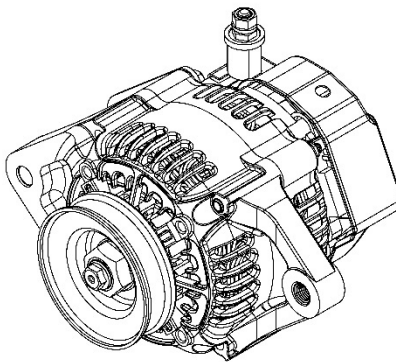


Technical Manual  
for  
**Model No. SF401  
Alternator**

for Lycoming Engines



Including:

Installation Instructions;  
Troubleshooting Guide; and  
Instructions for Continued Airworthiness

**B & C Specialty Products  
P.O. Box B  
Newton, KS 67114  
(316) 283-8000**

**BandC.com**

**NOTE**

The SF401 Alternator is not STC'd or PMA'd and is intended for installation on experimental amateur-built aircraft only.



## APPLICABILITY

This kit is applicable to aircraft with Lycoming engine installations which have an alternator mounting boss on the right-hand engine case. Engines with a 9-3/4" single-groove flywheel pulley will use the FK5414-1 installation kit and engines with a 7-1/2" flywheel pulley will use the FK5414-2 installation kit. "Case Mount" alternator installations are not supported.

## PARTS LIST

The following parts are supplied with the FK5414-1 and FK5414-2 Installation Kits:

<u>Qty.</u>	<u>Part No.</u>	<u>Description</u>
1	AN6-42A	Pivot Bolt
1	AN960-516L	Washer
2	AN960-616L	Washer
1	FC2-ASSY	Connector Assembly
3	MS20074-05-05	5/16-18 Bolt
1	MS20074-05-06	5/16-18 Bolt
1	MS21045-6	Nut, Locking
1	403-302-3	Tension Arm
1	403-316-4	Boss Mount Bracket
2	5710-82-125	Thick Washer
1	73383	Locking Plate
1	7355 (FK5414-1 kit only)	Belt
1	7305 (FK5414-2 kit only)	Belt

If replacements of the above items are needed, they may be ordered individually from B&C Specialty Products (Phone: 316-283-8000; or Online: [BandC.com](http://BandC.com)).

## CHANGE IN WEIGHT AND BALANCE

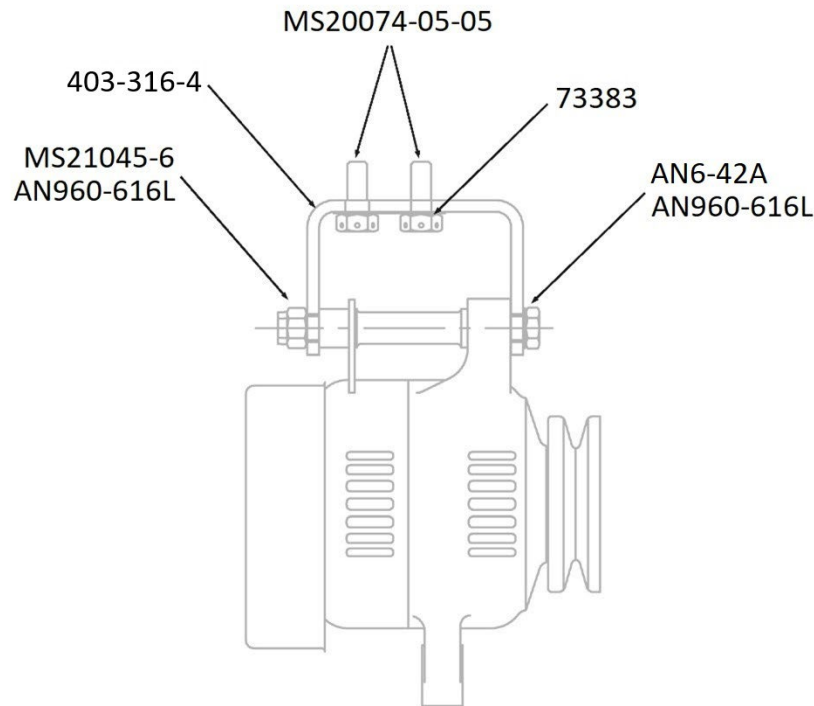
Installation of this kit will impact aircraft weight as follows:

SF401 Alternator: 6.1 lbs.

