

# 3 p e e p s



iSpeed3

NAKANISHI INC. 2022



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PR-K368E Ver.1 2022-02-28 03. 440

※Specifications and design are subject to change without notice.



SERIES **iSpeed3**  
ULTRA-HIGH-SPEED & SUPER-PRECISION

# The Finger Tips

You can arrange this finger spindle as you wish and realize a magical machining

Max. power 140W, Max. rpm 80,000min<sup>-1</sup>

Max. power 150W, Max. rpm 60,000min<sup>-1</sup>

## ✔ Spindle accuracy within 1 μm

- Optimum for high-precision machining
- Longer tool life

## ✔ Ceramic Bearing

- Longer bearing life
- Higher rigidity for heavy cutting

## ✔ Brushless motor

- No need to replace carbon brushes to enable maintenance-free operation
- Carbon brush dust will no longer penetrate the bearing to extend the product life





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With 50cm joint cord  
Max.rpm 80,000min<sup>-1</sup>



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**BM-322FR** ..... p.7  
With 50cm joint cord  
Max.rpm 60,000min<sup>-1</sup>



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With 50cm joint cord  
Max.rpm 60,000min<sup>-1</sup>

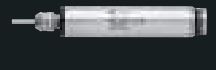


**BMF-319** ..... p.11  
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## Straight type motor spindle

**BMJ-319** ..... p.13  
Max.rpm 80,000min<sup>-1</sup>



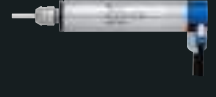
**BMJ-320** ..... p.13  
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**BM-320** ..... p.17  
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With 50cm joint cord  
Max.rpm 60,000min<sup>-1</sup>



## Motor cord

### 1. Joint type

[ Feature ] Connection possible out of the machine  
[ Length ] 3m, 5m, 7m



**EMCD-BM3** ..... p.22  
Joint type motor cord

### 2. Straight type

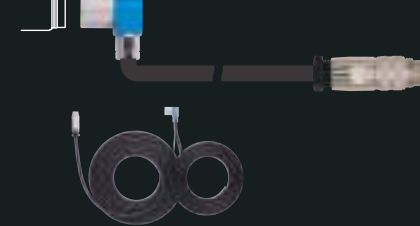
[ Feature ] Connection at the body end  
[ Length ] 4m, 6m, 8m



