

# **KELLY AEROSPACE**

## **Thermal Systems**

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The latest revision of the maintenance manual can be obtained from the Kelly Aerospace website at [www.kellyaerospace.com](http://www.kellyaerospace.com).

In the event Internet access is not available, please contact the Customer Service Office for inquiry or a copy of the latest revision:

Kelly Aerospace  
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## 1.0 SECTION: INTRODUCTION

This document identifies the instructions for continued airworthiness for the modification of the above aircraft by installation of the Kelly Aerospace Air Conditioning System.

**Applicability:** Applies to aircraft altered by installation of Kelly Aerospace Air Conditioning System

**Distribution:** This document should be a permanent aircraft record.

## 2.0 SECTION: DESCRIPTION OF THE ALTERATION

The Kelly Aerospace Thermacool Air Conditioning System is installed in the aircraft as a remote-mount unit in the tail cone of the aircraft. Conditioned air is ducted through a custom headliner and hat rack block off assembly. Pilot control of the air conditioning is through the climate control unit, located on the copilot's instrument panel. In the T182T Models the oxygen bottle is moved to the baggage compartment to accommodate the air conditioning components. In the 182Q and 182R installation involves an alternator upgrade and the addition of equipment to the aircraft electrical bus.

## 3.0 SECTION: CONTROL / OPERATION INFORMATION

### 3.1 Air conditioning System

The system is operated through temperature selection on a climate controller located on the right side of the instrument panel. There is both a fan mode only and a cooling mode.

Before testing the air-conditioning system, assure that all electrical connections are tight and all loose items are secured. With an external source of power connected to the aircraft control the operation of the air conditioning system using the Climate Controller located on the instrument panel.

Monitor the system voltage, amperage, and refrigerant flow. In a properly charged and properly installed system, the voltage should be approximately 28 VDC. The condenser fan should draw approximately 4.8 amps and the evaporator fan should draw approximately 4.0 amps and the entire system should draw approximately 35 Amps at 85 deg F. The current draw will vary with temperature. At 100deg F the system will draw approximately 40 amps and at 65 deg F approximately 31 amps.

With the engine running, the operator may select the operation mode of the air-conditioning by adjusting the Climate Controller located in co-pilots side of the instrument panel. The TEMP switch varies the temperature set point for the air-conditioning system. The FAN switch adjusts the air movement rate of the evaporator fan and the air circulation in the cabin. (On the A1235 Climate Controller the AC Annunciator will illuminate when the system is operating. The FAN Annunciator will illuminate when the circulating fan is operating. The FAIL Annunciator will illuminate if the compressor controller senses a fault condition.) The system may be operated during level flight, take off and landing or on the ground during taxi.

The air-conditioning system may be operated on the ground and without the engine running by connecting an APU or GPU to the ground power receptacle on the aircraft. The GPU or APU must be of sufficient capacity to run the A/C system with a minimum capacity of 45 amps at 28 volts. While operating on ground power the air-conditioning system will default to a maximum air-conditioning setting.

An external switch may have been installed to allow operation of the system without the need to unlock the aircraft. The switch for this has been mounted flush to the aircraft skin on the pilot side near the bottom left corner of the front windscreen. It is a piezo-electric switch and only requires a push with a finger to activate.

### 3.2 Oxygen System (T182T Only)

The Oxygen bottle has been moved from the rear empennage to the baggage compartment to accommodate the air conditioning components. The control system for the oxygen bottle is identical to the original Cessna installation.

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The attachment points for the oxygen masks for pilot and co-pilot seat are identical to that of the original Cessna installation. The rear seat oxygen mask ports are now located on the oxygen bottle cover in the baggage compartment.

The Oxygen tank fill port has moved to the baggage compartment. The fill port is identical to that of the original empennage mounted fill port. The fill port in the rear empennage will no longer be operational. The fill port hole will be an air intake for the air conditioning.

The procedure for maintaining and filling the oxygen tank is identical to that of the original Cessna installation with exception to the fill port location. Perform Oxygen System Functional Testing and System Leak Tests as per Chapter 35 of the Cessna 182T/T182 Maintenance manual as required.

