

INSTALLATION MANUAL

NUMBER TAS-415

STC SA2628WE

“Installation of Continental O-200-A engine, McCauley 1A101-DCM 6948 propeller, electric fuel transfer pump and associated changes”



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A	06/27/1973	Initial Issuance	
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Installation Manual

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A. General References

- 1. FAA, AC43.13-1B & 43.13-2B.
- 2. Drawings: STC2628WE; TAS 415 and TAS-415-1 thru 8.
- 3. Model C75/85/90/O-200 Continental Overhaul Manual.
- 4. Model A & C Series & 0-200 Service Parts Catalog.
- 5. Model A & C Series & 0-200 Continental Operator's Manual
- 6. Model 415: Ercoupe Service Manual (ESM), Univair
- 7. Model 415: Ercoupe Parts Catalog (EPM), Univair
- 8. Ercoupe Memoranda and Service Bulletin Manual (EBM), Univair
- 9. FAA Data Base: Airframe, Engine and Propeller Airworthiness Directives.

B. Required Item Listing

TCM O-200-A Engine Installation

Approval Code:

T = Type Certificate approved item. Obtain as New, Serviceable or Salvaged

S = Standard Hardware Item; AN, MS, NAS

P= Alpha Aviation PMA'd Item

Installer Supplied Items	QTY. REQ.	CODE
Item Description		
Engine Installation		
Cont,1 O-200-A38 e/w Starter: Cont,1 50309; Delco 1109656	1	T
Generator 35 Amp: Cont,1 536035; Delco 1101898	1	T
Regulator 35 Amp: Cont,1 627322; Cessna 0413205-10	1	T
Or		
Cont,1 O-200-A48; Starter:Cont,1 634464;Prestolite MZ4214	1	T
Starter Solenoid: Cessna: S1660-1	1	T
Circuit Breaker 10 AMP; AAI-W23G10	1	P
Push Button Starter Switch, AAI-SPB01	1	P
Alternator 60 Amp: Cont,1 633661; DOFF10300-F	1	T
Regulator: Cessna: C611501-0101	1	T
Ammeter 60Amp: Cessna: S1320-2	1	T
Circuit Breaker – 60amp: Cessna: S1707-60	1	T
Engine Mount Assembly – Lord J9534-2	4	T
Or		
Cont,1 530740 Bushing	8	T
530741 Cup Washer	8	T
530626 Seat	8	T
530627 Spacer	4	T
628555-16 Hose	4	T
Engine Mounting Hardware		
AN6-52 Bolt - Top	2	S
AN6-50 Bolt - Bottom	2	S
AN960- 6 Washer	8	S
AN970-6 Washer	8	S
AN310-6 Nut	4	S
AN380-3-3 Cotter Pin	4	S
Propeller		
McCauley 1A101-DCM 6948	1	T
McCauley Installation Kit #B-4622-9	1	T

Parts Listing		QTY	CODE	P/O	Initial
Alpha Aviation Supplied Items		REQ			
Kit Modification Parts: 415-O200A					
Fuel Pump Installation					
AAI-476087	Fuel Pump	1	P		
AN3-3A	Bolt	2	S		
AN960-10	Washer	4	S		
AN970-3	Washer	2	S		
AN365-1032	Nut	2	S		
Pressure Switch Installation					
AAI-76577	Hobbs Pressure Switch: N.C., 4psi	1	P		
AN911-1D	Nipple	1	S		
AN917-1D	Tee Fitting	1	S		
AAI -W31G10	Switch / Breaker 10A	1	P		
MS25041-2	Lamp Warning: Red, Press to Test	1	S		
GE #330	Bulb (12V)	1	S		
Mil-W-22759/16	# 16 GA Wire	8'	S		
Mil-W-22759/16	# 20 GA Wire	10'	S		
31902	#8 Wire End- Loop 16ga (Blue)	6	S		
31890	#8 Wire End – Loop 20ga (Red)	12	S		
32448	Wire Splice – Knifes (Blue)	2	S		
3/16" dia.	Sleeve Insulating: Clear	4"	S		
Documentation					
TAS-415	Installation Manual	1	P		
TAS-415 -1/2/3A/3B	Installation Drawings	4	P		
TAS-415-5	Baffle: R/F. - Drawing, Plate, Seal, Rivet Pack	1	P		
TAS-415-6	Panel Marking Requirements	1	P		
TAS-415-7	Flight Manual Supplement	1	P		
TAS-415-8	Instructions for Continued Airworthiness (ICA)	1	P		
10-03905	Instrument Range Marking Decal	1	S		

Date _____

Kits _____

C. Intentionally left blank

D. Installation Description and Documentation

“Installation of Continental O-200-A engine, McCauley 1A101-DCM 6948 propeller, electric fuel transfer pump and associated changes”

Engine Installation

The replacement Continental O-200-A engine is similar to the C-75/C-85 engine being removed, as it is of the same design, has the same physical dimensions and approximate weight.

