



Continental Motors

ENGINE EXAMINATION REPORT

ENGINE MODEL	TSIO-360-KB
ENGINE SERIAL NUMBER	268024-R
AIRCRAFT MAKE & MODEL	Piper PA34-220T
AIRCRAFT SERIAL NUMBER	34-8133142
AIRCRAFT REGISTRATION	N8404B
FILE NUMBER	17-513

NAME	SIGNATURE	DATE
Kurt Gibson		06/20/2018

ENGINE FIELD INSPECTION REPORT

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GENERAL INFORMATION

EXAMINATION		ACCIDENT DATA	
DATE	06/04/2018	NTSB ACCIDENT #	WPR18LA124
FACILITY	Airglades Airport	NTSB INVESTIGATOR	Josh Cawthra
ADDRESS	[REDACTED] Clewiston, FL 33440	FAA INVESTIGATOR	Juan Garcia
		ACCIDENT DATE	04/20/2018
		ACCIDENT LOCATION	Clewiston, Florida

ENGINE INFORMATION

ENGINE POSITION	Left
TOTAL TIME	1950.5 (time at the last maintenance entry)
TIME SOH	0.0 (time at the last maintenance entry)
TYPE & TIME SLI	Unknown
BUILD DATE	05/18/1987
IN SERVICE DATE	Unknown

Significant logbook information:

The last maintenance entry was on 01/30/2018 and was for the installation of the engine after a major overhaul (overhaul performed by Certified Engines Unlimited Inc.). It was noted that according to the logbook entry a compression check was performed and all cylinders were recorded as 80/80.

Report Summary:

Search Code(s):

15-12-68

There were no anomalies noted that would have prevented normal operation or production of rated horsepower.

Disposition of engine following exam:

The wreckage remained on the ramp at the Airglades airport in Clewiston, Florida.

INSPECTION WITNESSES			
NAME	Kurt Gibson	NAME	Juan Garcia
ADDRESS	Mobile, Alabama	ADDRESS	Miramar, Florida
ORGANIZATION	Continental Motors	ORGANIZATION	FAA
PHONE		PHONE	
NAME		NAME	
ADDRESS		ADDRESS	
ORGANIZATION		ORGANIZATION	
PHONE		PHONE	
NAME		NAME	
ADDRESS		ADDRESS	
ORGANIZATION		ORGANIZATION	
PHONE		PHONE	

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PAGE 4 of 27**EXTERNAL INSPECTION OF ENGINE**

The engine remained attached to the airframe though all of its engine mounts, cables, wires, and hoses. The engine displayed minimal impact damage signatures. The crankcase remained intact and was undamaged. All six cylinders remained attached to their cylinder bays and were undamaged. The propeller flange remained attached to the crankshaft and the three blade, variable pitch propeller remained attached to the crankshaft.

Both of the magnetos remained attached to their installation points and were undamaged. The ignition harness remained attached to both of the magnetos and to each of the spark plugs; the ignition harness was undamaged. All of the spark plugs remained installed in their cylinders and were undamaged.

The fuel pump remained attached to its installation point and was undamaged. The throttle and metering assembly remained attached to its installation point and was undamaged. The fuel manifold valve and fuel nozzles remained installed in their respective installation points and were undamaged. There were no signs of fuel leaks around any of the fuel components.

The turbocharger remained attached to its installation point and was undamaged; it was noted that there was a significant amount of corrosion around the turbine portion of the turbocharger. The fixed wastegate remained installed and was secured with safety wire. The overboost valve remained attached to its installation point and was undamaged.

The induction system remained intact and was undamaged. There were no signs of induction leaks noted. The exhaust system remained attached to the engine and to the turbocharger; there were no signs of exhaust leaks noted.

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ENGINE TEARDOWN AND COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition:

The exhaust system remained attached to the engine and to the turbocharger. The V-band clamps were noted to be attached to their installation points. There were no signs of exhaust leaks or other anomalies noted.



INDUCTION SYSTEM

Condition:

The induction system remained attached to the engine and was undamaged. There were no signs of induction leaks noted. The induction air filter was removed and visually inspected; there were no signs of blockages noted.



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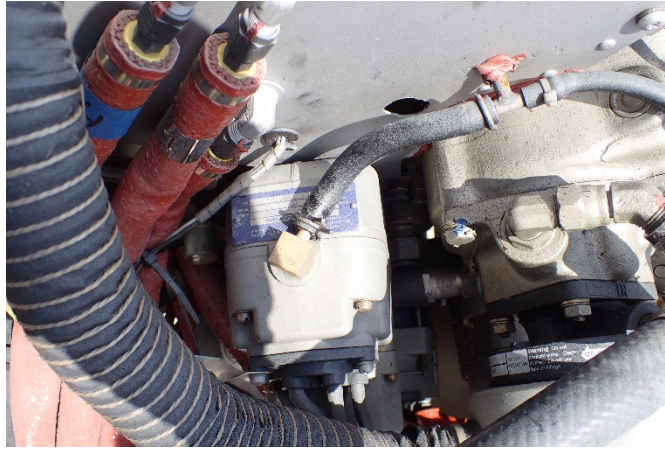
Manufacturer: CMI/Bendix

P/N: 10-79020-18

S/N: L0204392

Condition:

The magneto remained attached to its installation point and was undamaged. There were no anomalies noted with the magneto.

**RIGHT
MAGNETO**

Manufacturer: CMI

P/N: 10-79020-18

S/N: I069108DR

Condition:

The magneto remained attached to its installation point and was undamaged. There were no anomalies noted with the magneto.



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IGNITION HARNESS

Manufacturer: CMI

P/N: Not observed

S/N: Not observed

Condition:

The ignition harness remained attached to both of the magnetos and to each spark plug. There were no anomalies noted with the ignition harness.

