time clock also verifies that the detector is active.

Audible alarm

The alarm can be configured for high, medium, and low sound levels. The sound can also be turned off. Low is approximately 75 dB at 1 meter (for office/lab use), Medium is approximately 85 dB at 1 meter (for light industrial use), and High is greater than 90 dB at 1 meter (for heavy industrial use).

Monitoring icons

A round green icon in the lower left of the display indicates that the detector is on and detecting. "In monitor" is shown next to the icon and the current gas concentration is displayed. The icon changes to indicate that the detector is out of monitor mode, or is in a fault or alarm state. Alarms and faults can be present simultaneously (the alarm will supercede fault notification on the main display and status bar color). When the detector is not detecting, "Out of monitor" is displayed and 4 dashes are shown instead of a gas concentration. When the detector is out of monitor mode, the status bar will change to blue. When a gas concentration exceeds the limit, "Over limit" is displayed and the gas concentration is preceded by the greater-than symbol (">").

Battery

The detector's battery level is indicated from 0 (fully discharged) to 100% (fully charged). The battery icon displays the approximate battery level on the status bar, while a more accurate value can be found in the Review mode under Additional Status. If the battery's charge is too low for safe operation, a "Critically low battery!" message will be displayed.

Bar graph

The bar graph displays the concentration reading up to double the Alarm 2 value for the gas being monitored. The Alarm 1 and Alarm 2 values are indicated numerically on the bar graph.

The display can be configured for different backlight and dimming options. By default the backlight will dim after a few minutes of no activity. The display can be configured to turn off the backlight entirely after a set period of time.

Inhibit

When the detector is in inhibit mode, it will show a bell icon with a red slash through it.

1. Use the [Up] or [Down] buttons to select the "Inhibit" on the Maintenance menu.

2. Press the [Accept] button.

3. The Inhibit Type menu or the Time Out menu can then be selected. Possible inhibit types are none, alarms only, faults only, alarms and faults, and all, as shown in the following table). The Time Out options (the time until the detector exits inhibit mode and returns to active monitoring) are from 1 to 60 minutes.

4. To take the unit out of inhibit, select "None" from the Inhibit Type menu and press the [Accept] button twice to return to the Maintenance menu.

NOTE

If the inhibit times out before the inhibit state is returned to "none," maintenance fault code M17 will be displayed.

Inhibit Modes					
Parameter	Inhibit - None	Inhibit - Alarms Only	Inhibit - Faults Only	Inhibit - Alarms & Faults	Inhibit - All
4-20 mA Operation [1]					
Concentration > Full Scale	Over-range Level	Over-range Level	Over-range Level	Over-range Level	Inhibit Level
Concentration Above Alarm Threshold	Concen-tration Level	Concentration Level	Concentration Level	Concentration Level	Inhibit Level
Instrument Fault	< 1 mA	< 1 mA	#N/A	#N/A	#N/A
Non-Zero Concentration	Concentration Level	Concentration Level	Concentration Level	Concentration Level	Inhibit Level
Maintenance Fault	Maint Fault Level	Maint Fault Level	#N/A	#N/A	#N/A
Simulated Instrument Fault	< 1 mA	< 1 mA	#N/A	#N/A	#N/A
Simulated Maintenance Fault	Maint Fault Level	Maint Fault Level	#N/A	#N/A	#N/A
Zero Concentration	4 mA	Inhibit Level	Inhibit Level	Inhibit Level	Inhibit Level
Out Of Monitor	4 mA	Inhibit Level	Inhibit Level	Inhibit Level	Inhibit Level
Other I/O Behavior [2]					
Red LED	Yes	Yes	Yes	Yes	Yes
Yellow LED	Yes	Yes	Yes	Yes	Yes
Alarm 1 Relay	Yes	No	Yes	No	No
Alarm 2 Relay	Yes	No	Yes	No	No
Any Alarm Relay	Yes	No	Yes	No	No
Maintenance Fault Relay	Yes	Yes	No	No	No
Instrument Fault Relay	Yes	Yes	No	No	No
Any Fault Relay	Yes	Yes	No	No	No
Buzzer	Yes	Yes [3]	Yes [4]	No	No
LCD - Alarm	Yes	Yes	Yes	Yes	Yes
LCD - Fault	Yes	Yes	Yes	Yes	Yes
LCD - Concentration	Yes	Yes	Yes	Yes	Yes
Web - Alarm	Yes	Yes	Yes	Yes	Yes
Web - Fault	Yes	Yes	Yes	Yes	Yes
Web - Concentration	Yes	Yes	Yes	Yes	Yes
MODBUS/TCP - Alarm	Yes	No	Yes	No	No
MODBUS/TCP - Fault	Yes	Yes	No	No	No
MODBUS/TCP - Concentration	Yes	Yes	Yes	Yes	No
Event History	Yes	Yes	Yes	Yes	Yes

[1] Conditions are listed with the highest priority at the top. The 4-20 mA output will take the state of the highest priority applicable condition that is present.

[2] Yes = operates normally
Yes with conditions = active only under some conditions
No = not active

[3] For real and simulated faults only

[4] For real and simulated alarms only

Review menu

Event History

The detector's history can be reviewed from the Review menu. It can be searched by event (alarms, faults, alarms and faults, or all events) or by a range of dates. The results of a search can be displayed as a list of events. Results of searches can be sorted by oldest event first or most recent event first. The results can be exported to a USB flash drive. Web events (event type, event subtype, date/time stamp, concentration/data, or event descriptions) can be viewed.
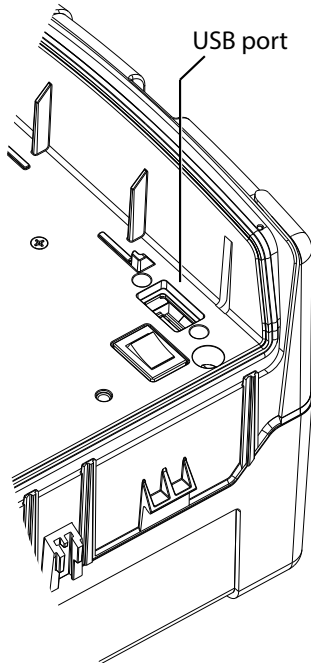
USB port

Figure 23. Locations of the USB port and on/off rocker switch

NOTE

FAT32 is the default file system of the SPM Flex detector. The detector does not read/write NTFS disks.

Chemcassette

The Chemcassette review screen displays the Chemcassette type, its serial number, expiration date, and the days remaining before it must be changed.

Gas Settings

The gas being detected, its abbreviation, the CAS number, the LDL, the full scale, the Alarms 1 and 2 setpoints, and the 4-20 mA full scale can be seen on the Gas Settings review screen.

Network

The Network Summary option displays the IP address, the Subnet mask, the Gateway, and the MAC address.

Additional Status

The flow rate of the gas, the battery level, the ambient temperature and relative humidity, and the stream temperature and relative humidity can be found on the Additional Status Summary screen.

