

# SPiiPlus Econo Series

## Economical Motion Controllers



## SPiiPlus SA-LT

### Economical 2, 4, 6, 8 Axes Stand Alone Motion Controller

The SPiiPlus SA-LT is especially designed for enhancing the performance of OEM machinery that requires multi-axis synchronization and low price. With its versatility, the SPiiPlus SA-LT controls systems with both servo and step motors. It provides smooth motion, high resolution and high speed without compromising accuracy and throughput. The SPiiPlus SA-LT comprises simple and convenient connectivity interface with the application's drivers, encoders, I/Os and communication bus using D-Type connectors. SPiiPlus SA-LT accurate motion control is obtained with 20kHz sampling rate, real time registration inputs and position compare outputs and ACSPL+ multi-tasking application language. A powerful suite of software tools provides high speed host communication via multiple channels and a quick application development, system setup and analysis.

## Specifications

### Axes

See table on next page.

### Profile Generation

Trajectory Calculation Rate: 1kHz.  
Position Range:  $\pm 4 \times 10^{15}$  counts.  
Velocity:  $160 \times 10^9$  counts/second.  
Acceleration: up to  $4 \times 10^{15}$  counts/second<sup>2</sup>.

### Control

Position (P) loop + velocity loop (PI, 2<sup>nd</sup> order low-pass and Notch filters).  
Sampling Rate: 20 kHz.  
Accuracy:  $\pm 1$  count.  
Dual Loop: see table on next page.  
Note: each Dual Loop consumes another axis, which should be defined as a dummy.

### Feedback

Feedback types: incremental digital encoders.  
**Incremental Digital Encoder:**  
One per axis, A&B,I, UP/DN,I;  
CLK/DIR,I. Type: RS-422.  
Max. rate: 30 million encoder counts/sec.

### Drive Interface

**Analog commands:** see table on next page. One torque command per axis. Type: see Analog Outputs, drive commands section. Offset compensation: programmable, 0.3mV resolution.  
**Pulse-Direction Commands:** see table on next page.  
Type: RS-422. Up to 4 million pulse/sec.  
**Drive enable output:**  
Quantity: one per axis.  
Type: two-terminal, opto-isolated, sink or source. Up to 24V/20mA.  
**Drive Fault Input:**  
Quantity: one per axis.  
Type: two-terminal, opto-isolated, sink or source. Input circuit current: <7mA.

### Digital I/O

**Safety Inputs:** requires an external supply - see Controller & Power Supply section.  
**Emergency stop input:**  
Quantity: one. Type: two-terminal, sink or source, opto-isolated.  
**Left and right limit inputs:**  
Quantity: pair per axis. Type: 5V or 24V, single-ended, sink (default) or source, opto-isolated.  
Safety inputs voltage: 5V or 24V.  
Input circuit current: <15mA  
**Digital Inputs:** requires an external supply - see Controller & Power Supply section.  
**General purpose inputs:**  
Quantity: eight. Type: 5V or 24V, single-ended, sink (default) or source, opto-isolated.  
Input circuit current: <15mA.  
**Mark (position capture) inputs:**  
Quantity: see table on next page.  
Type: RS-422.  
Propagation delay: <0.1  $\mu$ sec.

**Digital Outputs:** requires an external supply - see Controller & Power Supply section.  
**General purpose outputs:**  
Quantity: eight. Type: 5V or 24V, single-ended, sink (default) or source, opto-isolated, 50mA per output.  
**PEG (Position Event Generator) pulse outputs:**  
Quantity: see table on next page.  
Type: RS-422. Propagation delay: <0.1 $\mu$ sec.  
PEG pulse width: 25nsec to 1.6msec.  
PEG position accuracy:  $\pm 1$  count at up to 5,000,000 counts/sec.  
**HSSI Expansion Channels:** see table on next page. Each channel provides 64 input bits and 64 output bits per channel, sampled and updated at 20KHz.  
Type: RS-422. Up to additional 64/63 I/Os via each HSSI using HSSI-IO16 modules.

### Communication Channels

Serial: two RS-232. Up to 115,200bps.  
Ethernet: TCP/IP, 10/100 Mbits/sec.  
Simultaneous communication through all channels is fully supported. Modbus protocol as master or slave is supported via Ethernet or Serial channels.

### Analog I/O

**Analog Inputs:**  
**General purpose 1V<sub>rtp</sub> analog inputs:**  
Quantity: see note \*1 in the table on next page. Type: 1V<sub>rtp</sub>, differential, 14-bit resolution.  
**General purpose  $\pm 10V$  analog inputs:**  
Quantity: see note \*2 in the table on next page. Type:  $\pm 10V$ , differential, 14-bit resolution.  
**Analog Outputs:**  
**Drive commands or general purpose  $\pm 10V$  analog outputs:** Quantity: see note \*3 in the table on next page. Type:  $\pm 10V$ , differential, 16-bit resolution.  
**General purpose only  $\pm 10V$  analog outputs:** Quantity: see note \*4 in the table on next page. Type:  $\pm 10V$ , differential, 16-bit resolution.  
Signal-to-noise ratio of all analog I/O:  $\geq 72$ dB (3 sigma).

