Keith

Environmental Systems

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SERVICE AND MAINTENANCE MANUAL

AIRCONDITIONING SYSTEM

REVISION E

JUNE 1, 1979

WEIGHT AND BALANCE SUPPLEMENT

MODEL: Cessna T210 Series w/95 Amp Alternator

SERIAL NUMBER:

REGISTRATION NUMBER:

ITEM	WEIGHT	ARM	MOMENT
1. Previous Empty Weight			
2. Add Airconditioner			
a) Compressor/Support Bracket	25.8	- 6.0	- 154.80
b) Evaporator Assy/Cover	19.5	120.2	2343.90
c) Condenser Assy/Dryer	19.0	175.6	3336.40
d) Air Ducts	4.0	55.5	222.00
e) Plumbing/Wiring/Hardware	5.0	80.8	404.00
	73.3	83.92	6151.50

New Aircraft Empty Weight

New Aircraft Empty Weight C.G.

New Aircraft Useful Load

DESCRIPTION - AIRCONDITIONING SYSTEM

Keith Products Airconditioning unit is composed to two major component installations: 1) the equipment package and 2) the evaporator package.

The Equipment Package comprises the compressor, drive motor, condenser fan, coil, and receiver drier.

The Evaporator Package consists of the evaporator coil, blower, blower drive motor, and the expansion valve.

The control for the system is located on the pilot's switch panel and consists of a simple on-off switch; some units carry a fan only position.

When the switch is placed in the ON position, the compressor, driven by an electric motor, compresses the Freon gas to a high pressure and high temperature. This gas is routed to the condenser where cooling from the fan removes heat from the gas, condensing it to a liquid. The liquid is then stored in the receiver drier, adjacent to the compressor, until it is used. The Freon is metered to the evaporator through the expansion valve at a rate to allow all the liquid to evaporate and return to the compressor at a reduced pressure. The cabin heat is absorbed from air passing over the evaporator cooling fins. See Figure No. 1.

CAUTION

WHEN THE AIRCONDITIONER IS TURNED OFF, IT IS RECOMMENDED THAT A MINIMUM OF THREE MINUTES ELAPSE BEFORE IT IS TURNED ON AGAIN: THIS ALLOWS THE COMPRESSOR HEAD PRESSURE TO BLEED OFF AND BRING THE STARTING LOAD TO NORMAL.

TROUBLE SHOOTING THE AIRCONDITIONING SYSTEM (Cont'd)

TROUBLE	PROBABLE CAUSE	CORRECTION
Noisy Compressor	Loose, torn or misaligned belt	Align or replace belt.
	Foreign material or damaged port in compressor	Remove and replace compressor.
	Compressor loose on bracket	Tighten compressor.
Noisy Fan	Fan striking housing	Check fan travel.
	Fan shaft bearings out	Replace bearings.

EVACUATION AND CHARGING PROCEDURES

The evacuation and charging procedures given are factory recommended. If followed, these procedures will give optimum results. The following equipment must be available to properly service the air-conditioning system.

a) Charging manifold and hoses

b) Refrigerant can adapter

c) R-12 refrigerant cans or R-12 cylinder

d) Vacuum pump capable or operating at least 28 to 29 inches Hg

e) 1/4" open end wrench

CONNECTING THE MANIFOLD AND HOSE

a) Remove caps from service ports on compressor

b) Connect compound gauge (low pressure) hose to suction port

c) Connect high pressure gauge hose to discharge port

d) Close valves on the charging manifold (turn clockwise)

RECHARGING THE SYSTEM

Whenever it becomes necessary to replace any of the refrigerant components or lines, the refrigerant pressure must be discharged.

Open oil filler plug in compressor until seal is broken and Freon escapes slowly.

CAUTION

EXERCISE CARE WHEN RELEASING REFRIGERANT GAS. THIS IS A HIGH PRESSURE SYSTEM: GOGGLES AND GLOVES SHOULD BE WORN FOR PROTECTION.

EVACUATION OF THE REFRIGERANT SYSTEM

a) Connect manifold and hose in accordance with Connecting Procedures.

b) Connect center hose from charging manifold to vacuum pump and turn pump on.

c) Open service valves halfway (turn counter clockwise) on compound gauge (low pressure).

d) Continue to pull a vacuum on the system for 30 minutes after compound gauge reaches 28 inches or more on vacuum gauge.

e) Periodically check for leaks by closing valves and verifying that system is holding vacuum.

NOTE

IN THE EVACUATING PROCEDURES GIVEN, THE SPECIFICATION FIGURE, 28 INCHES OF MERCURY OR MORE IS USED. THIS FIGURE IS ONLY ATTAINABLE AT OR NEAR SEA LEVEL. FOR EACH 1000 FEET OF FIELD ELEVATION WHERE THIS OPERATION IS BEING PERFORMED, LOWER THE SPECIFICATION FIGURE ONE (1) INCH.

f) Close hand valve (clockwise) on compound gauge.

g) Turn off vacuum pump and disconnect from charging hose.

CHARGING THE REFRIGERANT SYSTEM

a) Connect manifold and hose in accordance with Connecting Procedures.

CAUTION

USE ONLY R-12 IN THIS SYSTEM

b) Connect center manifold hose to R-12 can, using can adapter or R-12 cylinder. Open valve on can adapter or cylinder.

c) Slightly loosen connect of center hose at manifold to purge any air trapped in hose. (This should take approximately one second.) Tighten center hose connection.

d) Open low side valve and do not exceed 40 PSI on low side gauge.

