g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GEF-THC1x**

Test Procedure for THC1x Printed Circuit Board

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Functional test procedure for THC1 Printed Circuit Board

1. SCOPE

1.1 This specification provides the Engineering Requirements for testing the THC1 printed circuit board. The process applies only to THC1 boards model number 44A399742-G01.

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-36093**	Diagnostic Software for 1050T Controls
3.1.2	**GEK-71632**	Diagnostic Software for 1050MC Controls
3.1.3	**GEK-45668**	Computer Access Panel
3.1.4	**44C288517**	Schematics
3.1.5	**GEK-71700D**	Board Strapping for 1050 PCB.

4. ENGINEERING REQUIREMENTS

4.1 Description

4.1.1 The Thread-cutting Board (THC1) is used in the 1050 Control it generates 1000 pulses per revolution from a resolver transducer coupled with the spindle. The THC1 board is functionally divided into 10 main areas Transducer Excitation, Supervisory Processor Interface, Delta Angle Calculation, Spindle RPM Calculation, Digital Filter Circuitry, Variable Lead DDA, THC1 Data Output, Reversal Error, MFO Circuitry, and Diagnostics.

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	GE 1050T	CPU3 Model
1	GE Computer Access Panel	External Interface
1	Diagnostic Tape Specific to Control	Diagnostic Tape
1	Executive Tape Specific to Control	Executive Tape
1	Part Program	Exercise Tape
1	Axis Cart	Motion Cart for Control
1	HP 3478A	Multimeter

6. TESTING PROCESS

6.1 Diagnostic Test

6.1.1 Configure the THC1 Circuit Board as to 1050 Board Strapping THC1*1 1050T.

6.1.2 Load the third section of the Diagnostic Tape.

6.1.2.1 Once the tape is fully loaded it will rewind back to the beginning (Before Test No. 1). The Display should show: Push Control OFF, then ON, and follow the instructions at this time. If the Cap Panel is hooked up you will also have to hit the RUN switch to start the control's program.

6.1.2.2 Depress Option Stop "OPTN Stop" to start Diagnostics the depress cycle start to test boards in 1050T. After aboard 1 to 2 hours depress Option Stop to halt Test.

6.1.3 Setup the control for operator control diagnostics.

6.1.3.1 Press NEXT, then 2, then Cycle Start. Alphanumeric characters should scroll on the display and the Option STOP lamp should flash.

6.1.3.2 Press Cycle Start button until display stops scrolling. Press Cycle Start button again until the Option Stop push button quits flashing.

6.1.3.3 Go to THC1*1 Test 22, Depress Next then Option Stop.

1. Test MFO Turn MFO Pot (% Feed-rate) on control from 0 to 120 MFO Numbers on Display should go from 01 at 0% to F6 at 120%
2. Test X RE and Z RE (error switches on THC1 board). All switches off output on display will be X RE 00 and Z RE 00 as you turn on each switch the X RE and Z RE displays will count from 00 to 7F.

Note refer to GEK-36093 THC1* 20-24 Test for information.

6.1.3.4 Go to the Spindle portion of this test by hitting the Next and Option Stop push buttons until the display shows spindle angle on the screen. With spindle disabled, physically turn the spindle servo and you should see the spindle angle on the display count up or down with the first three digits on the right. Reverse direction of the motor and you should see the same thing occur. Power down.

6.2 Functional Test for Spindle Test.

6.2.1 Load Executive Tape. Turn off Software Load Switch and display should read 44S287840-C5L. Turn off control and then turn control on. Connect Meter Leads to Analog Spindle and Spindle Com. Press control on again to get unit out of an E-Stop condition. Balance spindle by adjusting P2 on PERI, you should read zero volts on the multimeter when the spindle is balanced. Enable Axis Cart.

6.2.2 Turn Mode switch to MDI and Display switch to Program Edit, enter M03, then S1000, then press Cycle Start. Switch the Display Switch back to status to see what is happening. Be sure spindle pot is turned to 100%. Spindle should now be running, Turn Gain Adjust P1 on PERI to @ +2.5V Spindle Speed on Display should read @1000 RPM.

6.2.3 Turn Spindle Speed Pot on Control RPM should vary +/- as you adjust from 85% to 115%.

6.2.4 Switch back Display Switch to Program Edit and enter M04 from keyboard, then press Cycle Start. Switch Display Switch back to status to see what is occurring with the control. This checks the Spindle RPM in the opposite direction meter should read @-2.5V.

6.2.5 Now turn Display Switch back to Program Edit, enter S2500 from keyboard, press Cycle Start. Spindle should increase to 2500rpms and voltage should read about 6V at the spindle jacks. Turn Display Switch to status to see what is occurring, you should see plus or minus 50rpms.

6.2.6 Switch back Display Switch to Program Edit and enter M03 from keyboard, then press Cycle Start. This checks the speed of the spindle in the opposite direction. Switch Display Switch back to status to see what is occurring with the control.

6.2.7 You can stop the spindle at any time by entering M05 and Cycle Start when located on the Program Edit page. After stopping spindle remove executive tape and load in Long Part Program tape.

6.2.8 Run Part Program Tape by switching Mode Switch back to Auto, enabling the entire Axis's, and pressing Cycle Start. Switch Display Switch to Status and monitor the display to see that the spindle cycles through different speeds (500, 1000, 1500, and 2500) and directions (FWD and REV) on display. This tape usually runs about 2 hours. When done with tape, shut down control and remove disconnect meter, reinstall control's original board.

6.3 ***TEST COMPLETE ***

7. REFERENCES

7.1 None at this time