

Datasheet BSD5 FieldBus Servo Drive

Highlights

FieldBus Servo Drive

- **High-Performance Control Algorithms – Improved Accuracy and Response Speed**
 - **Current loop cycle shortened to 1.2 μ s**, enabling high-acceleration and high-precision control
 - **Speed loop cycle shortened to 31.25 μ s**, meeting the dynamic performance requirements of high-end equipment such as AOI machines and laser direct-write systems
 - **16-bit current sampling**, improving servo system control accuracy
- **Easy Operation – More Efficient Tuning**
 - **One-touch tuning**: Complete three-loop and vibration suppression parameter tuning within seconds
 - **Minimal movement required**: Fine adjustments are sufficient for tuning
 - **Precise tuning**: Frequency-response-based analysis allows faster and more accurate adjustments; filter frequency precision improved to 0.5 Hz
 - **Multiple adjustable parameters**: Supports self-tuning mode, system type, load inertia, and other settings to adapt to different applications
- **Rich Features – More Accurate Control**
 - **Error compensation**: Real-time correction of encoder errors to enhance repeatability and positioning accuracy
 - **Dual-domain tuning**: Supports both frequency-domain and time-domain tuning, suitable for complex applications
 - **Supports multiple encoder types**: Compatible with major absolute encoders (BiSS-C, EnDat 2.2, Tamagawa, Nikon), ABZ incremental encoders, and Hall position sensors
 - **Model-tracking control**: Effectively suppresses low-frequency vibration and trajectory deviations, improving path-following accuracy
 - **Position-comparison output**: Drives output control signals to synchronize cameras, lasers, and other peripherals
 - **Automatic gain switching**: Adjusts gain according to motion status, balancing responsiveness and stability
- **Safe and Reliable – Protecting the Human and Machine System**
 - **Built-in safety functions**: Supports STO, SS1, SS2, and complies with international safety standards
 - **Motor temperature protection**: Compatible with various temperature sensors; automatically powers off on over-temperature to prevent equipment damage



