

GTA-VSD20i

Digital Ventilation Fan
Controller System

OPERATOR'S MANUAL



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GTA-VSi™

Digital Ventilation Fan Controller System

Part Number 73-8010

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GasTech Australia maintains a service facility at the factory as well as authorised service facilities around the world. Should your controller system require service, you may contact us toll free at 1800 999 902 within Australia only or 61-8-6108-0000, or visit our website www.gastech.com.au for authorised service locations.

For non-warranty repairs, you will need to provide a purchase order number. If you need to set a limit to the repairs costs, state a "Not to Exceed" figure. If you need a quotation before you can authorise repair costs, so state, but understand this will incur additional costs and may delay processing of the repair.

GasTech Australia's policy is to perform all needed repairs to restore the instrument to full operating condition, including reactivation or replacement of all out-of-warranty electrochemical cells.

You may send the unit, freight prepaid, to: GasTech Australia Pty Ltd, 24 Baretta Rd, Wangara 6065, Western Australia. Attn.: Service Department. Enclose the copy of your contact details. Pack the instrument and all its accessories (preferably in its original packing) and any special instructions. Repairs are warranted for 90 days from the date of shipment. Sensors have individual warranties.

Always include your address, purchase order number, shipping and billing information, and a description of the defect as you perceive it. If this is the first time you are dealing directly with the factory, you will be asked to provide credit references, prepay, or authorise COD shipment.



NOTE: GasTech Australia assumes no liability for work performed by unauthorised service facilities.


WARRANTY STATEMENT

1. Consumers have the benefit of conditions and warranties implied by the Trade Practices Act 1974 (TPA) and similar provisions of State and Territory enactments and nothing in these conditions is intended to exclude, restrict or modify any statutory obligation of GASTECH AUSTRALIA PTY LTD (Company) if that cannot lawfully be effected.
2. This warranty relates only to Equipment manufactured and services supplied by the Company, its related corporations and subsidiaries. Equipment or any part thereof which is returned to the Company, transportation prepaid, within 27 months from the date of dispatch from the Company's premises or 24 months from the date of shipment to the ultimate user (whichever occurs first) and is found by the Company, after examination, to be defective in workmanship or materials, will be either repaired or replaced as determined by the Company, free of charge. The terms of this paragraph apply unless stated otherwise in this instruction manual.
3. This warranty does not apply to:
 - a) replacement or repairs which are required as a results of improper installation, misuse, maladjustment modification or lack of routine maintenance by others;
 - b) items subject to deterioration or consumption in normal service, that is, those which must be cleaned, repaired or replaced routinely such as (but not limited to) lamps, bulbs and fuses, pump diaphragms and valves, absorbent cartridges, filter elements and batteries; or
 - c) goods, materials or parts supplied or manufactured by unrelated third parties and provided to the Purchaser at the specific request of the Purchaser and such goods, materials or parts will be repaired or replaced only to the extent of the original suppliers warranty.
4. Should the Company be liable for breach of a condition or warranty (other than the pursuant to section 69 of the TPA) implied by Division 2 of Part V of the Act (other than that implied by section 69 of the TPA) the liability of the Company for such breach shall, subject to section 68A(2) of the TPA, be limited to one of the following as determined by the Company.
 - a) the replacement of the Equipment or the supply of equivalent Equipment-,
 - b) the payment of the cost of replacing the Equipment or of acquiring equivalent Equipment.
5. Subject to Clauses 2 and 4 and any legislation to the contrary:
 - a) representatives and agreements not expressly contained herein shall not be binding upon the Company as conditions, warranties or representations; all such conditions, warranties, and representations on the part of the Company, whether express or implied, statutory or otherwise, whether collateral or antecedent or otherwise are hereby expressly negated and excluded;
 - b) the Company shall be under no liability to the Purchaser for any loss (including but not limited to loss of profits and consequential loss) or for damage to persons or property or for death or injury caused by any act or omission (including negligent acts or omissions) of the Company or the Company's agents, wherever occurring, arising from the subject matter of this agreement;
 - c) the Purchaser shall indemnify the Company against any claims made against the Company by any third party in respect of any such loss, damage, death or injury as is set out in sub-paragraph b) hereof; the Purchaser further agrees to indemnify the Company against all losses and expenses which the Company may suffer or incur due to the failure of the Purchaser fully to observe its obligations under this contract; and
 - d) no warranty is given and no responsibility is accepted by the Company to ensure the Equipment supplied complies with any statutory requirements relating to the marketing of goods. Compliance with such legislation shall be the sole responsibility of the Purchaser.
 - e) the Company specifically denies any liability for the overall performance of any plant or the results of any process with which the Equipment is integrated.

