



CURTIS

Motor Controllers



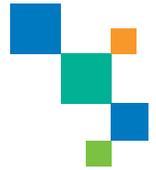
ACF2-A

AC Induction Motor Controller with VCL



CE 





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

This new AC induction motor controller (inverter) uses dual high performance ARM Cortex microprocessors in an compact, package to deliver unmatched performance and a very flexible feature set.

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 master capabilities. Model AC F2-A is also suitable for traction or hydraulic pump control on other types of battery powered vehicles.

Together with the new Curtis model 3140 CAN LCD display and the new user-friendly Curtis Software Suite, 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 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.

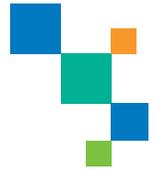
You Choose the Motor

- ▶ Easily configured to work with any AC induction motor (dependent on installed software.)
- ▶ Improved motor auto-characterization setup allows simple on-truck pairing with different Induction motor types.
- ▶ Comprehensive library of induction motor types stored in controller memory.

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

- ▶ The latest implementation of Curtis' renowned IFO Vector control algorithm, and our advanced PWM switching technology, assures 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 / EN1175-1:1998+A1:2010.
- ▶ Ultra-fast processor speeds allows highly accurate control and regulation of voltage, frequency and current.

Customize Your Vehicle with VCL

- ▶ The Curtis VCL (Vehicle Control Language) allows Curtis AC motor controllers to perform as 'vehicle managers' eliminating the need for costly, additional system controllers.
- ▶ With model AC F2-A, Curtis introduces several significant VCL enhancements:
 - Increased CAN master capabilities.
 - Nearly double the VCL code execution speed.
 - Plentiful on-board memory supports large, complex vehicle application programs (VCL).
 - New output driver control modes, arrays, trigonometry and other complex math functions.

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

Comprehensive CAN Master 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 DS301 profile.
- ▶ Capable of acting as 'CAN interpreter' allowing 3rd party CAN devices with differing profiles to work on the same CAN network.

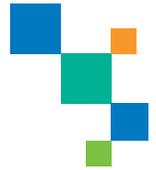
Improved Diagnostics

- ▶ Integrated, high visibility Status LED with simplified flash code sequence for at-a-glance system troubleshooting.
- ▶ Dynamic throttle safety checking for increased safety with analog throttle commands.
- ▶ Improved error logging and fault history tables with CAN Emergency Messages.

CAN-based Programming

- ▶ Model AC F2-A is programmable directly over the CANbus. This allows simpler 'vehicle level' communication with many of the CAN-based service tools in use by the major industrial truck manufacturers worldwide, or significantly, allows use of the Curtis Software Suite of development tools.





SYSTEM ACCESSORIES



Curtis Model 3140

A cost-effective, CAN-based LCD vehicle status display in a rugged 52mm diameter housing is the ideal partner to model AC F2-A for use on Class III powered pallet truck applications.

- ▶ Large, easy-to-read 16-segment format LCD.
- ▶ Battery Discharge Indicator, Service (Hours) Counter and Diagnostic/Message Center functions.
- ▶ Sealed to IP65 front, IP54 rear.
- ▶ 12–48V nominal operating voltage range.
- ▶ CE compliant, UL583 recognized component.
- ▶ Optional backlight and heater.



The Curtis Software Suite

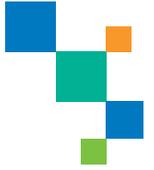
A fully integrated suite of development and diagnostic tools for use on CAN systems using Curtis and other 3rd party CAN-based products. It is comprised of the following tools that run in a shared environment:

- ▶ **Launch Pad**
Starting point and project editor.
- ▶ **Programmer**
Similar in function to the 1314.
- ▶ **TACT**
Improved version of the stand-alone oscilloscope/datalogging tool.
- ▶ **CAN Monitor**
CAN data 'sniffer' and debugging tool.
- ▶ **VCL Studio**
Editor and compiler for VCL software.
- ▶ **Menu Editor**
Tool to create and modify programming menus.
- ▶ **Pack & Flash**
Downloader tool to load you software into the CAN device.

