

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24LA214

POWERPLANTS

Specialist's Field Notes

July 9, 2025

TABLE OF CONTENTS

A	ACCIDENT.....	3
B	POWERPLANTS GROUP.....	3
C	SUMMARY.....	3
D	DETAILS OF THE EXAMINATION.....	4
1.0	VISUAL EXAMINATION AND TESTING	4
1.1	Fuel Control Unit.....	4
1.2	Propeller Governor.....	9
E	FOLLOW UP ACTIVITIES	12
F	LIST OF ATTACHMENTS	12

A ACCIDENT

Location: Pleasant Grove, California
Date: June 25, 2024
Time: 05:54 Pacific Daylight Time
12:54 Coordinated Universal Time
Airplane: Grumman-Schweizer 164B, N6793K

B POWERPLANTS GROUP

Specialist Robert Hunsberger
National Transportation Safety Board
Washington, DC

Group Member Joe Howard
Honeywell
Phoenix, Arizona

Group Member Matt Zolnierczyk
Woodward
Loves Park, Illinois

C SUMMARY

On June 25, 2024, about 0554 Pacific daylight time, a Grumman-Schweizer 164B, N6793K was substantially damaged when it was involved in an accident near Nicolaus, California. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 positioning flight.

According to the pilot, he planned to reposition the airplane to Amana, Iowa. He stated that he prepared for the positioning flight by conducting 4 training flights to familiarize himself with the turbine-powered airplane. On the day of the accident flight, the airplane was loaded with about 270 gallons of Jet A fuel in the hopper and about 60 gallons of Jet A fuel in the wing tanks. The pilot stated that on the accident flight, he applied full power for takeoff on runway 18, however, the airplane did not accelerate as it had on previous flights with less weight. During the takeoff roll, once the tail came up, he noted that about 90% of the 2,100 ft long runway had been utilized and the airplane was failing to gain lift. The pilot applied an aft control stick input to clear a gate located at the end of the runway; however, the airplane struck the gate and a vehicle that was traveling on a road that spanned perpendicular to the runway. The airplane subsequently impacted terrain and came to rest upright.

The engine fuel control unit (FCU) and propeller governor were shipped to Woodward in Loves Park, Illinois for examination and testing. Party members from Woodward, Honeywell, and the National Transportation Safety Board completed the testing on July 8-9, 2025,

D DETAILS OF THE EXAMINATION

1.0 Visual Examination and Testing

The accident engine FCU and propeller governor were secured in a cardboard shipping box in a Woodward conference room when the investigation team arrived (**Figure 1**). Woodward notified the team that the box was damaged in transit. The foam packing prevented any damage to the components.



Figure 1- Shipping Box, as Received

1.1 Fuel Control Unit

The FCU, part number 8070-183, serial number 1191073 was shipped new from Woodward on July 21, 1975. Woodward records indicate the FCU was returned to Woodward on 10/27/1989, 6/8/1992, and 8/22/1994. The FCU information from the engine logbook was not available at the time of the examination with recent maintenance history.

The FCU housing was intact with light surface discoloration that was typical of similar service run components (**Figures 2 and 3**). Three of the four mounting flange ears were fractured and missing (**Figure 4**). The input drive spline could be rotated by hand with normal resistance. A spare transfer tube was installed and the FCU was

secured to the test bench using angle iron and all-thread to provide clamping force (**Figure 5**). The FCU was tested using test specification procedure (TSP)-8519, revision A1. There were no leaks or other anomalies observed when the FCU was pressurized to start testing. Fuel flow readings were collected at the lower power settings of the acceleration schedule but once Ps3 pressure reached approximately 95 psi, an air leak could be heard and felt coming from the main air section cover. The Ps3 bellows cover was removed and the Ps3 diaphragm had a circumferential tear over about 90 degrees adjacent to the plate (**Figure 6**). The piston, spring, and housing were all in good condition. There was minor dark grease like accumulation on Ps3 bellows components that was not typical according to Woodward (**Figure 7**).

