

# Vortex FP

Flameproof Gas Detection Control System



## Installation, Operation and Maintenance Manual

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## INTRODUCTION

The Crowcon Vortex FP gas detection control system can be installed in Zone 1 or Zone 2 hazardous areas, and is designed to monitor toxic and/or flammable gas detectors, or fire detection devices. The system must be installed and operated in accordance with these instructions.

## WARNING

**The equipment described in this instruction manual has mains voltages applied to it. Ensure correct safety procedures are adopted before working on the equipment.**

**The equipment described in this manual is designed for detection of flammable and/or toxic gases. Ensure local safety procedures are adopted before carrying out any maintenance or calibration work.**

**The equipment described in this manual may be connected to remote alarms and/or shutdown systems. Ensure that local operating procedures are adopted before carrying out any maintenance or calibration work.**



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Crowcon reserves the right to change the design or specification of this product without notice.

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# 1. INTRODUCTION

## 1.1 SAFETY INFORMATION

Vortex FP is a certified Flameproof (Exd) detector suitable for use in ATEX Zone 1 or Zone 2 hazardous areas.

- Vortex FP must be installed, operated and maintained in strict accordance with these instructions, warnings, label information, and within the limitations stated.
- The cover retaining bolts must be kept tightly closed until power to the control system is isolated - otherwise ignition of a flammable atmosphere can occur.
- Before removing the cover for maintenance or calibration purposes, ensure the surrounding atmosphere is free of flammable gases or vapours.
- Maintenance and calibration operations must only be performed by qualified service personnel.
- Only genuine Crowcon replacement parts must be used; substitute components may invalidate the certification and warranty of the system.
- Vortex FP must be protected from extreme vibration.
- Vortex FP must be protected from direct sunlight in hot environments as this may cause the temperature of the system to rise above its specified limits and cause premature failure.
- Vortex FP is supplied certified for use in hazardous areas only with the components originally fitted. No other devices may be fitted within the Vortex FP enclosure.

## 1.2 PRODUCT DESCRIPTION

Vortex FP is a sophisticated control system designed for monitoring up to twelve gas detectors. Three input channels may alternatively be used for monitoring conventional smoke or heat detectors, or flame detectors. Vortex FP may contain (depending on specification) up to 24 relays for control of external devices.

Vortex FP is supplied in an Exd Flameproof junction box constructed of LM25 aluminium and finished with a tough polyester coating. Gas levels, alarms and faults can be viewed through the window, and system functions can be accessed either via the push-buttons or by using the supplied 'Crowmag' magnetic key.

Vortex FP may be delivered configured for 1-4, 1-8 or 1-12 input channels, and with up to three 8-way relay modules. Vortex FP may also have up to four Zener barriers or galvanic isolators fitted for connection of intrinsically safe (I.S.) field devices. Please refer to the specification sheet provided with the system for exact configuration details.

Vortex FP is based on Crowcon's Vortex control system, and the standard Vortex manual (part number M07211) must be referred to in conjunction with these instructions.

Vortex FP is not available with back-up batteries fitted. For continued operation in the event of mains supply failure, it is recommended that Vortex FP is connected to a suitable UPS system.

A view of internal system modules and components is shown on the following page.

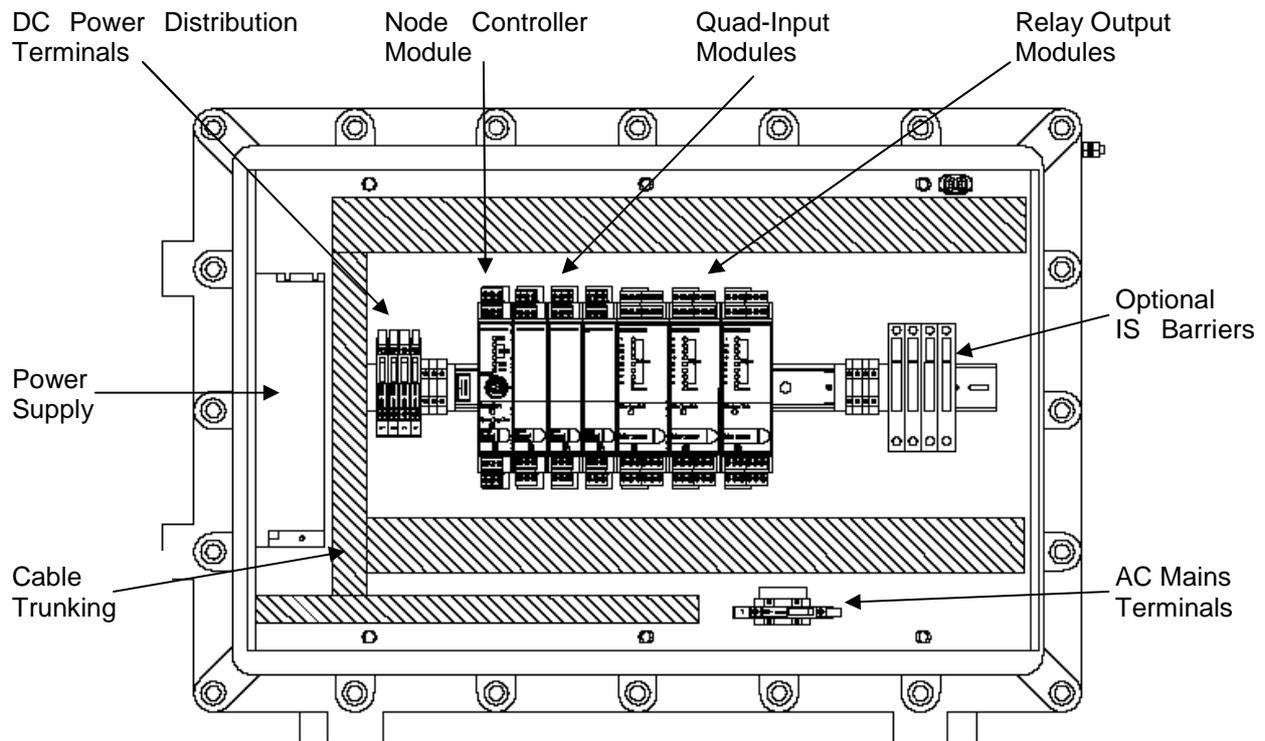


Figure 1 – System Internal View

## 2. INSTALLATION

### Warning

This product is designed for use in Zone 1, Zone 2 hazardous areas, and is certified ATEX Ex d IIB+H<sub>2</sub> (-20 to +45°C).

Installation must be in accordance with the recognised standards of the appropriate authority in the country concerned.

For further information please contact Crowcon. Prior to carrying out any installation work ensure local regulations and site procedures are followed.

### General Notes:

Vortex FP weighs approximately 70Kg. Appropriate lifting equipment must be used when transporting and mounting the system. The surface to which the system will be mounted, and the fixings used must be able to support its weight adequately.

Care should be taken so as to avoid damage the painted finish of the system.

Vortex FP Compact has an ingress protection rating of IP66 and is therefore suitable for outdoor installation. It is recommended however that a suitable sun-shade and rain canopy is fitted.

Cabling must be in accordance with the recognised standards of the appropriate authority in the country concerned and meet the electrical requirements of the field devices.

Field cables must be connected to the system using ATEX certified Exd cable glands, which are suitable for the type of cable used. Crowcon recommends Steel Wire Armoured (SWA) cable is used. Other cables types may be used provided suitably certified cable glands are also used.

**Important note:** If a Vortex FP system is to be connected to a control system in a safe area (ie control room, plant room etc) it is strongly recommended that the Vortex RS-485 function terminals are connected to an accessible point in the safe area. All Vortex configurations, calibration and diagnostic functions can then be carried-out using the Vortex PC software supplied with the system from the safe area without requiring the Flameproof junction box to be opened. Refer to the Vortex manual for more details.

1. The fixing brackets/bolts are supplied with, but not fitted to the Vortex FP enclosure. To fit the brackets lay the Vortex FP enclosure on a suitable surface and raise onto one end. Remove the 20 lid retaining bolts and carefully open the lid of the enclosure. The fixing brackets should be secured to the enclosure using the supplied retaining bolts/nuts (see below).