MANUAL CONVENTIONS

This product is designed to form part of a system to detect toxic gases and to give warning before they reach harmful levels. In order to ensure that it will warn of dangerous concentrations, it is essential that the instructions in this manual, particularly those concerning installation, operation, and maintenance, be read, understood, and followed.

Notices are used in this operator's manual to alert you to hazardous conditions to person or instrument and to notify you of additional information. This operator's manual uses the following notices.

 **NOTE:** Notifies you of additional information.

 **CAUTION:** Notifies you of potential damage to equipment.

 **WARNING:** Notifies you of potential danger that can result in personal injury or death.

1. Introduction

The GTA-VSD20i™ is an AS1668.2 compliant ventilation fan controller system targeted at car park air quality monitoring applications. The system is designed to provide ventilation fan control based on gas concentration input signals from connected gas detectors. The inbuilt control software provides both on/off and variable speed fan operation that complies with AS1668.2 and the operational recommendations published by fan manufacturers.

The GTA-VSD20i consists of individual components that require connecting together to form the desired system. The components are:- The main controller, optional extender Modules and an optional Graphical Display.

The main control module is supplied factory pre-configured and will operate independently without the HMI unit connected. The HMI is available as an option for systems where changes need to be made to the channel operations of the system and / or visualisation of the gas concentration readings is required.

1.1 Features

- AS1668.2 compliant operation.
- Scalable from 4 to 20 inputs.
- Industry Standard 4 - 20mA inputs.
- Industry Standard 0 - 10V output.
- Variable Speed and on/off fan control.
- Low stress fan drive control.
- High gas overload signal output.
- System fault signal output.
- Gas alarm output signals.
- Touch screen user interface option.



2. Component Parts

2.1 Main Controller Module

The main controller module contains the system program that accepts input signals from connected gas detectors, processes the measurements and outputs the appropriate signal to the fan. The main module can be used on its own to form a basic system with 4 input channels.

The Main module comprises:-

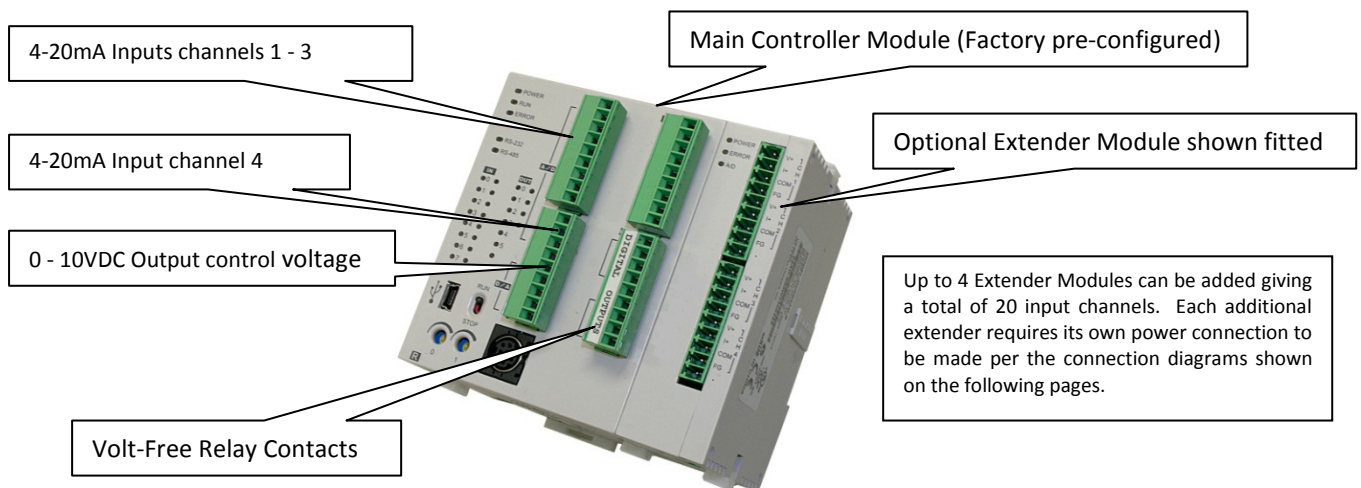
4 x 4 - 20mA inputs to connect to gas detectors.

