



CURTIS

Motor Controllers



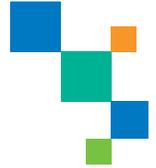
# ACF2-A

## AC Motor Controller with VCL



CE 





## The Ultimate Class III Truck Control System: Superb Performance and Value

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

Model AC F2-A is fully optimized for use as a traction controller on 1.0 ton-2.0 ton Class III pedestrian-operated powered pallet trucks. It provides vehicle designers with the ability to fully define and control the detailed dynamic performance of their vehicle's drivetrain, and also provides comprehensive vehicle management and CAN capabilities. Model AC F2-A is also suitable for traction or hydraulic pump control on other types of battery powered vehicles.

Together with the Curtis model 3141 CAN LCD display and the user-friendly Curtis Integrated Toolkit, the Curtis model AC F2-A is the ultimate Class III truck control system.



## FEATURES

### Fit for Purpose

- ▶ Compact, rugged housing with very small 'footprint' for its 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 and IP67 environmental protection as per IEC 60529.
- ▶ Exceeds latest global conformance requirements for functional safety, electrical safety and EMC.
- ▶ CE marked as a programmable safety device.
- ▶ UL583 recognized component.

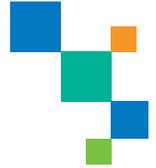
### Motors

- ▶ 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.
- ▶ Comprehensive library of AC motor types stored controller memory.

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

- ▶ The latest implementation of Curtis' renowned field-oriented control algorithms and our advanced PWM switching technology assure maximum motor output torque and highest possible system efficiency across the entire torque/speed spectrum.
- ▶ Smooth and predictable drive control that only Curtis can deliver.





## 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.
- ▶ Fully configurable over- and under-voltage protection parameters.
- ▶ Wide operating voltage range allows use with the latest cell chemistries such as lithium ion.
- ▶ Configurable CANbus and VCL allows easy integration with the BMS (Battery Management Systems) typically found on lithium battery packs.

### Powerful, High Performance Dual Microprocessors

- ▶ Dual-micro architecture achieves up to PL=D, category 2 functional safety under EN ISO 13849-1 / EN 1175-1:1998+A1:2010.
- ▶ Ultra-fast processor speeds allow highly accurate control and regulation of voltage, frequency and current.
- ▶ Hardware 'ready' for the forthcoming EN 1175:2020.

### Customize Your Vehicle with VCL

- ▶ The Curtis VCL (Vehicle Control Language) allows Curtis AC motor controllers to perform the role of manager, eliminating the need for costly, additional system controllers.

### Highly Flexible I/O

- ▶ All I/O pins are multi-function, and can be configured to provide up to:
  - 17 Digital Inputs
  - 9 Analog Inputs
  - 2 Potentiometer sources
  - 5 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 a variety of CAN tiller heads from leading manufacturers FREI and REMA.
- ▶ Fully compliant with CANopen protocol CiA 301.
- ▶ Capable of acting as 'CAN interpreter' allowing 3rd party CAN devices with differing profiles to work on the same CAN network.

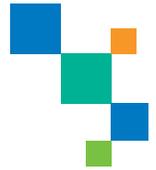
### Improved Diagnostics

- ▶ 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.
- ▶ Improved error logging and fault history tables with CAN Emergency Messages.

### CAN-based Programming

- ▶ Model AC F2-A is programmable over the CANbus. This allows simpler '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.





## SYSTEM ACCESSORIES



### Curtis Model 3141

A cost-effective, CAN-based LCD vehicle status display in a rugged 52mm diameter housing is the ideal partner to model AC F2-A.

- ▶ Large, easy-to-read 16-segment format LCD.
- ▶ Battery Discharge Indicator, Service (Hours) Counter and Diagnostic/ Message Center functions.
- ▶ Sealed to IP65 (IP67 optional).
- ▶ 12–48V nominal operating voltage range.
- ▶ CE compliant, UL583 recognized component.
- ▶ Optional backlight and heater.

### 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:

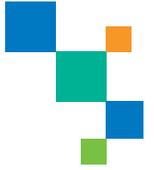
- ▶ **Launchpad**  
Starting point and project editor.
- ▶ **Programmer**  
Used to configure parameters, view monitor values, and view active faults and the fault history.
- ▶ **TACT**  
Improved version of the stand-alone oscilloscope/ datalogging tool.
- ▶ **VCL Studio**  
Editor and compiler for VCL software.
- ▶ **Menu Editor**  
Tool to create and modify programming menus.
- ▶ **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.

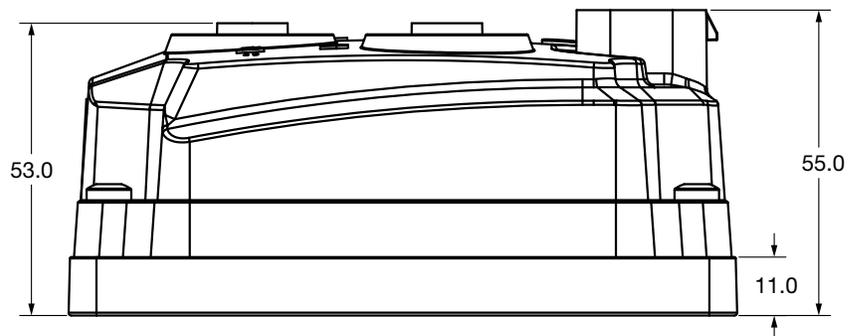
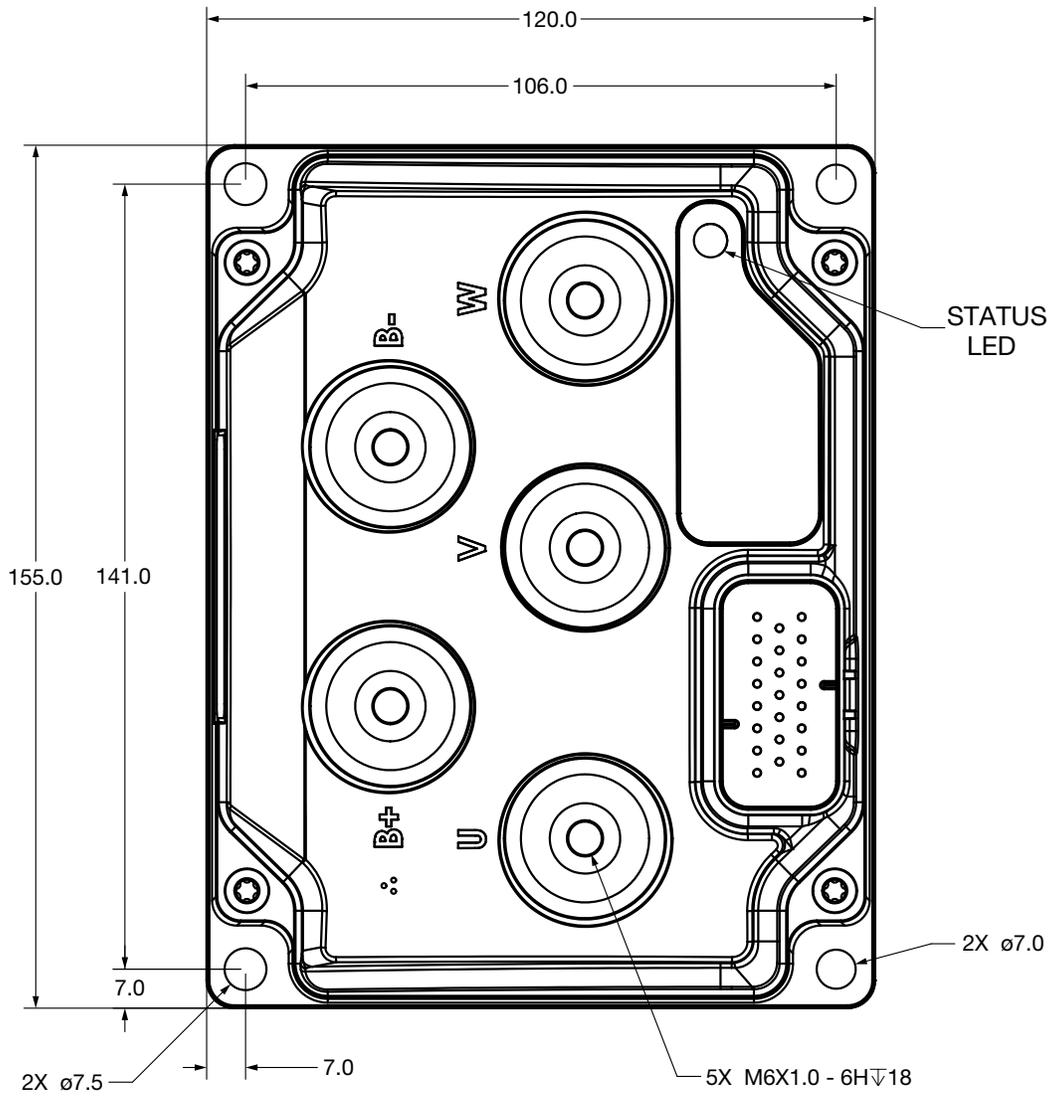
## MODEL CHART

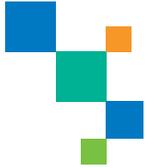
Model	Nominal Battery Voltage:	Maximum Current: [S2-2 minute]	Maximum Current: [S2-60 minute]	Internal 120Ω CAN Termination
AC F2-A 12-120-001	12V	120Arms	40Arms	Yes
AC F2-A 12-120-051	12V	120Arms	40Arms	No
AC F2-A 24-120-001	24V	120Arms	40Arms	Yes
AC F2-A 24-120-051	24V	120Arms	40Arms	No
AC F2-A 24-200-001	24V	200Arms	67Arms	Yes
AC F2-A 24-200-051	24V	200Arms	67Arms	No
AC F2-A 24-240-001	24V	240Arms	84Arms*	Yes
AC F2-A 24-240-051	24V	240Arms	84Arms*	No
AC F2-A 24-280-001	24V	280Arms	84Arms*	Yes
AC F2-A 24-280-051	24V	280Arms	84Arms*	No
AC F2-A 48-150-001	36-48V	150Arms	50Arms*	Yes
AC F2-A 48-150-051	36-48V	150Arms	50Arms*	No
AC F2-A 48-240-001	36-48V	240Arms	80Arms*	Yes
AC F2-A 48-240-051	36-48V	240Arms	80Arms*	No

\*Subject to change, please contact your Curtis sales representative for more information.

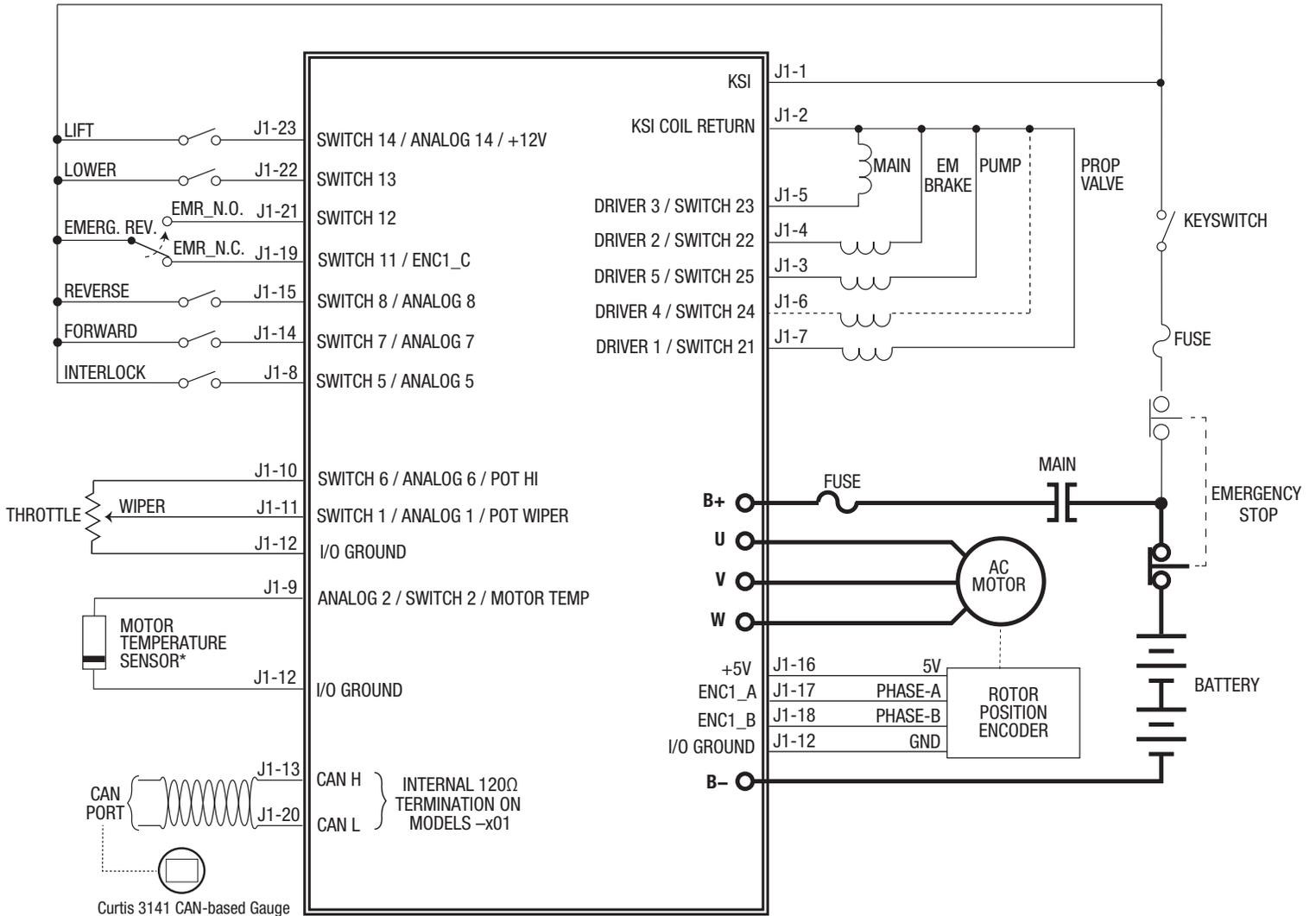


## DIMENSIONS

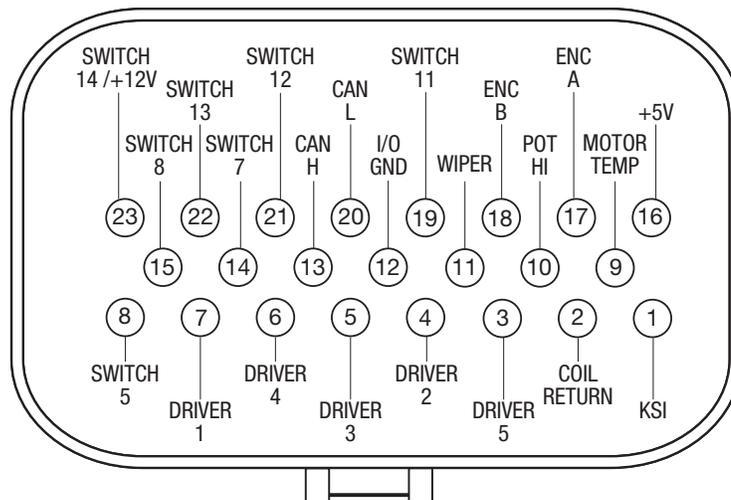


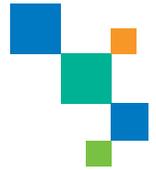


## CONNECTOR WIRING



## PINOUT CHART





## SPECIFICATIONS

Nominal Input Voltage	12V	24V	36/48V
Minimum Voltage	9V	12V	18V
Brownout Voltage	8.3V	8V	12V
Maximum Voltage	15V	30V	63V
PWM Frequency	10Khz		
Maximum Controller Output Frequency	599Hz		
Electrical Isolation to Heatsink	500Vac		
Storage Ambient Temperature	-40°C to 95°C		
Operating Ambient Temperature	-40°C to 50°C		
Thermal Cutback	Controller linearly reduces maximum current limit with an internal heatsink temperature from 85°C (185°F) to 95°C (203°F); complete cutoff occurs above 95°C (203°F) and below -40°C (-40°F).		
Design Life	8000 hours		
Operating Duration at Maximum Current	1 Minute		
Package Environmental Rating	IP65/IP67		
Weight	1.1Kg (2.2lbs)		
Dimensions W x L x H	120mm x 155mm x 53mm		
EMC	Designed to the requirements of EN 12895:2015		
Safety	Designed to the requirements of EN1175-1:1998+A1: 2010, EN ISO 13849-1:2015		
UL	UL recognized component per UL583		

**WARRANTY** Two year limited warranty from time of delivery.

The Curtis Difference   
**You feel it when you drive it**



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Specifications subject to change without notice

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