**EMCD-BM3S** ..... p.22  
Straight type motor cord

### 3. Angle type

[ Feature ] Connection at the body end into 90° degrees  
[ Length ] 4m, 6m, 8m



**EMCD-BM3A** ..... p.22  
Angle type motor cord

## Controller

**iSpeed3 CONTROLLER**  
Controller ..... p.21

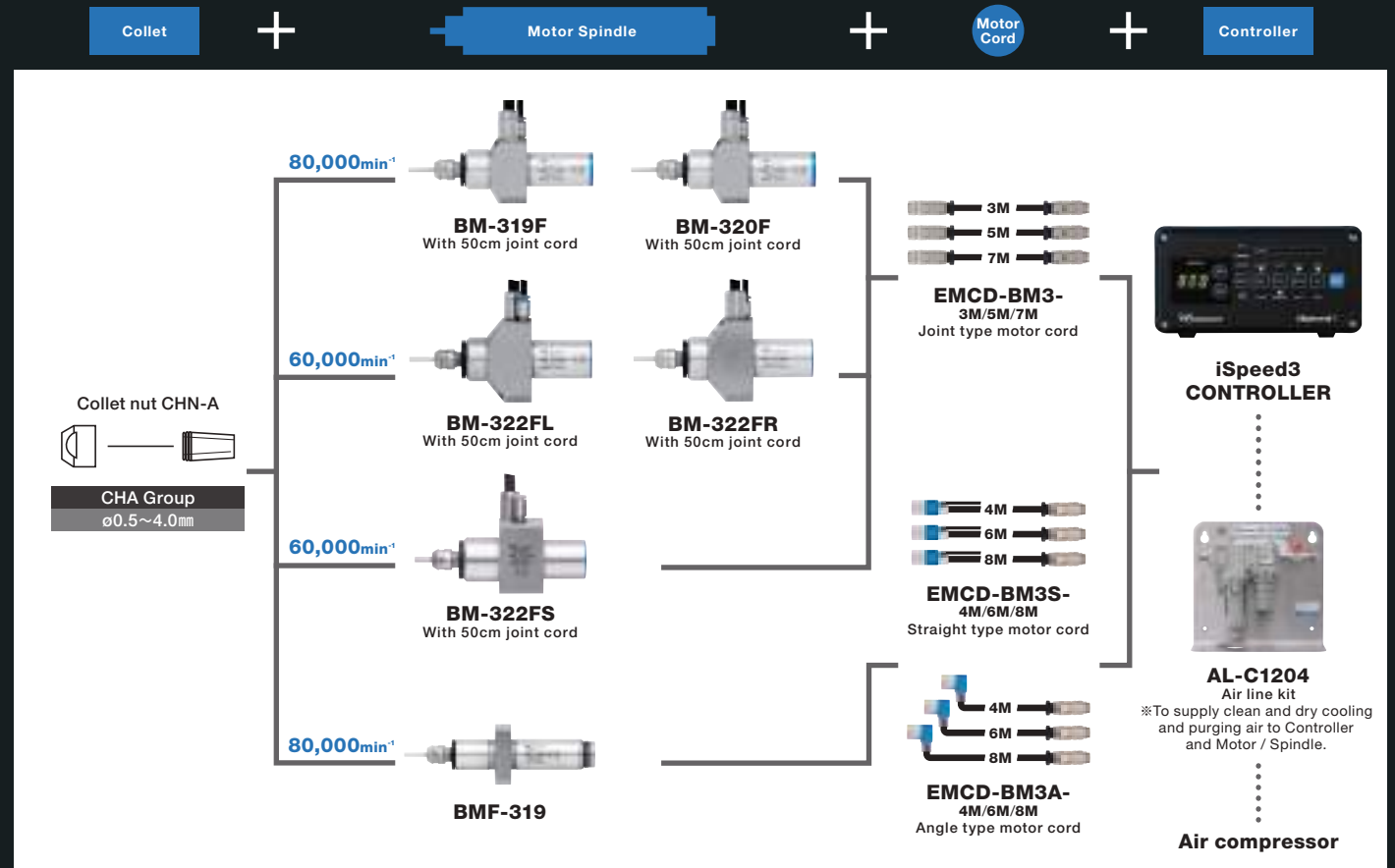
## Accessories

**AL-C1204**  
Air line kit ..... p.22

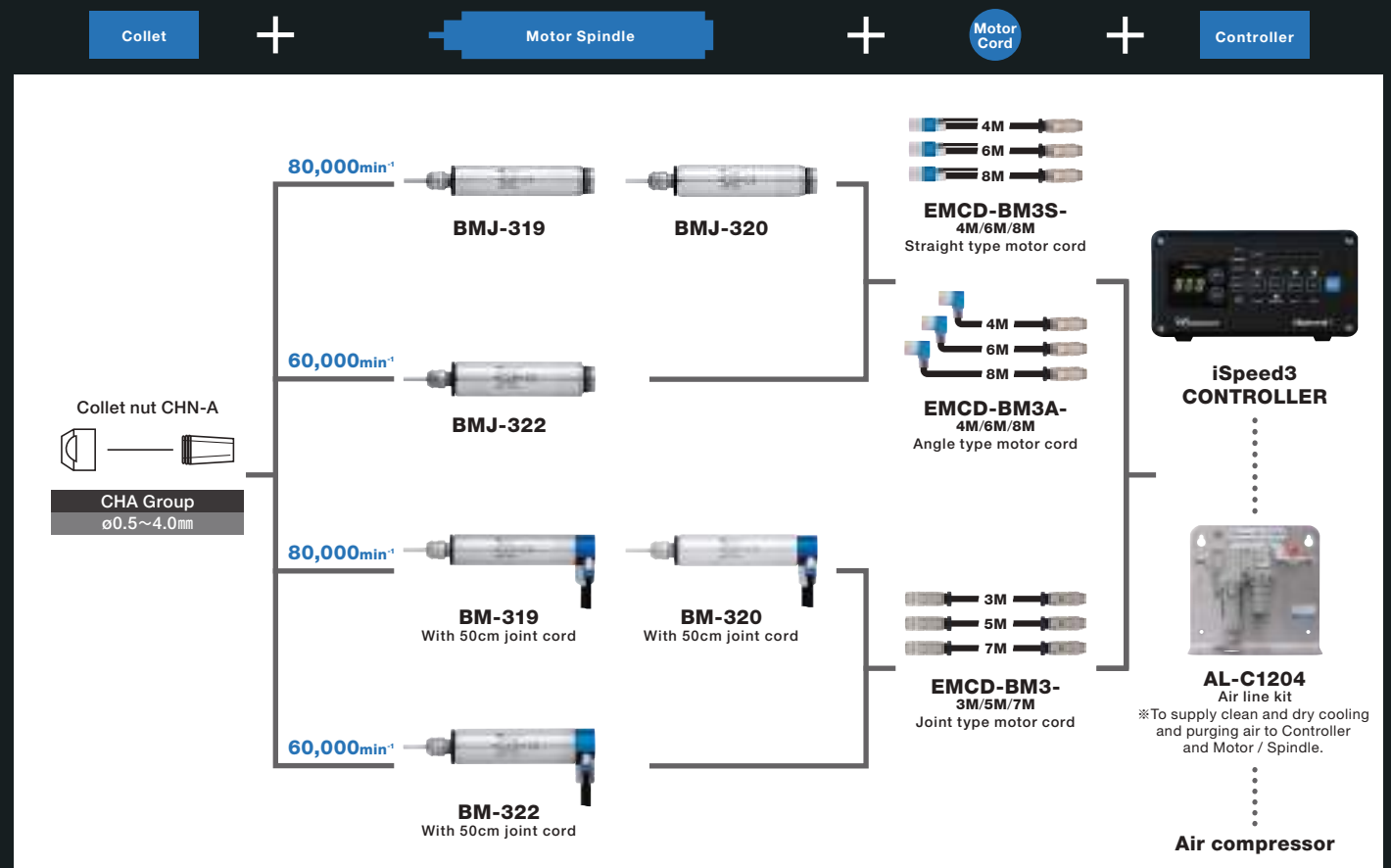
**CHA / CHN-A**  
Collet / Collet nut ..... p.23

