

SM50 OEM Ozone Sensor Module

The Aeroqual SM50 range of gas sensor modules provides state of the art gas measurement in a flexible cost effective package. Each module is ready to use with multi-point calibration (NIST traceable). Outputs include analog voltage, relay, RS232, RS485 and status indicators with optional piezo alarm and LED, VFD or LCD displays. The modules are compact and produce a linear output with gas concentration (actual sensor and calibration is subject to application).



SM50 Sensor module (sensor side)



SM50 Sensor module (relay side)

Fan or optional
audible alarm
position

Software Options

Two software options are available allowing the module to be used in the following ways:-

1. As a simple switching device (switching equipment on and off) – NOT INSTALLED.
2. As a control device (to maintain a specific gas concentration between user defined levels through the control of an external device via the on-board relay) - INSTALLED

The software is loaded prior to delivery and can only be altered by returning it to Aeroqual Limited

Ozone Sensors

Sensor	Calibrated Range	Accuracy	Resolution	0-5V Analog Output
Ozone ultra low (OZU)	0 - 0.150 ppm	$\leq \pm 0.010$ ppm	0.001 ppm	0 - 0.150 ppm
Ozone low (OZL)	0 - 0.5 ppm	$\leq \pm 0.02$ ppm (0 - 0.1 ppm) $\leq \pm 20\%$ (> 0.1ppm)	0.001 ppm	0 - 0.5 ppm
Ozone high (OZH)	0.5 - 20 ppm	$\leq \pm 20\%$	0.01 ppm	0 - 20 ppm

Operating Instructions

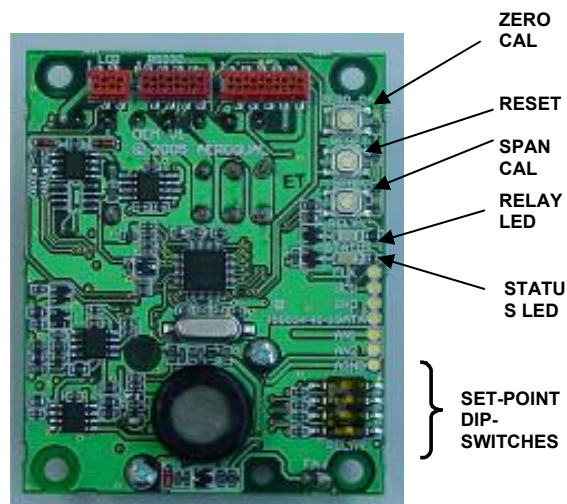
1. Operation as a Single Point Switching Device

Setting the Relay and Alarm Set Point

The Relay and Alarm Set Point is factory set (unless otherwise specified) to "off-on-off-on as shown in the table below.

The Alarm and/or Relay Set Point can be altered by adjusting the set-point dip-switches as shown below.

Note: The relay, alarm & sensor diagnostics are inactive during the warm up period.



Relay dipswitch (1 2 3 4)	O3 Ultra-Low (ppm)	O3 Low (ppm)	O3 High (ppm)
on on on on	0.000	0.000	0
off on on on	0.010	0.025	1
on off on on	0.020	0.050	2
off off on on	0.030	0.075	3
on on off on	0.040	0.100	4
off on off on *	0.050	0.125	5
on off off on	0.060	0.150	6
off off off on	0.070	0.175	7
on on on off	0.080	0.200	8
off on on off	0.090	0.225	9
on off on off	0.100	0.250	10
off off on off	0.110	0.300	12
on on off off	0.120	0.350	14
off on off off	0.130	0.400	16
on off off off	0.140	0.450	18
off off off off	0.150	0.500	20

* Default factory setting

Status LED / Diagnostics

The Status LED (glows green) is only of interest if the monitor appears to be operating incorrectly.

At start up, the Status LED will flash 2 to 6 times at an interval of 0.5 seconds.

During the 3 to 10 minute warm-up time, the Status LED will flash at an interval of 2 seconds.

The Status LED remains on under normal operation indicating that the unit is on.

If the sensor fails, the status LED will flash quickly at an interval of 0.3 seconds.

Relay LED

The Relay LED (glows red) indicates that the gas concentration has reached the "Relay-Set-Point" (as set with the dip switches) and the relay is activated.

Using the Relay Output

The Relay output is a set of volt-free contacts that can be used to trigger an external device directly or for higher voltage and current loads via a secondary relay (e.g. alarm bell, siren, extractor fan etc).

