g GE Energy ***GE Energy*** ***Parts & Repair Services*** ***Louisville, KY***	**Functional Testing Specification** **LOU-SSB-DGNR**

Test Procedure for an SSB DGNR DC Speed Controller

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release – Converted from SSB procedure	R. Duvall	2/11/09
B	Added SCR module and Diode module checks to "test process" flow chart. Added information in the Notes section to describe replacing SCR modules and also GE Wind part numbers for main control boards	E. Rouse	2/13/09
C	Added repaired part numbers to section 7	C. Wade	9/3/2009
D	Added step 6.3.1.3, 500 ohms between Pin 16 & Pin 17.per G. Chandler	C. Wade	12/16/2009
E	Added steps 6.2.1.1, adjusting 3-phase panel before connecting, steps 6.3.2.3.2, changed voltage reading to + & - 70V, steps 6.3.2.4.4.1 run unit for 30 minutes to burn-in unit on tester.	J. Hardin	4/12/2012

PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
Robert Duvall	E. Rouse		Charlie Wade
DATE	**DATE**	**DATE**	**DATE**
2/11/2009	2/19/2009		2/19/2009

1. SCOPE

1.1 This is a functional testing procedure for a SSB DGNR DC Speed controller.

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** Referenced in Section 8
- **3.1.2** Check 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 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, 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

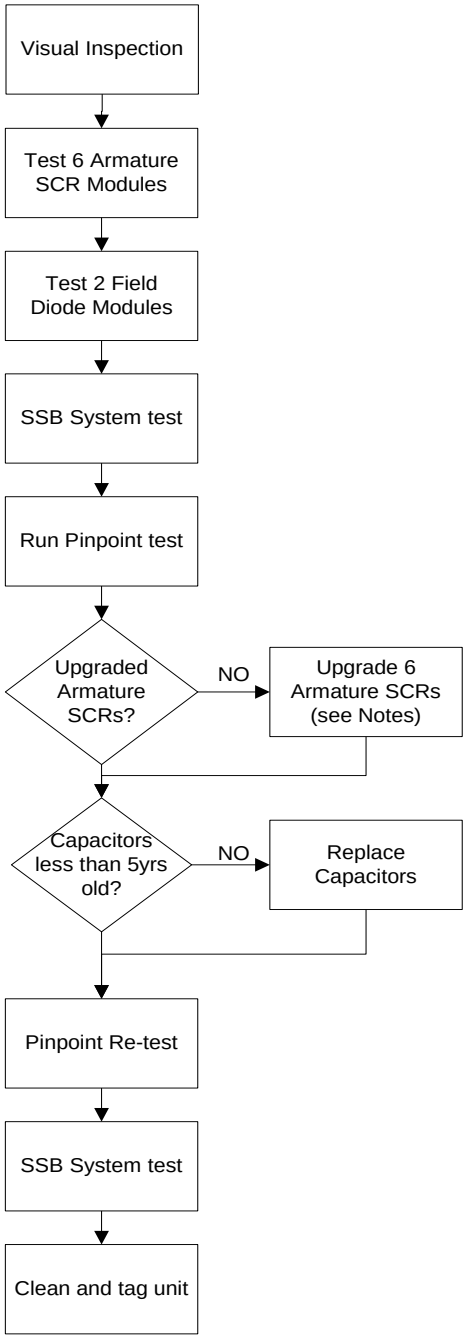
5. EQUIPMENT REQUIRED

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	H188715	DGNR factory test fixture
1	H188687	Pinpoint system w/ DGNR test box
1		Multimeter (Fluke 85 or equivalent)

6. TESTING PROCESS

6.1 Overview



6.2 Setup

6.2.1 Pinpoint test system

6.2.1.1 It is recommended that the control card be tested on PP2 before changing out capacitors and installing into assembly.

"Pinpoint DGNR test requirements.xls"

6.2.1.2

Note: The factory tester is not a complete module test. It is only to be used in conjunction with the Pinpoint Test System.

