



CURTIS

A KOHLER COMPANY



Motor Controllers

AC Induction and PMAC Motor Controllers

SE SERIES





Models 1232SE / 1234SE / 1236SE / 1238SE

A range of controllers (inverters) for the speed and torque control of 3-phase AC motors. Intended for use as electric traction or hydraulic pump motor controllers for mobile, on-vehicle applications that use a 24-96 VDC nominal battery supply.

The 'SE' Advantage

The Curtis 'SE' AC controllers utilize the latest technology to increase the peak current ratings for each size of controller. For a given rating, the SE models are smaller and lower cost than previous Curtis AC controllers, benefits that are highly advantageous for all types of applications.

Only Curtis AC can offer:

Curtis VCL™—Vehicle Control Language is an easy to use programming language that allows vehicle developers to write powerful logic functions and create a 'virtual system controller.' Curtis offers customers VCL development tools and training. Curtis also provides a VCL service where Curtis engineers will work with the OEM to create any custom VCL code required.

Field Oriented Control (FOC) algorithms generate the maximum possible torque and efficiency across the entire speed range. Advanced Curtis control provides superb drive 'feel', improved speed regulation and increased gradeability.

Motors—Easily configured to work with any AC induction or PMAC motor. Improved motor auto-characterization setup allows simple on-truck pairing with different Induction motor types. In addition, a comprehensive library of induction and PMAC motor types are conveniently stored in the controller memory.

Dual-Drive Functionality is standard, allowing correct control of applications featuring twin traction motors. This function ensures smooth and safe operation, minimal tire wear and correct load sharing between the traction motors at all times.

Configurable CANbus connection allows communication with other CANbus enabled devices. They are CANopen compatible and provide 24 VCL-configurable CAN 'mailboxes'—10 more than earlier Curtis AC controllers.

Integrated System Controller—More than just a motor controller, they are also powerful system controllers. They feature a comprehensive allocation of multi-function I/O pins for use as analog inputs, digital inputs, contactor coil drivers and proportional valve drivers. In addition to this local I/O, these controllers can use VCL to map and configure the remote I/O available on other CANbus devices, send messages to CAN displays and thus control and monitor the entire system.



Model 1232SE



Model 1234SE



Model 1236SE



Model 1238SE



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FEATURES

Increased Performance, Improved Functionality

- ▶ Higher peak current rating allows use of a physically smaller controller for a given load, for easier installation in any vehicle.
- ▶ CE marked as a programmable safety device under EN ISO 13849-1.
- ▶ Models available for 250A–1000A output at 24–96V system voltages. These are true 2 minute RMS ratings, not short duration ‘boost’ ratings.
- ▶ Enhanced 64 MHz micro and additional FLASH memory doubles the available VCL code space and provides more than twice the VCL execution speed.
- ▶ VCL-configurable CAN ‘mailboxes’ provide highly flexible CAN capabilities.
- ▶ Advanced Pulse Width Modulation techniques produce low motor harmonics, low-torque ripple and minimized heating losses, resulting in high efficiency.

Unmatched Flexibility

- ▶ Programmable for either traction or pump applications.
- ▶ Field upgradeable software.
- ▶ Integrated battery state-of-charge algorithm and hour meters.
- ▶ Fully-featured generic software and VCL for typical Warehouse Truck applications is included on 24V 1232SE and 1234SE models.
- ▶ Comprehensive programming options and VCL allow other applications to be easily supported.
- ▶ Curtis handheld or PC Windows programming tools provide easy programming and powerful system diagnostic tools.
- ▶ Integrated status LED provides instant diagnostic indication.

Robust Safety and Reliability

- ▶ Dual microprocessor architecture cross-checks critical circuits, logic, and software functions to ensure the highest possible functional safety performance level is achieved.
- ▶ Insulated metal substrate power-base provides superior heat transfer for increased reliability.
- ▶ Fail-safe power component design.
- ▶ Reverse polarity protection on battery connections.
- ▶ Short-circuit protection on all output drivers.
- ▶ Thermal cutback, warning, and automatic shutdown provide protection to motor and controller.
- ▶ Rugged sealed housing and connectors meet IP65 environmental sealing standards for use in harsh environments.

