

# Single Axis Servo Motor Drives SXD Series

*Compact modular drive with output up to 15 A, 80 V, 1000 W*

Allied Motion's SXD is a single-axis digital servo motor drive capable of driving a DC brush, DC brushless or AC brushless motor. The SXD modular package has a very compact form factor that can be either panel or DIN-rail mounted. Its small size means the SXD is easier to integrate into equipment and will help minimize overall system size.

This single-axis servo motor drive is capable of supplying up to 1000 W continuous output power to the motor. Standard ratings are 12 to 80 VDC bus, 15 A continuous and 30 A peak current.

The SXD can be used to control motor torque (current) or speed. Motor position can be controlled via CANopen, Modbus RTU, or using the ALLNET .NET framework.

The SXD employs Space-Vector Modulation for efficient, smooth, sinusoidal power output to the motor.

Allied Motion's *IN Control*<sup>™</sup>, a Windows-based software application, compatible with Vista / 7 / 8 / 10 computers, enables easy set-up and configuration of the SXD drive.

## Options

- Cables: Connector ized mating cables for the SXD are available as standard accessories



## Features & Benefits

- Torque (current), velocity and position control mode
- High performance 10 kHz current loop, 5 kHz velocity loop, 2 kHz position loop, multiple configurable loop filters
- Compatible with brushless AC and DC, and brush DC motors
- Digital Inputs: 4 optically isolated; can be wired as current sourcing or current sinking
- Digital Output: Optically isolated, 25 mA max; can be wired as current sourcing or current sinking
- Encoder Input: Buffered A/B/Z differential channels for single-ended or differential encoders
- Analog Inputs: 2 differential,  $\pm 10$  V
- Analog Output: 0 - 5 V range, 5 mA maximum
- Communication Ports: RS232, RS485, CAN
- Fully protected against over-voltage, under-voltage, reverse-voltage, short-circuit and over-temperature events; protective metal PCB cover
- "Keep-Alive" feature enables connecting separate logic and main power supplies to maintain logic and peripherals with main power shut off
- *IN Control* Windows-based set up software includes a digital oscilloscope and frequency analysis tools
- ALLNET .NET Framework provides command, control and monitor of the SXD through a set of high-level classes and methods using applications developed in Visual Studio
- Compact and modular form-factor fits tight spaces
- 2-screw panel mount version or DIN-rail mount version
- Compliance: RoHS



### QuickShip Products

Some of the part number configurations for this product are in stock and available for ***immediate delivery!***

Look for the QuickShip symbol next to available part numbers. Then, click on the part number to go directly to our online store.



## SXD – Specifications

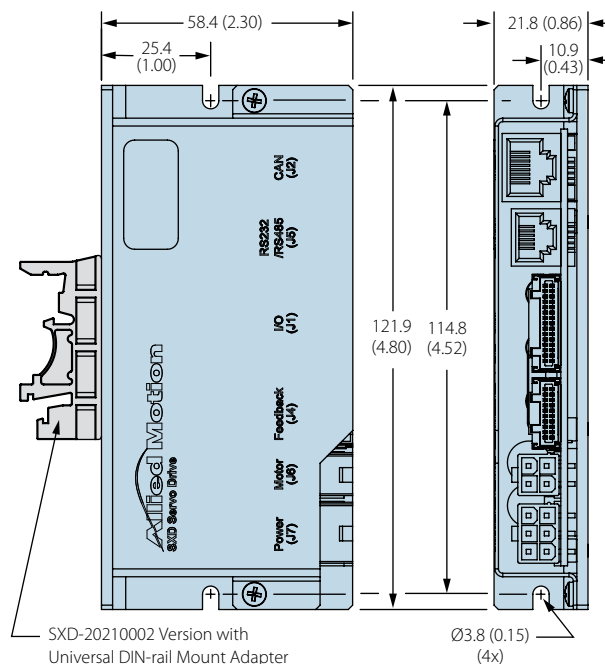
Model	 <a href="#">SXD-20210001</a>	 <a href="#">SXD-20210002</a>
Mounting Style	Panel-mount	Panel-mount with universal DIN-rail mounting adapter
Architecture	DC-powered, modular, single-axis digital PWM servo drive	
Motor Compatibility	Brush DC or brushless servo motor (linear or rotary) with sinusoidal or trapezoidal back-EMF characteristic	
DC Power Input Range	12 to 80 VDC	
“Keep-Alive” Power Input Range	12 to 80 VDC, 100 mA maximum plus motor encoder current draw	
Output Current	Up to 15 A continuous; 30 A peak (2 sec); observing proper heat sinking and ambient temperature	
Power Output	Up to 1000 W observing proper heat sinking and ambient temperature	
Amplifier Type	PWM (20 kHz nominal) 4-quadrant control	
Efficiency	> 92% at 30 °C	
Minimum Motor Inductance	50 µH	
Control Modes	Position, velocity or torque (current) control: 10 kHz torque, 5 kHz velocity, and 2 kHz position loop update rates; PID + feed-forward, user-configurable digital filters (e.g., notch, low pass)	
Position Feedback Input	3.5 MHz buffered differential A/B/Z inputs (for incremental encoder) and Hall sensors, 5 V, single-ended	
Positioning	Point-to-point, target position with velocity/acceleration limits	
Memory	Flash memory for parameters, miscellaneous storage	
Set up Interface	RS232, 460800 baud, 8 data bits, no parity, 1 stop bit	
Inputs and Outputs	<ul style="list-style-type: none"> <li>• Digital IN: 4 optically isolated, configurable as current sourcing or current sinking; ON level: 5 to 32 V, OFF level: 0 to 1.2 V</li> <li>• Digital OUT: 1 optically isolated, configurable as current sourcing or current sinking; 25 mA maximum, 32 V maximum</li> <li>• Analog IN: 2 differential, ±10 V</li> <li>• Analog OUT: 1, 0 - 5 V range, 5 mA max</li> <li>• Brake control and power with settable voltage level up to the DC bus level and up to 1 A continuous current</li> </ul>	
Communications	<ul style="list-style-type: none"> <li>• ALLNET .NET Framework over RS232, 460800 baud, 8 data bits, no parity, 1 stop bit</li> <li>• CANopen over CAN, up to 1000k baud</li> <li>• Modbus RTU over RS485, 38400 baud, 8 data bits, no parity, 1 stop bit</li> </ul>	
LED Status Indicator	<ul style="list-style-type: none"> <li>• Green, slow-blink =&gt; Disabled, operation is normal</li> <li>• Green, fast-blink =&gt; Enabled, operation is normal</li> <li>• Red, slow-blink =&gt; Fault</li> </ul>	
Current Loop Type	PI, 100 µs loop delay	
Velocity Loop Type	PID/PDF, 200 µs loop delay	
Position Loop Type	P with feed forward, 500 µs loop time	

