AITHRE SHIELD EX SERIES

CO AND O2 PSI SENSORS FOR EXPERIMENTAL AIRCRAFT

GENERAL INFORMATION: The Aithre Shield EX 1.0, 2.0, and 3.0 integrate behind-the-panel with your avionics using a simple analog voltage output(s). The EX 1.0, 2.0, and 3.0 each feature carbon monoxide detection with long life, high sensitivity, fast response time, simple wiring, temperature/pressure independence, and a small form factor. The EX 2.0 also supports the iOS Aithre Connect application that is available from the APPLE store. The EX 3.0 adds the wireless reception of tank psi from the Aithre Altus portable oxygen tank pressure gauge and outputs the tank psi as a simple analog voltage output.

WIRING INSTRUCTIONS

- Red – **5V Power Input ONLY (WARRANTY VOID 12V/24V)**
  - Do NOT connect to 12V or 24V power supplies
  - Total current draw is very low at around 5 mAmp
- Black – Aircraft Ground
- White – Analog Voltage of Carbon Monoxide
  - Minimum 0 ppm CO gas = 0V
  - Maximum 255 ppm CO gas = 3.3V
  - Linear voltage output between 0 ppm and 255 ppm
  - Connect to available analog input pin on engine monitor module
- Yellow (EX 3.0 only) – Analog Voltage of Oxygen Tank PSI
  - Requires the Aithre Altus wireless portable oxygen tank pressure gauge
  - Minimum 0 psi Oxygen = 0V
  - Maximum 2500 psi Oxygen gas = 3.3V
  - Linear voltage output between 0 psi and 2500 psi
  - Connect to available analog input pin on engine monitor module

MOUNTING INSTRUCTIONS

- Mount behind or under the avionics panel at any location with access to general cabin air
- Do NOT tape or cover over the housing intake holes in the case
- For optimal Bluetooth range of EX 2.0 and EX 3.0 mount unit away from radio and high current wires
  - Try temporary mounting positions before permanently mounting to ensure satisfactory Bluetooth range
  - For the EX 3.0, always run the iOS application in the foreground or the background to reinforce and boost the strength of the BLE signal between the Aithre Altus and the EX 3.0

CALIBRATION INSTRUCTIONS

- CO: Calibrate your avionics with these suggested
  - Normal Range: 0 ppm (0V) - 9 ppm (0.12V)
  - Caution Range: 10 ppm (0.12V) – 49 ppm (0.64V)

        - Warning Range: 50 ppm (0.64V) – 255 ppm (3.3V)
    - O2 PSI (EX 3.0 only): Calibrate your avionics with these suggested
        - Normal Range: 500 psi (0.66V) – 2500 psi (3.3V)
        - Caution Range: 100 psi (0.13V) – 500 psi (0.66V)
        - Warning Range: 0 psi (0V) – 100 psi (0.13V)

SAFETY INFORMATION – CO

- Detects carbon monoxide in the range of 0 – 255 ppm
- The advanced solid electrochemical sensor used has a lifespan of 10 years without recalibration
- Normal in-use temperatures are -10C to +50C. Required temperatures for storage between use are -40C to +60C
- Do not expose to liquids or extreme dust
- In an event that carbon monoxide is detected, attempt to reduce carbon monoxide levels by increasing clean air flow and turning off cabin heat. Before any emergency action, it is important to verify any detected carbon monoxide values by evaluating your symptoms
- Never try to dismantle or open the device yourself, or push objects of any kind into the device

ADVANCED FLIGHT SYSTEMS ADDENDUM

Hook up the red 5V power, black ground, white (CO ppm) analog output wire, and yellow (O2 PSI for EX 3.0 only) analog output wire.

USING SV-EMS

For the EX 1.0 or 2.0, the white analog output wire goes to pin 1 of the SV-EMS.

For the EX 3.0, the white analog output wire goes to pin 1 and the yellow analog output wire should go to pin 2 of the SV-EMS.

USING AF-EMS (only for Aithre Shield EX 1.0 and EX 2.0)

For the EX 1.0 and 2.0, the white analog output wire should go to the rudder trim pin of the AF-EMS.