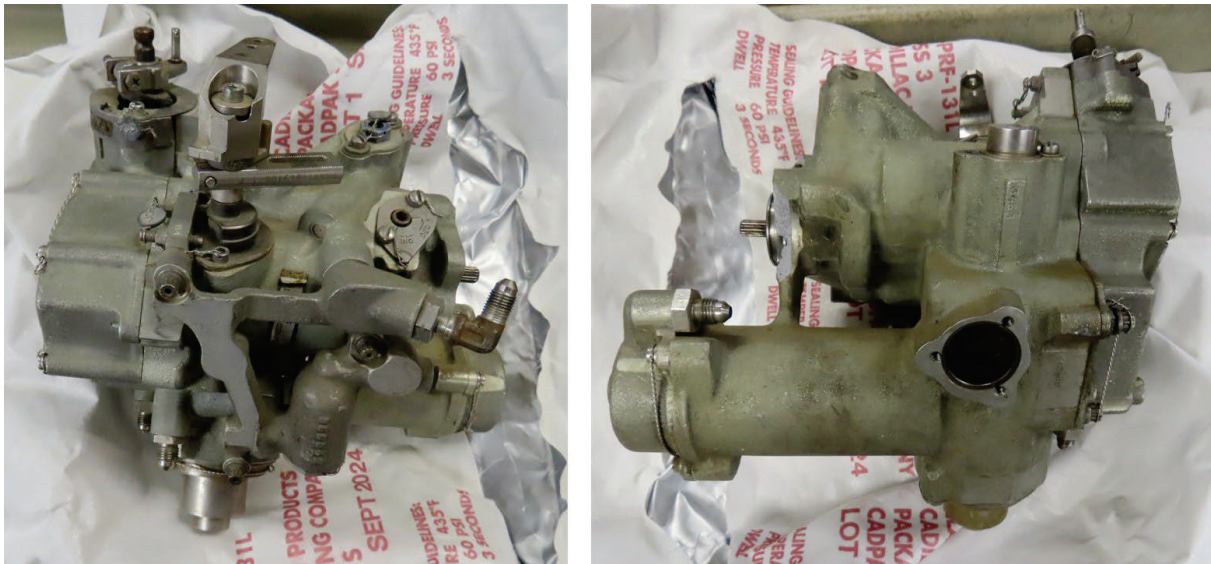


Figure 2- FCU, as Received



Figure 3- FCU Data Plate



Figure 4- FCU Mounting Flange Damage

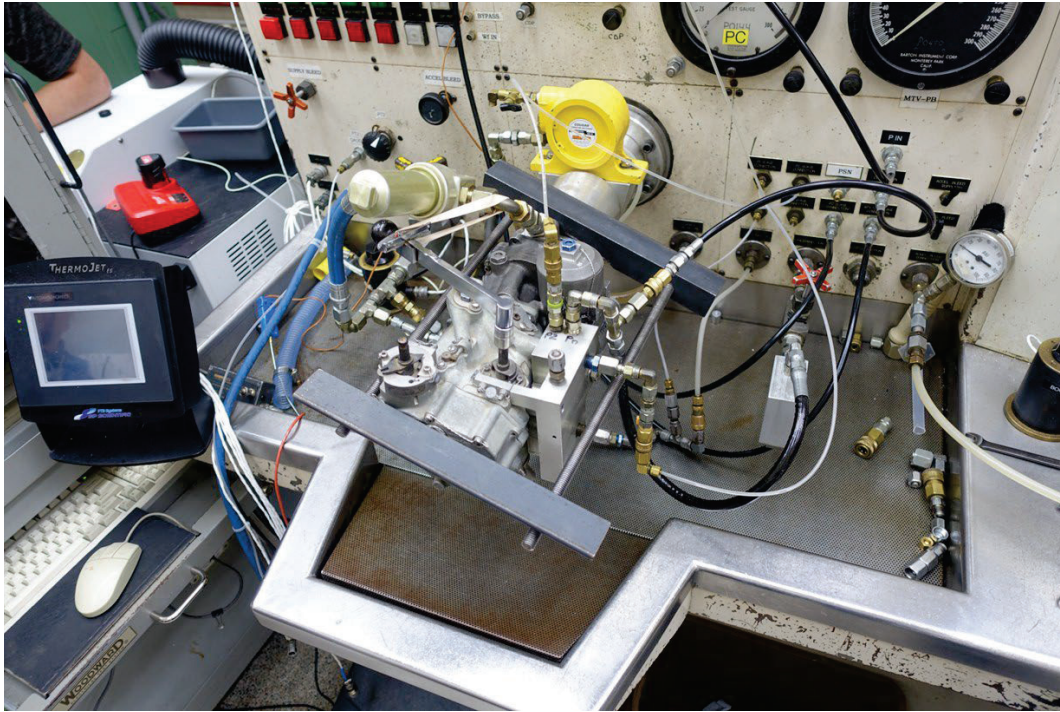


Figure 5- FCU Test Bench Installation



Figure 6- Ps3 Diaphragm Tear



Figure 7- (L) Ps3 Piston, (R) Ps3 Sensor Sleeve

The Ps3 diaphragm was replaced with a new part from Woodward supply and the FCU schedules were retested. The main metering valve schedule- Tt2 correction showed the fuel flow was low at max power settings. The maximum speed adjustment port was opened, and the adjustment screw already turned to the maximum position. The FCU cover was removed and there were no internal part failures or other anomalies visible. The FCU TSP run sheets are included as an attachment to the field notes (Attachment 1).

1.2 Propeller Governor

The propeller governor, part number 210736, serial number 2456492, was shipped new from Woodward on September 11, 1992, and has not been returned to Woodward since. The propeller governor information from the engine logbook was not available at the time of the examination with recent maintenance history.

The propeller governor was intact and in good condition. There was minor discoloration on the governor housing that was considered typical of similar service run components. Woodward noted that the lockwire and seals were not the type used by Woodward indicating the component had been repaired by another vendor at an unknown date.

The propeller governor was shipped with the airframe speed setting lever and stop attached and was initially installed on a test cell bench in the as received condition. The propeller governor was tested using TSP-325, revision AH. No leaks or other anomalies were observed when testing was started. The speed lever stop is a non-Woodward installed component and limited the lever travel to the min speed position on the Woodward bench. The maximum speed setting was slightly outside of TSP but was within the expected range of customer field adjustment according to Woodward. The speed lever was replaced with a Woodward test bench spare and the minimum speed point was re-tested and was also slightly outside of TSP specification but within typical customer field adjustment. The flow check valve opened at approximately 6 psig, within the allowable limit. The internal leak and total leak¹ measurements were recorded above TSP specification. The TSP run sheet is available as an attachment to the field notes (Attachment 2).

¹ Internal leak is measured by introducing pressure flow into the inlet port while all other ports are blocked. Total leak check introduces pressure flow into the discharge port (opposite direction of flow during operation) while all other ports are blocked.