1 x voltage output 0 - 10V to connect to fan driver systems.

5 x volt-free relay contacts to connect to fan driver, beacons, sounders etc.

1 x Digital communication port to connect to the optional graphical display module.

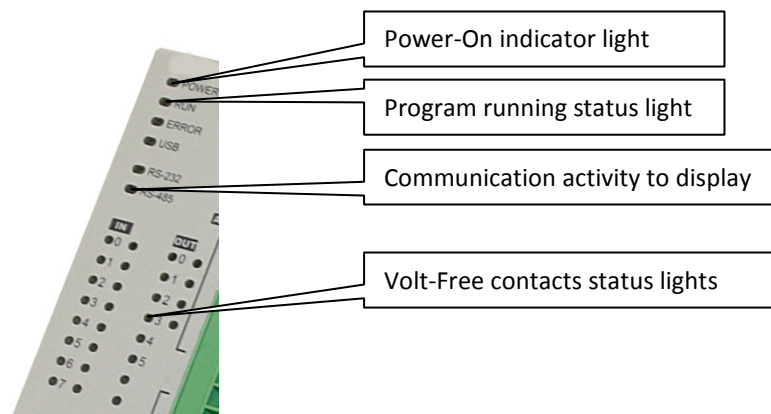
1 x Power input connector.



There are a number of additional features on the main controller but these are used for factory programming and test and do not need to be included in user applications.

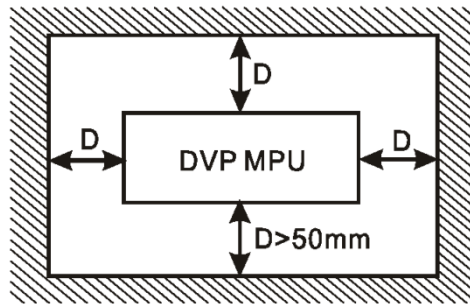
The 'Run' / 'Stop' switch must be in the 'Run' position for the controller code to function.

Signals X0 to X7 are not used in the GTA-VSD20i system. Connection to these terminals is not required.

