

United States of America
Department of Transportation — Federal Aviation Administration
Supplemental Type Certificate

Number SA4626NM

This certificate, issued to Aero Twin, Inc.

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 23 of the Federal Aviation Regulations.* *Complete certification basis is specified in Type Certificate Data Sheet Number A37CE, Revision 4.

Original Product — Type Certificate Number: A37CE
Make: Cessna
Model: 208, 208A, and 208B.

Description of Type Design Change:

Fabrication and Installation of Aero Twin, Inc. Auxiliary Dry Air Pump Kit No. AP8-100 in accordance with Aero Twin, Inc. Master Drawing List No. AP8-100, dated April 20, 1990, or later FAA approved revision.

Limitations and Conditions:

The approval of this change in type design applies to the basic Cessna 208, 208A, and 208B airplanes only. This approval should not be extended to other aircraft of these models on which other previously approved modifications are incorporated unless it is determined by the installer that the modifications will introduce no adverse effect on the airworthiness of such aircraft.

(See Continuation Sheet Page 3 of 3)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: July 18, 1989

Date reissued:

Date of issuance: April 20, 1990

Date amended:



By direction of the Administrator
Alan C. Strickfaden
Alan C. Strickfaden, *(Signature)* Supervisor
Anchorage Aircraft Certification Field Office
Northwest Mountain Region
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

United States of America
Department of Transportation—Federal Aviation Administration
Supplemental Type Certificate
(Continuation Sheet)

Number SA4626NM

Limitations and Conditions: (Continued)

Cessna 208, 208A, and 208B airplanes modified in accordance with this Certificate must be operated in accordance with FAA approved Aero Twin, Inc. Airplane Flight Manual Supplement dated April 20, 1990, or later FAA approved revision.

Cessna 208, 208A, and 208B airplanes modified in accordance with this Certificate must be maintained in accordance with Aero Twin, Inc., Cessna 208 Caravan Auxiliary Dry Air Pump Kit Number AP8-100 Instructions for Continued Airworthiness dated April 20, 1990, or later FAA approved revision.

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

FAA FORM 8110-2-1 (10-69)

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This certificate may be transferred in accordance with FAR 21.47.

C FAA AC 82-03578

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
CESSNA MODELS
208, 208A, & 208B

REG. NO. _____
SER. NO. _____

This supplement must be attached to the Cessna Aircraft Company Pilot's Operating Handbook and FAA Approved Airplane Flight Manual for the Cessna 208, 208A, or 208B airplane when the Aero Twin Auxiliary Dry Air Pump Kit Number AP8-100 is installed in accordance with Supplemental Type Certificate (STC) Number SA4626NM. The Cessna Pilot's Operating Handbooks and FAA Approved Airplane Flight Manuals (POH/AFMs) for the above model Cessna 208 airplanes are identified by the following Cessna part numbers:

Model	Serial Numbers	POH/AFM Cessna P/N	Dated
208	20800001 thru 20800060	D1286-13PH	09/7/84
208	20800061 and up	D1307-13PH	09/2/85
208A	20800007 and up	D1287-13PH	1/31/85
208B	208B0001 and up	D1309-13PH	10/1/86

The information contained herein supplements or supersedes the information of the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this Supplement, consult the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

FAA APPROVED:


Gregory H. Holt
Manager, Aircraft Certification Office
Federal Aviation Administration
Anchorage, Alaska 99513-7587

LOG OF REVISIONS			
REVISIONS NO.	DATE	PAGES REVISED AND DESCRIPTION OF REVISIONS	APPROVAL SIGNATURE
A		All pages revised and reissued per ECO AT-79	

SECTION I - GENERAL

The auxiliary dry air pump system provides an independent back-up source of pneumatic power to operate the gyro flight instruments in the event the bleed air vacuum system fails.

When operating normally, system vacuum is provided by existing bleed air passing through the vacuum ejector. The check valves in the added manifold, ensure air is drawn through the gyroscopic instruments. In the event of Bleed Air System failure, the auxiliary pump can be activated to provide vacuum to the instruments.

The control switch (labeled AUX VAC) for the auxiliary pump system is located on the lower left side of the instrument panel. The control switch operating modes are "push-for-on" and "push-for-off". The switch button stays partially depressed in the "ON" mode.

The switch button incorporates two annunciator light sections labeled VAC OFF and AUX ON. The VAC OFF section is controlled by a vacuum switch in the primary pneumatic system and illuminates an amber light when the bleed air vacuum system is inoperative or when the bleed air vacuum system falls below the switch activation level. The AUX ON section is controlled by a vacuum switch in the auxiliary pneumatic system and illuminates a blue light when the auxiliary pump is operating and creating a vacuum in the system. When the auxiliary pump is activated at high altitude, or if the system has developed air leaks, the AUX ON light may fail to illuminate. This indicates that the system vacuum is still below the AUX ON switch activation level, even though the auxiliary pump is operating. The annunciator lights do not incorporate a press-to-test feature. Refer to SECTION VIII for lamp test and replacement.

System electrical protection is provided by a 15 amp circuit breaker in the pump motor circuit and a 2 amp circuit breaker in the annunciator light circuit. The circuit breakers are located on the left side of the power box forward of the firewall.

