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MANDATORY

SERVICE BULLETIN

DATE: October 10, 2014 Service Bulletin No. 614A
(Supersedes Service Bulletin No. 614)
Engineering Aspects are
FAA Approved

SUBJECT: Exhaust System Inspection and Turbocharger Mounting Bracket Replacement
MODELS AFFECTED: Lycoming Engine Model TIO-540-AJ1A with a Serial Number Identified in Table 1 or any TIO-540-AJ1A with a Turbocharger Mounting Bracket Purchased as a Spare between April 5, 2012 and May 29, 2014

TIME OF COMPLIANCE: The Required Action must be completed within the next 25 hours or next scheduled maintenance event (whichever occurs first) for:

- Engines identified in Table 1 with 0 to 400 hours time in service since new, rebuilt, or overhauled.
- Engines with a turbocharger mounting bracket purchased as a spare between April 5, 2012 and May 29, 2014, with 0 to 400 hours time in service since bracket replacement.
- Return turbocharger mounting brackets currently in stock.

The Required Action must be completed at next overhaul for:

- Engines identified in Table 1 with over 400 hours time in service since new rebuilt, or overhauled.
- Engines with a turbocharger mounting bracket purchased as a spare between April 5, 2012 and May 29, 2014, with over 400 hours time in service since bracket replacement.

REASON FOR REVISION: Engine serial number L-13961-61E was added to Table 1. There are no other changes.

NOTE

Incomplete review of all the information in this document can cause errors. Read the entire Service Bulletin to make sure you have a complete understanding of the requirements.

This Service Bulletin contains turbocharger mounting bracket replacement instructions, disassembly/inspection/assembly instructions for the exhaust system (Figures 1 and 2), and warranty instructions for specific Lycoming engine models TIO-540-AJ1A, identified in Table 1. This mandatory inspection and turbocharger mounting bracket replacement must be done on engines identified in the Time of Compliance above.

Table 1
Serial Numbers of Affected Lycoming Engine Models TIO-540-AJ1A

Engine Serial Number	Engine Serial Number	Engine Serial Number	Engine Serial Number
L-6748-61E	L-13828-61E	L-13832-61E	L-13843-61E
L-13817-61E	L-13831-61E	L-13833-61E	L-13847-61E
L-13819-61E	L-13823-61E	L-13839-61E	L-13855-61E



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Table 1 (Cont.)
Serial Numbers of Affected Lycoming Engine Models TIO-540-AJ1A

L-13856-61E	L-13947-61E	L-14011-61E	RL-2551-61E
L-13857-61E	L-13948-61E	L-14013-61E	RL-2848-61E
L-13866-61E	L-13949-61E	L-14014-61E	RL-3450-61E
L-13867-61E	L-13950-61E	L-14015-61E	RL-4138-61E
L-13873-61E	L-13960-61E	L-14017-61E	RL-7243-61E
L-13882-61E	L-13961-61E	L-14024-61E	RL-7512-61E
L-13883-61E	L-13962-61E	L-14025-61E	RL-8435-61E
L-13884-61E	L-13967-61E	L-14026-61E	RL-8767-61E
L-13885-61E	L-13973-61E	L-14028-61E	RL-8914-61E
L-13886-61E	L-13975-61E	L-14034-61E	RL-8979-61E
L-13895-61E	L-13976-61E	L-14054-61E	RL-9399-61E
L-13896-61E	L-13979-61E	L-14055-61E	RL-9466-61E
L-13898-61E	L-13981-61E	L-14056-61E	RL-9618-61E
L-13900-61E	L-13983-61E	L-14057-61E	RL-9663-61E
L-13902-61E	L-13984-61E	L-14062-61E	RL-10098-61E
L-13907-61E	L-13993-61E	L-14063-61E	RL-10194-61E
L-13913-61E	L-13996-61E	L-14066-61E	RL-10249-61E
L-13915-61E	L-13997-61E	L-14067-61E	RL-10615-61E
L-13930-61E	L-13998-61E	L-14069-61E	RL-11011-61E
L-13931-61E	L-13999-61E	L-14071-61E	RL-12121-61E
L-13934-61E	L-14000-61E	L-14076-61E	RL-12163-61E
L-13936-61E	L-14001-61E	L-14077-61E	RL-12343-61E
L-13938-61E	L-14003-61E	RL-1726-61E	RL-13352-61E
L-13939-61E	L-14004-61E	RL-1810-61E	RL-13601-61E
L-13946-61E	L-14005-61E	RL-1862-61E	

Required Action

Exhaust System Disassembly and Removal



BEFORE DISASSEMBLY OF THE EXHAUST SYSTEM, IF THE ENGINE HAD BEEN OPERATING, LET THE ENGINE AND THE EXHAUST SYSTEM COOL FOR 1 HOUR OR LONGER AFTER ENGINE SHUTDOWN TO PREVENT BURNS.

NOTE

This procedure applies only to exhaust system components (Figure 3) that are installed on the Lycoming TIO-540-AJ1A engine at the factory and not airframe-installed exhaust system components. As a point of reference, Figure 4 identifies some of the factory-installed exhaust components on the engine and airframe-installed exhaust components around the turbocharger.