NOTE

MOST OF THE FIRST CAN WILL BE PULLED INTO UNIT SYSTEM BY VACUUM.

e) Connect APU or start engines and turn on airconditioning system, refrigerant will begin to be pumped from the can into the condensing unit.

f) Charge to a High Pressure Reading as follows:

Ambient Temperature	High Side Pressure
80 F	150 - 170 psi.
90 F	175 - 195 psi.
95 F	185 - 205 psi.
100 F	210 - 230 psi.
105 F	230 - 250 psi.

(Low side reading should be 20 - 40 psi.)

CHARGE ONLY UNTIL THE SIGHT GLASS IN THE RECEIVER DRIER IS CLEAR OF BUBBLES.

g) Close hand valve (clockwise) on compound gauge and close valve on can adapter or cylinder.

h) Disconnect charging hoses from high side unit. (Some refrigerant trapped in the hoses will be expelled at this time and sound as though the system is leaking. This is normal.)

i) Back seat service valves (fully counter clockwise); replace caps on suction and discharge ports.

CLEANING INSPECTION AND REPAIR

A. Cleaning

1. The airconditioning components should be wiped clean with a cloth and a stream of low pressure dry air.

B. Inspection

To avoid invalidating warranty, the following procedure must be followed:

1. Dual Polyflex Belts

   a. After five (5) hours or airconditioning operation, tension belts to 30 pounds.

   b. Each time belts are removed and/or replaced, initial tension must be 30 pounds. After one-half (1/2) hour of ground operation, tension to 30 pounds. Run one-half (1/2) hour and tension - then follow 1.

2. Single 3/8" "V" Belt

   a. Maintain belt tension at 40-50 pounds. This is quivalent to deflecting the belt .3 inch, measured at the center span, with a 10 pound load being applied perpendicular to the belt.

   b. After installing a new belt, reset tension again after approximately one hour of operation.

Every 100 hours inspect the airconditioning system for the following:

1. Security of mounting
2. Compressor and fan belt or belts for proper tension
3. Sight gauge for proper refrigerant level
4. Empty condensate tank (Not all units)
5. Remove lint and grease from evaporator with a vacuum

C. Repair and Servicing

Repair to the airconditioning system is limited to the replacement of components.

SAFETY PRECAUTIONS

The refrigerant used in the airconditioning system is R-12. This refrigerant is non-explosive, non-inflammalbe, non-corrosive, has practically no odor, and is heavier than air. Although R-12 is classified as a safe refrigerant, certain precautions must be observed to protect parts involved and the person working on the unit.

SAFETY PRECAUTIONS cont'd

Liquid R-12, at normal atmosperic pressure and temperature, evaporates so quickly that it tends to freeze anything that it contacts. Care must be taken to prevent any liquid refrigerant from coming in contact with the skin and especially the eyes. R-12 is readily absorbed by most types of oil. Therefore, it is recommended a bottle of clean mineral oil and weak solution of boric acid be kept nearby when servicing the refrigerant system.

CAUTION

ALWAYS WEAR SAFETY GOGGLES WHEN SERVICING ANY PART OF THE REFRIGERANT SYSTEM. SHOULD ANY LIQUID REFRIGERANT GET INTO THE EYES, USE A FEW DROPS OF MINERAL OIL TO WASH THEM OUT, THEN USE A WEAK SOLUTION OF BORIC ACID TO WASH EYES, AND SEEK AID FROM A DOCTOR IMMEDIATELY EVEN THOUGH THE IRRITATION HAS CEASED.

It is important to keep the system tightly sealed, because the refrigerant system is always under pressure. Heat applied to any part would cause this pressure to build up excessively.

WARNING

TO AVOID EXPLOSION, NEVER WELD, USE A BLOW TORCH, SOLDER, STEAM CLEAN, BAKE AIRCRAFT FINISH OR USE EXCESS AMOUNTS OF HEAT ON, OR IN THE IMMEDIATE AREA OF ANY PART OF THE AIR COOLING SYSTEM OR REFRIGERANT SUPPLY TANK, WHILE THEY ARE CLOSED TO ATMOSPHERE WITH REFRIGERANT OR NOT. ALTHOUGH R-12, GAS, UNDER NORMAL CONDITIONS, IS NON-POISONOUS, THE DISCHARGE OF REFRIGERANT GAS NEAR AN OPEN FLAME CAN PRODUCE A VERY POISONOUS GAS. THIS GAS WILL ALSO ATTACH ALL BRIGHT METAL SURFACES. THIS POISONOUS GAS IS ALSO GENERATED IN SMALL QUANTITIES WHEN A FLAME-TYPE LEAK DETECTOR IS USED.

When checking the system for leaks, the system should be allowed to operate from 10 to 15 minutes prior to checking.

CAUTION

THE USE OF A FLAME-TYPE LEAK DETECTOR IS NOT RECOMMENDED FOR USE ON AIRCRAFT BECAUSE OF FIRE HAZARD.

The use of the electronic leak detector H-10 is recommended; however, if the H-10 leak detector is not available, leak detector solution conforming to MIL-L-25567 can be used to check each fitting, hose connection and airconditioning component.

