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Install manual/Service Letter

Doc No: NC-08-006 Rev W

EFFECTIVITY

Cessna Aircraft Types: 182Q, 182R, 182S, 182T, T182T

REVISION HISTORY

REV	DESCRIPTION	DATE
C	See ECN #09-052	15 May 2009
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H	See ECN #10-079	16 Mar 2011
I	See ECN #11-023	14 July 2011
J	See ECN #11-055	18 Nov 2011
K	See ECN #11-064	05 Jan 2012
L	See ECN #12-035	27 Mar 2013
M	See ECN #13-010	07 July 2013
N	See ECN #13-024	28 April 2014
P	See ECN #14-025	02 Dec 2014
Q	See ECN #15-011	27 Jun 2016
R	See ECN #17-013	27 Jun 2017
S	See ECN #17-025	21 Aug 2017
T	See ECN #18-020	04 Oct 2018
U	See ECN #19-003	09 Jan 2019
V	See ECN #21-013	05 Jan 2022
W	See ECN #22-005	14 Mar 2022

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PURPOSE

For installation of air conditioning system.

COMPLIANCE

Not mandatory, shall be complied with at aircraft owner’s discretion.

APPROVAL

FAA approval has been obtained on all technical data in this Service Letter that affects type design.

RESOURCES

100 hours of labor are required to comply with this Service Letter.

SYSTEM OVERVIEW

The Cessna 182T/T182T is a single alternator, single bus electrical system. The existing system uses an ASG12000-3 / 9910592-3, 95 amp alternator, which is mounted on the right front side below the engine cooling baffling. The Air Conditioning System is powered by the primary alternator. Some load shedding is required when running the air conditioning system. Refer to the AFMS for the electrical load limitations.

The Cessna 182S and some 182T models use a 9910591-11, 60 amp alternator. The alternator must be upgraded to an ASG12000-3 / 9910592-3 95 amp alternator as shown in the Cessna Aircraft Company MODEL 182/T182 Illustrated Parts Catalog. The required alternator and mounting parts are included in the Kit.

The Cessna 182Q and 182R use a C611503-0102, 60 amp alternator. The alternator must be upgraded to an ASG12000-1, 95 amp alternator. The mounting and installation of the 95 amp alternator is the same as that for the current 60 amp alternator. The required alternator is included in the Kit.

The air conditioning system consists of an electric hermetically sealed compressor, condenser and evaporator all located on or behind the hat rack. 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. R-134a is used as a refrigerant for the system. All R-134a lines are located at or behind the hat rack. Power is run from the second alternator under the floor to the components in the rear of the aircraft. A toggle switch near the climate controller is used to turn the system on and off.

MATERIAL INFORMATION

The following documents list the materials required for compliance with this Service Letter. Parts can be obtained from Kelly Aerospace Thermal Systems (KATS).

NC-08-039 (KATS)

INSTRUCTIONS FOR COMPLIANCE

1. Preparation

A. Ensure all documentation is the latest revision.
B. Conduct a parts inventory to ensure all required items are present.
C. Remove aircraft battery per the Cessna Aircraft Maintenance Manual (AMM).
D. Remove the engine cowling per AMM.
E. Secure external power receptacle to prevent unwanted power on aircraft busses (e.g. tape over receptacle with non-metallic masking tape with label warning of hazard).

F. Remove the following components utilizing the AMM and store securely:
1) Front and rear seats
2) Headliner to include upper aft window molding left and right, and left and right aft passenger window molding (182S, 182T and T182T ONLY)
3) Remove left and right former from overhead and discard (182T and T182T Only)
4) Hat rack close out panels and carpet
5) Cabin carpet
6) Tail cone avionics access panel
7) ELT and antenna coax
8) Aft black plastic close out
9) Glove box
10) LH rudder pedal cover
11) Floor inspection panels when/as required
12) Lamar electrical box cover
13) T182T ONLY
    a. O2 bottle (T182T ONLY)
    b. O2 bottle fwd. mount brackets and both band clamps
    c. Aft passenger O2 outlets and supply lines

G. For all references to wire stripping, crimping and tying procedures refer to AC 43.13-1B chapter 11.

H. For all references to riveting procedures refer to AC 43.13-1B chapter 4.

I. Consumables to be procured locally
1) Paint, as required for touch up and re-coloring N numbers
2) Masking tape
3) Assorted sizes of tie wraps
4) M22759/16 wire or equivalent in the sizes of AWG 8, 10, 16 and 18.

J. Torque Specifications

Unless otherwise specified, use the following torque values.	
6-32 UNC	7-9 inch-lbs.
8-32 UNC	17-19 inch-lbs.
10-24 UNC	20-22 inch-lbs.
10-32 UNF	28-31 inch-lbs.
1/4-20 UNC	70-75 inch-lbs.
1/4-28 UNF	90-94 inch-lbs.
5/16-24 UNF	120-145 inch-lbs.
3/8-24 UNF	200-250 inch-lbs.
7/16-20 UNF	520-630 inch-lbs.

