

P PERFORMANCE CONTROLS, INC.™



ACD Series

**Digital Motor Controllers/Choppers
for Industrial Vehicle and
Automation Applications**

Performance Controls ACD Series D

The Leading Choice in Compact, Cost-Effective
to Simplify Installation and Opti

Here's Why:

Flexibility to Meet a Wide Range of Induction Motor and Brushless Permanent Magnet Motor Requirements

The ACD Series of four-quadrant AC motor servo drives utilizes a high performance Digital Signal Processor (DSP), high efficiency MOSFETS, and proprietary control techniques to perform smooth, reliable motor control functions with a high degree of flexibility. Parameters are available to optimize the motor performance, set acceleration/deceleration and forward/reverse speed limits, and add additional features and commands. The ACD can also be customized to simplify installation, and expand the voltage or current range.

The main power AC bus can be operated from a 24 VDC to 48 VDC source. The Internal Switching Power Supply (IPS) used to bias the control circuits can be powered from the main power, or from a separate supply for an added level of safety.

For applications involving dual drive axis, the amplifiers can be operated as a master and slave. In this mode, the master receives its command and sends a current command to the slave amplifier through an RS422 serial port to create a digital equivalent of a differential drive. In addition, the motor temperature, base plate temperature, fault information, limit switch data, and current feedback are also communicated via the serial bus.

A unique "Get Me Home" mode is included in the ACD's extensive protection circuits to protect both the amplifier and motor, and is designed to gradually shut down the drive. Two LEDs provide visual indication of the drive's status for simple diagnosis.

The ACD's NEMA 1 enclosure is designed to protect the internal electronics from contact and dust, and an aluminum base plate is used for mounting and heat sinking. Other NEMA enclosures are available upon request.

A Host of Unique Features that Provide Significant User Benefits:

- **Digital Tuning**—optimizes performance (drives are programmed to match the motor), enables cloning, eliminates pot drift, and reduces inventory (through use of the same drive for multiple applications)
- **Proprietary High Frequency PWM Modulation Technique**—enables quiet operation, highly responsive control in torque and velocity modes, efficient use of supply voltage, and decreases heating and losses in motor
- **Field Oriented Vector Control**—optimizes use of voltage
- **Accommodates Multiple Motor Types**—can be used with Induction or Brushless Permanent Magnet Motors (operated with resolver, encoder, hall only or sensorless) and all modes provide sinusoidal commutation for optimum efficiency
- **MOSFET Power Devices**—optimizes power efficiency for longer life per battery charge
- **Electrical Isolation**—eliminates the need for external isolation components, good for 'floating battery' designs for single-point failure immunity
- **High Voltage Components**—allows supply voltage as high as 75 VDC while charging without having to use relays or methods to disconnect the drive from the battery
- **"Get Me Home" Over-Temperature Warning Mode**—provides warning and linear reduction of current limit to allow continued operation at reduced capacity for a controlled shutdown
- **Regenerative Braking**—recharges battery while operating
- **Master/Slave Operation**—coordinates multiple axis from a single command (such as dual traction drives) and allows digital mode selection (same model works in either mode) to reduce inventory
- **Internal Closed-Loop Speed and Torque Control**—eliminates need for an external controller, allows separate forward/reverse speed limits, and smooth transitions through programmable acceleration/deceleration



Digital Motor Controllers/Choppers... The Digital Servo Drives that can be Customized to Optimize Performance of AC Motors

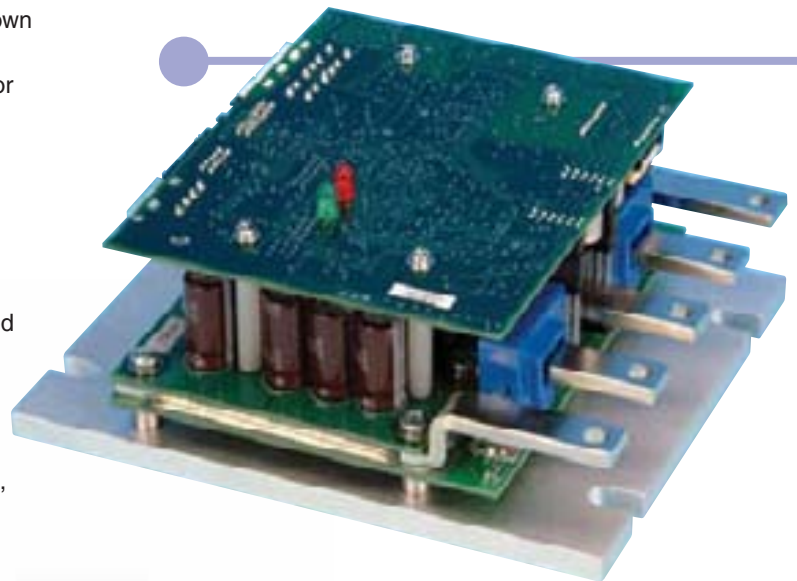
Superior Fault Protection Designed to Protect Both the Amplifier and Motor Circuits

Amplifier Protection Circuits

- **Over Current**—protects power transistors from excessive power dissipation, shutdown will occur when max current output is reached (includes shorts to ground)
- **Over RMS Current**—guards against overheating the drive due to persistent high levels of current. When the RMS current is reached output current is limited
- **Over-Temperature**—protects against the unit overheating, shutdown will occur when excessive heat sink temperature happens
- **Transistor Over-Temperature**—protects against power transistor overheating, current reduction will occur when the maximum temperature of a MOSFET is reached

Motor Protection Circuits

- **Peak Current**—limits peak output current to the limit programmed for the motor
- **Over RMS Current**—guards against overheating the motor due to persistent high levels of current. When the RMS current is reached output current is limited
- **Over-Temperature**—protects motor from excessive temperature, requires motor to have temperature sensor
- **Over Travel Limit Switches**—prevent clockwise rotation of the motor if clockwise input becomes high or counterclockwise rotation if counterclockwise input becomes high



Universal Design to Satisfy Many Types of Electric Vehicle and Automation Applications

ACD Series Digital Motor Controllers/Choppers are ideally suited for but not limited to:

- AGV (Traction, Steering, Lift)
- Powered Carts
- Aerial Lift Equipment
- Robotics
- Forklift Trucks (Traction, Steering, Lift)
- Power Mobile Chairs
- Personnel Carriers
- Airport Support





Models

Brushless Motor Controller Family			ACD48-40	ACD48-80	ACD48-160	ACD48-320
Parameter	Conditions	Units	Value	Value	Value	Value
Nominal Bus Voltage		Volts DC	24-48			
Continuous Output Current	@ 60°C Base Plate	Amps, RMS	41	82	163	320
Continuous Output Power		HP (kW)	3.2 (2.4)	6.4 (4.8)	12.9 (9.6)	25.8 (19.2)
Maximum Output Current	15 sec	Amps, RMS	60	121	242	484
Standby Power	nominal	Watts	<12	<12	<12	<12
PWM Frequency		kHz	20	20	20	20
Operating Temperature Range		°C	0 to 50			
Storage Temperature		°C	-20 to 85			
Humidity	non-condensing	%	≤95			
Width		Inches	5.6	5.6	Consult Factory	
Length		Inches	6.5	6.5		
Height		Inches	2.75	2.75		
Weight		Lbs	4.2	4.2		

Note: Parameters are subject to change. Consult factory for current data.

For more information or to discuss your particular application, call 215-619-4920, Fax: 215-619-4999 or e-mail: sales@pcipa.com.

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