The auxiliary pump is mounted on the upper right forward side of the firewall. The auxiliary system connects to the primary system at a manifold downstream of the relief valve. Isolation of the primary and auxiliary systems from each other is accomplished by check valves on each side of the manifold. The primary system switch is located on the vacuum ejector side of the manifold and senses vacuum supplied to the gyros. The auxiliary system vacuum switch is located in the manifold downstream of the check valve and senses vacuum generated by the auxiliary pump.

In order to assure high reliability of the auxiliary air pump system, as a back-up power supply for the gyro instruments, the pump/motor assembly must be removed and replaced after 500 hours accumulated pump operating time or 10 years installed time, whichever comes first. An elapsed time indicator (ETI) is incorporated into the auxiliary pump electrical system to show accumulated hours of operation.

Refer to the Aero Twin Auxiliary Dry Air Pump Kit No. AP8100 Installation and Maintenance Instructions (Manual AP81M) for testing and servicing procedures.

SECTION II - LIMITATIONS

A. Operating Limits

Flight in Instrument Meteorological Conditions (IMC) by reference to vacuum powered instruments is prohibited when vacuum gage indicator is not in the green arc range (4.5 to 5.5 inches mercury).

B. Placards

Above the switch/wire assembly, P/N AP8-40, on lower left side of the instrument panel:

- AUX VAC
- PUSH
- ON-OFF

SECTION III - EMERGENCY PROCEDURES

No change - Except:

A. Engine Driven Vacuum Pump Failure

1. Vacuum Gage Registers Zero, VAC OFF Light Illuminated

a. Turn on auxiliary air pump.

A. Engine Driven Vacuum Pump Failure (Continued)

- b. Verify that the vacuum gage registers in the green arc, the "AUX ON" light is illuminated, and the annunciator panel "VAC LOW" light is extinguished.

NOTE

The vacuum gage is the primary indicator of the system operational condition. Since the annunciator lights may have burned out bulbs they should not be relied on to indicate actual system condition.

- c. Verify that alternator capacity is not being exceeded as indicated by ammeter showing discharge and/or illumination of the voltage low light. Turn off non-essential electrical equipment.
- d. Continue normal operation. Have vacuum system serviced prior to next flight.

2. Auxiliary Pump On, Vacuum Gage Registers Below Green Arc

May occur at high altitude or if system is leaking.

- a. Disengage the autopilot.
- b. Decrease altitude at a normal rate until the vacuum gage registers in the green arc.

NOTE

With the auxiliary pump on, even though the vacuum gage registers below the green arc, several minutes may be available before the attitude and directional indicators become unreliable.

- c. During descent, until the green arc is obtained, cross-check the attitude and directional indicators with the electrically powered turn coordinator or turn, bank indicator and magnetic compass. If reliability of the attitude gyro and directional gyro indicators is suspect, follow the procedures for Emergency Operation in Clouds in Section 3 (Vacuum System Failure) of the Basic Airplane Flight Manual.

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2. Auxiliary Pump On, Vacuum Gage Registers Below Green Arc (Continued)

- d. Re-engage the autopilot if desired and continue normal operation. Have vacuum system serviced prior to next flight.

B. Auxiliary Air Pump System Failure

(bleed air system previously failed)

1. Vacuum gage registers zero, "VAC OFF" light is illuminated, the "AUX ON" light is extinguished and the "VAC LOW" light is illuminated.
- a. Disengage the autopilot.
- b. If the failure occurs under IFR flight conditions follow Aircraft Flight Manual procedures for Emergency Operations in Clouds until reaching VFR flight conditions.
- c. Maintain VFR flight conditions until landing.
- d. Have primary and auxiliary vacuum system serviced prior to next flight.

SECTION IV- NORMAL PROCEDURES

If the system does not function as described below, refer to SECTION VIII of this Supplement for service information.

A. Preflight

The following functional check of the auxiliary air pump system is recommended prior to each instrument flight.

1. Turn on battery switch. Verify the "VAC OFF" and "VAC LOW" lights are illuminated.

NOTE

To prevent battery drain, operation of the auxiliary pump in cold weather prior to starting the engine is not recommended.

2. Start engine. Set power lever to 400 Ft.-Lbs. Verify "VAC OFF" and "VAC LOW" lights are extinguished and vacuum gage registers in the green arc.

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A. Preflight (Continued)

- 3. Turn on auxiliary pump. Verify "AUX ON" light is illuminated.
- 4. Turn off auxiliary air pump. Verify "AUX ON" light is extinguished.

NOTE

In warm weather, with a fully charged battery, auxiliary pump operation may be checked prior to engine startup. Keep running time short to avoid excessive battery drain.

B. Operation in Flight

The auxiliary air pump system may be functionally checked in flight as follows:

- 1. Turn off non-essential electrical equipment as necessary to avoid exceeding the alternator capacity and draining the battery.
- 2. Turn on auxiliary air pump. Verify the "AUX ON" light is illuminated, and suction gage registers in the green arc. The suction gage should show a slight increase when the auxiliary pump is turned on.
- 3. Turn off auxiliary air pump.
- 4. Turn back on all desired electrical equipment.

