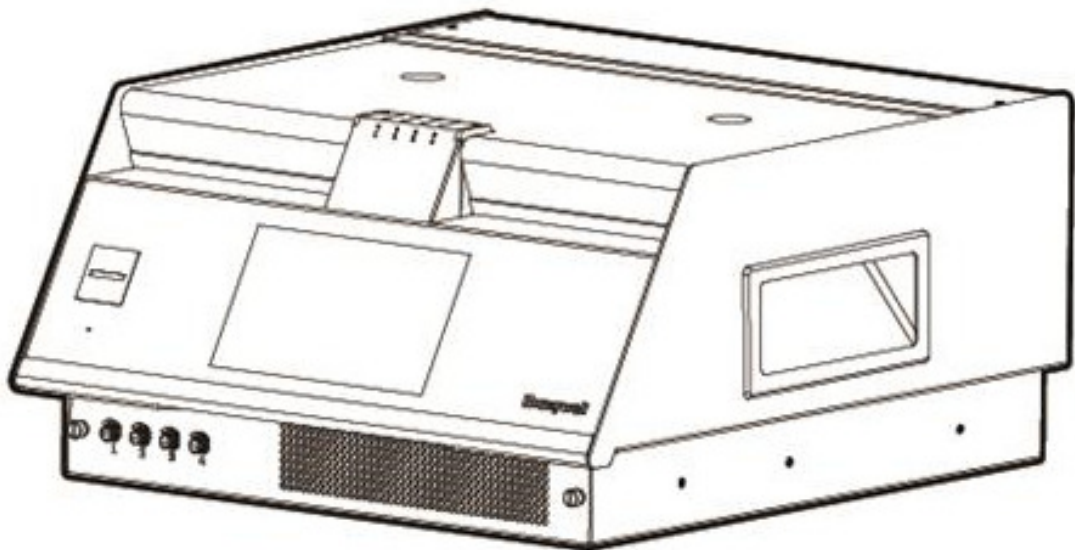


# USER MANUAL

**Vertex™ VC 4**  
4-Points Continuous Monitor



**Honeywell**

xxxx-xxxx-001 Rev-01 ENG @ 2023 Feb

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CHAPTER

# 1 Safety

Read this information before you start using your device.

## Trademarks

Brand or product names are trademarks of their respective owners. The following brand or product names are trademarks of Honeywell:

- Vertex™
- Chemcassette®


## General Safety




Follow all installation and operational instructions to ensure the safe and reliable operation of this unit. If this monitor is used in a manner not specified by Honeywell Analytics Inc., the protection provided by the equipment could be impaired.





**WARNING:** Do not connect or disconnect anything from the Power Distribution Unit (PDU) while energized.

## Continuous Monitor Symbols

Symbol	Description
	Lifting instructions, low clearances, slipping/tripping hazards, minor corrosive dangers. Also used when defining personal protective equipment (gloves, dust masks, etc.)

	Personal injury risk: machinery hazards around guarded equipment, moving parts, crush/pinch hazards, flying debris, and arc flash hazards.
	The most dangerous or potentially lethal hazards: unguarded equipment, confined space entrances, and lockout labels.
	Caution: possibility of electric shock

Symbol	Description
	Caution: hot surface
	Protective conductor terminal (ground terminal)

## EMC Considerations

Your Honeywell Analytics continuous gas monitor has been designed to comply with Electromagnetic Compatibility (EMC) standards applicable at the time of its manufacturing. The design includes filtering, shielding and bypassing techniques. At the time of certification, simulated customer Input/ Output (I/O) schemes were tested.

All methods used in your equipment for emission suppression and reduction of susceptibility are interactive. Modifications to the monitor could result in increased emissions and higher vulnerability to other radiated fields.

Following the guidelines in this EMC Considerations section will ensure your monitor maintains the enhanced degree of EMC integrity. The guidelines listed apply only to I/O emissions and do not apply to A.C. and D.C. monitor power connections.

## FCC Compliance Statement

CAUTION: Changes or modifications not expressly approved could void your authority to use this equipment.

This product complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device 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 device,

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.

To satisfy FCC RF exposure requirements, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

## **NCC Compliance Statement**

Without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic as well as performance to an approved low power radio-frequency devices. The low power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, the user shall cease operating immediately until no interference is achieved. The said legal communications means radio communications is operated in compliance with the Telecommunications Management Act. The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.



# China RoHS

产品中有害物质的名称及含量						
部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板组件	×	○	○	○	○	○
线束及电镀连接组件	×	○	○	○	○	○
第三方电脑、显示器、键盘、光驱、开关、集成器、控制器	×	○	○	○	○	○
机械部件风扇，马达，福马轮	×	○	○	○	○	○
外壳	○	○	○	○	○	○
金属零件	○	○	○	○	○	○
紧固件	×	○	○	○	○	○
管路系统	○	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制

○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

## Cabling

At the very minimum, all cables should include a braided shield. Ensure local electrical code requirements are met.

Braid	Must have a minimum 65% coverage
Foil	When used with braid, provides 100% coverage. Do not use foil alone. It has a tendency to break.
Stranded Pair	Provides the greatest surface area

Shield Termination	<p>Continuation of the shield to the cabinet earth ground is most important.</p> <p>For discrete wire terminations, pigtails to the cabinet (connector) ground should be extremely short (no greater than three inches).</p> <p>For multiconductor connector terminations, only 360° shells should be used.</p>
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Note:

Honeywell Analytics product testing uses >65% braid with foil (around the bundle); twisted pair; stranded 24 AWG (minimum wiring for all qualification and certification testing.)

## Connectors

All qualification and certification of Honeywell Analytics products were achieved with high quality connectors, providing 360° shield coverage. These connectors generally had metal shells.

Failure to properly secure the connector to the equipment will result in high emission levels. Also, poorly constructed or improperly assembled connectors can be a high source of radiated noise and provide a path for external signals into the monitor.

In order to adhere to EMC, all external cables need to be installed in either metal ducts or zipper tubes that have both ends connected to ground.

All Ethernet cables need to be shielded cables.

# 2 Introduction

Learn what you need to know about the Honeywell Vertex™ VC4 4-Point Continuous Monitor System before operating.

## System Overview

The Honeywell Vertex™ VC4 System continuously monitors up to 4 remote locations for toxic gases. It responds to gases that exceed programmed levels by:

- Triggering alarms and opening event windows to warn operators of high concentrations
- Displaying the location, gas type and gas concentration
- Storing the alarm information in a database

The Vertex™ VC4 System provides fast response to a wide range of gases. Each location may be up to 400 ft (122 m) from the Vertex™ VC4 System. The system triggers relays for each individual point for two levels of gas concentrations.

The Vertex™ VC4's flexibility allows it to be easily configured for tabletop use or rack mounting. The Vertex™ VC4 uses Honeywell patented Chemcassette® technology for rapid, accurate gas detection. The system was designed for maximum uptime, so filters, detector tape, and even the entire chassis can be replaced quickly and easily. And the system powers up in the same state as when powered down.

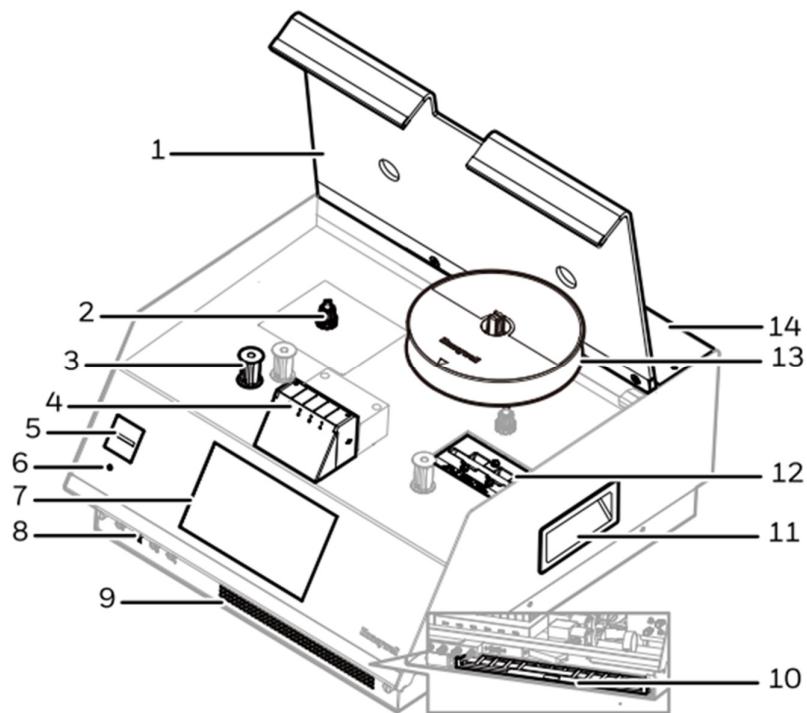
Operation can be through an LCD touch screen or through a local area network (LAN). Chemcassette® is a registered trademark of Honeywell Analytics, Inc.

# System Components

The following photos illustrate the Vertex™ VC4 System views, ports, connections and controls.

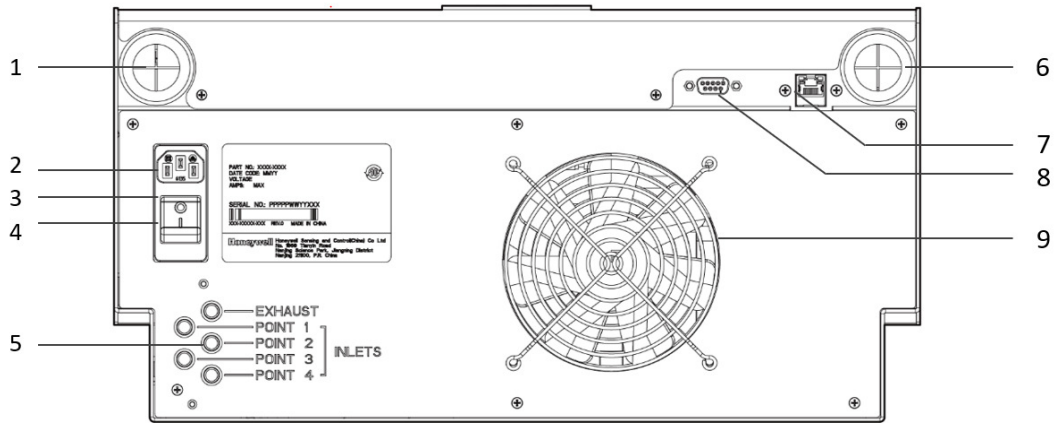
## Overview

1. Cover of Chemcassette®	2. Supply reel	3. Tape guide roller
4. Optics block	5. Status LED	6. Alarm Buzzer
7. HMI Display	8. Needle valve	9. Air filter
10. Keyboard	11. Handle	12. Filter block
13. Take-up reel	14. Cover of IO panel	



## Back view

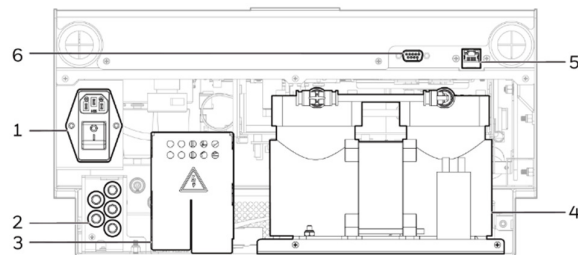
1. Alarm wire panel knockouts	2.Line power in	3.Fuse
4.Power switch	5.Sample inlets and exhaust	6.Current loop knockout
7.Ethernet port	8.COM port	9. Cooling fan



## Interior — Front View

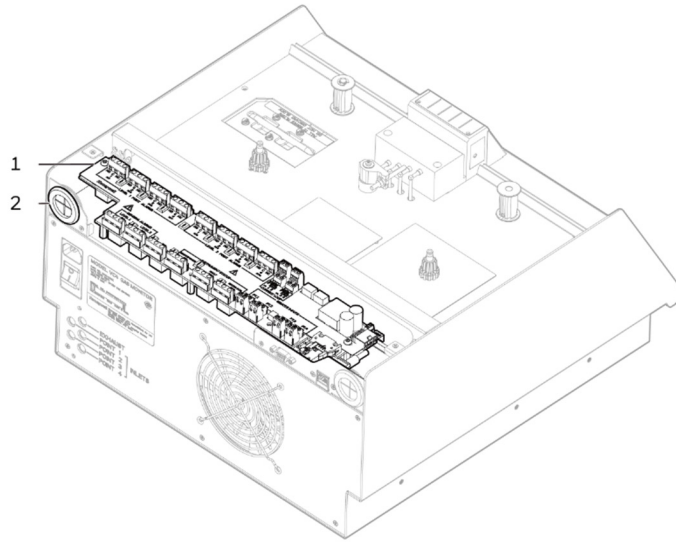
1. Support rod	2. Industrial PC	3. USB port

## Interior — Back View




# IO Panel

1. I/O panel (cover removed)	2. IO connection identification card	3.



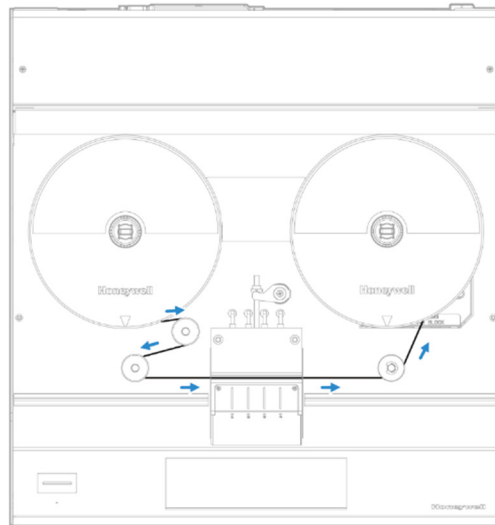
## System Control Unit

1.	2.	3.
4.	5.	6.



# Chemcassette®

## 1. Chemcassette® directional flow



# Sampling System

The Vertex™ VC4 is a monitoring center for sampling lines from sample locations. As they apply to the Vertex™ VC4 System, the words point, line and location require definition:

- A location is a place to be monitored
- Sample atmosphere runs from the location to the Vertex™ VC4 System via a line
- Each of the 4 sample tubing connections on the Vertex™ VC4 System corresponds to a point. A sample line can be connected directly to a single

The system draws air simultaneously from all locations. Two different types of flow are:

- Transport flow: high-velocity, large-volume air movement through the lines
- Sample flow: air admitted to the Chemcassette® detection system

The high speed of transport flow allows rapid monitoring and response time when using long lines from monitored locations to the Vertex™ VC4 System. A small portion of the transport flow(sample flow) is analyzed to determine concentration levels.

The complete sampling and monitoring system consists of the following components:

- Sample lines to all monitored locations
- Flow connections through quick-connect ports on back of unit
- Vacuum pump
- Manifolds, Orifices, Chemcassette® and filters
- Flow controlling manual needle valve
- Exhaust port

There are 4 inlets, one for each monitored location. One exhaust port is also located on top of the Vertex™ VC4 cabinet.

## Chemcassette® Detection System

The Chemcassette® detection system is included on an analyzer plate on top of the Vertex™ VC4. The Analyzer module is a self-contained, microprocessor-controlled analyzer. Sample lines and the vacuum source are connected to the Chemcassette® via a single 5-tube connector to develop a better stain for better sensitivity and reliability.

The system powers up in the same state as when powered down. Data is stored in the module's memory until the data acquisition computer retrieves it.

The Vertex™ VC4 Analyzer module use the Honeywell Analytics Chemcassette® optical detection system. Analyzer module sample and detect a specific gas or family of gases.

Each Analyzer module manages Chemcassette® tape transport, provides optical detection of stain, directs sample

flow through the Chemcassette® to develop a better stain for better sensitivity and reliability, stores event data for retrieval by the data acquisition computer.

Components of the detection system include:

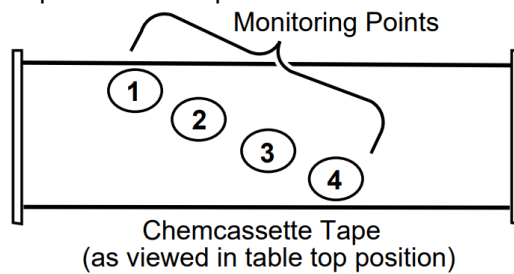
- Chemcassette® detection tape
- Optics and electronics for the detection system
- Chemcassette® tape transport mechanism
- Manual adjustment needle valve

## Detector Optics

The heart of the Chemcassette® module is an optical detection system that measures a stain that develops on the Chemcassette® tape in the presence of a target gas.

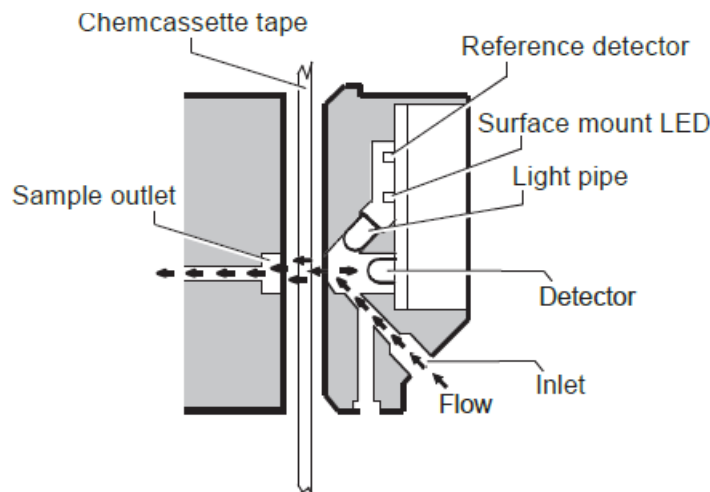
## Stain Pattern

The following chart shows the stain pattern of sample detection on the Chemcassette® tape.



When monitoring a location, the system detects and measures a specific gas or a family of gases in the sample. The microprocessor in the analyzer module interprets the data and responds appropriately.

In the Closed Loop Optics (CLO) detection system, a reference detector monitors and controls the intensity of the LED.



The microprocessor in the Chemcassette® analyzer module interprets the stain. It then calculates and reports a precise concentration level to Daq PC or external system. Gas concentrations are reported in parts-per-million (ppm), parts-per-billion (ppb) or milligrams-per-cubic-meter (mg/m<sup>3</sup>).

## Chemcassette® Tapes

Chemcassette® tapes are tagged with a radio frequency identification (RFID) tag to automatically identify the following:

- Serial number
- Gas family/ tape type
- Revision level
- Expiration date of the tape
- Chemcassette® leader parameters

The module uses a leader on the Chemcassette® tape to allow calibration of the optics every time a new tape is installed. This feature can be bypassed.

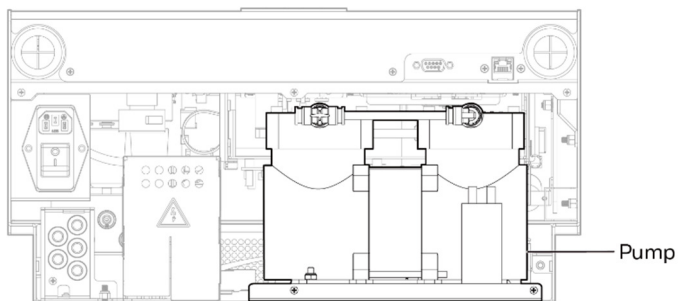
# Vacuum Pump

The pump provides a vacuum source for the transport and sampleflow system. The pump exhaust connects to the manufacturing facility central toxic exhaust system.