Meets or complies with relevant US and International Regulations

- ▶ EMC: Designed to the requirements of EN 12895:2015.
- ▶ Safety: Designed to the requirements of:
 - EN 1175-1:1998+A1:2010
 - EN (ISO) 13849-1 2015
- ▶ IP65 Rated per IEC 60529.
- ▶ UL recognized per UL583.
- ▶ 1238SE-69xx / 79xx UL583 Pending.
- ▶ Regulatory compliance of the complete vehicle system with the controller installed is the responsibility of the vehicle OEM.



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FUNCTIONAL SAFETY DATA

Safety Function	Designated Architecture	MTTFd	DC	CCF
Uncommanded Powered Movement	Category 2	>40 yrs	>90%	Pass
Motor Braking Torque	Category 2	>16 yrs	>90%	Pass

MODEL CHART

Model	Motor Type	Nominal Battery Voltage (V)	Max Current [S2-2 Minute]	Max Current [S2-60 Minutes]
1232SE-247X	Induction/PMAC	24	375Arms	185Arms
1232SE-537X	Induction/PMAC	36-48	350Arms	175Arms
1232SE-637X	Induction/PMAC	48-80	250Arms	145Arms
1234SE-457X	Induction/PMAC	24-36	500Arms	235Arms
1234SE-547X	Induction/PMAC	36-48	450Arms	215Arms
1234SE-637X	Induction/PMAC	48-80	350Arms	150Arms
1236SE-467X	Induction/PMAC	24-36	650Arms	285Arms
1236SE-567X	Induction/PMAC	36-48	600Arms	260Arms
1236SE-657X	Induction/PMAC	48-80	450Arms	185Arms
1238SE-4971	Induction/PMAC	24-36	1000Arms	425Arms
1238SE-5971	Induction/PMAC	36-48	900Arms	395Arms
1238SE-6971	Induction/PMAC	48-80	900Arms	305Arms
1238SE-7971	Induction/PMAC	72-96	900Arms	305Arms





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SYSTEM ACCESSORIES



The Curtis Model 1222 is an AC induction motor controller for 'steer by wire' electric power steering systems and is the ideal partner for the 'SE' Controllers on vehicles such as reach trucks, order pickers, stackers and other similar industrial vehicles.



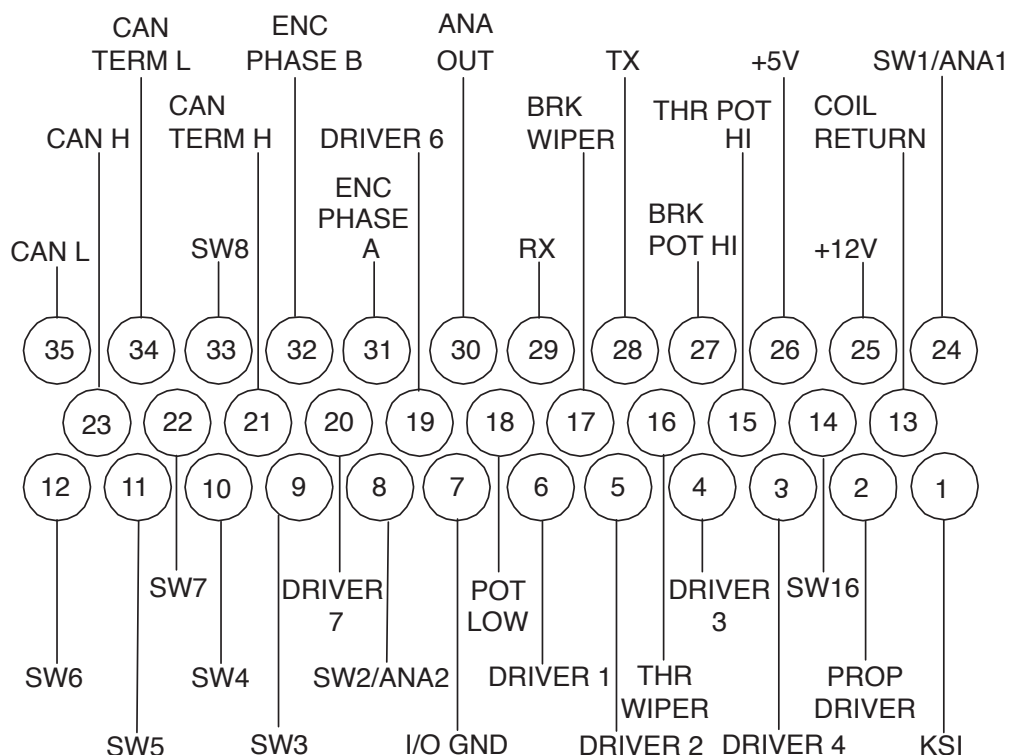
The Curtis Model 1352 CANbus I/O expansion module features 9 I/O pins, including 6 proportional valve drivers. This module can be used to further expand the I/O capability of Curtis AC motor controllers using VCL.