Once the brackets are attached, close the door and restrain using one fixing bolt before attempting to mount the cabinet.

2. Lift the system in to place and secure via the mounting bracket fixing points shown in the diagram on the next page.
3. Re-fit the lid onto the hinge-points and re-connect the display module ribbon cable.
4. Twenty M20 entries are provided for field cables. Connect the cables to the system using certified Exd cable glands. Certified M20 plugs are fitted to all entries, these plugs must be removed on the entries to be used for field cables only. All spare cable entries must be left with Exd certified plugs securely fitted.
5. Cable conductors should be connected to the Vortex modules and terminals as shown on the wiring diagram provided with the system. Reference should also be made to the Vortex manual (M07211). **Warning: power must not be applied until the enclosure lid has been closed and securely tightened.**

6. I.S. field devices must be connected to the safety barriers fitted within the system, in accordance with their instructions. **Zener Barriers must be grounded to a dedicated I.S. earth.**
7. Once all cable connections have been made the lid should be closed and tightly secured using the 20 fixing bolts.
8. Connections to field devices (gas detectors, fire detectors etc) must be made according to the instructions provided with each device.

System dimensions and mounting points are shown below.

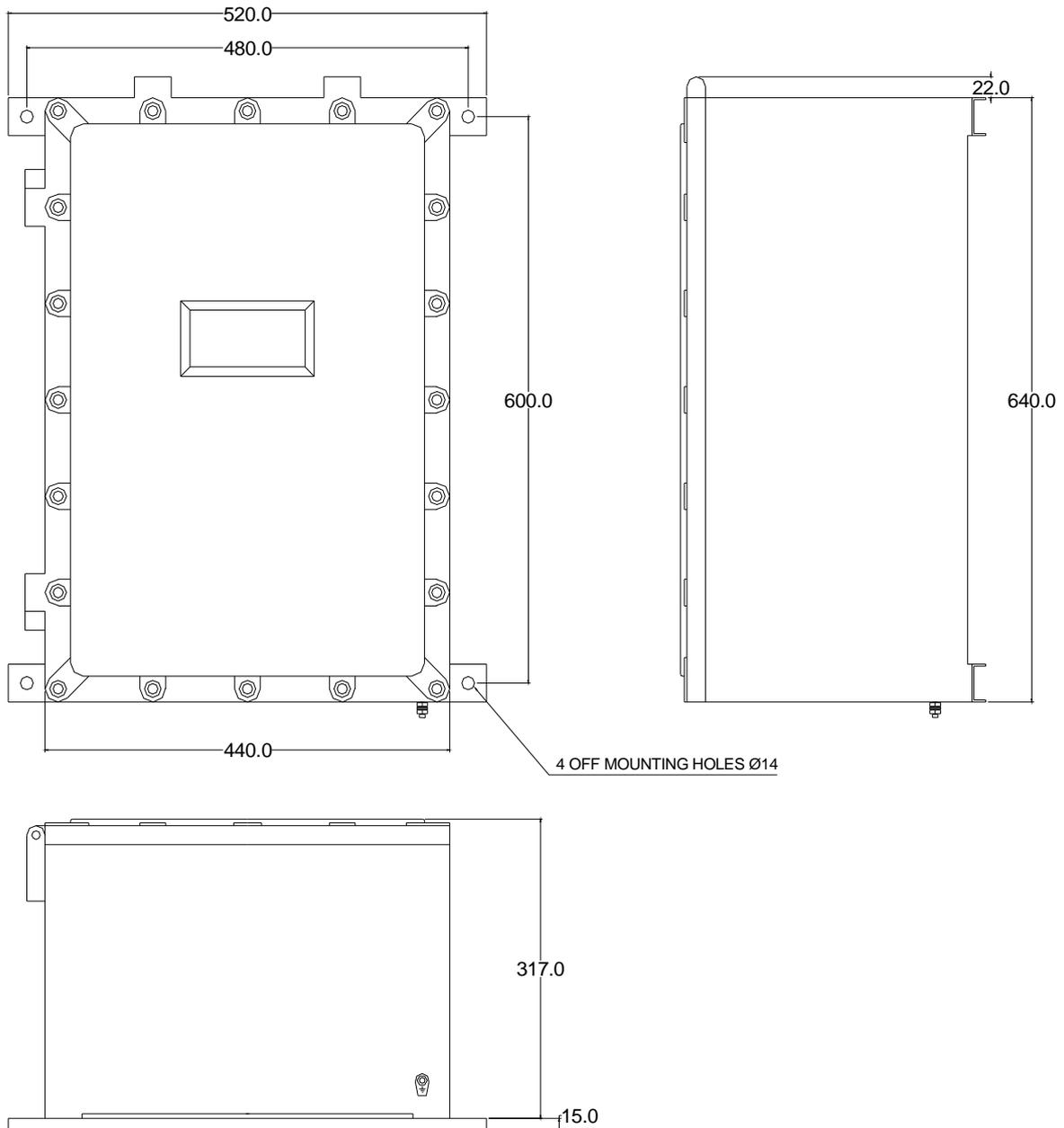


Figure 2 – System Dimensions and Mounting Detail

## **3. OPERATION & MAINTENANCE**

### **3.1 APPLYING POWER**

**Before applying power ensure that any control or shutdown systems to which the Vortex FP is connected are inhibited.**

Refer to the wiring diagram supplied with the system for details on where to make ac/dc supply connections. The system will be configured specifically for each order; the Specification Sheet supplied will confirm whether the system has been configured for 230Vac, 110Vac or 24Vdc operation. The 150W power supply unit (PSU) fitted to the system has a switch that must be set according to the required ac supply voltage.

Once all field cables have been installed, apply power to system from either the 110/230Vac or 24 V dc external supplies.

When power is applied the green Power Healthy LED will illuminate to indicate that the system is operational.