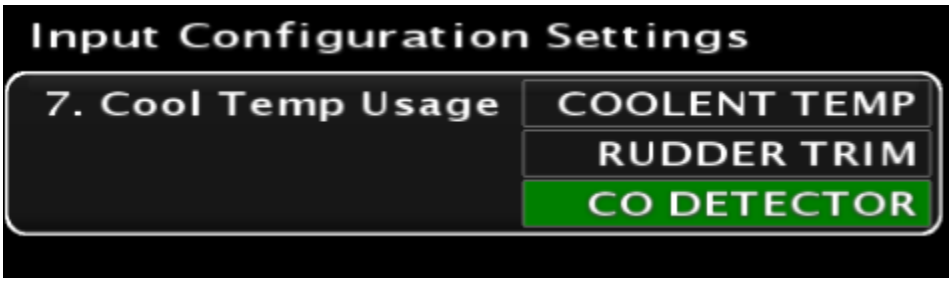
The EX 3.0 does not work with the AF-EMS.

Contact Ken Chard at Dynon/Advanced support for the most recent Advanced Flight Software update with EX 1.0, 2.0, and 3.0 support.

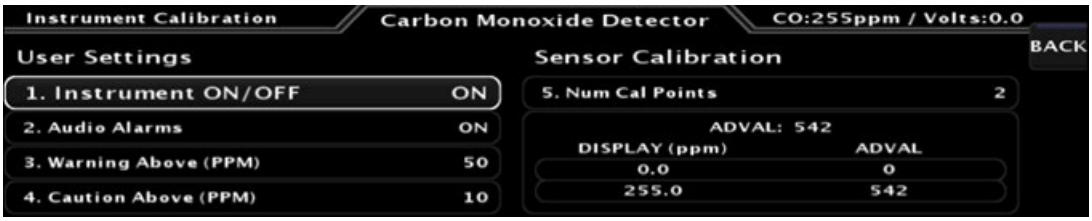
After wiring and installing the most current software, go to calibration settings.

If using the SV-EMS, simply verify that the CO and/or O2 psi instruments are turned on.

If using the AF-EMS for the EX 1.0 or EX 2.0, the calibration settings are different. Go to item '**3. Aircraft Info**' and press SEL. After that, set item '**7. Cool Temp Usage**' to CO DETECTOR like this:



Next go to item '**43. CO Detector**' and press SEL. You will need to set your configuration to match the following.



DYNON ADDENDUM

Hook up the red 5V power, black ground, white (CO) analog output wire, and yellow (tank psi – EX 3.0 only) analog output wire using the SV-EMS. The white and yellow analog output wires should go to one of the following pins of the SV-EMS: 8, 22, 23, 31.

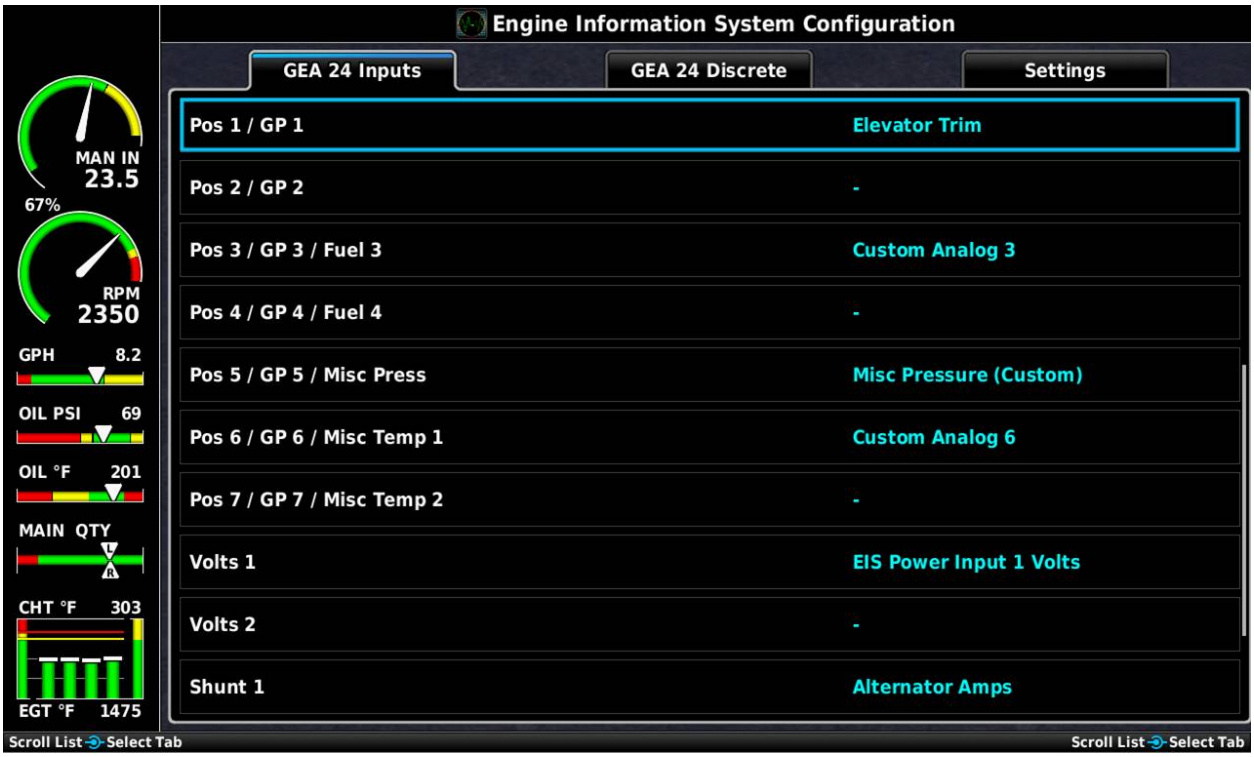
Contact Don Jones at Dynon Support to download the Aithre Shield EX widgets. Make sure to specify to Don whether you need the CO and/or the tank psi widgets.

