

G212 INSTALLATION NOTES:

(March 28, 2008)

Thank you for purchasing the G212 drive. The G212 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.

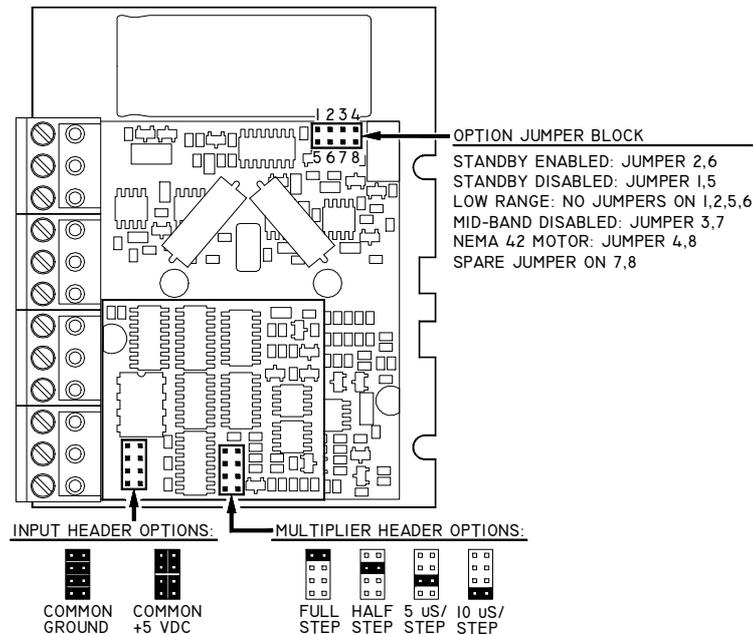
PLEASE READ FIRST BEFORE USING THE G212

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 G212 has a built in STEP PULSE MULTIPLIER. This circuit makes the G212 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 G212 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 G212 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.

REMOVING AND REPLACING THE COVER:

The STEP PULSE MULTIPLIER and the INPUT OPTION settings are jumpered internally. It is necessary to remove the cover of the drive to change these settings from their default values. Please follow the steps below on how to remove and replace the cover to avoid damaging the drive:

REMOVING THE COVER:

- 1) Remove the two 2-56 phillips-head screws on the bottom of the drive.
- 2) Gently lift the back of the cover upward until the LED clears the rectangular hole
- 3) Slide the cover backwards while still lifting until it clears the drive.

REPLACING THE COVER:

- 1) Make sure the LED is vertical relative to the drive printed circuit board.
- 2) Slide the cover forward over the drive while lifting the back of the cover.
- 3) When the cover is fully forward, look to see the LED is aligned with the hole.
- 4) Gently press the cover down, making sure the LED moves into the hole.
- 5) Replace the screws on the bottom of the drive.

It is recommended to use small needle-nose pliers or tweezers to move the jumpers on the internal headers.

(TERM. 1) POWER GROUND Connect the power supply ground to term.1

(TERM. 2) 24 - 80 VDC Connect the power supply "+" to this terminal

CAUTION! Never put a switch on the DC side of the power supply! This will damage, if not destroy, your drive!

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 G212.

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.

A more accurate calculation of power supply voltage is to find your motor's inductance, and put it into the following equation.

$$32 * (\sqrt{\text{mH inductance}}) = \text{Power Supply Voltage}$$

If your motor has 2mH of inductance, the equation would look as follows.

$$32 * (\sqrt{2}) = 45.12\text{V}$$

(TERM. 3) COIL A Connect one motor winding to this terminal

(TERM. 4) COIL /A Connect the other end of the winding to this terminal

(TERM. 5) COIL B Connect the other motor winding to this terminal

(TERM. 6) COIL /B Connect the other end of the winding to this terminal

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

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) NC There is no connection to this terminal.

(TERM. 8) DIRECTION Connect the DIRECTION line to this terminal.

(TERM. 9) STEP PULSE 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 to be driven by standard TTL logic or other driver capable of sinking 16 mA of current. The minimum logic "0" time is 0.5uS while the minimum logic "1" time is 4.5uS. 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 G212's current output to the motor windings. The G212 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: **$R \text{ (in kilo-ohms)} = 47 * I / (7 - I)$** , or **$R = 47 * I / (2 - I)$** for the low current range.

Here are the current set resistor values for motor current in .5A increments. Round the appropriate answer to the nearest 5% resistor value.

- a. 1A – 7.8K
- b. 1.5A – 12.8K
- c. 2A – 18.8K
- d. 2.5A – 26.1K
- e. 3A – 35.25K
- f. 3.5A – 47K
- g. 4A – 62.67K
- h. 4.5A – 84.6K
- i. 5A – 117.5K
- j. 5.5A – 172.33K
- k. 6A – 282K
- l. 6.5A – 611K
- m. 7A – OPEN

HEATSINKING: The G212 needs heatsinking for current settings greater than 6 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 G201.

The drive must be heatsinked to a piece of aluminum, preferably with fins and a fan to increase heat dissipation and surface area. Do not screw the drives directly to the door of your control cabinet, as this will typically not provide adequate heatsinking properties.

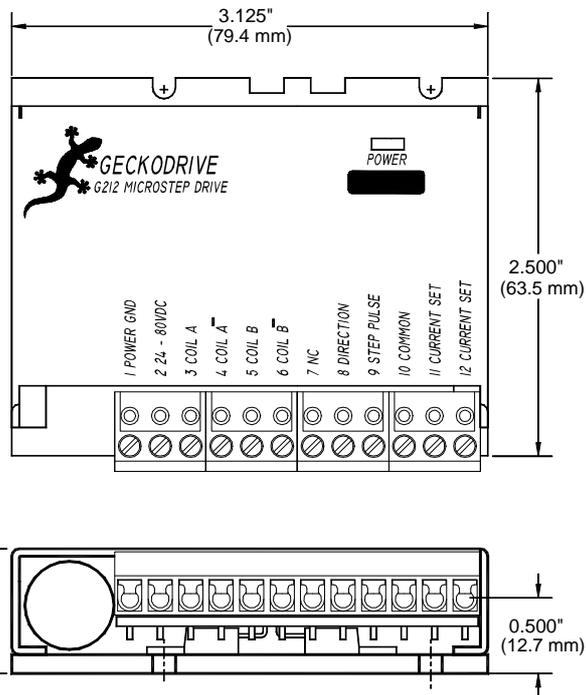
.AUTO CURRENT REDUCTION: The G212 reduces motor phase current to 33% of the set value when the motor is stopped. To disable this feature remove the cover and jumper **JP1** (see Fig. 2).

ADJUST: This trimpot adjusts the motor for the smoothest possible low-speed operation. Set the motor speed to about 1/4 revolution per second and 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.

MAIN CONNECTOR: The G212 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 G212. The connectors must initially be removed to mount the G212 to a heatsink or chassis.

G212 Step Motor Drive

Cover: Aluminum, Anodized
 Plate: Aluminum, Hard Anodized
 Color: Black, OrangeText
 Weight: 4.5 oz (130 gm)
 Size: 3.125" X 2.5" X 0.825"
 (79.4 X 63.5 X 21 mm)



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:	3.125"W, 2.5"D, .85"H (79.4mm, 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:	4.5 oz. (130 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
Power Dissipation:	1 to 18 W (1 to 7 Amps)

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