R208
MICROSTEPPING DRIVER

MAIN FEATURES:

- Voltage: +12 to 24VDC
- Current: 0.35 to 2.0 Amps Peak
- Hold current: 23% or 100%
- Step resolution: Full Step, 2x, 4x, 8x, 2 wires with 4 combinations of high and low (00, 01, 10, 11)
- Speed: (step frequency: 25 kHz)
- Inputs: Step Clock, Direction, Disable/Enable
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ACCESSORIES:

- Each R208 comes with a DB-9 connector with flying leads, and a 4 pin connector with flying leads for the motor.

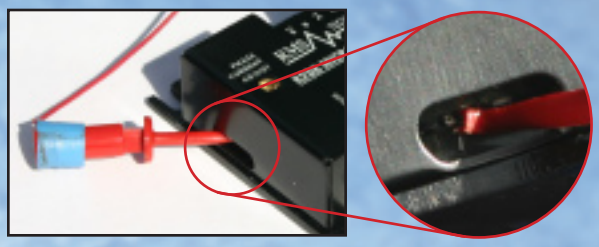
p/n 090-00019

p/n 090-00018

- 090-00019 DB-9 cable (comes with unit)
- 090-00018 motor cable (comes with unit)
- Also Requires (not included): PC, step motor, function or pulse generator, controller

SETTING THE CURRENT:

- Connect the power supply and use a voltmeter to read from pin 7 to the potentiometer in the R208 board as shown:



- Rotate potentiometer
  (CW will decrease current, CCW will increase current)
- Voltmeter should read the following:
  Voltage Vref = (I – 0.14)/1.554, where I is desired current in Amps/Phase, and this formula accounts for multiplying 1.4 times to get peak current.
  Example: if motor is rated at 0.8 Amps/Phase,
  Vref = (0.8 – 0.14)/1.554 = 0.0.425V

PIN ASSIGNMENTS:

A DB-9 female connector cable receives power and provides the control connections for the R208 Driver. Active signals are optically isolated. An open-collector drive is required to provide pulses for Step, levels for Direction and Disable/Enable.

Pin #	Color	Function	Input
1	Red	+V	Motor Supply Voltage: +12 to +24 VDC
2	Black	SR1 Input	Step Resolution 1. Pins 2 & 3 are used to preset the step resolution by selective contact to ground (Pin 7)
3	Brown	SR2 Input	Step Resolution 2. Pins 2 & 3 are used to preset the step resolution by selective contact to ground (Pin 7)
4	Black/White	Enable/Disable Input	This input is used to enable/ disable the output of the driver.
5	Orange	Direction Input	This input is used to change the rotation direction of the motor.
6	Green	Power Ground	The ground or return of power supply connects here.
7	White	Logic Ground	Used to ground to the logic functions (i.e. step resolution)
8	Blue	Opto Supply	+5 VDC input used to supply power to the isolated logic inputs. A resistor must be used if the supply is greater than 5 VDC.
9	Yellow	Step Clock	Connects to the open-collector drive.

CHANGING STEP RESOLUTION:

Pins 2 and 3 are used to change microstepping. When one pin, both or no pins are connected to Pin 7, this will change the step resolution accordingly:

Step Resolution	SR1	SR2
Full	Close	Close
Half	Close	Open
1/4	Open	Close
1/8	Open	Open