NOTE

For maximum service life, avoid continuous non-emergency operation of the auxiliary air pump.

SECTION V- PERFORMANCE

No change.

SECTION VI- WEIGHT AND BALANCE/EQUIPMENT LIST

<u>ITEM</u>	<u>WT. (lbs.)</u>	<u>Arm (inches)</u>
Auxiliary Dry Air Pump, Kit Number AP8-100	13.6	99.1

Refer to the Aero Twin Auxiliary Dry Air Pump Kit No. AP8-100 Installation and Maintenance Instructions (Manual AP8-1M) for detailed equipment list.

SECTION VII-AIRPLANE AND SYSTEM DESCRIPTION

Refer to Section I of this supplement and the instructions for continuing airworthiness.

SECTION VIII-AIRPLANE HANDLING, SERVICE AND MAINTENANCE

For other pneumatic and electrical system schematics, and test and service procedures, refer to the Aero Twin Auxiliary Dry Air Pump Kit No. AP8-100 Installation and Maintenance Instructions (Manual AP8-1M).

A. Annunciator Lamp Test and Replacement

Referring to SECTION IV NORMAL PROCEDURES, if the annunciator lights do not illuminate as expected, check for burned-out lamps, replace as required and retest the system.

The annunciator lamps are sub-miniature T-13/4 wedge base (commercial type e5) bulbs. To replace the lamps, pull the legend button off the switch and eject the lamps by pulling on the release tabs. Reset the release tabs, insert new lamps and press the switch button back into place.

NOTE

The wedge base T-1 3/4 annunciator lamps are not interchangeable with the flange base MS25237-327 lamps used in other aircraft lights. It is recommended that spare lamps and fuses for the auxiliary air pump system be carried in the aircraft.

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B. Pump Motor and Annunciator Circuit Replacement

NOTE

Blown circuit breakers may indicate electrical shorts or other problems. Inspect the auxiliary pump system for defects and repair as necessary.

C. Auxiliary Pump Assembly Service Time Limit

The auxiliary pump assembly P/N: AAAA2-1 must be removed and replaced at 500 hours accumulated operating or 10 years installed time, whichever occurs first. Accumulated operating time is established by the elapsed time indicator located under/behind the instrument panel. Refer to the Aero Twin Auxiliary Dry Air Pump Kit No. AP8-100 Instructions for Continued Airworthiness for details.

D. Infrequent Use of Aircraft or Auxiliary Air Pump

If the aircraft has been idle or the auxiliary vacuum pump has not been used for six months or more, refer to the Aero Twin Auxiliary Dry Air Pump Kit Instructions for Continued Airworthiness for special check-out procedures prior to IFR flight.

SECTION IX- SUPPLEMENTS

This supplement must be attached to the basic Pilots Operating Handbook and FAA Approved Flight Manual.

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AERO TWIN, INC.

Auxiliary Dry Air Pump Kit No. AP8-100

INSTALLATION INSTRUCTIONS


LOG OF REVISIONS			
REVISIONS		PAGES REVISED AND DESCRIPTION OF REVISIONS	APPROVAL SIGNATURE
NO.	DATE		
--	04/20/90	Original Issue	---
A	01/10/98	All pages revised and reissued per ECO AT-50. All pages dated January 10, 1998.	
B	06/08/01	All pages revised and reissued per ECO AT-68. All pages dated June 8, 2001.	
C	10/15/02	All pages revised and reissued per ECO AT-79. All pages dated October 15, 2002.	
D	05-22-03	All pages revised and reissued per ECO AT-91. All pages dated May 5, 2003.	

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SECTION I - GENERAL INFORMATION

A. Kit Description: The auxiliary dry air pump system provides an independent backup vacuum source to operate the gyro flight instruments in the event that the bleed air vacuum system fails. The kit consists of a 28 VDC electrically driven dry air pump, connected to the primary pneumatic system through a manifold downstream of the vacuum relief valve. Isolation of the auxiliary from the primary system is provided by check valves in the manifold. The pump is controlled through a panel mounted switch, which incorporates annunciator lights to inform the pilot of the system operation status. Accumulated pump operation time (for compliance with in-service time limit) is recorded by an elapsed time indicator (ETI) that is attached to the pump-mounting bracket. For a complete operational description of the auxiliary pump system, refer to the AFM/POH Supplement supplied with the kit.

B. Performance Specifications: The auxiliary pump system is designed to provide sufficient vacuum to power two gyroscopic flight instruments. In a normal installation, the auxiliary pump system can maintain a minimum of 4.6 in. Hg. vacuum across the gyros to an altitude of at least 24,000 feet.

Note: Poor system installations and maintenance practices will reduce the maximum altitude at which a given vacuum can be obtained.

The system electrical power requirement is 9.0 amperes at 28 VDC.

In-service time for the AA4A2-1 auxiliary pump/motor assembly is limited to 500 hours actual pump operating time (established by the elapsed time indicator) or 10 years, whichever occurs first. Under normal usage, 500 hours of pump operating time is equivalent to 8000 or more aircraft operating hours. The vacuum pump must be running to read the accumulated time on the elapsed time indicator.