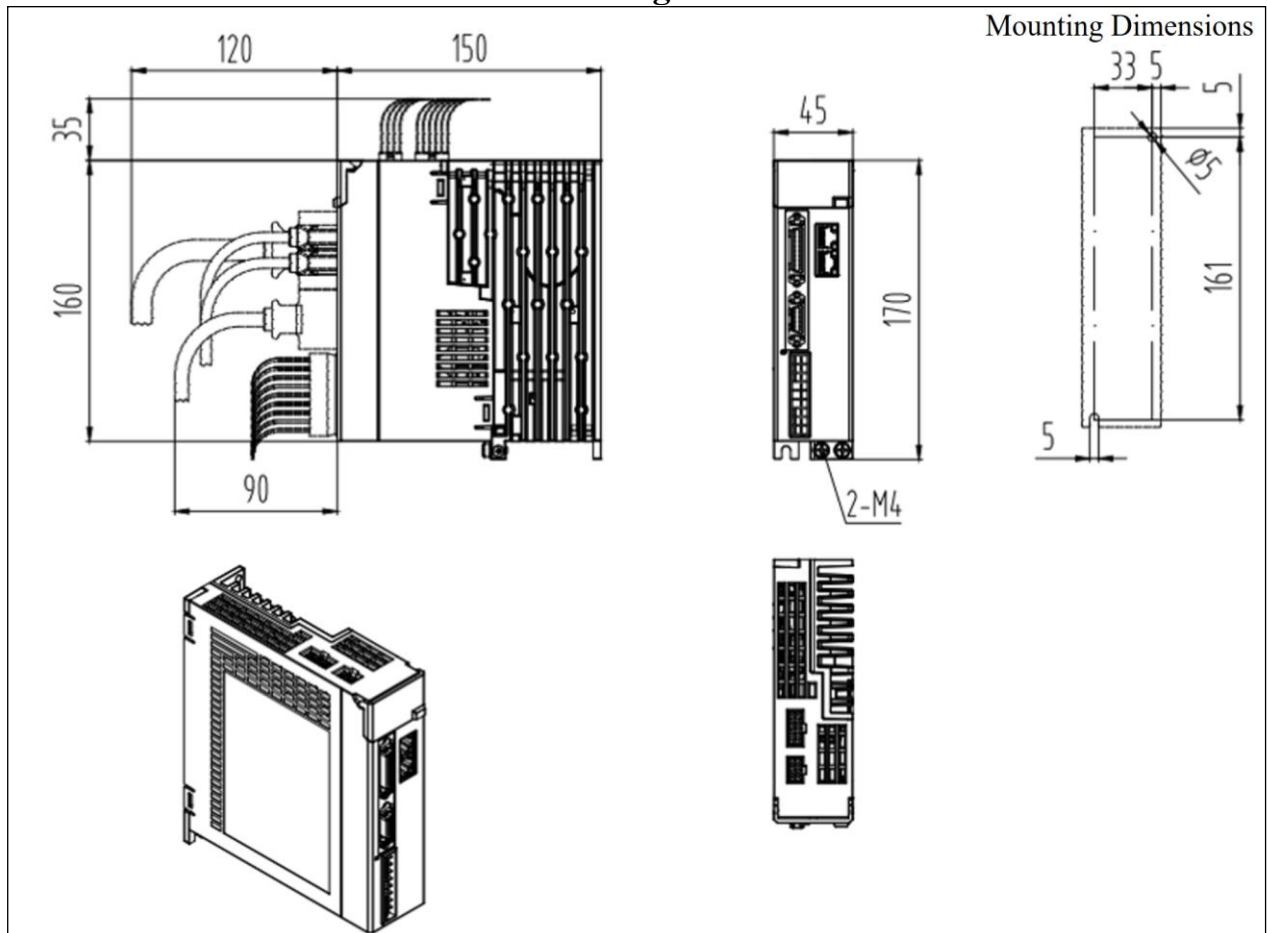
1. Specifications

FieldBus Servo Drive				
Model			BSD5-3D0A-ME	BSD5-6D0A-ME
Output (Motor Side)	Continuous Output Current		3.0 Arms	6.0 Arms
	Instant Maximum Output Current		12.0 Arms	18.0 Arms
AC Input (Power Supply Side)	Phase Number / Voltage		Single Phase (1PH) AC 200 V ~ 240 V, -15% ~ +10%	
	AC Voltage Frequency Range		50/60 Hz	
	Rated Single Phase AC Input Current		4.2 Arms	8.5 Arms
Control Power Supply Input	Input Voltage		Single Phase (1PH) AC 220 V, ±15%	
	Power Consumption		7W	10W
Built-In Regenerative Braking Resistor			50Ω/50 W	
Minimum Allowable External Regenerative Braking Resistance			30 Ω	
Dimension: (Width x Height x Depth)			45 mm × 170 mm × 150 mm	
Mass			1.0 kg	
Encoder Interface	Absolute Encoder		Protocol: Tamagawa, Nikon, Biss-C, EnDat 2.2	
	ABZ Incremental Encoder		A、B、Z Signal, 1Vpp SinCos Signal	
	Hall Sensor		TTL Single Ended Input Signal	
EtherCAT	Minimum communication cycle		250 μs	
	Profile		IEC61800-7 Profile type1 (CiA402), CoE (CANopen over EtherCAT)	
	Communication object		PDO (Process Data Object), SDO (Service Data Object)	
	Synchronization Type		DC Sync0, Free Run (Only supports PP operation mode)	
	Operation mode		Profile Position Mode (PP), Homing Mode (HM), Cyclic Sync Position Mode (CSP), Cyclic Sync Velocity Mode (CSV), Cyclic Sync Torque Mode (CST)	
Analog Voltage, Pulse Train	Position Command Pulse Input	Input Pulse Form	Three forms: direction+pulse, phase A + phase B quadrature pulse, CW/ CCW pulse	
		Input Form	RS422 Differential Input	
		Input Pulse Frequency	Single: 5 MHz	
	Position Feedback Pulse Output	Output Pulse Form	A、B and Z signals, where AB signal is a square wave with a phase difference of 90 °, and the Z signal of the rotating motor is a single turn 0 signal	
		Output Pulse Frequency	Single: 1 MHz, Quadrature: 4MHz	
		Output Form	Direct mode: The pulse signal of the motor A/B/Z incremental encoder is directly fed back to the controller through the driver Conversion mode: The motor encoder position value is converted into an ABZ pulse signal and fed back to the controller through the driver	
		Update Cycle	62.5 μs	
	Analog Voltage	Command Voltage	±10 V, Differential	
		Operation Mode	Velocity Mode, Torque Mode	
		Resolution Ratio	16bit	
		Bandwidth	1 kHz	
		Impedance	4.7 kΩ	
Debug Interface	Communication Interface		Mini USB	
	Debugging Software		DriveMaster	
I/O Interface	DI		8 Channels (Including 2-channel high-speed DI)	
	DO		5 Channels	