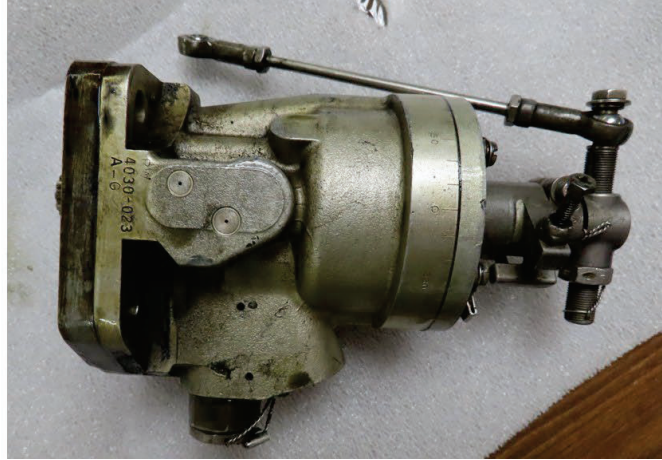
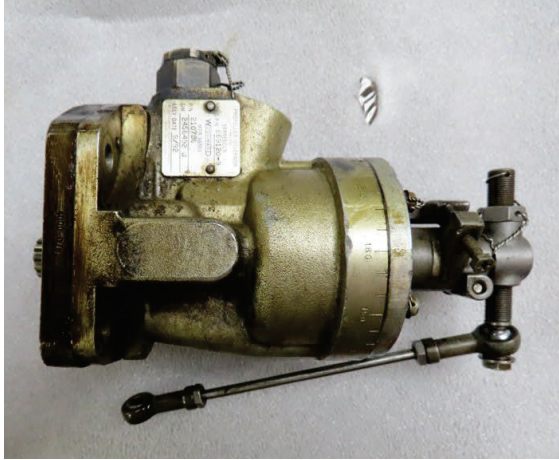


Figure 8- Propeller Governor, as Received

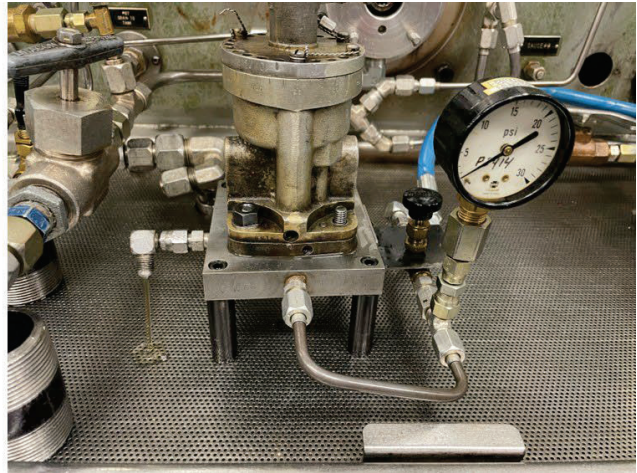
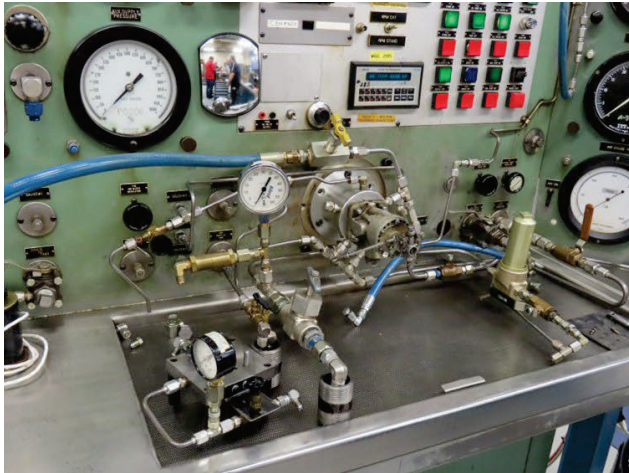


Figure 9- Propeller Governor, Test Bench Installations

The propeller governor was partially disassembled. The governor base plate was difficult to separate and eventually had to be forced off, resulting in damage to the drive spline bore (**Figure 10**). The check valve was intact but the valve piston appeared to be in a different axial position in the sleeve compared to an exemplar part (**Figure 11**). The check valve position would not have affected governor operation during the accident flight. There was no other internal damage noted.

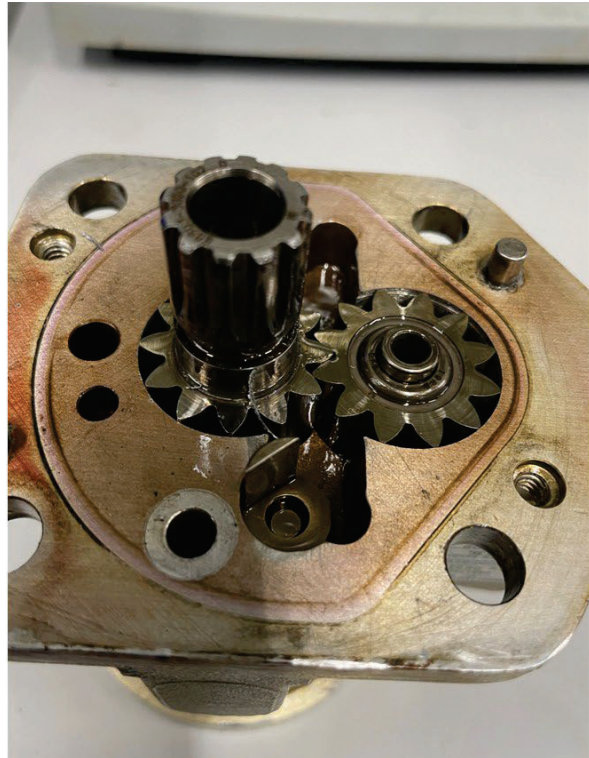


Figure 10- Propeller Governor Base Plate, Drive Spline Bore, (R) Drive Spline



Figure 11- Check Valve Sleeve and Piston, (R) Exemplar Assembly

E FOLLOW UP ACTIVITIES

- Woodward Materials Laboratory to visually examine the Ps3 diaphragm tear and piston.
- Honeywell to provide performance estimates at the maximum fuel flow recorded during bench test.