## SXD – Specifications

Protection Features	<ul style="list-style-type: none"> <li>• Over-voltage detection (power stage trip at 90 V)</li> <li>• Under-voltage detection (threshold at 10 V)</li> <li>• Reverse-voltage protection</li> <li>• Short-circuit protection: Phase-to-phase or phase to either supply rail</li> <li>• Over-temperature shutdown at 100 °C heat sink temperature<sup>(1)</sup></li> <li>• Motor temperature: Thermistor, beta-type, NTC, 1 °K to 100 °K at 25 °C</li> </ul>
	Integral shunt regulator circuit with 82 V threshold, capable of dissipating up to 50 W into external 10 ohm resistor (user-supplied); excess energy above 50 W is the responsibility of the user to manage via external means.
Regenerated Energy Management	
Environmental Limits	<ul style="list-style-type: none"> <li>• Altitude: 1000 m (3300 ft); derate power output 2% per 300 m (1000 ft) above 1000 m</li> <li>• Relative Humidity: 5% to 95%, non-condensing</li> <li>• Vibration: IEC 68, parts 2 - 6: 10 - 55 Hz, 0.075 mm, 10 cycles per axis (XYZ), 1 octave/minute sweep</li> </ul>
Weight	0.12 kg (0.25 lb)
Ambient Operating Temperature	-20 to +40 °C max
Ambient Storage Temperature	-40 to +100 °C

<sup>(1)</sup> Heat sink temperature dependent: Heat sink must remain below 90 °C