C. Ownership Registration and Document Revision Service: FAR 21.50(b) and 23.1529 require that the manufacturer of a product establish a procedure to notify aircraft owners of changes to FAA approved maintenance documents. Aero Twin, Inc. is complying with these regulations by providing a Warranty Registration and Service Letter Program.

A warranty registration card is included in each Kit Number AP8-100. This card must be filled out and returned to Aero Twin, Inc. so that the aircraft owner can be supplied with any important information related to the auxiliary air pump kit installed in his aircraft.

SECTION II - INSTALLATION

A. General Notes:

1. Certain parts of this installation can be difficult. We recommend that the most experienced mechanics available be assigned to the task. Wiring experience is particularly important.
2. Read all directions and review the complete installation drawing package prior to beginning. If there are any questions, contact Aero Twin at (907)274-6166.
3. The function and reliability of your auxiliary vacuum system will be directly related to the quality of the installation.
4. **PRIOR TO DRILLING ANY HOLES, CONFIRM CLEARANCE ON THE BACK SIDE OF THE SURFACE TO BE DRILLED.** This is particularly important when drilling through the firewall.

B. Preparation to Begin Installation:

1. Remove cowlings
2. Disconnect battery
3. Remove pilot and copilot seats

C. Vacuum Component Installation per Drawing AP8-2I, sheets 1 through 6 of 6:

1. Sheet 1: Vacuum System Schematic. Review this prior to proceeding.
2. Sheet 2: Locate the position for the pump bracket and drill out six existing rivets in the firewall. Locate and drill three 7/8" diameter holes.
3. Sheet 3: With the bracket assembly held in position, match drill the bracket to the six mounting holes opened in the firewall. Drill two additional mounting holes through the bracket and the firewall, then install the bracket.
4. Sheet 4: Install the pump and contactor on the bracket. Make electrical connections to the pump and contactor.
5. Sheet 5: Install two fittings through the firewall; relocate the existing vacuum relief valve to the right-most fitting and reroute the instrument vacuum hoses as required. Install the supplied vacuum hose assembly between the bleed air ejector fitting and the second new fitting.
6. Sheet 6: Install the supplied fittings in the pump inlet and outlet ports. Install the vacuum manifold on the manifold bracket using two large cable ties (provided). Cut and install four hoses and one 180° tube bend as shown on the drawing. Note that the hose which loops from the pump inlet to the manifold is best routed around the engine mount tube as shown in the drawing; use the supplied Adel clamps to secure the hose to the *upper* mount tube.

D. Electrical Component Installation per Drawing AP8-WI, sheets 1 though 5 of 5:

1. Sheet 1: Electrical System Schematic. Review this prior to proceeding.
2. Sheet 2: Locate an appropriate position on the panel for the system control switch. If the recommended position is used, it may be necessary to relocate one post light. Cut a rectangular hole as specified and install the switch can, placards*, and switch assembly. Install the ETI assembly to the pump-mounting bracket.

*The load reduction caution placard will be installed only if needed, to be determined during system operational tests. At this point you should allow for sufficient panel space to install the placard if required.

3. Sheet 3: Install the four-pin receptacle in the third 7/8" diameter hole. Thread wires 372-37B, 372-35B, and 372-21B through the clamp crown/boot assembly, trim to length, and solder to the appropriate terminals of the receptacle. Secure the clamp crown/boot to the receptacle and secure all wires under the panel.
4. Sheet 4: Install the circuit breakers and doubler in the electrical box, and make all required electrical connections. Wire loom installed over the wires exiting the electrical box should extend into the box slightly - the box cover will retain the loom.
5. Sheet 5: Make electrical connections to the manifold.

Complete the electrical installation by connecting the 4-pin firewall connector. Perform a thorough continuity check of all wiring, using the system schematic as a reference. When system continuity is verified, install loom over all exposed wiring forward of the firewall, to match existing engine wiring. Secure each end of loom and at 12 inch intervals using small cable ties supplied in kit. Recheck that all vacuum fittings are secure. Reconnect Battery. Reinstall Pilot's seat.

When you are satisfied that the installation is complete and correct, proceed to system operational tests.

SECTION III: SYSTEM ADJUSTMENT AND OPERATIONAL TESTS

A. General Notes:

The following items need to be done to confirm system functionality and potential effect on other aircraft systems (each is described in detail in the following paragraphs):

- Check/Adjust vacuum relief valve setting
- Check Aux. Vacuum System function with engine off
- Check Aux. Vacuum System function with engine running
- Check aircraft total electrical load with Aux. Vacuum System on, engine running
- Check magnetic compass deviation

Prior to proceeding, it is important to understand the function of the vacuum switches that are part of this installation. Both switches are mounted on the manifold.

The "VAC-OFF" switch is a normally closed switch that activates the "VAC-OFF" annunciator on the aux system control switch. This switch senses vacuum condition in the instrument circuit. When bleed air powered ejector vacuum to the instruments is greater than 3 inches of mercury, the switch will open and the "VAC-OFF" light will turn off. This light can 'flicker' if the vacuum level is near the 3 inch activation level (this can occur at low idle power settings).

