CENTURY
FLIGHT SYSTEMS, INC.

MUNICIPAL AIRPORT [redacted]
MINERAL WELLS, TEXAS 76068
[redacted]

November 1, 2012

Orrin K. Anderson
Air Safety Investigator
National Transportation Safety Board

Subject: WPR12LA048 Testing of Autopilot Components Removed from N36824

The following components were shipped to Century Flight Systems for a function test. Each component testing was limited but based on procedure of its Data Sheet.

1. 1D937-2050-311FF18 (Flight Computer) s/n 2178G
2. 52D67 (Attitude Gyro) s/n T72374M
3. 52D254 (Directional Gyro) s/n A6156G
4. 1C784-2-879 (Roll Servo) s/n 1501
5. 1C784-3-1052 (Pitch Servo) s/n 1511

RESULTS

The Century 2000 Flight Computer was connected to Century Flight Systems test console in accordance with its Data Sheet. Power was applied to the Flight Computer and a normal display was noted. All test results from the abbreviated test procedure was normal.

The Attitude Gyro was connected to a test fixture and a vacuum source was applied. The Attitude Gyro failed to erect but gyro rotor spin up was heard. Removal of the front bezel on the unit showed the pitch attitude indicator (football) jammed onto the roll attitude index ring. It is suggested heavy impact force was its cause. No further testing was conducted.

The Directional Gyro was connected to a test fixture and a vacuum source was applied. Rotor spin up was heard and compass card movement was noted when DG was moved, however no electronic output was indicated on the test fixture. Upon examination of the CD 175 electrical connector on the DG, it was noted two male pins were pushed back into the connector and not making contact with the female pins in the mating connector of the test stand. Pin 15 (shield ground) and pin 20 (signal ground) were the pins found to be pushed back.

The Roll Servo was connected to Century Flight Systems test console. Unit was checked for correct current draw, servo speed and slip clutch tension. Unit was found to be in spec.

The Pitch Servo was connected to Century Flight Systems test console. Unit was checked for correct current draw, servo speed and slip clutch tension. Unit check for current draw and servo speed was found to be in spec. Slip clutch tension was found to be 20 pounds higher than the Data Sheet specification. Tamper seal on top of capstan was found to be broken.

All testing of the components were witnessed by the following personnel:

Tom Latson (Air Safety Investigator NTSB)
Mike Allen (CFS Quality Control Manager)
Mike Underwood (CFS Production Manager)
Scott Collins (CFS Technical Services Rep)

Included in this report will be two Appendixes. Appendix A consisting of photos of the components taken by Tom Latson and Appendix B consisting of the Data Sheets for each component.

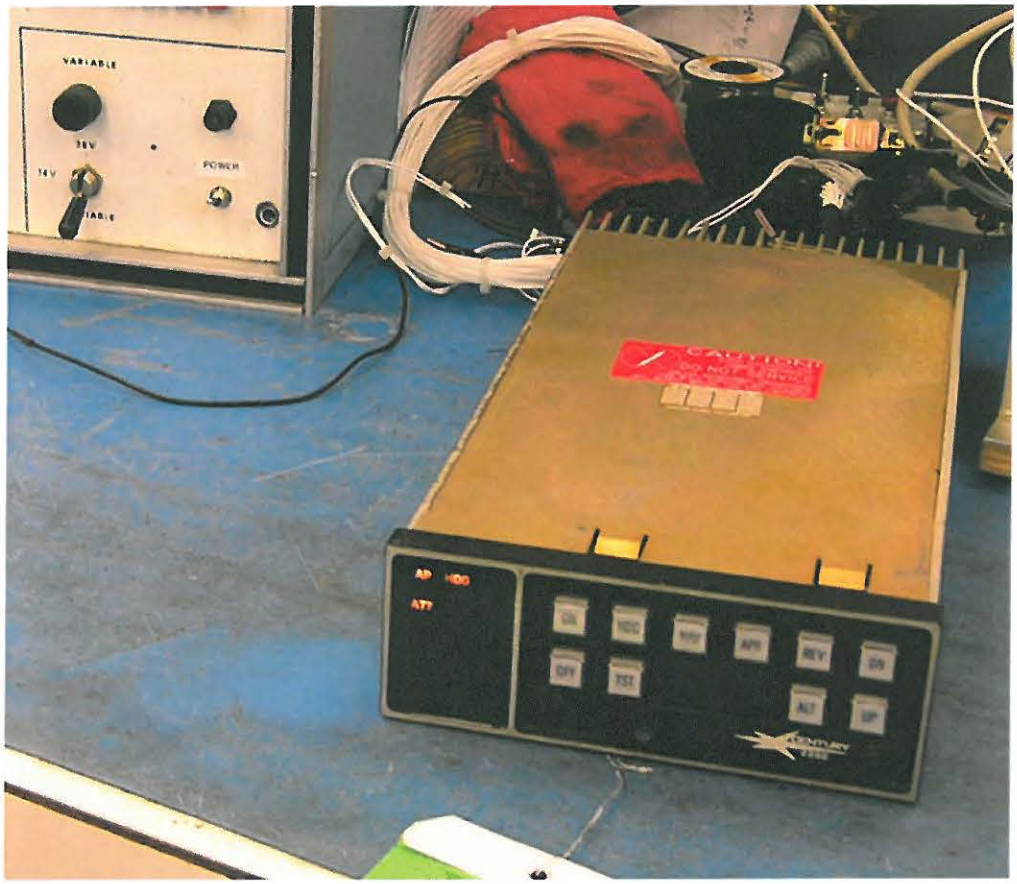
Respectfully

[redacted]

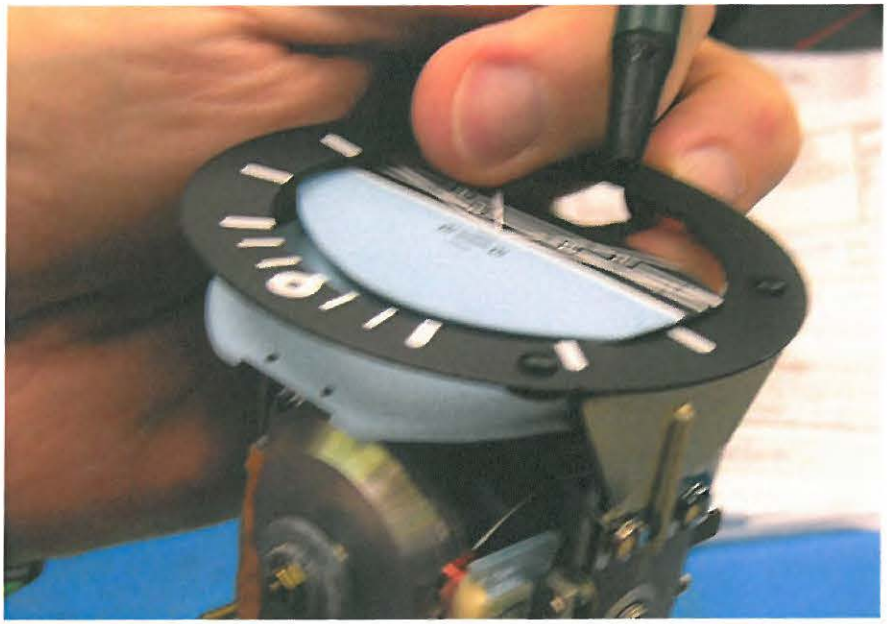
Scott Collins
Technical Services Representative

