



GE Energy

Functional Testing Specification

Inspection & Repair Services
Louisville, KY

LOU-GEF-AC200 4 Axis PS

Test Procedure for AC200 4 Axis Power Supply

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	C. Wade	06/06/2005
B	Updated the test to reflect differences between how the test gets performed on the current test fixture as opposed to how the test used to get performed before there was a formal test fixture. Revised grammar. Added missing steps. Revised order of operations.	C. Edlin	07/09/09
C	Added note to section 7.3 on temperature sensors	C. Wade	5/28/2013
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DATE 06/06/2005	DATE 07/09/2009	DATE	DATE 07/09/2009

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Functional test procedure for AC200 4 Axis Power Supplies

1. SCOPE

- 1.1 This is a functional test procedure for testing an AC200 4 Axis Power Supply. The process applies only to 4 Axis Power Supplies 44A963225-G01/G02/G04.

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.
- 3.2 **GEK-83477 Instruction Book for AC200 Instruction Manual**
GEK-25393 Instruction Book for AC200 Application Manual
44C962970 Drawing & Mod instructions for 4-Axis PS W/Soft Start Installed

4. ENGINEERING REQUIREMENTS

4.1 Description

- 4.1.1 The AC200 servo and spindle drives are multi-axis high performance velocity controller to power an ac squirrel cage induction motor. The servo induction motor combination is often used as a position controller in which a position error discriminator supplies the velocity command. The spindle drive can stand alone or used in combination with one or more servo drives. Combination systems using up to four AC200 drives may be mounted in one rack and operated simultaneously from one power supply.

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.

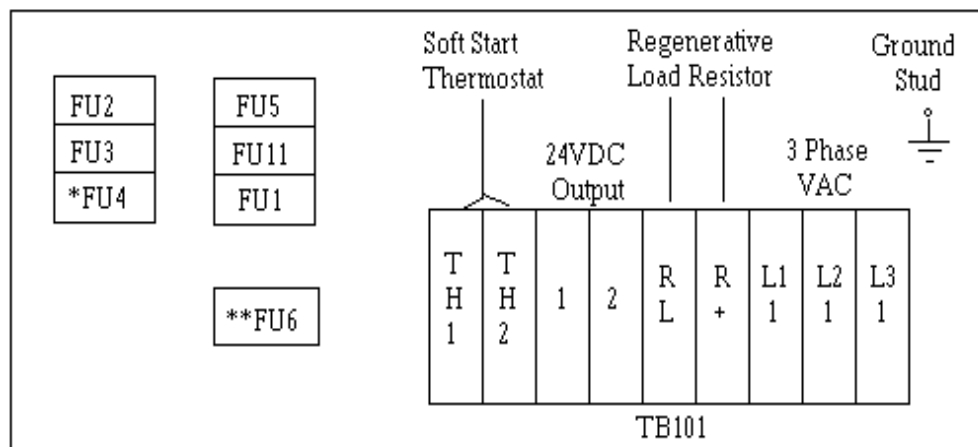
Qty	Reference #	Description
1	H033742	AC200 4 Axis Power Supply Test Fixture
1	Oscilloscope	Oscilloscope
1	DVM	Set for AC
1	DVM	Set for DC
1	Hand-held DVM	For measuring the 24VDC output

6. Testing

6.1 Static Test

6.1.1 Verify proper fuse values. See Table below.

FU-2	4 Amp 600 Volt	All Units
FU-3	15 Amp 600 Volt	All Units
FU-5	3 Amp 250 Volt	All Units
FU-6	10 Amp 600 Volt	G02 & G04
FU-4	1 Amp 600 Volt	G04 only
FU-11	5 Amp 250 Volt	All Units
FU-1	5 Amp 250 Volt	All Units



