



Continental Motors

ENGINE RUN REPORT

ENGINE MODEL	TSIO-520-UB17B
ENGINE SERIAL NUMBER	527516
AIRCRAFT MAKE & MODEL	Raytheon B36TC
AIRCRAFT SERIAL NUMBER	EA-679
AIRCRAFT REGISTRATION	N679EA
FILE NUMBER	17-333

NAME	SIGNATURE	DATE
Christopher Lang		February 19, 2018

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GENERAL INFORMATION			
EXAMINATION		ACCIDENT DATA	
DATE	February 14-15, 2018	NTSB ACCIDENT #	CEN18FA049
FACILITY	Continental Motors	NTSB INVESTIGATOR	Aaron Sauer
ADDRESS	2039 Broad Street Mobile, Alabama 36615	FAA INVESTIGATOR	Travis Schwien
		ACCIDENT DATE	December 6, 2017
		ACCIDENT LOCATION	Chesterfield, Missouri
ENGINE INFORMATION			
ENGINE POSITION	Front, Single		
TOTAL TIME	787.4 Hours		
TIME SOH	N/A		
TYPE & TIME SLI	65.3 Hours since last annual inspection		
BUILD DATE	March 13, 2001		
IN SERVICE DATE	June 9, 2001		
Significant logbook information: Times listed above are from last logbook entry dated 10/03/2017. GAMljectors were installed on February 28, 2017 at a Hobbs time of 678.8. On August 7, 2017 at a Hobbs time of 741.2, all six cylinders were replaced with Superior Air Parts cylinders. The connecting rods were removed and sent to Poplar Grove Airmotive for inspection and new bushings. The connecting rods were reinstalled with new bearings, nuts and bolts.			
Report Summary: The examination and test cell run of this engine did not reveal any anomalies that would have prevented normal operation and production of horsepower.		Search Code(s): 15-12-68	
Disposition of engine following exam: The engine was shipped to AMF Aviation in Springfield, Tennessee for storage.			

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NAME	Phillip Grice	NAME	Greg Eastburn
ADDRESS	Mobile Alabama	ADDRESS	Mobile Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Lisa Jersild	NAME	Chris Lang
ADDRESS	Mobile Alabama	ADDRESS	Mobile, Alabama
ORGANIZATION	Continental Motors	ORGANIZATION	Continental Motors
PHONE		PHONE	
NAME	Aaron Sauer	NAME	Henry Soderlund
ADDRESS	Denver, Colorado	ADDRESS	Wichita, Kansas
ORGANIZATION	NTSB	ORGANIZATION	Textron Aviation
PHONE		PHONE	

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EXTERNAL INSPECTION OF ENGINE

The engine exhibited light thermal damage to the accessory section and residue from fire extinguishing efforts. Three of the engine mount legs were broken. The induction and exhaust systems exhibited slight impact damage. The turbocharger remained attached to the engine and exhibited impact damage to the mount bracket and the turbine housing. The turbocharger did not rotate freely by hand.

The turbocharger was removed and replaced with a slave turbocharger for the test run. The accident engine turbocharger was subsequently disassembled and the turbine housing appeared to have impact damage that prevented the turbine wheel from rotating. The other components of the turbocharger exhibited no anomalies.



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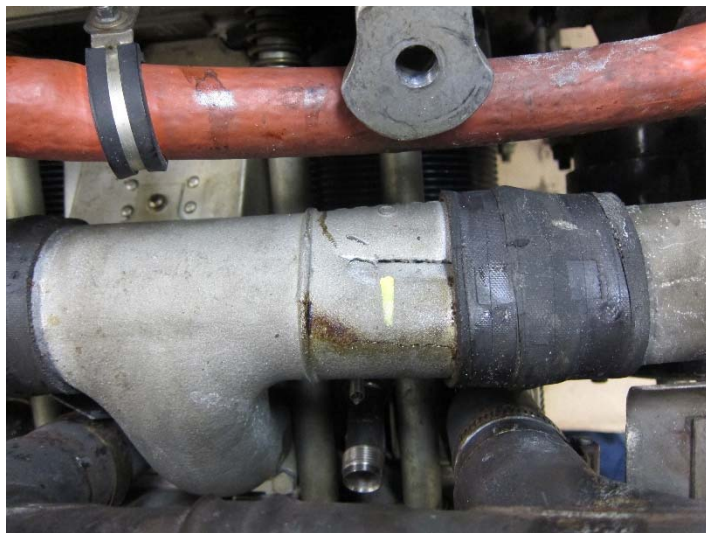
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ENGINE PREPARATION PRIOR TO RUN

There were a number of airframe related items removed in preparation for operation on the CMI test bed.

