CURTIS

Motor Controllers

# PM Electric Power Steering Controller

## Model 1220

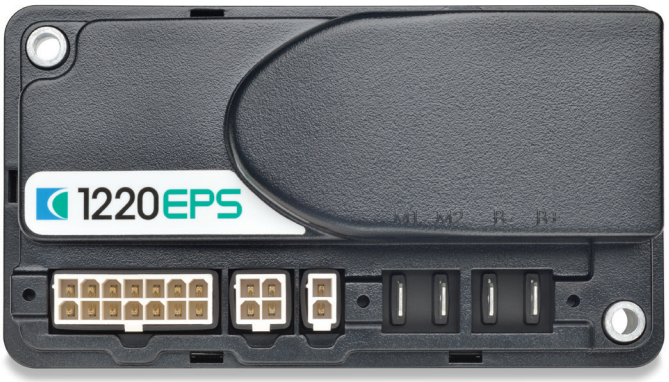
# Model 1220

## PM Electric Power Steering Controller

The Curtis Model 1220 is a brushed DC permanent magnet motor controller for electric power steering, steer-by-wire systems and only works with Curtis VCL enabled AC traction controllers. The steering motor functions as an actuator to change the angle of the wheel(s) thereby changing travel direction. Model 1220 interprets the steering command input and wheel position feedback, driving the steering motor to move the wheel to the desired position.

Intended applications are Class 3 material handling vehicles such as pallet trucks, stackers and other similar industrial vehicles.

## FEATURES




### Advanced Motor Control

- Absolute position control mode.
- 16 kHz Pulse Width Modulation (PWM) switching frequency ensures silent operation.
- Advanced PWM techniques produce low motor harmonics, low torque ripple, and minimized heating losses, resulting in high efficiency.
- Configurable homing methods, center offset, and end-stop protection.
- 24 V nominal supply voltage.
- 40 A 2-minute current rating.

### Unmatched Flexibility

- Integrated hour meter and diagnostic log functions.
- Curtis 840 Spyglass can be connected to show traction and steering information such as BDI, hourmeter, fault, traction speed, and steered wheel angle.
- +5V low-power supply for input sensors, etc.
- Curtis 1313 handheld programmer and 1314 PC Programming Station provide easy programming and powerful system diagnostic and monitoring capabilities.
- External Status LED driver gives instant diagnostic indication.

### Maximum Safety

- Dual steering command inputs for redundant check.
- Fault output can be used to turn off traction controller's main contactor or interlock connection.
- Steered wheel position (angle) output can be used to limit traction motor speed.
- Following error check ensures the wheel position tracks the steering command.
- Power On Self-Test: FLASH, ALU, EEPROM, software watchdog, RAM, etc.
- Power On Hardware Check: Motor Open, Motor Short, and MOSFET short.
- Periodic Self-Tests: EEPROM parameters, Motor Open and command and feedback devices.

### Robust Reliability

- Intelligent thermal cutback and overvoltage/under voltage protection functions maintain steering while reducing traction speed until severe over/under limits are reached.
- Standard Mini-Fit Molex Jr. and Fast-on terminals provide proven, robust wiring connections.
- Electronics sealed to IP65.
- Reverse polarity protection on battery connections.
- Inputs protected against shorts to B+ and B–.

# Model 1220

## PM Electric Power Steering Controller

### FEATURES continued

#### Meets or complies with relevant US and International Regulations

- EMC: Designed to the requirements of EN12895.
- UL recognized per UL583 (pending).
- Sealing to IP65 (excluding connectors).
- Regulatory compliance of the complete vehicle system with the controller installed is the responsibility of the vehicle OEM.

**NOTE:** The Curtis Model 1220 does not satisfy EN1175 1:1998+A1:2010 Article 5.9.6 as it is not a category 3 device under EN ISO 13849-1:2008. It should not be used on any vehicle within the scope of the Machinery Directive 2006/42/EC that will be operated within the European Economic Area (EEA).

### MODEL CHART

| Model | Nominal Battery Voltage (V) | Max Boost Current, > 10 Sec (A) | 2 Min Current Rating (A) | 60 Min Current Rating (A) |
|---|---|---|---|---|
| 1220-2201 | 24 | 50 | 40 | 20 |

### SYSTEM ACCESSORIES

**Curtis AC Motor Speed Controllers** provide highly efficient control of AC induction motors performing traction drive or hydraulic pump duties, and offer the highest levels of functional safety.