F LIST OF ATTACHMENTS

- Attachment 1- FCU TSP-8519 Run Sheets
- Attachment 2- Propeller Governor TSP-325 Run Sheets

Submitted by:

Robert Hunsberger
NTSB- Powerplants

Attachment 1- Fuel Control, as Received

WOODWARD GOVERNOR COMPANY

Rockford, Illinois
CAGE 66503

TSP-8519
Page 2 of 10
Rev. A1

W.G.C. Order _____ Date 7/8/2025

Customer AlliedSignal Aerospace Co. By _____

Prod. Order _____ W.G.C. P/N 8070-182, -183

T2 Simulator No. _____ AlliedSignal P/N 869199-35

Test Stand No. _____ W.G.C. S/N 1191073

Case # _____

AlliedSignal PSC No. 869199-N

All input settings should consistently be made while approaching set point as follows:

Pt2 Approach all inlet pressure settings from a lower pressure setting.

Tt2 Approach all inlet temperature settings from a higher temperature setting.

Ps3 Approach all compressor pressure settings from a lower pressure setting except when checking deceleration schedules.

MFL Approach all manual fuel lever angular settings from a lower setting.

PRESSURE TEST

Operate unit at the underspeed governor minimum set point. Actuate fuel discharge shutoff valve. Do not shut off discharge flow for more than 2 seconds.

Checked By _____

1 STANDARD ACCELERATION SCHEDULE

Sea level start flow checking procedure: (Test Pt. 1.2 only).
Start flow is to be accomplished in the following sequence:

CAUTION: At no time in this calibration procedure is Pt2 to be set above Ps3.

- A. Preset speed, Tt2. Underspeed governor lever, main metering valve lever as specified on data sheet.
- B. Set Ps3 at 20 PSIA minimum.
- C. Set Pt2 from a low pressure to the required set point without overshoot.
- D. Reset Ps3 to 15 PSIA without undershoot.
- E. Read start fuel flow.

HOLD CONSTANT: Tt2 = 59 DEG. F Pt2 = 14.7 PSIA											
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM ± 25	Ps3 PSIA	PfN PSIG	Wf - PPH	Wf-PPH		HYSTERESIS	
		USG	MFL					ACTUAL	ACTUAL	SPEC.	ACT.
1.1	150	MIN.	0	450	15	85	RECORD	3	-----	-----	---
1.2	350	MIN.	0	1000	15	85	46 $\pm$ 2	40	-----	-----	---
1.3	350	MAX.	0	1000	15	85	46 $\pm$ 2	40	-----	-----	---
1.4**	350	MIN.	0	1000	18.2 $\pm$ 1	85	46 $\pm$ 2	46	-----	-----	---
1.5***	350	MIN.	0	1000	20.1 $\pm$ 1	200	70	63	-----	-----	---
1.6	800	MAX.	0	2200	25	215	104 $\pm$ 3	101	-----	-----	---
1.7	1150	MAX.	0	3000	45	250	189 $\pm$ 7	183	-----	-----	---
1.8	1400	MAX.	0	3600	65	290	256 $\pm$ 10	242	-----	-----	---
1.9	1550	MAX.	0	4000	85	335	307 $\pm$ 12	285		3	
1.10	1550	MAX.	0	4000	105	410	379 $\pm$ 14	347		6	
1.11	1550	MAX.	0	4000	116	500	452 $\pm$ 18	386	-----	-----	---
1.12	1550	MAX.	101	4000	130	610	515 $\pm$ 10		-----	-----	---

Remarks: **With Wf as specified, increase Ps3 until Wf starts to increase. Record Ps3.

***Adjust Ps3 from a lower setting to a higher setting for exact Wf of 70 PPH. Record Ps3.

TEST DATA SHEET
ALTITUDE ACCELERATION SCHEDULES

2 15,000 FOOT ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = 59 deg. F Pt2 = 8.8 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf- PPH	
		USG	MFL	REQ'D	REQ'D	REQ'D	REQ'D	ACTUAL
2.1	350	MIN.	0	1000	8.8	80	44±6	
2.2	1200	MAX.	0	3100	30	230	126±5	
2.3	1550	MAX.	0	4000	60	280	215±9	
2.4	1550	MAX.	0	4000	70	310	275±11	
2.5	1550	MAX.	MAX.	4000	75	335	313±13	

3 30,000 FOOT ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = 59 deg. F Pt2 = 4.4 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf - PPH	
		USG	MFL	REQ'D	REQ'D	REQ'D	REQ'D	ACTUAL
3.1	1550	MAX.	0	4000	25	225	87±4	
3.2	1550	MAX.	0	4000	35	240	138±5	
3.3	1550	MAX.	0	4000	40	255	179±7	

4 HOT DAY ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = 103 deg.F Pt2 = 14.7 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf - PPH	
		USG	MFL				REQ'D	ACTUAL
4.1	350	MIN.	0	1000	15	95	48±6	42
4.2	1300	MAX.	0	3400	55	275	235±10	223
4.3	1550	MAX.	0	4000	85	345	319±13	294
4.4	1550	MAX.	0	4000	116	525	470±18	

