



CURTIS

Motor Controllers



Programmable Series Motor Controllers

Models 1204M / 1205M / 1209M / 1221M



1205M



Models 1204M / 1205M / 1209M / 1221M



Programmable Series Motor Controllers

Curtis Models 1204M/1205M/1209M/1221M provide fully programmable control of DC series motors performing on-vehicle traction or pump duties. These microprocessor-based MOSFET controllers add flexibility and versatility to the time-proven Curtis series motor controller family.

Primarily designed for battery-powered vehicle applications using either electric or hydrostatic traction. These include industrial trucks, personnel carriers, mobile elevating work platforms, and golf and utility vehicles.

FEATURES

Controllable Power

- ▶ Pulse Width Modulation (PWM) control with programmable speed, acceleration rate, and current limit.
- ▶ Short duration boost capability (5 sec, 110% of 2 min current rating). Allows clearing of obstacles, climbing ramps.
- ▶ High efficiency, silent operation. Costs, heat-sinking requirements, motor and battery losses reduced. Low-end torque, range, and battery life maximized.

Programmable and Flexible

- ▶ Fully programmable via Curtis hand-held tools or Curtis PC programming software model kits 1314K.
- ▶ Supports multiple throttle types and high pedal disable (HPD) options.
- ▶ LED output for easy system troubleshooting via flash codes.
- ▶ Fully programmable analog throttle input for precise speed control with a variety of signal sources.
- ▶ Programmable under voltage cutback caters for different battery types.
- ▶ Programmable, variable, or fixed plug braking modes.
- ▶ Plug braking diode internal to controller.
- ▶ Models available without A2 busbar for applications such as pump control that do not require plug braking.

Robust Safety and Reliability

- ▶ Redundant hardware and software watchdog timers.
- ▶ MOSFET short-circuit protection functions.
- ▶ Programmable High Pedal Disable function prevents controller operation if throttle is applied before key is turned on.
- ▶ Contactor fault detection: controller shuts down safely if the main contactor opens.
- ▶ Contactor protection functions minimize high current arcing to prevent contact pitting and thus prevent contactor weld failures.
- ▶ PWM frequency shifts from 15.6kHz to 1kHz in high temperature of controller, providing audible warning of thermal cutback.
- ▶ Under voltage cutback and shutdown functions protect against low battery voltage, including low voltage caused by external loads.
- ▶ Electrical isolation to heat sink: 500VAC($\leq 48V$); 1000VAC ($>48V$).

Compliance

- ▶ EMC: Designed to the requirements of EN12895.
- ▶ Package environmental rating: IP54.
- ▶ Certified to UL 583 (*See note in model chart section).
- ▶ Regulatory compliance of the complete vehicle system with the controller installed is the responsibility of the vehicle OEM.



1204M



1221M



1209M

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MODEL CHART

Model No.	Voltage (V)	Current Limit (A)	
		2 Min)	1 Hour
1204M-42XX	24/36	275	125
1204M-53XX*	36 / 48	325	140
1204M-63XX*	48 / 72	325	140
1205M-46XX	24 / 36	500 (30 Sec)	175
1205M-56XX*	36 / 48	500 (1 Min)	200
1205M--6B3XX	60 / 72	400 (1 Min)	175
1209M-55XX	36 / 48	450	200
1209M-64XX	48 / 72	400	175
1221M-67XX	48 / 72	550	225

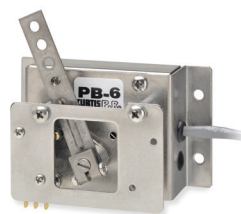
NOTE: 5 sec, 10% current boost available on all models listed.

*These models have not been tested to UL 583

SYSTEM ACCESSORIES



Curtis Model 906 is an inexpensive, one piece, easy to install battery fuel gauge that provides a reliable, accurate, and easy to read display of battery state-of-charge.



The Curtis Pot Box is a building block for a vehicle throttle. Attached to a lever arm, the pot box provides the controller with a proportional resistance to indicate the desired speed.



The Curtis Model 1313 Handheld Programmer is ideal for setting parameters and performing diagnostic functions.

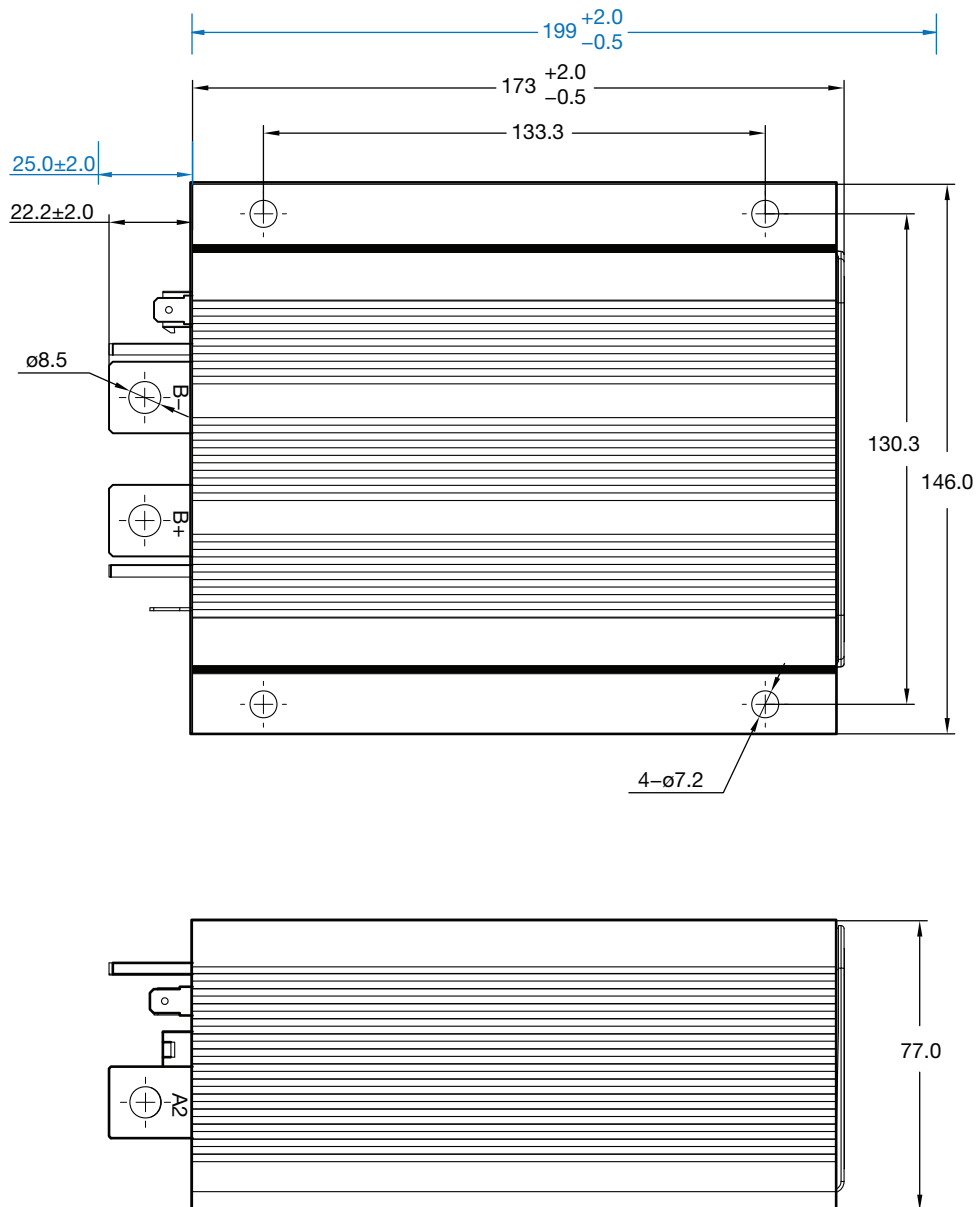
Models 1204M / 1205M / 1209M / 1221M

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DIMENSIONS mm

Model 1204M and Model 1205M (1205M dimensions same as 1204M except for those shown in blue)



