A KOHLER COMPANY

CURTIS

Motor Controllers

HVi F5-R

AC High Voltage Motor Controller

Voltage: 150V–525V

Power: 70kW peak / 40kW continuous

kW ratings are dependent on the efficiency and power factor of the controlled motor.

CE

HVi F5-R

Superb Performance and Value

The Curtis Model HVi F5-R Motor Controller has an operating voltage range of 150–525V, 70kW peak power, and 40kW continuous power. Model HVi F5-R provides accurate speed and torque control of 3-phase AC induction and PMAC motors.

The HVi F5-R uses dual, high-performance ARM Cortex microprocessors that provide a category 2 designated architecture for functional safety, as well as efficient motor control and flexible system control. The controller is designed for electric traction, hydraulic pump and on-engine generator (OEG) hybrid systems on mobile equipment applications such as material handling trucks, mobile elevating work platforms, airport ground support and construction equipment.

FEATURES

Fit for Purpose

- Field-oriented motor control algorithms maintain optimal performance for 3-phase AC motors under all operating conditions.
- Real-time motor torque and power estimates optimize vehicle-level power.
- Rugged aluminum housing with a small footprint for the power rating.
- Liquid-cooled (50/50 water/glycol with a 65°C maximum coolant temperature).
- IP6K9K motor and battery power connectors with high voltage interlock.
- Sealed, 35-pin Ampseal I/O connector.
- 8–32V isolated logic board.
- IP67 environmental protection as per IEC 60529.
- A mounting kit is supplied.
- CE/UKCA marked as a programmable safety device (pending).
- Designed to comply with UL583.

Motors

- Works with any AC induction or PMAC motor.
- Motor auto-characterization simplifies on-truck pairing with different induction motor types.
- Supports most motor position sensors, including resolver, sine/cosine and quadrature AB incremental sensors.

You Feel It When You Drive It— Maximum Torque, Minimum Losses, Full Control

- Curtis' renowned field-oriented control algorithms and PWM switching technology assure maximum torque and system efficiency across the entire torque/speed spectrum.
- Smooth and predictable drive control that only Curtis can deliver.

HVi F5-R

FEATURES continued

Get More Out of Your Battery—Regardless of the Technology

- High-efficiency means more of your battery's energy is converted to motor output power.
- Configurable overvoltage and undervoltage protection parameters.
- Wide operating voltage range allows use with cell chemistries such as lithium ion.
- Configurable CANbus and VCL allow easy integration with the Battery Management Systems (BMS) typically found on lithium battery packs.

Powerful Dual Microprocessors

- Dual-micro architecture supports category 2 functional safety under EN ISO 13849-1:2015 and EN 1175:2020.
- Blazing processor speeds for precise regulation of voltage, frequency and current.

Customize Your Vehicle with VCL

- The Curtis Vehicle Control Language (VCL) enables Curtis AC Motor Controllers to operate as system controllers, eliminating the need for costly additional controllers.

Flexible I/O

- 8–32V isolated logic:
  - Dual CANbus
  - 2 thermistors
  - 4 digital outputs
  - 2 digital inputs
  - 2 analog inputs (configurable)
  - 5V external supply
  - CAN termination option
  - Inputs for quadrature, sine/cosine and resolver motor position sensors

Comprehensive CAN Capabilities

- Configurable 11 or 29 bit protocol support for CANopen or J1939 use.
- Dual independent CAN ports with full galvanic isolation.
- Plug and play support for Curtis CAN displays.
- Fully CANopen compliant per CiA 301.
- Acts as a "CAN interpreter" that allows third-party CAN devices with differing profiles to work on the same CANbus.

Diagnostic and Safety Features

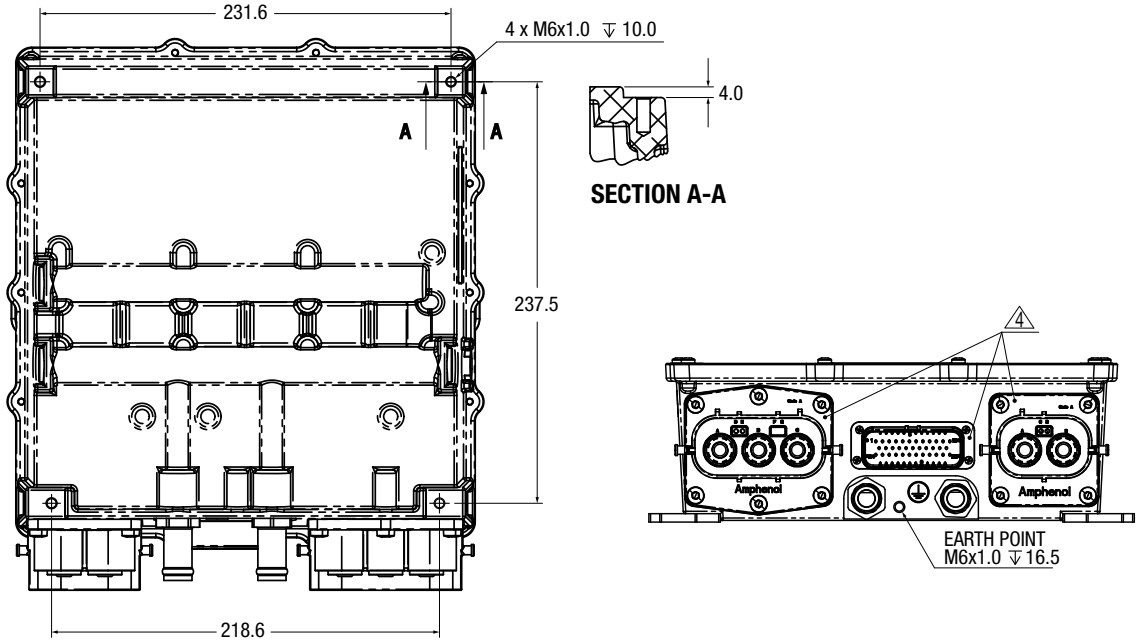
- Internal active discharge.
- Motor active short circuit protection in event of overvoltage.
- Thermal cutback, warning and automatic shutdown protect the motor and controller.
- High voltage interlock (HVIL).
- Error logging, fault history and CAN Emergency Messages.

