RAJAY/ROTO-MASTER AIRCRAFT

SERVICE LETTERS

Rajay Industries is no longer in business.

Rajay turbochargers, controllers, actuators and scavenge pumps are available from:

Roto-Master
7101 Fair Avenue
North Hollywood, CA. 91605
(818) 982-4500

Rajay kit parts, service and technical information is available through:

Century Aircraft Corporation
10001 American Drive
Amarillo, Texas 79111
(806) 335-2806

Sky Ox parts, service and technical information is available from:

Sky-Ox Ltd.
P.O. Box 500
Saint Josephs, Michigan 49085
(616) 925-8931
(800) 253-0800

TELEX NO. 65-1390 (ROTMASTER LSA) • CABLE: ROTOTURBO
AN ECHLIN COMPANY
RAJAY CORPORATION

Service Instruction

Date: November 7, 1963

Service Letter No. 1

Models Affected: "Turbo 200" Apache (PA 23TS & PA23TS160)

Subject: Inspection of Carb Box Check Valve Hinge Tabs

Time of Compliance: At next routine inspection

It has been noted that the hinge tabs in the Carb Box Assembly, P/N RJ 0028-100, have shown excessive wear in service. The material for the tabs has been changed from aluminum to steel in the production parts.

Parts in service should be visually inspected at the next routine inspection and subsequently at 100 hour intervals until replaced. Tabs worn in excess of 1/16 inch require the Carb Box Assembly be replaced. This assembly is available from the factory for an exchange price of $12.50 per assembly. The carb Box Assembly may be replaced by any aircraft mechanic.

Any questions regarding this subject should be directed to the Rajay Corporation, 2602 East Wardlow Road., Long Beach, California 90807.

FAA APPROVED
RAJAY CORPORATION

Service Instruction

Date: October 26, 1964

Models affected: All Rajay Turbocharged aircraft equipped with model 315A10 Turbochargers.

Subject: Inspection of Turbocharger turbine scroll.

Time of Compliance: Within next 25 hours service and at each 100 hours operation interval thereafter until replaced.

It has been noted that radial cracks have appeared on some turbine scrolls of the Rajay model 315A10 Turbochargers as shown in the figure below. No case of complete failure has been observed nor reported.

The affected Rajay model 315A10 Turbochargers are to be inspected within the next 25 hours service and at each 100 hour operation interval thereafter until replaced. This inspection will consist of careful visual scrutiny of the exterior of the turbine scroll, particularly in the area marked on the figure below. If cracks are observed, install a placard in full view of the pilot to read "TURBOCHARGER INOPERATIVE". Upon replacement of the cracked turbine scroll, the placard may be removed. Modification to correct this problem is in work.

It is requested Rajay Corporation, 2602 E. Wardlow Road, Long Beach, California 90807, be notified of airplane type, serial number, registration number, owner, Turbocharger serial numbers, date and approximate hours in service with turbochargers at the time of initial inspection.

FAA APPROVED
October 28, 1964
Models Affected: "Turbo Commander 500B"

Subject: Inspection of Air Box Assembly Check Valve Hinge Tabs

Time Compliance: At next routine inspection

It has been noted that the hinge tabs in the Air Box Assembly, Rajay P/N RJ 2016-1 & -2, have shown excessive wear under some conditions of service.

Parts in service should be visually inspected at the next routine inspection and subsequently at 100 hour flight operation intervals until replaced. Tabs worn in excess of 1/16 inch require the Air Box Assembly be replaced. Modified Air Box Assemblies are available from the factory for an exchange price of $20.00 per assembly. The Air Box Assembly may be replaced by any aircraft mechanic.

Any questions regarding this subject should be directed to Rajay Corporation, 2602 E. Wardlow Rd., Long Beach, California 90807.

FAA Approved
January 6, 1965
RAJAY CORPORATION
Service Instruction

Date: April 16, 1965 Service Letter No. 4
Models Affected: Riley Turbo Rocket
Subject: Inspection of Compressor Discharge Box Check Valve Hinge Tabs
Time Compliance: At next routine inspection

It has been noted that the hinge tabs in the Compressor Discharge Box Assembly, P/N RJ 1006-31/-41, have shown excessive wear in service. The material for the tabs has been changed from aluminum to steel in production parts.

Parts in service should be visually inspected at the next routine inspection and subsequently at 100 hour intervals until replaced. Tabs worn in excess of 1/16 inch require the Compressor Discharge Assembly be replaced. This assembly is available from the Rajay Factory for an exchange price of $12.50 per assembly. The Compressor Discharge Assembly may be replaced by any Aircraft Mechanic.

Any questions regarding this subject should be directed to The Rajay Corporation, 2602 East Wardlow Road, Long Beach, California 90807
RAJAY CORPORATION
Service Instruction

Models Affected: Turbo Comanche 250 (PA 24-250) and Turbo Aztec (PA 23-250)

Subject: Ground operation of fuel boost pumps

Time of Compliance: Upon receipt of this service letter

Investigation into the cause of reported engine driven fuel pump malfunctions in the above aircraft models indicates the possibility of the pumps running dry. This condition could exist with excessive vapor in the fuel system due to prolonged ground operation or extreme hot weather operation.

To eliminate the possibility of running the engine driven fuel pumps dry, the electric fuel boost pumps are to be "ON" for all ground operations. A placard to this effect is in the process of manufacture and will be furnished when available.

Any questions regarding this subject should be directed to Rajay Corporation, 2602 East Wardlow Road, Long Beach, California 90807.

FAA Approved
July 1, 1965
RAJAY CORPORATION
Service Instruction

July 14, 1965

Subject: Inspection Recommendations Following Overboost of Rajay Turbocharged Lycoming Engines

Models Affected: All Rajay Turbocharged Lycoming Engines

Time of Compliance: Following Overboost

The attention of all operators of Rajay Turbocharged Lycoming engines is directed to Lycoming Service Instruction No. 1023B dated January 15, 1965. It is suggested that the recommendations set forth in the above Service Instruction be applied to Lycoming engines equipped with Rajay Turbochargers. Adherence to these recommendations will contribute to continued satisfactory operation of the Rajay Turbocharger/Lycoming engine combination.

Any questions regarding this subject should be directed to the Rajay Corporation, 2602 East Wardlow Road, Long Beach, California 90807.

FAA Approved
July 14, 1965
RAJAY CORPORATION
Service Instruction

July 21, 1965

Service Letter No. 7

Model Affected: Rajay Turbocharged Piper PA30 Twin Comanche

Subject: Engine Mount Protection

Time of Compliance: Upon receipt of material

It has been noted that some deterioration of the engine mount surface protection paint has occurred on the lower RH engine mounts of the Turbocharged Twin Comanche. This can be attributed to the increased temperature in the area due to relocated exhaust stacks.

Aircraft in service should be inspected upon receipt of this service letter and if deterioration of paint is in evidence, notify Rajay Corporation for material to correct this deficiency per the instructions and sketch below. (This treatment is incorporated in all installations subsequent to this date)

Sand mount tubes to bare metal and remove grease and oil with solvent. Make certain surface is completely dry. Apply 2 brush coats of Extra High H-170 Heat-Rem paint on moderately warm but not hot surface. Allow 12 hours drying between coats.

Any questions regarding this subject should be directed to Rajay Corporation, 2602 East Wardlow Road, Long Beach, California 90807.
RAJAY CORPORATION
Service Instruction

Date: October 1, 1965

Models Affected: Turbo Twin Comanche Piper PA-30

Subject: Inspection of Alternate Air Inlet Valve Bracket

Time of Compliance: At next routine inspection

It has been noted that the Alternate Air Inlet Valve Bracket P/N RJ 0605-71 hinge holes in parts manufactured prior to June 1965, have shown excessive wear in service. Parts manufactured subsequent to June 1965 incorporate brass reinforced hinge pin holes and therefore have increased wear resistance.

Parts in service should be visually inspected at the next routine inspection. Those parts incorporating the brass reinforcement require no further special attentions. Those parts without the brass reinforcement should be inspected for a maximum wear elongation of the hinge pin holes of 1/16 inch. If elongation does not exceed 1/16 inch the parts should be reinspected at intervals of 100 hours of service until replaced with the reinforced bracket. The Alternate Air Inlet Valve/Bracket Assy RJ 0605-5/-71 is available from the factory for $5.00 each. The Valve/Bracket Assy may be replaced by any aircraft mechanic.

Any questions regarding this subject should be directed to Rajay Corporation, 2602 East Wardlow Road, Long Beach, California 90807.

FAA Approved
RAJAY CORPORATION

Service Instruction

Date: December 14, 1965

Service Letter No. 9

Models Affected: Turbo Twin Comanche Piper PA-30

Subject: Alternate source for fuel nozzle bleed air.

