



CURTIS

A KOHLER COMPANY



Brushless DC Permanent Magnet Motor Controller

Model 1212BL



1212BL



The Curtis Model 1212BL Motor Speed Controllers provide efficient, optimal control of Brushless DC (BLDC) drive motors for battery powered vehicles. The 1212BL is optimized for use on small/micro Class III pallet trucks and sweeper scrubber floorcare machines. Highly flexible programmability allows model 1212BL controllers to be applied on any low power BLDC motor application. Together with a CAN LCD display and the user-friendly Curtis Integrated Toolkit, the Curtis model 1212BL is the ultimate small/micro Class III truck control system.

FEATURES

Fit for Purpose

- ▶ Compact, rugged housing with very small footprint for its power rating.
- ▶ Heavy-duty M4 busbars for motor and battery connectors.
- ▶ Impervious to most oils, solvents, degreasers and other chemicals often encountered by industrial vehicles.
- ▶ Tyco Mini-Universal Mate-N-Lok connectors, with ability to add a sealed mating connector.
- ▶ Internal main relay embedded into the 1212BL.
- ▶ Supports various industry standard motor temperature sensors.

Smooth and Secure Control

- ▶ Advanced speed regulation maintains precise speed over varied terrain, obstacles, curbs and ramps.
- ▶ Boost Current feature enhances performance with transient loads, such as starting on a hill and climbing obstacles.
- ▶ Linear cutback of current ensures smooth control with no sudden loss of power during under-voltage or over-temperature.
- ▶ Emergency reverse inputs.
- ▶ Dynamic throttle fault detection (open/short wiring fault detection).
- ▶ Adjustable EM-brake holding voltage reduces heating of the brake coil.
- ▶ Hydraulic lift lockout functionality to protect the vehicle's batteries from damaging level of discharge.
- ▶ Charger inhibit input.
- ▶ Inputs are protected against shorts to B+ and B-.
- ▶ Short-circuit protected outputs.



Flexible I/O

- ▶ I/O can be configured to provide up to:
 - Four digital inputs
 - Two analog inputs
 - One potentiometer input
 - Supports 120° hall position sensors
 - Two 1.5A coil drivers for pump contactor and lower valve
 - One 3.0A coil driver for Electromagnetic Brake
 - One motor temperature sensor input
 - +5V and +12V external power supplies



FEATURES continued

Comprehensive CANopen Capabilities

- ▶ Plug and Play support for Curtis CAN displays and a variety of CAN tiller heads.
- ▶ Dedicated CAN mailbox for 3rd party battery monitoring system (BMS) with lithium-ion battery systems.
- ▶ Fully compliant with CANopen protocol CiA 301.

Powerful, High Performance Dual Microprocessors

- ▶ Dual-micro architecture achieves category 2 functional safety under EN ISO 13849-1 / EN1175:2020.
- ▶ Ultra-fast processor speeds allows highly accurate control and regulation of voltage and current.

- ▶ Model 1212BL is programmable over the CANbus. This allows vehicle level communication with many of the CAN-based service tools used by the major industrial truck manufacturers worldwide.
- ▶ Allows use of the Curtis Integrated Toolkit development tool.

Improved Diagnostics

- ▶ Integrated, high visibility status LED with simplified flash code sequence for at-a-glance system troubleshooting.
- ▶ Thermal cutback, warning, and automatic shutdown provide protection to motor and controller.
- ▶ Error logging, fault history tables and CAN emergency messages.

CAN-based Programming

Meets or complies with relevant US and International Regulations

- ▶ EMC: Designed to the requirements of EN12895:2015+A1:2019.
- ▶ Safety: Designed to the requirements of EN ISO 13849-1:2015, EN1175:2020.
- ▶ UL583 recognized component (pending).
- ▶ Electronics sealed to IP65 per IEC 60529.