# System Chart

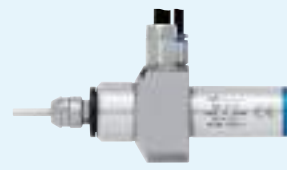
## Flange type motor spindle



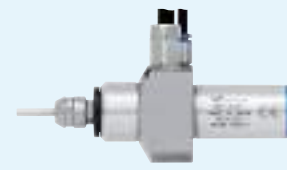
## Straight type motor spindle



Spindle Guide



BM-319F



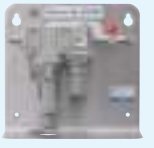
BM-320F



EMCD-BM3



iSpeed3 CONTROLLER



AL-C1204

iSpeed3 SERIES

Shown In Actual Size

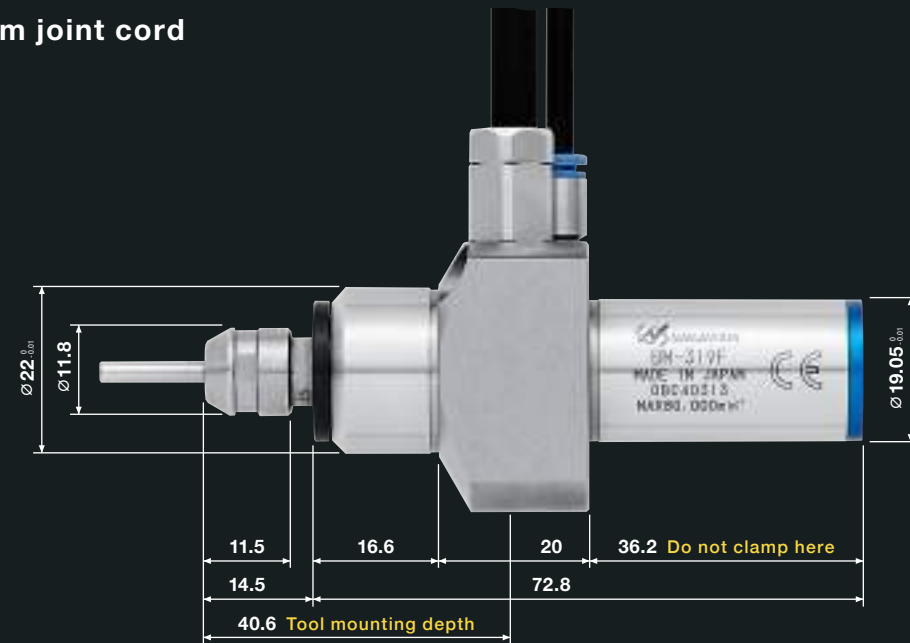
# Flange type motor spindle

## BM-319F

With 50cm joint cord

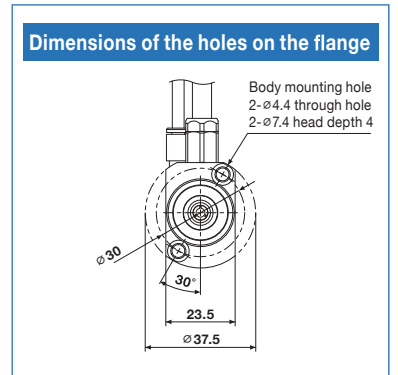
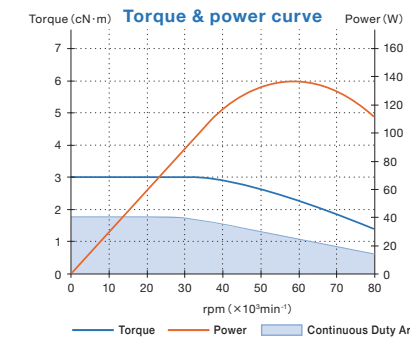
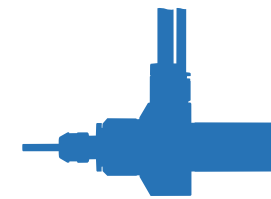


O.D.  $\phi$ 19.05mm



## BM-319F

Code No. **7813** Model **BM-319F**



O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 19.05mm	80,000min <sup>-1</sup>	140w	Within1 $\mu$ m	260g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each / Bolt : 2pcs. (M4×L25)			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