Table 1 – Torque Specifications

2. Alternator Upgrade (182S, 182T and T182T when required only)

A. Reference Cessna Aircraft Company Illustrated Parts Catalog Section 24-20-00, Figure 01.
B. All 182S models and some 182T models come equipped with alternator and components as shown on Detail A, 18280001 thru 182881197.
C. Parts are provided in the kit to upgrade the alternator and components to those shown on Detail A, 18281198 and on
   1) Item 8, use ASG12000-3
   2) Item 9, reuse Item 3, 0750220-1 Bolt
   3) Item 10, reuse Item 5, S1450-6-14-080 Washer
   4) Item 11, use S1915-2 Capacitor
   5) Item 12, use 25-040390 Belt
   6) Item 12A, use 0750289-01 or AL-00144
   7) Item 13, reuse Starting Link
   8) Item 14, use AN7-42A Bolt
   9) Item 15, reuse Item 4 AN363-720 Nut
   10) Item 16, reuse Item 6 NAS1149C0763R Washers.
   11) Use 40024 Plug, Alternator Field and attach field and ground wires as required.
   12) Ensure Alternator wiring size is sufficient per Cessna AMM.

3. Alternator Upgrade (182Q & 182R Only)

This installation involves the addition of equipment to the aircraft electrical bus. A power assessment should be conducted to verify available aircraft electrical power. The aircraft load analysis will take into account variations in equipment installed on individual aircraft. For aircraft needing additional electrical capacity see drawing #AL-00067 for details on installation of ASG12000-1 (Alternator). Electrical power should be disconnected from the aircraft to reduce the risk of electrical shock or spark induced fire.

A. Parts are provided in the kit to upgrade the alternator and components.

   1) Replace alternator with ASG12000-1 Alternator
   2) Reuse 0750220-1 Bolt
   3) Reuse S1450-6-14-080 Washer
   4) Use S1915-2 Capacitor
   5) Reuse existing belt
   6) Replace Alternator Arm with AL-00143 Alternator Arm
   7) Reuse Alternator Pivot Arm Bracket
   8) Replace bolt with AN7-42A Bolt
   9) Reuse Item AN363-720 Nut
   10) Reuse NAS1149C0763R Washers.
   11) Use 40024 Plug, Alternator Field and attach field and ground wires as required.

