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SYNTEC HIGH-PERFORMANCE SPINDLE DRIVE SPD SERIES



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SYNTEC TECHNOLOGY

T R U S T E D T E C H N I C A L S E R V I C E

High-Performance Spindle Drive - SPD Series



- All digital 32-bit high-performance drive of machine tool industry
- High-resolution vector control is available for the high-accuracy cutting spindle of a machining center and a mill-turn multi-tasking machine
- Applying SYNTEC high-resolution encoder can provide high-quality C-axis function
- Various power and voltage choice for wide used

Features

Dual Feedback Spindle Control

Resolve the flexible and backlash issues of a motor and a spindle to enhance processing quality

USB Port

Serial Bus Communication Mechatrolink II

Standard Encoder Cable

I. High Performance, Speed, and Accuracy

- High bandwidth and rapid response for excellent control performance
- Smooth curved control commands for stable rotational speed and good processing features
- High-speed positioning for time-saving and rapid effect

II. Various Communication Interface and USB

- Mechatrolink II serial communication protocol
- Support TTL protocol and absolute high-resolution communication encoders
- Support USB interface for rapid communication
- 4 direct input entries and 2 direct output entries.

III. Various Control Modes for Different Applications

- Position control and speed control for C-axis function
- Support mixed control mode through I/O exchange
- V/F control provides rotational speed arrived function
- V/F operating curved adjusting function (2 points)

Configuration Page

Data Capture Page

Auto-Adjusting Function

Data Analysis (FFT)

IV. Powerful Servo Software

- Auto-tuning function for stable control
- Simple page design for monitoring, measuring, and analyzing status easily
- Easy data capture for scanning, writing, and saving configurations
- Provide standard monitor software in PC with tuning function
- Modifying configurations and auto-tuning can also be achieved by the upper controller



V. Various Applications

- Permanent-magnet synchronous motor
- Induction asynchronous motor
- Direct-drive motor
- Built-in motor
- Fourth Axis
- Other high-resolution servo control applications

Model Description **SPD - 32A1 - 075**

Type SPD : Spindle Driver SVD : Servo Driver	Model Code A1 is a hardware model	Power 035 : 3.5 kW 075 : 7.5 kW 110 : 11.0kW 185 : 18.5kW
Input Voltage 2 : 220V 3 : 380V	Voltage Phase 1 : 1-phase 2 : 3-phase	

Specification

Model	220V					380V					
	SVD-22□□-□□□	SPD-22□□-□□□	SPD-32□□-□□□			SPD-32□□-□□□					
Rated Power (kW)	A1-010	A1-035	A1-075	A1-110	A1-185	A1-055	A2-075	A1-110	A1-150	A1-185	A1-220
Rated Source Voltage	3-phase 200~230V 50/60Hz		3-phase 200~240V 50/60Hz			3-phase 380~440V 50/60Hz					
Rated Output Current (A)	5.5	16.6	33	47	75	15	21	27	34	42	52
Dynamic Braking	Built-in (External Available)		External								
PC Communication Interface	USB										
Feedback Encoder	Incremental ABZ encoder / Absolute communication encoder										
Serial Communication Interface of Controller	Mechatrolink II										
Cooling Down	Fan cooling										
Dimensional Drawing	D 1	D 2	D 3	D 3	D 4	D 5	D 3	D 3	D 3	D 4	D 4

D1

D2

D3

D4

D5

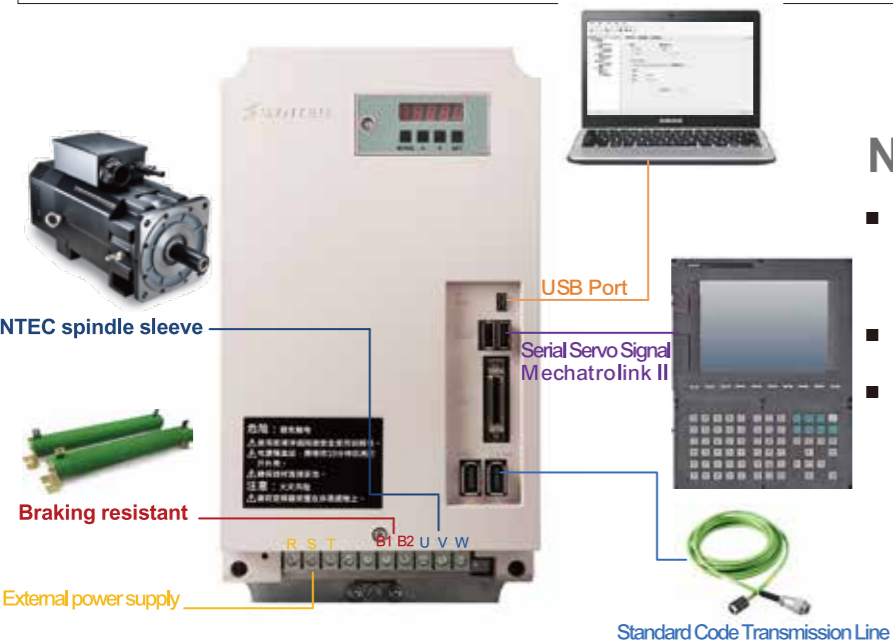
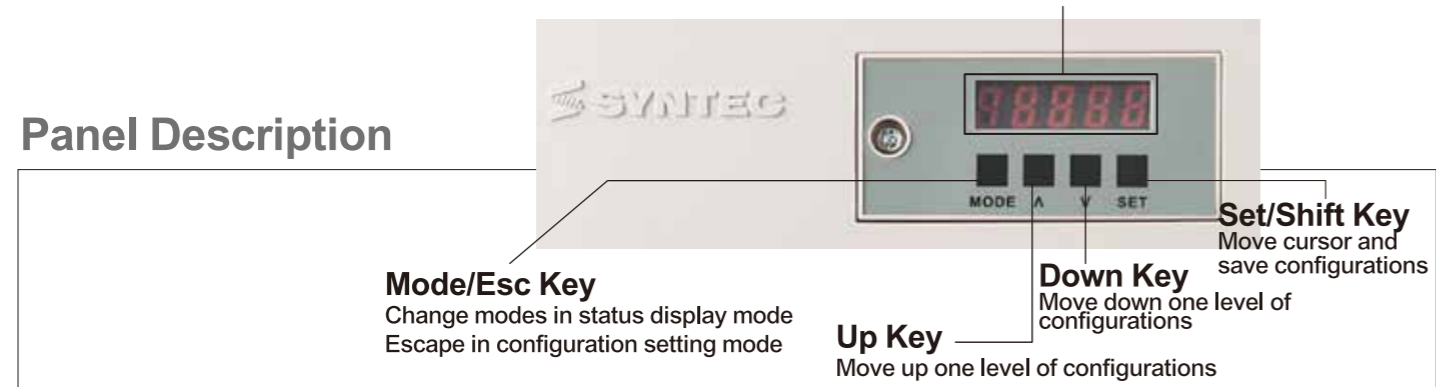
Recommended lock method
Tapping M5*4 PCS

