



## New IPS Series

### Intelligent Positioning Servo

Closed-loop programmable Position, Velocity, or Torque mode control. It's as simple as filling in the blanks. The new intelligent IPS single axis digital servo controller makes brushless servo applications a snap.

### All-in-One Performance

Automotion's IPS servo controller is a new generation of high performance digital brushless servo controllers that combine programmable torque, velocity, position, and motion control capability — all in one compact package.

The IPS series was created specifically to provide optimal cost, performance and ease of use for our OEM customers. It's the right brushless servo controller to meet your OEM price and performance needs.

IPS controllers come with user programmable input/output signals that can be configured for each unique application, including electronic gearing, cam following, step motor emulation, analog input for velocity or process control, torque control and stored motion sequencing. IPS controllers take the guesswork out of application tuning. Servo variables, including torque, velocity, position and following error are captured in real time and evaluated graphically using the IPS's Windows®-based tuning utility.

Adjusting servo parameters is as simple as filling in the blanks using our AutoMotion-PLUS™, Windows® compatible motion control configuration software.

Each IPS comes equipped with two serial communication ports. The primary port is used to program multiple operation modes into the IPS using a laptop computer or our optional hand held operator interface terminal. It can also be used for continuous remote monitoring of the IPS during operation.

An auxiliary com-port supports accessory items such as a printer or bar code reader, and can also be used for status query.

Both communications ports can be configured for multi-drop 485 control of multiple IPS units used in coordinated multi-axis motion control and I/O sharing.

# IPS1000

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# The IPS Family Features are Truly Intelligent

- Digital control assures reliable, repeatable, drift free machine setup.
- All parameters required for system setup are digitally set in software. No POTs to tweak and no components to change.
- Motion can be controlled through a serial interface, or stored and sequenced via a digital I/O interface.
- An auxiliary serial port allows multiple IPS units to coordinate moves, homing, and limit operations.
- Universal power input capability from 48 to 264 VAC, 50/60 Hz, or 50 to 400 VDC assures trouble-free operation worldwide.
- The IPS is fully supported by AutoMotion-PLUS™: Our Windows® 95/98/NT compatible configuration software.
- Enjoy the many benefits of digital intelligence with the reliability and safety of a UL, CSA, and CE compliant design.\*
- Both “S” curve and “Trapezoidal” move trajectories are supported.
- An optional programmable hand-held or panel mount operator interface terminal provides fast and economical field set-up and diagnostics.
- IPS drives are highly integrated, compact, EMI hardened and use multi-layer SMT PCB construction for greatest reliability.

\* IPS units are designed and manufactured to EN60950, UL1950, and CSA 22.2.14 safety requirements. Contact factory for information on applicable CE and UR markings.



IPS1000 with hand-held OIT Terminal

## Application Support Tools

### AutoMotion™ PLUS Software Windows® 95/98/NT Utility

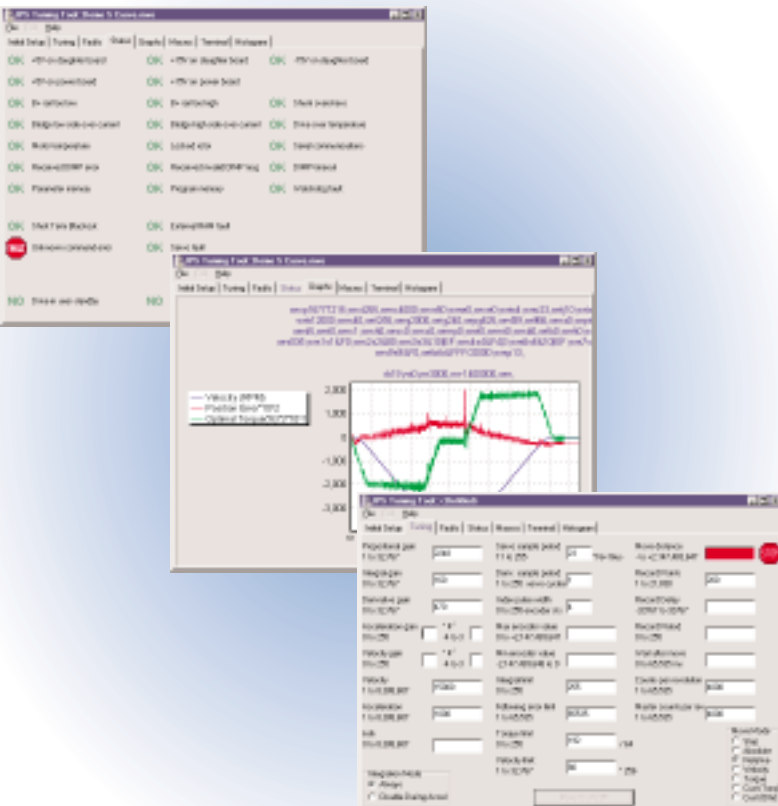
- Graphical Tuning Window
- Parameter Set-Up Window
- Servo Status Window
- Terminal Window
- Select Servo Operation Modes — P(t), V(t), I(t)
- Select Servo Command Input Source
- Select Input/Output Functions
- Upload/Download IPS Configuration
- Open, Save, Save-as — IPS Configuration, Data, and Application Program
- Marco Editor