### Controller & Power Supply

User Memory: RAM: 13Mb. Flash: 13Mb.  
Powerup Time: 25sec.  
Power Supply Voltage/Current: 24Vdc(+/-10%)/2A.  
I/O Supply Voltage/Current: +5Vdc ( $\pm 10\%$ )/1A, or 24Vdc ( $\pm 20\%$ )/1A.  
Safety Supply Voltage/Current: +5Vdc ( $\pm 10\%$ )/1A, or 24Vdc ( $\pm 20\%$ )/1A.

### Environment

Operating Temperature: 0°C to 40°C.  
Storage Temperature: -40°C to 70°C.  
Humidity: 90%RH, non-condensing.



# Axes and I/O Functionality

Product	Axes and Supported Features				I/O				
	Axes with $\pm 10V$ Drive Command	Axes with P-D Drive Commands	Axes Supporting Dual Loop	G.P Digital I/O	Axes with PEG Pulse Output	Position Registration MARK Inputs	Analog Inputs	Analog Outputs	HSSI Channels
SPiiPlus SA-LT-2...	2 (XA)	1 (A)	1 (X)	8/8	1 (X)	2 per X	4(*1)	2(*3)	1
SPiiPlus SA-LT-4...	4 (XAYB)	2 (AB)	2 (XY)	8/8	2 (XY)	2 per X, 1 per Y	4(*1)	4(*3)	1
SPiiPlus SA-LT-6...	6 (XAYBZC)	3 (ABC)	3 (XYZ)	8/8	3 (XYZ)	2 per X, 1 per Y,Z	2(*1)+2(*2)	6(*3)+2(*4)	1
SPiiPlus SA-LT-8...	8 (XAYBZCTD)	4 (ABCD)	4 (XYZT)	8/8	4 (XYZT)	2 per X, 1 per Y,Z,T	4(*2)	8(*3)+2(*4)	1

\*1: General purpose 1Vptp analog inputs

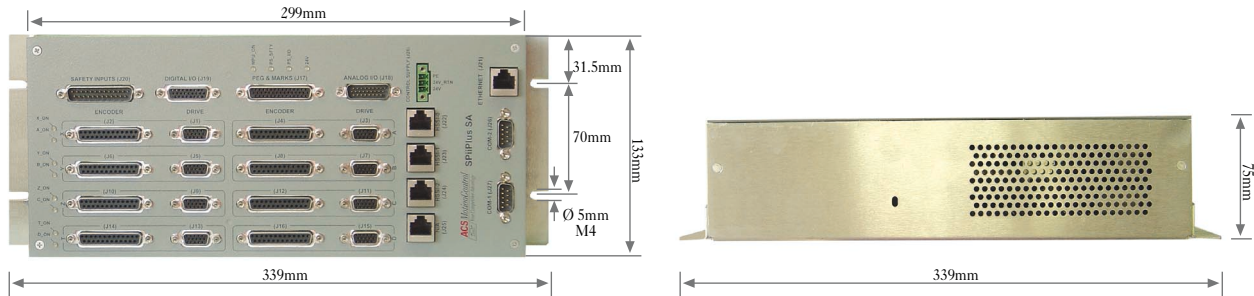
\*2: General purpose  $\pm 10V$  analog inputs, or general purpose 1Vptp analog inputs

\*3: Drive commands or general purpose  $\pm 10V$  analog outputs (by DCOM command)

\*4: General purpose only  $\pm 10V$  analog outputs (by AOOUT10,11 commands)

For further information about analog I/O comments, see Analog I/O Specifications

# Layout & Dimensions



# How To Order

## SPiiPlus SA-LT Controller and Software

### • SPiiPlus SA-LT Controller

Example: **SPiiPlus SA-LT - 8 - E**

Number of axes: [2] - Two axes controller [6] - Six axes controller  
 [4] - Four axes controller [8] - Eight axes controller

Communication channels:

[E] - two RS-232 and one Ethernet 10/100 Mbits/sec.

Each SPiiPlus SA-LT controller is provided with:

- One CD with SPiiPlus ADK (Advanced Development Kit) for programmers who develop ACSPL+ based applications and host based programs. The SPiiPlus ADK is free to download from our website | Download & Support | SPiiPlus Downloads | Software Installation section. The SPiiPlus ADK includes:

- **SPiiPlus MMI** - for axis configuration, servo tuning, programming and viewing parameters
- **SPiiPlus C and COM Libraries** - for host programming in C/C++ or Visual Basic™
- **SPiiPlus Utilities** - for upgrading firmware and recovering from errors
- **SPiiPlus Simulator** - for fast application development and debugging
- **SPiiPlus FRF** - for analyzing motion frequency response
- Hardware & setup, software and programming guides in PDF format
- ACSPL+, C/C++ and COM training files and programming examples

### Supported Motors:

±10V Commands	AC Servo/DC Brushless (commutation by drive)
	DC Brush
P-D Commands	Nanomotion Piezo-ceramic
	Step motor
	Servo motor



## Additional Products

- **SPiiPlus SA-ACC**: Interface kit that includes mating connectors to SPiiPlus SA-LT panel of connectors.

# Warranty

The warranty of this product is according to the Terms and Conditions of Sale and is effective for one year from date of shipment from ACS Motion Control. Copyright© August 2006 ACS Motion Control. All rights reserved. Version 1.2.

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For the most updated information please refer to [www.acsmotioncontrol.com](http://www.acsmotioncontrol.com)