4. Installation of Access Panel Doubler (182Q Only)

A. Referencing Drawing AC-00327 for proper location; tape AC-00328 template to right side of tail cone, see Figure 1.

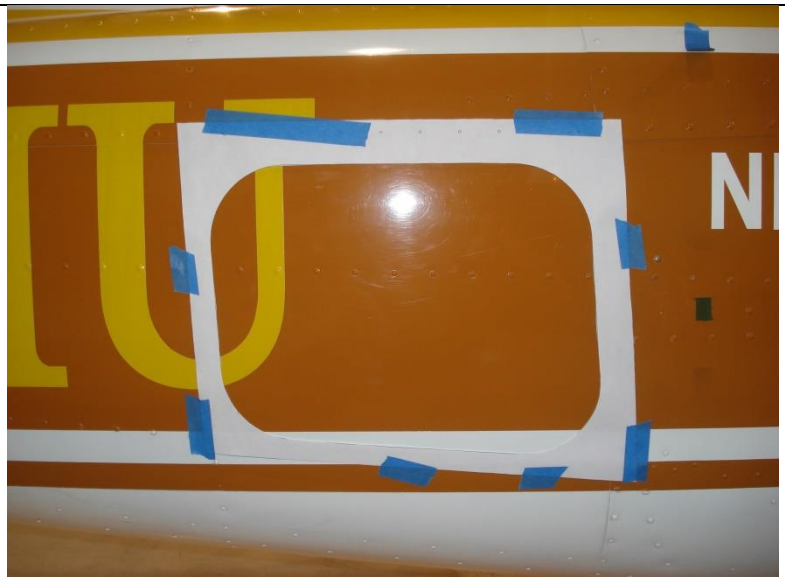


Figure 1 - Access Panel Template

B. Cut opening in tail cone per Drawing AC-00327 and Template AC-00328. See Figure 2.

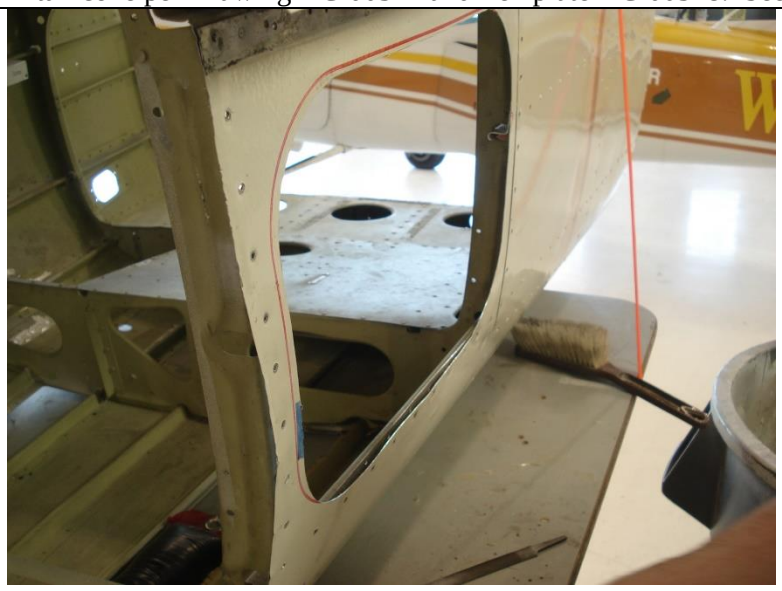


Figure 2 - Access Panel Cutout

C. Remove existing aircraft rivets per AC-00327, see Figure 3.

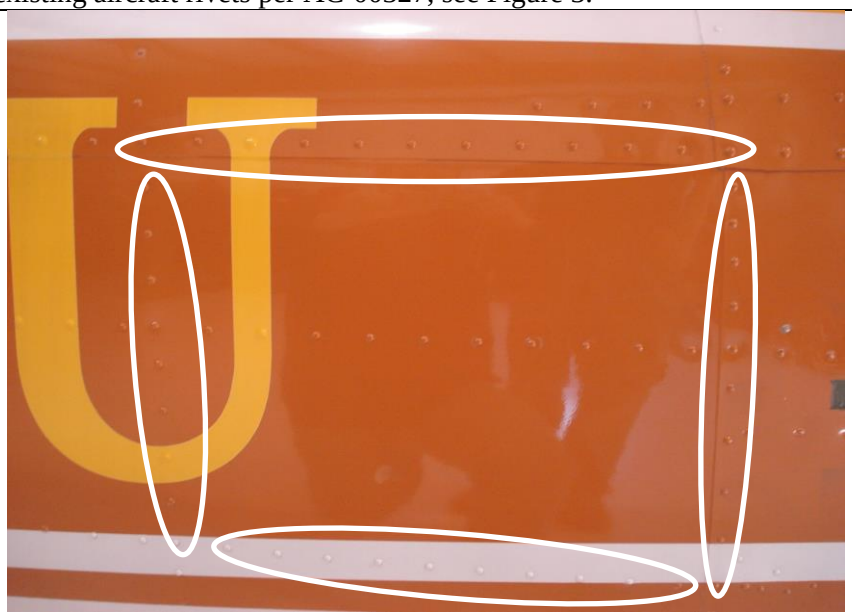


Figure 3 - Remove Existing Rivets

D. Match drill doubler to existing rivet holes and install per Drawing AC-00327, see Figure 4.

Figure 4 - Install Access Panel Doubler

5. Installation of components

A. Existing aircraft rivets will need to be removed as required attaching ELT bracket, circuit breaker bracket and condenser/compressor assembly. Reinstallation with longer rivets may be required.
B. Remove ELT mounting bracket from left tail cone. Remove buzzer mount from ELT bracket and mount on new ELT bracket AC-00120 per Dwg# AC-00146.
C. Install bracket AC-00120 Per Dwg# AC-00146. See Figure 5.

