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Instructions for Continued Airworthiness
Cirrus SR22/SR22T Built-In Oxygen System

STC Number SA01708SE

NOTICE

The Airworthiness Limitations Section (Section 2.6) is FAA Approved and specifies maintenance required under Sections 43.16 and 91.403 of the Federal Aviation Regulations, unless an alternative program has been FAA Approved.

These documents must be kept with the aircraft records.

REVISION HISTORY

Rev.	DESCRIPTION OF CHANGES	Author	Date	Approved By	Approved Date
-	Original Release	STP	9/7/2006	JNS	9/7/2006
A	Revised document to include remote filler, and final oxygen system wire routing.	JNS	9/27/2006	JNS FAA	9/27/2006 10/3/2006
B	Revised document to include the A5 constant flowmeter, the PreciseFlow® Oxygen Conserver, added Section 2.7.1 inspection checklist for ease of maintenance, updated wire schematics adding the remote Annunciator option, added Section 3.0 IPC to this document for ease of maintenance for Cirrus Customers and Service Centers.	JNS	4/27/2007	JNS/FAA	7/23/2007
C	Added section 2.4.7 for either ground or flight testing of the O2 Required Pressure Sensor, added a ground test procedure for sensor test, allowed the owner/pilot to perform the 50, 200, and 500hr inspections on the breathing equipment. Corrected typo on item 1, Figure 19 for the Bottle Assembly. Added Trouble Shooting Flow Charts figures 5-11.	JNS	2/8/2008	JNS	2/8/2008
D	Removed owner/pilot notes for 50, 200, and 500hr inspections on the breathing equipment as required per the FAA. Corrected page numbering error do to formatting.	JNS	3/21/2008	JNS	3/21/2008
E	Updated ICA for Cirrus Perspective Installations; Added new SR22T model throughout document; changed Hydrostatic pressure test to every 5 yrs. (was: 3 yrs.);	W. Ashforth	2/22/10	CRB	2/23/10
F	Added 5 port manifold data, changed CPC O-ring service interval to 5 years, removed A4 from IPC, corrected typos.	R. Norris	5/27/2011	CRB	6/22/11
G	Corrected typo in table 1 of section 2.7. Updated system wire diagram section 2.8. Added 051A0330-2 to BOM section 3.7.3. Added 102N0420-2 to BOM section 3.8 fig 25. Added 102N0401 (3.8.1) to section 3.8. Added renamed conserver X3 to all sections.	J. Noland R. Norris	02/04/2016	CRB	02/15/2016
H	Added information regarding the optional Cirrus Perspective install without PFI Display Panel.	C. Kent	02/10/2023	CRB	02/10/2023

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1.0 OVERVIEW

1.1 PURPOSE

The Built-In Oxygen System ("Oxygen System" or "System"), is installed to provide supplemental oxygen for the pilot and passengers. The System consists of the following:

1. A 77 cu Ft. composite wrapped cylinder mounted in the aft fuselage of the aircraft
2. An oxygen regulator which is connected to the bottle and contains:
   a. An overpressure discharge
   b. A high pressure transducer
3. A Remote Filler Assembly located in the aft center of the baggage compartment and contains:
   a. A service port for filling the Oxygen System
   b. A manual pressure gauge
4. Associated plumbing and fittings
5. A System actuation switch and an optional center console panel display.
6. An overhead distribution manifold with low pressure transducer and integrated interior LED dome light.
7. Breathing devices and flowmeters with cannulas, or masks

Setting the oxygen switch to ON initiates the display to show oxygen quantity and energizes the System to allow oxygen to reach the overhead distribution manifold. Additionally, the System annunciates if oxygen should be used in the aircraft as well as oxygen pressure or electrical faults. Four (4) or five (5) manually operated oxygen flowmeters or PreciseFlow or X3 Oxygen Conservers can be connected to the oxygen distribution manifold. The flow controls are calibrated and adjustable for altitude by the user. The following flow controls can be one of the following:

- A4 Flowmeters and Standard or Oxygen Conserving Cannulas -- Up to 18,000 Ft.
- A4 Flowmeters and Masks (Standard and Microphone) -- Up to 25,000 Ft.
- A5 Flowmeters and Standard or Oxygen Conserving Cannulas – Up to 18,000 Ft.
- A5 Flowmeters and Masks (Standard and Microphone) – Up to 25,000 Ft.
- PreciseFlow or X3 Oxygen Conserver with Dual Lumen Cannula – Up to 18,000 Ft.
- PreciseFlow or X3 Oxygen Conserver with Masks (Standard and Microphone) – Up to 25,000 Ft.

1.2 ICA REVISIONS

To ensure the maintenance of your existing aircraft, possible revisions to Section 2.0 Instructions for Continued Airworthiness may require updating over the life of the aircraft. Per the applicable Federal Aviation Regulations, an update process is required to properly maintain these instructions in addition to the aircraft itself. Because of this, it is imperative to complete the registration card for the aircraft once the System has been installed.

Revisions can be made by a service letter from Precise Flight Inc., an Airworthiness Directive as issued by the Administrator, by single page updates, or by a complete replacement of all pages of the manual. It must be clearly noted as to the revision level of the pages listed in the List of Active Pages. If a single sheet(s) is replaced, replace the List of Active Pages with the new one provided, or update the list manually and initial and date the list.

2.0 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

2.1 INTRODUCTION

The contents of this section provide the instructions for continued airworthiness for the Cirrus SR22/SR22T Built-In Oxygen System. The majority of the installation does not affect the standard airworthiness of the aircraft; only the key Oxygen System items that are noted in this section. All structure and general maintenance must be performed in accordance with existing approved maintenance practices, the aircraft maintenance manual or other FAA Approved document(s).

2.2 SYSTEM DESCRIPTION

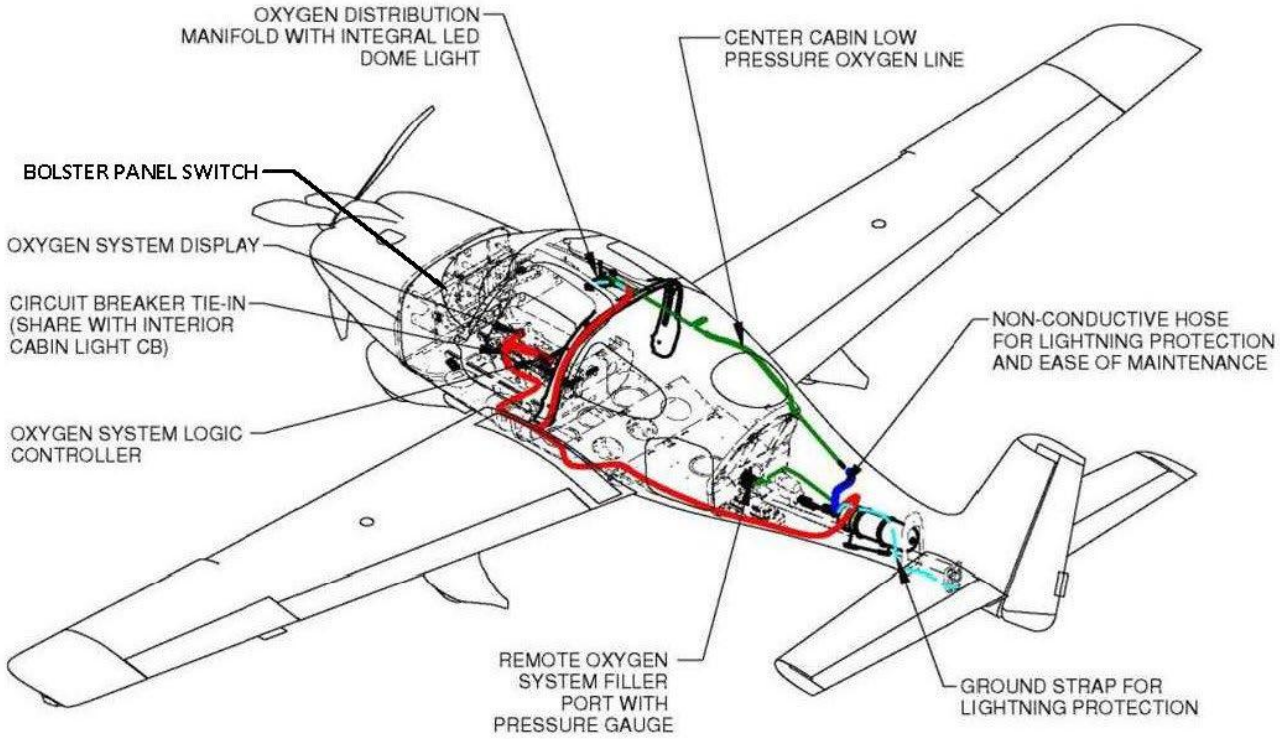

Figure 1 - SR22/SR22T Built-In Oxygen System Overivew

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS – STC SA01708SE
Cirrus Design SR22/SR22T Built-In Oxygen System

The Built-In Oxygen System consists of a few simple components for supplying sufficient oxygen to the crew and passengers of the Cirrus SR22/SR22T aircraft. These components follow:

Oxygen Bottle
- Stores 77 cu Ft. of Oxygen at 1800 psig

Regulator Assembly
- Converts the high bottle pressure to a usable 70 psig for cabin distribution. This is actuated through a latching solenoid assembly with an electrical connection to the aircraft cockpit. The regulator assembly allows the bottle to be filled through a separate fill port and a fill gage. The fill gage allows the maintenance personnel to monitor the fill operation. An overpressure burst disc is incorporated to dissipate excess pressure and protect the bottle. A high pressure transducer electrically transmits bottle pressure to the cockpit display.

Oxygen Remote Filler Station
- Allows for easy filling of the oxygen system and incorporates a manual pressure gage for filling, and preflight. Located for convenient access through the baggage door on the left hand side of the aircraft, just above the floor on the center of the baggage compartment aft wall. An easy access door covers the filler port to prevent damage to the filler from shifting baggage.

Oxygen Distribution Lines and Electrical Wiring Connections
- The oxygen distribution lines allow oxygen to safely enter the aircraft cabin. The electrical connections allow the bottle and oxygen cabin pressure to be transmitted to the cockpit and for cockpit selection of oxygen in the aircraft cabin.

Oxygen Distribution Manifold
- Allows the crew and passengers to connect to the Oxygen System with four (4) or five (5) quick disconnect fittings with the capability of sealing oxygen flow to the cabin when disconnected.

Oxygen System Display and Display-Logic Controller (DLA)
- The Oxygen System display or Cirrus Perspective Display provides control over the oxygen delivery to the aircraft cabin. Both displays systems indicate when oxygen is to be used (above 12,000 Ft. PA) and provide an indication of cabin oxygen or electrical actuation fault. When equipped with the optional System Display, the cabin oxygen flashing fault illuminates if cabin oxygen is not between 60 psig and 85 psig, The electrical actuation fault illuminates if there is an electrical short or open circuit to the latching solenoid at the regulator. When not equipped with the optional System Display, the oxygen faults are delivered through a warning message displayed on the Cirrus Perspective Display, accompanied by an audible warning chime. The oxygen controller supports these functions and ensures a short duration signal to drive the latching solenoid.

Breathing Equipment
- The breathing equipment can consist of either constant flow and/or demand flow regulator breathing stations. Both use a connection to the distribution manifold. Precise Flight A4 or A5 constant flow devices or “Flowmeters” indicate the flow of oxygen with an integral valve to control the quantity of oxygen reaching the crew or passenger. The PreciseFlow or X3 demand flow conservers are calibrated and adjusted by the user for altitude to supply oxygen to either dual lumen cannulas up to 18,000ft, or dual sensing masks. The flow indicator on this flow device is labeled with appropriate oxygen flow for increasing aircraft altitude. The constant

flowmeter or demand regulator is attached to the appropriate approved mask or cannula to deliver oxygen to the crew or passengers.

2.3 Special Tools Required

-Plastic reservoir hand pump
-Chemical-resistant gloves
-Protective eyewear with side shields

Refer to the installation instructions, or drawings for the Precise Flight Built-In Oxygen System.

2.4 Maintenance Instructions

CAUTION: INSTALL PROTECTIVE COVERS ON ALL OPEN LINES AND COMPONENT FITTINGS IMMEDIATELY AFTER THEY ARE DISCONNECTED.

Maintain aircraft structure and wiring in accordance with aircraft maintenance manual and FAA AC43.13.

Precise Flight Inc., www.preciseflight.com, is the approved Overhaul Facility

2.4.1 Bottle Removal and Replacement

The Built-In Oxygen System bottle removal and replacement procedure follows:

WARNING: OXYGEN SYSTEM MUST BE BLED TO ZERO PSI BEFORE ANY MAINTENANCE.

Bleeding Procedure:

1. Aircraft battery power ON, oxygen display panel or Bolster Panel Oxygen System SwitchON.
2. Connect Flowmeter breathing device to overhead distribution panel and turn Flowmeter to full flow until oxygen is purged from the System. When equipped with the optional Display Panel ensure the flashing red 200 PSI quantity LED has been illuminated for 10 minutes and no more oxygen is flowing through the breathing device. In Systems without the optional Display Panel ensure that the red “Oxygen QTY” warning shows on the Garmin Avionics display, accompanied by a repeating double chime for 10 minutes and no more oxygen is flowing throught the breathing device.
3. Oxygen panel display or Bolster Panel Oxygen System Switch OFF, aircraft power OFF.

Bottle Removal Procedure:

1. Remove aft fuselage access panel fasteners.
2. Remove and store access panel in a safe location.
3. Detach flexible oxygen line and cap both lines.
4. Disconnect electrical harness.
5. Release the two band clamp restraints.
6. Remove bottle and regulator assembly by first moving the assembly forward and to the left. Remove bottle and regulator assembly aft end of the bottle first.
7. Installation is opposite of removal – Tighten wing nuts until snug and then two more turns to ensure proper tension on clamp bolt.
8. Perform a functional system check following installation (purging per next step can be accomplished during the functional test).

9. Purge the oxygen system by filling the main tank to a minimum of 500psig and bleeding the system down between 50-100psig by following the bleeding procedure prior to filling the system for use.

2.4.2 Filler Station Cleaning

The filler port requires cleaning periodically, and prior to filling, to keep clean of dirt, dust, and oils to prevent fire.

2.4.3 Line Cleaning

Line Cleaning Procedure:

1. Preparation
    a. Obtain a suitable container for collecting fluid waste.
    b. Wear protective gloves and eyewear.
    c. Assemble a reservoir pump and drain line, see Fig 1.
2. Flushing
    a. Fill 2 qt reservoir with 1% Alconox or Liquinox detergent solution. www.alconox.com
    b. Attach reservoir pump to cabin oxygen line.
    c. Pump 2 qt Alconox or Liquinox through oxygen line.
    d. Undo pump connection and rinse pump with clear water.
    e. Fill 2 qt reservoir with clear tap water.
    f. Attach reservoir pump to cabin oxygen line.
    g. Pump 2 qt water through oxygen line.
    h. Repeat steps A through D, rinsing the pump with the next cleaning material.
    i. Pump 1 qt Methyl Alcohol through oxygen line.
    j. Pump 1 qt 3M Novec 7100 Engineered Fluid through oxygen line.
    k. Purge the line of Novec 7100 by passing clean dry air through the line.
    l. With the air still flowing, sniff the air exiting the drain line. The absence of odors will verify the line is free of 3M Novec 7100 Engineered Fluid.
    m. Reconnect lines and restore System to service.

2.4.4 Functional Test

The following test procedure will evaluate the Built-In Oxygen System installation in the aircraft:

1. Check wiring and connections before applying aircraft battery power.
2. Fill Oxygen System with aviators oxygen (see Maintenance Manual or Flight Manual Supplement), leave access panel open.
3. Switch the Oxygen System ON at the oxygen control panel or Bolster Panel Oxygen System Switch and verify that the Oxygen System quantity display or Cirrus Perspective Display indicates the same oxygen pressure shown at the aft fill port gauge.
4. Connect Flowmeter breathing device to overhead distribution panel.
5. Ensure oxygen flow through a breathing device.
6. Switch the Oxygen System OFF at the oxygen control panel or Bolster Panel Oxygen System switch.
7. Turn aircraft battery power off.

2.4.5 Oxygen System Installation

Refer to Precise Flight Inc. drawing list 102N0000 Cirrus Design Built-In Oxygen System for installation and removal of the oxygen system components.

2.4.6 Oxygen System Bleed-Down (Purging)

Use the following procedure to bleed-down the oxygen system should any of the hard lines, non-conductive line be opened, or bottle removed and re-installed/replaced. This procedure is required to prevent contamination, or moisture inside the system.

1. Attach the filler line to the filler port, making sure to purge the line prior to attaching to the aircraft.
2. With the System ON, and flowmeters (or open Connectors) installed in the distribution ports, initiate flow for 1-2min.
3. Remove the flowmeters from the distribution port, and turn the oxygen System OFF, and fill to 650psig.
4. Perform leak checks as required.
5. Turn the System ON and using flowmeters (or open connectors) installed in the distribution ports; bleed the system down to below 50psig (but above 0psig).
6. Repeat steps 3-5 once. (Leak check not required on second purge)
7. Remove the flowmeters from the distribution port, and turn the oxygen System OFF, and fill to 1500psig.
8. Perform Final leak check.
9. Fill System to 1800-2000psig as required.