5 COLD DAY ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = -60 deg. F Pt2 = 14.7 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf - PPH	
		USG	MFL				REQ'D	ACTUAL
5.1	350	MIN.	0	1000	15	80	44±6	38
5.2	1150	MAX.	0	3000	45	245	166±6	151
5.3	1450	MAX.	0	3800	75	300	249±10	223
5.4	1550	MAX.	0	4000	105	370	334±13	
5.5	1550	MAX.	0	4000	116	435	396±16	

8 OVERSPEED GOVERNOR

HOLD CONSTANT: MFL = MAX. Tt2 = 59 deg. F. Pt2 = 14.7 PSIA							
TEST POINT	USG LEVER POSITIONS	INPUT SPEED RPM ± 5	INLET FLOW PPH REF.	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	REQ'D		REQ'D	REQ'D	REQ'D	ACTUAL
8.1	MAX.	4536	1800	118	510		
8.2	MAX.	4581	1800	118	510	*	
8.3	MAX.	4695	1800	118	330	200 $\pm$ 10	
8.4	MAX.	4800	1800	118	310	109 $\pm$ 5	
8.5	MAX.	4800	1800	118	310	**	
8.6	MAX.	4695	1800	118	330	RECORD	

REMARKS: * 10 PPH max. drop from the actual flow of preceding data point 8.1.
**Record fuel flow with MFL at min. position.

9 DECELERATING SCHEDULE

HOLD CONSTANT: Tt2 = 59 deg. F. SPEED = 4536 RPM					
INLET FLOW = 1800 PPH REF. MFL = 0 USG = MIN.					
TEST POINT	Pt2 PSIA	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	REQ'D	REQ'D	REQ'D	ACTUAL
9.1	14.7	117	315	160 $\pm$ 5	
9.2	14.7	75	270	108 $\pm$ 5	
9.3	4.4	25	170	RECORD	

6 UNDERSPEED GOVERNOR 65% SPEED

HOLD CONSTANT: MFL = 0 Tt2 = 59 deg.F. Pt2 = 14.7 PSIA								
TEST POINT	USG LEVER POSITIONS (DEGREES)		INPUT SPEED RPM ± 5	INLET FLOW PPH REF.	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	ACTUAL	REQ'D		REQ'D	REQ'D	REQ'D	ACTUAL
6.1	3 $\pm$ 3	2847	2847 MIN.	1100	45	235	145 MIN.	165165
6.2	3 $\pm$ 3	"	2948	1100	42	235	95 $\pm$ 5	78 2920
6.3	3 $\pm$ 3	"	2970	1100	42	235	*	78
6.4	3 $\pm$ 3	"	2948	1100	42	235		78

REMARKS: *A minimum of 5 PPH less than the fuel flow at Data Point 6.2.

7 UNDERSPEED GOVERNOR - 97% SPEED

HOLD CONSTANT: MFL = 0 Tt2 = 59 deg. F. Pt2 = 14.7 PSIA								
TEST POINT	USG LEVER POSITIONS (DEGREES)		INPUT SPEED RPM ± 5	INLET FLOW PPH REF.	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	ACTUAL	REQ'D		REQ'D	REQ'D	REQ'D	ACTUAL
7.1	40 $\pm$.25		4287 MIN.	1650	110	400	340 MIN.	
7.2	40 $\pm$.25	"	4400	1700	102	305	170 $\pm$ 5	138 4337
7.3	40 $\pm$.25	"	4420	1700	102	305		
7.4	40 $\pm$.25	"	4400	1700	102	305		
7.5	14 $\pm$ 1		3400**	1300	55	250	110 $\pm$ 3	

REMARKS: **Set speed and fuel flow. Record speed lever angle.
Req: = 14 $\pm$ 1.

10 MAIN METERING VALVE SCHEDULE - Tt2 CORRECTION

HOLD CONSTANT: Pt2 = 14.7 PSIA INLET FLOW = 1800 PPH REF. SPEED = 4536 RPM USG = MAX.										
NOTE: APPROACH ALL MMV SETTINGS FROM A LOWER LEVER SETTING										
TEST POINT	MFL POSITION +/- .5 DEGREES	Tt2 DEG. F.	Tt2 MIKE	Ps3 PSIA	PfN PSIG	Wf - PPH				
						REQ'D	ACT. ↓	ACT. ↑	HYSTERESIS	
									SPEC.	ACTUAL
10.1	101	130	.839	140	435	370±10		-----	-----	-----
10.2	101	103	.823	140	465	405±10			8	
10.3	101	59	.800	140	535	460±10		-----	-----	-----
10.4	101	59	.800	140	550	+		-----	-----	-----
10.5	60	59	.800	75	285	202±8		-----	-----	-----
10.6	30	103	.823	65	240	140±6		-----	-----	-----
10.7	30	59	.800	65	240	151±5	137		3	
10.8	30	-60	.735	65	245	182±8		-----	-----	-----

+Record flow change when USG lever is changed from max. speed stop to the min speed stop. The change in flow must not exceed 10 PPH.