SPARK PLUGS

Manufacturer: Champion

P/N: RHM38E

Condition:

All of the spark plugs remained installed in their cylinders and were undamaged. The top spark plugs were removed and the electrodes were visually inspected. The electrodes displayed normal operating and wear signatures when compared with Champion Aviation Service Manual AV6-R. The bottom spark plugs were inspected using a lighted borescope. It was noted that the #1, #3, and the #5 bottom spark plugs were oil soaked consistent with post-accident accumulation. The bottom spark plugs displayed normal operating and combustion signatures. There were no anomalies noted.



#1 Top Spark Plug



#1 Bottom Spark Plug

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#3 Top Spark Plug



#3 Bottom Spark Plug



#5 Top Spark Plug



#5 Bottom Spark Plug



#2 Top Spark Plug



#2 Bottom Spark Plug

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#\$ Top Spark Plug



#4 Bottom Spark Plug



#6 Top Spark Plug



#6 Bottom Spark Plug

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FUEL SYSTEM

FUEL PUMP

Manufacturer: Inaccessible

P/N: Inaccessible

S/N: Inaccessible

Condition:

The fuel pump remained attached to its installation point and was undamaged. There were no signs of fuel leaks around the fuel pump. The mixture control arm remained attached to the control rod end and to the mixture shaft. Mixture control continuity was established by moving the control in the cockpit and observing mixture arm movement. It was noted that the mixture control was improperly rigged; the mixture control would not hit the mixture idle cut off stop when the control in the cockpit was moved to idle cut off.



THROTTLE BODY METERING UNIT

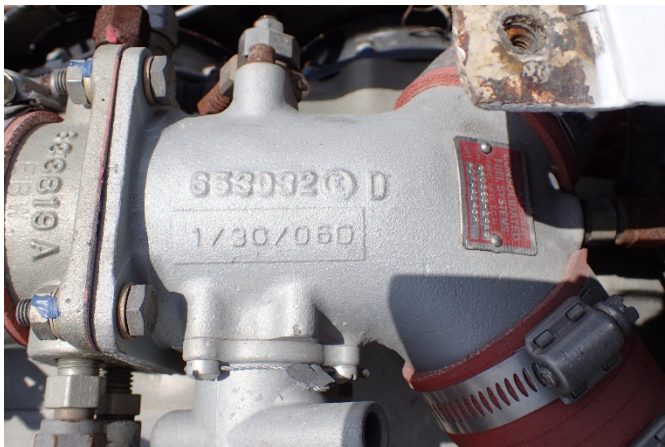
Manufacturer: CMI
(overhauled by
Consolidated Fuel Systems)

P/N: 640563-14A3

S/N: A07AA143R

Condition:

The throttle and metering assembly remained attached to its installation point and was undamaged. There were no signs of fuel leaks around the assembly and the fuel lines were secure. The throttle control arm remained secured to the throttle shaft and to the throttle control cable rod end. Throttle control cable continuity was established by moving the control in the cockpit and observing control arm movement. There were no anomalies noted.



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FUEL MANIFOLD VALVE

Manufacturer: CMI
(overhauled by
Consolidated Fuel Systems)

P/N: 641032-11A8

S/N: C07AA169R

Condition:

The fuel manifold valve remained attached to its installation point and was undamaged. There were no signs of fuel leaks around the manifold valve. There were no anomalies noted.



FUEL NOZZLES AND LINES

Manufacturer: CMI

Condition:

All of the fuel nozzles remained installed in their cylinders and were undamaged. There were no anomalies noted with any of the fuel nozzles.

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The oil sump remained intact and was undamaged. There were no anomalies noted with the oil sump.

**OIL PICK-UP
TUBE & SCREEN****Condition:**

Due to the type of inspection performed the oil pick-up tube and screen was not observed.

OIL PUMP**Condition:**

Due to the type of inspection performed the oil pump could not be observed.

OIL FILTER

Manufacturer: Not observed

P/N: Not observed

Condition:

The oil filter remained attached to the oil filter adapter and was undamaged. There were no signs of oil leaks around the filter. There were no anomalies noted.

OIL COOLERManufacturer: Not observed
(overhauled by Skyline
Accessories)

P/N: 646880

S/N: 76A3436

Condition:

The oil cooler remained attached to its installation point and was undamaged. There were no anomalies noted.



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CYLINDERS

CYLINDERS

Condition: All of the cylinders remained attached to their cylinder bays and were undamaged. The top spark plugs were removed and the cylinders were inspected using a lighted borescope. The cylinder bores, piston faces, and valve heads displayed normal operating and combustion signatures. The crankshaft was rotated and all of the cylinders displayed good thumb compression and suction. There were no anomalies noted with the cylinders.



VALVES AND GUIDES

Condition: The valve heads were inspected using a lighted borescope. The valve heads displayed normal operating and combustion signatures.



