TOC-750 SERIES 2-WIRE DETECTOR NODES & STATUS INDICATORS

Operation and Maintenance

V1.35

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Important Notes

Gas detection systems must be correctly specified, installed and maintained in order to be effective. Anyone undertaking elements of this work should have access to the necessary equipment and be able to demonstrate competence. This will usually mean having passed a training competency course. International Gas Detectors run training courses for safety survey, specification , installation and service aspects of hazardous gas detection systems. In addition IGD can supply test equipment and calibration gases necessary to undertake this work.

Please note the following points

1. A zero grade gas usually instrument air or Nitrogen and a suitable calibration gas mixture is required.

2. The correct gas adaptors must be used to apply gases to detectors when zeroing and calibrating. Incorrect application of gases can affect calibration results

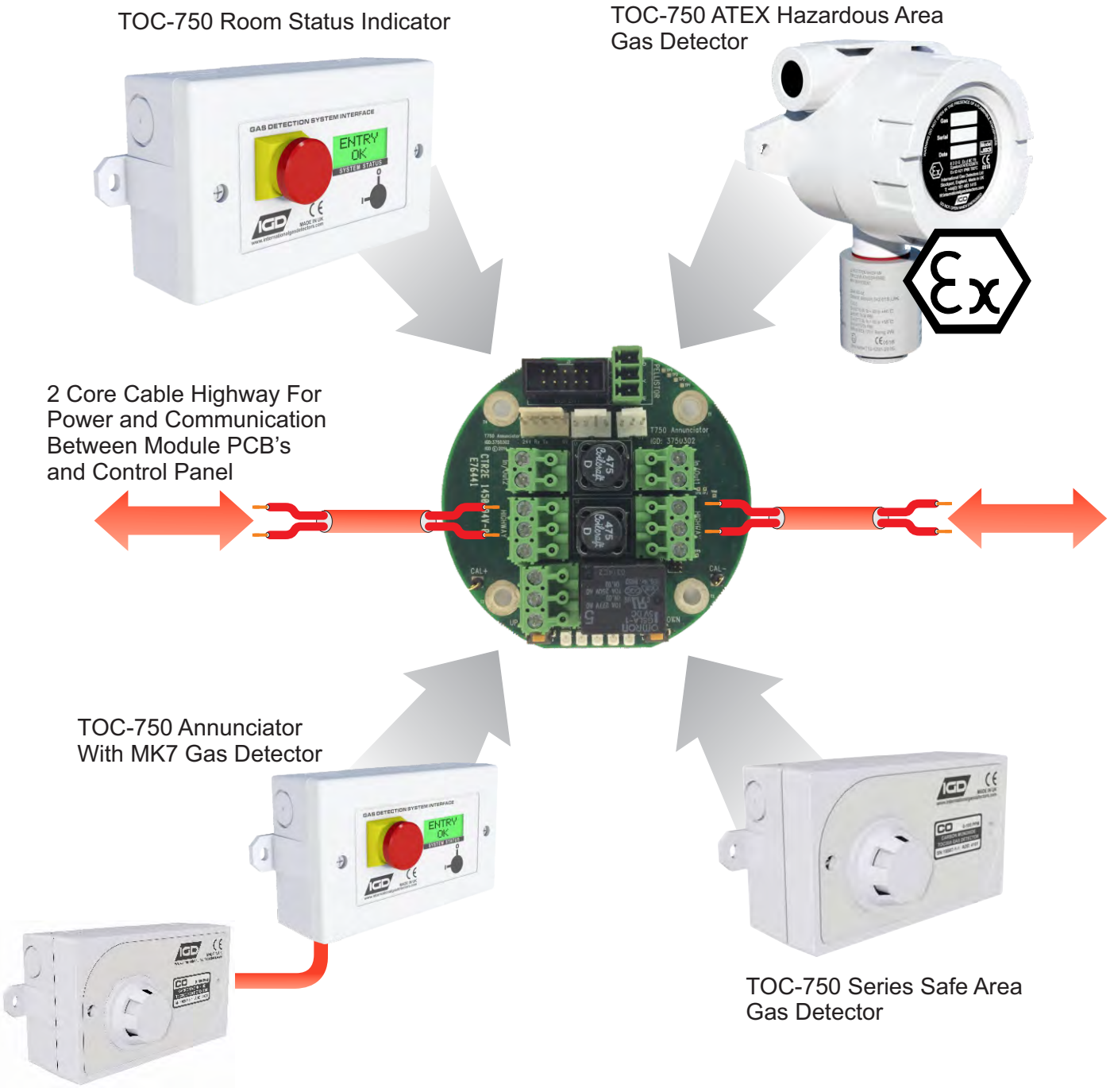
3. Use equipment and gases traceable to a national standard. Any calibration will only be as good as the equipment and materials used.

4. IGD supply fixed flow regulators for use with IGD calibration gas bottles which supplies gas at 0.5L/Min

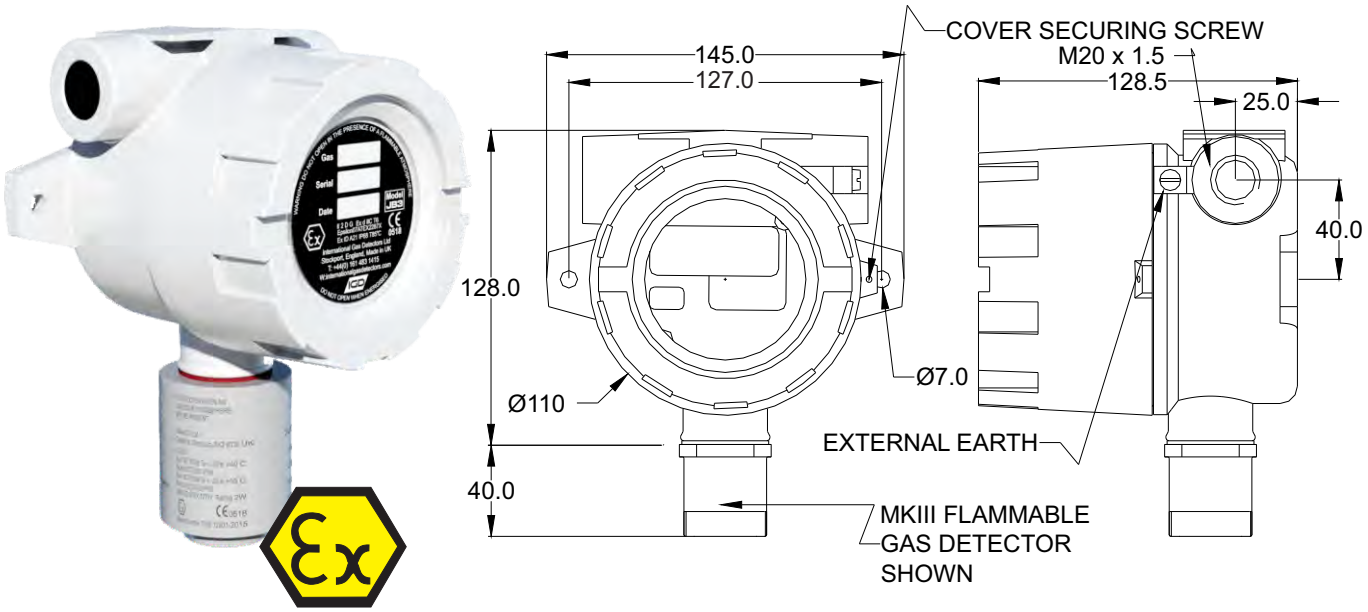
5. **Refer to *2-Wire Gas Detection Systems Installers Guide* before installation.**