APPENDIX A

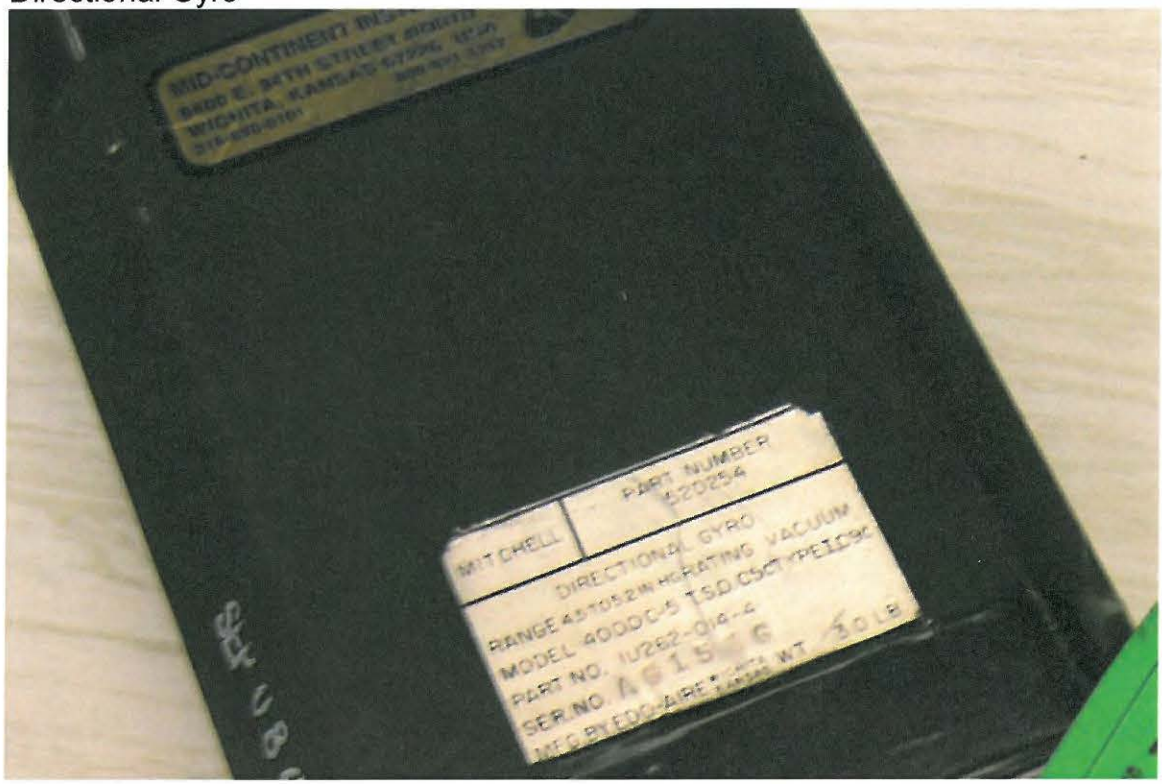
FLIGHT COMPUTER



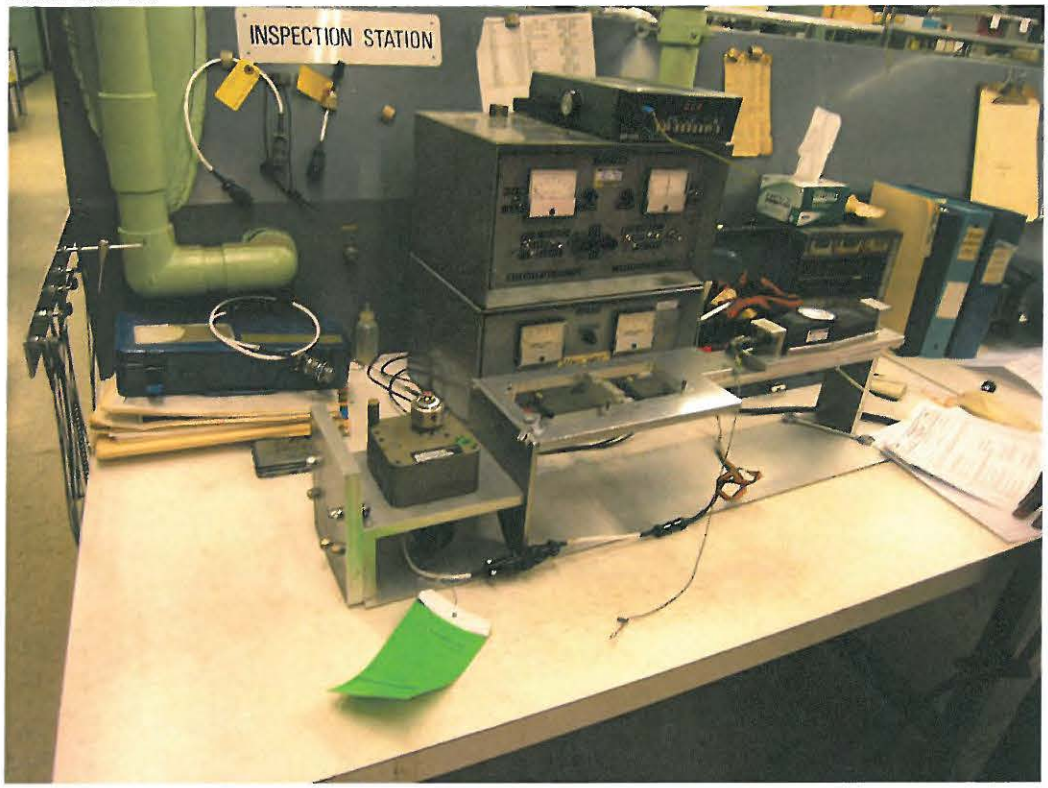
Attitude Gyro



Directional Gyro

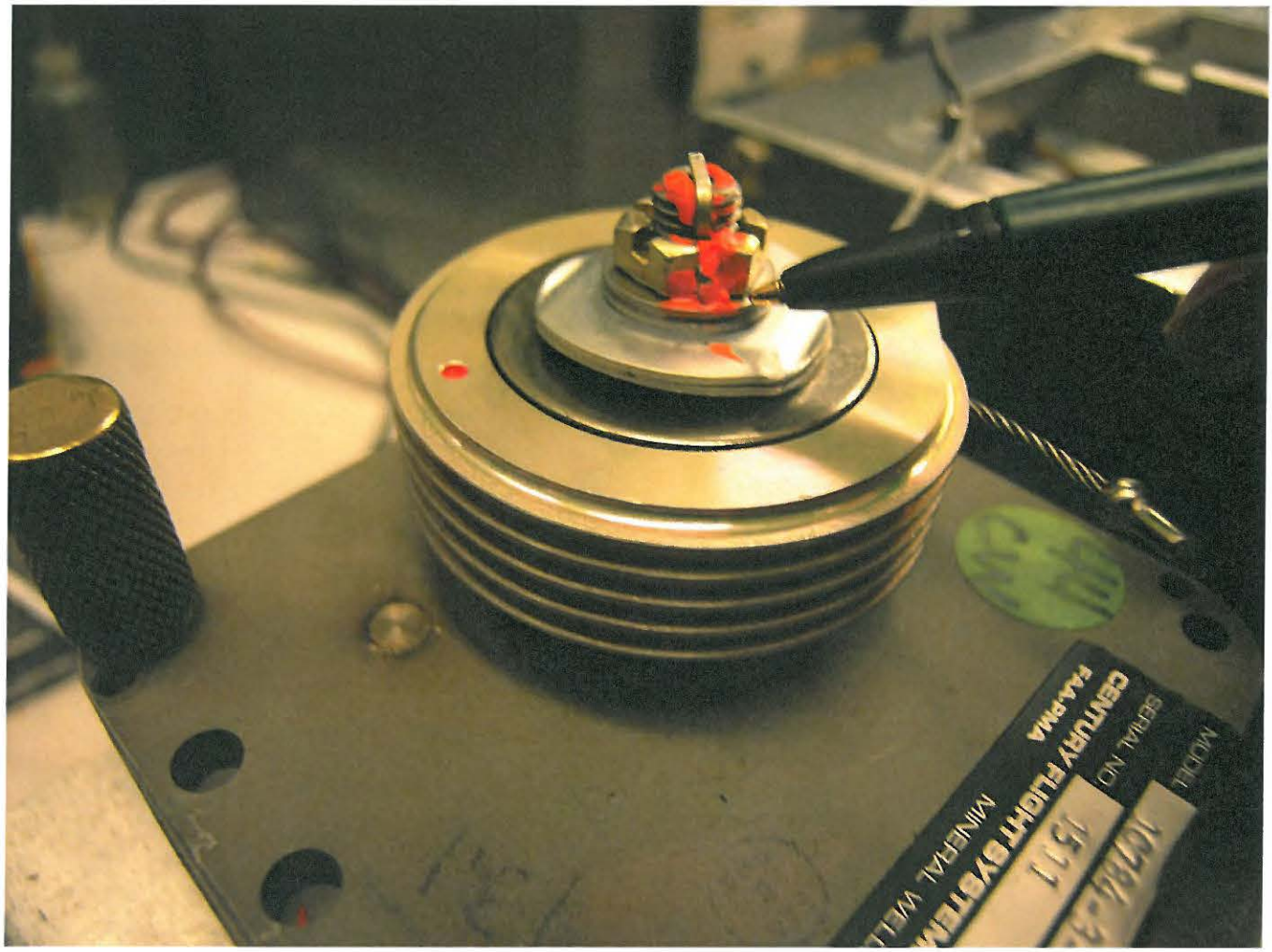


Roll Servo



Pitch Servo

Pitch Servo


CENTURY FLIGHT SYSTEMS
PALMDALE
MINERAL WELL
SERIAL NO
MODEL

APPENDIX B

CENTURY FLIGHT SYSTEMS, INC.
Mineral Wells, TX

APPROVED: L.M. HIGGINS
DATE: 07-31-96

DATA SHEET FOR SPECIFICATION 12A475 CENTURY 2000

SPEC. NO. 91A672

REV	EO#	DATE
G	19394	06-25-09

INSPECTED BY Mitchell Langston - 584 P/N 10937-20503111FF18 DATE 10/26/12

ACCEPTED ✓ REJECTED S/N 2178G

REMARKS: CFS 51 INC.

