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Si52HyUdMC1-120V-20A, Single, 120V at 20A, Open-Loop, Hybrid, Unidirectional Motor Controller with Integrated Heat Sink, and with 5kHz or 20kHz PWM, T-Chip

The **Si52HyUdMC1-120V-20A** is a 120V, 20A microprocessor based, Single, Open-Loop, Hybrid, Unidirectional, Motor-Controller board that uses 5kHz or 20kHz pulse-width modulation (**PWM**) to efficiently control the speed of a brush type DC motor (or load current) in the 0 to 2400W power range, and in 20W steps. An onboard microprocessor generates a 5kHz or 20kHz **PWM** carrier signal, controls the load-power (or motor speed) and controls the load-current rate (or motor acceleration and deceleration). The **PWM** carrier frequency is user selectable by the jumper **CN4**, 20kHz when **CN4** is open and 5kHz when short. The high frequency PWM rate provides a smooth speed control and insures a quiet motor environment. As the name hybrid (**Hy**) implies, the desired motor speed (or PWM pulse-duration) is set by a variable (0 to +5V) analog input-voltage **V_{I,G}**, providing a smooth motor-speed control from 0 to 100% in 0.833% steps; while the other control-signals are digital. This analog input (**V_{I,G}**) is zener-diode protected and can withstand severe overloads.. The user can choose between slow or fast motor acceleration/deceleration modes by short-circuiting or open-circuiting the pins labeled **J1**. The slow mode, with rise-time/fall-time of 0.5s, is selected by short-circuit (**J1** jumper installed); while the fast buildup mode, with rise-time/fall-time of 0.025s, is selected by leaving these pins open (no Jumper installed). An onboard LED (red) is used to monitor the load-voltage.



Both of these jumpers are examined only at power turn-on; consequently, the power must be turned on and off whenever these jumpers are reconfigured.

A small (4.0"x3.3"x0.062") Aluminum Plate (integrated heat sink) is included with mounting hardware (as shown on the photograph) to operate at 20A or 2400W power levels. Higher power-levels (120V, 30A or 3600W) can be achieved with more efficient heat-sinks. Please click on this link and read the [Board Mounting Instructions and Heat Sink Selection Guide](#). Typical applications are: Inductive-Plunger Driver, SPST Solid State Relay, etc. This board can be configured to perform efficiently in many customized applications.

Specifications and Application for **Si52HyUdMC1-120V-20A**

- **Typical Operating Temperature at 20A:** 45°C with the Metal Heat-Ring Bolted to a small (4.0"x3.3"x0.062") Aluminum Plate Heat-Sink, while the plate is exposed to air at 25°C (as shown on the photograph).
- **Source-Voltage Requirement (V_P from pin +P to pin -P):** Any DC voltage from 30V to 120V, unregulated and unfiltered DC.
- **Max. Continuous Average Load-Current:** 20A at 100% duty-cycle, with heat-sink (as shown).
- **Max. Load-Current for 5sec:** 40A at 100% duty-cycle, with heat-sink (as shown).
- **Load Isolation:** The Load or Motor must be isolated from the source voltage (V_P).
- **Power-Conversion Efficiency:** Approximately 95.5% at full-load (120V and 20A).
- **PWM Switching Frequency:** 5kHz when **CN4** short and 20kHz when **CN4** open.
- **PWM Duty-Cycle:** varies linearly from 0% to 100% in 0.83% steps, using **V_{I,G}** as control voltage (voltage at pin **I1** relative to pin **G** on connector **CN5**): where **V_{I,G}** = 0V yields 0%, and **V_{I,G}** = +5V,