Output State

The detector's relay assignment (i.e., Alarm 1, Alarm 2, or Instrument Fault), the current relay states (e.g., off, off, on), the current mA output (driven value and measured value), and the current inhibit state are displayed in the Output State Summary.

Trend/Plot

The Trend/Plot review screen shows the date, time, and time range. A trend plot over the specified time range can be displayed. The data can be exported to a flash drive via the USB port as a csv file.

Software

The Software summary screen displays the number of the current version numbers of the software, the user interface, the gas detection algorithm, the optics algorithm, and the RFID algorithm.

> ⚠️ **WARNING**
>
> Calibration, set-up, and test modes are intended for use by trained personnel or service engineers only. Access to these modes can be passcode protected.

Maintenance menu

Inhibit

Alarms or alarms and faults can be inhibited from the Maintenance menu. The timeout period (the length of time before inhibit mode is exited and monitoring resumes) can also be configured here. The range is 1 to 60 minutes. The default timeout period is 30 minutes. A timeout period of 0 minutes means that the feature is disabled.

4-20 mA current loop calibration

This feature allows the detector's output to match an external monitoring device.

Flow characterization

Flow characterization is an optional function. When utilized, it allows a flow

system to be optimized with a certain type of Chemcassette cartridge. This allows the SPM Flex detector to quickly reach the correct flow rate.

Open/close gate

The gate can be opened and closed manually. For intermittent use, this allows Chemcassette cartridges to be conveniently removed and stored.

Update program

Through the *Update program* option, the new firmware can be loaded via the USB port.

Factory service mode

For Honeywell Analytics service personnel only.

Setup menu

Many of the functions of the SPM Flex detector can be configured from the Setup menu.

General

The backlight intensity and timeout period are chosen from this menu as well. The power-up options are chosen from this menu. The detector can be programmed to be in monitoring mode or out of monitoring mode when powered up. It can also be programmed to power up in the state it was in when it was powered down. (This is the default state.) Finally, if languages other than English are loaded in the detector's software, the language can be chosen from the General menu.

The unit IDs, either short (up to 20 characters) or long (up to 35 characters) and an idle timeout period of from 1 to 60 minutes (20 minutes default) can also be entered from the General menu. An idle timeout period of 0 minutes will disable the idle timeout function.

Monitoring

The available gases are displayed and can be selected from the Gas menu. Alarms 1 and 2 can be enabled or disabled and their respective setpoints can be adjusted. The LDL can also be enabled or disabled and user-defined LDL limits can be entered. The minimum and maximum values for the 4-20 mA full scale can be entered.

The TWA mode can be set for either a fixed start time or a floating start time at the TWA menu. The TWA start time can also be entered. The default is 08:00 but another time can be entered by the user. In this case, the detector will calculate the second time (8 hours later) and third time (16 hours later).

Before storing the detector following a gas event, purge the flow system by operating the detector in clean air until it returns to zero. If the case must be wiped down, install push fittings in the Sample In/Out ports to prevent fluids from entering the detector.

> ## NOTE
> The detector's continuous monitoring algorithm enables a fast response and high sensitivity. It also rapidly indicates trends. However, in some cases, this algorithm can cause the decay time to be substantial, especially with gases having slow stain development, specifically low level AsH3 and GeH4. In the absence of gas, it may be necessary to continue monitoring for several minutes before zero concentration is reported.

Latching

The SPM Flex detector's alarms and faults can be either latching or non-latching, depending on the settings on the Latching menu. The default for both is latching.

Outputs

The detector's display characteristics (e.g., brightness, time to dim/time to off) are set at the Display menu. The volume of the alarms (silent, low, medium, or high) are chosen from the Audio menu options. Parameters set from the Relays menu are relay assignments, that alarm relay's normal state (energized or de-energized), and the maintenance fault's normal state (energized or de-energized). Three parameters can be set from the 4-20 mA Levels menu: the inhibit level from 1.5 mA to 3.5 mA (the default is 2.0 mA), the maintenance fault level from 1.5 mA to 3.5 mA (the default is 3 mA), and the overrange level from 21.0 mA to 22.0 mA (the default is 21.5 mA). The mA levels are adjusted in 0.5 mA increments.

Network

The Ethernet mode can be set for either auto or manual. In manual mode, the IP address, subnet mask, and default gateway can be specified. The Modbus TCP menu can be enabled or disabled (disabled is the default).

The web server is not designed for more than ten simultaneous connections. (Responses will be slower with more connections.)

Security

> ## ⚠️ **WARNING**
>
> Follow local and site procedures when working with the SPM Flex gas detector. If needed, ensure that the associated control panel is inhibited in order to prevent false alarms. The following procedures must be followed carefully and performed only by suitably trained personnel.

When enabled, the detector has five security levels, summarized in this table. Passcodes are entered at the login menu.

Access Rights	Security Levels					
	0 Not Logged In	1 Routine Maintneance	2 Advanced Maintneance	3 Power User	4 Admin	5 Factory Service
Log in/log out	●	●	●	●	●	●
Reset alarms and faults	●	●	●	●	●	●
Review mode	●	●	●	●	●	●
Limited maintenance access		●	●	●	●	●
Change Chemcassette (to same type)		●	●	●	●	●
Testing			●	●	●	●
Maintenance			●	●	●	●
Limited setup			●	●	●	●
Full setup				●	●	●
Change Chemcassette (to any type)				●	●	●
Security					●	●
Program update					●	●
Factory service menu (Honeywell personnel only)						●

Configuration Manager
Access to options for up to five internal flash slots can be chosen from the Configuration Manager menu. Information can also be imported to or exported from the detector via the USB option.

Test menu

The detector's optical system can be checked from the Optics Verification screen (using the verification card.) Alarms 1 and 2, maintenance faults, and instrument faults can be tested from the Simulate menu. The alarms and faults can also be reset from the Simulate menu. The Force Relays and Force 4-20 mA options are also available through the Test menu.

Power off

Select "Power off" to shut off the detector. Selecting this option has the same effect as pressing and holding the power button for 5 seconds.