SPEC. SECTION	REQUIREMENT		RESULTS
2.4.1.0	SYSTEMS CHECKS		
2.4.1.1.	STATIC PORT LEAKAGE		
	Leakage shall not exceed 10 ft. in one minute.		0
2.4.1.2	AP A + IMPEDANCE		
	Resistance shall be greater than 1k ohms.		2K
2.4.1.3	TRIM A+ IMPEDANCE		
	Resistance shall be greater than 5 k ohms.		✓
2.4.1.4	INITIAL SUPPLY CURRENT		
	Supply current shall be: A. 14 Volt Units: 2.5 Amperes Max.		✓
	B. 28 Volt Units: 2.0 Amperes Max.		N/A
	C. Single Axis Units: 0.5 Amperes Max.		N/A
2.4.1.5	HDG shall be ON.		(✓)
	ATT shall be ON.		(✓)
2.4.2	SYSTEM LOCKOUTS		
2.4.2.1	EXT Device Lockouts		(✓)
2.4.2.2	ALT MODE LOCKOUT (Not Applicable If 81D666-5 Or 81D667-5 Pitch Board Is Installed)		
	ATT remains ON.		(✓)
	ALT remains OFF.		(✓)
2.4.3.1	REFERENCE VOLTAGE CHECKS		
	V+ value shall be + 9.6 ± /3 VDC.		9.5
2.4.3.2	V+ shall not change more than .010 VDC		✓
	Annunciators shall not flash.		✓
2.4.4.0	LOW VOLTAGE WARNING		
2.4.4.1	All functional annunciations shall flash.	FLASH	(✓)
	ON and OFF except HDG and ATT, which shall be ON.	HDG	(✓)
		ATT	(✓)
2.4.4.2	A. 14 V Units: HDG and ATT ON and bright.	HDG	(✓)
	B. 28 V Units: At A+ value of 20.3 ± 1 VDC.	ATT	(✓)
	HDG and ATT ON and bright.	BRIGHT	(✓)
		A+ VALUE	(✓ 13.8)
2.4.4.3	ROLL REFERENCE shall be ± .03 VDC.		-.007
2.4.4.4	PITCH REFERENCE shall be ± .10 VDC.		-.007
2.4.4.5	TRIM REFERENCE shall be ± .10 VDC.		-.007
2.4.4.6	Gyro excitation shall be 5K Hz ± 750 Hz.		5K KHZ
	Gyro ACV excitation shall be 1.5 ± .15 VRNS.		1.45 VRMS

NTSB

CENTURY FLIGHT SYSTEMS, INC.
Mineral Wells, TX

APPROVED: L.M. HIGGINS
DATE: 07-31-96

DATA SHEET FOR SPECIFICATION 12A475 CENTURY 2000

SPEC. NO. 91A672

REV	EO#	DATE
G	19394	06-25-09

SPEC. SECTION	REQUIREMENT	RESULTS
2.4.5.0	LIGHT DIMMER & PANEL LIGHTING	
2.4.5.1	HDG and ATT visible but dimly lit.	VISIBLE (✓) DIM (✓)
2.4.5.2	All panel lights are on.	LIGHTS (✓)
2.4.6.0	PREFLIGHT TEST SEQUENCE (Pitch Option Required)	
2.4.6.1	All functional annunciations visible for 3.3 ± 1.5 seconds.	All Annunciations (✓) TIME 3
	After 3.3 ± 1.5 seconds, ALT and GS shall extinguish.	(✓)
2.4.6.2	HDG, ATT, and TEST shall be visible.	HDG (✓) ATT (✓) TEST (✓)
2.4.6.3	A. HDG, ATT & TEST lights ON.	HDG (✓) ATT (✓) TEST (✓)
	B. HDG, ATT & TEST lights ON.	HDG (✓) ATT (✓) TEST (✓)
2.4.6.5	A. HDG & ATT shall remain ON. TEST Light shall go OFF.	HDG (✓) ATT (✓) TEST (✓)
	B. HDG & ATT shall remain ON. TEST Light shall go OFF.	HDG (✓) ATT (✓) TEST (✓)
2.4.6.6	HDG & ATT shall remain ON. TEST Light shall go OFF.	HDG (✓) ATT (✓) TEST ✓
2.4.6.7	All functional annunciators visible for 3.3 ± 1.5 seconds.	All Annunciators (✓)
	After 3.3 ± 1.5 seconds ALT & GS shall extinguish.	(✓)
2.4.6.8	HDG, ATT & TEST shall be ON.	HDG (✓) ATT (✓) TEST (✓)
2.4.6.9	A. HDG, ATT and TEST shall remain ON. Pitch Motor Velocity 100% ± 12% UP.	HDG (✓) ATT (✓) TEST (✓) VELOCITY 98 % DIRECTION UP
	B. HDG, ATT and TEST shall remain ON. Pitch Motor Velocity 100% ± 12% DOWN.	HDG (✓) ATT (✓) TEST (✓) VELOCITY 97 % DIRECTION DN
2.4.6.10	HDG and ATT shall remain ON Test shall flash.	HDG (✓) ATT (✓) TEST (✓)
2.4.6.11	A. HDG and ATT shall remain ON. TEST shall go OFF. Pitch Motor Velocity Greater than 150% UP.	HDG (✓) ATT (✓) TEST (✓) VELOCITY 7150 % DIRECTION UP

NOTE 9

SPEC. SECTION	REQUIREMENT	RESULTS
	B. HDG and ATT shall remain ON. TEST shall go OFF. Pitch Motor Velocity Greater than 150% ~~UP~~ DN ML	HDG (✓) ATT (✓) TEST (✓) VELOCITY 2150 % DIRECTION DN
2.4.6.12	HDG and ATT shall remain ON. Test shall go OFF.	HDG (✓) ATT (✓) TEST (✓)
2.4.7.0	LATERAL MODE CONTROL LOGIC (ALL VERSIONS)	
2.4.7.1	HDG shall go OFF. NAV shall flash.	HDG (✓) NAV (✓)
2.4.7.2	NAV shall go OFF. APR shall flash.	NAV (✓) APR (✓)
2.4.7.3	APR shall go OFF. REV shall flash.	APR (✓) REV (✓)
2.4.7.4	REV shall go OFF. HDG shall come ON.	REV (✓) HDG (✓)
2.4.8.0	SYSTEM CONTROL * Ignore Pitch and Trim mode indications if not installed.	
2.4.8.1	The power supply current shall increase but remain less than 3 amps. Roll, Pitch, and Trim servos shall engage.	CURRENT 1.67 ROLL (✓) PITCH (✓) TRIM (N/A)
2.4.8.2	The trim servo shall disengage.	DISENGAGE (✓)
2.4.8.3	The trim servo shall engage.	ENGAGE (✓)
2.4.8.4	The Roll, Pitch and Trim Servos shall disengage	ROLL (✓) PITCH (✓) TRIM (N/A)
2.4.8.5	The Roll, Pitch, and Trim servos shall disengage; AP shall flash for 5 ± 2 seconds and then remain OFF.	ROLL (✓) PITCH (✓) TRIM (N/A) AP FLASH (✓) TIME 5 AP OFF (✓)
2.4.8.6	AP shall come ON; the Roll, Pitch and Trim servos shall engage.	AP (✓) ROLL (✓) PITCH (✓) TRIM (N/A)
2.4.8.7	The Roll, Pitch, and Trim Servos shall disengage; AP shall flash.	ROLL (✓) PITCH (✓) TRIM (N/A) AP FLASH (✓)
2.4.8.8	The Roll, Pitch, and Trim servos shall remain disengaged; AP shall go OFF.	ROLL (✓) PITCH (✓) TRIM (✓) AP OFF (✓)
2.4.9.0	ALTITUDE MONITOR	
2.4.9.1	ALT shall come ON. ATT shall go OFF.	ALT (✓) ATT (✓)
2.4.9.2	~~ATT shall come ON.~~ ALT shall go OFF.	ATT (✓) ALT (✓)

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CENTURY FLIGHT SYSTEMS, INC. Mineral Wells, TX APPROVED: L.M. HIGGINS DATE: 07-31-96	DATA SHEET FOR SPECIFICATION 12A475 CENTURY 2000	SPEC. NO. 91A672 REV G / EO# 19394 / DATE 06-25-09

