AITHRE®

Aithre Altus AVI8 w/ Aithre-Mountain High Regulator

DEVICE OPERATION MANUAL

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INTRODUCTION

The Aithre Altus AVI8 2-Place Smart Valve with Aithre - Mountain High Regulator is a 2-place portable smart oxygen system that can work with any existing bottle and valve. Your valve must have a CGA-540 port. The AVI8 provides high endurance through microburst technology and uses biometric feedback and altitude control when used with the Aithre Connect iOS app. The AVI8 is compatible with and enhanced by the Aithre Shield CO detector (portable or installed) and the Aithre Illyrian oximeter. These devices are sold separately but provide the biometrics to the Aithre Connect App for enhanced safety and efficiency of the O2 delivery.

Multiple AVI8 products can be used simultaneously.

This "Device Operation Manual" supplements the "AVI Series Software Operation Instructions" that cover use of the Aithre Connect iOS app. It can be found at www.aithreaviation.com.

PRODUCT OVERVIEW

PACKAGE CONTENTS: AITHRE AVI8 2-PLACE SMART O2 VALVE

1. AVI8 Control Box
2. O2 Handle Button w/ 3 Foot Cord
3. Connecting tubing from bottle to AVI8, 1ft
4. Power Cable converter 5V-12V, USB
5. Velcro strap for mounting AVI8 control box to bottle
6. Aithre Dual Cannula, male fitting, zip tie
7. Neoprene Cannula Pouch w/carabineer
8. Warranty Card

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![AITHRE logo]

PACKAGE CONTENTS: AITHRE ALTUS MESO

1. USB Battery Bank
2. USB Battery Bank Charger Cord
3. Meso Transducer, Tape
4. Tee Fitting, Tape
5. Meso and Connector
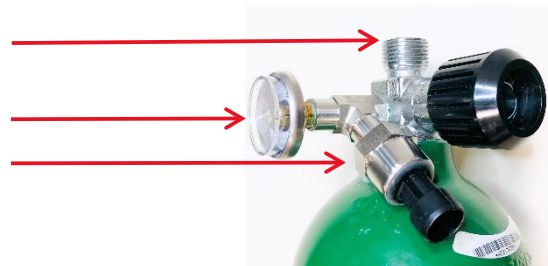
PACKAGE CONTENTS: MOUNTAIN HIGH REGULATOR

1. Mountain High Regulator
2. Push to Connect Port, Straight
3. Push to Connect Port Alternative, 90º

PRODUCT OVERVIEW: AITHRE ALTUS MESO AND YOUR EXISTING BOTTLE AND VALVE

NOTE: See "Aithre Altus Meso Installation Instructions" for detailed installation instructions. The Information below assumes you have read and safely installed the Meso Transducer.

- o Your Existing Bottle and Valve
  - CGA-540 Valve/Fill Port required
  - Manual Pressure Gauge on existing bottle valve
    - o Connected to bottle with tee fitting
  - Meso Transducer
    - o Connected to tee fitting
    - o Extension may be needed for tee fitting
    - o Black end connects to Meso connector

- o Aithre Altus Meso Tank Monitor
  - o Connect the connector end to transducer
  - o Connect USB end to USB battery bank or ship power USB, 5V
  - o Ensure correct connector orientation
  - o Push until you hear a "click"
  - o Draws only 5mA
  - o When USB end connected to power, device is "on"
  - o Auto-pairs to Aithre Connect App to output tank pressure and estimated time remaining

- o Filling
  - o Fill to 2,000 psi using the CGA 540 Fill port

PACKAGE OVERVIEW: MOUNTAIN HIGH REGULATOR

o   Mountain High Regulator Installation
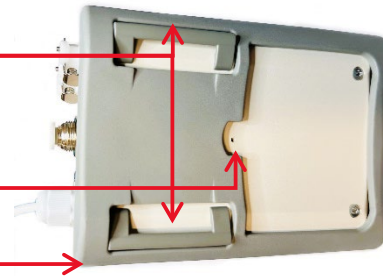- Ensure the valve is off
- Hand Tighten MH Regulator to the valve

