

SPiiPlus SAR-LT

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



The RoHS compliant SPiiPlus SAR-LT controller is especially designed for enhancing the performance of OEM machinery that requires multi-axis synchronization and low price. With its versatility, the SPiiPlus SAR-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 SAR-LT comprises simple and convenient connectivity interface with the application's drivers, encoders, I/Os and communication bus using D-Type connectors.

SPiiPlus SAR-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.

SPiiPlus SAR-LT capabilities can be significantly extended using CANOpen compatible servo drives, intelligent servo and step motors and IOs. The network includes up to 64 nodes of axes and IOs.

The SPiiPlus controller can be programmed using IEC61131-3 PLC language and ACSPL+ powerful motion language. The two languages complement each other and enhance both motion and machine control capabilities.

Axes and I/O Functionality

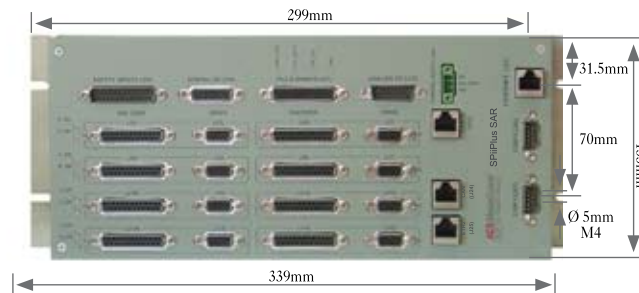
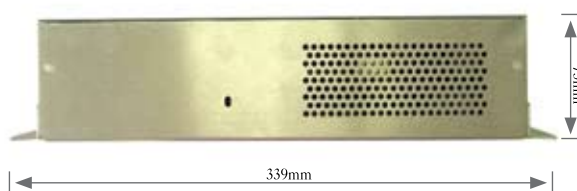
Product	Axes and Supported Features			I/O					
	Axes with $\pm 10V$ Drive Command	Axes with P-D Drive Commands	Axes Supporting Dual Loop	G.P. Digital I/O	Axes with PEG Pulse Output	Position Registration MARK Inputs	Analog Inputs	Analog Outputs (*2)	HSSI Channels
SPiiPlus SAR-LT-2...	2 (XA)	1 (A)	1 (X)	8/8	1 (X)	2 per X	0	1	1
SPiiPlus SAR-LT-4...	4 (XAYB)	2 (AB)	2 (XY)	8/8	2 (XY)	2 per X, Y	0	2	1
SPiiPlus SAR-LT-6...	6 (XAYBZC)	3 (ABC)	3 (XYZ)	8/8	3 (XYZ)	2 per X, Y 1 per Z	2(*1)	3	1
SPiiPlus SAR-LT-8...	8 (XAYBZCTD)	4 (ABCD)	4 (XYZT)	8/8	4 (XYZT)	2 per X, Y, 1 per Z, T	4(*1)	4	1

*1: General purpose $\pm 10V$ analog inputs
 *2: General purpose only $\pm 10V$ analog outputs

Note: When drive commands are not used, the outputs can be utilized as a general purpose $\pm 10V$ analog outputs

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

Layout & Dimensions



Axes

See table on previous page.

Profile Generation

Trajectory Calculation Rate: 1kHz.
Position Range: $\pm 4 \times 10^{15}$ counts.
Velocity: 160×10^9 counts/second.
Acceleration: up to 4×10^{15} counts/second².

Control

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

Feedback

Feedback types: incremental digital encoders, and 3 hall inputs for initiating commutation.

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.

Hall inputs:

Quantity: three. Type: single-ended, 5V, source, opto-isolated
Input circuit current: <7mA.

Drive Interface

Analog commands:

see table on previous 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 previous 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 previous page.
Type: RS-422 or single ended opto isolated (1 per X, Y).

Propagation delay: <0.1 μ 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.

Mechanical brake:

Quantity: eight. Type: 5V or 24V, single-ended, source only, opto-isolated, 7mA per output.

PEG (Position Event Generator) pulse outputs:

Quantity: see table on previous page.
Type: RS-422. Propagation delay: <0.1 μ sec.

PEG for X,Y can be configured by jumper JP9 to be single ended opto isolated.

PEG pulse width: 25nsec to 1.6msec.

PEG position accuracy: ± 1 count at up to 5,000,000 counts/sec.

HSSI Expansion Channels:

see table on first 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 & Networking

Serial: two RS-232. Up to 115,200bps.
Ethernet: two TCP/IP, 10/100 Mbits/sec.

Simultaneous communication through all channels is fully supported.

Networking: Modbus protocol as master or slave is supported via Ethernet or Serial channels.

CANopen network master with up to 64 nodes of drives and IOs.

Analog I/O

Analog inputs:

General purpose $\pm 10V$ analog inputs:

Quantity: see note *1 in the table on the previous page. Type: $\pm 10V$, differential, 14-bit resolution.

Analog Outputs:

General purpose only $\pm 10V$ analog outputs: Quantity: see note *2 in the table on previous page.

Type: $\pm 10V$, differential, 10-bit resolution, filtered PWM. Signal-to-noise ratio of all analog I/O: ≥ 72 dB (3 sigma).

Controller & Power Supply

User Memory: RAM: 128Mb. Flash: 128Mb.
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.

How To Order

SPIIPlus SAR-LT Controller and Software

• SPIIPlus SAR-LT Controller

Example: SPIIPlus SAR - LT - 8 - E - C

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.

Optional field - CANopen network [C] - PLC enabled

Each SPIIPlus SAR-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

Additional Products

- **SPIIPlus SAR-ACC:** Interface kit that includes mating connectors to SPIIPlus SAR-LT panel of connectors.

Supported Motors:

$\pm 10V$ Commands	AC Servo/DC Brushless (commutation by drive)
	DC Brush
	Nanomotio Piezo-ceramic
P-D Commands	Step motor
	Servo motor



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