

# ServoWorks™ S-200M™:



## Superior 5-Axis CNC Performance

### Overview

ServoWorks™ S-200M™ (under development) is an innovative PC-based industrial CNC controller for powerful 5-axis machining of complex free-form shapes in a single setup. ServoWorks S-200M controls 7 axes plus a spindle: 5 coordinated CNC axes, and two axes that can be used for PLC axes, synchronous control, or linear scale feedback.

### Product Features

- Provides powerful, automatic execution of motion (part) programs, processing up to 1000 blocks per second
- Linear scale feedback control
- 6 workpiece coordinate systems
- Maximum positioning speed: 300 M/min
- Operates with or without a touch panel
- Can be used with a manual pulse generator (handwheel)
- Includes the ServoWorks MotionLite application for servo setup, configuration and tuning
- Can operate on the EtherCAT, VersioBus™ II, Panasonic Realtime Express™, MECHATROLINK™, Mitsubishi SSCNET™ or CANopen communication platforms
- Available for GUI display in English, Japanese, Korean, Simplified Chinese or Traditional Chinese
- The ServoWorks S-200M Windows HMI application can be fully customized by using the ServoWorks Development Kit (SDK)

### Tool Compensation with Advanced Features

- Tool offset compensation: geometry and wear offsets
- 256 pairs of tool offsets
- Tool length compensation in the tool axis direction
- Three-dimensional cutter radius compensation
- Thermal growth compensation along tool vector

### Macro Functions

- Supports local, global, permanent, and system variables (including symbolic global variables)
- Extensive math operations and unlimited nesting of branching and repetition conditional statements

### 5-Axis Machining Features

- Tilted working plane commands to greatly simplify part programming, and automatically define the tool axis as perpendicular to the tilted plane
- Three-dimensional coordinate conversion to convert programming in a XY/ZX/YZ plane to any 3D plane
- Three-dimensional circular interpolation to program arcs and circles on a tilted working plane
- Three-dimensional handle feed to simplify tilted working plane machine setup
- Tool center point control to control the movement of the tool center point even if the rotary axes change
- Rotary table dynamic fixture offset to set up a workpiece on a fixture rotated on a rotary table

### CNC Milling Functions

- 5 axes simultaneous control, plus a C axis (spindle) for tapping and positioning capability
- Rigid tapping
- Complete dual-axis synchronous control
- Corner deceleration control for sharper corners while maintaining high feedrates away from corners
- 1000 cycle three-dimensional dynamic look-ahead contour control (3D-DLACC) with pre-interpolation acceleration for high-speed, high-precision machining [VersioBus II interface system: one second look-ahead for 1 ms position feedback rate]
- High-speed /high-precision machining: 60 m/min (2400 in/min)
- Complete drilling and boring canned cycles

### Spindle Control Features

- Manual spindle control
- Spindle CW (M03), spindle CCW (M04) and spindle stop (M05)
- Spindle speed override (50 - 120%)
- Constant surface speed control (CSS)
- Actual spindle speed measurement and display
- Spindle orientation
- C axis control
- Spindle gear change – supports up to 4 gear stages

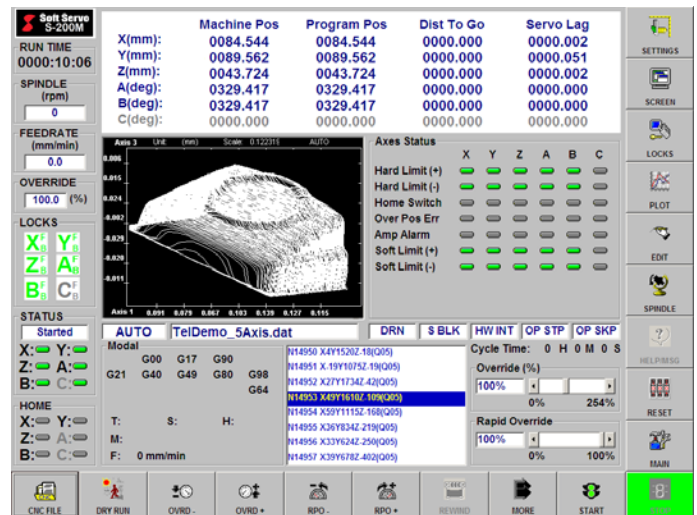
## PLC Features

- PLC axes for independent, individual positioning
- Integrated soft motion and soft PLC (ideal for high-speed milling)
- Includes LadderWorks PLC, an independent PLC package including a real-time soft PLC Engine and the LadderWorks Console - a Win32 application with a user-friendly ladder editor for editing, monitoring, debugging and compiling PLC sequence programs.

## Supported G Codes

- G00 Rapid traverse  
 G00.1 Rapid traverse with programmable acceleration/deceleration  
 G01 Linear interpolation  
 G02 CW circular or helical interpolation  
 G03 CCW circular or helical interpolation  
 G02.3 Positive exponential interpolation  
 G03.3 Negative exponential interpolation  
 G04 Dwell  
 G05 Dynamic look-ahead contour control on /off  
 G08 Three-dimensional full circle specified by a center point  
 G10 Program data input  
 G11 Specifies the second point for a three-dimensional arc  
 G11.1 Specifies the third point for a three-dimensional arc  
 G12 Specifies the second point for a three-dimensional full circle  
 G12.1 Specifies the third point for a three-dimensional full circle  
 G12.2 Completes the three-dimensional full circle command  
 G17 XY plane selection  
 G18 ZX plane selection  
 G19 YZ plane selection  
 G20 Inch data input  
 G21 Metric data input  
 G28 Automatic return to the reference point  
 G29 Automatic return from the reference point  
 G30 Automatic return to the 2nd, 3rd, & 4th reference points  
 G31 Skip cutting  
 G40 Three dimensional cutter radius compensation cancel  
 G41 Three dimensional cutter radius compensation on (left)  
 G42 Three dimensional cutter radius compensation on (right)  
 G43 Positive tool length compensation  
 G44 Negative tool length compensation  
 G49 Tool length compensation cancel  
 G50 Scaling off  
 G51 Scaling on  
 G50.1 Mirror image off  
 G51.1 Mirror image on  
 G52 Local coordinate system selection  
 G53 Machine coordinate system selection  
 G54 Workpiece coordinate system 1 selection  
 G54.1 Additional workpiece coordinate system selection  
 G55 Workpiece coordinate system 2 selection  
 G56 Workpiece coordinate system 3 selection  
 G57 Workpiece coordinate system 4 selection

- G58 Workpiece coordinate system 5 selection  
 G59 Workpiece coordinate system 6 selection  
 G61 Exact stop check mode  
 G64 Continuous cutting mode  
 G64.1 Continuous cutting mode with block rollover  
 G65 Simple macro call  
 G66 Modal macro call  
 G67 Modal macro call cancel  
 G68 Coordinate system rotation/three-dimensional coordinate rotation (specified by vector and coordinate datum)  
 G68.1 Three-dimensional coordinate rotation on (specified by tool vector and another vector)  
 G69 Coordinate system rotation cancel/three-dimensional coordinate rotation cancel  
 G73 High speed peck drilling cycle  
 G74 Counter tapping cycle  
 G76 Fine boring cycle  
 G80 Canned cycle cancel  
 G81 Drilling cycle, spot boring  
 G82 Drilling cycle (dwell)  
 G83 Peck drilling cycle  
 G84 Tapping cycle  
 G85 Boring cycle  
 G86 Boring cycle (spindle stop)  
 G87 Back boring cycle  
 G89 Boring cycle (dwell)  
 G90 Absolute command programming  
 G91 Incremental command programming  
 G92 Workpiece coordinate programming  
 G94 Feed per minute mode  
 G95 Feed per revolution mode  
 G98 Return to initial point in canned cycle  
 G99 Return to R point in canned cycle  
 G130 Tool vector smooth interpolation off  
 G131 Tool vector smooth interpolation on  
 G310 Linear interpolation feedrate include rotary axes  
 G311 Linear interpolation feedrate exclude rotary axes



Consult the [ServoWorks CNC Product Parts List](#) or your Soft Servo Systems sales representative regarding standard and optional features for this product.



**Soft Servo Systems, Inc.**  
 Control the Future

39 Whitcomb Street, Waltham, MA 02453, USA

Tel: 1.781.891.9555

Fax: 1.781.891.3853

[www.softservo.com](http://www.softservo.com)

Send inquiries to: [info\\_usa@softservo.com](mailto:info_usa@softservo.com)

Revised August 4, 2009