CHECKING COMPRESSOR OIL LEVEL

Check the compressor oil level only if a portion of the refrigerant system is being replaced or if there is a leak in the system and the refrigerant is being replaced.

a) Operate airconditioning system for 15 minutes in temperatures of 60° F or above.

b) Turn off airconditioner.

c) Discharge the refrigerant system in accordance with Discharge Procedures.

d) Remove the oil filler plug from the compressor, rotate compressor until the keyway in the shaft is pointing towards the head of the compressor. This places the throws of the crankshaft into most favorable position for passage of the dipstick.

e) Insert a flattened 1/8 inch diameter rod in the oil filler hold until it bottoms. The rod should show from 13/16 inch to 1-3/16 inch of oil on the rod. The oil charge should be maintained between 6 ounces and 10 ounces maximum for best results.

f) If additional oil is needed in the compressor, add Sunisco 5 or Capella E refrigerant compressor oil, or equivalent.

g) Replace oil filler plug, evacuate and charge refrigerant system in accordance with Evacuating and Charging Procedures.

h) Check compressor filler plug for leaks using the H-10 Leak Detector or Leak Tek MIL-L-25567.

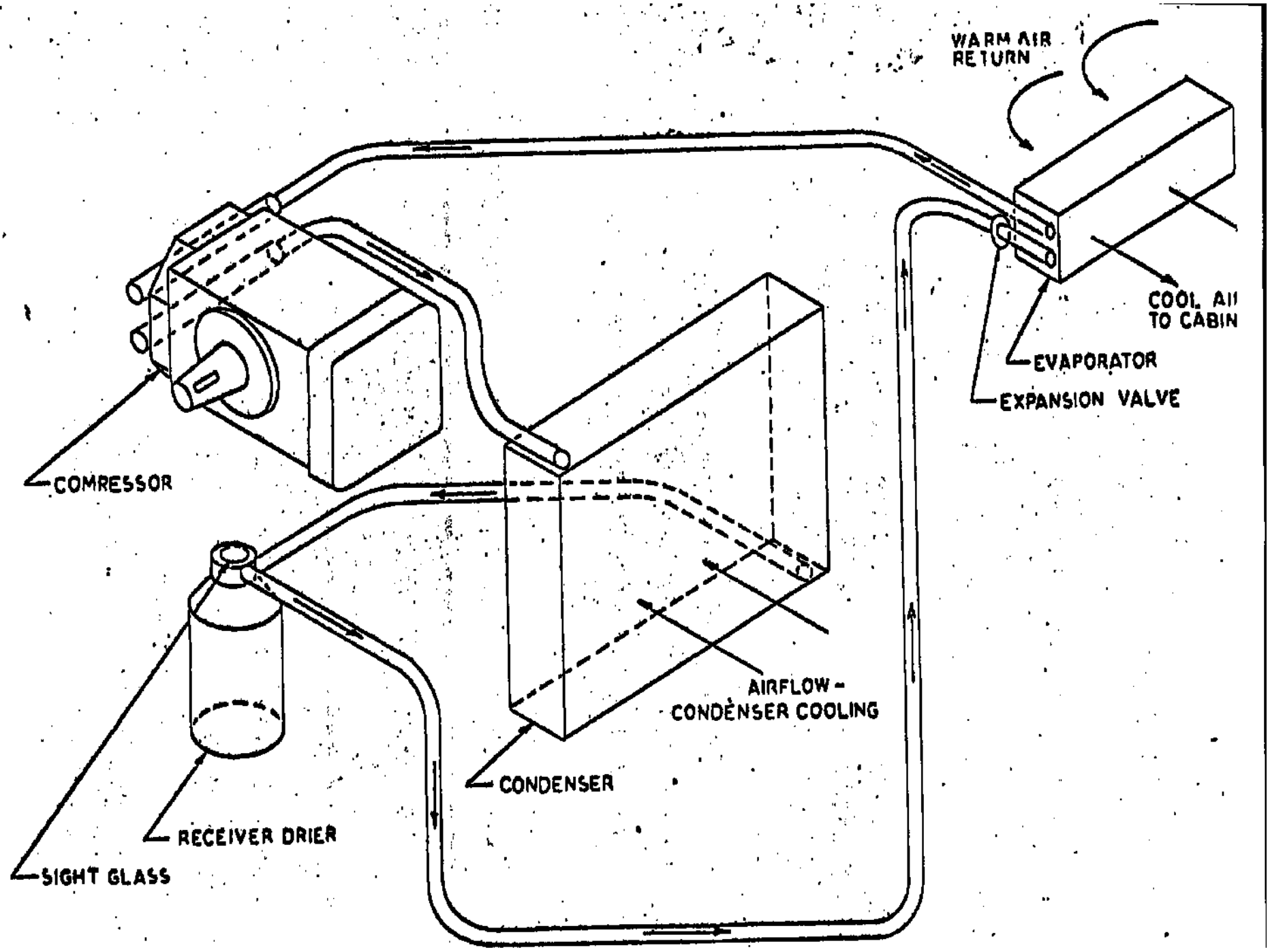

WARM AIR
RETURN
COOL AIR
TO CABIN
EVAPORATOR
EXPANSION VALVE
COMRESSOR
AIRFLOW -
CONDENSER COOLING
CONDENSER
RECEIVER DRIER
SIGHT GLASS

FIG.1

SIMPLIFIED PROCEDURES FOR CHARGING AND TESTING VAPOR CYCLE - FREON 12 AIRCONDITIONING SYSTEMS

These procedures apply to all conditions of charging and testing.

1. Check all hose and fitting connections to be sure they are tight. This includes all factory or assembly line connections, as well as the connections you make.

2. Connect vacuum pump with hoses to both suction and discharge service valve ports. Turn both compressor service valves approximately 4 turns clockwise from back seated position. (If installed.)