Safety Interface	STO	STO1, STO2 Input, STOM Output
Integrated security functions		Safety Torque Off (STO), Safe Stop 1 (SS1), Safe Stop 2 (SS2)
Cooling Mode		Fan forced cooling
Usage environment	Ambient temperature, relative humidity of usage environment	No reduced rated power in 0°C~45°C, lower rated power in 45°C~55°C; 10%~95% RH (No condensation)
	Ambient temperature, relative humidity of storage environment	-40~70°C; 10%~95%RH (No condensation)
	Vibration	10Hz~58Hz,amplitude: 0.075 mm; 58Hz~200Hz,acceleration: 1g
	Altitude	Less than 1000m above sea level
	IP Level	IP20
Applicable standards^{Note 1}	CE instruction	IEC61800-3, IEC61800-5-1
	Functional safety certification	IEC61508, IEC61800-5-2, ISO13849

Note 1: BSD5 product supports integrated security features, and relevant certification is currently in progress.

2. FieldBus Servo Drive Dimension Drawing



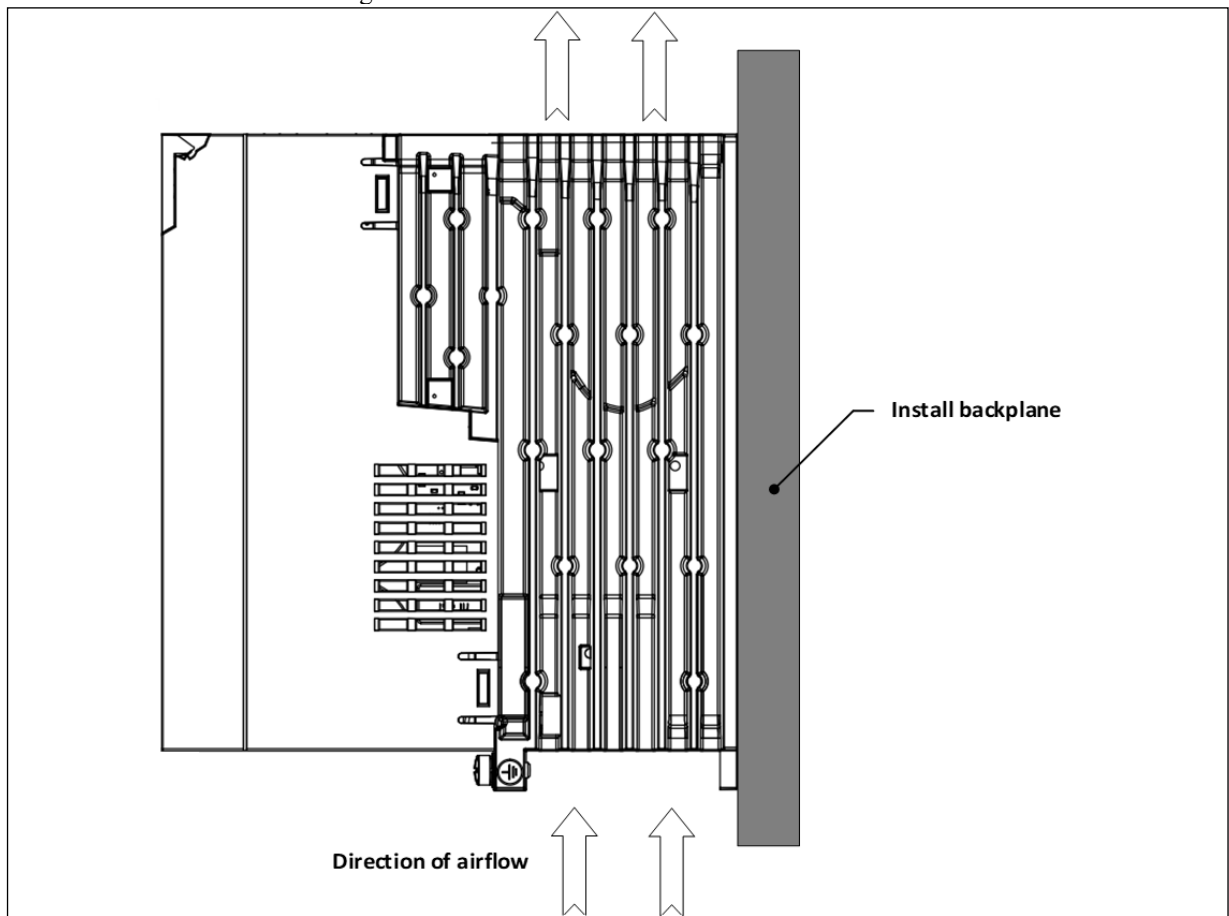
Note:

1. All dimensions are in millimeters.
2. For dimensions not indicated in the drawing, please contact the sales team.

3. FieldBus Servo Drive Installation Guide

3.1 Drive Mounting Orientation

The recommended drive mounting orientation is shown below:

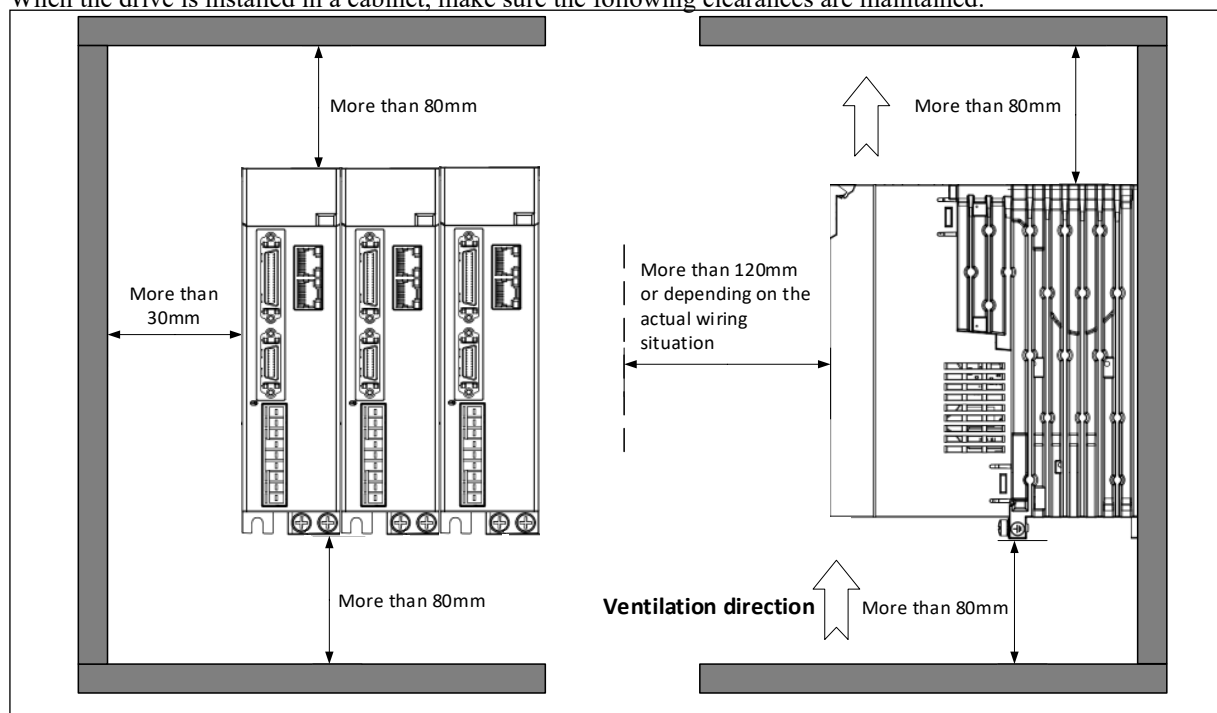


Note:

1. Because heat generated by the servo drive dissipates upward, vertical mounting is generally required to ensure stable performance; make sure the airflow direction of the built-in forced-air cooling is from bottom to top.