GARMIN G3X ADDENDUM

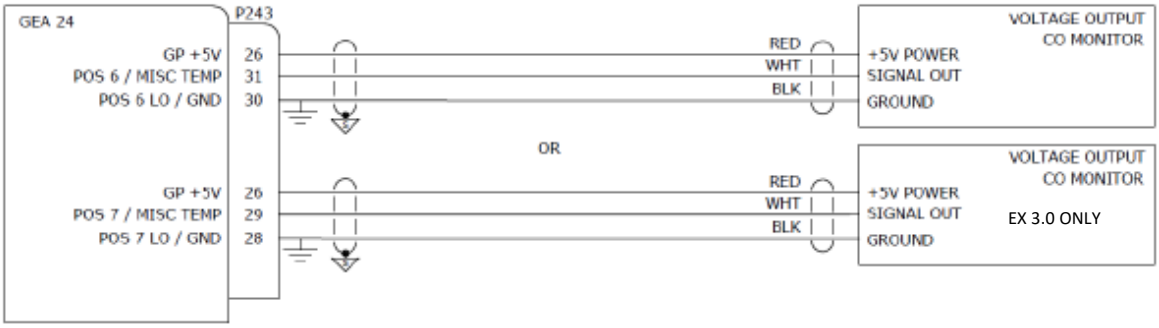
Hook up the red 5V power, black ground, white (CO) analog output wire, and yellow (tank psi – EX 3.0 only) analog output to the GEA 24. Make sure the black ground wire is grounded to aircraft ground. The following pinout from the G3x manual shows which pins are available for 5V and analog inputs.

Pin Name	Connector	Pin	I/O
GP1 HI / +5V	J244	18	Out
GP1 / POS 1	J244	19	In
GP1 LO / GND	J244	20	--
GP2 HI / +5V	J244	21	Out
GP2 / POS 2	J244	22	In
GP2 LO / GND	J244	23	--
GP +5V_2	J244	24	Out
GP GND_2	J244	26	--
GP +5V_3	J244	27	Out
GP GND_3	J244	29	--
POS 3 HI / +5V	J244	11	Out
POS 3 / GP 3 / FUEL QTY 3	J244	12	In
POS 4 HI / +5V	J244	14	Out
POS 4 / GP 4 / FUEL QTY 4	J244	15	In
POS 5 HI / +5V	J244	30	Out
POS 5 / GP 5 / MISC PRESS	J244	31	In
POS 5 LO / GP 5 / GND	J244	32	--
GP +12V	J244	50	Out
POS 6 / GP 6 / TIT 1/ MISC TEMP 1 HI	J243	31	In
POS 6 / GP 6 / TIT 1/ MISC TEMP 1 LO	J243	30	In
POS 7 / GP7 / TIT 2/ MISC TEMP 2 HI	J243	29	In
POS 7 / GP 7 / TIT 2/ MISC TEMP 2 LO	J243	28	In
GP +5V	J243	26	Out
GP GND	J243	27	--

One of the simplest ways of finding out which analog input pins are available is to look at the engine/airframe configuration page on your PFD (in config mode). In this example below, inputs 2,4, and 7 are not presently in use.



Below is an example wiring diagram.