FK5414-1 or -2 Installation Kit (with Tension Arm & Hardware): 1.2 lbs.

## INSTALLATION

- Step 1. Remove engine cowl, spinner, propeller, and nose cowl. Disconnect ship's battery, Negative (-) terminal first.
- Step 2. Remove existing alternator/generator, mounting bracket, tension arm, and belt (if applicable).

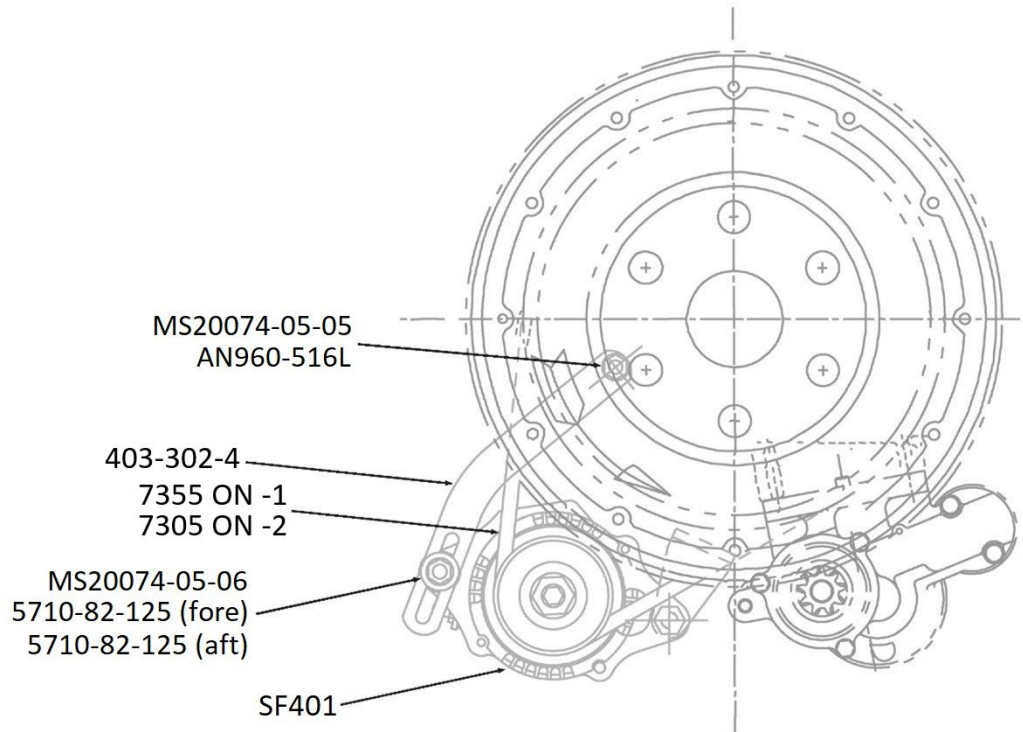


- Step 3. Mount the 403-316-4 bracket to the engine case boss, using the two MS-20074-05-05 bolts and the 73383 locking plate. Torque the bolts to engine manufacturer's specifications or 110-150 in-lbs. Lock the bolts by bending the tabs on the locking plate up against the flats on the bolt hex.

### CAUTION

Take care in preparing the engine case to accept the 403-316-4 bracket. ***The SF401 receives its ground through the mounting bracket.*** It is essential that the mating surfaces are clean and the mounting hardware is tight. On non-standard installations, make sure the alternator is grounded well enough to carry full alternator output despite any mechanical/electrical isolation mounts.

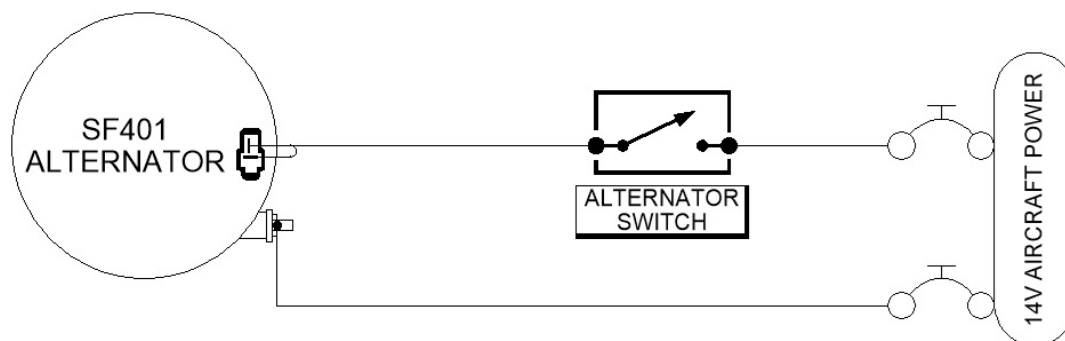
- Step 4. Position the SF401 alternator so that the alternator “pivot tube” fits within the U-shaped opening of the 403-316-4 bracket. Secure the alternator in place using the AN6-42A pivot bolt, two AN960-616L washers, and MS21045-6 locking nut. Do not fully tighten bolt and nut to allow for later adjustment.