The cover for the oxygen bottle is sheet metal and is limited to holding 30 pounds of baggage. See placard AC-00134 on the aircraft wall in the baggage compartment above the oxygen cover box.

#### 4.0 SECTION: MAINTENANCE / SERVICING INSTRUCTIONS

There are no maintenance requirements for the Air-conditioning System outside of normal 100hr/Annual inspection intervals or during routine maintenance.

Perform a system functional test after any maintenance is performed on the air-conditioning system.

**Note:** Before inspections or maintenance are performed it is the responsibility of the owner/operator and maintenance agency to assure that they are in possession of the latest revision of the applicable documentation and drawings.

#### CHARGING

The Air Conditioning System should contain 32 – 36 oz of R-134A Refrigerant. There are no substitutions permitted. The service ports are located above the hat rack near the evaporator. The small service port is the high pressure side and the large service port is the low pressure side.

**Caution: It is vital that the compressor is NOT operated while the system is under vacuum. Doing so will instantly damage the compressor.**

Reduce system to atmospheric pressure (Bleed off nitrogen charge slowly to prevent condensation if the system has been pressure checked). Evacuate system with a vacuum pump to 29" hg or better for at least two hours. Weigh in the required amount of R-134A refrigerant.

#### 5.0 SECTION: TROUBLESHOOTING

Failures of the Kelly Aerospace Thermacool Air Conditioning System can include but may not be limited to the following items:

- 1) Fan motor failure, characterized by no or little airflow. Corrective action: Troubleshoot the fan motor wiring, relay and fan for proper operation, repair or replace as necessary.
- 2) Compressor failure, characterized by low amp draw, or little cold air output. Corrective action: Troubleshoot compressor and compressor controller and wiring, repair or replace as necessary.
- 3) Low or no refrigerant, characterized by little or no cold air. Corrective Action: Inspect system for leaks, repair as necessary, and service system appropriately with R-134A refrigerant.
- 4) Any or all of these probable failures require inspection as necessary, or system must be secured and placarded until repaired.

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## 6.0 SECTION: REMOVAL AND REPLACEMENT INFORMATION

Refer to the Kelly Aerospace Thermacool Air Conditioning System Installation Manual.

When replacement of any refrigerant containing device is necessary, i.e. compressor or evaporator, it is necessary to evacuate the refrigerant prior to removal. An EPA approved refrigerant evacuation machine is required. Prior to recharging the system with refrigerant, the system must be evacuated. Allow the vacuum source to remain connected for a minimum of one hour to assure there are no leaks and verify system integrity.

## 7.0 SECTION: DIAGRAMS

A list of all applicable diagrams can be found in document NC-08-007.

All drawings and diagrams will be provided by Kelly Aerospace Thermal Systems. These may be obtained by contacting Kelly Aerospace by calling 440-951-4744 or fax 440-951-4725

## 8.0 SECTION: SPECIAL INSPECTION REQUIREMENTS

Inspect the system during 100 Hr and/or Annual inspections. There are no servicing requirements for the Air-conditioning System outside of normal 100hr/Annual inspection intervals or during routine maintenance.

Remove necessary access covers per the ASM.

During the annual or 100 hr inspections check for the following items:

1. Security of attachment of all components.
2. Evidence of any leaks.
3. Fretting or cracking of any sheet metal structures.
4. Insect or animal nests in condenser or evaporator sections.
5. Bent or obstructed fins on the condenser and evaporator coils.
6. Loose or missing hardware.
7. Loose or chaffing tubing.
8. Loose or chaffing wires.

## 9.0 SECTION: DATA RELATED TO STRUCTURAL FASTNERS

Plenum installation should match factory rivet spacing and reference AC43.13-1B. Also, refer of Cessna Maintenance Manual.

## 10.0SECTION: OVERHAUL PERIOD

No additional overhaul time limitations.

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## 11.0SECTION: AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations Section is FAA APPROVED and Specifies maintenance required under FARs parts 43.16 and 91.403 unless an alternate program has been FAA APPROVED. There are no additional Airworthiness Limitations as a result of this alteration.

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