Time of Compliance: Operator's option

It has been noted that during sustained operation under heavy dust conditions (operation from unimproved airfields) some fuel nozzle contamination can be attributed to the present source of fuel nozzle bleed air. To eliminate this problem possibility the factory is offering a kit for field retrofit to provide filtered air source. All production kits manufactured subsequent to December 12, 1965 incorporate filtered air source for fuel nozzle bleed air.

Operators interested in the above retrofit kit may obtain parts and instructions by contacting the Rajay factory direct - The Rajay Corporation, 2602 E. Wardlow Road, Long Beach, California 90807.
RAJAY CORPORATION
Service Instruction

May 23, 1967

Service Letter No. 10

Subject: Relocation of T/C Oil Warning Light Power Wire.

Models Affected: Piper PA30 Turbo Twin Comanche

Time of Compliance: At next routine inspection or within next 100 hours operation.

It has come to the attention of the manufacturer the turbocharger oil warning light power wire is not installed in the most desirable location.

The turbocharger oil warning light wire is presently connected to the Stall Warning Circuit Breaker. This wire and the corresponding placard is to be moved to the Flap Solenoid Circuit Breaker. Enter this action in the Aircraft Log on date accomplished.

Any questions regarding this subject should be directed to Rajay Corporation, P. O. Box 207, Long Beach, California 90801.

FAA APPROVED
June 12, 1967

RAJAY CORPORATION
Service Instruction

Service Letter No. 11

June 12, 1967

Subject: Inspection of Turbo oil supply hose.

Models Affected: Turbo Twin Comanche - Piper PA30 fitted with Lycoming IO-320-C1A engines.

Time of Compliance: At next routine inspection.

It has been noted that deterioration of the Turbo oil supply hose (P/N 624000-4-0224) has taken place in some installations. This hose installation should be inspected to ensure it is properly installed and remaining free and clear of the turbine scroll as shown in the sketch below:

Questions regarding this subject should be directed to RAJAY CORPORATION, P. O. Box 207, Long Beach, California 90801.

PAA APPROVED
RAJAY CORPORATION
Service Instruction

December 13, 1967

Subject: Intake Manifold Plugs.

Models Affected: Aero Commander Turbo 500A

Time of Compliance: Upon receipt of service instruction.

In compliance with Federal Air Regulations the intake manifold drains were replaced with plugs at the time of installation of the Rajay Turbocharger system. A recent ruling by the FAA will permit use of drains in this system, hence to preclude the possibility of hydro-static leak by fuel and subsequent engine damage, the original type drain plugs may be re-installed in the engine intake manifold at the operator's option.

All future Rajay Turbocharger Systems for the Aero Commander 500A will retain the original drains.

Any questions regarding this subject should be directed to Rajay Corporation, P. O. Box 207, Long Beach, California, 90801.

FAA APPROVED
Model Affected: Rajay Turbocharged Piper PA30 Twin Comanche
(Prior to mfg. S/N 30-1718)

Subject: Engine Mount Protection

Time of Compliance: Within the next 25 flight hours

It has been noted that some deterioration of the engine mount surface protection paint has occurred on the lower RH engine mounts of the Turbo Twin Comanche. This condition can be attributed to an inadequate amount of heat and corrosion resistant paint (silver in color) applied at time of installation of the turbocharger system prior to mfg. S/N 30-1718.

Aircraft in service should be inspected upon receipt of this instruction and if deterioration of the subject part is in evidence, notify Rajay Corporation for material to correct this deficiency per the instructions and sketch below.

Sand mount tubes to bare metal in shaded area shown and remove grease and oil with solvent. Make certain surface is completely dry. Apply 2 brush coats or 3 spray coats of Extra High H-170 Heat-Res paint on moderately warm but not hot surface. Allow 12 hours drying between coats.

Any questions regarding this subject should be directed to Rajay Corporation, P.O. Box 207, Long Beach, California 90801. FAA APPROVED
RAJAY CORPORATION  
Service Instruction  

August 5, 1968  

Models Affected:  Piper Model PA-30 Turbo Twin Comanche  

Subject:  Engine driven fuel pump vent fitting.  

Time of Compliance:  Operator's option.  

Current production Piper Model PA-30 Turbo Twin Comanche's are being furnished with new type engine driven fuel pump vent fitting. This fitting is manufactured with a very small orifice at the fuel pump vent port. This orifice restricts the loss of fuel in event of a fuel pump diaphragm rupture to less than four (4) gallons per hour.  

The subject fitting, RJ 0631 Tee, is available from Rajay Corporation, P. O. Box 207, Long Beach, California 90801, for $5.00 each. This fitting is a direct replacement for the AN826-2D fitting presently installed in aircraft PA30-1766 and previous.  

FAA APPROVED
RAJAY INDUSTRIES, INC.

SERVICE INSTRUCTION

DATE: February 23, 1970

SERVICE LETTER NO. 15

MODELS AFFECTED: All dash numbers of Rajay Turbocharger system
                  Lube Scavenge Pump P/N RJ 1025 and RJ 1045
                  S/N 800 & previous RJ 1025
                  S/N 585 & previous RJ 1045

TIME OF COMPLIANCE: Within next 25 operating hours

To prevent the possible disengagement of the internal ring retaining pin from the pump housing the following fix for pumps in service should be accomplished:

79-028-125-0187 ESNA
(Or Equivalent)
Press into hole

Contact Rajay Industries, Inc., P. O. Box 207, Long Beach, California 90801, Phone 213/426-0346 for any further information required.

FAA APPROVED
RAJAY INDUSTRIES, INC.
SERVICE INSTRUCTION

DATE: July 7, 1970

SERVICE LETTER NO. 16

MODELS AFFECTED: ALL RAJAY TURBOCHARGED MOONEY M-20E (Super 21) and
M-20F (Executive) Aircraft

TIME OF COMPLIANCE: DURING ALL OPERATIONS

It has come to our attention that some operators of the above aircraft
have been experiencing reduced service life from their Rajay Turbocharged
engines. We have conferred with some engine overhaul facilities and it
appears that in each case of reduced service life there is evidence of long
term operation at high engine temperatures.

In view of the above, it is recommended that all turbocharged operation
above 60% power be at Best Power mixture setting or richer. This is an EGT
of approximately 100-125°F on the rich side of peak.

Naturally, fuel consumption will increase slightly; however, this is
offset by an increase in performance and a substantial increase in engine
life.

Questions on the above should be directed to your local Rajay Dealer
or Rajay Industries, Inc., P. O. Box 207, Long Beach, California 90801,
phone (213) 426-0346.

FAA DER APPROVED
RAJAY INDUSTRIES, INC.
SERVICE INSTRUCTION

DATE: July 7, 1970

SERVICE LETTER NO. 17

MODELS AFFECTED: ALL RAJAY TURBOCHARGED AIRCRAFT, AFTER MARKET INSTALLATIONS

TIME OF COMPLIANCE: OPERATORS DISCRETION

There has been some question from the field as to the total adequacy of the RJ 4120 Waste Gate Return Spring. In response to the above, Rajay now offers a stronger spring available for in the field exchange. The new spring may be handily identified as it is 3/16 inch wide vs the RJ 4120 which is 3/32 inch wide.

It may be necessary to relocate the tab hole on the ring to properly preload the spring. See Sketch for installation: (Spring loaded toward open position.)

The new RJ 4120-11 Waste Gate Return Spring is available from stock for $4.85 each. This price is based on the RJ 4120 Spring being returned by U. S. Mail upon replacement.

Contact RAJAY INDUSTRIES, INC., P. O. Box 207, Long Beach, California 90801, Phone No. 213/426-0346, to place order or to obtain further information.

FAA DER APPROVED
DATE: February 3, 1971

PARTS AFFECTED: OLD STYLE OXYGEN OUTLET ASSEMBLIES

TIME OF COMPLIANCE: WHEN NECESSARY

All old style oxygen outlet assemblies will not accept the new Rajay quick-disconnect hose fittings. The valve body may be modified to be compatible with both old and new style fittings.

Remove valve body from regulator (or manifold) with 1/4 allen wrench. (Do not lose valve and spring). Modify body as shown:

---

DRILL 1/4 (0.250 DIA.) HOLE .590 DEEP

OLD

NEW

Reassemble after cleaning all parts with iso-pro alcohol or equivalent.