2.4.7 Oxygen Required Pressure Calibration Check

The Precise Flight, Inc. Fixed Oxygen System is designed with an additional safety feature to indicate O2 is required if the system is off, or there is no pressure at the outlet, when the cabin pressure is at 12,000ft Pressure Altitude (PA). On systems with the optional Display Panel this pressure sensor is internal to the Display Logic Controller (DLA). On systems without the optional Display Panel the pressure sensor is internal to the Garmin Avionics system. To ensure this safety feature is functioning properly a check of its function is required during the annual inspection. This may be done by a flight test to altitude, or by a ground test.

Note:	**The Altitude Sensor in the Oxygen System Display Logic Assembly is NOT connected to the aircraft static system.**

Note:	**Not All aircraft are equipped with a Display Logic Assembly where a test port is available. In these cases the flight test is the only approved method for testing the calibration.**

2.4.7.1 Flight Test (Method A)

Method A of checking the calibration is by flight test. This flight is intended to be done during the maintenance release flight following the annual inspection. The procedure is to fly to 11,000ft PA (alt setting of 29.92inHg) and during the climb to 12,500ft PA with the oxygen system OFF. For Systems with the optional Display Panel, note the altitude which the O2 Required Amber light begins to flash. For Systems without the optional Display Panel, note the altitude at which the yellow "Oxygen RQD" advisory appears on the Garmin Avionics display. The indication should occur between 11,500ft PA and 12,500ft PA on either system if the system is operating normally.

2.4.7.2 Ground Test (Method B – Systems with Optional Display Panel only)

Method B for checking the calibration is by ground test. The ground test requires the removal of pilots side Aft Trim Panel to gain access to the Display Logic it Controller (DLA), and is recommended that this be performed with the seats removed, and the LH (Pilots) side Aft Trim Panel must be removed.

Note:	**This should be performed during the Cabin Group Inspection as part of the Annual inspections. In the case of a progressive Maintenance Program, this test should be accomplished as close to once every year, not to exceed 18months.**

Note:	**For Systems without the Optional Display Panel, follow the Altitude Calibration testing criteria for the Garmin Avionics System as altitude detection for the oxygen system is performed by the Garmin Avionics System.**

Use the following procedure for the ground test method for the DLA pressure calibration check:

1. Remove the Pilot Seat if not already removed as part of the annual maintenance check, cabin group.
2. Remove the LH Aft Trim Panel if not already removed as part of the annual maintenance check, cabin group to gain access to the DLA. (See Figure 2)

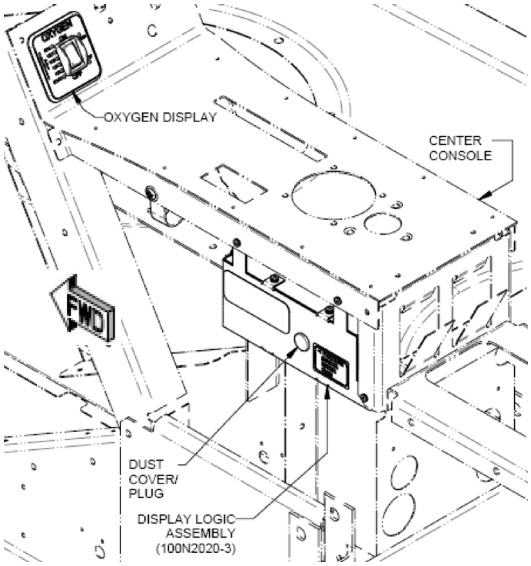

Figure 2 - Location of Oxygen System Display Logic Controler

3. Check general condition of the wiring, and DLA.
4. Remove the Dust Cover/Plug. (See Figure 3)

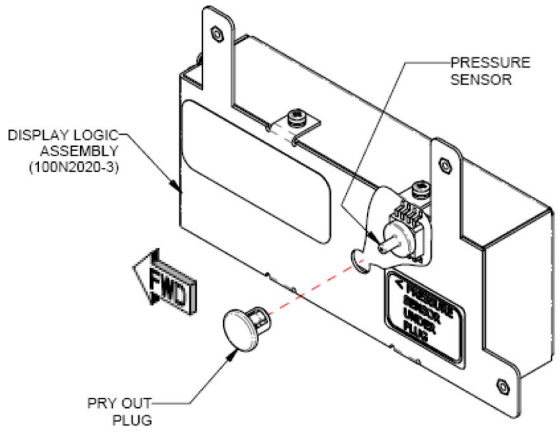

Figure 3 - Removal of the Dust Cover Plug

5. Using a soft rubber or similar tube with an inside diameter (ID) of 7/64in, connect one end to the pressure sensor nipple, and the other to the static line on a Pitot-Static Test system with pump.

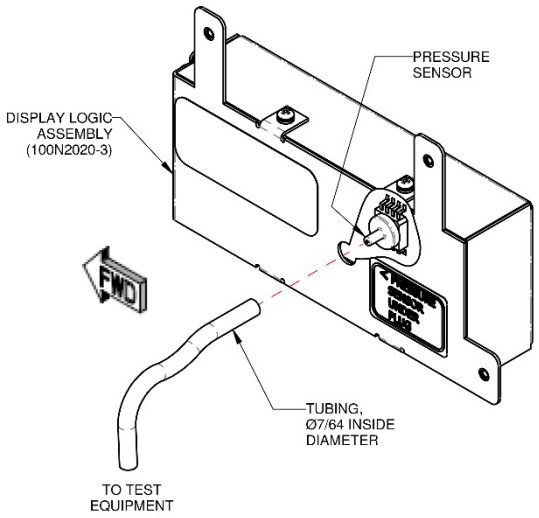

Figure 4 - Attachment of the Static Test Hose

CAUTION: CARE MUST BE TAKEN DURING THE INSTALLATION AND REMOVAL OF THE 7/64" INSIDE DIAMETER TUBING TO PREVENT DAMAGE TO THE SENSOR AND/OR THE CONTROLLER CIRCUIT. DO NOT YANK, OR PULL EXCESSIVELY DURING THE REMOVAL OR DAMAGE WILL OCCUR AND THE UNIT MUST BE REPLACED.

6. With the aircraft in a safe condition to power up the Main Bus 2, turn ON the main bus 2 with the oxygen system off.
7. Cycle the system ON and OFF to ensure the system is functioning, use a breathing device to ensure flow is present. With the system OFF, let the oxygen 'bleed down' prior to removing the breathing device.

8. Using the static portion of the Pitot-Static tester, increase the static altitude slowly to 11,000ft PA. Continue increasing the altitude and note when the display indicates “O2 required” as signified on the display by the flashing amber LED. Note the altitude which this occurred.
9. Verify the altitude where the indication first occurred:
    a. If indication is between 11,500ft PA and 12,500ft PA, then proceed to the next step.
    b. If the indication is outside of this range, re-verify the indication. If the DLA fails a second time, remove the DLA and replace, or contact PFI for re-adjustment.
10. Turn Aircraft power off.
11. Remove the pressure tubing taking extra care not to damage the DLA pressure transducer.
12. Re-install the dust cover/plug.
13. Note passing test as required.

Use the following procedure for the ground test method for pressure calibration check on Systems without the optional PFI Control Display:

1. Follow instructions for Pressure Altitude testing the Garmin Avionics System
2. Simulate a static altitude of 11,000 ft PA. Slowly increase the static altitude and note when the Garmin Avionics display indicates “OXYGEN RQD” in amber and sounds a double chime. Record the altitude when this occurred.
    a. If the indication is between 11,500ft PA and 12,500ft PA, then proceed to the next step.
    b. If the indication is outside of this range, re-verify the indication. If the Garmin Fails a second time, contact Cirrus for further instructions.
3. Turn Aircraft power off.
4. Note Passing test as required.

2.5 TROUBLE SHOOTING GUIDE

2.5.1 Oxygen System Fails to Operate

a. Check circuit breaker.
b. Check connector plugs for security and contact insertion.
c. Check wiring diagram against aircraft installation. See Section 2.8.
d. Check the system function per section 2.5.2.

2.5.2 Oxygen System Trouble Shooting Flow Chart For Systems Equipped with the Oxygen System Display

This section is for reference when troubleshooting the PFI Fixed Oxygen System, if used, and parts returned, please copy steps taken for reference.

CAUTION: Pressures above 105psig on the low-pressure side will damage the low-pressure transducer and will require the transducer to be replaced.

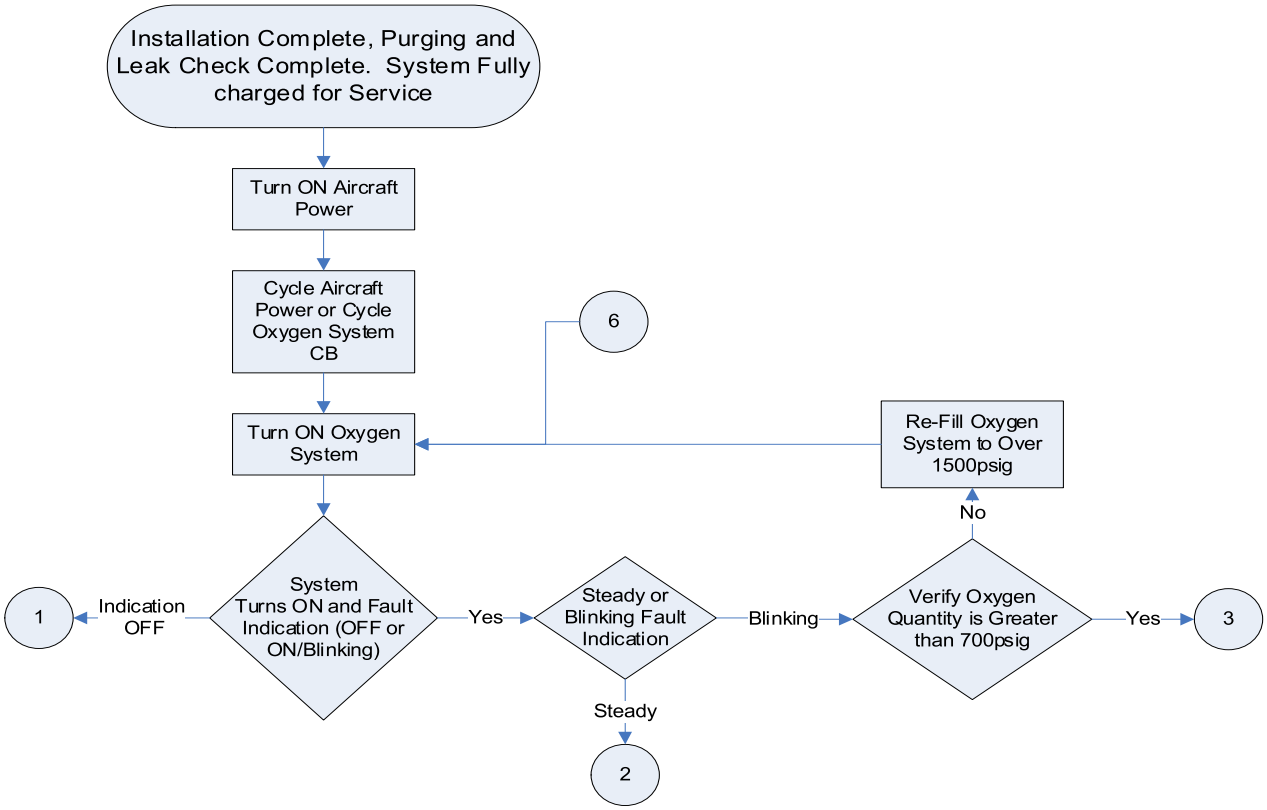

Figure 5 –Trouble Shooting FlowChart (6)

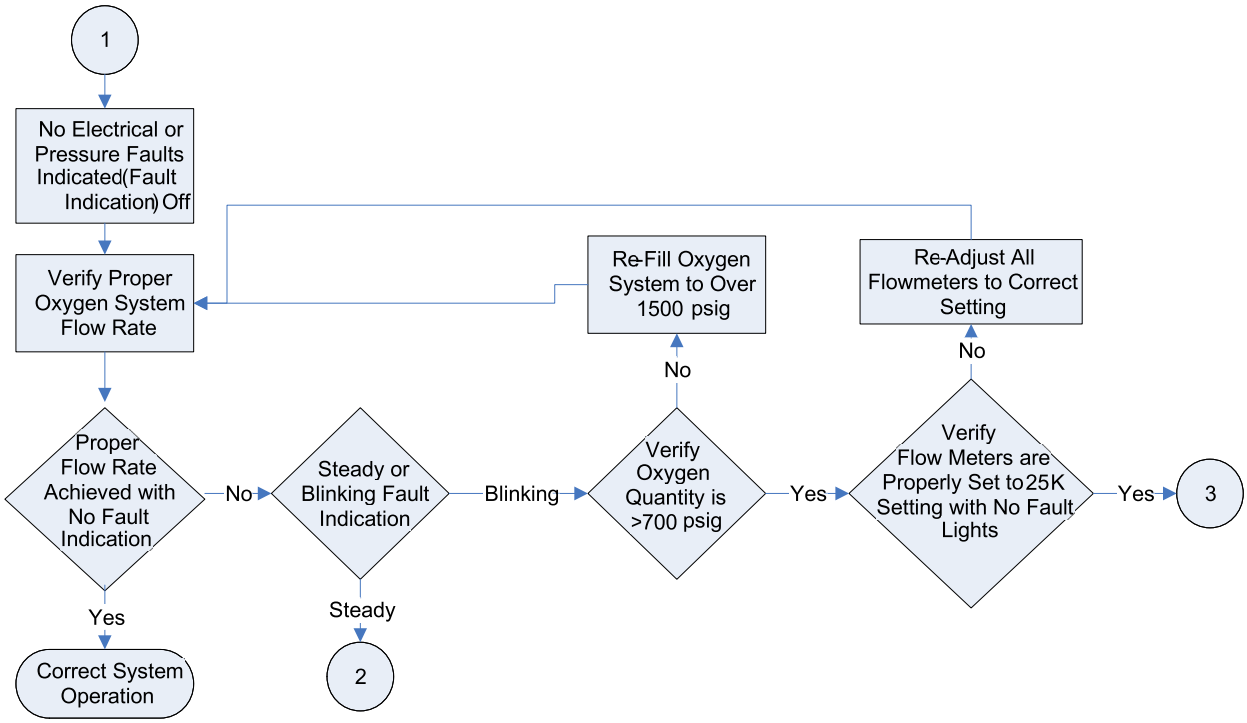

Figure 6 - Trouble Shooting Flow Chart (1)

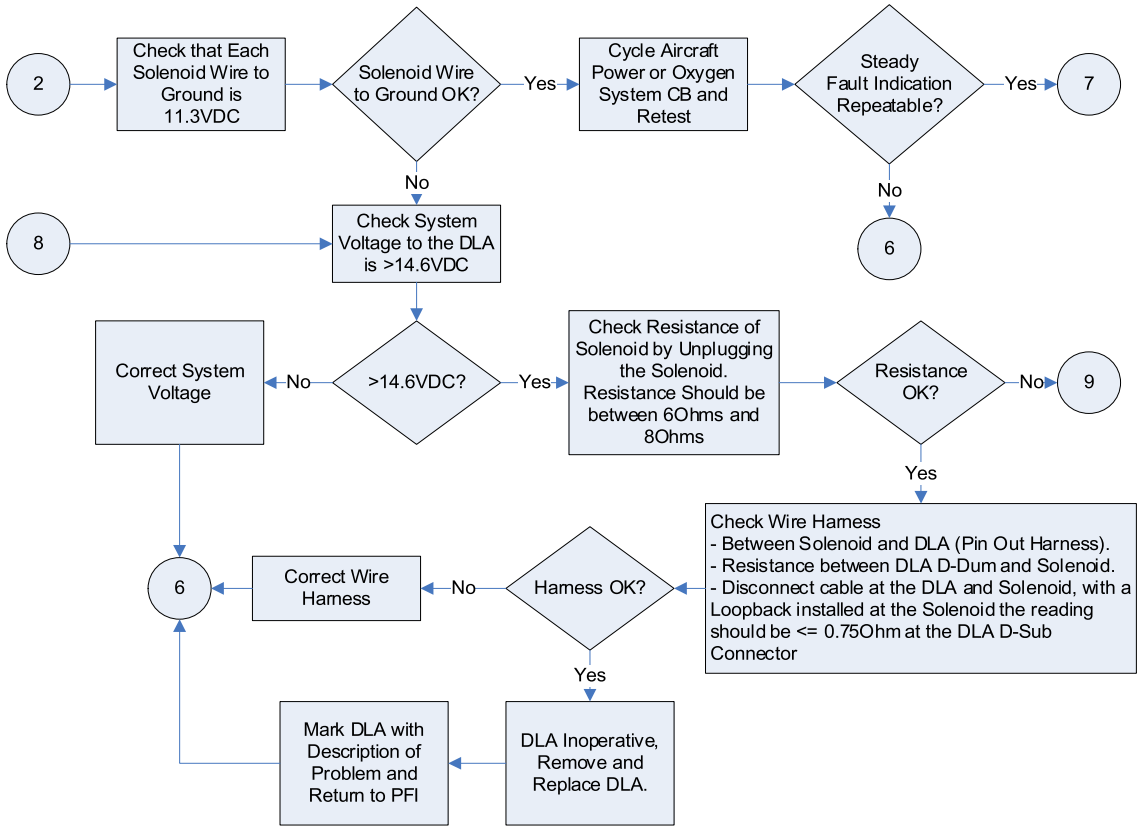

Figure 7 - Trouble Shooting Flow Chart (2 & 8)

