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GE Energy

Functional Testing Specification

*Inspection & Repair Services
Louisville, KY*

**LOU-GEF
IMC-3141-2-B**

Test Procedure for a IMC-3141-2-B Master Amplifier

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DATE 06/14/2005	DATE	DATE	DATE 6/14/2005

Test Procedure for an IMC-3141-2-B Amplifier

1. SCOPE

1.1 This is a functional testing procedure for IMC-3141-2-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 Pub 127

3.1.2 Pub 42

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	IMC-3141-2-B	Slave Drive
1	15vdc PS	Power Supply
1	Motor	Large Motor with Resolver
1	Variac	110vac variac
1	220vac	Transformer
2	Cables	Motor Power & Feedback Cable

6. TESTING PROCESS

6.1 Connection Setup

6.1.1 Before hooking up controller/amplifier ohm check the dipswitches.

6.2.1. IMC-3141 Setup for Resolver Feedback

6.2.2. Hook up large motor and cable with resolver feedback to unit. Hook up communication cable. Hook up autotransformer and transformer power to the UUT. Hook up both 22 and 24 pin connecting cables and place all the switches on switch box in the up (open) state.

6.2.3. Hook up +12V power supply, Positive lead to Red Jack on switch box, Ground lead to Black Jack on switch box.

6.2.4. Set dip switches on amp to the following;

	1	2	3	4	5	6	7	8	9	10
SW1	Left	Left	Left	Left	Right	Left	Left	Left	Left	Right
SW2	Left	Left	Left	Right	Right	Right	Right	Left	Left	Left
SW3	Left	Right	Left	Left						

SW1 sets up no tach voltage and motor current settings. SW2 sets up the address of the amplifier, master or slave, communications, & pulse multiplier. SW3 is set this way for commutation, Don does not know why; only it has always been set this way.

6.2 Powering Up Amplifier

6.2.1 Turn on power to 230VAC transformer and +12VDC power supply. Bottom two 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). Flip SW10, SW11, & SW12 switches down, should see LED 5 go off. Now flipped switch SW12 off, (LED 5 should come back on).

6.2.2 Boot up computer and enter on-line communications mode with drive. Press F1 to query the address, enter (0) for the controller. Upload customer's software to computer before downloading test file to operate amplifier. Then download file IMC3141 into drive. Use the ESC key to back out of the communication program on the computer. Now flipped switch SW12 on, (LED 5 should go off).

6.2.3

OSFN	Drive should move in a Clockwise direction
OSRN	Drive should move in a Counterclockwise direction
OST	Stops motor
OSP10000	Speed of Motor
OAC50000	Acceleration Rate

6.2.4 OSFN (Slew Forward)

6.2.5 Switch 10 is for the positive over travel limit. When you remove this voltage drive will stop (Be sure to Check, FLIP IT NOW). Drive should have stopped. Enter OSFN again and Switch 11 will not affect the drive, (FLIP IT NOW). Busy light will go out when switch is flipped.

6.2.6 Motor should be turning clockwise direction with the forward command. Green LED should steadily be ON. Switch Box busy Lamp will be ON (Lamp Three).

6.2.7 OST (Stop)

6.2.8 Run motor for a minute or so and then stop unit and run in the opposite direction.

6.2.9 **OSRN** (Slew Reverse)

6.2.10 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. Motor should be turning counterclockwise direction with the forward command. Yellow LED should steadily be ON. Switch Box busy Lamp will be ON (Lamp Three)

6.2.11 **OST** (Stop)

6.3 Checking switch 9, Home Input Line.

6.3.1 Enter the following command (0PFH) then press enter. LED 5 should be off and motor enabled.

6.3.2 Motor should begin to turn and continue to turn until SW9 is toggled on switch box, when done motor should stop and LED 3 on switch box should turn off.

6.4 Checking Profiles 1 thru 8

6.4.1 Press ESC until you are back at main screen and then press 2 for on-line communication. Enter 0DG1 from the terminal screen while the drive is disabled. Then flip SW1 thru SW8 one at a time and you should see the screen display which switch was flipped. (May have to enter PE=1 or PE1). If drive is enabled the program is set to turn the motor about 1 or 2 revolutions by flipping switches 1 through 8. Switch 8 will take you back to your original position. When you toggle SW1 again the drive should move completely back to it's starting position. As long as you toggle the switches in an incremental fashion (SW1 to SW8) the motor will spin in a clockwise direction. If you decrement a switch the motor will spin in the reverse direction.