#1 Exhaust Valve



#1 Intake Valve

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#3 Exhaust Valve



#3 Intake Valve



#5 Exhaust Valve



#5 Intake Valve

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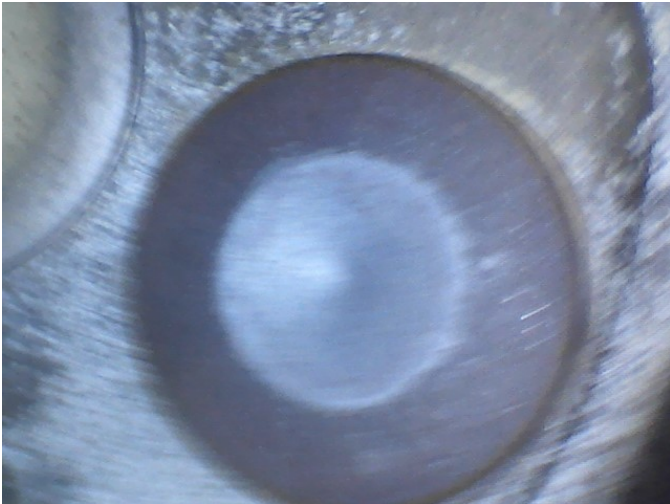
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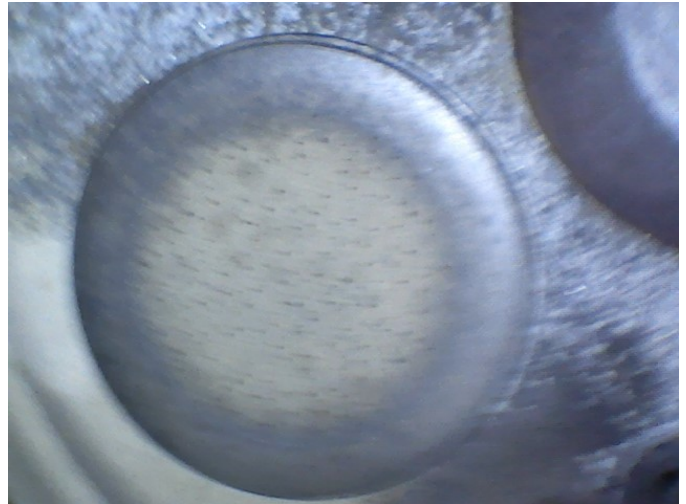
#2 Exhaust Valve



#2 Intake Valve



#4 Exhaust Valve



#4 Intake Valve



#6 Exhaust Valve



#6 Intake Valve

ROCKER ARMS AND SHAFTS	
Condition:	The rocker arms were not observed during the examination.

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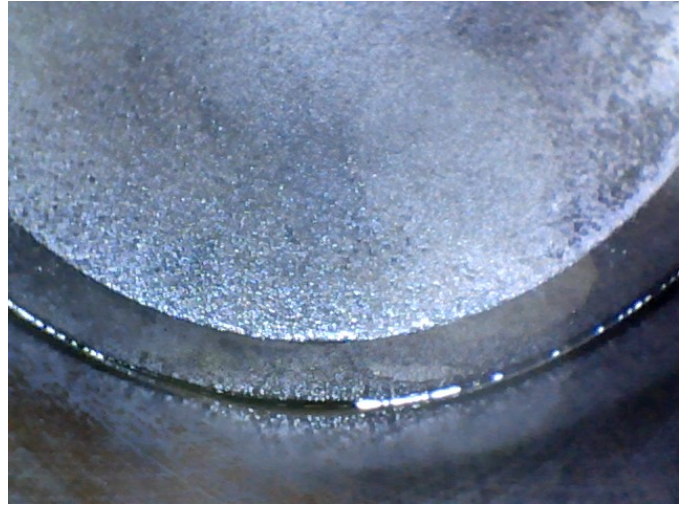
Piston P/N: 654858B

Condition:

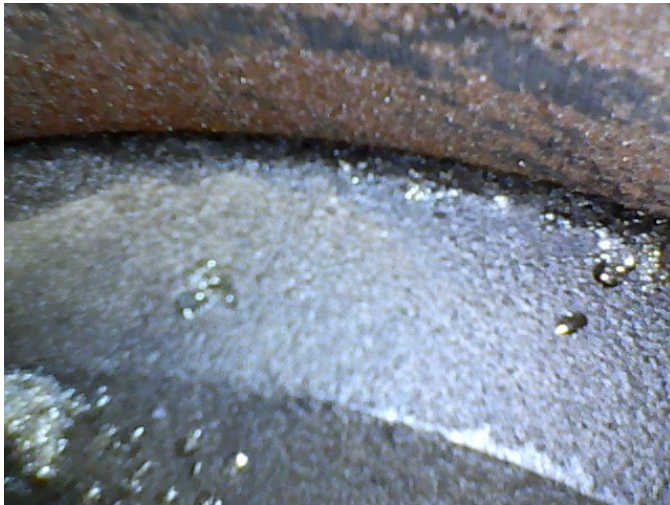
The piston faces were inspected using a lighted borescope; the piston face displayed normal operating and combustion signatures. It was noted there was very little combustion deposits on the piston faces which is consistent with an engine that has been recently overhauled.



#1 Piston



#3 Piston



#5 Piston



#2 Piston

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#4 Piston



#6 Piston

CRANKCASE ASSEMBLY

CRANKCASE	Casting Number:	1-3-5: Not observed	2-4-6: Not observed	S/N: Not observed
Condition:	The crankcase remained intact and was undamaged. There were no anomalies noted with the crankcase.			



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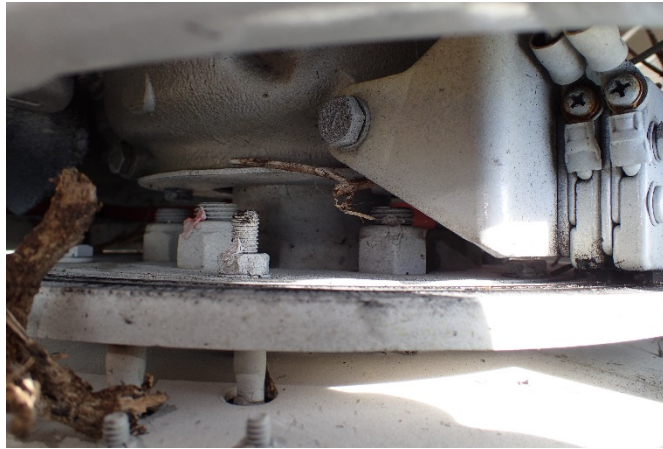
Forging: Inaccessible

S/N: Inaccessible

Heat code: Inaccessible

Condition:

The propeller flange remained attached to the crankshaft and there were no cracks noted in the visible portion of the crankshaft. The crankshaft was rotated by hand and continuity was established between the internal components of the engine. There were no anomalies noted with the crankshaft.