PRODUCT OVERVIEW: AITHRE AVI8 1-PLACE SMART O2 VALVE

o   AVI8 Control Box Top
- O2 Handle Button Cord
- Power cord female port
  - o   Receives male port of power cord
- Push to connect port for connecting tubing
  - o   Receives tubing end of connecting tubing
- PILOT Quick connect female cannula port
  - o   Receives male cannula port
  - o   Side release QC button
- PAX Quick connect female cannula port
  - o   Receives male cannula port
  - o   Side release QC button

o   AVI8 Control Box Back
- Strap eyelets
  - o   Receives hook portion of Velcro straps
  - o   Slides into mounting clip (sold separately)
- Case interior air release valves
  - o   Do not plug
- Rubber Case protector

o   Connecting Tubing
- Ensure the valve is "off"
- Tube end connects to AVI
- Other Tube end connects to PTC port on regulator
- Bottle valve can now be turned on for AVI8 for O2 flow

o   Power Cable
- Male plug connects to AVI8 in the female port.
- USB end connects to USB power, we recommend use of aircraft power.
- Do NOT use a battery because if the battery drains, the AVI will stop functioning and no oxygen will be delivered.
- The AVI8 uses approximately 300 mA per user and accepts 12V power.
- The junction box converts 5V USB power from any USB outlet to 12V for use with the AVI8.
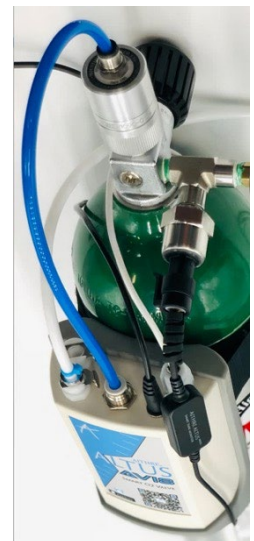
- o O2 Handle On/Off Button and Light Indicator
  - O2 Button turns the AVI8 on and off.
  - Button light turn on when the unit is on and oxygen is being delivered.
  - Button light automatically turns OFF if there is no respiration or power.
  - Button light will automatically come back on if respiration or power is restored.
  - The button light can be dimmed using the Aithre App settings.
  - When the AVI8 is powered "on" it will auto-pair with the Aithre Connect App.
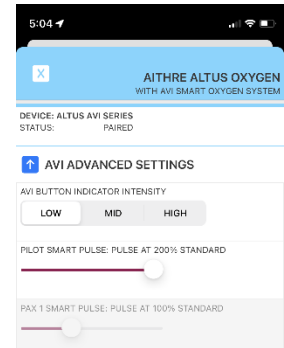
- o Aithre Dual Cannula
  - Silicone dual cannula, 7ft
  - Male fitting
  - Zip ties for securing male fitting to cut cannula
  - Male fitting to plug into quick connect female cannula port on AVI
  - Male fitting can plug into back up port connector on the adjustable flow regulator as back up should AVI lose power.
  - Nostril portion of cannula is inserted with the tab down
  - Left and right tubing is positioned behind the ears
  - Where left and right tubing intersect can be sinched with band to hold cannula in place

- o Aithre Neoprene Storage Pouch with Carabineer
  - Keep cannula and accessories neat and tidy

- o Velcro Strap for Mounting AVI8 Control Box to Bottle
  - "Loop" side has adhesive to attach to bottle
    - o Be sure all the tubing length fits before adhering Velcro
  - "Hook" side has no adhesive and is positioned through strap eyelets of AVI8 control box
  - Cut to desired length or leave long for position variability
  - Remove rubber protector and slide on to AVI mounting kit (sold separately)

PRODUCT OVERVIEW: AITHRE DUAL CANNULA ASSEMBLY

1. Remove cannula from package
2. Determine length needed
3. Cut cannula cord to desired length
4. Insert barb end of male fitting
5. Zip tie over the tubing and barb connection as tight as possible
6. Trim excess zip tie
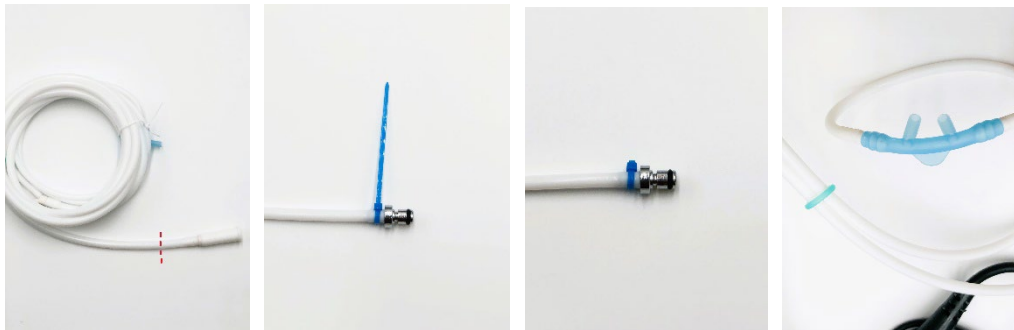
PUTTING IT TOGETHER: BOTTLE