If after a settling period faults are reported, check the sensor connections again or refer to Faults table in section 6.4 of the Vortex manual.

Vortex FP should display readings for all channels/sensors being monitored. Allow sensors to settle before commencing calibration; refer to sensor instructions supplied with detectors for recommended settling times.

### **3.2 COMMISSIONING**

Crowcon strongly recommends that fixed gas detecting installations are fully commissioned as soon as possible after installation. Commissioning should include a full check of cabling and equipment functions, as well as output functions. Gas detectors must be calibrated, and the function of all gas and fire detectors must be verified in accordance with their instructions.

### **3.3 ROUTINE MAINTENANCE**

Crowcon recommends that gas detectors are tested routinely to ensure correct calibration and operation. Gas detectors, sensors may require recalibration at least every 6 months. Fire detectors should be tested every 3 to 6 months. Site procedures may require more frequent testing.

For detailed instructions on the routine functional testing of detectors, please refer to the relevant Installation, Operating and Maintenance Instructions provided with each detector.

Output functions such as audible/visual alarm operation and signalling to external equipment should be tested and verified on a regular basis.

Vortex FP requires cleaning as necessary to ensure the display window does not become obscured. The enclosure, cables and glands should also be checked regularly to ensure that Flameproof integrity is maintained.

For more detailed information on Vortex system maintenance, please refer to Section 7 of the standard Vortex manual (part number M07211).

It may be necessary to open or remove the lid of the Vortex FP enclosure in order to perform some maintenance functions. ***Vortex FP must be completely de-energised before the lid is opened; local procedures must be adhered to when servicing equipment installed in a hazardous area.***

### 3.4 VORTEX FP DISPLAY AND CONTROLS



Vortex FP incorporates a Display Module which is fitted behind a window, and provides a display of detector signals and reports the current status of the system. Display functions are controlled using a Crowmag calibration tool, which should be oriented (horizontally or vertically) as indicated by the arrows on the display function fields.