With the change from the Continental C-75/C-85 engine to the STC SA2628WE Continental O-200-A engine the firewall forward installation remains virtually unchanged.

The installation varies in that the Continental O-200A engine isn't equipped with an engine driven fuel pump.

A firewall mounted electric fuel Transfer pump installation is added to replenish the header tank.

The carburetor air box, exhaust system, cooling baffles and various electrical and fuel connections remain unchanged and are transferred to the Continental O-200-A replacement engine.

Fuel System

Overview - The fuel system consists of 2 wing tanks that feed a fuselage header tank located aft of the firewall behind the instrument panel. The header tank gravity feeds the engine

The header tank is continually replenished from the wing tanks via a closed loop system powered by a mechanical fuel pump.

When the fuel in the wing tanks is gone the header tank continues to gravity feed the engine until it is empty.

Fuel quantity indicators are installed to monitor the header and wing tanks.

Propeller Installation

As with the engine installation, the replacement McCauley1A101DCM6948 propeller installation is physically identical to the McCauley 1B90 being removed.

The original Propeller spinner and back plates are reused.

The propeller installation will require a new McCauley mounting bolt package as called out in the McCauley manual.

Airframe Qualification

Aircraft that have a standard airworthiness certificate are eligible for this installation.

The airworthiness certificate must be issued in the Normal category.

Inspect the aircraft and its records to assure that any change in structure or installed equipment does not preclude the installation of this engine / propeller combination.

Weight and Balance

The weight and balance change which occurs with this upgrade is not quantifiable in advance and must be documented by the installer. Either through the keeping of a log as items are removed and replaced or the weighing of the aircraft a completion.

FAA Documentation

This installation is an FAA approved installation when done in a conforming manner, per the approved data and parts listing. All parts supplied by Alpha Aviation Inc. are either FAA/PMA modification parts or standard parts and the Installation Manual, TAS-415, is approved data.

When the installation is completed, per the approved data, the installer should:

Update the aircraft equipment list.

Update the aircraft weight and balance record.

Install the Flight Manual Supplement; TAS-415-7 into the Airplane Flight Manual or Operation Limitations.

Install the Instructions for Continued Airworthiness; TAS-415-8 into the aircraft maintenance records.

Make the appropriate maintenance entries in the aircraft log book.

Prepare and submit a Form 337 to the FAA.

E. Propeller and Cowling Removal

1. Remove Spinner and Back Plates - store for reuse.
Note – Taper Shaft Backing Plates will need to have the mounting holes enlarged to 3/8” for reuse.
2. Remove propeller; save bolts and store - not being reused on this aircraft
3. Remove upper cowl and side panels – store for reuse.
4. Remove Nose Bowl – Store for reuse.
5. Remove Lower Cowl – store for reuse.
6. Remove Cowl Mounting Rails and Brackets – store for reuse.
7. Remove Cowl Support at the case attachment – store for reuse.

F. Engine Removal

- 1 Disconnect the battery.
- 2 Drain the engine oil, drain the fuel lines and carburetor bowl.
- 3 Disconnect the primer line, throttle cable, mixture cable. - tie back for reconnection.

- 4 Remove the carburetor gascolator and bracket assembly – store for reuse.
- 5 Remove the starter pull cable, fuel lines, oil pressure line, tachometer cable and all electrical connections. Tie back or store for reuse.
- 6 Remove the exhaust system, cabin air system and carb heat duct – store for reuse.
- 7 Disconnect the carburetor heat cable and remove the air box – Store for reuse.
- 8 Remove the engine baffling installation and engine oil breather line – Store for reuse
- 9 To avoid damage when the engine is removed - install a solid tail stand for support.
- 10 Remove the engine assembly by reference to the Ercoupe Service Manual (ESM).
- 11 Store the removed engine assembly for reuse on another aircraft, overhaul or salvage.

G. Install Electric Fuel Transfer Pump and Warning Lamp

Note – If the Continental O-200-A engine being installed is equipped with an engine driven fuel pump it may be used and negate the need for the Electric Fuel Transfer Pump, Warning Lamp and the Flight Manual Supplement.

In that case the installer must prepare the FAA Form 337; installing STC SA2628WE and request a deviation approval (FAA approval in Box 3) prior to returning the aircraft to service.

