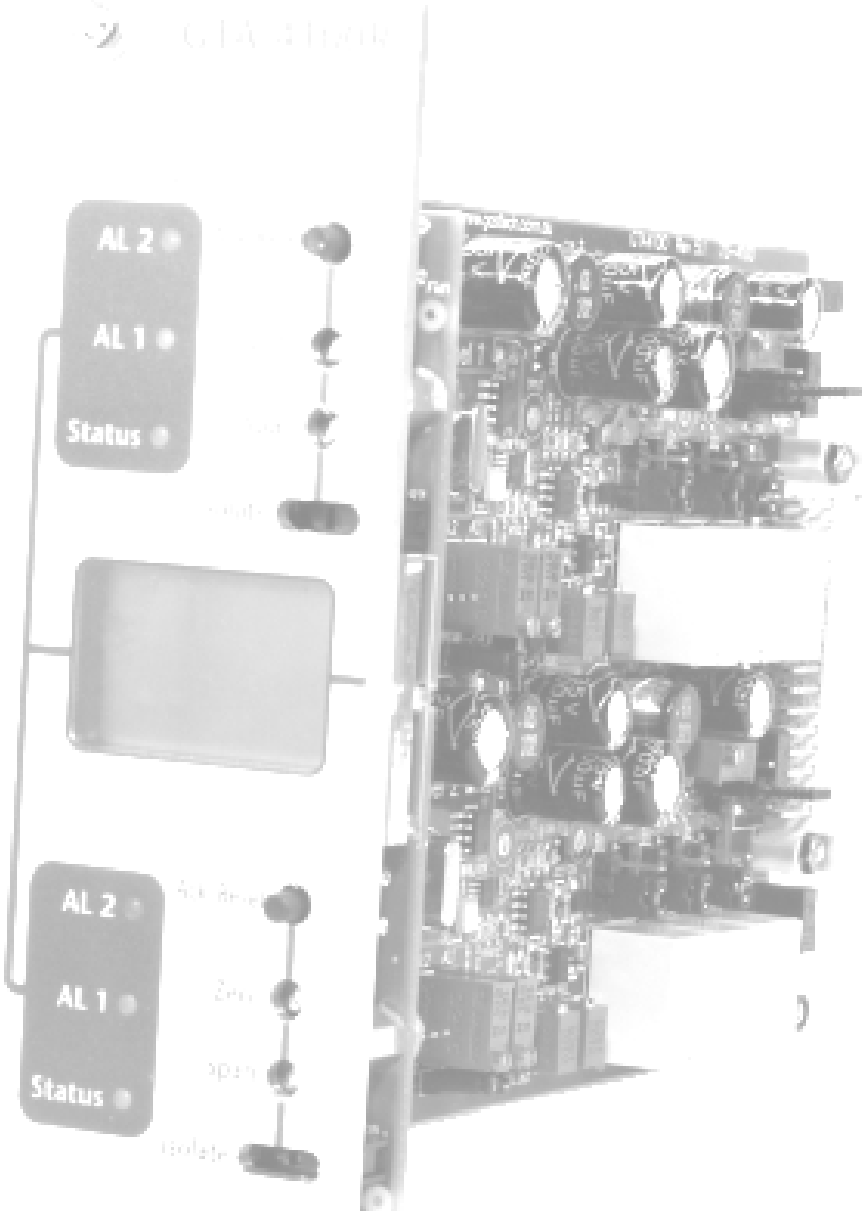
GTA-4100R

Dual Processor, Dual Channel Controller Card

Part Number 73-4100R

Manual Revision v6.30 (updated 10 November 2009)



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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.

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You may send the unit, freight prepaid, to: GasTech Australia Pty Ltd, 106 Westpoint Centre, 396 Scarborough Beach Road, Osborne Park 6017, 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.

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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.
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    b) the payment of the cost of replacing the Equipment or of acquiring equivalent Equipment.
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    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 negatived and excluded;
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    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
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MANUAL CONVENTIONS

This instrument is designed to detect one or more of the following: flammable vapours, oxygen content and/or toxic gas 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 start up, operation, calibration, 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.**

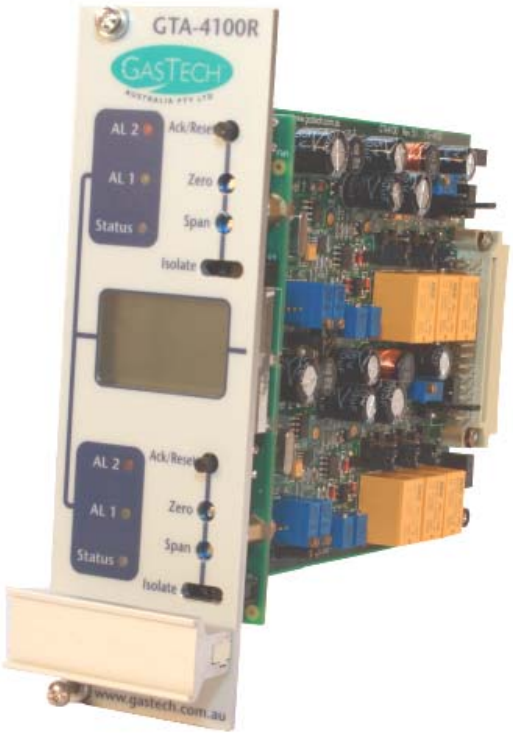
 **WARNING: Notifies you of potential danger that can result in personal injury or death.**

1 Introduction

The GTA-4100 series is a family of fixed-instrument, continuous-monitoring systems. The GTA-4100R is a two-channel dual processor, rack or panel-mounted control module that receives signals from remote transmitters, displays the reading, provides alarm, recorder, and relay outputs and provides power for remote transmitters, including sample-draw transmitters.

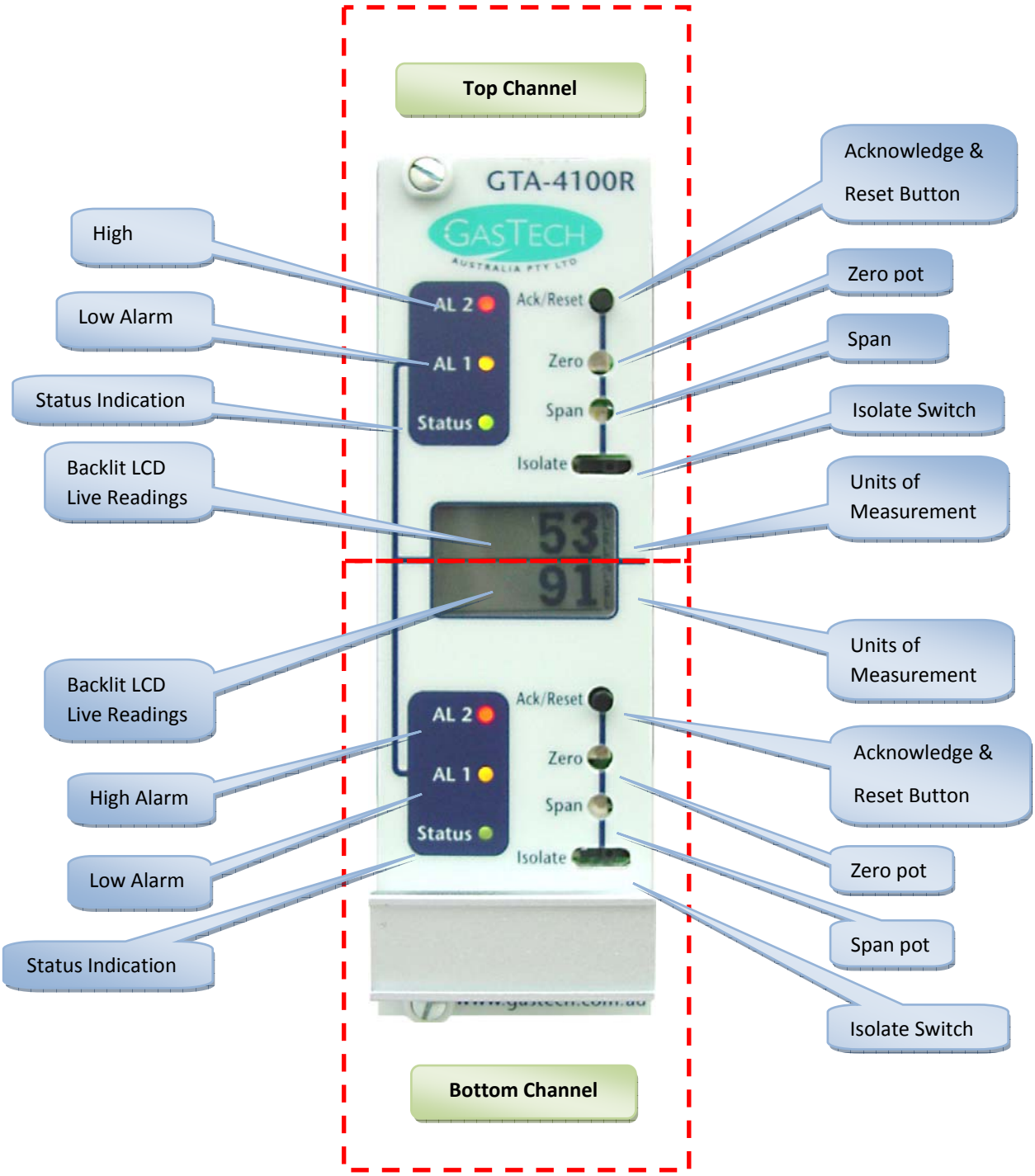
1.1 Features

- Each channel accepts a standard 4 to 20mA analogue input signal from remote 2 or 3 wire transmitters.
- Supports 0-1V, 0-5V, 0-10V, and 0-24V as well as digital and resistance input types.
- Includes a 3 wire internal amplifier for catalytic sensors.
- Two processors per card providing independent channel isolation giving higher reliability
- Simultaneously displays the current reading for both channels.
- Provides a 4 to 20mA analogue recorder output for each channel.
- Warns of hazardous conditions with audible and visual indications at two alarm set points for each channel.
- Fault circuit provides visual, audible, and relay indication to warn of failure or other malfunction.
- Provides a low and a high alarm relay for each channel.
- Set up for one or two zones as standard.
- Slide-in module compatible with a standard 3U rack assembly.
- Occupies one 8E width (Standard 19” rack)



1.2 Front Panel Layout

The diagram below shows the layout of the front panel. Each GTA-4100R card is divided into two identical channels - top and bottom. Each side of the card is completely isolated from the other and operates completely independently. The only shared component is the LCD and the card will continue to work correctly even if the LCD fails. This is a non critical device and is written to by both processors but has no affect on either channel.