**CONNECTING RODS**

P/N: Inaccessible

Forging or Serial Number: Inaccessible

Condition:

Operation of the connecting rods was verified by rotating the crankshaft and observing piston movement; the connecting rods operated normally.

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P/N: Inaccessible

S/N: Inaccessible

Condition:

Operation of the camshaft was verified by rotating the crankshaft and observing valve head movement; the camshaft operated normally.

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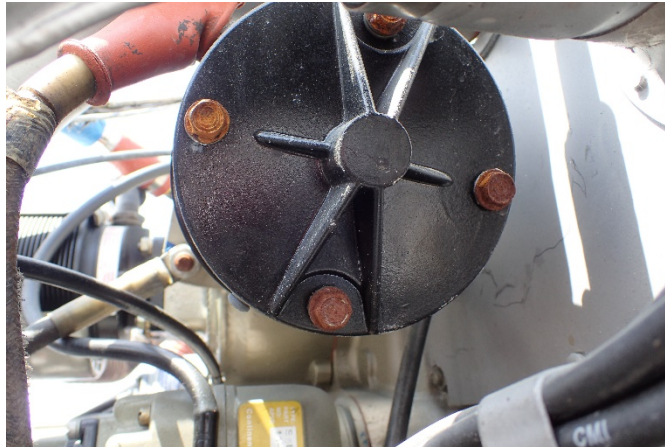
Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The starter remained attached to its installation point and was undamaged. There were no anomalies noted with the starter.

**STARTER
ADAPTER**

P/N: Illegible

Condition:

The starter adapter remained attached to its installation point and was undamaged. There were no anomalies noted with the adapter.

**ALT/GEN #1**

Manufacturer: Not observed

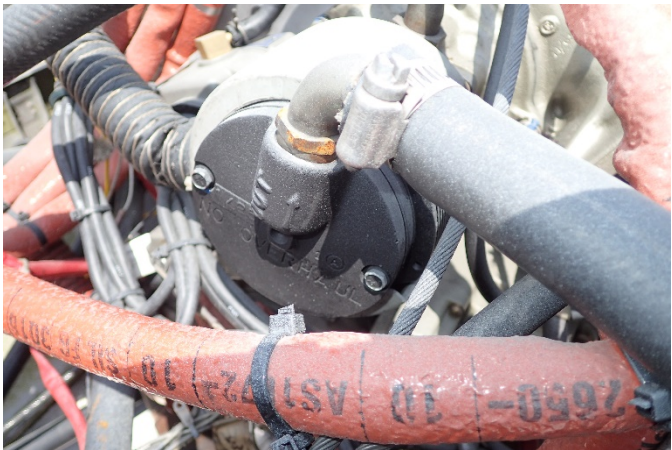
P/N: Not observed

S/N: Not observed

Condition:

The alternator remained attached to its installation point and was undamaged. There were no anomalies noted with the alternator.

VACUUM PUMP	Manufacturer: Rapco	P/N: 441CC-7	S/N: 176441
Condition:	The vacuum pump remained attached to its installation point and was undamaged. There were no anomalies noted with the vacuum pump.		



TURBO	Manufacturer: Not observed (overhauled by Approved Turbo Components)	P/N: 600573-9000	S/N: TR0898038
Condition:	The turbocharger remained attached to its installation point and was undamaged. It was noted that the V-band clamps remained attached to the turbocharger and were undamaged. The turbocharger induction inlet tube was removed and it was noted that the compressor was capable of rotating normally. There were no anomalies noted.		



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WASTEGATE

Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The fixed wastegate remained attached to its installation point and was secured with safety wire. There were no anomalies noted.



OVERBOOST VALVE

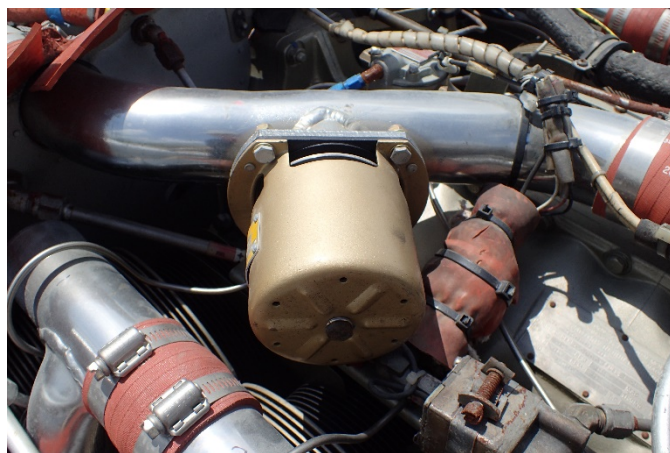
Manufacturer: KAES
(overhauled by Approved Turbo Components)

P/N: 681066-9001

S/N: JHN00619

Condition:

The overboost valve remained attached to its installation point and was undamaged. The overboost valve was actuated by using a screw driver; the overboost valve operated normally. There were no anomalies noted.



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PROPELLER

PROPELLER GOVERNOR

Manufacturer: Inaccessible

P/N: Inaccessible

S/N: Inaccessible

Condition:

Due to the position of the engine the governor was unable to be inspected.

PROPELLER

Manufacturer: McCauley

P/N: Not observed

S/N: Not observed

Condition:

The three blade, variable pitch propeller remained attached to the crankshaft and the three propeller blades displayed impact damage signatures. All of the propeller blades displayed varying amounts of aft bending and polishing at the propeller tips. There were no anomalies noted with the propeller.