Note: The exhaust line from the Vertex™ VC4 should not exceed 50 feet.

The pump is located in the Vertex™ VC4 System cabinet. The cooling fan circulate air over the pump.

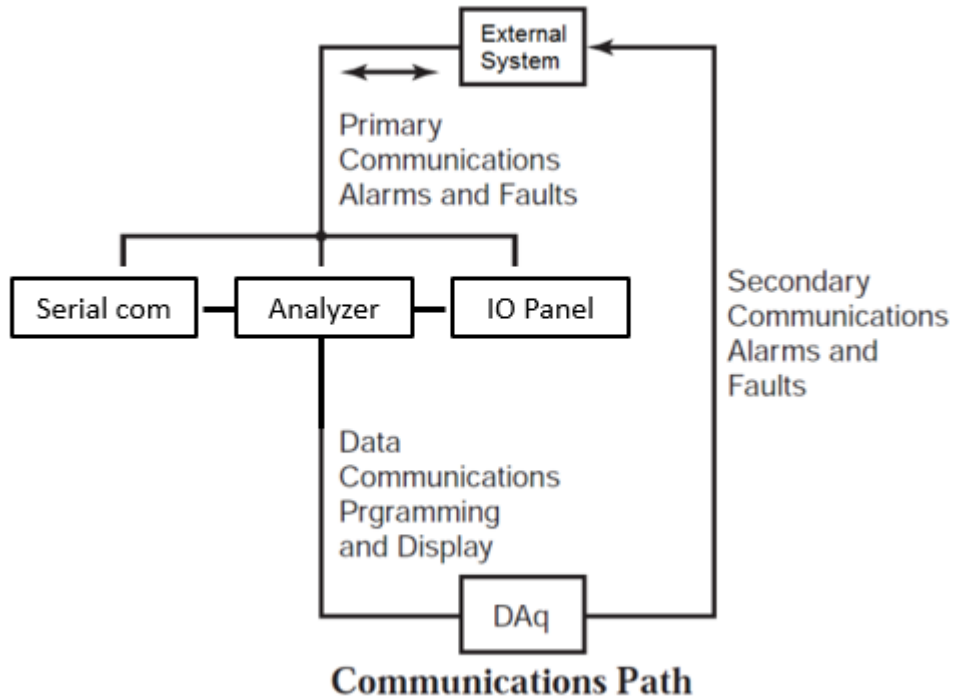
The Vertex™ VC4 System draws cooling air in through a filter mounted on the front panel of the cabinet.



# Control Systems

The Vertex™ VC4 control system consists of a central data acquisition computer (DAq), and one analyzer module.

Following is a simplified block diagram of the communications path of the control system. The analyzer module is microprocessor controlled and contain non-volatile memory.



# Data Acquisition Computer

The data acquisition computer (DAQ) is the central processor for the Vertex™ VC4 System. It configures the analyzer, stores data and provides a network interface for data transfer to other computers.

System display and operator control is through an on-screen keyboard.

1. Ethernet Network (Modbus TCP/IP, Web server)	2. Internal Ethernet to Network Switch	3. Power Butten (LED indictor)
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# 3 Installation

The installation procedure for the Vertex™ VC4 System consists of six steps:

1. Surveying the Installation Site
2. Optional Mounting Method
3. Installing Sample Lines / Filters
4. Installing Pump Exhaust Line
5. Electrical Power
6. Data Acquisition System

## Installation Step 1: Surveying the Installation Site

A survey of the site helps you to make important decisions before installing your Vertex™ VC4 System. Topics in this section are intended to assist you with appropriate placement of the Vertex™ VC4 System and in determining if you have special filtering needs at the sampling location.

The site should:

- Be remote from the monitored location
- Have sufficient ventilation for cabinet cooling
- Have power available
- Be indoors in an area that is not subject to wide variations in temperature and humidity

Note: The recommended humidity is 20-80% RH and a temperature between 50°F to 104°F (10°C to 40°C).

## Placement of the Vertex™ VC4 System

Install the Vertex™ VC4 System in an environmentally-protected site remote from the manufacturing or storage locations that it monitors.

You can place the Vertex™ VC4 System away from sample locations with sample tubing up to 400ft. (122m) length.

## Exposure to Dust and Humidity

Exposure to corrosive gases or materials, excess moisture, dust and other unusual environmental conditions could seriously hamper the unit's monitoring ability and could cause damage to it.

Allow room around the Vertex™ VC4 System for ventilation and servicing.



## Sample Transport Time

The shorter the sample line, the shorter the transport time. If monitoring a critical location, it may be desirable to place the monitor near that critical area to reduce sample transport time for that location.

## Monitor Dimensions

Monitor dimensions are an important factor in monitor placement. The Vertex™ VC4 System is 85 cm (33.5 in.) wide, 88 cm (34.6 in.) deep and 201 cm (79 in.) / 211 cm (83 in.) with caster in height. The system with 8 analyzers weighs about 518 kg (1142 pounds). Allow for 83 cm (32.5 in.) door swing; 12.3 cm (5 in.) at rear and 12.3 cm (5 in.) on sides. Allow clearance above the monitor for installing sample lines.

Monitor dimensions are important factors in instrument placement. For the basic tabletop configuration, the dimensions are approximately 9.187 inches (23.3 cm) high. See Section 3.5 for required clearances and mounting dimension for the optional wall and rack mount configurations. The VERTEX™ VC4 is 17 inches (43 cm) wide and 17-3/4 inches (45 cm) in depth. The VERTEX™ VC4 weighs about 50 pounds (23 kg).

## Sample Locations

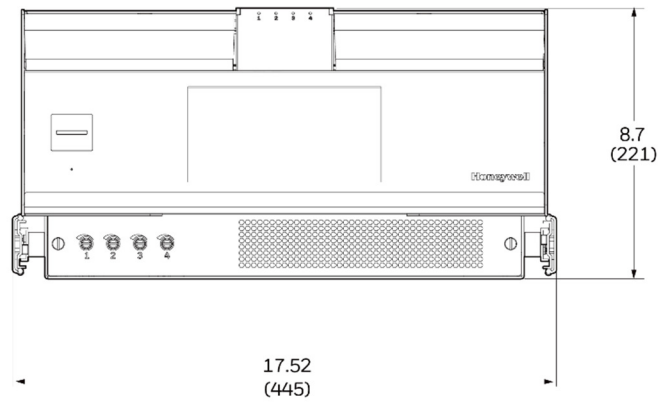
Before installing the Vertex™ VC4 System, evaluate the sampling locations to determine the presence of excessive dust or moisture. An external filter must be used in all locations. Make sure you use the correct filter. Dust may be a result of construction as well as manufacturing activities. Moisture may result from rain entering a line at an outdoor sampling location or from condensation caused by temperature fluctuations. Water condensation in the sample lines could cause false alarms.

Note: Variables such as airflow, the molecular weight and temperature of the sample gas, and the physical conditions of the areas being monitored influence the placement of the sampling locations. You may need to consult your company's industrial hygienist or safety officer before installing sample lines to determine your company's policy related to sampling locations and monitoring of the desired sample gas.

## Sample Line Particulate Filter Use

See **Filter Compatibility** Specifications, to determine which filter type should be used at the location.

# Installation Drawings



# Rack Mounting

The Vertex™ VC4 Rack Kit includes two custom slides and hardware for installation in a customer-supplied standard 19 inch rack. For detailed installation prints, ask for MDA drawing #874550-I.

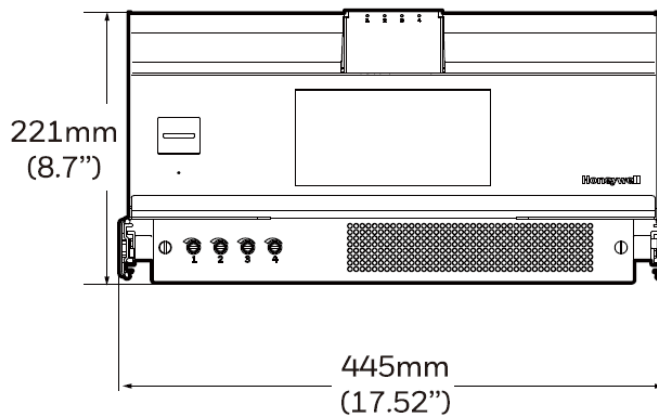


CAUTION

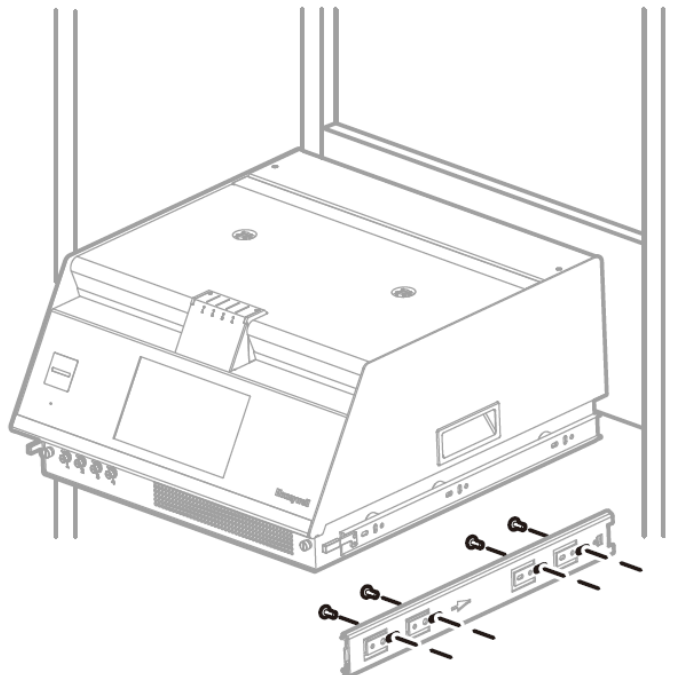
Verify power is Off before disconnecting customer I/O board

Follow these points when installing the rack mount:

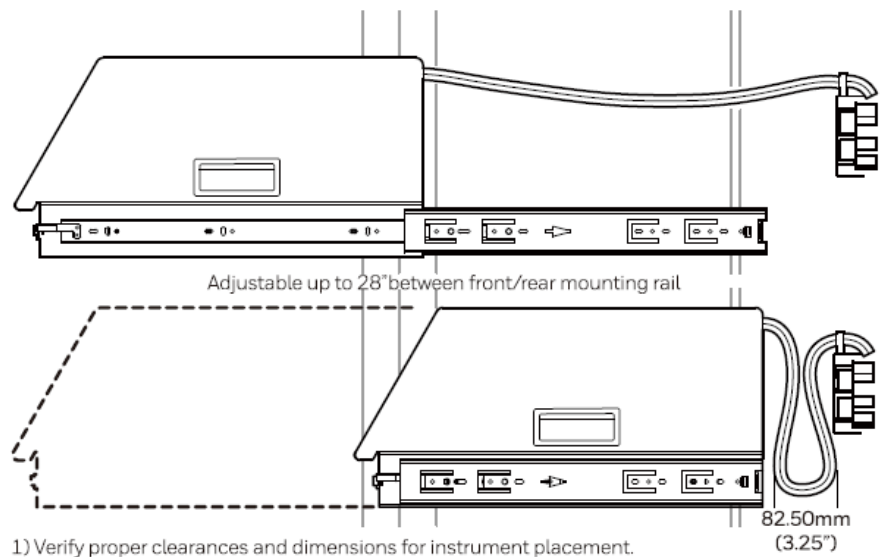
1. Verify proper clearances and dimensions for instrument placement.



2. Allow 9.00 inch (23 cm) height between units for proper clearance
3. Refer the figure for right side fastener locations. Left side installation is identical



4. In the recessed position, make sure there is 3-1/4 inch (8.25 cm) clearance for the loop of slack cable as shown in Figure below



## Installation Step 3: Installing Sample Lines

Use only FEP Teflon® tubing to assure proper sample transport. Other types of tubing are not sufficiently inert. See Specifications, for tube specifications. FEP tubing can be ordered from Honeywell Analytics.

Install sample lines from each location to the Vertex™ VC4 System, allowing room to access the back panel. This procedure involves:

- Sample Line Installation Requirements
- Sample Line Connections
- Installing Sample Line Particulate Filters

Honeywell Analytics supplies FEP grade Teflon tubing with all new monitors. This tubing is manufactured to our own strict specifications and has been purged of all byproducts of the manufacturing process. On occasions, users have supplied their own FEP type tubing. Should you choose to use your own tubing, be advised that some brands of FEP tubing off-gas small amounts of HF, which can be detected on start up by Honeywell Analytics monitors configured for detecting mineral acids gases (HBr, HCl, HF, NF<sub>3</sub>). Before enabling building alarm systems, make certain that 1) you have installed the correct Chemcassette®, and 2) your monitor reads zero.

1/4 in. (6.35 mm) O.D. x 0.190 in. (4.83 mm) (Thin wall)

### Sample Line Installation Requirements

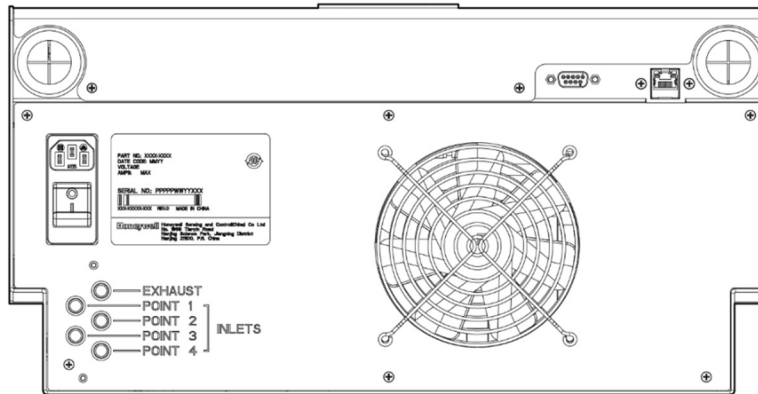
Follow the general requirements listed below when installing sample lines.

- Sample lines should not exceed 400 ft. (122m) in length.
- Route all lines as direct as possible to improve transport time.
- Avoid running sample lines through areas of great temperature extremes, such as adjacent to steam or chiller lines.
- Sample lines should not be crimped, bent to less than a 12 in. (30.5 cm) radius, or placed in an area where weight could collapse the tubing. Sample lines should be easily accessible for periodic inspection.
- Where possible, leave as many bends exposed for periodic visual inspection of the line for kinked or damaged tubing.
- Check each sample line installation for seal integrity after completing installation of the Vertex™ VC4 System. See Leak Checking Sample Lines, for the leak check procedure. Also use this procedure to detect leaking or severed tubing after events, such as construction, which may have affected the integrity of the tubing.
- Unused points require a filter. Filter kit 1295A0702 is recommended.
- If the Vertex™ VC4 is installed with a Chemcassette® tape, the optics may need cleaning before activating a previously unused point(s).

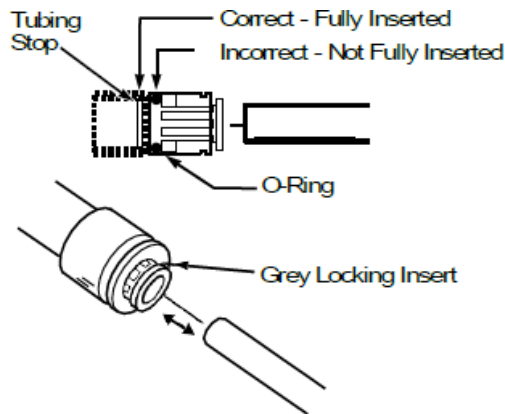
## Sample Line Connections

To prepare for installation of sample lines, remove the FEP Teflon tubing from the installation kit. The back of the unit includes 5 connections:

- 4 Sample Inlets (Point legend follows and is in proper sequence.)
- Exhaust Outlet (See Installing Pump Exhaust Line, for connection.)



Note: Always perform a leak check after installing sample lines. See Leak Checking Sample Lines, for the leak check procedure.



### Sample Line Inlet Connections

Each inlet has a quick connect/disconnect fitting with an internal O-ring and an external grab ring. To install a tube into a sample line inlet, insert the tube far enough into the fitting to ensure that the tube has passed through both the external grab ring and the internal O-ring and is firmly seated against the stop. The insertion depth for a correctly installed sampling line is 1/2 in. to 5/8 in. (12 mm - 16 mm).



Improper installation of the tube into the connector results in dilution of the sample.

## Installing Sample Line Particulate Filters

Attach a sample line filter to the sampling end of the line for all locations.



CAUTION

Excess amounts of dirt in the filters reduces the sample flow, raises sample vacuum and may affect concentration readings of the analyzer.

See **Filter Compatibility** Specifications, to determine the proper filter type to use with each target gas.

# Installation Step 4: Installing the Pump Exhaust Line

This section describes exhaust connections and installation. The Vertex™ VC4 is equipped with a vacuum pump located in the Vertex™ VC4 cabinet. The pump exhaust line connects to the manufacturing facility central toxic exhaust system.

## Exhaust Line Installation Requirements

Follow the general requirements listed below when installing exhaust lines.

The length of the line should not exceed 50 ft. (15 m). If longer distances are required, contact Honeywell Analytics.

Do not crimp exhaust lines or place them in an area where weight could collapse the tubing or bend them to less than a 12 in. (30.5 cm) radius.

Where possible, leave as many bends exposed for periodic visual inspection of the line for kinked or damaged tubing.

Varying exhaust pressure can induce pump failure or flow faults.

## Exhaust Line Connection

The instrument includes 50 ft. (15 m) of 0.190 in. (4.83 mm) I.D. x 1/4 in. (6.35 mm) O.D. Teflon or Polypropylene tubing. Insert the tubing into the exhaust port at the back of the unit.



CAUTION

Leaks in the exhaust tubing connection can cause exposure to toxic gases from remote sample areas.

To ensure a leak-free installation:

- Use a polypropylene tube with outside diameter 1/4 in. (6.35 mm) +/- .005 in. (0.127 mm).
- Verify that the external surface of the tube is free of score marks and scratches that could compromise the O-ring seal used in the fitting over the insertion depth.
- Cut the tube end perpendicular to its length 0.062 in (1.5 mm) from its end.
- Insert the tube in the fitting to a depth of 1/2 in. to 5/8 in. (12 mm - 16 mm).

With the system running, verify the leak integrity by plugging a sample point and monitor sample point flow via HMI point flow screen.



## Installation Step 5: Electrical Power

The Vertex™ VC4 requires a dedicated AC power line. Configurations include:

- 120 volt  $\pm$  10%; 60 Hertz; 3 amp
- 100 volt  $\pm$  10%; 50 or 60 Hertz; 3 amp
- 220/240 volts  $\pm$  10%; 50 or 60 Hertz; 2 amp

Plug the line into a dedicated outlet having sufficient amperage capacity.