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.

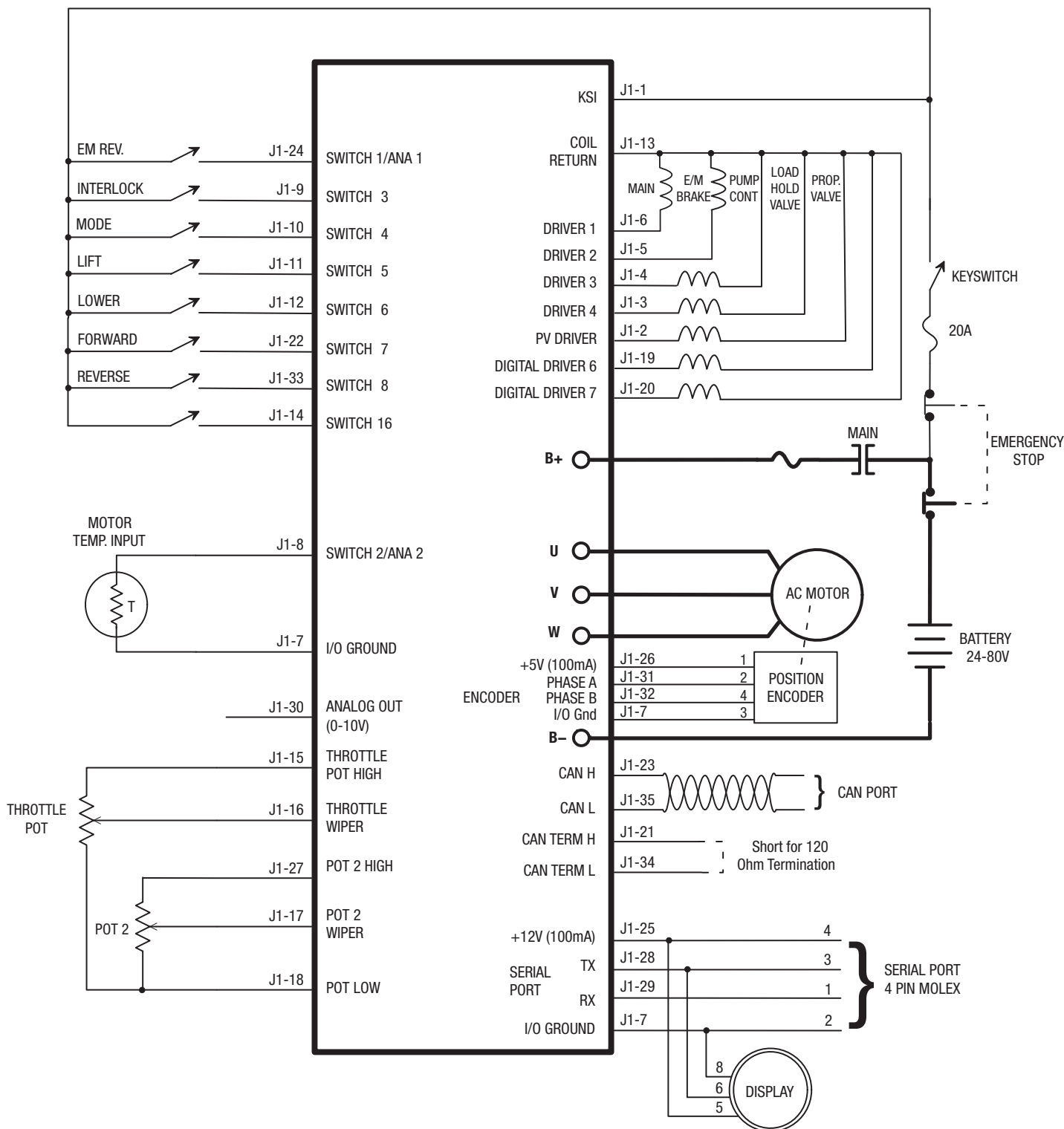
CONNECTOR WIRING





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