



GE Energy

Functional Testing Specification

Parts & Repair Services
Louisville, KY

LOU-GED-DS3800DGRC

Test Procedure for a DS3800NGRC

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DATE 08/07/12	DATE	DATE	DATE 8/10/2012

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1. SCOPE

1.1 This is a functional testing procedure for a DS3800NGRC.

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		Fluke 87 DMM (or Equivalent)
1		Tenma Power Supply
1		Function Generator

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6. Testing Process

6.1 Setup

- 6.1.1 Remove all components from saddle clamps if installed making note of where they go so they can be put back after test.
- 6.1.2 Set all pots fully CCW
- 6.1.3 Set power supply for 15VDC
- 6.1.4 All measurements are in ohms +-5%, unless otherwise stated
- 6.1.5 All saddle clamp references assume the DA and DB connectors are on YOUR LEFT.

Note: In the procedure (SC) refers to the saddle clamp post

6.2 Testing Procedure


- 6.2.1 Verify DA28-DA29 = 150K to 100K as R3 is adjusted
- 6.2.2 Verify DA28-DB3 = 50K
- 6.2.3 Verify DB27-TP21 = 0
- 6.2.4 Install jumper in C5 (SC)
- 6.2.5 Verify DA29-TP7 = 0
- 6.2.6 Move C5 jumper to C5A
- 6.2.7 Verify DA29-DA13 = 0
- 6.2.8 Verify TP8-DA19 = 0
- 6.2.9 Verify DB32-DA14 = 82.5K
- 6.2.10 Install J31
- 6.2.11 Connect -15VDC to DB2 with Com to DB3
- 6.2.12 Verify DA21 = 0V to -15VDC as R16 is adjusted
- 6.2.13 Remove Power
- 6.2.14 Install J27
- 6.2.15 Verify DB39-DB20 = 0
- 6.2.16 Move J27 to J28
- 6.2.17 Verify DB39-DB20 = Open
- 6.2.18 Verify DB17-DB20 = 0
- 6.2.19 Install J21
- 6.2.20 Install J23
- 6.2.21 Verify DA34-DA31 = 0
- 6.2.22 Verify DA33-DA31 = 0

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- 6.2.23** Install J22
- 6.2.24** Verify DA34-DB17 = 0
- 6.2.25** Install J24
- 6.2.26** Install J26
- 6.2.27** Verify DA33-DB29 = 0
- 6.2.28** Install J25
- 6.2.29** Verify DB29-DA31 = 0
- 6.2.30** Apply +15VDC to DB1 with Com to DB3
- 6.2.31** Verify DA16 = 0 to 15VDC as R11 is adjusted
- 6.2.32** Remove Power
- 6.2.33** Install J33
- 6.2.34** Verify DA26-DA27 = 0-10K as R12 is adjusted
- 6.2.35** Verify DA27-TP10 = 0
- 6.2.36** Verify DA27-DB3 = 10K
- 6.2.37** Install J34
- 6.2.38** Verify TP10-DB21 = 0
- 6.2.39** Apply +15VDC to DA4 with Com to DB3
- 6.2.40** Verify DA1 = 0 to 15VDC as R10 is adjusted
- 6.2.41** Verify TP3 = 15VDC
- 6.2.42** Remove Power
- 6.2.43** Install J10
- 6.2.44** Verify DA18-TP13 = 0
- 6.2.45** Verify DA18-TP12 = 200K
- 6.2.46** Verify J35 is removed
- 6.2.47** Verify DA18-DA20 = 100K
- 6.2.48** Install J35
- 6.2.49** Verify J42 and J43 are removed
- 6.2.50** Connect Function Generator set for 5V @ 26Khz to DA18 and DA20
- 6.2.51** Connect DMM to DA18 and DA20
- 6.2.52** Verify voltage on DMM Decreases from 5VAC to 4VAC as the frequency is increased to approx. 133Khz
- 6.2.53** Remove DMM and function Generator
- 6.2.54** Verify DB9-DA31 = Open
- 6.2.55** Verify DB9-DA31 = 0 as SW2 is toggled either way

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- 6.2.56** Verify DB3-TP16 = 0
- 6.2.57** Verify Top R69 (SC) to Top R71 (SC) = 0
- 6.2.58** Verify Top R69 (SC) to Bottom R70 (SC) = 0
- 6.2.59** Verify Top R68 (SC) to Top R73 (SC) = 0
- 6.2.60** Verify Top R68 (SC) to Top R72 (SC) = 0
- 6.2.61** Verify DB3-R68 Top (SC) = 0
- 6.2.62** Install J40
- 6.2.63** Verify DB18-R70 Top (SC) = 0
- 6.2.64** Install J39
- 6.2.65** Verify R70 Top (SC) to C18 Top (SC) = 0
- 6.2.66** Verify R70 Top (SC) to R74 Top (SC) = 0
- 6.2.67** Verify R70 Top (SC) to DB5 = 0
- 6.2.68** Install J38
- 6.2.69** Verify DA23-DB16 = 27.4K
- 6.2.70** Verify DB13-TP6 = 0
- 6.2.71** Verify TP6-DA15 = 27.4K
- 6.2.72** Verify TP17-DB6 = 0
- 6.2.73** Verify DB6-DA14 = 110K
- 6.2.74** Verify DB32-C18 Bottom (SC) = 27.4K
- 6.2.75** Verify DB32-DB13 = 27.4K
- 6.2.76** Verify DB13-R74 Bottom (SC) = 5K to 0 as R21 is adjusted
- 6.2.77** Verify R74 Bottom (SC) to DB3 = 47.5K to 52.5K as R21 is adjusted
- 6.2.78** Apply 15VDC to DB1 with Com to DB3
- 6.2.79** Verify DB5 = 3VDC to 13.5VDC as R22 is adjusted
- 6.2.80** Remove Power
- 6.2.81** Apply -15VDC to DB2 with Com to DB3
- 6.2.82** Verify DB5 = -13.5VDC to -3VDC as R22 is adjusted
- 6.2.83** Remove Power
- 6.2.84** Verify DA22-TP2 = 0
- 6.2.85** Verify DA22-DA9 = 18.2K
- 6.2.86** Install J4
- 6.2.87** Verify DA9-DB3 = 24.5K
- 6.2.88** Verify DB3-DA3 = 10K
- 6.2.89** Remove J4

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- 6.2.90** Verify DA9-DA11 = 82.5K
- 6.2.91** Install J3
- 6.2.92** Verify DA3-DA11 = 150K
- 6.2.93** Verify DA11-DA5 = 100K
- 6.2.94** Verify DA11-DA7 = 100K
- 6.2.95** Install J5
- 6.2.96** Verify DA9-DA11 = 20.5K
- 6.2.97** Verify DA11-TP1 = 150K
- 6.2.98** Verify J20 and J49 are removed
- 6.2.99** Install J19 in pos. B (the two right pins with the jumper vertically connecting them)
- 6.2.100** Verify DA11-DB7 = 300K
- 6.2.101** Verify DA17-TP5 = 0
- 6.2.102** Install J7
- 6.2.103** Verify DA17-DA25 = 0
- 6.2.104** Install J8
- 6.2.105** Verify DA25-DB15 = 1.15M
- 6.2.106** Verify DB15-R112 Top (SC) = 0
- 6.2.107** Verify R112 Bottom (SC) to C28A Bottom (SC) = 0
- 6.2.108** Verify DB23-C28A Top (SC) = 0
- 6.2.109** Verify DB19-DB23 = 221K
- 6.2.110** Install J48
- 6.2.111** Verify J47 is removed
- 6.2.112** Verify DB23-DB38 = 2.2M to 2.3M as R18 is adjusted
- 6.2.113** Verify DB38-DB36 = 100K
- 6.2.114** Install J29
- 6.2.115** Verify DB23-DB25 = 221K
- 6.2.116** Verify DB23-TP18 = 332K
- 6.2.117** Install J19 in pos. D (the two left pins with the jumper vertically connecting them)
- 6.2.118** Verify DB11-DB23 = 482K
- 6.2.119** Verify DB26-DB33 = 11.5K
- 6.2.120** Verify DB34-DB33 = 0 to 10K as R8 is adjusted
- 6.2.121** Install J47
- 6.2.122** Verify DB38-TP24 = 0
- 6.2.123** Verify TP24-C42 Top (SC) = 0

