CURTIS

Motor Controllers

Brushed PM Electric Power Steering Controller with CANopen

Model 1220C

Model 1220C

The Curtis Model 1220C is a brushed DC permanent magnet motor controller for electric power steering (EPS) systems. Model 1220C is exclusively designed for Curtis AC traction controllers that support the Curtis Vehicle Control Language (VCL). Model 1220C steers the vehicle by interpreting the steering command input and wheel position feedback. The steering input can be a linear potentiometer, analog voltage sensor, or CANopen. The wheel position feedback can be provided by a linear potentiometer, analog voltage sensor, polarity encoder, or quadrature encoder.

Model 1220C is designed for Class III material handling vehicles such as pallet trucks, stackers and similar industrial vehicles.

FEATURES

Advanced Motor Control

- Absolute position control mode.
- 15.625 kHz Pulse Width Modulation (PWM) switching frequency ensures silent operation.
- Advanced PWM techniques produce low motor harmonics, low torque ripple, and minimized heating losses.
- Configurable homing methods.
- Center offset and end-stop protection.
- In-line signal path mapping functions translate non-linear input signals into linearized signals.
- 24V nominal supply voltage.
- 40A 2-minute current rating.

Flexibility

- Boost current function increases the current limit to provide power for critical operations.
- Integrated hour meter and diagnostic log functions.
- The Curtis Model 3150 display can be connected to show traction and steering information such as BDI, hourmeter, fault, traction speed, and steered wheel angle.
- +5V and +15V power supplies for input sensors, Curtis programming devices, etc.
- Curtis 1313 handheld programmer and 1314 PC Programming Station provide programming and system diagnostic and monitoring capabilities.
- External status LED driver for instant diagnostics.

Maximum Safety

- Dual steering command and analog position feedback inputs for redundant safety checks.
- Fault output can be used to turn off the traction controller's main contactor or interlock connection when a serious fault is detected.

- The controller verifies that the steered wheel position follows the operator's steering commands. If an obstacle such as a pothole prevents the wheel from following a command, the controller shuts down the traction motor.
- 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, command and feedback devices, and +5V power supply.

Reliability

- Thermal cutback and overvoltage/under voltage protection functions maintain steering while reducing traction speed until minimum and maximum temperature and voltage limits are reached.
- Electronics sealed to IP54.
- Reverse polarity protection.
- Inputs protected against shorts to B+ and B–.

Model 1220C

FEATURES continued

CAN Features

- Compliant with the mandatory items in CANopen CiA 301.
- Configurable CAN baud rates from 125 kbps to 1 Mbps.
- CANopen emergency messages
- CAN steer control input.

Meets or complies with relevant US and International Regulations

- EMC: Designed to the requirements of EN 12895:2015+A1:2019.
- UL recognized component per UL583 (pending).
- Electronics sealed to IP54.

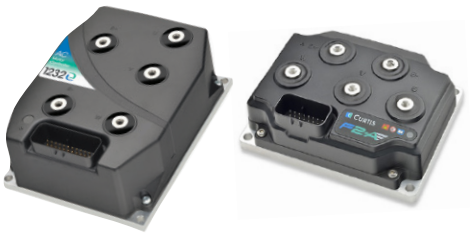
NOTE: The Curtis Model 1220C does not satisfy EN 1175:2020 as it is not a PLd device under EN ISO 13849-1:2023. It should not be used on any vehicle within the scope of the Machinery Directive 2006/42/EC that will be operated within the European Economic Area (EEA).