Typical Models Covered By This Manual

TOC-750 Series Hazardous Gas detectors can be supplied in a number of formats. Some typical models are indicated in the diagram below. All 750 Series detectors and annunciators use a common ‘module’ PCB as indicated below to interface between the detector or interface and the control panel using IGD’s Sentinel+ 2-Wire protocol. A single 2-Wire ‘Highway’ can support up to 32 devices interfaced using the ‘module’ PCB. Highways can be up to 1000M long depending on cable size and detector types.

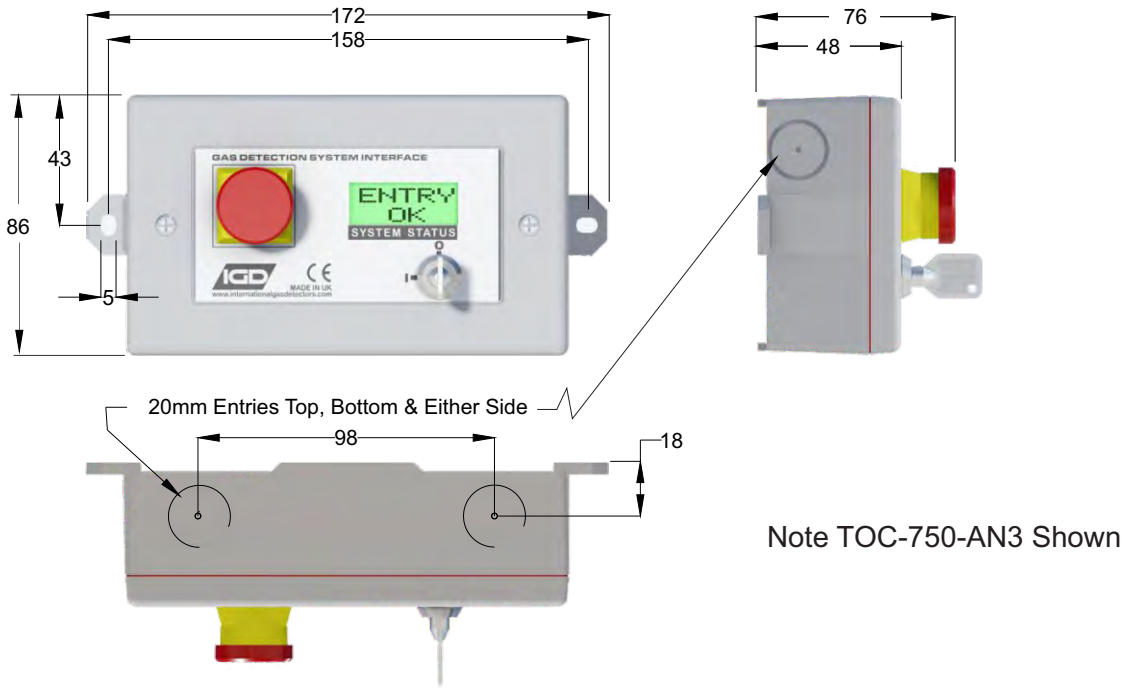


Mounting Details and Dimensions ATEX Versions



The ATEX version uses IGD's JB3 series ATEX EXD terminal enclosure. Please note that cable glanding and sealing must conform to ATEX requirements which is more fully described in the ATEX JB3 manual.

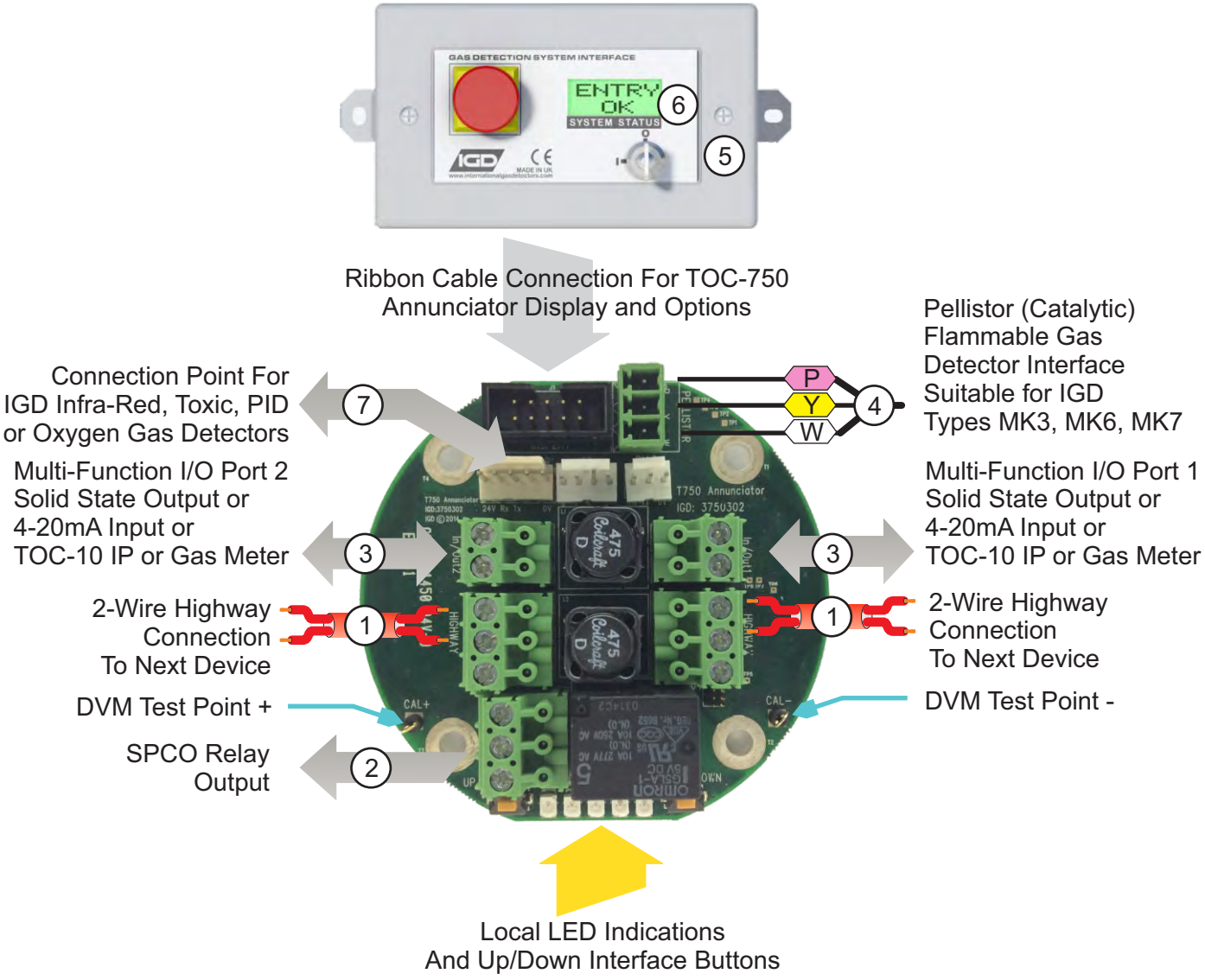
Mounting Details and Dimensions Safe Area Versions