- Step 5. Attach the 403-302-4 belt tension arm to the engine case using the MS-20074-05-05 bolt and an AN960-516L washer. Attach tension arm slotted end to alternator using the MS20074-05-06 bolt, with a 5710-82-125 washer fore and another 5710-82-125 washer aft of the tension arm. Leave both bolts loose for belt adjustment.
- Step 6. Install 7355 or 7305 drive belt, slipping it around the SF401 alternator pulley and the ring gear support (flywheel) pulley. Re-install nose cowl and propeller. Properly torque and safety propeller bolts to manufacturer’s specifications. Adjust the tension of the belt according to one of the methods described in Lycoming Service Instruction 1129C (or latest revision). As a minimum, the following procedure should be followed:
- A. Hold and secure propeller so as to prevent engine rotation;
  - B. Apply torque wrench to alternator pulley nut until belt slips;
  - C. Belt slip should not be observed below 12-14 ft.-lbs. for a new belt, or 8-10 ft.-lbs. for a used belt (viz. one that has been installed previously and run on an engine).

Torque tension arm bolts to 110-150 in-lbs. and the alternator pivot bolt to 225-300 in-lbs. Safety wire the tension arm bolts.

- Step 7. Install the FC2-ASSY connector assembly on the SF401, and route the wire aft to the alternator switch. Use adel clamps, nylon wire ties, or waxed string to secure this harness aft, making sure that it is tied away from chafe points and clear of all flight control mechanisms throughout the entire range of control movements. Route harness through grommets when firewall penetration is required. Install a terminal on the unfinished end of the harness, and connect to the alternator switch terminal. The switch will provide power from the aircraft bus and requires about 60mA of current. Use appropriate circuit protection to provide power to the switch.



- Step 8. Wire the output of the SF401 to a suitably-sized current limiter (40 amp) or circuit breaker (50 amp), per the latest revision of AC 43.13. Along the wiring path, use suitable anchor points, allowing enough slack for all possible engine movement. Torque the output post nut to 50 in-lbs. Install an insulating elbow over the connection.
- Step 9. Reconnect the aircraft battery, Positive (+) terminal first. Perform preliminary functional test on page C-1.
- Step 10. Check all fasteners for security and safety. Check that all wiring is clear of flight controls throughout the entire range of control movement. Re-install the engine cowling.
- Step 11. Perform final test on page C-1. Update ship's weight and balance, pilot operating handbook and maintenance records.

### PRELIMINARY FUNCTION TEST

- Step 1. Re-connect the battery. The magneto switch should remain OFF.
- Step 2. Close the alternator “Main” and “Control” circuit breakers (if so equipped).
- Step 3. Turn ON the battery and alternator master switches. Check that none of the alternator breakers trip.
- Step 4. Using a voltmeter (preferably digital), check the voltage at the alternator connector assembly. The observed voltage should match the aircraft bus voltage.
- Step 5. Using engine ground as negative reference, check the voltage at “B” lead (output terminal) of the alternator. The voltage should be equal to the bus voltage.
- Step 6. Turn OFF the battery and alternator master switches.

### FINAL TEST

- Step 1. Perform a normal preflight inspection.
- Step 2. Move the aircraft to an area safe for engine start.
- Step 3. Ensure that alternator circuit breakers are closed.
- Step 4. Turn ON the battery master and alternator master switches. Observe system voltage.
- Step 5. Perform a normal engine start and allow the engine to reach proper temperature for run-up RPM.
- Step 6. Set engine to approximately 1700 RPM minimum. Check for a bus voltage near 14.0 volts.
- Step 7. Increase electrical load using Nav lights, landing lights, etc. and check to see that the load is being supported and that the voltage stays above the voltage observed prior to starting. Higher RPM may be required for heavy loads.
- Step 8. Return engine to idle RPM. Perform a normal engine shutdown. Turn OFF battery and alternator master switches.

