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FAA Form 337 (10-06)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

USA N9456P

Date

Nationality and Registration Mark

The purpose of this form 337 is to document installation of a complete new avionics package. 8. Description of Work Accomplished

Removed two Narco MK 12B VHF NacComs, Two Ti2 MP-12A1 Power Audio Units, and one UGR-2 Glideslope Receiver. Removed Glideslope antenna. Removed one Narco VOA-40 Nav Converter Indicator, one VOA-50 Nav Converter Indicator. Removed one VP-22 B1 Narcomaster Audio Panel and one VP-22A2 Narcomaster Audio Panel. Removed Narco AT-50 Transponder. Removed Trans-Cal Industries D120-P2-T altitude Encoder. Removed King KA-25 Isolation Amplifier. Removed Píper PM-1 Marker Beacon Antenna/Receiver. Also removed all associated wire harnesses.

Installed PS Engineering PMA7000B Audio Panel in accordance with PS Engineering Install Manual 200-780-0005. Installed Comant CI-102 Marker Beacon Antenna in accordance with AC 43.13-2B. Installed Garmin GNS 430 GPS-Nav-Com in accordance with Garmin Install Manual 190-00140-02. FAA approved FMS was provided. ICA is on condition. Installed Garmin GA-56 GPS Antenna in accordance with Garmin Install Manual 190-00094-00. Installed Apollo SL-60 GPS-Com in accordance with Apollo Install Maunal 560-0957-01. FAA approved FMS was provided. Installed Garmin A-33 GPS antenna in accordance with Garmin Install Manual 560-0949-01. Installed King KN-62 DME in accordance with King Install Manual 006-00144-0006. Installed Apollo MX-20 MFD in accordance with Apollo Install Manul 560-1025-09. This installation is in accordance with STC SA02154AK and this aircraft is listed on the AML. FMS 560-1032-05 and ICA 560-1048-00 were provided. Installed Garmin GTX-327 Transponder in accordance with Garmin Install Manual 190-00187-02. Installed Trans-Cal Industries SSD120-30N Altitude Encoder in accordance with TCI Install Manual 882188. Certification will need to be complied with. Installed JPI Instruments EDM-830 Engine Monitoring System in accordance with JPI Install Manual Report 103. This installation is in compliance with STC SA2586NM and this aircraft is listed on the AML.

Fabricated a new pilots panel from 2024T3x0.090 aluminum. The panel was mounted using the existing factory mounts. The PMA7000B Audio Panel Is mounted at the top of the radio stack. Circuit protection is provided by a 5 amp circuit breaker located at the bottom of the copilots panel and labeled "AUDIO". The Intercom is a 6 place system with 2 music input jacks. Music 1 input jack is mounted with the copilots Mic and Phone Jacks. Music 2 input Jack is mounted with the left forward pax MIc and Phone jacks. A switch above the radio stack in "ALL" position allows all positions to hear music input one or in the "SPLIT position Pax to hear music input two and crew to hear music input one. The Marker Beacon antenna input is connected to the CI 102 Marker Beacon antenna mounted on the bottom of the fuselage at station 144. The GNS 430 GPS/NavCorn is mounted below the PMA7000B. Circuit protection for the Corn section is provided by a 10 amp circuit breaker located at the bottom of the copilots panel and labeled "Com 1". Circuit protection for the Nav and GPS sections is provided by a 5 amp circuit breaker located at the bottom of the copilots panel and labeled "GPS/NAV 1". The Com and Nav audio input/outputs are connected to the PMA7000B Com 1 and Nav 1 audio inputs and outputs. Analog Nav output and GPS/Nav annunciation is provided to the # 1 Nav Indicator, a Garmin GI-106A mounted at the top right of the pilots panel. This information is also provided to the autopilot "NAV 1 - NAV 2" Input selector switch. Serial data Nav information is provided to the MX 20 MFD mounted in the pilots panel. The GPS antenna input is connected to the GA 56 GPS antenna mounted on top of the fuselage at station 85.5. The Com antenna input is connected to an existing Com antenna and the Nav antenna input is connected to the existing Nav Splitter. The Apollo MX 20 MFD is mounted in the center of the pilots panel. Circuit protection is provided by a 5 any circuit breaker located at the bottom of the copilots panel and labeled "MFD". The MX 20 receives Navigation information from the GNS 430 via serial data bus and altitude Information from the GTX 327 transponder also via serial data bus. The Apollo SL60 GPS/Com is mounted below the GNS 430. Circuit protection for the Com section is provided by a 10 amp circuit breaker located at the bottom of the copilots panel and labeled "Com 2". Circuit protection for the GPS section is provided by a 5 amp circuit breaker located at the bottom of the copilots panel and labeled "GPS 2". An annunclator mounted above the radio stack annunclates the SL 60 mode, "PTK or MSG". Com audio input/outputs are connected to the PMA7000B Com 2 audio input/outputs. The GPS Nav output drives a King KI-205 Nav indicator mounted below the GI-106A. This information is also provided to the autopilot "NAV 1 -NAV 2" input selector switch. The GPS antenna input is connected to a A-33 GPS antenna mounted on top of the fuselage at station 103.5. The Com antenna input is connected to an existing Com antenna. The KN 62 DME is mounted below the SL 60. Circuit protection is provided by a 10 amp circuit breaker located at the bottom of the copilots panel and labeled "DME". DME frequency can be controlled by the GNS 430 vis serial data bus. the audio output is connected to the DME audio input of the PMA7000B. The antenna input is connected to the existing DME antenna. The GTX 327 transponder is mounted below the KN 62. Circuit

[X] Additional Sheets Are Attached

### 8. Description of Work Accomplished

### USA N9456P

Nationality and Registration Mark

Date

protection is provided by a 5 amp circuit breaker located at the bottom of the copilots panel and labeled

"Xponder". The altitude input is provided by the TCI SSD120-30N mounted behind the copilots panel at station
59.5. The antenna input is connected to the existing transponder antenna. Installed JPI EDM 830 Engine

Monitoring System in the copilots panel. Circuit protection is provided by a 2 amp circuit breaker located at the
bottom of the copilots panel and labeled "JPI". The EGT, CHT, OAT, OIL Temp, OIL Pressure, TIT, MAP, FF and
RPM sensors were all installed. Serial data navigation information is also received from the GNS 430. The
EGT - FF switch is mounted above the radio stack.

An electrical load evaluation was performed and was found to present no additional load beyond the previously installed equipment.

Replaced the pilots coil cord and PTT switch, rewiring the pitch trim and PTT. Installed PTT switch on the copilots yoke.

Installed Nullte light rings on the pilots panel for the Airspeed Indicator, Turn Coordinator, Attitude Gyro, Directional Gyro, Altimeter and Vertical Speed indicator. The light rings are connected to the existing lighting bus. Light rings were also installed in the copilots panel for the RPM indicator, Manifold Pressure indicator and Suction Gage.

All work performed in accordance with AC 43.13-1B.

The aircraft Equipment List was revised. Aircraft will be weighed before airworthiness release. Transponder and pitot-static system need to be certified.

[ ] Additional Sheets Are Attached

U.S Department of	MAJ (Airframe,	OR REPAIR AND AL Powerplant, Propell	TERATION er, or Appliance)		20 A Use Or Identificat Pii
Transportation Federal Aviation Administration				evision thereof) for instruc	tions .000
INSTRUCT and disposi	ONS: Print or type all entries. See tion of this form. This report is requ ch violation (Section 901 Federal Av	ired by law (49 U.S.C. 1421). Fall liation Act 1958)		penalty not to exceed •.	
IOI BACT SU	Make Piper		Model PA24-250	ion Mark	
1. Aircraft	Serial No. 24-3136		Nationality and Registrat N7905P		
2. Owner	Name (As shown on registration Eagle View, LLC	n certificate)	Address (As shown on re 3651 Lindell Rd. Bo	ox D367 La Vegas	
		3. For FAA L	Jse Only		
Y	76 to 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4. Unit Ident	lification		5. Type
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AIRFRAME		(As described in item	1 above)		
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APPLIANCE	Manufacturer		1.0 A <sub>1.</sub>		
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Lee Streling 2877 Shado 83616	wwolf Dr.		rtificated Mechanic d Repair Station	563134557	
have hee	at the repair and/or alteration made on made in accordance with the requ true and correct to the best of my ki	to the unit(s) identified in item 4 a pirements of Part 43 of the U.S. F	above and described on the re	everse or attachments had that the information f	ereto umished
Date 12-4-2012		Signature of	of Authorized Individual		e e

7. Approval for Return to Service

Inspection Authorization

REJECTED

Person Approved by Transport Canada Airworthiness Group

Signature of Authorized Individual

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the

☐ APPROVED

FAA Form 337 (12-88)

Date of Approval or Rejection

BY

Administrator of the Federal Aviation Administration and is

Manufacturer

Repair Station

Certificate or

Designation No.

FAA Fit Standards

Inspector

**FAA Designee** 

Other (Specify)

Alteration

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

### 8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N7905P 12/4/2012 AFTT 6461.80 SN 24-3136

Complete removal of the following items:

Part#	Wt.
Adf IND 1088A	1.5lb
NAV/IND NAV-11	3.5lb
Marker CN40C	1.0lb
Com NARCO COM 11-A	3.0lb
TRANSPONDER AT50A	2.3lb
ADF TUNER 5814	5.0lb
LORAN 800	3.0lb
A.D.F. ANTENNA 108813	1.5lb
AUDIO PANEL A-8101	1.2lb
ENCDDER AR500	1.0 lb

The Following avionic alterations and installations have been accomplished in accordace with the manufacture's installation documents. FAA AC 20-138, appendix 1, procedures for obtaining FAA approval for VFR operation by FAA Form 337 for follow-on GPS equipment installation, specifically section 1, follow-on GPS equipment installation VFR use only, and FAA AC 43:13-18, chapter 11 all sections, and FAA FAR AC 43:13-2A, chapters 2 and 3 Equipment mounted to airframe in accordance with manufacture's installions manual and/or AC 43;12-1B chapter 4 sections 4, chapter 7 sections 1 and Piper Standard Practice Manual. Note that all circuit breaker used during installation are P/N:7277-2-x.,"x' represents the number that corresponds with the amperage of that circuit breaker. RG142 coaxial cable used for installation. All co,,unicatiom wiring are is 22 gauge double or triple twist shielded. Avionics buss feed is 10 gauge wire. Power wires for communications are 18 gauge. Radio power wires are 20 gauge.

The Following avionics have been installed and interface:

١	Installed	P/N	C/B	Manual Referance
١	GARMIN GNS 430 GPS-NAV-COM	011-00-490-00	2EA. 5 AMP	190-00356-02REV.F
١	GARMIN GTX327 TRANSPONDER	01100-280-00	5AMP	190-00187-02REV.F
ı	APOLLO SL 30 NAV/COM-	- 430-6040-300 1EA 2AMP	1EA-5AMP	5172-0007-02REV.B
ı	MA 7000B AUDIO PANEL PMA	7000M-S	2AMP	200-066-003REV.F
ı	MX20DISPLAY	4300270500	5AMP	2170-0002-001
	ENCODER	A-30-8	1AMP	ACKA30-8REV.4
	GARMIN 9I-106	CDI IND. 0663039-00	1AMP	7010561 REV.O
	KING NAV IND KI	206-066-3039-00	1AMP	0664001-001REV.C
	AMERKING	14TO 28 VDCINVĒRT AK 550	15AMP	066-02491-001REV.B

Wiring and antenna co-ax selections, where not specified in the approved data or installation manuals, have been made in accordance with FAA GAR AC 43:13-1B, chapter \$1\$ sections 6-17, and FAA FAR AC 43:13-2A, chapters 2 and 3. Avionic hamesses, electrical hamesses and antennas have been installed in accordance with FAA FAR AC 43:13-1B, chapter 11 sections 6=17, and FAA FAR AC 43:13-2A, chapters 2 and 3. The installation recorded above are to be inspected as per the applicable manufacturer's supplied information and FAA FAR 43, appendix D, as per the requirements of instruction for continued airworthiness at subsequent annual inspections, physical weight and balance performed and equipment list updated. Aircraft electrical load analysis completed. System does not exceed 80% of rated load. All systems operational checks good the installation does not conflict with any previously installed modifications or alterations.E.M.I. Test Performed I.A.W. Til Documents N97RE221 REV.A Continuing Airworthiness I.A.W.B.H.T. Generl Inspection Statement Ok To Return To

Performed I.A.W. Service.	Til Documents N97RE221 REV.A Continuing Airworthiness I.A.W.B.H.T. Generl ∜nspection Statement Ok To Return To
1	END
i , e	Additional Sheets Are Attached

U.S.GPO:1989-0-663-171

Great Lakes Aero Products 2412 Devison Road Flint, Michigan 48506

Type Certification Data Sheet No. 1A15 for complete certification basis). Jak Civil Air

PA-24, PA-24-250, PA-24-260, PA-24-400

illation of Great Lakes Aero Freducts forward windows, P/R's W-, W/T-, 1058-187 or -250 and W-, M/6-20599-187 or -250 in accordance with Great Lakes Aero rets Installation Instructions A-5, no revisions, dated August, 1978, or later FAA

operoval of this change in type design applies basically to the Piper PA-24, 1-250, PA-24-250, and PA-24-400 models only. This approval should not be identifications are incorporated unless it is determined that the interrelationship identifications and any of those other previously approved modifications will idea no adverse effect upon the airworthiness of that aircraft.

Contactor September 2, 1978

Las manual: June 26, 1984

October 2, 1978

Manager, Chicago Aircraft Certification Office. ACE-115C. FAA: Central Region

Supplemental Type Certificate

Great Lakes Aero Products 2412 Davison Road Flint, Michigan 48506

(See Type Certification Data Sheet No. ALEA for complete certification basis).

Installation of Great Lakes Aero Products forward windows, P/N's H-W/T-, W/G-2058-187 or -250 and N-W/G-20599-187 or -250 in accordance with Great Lakes Aero Products Installation Instructions A-5, no revisions, dated August, 1978, or later FAA

The approval of this change in type design applies basically to the Piper PA-30 and -39 models only. This approval should not be extended to other aircraft of these models on which other previously approved modifications are incorporated unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce ho adverse effect upon the airworthiness of that aircraft.

Sandyaluan: September 2, 1978

October 2, 1978

Lab marand: June 26, 1984



Manager, Chicago Aircraft Cartificate Office, ACE-115C, FAA, Contral Region

April 1000 84 19-2 (10-44)

United States of America

Department of Transportation — Kederal Abiation Administration

# Supplemental Type Certificate

Number ... SA2550CE

This confifered assued to ... Webco Alreraft. Route 4, Box 13A Newton, KS 67114

antifier that the change in the type dieign for the following product with the limitations and conditions therefor suspecified hereon meets the sireworthiness requirements of Port 3 of the Civil Air

Regulations: effective May 15, 1956, Amendments 3-1 through 3-6 and Paragraph 3.705(a) Of Amendment 3-7 Original Product - Type Conliferato Number:

Aircraft Drawing List 2130-101, dated August 29, 1989, and Door Latch Kit Installation of a Webco door latch kit per Webco Installation Instructions WDL INSTR. #001, dated October 5, 1989, or later approved

ilalians and formdilians: The approval of this change in type design applies only to the basic aircraft models listed and should not be extended to other specific models of these airplanes on which other approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously incorporated approved modifications will not introduce any adverse effect

This cortificate and the supporting data which is the basis for approval shall remain in effect until sur mendered, suspended, roucked, or a termination date is athornies as tablished by the Administration of the Federal Aviation Administration

Date of application: August 29, 1989 . Sale resemed:

Sale amended:

Galo of issuance: October 27, 1989

By direction of the Sidministration



Lawrence A. Herron, Manager Wichita Aircraft Certification Office

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

M Form \$110-2 (10-68)

This certificate may be transferred in accordance with FAR 21.47.

### CONTROL O STATE PRINTE

Department of Transportation—federal Aviation Administration.

## Supplemental Type Certificate

. Number SA662SW

This contifical is included Mitchell Industries, Inc. dba **EDO-AIRE MITCHELL** P. O. Box 610

Mineral Wells, Texas 76067

colifer that the change in the type design for the following product with the limitations and conditions

thorefor as specified hereon meets the sinworthiness requirements of Part 3 afthe Civil Air

Regulations

Criginal Product - Trypo Cortificator Number: 1A15 and A1EA

Make: Piper

Model: PA-24-250, PA-24-260, and PA-30

Description of Trypo Design Change: Installation of Mitchell Automatic Flight System Model AK220 consisting of Century III Autopilot with optional automatic Pitch Trim, Automatic Aileron stabilizer and radio Coupler in accordance with Bulletin No. 322 Revision 3, dated 12-18-69. Installation of . Glida Slope Coupler in accordance with Bulletin No. 366, dated 9-18-67. Installation of Mitchell Radio Coupler Model 1C388-3 per Bulletin No. 611, Revision 1, dated 4-16-74 and Master Drawing List No. 87A708, Revision A, dated 4-16-74.

### Limitations and Conditions:

- Mitcheil Industries, Inc. FAA Approved Placard 13A329-220 required with Century III installation
- Mitchell Industries, Inc. FAA Approved Placard 13A343-220 required with Stabilizer installation.
- FAA Approved Autopilot Flight Manual Supplement dated 4-16-74, PN68S168, is required for Mitchell Radio Coupler Model 10388-3.

This cortificate and the supporting dates which is the basis for approval shall remain in effect world sucrendered, suspended, maked or a commination date is showing established by the Idministration of the Federal Tiviation Ildoninistrations

Dais of application: May 27, 1966

Data of sevence: June 24, 1966

Dob risered: 9/7/66; 2/7/69; 1/26/70; 4/16/74

Dalo amended:

By direction of the oldministrator

Don P. Watson

Acting Chief, Engineering and Manufacturing Branch

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

FAA Form \$110-2(10-48)

This certificate may be transferred in occordance with FAR 21.47.

Revision 4

### United States of America

Department of Transportation—Kederal Aviation Administration

## Supplemental Type Certificate

Number SA3531NM

**BOGERT AVIATION** Rt. 1 Box 1676 Prosser, WA 99350

This certificate issued to Bogert Aviation

corlifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Furt \* Regulations

Criginal Product - Type Certificate Number: \*

\*See attached FAA Approved Model List (AML) No. SA3531NM for list of approved airplane models and applicable

Make: \* Medel: \*

airplane models and applicable airworthiness regulations.

Dissoription of Type Design Change: Installation of copper electrical cables in accordance with Bogert Aviation Installation Instructions as listed on AML No. SA3531NM, or later FAA approved revision.

fimilalions and benditions: Approval of this change in type design applies to the above model aircraft only. This approval should not be extended to aircraft of this model on which other previously approved modifications are incorporated unless it is determined that the relationship between this change and any of those other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that aircraft. A copy of this Certificate and FAA Approved Model List (AML) No. SA3531NM amended April 10, 1989, or later FAA approved revision, must be maintained as part of the permanent records for the modified aircraft. This certificate and the supporting data which is the basis for approval shall remain in effect until sur-

rendered, suspended, renoked; or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Gale of application: May 27, 1986

Testerfissiones July 15, 1986

Sale rissued:

Tale unwaded: April 10, 1989

By direction of the Administrator

Strong L' mills (Signature)

Acting Assistant Manager, Seattle Aircraft Certification Office

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

FAL FOR 8110-2(10-68)

This certificate may be transferred in accordance with FAR 21.47

### Coiron & Brance in America Department of Transportation—Federal Aviation Administration upplemental Type Certificate

Number SA2549CE

Webco Aircraft Route 4, Box 13A Newton, KS 67114

corlifees that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meds the sirverthiness requirements of Port

Regulations: effective November 1, 1949, Amendments 3-1 through 3-2

Original Product - Typo Cortificate Number:

Piper

PA-24, PA-24-250, -260 and -400

Aircraft Drawing List 2430-101, dated August 29, 1989, and Door Latch Kit Installation Instructions WDL INSTR. #001, dated October 5, 1989, or later approved

The approval of this change in type design applies only to the basic aircraft models listed and should not be extended to other specific models of these airplanes on which other approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously incorporated approved modifications will not introduce any adverse effect upon the airworthiness of that aircraft.

This cortificate, and the supporting date which is the fast for approval shall remain in effect until surrendered, suspended, rovoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration

Dale of application: August 29, 1989

Sale wissued :

Dale of issuance:

October 27, 1989

Tale amended:



By direction of the Administrator

Lawrence A. Herron, Manager Wichita Aircraft Certification Office

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

This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8110-2 (10-48)

### United States of America

## Department of Transportation — Federal Aviation Administration

# Supplemental Type Certificate

Number

**SA2549CE** 

This certificate, issued to

Webco Aircraft Route 4, Box 13A Newton, KS 67114

corlifees that the change in the type design for the following product with the limitations and conditions

Civil Air of the therefor as specified horson meets the sirvorthiness requirements of Part

Regulations effective November 1, 1949, Amendments 3-1 through 3-2

Original Product - Type Certificate Number:

Make Piper

Model: PA-24, PA=24-250, -260 and -400

Description of Type Design Change: Installation of a Webco door latch kit per Webco Aircraft Brawing List 2430-101, dated August 29, 1989, and Door Latch Kit Installation Instructions WDL INSTR. #001, dated October 5, 1989, or later approved revisions.

The approval of this change in type design applies only to Limitations and Conditions: the basic aircraft models listed and should not be extended to other specific models of these airplanes on which other approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously incorporated approved modifications will not introduce any adverse effect upon the airworthiness of that aircraft.

This cortificate and the supporting data which is the basis for approval shall remain in effect until surmendered, suspended, revoked; or a termination date is otherwise established by the Administrator of the

Federal Aviation Administration

Date of application: August 29, 1989

Late reissued :

Dale of issuance :

October 27, 1989

Tale amended:



By direction of the Administrator aurence a. Herron

Lawrence A. Herron, Manager Wichita Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred in accordance with FAR 21.47.

FAA FORM \$110-2(10-68)

### United States of America

Department of Transportation — Federal Aviation Administration

# Supplemental Type Certificate

Number

This certifical assued to .. Webco Aircraft Route 4, Box 13A Newton, KS 67114

contifies that the change in the type disign for the following product with the limitations and conditions therefor as specified hereon meets the sirworthiness requirements of Part

Regulations. effective May 15, 1956, Amendments 3-1 through 3-6 and Paragraph 3.705(a) Of Amendment 3-7 Original Graduct - Type Garlificato Number: A1EA

Make: Piper

PA-30, PA-39

Description of Type Daign Change: Installation of a Webco door latch kit per We Alrcraft Drawing List 2430-101, dated August 29, 1989, and Door Latch Kit Installation of a Webco door latch kit per Webco Installation Instructions WDL INSTR. #001, dated October 5, 1989, or later approved

The approval of this change in type design applies only to the basic aircraft models listed and should not be extended to other specific models of these airplanes on which other approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously incorporated approved modifications will not introduce any adverse effect upon the airworthiness of that aircraft.

This consificate and the supporting data which is the basis for approval shull remain in effect until sur rendered; suspended, roucked; or a termination date is athorwise established by the Administrator of the Federal Aviation Administration

Date of application: August 29, 1989

Sale ressued :

Dale of issuance:

October 27, 1989

Sale amended:



By direction of the Administrator

Lawrence a. Herron

Lawrence A. Herron, Manager Wichita Aircraft Certification Office

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

This certificate may be transferred in accordance with FAR 21.47.

TAA Form 8110-2 (10-68)

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FAA Form 337 (10/06)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished (If more space is required, attach additional sheets, identify with eircraft nationality and registration mark and date work completed.) Replaced the origional generator and regulator with Inter AV, Inc., (70 Box 16714, San Antonia, Tx 78216) alternator and regulator in accordance with their STC SA 334 SW. There are no special instructions for continued zirworthiness, only the annual or 100 hour inspection.
Nothing Follows

QU.S. GOVERNMENT PRINTING OFFICE: 1992-769-012/60157

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FAA Form 337 (10/06)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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FAA Form 337 (10/06)

Certificate or Designation No. 1459849

FAA Designee

Repair Station

Inspection Authorization

Other (Specify)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished
(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

A Webco door latch Kit was installed under STC SA 2549 CE in accordance with the Furnished Door Latch Kit Installation Instructions (WDL INSTR#001). This door latch requires no special maintience or inspections other than the normal 100 hr. or annual inspections.

Nothing Follows

Additional Sheets Are Attached

\*U.S.G.P.O. 1990-761-753

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Maintenance Organization

Inspection Authorization

FAA Form 337 (10/06)

1459849

Certificate or Designation No.

BY

FAA Flt. Standards

Inspector

FAA Designee

Manufacturer

Repair Station

Persons Approved by Canadian Department of Transport

Other (Specify)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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FAA Form 337 (10/06)

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6. Conformity Statement  Agency's Name and Address  B. Kind of Agency  U. S. Certificated Mechanic  Foreign Certificated Mechanic  C. Certificate No. 1459849  Certificated Repair Station  Certificated Repair Station  Certificated Maintenance Organization  Certificated In accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.  Signature Date of Anthonized Individual  T. Approval for Return to Service  Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by Administrator of the Federal Aviation Administration and is  FAA Fit. Standards Inspector  Maintenance Organization  Persons Approved Department of Transport  Other (Specify)  Signature/Date of Authorized Individual  Persons Approved Department of Transport  Other (Specify)			APPLIAN	NCE	Manufacturer				-			
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Certificated Repair Station  Certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.  Itended range fuel  Signature/Date of Authorized Individual  T. Approval for Return to Service  Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by Administrator of the Federal Aviation Administration and is  FAA Fit. Standards Inspector  Manufacturer  Manufacturer  Malntenance Organization  Other (Specify)  Persons Approved by Canadian Department of Transport  Other (Specify)  Signature/Date of Authorized Individuals	me					_ 2	X	U. S. Cert	ificated Mechanic		Mar	nufacturer
Country  Certificated Maintenance Organization  Certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.  Certificated range fuel is true and correct to the best of my knowledge.  Signature Date of Authorized Individual  7. Approval for Return to Service  Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by Administrator of the Federal Aviation Administration and is  FAA Fit. Standards   Manufacturer   Maintenance Organization   Persons Approved by Canadian Department of Transport  FAA Designee   Repair Station   Inspection Authorization   Other (Specify)	dress					[	_				C. Certif	ficate No. 1459849
D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.  Idended range fuel Signature Date of Authorized Individual part 14 CFR Part 43 pp. B  7. Approval for Return to Service  Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by Approved Rejected  FAA Fit. Standards Inspector Manufacturer Manufacturer Manufacturer Part Manufacturer Persons Approved by Canadian Department of Transport  FAA Designee Repair Station Inspection Authorization  Signature/Date of Authorized Individuals  Signature/Date of Authorized Individuals	,				State	<b>-</b> ⊦	+				1	
have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.  Attended range fuel at 14 CFR Part 43 and the information furnished in the part of the persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the following function and is persons approved in the manner prescribed by the following function function for the federal Aviation Administration and is persons approved by Canadian Department of Transport function fu											<u> </u>	
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7. Approval for Return to Service  Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by a Administrator of the Federal Aviation Administration and is  FAA Fit. Standards Inspector  FAA Designee  Repair Station  Manufacturer  Maintenance Organization  Persons Approved by Canadian Department of Transport  Other (Specify)  Signature/Date of Authorized Individuals	fumish	ed herein is	true and c	orrect (	to the best of my	knowl	edg	je.		on regulation		at the monthagon
7. Approval for Return to Service  Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by Approved  FAA Fit. Standards Inspector  FAA Designee  Repair Station  Maintenance Organization  Persons Approved by Canadian Department of Transport  Other (Specify)  Signature/Date of Authorized Individuals				Sign								
7. Approval for Return to Service  Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by Approved  FAA Fit. Standards Inspector  FAA Designee  Repair Station  Maintenance Organization  Persons Approved by Canadian Department of Transport  Other (Specify)  Signature/Date of Authorized Individuals	er 14 CFR i pp. B	Part 43			Huffen 1	O,	K	Brow	Th			
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FAA Fit. Standards Inspector Manufacturer Maintenance Organization Persons Approved by Canadian Department of Transport  FAA Designee Repair Station Inspection Authorization  Signature/Date of Authorized Individuals	Administra	or of the F	ederal Avia	tion Ad	ons specmed b Iministration and	is	tne	unit ide	nuned in item 5	was inspec	ted in th	ne manner prescribed by
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FAA Form 337 (10/06)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

Description of Work Accomplished (If more space is required, attach additional sheets. Identify with a	aircraft nationality and registration mark and date wo	k completed.)
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	Nationality and Registration Mark	Date
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Exp: 8/31/2014	1. 12

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have	fy that the rep	n accordance	teration made to the with the requirement to the best of my	its of f	⊃art	entified in item 43 of the U.S	5 above and de	scribe	ed on th	ne reverse or attachments here s and that the information	eto
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			b'	7. Ap	prov	val for Retur	n to Service	D I			4 h. 45-
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ву	FAA Fit. Star Inspector	ndards	Manufacturer		M	aintenance C	rganization		Depar	ns Approved by Canadian trnent of Transport	
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FAA Form 337 (10/06)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

Description of Work Accomplished
(If more space is required, attach additional sheets, identify with aircraft nationality and registration mark and date work completed.) Description of Work Accomplished Removed aluminum bettery to starter cables and installed copper electrical cables in accordance with Bogert Aviation Instellatione Instructions with STC SA 3531 NM. There are no special instructions for continued airmorthiness, only the annual or 100 hour inspection. Nothing Follows

Additional Sheets Are Attached

US Departme of Transportal Federal Avial Administration	Non:	(Airframe, P	R REPAIR AND owerplant, Prop	peller, or App	liance)	OMB No. 212 Exp. 8/31/201	FOR FAA U	
INSTRUC	TIONS: Print	or type all entries of this form. S.C. §46301(a))	es. See Title 14 C This report is requi	FR §43.9, Part 4 ired by law (49 U.	3 Appendix B, and S.C. §44701). Fallu	AC 43,9-1 (c re to report c	or subsequent an result in a	revision thereof) civil penalty for ea
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FAA Form 337 (10/06)

1459849

Certificate or Designation No.

FAA Flt. Standards

FAA Designee

Inspector

Manufacturer...

Repair Station

App. B

BY

7. Approval for Return to Service Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is

Maintenance Organization

Inspection Authorization

Signature/Date of Authorized Individuals

Authorized Individuals

Authorized Individuals

Persons Approved by Canadian Department of Transport

Other (Specify)

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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FAA Form 337 (10/06)

### America States of America

### Department of Transportation—federal Aviation Administration

## Supplemental Type Certificate

Number SE3552NM

This certificate, issued to

Johnston Aircraft Service, Inc.

cortifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 13 of the Civil Air Regulations, effective June 15, 1956, as amended by 13-1 and 13-2.

Original Product - Type Certificate Number: E-295

Make: Lycoming

Model: 0-540-A1A, -A1A5, -A1B5, -A1C5, -A1D5

Description of Type Design Change: Modification of crankshaft damper configuration in accordance with FAA sealed Johnston Aircraft Service, Inc. Report CPR-2 "NC" dated December 10, 1986, or later FAA approved revision.

Limitations and Conditions: The approval of this change in type design applies to the basic engine of the specified models that are otherwise unmodified. This approval should not be extended to other specific engines of these models on which other provides of these models of these models on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adderse effect upon the airworthiness of that engine.

This certificate and the supporting data which is the basis for approval shall remain in effect until sur-

ation date is otherwise established by the Administrator of the rendered, suspended, revoked, or a lery

Fedoral Aviation Administrations

Date of application: November 25

Dute reissued:

Date of issuance: December 10, 1986

Dale amended:

By direction of the Advanistrator

Manager, Western Aircraft Certification Office

(Title)

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

This certificate may be transferred in accordance with FAR 21.47.

JOHNSTON AIRCRAFT SERVICE, INC.
P.O. BOX 1457
TULARE, CALIFORNOA 93275

JOHNSTON AIRCRAFT SERVICE, INC. REPORT CPR-2

### ENTITLED

Technical Details for Changing the Lycoming 0-540 A1A, A1A5, A1B5, A1C5, A1D5 and Lycoming 10-540 C1B5 to be eligible for the Hartzel & Compact Propeller, HC-C2YK-1BF/F8477D-5R.

F.A.A. APPROVED PER S.T.C. NO. SE3553NM

Date: DEC 10 1986

Page 1 of 6 Pages

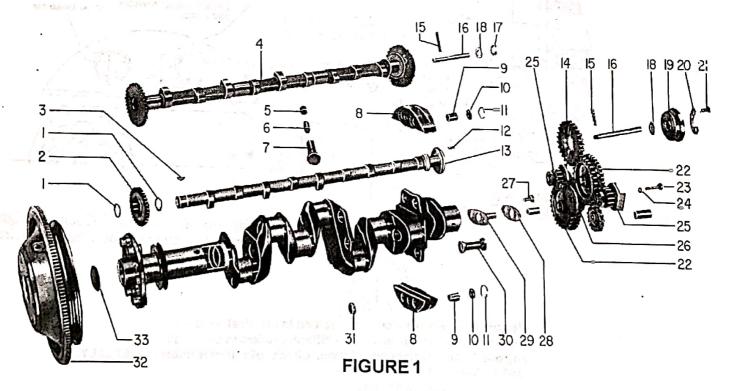
### **CYLINDER REMOVAL**

- Remove Left Rear (#6) Cylinder and Piston Assembly from Engine using Instructions contained in Lycoming Overhaul Manual for Direct Drive Engines, P.N 60294-7. Leave the Piston and Rings inside the Cylinder with only enough Piston showing for access to the Piston Pin.
- 2. You now have access to the Counterweighs through the # 6 Cylinder hole in the Crankcase.

### **COUNTERWEIGHT REMOVAL**

Use Figure 1 (Typical Crankshaft and Related Parts) as shown below to aid in Counterweight Removal and Installation.

- Remove the two (2) Lycoming Counterweights, P/N 71904, and (2) Rollers, P/N 70416 and (2) P/N 72022, merely by removing the retaining rings, CPR-2 Figure 1,Ref. 11,after which the Washers, Ref. 10, Rollers, Ref. 9, and Counterweights, Ref. 8, may be detached from the Crankshaft Lug.
- After removing 71904 Counterweights and prior to installing 72801 Counterweights, dimensionally
  check bushings in Crankshaft Counterweight Cheeks. Any bushings not meeting New Lycoming
  specifications must be replaced per latest version of Lycoming Service Instruction 1142.



- 1. Retaining Rings
- 2. Camshaft Gov. Drive Gear
- 3. Woodruff Key
- 4. Camshall (Integral Gear)
- 5. Tappet Socket
- 6. Tappet Plunger Assy.
- 7. Tappet Body
- 8. Counterweight
- 9. Roller
- 10. Washer
- 11. Retaining Ring

- 12. Stepped Dowel
- 13. Camshaft
- 14. Camshaft Gear
- 15. Pin
- 16. Tachometer Shaft
- 17. Retaining Ring
- 18. Spacer
- 19. Breather Slinger
- 20. Lockplate
- 21. Hex Head Screw
- 22. Crankshaft Idler Gears

- 23. Screw
- 24. Washer
- 25. Magneto Drive Gear
- 26. Crankshaft Gear
- 27. Hex Head Screw
- 28. Lockplate
- 29. Idler Gear Shaft
- 30. Sludge Tube (not used on current models)
- 31. Crankshaft Counterweight Bushing
- 32. Ring Gear Support Assy.
- 33. Expansion Plug

Page 2 of 6 Pages

### COUNTERWEIGHT INSTALLATION

1. Per Lycoming Service Instruction 1012 Rev.F, Install New P/N 71907 Washers, Ref.10, and New P/N LW11750 (7∜906) Retaining Rings, Ref. 11, on one side of New Style on its proper lug on the Crankshaft per Figure 2, Service Instruction 1012 Rev. F. Insert Washers and P/N 172797, Ref.9, and secure assembly by installing New P/N 71907 the Bushings, P/N 71903, in the Counterweights must be New and Finished per Lycoming Service Instruction 1143. Circlips are inserted with sharp edge outward ( see CPR-2 See Table on Figure 3, of CPR-2.

NOTE: All reference numbers refer to Figure 1, P.2 of CPR-2.

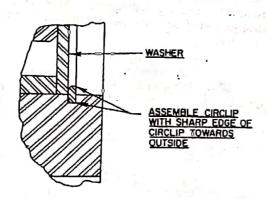


Figure 2
Assembly of Circlips in Counterweight

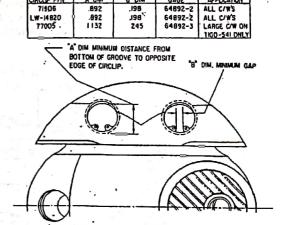


Figure 3
Diagram of Assembled Counterweight
Showing Dimensions for Checking Circlip

### **CAUTION**

Be sure the correct rollers are installed in identical pairs only.

Under no circumstances are two different rollers to be installed on any one Counterweight installation. Check roller Part Number CAREFULLY.

Insert one end of the Counterweight Retaining Gap Gage, Avco Lycoming P/N 64892-2 or -3 between the ends of the Counterweight Retaining Ring; see Figure 3 for gap dimensions and gage selection. Be sure the gage is resting on the botton of the groove. The gage must pass between the ends of the Retaining Ring and when rocked back and forth, must clear the inside edge of the top of the Retaining Rings. If the gage does not pass freely between the ends and under the top of the ring, the ring is not properly seated. Be sure all rings are properly seated.

Page 3 of 6 Pages

### COUNTERWEIGHT INSTALLATION CONTINUED.

### NOTE:

A recent revision to Lycoming Part No. 64892 Gage Set eliminated the Part No. 64892-1 Gage from the set. The Part No. 64892-2 that is to be used for checking both the Part Nos. 71906 and LW14820 Circlips, must be modified to the specifications listed in the Table Section of Figure 3 or a new gage set can be purchased through Avco Lycoming Williamsport Division.

### SPECIAL TOOLS REQUIRED.

Avco Lycoming Part No. 64892 Gage Set, now consist of:

Part No. 64892-2 Gage Part No. 64892-3 Gage

Repeat the same procedures with the second New Style Counterweight, Part No. 72801, but use two (2) New Rollers, Part No. 72965, in the second assembly.