Figure 5 – Moving of ELT Mounting and Buzzer Mount

D. Install Condenser/Compressor Assembly per Dwg #AC-00080 and Figure 6 below.

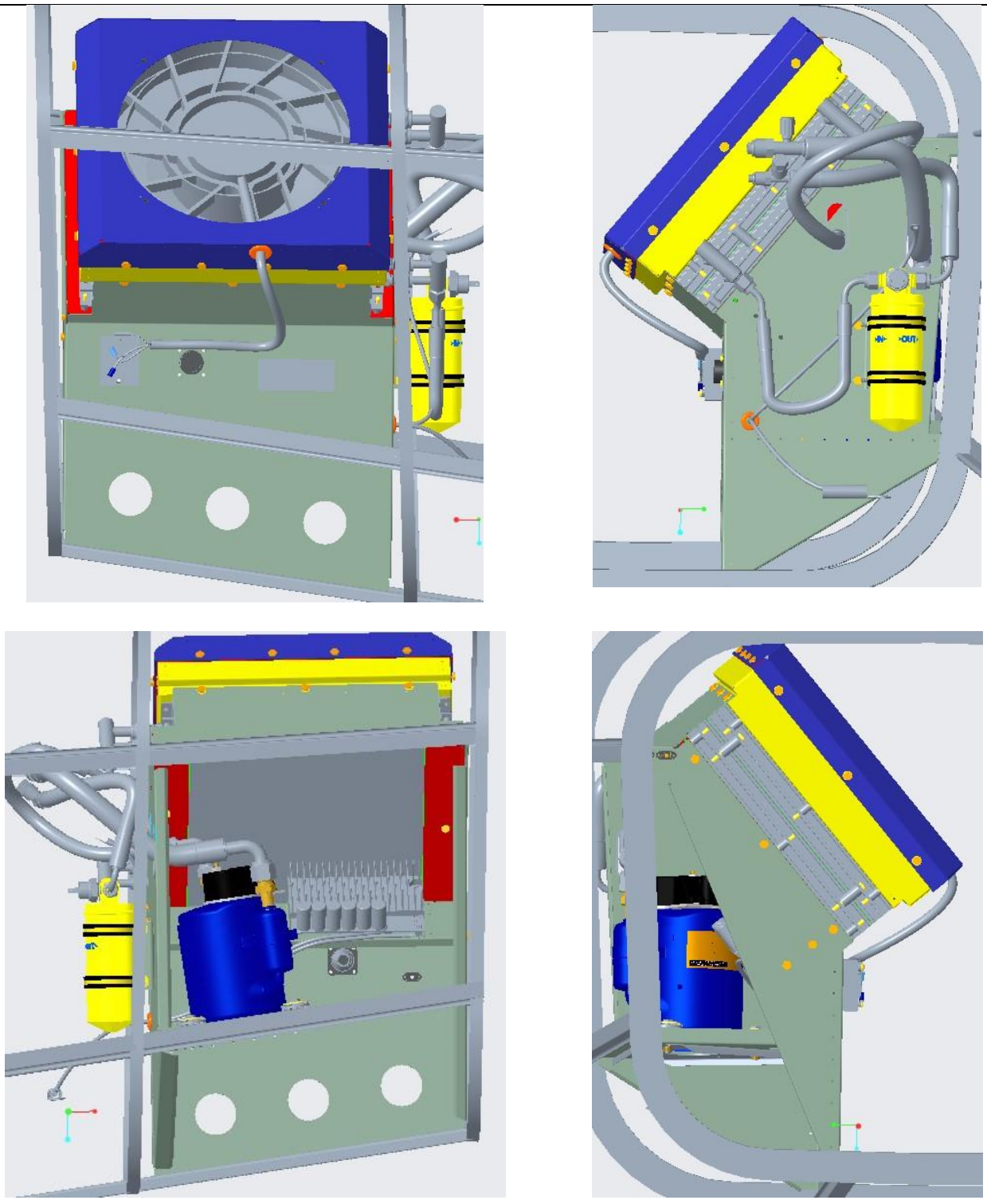


Figure 6 – Condenser/Compressor Assembly

E. Install Evaporator Assembly.

1) For 182R, 182S, 182T and T182T only; reference Dwg # AC-00108. See Figure 7.

Figure 7 – Evaporator Assembly 182R, 182S, 182T and T182T

2) For 182Q only; reference Dwg# AC-01555. Mount the Evaporator Assembly to the radio shelf next to the battery using a minimum of (6) #10 mil-spec screws or bolts and large area mil-spec washers. See Figure 8. Attach the (2) 05-29910 SCAT-10 2.5" Ducts to the Evaporator Assembly with (2) NAS1922-0275-3 or 200-44H Hose Clamps. Leave the other ends loose for future attachment to the Overhead Vent Assembly.

Figure 8 - Evaporator Assembly Installation 182Q

F. Mount Cabin temp sensor in AC-00090 as detailed in Dwg# AC-00108 Sheet 1 View H-H.
G. Install circuit breaker bracket AC-00106 per Dwg# AC-00146.
H. Reference Figure 9 below for suggested location of CB-1 or CB-2 climate controller.

Figure 9 – Climate Controller Locations

I. Install Climate Controller.
   1) Ensure chosen location has adequate clearance behind panel for wiring harness loop
   2) For CB-1 Temperature Control Panel reference Dwg# CB-1, cut opening as shown and snap controller into the hole.
   3) For CB-2 Temperature Control Panel reference Dwg# CB-2, cut opening as shown and snap controller into the hole.

J. Drill holes for external (Optional) Piezo Electric Switch and Evaporator Drain Line where required. Figure 10 shows typical installations.