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NOTE

This procedure can be done on an engine installed in an airframe.

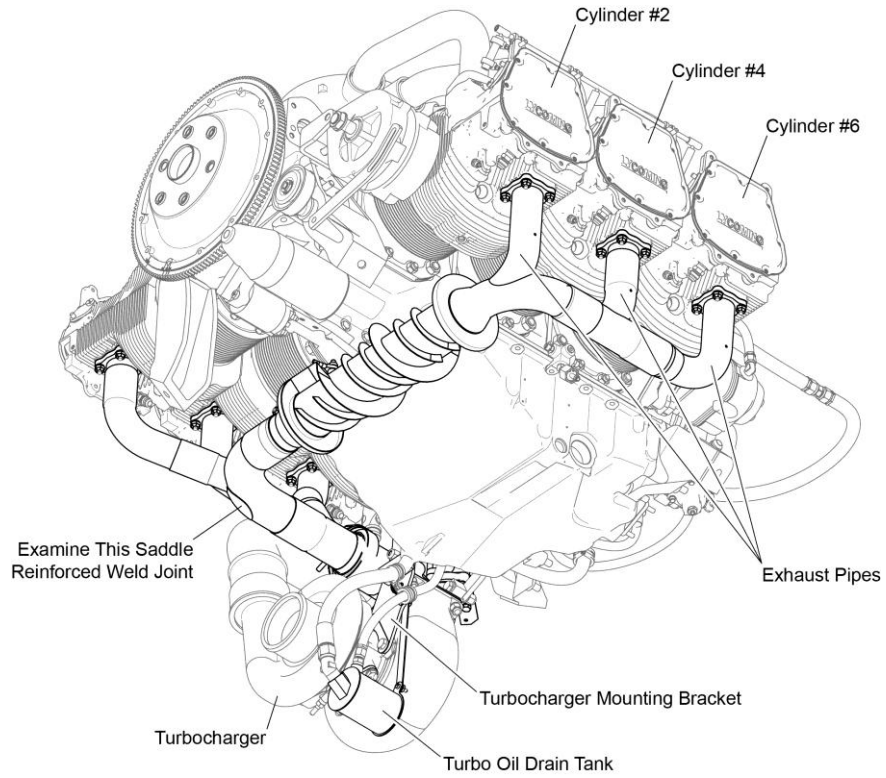


Figure 1
Installed Exhaust System (#1, #3, #5 Cylinder - Right Side of Engine)

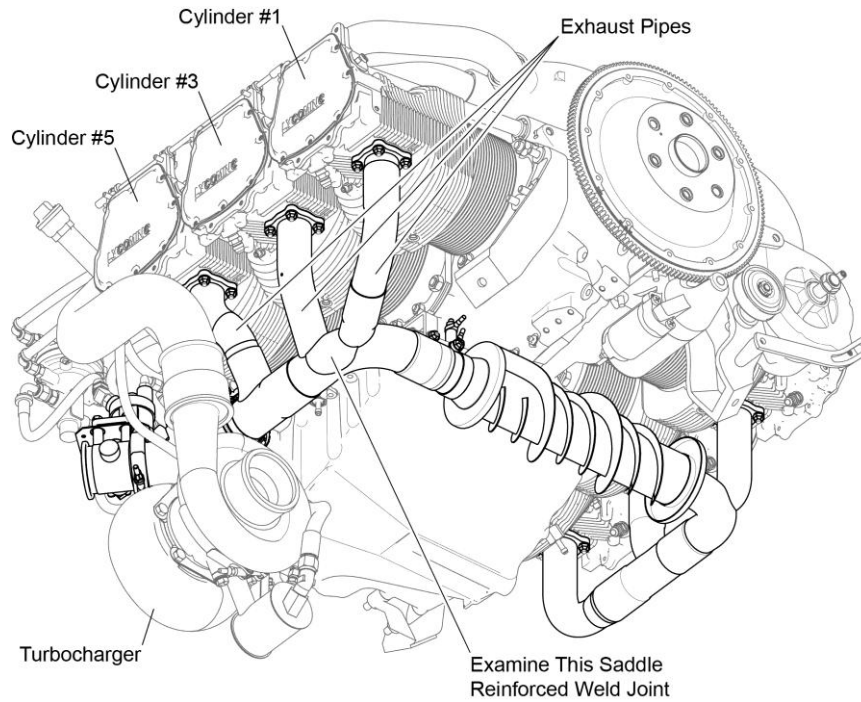


Figure 2
Installed Exhaust System (#2, #4, #6 Cylinder - Left Side of Engine)