TYPICAL WIRING

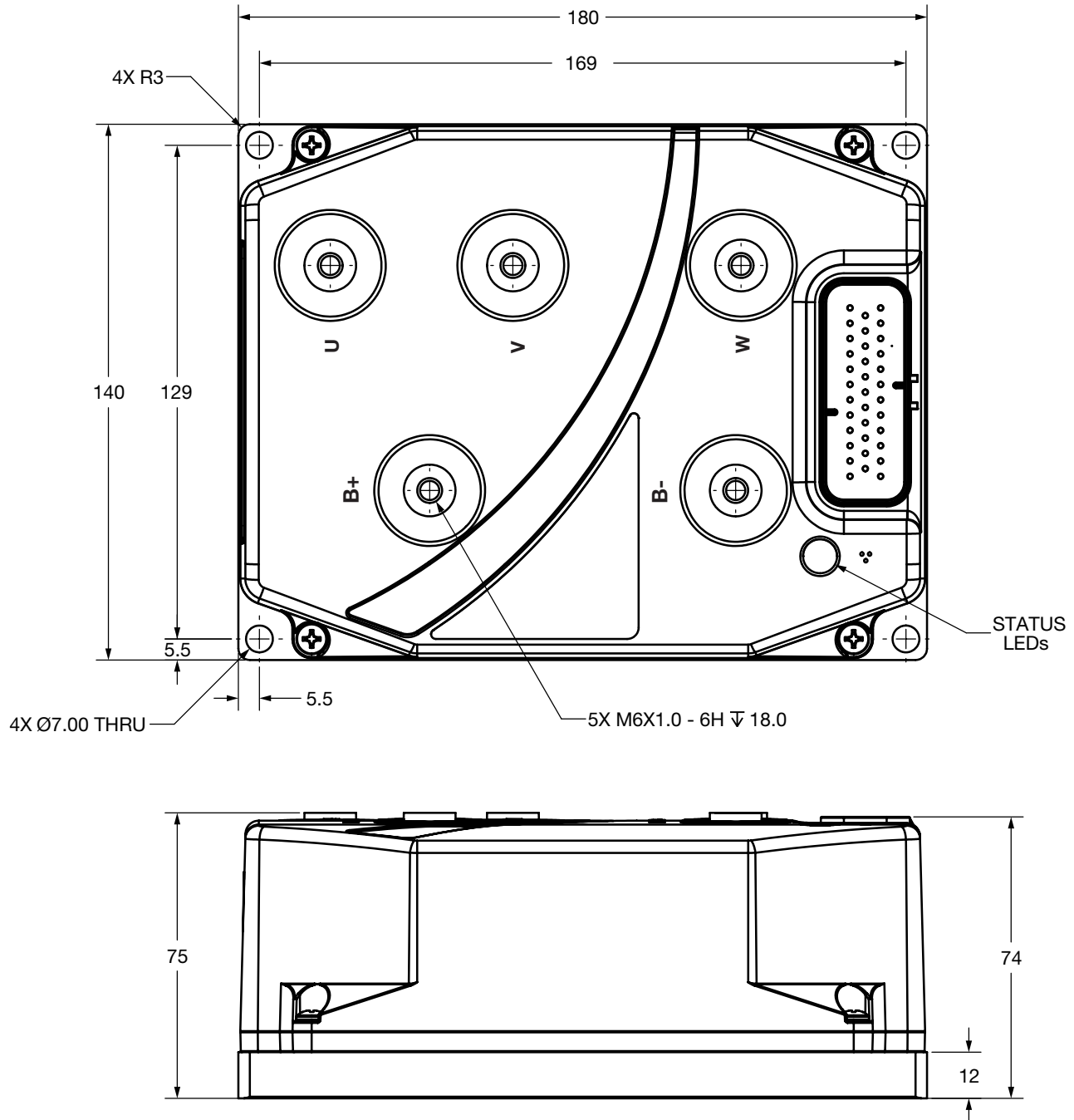




Models 1232SE / 1234SE / 1236SE / 1238SE

DIMENSIONS mm (typical)

