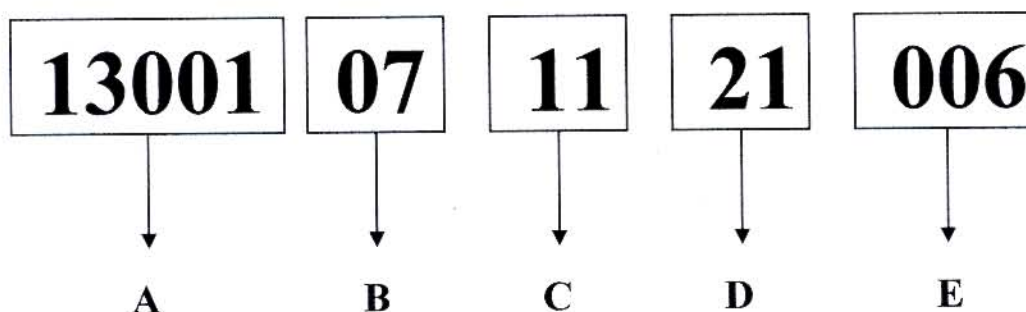




## SC916, 14 digit serial numbers

NOTE: SC916 serial numbers are similar to the Stairmaster 4400CL Stepper

**S/N: #13001071121006**



A: Is the machine ID number:

SC916 Domestic (Unboxed) = 13001

SC916 Domestic (Boxed) = 13002

SC916 International = 13003

SC916 Domestic, TV (Unboxed) = 13004

SC916 Domestic, TV (Boxed) = 13005

B: Year machine was made:

07 = 2007

C: Month machine was made:

11 = November

D: Day the machine was made:

21 = 21<sup>st</sup> day of the month

E: Machine number of the work order:

006 = 6<sup>th</sup> machine for work order #xxxxx



## C51 & C52 Cardio Console Codes

### General Information:

- Press the UP Speed/Load key [▲], the numeric [ # ] key, and then press the [ENTER] key once to enter this mode. Pressing [▲] or [▼] forwards or backs up through the selections. Pressing [ENTER] then selects that item. Enter values then press the [ENTER] key again to store the value.
- Once in console codes mode, pressing [▲] [▼] forwards or backs up through the selection, pressing [ENTER] then selects that item. Pressing [CLEAR] exits any of the special access modes.
- Pressing [CLEAR] twice will exit the Console Service Mode.

### Workout Default Console Codes

[▲] [2] [ENTER] "DEFAULTS"  
 [▲] [ENTER] " ENTER WT XXX"  
 [▲] [ENTER] " ENTER LEVEL 1 TO XX"  
 [▲] [ENTER] " ENTER TIME XX"  
 [▲] [ENTER] " ENTER AGE XX"  
 [▲] [ENTER] " CHR PERCENT XX"  
 [▲] [ENTER] " ENTER SPEED XX.X" (TM, TC only)  
 [▲] [ENTER] " QUICKSTART SPEED XX.X" (TM, TC only)  
 [▲] [ENTER] " MIN INCLINE XX" (future)

[▲] [3] [ENTER] "CUSTOMIZE"  
 [▲] [ENTER] " MAX TIME "  
 [▲] [ENTER] " COOL DOWN "  
 [▲] [ENTER] " CHANGE UNITS "  
 [▲] [ENTER] " HR INPUTS "  
 [▲] [ENTER] " SELECT STATS " (T916 TM)  
 [▲] [ENTER] " LANGUAGE "  
 [▲] [ENTER] " CONTRAST UPPER "  
 [▲] [ENTER] " CONTRAST LOWER "  
 [▲] [ENTER] " MAX SPEED " (TM only)  
 [▲] [ENTER] " ENABLE MAG KEY " (TM only)  
 [▲] [ENTER] " AUTO STOP "  
 [▲] [ENTER] " SET DEFAULTS "

[▲] [4] [ENTER] "MACHINE STATUS"  
 [▲] [ENTER] " RUN HOURS "  
 [▲] [ENTER] " WORKOUTS "  
 [▲] [ENTER] " DISTANCE "  
 [▲] [ENTER] " CONSOLE VERSION "  
 [▲] [ENTER] " DEVICE TYPE " "Displays Machine Type"  
 [▲] [ENTER] " TM DRIVE VER " (TM only)  
 [▲] [ENTER] " MAINT HOURS "