o Bottle
- Fill bottle to 2,000 psi using the CGA 540 Fill port
    o Ensure the valve is in "off" position
    o Ensure all tubing is disconnected from the regulator
    o Unscrew regulator from fill port
    o Fill in 500 PSI stages to overheating bottle
    o Hand tighten regulator back on
- Secure bottle in airplane
- Connect the Aithre Altus Meso to the transducer, connected when you hear "click"
- Plug the Altus Meso to USB power

PUTTING IT TOGETHER: BOTTLE TO THE AVI8

o Aithre AVI8 2-Place Valve
- Secure AVI8 to Velcro strap on bottle or on mounting clip
- Connect the tube end of the connector tubing to the push to connect port on the AVI
    o Ensure it is well seated so as not to leak at this connection
- Connect the other tube end of the connector to the PTC port on the bottle regulator

- o   Ensure it is well seated so as not to leak at this connection
- Connect male end of power cable to AVI8
  - o   Connect USB end of power cable to 5V power
- Cannula(s) can be fitted for the user(s) and plugged in
  - o   Plug in male fitting of cannula(s) to the quick connect female port on the AVI8
  - o   If power is "on" O2 will begin to be delivered
- If power is "on" and the cannula is plugged in O2 will begin to be delivered.
- When AVI8 is powered on It will auto-pair to the Aithre Connect App.

WARNING: PRESSURE COMPATIBILITY

The AVI8 is only compatible with the Aithre bottles having Aithre regulators or Aithre-Mountain High regulators tuned to 50 psi and compatible with Aithre AVI control boxes. Using an unapproved regulator with the AVI controller may damage the AVI and work improperly and will void the warranty. Do not use the Aithre-Mountain High regulator with any Mountain High pulse demand system.

WARNING: NO BACKUP AND MANUAL VALVE MUST BE ACTIVATED

The Aithre-Mountain High regulator does not include the safety features of the standard Aithre regulator that is available with Aithre composite bottles. There is no independent continuous flow backup line on the Aithre-Mountain High regulator, as there is with the Aithre regulator on the composite bottles. You must provide a backup oxygen source when using the Aithre-Mountain High regulator over 12500 feet. Aithre has 47L fixed flow bottles or adjustable flow emergency bottles that are available for this purpose.

The Aithre-Mountain High regulator requires that the valve be turned on. No oxygen will flow if the manual valve on the bottle is in the off position. Preflight check to always verify that your valve is turned on whenever oxygen is expected or possible during flight. Keep your bottle within arm's reach during flight so that the valve can be activated when required.

OPERATION INSTRUCTIONS

ALTITUDE RESTRICTIONS

The AVI8 is a portable system and is not approved for use above 18000 FT. Flight above 8000 FT is dangerous and you should become familiar with the operation of the AVI8 under 8000 FT and fully understand its operation and system limitations before continuing higher. When above 12500 FT, Aithre recommends use of the Illyrian wearable oximeter for continuous SPO2 monitoring and use of a backup emergency oxygen source or bottle.

BEGIN O2 FLOW

After bottle and AVI8 have been properly connected the AVI8 unit is "on" when power is provided. Oxygen will be delivered when a combination of the following are present:

1. AVI8 unit is powered "on"
2. Cannula male fitting is plugged into female quick connect port on the AVI8
3. And breathing is detected
4. If "auto" mode settings are set to trigger at a parameter

BASIC USE

The Aithre AVI8 basic operation involves the following steps:

- Plug USB power cable of the Meso tank monitor to battery bank or USB power
  - Providing power to the unit turns it "on"
  - Ensure that the device auto-pairs to Aithre Connect app and reads tank pressure
- Connect the AVI8 connector tubing to the portable oxygen bottle via the female quick connect port
  - This can be left connected when not used or disconnected
- Plug USB power cable to 5V power
- Activate the AVI8 system by pushing the O2 button "on"
  - The button will turn blue to indicate that the system is activated
  - Test microbursts will occur to demonstrate system operation
  - The speaker will emit a single beep to indicate that the system is activated
- Push the male fitting end of the cannula(s) into the AVI8 female plug until it "clicks"
  - The cannula can be connected before or after the AVI8 is activated