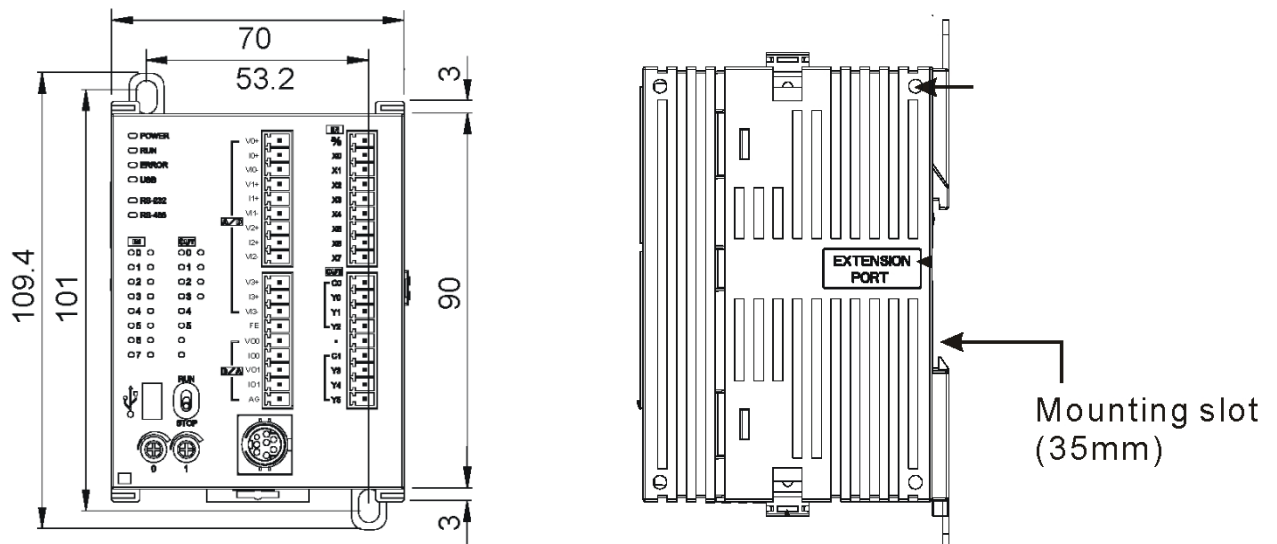


3. Mounting

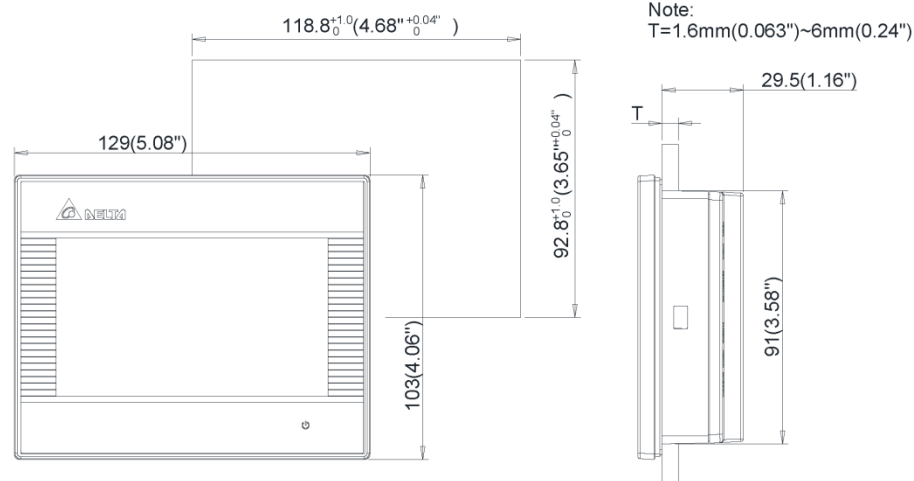
Install the Control Unit into an enclosure with sufficient space around it to allow heat dissipation, as shown below.