The "VAC-ON" switch is a normally open switch that activates the "VAC-ON" annunciator on the aux system control switch. This switch senses vacuum condition on the auxiliary pump side of the manifold. When the aux pump is supplying vacuum, the switch will close, illuminating the "VAC-ON" annunciator.

B. Vacuum Relief Valve Setting/Adjustment:

The aircraft vacuum relief valve should be set, with the engine operating at 68% Ng, so that the suction gauge reads 5.0 inches of mercury. Adjust the system as required, in accordance with the FAA Approved Maintenance Manual for the aircraft

C. Auxiliary Air Pump Functional Check (without Engine Power)

Note: If it is required to run auxiliary pump for more than a couple of minutes, it is recommended that the aircraft be connected to an APU.

1. Turn aircraft battery switch "ON".
2. The "VAC OFF" side of auxiliary dry air pump switch should be illuminated (indicating that ejector vacuum is under 3 inches of mercury). This annunciator should remain illuminated when ever the engine is not running. If not, trace the system wiring to locate the problem.
3. Push the auxiliary dry air pump switch to cycle it to the "ON" position. Switch will stay partially depressed. Do not run the auxiliary pump for more than a couple of minutes unless an APU is connected.
4. Auxiliary pump "AUX ON" light should be illuminated (indicating that the auxiliary system is drawing vacuum). If the light does not illuminate, check that the pump is actually running. If not, trace the wiring to determine the problem. If the pump is running, check for vacuum leaks.
5. The annunciator panel "VAC LOW" light should cycle off shortly after pump is turned on (indicating that vacuum in the system is greater than 3 inches of mercury).
6. Check suction gauge for proper system vacuum - 4.5 to 5.5 inches of mercury.
7. Push the auxiliary vacuum switch to cycle to the "OFF" position.
8. The auxiliary pump "AUX ON" light should cycle off.
9. The "VAC OFF" light should remain illuminated.
10. Turn the aircraft battery switch "OFF".

D. Auxiliary Air Pump Functional Check - Engine running

1. Start Engine.
2. Set power lever to 400 Ft.-Lbs.
3. Check to see that the "VAC OFF" light in the auxiliary pump switch is *not* illuminated and that the vacuum gauge reads 4.5 to 5.5 inches of mercury. If not, repair the vacuum system.

4. Turn the auxiliary vacuum pump on.
5. Check the "AUX ON" light for illumination.
6. Check to see that the "VAC OFF" light is still *not* illuminated and that the suction gauge still reads 4.5 to 5.5 inches of mercury.
7. Set power lever to idle.
8. Turn auxiliary pump off.
9. Shut engine down.

E. Check aircraft total electrical load with Aux. Vacuum System on, engine running

The ability of the aircraft electrical system to accept the additional load of the auxiliary pump must be checked as follows.

1. Start Engine
2. Turn on all electrical and avionics equipment that would normally be in continuous use the most critical flight condition (IFR, night, icing equipment):
 - Battery Switch – CHECK ON.
 - Avionics No. 1 and No. 2 Power switch – CHECK ON.
 - Radios – ON.
 - Navigational Lights, Strobe lights, and Flashing Beacon (if installed) – ON.
 - Panel Lights, Night – ON.
 - Seat Belt On and No Smoking Lights – ON.
 - Pitot static Heat – ON.
 - Stall Heat – ON.
 - Wing Light – ON.
 - Windshield Heat – ON.
 - Propeller Heat – ON.
 - Bleed Air Heat – ON.
 - Circuit Breakers – CHECK IN.

NOTE: Per AC 43.13-1A, Chapter 11, Section 2, short intermittent loads such as radio transmitters and wing flaps need not be considered when evaluating the electrical system. Heating systems should only be run for short periods on the ground.

3. Observe that the ammeter does not show discharge and that the voltage low light does not illuminate.
4. Set Power lever to 400 Ft.-Lbs.
5. Observe that the ammeter does not show discharge and that the voltage low light does not illuminate.
6. Turn on auxiliary pump.
7. Observe that the ammeter does not show discharge and that the voltage low light does not illuminate.
8. Set Power lever to idle
9. Observed that the ammeter does not show discharge and that the voltage low light does not illuminate.
10. If ammeter shows discharge and/or the voltage low light illuminates, it will be necessary to restrict use of non-essential electrical equipment when the auxiliary pump is operated. If such a restriction is required, install the 'load reduction caution placard' provided with the kit (refer to Drawing No. AP8-WI sheet 2, and Section II, paragraph D.2. of this manual)

NOTE: Restrictions are allowable only when the equipment selected for shut-down is non-essential, that is, not required for operation in an approved flight condition. For example, if the aircraft is certified for flight into known icing conditions, it is not permissible to shut down prop deice, windshield heat, etc. to prevent generator overload when the auxiliary pump is on.

NOTE: If the combined electrical load due to essential equipment and the auxiliary pump exceeds the existing starter/generator capacity, the optional Cessna stand by alternator must be installed.