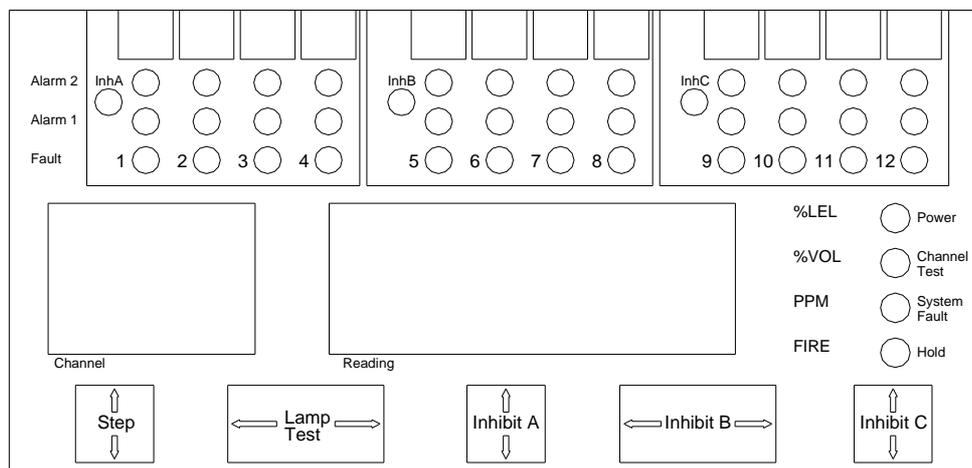


Figure 3 – Display Module Layout

#### Crowmag control functions:

**Step:** when the system is holding on a particular channel (ie the 'Hold' button has been pressed), use the Step function to display the next channel in sequence. Also used to increase the Reading display in Channel Test mode (section 7.4 of the standard Vortex manual). Hold Crowmag vertically to activate.

Lamp test: lights all display LED's. Hold Crowmag horizontally to activate.

Inhibit: places the appropriate input module into inhibit state. An LED indicates when an input module is inhibited ('Inh A', 'Inh B', 'Inh C' LED's). Hold Crowmag vertically for input modules A and C, horizontally for input module B.

**Button functions:**

Accept/Reset: silences the internal sounder and resets latched relays once an alarm state has been cleared.

Hold: forces the display to 'Hold' on a particular input channel. Also used to decrease the Reading display in Channel Test mode (see Vortex manual section 7.4).

Run: press either to restart cycling through the channels after HOLD has been selected, or to end Channel Test mode.

Other display indications and functions are described below:

| Feature                          | Description  |
|----------------------------------|--|
| System Fault LED                 | Yellow LED indicates a system fault. Specific system faults are indicated on the Node controller module; refer to the Vortex manual for more information.  |
| Power Healthy LED                | Yellow LED indicates system power status. Refer to section 6.4.2 of the Vortex manual for more information.  |
| Zone Inhibit LED's               | Yellow LED for each zone (A,B,C: Quad Input Modules). Indicates that the zone (quad input module), or a channel in the zone, is currently inhibited.   |
| Hold LED                         | Green LED when continuously illuminated indicates that the HOLD button has been used to hold the current channel.<br>When this LED flashes, it indicates "Jump on Alarm". The Channel Reading now shows the channel (or the first of more than one channel) that has gone into alarm.                      |
| Channel Test LED                 | Yellow LED when flashing indicates that the system is in Channel Test mode. Refer to section 7.4 of the standard Vortex manual.  |
| Units Indication LEDs            | Indicates what the units of the currently displayed reading are.   |
| Reading                          | The reading on the input device (detector) currently indicated by the Channel display. The number is shown in red on a 7-segment display. This should be read in conjunction with the 'units' indication. For the use of this display in Channel Test mode, see section 7.4 of the standard Vortex manual. |
| Channel Number                   | Green 7-segment display that normally displays the number of the currently-displayed channel (detector). For the use of this display in Channel Test mode, see section 7.4 of the standard Vortex manual.  |
| Channel Alarm 1 and Alarm 2 LEDs | Red LEDs for each channel. Illuminated when the alarm level is reached on the channel. When the alarm is first raised, the LED flashes. After the ACCEPT/RESET button is pressed, the LED goes out if the alarm condition has been cleared. If the alarm condition still exists, it displays continuously. |
| Channel Fault LEDs               | Yellow LED for each channel. Illuminated when a fault is detected on the channel. When the fault is first raised, the LED flashes. After the ACCEPT/RESET button is pressed, the LED goes out if the fault has been cleared. If the fault still exists, it displays continuously.                          |

Additional functions are available via buttons fitted to the rear of the display PCB. The button locations and functions are shown below.