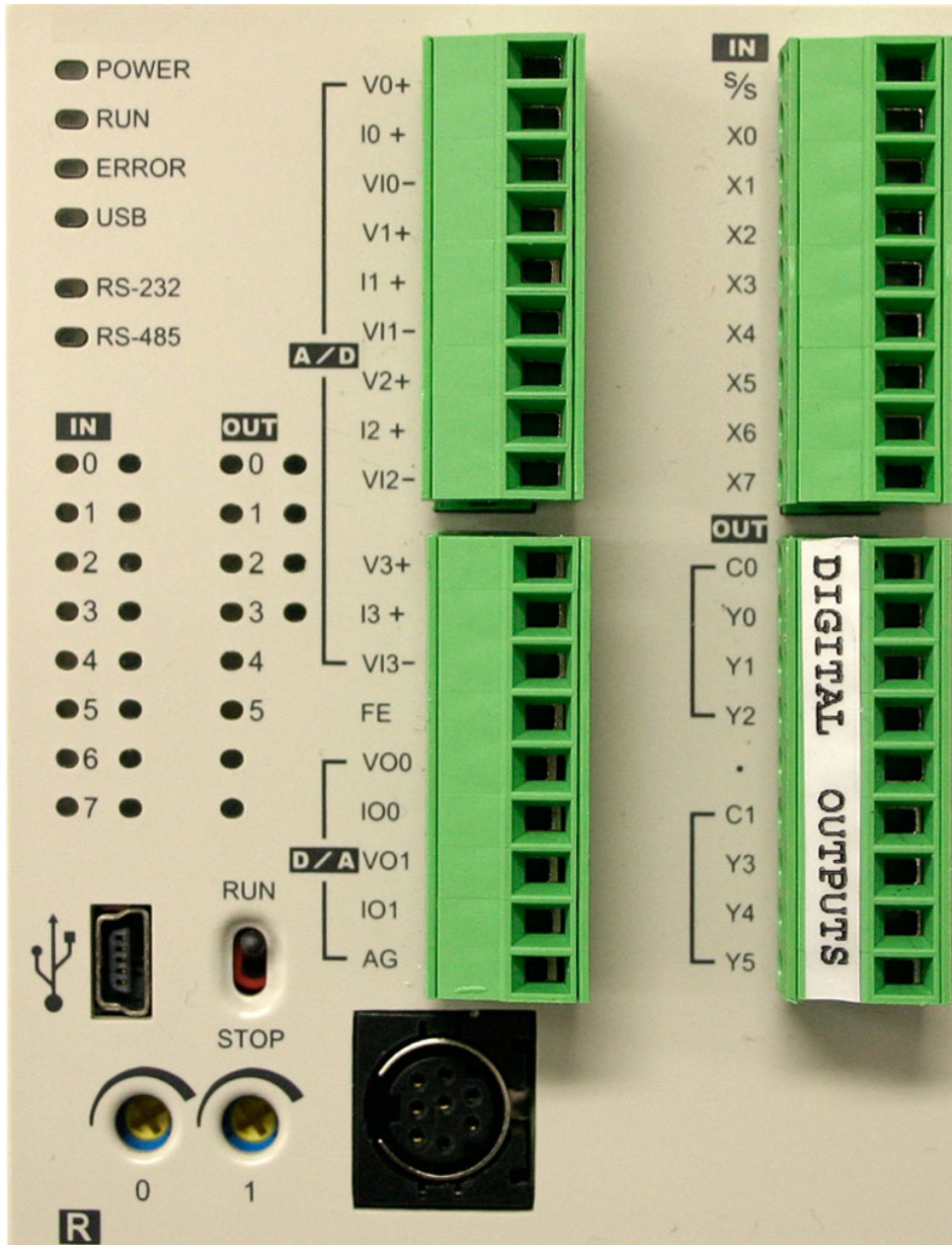


DIN Rail Mounting: When mounting the control unit to 35mm DIN rail, be sure to use the retaining clip to stop any side-to-side movement of the unit and reduce the chance of wires becoming loose. The retaining clip is at the bottom of the housing. To secure the controller to DIN rail, pull down the clip, place it onto the rail and gently push it up. To remove the unit, pull the retaining clip down with a flat screwdriver and gently remove it from the DIN rail.



The optional HMI unit is designed for panel mounting. A mounting kit with gasket is provided to allow a proper seal to be made around the mounting hole. Dimensions for the rectangular cut-out are given in the diagram below.





Main Control Unit Front Panel

See following section and wiring diagrams for information on connecting to the controller terminals.

3.1 Wiring Up The Modules

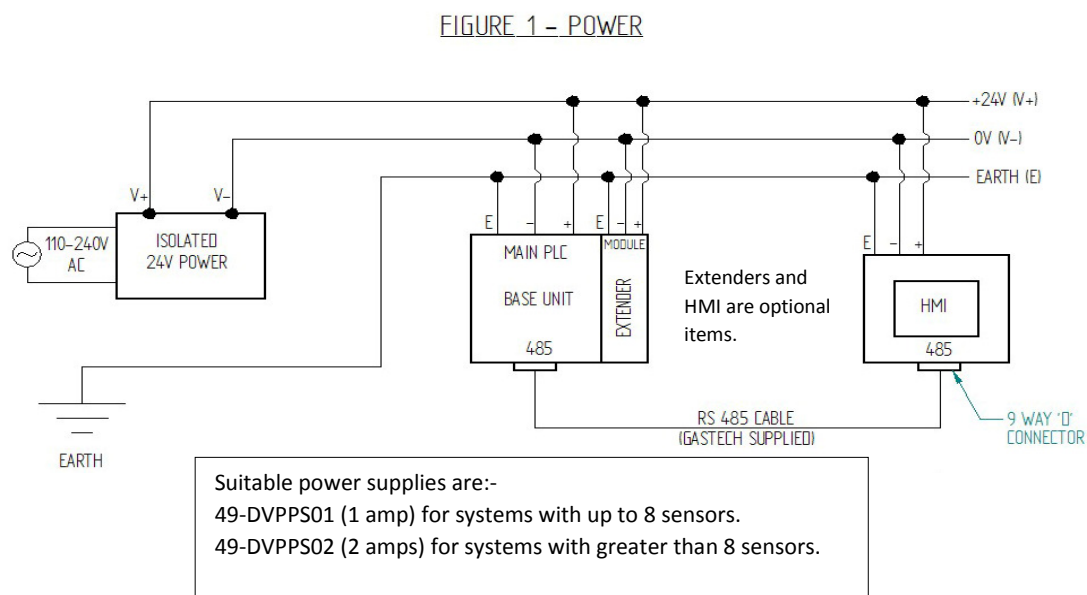
The main control unit and (optionally) the HMI require to be wired together to form the complete ventilation controller system. Wiring is required to provide power and signal inputs / outputs to and from the modules. If the HMI option is included in the system configuration, the cable to connect the HMI to the main control unit is supplied with the system components. The plugs for the for the power connections are also provided.

