

ACF2-A

AC Motor Controller with VCL

Parker CURTIS

Superb Performance and Value

The Curtis Model AC F2-A Motor Controller provides accurate speed and torque control of 3-phase AC induction, PMAC and BLDC motors.

Model AC F2-A is optimized for use as a traction controller on 1.0 ton-2.0 ton Class III pedestrian-operated powered pallet trucks. The controller is also suitable for traction or hydraulic pump control on other types of battery powered vehicles. Vehicle designers can define and control the dynamic performance of vehicles' drivetrains. Model AC F2-A is also a powerful system controller that can operate as a commander device on the CANbus.

Features



Fit for Purpose

- Field-oriented motor control algorithms maintain optimal performance for 3-phase AC motors under all operating conditions.
- Rugged housing with a small footprint for the power rating.
- Heavy duty M6 busbars for motor and battery connectors.
- Sealed, 23-pin AMPseal I/O connector.
- Impervious to most oils, solvents, degreasers and other chemicals often encountered by industrial vehicles.
- IP65 environmental protection as per IEC 60529.
- Exceeds global conformance requirements for functional safety, electrical safety and EMC.
- CE/UKCA marked as a programmable safety device.
- UL583/cUL583 recognized component.

Motors

- Works with any AC induction, PMAC or BLDC motor.
- Motor auto-characterization simplifies on-truck pairing with different induction motor types.
- Comprehensive library of AC motor types stored in controller memory.

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

- Curtis' renowned field-oriented control algorithms and advanced 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.

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.



Features continued

Powerful Dual Microprocessors

- Dual-micro architecture achieves 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

- All I/O pins are multi-function, and can be configured to provide up to:
  - Seventeen digital Inputs
  - Nine analog Inputs
  - Two potentiometer sources
  - Five output drivers, including proportional valve driver
  - Quadrature encoder input
  - Sine/Cosine sensor input

Comprehensive CAN Capabilities

- Configurable 11 or 29 bit protocol support for CANopen or J1939 use.
- Plug and play support for Curtis CAN displays and CAN tiller heads from leading manufacturers FREI and REMA.
- 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.

Diagnostics

- Status LED for at-a-glance system troubleshooting.
- Thermal cutback, warning and automatic shutdown protect the motor and controller.
- Error logging, fault history and CAN Emergency Messages.

CAN-based Programming

- 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.



System Accessories



Curtis Model 3150

- A CAN-based color LCD vehicle status display in a rugged 52 mm diameter housing is the ideal partner to Model AC F2-A.
- 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.