MODEL CHART

Model	Nominal Voltage	Maximum Current [S2–2 minutes]*	Typical Current: [S2–60 minutes]*	Maximum Boost Current
1220C-22*XX*	24V	40A	20A	50A

** The S2-2 minute and S2–60 minute ratings are the currents typically reached before thermal cutback occurs. The ratings are based on mounting the controller to a 150 mm², 6 mm thick aluminum plate. The initial heatsink temperature is 25°C. The motor current is held at the rating being tested for a minimum of 120% of the rated time before thermal limiting begins.*

SYSTEM ACCESSORIES



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

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

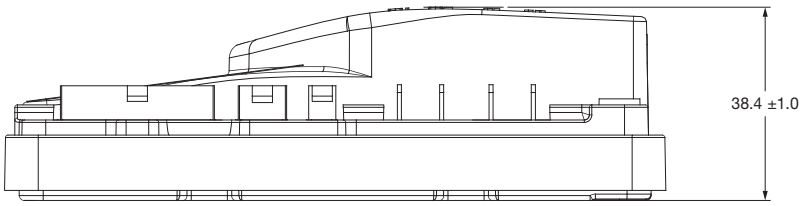
Curtis Model 3150 A CAN-based color LCD vehicle status display in a rugged 52 mm diameter housing.

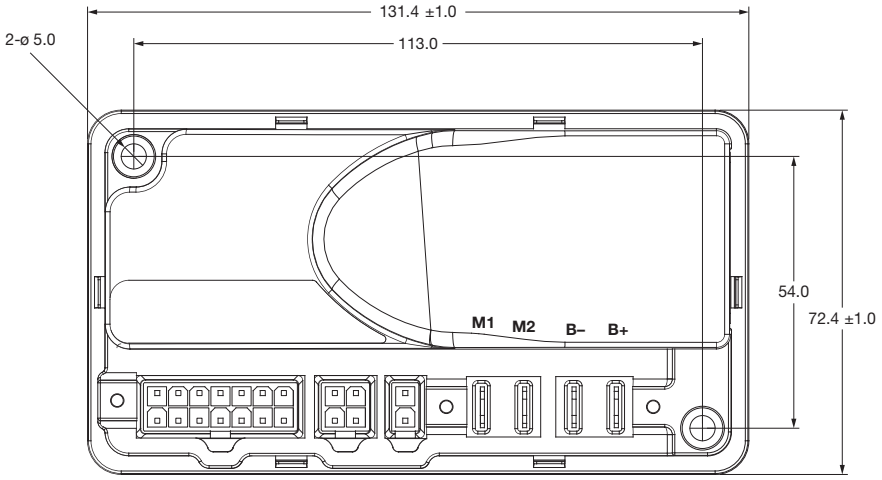
- Battery Discharge Indicator, Service (Hours) Counter and Diagnostic/ Message Center functions.
- Sealed to IP67 front and IP65 rear.
- CE/UKCA compliant.
- UL583 recognized component.
- Optional heater.
- For more information, see the Curtis Instrumentation page.

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

Model 1220C

DIMENSIONS (mm)





J1

Pin	Function	Pin	Function
1	Status LED	8	CANH
2	Steer Motor Encoder Phase A	9	Steer Motor Encoder Phase B
3	Position Analog 2	10	I/O GND
4	Interlock Input	11	Position Analog 1
5	KSI	12	CANL
6	Command Analog 1	13	Command Analog 2
7	+5V Supply	14	I/O GND

J2

Pin	Function
1	Rx1 (from Programmer)
2	I/O GND
3	Tx1 (to Programmer)
4	+15V Supply