## TROUBLESHOOTING

CONDITION	POSSIBLE CAUSE	SUGGESTED ACTION
Charging system off-line (no output)	Engine at idle or low RPM	Reduce load until increased engine RPM possible.
	Output circuit breaker/current limiter open	Check breaker/limiter condition. Investigate whether open condition indicative of short-circuit or other “hard fault” in circuit.
	Output circuit breaker/current limiter failed	Test for voltage drop in breaker/limiter. Consider replacement if voltage drop greater than 0.25 volts detected. If equipped with current limiter, evaluate and replace if open.
	DC output wire broken, or has failed crimp joint	Replace broken wire assembly; or remove old crimp joint, dress and crimp new wire terminal on output wire.
	Control circuit breaker open	Check breaker condition. Investigate whether open condition a result of chaffed or abraded wire insulation at wire bundle ties or firewall pass-thru.
	Control breaker failed	Test for voltage drop in circuit breaker. Consider replacement if voltage drop greater than 0.25 volts detected.
	Control wire broken, or has failed crimp joint(s)	Replace broken wire assembly; or remove old crimp joint, dress and crimp new wire terminal on control wire.
Alternator not supporting load (insufficient output)	Electrical system load exceeds alternator capacity	Evaluate “continuous” power requirements and reconfigure load management practice.
	Alternator/stator damaged or failing	Repair or replace alternator/stator.
Alternator over-voltage condition indicated	Inadequate aircraft Ground reference, or loss of connection to aircraft Ground	Confirm resistance between the battery negative (-) terminal and the alternator case is less than 0.50 ohms. Use a digital multi-meter on the lowest scale for this measurement. Resistance in excess of this value warrants further investigation.
	Regulator failure	Repair or replace regulator.
Excessive alternator “noise” audible in headsets	Inadequate or degraded Ground connections for alternator, regulator, and/or audio or radio systems	Check for corrosion or lack of cleanliness at Grounding points. Ensure that gas-tight connections are present at each connection in Ground system.





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### **Instructions for Continued Airworthiness For B&C Specialty Products SF401 Alternator**

The B&C SF401 alternator requires no recurrent maintenance during its service life of 2200 hours. It is recommended that at 2200 hours or less time in service or during engine overhaul the alternator be returned to B&C Specialty Products for factory overhaul.

#### **Inspection:**

1. After the first 25 hours of operation after installation, check belt tension according to one of the methods described in Lycoming Service Instruction 1129C (or latest revision). As a minimum, the following procedure should be followed:
  - A. Hold and secure propeller so as to prevent engine rotation;
  - B. Apply torque wrench to alternator pulley nut until belt slips;
  - C. Belt slip should not be observed below 12-14 ft.-lbs. for a new belt, or 8-10 ft.-lbs. for a used belt (viz. one that has been installed previously and run on an engine).
2. At each Annual or 100 hour inspection check the alternator externally for security of mounting and wiring.
3. At each Annual or 100 hour inspection check the operation of the charging system, perform a normal engine run-up, adding and removing electrical loads while monitoring the ammeter or bus voltmeter. Ascertain that the alternator maintains the aircraft electrical bus at the approximate regulator set point as loads are added and removed (at high loads, cruise RPM may be required).
4. At each Annual or 100 hour inspection check the alternator drive belt condition and tension. The belt should not be cracked or frayed. Perform test outlined in item 1 (above) to determine if belt tension is sufficient.
5. At each Annual or 100 hour inspection check the alternator bearings. Release the belt tension. Check for radial and axial alternator shaft play and for smooth rotation. Reject an alternator that has rough rotation or shaft play. Re-tension the belt according to one of the procedures outlined in item 1 (above).

Failure due to broken wires or damaged connectors may be corrected in the field using repair procedures complying with the latest revision of AC43.13-xx. All other repairs are by factory service or replacement only.

**INSTALLATION OF THIS UNIT ON A TYPE-CERTIFICATED AIRCRAFT  
MUST BE ACCOMPANIED BY AN STC OR BY A ONE-TIME FIELD APPROVAL**