Continental Motors

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ENGINE MODEL	LTSIO-360-KB
ENGINE SERIAL NUMBER	268291-R
AIRCRAFT MAKE & MODEL	Piper PA-34-220T
AIRCRAFT SERIAL NUMBER	34-8133142
AIRCRAFT REGISTRATION	N8404B
FILE NUMBER	17-513

NAME	SIGNATURE	DATE
Kurt Gibson		06/18/2018

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GENERAL INFORMATION

EXAMINATION		ACCIDENT DATA	
DATE	06/04/2018	NTSB ACCIDENT #	WPR18LA124
FACILITY	Airglades Airport	NTSB INVESTIGATOR	Josh Cawthra
ADDRESS	[REDACTED] Clewiston, FL 33440	FAA INVESTIGATOR	Juan Garcia
		ACCIDENT DATE	4/20/2018
		ACCIDENT LOCATION	Clewiston, Florida

ENGINE INFORMATION

ENGINE POSITION	Right
TOTAL TIME	1798.0 (time at last maintenance entry on 01/30/2018)
TIME SOH	0.0 (time at last maintenance entry on 01/30/2018)
TYPE & TIME SLI	Unknown
BUILD DATE	09/09/1988
IN SERVICE DATE	Unknown

Significant logbook information:

The last maintenance entry was on 01/30/2018 and was for the installation of the engine after a major overhaul (overhaul performed by Certified Engines Unlimited Inc.). It was noted that according to the logbook entry a compression check was performed and all cylinders were recorded as 80/80.

Report Summary:

Search Code(s):

15-12-68

There were no anomalies noted that would have prevented normal operation or production of rated horsepower. Due to the position of the engine internal continuity could not be checked.

Disposition of engine following exam:

The wreckage remained on the ramp at the Airglades airport in Clewiston, Florida.

INSPECTION WITNESSES			
NAME	Kurt Gibson	NAME	Juan Garcia
ADDRESS	Mobile, Alabama	ADDRESS	Miramar, Florida
ORGANIZATION	Continental Motors	ORGANIZATION	FAA
PHONE		PHONE	
NAME		NAME	
ADDRESS		ADDRESS	
ORGANIZATION		ORGANIZATION	
PHONE		PHONE	
NAME		NAME	
ADDRESS		ADDRESS	
ORGANIZATION		ORGANIZATION	
PHONE		PHONE	

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PAGE 4 of 26**EXTERNAL INSPECTION OF ENGINE**

The engine remained attached to the airframe though all of its engine mounts, cables, wires, and hoses. The engine displayed minimal impact damage signatures. The crankcase remained intact and was undamaged. All six cylinders remained attached to their cylinder bays and were undamaged. The propeller flange remained attached to the crankshaft and the three blade, variable pitch propeller remained attached to the crankshaft.

Both of the magnetos remained attached to their installation points and were undamaged. The ignition harness remained attached to both of the magnetos and to each of the spark plugs; the ignition harness was undamaged. All of the spark plugs remained installed in their cylinders and were undamaged.

The fuel pump remained attached to its installation point and was undamaged. The throttle and metering assembly remained attached to its installation point and was undamaged. The fuel manifold valve and fuel nozzles remained installed in their respective installation points and were undamaged. There were no signs of fuel leaks around any of the fuel components.

The turbocharger remained attached to its installation point and was undamaged; it was noted that there was a significant amount of corrosion around the turbine portion of the turbocharger. The fixed wastegate remained installed and was secured with safety wire. The overboost valve remained attached to its installation point and was undamaged.

The induction system remained intact and was undamaged. There were no signs of induction leaks noted. The exhaust system remained attached to the engine and to the turbocharger; there were no signs of exhaust leaks noted.

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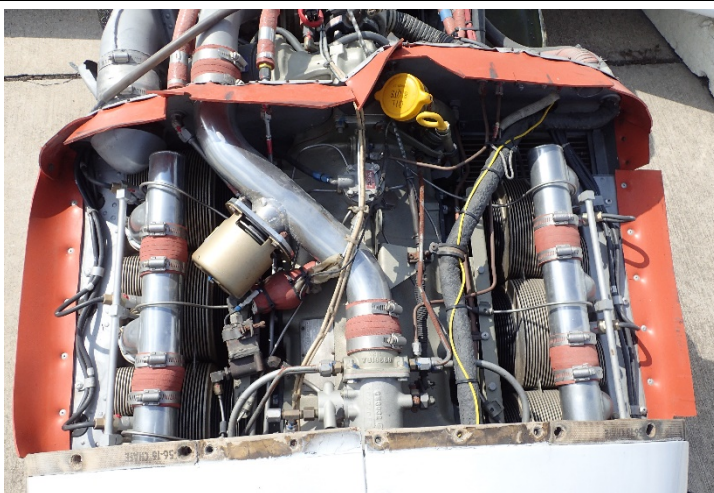
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ENGINE TEARDOWN AND COMPONENT EXAMINATION

EXHAUST SYSTEM

Condition:

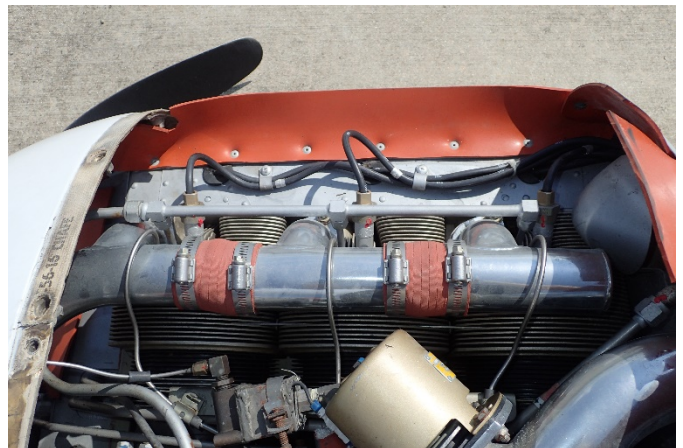
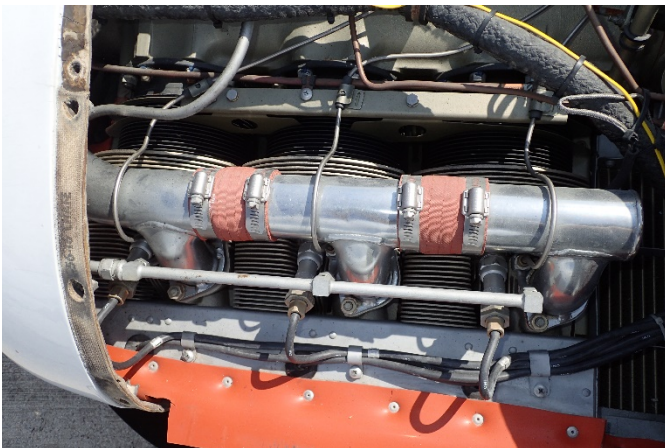
The exhaust system remained attached to the engine and to the turbocharger; the exhaust tailpipe displayed impact damage signatures. There were no signs of exhaust leaks or other anomalies noted.