**Warning: access requires the Vortex FP enclosure to be opened; site procedures must be strictly adhered to before attempting to open the enclosure or to operate a powered system with an open enclosure. Performing any of the following functions will normally require a 'hot-work permit' to be issued by the site supervisor, and the local area must be tested to ensure no flammable gases or vapours are present.**

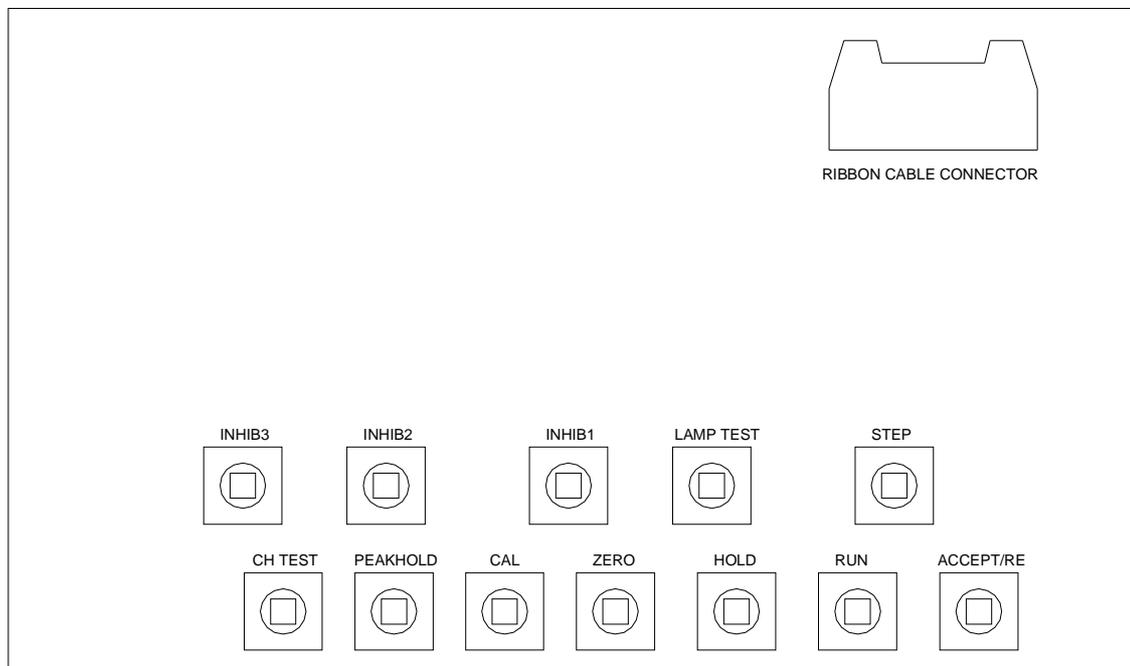


Figure 4 – Rear of Display Module

| Feature              | Description  |
|----------------------|--|
| HOLD Button          | Press to hold the display on the current channel.  |
| CHANNEL TEST Button  | After the HOLD button has been used to select a channel, use the Channel Test button to display alarm levels or for zero adjustment and calibration. Refer to the standard Vortex manual for more information. This button can be disabled using Vortex PC.  |
| PEAK HOLD CAL Button | Used for the Peak Hold Calibration, refer to section 7.3 of the standard Vortex manual. Can be disabled using Vortex PC.   |
| CAL Button           | Used for the Calibration, refer to sections 3.8 and 7.3 of the standard Vortex manual. Can be disabled using Vortex PC.  |
| ZERO Button          | Used for the Zero Adjustment refer to sections 3.8 and 7.3 of the standard Vortex manual. Can be disabled using Vortex PC.   |
| ZONE INHIBIT Buttons | One button for each zone (Quad Input Module). Used to prevent the corresponding output relays from being activated during testing or calibration. Refer to sections 3.8, 7.3 and 7.4 of the standard Vortex manual. Vortex PC software can be used to inhibit individual channels.<br>Note: Even in the inhibit condition, the alarm LEDs on the display module are triggered if alarms occur. |