Contact RAJAY INDUSTRIES, INC., P. O. Box 207, Long Beach, California 90801, Phone No. 213/426-0346, to obtain additional information.
RAJAY 1 NDUSTRIES, INC.
SERVICE INSTRUCTION

DATE: SEPTEMBER 5, 1972
MODEL S AFFECTED: RAJAY TURBOCHARGED PIPER MODELS PA-30 AND PA-39
TIME OF COMPLIANCE: OPERATORS DISCRETION

THERE HAVE BEEN ISOLATED REPORTS OF THE TURBOCHARGER INDUCTION DUCT RETAINING STUDS BACKING OUT AND BEING INGESTED INTO THE COMPRESSOR SECTION OF THE TURBOCHARGER. TO PRECLUDE THIS FROM OCCURRING ON ANY FUTURE INSTALLATIONS, A REVISED ASSEMBLY WILL BE USED AS SHOWN BELOW:

![Diagram showing revised assembly](image)

INSTALL:
NAS 183-4-8 Stud
AN 310-4 Nut
4 Each Required
Safety Wire (.030 Dia.) Per
MS 33540 Top To Bottom As Shown
2 Places

THIS INSTALLATION MAY BE PERFORMED AS A FIELD MODIFICATION AT OPERATORS DISCRETION. ANY FURTHER INFORMATION REQUIRED MAY BE OBTAINED FROM RAJAY INDUSTRIES, INC., P.O. BOX 207, LONG BEACH, CALIFORNIA 90801, (213) 426-0346.

FAA DER APPROVED
RAJAY INDUSTRIES, INC.
SERVICE INSTRUCTION

DATE: APRIL 16, 1974

SERVICE LETTER No. 20

SUBJECT: FUEL PUMP FITTING INSPECTION

MODELS AFFECTED: ALL RAJAY TURBOCHARGED LYCOMING ENGINES FITTED WITH RAJAY R00253-2 OR R00253-501 FUEL PUMPS WITH 9/16-18 UNF THREADED INLET (NOT APPLICABLE TO PUMPS WITH TAPERED PIPE THREADED PORTS)

TIME OF COMPLIANCE: ANYTIME FUEL PRESSURE FLUCTUATES OR DETERIORATES WITH INCREASE IN ALTITUDE

The attention of all operators of RAJAY TURBOCHARGED LYCOMING ENGINES fitted with RAJAY R00253-2 or R00253-501 FUEL PUMPS IS DIRECTED TO LYCOMING SERVICE BULLETIN No. 374 DATED MARCH 15, 1974. IT IS SUGGESTED THAT THE RECOMMENDATIONS SET FORTH IN THE ABOVE LYCOMING SERVICE BULLETIN BE APPLIED TO THE AFFECTED ENGINES. ADHERENCE TO THESE RECOMMENDATIONS WILL CONTRIBUTE TO CONTINUED SATISFACTORY OPERATION OF THE RAJAY TURBOCHARGER/LYCOMING ENGINE COMBINATION.

Any questions regarding this subject should be directed to RAJAY INDUSTRIES, INC., P. O. BOX 207, LONG BEACH, CALIFORNIA 90801, (213) 426-0346.

FAA DER APPROVED APRIL 16, 1974
RAJAY INDUSTRIES, INC.
Service Instruction

Service Letter No. 21

Date: May 15, 1976

Equipment Affected: All aircraft and aircraft engines equipped with Rajay Turbochargers

To: Aircraft and engine manufacturers
    Aircraft operators and aircraft modification & maintenance bases

Time of Compliance: Within next 25 hours service and subsequently as scheduled below.

Subject: Inspection of Turbocharger Turbine (Exhaust) Housing

Reason:

Hairline cracks have been discovered in the tongue area of the turbine housing inlet in Rajay Turbocharger models 301E10, 315F10, 325E10, and 325F10. These turbochargers are fitted with turbine housing parts number TC 59-11, TC 60-11, and TC 82-11 as applicable. Investigation indicates this crack does not propagate rapidly therefore does not appear to be a pressing airworthiness item. Examples in hand indicate no external distress apparent in units that have been in service upwards to 10 years and show a hairline parting in the area of the tongue of the turbine inlet of 3/4 inch in length. (See sketch for location.)

Description:

It is recommended the following inspection procedures be put into effect and continued until the unit is replaced with a TC 59-11 "E" change or later, TC 60-11 "D" change or later, or the TC 82-11 "A" change or later, P/N appropriate to the Turbocharger model.

Initial inspection within 25 hours service from receipt of this letter. Follow-up inspections at 200 hours intervals until replaced per above.

Replacement of the subject unit should be made at any time the crack is observed to extend beyond 3/4 inch in length.

It is recommended to report the inspection findings by completing the malfunction or defect report, FAA Form 8330-2, and to submit it to the local FAA General Aviation District Office.

It is anticipated revised turbine housings per the change letters shown above will be available on June 1, 1976.

Contact RAJAY INDUSTRIES, Inc., P.O. Box 207, Long Beach, CA 90801, phone (213) 426-0346, to obtain further information as available.

Approval: FAA - DER, approved.
RAJAY INDUSTRIES, INC.
A Subsidiary of The Textron Corporation

FAA Approved

Date: August 9, 1976

Subject: Inspection of Turbocharger Turbine (Exhaust) housings

Equipment Affected: All aircraft engines equipped with Rajay Turbochargers

Distribution to: Aircraft and engine manufacturers - aircraft operators and aircraft modification and maintenance bases

Time of Compliance: At the next engine major or turbocharger overhaul, whichever comes first.

Reason:
Hairline cracks have been discovered in the tongue area of the turbine housing inlet in Rajay Turbocharger models 301E10, 315F10, 325E10, and 325EF10. These Turbochargers are fitted with turbine housing part numbers TC 59-11, TC 60-11, and TC 82-11 as applicable. Investigation indicates this crack does not propagate rapidly, therefore does not appear to be a pressing airworthiness item. Examples in hand indicate no external distress apparent in units that have been in service upwards to 10 years.

Purpose:
Inspection for hairline cracks in the turbine housing inlet in Rajay Turbocharger models 301E10, 315F10, 325E10, and 325EF10. These Turbochargers are fitted with turbine housing part numbers TC 59-11, TC 60-11, or TC 82-11 as applicable.

Instructions:
It is recommended that the inspection schedule of this letter be put into effect and continued until the unit is replaced with Part No. TC 59-11 "E" change or later, TC 60-11 "D" change or later, or the TC 82-11 "A" change or later, appropriate to the turbocharger model.

Replacement of the subject unit should be made at any time the crack is observed to extend beyond 3/4 inch in length in Type A cracks and over 2 inches in Type B cracks. (See sketches below)

Caution
Do not misinterpret the parting line of the casting in this area to be a crack.

Exhaust Gas Inlet

Possible cracks in this area allowable to 3/4 inch

2600 EAST WARDLOW ROAD / P.O. BOX 207 / LONG BEACH, CALIFORNIA 90801 / PHONE (213) 426-0346
Possible cracks in this area allowable to 2 inches

View of Turbine Housing with Turbo Center Section Removed.

Enlarged View of Cracked Area

Type B

It is recommended to report the inspection findings by completing the malfunction or defect report, FAA Form 8330-2, and to submit it to the local FAA general aviation district office.
Date: April 3, 1978

Model Affected: All Rajay Turbocharged Mooney M 20 E (Super 21) and M 20 F (Executive) Aircraft

Subject: Oil seepage into overboard exhaust pipe

Time of Compliance: Customer Option - Compliance not required

Oil has appeared in the overboard exhaust pipe of a few of the subject airplanes prior to engine start-up. This is caused by oil from the turbocharger oil outlet line draining into the turbocharger bearing housing during periods of engine idleness. Some of this oil seeps out the turbocharger shaft seal and into the overboard exhaust pipe. This oil clears up after running the engine a short time and no oil leaks during normal engine operation.

For owners who desire to eliminate this oil seepage, a parts replacement kit is available for $125.00 from Rajay. This price is effective thru December 31, 1978.

The modification adds a MS28885-8 check valve and replaces the turbocharger oil outlet hose with two shorter hoses and fire shielding as shown on attached E.O. 440.

Contact Rajay for any additional information.

Attachment: E.O. 440
DATE: October 2, 1978

SUBJECT: Inspection and replacement of turbocharger lubrication system check valve.

EQUIPMENT AFFECTED: All aircraft listed as follows:

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Model</th>
<th>STC No.</th>
<th>E.O. No.</th>
</tr>
</thead>
<tbody>
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<td>PA30 &amp; 39</td>
<td>SA787WE</td>
<td>934</td>
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<tr>
<td></td>
<td>PA32-260</td>
<td>SA1557WE</td>
<td>930</td>
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<td></td>
<td>PA24-250</td>
<td>SA811WE</td>
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<td>PA-23-160</td>
<td>SA4-1637WE</td>
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<td>PA-23-235 and</td>
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<td>PA-23-250 (B)</td>
<td>SA539WE</td>
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<td>SA1156WE</td>
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<td>SA181SO</td>
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<td>*182</td>
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<td>*310 Rocket</td>
<td>SA212SO</td>
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<tr>
<td>Helio</td>
<td>H-295</td>
<td>SA156SO</td>
<td>931</td>
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</table>

TIME OF COMPLIANCE: At next scheduled maintenance or as required.

