Positioning Hardware

Encoder, Power amplifier, and motor Testing

Abstract: This TSB describes a procedure to test the encoders on motors, power amplifier and motor armature used by Allen Datagraph. You can use this test if you suspect the encoder on your motor is malfunctioning.

Requirements:

5V source (you can use clip leads and test points on CPU board)
Volt Meter
12 v power supply with current meter

Encoder Testing (all products) motor not in machine

Procedure:
Connect +5 to red wire of encoder
Connect ground to black wire of encoder

Set meter to dc volts
Connect black lead of meter to black wire
Connect red lead of meter to red wire
Verify +5VDC $\pm$ 0.2V

Set meter to ac volts

Move red lead of meter to green or grey wire
AC voltage should be near zero
Spin motor
AC voltage should increase

Move red lead of meter to white / yellow wire
AC voltage should be near zero
Spin motor
AC voltage should increase

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All products made in America

Encoder Testing (I960 products) motor in machine

Using dvm set to dc volts connect black meter lead to gnd test point and red to red wire of encoder. Voltage should be > 4.7 and < 5.3V.

move red meter lead to white / yellow wire. When stopped dc voltage should be either < 0.7v or > 3.8V. When motor is moving voltage will change to about 2.5v.

Move red meter lead to grey / green wire. When stopped dc voltage should be either < 0.7v or > 3.8V. When motor is moving voltage will change to about 2.5v.

You can then check to see if the servo board properly processes the counts by checking the velocity voltage produced at xvel and yvel test points.
Connect DVM black lead to dgnd on servo board PL-00-05-427
Connect red to xvel test point
Unplug power to motor (2 pin connector)
Power on
With no movement the xvel will be near zero volts
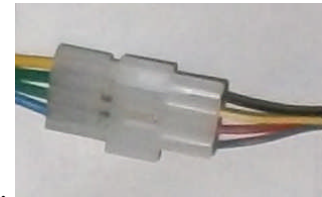While moving in one direction voltage will go up from zero and other direction voltage will go down.

Repeat with y-axis move red lead of meter to yvel.

Encoder Testing (mmc/tmc products) motor in machine

Power off machine. Disconnect motor power connector.

Power on machine. Pull apart encoder connector at motor.

showing this connector. Using dvm set to dc volts connect black meter lead to yellow (y axis) or violet (x axis) pin showing through connector and red lead to blue/wht (y axis) or blk/wht (x axis) pin showing through connector going to mmc/tmc board.. Voltage should be > 4.7 and < 5.3V.
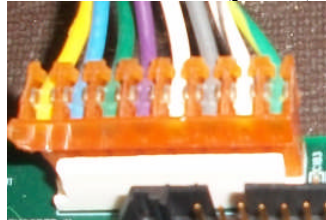

Reconnect encoder connector at motor. Leave power disconnected.
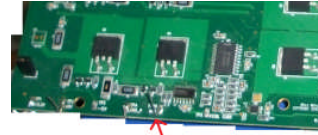
Move the black lead of meter to gnd test point on mmc **GND TEST POINT** or tmc

Move red meter lead to Green (y axis) or Gray (x axis)

wire touching the metal loop next to the wire. When motor is stopped dc voltage should be either < 0.7v or > 3.8V. When motor is moving (e.g. turning motor by hand) voltage will change to about 2.5v.

Move red meter lead to Blue (y axis) or White (x axis) wire. When stopped dc voltage should be either < 0.7v or > 3.8V. When motor is moving voltage will change to about 2.5v.

Power Amplifier Testing (I960 products)

With motor power connector unplugged power on so you can move the motor in both directions. You can check the power amplifier to verify that it properly responds to errors produced by moving the motors. When the motor is in the correct position the power amplifier voltage is near zero. Deviations from the expected position produce voltage at VMX and VMY test points to return the motor to the correct position. The machine will initialize with the motor at or near (less than 1/2 inch from) the expected position. Measure the voltage and VMX test point with black lead on DGND test point.

Moving the motor less than 3/4 inch of travel will produce both positive a negative voltages.

Repeat with y-axis, move read lead of meter to VMY test point.

Motor Testing

K-232 / K-240 / LS-189 motors 24 v motors

Connect motor to 12.5V volt power supply. No load condition. Verify current drawn is less that 300 ma. Reverse leads and repeat.

K-244 12v motors.

Connect to 6.5V supply and measure current

Verify current drawn is less that 300 ma. Reverse leads and repeat.