Note TOC-750-AN3 Shown

Module PCB Features

The following diagram indicates features available on the TOC-750 'module' PCB. Please note that failure to observe and make correct connections or exceed ratings may result in damage to the PCB.

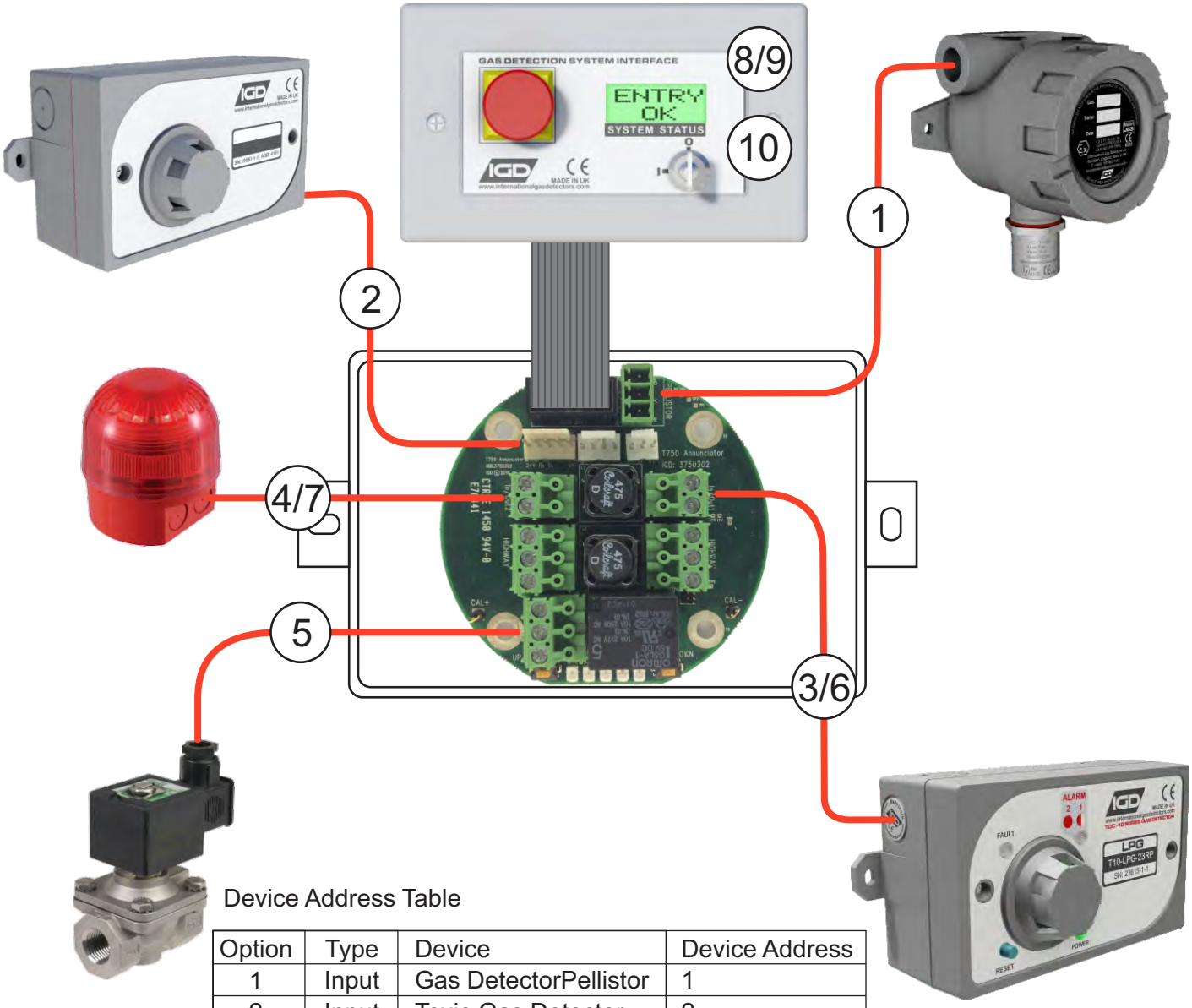


Module PCB Basic Interface Specifications

	Housing	TOC-750 Series ABS or Copper Free Aluminium For ATEX Versions
	Sealing	IP65 (using suitable glanding & splash guard) for TOC-750, IP68 for ATEX Versions
	Environment	0 -95% RH Non Condensing
	Temperature	0-55 Deg C
	Voltage	12-28V DC
1	Communication	IGD 2-Wire Highway Operating IGD Sentinel+ Protocol Using 2 Core Screened Cable Not Polarity Dependant
2	Relay	5A Non Inductive Loads 230V AC
3	Digital Output	24V DC 100mA Combined For Both Outputs Typically for LED Beacon Sounders
	Digital Input	Suitable for use with TOC-10 Link Function, switch/call point, totalising count
	Analogue I/P	4-20mA, selectable range, units and tag information
4	Pellistor Port	Option to Interface to MK3, MK6 or MK7 Pellistors
5	Sounder	85dB (Option for TOC-750 Annunciators)
6	Display	2 x 8 Programmable LCD with RGB Backlight (Option for TOC-750 Annunciators)
7	Comm Port	Supports IGD Infra-Red, PID, Toxic and Oxygen Gas Detectors