When the gas concentration reaches the desired set point, the relay is energised and the relay LED will light up (red). This will:-

- close the relay in the case of a "normally open relay" and
- open the relay in the case of a "normally closed relay".

When the gas concentration drops below the set point, the relay is de-energised and switches to the opposite condition.

Normally Open Relay

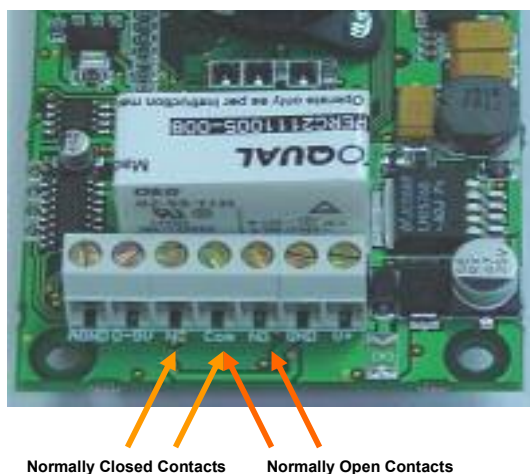
This relay will close when the set point is reached and switch on the external device; and then reverse this condition when the gas concentration drops below the set point. This is the safest way to operate the relay because if the power should fail, the external device is switched off (fail-safe condition).

Normally Closed Relay

This relay will open when the set point is reached and switch off the external device; and then reverse this condition when the gas concentration drops below the set point. This does not create a fail-safe condition.

Connecting to the Relay

Wire up the desired external device to either the normally open or normally closed contacts as shown below.



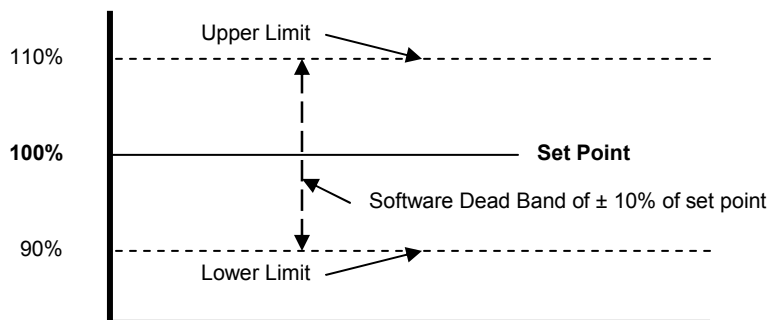
Please note that the maximum rating for the SM50 on-board (primary) relay is 30V / 2A. Should switching a higher voltage or current be required, consult a licensed electrician regarding fitting an external (secondary) relay with a higher rating.

2. Operation as a Control Device

NOTE: For this option the SM50 hardware is the same but specialised software has to be loaded at our factory prior to despatch.

The SM50 used as a control device allows the user to maintain a specific gas concentration between defined levels through the control of an external device via the on-board relay.

The specialised on-board software creates a “dead band” ($\pm 10\%$) around the selected set point (see diagram below).



When the gas concentration is rising from below the “Lower Limit” to the “Upper Limit”, the relay remains closed.
When the gas concentration is falling from above the “Upper Limit” to the “Lower Limit”, the relay remains open.