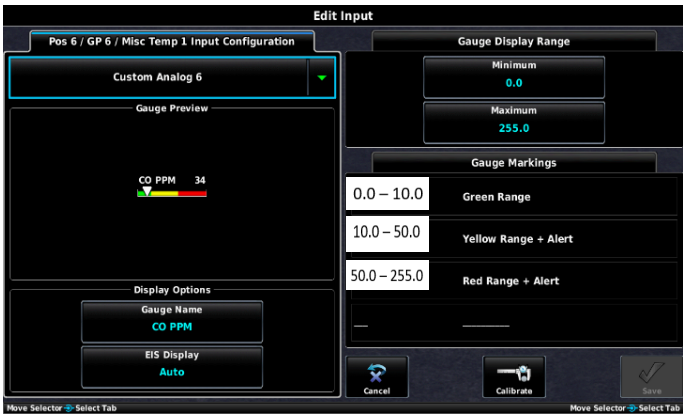
MAKE SURE THE BLACK GROUND WIRE IS GROUNDED TO AIRCRAFT GROUND AS THE PIN GROUNDS (E.G. PIN 30 AND 28) ON THE GEA 24 MAY NOT ALWAYS BE CONNECTED TO AIRCRAFT GROUND.

After wiring, set up the Aithre Shield EX detector as a GP (general purpose) input to the engine monitor and selected Custom Analog as a gauge. Then calibrate the gauge for 0v = 0 PPM and 3.3 v = 225 PPM and then setup the red, yellow and green ranges with the warning levels recommended in the general instructions above.

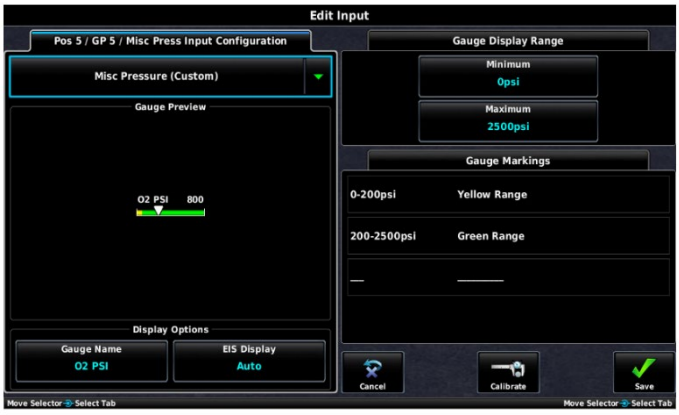
Note that in addition to the graphical CO gauge, you can also put the CO discrete readings as text in the top of the primary page. There are limited “data fields” along the top of the G3X depending on how many remote options are interfaced. For instance, a remote Com takes up space, a transponder also takes up space. Any remaining data fields can be configured. To configure the unit when on the PFD page press:

MENU, MENU, SETUP, DATA BAR, scroll all the way to the bottom and press CHANGE next to DATA FIELDS. It will then prompt you to touch an existing data field to change it to a different one from their drop down list. Select the Aithre Shield EX and you should be good to go.

EXAMPLE G3x SETTINGS FOR CARBON MONOXIDE



EXAMPLE G3x SETTINGS FOR OXYGEN TANK PSI (EX 3.0 only)



ADDITIONAL PRODUCT INFORMATION

USA

Contains Transmitter Module
FCC ID: A8TBM71S2
or
Contains FCC ID: A8TBM71S2

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CANADA

Contains transmitter module
IC: 12246A-BM71S2

ADDITIONAL USER MANUAL INFORMATION

USA

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

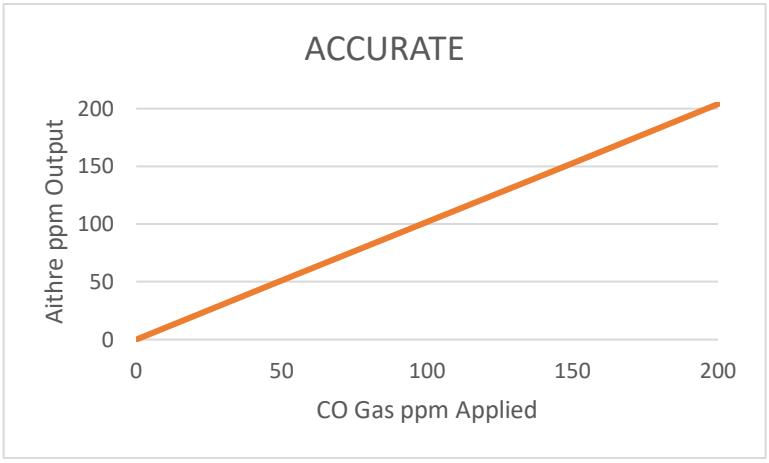
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