6.4.2 If unit passes all tests run motor drive for two hours with the EX9 cycle command. EX9 executes a program in the IMC3141 file that was previously downloaded. You may have to put a fan on the controller if it gets too hot. Lamp 3 on switch box will be on when running a program or motor.

6.4.3 End of Test

6.5 ***TEST COMPLETE ***

7. NOTES

7.1 See hand written notes on testing opto-couplers on the small ½ bridge cards. Use drawing 70004879 for these small cards (70003850). See Charlie if you have any questions.

8. REFERENCES

IMC3141 Program for the drive.

(IMC-3141 Servo Parameters)

PE0	RAN
WP0	MW
PO1073741823	ED
NO-1073741824	
OT0	DE5
WR0	AM50000
DB0	RAN
PB4	MW
LD4096	ED
GN30	
IB255	DE6
ZR220	AM60000
FF0	RAN
PL0	MW
GR1	ED
AM0	
IM0	DE62
AC10000	AM70000
DC10000	RAN
SP13500	MW
BS0	ED
DT0	
AP0	DE63
IP0	AM00000
LR0	RAN
PE2	MW
	ED
DE1	
AM10000	DE9
RAN	SP15000
MW	AC10000
ED	IM100000
	DT100
DE2	RFD
AM20000	MW
RAN	IM100000
MW	DT100
ED	RRD
	MW
DE3	RMO
AM30000	ED
RAN	
MW	
ED	
	PIZ
DE4	(IMC Servo Setpoint A)
AM40000	(IMC Servo Setpoint B)

Configuration and Test procedures for XMC-3-B

Use test WETS5405 to calibrate XMC-3 power bd.

Same testing procedure and tests for 6 Amp and 4Amp drives. The only difference is the Power and half bridgeboards.

Use test WETS5404 for 4 AMP half bridgeboard testing. (70003850)

Use test WETS5407 for 6 AMP half bridgeboard testing. (70004879)

To change power bd. for 110VAC operation, add a jumper at JP1.

To convert unit from sink to source, change EPROM (U29), set JP1 to A & B and E & F, then remove R76 and put it in R25 spot.

E-proms are as follows:	For IMC-31X0	31450035
	IMC-31X1	31450036
	CMC-31X0	31450037
	CMC-31X1	31450038

To convert from IMC to CMC, use applicable EPROM, remove U9 and jumper pins 9 & 11, then remove U8 and replace with 31320090.

Now mate the power and logic boards together with a shield board between them.

Connect AC power cable to power board and turn on power. Connect voltmeter positive side to U6 pin 25 and ground to U29 pin 14. Turn R35 pot until meter reads 0volts. Now turn off power and seal pot.

Run WETS5427 test procedure at Jeff's old bench.

IMC: U8 – DAJ – 31290093

U9 – DBI – 31320592

CMC: U8 – DAJ – 31290090

Repairs and what to look for on XMC-3 units

If the unit is returned for repair, be sure the board is not burned. If it looks repairable, more than likely have to replace R25-28 and C32-36. Need to replace C22-25 only if any one of R25-28 is open.

If the clamp circuit is burned up, you may just want to replace the power board. Many times a short on the logic board +5V or +12V line causes this clamp circuit to burn up. So if you replace the power board, be prepared to troubleshoot a bad cap or IC on the logic bd. Be sure the half bridge modules 70003850 are up to date.

Half bridge module upgrades are simple. Install a .001ufd cap across R29, cut foil on solder side at R29 and tack a 1K ohm resistor from R29 lead to other side of cut. See model if necessary.

To trouble shoot a half bridge bd., use the model B half bridge test set and be sure the pulses are at U8 pins 11 and 12. Most of the time U8 is bad. Be sure Q1&2 are not shorted. If one of them are shorted, replace both Q1&2, C28, U14, and quite possibly Q3, 4, 5, and 6.

To upgrade logic boards, replace U15 with 70004444 bd., replace CR13 with zero ohm resistor, upgrade EPROM to latest revision. Cut out CR10&11 and Q3. Run jumper wire from U29 pin 28 to U30 pin 28. Run more jumper wire from U15 pin 7 to U14 pin 14 and U15 pin 14 to U14 pin 7. Finally, replace U30 ram with battery-backed version 31430050 for IMC's only.

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.

Commutator board on the other hand, Good Luck! They always gave me trouble. Try socketed IC and look for shorts. Be sure voltages are correct on the bd. See if directional lights work as you turn the motor.

Usually not too many problems with this board.