

# 23001C Basic Motor Speed Control



## Safety Warning!

This product should be installed by a qualified technician, electrician or electrical maintenance person familiar with its operation and the hazards involved. Proper installation, which includes wiring, mounting in proper enclosure, fusing or other current protection and grounding, can reduce the chance of electric shock, fires or explosion in this product or other products used with this product, such as electric motors, switches, coils, solenoids and relays. Eye protection must be worn when working with this product. This product is constructed of materials that may be a potentially hazard. Proper shielding, grounding and filtering of this product can reduce the emission of radio frequency interference which may adversely effect sensitive electronic equipment. If information is required on this product, contact the factory. It is the responsibility of the individual installer to supply this safety warning to the ultimate user of this product. This control contains electronic start/stop and inhibit circuits, which may inhibit the voltage to the motor. However, these circuits are never to be used as a safety disconnect, since they are not fail-safe. Use only the AC line for this purpose. Fire and/or electrocution can result due to improper use of this product. Warning, operation of this device requires detailed installation and operation instructions provided in the Installation/Operation manual intended for use with this product. It should be retained with this device at all times.

### Maximum Electrical Rating and Limitation of Use

- **Input Rating:** (per 508C-54.1A) 120VAC, 5Amp, single phase, 50 / 60 Hz line voltage
- **Output Rating:** (per 508C-54.1b) 0 to 90VDC at maximum average load current of 5 Amp (1/4HP)
- **Overload protection:** (per 508c-56.1) Unit is not protected from overload condition. User must provide line fuse.
- **Over Speed Protection:** (per 508c-56.1) Device does not provide over-speed protection for failed components within the controller device.
- **Catalog number:** (per 508C-55.1c) 23001
- **Temperature Rating:** (per 508C-55.6) Maximum Surround Air Temperature 45°C /113°F at full rating
- **Wire type** (per 508c-60.8) Use Copper Conductors Only. Wire motor and AC input terminals using 14 AWG copper conductors.
- **Wiring Torque** (per 508c-60.11) Terminal clamping screws should be tightened to 7 in-LBS
- **Power Source:** (per 508C-56.4, 57.2) AC power to the controller must be fused to limit maximum inrush current to 3A.
- **Motor Type:** Unit is designed for permanent magnet brush type DC motors, or shunt wound motors.
- **Warning:** Bonding of chassis ground is not automatic and must be provided as part of installation. End product must be grounded with designated wire from chassis to earth ground at electrical box.
- **Enclosure:** Unit must be mounted in a protective enclosure where it will **not** be exposed to contaminants such as water, metal chips, solvents or excess vibration. Enclosure should be at least 1-1/2 times size of the drive and comply with UL50 standards.
- **Control Circuit Protection:** Device requires external fuse, selected to match the motor and application.
- **Maintenance/Repair** (per 508C-6.4.2) Drive unit contains no user serviceable parts.

### Installation Instructions

1. Install external fuse between AC power and L1 terminal (see Table 1). Fuse both L1 & L2 for 220V use.
2. Set top board switch to 115 position (120V AC line voltage). Set bottom board switch to 90 position (0-90V out)
3. Wire per Figure 1 below
4. Set board Torque for 150% of motor current rating (see torque trimpot adjust instructions below)