### Handheld OIT Terminal (Optional)

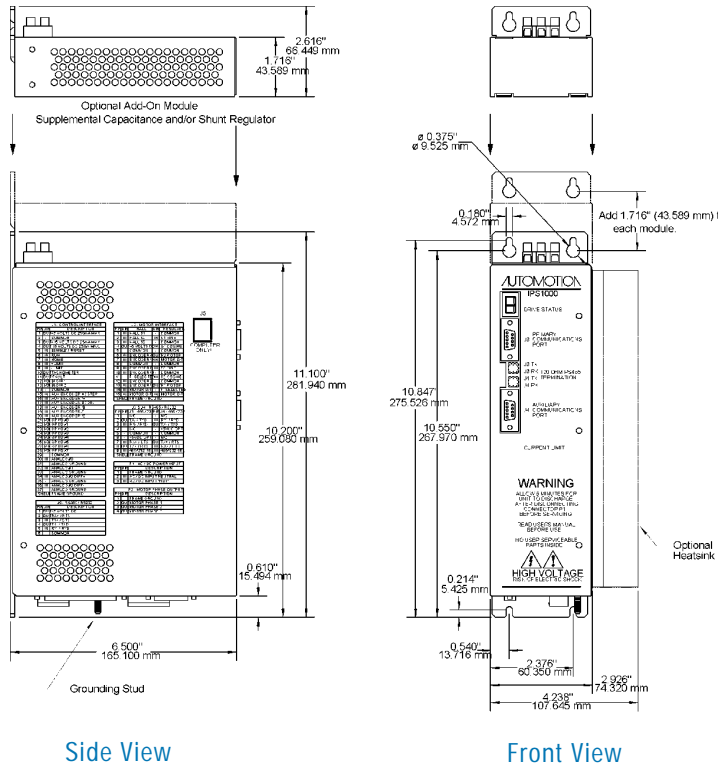
- Menu Driven Operation
- Upload/Download/Save — Configuration
- Modify Drive Parameters
- Monitor Variables - Speed, Torque, Position
- Select Servo Operation Modes — P(t), V(t), I(t)
- Select Servo Command Input Source
- Select Input/Output Functions
- Nonvolatile Memory

### Panel Mount OIT (Optional)

- Menu Driven Operation
- User Unit Conversion
- Recipe Set-up — Length, Count, Rate...
- Monitor Variables — Speed, Torque, Position...
- Nonvolatile Memory



