The following procedure(s) are used for evaluation only. NO adjustments to the existing governor settings should be made unless requested by the FAA/NTSB investigator.

SECTION A - EVALUATION OF THE EXISTING GOVERNOR USING THE TEST BENCH

Run-In and Relief Pressure Verification

- After receiving concurrence from the FAA/NTSB investigator, open the box and perform a visual examination of the governor. Note any damage or abnormalities in Table A. Photographically document the condition of the governor.
- 2) Record the governor model and serial number and control arm position in Table A. Manually cycle the control arm from the high rpm stop to the low rpm stop. Movement should be smooth. If binding is noticed or it will not rotate, do NOT install governor the test bench and move directly to Section B
- 3) Manually rotate the drive gear. Verify that free rotation exists and the drive gear is absent of binding. If rotation is not free or binding occurs, do NOT install governor onto the test bench and move directly to Section B.
- 4) To aid in re-assembly, index/mark the top cover position/location on the body using a marker.
- 5) Remove the six A-1635-74 screws from the top cover and remove the top cover/head assy.
- 6) Visually inspect inside of the governor body, flyweight assy, speeder spring, and thrust bearing. Visually inspect for any signs of wear or metal fragments. Note the condition of the oil (thick, thin, color, smell, etc). Photo document the findings. If any abnormality exists, do NOT install governor onto the test bench and move directly to Section B.
- 7) Replace the cover/head assy, using the previously mark location for proper alignment. Torque screws 18-24 in/lbs, using an alternating torque sequence.
- 8) Verify that the governor test bench calibration is current and valid.
- 9) Mount the governor onto the test bench.
- 10) Place "MODEL" switch to "C/S" position.
- 11) Place "ROTATION" switch in the "CCW" position.
- 12) Place "RPM RANGE" switch to "1" position.
- 13) Turn "MANUAL RPM" knob counterclockwise to "MIN" position.
- 14) Place "MAN/GOV" switch to "MAN" position.
- 15) If not already partially open (turn knob counterclockwise) "OUTPUT PRESSURE" valve approximately ½ turn.
- 16) Depress "HYDRAULIC PUMP START" button. The button should be now be illuminated.
- 17) Depress "DRIVE MOTOR START" button.
- 18) Close "OUTPUT PRESSURE" (turn knob clockwise until reaches stop) valve.
- 19) Adjust governor input pressure to 50 ±5 PSIG using "INPUT PRESSURE" valve and "INPUT PRESSURE" reading on gauge panel.
- 20) Place "RPM RANGE" switch to "2" position.
- 21) Operate governor at 1750 RPM for 5 minutes minimum.

22) Measure and record the pressure relief pressure relief value in Table A. Do <u>NOT</u> adjust pressure relief.

Verify Pump Capacity

- Test to be completed with "MAN/GOV" switch in "MAN" position, "INPUT PRESSURE" set at 50 ±5 PSIG, and governor RPM adjusted using the manual RPM control knob to 1750 ±5 RPM, and governor Control Lever (A-20609) rotated counterclockwise until it reaches the Min. RPM stop.
- Using the "OUTPUT PRESSURE" gauge reading and the "OUTPUT PRESSURE" valve, adjust governor output pressure to 150 ±5 PSIG by rotating valve counterclockwise.
 Important: Adjustment of governor input pressure to 50 ±5 PSIG may be necessary after

Important: Adjustment of governor input pressure to 50 \pm 5 PSIG may be necessary after adjustment of governor output pressure is made.

 In Table A, record the governor pump capacity reading on the "PUMP CAPACITY" gauge located on gauge panel.

Verify Internal Leakage Test

- 1) Test to be completed with "MAN/GOV" switch in "MAN" position, "OUTPUT PRESSURE" valve closed, "INPUT PRESSURE" set at 50 ±5 PSIG, and rotate governor Control Lever rotated counterclockwise until it reaches the Min. RPM stop.
- 2) While observing the "GOVERNOR RPM" gauge, rotate the "MANUAL RPM" knob to adjust governor speed to 2400 ±5 RPM.
- 3) Observe "GOVERNOR LEAKAGE" meter located on gauge panel. In Table A, record the maximum value observed in 1 minute.

Verify Maximum RPM Check

- 1) Set "OUTPUT PRESSURE" valve (turn clockwise to stop) and governor input pressure set at 50 ±5 PSIG.
- 2) Rotate governor Control Lever until it reaches the Min. RPM stop.
- 3) Place the "RPM RANGE" switch in "1" position.
- 4) Position "MANUAL RPM" dial in the "MIN" position.
- 5) Place "MAN/GOV" switch in "GOV" position.
- 6) Measure the maximum governor RPM by positioning the Control Lever against the high RPM stop. Record this value in Table A.
- 7) Measure the Control Arm Setting (in Degrees) and record in Table A.

Verify Minimum RPM Check

 With the Control Lever at the maximum RPM position and the governor "OUTPUT PRESSURE" valve closed, rotate the Control Lever counterclockwise to minimum control RPM specified on the governor assembly drawing.

- 2) Measure the minimum governor RPM by positioning the Control Lever against the high RPM stop. Record this value in Table A.
- 3) Measure the angle between maximum RPM and minimum control RPM. Record this value in Table A as "Control Arm Travel".

STOP. Report all measured values in Table A to the FAA/NTSB investigator before proceeding further.

SECTION B - DISASSEMBLY OF THE EXISTING GOVERNOR

- 1) Perform disassembly only if directed to do so by the FAA/NTSB investigator.
- 2) Disassemble the governor in accordance with McCauley Governor Manual 780401, Chapter 1.
- After removal of each part, photo document the part and note the observed condition(s) in Table B. Check with the FAA/NTSB investigator before continuing after each part removal.