3.2 Drive Mounting Clearance Requirements

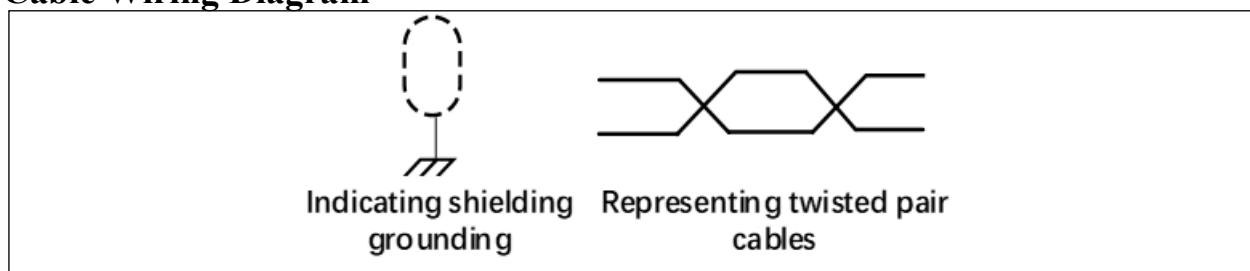
When the drive is installed in a cabinet, make sure the following clearances are maintained:



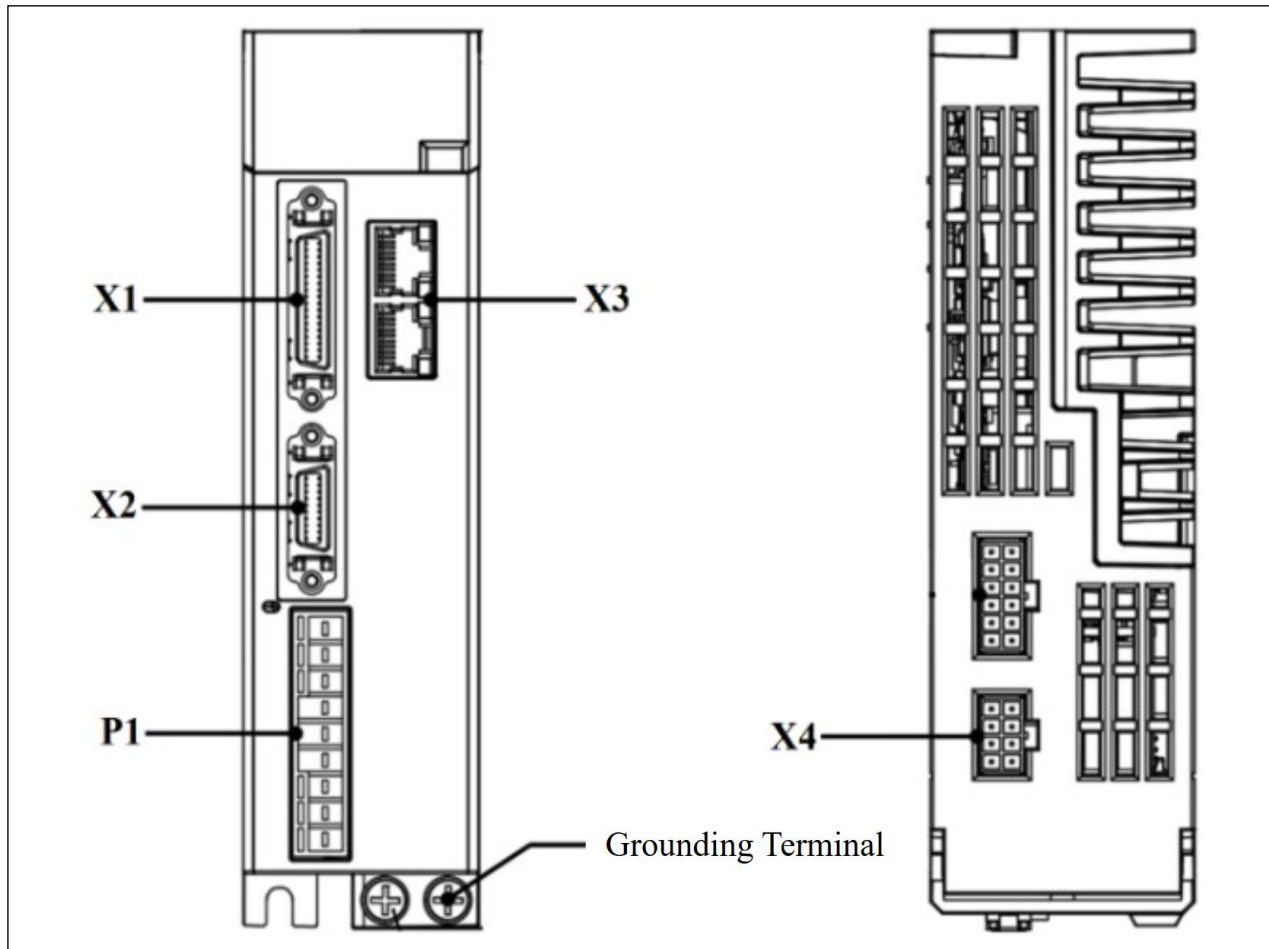
Note:

1. All dimensions are in mm.
2. Multiple servo drives may be installed side by side.
3. Keep the ambient operating temperature of the servo drive below 45 °C.
4. If heat dissipation inside the control cabinet is poor, use cooling fans to maintain airflow.

4. Cable Wiring Diagram

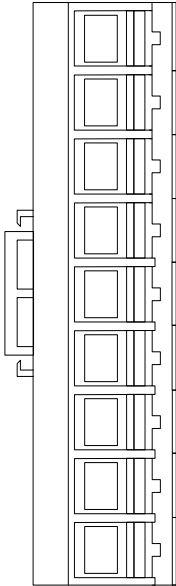


5. Port Locations and Names



Port	Function
P1	Main power input and motor power output port
X1	Position command input/output port
X2	Encoder port
X3	EtherCAT communication port
X4	STO port
Grounding terminal	Grounding terminal

5.1 Main Power Input Port / Motor Power Output Port (P1)

Connector Diagram and Pin Definition	Function
	Power input port, control power and regenerative braking port, motor power output

When different power inputs are used, the wiring method for each port differs. The following power input methods are listed:

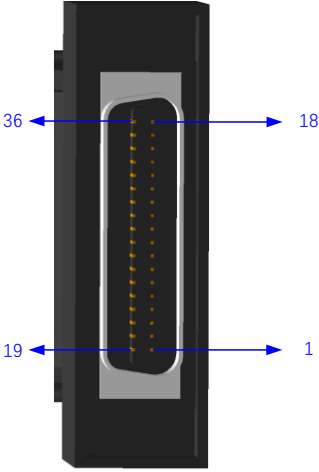
• Single-phase AC 220 V Power Input

Port Name	Pin Symbol	Specifications and Parameters
Power input port, control power and regenerative braking port	L1, L2	Single-phase AC 220 V, -15% to +10%; 50/60 Hz
	B, RB, P	When using the built-in braking resistor, short terminals B and RB; do not use terminal P
		When using an external braking resistor, connect the resistor to terminals B and P; do not use terminal RB
Grounding terminal		Connect to the external circuit grounding terminal

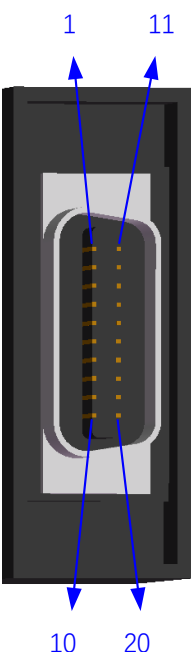
• Motor Power Output

Port Name	Pin Symbol	Specifications and Parameters
Motor power output port	U、V、W	Motor three-phase power output
	PE	Connect to motor PE

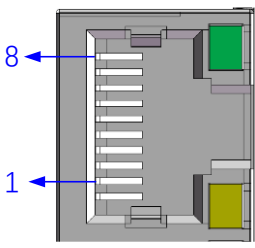
5.2 Position Command Input/Output Port (X1)