2 Installation

WARNING: Perform all installation procedures in a fresh air environment (known to be free of combustible and toxic gas and having normal oxygen content). The GTA-4100R is not in operation as a system, until the start up procedure is complete.

NOTE: The packing slip indicates the serial number of your GTA-4100R. The serial number is also on a label on the side of the GTA-4100R. Please record the serial number on the front of this manual.

This section will outline and explain in detail the various stages of commissioning a new system including:

- Mounting
- Wiring

2.1 Mounting

The installation area should be in a safe place, preferably near an entrance door where the fire department or other emergency response team can see the indication if an alarm has caused the building to be evacuated.

The GTA-4100R controller is suitable for mounting in a rack assembly using card-guides to support the main circuit board and the two captive screws at the front of the controller to secure it in place.

The GTA-4100R cards can be mounted in two different configurations:

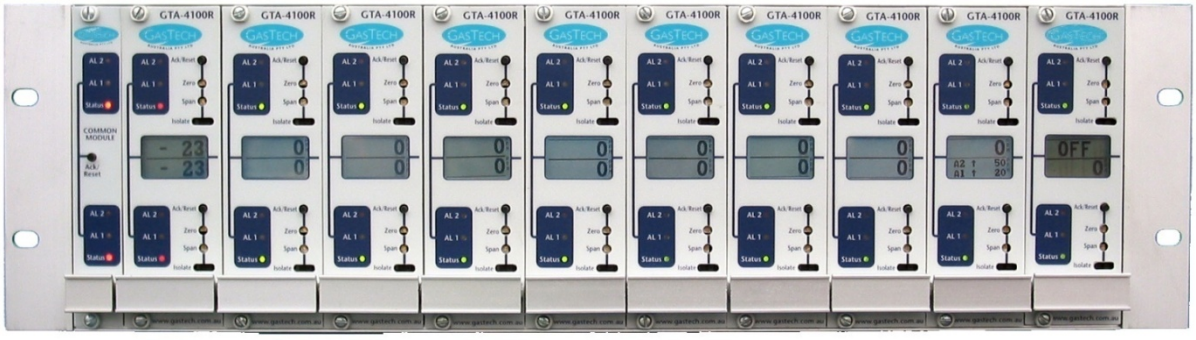
1. Micro Rack™
2. A standard 19" rack case

2.1.1 Micro Rack™

The wall mountable Micro Rack™ shown below, can house up to four GTA-4100R cards.

2.1.2 Standard 19" Rack

A standard 19" wide rack case version can house up to ten GTA-4100R cards. It requires a standard rack frame with 3 units of space free in order to be mounted.



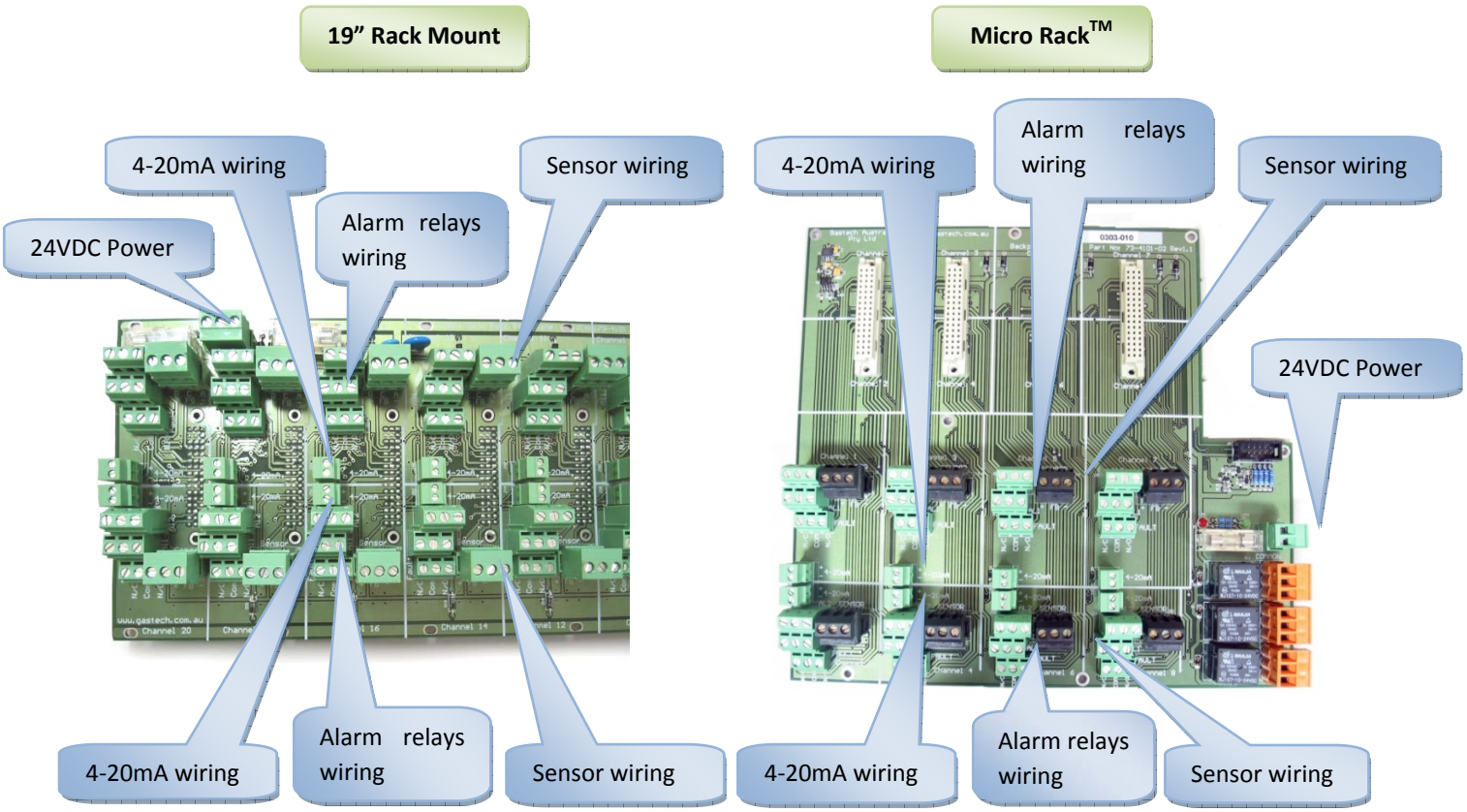
2.2 Wiring

Both the Micro Rack™ and the standard 19" rack case versions contain a back plane. The back plane is the PCB at the back of each enclosure that the GTA-4100R cards plug into. It is also where all wiring terminates via terminal blocks.

The Micro Rack™ version gets terminated from the front as the system is wall mounted - the termination blocks are on the same side as the cards plug in.

The 19" rack version is terminated from the back and the 4100R cards are plugged into the front.

The diagram below shows the location of the terminal blocks and relays on the back plane.



There are five types of terminal block connectors on each back plane.

1. **SENSOR INPUTS** - First at the top right for top channel, or bottom right for bottom channel is the sensor connector. This is a 2.5mm 3 way removable connector which is fitted to all back planes. The terminals are clearly marked on the PCB. Some examples for common sensors are shown later in this manual or you can refer to the sensor manual for the correct connection details.
2. **ALARM RELAYS** - The second set of connectors are the individual alarm relay connectors, this is to the right of the sensor connector a 3 tier non-removable 1.5mm connector. The terminals are for "N/C" Normally Closed, "C" Common, and N/O Normally open contacts. These are clearly marked on the PCB. The bottom tier is for Fault, the middle tier is for "AL1" (alarm 1) and the top tier is for "AL2" (alarm 2).
3. **4-20mA OUTPUT** - The third connector is a 1.5mm removable connector at the top of the relay connector. This is the 4-20mA output for each channel. The terminals are clearly marked on the PCB "+ and –"
4. **POWER** – The power terminal block is a 2.5mm connector. On the standard 19" rack, the power connector is a 3-way type at the top of the PCB between channel 17 and 19. There are two 5 Amp fuses either side of the connector – one for the top channel and one for the bottom channel.

   On the Micro Rack™ the power connector is a 2-way type located on the right side of the board, next to the 5 Amp fuse. There is a green LED next to the power connector on each PCB which indicates that the board is receiving power. There is also a red LED next to each fuse. If a fuse is blown this red LED will illuminate. The polarity for these power terminals are clearly marked on the PCB.
5. **COMMON RELAYS** – Each back plane contains common relays. These will be discussed in the next section.

2.2.1 Common Module

The common modules purpose is to synchronize all the 4100R cards flashing LEDS as well as common up all the alarm relays and runs a local buzzer. It also provides a global Ack/Reset button.

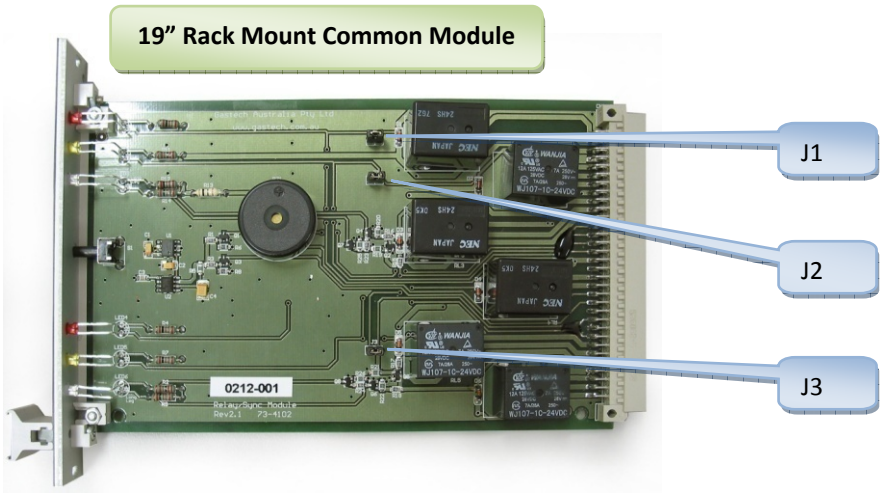
As you can see in the image above, both the Micro Rack™ and the standard 19" rack case versions contain a common module. In the Micro Rack™ the common module is built into the custom enclosure. In the standard 19" rack case version, the common module is a separate card half the width of the GTA-4100R cards.

In the standard 19" rack case version, the common module has two settings:

1. **Common Zoned** - This is where jumper J1, J2, and J3 are in place. These will common all of the channels and give the user two separate 10 amp relays for all the channels.