**The Curtis Model 840 LCD Multifunction Display** contains 8 large, easy to read characters to provide display of battery discharge (BDI), hour meter and error messages. Built-in backlight is also available.

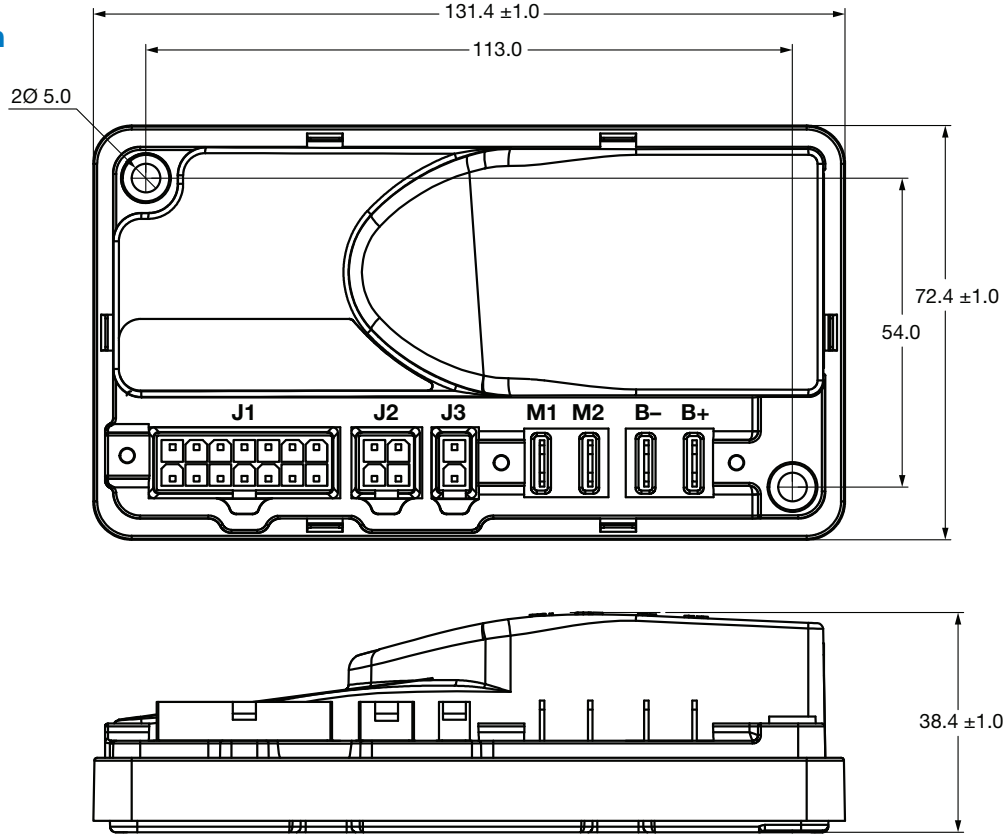
**The Curtis Model 1313 Handheld Programmer** is ideal for setting parameters and performing diagnostic functions.

**Contact Curtis to obtain the VCL Vehicle Control Language compiler and development tools.**

# Model 1220

## PM Electric Power Steering Controller

### DIMENSIONS mm




### J1

| Pin | Function | Pin | Function |
|---|---|---|---|
| 1 | Status LED | 8 | Rx2 (from Traction Controller) |
| 2 | Steer Motor Encoder Phase A | 9 | Steer Motor Encoder Phase B |
| 3 | Position Analog 2 | 10 | Feedback Pot Low |
| 4 | Interlock Input | 11 | Position Analog 1 |
| 5 | KSI | 12 | Steering Angle Output |
| 6 | Command Analog 1 | 13 | Command Analog 2 |
| 7 | +5V | 14 | Command Pot Low |

### J2

| Pin | Function |
|---|---|
| 1 | Rx1 (from Programmer) |
| 2 | GND |
| 3 | Tx1 (to Programmer/840) |
| 4 | B+ |

