# G210-REV5 INSTALLATION NOTES:

**(April 3, 2002)**

Thank you for purchasing the G210 drive. The G210 Microstep drive is warranted to be free of manufacturing defects for 1 year from the date of purchase. Also anyone who is dissatisfied with it or is unable to make it work will be cheerfully refunded the purchase price if the G210A is returned within 15 days of the purchase date.

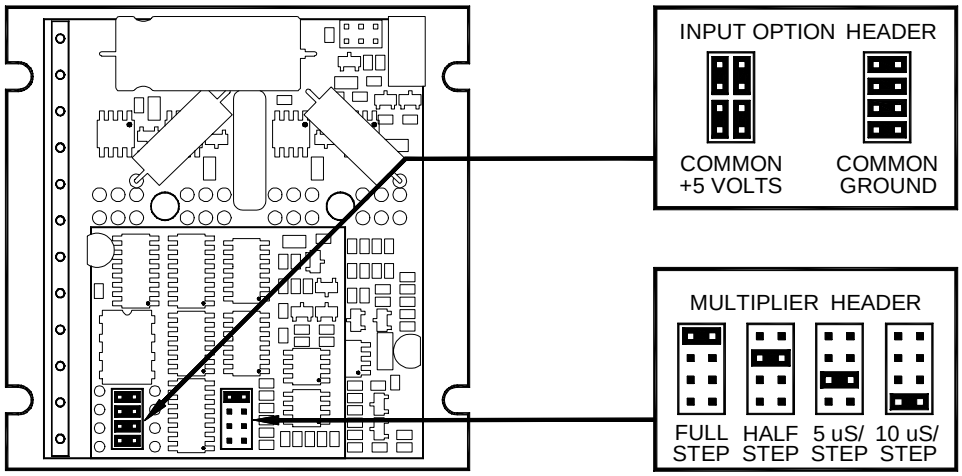
**PLEASE READ FIRST BEFORE USING THE G210**

Before you start, you must have a suitable step motor, a DC power supply suitable for the motor and a current set resistor. The motor's rated phase current must be between 1A and 7A, or 0.3A to 2A for the low current range. The power supply voltage must be between 4 times and 20 times the motor's rated voltage. The current set resistor may be a 1/4 Watt, 5% part. Finally have a STEP and DIRECTION pulse source available.

**G210A MULTIPLIER AND INPUT OPTION HEADERS**

**MULTIPLIER OPTION HEADER**

The G210A has a built in STEP PULSE MULTIPLIER. This circuit makes the G210 selectable for full-step, half-step, 5 microstep and 10 microstep operation. In all cases the motor will move with microstep smoothness. Use the MULTIPLIER HEADER to select the desired resolution. Do not operate the drive without a jumper.




**INPUT OPTION HEADER**

The INPUT OPTION HEADER allows the STEP and DIRECTION opto-isolators to be configured as either common ground or common +5VDC.

If the G210A inputs are driven by a source that has only ground available, such as a PC parallel port, move the 4 jumpers on the header so that it looks like the COMMON GROUND setting. Connect the input driver ground to TERM 10 on the main connector.

If the G210A inputs are driven by open collector transistors or standard TTL gates, move the 4 jumpers on the header so that it looks like the COMMON +5VDC setting.

## G210A TERMINAL WIRING

### POWER SUPPLY HOOKUP

**(TERM. 1) POWER GROUND** Connect the power supply ground to term.1
**(TERM. 2) +24 TO 80 VDC** Connect the power supply "+" to this terminal

The power supply voltage must be between 24 VDC and 80 VDC. The maximum power supply current required is 67% of the motor's rated phase current. An unregulated power supply may be used as long as the voltage stays between the limits; keep the ripple voltage to 10% or less for best results.

**CAUTION!** Power supply voltage in excess of 80 VDC will damage the G210A.

If the power supply is more than 1 foot (300 mm) away from the G210A, a 470 uF capacitor must be connected across the G210A's power supply terminals. Keep the capacitor lead length to 1 inch (25 mm) or less.

The choice of power supply voltage depends on the high speed performance required of the motor; doubling the voltage doubles the motor's high speed power. In all cases the power supply voltage should be no less than 4 times or no more than 25 times the motor's rated voltage. The motor may not run as smoothly as possible if the power supply voltage is less than 4 times the motor's rated voltage. A power supply voltage greater than 25 times the motor's rated voltage will overheat and damage the motor, even if it is not turning. Motor winding inductance should be 500 uH or greater.

**(TERM. 3) PHASE A** Connect one motor winding to this terminal
**(TERM. 4) PHASE B** Connect the other end of the winding to this terminal
**(TERM. 5) PHASE C** Connect the other motor winding to this terminal
**(TERM. 6) PHASE D** Connect the other end of the winding to this terminal

One motor winding connects to term. 3 and 4, while the other winding connects to term. 5 and 6. Turn the power supply off when connecting or disconnecting the motor. If the motor turns in the wrong direction, reverse the motor winding connections to term. 3 and 4.

**CAUTION!** Do not short the motor leads to each other or to ground; damage will result to the G210A.

4-wire, 6-wire and 8-wire motor may be used. When 6-wire motors are used, they may be connected in half winding or full winding. This is equivalent to an 8-wire motor connected in parallel or series. If a motor is connected in series or full winding, the motor's phase current rating is half of its parallel or unipolar rating. The choice depends on the high-speed performance required; a parallel-connected motor will provide twice the power of a series-connected motor at the same power supply voltage.