11 MAIN METERING VALVE SCHEDULE - Pt2 CORRECTION

HOLD CONSTANT: Tt2 = 59 deg. F. INLET FLOW = 1800 PPH REF. SPEED = 4536 RPM USG = MAX.									
NOTE: APPROACH ALL MMV SETTINGS FROM A LOWER LEVER SETTING									
TEST POINT	MFL POSITION +/- .5 DEGREES	Pt2 PSIA	Ps3 PSIA	PfN PSIG	Wf - PPH				
					REQ'D	ACT. ↓	ACT. ↑	HYSTERESIS	
								SPEC.	ACT.
11.1	101	4.4	55	260	137±6		-----	-----	-----
11.2	101	8.8	140	380	275±10		-----	-----	-----
11.3	101	14.7	140	535	460±10			7	
11.4	30	6.8	22	220	RECORD		-----	-----	-----
11.5	30	8.8	30	225	91±5		-----	-----	-----
11.6*	30	14.7	65	275	151±5			3	
11.7	30	17.6	65	275	181±5		-----	-----	-----

*Adjustability range minimum +30-15 PPH Act. + _____ - _____.

12 LEVER SHAFT TORQUE

TEST POINT		REQ'D TORQUE IN.-LB.	ACTUAL TORQUE RANGE
12.1	MMV	7 MAX.	10
12.2	USG	10 MAX.	12

13 MMV ANGULAR TRAVELS

TEST POINT	FLAT	ANGLE, DEGREES	
		REQ'D DEG.	ACTUAL
13.1	G1	0	
13.2	BREAK	24 - 26	
13.3	MAX.	101 +.5	

14 ACCELERATION SCHEDULE Tt2 HYSTERESIS

MMV - MAX. Pt2 - 14.7 PSIA USG = MAX. N = 4000±10 RPM INLET FLOW = 1550 PPH REF.								
TEST POINT	Tt2 deg. F.	SENSOR SIM. SETTING	Ps3 PSIA	PfN PSIG	FUEL FLOW – PPH			
					ACTUAL ↓	ACTUAL ↑	HYSTERESIS	
							REQ'D	ACTUAL
14.1	135	.843	113	510			----	----
14.2	103	.823	113	490			3	
14.3	-60	.735	113	410			3	
14.4	-75	.727	113	410			----	----

15 MAX. MFV Wf ADJ. CHECK

TEST POINT

15.1 Record Wf at Test Point 10.3 RECORD _____

15.2 Adjust max. power CCW. RECORD _____

Must be 35 PPH less than 10.3

NOTE: Reset adjustment to level of T.P. 10.3

Fuel Control- Ps3 Diaphragm Replaced

WOODWARD GOVERNOR COMPANY
Rockford, Illinois
CAGE 66503

TSP-8519
Page 3 of 10
Rev. A1

8070-183

S/N 1191073

7/9/2025

1 STANDARD ACCELERATION SCHEDULE

Sea level start flow checking procedure: (Test Pt. 1.2 only).
Start flow is to be accomplished in the following sequence:

CAUTION: At no time in this calibration procedure is Pt2 to be set above Ps3.

- Preset speed, Tt2. Underspeed governor lever, main metering valve lever as specified on data sheet.
- Set Ps3 at 20 PSIA minimum.
- Set Pt2 from a low pressure to the required set point without overshoot.
- Reset Ps3 to 15 PSIA without undershoot.
- Read start fuel flow.

HOLD CONSTANT: Tt2 = 59 DEG. F Pt2 = 14.7 PSIA											
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM ± 25	Ps3 PSIA	PfN PSIG	Wf - PPH	Wf-PPH		HYSTERESIS	
		USG	MFL					ACTUAL	ACTUAL	SPEC.	ACT.
1.1	150	MIN.	0	450	15	85	RECORD	3	-----	-----	---
1.2	350	MIN.	0	1000	15	85	46 $\pm$ 2	40	-----	-----	---
1.3	350	MAX.	0	1000	15	85	46 $\pm$ 2	41	-----	-----	---
1.4**	350	MIN.	0	1000	18.2 $\pm$ 1	85	46 $\pm$ 2	46	-----	-----	---
1.5***	350	MIN.	0	1000	20.1 $\pm$ 1	200	70	65	-----	-----	---
1.6	800	MAX.	0	2200	25	215	104 $\pm$ 3	100	-----	-----	---
1.7	1150	MAX.	0	3000	45	250	189 $\pm$ 7	179	-----	-----	---
1.8	1400	MAX.	0	3600	65	290	256 $\pm$ 10	240	-----	-----	---
1.9	1550	MAX.	0	4000	85	335	307 $\pm$ 12	282	284	3	2
1.10	1550	MAX.	0	4000	105	410	379 $\pm$ 14	342	346	6	4
1.11	1550	MAX.	0	4000	116	500	452 $\pm$ 18	386	-----	-----	---
1.12	1550	MAX.	101	4000	130	610	515 $\pm$ 10	432	-----	-----	---

Remarks: **With Wf as specified, increase Ps3 until Wf starts to increase. Record Ps3.