Connection Possabilities

The 750 Series Module PCB Operates as an Interface 'Hub' on the Addressable 2-Wire Highway. The Diagram Below Shows a Typical Set of Connection Possibilities



Device Address Table

Option	Type	Device	Device Address
1	Input	Gas DetectorPellistor	1
2	Input	Toxic Gas Detector	2
3	Input	TOC-10	3
4	Input	4-20mA	4
5	Input	E-Stop	5
6	Output	Solid State Output	102
7	Output	Solid State Output	103
8	Output	Relay & OP1	101
9	Input	Key Switch	6
10	Output	Sounder	104

I/O Port 2 Either Input or Output

I/O Port 1 Either Input or Output

Note that one 2-Wire addressable highway running Sentinel+ protocol can support up to 32 modules. Each module can have up to 8 connected devices. IGD Configuration software is used to configure the module PCB to switch devices on and off and set addresses (see Tocsin 650/750 Manual). If the connected devices have already been configured then the base address can be set from which all other module addresses will sequentially follow. This is described later in this manual. Device addresses indicated in the table are typical but can be individually set.

Installation Guide

Your 750 Series control panel has been supplied with a separate installation guide. Please read this before installing your system. The Installation guide provides information for correct cable selection, how to correctly install cables and devices and ensure correct cable segregation. It is important to read and understand this document prior to installation.

Copies of the installation guide are available in the downloads section of our website. Always check you are using the latest versions of the supplied manuals by checking on the IGD website.

Failure to follow correct installation may result in poor performance and/or damage to system components.

IGD-Academy

IGD's On-Line training academy is available to support your companies activities. The Academy features a range of CPD approved training courses and 'how to' videos.

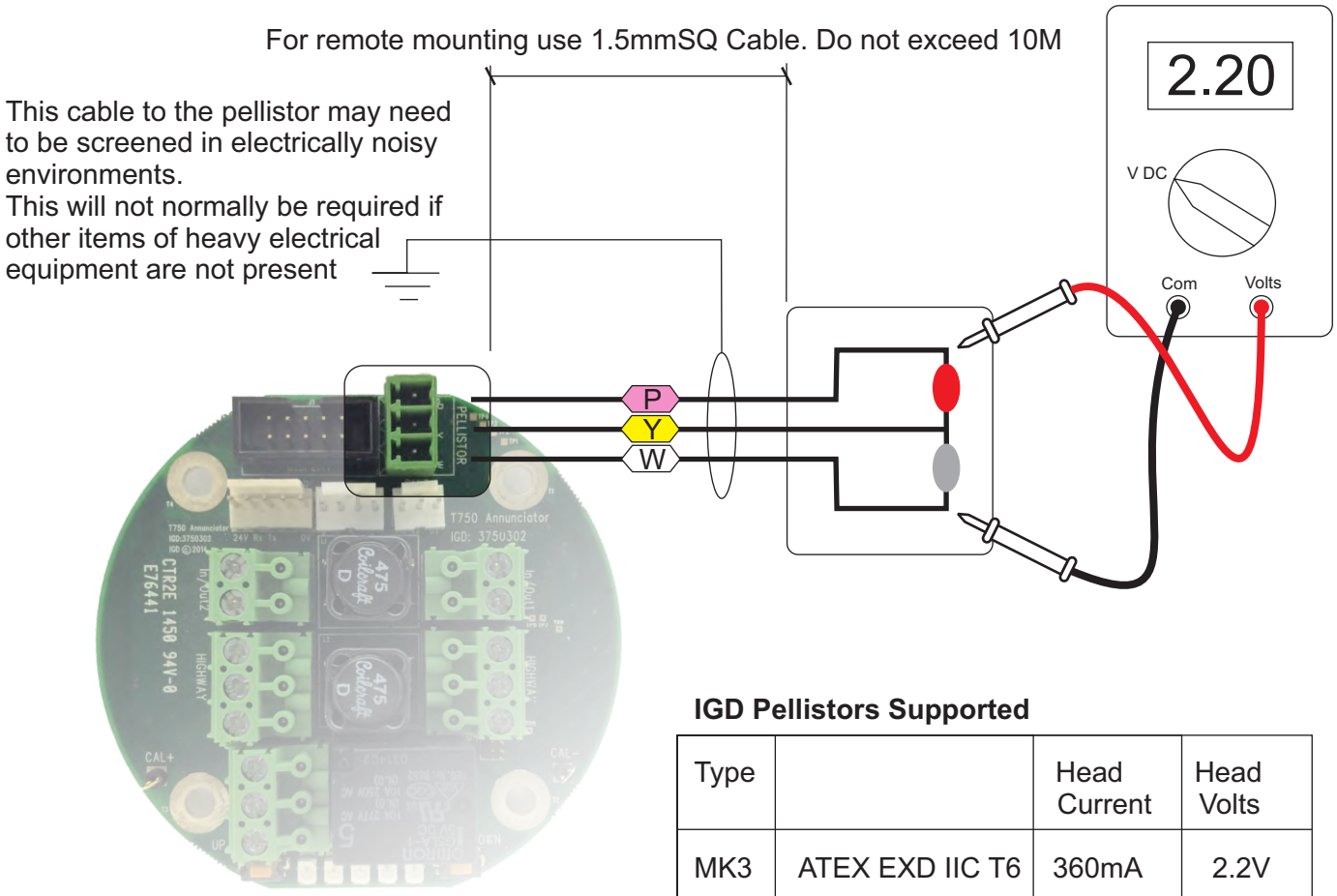
The academy can be found at: https://igdacademy.internationalgasdetectors.com

Please note that some courses are only available on a request basis. If you require a request only course please email sales@internationalgasdetectors.com to request your account and course.

Pellistor (Catalytic) Flammable Gas Detector Interface

The module PCB is equipped with a Pellistor or Catalytic flammable gas detector interface. This supports all IGD manufactured pellistors as indicated below. Note that the correct pellistor option must be selected in the setup software routine for the pellistor to operate correctly.

The Pellistor can be mounted remotely from the PCB. When doing so do not exceed the indicated cable length.