CAN-based Programming

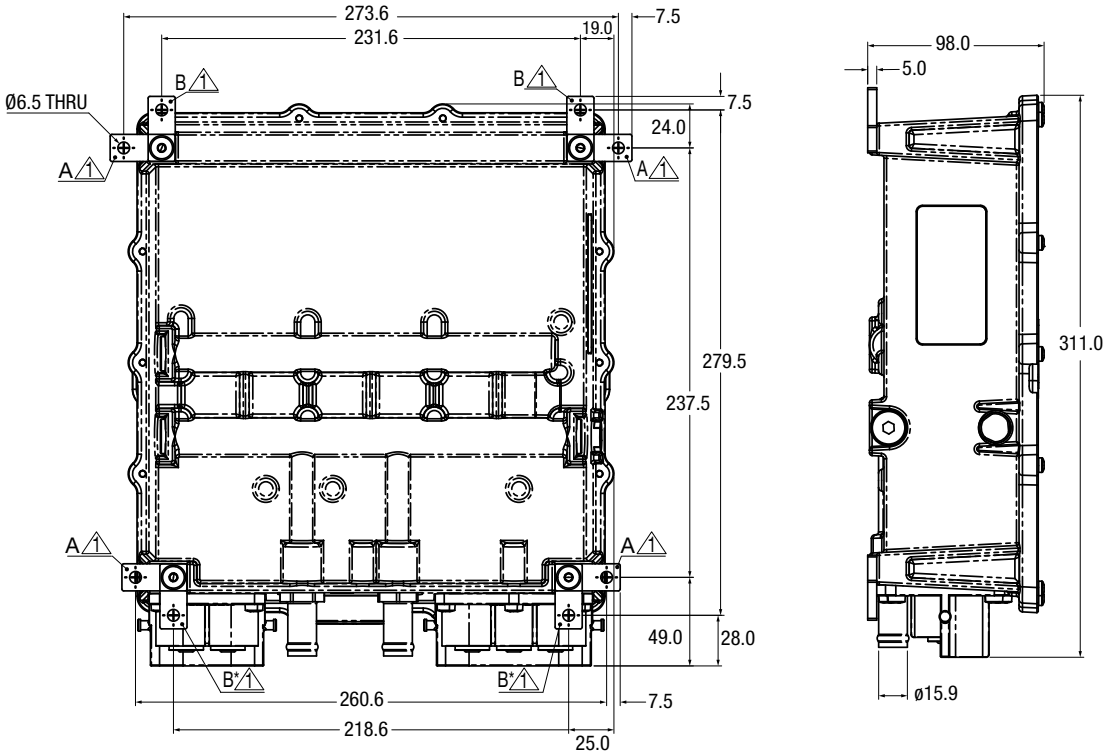
- Model HVi F5-R is programmable over the CANbus.
- Supports most CAN-based service tools used by major industrial truck manufacturers worldwide.
- Develop, configure, optimize and debug vehicle systems with the Curtis Integrated Toolkit.

