g GE Canada
Electronic Products Repair

Test Instructions for

4006L5036 G001
Device Number

NRP Regulator Card
Description of Device

Originated By: Rogerio Cordeiro **Date:** May 25, 2005
Typed Name mm/dd/yy

Approved By: Dennis Cully **Approval Date:** May 25, 2005
Signature mm/dd/yy

TEST INSTRUCTIONS
PREVIOUS REVISION SHEET

4006L5036 G001
Device Number
NRP Regulator Card
Description of Device

Originated By	**Date mm/dd/yy**	**Description of change**
Dale Derr	Oct. 29, 84	New instructions
Omar Zawistowski	Oct. 29, 84	Adapted to shop test station
Omar Zawistowski	Jan. 13, 95	Formalized adaptation & added handwritten supplements
Rogerio Cordeiro	Nov. 4, 99	Created new test instructions
Jason Humphries	July 5, 2000	Minor Change to Test of Field Economy Test
Lucio Carrescia	March 31, 2004	Added hand written notes.
Rogerio Cordiero	October 19, 2004	Added upgrade information
Rogerio Cordiero	May 25, 2005	Adjusted instructions to new format
Steve Pharris	Aug 26, 2013	Changes to reflect new test station and notes

TEST INSTRUCTIONS

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Location: Book or file

4006L5036 G001
NRP Regulator Card
Date: May 25, 2005

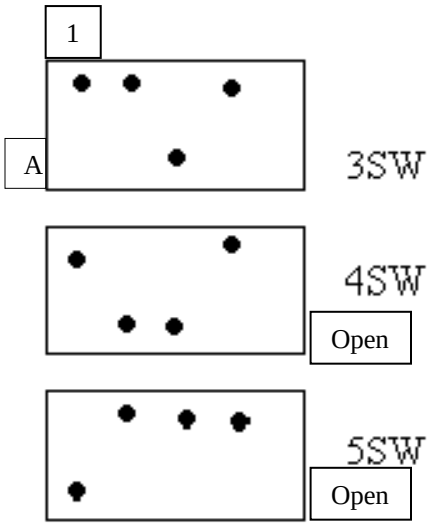
1. **PURPOSE:** To test the NRP Regulator Card.

2. **ELEMENTARY:**

3. **EQUIPMENT:**

   a. New MOPEX Test Station
   b. Oscilloscope (Dual Channel) w/ qty.2 X10 probes
   c. 1μF Cap
   d. Wire jumper
   e. 470kΩ Resistor
   f. 7.5kΩ Resistor
   g. Multimeter (2)

4. **SET UP:**
   a. Inspect card and perform all upgrades.
   b. Install 1μF in SC1 and SC2.
   c. Install jumper in SC3 and SC4.
   d. Install 470kΩ in SC5 and SC6.
   e. Adjust pots R1 – R7 CCW.
   f. Set dip switches as follows:



5. **PROCEDURES:**

   a. Power Supplies:
      i. Apply Main Power then 310VAC Power
      ii. Measure +15V±0.3V on TP18. Com is TP19.
      iii. Measure -15V±0.3V on TP21.
      iv. Measure +9.55V±0.3V on TP17.

v. Measure +28V±10V on the anode of LED3 or LED4.

b. Phase Shift Network:

i. Measure 15Vpp on R174. 0°
ii. Measure 16Vpp on R169. 90°
iii. Measure 15Vpp on R177. 180°
iv. Measure 16Vpp on R171. 270°

c. Isolation Oscillator:

i. Put scope CH1 on TP5
ii. Observe a 20Vpp square wave at ≈ 260Hz *(If the circuit is oscillating to slowly or not at all damage will occur to card and the drive)*

d. Isolation Processing:

i. Apply310VAC Power
ii. Insure Field Economy is off (Down) and unit is set to Forward.
iii. Place DMM onTP6 and adjust R12 for 0V±10mV.
iv. Place DMM onTP7 and adjust R14 for 0V±10mV.
v. Place DMM onTP7 and adjust R10 for minimum ripple.
vi. Set R3 mid scale.
vii. Adjust R1 for ≈-1V on TP1 {this may take a moment.}.
viii. Monitor the Mopex output with a meter and scope (TB5 and TB8 jacks on front of fixture). The output should be fairly balanced going from forward to reverse and back again. A difference of ≈ 5 volts is acceptable. The output waveform is 120 Hz at ≈ 41 volts dc. Put Mopex in REV and note REV relay picks up. Put Mopex in FWD and note FWD relay picks up.