1232SE

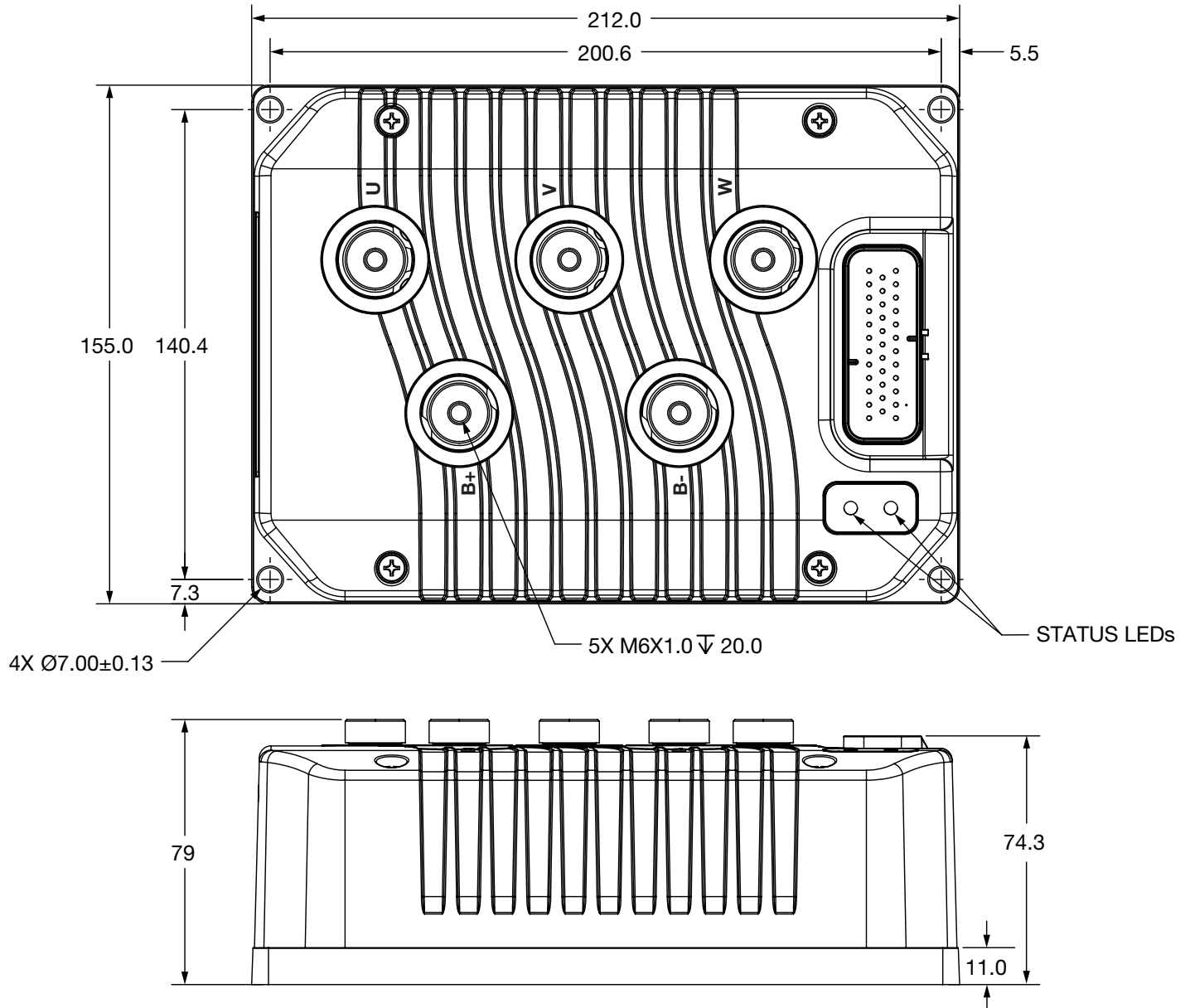




Models 1232SE / 1234SE / 1236SE / 1238SE

DIMENSIONS mm (typical)