Unit:mm

High-Performance Spindle Drive - SPD Series External Equipments and Specifications

Displayer
5 7-segment LED display showing values for monitoring and setting configurations

Panel Description

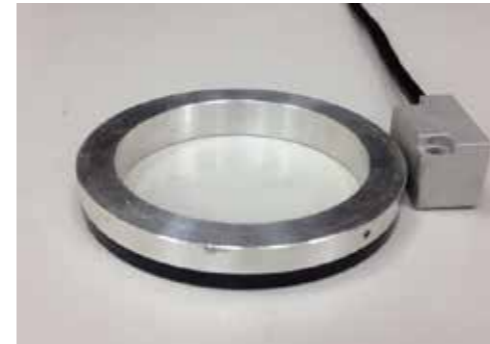


Notes of Installation

- Check the U, V, and W terminals connected to the motor appropriately. Otherwise, reverse or other abnormal cases may occur, and the encoder calibration is required.
- The power supply of control panel is recommended to select two of RST terminals directly.
- Only one of general pulse interface and serial bus communication interface can be selected for the upper controller.

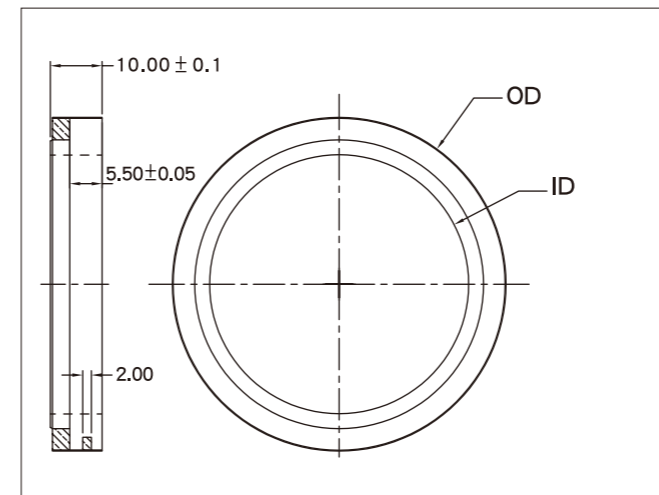
Hollow Type Magnetic Encoder (Type 2)

A magnetic hollow shaft encoder consists of a scanning head and a magnetic ring. The magnetic ring is fixed on the spindle, and the scanning head is set on the side. The size of magnetic ring must be selected according to the size of spindle.



- Contactless inductive technology for small volume and high mechanism compatibility
- High resolution and reliability
- Various magnetic ring sizes for different applications
- Available for the 2nd feedback or C-axis lathe

Product Name	Hollow Type Magnetic Encoder (Type 2)
Source Voltage	5V ± 5%
Max Rotational Speed	8000-2000 (according to magnetic ring size)
Transmission Speed	2.5Mbps
Revolution	16~20 bit (according to magnetic ring size)
Weight	40g



Magnetic ring size (mm)

Model No.	Number of Magnetic Poles	Outer Diameter(OD)	Inner Diameter(ID)
MR-60	124	77.3 ± 0.02	60.-0.01/-0.02
MR-82	162	101.5 ± 0.02	82.0-0.01/-0.02
MR-125	242	152.5 ± 0.02	125.0-0.01/-0.02

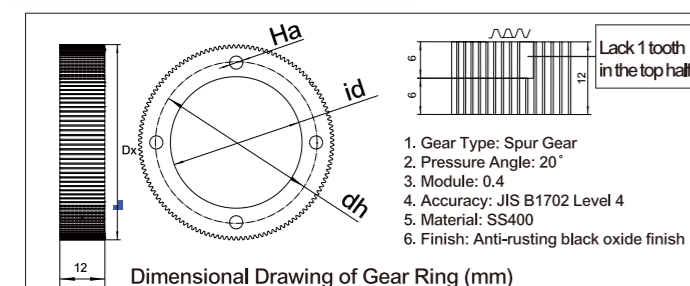
Note: magnetic rings consist of non-keyway ones and double keyway ones

Hollow Type Magnetic Encoder (Type 1)