Troubleshooting

Symptom	Cause	Corrective Action
No display	Faulty connection at display	Check the multi-pin connector on the back of the display (the display must removed from cabinet)
No blue light	No power to the detector	Turn the circuit breaker on
		Check the power cable
Detector does not appear on the network	Incorrect network connection	Check cable connection to Ethernet port System is for internal use only
	Detector not configured for the network	Verify that network configuration is enabled
		Use the "Auto..." setting
SPM Flex won't turn on	No external power (blue light)	Check external connection Check power supply is plugged in Check circuit breaker
	Battery too low	Plug SPM Flex in to recharge the battery or use external power supply. Confirm that the blue light is present in the LED status bar. If the battery pack is overly discharged the unit will not turn on unless plugged in to the external power. When fully discharged, the battery pack will initially charge at a slower rate than normal until it reaches a minimum voltage.
	Blue light present but won't turn on	Check physical power switch (located in Chemcassette cartridge bay) is in the on position. Press and hold the on switch on the top left of the display until you see activity.
No display	Faulty connection	Check ribbon cable is properly seated
	Broken display or interface board	Replace display/interface board. Contact HA
	Unit is not powered on	See section for turning unit on and troubleshooting power issues
SPM Flex is not on Ethernet network	Physical connection issue	Check correct CAT5 cable is used. Check cable is properly connected at both ends. Confirm network port is active.
	Incorrect configuration	If possible, use Auto detect configuration to automatically get IP configuration from network. Otherwise, check IP configuration is correct. Reboot.
Cannot get Modbus TCP data over network	Incorrect configuration	Confirm network configuration for SPM Flex and target device. Confirm target device is on the same network/subnet. Confirm SPM Flex IP address on Review/Network Summary.
Detector does not communicate via USB	Faulty connection	Check the cable connection
Detector cannot provide a 4-20 mA output	Faulty connection	Check the cable connection
Relay not activated when unit states that it has been	Faulty connection	Check the cable connection
No date or time	Real-time battery expired	Replace the real-time battery
		Contact Honeywell Analytics
Chemcassette cartridge will not install properly	Shipping tab still in place	Confirm that the red shipping tab has been removed from the payout spool
	Gate closed	Use Change Chemcassette wizard to open gate and guide you through the process
	Security lockout	Confirm you are logged in with an account with appropriate security level to change Chemcassette cartridge
Unit will not read Chemcassette	Defective RFID chip	Replace Chemcassette
Chemcassette gate won't open	Gate open command not sent	Use either Change Chemcassette wizard or Maintenance / Open/Close gate.
	Gate motor is broken	Replace gate motor or contact HA
Chemcassette tape will not advance	No power	Check the cable connection
Chemcassette tape continues to advance	Encoder	Check the cable connection
	Hall effect sensor	Check the cable connection

Symptom	Cause	Corrective Action
Chemcassette gate will not open	No power	Check the cable connection
Cannot remove Chemcassette cartridge	Gate open command not sent	Use either Change Chemcassette wizard or Maintenance / Open/Close gate.
Chemcasette cartridge door will not latch closed	Door is not properly closed or aligned	Make sure Chemcassette cartridge is fully seated. Make sure USB stick is not interfering with door. Make sure door is fully seated on both sides – latches should hook under the tabs on the side of the case easily. Make sure all four latches are properly secured.
Pump will not turn on	No power	Check the cable connection
Cannot achieve target flow rate	Inlet or outlet tube is blocked	Confirm inlet and outlet tube are free of restrictions or kinks, and that all filters are clean.
	Gate is not sealing correctly	Confirm Chemcassette cartridge is fully seated. Exit and enter monitor to pull a fresh part of the tape.
	Pump is old	Replace pump. Contact HA.
	Filters are clogged	Check filters (internal and external) and replace as needed
	Tubing connections are not properly seated	Confirm all tubing connections are properly seated (internal and external).
SPM Flex will not connect properly or stay on mounting plate	Incorrectly installed mounting plate	Make sure the mounting plate is installed the correct direction so that the mounting heads on the back of the SPM Flex can slot in and slide down to secure.
	Mounting screws not installed	Confirm the mounting screws have been installed on the back of the SPM Flex
Gas readings are not as expected	Flow system issue	Confirm all tubing connections are properly inserted. Confirm correct filter type is used for the target gas. When in doubt use the corrosive filter. Confirm target flow rate is achieved.
	Chemcassette cartridge issue	Confirm correct Chemcassette cartridge is selected for the target gas. Confirm Chemcassette cartridge is within operating age, sampling conditions, and has been correctly stored. If generating a gas bump test gas to confirm performance, refer to gas generation document located in the online High Tech Technical Library. Refer to individual Chemcassette type technical notes for specific performance information.
Buzzer does not activate	No power	Check the cable connection
SPM Flex won't turn off	Power button on top left / menu option not available	Ensure that user is logged in with the correct security level
SPM Flex unintentionally turns on during transport	Physical power switch is on, unintentionally pushing power switch by display	Put the physical power switch located behind the Chemcassette door in the off position. Place switch back in the on position when ready to use again.
Detector will not charge	Faulty connection	Check the cable connection

*corrective actions vary with security levels

Type	Sub-type	Display String	Technical Description	Meaning of Parameter	Probable Cause	Corrective Action
Instrument Faults	101	Flow Failure	Flow failure	Flow, cc/min	Pump failure -Flow line obstruction -Positive pressure	Replace pump Check flow lines Check for positive pressure
	103	Gate Motor Failure	Gate timeout	N/A	Gate motor failure -Gate motor sensor failure	Replace
	104	Tape Advance Failure	Tape advance timeout	N/A	Broken tape -Tape drive motor failure -Encoder failure	Replace
	105	High Background	optics counts too low after multiple pulls	N/A	Tape issue	Check, replace
	106	Gas Table Invalid	Gas table invalid	error code	CC RFID issue	Replace, contact HA
	107	Comm. Failure RFID.	comm. fail to RFID reader	N/A	RFID PCB failure	Replace
	108	Chemcassette Read Failure	RFID read failure	N/A	CC RFID issue	Replace, contact HA
	109	Temperature Too High	overtemperature	Temperature, C	Environment is over recommended temperature	Improve ventilation/cooling
	110	Temperature Too Low	undertemperature	Temperature, C	Environment is below recommended temperature	Bring environment to correct temperature
	111	Optics Error	value of LED drive or reference detector signal out of range	N/A	Optics PCB failure	Replace
	112	Low Voltage Fault	DC input voltage low	voltage in Volts		
	113	Chemcassette Expired	Now>LifeInBag+Mfg or Now>LifeOutOfBag+FirstUse	1.0 or 2.0 for two causes	Chemcassette cartridge has expired	Replace
	114	Optics Subsystem Fail	no comm. to optics block	N/A	Optics cable disconnected -Optics PCB failure	Reconnect, replace
	115	Comm. Failure GD	no comm. to GD	N/A	Main PCB failure	Contact HA
	116	Electrical Noise	Optics signal noisy	N/A	External electrical noise PCB failure	Check environment Contact HA
	117	NV Memory Corrupt	CRC error	code to which test failed.	PCB failure	Replace
	118	mA Output Mismatch	Feedback ADC mismatches DAC	Error magnitude in mA.		
	119	Ethernet Fail	Ethernet hardware in UI failed to initialize	N/A	External connection issue Main PCB failure	Check external Ethernet connection Replace
	120	Battery Very Low	Battery critically low, shutting down	Battery level	Low battery	Charge unit
Maintenance Faults	1	Flow Warning	Flow is unregulated	Flow, cc/min	Flow out of control range	Check Chemcassette Check sample tube
	2	Chemcassette Low	Tape will run out in 24 hrs	N/A	Low tape	Replace
	3	Idle Timeout	out of monitor too long	N/A	Out of monitor	Put in monitor and reset fault
	4	Low Voltage Warning	DC input voltage low	voltage in Volts		
	5	Comm Failure SPI	no SPI comm. to UI	N/A		Contact HA
	6	File System Error	File system error in NAND or USB.	N/A		Contact HA
	7	Comm. Invalid GD	Invalid SPI parameter data from GD.	N/A		Contact HA
	8	Warn CC Expiring	Prediction tape will expire in 24 hours.	N/A	Old tape	Replace
	9	Software Error	catch all	error code		
	10	Optics Adjust Fail		error code		
	11	Flow Cal Fail		error code		
	12	Inhibit Timeout		N/A	Unit has been left in inhibit mode longer than timeout warning	Reset
	13	Force mA Timeout		N/A	Unit has been in force mode too long	Take out of force mode, reset fault
	14	Force Relay Timeout		N/A	Unit has been in force mode too long	Take out of force mode, reset fault
	15	Battery Low	Battery Low		Battery is low	Charge battery

table continued...

