

<div>g</div> <div>GE Energy</div> <div>Parts & Repair Services Louisville, KY</div>		<div>Functional Testing Specification</div> <div>LOU-GED-948D818G4</div>	
Test Procedure for a 948D818G4			
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REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release Transferred from G5 test to a G4 test and converted to an electronic format.	G. Chandler	10/18/2012
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DATE 10/18/2012		DATE	DATE
			QUALITY APPROVAL <i>Charlie Wade</i> DATE 10/18/2012

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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
2		30VDC Power Supplies
1		Fluke 85 meter or equivalent
1		Op Amp Card

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6. Modifications/Upgrades

6.1 Check Orange Book for any modifications or upgrades.

7. Testing Process

7.1 Setup

7.1.1 Notes highlighted in "Blue" were hand written on test instruction P3K-AL-0025.

7.1.1.1 Power, -22VDC to Pin-21 and ground to Pin-19

7.2 Testing Procedure

7.2.1 Turn on power.

7.2.2 Before start of test note voltages at TP4 _____ and TP5 _____ and write down.

7.2.3 Adjust Pot R4 and R3 clock-wise.

7.2.4 TP4 = -8.3VDC +- 0.45VDC. Pin 32 is the same voltage as TP4. Run R3 CCW monitoring the voltage at TP4, should be a smooth change to 0VDC. Return R3 clock-wise.

7.2.5 TP5 = -8.3VDC +- 0.45VDC. Run R4 CCW monitoring the voltage at TP5, should be a smooth change to 0VDC.

7.2.6 Set pot R4 CCW, set pot R3 for -5.0VDC at TP4, and short Pin-25 to common. "Do this on". Read Pin-20, about -1.7V

7.2.7 Remove common from Pin-25 and place at Pin-36. Read Pin-20 about -1.43VDC.

7.2.8 Remove common from pin 36 and place at pin 3. Record the voltage a pin 20 before making any adjustments to R1. Turn pot R1 to the fully CCW position. Pin 20 = -1.62V to -1.72V. Turn Pot R1 to the fully CW position. Pin 20= -2.26V to -2.66V. Return R1 to the previously recorded voltage at pin 20.

7.2.9 Remove common from pin 3 and place at pin 18. Record the voltage a pin 20 before making any adjustments to R2. Turn pot R2 to the fully CW position. Pin 20 = -1.62V to -1.72V. Turn Pot R2 to the fully CCW position. Pin 20= -1.92V to -2.26V. Return R2 to the previously recorded voltage at pin 20.

7.2.10 Set pot R3 full CCW. Set pot R4 for -5.000V at TP5. Remove the common from pin 18 and place it at pin 25. Pin 20 = -1.62V to -1.72V.

7.2.11 Disconnect all leads to test kit.

7.2.12 Using a sinewave generator put a 10 Hz signal into Pin-36 (use Pin-19 as common). Set voltage at C2 and R13 junction for 2.00VRMS. Raise the frequency until the voltage at C2/R13 junction = 1.41VRMS. The frequency should be about 36 to 45 Hz.

7.2.13 If card is for Brunswick go to appendix A, otherwise continue to next step.

7.3 Post Testing Burn-in Required ☒ Yes ☐ No



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

7.4 ***TEST COMPLETE ***

8. Attachments

8.1 Appendix A - Brunswick specific setup adjustment.

8.2 Brunswick Drawing (Figure 1)

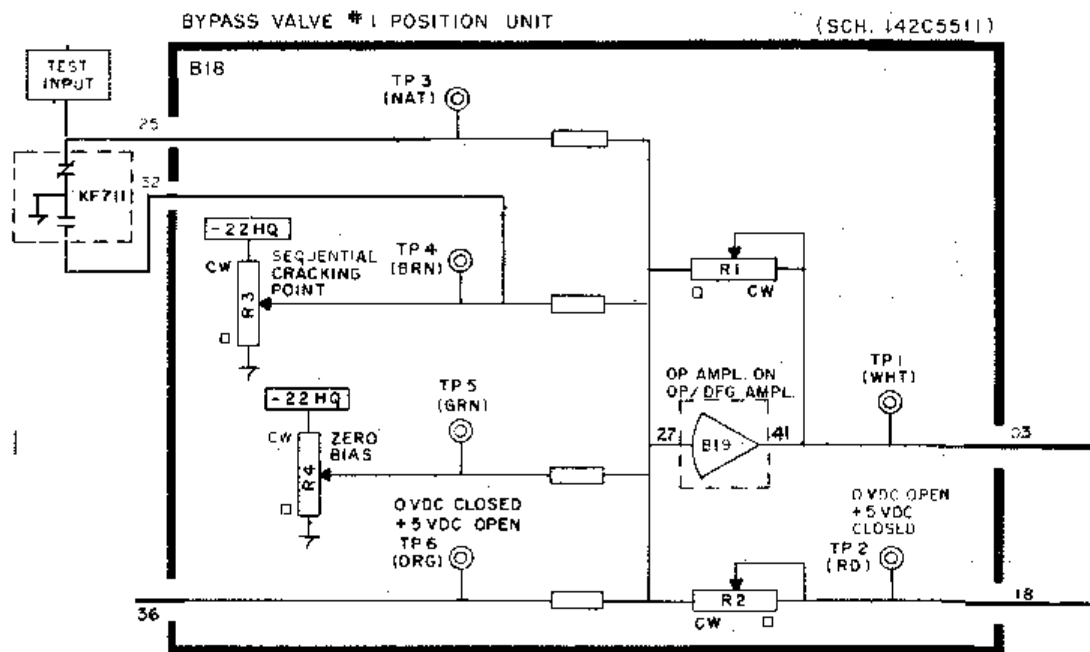


Figure 1

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Appendix A (Brunswick Specific Test adjustment for 948D818G0005), careful not for a G4, this is for reference only.

1. Testing Process

1.1 Setup

- 1.1.1 Set pots R3 and R4 CCW.
- 1.1.2 Adjust pot R1 for 386K ohms between Pin-1 and Pin-20.
- 1.1.3 Adjust pot R2 for 183.5K ohms between Pin-18 and Pin-20.
- 1.1.4 Install Op/Amp card
 - 1.1.4.1 Pin-20 to Op/Amp input pin 27
 - 1.1.4.2 Pin-1 to Op/Amp output pin 41
- 1.1.5 Ground Pin-18 (TP2), Pin-25 (TP3) and Pin-36 (TP6)
- 1.1.6 Install an Op Amp card Pin-20 to the input & Pin-1 to the output of the Op Amp.
- 1.1.7 Ground Pin-18, Pin-25, and Pin-36.

1.2 Testing Procedure

- 1.2.1 Apply power to card under test and to Op Amp card.
- 1.2.2 Adjust Op/Amp R3 for 0.000 at Pin-3 (TP1)
- 1.2.3 Remove Ground and apply +0.2V at Pin-36 (TP6) and trim R1 for -3.86V +/- 50mV at Pin-3 (TP1).
 - 1.2.3.1 Ground Pin-36.
- 1.2.4 Remove ground and apply 5.000V to Pin-18 (TP2) and adjust R4 for 0.0V +/- 50mV at Pin-3 (TP1).
- 1.2.5 Remove voltage and ground Pin-18 (TP2).
- 1.2.6 Remove ground and apply 0.545V at Pin-36 (TP6) and trim R4 for 0.0V +/- 50mV at Pin-3 (TP1).
- 1.2.7 Remove voltage and ground Pin-36 (TP6).
- 1.2.8 Remove ground and apply +5.000V to Pin-18 (TP2) and trim R2 for 0.0V +/- 50mV at Pin-3 (TP1)
- 1.2.9 Turn R3 CW.
- 1.2.10 Apply a "+" voltage to Pin-36 (TP6) until Pin-3 = 0V +/- 50mV.
- 1.2.11 The voltage at Pin-36 (TP6) must be >+4.5V.
- 1.2.12 Adjust voltage at Pin-36 (TP6) to +4.455V and adjust R3 for 0V +/- 50mV on Pin-3 (TP1).
- 1.2.13 Remove voltage and ground Pin-18 (TP2).
- 1.2.14 Increase voltage at Pin-36 (TP6) until Pin-3 (TP1) = 0V +/- 50mV.

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1.2.15 The voltage on Pin-36 (TP6) should = +5.000V +/-0.01V.

1.2.16 Ground pin 32 (TP4).

1.2.17 Decrease applied voltage to Pin-36 (TP6) until Pin-3 (TP1) is 0.0V +/- 50mV.


1.2.18 Verify voltage to Pin-36 (TP6) is +0.545V +/- 10mV.

1.2.19 Remove voltage and ground Pin-36 (TP6).

1.2.20 Apply "+" voltage to pin 25 (TP3) until pin 3 (TP1) is 0.0V +/- 50mV.

1.2.21 Verify voltage to pin 25 (TP3) is +0.82V +/- 20mV.

1.3 *End of Adjustment*****

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Job # _____

Serial # _____

Burn-in Start _____

Date _____

Data Sheet for 948D818G0005

Burn-in Stop _____

Test Procedure P3K-AL-0025

Technician _____

Test Procedure Step	Nominal	Lower Limit	Pre-Burn in Results	Post Burn in Results	Upper Limit	Pot Values If applicable CW CCW		Pass/Fail
7.2.4	-8.3V	-7.85V			-8.75V	R3		
7.2.4	0V	0V			0V		R3	
7.2.5	-8.3V	-7.85V			-8.75V	R4		
7.2.5	0V	0V			0V		R4	
7.2.6	-1.7V	About			About			
7.2.7	-1.43V	About			About			
7.2.8	-2.43V	-2.38V			-2.47V			
7.2.9	-1.94V	-1.63V			-2.36V			
7.2.10	-2.34V	About			About			
7.2.12	41Hz	36 Hz			45 Hz			

Brunswick plant specific alignment results (Appendix A)

Test Procedure Step	Nominal	Lower Limit	Pre-Burn in Results	Post Burn in Results	Upper Limit	Pot Values If applicable CW CCW		Pass/Fail
1.1.2	R1							
1.1.3	R2							
1.2.3	-3.86V	-3.81V			-3.91V			
1.2.4	0V	-.05V			+.05V			
1.2.6	0V	-.05V			+.05V			
1.2.8	0V	-.05V			+.05V			
1.2.11	> +4.5V	+4.5V						
1.2.12	0V	-.05V			+.05V			
1.2.15	+5V	+4.99V			+5.01V			
1.2.17	0V	-.05V			+.05V			
1.2.18	+0.545V	+0.535V			+0.555V			
1.2.21	+0.82V	+0.80V			+0.84V			