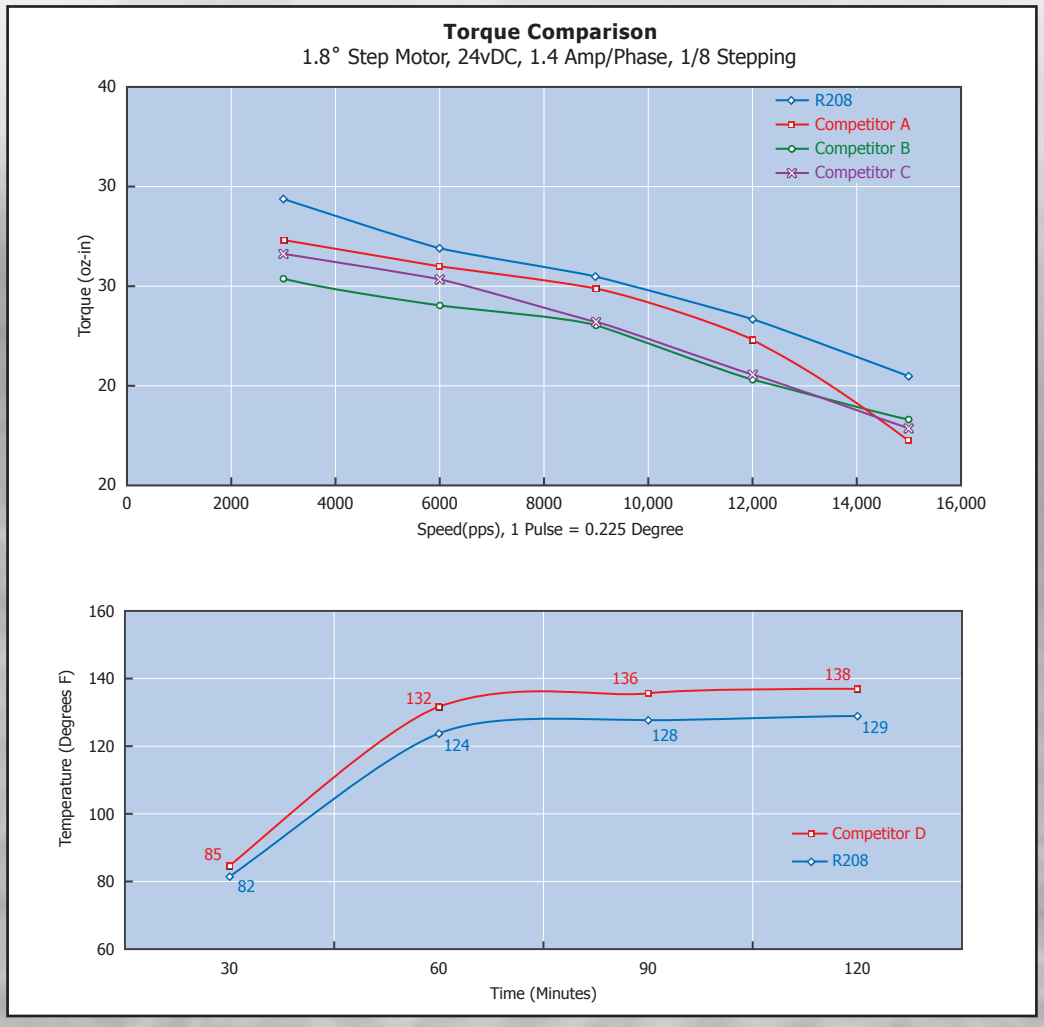
SR1 (Pin 2) and SR2 (Pin 3) are used to preset the step resolution by selective contact closure to ground (Pin 7).

KEY SELLING FEATURES:

- Extremely Low Cost
- Compact Size
- Low Power Dissipation
- Higher Torque

DETAILED FEATURES:

- Operating temperature: -20 to 50 °C
- Humidity range: 0 to 95% (non-condensing)
- Step pulse timing:
  - Minimum step pulse width: 20 microseconds (20x10-6)
  - Minimum step low time: 20 microseconds
  - Maximum power-down recovery time 20 milliseconds
- Max step frequency = 1 / [min. step pulse width + min. step low time] = 25 kHz
- More efficient and better torque output:



COMMON TECH SUPPORT QUESTIONS / RMA ISSUES:

BURNED OR BLOWN DRIVER (LOW INDUCTANCE):

Motors with inductance levels of 1.5 mH or less will cause the drivers to blow or not work as expected. Torque will drop because the output current is less than expected. (A limitation of the driver chip)

MOTORS ARE HOT:

Check holding current and running current. It could be too high.