SPEC. SECTION	REQUIREMENT	RESULTS
2.4.10.0	RESET GENERATOR	
2.4.10.1	ALT shall com ON. ATT and HDG shall go OFF. NAV shall flash.	ALT (✓) ATT (✓) HDG (✓) NAV (✓)
2.4.10.2	AP, HDG and ATT shall come ON. NAV and ALT shall go OFF. The Roll, Pitch and Trim servos shall engage.	AP (✓) HDG (✓) ATT (✓) NAV (✓) ALT (✓) Roll (✓) Pitch (✓) Trim (N/A)
2.4.10.3	NAV shall flash. ALT shall com ON. HDG and ATT shall go OFF.	NAV (✓) ALT (✓) HDG (✓) ATT (✓)
2.4.10.4	HDG and ATT shall be ON. The Roll, Pitch and Trim servos Shall be disengaged	HDG (✓) ATT (✓) Roll (✓) Pitch (✓) Trim (N/A)
2.4.10.5	AP and ALT shall come ON. NAV shall flash. HDG and ATT shall go OFF. Roll, Pitch and Trim servos shall engage.	AP (✓) ALT (✓) NAV (✓) HDG (✓) ATT (✓) SERVOS (✓)
2.4.10.6	NAV and ALT shall go OFF. HDG and ATT shall come ON. AP shall flash, then remain OFF. Roll, Pitch and Trim servos shall engage.	NAV (✓) ALT (✓) HDG (✓) ATT (✓) AP (✓) SERVOS (✓)
2.4.11.0	MANUAL TRIM (If Installed))	
2.4.11.1	HDG and ATT shall to OFF	HDG (N/A) ATT ( )
2.4.11.2	The trim servo shall not engage: The trim motor shall no run.	Not ENGAGE ( ) Not RUN ( )
2.4.11.3	The trim servo shall engage;	ENGAGE ( ) Motor Direction % Motor Velocity
2.4.11.4	The trim servo shall engage; the trim motor shall run in the trim DOWN direction and greater than 90% motor velocity.	ENGAGE ( ) Motor Direction % Motor Velocity N/A

NST 5B

CENTURY FLIGHT SYSTEMS, INC.
Mineral Wells, TX

APPROVED: L.M. HIGGINS
DATE: 07-31-96

DATA SHEET FOR SPECIFICATION 12A475 CENTURY 2000

SPEC. NO. **91A672**

REV	EO#	DATE
G	19394	06-25-09

SPEC. SECTION	REQUIREMENT	RESULTS
2.4.12.0	AUTOTRIM (If Installed)	
2.4.12.1	AP shall come ON, the roll, pitch & trim servo shall engage. The trim motor shall run in the DN direction as noted in table. (See page 7A.)	VELOCITY N/A %DN
2.4.12.2	The trim motor shall run in the UP direction at less than 5% for 3.3 ± .75 seconds then increase.	VELOCITY ____ % UP TIME ____ SEC.
2.4.12.3	The trim motor shall run in the UP direction as noted in the table. (See page 7A.)	VELOCITY ____ % UP
2.4.12.4	The trim motor shall run the in DN direction at less than 5% for 3.3 ± .75 seconds then increase.	VELOCITY ____ %DN TIME ____ SEC. N/A
2.4.13.0	PITCH ATTITUDE HOLD (if installed)	
2.4.13.1	The pitch attitude shall stabilize at 0° ± 1°.	____ °

TABLE OF TRIM VELOCITY VALUES

IF N5 EQUALS	TEST WEIGHT	TRIM MOTOR 14 V Unit		VELOCITY (SEE NOTE 3)	TRIM MOTOR 28 V Unit		VELOCITY (SEE NOTE 4)
*0	0 LBS.	53%	±	16%	SEE NOTE 2		
*1	0 LBS.	49%	±	15%	SEE NOTE 2		
*2	0 LBS.	44%	±	13%	SEE NOTE 2		
*3	0 LBS.	40%	±	12%	SEE NOTE 2		
4	0 LBS.	66%	±	20%	57%	±	17%
5	0 LBS.	53%	±	16%	46%	±	14%
6	0 LBS.	49%	±	15%	42%	±	13%
7	0 LBS.	44%	±	13%	38%	±	11%
8	2.5 LBS.	63%	±	16%	54%	±	14%
9	2.5 LBS.	52%	±	13%	45%	±	11%
A	5 LBS.	67%	±	13%	56%	±	11%
B	5 LBS.	55%	±	11%	47%	±	10%
C	5 LBS.	51%	±	10%	44%	±	9%
D	10 LBS.	67%	±	10%	58%	±	9%
E	10 LBS.	62%	±	9%	53%	±	8%
F	15 LBS.	71%	±	11%	61%	±	9%
H	15 LBS.	64%	±	10%	55%	±	8%
J	15 LBS.	57%	±	9%	49%	±	7%
K	15 LBS.	47%	±	7%	41%	±	6%
L	15 LBS.	42%	±	6%	36%	±	5%
M	15 LBS.	35%	±	5%	30%	±	4%

NOTES:

*1. These 14V Units tested using a 66C397 Test Servo Actuator.

2. These Units cannot be tested with present test techniques.

3. For 14V Unit test, refer to Test Servo Actuator 66C396 and Autotrim External Servo Test Fixture 96D66 for complete information.

4. For 28V Unit test, refer to Test Servo Actuator 66C397 and Autotrim External Servo Test Fixture 96D66-1 for complete information.

NTSB

CENTURY FLIGHT SYSTEMS, INC. Mineral Wells, TX APPROVED: L.M. HIGGINS DATE: 07-31-96	**DATA SHEET FOR SPECIFICATION 12A475 CENTURY 2000**	SPEC. NO. **91A672** REV **G** EO# **19394** DATE **06-25-09**

SPEC. SECTION	REQUIREMENT	RESULTS
2.4.13.2	The pitch attitude shall return to 0° ± 1° within 7 ± 2 seconds.	_____ ° _____ sec.
2.4.13.3	The pitch attitude shall stabilize at 0° ± 1°	_____ °
2.4.14.0	PITCH MODIFIER	
2.4.14.1	The pitch attitude shall move down at .75 ± .15°/second; then stabilize at 10° ± 1° pitch down.	.75 °/sec. 10
2.4.14.2	The pitch attitude shall move up at .75 ± .15°/ second; then stabilize at 0° ± 1°.	.75 °/sec. 0 °
2.4.15.0	PITCH LIMITER	
2.4.15.1	The pitch attitude shall limit at 24° ± 3° UP.	26 °
2.4.15.2	The pitch attitude shall limit at 14° ± 3° pitch DOWN	16 °
2.4.16.0	PITCH SYNCHRONIZER	
2.4.16.1	The pitch attitude shall stabilize at 0° ± 1°.	0 °
2.4.16.2	The pitch attitude shall stabilize at 10° ± 1° pitch UP.	10 °
2.4.17.0	AUXILIARY MODE	
2.4.17.1	ATT shall go OFF ALT shall come ON Pitch rate shall be 2.6° ± .3° sec. DOWN	ATT ( ) ALT ( ) _____ °/sec.
2.4.17.2	ATT shall go OFF ALT shall come ON Pitch rate shall be 2.6° ± .3° sec. UP	ATT ( ) ALT ( ) _____ °/sec.
2.4.18.0	ALTITUDE HOLD	
2.4.18.1	ALT shall remain ON Pitch motor velocity shall be 0 ± 12%	ALT ( ) _____ %
2.4.18.2	Pitch rate shall be up as noted in the table.	_____ °/sec.
2.4.18.3	Pitch rate shall be DOWN as noted in the table.	_____ °/sec.

XXXXXN$_6$X	PITCH RATE °/sec
0	1° ± .2°/sec.
1	1° ± .2°/sec.
2	.5° ± .1°/sec.
3	.67° ± .13°/sec.
4	.9° ± .2°/sec.
5	.5° ± .1°/sec.
6	1° ± .2°/sec.
7	.55° ± .11°/sec.

2.4.19.0	NAV FLAG	
2.4.19.1	APR shall flash; HDG shall go OFF	APR (✓) HDG (✓)
2.4.19.2	APR ON after 2.2 ± .75 seconds.	APR (✓) TIME 2.2 sec.
2.4.19.3	APR flashes when NAV flag value is + .180 ± .03 VDC	APR (✓) NAV FLAG .180 V
2.4.19.4	APR shall be ON when NAV flag value is + .200 ± .03 VDC	APR (✓) NAV FLAG .200 V