### Workout Default Console Codes Continued...

[▲] [5] [ENTER] " R AND D "  
 [▲] [ENTER] " PROGRAM LOOP "  
 [▲] [ENTER] " COM TIME DISABLE "

[▲] [6] [ENTER] " DIAGNOSTIC "  
 [▲] [ENTER] " DISPLAY TEST "  
 [▲] [ENTER] " KEY TEST "  
 [▲] [ENTER] " SERIAL PORTS "  
 [▲] [ENTER] " A SENSOR B "  
 [▲] [ENTER] " I/O TEST "  
 [▲] [ENTER] " ALT TEST " (Non-TM only)  
 [▲] [ENTER] " TACH TEST " (Non-TM only)  
 [▲] [ENTER] " BUS VOLTS " (TM, TC only)  
 [▲] [ENTER] " TREADLE CENTERING " (TC only)  
 [▲] [ENTER] " TREADCLIMBER " (TC only)  
 [▲] [ENTER] " AUTO STOP " (TM only)  
 [▲] [ENTER] " GRADE ACT " (TM only)

[▲] [7] [ENTER] " SERVICE "  
 [▲] [ENTER] " ERROR LOG "  
 [▲] [ENTER] " MAINT HOURS "  
 [▲] [ENTER] " QA ID "

[▲] [8] [ENTER] " Machine Configuration " [ENTER]  
 For Treadmill Devices, the selections are:  
 [▲] [ENTER] " TC/TM CONFIG RQD "  
 [▲] [ENTER] " TREADCLIMBER "  
 [▲] [ENTER] " T9.16 " (T916)  
 [▲] [ENTER] " T9.14 " (T914)

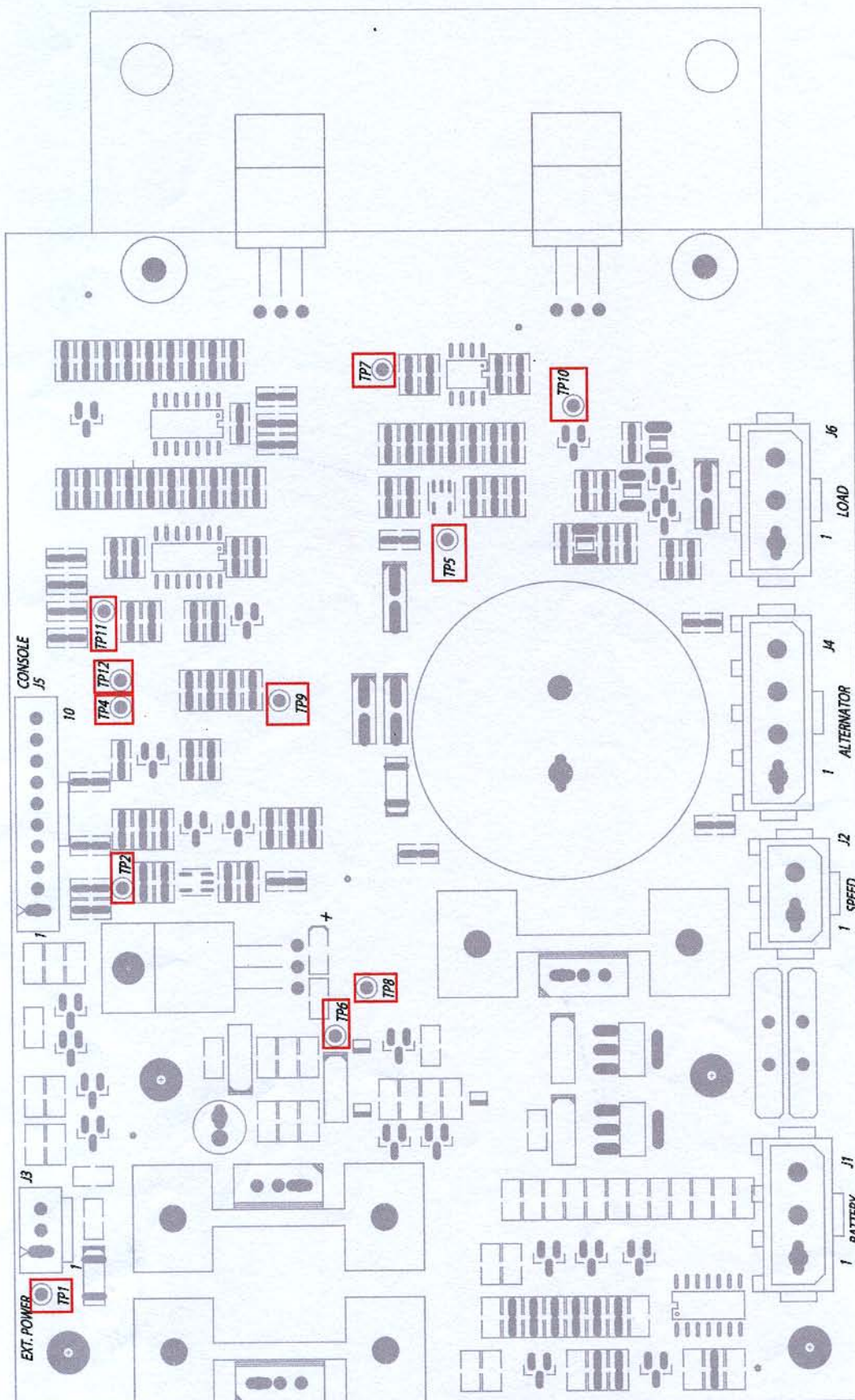
For Non-Treadmill Devices, the selections are:

[▲] [ENTER] " NTM CONFIG RQD "  
 [▲] [ENTER] " BIKE "  
 [▲] [ENTER] " ELLIPTICAL "  
 [▲] [ENTER] " STEP MILL "  
 [▲] [ENTER] " STEPPER "

TC = TreadClimber, TM = Treadmill, NTM = Non Treadmill e.g., "BIKE", "ELLIPTICAL"

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27451 Test Point definitions  
Rob Deatherage 09-18-07  
Joe Polaro 10 /07

TP1: Signal External Input Voltage. This signal will have the DC input voltage of an external power supply if installed, 0V otherwise. *Use this Test Point to check the external Power supply/Adaptor output voltage.*

TP2: Signal Alternator Tachometer. This signal will be sinusoidal, and will vary proportionally in both amplitude and frequency in relationship to the alternators RPM. It will have a frequency of 6 times that of the rotational velocity. *Use this test point to check the inductive switch ac output voltage.*

TP3: Signal Circuit Ground.

*This is the signal ground reference point. Your negative meter probe is placed here when performing the voltage checks.*

TP4: Signal Current Sense. This signal will allow the console to sense the total current consumption of what the alternator is delivering. Its voltage will be a one-to-one relationship of current measured, or 1V = 1A of current. *Use this test point to measure The total amp draw of the bikes load (console and lower electronics consumption) this also informs you of the total amp output from the alternator to support the demand. Volts = amps.*

TP5: Signal Alternator Field Control. This signal is actually a current into the alternator's field to control B+ levels. Since the alternator has a typical field resistance of 4ohms, voltages from 0V to B+ can be measured. *Use the test point to measure field output voltage from the lower board to the alternator field terminal (Brown wire). This output comes from the lower board only. Its voltage, divided by 4, is the current into the alternator's field.*

TP6: Signal Console Switched Power Control. If this signal is 1.2V or greater, battery voltage or 8V will be switched to the console. This will be the case when the alternator's velocity is 25RPM or greater, or the device is externally powered. *This test point is to verify that the proper signal is present to turn on Q11 Transistor on the lower board to power up the console. (Fundamental signal to start current flowing from the regulated 8 volts source.*

TP7: Signal 2.5V reference. This signal should measure 2.5V whenever the device is externally powered, or whenever the alternator's velocity is adequate to turn on console. *This test point is to verify that there is 2.5 volts DC, A reference voltage to keep the console powered up when the Charger/ Adaptor in being used. Or the alternator's Rotational velocity ( RPMs ) is 40 or above.*

TP8: Signal Regulated 8V. This signal will measure the level of the battery voltage if the device is NOT externally powered and the alternator's velocity is adequate to turn on the console. If the device is externally powered, or the user has entered a workout, this signal will be regulated and should not exceed 8V. **This test point is to indicate that U5 Is regulating the control voltage on the lower board only, and is regulated after the 8V regulator regulates B+ or external power.**

**This voltage should not exceed 8 volts DC. This test point can also measure the battery voltage only when the alternator is off and the charger is not connected.**

TP9: Signal B+ Voltage Sense. This signal should measure 1/3 that of B+, or 1/3 of what TP12 measures.