1. Install the electric fuel transfer pump (PN AAI-476087) and pressure switch (PN AAI-76577) are shown on drawing TAS-415-1.
2. Install the Fuel Transfer Pump 10amp Switch/Breaker and Warning Lamp as detailed on drawing TAS-415-2.
3. Complete the electrical interconnection by reference to drawing TAS-415-3A or TAS- 415-3B as appropriate. Note - Use fire proof sealer at firewall penetration.

H. Install Fuel Pump Fittings and Reconnect

1. Install the fuel pump output fitting removed from the engine driven fuel pump during disassembly, Install into the open end AN917-1D TEE installed in step G., 1.

This fitting is extremely important to the system to prevent overflow of fuel from the fuselage fuel header tank. This fitting can be identified by the .0625” restriction in its output; PN: 415-48201-28 / AN844-4DS.

2. Install the fuel pump input fitting removed from the engine driven fuel pump during disassembly. The fitting is an AN844-4D installed in the bottom port of the fuel pump.
3. Reconnect the fuel pump output line by adjusting the length of the fuel line originating at the firewall top bulkhead fitting to the fuel pump upper port – pressure switch location. Adjust the length and position to maintain an acceptable bend radius.
4. Reconnect the fuel pump input line by adjusting the length of the fuel line originating at the firewall lower bulkhead fitting to the fuel pump lower port. Adjust the length and position to maintain an acceptable bend radius.
5. Restore fuel flow to the Transfer Pump System and leak test.

I. Fuel Gauge Requirement

A fuel gauge must be installed in at least one wing tank (the wing tanks are inter-connected) and the fuselage header tank to provide the pilot an accurate fuel level indication.

1. Original Equipment
 - a. The fuselage header tank fuel gauge, Models 415-C,-CD,-D,-E,-G is a simple float activated wire gauge.
 - b. Model 415-C aircraft serial number 113-2622 were equipped with a fuel gauge in the right hand wing tank. This gauge was inside the cockpit adjacent to the right seat passenger's right leg. This gauge assembly was removed along with the turnplate fuel tanks in accordance with Ercoupe Service Memorandum ESM-39.

Most Model 415-C aircraft serial number 113-2622 have been retro- fitted with newer aluminum wing tanks with a redesigned fuel gauge in left tank. See c. below.
 - c. Models 415-C,-CD,-D,-E,-G serial number 2623 and above are equipped with aluminum wing tanks which feature a fuel gauge assembly (PN:415-48115) installed in the left tank.

Gauge readings are visible through a side wall opening at the pilot's left knee. Replacement assemblies are no longer available.
2. Replacement fuel caps and gauges can be installed - use extreme caution to insure that any replacement caps and/or gauges maintain the required fuel tank venting.

Univair Aircraft Corporation, Service Bulletin 33, Dated March 5, 2012 covers this subject in detail and should be consulted any time fuel system components are being serviced, repaired or replaced.

J. Install Engine Assembly (Continental O-200-A)

Conditions – This installation instruction covers the installation of the following common engine configurations, other configurations will need to be approved by STC or installer sourced FAA field approval.

Continental O-200-A38 engine package: Magnetos/Harness, Carburetor, Delco Pull Starter, Delco 35amp Generator.

Or

Continental O-200-A48 engine package: Magnetos/Harness, Carburetor, Prestolite Push Button Operated Starter and Ford 60amp Alternator.

They vary by the use of different Starter and Generator / Alternators and are chosen for their availability and generation capacity to support the continuous duty fuel pump requirement.

Configuration A38 was used on Cessna Model 150G and 150H aircraft and Configuration A48 was used on Cessna Model 150J, 150K, 150L, 150M Aircraft.

Both configurations are detailed in the Continental Service Parts Catalog.

1. Inspect the firewall, engine mount and nose landing gear for any maintenance issues needing attention prior to engine installation.
2. Uncrate the new engine and hoist into position.
3. By reference to the Continental Service Parts Catalog assemble the Lord Mounts J-9534-2 (4) onto the crankcase mounting bosses – Temporarily tape in place.

Note – The O-200-A engine mount bosses sit forward 1/2” and require that the 530627/653695 spacers be shortened 1/4". The 530740 rubber bushings will compress to compensate and remain resilient. The remaining 1/4" is taken-up by enlarging the aft edge of the engine cowl fuel filler neck hole by 1/4". The rubber neck bushing is large enough to compensate.

4. Mount the engine to the mounts using the AN6-52 top and AN6-50 bottom bolts, include the bonding strap and attaching hardware. Remove the temporary tape and torque to 60 to 80 inch pounds, re-adjust after run in.
5. Reinstall the engine baffling installation and engine oil breather line. The left front baffle will need either a filler to close the now un-needed fuel pump opening or replacement per Drawing TAS-415-5.

