RoboteQ

AX2550/2850

Dual Channel Forward/Reverse Digital Robot Controller with Optical Encoder Inputs

up to 2 x 140 SmartAmps

for Computer Guided and Remote Controlled Robotic Vehicles

Roboteq's AX2550 controller and its 2850 variant are designed to convert commands received from a R/C radio, Analog Joystick, wireless modem, or microcomputer into high voltage and high current output for driving one or two DC motors. Designed for maximal ease-of-useby professionals and hobbyist alike, it is delivered with all necessary cables and hardware and is ready to use in minutes.

The controller's two channels can either be operated independently or mixed to set the direction and rotation of a vehicle by coordinating the motion on each side of the vehicle. The motors may be operated in open or closed loop speed mode. Using low-cost position sensors, they may also be set to operate as heavy-duty position servos.

The AX2850 version is equipped with quadrature optical encoders inputs for precision speed or position operation.

Numerous safety features are incorporated into the controller to ensure reliable and safe operation. A high efficiency version is also available for higher current operation in extended temperature environment.

The controller can be reprogrammed in the field with the latest features by downloading new operating software from Roboteq.

Applications

- Heavyweight, heavy duty robots
- Terrestrial and Underwater Robotic Vehicles
- Automatic Guided Vehicles
- Electric vehicles
- Police and Military Robots
- Hazardous Material Handling Robots
- Telepresence Systems

Key Features	Benefits
Dual MCU digital design	Accurate, reliable, and fully programmable operation. Advanced algorithms
R/C mode support	Connects directly to simple, low cost R/C radios
RS232 Serial mode support	Connects directly to computers for autonomous operation or to wireless modem for two-way remote control
Analog mode support	Connects directly to analog joystick
Optional Optical encoder in (AX2850)	Stable speed regardless of load. Accurate measurement of travelled distance
Built-in power drivers for two motors	Supports all common robot drive methods
Up to 140A output per channel	Gives robot strongest lifting or pushing power
Programmable current limitation	Protects controller, motors, wiring and battery.
Open loop or closed loop speed control	Low cost or higher accuracy speed control
Closed loop position control	Create low cost, ultra-high torque jumbo servos
Data Logging Output	Capture operating parameters in PC or PDA for analysis
Built-in DC/DC converter	Operates from a single 12V-40V battery
Extruded aluminum, heat sinking enclosure	Operates in the harshest shock and temperature environment
Field upgradable software	Never obsolete. Add features via the internet

Technical Features

Microcomputer-based Digital Design

- Multiple operating modes
- Fully programmable using either built-in switches and 7 segment LED display or through connection to a PC
- Non-volatile storage of user configurable settings. No jumpers needed
- Simple operation
- Software upgradable with new features

Multiple Command Modes

- Serial port (RS-232) input
- Radio-Control Pulse-Width input
- 0-5V Analog Voltage input

Multiple Motor Control modes

- Independent channel operation
- Mixed control (sum and difference) for tank-like steering
- Open Loop or Closed Loop Speed mode
- Position control mode for building high power position servos
- Modes can be set independently for each channel

Optical Encoder Inputs (AX2850)

- Two Quadrature Optical Encoders inputs
- 250kHz max. frequency per channel
- 32-bit up-down counters
- Inputs may be shared with four optional limit switches

Automatic Command Corrections

- Joystick min, max and center calibration
- Selectable deadband width
- Selectable exponentiation factors for each command inputs
- 3rd R/C channel input for accessory output activation

Special Function Inputs/Outputs

- 2 Analog inputs. Used as
  - Tachometer inputs for closed loop speed control
  - Potentiometer input for position (servo mode)
  - External temperature sensor inputs
  - User defined purpose (RS232 mode only)
- One Switch input configurable as
  - Emergency stop command
  - Reversing commands when running vehicle inverted
- Up to 2 general purpose outputs for accessories or weapon
  - One 24V, 2A output
  - One low-level digital output
- Up to 2 digital input signals

Built-in Sensors

- Voltage sensor for monitoring the main 12 to 40V battery
- Voltage monitoring of internal 12V
- Temperature sensors near each Power Transistor bridge

Advanced Data Logging Capabilities

- 12 internal parameters, including battery voltage, captured R/C command, temperature and Amps accessible via RS232 port
- Data may be logged in a PC or microcomputer
- Data Logging Software supplied for PC

Low Power Consumption

- On board DC/DC converter for single 12 to 40V battery system operation
- Optional 12V backup power input for powering safely the controller if the main motor batteries are discharged
- 200mA at 12V or 100mA at 24V idle current consumption
- Power Control wire for turning On or Off the controller from external microcomputer or switch
- No consumption by output stage when motors stopped
- Regulated 5V output for powering R/C radio. Eliminates the need for separate R/C battery.

High Efficiency Motor Power Outputs

- Two independent power output stages
- Dual H bridge for full forward/reverse operation
- Ultra-efficient 2.5 mOhm (1.25mOhm HE version) ON resistance MOSFETs
- Four quadrant operation. Supports regeneration
- 12 to 40 V operation
- User programmable current limit up to 140A depending on controller version and heatsink arrangement
- Standard Fast-on connectors for power supply and motors
- 16 kHz Pulse Width Modulation (PWM) output
- Aluminum heat sink. Optional conduction cooling plate

Advanced Safety Features

- Safe power on mode
- Optical isolation on R/C control inputs
- Automatic Power stage off in case of electrically or software induced program failure
- Overvoltage and Undervoltage protection
- Watchdog for automatic motor shutdown in case of command loss (R/C and RS232 modes)
- Large and bright run/failure diagnostics on 7 segment LED display
- Programmable motors acceleration
- Built-in controller overheat sensors
- "Dead-man" switch input
- Emergency Stop input signal and button

Compact Design

- All-in-one design. Built from aluminum heat sink extrusion with mount brackets
- Efficient heat sinking. Operates without a fan in most applications.
- 9" (228.5mm) L, 5.5" W (140mm), 1.8" (40mm) H
- -20o to +70o C (-40 to +85o C, HE version) operating environment
- 3 lbs (1,350g)

Ordering Information

Model	Description
AX2550	Dual Channel DC Motor controller up to 120 SmartAmps per channel
AX2550HE	Dual Channel High-Efficiency, Ext Temperature, DC Motor controller up to 140 SmartAmps per channel
AX2850	Dual Ch. Forward/Reverse DC Motor controller up 120 SmartAmps per ch. with Optical Encoder inputs
AX2850HE	Dual Ch., High-Efficiency, Ext.Temperature, DC motor controller up to 140 SmartAmps per ch. with Optical Encoder inputs

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