- o Repeat this step for each station where oxygen delivery is desired
- Don the cannula and breathe normally
  - o Oxygen is only delivered when breathing is detected
  - o Each station operates independently
  - o Oxygen will be delivered as a series of microbursts at the beginning of the inhalation
- Deactivate the AVI8 system by pushing the O2 button "off"
- Disconnect the portable oxygen bottle to refill
  - o The portable oxygen bottle can remain connected to the AVI8 without damage or removed for filling or long-term storage
- Without Aithre Connect iOS app connected system delivery defaults to recommended O2 at 18,000 ft at each station
- Optionally, the Aithre Connect iOS app may be used to monitor and/or further control the AVI8 system
  - o Open the Aithre Connect iOS app while the AVI8 is activated
  - o The Aithre Connect iOS app is not required for operation
  - o See section "IOS APP and WatchOS Companion APP" below

SAFETY USER FEEDBACK

The AVI8 provides feedback via an integrated button light and speaker, which may be optionally supplemented with notifications from the Aithre Connect iOS app

- Integrated button light on handle button
  - o Light is blue or <u>on</u> when AVI8 "on" and activated
  - o Light turns <u>off</u> after 60 seconds if no station 1 (pilot) respiration is detected (e.g. cannula is kinked or disconnected)
  - o Light will be blue or <u>on</u> again when respiration detected on station 1 (pilot)
  - o Light is <u>off</u> when AVI8 not activated or "off"
- Speaker, internal to AVI8 control box
  - o Speaker emits one beep when AVI8 is initially activated
  - o Speaker emits two beeps after 60 seconds when respiration is not detected on station 1 (pilot)
  - o Speaker will continue emitting 2 beeps every 60 seconds when respiration is not detected on station 1

IOS APP AND WATCHOS COMPANION APP

While the AVI8 is powered "on" it will auto-pair with the Aithre Connect App. The app can be used to enhance the safety and efficiency of the AVI8. Additionally, the Aithre Illyrian oximeter can be worn and provide SPO2 and heart rate information to the further enhance the AVI8 O2 delivery to the user.

For Aithre Connect iOS app instruction with use of the AVI8 please read and refer to the document: "AVI Series Software Operation Instructions" that covers in detail use of the Aithre Connect iOS app with all AVI devices. It can be found at www.aithreaviation.com.

Download Aithre Connect iOS and companion WatchOS app from the Apple Store.

- The AVI8 will output data to the Aithre Connect App when powered on.
- If pairing issues present, make sure your wireless phone antenna is on, make sure you enabled access to wireless communication by the Aithre app in iOS settings, and cycle the Aithre AVI8 power.
- There is NO manual pairing of the AVI8.