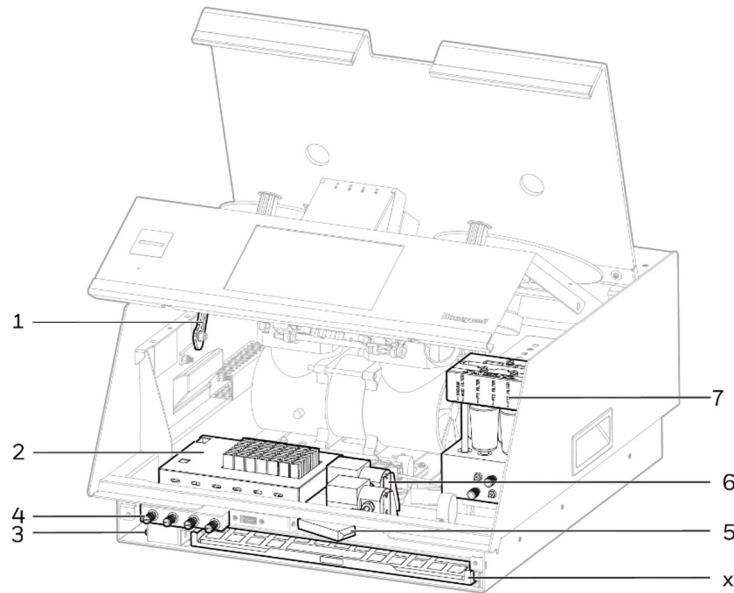
Line voltage should fluctuate no more than  $\pm$  10%

# Installation Step 6: Data Acquisition System

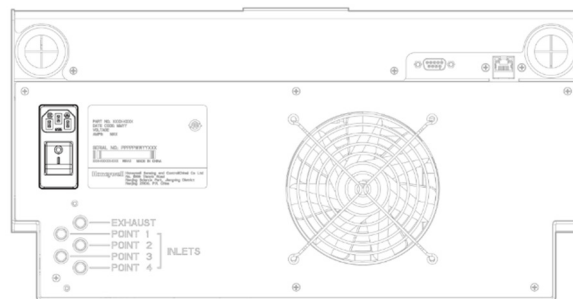
The data acquisition computer or DAq is the main computer in the Vertex™ VC4 System.

The Vertex™ VC4 System can be connected to an external Ethernet network at the port shown.

## Main computer and Keyboard



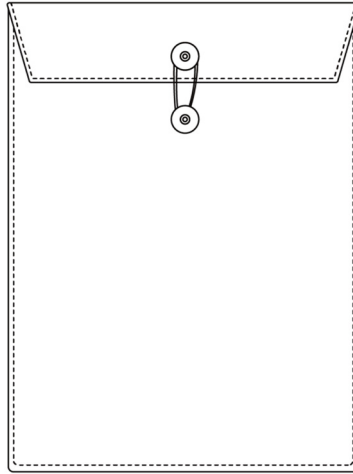
## External Network Connection



### NOTE

To maintain EMC certification, the Ethernet cable should make 1 loops through the supplied ferrite cable clamp. The clamp should remain on the outside of the Vertex™ VC4 enclosure.

The ferrite is supplied with the Vertex™ VC4 product, and it is in the Binder. The binder is attached in the product package.



# Installation Step 7: Wiring Alarm Relays



## WARNING

Use caution when servicing fuses or terminal blocks. Power to contacts is supplied externally.

## Relay Contacts

The Vertex™ VC4 has 14 form C, single-pole, double-throw relays that activate external alarm devices. Contacts are available for each circuit to accommodate installation of external devices.

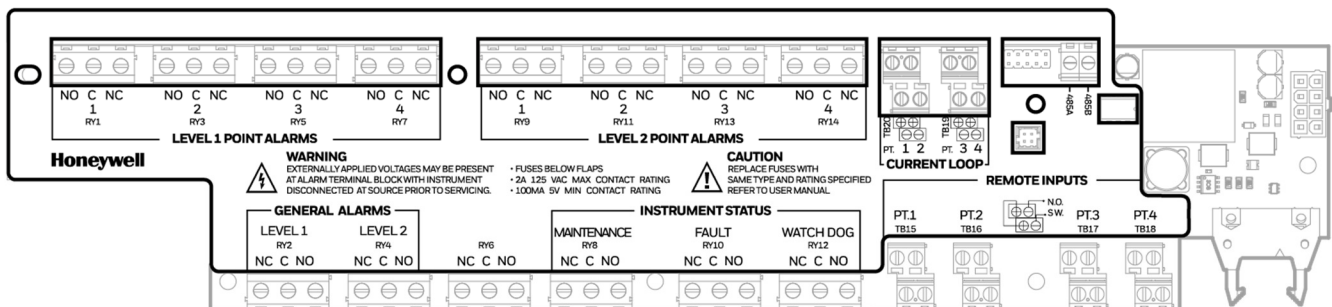
The relay panel may be removed from the Vertex™ VC4 chassis without disconnecting relay wiring. This allows you to replace the VC4 without having to reinstall the relay connections.

Each relay has three terminal contacts.

- Normally open
- Fused common
- Normally closed

The terminal blocks for the relay contacts are located on the relay panel. See Figure. Relays include:

- Four Level 1 alarms (RY1, RY3, RY5, RY7)
- Four Level 2 alarms (RY9, RY11, RY13, RY14)
- One general Level 1 alarm (RY2)
- One general Level 2 alarm (RY4)
- One watch dog (power loss/CPU failure) relay (RY12)
- One maintenance fault relay (RY8)
- One instrument fault relay (RY10)
- One “Out of Monitoring” relay (RY6)



NOTE: Make sure that watch dog relays and instrument fault relays are wired in series to ensure that any fault will trigger a diagnostic alarm. This will ensure a fail-safe operation.

## Ratings

To ensure reliable contact operation, the following limits must be observed:

- 0.1 to 2.0 amps
- @5-24 VDC or
- @5-120 VDC



CAUTION

The alarm relay has a minimum load requirement of greater than 5V and 100 mA. For reliable relay operation, ensure the alarm circuit meets these requirements. The relay contacts are protected by metal oxide varistors rated for 120 VAC maximum operation.

## Wiring Guidelines

To wire the alarm relays:

- Use shielded cable or conduit. See Appendix E for additional cable information



CAUTION

Failure to replace and retighten hardware after servicing can adversely affect instrument performance and EMC compliance. Make certain all fasteners are reinstalled and firmly tightened. This will ensure a proper ground.

- Connect grounds to stud at lower left corner of the I/O panel. See Figure 3-11
- Use #8 hardware provided
- Use a single, solid or stranded wire (not exceeding 14 gauge) per terminal block connection
- Do not switch DC current with the relay contact unless you are using counter electromotive force (CEMF) protection such as a suppression diode
- Do not use the VERTEX™ VC4 power supply for external alarm power

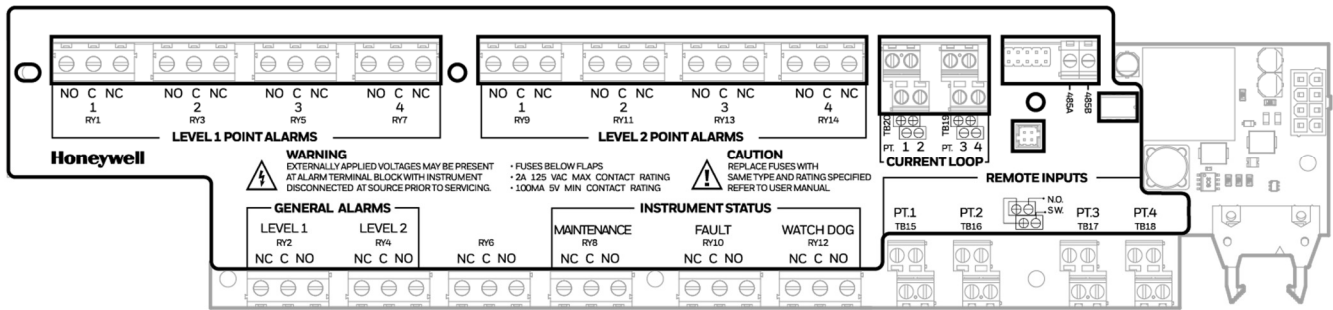
**IMPORTANT:** Make sure all connections comply with applicable RFI/EMI standards

# Installation Step 8: Wiring Current Loop (4-20 mA Output)

Each current loop output produces a current which varies linearly from 4 to 20 mA as the concentration of gas varies from zero to full scale concentration. The gas concentration for 20 mA full scale defaults to the full scale of the gas.

Furthermore, the Vertex™ VC4 can be configured lower to reduce these output currents to 2 mA if certain faults occur. These outputs will drop to zero mA after a power failure.

The current loop connection points are located on the I/O Panel. The impedance range of the analog output is 100-800 ohms. All wiring should follow the wiring guidelines described in **Wiring Guidelines**.



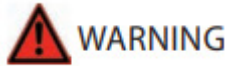
# Installation Step 9: Remote Alarm Reset Option

The remote alarm reset option provides the ability to reset the VERTEX™ VC4 alarm conditions for any individual point from a remote location. There are two ways to connect the remote reset circuit: • using an external 24V DC power supply • using the VERTEX™ VC4 unit's internal 24V DC system The remote alarm reset option is factory-programmed with the purchase of the VERTEX™ VC4 monitor. The factory-programmed setting must be performed by an authorized Honeywell field service engineer. External wiring, power supply, and switches are user-supplied items. The following information will describe the two types of alarm reset circuits, wiring, and recommendations for installing an alarm reset system.

## How it Works

The remote alarm reset option works similar to the reset button on the VERTEX™ VC4 instrument. However, the remote option will allow resetting an alarm from individual points, while the reset button on the VERTEX™ VC4 unit resets all alarms from all points at once. An additional advantage to the remote reset option is it can be located away from the VERTEX™ VC4 unit. In an alarm condition, momentarily pressing (0.250 seconds minimum) the remote reset button will reset the individual point's alarm. This will also reset all fault indications on the instrument.

### Wiring Considerations+



Removal of the cover over the Input/Output Module may expose hazardous voltages that are still present with power removed from the VERTEX™ VC4 monitor. Ensure all wiring installation is performed by qualified personnel following all national and local electrical codes.

A major consideration in any remote application is the reduction of electrical interferences such as RFI or other electrical noise. Follow the guidelines below when choosing the wire and routing path for your remote reset switch location. 1. External wires should be either shielded twisted pair or individually shielded wires and should be rated at 600V for isolation. The remote alarm reset contacts draw approximately 25 mA/pt (100 mA for all four points). The loop resistance (wire and switch contact resistance) should be 2000 ohms per point maximum. 2. Do not run the alarm circuit wiring in the same conduit with wiring for inductive loads such as motor controls or AC loads and lines. 3. Use switches designed for low current applications, with normally open, momentary close contacts. 4. The back panel of the VERTEX™ VC4 has been designed to allow low voltage wiring to exit from the unit from the right side (as you view the back panel) while higher voltage and AC wiring exits on the left. Keeping this wiring protocol reduces the risk of electrical noise causing interference to your alarm circuit. The remote inputs are located at the lower right of the relay panel as shown below

### Using an External Power Supply

The recommended method of wiring the remote alarm reset circuit is using an external (user-supplied) 24 VDC power supply. Using the external power supply provides a very efficient method of powering the alarm reset circuit, and reduces the risk of electrical interference within the VERTEX™ VC4 monitor. A schematic of the circuit is shown in Figure 10-1.

# 4 Device Operations

Learn what you can do with your Honeywell Vertex™ VC4 System Continuous Monitor.

## Getting Ready for the Start-up

Learn the Honeywell Vertex™ VC4 system start-up sequence and how to configure the analyzer module for specific gas locations.

Honeywell Analytics loads all software on the DAq at the factory. The Universal Chemcassette® Analyzer are configured for the mineral acid family of gases. You need to configure each point for the target gases at your facility.

Before you begin the start-up and configuration, gather the following information:

- The location to which each point is connected
- Target gas at each location
- Alarm levels

Ahead of the start-up sequence, make sure that the following installation steps are completed:

- Sample lines
- Exhaust line
- AC power connection
- Sample Line Dust Filters
- I/O Connection

## Initial Startup

Use this section to turn on your Vertex™ VC4 System and to configure the analyzer module for specific gas locations. There are eight parts to this startup procedure:

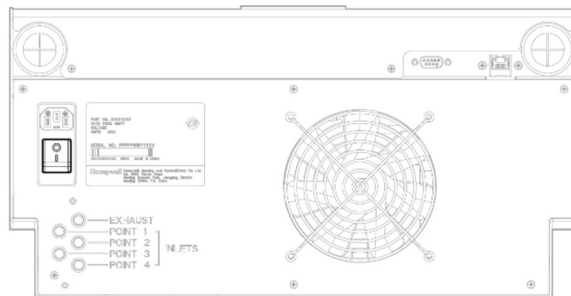
- Power Up
- Start Program
- Log in the HMI program
- Create a configuration profile
- Replace the Chemcassette® Tape
- Leak Checking Sample Lines
- Adjust the Flow rate
- Adjust Supply Vacuum



# Power Up

Use the rocker switch on the right rear of the unit, above the power cord, to turn on power to the Vertex™ VC4.

1. Open the rack door.
2. Open the touch screen door.
3. Turn on the rack power switch.
4. Turn on the power switch to appropriate analyzers.
5. Close and latch touch screen door. After 15 seconds, the analyzer status LEDs sequence fourtimes through all colors.



After the initial color sequence, the Vertex™ VC4 LEDs show system status. The following chart matches analyzer status with LED signals.

Mon State	Alarm State	Fault State	time in millesconds									
			500		400		100					
idle	0	none	black							green		
		maintenance	amber							black		
		instrument	amber			black						
	1	any	red					black				
	2	any	red			black						
monitoring	0	none	green							black		
		maintenance	amber							green		
		instrument	amber			green						
	1	any	red					green				
	2	any	red			green						
primary program invalid			amber	black	amber	black	amber	black	amber	black	amber	black
unpowered			black									

**NOTE**

Before the Vertex™ VC4 compliance System can begin monitoring, you must create a configuration profile.

## Start Program

Upon power-up, the HMI PC automatically starts Ubuntu (Linux) and loads the Vertex™ VC4 HMI program. After the startup sequence, the Vertex™ VC4 HMI main screen opens as below. The start-up time may take several minutes, and the default user is Viewer (R3).

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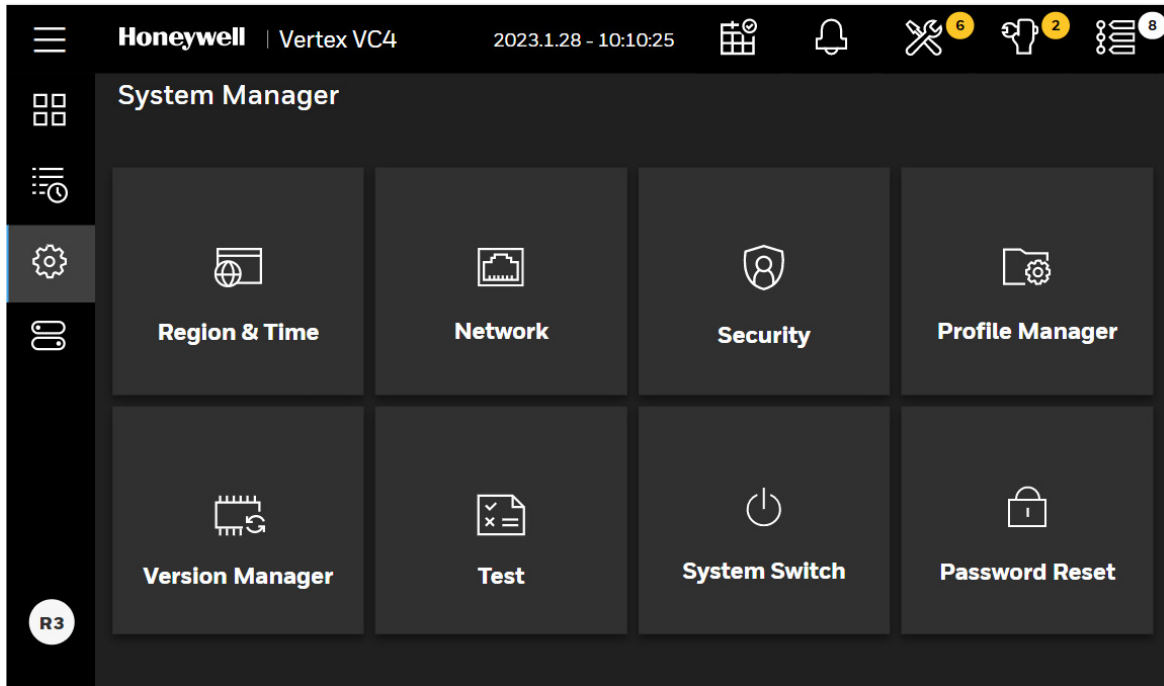
### NOTE

Use the System Manager->Region and time menu to change the time and date on your Vertex™ VC4

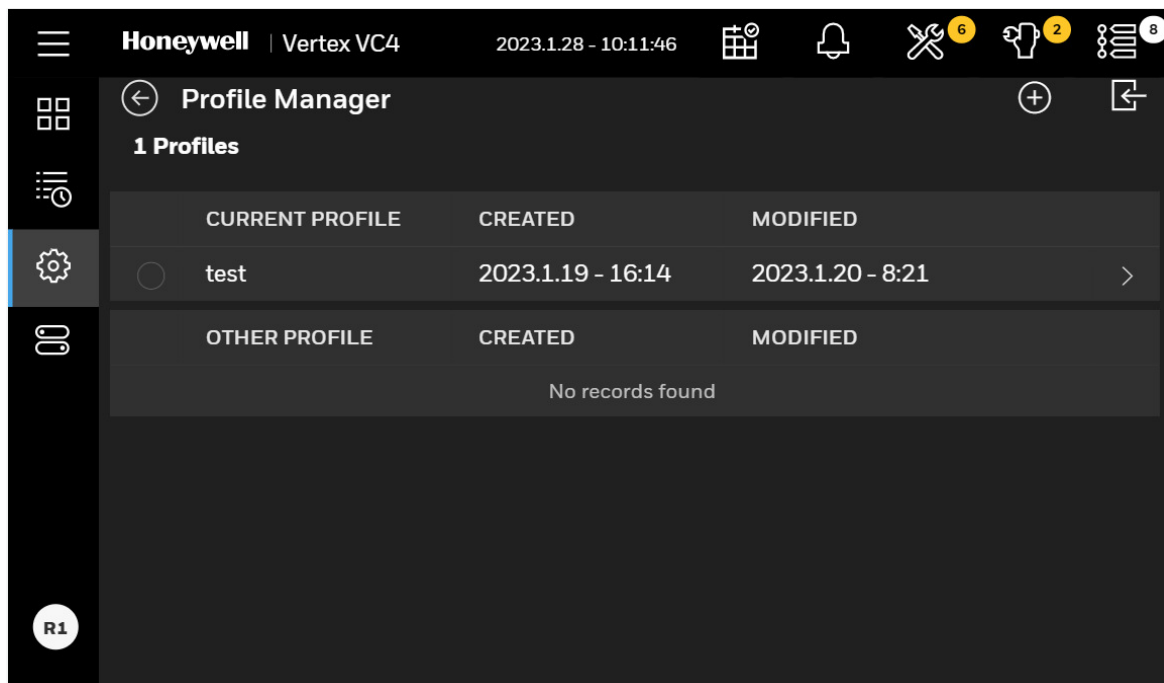
# Create a Configuration Profile


The configuration profile stores all of the monitor settings in a single file on the hard drive. Configuration profiles include system level information, point settings and analyzer information.