11. Turn off all non-essential equipment (such as lights and heating equipment).
12. Shut down engine.

F. Check magnetic compass deviation

The magnetic compass may be affected by the auxiliary vacuum pump installation and must be checked for deviation from the current calibration card.

1. After the installation is complete, swing the compass (per AC 43.13-1A Chapter 16, Section 5) with the auxiliary pump both on and off.
2. The aircraft should be at a location free from influence of steel structures, underground pipes and cables, reinforced concrete, or other aircraft.
3. Place the aircraft in level flying position, with the engine still running.
4. With the auxiliary pump OFF turn the aircraft on successive 30 degree headings through 360 degrees. Note any errors on the calibration placard.
5. With the auxiliary pump ON repeat the ground swing, as noted in step 4. Note any compass deviations.
6. If the readings are significantly different from the current compass deviations, prepare a new (or additional) card showing the compass deviation with the auxiliary pump installed.

SECTION IV: WEIGHT AND BALANCE

When the Aero Twin Auxiliary Dry Air Pump Kit No. AP8-100 is installed, the aircraft empty weight and balance data must be updated and incorporated into the aircraft records. The table below shows a component breakdown of the items of mass added as part of this kit, and gives the total for the entire installation.

Item Part No.	Equipment Installed	Weight (lbs)	Arm (inches)	Moment (in.-lbs./1000)
AP8-30	Pump/Pump Bracket Assembly	9.8	96.5	0.95
AP8-100-20	Manifold Assembly	0.9	97.0	0.09
	Circuit Breakers and Power Box Wiring	0.3	97.0	0.03
AP8-14	Hose Assembly	0.7	101.0	0.07
	Hose	1.0	98.0	0.1
	Hose Fittings and Hardware	0.7	100.0	0.07
AP8-40	Switch Assembly and Attach Hardware	0.2	118.0	0.02
	Miscellaneous Wiring	0.1	102.0	0.01
Total	Auxiliary Dry Air Pump Kit AP8-100	13.6	97.5	1.34

Complete FAA form 337 with the above data and make appropriate flight manual and log book entries.

SECTION V - INSTALLATION PARTS LIST

Item	Description	P/N	Quan
	Firewall Connector	MS3106A14S-2P	1
	Firewall Connector	MS3100A14S-2S	1
	Switch	AML21GBA2AD	1
	Switch Button	AML51-G-20-BA	1
	Switch Bracket (Holder)	AML61EB1E	1
	Contactora	70-903	1
	Pump/Motor Assembly	AA4A2-1	1
	Manifold and Check Valve Assy.	AP8-100-20	1
	45 Degree elbow	1K9-6-10	1
	90 Degree elbow	1K1-6-10	1
	180 Degree Tube Bend	AP8-180	1
	Hour meter	T1141AB	1
	Hose Clamp	6510	8
	Doubler	AP8-12	1
	Pump Manifold Bracket Assembly	AP8-30	1
	Hose Assembly	AP8-14	1
	Placard (Circuit Breaker)	AP8-13	1
	Switch placard ("AUX VAC")	B4-192-1	1
	Switch Placard ("Push ON-OFF")	B4-192-2	1
	Placard (Electric load limit)	B4-203-1	1
	Rivets	CCR264SS-3-4	2
	3/8" Loom	CLT38F-C20	6 ft
	1/2 " Loom	CLT50F-C20	6 ft
	Hose, 5/8"	MIL-H-6000	6 ft
	Circuit Breaker (2 Amp)	S1232-502	1
	Circuit Breaker (15 Amp)	S1232-515	1
	Cable Ties (Large)	TY525M	2
	Cable Ties (Small)	TY523M	24
	90 Degree elbow (Firewall)	1K13-10-10	2
	Nut Ring	FSU-14	1
	Clamp, Crown and Boot	MS3420-6	2
	Nipple	MS25171-1S	6
	Nut	MS21042-3	9
	Nut	MS21044N06	2
	Lock Washer	MS35333-38	4
	Screw	AN525-10R8	1
	Adel Clamp	MS21919WDG16	2

Aero Twin, Inc.
2404 Merrill Field Drive
Anchorage, Alaska 99501

Auxiliary Dry Air Pump Kit No. AP8-100
Installation Instructions
Doc. No. AP8-1M

	Description	P/N	Quan
	Washer	AN960-4L	4
	Washer	AN960-C10	12
	Washer	AN960-8L	4
	Washer	AN960-6	6
	Washer	AN960-516L	1
	Washer	AN960-2	2
	Washer	AN960-1416	4
	Washer	AN960-10L	1
	Screw	AN526-440R8	4
	Bolt	AN3-5A	4
	Bolt	AN3-4A	4
	Wire		1
	Wire		1
	Wire		1
	Wire		1
	EMI Filter	93F2012	1

END-----

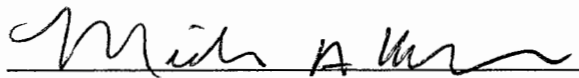
Aero Twin, Inc.
Auxiliary Dry Air Pump Kit No. AP8-100
For
Cessna Model 208, 208A, and 208B Caravan Aircraft