See "AVI Series Software Operation Instructions" for further details.
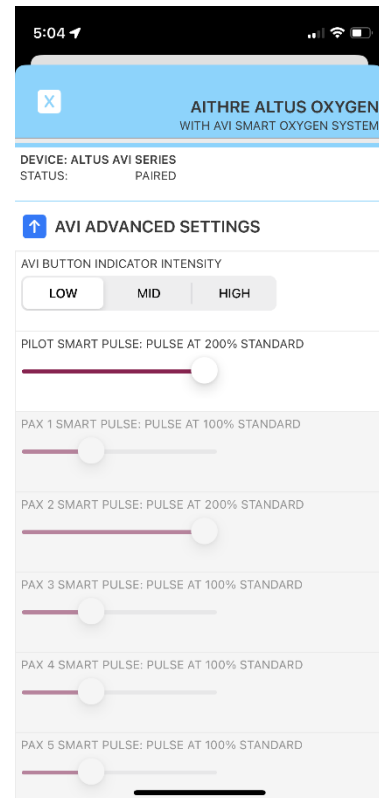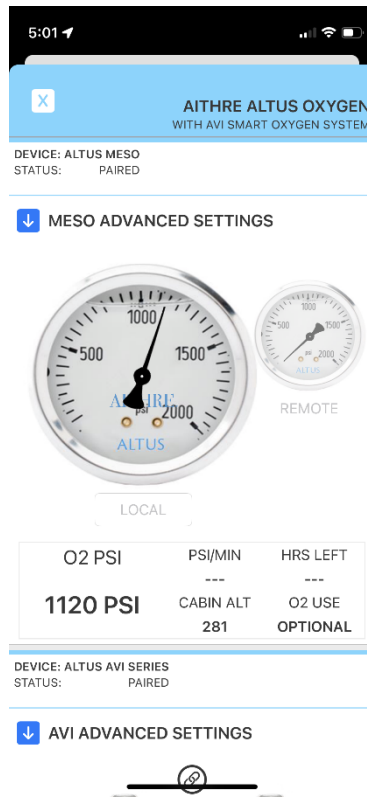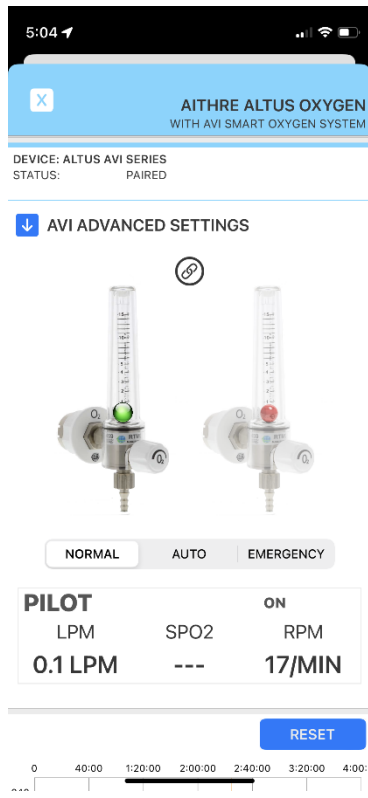
CHECKLISTS

PREFLIGHT

Before every flight where oxygen use is planned or possible, it is important to thoroughly inspect and test your AVI8 oxygen system. During your prefight inspection, the following checks should be performed:
- Ensure bottle is mounted securely in the aircraft and all straps are secured and tight.
- Check all oxygen plumbing for security in their connections, kinks, or cracks in tubing, and for any visible moisture.
- Verify main oxygen line to the AVI8 is pushed all the way into the AVI8 and the male push to connect is fully seated in the always-on full flow port of the regulator on the oxygen bottle.
- Verify pilot and co-pilot cannulas are properly connected and secure.
- Ensure no air leaks can be heard.
- Verify the Altus Meso is securely plugged into the oxygen bottle pressure transducer.
- Verify the AVI8 and Altus Meso are plugged into their respective power sources.
- Turn on power.
- Verify operation:
  - Don and plug in a cannula into the pilot port.
  - Turn on the O2 master button and verify blue light illuminates.
  - Verify test pulses, followed by a beep, are heard.
  - Breathe normally and verify that oxygen pulses are delivered at each inhalation.
  - Move the cannula to the co-pilot port and re-test the above.
- Open the Aithre Connect app and verify automatic pairing and connection to the AVI8 and Altus Meso.
- Check that the pressure on the Altus Meso readout agrees with the bottle pressure gauge.

BEFORE TAKEOFF

Prior to departure, users may wish to don their cannulas to take advantage of the advanced oxygen delivery algorithms implemented into the AVI8 for items such as heart rate, SPO2, pressure altitude, etc. If oxygen is not required prior to departure, it is still important to set up the parameters on the Aithre app to prevent in-flight distraction.
- Don the cannula(s) prior to takeoff.
- Turn on the O2 master button.
- Confirm the bottle valve is on.
- If not using app, default delivery will be at 18,000.
- Configure the Aithre app to "normal" mode (default), adjust available parameters.
- Configure the Aithre app based on your required parameters and turn AUTO mode on
  - Once AUTO configuration is complete, the O2 system will stop delivering oxygen unless one of the user-defined thresholds are met.

IN-FLIGHT OPERATION

Once oxygen use is required or desired, users should take the following steps to ensure that the oxygen system is working as designed:

- Ensure the blue light is illuminated on the O2 master button.
- Open the Aithre Connect app and open the OXYGEN tab.
- Ensure respiration rate is displaying and showing the correct respiration rate. The average human respiration rate is defined as 12-16 breaths per minute.
- Use the Aithre Illyrian to verify blood-oxygen (SPO2) levels of all passengers is at least 92%.
- Periodically check oxygen bottle pressure in the Aithre Connect app and confirm that system endurance will be sufficient for the flight.
- If oxygen will not be required for the remainder of the flight and once it is safe to do so, the O2 master button can be turned off and cannulas removed.
- It is acceptable to continue wearing the cannula until the conclusion of the flight and leave the AVI8 system armed and/or in AUTO mode.