Terminal Diagram	Pin	Name	Description
	Pin 1	DI4	Digital input signal DI4
	Pin 2	DI_COM+	Positive common terminal for digital input signals
	Pin 3	DI5	Digital input signal DI5
	Pin 4	DI6	Digital input signal DI6
	Pin 5	DI7	Digital input signal DI7
	Pin 6	DI8	Digital input signal DI8
	Pin 7	DO1	Digital output signal DO1
	Pin 8	DO3	Digital output signal DO3
	Pin 9	DIR+	Position command direction signal +
	Pin 10	DIR-	Position command direction signal -
	Pin 11	PULSE+	Position command pulse signal +
	Pin 12	PULSE-	Position command pulse signal -
	Pin 13	HDIR+	High-speed position command pulse direction signal +
	Pin 14	HDIR-	High-speed position command pulse direction signal -
	Pin 15	HPULSE+	High-speed position command pulse signal +
	Pin 16	OZ+	Encoder Z-phase feedback +
	Pin 17	HPULSE-	High-speed position command pulse signal -
	Pin 18	OZ-	Encoder Z-phase feedback -
	Pin 19	AIN+	Analog command signal +
	Pin 20	AIN-	Analog command signal -
	Pin 21	DI3	Digital input signal DI3
	Pin 22	GND	Control power signal ground
	Pin 23	HDI2	High-speed digital input signal HDI2
	Pin 24	HDI1	High-speed digital input signal HDI1
	Pin 25	PULL-HI	PULL-HI signal
	Pin 26	DO2	Digital output signal DO2
	Pin 27	DO4	Digital output signal DO4
	Pin 28	DO5	Digital output signal DO5
	Pin 29	DO_COM-	Negative common terminal for digital output signals
	Pin 30	24V+	24 V input power positive terminal
	Pin 31	GND	Control power signal ground
	Pin 32	OCZ	Encoder Z-phase OC output
	Pin 33	OB+	Encoder B-phase feedback +
	Pin 34	OA+	Encoder A-phase feedback +
	Pin 35	OB-	Encoder B-phase feedback -
	Pin 36	OA-	Encoder A-phase feedback -

5.3 Encoder Port (X2)

Terminal Diagram	Pin	Name	Description
	Pin 1	HALL_U	Hall U-phase signal
	Pin 2	HALL_V	Hall V-phase signal
	Pin 3	HALL_W	Hall W-phase signal
	Pin 4	5V+	5 V power positive terminal
	Pin 5	A+/DATA+	Encoder incremental A+ signal / serial data signal +
	Pin 6	A-/DATA-	Encoder incremental A- signal / serial data signal -
	Pin 7	B+/CLK+	Encoder incremental B+ signal / serial clock signal +
	Pin 8	B-/CLK-	Encoder incremental B- signal / serial clock signal -
	Pin 9	COS+	Encoder cosine signal +
	Pin 10	COS-	Encoder cosine signal -
	Pin 11	Z-	Encoder incremental Z- signal
	Pin 12	Z+	Encoder incremental Z+ signal
	Pin 13	5V+	5 V power positive terminal
	Pin 14	GND	5 V power negative terminal
	Pin 15	GND	High-speed position command pulse signal +
	Pin 16	GND	Encoder Z-phase feedback +
	Pin 17	T-MOTOR+	Temperature detection signal +
	Pin 18	T-MOTOR-	Temperature detection signal -
	Pin 19	SINE-	Encoder sine signal -
	Pin 20	SINE+	Encoder sine signal +

5.4 EtherCAT Communication Port (X3)

Terminal Diagram	Pin	Name	Description
	Pin 1	TX+	Tx data +
	Pin 2	TX-	Tx data -
	Pin 3	RX+	Rx data +
	Pin 4	-----	NC
	Pin 5	-----	NC
	Pin 6	RX-	Rx data -
	Pin 7	-----	NC
	Pin 8	-----	NC