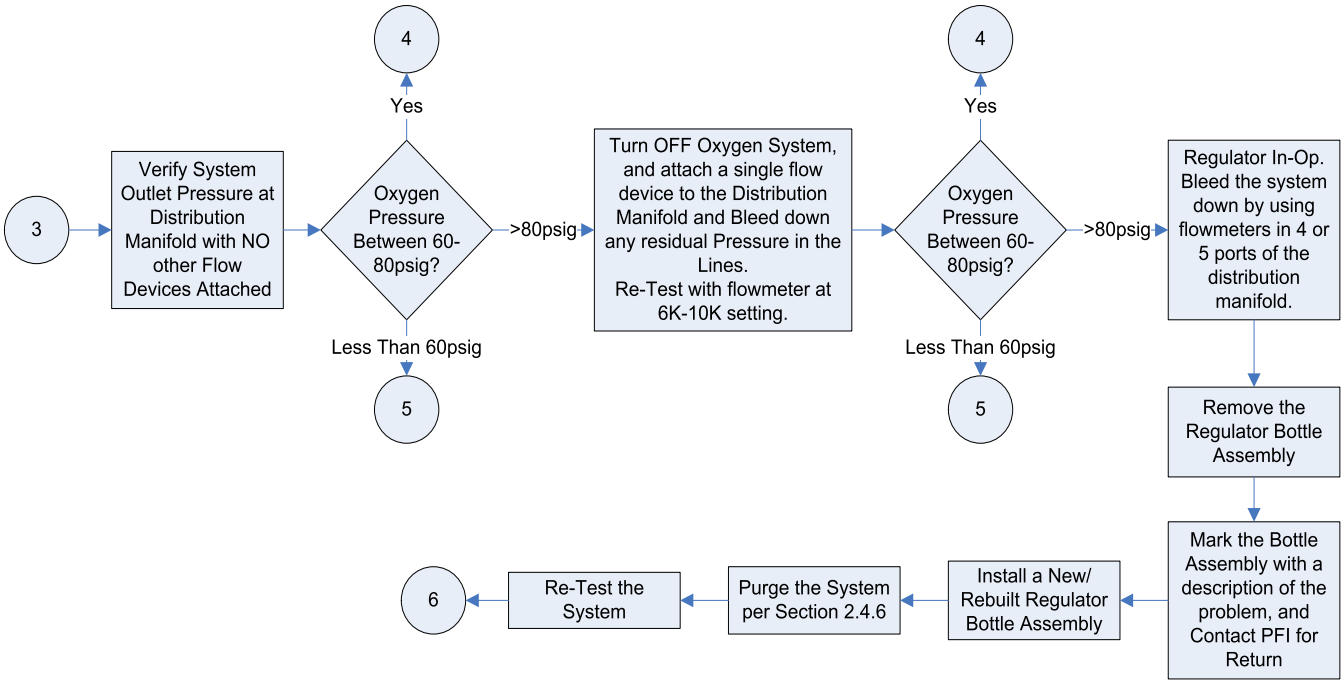

Figure 8 - Trouble Shooting Flow Chart (3)

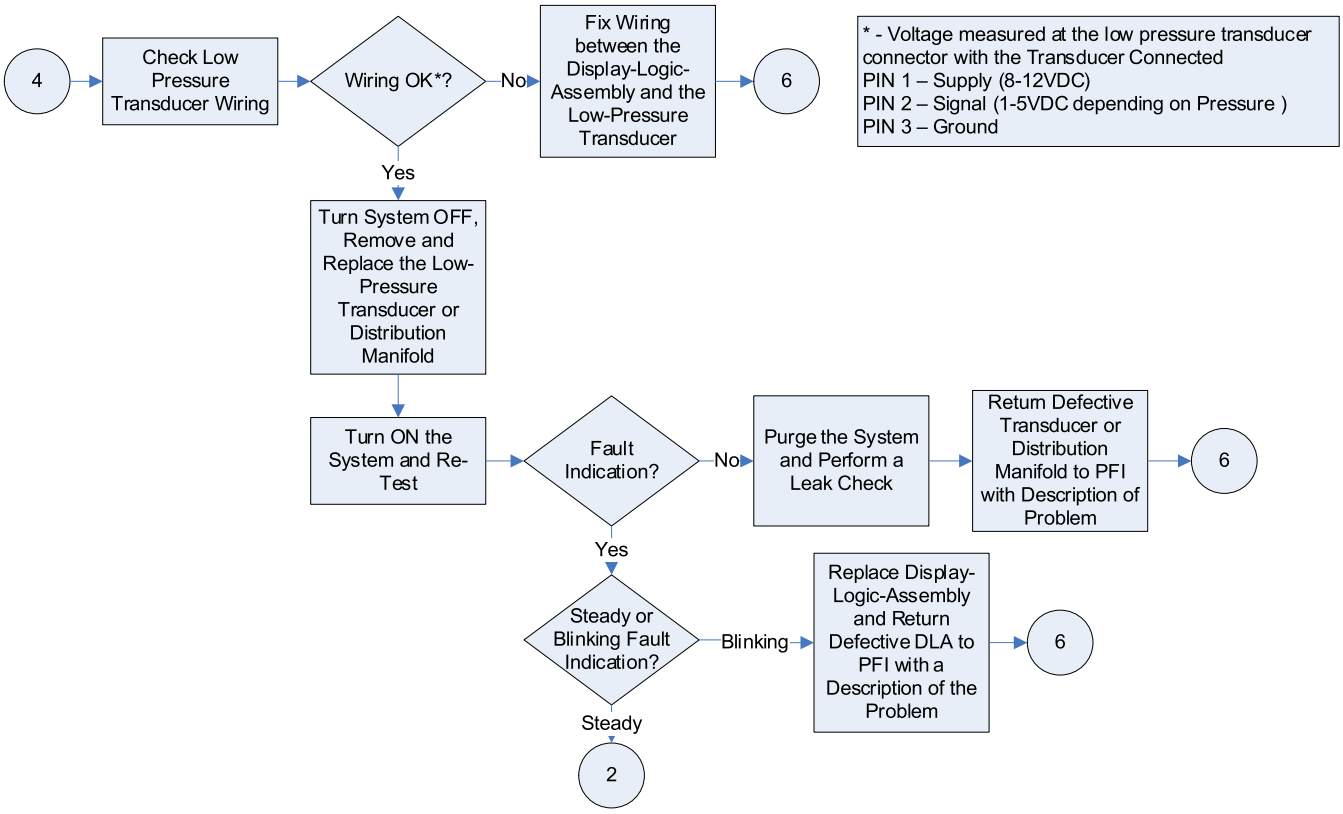

Figure 9 - Trouble Shooting Flow Chart (4)

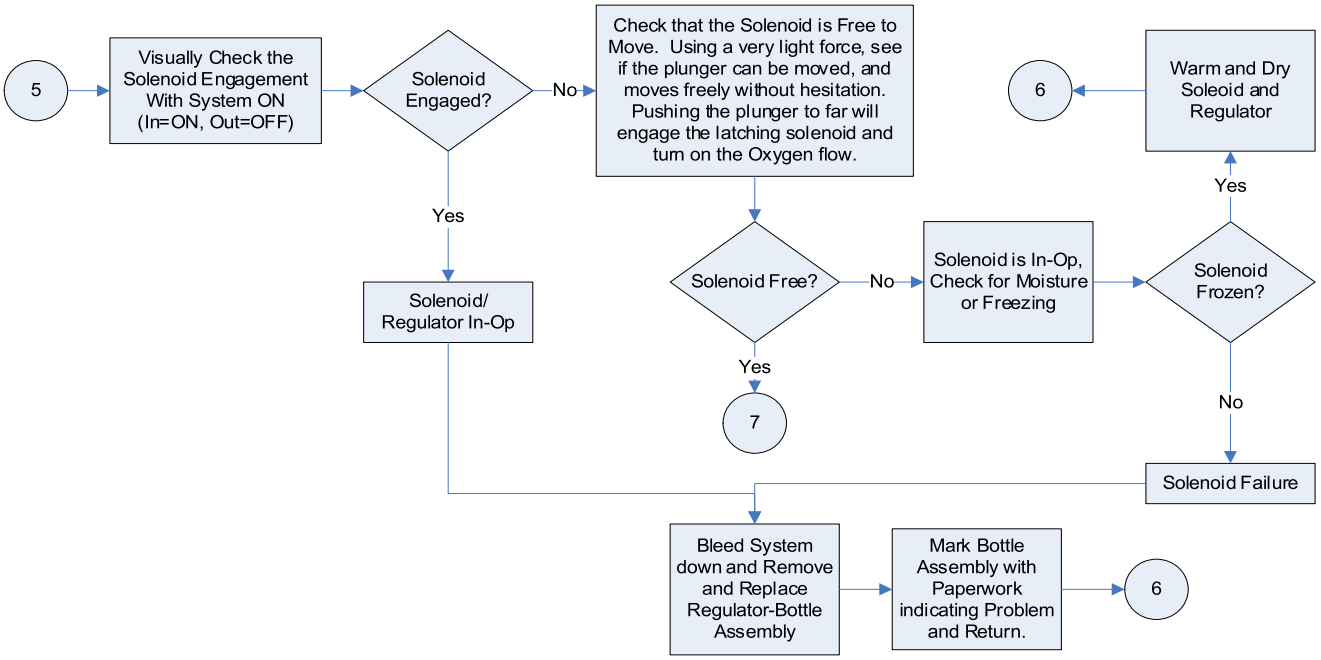

Figure 10 - Trouble Shooting Flow Chart (5)

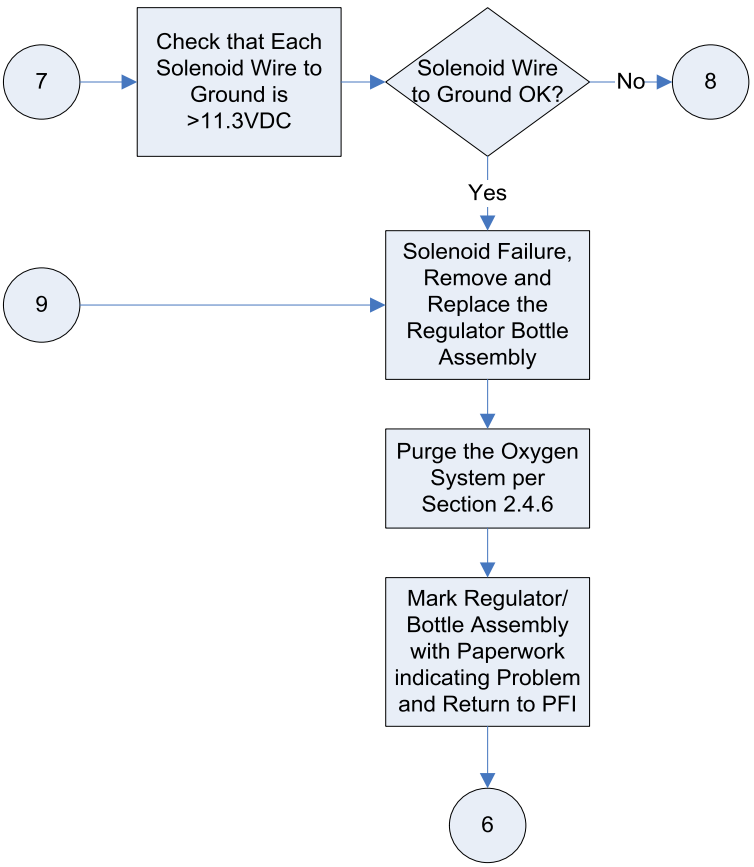

Figure 11 - Trouble Shooting Flow Chart (7 & 9)

2.5.3 Oxygen System Trouble Shooting Flow Chart For Systems Not Equipped with the Oxygen System Display

This section is for reference when troubleshooting the PFI Fixed Oxygen System, if used, and parts returned, please copy steps taken for reference.

CAUTION: Pressures above 105psig on the low-pressure side will damage the low-pressure transducer and will require the transducer to be replaced.

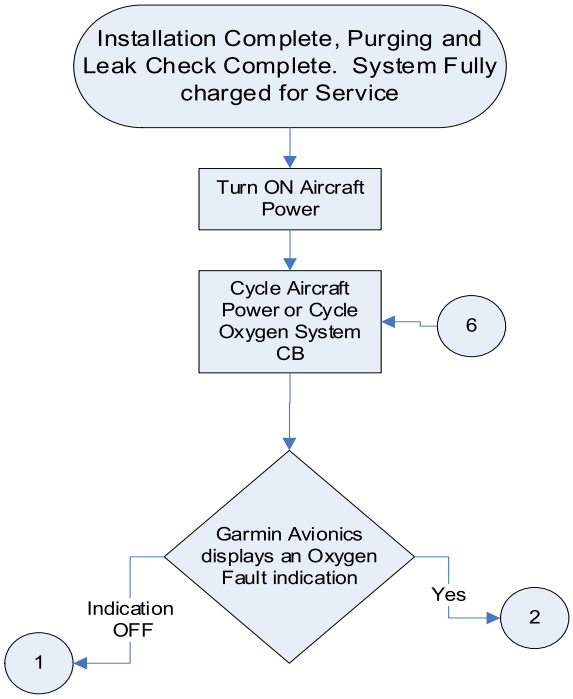

Figure 12 –Trouble Shooting FlowChart (6)

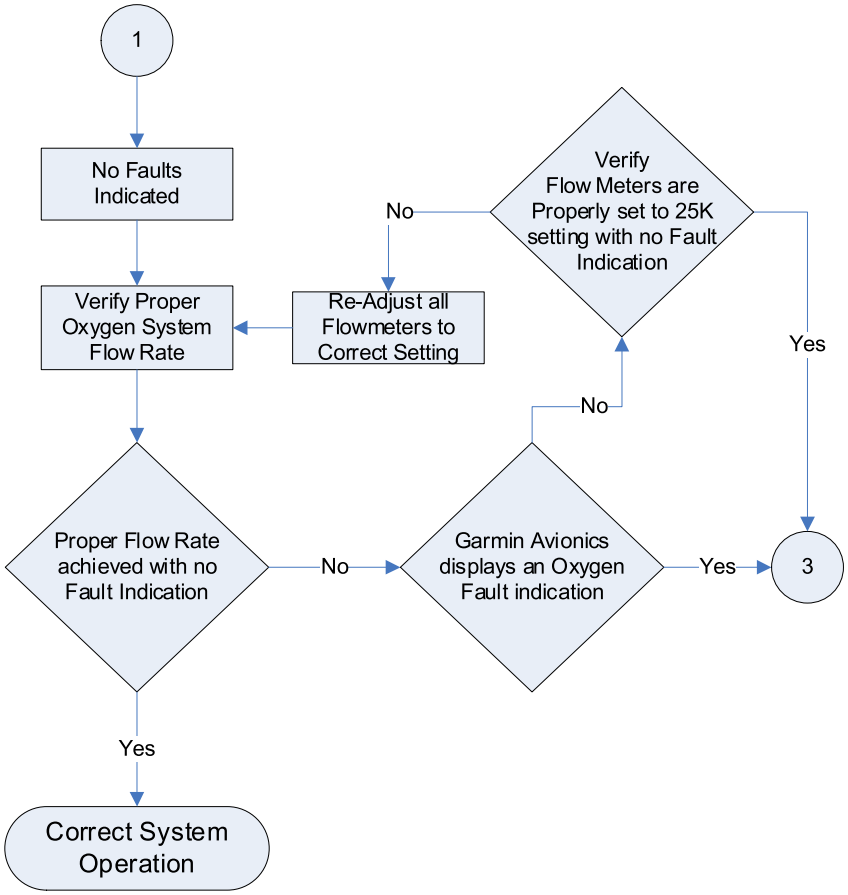

Figure 13 - Trouble Shooting Flow Chart (1)

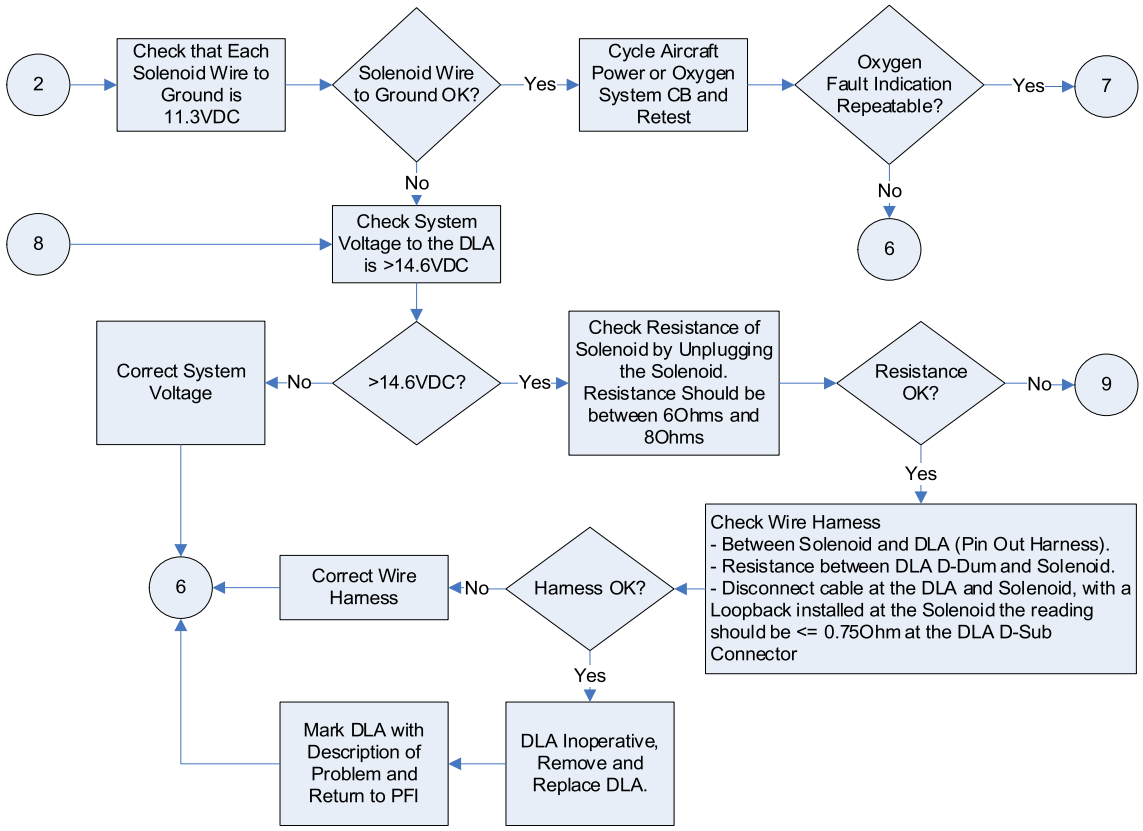

Figure 14 - Trouble Shooting Flow Chart (2 & 8)