**(TERM. 7) DISABLE**

Shorting this input to ground (term. 7 to 12) forces winding currents to zero and stops all output switching activity. The G210A will continue totalizing step and direction inputs if any are sent. The power supply current drops to less than 15 ma. The motor will return to its original position when the disable input is released if no step pulses have been sent and the motor has not been moved more than 2 full steps.

**(TERM. 8) DIR** Connect the DIRECTION line to this terminal.
**(TERM. 9) STEP** Connect the STEP line to this terminal.
**(TERM. 10) COMMON** Connect this terminal to the controller +5VDC power supply or ground.

These inputs are optically isolated from the rest of the drive. Term. 10 is the common connection for the opto-isolators and must be connected to the +5 VDC supply or ground of your pulse generator, depending on how the input header is configured.

These inputs are meant to be driven by standard TTL logic or other driver capable of sinking 16 mA of current. The minimum logic "0" time is .5 uS while the minimum logic "1" time is 4 uS. Microstepping occurs on the falling edge of the step input.

**(TERM. 11) CURRENT SET** Connect the current set resistor to this terminal
**(TERM. 12) CURRENT SET** Connect the other end of the current set resistor to this terminal

This input programs the G210A's current output to the motor windings. The G210A will accommodate motor winding currents from 1 amp to 7 amps. Use the following equation to calculate the value, (in kilo-ohms) of the current set resistor: **R (in kilo-ohms) = 47 * I / (7 – I)**, or **R = 47 * I / (2 – I)** for the low current range.

**HEATSINKING:** The G210A needs heatsinking for current settings greater than 3 amps. The case temperature (measured on the bottom plate) should not exceed 70 degrees C, and for best life should be kept to 50 degrees or less. Use heatsink compound between the G210A and the heatsink.

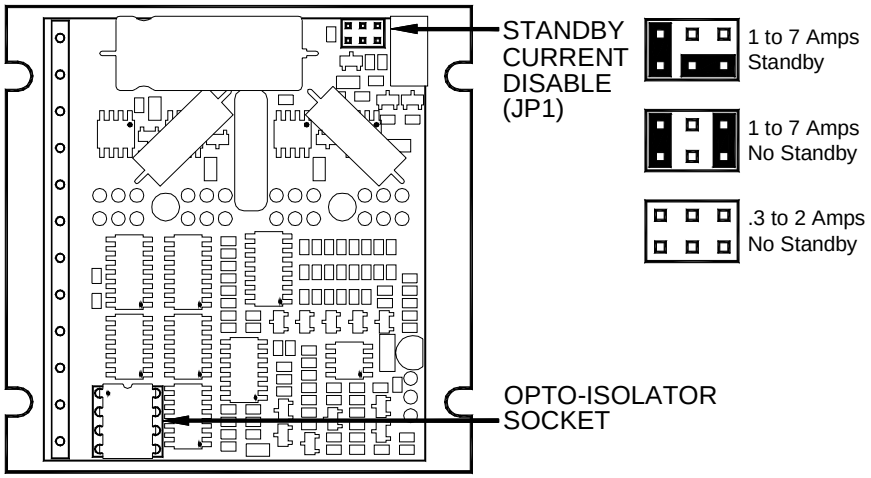
**CAUTION!** Current settings above 3 Amps without a heatsink will result in damage to the G210A.

**AUTO CURRENT REDUCTION:** The G210A reduces motor phase current to 33% of the set value when the motor is stopped. To disable this feature remove the cover and jumper **JP1** (see Fig. 2).

**ADJUST:** This trimpot adjusts the motor for the smoothest possible low-speed operation. Set the motor speed to about 1/4 revolution per second, then turn the trimpot until a distinct null is noted in the motor's vibration. This will result in the most even microstep placement for a given motor and power supply voltage.

**CONVERTING THE G210A TO A G201A:** The G210A can be converted back to a G201A by removing the G901 step pulse multiplier board. Remove the cover of the drive, and then use a small pair of needle-nose pliers to remove the G901 board from its socket. Plug an HCPL-2531 opto-isolator into this socket and replace the cover.

**MAIN CONNECTOR:** The G210A uses a 2-piece modular main connector. The connector is split in two pieces; terminals 1 thru 6 (power supply and motor leads) and terminals 7 thru 12 (control interface). Each can be removed separately by pulling the connector body upwards and off of the mating header pins on the G210A. The connectors must initially be removed to mount the G210A to a heatsink or chassis.




**(Fig. 2)**

**SPECIFICATIONS:**

| | |
|---|---|
| Supply Voltage: | 24 to 80 VDC |
| Phase Current: | 1 to 7 Amps |
| Auto Current Reduction: | 33% of set current, 1 second after last Step Pulse |
| Size: | 2.5"W, 2.5"D, .85"H (63.5mm, 63.5mm, 21.5mm) |
| Mounting Pattern: | 4 6-32 screws, 1.75" by 2.375" (44.5 mm, 60 mm) |
| Quiescent Current: | 15 Ma or less |
| Weight: | 3.6 oz. (100 gm) |
| Step Frequency: | 0 to 200 kHz |
| Step Pulse "0" Time: | 0.5 uS min (Step on falling edge) |
| Temp: | 0 to 70 C |
| Step Pulse "1" Time: | 4 uS min |
| Humidity: | 0 to 95 % (non-condensing) |
| Direction Setup: | 1 uS min (20 uS min hold time after Step edge) |
| Power Dissipation: | 1 to 18 W (1 to 7 Amps) |

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# G210 Stepper Drive

Cover: Aluminum, Anodized
Plate: Aluminum, Hard Anodized
Color: Black, Orange Text
Weight: 3.6 oz (100 gm)
Size: 2.5" X 2.5" X 0.825"
(63.6 X 63.5 X 21 mm)