



GE Energy

Functional Testing Specification

Parts & Repair Operations
Louisville, KY

LOU-GEF-RLV01/02

Test Procedure for RLV01 and RLV02 Printed Circuit Boards

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DATE 1/02/2009	DATE	DATE	DATE 1/2/2009

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Functional test procedure for RLV01 and RLV02 Resolver Printed Circuit Boards

1. SCOPE

1.1 This is a functional test procedure for testing the MC2000 44A91301-G01RLV01 and 44A719301-G02RLV02 printed circuit boards.

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	GEK-25382	Maintenance & Troubleshooting
3.1.2	GEK-25381	Startup & Adjustments
3.1.3	GEK-25391	System Diagrams
3.1.4	GIT-200	TAB12 Diagnostic Software
3.1.5	44C719624	RLV01/02 Elementary

4. ENGINEERING REQUIREMENTS

4.1 Description

4.1.1 The RLV01/02 board provides an interface between resolver, which is, mounted external to the numerical control and axis boards that are located in the control's logic rack.

4.2 Equipment Cleaning

4.2.1 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.

4.3 Equipment Inspection

4.3.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:

- 4.3.1.1** Wires broken or cracked
- 4.3.1.2** Terminal strips / connectors broken or cracked
- 4.3.1.3** Loose wires
- 4.3.1.4** Components visually damaged
- 4.3.1.5** Capacitors leaking
- 4.3.1.6** Solder joints damaged or cold
- 4.3.1.7** Circuit board burned or de-laminated
- 4.3.1.8** 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	MC2000 Control	Test Control with Axis cart
1	Factory Diagnostics Bubble Board	Diagnostic Software
1	MB3 7.59MC Bubble Board	7.59MC Software
1		Oscilloscope

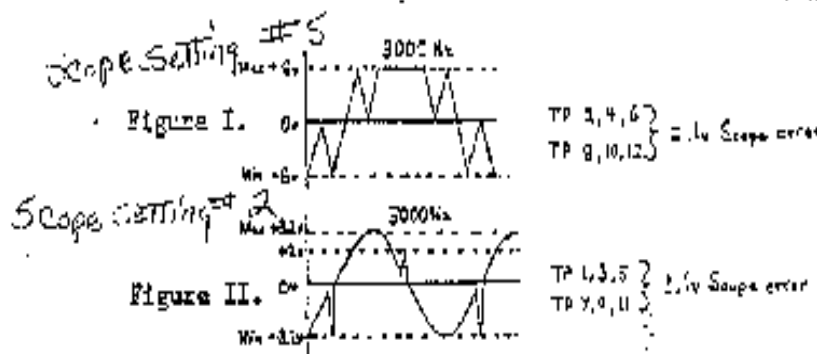
6. TESTING PROCESS

6.1 Test Axis Resolver Test

- 6.1.1 Ensure power is OFF by depressing the "Red Off" push button on the NCCS and that the motion cart power switch is off
- 6.1.2 Remove known good board (KGB) and insert the board under test (BUT).
Make the following connections.
 - 6.1.2.1 Plug 1PL from RLV01 into Axis 1PL
 - 6.1.2.2 Plug resolver cable into RLV01 3PL, 4PL, and 5PL.
- 6.1.3 Turn MC2000 Control on by depressing "Green On" push button on the NCCS
 - 6.1.3.1 A "Power Up Diagnostics" should be displayed on the NCCS, then "System Loading" will be displayed, next "Mark Century 2000 Service Diagnostics Initialization" will appear.

NOTE: All LEDs on the boards in the logic rack should be on. If any LED fails to come on, turn power off and then back on. If any LED still fails to come on at the end of this time, turn power off and remove BUT. Check logic rack with KGB. If system works with KGB then BUT is bad.

- 6.1.3.2 Check Resolver Waveforms for Axis1, 2, and 3, at test point TP2, TP4, TP6 for Figure I and TP1, TP3, TP5 for Figure II. Note you may have to turn Axis to get the correct waveforms.



- 6.1.3.3 Depress any key to continue.

