g GE Energy ***Inspection & Repair Services*** ***Louisville, KY***	**Functional Testing Specification** **LOU–GEF** **IMC-1151-2-B**

Test Procedure for a IMC-1151-2-B Amplifier

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PREPARED BY	REVIEWED BY	REVIEWED BY	QUALITY APPROVAL
C. Wade			Charlie Wade
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Test Procedure for an IMC-1151-2-B Amplifier

1. SCOPE

1.1 This is a functional testing procedure for IMC-1151-2-B Amplifier.

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

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 or cracked
  - **4.2.1.2** Terminal strips / connectors broken or cracked
  - **4.2.1.3** Loose wires
  - **4.2.1.4** Components visually damaged
  - **4.2.1.5** Capacitors leaking
  - **4.2.1.6** Solder joints damaged or cold
  - **4.2.1.7** Circuit board burned or de-laminated
  - **4.2.1.8** 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	15vdc PS	Power Supply
1	Cable Set	IMC-1150 Stepper Cable Set
1	Motor	Motor with encoder
1	Variac	110vac Variac
1	Transformer	220vac Transformer

6. TESTING PROCESS

6.1 Connection Setup

6.1.1 Before hooking up amplifier ohm check the dipswitches.

6.2. Testing Procedure

6.2.1. IMC-1150 Switch Setup
6.2.2. SW1 Settings 7 & 8 right, all others switched left
6.2.3. SW2 Settings 5, 6, & 7 right, all others switched left.
6.2.4. Hookup both 24 and 22 pin connecting cables and place all switches on switch box in the up (open) state.
6.2.5. Hookup the IMC-1150 communication cable to PC
6.2.6. This unit is 220VAC model, be sure to hook up transformer through the 110VAC autotransformer. Hook up power and encoder cable to motor.
6.2.7. Use +12V power supply to feed the switch box. Red lead to Red Jack on Switch Box, Black Lead to Black Jack on Switch Box.
6.2.8. Power up computer and amplifiers. Bottom three LEDs should blink on. Led 5 should continue to stay lit until unit is enabled by engaging switch 12 on the switch box. Lamp number four on the switch box should also be on; it is the same as LED 5 Fault Lamp. If over temp light on drive is on shut down and trouble shoot problem.
6.2.9. Access CCS and go to the Terminal Mode. Enter the address of the amplifier, should be (0). Controller communication LED will blink when the enter key is pressed, if you are communicating. Press F1 to query the address, enter (0) for the controller. Use the ESC key to back out of the communication program on the computer. . If communication has been established you should see an echo from the drive every time you hit enter on the PC. The XMIT LED will blink every time screen updates/transmits.
6.2.10. Press 6 for the Application Screen. Press F5 to download a file and press “Y” to clear memory. Download IMC-1151 program to address (0) of the axis controller, it has an exercise program that will be used later in this procedure.
6.2.11. Flip SW12 switch to enable axis, fault light should go when active. SW10 & SW11 will also need to be flipped down; these are over travel limit switches that will allow to motor to turn without stopping.

0WB	(Warm Boot)
0SP1000	(Speed of Motor)
0AC5000	(Load Acceleration Rate)
0ER4096	(No Encoder) Tells drive there is no encoder feedback
0SFN	(Slew Forward) Forward Direction

6.2.12. Switch 10 is for the positive over travel limit. When you remove this voltage, drive will stop (Be sure to Check). Switch 11 will not affect the drive. Busy light will go out when switch is flipped. Motor should be turning clockwise direction with the forward command. Green LED should steadily be ON, with Yellow LED blinking. Switch Box busy Lamp will be ON (Lamp Three).
6.2.13. 0ST (Stop) Stops Motor

6.2.14. Run motor for a minute or so and then stop unit and run in the opposite direction.
6.2.15. 0SRN (Slew Reverse) Reverse Direction
6.2.16. Switch 11 is for the negative over travel limit. When you remove this voltage drive will stop (Be sure to Check). Switch 10 will not affect the drive. Busy light will go out when switch is flipped.
6.2.17. Motor should be turning counterclockwise direction with the forward command. Yellow LED should steadily be ON, with Green LED blinking. Switch Box busy Lamp will be ON (Lamp Three)
6.2.18. 0ST (Stop) Stops Motor
6.2.19. This is the initial test to see if the controller runs motor smoothly in both directions. If so continue with test.

6.3. Stepper Motor Test with encoder

6.3.1. Power down controller and reset switches SW1 and SW2 the following way;
6.3.1.A. SW1 1, 3, 4, 7, & 8 flipped in right direction.
6.3.1.B. SW1 2, 5, & 6 flipped in the left direction
6.3.1.C. SW2 5, 6, & 7 right, all others switched left, no change from previous step.
6.3.2. Be sure stepper motor has an encoder connected to it.
6.3.3. Flip all test box switches up again.
6.3.4. Power up +12V and 220VAC power supplies. If you physically turn stepper motor shaft you will see feedback LED light up depending on direction turned. This will let you know if you have the correct motor/encoder/axis configuration.
6.3.5. Controller address should still be set for (0). Go to on-line communications and change 0ER from 4096 to 26214, this let the drive know you have encoder feedback and will act accordingly. You can poll the memory within each axis by entering specific information, for example (0ER?) will give me what ER information is in the drive
6.3.6. Now Flip SW10, SW11, & SW12 switches down, should see LED 5 go off.
6.3.7. Flip switch 1 on the switch box and stepper should begin to move. Once stepper stops flip switch 2, motor will move again, SW3, SW4, SW5, SW6, and SW7. When switch 8 is flipped the motor will reverse direction and go back to where the program began.
6.3.8. Switch 10 and 11 are for the positive and negative over travel limit. When you remove this voltage drive will stop (Be sure to check). In one direction one of the switches will not affect the drive whereas the other will.
6.3.9. Motor should be turning clockwise direction with the forward command. Green LED should steadily be ON, with Yellow LED blinking. Switch Box busy Lamp will be ON (Lamp Three). Motor should be turning counterclockwise direction with the forward command. Yellow LED should steadily be ON, with Green LED blinking. Motor should run smoothly in both directions, continue with test. When axis has stop inhibit drive and press ESC. This will bring you back to the header page.
6.3.10. 0ST (Stop) This command will stop axis.
6.3.11. Press 6 for the Application Screen. Press F5 to download a file and press “Y” to clear memory. Download IMC-1151 program to address (0) of the axis controller.