CURTIS™ INTEGRATED TOOLKIT

The Curtis Integrated Toolkit

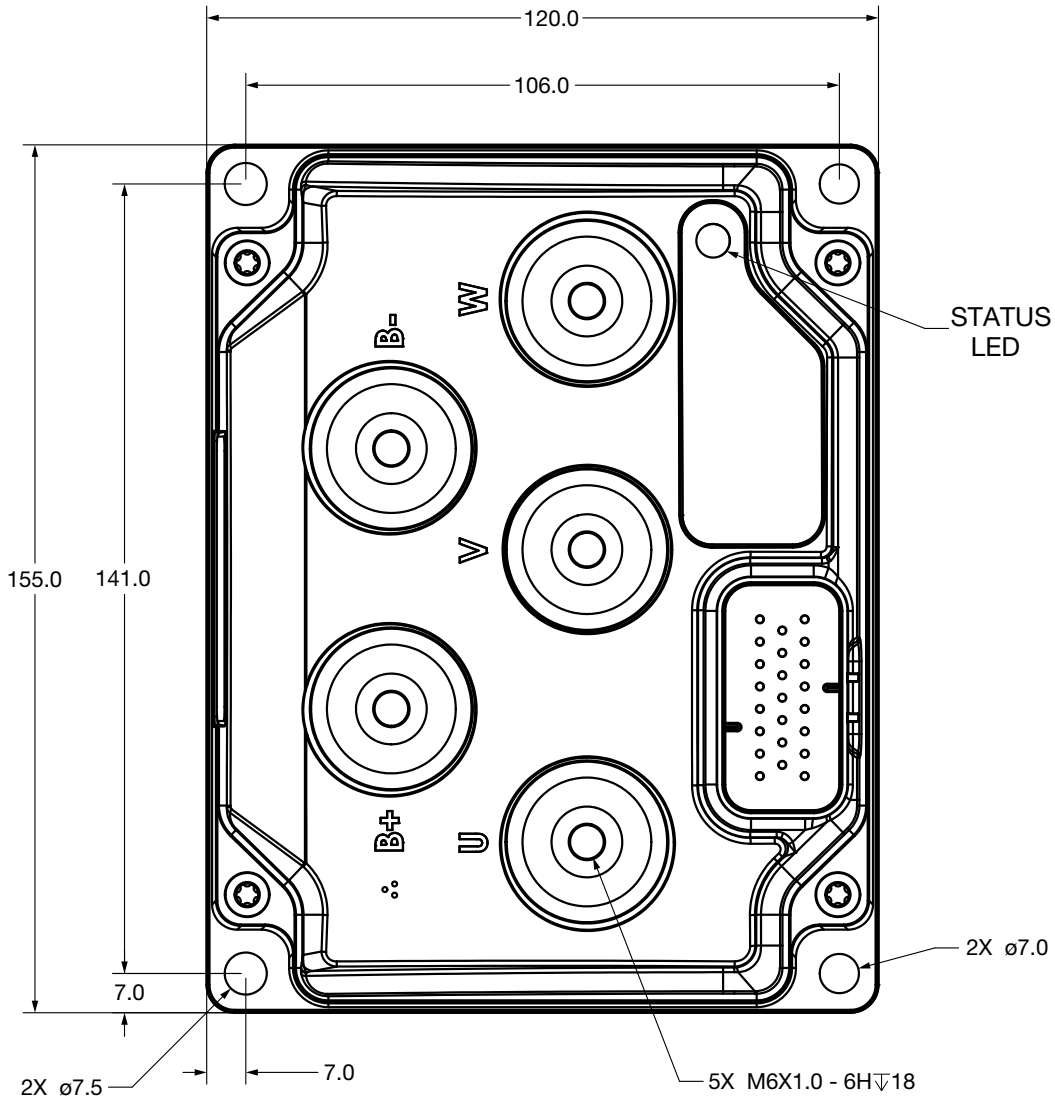
- **The Curtis Integrated Toolkit (CIT)** provides a suite of development and diagnostic tools for working with CAN systems that use Curtis and third-party CAN devices. CIT consists of the following tools:
  - **Launchpad**
    Starting point and project editor.
  - **Programmer**
    Configure parameters, view monitor values, and view active faults and the fault history.
  - **TACT**
    Stand-alone oscilloscope and data-logging tool.
  - **VCL Studio**
    Editor and compiler for VCL software.
  - **Menu Editor**
    Create and modify programming menus.
  - **Package & Flash**
    Load your software into CAN devices.
- **The Curtis Integrated Toolkit** is compatible with many leading USB>CAN interface dongles from Peak, Kvaser, iFAC, Sontheim, etc.

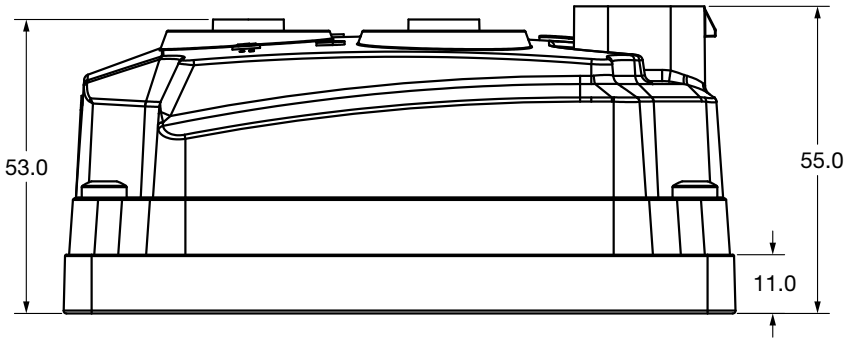
Model Chart

Model	Nominal Battery Voltage	Maximum Current [S2-2 minutes]	Typical Current [S2-60 minutes]*	Internal 120Ω CAN Termination
AC F2-A 12-120-001	12V	120 Arms	120 Arms	Yes
AC F2-A 12-120-051	12V	120 Arms	120 Arms	No
AC F2-A 12-280-001	12V	280 Arms	130 Arms	Yes
AC F2-A 12-280-051	12V	280 Arms	130 Arms	No
AC F2-A 24-120-001	24V	120 Arms	120 Arms	Yes
AC F2-A 24-120-051	24V	120 Arms	120 Arms	No
AC F2-A 24-200-001	24V	200 Arms	150 Arms	Yes
AC F2-A 24-200-051	24V	200 Arms	150 Arms	No
AC F2-A 24-240-001	24V	240 Arms	150 Arms	Yes
AC F2-A 24-240-051	24V	240 Arms	150 Arms	No
AC F2-A 24-280-001	24V	280 Arms	130 Arms	Yes
AC F2-A 24-280-051	24V	280 Arms	130 Arms	No
AC F2-A 48-150-001	36-48V	150 Arms	130 Arms	Yes
AC F2-A 48-150-051	36-48V	150 Arms	130 Arms	No
AC F2-A 48-240-001	36-48V	240 Arms	140 Arms	Yes
AC F2-A 48-240-051	36-48V	240 Arms	140 Arms	No

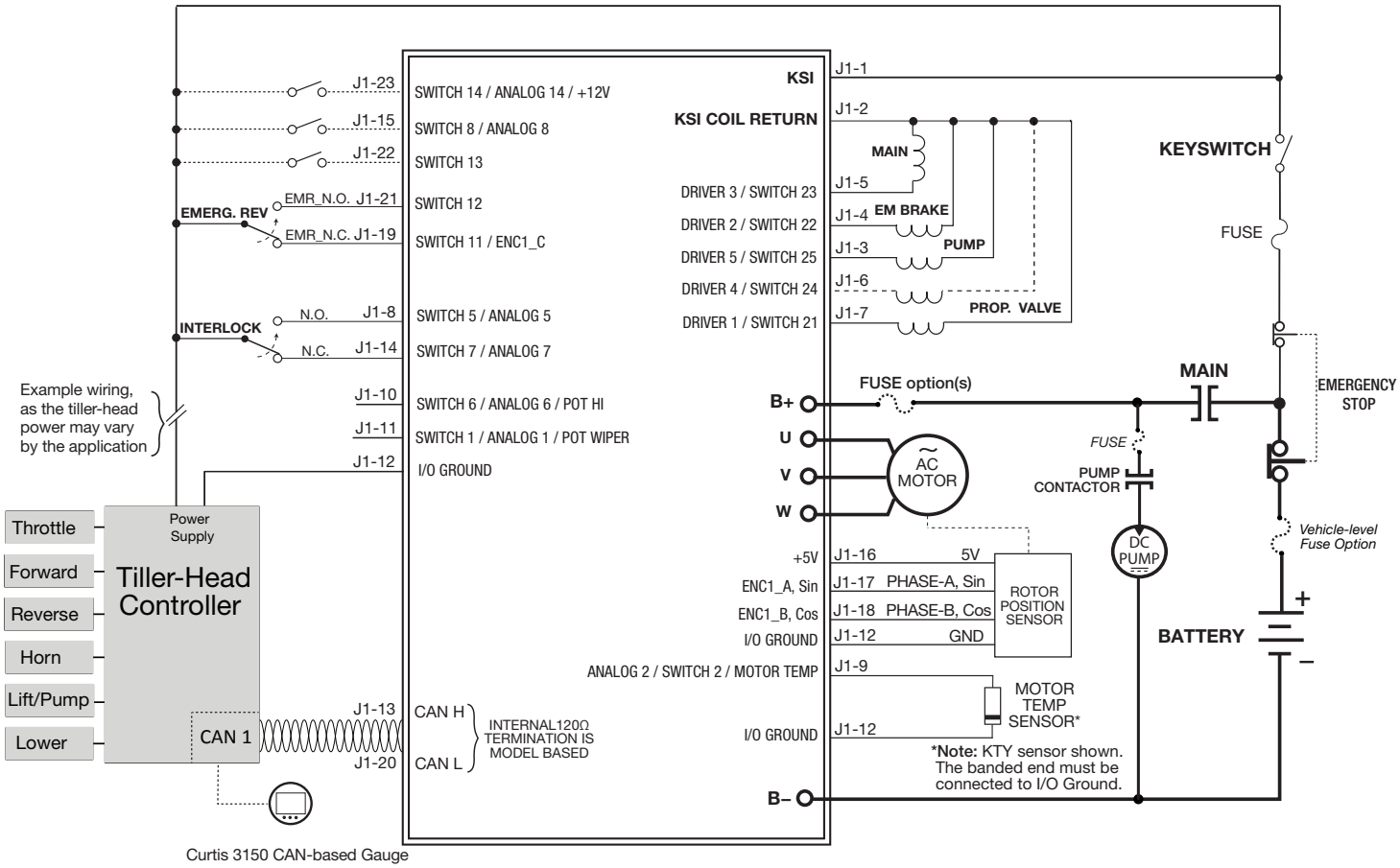
*The S2-2 minute and S2-60 minute ratings are the currents typically reached before thermal cutback occurs. The ratings are based on mounting the controller to a 6 mm thick vertical steel plate with 6 km/h (1.7 m/s) airflow perpendicular to the plate and operating the controller with an ambient temperature of 25°C.

Dimensions (mm)

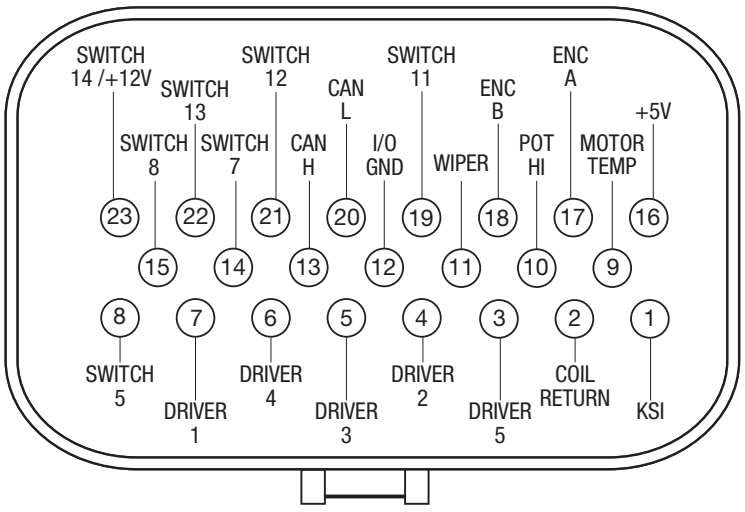




Connector Wiring



Pinout Chart



Specifications

Nominal Input Voltage	12V	24V	36–48V
Minimum Voltage	9V	12V	18V
Maximum Voltage	15V	30V	63V
PWM Frequency	10 kHz nominal (configurable)		
Maximum Controller Output Frequency	599 Hz		
Electrical Isolation to Heatsink	500 VAC		
Storage Ambient Temperature	–40°C to 95°C		
Operating Ambient Temperature	–40°C to 50°C		
Thermal Cutback	Controller linearly reduces maximum current limit when the internal heatsink temperature is between 85°C and 95°C; complete cutoff occurs above 95°C and below –40°C.		
Design Life	48V 240 Arms models: 2000 hours All other models: 8000 hours		
Ingress Protection	IP65		
Weight	1.1 kg		
Dimensions W x L x H	120 mm x 155 mm x 55 mm		
Mounting	2x ø7.0 mm and 2x ø7.5 mm		
Power Connections	5x M6x1.0		
EMC	Designed to the requirements of EN 12895:2015		
Safety	Designed to the requirements of EN ISO 13849-1:2015 and EN 1175:2020		
UL	UL recognized component per UL583/cUL583		

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.

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