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- 6.1.4 “Factory Test Diagnostics” menu page will be displayed.
- 6.1.5 Select “Axis Processor Test” using the cursor control and push “Enter” key.
The “Axis Processor Service Diagnostics” screen will be displayed.
- 6.1.6 Turn on Axis Motion Cart Power switch ON at this time.
- 6.1.7 Select “Single Board Axis Test”
 - 6.1.7.1 Set counters on motion cart to zero
 - 6.1.7.2 Enter “1” for number of repetitions.
 - 6.1.7.3 Enter board number to be tested.
 - 6.1.7.4 Depress “enter”.
 - 6.1.7.5 Watch motors on motion cart. All motors should turn at the same speed and at the same time. Motors should run smoothly.
 - 6.1.7.6 Count on counters should be +- 1 count at end of test.
 - NOTE: If BUT does not meet specifications, BUT is bad.**
 - 6.1.7.7 Select “Single Board Axis Test “ run test for 100 times.
 - 6.1.7.8 If test passed, then continue to next test.
- 6.2 Part Program Test
- 6.3 Depress Cancel and turn CPU Switch to center position then depress Cancel “do you want to reboot (y/n) depress “y” push button on no keyboard, MB3 Program should load.
 - 6.3.1 Once control is up and on line with the 7.59MC application, select “INDEX” on the white keys at the top of the keyboard. This should cause the control to display two or three part programs, select “MCLOOP Program” with the gray buttons, and then press POSN, one of the white keys. This should take you back to the position page.
 - 6.3.1.1 Turn on axis cart and enable drives.
 - 6.3.1.2 Press Control On again, this will lock in drives from control.
 - 6.3.1.3 Press “Auto” and then “Cycle Start” and drive should begin to move and will continue until they are interrupted by pressing “Cancel or Clear” or removing power. Run Part Program Test for 3 hours.
 - 6.3.1.4 When complete turn off Axis Motion Cart and MC2000 Control.
This completes Test for RLV02, Continual on with the Test for RLV01.
 - 6.3.1.5 Remove Resolver cable 1PL from RLV01 and plug it into 2PL.

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- 6.3.1.6 Remove Resolver cables from 4PL, 5PL, and 6PL and plug them into 6PL, 7PL, and 8PL.
- 6.3.2 Turn MC2000 Control on by depressing “Green On” push button on the NCCS
 - 6.3.2.1 A “Power Up Diagnostics” should be displayed on the NCCS, then “System Loading” will be displayed, next “Mark Century 2000 Service Diagnostics Initialization” will appear.
 - 6.3.2.2 Check Resolver Waveforms for Axis4, 5, and 6, at test point TP8, TP10, TP12 for Figure I and TP7, TP9, TP11 for Figure II. Note you may have to turn Axis to get the correct waveforms. As in 5.2.3.2
 - 6.3.2.3 Select “Axis Processor Test” using the cursor control and push “Enter” key.
- 6.3.3 Select “Single Board Axis Test”
 - 6.3.3.1 Enter “1” for number of repetitions.
 - 6.3.3.2 Enter board number to be tested.
 - 6.3.3.3 Turn off axis cart inhibit switch.
 - 6.3.3.4 Set counters on motion cart to zero (when prompted) and depress any key.
 - 6.3.3.5 Watch motors on motion cart. All motors should turn at the same speed and at the same time. Motors should run smoothly.
 - 6.3.3.6 Count on counters should be +- 1 count at end of test.
 - 6.3.3.7 Select “Single Board Axis Test “ run test for 100 times.
 - 6.3.3.8 If test passed, then continue to next test.
- 6.3.4 Test Part Program
 - 6.3.4.1 Depress Cancel and turn CPU Switch to center position then depress Cancel “do you want to reboot (y/n) depress “y” push button on no keyboard, MB3 Program should load.
 - 6.3.4.2 Once control is up and on line with the 7.59MC application, select “INDEX” on the white keys at the top of the keyboard. This should cause the control to display two or three part programs, select “MCLOOP Program” with the gray buttons, and then press POSN, one of the white keys. This should take you back to the position page.
 - 6.3.4.3 Turn on axis cart and enable drives.
 - 6.3.4.4 Press Control On again, this will lock in drives from control.

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6.3.4.5 Press “Auto” and then “Cycle Start” and drive should begin to move and will continue until they are interrupted by pressing “Cancel or Clear” or removing power. Run Part Program Test for 3 hours.

6.3.4.6 When complete turn off Axis Motion Cart and MC2000 Control.

6.4 *TEST COMPLETE *****

7. NOTES

7.1 Card can be run in either MC2000 control.