Power

Input	11 - 24 VDC
Consumption	2.5 - 6 W max

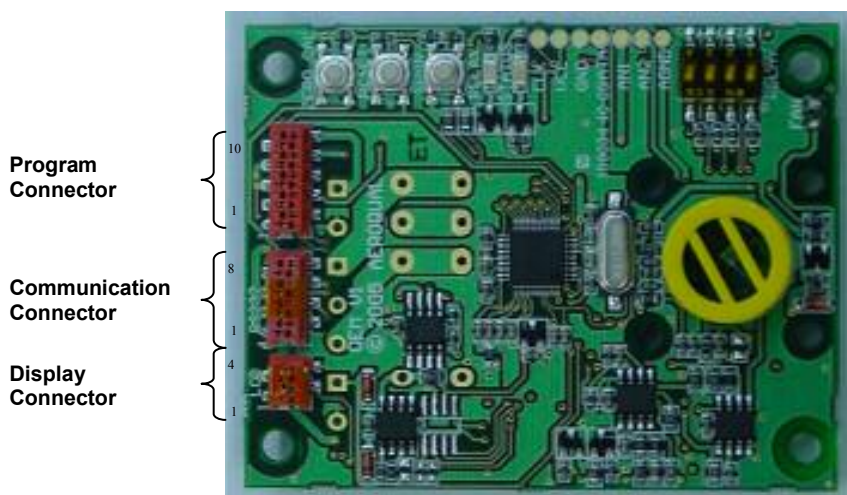
Outputs

0-5V analog	12 bit
Relay	Onboard 30 V / 2 A, NO, NC, COM
2 x LED indicators	Relay status red = activated Sensor status green = normal, green slow flash (2 seconds) = warming up green fast flash (0.3 seconds) = failure

Inputs

Relay setpoints	4-way dip switch
Zero calibration	Auto-calibration zero button (use only under factory advice)
Reset	Microprocessor reset button
Span calibration	DO NOT USE – calibration will be lost (for factory use only)

I/O Connectors



Program Connector

PIN	1	2	3	4	5	6	7	8	9	10
CONFIG.	VCC (5V)	BUSY	CLK	R x D	GND	RESET	CNV	T x D	N/A	VIN (11-24V)

Communication Connector

PIN	1	2	3	4	5	6	7	8
CONFIG.	VIN (11-24V)	GND	METER_TX (RS232)	METER_RX (RS232)	SPAN	ZERO	0-5V OUT (analog)	AGND (analog GND)

Display Connector

PIN	1	2	3	4
CONFIG.	VCC (5V)	SCL (clock)	SDA (data)	GND

Diagnostics

If sensor failure then:-

Status LED	fast green flash
Relay	on
Relay LED	red
0-5V analog output	5V

Mechanical

Board Size	60 mm x 75 mm
Mounting	Screw or extrusion slot
Fan (if required)	Onboard ball-bearing 50,000 hours
Sensor filter	Onboard

Options

Display	LCD 3.5 digit on a separate board VFD 2-line / 8-column on a separate board
Piezo alarm	Onboard or loose
12-bit 0-5 V analog	Onboard option
RS232 communication	Onboard option
RS485 communication	Onboard option
Temperature sensor	Range: -40 to 120 °C Accuracy: ± 0.3 °C Resolution: 0.01 °C
Humidity sensor	Range: 0 to 100% RH Accuracy: ± 2% RH Resolution: 1% RH

Environmental

Operating temperature	0 to 50 °C -20 to 50 °C if enclosed
Operating humidity	5 to 95% RH (non-condensating)