22-16AWG (1.5mm) single or multiple core wire is recommended for wiring the signal I/O terminals. The terminal screws should be tightened to no more than 1.90 kg-cm (1.65 in-lbs) based on the use of 60/75°C copper conductor. 22-16AWG < 1.5mm.

DO NOT place more than a single circuit connection in each I/O connection point.

The diagrams below indicate which connection should be made to assemble the components into a basic control system. Other connection schemes are possible based on the requirements of the application. The diagrams below serve as a guide for such systems. Connectors on the modules are marked to indicate function and pin function.

3.1.1 Power Connections - Main Control Unit, Extender Module and HMI



3.1.2 Power Supply Considerations

The power input to the main control modules and HMI is DC. When configuring a system using the modules, please note the following points:

- Power is connected to the two terminals, 24VDC and 0V, and the range of power is 20.4 ~ 28.8VDC.
- If the DC supply voltage is less than 20.4VDC, the modules will stop running, all outputs will go "Off" and the ERROR indicator will flash continuously.
- Power brownouts of less than 10 ms will not affect the operation of the modules.
- The main control unit plus a single extender and the HMI require a power supply of 20W or greater. The supply will also need to be able to support the required number of connected gas sensors. For a fully loaded system of 20 sensors, this would need to be around 35W.

3.1.3 Connections From Gas Sensors and Connection to Fan System.

FIGURE 2 - SENSOR CONNECTIONS: (A/D)

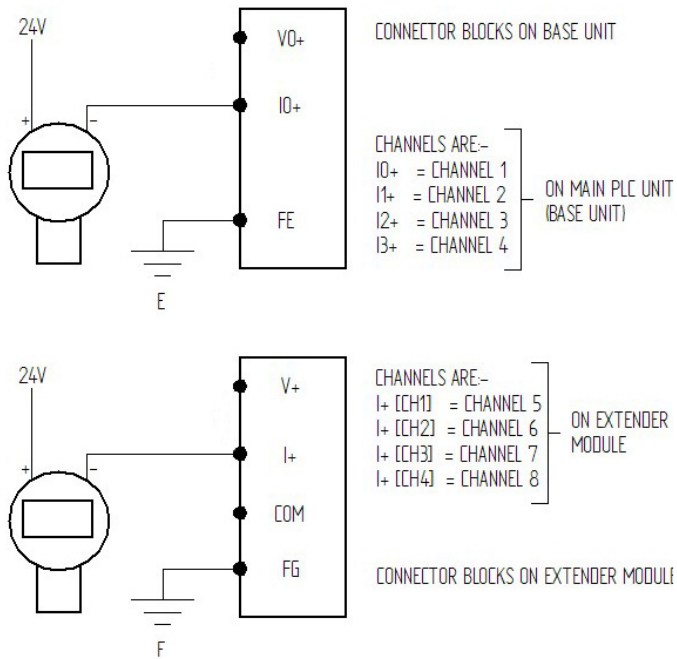
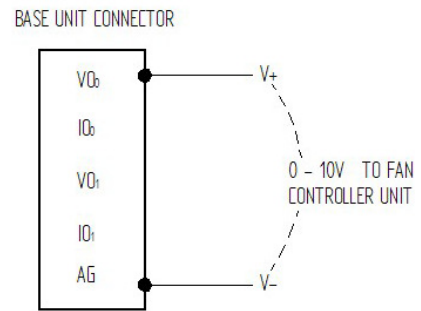
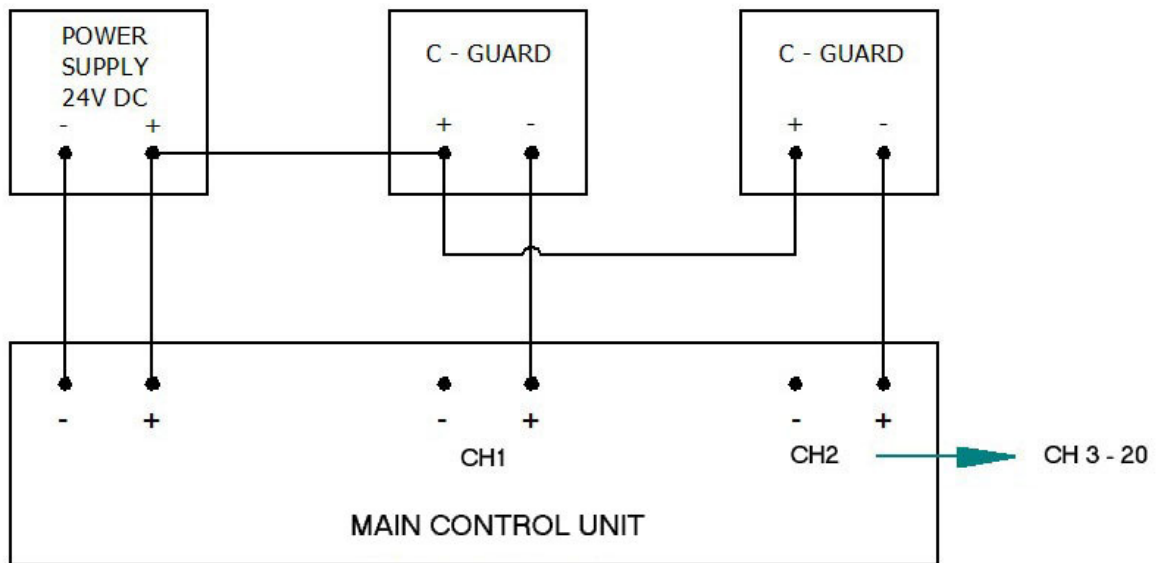