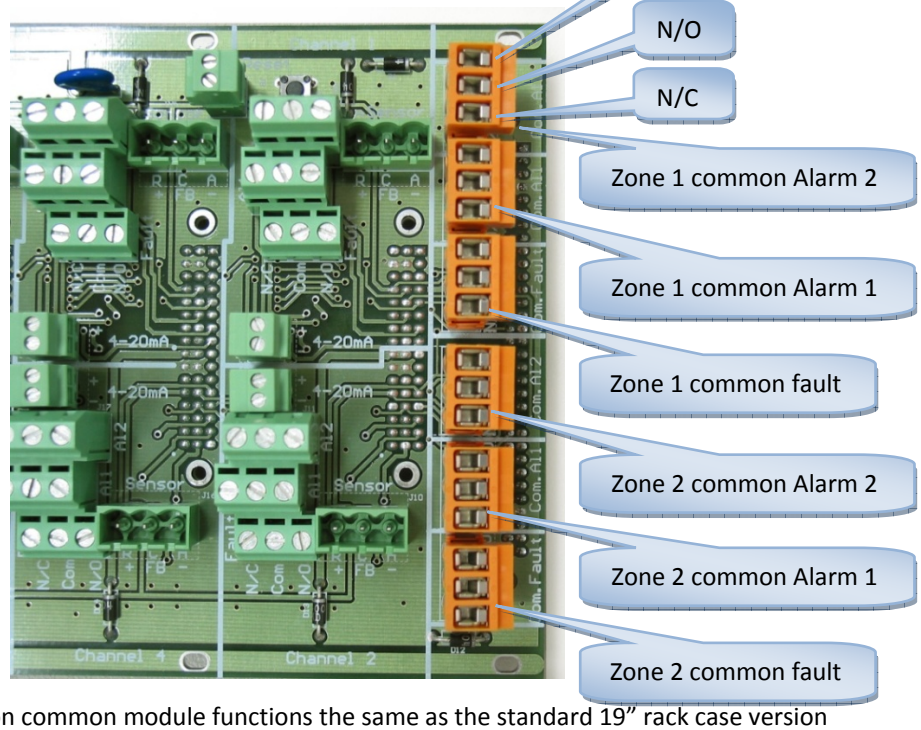
2. **Double Zone** - This where jumper J1, J2, and J3 are removed. This will zone the top channels together and the bottom channels together giving one 10 amp relay for each zone.

NOTE: You can mix the zones – for example you can common zone the common low alarms but double zone the common high alarms.



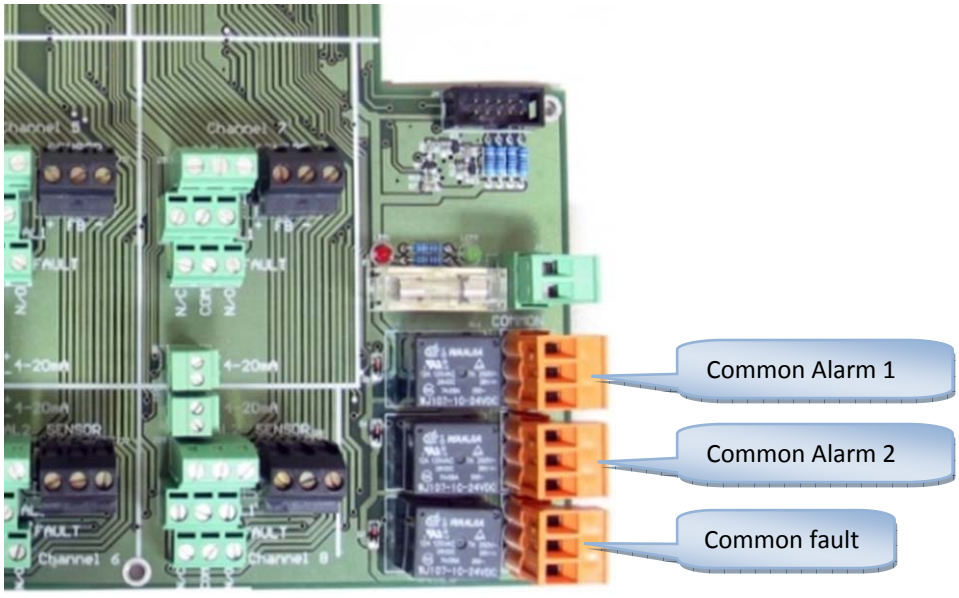
The terminals for these common relays are located on the right hand side of the circuit board next to channel one and two. The terminals are 2.5mm top mounted plug in different colour to the channel inputs. The terminals are clearly marked on the PCB.

19" Rack Mount Common Module Backplane



With the Micro Rack™ version common module functions the same as the standard 19" rack case version except that there is only one set of relays, so you cannot zone the top and bottom of the cards.

Micro Rack™ Common Module



3 Configuration

This section will outline and explain in detail the various stages of configuring a system. This section should be referenced when commissioning a new system but also as when changing transmitter or sensor types.

- Isolate Mode
- Configuration & Programming
- Configuration Examples
- Calibration

3.1 Isolate Mode

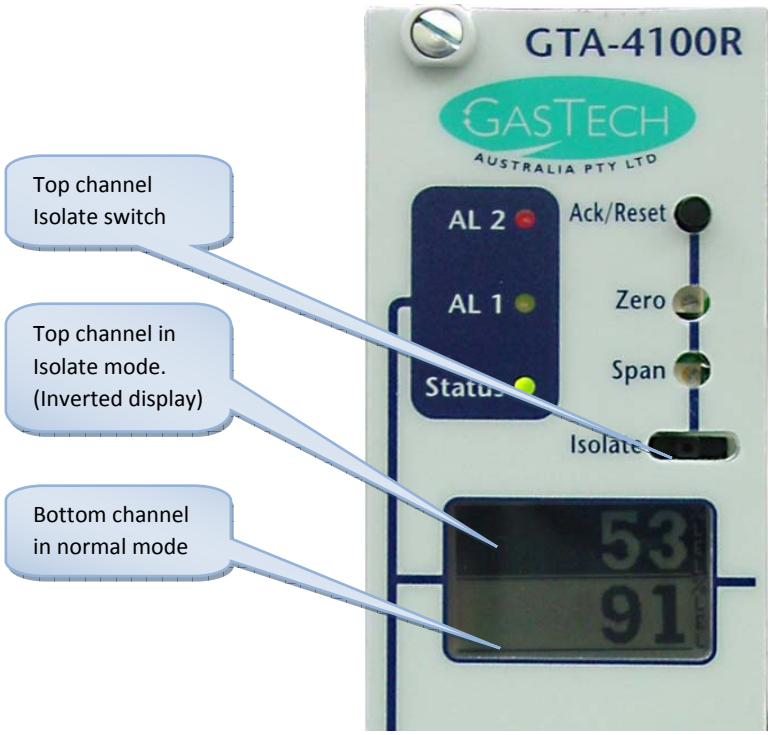
The Isolate feature is designed so the operator can do maintenance/calibration on that channel without causing unwanted alarms.

To turn that channel into Isolate modem flick the “Isolate” switch from right to left. The display will change to an inverted mode as seen in the picture below. The isolate switch will isolate all alarms from that channel only - not the complete card. The 4-20mA output will change to 2mA indicating the channel is in Isolate mode.

NOTE: The Isolate mode can be selected if a channel is giving spurious alarms and investigation is in the process this will eliminate any alarms during the investigation period.

If a sensor takes longer than 30 seconds to stabilize or come on line the Isolate mode can be selected until the sensor comes on line. The display will still show the sensor readings during this time.

NOTE: The GTA-4100R advanced software has a feature called zero suppression, which monitors the sensor performance and small sensor drifts, which is a characteristic of all sensors. This drift is due to sudden temperature, humidity and pressure changes or aging sensors. Normally the advanced electronics and software will remove this insignificant drift and keep the detector reading zero or 20.9 (for an Oxygen sensor). However in isolate mode the zero suppression feature is turned off, so during calibration the channel can be exactly zeroed without the dead band masking.



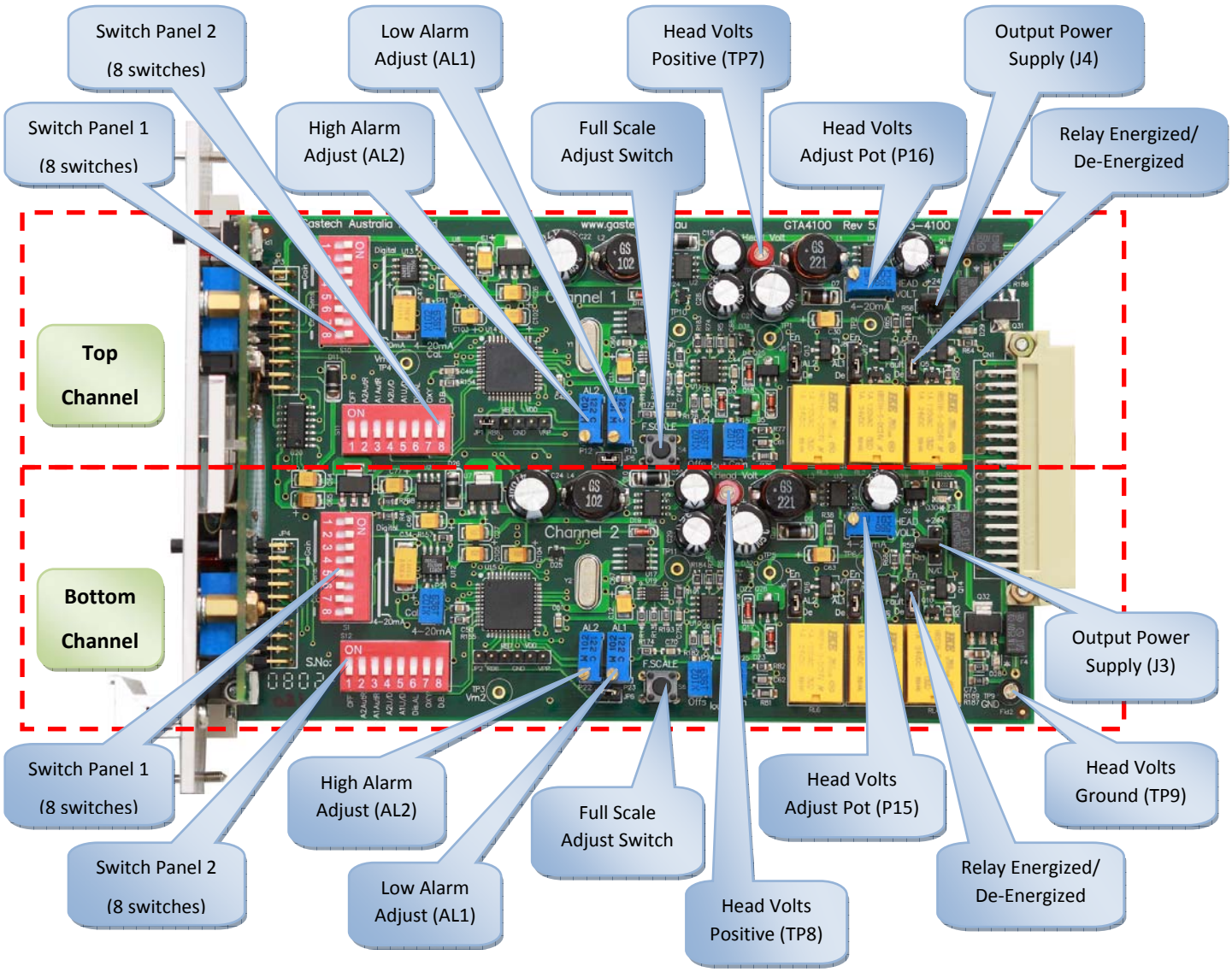
WARNING: Isolate mode of the GTA-4100R allows you to disable the alarm LED's, buzzer, and relays during calibration procedures and response tests. When calibration mode is activated, the LED's, buzzer, and relays will not operate as described in this section. You must *de-isolate* the channel to bring it back into operation.