1. From the main menu, go to **System Manager > Profile Manager**.

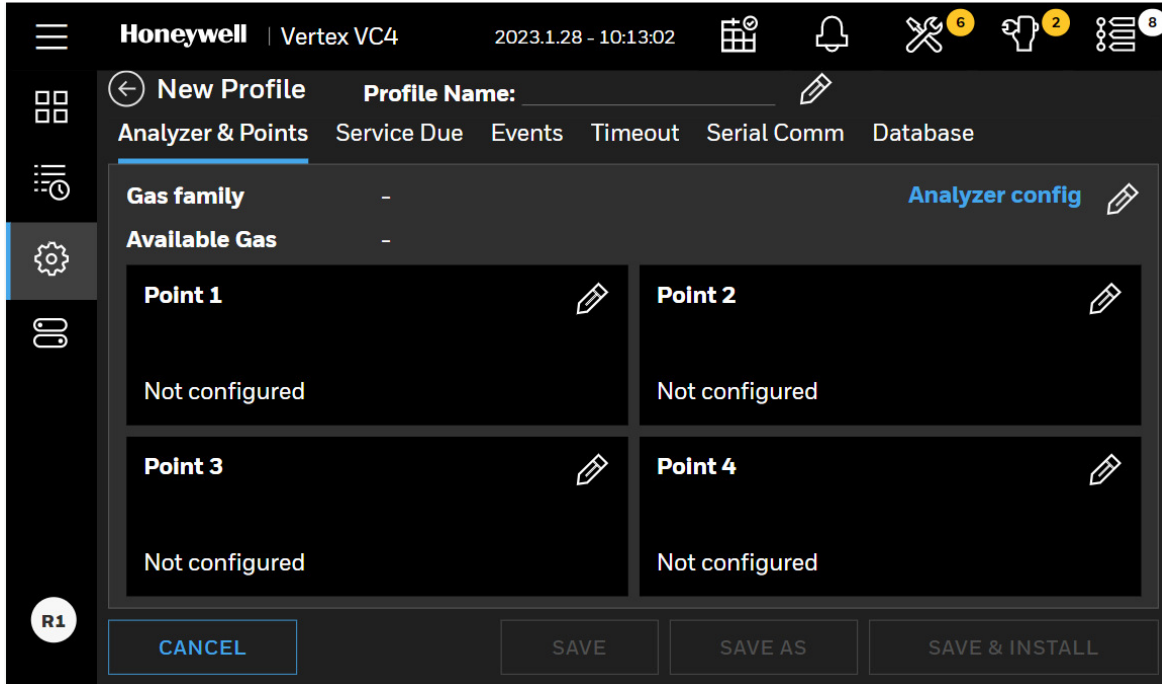


Then you'll see the following page.

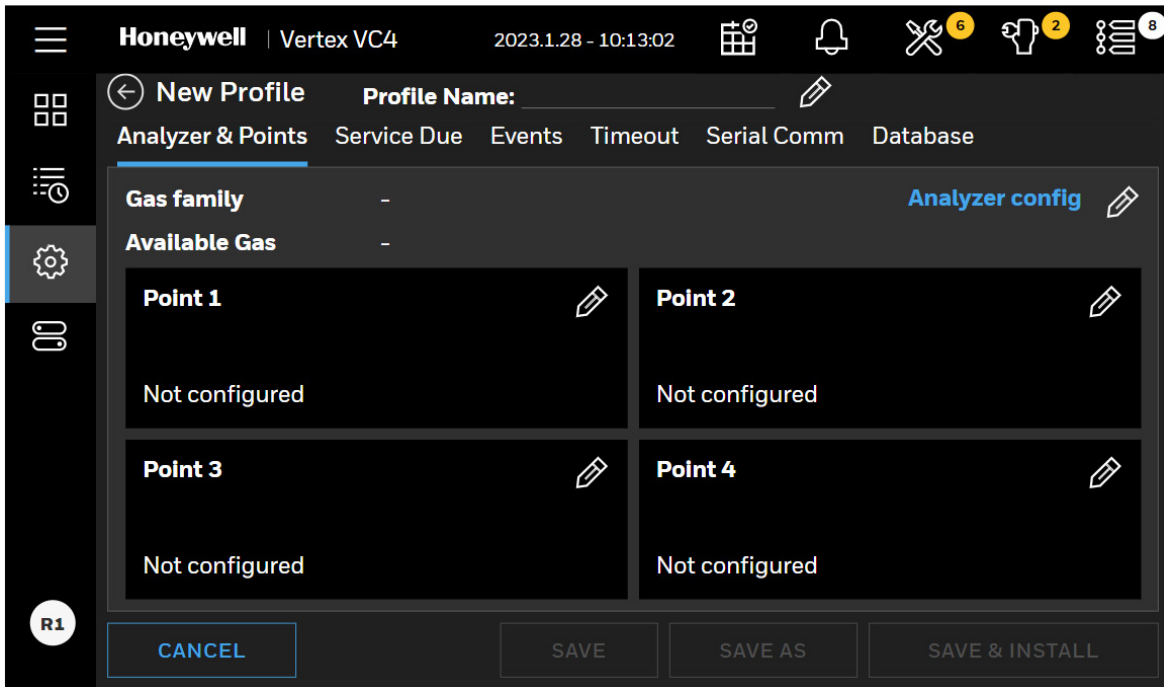


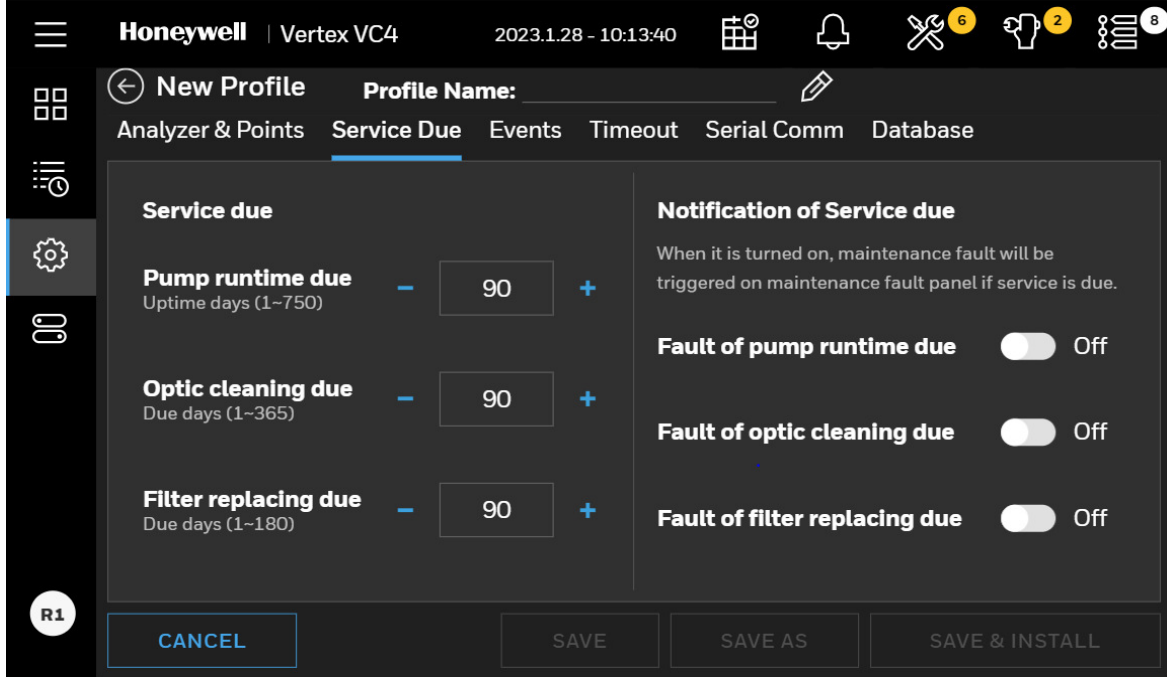
2. Tap the Add profile button  .



3. In the Add new profile page, enter a profile name, and then you can start to edit the profile.

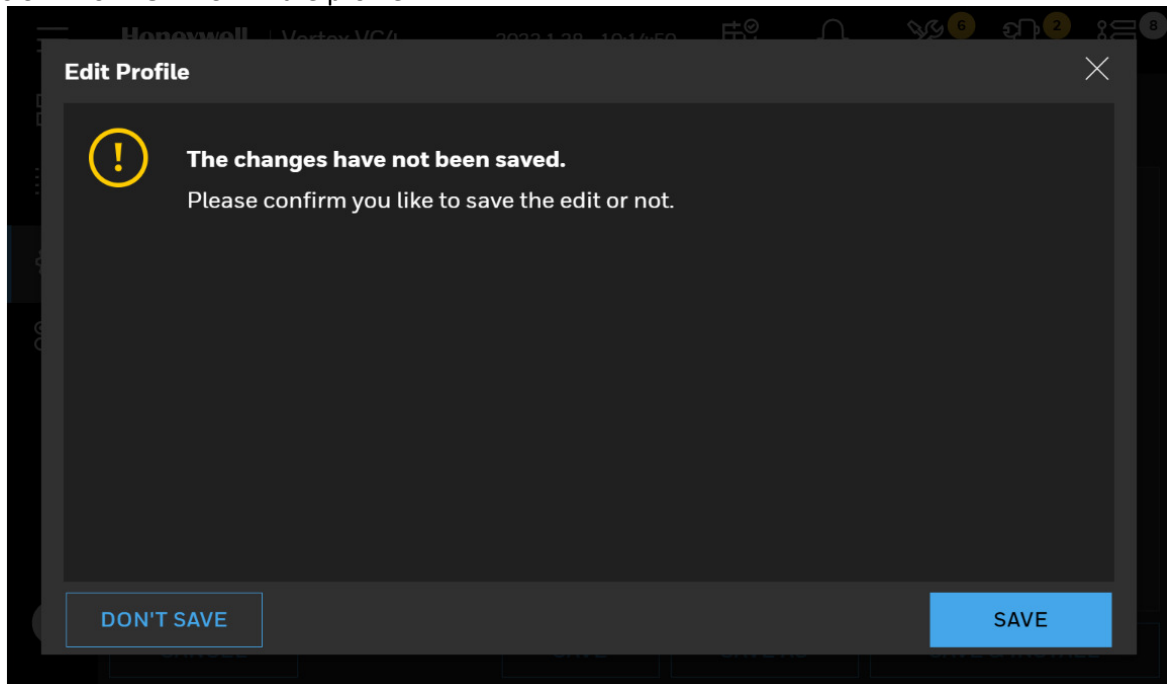


4. You can edit or modify values such as: Configuration of Analyzers and Points and Notification of Service Due, Events, Timeout, Serial comm, Database through pressing the tabs to access the relative pages.



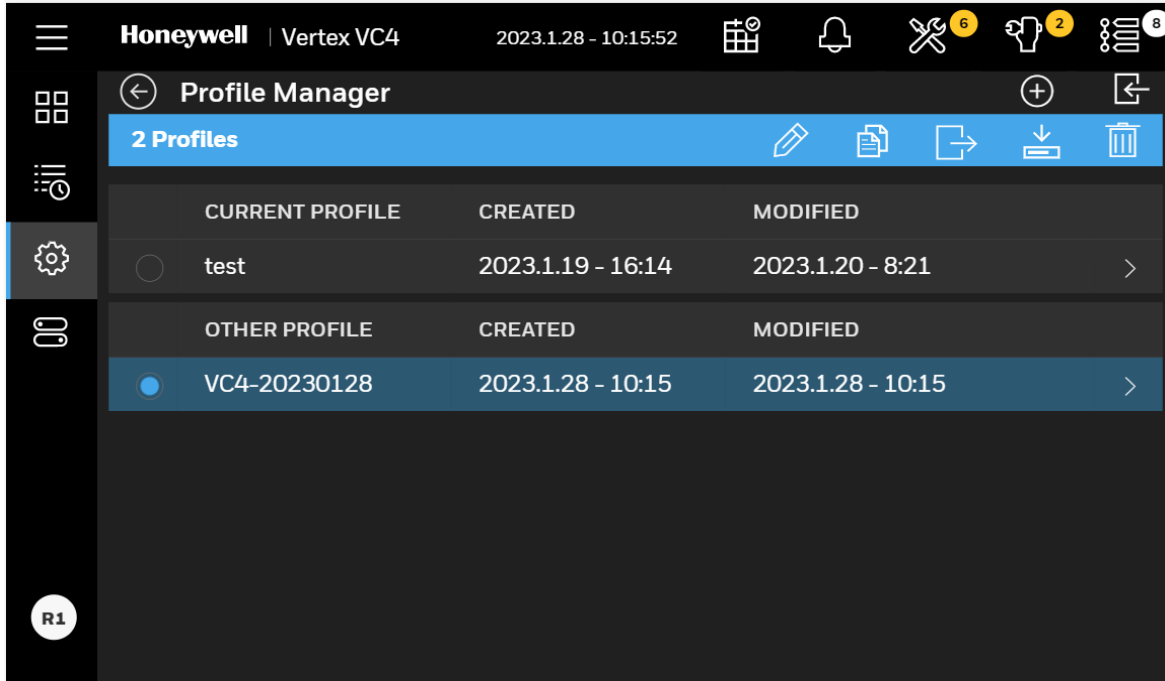


5. After configuration is completed, tap **SAVE** button or tap back button  to complete the Creating Profile process.
6. When you tap the back button , there are several options for the profile you just edit, you can choose to **SAVE** or **DON'T SAVE** the profile.

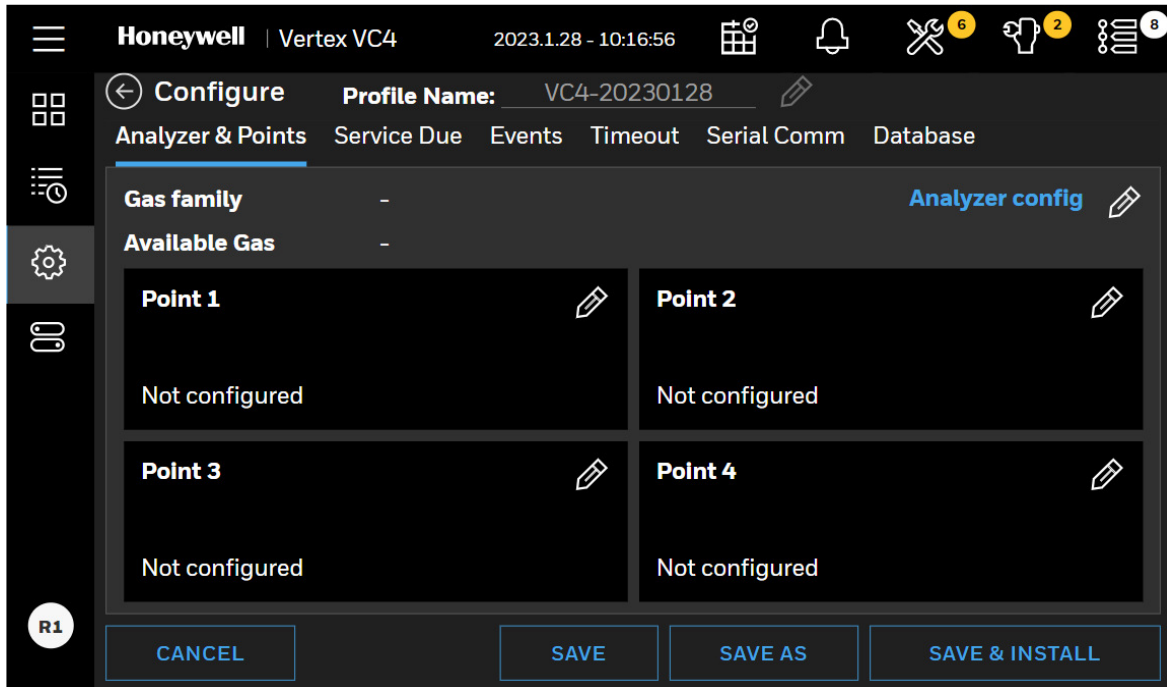


7. Tap **SAVE AND INSTALL** whether you want to install this new profile in the system. If you do not want to install this project, tap **SAVE AS** and enter a profile name

8. To install another profile, you can select a profile in the list on the left side, and then tap the button of **INSTALL TO SYSTEM** to complete installation

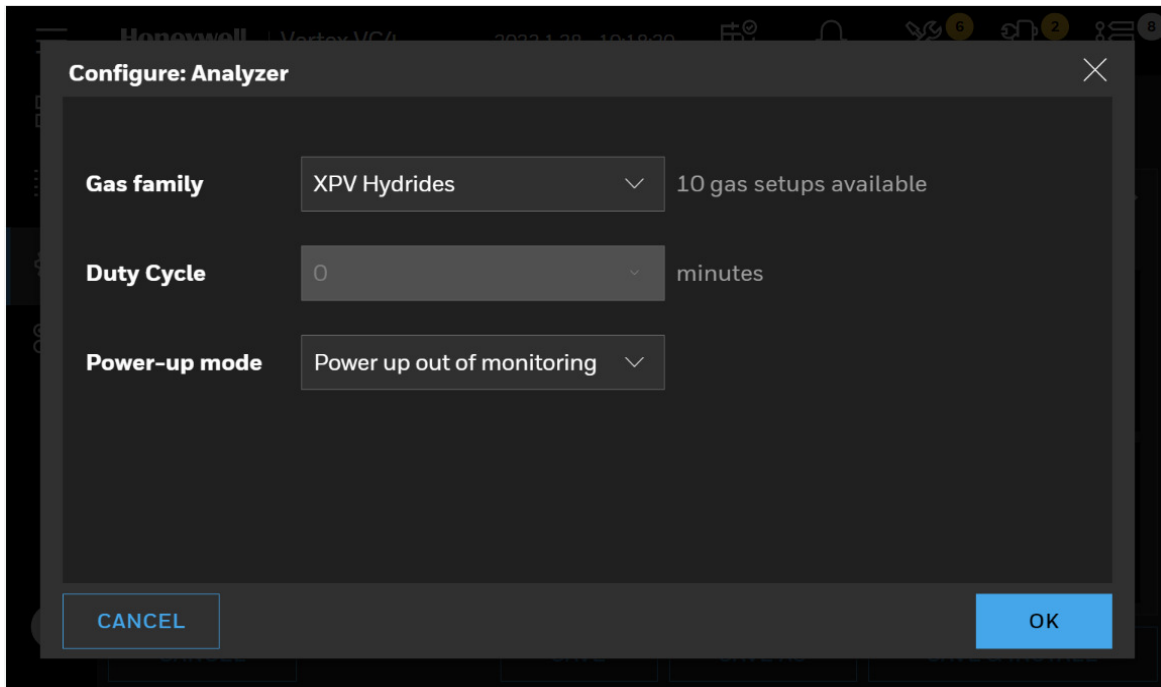


## Analyzer/Points



Tap on the Analyzer config EDIT  button.

Activate the Analyzer configuration, select the gas family.




## Duty Cycle

This function allows the user to extend the duration of the tape advance interval. This is useful in applications in which a background level of gas is expected in normal operation. This interval can be configured for up to fifteen minutes. When in monitor mode, if the detector reaches its maximum concentration for that window, it will not advance tape and stays at current window until the duty cycle expires.

### Power-up mode:

There are three options in power-up mode as below.

- Power up in monitoring mode: Analyzer will start monitoring mode after it powers up.
- Power up out of monitoring mode (default): Analyzer will stay at idle more after it powers up. An operator manually starts monitoring mode.
- Power up in last state: Analyzer remembers its last state and gets back to that state after it powers up.

