



CURTIS

Motor Controllers



# Electric Power Steering Controller

## Model 1222



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The Curtis Model 1222 is an AC induction motor controller for 'steer by wire' electric power steering systems. In these systems, the steering motor functions as an actuator to change the angle of the vehicle's steered wheel(s) and so change the direction of travel. The Model 1222 performs as the steering system controller, interpreting the steering command input and wheel position feedback, then driving the steering motor to move the steered wheel to the desired position.

Designed for use as an electric power steering controller for 300–1400W AC induction gearmotors with overall gear reductions between 50:1 and 800:1.

### FEATURES

#### Advanced Motor Control

- ▶ Absolute Position (pedestrian stacker) or Relative Position (reach truck) control modes.
- ▶ Supports >360° multi-turn steering mode.
- ▶ Indirect Field Orientation (IFO) vector control algorithm provides maximum possible torque while ensuring maximum efficiency and accurate current control.
- ▶ 16 kHz PWM switching frequency ensures silent operation across the 0–200 Hz stator frequency range.
- ▶ Advanced PWM techniques produce low motor harmonics, low torque ripple, and minimized heating losses, resulting in high efficiency.
- ▶ 70A RMS 2 minute current output.



#### Versatile Steering Input and Feedback Options

- ▶ Steering command input via CAN, dual redundant quadrature encoder, Sin/Cosine sensor, Sawtooth and Analog inputs.
- ▶ Steered angle feedback via dual redundant homing switch, quadrature encoder, Sin/Cosine, Sawtooth or Analog voltage inputs.
- ▶ Fully programmable input/output ratio mapping functions.
- ▶ Configurable homing methods, center offset, auto-center and end-stop protection functions.
- ▶ Programmable force feedback driver for command input devices featuring variable friction tactile feedback (TFD).

- ▶ Dual redundant configuration of all safety relevant parts.
- ▶ Two microprocessors, each with its own separate EEPROM memory.
- ▶ Separate input paths to each micro for all input and feedback signals.
- ▶ 5A high-side fault output driver consists of 2 switches connected in series, each switch controlled by one micro with independent supervision.
- ▶ Meets the requirements of the latest international functional safety standards.

#### Unmatched Flexibility

#### Maximum Safety



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### FEATURES continued

- ▶ CANopen system communications.
- ▶ 35-pin AMPseal logic connector.
- ▶ Software includes a library of over 20 pre-defined AC steering motor types from various manufacturers.
- ▶ Programmable motor temperature input prevents thermal damage to motor and supports all commonly used thermistors.
- ▶ Integrated hour meter and diagnostic log functions.
- ▶ +5V and +10V low-power supplies for input sensors, etc.
- ▶ Curtis handheld and PC Windows programming tools provide easy programming and powerful system diagnostic and monitoring tools.
- ▶ Integrated status LED provides instant diagnostic indication.
- ▶ Field upgradeable software.
- ▶ Insulated Metal Substrate (IMS) powerbase ensures superior heat transfer.
- ▶ Intelligent thermal cutback, and overvoltage/undervoltage protection functions maintain steering while reducing traction speed until severe over/under limits are reached.
- ▶ Rugged sealed housing and AMPseal connector for use in harsh environments.
- ▶ Reverse polarity protection on battery connections and short circuit protection on all output drivers.

### Meets or Complies with Relevant US and International Regulations

- ▶ EMC: Designed to the requirements of EN12895.
- ▶ Safety: Designed to the requirements of EN1175-1:1998+A1:2010 (EN ISO13849-1).
- ▶ IP65 rated per IEC 60529.
- ▶ UL recognized per UL583.
- ▶ Regulatory compliance of the complete vehicle system with the controller installed is the responsibility of the vehicle OEM.

### Robust Reliability



### FUNCTIONAL SAFETY

Safety Function	PL	Designated Architecture	MTTFd	DC
Prevention of unintended steering or loss of steering	d	Category 3	≥13 yrs	≥90%