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SPEC. SECTION	REQUIREMENT	RESULTS
2.4.20.0	GS ARMING	
2.4.20.1	GS shall come ON after 2.2 ± .75 seconds; APR shall remain ON	GS ( ) TIME _____ sec. APR ( )
2.4.20.2	GS shall go OFF	GS ( )
2.4.20.3	GS shall come ON	GS ( )
2.4.20.3	GS shall go OFF	GS ( )
2.4.20.5	GS shall come ON	GS ( )
2.4.20.6	GS shall go OFF	GS ( )
2.4.20.7	GS shall come ON	GS ( )
2.4.20.8	GS shall go OFF	GS ( )
2.4.20.9	GS shall come ON after 2.2 ± .75 seconds.	GS ( ) TIME _____ sec.
2.4.21.0	GS COUPLER	
2.4.21.1	AP, ATT, APR, and GS shall be ON.	AP ( ) ATT ( ) APR ( ) GS ( )
2.4.21.2	ATT shall go OFF. At less than 75% but more than 25% UP GS deviation. The pitch attitude shall not increase.	ATT ( ) Deviation _____ % GS UP ( ) Attitude ( )
	GS deviation shall stabilize at 0% ± 5%	Stabilize _____ %
2.4.21.3	GS deviation shall stabilize at 0% ± 5%. Within 2 min. ± 20 seconds	Deviation _____ % Time _____ sec
2.4.22.0	LOSS OF GS ARMING	
2.4.22.1	GS shall flash when GS flag value is .180 ± .03 VDC	GS ( ) Flag Value _____ VDC
2.4.22.2	GS shall remain ON when GS flag value is .200 ± .03 VDC	GS ( ) Flag Value _____ VDC
2.4.22.3	GS and APR shall flash	GS ( ) APR ( )
2.4.22.4	GS and APR shall remain ON after 2.2 ± .75 seconds	GS ( ) APR ( ) TIME _____ sec.
2.4.22.5	HDG shall come ON APR shall go OFF GS shall flash	HDG ( ) APR ( ) GS ( )
2.4.22.6	ALT shall come ON GS shall go OFF	ALT ( ) GS ( )
2.4.23.0	LATERAL AXIS	
2.4.23.1	Roll attitude shall be adjustable from 14° ± 4° to 32° ± 4° left.	_____ ° _____ °
2.4.23.2	Roll attitude shall be adjustable from 19° ± 3° to 27°± 3° right.	_____ ° _____ °

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SPEC. SECTION	REQUIREMENT		RESULTS
2.4.23.3	Roll Attitude shall be adjustable from 12.5 ± 5.5° to 12.5 ± 5.5° left or right.		____° ____°
2.4.23.4	Roll rate shall be 5° ± 1°/second left.		____°/sec.
2.4.23.5	Roll rate shall be 5° ± 1°/second right.		____°/sec.
2.4.23.6	Roll attitude shall stabilize at 24° ± 1° left.		____°
2.4.23.7	Roll attitude shall stabilize at 24° ± 1° right.		____°
2.4.23.8	APR shall come ON. NAV shall go OFF. Roll attitude shall remain at 24° ± 1° right.	APR NAV Attitude	( ) ( ) ____°
2.4.23.9	REV shall come ON. NAV shall go OFF. Roll attitude shall stabilize at 24° ± 1° left.	REV APR Attitude	( ) ( ) ____°
2.4.23.10	HDG shall go OFF. NAV shall come ON. CRS shall stabilize at 42° ± 3.5° right. Couple at 28% ± 5%.	HDG NAV CRS Couple at	( ) ( ) ____° %
2.4.23.11	APR shall come ON. HDG shall go OFF. CRS shall stabilize at 42° ± 3.5° left. Couple at 78% ± 5%	APR HDG CRS Couple at	( ) ( ) ____° %
2.4.23.12	NAV deviation shall stabilize at 0% ± 3%		____%
2.4.23.13	REV shall come ON. APR shall go OFF. NAV deviation shall stabilize at 0% ± 3%	REV APR	( ) ( ) ____%
2.4.23.14	Roll attitude maximum is 12° ± 1° until CRS is 45° ± 2°. then roll attitude is 24° ± 1°	Attitude CRS Attitude	____° ____° ____°
2.4.23.15	Roll attitude maximum is 8° ± 2° (12° ± -2° for Heavy A/C) until CRS is 45° ± 2°. then roll attitude is 24° ± 1°	Attitude CRS Attitude	____° ____° ____°
2.4.23.16	HDG shall be ON. APR shall be ON. CRS shall be 30° ± 2° left until NAV deviation is 22 ± 5% right HDG shall go OFF.	HDG APR CRS Deviation HDG	( ) ( ) ____° ____% ( )
2.4.23.17	HDG shall com ON. NAV shall flash.	HDG NAV	( ) ( )
2.4.23.18	HDG shall go OFF. NAV shall remain ON.	HDG NAV	( ) ( )
2.4.23.19	HDG shall go OFF. REV shall be ON. Roll attitude shall stabilize at 0° ±4°.	HDG REV Attitude	( ) ( ) ____°
2.4.23.20	NAV deviation shall stabilize at 0% ± 3%.		____%
2.23.21	CRS shall move 5° left in 27 ± 5 seconds.		____° ____sec.
2.4.23.22	CRS shall move 5° left in 27 ± 5 seconds.		____° ____sec.

CENTURY FLIGHT SYSTEMS, INC.
Mineral Wells, TX

APPROVED: L.M. HIGGINS
DATE: 07-31-96

DATA SHEET FOR SPECIFICATION 12A475 CENTURY 2000

SPEC. NO. 91A672

REV	EO#	DATE
G	19394	06-25-09

SPEC. SECTION	REQUIREMENT	RESULTS
2.4.23.23	HDG shall come ON. REV shall go OFF.	HDG ( ) REV ( )
2.4.23.24	APR shall come ON. HDG shall go OFF. Roll attitude shall increase to 24° ± 1° right.	APR ( ) HDG ( ) _____ °
2.4.23.25	Roll attitude remains 24° ± 1° right after 35 ± 6 seconds (17.5 ± 3 seconds for Heavy A/C)	_____ ° _____ sec.
2.4.23.26	Roll attitude decreases to 12° ± 1° right aster 70 ± 12 seconds. (35 ± 6 seconds for Heavy A/C)	_____ ° _____ sec.
2.4.23.27	HDG shall come ON. APR shall go OFF.	HDG ( ) APR ( )
2.4.23.28	NAV shall come ON. HDG shall go OFF. Roll attitude shall increase to 24° ± 1° left	NAV ( ) HDG ( ) _____ °
2.4.23.29	Roll attitude shall decrease to 13° ± 1° left after 35 ± 6 seconds. (N/A for Heavy A/C)	_____ ° _____ sec.
2.4.23.30	Roll attitude shall decrease to 8.5° ± 1° left after 70 ± 12 seconds. (N/A for Heavy A/C)	_____ ° _____ sec.
2.4.23.31	Roll Attitude stabilizes at 14.8 ± 2° left.	( )
2.4.23.32	Roll Attitude stabilizes at 15.5 ± 2° left.	( )
2.4.24.2	PITCH STRG Adjustment range 14V 330 to 430 MIN 28V 165 to 215 MIN	High _____ Low _____
2.4.24.3	For 5° pitch down the PITCH STRG is 520 ± 40 mA 14V. or 260 ± 20 mA 28V.	_____
2.4.24.4	For 5° pitch up the PITCH STRG is 260 ± 40 mA 14V. or 130 ± 20 mA 28V.	_____
2.4.24.5	ROLL STRG CTR is adjustable at least over ± 3 Volts.	_____ _____
2.4.24.6	-4.16 ± .5 volts ROLL STRG for 10° left HDG OFFSET.	_____
2.4.24.7	4.6 ± .5 volts ROLL STRG for 10° right HDG OFFSET.	_____
2.4.25.1	AP shall com ON: ROLL and PITCH servos shall engage	AP ( ) ROLL ( ) PITCH ( )
2.4.25.2	Servo shall drive DOWN.	SERVO ( )
2.4.25.3	After approximately 3 seconds, TRIM DN light shall flash at slow rate.	TRIM DN ( ) Sec. _____ FLASH ( )
2.4.25.4	Servo shall drive UP.	
2.4.25.5	After approximately 3 seconds, TRIM UP light shall flash at a slow rate	TRIM UP ( ) SEC _____ FLASH ( )

NOSB

CENTURY FLIGHT SYSTEMS, INC. Mineral Wells, TX APPROVED: L.M. HIGGINS DATE: 07-31-96	DATA SHEET FOR SPECIFICATION 12A475 CENTURY 2000	SPEC. NO. 91A672 REV G / EO# 19394 / DATE 06-25-09

SPEC. SECTION	REQUIREMENT	RESULTS
2.4.25.6	After approximately 3 seconds, TRIM DN light shall flash at a fast rate.	TRIM UP ( ) SEC _____ FLASH ( )
2.4.25.7	After approximately 3 seconds, TRIM UP light shall flash at fast rate.	TRIM UP ( ) SEC _____ FLASH ( )
2.4.25.8	TRIM UP shall flash at fast rate. EXT light cycles on every 2 minutes for 5 seconds.	FLASH ( ) EXT LT ( )
2.4.26.1	YD light ON with YD depressed and OFF when released.	YD LT ( )

NOSE

CENTURY FLIGHT SYSTEMS, INC.