			Instrument Fault/Maintenance Fault/Information Codes			
Type	**Sub-type**	**Display String**	**Technical Description**	**Meaning of Parameter**	**Probable Cause**	**Corrective Action**
Information	1	SPM Energized	The microprocessor booted	N/A	N/A	N/A
	2	Monitoring Started	Monitoring started	N/A	N/A	N/A
	3	Monitoring Stopped	Monitoring stopped	N/A	N/A	N/A
	4	Tape Advanced	A new windows was pulled. (remove for production)	N/A	N/A	N/A
	5	Force mA Requested		zero	N/A	N/A
	6	mA Output Forced	current loop forcing started	zero	N/A	N/A
	7	mA Output Released	current loop forcing ended.	N/A	N/A	N/A
	8	User Login	User logged-in successful.	User level which just logged in, 0 is lowest level	N/A	N/A
	9	User Logged Out	User logged out manually or by timeout.	User level which just logged out, 0 is lowest level	N/A	N/A
	10	Alarm/Fault Reset Request	UI requests alarm/fault reset.	N/A	N/A	N/A
	11	Silent Buzzer Request	UI requests to shut up buzzer through Alarm/fault reset menu.	N/A	N/A	N/A
	12	Enter Monitor Request.	UI requests to enter monitor	N/A	N/A	N/A
	13	Exit Monitor Request	UI requests to out of monitor	N/A	N/A	N/A
	14	Change CC Started	UI initialize change CC sequence	N/A	N/A	N/A
	15	Inhibit Started	UI initializes inhibit.	which type of inhibit.	N/A	N/A
	16	Inhibit End Request	UI request to end inhibit.	N/A	N/A	N/A
	17	4-20mA Calibration Started	UI initializes 4-20 calibration.	N/A	N/A	N/A
	18	Flow Characterization Started	UI initializes flow char	N/A	N/A	N/A
	19	Update Program Started	User chose an update file to perform program update.	N/A	N/A	N/A
	20	Update Program Failed	Update program failed	N/A	N/A	N/A
	21	Update Program Success	Update program success	N/A	N/A	N/A
	22	Gas Related Configuration.	Gas related set up changed by UI.	N/A	N/A	N/A
	23	Non Gas Related Configuration.	Non-gas set up changed by UI.	N/A	N/A	N/A
	24	Security Set Up Configuration	Security set up changed	N/A	N/A	N/A
	25	Optics Verification Started	UI initialized optics verification sequence	N/A	N/A	N/A
	26	Simulation Started	UI requests to start simulation.	N/A	N/A	N/A
	27	Force Relay Started	UI started force relay.	N/A	N/A	N/A
	28	Force Relay End Request	UI exited force relay function.	N/A	N/A	N/A
	29	Time Changed	UI time set	N/A	N/A	N/A
	30	Optics Auto Adjust Requested		N/A	N/A	N/A
	31	Optics Auto Adjust Success	Optics Auto-Adjust Success.	LED drive counts	N/A	N/A
	32	Optics Corrected	LED output dropped unexpectedly	1 – first SLDE 2 – second SLDE 3 – Reference Photodiode Shift	N/A	N/A
	33	Mfg Service Mode	UI has received commands to go into manufacturing service mode	None	N/A	N/A
	34	Electrical Noise	Optics block reports signal is noisy		N/A	N/A

Maintenance

Perform maintenance activities according this schedule. Use only Honeywell Analytics replacement parts. Use appropriate static discharge mitigation while servicing the interior of the detector to avoid damage.

Maintenance Intervals (months)			
Description	3	6	12
Authorized Honeywell preventive maintenance			●
Replace the end-of-line filter	●		
Check pump			●*
Check for system leaks		●	
Verify optic system response			●
Replace internal filters			●
Check stepper motor	as needed		
Check gate motor	as needed		
Clean the exterior surfaces	as needed		
Replace real-time coin battery	3 years or as needed		
Replace main battery	return the detector to Honeywell Analytics		

*or as needed

Authorized Honeywell preventive maintenance

In addition to the standard maintenance schedule performed by the end user, it is recommended that units are periodically returned to Honeywell for comprehensive inspection, cleaning, and systems tests. While not required, users are encouraged to have this service performed every one to three years depending on usage, site conditions, and gases monitored to help ensure years of continued smooth operation.

To replace the end-of-the-line filter

Hold down the locking ring on the push fitting, as shown in Figure 24, to release the filter. Gently press the new filter into the fitting until it locks. An arrow is printed on the filter to show the gas's proper direction of flow.
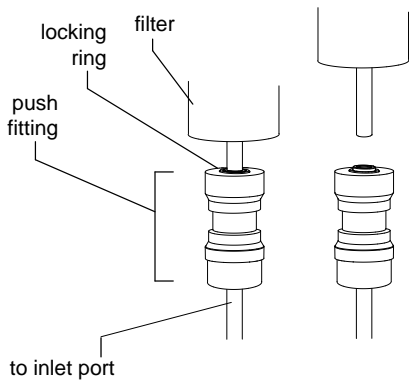
Figure 24. Removing a filter from a push fitting

To check the pump

The detector will display an instrument fault in the event of a pump malfunction. See pages 44-45.

To check for system leaks

1. Place the detector in Inhibit mode.

2. In the Review menu, navigate to the Additional Status option.

3. Plug the inlet tube and observe the flow reading on the LCD display. If the flow stabilizes at more that maximum cc/m (shown for each gas in the following table), there is likely a system leak.

Family	Gas	Maximum Allowable Leak Rate (cc/min)
Hydrides	AsH3	30
	PH3	30
	B2H6	30
	SiH4	30
	GeH4	30
	H2Se	30
	H2S	50
Mineral Acids	HF	50
	HCl	50
	HBr	50
	BF3	50
Mineral Acids (export unrestricted)	HF	50
	HCl	50
	HBr	50
	BF3	50
Oxidizers	Cl2	50
	F2	30
	NO2	30
	ClO2	50
Amines	NH3	30
	DMA	30
	TDMAT	30
	TMA	TBD
COCl2	COCl2	50
Diisocyanates	TDI	TBD
	MDI	TBD
	HDI	TBD
Hydrazines	N2H4	50
	MMH	50
	UDMH	50
HCN		30
SO2		30
O3		30
H2O2		TBD

To verify optic system response
Using the optional optics test card, perform the optics verification test.