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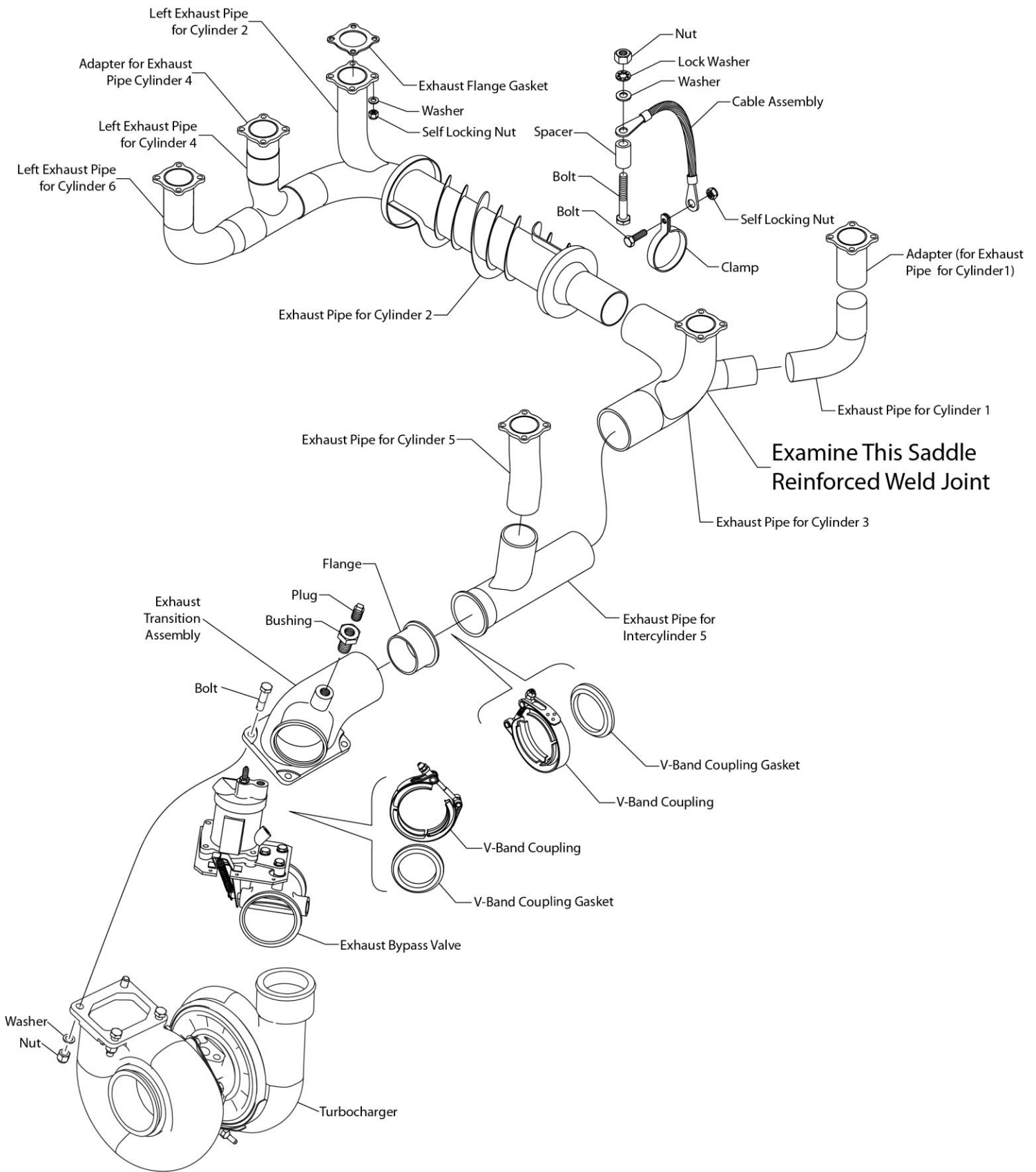


Figure 3
TIO-540-AJ1A Turbocharged Exhaust System

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1. Identify affected engines in Table 1 that are either installed in your aircraft or in your inventory.
2. Before disassembly either draw a sketch or take a photograph of the exhaust system installed on the engine and attached to the airframe for reference on reassembly.
3. Make a copy of the Exhaust System Inspection/Assembly Checklist included in this Service Bulletin for each affected engine to be examined as a record of inspection and replacement of the turbocharger mounting bracket in compliance with this Service Bulletin.
4. To access, the exhaust system, remove any airframe components as necessary per the airframe manufacturer's instructions.