3. Pull vacuum on system for 20 minutes. Low pressure gauge should read about 23 inches of vacuum at 6000 feet altitude or 29 inches of vacuum at sea level within 5 minutes. If this is not attained, you should suspect a leak, in which case, shut off vacuum pump, charge enough R-12 into the system to show 30 PSI on both gauges, and check for leak with Sherlock or Halide Leak Detector.

   After leaks are repaired, repeat point 3 above.

4. After vacuum is obtained, shut off both valves on charging manifold. Then shut off vacuum pump. Next, connect charging line from manifold to R-12 cylinder. Open cylinder valve and bleed charging line at manifold.

   With R-12 cylinder valve open, and line bled, open low pressure (suction) line valve on manifold, and charge unit until 70 PSI is shown on both gauges, or until pressure stops rising.

5. You are now ready to run and charge the system. Start the system and continue to charge the unit until sight glass clears.

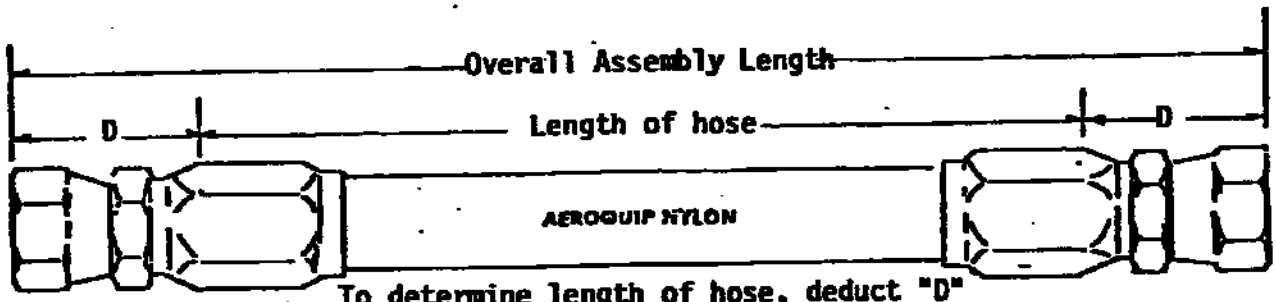
   Observe glass carefully, and stop charging immediately as soon as bubbles disappear in sight glass. This is important as overcharging electrically driven system can result in damage to the drive motor.

   Always charge with cylinder in upright position. If cylinder becomes very cold, indicating too low a pressure to force vapor into system, heat cylinder by placing it in a container of warm water.

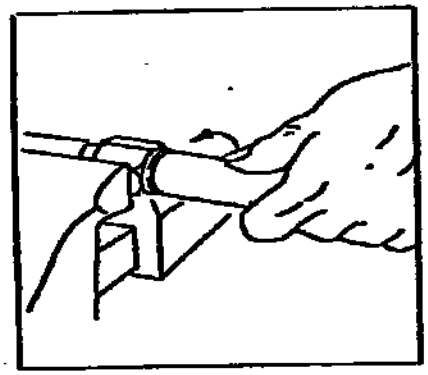
6. When charging is finished, shut system off, and check every connection with Electronic Leak Detector. If any leak is detected, repair completely before you release unit for shipment or to a customer.

ASSEMBLY INSRUCTIONS
for
Nylon Hose and Reusable Fittings

In order to keep foreign objects and debris out of components attached to these lines, it is recommended that the hose be cut with a sharp knife rather than a hacksaw. Any burrs or loose particles should be removed from within the end of the hose and from the end of the hose before assembly. This will prolong equipment life. It is especially important that on hand assembly within the aircraft these cleanliness measures be observed.

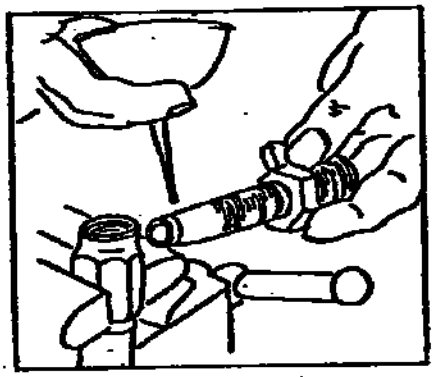


To determine length of hose, deduct "D" dimensions of both fittings from over-all assembly length.



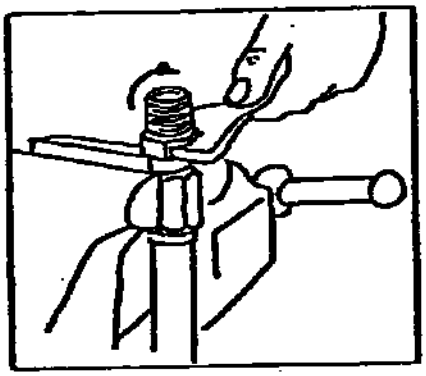
STEP 1

Cut hose square to length. Put socket in vise and screw counter-clockwise into socket until hose bottoms.



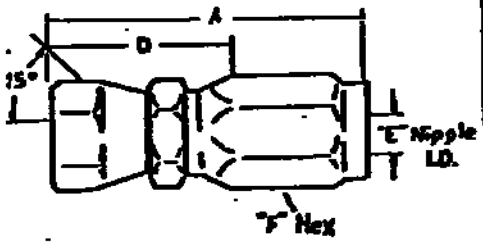
STEP 2

Oil nipple threads and inside of hose liberally. *Use compressor oil only.



STEP 3

Screw nipple clockwise into socket and hose until hex contacts socket.