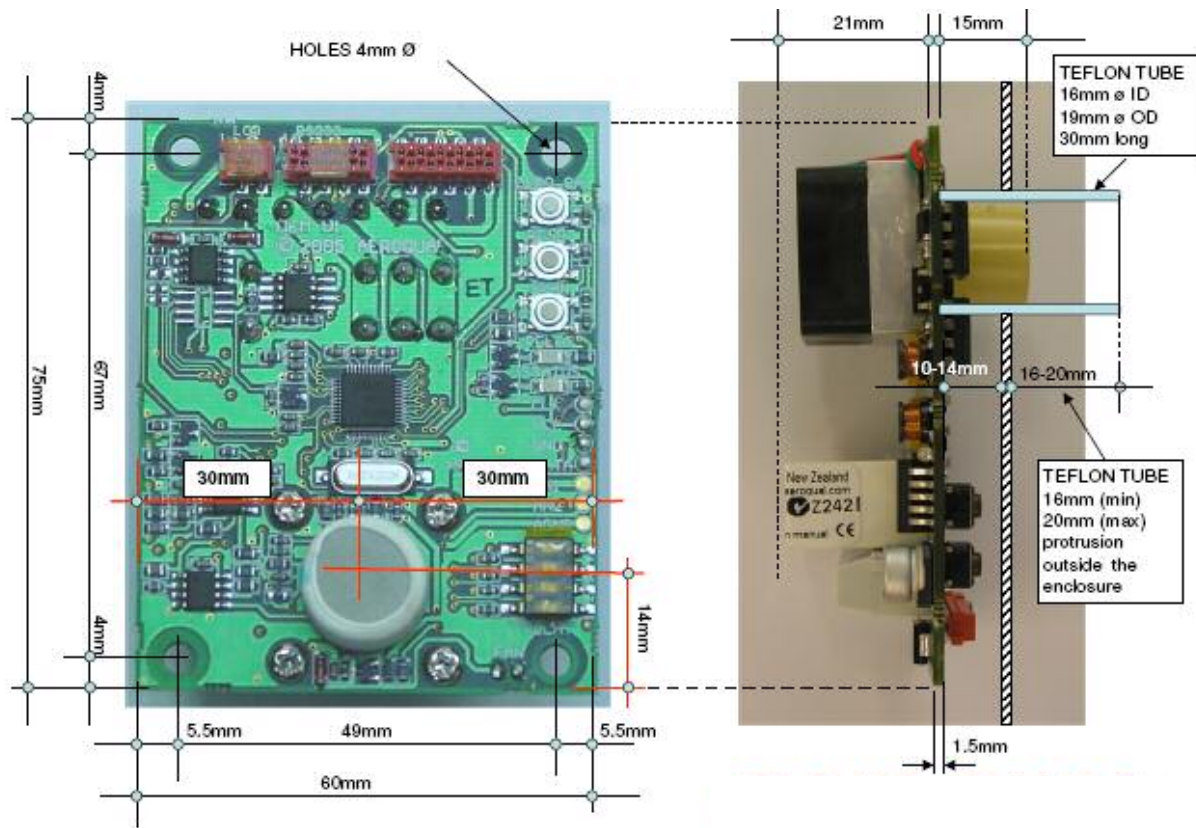
Approvals



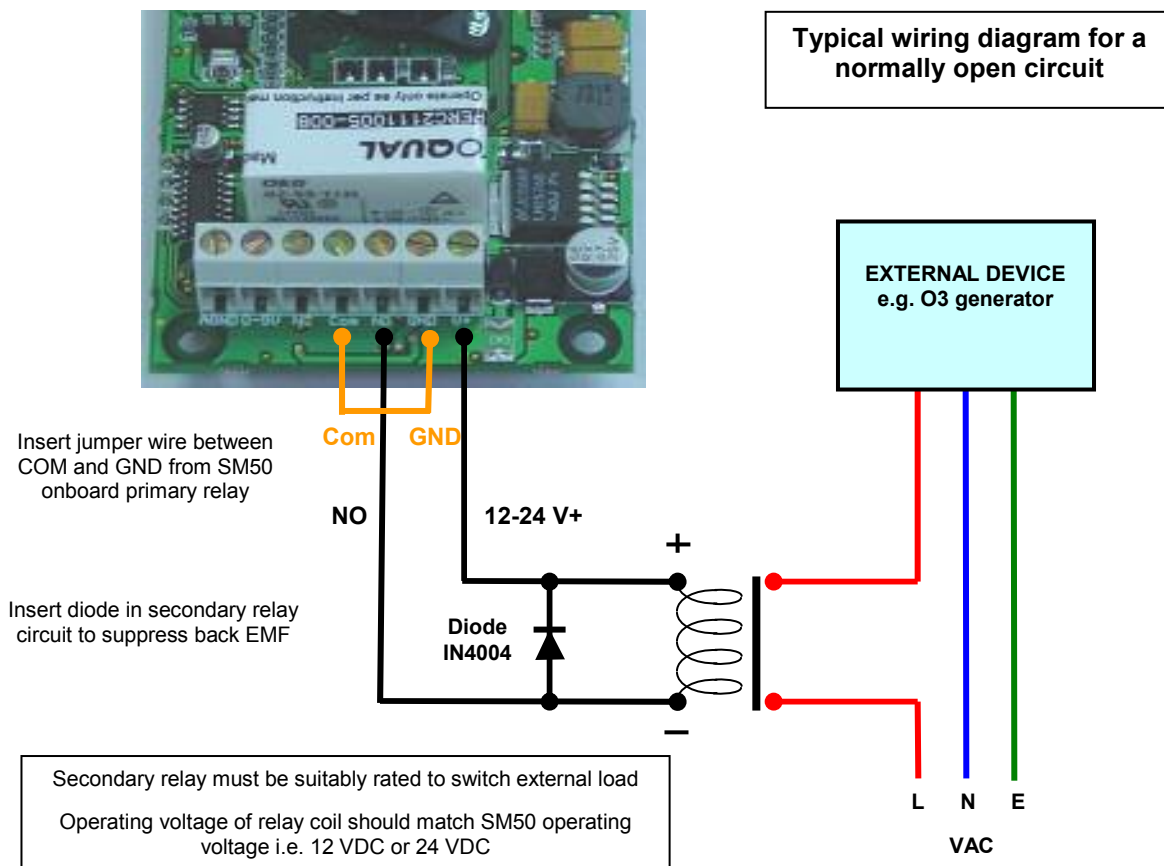
Warranty

1 year limited warranty (excludes calibration)