## 4. TECHNICAL SPECIFICATION

|                        |  |
|------------------------|--|
| Size:                  | 440mm x 640mm x 332mm (width x height x depth)               |
| Construction:          | LM25 alloy, polyester powder coated                          |
| Weight:                | 70Kgs approx.  |
| Cable entries:         | 20 x M20   |
| Certification:         | ATEX Ex II 2G<br>Exd IIB+H <sub>2</sub>                      |
| Inputs:                | Refer to the specification sheet provided with the system.   |
| Outputs:               | Refer to the specification sheet provided with the system.   |
| Power:                 | 230Vac 50-60Hz, 1.6A<br>110Vac 50-60Hz, 3.2A<br>20-30Vdc, 5A |
| Operating Temperature: | -10 to +40° C (storage temperature -25 to +55°C)             |
| Humidity:              | 15-90% non-condensing  |
| Ingress Protection     | IP66   |
| CE Approvals           | Low Voltage Directive EN61010-1:2001<br>EMC EN50270: 2006    |

## 5. WARRANTY STATEMENT

This equipment leaves our works fully tested and calibrated. If within the warranty period of 12 months from despatch, the equipment is proved to be defective by reason of faulty workmanship or material, we undertake at our discretion either to repair or replace it free of charge, subject to the conditions below.

### Warranty Procedure

To facilitate efficient processing of any claim, contact our customer support team on +44 (0)1235 557711 with the following information:

Your contact name, phone number, fax number and email address.  
Description and quantity of goods being returned, including any accessories.  
Instrument serial number(s).  
Reason for return.

Obtain a Returns form for identification and traceability purpose. This form may be downloaded from our website 'crowconsupport.com', along with a returns label, alternatively we can email you a copy.

**Instruments will not be accepted for warranty without a Crowcon Returns Number ("CRN"). It is essential that the address label is securely attached to the outer packaging of the returned goods.**

Units returned to Crowcon as faulty and are subsequently found to be 'fault free' or requiring service, may be subject to a handling and carriage charge.

## **Warranty Disclaimer**

The guarantee will be rendered invalid if the instrument is found to have been altered, modified, dismantled, or tampered with. Any service by 3rd parties **not** authorized & certified by Crowcon will invalidate the warranty on the equipment. Use of alternative manufacturer's sensors which have not been approved by Crowcon will invalidate the warranty of the product as a whole. The warranty does not cover misuse or abuse of the unit.

Any warranty on batteries may be rendered invalid if an unreasonable charging regime is proven.

## **Repair Warranty**

Product repairs within the warranty period will be free of charge for both labour and parts. Should a full service / calibration also be due, then this is agreed with the customer to be carried out at the same time as the repair and the service element will be chargeable.

Replaced parts (outside of product warranty) will usually carry a further 12 month warranty (sensor warranty exclusions are published on the Crowcon Intranet), Repairs / Service labour carries a 3 month warranty. Should a second but unrelated failure occur outside of the product warranty or parts warranty where applicable, this will be subject to separate charges.

Crowcon accept no liability for consequential or indirect loss or damage howsoever arising (including any loss or damage arising out of the use of the instrument) and all liability in respect of any third party is expressly excluded.

The warranty and guarantee does not cover the accuracy of the calibration of the unit or the cosmetic finish of the product. The unit must be maintained in accordance with the Operating and Maintenance Instructions.

Our liability in respect of defective equipment shall be limited to the obligations set out in the guarantee and any extended warranty, condition or statement, express or implied statutory or otherwise as to the merchantable quality of our equipment or its fitness for any particular purpose is excluded except as prohibited by statute. This guarantee shall not affect a customer's statutory rights.

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