INDUCTION SYSTEM

Condition:

The induction system remained attached to the engine and was undamaged. There were no signs of induction leaks noted. The induction air filter was removed and visually inspected; there were no signs of blockages noted.



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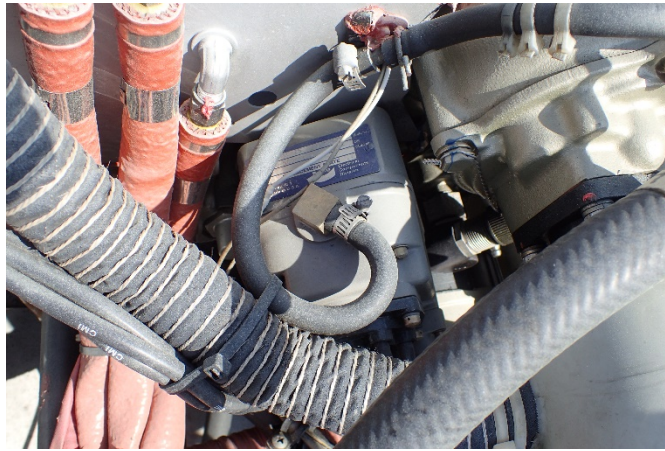
Manufacturer: CMI/Bendix

P/N: 10-500556-1

S/N: D13KA095

Condition:

The magneto remained attached to its installation point and was undamaged. Due to the position of the engine the magneto could not be tested. There were no anomalies noted.

**RIGHT
MAGNETO**

Manufacturer: CMI/Bendix

P/N: 10-500556-1

S/N: D09GA094

Condition:

The magneto remained attached to its installation point and was undamaged. Due to the position of the engine the magneto could not be tested. There were no anomalies noted.



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IGNITION HARNESS

Manufacturer: CMI

P/N: Not observed

S/N: Not observed

Condition:

The ignition harness remained attached to both of the magnetos and to each spark plug. The harness was undamaged and there were no anomalies noted.



SPARK PLUGS

Manufacturer: Champion

P/N: RHM38E

Condition:

All of the spark plugs remained installed in their cylinders and were undamaged. The spark plugs were removed and visually inspected. The electrodes displayed normal operating and wear signatures when compared with Champion Aviation Service Manual AV6-R. There were no anomalies noted.



#1 Spark Plugs



#3 Spark Plugs

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#5 Spark Plugs



#2 Spark Plugs



#4 Spark Plugs



#6 Spark Plugs

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FUEL SYSTEM

FUEL PUMP

Manufacturer: CMI

P/N: Inaccessible

S/N: Inaccessible

Condition:

The fuel pump remained attached to its installation point and was undamaged. There were no signs of fuel leaks around the fuel pump. The mixture control arm remained attached to the control rod end and to the mixture shaft. Mixture control continuity was established by moving the control in the cockpit and observing mixture arm movement. There were no anomalies noted.



THROTTLE BODY METERING UNIT

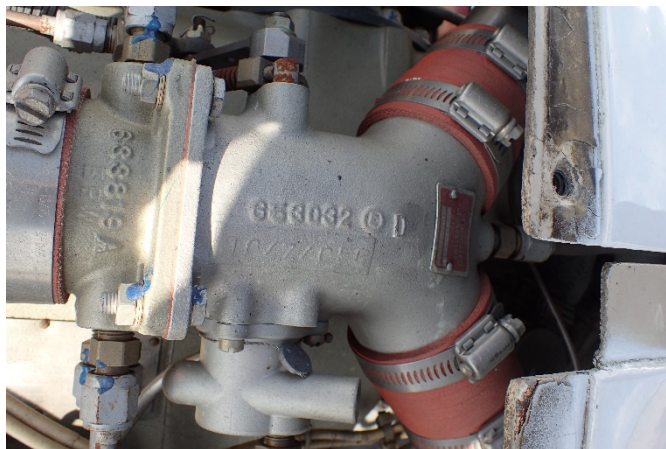
Manufacturer: CMI
(Overhauled by
Consolidated fuel systems)

P/N: 640563-14A2

S/N: A08HA270R

Condition:

The throttle and metering assembly remained attached to its installation point and was undamaged. There were no signs of fuel leaks around the assembly and the fuel lines were secure. The throttle control arm remained secured to the throttle shaft and to the throttle control cable rod end. Throttle control cable continuity was established by moving the control in the cockpit and observing control arm movement. There were no anomalies noted.



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VALVE**Manufacturer: CMI
(Overhauled by
Consolidated fuel systems)

P/N: 641032-11A8

S/N: C09BA050R

Condition:

The fuel manifold valve remained attached to its installation point and was undamaged. There were no signs of fuel leaks around the manifold valve. There were no anomalies noted.

**FUEL NOZZLES AND
LINES**

Manufacturer: CMI

Condition:

All of the fuel nozzles remained installed in their cylinders and were undamaged. There were no anomalies noted with any of the fuel nozzles.

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The oil sump remained intact and was undamaged. There were no anomalies noted with the oil sump.

**OIL PICK-UP
TUBE & SCREEN****Condition:**

Due to the type of inspection performed the oil pick-up tube and screen was not observed.