### CIRCLIP IDENTIFICATION

FREE DIA.	HOLE SIZE	STAMPED MARK	P/N
1.056	072/.060	93	71906
1.056	.093/.076	N/A	LW-14820
1.344	.090/.076	N/A	77005

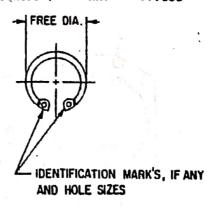
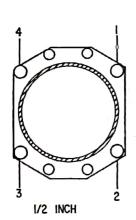


Figure 4
Circlip Identification

Page 4 of 6 Pages

### CYLINDER INSTALLATION

- Re-install No. 6 Cylinder and Piston Assembly on its pad using a New Cylinder Base Seal.
   Initially tighten 1/2 inch cylinder hold-down nuts, to a torque of 300 in. b (25ft. lb) in the sequence shown in Figure 5. On engines with cylinder hold-down plates, follow instructions in Figure 6
- Instal 3/8 inch nuts on the remaining cylinder base studs and torque to 300 in. lbs (25ft. lb).
   The sequence for tightening these nuts is optional.
- Using the same sequence as described in Paragraphs 1 and 2, and shown in Figure 5, check all 1/2 inch nuts for tightness by bringing torque to 600 in.lb (50ft . lb). Be sure shims are removed before final torquing engines using cylinder hold-down plates.
- Check 3/8 inch nuts for tightness on the remaining cylinder base studs by bringing torque up to 300 in. lb (25ft.lb). Sequence is optional.
- After all cylinder base nuts have been tightened, remove any nicks in cylinder fins by de-burring or filling.
- 6. After tightening cylinder base nuts, install the remaining cylinder parts in the opposite sequence you removed them. Use all new gaskets and seals during assembly. Be sure to collapse Lifter Plungers and check for proper dry clearance of .028 to .080 between Rocker Arms and Valves with Piston at Top Dead Center on compression stroke. If your engine WAS performing normally and you cannot obtain proper Valve clearance then re-check your cylinder installation for problems ( refer to Lycoming Direct Drive Overhaul Manual, Part No. 60294-7).



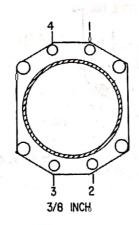
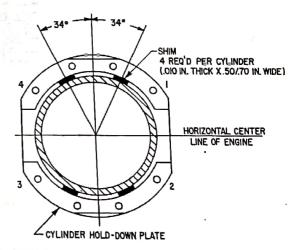


Figure 5 Sequence of Tightening Cylinder Base Nuts



INSTRUCTIONS - ON ENGINES USING CYLINDER HOLD-DOWN PLATES, DURING INITIAL TIGHTERNING, USE TWO SHIMS BETWEEN EACH PLATE AND THE BARREL, LOCATED AS SHOWN. REMOVE SHIMS BEFORE FINAL TIGHTENING.

Figure 6 Location of Shims Between Cylinder Barrel and Hold-Down Plates

Page 5 of 6 Pages

- All the Engines listed for this Modification now have the same rotational dampening system as the Lycoming 0-540 E4A5 and IO-540 D4A5, both rated at 260 H.P. at 2700 R.P.M., per current Lycoming Parts Manual, PC-115 and 215, and current Lycoming Certified Aircraft Engine Manual SSP 283.
- One other determining factor is the Camshaft. Any Engine equipped with early Camshaft, Part No. 71642, is not eligible for the H.P. or R.P.M. increase.
- All Engines changed by this Modification shall have (M) followed by the S.T.C. Number marked on the Engine Data Plate following the Engine Model designation.

### REFERENCE MATERIAL

Lycoming Service Instruction 1012F
Lycoming Service Instruction 1142 (Latest Version)
Lycoming Service Instruction 1143 (Latest Version)
Lycoming Direct Drive Overhaul Manual
Part No. 60294-7 (Latest Version)
Lycoming Parts Catalog, Part No. PC-115, for O-540 Series
Aircraft Engines (Latest Version)

Page 6 of 6 Pages

### TEXTRON Lycoming

Williamsport Plant
Textron Lycoming/Subsidiary of Textron Inc.
652 Oliver Street
Williamsport, PA 17701 U.S.A.



DATE:

October 31, 1988

Service Instruction No. 1012F (Supersedes Service Instruction No. 1012E) Engineering Aspects are FAA Approved

SUBJECT:

PART I: Correct Location for Counterweights and Rollers on a

Crankshaft

PART II: Proper Assembly Procedure for Counterweights and Rollers

on a Crankshaft

MODELS AFFECTED:

All Textron Lycoming engines employing counterweights.

TIME OF COMPLIANCE:

As Required.

The purpose of this service instruction is to provide correct assembly procedures and identify the correct location on the crankshaft for the various counterweights and rollers utilized on Textron Lycoming reciprocating aircraft engines. Since the original edition of this publication; counterweight design changes,

material improvements and improvements in manufacturing methods have resulted in a number of counterweight supersedures. The following table lists applicable counterweight part number supersedures in the sequence of occurrence. The referenced notes following the table describe the supersedure.

### COUNTERWEIGHT AND ROLLER SUPERSEDURE HISTORY

Original	Superseding	Original	Superseding
Counterweight	Counterweight	Roller	Roller
Part Number	Part Number	Part Number	Part Number
* 69393 * 69394 * 69349 * 65602 * 65640 + 71904 + 71905 + 72801 + 72534 + 73643 + 73644 + 73812	71904 71905 71905 71904 71904 LW-19225 LW-19226 LW-19227 LW-19213 LW-19211 LW-19210 LW-19212	† 76787	73648

P/N 69393 and 69394 counterweights are cast iron and did not incorporate bushings in the roller bores. These
counterweights must be replaced at overhaul. (Not interchangeable.)

\*\* P/N's 69349, 65602 and 65640 counterweights incorporate screw in plugs and circlips to secure the rollers in the counterweight. When it becomes necessary to replace one of these counterweights, all counterweights on that certain crankshaft must be replaced. (Not interchangeable.)

+ P/N's 71904, 71905, 72801, 72534, 73643, 73644 and 73812 counterweights have been superseded as a result of manufacturing process changes. Each one is completely interchangeable with its respective replacement counterweight. Existing stock of these counterweights is usable until depleted.

† P/N 76787 roller was replaced by P/N 73648 as a product improvement and to eliminate a dispensible part.



### NOTE

Any O-540-A1A model engine installed in a Piper aircraft must be converted to the O-540-A1A5 configuration at overhaul. This is accomplished by installing two (2) fifth order counterweight rollers P/N 72022, in place of two (2) of the four (4) sixth order P/N 70416 rollers, on one of the two (2) rear crankshaft lugs. When this modification has been completed, stamp the number "5" after the model number on the engine nameplate.

### PART I

Part I separates applicable engines into groups that utilize the same basic crankshaft design with the same counterweight and roller configuration. The location column in the table that accompanies each group references the group to a numbered figure which is an illustration that is typical of the crankshaft installed in the engines listed with the group. Each counterweight lobe position is numbered on the illustration and the location column in the table assigns each counterweight and roller combination to one or more of these numbered positions.

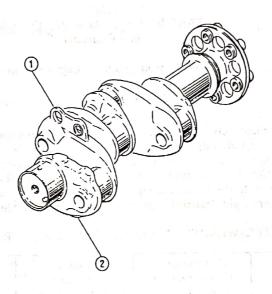


Figure 1.
Counterweights and Rollers - Group 1

Group	Counterweights P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group 1 (4 Cyl. Direct Drive Engines)	7 ,3, V	ч.	155		Figure 1
0-360-A1F6, -A1F6D, -A1G6, -A1G6D, -E1A6D, -F1A6, -G1A6; LO-360-A1G6D, -E1A6D; IO-360-A1B6, -A1B6D, -A1D6D, -A3B6D,	LW-19227 LW-19227	6 1 2 1 1	LW-10977 LW-10945	2	Either Position Either Position
-A3D6D, -B2F6, -C1C6, -C1D6, -C1E6, -J1A5D; AEIO-360-A1B6, -B1G6; LIO-360-C1E6; TO-360- C1A6D, -E1A6D, -F1A6D; LTO-360-E1A6D; TIO- 360-A3B6, -C1A6D.					

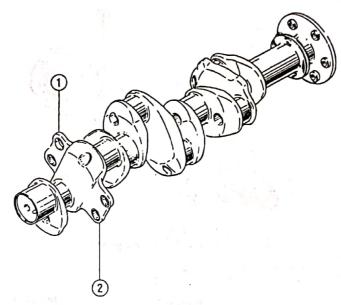


Figure 2. Counterweights and Rollers - Group 2, 3, 4, 5, 6, 7

Group	Counterweights P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group 2 (6 Cyl. Direct Drive Engines)					Figure 2
0-540-A1D, -A2B.	LW-19225	2	70416	4	Position 1, 2
Group 3 (6 Cyl. Direct Drive Engines)			-		Figure 2
0-540-A1A, -A1A5, -A1B5, -A1C5, -A1D5,	LW-19225	1	70416	2	Either Position
-A3D5, -B1A5, -B1B5, -B2B5, -B2C5,	LW-19225	i	72022	2	Either Position
-F1A5, -F1B5, -G1A5, -G2A5, -H1B5D,	511 10110				
-H2A5, -H2B5D; IO-540-C1B5, -C1C5.	2 30 64		- 363	t at a set	1730
Group 4 (6 Cyl. Direct Drive Engines)	*Chepuille		Nac i		Figure 2
0-540-A4D5, -B4B5, -E4A5, -E4B5, -E4C5,	LW-19227	1	72965	2	Either Position
-J1A5D; IO-540-A1A5, -B1A5, -B1B5, -B1C5,	LW-19227	l	72797	2	Either Position
-C1B5, -C4B5, -C4C5, -C4D5D, -D4A5, -E1A5,					
-E1B5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5,					
-G1F5, -J4A5, -P1A5, -T4A5D, -T4B5D, -T4C5D,					- 2:18
-W1A5D; AEIO-540-D4A5, -D4B5, -L1B5D; TIO-					
540-C1A, -E1A, -G1A, -H1A, -AA1A5, -AB1AD.					•
Group 5 (6 Cyl. Direct Drive Engines)					Figure 2
IO-540-K1A5, -K1A5D, -K1B5, -K1C5, -K1D5,	LW-19210	1	73648	2	Either Position
-K1E5, K1E5D, -K1F5, -K1F5D, -K1G5,	LW-19210	1	76788	2	Either Position
-K1G5D, -K1H5, -K1J5, -K1J5D, -K1K5, -L1A5,					1
-L1A5D, -L1B5D, -L1C5, -M1A5, -M1A5D,					
-M1B5D, -M2A5D, -N1A5, -R1A5, -R1A5D,					
-S1A5, -U1B5D, -AA1A5; AEIO-540-L1B5D;					
HIO-540-A1A; TIO-540-A1A, -A1B, -A2A,					Til sand
-A2B, -A2C, -F2BD, -J2B, -J2BD, -N2BD, -R2AD,					
-S1AD, -T2AD, -U2A, -V2AD, -W2A; LTIO-540- F2BD, -J2B, -J2BD, -N2BD, -U2A, -V2AD, -W2A					
	9 11 1				Figure 2
Group 6 (6 Cyl. Direct Drive Engines)					Either Position
0-540-J3A5, -J3A5D, -J3C5D, -L3C5D; IO-540-	LW-19210	l	LW-15558	2	Either Position
W3A5D.	LW-19210	1	76788	2	
Group 7 (6 Cyl. Direct Drive Integral Accessory Housing Engines)				34	Figure 2
TIO-541-A1A	20011		70040	2	Either Position
HO-941-MIA	76044	1	76042 76043	2	Either Position
	76044	1	70043	4	Distro. 1 Trans.

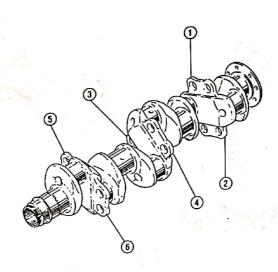


Figure 3.
Counterweights and Rollers - Group 8, 9, 10, 11, 12, 13, 14

Comm	Counterweights P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group			A STATE		Figure 3
Group 8 (6 Cyl. Geared Engines)	LW-19225	6	69433	12	All Positions
GO-435-C2, -C2A, -C2A2, -C2B, -C2B1, -C2B2, -C2C, -C2E; GO-480-B series (except	B.1. 10220				
-C2B2, -C2C, -C2E; GO-480-B series (exception of the control of th	PROME THE				
IGO-480-A1B6	Contract of the Contract of th				
Group 9 (6 Cyl. Geared Engines)					Figure 3
GO-435-C2B2-6; GO-480-B1A6*, -B1E6,	LW-19225	4	69433	8	Positions 1, 2, 3, 4
-C series; -F series, -G series; GSO-480	LW-19225	1	70416	2	Position 6
series (except -B1B3); IGSO-480 series	LW-19226	1	69433	2	Position 5
(except -A1F3)	- N				<u>, i' i </u>
Group 10 (6 Cyl. Geared Engines) (Special)					Figure 3
GO-480-B1A6 with the following S/N's:	LW-19225	6	70416	12	All Positions
L-567-28,L-569-28, L-573-28,L-574-28,					
L-575-28,L-576-28.		1.00		100	Y'- 12'-
Group 11 (6 Cyl. Geared Engines)		7 4			Figure 3
GSO480-B1B3; IGSO-480-A1F3.	LW-19210	2	76788	4	Positions 1, 2
GSU460-B1B3; 1GSU460-A11-3.	LW-19213	4	69433	8	Positions 3, 4, 5, 6
Group 12 (6 Cyl. Geared Engines)	- (p				Figure 3
	LW-19213	4	73287	8	Positions 1, 2, 3, 4
IGO-540-A, ·B series	LW-19215	1	70416	2	Position 6
	LW-19226	i	73287	2	Position 5
Group 13 (6 Cyl. Geared Engines)	277 10000	i n			Figure 3
	LW-19213	7 = 0	69433	8	Positions 1, 2, 3, 4
IGSO-540-A, -B series	LW-19213	13 15 Tu	70416	2	Position 6
	LW-19225 LW-19226	1	69433	2	Position 5
Crown 14/6 Cul Vertical Engine	L141.13220		03400		Figure 3
Group 14 (6 Cyl. Vertical Engines)	07-0		50000	10	All Positions
VO-540-B1B3, -C1C3	LW-19213	6	73338	12	All Fositions

<sup>\*</sup> See Group 10 also.

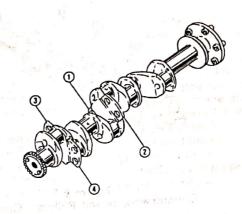


Figure 4.
Counterweights and Rollers - Group 15

Croup	Counterweights Qty. P/N No.	Roller P/N	No. Location Figure 4
Group  Group 15° (6 Cyl. Direct Drive Integral Accessory Housing Engines) TIO-541-E1A4, -E1B4, S/N's 101-59 thru S/N's 297-59	75637 1 1 76044 1 76044 1 75636 1	77386 76042 76043 77385	Position 1 Position 3 Position 4 Position 2
TIO-541-E1A4, -E1B4, S/N's 298-59 and upE1C4, -E1D4	75637 1 76044 1 76044 1 78988 - 1	77386 76042 76043 77385	2 Position 1 2 Position 3 2 Position 4 2 Position 2

<sup>\* -</sup> Change 77887 crankshaft and counterweight assembly to 78989 at engine overhaul by using 78988 counterweight instead of 75636.

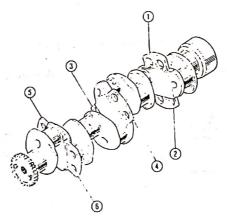


Figure 5.
Counterweights and Rollers - Group 16

Counter	Weights and				
Group	Counterweights P/N	Qty. No.	Roller P/N	Qty. No.	Location Figure 5
Group 16 (6 Cyl. Geared Integral Accessory Housing Engines) TIGO-541-B1A, -D1A, -D1B, -E1A	75637	5	75631	10	Positions 2, 3, 4, 5, 6
TIGOGIETA, DIA. DIO, DIA	77002	1	77007	2	Position 1

When assembling TIGO-541 counterweight P/N 77002 to No. 1 position on the crankshaft, do not use 71906 or LW-14820 circlips and 71907 washers. Use washer P/N 77004 and circlip P/N 77005.

Service Instruction No. 1012F

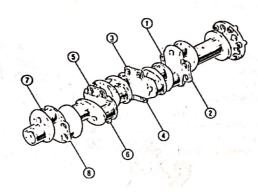


Figure 6.
Counterweights and Rollers - Group 6

	Group Group 17 (8 Cyl. Direct Driv	e Engines)		Counterweights P/N	Qty. No.	Roller P/N	Qty. No.	Location
	IO-720-A, -B, -C, -D series	and the second	(23543)	LW-19211	6	73649	10	Figure 6
-	Carteria (	341 2	(73812) (73644)	LW-19212 LW-19210	1 I	73649 73814 73648	12 2 2	Positions 1, 2, 4, 5, 7, 8 Position 3 Position 6

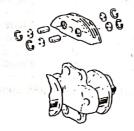


Figure 7.
Typical Counterweight Installation

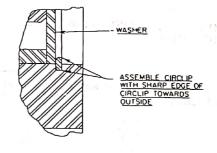


Figure 8. Assembly of Circlips in Counterweight

CACID PIN	T. Dan	B DIM	GAGE	APPLICATION
11906	835	198	64892-2	ALL C/#5
L# 14820	892	198	64892-2	ALL CIN'S
11005	1132	245	64092-3	LARCE CAN ON
L	L			1160-541 ONLY
<u> </u>	DIN MANNA	DISTANCE P		
\ E	OF TON OF CA	DONE TO DOS	ACC.	
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Figure 9.
Diagram of Assembled Counterweight
Showing Dimensions for Checking Circlip

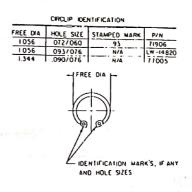


Figure 10. Circlip Identification

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#### PART II

#### CAUTION

The practice of marking crankshafts, counterweights and rollers, to insure proper location at reassembly, should not be accomplished with permanent markings of any kind. Refer to the latest Revision of Service Instruction No. 1152. Scoring, scratching, etching or other type of permanent marking could result in counterweight failure. See figure 7.

Install washers, P/N 71907 and circlips, P/N 71906 or LW-14820 on one side of the counterweight and place the counterweight on the proper crankshaft lobe. Insert the proper rollers and secure the assembly by installing washers and circlips on the other side of the counterweight (refer to figure 7). Circlips are inserted with the sharp edge outward (see figure 8). Two gages will check all circlips installed in any Textron Lycoming counterweight. See table with figure 9.

#### CAUTION

Install the correct rollers in identical pairs only. Under no circumstance are two different rollers to be installed on any one counterweight installation. Check roller part number and size by using the table at the end of this instruction.

Insert one end of the counterweight circlip gap gage, P/N 64892-2 or -3 between the ends of the circlip; see figure 9 for gap dimension and gage selection. Be sure the gage is resting on the bottom of the groove. The gage must pass between the ends of the circlip and when rocked back and forth, must clear the inside edge of the top of the circlip. If the gage does not pass freely between the ends and under the top of the circlip, the circlip is not properly seated. Insure all circlips are properly seated.

#### NOTE

A recent revision to P/N 64892 gage set eliminated the 64892-1 gage from the set. The 64892-2 gage that is to be used for checking both the 71906 and LW-14820 circlips, must be modified to the specifications listed in the table section of figure 9 or a new gage set P/N 64892 can be purchased through any Textron Lycoming authorized Distributor.

#### SPECIAL TOOLS REQUIRED:

Textron Lycoming P/N 64892 gage set, now consists of:

64892-2 Gage 64892-3 Gage

#### ROLLER OUTSIDE DIAMETERS

P/N	*, // - 1 OD	P/N	OD	P/N	OD
69433	.5050/.5045	73648	.6572/.6567	76788	.6895/.6890
70416	.6950/.6945	73649	.6098/.6093	77007	.5167/.5162
72022	.6655/.6650	73814	.5652/.5647	77385	.5845/.5840
72797	.6915/.6910	75631	.4741/.4736	77386	.5333/.5328
72965	.6602/.6597	76042	.6420/.6415	LW-10945	.6915/.6910
73287	.5194/.5189	76043	.6795/.6790	LW-10977	.7141/.7136
73338	.5260/.5255		1.	LW-15558	.6451/.6446

NOTE: Revision F" adds new models, changes text, updates part numbers as applicable.

18297, 19215, 19563, 19215A, 20196, 22254, 22636, 22734A, 22734B — These numbers for Textron Lycoming reference only.

### TEXTRON Lycoming

Reciprocating Engine Division/ Subsidiary of Textron Inc. 652 Oliver Street Williamsport, PA 17701 U.S.A.

# SERVICE INSTRUCTION

May 28, 1992

Supplement No. 1

for

Service Instruction No. 1012F

A recent revision to P/N's LW-19225, LW-19226 and LW-19227 counterweight assemblies changes the distance from the centerline of the counterweight bushing bore to the flat edge of the counterweight on applicable counterweights that are identified with the letter "E", as a suffix to the counterweight part number. (Refer to Dimension "A", in the revised Figure 6, from Supplement No. 2 to Service Instruction No. 1143B which is also included with this supplement for reference purposes.) Applicable counterweights that were placed in service, prior to distribution of this Supplement, that are not identified with a letter suffix in the part number will have to be measured to determine the "A" dimension. After the "A" dimension has been determined, vibropeen the correct identification letter on the counterweight as a suffix to the part number.

Although applicable counterweights that are identified with the letter "E" suffix in the part number, fit and perform perfectly on the lobes of crankshafts installed in direct drive engines it is impossible to assemble them on crankshafts that are installed in reduction gear equipped engines. For this reason production of counterweights with the relocated bushing bores has

been discontinued and all applicable counterweights will be manufactured to the original "A" dimension which is listed with the part number that contains the "D" suffix in the revised Figure 6. New counterweights that are manufactured to the original "A" dimension will be identified with the letter "F" or a subsequent letter (G, H, etc.) as a suffix to the part number.

#### CAUTION

TO INSURE PROPER COUNTER-WEIGHT OPERATION DO NOT ASSEM-BLE A P/N LW-19225E, LW-19226E OR LW-19227E AT ANY DESIGNATED LOCA-TION ON THE CRANKSHAFT OF A GEAR EQUIPPED REDUCTION ENGINE. USE THESE COUNTER-DIRECT ON WEIGHTS CRANKSHAFTS ONLY. APPLICABLE COUNTERWEIGHTS THAT ARE IDEN-TIFIED WITH REVISION LETTERS D, F OR SUBSEQUENT LETTERS CAN BE USED AT ANY DESIGNATED LOCA-TION.



owner a new construction	Spacer						
Counterweight Part No.	Detail Part No.	A	B ± .002	(Lbs.) Minimum			
71904 LW-19225D	12 27	.825 .855	.425 .395	1.796 1.796 1.796			
LW-19225E	17	.875 .825	.375 .425	1.752			
71905 LW-19226D	12 27 17	.855 .875	.395 .375	1.756 1.756			
72801 LW-19227D LW-19227E*	10 28 30	.715 .740 .760	.535 .510 .490	1.846 1.846 1.846			
72534 I.W-19213	13 29	.950 .965	.300	2.246 2.246			
73643 LW-19211	15 12	.805 .825	.445 .425	2.212 2.212			
73644 LW-19210	11 30	.741 .761	.509	2.166 2.166			
73812 LW-19212	16 31	.908	.342 .327	2.266 2.266			
74901	20	.720	.530	1.470			
75636	20	.720	.530	1.600			
75637	17	.875	.375	1.678			
76044	18	.730	.520	1.810			
78988	18	.730	.520	1.600			

<sup>\*</sup> Use spacer No. 30 and .001 inch thick shim stock to achieve .490 spacer thickness when grinding the bushings in a P/N LW-19227E counterweight.

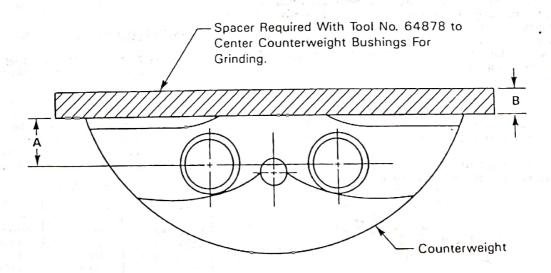


Figure 6. (Revised) Identification of Dimension "A" and "B" (From Supplement No. 2 to Service Instruction No. 1143B, included for reference purposes)

5. Assemble the new bushing on the puller and pro-



# Service Instruction

#### LYCOMING DIVISION

WILLIAMSPORT, PA. 17701

 $\langle L \rangle$ 

DATE:

May 7, 1971

Service Instruction No. 1142B (Supersedes Service Instruction No. 1142A) Engineering Aspects are FAA (DEER) Approved

SUBJECT:

MODELS AFFECTED:

Replacement of Crankshaft Counterweight Bushings

O-360-A1E6, -A1F6, -A1G6, IO-360-A1B6, -A1C6, -A1D6, -C1D6, -C1E6, LIO-360-C1E6, GO-435, GO-480, GSO-480, IGSO-480, O-540, IO-540, IGO-540, IGSO-540, TIO-541, TIGO-541 and IO-720 series engines.

TIME OF COMPLIANCE: At overhaul.

All of the above engines incorporate dynamic counterweight and roller combinations as an effective means of dampening vibrations. Each roller used to attach the counterweight is supported by three hardened steel bushings, two of which are located in the counterweight and the other in the crankshaft lug.

Wear on the steel bushings in the crankshaft counterweight lugs is confined to a localized area opposite the longitudinal centerline of the crankshaft. This wear will appear as an out-of-round condition, which can reaculy be measured.

#### CAUTION

If an engine is disassembled prior to its normal overhaul time, check the inside diameter of the counterweight bushings in the crankshaft. If any bushing is more than .0007 inch out-of-round, it must be replaced.

Also, the bushings are occasionally found to be cracked on the outside surface, a condition not visible until the bushing has been removed. Consequently, all bushings in the crankshaft lugs should be replaced during overhaul. The crankshaft may be returned to the factory for rebushing, or it may be accomplished in the following manner:

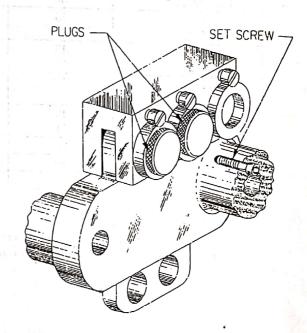
#### NOTE

For replacement of the bushings in the counterweights at overhaul, see the latest edition of Service Instruction No. 1143.

1. Assemble puller (Avco Lyc. P/N 64872, figure 1) and remove the old bushing from crankshaft lug.



Figure 1. No. 64872 Puller to Remove and Install Bushings



#### WITH PLUGS IN PLACE TIGHTEN SET SCREW

Figure 2. No. ST-280 Reaming Fixture Assembled to Crankshaft

2. Measure the hole and determine what size bushing is required by the following chart. If the hole is within standard limits, reaming the hole is not necessary. If, however, it is determined that a larger oversize bushing is required, steps 3 and 4 must be completed before installing the new bushing.

Hole Size	Nomufai Size	Reamer Size
. 9369/. 9377	Std.	None
. 9420/. 9425	P05	64874 (.005 o/s)
. 9445/. 9450	P075	ST 210 (.0075 o/s)
. 9470/. 9475	P010	64875 (.0017 o/s)
. 9495/. 9500	P0125	ST 211 (.0125 o/s)
. 9520/. 9525	P15	64875 (.015 o/s)

Page 1 of 2

3 Determine reamer needed (.005 o/s, .0075 o/s, .010 o/s, .0125 o/s or .015 o/s) and assemble the .010 o/s, .0125 o/s or .015 o/s) and assemble the reaming fixture (Avco Lyc. P/N ST-280) over the reaming fixture (Avco Lyc. P/N ST-280) over the reaming fixture (Avco Lyc. P/N ST-280) over the reaming fixture up the holes and secure the fixture by tightening the Allen head set screws. See figure 2.

#### NOTE

On fixture ST-280 select proper set of holes for crankshaft being reamed. Wide set of holes are spaced 2, 125 apart. The narrow set are spaced 1, 800 apart.

4. Assemble the reamer to be used with a universal joint drive. Remove one plug from the fixture and proceed to hand ream the hole to proper size. Following the above procedure ream the remaining hole.

#### NOTE

One location plug must be in fixture when reaming to assure proper spacing.

5. Assemble the new bushing on the puller and proceed to pull the bushing into the hole. (Reference 578, Table of Limits, Service Bulletin No. 266.)

#### CAUTION

The inside diameter of this bushing is finished at the factory and no further finishing of the bushing is necessary. Caution must be exercised when installing the bushing so that the finished ID is not damaged. Because of possible damage to the crankshaft lug. never under any circumstances remove or install these bushings by use of a drift.

6. After the bushing is installed, check its alignment with the main bearings by placing the crankshaft in vee blocks on a surface plate. Install the wedge blocks, Tool No. ST-212, in the bushing and compare parallelism of the wedge blocks with that of main journals within .002 per inch. Support the crankshaft in the vee blocks at journals adjacent to the bushing location.

### SPECIAL TOOLS REQUIRED:

Deat No.	A of a limit	Nomenclature
64875 ST-211 64876 ST-212	t di og gje ti dagewakter t gira og ggi et ræde fliget et gorg og drive	Puller - Remove and install counterweight bushings Fixture - Ream crankshaft counterweight holes Reamer005 o/s counterweight bushing holes Reamer0075 o/s counterweight bushing holes Reamer010 o/s counterweight bushing holes Reamer0125 o/s counterweight bushing holes Reamer015 o/s counterweight bushing holes Wedge blocks. paralle: - counterweight bushing
UREL:	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 against base to the annual and

#### PAI:TS REQUIRED:

BIDU.							2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Part No.	,	. y 1		j.	بايه	60 000	Nomenclature	
70256	75. 35. 35. 35. 375. 225.					Bushing	- Crankshaft counterweight Std Crankshaft counterweight .005 o/s - Crankshaft counterweight .0075 o/ - Crankshaft counterweight .010 o/s - Crankshaft counterweight .0125 o/s - Crankshaft counterweight .015 o/s - Crankshaft counterweight Std Crankshaft counterweight .005 o/s - Crankshaft counterweight .0075 o/ - Crankshaft counterweight .010 o/s - Crankshaft counterweight .015 o/s - Crankshaft counterweight .015 o/s - Crankshaft counterweight Std Crankshaft counterweight .005 o/s - Crankshaft counterweight .005 o/s - Crankshaft counterweight .010 o/s - Crankshaft counterweight .010 o/s - Crankshaft counterweight .015 o/s	s s s
						1101 0		

See applicable parts catalog for correct bushing part number for installation in particular crankshafts.

NOTE: Revision "B" adds model TIGO-541; additional fixture plug and removes 64873 fixture.

12179, 13623. OS-5084 - These numbers for Avco Lycoming reference only.

Page 2 of 2

# TEXTRON Lycoming

Williamsport Plant
Textron Lycoming/Subsidiary of Textron Inc.
652 Oliver Street
Williamsport, PA 17701 U.S.A.



DATE:

April 11, 1988

Service Instruction No. 1143B (Supersedes Service Instruction No. 1143A) Engineering Aspects are FAA Approved

SUBJECT:

PART I - Counterweight Bushing Tooling Update.

PART II - Counterweight Bushing Replacement.

MODELS AFFECTED:

All Textron Lycoming piston aircraft engines with dynamic

counterweights employing 3/4 inch I.D. bushings.

TIME OF COMPLIANCE:

During engine overhaul.

Dynamic counterweights are installed on piston engine crankshafts to eliminate vibrations that are caused by torsional frequency changes that occur at different engine speeds and operating conditions. The counterweight is mounted on the crankshaft with two steel rollers that allow the counterweight to move as required to maintain crankshaft balance. Both the counterweight supporting lug of the crankshaft and the counterweight contain hardened steel bushings that are ground to a very smooth and annular finish. If any of these bushings become damaged or worn out of round, the counterweight will become ineffective and cause vibrations that will lead to severe engine damage or failure.

The procedure for inspecting and replacing the hardened steel bushings in a crankshaft is described in the latest revision of Service Instruction No. 1142. This publication describes the procedures and tooling required to inspect and replace the steel bushings installed in a counterweight assembly.

A recent change in counterweight manufacturing

procedures has affected the finished dimensions of some of the counterweights that were included in previous editions of this publication. This change in the finished dimensions of the counterweight requires changes in some of the special counterweight bushing tooling listed in the special tools section of this publication. Textron Lycoming Service Letter No. L217 briefly describes these tooling changes and offers update kits on a limited time special price basis. This publication will completely describe the tooling changes and include the necessary illustrations and dimensions of the detail parts required to update each tool.

To control the inventory of new and superseded counterweights, all counterweights that are machined to the new specifications have been issued new part numbers. The table with Figure 6 of this publication matches new counterweight part numbers with the respective superseded counterweight part number. All new counterweights are completely interchangeable with the respective superseded counterweight.



age 2 of 10

# PART I. COUNTERWEIGHT BUSHING TOOLING UPDATE

Spacers are used with the P/N 64878 fixture to align the bushing bore of the counterweight with the center of the fixture. The "A" dimension from Figure 6 which is the distance from the center line of the counterweight bushing bore to the flat edge of the counterweight determines the thickness of the spacer. As can be seen in the table with Figure 6, the counterweights that are machined to the new specifications do not have the same "A" dimension as the counterweights that they replace. Owners of P/N 64878 fixtures who do not wish to purchase the P/N 64878-50 update kit can make the spacers required to align these new counterweights from hardened and ground steel using the dimensions

shown in Figure 1. Stamp or vibra-peen each spacer with the correct part number on a surface that will not interfere with counterweight alignment.

A new set-master is required for the P/N ST-94 gaging fixture. Figure 2 illustrates the new set master and finish grinding dimensions. Stamp or vibra-peen the step height dimension, on each step, as shown in Figure 2. This dimension is the distance from the center line of the set master to the surface of the step which can be matched with an "A" dimension in the table with Figure 6. This tool is made from oil hardened tool steel and ground to the finish dimensions.

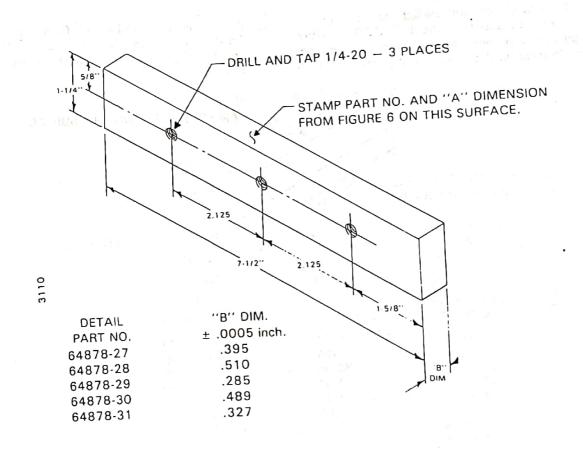


Figure 1. Dimensions of New Spacers for P/N 64878 Fixture

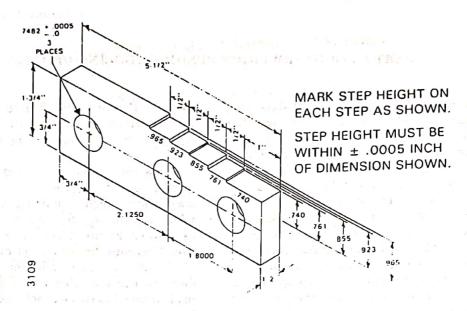


Figure 2. Dimensions of New Set Master P/N ST-94-10

To insure the counterweight is properly and squarely mounted to the P/N ST-91, fixture spacers have been added. These spacers are made from hardened steel and ground to finish

dimensions. Refer to Figure 3 for part numbers, finished dimensions, and application of these spacers. Figures 9 and 10 illustrate use of the spacers.

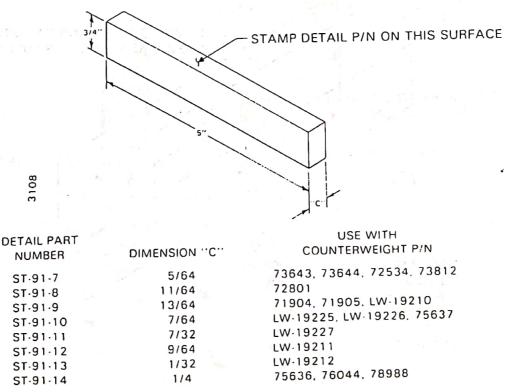


Figure 3. Dimensions of New Spacers for ST-91 Gage

#### PART II. COUNTERWEIGHT BUSHING REPLACEMENT

The procedure for replacing counterweight bushings is as follows:

- 1. Counterweight Bushing Inspection Wear in the counterweight bushings is usually evident as out-of-round on the inside diameter. Check each bushing with the P/N ST-73 bore gage. The diameter should be between 0.7485 and 0.7505 inch and the out-of-round should not exceed 0.0005 inch. The P/N ST-73 gage can be set with a micrometer. If the diameter of any bushing is oversize or out-of-round all of the bushings in the counterweight must be replaced.
- 2. Counterweight Bushing Removal The bushings can be pressed from the counterweight with an arbor press and special driver P/N ST-92. Refer to Figure 4. Insure the counterweight lays flat

- and square with the arbor press spindle. Press both bushings from one side of the counterweight, turn the counterweight over and press out the remaining two bushings.
- 3. Counterweight Bushing Bore Inspection -Visually examine the bushing bore. The bore must be smooth and free of scratches, tool marks, galling or other surface damage. Any evidence of damage is reason to scrap the counterweight. Measure the bushing bore diameter; bushing bores will be found to be either .9369/.9377 or .9384/.9392. Counterweights having the larger diameter bore are marked with the letter "B" near each bore. Refer to the "Parts Required" section of this publication. Using the magnetic particle method check the counterweight for cracks. Any indication of cracks is reason to reject the counterweight.