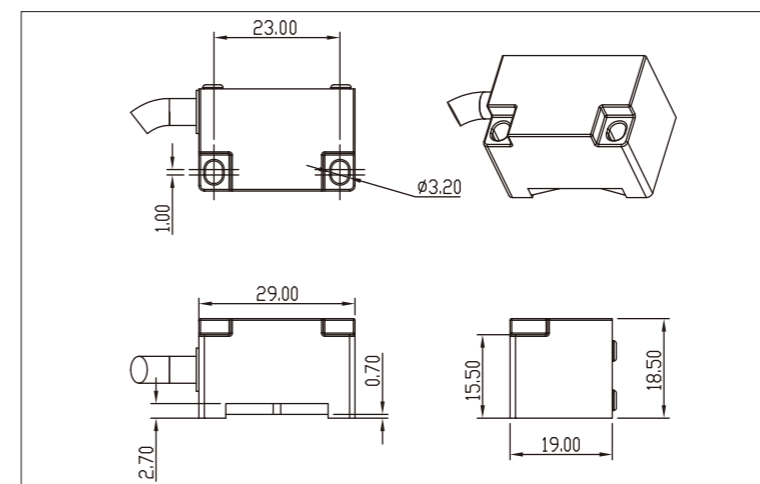
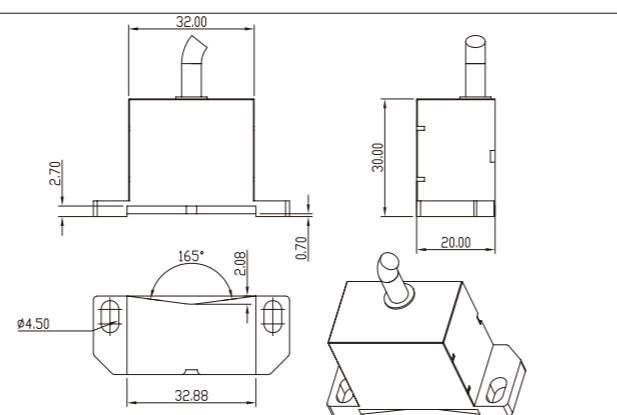
- High-resolution communication encoder with excellent control performance
- High reliability and durability
- Available for built-in spindle, or the 2nd feedback

Product Name	Hollow Type Magnetic Encoder (Type 1)
Source Voltage	5V ± 5%
Max Rotational Speed	20000RPM
Transmission Speed	2.5Mbps
Revolution	196608(192 teeth) 262144(256 teeth)
Weight	45g



- Gear Type: Spur Gear
- Pressure Angle: 20°
- Module: 0.4
- Accuracy: JIS B1702 Level 4
- Material: SS400
- Finish: Anti-rusting black oxide finish

Number of teeth	Dx	id	dh	Ha
192	77.6 ± 0.05	50 + 0.02	57 ± 0.05	3.5
256	103.2 ± 0.05	82 + 0.02	92 ± 0.05	4.5

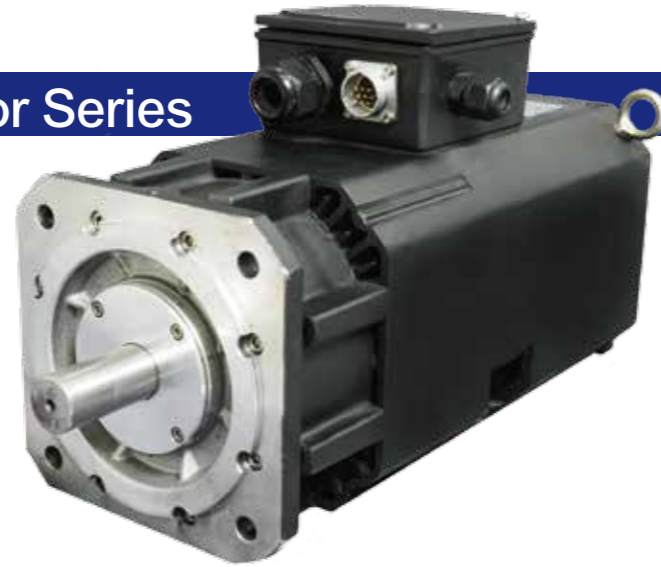


Micro-Scanning Head Dimensional Drawing (mm)

Milling Spindle Induction Motor Series

General Features

Installation	Vertical: IMB5 (Standard)
Insulation Grade	Level F (155°C-311°F)
Protection Degree	IP54
Temperature Detection	KTY84
Output Shaft	Plain shaft
Cooling Down	Fan cooling
Fan Outlet	Drill on the 2 sides, and one is covered by a stopper
Encoder	16-bit SYNTEC serial high-resolution magnetic encoder