**This test point indicates console B+ sensing signal. It allows the console to know the level of B+ during elliptical operation.**

TP10: Signal Resistance Control. This signal alternates between 0V and 5V proportionally to the amount of time the load resistor is switched onto B+. It is a high frequency signal, so a meter will read some value between 0V and 5V. It is active low, or 0V is full on, 5V is full off.

**This test point indicates the duty cycle of the Load Resistor. This is the gating signal For Q16 to dump the B+ from the alternator to the load resistor. 0 volts indicates the resistor is fully on. 5 volts indicates the load resistor is off.**

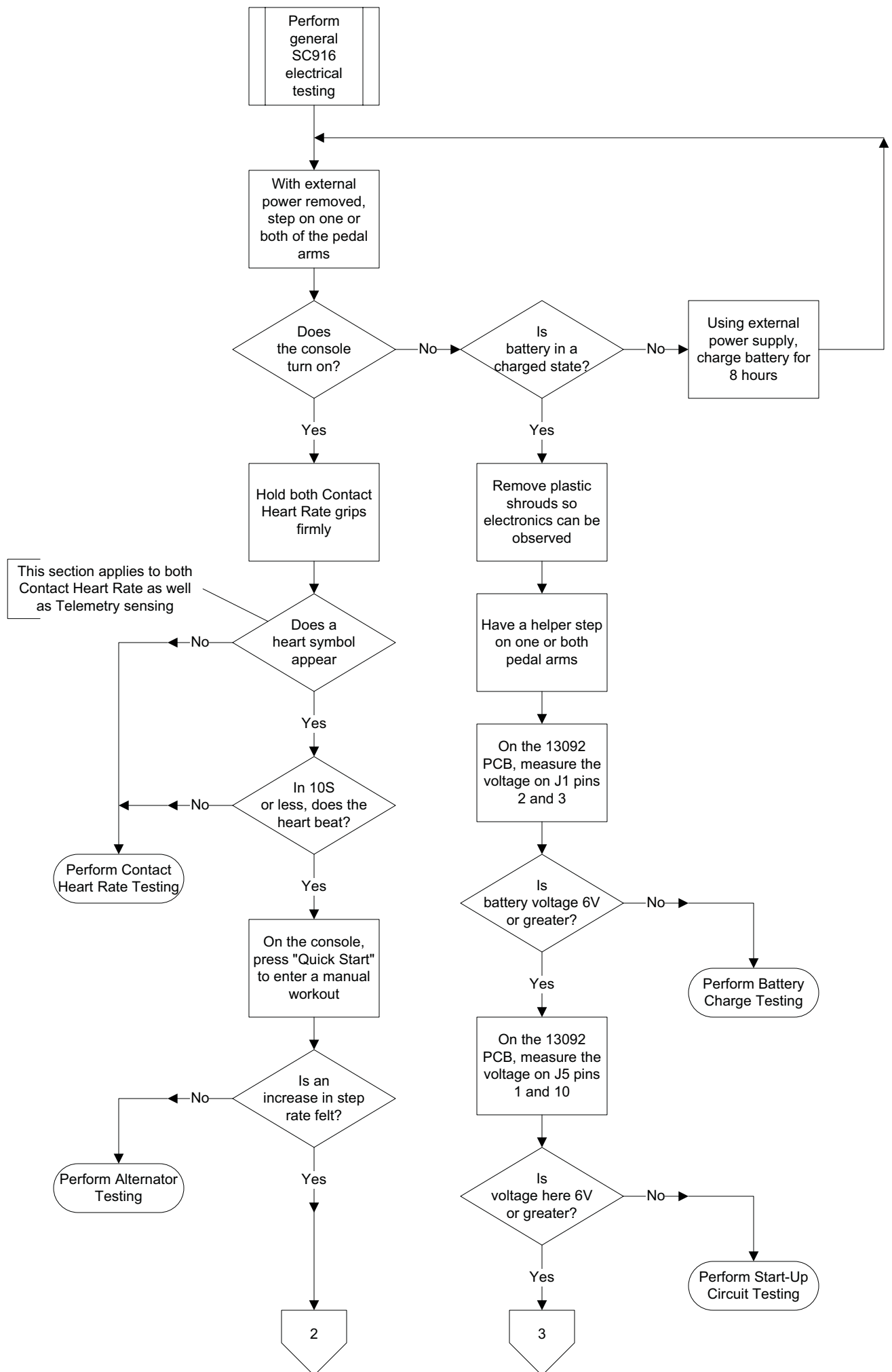
TP11: Signal Alternator Shutdown. This signal will be high (5V) whenever the console does not want the user to feel resistance. In this case, the battery or external power will provide console power.