J3

Pin	Function
1	Fault Output
2	Home Switch

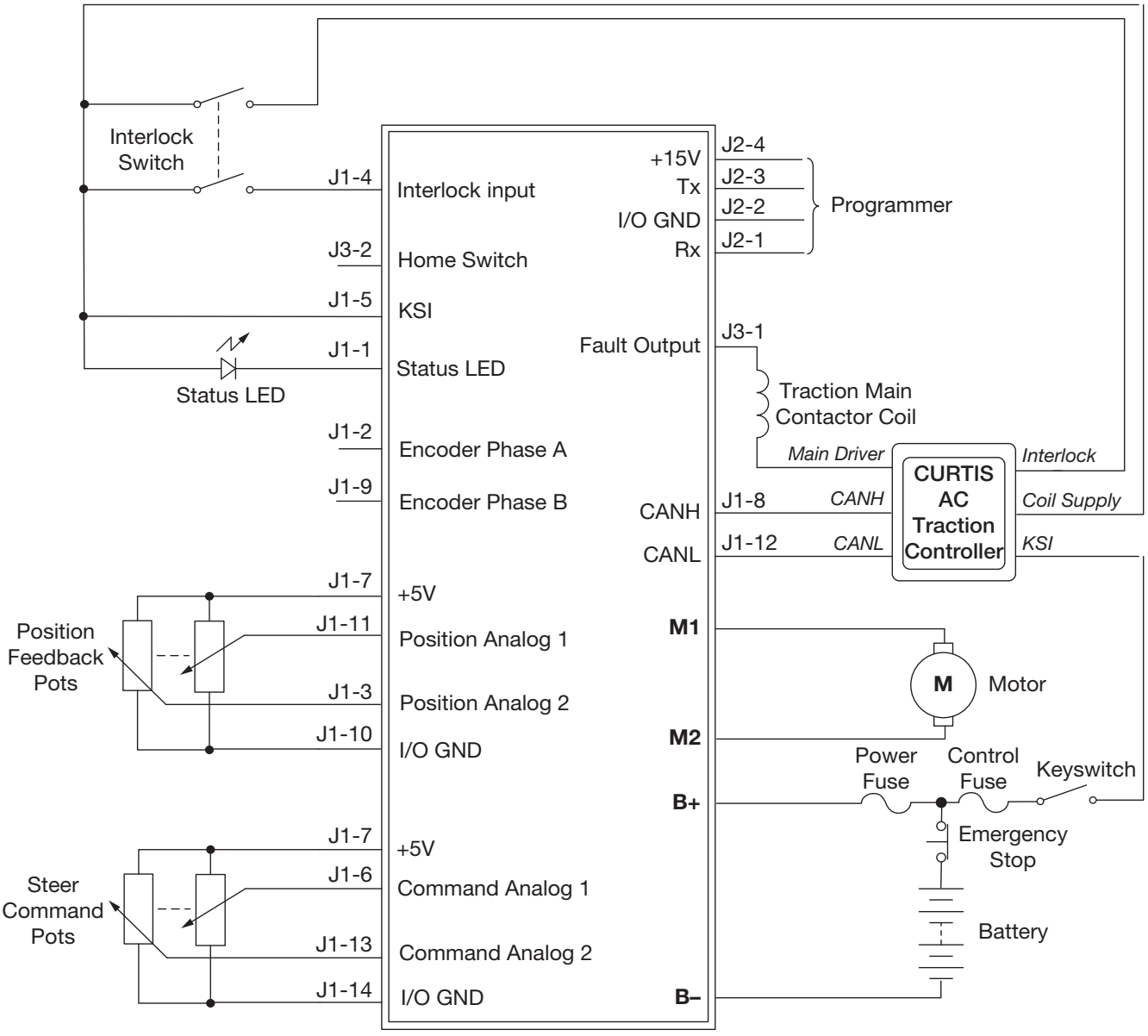
MOLEX MATING CONNECTOR DATA

Connector	Molex Part Number
J1	39-01-2145
J2	39-01-2045
J3	39-01-2025

Note: Use appropriate 45750-series crimp terminals.