FIGURE 3 - VOLTAGE OUTPUT (D/A)



For sensor connection details, please refer to the individual sensor user manuals.

Connecting C-Guard Gas Sensors to the Controller

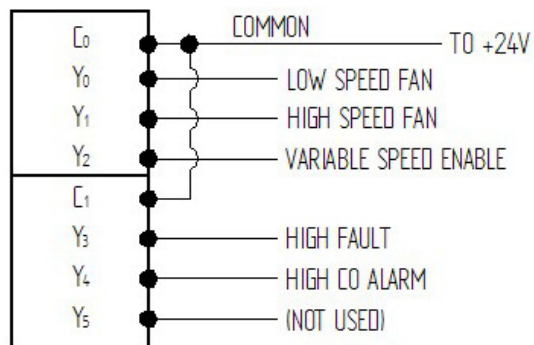


3.1.4 Connections To Relay Switched Functions.

FIGURE 4A – RELAY CONNECTIONS
(NORMALLY OPEN CONTACTS)

BASE UNIT CONNECTOR

Relay Contacts are rated at 1.5A each (resistive). Maximum voltage on each contact is 30VDC or 250VAC. The relay common terminal is rated 5A maximum. If the relays are being used to switch inductive loads such as contactors, motors or lamps directly, the contacts are rated 20WDC/100WAC maximum. If in doubt, please contact GasTech Australia.



4. System Operation.

4.1 System Commissioning

Once a system has been wired up and all sensors connected, power should be checked on the connector plugs before plugging them into the main module, extender module and HMI. If all power is present and correct, then turn off the power supplies and connect the power plugs into each module.

Conduct a final check of all sensor wiring and signal connection to and from any other components in the system (such as fan controller, sirens, beacons etc.).

If connection are all correct, then power can be applied to the system.

At power up, the modules establish communications and initialise to the working state. If a HMI unit has been included in the system, failure to connect or initialise correctly will be signaled by the HMI issuing warning beeps.

A normally running system will measure signals from connected sensors into enabled channels. The 0 - 10VDC control voltage signal will set to a value based on the sensor that is detecting the highest concentration of carbon monoxide. In an application with a normal ventilated condition, the output will be 0V. The variable speed enable signal will also be inactive.

During the first system power-up, it is possible that the sensors will produce a signal that is above the pre-set fan switch points. This is due to the initial warm-up characteristics of the carbon monoxide sensors. The GasTech 'C-Guard' has a 60 second warm-up timer that holds the output signal at 4mA to allow the sensor to stabilise. If sensors have been stored for a long time or stored in extremes of temperature, the settling time of the sensors may be longer than the 60 seconds, resulting in a period where the signals into the controller are seen as measured gas concentrations. The result of this is that connected fan systems will activate until the sensors stabilise to their normal base-line condition. If this is likely to cause a problem with the application, please ensure that the enable and control signals are disconnected from the main control unit before powering up for the first time.