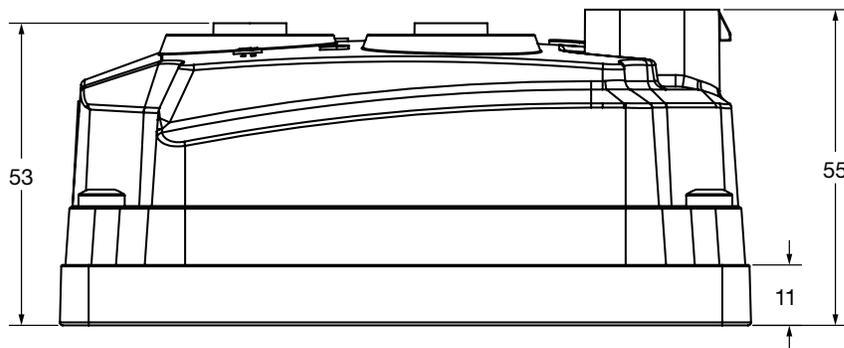
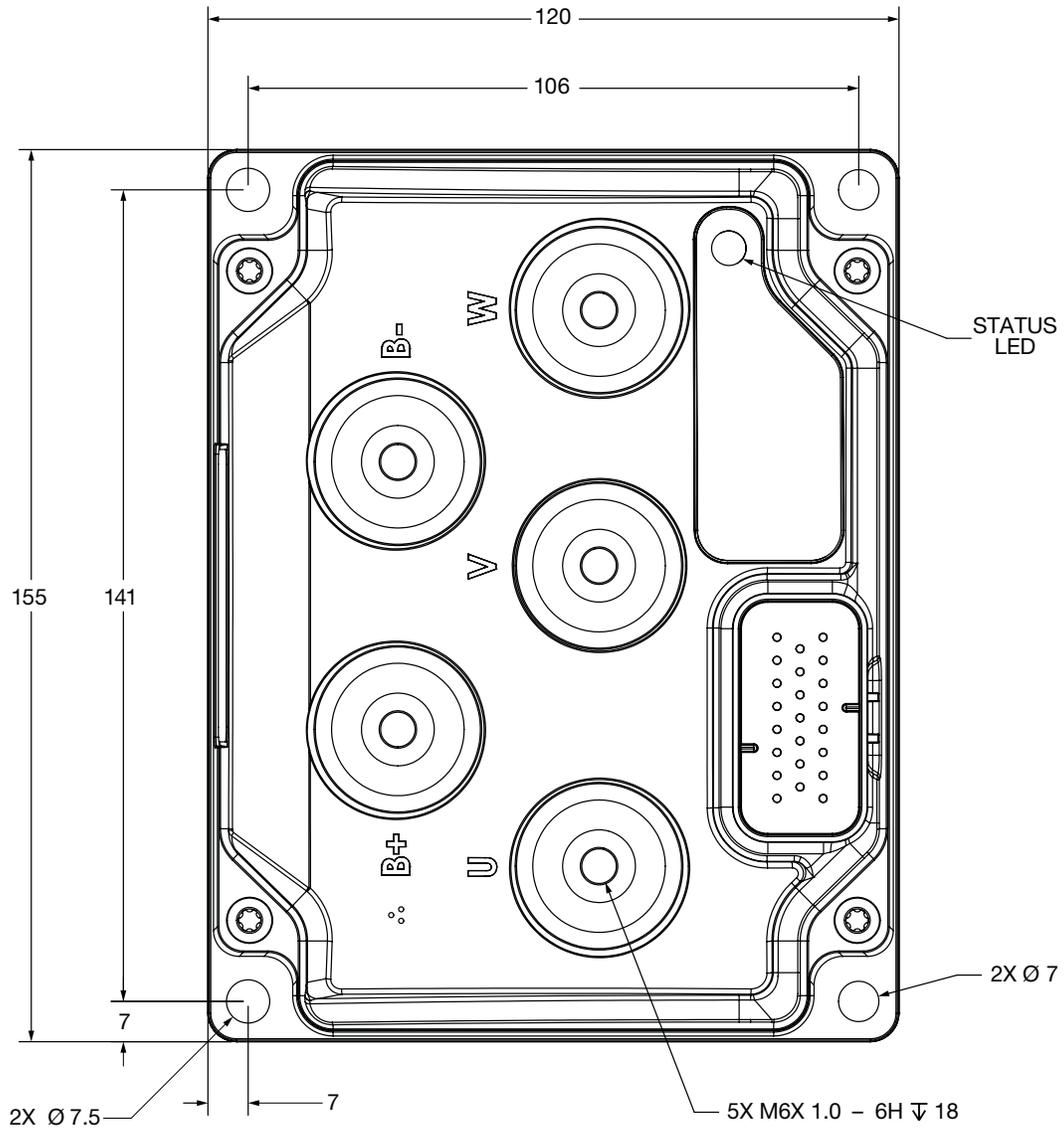
The Curtis Software Suite is compatible with many leading USB>CAN interface dongles from Peak, Kvaser, iFAC, Sontheim etc. Contact your local Curtis Sales office for further information.

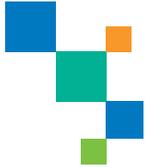
MODEL CHART

Model	Battery	Maximum Current: RMS S2-1 minute	Current Rating: RMS S2-60	Lifetime Current: RMS	Internal 120Ω CAN Termination
AC-F2-A-24-200-002	24V	200A	67A	50A	Yes
AC F2-A-24-200-051	24V	200A	67A	50A	No
AC-F2-A-24-120-001	24V	120A	40A	30A	Yes
AC F2-A-24-120-051	24V	120A	40A	30A	No