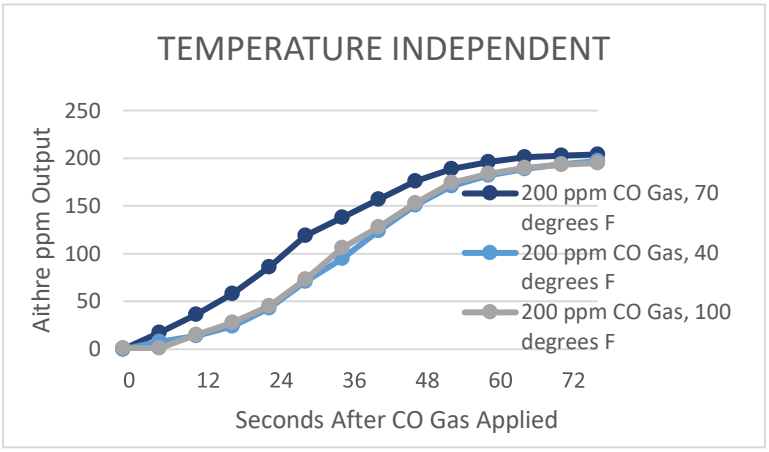
CANADA

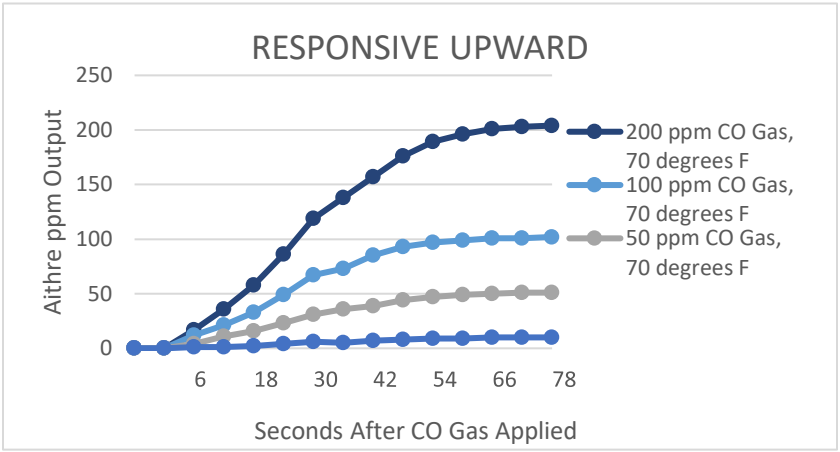
This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

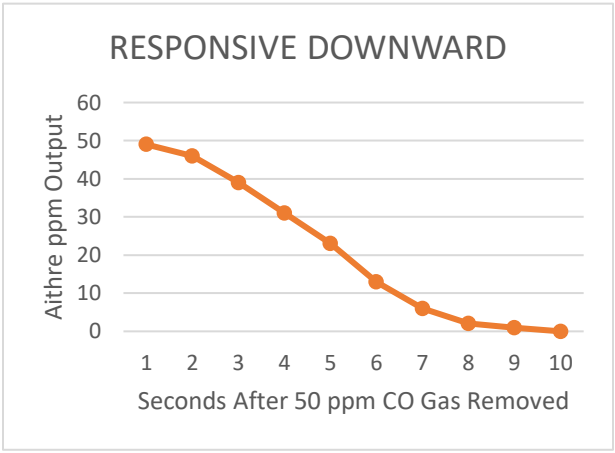
- This device may not cause interference; and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.


ACCURATE
Aithre ppm Output
200
150
100
50
0
0
50
100
150
200
CO Gas ppm Applied


TEMPERATURE INDEPENDENT
Aithre ppm Output
250
200
150
100
50
0
0
12
24
36
48
60
72
Seconds After CO Gas Applied
200 ppm CO Gas, 70 degrees F
200 ppm CO Gas, 40 degrees F
200 ppm CO Gas, 100 degrees F


RESPONSIVE UPWARD
Aithre ppm Output
250
200
150
100
50
0
6
18
30
42
54
66
78
Seconds After CO Gas Applied
200 ppm CO Gas, 70 degrees F
100 ppm CO Gas, 70 degrees F
50 ppm CO Gas, 70 degrees F


RESPONSIVE DOWNWARD
Aithre ppm Output
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
Seconds After 50 ppm CO Gas Removed