Programmable Series Motor Controllers

Models 1204M / 1205M / 1209M / 1221M
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(≤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.
Models 1204M / 1205M / 1209M / 1221M
Programmable Series Motor Controllers

MODEL CHART

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Voltage (V)</th>
<th>Current Limit (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2 Min)</td>
</tr>
<tr>
<td>1204M–42XX</td>
<td>24/36</td>
<td>275</td>
</tr>
<tr>
<td>1204M–53XX*</td>
<td>36 / 48</td>
<td>325</td>
</tr>
<tr>
<td>1204M–63XX*</td>
<td>48 / 72</td>
<td>325</td>
</tr>
<tr>
<td>1205M–46XX</td>
<td>24 / 36</td>
<td>500 (30 Sec)</td>
</tr>
<tr>
<td>1205M–56XX*</td>
<td>36 / 48</td>
<td>500 (1 Min)</td>
</tr>
<tr>
<td>1205M–6B3XX</td>
<td>60 / 72</td>
<td>400 (1 Min)</td>
</tr>
<tr>
<td>1209M–55XX</td>
<td>36 / 48</td>
<td>450</td>
</tr>
<tr>
<td>1209M–64XX</td>
<td>48 / 72</td>
<td>400</td>
</tr>
<tr>
<td>1221M–67XX</td>
<td>48 / 72</td>
<td>550</td>
</tr>
</tbody>
</table>

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
Programmable Series Motor Controllers

**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
Programmable Series Motor Controllers

**TYPICAL WIRING — PUMP**

![Typical Wiring Diagram](image)

- **INTERLOCKS**
- **KEYSWITCH**
- **POLARITY PROTECTION DIODE**
- **FUSE**

- **SERIAL PORT 4-PIN MOLEX**
- **THROTTLE POT**
- **STATUS LED**
- **MAIN DRIVER OR REVERSE INPUT**

- **KSI**
- **THROTTLE POT WIPER**
- **THROTTLE POT LOW**

- **+15V**
- **Tx**
- **GND**
- **Rx**

- **MAIN DRIVING OR REVERSE INPUT**
- **B+**
- **A2**
- **S1**
- **S2**

- **B-**
- **A1**
- **M-**
- **B+**
- **FUSE**

- **PRECHARGE RESISTOR**
- **MOTOR ARMATURE**
- **MOTOR FIELD**
- **+**
- **-**
Models 1204M / 1205M / 1209M / 1221M
Programmable Series Motor Controllers

TYPICAL WIRING — TRACTION

WARRANTY Two year limited warranty from time of delivery.