Check wiring. Motor phases could be crossed (A is in B or B Bar, etc)

MOTORS DO NOT ROTATE:

Check connection between motor and drive. If, for example, the "A" and "A Bar" connection is actually connected to an "A" phase wire and a "B" phase wire, then the driver will not run. (CAUTION: Doing this could burn the driver)

Be sure they have connected an external +5VDC power supply for the optos.

Is power being supplied to the motor? (Is there holding torque?) If so, then the unit is okay, so check the signal generator. Change the signal to TTL and be sure Pin 4 (enable/disable) is not touching Pin 7 (logic ground).

POWER SUPPLY IS DRAWING EXCESSIVE CURRENT:

Check if the polarity is switched on the main power supply. See connection chart above.

Unpluggin a motor from the driver while power is still on will burn the driver chips. The motor has Back EMF voltage and when disconnecting the motor from the driver, it could send voltage back into the driver. Once they are burned, something is short-circuited on the driver board and will draw excessive current from power supply.

MOTOR ROTATES, BUT IRRATICALLY, NOT SMOOTHLY:

Check resistance of motor, ensure that Phase A and Phase B are equal

If one of the two drivers are blown, then only half of the driver works. If this is the case, turning on and off the pulses to move and stop the motor might cause the motor to rotate CW and CCW at random times, when it should only rotate in one direction. Half the torque is available too.

Acceleration or speed is too fast for the motor. Lower the speed until it steps smoothly

You could be hitting a resonant spot, microstep the unit to see smoother results

Ensure step pulses are from a source with 5V amplitude pulses, 50% duty cycle, pulse train, and is a square wave.

Check correct wiring.

DO I NEED TO USE A SEPARATE +5VDC SOURCE FOR THE OPTOS?

It is highly recommended to use a separate source, but if they want to use resistors to limit the current going into the +5 VDC opto supply, they can do this. Tying together the two power sources could cause damage to the optos.

Use the following chart to always limit the current to 7 mA given a specific voltage source:

OPTO SUPPLY	RESISTOR VALUE (Ohms 5%)
5 V	–
10 V	750
15 V	1300
20 V	2000
24 V	2700

VOLTMETER READS UNCLEAR WHEN SETTING THE CURRENT:

If the value continually changes and you cannot reach the desired Vref value, then the driver board has been damaged. The optos might have blown.

DOESN'T ALWAYS CHANGE TO THE CORRECT STEP RESOLUTION:

Changing step resolution "on the fly" might ruin the driver.
Disable the motor from running, then change step resolutions.

Perhaps one of the two step resolution pins are not working properly. If Pin 2 is damaged, then only 1/4 and 1/8 microstep will work. If Pin 3 is damaged then only 1/2 step and 1/8 microstep will work.

WILL POTENTIAL BACK-EMF FROM THE STEP MOTOR DAMAGE THE R208?

The circuit on board is protected and it should not be an issue if you are using the driver properly.

HOW LONG ARE THE CABLES FOR THE MOTOR? HOW LONG CAN THEY BE?

Both cables are 12 inches in length. Leads are all flying leads. The length between the motor and driver is recommended to stay within 1 to 2 feet. Anywhere between 2 feet and 6 feet, be sure to use a twisted pair shielded cable, meaning, the two wires for phase A and the two wires for phase B are both shielded and twisted, then shielded overall. Anywhere beyond 6 feet, it is recommended to measure the amount of current going out of the driver versus the amount of current the motor is receiving. This value will be different due to the wire resistance across 6+ feet. You may need to set the current to be higher at the driver end and by the time the motor sees the signal, it will be the desired amount.

IS THE R208 A LOGIC SOURCING OR SINKING?

The R208 is a logic sinking driver with power put into the driver. A logic sourcing driver can provide a power source.

WHAT IS THE HEAT DISSIPATION OF THE R208?

It has 35°C/Watt heat dissipation which is very low compared to other drivers.