## Dimensions (in/mm)



Side View

Front View

## Pinouts

### J1 — Control Interface\*

- 1 +5 VDC, 250 mA, Output.
  - 2 Common, Return
  - 3 +15 VDC, 25 mA, Output
  - 4 -15 VDC, 25 mA, Output
  - 5 Enable/Reset Input, +5 to +24 VDC
  - 6 Run Input, +5 to +24 VDC
  - 7 Home Input, +5 to +24 VDC
  - 8 + Limit, Input, +5 to +24 VDC
  - 9 - Limit, Input, +5 to +24 VDC
  - 10 Tachometer, Output
  - 11 !Fault, Output
  - 12 Prog. I/O, +5V, 20mA max.
  - 13 Prog. I/O, +5V, 20mA max.
  - 14 Common, Return
  - 15 Aux. Encoder A, Input/Step Input
  - 16 Aux. Encoder IA, Input
  - 17 Aux. Encoder B, Input/Dir Input
  - 18 Aux. Encoder IB, Input
  - 19 Aux. Encoder Z, Input
  - 20 Aux. Encoder IZ, Input
  - 21 GP I/O #0, +5V
  - 22 GP I/O #1, +5V
  - 23 GP I/O #2, +5V
  - 24 GP I/O #3, +5V
  - 25 GP I/O #4, +5V
  - 26 GP I/O #5, +5V
  - 27 GP I/O #6, +5V
  - 28 GP I/O #7, +5V
  - 29 Common
  - 30 Analog Input #0
  - 31 Analog Ground
  - 32 Analog Input #1
  - 33 Analog Ground
  - 34 Analog Input #2, Diff+ Optional
  - 35 Analog Ground
  - 36 Analog Input #2, Diff- Optional
  - 37 Analog Ground
- \* Standard User I/O. Contact factory for optional configurations.

### J2 — Motor Interface

#### Hall System (standard)

- 1 Commutation S1, Input
- 2 Commutation S2, Input
- 3 Commutation S3, Input
- 4 +5 VDC, 125 mA Output
- 5 Common, Return
- 6 Encoder A, Input
- 7 Encoder IA, Input
- 8 Common, Return
- 9 Encoder B, Input
- 10 Encoder IB, Input
- 11 Frame Ground (Optional)
- 12 Encoder Z, Input
- 13 Encoder IZ, Input
- 14 Motor Temp/PTC Input
- 15 Motor Temp/PTC Input

#### Resolver (Optional)

- Common
- S1 Sine, Input
- Common
- S4 Cosine, Input
- Common
- R3 Rotor, Output
- Motor Temp/PTC Input
- Common
- S3 Sine, Output
- Common
- S2 Cosine, Input
- Common
- R1 Rotor, Output
- Frame Ground (Optional)
- Motor Temp/PTC Input

### J3 — Primary Communications Port

- 1 N.C.
- 2 RS232 TXD / RS485 TXD- Output
- 3 RS232 RXD / RS485 RXD- Input
- 4 N.C.
- 5 Common
- 6 +5 VDC, 100 mA, N.C. Optional
- 7 RS232 CTS / RS485 RXD+ Input
- 8 RS232 RTS / RS485 TXD+ Output
- 9 RS485 / !RS232 Select, Input

### J4 — Auxiliary Communications Port

- 1 N.C.
- 2 RS232 RXD / RS485 RXD- Input
- 3 RS232 TXD / RS485 TXD- Output
- 4 +5 VDC, 100 mA, N.C. Optional
- 5 Common
- 6 N.C.
- 7 RS232 RTS / RS485 TXD+ Output
- 8 RS232 CTS / RS485 RXD+ Input
- 9 RS485 / !RS232 Select, Input

### P1 — AC/DC Power Input

- 1 Frame Ground
- 2 AC "NEU" or DC Input
- 3 AC "HOT" or DC Input

### P2 — Motor Phase Output

- 1 Frame Ground
- 2 Phase 1 Output
- 3 Phase 2 Output
- 4 Phase 3 Output

### TB1 — External Shunt Resistor/ Supplemental Capacitors

- 1 B+ Motor Rail
- 2 Shunt Resistor
- 3 B- Motor Rail

# IPS Product Specifications

## Control Card

Processor	32 MHz, RISC
RAM	Up to 64Kword RAM (32Kword standard)
Non-volatile Memory	Up to 64Kbyte EEPROM (4Kbyte standard)
Digital I/O	13 (user configurable) including an 8 bit bi-directional parallel I/O port
Analog Inputs	Up to three (3) 12 bit
Status Annunciation	7 segment status display
Communications	2 RS-232/485 communication ports
Automatic Fault Monitoring	Travel limits, Logic brownout, Processor watchdog, Reset active, Following error, Motor temp, Amplifier temp, Amplifier overcurrent

## Servo Control

Control Loops	PID filter update rate	Up to 5.2KHz (adjustable)
	Derivative update rate	Adjustable
Feedback	Encoder feedback	2 MHz
	Optional Resolver	
Current Resolution		10 Bit
Torque Operators		Current sensor auto nulling, Torque limiting
Trajectory Generation		S-curve, Trapezoidal
Loop Operation		Position, Velocity, Contour, Cam, Slave, Torque
Feedforward		Acceleration, Velocity
Parameter Scaling	Jerk	24 bits fractional
	Acceleration	32 bits, 24 bits fractional
	Velocity	40 bits, 24 bits fractional
	Position	56 bits, 24 fractional

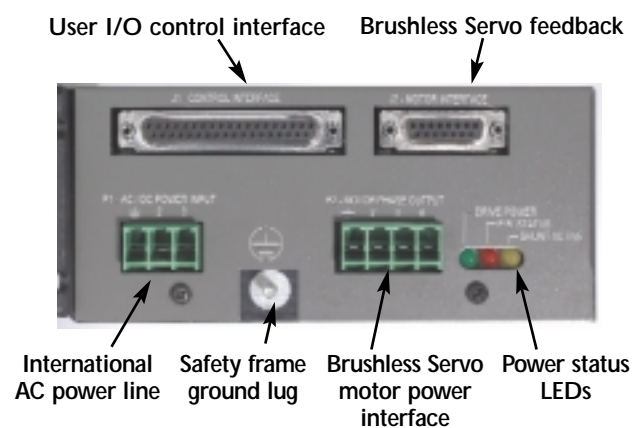
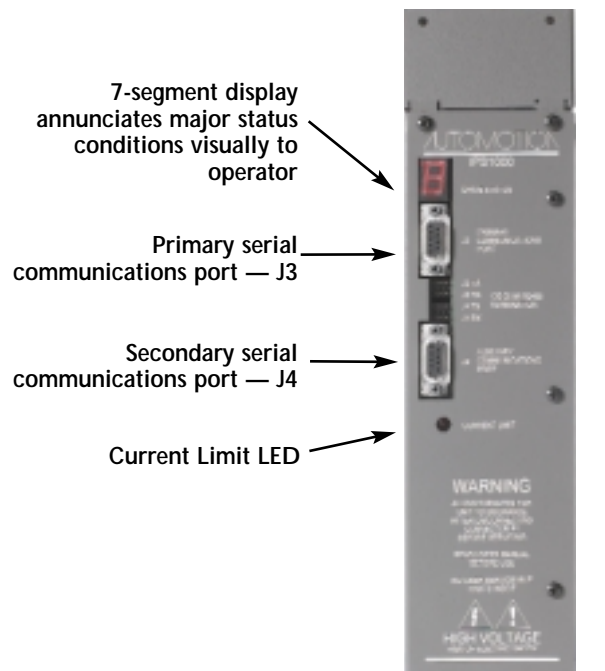
## Command Interpreter

Interpreter Type	Preemptive Multitasking
Command Set	50+ "RISC" ASCII commands
Macro Storage	Up to 255 macros
Arithmetic Operators	Addition, Subtraction, Left and Right shift
Logical Operators	All standard logical and comparative operators
Branching	IF, GOTO, LOOP, Macro Call, Macro Return
Operation Modes	Immediate (serial interface), Standalone (user programmed)
Communication Modes	RS-232 / RS-485 Point to Point, Multi-drop
Communication Format	ASCII character based
Number Radix	ASCII decimal, ASCII hexadecimal
Data Recording	21K points, Desired position, Actual position, Desired torque, Actual torque, Torque limit

Windows 95/98/NT is a registered trademark of Microsoft Corporation.



If you need more information, including custom user options available, please contact:  
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## Power Specifications

Model		10	20	30
Input Power	Volts	48 to 264 AC or 60 to 400 DC		
	Hz	50/60 or DC		
Motor Supply	VDC	50 to 400, 310 Nominal		
Output Power Peak	KW	2.2	4.3	6.5
Phase Cur. Peak*	A	10	20	30
Phase Cur. Cont.*	A	7	14	21
Shunt Power Peak	Watt	600 or 1200 for 10 Sec.		
Shunt Power Cont.	Watt	None, 55 or 110 — Optional		
Overtemp Trip	degC	70 on cold plate surface		
Bridge PWM	KHz	18 to 20		
C. Loop Bandwidth	Hz	Digitally Tunable, 2 KHz typ.		
Load Inductance	mH	0.25 to 50		
Motor Feedback & Interface Power	VDC	+5, +/-15 - 3% regulated		
	mA	500	25	25
Drive Status		7-Segment Display		

\*Note: Peak limited values. All current values are measured at the peak of a six-step waveform. For estimated RMS values, multiply by 0.707.