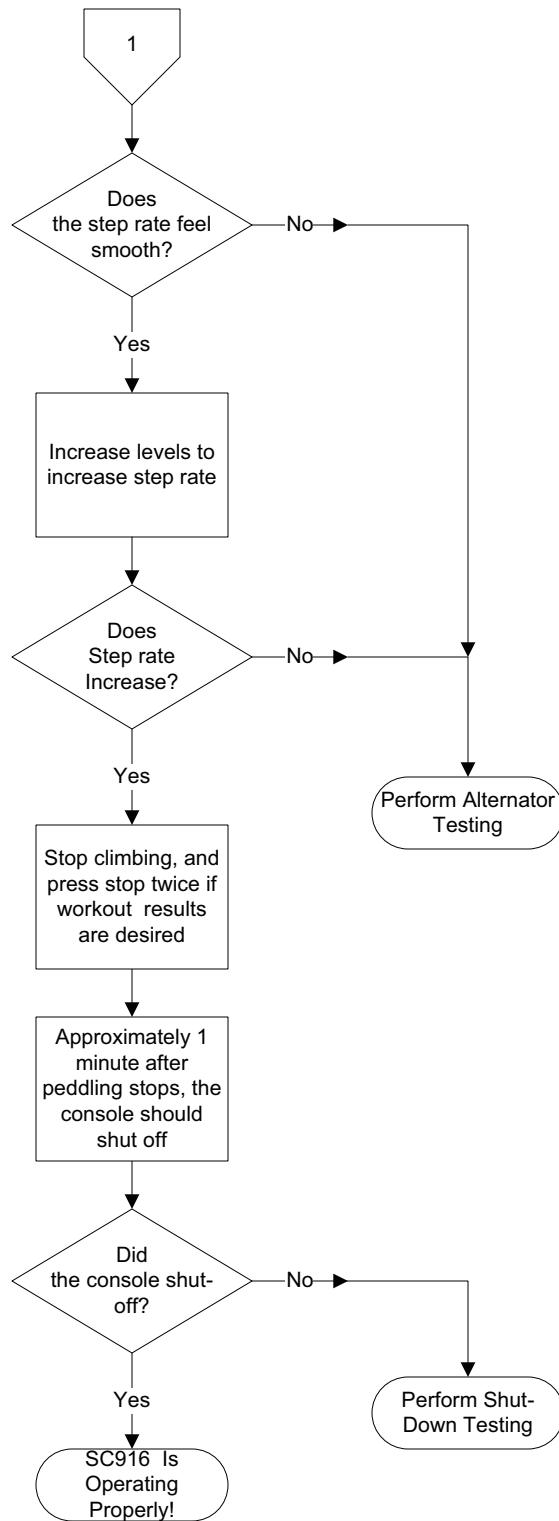
**This test point is to indicate that the console is able to turn on the alternator by driving this signal to a logic low (less than 1 volt) a logic high (5 volts) indicates the alternator is off.**

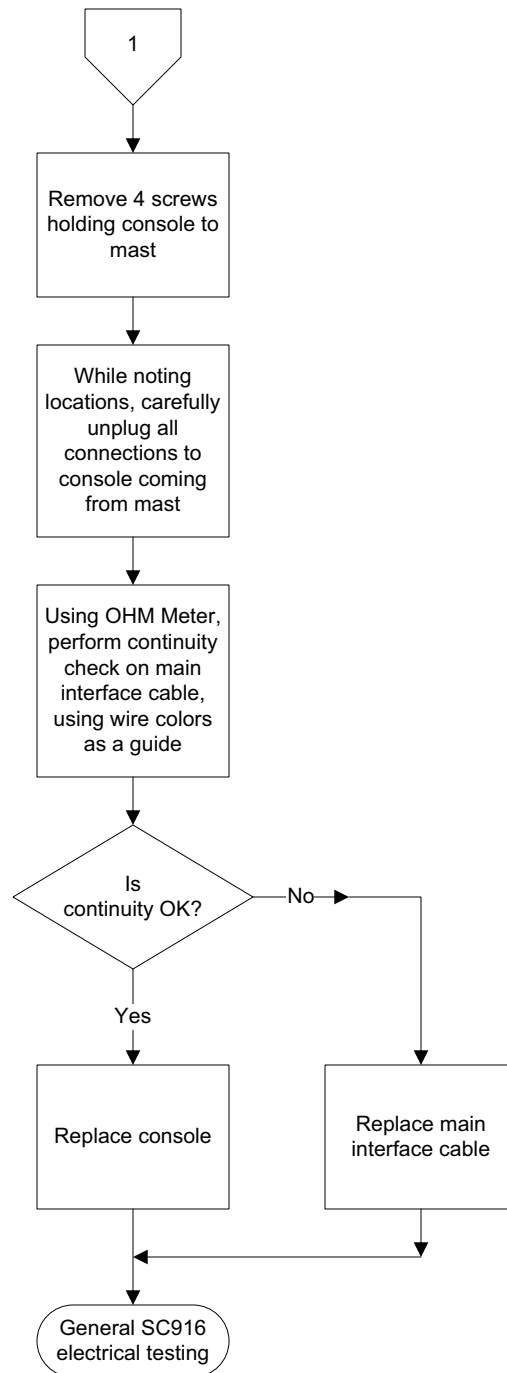
TP12: Signal Alternator B+. This signal will be 0V until the user has begun a workout. Once workout has begun, this voltage should read 7.8V during low resistance levels, or 9.8V during higher levels.