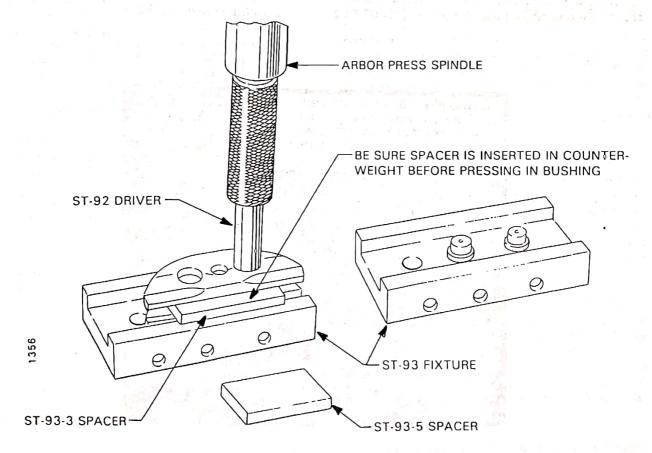


Figure 4. Installing Counterweight Bushing Using Fixture ST-93 and Driver ST-92

#### CAUTION

It is not permissible under any cumstance to attempt to enlarge the bushing bore in a counterweight. Eventual engine damage will result from any operation that will reduce the snap ring groove depth in the counterweight bushing bores.

4. Counterweight Bushing Installation -

#### CAUTION

The spacers provided with fixture P/N ST-93 are used to control the depth that the bushings are driven into the counterweight. The bushing must be flush to .002 inch from protruding into the slot of the counterweight.

Measure the center to center distance of the bushing bore in the counterweight. Select the two holes in the P/N ST-93 fixture that correspond with this measurement and install the two P/N ST-93-2

locating pins in these holes. Refer to Figure 4. Install the correct spacer either ST-93-3 or ST-93-5 in the counterweight and position it on the P/N ST-93 fixture with the P/N ST-93-2 pins located in the bushing bores. Using an arbor press and the P/N ST-92 driver press the new bushings in place. Turn the counterweight over and install new bushings in the opposite side of the counterweight in the same manner.

5. Finish grinding of the counterweight bushing I.D. - grinding the inside diameter of the new bushing to the correct size and surface finish is the most important step in the rebushing procedure. Do not attempt to substitute any other process for the one herein described.

#### NOTE

The fixture P/N 64878 is sold without any mounting or locating holes drilled in its base. This allows the fixture to be mounted on any suitable machine without interference from pre-drilled holes.

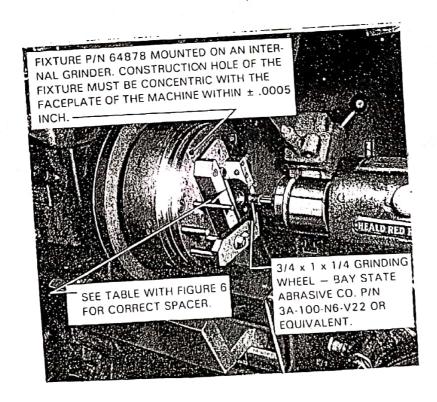


Figure 5. Counterweight and 64878 Fixture Assembled on an Internal Grinding Machine

Page 5 of 10

A. Secure the P/N 64878 fixture on the faceplate of an internal grinding machine. Insure the 1-1/8 inch diameter construction hole in the center of the fixture is concentric with the center of the faceplate. Concentricity must be held to within ± .0005 inch total indicated reading. Refer to Figure 5.

#### NOTE

In the following table the new superseding counterweight part number is listed in the same block with the part number of the counterweight that it replaces. The new number is the lower number in each block.

B. Select and install the correct spacer on the fixture and secure it to the alignment bar of the fixture with the three 1/4-20 socket head screws. The detail part number is stamped on the spacer. Refer to the table with Figure 6 for the correct spacer to use with each counterweight.

Counterweight	Spacer Detail	Dim	ensions	Weight (Lbs.)	
Part No.	Part No.	Α .	B ± .002	Minimum	
71904 LW-19225	12 27	.825 .855	.425 .395	1.796 1.796	
71905 LW-19226	12 27	.825 .855	.425 .395	1.752 1.756	
72801 LW-19227	10 28	.715 .740	:.535 .510	1.846 1.846	
72534 LW-19213	13 29	.950 .965	.300 .285	2.246 2.246	
73643 LW-19211	15 12	.805 .825	.445 .425	2.212 2.212	
73644 LW-19210	11	.741 .761	.509 .489	2.166 2.166	
73812 LW-19212	16 31	.908 .923	.342	2.266 2.266	
74901	20	.720	.530	1.470	
75636	20	.720	.530	1.600	
75637	17	.875	.375	1.678	
76044	18	.730	.520	1.810	
78988	18	.730	.520	1.600	

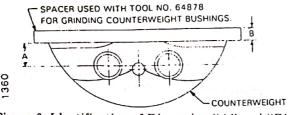


Figure 6. Identification of Dimension "A" and "B"

#### NOTE

Locating pin P/N 64878-2 is used to align the counterweight through an unfinished bushing. P/N 64878-6 locating pin is larger and is used to align the fixture through bushings that have been ground to size. These locating pins are off-set to accommodate the two different center to center bushing bore distances that will be found on counterweights.

C. Install and rotate the smaller pin P/N 64878-2 to the position required to place one set of bushings on the center line of the fixture. Lock the locating pin in this position by tightening the 10-32 socket head screw that secures the P/N 64878-23 locating clamp.

D. Install the counterweight on the fixture as shown in Figure 5. Insure the counterweight and fixture mating surfaces are clean. Tighten the applicable knurled head screw to secure the counterweight against the spacer. If the threaded end of the screw attempts to enter the slot in the counterweight, install the metal block P/N 64878-21 on the end of the screw. Adjust the fibre block of the hold down clamp over the center of the counterweight and tighten the socket head screw to secure the counterweight to the fixture.

E. Grind the inside diameter of both bushings to 0.7485/0.7505 inch diameter. Surface finish of the finished bushing must be 15 micro inches. The 3/4 x 1 x 1/4 grinding wheel shown in Figure 5 is satisfactory for this purpose. It can be purchased from Bay. State Division, Dresser Industries Inc., 12 Union Street, Westboro, Mass. 01581. Order P/N 3A-100-N6-V22.

F. Remove the counterweight from the fixture and remove the small locating pin P/N 64878-2. Install the larger locating pin P/N 64878-6 in the opposite hole. Rotate the pin to align the unground bushings with the center line of the fixture. Secure the pin and counterweight as described in steps C and D. Proceed to grind the remaining bushing as described in step E.

6. Inspection of Finished Counterweight Bushings —

A. Inspect the newly ground counterweight bushings using the magnetic particle method to determine if grinding cracks are present in the finished bushing. Replace any bushings that are found to be cracked.

B. Fixture P/N ST-94 is used to check the finished bushing bores for correct location. To set up the fixture, install the P/N ST-94-2 relieved locating pin in the center hole with the locating diameters in the vertical position as shown in Figure 7. Install the P/N ST-94-3 solid locating pin in the outside hole that has the same center to center distance as the counterweight bushing bores. The P/N ST-94-2 pin can remain permanently installed in the center hole with the P/N ST-94-3 being moved as required to adapt to the counterweight being inspected. If the pins do not fit into the newly ground bushing, it may be concluded that the bores are mislocated and the bushings must be replaced and reground again. If the counterweight fits, proceed to step C.

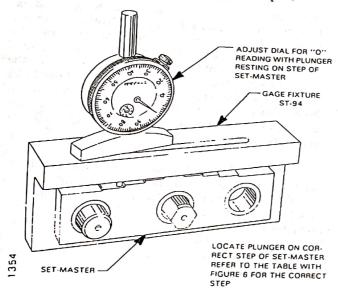


Figure 7. Depth Gage Adjusted with Set-Master Preparatory to Checking Line Position of Counterweight Bushings

C. Also check the distance from the center of the bushing bore to the flat edge of the counterweight with the fixture P/N ST-94 and either P/N ST-94-5 or ST-94-10 set-master in the following manner. Place the set-master over the locating pins of the fixture (refer to Figure 7), preload the depth gage approximately .010 inch, set the dial gage to "0" with the plunger resting on the appropriate step of the set-master. The steps are identified by the "A" dimensions from the table with Figure 6. Remove the set-master and install the counterweight over the pins. Set the depth indicator thru the fixture and onto the counterweight. Refer to Figure 8. No more than ± .004 inch difference between this measurement and the measurement obtained with the set-master is allowed.

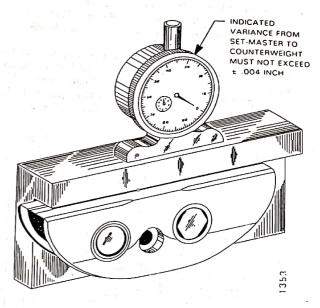


Figure 8. Checking Center Line Position of Counterweight Using Gage Fixture ST-94

#### NOTE

During the following step (D) if erratic or excessively "out of limits" measurements are observed, remove the counterweight and insert it on the P/N ST-91 fixture so that the opposite inner face of the counterweight is located against the fixture. Then repeat the measurements. Only one of the inner faces of the counterweight is square with the bushing bores.

Service Instruction No. 1143B

D. Select the proper spacer either P/N ST-91-7, ST-91-8, ST-91-9, ST-91-10, ST-91-11, ST-91-12, ST-91-13, or ST-91-14 and install it and the counterweight on the fixture. Refer to Figure 3 for spacer application. Press the counterweight squarely against the spacer and tighten the knurled screw to secure the counterweight firmly against the locating surface of the fixture. Install the gaging arbors P/N ST-91-3 through each of the finished bushings as illustrated in Figure 6. Place the fixture on a surface plate and indicate both ends of each arbor as illustrated in Figure 9. Turn the fixture over to rest on its adjacent side and again indicate both ends of the gaging arbors. See Figure 10. The difference in measurements from one end of the gaging arbor to the other must not exceed .003 inch per inch in any instance.

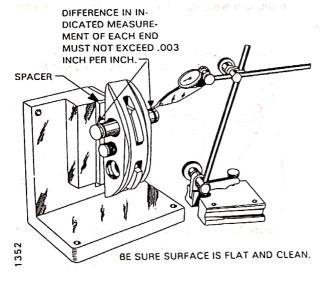


Figure 9. Checking Parallel and Squareness of Counterweight Bushings with Gage Fixture ST-91 — Vertical Position

7. Counterweight Balance Procedure - The center of gravity of the counterweight is located at the center of the 1/4 inch or 3/8 inch diameter drilled hole that is located between the bushing bores. The balance of the counterweight in relation to its center of gravity is quite important and may have been changed when the new bushings were installed. Check the balance of the counterweight in the following manner.

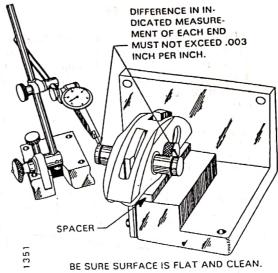


Figure 10. Checking Parallel and Squareness of Counterweight Bushings with Gage Fixture ST-91 — Horizontal Position

A. Install the counterweight on the correct P/N ST-96 balancing arbor, either the P/N ST-96-1 for the 3/8 inch hole or P/N ST-96-2 for the 1/4 inch hole, and place the arbor on a pair of balancing ways. Insure each blade of the ways engages the arbor at a point not more than 1-1/2" from each end.

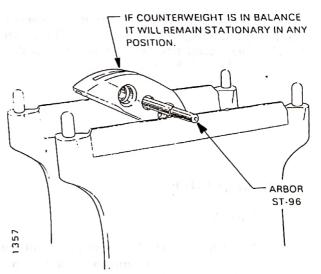


Figure 11. Counterweight Mounted on ST-96 Arbor for Balancing

#### NOTE

The center of both of the P/N ST-96 arbors is tapered to compensate for slight variations in the diameter of the hole. The first 1-1/2 inches of each end of the arbor is carefully ground to insure concentric diameters.

BALANCE MUST BE ACHIEVED BY
PLACING WEIGHT NOT MORE
THAN 1 INCH FROM CENTER OF
COUNTERWEIGHT
ST-95
WEIGHT

Figure 12. Counterweight Balanced by Weight ST-95 Placed Within One Inch from Center

B. If the counterweight is in perfect balance it will remain in any position it is placed. See Figure 11. If it has a tendency to move, try to keep it in

balance by placing the center of the P/N ST-95 weight not more than 1" from the center of the arbor. See Figure 12. If the counterweight can be brought into balance with the addition of this weight the balance can be considered satisfactory.

- C. If the counterweight cannot be brought into balance by the addition of the P/N ST-95 weight, carefully grind the heavy end at the locations shown in Figure 13.
- 8. Counterweight Weight Limitations A weight check is not necessary unless the counterweight has been ground to correct an improper balance condition. If the counterweight has been ground it must meet the minimum weight requirements shown in the table with Figure 6. Do not install any counterweight weighing less than the minimum weight, listed in the table, in any engine.

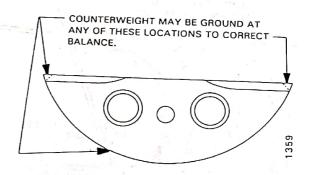


Figure 13. Location of Areas on Counterweight for Grinding

### PARTS REQUIRED:

Part No.

Nomenclature

71903-A

Bushing, dynamic counterweight

(Identification letter "A" .9395/.9390 OD)

71903-B

Bushing, dynamic counterweight

(Identification letter "B" .9410/.9405 OD)

### SPECIAL TOOLS REQUIRED:

Tool No.	Nomenclature
ST-73	Dial bore gage (measure .7485/.7505 inside diameter of bushing)
ST-91	Squareness gage (check parallel and squareness of finished bushing bores)
ST-92	Driver (remove and install bushings)
ST-93	Assembly fixture (install bushings in counterweight)
ST-94	Location Gage (check hole location after grinding)
ST-95	Weight, balance (.004 pound - check balance of counterweight after rebushing)
ST-96	Balancing arbor (check balance of counterweight after rebushing)
64878	Grinding fixture (hold counterweight during bushing grinding)

NOTE: Revision "B" changes text, adds tooling update, adds new counterweight part numbers.

22254, 22734, 22734-A, 22734-B — These numbers for Textron Lycoming reference only.

# INSTRON Lycoming

Reciprocating Engine Division/ Subsidiary of Textron Inc. 652 Oliver Street Williamsport, PA 17701 U.S.A.

# SERVICE INSTRUCTION

May 28, 1992

Supplement No. 2

for

Service Instruction No. 1143B

This publication replaces Supplement No. 1 for Service Instruction No. 1143B in its entirety. Remove and discard Supplement No. 1.

A recent revision to P/N's LW-19225, LW-19226 and LW-19227 counterweight assemblies changes the distance from the centerline of the counterweight bushing bore to the flat edge of the counterweight on applicable counterweights that are identified with the letter "E", as a suffix to the counterweight part number. (Refer to Dimension "A", in the revised Figure 6, included with this Supplement.) Applicable counterweights that were placed in service, prior to distribution of this Supplement, that are not identified with a letter suffix in the part number will have to be measured to determine the "A" dimension. After the "A" dimension has been determined, vibropeen the correct identification letter on the counterweight as a suffix to the part number.

Although applicable counterweights that are identified with the letter "E" suffix in the part number, fit and perform perfectly on the lobes of crankshafts installed in direct drive engines it is impossible to assemble them on crankshafts that are installed in reduction gear equipped engines. For this reason production of counterweights with the relocated bushing bores has been discontinued and all applicable counterweights will be manufactured to the original "A" dimension which

is listed with the part number that contains the "D" suffix in the revised Figure 6. New counterweights that are manufactured to the original "A" dimension will be identified with the letter "F" or a subsequent letter (G, H, etc.) as a suffix to the part number.

#### CAUTION

TO INSURE PROPER COUNTER-WEIGHT OPERATION DO NOT ASSEM-BLE A P/N LW-19225E, LW-19226E OR LW-19227E AT ANY DESIGNATED LOCA-TION ON THE CRANKSHAFT OF A REDUCTION GEAR EQUIPPED ENGINE. USE THESE COUNTER-WEIGHTS ON DIRECT DRIVE CRANKSHAFTS ONLY. APPLICABLE COUNTERWEIGHTS THAT ARE IDEN-TIFIED WITH REVISION LETTERS D, F OR SUBSEQUENT LETTERS CAN BE USED AT ANY DESIGNATED LOCA-TION. REFER TO THE LATEST REVI-SION TO SERVICE INSTRUCTION NO. 1012 FOR COUNTERWEIGHT APPLICATION.



Counterweight	Spacer Detail	Dimensions		Weight	
Part No.	Part No.	A	B ± .002	(Lbs.) Minimum	
71904	12	.825	.425	1.796	
LW-19225D	27	.855	.395	1.796	
LW-19225E	17	.875	.375	1.796	
71905	12	.825	.425	1.752	
LW-19226D	27	.855	.395	1.756	
LW-19226E	17	.875	.375	1.756	
72801	10	.715	.535	1.846	
LW-19227D	28	.740	.510	1.846	
LW-19227E*	30	.760	.490	1.846	
72534	13	.950	.300	2.246	
LW-19213	29		.285	2.246	
73643	15	.805	.445	2.212	
LW-19211	12	.825	.425	2.212	
73644	11	.741	.509	2.166	
LW-19210	30	.761		2.166	
73812	16	.908	.342	2.266	
LW-19212	31	.923	.327	2.266	
74901	20	.720	.530	1.470	
75636 75637	20	.720	.530	1.600	
76044	17	.875	.375	1.678	
78988	18 18	.730 .730	.520	1.810 1.600	

<sup>\*</sup> Use spacer No. 30 and .001 inch thick shim stock to achieve .490 spacer thickness when grinding the bushings in a P/N LW-19227E counterweight.

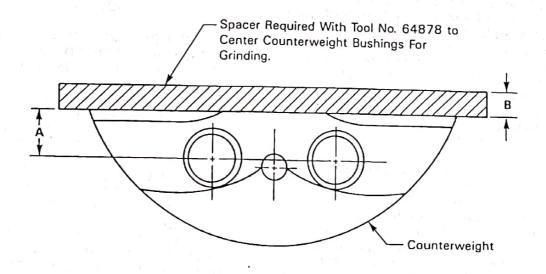


Figure 6. (Revised) Identification of Dimension "A" and "B"

#### TOOL DATA:

There is no change to the tooling update kits offered in Service Letter No. L217; however, as can be seen by the dimensional changes listed in the revised Figure 6, different tools and set-up procedures are required with counterweights that are identified with the letter "E" as a suffix to the part number.

#### These changes are:

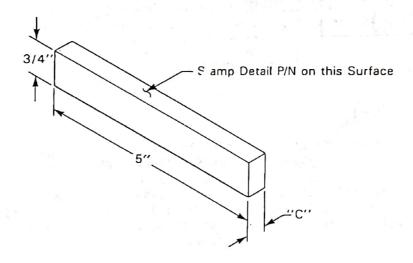
1. Use spacers as listed in the revised Figure 6.

#### NOTE

Use .001 inch thick shim stock between the P/N 64878 fixture and the P/N 64878-30

spacer to align the P/N LW-19227E counterweight.

- 2. When checking the distance from the centerline of the bushing bore to the flat edge of the P/N LW-19227E counterweight with the P/N ST-94 fixture, use the .0761 step of the P/N ST-94-10 set master, set the preloaded dial indicator to + .001 inch to compensate for the .001 difference between the counterweight measurement and the set master.
- 3. Figure 3 is revised and included with this Supplement, to show spacer application for the revised counterweights. Figure 3A is added to illustrate an undercut to the P/N ST-91-6 knurled screw. This undercut is required to allow use of existing spacers with the revised counterweights.



DETAIL PART			USE WITH	
NUMBER	DIMENS	SION "C"	COUNTERWEIGHT	P/N
ST-91-7	5	/ <sub>64</sub>	73643, 73644, 72534, 738	312
ST-91-8		1/64	72801, LW-19225E, LW-19	
ST-91-9	13	3/64	71904, 71905, LW-19210	
ST-91-10	7,	/64	LW-19225D, LW-19226D,	75637
ST-91-11	7,	/32	LW-19227D	
ST-91-12	9,	/ <sub>64</sub>	LW-19211, LW-19227E	
ST-91-13		/32	LW-19212	
ST-91-14	1	14	75636, 76044, 78988	

Figure 3. (Revised) Dimensions of New Spacers for ST-91 Gage

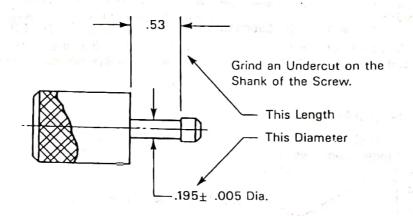


Figure 3A. Modifications to P/N ST-91-6 Knurled Screw

22971, 22971-A — These numbers for Textron Lycoming reference only.

#### United States of America

### Department of Transportation—Lederal Aviation Administration

# Supplemental Type Certificate

Number SE3552NM

This certificate, issued to

Johnston Aircraft Service, Inc.

cortifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 13 of the Civil Air Regulations, effective June 15, 1956, as amended by 13-1 and 13-2.

Original Product - Type Cortificator Number: E-295

Make: Lycoming

Model: 0-540-A1A, -A1A5, -A1B5, -A1C5, -A1D5

he Design Change: Modification of crankshaft damper configuration in accordance with FAA sealed Johnston Aircraft Service, Inc. Report CPR-2 "NC" dated December 10, 1986, or later FAA approved revision.

Limitations and Conditions: The approval of this change in the design applies to the basic engine of the specified models that are otherwise unmodified. This approval should not be extended to other specific engines of these models on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that engine.

is for approval shall remain in effect until sur-This certificate and the supporting data which is the Yo is otherwise established by the Administrator of the rendered, suspended, revoked, or a to

Federal Aviation Administration

Date of application: November 25

Date reissued:

Date of issuance: December 10, 1986

Date amended:

By direction of the Adjorgnistrat Manager, Western Aircraf

Certification Office

(Tille)

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

This certificate may be transferred in accordance with FAR 21 47

# **TEXTRON** Lycoming

652 Oliver Street Williamsport, PA 17701 U.S.A. 717/323-6181

# SERVICE LETTER

Service Letter No. L235A (Supersedes Service Letter No. L235) June 29, 1998

TO:

All Owners and Operators of Textron Lycoming O-540-A1A5, -A1B5,

-A1C5, -A1D5 and IO-540-C1B5 model engines.

SUBJECT:

Installation of Hartzell Compact Aluminum Hub Propeller on Comanche 250

Aircraft.

Textron Lycoming has been notified that some owners of the Comanche 250 aircraft would like to install the Hartzell compact aluminum hub propeller. This propeller is only compatible with the following crankshaft counterweight and roller configuration.

Counterweight No. 5 Roller

72801 or LW-19227

No. 5 Roller No. 6 Roller 72965 72797

The engine models which incorporate this counterweight system are the O-540-A4A5, -A4B5, -A4C5, -A4D5 and IO-540-C4B5 model engines.



JOHNSTON AIRCRAFT SERVICE, INC. P.O. BOX 1457 TULARE, CALIFORNIA 93275

JOHNSTON AIRCRAFT SERVICE, INC. REPORT CPR-2

#### ENTITLED

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weights, discussionerly limits to trackshaft therefore to the service of the discussion and the service the discussion and the service that the service that the service the service that the service that the service the service that the service

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Technical Details for Changing the Lycoming 0-540 A1A, A1A5, A1B5, A1C5, A1D5 and Lycoming 10-540 C1B5 to be eligible for the Hartzell Compact Propeller, HC-C2YK-1BF/F8477D-5R.

F.A.A. APPROVED PER S.T.C. NO. SE 3552NM

Date: DEC 1 0 1986

Page 1 of 6 Pages

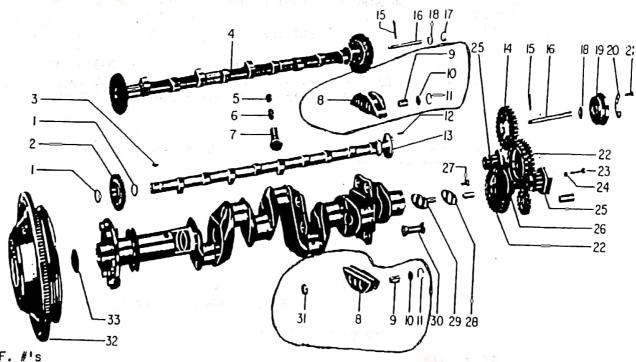
#### CYLINDER REMOVAL

- Remove Left Rear (#6) Cylinder and Piston Assembly from Engine using 1. instructions contained in Lycoming Overhaul Manual for Direct Drive Engines, P/N 60294-7. Leave the Piston and Rings inside the Cylinder with only enough Piston showing for access to the Piston Pin.
- You now have access to the Counterweights through the  $\emph{#}$  6 Cylinder hole 2. in the Crankcase.

#### COUNTERWEIGHT REMOVAL

- 1. Remove the two (2) Lycoming Counterweights, P/N 71904, and (2) rollers, P/N 70416 and (2) P/N 72022, merely by removing the retaining rings, ref. 11, after which the Washers, ref. 10, Rollers, ref. 9, and Counterweights, ref. 8, may be detached from the Crankshaft Lug.
- 2. After removing 71904 Counterweights and prior to installing 72801 Counterweights, dimensionally check bushings in Crankshaft Counterweight Cheeks. Any bushings not meeting New Lycoming specifications must be replaced per latest version of Lycoming Service Instruction 1142.

Use Figure 1 (Typical Crankshaft and Related Parts) as shown below to aid in Counterweight Removal and Installation.



REF. #'s

- 1. Retaining Rings
- 2. Camshalt Gov. Drive Gear
- 3. Woodruff Key
- 4. Camshaft (Integral Gear)
- 5. Tappet Socket
- 6. Tappet Plunger Assy.
- 7. Tappet Boxly
- 8. Counterweight
- 9. Roller
- 10. Washer
- 11. Retaining Ring

- 12. Stepped Dowel
- 13. Canishaft
- 14. Camshaft Gear
- 15. Pin
- 16. Tachometer Shaft
- 17. Retaining Ring
- 18. Spacer
- 19. Breather Slinger
- 20. Lockplate
- 21. Hex Head Screw
- 22. Crankshaft Idler Gears

- 23. Screw
- 24. Washer
- 25. Magneto Drive Gear
- 26. Crankshaft Gear
- 27. Hex Head Screw
- 28. Lockplate
- 29. Idler Cear Shaft
- 30. Sludge Tube (not used on current models)
- 31. Crankshaft Counterweight Bushing
- 32. Ring Gear Support Assy.
- 33. Expansion Plug

## COUNTERWEIGHT INSTALLATION

1. Per Lycoming Service Instruction 1012 (Latest Version), install New 71907 Washers, ref. 10, and New LW14820 (71906) Retaining Rings, ref. 11, on one side of New Style Rebuilt or New Counterweight Assembly, P/N 72801, ref. 8, and place the Counterweight on its proper lug on the Crankshaft per Figure 4 Service Instruction 1012 (latest version). Insert (2) New Rollers, P/N 72797, ref. 9, and secure assembly by installing New 71907 Washers and LW 14820 (71906) Circlips on the other side of the Counterweight. All the Bushings, P/N 71903, in the Counterweights must be New and Finished per Lycoming Service Instruction 1143 (latest version). Circlips are inserted with sharp edge outward (see Figure 2). Two gages will check all circlips in any Avco Lycoming Counterweight.

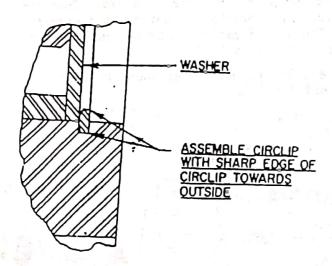


Figure 2
Assembly of Circlips in Counterweight

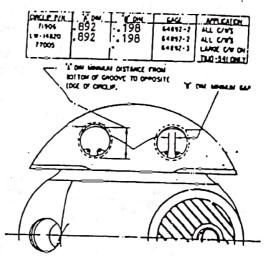


Figure . 3
Diagram of Assembled Countervelght
Showing Dimensions for Checking Circlip

#### CAUTION

Be sure the correct rollers are installed in identical pairs only. Under no circumstances are two different rollers to be installed on any one Counterweight installation. Check roller part number CAREFULLY.

Insert one end of the Counterweight Retaining Gap Gage, Avco Lycoming P/N 64892-2 or -3 between the ends of the Counterweight Retaining Ring; see Figure 3 for gap dimensions and gage selection. Be sure the gage is resting on the bottom of the groove. The gage must pass between the ends of the Retaining Ring and when rocked back and forth, must clear the inside edge of the top of the Retaining Rings. If the gage does not pass freely between the ends and under the top of the ring, the ring is not properly seated. Be sure all rings are properly

# COUNTERWEIGHT INSTALLATION CONTINUED.

A recent revision to Lycoming Part Number 64892 gage set eliminated the 64892-1 gage from the set. The 64892-2 that is to be used for checking both the 71906 and LW14820 Circlins, must be both the 71906 and LW14820 Circlips, must be modified to the specifications listed in the table section of figure 3 or a new gauge set can be purchased through Avco Lycoming Williamsport Division.

# SPECIAL TOOLS REQUIRED.

Avco Lycoming Part Number 64892 Gauge Set, now consists of:

> 64892-2 Gauge 64892-3 Gauge

Repeat the same procedures with the second New Style Counterweight, Part Number 72801, but use two (2) New Rollers, Part Number 72965,

#### CIRCLIP IDENTIFICATION

FREE DIA.	HOLE SIZE	STAMPED MARK	P/N
1.056	.072/.060	93	71906
1.056	£93/.076	NA	LW-14820
1.344	.090/076	N/A	77005

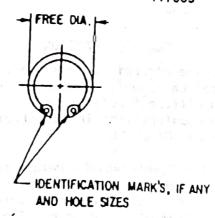


Figure 4 Circlip Identification

Page 4 of 6 Pages

# COUNTERWEIGHT INSTALLATION

Per Lycoming Service instruction 1012 (Latest Version), install New 71907 Washers, ref. 10, and New LW14820 (71906) Retaining Rings, ref. 11, on one side of New Style Rebuilt or New Counterweight Assembly, P/N 72801, ref. 8, and place the Counterweight on its proper lug on the Crankshaft per Figure 4 Service Instruction 1012 (latest version). Insert 71907 Washers and LW 14820 (71906) Circlips on the other side of the Counterweight. All the Bushings, P/N 71903, in the Counterweights must Circlips are inserted with sharp edge outward (see Figure 2). Two gages will check all circlips in any Avco Lycoming Counterweight.

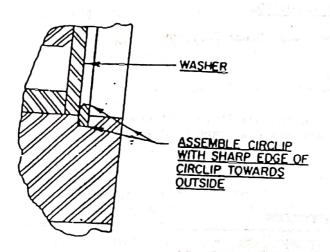


Figure 2
Assembly of Circlips in Counterweight

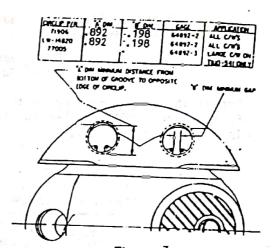


Figure 3
Diagram of Assembled Counterweight
Showing Dimensions for Checking Circlip

#### CAUTION

Be sure the correct rollers are installed in identical pairs only. Under no circumstances are two different rollers to be installed on any one Counterweight installation. Check roller part number CAREFULLY.

Insert one end of the Counterweight Retaining Gap Gage, Avco Lycoming P/N 64892-2 or -3 between the ends of the Counterweight Retaining Ring; see Figure 3 for gap dimensions and gage selection. Be sure the gage is resting on the bottom of the groove. The gage must pass between the ends of the Retaining Ring and when rocked back and forth, must clear the inside edge of the top of the Retaining Rings. If the gage does not pass freely between the ends and under the top of the ring, the ring is not properly seated. Be sure all rings are properly seated.

Page 3 of 6 Pages

### COUNTERWEIGHT INSTALLATION CONTINUED.

#### NOTE:

A recent revision to Lycoming Part Number 64892 gage set eliminated the 64892-1 gage from the set. The 64892-2 that is to be used for checking both the 71906 and LW14820 Circlips, must be modified to the specifications listed in the table section of figure 3 or a new gauge set can be purchased through Avco Lycoming Williamsport Division.

#### SPECIAL TOOLS REQUIRED.

Avco Lycoming Part Number 64892 Gauge Set, now consists of:

64892-2 Gauge 64892-3 Gauge

Repeat the same procedures with the second New Style Counterweight, Part Number 72801, but use two (2) New Rollers, Part Number 72965, in the second assembly.

#### CIRCLIP IDENTIFICATION

FREE DIA.	HOLE SIZE	STAMPED MARK	P/N 71906 LW-14820	
1.056	.072/.060	93		
1.056	.093/.076	N/A		
1,344	.090/076	N/A	77005	

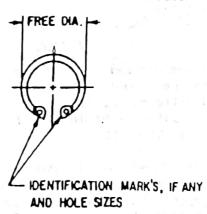


Figure 4 Circlip Identification

Page 4 of 6 Pages

#### CYLINDER INSTALLATION

- 1. Re-install # 6 Cylinder and Piston Assembly on its pad using a New Cylinder Base Seal. Initially tighten \( \frac{1}{2} \) inch cylinder hold-down nuts, to a torque of 300 in. Ib (25 ft. Ib.) in the sequence shown in Figure 5. On engines with cylinder hold-down plates, follow instructions in figure 6.
- 2. Install 3/8 inch nuts on the remaining cylinder base studs and torque to 300 in. !bs. (25ft.lbs). The sequence for tightening these nuts is optional.
- 3. Using the same sequence as described in paragraphs 1 and 2, and shown in figure 5, check all  $\frac{1}{2}$  inch nuts for tightness by bringing torque to 600 in.1b (50ft.1b). Be sure shims are removed before final torquing engines using cylinder hold-down plates.
- 4. Check 3/8 inch nuts for tightness on the remaining cylinder base studs by bringing torque up to 300 in.lb (25ft.lb). Sequence is optional.
- 5. After all cylinder base nuts have been tightened, remove any nicks in cylinder fins by de-burring or filing.
- 6. After tightening cylinder base nuts, install the remaining cylinder parts in the opposite sequence you removed them. Use all new gaskets and seals during assembly. Be sure to collapse Lifter Plungers and check for proper dry clearance of .028 to .080 between Rocker Arms and Valves with Piston at Top Dead Center on compression stroke. If your engine WAS performing normally and you cannot obtain proper Valve clearance then re-check your cylinder installation for problems ( refer to Lycoming Direct Drive Overhaul Manual, P/N 60294-7)

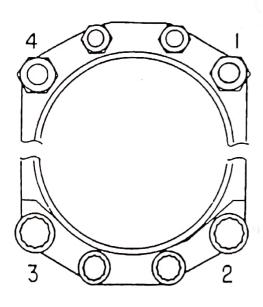


Figure 5 Sequence for Tightening Cylinder Basenuts

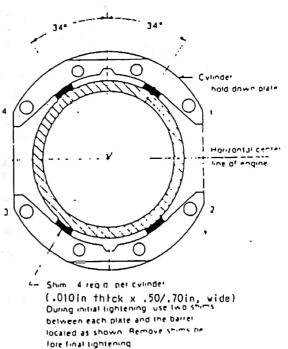


Figure 6. Location of Shims Between Cylinder Barrel and Hold-Down Plates

JOHNSTON AIRCRAFT SERVICE, INC. REPORT CPR-2

# COUNTERWEIGHT INSTALLATION CONTINUED.

#### NOTE:

A recent revision to Lycoming Part Number 64892 gage set eliminated the 64892-1 gage from the set. The 64892-2 that is to be used for checking both the 71906 and LW14820 Circlips, must be modified to the specifications listed in the table section of figure 3 or a new gauge set can be purchased through Avco Lycoming Williamsport Division.

#### SPECIAL TOOLS REQUIRED.

Avco Lycoming Part Number 64892 Gauge Set, now consists of:

64892-2 Gauge 64892-3 Gauge

Repeat the same procedures with the second New Style Counterweight, Part Number 72801, but use two (2) New Rollers, Part Number 72965, in the second assembly.

#### CIRCLIP IDENTIFICATION

FREE DIA.	HOLE SIZE	STAMPED MARK	P/N
1.056	.072/.060	_ 93	71906
1.056	D93/.076	NA	LW-14820
1,344	.090/076	N/A	77005



Figure 4 Circlip Identification

#### JOHNSTON AIRCRAFT SERVICE, INC. REPORT CPR-Z

- 1. All the Engines listed for this Modification now have the same rotational dampening system as the Lycoming 0-540 E4A5 and 10-540 D4A5, both rated at 260 H.P. at 2700 R.P.M., per current Lycoming Parts Manuals, PC-115 and 215, and current Lycoming Certified Aircraft Engine Manual SSP 283.
- 2. One other determinging factor is the Camshaft. Any Engine equipped with early Camshaft, Part Number 71642, is not eligible for the H.P. or R.P.M. increase.
- 3. All Engines changed by this modification shall have (M) followed by the S.T.C. number marked on the Engine Data Plate following the Engine Model designation.
- 4. Johnston Aircraft Service, Inc. has Rebuilt and New Counterweight Modification Kits available for sale.

#### REFERENCE MATERIAL

Lycoming Service Instruction 1012 (Latest Version)
Lycoming Service Instruction 1142 (Latest Version)
Lycoming Service Instruction 1143 (Latest Version)
Lycoming Direct Drive Overhaul Manual
P/N 60294-7 (Latest Version)
Lycoming Parts Catalog, P/N PC-115, for 0-540 Series
Aircraft Engines (Latest Version)

## TEXTRON Lycoming

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# SERVICE

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October 31, 1988

ENGHIER TOTAL TURE

Service Instruction No. 1012F (Supersedes Service Instruction No. 1012E) Engineering Aspects are FAA Approved

SUBJECT:

PART I: Correct Location for Counterweights and Rollers on a

Crankshaft

PART II: Proper Assembly Procedure for Counterweights and Rollers

on a Crankshaft

MODELS AFFECTED:

All Textron Lycoming engines employing counterweights.

TIME OF COMPLIANCE:

As Required.