Part number JBS-48	Vendor part number	O.D. tube size	thread	A	cut-off D	E	F
-1	FC9158-0606S	3/8	5/8-18	2.26	1.48	.28	.75
-2	FC9158-0808S	1/2	3/4-16	2.84	1.68	.40	.94

ADDENDUM B TO
SERVICE AND MAINTENANCE MANUAL - AIRCONDITIONING SYSTEM
DATA FOR CESSNA 210 SERIES AND P210 ENGINE DRIVEN SYSTEM

May 5, 1978
Revised: 4-25-79
Revised: 6-07-79

DESCRIPTION

Keith Products airconditioning is composed of three (3) major component packages:

1. The engine driven compressor on the left rear side of the engine;
2. The condenser unit mounted in the tailcone, on the left hand side of the aircraft;
3. 210 Series: the evaporator unit mounted on the wheel well in the baggage compartment and connected to overhead air ducts above windows on each side.

   P210 Series: the evaporators located under the forward outboard corner of the rear seat connected to side wall ducts on each side.

Switches and circuit breakers are mounted on the left hand upholstery panel, just aft of the instrument panel, or on the panel itself.

The receiver drier unit mounted in the tailcone on the left hand side of the aircraft in the 210 series and under the aft seat in the P210 series.

SERVICING

This unit is serviced the same as the instructions given in the accompanying service manual except the engine must be running to accomplish the items needing system activation. One service tap is normally located at the intake of the evaporator, the other in the tailcone behind the rear baggage wall. The rear baggage compartment upholstery panel and access door must be opened to get at the receiver drier and the high pressure service tap. On the P210 series, the high pressure tap is under the aft seat with the receiver drier.

BELT TENSION

1. 60 amp alternator - belt tension should be 25-35 pounds for the compressor belt and 50-60 pounds for the alternator drive belt. Use these figures instead of the one in the service manual.
2. 90 amp alternator - belt tension should be 25-35 pounds for the compressor belt and 60-70 pounds for the alternator drive belt. Use these figures instead of the one in the service manual.

OPERATION

When the toggle switch is in the "ON" position, the system is operating. The fan switch gives two (2) fan speeds for the evaporator fan. When the toggle switch is in the "OFF" position, the compressor clutch is disengaged and the pulley freewheels, essentially taking no horsepower from the engine.

CAUTION

A placard on the airconditioning switch panel reads "Turn Off Airconditioner for Takeoff and Landing". This is to avoid engine power loss due to system, during periods of critical flight requirements.

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AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

CESSNA MODELS: 210K, L, M, N;
T210K, L, M, N and P210N

WITH

AIR CONDITIONING SYSTEM INSTALLATION

REGISTRATION NO. _____

SERIAL NO. _____

This supplement must be attached to the FAA Approved Flight Manual when an R-12 or R134a Air Conditioning System is installed in accordance with STC SA71RM and SE70RM. The information contained herein supplements or supersedes the information of the basic Airplane Flight Manual only in those areas listed. For Limitations, Procedures and Performance Data not contained in this supplement, consult the basic Airplane Flight Manual.

APPROVED: A J Merrill

A. J. Merrill, Manager
Special Certification Office
Federal Aviation Administration
Fort Worth, Texas 76193-0190

Date: MAY 07 1997

FAA APPROVED
DATE: MAY 07 1997
REVISION: 4

LOG OF REVISIONS

REVISION NUMBER	PAGES		DESCRIPTION	FAA APPROVED
	NO.	DATE		
	ALL		Original Manual	WRB
1	Sht 1	6-7-79	Added Model P210N	WRB
1	Sht 3	6-7-79	Added Revision 1	WRB
2	Sht 1	4-18-80	Revised Mag Compass limitation Added note to Normal Procedure Section	WRB
	Sht 2		Revised Performance Section	
3	ALL	9-17-80	Revised to reflect new company name.	GEG
4	ALL	7-14-95	Changed to new format. Added Models 210K,L,M; T210K,L,M Changed Parker Hannifin Corp., Airborne Div. to Keith Products Page 1: was "Airborne airconditioning system", now R-12 or R134a. Added Contents Page	JF Merrell

FAA APPROVED
DATE: MAY 07 1997
REVISION: 4

Keith Products, Inc.
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AIRPLANE FLIGHT MANUAL
SUPPLEMENT FOR CESSNA MODELS 210, T210, P210
STC SA71RM and STC SE70RM
AIR CONDITIONING SYSTEM

LIST OF CONTENTS IN THIS SUPPLEMENT

FAA APPROVED
DATE: MAY 07 1997
REVISION: 4

OPERATING LIMITATIONS

The following placards are required on the Instrument Panel:

TURN OFF AIR CONDITIONER FOR TAKE-OFF AND LANDING

TURN OFF AIR CONDITIONER TO READ MDI OR SET DG

NORMAL OPERATING PROCEDURES

Turn Air Conditioner OFF when battery starting engines.

Air Conditioner System Operation:

To turn air conditioner ON - move switch to "Air Conditioner".

To turn air conditioner OFF - move switch to OFF.

For circulation without cooling - move switch to "FAN ONLY".

To set DG to MDI - turn air conditioner OFF.

NOTE: Adjust electrical load to preclude battery discharge.

EMERGENCY PROCEDURES

In the event of engine or generator failure, turn off the air conditioner.

PERFORMANCE

The air conditioner requires approximately 3 HP. For any critical or emergency performance condition, turn off air conditioner.