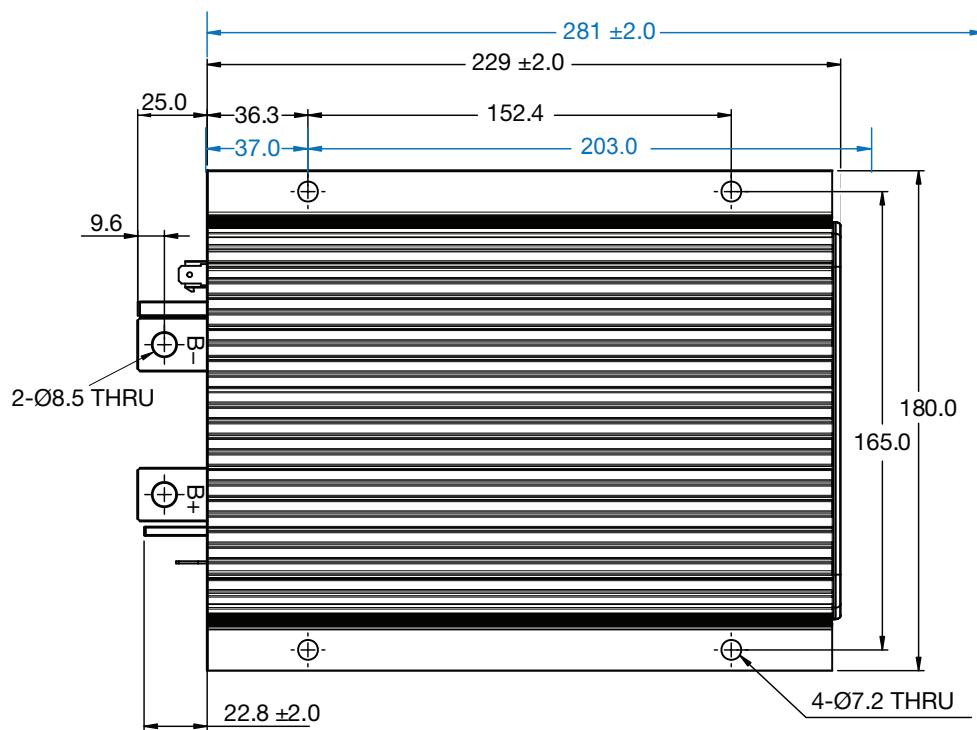
Models 1204M / 1205M / 1209M / 1221M

Programmable Series Motor Controllers



DIMENSIONS mm

Model 1209M and Model 1221M (1221M dimensions same as 1209M except for those shown in blue)