**INSTRUCTIONS FOR CONTINUED
AIRWORTHINESS**

Document No. AP8-ICA

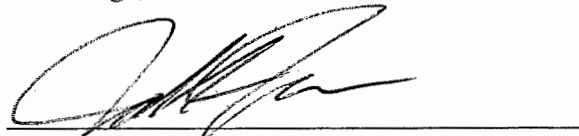
Maintenance Manual
Airworthiness Limitations

FAA/DAS Approved:



DAS Administrator
Designated Alteration Station DAS-01-AK
Anchorage, Alaska

FAA/DAS Approved:



DAS Airworthiness Inspector
Designated Alteration Station DAS-01-AK
Anchorage, Alaska

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1.0 Maintenance Manual

1.1 INSPECTION REQUIREMENTS

The auxiliary pump system should be inspected and functionally checked on a regular 100 hr/annual basis. The following should become part of the aircraft service manual inspection outline guide.

1. Mounting hardware
2. Contactor
3. Pump mounting bracket
4. Pump assembly
5. Hoses, fittings and clamps
6. Manifold and vacuum switches
7. Wire and electrical connectors
8. Elapsed time indicator (ETI)

1.2 OPERATIONAL CHECK - ENGINE OFF

The Aero Twin auxiliary pump system should be operationally checked every 100hr/annual as follows:

NOTE: If it is required to run auxiliary pump for more than a couple of minutes, it is recommended that the aircraft be connected to an APU.

1. Turn aircraft battery switch "ON".
2. The "VAC OFF" side of auxiliary dry air pump switch should be illuminated, and will remain illuminated until the engine is running (indicating that engine operated ejector pump vacuum is under 3 inches of mercury). If not, trace the system wiring to locate the problem (refer to Figure 1 at the end of Section I).
3. Push the auxiliary dry air pump switch to cycle it to the "ON" position. Switch will stay partially depressed. Do not run the auxiliary pump for more than a couple of minutes unless an APU is connected.
4. Auxiliary pump "AUX ON" light should be illuminated (indicating that the auxiliary system is drawing vacuum). If the light does not illuminate, check that the pump is actually running. If not, trace the wiring to determine the problem. If the pump is running, check for vacuum leaks.

5. The Annunciator Panel "VAC LOW" light should cycle off shortly after pump is turned on (indicating that vacuum is available for the instrument system is greater than 3 inches of mercury).
6. Check suction gauge for proper system vacuum, 4.5 to 5.5 inches of mercury.
7. Push the auxiliary vacuum switch to cycle to the "OFF" position.
8. The auxiliary pump "AUX ON" light should cycle off.
9. The annunciator panel "VAC LOW" light should illuminate.
10. The "VAC OFF" annunciator should remain illuminated for this entire check.
11. Turn the aircraft battery switch "OFF".

1.3 IN-SERVICE TIME LIMITS

In order to assure high reliability of the auxiliary pump system as a back-up power supply for vacuum instruments, an in-service time limit has been placed on the pump/motor assembly and system hoses.

SPECIAL MAINTENANCE NOTE

The pump/motor assembly and all MIL-H-6000 system hoses must be removed from service and replaced at 500 hours cumulative pump operating time as indicated on the elapsed time indicator (ETI) or at 10 years of installed time in the aircraft, whichever occurs first. The ETI is matched to the pump/motor assembly and must be replaced with the pump.

Under normal usage, 500 hours of pump-operating time is equivalent to 8000 hours or more of aircraft operating time. ***The pump must be running to read the elapsed time indicator (ETI).***

At the required time, remove and replace the auxiliary pump/motor assembly and ETI as follows:

1. Turn off aircraft master switch and auxiliary pump switch.
2. Disconnect hoses from pump/motor assembly.

3. Disconnect electrical leads at terminals on pump/motor assembly. If a replacement assembly is not to be installed immediately, insulate the lead ends.
4. Loosen band clamps and remove pump/motor assembly from aircraft.
5. Remove fittings from pump/motor assembly. If serviceable, save fittings for use with replacement pump.

WARNING: Do not place pump or motor housing in vice. Hold by hand when removing or tightening fittings.

6. Locate the ETI on the pump-mounting bracket and disconnect electrical leads from the contactor. If a replacement ETI is not to be installed immediately, insulate and secure the leads remaining in the aircraft.
7. Remove the ETI. Secure ETI to pump/motor assembly for later disposal.

NOTE: If a replacement auxiliary pump/motor assembly is not installed prior to next flight, cover the auxiliary pump switch, on the instrument panel, with an "INOP" placard.

8. Install replacement auxiliary pump/motor assembly by reversing removal procedures. Install replacement ETI per Section II, paragraph D.2 of the installation instructions.

CAUTION: Do not over tighten motor electrical terminal screws.

1.4 INFREQUENT AIRCRAFT OR AUXILIARY PUMP USAGE

If the aircraft has been idle or the auxiliary pump not used for six months or more, the auxiliary pump should be checked out prior to IFR flight as follows:

1. Turn on the auxiliary pump and let it run continuously for approximately 20 minutes. (This can be done in VFR flight, or on the ground with the engine running or an APU attached.)
2. After running the pump continuously for approximately 20 minutes, check the entire system for proper operation according to paragraph 1.2 OPERATIONAL CHECK - ENGINE OFF.