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INSTALLATION INSTRUCTIONS
FOR INSTALLING
KEITH PRODUCTS AIRCONDITIONER
IN A
CESSNA 210 SERIES

Number of Pages
1 thru 16
April 23, 1976

Revised: September 8, 1978

Revised: April 26, 1979

I. INTRODUCTION:

This manual contains information and documents necessary to accomplish the installation, maintenance, and repair of Keith Products systems. Use of this manual in conjunction with the installation drawings provided will result in the best possible installation of the system with the minimum expenditure of labor.

This system reflects the technical expertise of the world leader in vapor cycle air conditioning systems for aircraft. The system components have been carefully matched, resulting in optimum performance and minimum weight. The system is only as good as it's installation, however, so it is extremely important that the installer READ AND UNDERSTAND THESE INSTRUCTIONS COMPLETELY PRIOR TO STARTING INSTALLATION WORK.

Upon completion of the installation, the Kit List and Installation Instruction of this manual may be discarded. The supplemental type certificate, Airplane Flight Manual Supplement and Weight and Balance Revision should be inserted into the Airplane Flight Manual. The service and maintenance information should be inserted into the permanent aircraft file.

GENERAL:

1. These instructions are intended only to sequence and clarify the installation drawing(s). In case of a discrepancy, the drawing shall be the authority.

2. All references are to the following installation drawing(s), unless otherwise specified: 21-010 or 21-011

3. For preparation of aircraft for installation of airconditioner kit, see appropriate aircraft service manual.

4. Standard aircraft practices should be adhered to as outlined by FAA Advisory Circular 43.13-1 and 43.13-2.

5. Upon completion of installation, charge and test unit following service instructions included with kit.

THE FOLLOWING ORDER OF INSTALLATION IS RECOMMENDED, BUT NOT MANDATORY:

1. Hoses and wiring

2. Condenser

3. Compressor

4. Evaporator

PREPARING AIRCRAFT:

Remove left and right engine cowl sections.

Remove baggage compartment rear bulkhead upholstery panel and access panel.

Remove seats and carpeting from cabin and baggage area.
Note: Removal of rear bench seat is optional.

Loosen upholstery panels on right hand side aft of door and left hand front panel on pilot's side.

HOSES AND WIRING:

1. Install bulkhead fittings in firewall at location shown.

2. Route freon hoses from bulkhead fittings along left sidewall under upholstery panel and thru floor just ahead of left forward door post. Hose run under floor and across fuselage, coming up through floor just ahead of right aft door post. Hose should pass over gear acutator, and through floor at a shallow angle to avoid kinks. Run hoses over door post and behind upholstery panel to evaporator location on wheel well. Route high pressure hose down along aft side of wheel well and under baggage compartment floor into tailcone to condenser location. The routing of the high pressure hose from condenser back to the evaporator follows same routing. Wiring follows hoses as appropriate. Insure proper clearance with cables, pulleys and gear linkage. Provide chaffing protection and tie hoses as necessary.

3. Follow instructions provided in kit for assembly of hose fittings.

4. Locate switches and circuit breakers on instrument or side panel as shown on drawing.

5. Placard switches, compass and instrument panel and baggage compartment as shown.

EVAPORATOR INSTALLATION:

1. Locate coil and drain pan assembly on top of wheel well and secure as shown.

2. Locate and secure both blower assemblies as shown. Install aluminum angles for evaporator cover attachment with same fasteners.

3. Connect freon hoses and wiring per schematic. Route freon hoses forward of right blower housing, using care to avoid kinks.

4. Cut away right side of evaporator cover as necessary to allow hose egress, but seal opening with duct tape or sealant.

5. Cut away carpet section covering top of wheel well and re-install carpet. Glue carpet along top edge of wheel well. Carpet should extend under evaporator cover by 3/4" on forward and aft edges.

6. Secure cover with self-tapping decorative screws threaded into aluminum angles as shown.

OVERHEAD SIDEWALL DUCT INSTALLATION:

1. Remove existing plastic trim panels over side windows and doors. On some models, sidewall trim may be one piece above wheel well. It is necessary to cut the panel as shown on the drawing, View N and V, Sheet 5. Retain attaching hardware for re-use.

2. Seal edges of the headliner to the structure with duct tape as shown. Remove coat hook bracket above each aft side window and discard. Install plastic backing plate aft of each side window as shown. Ref: 21-011, Sh 5, View V

3. Using original trim panels as a guide, and fit checking frequently, trim new panels to fit aircraft. Trim panels should conform as tightly as possible to headliner to prevent excessive air leakage.

4. Install new window trim panels using original fasteners. Use one #6 decorative screw at duct splice, and add 2 screws at extreme forward end of duct into windshield pillow trim. Do not attempt to use original screw holes. Place a strip of masking tape along side window and mark location of original screw holes, and each end of trim attachment tabs. This then acts as a guide for drilling new pilot holes for trim attach screws.

5. Trim transition duct to fit between evaporator cover and sidewall duct and install as shown.

CONDENSER INSTALLATION:

1. Locate and install doublers for air inlet and outlet in tailcone as shown. Install air deflectors and screens over holes.
2. Locate and install four (4) condenser mounting clips as shown. Position these carefully; location is critical. Make certain that fwd and aft clips are in same plane.
3. Locate and secure condenser assembly as shown.
4. Install air exhaust duct and secure to condenser as shown. The duct is not sealed to skin at outlet hole, but should be a close fit around hole.
5. Mount receiver-drier bottle using clamps as shown.
6. Connect hoses and wiring per schematic.