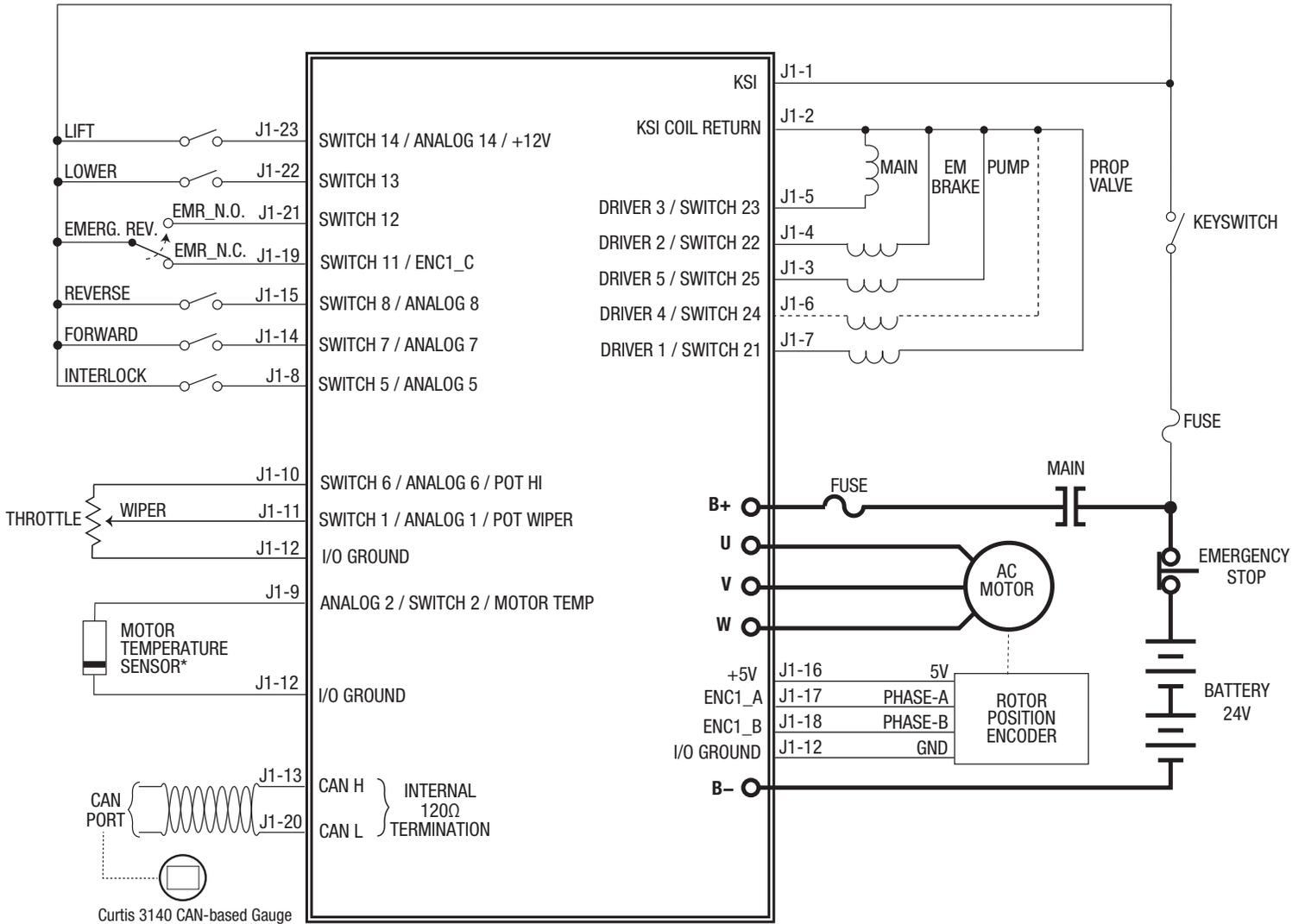


DIMENSIONS



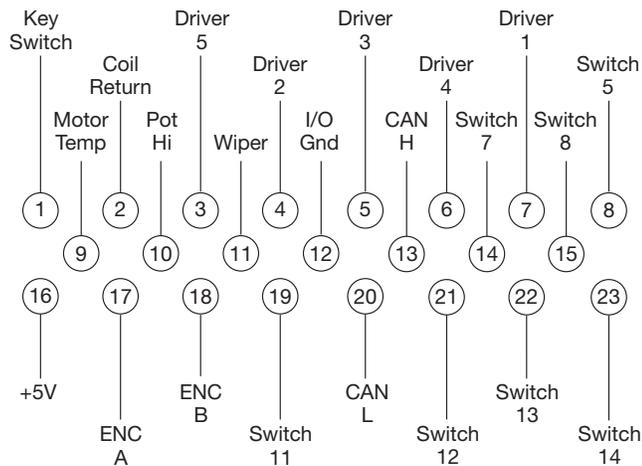


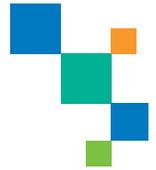
CONNECTOR WIRING



*NOTE: KTY sensor shown. The banded end must be connected to I/O Ground.

PINOUT CHART





SPECIFICATIONS

Nominal Input Voltage	24V
Minimum Voltage	12V
Brownout Voltage	8V
Maximum Voltage	30V
PWM Frequency	10Khz
Maximum Encoder Frequency	20Khz
Maximum Controller Output Frequency	500Hz
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
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 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