## SXD Dimensions — mm (in)



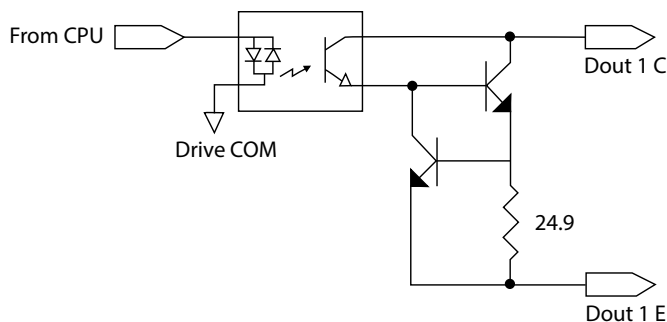
## SXD Electrical Connections

### I/O Connector (J1)

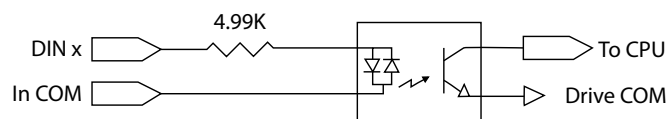
Pin	Name	Function
1	Din 1	Isolated discrete IN 1
2	Dout 1 C	Isolated discrete OUT 1 collector
3	Din 2	Isolated discrete IN 2
4	N/C	
5	In COM	Isolated IN common
6	Dout 1 E	Isolated OUT 1 emitter
7	Din 3	Isolated IN 3
8	Din 4	Isolated IN 4
9-12	N/C	
13	+5 V Ext	+5 V supply; 250 mA (I/O+feedback)
14	COM	+5 V return, un-isolated I/O
15	ENC A +	Buffered encoder channel A+ OUT
16	ENC A -	Buffered encoder channel A- OUT
17	ENC B +	Buffered encoder channel B+ OUT
18	ENC B -	Buffered encoder channel B- OUT
19	ENC Z +	Buffered encoder channel Z+ OUT
20	ENC Z -	Buffered encoder channel Z- OUT
21-22	N/C	
23	COM	+5 V return, un-isolated I/O
24	COM	+5 V return, un-isolated I/O
25	Analog Out 1	Analog OUT 1
26	CHAS	Chassis ground connection
27	An In 1 +	Differential analog IN 1, positive
28	An In 2 +	Differential analog IN 2, positive
29	An In 1 -	Differential analog IN 1, negative
30	An In 2 -	Differential analog IN 2, negative

Molex Duo-Clasp Dual Row 1.25 mm: 502046-3070  
Mate: Molex 503110-3000  
Use 26 - 28 AWG wire gauge

### Isolated Input Circuit (Typical):



### Isolated Output Circuit (Typical):



### Feedback Connector (J4)

Pin	Name	Function
1	En A +	Incremental encoder A + IN
2	En A -	Incremental encoder A - IN
3	En B +	Incremental encoder B + IN
4	En B -	Incremental encoder B - IN
5	En Z +	Incremental encoder Z + IN
6	En Z -	Incremental encoder Z - IN
7	+5 V Ext	+5 V supply; 250 mA, Hall-effect sensors, encoder
8	COM	+5 V return, Hall-effect sensors, encoder
9	HALL A	Motor Hall A IN: internal 1 k pull-up
10	HALL B	Motor Hall B IN: internal 1 k pull-up
11	HALL C	Motor Hall C IN: internal 1 k pull-up
12	COM	+5 V return, Hall-effect sensors, encoder
13-16	N/C	
17	MOT TH	Motor thermistor input
18	CHAS	Chassis ground
19	BR +	Brake +
20	EBR -	Brake -

Molex Duo-Clasp Dual Row 1.25 mm: 502046-2070  
Mate: Molex 503110-2000  
Use 26 - 28 AWG wire gauge

### Motor Connector (J6)

Pin	Function
1	Motor Phase A
2	Motor Phase B
3	Motor Phase C
4	Chassis

Molex Minifit 87427-0402  
Mate: 0039012040  
Use 16 - 24 AWG wire

### Power Connector (J7)

Pin	Function
1	V IN (+)
2	V AUX (+) (keep-alive)
3	Regen (+)
4	V IN (-)
5	V AUX (-) (keep-alive)
6	Regen (-)

Molex Minifit 87427-0602  
Mate: 0039012060  
Use 16 - 24 AWG wire

### RS232/RS485/CAN Connector (J5), RJ-11

Pin	Function
1	CANopen (+) / Modbus RTU (+)
2	Common
3	RS-232 Tx
4	RS-232 Rx
5	Do not connect
6	CANopen (-) / Modbus RTU (-)

### CAN Connector (J2), RJ-45

Pin	Function
1	CANopen (+) / Modbus RTU (+)
2	CANopen (-) / Modbus RTU (-)
3	Common
4	N/C
5	N/C
6	N/C
7	Common

## SXD Cable Accessories

	Description	Part Number
Motor Feedback	20-pin motor feedback cable with connector, flying leads, 0.5 m (1.5 ft)	AC-CB-100119
Motor Power	SXD 15 A motor power cable with connector, 3 m (10 ft) length	AC-CB-100120
Input Power	SXD 15 A input power cable with connector. 3 m (10 ft) length	AC-CB-100121
I/O	30-pin I/O cable with connector, flying leads, 0.5 m (1.5 ft) length	AC-CB-100122
RJ-11	Female RJ-11 to female DB-9 modular adapter with 2 m RJ-11 male-male interconnection cable	AC-CB-100123

## Recommended Parts

	Description	Part Number
Dissipation Resistor	Vishay 50 W, 10 ohm regeneration energy dissipation resistor, or equivalent	FVT05006E10R00JE
Fuse	3 A Littlefuse regeneration management resistor protection fuse, fast-acting 3AB ceramic body, cartridge /with leads, lead-free	0314003P / 0324003P

## Documents & Software

Documentation and most software are available for download from the Allied Motion website ([www.alliedmotion.com](http://www.alliedmotion.com))

34-2100	Hardware Manual: Wiring and Installation
34-2200	Software Manual: <i>IN Control</i> User Guide
34-2202	Software Manual: Parameters and Control Structure
—	ALLNET .NET Framework software

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- Standard product selection
- Product customization and options guidance
- Specification development assistance for custom-design products
- Price quotations
- Ordering, order status and shipment information
- Logistics assistance

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