3.2 Configuration & Programming

NOTE: Each channel can be individually programmed for any setting. A card does not have to be the same i.e. Top channel might be a combustible sensor where the bottom channel can be an Oxygen sensor.

3.2.1 Board Layout

The diagram below shows the location of the various jumpers, dip switches and trim-pots on the GTA-4100R PCB.

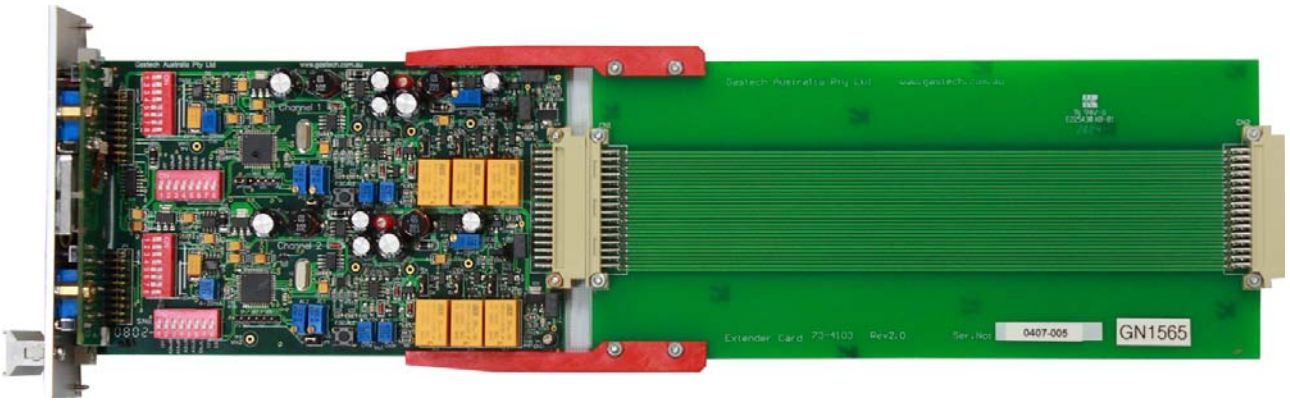


⚠ CAUTION: Take note when adjusting switches, jumpers and potentiometers ensuring you are adjusting the correct channel.

3.2.2 Extender Card

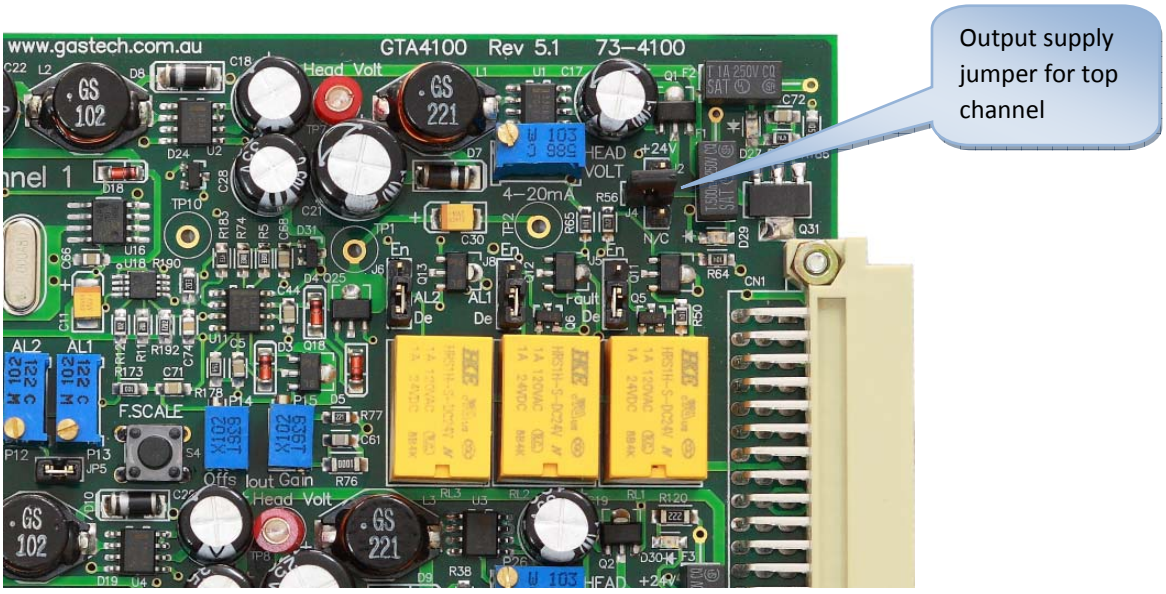
The GTA-4100R slides forward in its guides for access to the programming controls. An Extender Card (GasTech P/N: 73-4103) allows you to power the card up from the 19" rack or the Micro Rack and adjust the settings or conduct testing.

To install the extender card, remove the GTA-4100R by unscrewing the 2 screws securing it to the rack chassis. The card will then slide out on its guides. Insert the Extender card and then plug the GTA-4100R into the Extender card.

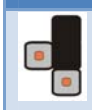


3.2.3 Output Power Supply

Different devices connected to the GTA-4100R have different power supply requirements. There are three supported settings: 24VDC, adjustable 1.4-14Vdc, and zero output. There are two jumpers on the GTA-4100R PCB which selects between these three settings – one for the top channel (J4) and one for the bottom channel (J2)



Place the jumper in the correct position for the sensor being interfacing with each GTA-4100R channel.

Jumper Position	Description
	24VDC out 500mA max from the card

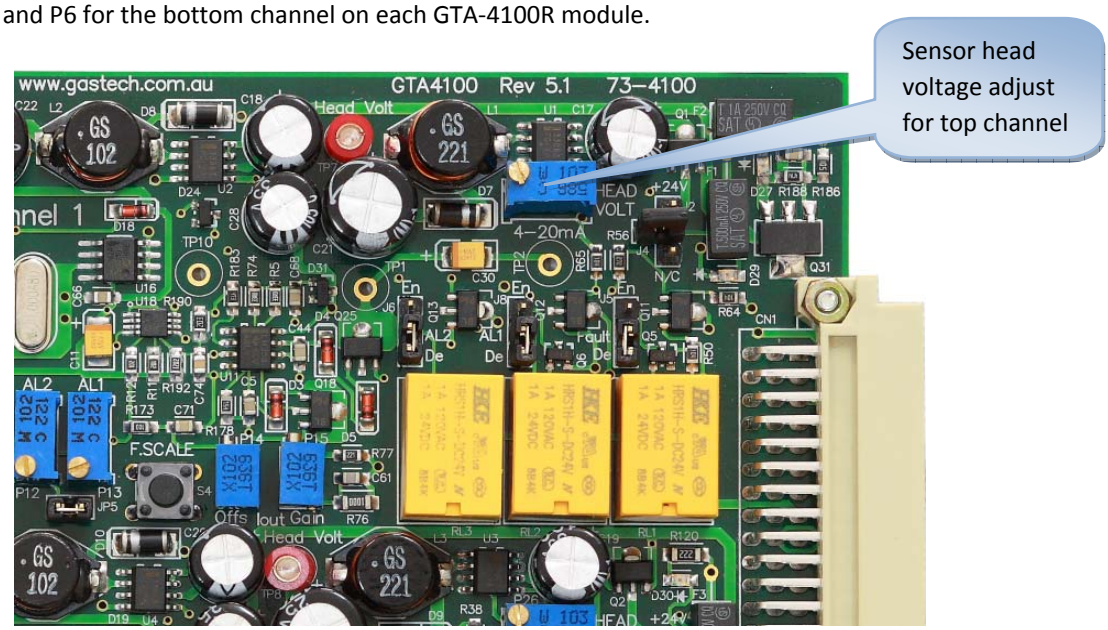
	1.4-14V adjustable from the card
	Zero Volts from the card (externally powered)

NOTE: The next section contains some configuration examples for common sensors that can be connected to the GTA-4100R.

CAUTION: If you select the 1.4-14V adjustable option, see the next section for details on setting the specific voltage to the sensor.

3.2.4 Sensor Voltages

Sensor head voltages for each channel are set by adjusting the "Head Volt" potentiometer. This is P5 for the top channel and P6 for the bottom channel on each GTA-4100R module.



These potentiometers are set to 6V at the factory prior to delivery of the system but will need to be re-adjusted to compensate for voltage drops in cable runs or different sensors. For this reason, sensor head voltages should be checked as part of the commissioning process or when changing to a different sensor type. The procedure is as follows:

1. Before making any adjustments, place the 4100R module into isolate mode.
2. Unplug the top and bottom channel sensor input cables from the back plane.
3. Ignore any Fault and Alarm indications and allow the system to stabilise before proceeding further.
4. To check the top channel sensor voltage, connect a digital voltmeter between TP9 (negative lead) and TP7 (positive lead)

5. Refer to sensor specification sheet for correct sensor head voltage.
6. Carefully adjust P5 until the correct sensor voltage is reached.