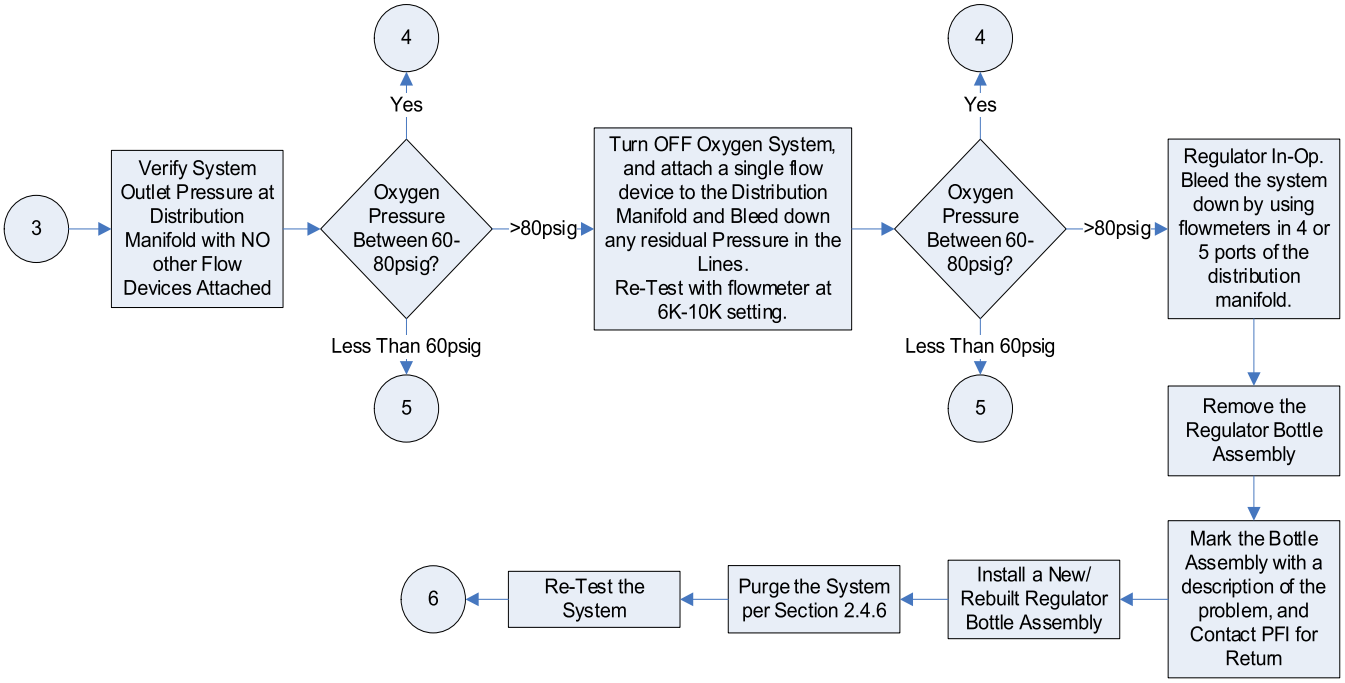

Figure 15 - Trouble Shooting Flow Chart (3)

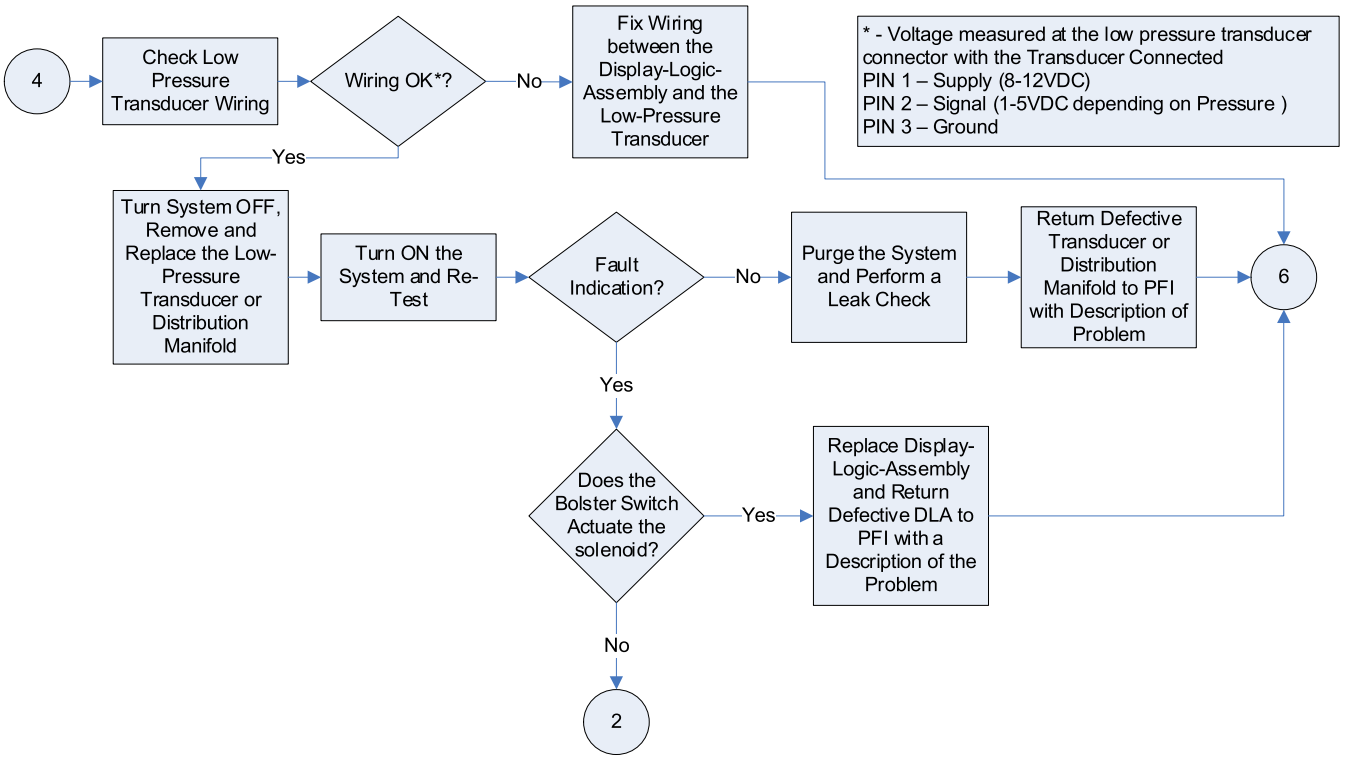

Figure 16 - Trouble Shooting Flow Chart (4)

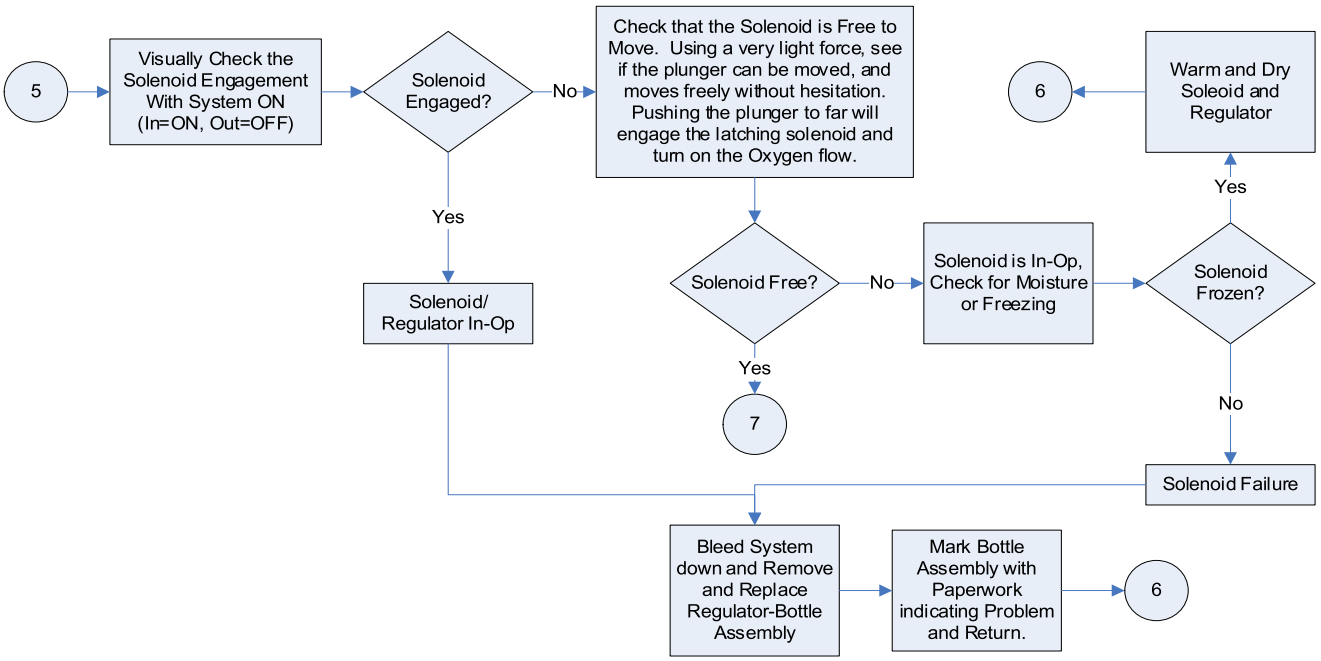

Figure 17 - Trouble Shooting Flow Chart (5)

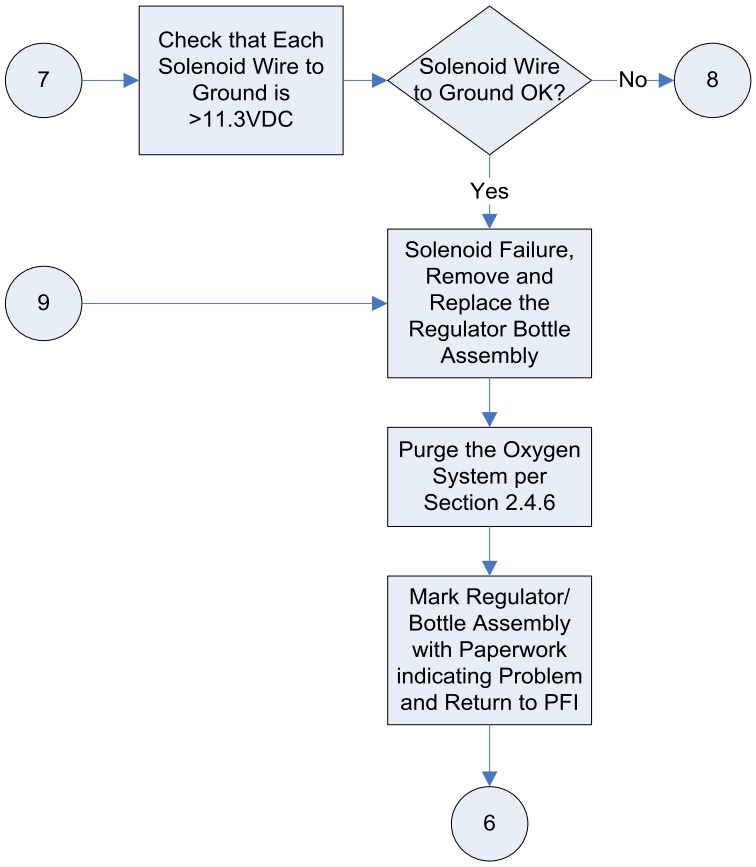

Figure 18 - Trouble Shooting Flow Chart (7 & 9)

2.5.3 Additional Technical Assistance

Please call Precise Flight, Inc., www.preciseflight.com, 800-547-2558 or 541-382-8684.

2.6 AIRWORTHINESS LIMITATIONS

This Airworthiness Limitations Section is FAA Approved and Specifies maintenance required under Sections 43.16 and 91.403 of the Federal Aviation Regulations, unless an alternative program has been FAA Approved.

None – The operation of the Built-In Oxygen System does not impact the airworthiness limitations, and is not required for normal flight.

Note:	**To maintain the altitude capability of the aircraft, the Scheduled Maintenance Intervals and Inspections must be maintained.**

2.7 SCHEDULED MAINTENANCE INTERVALS AND OVERHAUL INTERVALS FOR INSPECTIONS FOR CONTINUED AIRWORTHINESS

For this section, the 50hr, 200hr, and 500hr are time of oxygen system in use. Annual and yearly inspection intervals are calendar intervals. Section 2.7.1 and Table 2 provides a checklist version of this for maintenance work.

Table 1 - Scheduled Maintenance Intervals and Inspections

	Cirrus Design SR22/SR22T BUILT-IN OXYGEN SYSTEM	EACH 50 HOURS OF USE	EACH 200 HOURS OF USE	EACH 500 HOURS OF USE	ANNUALLY	3 YEARS	5 YEARS	15 YEARS
1.	Check flexible lines for security of connections, kinks or tube discoloration.				•			
2.	Replace oxygen cannulas and/or oxygen masks.		•					
3.	Replace or overhaul microphone oxygen mask.			•				
4.	Perform functional test per Section 2.4.3. Follow Cirrus Maintenance Manual and this document for general aircraft wiring system checks and headliner removal. Oxygen Wiring Diagram is in the Appendix. Check security of oxygen bottle mounting; re-torque wing nuts to snug and two turns tight. If contamination is found, clean oxygen lines. See 2.4.2. Check security of oxygen lines, and check bonding continuity on cabin oxygen line to ensure resistance to aircraft ground is no more than 0.0025Ω (2.5mΩ) between any metal to metal connections on the System. Clean and check condition of the filler port and ensure filler cap or rubber pad is present. Confirm that "O2 REQ'D" annunciation occurs at 12,000 Ft. ± 500 Ft. Pressure Altitude.				•			
5.	Replace O-Ring in CPC Connector Assembly on the breathing stations						•	
6.	Purge Oxygen System. See Maintenance Manual. Remove and hydrostatically test the oxygen cylinders from date marked on cylinder. Overhaul regulator/valve assembly – replace O-Rings, verify regulator pressure setting. If contamination is found, clean oxygen lines. See 2.4.2. Inspect oxygen lines and fittings for leaks, cracks or damage. Leak check with Snoop or equivalent. wwww.swagelok.com. Replace flexible oxygen lines on breathing stations. Replace O-Ring in CPC connector assembly identified on the breathing stations. Overhaul A4 and/or A5 Constant Flowmeters.						•	
7.	Replace composite wrapped oxygen cylinder. Overhaul regulator/valve assembly – replace O-Rings, verify regulator pressure setting. Replace non-conductive low-pressure oxygen line between the regulator and the AL hard-lines. Inspect oxygen lines and fittings for cracks, leaks or damage. Leak check with Snoop or equivalent. wwww.swagelok.com. Purge Oxygen System. Replace flexible oxygen lines on breathing stations. Replace O-Ring in CPC connector assembly identified on the breathing stations. Overhaul A4, and/or A5 Constant Flowmeters and PreciseFlow or X3 Demand Conservers.							•

Notes:

1. Applicable to aircraft with Solid Green (Kevlar) Oxygen Bottle (PFI P/N 026N2001-3)
2. Applicable to aircraft with Striped Green (Carbon) Oxygen Bottle (PFI P/N 026N2003-3)

2.7.1 Scheduled Maintenance Checklist

For this section, the 50hr, 200hr, and 500hr are time of oxygen system in use. Annual and yearly inspection intervals are calendar intervals.

Aircraft Registration Number	Aircraft Serial Number	Total Time	Hobbs Time	Inspection Completion Date

Table 2 - Scheduled Maintainance Checklist

Item	Inspection Criteria	50hr	200hr	500hr	Annual	3 Year	5 Year	15 Year
Breathing Station Group								
1	Check Breathing Stations a) Check tubing connections for security b) Check tubing for kinks or discoloration and general cleanliness c) Check condition of flowmeters or PreciseFlow or X3 d) Check flow indicator on PreciseFlow or X3 for cracks, stickiness, general condition e) Check Cannulas and Masks for general condition, cleanliness, or discoloration Initials:_____Date:_____	•						
2	Replace Oxygen Cannulas and Standard (Clear) Masks a) Replace Standard Cannula as required and mark in-service date on new part. b) Replace Oxymizer Cannula as required and mark in-service date on new part. c) Replace PreciseFlow or X3 Dual Lumen Cannula as required and mark in-service date on new part. d) Replace Standard (Clear) Facemask as required and mark in-service date on new part. e) Replace Standard (Clear) PreciseFlow or X3 Facemask as required and mark in-service date on new part. Initials:_____Date:_____		•					
3	Replace/Overhaul Oxygen Facemasks with Microphone (Blue) a) Replace or Overhaul Facemask with Microphone (Blue) as required and mark in-service date on New or Overhauled part. b) Replace or Overhaul PreciseFlow or X3 Facemask with Microphone (Blue) as required and mark in-service date on New or Overhauled part. Initials:_____Date:_____			•				
4	Replace O-Rings in CPC connectors on Breathing Stations. Initials:_____Date:_____						•	

5	Replace/ Overhaul A4 and or A5 Constant Flowmeters and PreciseFlow or X3 Oxygen Conservers a) Replace or Overhaul A4 or A5 Constant Flowmeters as required and mark in-service date on New or Overhauled part. b) Replace or Overhaul PreciseFlow or X3 Oxygen Conservers as required and mark in-service date on New or Overhauled part. c) Replace flexible oxygen lines on breathing stations, part of replacement or overhaul. Initials:_____Date:_____						•	
Oxygen System Installation Group								
6	Functional Check a) Perform a functional check per section 2.4.4 of this document. Initials:_____Date:_____				•			
7	Check Wiring a) Using the Cirrus Maintenance Manual and this document, check the general wiring system including the portion of the oxygen system behind interior panels. b) See section 2.8 for oxygen system wiring schematic. Initials:_____Date:_____				•			
8	Check Oxygen System a) Check the security and condition of the oxygen bottle assembly in the tail of the aircraft. If contamination is found in oxygen lines, clean oxygen lines per section 2.4.3. Normal checks do not require the oxygen lines to be opened for inspection. b) Re-torque nuts for bottle mounting to 8in-lbs as required c) Check the security of oxygen lines and verify electrical continuity. Must be less than 0.0025Ω (2.5mΩ) between any connections. IE: tube to fitting, fitting to tube. d) Clean and check filler port and insure filler cap is present. Initials:_____Date:_____				•			
9	Check Altitude Annunciator (Refer to Section 2.4.7) a) If equipped with the Optional Display Controller, verify that the “O2 REQ’D” indicator light on the display and if present the “OXYGEN REQUIRED” panel mount illuminate if the oxygen system is in the OFF position and the aircraft is at 12,000ft ± 500ft Pressure Altitude. Initials:_____Date:_____ b) If not equipped with the Optional Display Controller, verify that the amber “Oxygen RQD” warning on the Garmin Avionics display illuminates if the oxygen system is in the OFF position and the aircraft is at 12,000ft ± 500ft Pressure Altitude. Initials:_____Date:_____				•			
Aircraft with Solid Green (Kevlar) Oxygen Bottle (PFI P/N 026N2001-3)								
10	Hydrostatic Test Oxygen Bottle a) Remove Oxygen Bottle Assembly and return to Precise Flight Inc. for Bottle Hydrostatic test and Regulator Overhaul.						•	

	a. Overhaul regulator/valve assembly – Clean regulator, replace O-Rings, and verify regulator pressure. b. Hydrostatic test the bottle and replace as required. b) Cap oxygen lines to prevent contamination. If oxygen lines become contaminated, or contamination found, clean lines per Section 2.4.3 of this report. c) Re-Install Overhauled Regulator Valve Assembly and New Bottle. d) Bleed Down (Purge) Oxygen System per Section 2.4.6. e) Perform a functional check per section 2.4.4 of this document. Initials:_____Date:_____							
Aircraft with Striped Green (Carbon) Oxygen Bottle (PFI P/N 026N2003-3)								
11	Hydrostatic Test Oxygen Bottle a) Remove Oxygen Bottle Assembly and return to Precise Flight Inc. for Bottle Hydrostatic test and Regulator Overhaul. a. Overhaul regulator/valve assembly – Clean regulator, replace O-Rings, and verify regulator pressure. b. Hydrostatic test the bottle and replace as required b) Cap oxygen lines to prevent contamination. If oxygen lines become contaminated, or contamination found, clean lines per Section 2.4.3 of this report. c) Re-Install Overhauled Regulator Valve Assembly and New Bottle. d) Bleed Down (Purge) Oxygen System per Section 2.4.6. e) Perform a functional check per section 2.4.4 of this document. Initials:_____Date:_____						•	

All Aircraft								
12	Replace Oxygen Bottle a) Remove Oxygen Bottle Assembly and return to Precise Flight Inc. for Bottle replacement and Regulator Overhaul. a. Overhaul regulator/valve assembly – Clean regulator, replace O-Rings, and verify regulator pressure. b) Cap oxygen lines to prevent contamination. If oxygen lines become contaminated, or contamination found, clean lines per Section 2.4.3 of this report. c) Re-Install Overhauled Regulator Valve Assembly and New Bottle. d) Bleed Down (Purge) Oxygen System per Section 2.4.6. e) Perform a functional check per section 2.4.4 of this document. Initials:_____Date:_____							•

- End of Checklist –

2.8 SYSTEM WIRING DIAGRAM

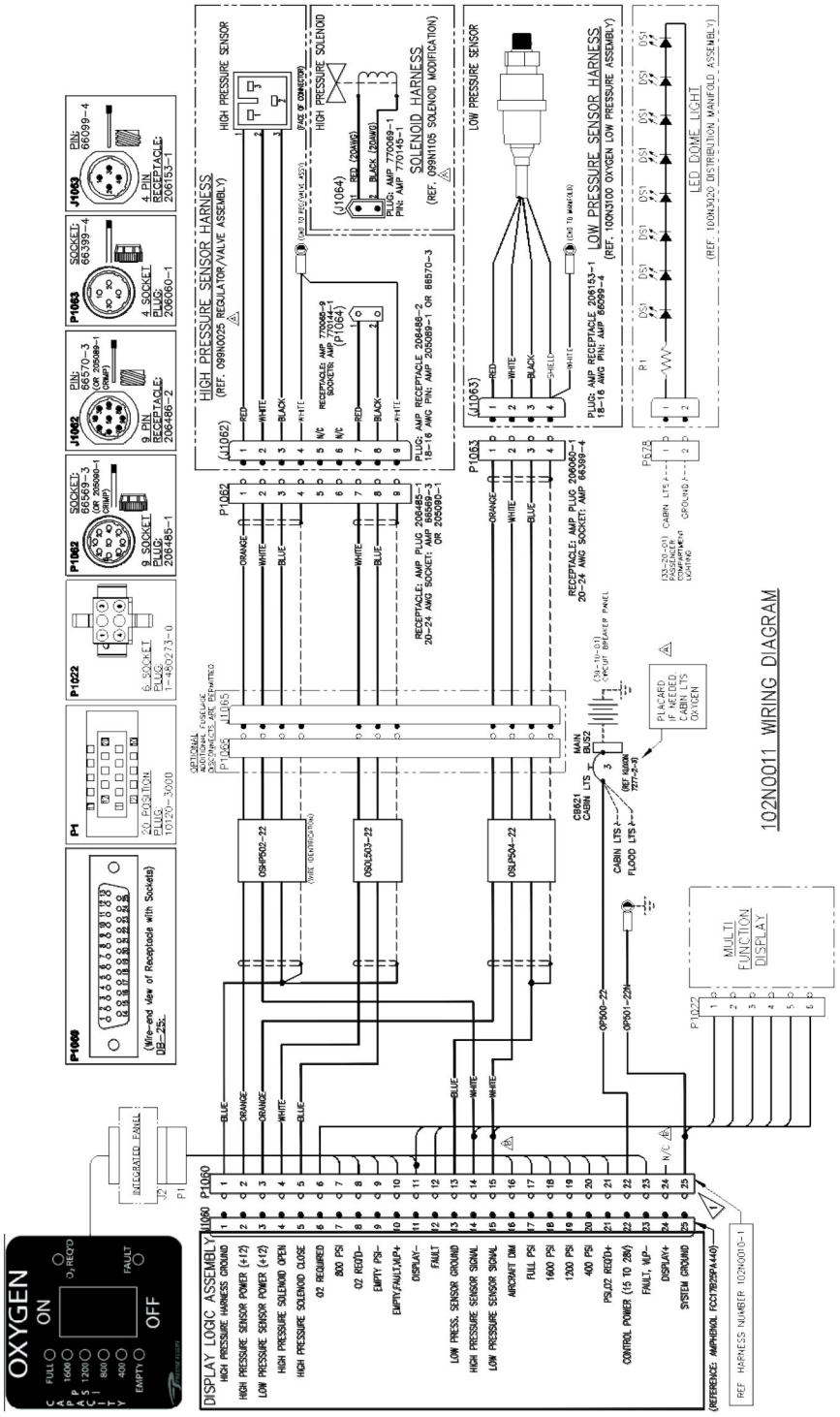

Figure 19 – Typical System Wire Diagram (Standard Installation)

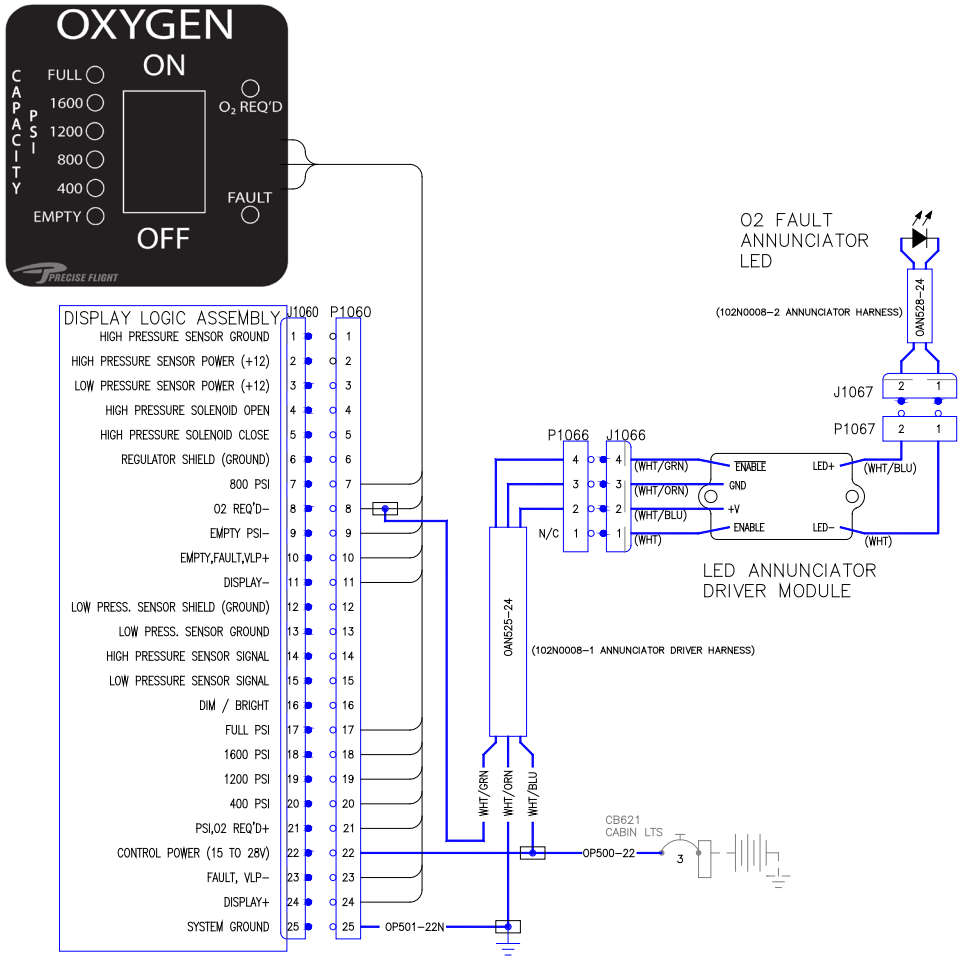

Figure 20 - OPTIONAL - Remote Annunciator Wire Diagram

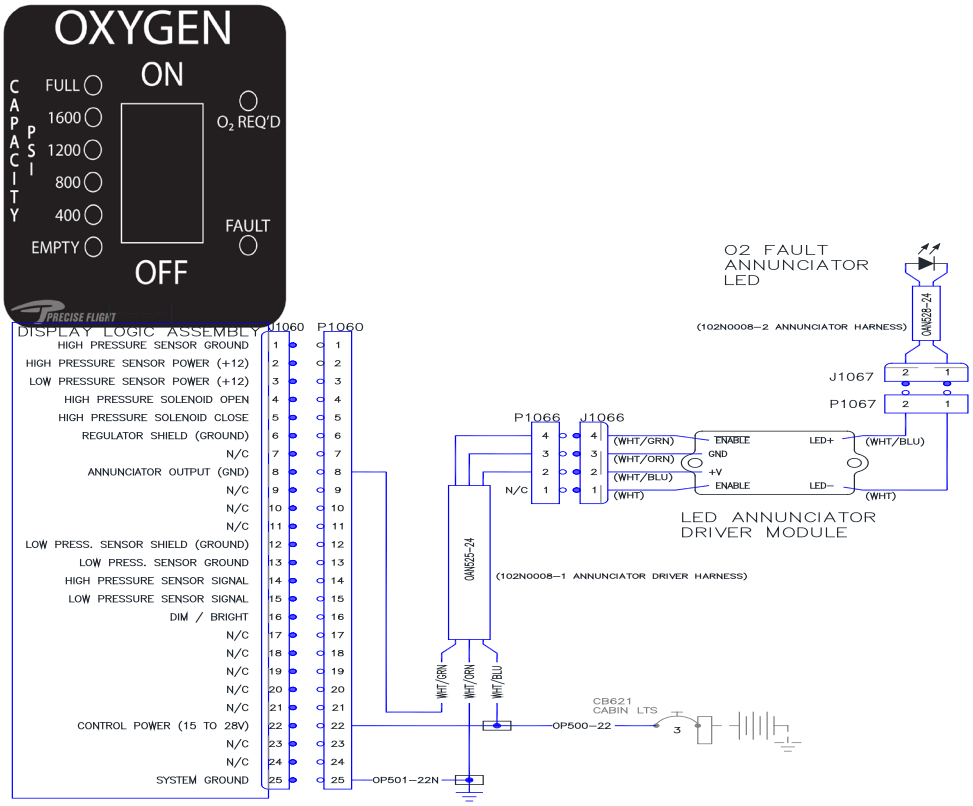

Figure 21 - OPTIONAL - Remote Annunciator Wire diagram (Ribbon Cable Installations)

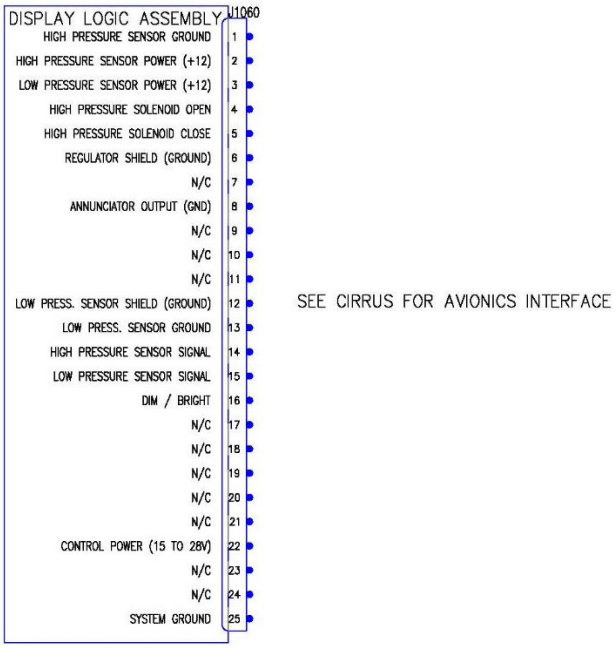

Figure 22– OPTIONAL – Garmin Avionics Wiring Diagram (Installation w/out PFI Display Controller)

3.0 ILLUSTRATED PARTS CATALOG

3.1 PURPOSE

This section is not FAA accepted or FAA Approved and is for information only to aid in the maintenance and ordering replacement parts for the Precise Flight Built-In Oxygen System.

3.2 OVERVIEW

See Figure 1 for system overview picture.

3.3 BREATHING STATIONS

This section lists the replacement breathing station equipment available for the Cirrus SR22/SR22T Built-In Oxygen System.

3.3.1 Constant Flow Breathing Equipment

NOTE:

The original Precise Flight, Inc. A4 Constant Flowmeter has been replaced by the A5 Constant Flowmeter for replacement parts. The Masks and Cannulas are interchangeable between the Constant Flow Meters Only.

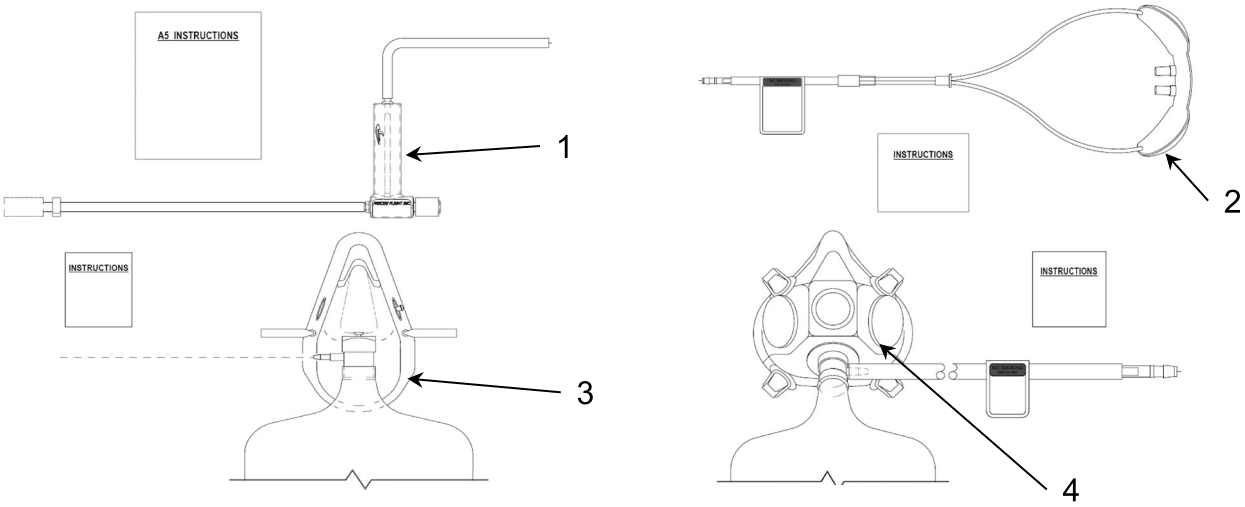

Figure 23 – Replacement Constant Flow Breathing Equipment

Fig.	Item	PFI Part Number*	Nomenclature	Effective
Figure 23	1	027N0003-1	A5 Flowmeter with CPC Connector	All
Figure 23	2	020N0001-1	Oxymizer Cannula	All
Figure 23	3	020N0002-1	Face Mask	All
Figure 23	4	020N0005-1	Face Mask with Microphone “Blue”	All

* Or equivalent foreign language version.

PFI Kit Part Number	Fig.	Item	Qty.	PFI Part Number	Nomenclature
027N0305-1	-	-	-	-	A5 Assembly with Cannula – Face Mask, CPC, Kit
	Figure 15	*1*	*1*	*027N0003-1*	*A5 Flowmeter with CPC Connector*
	Figure 15	*2*	*1*	*020N0001-1*	*Oxymizer Cannula*
	Figure 15	*3*	*1*	*020N0002-1*	*Face Mask*
027N0306-1	-	-	-	-	A5 Assembly with Cannula – Face Mask with Microphone, CPC, Kit
	Figure 15	*1*	*1*	*027N0003-1*	*A5 Flowmeter with CPC Connector*
	Figure 15	*2*	*1*	*020N0001-1*	*Oxymizer Cannula*
	Figure 15	*4*	*1*	*020N0005-1*	*Face Mask with Microphone “Blue”*

3.3.2 PreciseFlow or X3 Demand Flow Breathing Equipment

NOTE:

The Cirrus Built-In Oxygen System requires the PreciseFlow or X3 with CPC and In-Line Regulator. The PFI Semi-portable oxygen systems use a different pressure and are not compatible with the Built-In Oxygen System.

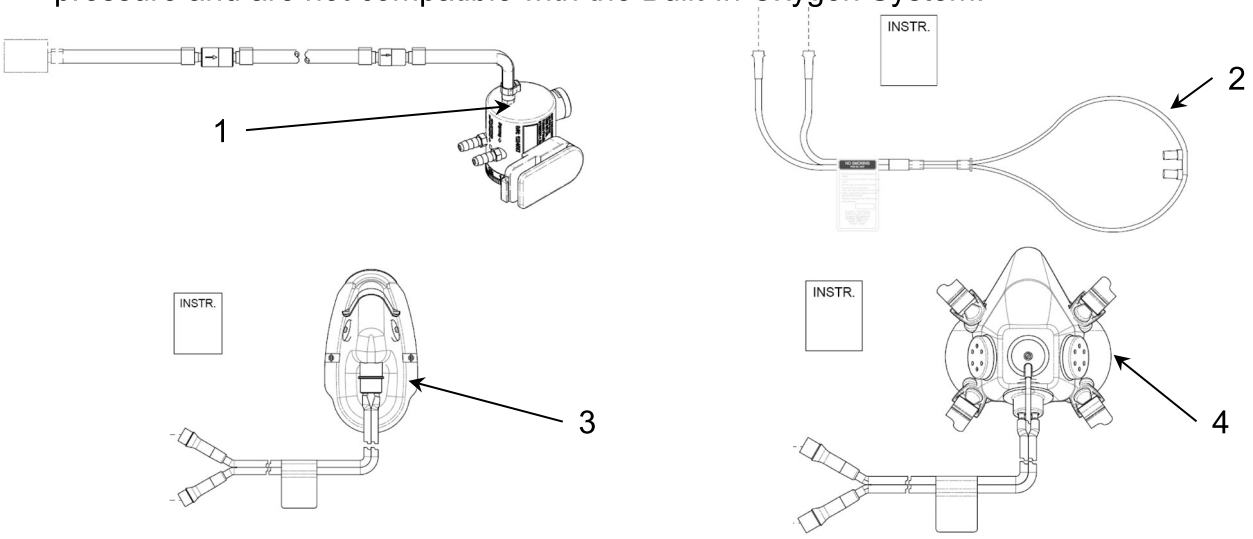

Figure 24 – Replacement PreciseFlow Demand Breathing Equipment

Fig.	Item	PFI Part Number*	Nomenclature	Effective
Figure 24	1	027N1002-1	Conserver and Inline Regulator Assembly, CPC	All
Figure 24	2	020N0050-1	Conserver (Dual Lumen) Cannula	All
Figure 24	3	020N0060-1	Conserver Face Mask	All
Figure 24	4	020N0070-1	Conserver Face Mask with Microphone	All

* Or equivalent foreign language version.

PFI Kit Part Number	Fig.	Item	Qty.	PFI Part Number	Nomenclature
027N1101-6	-	-	-	-	Conserver with Cannula/Face Mask, Inline Regulator Kit
	Figure 16	*1*	*1*	*027N1002-1*	*Conserver and Inline Regulator Assembly, CPC*
	Figure 16	*2*	*1*	*020N0050-1*	*Conserver (Dual Lumen) Cannula*
	Figure 16	*3*	*1*	*020N0060-1*	*Conserver Face Mask*
027N1102-6	-	-	-	-	Conserver with Cannula/Microphone Face Mask, Inline Regulator, Kit
	Figure 16	*1*	*1*	*027N1002-1*	*Conserver, Inline Regulator Assembly, CPC*
	Figure 16	*2*	*1*	*020N0050-1*	*Conserver (Dual Lumen) Cannula*
	Figure 16	*4*	*1*	*020N0070-1*	*Conserver Face Mask with Microphone*

3.4 OVERHEAD DISTRIBUTION MANIFOLD INSTALLATION

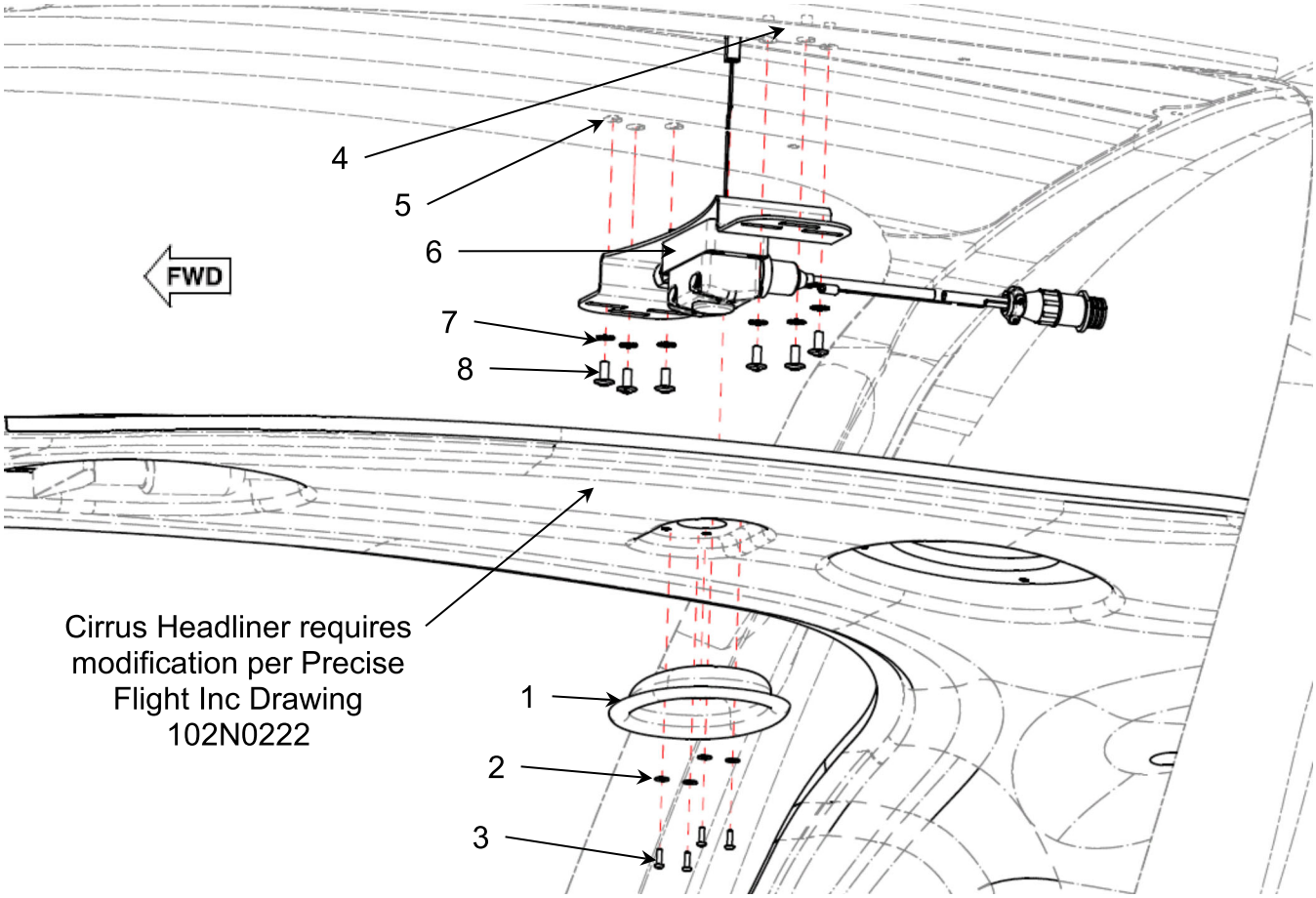

Figure 25 – Overhead Distribution Manifold

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 25	1	102N0221-1	Manifold Trim Ring	All
Figure 25	2	HD 07091	#4 Black Oxide Washer	All
Figure 25	3	HD 07090	4-40 x 3/8 Button Head Cap Screw, Black Oxide	All
Figure 25	4	EL 03046 CDC 50379-002	Copper Foil Tape, Tin Plated 4”	All
Figure 25	5	NAS1329A3-80	Insert	All
Figure 25	6	102N0232-1 OR 102N0235-1 OR 102N7100-1	4 port Manifold and Bracket Assembly 5 port Manifold and Bracket Assembly 5 port Manifold and Bracket Assembly – Port Lighting	4 port A/C 5 port A/C Installs w/out PFI Display Controller
Figure 25	7	MS 35335-32	#10 Ext. Star Lock Washer	All
Figure 25	8	AN525-10R7	10-32 x 7/16 Washer Head Machine Screw	All

3.5 Oxygen Low Pressure Line Installation

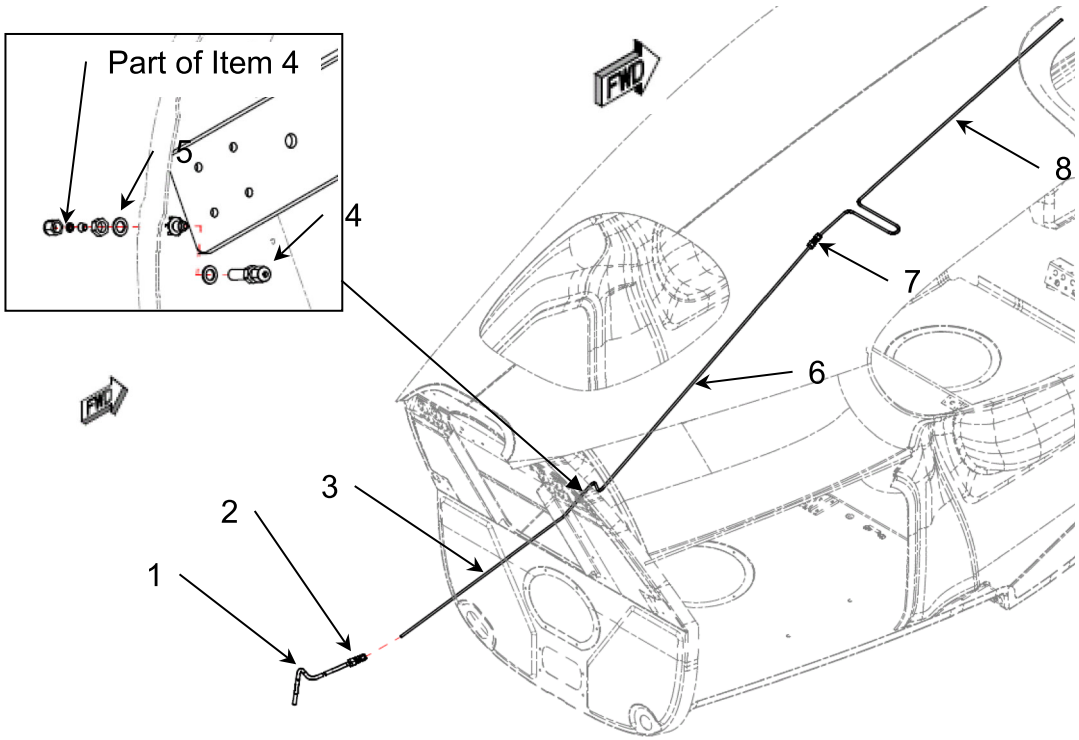

Figure 26 – Low Pressure Line Installation

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 26	1	102N0253-1	Flexible Tubing Sub-Assembly	All
Figure 26	2	HD 07107	Fitting, Reducing Union	All
Figure 26	3	102N0252-1	Aft Fuselage Low Pressure Line	All
Figure 26	4	HD 06057	Bulkhead Union Fitting	All
Figure 26	5	NAS1149F0632P	3/8ID x 5/8OD Washer	All
Figure 26	6	102N0251-2 OR 102N7805-1	Aft Cabin Low Pressure Line Aft Cabin Low Pressure Line	All Installs w/out PFI Display Controller
Figure 26	7	HD 07094	Fitting, 3/16 Comp Union	All
Figure 26	8	102N0251-1 Or 102N7800-1	Forward Cabin Low Pressure Line Forward Cabin Low Pressure Line	All Installs w/out PFI Display Controller

3.6 OXYGEN BOTTLE INSTALLATION

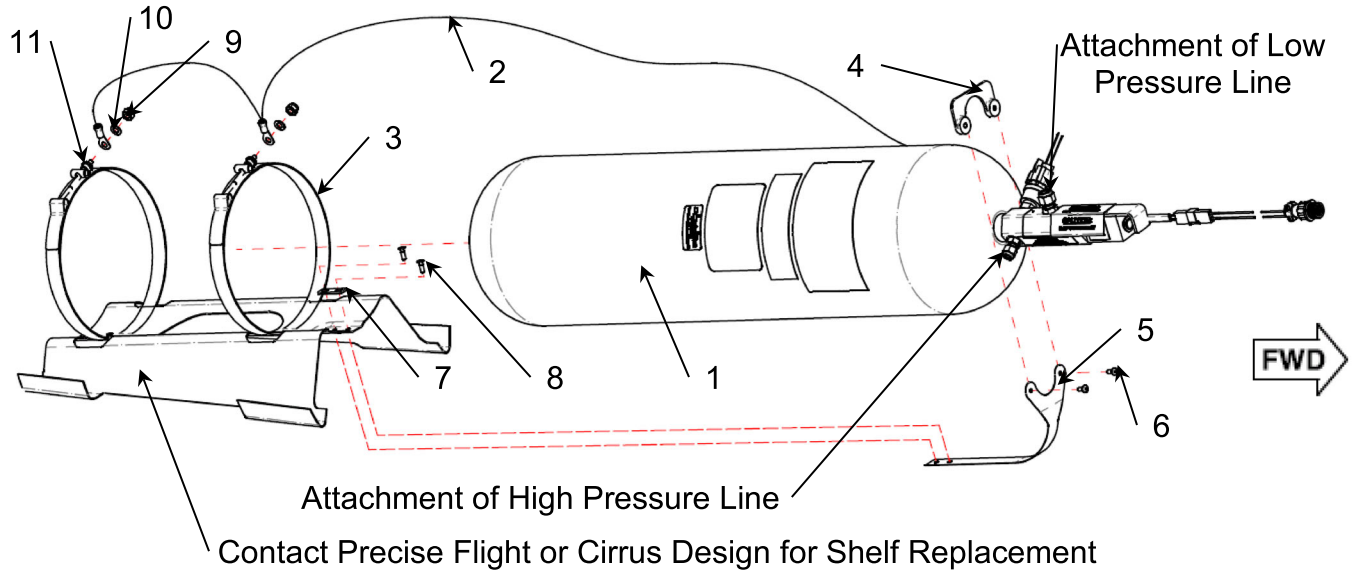

Figure 27 - Bottle Installation

Fig.	Item	Part Number	Nomenclature	Effective
Figure 27	1	100N0020-4 w/ 099N0024-1 or 100N1020-4 Regulator	Bottle Assembly, 77cuft, Remote Fill, 70psig[1]	4 port manifold A/C only
Figure 27	1	100N0020-5 w/ 099N0025-1 or 100N1020-5 Regulator	Bottle Assembly, 77cuft, Remote Fill, SAE, 70psig[1]	4 port manifold A/C only
Figure 27	1	100N0020-4 w/ 099N0024-2 Regulator	Bottle Assembly, 77cuft, Remote Fill, 70psig[1]	4 or 5 port manifold
Figure 27	1	100N0020-5 w/ 099N0025-2 Regulator	Bottle Assembly, 77cuft, Remote Fill, SAE, 70psig[1]	4 or 5 port manifold
Figure 27	2	102N0006-1	Cirrus Fixed Oxygen System – Ground Strap	All
Figure 27	3	102N0120-1	Band Clamp Assembly, 77cuft Bottle	All
Figure 27	4	CDC 16524-002	U-Clamp, Oxygen Bottle	All
Figure 27	5	CDC 16523-001	Strap, Oxygen Bottle	All
Figure 27	6	MS27039-0805 NAS1149FN832P	Screw, Pan Head Structural #8-32 Washer, 0.32” Thick	All
Figure 27	7	CDC 16522-001	Pad, Aluminum, Oxygen Bottle	All
Figure 27	8	MS24694S5 MS21083N08 NAS1149FN832P	Screw, Counter Sunk, Structural #8-32 Nut, #8-32 Washer, 0.32” Thick	All
Figure 27	9	(Part of item 3)	¼-28 Nylock Nut	All
Figure 27	10	(Part of item 3)	AN960-4R – ¼ Washer	All
Figure 27	11	(Part of item 3)	AN316-4R - ¼-28 Nut	All

Notes: 1 – Bottle assembly is available in NPT or SAE ports for the filler line and low pressure outlet connections, and standard or high flow regulators. Verify part number prior to ordering a replacement.