From the Test menu, select the Optics verification option and follow the instructions on the display. If the "Optics verification success!" message is displayed, the optic system is functioning normally. If the "Optics verification failed! Please remove card and put Chemcassette back" message is displayed, return the detector the Honeywell Analytics for service.

To replace internal filters
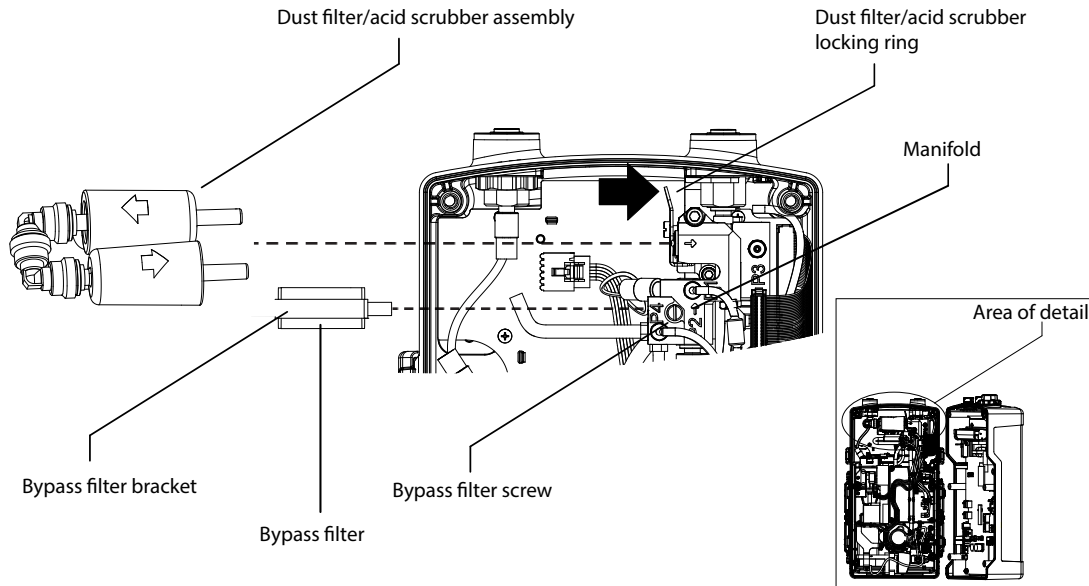
Figure 25. Removing the internal filters

The dust filter and acid scrubber are attached to a single manifold. Press and hold the locking ring on the fitting firmly in the direction of the arrow and lift the filter assembly out together. Replace the filters in the manifold and reattach the assembly by gently pressing it into the Push fittings until it locks.

To free the bypass filter, remove the bypass filter screw and pull out the bracket-filter assembly. Disconnect the black bypass tube. Attach the tube to the new filter-bracket assembly, insert it in the manifold, and tighten the bypass filter screw.

Perform a leak test (see the previous page) after every filter replacement.

To check the stepper motor
The detector will display an instrument fault in the event of a stepper motor malfunction. See pages 44-45.

To check the gate motor
The detector will display an instrument fault in the event of a gate motor malfunction. See pages 44-45.

To replace the real-time coin battery

The battery can be removed by gripping it firmly with needle-nose pliers and pulling straight out. Gently press the new battery with the positive (+) side facing out until it snaps into place.
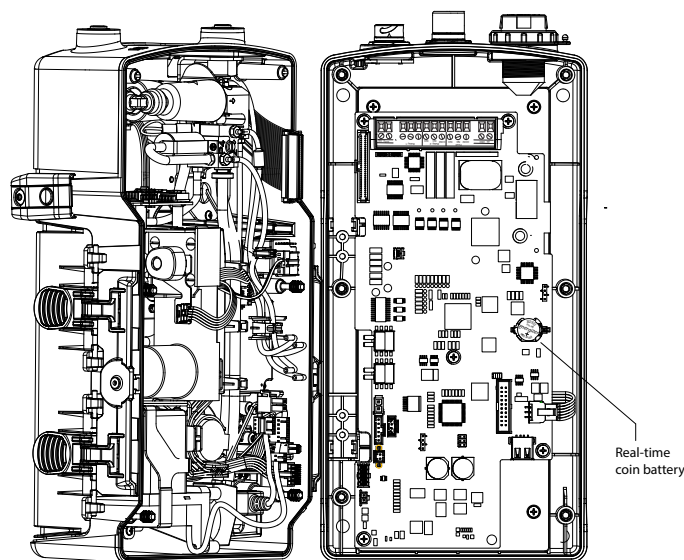
Figure 26. The real-time coin battery

To clean the exterior surfaces

Exterior surfaces of the detector can be cleaned with a soft cloth moistened with water or with 6% IPA alcohol wipes.

Storing the detector

When storing the detector with the power adaptor plugged in, the rocker switch can be left in the on position; the battery will continue charging. The detector can also be charged with the rocker switch off.

When storing the detector without being plugged into the power adaptor, turn the rocker switch off. This will minimize the power .. This is the recommended setting for long-term storage or for transporting the detector. Charge the detector at least four hours every three months (the rocker switch can remain off).

Recycling

At the end of its usable life, return the detector to Honeywell Analytics for recycling.

Storing Chemcassette® cartridges

Follow the instructions on the cartridge label for acceptable storage temperatures and expiration dates.

Labels

Flex CC-S-U XP Mineral Acids
(XP-MA)
P/N 1265-4012
Stor.Temp.: **Less than 0°C (32°F)**
Exp.Date: **04-Mar-2015**
SFID# 1265-40129131026
Detect: **HF, HCl, HBr, BF3**

Made in USA

Flex CC-S-U XP
Mineral Acids
(XP-MA)

Packing label

P/N 1265-4012
Flex CC-S-U XP Mineral
Acids
(XP-MA)
Exp. Date: **04-Mar-2015**
Stor. Temp.:**Less than 0°C (32°F)**

Cartridge top

P/N 1265-4012

SFID# 1265-40129131026
Made in USA

Cartridge bottom

Figure 27. Chemcassette packing and cartridge labels

The cartridge's bottom label contains the RFID tag.