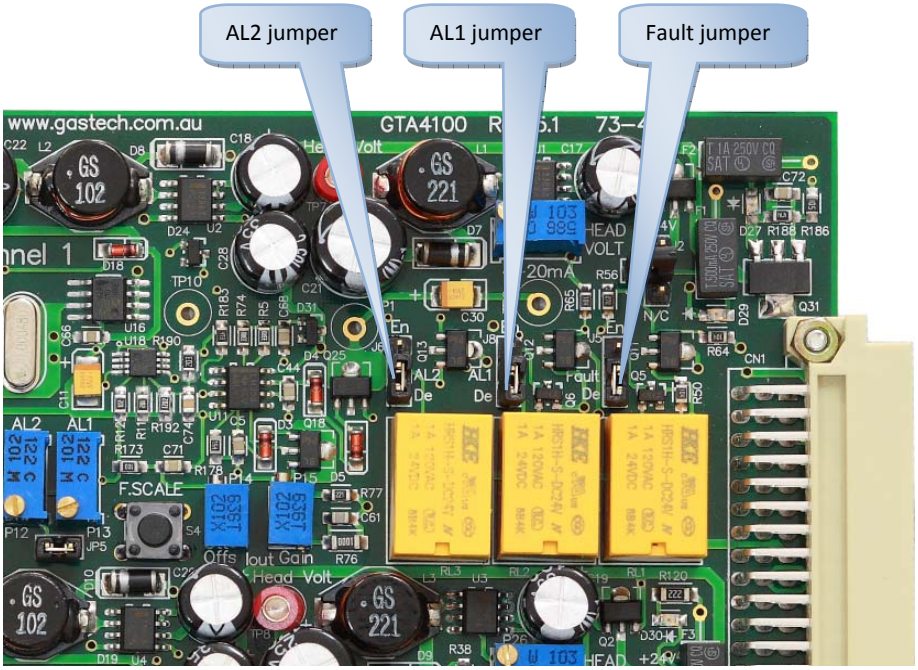
NOTE: The adjustable voltage range is 1.4 -14.0 VDC.

7. Repeat this procedure for the bottom channel sensor voltage, by connecting a digital voltmeter between TP9 (negative lead) and TP8 (positive lead). Then adjust P6 until the correct voltage is set.
8. Plug back in the top and bottom channel sensor input cables on the back plane.
9. Using a digital voltmeter, measure the head voltage at each sensor in the field. The voltage is measured between the “Active” and the “Reference” conductors for that sensor. The difference from the voltage at the card is the line drop in the cabling so this has to be adjusted for the system to operate correctly.
10. Carefully re-adjust P5 (top channel) or P6 (bottom channel) for the correct voltage at sensor out in the field.
11. Repeat this process for each sensor on each card.

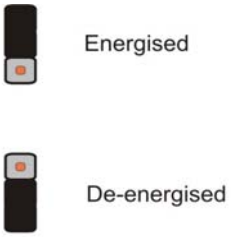
3.2.5 Relay Configuration

Each channel has three alarm relays, AL2 (alarm 2) AL1 (Alarm 1) and Fault. Each of these relays can be set as energized or non-energized.

NOTE: When a relay is set to energized, the normally open contacts become normally closed contacts. This configuration allows warnings or alarms to be activated in the case of a power failure.

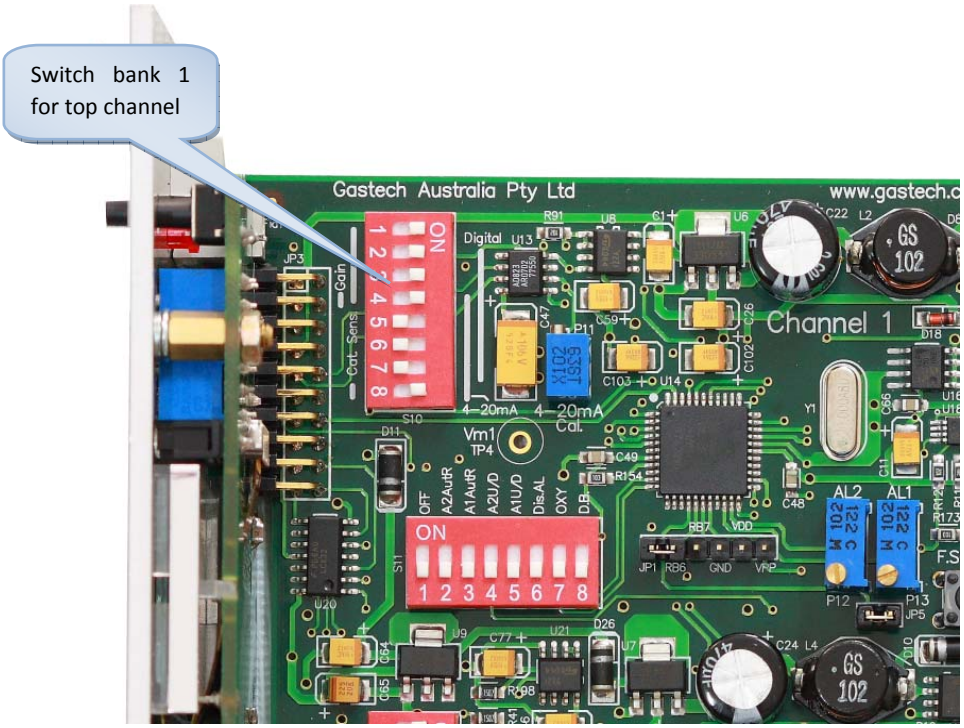


Moving the jumper directly above the relay to the desired position changes the normal status of these relays.



3.2.6 Switch Bank 1

Switch bank 1 (S10 top channel, S1 bottom channel) is used to configure the GTA-4100R module for the various sensors that are attached to it. See the next section for various configuration examples for common sensors that can be connected to the GTA-4100R.

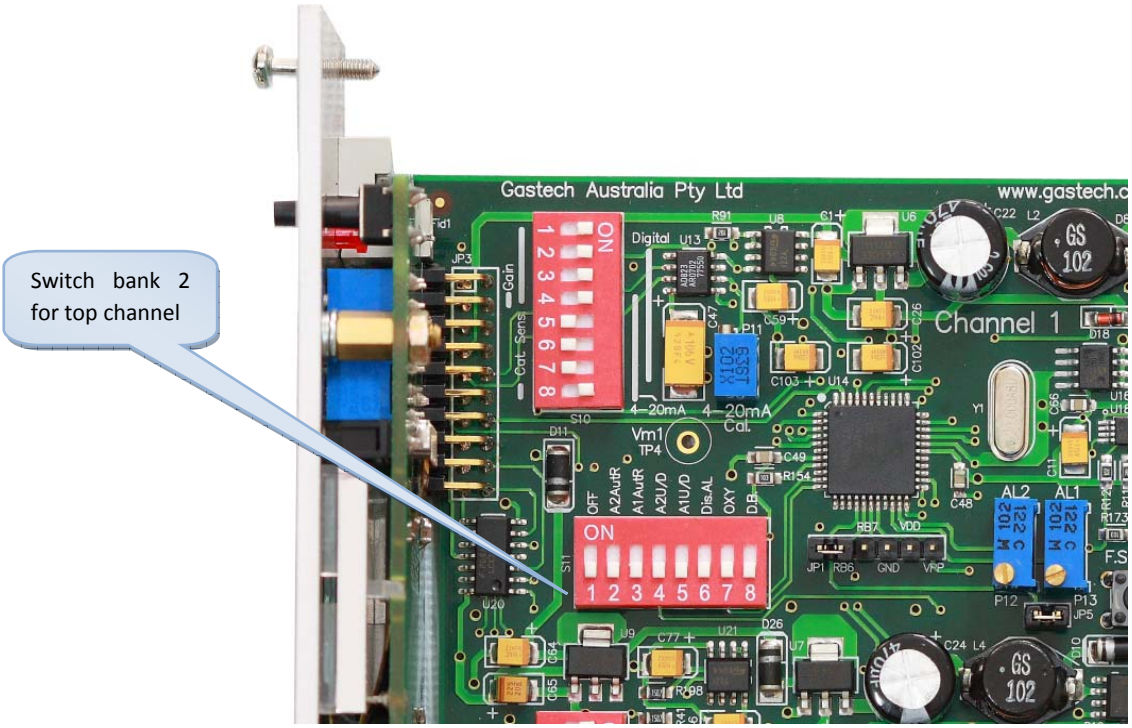


The default settings for this Switch bank 1 are as follows:

Switch 1 (S10, S1)

3.2.7 Switch Bank 2

Switch bank 2 (S11 top channel, S12 bottom channel) is used to configure various settings in the GTA-4100R.



This table shows the function of each of the 8 switches in the bank. See the next section for various configuration examples for common sensors that can be connected to the GTA-4100R.

Switch	Description
1	Channel ON or Off
2	Alarm 2 OFF for Latching or ON Auto resetting
3	Alarm 1 OFF for Latching or ON Auto resetting
4	Alarm 2 Direction OFF for rising or ON for falling alarms
5	Alarm 1 Direction OFF for rising or ON for falling alarms
6	Display alarms ON for display OFF for normal mode
7	ON for Oxygen dead band around 20.9%
8	ON for Dead band around 0 (+-3% of full scale)

The default settings for this Switch bank 2 are as follows:

Switch 2 (S11, S12)

3.2.8 Setting the Range

The range shown on the LCD screen can be adjusted to suit the different sensors being used on the GTA-4100R card. Follow this procedure to change the range:

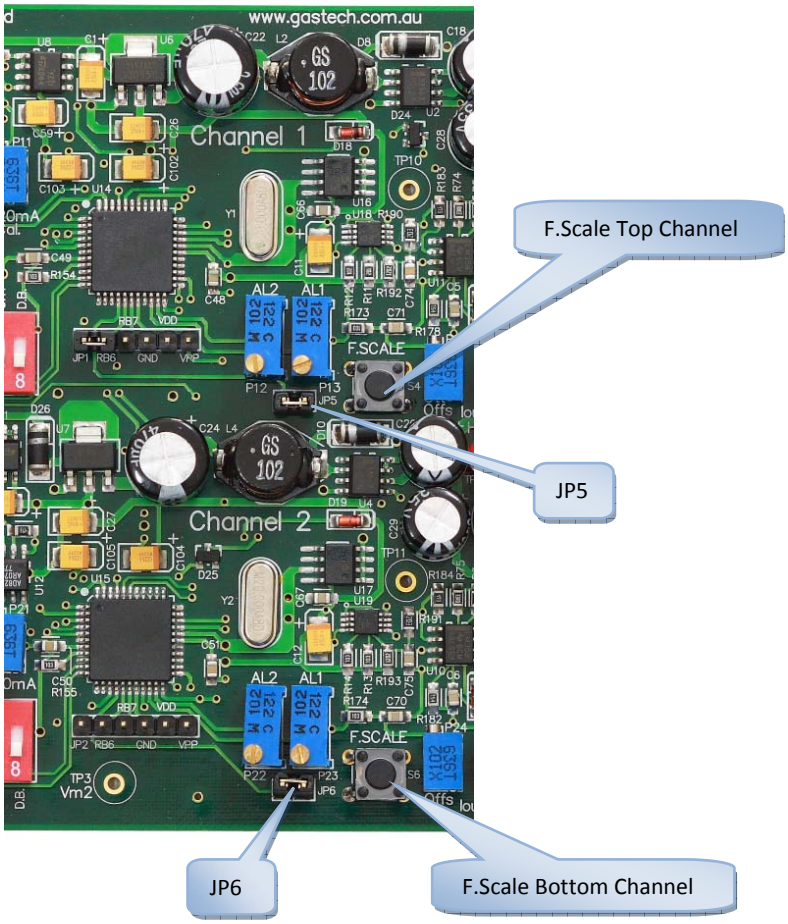
1. Ensure that the switch bank 2, position 6 (DisAL) is turned off before proceeding.
2. Confirm that jumper JP5 or JP6 are in place.
3. Press the F.Scale button and this will show the set range for the channel.
4. Hold the button down for 3 seconds and the range will start stepping up between 0-1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 40, 50, 75, 100, 150, 200, 300, 500, 1000, 2000.

