

<p>LOU-GEF-AC200 Servo REV. E</p>	<p>g</p> <p>GE Energy Parts & Repair Operations Louisville, KY</p>	<p>Page 2 of 7</p>
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Functional test procedure for AC200 Servo Drive

1. SCOPE

- 1.1 This is a functional test procedure for testing AC200 Servo Drives. The process applies only to AC200 Servo Drives model numbers 44A963095-G02, G03, G04 and 44A963385-G02, G03, G04, G05. The 44A963385-G04 has an ACCB2 board versus the 44A963095-G04 that has an ACCB1 card. The ACCB2 has tighter tolerances than the ACCB1 card, but they are tested the same when installed into an assembly.

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

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**

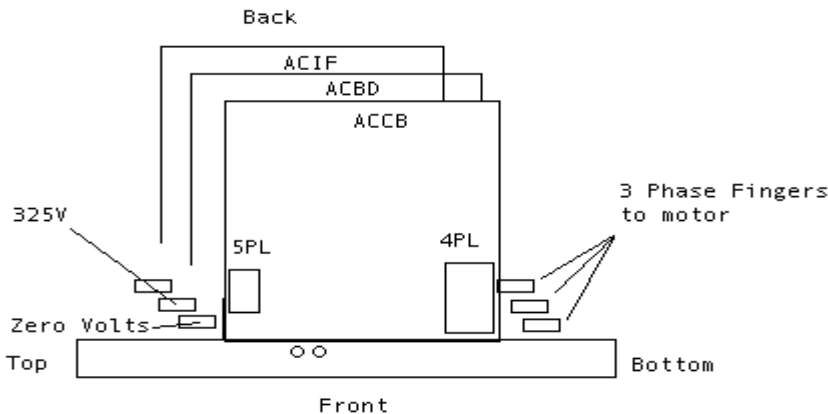
5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.

Qty	Reference #	Description
1	AC200 Manual Servo Drive Test Stand	Test Fixture
2	Digital Volt Meter	Multimeter
1	Oscilloscope	Oscilloscope
1	MC2000/AC200 control with motors	For Exercising Drives

6. **TESTING**

6.1 **Static Test:**

- 6.1.1** Check all 3-power modules on servo drive for shorts.
- 6.1.2** If a power module is shorted, replace module and check for damage on ACBD card.
- 6.1.3** The list below shows approximate values that will help identify shorted power modules.



- 6.1.4** This is a typical check to catch any shorted power modules.
- 6.1.5** These checks were made with a Fluke meter (Fluke 77) using the diode scale across the finger contacts of the drive.

		Approximate Value
Red Lead on 0 volts	Black Lead on Phase 1	.38
	Black Lead on Phase 2	.38
	Black Lead on Phase 3	.38
Red Lead on 325V	Black Lead on Phase 1	Open
	Black Lead on Phase 2	Open
	Black Lead on Phase 3	Open
Black Lead on 0 volts	Red Lead on Phase 1	Open
	Red Lead on Phase 2	Open
	Red Lead on Phase 3	Open
Black Lead on 325V	Red Lead on Phase 1	.38
	Red Lead on Phase 2	.38

Red Lead on Phase 3 **.38**

Red lead to 0 volts **.65**
Black lead to 0 volts **Open**
Black lead to 325 volts,
Red lead to 325 volts

6.2 Manual Tester (AC200 Servo Drive):

6.2.1 Test jumpers should be set on the drive to the following.

JP2	1-2	JP6	2-3	JP10	1-3
JP3	1-2	JP7	1-3	JP11	1-3
JP4	1-2	JP8	1-2	JP12	1-2
JP5	1-2	JP9	1-2	JP13	1-2

6.2.2 The personality module is the chip, which gets installed into the U24 socket of the ACCB card.

6.2.3 Install personality module and connect 4PL and 5PL to drive according to the following table.

25 Amp Servo Drive	44A963085-G07	30 Frame
50 Amp Servo Drive	44A963085-G09	180 Frame
75 Amp servo Drive	44A963085-G12	180 Frame
100 Amp Servo Drive	44A963085-G27	180 Frame

6.2.4 Connect scope and meter common to the backside of C211.

6.2.5 Turn the power on.

6.2.6 All LEDs should turn on.

6.2.7 Verify the following voltages.

3PL-5 + 5 volts	3PL-6 -5 volts	3PL-8 +11 volts
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6.2.8 Remove the berg jumper from JP2.

6.2.9 Check pin 2 of JP2 for zero volts.

6.2.10 Attach scope probe and positive meter lead to TP13 (VCO).

6.2.11 Adjust P4 so that a saw-tooth wave appears on the scope and the meter reads a voltage of approximately 1.2 volts at TP13.