Blue dot is Typical (Optional) Piezo Electric Switch Installation

Aft Most Drain (top of picture) Line is Typical Evaporator Drain Installation

Figure 10 – Piezo Switch and Evaporator Drain

K. Install the following components below the J Box. Reference Figure 11 and Figure 12 below for location details.

NOTE:
Be sure selected locations for installation of components on firewall have adequate clearance for installation tools on both sides of firewall.

1) 70 Amp Fuse: P/N: 0498070.M
2) Fuse Holder: P/N: 0498900.TXN
3) Cover the hosel and bare wire of the AWG 6 / #10 ring terminal crimp with M23053/5-107-0 as shown on Figure 11 below.
4) Install firewall feed through per manufacturer's recommendation (TTP4200-260-0469).

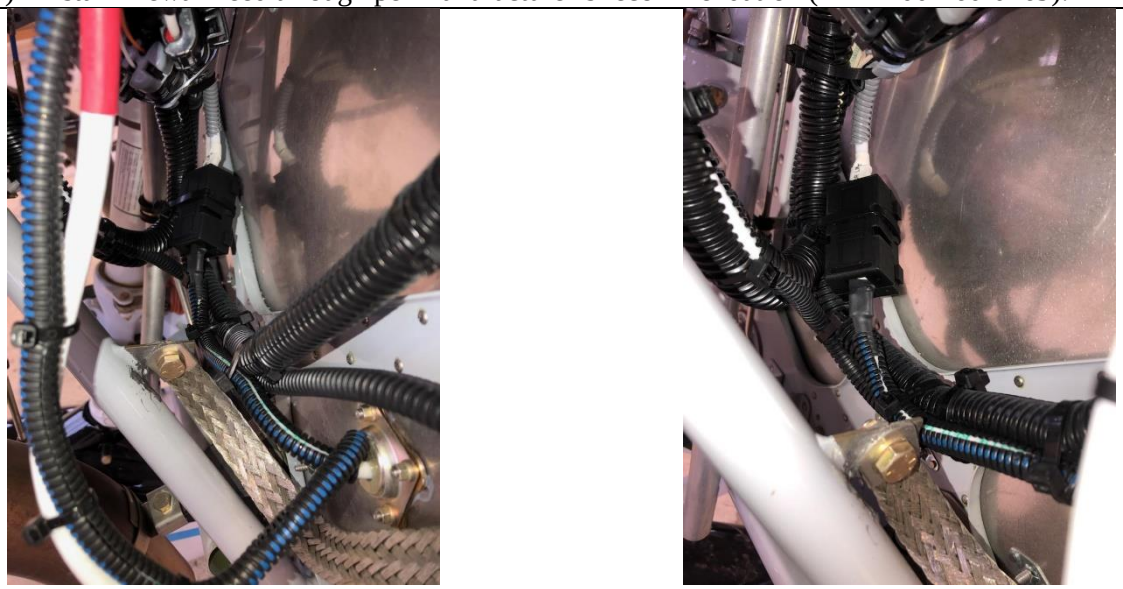


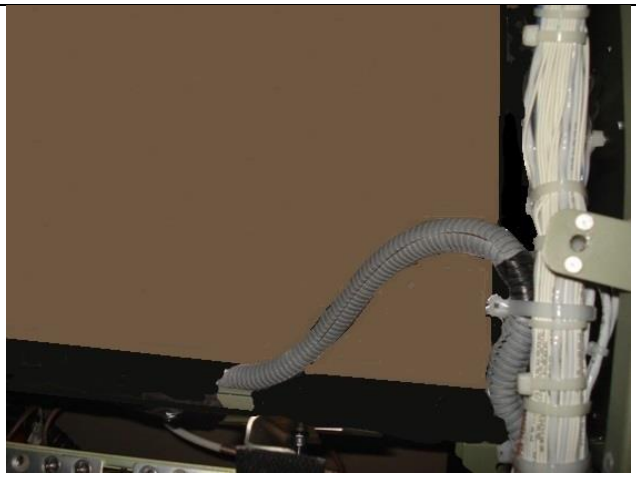
Figure 11 –Location of 70 Amp Fuse Below J Box on Firewall

Figure 12 - Location of Firewall Feed Through

L. O2 bottle relocation (T182T ONLY) see NC-14-012 Cessna 182S, 182T & T182T Headliner Installation and O2 Bottle Relocation Instructions.
M. Headliner Installation (182S, 182T and T182T ONLY) see NC-14-012 Cessna 182S, 182T & T182T Headliner Installation and O2 Bottle Relocation Instructions.

6. Modification of existing components

A. Modify tail cone access door per Dwg# AC-00111.
B. Assemble tail cone access door per Dwg# AC-00109.
C. Modify 182 skin and assemble the plenum inlet per Dwg# AC-00241.
D. Paint reworked areas per AMM as required.
E. Trim the original hat rack close outs to allow access to the circuit breakers and allow the hoses and wiring to pass through. Seal with 4217-W3 cork tape and 4218-W3 foam tape. See Figure 13 for examples of 182R, 182S, 182T and T182T models.