NOTE: The default range is 100.

5. Decimal points are pre set as follows:
    a. Two digits from 0-5
    b. One digit 10 to 100
    c. No decimal point 100-2000

NOTE: The range and decimal point settings stated here are standard but others can be configured on request.

6. Once the range has been set, you can remove jumper JP5 (top channel) or JP6 (bottom channel) to stop accidental changes after installation.



3.2.9 Setting the Units of Measurement

The range shown on the LCD screen can be adjusted to suit the different sensors being used on the GTA-4100R card.

NOTE: The default unit of measurement is %LEL

Follow this procedure to change the range:

1. Ensure that the switch bank 2, position 6 (DisAL) is turned on before proceeding. The display will show the alarm levels and direction.
2. Confirm that jumper JP5 or JP6 are in place.
3. Press and hold the F.Scale button for 3 seconds and the units of measurements will toggle through each available option:

ppm	Parts per million
%LEL	Percent of the Lower Explosion Limit
%Vol	Percent by volume
Vol	Volume
PPMm	Parts per million meters
LELm	Lower explosion limit meters

NOTE: These units are standard but others can be configured on request.

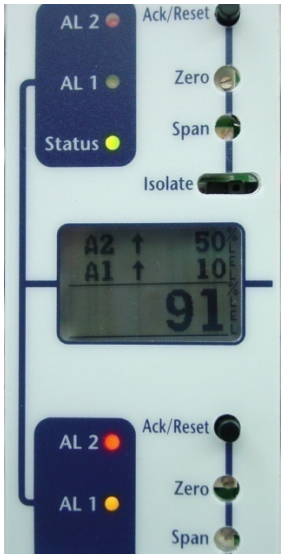
4. Once the range has been set, you can remove jumper JP5 (top channel) or JP6 (bottom channel) to stop accidental changes after installation.

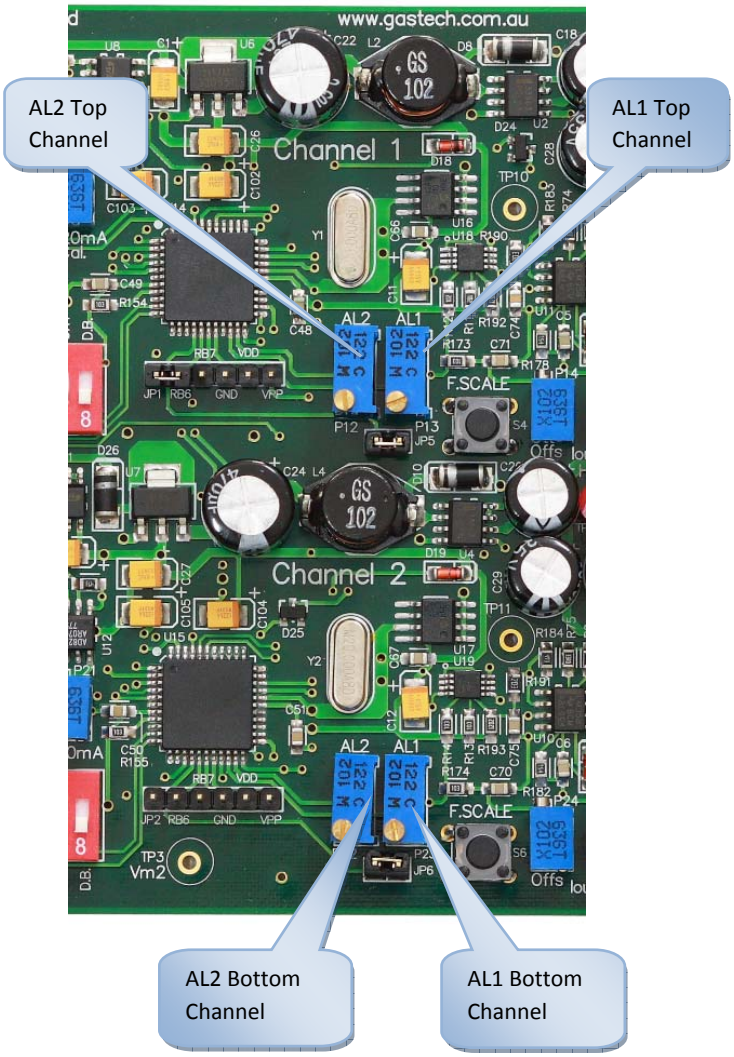
3.2.10 Setting Alarms

The alarm trigger points can be adjusted to suit the different sensors being used on the GTA-4100R card. Follow this procedure to change the alarms:

1. Ensure that the switch bank 2, position 6 (DisAL) is turned on before proceeding. The display will show the alarm levels and direction on the LCD screen.
2. For the top channel, the AL1 (P13) pot changes the low trigger alarm and the AL2 (P12) pot changes the high trigger alarm.
3. For the bottom channel, the AL1 (P13) pot changes the low trigger alarm and the AL2 (P12) pot changes the high trigger alarm.

NOTE: The default alarm settings are AL1=20 with direction UP and AL1=50 with direction UP.

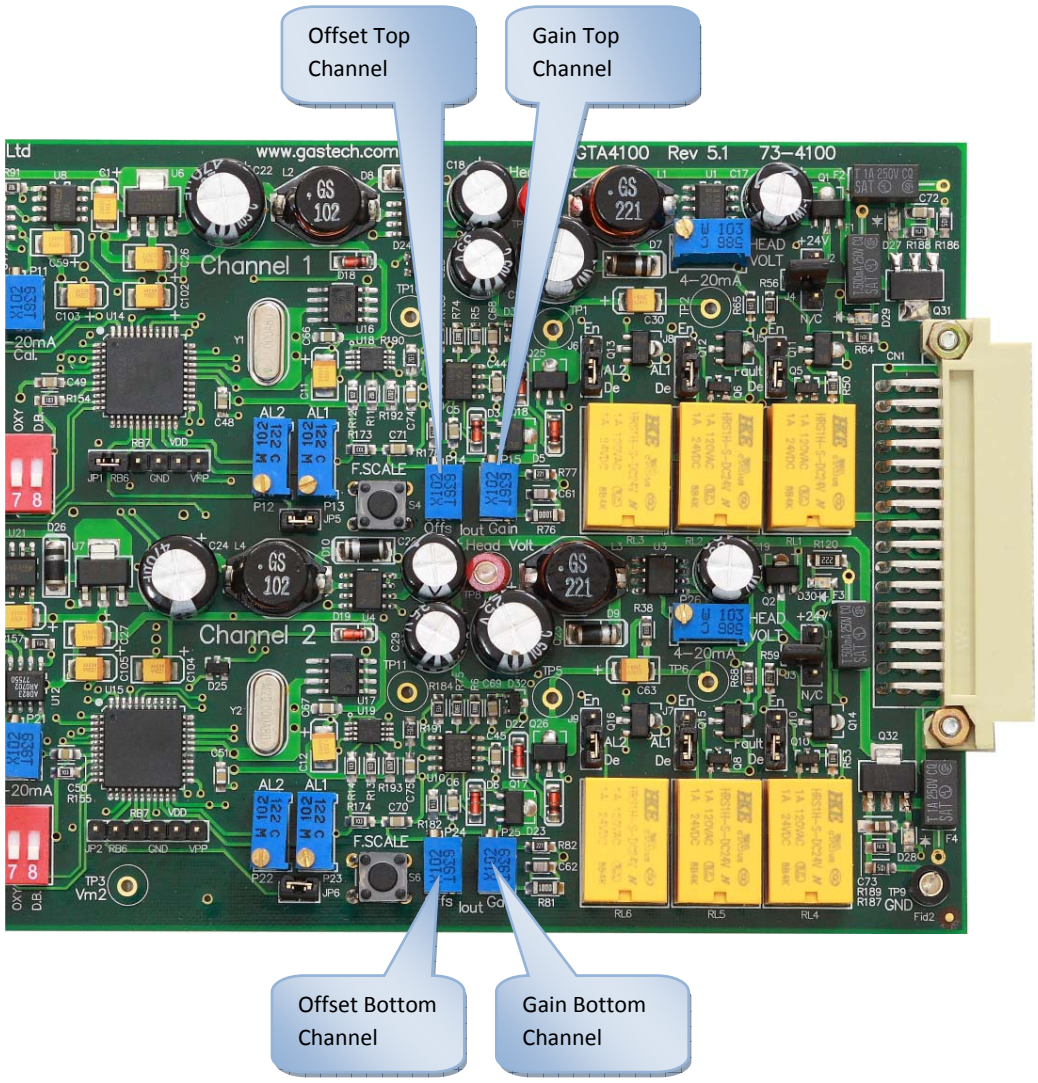




3.2.11 Gain and Offset Settings

These pots calibrate the gain and offset for the onboard 4-20mA port, which is used to provide a proportional output to PLC's.

NOTE: These pots are factory set and should not normally need adjusting.



3.3 Settings Summary Table

This table shows the factory default settings for each channel. The second table can be used to record any custom settings for future reference.