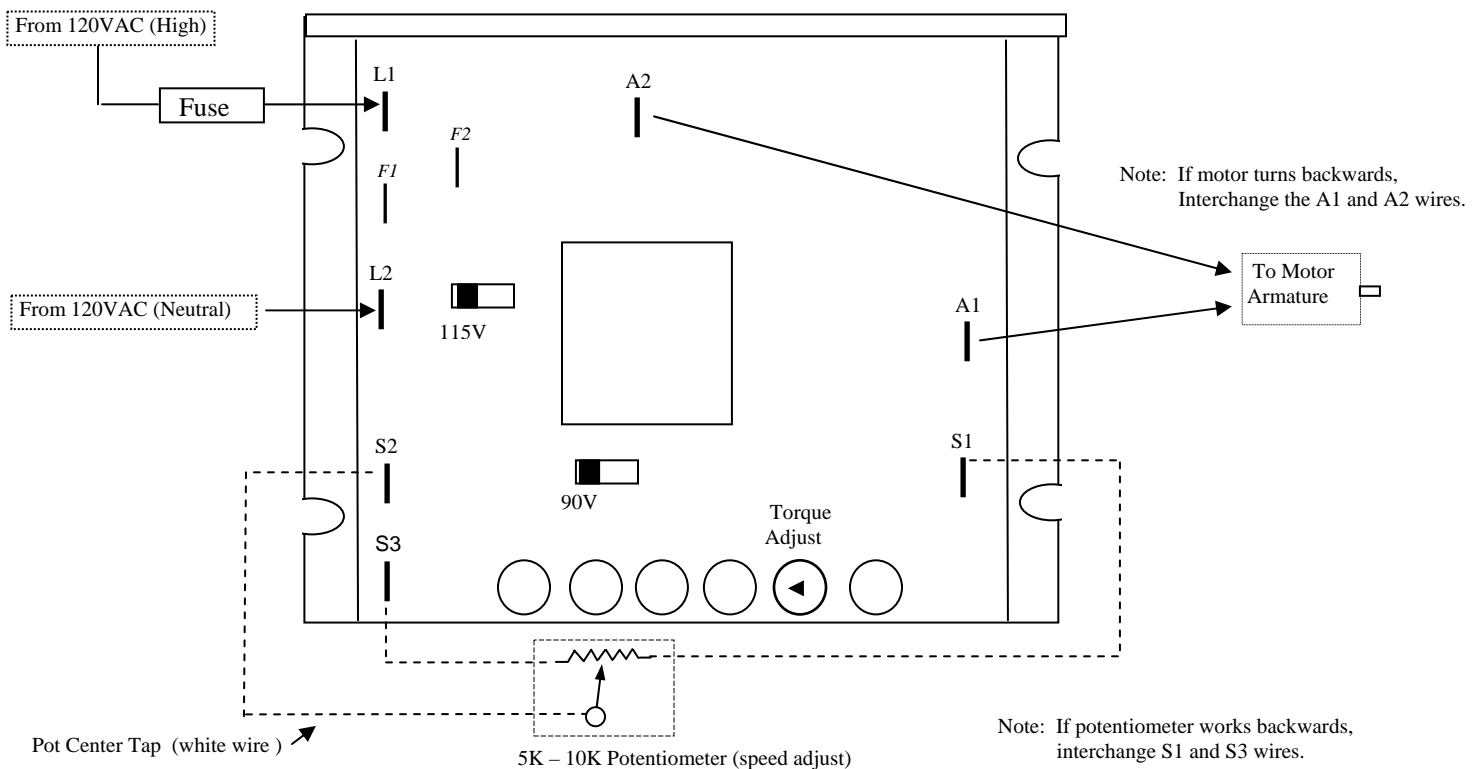


Figure 1 - Wiring Diagram

Table1. Fuse Selection

**Recommended Fuse Sizes (external fuse is required)**

Horsepower	Max Armature Current	AC Line Fuse Amps
1/15 HP	0.8	1.5
<b>1/8 HP</b>	<b>1.5</b>	<b>2.0</b>
1/6 HP	1.7	3.0
1/4 HP	2.5	5.0

**Field Output Connection - Normally Not Used (shunt wound motors only)**

Line Voltage	Field Voltage DC	Connect Field To
115	50VDC	F1 and L1
115	100VDC	F1 and F2

**Torque Trimpot Adjust**

The torque should be set to 150% of the motor nameplate current rating.

1. With power disconnected from the drive, connect a DC ammeter in series with the armature.
2. Set torque trimpot to minimum (full CCW).
3. Set the external speed adjust potentiometer to maximum speed.
4. Carefully lock the motor armature. Be sure the motor is firmly mounted.
5. Apply power. The motor should be stopped
6. Slowly adjust the Torque trimpot CW until the armature current is 150% of rated motor current.
7. Turn the external speed adjust potentiometer to minimum speed (fully CCW).
8. Remove power.
9. Remove the stall from the motor.
10. Remove the ammeter in series with the motor.

**Min Spd Trimpot Adjust**

The minimum speed trimpot establishes the motor speed obtained in response to the minimum potentiometer adjustment. It is factory adjusted to zero speed. This trimpot may be adjusted to allow the motor to turn at a predetermined speed, when the user has adjusted the external speed potentiometer to minimum.

**Max Spd Trimpot Adjust**

The maximum speed trimpot establishes the motor speed obtained in response to the maximum user potentiometer adjustment. It is factory adjusted to maximum speed. This trimpot may be adjusted to limit the motor speed, when the user has adjusted the external speed potentiometer to maximum.

**IR Comp Trimpot**

The IR compensation trimpot setting determines the degree to which motor speed is held steady under varying loads. If set too low, the motor speed will drop when loaded to 100% of rated load. If set too high, the motor speed will oscillate. **IR Comp is factory set for optimum motor regulation and should not be adjusted.**

**ACCEL Trimpot**

The acceleration setting determines the time the motor takes to ramp to a higher speed. Turning the trimpot CW will decrease acceleration and CCW will increase acceleration. The ACCEL trimpot is factory adjusted for maximum acceleration (full CCW).

**DECEL Trimpot**

The deceleration setting determines the time the motor takes to ramp down to a slower speed. The deceleration trimpot is factory set to the fastest deceleration time (full CCW).