IGD Pellistors Supported

Type		Head Current	Head Volts
MK3	ATEX EXD IIC T6	360mA	2.2V
MK6	Safe Area	170mA	2.5V
MK7	Safe Area	170mA	2.5V

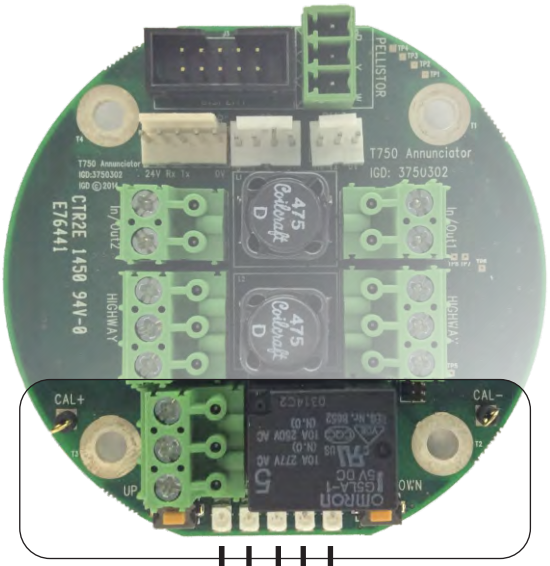
Note: The Pellistor 'Type' is selected using IGD service tool app or by using the setup routine in the TOC-750 Software. Once selected this automatically sets the head supply voltage.

In operation and with zero air applied correctly to the detector the 'balance' between the two detector 'beads' as measured P-Y and Y-W should not show a difference of more than 70mV. If the difference is larger than this then it could be an indication of aging or damage and the detector should be replaced.

Module Indications

Each module has two push buttons, labelled up and down and five LED's. In operation the LEDs and buttons work together to allow local calibration, change or reading of the base address or connected status as follows:

Connected Status



LED 1
Lit Green if pellistor option activated
Flashing green see table

LED 2
Lit Green if IR-PID-Toxic option activated
Flashing green see table

LED 3
Lit Green if I/O Port 1 option activated
Flashing green see table

LED 5
Lit Green if Relay option activated
Flashing green see table

LED 4
Lit Green if I/O Port 2 option activated
Flashing green see table

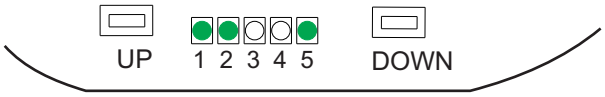
Note the LED flash rate is used to indicate as follows:

LED Flash Rate	Indicates
ON no Flash	Option Enabled and Powered But No Communication
1 per Second	Option Enabled Powered and Communication All OK
5 per Second	Line Voltage Low only LED 1 then LED 5
1 per 10 Seconds	Option Has a Fault Condition

Note: IGD App is used to configure the module PCB to switch devices on and off and set addresses (see Tocsin 650/750 Manual).

Addressing the Assembly

The TOC-750 Module PCB is an Addressable Device and Comes Equipped With a Simple Interface to Allow the Base Address to be Set. To Set The Set Address,



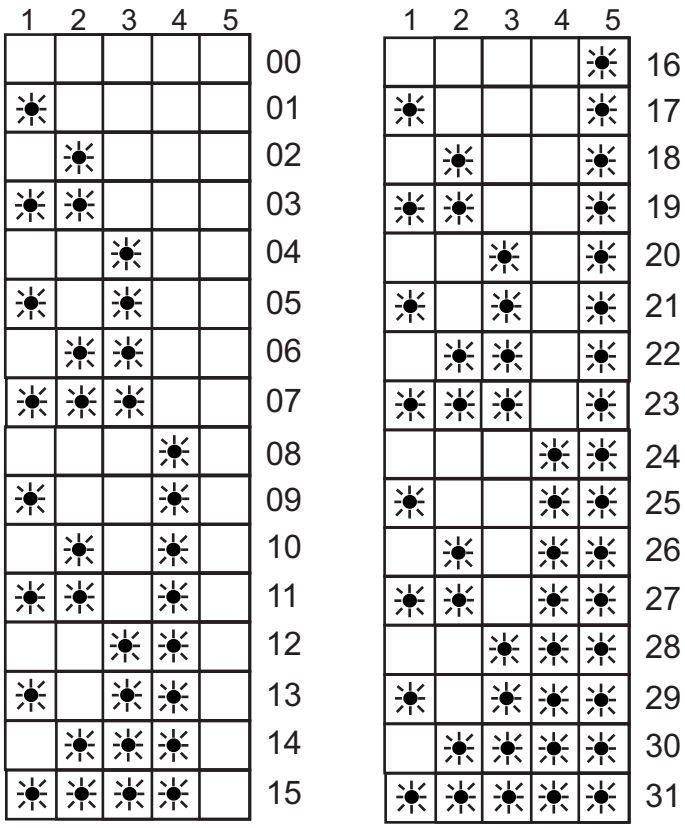
Press and hold the Down button for >2s

Release Button the Light Pattern Will Now Indicate the set Address as Shown in the Table Below.

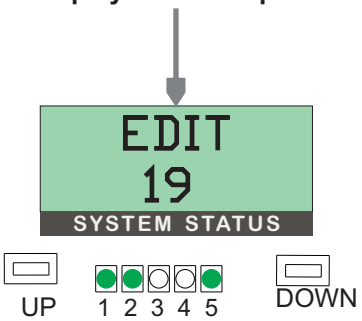
With the Set Address Lit, the UP and DOWN buttons can now be used to alter the address if required

With the Required Address lit, Press and Hold the DOWN Button Until the LED's go out. Release the DOWN button and the new Base Address is Now Set.

Note That with the base address set the LED's revert to showing what options are active and which of those options are communicating, see previous section on 'Module Indications'.



Note when editing if an Annunciator Display is fitted the base address display will also update



Setting the base address using the button interface sets the address for all other active options on the module as follows:
For a Base Address Set of 01:

Pellistor Input = Base Address = 01
02 = IR/PID/Toxic or Oxygen Sensor
03 = Digital or analogue Input 1
04 = Digital or analogue input 2
05 = E-Stop
06 = Key Switch

101 = Relay & Sounder
102 = Digital Output 1
103 = Digital Output 2
104 = Display Sounder

Anything turned off is ignored. Addresses are allocated in the following sequence.