***Adjust Ps3 from a lower setting to a higher setting for exact Wf of 70 PPH. Record Ps3.

TEST DATA SHEET
ALTITUDE ACCELERATION SCHEDULES

2 15,000 FOOT ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = 59 deg. F Pt2 = 8.8 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf- PPH	
		USG	MFL				REQ'D	ACTUAL
2.1	350	MIN.	0	1000	8.8	80	44±6	
2.2	1200	MAX.	0	3100	30	230	126±5	
2.3	1550	MAX.	0	4000	60	280	215±9	
2.4	1550	MAX.	0	4000	70	310	275±11	
2.5	1550	MAX.	MAX.	4000	75	335	313±13	

3 30,000 FOOT ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = 59 deg. F Pt2 = 4.4 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf - PPH	
		USG	MFL				REQ'D	ACTUAL
3.1	1550	MAX.	0	4000	25	225	87±4	
3.2	1550	MAX.	0	4000	35	240	138±5	
3.3	1550	MAX.	0	4000	40	255	179±7	

4 HOT DAY ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = 103 deg.F Pt2 = 14.7 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf - PPH	
		USG	MFL	REQ'D	REQ'D	REQ'D	REQ'D	ACTUAL
4.1	350	MIN.	0	1000	15	95	48±6	
4.2	1300	MAX.	0	3400	55	275	235±10	
4.3	1550	MAX.	0	4000	85	345	319±13	
4.4	1550	MAX.	0	4000	116	525	470±18	

5 COLD DAY ACCEL SCHEDULE

HOLD CONSTANT: Tt2 = -60 deg. F Pt2 = 14.7 PSIA								
TEST POINT	INLET FLOW PPH REF.	REQUIRED LEVER POSITIONS (DEGREES)		INPUT SPEED RPM	Ps3 PSIA	PfN PSIG	Wf - PPH	
		USG	MFL	REQ'D	REQ'D	REQ'D	REQ'D	ACTUAL
5.1	350	MIN.	0	1000	15	80	44±6	
5.2	1150	MAX.	0	3000	45	245	166±6	
5.3	1450	MAX.	0	3800	75	300	249±10	
5.4	1550	MAX.	0	4000	105	370	334±13	
5.5	1550	MAX.	0	4000	116	435	396±16	

6 UNDERSPEED GOVERNOR 65% SPEED

HOLD CONSTANT: MFL = 0 Tt2 = 59 deg.F. Pt2 = 14.7 PSIA								
TEST POINT	USG LEVER POSITIONS (DEGREES)		INPUT SPEED RPM ± 5	INLET FLOW PPH REF.	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	ACTUAL	REQ'D		REQ'D	REQ'D	REQ'D	ACTUAL
6.1	3 $\pm$ 3		2847 MIN.	1100	45	235	145 MIN.	
6.2	3 $\pm$ 3	"	2948	1100	42	235	95 $\pm$ 5	
6.3	3 $\pm$ 3	"	2970	1100	42	235	*	
6.4	3 $\pm$ 3	"	2948	1100	42	235		

REMARKS: *A minimum of 5 PPH less than the fuel flow at Data Point 6.2.

7 UNDERSPEED GOVERNOR - 97% SPEED

HOLD CONSTANT: MFL = 0 Tt2 = 59 deg. F. Pt2 = 14.7 PSIA								
TEST POINT	USG LEVER POSITIONS (DEGREES)		INPUT SPEED RPM ± 5	INLET FLOW PPH REF.	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	ACTUAL	REQ'D		REQ'D	REQ'D	REQ'D	ACTUAL
7.1	40 $\pm$.25		4287 MIN.	1650	110	400	340 MIN.	
7.2	40 $\pm$.25	"	4400	1700	102	305	170 $\pm$ 5	
7.3	40 $\pm$.25	"	4420	1700	102	305		
7.4	40 $\pm$.25	"	4400	1700	102	305		
7.5	14 $\pm$ 1		3400**	1300	55	250	110 $\pm$ 3	

REMARKS: **Set speed and fuel flow. Record speed lever angle.
Req: = 14 $\pm$ 1.

8 OVERSPEED GOVERNOR

HOLD CONSTANT: MFL = MAX. Tt2 = 59 deg. F. Pt2 = 14.7 PSIA							
TEST POINT	USG LEVER POSITIONS	INPUT SPEED RPM ± 5	INLET FLOW PPH REF.	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	REQ'D		REQ'D	REQ'D	REQ'D	ACTUAL
8.1	MAX.	4536	1800	118	510		403
8.2	MAX.	4581	1800	118	510	*	399
8.3	MAX.	4695	1800	118	330	200 $\pm$ 10	215
8.4	MAX.	4800	1800	118	310	109 $\pm$ 5	98
8.5	MAX.	4800	1800	118	310	**	79
8.6	MAX.	4695	1800	118	330	RECORD	228

REMARKS: * 10 PPH max. drop from the actual flow of preceding data point 8.1.
**Record fuel flow with MFL at min. position.

9 DECELERATING SCHEDULE

HOLD CONSTANT: Tt2 = 59 deg. F. SPEED = 4536 RPM					
INLET FLOW = 1800 PPH REF. MFL = 0 USG = MIN.					
TEST POINT	Pt2 PSIA	Ps3 PSIA	PfN PSIG	Wf - PPH	
	REQ'D	REQ'D	REQ'D	REQ'D	ACTUAL
9.1	14.7	117	315	160 $\pm$ 5	
9.2	14.7	75	270	108 $\pm$ 5	
9.3	4.4	25	170	RECORD	

10 MAIN METERING VALVE SCHEDULE - Tt2 CORRECTION

HOLD CONSTANT: Pt2 = 14.7 PSIA INLET FLOW = 1800 PPH REF. SPEED = 4536 RPM USG = MAX. NOTE: APPROACH ALL MMV SETTINGS FROM A LOWER LEVER SETTING										
TEST POINT	MFL POSITION +/- .5 DEGREES	Tt2 DEG. F.	Tt2 MIKE	Ps3 PSIA	PfN PSIG	Wf - PPH				
						REQ'D	ACT. ↓	ACT. ↑	HYSTERESIS	
									SPEC.	ACTUAL
10.1	101	130	.839	140	435	370±10	362	-----	-----	-----
10.2	101	103	.823	140	465	405±10	382	379	8	3
10.3	101	59	.800	140	535	460±10	407	-----	-----	-----
10.4	101	59	.800	140	550	+	406	-----	-----	-----
10.5	60	59	.800	75	285	202±8	207	-----	-----	-----
10.6	30	103	.823	65	240	140±6	130/130	-----	-----	-----
10.7	30	59	.800	65	240	151±5	134/138	136	3	2
10.8	30	-60	.735	65	245	182±8	178	-----	-----	-----

+Record flow change when USG lever is changed from max. speed stop to the min speed stop. The change in flow must not exceed 10 PPH.