### MODEL CHART

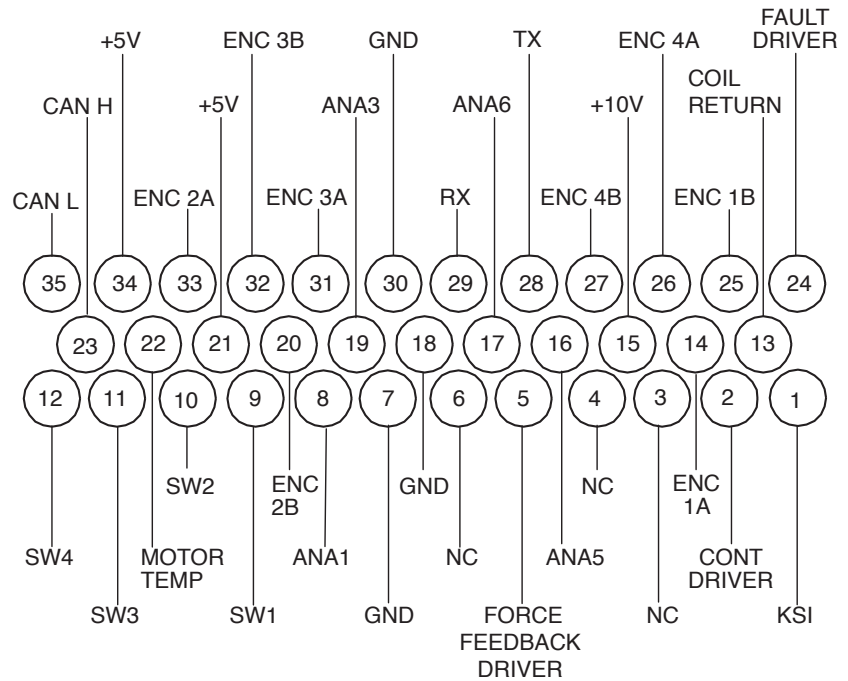
Model	Battery Voltage (V)	2 Minute RMS Current Rating (Arms)	1 Hour RMS Current Rating (Arms)
1222-51XX	24-48	70	40
1222-61XX	46-80	70	40

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### CONNECTOR WIRING



### SYSTEM ACCESSORIES



**Curtis AC Motor Speed Controllers** provide highly efficient control of AC induction motors performing traction drive or hydraulic pump duties, and offer the highest levels of functional safety.



**Curtis Steering Command Units** are tough compact, and integrate seamlessly with the Model 1222 steering controller. Versions with constant or variable steering friction are available.



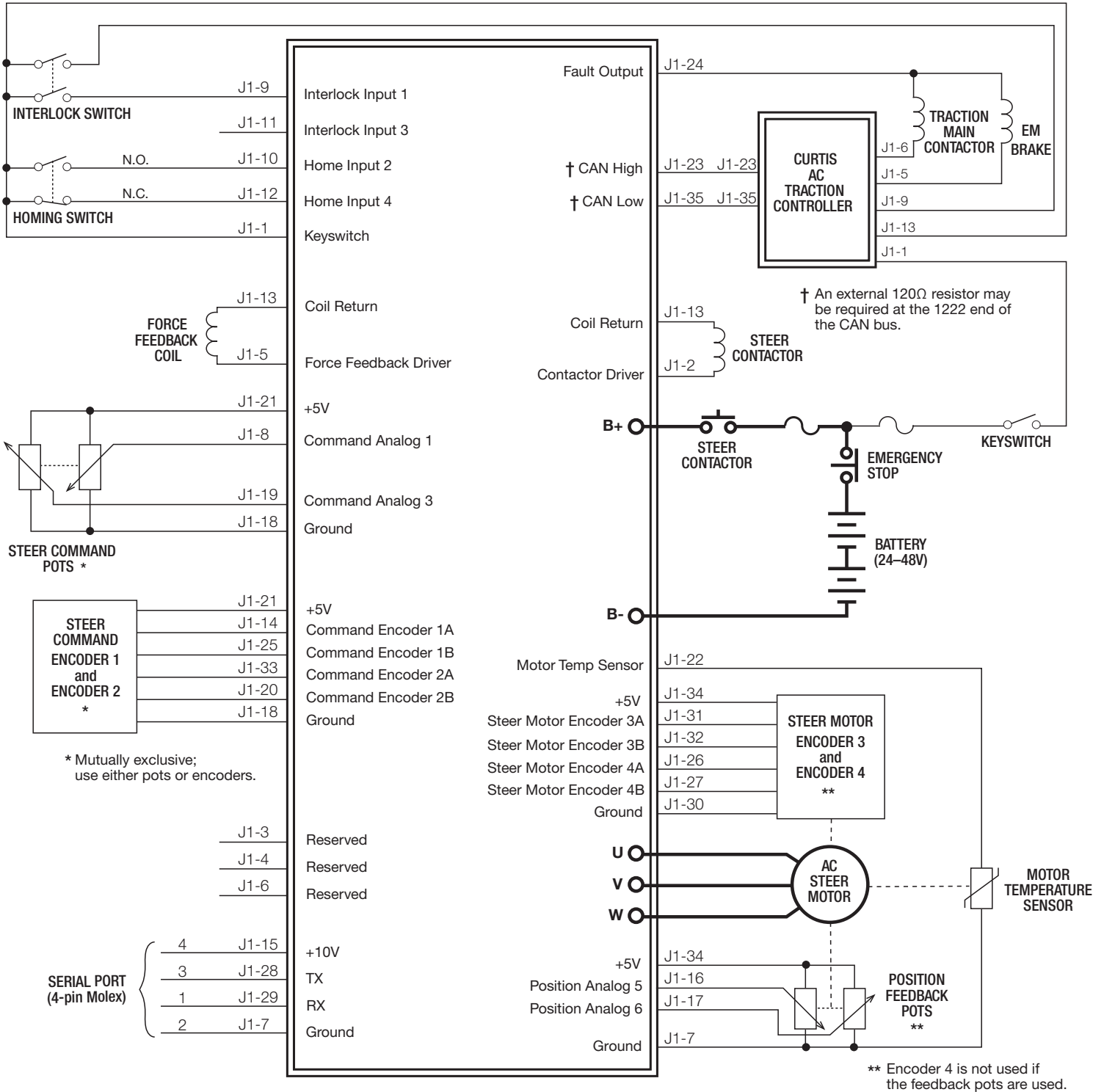
**The Curtis Model 1313 Handheld Programmer** is ideal for setting parameters and performing diagnostic functions.