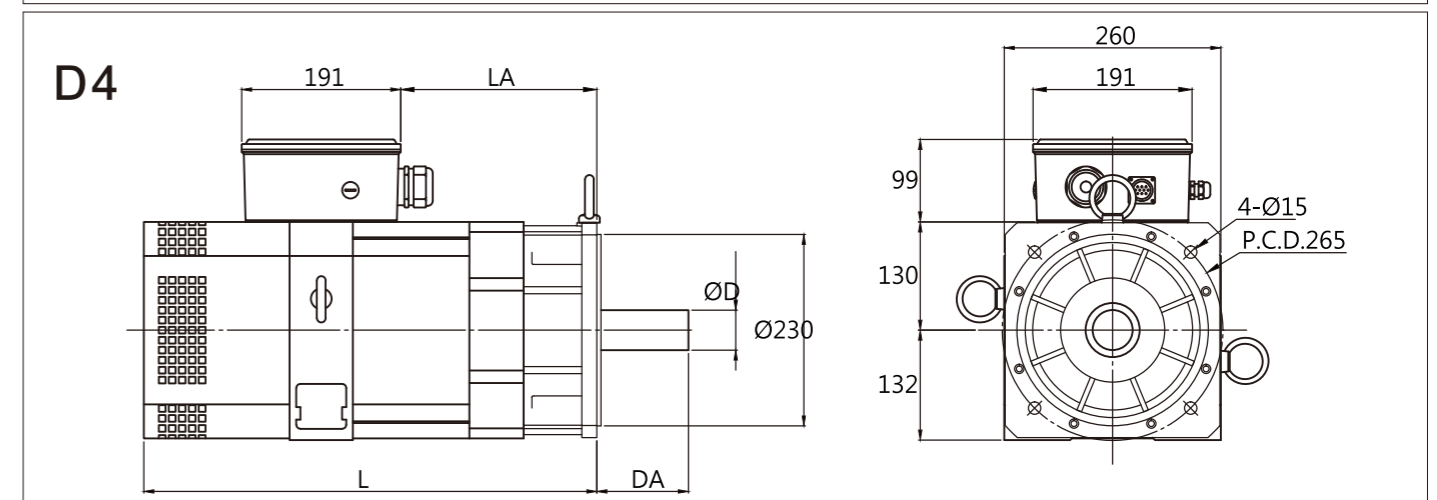
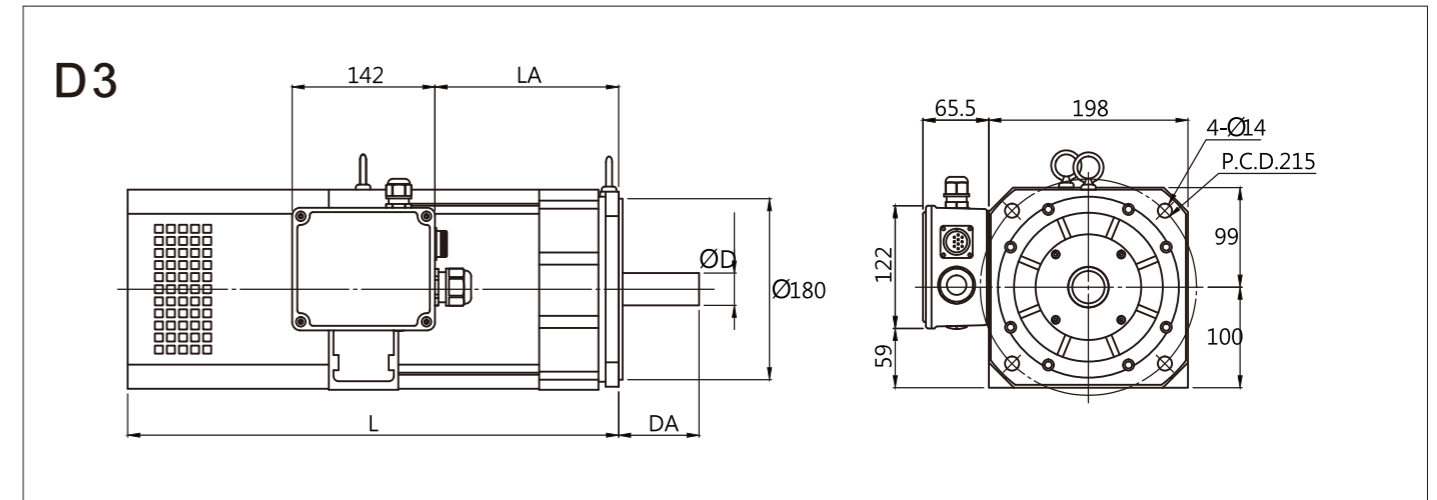
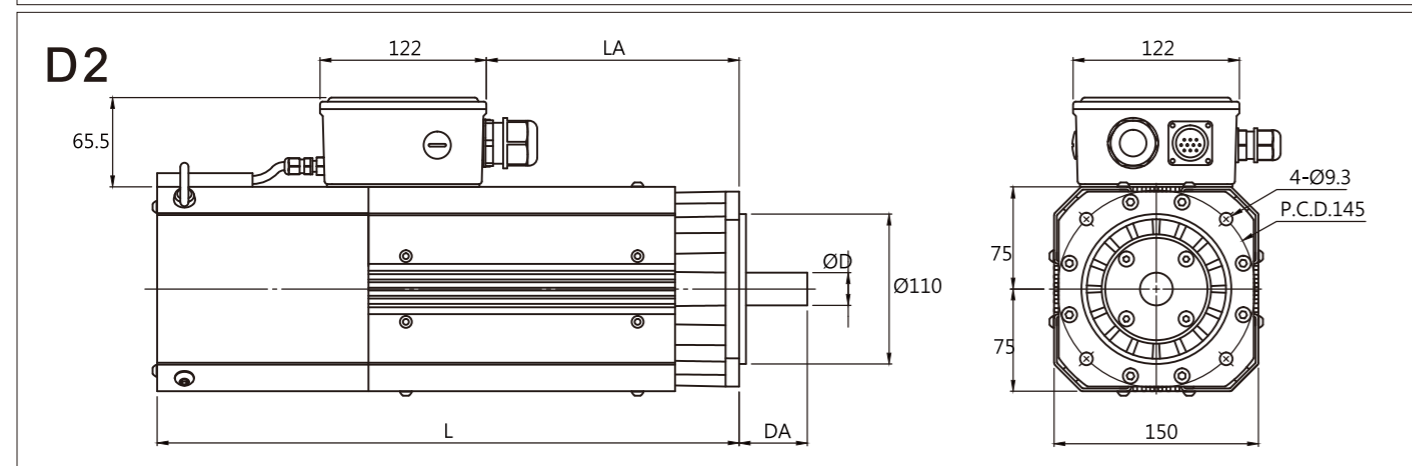
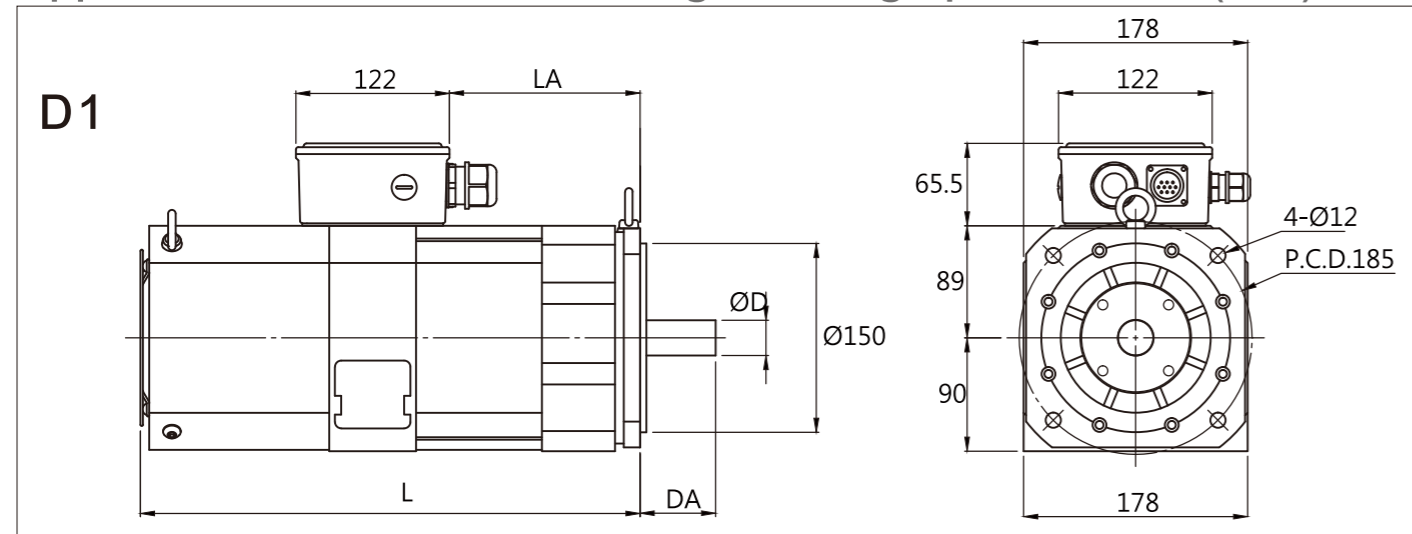