Honeywell Analytics, Inc.
405 Barclay Blvd
Lincolnshire, IL 60069 USA
tel: +1 847 955 8200
e-mail: ha.us.service@honeywell.com
Made In Korea / Fabrique en Corée

UL CERTIFIED
SAFETY US·CA
SÉCURITÉ US·CA
E468246

SPM Flex Gas Detector
P/N: 1265-0500 Rev. 0A
Input Voltage: ⎓ 24VDC 4.0A

CE

126505000A21140018

CAUTION
Certified to reduce risk of electric shocks and electrical fire hazards only.
Warning - Equipment must be isolated or disconnected from voltage supply before servicing
La certification couvre uniquement les risques de choques électriques et d'incendies d'origine électrique.
Attention - Cet équipement doit être isolé ou déconnecté de l'alimentation avant d'y faire des tâches de maintenance.
Patents: US7224285, US7504959

Figure 28. The detector's nameplate

Detectable Gases

Family	Gas	Range	TLV [1]	LAL	Default Alarm		Response time (T50) at 2TLV gas conc.(sec)	Max. Sample Tubing length (m)	ChemCassette			Optimum Temp range (ºC)	Optimum %RH range[6] for +/-20% accuracy
					A1	A2			Name	P/N (30-90d)	P/N (14d)		
Hydrides	AsH3	0.5-500ppb	5 ppb		1 ppb	2.5 ppb	5 ppb	55	30	Flex CC XP Hydrides	1265-3000	1265-4000	0-40	10-70% RH [3, 5]
	PH3	3-3000 ppb	300 ppb	2014 NIC: 0.1ppmTWA; 0.5ppm STEL-C	5 ppb	150 ppb	300 ppb	6	30					30-70% RH [3, 5]
	B2H6	5-1000 ppb	100 ppb		10 ppb	50 ppb	100 ppb	14	30					30-70% RH [4, 5]
	SiH4	0.03 - 50 ppm	5 ppm		0.05 ppm	2.5 ppm	5 ppb	13	30					34-50% RH [3, 5]
	GeH4	50-2000 ppb	200 ppb		100 ppb	100 ppb	200 ppb	245	30					40-50% RH [3, 5]
	H2Se	2-500 ppb	50 ppb		5 ppb	25 ppb	50 ppb	14	30					10-60% RH [3, 5]
	H2S	0.001-9.999 ppm	1 ppm		0.005 ppm	0.5 ppm	1 ppm	7	30					10-75% RH [3, 5]
Mineral Acids	HF	0.02-20 ppm	0.5 ppm	2 ppm STEL-C	0.03 ppm	1 ppm	2 ppm	7	5	Flex CC XP Mineral Acids	1265-3001	1265-4001	0-35	15-75% RH [4, 5]
	HCl	0.02-20 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	5	5					30-50% RH [4, 5]
	HBr	0.02-10 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	4	5					15-60% RH [4, 5]
	BF3	0.05-10 ppm	1 ppm	STEL-C	0.1 ppm	0.5 ppm	1.0 ppm	4	5					15-60% RH [4, 5]
Mineral Acids (export unrestricted)	HF	0.4-20 ppm	0.5 ppm	2 ppm STEL-C	0.4 ppm	1 ppm	2 ppm	7	5	Flex CC-U XP Mineral Acids	1265-3012	1265-4012	0-35	15-75% RH [4, 5]
	HCl	0.02-20 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	5	5					30-50% RH [4, 5]
	HBr	0.02-10 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	4	5					15-60% RH [4, 5]
	BF3	0.05-10 ppm	1 ppm	STEL-C	0.1 ppm	0.5 ppm	1.0 ppm	4	5					15-60% RH [4, 5]
Oxidizers	Cl2	0.005 - 5 ppm	0.5 ppm		0.02 ppm	0.25 ppm	0.5 ppm	7	10	Flex CC XP Chlorine	1265-3002	1265-4002	0-40	30-55% RH [3, 5]
	Cl2	0.01-5 ppm	0.5 ppm		0.05 ppm	0.25 ppm	0.5 ppm	9	10	Flex CC Fluorine/Oxidizers	1265-3004	1265-4004	0-40	0-85% RH
	F2	0.01-10 ppm	1 ppm	0.1 ppm OSHA PEL	0.05 ppm	0.5 ppm	1.0 ppm	5	10					0-85% RH
	NO2	0.03-10 ppm	0.2 ppm		0.05 ppm	0.1 ppm	0.2 ppm	56	30					10-70% RH [4, 5]
	ClO2	20-1000 ppb	100 ppb		25 ppb	50 ppb	100 ppb	36	10					5-90% RH
Amines	NH3	0.01-150 ppm	25 ppm		0.05 ppm	12.5 ppm	25 ppm	4	30	Flex CC XP Ammonia	1265-3003	1265-4003	0-35	0-90% RH [3]
	DMA	0.5-50 ppm	5 ppm		0.1 ppm	2.5 ppm	5 ppm	10	30					5-90% RH [3]
	TDMAT	0.01 -20 ppm	n/a		0.05 ppm	1 ppm	2 ppm	14	30					5-90% RH [3]
	TMA	0.5-50 ppm	5 ppm		0.1 ppm	2.5 ppm	5 ppm		30					0-90% RH [3]
COCl2	COCl2	7-4000 ppb	100 ppb			50 ppb	100 ppb		30	Flex CC XP Phosgene	1265-3007	1265-4007	0-40	10-90% RH
Diisocya-nates	TDI	0.3-150 ppb	1 ppb	2014 NIC (1 ppb TWA; 3 ppb STEL)	0.5 ppb	1 ppb	2 ppb		0.15	Flex CC Diisocyanates	1265-3006	1265-4006	0-40	25-65% RH
	MDI	2-60 ppb	5 ppb			2.5 ppb	5 ppb		0.15					TBD
	HDI	2-60 ppb	5 ppb			2.5 ppb	5 ppb		0.15					TBD
Hydrazines	N2H4	5-1000 ppb	10 ppb			5 ppb	10 ppb		0.15	Flex CC Hydrazines	1265-3008	1265-4008	0-40	10-70% RH [2]
	MMH	3-2000 ppb	10 ppb			5 ppb	10 ppb		5					TBD
	UDMH	3-5000 ppb	10 ppb			5 ppb	10 ppb		5					TBD
HCN	HCN	0.5-30 ppm	4.7 ppm			2.4 ppm	4.7 ppm		10	Flex CC Hydrogen Cyanaide	n/a	1265-4009	0-30	30-75% RH
SO2	SO2	5-2500 ppb	250 ppb			120 ppb	250 ppb		30	Flex CC Sulfur Dioxide	1265-3005	1265-4005	0-40	TBD
O3	O3	10-1000 ppb	100 ppb			50 ppb	100 ppb		5	Flex CC Ozone	1265-3011	1265-4011	0-40	30-55% RH
H2O2	H2O2	0.1-3 ppm	100 ppb				100 ppb		5	Flex CC Hydrogen Peroxide	1265-3010	1265-4010	0-40	TBD

1 Source: ACGIH 2014.

Outside of RH range:

2 Tends to have lower response at higher humidities.

3 Tends to increase sensitivity at higher humidities (due to the chemistry of the reaction).

4 Tends to under-report at higher humidities (typically >75% RH) due to the gas characteristics to adhere or decompose on contact with water/moisture. The response seems to be lower but the actual gas concentration under these high humidity conditions will be lower than expected.

5 Tends to under-report in dry conditions (<25-30% RH).

6 Depending on the combination of temperature and humidity, even within the ranges specified above, a unit's performance efficiency can be influenced due to condensation, physical tape material changes, or optical changes. Consult Honeywell Analytics' Service Department.