The purpose of this service instruction is to provide correct assembly procedures and identify the correct location on the crankshaft for the various counterweights and rollers utilized on Textron Lycoming reciprocating aircraft engines. Since the original edition of this publication; counterweight design changes,

material improvements and improvements in manufacturing methods have resulted in a number of counterweight supersedures. The following table lists applicable counterweight part number supersedures in the sequence of occurrence. The referenced notes following the table describe the supersedure.

#### COUNTERWEIGHT AND ROLLER SUPERSEDURE HISTORY

Original	Superseding	Original	Superseding Roller Part Number
Counterweight	Counterweight	Roller	
Part Number	Part Number	Part Number	
* 69393 * 69394 ** 69349 ** 65602 ** 65640 + 71904 + 71905 + 72801 + 72534 + 73643 + 73644 + 73812	71904 71905 71905 71904 71904 LW-19225 LW-19226 LW-19227 LW-19213 LW-19211 LW-19210 LW-19212	† 76787	73648

 P/N 69393 and 69394 counterweights are cast iron and did not incorporate bushings in the roller bores. These counterweights must be replaced at overhaul. (Not interchangeable.)

P/N's 69349, 65602 and 65640 counterweights incorporate screw in plugs and circlips to secure the rollers in the counterweight. When it becomes necessary to replace one of these counterweights, all counterweights on that certain crankshaft must be replaced. (Not interchangeable.)

+ P/N's 71904, 71905, 72801, 72534, 73643, 73644 and 73812 counterweights have been superseded as a result of manufacturing process changes. Each one is completely interchangeable with its respective replacement counterweight. Existing stock of these counterweights is usable until depleted.

† P/N 76787 roller was replaced by P/N 73648 as a product improvement and to eliminate a dispensible part.

Page 1 of 7



#### NOTE

Any O-540-A1A model engine installed in a Piper aircraft must be converted to the O-540-A1A5 configuration at overhaul. This is accomplished by installing two (2) fifth order counterweight rollers P/N 72022, in place of two (2) of the four (4) sixth order P/N 70416 rollers, on one of the two (2) rear crankshaft lugs. When this modification has been completed, stamp the number "5" after the model number on the engine nameplate.

#### PART I

Part I separates applicable engines into groups that utilize the same basic crankshaft design with the same counterweight and roller configuration. The location column in the table that accompanies each group references the group to a numbered figure which is an illustration that is typical of the crankshaft installed in the engines listed with the group. Each counterweight lobe position is numbered on the illustration and the location column in the table assigns each counterweight and roller combination to one or more of these numbered positions.

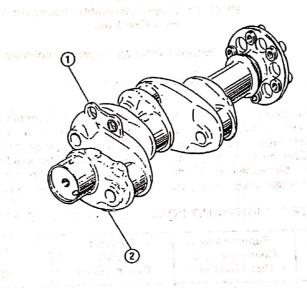


Figure 1.
Counterweights and Rollers - Group 1

Group		Qty. Roller No. P/N	Qty. No.	Location
Group 1 (4 Cyl. Direct Drive Engines)		Tut I	+	Figure 1
0-360-A1F6, -A1F6D, -A1G6, -A1G6D, -E1A6D,	LW-19227	1 LW-10977	2	Either Position
F1A6, -G1A6; LO-360-A1G6D, -E1A6D; IO-360		1 LW-10945	2	Either Position
A1B6, -A1B6D, -A1D6, -A1D6D, -A3B6D,				
A3D6D, -B2F6, -C1C6, -C1D6, -C1E6, -J1A5D;		n -halfyr		
AEIO-360-A1B6, -B1G6; LIO-360-C1E6; TO-360-	· 4 : the trial Bistone			
C1A6D, -E1A6D, -F1A6D; LTO-360-E1A6D; TI		Contact The Sales		
360-A3B6, -C1A6D.		RAPTOR COLUMN		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

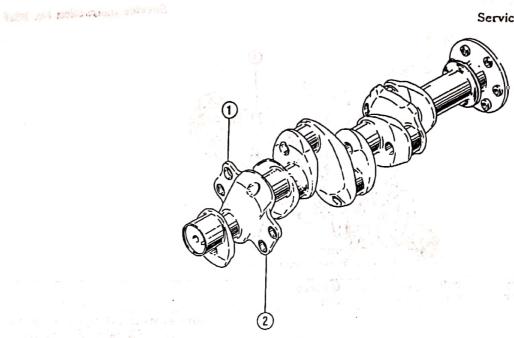


Figure 2. Counterweights and Rollers - Group 2, 3, 4, 5, 6, 7

Group	Counterweights P/N	Qty. No.	Roller P/N		Qty. No.	Location
Group 2 (6 Cyl. Direct Drive Engines)	Miller Was Hall Bad		7.1			Figure 2
0-540-A1DA2B.	LW-19225	2	70416		4	Position 1, 2
Group 3 (6 Cyl. Direct Drive Engines)				-		Figure 2
0-540-A1A, -A1A5, -A1B5, -A1C5, -A1D5,	LW-19225	110	70416		2	Either Position
-A3D5, -B1A5, -B1B5, -B2B5, -B2C5,	LW-19225	1	72022		2	Either Position
-F1A5, -F1B5, -G1A5, -G2A5, -H1B5D,	B.11 10220	-				
-H2A5, -H2B5D; IO-540-C1B5, -C1C5.	and the second second second					
Group 4 (6 Cyl. Direct Drive Engines)						Figure 2
0-540-A4D5, -B4B5, -E4A5, -E4B5, -E4C5,	LW-19227	1	72965		2	Either Position
-J1A5D; IO-540-A1A5, -B1A5, -B1B5, -B1C5,	LW-19227	1	72797		2	Either Position
-C1B5, -C4B5, -C4C5, -C4D5D, -D4A5, -E1A5,	Aut					k 2
-E1B5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5,						
-G1F5, -J4A5, -P1A5, -T4A5D, -T4B5D, -T4C5D,			duator con d			
-W1A5D; AEIO-540-D4A5, -D4B5, -L1B5D; TIO-	E3-5-7		14 11 1	544	- 1 / 2	
540-C1A, -E1A, -G1A, -H1A, -AA1A5, -AB1AD.			334	11 4	4 2 9	1 7 , 10
Group 5 (6 Cyl. Direct Drive Engines)						Figure 2
IO-540-K1A5, -K1A5D, -K1B5, -K1C5, -K1D5,	LW-19210	1	73648		2	Either Position
-K1E5, K1E5D, -K1F5, -K1F5D, -K1G5,	LW-19210	l	76788		2	Either Position
-K1G5D, -K1H5, -K1J5, -K1J5D, -K1K5, -L1A5,						
-L1A5D, -L1B5D, -L1C5, -M1A5, -M1A5D,				See Gray		
-M1B5D, -M2A5D, -N1A5, -R1A5, -R1A5D,	\$1.00					AND THE RESERVE
-S1A5, -U1B5D, -AA1A5; AEIO-540-L1B5D; HIO-540-A1A; TIO-540-A1A, -A1B, -A2A,						
-A2B, -A2C, -F2BD, -J2B, -J2BD, -N2BD, -R2AD,	B1 / 61-7					
-SIAD, -T2AD, -U2A, -V2AD, -W2A; LTIO-540-						28VP 1 19 0
F2BD, -J2B, -J2BD, -N2BD, -U2A, -V2AD, -W2A.						
Group 6 (6 Cyl. Direct Drive Engines)	fin and					Figure 2
0-540-J3A5, -J3A5D, -J3C5D, -L3C5D; 10-540-	LW-19210		LW-155	58	2	Either Position
W3A5D.	LW-19210	ì	76788	5.9913	2	Either Position
Group 7 (6 Cyl. Direct Drive Integral Accessory Housing Engines)	The said To		1		lin +	Figure 2
TIO-541-A1A	76044	i	76042		2	Either Position
	76044	1	76042		2	Either Position
	10044		,0010			

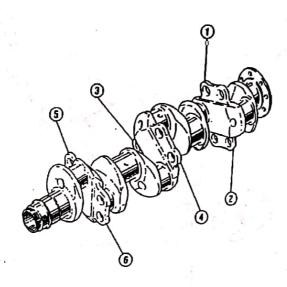


Figure 3. Counterweights and Rollers - Group 8, 9, 10, 11, 12, 13, 14

Group	Counterweights P/N	Qty No.		Qty.	Facet
Group 8 (6 Cyl. Geared Engines)			4/11	140.	Location
GO-435-C2, -C2A, -C2A2, -C2B, -C2B1, -C2B2, -C2C, -C2E; GO-480-B series (except -B1A6, -B1E6) -C2C6, -C2D6, -D series; IGO-480-A1B6	LW-19225	6	69433	12	Figure 3 All Positions
Group 9 (6 Cyl. Geared Engines)				1 10	1. 11. 14.12. 1
GO-435-C2B2-6; GO-480-B1A6*, -B1E6, -C series; -F series, -G series; GSO-480 series (except -B1B3); IGSO-480 series (except -A1F3)	LW-19225 LW-19225 LW-19226	4 1 1	69433 70416 69433	8 2 2	Figure 3 Positions 1, 2, 3, 4 Position 6 Position 5
Group 10 (6 Cyl. Geared Engines) (Special) GO-480-B1A6 with the following S/N's: L-567-28,L-569-28, L-573-28,L-574-28, L-575-28,L-576-28.	LW-19225	6	70416	12	Figure 3 All Positions
Group 11 (6 Cyl. Geared Engines)				1.2.2.1	the state of the s
GSO-480-B1B3; IGSO-480-A1F3.	LW-19210 LW-19213	2 4	76788 69433	4	Figure 3 Positions 1, 2
Group 12 (6 Cyl. Geared Engines)	211 10210		03433	8	Positions 3, 4, 5, 6
IGO-540-A, -B series	LW-19213 LW-19225 LW-19226	1	73287 70416	8 2	Figure 3 Positions 1, 2, 3, 4 Position 6
Group 13 (6 Cyl. Geared Engines)	LVV-15220	-	73287	2	Position 5
GSO-540-A, -B series	LW-19213 LW-19225 LW-19226	4· 1 1	69433 70446 69433	8 2 2	Figure 3 Positions 1, 2, 3, 4 Position 6 Position 5
Group 14 (6 Cyl. Vertical Engines) /O-540-B1B3, -C1C3	LW-19213	6	73338	12	Figure 3 All Positions

See Group 10 also.

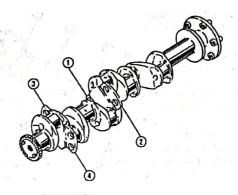


Figure 4.
Counterweights and Rollers - Group 15

Group	Counterweights P/N	Qty. Roller No. P/N	Qty. No.	Location
Group 15° (6 Cyl. Direct Drive Integral Accessory Housing Engines)	. Hilliam Call		2-m, " (C	Figure 4
TIO-541-E1A4, -E1B4, S/N's 101-59 thru S/N's 297-59	75637 76044 76044 75636	1 77386 1 76042 1 76043 1 77385		Position 1 Position 3 Position 4 Position 2
TIO-541-E1A4, -E1B4, S/N's 298-59 and up, -E1C4, -E1D4	75637 76044 76044 78988	1 77386 1 76042 1 76043 1 77385	2 2 2 2	Position 1 Position 3 Position 4 Position 2

<sup>\* -</sup> Change 77887 crankshaft and counterweight assembly to 78989 at engine overhaul by using 78988 counterweight instead of 75636.

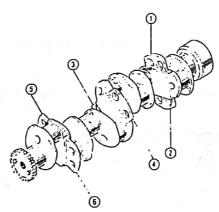


Figure 5.
Counterweights and Rollers - Group 16

Group	Counterweights P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group 16 (6 Cyl. Geared Integral Accessory Housing Engines)	6 - 2/5 - 1	4	180		Figure 5
TIGO-541-B1AD1AD1BE1A	75637	5	75631	10	Positions 2, 3, 4, 5, 6
	77002	1	77007	2	Position 1

When assembling TIGO-541 counterweight P/N 77002 to No. 1 position on the crankshaft, do not use 71906 or LW-14820 circlips and 71907 washers. Use washer P/N 77004 and circlip P/N 77005.

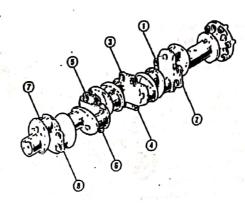


Figure 6. Counterweights and Rollers - Group 6

Group Group 17 (8 Cyl. Direct Drive Engines)		Counterweights P/N	Qty. No.	Roller P/N	Qty. No.	Location
O-720-A, -B, -C, -D series	(73543)	) LW-19211	6	73649		Figure 6
	(१३४१३) (१३४५४)	LW-19212 LW-19210	1	73814 73648	2	Positions 1, 2, 4, 5, 7, 8 Position 3 Position 6

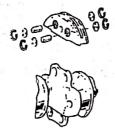


Figure 7. Typical Counterweight Installation

CHCLE PIN	100			
1/906	835	TOU	GAGE 61892-2	ALL E/VS
11005	1255	798 Z45	64892-2	ALL CINS
L	ليجين		64812-3	LARCE CAN DH
7	-	DISTANCE FA	NOW .	1507-751 04(1)
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Figure 9.

Diagram of Assembled Counterweight
Showing Dimensions for Checking Circlip

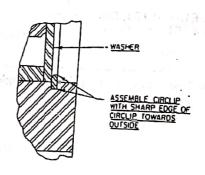


Figure 8.
Assembly of Circlips in Counterweight

100	CIRQUP IDE	NT IF ICAT IO	N	
1056 1056 1344	012/060 093/076 090/076	51AMPED 93 N/A H/A	MARK.	P/N 71906 LW -14820
igi ity o	FREE	DIA		
C -10 4	L IDENT	CICALICH I	NANK S	. IF ANY

Figure 10.
Circlip Identification

Page 6.01 7

#### PART II

#### CAUTION

The practice of marking crankshafts, counterweights and rollers, to insure proper location at reassembly, should not be accomplished with permanent markings of any kind. Refer to the latest Revision of Service Instruction No. 1152. Scoring, scratching, etching or other type of permanent marking could result in counterweight failure. See figure 7.

Install washers, P/N 71907 and circlips, P/N 71906 or LW-14820 on one side of the counterweight and place the counterweight on the proper crankshaft lobe. Insert the proper rollers and secure the assembly by installing washers and circlips on the other side of the counterweight (refer to figure 7). Circlips are inserted with the sharp edge outward (see figure 8). Two gages will check all circlips installed in any Textron Lycoming counterweight. See table with figure 9.

#### CAUTION

Install the correct rollers in identical pairs only. Under no circumstance are two different rollers to be installed on any one counterweight installation. Check roller part

number and size by using the table at the end of this instruction.

Insert one end of the counterweight circlip gap gage, P/N 64892-2 or -3 between the ends of the circlip; see figure 9 for gap dimension and gage selection. Be sure the gage is resting on the bottom of the groove. The gage must pass between the ends of the circlip and when rocked back and forth, must clear the inside edge of the top of the circlip. If the gage does not pass free-oly between the ends and under the top of the circlip, the circlip is not properly seated. Insure all circlips are properly seated.

#### NOTE

A recent revision to P/N 64892 gage set eliminated the 64892-1 gage from the set. The 64892-2 gage that is to be used for checking both the 71906 and LW-14820 circlips, must be modified to the specifications listed in the table section of figure 9 or a new gage set P/N 64892 can be purchased through any Textron Lycoming authorized Distributor.

### SPECIAL TOOLS REQUIRED:

Textron Lycoming P/N 64892 gage set, now consists of:

64892-2 Gage 64892-3 Gage

#### ROLLER OUTSIDE DIAMETERS

	2.0	P/N	OD	P/N	· OD
P/N	OD	73648	.6572/.6567	76788	.6895/.6890
69433	.5050/.5045	73649	.6098/.6093	77007	.5167/.5162
70416	.6950/.6945	73814	.5652/.5647	77385	.5845/.5840
72022	.6655/.6650		.4741/.4736	77386	.5333/.5328
72797	.6915/.6910	75631	.6420/.6415	LW-10945	.6915/.6910
72965	.6602/.6597	76042		LW-10945	.7141/.7136
73287	.5194/.5189	76043	.6795/.6790		.6451/.6446
73338	.5260/.5255			LW-15558	.04317.0440

NOTE: Revision F" adds new models, changes text, updates part numbers as applicable.

18297, 19215, 19563, 19215A, 20196, 22254, 22636, 22734A, 22734B — These numbers for Textron Lycoming reference only.

45 Service Inc.

## **TEXTRON** Lycoming

Reciprocating Engine Division/ Subsidiary of Textron Inc. 652 Oliver Street Williamsport, PA 17701 U.S.A.



May 28, 1992

Supplement No. 1

for

Service Instruction No. 1012F

A recent revision to P/N's LW-19225, LW-19226 and LW-19227 counterweight assemblies changes the distance from the centerline of the counterweight bushing bore to the flat edge of the counterweight on applicable counterweights that are identified with the letter "E", as a suffix to the counterweight part number. (Refer to Dimension 'A', in the revised Figure 6, from Supplement No. 2 to Service Instruction No. 1143B which is also included with this supplement for reference purposes.) Applicable counterweights that were placed in service, prior to distribution of this Supplement, that are not identified with a letter suffix in the part number will have to be measured to determine the "A" dimension. After the "A" dimension has been determined, vibropeen the correct identification letter on the counterweight as a suffix to the part number.

Although applicable counterweights that are identified with the letter "E" suffix in the part number, fit and perform perfectly on the lobes of crankshafts installed in direct drive engines it is impossible to assemble them on crankshafts that are installed in reduction gear equipped engines. For this reason production of counterweights with the relocated bushing bores has

been discontinued and all applicable counterweights will be manufactured to the original "A" dimension which is listed with the part number that contains the "D" suffix in the revised Figure 6. New counterweights that are manufactured to the original "A" dimension will be identified with the letter "F" or a subsequent letter (G, H, etc.) as a suffix to the part number.

#### CAUTION

TO INSURE PROPER COUNTER-WEIGHT OPERATION DO NOT ASSEM-BLE A P/N LW-19225E, LW-19226E OR LW-19227E AT ANY DESIGNATED LOCA-TION ON THE CRANKSHAFT OF A REDUCTION GEAR EQUIPPED ENGINE. USE THESE COUNTER-WEIGHTS ON DIRECT CRANKSHAFTS ONLY. APPLICABLE COUNTERWEIGHTS THAT ARE IDEN-TIFIED WITH REVISION LETTERS D. F OR SUBSEQUENT LETTERS CAN BE USED AT ANY DESIGNATED LOCA-TION.



Page 1 of 2

	Spacer Dimensions Unterweight Detail			
Counterweight Part No.	Part No.	A	B ± .002	(Lbs.) Minimum
71904	12	.825	.425	1.796
LW-19225D	27	.855	.395	1.796
LW-19225E	17	.875	.375	1.796
71905	12	.825	.425	1.752
LW-19226D	27	.855	.395	1.756
LW-19226E	17	.875	.375	1.756
72801	10	.715	.535	1.846
LW-19227D	28	.740	.510	1.846
LW-19227E*	30	.760	.490	1.84 <u>6</u>
72534	13	.950	.300	2.246
LW-19213	29	.965	.285	2.246
73643	15	.805	.445	2.212
LW-19211	12	.825	.425	2.212
73644	11	.741	.509	2.166
LW-19210	30	.761	.489	2.166
73812	16	.908	.342	2.266
LW-19212	31	.923	.327	2.266
74901	20	.720	.530	1.470
75636	20	.720	.530	1.600
75637	17	.875	.375	1.678
76044	18	.730	.520	1.810
78988	18	.730	.520	1.600

Use spacer No. 30 and .001 inch thick shim stock to achieve .490 spacer thickness when grinding the bushings in a P/N LW-19227E counterweight.

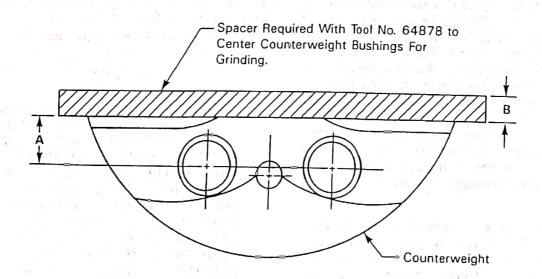


Figure 6. (Revised) Identification of Dimension "A" and "B" (From Supplement No. 2 to Service Instruction No. 1143B, included for reference purposes)



## Service

## Instruction

## LYCOMING DIVISION WILLIAMSPORT, PA. 17701

(L)

DATE:

May 7, 1971

Service Instruction No. 1142B (Supersedes Service Instruction No. 1142A) Engineering Aspects are FAA (DEER) Approved

SUBJECT:

Replacement of Crankshaft Counterweight Bushings

MODELS AFFECTED:

O-360-A1E6, -A1F6, -A1G6, IO-360-A1B6, -A1C6, -A1D6, -C1D6, -C1E6, LIO-360-C1E6, GO-435, GO-480, GSO-480, ICSO-480, IO-540, IO-540, ICO-540, ICSO-540, ICSO-

TIME OF COMPLIANCE: A

At overhaul.

All of the above engines incorporate dynamic counterweight and roller combinations as an effective means of dampening vibrations. Each roller used to attach the counterweight is supported by three hardened steel bushings, two of which are located in the counterweight and the other in the crankshaft lug.

Wear on the steel bushings in the crankshaft counterweight lugs is confined to a localized area opposite the longitudinal centerline of the crankshaft. This wear will appear as an out-of-round condition, which can ready be measured.

#### CAUTION

If an engine is disassembled prior to its normal overhaul time, check the inside diameter of the counterweight bushings in the crankshaft. If any bushing is more than .0007 inch out-of-round, it must be replaced.

Also, the bushings are occasionally found to be cracked on the outside surface, a condition not visible until the bushing has been removed. Consequently, all bushings in the crankshaft lugs should be replaced during overhaul. The crankshaft may be returned to the factory for rebushing, or it may be accomplished in the following manner:

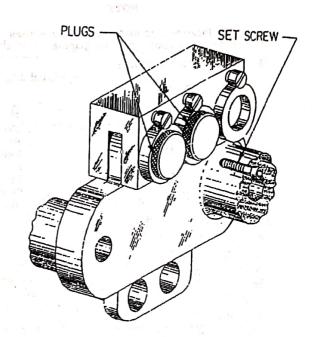
#### NOTE

For replacement of the bushings in the counterweights at overhaul, see the latest edition of Service Instruction No. 1143.

1. Assemble puller (Avco Lyc. P/N 64872, figure 1) and remove the old bushing from crankshaft lug.



Figure 1. No. 64872 Puller to Remove and Install Bushings



#### WITH PLUGS IN PLACE TIGHTEN SET SCREW

Figure 2. No. ST-280 Reaming Fixture Assembled to Crankshaft

2. Measure the hole and determine what size bushing is required by the following chart. If the hole is within standard limits, reaming the hole is not necessary. If, however, it is determined that a larger oversize bushing is required, steps 3 and 4 must be completed before installing the new bushing.

Hole Size	Nomufai Size	Reamer Size
. 9369/. 9377 . 9420/. 9425 . 9445/. 9450 . 9470/. 9475 . 9495/. 9500 . 9520/. 9525	Std. P05 P075 P010 P0125	None 64874 (. 005 o/s) ST 210 (. 0075 o/s) 64875 (. 0017 o/s) ST 211 (. 0125 o/s) 64875 (. 015 o/s)

Page 1 of 2

3 Determine reamer needed (.005 o/s, .0075 o/s, .010 o/s, .0125 o/s or .015 o/s) and assemble the reaming fixture (Avco Lyc. P/N ST-280) over the crankshaft lug. Use the two plugs provided to line up the holes and secure the fixture by tightening the Allen head set screws. See figure 2.

#### NOTE

On fixture ST-280 select proper set of holes for crankshaft being reamed. Wide set of holes are spaced 2, 125 apart. The narrow set are spaced 1, 800 apart.

4. Assemble the reamer to be used with a universal joint drive. Remove one plug from the fixture and proceed to hand ream the hole to proper size. Following the above procedure ream the remaining hole.

#### NOTE

One location plug must be in fixture when reaming to assure proper spacing.

5. Assemble the new bushing on the puller and proceed to pull the bushing into the hole. (Reference 578, Table of Limits, Service Bulletin No. 268.)

#### CAUTION

The inside diameter of this bushing is linished at the factory and no further finishing of the bushing is necessary. Caution must be exercised when installing the bushing so that the finished ID is not damaged. Because of possible damage to the crankshaft fug. never under any circumstances remove or install these bushings by use of a drift.

6. After the bushing is installed, check its alignment with the main bearings by placing the crankshaft in vee blocks on a surface plate. Install the wedge blocks, Tool No. ST-212, in the bushing and compare parallelism of the wedge blocks with that of main journals within .002 per inch. Support the crankshaft in the vee blocks at journals adjacent to the bushing location.

#### SPECIAL TOOLS REQUIRED:

Part No	١.							Nomenclature
64872. ST-280				100	•		٠	Puller - Remove and install counterweight bushings Fixture - Ream crankshalt counterweight holes
64874.						_		Reamer 005 o/s counterweight bushing holes
ST-210			٠.		,			Reamer 0075 o/s counterweight bushing holes
64875.								Reamer010 o/s counterweight bushing holes
								Reamer 0125 o/s c. unterweight bushing holes
64876.			•					Reamer 015 n/s counterweight bushing holes
ST-212	٠	•	•	•	٠	and a	٠.	Wedge blocks, paralle: - counterweight bushing

#### PARTS REQUIREC:

			The state of the s	
Part No.			Nomenclature	
70256		Bushing - 0	Crankshaft counterweight Std.	
70256⊕ PO5 .		Bushing - C	Crankshaft counterweight . 005 o/	's
70256-P075.		Bushing - C	Crankshaft counterweight . 0075 o	i's
70256-P10 .	der .		Crankshaft counterweight . 010 o/	
70256-P125.		Bushing - C	Crankshaft counterweight . 0125 o	νZs.
70256-P15 .			Crankshaft counterweight . 015 o/	
73810		Bushing - C	Crankshall counterweight Std.	.,
73810-P05 .		Bushing - C	Crankshaft counterweight . 005 o/	
73810-P075.		Bushing - C	Crankshall counterweight . 0075 o	/-
73810-P10 .	. 12 mg	Bushing - C	Crankshaft counterweight . 010 o/	, ,
73810-P125.		Bushing - C	Crankshall counterweight . 0125 o.	10
73810-P15 .		Bushing - C	Crankshaft counterweight .015 o/	23
74876		Bushing - C	Crankshalt counterweight Std.	3
74878-P03 .	i e decire in	Bushing - C	Crankshaft counterweight . 005 o/s	_
74876-P075.		Bushing - C	Crankshaft counterweight .0075 o.	5
74976-P10 .		Bushing - C	Crankshaft counterweight . 010 o/s	78
74876-P123.		. Bushing - C	Frankshalt counterweight . 0125 o	5
74876-P15 .		Bushing - C	Frankshaft counterweight . 0125 o/	/ S
			of c.t. 1013 of the counterweight . 013 of	S
		NOTE		

See applicable parts catalog (or correct bushing part number for installation in particular crankshafts.

NOTE: Revision "B" adds model TIGO-541; additional fixture plug and removes 64873 fixture.

12179, 13623. OS-5084 - These numbers for Avco Lycoming reference only.

Page 2 of 2

## TEXTRON Lycoming

Williamsport Plant
Textron Lycoming/Subsidiary of Textron Inc.
652 Oliver Street
Williamsport, PA 17701 U.S.A.



DATE:

April 11, 1988

Service Instruction No. 1143B (Supersedes Service Instruction No. 1143A) Engineering Aspects are FAA Approved

SUBJECT:

PART I - Counterweight Bushing Tooling Update.

PART II - Counterweight Bushing Replacement.

MODELS AFFECTED:

All Textron Lycoming piston aircraft engines with dynamic counterweights employing 3/4 inch I.D. bushings.

TIME OF COMPLIANCE:

During engine overhaul.

Dynamic counterweights are installed on piston engine crankshafts to eliminate vibrations that are caused by torsional frequency changes that occur at different engine speeds and operating conditions. The counterweight is mounted on the crankshaft with two steel rollers that allow the counterweight to move as required to maintain crankshaft balance. Both the counterweight supporting lug of the crankshaft and the counterweight contain hardened steel bushings that are ground to a very smooth and annular finish. If any of these bushings become damaged or worn out of round, the counterweight will become ineffective and cause vibrations that will lead to severe engine damage or failure.

The procedure for inspecting and replacing the hardened steel bushings in a crankshaft is described in the latest revision of Service Instruction No. 1142. This publication describes the procedures and tooling required to inspect and replace the steel bushings installed in a counterweight assembly.

A recent change in counterweight manufacturing

procedures has affected the finished dimensions of some of the counterweights that were included in previous editions of this publication. This change in the finished dimensions of the counterweight requires changes in some of the special counterweight bushing tooling listed in the special tools section of this publication. Textron Lycoming Service Letter No. L217 briefly describes these tooling changes and offers update kits on a limited time special price basis. This publication will completely describe the tooling changes and include the necessary illustrations and dimensions of the detail parts required to update each tool.

To control the inventory of new and superseded counterweights, all counterweights that are machined to the new specifications have been issued new part numbers. The table with Figure 6 of this publication matches new counterweight part numbers with the respective superseded counterweight part number. All new counterweights are completely interchangeable with the respective superseded counterweight.

## PART I. COUNTERWEIGHT BUSHING TOOLING UPDATE

Spacers are used with the P/N 64878 fixture to align the bushing bore of the counterweight with the center of the fixture. The "A" dimension from Figure 6 which is the distance from the center line of the counterweight bushing bore to the flat edge of the counterweight determines the thickness of the spacer. As can be seen in the table with Figure 6, the counterweights that are machined to the new specifications do not have the same "A" dimension as the counterweights that they replace. Owners of P/N 64878 fixtures who do not wish to purchase the P/N 64878-50 update kit can make the spacers required to align these new counterweights from hardened and ground steel using the dimensions

shown in Figure 1. Stamp or vibra-peen each spacer with the correct part number on a surface that will not interfere with counterweight alignment.

A new set-master is required for the P/N ST-94 gaging fixture. Figure 2 illustrates the new set master and finish grinding dimensions. Stamp or vibra-peen the step height dimension, on each step, as shown in Figure 2. This dimension is the distance from the center line of the set master to the surface of the step which can be matched with an "A" dimension in the table with Figure 6. This tool is made from oil hardened tool steel and ground to the finish dimensions.

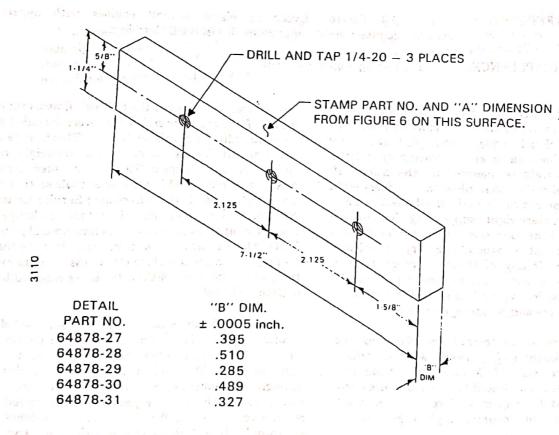


Figure 1. Dimensions of New Spacers for P/N 64878 Fixture

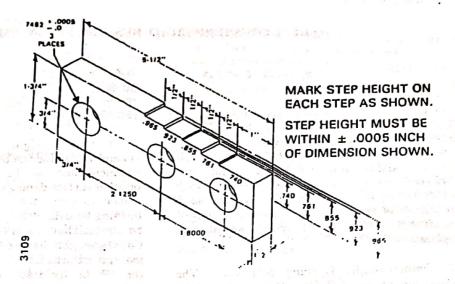


Figure 2. Dimensions of New Set Master P/N ST-94-10

To insure the counterweight is properly and squarely mounted to the P/N ST-91, fixture spacers have been added. These spacers are made from hardened steel and ground to finish

dimensions. Refer to Figure 3 for part numbers, finished dimensions, and application of these spacers. Figures 9 and 10 illustrate use of the spacers.

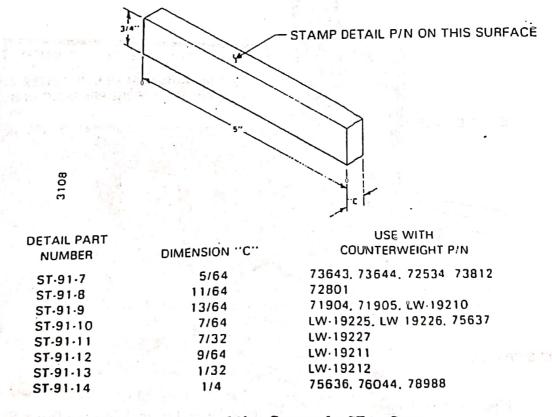


Figure 3. Dimensions of New Spacers for ST-91 Gage

## PART II. COUNTERWEIGHT BUSHING REPLACEMENT

The procedure for replacing counterweight bushings is as follows:

Marie Marie Marie

- 1. Counterweight Bushing Inspection Wear in the counterweight bushings is usually evident as out-of-round on the inside diameter. Check each bushing with the P/N ST-73 bore gage. The diameter should be between 0.7485 and 0.7505 inch and the out-of-round should not exceed 0.0005 inch. The P/N ST-73 gage can be set with a micrometer. If the diameter of any bushing is oversize or out-of-round all of the bushings in the counterweight must be replaced.
- 2. Counterweight Bushing Removal The bushings can be pressed from the counterweight with an arbor press and special driver P/N ST-92. Refer to Figure 4. Insure the counterweight lays flat

- and square with the arbor press spindle. Press both bushings from one side of the counterweight, turn the counterweight over and press out the remaining two bushings.
- 3. Counterweight Bushing Bore Inspection -Visually examine the bushing bore. The bore must be smooth and free of scratches, tool marks, galling or other surface damage. Any evidence of damage is reason to scrap the counterweight. Measure the bushing bore diameter; bushing bores will be found to be either .9369/.9377 or .9384/.9392. Counterweights having the larger diameter bore are marked with the letter "B" near each bore. Refer to the "Parts Required" section of this publication. Using the magnetic particle method check the counterweight for cracks. Any indication of cracks is reason to reject the counterweight.

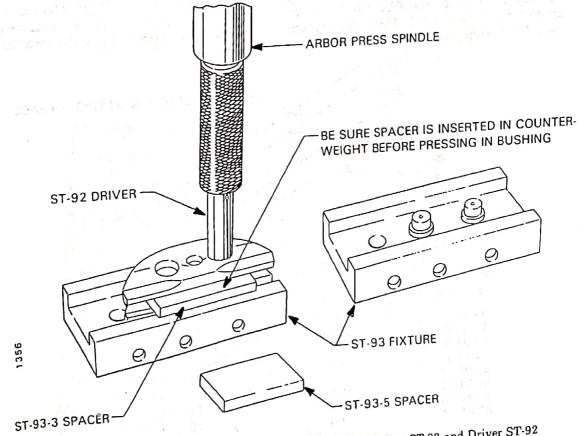


Figure 4. Installing Counterweight Bushing Using Fixture ST-93 and Driver ST-92

Page 4 of 10

~P~ 0 01 10

#### CAUTION

It is not permissible under any circumstance to attempt to enlarge the bushing bore in a counterweight. Eventual engine damage will result from any operation that will reduce the snap ring groove depth in the counterweight bushing bores.

4. Counterweight Bushing Installation -

#### CAUTION

The spacers provided with fixture P/N ST-93 are used to control the depth that the bushings are driven into the counterweight. The bushing must be flush to .002 inch from protruding into the slot of the counterweight.

Measure the center to center distance of the bushing bore in the counterweight. Select the two holes in the P/N ST-93 fixture that correspond with this measurement and install the two P/N ST-93-2

locating pins in these holes. Refer to Figure 4. Install the correct spacer either ST-93-3 or ST-93-6 in the counterweight and position it on the P/N ST-93 fixture with the P/N ST-93-2 pins located in the bushing bores. Using an arbor press and the P/N ST-92 driver press the new bushings in place. Turn the counterweight over and install new bushings in the opposite side of the counterweight in the same manner.

5. Finish grinding of the counterweight bushing I.D. — grinding the inside diameter of the new bushing to the correct size and surface finish is the most important step in the rebushing procedure. Do not attempt to substitute any other process for the one herein described.

#### NOTE

The fixture P/N 64878 is sold without any mounting or locating holes drilled in its base. This allows the fixture to be mounted on any suitable machine without interference from pre-drilled holes.

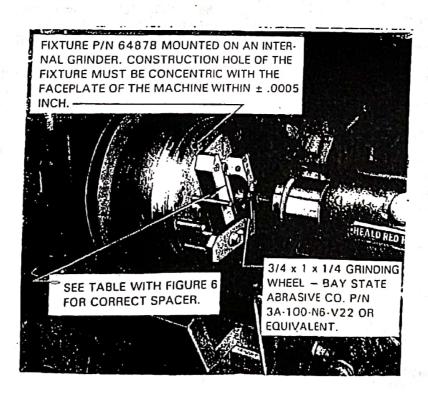


Figure 5. Counterweight and 64878 Fixture Assembled on an Internal Grinding Machine

Page 5 of 10

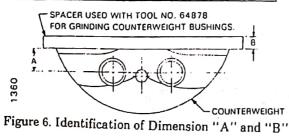
A. Secure the P/N 64878 fixture on the faceplate of an internal grinding machine. Insure the 1-1/8 inch diameter construction hole in the center of the fixture is concentric with the center of the faceplate. Concentricity must be held to within ± .0005 inch total indicated reading. Refer to Figure 5.

#### NOTE

In the following table the new superseding counterweight part number is listed in the same block with the part number of the counterweight that it replaces. The new number is the lower number in each block.

B. Select and install the correct spacer on the fixture and secure it to the alignment bar of the fixture with the three 1/4-20 socket head screws. The detail part number is stamped on the spacer. Refer to the table with Figure 6 for the correct spacer to use with each counterweight.