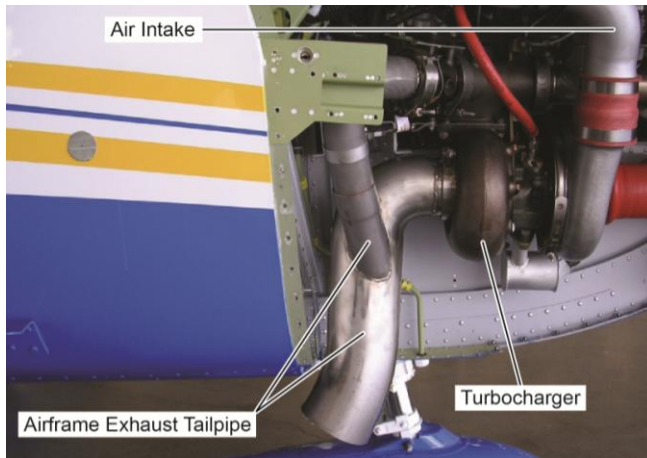


Figure 4
Installed Exhaust System

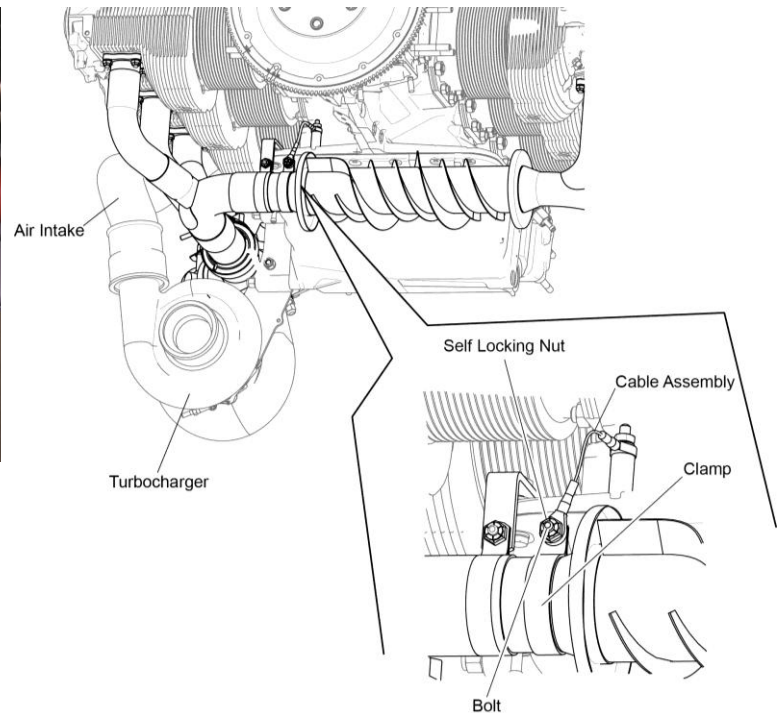


Figure 5
Exhaust System End of the Cable Assembly

5. Remove the bolt and self-locking nut from the exhaust system end of the cable assembly (Figure 5). Discard the self-locking nut.
6. Remove the V-band coupling from the following two slip joint connections (Figure 3) on the exhaust system:
 - Exhaust pipe for intercylinder number 5 and exhaust transition assembly connection
 - Exhaust transition assembly and exhaust bypass valve connection
7. Remove and discard the gasket (Figure 3) from each of the two removed V-band couplings.

 CAUTION

DO NOT USE ETCH TOOLS, GRAPHITE LEAD PENCIL, OR SCRIBE TO APPLY AN IDENTIFIER MARK ON EXHAUST PIPES. USE EITHER A NON-GRAPHITE MARKER SUCH AS COLORBRITE NO. 2127 OR 4127 OR A MARKS-A-LOT.

8. For reference, prior to exhaust system disassembly, use either a non-graphite marker such as Colorbrite No. 2127 or 4127 or a Marks-A-Lot marker to identify the exhaust system pipes on each side of the engine (Figure 3).

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 CAUTION

AS A SAFETY PRECAUTION, USE THREE PEOPLE TO COMPLETE THE NEXT STEPS TO PREVENT INJURY AND PARTS FROM FALLING.

9. While one person removes the self-locking nuts and washers (Figure 3) from the vertical portion of the three exhaust pipes on the 2-4-6 (even numbered) cylinder side of the engine (Figure 2), two people lower and remove the exhaust pipes and put them on a clean work surface. Discard the self-locking nuts and gasket from each exhaust pipe flange at the cylinder head.
10. Repeat the previous step for the three exhaust pipes on the 1-3-5 (odd-numbered) cylinder side of the engine (Figure 1).
11. Disconnect the hose and air inlet tube from the turbocharger (Figure 6).