Note 1 – This installation instruction assumes the removed engine installation was a C85-12 and that the oil cooling baffles (Ercoupe Parts Catalog Fig 17, items 13/14/15) are installed. If not they are required to insure adequate oil cooling.

Note 2 – Experience has shown that baffling installations sustain considerable wear and tear in service. It is suggested that the baffles receive any needed refurbishment or replacement at this time to assure adequate cooling.

6. Reinstall the exhaust system and heat muffs – defer the Scat hose installation.

7. Reinstall the Carburetor Air box, replace the filter element, re-connect the control cable and re-rig.
8. Reinstall the Engine primer line.
9. Reinstall and connect the throttle cable and re-rig.
10. Reinstall the Carburetor mixture cable and re-rig.
11. Reinstall the Carburetor gascolator and bracket assembly.

Note – This installation is covered in detail in Univair Service Bulletin 24B and FAA; AD 2002-16-04

12. Reinstall the fuel line.
13. Reinstall the oil pressure line.
14. Reinstall the tachometer cable.
15. Reinstall and re-rig the starter pull cable. If so equipped.
16. Reconnect all electrical connections.

Note 1 – Either the Alternator or Generator installation will require the installation of a mated Regulator / Controller as shown on Drawing TAS-415-3A or B and the Required Items Listing – they are installed under the right seat in place of the existing regulator.

Note 2 –The A48 configuration requires the replacement of the Ammeter and Main Breaker with 60amp units. Shown on Drawing TAS-415-3A and the Required Items Listing.

Note 3 - The A48 Configuration requires the addition of a starter Push Button, Solenoid, Circuit Breaker and wiring shown on drawing TAS-415-3A and the Required Items Listing.

17. Restore fuel flow to the Gascolator and leak check.
18. Test the primer system and leak check.
19. Install the oil filter, if so equipped.
20. Replenish the oil sump – 6 quarts.
21. Reinstall the Carburetor heat Scat tubing and the Cabin heat Scat tubing.
22. Reconnect the battery.

K. Instrument Range Markings and Placard Installation

Install the required range markings and placards - See drawing TAS-415-6

1. Flight Instruments – Airspeed; Range markings per Operating Limitations or Airplane Flight Manual (AFM).
2. Engine Instruments – * Power Plant Instrument Markings (STC Addendum page 3).
 - * Tachometer as listed.
 - * Oil Temperature as listed.
 - * Oil Pressure as listed.
3. Weight and balance report – Install per STC Addendum page 3; Note 1.
4. Instrument Panel Placards – Install per STC Addendum page 4; Note 2.

L. Final Inspection and Testing

1. Visually inspect completed engine installation and instrument panel installation.
2. Pre oil the engine by removing the spark plugs and disconnect the oil pressure line – electrically crank the engine until fresh oil appears at the oil pressure fitting. Reconnect the oil line. Continue cranking for 30 seconds to fill the oil gallery. Reinstall Spark Plugs.
3. Leak test the fuel system.
4. Test the fuel transfer pump system operationally and for leakage.
5. Operationally test the fuel transfer pump system warning light.

The Hobbs pressure switch has an adjustment device consisting of either a slotted or allen wrench stud and lock nut inside the unit, under the rubber cap.

- a. Remove rubber cap and set aside.
- b. Locate adjustment stud.
- c. Loosen the nut.
- d. Turn stud "out" (counter clockwise). Switch is normally factory set at 4-psi.
- e. Reduce pressure setting to a point where the warning light will extinguish with pump "on" and pumping and will illuminate when the pump is turned "off" or when the wing tanks are empty.
- f. Secure lock nut and reinstall rubber cap

6. Ground run-up requirements will vary depending upon the status of the newly installed engine. Whether the engine is new, freshly overhauled, has been run-in on a test stand or is a continued time engine.

It is critical that the run in be a well-planned event and not left to chance.

7. Document your installation;

Aircraft Weight and Balance / Center of Gravity computation
Aircraft Equipment List update

Engine; AD search and compliance
Engine; Installation log book entry
Engine; Annual Inspection sign off

Propeller; AD search and compliance
Propeller; Installation log book entry
Propeller Annual Inspection sign off

Airframe; Install Flight Manual Supplement in AFM
Airframe; AD search and compliance
Airframe; Engine & Propeller installation log book entry
Airframe; Annual Inspection sign off

FAA Form 337; Preparation, sign off and submission

9. Flight operations; the first flight and testing should be accomplished by a qualified pilot and include a flight test check list.