e. Regulator limits and Field economy:

i. Set R1 and R3 CCW.
ii. Set 3SW2 to A.
iii. Set R1 CW.
iv. Set R3 for -100V (at TB5 and TB8).
v. Set R11 for 5V at TP7.
vi. Set R1 CCW.
vii. Set R4 for -50V on external meter (at TB5 and TB8).
viii. Set 3SW2 to B.
ix. Set R1 to the ¼ scale (note R1 may have to be increased a bit to obtain 100V).
x. Adjust R3 for -100V on external meter (at TB5 and TB8).
xi. Turn Field Economy on (Up) and note the output voltage drops to -67V ± 10Vdc.
xii. Turn Field Economy off (Down) and note the output voltage returns to -100V.

f. Field reversing and regulator:

i. Put DMM on TP1 and Measure ≈-2.5V.
ii. Put DMM on TP2 and Measure ≈0V
iii. Power down 310VAC Supply
iv. Put Mopex in REV
v. Apply 310VAC Power and note TP2 jumps to ≈2.5V.

g. Field loss and detect:

i. Put DMM on TP8 measure –0.2V in FWD and +0.2V in REV.**(Power Down 310VAC Before Switching Direction)**
ii. Set 4SW1 to open.
iii. Adjust R13 for 0V±10mV on TP8.
iv. Set 4SW1 to closed.
v. Turn R7 CW until the Healthy (Field Loss) relay drops.

vi. Turn R7 CCW ¼ turn.
vii. Set 4SW1 to open. Note that the field loss relay drops after 1 sec.
viii. Set 4SW1 to closed.
ix. Set 5SW3 and 5SW4 to open.
x. Set 4SW1 to open. Note field loss relay drops after 8 sec.
xi. Set 4SW1 to closed.

h. Gate Pulse Generators: Two circuits per card, check both. There are two TP16's

i. Place scope CH1 on TP16. Note the GPG firing on both circuits.
ii. Set 4SW1 to open and note the GPG firing stops. Close 4SW1.
iii. To adjust the Mopex in voltage mode, set R1 to ¼ scale, adjust R3 to -100Vdc. Place Mopex in Field Economy and adjust R1 for 67Vdc. Allow unit to run in normal mode and Field Economy.

i. Current Mode:

i. Place the card in current mode, and see that the drive still runs. Do this by performing the following:
ii. Power down unit
iii. Remove jumper or capacitor installed earlier.
iv. Remove the 470K ohm resistor from the saddle clamps SC5 and SC6 and install a 7.5K ohm resistor
v. Set 3SW3 to B, close 4SW3, and open 4SW4.
vi. Set R6 to mid position and Pots R1-R5 and R7 CCW
vii. Apply Power
viii. Adjust the voltage to 100Vdc by adjusting R1 and R3. **(Do this slowly or the motor will go into run away)**.

6. UPGRADES:

a. Rev0 to Rev1
   i. Un-know not documented.
b. Rev1 to Rev2
   i. Change silk screen of SC1 and SC2 from C40 to read C29. *Do not do will be returned later*
c. Rev2 to Rev3
   i. Change C30 from 0177A1283 P225 0.47µF 200V to 0177A1283 P125 .47µF 100V. *Do not do will be returned later*
d. Rev3 to Rev4
   i. Cut trace fromOA5-pin5.
   ii. Jumper OA5-pin4 to trace that was just cut. Do not solder to OA5-pin5.
e. Rev4 to Rev5
   i. Add spacer to all upright diodes and zeners.
   ii. Add "A" indicator for sw3 closest to C2 and C4 marking on sw3.
   iii. Add "B" indicator for sw3 closest to C1 and C3 marking on sw3.
f. Rev5 to Rev6
   i. Change SC1 and SC2 marking C29 back to C40.
g. Rev6 to Rev7
   i. Change C30 back to 0177A1283 P225 0.47µF 200V.
   ii. Add 0177A1286 P013 to busses of IC2A and IC2B other leg of Cap to exposed leg of R141.
h. Rev7 to Rev8
   i. Delete R139A and R139B from card.

7. END: