



Power PMAC Overview

The power and flexibility of the Power PMAC allows the integration of the Power PMAC Features into virtually any kind of industrial motion control application.

Motor Servo Control

- Extremely fast update rates (Phase and Servo)
- Standard PID with full feedforward model
- Powerful automatic tuning and analyser tools
- Analog, Pulse Width Modulated (PWM), Pulse Frequency Modulated (PFM), MACRO or EtherCAT Outputs
- Vibration suppression filters
- Multiple 7th order notch and low pass filters
- Adaptive control for varying loads
- Cascaded loops (force, height, camera auto-focus control)
- Support for custom-written commutation routines
- Support for custom-written servo routines
- Custom routines directly in C or from MATLAB®/Simulink®

Coordinate Systems / Forward and Inverse Kinematics

- Up to 256 axes of coordinated or independent motion
- Up to 128 independent coordinate systems
- Up to 32 independent axes per coordinate system
- Dynamic axes transformations (e.g. offsets, rotations, mirroring)
- Forward/Inverse kinematics for non-linear mechanisms
 - User defined routines convert between tool tip coordinates and actuator positions
 - Permits direct specification of tool tip path

Trajectory Generation - Motion Programs

- Auto-coordination of multiple sets of axes
- Linear, circular, rapid, position-velocity-time (PVT), LIN to PVT (curve fit), Spline move modes
- Seamless blending between linear, circular and PVT modes
- Automatic move until trigger (hardware input)
- True S-Curve accel / decel
- All move modes supported with user kinematics
- Dynamic multi-block lookahead with velocity/acceleration control and jerk limit
- Sub-millisecond segmentation time
- Negative feedrate for true motion reversal in lookahead
- Move block execution rate up to 10,000 blocks/sec
- G-code, M-code, and T-code ready
- Calculations and I/O synchronous to motion
- Tool radius compensation, 2D or 3D

Programmable Logic Control (PLCs)

- Access to all registers
- Trigonometric, transcendental, vector and matrix functions
- 64-bit floating-point architecture optimized math
- Executive functions for standalone operation
- Data gathering of up to 128 hardware/software registers per servo cycle
- Program in PMAC Script
- Program in ANSI C:
 - Real time with pre-emptive kernel routines
 - General purpose routines
 - MATLAB®/Simulink® Embedded Coder® generated code

Compensation Tables

- Position/torque compensation tables in 1D, 2D, or 3D with rollover and mirroring options
- 1st/3rd order interpolation between points every servo cycle
- Up to 256 compensation tables (64K each)
- Support for superimposed compensation table results
- Backlash compensation, fixed or in tables
- Hardware Position Capture and Compare
- Specialised circuitry tying encoder counts to digital I/O
- I/O on exact count (w/sub-count interpolation) at any speed (within 10 nanoseconds)
- For probing, registration, measurement trigger, laser firing

Gantry Control

- Follower motor(s) executes leader's trajectory
- Automatic skew removal on homing
- Automatic gantry cross-coupling servo correction

Electronic Gearing and Cams

- Powerful master/slave techniques
- Position following (gearing) requires no program for motion
- External time base (cam) keeps full trajectory flexibility (non-returning, limited reversal, e.g. moving web application)
- Up to 256 cam tables (16k points each)
 - Position/torque profile(s)
 - Returning, forward/reverse travel
 - Extremely precise synchronized outputs