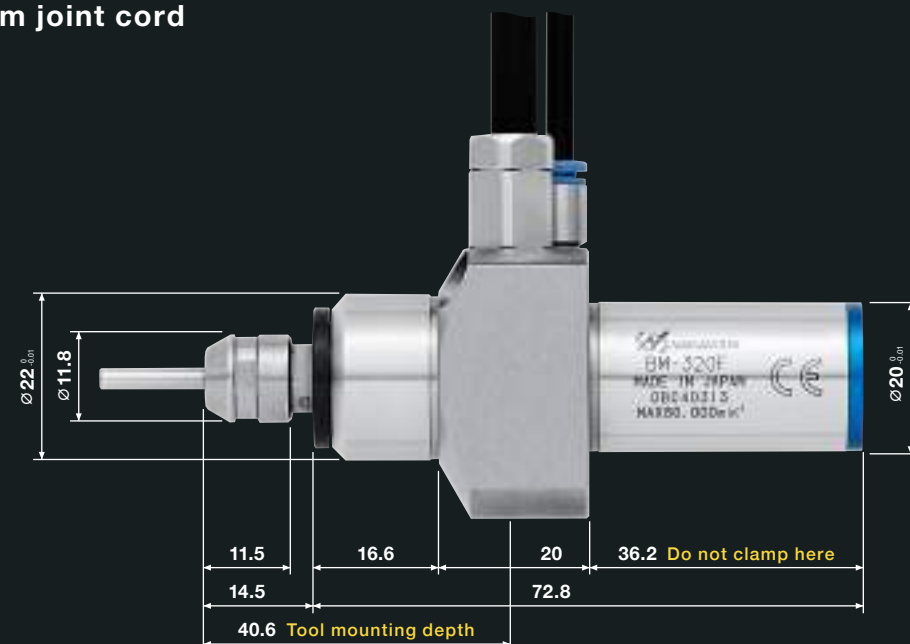
※ Cord length L=0.5m  
※ Collet is sold separately.

## BM-320F

With 50cm joint cord

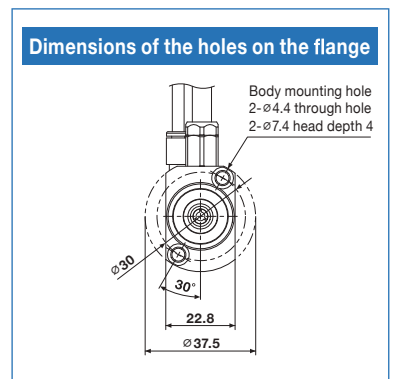
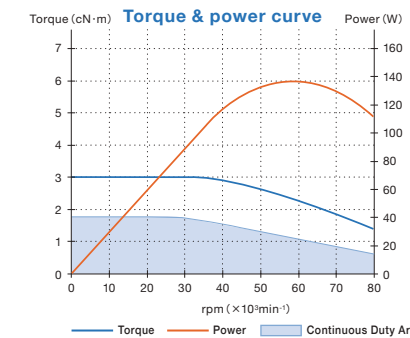
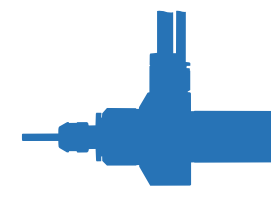


O.D.  $\phi$ 20mm



## BM-320F

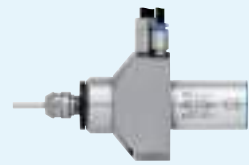
Code No. **7816** Model **BM-320F**



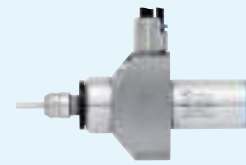
O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 20mm	80,000min <sup>-1</sup>	140w	Within1 $\mu$ m	270g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each / Bolt : 2pcs. (M4×L25)			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

※ Cord length L=0.5m  
※ Collet is sold separately.