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### TYPICAL WIRING DIAGRAM

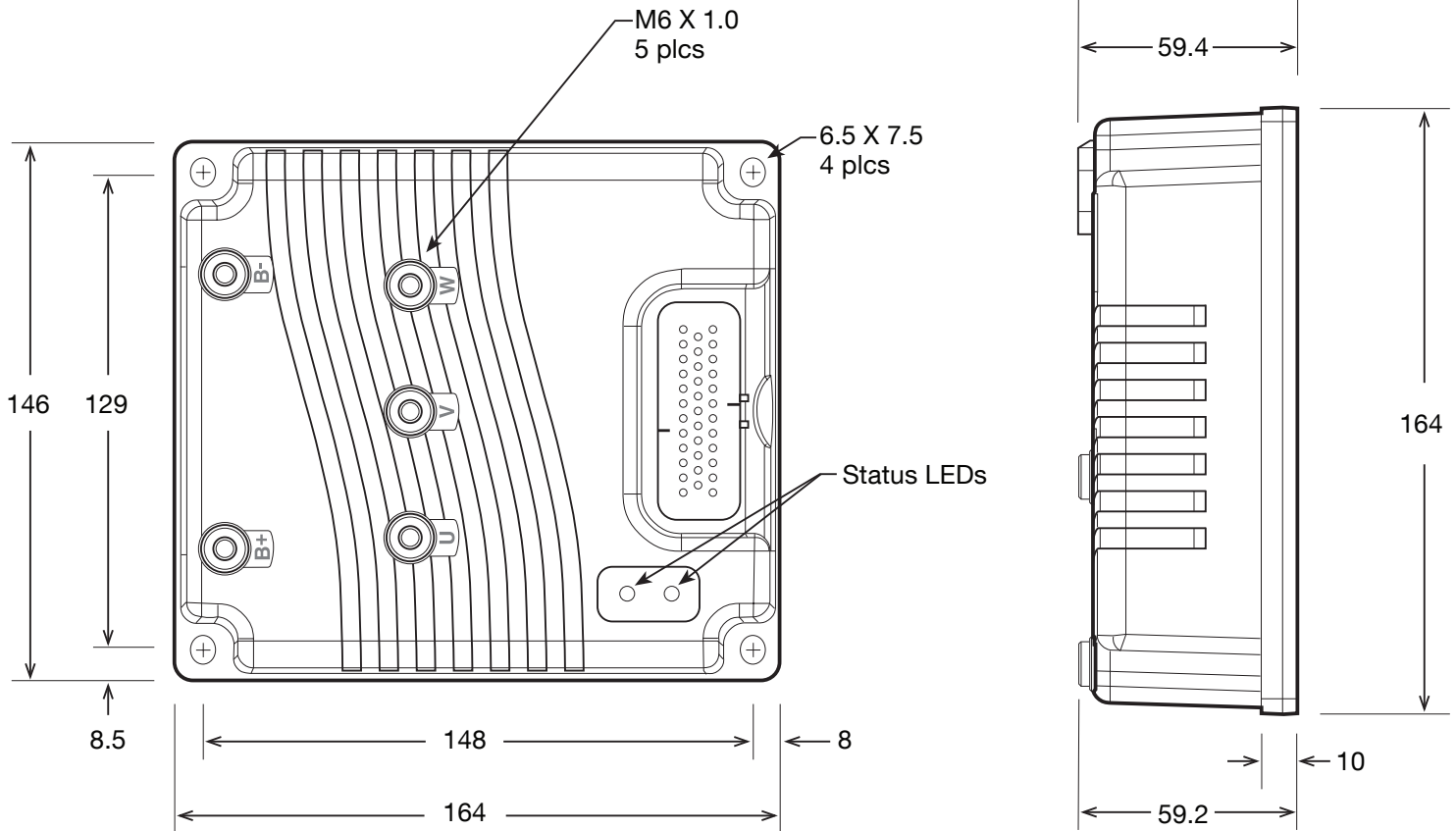


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### DIMENSIONS mm



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

The Curtis Difference   
You feel it when you drive it



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