Specification	Requirement*	Measured Value
Governor Model (Part Number)	C290D3/T43 (D-20309-39)	C290D3-M/T43 D20909-39
Governor Serial Number	N/A	991416
Visual condition at time of receipt (notes)	N/A	 Top cover was sheared off near the control shaft (see photo 1). The aft side of the low pitch stop post was cracked and missing (photo 2) B-20040 (return) spring was missing. The A-20069 spring was observed to be free inside of the governor body (see photo 3) A-20609 was found bent (see photos 5 and 6)
Pressure Relief (PSIG)	290 +/-20	Not Capable of Verifying
Pump Capacity @1750 RPM (Quarts/Min)	5 minimum	Not Capable of Verifying
Internal Leakage @ 2400 RPM (Quarts/Hour)	50 maximum	Not Capable of Verifying
Maximum RPM	2700 +/-10	Not Capable of Verifying
Control Arm Setting (Degrees)	130 +/-7.0	Not Capable of Verifying
Minimum RPM (ref @ max control arm travel)	<1750	Not Capable of Verifying
Control Arm Travel (Degrees)	60 +/- 7.0	Not Capable of Verifying

TABLE A – NTSB Case Number CEN16LA043

* Requirement is established based on the limits published in McCauley Manual 780401 and SB 2000-10B.

Other Observations:

- 1. Before disassembly, the D-20887 drive gear was found to move freely inside of the governor assy.
- 2. During disassembly, the flyweight assy was found to have made contact with the ID of the governor body (photos 7 and 8). With the top cover/control shaft installed, the flyweights cannot make contact with the body. Once the top cover was severed, the flyweight assy was able to rock, causing brief contact with the body. This is also consistent with slight wear found on the D-20887 drive gear (photo 9).
- 3. All of the observed issues appear to be consistent with impact damage.

TABLE B

PART NUMBER	PART NAME	OBSERVED CONDITION
A-1633-120G	O-RING	No abnormalities were observed
A-1633-121G	O-RING	No abnormalities were observed
A-1633-36G	O-RING	No abnormalities were observed
A-1633-42G	O-RING	No abnormalities were observed
A-1635-105F	SCREW	No abnormalities were observed
A-1635-19F	SCREW	No abnormalities were observed
A-1635-74F	SCREW	No abnormalities were observed
A-1635-84F	SCREW	No abnormalities were observed
A-1636-29E	RETAING RING - EXT	No abnormalities were observed
A-1636-45E	RETAING RING - EXT	No abnormalities were observed

PART NUMBER	PART NAME	OBSERVED CONDITION
A-1637-3C	GREASE	N/A
A-1637-4C	ORE-LUBE	N/A
A-1639-16A	NUT	No abnormalities were observed
A-1640-4	LOCKWIRE	No abnormalities were observed
A-20026	STUD-IDLER	No abnormalities were observed
A-20027	PIN-DOWEL	No abnormalities were observed
A-20047	PROTECTIVE	N/A
A-20069-4B	SPRING-SPEEDER	No abnormalities were observed. Spring was found loose inside the governor body (photo 3)
A-20107	ASSY-IDLER	No abnormalities were observed
A-20218	PISTON	Normal wear observed

PART NUMBER	PART NAME	OBSERVED CONDITION
A-20264	DRIVE	No abnormalities were observed
A-20284	SPRING-PRESS	No abnormalities were observed
A-20572	STOP-PISTON	No abnormalities were observed
A-20609	CONTROL LEVER	C-20606 was bent. Control shaft and control lever rotated freely inside the severed top cover shaft. See photos 5 and 6
A-20610	BEARING-THRUST	After removal of the top cover, the bottom half of the A-20610 bearing was found loose inside of the body. It is believed that because of the severed top cover, the B-20910 pilot spool, A-20610 bearing and the A-20069-4 spring became dislodged. The parts were then placed inside of the governor body after the accident. See photos 3 and 4.
B-20024	GASKET	N/A
B-20040B	SPRING-TORSION	Missing
B-20160	CAP-LOCKING	No abnormalities were observed
B-20251A	CYLINDER-PRV	Normal wear observed. No abnormalities.
B-20255	PLUG-RELIEF	No abnormalities were observed

PART NUMBER	PART NAME	OBSERVED CONDITION
B-20576	SEAT-SPRING	No abnormalities were observed
B-20862	GASKET-COVER	No abnormalities were observed
B-20889	ASSY-FLYWEIGHT	Flyweights moved freely. Wear from contact with the ID of the body housing was observed. See photos 7 - 8 and "Other Observations" in Table A
B-20910	SPOOL-PILOT	No abnormalities were observed
B-20923	NUT	No abnormalities were observed
C-20606	SHAFT-CONTROL	No abnormalities were observed
C-20943	COVER-PUMP	No abnormalities were observed
C-20959 C-20949	COVER-ALUM COVER-INJ MOLDED	Severed – see photos 1, 2 and 3 The aft side of the low stop post is not a wear/contact surface. Therefore, this fracture is believed to have been caused by impact. Note: The C-20949 cover was discontinued and replaced with the C-20959 in 2007, ref SL2007-11
D-20887	GEAR-DRIVE	Slight wear was observed at contact with the B- 20889 flyweight assy. See "Other Observations" in Table A and photo 9
D-20946	BODY-CS	Wear from contact with the B-20889 flyweight assy was observed. See "Other Observations" in Table A and photos 7 and 8



A-20609 Control Lever – Angular fracture