6.2.1.3 Replace SCRs if necessary.

6.2.1.4 Replace Capacitors if necessary.

6.2.1.5 Setup instructions given during automated test.

6.3 Testing Procedure

6.3.1 Testing Armature SCR Modules and Field Diode Modules

6.3.1.1 SCR Module Checks - Using a multimeter, verify the following:

POSITIVE LEAD		NEGATIVE LEAD	MEASUREMENT
Pin 1 L1	TO	Pin 4 SCRBNK1	OPEN
Pin 1 L1	TO	Pin 5 SCRBNK2	OPEN
Pin 2 L2	TO	Pin 4 SCRBNK1	OPEN
Pin 2 L2	TO	Pin 5 SCRBNK2	OPEN
Pin 3 L3	TO	Pin 4 SCRBNK1	OPEN
Pin 3 L3	TO	Pin 5 SCRBNK2	OPEN

6.3.1.2 Diode Module Checks - Using a multimeter, verify the following:

POSITIVE LEAD		NEGATIVE LEAD	MEASUREMENT
Pin 12 Anode D1	TO	Pin 14 Cathode D1	.500V 1.6M ohms +/- 10%
Pin 13 Anode D1	TO	Pin 14 Cathode D1	.500V 1.6M ohms +/- 10%
Pin 15 Anode D2	TO	Pin 12 Cathode D2	.500V 1.6M ohms +/- 10%
Pin 15 Anode D2	TO	Pin 13 Cathode D2	.500V 1.6M ohms +/- 10%

6.3.1.3 On G1-04-00*33 (DGNR-030S) verify 500 ohms +/- 5% between Pin 16 & Pin 17.

6.3.1.4 Verify the part numbers of the installed SCR modules. If they are not MCC 44-16IO1B, they must be replaced after initial testing.

6.3.2 SSB Factory Tester

6.3.2.1 Current Test – must be equal across all three phases and read no more than 30mA.

6.3.2.1.1 Set main switch to “ON” position.

6.3.2.1.2 Press the “Test on” pushbutton

6.3.2.1.3 Verify “Current electronic” meters read less than 30 mA.

6.3.2.2 Relay Output Test

6.3.2.2.1 Adjust “Speed” potentiometer to 50% (0 rpm)

6.3.2.2.2 Adjust “Current” potentiometer to 0% (0 Amps)

6.3.2.2.3 Switch the “Start release” switch to the ON “1” position and verify the “Start release” lamp illuminates.

6.3.2.3 Speed Control Test – 15V thruster cards

6.3.2.3.1 Adjust “Current” potentiometer to 100%

6.3.2.3.2 Adjust “Speed” potentiometer to 100% and verify a reading of +70V +/- 10% on the “Voltage Tacho” meter.

6.3.2.3.3 Adjust “Speed” potentiometer to 0% and verify a reading of -70V +/- 10% on the “Voltage Tacho” meter.

6.3.2.3.4 Adjust “Speed” potentiometer to 50%

6.3.2.4 Dynamic Current Test and Synchronous Power Supply Test

6.3.2.4.1 Adjust “Current” potentiometer to 0%

6.3.2.4.2 Adjust “Speed” potentiometer to 100%

6.3.2.4.3 Press the “Close Brake” push button for 7-12 seconds while adjusting “Current” potentiometer from 0% (0 Amps) to 100%

6.3.2.4.3.1 Verify that the “Armature current” meter fully deflects for approximately 7 seconds then falls back to the continuous current position of 60 Amps.

6.3.2.4.4 Press the “Close Brake” push button and slowly adjust “Current” potentiometer from 0% (0 Amps) to 100%

6.3.2.4.4.1 Verify that the “Current Power Supply” meters are synchronous.

6.3.2.4.4.2 Full C @ 100 adjust speed quickly from 100R to 100F.

6.3.2.4.4.3 50% @ speed D18 should come on @ 10% current.

6.3.2.4.4.4 Run 30 minutes, 80% speed & 20% current in both directions.

6.4 ***TEST COMPLETE ***

7. NOTES

GE Wind Part Numbers for complete DGNR Speed Control Units

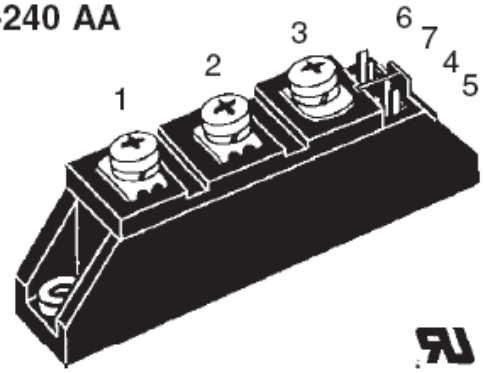
Model Number	Description	Mounting	GE Wind Part # (new)	Supplier Part Number	GE Louisville Repair Number
DGNR-30S	DC Speed Control	Surface Mount	T56225811954	G1-04-00*33	107W7440R002
DGNR-30Z	DC Speed Control (15V)	Recessed mount	UX5670010511 Changed to 104W4233P001	G1-04-00*47	104W4233R002
DGNR-30Z	DC Speed Control (30V)	Recessed mount	UX59901000844 Changed to 391A9302P001	G1-04-00*34	391A9302R001