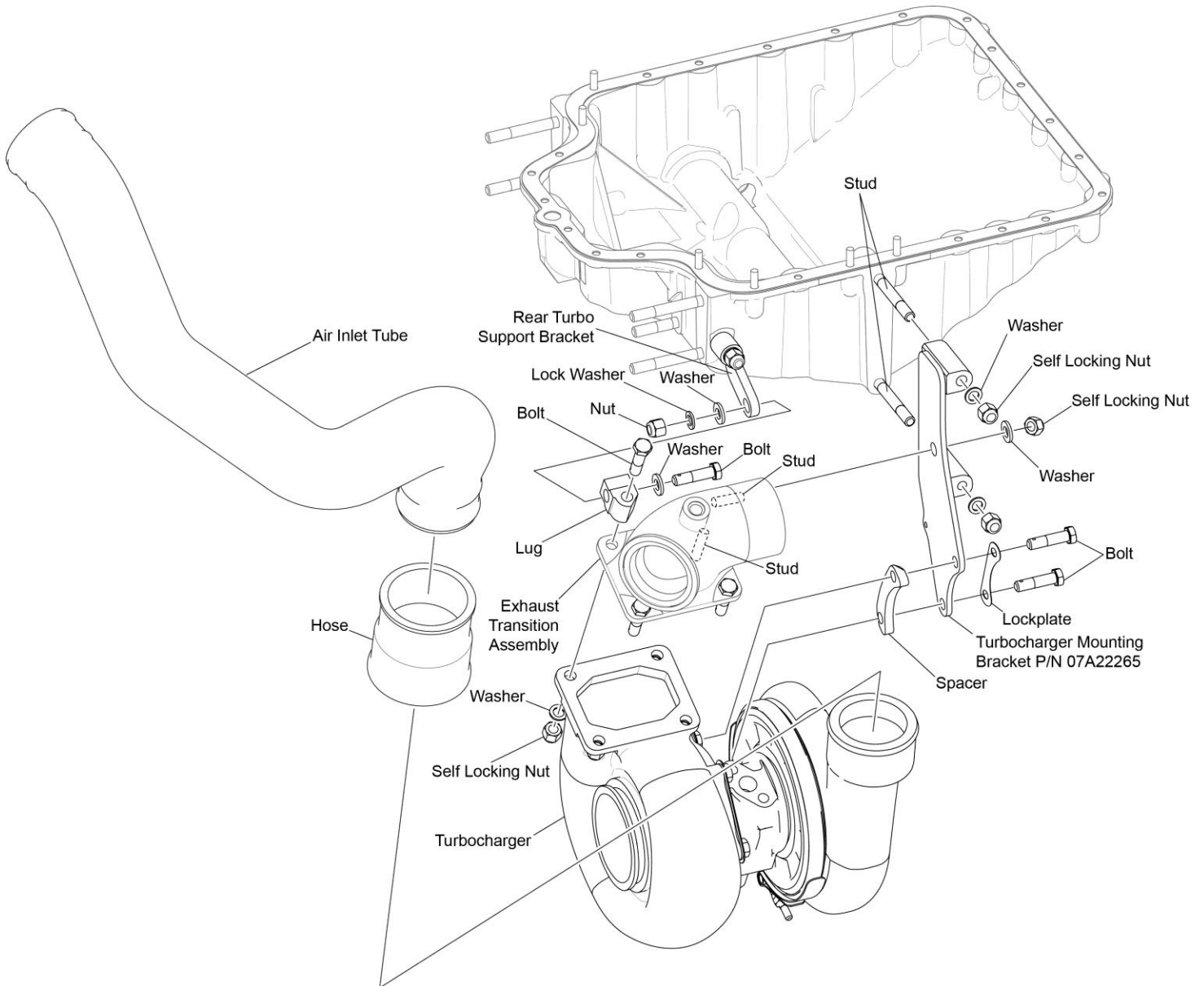


Figure 6
Turbocharger

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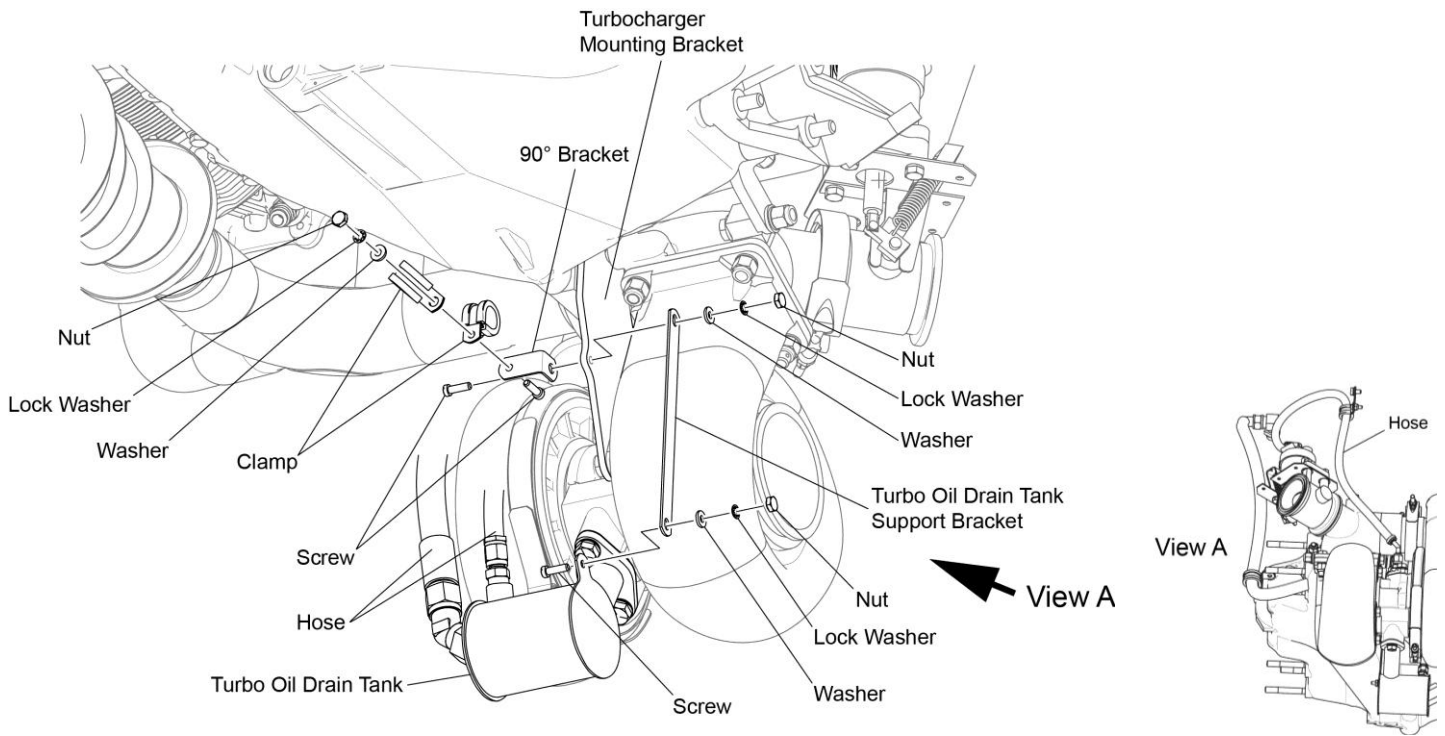


