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Electronic Products Repair

Test Instructions for

New Mopex Armature Protection Card
Device Number

4006L5037 G001
Description of Device

Originated By: Lucio Carrescia **Date:** January 21, 2005
Typed Name mm/dd/yy

Approved By: Dennis Cully **Approval Date:** January 21, 2005
Signature mm/dd/yy

TEST INSTRUCTIONS
PREVIOUS REVISION SHEET

New Mopex Armature Protection Card
Device Number
4006L5037 G001
Description of Device

Originated By	**Date mm/dd/yy**	**Description of change**
Tim Papez	Nov. 29, 95	Created new instruction, original never existed in EPR.
Tim Papez	Apr. 16, 96	Revised procedure 11 and 12, to reflect proper operation.
Rogerio Cordeiro	Nov. 4, 99	Created New instructions to test all of the card
Lucio Carrescia	April 29, 2003	Added minor revisions.
Lucio Carrescia	Jan. 21, 2005	Added more information to the Trip test and included upgrade information.

TEST INSTRUCTIONS

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Location: Book or file

New Mopex Armature Protection Card
4006L5037 G001

Date: December 30, 2013

PURPOSE: To test the 4006L5037 G001 card.

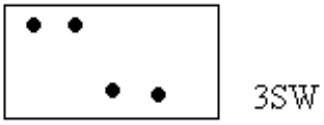
ELEMENTARY:

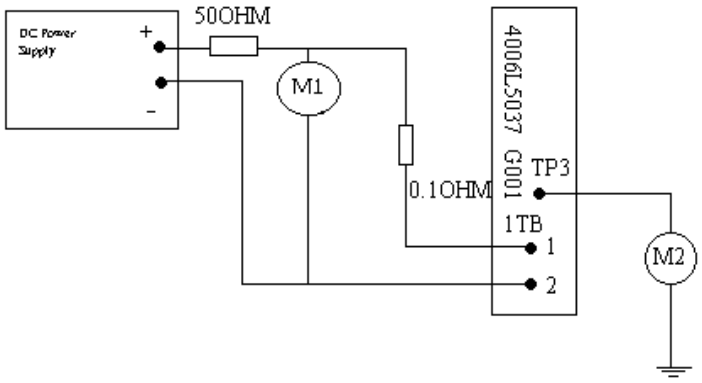
EQUIPMENT:

New Mopex

SET UP:

Set the dip switches as follows and set all **unsealed pots CCW**. Install R32 = 100KΩ. Do not install C21.





PROCEDURES:

Power Supplies:
1. Use TP20 (COM) for ground.
2. Measure +15V on TP18.
3. Measure –15V on TP19.

Armature Current Isolator:
1. Measure 20Vpp square wave at TP1.
2. Set 1TB1 and 1TB2 to 0V by shorting 1TB1and 1TB2 together.
3. Place DMM on TP2, and adjust R8 for 0V±10mV.
4. Place DMM on TP3, and adjust R12 for 0V±10mV.
5. Adjust R9 for minimum ripple on TP3.
6. Set 1SW up and adjust R7 for –2.5V on TP3.
7. Set 1SE down and adjust R7 for +2.5V on TP3. Remove short from 1TB1 and 1TB2.
8. Method 1: Using the above hook up, apply the voltages from table 1 into 1TB1 and 1TB2, and measure the corresponding voltage on TP3. Method 2: Connect the power supply directly to 1TB1 (+) and 1TB2 (-) and apply the voltages from table 2 (use fine voltage and fine current limit controls). Measure the corresponding voltage on TP3. **For both methods, take note of procedure 9.**

Table 1

1TB1/1TB2	TP3	Tolerance
M1	M2	
50mV	-2.5V	±0.07V
100mV	-5.0V	±0.1V
150mV	-7.5V	±0.12V
200mV	-10V	±0.14V

Table 2

1TB1/1TB2	TP3	Tolerance
M1	M2	
49.1mV	-2.5V	±0.07V
98.1mV	-5.0V	±0.1V
147.1mV	-7.5V	±0.12V
196.1mV	-10V	±0.14V

9. Adjust R11 to calibrate TP3 to the desired voltage if required.

Armature Current meter output:
1. Set TP3 to –2.5V see table.
2. Place red lead of external meter on 2TB3 on back plane.
3. Adjust R6 for 100°C on external meter.
4. Place red lead of external meter on 2TB5 on back plane.
5. Adjust R5 for 100°C on external meter.
6. Place red lead of external meter on 2TB7 on back plane.
7. Adjust R4 for 100°C on external meter.