Spindle Guide



BM-322FL



BM-322FR



EMCD-BM3



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AL-C1204

iSpeed3 SERIES

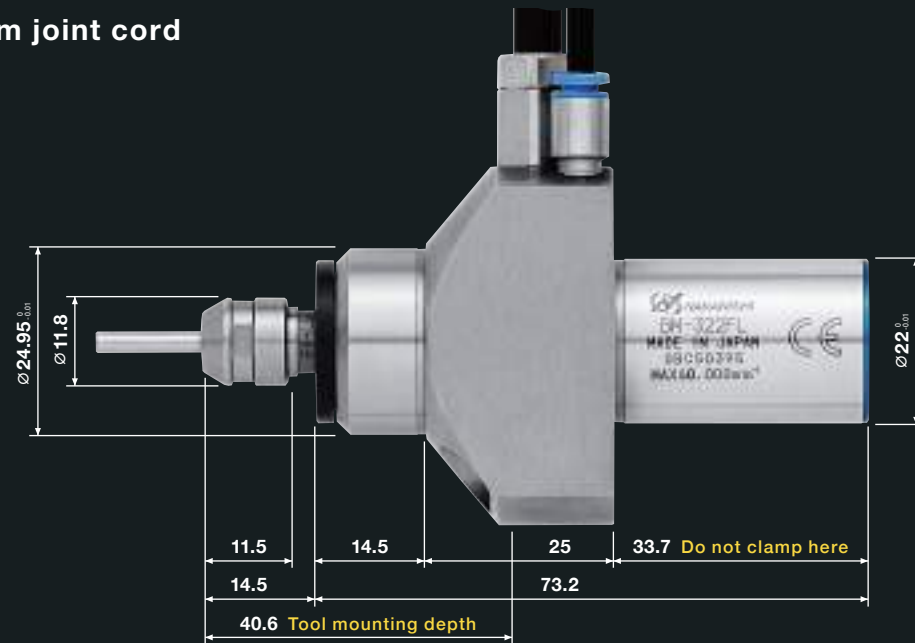
Shown In Actual Size

# Flange type motor spindle

**BM-322FL**  
With 50cm joint cord



O.D.  $\phi$ 22mm



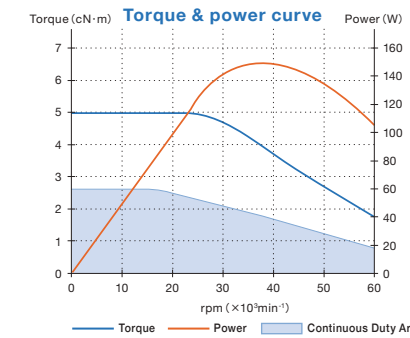
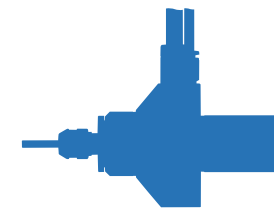
# Specifications

**DXF data** DXF files are available on our website

Order by Code No.

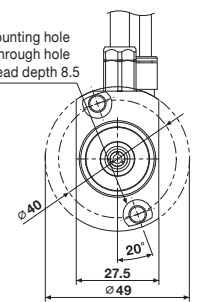
**BM-322FL**

Code No. **7815** Model **BM-322FL**



### Dimensions of the holes on the flange

Body mounting hole  
2- $\phi$ 5.2 through hole  
2- $\phi$ 10 head depth 8.5



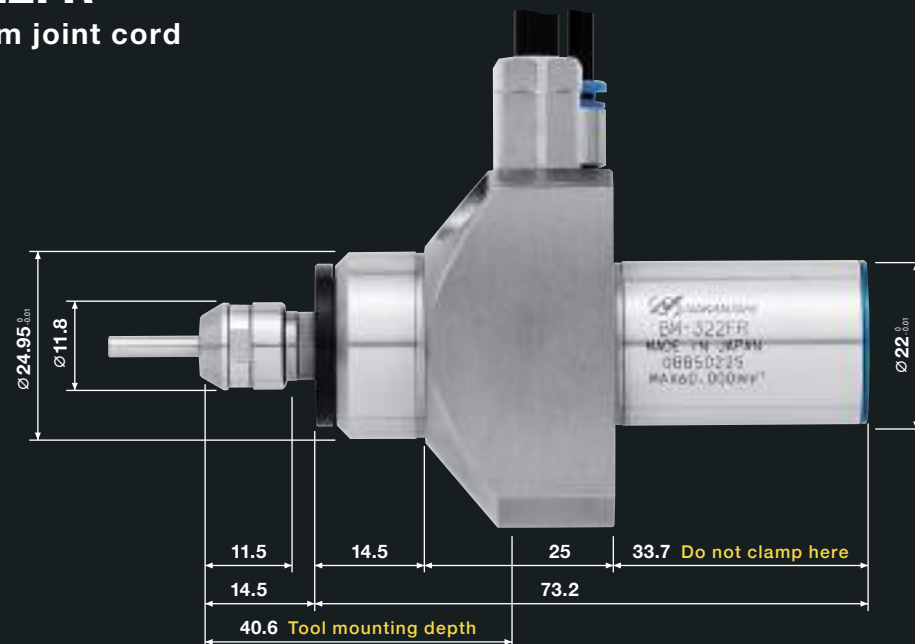
O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 22mm	60,000min <sup>-1</sup>	150w	Within1 $\mu$ m	360g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each / Bolt : 2pcs. (M5×L25)			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

※ Cord length L=0.5m  
※ Collet is sold separately.

**BM-322FR**  
With 50cm joint cord

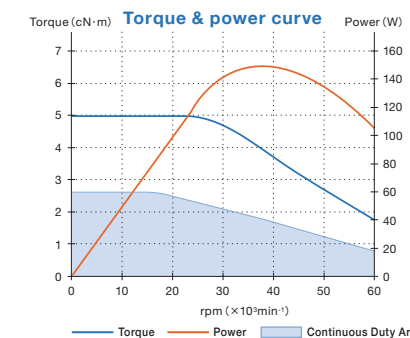
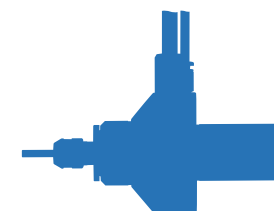


O.D.  $\phi$ 22mm



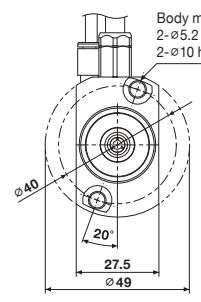
**BM-322FR**

Code No. **7817** Model **BM-322FR**



### Dimensions of the holes on the flange

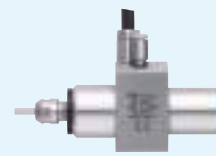
Body mounting hole  
2- $\phi$ 5.2 through hole  
2- $\phi$ 10 head depth 8.5



O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 22mm	60,000min <sup>-1</sup>	150w	Within1 $\mu$ m	360g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each / Bolt : 2pcs. (M5×L25)			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

※ Cord length L=0.5m  
※ Collet is sold separately.