Counterweight Part No.	Spacer Detail Part No.	Dir	Dimensions A B ± .002					
71904	12	.825	.425	1.796				
LW-19225	27	.855	.395	1.796				
71905	12	.825	.425	1.752				
LW-19226	27	.855	.395	1.756				
72801	10	.715	.535	1.846				
LW-19227	28	.740	.510	1.846				
72534	13	.950	.300	2.246				
LW-19213	29	.965	.285	2.246				
73643	15	.805	.445	2.212				
LW-19211	12	.825	.425	2.212				
73644	11	.741	.509	2.166				
LW-19210	30	.761	.489	2.166				
73812	16	.908	.342	2.266				
LW-19212	31	.923	.327	2.266				
74901	20	.720	.530	1.470				
75636	20	.720	.530	1.600				
75637	17	.875	.375	1.678				
76044	18	.730	.520	1.810				
78988	18	.730	.520	1.600				



NOTE

Locating pin P/N 64878-2 is used to align the counterweight through an unfinished bushing. P/N 64878-6 locating pin is larger and is used to align the fixture through bushings that have been ground to size. These locating pins are off-set to accommodate the two different center to center bushing bore distances that will be found on counterweights.

- C. Install and rotate the smaller pin P/N 64878-2 to the position required to place one set of bushings on the center line of the fixture. Lock the locating pin in this position by tightening the 10-32 socket head screw that secures the P/N 64878-23 locating clamp.
- D. Install the counterweight on the fixture as shown in Figure 5. Insure the counterweight and fixture mating surfaces are clean. Tighten the applicable knurled head screw to secure the counterweight against the spacer. If the threaded end of the screw attempts to enter the slot in the counterweight, install the metal block P/N 64878-21 on the end of the screw. Adjust the fibre block of the hold down clamp over the center of the counterweight and tighten the socket head screw to secure the counterweight to the fixture.
- E. Grind the inside diameter of both bushings to 0.7485/0.7505 inch diameter. Surface finish of the finished bushing must be 15 micro inches. The 3/4 x 1 x 1/4 grinding wheel shown in Figure 5 is satisfactory for this purpose. It can be purchased from Bay. State Division, Dresser Industries Inc., 12 Union Street, Westboro, Mass. 01581. Order P/N 3A-100-N6-V22.
- F. Remove the counterweight from the fixture and remove the small locating pin P/N 64878-2. Install the larger locating pin P/N 64878-6 in the opposite hole. Rotate the pin to align the unground bushings with the center line of the fixture. Secure the pin and counterweight as described in steps C and D. Proceed to grind the remaining bushing as described in step E.
- 6. Inspection of Finished Counterweight Bushings —

A. Inspect the newly ground counterweight bushings using the magnetic particle method to determine if grinding cracks are present in the finished bushing. Replace any bushings that are found to be cracked.

B. Fixture P/N ST-94 is used to check the finished bushing bores for correct location. To set up the fixture, install the P/N ST-94-2 relieved locating pin in the center hole with the locating diameters in the vertical position as shown in Figure 7. Install the P/N ST-94-3 solid locating pin in the outside hole that has the same center to center distance as the counterweight bushing bores. The P/N ST-94-2 pin can remain permanently installed in the center hole with the P/N ST-94-3 being moved as required to adapt to the counterweight being inspected. If the pins do not fit into the newly ground bushing, it may be concluded that the bores are mislocated and the bushings must be replaced and reground again. If the counterweight fits, proceed to step C.

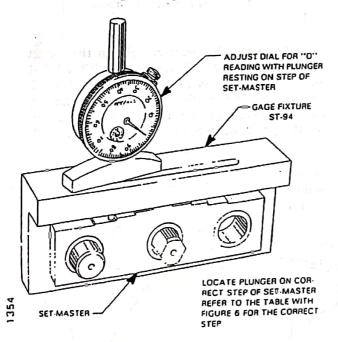


Figure 7. Depth Gage Adjusted with Set-Master Preparatory to Checking Line Position of Counterweight Bushings

C. Also check the distance from the center of the bushing bore to the flat edge of the counterweight with the fixture P/N ST-94 and either P/N ST-94-5 or ST-94-10 set-master in the following manner. Place the set-master over the locating pins of the fixture (refer to Figure 7), preload the depth gage approximately .010 inch, set the dial gage to "0" with the plunger resting on the appropriate step of the set-master. The steps are identified by the "A" dimensions from the table with Figure 6. Remove the set-master and install the counterweight over the pins. Set the depth indicator thru the fixture and onto the counterweight. Refer to Figure 8. No more than ± .004 inch difference between this measurement and the measurement obtained with the set-master is allowed.

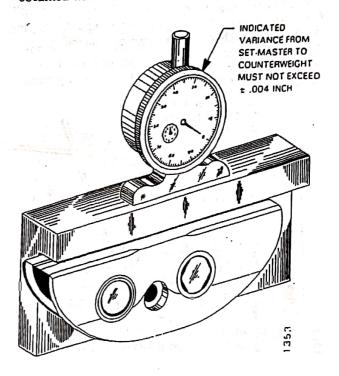


Figure 8. Checking Center Line Position of Counterweight Using Gage Fixture ST-94

#### NOTE

During the following step (D) if erratic or excessively "out of limits" measurements are observed, remove the counterweight and insert it on the P/N ST-91 fixture so that the opposite inner face of the counterweight is located against the fixture. Then repeat the measurements. Only one of the inner faces of the counterweight is square with the bushing bores.

D. Select the proper spacer either P/N ST-91-7, ST-91-8, ST-91-9, ST-91-10, ST-91-11, ST-91-12, ST-91-13, or ST-91-14 and install it and the counterweight on the fixture. Refer to Figure 3 for spacer application. Press the counterweight squarely against the spacer and tighten the knurled screw to secure the counterweight firmly against the locating surface of the fixture. Install the gaging arbors P/N ST-91-3 through each of the finished bushings as illustrated in Figure 6. Place the fixture on a surface plate and indicate both ends of each arbor as illustrated in Figure 9. Turn the fixture over to rest on its adjacent side and again indicate both ends of the gaging arbors. See Figure 10. The difference in measurements from one end of the gaging arbor to the other must not exceed .003 inch per inch in any instance.

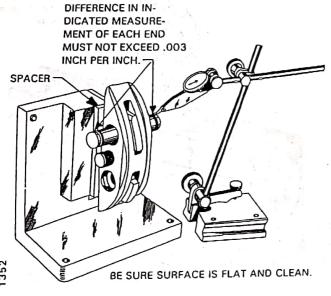


Figure 9. Checking Parallel and Squareness of Counterweight Bushings with Gage Fixture ST-91 — Vertical Position

7. Counterweight Balance Procedure - The center of gravity of the counterweight is located at the center of the 1/4 inch or 3/8 inch diameter drilled hole that is located between the bushing bores. The balance of the counterweight in relation to its center of gravity is quite important and may have been changed when the new bushings were installed. Check the balance of the counterweight in the following manner.

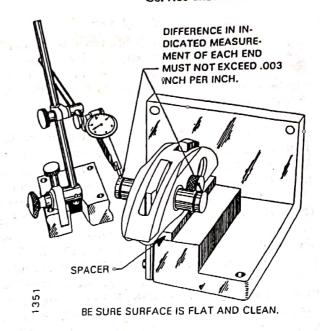


Figure 10. Checking Parallel and Squareness of Counterweight Bushings with Gage Fixture ST-91 — Horizontal Position

A. Install the counterweight on the correct P/N ST-96 balancing arbor, either the P/N ST-96-1 for the 3/8 inch hole or P/N ST-96-2 for the 1/4 inch hole, and place the arbor on a pair of balancing ways. Insure each blade of the ways engages the arbor at a point not more than 1-1/2" from each end.

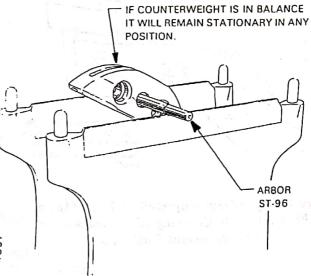


Figure 11. Counterweight Mounted on ST-96 Arbor for Balancing

#### NOTE

The center of both of the P/N ST-96 arbors is tapered to compensate for slight variations in the diameter of the hole. The first 1-1/2 inches of each end of the arbor is carefully ground to insure concentric diameters.

PLACING WEIGHT NOT MORE
THAN 1 INCH FROM CENTER OF
COUNTERWEIGHT
ST-95
WEIGHT

BALANCE MUST BE ACHIEVED BY

Figure 12. Counterweight Balanced by Weight ST-95 Placed Within One Inch from Center

B. If the counterweight is in perfect balance it will remain in any position it is placed. See Figure 11. If it has a tendency to move, try to keep it in

balance by placing the center of the P/N ST-95 weight not more than 1" from the center of the arbor. See Figure 12. If the counterweight can be brought into balance with the addition of this weight the balance can be considered satisfactory.

C. If the counterweight cannot be brought into balance by the addition of the P/N ST-95 weight, carefully grind the heavy end at the locations shown in Figure 13.

8. Counterweight Weight Limitations · A weight check is not necessary unless the counterweight has been ground to correct an improper balance condition. If the counterweight has been ground it must meet the minimum weight requirements shown in the table with Figure 6. Do not install any counterweight weighing less than the minimum weight, listed in the table, in any engine.

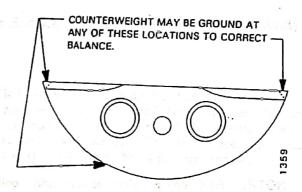


Figure 13. Location of Areas on Counterweight for Grinding

#### PARTS REQUIRED:

Part No.

Nomenclature

71903-A

Bushing, dynamic counterweight

71903-B

(Identification letter "A" .9395/.9390 OD)

Bushing, dynamic counterweight

(Identification letter "B" .9410/.9405 OD)

#### SPECIAL TOOLS REQUIRED:

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	Tool No.	Nomenclature
Section 18 years	ST-73	Dial bore gage (measure .7485/.7505 inside diameter of bushing)
COLUMN TO SERVER OF THE SERVER	ST-91	Squareness gage (check parallel and squareness of finished bushing bores)
	ST-92	Driver (remove and install bushings)
and a second	ST-93	Assembly fixture (install bushings in counterweight)
	ST-94	Location Gage (check hole location after grinding)
a canton	ST-95	Weight, balance (.004 pound - check balance of counterweight after
A CONTRACTOR	ST-96	Palancing arbor (check balance of counterweight after rebushing)
	64878	Grinding fixture (hold counterweight during bushing grinding)
1 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		

NOTE: Revision "B" changes text, adds tooling update, adds new counterweight part numbers.

22254, 22734, 22734-A, 22734-B — These numbers for Textron Lycoming reference only.

## TEXTRON Lycoming

Reciprocating Engine Division/ Subsidiary of Textron Inc. 652 Oliver Street Williamsport, PA 17701 U.S.A.



May 28, 1992

Supplement No. 2

for

Service Instruction No. 1143B

This publication replaces Supplement No. 1 for Service Instruction No. 1143B in its entirety. Remove and discard Supplement No. 1.

A recent revision to P/N's LW-19225, LW-19226 and LW-19227 counterweight assemblies changes the distance from the centerline of the counterweight bushing bore to the flat edge of the counterweight on applicable counterweights that are identified with the letter "E", as a suffix to the counterweight part number. (Refer to Dimension "A", in the revised Figure 6, included with this Supplement.) Applicable counterweights that were placed in service, prior to distribution of this Supplement, that are not identified with a letter suffix in the part number will have to be measured to determine the "A" dimension. After the "A" dimension has been determined, vibropeen the correct identification letter on the counterweight as a suffix to the part number.

Although applicable counterweights that are identified with the letter "E" suffix in the part number, fit and perform perfectly on the lobes of crankshafts installed in direct drive engines it is impossible to assemble them on crankshafts that are installed in reduction gear equipped engines. For this reason production of counterweights with the relocated bushing bores has been discontinued and all applicable counterweights will be manufactured to the original "A" dimension which

is listed with the part number that contains the "D" suffix in the revised Figure 6. New counterweights that are manufactured to the original "A" dimension will be identified with the letter "F" or a subsequent letter (G, H, etc.) as a suffix to the part number.

#### CAUTION

TO INSURE PROPER COUNTER-WEIGHT OPERATION DO NOT ASSEM-BLE A P/N LW-19225E, LW-19226E OR LW-19227E AT ANY DESIGNATED LOCA-TION ON THE CRANKSHAFT OF A REDUCTION GEAR EQUIPPED ENGINE. USE THESE COUNTER-WEIGHTS ОN DIRECT DRIVE CRANKSHAFTS ONLY. APPLICABLE COUNTERWEIGHTS THAT ARE IDEN-TIFIED WITH REVISION LETTERS D, F OR SUBSEQUENT LETTERS CAN BE USED AT ANY DESIGNATED LOCA-TION. REFER TO THE LATEST REVI-SION TO SERVICE INSTRUCTION NO. 1012 FOR COUNTERWEIGHT APPLICATION.



Page 1 of 4

Counterweight	Spacer Detail Part No.	Dimensions		Weight
Part No.		Α Α	B ± .002	(Lbs.) Minimum
71904 LW-19225D LW-19225E	12 27 17	.825 .855 .875	.395 .375	1.796 1.796
71905 LW-19226D LW-19226E	12 27 17	.825 .855 .875	.375 .395 .375	1.796 1.752 1.756 1.756
72801 LW-19227D LW-19227E*	10 28 30	.715 .740 .760	.575 .535 .510 .490	1.846 1.846 1.846
72534 LW-19213	13 29	.950 .965	.300 .285	2.246 2.246
73643 LW-19211	15 12	.805	.445	2.212 2.212
73644 LW-19210	11 30	.741	.509 .489	2.166 2.166
73812 LW-19212	16 31	.908	.342	2.266 2.266
74901	20	.720	.530	1.470
75636	20	.720	.530	1.600
75637	17 ·	.875	.375	1.678
76044	18	.730	.520	1.810
78988	18	.730	.520	1.600

<sup>\*</sup> Use spacer No. 30 and .001 inch thick shim stock to achieve .490 spacer thickness when grinding the bushings in a P/N LW-19227E counterweight.

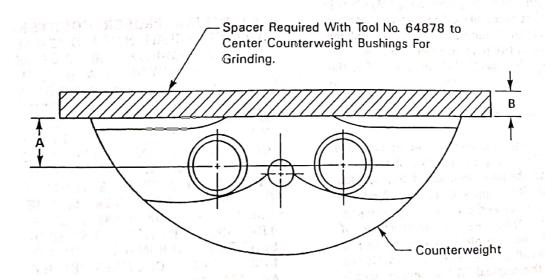


Figure 6. (Revised) Identification of Dimension "A" and "B"

#### TOOL DATA:

There is no change to the tooling update kits offered in Service Letter No. L217; however, as can be seen by the dimensional changes listed in the revised Figure 6, different tools and set-up procedures are required with counterweights that are identified with the letter "E" as a suffix to the part number.

#### These changes are:

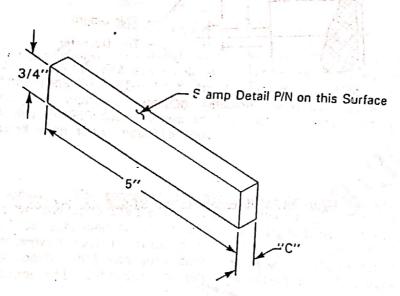
1. Use spacers as listed in the revised Figure 6.

#### NOTE

Use .001 inch thick shim stock between the P/N 64878 fixture and the P/N 64878-30

spacer to align the P/N LW-19227E counterweight.

- 2. When checking the distance from the centerline of the bushing bore to the flat edge of the P/N LW-19227E counterweight with the P/N ST-94 fixture, use the .0761 step of the P/N ST-94-10 set master, set the preloaded dial indicator to + .001 inch to compensate for the .001 difference between the counterweight measurement and the set master.
- 3. Figure 3 is revised and included with this Supplement, to show spacer application for the revised counterweights. Figure 3A is added to illustrate an undercut to the P/N ST-91-6 knurled screw. This undercut is required to allow use of existing spacers with the revised counterweights.



DETAIL PART NUMBER	DIMENSION "C"	USE WITH COUNTERWEIGHT P/N
ST-91-7 ST-91-8 ST-91-9 ST-91-10 ST-91-11 ST-91-12 ST-91-13	5/ <sub>64</sub> 11/ <sub>64</sub> 13/ <sub>64</sub> 7/ <sub>64</sub> 7/ <sub>64</sub> 7/ <sub>32</sub> 9/ <sub>64</sub> 1/ <sub>32</sub> 1/ <sub>4</sub>	73643, 73644, 72534, 73812 72801, LW-19225E, LW-19226E 71904, 71905, LW-19210 LW-19225D, LW-19226D, 75637 LW-19227D LW-19211, LW-19227E LW-19212 75636, 76044, 78988

Figure 3. (Revised) Dimensions of New Spacers for ST-91 Gage

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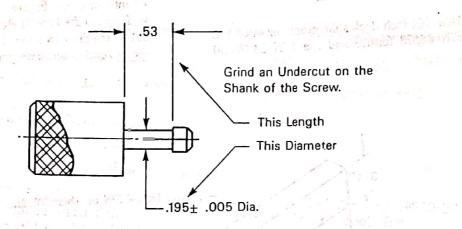


Figure 3A. Modifications to P/N ST-91-6 Knurled Screw

22971, 22971-A — These numbers for Textron Lycoming reference only.

Page 4 of 4

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#### United States of America

Department of Transportation — Federal Aviation Administration

## Supplemental Type Certificate

This certificate, issued to

Johnston Aircraft Service, Inc.

cortifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Port Regulations, effective November 1, 1949, including Amendments 3-1 to 3-12, inclusive.

Original Product - Type Certificate Number: 1A15

Make: Piper Model: PA-24-250

Description of Type Design Change: Installation of Hartzell HC-C2YK-1BF/F8477D-5R propeller in accordance with FAA sealed Johnston Aircraft Service, Inc. Installation Instructions No. CPI-2 "NC" dated December 10, 1986, or later FAA approved revision. FAA Approved Johnston Aircraft Service, Inc. Airplane Flight Manual Supplement No. 24-250 dated December 10, 1986, or later FAA approved revision is required with this installation.

*Limitations and Conditions:* The approval of this change in type design applies to the basic aircraft of the specified model that is otherwise unmodified. This approval should not be extended to other specific aircrafts of this model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse e fect upon the airworthiness of that airplane.

This certificate and the supporting data which is the ratio for approval shall remain in effect until sur-

e is otherwise established by the Administrator of the rendered, suspended, revoked, or a termin

Federal Aviation Administration

Date of application: November 29, 4986

Date reissued:

Date of issuance: December 10, 1986

Date amended:

Bry direction of the Administrator

Certification Office

(Title)

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

This certificate may be transferred in accordance with FAR 21.47. Page 1 of 4 Pages

FAA FORM 8110-2 (10-68)

#### United States of America

## Department of Transportation—Jederal Aviation Administration

## Supplemental Type Certificate

(Continuation Sheet)

(I) December 10, 1986

Number

SA3550NM

## SUPPLEMENTAL TYPE CERTIFICATE ADDENDUM NO. SA3550NM

The conditions and limitations of Aircraft Specification No. 1A15 apply except as follows:

This Addendum, which is part of Supplemental Type Certificate No. SA3550NM prescribes conditions and limitations under which the product for which the STC was issued meets the airworthiness requirements of the Civil Air Regulations. A copy of this Addendum shall be maintained as part of the modified aircraft permanent records.

Supplemental Type Certificate Holder: Johnston Aircraft Service, Inc.

#### II - Model PA-24-250, as modified by STC SA3550NM

Engine

Lycoming IO-540-C1B5, modified per STC SE3553NM.

Lycoming 0-540-A1A, -A1A5, -A1B5, -A1C5, -A1D5, modified

per STC SE3552NM.

Engine Limits

All Operations: 2575 r.p.m. (250 h.p.)

Maximum Normal Operating:

2515 r.p.m. (247 h.p.), 28.8" MP

Propeller and Propeller Limits Hartzell HC-C2Y

Hub Model: HC-C2YK-1BF

Blade Model: F8477D-5R

Diameter: not over 79 in., not under 76 in.

Pitch Settings at 30 in. Station: Low 15.5° + .2°

High  $32^{0} + 1^{0}$ 

Governor: Hartzell Model F-4-4 or F-4-4A or Woodward Models

210185, A210185 or A210305 reworked per Johnston Aircraft Service, Inc. Installation Instructions

CPI-2.

Spinner:

Hartzell Model 82-A3519

Powerplant Markings

Tachometer: Maximum 2575 r.p.m. (Red Radial)

Normal 500 to 2515 r.p.m. (Green Arc)

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

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

This certificate may be transferred in accordance with FAR 21.47.

#### United States of America

## Department of Transportation—Jederal Aviation Administration

# Supplemental Type Certificate

(Continuation Sheet)

(I) December 10, 1986

Number

SA3550NM

## SUPPLEMENTAL TYPE CERTIFICATE ADDENDUM NO. SA35550NM (cont.)

Required Equipment

In addition to the equipment applicable and required by by Aircraft Specification No. 1A15, the following equipment must be installed as a result of incorporating STC SA3550NM:

- (a) Equipment specified in Johnston Aircraft Service, Inc. Installation Instructions No. CPI-2 dated December 10, 1986, or later FAA approved revision.
  - (b) Johnston Aircraft Service, Inc. Airplane Flight Supplement No. 24-250 dated December 10, 1986, or later FAA approved revision.
  - NOTE 1. Current weight and balance report including list of equipment included in certified empty weight, and loading instructions when necessary, must be in the aircraft.
  - NOTE 2. Placards (Ref.) No Change.
  - NOTE 3. Reserved.
- NOTE 4. Noise Characteristics

For this modification the maximum normal operating power has been limited to 247 HP, and 2515 RPM which results in no acoustical change as defined in paragraph 21.93(b) of the Federal Aviation Regulations.

--END--

# JOHNSTON AIRCRAFT SERVICE, INC. P.O. Box 1457 Mefford Field Tulare, California 93275

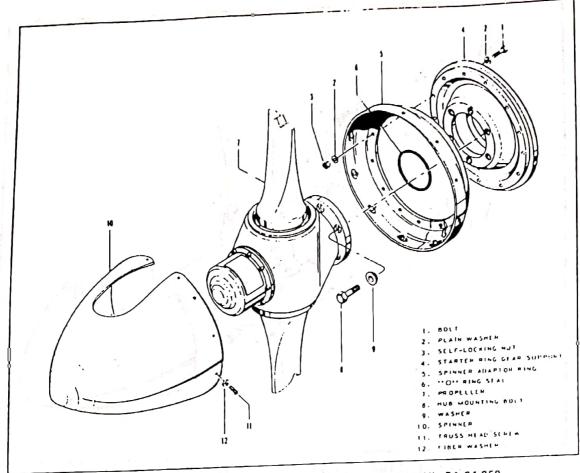
# INSTALLATION INSTRUCTIONS NO. CPI-2 for INSTALLATION OF HARTZELL PROPELLER HC-C2YK-1BF/F8477D-5R for PA24-250

FAA APPROVED PER S.T.C. NO. SA3550 NM

THIS S.T.C. IS ELIGIBLE ONLY WITH AIRCRAFT

THAT HAVE ENGINES MODIFIED PER S.T.C. SE 3553 NM or SE 3552 NM

DATE: DEC 1 0 1986



A-1. PROPELLER INSTALLATION (MCCAULEY) PA-24-250 FIGURE

## Removal Of Propeller. (McCauley) (PA-24-250) (Refer to Figure A-1)

- Remove the spinner (10) by removing the screws (11) that secure it to the spinner bulkhead (5)
- Place a drip pan under the propeller to catch oil spillage
- Cut the safety wire around the propeller mounting holts (8) and remove the holts from the engine
  - d Pull the propeller from the engine crankshaft.
  - Remove the propeller "O" ring (6) from the propeller hub bore
- The spinner bulkhead (5) may be removed from the starter ring gear (4) by removing nuts, washers and holts.

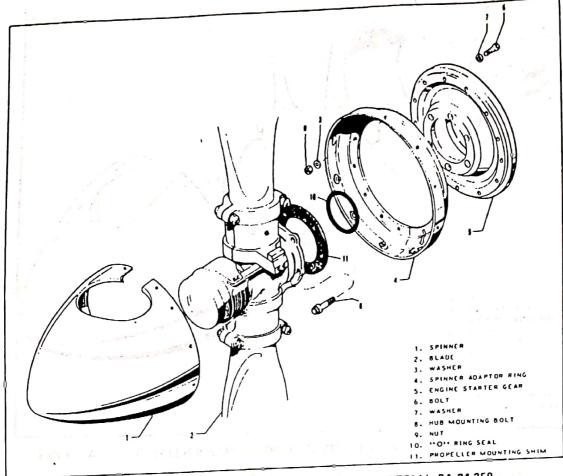


FIGURE A-2. PROPELLER INSTALLATION (HARTZELL) PA-24-250

Removal Of Propeller. (Hartzell) (PA-24-250) (Refer to Figure A-2,)

- a. Ascertain that the master switch and magneto switches are in the OFF position.
- b. Remove the spinner (1) by removing the screws that secure it to the spinner bulkhead (4).
- c. Place a drip pan under the propeller to catch oil spillage
- d. Cut the safety wire around the propeller mounting bolts (8) and remove them from the engine crankshaft flange.
  - e. Pull the propeller from the engine crankshaft.
  - f. Remove the propeller "O" ring (10) and shim (11) from the engine flange
- g. The spinner bulkhead (4) may be removed from the starter ring gear (8) by removing nuts, washers and bolts

page 3 of 11 pages

JOHNSTON AIRCRAFT SERVICE, INC.

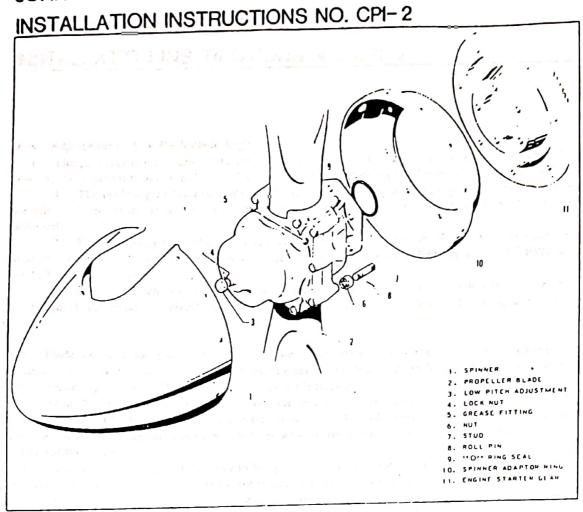


FIGURE A-3. PROPELLER INSTALLATION (HARTZELL) PA-24-250 (MODIFIED)

A-3. Installation Of Propeller, Hartzell Model HC-C2YK-1BF/8477D-5R and Hartzell Spinner Assembly, Part No. 82-A3519 (Refer to Figure A-3)

- a. Clean propeller and engine flanges.
- b. Install spinner bulkhead (10) on starter ring gear (11) and torque bolts to specifications given in Table A-1.
- c. Observe the starter ring gear to make sure it is mounted properly on the engine crankshaft flange. The crankshaft flange is stamped with an "O" mark and the starter ring gear is likewise identified by an "O" mark. Upon installation of the starter ring gear, the markings shall be mated to insure proper installation.
  - d. Lubricate and install O-ring (9) in the propeller hub O-ring grnove.
- Mount propeller on engine. Screw each stud (7) into its mating flange bushing a few threads at a time until all are tight. Torque bolts to specifications given in Table A.I. Safety the mounting bolts with MS20995C41 wire, routing the wire through the lock pins (8).
  - 1. Check blade track per paragraph A=5.
  - g. Check low pitch blade angle. (Refer to paragraph A-4.)
  - h. Install engine cowling if removed.
  - Install spinner (1) and secure with screws

page 4 of 11 pages

A-4. Adjustment Of Low Pitch Blade Angle Stop.

a. The propeller comes from the factory with the low pitch stop adjusted for proper blade angle. If, however, this adjustment has been disturbed, the following procedure is given for obtaining blade angle:

1. The blade angle (Refer to Table A-I) is determined by placing a propeller protractor on the face side of the propeller, at the 30 inch station, as measured from the hub center line. The blade must be horizontal.

2. The low pitch stop adjustment is made by a screw in the nose of the propeller cylinder. Rotating the screw clockwise increases the low pitch and reduces the static RPM by about 100 RPM for each half turn; or vice versa.

b. After the low pitch stop has been adjusted for proper blade angle, the governor should then be adjusted to obtain maximum rated engine RPM during take-off and climb as described in paragraph. A-9 or A-10.

A-5. Blade Track. Blade track is the ability of one blade tip to follow the other, while rotating, in almost the same plane. Excessive difference in blade track - more than .0625 inch - may be an indication of bent blades or improper propeller installation. Check blade track as follows:

2. With the engine shut down and blades vertical, secure to the aircrast a smooth board just under the tip of the lower blade. Move the tip fore and aft through its full "blade-shake" travel, making small marks with a pencil at each position. Then center the tip between these marks and scribe a line on the board for the full width of the tip.

b. Carefully rotate propeller by hand to bring the opposite blade down. Center the tip and scribe a

pencil line as before and check that lines are not separated more than .0625 inch.

c. Propellers having excess blade track should be removed and inspected for bent blades or for parts of sheared "O" ring, or foreign particles, which have lodged between hub and crankshaft mounting faces. Bent blades will require repair and overhaul of assembly.

page 5 of 11 pages

#### TABLE A-I

PROPELLER SPECIFICATIONS						
	Comments	15.5° co 34°				
or est Granza						
Propeller RPM Setting	Engine Static High RPM 24-250 (Modified)	2575 RPH Hax.				
responsation to the political degree of the contraction of the contrac	Engine Static Low RPM 24-250 (Modified)	1600 ± 50 RPM Min.				
Propeller Torque Limits	Description	Required Torque (Dry)				
The state of the s	Spinner Bulkhead Bulkhead to Starter Ring Gear Bulkhead to Propeller Hub	100 inch pounds 22 foot pounds				
endighter the state of the control o	Propeller Mounting Bolts Studs Spinner Attachment Screws	55 to 60 foot pounds 60 to 70 foot pounds 40 inch pounds				

The second second structure of the second se

A-6. Removal Of Propeller Governor.

a. Lift the left side panel of the engine cowling.

b. Disconnect control cable from governor control arm.

c. Remove the governor mounting stud nuts. It will be necessary to raise the governor as the nuts are being removed before the nuts can be completely removed.

d. Remove the mounting gasket. If the governor is to be removed for a considerable length of time and another unit is not substituted, it is advisable to cover the mounting pad to prevent damage caused by foreign matter.

#### A-7. Governor Change.

a. If your governor is a Hartzell B-4-2 Model, it must be replaced with Hartzell Model F4-4A Governor or a reworked Woodward Governor (see next sentence). If your governor is a Woodward Model 210185 or 210305 then it can be reworked to be compatible with the Hartzell Compact Propeller. See Page 10 of these instructions.

#### A-8. Installation Of Propeller Governor.

- Clean the mounting pad thoroughly making very certain that there are no foreign particles in the recess around the drive shaft.
- b. Place the governor mounting gasket in position with the raised portion of the screen facing away from the engine.
  - c. . Align the splines on the governor shaft with the engine drive and slide the governor in position.
- d. Raise governor off mounting pad enough to install washers and start mounting nuts. Torque nuts evenly.
  - e. Connect the control cable end to the governor control arm.
  - f. Adjust governor control per paragraph A-9 or A-10, if necessary!

## Adjustment Of Propeller Governor. (Hodified Woodward) (Refer to Figure A-4)

- a. Start the engine in accordance with the directions given in Owner's Operating Manual and allow to warm up.
- b. Push the "PROPELLER" cockpit control as far forward as it will go. At this position the governor speed adjusting control lever will be against the hi-rpm fine adjusting screw.
- c. Observe engine speed. Adjust the governor speed by means of the line adjustment screw for 2575 rpm. To do this, release the fasteners and lift the side engine cowling. Release the speed control lever clamp screw (4) and move the lever relative to the cover serrations. Once serration movement in a clockwise direction produces a decrease in speed of 100 rpm; one serration counter-clockwise increases the speed 100 rpm. One revolution of the hi-rpm fine adjustment screw in a clockwise direction decreases engine speed 25 rpm, counter-clockwise rotation increases engine speed 25 rpm, for each revolution of the screw.
- d. After setting the engine rpm at 2575, tighten the control lever clamping screw, and run the self-locking nut on the fine adjustment screw against the stop ring projection. Then safety-wire the head of the screw to the projection.
  - c. Fasten cowling on both sides.

page 7 of 11 pages

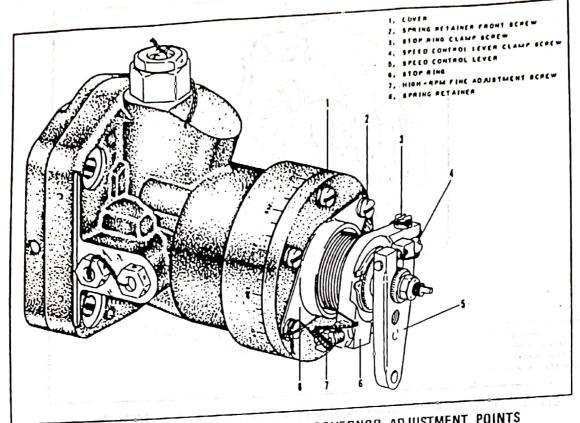


FIGURE A.4. WOODWARD PROPELLER GOVERNOR ADJUSTMENT POINTS

- A-10. Adjustment Of Propeller Governor. (Hartzell) (Refer to Figure A-5.)
  - 2. Release the fasteners and lift the left side engine cowling.
- b. Start the engine in accordance with the directions given in the Owner's Flight Manual and allow to
- c. Push the "PROPELLER" cockpit control as far forward as it will go. At this position the governor warm up. speed adjusting control lever will be against the hi-tpm fine adjusting screw.
- d. Observe engine speed. Adjust the governor by means of the fine adjustment screw for 2575 RPM. To do this, loosen the fine adjustment screw locknut and turn the hi-rpm fine adjustment screw in a clockwise direction to decrease engine speed and a counterclockwise rotation to increase engine speed. One revolution of the fine adjustment screw increases or decreases the propeller speed approxi-
- e. After setting the governor for high RPM, run the self-locking nut on the fine adjustment screw mately 15 RPM. against the base projection to lock.
  - f. Pull the "PROPELLER" cockpit control aft to the low RPM position.
- g. Observe engine speed. Set to 1600 RPM either by threading the fitting at the governor control arm onto the cable, or by turning it in the direction tending to remove the fitting from the cable, depending on whether it is required to decrease or increase engine speed, respectively. It will be necessary, of course, prior to adjusting, to remove the self-locking nut and disconnect it from the governor control arm and to release the fitting locknut.
- h. Reconnect cable to governor control arm, apply fitting locknut and recheck engine by moving cockpit control in and out of the appropriate setting.
  - i. Secure the cowling.

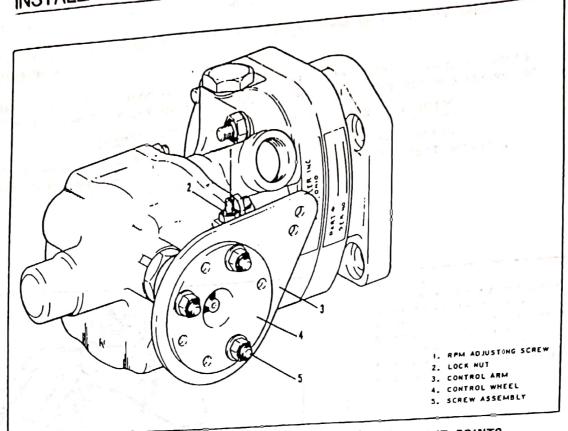


FIGURE A-5. HARTZELL PROPELLER GOVERNOR ADJUSTMENT POINTS

A-11. Perform weight and balance calculation making sure aircraft is in C.G. envelope and make change to useful load. Fill out FAA Form 337 with brief description of change and show approval in accordance with S.T.C. No. SABSSONM. Johnston Aircraft Service, Inc.'s Weight and Balance Supplement, Report 1359, will help with calculations.

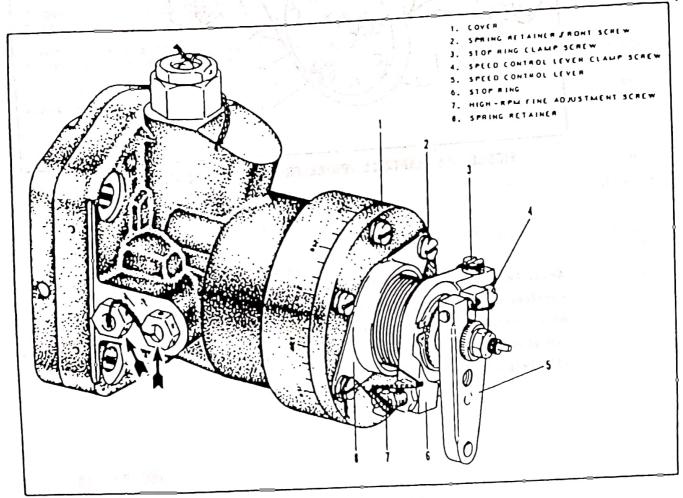
## WOODWARD 210185 GOVERNOR MODIFICATION TO A210185

DVI BUILD PAROTIA MOTERINE

- Remove (2) Finch Hex Plugs (shown by arrows in illustration). 1.
- Switch 5/32 inch Allen Cap Screw from Right Hand hole to Left Hand 2. Hand Hole.
- This change converts Re-install (2) 1/2 inch Hex Plugs and Safety Wire. the Oil Flow to proper direction for the Hartzell Compact Hub Propeller. 3.

## WOODWARD 210305 GOVERNOR MODIFICATION TO A210305

This Modification MUST be accomplished by a qualified Governor Overhaul Shop due to Pilot Valve change. Johnston Aircraft Service, Inc. can furnish a re-worked Exchange Governor.