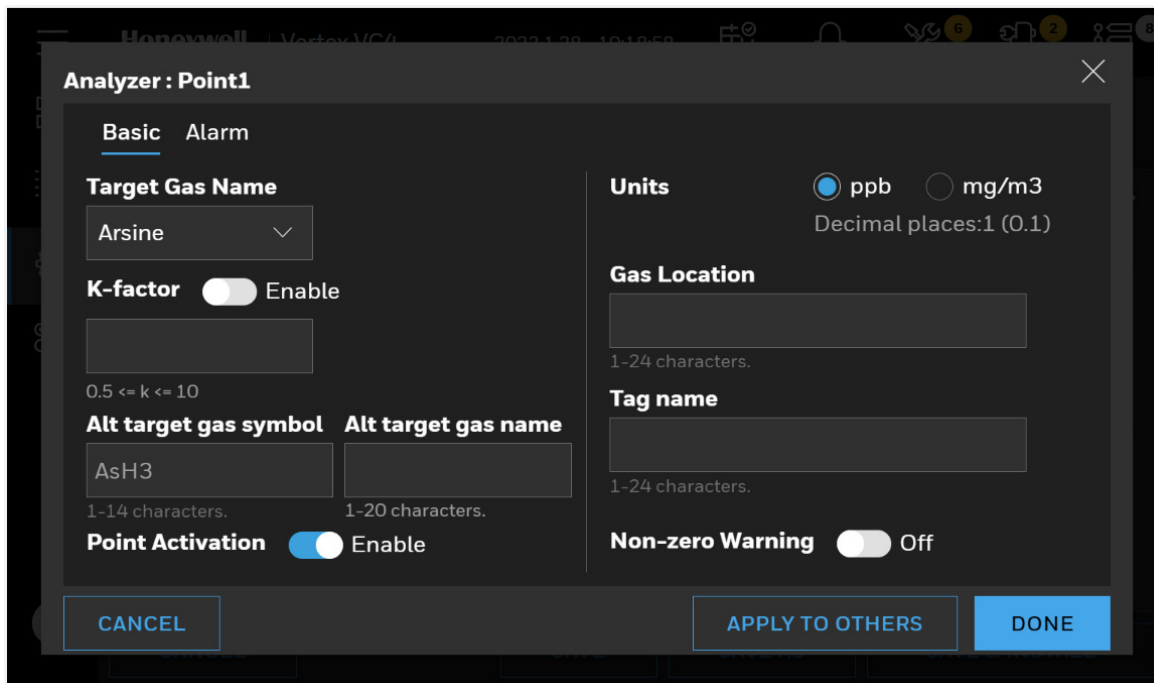
Select the point to configure and tap on the EDIT  button.

Activate the selected point and select the Target Gas. If you want to apply same configurations to other points of the analyzer, tap on the **APPLY TO OTHERS** button.

#### NOTE:

When making and saving a change to an item in the analyzer configuration, this also changes all items in the points to the default.





## Units

Select to display concentrations in milligrams per cubic meter. If this option is not selected, Vertex™ VC4 displays concentrations in parts-per-million (ppm) or parts-per-billion (ppb).

Select a target gas for the point and enter the gas location of the place where gas is sampled. A Tag Name can be set for the point also.

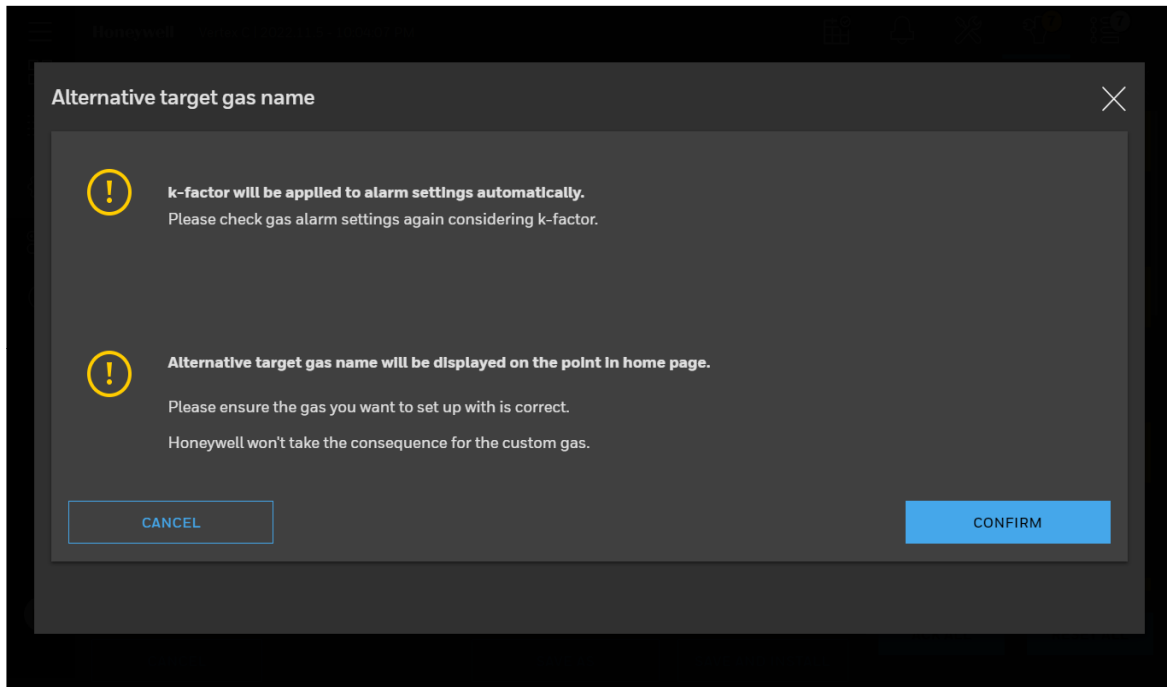
## K-factor

K-factor is a feature that allows gases' cross-sensitivity to be employed to measure a different gas using gas calibrations of a selected gas. The detector's readings are modified by the known relationship between the two gases. For example, a 5ppm concentration of Gas A is seen by the detector as the same as a 5.8 ppm concentration of Gas B. The K-factor is 1.2 ( $5.8 \div 5 = 1.16 = 1.2$  when rounded to one decimal place).

When k-factor is enabled, gas levels will be multiplied by k-factor automatically. Alarm levels should be checked again after enabling the k-factor.

### NOTE:

When mg/m3 is selected as a measurement unit, k-factor is not allowed to be ON.

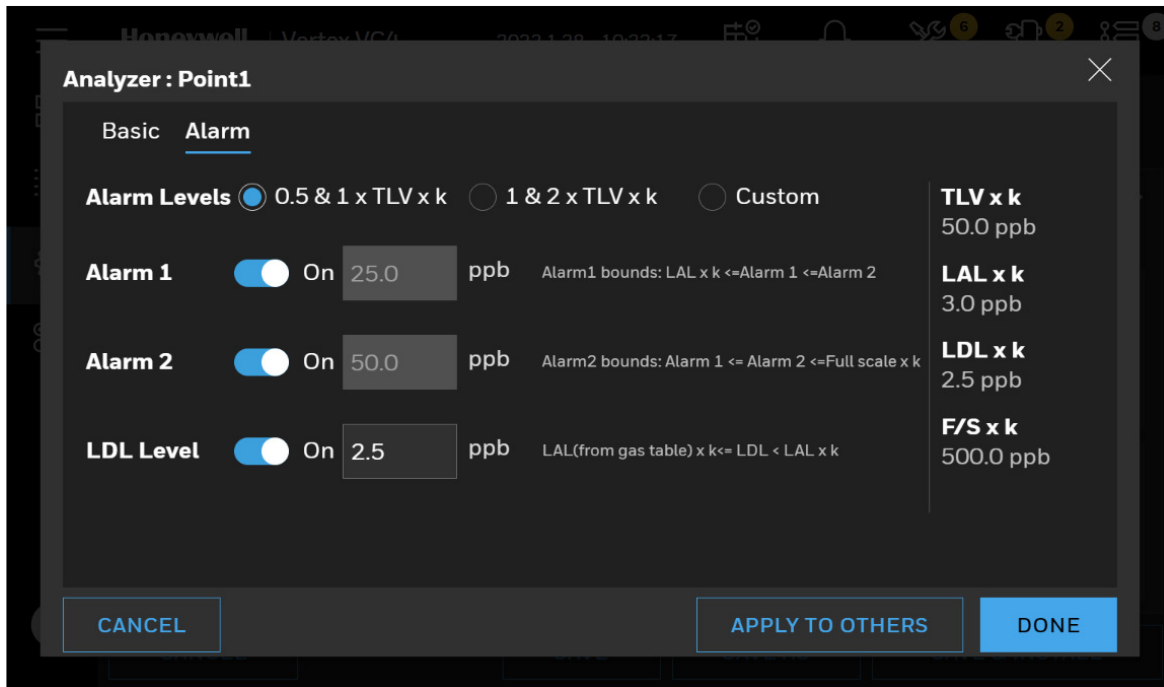


### Non-Zero Warning

When this option is ON and non-zero gas concentration is detected, an informative event will be recorded and non-zero warning status will be reported to DAq. The point with non-zero warning will blink in green.

### Alarm

Alarm levels can be selected from the preset or entered. When custom is selected, alarm levels are edited manually.

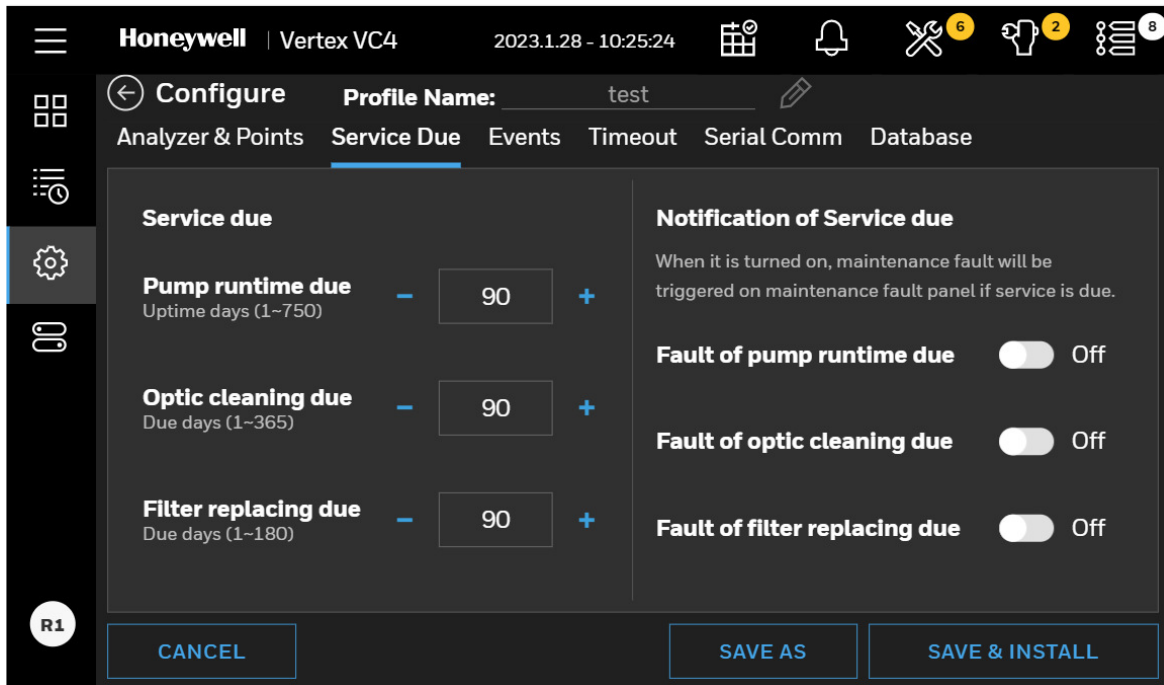


### Copy Point Configurations

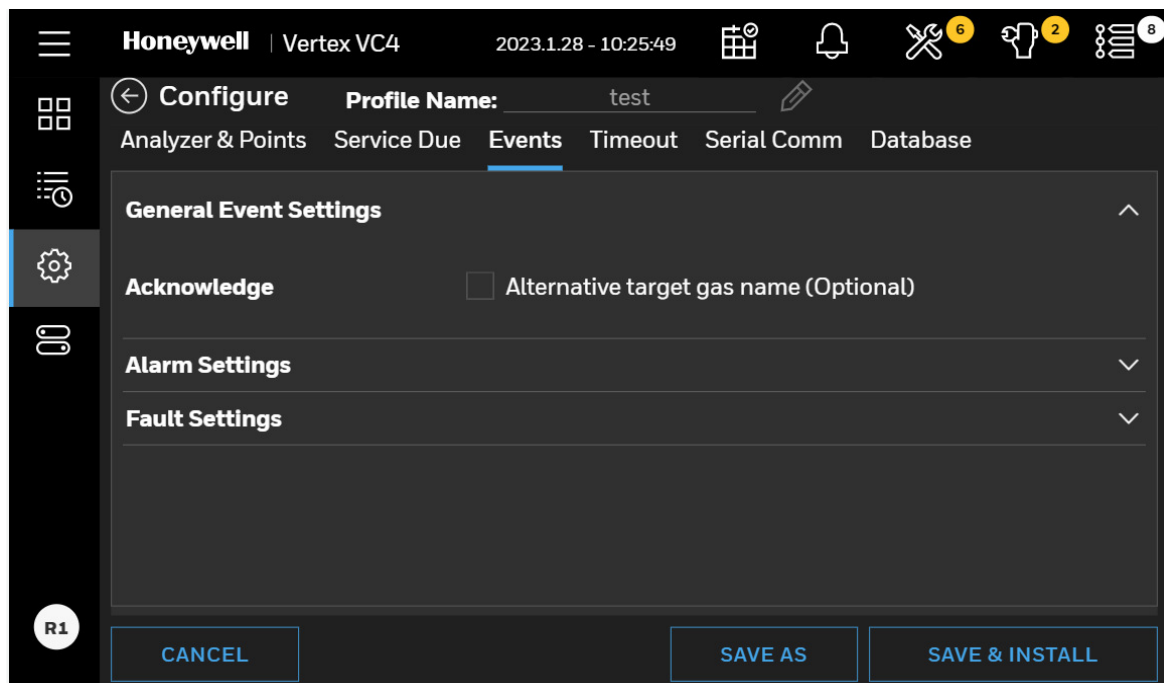
When multiple points are configured in same way, an operator can configure one point and copy it to other points to save time. Tap on the **APPLY TO OTHERS** button.

## Service Due

Notification of service due is ON, the analyzer will generate a maintenance fault when the maintenance service is overdue. When this option is OFF, an informative event will be recorded instead



## Events



### All events require to click Ack

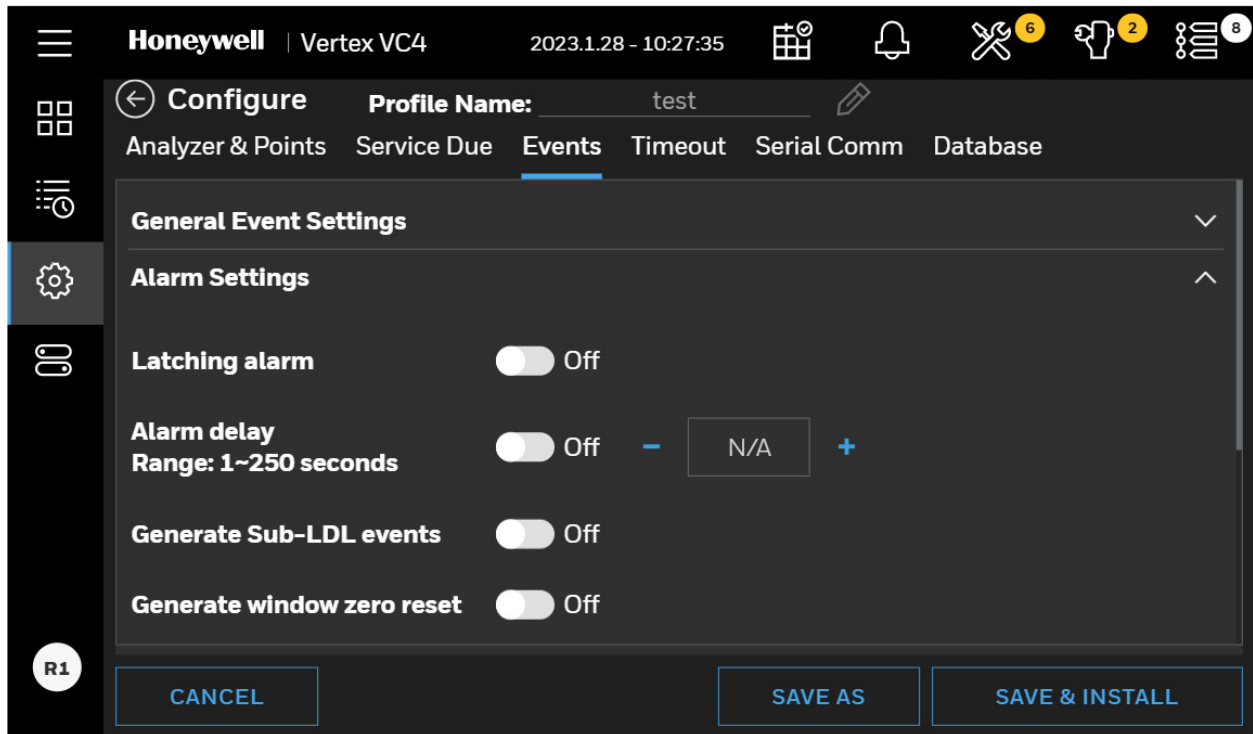
When selected, all gas alarms, and fault events will not be removed from the event list until an authorized user acknowledges the event.

### Non-Latching Gas Alarm

A latching gas alarm activates when a gas concentration reaches a level 1 or level 2 alarm setting. The latching gas alarm remains until an authorized operator resets the alarm. Non-latching gas alarm events clear themselves as soon as the gas concentration drops below the alarm setting

### Non-Latching Fault

A latching fault activates when an analyzer detects faulty conditions. The latching fault remains until an authorized operator resets the fault. Non-latching fault events clear themselves as soon as the faulty conditions disappear.



### Alarm Delay

When Alarm delay is ON, a gas alarm will be reported when a gas concentration reaches a level 1 or level 2 alarm setting and stays for more than alarm delay time. If the gas concentration drops below the alarm setting in less than alarm delay time, the gas alarm event will not be reported. This option is to filter out flickering gas events.

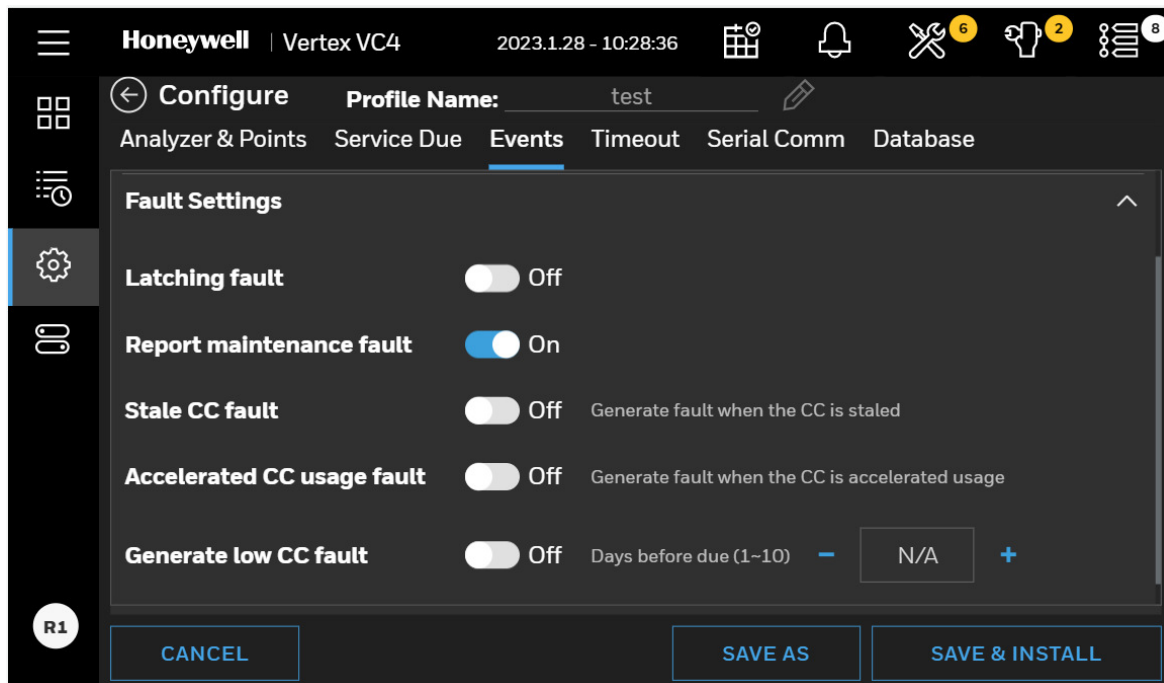
### Generate Sub-LDL Events

This is to record Optic signal exceed the Sub-LDL limits while gas concentration remains zero as an informative event.