### J3

| Pin | Function |
|---|---|
| 1 | Fault Output |
| 2 | Home Switch |

### MOLEX MATING CONNECTOR DATA

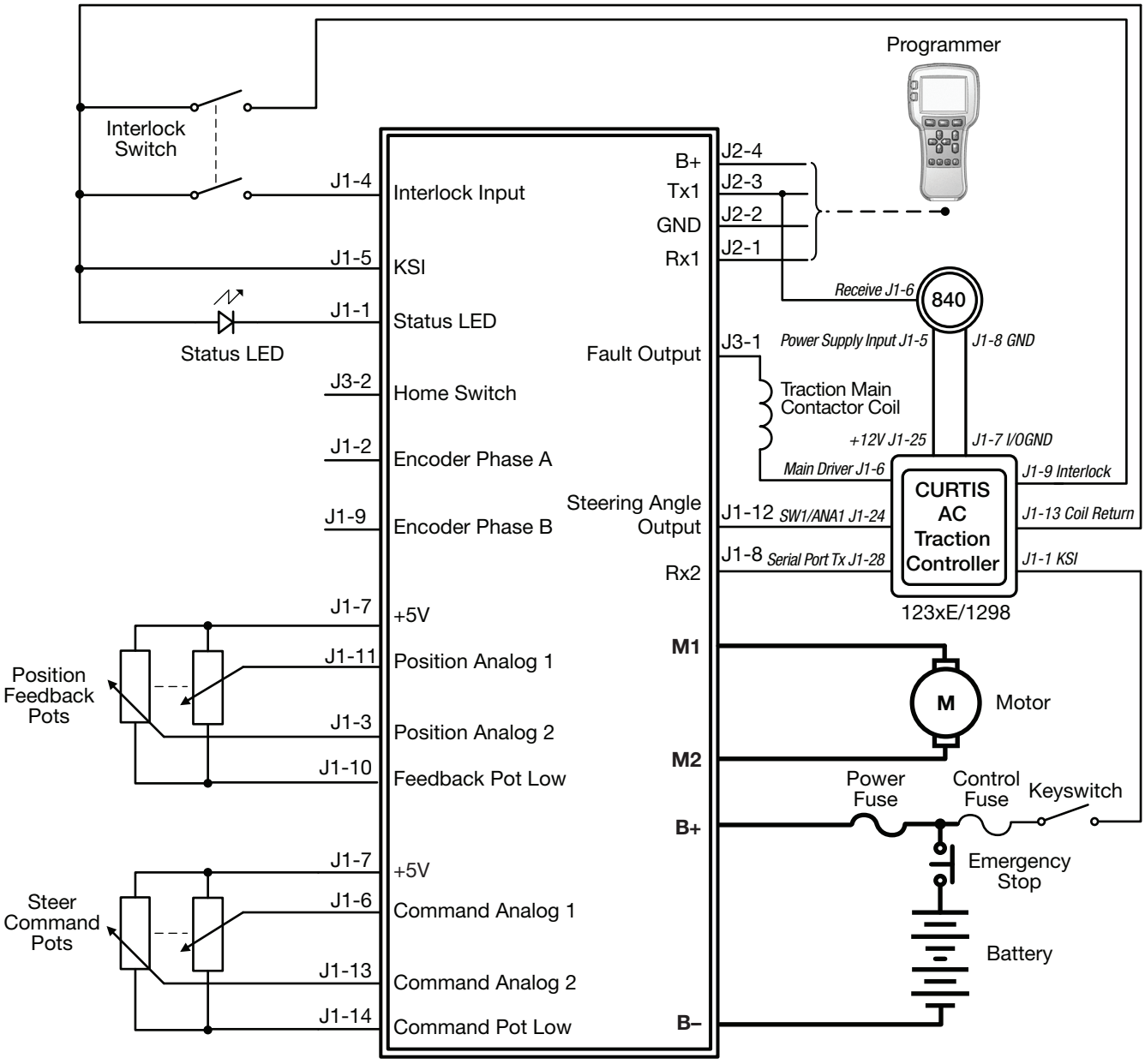
| Connector | Molex Part Number |
|---|---|
| J1 | 39-01-2140 |
| J2 | 39-01-2040 |
| J3 | 39-01-2020 |