1234SE

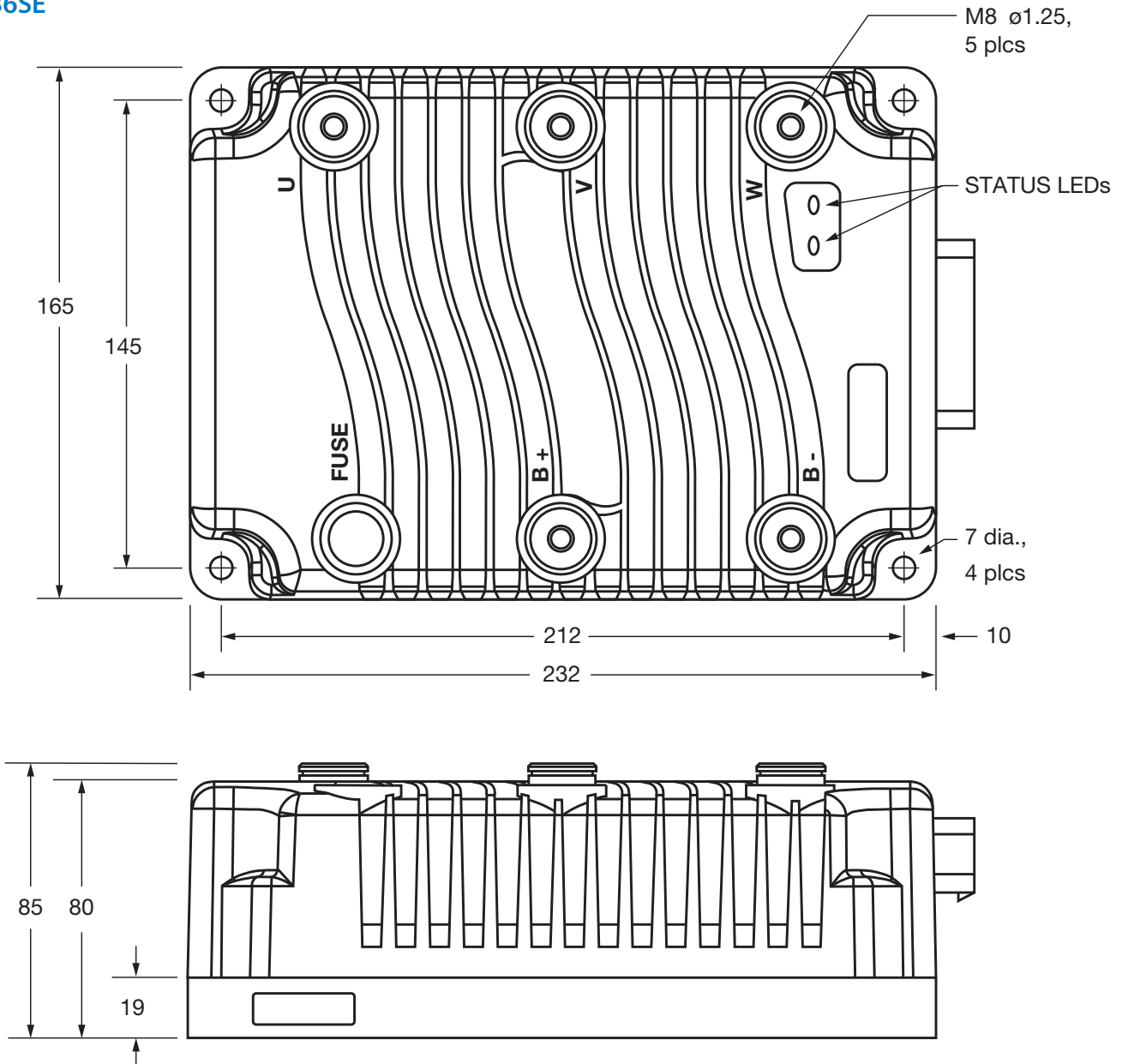




Models 1232SE / 1234SE / 1236SE / 1238SE

DIMENSIONS mm (typical)