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- 6.2.124** Install J46
- 6.2.125** Verify DB31-DB35 = 8.25K
- 6.2.126** Verify R157 Top (SC) to C42 Bottom (SC) = 0
- 6.2.127** Verify R157 Bottom (SC) to C40A Bottom (SC) = 0
- 6.2.128** Verify C40A Top (SC) to R158 Bottom (SC) = 0
- 6.2.129** Verify C40 Bottom (SC) to R158 Bottom (SC) = 0
- 6.2.130** Install J41
- 6.2.131** Verify DA12-DA8 = 0 to 50K as R20 is adjusted
- 6.2.132** Verify DB4-DA12 = 0
- 6.2.133** Verify R158 Top (SC) to DB40 = 0 to 1.5K as R19 is adjusted
- 6.2.134** Verify DB3-DB40 = 1.5K
- 6.2.135** Remove J32
- 6.2.136** Verify DB3-DB40 = >5K
- 6.2.137** Install J32
- 6.2.138** Install J9
- 6.2.139** Verify TP19-TP13 = 0
- 6.2.140** Install J44
- 6.2.141** Verify TP19-TP25 = 200K
- 6.2.142** Verify TP25-DB14 = 100K
- 6.2.143** Install J33
- 6.2.144** Verify TP23-DB21 = 0
- 6.2.145** Install J45
- 6.2.146** Verify TP25-TP23 = 200K
- 6.2.147** Install J6
- 6.2.148** Remove J36 and J37
- 6.2.149** Verify DA30-DA2 = 442K
- 6.2.150** Verify DA30-TP9 = 0
- 6.2.151** Verify DA30-DA24 = 0
- 6.2.152** Install J36
- 6.2.153** Verify DA30-DB12 = 180K
- 6.2.154** Remove J36
- 6.2.155** Verify DA30-DB12 = 1M
- 6.2.156** Verify DB12-R111 Top (SC) = 0
- 6.2.157** Install J37

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- 6.2.158** Verify DB3-DA2 = 221K
- 6.2.159** Verify DB3-DA2 = 221K
- 6.2.160** Verify DB4-C29 Bottom (SC) = 0
- 6.2.161** Verify TP20-DB24 = 0
- 6.2.162** Verify DB8-C40 Top (SC) = 0
- 6.2.163** Connect +15VDC to DB1 with Com to DB3
- 6.2.164** Connect DMM com to DB3
- 6.2.165** Verify DB4 = 9VDC
- 6.2.166** Verify Cathode of CR6 = 9VDC to 15VDC as R26 is adjusted
- 6.2.167** Verify CR6 Anode to DB12 = 0
- 6.2.168** Verify DB24 = 0VDC to 15VDC as R7 is adjusted
- 6.2.169** Install J17
- 6.2.170** Verify DB28 = 0VDC to 15VDC as R17 is adjusted
- 6.2.171** Install J15
- 6.2.172** Verify DB22 = 0VDC to 15VDC as R6 is adjusted
- 6.2.173** Install J13
- 6.2.174** Verify DB10 = 0VDC to 15VDC as R15 is adjusted
- 6.2.175** Verify DB35 = 2.1VDC to 1.5VDC as R28 is adjusted
- 6.2.176** Verify Cathode of CR24 = 9VDC to 15VDC as R9 is adjusted
- 6.2.177** Verify TP23 = 9VDC
- 6.2.178** Verify DB40 = 9VDC
- 6.2.179** Verify Anode of CR24 to C40 Top (SC) = 0
- 6.2.180** Verify TP15 = 3.5VDC to 15VDC as R14 is adjusted
- 6.2.181** Verify TP14 = 3.5VDC to 15VDC as R4 is adjusted
- 6.2.182** Set R4 for 15VDC at TP14
- 6.2.183** Set R5 Fully CCW
- 6.2.184** While holding SW1 (PB) rotate R5 fully CW and verify voltage at TP14 increases by .1VDC
- 6.2.185** Release SW1 and verify voltage at TP14 decreases by .1VDC
- 6.2.186** Verify R5 has no effect on TP14 if SW1 is NOT pressed
- 6.2.187** Verify DA32 = 9.5VDC
- 6.2.188** Verify CR19 Cathode = 9VDC to 15VDC as R13 is adjusted
- 6.2.189** Verify TP11 = 9.5VDC
- 6.2.190** Verify CR26 Cathode = 9VDC to 15VDC as R25 is adjusted