Figure 7
Turbo Oil Drain Tank and Support Bracket

12. Disconnect and put a cap on the two hoses connected to fittings on the turbo oil drain tank (Figure 7) and the hose connected to fitting on the turbocharger (Figure 7 - View A).
13. Remove the vertical bolt, washer, and self-locking nut from the lug on the exhaust transition assembly (Figure 6).

NOTE

In the next step, keep the 90° bracket (Figure 7) and clamps attached to the hoses.

14. Remove the screw, washer, lock washer, and nut from the portion of the 90° bracket that attaches to the turbo oil drain tank support bracket and turbocharger mounting bracket (Figure 7). Discard the lock washer.
15. Remove the horizontal bolt, two washers, lock washer, and nut from the lug on the transition assembly and rear turbo support bracket (Figure 6). Discard the lock washer. Remove and keep the lug.
16. Support the turbocharger assembly and remove the self-locking nuts and washers from the studs and turbocharger mounting bracket on the oil sump (Figure 6). Discard the self-locking nuts.
17. Carefully remove, as a unit, the turbocharger from the engine still attached to the exhaust transition assembly, turbocharger mounting bracket, turbocharger oil drain tank, and its support bracket. Put the assembly on a clean work surface.
18. Bend down the tabs of the lock plate (Figure 6).
19. Remove the two bolts, spacer, and lockplate that attach the turbocharger mounting bracket to the turbocharger (Figure 6). Discard the lockplate. Keep the spacer for reassembly.
20. Remove the self-locking nut and washer from the stud that attaches the turbocharger mounting bracket to the exhaust transition assembly (Figure 6). Discard the self-locking nut.

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21. Remove the turbocharger mounting bracket and send this bracket to Lycoming Engines to receive a replacement bracket as per warranty terms in this Service Bulletin. Refer to the replacement parts list in the “Warranty Instructions” section of this Service Bulletin.
22. Remove the three bolts, three self-locking nuts and three washers that attach the exhaust transition assembly to the turbocharger (Figure 6). Discard the self-locking nuts.

Exhaust System Inspection



CRACKED EXHAUST PIPES IN ANY EXHAUST SYSTEM COMPONENT, ESPECIALLY WELDED JOINTS, CAN CAUSE TOXIC GASES, SUCH AS CARBON MONOXIDE, TO ENTER THE COCKPIT.

NOTE

Send any part that is cracked or damaged to Lycoming Engines for replacement under warranty terms identified in this Service Bulletin.

1. Use a 10x power magnifying glass to examine the weld joints of the exhaust pipe for cylinder #3 (Figure 3). Closely examine the saddle reinforced weld joint (Figures 8 and 9). If any cracks or damage are found, replace the exhaust pipe.



Figure 8
Saddle

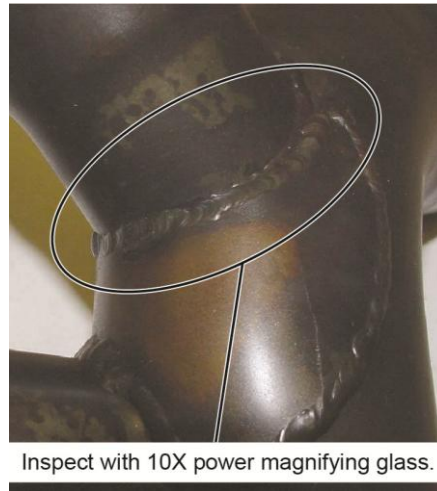


Figure 9
Saddle

2. Examine the #2 cylinder exhaust flange for damage or distortion. The flange must be straight and have no signs of exhaust leaking past the gasket. If the flange or pipe is distorted or damage, replace the pipe.
3. Examine the #2 cylinder exhaust port for signs of an exhaust leak or pulled exhaust studs. If evidence of leakage, damage, or pulled studs are found, replace the cylinder.
4. Complete a visual inspection on the entire exhaust system (Figures 1, 2, and 3) for any signs of leaks, distortion, or damage. Examine closely at all weld joints. Replace any damaged component.
5. Clean the exhaust pipes and flanges with approved solvents. Remove carbon or exhaust residue from slip joint mating surfaces with a red Scotch-Brite™ pad or equivalent abrasive pad. Remove any debris. Visually examine the cleaned exhaust pipes.