1236SE

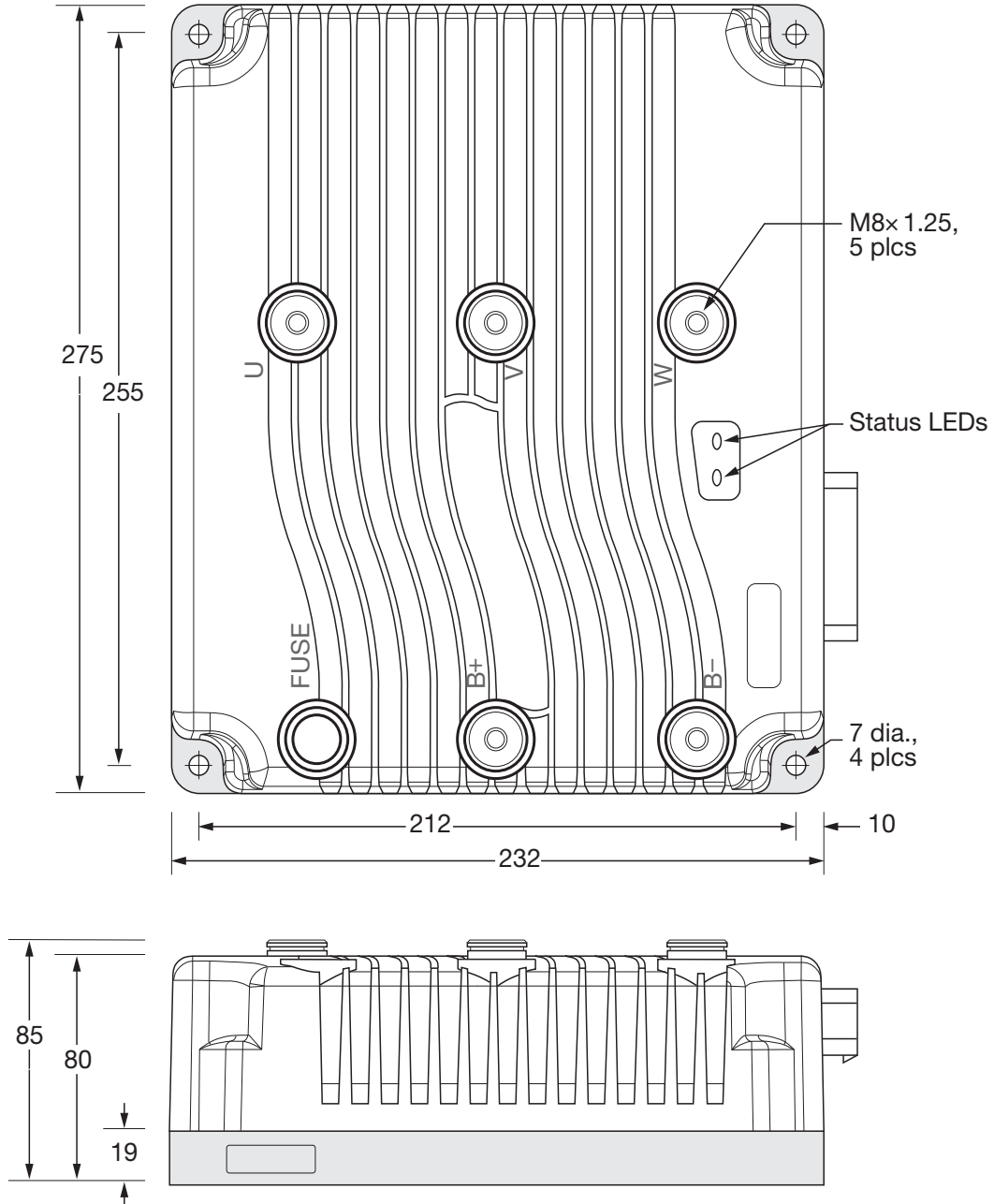




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DIMENSIONS mm (typical)

1238SE



WARRANTY Two year limited warranty from time of delivery.

The Curtis Difference 
You feel it when you drive it