4.2 Running The System

Once running, the system is automatic in operation. Each sensor is measured and the control unit processes the signals and outputs the required signals based on the measured carbon monoxide concentration. If a HMI has been included in the system, the 20 available channels can be viewed by using the 'NEXT' and 'PREVIOUS' buttons.

4.2.1 Enabling a Channel (HMI required)

By default each channel is set to the off state. To enable a channel, press the on/off button that sits over each channel icon.

4.2.2 Entering the Setup Password (HMI function)

A password is required to make the change. The default password is set at '12345678' The password is entered on the keypad that appears on the HMI screen when an attempt is made to switch a channel on or off.

4.2.3 Normal Input Signal Operation

Once enabled, a channel expects to see an operational input current between 4mA and 20mA corresponding to gas readings in the range 0 - 100ppm.

4.2.4 Fault Signal Indication

If any active channel receives an input signal less than the lower fault limit of 3.0mA a warning is given on the HMI and the system fault relay will be active. This will signal a sensor fault or sensor disconnection.

4.2.5 Fan Control / Alarm Relays

When a gas reading reaches or exceeds the pre-set alarm points, the programmed relay contacts will activate (see specification table for operating points). The corresponding LED will illuminate on the main control unit to show that the contact is active. If fitted, the HMI screen will also indicate that a signal is active.

The low and high speed fan control signals can be used to drive the fan system between two fixed speeds depending on the gas concentration detected.

4.2.6 Variable Speed Enable Signal

The Variable Speed Enable can be used to switch the fan system on and off based on a cycle time compliant with AS 1668.2. Additionally the timing of this signal is designed to present the least stress to the fan system by limiting the number of on/off cycles to no more than 4 per hour.

This signal is used in conjunction with the 0 - 10VDC output drive signal to control the fan speed during its on cycle.

4.2.7 Fan Control Voltage

The main control unit produces a control voltage signal that can be connected to fan controller units to allow the fans to be driven at variable rates. The control voltage range is the industry standard 0 - 10VDC.

The 0 - 10VDC is scaled such that 0V represents 8ppm of detected carbon monoxide and 10V represents 30ppm of detected carbon monoxide. Between 8ppm and 30ppm, the voltage will be set proportionately.

This allows the fans to work only as hard as is required to move the level of detected carbon monoxide back to the accepted limits according to AS1668.2. This variable drive in conjunction with the timed enable signal provide the most efficient form of fan control and is recommended above the use of basic two level on/off type systems. The control voltage is set based on the highest input signal fed from any of the enabled channels. For a gas sensor this represents the unit that is sensing the highest concentration level.

5. System Characteristics

Number of Input Channels:	Up to 20 via extender modules. Base system 4 channels.	
Inputs signal type:	Current Loop 4-20mA - Sinking.	
Input Scaling:	4 - 20mA = 0 - 100ppm carbon monoxide.	
Analog Output Signal:	0 - 10V DC.	
Output Scaling:	0V at 8ppm / 10V at 30ppm.	
Digital Fan Control Output- Low Range:	Volt-Free Contact.	Active at 8ppm.
Digital Fan Control Output- High Range:	Volt-Free Contact.	Active at 30ppm.
VSD Enable Signal:	Volt-Free Contact.	Active at 8ppm.
High Gas (Overload) Alarm Output:	Volt-Free Contact.	
High Gas (Overload) Activate Level:	100ppm.	
High Gas (Overload) De-activate Level:	30ppm.	
Fault Signal Output:	Volt-Free Contact.	Internal Fault, Sensor Disconnect.
Fan Control Timing:	AS1668.2 compliant using 15 minute cycle.	
Extender Module:	4 x 4 - 20mA inputs, specification as main module.	
Graphical Display Panel:	4.3 Inch Colour TFT 480 x 272 pixels.	
Display Functions:	Gas concentration reading, channel status, alarm status, log data display.	
Display User Input:	Channel Isolate function.	
System Component Operating voltage:	24V DC.	
Operating Temperature:	-20°C to +50°C	
Humidity Range:	0-95% non condensing	
Dimensions (approx.):	Main Module:	90mm (H) x 70mm (W) x 60mm (D).
	Extender Module:	90mm (H) x 25mm (W) x 60mm (D)
	Graphical Display:	103mm (H) x 130mm (W) x 40mm (D).
Warranty:	2 Years.	
Part Numbers:	73-8010:	Control Unit.
	73-8010-1:	Extender Module.
	73-8010-20:	Graphical Display Module.