Specifications

Description	Value
Detection Technique	Chemcassette-cartridge-based with advanced self monitoring optics design
Dimensions	see page 27
Weight	9.1 lbs. (4.1 kg)
Operating Temperature	0C to 40C for most gases / applications
Operating Humidity	0-100% RH for unit (Sample RH limited per tape/calibration). Sample line requires additional hardware to remove moisture in high RH conditions where condensing may occur. The sample must be non-condensing. Dry conditions may require humidification.
Power supply	Universal Line powered (90-260 VAC 50/60 Hz) for battery charger & non-classified use. Battery: 6+ hours under typical conditions – acts as battery back-up in fixed applications
Power consumption	~1.9 A at 24 VDC (including battery-charging current)

Power adaptor	Manufacturer	FSP Group
	Model	FSP135-AAAN1
	Input	100-240 VAC, 2 A, 50-60 Hz
	Output	24 VDC, 5.62 A
	CCN	QQGQ (E190414)
	Mark of conformity	UL listed

Description	Value
Communications	Relays: Alarm 1, Alarm 2, Fault (user configurable for normally open/closed) 4-20mA Ethernet (with Modbus TCP/IP and web server) USB port (for memory stick configuration/data transfer)
Flow System	Automatic flow control with bypass system, 250 or 500 cc/min at tape, higher flow at inlet to reduce sample time (internal bypass system); sample up to 100 ft
Local Alarms/Status	Visual: LEDs for alarm, normal condition and fault
	Audible: User selectable: Off, Low ~75 dB at 1 m, Medium ~85 dB at 1 m, High >90 dB at 1 m
Interface	4 large buttons, 3.5" Color LCD TFT display, web server
Data Logging	Rolling 3 months (15 sec. with no gas reading, 1 sec. when reading gas), Event history (1500 events – approx. 1 year)

Mounting screws	concrete	5/16 in x 2 in vibration-resistant stud anchor for concrete (McMaster-Carr 94475A185 or equivalent), add 0.25 in. to length when mounting bracket with sun shield
	wood	5/16 in. x 2 in. flange head lag screw for wood (McMaster-Carr 95526A375 or equivalent), add 0.25 in. to length when mounting bracket with sun shield

Description	Value
Battery type	Lithium ion
Battery life	Approximately 70% of its original capacity after 300 full charge/discharge cycles
Maximum inlet/outlet pressure differential	The overall maximum load on the pump between the inlet and the exhaust should not exceed 10 inches H_2O
Communication connector, optional communications cable	60 V, 5 A maximum
Relays	250 V, 6 A maximum

Wire gauges	Minimum	18
	Maximum	12

Description	Value
USB	2.0 or later
Indoor/outdoor use?	both (the power supply is indoor only)

Operating altitudes	-1,000 to 3,000 ft. above sea level	standard
	above 3,000 ft. to 6,000 ft. above sea level	requires factory adjustment, contact Honeywell Analytics

Description	Value
Ingress Protection rating	IP65
External switch or circuit breaker requirement (description & location)	meet or exceed all local codes and regulations
Ventilation requirements	mount with no obstructions within 4 in. (10 cm) of either side or within 2 in. (5 cm) above and below the detector

4-20 mA output defaults and ranges	Inhibit	2 mA, programmable from 1.5-3.5 mA in 0.5 mA increments
	Maintenance	3 mA, programmable from 1.5-3.5 in 0.5 increments
	Instrument fault	1 mA or less, not programmable (will be driven under 1 mA)
	Over-scale	21.5 mA, programmable 21-22 mA
	4-20 mA configurations	sink, source, isolated

Storage conditions	Detector	32°F to 104°F (0°C to 40°C), 0-100% RH non-condensing
	Chemcassette cartridges	less than 32°F (0°C)

Certifications	Detector	UL 61010-1, 3rd Edition, 2012-05 (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - Part 1: General Requirements)
		CAN/CSA-C22.2 No. 61010-1, 3rd Edition, 2012-05, (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - Part 1: General Requirements)
		IEC 61010-1:2010, 3rd Edition
		FCC approval for RFID board + Canadian and European
	Battery	UL/cUL Recognition to UL 2054 + 60950-1
		IEC 62133 1st Edition CB Certification
		UN Test Report to UN 38.3
	Self-declared European CE Mark on detector for:	EMC, LVD, ROHS, WEEE

Accessories and Parts

> ⚠️ **WARNING**
>
> Use only accessories and parts meeting or exceeding Honeywell Analytics' specifications.

Description		Part No.
SPM Flex base units	SPM Flex base unit	1265-0500
SPM Flex fixed units[1]	Australia	SPMF-F1AU
	Switzerland	SPMF-F1CH
	Denmark	SPMF-F1DK
	Europe	SPMF-F1EU
	Great Britain	SPMF-F1GB
	Japan	SPMF-F1JP
	North America	SPMF-F1US
SPM Flex portable units[2]	Australia	SPMF-P1AU
	Switzerland	SPMF-P1CH
	Denmark	SPMF-P1DK
	Europe	SPMF-P1EU
	Great Britain	SPMF-P1GB
	Japan	SPMF-P1JP
	North America	SPMF-P1US
Accessories	Shoulder strap for portable base unit (made from clean-room-compatible materials; the strap must be properly laundered and stored for clean room use)	SPMF-STRP
	Inlet sample wand	1265-0171
	Optics packaged test card assembly	1265-2014
	Power battery	factory-replaceable only
	Energizer CR2032 coin battery	0140-0013

Description			Part No.
Parts	Power	Universal power supply, for indoor use only (no cord)	SPMF-PWRS
		North America (120VAC) power cord	874333
		Australia	874557
		Great Britain	874558
		Denmark	874559
		Switzerland	874560
		Europe	874561
		Japan (100VAC)	1874-0112
	Cables and Connectors	Ethernet cable with weatherproof connector	SPMF-ECON
		Communication cable with weatherproof connector	SPMF-CCON
	Spare handle for portable base unit		SPMF-HNDL
	Dust covers	For Ethernet port	SPMF-DCET
		For communication port	SPMF-DCCO
		For power port	SPMF-DCPO
	Tubing	Tubing 1/4" O.D x 1/8" I.D. FEP - for sample inlet, price per foot	102599
		Tubing 1/4" O.D x 1/8" I.D. FEP - for sample inlet, price per foot	100440
		Union fitting - use to connect disposible end of line filter to tubing	0235-0095
	Mounting brackets	Standard mounting bracket for fixed unit (for SPM Flex only)	SPMF-MBST
		Retro-fit mounting bracket for fixed unit (compatible with original SPM)	SPMF-MBRF
	Filters[3]	Filter particulate manifold assy	1265A0115
		Bypass filter	871134
		Disposable microfibre dust filter	780248
		Acid scrubber filter	710235
		Line filter for corrosive gases	1991-0147

continued...