OIL PUMP**Condition:**

Due to the type of inspection performed the oil pump could not be observed.

OIL FILTER

Manufacturer: Champion

P/N: CH48108-1

Condition:

The oil filter remained attached to the oil filter adapter and was undamaged. There were no signs of oil leaks around the filter. There were no anomalies noted.



OIL COOLER	Manufacturer: Not observed (overhauled by Skyline Accessories)	P/N: 646880	S/N: SA3560
Condition:	The oil cooler remained attached to its installation point and was undamaged. There were no anomalies noted.		



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CYLINDERS

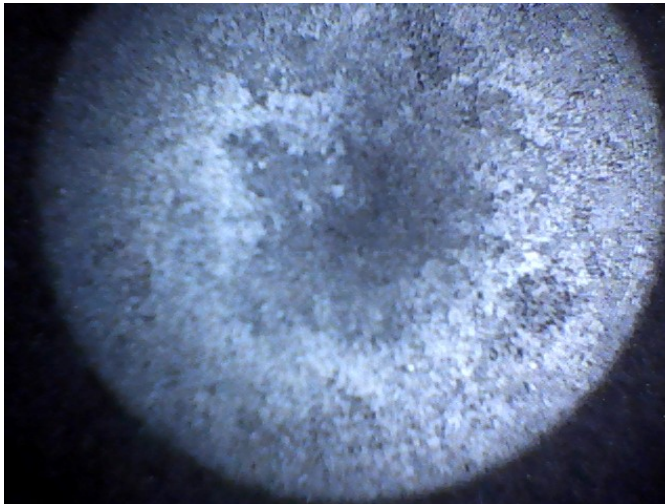
CYLINDERS

Condition: All of the cylinders remained attached to their cylinder bays and were undamaged. The top spark plugs were removed and the cylinders were inspected using a lighted borescope. The cylinder bores, piston faces, and valve heads displayed normal operating and combustion signatures. Due to the position of the engine the crankshaft could not be rotated, consequently thumb compressions were unable to be checked.



VALVES AND GUIDES

Condition: The valve heads were inspected using a lighted borescope. The valve heads displayed normal operating and combustion signatures.



#1 Exhaust



#1 Intake

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#3 Exhaust



#3 Intake



#5 Exhaust



#5 Intake

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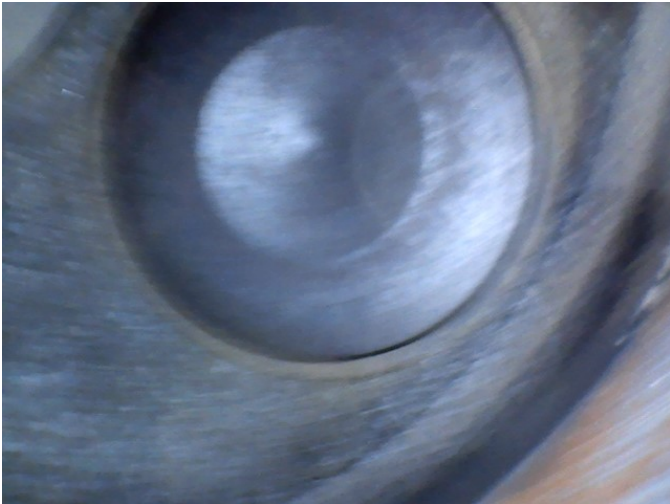
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#2 Exhaust



#2 Intake



#4 Exhaust



#4 Intake

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#6 Exhaust



#6 Intake

ROCKER ARMS AND SHAFTS

Condition:

The rocker arms were not observed during the examination.

PISTONS

Piston P/N: 654858B

Condition:

The piston faces were inspected using a lighted borescope; the piston face displayed normal operating and combustion signatures. It was noted there was very little combustion deposits on the piston faces which is consistent with an engine that has been recently overhauled.



#1 Piston



#3 Piston

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#5 Piston



#2 Piston



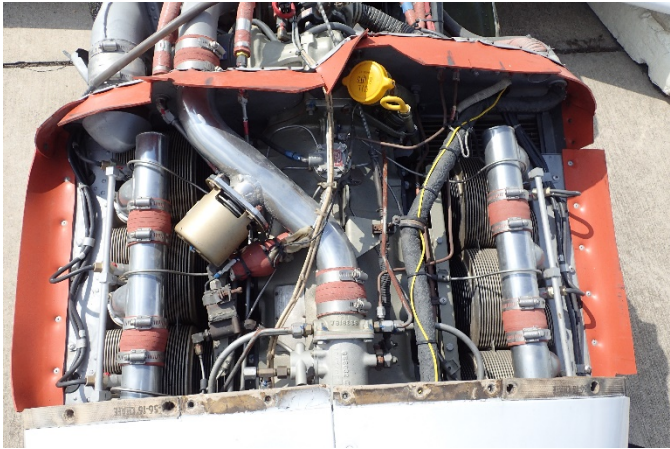
#4 Piston



#6 Piston

CRANKCASE ASSEMBLY

CRANKCASE	Casting Number:	1-3-5: Not observed	2-4-6: Not observed	S/N: Not observed
Condition:	The crankcase remained intact and was undamaged. There were no anomalies noted with the crankcase.			



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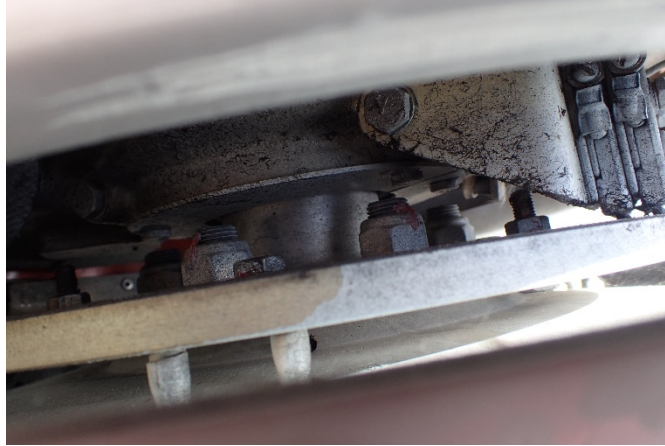
Forging: Inaccessible

S/N: Inaccessible

Heat code: Inaccessible

Condition:

The propeller flange remained attached to the crankshaft and there were no cracks noted in the visible portion of the crankshaft. Due to the position of the engine the crankshaft could not be rotated. There were no anomalies noted with the visible portion of the crankshaft.