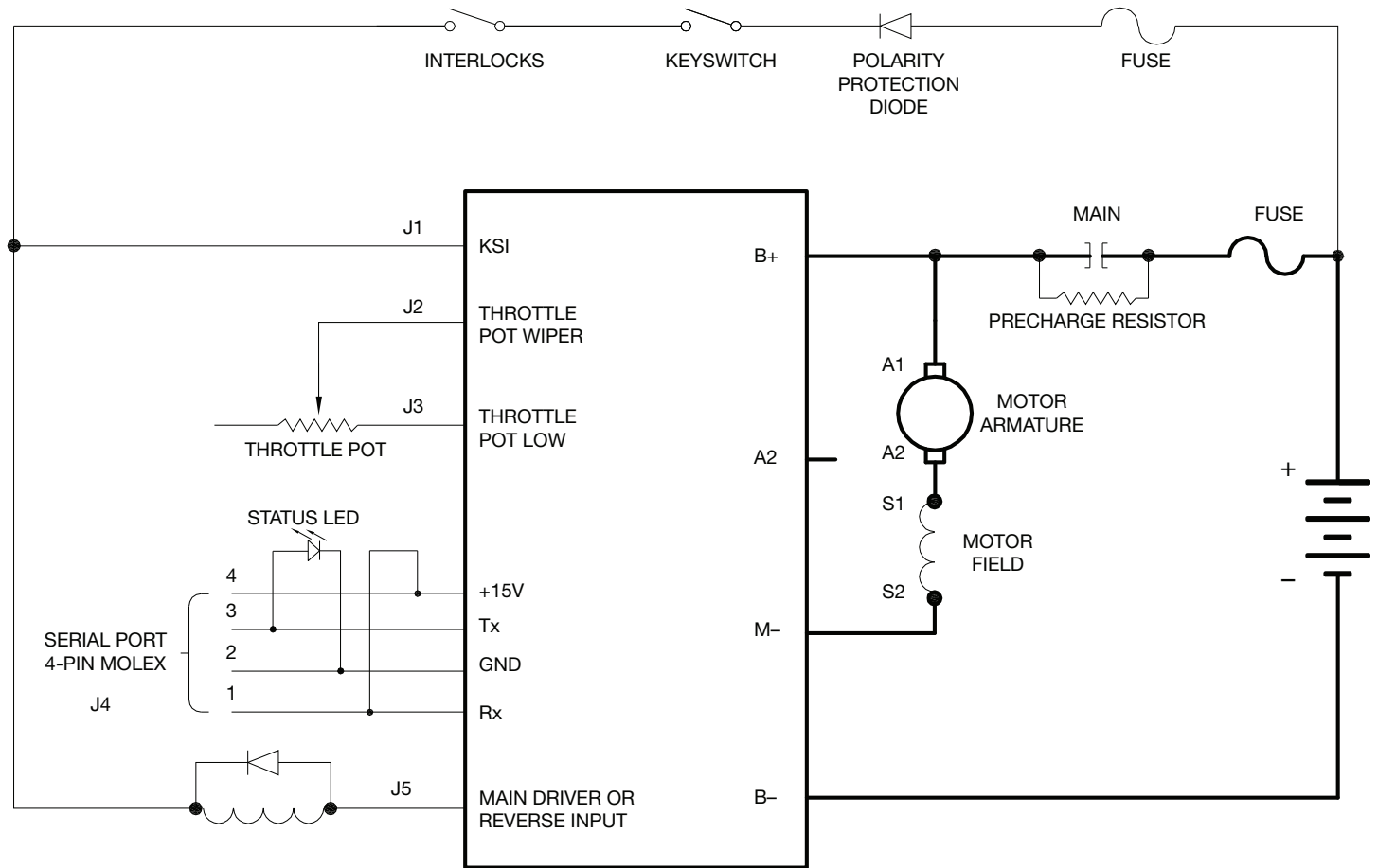


Models 1204M / 1205M / 1209M / 1221M



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TYPICAL WIRING — PUMP

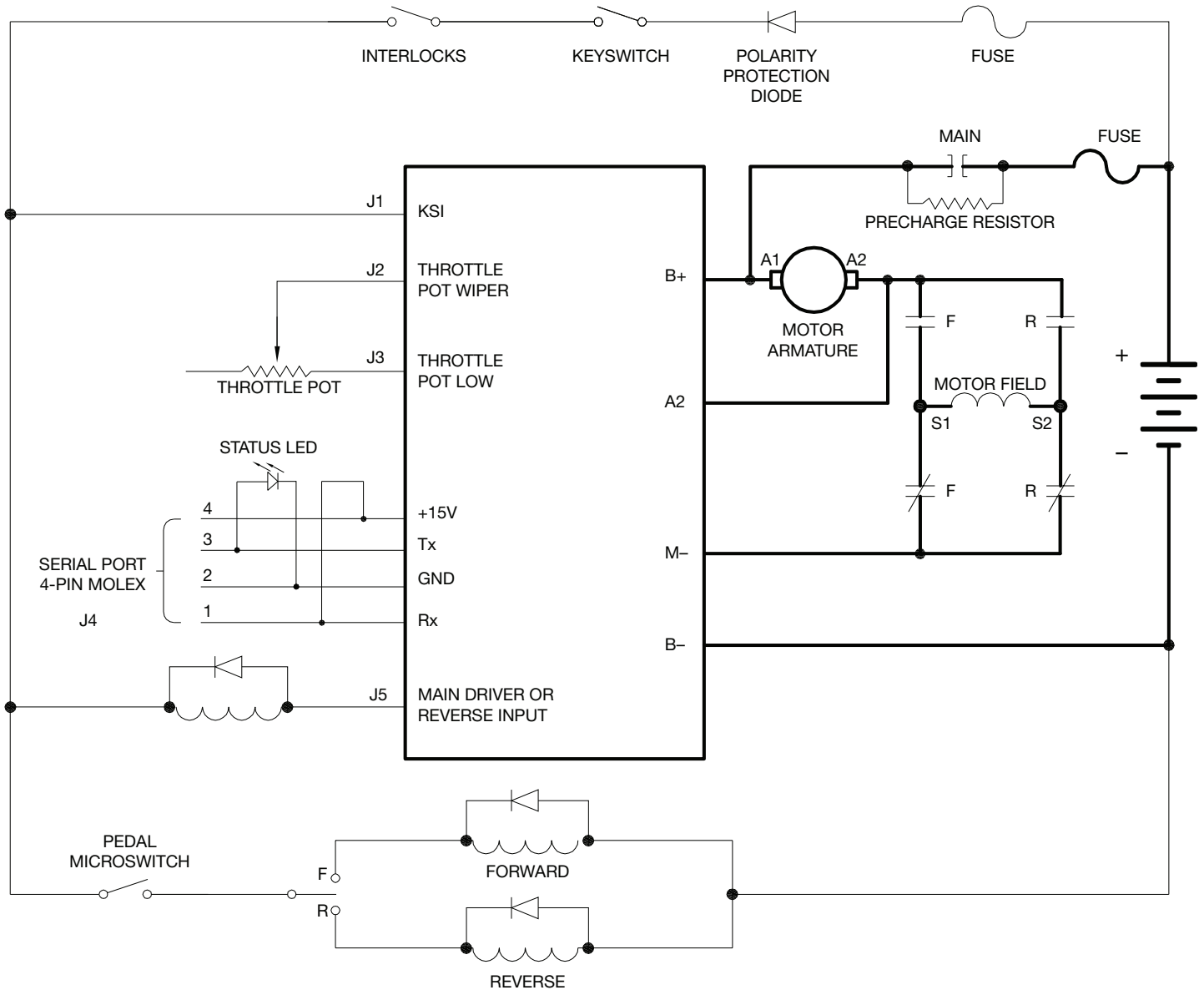


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Programmable Series Motor Controllers



TYPICAL WIRING — TRACTION



WARRANTY Two year limited warranty from time of delivery.

The Curtis Difference
 You feel it when you drive it