Drawn By:_____ Date:_____
Approved:_____ Date:_____
Approved:_____ Date:_____
Approved:_____ Date:_____
Signatures on file

ENGINEERING SPECIFICATION

DATA SHEET

For Artificial Horizon Gyros
52D66, 52D67, 52D166, 52D167 & M's
Inspection Acceptance Test

SPEC.NO. 91A251-2

Issued	Change	Approved	Date
-	Rel. EO 13712		8-28-90
A	15326		4-27-94

PART NO. 52D67 SERIAL NO. T72374M DATE: 10/26/12

INSPECTED BY: 581 ACCEPTED _____ REJECTED ✓

ACCEPTANCE TEST _____ QUALIFICATION TEST _____

REFERENCE:
52D66 & M -- 12A21
52S67 & M -- 12A19
52D166 & M -- 12A333
52D167 & M -- 12A334

NOT OUR FACTORY SEAL (NO IDENTIFYING MARKS)
WILL NOT ERECT
FOUND PITCH DISPLAY JAMMED DUE TO IMPACT

Acceptance test results within tolerance may be indicated by a check [✓] mark. Out of tolerance data must be recorded.

WILLIAM PETERSON

3.3 STARTING -- Low Power			
	Runs at 2.25" hg. (MAX.)		[ ]
3.4 STARTING -- Normal Power			
	Erection Time 3 minutes MAX.	[ ]	
	Roll Index Aligned +/- 2 deg.		[ ]
	Pitch Index Aligned +/- 2 deg.	[ ]	
3.5 ZERO STABILITY			
	Jitter does not exceed width of horiz. line		[ ]
3.6 AIR CONSUMPTION			
	Maximum consumption at normal vacuum 2.2 CFM.		[ ]
3.7 LEAKAGE			
	Airflow does not exceed .25 CFM		[ ]
3.8 SETTING ERROR			
	Horizon line +/- 1.0 deg.		[ ]
	Roll index +/- 1.0 deg.	[ ]	
3.9 VERTICALITY			
	Pitch indication of 5.0 deg. +/- 1.0 deg.	[ ]	
	Roll axis indicates no more than 1.0 deg. MAX.	[ ]	
3.10 AUTOPILOT OUTPUTS			
3.10.1 ROLL NULL			
	Mechanical within +/- 1.5 deg.	[ ]	
	Electrical within +/- 30 mV		[ ] mV
PITCH NULL (N/A for 52D66 & 52D166)			
	Mechanical within +/- 1.0 deg.	[ ]	
	Electrical within +/- 60 mV		[ ] mV
3.10.2 ROLL OUTPUT			NSTP

CENTURY FLIGHT SYSTEMS, INC.

Drawn By:_____ Date:_____
Approved:_____ Date:_____
Approved:_____ Date:_____
Approved:_____ Date:_____

Signatures on file

ENGINEERING SPECIFICATION

DATA SHEET

For Artificial Horizon Gyros
52D66, 52D67, 52D166, 52D167 & M's
Inspection Acceptance Test

SPEC.NO. 91A251-2

Issued	Change	Approved	Date
-	Rel. EO 13712		8-28-90
A	15326		4-27-94

	ANGLE OUTPUT mVOLTS	RIGHT	LEFT
	5 deg.	80 to 130	[ ] [ ]
	10"	170 to 240	[ ] [ ]
	20"	360 to 450	[ ] [ ]
	30"	540 to 700	[ ] [ ]
	60"	500 Minimum	[ ] [ ]

3.10.3 PITCH OUTPUT (N/A for 52D66 & 52D166)

	ANGLE OUTPUT mVOLTS	UP	DOWN
	5 deg.	170 to 230	[ ] [ ]
	10"	340 to 520	[ ] [ ]
	15"	500 to 750	[ ] [ ]
	55"	400 Minimum	[ ] [ ]

3.10.4 OUTPUT PHASE (3.10.3 for 52D66 & 52D166)
Roll in phase within +/- 30 deg. [ ]
Pitch in phase within +/- 30 deg. [ ]

3.10.5 END PLAY (3.10.4 for 52D66 & 52D166)
Does not exceed 25mV (.025v) [ ]

3.10.6 CONING (3.10.5 for 52D66 & 52D166)
Roll does not exceed 10 mV (.010V) [ ]
Pitch does not exceed 20 mV (.020V) [ ]

3.10.7 PITCH BAR DRIFT (N/A for 52D66 & 52D166)
Pitch Bar does not exceed spread from null of 40 mV Left to Right [ ]

3.10.8 PITCH SIGNAL STABILITY (N/A for 52D66 & 52D166)
Pitch output free of intermittants [ ]

3.11 LIGHTING: (For 52D166M & 52D167M)
Lights at 13.75V [ ]
Lights at 27.50V [ ]
Reduced to 8.94V [ ]
Reduced to 17.88V [ ]

3.11.1 LIGHTING WEDGE: (For 52D166M & 52D167M)
Satisfactory [ ]

3.11.1, 3.11.3, 3.11.2 INSTRUMENT DISPLAY
Miniature Airplane within +/- 2 deg. [ ]
Paint and Lens free of faults [ ]

3.12 LIGHTING (For 52D66M & 52D67M)
Provision for Light Tray [ ]

4.0N/A

5.0AUTOPILOT SYSTEM TEST
The Artificial Horizon Gyro was system tested per Specification 12A75. [ ]

---END---

NTSB

CENTURY FLIGHT SYSTEMS, INC.

Drawn By: J.N.P. Date: 08-28-90
Approved: J.L.P. Date: 08-28-90
Approved: L.M.H. Date: 08-28-90

DATA SHEET

TITLE:

DIRECTIONAL GYRO
52D254 & M

SPEC. NO.

91A458-1

Issued	Change	Approved	Date
-	Rel. 13712	LMH	8-28-90

SHEET 1 OF 1

PART NO. 52D254 SERIAL NO. A6156 DATE 10/26/12

INSPECTED BY 581 ACCEPTED _____ REJECTED ✓

ACCEPTED BY: _____ QUALIFICATION TEST _____

ACCEPTANCE TEST RESULTS WITHIN TOLERANCE MAY BE INDICATED BY A CHECK (√) MARK.

REFERENCE: 52D254 & M - 12A367

NO OUTPUT MID CONTINENT SEALS FOUND 2 PINS PUSHED IN ON PIGTAIL CONNECTOR.

PIN # 20 SIGNAL GND PIN # 15 SHIELD GND THESE 2 PINS ARE SPLIT PINS. ALL OF THE OTHER PIN ARE SOLID WHICH ARE NEW REPLACEMENTS.

I WONDER WHY THE PREVIOUS REPAIR TECHNICIAN DIDN'T REPLACE ALL OF THE PINS.

WILLIAM PETERSON

3.3	STARTING -- Low Power		
	Runs at 2.25" hg. (MAX.)	[ ]	
	Stabilized within 2 minutes	[ ]	
3.4	AIR CONSUMPTION		
	Maximum consumption at normal vacuum 2.2 CFM.	[ ]	
3.5	LEAKAGE		
	Airflow does not exceed .25 CFM	[ ]	
3.6	ROLL, PITCH, AND YAW (SCORSBY RUN)		
	0° heading (4° or less either direction)	[ ]	
	90° heading (4° or less either direction)	[ ]	
	180° heading (4°. or less either direction)	[ ]	
	270° heading (4° or less either direction)	[ ]	
3.7	HEADING STABILITY		
	Does not exceed 2° drift	[ ]	
3.8	AUTOPILOT OUTPUTS		
3.8.1	DC Power INPUT 10.0 VDC at 8 ma. MAX.		
3.8.2	NULL		
	Electrical zero occurs at 0° ± 1.5°	[ ]	
3.8.3	DIRECTION		
	At 45° Output Negative	[ ]	
	At 315° Output Positive	[ ]	

3.8.4 SIGNAL OUTPUT

Course Selector	Output Signal VDC RIGHT	LEFT
0° ± 1.5°--0.00 VDC	[ ]	
10° .505 to .605 VDC	[ ]	[ ]
20° 1.011 to 1.211 VDC	[ ]	[ ]
45° 2.330 to 2.670 VDC	[ ]	[ ]within .170-[ ]
90° >3.33 VDC	[ ]	[ ]

3.9	INSTRUMENT DISPLAY		
3.9.1	CARD SHAKE		
	Shake does not exceed ± 1/2°.	[ ]	
3.9.2	PAINT AND LENS		
	Free of Scratches, Spot, Spots and Flaws	[ ]	
3.10	LIGHTING (-M units only)		
	13.75 VDC [ ]8.95 VDC	[ ]	
	27.50 VDC [ ]17.88 VDC	[ ]	
3.11	LIGHTING WEDGE (-M Units only)		
	Free of Spots and Scratches	[ ]	

---END---

NTSB

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY:	JNP	DATE:	02-08-96
APPROVED BY:	SC	DATE:	02-08-96
APPROVED BY:	EGL	DATE:	05-11-99
APPROVED BY:	WRW	DATE:	05-11-99

ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O. #	DATE	APPV'D
A	11017	07-16-80	WRW
B	11287	03-24-81	WRW
C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
H	18519	02-02-04	LMH

Inspected By Qendra P/N 1C784-2-879 Date 10-26-12

Accepted _____ Rejected _____ S/N 1501 H834

Acceptance Test _____ Qualification Test _____

Ref. Engineering Spec 12A417

Acceptance test results within tolerance may be indicated with a (). Qualification test data and out-of-tolerance acceptance data shall be recorded in the space provided where applicable. Letters in ( ) after pin numbers are for 1C784-4 servos only.