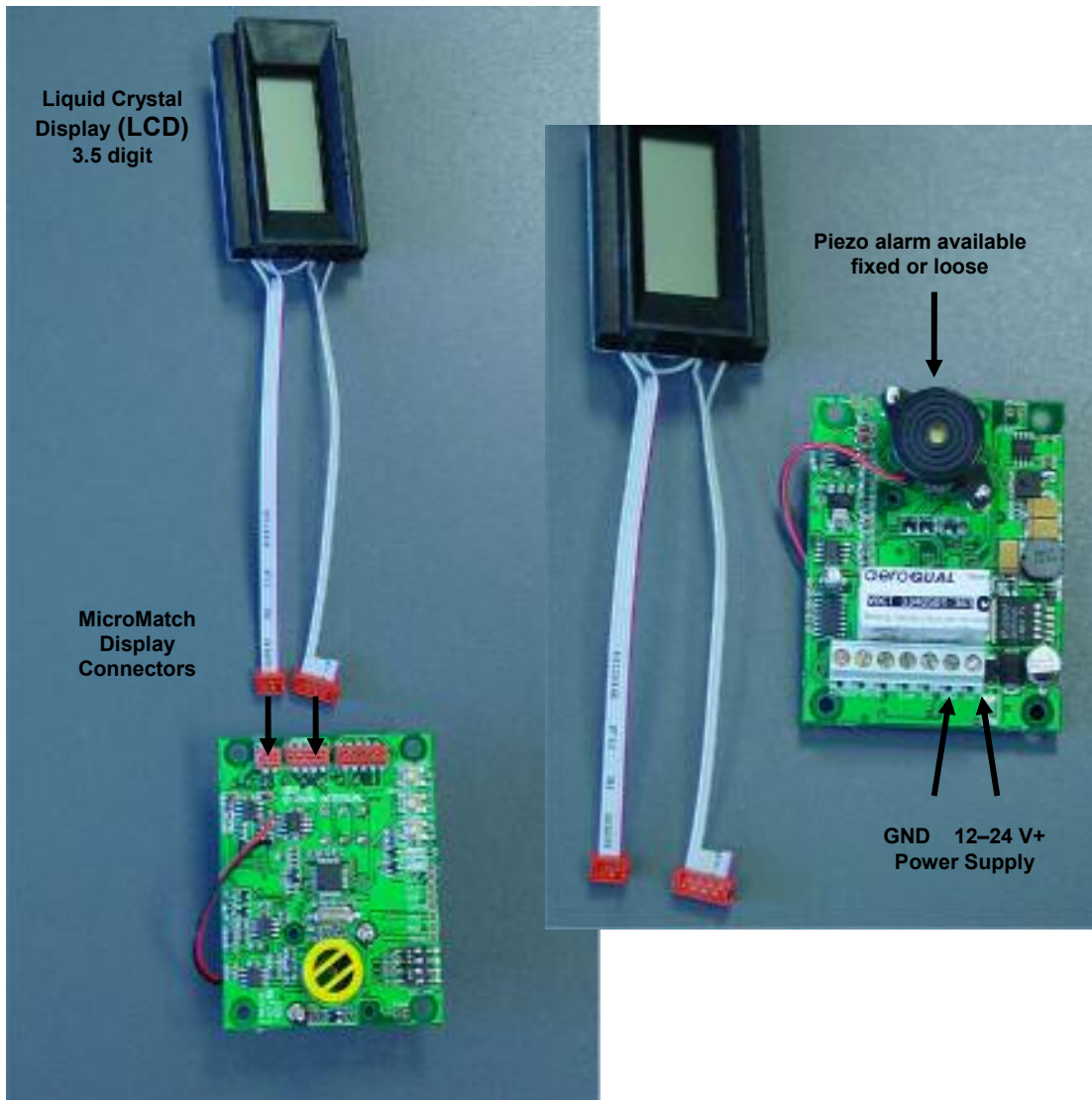
Mounting Dimensions



Wiring Guide for Secondary Relay to SM50



SM50 Module with Display Option



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