REASON: In-service experience has shown that the o-ring seal may be dislodged from the valve seat and cause restriction of oil flow to the turbocharger bearing.

PURPOSE: To replace check valve P/N B-4C2-25 with an improved P/N 532A-2MP-18* check valve (Continental engine) or P/N 532A-2MP-27 check valve (Lycoming engine).

*Continental engines use -18
For each affected Aircraft Model incorporating Rajay Turbochargers:

1. Remove existing check valve P/N B-4C2-25
2. Install new check valve P/N 532A-2MP-27 on aircraft with Lycoming engines
   P/N 532A-2MP-18* on aircraft with Continental engines
3. (Optional) If so equipped, relocate low oil pressure switch as shown below

*Continental engines use - 18
MAY 1 1979

In Reply
Refer to: AWE-140:GDR:8110-8

Rajay Industries, Incorporated
P. O. Box 207
Long Beach, CA 90801

Attention: Mr. R. Lloyd
Director of Engineering

Subject: Approval of Rajay Industries Service Letter No. 23
incorporating new check valve in turbocharger oil system

Reference: Rajay letters dated 10/2/78 and 11/22/78

Gentlemen:

We have received the Engineering Orders to the affected Drawings and
Service Information Letter No. 23 submitted with the reference Rajay
letters, in which you show the replacement of existing turbocharger oil
system-check valve with an improved type for the following affected
aircraft models:

<table>
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<td>PA24-250</td>
<td>SA811WE</td>
<td>942</td>
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<td>PA24-400</td>
<td>SA2359WE</td>
<td>942</td>
</tr>
<tr>
<td></td>
<td>PA-23 and</td>
<td></td>
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<tr>
<td></td>
<td>PA-23-160</td>
<td>SA4-1637WE</td>
<td>939</td>
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<tr>
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<td></td>
<td>PA-23-250 (R)</td>
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<td>PA-23-250 and</td>
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<td></td>
<td>PA-E23-250 (C)</td>
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<td>903</td>
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<td>Beechcraft</td>
<td>B95</td>
<td>SA153SE</td>
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<td>Mooney</td>
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<td>SA1156WE</td>
<td>940</td>
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<tr>
<td>Cessna</td>
<td>*310 I &amp; J</td>
<td>SA18150</td>
<td>938</td>
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<td>*310 C,D,E,F,&amp;G</td>
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<td>*180</td>
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<td>*182</td>
<td>SA1032WE</td>
<td>937</td>
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<td></td>
<td>*310 Rocket</td>
<td>SA21250</td>
<td>932</td>
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<tr>
<td></td>
<td>H-295</td>
<td>SA15650</td>
<td>931</td>
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</tbody>
</table>
TO PREVENT POSSIBLE ISSUANCE OF AN A.D. PLEASE DO MODIFICATION PER THIS SERVICE LETTER A.S.A.P. AND RETURN COMPLETED CARD TO RAJAY INDUSTRIES, INC.

<table>
<thead>
<tr>
<th>Aircraft Make</th>
<th>Model</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reg. No.</td>
<td>Serial</td>
<td>Total Airframe Time</td>
</tr>
<tr>
<td>Total Time</td>
<td>Total Time</td>
<td>Date of Rajay T/C Purchase</td>
</tr>
<tr>
<td>Engine(s)</td>
<td>S.M.O.H.</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Turbocharger Model No.</th>
<th>Turbocharger Part No.</th>
<th>Turbocharger Serial No.</th>
<th>Turbocharger Time Since New (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(LH)</td>
<td>RJ</td>
<td>(RH)</td>
<td>(RH)</td>
</tr>
<tr>
<td>(LH)</td>
<td>RJ</td>
<td>(RH)</td>
<td>(RH)</td>
</tr>
</tbody>
</table>

State when recommended modification (staking three screws) was accomplished: [Date]

By [A&P Lic. No.] [Signature]

Note mechanic, owner or pilot must fill in above statement. A&P mechanic must enter time, date, S/N of A/C & T/C, plus T/C model & P/N in log book after above modification.

<table>
<thead>
<tr>
<th>Shop Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>State</td>
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</tbody>
</table>

Is aircraft based here? 

<table>
<thead>
<tr>
<th>Owner's Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>State</td>
</tr>
</tbody>
</table>
We find the changes to the type design and the referenced Service Information Letter acceptable. Accordingly, we are returning to you one copy of each of the subject engineering orders and drawings for your information and file, and we shall keep the other copies in our file.

Sincerely,

ROBERT E. FOLLENSBEE
Chief, Propulsion Branch

Enclosures
FAA Approved

Date: February 7, 1979

Subject: Securing turbocharger bearing housing flange attachment screws.

Models Affected: Piper Seneca PA34-200 with Rajay Model 301E10 turbochargers added per STC SA2937WE. Model 301E10-2 turbochargers supplied to Lycoming and Enstrom Helicopter Corporation. The above model number turbochargers with serial numbers higher than 70484 are excluded from the provisions of this service letter. All Rajay turbochargers with sand cast (single piece) bearing housings are also excluded.

Reason: There have been field reports of oil leakage between the bearing housing flange and bearing housing on Rajay Model 301E10-2 turbochargers during flight. This service letter specifies a recommended inspection schedule and describes the recommended modification and its time of compliance. The recommended modification is needed to prevent possible oil leakage through the mating faces of the turbocharger bearing housing and bearing housing flange due to torque loss of the three attaching screws. This may cause accelerated engine oil consumption in-flight.

Type of Compliance: RECOMMENDED

Time of Compliance: See Below

A. Inspection before Modification:

1. Prior to next flight and every flight thereafter, until the recommended modification has been completed, inspect the underside of the lower cowl and interior of the exhaust pipes at the exit end for evidence of oil leakage.

2. Within the next 25 hours of service time and every 25 hours thereafter:

   a. Check for play or loose connection between bearing housing flange and bearing housing.
b. Check for evidence of oil leakage between bearing housing flange and bearing housing. See Fig. 1.

B. Modification:

Immediate compliance with this modification is necessary if any looseness is detected in the turbocharger or if any oil leakage from the bearing housing is found. Even if there is no looseness or oil leakage, this modification should be completed at the next aircraft annual inspection or at the next engine or turbocharger overhaul, whichever comes first. The modification is to be completed as follows:

1. Remove the turbochargers from aircraft.

2. Scribe mating index mark on bearing housing and bearing housing flange so they can later be reassembled in the same position. (See Fig. 1 and 2).

3. Remove compressor housing using a 5/32 allen wrench to remove (6) countersunk cap screws that secure the compressor housing to the bearing housing assembly. Separate these two components and remove the gasket. It may be necessary to tap the compressor housing gently with a plastic mallet while holding the bearing housing assembly.

4. Tighten (3) cap screws that secure bearing housing flange to bearing housing evenly to 80-100 inch-pounds and stake in two places as shown in Figure 2.

5. Inspect compressor housing gasket surface for damage and remove old gasket material residue. Clean gasket surfaces and install new compressor housing gasket. (Rajay P/N TC-6-44)

6. Reinstall compressor housing to bearing housing flange and secure with six cap screws. Tighten evenly & alternately to 80 to 100 inch-pounds.

7. Remove all evidence of oil from inlet and exhaust ducting.

8. Reinstall turbochargers. Torque turbine housing V-Band to 15-20 inch-pounds. Retorque after next flight or run-up.

9. Indicate compliance with the modification described in the "B. Modification" portion of this service letter by metal stamping or scribing the number "24" at corner of nameplate. (See Fig. 3).
10. When this modification is completed, it must be entered in the aircraft log book, along with the aircraft serial number, turbocharger model number, part number and serial number(s).

11. Complete and return compliance card attached to this service letter to Rajay Industries, Inc.
Date: July 6, 1979

Subject: Recommended Overhaul Procedures for Sky-Ox Equipment

The following Service Bulletin addresses the problem of recommended overhaul times for Sky-Ox equipment as supplied by Rajay Industries, Inc. These recommendations are based on regulations as specified by the controlling agencies or Rajay's years of experience in servicing Sky-Ox equipment. Additionally, all oxygen equipment should be maintained in the field in accordance with AC 43.13.

CYLINDERS: Cylinders must be maintained and hydrostatically tested according to the Code of Federal Regulations, Title 49, Chapter I, Paragraph 173.34. This regulation specifies hydrostatic testing at periodic intervals depending on the specification stamped on the cylinder. For specification DOT-3AA, the cylinder must be retested every 5 years. For DOT-3HT the interval is reduced to every 3 years. Cylinders with suspected damage should be inspected, and retested as needed, immediately.

