g GE Energy *Parts & Repair Services* *Louisville, KY*	**Functional Testing Specification** **LOU-GED-125D460FX**

Test Procedure for a 125D460FX

DOCUMENT REVISION STATUS: Determined by the last entry in the "REV" and "DATE" column

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release Transferred from paper copy to an electronic format.	G. Chandler	3/9/2013
B	Change step 7.2.3 to switch on all switches SW1 thru SW4, added step 7.2.8.5, and change reading at TP703 to 25KHz from 1KHz.	G. Chandler	1/14/2014
C	Added step 6.1.1 about removing ICs 707 & 708, and corrected frequency setting in steps 7.2.4.5 & 7.2.6.5 from 1K to 2.5K	G. Chandler	1/23/2014

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
G. Chandler			Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
3/9/2013			3/9/2013

1. SCOPE

1.1 This is a functional testing procedure for a Turbine Control board

2. STANDARDS OF QUALITY

2.1 Refer to the current revision of the IPC-A-610 standard for workmanship standards.

3. APPLICABLE DOCUMENTS

3.1 The following document(s) shall form part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.
- **3.1.1** Check board's electronic folder for more information

4. ENGINEERING REQUIREMENTS

4.1 Equipment Cleaning
- **4.1.1** Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to site specific SRA's for cleaning guidelines.

4.2 Equipment Inspection
- **4.2.1** Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:
  - **4.2.1.1** Wires - broken, cracked, or loosely connected
  - **4.2.1.2** Terminal strips / connectors - broken or cracked
  - **4.2.1.3** Components - visually damaged
  - **4.2.1.4** Capacitors - bloated or leaking
  - **4.2.1.5** Solder joints - damaged or cold
  - **4.2.1.6** Circuit board - burned or de-laminated
  - **4.2.1.7** Printed wire runs / Traces - burned or damaged

5. EQUIPMENT REQUIRED

5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.

Qty	Reference #	Description
1		5VDC Power Supply
2		15VDC Power Supplies
5		Fluke 85 meter or equivalent
1		12VDC Power Supply
1		O-Scope
1		Signal Generator
4		LEDs
2		1K ohm ½ watt resistor
4		Switch SPST

6. Setup

6.1.1 Remove IC707 & IC708, these ICs are not part of the card.

6.1.2 Connect the test circuit of figure 1.

6.1.3 Connect +15VDC, -15VDC, +12VDC, +5VDC, and commons

6.1.4 Turn power switch on.

7. Testing Process

7.1 General

7.1.1 M1 reads +5VDC current, 725mA Max (SPF relay in reset mode)

7.1.2 M2 reads -15VDC current, 60mA Max

7.1.3 M3 reads +15VDC current, 60mA Max

7.1.4 M4 reads -12VDC current, 8mA Max

7.2 Speed pickup redundancy, failure alarm, and speed setback circuits.

7.2.1 Clip lead in the following components;

7.2.1.1 C737 – 330uf @ 6VDC

7.2.1.2 R734 – 12.4K ohm

7.2.2 Adjust the signal generator for a 2.5K Hz +/-25Hz, 5 volt peak to peak square-wave.

7.2.3 With S1, S2, S3, and S4 “ON”, check that the following conditions exist: (Check S3 condition)

7.2.3.1 LED 1 is “ON”

7.2.3.2 LED 2 is “ON”

7.2.3.3 LED 3 is “OFF” (Reset using S4 if required)

7.2.3.4 LED 4 is “ON”

7.2.3.5 2.5K Hz (+/-25Hz) pulse train at TP703

7.2.4 Open S2 and S3 and check that the following conditions exits:

7.2.4.1 LED 1 is “ON”

7.2.4.2 LED 2 is “OFF”

7.2.4.3 LED 3 is “ON”

7.2.4.4 LED 4 is “ON”

7.2.4.5 2.5K Hz pulse train at TP703

7.2.4.6 TP707 is 2.40 volts min

7.2.4.7 TP711 is 0.80 volts max

7.2.5 Close S2 and verify that LED 3 turns off when S4 is temporarily opened. Confirm that TP707 and TP711 remain unchanged from previous step.