11 MAIN METERING VALVE SCHEDULE - Pt2 CORRECTION

HOLD CONSTANT: Tt2 = 59 deg. F. INLET FLOW = 1800 PPH REF. SPEED = 4536 RPM USG = MAX. NOTE: APPROACH ALL MMV SETTINGS FROM A LOWER LEVER SETTING									
TEST POINT	MFL POSITION +/- .5 DEGREES	Pt2 PSIA	Ps3 PSIA	PfN PSIG	Wf - PPH				
					REQ'D	ACT. ↓	ACT. ↑	HYSTERESIS	
								SPEC.	ACT.
11.1	101	4.4	55	260	137±6		-----	-----	-----
11.2	101	8.8	140	380	275±10		-----	-----	-----
11.3	101	14.7	140	535	460±10			7	
11.4	30	6.8	22	220	RECORD		-----	-----	-----
11.5	30	8.8	30	225	91±5		-----	-----	-----
11.6*	30	14.7	65	275	151±5			3	
11.7	30	17.6	65	275	181±5		-----	-----	-----

*Adjustability range minimum +30-15 PPH Act. + _____ - _____.

Attachment 2- Propeller Governor, as Received

WOODWARD GOVERNOR COMPANY
Rockford, Illinois
CAGE 66503
VENDOR CODE 23245

AS RECEIVED

TSP-325
Page 9 of 15
Rev. AH

CONSTANT SPEED PROP GOVERNOR - TEST REPORT
Use with Governors 210560 (869120-1), 210563 (893615-3) (See Below)

OIL INLET TEMP. 140 ± 5 DEG. F. OIL INLET PRESSURE 95 ± 10 PSIG

S/N 2456492

P/N 210736

PT.	TSP PARAGRAPH NUMBER	SPEED (RPM)		OIL PRESSURE (PSIG)		OIL FLOW (GTS./MIN)	
		REQUIRED	ACTUAL	REQUIRED	ACTUAL	REQUIRED	ACTUAL
1	C1	CHECK VALVE PRESS. CHECK	0	0	15 Max.	START FLOW	START FLOW
2	C2	TOTAL LEAK CHECK	0	0	200±10	.5 MAX.	(7.3)
3	C3	RELIEF VALVE CHECK a.	3500±15	3500	465±20	0	0
4	C4	PUMP CASE PRESSURE b.	3500±15	3500	525 PSI MAX.		
5	C4	PUMP CAPACITY CHECK	3500±15	3500	150±5	9.0 MINIMUM	(8.5)
6	C5	EXTERNAL LEAK	3500±15	3500	RELIEF VALVE	0	NONE
7	C6	OVERSPEED SETTING	3942±10		150±5		
8	C7	MAXIMUM RPM	3754±10	3856	150±5		
9	C8	MINIMUM RPM	2815±10	3552	150±5	USE	
10	C9	ARM TRAVEL - MAX. TO MIN.	55 DEG.-65 DEG.	(20)		BLEED	
11	C10	INCREASE SPEED TO OBTAIN		3843	200±5	ORIFICE	
12	C10	INCREASE SPEED TO OBTAIN		3913	50±5		
13	C10	PRESSURE GAIN = PT12-PT11 20-40 RPM		(70)			
14	C11	DECREASE SPEED TO OBTAIN		3852	200±5 PSI		
15	C11	SPEED HYSTERESIS = PT11-PT 14 -15 TO +40 RPM		-9			
16	C12	INTERNAL LEAK	AS REQUIRED	3874	150±5	NEW 1.40 MAX. O'HAUL 1.7 MAX.	(3.0)
17	C13	MAGNETIC PICKUP VOLTAGE	3700±10	N/A	Adjust pickup to 4.5V±.2 peak-to-peak		
18	C13	PICKUP INDICATED RPM	925±3*	N/A			
19	C16	ELECTRICAL SPEED CHANGE	50±5	N/A	28 VDC APPLIED TO COIL		

Use with Governors:
210736 (869120-6,-7,-8,-9) 8210-260 (893615-13)
210738 (893615-7,-12) 8210-100 (893615-17)
210743 (897382-1) 8210-266 (893615-18)
REMARKS: If governor is shipped without a lever, test
with P/N 210039

*Applied to 210743 prior to "0" change only.
Indicated pickup RPM (62)

SIGNATURE		DATE
TECHNICIAN	<u>Mark J. Lafferty</u>	<u>07/08/2025</u>
GARRETT PURCHASE ORDER #		
W.G. SALES ORDER #		<u>4026058</u>

110 min
90 max

TSP-325
Page 9 of 15
Rev. AH

OIL INLET TEMP. 140 ± 5 DEG. F. OIL INLET PRESSURE 95 ± 10 PSIG

P/N _____

- 0.9 NTS
- 2.1 Pump

	SIGNATURE	DATE
TECHNICIAN		
GARRETT PURCHASE ORDER # _____		
W.G. SALES ORDER # _____		

70 min
130 max