REGULATORS: Rajay recommends that all Sky-Ox regulators be inspected and repaired whenever leaks, damage or malfunctions occur or are suspected. In any event, the regulator should be inspected according to its usage rate as follows:

<table>
<thead>
<tr>
<th>Equipment Usage</th>
<th>Recommended Inspections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>Every year</td>
</tr>
<tr>
<td>Once per week</td>
<td>Every two years</td>
</tr>
<tr>
<td>Once per month</td>
<td>Every five years</td>
</tr>
</tbody>
</table>

The above recommendations are to be used as a guide and are not to be construed as rigid rules. Individual experience may dictate shorter or longer inspection intervals and, subject to local approving authorities, these intervals may be altered.
Service Bulletin No. 25

MASKS: Masks should be periodically cleaned with a mild soap solution, as usage warrants. Sufficient care should be exercised to avoid damaging the microphone in those masks, so equipped. As a minimum, the masks should be cleaned during the times when the regulator and cylinder are being inspected.

Service for Sky-Ox equipment can be obtained from any FAA repair station certified to work on Sky-Ox Brand regulators and cylinders. Service may also be obtained by returning the regulator, cylinder or masks to the factory, by insured means. Address all returned equipment with instructions on what is to be done, to:

Sky-Ox Repairs
% Rajay Industries, Inc.
2600 E. Wardlow Rd.
Long Beach, CA 90801

Sincerely,

RAJAY INDUSTRIES, INC.
FAA Approved
Date: July 28, 1980
Subject: Resetting of Flow Rates of Sky-Ox Oxygen Regulators

Equipment Affected: Sky-Ox* Models 2600A, 2600B, 2800A, 2800B, 2900A and 2900B oxygen regulators. Other possible numbers located on the regulators are 2779-A-2, 2776-A-3 & 2777-A. Regulator Models 2700A and 2700B, also designated 2779-A-4 (four outlets) used on portable Sky-Ox systems SK-10, have adequate oxygen flow to 20,000 feet and are excluded from the requirements of this service letter.

Models 2600A and 2600B are two-outlet regulators normally installed on Model SK-9 portable oxygen systems.

Models 2800A and 2800B are pre-set regulators for multi-outlet oxygen systems permanently installed in aircraft. They can be installed as part of FAA STC approved kits as listed in the "Aircraft Affected" section of this service letter. They can also be installed as separate parts or assemblies and locally approved by FAA form 337. When approved in this latter manner, the complete installation system is sometimes designated SK-101.

Models 2900A and 2900B are automatic, altitude compensating regulators for multi-outlet oxygen systems permanently installed in aircraft. They can be installed as part of FAA STC approved kits as listed in the

*Possibly sold by Air-Ox of Portland, OR, Dye-Ox of Phoenix, AZ, or Rajay Industries as "Sky-Ox".
"Aircraft Affected" section of this service letter. They can also be installed as separate parts or assemblies and locally approved by FAA form 337. When approved in this latter manner, the complete installation system is sometimes designated SK-1001.

Aircraft Affected: Aircraft with a portable SK-10 Sky-Ox oxygen system on-board or with a locally approved Sky-Ox system fixed installation. The following aircraft with a Sky-Ox fixed system installed per the applicable STC are also affected.

<table>
<thead>
<tr>
<th>Aircraft Make</th>
<th>Aircraft Model</th>
<th>Applicable S.T.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel Air</td>
<td>55 &amp; 95 Series</td>
<td>SA2977WE</td>
</tr>
<tr>
<td>Bonanza</td>
<td>33 &amp; 35 Series</td>
<td>SA2978WE</td>
</tr>
<tr>
<td>Cessna 180</td>
<td>G, H &amp; J</td>
<td>SA2979WE</td>
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<tr>
<td></td>
<td>(S/N 18051313</td>
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</tr>
<tr>
<td></td>
<td>&amp; Subsequent)</td>
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<tr>
<td>Cessna 182</td>
<td>E thru P</td>
<td>SA2980WE</td>
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<tr>
<td></td>
<td>(S/N 18253599</td>
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<tr>
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<td>&amp; Subsequent)</td>
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</tr>
<tr>
<td>Cherokee</td>
<td>PA32-260 &amp; 300</td>
<td>SA2933WE</td>
</tr>
<tr>
<td>Seneca</td>
<td>PA34-200</td>
<td>SA2932WE</td>
</tr>
<tr>
<td>Twin Comanche</td>
<td>PA30 &amp; 39</td>
<td>SA2849WE</td>
</tr>
</tbody>
</table>

Type of Compliance: MANDATORY

Time of Compliance: Prior to next usage of oxygen system. An FAA AD will soon be issued requiring compliance within 60 days.

Reason: The affected regulators may not meet the FAA minimum required oxygen flow rate under all circumstances when set by the former method.

Purpose: To reset the affected regulators using a method which better simulates altitude and insures the flow rate meets FAA minimums under all circumstances.
SERVICE LETTER No. 26 Rev. N/C

Instructions:

A. Regulator Models 2600A, 2600B, 2800A and 2800B

1. Inspect Sky-Ox oxygen system regulator and determine if it is affected. Note that only the Models 2700A, 2700B (2779-A-4) four-outlet regulators are not affected. If it is Model 2600A, 2600B, 2800A or 2800B proceed as follows.

First inspect further to see if there is a part number 500014-01, 500014-02 or 500016-01 stamped or etched on. Next determine if there is a letter "A" or "RA" stamped just under the left side of the serial number.

Example: 7955641 or 7955641 RA A

If any of the above numbers or letters are stamped on the regulator, it has already been reset and can be safely used with no further action required. However, the limits of items 6 & 7 following apply. If neither numbers or letters are present, proceed to item 3 following.

3. Remove regulator, safely package it and return it to Rajay Sky-Ox Sales, at the address shown on this letter.

4. Rajay will reset the regulator, free of charge, and return it freight paid.

5. A letter enclosed with the regulator will explain what was done and its effect.

6. The Models 2600A and 2700B regulators will be reset to provide adequate flow up to 20,000 feet.

7. The Models 2800A and 2800B will be reset to provide adequate flow up to 25,000 feet for a pilot and up to 9 passengers.
SERVICE LETTER No. 26 Rev. N/C

B. Regulator Models 2900A and 2900B

1. Inspect Sky-Ox oxygen system regulator to determine if it is affected. If it is a Model 2900A or 2900B, proceed as follows.

2. First inspect further to see if there is a part number 500015-01 stamped or etched on. Next determine if there is a letter "A" stamped just under the left side of the serial number. Example: 7955641

   A

If either of the above number or letter is stamped on the regulator, it has already been reset and can be safely used with no further action required. However, the limits of item 5 following apply. If neither the number or the letter is stamped on, proceed to item 3 following.

3. Telephone or write Rajay Industries and indicate you have a Model 2900A or 2900B regulator.

4. If you choose, you may request Rajay to send an instrument panel placard indicating an oxygen system limit of 20,000 feet.

5. Alternately, you may immediately send your regulator back to Rajay for resetting to a limit of 25,000 feet for a pilot and up to 9 passengers.

6. If desired, you can apply the placard immediately and send in the regulator for resetting to a 25,000 feet limit at some more convenient time before December 31, 1980.

If more information is needed, contact Rajay Sky-Ox Sales by mail or telephone.
June 24, 1982

FAA APPROVED SERVICE LETTER NO. 27

Subject: Rajay Turbocharger Model 325E10-2 Inspection of Turbocharger Turbine (Exhaust) Housings P/N TC-60-00 - letter D or E and/or 600510-02.

Equipment Affected: Aircraft Model
- Piper Turbo Arrow III (PA-28R-201T)
- Piper Turbo Arrow IV (PA-28-RT-201T)
- Piper Turbo Dakota (PA-28-201T)
- Piper Seneca II (PA-34-200T)
- Piper Seneca III (PA-34-220T)
- Mooney 231 (M20K)

Distribution To: Aircraft Manufacturers-
- Aircraft Engine Manufacturers-
- Aircraft Maintenance and/or Modification
- Bases-

Time of Compliance: Inspection of turbocharger housing is required at first 200 hour unit time in service, and subsequently at the time intervals specified by FAR §91.169 (ie. 100 hours when carrying people or giving flight instructions for hire, annually for all others).

Reason:
Formation of hairline cracks have been discovered in the exhaust inlet area of turbine housing TC-60-11 (600510-02) used on Model 325E10-2 Rajay turbochargers in production since June, 1976. In some cases, the crack in the tongue area has propagated through the outer wall of the turbine housing.

Therefore, field inspection monitoring is required to detect possible formation and/or propagation of subject hairline cracks in the turbine housing.

Instructions:
Perform visual inspection of the turbine housing P/N TC-60-11 Rev. D or E and/or P/N 600510-02, to determine existence of Type C, Stage 2 cracks*** as indicated in View 3.