Hat Rack Sealing and Closeout from Rear

Sealing in Hat Rack from Front

Figure 13 – Hat Rack Sealing

F. For 182R, remove ELT placard and reinstall on AC-00266. For 182S, 182T and T182T, remove ELT placard and reinstall on AC-00113. See Figure 14.

Figure 14 – ELT Placard Location

G. For 182R, 182S, 182T and T182T, trim hat rack carpet as required to fit around AC-00090 Evaporator Support Assembly. See Figure 15.

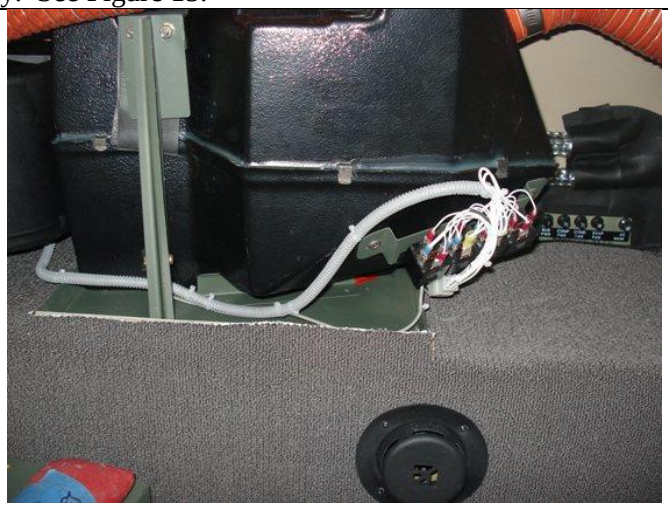


Figure 15 – Hat Rack Carpet Modification

H. For 182S, 182T and T182T only, attaching brackets AC-00143 to headliner above hat rack can be done with screws and nuts or rivets so that AC-00113 can be installed simply by Velcro fasteners or sheet metal screws through AC-00113 to AC-00143.

I. For installation of 182R block off see AC-00269. For installation of 182S, 182T and T182T block off see AC-00291. 182Q original block off is reused.

J. For the **182Q *ONLY***; complete the following steps for the Overhead Vent installation.
1) Place the AC-01536 Cutout Template against the bottom of the AC-01535 Vent Assembly and carefully match drill the (3) Ø.098 holes with a #44 drill.
2) Paint the Vent Assembly and 9688K311 plug if required to match the aircraft interior color.
3) Attach 8507K44 edge trim around the edges of the Vent Assembly.
4) Remove coat hanger. Seat the AC-01535 vent assembly on the angled trim so that the coat hanger mounting hole is aligned with the mounting hole in the vent assembly. If the upper trim of the rear window interferes, cut out notches taking care not to cut into the air passage way. Mark the location of the vent on the window. Mask window edges as required to paint a strip down the center of the window to conceal the duct from outside the aircraft. Abrade surface to be painted with Scotch Bright or equivalent. Clean surface with Windex or equivalent. Spray surface with Bulldog Adhesion Promoter or equivalent. Paint with Satin Black SEM interior paint or equivalent.
5) Seat the AC-01535 vent assembly on the angled trim so that the coat hanger mounting hole is aligned with the mounting hole in the vent assembly and temporarily attach the Vent Assembly with the AN3-4A bolt and AN970-3 washer. Match drill the (3) Ø.098 holes into the angled trim with a #44 drill. Remove the Vent Assembly, and using the three drilled holes as a guide, align the AC-01536 Cut-out Template and mark the (2) Ø2.875 holes. Cut the marked holes.
6) Route the (2) 2.5" SCAT ducts from the Evaporator Assembly through the holes and connect them to the hose adapters on the bottom of the Vent Assembly with (2) NAS1922-0275-3 or 200-44H Hose Clamps. Trim SCAT ducts to size as required.
7) Attach Vent Assembly to rear coat rack mounting hole with AN3-4A bolt and AN970-4 washer and the base of the Vent Assembly to the angled trim with (3) 92470A110 sheet metal screws.
8) After the Vent Assembly is securely attached to the aircraft, plug the access hole in the middle of the Vent Assembly with the 9688K311 plug.

7. Wiring

A. Reference AC-00696 and AC-00697 when installing a CB-1 controller. Reference AC-01291 when installing a CB-2 controller.