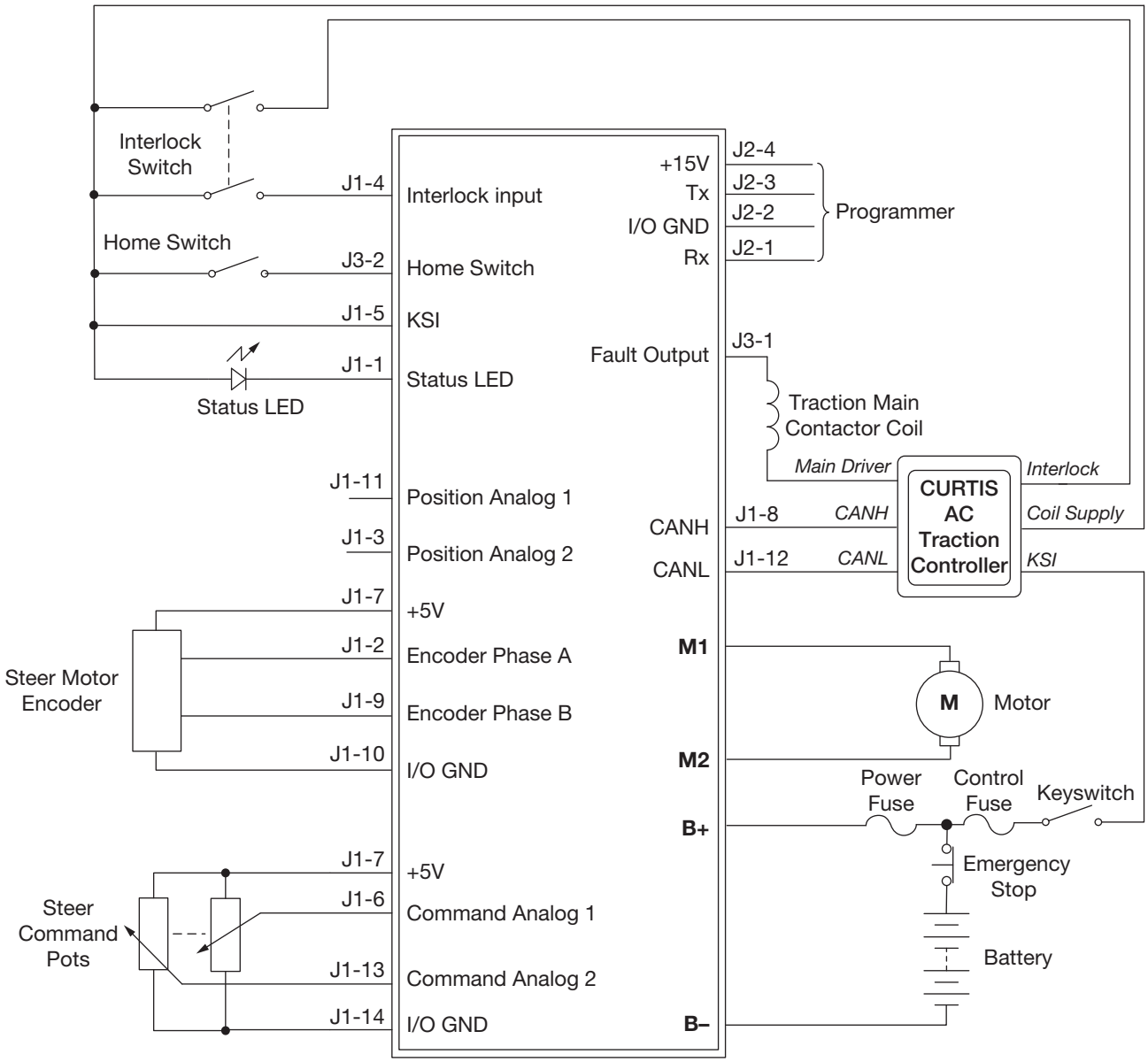
TYPICAL WIRING DIAGRAM

Analog Feedback



TYPICAL WIRING DIAGRAM

Encoder Feedback



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SPECIFICATIONS

Nominal Voltage	24V
Minimum Voltage	12V
Maximum Voltage	34V
Electrical Isolation to Heatsink	500 VAC, 50 Hz
Storage Ambient Temperature	–40°C to 85°C
Operating Ambient Temperature	–40°C to 50°C
Ingress Protection	IP54 for electronics
EMC	EN 12895:2015+A1:2019
UL	UL583 recognized component (pending)
Weight	0.3kg
Dimensions W x L x H	72 mm x 131 mm x 39 mm
Mounting	Clearance holes for 2x M4 bolts
Power Connections	4x 0.25" faston terminals

Note: Regulatory compliance of the complete vehicle system with the controller installed is the responsibility of the vehicle OEM.

WARRANTY Two year limited warranty from time of delivery.

The Curtis Difference
You feel it when you drive it