Equipment Specification

Specification	Power (Kw)		Rotational Speed (rpm)		Current (A)		Torque (Nm)		Inertia Kg.cm ²	Weight Kg	Drive Type SPD-	
	Continuous(S1)	S2-30MIN	Rated	Max	Rated	S2-30MIN	Rated	Max			3-Phase AC200V	3-Phase AC400V
Motor Type	3.7	5.5	3000	12000	12.4	15.9	11.67	17.35	43.46	30	22A1-075	32A2-075
SP-L5.5-12	3.7	5.5	3000	18000	12.4	15.9	11.67	17.35	40.57	30	22A1-110	32A1-110
SP-L5.5-18	3.7	5.5	3000	24000	13.1	19.5	11.6	17.35	30.67	25	22A1-110	32A1-110
SP-L5.5-24	3.7	5.5	3000	18000	17.6	20.9	23.3	34.7	78.64	38	22A1-075	32A2-075
SP-L11-18	7.5	22	3000	24000	13.1	19.5	7	10.5	23.97	20	22A1-075	32A2-075
SP-SL5.5-24	3.7	5.5	1500	12000	15.3	19.3	23.3	34.7	58.28	38	22A2-075	32A2-075
SP-M5.5-12	5.5	7.5	1500	10000	19.4	26.4	34.7	47.3	204.49	51	22A1-110	32A1-110
SP-M7.5-10	5.5	7.5	1500	12000	19.4	26.4	34.7	58.9	157.76	51	22A1-110	32A1-110
SP-M7.5-12	7.5	11	1500	8000	20.1	29.6	47.3	69.4	237.96	68	22A1-110	32A1-110
SP-M11-08	11	15	1500	7000	34.3	46.8	69.4	94.6	548.82	90	22A1-185	32A1-185
SP-M15-07	15	18	1500	7000	33.2	41.3	94.6	116.7	663.76	105	22A1-185	32A1-185
SP-M18-07												

Appearance Dimensional Drawing	Motor Type	D	DA	L	LA
D 1	SP-L5.5-12	28	60	397	152
D 1	SP-L5.5-18	28	60	397	152
D 2	SP-L5.5-24	24	50	427	186
D 1	SP-L11-18	28	60	437	192
D 2	SP-SL5.5-24	24	50	377	136
D 1	SP-M5.5-12	28	60	437	192
D 3	SP-M7.5-10	32	80	488	183
D 3	SP-M7.5-12	32	80	483	183
D 3	SP-M11-08	48	110	563	258
D 4	SP-M15-07	48	110	544	236
D 4	SP-M18-07	48	110	584	276

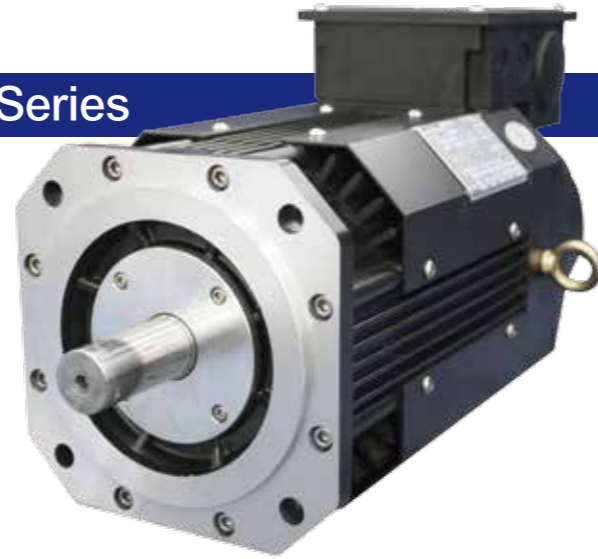
Appearance Dimensional Drawing of Milling Spindle Motor (mm)