A. Turbocharger Inspection Instructions

1. Installed Turbocharger Inspection - After an initial 200 hours time-in-service operation and each subsequent inspection, visually inspect the turbine housing outer wall for complete penetration of type "C", Stage 2, Cracks per View 3. See Section B instructions for more information.
a. If Outer Wall Is Penetrated - Replace the turbine housing with a new P/N 600510-02 (TC-60-11) (TCM P/N 643930**) housing and replace the gasket with a new P/N 600400-00 (TC-6-30) (TCM P/N 643932**) gasket, in accordance with the Maintenance Manual G70*, and Section B instructions prior to the next flight. Use a new P/N 600510-04 (TCM P/N 643931**) if available.

b. If Outer Wall Is Not Penetrated - At the next scheduled inspection, perform a removed turbocharger inspection per the instructions to follow and Section B instructions.

2. Removed Turbocharger Inspection - Remove the turbocharger (see Section Instructions following) and inspect for cracks as shown in View 1.

a. If No Cracks Are Found - Reinstall turbocharger and at the next scheduled inspection, reinspect per "Installed Turbocharger Inspection" - paragraph preceding.

b. If An Internal Crack Is Found - Remove turbine housing per Section B instructions and inspect for cracks as shown in View 2.

(1) If All Internal Cracks Are Within Limits - The turbine housing may be continued in service temporarily if a crack within the limits of View 1 and 2 is found, but the turbine housing must be removed for reinspection every 100 hours of service time. If, in the future, the crack exceeds the limits of View 1, 2, or 3, take action as described in sub-paragraph (2) following.

(2) If An Internal Crack Exceeds The Limit - In this case a new turbine housing and gasket should be installed. If a new housing is unavailable, the old one can be used temporarily, but it must be reinspected per Views 1, 2 and 3 every 25 hours of service until replaced. In any case, when a crack penetrates the outer wall as shown in View 3, the turbine housing and gasket must be replaced prior to the next flight.

NOTE: Since earlier Seneca II aircraft may not have the subject turbine housing installed, take special care to inspect the part number per the Section B instructions.

If unable to precisely determine the part number or revision letter, assume it is an affected turbine housing and perform inspections per this Service Letter.

If the old turbine housing (P/N TC-60-11, Rev. D or E or P/N 600510-02) is replaced with a new one that is affected by this Service Letter, this Service Letter will still apply after the housing accumulates 200 hours service time.

After replacement with a new 600510-04 turbine housing, this Service Letter no longer applies.
FAA APPROVED

REFERENCE: AD 82-27-03 (Effective December 30, 1982)

SUBJECT: Rajay Turbocharger Model 325E10
Inspection of Turbocharger Turbine Housings P/N TC-60-11 and/or 600510-01, 600510-02.

EQUIPMENT AFFECTED: Applies to all affected engines and airplanes certificated in all categories that have installed Rajay turbocharger model 325E10.

DISTRIBUTION TO: Aircraft Manufacturers-
Aircraft Engine Manufacturers-
Aircraft Maintenance and/or Modification Bases-

Time of Compliance: Inspection of the turbocharger turbine housing required:

- Within 50 hours unit time in service, or at the next aircraft annual or 100 hour inspection, whichever comes first, and
- Then at 200 hour time-in-service intervals.

Reason:
Formation of hairline cracks has been discovered in the inlet area of the turbocharger turbine housing (Rajay part number TC-60-11 or 600510-02) used on Model 325E10 Rajay turbochargers in production since June 1976. In some cases, the crack in the above referenced area (tongue area) may have propagated through the outer wall of the turbine housing.
Therefore, visual inspection is required as referenced in above "Time of Compliance" paragraph to detect the possible formation and/or propagation of subject hairline cracks in the turbine housing.

Upon replacement of the subject turbine housing per instructions Ala, A2b(2) with a new improved-material turbine housing (D55 Ductile Ni-Resist), P/N 600510-04 (TCM P/N 643931**), this Service Letter no longer applies.

DESCRIPTION:
Perform a visual inspection of the turbine housing P/N TC-60-11 and/or P/N 600510-01, 600510-02, to determine existence of cracks as indicated in Figure 2, Views 1, 2 and 3.

A. Turbocharger Inspection (See Section B for detailed inspection instructions)

1. Inspection of Turbocharger Installed on Engine - After the initial 50 hours Turbocharger time-in-service operation and/or at next aircraft annual and/or 100 hours inspection, whichever occurs first, and thereafter at every 200 hours unit time-in-service, but not later than May 31, 1983. Visually inspect the Turbocharger turbine housing to ascertain possible presence of cracks penetrating the outer wall as shown in View 3.
   a. If Outer Wall Is Penetrated - Replace the turbine housing and gasket with a new P/N 600510-04 (TCM P/N 643931**) housing and new P/N 600400-00 (TC-6-30) (TCM P/N 643932**) gasket prior to the next flight.

2. Inspection of Turbocharger Removed from Engine - Visually inspect the turbocharger turbine housing through the exhaust port for presence of cracks as shown in View 1.
a. If No Cracks Are Found - on the inner or outer wall of the turbine housing, reinstall turbocharger, and at the 200 hours time-in-service repeat the inspection of the unit per A.1. above

b. If An Internal Crack Is Found - remove turbine housing and inspect for cracks as shown in View 3.

(1) If All Internal Cracks are found within the limits of Views 1, 2 and 3, then the turbine housing may be returned to service, but continue to monitor the crack propagation at next and subsequent 200 hours time-in-service.

(2) If An Internal Crack Exceeds The Limit - as shown in Views 1, 2 or 3, then the turbine housing and gasket must be replaced with new housing as specified in A.1.a above.

CAUTION
In any case, when a crack penetrates the outer wall of a turbine housing as shown in View 3, the turbine housing and gasket must be replaced prior to the next flight.

If a crack has penetrated the housing, inspect the surrounding engine components, hoses, clamps and mounts for possible heat damage and replace as necessary.

If unable to determine the part number or revision letter of the turbine housing, assume it is an affected part and perform inspections per this Service Letter.
B. **Detail Inspection Instructions**

In certain aircraft installations, it may be possible to inspect the turbine housing inner and outer walls for penetrating cracks per Views 1 and 3, without removal of the turbocharger from the aircraft. In any event, the exhaust manifold must be disconnected from the coupling V-band so that the turbine housing internal area near the nozzle can be seen as shown in View 2. If a thermal blanket is installed on the turbine housing, it must be removed. (See Figure 1.)

To inspect the turbine housing for internal cracks per View 2, remove the complete turbocharger from the aircraft as per aircraft maintenance manual.

**CAUTION**
Before removing the turbocharger, make sure spare turbine housing gaskets are available. Do not attempt to reuse the gasket. (P/N 600400-00 or TC-6-30 or TCM P/N 643932**)

1. Remove the turbine housing blanket (if installed). (See Figure 1.)
2. Disconnect the exhaust manifold by removing the coupling V-bands.
3. Make "index marks" on the turbine housing and on the aluminum bearing housing so the turbine housing will be reinstalled in the same correct rotational position.
4. Remove the V-band nut and carefully remove the bearing housing V-band (P/N 600391).
5. Remove the turbine housing from the bearing housing and inspect per Description A.1. and 2. Light tapping at the joint with a rawhide mallet will help separate them.
6. While the housing is off, inspect the turbine wheel and heat shield for condition and/or foreign object damage.
NOTE: When the turbine housing is off, the turbine wheel should be in contact with the adjacent heat shield and rotating it should be difficult. If not, a Roto-Master or TCM service representative should be contacted.

7. Carefully remove all parts of the turbine housing gasket and replace with a new P/N 600400-00 or TC-6-30 or TCM P/N 643932** gasket.

8. If a new turbine housing is needed, order Roto-Master P/N 600510-04 (or TCM P/N 643931**).

9. After inspection, clean the two mating diameters and gasket surfaces on the turbine housing and bearing housing.

10. Reinstall the same or a new turbine housing as appropriately mandated by this inspection onto the bearing housing in the original rotational position.

NOTE: The turbine housing and bearing housing must be pressed together while the V-band is being reinstalled. A light tapping on the V-band with a rawhide mallet will help to tighten and seat the V-band.

11. Assure that the turbine housing is in the exact same rotational position (use the marks made earlier), the V-band is in the approximate same position and tighten the V-band nut to 15 to 20 inch/pounds torque. Do not overtighten.

12. Reinstall the turbine blanket (if used - see Figure 1) and check for free rotation of the turbine wheel. Do not reinstall if rotation is difficult or scraping noises are heard.

13. Reinstall the turbocharger on the aircraft per aircraft maintenance manual. Take special care that all oil lines and fittings are clean, undamaged and unobstructed.
14. If housing is replaced because of cracks, complete the FAA Malfunction or Defect Report, Form 8330-2 and submit to the local FAA GAD0 office.