**This test point is to measure the Alternator's B+ output. This voltage is controlled By the console by controlling the logic level of pin 7 of J5 on the 27451 PCB.**

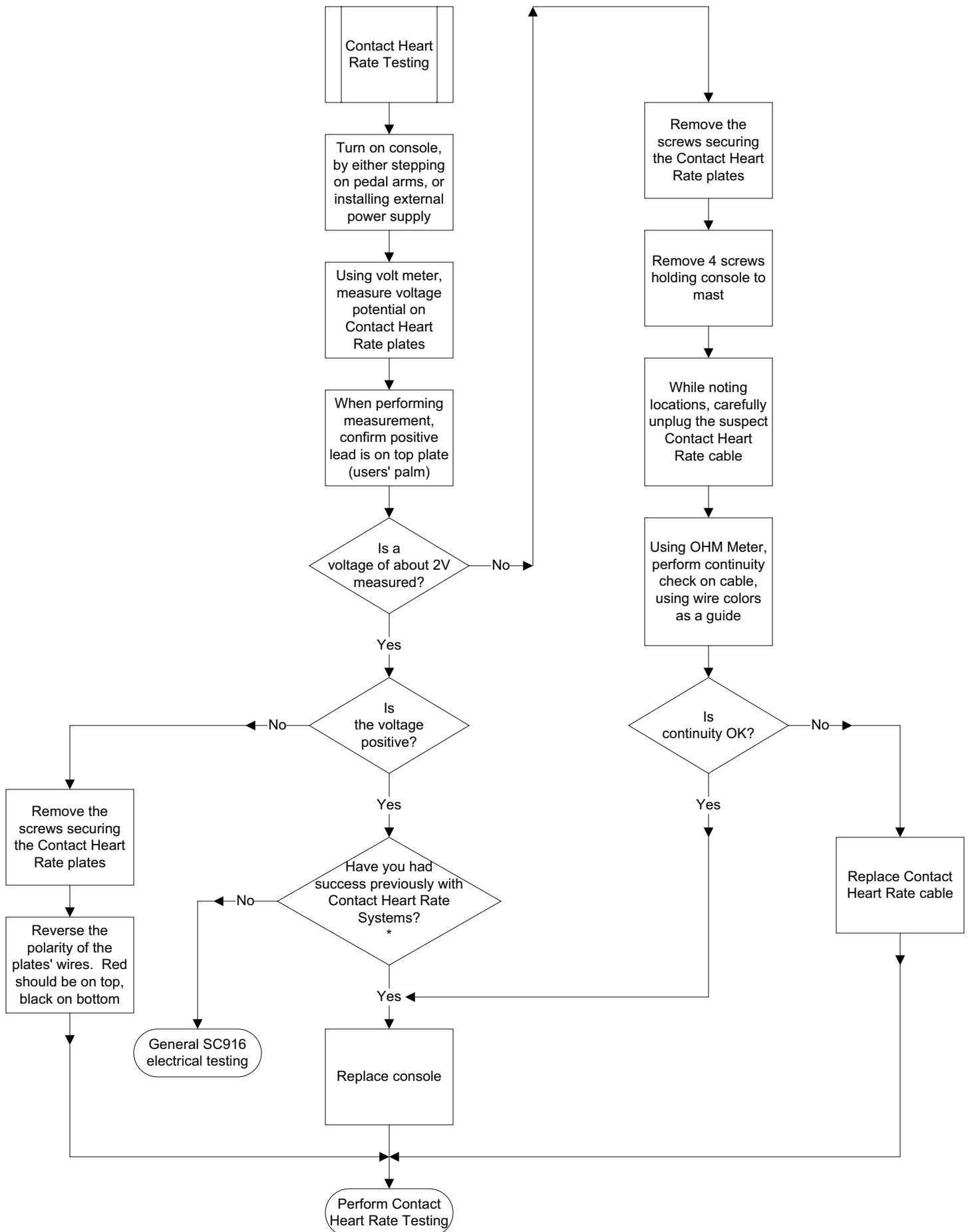
**A logic low on pin 7 tells the 27451 to control at 7.8V or a logic high sets 9.8V. Console voltage is regulated by Q3.**