High-Speed Spindle Induction Motor Series

General Features

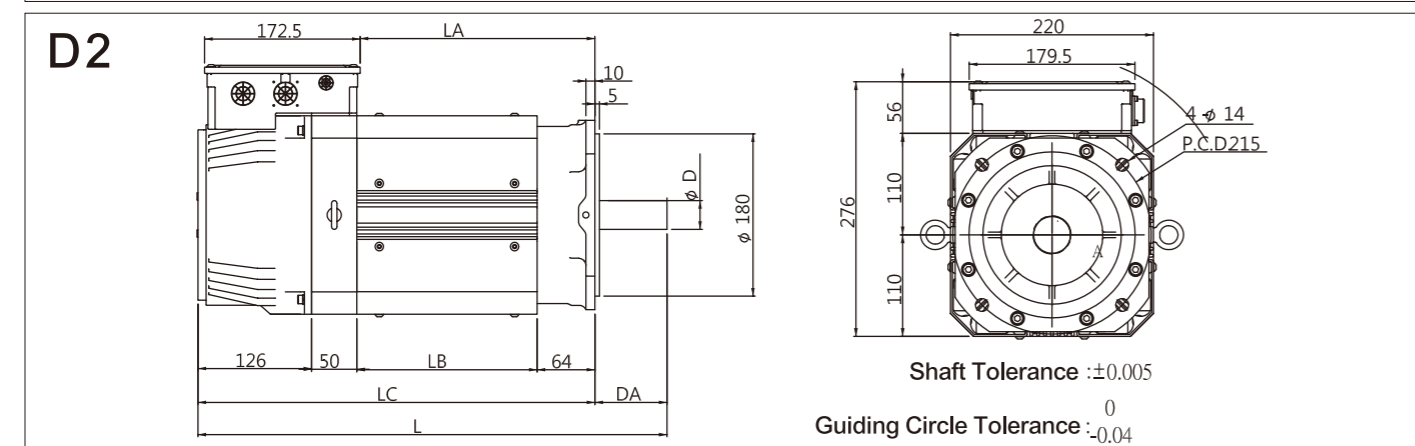
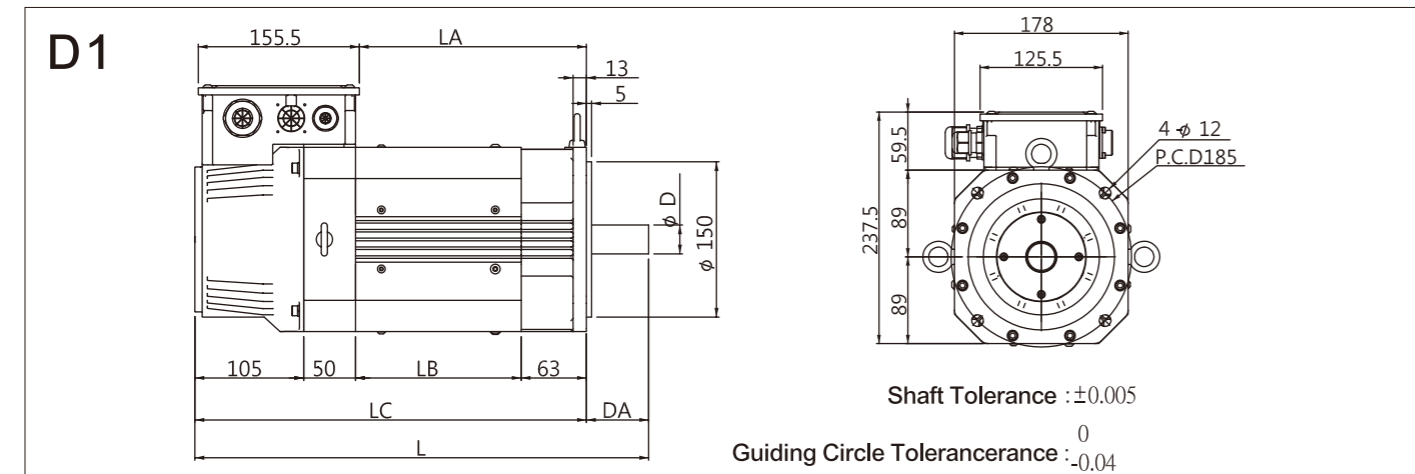
Installation	Vertical: IMB5 (Standard)
Insulation Grade	Level F (155°C-311°F)
Protection Degree	IP54
Temperature Detection	KTY84
Output Shaft	Plain shaft
Cooling Down	Fan cooling
Fan Outlet	Drill on the 2 sides, and one is covered by a stopper
Encoder	16-bit SYNTEC serial high-resolution magnetic encoder



Equipment Specification

Specification	Power (Kw)		Rotational Speed (rpm)		Current (A)		Torque (Nm)		Inertia Kg.cm ²	Weight Kg	Drive Type SPD-	
	Continuous(S1)	S2-30MIN	Rated Rotational Speed	Max Rotational Speed	Rated Current	S2-30MIN	Rated Torque	Max Torque			3-Phase AC200V	3-Phase AC400V
Motor Type												
SP-M5.5-10	3.7	5.5	2000	10000	12.5	18.5	17.7	26.5	93.95	28	22A1-075	32A2-075
SP-M7.5-10	5.5	7.5	2000	10000	18.5	25.2	26.3	39.5	114.14	39	22A1-110	32A1-110
SP-M11-08	7.5	11	2000	8000	19	27.8	35.8	53.7	183.51	52	22A1-110	32A1-110
SP-M15-07	11	15	2000	7000	27.5	37.5	52.5	77.8	220	68	22A1-185	32A1-185

Appearance Dimensional Drawing of Spindle Motor (mm)



Notes: It is all subject to the actual products in case of any difference between the one in the drawing and the actual one.