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- 6.2.191** Verify TP22 = 9.5VDC
- 6.2.192** Verify DB30 = 9.5VDC
- 6.2.193** Set R1 Fully CW
- 6.2.194** Verify TP4 = 9.5VDC
- 6.2.195** Verify DA10 = 9.5VDC
- 6.2.196** Verify CR1 Cathode = 9.5VDC to 15VDC as R2 is adjusted
- 6.2.197** Remove +15VDC from DB1
- 6.2.198** Apply -15VDC to DB2 with Com to DB3
- 6.2.199** Verify DA10 = -7.75VDC
- 6.2.200** Verify CR2 Anode = -7.75VDC to -15VDC as R1 is adjusted
- 6.2.201** Verify DB35 = -2VDC to -1.3VDC as R28 is adjusted
- 6.2.202** Verify DB40 = -9VDC
- 6.2.203** Verify CR25 Anode = -9VDC to -15VDC as R29 is adjusted
- 6.2.204** Verify TP19 = -9VDC
- 6.2.205** Verify CR7 Anode = -9VDC to -15VDC as R27 is adjusted
- 6.2.206** Install J16
- 6.2.207** Verify DB28 = 0 to -15VDC as R17 is adjusted
- 6.2.208** Install J14
- 6.2.209** Verify DB22 = 0 to -15VDC as R6 is adjusted
- 6.2.210** Install J12
- 6.2.211** Verify DB10 = 0 to -15VDC as R15 is adjusted
- 6.2.212** Verify CR18 Anode = -9VDC to -15VDC as R23 is adjusted
- 6.2.213** Verify TP11 = -9VDC
- 6.2.214** Set R4 fully CCW
- 6.2.215** Verify TP14 = -15VDC
- 6.2.216** Verify TP15 = -15VDC (if wrong adjust R14)
- 6.2.217** Verify TP22 = -9VDC
- 6.2.218** Verify CR27 Anode = -9VDC to -15VDC as R24 is adjusted
- 6.2.219** Remove Power
- 6.2.220** Verify CR1 Anode to TP1 = 150K
- 6.2.221** Verify CR2 Cathode to TP1 = 150K
- 6.2.222** Verify CR25 Cathode to DB8 = 0
- 6.2.223** Verify CR7 Cathode to DB12 = 0
- 6.2.224** Verify CR27 Cathode to TP25 = 100K

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6.2.225 Verify CR26 Anode to TP25 = 100K

6.2.226 Verify CR18 Cathode to CR19 Anode = 0

6.2.227 Verify CR16 Anode to CR17 Cathode = 0

6.2.228 Install J42

6.2.229 Verify CR16 Cathode to TP13 = 0

6.2.230 Install J43

6.2.231 Verify CR17 Anode to TP13 = 0

6.2.232 Install J11

6.2.233 Verify DB7-DB11 = 0

6.3 *TEST COMPLETE *****

7. Notes

7.1.1 All measurements are in ohms +-5%, unless otherwise stated

7.1.2 All saddle clamp references assume the DA and DB connectors are on YOUR LEFT.

8. Attachments

8.1 None at this time.