15. Check that the V-band torque is still 15 to 20 inch/pounds after next flight or run-up.

References and Notes:
** Teledyne Continental Motors (TCM) part numbers.

Roto-Master plans to offer a rebuilt exchange program.

For additional information, contact:
Roto-Master, Inc.
7101 Fair Avenue
North Hollywood, CA 91605
ATTN: Aircraft Field Sales Manager
TYPICAL TURBOCHARGER INSTALLATION; EXHAUST SYSTEM ARRANGEMENT WILL VARY WITH AIRCRAFT APPLICATION.

FIG. 1
INTERNAL CRACK

Cracks in this area are allowable to a length of .75 inch maximum.

NOTE
Do not misrepresent the casting parting line in this area as a crack.

VIEW 1 Turbine Housing Exhaust Inlet Internal Cracks.
FIG. 2 (cont.) TURBINE HOUSING VIEWS

VIEW 2 View of Turbine Housing with turbo center section removed

Cracks in this area allowable to 3/4 inch.

VIEW 3 View of Turbine Housing with external cracks

Cracks in this area allowable to 2 inches.

No cracks of any length in this area. If cracked, replace immediately.
The following information is an addendum to Roto-Master Service Letter 27A and should be attached thereto and made a part thereof.

The model number 325E10 includes models 325E10-1 and 325E10-2. The new Rajay model number 3AT6EE10J2 is identical to the older model number 325E10-1 and is also affected by AD 82-27-03.

Roto-Master turbochargers after serial number 203570 came equipped with a 600510-04 DSS Ductile Ni-Resist turbine housing and are therefore not affected by AD 82-27-03.

The 600510-02 Type 3 Ni-Resist housing that is affected by AD 82-27-03 has the letter "N" cast on the outside of the scroll. The 600510-04 DSS Ductile Ni-Resist turbine housing that terminates this AD has the letters "DN" cast on the outside of the scroll.

The following Rajay engine STC's are affected by AD 82-27-03:

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The TCM TSIO-360 engine is affected by AD 82-27-03 when it is equipped with a Rajay turbocharger that has a serial number prior to 203570.

The other engines mentioned in the AD do not come factory equipped with a Rajay model 325E10 turbocharger. The Rajay systems for these engines do not use a model 325E10 turbocharger. These engines are affected by AD 82-27-03 only when model 325E10 or 3AT6EE10J2 has been installed in place of the original turbocharger by an FAA field approval or a non Rajay STC. The engines that fall into this category are as follows:

- Lycoming 0-320, TO-360, O-540, and TIO-540
- Continental 0-470, IO-470, IO-520, and TIO-540

The Rajay turbine inlet gasket part number is RJ0115. The Rajay turbine discharge gasket part number is RJ0114. The turbine inlet and discharge V-band clamps are tightened to 20-30 in. lbs. The TCM TSIO-360 does not use turbine inlet or discharge gaskets.
A. Subject: All Rajay turbocharger oil supply, drain, fuel and air hose assemblies that were changed or modified per the installation drawing for the appropriate Rajay Turbocharger Installation Kit.

B. Equipment Affected: All aircraft fitted with an FAA-PMA approved Rajay Turbocharger(s) Installation covered by Supplemental Type Certificate as affected.

Distribution: Aircraft Operators and/or Owners
Aircraft Modification Bases
Aircraft Maintenance Bases
Aircraft Manufacturers

C. Time of Compliance: At the next 100 hours time-in-service or at the next annual aircraft inspection whichever occurs first.

D. Purpose: Field service reports have indicated instances of deterioration of the flexible fluid hose (oil, fuel, and air) installed on aircraft powerplant equipped with Rajay turbocharger(s) systems although proper inspection and maintenance practice requires replacement of subject hoses at specified intervals as referenced in the MIL-STU-1523.

Since these hose assemblies are probably installed in connection with the turbocharger having a possible degree of temperature higher than the original, therefore maintenance and inspection at specific intervals must be assured to prevent hose deterioration and in-flight failure.

It has been found that these hose assemblies are not inspected for condition as often as they should be, and therefore improper function of hoses has occurred due to their overaging and deterioration. Hose assemblies found damaged must be replaced prior to the next flight.

E. Instructions: Inspect the affected hose assemblies listed in Part F as follows:

1. Hose Assemblies Without Firesleeves - Every fuel, oil and air hose assembly called out on the Rajay Installation Drawing for the reference STC's that is not firesleeved must be inspected for age and condition and must be replaced within three (3) years from the tagged manufactured date with a firesleeved hose assembly per instruction 2. Hoses damaged, deteriorated and/or in un-airworthy condition, must be replaced prior to the next flight.

2. Hose Assemblies With Firesleeves - All fuel, oil and air firesleeved hose assemblies called out on the Rajay Installation Drawing for the STC's must be replaced according to the date that the hose was manufactured. This date is shown on the metal tag wrapped around the hose assembly itself.

Reference MIL-STD-1523, paragraph 5.2.3, for assembly date code and Table 1 for age limitations. For each subject hose assembly replaced, substitute a firesleeved hose assembly of identical design as shown in Part F.

3. The hose assemblies listed in this Service Letter are those which were part of the turbocharger installation modification per respective Supplemental Type Certificate; however, all other power plant hose assemblies which are part of the original Aircraft Type Certification should be inspected for airworthy condition and/or replaced as necessary following this Service Letter guideline.

Note 1. We recommend that powerplant fuel hoses running from the firewall to the fuel pump and from the fuel pump to the fuel control servo or carburetor also be inspected (and replaced with firesleeved equivalents if necessary).

Note 2. Since the affected air hoses are not listed in this service letter, contact Rajay Industries for air hose correct part number replacement information.
## AIR HOSE REPLACEMENT INFORMATION

**Ref:** Service Letter No. 28  
**Date:** September 21, 1981

### Affected Aircraft

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SUBJECT: Roto-Master (formerly Rajay) turbocharger turbine housing inspection. This procedure also includes a one time EGT gauge installation and/or redlining, and then periodic calibration checks thereafter.

EQUIPMENT AFFECTED: All aircraft and rotorcraft equipped with Rajay or Roto-Master turbochargers regardless of model, turbine housing, or application.

DISTRIBUTION TO: Aircraft and Engine Manufacturers Aircraft Maintenance and/or Modification Bases

TIME OF COMPLIANCE: The following turbocharger turbine housing inspection and gauge calibration should be incorporated as part of the regularly scheduled aircraft annual or 100 hour inspection as normally required for the particular aircraft application.

DESCRIPTION: This service letter addresses the following three areas:

A.) To establish the procedure for a periodic inspection to detect the existence of turbine housing cracks, and to set serviceable limits.

B.) To install a redlined EGT gauge if not previously so equipped, or to redline and/or placard and calibrate the existing gauge to clearly inform the pilot of the "never to exceed temperature" for the particular application.

C.) To recommend operating procedures that will extend turbocharger life.

REASON:

Hairline thermal stress relief cracks had previously been discovered in the tongue area of some older non-ductile Ni-Resist Rajay turbine housings. (Note: SL 27A and AD 82-27-03 require inspection of 600510-02 and TC-60-11 non-ductile turbine housings to safeguard against cracks that could permeate the housing wall section and permit exhaust gas to enter the engine compartment.) If cracks were found that exceeded the allowable limits, the housings were to be replaced with the new 600510-04 (TCM P/N 643931*) D5S Ductile Ni-Resist turbine housing and service letter 27A would no longer apply.
The foregoing inferred that the new DSS Ductile Ni-Resist turbine housings would function in a crack free state. This is not the case as all aircraft turbocharger turbine housings are subject to hairline thermal stress relief cracks of varying degrees. This is particularly true of the Roto-Master and Rajay turbine housings that have been exposed to exhaust gas temperatures (EGT) in excess of 1650 degrees F. Subsequent to the promulgation of SL 27A and AD 82-27-03 there have been reports of cracked housings on less severe applications that were not covered by the AD, as well as some new 600510-04 (TCM P/N 643931*) DSS Ductile Ni-Resist replacement turbine housings. All of the newly reported cracks were internal and as they do not propagate rapidly, the housings could still be considered serviceable.

The cracks were attributable to high exhaust gas temperatures (EGT) and, therefore, we must conclude that a lack of proper instrumentation and/or operating procedures were major contributing factors in a majority of these cases.

A.) TURBINE HOUSING INSPECTION AND ACCEPTABLE SERVICE LIMITS:

A dye penetrant inspection of the turbine housing to determine the existence of cracks as indicated in figure 2, Views 1, 2 and 3 should be included as part of the aircraft annual or 100 hour inspection as normally required for the aircraft application.