1.5 ROUTINE CLEANING

1. Protect the auxiliary vacuum pump and components when cleaning the engine compartment.

WARNING: Failure to protect the motor, pump and components from engine cleaning solvents may result in failure of the motor, pump and/or components within a short period of operation.

2. Prior to washing engine and engine compartment, protect the auxiliary vacuum motor and pump assembly by wrapping a protective covering around assembly.
3. Do not blast motor and pump with cleaning solvents under high pressure. To clean auxiliary pump and associated components, use a cloth wetted with cleaning solvent.

CAUTION: Ensure protective devices are removed from the motor and pump assembly after engine area is cleaned.

1.6 MISCELLANEOUS SERVICE

1.6.1 Annunciator Lamp Replacement

The annunciator lamps, item 76, in the auxiliary pump control switch are sub-miniature T-1 3/4 wedge base (commercial type 85) bulbs. To replace the lamps, pull the legend button off the switch and eject the lamps by pulling on the release tabs. Reset the release tabs, insert new lamps and press the switch button back into place.

NOTE: The wedge base T-1 3.4 annunciator lamps are not interchangeable with the flange base MS25237-327 lamps used in other aircraft lights. It is recommended that spare lamps and fuses for the auxiliary air pump system be carried in the aircraft.

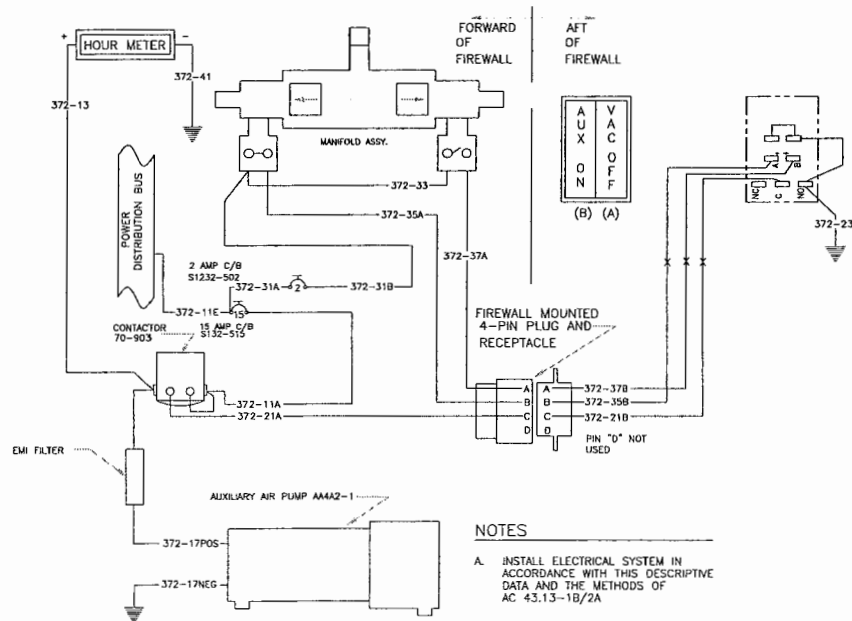
1.6.2 Pump Motor and Annunciator Circuit Breakers

NOTE: Tripped circuit breakers may indicate electrical shorts or other problems. Inspect the auxiliary pump system for defects and repair as necessary.

The circuit breakers are located on the left side of the power box on the forward left side of the firewall. Push circuit breakers in to reset.

Figure 1: System Electrical Schematic and Wire Gauge/Length Chart

WIRE	GAUGE	LENGTH	SPECIFICATION
372-21B	20	60"	MIL-C-22759/16
372-23	20	35"	
372-35B	20	60"	
372-37B	20	60"	
372-21A	16	44"	
372-35B	20	60"	
372-37A	20	60"	
372-11A	16	128"	
372-11E	16	18"	
372-31A	20	4"	
372-31B	20	120"	
372-33	20	4"	
372-39	20	9"	
372-13	16	7.5"	
372-17 POS	16	12"	
372-17 NEG	16	4.5"	
372-41	16	4.5"	
372-43	16	3"	



2.0 Airworthiness Limitations

Auxiliary Dry Air Pump Kit No. AP8-100

The Airworthiness Limitations section is FAA/DAS approved and specifies maintenance required under paragraphs 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

This modification does not affect the airworthiness section of the FAA Approved Maintenance Manual. The limitations of the installation, which contains life limited components, are contained in paragraph 2.1. The installation does not contain fail-safe components.

This section describes required replacement items. When repairs are deemed necessary, follow accepted standard practices and/or specific maintenance instructions in this manual. This section constitutes Component Airworthiness Limitations which apply to the Auxiliary Dry Air Pump installation only.

2.1 Scheduled Replacement Items:

The auxiliary pump/motor assembly, the elapsed time indicator (ETI) assembly, and all 5/8 ID MIL-H-6000 hose installed as part of this installation must be removed and replaced after 500 hours accumulated pump operating time (as established by the ETI) or after 10 years installed time, whichever comes first.

-----End of Section 2.0 Airworthiness Limitations-----

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DAS-01-AK