7.2.6 Open S1 and check that the following conditions exists:

7.2.6.1 LED 1 is "OFF"

7.2.6.2 LED 2 is "ON"

7.2.6.3 LED 3 is "ON"

7.2.6.4 LED 4 is "ON"

7.2.6.5 2.5K Hz (+/- 25Hz) pulse train at TP703

7.2.6.6 TP707 is 0.80 volts max

7.2.6.7 TP711 is 2.40 volts min

7.2.7 Close S1 and verify that LED 3 turns off when S4 is temporarily opened. Confirm that TP707 and TP711 remain unchanged from previous step.

7.2.8 Open S1 and wait for LED3 to come on, then open S2.

7.2.8.1 LED 1 is "OFF"

7.2.8.2 LED 2 is "OFF"

7.2.8.3 LED 3 is "ON"

7.2.8.4 LED 4 is goes out after a delay of about 3 seconds.

7.2.8.5 Turn on S3, verify LED4 is on.

7.3 Operator Loop Circuits

7.3.1 Adjust PS5 until TP714 is 1.48 +/- 0.01V.

7.3.2 Rotate P701 fully CW and verify that TP708 is 2.03 +/- 0.46V.

7.3.3 Rotate P701 fully CCW and verify that TP708 is 4.58 +/- 1.11V.

7.3.4 Adjust PS6 until TP713 is 1.48 +/- 0.01V.

7.3.5 Rotate P702 fully CW and verify that TP709 is 1.64 +/- 0.36V.

7.3.6 Rotate P702 fully CCW and verify that TP709 is 4.18 +/- 1.02V.

7.3.7 With the o-scope in the AC mode at 50mV/Div, verify that there is less than 50mV of noise at TP708 and TP709.

7.3.8 Turn power off. S2 off.

7.4 Post Testing Burn-in **Required** **_X_ Yes** **___ No**

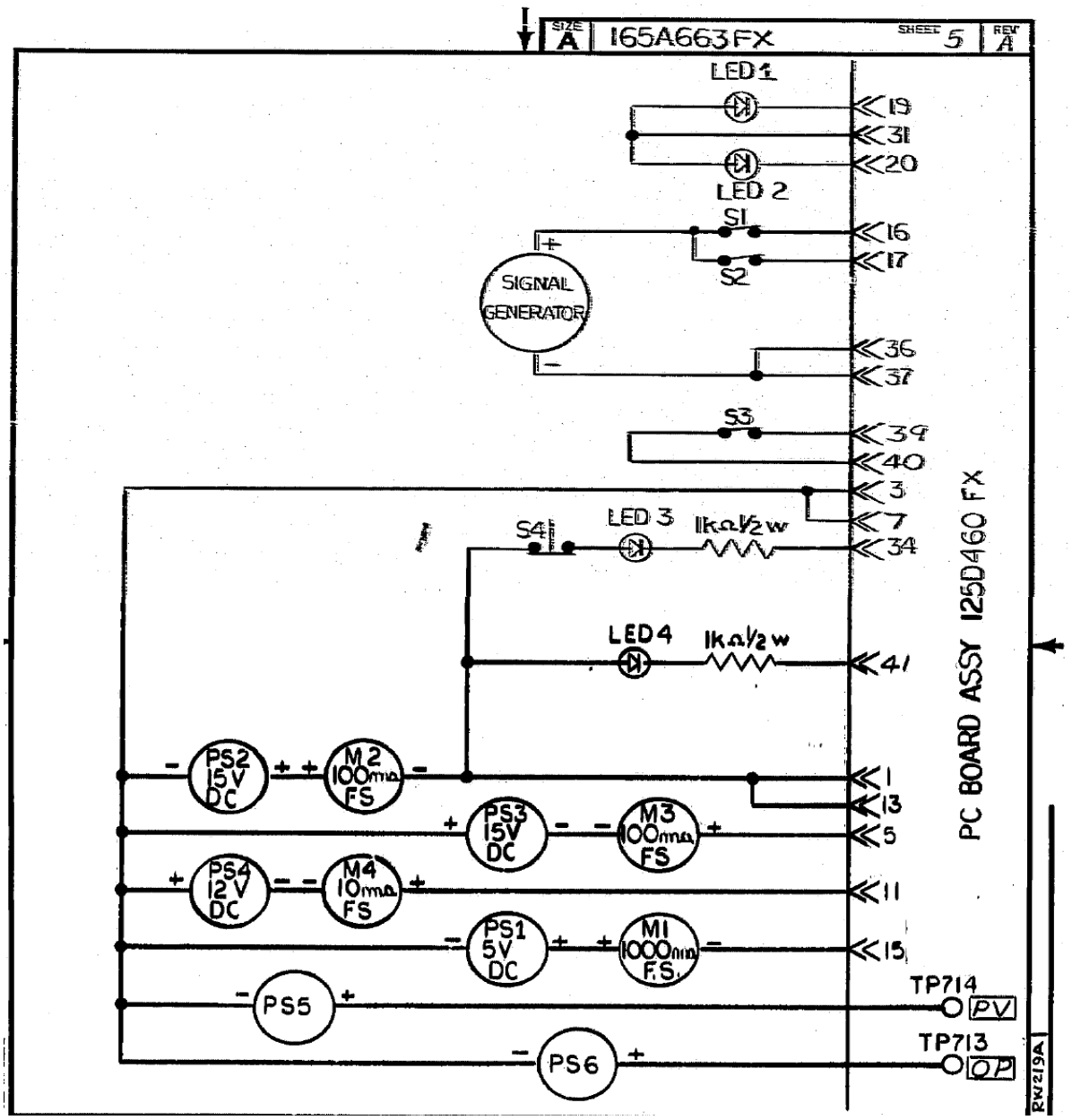
Note: 100 hour burn is required for most Turbine Control Boards