Spindle Guide



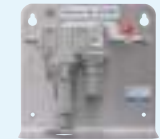
BM-322FS



EMCD-BM3



iSpeed3 CONTROLLER



AL-C1204

iSpeed3 SERIES

Shown In Actual Size

# Flange type motor spindle

**BM-322FS**  
With 50cm joint cord



O.D.  $\phi 22\text{mm}$



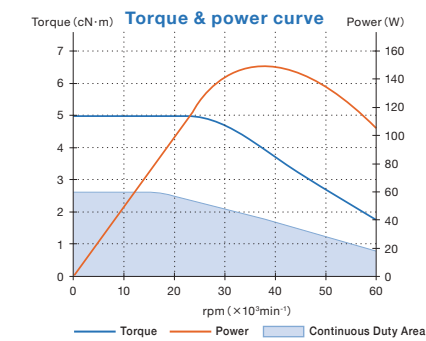
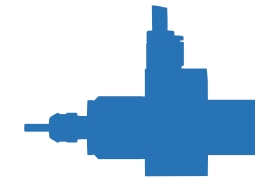
## Specifications

**DXF data** DXF files are available on our website

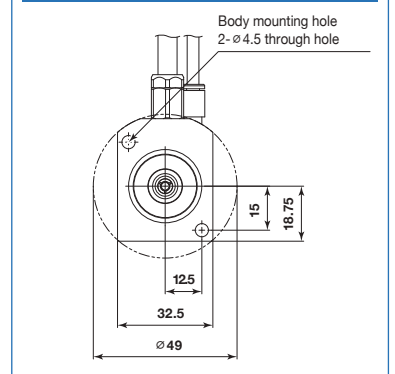
Order by Code No.

BM-322FS

Code No. **7823** Model **BM-322FS**



Dimensions of the holes on the flange



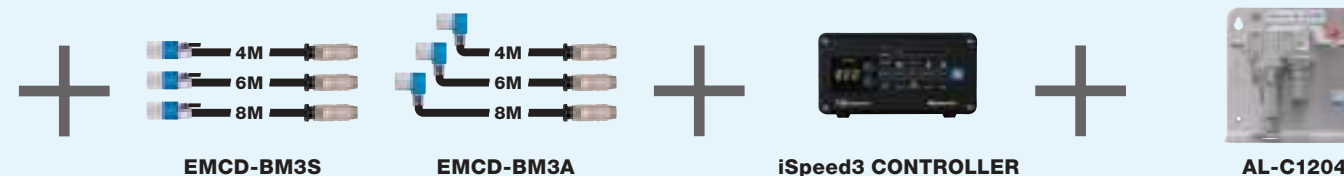
O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi 22\text{mm}$	<b>60,000</b> $\text{min}^{-1}$	<b>150w</b>	Within <b>1</b> $\mu\text{m}$	<b>430g</b>
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each / Bolt : 2pcs. (M4×L35)			
<b>Options</b>	Collet (CHA Group) : $\phi 0.5\sim\phi 4.0\text{mm}$ <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

※ Cord length L=0.5m  
※ Collet is sold separately.

Spindle Guide



BMF-319



iSpeed3 SERIES

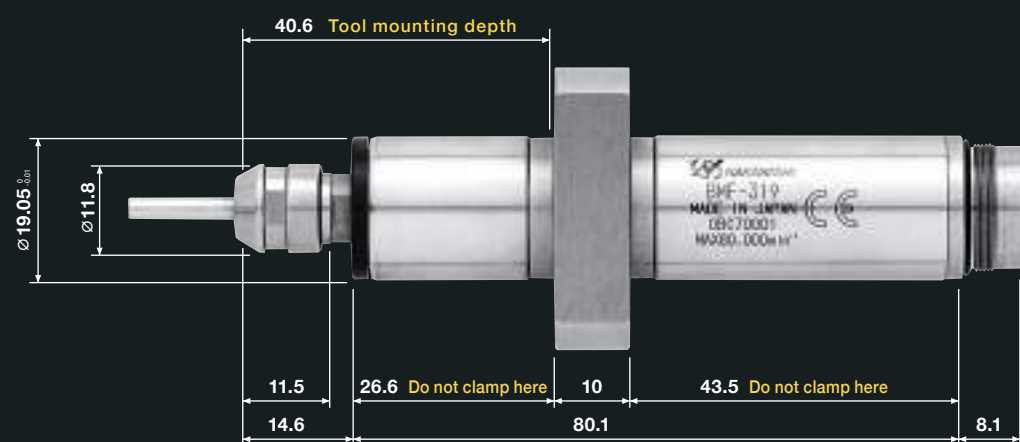
Shown In Actual Size

# Flange type motor spindle

## BMF-319



O.D.  $\phi$ 19.05mm



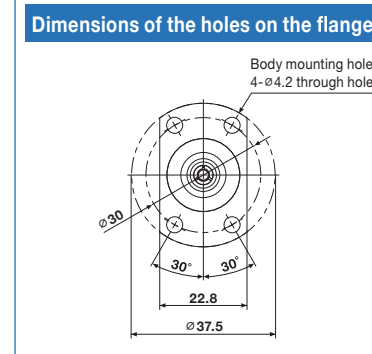
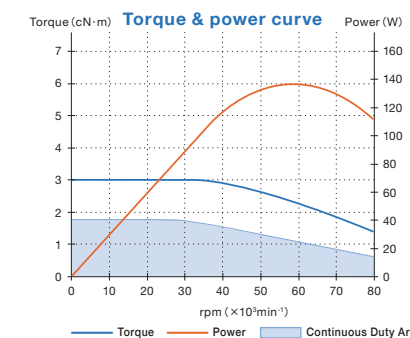
## Specifications

**DXF data** DXF files are available on our website

Order by Code No.