BATTERY BOX RELOCATION: (NON-TURBO MODELS)

1. Remove battery from battery box.
2. Remove battery box from firewall. Drill out fasteners in firewall and lower supports.
3. Opening in firewall is closed with stainless steel panel from kit. Pick up existing fastener locations. Seal panel heavily with firewall sealer. Bulkhead fittings and grommet may be installed at this time. Mount resister on closure panel.
4. Install new battery box on right hand side of firewall, per drawing. Box drain line is routed to cowl flap opening on right hand side.
5. Use existing battery hot wire for new ground wire. Shorten if necessary. Put together a new hot wire from kit. It must run across firewall to left hand side to relay. Secure wire as necessary.
6. Battery box is a tight fit, so make sure the location is correct before fastening to firewall.

COMPRESSOR INSTALLATION - Normally Aspirated Models:

(Ref. Dwg. 21-050)

1. Remove existing engine accessory drive pulley from rear of engine. Install new pulley. (Torque nut as specified on drawing.) (Transfer timing mark to new pulley before installation.)

COMPRESSOR INSTALLATION - Normally Aspirated Models: (cont'd)

2. If aircraft is equipped with rubber alternator mounting bushings, replace with steel bushings from kit. If equipped with existing steel bushings, leave in place.

3. Remove existing 5/16" bolts from engine block (left rear) and existing 1/2" nuts and spacers from the studs in same location. Install standoff assembly over studs. Replace spacer on lower stud with standard AN960-816 washer.

4. Replace 5/16" bolts with existing washers. NOTE: See drawing for torque values for these fasteners.

5. Preassemble compressor support assembly and compressor before attaching to standoff assembly. Compressor and support blocks have been matched drilled for bolts.

6. Install compressor and support assembly per drawing. Leave tension adjustment loose until final adjustment.

7. Install hoses and firesleeving to compressor. See hose fitting instructions.

8. Check belt alignment with straight edge (see data on drawing). Shims are included for respacing compressor if necessary. However, stock will need to be removed from support blocks before using shims. Sometimes differences in engine models may call for this.

9. Tighten belts as called for on drawing (25-30 lbs. on the compressor belt; 40-45 lbs. on the alternator belt).

COMPRESSOR INSTALLATION - NORMALLY ASPIRATED (95A ALTERNATOR):
(Ref. Dwg. 21-055)

1. Compressor installation is essentilly the same as for 60A normaaly aspirated models. Refer to above compressor installation.

2. Tighten belts as called out on drawing (55-65 lbs. on the compressor belt; 35-40 lbs. on the alternator belt).

COMPRESSOR INSTALLATION - TURBOCHARGED MODELS: (Ref. Dwg. 21-053)

1. Remove the following from the engine:

   A. Alternator

   B. Left fuel injector nozzles upper deck pressure vent line

   C. Pneumatic hose from air pump to regulator

   D. Oil line from engine to waste gate controller and fitting on engine block

   E. Blast tube over main fuel line from controller to distributor. Do Not disconnect fuel line from controller.

2. Re-locate bulkhead fitting on engine baffle for fuel injector distributor vent line and plug old hole as shown, if require

3. Cut left upper deck pressure vent line (B Above) and re-route with soft hose as shown. Plug old hole.

4. Replace elbow fitting for waste gate controller (D. Above) with straight fitting and connect hose. Leave controller end of hose loose until drive belt is installed.

5. Remove alternator drive pulley and replace with 3" diameter pulley. It will be necessary to loosen fuel control mounts and move unit to accomplish this. (Transfer timing mark to new pulley before installing.)

6. Mount compressor and alternator on new bracket and install on original alternator mount with existing hardware.

7. Install extension on alternator belt tensioning brace.

8. Relocate alternator filter capacitor to side of alternator with bracket provided.

9. Drill out alternator boss for belt tensioning brace to accept a 3/8" bolt.

10. Connect freon hoses to compressor per schematic.

11. Install brace between compressor and alternator.

12. Install drive belt and tighten. Secure belt tensioning brace to alternator. (Recommended belt tension - 50 to 55 lbs.)

COMPRESSOR INSTALLATION - TURBOCHARGED MODELS: (cont'd)

13. Connect oil line to waste gate controller using elbow provided. Route line below and slightly aft of controller, forward of fuel feed line to distributor and through belt to engine.

14. Install 22" blast tube over main fuel feed line to distributor. Route line up from controller aft of belt, over belt tensioning brace and through original hole in baffle. Tie line as required to clear belt.

15. Route new pneumatic hose from regulator upward and aft of compressor clutch, over fuel feed line and upper deck pressure lines and to pump. (Rotate suction relief valve to clock nipple outboard as far as possible).

16. Locate clutch dropping resistor and mount as shown.

17. Insure proper clearance of all lines and wiring from belt and control levers. Tie and route as required.

COMPRESSOR INSTALLATION - TURBOCHARGED MODELS W/95 AMP ALTERNATOR

(Ref. Dwg. 21-054)

1. Remove the following from the engine:

   A. Alternator

   B. Left fuel injector nozzles upper deck pressure vent line

   C. Pneumatic hose from air pump to regulator

   D. Oil line from engine to waste gate controller and fitting on engine block

   E. Blast tube over main fuel line from controller to distributor.

2. Re-locate bulkhead fitting on engine baffle for fuel injector distributor vent line and plug old hole as shown.

3. Cut left upper deck pressure vent line (B above) and re-route with soft hose as shown. Plug old hole.

4. Replace elbow fitting for waste gate controller (D above) with straight fitting and connect hose. Leave controller end of hose loose until drive belt is installed.