Detailed Inspection and Assembly Instructions:

NOTE:

Before removing the turbocharger, make sure the necessary turbine housing gaskets are available. Do not attempt to reuse the gaskets. (See Fig. 1 for parts list)

1. Remove the turbocharger(s) per the Aircraft Maintenance manual.
2. Remove the turbine housing blanket (if installed).
3. Disconnect any remaining exhaust pipes by removing the coupling V-bands.
4. Scribe "index marks" on the turbine housing and on the aluminum bearing housing so the turbine housing can be reinstalled in the same rotational position. If a new housing is to be installed, transfer the mark on the old housing to the same location on the new housing.
5. Remove the V-band nut and carefully remove the large V-band from the bearing housing (V-band P/N 600391).
6. Remove the turbine housing from the bearing housing. Light tapping at the joint with a rawhide mallet will help separate them. Dye penetrant inspect per figure 2.
IF CRACKS ARE FOUND THAT PENETRATE THE OUTER WALL OF THE HOUSING OR EXCEED THE LIMITS SHOWN IN FIGURE 2, REPLACE THE HOUSING WITH THE HOUSING SPECIFIED IN FIGURE 1. CRACKED TURBINE HOUSINGS CANNOT BE REPAIRED BY WELDING OR ANY OTHER PROCESS. DO NOT REPLACE A 600510-04 (TCM 643931*) "ON" TYPE TURBINE HOUSING WITH THE OLD STYLE 600510-02 (TCM 643930*) "N" TYPE TURBINE HOUSING. THE OLD 600510-02 (TCM 643930*) "N" TYPE TURBINE HOUSINGS MUST BE INSPECTED PER AD 82-27-03 AND SERVICE LETTER 27. IF A CRACK HAS PENETRATED THE HOUSING INSPECT THE SURROUNDING ENGINE COMPONENTS, HOSES, CLAMPS, AND MOUNTS FOR POSSIBLE HEAT DAMAGE. REPAIR OR REPLACE DAMAGED PARTS AS NECESSARY.

7. While the housing is off, visually inspect the turbine wheel, heat shield, and spring ring for condition and/or foreign object damage.

**NOTE:**
When the turbine housing is off, the spring ring should push the heat shield into the turbine wheel, and rotating it should be difficult. If the heat shield is loose, or if pieces of the spring ring have broken off, the spring ring must be replaced.

8. Carefully remove all parts of the turbine housing gasket and replace with a new P/N 600400-00 or TC-6-30 or TCM P/N 643932* gasket.

9. After inspection, clean and inspect the two mating diameters and gasket surfaces on the turbine housing and bearing housing.

**CAUTION:**

INSPECT THE PILOT DIAMETER ON THE ALUMINUM BEARING HOUSING FOR EROSION DUE TO OVERTEMPERATURE OR CHEMICAL ATTACK. THE PILOT DIAMETER SHOULDER MUST BE CAPABLE OF RADIALY LOCATING THE TURBINE HOUSING TO WITHIN .011 TIR. A BEARING HOUSING THAT CANNOT POSITIVELY LOCATE THE TURBINE HOUSING WILL ALLOW THE TURBINE WHEEL TO RUB ON THE HOUSING AND MUST BE REPLACED.

10. Reinstall the same or a new turbine housing as appropriately mandated by this inspection onto the bearing housing in the original rotational position.

**NOTE:**
The turbine housing and bearing housing must be pressed together while the V-band is being reinstalled. A light tapping on the V-band with a rawhide mallet will help to tighten and seat the V-band.

11. Assure that the turbine housing is in the same rotational position (use the marks made earlier), the V-band is in the approximate same position and tighten the V-band nut to 15 to 20 inch/pounds torque. Do not overtighten.
12. Reinstall the turbine blanket (if used) and check for free rotation of the turbine wheel. Do not reinstall if rotation is difficult or scraping noises are heard.

13. Reinstall the turbocharger on the aircraft per aircraft maintenance manual. Take special care that all oil lines and fittings are clean, undamaged and unobstructed. Insure that check valves are correctly installed for applications requiring them. Rajay aftermarket turbocharger kits use a turbine inlet and outlet gasket. (P/N RJ0115 and RJ0114 respectively) The TCM* TS10360 does not use turbine inlet or discharge gaskets. Tighten the inlet and outlet V-band clamps to 20-30 in-lbs.

14. Perform a ground runup to check for air, oil or exhaust leaks while also listening for scraping noises emanating from the turbo. Many installations are only designed to compensate for altitude and therefore will not make boost during a ground runup. Recheck that the torque for all V-bands is still correct after next flight or long run-up.

15. If a turbine housing is replaced because of cracks that have exceeded the serviceable limits, complete an FAA Malfunction or Defect Report, Form 8330-2 and submit to the local FAA GAD office. Please also indicate when or if the EGT gauge had been redlined and calibrated per steps B. and C. of this service letter.

B.) EXHAUST TEMPERATURE GAUGE INSTALLATION AND REDLINING.

Turbine housing life can be extended considerably by taking care not to exceed the maximum rated turbine inlet temperature. In many installations the pilot has no way of knowing if the maximum EGT is being exceeded because there is no redline or even numbers on the gauge. In some cases an EGT gauge was never installed. Any turbocharged engine should have an EGT gauge installed if not so equipped. Existing installations should have the gauge calibration checked. The gauge should be clearly redlined at the maximum allowable temperature. Gauges with actual temperature numbers may be placarded with the EGT limits instead of being redlined.

Engines originally Type Certificated (T.C.) with a turbocharger should have the gauge redlined per the engine and/or aircraft manufacturers' EGT specification as applicable. Never exceed 1650 degrees F for Rajay or Roto-Master turbochargers in any application. 1600 degrees F or less is recommended for longer life on these applications.

If the turbocharger was installed per an STC, the limits specified by the STC must be used. If the STC does not specify a limit, never exceed 1600 deg. F.

CAUTION!

OPERATING WITHIN SPECIFIED EGT LIMITATIONS MAY RESULT IN HIGHER FUEL CONSUMPTION RATES THAN MAY HAVE BEEN PREVIOUSLY ATTAINABLE WITH EXCESSIVE LEANING. FUEL FLOW RATES SHOULD BE CONFIRMED BEFORE RELYING ON PRIOR OR PUBLISHED FUEL RANGE CALCULATIONS.
C.) RECOMMENDED OPERATING PROCEDURES.

Turbine housing life, like that of most engine parts, is adversely affected by extremes and/or sudden changes in temperature. A very severe thermal shock occurs during an abrupt change from a high EGT lean cruise setting, to a low power setting prior to descent. The turbine housing is suddenly chilled by the blast of cold outside air, especially at altitude or in cold weather. Making a gentle transition from lean cruise to a lower temperature setting whenever possible will extend the life of the turbine housing.

Some turbocharger manufacturers require an extended idling period prior to shutdown to prevent the cast iron bearing housing from coking. Rajay and Roto-Master Aircraft turbochargers have aluminum bearing housings and do not have an oil coking problem. Extended idling prior to shutdown is not required, or harmful to a Rajay or Roto-Master turbocharger.

Figure 1.

PART NUMBER INTERCHANGE

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<th>Old P/N</th>
<th>Description</th>
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<th>TCM P/N*</th>
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<td>600509-03</td>
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<tr>
<td>RJ0115</td>
<td>Turbine outlet gasket</td>
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</tbody>
</table>

* Teledyne Continental Motors (TCM) part numbers.

**CAUTION:**

ANY TC 60-11 OR 600510-02 (TCM 643930*) OLD STYLE NON DUCTILE NI-RESIST TURBINE HOUSINGS THAT ARE STILL IN SERVICE MUST BE INSPECTED PER AD 82-27-03. THESE HOUSINGS ARE TREATED SEPARATELY IN SERVICE LETTER 27A. THIS SERVICE LETTER DOES NOT SUPERSEDE AD 82-27-03 OR SL 27A. THIS SERVICE LETTER ONLY APPLIES IN THESE APPLICATIONS AFTER THE HOUSING HAS BEEN REPLACED WITH A NEW DUCTILE D55 NI-RESIST 600510-04 HOUSING.

For further information contact: Roto-Master Inc.
7101 Fair Ave.
North Hollywood, CA. 91605
(818) 982-4500
VIEW 1 Turbine Housing Exhaust Inlet Internal Cracks

INTERNAL CRACK

Cracks in this area are allowable to a length of .75 inch maximum.

NOTE

Do not misrepresent the casting parting line in this area as a crack.

FIG 2 TURBINE HOUSING VIEWS
VIEW 2 View of Turbine Housing with turbo center section removed

Cracks in this area allowable to .75 inch.

Cracks in this area allowable to 2 inches.

VIEW 3 View of Turbine housing with external cracks

No cracks of any length in this area.
If cracked, replace immediately.

FIG. 2 (CONT.) TURBINE HOUSING VIEW