4.2.1 DIRECTION OF OUTPUT SHAFT ROTATION

1. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
2. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground). — Output shaft rotates CW (✓)
3. Apply 12.0 VDC to Pin 6(M) (+) and Pin 3(L) (ground). — Output shaft rotates CCW (✓)

4.2.2/4.2.3 SERVO ACTUATOR SOLENOID ENGAGEMENT & DISENGAGEMENT

1. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
2. Apply 10.8 VDC to Pin 1(B) (+) and Pin 8(G) (ground). — Solenoid shall engage (✓)
3. Apply 100 in.-lb. or motor stall torque load to output shaft. — Solenoid shall remain engaged (✓)
4. Disconnect power to solenoid Pins 1(B) & 8(G). — Solenoid shall disengage ( )
5. Apply 12.0 VDC to Pin 6(M) (+) and Pin 3(L) (ground).
6. Apply 10.8 VDC to Pin 1(B) (+) and Pin 8(G) (ground). — Solenoid shall engage (✓)
7. Apply 100 in.-lb. or motor stall torque load to output shaft. — Solenoid shall remain engaged (✓)
8. Disconnect power to solenoid pins 1 & 8. — Solenoid shall disengage (✓)

4.2.4 SERVO ACTUATOR SOLENOID INPUT CURRENT

1. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
2. Solenoid current measured at Pin 1(B) shall not exceed 0.6 amps. — .473 Amps (✓)

NTSB

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY: JNP DATE: 02-08-96
APPROVED BY: SC DATE: 02-08-96
APPROVED BY: EGL DATE: 05-11-99
APPROVED BY: WRW DATE: 05-11-99

ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O. #	DATE	APPV'D
A	11017	07-16-80	WRW
B	11287	03-24-81	WRW
C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
E	15988	04-12-96	WRW
F	17141	05-11-99	WRW
G	17750	03-08-01	WRW
H	18519	02-02-04	LMH

4.2.5 MOTOR CURRENT

Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).

Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).

3. Apply the following torque loads to the output shaft and measure the motor current at pin 3(L).

(Refer to allowable tolerances in ( ); record results of this test).

MAXIMUM MOTOR CURRENT (AMPS) AT 12.0 VDC INPUT VOLTAGE AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(.23) (____)	--	--	--	--
1C784-0-1	(.23) (____)	--	--	--	--
1C784-1	(.23) (____)	--	--	--	--
1C784-2/(-2-1)	(.23) 16.4	--	--	--	--
1C784-3	--	(.90) (____)	(1.3) (____)	--	--
1C784-5	(.48) (____)				

4.2.6 OUTPUT SHAFT SPEED

1. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
2. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
3. Apply the following torque loads to the output shaft and measure the output shaft speed.

(Refer to allowable tolerances in ( ); record results of this test.

NTSE

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY: JNP DATE: 02-08-96
APPROVED BY: SC DATE: 02-08-96
APPROVED BY: EGL DATE: 05-11-99
APPROVED BY: WRW DATE: 05-11-99

ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O. #	DATE	APPV'D
A	11017	07-16-80	WRW
B	11287	03-24-81	WRW
C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
E	15988	04-12-96	WRW
F	17141	05-11-99	WRW
G	17750	03-08-01	WRW
H	18519	02-02-04	LMH

OUTPUT SHAFT SPEED (RPM) AT 12.0 VDC INPUT VOLTAGE AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(2.2/1.5) (____)	--	--	--	--
1C784-0-1	(2.2/1.5) (____)	--	--	--	--
1C784-1	(4.0/2.9) (____)	--	--	--	--
1C784-2/(-2-1)	(8.3/6.1) (6.9)	--	--	--	--
1C784-3	(15.5/11.3)(____)	--	--	--	--
1C784-5	(27.4/22.6) (____)	--	--	--	--

4.2.7 TEMPERATURE EFFECTS ON MOTOR CURRENT

1. Stabilize the servo actuator at -55°C.
2. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
3. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
4. Apply the following torque loads to the output shaft and measure the motor current at Pin 3(L).

(Refer to allowable tolerances in ( ); record results of this test.

NOTE:Sections 4.2.7 thru 4.2.8 are for use in Qualification Testing only and need not be conducted on each production unit.

MAXIMUM MOTOR CURRENT (AMPS) AT 12.0 VDC INPUT VOLTAGE AT -55°C AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(.23) (____)	--	--	--	--
1C784-0-1	(.23) (____)	--	--	--	--
1C784-1	(.23) (____)	--	--	--	--
1C784-2/(-2-1)	(.54) (____)	--	--	--	--
1C784-3	--	(1.19) (____)	(1.6) (____)	--	--
1C784-5	(.56) (____)	--	--	--	--

NDSB

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY: JNP DATE: 02-08-96
APPROVED BY: SC DATE: 02-08-96
APPROVED BY: EGL DATE: 05-11-99
APPROVED BY: WRW DATE: 05-11-99

ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O. #	DATE	APPV'D
A	11017	07-16-80	WRW
B	11287	03-24-81	WRW
C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
E	15988	04-12-96	WRW
F	17141	05-11-99	WRW
G	17750	03-08-01	WRW
H	18519	02-02-04	LMH

5. Stabilize the servo actuator at +70°C.
6. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
7. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
8. Apply the following torque loads to the output shaft and measure the motor current at pin 3(L). Refer to allowable tolerances in ( ); record results of this test.

MAXIMUM MOTOR CURRENT (AMPS) AT 12.0 VDC INPUT VOLTAGE AT +70°C AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(.23) (____)	--	--	--	--
1C784-0-1	(.23) (____)	--	--	--	--
1C784-1	(.23) (____)	--	--	--	--
1C784-2/(-2-1)	(.37) (____)	--	--	--	--
1C784-3	--	(.85) (____)	(1.4) (____)	--	--
1C784-5	(.42) (____)	--	--	--	--

4.2.8 TEMPERATURE EFFECTS ON OUTPUT SHAFT SPEED

1. Stabilize the servo actuator at -55°C.
2. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
3. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
4. Apply the following torque loads to the output shaft and measure the output shaft speed.

Refer to allowable tolerances in ( ); record results of this test.

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY:	JNP	DATE:	02-08-96
APPROVED BY:	SC	DATE:	02-08-96
APPROVED BY:	EGL	DATE:	05-11-99
APPROVED BY:	WRW	DATE:	05-11-99

ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O.#	DATE	APPV'D
A	11017	07-16-80	WRW
B	11287	03-24-81	WRW
C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
E	15988	04-12-96	WRW
F	17141	05-11-99	WRW
G	17750	03-08-01	WRW
H	18519	02-02-04	LMH

OUTPUT SHAFT SPEED (RPM) AT 12.0 VDC INPUT VOLTAGE
AT -55°C AND NOTED LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(1.8/1.5) (____)	--	--	--	--
1C784-0-1	(1.8/1.5) (____)	--	--	--	--
1C784-1	(3.5/2.9) (____)	--	--	--	--
1C784-2/(-2-1)	(6.8/5.8) (____)	--	--	--	--
1C784-3	(13.5/11.1) (____)	--	--	--	--
1C784-5	(26/23.9) (____)	--	--	--	--

5. Stabilize the servo actuator at +70°C.

6. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground). 7. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).

8. Apply the following torque loads to the output shaft and measure output shaft speed.

Refer to allowable tolerances in ( ); record results of this test.

OUTPUT SHAFT SPEED (RPM) AT 12.0 VDC INPUT VOLTAGE
AT +70°C AND NOTED LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(2.2/1.5) (____)	--	--	--	--
1C784-0-1	(2.2/1.5) (____)	--	--	--	--
1C784-1	(4.0/2.9) (____)	--	--	--	--
1C784-2/(-2-1)	(8.5/6.1) (____)	--	--	--	--
1C784-3	(12.65/11.3)(____)	--	--	--	--
1C784-5	(25.6/24.6) (____)	--	--	--	--

NOSE

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY:	JNP	DATE:	02-08-96
APPROVED BY:	SC	DATE:	02-08-96
APPROVED BY:	EGL	DATE:	05-11-99
APPROVED BY:	WRW	DATE:	05-11-99

ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O. #	DATE	APPV'D
A	11017	07-16-80	WRW
B	11287	03-24-81	WRW
C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
H	18519	02-02-04	LMH

Inspected By Penobscu P/N 1C784-3-1052 Date 10-26-12

Accepted _____ Rejected _____ S/N 1511 2828

Acceptance Test _____ Qualification Test _____

Ref. Engineering Spec 12A417

Acceptance test results within tolerance may be indicated with a (). Qualification test data and out-of-tolerance acceptance data shall be recorded in the space provided where applicable. Letters in ( ) after pin numbers are for 1C784-4 servos only.