5.5 STO Port (X4)

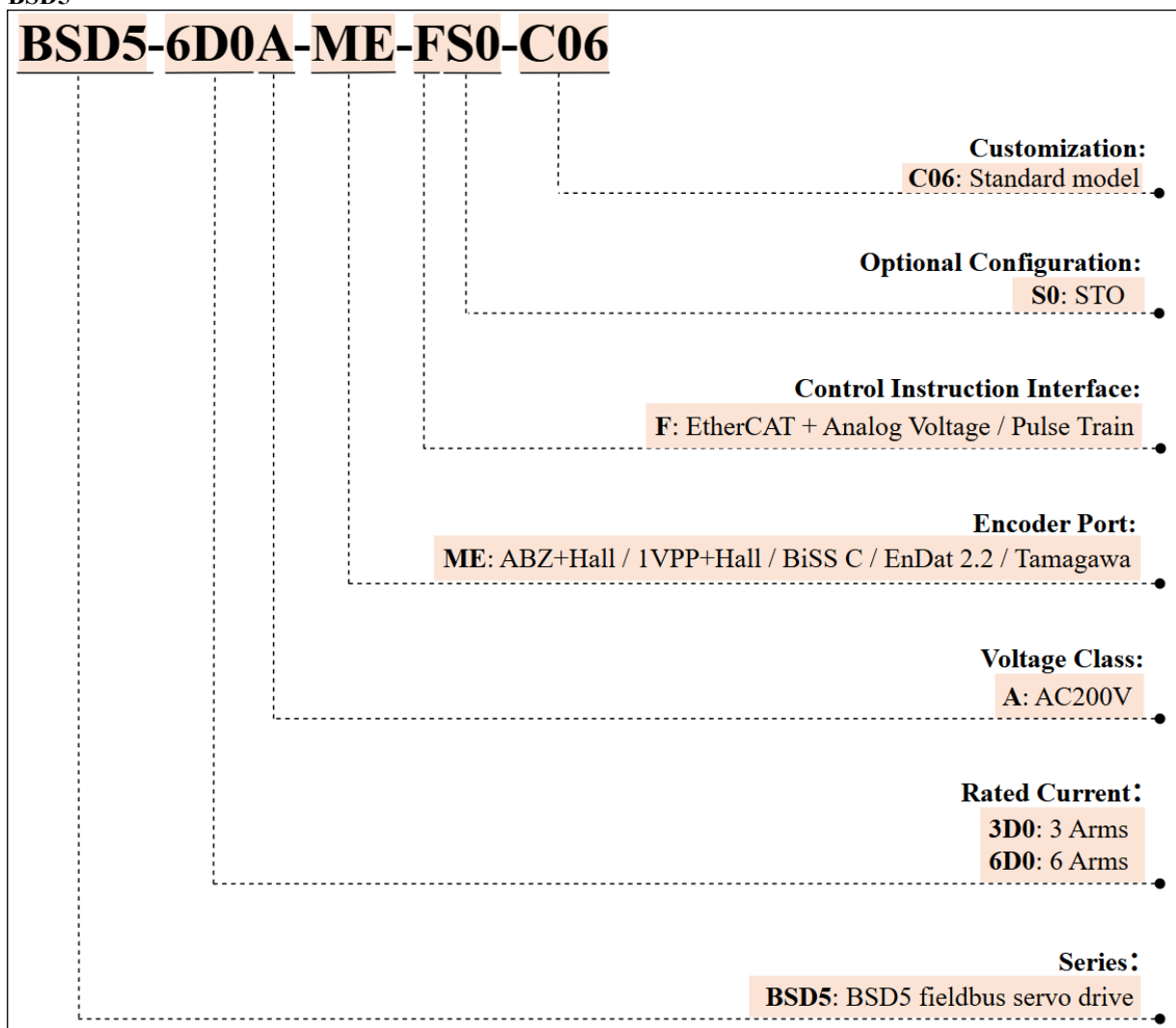
Terminal Diagram	Pin	Name	Description
	Pin 1	STO1-	STO1 signal -
	Pin 2	STO2-	STO2 signal -
	Pin 3	EDM-	External device monitoring signal -
	Pin 4	GND	Signal ground
	Pin 5	STO1+	STO1 signal +
	Pin 6	STO2+	STO2 signal +
	Pin 7	EDM+	External device monitoring signal +
	Pin 8	STO-RSV	STO inhibit signal

Note:

1. When the STO safety function is not used, short pins 4 and 8.

6. Model Name

6.1 BSD5



Note:

1. Some encoder-interface protocols are under development.
2. For customization, please contact the sales team for more information.