### 1st TWA Time

Use to set times for the beginning and end of each 8-hour, Time Weighted Average (TWA) period. Use this option to associate the TWA periods with shifts or any other regular event. The system calculates and displays the TWA after each 8-hour TWA cycle.

The default setting is 04:00 indicating that the Vertex™ VC4 will run three successive TWA periods from 04:00 to 11:59, 12:00 to 19:59, 20:00 to 03:59. Remember, the Vertex™ VC4 System uses a 24-hour clock. For example, to set the first TWA to 3:00 P.M., enter 15:00. The system automatically sets the beginning times of the second and third TWA periods at 8-hour intervals from the time entered for the first TWA period.



### Report Maintenance Fault

Select OFF to disable maintenance faults. When this option is OFF, the Analyzers will not generate maintenance faults. Instead informative events will be recorded.

### Stale CC Fault

When this option is ON and Chemcassette® is nearing its expiration date, the maintenance fault will be generated.

### Accelerated CC Usage Fault

When this option is ON and Chemcassette® usage for up to 24 hours exceeds twice of the average daily usage, the maintenance fault will be generated.

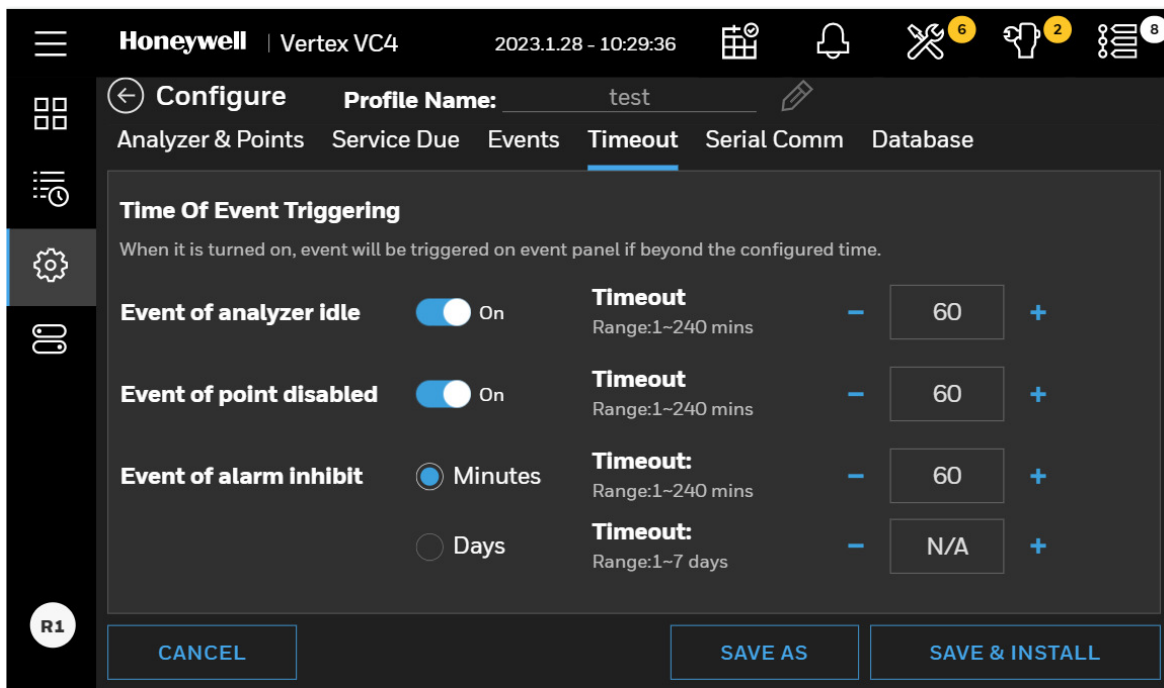
### Generate low CC Fault

Vertex™ VC4 software tracks the amount of Chemcassette® tape remaining on the supply reel and triggers a low tape event when remaining tape is less than Days Before Due. Choosing OFF disables the low tape event.

### Set Timeout Values

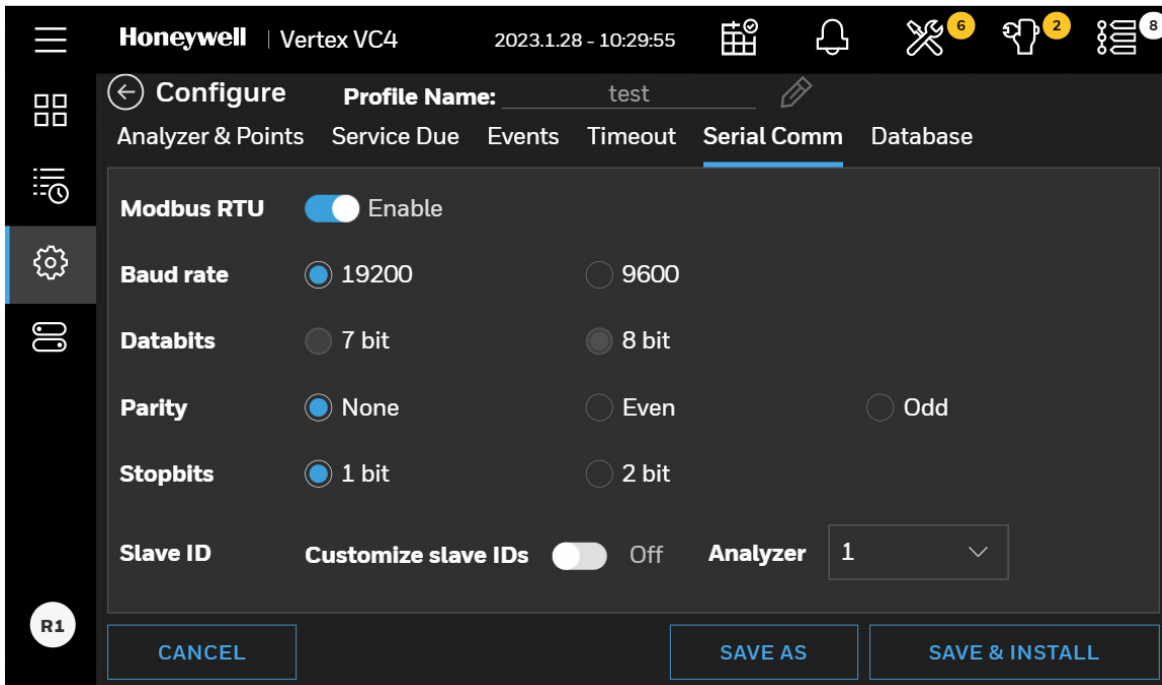
Authorized users may temporarily disable points or inhibits alarms from activating and points from monitoring. A point or alarm that is disabled/inhibited longer than the timeout limit will cause a maintenance fault which will call attention to locations excluded from monitoring.

Select On and enter a timeout up to displayed minutes or select OFF to disable the maintenance fault.



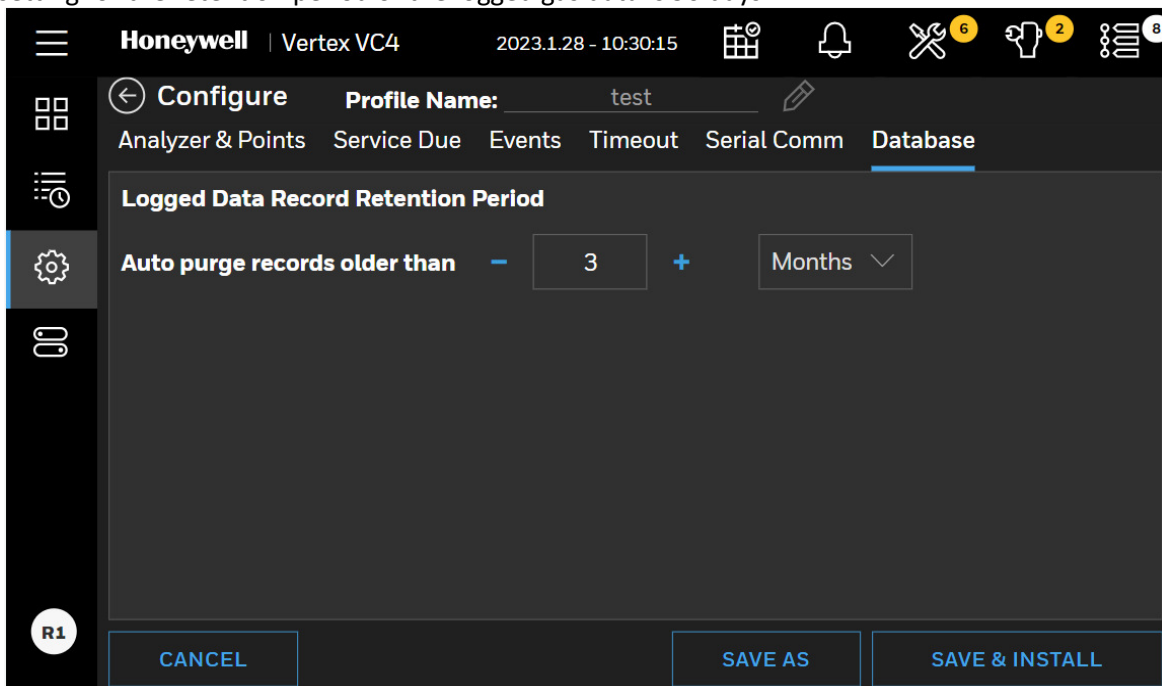
### Set Serial Comm

The configuration of Modbus RTU can be configured in Serial Comm Settings.




## Set Database

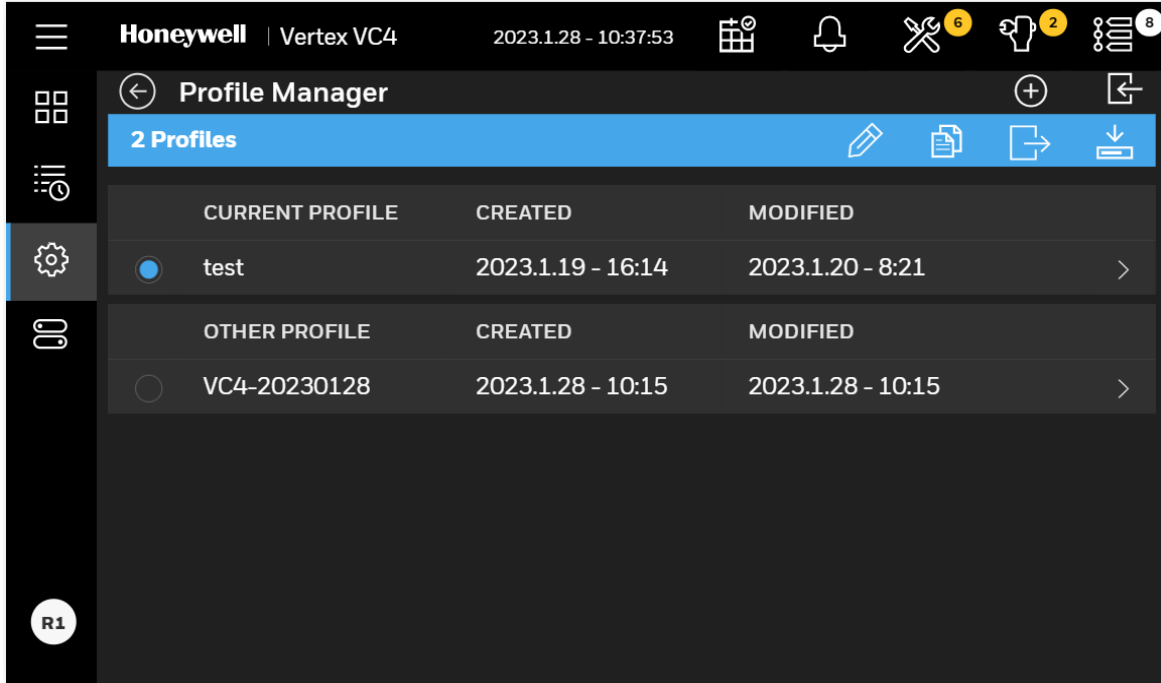
The retention period of logged gas data and event records can be configured in Database Settings. The default setting for the retention period of the logged gas data is 90 days.



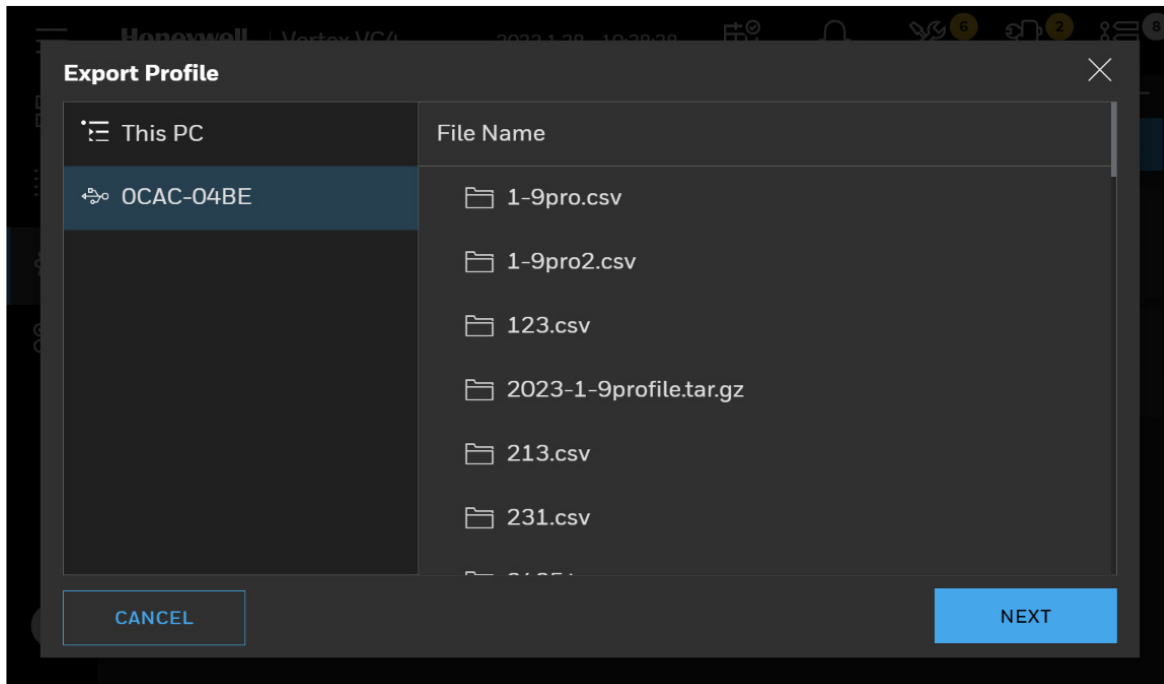
## Export/Import a Profile



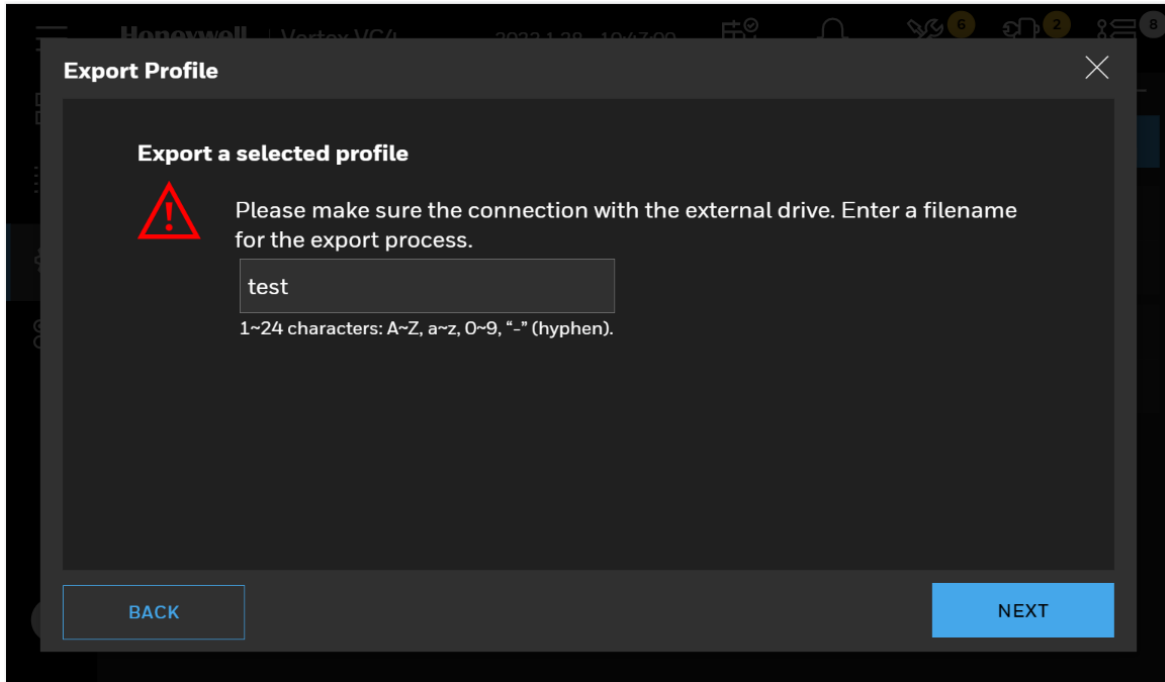
To export a profile, plug in USB flash drive in the DAQ. Select the profile in the list and tap **EXPORT**  to export it to USB flash drive




Select the location where the profile will be exported and tap **NEXT**

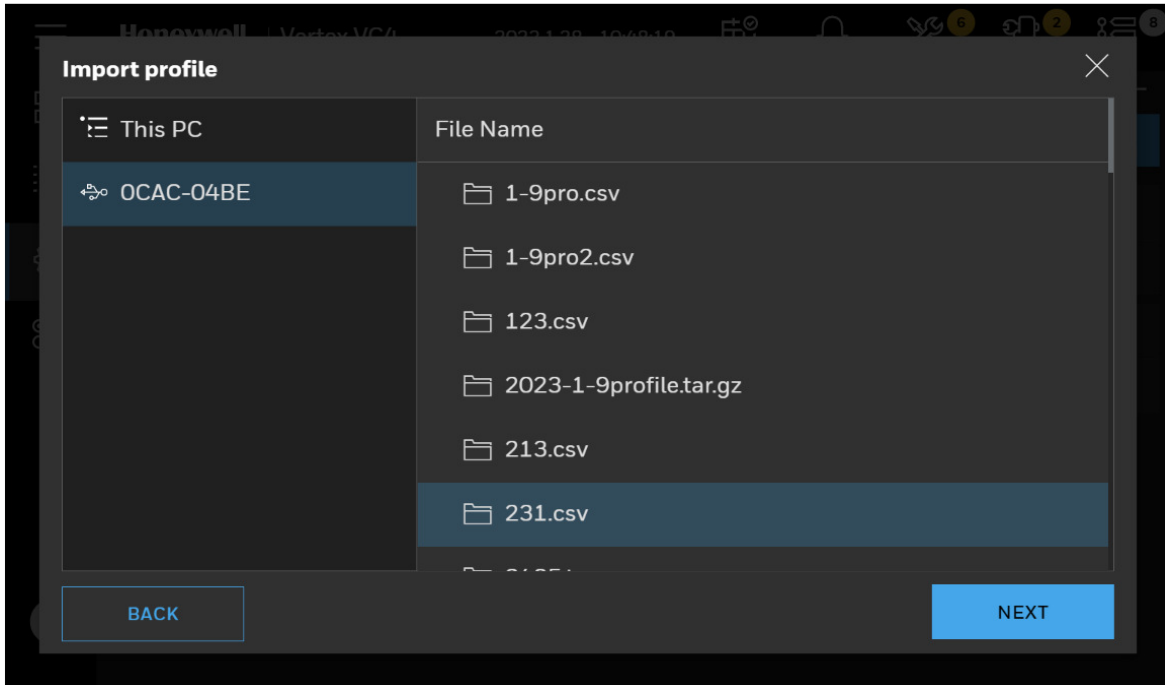


Enter a profile name and tap **EXPORT** and profile exporting will be completed.



