



Gemini Controls 2 Quad PWM Control Installation and Adjustment Instructions

120VAC & 240 VAC Models

INTRODUCTION

The Gemini 2 Quad series adjustable speed drive provides smooth motoring with the added feature of braking torque. Gemini's PWM braking is stepless and provides full braking torque from maximum speed down to 5-10% of maximum speed, depending on the motor. Braking is accomplished with PWM modulation.

Four LED's are provided to indicate motoring, braking, resistor loading, and power-on. For safety purposes an optional electronic interlock is included to prevent starting unless the speed control signal is at zero.

Specifications:

Speed Range: 100:1

Overload Capacity: 150% of rated current for 60 seconds

Maximum Speed Adjustment: 50-110% of rated speed

GENERAL

These instructions provide basic information for installation and adjustment. Please contact Gemini Corp. if further information is necessary. It is possible to damage the drive through misuse or misapplication. Please read this material thoroughly before proceeding with installation. Unpack the equipment noting any shortages or damaged equipment. Immediately notify the carrier of any damage. Store in clean, dry location if the product is not used immediately. The relative humidity should not exceed 95%, non-condensing.

INSTALLATION

The models are designed for chassis mount. Carefully mount the chassis allowing clearances for access, air flow and conduit entry. The environment should be free of vibration and contaminants. The operating temperature range for the Gemini drive is 32 to 104 degrees Fahrenheit (0-40C). Since the drive produces heat, utilize a source of cooling, such as a fan, when the ambient temperature approaches 104 degrees.

WARNING: This motor control contains a high voltage DC bus with considerable capacitance and a large amount of stored energy. Direct contact with this bus can be very dangerous. Do not touch any conductors or connections to the control while power is on, for at least five minutes after removal of power. Use insulated tools for any adjustments.

WIRING

1. Input Wiring - Connect the AC line to terminals "L1" and "L2" (note wiring diagram). The 115 VAC hot is wired to the fused terminal "L1". The chassis may be grounded using an unused hole. Do not ground the circuit board. Input wire size must be in compliance with the National Electrical Code and all local codes and restrictions. Fuse 1 is a line fuse. If Fuse 3 blows, return the



drive to the factory.

WARNING: Do not connect line power to the motor terminal connections.

2. Output Wiring - Connect the negative and positive of the motor to the "A-" and "A+" terminals of the drive. Fuse 2 provides motor protection. Do not operate the drive without connection to the motor.

3. As a safety feature, the 12M8-21000 series contain a zero speed lockout feature that disallows operation unless the speed potentiometer is at zero, or the external source is at zero volts. If this feature is not desirable, remove power, wait a minimum of 5 minutes, and carefully clip transistor Q6 from the circuit.

4. Braking Resistors - A 10 ohm braking (dump) resistor is required to dissipate power during a braking operation, when powered by 115VAC. A 20 ohm power resistor is used for 230 volt input. Parallel 50W braking resistors (100W total) are provided on models 12M8-21001 and 12M8-22001. The resistor wattage rating depends on speed, frequency and duration of braking.

The following table provides guidelines for selection of the wattage rating:

<u>Operation</u>	<u>Dump Resistor Wattage Rating</u>
Frequent braking at high speed	500 Watts per motor HP
Frequent braking at ½ speed	250 Watts per HP
Intermittent braking at any speed	100 Watt per HP

Example: Use a 20 ohm, 1000 watt dump resistor with a 2 HP motor/drive system, operating from 230VAC input, when frequent braking at high speeds is expected. Note: The power rating is variable, the ohmic values are not.

Wire the resistor to terminals "1" and "2". If the braking resistor is not connected, or is the wrong value, the drive will trip out while

attempting to brake. To reset the drive remove power. Most power resistors can operate at several hundred degrees, so there is no reason to suspect overload unless the resistor smokes, smells bad, or glows. Be sure to mount the braking resistor in a location where its high temperature will not damage nearby components.

5. Control Wiring - Connect a 10K, 1/4 watt speed potentiometer to the "L", "W", and "H" terminals, with the wiper connected to the "W" terminal, and the CCW end to the "L" terminal. If an external 0-10VDC speed reference signal is used, first set-up and adjust the system with a 10K potentiometer as a speed reference. Connect the **isolated**, external source only after satisfactory operation with a potentiometer, as any problem may then be directed toward interfacing. The frequency of a pulse width modulated **isolated** input signal must exceed 50Hz, otherwise damage may result. Wire the common to the "L" terminal and the positive voltage to the "W" terminal.

ADJUSTMENTS AND START-UP

1. Turn the "TORQUE BOOST", "and "MAX SPEED" potentiometers, located on the board, and speed adjustment potentiometer, to their full counterclockwise position. Rotate the "CURR LIMIT" potentiometer to the mid-position.

2. Apply power and rotate the speed potentiometer slightly clockwise. Note, the zero speed safety lock prevents the motor from rotating on start-up, when the speed potentiometer is at any position other than fully counterclockwise. Observe the direction of rotation. If incorrect, turn off the power and reverse the motor armature connections.

3. Rotate the speed potentiometer to the extreme clockwise position, and adjust the the "Maximum Speed" potentiometer for the desired maximum speed, or for rated motor voltage as measured with a DC meter at the armature connection.

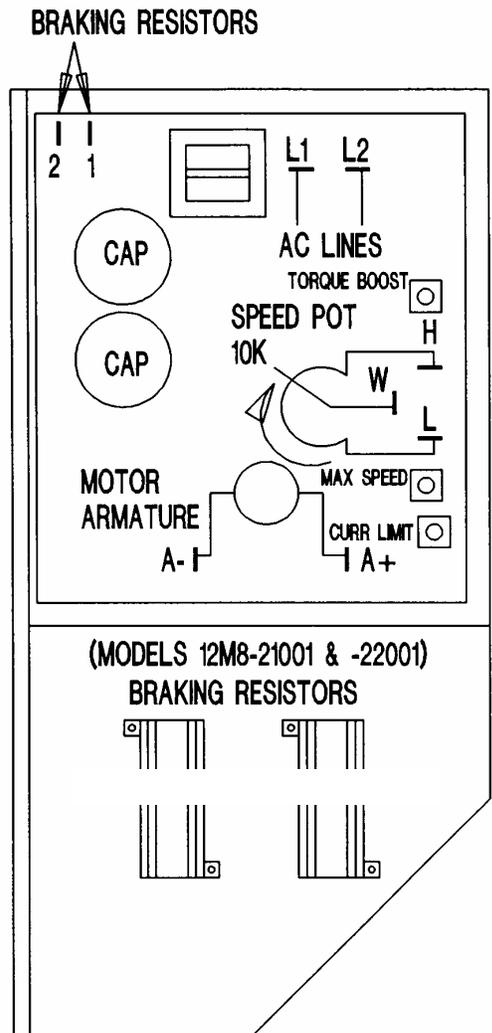
4. Adjust the "TORQUE BOOST" potentiometer clockwise until the yellow and green LED's, located on the board, turn on and off alternately, and then turn back counterclockwise just until the green LED is on steady.

5. The "CURR LIMIT" potentiometer can now be adjusted so that the motor will not stall under maximum load. Clockwise adjustment increases the current limit, and the torque available from the motor. If additional torque is required for acceleration, increase the current limit setting.

6. Operate the motor under load and fine tune the "TORQUE BOOST" adjustment for the best response.

Four LEDs are provided for status and diagnostic purposes: LED 1 indicates power ON, LED 2 - braking, LED 3 - motoring and LED 4 - dumping (hard braking). The system is now ready for operation.

BRAKING RESISTOR CONNECTIONS



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