Appearance Dimensional Drawing	Motor Type	D	DA	L	LA	LB	LC
D1	SP-M5.5-10	28	60	395	176.25	140	335
D1	SP-M7.5-10	28	60	518	299.25	240	458
D2	SP-M11-08	32	80	530	270.75	200	450
D2	SP-M15-07	48	110	635	345.25	275	525

Lathe Built-in Induction Rotor-Stator

General Features

Stator	Level F of Insulation Grade
Protection Degree	IP54
Temperature Detection	KTY84
Cooling Down	Water cooling
Rotor	2 structures of rotors: with jacket and without jacket



Model No. Description

BS 160 - 060 - 12 - C

- Product Name**: BS : Built in Spindle
- Outer Diameter of Stator**: 120 : 120mm, 160 : 160mm
- Length of Dynamo Sheet**: 060 : 60mm, 105 : 105mm, 120 : 120mm, 135 : 135mm
- Max Rotational Speed**: 12 : 12000 rpm
- Structure**: None: without jacket, C : with jacket

Lathe Built-in Rotor-Stator Specification (BS Series)

Specification	Power (Kw)		Rotational Speed (rpm)		Current (A)	Torque (Nm)		Drive Type SPD- 3-Phase AC400V
	Continuous(S1)	S2-30MIN	Rated Rotational Speed	Max Rotational Speed		Rated Torque	Max Torque	
BS120-060-12	1.5	2.2	4500	12000	4.1	3.2	4.8	32A2-075
BS120-120-12	2.2	3.7	4500	12000	6	4.8	7.7	32A2-075
BS160-105-12	3.7	5.5	2000	12000	20.8	13.8	20.8	32A2-075
BS160-135-12	5.5	7.5	3000	12000	25.4	17.3	23.6	32A2-075

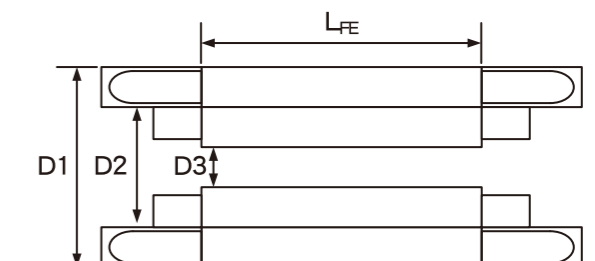
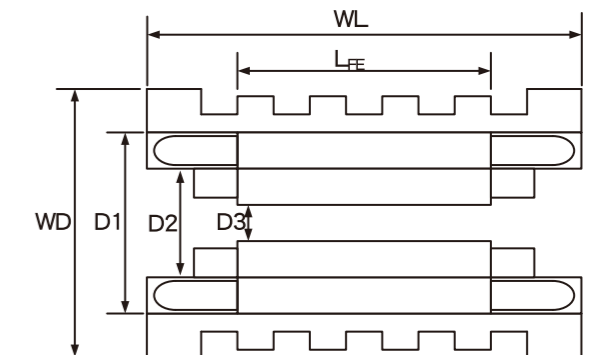
Appearance and Installation Size (mm)

• Without Jacket

Type	Specification	D1	D2	D3	L _{FE}
Lathe Asynchronous Spindle	BS120-060-12	120	74.5	52	60
	BS120-120-12	120	74.5	52	120
	BS160-105-12	159.8	109.7	80	105
	BS160-135-12	159.8	109.7	80	135

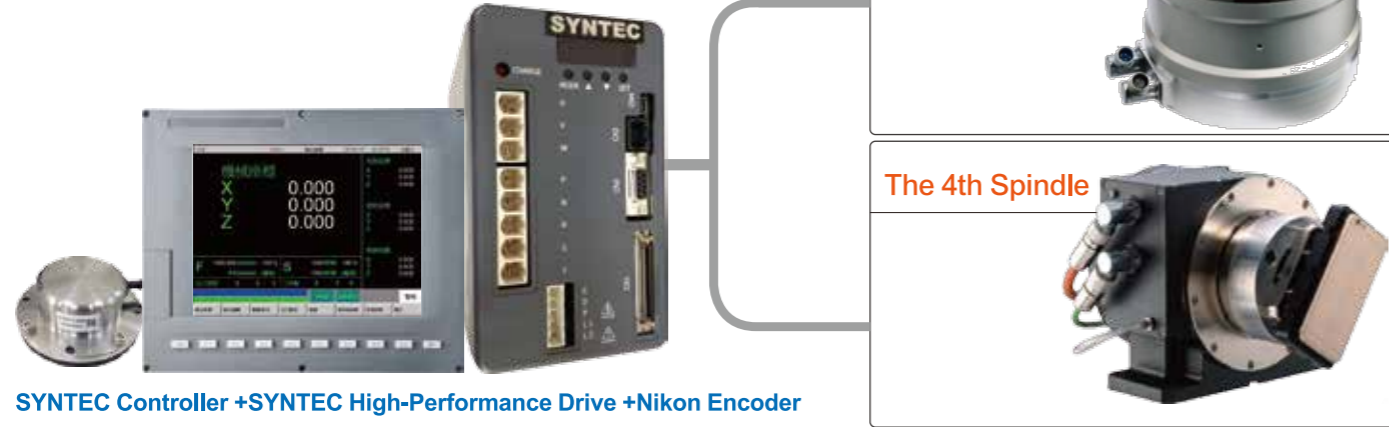
• With Jacket

Type	Specification	WD	D1	D2	D3	L _{FE}
Lathe Asynchronous Spindle	BS120-060-12-C	138	120	75	52	60
	BS120-120-12-C	138	120	75	52	120
	BS160-105-12-C	180	159.8	110	80	105
	BS160-135-12-C	180	159.8	110	80	135