To import a profile from USB flash drive, tap **IMPORT** 

Select the profile in the Import Profile window and tap **NEXT**.

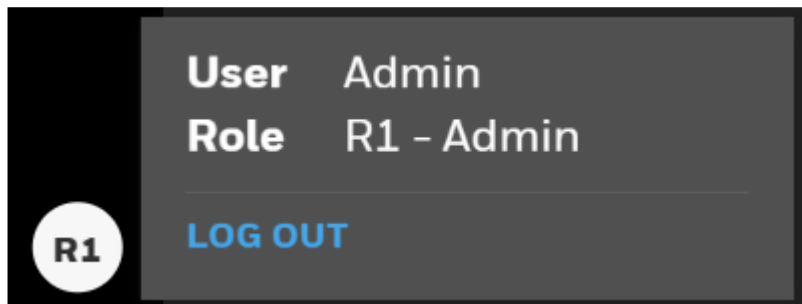


Selected profile will be imported and shown in the profile list of Profile Manager

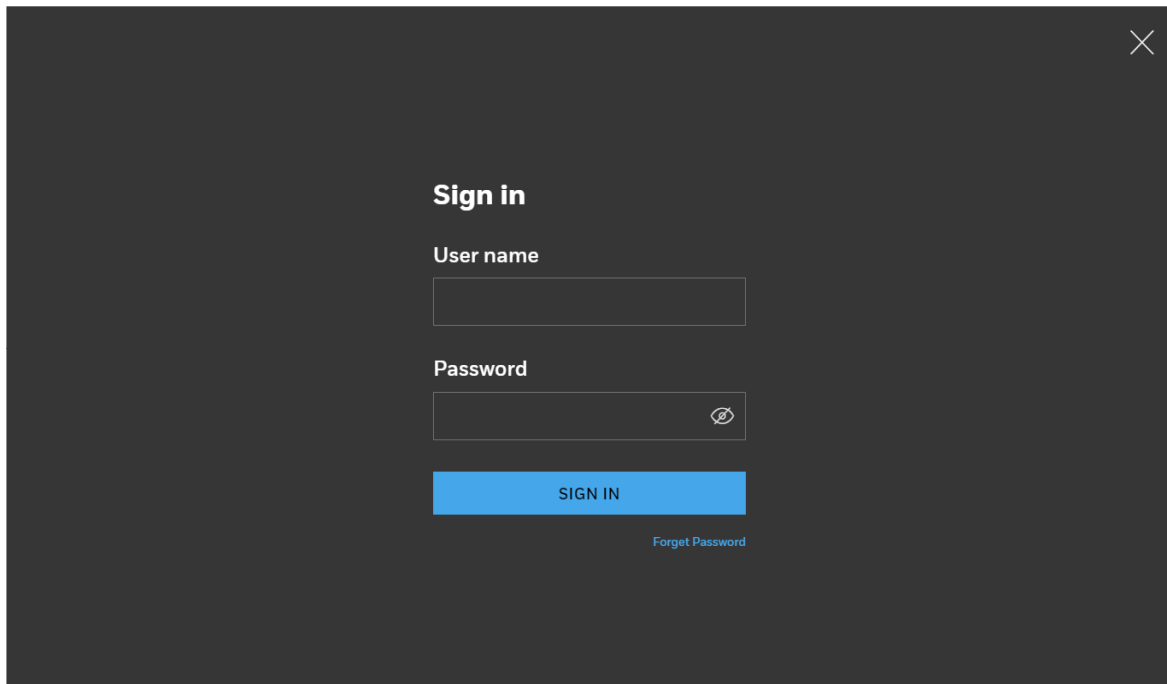
## Login and Logout

To protect the integrity of the system, the Vertex™ VC4 System classifies the access levels as a viewer, an operator and an administrator. If you require access to a protected menu, you must log in under a user role with permission to use that menu. The Vertex™ VC4 System administrator assigns a role to the user accounts. The role of the currently logged user is shown on the bottom of the main menu.

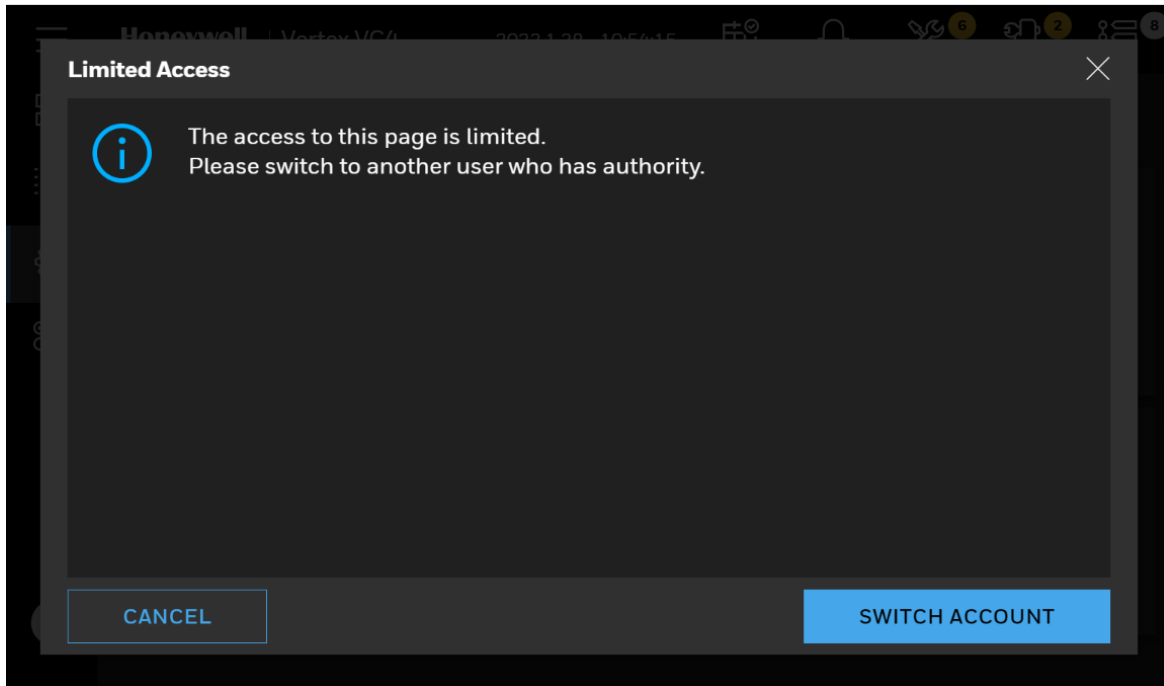
1. To log in, tap on the user role icon at the bottom of the main menu and select Log In.



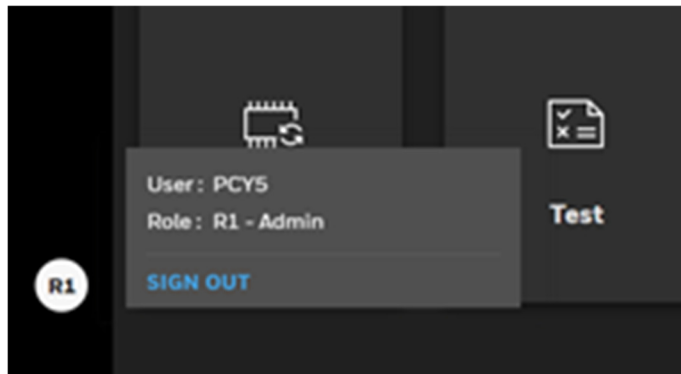
2. Enter your user ID and password in Log In screen and tap on the Log In button.



3. Once logged in, the system checks your role. As you use Vertex™ VC4 menus, only the pages to which you have access will be accessed. The pages associated with functions to which you are denied access will request you to switch to another user with an appropriate authority.



4. To log out tap on the user role icon at the bottom of the main menu and select Log Out.



**NOTE**

Default user ID and password are Admin / Admin for an administrator role and Operator / Operator for an operator role.

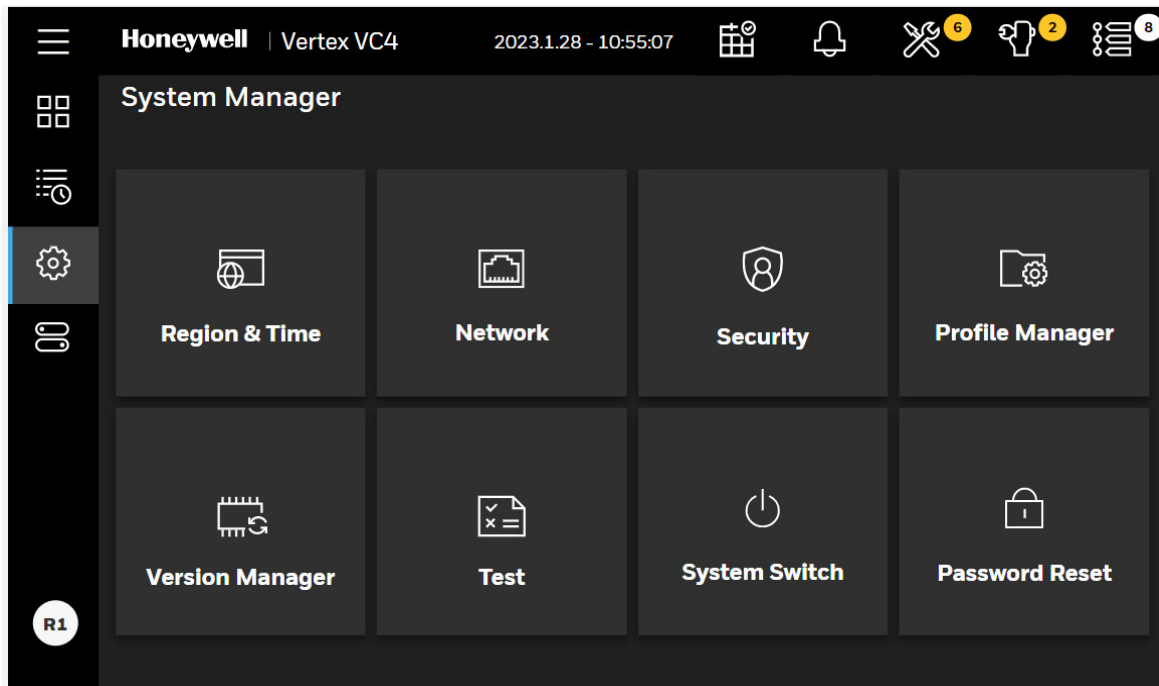
**NOTE**


Upon initial installation and login, it is strongly recommended to change the password of the default users in accordance with the password complexity.

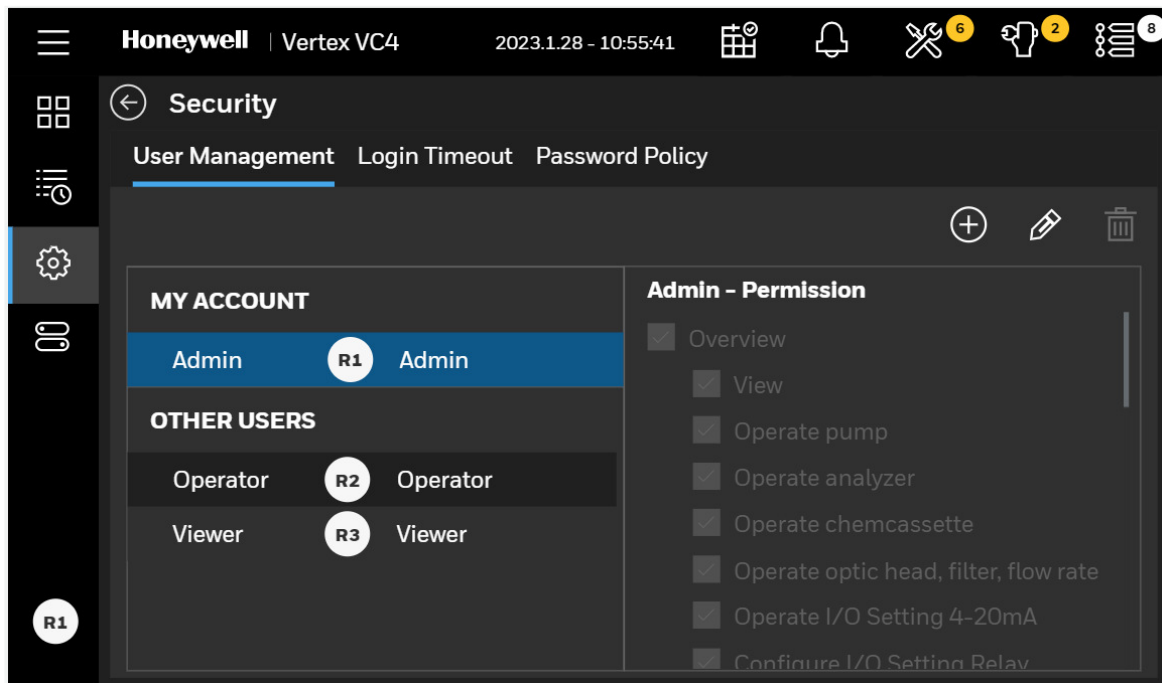
# Create a New User

Administrator can add a new user and assign an appropriate role to the user account.

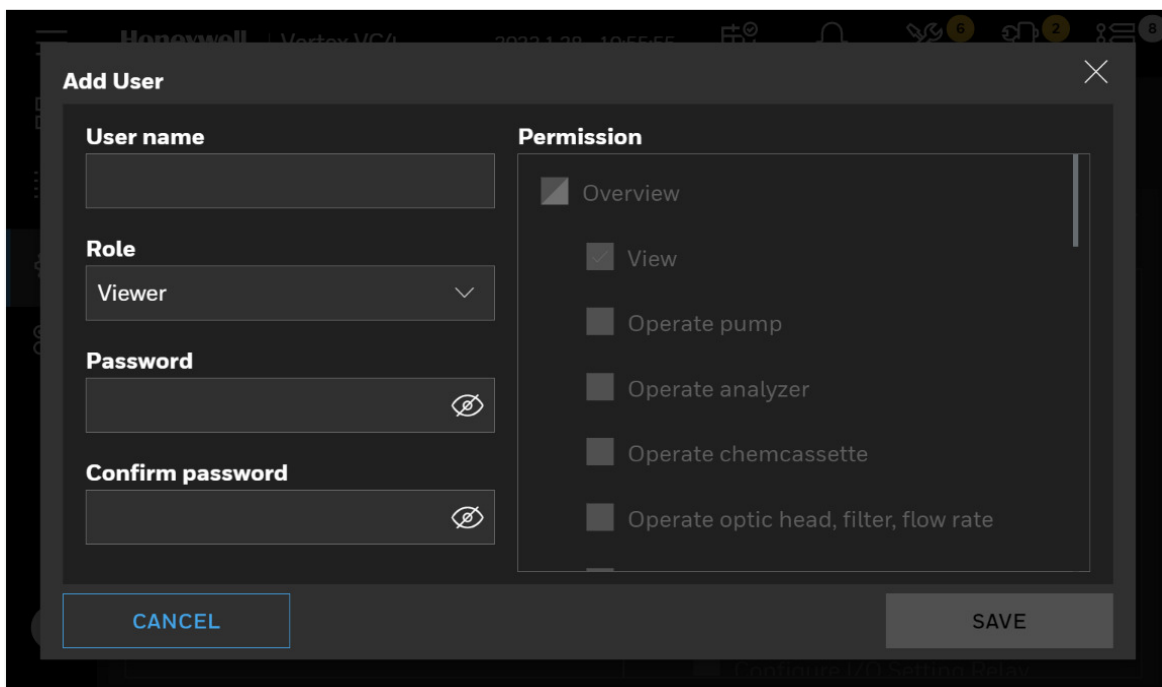
1. From the main menu, go to **System Manager > Security**



2. To add a new user, tap on the ADD button 



3. Type a username, password according to the password complexity and select an appropriate role to the user



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NOTE

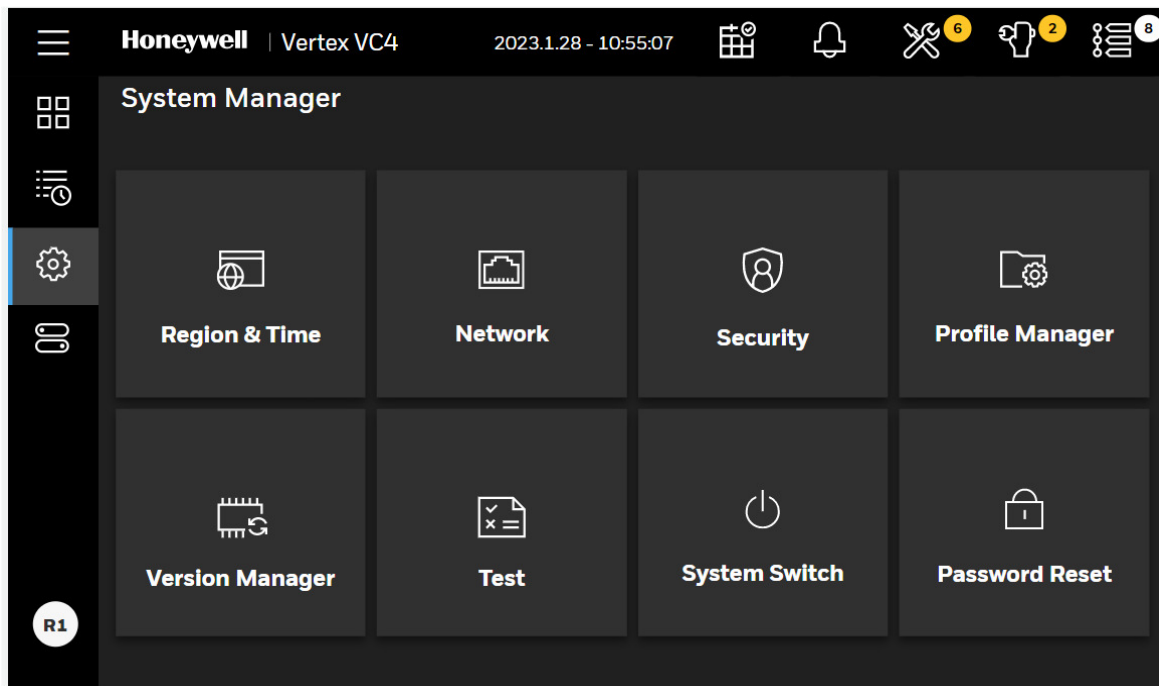
Passwords need to consist of at least 8 characters and include a lowercase, an uppercase and a special character and a number.