WOODWARD PROPELLER GOVERNOR

page 10 of 11 pages

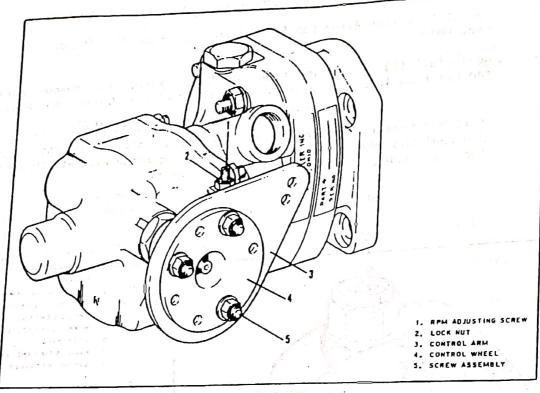


FIGURE A-5. HARTZELL PROPELLER GOVERNOR ADJUSTMENT POINTS

A-11. Perform weight and balance calculation making sure aircraft is in C.G. envelope and make change to useful load. Fill out FAA Form 337 with brief description of change and show approval in accordance with S.T.C. No. SABSSONM. Johnston Aircraft Service, Inc.'s Weight and Balance Supplement, Report 1359, will help with calculations.

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page 8 of 11 pages

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Page	5A Sec. 2		
Model	PA24-250		
Serial Nos.	All		
9.1	1A \$2 75% M		

# JOHNSTON AIRCRAFT SERVICE, INC. WEIGHT AND BALANCE SUPPLEMENT 250 MODEL PA24-250 COMANCHE EQUIPMENT LIST

ITEM	A Sign fair in their materia.	UE LOUX	ARM - IN.
PROPELLE	RS AND PROPELLER ACCESSORIES	<u>WE I GHT</u>	AFT DATUM
DELETE	1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 ×		
CLODELLA	- Hartzell Model HC-A2XK-1 or		
	~ McCauley Model 2D36C28 with	63 Lb	1.5 ln.
Governor 210185, 2	- Hartzell B-4-2 or Woodward 10250, A210185 and A210305		1.5 In.
Propeller	Spinner Dome and Bulkhead	5 Lb	10.0 In.
	Spriner Dome and Bulkhead	A Park Barrier Barrier	,1.5 In.
ADD			
Propel∣er Governor -	- Hartzell Model HC-C2YK-1BF/8477D-5R - Hartzell F-4-4A	57.5 Lb	1.5 ln.
• 6	or Moodward 210185. A210185	6 Lb	10.0 In.
Propeller	Spinner Dome and Bulkhead	5 Lb	10.0 ln.
vaabier -	Hartzell Model 82-A3519	5.7 Lb	1.5 ln.

DATE: \_\_ DEC 1 0 1986

page 11 of 11 pages

JOHNSTON AIRCRAFT SERVICE, INC. P.O. BOX 1457
TULARE, CALIFORNIA 93275
SUPPLEMENT NO. 24-250

SUPPLEMENT TO PIPER PA24-250 AFM

S.T.C. No. SA 3550 NM

F.A.A. APPROVED SUPPLEMENT TO
PIPER PA24-250

AIRPLANE FLIGHT MANUAL

Aircraft Serial No.	
Registration No.	

This supplement must be attached to the F.A.A Approved Flight Manual when the airplane is modified by the installation of Hartzell HC-C2YK-1BF/F 8477D⇒5R Propeller in accordance with S.T.C. No. SA3550NM

The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the basic Airplane Flight Manual.

F.A.A. Approved Hawin t. Kammelse

Supervisor, Technical/Administrative Support Section Federal Aviation Administration

Western Aircraft Certification Office

Northwest Mountain Region.

F.A.A. APPROVED DATE: 12/10/86

Page 1 of 3 Pages

JOHNSTON AIRCRAFT SERVICE, INC. P.O. BOX 1457 TULARE, CALIFORNIA 932 75 SUPPLEMENT NO. 24-250

SUPPLEMENT TO PIPER PA24-250 AFM

S.T.C. No. SA 3550NM

LOG OF PAGES ( INCLUDING REVISIONS)

NO. OF REV **PAGES** 

DATE

DESCRIPTION

APPROVED

NO

Orig.

1 thru 3

Complete Supplement

Supervisor, Technical Administrative Support

Section,

WACO. F.A.A.

F.A.A. APPROVED DATE: 12/10/86

Page 2 of 3 Pages

JOHNSTON AIRCRAFT SERVICE, INC. P.O. BOX 1457 TULARE, CALIFORNIA 93275 24-250 SUPPLEMENT NO.

SUPPLEMENT TO PIPER PA 24-250 AFM S.T.C. No. SA 3550

1. LIMITATIONS:

Engine

Lycoming Model 0-540 A1A, A1A5, A1B5, A1C5, A1D5,

modified per S.T.C. SE 3552

- 0R-

Lycoming Model 10-540-C1B5, Modified per S.T.C.

SE 3553 NM

**Engine Limits** 

2575 r.p.m. Maximum

Maximum Normal Operating

(247 h.p.) 2515 r.p.m.

(250 h.p.)

Fuel Grade

Aviation Gasoline - 91/96 Minimum Octane

Hartzell Constant Speed Controllable; Propeller Hub Model HC-C2YK-1BF

Blade Model F8477D-5R

Pitch Settings at 30 inch Station: Low 15.5° ±.2°; High 32° ± 1°

Diameter:

79 inches maximum 76 inches maximum

Engine Instruments and Indicators

Hartzell Model F-4-4A Governor:

See Johnston Aircraft Service, Inc. Installation

Instructions CPI-2, dated, DEC 1 0 1986 for

other Models eligible.

Spinner:

Hartzell Model 82-A3519

Tachometer: Green Arc ( Normal Operating Range)

500 to 2515 r.p.m.;

Red Line (maximum continuous) 2575 r.p.m.

PROCEDURES

No Change

PERFORMANCE

Equal to or Better Than That of the Basic Unmodified

Aircraft.

F.A.A. APPROVED DATE:

12/10/86

#### United States of America

# Department of Transportation—Federal Aviation Administration

# Supplemental Type Certificate

(Continuation Sheet)

(I) December 10, 1986

Number

# SUPPLEMENTAL TYPE CERTIFICATE ADDENDUM NO. SA3550NM

The conditions and limitations of Aircraft Specification No. 1A15 apply except as follows:

This Addendum, which is part of Supplemental Type Certificate No. SA3550NM prescribes conditions and limitations under which the product for which the STC was issued meets the airworthiness requirements of the Civil Air Regulations. A copy of this Addendum shall be maintained as part of the modified aircraft permanent records.

Supplemental Type Certificate Holder: Johnston Aircraft Service, Inc.

# II - Model PA-24-250, as modified by STC SA3550NM

Engine

Lycoming IO-540-C1B5, modified per STC SE3553NM.

Lycoming 0-540-A1A, -A1A5, -A1B5, -A1C5, -A1D5, modified

per STC SE3552NM.

Engine Limits

All Operations: 2575 r.p.m. (250 h.p.)

Maximum Normal Operating:

2515 r.p.m. (247 h.p.), 28.8" MP

Propeller and Propeller Limits Hartzell HC-C2Y

Hub Model: HC-C2YK-1BF

Blade Model: F8477D-5R

Diameter: not over 79 in., not under 76 in. Pitch Settings at 30 in. Station: Low  $15.5^{\circ} \pm .2^{\circ}$ 

High  $32^{0} + 1^{0}$ 

Governor:

Hartzell Model F-4-4 or F-4-4A or Woodward Models

210185, A210185 or A210305 reworked per Johnston Aircraft Service, Inc. Installation Instructions

CPI-2.

Spinner:

Hartzell Model 82-A3519

Powerplant Markings

Tachometer:

Maximum 2575 r.p.m. (Red Radial)

Normal 500 to 2515 r.p.m. (Green Arc)

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

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

This certificate may be transferred in accordance with FAR 21.47.

## United States of America

# Department of Transportation—Jederal Aviation Administration

# Supplemental Type Certificate

(Continuation Sheet)

(I) December 10, 1986

Number

SA3550NM

SUPPLEMENTAL TYPE CERTIFICATE ADDENDUM NO. SA35550NM (cont.)

Required Equipment

In addition to the equipment applicable and required by by Aircraft Specification No. 1A15, the following equipment must be installed as a result of incorporating STC SA3550NM:

- (a) Equipment specified in Johnston Aircraft Service, Inc.
  Installation Instructions No. CPI-2 dated December 10,
  1986, or later FAA approved revision.
  - (b) Johnston Aircraft Service, Inc. Airplane Flight Supplement No. 24-250 dated December 10, 1986, or later FAA approved revision.
  - NOTE 1. Current weight and balance report including list of equipment included in certified empty weight, and loading instructions when necessary, must be in the aircraft.
  - NOTE 2. Placards (Ref.) No Change.
  - NOTE 3. Reserved.
  - NOTE 4. Noise Characteristics

For this modification the maximum normal operating power has been limited to 247 HP, and 2515 RPM which results in no acoustical change as defined in paragraph 21.93(b) of the Federal Aviation Regulations.

--END--

# JOHNSTON AIRCRAFT SERVICE, INC. P.O. Box 1457 Mefford Field Tulare, California 93275

INSTALLATION INSTRUCTIONS NO. CPI-2

for

INSTALLATION OF HARTZELL PROPELLER HC-C2YK-1BF/F8477D-5R

for PA24-250

FAA APPROVED PER S.T.C. NO. SA3550NM

THIS S.T.C. IS ELIGIBLE ONLY WITH AIRCRAFT

THAT HAVE ENGINES MODIFIED PER S.T.C. SE 3553 NM or SE 3552 NM

page 1 of 11 pages

DATE: DEC 1 0 1986

# JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI-2

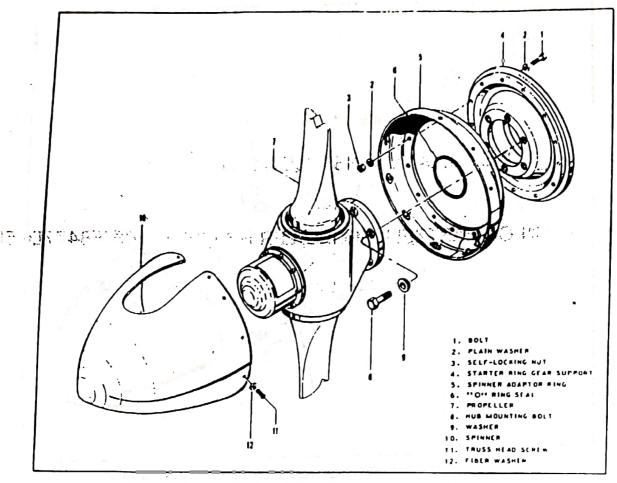


FIGURE A-1. PROPELLER INSTALLATION (MCCAULEY) PA-24-250

- A-1 Removal Of Propeller. (McCauley) (PA-24-250) (Refer to Figure A-1.)
  - a. Remove the spinner (10) by removing the screws (11) that secure it to the spinner bulkhead (5)
  - b. Place a drip pan under the propeller to catch oil spillage
- Cut the safety wire around the propeller mounting holts (8) and remove the holts from the engine crankshaft flange.
  - d. Pull the propeller from the engine crankshaft.
  - c. Remove the propeller "O" ring (6) from the propeller hub bore
- 1 The spinner bulkhead (5) may be removed from the starter ring gear (4) by removing nuts, washers and bolts. 7

# JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI-2

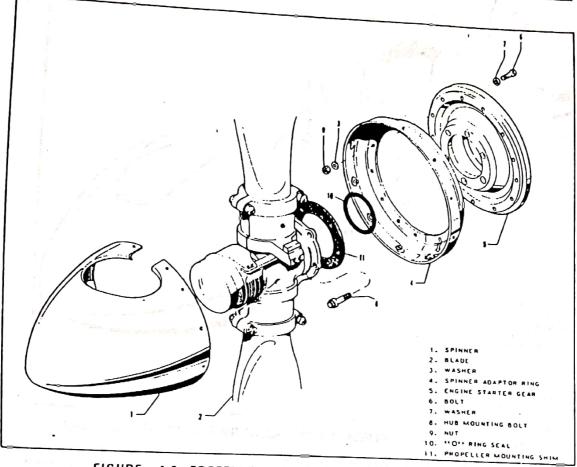


FIGURE A-2. PROPELLER INSTALLATION (HARTZELL) PA-24-250

A-2 Removal Of Propeller. (Hartzell) (PA-24-250) (Refer to Figure A-2.)

- a. Ascertain that the master switch and magneto switches are in the OFF position.
- b. Remove the spinner (1) by removing the screws that secure it to the spinner bulkhead (4).
- c. Place a drip pan under the propeller to catch oil spillage
- d. Cut the safety wire around the propeller mounting bolts (8) and remove them from the engine crankshaft flange.
  - c. Pull the propeller from the engine crankshaft.
  - f. Remove the propeller "O" ring (10) and shim (11) from the engine flange
- g. The spinner bulkhead (4) may be removed from the starter ring gear (8) by removing nuts, washers and bults.

JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI-2

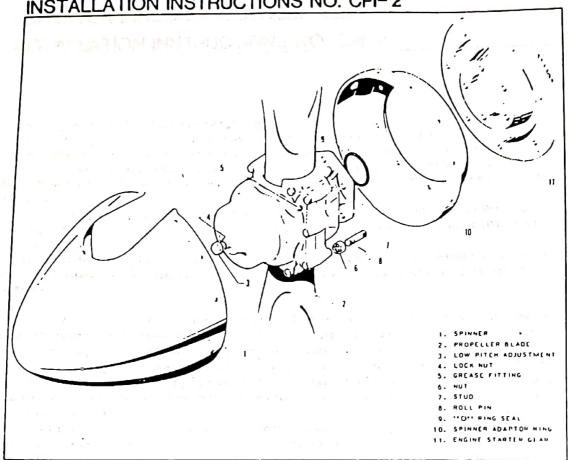


FIGURE A-3. PROPELLER INSTALLATION (HARTZELL) PA-24-250 (MODIFIED)

A-3. Installation Of Propeller, Hartzell Model HC-C2YK-1BF/8477D-5R and Hartzell Spinner Assembly, Part No. 82-A3519 (Refer to Figure A-3)

- a. Clean propeller and engine flanges.
- b. Install spinner hulkhead (10) on starter ring gear (11) and torque bolts to specifications given in Table A-1.
- c. Observe the starter ring gear to make sure it is mounted properly on the engine crankshaft flange. The crankshaft flange is stamped with an "O" mark and the starter ring gear is likewise identified by an "O" mark. Upon installation of the starter ring gear, the markings shall be mated to insure proper installation.
  - d. Lubricate and install O-ring (9) in the propeller hub O-ring grnove.
- e. Mount propeller on engine. Serew each stud (7) into its matting flange bushing a few threads at a time until all are tight. Torque bolts to specifications given in Table. A-L. Safety the mounting bolts with MS20995C41 wire, routing the wire through the lock pins (8).
  - f. Check blade track per paragraph A-5.
  - g. Check low pitch blade angle. (Refer to paragraph A-4.)
  - h. Install engine cowling if removed.
  - Install spinner (1) and secure with screws

# JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI-2

A-4. Adjustment Of Low Pitch Blade Angle Stop.

- a. The propeller comes from the factory with the low pitch stop adjusted for proper blade angle. If, however, this adjustment has been disturbed, the following procedure is given for obtaining blade angle:
- I. The blade angle (Refer to Table A-I) is determined by placing a propeller protractor on the face side of the propeller, at the 30 inch station, as measured from the hub center line. The blade must be horizontal.
- 2. The low pitch stop adjustment is made by a screw in the nose of the propeller cylinder. Rotating the screw clockwise increases the low pitch and reduces the static RPM by about 100 RPM for each half turn; or vice versa.
- b. After the low pitch stop has been adjusted for proper blade angle, the governor should then be adjusted to obtain maximum rated engine RPM during take-off and climb as described in paragraph A-9 or A-10.
- A-5. Blade Track. Blade track is the ability of one blade tip to follow the other, while rotating, in almost the same plane. Excessive difference in blade track more than .0625 inch may be an indication of bent blades or improper propeller installation. Check blade track as follows:
- a. With the engine shut down and blades vertical, secure to the aircraft a smooth board just under the tip of the lower blade. Move the tip fore and aft through its full "blade-shake" travel, making small marks with a pencil at each position. Then center the tip between these marks and scribe a line on the board for the full width of the tip.
- b. Carefully rotate propeller by hand to bring the opposite blade down. Center the tip and scribe a pencil line as before and check that lines are not separated more than .0625 inch.
- c. Propellers having excess blade track should be removed and inspected for bent blades or for parts of sheared "O" ring, or foreign particles, which have lodged between hub and crankshaft mounting faces. Bent blades will require repair and overhaul of assembly.

# JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI- 2

#### TABLE A-I

And a street of the second of	OPELLER SPECIFICATIO	N5
The content of a great trap of the content of the c	in the Tomas services The di- gress of constants against	the second last of the second
Blade Angle PA-24-250	Low Pitch (High RPM) High Pitch (Low RPM)	15.5° 15.5°
Flat 2 ga . A	400 E 17 18 E	<u> </u>
Propeller RPM Setting	Engine Static High RPM 24-250 (Modified)	2575 RPH Hax.
matrice at MF so the Greater	Engine Static Low RPM 24-250 (Modified)	1600 ± 50 RPM Min.
Commenter Riversaliste	Lignor mys a 1	
Propeller Torque Limits	Description	Required Torque (Dry)
en e	Spinner Bulkhead Bulkhead to Starter	The second of the second
	Ring Gear Bulkhead to Propeller Hub	100 inch pounds 22 foot pounds
	Propeller Mounting Bolts	55 to 60 foot pounds
	Studs Spinner Attachment	60 to 70 foot pounds
	Screws	40 inch pounds

# JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI-2

A-6. Removal Of Propeller Governor.

a. Lift the left side panel of the engine cowling.

b. Disconnect control cable from governor control arm.

c. Remove the governor mounting stud nuts. It will be necessary to raise the governor as the nuts are being removed before the nuts can be completely removed.

d. Remove the mounting gasket. If the governor is to be removed for a considerable length of time and another unit is not substituted, it is advisable to cover the mounting pad to prevent damage caused by foreign matter.

#### A-7. Governor Change.

a. If your governor is a Hartzell B-4-2 Model, it must be replaced with Hartzell Model F4-4A Governor or a reworked Woodward Governor (see next sentence). If your governor is a Woodward Model 210185 or 210305 then it can be reworked to be compatible with the Hartzell Compact Propeller. See Page 10 of these instructions.

#### A-8. Installation Of Propeller Governor.

- a. Clean the mounting pad thoroughly making very certain that there are no foreign particles in the recess around the drive shaft.
- b. Place the governor mounting gasket in position with the raised portion of the screen facing away from the engine.
  - c. . Align the splines on the governor shaft with the engine drive and slide the governor in position.
- d. Raise governor off mounting pad enough to install washers and start mounting nuts. Torque nuts evenly.
  - e. Connect the control cable end to the governor control arm.
  - f. Adjust governor control per paragraph A-9 or A-10, if necessary!

# A-9. Adjustment Of Propeller Governor. (Hodified Woodward) (Refer to Figure A-4)

- a. Start the engine in accordance with the directions given in Owner's Operating Manual and allow to warm up.
- b. Push the "PROPELLER" cockpit control as far forward as it will go. At this position the governor speed adjusting control lever will be against the hi-rpm fine adjusting screw.
- c. Observe engine speed. Adjust the governor speed by means of the fine adjustment screw for 2575 rpm. To do this, release the fasteners and lift the side engine cowling. Release the speed control lever clamp screw (4) and move the lever relative to the cover serrations. Once serration movement in a clockwise direction produces a decrease in speed of 100 rpm; one serration counter-clockwise increases the speed 100 rpm. One revolution of the hi-rpm fine adjustment screw in a clockwise direction decreases engine speed 25 rpm, counter-clockwise rotation increases engine speed 25 rpm, for each revolution of the screw.
- d. After setting the engine rpm at 2575, tighten the control lever clamping screw, and run the self-locking nut on the fine adjustment screw against the stop ring projection. Then safety-wire the head of the screw to the projection.
  - c. Fasten cowling on both sides.

# JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI-2

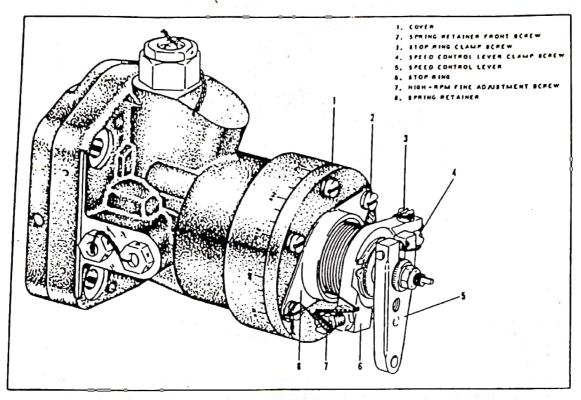


FIGURE A-4. WOODWARD PROPELLER GOVERNOR ADJUSTMENT POINTS

- A-10. Adjustment Of Propeller Governor. (Hartzell) (Refer to Figure A-5.)
  - a. Release the fasteners and lift the left side engine cowling.
- b. Start the engine in accordance with the directions given in the Owner's Flight Manual and allow to warm up.
- c. Push the "PROPELLER" cockpit control as far forward as it will go. At this position the governor speed adjusting control lever will be against the hi-rpm fine adjusting screw.
- d. Observe engine speed. Adjust the governor by means of the fine adjustment screw for 2575 RPM. To do this, loosen the fine adjustment screw lockmut and turn the hi-rpm fine adjustment screw in a clockwise direction to decrease engine speed and a counterclockwise rotation to increase engine speed. One revolution of the fine adjustment screw increases or decreases the propeller speed approximately 15 RFM.
- c. After setting the governor for high RPM, run the self-locking nut on the fine adjustment serew against the base projection to lock.
  - f. Pull the "PROPELLER" cockpit control aft to the low RPM position.
- g. Observe engine speed. Set to 1600 NHM either by threading the fitting at the governor control arm onto the cable, or by turning it in the direction tending to remove the fitting from the cable, depending on whether it is required to decrease or increase engine speed, respectively. It will be necessary, of course, prior to adjusting, to remove the self-locking but and disconnect it from the governor control arm and to release the fitting lockout.
- h. Reconnect cable to governor control arm, apply fitting locknut and recheck engine by moving cockpit control in and out of the appropriate setting.
  - i. Secure the cowling.

# JOHNSTON AIRCRAFT SERVICE, INC. INSTALLATION INSTRUCTIONS NO. CPI-2

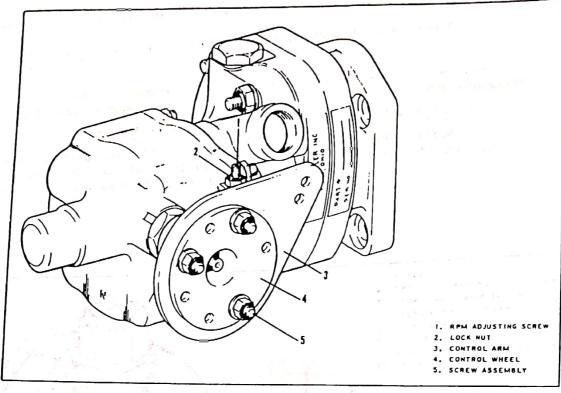


FIGURE A-5. HARTZELL PROPELLER GOVERNOR ADJUSTMENT POINTS

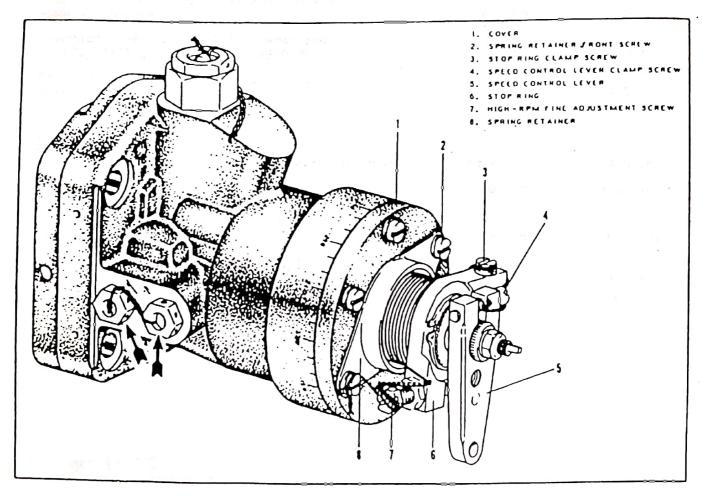
A-11. Perform weight and balance calculation making sure aircraft is in C.G. envelope and make change to useful load. Fill out FAA Form 337 with brief description of change and show approval in accordance with S.T.C. No. SA3550NM. Johnston Aircraft Service, Inc.'s Weight and Balance Supplement, Report 1359, will help with calculations.

### WOODWARD 210185 GOVERNOR MODIFICATION TO A210185

- 1. Remove (2) inch Hex Plugs (shown by arrows in illustration).
- 2. Switch 5/32 inch Allen Cap Screw from Right Hand hole to Left Hand Hand Hole.
- 3. Re-install (2)  $\frac{1}{2}$  inch Hex Plugs and Safety Wire. This change converts the Oil Flow to proper direction for the Hartzell Compact Hub Propeller.

## WOODWARD 210305 GOVERNOR MODIFICATION TO A210305

This Modification MUST be accomplished by a qualified Governor Overhaul Shop due to Pilot Valve change. Johnston Aircraft Service, Inc. can furnish a re-worked Exchange Governor.



WOODWARD PROPELLER GOVERNOR

page 10 of 11 pages

Nepor i	1000	
Page	5A Sec. 2	
Model	PA24-250	
Serial Nos.	AII	

# JOHNSTON AIRCRAFT SERVICE, INC. WEIGHT AND BALANCE SUPPLEMENT 250 MODEL PA24-250 COMANCHE EQUIPMENT LIST

	11.00			ARM - IN.
<u>EM</u>		o, Adori i <u>WE</u>	IGHT	AFT DATUM
PROPELLERS AND PROPELLER A	CCESSORIES			
DELETE	, e, a regester	21.15		
Propeller - Hartzell Mode	I HC-A2XK-1 or		120	
HC-82XK-1D with 8433-7 Bla w∛th V8433N-7, or	des or HC-A2VK-1	63	Lb	1.5 ln.
Prope∛ler - McCauley Model 80MM - 6 Blades	2D36C28 with	60	Lb	1.5 ln.
Governor - Hartzell B-4-2 210185, 210250, A210185 an		5	Lb	10.0 In.
Propeller Spinner Dome and Adapter	Bulkhead	-3-1 n 3	Lb	1.5 ln.
ADD				
Propeller - Hartzell Model	HC-C2YK-1BF/8477D-5R	57.5	Lb	1.5 ln.
Governor - Hartzell F-4≈4A	en a service de la companya de la co	6	Lb	10.0 ln.
Reworked Woodward 210185, or A210305	A210185	s as a 1. 5	Lb	10.0 ln.
Propeller Spinner Dome and Adapter - Hartzell Model 8	I Bulkhead 32-A3519	5.7	Lb	1.5 ln.

DATE:	DEC 1	0	1986	
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JOHNSTON AIRCRAFT SERVICE, INC. P.O. BOX 1457
TULARE, CALIFORNIA 93275
SUPPLEMENT NO. 24-250

SUPPLEMENT TO PIPER PA 24-250 AFM

S.T.C. No. SA 3550 NM

1. LIMITATIONS:

Engine

Lycoming Model 0-540 A1A, A1A5, A1B5, A1C5, A1D5,

modified per S.T.C. SE 3552 NM

- OR -

Lycoming Model 10-540-C1B5, Modified per S.T.C.

SE 3553 NM

**Engine Limits** 

Maximum

2575 r.p.m. (250 h.p.)

Maximum Normal Operating

2515 r.p.m. (247 h.p.)

Fue Grade

Aviation Gasoline - 91/96 Minimum Octane

Propeller

Hartzell Constant Speed Controllable;

Hub Model HC-C2YK-1BF Blade Model F8477D-5R

Pitch Settings at 30 inch Station: Low 15.5°  $\pm$ .2°; High 32°  $\pm$  1°

Diameter:

79 inches maximum

76 inches maximum

Engine Instruments and Indicators

Governor: Hartzell Model F-4-4A .

See Johnston Aircraft Service, Inc. Installation

Instructions CPI-2, dated, DEC 10 1986 for

other Models eligible.

Spinner:

Hartzell Model 82-A3519

Tachometer: Green Arc ( Normal Operating Range)

500 to 2515 r.p.m.;

Red Line (maximum continuous) 2575 r.p.m.

PROCEDURES

No Change

3. PERFORMANCE

Equal to or Better Than That of the Basic Unmodified

Aircraft.

12/10/86

F.A.A. APPROVED DATE:

Page 3 of 3 Pages

#### United States of America

### Department of Transportation — Jederal Aviation Administration

# Supplemental Type Certificate

Number SA3550NM

This certificate, issued to

Johnston Aircraft Service, Inc.

cortifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Gart Regulations, effective November 1, 1949, including Amendments 3-1 to 3-12, inclusive.

Original Product - Trype Certificate Number: 1A15

Make: Piper Model: PA-24-250

Description of Type Design Change: Installation of Hartzell HC-C2YK-1BF/F8477D-5R propeller in accordance with FAA sealed Johnston Aircraft Service, Inc. Installation Instructions No. CPI-2 "NC" dated December 10, 1986, or later FAA approved revision. FAA Approved Johnston Aircraft Service, Inc. Airplane Flight Manual Supplement No. 24-250 dated December 10, 1986, or later FAA afproved revision is required with this installation.

Limitations and Conditions: The approval of this change in type design applies to the basic aircraft of the specified model that is otherwise unmodified. This approval should not be extended to other specific airplaces of this model on which other previously approved modifications are incorpor ted, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

This certificate and the supporting data which to the train for approval shall remain in effect until sur-

is otherwise established by the Administrator if the

Dale of application: November 29, 1986

Dute reissued:

FAA FORM 8110-2 (10-68)

Date of issuance: December 10, 1986

Date amended:

Manager, Western Aircraft Certification Office

(Title)

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

Bry direction of the Administrator

	AD Number	PDF	Rec	Subject	Effective	compliance
	59-06-05	PDF	No	Nose gear bungee	06/01/59	•
	<u>59-12-09</u>	PDF	No	Control wheel sprocket stud Aileron	07/30/59	
	<u>59-13-02</u>	PDF	No	balance weight	10/01/59	n/a by sn
	<u>59-26-02</u>	<u>PDF</u>	No	Fuel cell vent tubes	01/15/60	n/a by sn
	60-24-03	<u>PDF</u>	No	Fuel vent tubes	12/19/60	n/a by sn
	61-16-06	PDF	No	Fuel selector valve handles Exhaust stack	08/31/61	n/a by sn
	61-20-02	<u>PDF</u>	Yes	reinforcemen t Aileron	10/20/61	n/a by sn
	<u>62-10-03</u>	<u>PDF</u>	No	counterweigh t bay rework	04/26/62	n/a by sn muffler hollow
	62-26-05	PDF	No	Exhaust system	12/05/62	with brace 6-13-
	63-27-03	<u>PDF</u>	No	Landing gear retraction	01/22/64	chanced 25 amp cb to 30
	<u>05-27-05</u>	P P	(c.ecg)	motor circuit Carburetor air box	01/23/64	amp ·
	<u>64-10-04</u>	<u>PDF</u>	No	deflector vanes	05/12/64	removed vanes 6-13-2013 kit 754-475
	64-22-03	PDF	No	Landing gear safety switch Stabilator control	09/28/64	installed 10/03/1962
	<u>65-11-04</u>	<u>PDF</u>	No	system Nose landing	05/15/65	n/a by sn kit 756-911 installed 8-20-
	65-25-03	PDF	no	gear drag link clevis	12/10/65	65 terminated recurring status muffler hollow
				iii jangan Segeralah		with brace 6-13- 2003 this terminates
	<u>68-05-01</u>	<u>PDF</u>	no	Exhaust mufflers Fuel cell	03/05/69	recurrence per para (i)
100	<u>68-13-03</u>	PDF	Yes	collapse Operation	03/05/69	marked on airspeed
	72-22-05	<u>PDF</u>	No	limitation placard	12/26/74	indicator 6-13-

74-10-03 R	PDF	No	2		
74-13-01	PDF		Superseded by	01/01/74	
7.40.4	LDF	No	Superseded by	06/18/74	
					Attach bolts are
74 10 00	5-16-10		Stabilator	\$1 18 50 V	stainless steel
<u>74-13-03</u>	<b>PDF</b>	no	attach bolts	04/30/76	this terminated recurring status
			Engine oil -	0 1/20/70	recurring status
			Beryl		100
			Aviation	110.30 43	
			filtrator		
			assembly -		
75 05 02	DDD		STC		
<u>75-05-02</u>	$\underline{\mathbf{PDF}}$	Yes	SA2653WE	02/21/75	n/a
75 12 06	-		Fin forward	1 1 1 4 1 8 PM	
<u>75-12-06</u>	<u>PDF</u>	Yes	spar	06/05/75	
			Torque tube		
75 27 00	<b>DD</b>		bearing		
<u>75-27-08</u>	<u>PDF</u>	No	fittings	06/03/76	pcw 1-7-1976
76 10 0=	2.3		Stabilator		
<u>76-19-07</u>	<u>PDF</u>	No	weight assy	09/29/76	not installed
	7 7 8	2.0			kit 760-914
		*** ] ***			installed 8-25-
A 2 1			Aileron spar		2005 terminates
<u>77-08-01</u>	<b>PDF</b>	Yes	cracks	04/18/77	recurring per para (b)
			Prevent	0 1/10///	para (b)
			landing gear		
<u>77-13-21</u>	<u>PDF</u>	Yes	collapse	12/16/77	
			Incorporation	12/10///	
			of Piper Kit		
<u>79-20-10</u>	<b>PDF</b>	Yes	763893	10/04/79	PCW 9-3-1984
			Placard near	10/04/75	
82-23-01 R1	<b>PDF</b>	No	flap actuator	04/07/83	n/a robertson
			Lower spar	04/07/03	SiC
			cap	21.2	
83-19-03	<b>PDF</b>	No	inspection	00/30/93	pcw 9-3-1984
			Brake	03/30/63	pcw 9-3-1984
			operation		
			placard P/N		
85-02-05 R1	PDF	No	81090-02	11/21/97	
			Stabilitor	11/21/9/	pcw
94-13-10	<b>PDF</b>	no	torque tube	09/13/04	pma mod no
5	(1) i		Superseded	00/12/94	longer required
			by 97-01-01		
			•		
95-20-07 C1	<u>PDF</u>	Yes	(97-01-01 C1, 97-01-01 R1)	11/17/07	
N OI			,	11/17/95	
			Cracks -		
			main gear		
97-01-01 R1	PDF	Van	sidebrace	12/00/00	J 0004 C
- VI VI IVI	IDT	Yes	studs	12/08/98	due 8364.2

			Facet Purolator	
99-05-09	DDE	BT-	induction air	
<del>29-03-09</del>	<u>PDF</u>	No	filters	03/19/99 due at 6352
			Cracks -	
	Trees.	- Na.	stabilator	terminated by
2012-17-06	PDF	Yes	horn	installation of
	1 <sup>3</sup> -21 m	1 63	assembly POH/AFM	10/22/12 austrailian horn
			change – fuel system	
			management	LWTCRES
2015-24-05	PDF	No	placard	01/12/16
			- But -	01/12/10
			GNS 430	
		NU	Circuitry	14 Table 1
			changes -	
2007 22 75		•	deviation &	
<u>2001-23-17</u>	<u>PDF</u>	No	flag outputs	12/28/01 —
AD Number	PDF	Rec	Subject Ef	fective
63-14-03	PDF	Yes	70.1.1.6	replaced with
<u>90 14 93</u>	IDF	res	Drive shaft	07/06/63 new style
			Oil filter	
66-20-04	PDF	No	adapter gasket	08/27/66
73-23-01	PDF	No	Piston pins	01/13/77
		110	Oil pump	01/13///
75-08-09	<b>PDF</b>	No	failure	08/18/77
		-77-7	Fuel	00/10///
<u>75-09-15</u>	<b>PDF</b>	No	starvation	04/30/75
			Center body	
			bellows seal	
<u>78-23-10</u>	<u>PDF</u>	No	assembly	11/07/78
			Regulator	
			diaphram	
			stem	
<u>79-04-05</u>	<b>PDF</b>	No	assembly	09/26/79
			Mixture	
01 02 05	DDE	NT-	control shaft	
81-03-05	PDF	No	assembly	02/11/81
<u>81-18-04 R2</u>	<u>PDF</u>	No	Superseded by	06/07/82
			Superseded	complied with at
			by 2004-10-14 (2004-10-14	last engine
91-14-22	<b>PDF</b>	Yes	(2004-10-14 C1)	overhaul 11-12- 08/19/91 2015
92 <b>-</b> 12-05	PDF	No	Piston pins	07/10/92
93-02-05	PDF	Yes	Superseded by	06/14/93
7 7 70	11/1	1 63	Superstucti by	00/11/20

			Connecting	
	DD E	Nt-	rod bolt failure	04/12/05
<u>95-07-01</u>	<u>PDF</u>	No		04/12/95
			Iron and aluminum	
			impellers in	
05.00.10	nne	No	oil pumps	07/15/96
<u>96-09-10</u>	PDF	NO	High pressure	01113130
04.00.00	DDE	N/a	fuel pumps	12/17/96
96-23-03	PDF	No	Superseded by	01/21/97
97-01-03	<u>PDF</u>	No	Defective	01/21/9/
0= 1= 11	DDE	N		08/12/97
<u>97-15-11</u>	PDF	No	piston pins	00/12/7/
			Crankshafts	
			serviced by	
00 15 11	DDE	BY.	Nelson	10/19/98
<u>98-17-11</u>	<u>PDF</u>	No	Balancing	10/19/90
			Crankshafts	
			serviced by	
00 45 44 64			Nelson	10/19/98
98-17-11 C1	PDF	No	Balancing	09/28/98
<u>98-18-12</u>	<u>PDF</u>	Yes	Superseded by	09/20/90
			Crankshaft	00/20/02
<u>2002-19-03</u>	PDF	No	failure	09/20/02
<u>2002-20-51 E</u>	<u>PDF</u>	No	Superseded by	10/01/02
<u>2002-23-06</u>	<u>PDF</u>	No	Superseded by	11/19/02
<u>2002-26-01</u>	<u>PDF</u>	Yes	Superseded by	01/31/03
			Non-TC	
			Holder -	
			Crane/Lear	
			Romec AN-	
			Type rotary	
<u>2003-14-03</u>	<u>PDF</u>	Yes	fuel pumps	08/14/03
			Crankshaft	
			gear retaining	
<u>2004-05-24</u>	<u>PDF</u>	No	bolts	03/30/04
			Prop Strike -	
			crankshaft	
			gear	
<u>2004-10-14</u>	<u>PDF</u>	Yes	installation	06/25/04
<u>2005-26-10</u>	<b>PDF</b>	No	Superseded by	01/31/06
			Non-TC	
		•	Holder - ECi	1 2 1 11 1
			connecting	
<u>2006-10-21</u>	<u>PDF</u>	No	rods	06/22/06
117 35			Non-TC	
			Holder - ECi	
			cylinder	
<u>2006-12-07</u>	<u>PDF</u>	No	assemblies	07/11/06