POST FLIGHT

- After landing, ensure the O2 master button is turned off (the face of the button will be flush with the bezel and the light will be extinguished) and cannulas are unplugged.
- The cannulas should be stored in the provided Aithre neoprene pouch or other protective bag that will prevent undue stress on the cannula or feed line. The cannulas should be replaced periodically to prevent infection.
- It is not required to disconnect the feed line from the Aithre oxygen bottle and the AVI8.

EMERGENCY PROCEDURES

NO OXYGEN FLOW OR NO RESPIRATION

- Don backup oxygen supply IMMEDIATELY using separate bottle.
- Descend to the lowest safe altitude possible.
- Verify power to AVI8.
- Ensure O2 master button is on.
- Verify oxygen bottle pressure.
- Verify Altus Meso is powered and connected to transducer.
- Ensure cannula connection is secure and not loose.
- Ensure AVI8 connection to port of the regulator is secure.
- Verify valve on bottle is on.
- If issue cannot be satisfactorily rectified, remain at the lowest safe altitude, or below 12,500ft whichever is higher.

SPO2 BELOW X% (92, 85 - iOS)

- Below 85%, the AVI will default to maximum effective flow (approximately 12.5LPM) only when the Aithre Connect iOS app is connected
- Ensure sampling quality is full scale and reposition Illyrian centrally low on forehead.
- If SPO2 does not increase, don backup oxygen supply IMMEDIATELY using separate bottle.
- DESCEND to the lowest safe altitude possible.

WARNING: When in doubt, ALWAYS don backup oxygen and DESCEND if possible. Hypoxia is known as a "silent killer" and often sets in with the victim completely oblivious to it.

REFILLING

The bottle is equipped with a CGA-540 fill port.

To remove the bottle from the aircraft and prepare for servicing:
- Disconnect the oxygen lines from the bottle regulator.
- Disconnect the Altus Meso from the pressure transducer.
- Remove AVI controller box from the bottle Velcro.
- Undo the rubber bottle clamps or other securing items.
- Carefully remove the bottle from the aircraft.

NOTE: Filling oxygen bottles can be dangerous and should only be done so by trained personnel. Improper filling can lead to explosion or fire, which can cause great bodily harm and even fatality.

WARNING: Exercise great care in not dropping the oxygen bottle. Bottle impacts can compromise the bottle's structural integrity, which will render the bottle unsafe to fill. In extreme cases, the bottle can even explode which can lead to bodily harm and/or fatal injury.

AITHRE

FCC 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

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.

WARRANTY NOTICE

LIMITED ONE YEAR WARRANTY FROM DATE OF PURCHASE WITH PROOF OR PURCHASE WITH SOLE REMEDY BEING REPLACEMENT OR REPAIR OF PRODUCT AT SELLER'S OPTION. NO SPECIAL OR CONSEQUENTIAL DAMAGES. WARRANTY LIMITED TO DEFECTS IN MATERIAL AND WORKMANSHIP. WARRANTY LIMITED TO THE ORIGINAL PURCHASER AND THE ORIGI NAL CUSTOMER OF THE PURCHASER AND CANNOT BE ASSIGNED OR TRANSFERRED. NO PERSON IS AUTHORIZED TO EXPAND THIS WARRANTY. THIS WARRANTY DOES NOT APPLY TO ANY PRODUCTS THAT HAVE BEEN SUBJECT TO ABUSE, MISUSE, OR IMPROPER INSTALLATION, STORAGE, MAINTENANCE, OPERATION OR WHICH HAS BEEN ALTERED, MODIFIED, OR INCORRECTLY REPAIRED. WARRANTY VOID IF HOUSING OPENED, OBJECT INSERTED, DEVICE INCORRECTLY POWERED, OR DEVICE EXPOSED TO LIQUID OR DUST. WARRANTY LIMITED TO THE FOREGOING AND OTHERWISE, AS IS WITH NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE EXPRESS OR IMPLIED.

AITHRE SUPPORT

Support for Aithre products is available on our website www.aithreaviation.com, phone 208-481-8310, and email support@aithreaviation.com

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