DIMENSIONS

Without Mounting Kit

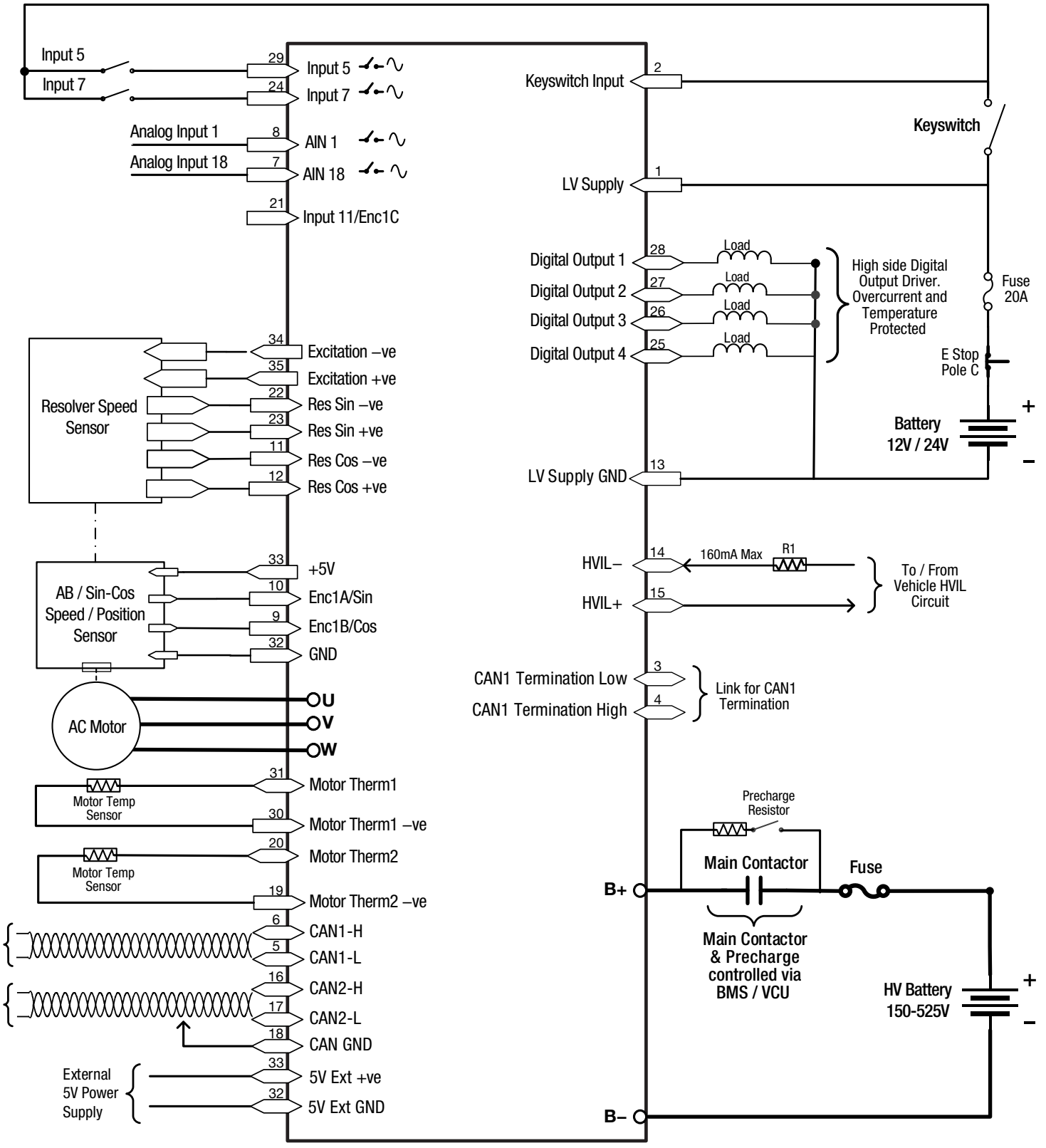


With Mounting Kit



Note: The positions marked with asterisks are not recommended for most applications due to partial obstruction.

LOGIC CONNECTOR WIRING



HVi F5-R

SPECIFICATIONS

Model No.		HVi F5-R-400-200-001	HVi F5-R-400+
Operating Voltage Range		150 VDC[1] – 525 VDC[2]	
LV Supply Voltage Range		12–24 VDC (8–32 VDC)	
Maximum Controller Output Frequency		599Hz[3]	
Switching Frequency Power Stage		Up to 10kHz	
Current [Arms]	Continuous, 60 min.	100A	150A TBC
	S2, 2 min. (Max.)	200A	300A TBC
Capacity [kW] @ nom V[4]	Continuous, 60 min.	40kW	70kW TBC
	S2, 2 min. (Max.)	70kW	120kW TBC
Coolant		50/50 water-glycol mix	
Nominal Flow Rate		10 l/min	
Maximum Coolant Cavity Pressure		<2 bar	
Coolant Temperature Range		–30°C to 65°C	
Weight		7.2 kg	
Dimensions		280 mm x 261 mm x 98 mm	
Ingress Protection		IP67	
Operating Ambient Temperature		–30°C to 85°C	
Motor Sensor Support		Resolver, sine/cosine, quadrature AB	
EMC		Designed to the requirements of EN 12895:2015+A1:2019	
Safety		Designed to the requirements of EN 1175-1:2020 & EN ISO 13849-1:2015	
UL		UL recognized component per UL583 (pending)	
Lifetime Rating		20,000 hours	

1: Undervoltage protection reduces the drive current when the voltage is below 150 VDC.

2: Overvoltage protection cuts back the regenerative braking (regen) current when the voltage is above 500 VDC.

3: Higher frequencies are supported. For more information, contact the Curtis sales-support office in your region.

4: kW ratings are dependent on the efficiency and power factor of the controlled motor.

WARRANTY Two year limited warranty from time of delivery.

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