# Model 1220

## PM Electric Power Steering Controller

### TYPICAL WIRING DIAGRAM

Analog Feedback

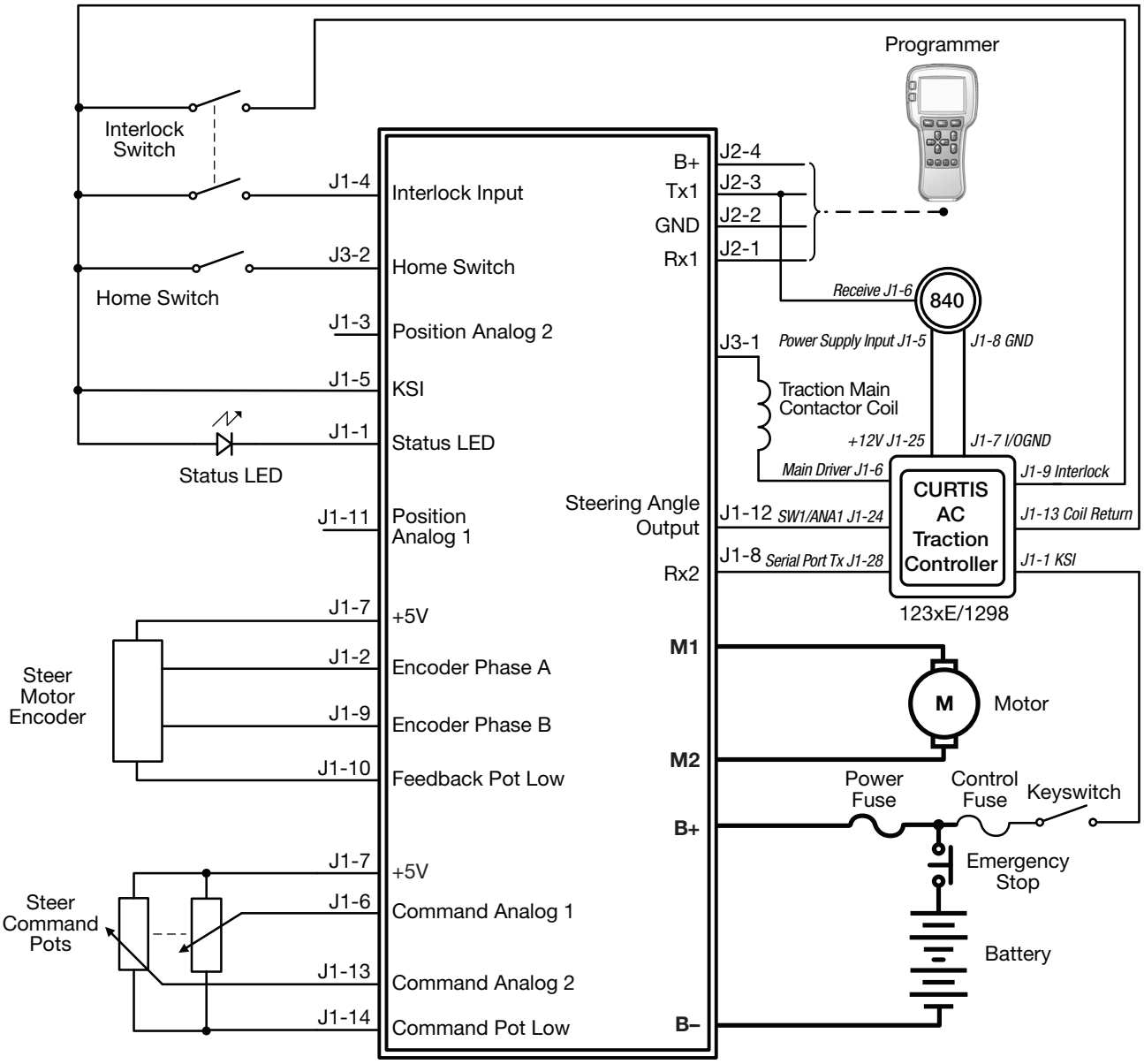


# Model 1220

## PM Electric Power Steering Controller

### TYPICAL WIRING DIAGRAM

Encoder Feedback




### WARRANTY

Two year limited warranty from time of delivery.

The Curtis Difference
You feel it when you drive it

CURTIS is a trademark of Curtis Instruments, Inc. | Specifications subject to change without notice | ©2016 Curtis Instruments, Inc. 50290 REV A 5/16