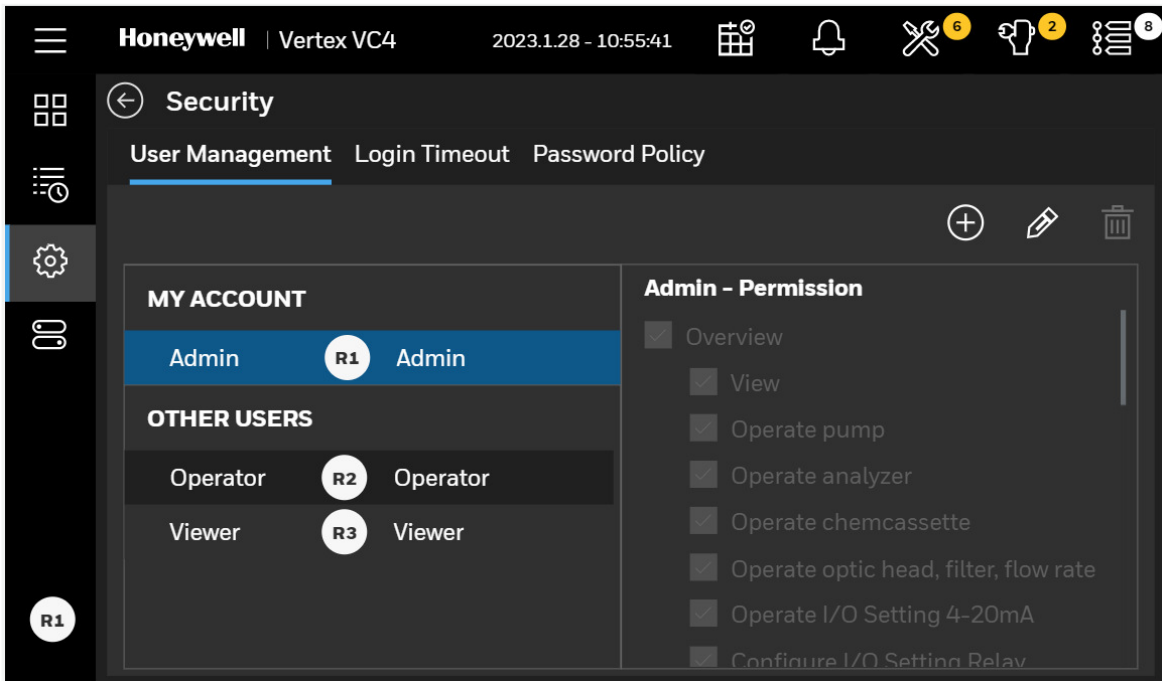
# Edit User Accounts

Administrator can edit user counts and change the user role and password.

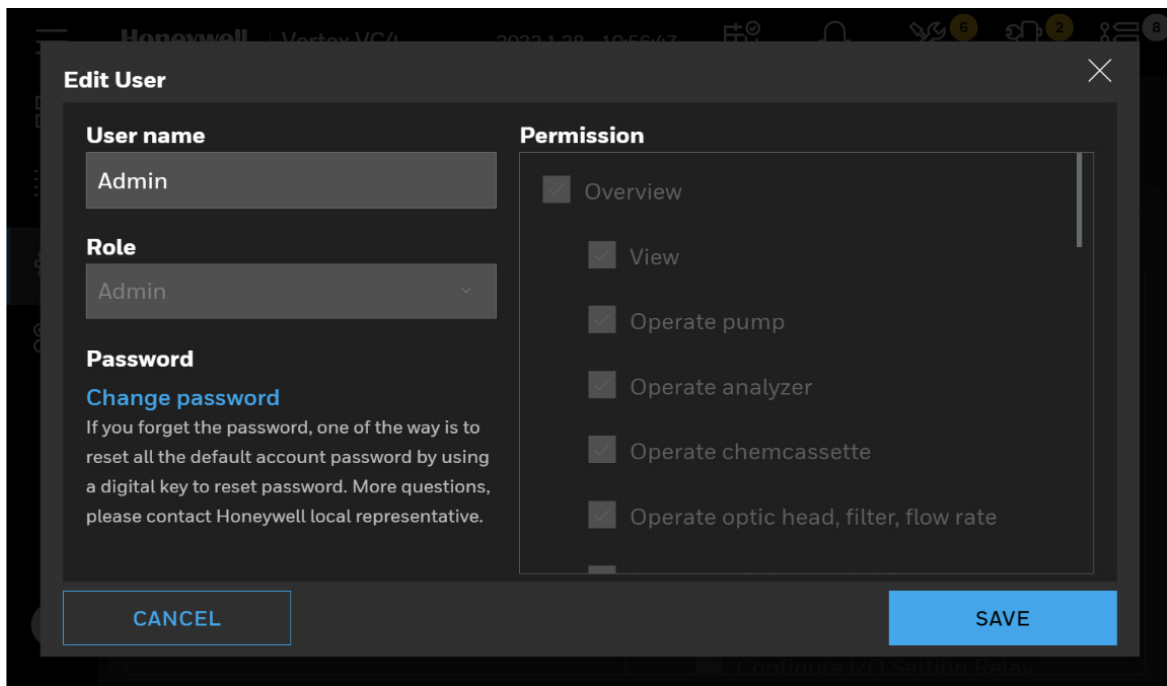
1. From the main menu, go to **System Manager > Security**



To edit users, select the target user in the list and tap on the **EDIT USERS**  button .




2. User role and password for the user can be changed by an administrator.

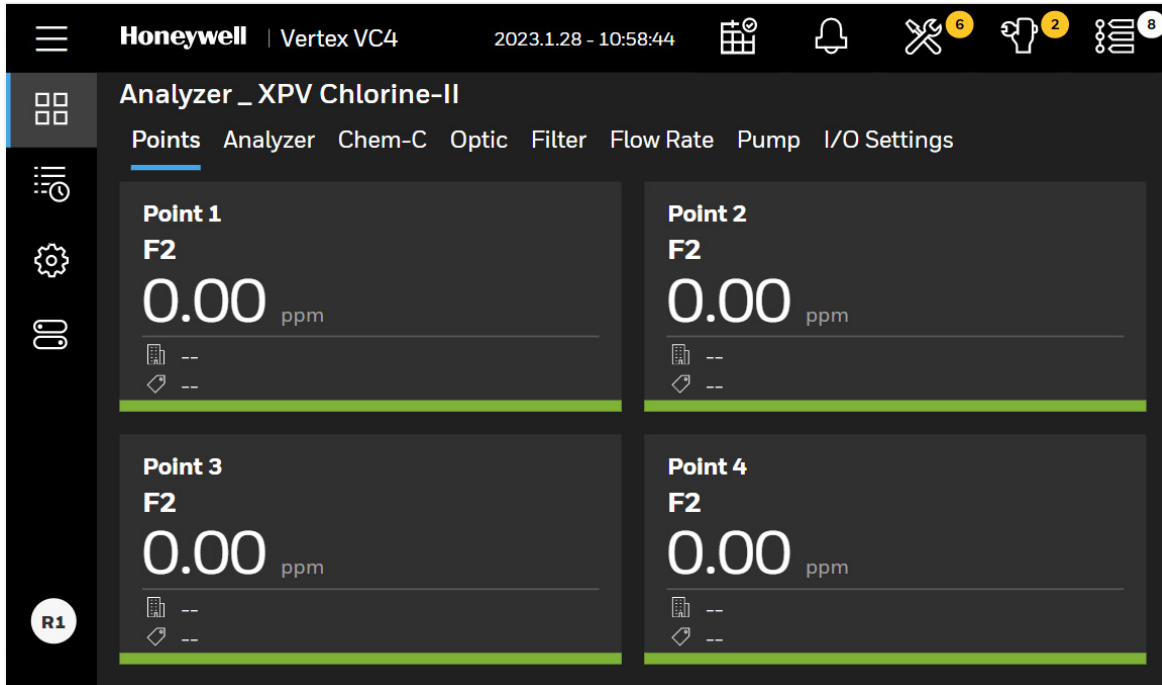


3. Alternatively, logged user can change one's password by tapping on the CHANGE PASSWORD button.

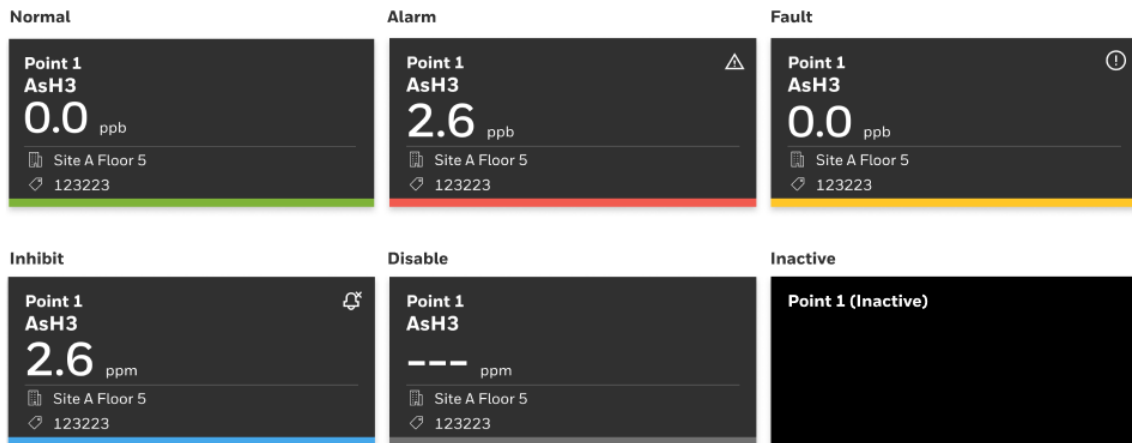
# View Overview Status

View Overview status of all connected analyzers such as analyzer status, pump status and point status of up to 4 points

1. In the left navigation panel, tap **OVERVIEW** 
2. Analyzer status is shown with gas family configured to the Analyzer



The point status are represented graphically as below depending on the status and configuration.



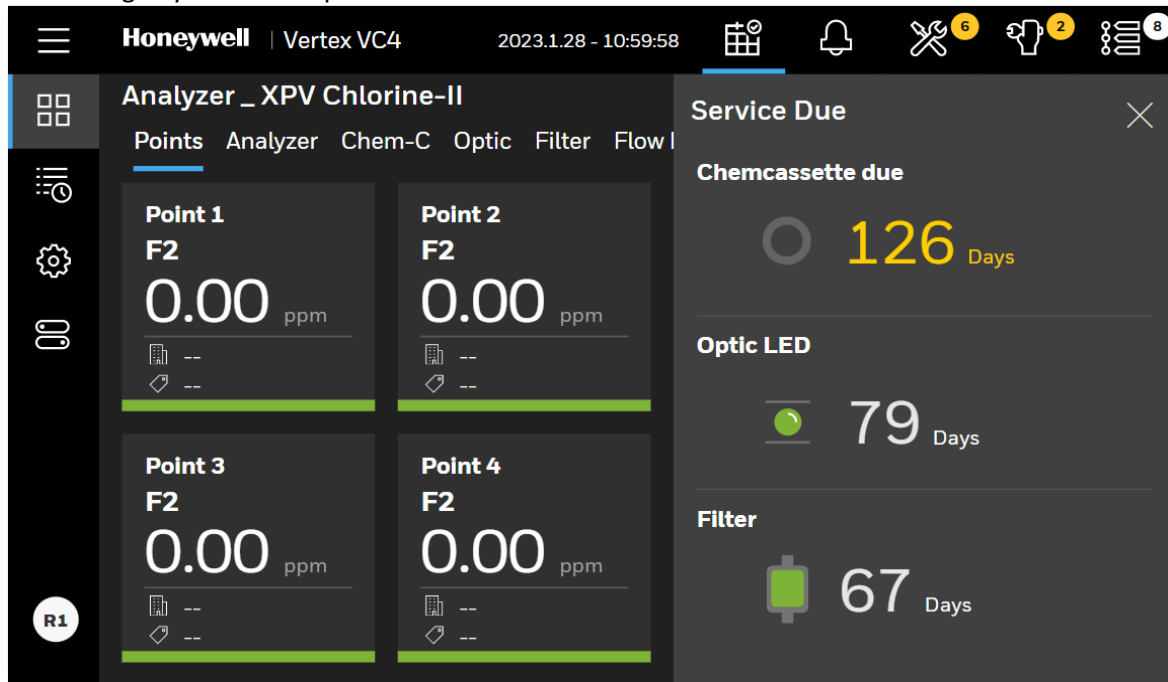
	Normal		Inhibited
	Either Alarm 1 or Alarm 2		Disable
	Either Maintenance fault or Instrument fault		Inactive

**NOTE**

When the analyzer is idle, the normal point and inhibit point color will turn into grey, but the alarm (before idle), fault point, non-configure and disabled point will still keep its previous status.


To view service due of multiple analyzers, tap  on the at the upper right of the Overview screen.

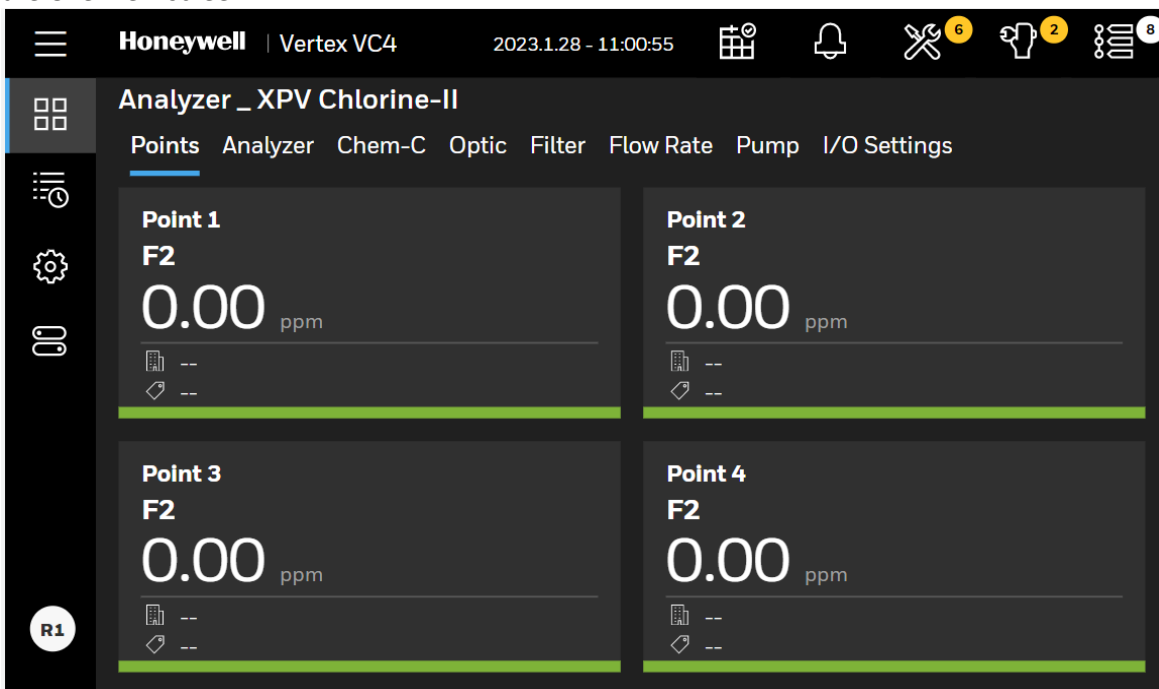
Service due of all connected analyzers will be shown graphically such as remaining CC tape life, remaining days to Optic cleaning and remaining days to filter replacement.




# View System Status

Review status of 4 points, Chemcassette® life, Optic block status, flow status, filter status, Pump status and I/O setting.

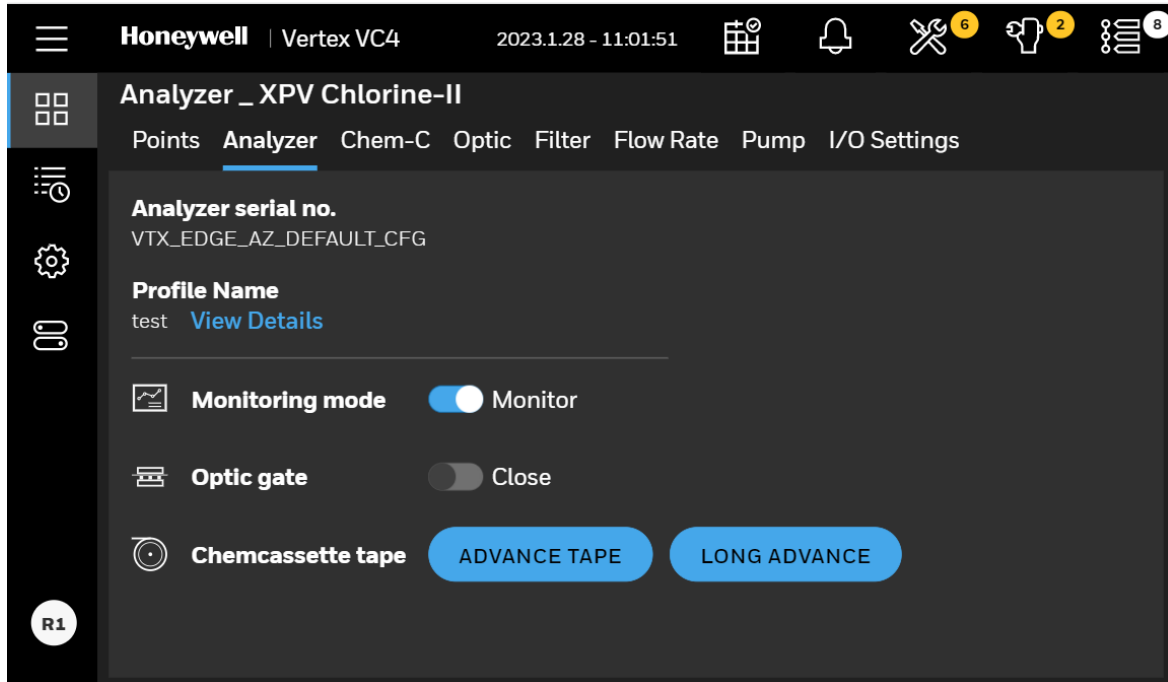
1. From the main menu, tap **OVERVIEW**  .
2. Point status such as gas name, gas concentration, measurement unit, location tag and point status will be displayed. The graphical representations of the point status at the bottom of point status box are the same as the Overview screen.



## View Detailed Analyzer Information

1. In the left navigation panel, tap **OVERVIEW**  .
2. Tap on the **Analyzer** button

The Analyzer Information window displays the Serial No. and the Profile ID.



3. Tap **View Details**. The detailed info is displayed. Use the arrow button to expand or collapse the contents. Scroll downward to view the entire contents.