3.7 Display/Logic Assembly Installation

NOTE:

The Cirrus Built-In Oxygen System has five (5) display/controller configurations. When replacing components take extra care to make sure the correct part is ordered or replaced per the Precise Flight, Inc. installation drawings.

3.7.1 Display and Controller Installations - Standard Installation

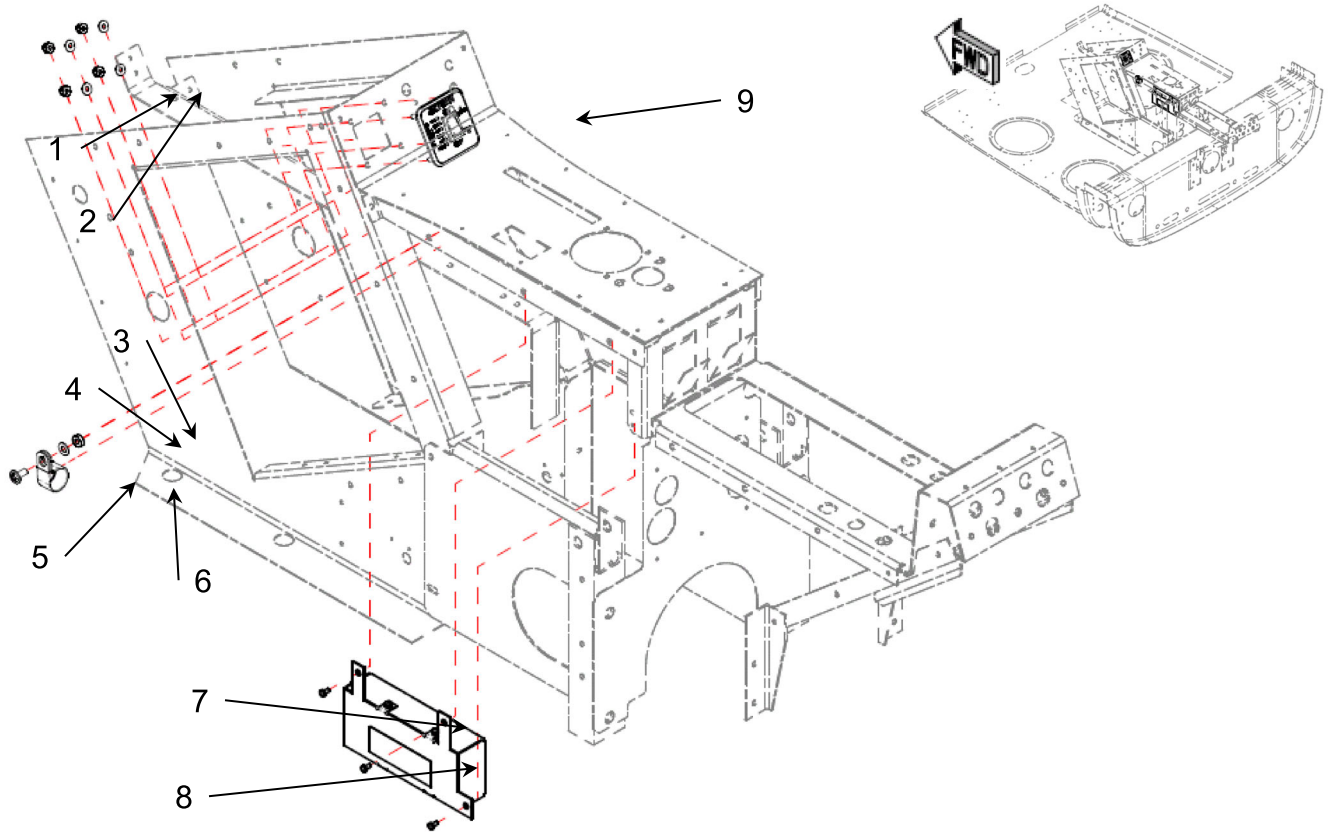

Figure 28 - Display and Logic Assembly Installation

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 28	1	AN365-632A	6-32 Nylock Nut	All
Figure 28	2	AN960-6	#6 Flat Washer	All
Figure 28	3	AN365-1032A	10-32 Nylock Nut	All
Figure 28	4	AN960-10L	#10 Flat Washer 0.032 THK.	All
Figure 28	5	AN525-10R7	10-32 x 0.4375L Washer Head Machine Screw	All
Figure 28	6	MS21919-DG6	#6 Adel Clamp With Cushion	All
Figure 28	7	100N2020-3	Display Logic Assembly, Remote – Low Profile	All
Figure 28	8	MS35206-213	Screw 4-40 x ¼ PH HD	All
Figure 28	9	100N2120-2	Display Assembly, Low Resolution	All

Notes: Special care must be taken when replacing the Display Logic Assembly, and/or the Display Assembly to make sure they are compatible with the wire harness.

3.7.2 Display and Controller Installations - Ribbon Cable

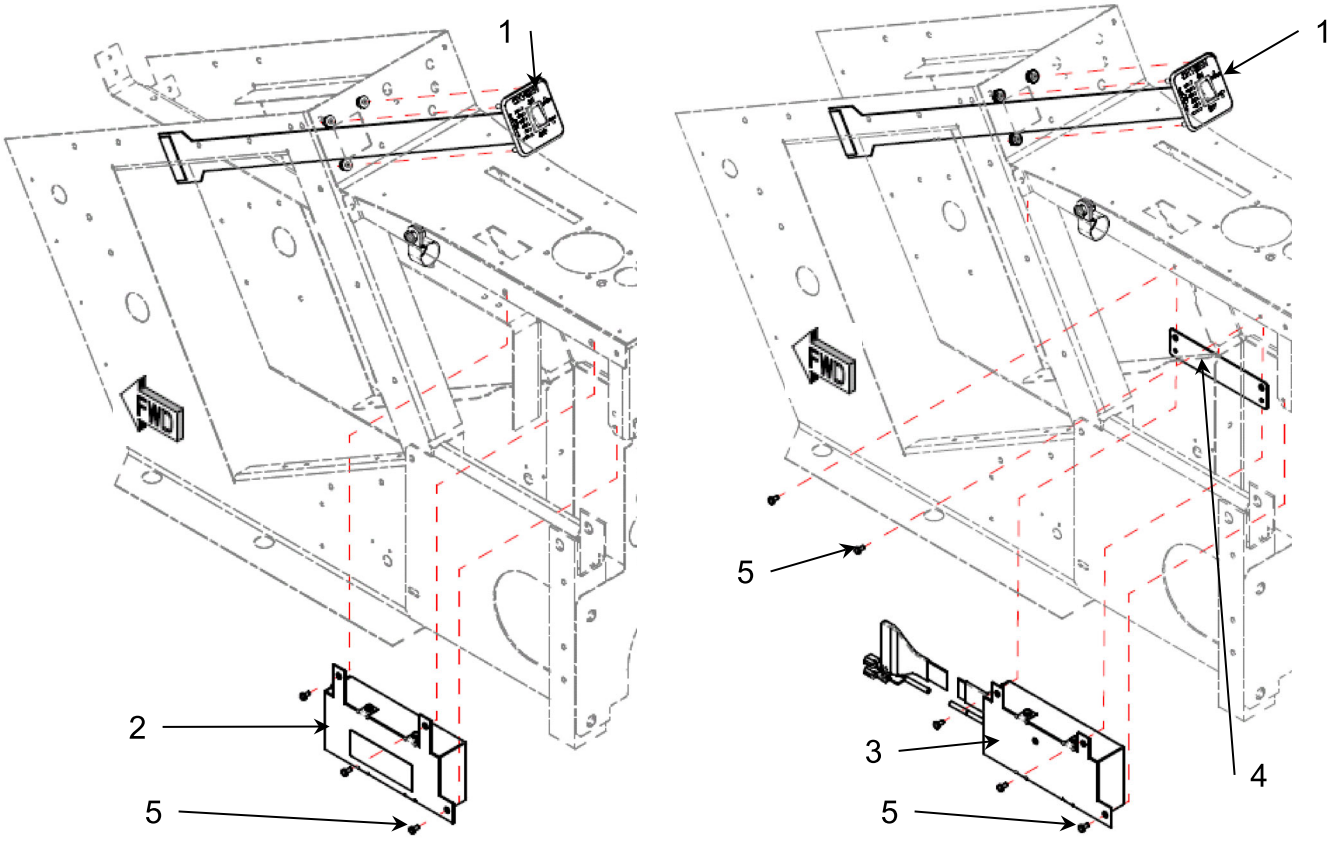

Figure 29 - Alternate Display and Logic Assembly Installations

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 29	1	100N2120-1	Display Assy, Low Resolution, with Ribbon Cable	All
Figure 29	2	100N2020-3	Display Logic Assy, Remote – Low Profile	All
Figure 29	3	100N2020-1	Display Logic Assy, Remote – Low Profile, Slide Lock	All
Figure 29	4	102N0320-1	Spacer Plate Adapter	All
Figure 29	5	MS35206-213	Screw, 4-40 x ¼ PH HD	All

Notes: Special care must be taken when replacing the Display Logic Assembly, and/or the Display Assembly to make sure they are compatible with the wire harness. If a direct part number replacement is not available, contact Precise Flight Inc. with part numbers for the Wire Harness, Display, and Display Logic Assembly. (New installations are in the Figure 20 configuration)

3.7.3 DISPLAY AND CONTROLLER INSTALLATION – CIRRUS PERSPECTIVE

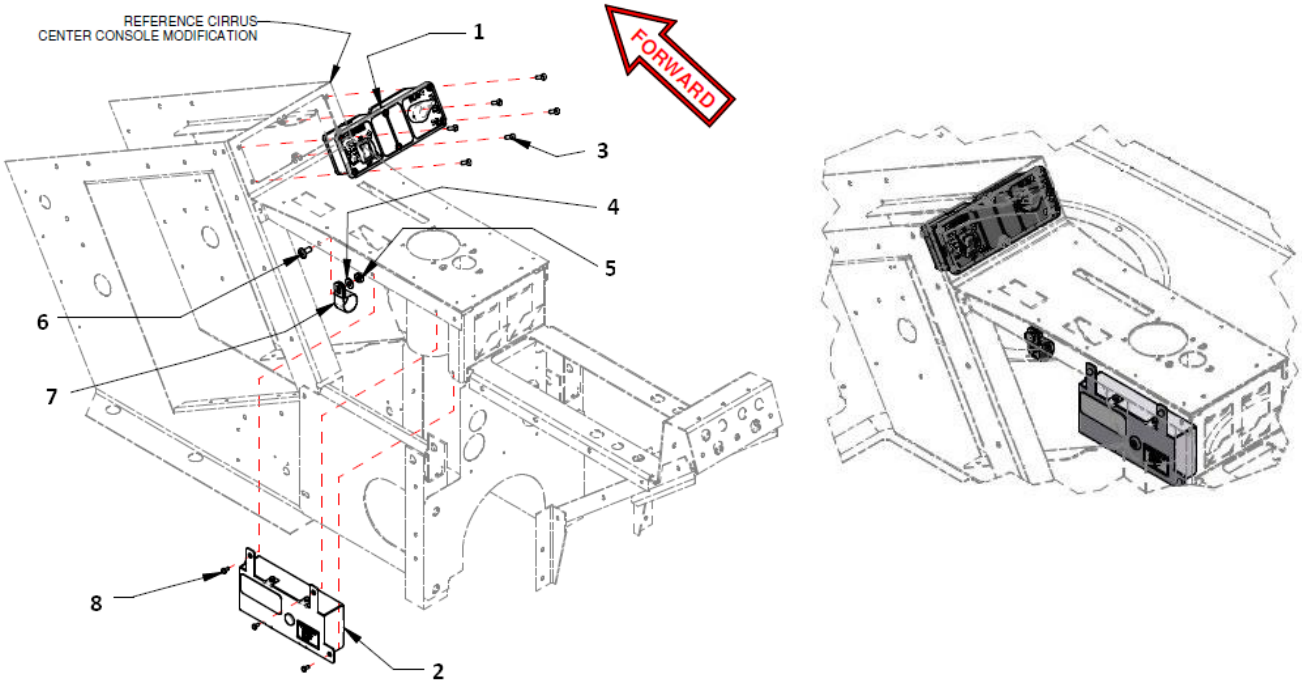

Figure 30 - Display and Logic Assembly Installations – Cirrus Perspective

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 30	1	051A0330-1 OR 051A0330-2	IFS Panel Assy., 104 – Flap, Oxygen IFS Panel Assy., 110 – Flap, Oxygen	See Note 1 See Note 2
Figure 30	2	100N2030-1	Display Logic Assembly, MFD	All
Figure 30	3	MS24693BB28	6-32 x ½" 100° Black Machine Screw	All
Figure 30	4	AN960-10L	#10 Flat Washer 0.32 Thk.	All
Figure 30	5	AN364-1032A	10-32 Nylock Nut	All
Figure 30	6	AN525-10R7	Screw, 10-32 x 7/16 Washer HD	All
Figure 30	7	NAS1712D4-19S	Clamp, Cushioned Loop	All
Figure 30	8	MS35206-213	Screw, 4-40 x ¼ PN HD	All

Notes:

1. MODEL SR22T S/N's 0001 THRU 0441
   MODEL SR22 S/N's 3026 THRU 3914

2. MODEL SR22T S/N's 0442 & SUBSEQUENT
   MODEL SR22 S/N's 3915 & SUBSEQUENT

3. Special care must be taken when replacing the Display Logic Assembly, and/or the Display Assembly to make sure they are compatible with the wire harness. If a direct part number replacement is not available, contact Precise Flight Inc. with part numbers for the Wire Harness, Display, and Display Logic Assembly.