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P/N: Inaccessible

S/N: Inaccessible

Condition:

Due to the position of the engine the camshaft could not be tested.

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ACCESSORIES

STARTER

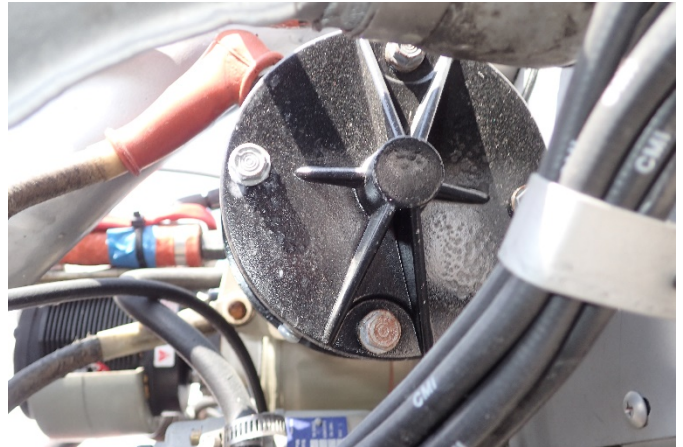
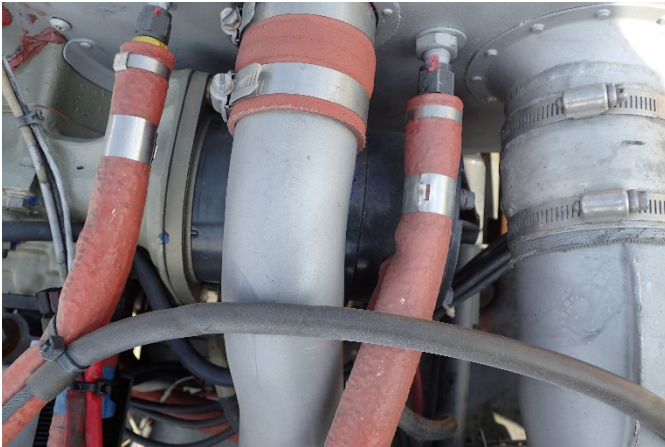
Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The starter remained attached to its installation point and was undamaged. There were no anomalies noted with the starter.



STARTER ADAPTER

P/N: Illegible

Condition:

The starter adapter remained attached to its installation point and was undamaged. There were no anomalies noted with the adapter.



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ALT/GEN #1

Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The alternator remained attached to its installation point and was undamaged. There were no anomalies noted with the alternator.



VACUUM PUMP

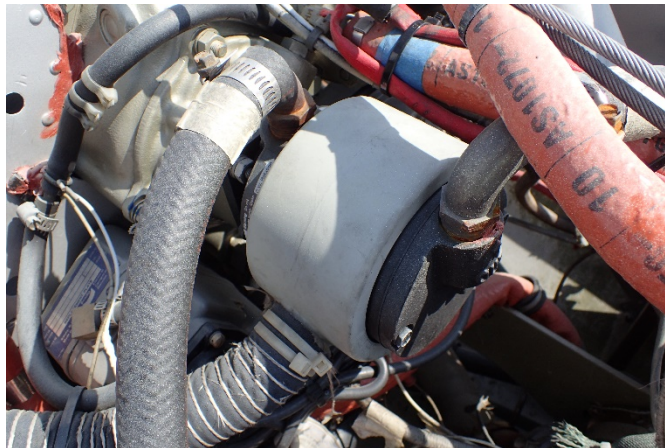
Manufacturer: Rapco

P/N: 442CW-6

S/N: 170142

Condition:

The vacuum pump remained attached to its installation point and was undamaged. There were no anomalies noted with the vacuum pump.



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TURBO

Manufacturer: Not marked
(overhauled by Approved Turbo
Components)

P/N: CF600573-9000

S/N: TR1204004

Condition:

The turbocharger remained attached to its installation point and was undamaged. It was noted that the V-band clamps remained attached to the turbocharger and were undamaged. The turbocharger induction inlet tube was removed and it was noted that the turbocharger had resistance to rotation; after the initial resistance was broken the turbocharger was capable of freely rotating.



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WASTEGATE

Manufacturer: Not observed

P/N: Not observed

S/N: Not observed

Condition:

The fixed wastegate remained attached to its installation point and was secured with safety wire. There were no anomalies noted.



OVERBOOST VALVE

Manufacturer: Not marked
(overhauled by Approved Turbo Components)

P/N: 481066-9001

S/N: LL0108

Condition:

The overboost valve remained attached to its installation point and was undamaged. The overboost valve was actuated by using a screw driver; the overboost valve operated normally. There were no anomalies noted.



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PROPELLER

PROPELLER GOVERNOR	Manufacturer: Inaccessible	P/N: Inaccessible	S/N: Inaccessible
Condition:	Due to the position of the engine the governor was unable to be inspected.		
PROPELLER	Manufacturer: McCauley	P/N: Inaccessible	S/N: Inaccessible
Condition:	The three blade, variable pitch propeller remained attached to its installation point and displayed impact damage signatures to all three propeller blades. Two of the propeller blades were bent aft and displayed polishing near the propeller blade tips; the third propeller blade displayed polishing of the blade tip. There were no anomalies noted with the propeller.		