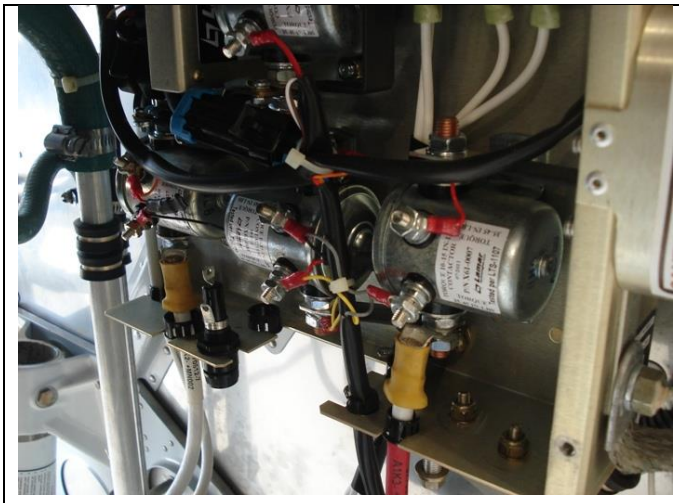
1) All harness runs below the cabin floor should be inside conduit.
2) The CB-1 or CB-2 harness runs from copilot's instrument panel to the left aft tail cone by following the existing wiring bundles and crossing over the center line of the aircraft under the avionics/hat rack area.
3) ENSURE NO CONTROL CABLE INTERFERENCE
4) Sufficient wire bundle length has been provided to accommodate variations in wire routing.
5) Terminate harness per Dwg# AC-00697 or AC-01292.
6) For **182Q ONLY**, the 2 wires labeled "FRZ SENS" on the AC-00700 Harness will be connected to the Thermostat included with the 2233101 Evaporator Assembly instead of MT0759 as shown on AC-00696 and AC-01291.

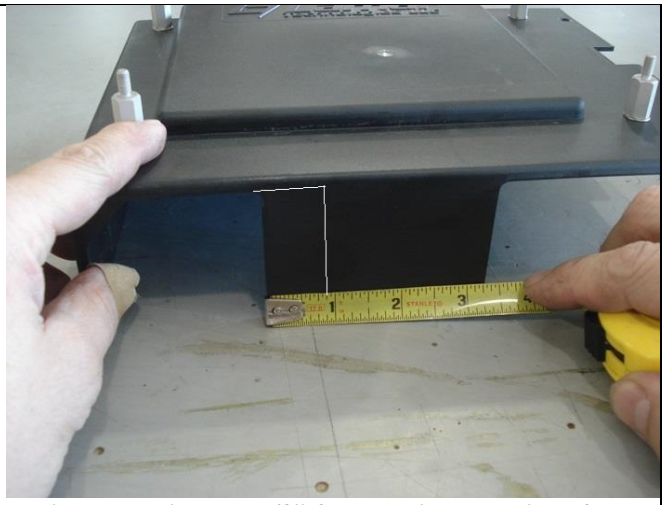
B. Lamar box interface

CAUTION:

All wiring added inside Lamar box will be wrapped with spiral wrap and secured where required to ensure wires are protected from chaffing, sharp bends etc. Wires exiting the Lamar box will be protected with snap bushings in open spaces. Care is to be taken in routing wires so as to avoid overcrowding; this may require wiring to be routed behind relays etc.

1) See applicable Dwg# AC-00696 or AC-01291 for wiring details.
2) See Figure 16 for modifications of the Lamar box and cover.





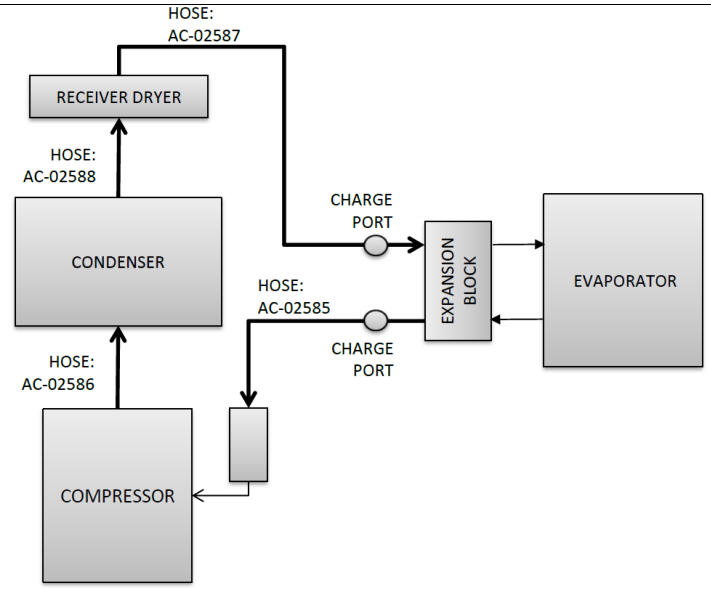
Trim approximately 7/8" from the inboard side of the bottom cover to expose the hole for the wire run

