g GE Industrial Systems	**Functional Testing Specification**
Renewal Services ***Louisville, KY***	**LOU-GED-DS3800NTCF**

Test Procedure for a DS3800NTCF Thermocouple Card

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	Monte Starling	9/11/2002
B	Amended 6.3.11 to reference different voltage source	Steve Pharris	9/12/2011
C			

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
Monte Starling	S. Pharris		Robert Durell
DATE	**DATE**	**DATE**	**DATE**
9/11/2002	9/12/2011		09/16/2002

Functional test procedure for a Card

1. SCOPE

1.1 This is a functional testing procedure for a DS3800NTCF Thermocouple Card.

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.

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 the local documented procedures 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 or cracked
  - **4.2.1.2** Terminal strips / connectors broken or cracked
  - **4.2.1.3** Loose wires
  - **4.2.1.4** Components visually damaged
  - **4.2.1.5** Capacitors leaking
  - **4.2.1.6** Solder joints damaged or cold
  - **4.2.1.7** Circuit board burned or de-laminated
  - **4.2.1.8** Printed wire runs 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 189 DMM (or Equivalent)
1		DS3800NTCF Test Box
1		DS3800 Connector Box w/switches
1		Rainbow Interface Box
1		DS3800 Power Supply Box
1		Millivolt Source

6. TESTING PROCESS

6.1 Setup

6.1.1 Connect Rainbow Box, DS3800 Connector Box w/switches and DS3800 Power Supply together. Connect power cord to Power Supply. If you are using a Rainbow Box that does not say (Do not use on ATE) make sure switch 95 and 96 on DS3800 Connector Box are in the center position. These switches should not be moved during the test, a short might result. Connect Banana Jumpers on Rainbow Box from **PA1** (DCOM) to **PA9** (ACOM).

6.2 Testing Procedure (Pretest calibration)

6.2.1 Connect **JA13** and **JA14** together and then tie them to **ACOM** (TP6) on front edge of card. Use Mini Grabbers; keep lead length as short as possible.
6.2.2 Connect Berg jumpers **J5-J8** and turn on power supply.
6.2.3 Adjust **R201** for **0 +/-.5 millivolts** at **TP5** with respect to **ACOM** (TP6).
6.2.4 Remove jumper **J8** and connect **J9**.
6.2.5 Adjust **R200** for **0 +/-.5 millivolts** at **TP4** with respect to **ACOM** (TP6).
6.2.6 Remove jumper **J9**.
6.2.7 Adjust **R202** for **0 +/-.5 millivolts** at **TP3** with respect to **ACOM** (TP6).
6.2.8 Remove Jumpers **J5-J7,** remove connections at **J13, J14** and **ACOM**.

6.3 Testing Procedure (After calibration)

6.3.1 Connect test box to **JA** connector making sure **Channel 15 Switch** is in the open position.
6.3.2 Make sure **JA15 +15 Volts Output LED** is glowing on test box.
6.3.3 Make the following connections on the Rainbow Interface Box.

PA81 to PA74	PA82 to PA72	PA83 to PA76	PA84 to PA78	PA85 to PA80

6.3.4 Set switches on front of DS3800 Connector Box w/switches to the following positions.

SW81	SW82	SW83	SW84	SW85
0	0	0	0	1

6.3.5 Individually select each of the following 16 channels while measuring the voltage output at **TP3** with respect to **ACOM** (TP6). Ideally voltage at **TP3** should measure **0 +/-1 millivolt max.** For each channel. If voltage on all channels is not within specified tolerance, adjust **R202** to minimize error on all channels. If all channels cannot be brought into tolerance by adjusting **R202,** you will most likely need to replace multiplexers (U1, U2) or OP-AMPS (U3-U5) to correct problem. If any components need to be replaced, you should go back through calibration procedure before proceeding. *Note: If you have to change parts after making switch connections on Rainbow Box, make sure you place all switches in the floating (center) positions before attempting to recalibrate.*

CHANNEL	SW81	SW82	SW83	SW84
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

6.3.6 Remove DS3800NTCF test box from **JA** connector.

6.3.7 Connect **TP1** and **TP2** together and then tie them to **ACOM** (TP6) on front edge of card. Use Mini Grabbers; keep lead length as short as possible.

6.3.8 Place switch **85** into the **'0'** low position.

6.3.9 Measure and record voltage at **TP3** with respect to **ACOM** (TP6).

6.3.10 Remove jumpers between **TP1**, **TP2** and **TP6**, place switch **85** back into the **'1'** high position.

6.3.11 Using the Millivolt source, apply **+46.232 millivolts D.C.** to **JA19** with respect to **JA20**. (**The Fluke 5500A will not source enough current for this step to function properly)** Select channel **'0'** by placing switches **81**, **82**, **83** and **84** into the **'0'** low position. Make sure switch **85** is in the **'1'** high position. Adjust **R203** for **+10.0000 VDC** at **TP3**, plus voltage recorded in step **6.3.9**. *Example: Step 6.3.9 measurement = -3.0 millivolts. Adjust R203 as follows.+10.0000 VDC plus -.003 millivolts = +9.9970 VDC.*

6.3.12 You may want to try several inputs to verify that channels change properly.

6.3.13 Seal all pots and placed Berg jumpers in the store (not connected) position.

6.4 ***TEST COMPLETE ***

7. NOTES

7.1 None at this time.