3.7.4 OPTIONAL – REMOTE ANNUNCIATOR (OPTIONAL)

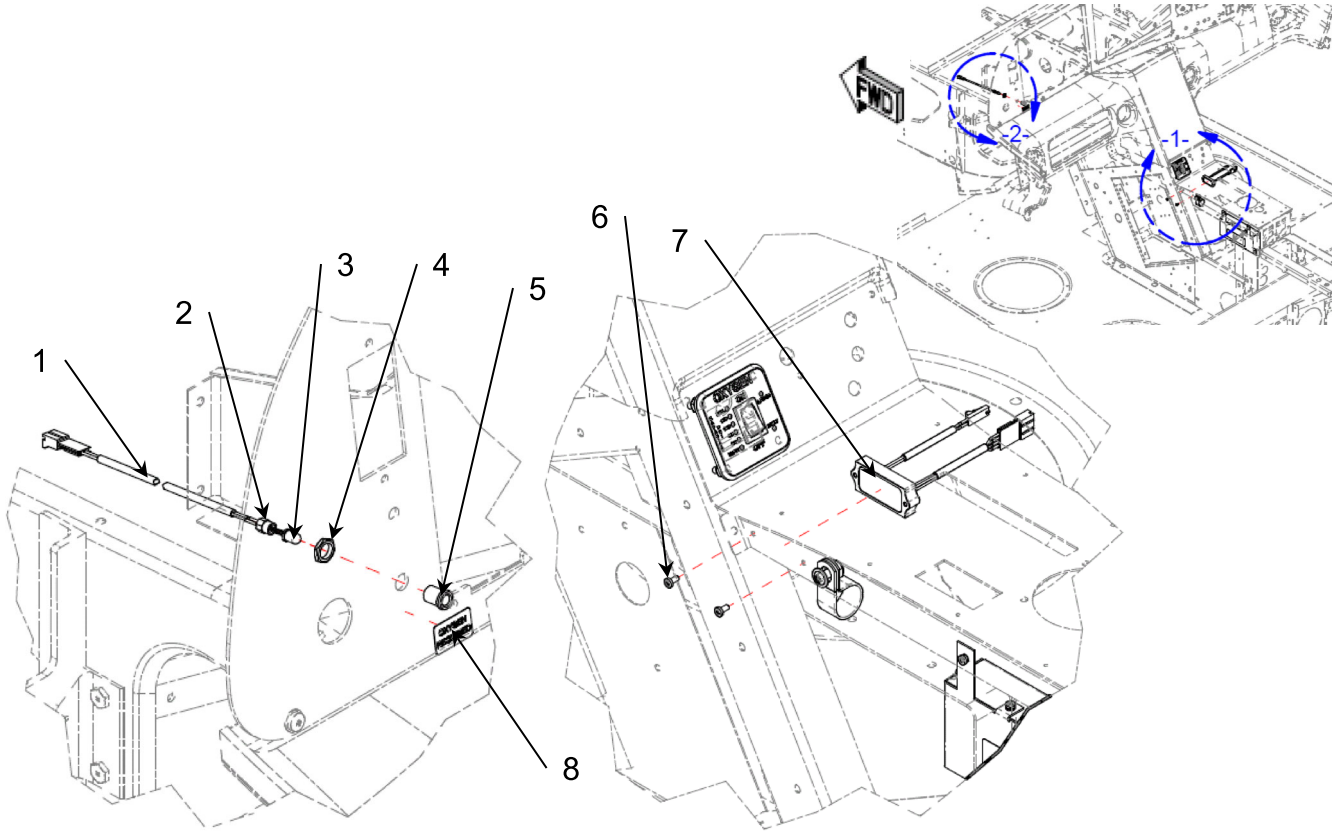

Figure 31 - Remote Annuciator

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 31	1	102N0008-2	Annunciator Wire Harness	All
Figure 31	2	Part of Item 1	LED Lamp Holder, Black, Holder Retainer	All
Figure 31	3	Part of Item 1	LED, Amber (EL03021)	All
Figure 31	4	Part of Item 1	LED Lamp Holder, Black, Nut	All
Figure 31	5	Part of Item 1	LED Lamp Holder, Black, Bezel	All
Figure 31	6	MS 35206-213	Screw, 4-40 x ¼ PN HD	All
Figure 31	7	010A0101-1	LED Annunciator, Driver Assembly	All
Figure 31	8	102N0051-1	Placard, Annunciator Dash, Oxygen Required	All
Figure 31	-	010A0101-1	Annunciator Driver Wire Harness (NOT SHOWN)	All

3.7.5 – OPTIONAL – CONTROLLER INSTALLATION – INSTALL W/OUT PFI DISPLAY CONTROLLER

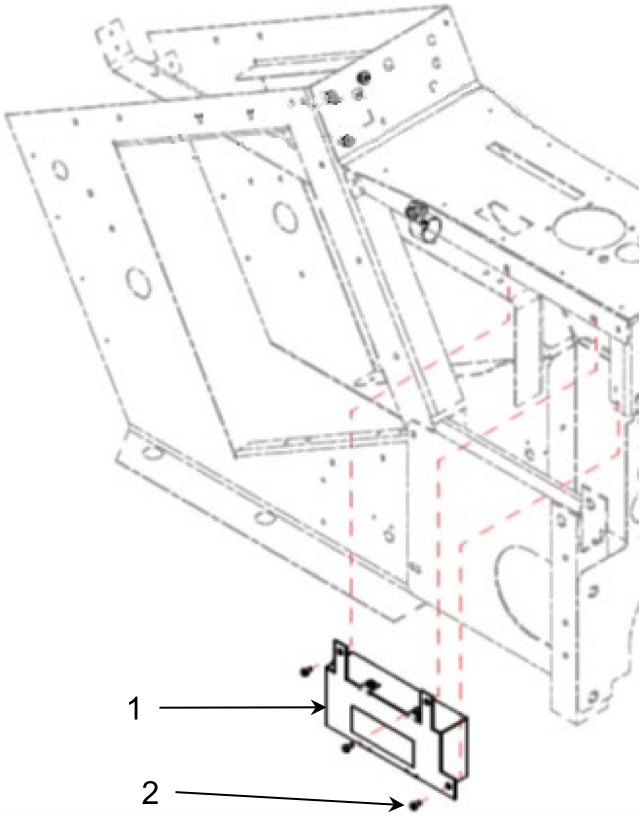

Figure 32 - OPTIONAL – Logic Assembly installation w/out PFI Display Controller

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 32	2	100N2030-1	Display Logic Assembly, MFD	All
Figure 32	8	MS35206-213	Screw, 4-40 x ¼ PN HD	All

3.8 Filler Port and Line Installation

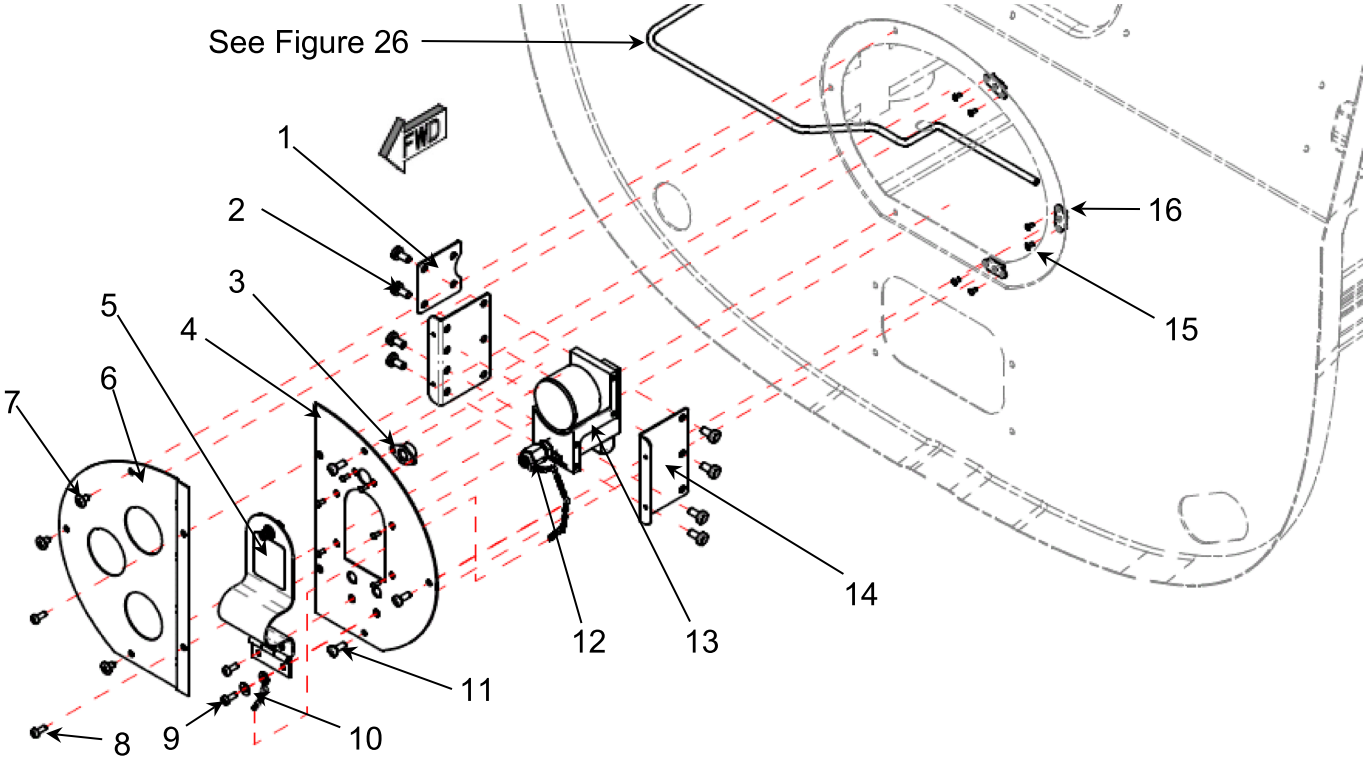

Figure 33 - Filler Port Assembly

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 33	1	102N0414-1	Bracket, TKS Proportioning Valve (OPTIONAL)	All
Figure 33	2	MS 07084, MS 07052, Or MS 07060	Screw, 10-32 x 3/8 WH, Cd Stl (AN525-10R6) Screw, 10-32 x ½, PHP, SS (MS51958-63) Screw, 10-32 x 7/16, PHP, SS (MS51958-62)	All
Figure 33	3	HD 07104	Receptacle, Camloc (212-12N)	All
Figure 33	4	102N0412-1	Access Panel Oxygen	All
Figure 33	5	102N0415-1	Door Assembly, Oxygen Filler	All
Figure 33	6	102N0411-1	Access Panel, Modification	All
Figure 33	7	-	See Cirrus IPC for Access Panel Screws	All
Figure 33	8	MS 01513	Screw, 6-32 x 3/8 PHP (MS35206-228)	All
Figure 33	9	MS 01513	Screw, 6-32 x 3/8 PHP (MS35206-228)	All
Figure 33	10	MS 01099	Flat Washer, #6 (AN960-6 or NAS1149FN616P)	All
Figure 33	11	MS 01708 Or MS 01743	Screw, 8-32 x ½ WHD, Cd Stl (AN525-832R8) Screw, 8-32 x 7/16, PHP (MS35206-244)	All
Figure 33	12	OX MI124	Filler Check Valve (MS22066-3)	All
Figure 33	13	102N0450-1	Remote Filler with Pressure Gage Assembly	All
Figure 33	14	102N0413-1	Bracket, Remote Filler	All
Figure 33	15	MS 07064	Rivet, Blind (CCR264xS-3-0x)	All
Figure 33	16	MS 01338	Nutplate, 8-32 Floating (MS21059-L08)	All

3.8.1 Alternate Filler Port and Line Installation

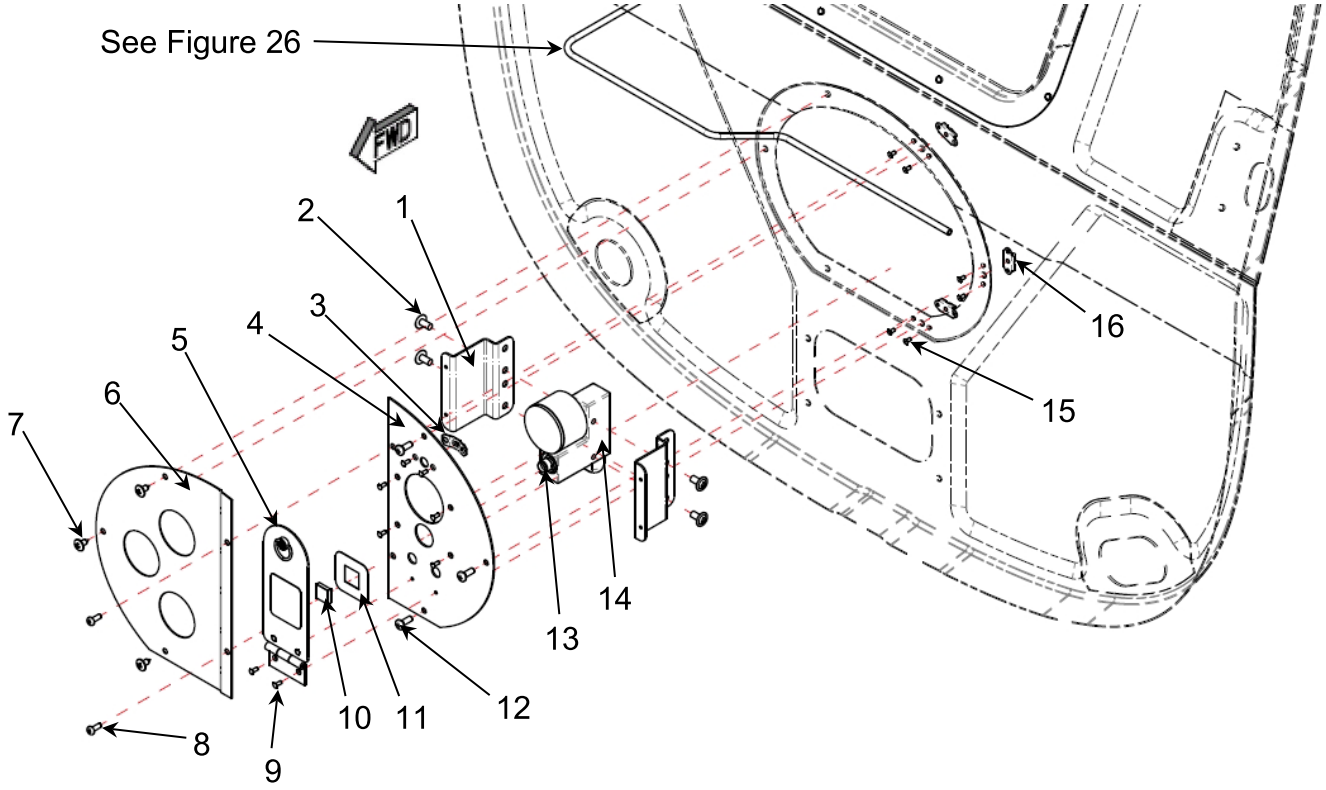

Figure 34 - Filler Port Assembly

Table 3

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 34	1	035N1413-1	Bracket, Remote Filler	All
Figure 34	2	MS 07084, MS 07052, Or MS 07060	Screw, 10-32 x 3/8 WH, Cd Stl (AN525-10R6) Screw, 10-32 x ½ PHP, SS (MS51958-63) Screw, 10-32 x 7/16 PHP, SS (MS51958-62)	All
Figure 34	3	HD 07276	Recept, ¼ Turn, Southco (82-35-295-15 or 82-35-295-20)	All
Figure 34	4	102N0453-1	Access Panel, Oxygen, Flat Door	All
Figure 34	5	035N0415-1	Door Assembly, Flat - Oxygen Filler	All
Figure 34	6	102N0411-2	Access Panel, Modification, wide	All
Figure 34	7	-	See Cirrus IPC for Access Panel Screws	All
Figure 34	8	MS 01513	Screw, 6-32 x 3/8 PHP (MS35206-228)	All
Figure 34	9	MS 01350	Rivet, 3/32 x ¼ (MS20426AD3-4)	All
Figure 34	10	HD 07277	Bumper, square, silicone (3592K6)	All
Figure 34	11	035N0425-1	Placard, Bumper Locator	All
Figure 34	12	MS 01708 Or MS 01743	Screw, 8-32 x ½ Washer Head (AN525-832R8) Screw, 8-32 x 7/16 PHP (MS35206-244)	All
Figure 34	13	OX 020245	Filler Check Valve (MS22066-1)	All
Figure 34	14	035N0210-1	Remote Filler with Pressure Gage Assembly	All
Figure 34	15	MS 07064	Rivet, Blind (CCR264xS-3-0x)	All
Figure 34	16	MS 01338	Nutplate, 8-32 Floating (MS21059-L08)	All

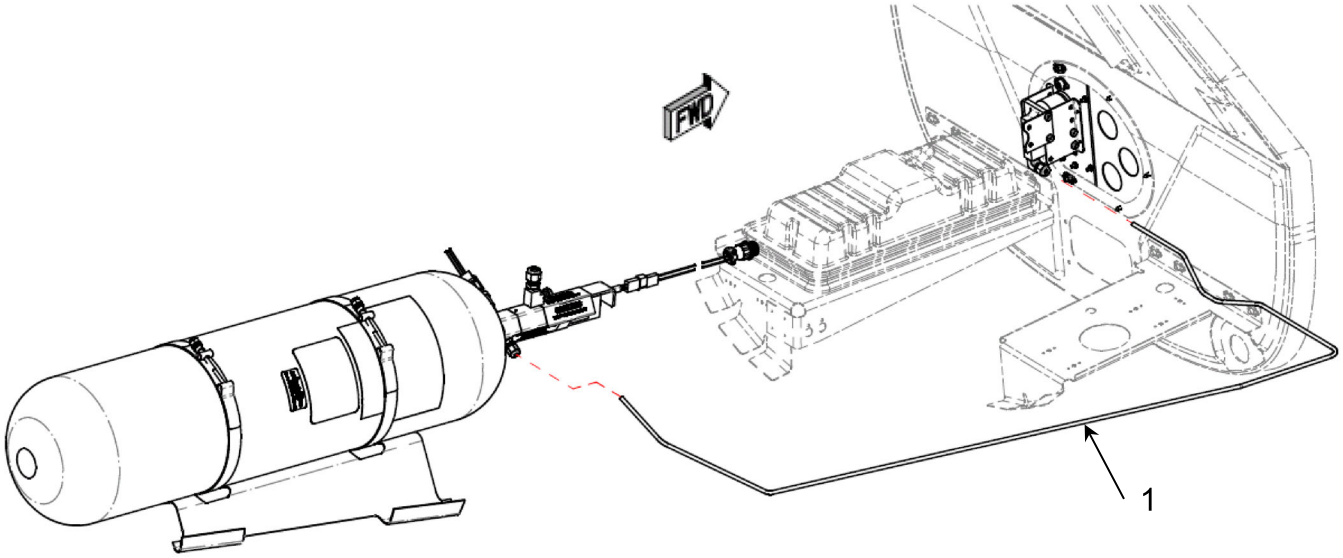

Figure 35 - High-Pressure Line Installation

Fig.	Item	PFI Part Number	Nomenclature	Effective
Figure 35	1	102N0420-1 Or 102N0420-2 Or 102N0421-1	High Pressure Oxygen Line Note: 102N0421-1 replaces 102N0420-1 and 102N0420-2. Cable tie mounts may need to be relocated for a new line installation.	All