SYNTEC DD Product Solution

- DD motors own zero-backlash, non-gear-wear, and high-torque advantages
- Rapid response for most fast operating
- No need maintenance and oil change for high- accuracy 4th/5th spindle or rotate task exchange
- Applying SYNTEC drive and Nikon encoder can provide high-accuracy solutions



SYNTEC Controller +SYNTEC High-Performance Drive +Nikon Encoder

Nikon Encoder Specification

Model No.	Appearance	Type	Position shift	Installation
MAR-H40A-HN01		Cross connecting shaft	Compensated	Do not need jig
MAR-MC43A-HN00		Hollow disconnecting shaft	Need compensation	Need jig

DD Series Motor Specification

Specification	Height (mm)	Disc Diameter (mm)	Hollow Hole (mm)	Rated Torque (Nm)		Rated Current (Arms)		Max Current (Arms)	Max Rotational Speed (rpm)	Drive	
				Water cooling	Self-cooling	Water cooling	Self-cooling				
DM160-070-019	120	160	20	19	8.64	38.1	6.58	2.81	19.7	SVD-22A1-035	
DM160-110-046	160			45.3	19.5	88.8	5.49	13.3	39.2		1000
DM198-080-032	140	198	35	31.5	14.6	67.6	9.39	4.4	26.8		500
DM198-120-076	180			75.8	33.2	157.5	9.66	4.26	27		500
DM230-070-067	220	230	45	67.1	27.3	126.7	10.9	4.33	28		200
DM230-110-167	260			166.9	64.5	308.9	11.4	4.21	27.8		200

Positioning/Repeatable Accuracy Error

Positioning Accuracy 20", Repeatable Accuracy 2"

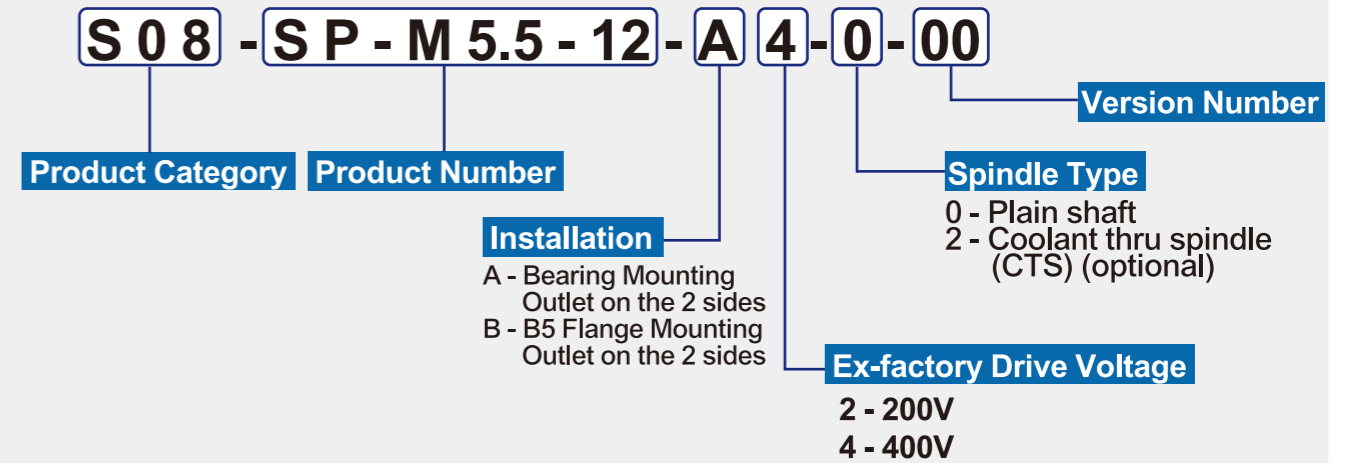


Feature:

- Adopting laser calibration technology of RENISHAW and applying the compensation in the encoders
- Available for co-action processing or index table

Spindle Product Order Number

Spindle Product Series Order Number Description



Order Number	Description					
	x		y			
	A	B	2	4	0	2
S08-SP-L5.5-12-xy-z-00		●	△	●	●	△
S08-SP-L5.5-18-xy-z-00		●	△	●	●	△
S08-SP-L5.5-24-xy-z-00		●	△	●	●	△
S08-SP-L11-18-xy-z-00		●	△	●	●	△
S08-SP-SL5.5-24-xy-z-00		●	△	●	●	△
S08-SP-M5.5-12-xy-z-00		●	△	●	●	△
S08-SP-M7.5-10-xy-z-00		●	△	●	●	△
S08-SP-M7.5-12-xy-z-00		●	△	●	●	△
S08-SP-M11-08-xy-z-00		●	△	●	●	△
S08-SP-M15-07-xy-z-00		●	△	●	●	△
S08-SP-M18-07-xy-z-00		●	△	●	●	△
S08-SP-M5.5-10-xy-z-01		●	△	●	●	△
S08-SP-M7.5-10-xy-z-01		●	△	●	●	△
S08-SP-M11-08-xy-z-01		●	△	●	●	△
S08-SP-M15-07-xy-z-01		●	△	●	●	△
Installation	A: Bearing Mounting	A				
	B: Flange Mounting		B			
Ex-factory Drive Voltage	2 : 200V			2		
	4 : 400V				4	
Spindle Type	0 - Plain shaft				0	
	2 - Coolant thru spindle (CTS)					2

● is Standard, △ is Optional
Notes: Make to order for bearing requirements.