Items removed:

Baffling, hoses and engine monitor wire harness
Air conditioning compressor and mount bracket
Propeller governor
Standby alternator

The following substitute or repaired parts were required for engine operation:

Number 1 induction riser
Turbocharger
Number 4 valve cover
3 engine mount legs

The engine driven fuel pump was removed and the drive coupling was found intact. The fuel pump was reinstalled on the engine prior to the test run.

The cylinders were bore scoped and no anomalies were noted.

The magneto-to-engine timing was checked and with the following results:

Magneto-to-Engine Timing (Specified):	Left Magneto:	Right Magneto:
22°BTDC	26°BTDC	27°BTDC

A cylinder leakage test was performed prior to the test run in accordance with the latest revision of CMI Service Bulletin SB03-3 with the engine at room temperature with the following results (master orifice reading – 43 PSI):

Cylinder #1 - 10/80 PSI (exhaust valve)	Cylinder #2 - 54/80 PSI (exhaust valve)
Cylinder #3 - 35/80 PSI (exhaust valve)	Cylinder #4 - 73/80 PSI (exhaust valve)
Cylinder #5 - 45/80 PSI (exhaust valve)	Cylinder #6 - 39/80 PSI (exhaust valve)

(*) – Leakage Source

The engine was not disassembled prior to the engine run. The crankshaft end-play measured 0.010" and the run-out was 0.003".

The engine was then prepared for operation by installing the appropriate thermocouples, pressure lines and test pads for monitoring purposes. The engine was then moved to CMI test cell number 43 and mounted for operation. The engine was fitted with a test club propeller for the TSIO-520-UB engine model.

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DESCRIPTION OF RUN

The first attempt to start the engine was unsuccessful. During trouble shooting, one of the test cell slave fuel lines was found to be obstructed. The obstructed fuel line was replaced and the engine started on the next attempt without hesitation or stumbling in observed RPM.

The engine RPM was advanced in steps for warm-up in preparation for full power operation. The engine throttle was advanced to 1200 RPM and held for five (5) minutes to stabilize. The engine throttle was advanced to 1600 RPM and held for five (5) minutes to stabilize. The engine throttle was advanced to 2450 RPM and held for five (5) minutes to stabilize. The engine throttle was advanced to full open position and held for five (5) minutes to stabilize. The engine throttle was rapidly advanced from idle to full throttle four times where it performed normally without any hesitation, stumbling or interruption in power. Throughout the test phase, the engine accelerated normally without any hesitation, stumbling or interruption in power and demonstrated the ability to produce rated horsepower.



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A cylinder leakage test was performed after the test run in accordance with the latest revision of CMI Service Bulletin SB03-3 with the engine hot with the following results (master orifice reading – 43 PSI):

Cylinder #1 - 77/80 PSI

Cylinder #2 - 76/80 PSI

Cylinder #3 - 77/80 PSI

Cylinder #4 - 75/80 PSI

Cylinder #5 - 73/80 PSI

Cylinder #6 - 75/80 PSI

ENGINE RUN PARAMETERS

Time		RPM	MP / TDP " Hg	Oil		Fuel				Cell °F	Cylinder Head Temperature °F					
Reading	Minutes			PSI	°F	Lbs/Hr	Nozzle PSI	Pump PSI	Fuel °F		# 1	# 2	# 3	# 4	# 5	# 6
1	5	1200	14.14/30.09	54	146		4.92	12.71	66	73	295	259	266	240	248	212
2	5	1600	19.77/31.45	50	182		4.77	17.58	66	72	344	310	326	296	295	240
3	5	2100	26.81/31.45	48	210	94.82	7.03	34.00	67	72	383	343	373	339	351	285
4	5	2450	33.13/36.76	48	218	174.0	13.24	46.82	68	74	373	332	370	335	349	288
5	5	F/T 2512	36.52/36.74	47	226	221.17	18.36	42.49	69	73	360	319	351	315	333	272
6	5	Idle 592	18.55/29.87	17	215	12.32	4.69	10.12	68	75	321	289	273	264	240	189
7	5		/													

Ambient Air Temperature °F	Ambient Air Pressure	Transfer Collar Δ P		Maximum Rated Power Engine Operational Parameters				
70.4	29.53	IN	OUT	RPM	" Hg MP	Fuel Flow Lbs/Hr	Metered PSI	Unmetered PSI
		32	34	2700	36.0	195-205	14.4-16.0	33.0-37.0

Notes: Operator – Lisa Jersild. Transfer collar pressure delta measured at full throttle power setting.

Engine Performance Test				
Test RPM	Left Magneto	Left Magneto	Right Magneto	Right Magneto
	RPM	RPM Drop	RPM	RPM Drop
2100	2136	40	2124	16