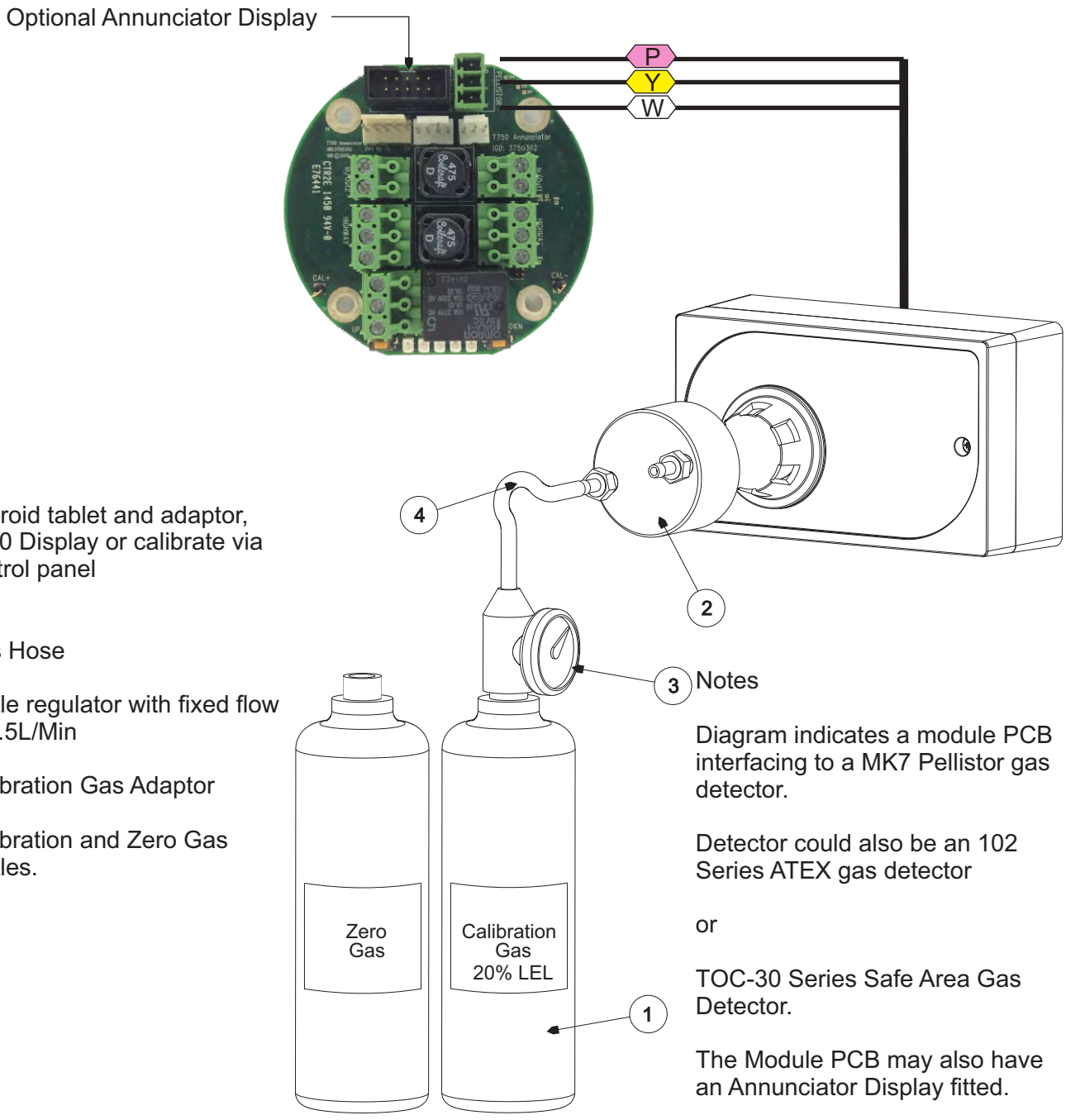
NOTE: WHEN SETTING ADDRESSES YOU CANNOT HAVE TWO DEVICE ADDRESSES SET THE SAME ON THE SAME ADDRESSABLE HIGHWAY or DEVICE.

Local Sensor Zero and Calibration

Detectors can be zero and calibrated in one of three ways.

1. Where the detector is combined with a display, use the display interface to zero and calibrate.
2. Use IGD's Android software/tablet with an IGD interface cable to directly zero and calibrate
3. Use the controller interface to zero and calibrate.

Connections and Required Equipment



5. Android tablet and adaptor, T750 Display or calibrate via control panel
4. Gas Hose
3. Bottle regulator with fixed flow at 0.5L/Min
2. Calibration Gas Adaptor
1. Calibration and Zero Gas Bottles.

Notes

Diagram indicates a module PCB interfacing to a MK7 Pellistor gas detector.

Detector could also be an 102 Series ATEX gas detector

or

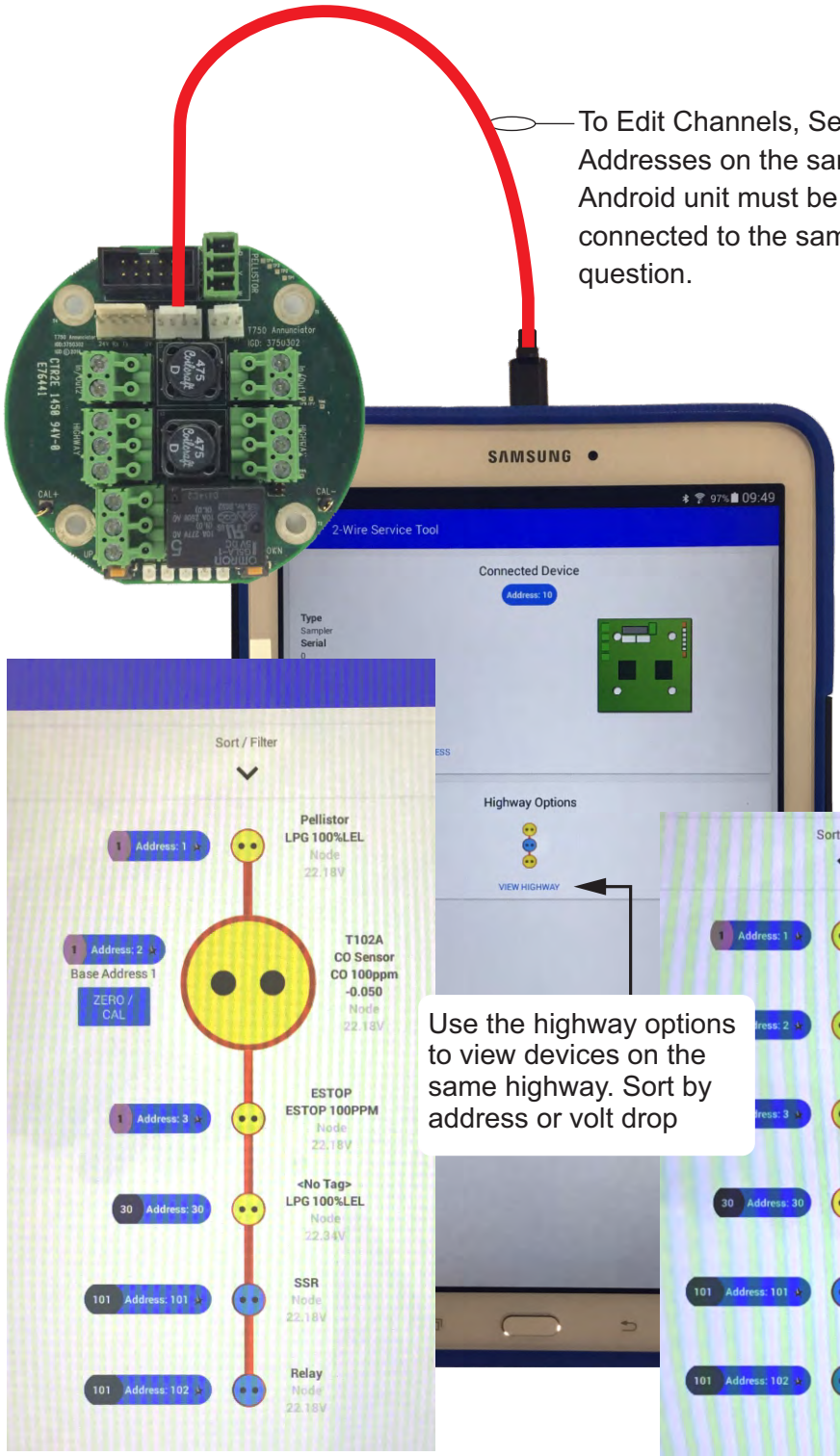
TOC-30 Series Safe Area Gas Detector.