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Exhaust System Assembly and Installation

1. Apply a uniform coating of Loctite® C5-A® anti-seize compound or equivalent to the slip joint mating surfaces (Figure 3) of the exhaust pipes.
2. Assemble the exhaust pipes at the slip joints and make sure there is no binding of the joined parts. If any binding or tightness is found, replace the exhaust pipes.
3. Apply a uniform coat of Loctite® C5-A® anti-seize compound or equivalent to the stud (Figure 6) on the exhaust transition assembly.

NOTE

When installing exhaust system components do not fully tighten any fasteners until all components of the exhaust system are properly aligned and the fasteners can be torqued evenly. Components must be able to be manipulated to align them.

4. Attach the exhaust transition assembly to the turbocharger (Figure 6) with the two bolts, three washers, and three new self-locking nuts hand-tight.
5. Install the lug on the exhaust transition assembly with the vertical bolt, washer, and new self-locking nut (Figure 6) hand-tight.
6. Apply a uniform coat of Loctite® C5-A® anti-seize compound or equivalent to the threads of the two bolts that attach the new turbocharger mounting bracket, lockplate, and spacer to the turbocharger.
7. Install the new turbocharger mounting bracket P/N 07A22265 on the turbocharger (Figure 6) and the stud on the exhaust transition assembly with the two bolts, spacer, and new lockplate. Torque the two bolts to 160 to 190 in.-lb. (18 to 21 Nm). Bend the tabs (Figure 6) of the lockplate into place.
8. Install the turbocharger mounting bracket with the turbocharger and exhaust transition assembly on the studs on the oil sump (Figure 6) with the washers and new self-locking nuts hand-tight.
9. Install the washer and new self-locking nut on the stud on the exhaust transition assembly hand-tight.
10. Install the horizontal bolt through the lug on the exhaust transition assembly with a washer, and new self-locking nut (Figure 6) hand-tight.
11. Install the screw, washer, and new self-locking nut that attaches the turbocharger oil drain tank support bracket, and 90° bracket with the clamps attached, to the turbocharger mounting bracket (Figure 7). Torque the clamps to 49 in.-lb. (5.5 Nm).
12. Apply a uniform coat of Loctite® C5-A® anti-seize compound or equivalent to the first three threads of each exhaust stud in all six cylinder heads.



CAUTION

USE CARE TO SUPPORT THE ENTIRE EXHAUST SYSTEM DURING INSTALLATION. DO NOT FORCE, PRY, OR BEND COMPONENTS DURING FINAL ALIGNMENT TO PREVENT DAMAGE TO THE PARTS.

13. Assemble the exhaust system on the engine as applicable.

NOTE

Refer to the latest revision of Lycoming Service Instruction No. SI-1562 for exhaust system installation guidelines.

14. Refer to the pre-disassembly photo or sketch. Attach each exhaust pipe to the corresponding cylinder head each with a new flange gasket, new washers, and new self-locking nuts. Do not fully torque the self-locking nuts.

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15. Make sure there are no gaps at pipe connections and all pipes are correctly aligned before the final torque of the fasteners.

NOTE

The V-band coupling at the exhaust transition must be correctly aligned. Incorrect alignment of the V-band coupling at the exhaust transition is an indication that the exhaust system is not correctly installed. If the V-band coupling does not align, adjust the exhaust system components until the V-band coupling is in correct alignment. A slight adjustment to the turbocharger orientation also can be made to correct the V-band coupling alignment.

16. After validation of the alignment and configuration of the exhaust pipes, slide the V-band coupling with a new gasket over the exhaust pipe for intercylinder number 5 and exhaust transition assembly connection. Press the V-band coupling on the flanges.
17. Complete final torques to ensure all fasteners are torqued:
 - A. Torque the V-band coupling at the exhaust pipe for intercylinder number 5 and exhaust transition assembly connection to 85 in.-lb. (10 Nm). Refer to the latest revision of Lycoming Service Instruction No. SI-1238 for Assembly and Torque Procedures for V-Band Couplings.
 - B. Torque the nuts that attach the new turbocharger mounting bracket (Figure 6) to the oil sump to 30 ft.-lbs. (40.7 Nm).
 - C. Torque the self-locking nuts that attach the exhaust transition assembly (Figure 6) to the turbocharger to 30 ft.-lbs. (40.7 Nm).
 - D. Torque the nut that attaches the exhaust transition assembly to the turbocharger mounting bracket (Figure 6) to 30 ft.-lbs. (40.7 Nm).
 - E. Torque the nuts that attach the exhaust pipes to the cylinders (Figure 3) to 96 in.-lb. (11 Nm) -on all cylinders.
18. Remove the caps from the three hoses. Connect one hose to the turbocharger (Figure 7 - View A) and the other two hoses to the turbo oil drain tank (Figure 7).
19. Lubricate the inside of the hose for the air intake tube with engine oil mixture (15% pre-lubricant (STP or equivalent) and 85% SAE 50 mineral-base aviation-grade lubricating oil) and connect the air intake tube to the turbocharger (Figure 6). Torque the clamps to 35 in.-lb. (4 Nm).
20. Install the V-band coupling and new gasket at the exhaust bypass valve and exhaust transition assembly connection. Torque the V-band coupling to 85 in.-lb. (9.6 Nm).
21. Install the exhaust system end of the cable assembly (Figure 5) with a bolt and new self-locking nut. Torque the nut to 96 in.-lb. (10.9 Nm).
22. Refer to the airframe manufacturer's maintenance manual and reinstall all airframe components previously removed to gain access to the Lycoming exhaust system.
23. Record replacement of turbocharger mounting bracket, any corrective action, and compliance with this Service Bulletin in the engine logbook.