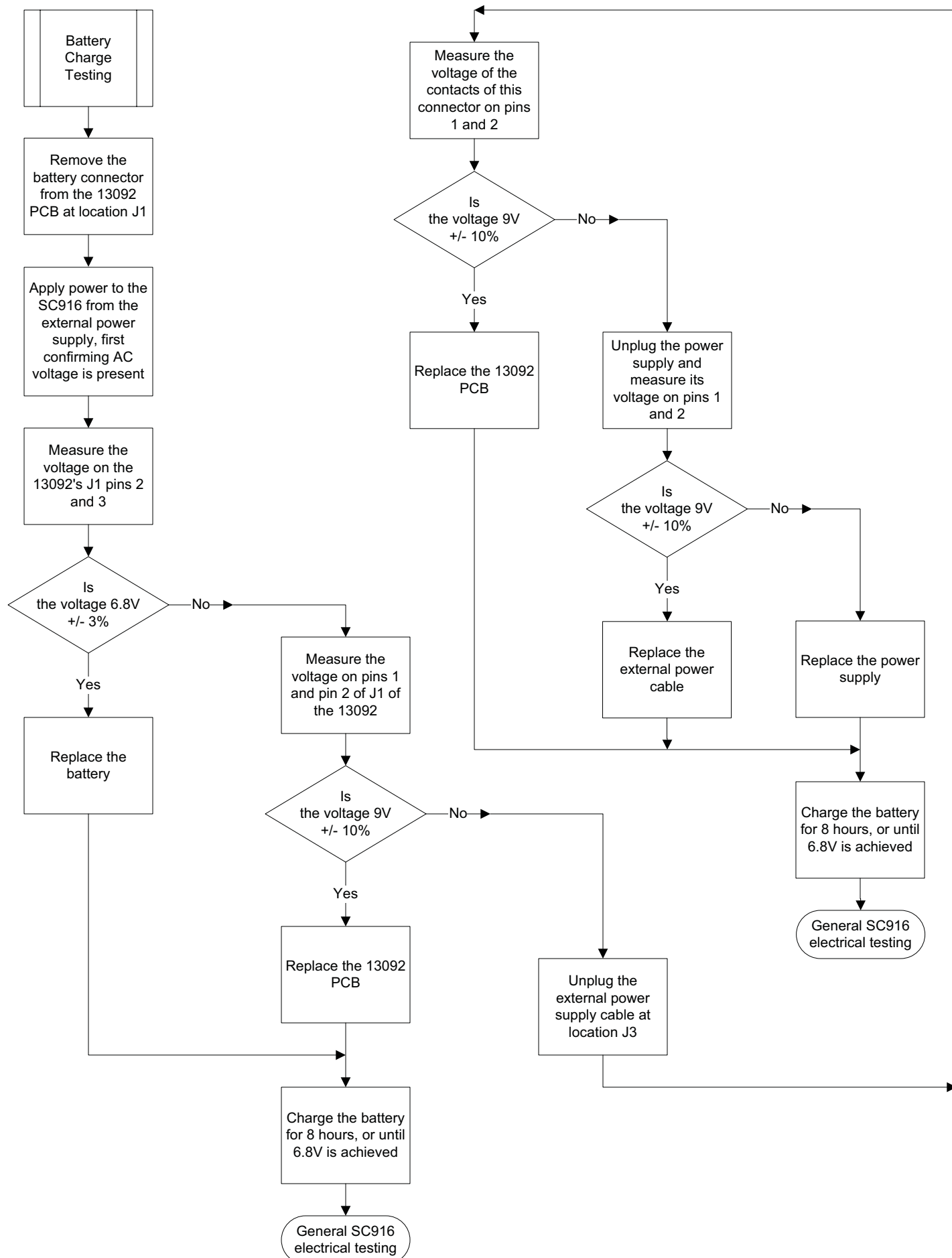








\* Contact Heart Systems perform properly on roughly 87% of the population, according to latest data from Salutron. Many factors affect the pulse strength at the user's palms.