5. Remove alternator drive pulley from engine and replace with 2.75" diameter pulley. It will be necessary to loosen fuel control mounts and move unit to accomplish this. (Transfer timing mark to new pulley before installing.)

6. Remove existing pulley from alternator and replace with 3.5" diameter pulley.

7. Shorten blast tube to fuel pump by 4.4".

8. Relocate alternator filter capacitor to side of alternator with bracket provided.

9. Drill out alternator boss for belt tensioning brace to accept a 3/8" bolt.

10. Connect freon hoses to compressor per schematic.

11. Install brace between compressor and alternator.

12. Install drive belt and tighten. Secure belt tensioning brace to alternator. (Recommended belt tension - 60 to 65 lbs.)

COMPRESSOR INSTALLATION - TURBOCHARGED MODELS W/95 AMP ALTERNATOR (cont'd)

13. Connect oil line to waste gate controller using elbow provided. Route line below and slightly aft of controller, forward of fuel feed line to distributor and through belt to engine.

14. Add US4-4 swivel connector to distributor line connection at mixing valve, then 2071-4-4S elbow, then U2-4 union. Rotate elbow and union upward for fuel line routing in blast tube. Shorten blast tube by 5.0. Install blast tube over main fuel feed line to distributor. Route line up from mixing valve forward thru belt to original hole in baffle. (Center fuel line beneath top belt and inboard of 7" pulley sheave to provide maximum clearance.)

15. Route new pneumatic hose from regulator upward and aft of compressor clutch, over fuel feed line and upper deck pressure lines and to pump. Remove existing vacuum regulator and replace with one from kit.

16. Add swivel 45° elbow to existing 90° elbow at pump fuel line connection at mixing valves. Orient forward and outboard to provide hose clearance from belt.

17. Locate clutch dropping resistor and mount as shown.

18. Insure proper clearance of all lines and wiring from belt and control levers. Tie and route as required per good aircraft practices.

COWL COMPRESSOR COVER - TURBOCHARGED MODEL W/95 AMP ALTERNATOR

1. Use template from Drawing 21-054 Sh 5 to cut clearance hole in cowling for alternator and arms.

2. Drill rivet holes as shown on drawing.

3. After fastener rivets are in, pop rivet (with washers) the baffle material to the baffle support.

4. Paint fairing to match aircraft if desired. Paint is not necessary on material.

AIRCRAFT FINAL ASSEMBLY:

Cabin may be buttoned up at this point. Upholstery panels replaced, carpeting replaced and seats reinstalled.

Service unit per Keith Service Manual and Cessna 210 Service Manual Addendum included in kit.

Add 4.0 ounces of 500 viscosity refrigerant oil prior to initial servicing only. This oil may be added directly to the compressor discharge hose before making final connection, or at the high side service tap. If oil is added at high side service tap however, the initial system evacuation should be accomplished through the low side tap only. This prevents the oil charge from being sucked out of the system by the vacuum pump. This addition of oil pertains particularly to the C-210 and T-210 and may not apply to other JB Systems airconditioners.

Process ship's paperwork as required.

REMOVAL OF COMPRESSOR PULLEY AND CLUTCH IF REQUIRED:

Remove 3/4" self-locking nut using spaner wrench to hold clutch plate and 3/4" offset box end wrench. Remove clutch plate by installing puller to clutch plate using (3) 1/4-20 x 1 1/8 bolts. Remove woodruff key, remove 1 7/16 external snap ring using external snap ring pliers, place adapter sleeve over shaft, *install pulley puller on pulley, placing puller hooks under two ribs in pulley, place 8" C-clamp across puller hooks and tighten - remove pulley.
* Note: Always use adapter sleeve. Never apply force directly to shaft, to prevent damage to shaft seal.

To install pulley, support compressor on four mounting lugs on rear of compressor. Align pulley squarely on the hub, place adapter sleeve on top of pulley and over shaft and press the pulley down until it seats on the bottom of the housing. Reinstall snap ring sharp side up using snap ring pliers. Replace woodruff key in shaft. Replace clutch plate, aligning squarely with the key, place adapter sleeve over shaft and press clutch plate on shaft. Torque 3/4" self locking shaft nut.
Note: Use arbor press or soft mallet for above.

WEIGHT AND BALANCE SUPPLEMENT

MODEL: Cessna 210 STD Series (Including 95A Alt.)

SERIAL NUMBER:

REGISTRATION NUMBER:

ITEM	WEIGHT	ARM	MOMENT
1. Previous Empty Weight			
2. Add Airconditioner			
a) Compressor/Support Bracket	25.5	- 6.0	- 153.0
b) Evaporator Assy/Cover	19.5	120.2	2343.90
c) Condenser Assy/Dryer	19.0	175.6	3336.40
d) Air Ducts	4.0	55.5	222.00
e) Plumbing/Wiring/Hardware	5.0	80.8	404.00
	73.0	84.29	6153.30

New Aircraft Empty Weight

New Aircraft Empty Weight C.G.

New Aircraft Useful Load

WEIGHT AND BALANCE SUPPLEMENT

MODEL: Cessna 210 STD Series

SERIAL NUMBER:

REGISTRATION NUMBER:

ITEM	WEIGHT	ARM	MOMENT
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c) Condenser Assy/Dryer	19.0	175.6	3336.40
d) Air Ducts	4.0	55.5	222.00
e) Plumbing/Wiring/Hardware	5.0	80.8	404.00
	73.0	84.29	6153.30

New Aircraft Empty Weight

New Aircraft Empty Weight C.G.

New Aircraft Useful Load