4.2.1 DIRECTION OF OUTPUT SHAFT ROTATION

1. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
2. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground). — Output shaft rotates CW (4
3. Apply 12.0 VDC to Pin 6(M) (+) and Pin 3(L) (ground). — Output shaft rotates CCW (4

4.2.2/4.2.3 SERVO ACTUATOR SOLENOID ENGAGEMENT & DISENGAGEMENT

1. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
2. Apply 10.8 VDC to Pin 1(B) (+) and Pin 8(G) (ground). — Solenoid shall engage (4
3. Apply 100 in.-lb. or motor stall torque load to output shaft. — Solenoid shall remain engaged (4
4. Disconnect power to solenoid Pins 1(B) & 8(G). — Solenoid shall disengage (4
5. Apply 12.0 VDC to Pin 6(M) (+) and Pin 3(L) (ground).
6. Apply 10.8 VDC to Pin 1(B) (+) and Pin 8(G) (ground). — Solenoid shall engage (4
7. Apply 100 in.-lb. or motor stall torque load to output shaft. — Solenoid shall remain engaged (4
8. Disconnect power to solenoid pins 1 & 8. — Solenoid shall disengage (4

4.2.4 SERVO ACTUATOR SOLENOID INPUT CURRENT

1. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
2. Solenoid current measured at Pin 1(B) shall not exceed 0.6 amps. — 517 Amps (4

Clutch set is at 60/165
seal is broken on top of
clutch setting

NTSB

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY: JNP DATE: 02-08-96
APPROVED BY: SC DATE: 02-08-96
APPROVED BY: EGL DATE: 05-11-99
APPROVED BY: WRW DATE: 05-11-99

ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O. #	DATE	APPV'D
A	11017	07-16-80	WRW
B	11287	03-24-81	WRW
C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
E	15988	04-12-96	WRW
F	17141	05-11-99	WRW
G	17750	03-08-01	WRW
H	18519	02-02-04	LMH

4.2.5 MOTOR CURRENT

Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).

Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).

3. Apply the following torque loads to the output shaft and measure the motor current at pin 3(L).

(Refer to allowable tolerances in ( ); record results of this test).

MAXIMUM MOTOR CURRENT (AMPS) AT 12.0 VDC INPUT VOLTAGE AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(.23) (____)	--	--	--	--
1C784-0-1	(.23) (____)	--	--	--	--
1C784-1	(.23) (____)	--	--	--	--
1C784-2/(-2-1)	(.23) (____)	--	--	--	--
1C784-3	--, 13	(.90) (____)	(1.3) (____)	--	--
1C784-5	(.48) (____)				

4.2.6 OUTPUT SHAFT SPEED

1. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
2. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
3. Apply the following torque loads to the output shaft and measure the output shaft speed.

(Refer to allowable tolerances in ( ); record results of this test.

NTB

CENTURY
Mineral Wells, TX

DRAWN BY: JNP DATE: 02-08-96
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ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

REV	E.O. #	DATE	APPV'D
A	11017	07-16-80	WRW
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C	11466	09-17-81	WRW
D	15906	02-08-96	LMH
E	15988	04-12-96	WRW
F	17141	05-11-99	WRW
G	17750	03-08-01	WRW
H	18519	02-02-04	LMH

OUTPUT SHAFT SPEED (RPM) AT 12.0 VDC INPUT VOLTAGE AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(2.2/1.5) (____)	--	--	--	--
1C784-0-1	(2.2/1.5) (____)	--	--	--	--
1C784-1	(4.0/2.9) (____)	--	--	--	--
1C784-2/(-2-1)	(8.3/6.1) (____)	--	--	--	--
1C784-3	(15.5/11.3)(13.1)	--	--	--	--
1C784-5	(27.4/22.6) (____)	--	--	--	--

4.2.7 TEMPERATURE EFFECTS ON MOTOR CURRENT

1. Stabilize the servo actuator at -55°C.
2. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
3. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
4. Apply the following torque loads to the output shaft and measure the motor current at Pin 3(L).

(Refer to allowable tolerances in ( ); record results of this test.

NOTE:Sections 4.2.7 thru 4.2.8 are for use in Qualification Testing only and need not be conducted on each production unit.

MAXIMUM MOTOR CURRENT (AMPS) AT 12.0 VDC INPUT VOLTAGE AT -55°C AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(.23) (____)	--	--	--	--
1C784-0-1	(.23) (____)	--	--	--	--
1C784-1	(.23) (____)	--	--	--	--
1C784-2/(-2-1)	(.54) (____)	--	--	--	--
1C784-3	--	(1.19) (____)	(1.6) (____)	--	--
1C784-5	(.56) (____)	--	--	--	--

NTSF

CENTURY Flight Systems, Inc. Mineral Wells, TX	ENGINEERING SPECIFICATION DATA SHEET	SPEC. NO. 91A592
DRAWN BY: JNP DATE: 02-08-96 APPROVED BY: SC DATE: 02-08-96 APPROVED BY: EGL DATE: 05-11-99 APPROVED BY: WRW DATE: 05-11-99	**For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure**	REV / E.O.# / DATE / APPV'D A 11017 07-16-80 WRW B 11287 03-24-81 WRW C 11466 09-17-81 WRW D 15906 02-08-96 LMH E 15988 04-12-96 WRW F 17141 05-11-99 WRW G 17750 03-08-01 WRW H 18519 02-02-04 LMH

5. Stabilize the servo actuator at +70°C.
6. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
7. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
8. Apply the following torque loads to the output shaft and measure the motor current at pin 3(L). Refer to allowable tolerances in ( ); record results of this test.

MAXIMUM MOTOR CURRENT (AMPS) AT 12.0 VDC INPUT VOLTAGE AT +70°C AND NOTED TORQUE LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(.23) (____)	--	--	--	--
1C784-0-1	(.23) (____)	--	--	--	--
1C784-1	(.23) (____)	--	--	--	--
1C784-2/(-2-1)	(.37) (____)	--	--	--	--
1C784-3	--	(.85) (____)	(1.4) (____)	--	--
1C784-5	(.42) (____)	--	--	--	--

4.2.8 TEMPERATURE EFFECTS ON OUTPUT SHAFT SPEED

1. Stabilize the servo actuator at -55°C.
2. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground).
3. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).
4. Apply the following torque loads to the output shaft and measure the output shaft speed.

Refer to allowable tolerances in ( ); record results of this test.

NTSB

CENTURY Flight Systems, Inc.
Mineral Wells, TX

DRAWN BY: JNP DATE: 02-08-96
APPROVED BY: SC DATE: 02-08-96
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ENGINEERING SPECIFICATION DATA SHEET

For 1C784-( ) Servo Actuator Final Inspection Checkout Procedure

SPEC. NO. **91A592**

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D	15906	02-08-96	LMH
E	15988	04-12-96	WRW
F	17141	05-11-99	WRW
G	17750	03-08-01	WRW
H	18519	02-02-04	LMH

OUTPUT SHAFT SPEED (RPM) AT 12.0 VDC INPUT VOLTAGE
AT -55°C AND NOTED LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(1.8/1.5) (____)	--	--	--	--
1C784-0-1	(1.8/1.5) (____)	--	--	--	--
1C784-1	(3.5/2.9) (____)	--	--	--	--
1C784-2/(-2-1)	(6.8/5.8) (____)	--	--	--	--
1C784-3	(13.5/11.1) (____)	--	--	--	--
1C784-5	(26/23.9) (____)	--	--	--	--

5. Stabilize the servo actuator at +70°C.

6. Apply 12.0 VDC to Pin 3(L) (+) and Pin 6(M) (ground). 7. Apply 12.0 VDC to Pin 1(B) (+) and Pin 8(G) (ground).

8. Apply the following torque loads to the output shaft and measure output shaft speed.

Refer to allowable tolerances in ( ); record results of this test.

OUTPUT SHAFT SPEED (RPM) AT 12.0 VDC INPUT VOLTAGE
AT +70°C AND NOTED LOAD

P/N ACTUATOR	NO LOAD	30 IN-LB.	50 IN-LB	70 IN-LB.	165 IN-LB
1C784	(2.2/1.5) (____)	--	--	--	--
1C784-0-1	(2.2/1.5) (____)	--	--	--	--
1C784-1	(4.0/2.9) (____)	--	--	--	--
1C784-2/(-2-1)	(8.5/6.1) (____)	--	--	--	--
1C784-3	(12.65/11.3)(____)	--	--	--	--
1C784-5	(25.6/24.6) (____)	--	--	--	--

NTSB