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6.2 Connections

- 6.2.1 Connect the ground cable of the fixture to the chassis of the PS.
- 6.2.2 The incoming power cables of the fixture are the black, white and red cables.
- 6.2.3 Connect the incoming power cables of the fixture to the Terminal-Block (TB101) inputs of the PS in the following fashion.
 - 6.2.3.1.1 Red to L1-1:
 - 6.2.3.1.2 White to L2-1:
 - 6.2.3.1.3 Black to L3-1:
- 6.2.4 The yellow and orange cables are the cables for the regenerative load resistor.
- 6.2.5 Connect the regenerative load resistor cables to the Terminal-Block at terminals RL and R+.
- 6.2.6 If the PS being tested contains the 24-volt option, connect the 24-volt load to the Terminal-Block at terminals 1 and 2.
- 6.2.7 There are four axis plugs on the fixture and four on the PS.
- 6.2.8 The axis plugs are labeled Slot-1, Slot-2, Slot-3 and Slot-4.
- 6.2.9 Connect the axis plugs of the fixture to the slot plugs of the PS accordingly.
- 6.2.10 Connect the scope to the 80KHz signal output (located on the right side of the fixture).
- 6.2.11 Set the scope for 5V/division and 2uSec/division.
- 6.2.12 The cables to which each DVM gets connected, exit the fixture from the top.
- 6.2.13 The black and white pair is for AC. The black and red pair is for DC.
- 6.2.14 Connect the AC DVM in the following fashion.
 - 6.2.14.1.1 Black to common:
 - 6.2.14.1.2 White to hot:
- 6.2.15 Connect the DC DVM in the following fashion.
 - 6.2.15.1.1 Black to common:
 - 6.2.15.1.2 Red to hot:

6.3 Power Up

- 6.3.1 The AC adjustment knob is located on the bottom front of the fixture.
- 6.3.2 Ensure that the AC adjustment is set to 0VDC.
- 6.3.3 If the PS has a regenerative load fuse (FU-3), remove it.
- 6.3.4 This step applies only if the PS contains the optional Soft-Start relay. **Note: If there is an error in the Soft-Start circuit the Soft-Start resistor will burn.** Listen for the Soft-Start relay to energize upon power up.
- 6.3.5 Turn on the AC power.
- 6.3.6 As you monitor the AC input and DC busses, slowly adjust the AC voltage to 230VAC. **Note: If the PS growls or otherwise sounds like it is binding, stop the test and verify proper internal board connections.**
- 6.3.7 Verify that the 325VDC buss steps up along with the 230VAC buss.
- 6.3.8 If the PS contains the optional 24VDC output, ensure that the 24VDC output measures 24VDC at the Terminal-Block terminals 1 and 2.
- 6.3.9 This step applies only if the PS contains the optional Soft-Start relay. Listen for the relay to de-energize upon power down.
- 6.3.10 Turn the power off.
- 6.3.11 With FU-3 removed the 325VDC buss holds a charge and thus drains slowly.
- 6.3.12 **Do not touch the fuse receptacle until the 325VDC buss has drained to 0VDC.**

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6.4 Test capacitor Fast Discharge Circuit

- 6.4.1** Once the 325VDC buss has drained to 0VDC, replace FU-3.
- 6.4.2** Turn on the AC power.
- 6.4.3** Ensure that the 325VDC Buss comes up to 325VDC almost immediately.
- 6.4.4** When the power gets turned off, ensure that the 325VDC buss drops to 25VDC almost immediately.
- 6.4.5** Turn the power off.

6.5 Check the 80KHz signal.

- 6.5.1** Turn on the AC power.
- 6.5.2** Using the selector switch (located at the 80KHz signal output), ensure that a 32V P-P, 80KHz square wave is present for each of the four axis plugs.

6.6 Test regenerative circuits.

- 6.6.1** When the regenerative load circuit turns on, you can hear the load resistor begin to click.
- 6.6.2** Once you hear the clicking of the load resistor, be steadfast in adjusting the AC voltage back down. This is because allowing the regenerative load circuit to be active for too long can burn out the PS.
- 6.6.3** Slowly raise the AC voltage until the DC buss output measures approximately 380VDC or until you hear the load resistor begin clicking (whichever comes first).
- 6.6.4** Immediately readjust the AC input back down to 230VAC.
- 6.6.5** If the PS passed all previous testing, staying within the immediate vicinity to ensure no mishaps occur, allow the unit to burn in for 1 hour.

6.7 *TEST COMPLETE *****

7. NOTES

- 7.1** It is important that the 80KHz output signals are as high as possible. When this supply gets connected into a system and the servos get energized, the load of the servos causes the amplitude to drop slightly. If it starts at too low of an amplitude, when the voltage drops, it will cause one or two of the servos to trip out.
- 7.2** When dealing with a G02 or G04 power supply, be sure the modification is done to the wiring on the front panel. See the drawing in the AC200 power supply book. The modification has been done to most units. However, there are still some units lingering in the industry, which have not had the modification. Here is an easy way to see whether or not this has been done is. If there is a wire on the left side connecting FU2 & FU3 the mod has not been done. This is OK on a G01, but they have been separated on G02 and G04 units.
- 7.3** Starting May 24 2013, add temperature sensors to all 3-axis power supplies. This shall be done for at least the next year and reviewed yearly after that.

8. NOTES

- 8.1** None at this time