### BMF-319

Code No. **7822** Model **BMF-319**



O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 19.05mm	80,000min <sup>-1</sup>	140w	Within1 $\mu$ m	180g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each / Bolt : 2pcs. (M4×L16)			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <a href="#">p.23</a>			
	Motor cord (Straight) : Length 4m (9264), 6m (9265), 8m (9266)			
	Motor cord (Angle) : Length 4m (9267), 6m (9268), 8m (9269)			

※ Collet is sold separately.



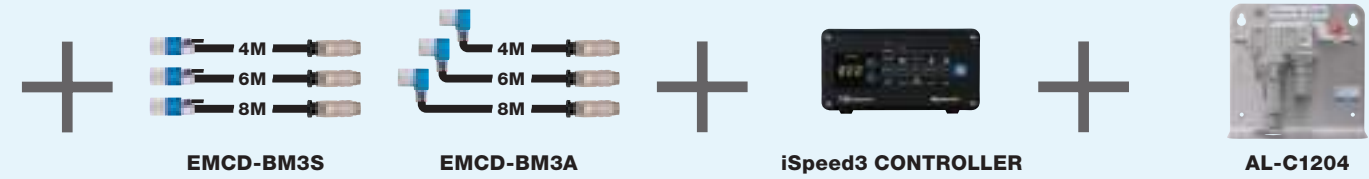
Spindle Guide



BMJ-319



BMJ-320



iSpeed3 SERIES

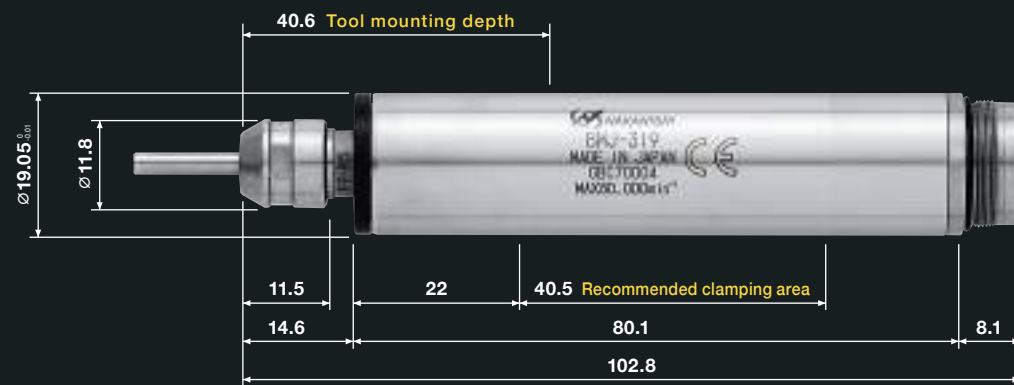
Shown In Actual Size

# Straight type motor spindle

## BMJ-319



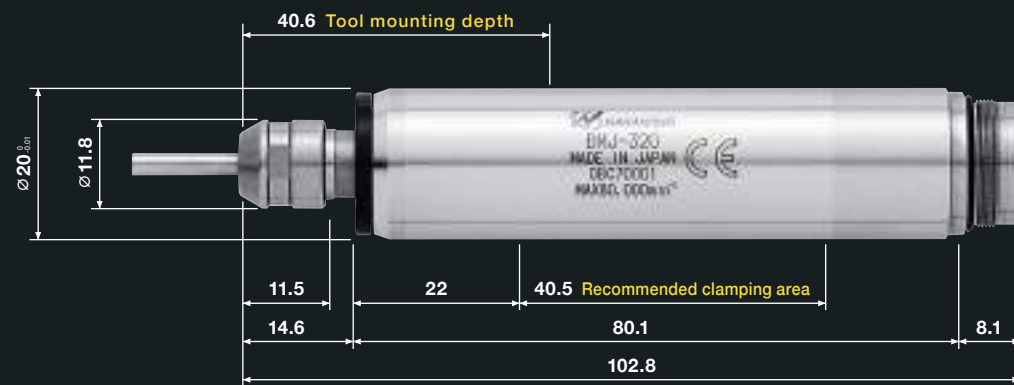
O.D.  $\phi$ 19.05mm



## BMJ-320



O.D.  $\phi$ 20mm



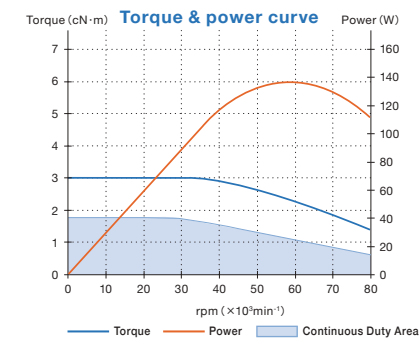
# Specifications

**DXF data** DXF files are available on our website

Order by Code No.