Figure 16 – Junction Box Modification

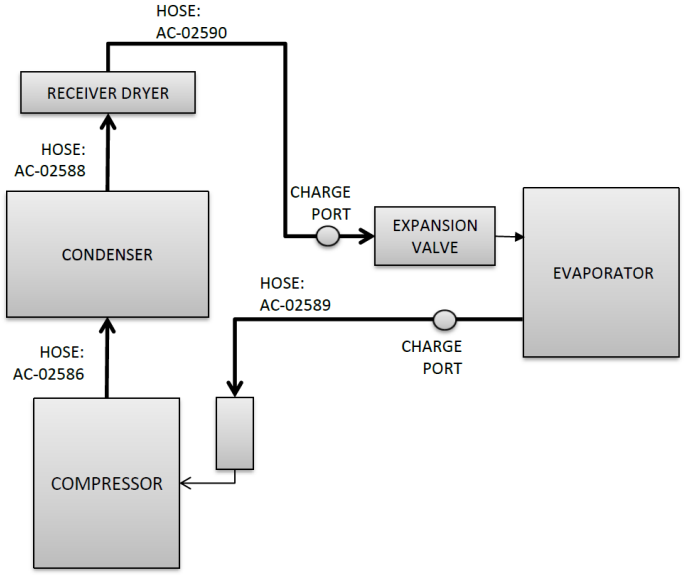
C. Compressor controller harness AC-00699 when installing CB-1or CB-2 Controller.
   1) Install in condenser/compressor plenum as shown in Dwg# AC-00080
   2) See Dwg# AC-00696 or AC-01291 for detail.
D. External power harness AC-00125 (Optional).
E. See applicable Dwg# AC-00696 or AC-01291 for all other wiring details.

8. Servicing

A. Only qualified personnel with proper equipment may service this air conditioning system.
B. Connect condenser, evaporator and compressor hoses per Figure 17 below.



R-134A HOSE LAYOUT FOR 182R, 182S, 182T and T182T AC SYSTEM



R-134A HOSE LAYOUT FOR 182Q AC SYSTEM

Figure 17 - R-134a Hose Layout

C. Wrap lines where required to prevent sweating with cork insulation tape P/N 4217-W3.
D. Evacuate system and ensure no system leakage prior to charging with R-134a.
E. Charge system with 34 oz. +/- 2 oz. of R-134a.

9. Reassembly of aircraft

A. Reinstall the following components utilizing the AMM.
   1) Front and rear seats
   2) Cabin carpet
   3) Tail cone avionics access panel
   4) Aft black plastic close out trim as required
   5) Glove box
   6) LH rudder pedal cover
   7) Floor inspection panels when/as required
   8) Lamar electrical box cover
   9) ELT and antenna coax
   10) Exhaust pipe and waste gate (T182T ONLY)
B. Reinstall aircraft battery per the AMM.
C. Reinstall the engine cowling per the AMM.

NOTE:
Cabin heat air has been relocated on T182T to Flange installed on lower cowl. Install with original hose clamps.

10. Perform operational tests of air conditioning system.

A. Plug in external power and energize.
B. Ensure cabin temp controller master switch is in the “on” position.
C. Cabin temp should be displayed.
D. Select fans up and fan speed should correspond.
E. Select fans “zero” fans should stop.
F. Select ac “on” and drive cabin temp requested below ambient temp by at least 10 degrees F.
G. Headliner outlets should flow air 20-30 degrees cooler than ambient and fan speed will increase to max.
H. Deselect ac “on” leaving air conditioning master switch in the “on” position
I. Cycle external power.
J. Rub piezo electric switch located near the external power plug (if installed).
K. Air conditioning should come on full cold and green ac annunciation will be flashing.
L. Again headliner outlets should be 20-30 degrees cooler than ambient.
M. Unplug external power and air conditioning will turn off.
N. Check that water is coming from evaporator drain line, water will not be present only if atmosphere is extremely dry, so if no water is flowing check for hose continuity to evaporator plenum. A steady stream of air should be felt at the evaporator drain line also as the evaporator fan pressurizes the plenum and forces condensed water out.
O. If any items do not operate as described, troubleshoot system and correct discrepancies.
P. Aircraft will need to be located in a run up area to complete this section.
Q. Utilizing qualified personnel operate the aircraft engine per the Pilot Operating Handbook.
R. Repeat items B) through L) of this section to ensure operation of the secondary alternator.
S. If further assistance is needed contact Kelly Aerospace Thermal Systems Technical support at 440-951-4744.

11. Return to service

A. Perform compass swing deviation check as required by AC 43.13-1B chpt12 sec3.
B. Update aircraft Weight and Balance records.
C. Install Approved Flight Manual Supplement.
D. Complete FAA form 337.
E. Make aircraft log book entry.