Standard Setting						Top Channel Switch S1, Bottom Channel Switch S10								Top Channel Switch S11, Bottom Channel Switch S12								Power Jumper		
	S/N	Ver.	Range	AL1	AL2	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	+24v	ADJ	N/C
Ch1			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	
Ch2			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	
Ch3			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	
Ch4			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	
Ch5			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	
Ch6			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	
Ch7			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	
Ch8			100	20	50	On	On	On	On	Off	Off	Off	On	Off	On	On	Off	Off	Off	Off	On		X	
			% LEL	↑	↑																		6.0V	

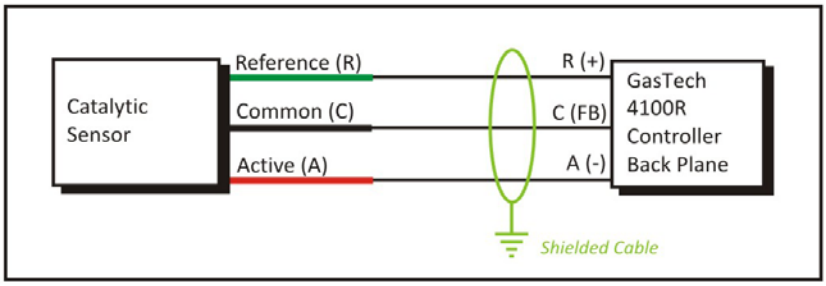
Custom Setting						Top Channel Switch S1, Bottom Channel Switch S10								Top Channel Switch S11, Bottom Channel Switch S12								Power Jumper		
	S/N	Ver.	Range	AL1	AL2	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	+24v	ADJ	N/C
Ch1																								
Ch2																								
Ch3																								
Ch4																								
Ch5																								
Ch6																								
Ch7																								
Ch8																								

3.4 Configuration Examples

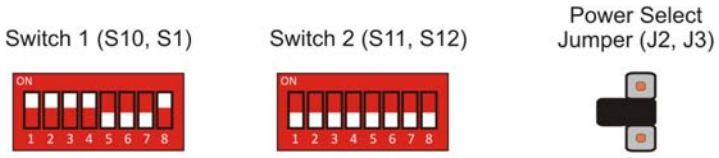
3.4.1 Catalytic Sensor

This diagram shows how to connect GasTech catalytic sensors to the GTA-4100R. Compatible GasTech part numbers include 61-0103, 61-0101 and 61-0203.

NOTE: If you are connecting a catalytic sensor to the GTA-4100R, no field amplifier is required.



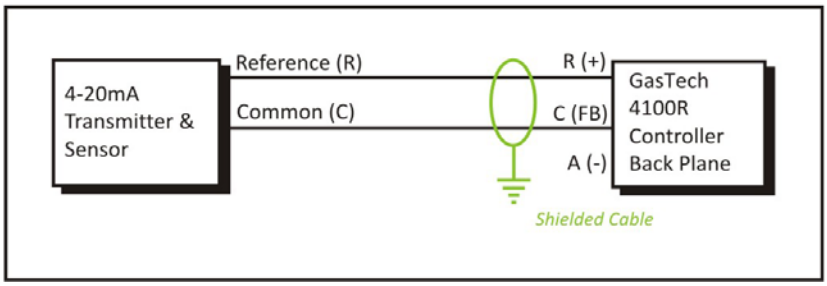
With a catalytic sensor, the DIP switches and jumper settings should be set as shown below.



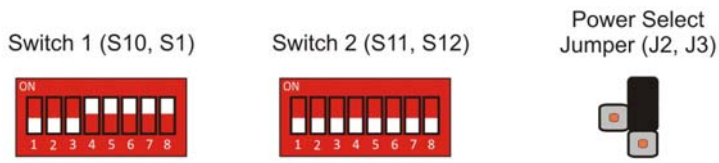
NOTE: Switch 1, position 4 can be put in the OFF position to give extra gain for ppm and low reactive sensor types.

3.4.2 Two-wire 4-20mA Loop Powered Sensor & Transmitter

This diagram shows how to connect a two-wire 4-20mA loop powered sensor & transmitter to the GTA-4100R. Compatible GasTech part numbers include the GTA-65 series of Oxygen and toxic sensors.

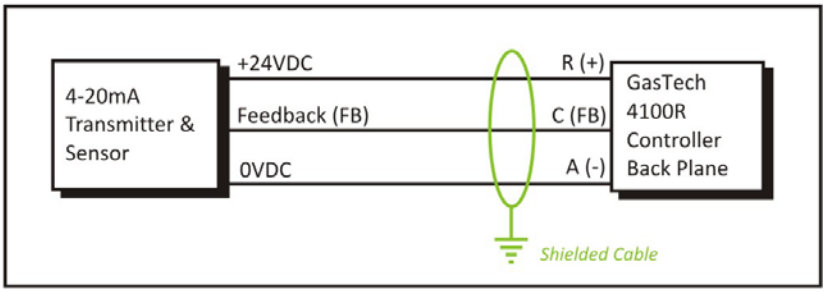


In this configuration, the DIP switches and jumper settings should be set as shown below.



3.4.3 Three-wire 4-20mA Sensor & Transmitter (500mA Max)

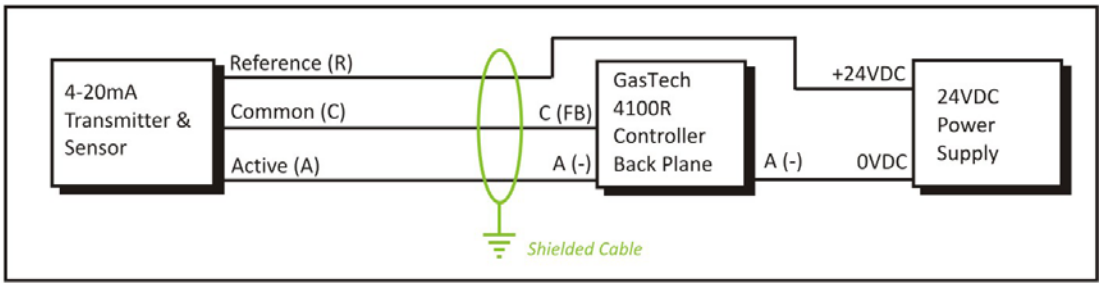
This diagram shows how to connect a three-wire 4-20mA sensor & transmitter to the GTA-4100R assuming that the maximum current draw is 500mA.



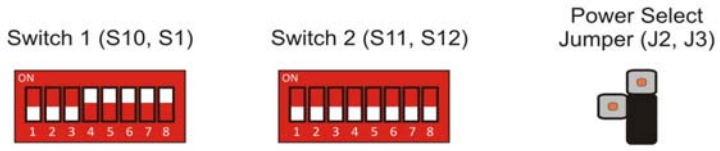
In this configuration, the DIP switches and jumper settings should be set as shown below.

3.4.4 Three-wire 4-20mA Sensor & Transmitter (500mA Min)

This diagram shows how to connect a three-wire 4-20mA sensor & transmitter to the GTA-4100R. This scenario is used when the sensor draws more than 500mA and therefore must be externally powered.

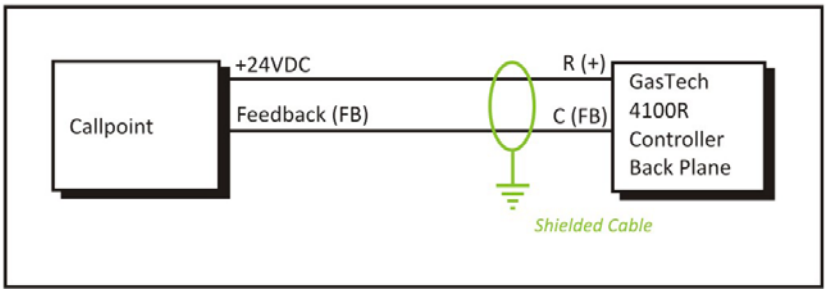


In this configuration, the DIP switches and jumper settings should be set as shown below.

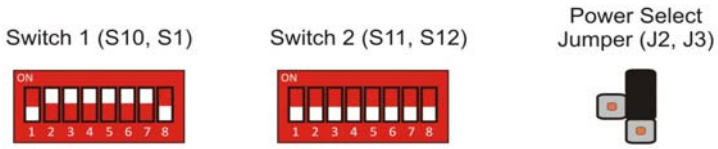


3.4.5 Digital Contact Open & Closed (Callpoints)

This diagram shows how to connect callpoints to the GTA-4100R.

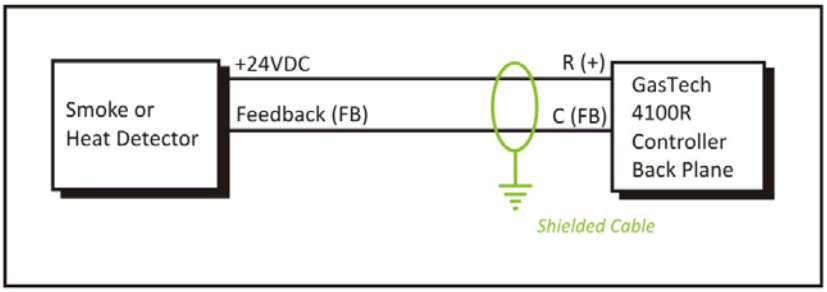


In this configuration, the DIP switches and jumper settings should be set as shown below.

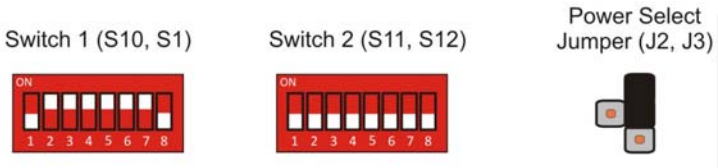


3.4.6 Smoke & Heat Detectors

This diagram shows how to connect smoke or heat detectors to the GTA-4100R. Multiple detectors can be wired in parallel if required.

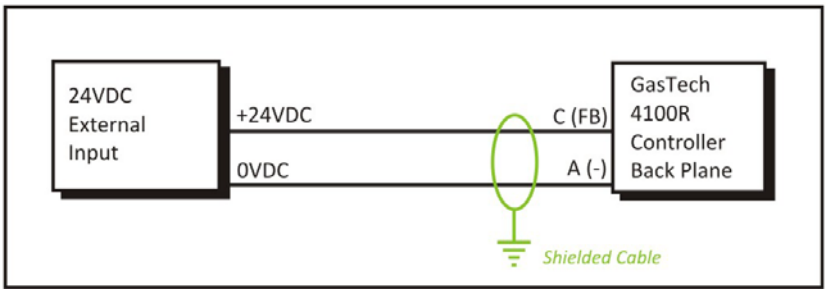


In this configuration, the DIP switches and jumper settings should be set as shown below.

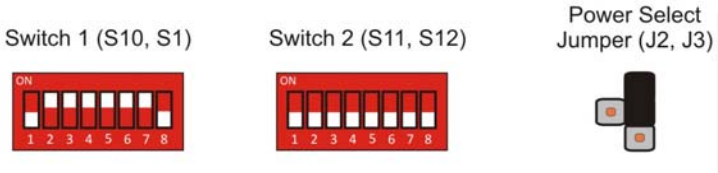


3.4.7 Externally Powered Activate Devices

This diagram shows how to connect an externally powered activate device to the GTA-4100R.



In this configuration, the DIP switches and jumper settings should be set as shown below.



3.5 Calibration

The only calibration that needs to be performed at the GTA-4100R is for a catalytic sensor with no field amplifier (using the GTA-4100R internal amplifier). Follow this procedure:

1. Switch the required channel to be calibrated into Isolate mode using the Isolate switch on the front panel.
2. The display will invert, the alarms will be deactivated and the 4-20mA output will drop to 2mA. While the channel is in Isolate no alarms from that channel will activate.