The Module PCB may also have an Annunciator Display fitted.

IGD provide a range of Android based Apps for use with suitable tablets and mobile phones. For control panels these connect directly using bluetooth. For addressable devices it is necessary to make a direct USB cable connection using IGD's interface cable as indicated below. Apps can be downloaded from the App store.

Interface Cable
PN TOC-CBL-SET

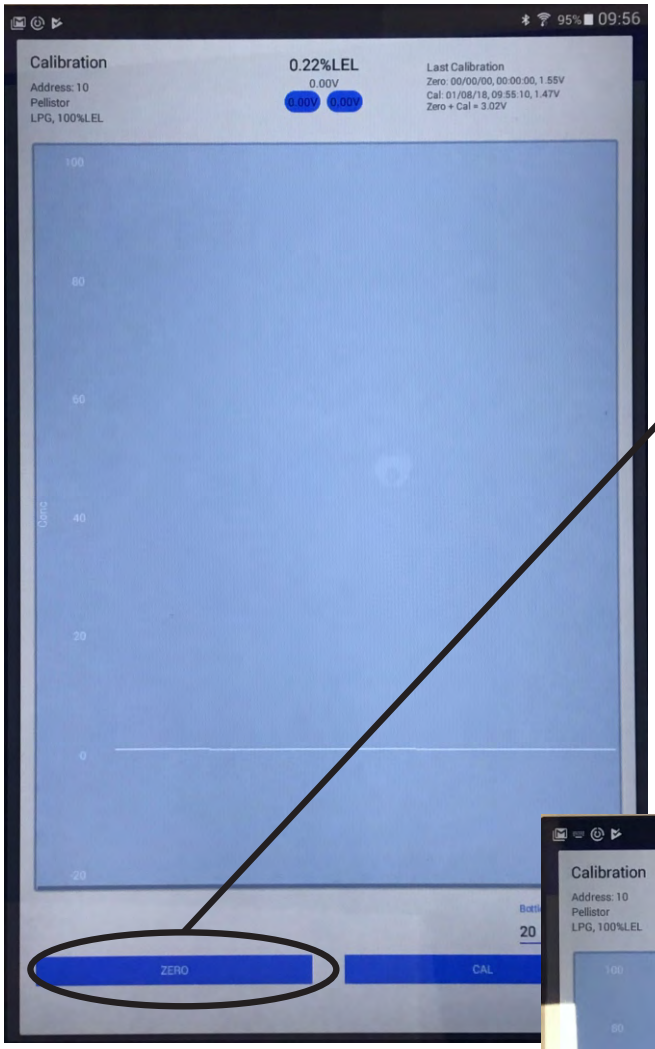
To Edit Channels, Settings or Addresses on the sampler the Android unit must be directly connected to the sampler in question.



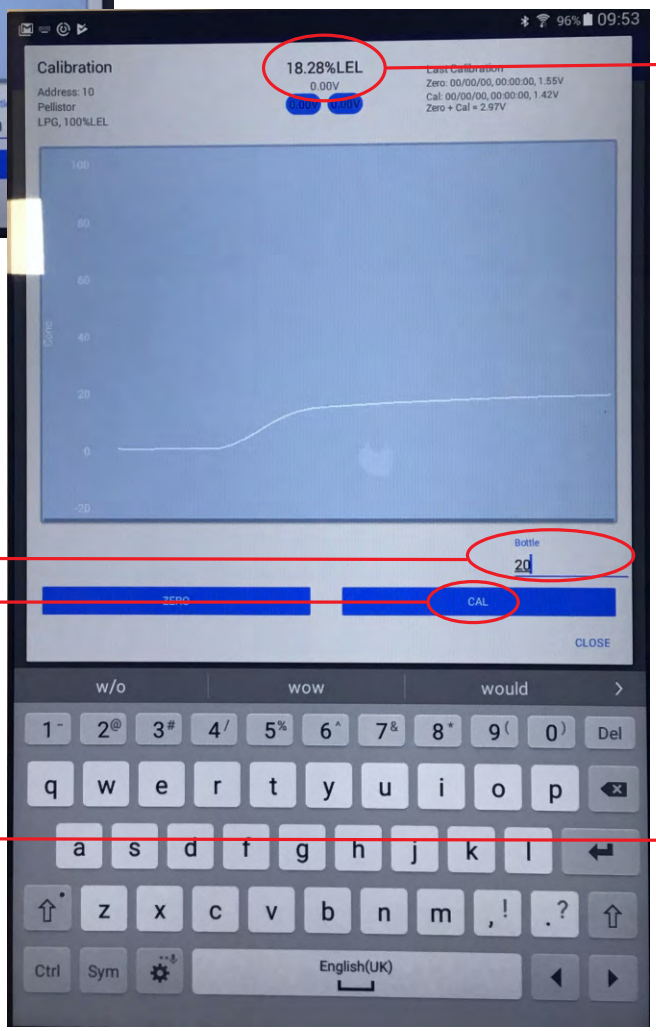
Use the highway options to view devices on the same highway. Sort by address or volt drop

NOTE:

When undertaking work with a connected tablet ensure the system controller is placed in INHIBIT mode. Failure to do so may result in system errors.



Flow a suitable zero gas (usually Nitrogen) allow the graph/reading to settle (usually 60-90 seconds) and select ZERO to zero the detector



Now apply calibration gas as indicated.

The graph should show the signal rise as the detector responds to gas and gives a visual indication to show when the reading has stabilised.