Description			Part No.
Chemcassette cartridges	Long --up to 90 days (XP) or 30 days (standard) of continuous monitoring	SPM Flex CC XP Hydrides	1265-3000
		SPM Flex CC XP Mineral Acids (may require an export license)	1265-3001
		SPM Flex CC XP Chlorine	1265-3002
		SPM Flex CC XP Ammonia	1265-3003
		SPM Flex CC Fluorine Oxidizers	1265-3004
		SPM Flex CC Sulfur Dioxide	1265-3005
		SPM Flex CC Diisocyanates	1265-3006
		SPM Flex CC XP Phosgene	1265-3007
		SPM Flex CC Hydrazine	1265-3008
		SPM Flex CC Hydrogen Peroxide	1265-3010
		SPM Flex CC Ozone	1265-3011
		SPM Flex CC-U XP Mineral Acids (No export restriction - LDL limited above 366 ppb for HF)	1265-3012
	Short --up to 2 weeks of continuous monitoring	SPM Flex CC-S XP Hydrides	1265-4000
		SPM Flex CC-S XP Mineral Acids (may require an export license)	1265-4001
		SPM Flex CC-S XP Chlorine	1265-4002
		SPM Flex CC-S XP Ammonia	1265-4003
		SPM Flex CC-S Fluorine Oxidizers	1265-4004
		SPM Flex CC-S Sulfur Dioxide	1265-4005
		SPM Flex CC-S Diisocyanates	1265-4006
		SPM Flex CC-S XP Phosgene	1265-4007
		SPM Flex CC-S Hydrazine	1265-4008
		SPM Flex CC-S Hydrogen Cyanide	1265-4009
		SPM Flex CC-S Hydrogen Peroxide	1265-4010
		SPM Flex CC-S Ozone	1265-4011
		SPM Flex CC-S-U XP Mineral Acids (No export restriction - LDL limited above 366 ppb for HF)	1265-4012

1 Includes a standard wall mounting bracket, a battery, a power supply (for indoor use only), a manual on CD, a printed quick start guide, and a power cord appropriate for the region.

2 Includes an Ethernet connector, a power connector, a handle accessory kit, a clean-room-safe shoulder strap, a user manual on CD, a printed quick start guide, and a power adaptor with a plug and cable appropriate for the region. (The shoulder strap must be properly laundered and stored for clean room use.)

3 Use an external filter to protect the tubing from contamination (the particulate filter for non-corrosive gases, the corrosive filter for corrosive gases). For multiple-gas applications or if the correct filter is not known, use the corrosive filter. Replace the filter every 3 months. Refer to *Detectable Gases* for information on specific gases.

Certifications

Type Examination Certificate

Certificate Number   20140418- 13CA49834

Issue Date   2014-04-18

Page 1 of 1

Test results apply only to the sample(s) actually tested by UL, LLC ("UL").

Product:	**Rechargeable Li-Ion Battery Pack**
Tests Requested By:	HONEYWELL ANALYTICS INC 405 Barclay Blvd Lincolnshire, IL 60069 United States
Manufacturer:	HONEYWELL ANALYTICS INC 405 Barclay Blvd Lincolnshire, IL 60069 United States
Model/Type/Serial Ref:	SPM Flex (rated 7.8Ah, 11.1Vdc, Pack Configuration 3S-3P)

UL has determined that the sample(s) tested conform with the requirements of the Standard(s) indicated on this Certificate.

The client provided all of the test samples for testing by UL. UL did not select the samples or determine whether the samples provided were representative of other manufactured products. UL has not established Follow-Up Service or other surveillance of the product. UL's name and marks shall not be used on or in connection with the product. The client and or manufacturer are solely and fully responsible for conformity of all products to all applicable standards, specifications or requirements. The test results may not be used, in whole or in part, in any other document without UL's prior written approval.

Standard(s): Section 38.3 of UN ST/SG/AC.10/11/Rev. 5 Issued 2009-01-01 Transport of Dangerous Goods - Manual Tests & Criteria, Fifth Edition, Amendment 1.

Issued By   *Michelle Hahnlein*

Reviewed by

Michelle Hahnlein
UL LLC

Glenn Wang
UL LLC

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Figure 29. Battery certification

Figure 30. IEC certification

placeholder

Figure 31. XXX certification

placeholder

Figure 32. YYY certification

Figure 33. ZZZ certification

Warranties

SPM Flex warranty

All products are designed and manufactured to the latest internationally recognized standards by Honeywell Analytics under a Quality Management System that is certified to ISO 9001.

As such, this instrument (including the pump) is warranted under proper use, to the original end-user purchaser, against any defects in materials or workmanship related failures for a period of 12 months from the date of first turn-on or 18 months from delivery from Honeywell Analytics to the customer, whichever is less. Separate warranty conditions apply to the sensor cartridges limited as indicated below. During this period, Honeywell Analytics will repair or replace defective parts on an exchange basis, F.O.B. to approved service centers on a global basis.

This warranty does not cover damage caused by accident, abuse, or abnormal operating conditions.

Defective equipment must be returned to Honeywell Analytics for repair. Before returning materials for repair or replacement, the Customer must obtain a Service Event Number (SE#) by contacting Honeywell Analytics Service in advance; include a detailed report stating the nature of the defect and ship the equipment prepaid to Honeywell Analytics' factory. If no detail report is included, Honeywell Analytics reserves the right to charge an investigative fee (prices available upon request) before any repair or replacement is performed. Returned goods must detail the Service Event Number (SE#) clearly on the package.

Service in the field or at the customer's premises is not covered under these warranty terms. Time and travel expenses for on-site warranty services will be charged at Honeywell Analytics' normal billing rates. Contact your Honeywell Analytics representative for information on available Service Contracts.

Honeywell Analytics shall not be liable for any loss or damage whatsoever or howsoever occasioned which may be a direct or indirect result of the use or operation of the Contract Goods by the Buyer or any Party.

This warranty covers the gas detector and parts sold to the Buyer only by authorized distributors, dealers and representatives as appointed by Honeywell Analytics. This warranty does not cover defects attributable to improper installation, repair by an unauthorized person or the use of unauthorized accessories/parts on the product. A warranty claim will only be accepted if a proof of purchase is submitted and all conditions obtained within this Warranty are met.

Honeywell Analytics reserves the right to validate any warranty claim prior to processing. Upon acceptance of a warranty claim, Honeywell Analytics will repair or replace the defective product free of charge. The initial warranty period is not extended by virtue of any works carried out there after.

Instruments which have been repaired or replaced during the warranty period are warranted for the remainder of the unexpired portion of the original warranty period. Honeywell Analytics is released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own authorized personnel, unless such work is authorized in writing by Honeywell Analytics. Honeywell Analytics is released from all obligations under its warranty in the event that detection substrates other than Honeywell Analytics' Chemcassettes® have been installed and used in Honeywell Analytics' instruments.

Honeywell Analytics reserves the right to change this policy at any time. Contact Honeywell Analytics for the most current warranty information.

Chemcassette® cartridge warranty

All Chemcassette cartridges® are warranted for a period not to exceed the Chemcassette® cartridge expiration date printed on each package and tape reel.

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