NOTE: When in Isolate mode the dead bands are removed so you can get an exact calibration, and view any small change in sensor output.

CAUTION: The visual and audible alarm indicators and relays are inactive during isolation mode and will not indicate any hazardous condition on that channel that may occur while in Isolate mode

3. Apply zero grade air to the sensor and allow the sensor to stabilize.
4. Slowly adjust the “Zero” pot on the front panel of the GTA-4100R until the display shows “0” or the required value.
5. Apply the span gas to the sensor and allow it to stabilize.
6. Slowly adjust the “Span” pot on the front panel of the GTA-4100R till the display displays the required value.
7. Remove the gas and apply zero grade air to the sensor again and allow the reading to stabilize.
8. Once the sensor has reached “0” or the required value you can bring the channel out of isolation, this will reactivate the alarms.

4 General Use

4.1 Checks

Complete the following procedure to place the GTA-4100R in normal operation.

1. Complete the mounting and wiring procedures described in the previous sections
2. Complete all configuration and programming procedures described in the previous sections
3. Verify that all wiring connections are correct and secure
4. Complete all installation procedures described in the sensors manual
5. Check each card is configured for the appropriate transmitter (sensor)
6. Check power being supplied to the GTA-4100R is correct (24VDC)
7. Turn on the incoming power at the power source
8. Verify the LCD display and status LEDs on each card are on

NOTE: The low alarm, high alarm, and fault circuits are not active for 60 seconds after power is applied to the GTA-4100R. This time delay minimizes false alarms during transmitter warm-up. The display will be flashing with the characters inverted.

4.2 Alarms

This section outlines the GTA-4100R indications for low alarm AL1, high alarm AL2, and fault conditions, including the standard relay action.

NOTE: The Isolate feature of the GTA-4100R allows you to disable the alarm LED's, buzzer, and relays during calibration procedures and response tests. When calibration mode is activated, the LED's, buzzer, and relays will not operate as described in this section.

The GTA-4100R activates visual, audible, and relay alarm indicators, when any of the programmed alarm set points are passed.

4.2.1 Low AL1 Alarm

When the displayed reading passes the programmed low alarm set-point:

- The AL1 ALARM LED flashes
- The buzzer sounds
- The low alarm relay activates

If the AL1 alarm is set to trigger on a rising level and the set point is triggered, the buzzer will sound and the channel AL1 LED and Common AL1 LED will flash.

If the alarm is set to trigger on a falling level, the buzzer will sound and the channel AL1 LED and Common AL1 LED will flash.

If the low alarm is latching:

If the low alarm has been configured to be latching, and the alarm has not been acknowledged, the panel buzzer, LED, and relay remain latched after the alarm condition has passed. These alarm indications must then be de-activated by pressing the "Ack/Reset" button on the front face of the controller, or by initiating a Global "Ack/Reset" button on the common module.

1. Follow the established procedure for a low alarm condition. If a procedure is not in place, establish one that is appropriate for your application.
2. When the reading returns to normal, acknowledge the alarm by pressing the Ack/Reset button to silence the buzzer and turn off the AL1 ALARM LED.
3. Press and hold the Ack/Reset for 3 seconds to reset the alarms.

If the low alarm is non-latching:

1. Follow the established procedure for low alarms. If a procedure is not in place, establish one that is appropriate for your application.
2. After the reading returns to normal, the GTA-4100R automatically silences the buzzer, turns off the AL1 ALARM LED and deactivates the applicable alarm relay.

3. Press and hold the Ack/Reset to acknowledge the alarm and silence the panel buzzer and steady the Alarm LED's if the alarm condition has not been cleared.

4.2.2 High AL2 Alarm

If the high alarm is latching:

If the high alarm has been configured to be latching, and the alarm has not been acknowledged, the buzzer, LED, and relay remain active after the alarm condition has passed. These alarm indications must then be cleared by pressing the "Ack/Reset" button on the front face of the controller, or by initiating a Global "Ack/Reset" button on the common module.

1. Follow the established procedure for a high alarm condition. If a procedure is not in place, establish one that is appropriate for your application.
2. When the reading returns to normal, acknowledge the alarm by pressing the Ack/Reset button to silence the buzzer and turn off the AL2 ALARM LED.
3. Press and hold the Ack/Reset for 3 seconds to reset the alarms.

If the high alarm is non-latching:

1. Follow the established procedure for high alarms. If a procedure is not in place, establish one that is appropriate for your application.
2. After the reading returns to normal, the GTA-4100R automatically silences the buzzer, turns off the AL2 ALARM LED and deactivates the applicable alarm relay.
3. Press and hold the Ack/Reset to acknowledge the alarm and silence the panel buzzer and steady the Alarm lights if the alarm condition has not been cleared.

4.2.3 Ack/Rest Button

• Pressing the Ack/Reset button will silence the panel buzzer and steady the flashing LEDs.

• Pressing and holding the Ack/Reset button for 3 seconds will Ack/Reset the alarms and relays.

• If the channel is set for non-latching the alarms and relays on that channel will automatically Ack/Reset when the cause of the alarm is cleared.

• To Ack/Reset the alarm on a channel with latching alarms. First you have to acknowledge the alarms by pressing the Ack/Reset once. The panel buzzer will silence and the alarm LED's will steady. Pressing and holding the Ack/Reset for 3 seconds will clear and Ack/Reset the alarms and relays. Ack/Reset button on the channel is for that channel only. The Ack/Reset on the common module is common to all channels and will reset all cards.

NOTE: If the cause of the alarm is still present the channel will go back into alarm status.

4.2.4 Fault Alarm

The fault alarm is activated when the 4 to 20mA analog input from a transmitter falls below 10% of the 4mA zero point or 200% above the 20mA full-scale set point, the programmed fault alarm set-point. This can be caused by such factors as a drifting sensor input or a broken wire connection. When a fault alarm occurs, the indications are as follows:

• The Status LED changes from green to red.

• The buzzer and fault relay activate.

4.3 Normal Operation

Normal operation is any time the start up procedure has been completed, no calibration or set-up procedures are in progress, and no alarm, or fault condition exists. During normal operation, the GTA-4100R behaves as follows:

• The screens displays the current gas concentrations (channel 1 on the top half of the screen, channel 2 on the bottom half of the screen).

• The 4 to 20mA analog recorder outputs at the terminal strip correspond to the displayed gas readings.

• The AL1 ALARM, AL2 ALARM, and FAULT LED's and relays for both channels are off.

• Common module buzzer is off

4.4 Maintenance

WARNING: Perform all installation procedures in a fresh air environment (known to be free of combustible and toxic gas and having normal oxygen content).

Routine maintenance of the GTA-4100R consists only of periodic checks to ensure that the system remains at zero (or 20.9% for O_2). The transmitters and sensors used in conjunction with the GTA-4100R must be calibrated at regular intervals following the procedures described in their respective manuals.

APPENDIX I. Troubleshooting

Fault	Remedy
1. No Power. **2. No readings or messages on the display screens.**	**1.** Verify that power is on. **2.** Verify correct connections at the power source **3.** Verify that the wiring connections at the terminal strip are complete and correct. **4.** Check the continuity of the fuse, and replace if necessary. (Fuse is 3AG-1, 250Volts/1 Amp.) **5.** If difficulties continue, contact GasTech Australia for further instruction.
1. Frequent or suspect alarms. **2. No change in zero reading.**	**1.** Make sure that the transmitter wiring to the GTA-4100R is properly shielded. See the Installation section of the Transmitters manual. **2.** Incorrect Signal Reading Feedback signal does not correspond with the reading at the display 4-20mA mode. **3.** Isolate the required channel. **4.** Adjust the Zero pot on the front panel. This will adjust the display to match the input signal. **5.** If difficulties continue, contact GasTech Australia for further instruction.

APPENDIX II. Spare Parts List

A variety of spare parts are available for the GTA-4100R unit.

Part Number	Description
73-4105	Card cage, full rack (19-inch, 10 slots)
21-4105-01	Card cage, half rack (4 slots)
23-0241	Replacement card guide
71-4100R	Operator's Manual, GTA-4100R
73-4100	GTA-4100R dual processor dual input card
73-4101	GTA-4100R back plain 20 channel
73-4101-01	GTA-4100R back plain 10 channel 1/2 rack
73-4102	GTA-4100R Common Module relay/global rest
73-4103	GTA-4100R extender card
73-4104	GTA-4100R Card display PCB

4.5 Power Supplies

Twenty-four VDC power must be supplied to each GTA-4100R controller module. The controller module, in turn, supplies 24 VDC power to the transmitters and sample draw adapters connected to it. Two power supplies are available from GasTech Australia for the GTA-4100R:

Part Number	Description
49-4100A-02	110-240VAC to 24VDC 150W power supply. For 5 controllers with 10 transmitters, used with the full 19-inch rack card cage
49-4100A-03	110-240VAC to 24VDC 300W power supply. For 10 controllers with 20 transmitters, used with the full 19-inch rack card cage

APPENDIX III. Specifications

Note: Specifications subject to change without any notice.

Feature	Description
Range	Adjustable to 0-2000
Inputs	Two 24 VDC 4 to 20mA analogue signal inputs, source or sink type, two or three-wire. 3 wire catalytic, 0-1V, 0-5V, 0-10V, 0-24V. 24V Digital, and resistance
Analogue recorder	One 4 to 20mA source for each channel, 1000 OHMS maximum output impedance
Relay outputs	Low alarm relay, high alarm relay, and fault for each channel, programmable for latching/non- latching, 1 AMP/240 VAC. Common alarms, if Common Module is fitted (73-4102) each relay rated at 10 AMP/240 VAC
Voltage input	24 VDC nominal (18-30 VDC)
Current Consumption	0.25 Amp maximum. Fuse: 3AG-1, 250 V/1 Amp
Low alarms AL1	Independently adjustable from below zero to above full scale. Programmable to activate on rising or falling level. Audible and visual indication
High alarms AL2	Independently adjustable from below zero to above full scale. Programmable to activate on rising or falling level. Audible and visual indication
Acknowledged	Operating the Acknowledge/Reset button on each channel or the global reset on the Common Module
Fault alarm	Channel fault
Calibration	Isolate switch on each channel will isolate the alarms during the calibration mode. 4-20mA will be set to 2.0mA, display inverted
Dead bands	3% of full range at zero for common gas applications to eliminate unwanted noise. Selectable on or off. 20.5 to 21.3 for oxygen sensors to eliminate unwanted noise. Selectable on or off
Operating temperature	-20° to +55°C
Operating humidity	0 to 95% RH non-condensing
Module dimensions	19” rack case - 3RU high, one 8E width per module
Weight	Approximately 220g

Intrinsically safe rating	None