7.4.1 Re-test card after 100 burn-in.

7.5 ***TEST COMPLETE ***

8. Attachments

8.1 Test circuit for card



8.2 The next page has a blank copy of the data sheet.

New Step	Read at	Required Value	Pre-Test Measured	Post-Test Measured	Post-Test Final Measured
7.1.1	M1 (+5.VDC)	725mA Max			
7.1.2	M2 (-15.0VDC)	60mA Max			
7.1.3	M3 (+15.0VDC)	60mA Max			
7.1.4	M4 (-12.0VDC)	8mA Max			
7.2.3.1	LED 1	ON			
7.2.3.2	LED 2	ON			
7.2.3.3	LED 3	OFF			
7.2.3.4	LED 4	ON			
7.2.3.5	TP703	25K Hz			
7.2.4.1	LED 1	ON			
7.2.4.2	LED 2	OFF			
7.2.4.3	LED 3	ON			
7.2.4.4	LED 4	ON			
7.2.4.5	TP703	1K Hz			
7.2.4.6	TP707	2.40V Min			
7.2.4.7	TP711	0.80V Max			
7.2.5	LED 3	OFF			
7.2.5	TP707	2.40V Min			
7.2.5	TP711	0.80V Min			
7.2.6.1	LED 1	OFF			
7.2.6.2	LED 2	ON			
7.2.6.3	LED 3	ON			
7.2.6.4	LED 4	ON			
7.2.6.5	TP703	25K Hz			
7.2.6.6	TP707	0.80V Max			
7.2.6.7	TP711	2.40V Min			
7.2.7	LED 3	OFF			
7.2.7	TP707	0.80V Max			
7.2.7	TP711	2.40V Min			
7.2.8.1	LED 1	OFF			
7.2.8.2	LED 2	OFF			
7.2.8.3	LED 3	ON			
7.2.8.4	LED 4	OFF after 3 Sec delay			
7.2.8.5	LED 4	ON			
7.3.1	PS5 (TP714)	1.48 +/- 0.01V			
7.3.2	TP708	2.03 +/-0.46V			
7.3.3	TP708	4.58 +/-1.11V			
7.3.4	PS6 (TP713)	1.48 +/- 0.01V			
7.3.5	TP709	1.64 +/-0.36V			
7.3.6	TP709	4.18 +/-1.02V			
7.3.7	TP708	50mV Max			
7.3.7	TP709	50mV Max			

Data Sheet for 125A460FX, Serial Number_____, Service Order #_____, Date_____