		Non-TC Holder -	
		Superior Air	
		Parts -	
		Cylinder	
2007 04 10 D1 DDF	No	Assemblies	06/01/07
2007-04-19 R1 PDF	Yes	Superseded by	03/12/08
2008-06-51 E PDF	Yes	Superseded by	04/29/08
2008-08-14 PDF	Yes	Superseded by	08/14/08
2008-14-07 PDF		Superseded by	10/20/08
2008-19-05 PDF	Yes	Non-TC	12 12 12 12 12 12 12 12 12 12 12 12 12 1
		Holder-	
		Precision	
		Airmotive	
		RSA-5 &	
		RSA-10 series	
		fuel injection	
2000 02 02 DDE	Yes	servos	02/09/09
2009-02-03 PDF	165	Non-TC	
		Holder - ECi	
		cylinder	
		assemblies;	
		P/N	,
And the second s		AEL65102	
2009-26-12 PDF	Yes	Series	02/04/10
2011-15-10 PDF	No	Superseded by	08/16/11
2011-26-04 PDF	Yes	Superseded by	01/25/12
2011-20-04	1.	Non-TC	
		Holder -	
		AVStar - fuel	
		servos -	
7		diaphragm	
		P/Ns	
		AV2541801,	02/24/12
<u>2012-03-06</u> PDF	No	AV2541803	02/24/12 10/24/12
<u>2012-19-01</u> PDF	No	Crankshafts	10/24/12
		Externally mounted fuel	
		injector fuel	
2017 10 07 PDF	Yes	lines	11/03/15
2015-19-07 PDF	1 68	Connecting	11/00/10
		rod small end	
2017-16-11 PDF	No	bushings	08/16/17
The Following			

Owners Name(s):	CONTRACTOR OF THE PARTY OF THE	Date:	Inspection Location:
N7905P LLC	N7905P	5-25-19	VGT
the same of the sa	Hobbe:	Techometer:	I will be the later
	0	895.2	
	ELT Ballery Due:	Transponder Test:	Pitol Static Test:
	6/30/2026		
Home Phone #:   Cell. Phone #:   Work Phone #:	Oxygen System:	Fire Extinguisher:	Little Manual Links
Committee of the Commit	9		

Airworthiness Cert.; Y / N Air	craft Registration: Y / N	Radio Station License: Y / N	Pilot Op. Handbook: Y / N	Weight and Balance; Y / N	Crash Tag on Airframe: Y / N
Exterior Clean: Y / N	Interior Clean: Y / N	Under Flooring Clean: Y / N	Inside Wings Clean: Y / N	Left Engine Clean; Y / N	Right Engine Clean: Y / N

				And the second s
Full Power RPM: Idle RPM / Cut-Off:	Nose / Main Tire PSI:	Nose / Main Strut (inches):	Engine Timing (BTDC):	Engine Oil:
Full Power RPM: Idle RPM / Cut-Off:	Company of the Compan	- to A committee to make I wanted to be a second or the se	and the second s	Supplied Street
N. No. 10 10 10 10 10 10 10 10 10 10 10 10 10		l <i>1</i>		
1 1	1	/		

The Mark Wall Comment	Make 5	Model Number	, Serial Number	, Total Time	TSMOH / Serial Number
Aircraft	Piper	PA24-250	24-3136	7364,20	Committee of the said
Engine	Teledyne Continental	, IO-540-A1A5	L-5176-40	5469.00	0.00
Propeller	Hartzell	HC-C2YK-1BF/F8477D-5R	NS3592B	0.00	0.00
Blade	Hartzell	L76322			
Blade	114142011	L76324	*		
E.L.T.	Airtex	ELT 345	381672-039	58 sec	Jun 28
Engine Monitor	JPI	EDM700	1		
Airframe		Model Number	Part Number	Serial Number	Notes
Battery	CONCORD	GX35	sealed		
Ignition Switch			2000		
Seat Belts					
Compass	Precision Aviation		PA1-700	24477	
Com. #1	1 11	-			
Com. #2	APOLLO	SL30	430-6040-301	6032326	MOD-J,K
GPS - Receiver		GNS 430	011-00280-00	96304750	
GPS - Antenna					
Nav. #1		·			
Nav. #2					MOD- ABCDEFHJKMNR
Nav head #2	APOLLO	MX 20	430-0270-500	6022969	MOD- ABCDEFHJRMNR
Transponder:	GARMIN	GTX 327	011-00490-00	83724654	
ADF - Receiver					
ADF - Indicator					
ADF - Antenna					
Audio Panel	••	MA7000		K04759	
Encoding Altimeter:		= -, ,			

Glide slope receiver		-1 V. S. W			The Carlo Section Sect
Engine :	Make .	Model Number	Part Number	Serial Number	Notes
Alternator / Governor		A			· · · · · · · · · · · · · · · · · · ·
Voltage Regulator	InterAV	-, -, -, -, -, -, -, -, -, -, -, -, -, -	'		
Air Filter					Jun-06
Flexible Hoses					Juirou
Carb. / Throttle Body		MA-4-5	10-4404		
Fuel: Pump		LW-15472		306	
Fuel: Pump - Aux.		<i>3</i> .			
Magneto: Left		S6LN-200	10-163010-10	785933	
Magneto: Right		S6LN-204	10-163050-9	321363	
Spark Plugs		<u> </u>			
Oil Filter					
Oil Pump	Lycoming	05K19423-S			
Oil Cooler					12/28/2013
Starter				140470	12/26/2013
Vacuum Pump		215CC		112173	
Prop Governor			. H4-4A		new 6-30-06
Magneto harness					8/15/03

Turn Coordinator

- Edin

# 24306 or ~6385

2005-12-06 PDF 2006-10-21 PDF	Yes	Revised inspection intervals: magneto riveted & snap-ring impulse coupling assemblies Replacement ECi connecting rods, P/N AEL11750	07/19/	
Line Section 1		Superior Air Parts Cylinde	<b>r</b>	
2007-04-19 R1 PDF	No	Assembly removal	06/01/0	07 —
Airworthiness Directives: Com Appliance Make: Model: N-No: Serial:				, i
- Total	Total AC Hours: Hrs. Since Last:	, , , , , , , , , , , , , , , , , , ,	74	
AD 73-07-04 Amdt. 39-1731	Issued: 05/26/05	Effective: 10/11/73	Recurring: No	Hrs:
Subject: Bendix S4LN or S4RN, S6LN of S8RN Magnetos With Series Numbers Through -604 And -Superseded by 94-01-03 Method:			-,;-,-5,	Due:
Terminated by:				SB#:
Name:	Sig.		Cert.	SB#: Date:
				Date.
AD 82-20-01 Amdt. 39-4658	Issued: 06/04/05	Effective: 06/14/83	Recurring: No	Hrs:
Subject: Bendix Model S4LN, S4RN, S6 D4RN, D6LN & D6RN Series Magnetos - Method:	LN, S6RN, D4LN, Impulse Coupling	Supersedes:		Due;
Terminated by:				SB#:
Name:	Sig.		Cert.	SB#:
				Date:
AD 89-04-02 Amdt. 39-6109	Issued: 06/11/05	Effective: 03/08/89	Recurring: No	Hrs;
Subject: Facet Aerospace MA-4-5, MA-5, Carburetors - SB A1-88 Replacement Of Pin	& MA-6AA Air Metering Stop	Supersedes:		Due:
Method:		·		SB#;
Terminated by:				SB#:
Name:	SIg.		Cert.	Date:
AD 99-05-09 Amdt. 39-11057	Issued: 03/03/99	Effectives 00140100		
Subject: Facet - Purolator Products Indus	ction Air Filtore	Effective: 03/19/99	Recurring: No	Hrs:
ilistalled On Piper PA-23, PA-24, PA-28, P		Supersedes:		Due:
Method	A-32 And PA-34			
method;	A-32 And PA-34			SB#:
Terminated by:	PA-32 And PA-34 Sig.		Cert.	SB#: SB#: Date:

6	
JS Department	
of Transportation	
Federal Aviation	ı

OMB No. 2120-0020 Exp: 6/31/2018	Electronic Tracking Number
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US Department of Transportation Federal Aviation	on on	(Airfran	ne, Po	REPAIR AN	ope	eller,	or Appli		B. and	1 AC	43.9-1	(or subs	equent revision thereof) for
	s and disposi ion. (49 U.S	.C. §46301	(a))		CFF quire	R §43 ed by	1.9, Part 43 1aw (49 U.S					rt can res	equent revision thereof) for ult in a civil penalty for each
3don viole	Nationality	y and Regis	stration	Mark				Serial N	24	-31	36		7
1. Aircraft	N7905I			10 m 20 m 10 m 10 m 10 m 10 m 10 m 10 m		tte en		Model	pa24	1 2	50	s	eries
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			registra	ation certificate)			10 7 12	Address	s <i>(As sh</i> PO Box	128	n regi	Stration C	ertificate)
	N7905P	LLC							Loganda				State NV
2. Owner								Zip	89021			Countr	y USA
						3 Fo	r FAA Use	Only					1 10 10 10 10 10 10 10 10 10 10 10 10 10
1					λ	5. Un	it identifica	tion					
4. Ty	1 10 10 10	Uni	• 1		Mak					Mode	el		Serial No.
Repair	Alteration	On	-	piper	Wildi			(As described in Item 1 above)		24-3136			
		AIRFRAM		ргрег				(7.5 0.					
		POWERF	LANT					001/	1/ 1/	) E /	E Q /	77D-	
	x	PROPELI		Туре Туре	artz	ze∥		-C2Y	N-10	<b>ΣΓ</b> /	-0-	1110	
		APPLIAN	CE	Manufacturer X									
					6.		formity Sta						
A. Agency's	Name and A	ddress				B. K	ind of Agend U. S. Certific		anic .			x Man	ufacturer
Name Richa	rd A. Mier				_	$\vdash$	Foreign Cert					C. Certifi	
Address 32	163 DELL V		27_	State _NV	_		Certificated  Certificated	Repair Stat	ion	ization		52	25680249 IA
D. I certif	y that the rep		alteration	the best of my	knov	wledg	ntified in iten 13 of the U.S e.	- E abaya	and day	coribo	d on t ulation	he revers	e or attachments hereto at the information
Extended ra			Signa	ture/Date of Au	lhoriz	zed Ir	idividual						
per 14 CFR App. B				Richard	1 4	1- /	nie				8	-10-	2019
				7	. Ap	prova	al for Retur	n to Serv	ice			ad in IL	o manner prescribed by the
Pursuant Administr	to the auth ator of the Fe	ority giver ederal Aviat	perso ion Adn	ns specified be ninistration and	elow, is	, the	unit identi	fied in ite x Appro	em 5 v ved	was II	,		e manner prescribed by the
	FAA Fit. Stan	dards X	Manı	ufacturer		Mai	intenance C	rganizatio	on	Otho	Person Depa	rtment of T	ed by Canadlan ransport
	FAA Designe	90	Repa	air Station	X	Ins	pection Aut	norization		Cirie	i lobe		
Certificate of Designation	or A&P 52 n No. IA	25680249	Signa /(	ature/Date of Au	thoriz	zed Ir	ndividual	- 11/1			8.	10.7	2019

FAA Form 337 (10/06)

#### NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

	NZOGED			
TAF 7364.3 Removed Hartzell propeller HC A2VK-1, prop governor martzell prop HC-C2YK-1BF/F8477D-5R. Prop, Hartzell governor F-4-4 stalled in accordance with STC# SA3550NM. In accordance with FAA o CPI-2 "NC" dated Dec.10,1986,or later FAA approved revision. and a sinstalled in accordance with STC 3550NM installation manual. We	sealed Johnson Ai	2 and spinner nd bulkhead rcraft Service	adapter mod Inc. Installa	eate  pulkhead adapted by the second
OTHING FOLLOWS				equipment list
C.Va National Contraction	gent kan a			
to have page				
Additional Sheets Are				

FAA Form 337 (10/06)

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	instruction such viola
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	1. Aircraft
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	2. Owner
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	4. T
	Repair

MB No. 2120-0020 rp; 5/31/2018	Electronic Tracking Number
	For FAA Use Only

**	A W.							For FAA Use Only
		MAJ	OR REPAIR AN	D ALTERATION	liance)		- 1	Principal Control
US Department	,	(Airframe,	Powerplant, Pro	opelier, or App		-		thornon fo
Federal Aviation	n .		A TOP OF THE PERSON NAMED IN COLUMN TO PERSO	and Ded 4	Annendix B, and /	C 43.9-1	(or subs	sequent revision thereof) fo buit in a civil penalty for each
Administration	ONE: Print	or type all er	tries. See Title 14	CFR \$43.9, Part 4	S.C. §44701). Fallur	e to repor	t can res	JUIT IN A CIVII P
INSTRUCTI	and disposi	tion of this for	m. This report is rec	diled by ion (	In dal No			sequent revision thereory to built in a civil penalty for each
such violation	on. (49 U.S.	C. §46301(a)) y and Registra	lion Mark		Serial No. PA2	4-313	,0	
	Nationality N7905F	y and Registra D	1	er Th	Model Pa24	250	S	eries
Aircraft	Make				Pa24	-250		adificata)
	Make Pi	per	and the second second	1 11 11 11 11	Address (As show	yn on regis	stration c	erimeato)
	Name (As	shown on reg	istration certificate)		Address PO Box 12	0		State NV
	N7905P	LLC			20021		Countr	y USA
Owner								U XY 1
				3. For FAA Use	Only			
							_	
4. Tyr	20	=1		5. Unit Identific		odel		Serial No.
-	Alteration	Unit		Make			21/01	PA24-3136
Repair	Alteration		Piper		(As described in	Item 1 ab	i0Vθ)	
	x	AIRFRAME						
		POWERPLA	NT					_=
	П	PROPELLE	₹					=
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		**********			-			
П		APPLIANCE	Manufacturer					,
				- Jan 54	atomont.			
				6. Conformity St B. Kind of Ager	ncv			
. Agency's	Name and A	Address		U. S. Certif	cated Mechanic			ıfacturer
lama Richa	rd A. Mier				rtificated Mechanic	(	C. Certific	
	63 DEL	LING CT	State		Repair Station		52	25680249IA
	LV	untry U		Certificated	Maintenance Organizat	ion		
Tip 197	04			nit(s) identified in ite	m 5 above and descri	ibed on the	e reverse	or attachments hereto t the information
D. I certify	y that the rep	pair and/or all	with the requirements	of Part 43 of the U.	m 5 above and descri S. Federal Aviation R	egulations	and the	( (i) o iii o iii o
furnish	ed herein is				-			=
Extended ra			tionature/Date of Auti	nonzeu muividuai				
per 14 CFR	Part 43		P: 1-	IA. Min	ـــ	8-	10-	2019
Арр. В					4- Camileo			
			7.	Approval for Retu	lified in item 5 was	inspecte	d in the	manner prescribed by the
Pursuant	to the auth	nority given p	ersons specified be Administration and i	Blow, the unit labil S	Approved	Rejected		manner prescribed by th
Administra	ator of the Fe	BOBIAI AVIATION	, carried and the same	Maintenance		Person	s Approve ment of Tr	d by Canadian
1 1 1	FAA FIt. Star	ndards	Manufacturer	Maintenance	I			ansport
BY	nspector	<del>-  - </del> -		(Inspection Au	thorization Ot	her (Spec	"Y)	
1	FAA Designe		Repair Station					
Certificate of	or A&P52	5680249IA	Signature/Date of Aut	horized Individual				9
Designation			P. 1	A. Mier		8-	-12-	2019
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FAA Form 337 (10/06)

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#### NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished (If more space is required, attach additional sheets, identify with	ith aircraft natio	nality and reg N7905P	istration mark	8/10/201	9	-
SCALAR AND A STATE OF THE STATE						
	ward STC SA	044000F In	d Registration	with install inst	Date ruction MVA-	EDACE!
Removed door holder (slide) #27072-03. Installed door stew 340C10M&O. Mtn. View Aviation. Approved Modei list SAO practices in AC43.13-1B.capter 4-57 Figure 4-8not	1 2006 300	.0,2002 , , .	approved. I	nstalled with a	oproved meth	ods ar
Pacifico III / O 10.10 I Electron						
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Addition	nal Sheets Are	Attached				

FAA Form 337 (10/06)

	and the second					The state of the s		No. 2120-0020 5/31/2018		
US Depart of Transpo Federal A	ortation Iviation	(Airframe	, Powerplant, Pr	ND ALTERATION Propeller, or Appliance)				For FAA Use Only		
INSTRU	UCTIONS: P	rint or type all e position of this fo J.S.C. §46301(a)	mi. Itiis tahoit is tec	CF quir	R §43.9, Par ed by law (49	t 43 Appendix B, and A U.S.C. §44701). Fallur			bsequent revision there esuit in a civil penalty fo	
SUCITAR	Nation	ality and Registra		Serial No. PA2	4-3	136				
1. Aircraft	1. Aircraft N7905P  Make Piper					Model Pa24	-25	0	Series	
2. Owner	Name (As shown on registration certificate) N7905P LLC			\$1	ant of Miles Marine Control	Address (As show. Address PO Box 128 City Logandale Zip 89021			State NV Country USA	
i.			No the second		. For FAA Us				W-1	
4. Tyr	pe	-		5	. Unit identifi				Sorial No.	
	pe Alteration	Unit	M	5 lake		Mod		=	Serial No.	
		Unit	M. Piper	_				above)	Serial No. PA24-3136	
	Alteration		Piper	_		Mod		above)		
	Alteration	AIRFRAME	Piper	_		Mod		above)		
	Alteration	AIRFRAME	Piper	_		Mod		above)		
Repair	Alteration	AIRFRAME POWERPLANT PROPELLER APPLIANCE	Piper Type Manufacturer	lake	onformity Sta	(As described in It		above)		
Repair	Alteration  x	AIRFRAME POWERPLANT PROPELLER APPLIANCE	Piper Type Manufacturer	lake	onformity Sta Kind of Agen	(As described in it			PA24-3136	
Repair	Alteration  x	AIRFRAME POWERPLANT PROPELLER APPLIANCE	Piper Type Manufacturer	lake	onformity Sta Kind of Agen U. S. Certific	(As described in lit		Manu	PA24-3136	
Repair	Alteration  x	AIRFRAME POWERPLANT PROPELLER APPLIANCE	Piper Type Manufacturer	lake	onformity Sta Kind of Agen U. S. Certific Foreign Cert	(As described in it		Manu C. Certific	PA24-3136	
Repair	Alteration    X	AIRFRAME POWERPLANT PROPELLER APPLIANCE dress	Piper  Type  Manufacturer  6	lake	onformity Sta Kind of Agen U. S. Certific Foreign Cert Certificated	(As described in lit		Manu C. Certific	PA24-3136	

FAA Form 337 (10/06)

per 14 CFR Part 43

FAA Flt. Standards

Inspector

FAA Designee

Manufacturer

Repair Station

Richard A. Min

Certificate or A&P525680249IA Signature/Date of Authorized Individual

Арр. В

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is Approved Rejected

Maintenance Organization

Inspection Authorization

8-10-2019

Persons Approved by Canadlan Department of Transport

8-10-2019

Other (Specify)

#### NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished (If more space is required, attach addition	onal sheets, identify	with aircraft natio	nality and regist N7905P	tration mark a	8/10/201	9	4
	24 11						
<u> </u>			Nationality and	Registration N	Mark	Date	with a nev
removed sections of damaged skins to ne. Purchased center skins part #206 stalled by using acceptable method eaned prepped ,by alodine, washing Nothing Follows	600-13 and 22232-	UZ and used se	igure 4-5 4-6 4	L16 and 4-1	8. also page 4	1-36. It was	then
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page and the same	-			A		-	
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US Department
of Transportation
Federal Aviation

OMB No. 2120-0020 Exp: 5/31/2018	Electronic Tracking Number
	For FAA Use Only

US Department of Transportati Federal Aviati Administration	ation ation	(Airfram	AJOR REPAIR A le, Powerplant, I	AND A	ALTERATION eller, or Appl	ance)	14		For FAA Use Only	
INSTRUC instruction such viola	ation. (49 U.S.	S.C. §46301(a		14 CFF require	R §43.9, Part 43 ad by law (49 U.5	3.0. 344701), FE	allure	to report can	subsequent revision result in a civil pena	thereof) for alty for each
Ž	Nationality	ly and Regist	tration Mark			Serial No. 24	1 2	126		
1. Aircraft	Make .			4 20		Model -	1-0	130	La color	
	pi	per	10.5		Party of the	pa2	24-	250	Series	11
2. Owner	Name (As N7905P	shown on r	registration certificate	θ)	a set late a	Address (As s	shown x 128	n on registratio		e por tanta
il de						City Logano	dale		State USA	NV
			<u> </u>		3. For FAA Use (	Zip			ountry USA	
4. Ty		Т ,			100				1.1	
Repair	Alteration	Unit		-000	5. Unit Identifica	tlon			-	
Поран	Alteration	Unit	-	Mak	(8		Mod	let	Seria	l No.
	x	AIŖFRAME	E piper			(As describe	d in It	tem 1 above)	24-3136	
		POWERPL	LANT							
		PROPELLI								
		APPLIANC	Type  CE Manufacturer							
A. Agency's	's Name and A	Address			B. Kind of Agence					
Name Rich	hard A. Mier					ated Mechanic		x N	4	
	863 DE	161106	CT			ificated Mechanic			Manufacturer rtificate No.	
	(V		State A//		Certificated F	Repair Station				- I A
D. I certi	tify that the ren	pair and/or a	alteration made to the	e unit(s	\ Identified In the	Maintenance Organ			52568024	9 IA
fumis	ished herein is	true and cor	orrect to the best of m	ny know	wledge.	. Federal Aviatio	n Red	gulations and	that the information	iereto.
per 14 CFR App. B			Signature/Date of A	JA.	Min			8-11	0-2019	
Pursuan	to the auth	- de - bron		7. Apr	proval for Return	ı to Service				
			persons specified ion Administration an	below, id is	the unit identif	fied in item 5 v	was	inspected in Rejected	the manner prescr	ibed by the
BY	FAA Fit. Stan Inspector	ndards X	Manufacturer	\	Maintenance O	rganization		Department of	roved by Canadian of Transport	
Certificate	FAA Designe		Repair Station	х	Inspection Auth	orization	Oth	er (Specify)		
Designation	on No. IA	25680249	Signature/Date of A			i		8-1:	2-2019	

FAA Form 337 (10/06)

# NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

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èn da His	1 E T E D 0 4000	from station 130. Installed	1 Adox ELT 3/154#	Nationality and Reg	1572 A2A at et	ation 171 Installed r
Ren	enna at station 205.	from station 130. Installed	Artex ELT 343AF	installed on the factor	ory installed av	vionics shelf immedia
stati	on 171 using factory s	supplied mounting tray, an ving references: AC 43.1	id factory supplied 3.13.2A . Chapter :	installation instruction 2 paragraph 28, fig 2		
was	recalculated, and Airc	craft equipment list update	d. END	- II man plants and a		
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FAA Form 337 (10/06)

# The Aviation DataBase -- AD Resource System Aviation DataSource, Inc.

DataBases updated Oct. 11, 2012: As of Biweekly 2012-20/-21

Airworthiness Directives: Compliance Report - Airframe

Airframe		Engine(s)	Ammane	Propeller(s)		
Make: Piper Airce Model: PA-24-250 N-No.: 7505 F Serial: 24-3136 Hours:		Make: Lycoming Model: L-S/N: R-S/N: L-Hrs: R-H	0.540-AID5	Make: Model: L-S/N: R-S/N:	R-Hrs:	
59-06-05	Amdt.	Issued:	Effective: 01/01/59	Recurring: No	Hrs:	
Subject: Nose gea	ar bungee		Supersedes:		Due:	
Method:				· 1992.	SB#:	
Terminated by:			- V		SB#:	
Name:		Sig.	-	Cert.	Date:	
59-12-09	Amdt.	Issued:	Effective: 01/01/59	Recurring: No	Hrs:	
Subject: Control v	wheel sprocket st	ud	Supersedes:		Due:	
Method:			Variation in		SB#:	
Terminated by:					SB#:	
Name:		Sig.	e"	Cert.	Date:	
59-13-02	Amdt.	Issued:	<b>Effective:</b> 01/01/59	Recurring: No	Hrs:	
Subject: Aileron b	alance weight	. a fox-	Supersedes:		Due:	
Method:					SB#:	
Terminated by:					SB#:	
Name:		Sig.		Cert.	Date:	
59-26-02	Amdt.	Issued:	Effective: 01/01/59	Recurring: No	Hrs:	
Subject: Fuel cell	vent tubes		Supersedes:		Due:	
Method:	3.				SB#:	
Terminated by:					SB#:	
Name: .	<i>i</i>	Sig.		Cert.	Date:	
60-24-03	Amdt.	Issued:	Effective: 12/19/60	Recurring: No	Hrs:	
Subject: Fuel vent	tubes	200	Supersedes:			
Method:	(,				SB#:	
Terminated by:					SB#:	
Name:	ði:	Sig.	1.35	Cert.	Date:	

10/11/2012

·					
61-16-06	Amdt.	Issued:	Effective: 08/31/61	Recurring: No	Hrs:
Subject: Fuel se	lector valve handle	les	Supersedes:		Due:
Method:	a tipe of the part of the last	B			SB#:
Terminated by:	Set 1	8	-		SB#:
Name:		Sig.		Cert.	Date:
61-20-02	Amdt.	Issued:	Effective: 10/20/61	Recurring: Yes	Hrs:
Subject: Exhaust	t stack reinforceme	ient	Supersedes:		Due:
	3-2-19				SB#:
Terminated by:				1 7	SB#:
Name:		Sig.		Cert.	Date:
62-10-03	Amdt.	Issued:	Effective: 04/26/62	Recurring: No	Hrs: 77, 12
Subject: Aileron	counterweight bay	v rework	Supersedes:		Due:
	by SN	, , , , , , , , , , , , , , , , , , , ,			SB#:
Terminated by:	<u> </u>		7,		SB#:
Name:		Sig.		Cert.145 9849	Date: 6-13-2013
62-26-05	Amdt.	Issued:	Effective: 12/05/62	Recurring: No	Hrs:
Subject: Exhaust s	system		Supersedes:		Due:
	<del></del>	How with Br		, <u>, , , , , , , , , , , , , , , , , , </u>	SB#:
	Abv.	1			SB#:
Name: Brown		Sig.	-	Cert./459849	Date 8-13-2013
63-27-03	Amdt.		Effective: 01/23/64	Recurring: No	Hrs:
Subject: Landing g			Supersedes:		Due:
		Breaker to 30	Amp, Bos	KI	SB#:
Terminated by:					SB#:
Name: U	yknown	Sig.	17	Cert.	Date: Book (
		Issued:	Effective: 05/12/64	Recurring: No	Hrs: 7
Subject: Carbureton			Supersedes:	,	Due:
Method: Some boly R	Euroved Va	ines per thi.	SAD		SB#:
Terminated by:		100			SB#:
Name:	<b>8</b>	Sig. All		Cert. 1459849	Date: 6-13-2013
		issued;	Effective: 09/28/64	Recurring: No	Hrs: 300
Subject: Landing go	ear safety switch		Supersedes:		Due:
3 7 - 344	eringer war in a light	1 2 2 2 2			La masses of a file

Method;	64-22			The state of the s	SB#:
Terminated by:	Kit 754-4	15 installed			SB#:
Name:		Sig.		Cert 1498006	Date: 103-60
65-11-04	Amdt.	lssued:	Effective: 05/15/65 Recurring: No		Hrs:
Subject: Stabilate	or control system	The state of the s	Supersedes:		Due:
Method: W	+ Mitch	el autopilat	Mar-	3	SB#:
Terminated by:		on the great			SB#:
Name:		Sig.		Cert.	Date:
65-25-03	Amdt.	Issued:	Effective: 12/10/65	Recurring: Yes	Hrs: /6/5
Subject: Nose lan	ding gear drag li	nk clevis	Supersedes:	***	Due:
Method: PCW	by Kit #	156-911 58 44	5		SB#:
Terminated by:			_ fre er <sup>1</sup> .		SB#:
Vame:		Sig.		Cert.106 8050	Date: 3-24-66
58-05-01	Amdt.	Issued:	Effective: 03/05/69	Recurring: 🌿	Hrs: 64 62,116
Subject: Exhaust	mufflers		Supersedes:		Due:
Method: By 5	inding the	muffer fiellow	and Brece	stops	SB#:
		ing festure.		1	SB#:
Name: Brown		Sig. Ask		Cert./459849	Date: 6-13-2013
58-13-03	Amdt.	Issued:	Effective: 03/05/69	Recurring: Yes	Hrs:6453,0 Hrs:646Z,16
Subject: Fuel cell			Supersedes:		Due: 7462,11
Method: CW	3-29-64	7 = 23 - 83 Tach 40774 9-25-09 w530			SB#:
Ferminated by:	. Amali				SB#:
Name: Broo	m	Sig. Al Brown	row Cert./45984		Date: 6-13-2013
72-22-05	Amdt.	Issued:	Effective: 12/26/74	Recurring: No	Hrs:6467,10
Subject: Operation	n limitation place	ard	Supersedes:		Due:
Method: Ma	rkedon	Air Speed	ir speed indicator		SB#:
Terminated by:	H Pi	x u	41		SB#:
Name: B	rown	Sig. Johnson	tun	Cert./ 659849	Date: 6-13-201
	Amdt.	Issued:	Effective: 01/01/74	Recurring: No	Hrs:
74-10-03 R	JL		16	Due:	
	ded by 79-20-10		Supersedes:		Due:
2 7 7 8 7 7 1			Supersedes:	41 0	SB#:
Subject: Superse	ded by 79-20-10		Supersedes:	1 · · ·	

74-13-01	Amdt.	Issued: Effective: 06/18/74 Recurring			Hrs:	
Subject: Supersed	led by 94-13-10	X	Supersedes:		Due:	
Method:	NA			V V V	SB#:	
Terminated by:	1 - a - b -			da li	SB#:	
Name:		Sig.		Cert.	Date:	
74-13-03	Amdt.	Issued:	Effective: 04/30/76	Recurring: Yes	Hrs:	
Subject: Stabilator	r attach bolts		Supersedes: 7	1.017	Due:	
Method:		$\overline{\lambda}$	1108	77 W	SB#:	
Terminated by:	5 × 8,				SB#:	
Name:	12 <sup>1</sup> 1 20 -	Sig.		Cert.	Date:	
		issueu:	Effective: 02/21/75	Recurring: Yes	Hrs:	
Subject: Engine oi assembly - STC S	l - Beryl Aviatio SA2653WE	on filtrator 5	Supersedes:		Due:	
Method:				-	SB#:	
Terminated by:	NA				SB#:	
Name:		Sig.	Cer		Date:	
75-12-06	Amdt.	Issued:	<b>Effective:</b> 06/05/75	Recurring: Yes	Hrs:646Z,16	
Subject: Fin forwa	rd spar		Supersedes:		Due:	
Method: CW	by Inspec	tion befor ,	painting		SB#:	
Terminated by:		- A			SB#:	
Name: Brown						
		Sig. 4		Cert. / 459849	Date: 6 - (3 -2013	
	Amdt.	Issued:	Effective: 06/03/76	Recurring: No	Date: 6-13-2013	
Subject: Torque tu	Amdt.	Issued:			Hrs: 38 12.46	
Subject: Torque tu Method:	Amdt.	Issued:	06/03/76		Hrs: 38 12,46	
Subject: Torque tu Method: Terminated by:	Amdt.  ube bearing fittin	Issued:	06/03/76		Hrs: 38 12,46  Due: SB#:	
Subject: Torque tu Method:	Amdt.  ube bearing fittin	Issued:	06/03/76		Hrs: 38 12.46  Due:  SB#:  SB#:	
Subject: Torque tu Method: Terminated by: Name: Ni/	Amdt.  The bearing fitting states of the search of the sea	Issued:	06/03/76	Recurring: No	Hrs: 38 12,46  Due: SB#: SB#:	
Subject: Torque tu Method: Terminated by: Name: Ni/ 76-19-07 Subject: Stabilator	Amdt.  The bearing fitting states of the search of the sea	Issued:	06/03/76  Supersedes:  Effective:	Recurring: No  Cert. 21 98115	Hrs: 38 12.46  Due:  SB#:  SB#:  Date: 1-7-76  Hrs:	
Subject: Torque tu Method: Terminated by:  Name: Ni/ 76-19-07  Subject: Stabilator Method:	Amdt.  The bearing fitting states of the search of the sea	Issued:  Sig.  Issued:	06/03/76  Supersedes:  Effective: 09/29/76	Recurring: No  Cert. 21 98115	Hrs: 38 12.46  Due:  SB#:  SB#:  Date: 1-7-76	
Subject: Torque tu Method: Terminated by:  76-19-07  Subject: Stabilator Method: Terminated by:	Amdt.  The bearing fitting states of the search of the sea	Issued:	06/03/76  Supersedes:  Effective: 09/29/76	Recurring: No  Cert. 21 98115	Hrs: 38 12.46  Due: SB#: SB#: Date: 1-7-76  Hrs: Due: SB#:	
Subject: Torque tu Method: Terminated by:  Name: Ni/ 76-19-07  Subject: Stabilator Method:	Amdt.  Les  Amdt.  Amdt.  r weight assy	Issued:  Sig.  Issued:	06/03/76  Supersedes:  Effective: 09/29/76	Recurring: No  Cert. 21 98115	Hrs: 38 12.46  Due:  SB#:  SB#:  Date: 1-7-76  Hrs:  Due:	
Subject: Torque tu Method: Terminated by:  76-19-07  Subject: Stabilator Method: Terminated by:	Amdt.  Les  Amdt.  Amdt.  Amdt.  Amdt.  Amdt.	Issued:  Sig.  Issued:  Book 1+7	06/03/76  Supersedes:  Effective: 09/29/76	Recurring: No  Cert. 21 98115  Recurring: No	Hrs: 38 12.46  Due:  SB#:  SB#:  Date: 1-7-76  Hrs:  Due:  SB#:  SB#:  Date:	

Method: I	uspi 7-23.	er ac			SB#:	
Name:					SB#:	
Name:	Brown	Sig.		Cert./459849	Date: 6-13-7013	
77-13-21	Amdt.	Issued:	Effective: 12/16/77		Hrs:6462,16	
	nt landing gear o		Supersedes:	V	Due:	
Method: Bu	ngies Replace	ed Lube + In	50.		SB#:	
Terminated by:			<del>                                     </del>		SB#:	
Name:	Brown	Sig. Ale		Cert. (Large et al.)		
79-20-10	Amdt.		The same	1459849	Date: 6-13-7013	
	oration of Piper	Issued:	Effective: 10/04/79	/00 hre	Hrs:	
Method:	W 9-2:01	1 703893	Supersedes: 74	-10-03	Due:	
Terminated by:	W 9-3-84	etal			SB#:	
Name:				=======================================	SB#:	
		Sig.	A STATE OF THE STA		Date:	
32-23-01 R1	Amdt.	Issued:	Effective:	Cert.	Date:	
ubject: Placard	near flap actua	II .	04/07/83	Recurring: No	Hrs:	
lethod:	114		Supersedes:	Due:		
erminated by:	101	pertson STC		•	SB#:	
lame:				V	SB#:	
	~	Sig.	Co			
3-19-03	Amdt.	Issued:	Effective: 09/30/83	Recurring: No	Date:	
ubject: Lower	spar cap inspec	tion			Hrs: 4905	
dethod: C	W Book		Supersedes:		Due:	
erminated by:		-		-	SB#:	
lame:		C:-			SB#:	
		Sig.		Cert.		
5-02-05 R1	Amdt.	Issued:	Effective: 11/21/97		Date: 9-3-84	
Moder: Brake o	peration placar	d P/N 81090-02		Recurring: No	Hrs:	
		02	Supersedes:	-	Due:	
erminated by:					SB#:	
lame:		Sig.			SB#:	
4-13-10		org,		Cert.		
	Amdt.	Issued:	Effective:		Date:	
ubject: Stabilite Iethod: BK Z	or torque tube		08/12/94	Recurring: Yes	Hrs: 6462,16	
erminated by:	2-5-08 d	16443,9 975	Supersedes: 74	-13-01	Due:	
	_	1-45-6	906453.0		SB#:	
ame: Byo						

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DataBases updated November 21, 2017: As of Biweekly 2017-23/-24

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Search within the listed ADs for: N7905P