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Warranty Instructions and Replacement Parts for Engines/Parts Affected by Service Bulletin No. 614

- Contact an Authorized Lycoming Distributor to order the replacement parts listed below.

Parts Necessary for Required Action

Part Name	Lycoming Part Number	Qty.
BRACKET, Turbo mounting	07A22265	1
NUT, 3/8-24 self-locking	MS20500-624	8
LOCKPLATE	LW-12291	1
GASKET, Exhaust flange	LW-18234	12
GASKET, V-band coupling, 2-1/4 tube	78246	1
WASHER, 1/4 plain	AN960C416	24
NUT, 1/4-20 self-locking	STD-2044	25
GASKET, V-band coupling, 2-1/4 tube	75845	1
WASHER, No. 10 internal lock	STD-251	1

Additional Parts That Could be Necessary Based on Results of Inspection

Cylinder Kit	05K22680	1
ADAPTER, Exhaust pipe, cyl. no.1	40G22384	1
PIPE, Exhaust, inter. cyl. no. 5	40B22267	1
FLANGE, Exhaust manifold	40C22381	1
ADAPTER, Exhaust pipe, cyl. no.4	40G22384	1
PIPE, Exhaust, cyl. no. 1	40B22190	1
PIPE, Exhaust, cyl. no. 2	40B22318	1
PIPE, Exhaust, cyl. no. 3	40B22621	1
PIPE, Exhaust, left, cyl. no. 4	40B22379	1
PIPE, Exhaust, cyl. no. 5	40B22193	1
PIPE, Exhaust, left, cyl. no. 6	40B22380	1
PIPE, Exhaust, cyl. no. 1 with EGT probe hole*	40B23387	1
PIPE, Exhaust, cyl. no. 2 with EGT probe hole*	40B23386	1
PIPE, Exhaust, cyl. no. 3 with EGT probe hole*	40B23388	1
PIPE, Exhaust, cyl. no. 4 with EGT probe hole*	40B23385	1
PIPE, Exhaust, cyl. no. 5 with EGT probe hole*	40B23389	1
PIPE, Exhaust, cyl. no. 6 with EGT probe hole*	40B23384	1
* For use with Cessna OEM G1000 EGT Indication Systems only.		

- Upon receipt, complete the installation procedure.
- Return the removed turbocharger mounting bracket P/N 07A22265 and any cracked or damaged exhaust system components to Lycoming Engines through the same Authorized Lycoming Distributor that ordered the replacement turbo mounting bracket P/N 07A22265 and file a warranty claim for:
 - Reimbursement of the replacement parts.
 - Associated Freight.
 - Removal and Reinstallation Labor Allowance of not more than 8 hours.

If you have any questions, contact Lycoming Field Service by phone at 570-327-7222 or 877-839-7878.

NOTE

Warranty consideration is available for 12 months from the date of issue of this Service Bulletin.

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Exhaust System Inspection/Assembly Checklist	
Engine Serial Number:	Date of Inspection
Hours of engine service:	Inspection done by:
Task	Findings/Corrective Action
Use a 10x power magnifying glass to examine the weld joints of the exhaust pipe for cylinder #3. Give special attention to the saddle reinforced weld joint (Figures 8 and 9).	
Examine the studs that attach the exhaust pipe on the #2 cylinder for any indication that they have pulled away from the cylinder head.	
Examine the exhaust transition assembly (Figure 3), its flange, and slip joints for cracks, bulges, dents, or residue.	
Complete a visual inspection on the entire exhaust system for any signs of leaks, distortion, or damage. Examine closely at all weld joints.	
Clean the exhaust system with approved solvents. Remove carbon or exhaust residue off of slip joint mating surfaces with a red Scotch-Brite™ pad or equivalent abrasive pad.	
Apply a uniform coating of Loctite® C5-A® anti-seize or equivalent to the slip joint mating surfaces, assemble the exhaust pipes at the slip joints and test for freedom of movement.	
Replace the turbocharger mounting bracket. Return the removed turbocharger mounting bracket and any cracked or damaged exhaust system components to Lycoming Engines.	

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