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





SYSTEM ACCESSORIES

The Curtis Integrated Toolkit

A fully integrated suite of development and diagnostic tools for use on CAN systems using Curtis and other 3rd party CAN-based products. It is comprised of the following tools that run in a shared environment:



- **Launchpad**
Starting point and project editor.

► **Programmer**
Used to configure parameters, view monitor values, and view active faults and the fault history.
- **TACT**
Stand-alone oscilloscope/datalogging tool.

► **Package & Flash**
Downloader tool to load your software into the CAN device.

The Curtis Integrated Toolkit is compatible with many leading USB>CAN interface dongles from Peak, Kvaser, iFAC, Sontheim, etc. Contact your local Curtis Sales office for further information.

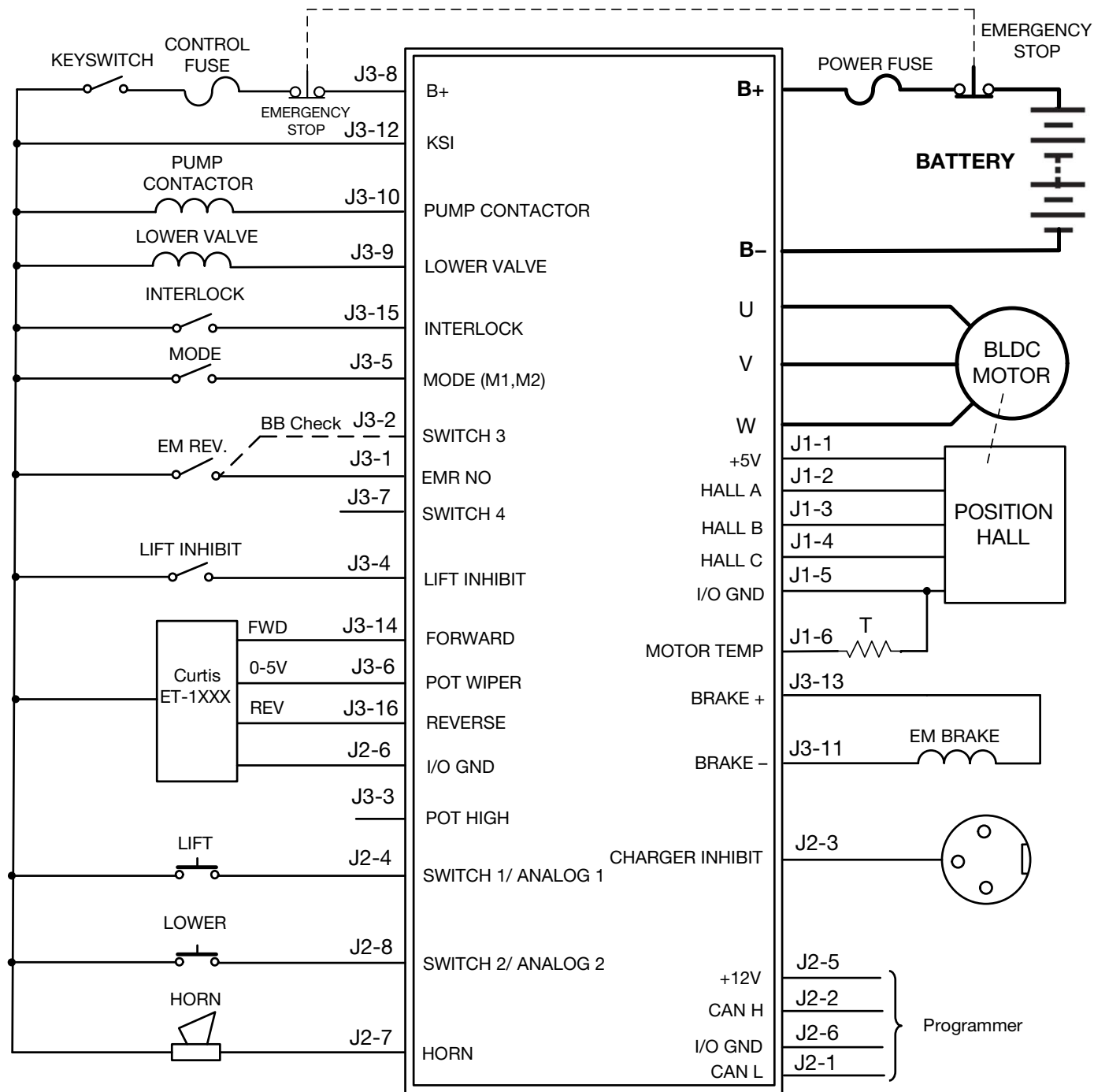
MODEL CHART

Model Number	Nominal Voltage	Peak current 10 seconds	1 Minute Rating	1 Hour Rating
1212BL-52xx	36-48V	70 A	60A	25A