6.4. Checking switches 9 thru 12

6.4.1. During On-Line Communication Mode, Enter the address 0 or 1, then press F7, enter, then set the time, usually I enter 55 to 200.

6.4.2. On the switch box by flipping SW9, SW10, SW11, and SW12 down, you should see a change in the number sequence registered on the screen. I am looking for a consistent change when activating the switch.

6.5. Checking Profiles

6.5.1. Press ESC until you are back at main screen. Press 2 for on-line communication, and then enter 0DG1. When you toggle SW1 through SW6 from the center position to the down position you should see the screen reflect the change. Switch number will also be displayed.

6.5.2. If you have downloaded the program IMC1151, then all you should have to do to start program it is type (0EX9) to begin. You should run drive for at least four hours, be sure to put a fan on the motor.

6.6. End of Test

6.7. ******TEST COMPLETE ******

7. NOTES

8. REFERENCES

Calibration Procedure for Logic Card

Adjustment for Pot R14 on Logic Card.

Use frequency counter HP5384, with Channel A.
On HP screen you should see the following selected;
(Filter on)
(A-on)
(Gate)

You must have the power supply board connected to the logic card. You must also be able to communicate with the unit.

Connect counter between TP1 and ground.
Type FD131992 <enter>
Adjust R14 for a reading of 7820hz, be as close as possible.
Type FD134737 <enter>
Counter display must read 31250hz, + or – 250hz.
End of Test

Adjustment for Pot R55 & R57 (Motor Phase Offset Pot Calibration)

Set switches to the following
SW1 1 & 3 open, the rest closed
SW2 5, 6, & 7 open, the rest closed.
Connect meter across R65 on power board. Connect another meter across R81 also on power board.

To Adjust R55.
Type the following command in to drive.
0WB <enter>
0SP1 <enter>
0AC1000 <enter>
0SFN <enter>
0HT Watch meter, when it goes to zero hit <enter>. Actually, stop when meter almost reaches zero on the positive side near or around 0.01 to 0.03, then use the next two commands to adjust closer to zero.
Type RPF1 <enter> or RRI1 <enter> to obtain the lowest positive reading or zero.
Adjust R55 on logic board until meter reads 0.015V

To adjust R57
0SP1000 <enter>
0RFI32 <enter>
Adjust Pot R57 meter for a reading of 0.015V.
End of Test

Configuration and Test procedures for XMC-1-B

1. Use test WETS5401 to calibrate XMC-1 power bd.
2. To change power bd. for 220VAC operation, move JP3 to A & B.
3. To convert unit from sink to source, change EPROM (U35), set JP1 to A & B and E & F, then remove R19 and put it in R12 spot.
4. E-proms are as follows:

For	IMC-1X50	31450011
	IMC-1X51	31450012
	CMC-1X50	31450028
	CMC-1X51	31450045

5. To change the unit to a 3AMP version, change R23 to 9.1K ohms.
6. To convert from IMC to CMC, use applicable EPROM, remove U12 and jumper pins 9 & 11, then remove U11 and replace with 31320090.
7. Now mate the power and logic boards together with a shield board between and run WETS5425 test procedure to calibrate unit.
8. After successful completion of testing, forward to assembly.

Repairs and what to look for on XMC-1 units

The first thing to do is look at the J2 power connector. Be sure the motor connection pins look OK. If a slight discolor, replace connector.
If the unit is returned for repair, be sure the board is not burned. If it looks repairable, more than likely have to replace R2 & R3, C5, C6, C7, and 25. If C20 is shorted replace C20.
If D16&18 looks burnt, can try to fix by replacing them, T4, Q8, and U7.
If you get the power board working but it doesn't run in encoder mode, suspect opto-coupler U9, U12, U14, U17.
To upgrade logic boards, replace U6 with 70004444 bd., replace D7 with zero ohm resistor, upgrade EPROM to latest revision. Cut out D5&6 and Q2. Run jumper wire from U35 pin 28 to U36 pin 28. Run more jumper wire fromU6 pin 7 to U5 pin 14 and U6 pin 14 to U5 pin 7. Finally, replace U36 ram with battery-backed version 31430050.
If troubleshooting new power boards, power OK but will not run correctly, be sure no transistors are shorted to the T-bar. Always be on the look out for shorts and missing parts.
If you turn on the power to the unit and the bottom 3 lights are on, the clock is probably not working. Check for a clock signal to the EPROM and look for the INT pulse at pin 16 of the CPU. If not there, suspect bad CPU. Have been getting a few of them lately.
Communication problems can be on the logic bd. U1, U13, or U20 and even on the power bd. U19. Have to troubleshoot with computer in terminal mode hooked up to the unit using techniques with the scope. Hopefully this narrows it down some. Very rarely U16 can fail causing comm. Fail. If having real difficulty, sometimes can be as simple as SW2 not functioning. Test SW2 with ohmmeter.