Additional GE Wind Part Numbers

Description	GE Wind Part Number
Main board for 15V DGNR Speed Controller	UX59901000460
Main board for 30V DGNR Speed Controller	UX59901000599

SCR MODULE INFORMATION

TO-240 AA



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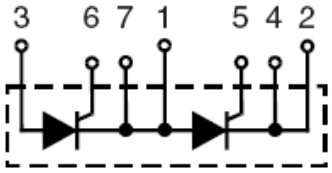
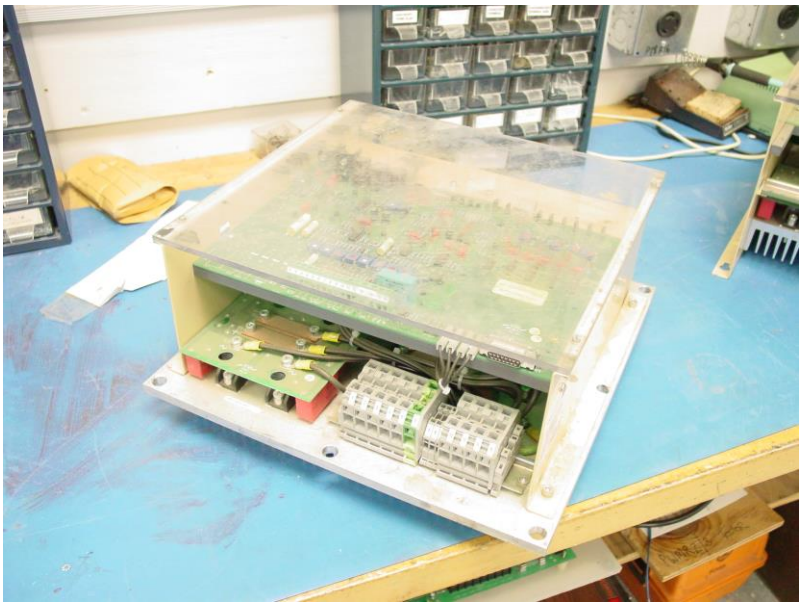


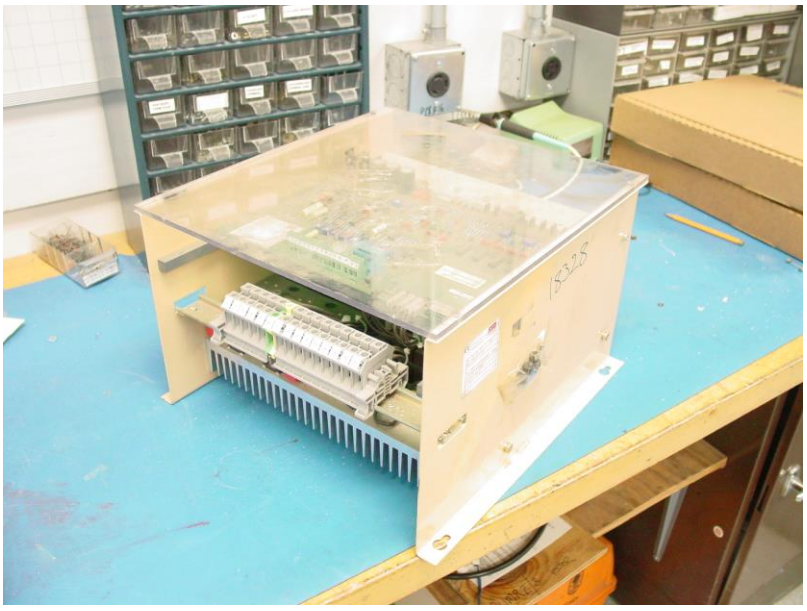
	Voltage Rating		Current Rating	
Part #	**Vdsm**	**Vdrm**	**@ 75c**	**@ 85c**
MCC 26-12 IO1B	1300	1200	32	27
MCC 26-14 IO1B	1500	1400	32	27
MCC 26-16 IO1B	1700	1600	32	27
MCC 44-16 IO1B	1700	1600	51	49

If the unit in for repair has any armature SCR modules that are of the first three part numbers listed above, it is mandatory that they be replaced with the fourth part number listed because it has a much higher current rating (49 amps at 85c) to prevent heat failures in the field.

DGNR-30Z – Recessed Mount



DGNR-30ZS– Surface Mount



8. ATTACHMENTS

8.1 Factory Test Procedure – for reference only "operating instructions thyristor

8.2 Unit Operating Instructions - doc_1363432.pdf

8.3 MCC26 SCR datasheet – L073.pdf

8.4 MCC44 SCR datasheet – L074.pdf