6.2.12 Null VCO by adjusting P4 down to -.22vdc.

6.2.13 Turn the power off.

6.2.14 Reinstall the berg jumper to JP2 in the 1-2 position.

6.2.15 R210 is between TP11 and JP2.

6.2.16 Connect a meter from ground to the backside of R210.

6.2.17 Turn the power on.

6.2.18 The current limit setting (as measured at the backside of R210) should correspond to the following table.

25 Amp Servo Drive	2.3vdc
50 Amp Servo Drive	2.3vdc
75 Amp servo Drive	2.15vdc
100 Amp Servo Drive	2.42vdc

6.2.19 For the Drive Enable switches: up = disabled; down = enabled

6.2.20 Enable the drive.

6.2.21 Field-flux setting at TP2 should be verified according to the following table.

25 Amp Servo Drive	.35vdc
50 Amp Servo Drive	.8vdc
75 Amp servo Drive	.5vdc
100 Amp Servo Drive	.35vdc

6.2.22 Connect a meter to the Velocity Command output of the test fixture.

6.2.23 Connect the scope probe and meter to TP8.

6.2.24 For the polarity switch; down = positive, up = negative

6.2.25 Using the speed pot to the right of the polarity switch, place a velocity command of at least +1vdc.

6.2.26 Enable the drive.

6.2.27 Once enabled, the drive signal should fold back within 45 seconds. However, the drive signal will sometimes fold back in as little as 5 seconds.

6.2.28 The measurements should correspond to the following table.

Drive Type	Pre-Fold-Back	Post-Fold-Back
25 Amp Drive	3vdc to 4vdc	2.4vdc
50 Amp Drive	3vdc to 4vdc	2.4vdc
75 Amp Drive	3vdc to 4vdc	2.2vdc
100 Amp Drive	3vdc to 4vdc	2.36vdc

6.2.29 Disable the drive.

6.2.30 Repeat steps 5.3.25 – 5.3.30 for –1vdc.

6.2.31 Turn the power off.

6.3 Balancing current sensors with drive disabled:

6.3.1 Remove the berg jumper from JP2.

6.3.2 There is a special jumper cable with four clip-leads used for the next step, which takes place on the ACCB card.

6.3.3 R17 is located near 4PL. Using the special jumper cable, jumper the front side of R17, TP2 and pin 2 of JP2 to ground.

6.3.4 Set scope to 2-volts/division & 20-u-sec/division in un-calibrate mode.

6.3.5 Special Note: The following offset adjustment section of this procedure has a direct effect on the DC level of the current to the motor. The greater the motor speed the more critical this offset balance becomes to the performance of the motor.

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- 6.3.6** Turn the power on.
- 6.3.7** The current sensors are slightly temperature sensitive. Before balancing, allow about 1 minute for the current sensors to stabilize.
- 6.3.8** Attach the scope probe to 3PL-2.
- 6.3.9** Adjust scope for one cycle across the screen.
- 6.3.10** Manually turn the motor by hand or foot whichever is easier.
- 6.3.11** With the motor turning, adjust P5 so that the offset of the cycle is centered on the centerline of the scope.
- 6.3.12** Using P6 for 3PL-3 and P7 for 3PL-4, repeat steps 5.4.8 – 5.4.11 accordingly.
- 6.3.13** Turn the power off.
- 6.3.14** Remove all jumper leads.
- 6.3.15** Reinstall the berg jumper in position 2-3 to JP2.
- 6.3.16** Connect the servo drive's 180-frame motor-slot cable to the 4PL connector on the ACCB card.
- 6.3.17** Connect the motor and +325vdc buss to the drive with the wire jumper plugs.
- 6.3.18** Turn the power on.
- 6.3.19** Enable the drive.
- 6.3.20** Balance the motor using P2.
- 6.3.21** Using the speed pot to the right of the polarity switch, place a small, positive velocity command.
- 6.3.22** The motor should run smoothly in the counter-clockwise direction for a positive velocity command.
- 6.3.23** Place a small, negative velocity command.
- 6.3.24** The motor should run smoothly in the clockwise direction for a negative velocity command.
- 6.3.25** Set the velocity command to –5vdc.
- 6.3.26** Using P3 on the ACCB card, adjust the motor's speed to measure at 1000 RPM.
- 6.3.27** Set the velocity command to +5vdc.
- 6.3.28** Using P8 on the ACCB card, adjust the motor's speed to measure at 1000 RPM.
- 6.3.29** Set the velocity command to –10vdc.
- 6.3.30** Check to verify that the motor's speed measures at 2000 RPM.
- 6.3.31** While the motor is running at top speed, verify that no fault occurs when switching the polarity of the velocity command multiple times (5 or so) very quickly

6.4 Dynamic Brake output test:

- 6.4.1** Verify that the motor stops when the 5PL cable gets physically pulled off from the 5PL connector of the ACCB card while the motor is running.
- 6.4.2** Turn the power off.

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6.5 MC20000/AC200 Control test and burn-in:

- 6.5.1** Reset JP10 and 11 to the 1-2 position and JP6 to the 5-6 position.
- 6.5.2** Install the drive into slot #1 of the MC20000/AC200 control.
- 6.5.3** Be sure jumpers, personality module, and any gain components are installed properly before operating control.
- 6.5.4** Setup sheets for the drives are in the back panel of the control.
- 6.5.5** Start up control.
- 6.5.6** Run the part program for two to three hours.
- 6.5.7** If all goes well, shut down the control, remove the drive from the control and remove the personality module from the drive.

6.6 *TEST COMPLETE *****

7. NOTES

Be sure all electrolytic capacitors on the unit are up to date. Any bad connector on any of the cards should also be changed. This unit is prone to faults when interconnects are dirty or corroded. When in doubt, change it out. Check the stand-offs, (T1 - T6) on ACCB1/2 card and the daughter board (clock) for cold solder joints. When shipping unit back to customer be sure to include the AC200 Check Sheet.