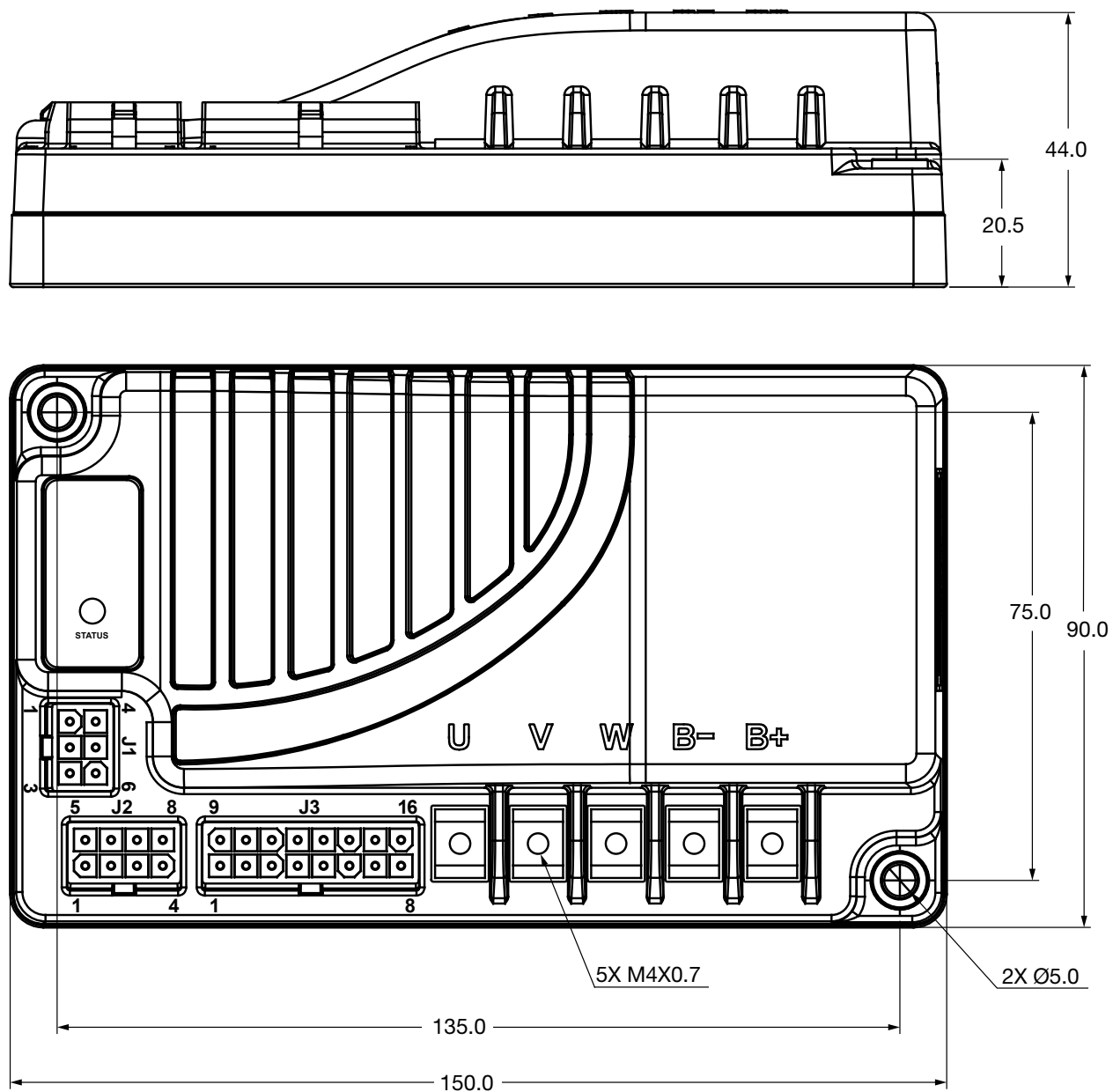
WIRING DIAGRAM



1212BL

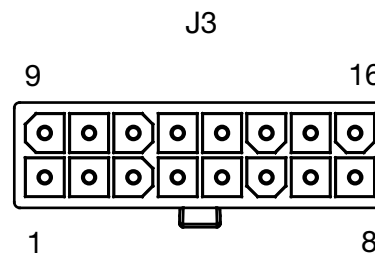
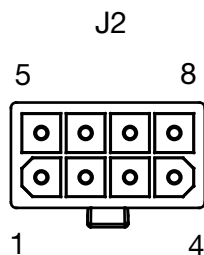
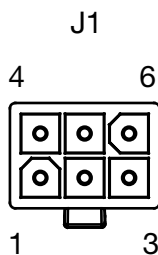


DIMENSIONS mm





CONNECTOR PINOUT CHARTS



J1

Pin	Description
1	+5V Output (50 mA)
2	Hall A
3	Hall B
4	Hall C
5	I/O Ground
6	Motor Temp Sensor Input

J2

Pin	Description
1	CAN L
2	CAN H
3	Charger Inhibit
4	Switch 1 / Analog Input 1
5	+12V Output (60 mA)
6	I/O Ground
7	Horn Driver
8	Switch 2 / Analog Input 2

J3

Pin	Description	Pin	Description
1	EMR NO Input	9	Lower Driver
2	Switch 3	10	Lift Driver
3	POT-Hi	11	EM Brake -
4	Lift Inhibit	12	KSI
5	Mode	13	EM Brake +
6	POT Wiper	14	FWD
7	Switch 4	15	Interlock
8	B+	16	REV

MATING CONNECTOR

J1 6-PIN Connector

Mating Sealed Connector	
1	Connector: TYCO #794895-1, Plug
2	Contact: TYCO #770904-1
3	Interface Seals: TYCO # 794772-6
4	Wire Seals: TYCO #794758-1
5	Cavity Plug: TYCO #794995-1 (If Required)
Mating Unsealed Connector	
1	Connector: TYCO #172168-1 Plug
2	Contact: TYCO #770904-1

J2 8-PIN Connector

Mating Sealed Connector	
1	Connector: TYCO #794821-1, Plug
2	Contact: TYCO #770904-1
3	Interface Seals: TYCO # 794772-8
4	Wire Seals: TYCO #794758-1
5	Cavity Plug: TYCO #794995-1 (If Required)
Mating Unsealed Connector	
1	Connector: TYCO #770579-1 Plug
2	Contact: TYCO #770904-1

J3 16-PIN Connector

Mating Sealed Connector		Mating Unsealed Connector	
1	Connector: TYCO #794824-1, Plug	Connector: TYCO #770583-1 Plug	
2	Contact: TYCO #770904-1	Contact: TYCO #770904-1	
3	Interface Seals: TYCO # 1-1586362-6		
4	Wire Seals: TYCO #794758-1		
5	Cavity Plug: TYCO #794995-1 (If Required)		

WARRANTY Two year limited warranty from time of delivery.

The Curtis Difference
You feel it when you drive it