Absolute value circuit:
1. Set TP3 to –2.5V see table.
2. Note TP5 is equal to TP3. Adjust R10 if required to make it equal.

3. Reverse input polarity and note TP5 remains at –2.5V and TP3 is +2.5V.

IOC and Reset:

1. Set TP3 to –2.5V see table.
2. Set 3SW4 to closed, note the cathode of Z2 is 0V.
3. Note PA54 is 0V, PA60 is 24V, and the cathode of Z5 is 5V.
4. Adjust R3 until LED5 turns off.
5. Note PA54 is 5V, PA60 is **.23V**, and the cathodes of Z2 and Z5 are 5V.
6. Set 3SW4 to open.
7. Adjust R3 CCW just until LED5 comes on, then return to previous setting from procedure 4.
8. Press PB1, note LED5 goes off.
9. Set 3SW4 to closed.

Overload Alarm:

1. Set TP3 to –2.5V see table.
2. Place DMM on TP16.
3. Slowly raise R2 until TP16 begins to decay on its own.
4. Note TP16 will settle at ≈-120mV.
5. Note TP17 will read ≈9.55V.
6. Note LED4 will turn off and the cathode of Z3 is 5V.

ITOC:

1. Set TP3 to –2.5V see table.
2. Set R14 CCW.
3. Place scope CH1 on TP7. Note a negative going pulse with 6V in amplitude.
4. Place scope CH2 on TP6. Note a 6Vp ramp.
5. Raise R1 until LED1 comes on. Note TP6 is now a –6Vp ramp.
6. Raise R14 such that TP7 is 10V in amplitude. (pot is at mid position)
7. Press PB1 to turn off LED3.
8. Note LED2 flashes.
9. Set 3SW1 and 3SW2 to open.
10. Note TP9 is a square wave of ≈7.736kHz.

Trip:

1. Set 3SW1 to open and 3SW2 to close.
2. Set TP3=-2.5V see table.
3. Increase TP3 to –3.75VDC
4. Raise R3 until LED5 turns off.
5. Raise TP3 to –4V
6. LED3 will come on after a delay of approximately 54 seconds and the Trip relay will turn off as LED 3 comes on. The cathode of Z4 will be at 0 volts. You may need to cycle the power supply off, press PB1, wait 1 minute, and then cycle power supply on to measure the time.
7. Turn off the power supply (without changing settings) and press PB1. The cathode of Z4 will be at 5 volts.
8. Activate Relay Parallel on the Mopex unit.
9. Turn on the power supply. The Trip relay goes off immediately along with IOC and Alarm relays. LED 3 comes on after the usual time delay.
10. Close 3SW3. Turn off the power supply and LED's 3 to 5 will turn off immediately and all 3 relays will turn on.
11. Confirm the following frequencies to the respective input voltages.

TP3	TP6

	1CAP IN CIRCUIT (3SW1 or 3SW2 CLOSED)	2 CAPS IN CIRCUIT (3SW1 & 3SW2 CLOSED)
- 4V	≈3.82Hz	≈1.89Hz

Upgrades:

Rev 4 to 5

1. Change R24 to 0177A1457 P055 (1.8K).
2. Change R37 to 0177A1457 P077 (15K).
3. Change R31 to 0177A1458 P005 (150K).

Rev 3 to 4

1. Change transistor Q7 to 0177A1067 P020.

Rev 2 to 3

1. Left R20 off board, keeping open lead a minimum of .5 inches away from the run under R8 going to R105.
2. Disconnect R20 from 1TB1. Cover R20 and leads with variflex electrical insulation sleeving from hole in board to terminal connection.
3. Reconnect terminal of R20 to 1TB1.
4. Secure sleeving with RTV.

Rev 1 to 2

1. Reverse the silk screening of D33.
2. Cut the run between the cathode of Z3 and the cathode of D34 on the solder side of the board.
3. Run an insulated wire on the solder side of the board from the cathode of Z3 to the lead of R72 closest to R94.

END.