Annual 12-1-2017 search

Na Conture	r: Pipc	Afrers	s for: N79037  Annual 12 7 2 7  Number of ADs:  Model: Commanche -250	Effective
Airworthines:	s Direc	tives for	AD.	06/01/59
Rec (Yes); Indica	PD	F Rec	Subject	07/30/59
AD Number	PD		Nicco gear puligeo	10/01/59
<u>59-06-05</u> <u>59-12-09</u>	PDI	=	Control wheel sprocket stud	01/15/60
<u>59-12-02</u> 59-13-02	PDI		Ailenn balance weight	12/19/60
<u>59-26-02</u>	PDF		Fuel cell vent tubes	08/31/61
60-24-03	PDF		Fuel vent tubes Fuel selector valve handles	10/20/61
61-16-06	PDF	===	Exhaust stack reinforcement	04/26/62
61-20-02	PDF		Aileron counterweight bay rework	12/05/62
62-10-03	PDF	No	Exhaust system	01/23/64
62-26-05	PDF	No	Landing gear retraction motor circuit	05/12/64
63-27-03	PDF		Carburetor air box deflector vanes	09/28/64
64-10-04	<u>PDF</u>	No	Landing gear safety switch	05/15/65
64-22-03	<u>PDF</u>		1tom	12/10/65
65-11-04	<u>PDF</u>	No	Nose landing gear drag link clevis as 100 hrs (W by Insp. full)	03/05/69
65-25-03	<u>PDF</u>	Yes	Nose landing gear drag min extra Application of the courter of the	03/05/69
68-05- <u>01</u>	<u>PDF</u>	Yes	Exhaust mufflers NA - (no guts) ARB  Exhaust mufflers m	12/26/74
68-13-03	<u>PDF</u>	Yes	Fuel cell collapse 14243 CA CO	01/01/74
72-22-05	PDF	No	Operation limitation placard	
	PDF	No.	Superseded by 79-20-10	06/18/74
	PDF	No	Superseded by 94-13-10	04/30/76
	PDF	Yes	Stabilator attach bolts All 49001 flets  STC SA2653WE	02/21/75
4-13-05	PDF	Yes	Stabilator attach Bolts 477 4 9000 Feet STC SA2653WE Engine oil - Beryl Aviation filtrator assembly - STC SA2653WE	06/05/75
3-03-02	PDF	Yes	Fin forward spar CW by Timp, 10 par glass files	06/03/76
<u>J-12-00</u>	PDF	No	Torque tube bearing fittings	09/29/76
3 27 32	PDF		Stabilator weight/assy	04/18/77
0-15-07		<del></del>	make Haakit	12/16/77
7 45	<u>PDF</u>	Yes	Prevent landing gear collapse Bong en Due et 2018 Annual	
<u> </u>		Yes	Incorporation of Piper Kit 763893 PCW	10/04/79
9-20-10	<u>PDF</u>			04/07/83
2-23-01 R1	<u>PDF</u>		Placard near flap actuator	09/30/83
3-19-03	PDF	No	Lower spar cap inspection	11/21/97
5-02-05 R1	PDF	No	Brake operation placard P/N 81090-02	08/12/9
	PDF	Yes	Stabilitor torque tube PMA Mose (No Longer read)	11/17/9
	PDF	Vac	Superceded by 97-01-01	
		Yes	Cracks - main gear sidebrace studs ea 1000 Ard. 301 hvs left before Date	12/08/9
		No	Facet Purolator induction air filters	
		Vec	Cracks - stabilator horn assembly CW Has Austriale Horn installed	10/22/1
		Yes	Cracks - stabiliator from assembly CW 97 \$ 6 05 11 22 MOVING MOVING MAINTENANCE OF THE CONTRACT OF THE PROPERTY OF THE PROPERT	01/12/1
\ <u>15-24-05</u>	<u>PDF</u>	No :	POH/AFM change - fuel system management placard	

No. of ADs: 4 ollowing ADs apply to Accessories that could be installed on the Comanche -250 (See Explanation) search.com/PHPScripts/Sel\_LAC.php3

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Search within the listed ADs for: N 7905 F

Manufactu Airworthin	ess Direct	IAG2 10	FULL COLUMN TO THE PROPERTY OF	Effective
Rec (Yes); Ind	icates a Re	CULLINE	ALL  The state of	06/01/59
AD Number	PD			07/30/59
<u>59-06-05</u> 59-12-09	PDI			10/01/59
59-13-02	PDI		Aileron balance weight	01/15/60
59-26-02	PDF	No	Fuel cell vent tubes	12/19/60
60-24-03	PDF	No	Fuel vent tubes	08/31/61
61-16-06	PDF	No	Fuel selector valve handles	10/20/61
61-20-02	PDF	Yes	Exhaust stack reinforcement PCW	04/26/62
62-10-03	PDF	No	Aileron counterweight bay rework	12/05/62
<u>62-26-05</u>	<u>PDF</u>	No	Exhaust system	01/23/64
63-27-03	<u>PDF</u>	No	Landing gear retraction motor circuit	05/12/64
64-10-04	PDF	No	Carburetor air box deflector vanes	09/28/64
54-22- <u>03</u>	<u>PDF</u>	No	Landing gear safety switch	05/15/65
5-11-04	PDF	No	Stabilator control system	12/10/65
5-25-03	<u>PDF</u>	Yes	Nose landing gear drag link clevis (W by Insp	
8-05-01	PDF	Yes	Exhaust mufflers Hollow NA	03/05/69
8-13-03	<b>PDF</b>	Yes	Fuel cell collapse CW by Insp	03/05/69
2-22-05	PDF	No	Operation limitation placard	12/26/74
4-10-03 R	PDF	No	Superseded by 79-20-10	01/01/74
I-13 <b>-</b> 01	PDF	No	Superseded by 94-13-10	06/18/74
-13-03	PDF	Yes	Stabilator attach bolts CW by I 150	04/30/76
-05-02			Engine oil - Beryl Aviation filtrator assembly - STC SA2653WE	02/21/75
-12-06	-		Fin forward spar CW by INSP	06/05/75
-27-08	PDF		Torque tube bearing fittings	06/03/7
19-07	PDF	No	Stabilator weight assy	09/29/7
08-01	PDF	Yes	Aileron spar cracks /25/2/	04/18/7
13-21	PDF	Yes	Prevent landing gear collapse PC W (Bungaex)	12/16/7
<u> 20-10</u>	PDF	Yes	Incorporation of Piper Kit 763893 PAW WKit	10/04/
23-01 R1	PDF		Placard near flap actuator	04/07/
19-03	PDF	No	Lower spar cap inspection	09/30/
02-05 R1	PDF 1	No .	Brake operation placard P/N 81090-02	11/21
3-10	<u>PDF</u>	Yes	Stabilitor torque tube CW by Insp	08/12
0-07_C1	PDF	Yes	Superseded by 97-01-01	11/17
1-01 R1	PDF	Yes	Cracks - main gear sidebrace studs ea 500 And	12/0
<u>5-09</u>	PDF 1	No I	Facet Purolator induction air filters	03/1
-17-06	PDF		Cracks - stabilator horn assembly Installed Austraila	17
-24-05	PDF N		POH/AFM change - fuel system management placard	Horn 10/2

## https://airresearch.com/PHPScripts/Sel\_LAC.php3

No. 1 to the Commanche -250 (See Explanation) No.	A OI ALL SANCE CONTROL OF THE PROPERTY OF THE
The Following ADs apply to Accessories that could be installed on the Commanche -250 (See Explanation) No	05/01/00 -
	12/28/01
198-21-21 KI lag outputs	02/23/05
2001-23-17 [132] AND GTY 330 GTY 330D Mode S Transporters	
2005-01-19 Vacuum Pumps, pump chames 1	-1-22
2006-03-08 PDF No Acro Advantage ADV21100 to 11 year he found in the Appliance/Accessory In	dex.

ADs that address non-Type Certificate holders (Garmin, Bendix, etc.) can be found in the Appliance/Accessory Index.

Use your Browser's "Print Page" function to print this Summary,

and/or use "Save As" to save it to disk. Change the file name before clicking on "Save".

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Search within the listed ADs for:

search

Manufacturer: Lycoming Engines TC No.: <u>E-295</u> Airworthiness Directives for Model: O-540-A1B5

Number of ADs: 30

Rec (Yes); Indica			Effective
AD Number	Rec		07/01/59
<u>59-10-07</u>	No	Cylinder baffle clamps	07/06/63
63-14-03	Yes		07/10/64
64-16-05	No	Oil seal failure	08/27/66
66-20-04	No	Oil filter adapter gasket	08/18/77
75-08-09	No	Oil pump failure	06/07/82
81-18-04 R2	No No	Superseded by 96-09-10	09/01/89
87-10-06 R1	No	Rocker arm assemblies	08/19/91
91-14-22	Yes	Superseded by 2004-10-14	07/10/92
92-12-05		Piston pins	04/12/95
95-07-01	No	Connecting rod bolt failure	07/15/96
96-09-10		Iron and aluminum impellers in oil pumps	
97-01-03		Superseded by 97-15-11	01/21/97
97-15-11		Defective piston pins	08/12/97
98-17-11	_	Crankshafts serviced by Nelson Balancing	10/19/98
98-17-11 C1		Crankshafts serviced by Nelson Balancing	10/19/98
2002-20-51 E		Superseded by 2002-23-06	10/01/02
2002-23-06	No	Superseded by 2004-05-24	11/19/02
004-05-24	No	Crankshaft gear retaining bolts	03/30/04
004-10-14	Yes	Prop Strike - crankshaft gear installation	06/25/0
005-19-11	No	Crankshaft replacement	10/21/0
2005-26-10	No S	Superseded by 2006-12-07	01/31/0
006-10-21	No I	Non-TC Holder - ECi connecting rods	06/22/0
006-12-07	- <del> </del>  -	Non-TC Holder - ECi cylinder assemblies	07/11/0
006-20-09		Superseded by 2012-19-01	11/03/0
007-04-19 R1	-	Non-TC Holder - Superior Air Parts - Cylinder Assemblies	06/01/0
008-19-05		Superseded by 2009-26-12; ECi cylinders	10/20/0
009-26-12		Non-TC Holder - ECi cylinder assemblies; P/N AEL65102 Series	
		Volare - Marvel-Schebler (BorgWarner) HA-6 carburetors	02/04/
W. Bay		That ver-benevici (Bolg warner) FIA-o carburctors / V / J	03/27/1

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Search within the listed ADs for: \$7905 P

search

Manufacturer: Lycoming Engines TC No.: E-295 Airworthiness Directives for Model: O-540-A1B5

Number of ADs: 30

Rec (Yes); Indicat	es a Recurr	ing AD		Effective
AD Number	PDF	Rec	Subject	07/01/59
<u>59-10-07</u>	<u>PDF</u>	No	Cylinder baffle clamps	07/06/63
63-14-03	PDF	Yes	Drive shall was Replaced with new styll	07/10/64
64-16-0 <u>5</u>	<u>PDF</u>	No	Oil seal failure	08/27/66
66-20-04			Oil filter adapter gasket	08/18/77
75-08- <u>09</u>	<u>PDF</u>		Oil pump failure	06/07/82
81-18-04 R2	PDF		Superseded by 96-09-10	09/01/89
87-10-06 R1	<u>PDF</u>		Rocker arm assemblies	08/19/91
91-14-22	<b>PDF</b>	Yes	Superseded by 2004-10-14	07/10/92
92-12- <u>05</u>	<b>PDF</b>	No	Piston pins	04/12/95
95-07-0 <u>1</u>	<b>PDF</b>	No	Connecting rod bolt failure	07/15/96
06-09-10	PDF	No	Iron and aluminum impellers in oil pumps	01/21/97
97-01 <b>-</b> 03	PDF	No	Superseded by 97-15-11	
7-15-11	PDF	No	Defective piston pins	08/12/97
08-17-1 <u>1</u>	PDF	No	Crankshafts serviced by Nelson Balancing	10/19/98
98-17-11 <u>C1</u>	PDF	No	Crankshafts serviced by Nelson Balancing	10/19/98
2002-20-51 E	PDF	No	Superseded by 2002-23-06	10/01/02
2002-23-06	PDF	No	Superseded by 2004-05-24	11/19/02
2004-05-24	PDF	No	Crankshaft gear retaining bolts	03/30/04
2004-10-14	PDF	Yes	Prop Strike - crankshaft gear installation	06/25/04
2005-19-11	PDF	No	Crankshaft replacement	10/21/05
2005=26-10	PDF	No	Superseded by 2006-12-07	01/31/06
2006-10-21	PDF	No	Non-TC Holder - ECi connecting rods	06/22/06
2006-12-07	PDF	No	Non-TC Holder - ECi cylinder assemblies	07/11/0
2006-20-09	PDF	No	Superseded by 2012-19-01	11/03/0
2007-04-19 R1	PDF	No	Non-TC Holder - Superior Air Parts - Cylinder Assemblies	06/01/0
2008-19-05	PDF	Yes	Superseded by 2009-26-12; ECi cylinders	10/20/0
2009-26-12	PDF	Yes	Non-TC Holder - ECi cylinder assemblies; P/N AEL65102 Series	02/04/1
2012-03-07	PDF	No	Non-TC Holder - Volare - Marvel-Schebler (BorgWarner) HA-6 carburetors	03/27/1
2012-19-01	PDF	No	Crankshafts	10/24/1

The Following ADs apply to Accessories that could be installed on the O-540-A1B5 (See Explanation) No. of ADs: 8

63-22-03	PDF	No	Marvel-Schebler MA-4 Series Carburetors - venturi replacement	12/02/63	
69-24-03	PDF	No	Marvel-Schebler MA-3 Series Carburetors - modification	11/29/69	
89-04-02	PDF	No	Carburetor throttle jamming; air metering stop pin replacement (P/N 62-226)	03/08/89	
2005-12-06	PDF	Yes	Teledyne Cont. S-20, S-1200, D-2000 & D-3000 Series Magnetos	07/19/05	
<u>2006-10-21</u>	<b>PDF</b>	No	Replacement: ECi connecting rods, P/N AEL11750	06/22/06	

### Aviation DataSource, Inc. --The Aviation DataBase

https://airresearch.com/PHPScripts/Sel\_LAC.php3

2006-12-07 PDF No ECi cylinder assemblies, P/N AEL65102 series "Classic Cast"	07/11/06	_
2000-12-07 Parts Calindar Assembly removal	06/01/07	-
	02/04/10	
2009-26-12 PDF Yes Cracks: head-to-barrel interface; cylinder assemblies replacement		_

ADs that address non-Type Certificate holders (Garmin, Bendix, etc.) can be found in the Appliance/Accessory Index.
Use your Browser's "Print Page" function to print this Summary, and/or use "Save As" to save it to disk. Change the file name before clicking on "Save".

## Aviation DataSource, Inc. --

The Aviation DataBase

DataBases updated November 2, 2015: As of Biweekly 2015-22/-23

5-Line HTML Report

Display Reports in MS-Word

Return to Search Selections

Search within the listed ADs for: N 7905 P

search

PA 24-250 SN 24-3136

Manufacturer: Piper Aircraft Inc. TC No.: 1A15
Airworthiness Directives for Model: Commanche -250

Number of ADs: 35

Rec (Yes); Indicate			Effective
AD Number		Subject (1/1)	06/01/59
<u>59-06-05</u>	No	Nose gear bungee	07/30/59
<u>59-12-09</u>	No	Control wheel sprocket stud	10/01/59
<u>59-13-02</u>	No	Aileron balance weight	01/15/60
59-26-02	No	Fuel cell vent tubes	12/19/60
60-24-03	No	Fuel vent tubes	08/31/61
61-16-06	No	Fuel selector valve handles	10/20/61
61-20-02	Yes	Exhaust stack reinforcement NAMF3 3-21-1962 NM	04/26/62
<u>62-10-03</u>	No	Aileron counterweight bay rework	12/05/62
<u>62-26-05</u>	No	Exhaust system	01/23/64
63-27-03	No	Landing gear retraction motor circuit	05/12/64
64-10-04	No	Carburetor air box deflector vanes	According to the second
64-22-03	No	Landing gear safety switch	09/28/64
65-11-04	No	Stabilator control system	05/15/65
65-25-03	Yes	Nose landing gear drag link clevis PCW CKIP #756-9//	12/10/65
68-05-01	Yes	Exhaust mufflers Hollowed out PCU	03/05/69
68-13-03	Yes	Fuel cell collapse QW by in 5P,	03/05/69
72-22-05	No	Operation limitation placard	12/26/74
74-10-03 R	No	Superseded by 79-20-10	01/01/74
74-13-01	No	Superseded by 94-13-10	06/18/74
74-13-03	Yes	Stabilator attach bolts $FLW$	04/30/76
75-05-02	Yes	Engine oil - Beryl Aviation filtrator assembly - STC SA2653WE	02/21/75
75-12-06	· Yes		06/05/75
75-27-08	No		06/03/76
76-19-07	No		09/29/76
77-08-01	Yes		04/18/77
77-13-21	Yes		12/16/7
79-20-10	Yes		10/04/79
82-23-01 R1	No		04/07/8

# C/N J-25-05 6427.9 Kit Installed

https://airresearch.com/PHPScripts/Sel\_LAC.php3

83-19-03	No	Lower spar cap inspection	
85-02-05 R1	No		09/30/83
94-13-10	Yes	Stabilitor torque tube	11/21/97
95-20-07 C1			08/12/94
97-01-01 R1		Cracks - main gear sidebrace at 1	11/17/95
99-05-09	No	Facet Purolator induction air filters	12/08/98
<u>2012-17-06</u>	Yes	Cracks - stabilizator b	03/19/99
Use your Browser and/or use "Save	's "Pr	rint Page" function to print this Summary	10/22/12

Sidan IA 1459849

and/or use "Save As" to save it to disk. Change the file name before clicking on "Save". ADs that address non-Type Certificate holders (Garmin, Bendix, etc.) can be found in the Appliance/Accessory

Index.

77-08-01

PIPER:
Amendment 39-2871. Applies to Models PA-24, PA-24-250 and PA-24-260, Serial Nos. 24-1 through 24-5047; Model PA-24-400, Serial Nos. 26-2 through 26-148; Model PA-30, Serial Nos. 30-2 through 30-2000; Model PA-39, Serial Nos. 39-1 through 39-155; certificated in all categories except aircraft incorporating Piper Kit number 760 914.

To prevent possible hazards in flight associated with aileron spar cracks, accomplish the following:

- (a) Within the next 100 hours in service from the effective date of this AD or upon the attainment of 1000 total hours in service, whichever is later, and at intervals not to exceed 100 hours in service from the last inspection, inspect and alter as necessary in accordance with the instructions sections of Piper Service Letter No. 787 dated December 1, 1976, or equivalent.
- (b) Upon the incorporation of Aileron Outboard Hinge Bracket Replacement, Piper Kit No. 760 914 or equivalent, compliance with the requirements of this AD may be dispensed with.
- (c) Equivalent inspections and alterations must be approved by the Chief, Engineering and Manufacturing Branch, FAA, Eastern Region.
- (d) Upon submission of substantiating data by an owner or operator through an FAA Maintenance Inspector, the Chief, Engineering and Manufacturing Branch, FAA, Eastern Region may adjust the inspection intervals specified in this AD.

This amendment becomes effective April 18, 1977.

65-25-03

PIPER: Amdt. 39-155 Part 39 Federal Register November 10, 1965. Applies to Models PA-24 and PA-24-250 Airplanes, Serial Numbers 24-1 through 24-3225 except 24-923.

Compliance required as indicated.

To prevent further failures of the nose landing gear drag link clevis. accomplish the following:

- (a) Inspect nose landing gear drag link clevis, P/N's 20859-03(HT), 20859-02, or 20859-00, as applicable, for cracks in the thread roots and the shank-to-clevis, fillet radius using water-washable or water -emulsifiable dye penetrant methods or an FAA-approved equivalent within the next 25 hours' time in service after the effective date of this AD, unless already accomplished within the last 75 hours' time in time in service and thereafter at intervals not to exceed 100 hours' time in service from the last inspection until modified in accordance with (b)(2) or (3).
- (b) If a crack is found, before further flight -
- (1) Replace the clevis with an uncracked clevis in accordance with Piper Service Letter No. 366, dated January 3, 1962, or later FAA-approved revision:
- (2) Replace the clevis with an uncracked drag link clevis, P/N 20859-03 (HT), reinforced with drag link clevis reinforcement bracket, Piper P/N 25257, in accordance with the sketch on the back of Piper Service Letter No. 445, dated April 21, 1965, or later FAA-approved revision, or an equivalent approved by the Chief, Engineering and Manufacturing Branch, FAA Eastern Region; or
- Piper Kit Number 754429, or an equivalent approved by the (3) Install Chief, Engineering and Manufacturing Branch, FAA Eastern Region.

This directive effective December 10, 1965. Lit 756-911

83-19-03

83-19-03 PIPER:

Amendment 39-4730. Applies to Models PA-24-180/250/260 (S/N 24-1 and up); PA-24-400, (S/N 26-2 and up); PA-30 (S/N 30-2 thru 30-2000); and PA-39 (S/N 39-1 thru 39-155) airplanes certificated in any category.

COMPLIANCE: Required as indicated, unless already accomplished.

To prevent wing lower main spar cap damage and possible cracks in this component where it enters the fuselage at the lower wing root fairing, accomplish the following:

- a) Within the next 100 hours time-in-service after the effective date of this AD, inspect the lower spar cap for chafing damage and cracks in accordance with the Instructions Section of Piper Service Bulletin 751 dated May 24, 1983.
- b) Prior to further flight, polish out any chafing damage or replace parts which are cracked or that have chafing damage which cannot be polished out within the depth limits specified in the Instructions Section of Piper Service Bulletin 751 dated May 24, 1983, with a serviceable part.
- c) Prior to reinstallation, trim the lower portion of the seal plates in dated May 24, 1983.
- d) Aircraft may be flown in accordance with Federal Aviation Regulation 21.197 to a location where this AD can be accomplished.
- e) An equivalent method of compliance with this AD may be used, if approved, by the Manager, New York Aircraft Certification Office, FAA, Room 202, 181 South Franklin Avenue, Valley Stream, New York 11581.

This amendment becomes effective on September 30, 1983.

10-362 Kit installed

64-22-03

PIPER:
Amdt. 802 Part 507 Federal Register August 28, 1964.
Applies to Models PA-24 and PA-24-250 Aircraft Serial
Numbers 24-1 through 24-3284.

Compliance required within the next 50 hours' time in service after the effective date of this AD, unless already accomplished.

To eliminate possible breakage or loosening of the wires leading to the landing gear safety switch with resultant malfunction of the landing gear safety switch accomplish the following:

- (a) On the left main landing gear, inspect for broken and loose wires and terminals at the connections to the landing gear safety switch. Repair any broken or loose wires and terminals before further flight.
- (b) Install Piper Kit No. 754475, or FAA approved equivalent, leaving sufficient slack in the wires between the new clamp and the safety switch to prevent pulling of the wires.

(Piper Service Letter No. 379, dated July 12, 1962, pertains to this subject.)

This directive effective September 28, 1964.

PIPER Customer Services

Piper Aircraft Corporation Lock Haven, Pennsylvania, U.S.A.

SERVICE LETTER No. 379

August 10, 1962

Page 1 of 2

TO: Distributors, Dealers, Certified Service Centers and Owners

SUBJECT: Landing Gear Safety Switch Harness

**MODELS AFFECTED:** 

PA-24 and PA-24 "250" Comanches Serial Numbers 24-1 to 24-3284 incl.

We have been advised that over extended periods of operation, there is a possibility of a wire or wires in the landing gear safety switch harness becoming broken at the switch. This condition would cause malfunction of the safety switch.

A kit, consisting of a bracket, clamp, plastic sleeve and necessary hardware, is available for use in the subject aircraft. It is recommended that this kit be installed in the referenced aircraft as it will support the wire harness of the safety switch. See <a href="mailto:sketch">sketch</a> on the reverse side of this Service Letter.

Until such time as this kit is installed, an inspection of the safety switch and related wire harness should be performed at each 100 hours of operation to ascertain this condition does not exist.

The part number of this kit is 754 475, unit price \$1.08, and is available through your Piper distributor or dealer.

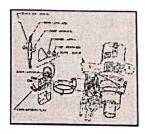
Very truly yours,

PIPER AIRCRAFT CORPORATION /s/ Wes Holmes Service Manager

WH:dlt

(over)

#### Page 2 of 2



Sketch

63-27-03

PIPER:
Amdt. 661 Part 507 Federal Register December 24, 1963.
Applies to All Models PA-24 and PA-24-250 Aircraft, Which
Have 25 Ampere Circuit Breakers in the Landing Gear
Retraction Motor Circuit.

Compliance required within the next 100 hours' time in service after the effective date of this AD.

Inadvertent tripping of the 25 ampere landing gear retraction circuit breaker has resulted in stoppage of the landing gear retraction mechanism in other than the fully extended position. Therefore, in order to eliminate this condition, with its associated hazard of partial-gear-down landing accidents, the 25 ampere circuit breaker in the landing gear retraction motor circuit must be replaced with a 30 ampere circuit breaker, Piper P/N 454661, or FAA approved equivalent.

(Piper Service Letter No. 356, dated March 31, 1961, pertains to this same subject.)

This directive effective January 23, 1964.

The title that item beautiful warrand by:

62-26-05

Amdt. 511 Part 507 Federal Register December 5, 1962. Applies to All Models PA-24 and PA-24 "250" Aircraft.

Compliance required within the next 50 hours' time in service after the effective date of this AD, unless already accomplished.

To preclude hazardous carbon monoxide contamination in the cockpit and engine power loss, caused by cracked muffler heater shrouds, accomplish the following:

- (a) For aircraft Serial Numbers 24-1 to 24-2298 inclusive, equipped with channel reinforced muffler P/N's 22594-00, 22594-02 on PA-24, and P/N's 22593-00, 23159-00 on PA-24 "250" installed as service replacements:
- (1) Remove the tail pipe, the right-hand exhaust stack, and carburetor heat shroud and inspect for cracks and hot spots. Pay particular attention to the junction of rear cylinder exhaust tube with the stack assembly.
- (2) Remove the muffler and muffler heater shroud. Carefully inspect the muffler for visible cracks, particularly in the area near the tail pipe opening and examine the internal baffle and perforated tube. Submerge the muffler in water and pressure test at 10 p.s.i.
- (3) Replace the muffler prior to further flight if cracks, heat deterioration, defects, or wrinkles formed in the perforated tube are observed or if leaks are detected during the pressure test.
- (4) Rework the muffler heater shroud by:
- (i) enlarging the opening in the shroud in accordance with the Piper tem-
- (ii) installing the muffler reinforcement tube, P/N 23482-00 using 20 rivets PDR 134A-6, or FAA approved equivalent; and
- (iii) installing cover plate P/N 23498-00 using 11 rivets AN 426A3-4, or FAA approved equivalent, in accordance with Piper Immediate Action Service Bulletin No. 210 (Kit P/N 754 484).
- (5) Reinstall the muffler exhaust stacks, tailpipe, and air ducts on the
- (b) For aircraft Serial Numbers 24-2299 to 24-3284 inclusive, equipped with channel reinforced muffler P/N's 22594-00, 22594-02 on PA-24, and Numbers 24-2876, 24-2929, 24-2949, 24-2967, 24-2990, 24-3033, 24-3095, 24-3114, 24-3130, 24-3150, 24-3155, 24-3173, 24-3191, 24-3193, 24-3241, 24-3196, 24-3198, 24-3203, 24-3204, 24-3222, 24-3233, 24-3234, 24-3241, 24-3244, 24-3248, 24-3254, 24-3257, 24-3258, 24-3265, 24-3280, 24-3270, 24-3273, 24-3274, 24-3276, 24-3277, 24-3278, 24-3279, 24-3280, 24-3282, 24-3283, which have been modified:
  - (1) Perform inspections required by (a)(1) and (a)(2), and the replacement
  - (2) Install new cabin heater shroud, P/N 23507-00 on PA-24, and P/N 23489-00 on PA-24 "250". Center the tailpipe in the shroud tailpipe opening.
  - (3) Reinstall the muffler exhaust stacks, tailpipe, and air ducts on air-

NOTE: PA-24 and PA-24 "250" mufflers have been manufactured incorporating two different styles of tailpipe reinforcement brackets. This AD requires modification of one style only - those with channel style reinforcement. See Sketch A of Piper Service Bulletin No. 210 for further identification. Both types of mufflers have been sold as service replacements. It will therefore be necessary to examine aircraft Serial Numbers 24-1 to 24-2587 inclusive, if the original muffler has been replaced, to determine if the modification is required. Aircraft Serial Numbers 24-2588 through 24-3284, were manufactured with the channel shaped reinforcement and will require modification except those already modified as indicated.

(Use Piper Service Letter No. 324B as a guide for inspections in addition to Service Bulletin No. 210.)

This directive effective December 5, 1962.

#### PIPER AIRCRAFT CORPORATION

**SERVICE BULLETIN NO. 210** 

F.A.A. Approved

**OCTOBER 3, 1962** 

SUBJECT: Replacement or Modification of Muffler Shrouds

MODELS AFFECTED: PA-24 and PA-24 "250" Comanches • Serial Numbers 24-2588 to 24-2875 incl., 24-2877 to 24-2928 incl., 24-2930 to 24-2948 incl., 24-2950 to 24-2966 incl., 24-2968 to 24-2989 incl., 24-2991 to 24-3032 incl., 24-3034 to 24-3094 incl., 24-3113 incl., 24-3115 to 24-3129 incl., 24-3131 to 24-3149 incl., 24-3151 to 24-3154 incl., 24-3156 to 24-3172 incl., 24-3174 to 24-3190 incl., 24-3195, 24-3197, 24-3199 to 24-3202 incl., 24-3205 to 24-3221 incl., 24-3232 to 24-3232 incl., 24-3235 to 24-3240 incl., 24-3269, 24-3271, 24-3272, 24-3275, 24-3281, 24-3284 and all of the referenced aircraft prior to Serial No. 24-2588 in which mufflers, been installed as service replacements.

DATE OF COMPLIANCE: Prior to but not later than next 50 hours of operation

Service reports have been received advising of cracks located in the muffler housing near the tailpipe reinforcement strap. The muffler heater shroud has therefore been redesigned to remove the affected area from the heater system. This has been accomplished by increasing the shroud opening around the tailpipe, making the area more accessible for inspection.

Comanche mufflers have been manufactured incorporating two different styles of tailpipe reinforcement brackets. However, this Service Bulletin requires modification of one style only; those with the channel-shaped reinforcement. See Sketch "A" for further identification. Both styles of muffler have been sold as service replacements. It will therefore be necessary to inspect aircraft, Serial Nos. 24-1 to 24-1 inclusive if the original muffler has been replaced, to determine if compliance with this Bulletin is required.

Aircraft, Serial Nos. 24-2588 through 24-3284 inclusive, were manufactured with the channel shaped reinforcement and will require modification, except those already modified as indicated by serial numbers omitted under models affected.

#### PAGE 2 OF 3

#### RECOMMENDED AIRCRAFT INSPECTION PROCEDURE

Aircraft Serial Nos. 24-1 to 24-2298 inclusive (Mufflers with channel reinforcement only)

- 1. Remove the tailpipe.
- 2. Remove the right hand exhaust stack and inspect for cracks, etc., paying particular attention to the junction of rear cylinder exhaust tube with the stack assembly.
- 3. Remove the muffler. This can be accomplished by taking the muffler out the right side, without removing the left exhaust stack.
- 4. Remove muffler heater shroud.
- 5. Carefully inspect the muffler for visible cracks, particularly the area near the tailpipe opening. Inspect the internal baffle and perforated tube. Submerge the muffler in water and pressure test at 10 p.s.i.

If cracks or other defects are observed, leaks detected during pressure test, or wrinkles found in the perforated tube, the muffler must be replaced.

- 6. Remove the cold air inlet take-off assembly located on the aluminum heater shroud.
- 7. Cut out the enclosed template and place on the aluminum shroud over the present tailpipe opening.
- 8. Cut the new opening in the aluminum shroud, taking care not to cut past the splice. (See Note Figure 2.)
- 9. Install the muffler housing reinforcement tube, part number 23482-00, on the inside of the aluminum heater shroud. (See Figure 2.)
- 10. Relocate the cold air inlet take-off assembly as shown on the take-off relocation table and install cover plate, part number 23498-00, over old hole. Trim cover plate as required. (See <u>Figure 2</u>.)
- 11. Reinstall the aluminum shroud on the muffler. The tailpipe should be centered in the shroud tailpipe opening.
- 12. Reinstall the muffler, exhaust stack, tailpipe, etc., on the aircraft.
- 13. The referenced material required for the heater shroud modification is contained in Kit, part number 754 484.

#### PAGE 3 OF 3

#### RECOMMENDED AIRCRAFT INSPECTION PROCEDURE (Cont.)

Aircraft Serial Nos. 24-2299 to 24-3284 inclusive (Mufflers with channel reinforcement only)

Steps numbers 1 through 5 - Same as for Serial Numbers 24-1 to 24-2298 inclusive.

- 6. Install new cabin heater shroud, part number 23507-00 on PA-24, and part number 23489-00 on PA-24 "250." The tailpipe should be centered in shroud tailpipe opening.
- 7. Install the muffler, exhaust stack, tailpipe, etc. on the aircraft.

We have been aware that in some instances, inspection of the exhaust systems has not been as thorough as it should have been and are, therefore, attaching to this Bulletin a copy of our Service Letter No. 324B covering that subject.

#### **NOTE FOR DISTRIBUTORS**

Distributors should order muffler shrouds, part number 23507-00 PA-24, and part number 23489-00 PA-24 "250", in sufficient quantities to comply with this Bulletin.

Credit will be issued for these shrouds and three (3) hours warranty labor will be approved upon receipt of a Warranty and Credit Claim.

Distributors should order kit number 754 484 in sufficient quantities for muffler shroud modification.

PA-24 "250" Comanches, Serial Nos. 24-103 to 24-2298 inclusive, using muffler shroud, part number 21577-00, will require a longer flex tube. An order for this tube, part number 22502-25, should accompany the order for the kit.

Credit will be issued for kit number 754 484 and five (5) hours warranty labor upon receipt of a Warranty and Credit Claim.

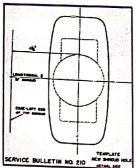


Figure 1

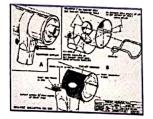


Figure 2

# FAA APPROVED HODEL LIST (AML) NO. SAJ531WH

#### FOR

## DISTALLING COPPER ELECTRICAL CAMLES

	1		ORIGINAL TYPE CERTIFICATE	CERTIFICATION BASIS FOR	Ins:		Dates July 19, 1996	
	AIRCRAFT	AIRCRAFT HODEL	NUMBER	ALTERATION	NUMBER	REVISION NO.	AFM Supplement	AMI
ITE!	Piper	PA34-200/ -200T/ & PA34-220T	A7S0	FAR 23 and Amendments listed in TCDS A7SO	2-1	6/25/86	MUMBER/DATE	AMENDMENT
		PA)4-2201			y A			
2	Piper	PA28-140/ -150/-160/	2A13	CAR 3 and Amendments listed in TCDS 2A13	2-2	6/25/86	11/4	9/9/96
		-180/-235/ -151/-161/ -181/-236/						3/3/30
		-201T, and    PA28R-180/						
		-200/-201/ -201T,and PA28RT-201/	-					
		-201T						
3	Piper	PA-18 Series	1A2	CAR 3	2-3	7/23/86	H/A	9/9/36
4	Piper	PA-20 Series	1.44	CAR 3	2-3	7/23/86	N/A	9/9/86
						2 21		

Page 1 of 7

8 ' ' 5			CRIGINAL TYPE	CERTIFICATION BASIS		ALLATION RUCTIONS	AFM	AML
ITEH	AIRCRAFT MAKE	AIRCRAFT HODEL	CERTIFICATE NUMBER	FOR ALTERATION	   Number	REVISION NO.	SUPPLEMENT NUMBER/DATE	DATE
5	Piper	PA-22 Series	1.46	CAR 3 dated 11/1/49 & amendments 3-1 thru 3-6.	2–3	7/23/86	N/A	9/9/86
6	Piper	PA-24,  PA-24-250/  -260/-400	1415	CAR 3 dated 11/1/49 & amendments 3-1 thru 3-12.	2-4	7/31/86	N/A	7/16/87
7		PA-32-300/ -301/-301T, PA-32R-300/ -301/-301T/	A350 .	CAR 3 dated 5/15/56 thru Amendment 3-8 & TCDS A3SO	2–10	9/20/86	n/a	7/16/87
	_	and PA-32RT-300/ -300T						
8	Piper	PA-30	A1EA	CAR 3 dated 5/15/56 thru Amendment 3-6 dated 9/31/61, & Para.	2-9	9/20/86	N/A	9/29/86
7				3.705(a) of Amendment   3-7 dated 5/3/62. Also  FAR 23.1557(a)(1) of Amendment 23-7 dated 9/14/69.				

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David Fletcher P O Box 308 Comfort, TX 78013-0308, USA

ORDER ID: 26-07290-27044

Order date: Jul 3, 2021

ITEM	QTY	PRICE
Lot of 8 Lycoming Push rod tube O-360, 540, LW11485 W Warrant Airworthy (Item ID: 254931096536)	1	\$115.00
	Subtotal Shipping Sales tax (eBay collected) Discount Total**	\$115.00 \$14.82 \$9.63 \$0.00 <b>\$139.45</b>

<sup>\*\*</sup>Total includes eBay collected tax. eBay collects and remits the tax to the tax authorities in accordance with applicable state law.

### Aircraft Weight and Balance Revision

Tail Number: N	7905P	Date: 6/15/2013  Work Order No: 7627-05-2013  Type Certificate 1A15					
Prepared by: LONE MOU 2830 N. RA STE A LAS VEGAS							
Aircraft Make:	Model: PA24-250	Data No: Time: 6461.80					
Registered Owner: EAGLE VIEW LLC	The second second		Address:				
Maximum Weight 290	00	CG R	ange FWD	A	FT		
As Received; Date of Pr			seful Load:	EW:	EWCG:	Moment:	
Notes: WEIGHED USIN	G ARLYN SCALES MODE	L 5-2205, SN	18098A LAST (	CALIBRATED 5/1/2	013		
	T.			Weight	Arm	Moment	
LEFT MAIN				636.0	108.5	69006.00	
RIGHT MAIN	* ;			624	108.5	67704.00	
NOSE				616	30.7	18911.20	
				24	90	2160.00	
UNUSABLE FUEL	1	-	4	0.00	0.00	0.00	
		-		0.00	0.00	0.00	
	*		· ·	0.00	0.00	0.00	
			7, 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.00	0.00	0.00	
		2 A.27 A	14441	0.00	0.00	0.00	
			=======================================	0.00	0.00	0.00	
· ·			New Emp	ty Weight CG	New	Useful Load	
As Calculated	Moment	157781.20		1000.00			
As Weighed	Weight	1900.00		33.04			
	:		Repair Agency L90R473Y or License No:				