Due to requiring many pieces of test equipment, this procedure does not test the complete functionality of the charger but rather its final "float" state. If the battery voltage is less than 3V, no more than 50mA is applied. From 3V to 6.8V current control applies nearly .5A until voltage control or float state is entered.

Batteries can only be tested under load. Even if it measures 6V or more unloaded, it can still produce little or no voltage under load as a defective battery's internal impedance increases.

# Alternator Testing

To minimize the complexity of the flowchart, this section will best be described in terms of system theory.

The colored connections to the alternator are as follows:

White-B+, Alternator output voltage

Brown-Field, Alternator Control Current

Black-Ground, Alternator return

Prior to proceeding with tests below, perform continuity checks on the alternator cable, and confirm cable is securely fastened to the alternator and the 13092.

Resistance over gravity is performed by the alternator in the SC916. When a user first steps on the pedal arms, and prior to starting a workout, the console should be enabling full field current to the alternator. Field current is enabled by asserting the signal at TP11 to 5V. At this time, initial field current is provided by the internal battery.

The alternator's B+ should rise as a result of this, but its voltage will depend on the weight of the user. Resistance is achieved by the oppositions of internal magnetic fields when field current is applied. The user's weight will affect the alternator's RPM under this condition, and under full field current conditions the voltage is not controlled. For an average weight user, a 6V to 8V level on B+ would be a normal condition.

Once a user starts a workout, the console controls the alternator's field current attempting to maintain the desired step rate. Again, this accomplished on TP11, and this signal is Pulse Width Modulated (PWM) from 0V to 5V. If the step rate is fast, the console will assert TP11 high longer, if the step rate is slow, it will assert TP11 low longer.

When TP11 is high, the alternator field current is limited current limited to 3.25A. So regardless of the voltage measured at B+, 3.25A is the maximum field current available. When TP11 is low, no field current should flow.

The only situation where a PWM signal would not be present on TP11 during a workout, is if a very light weight person was attempting to achieve a step rate that could not be achieved by their weight overcoming the frictional resistance of the system. In this case, the console would keep TP11 low (no field current, or no induced resistance).

During workouts when step rates of 25 Steps/Minute are targeted, the alternator's B+ increases as a function of speed and user weight. For high level workouts with heavy weight users, B+ levels of 40V could be witnessed. Once B+ exceeds 7V, battery maintenance and self-sustaining power console power will be provided.

If the alternator's B+ is not powering on but the console is, first confirm TP11 is 5V. If it is, and no resistance is felt, measure the field voltage with respect to ground. If this is 5V or greater with no B+, replace the alternator.

If maximum resistance is always felt, determine if TP11 is ever being driven low. If TP11 is driven low and full field current exists, suspect a defective 13092 PCB. If TP11 never goes low, suspect a bad console or shorted interface cable.

If no field voltage is detected, and if the console is on and configured as a stepper, measure the alternator's field resistance. Unplug the alternator from the 13092's J4, and measure the resistance from the brown wire to the black wire. 4ohms is typical for Prestolite units. If this is 4ohms or more, replace the 13092 PCB. If it's way less or shorted, replace the alternator.

If the step rates or B+ voltage are sporadic first look for loose connections. This type of problem could be caused by a defective alternator or 13092. If a known-good 13092 unit is available it will be the easiest component to replace. If the problem goes away, confirm the other PCB still causes sporadic behavior, and the problem was not in fact a loose connection.

The external 2.5ohm load resistor acts as a resistive ballast on the alternator. Once B+'s level exceeds 16V, this 2.5ohm load is switched onto B+. The resistance of the load can be confirmed by an ohm meter. If a known workout condition exists that drives B+ above 16V, confirm a voltage is measured across this 2.5ohm load. If it is not, check its cable continuity to the 13092 and B+. If the continuity checks, or if the voltage across the resistor always measures the value of B+ replace the 13092.