Once the graph shows a flat line and the reading is stable.

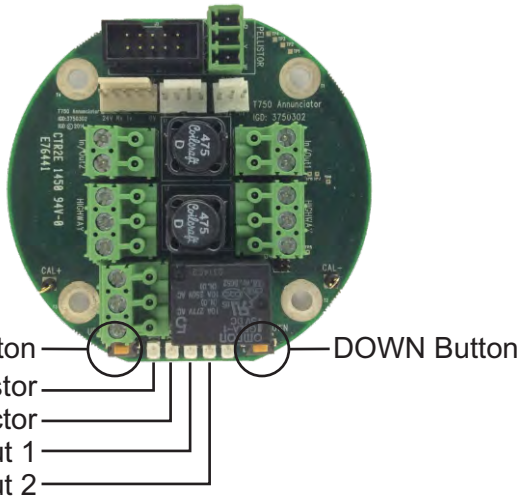
1. Check and enter the calibration gas value.

2. Select to calibrate

3. Observe the result is within tolerance

Detector Zero Sequence

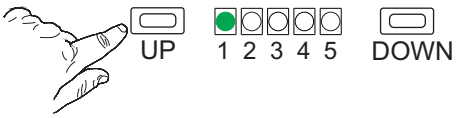
The module PCB has four inputs which can be enabled and calibrated locally using the equipment set previously described. When the module PCB is powered and as described in the indications section, the LED's will indicate which options are enabled .



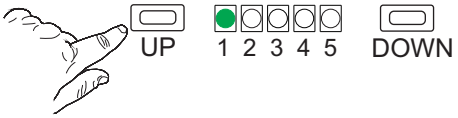
The zero sequence operates as follows:

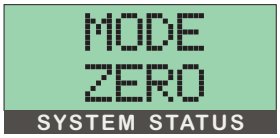
1. Press the UP button until the LED's go out, release the UP button.

2. Select the module address that requires zero by using the up/down buttons. With the correct module input number displayed press and hold the UP button. Release when the LED's go out.

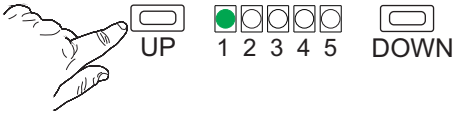


3. Use the UP/DOWN buttons to select the left LED for zero mode (right LED is CAL mode) With the left LED on, press and hold the UP button. Release when the LED's go out.





4. With a zero gas flowing allow the detector to stabilise (usually 30-40 seconds). Note if a display is fitted it will indicate the level at the same time.



5. With zero gas flowing and the reading stable press and hold the Up button to update the zero point

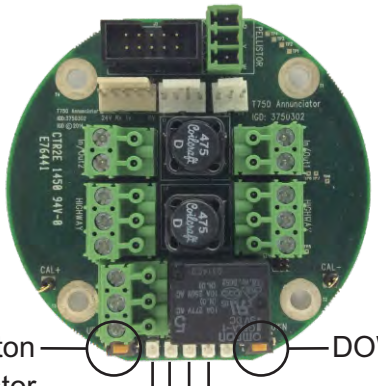
6. Each LED will blink in series to indicate the update and the module will go back to normal operation.

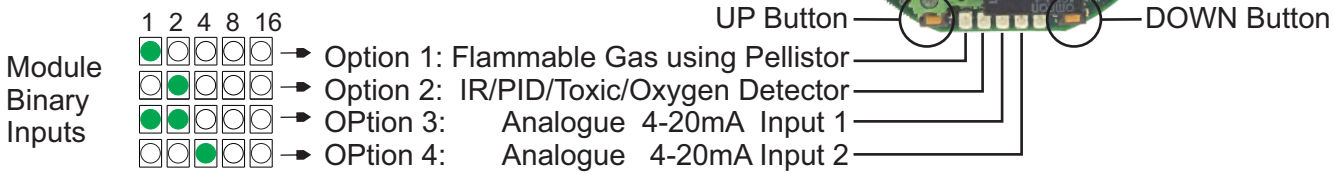
7. Press and hold the UP button to complete the sequence and return the module to normal operation.

NOTE: There is no ABORT option so before selecting to zero ensure all necessary equipment as previously indicated is available.

Detector Cal Sequence

The module PCB has four inputs which can be enabled and calibrated locally using the equipment set previously described. When the module PCB is powered and as described in the indications section, the LED's will indicate which options are enabled .



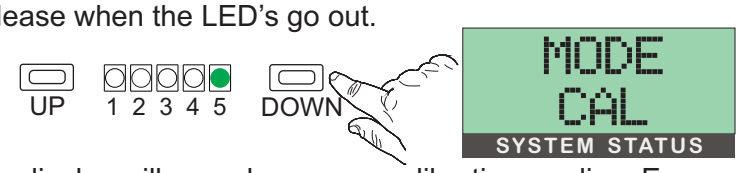


The Cal sequence operates as follows:

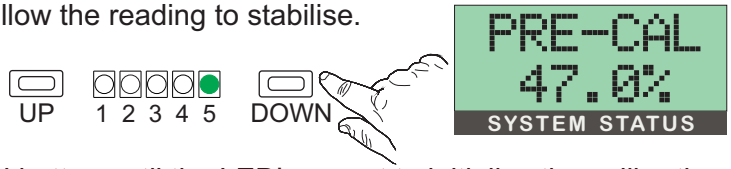
1. Press the UP button until the LED's go out, release the UP button.

2. Select the module address that requires calibration by using the up/down buttons. With the correct module input number displayed press and hold the UP button. Release when the LED's go out.

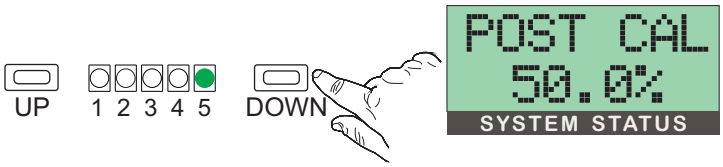
3. Use the UP/DOWN buttons to select the Right LED for Cal mode. With the right LED on, press and hold the UP button. Release when the LED's go out.



4. Cal Mode is selected. The display will now show a pre-calibration reading. Ensure cal gas is flowing to the detector and allow the reading to stabilise.



5. Press and hold the DOWN button until the LED's go out to initialise the calibration. The display will now show a post cal reading, check the reading is in tolerance



6. Each LED will blink in series to indicate the update and the module will go back to normal operation.

NOTE: There is no ABORT option so before selecting to calibrate ensure all necessary equipment as previously indicated is available.

Reset to Defaults

If required the module can be reset back to a default state. The diagram below indicates the sequence to do this.