## BMJ-319

Code No. **7819** Model **BMJ-319**

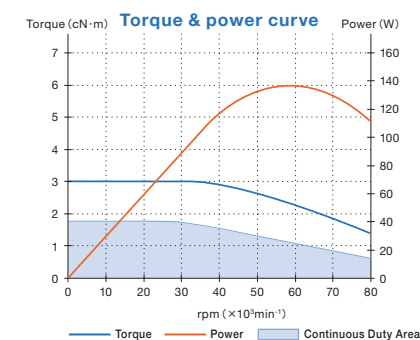


O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 19.05mm	80,000min <sup>-1</sup>	140w	Within1 $\mu$ m	145g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <a href="#">p.23</a> Motor cord (Straight) : Length 4m (9264), 6m (9265), 8m (9266) Motor cord (Angle) : Length 4m (9267), 6m (9268), 8m (9269)			

※ Collet is sold separately.

## BMJ-320

Code No. **7820** Model **BMJ-320**



O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 20mm	80,000min <sup>-1</sup>	140w	Within1 $\mu$ m	160g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <a href="#">p.23</a> Motor cord (Straight) : Length 4m (9264), 6m (9265), 8m (9266) Motor cord (Angle) : Length 4m (9267), 6m (9268), 8m (9269)			

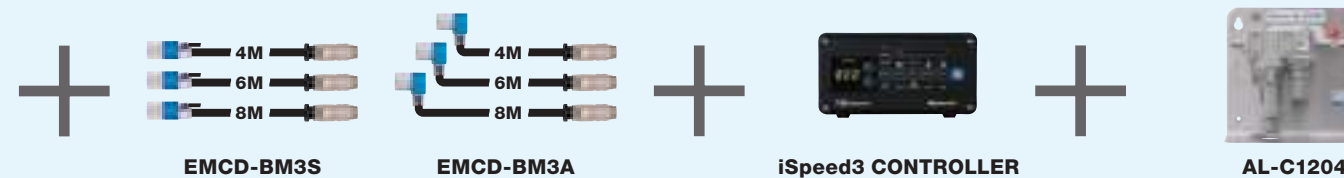
※ Collet is sold separately.



Spindle Guide



BMJ-322



iSpeed3 SERIES

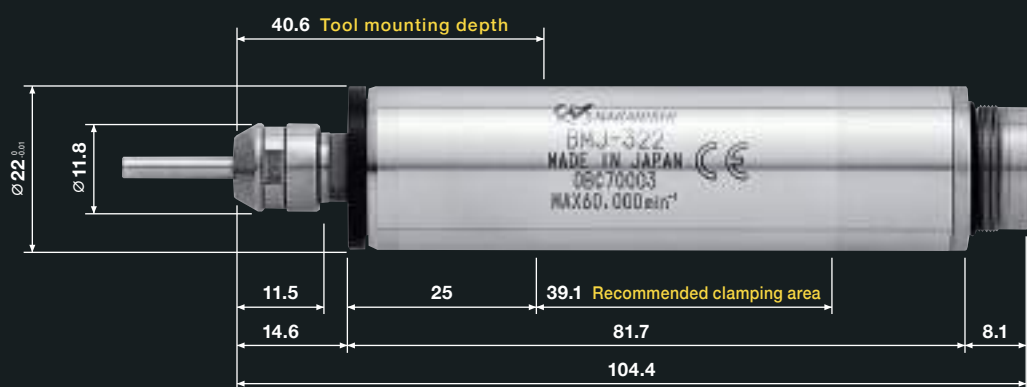
Shown In Actual Size

# Straight type motor spindle

## BMJ-322



O.D.  $\phi$ 22mm



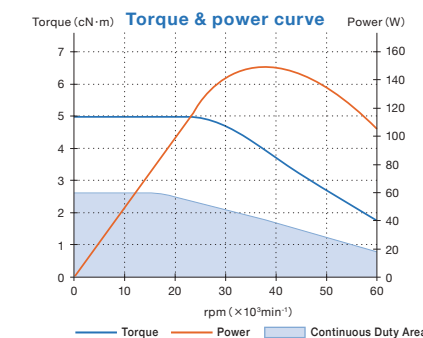
# Specifications

**DXF data** DXF files are available on our website

Order by Code No.

## BMJ-322

Code No. **7821** Model **BMJ-322**

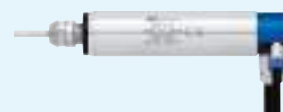


O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 22mm	60,000 $\text{min}^{-1}$	150w	Within1 $\mu\text{m}$	190g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <a href="#">p.23</a>			
	Motor cord (Straight) : Length 4m (9264), 6m (9265), 8m (9266)			
	Motor cord (Angle) : Length 4m (9267), 6m (9268), 8m (9269)			

\* Collet is sold separately.

Spindle  
Guide

BM-319



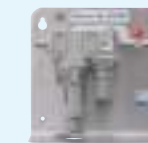
BM-320



EMCD-BM3



iSpeed3 CONTROLLER



AL-C1204

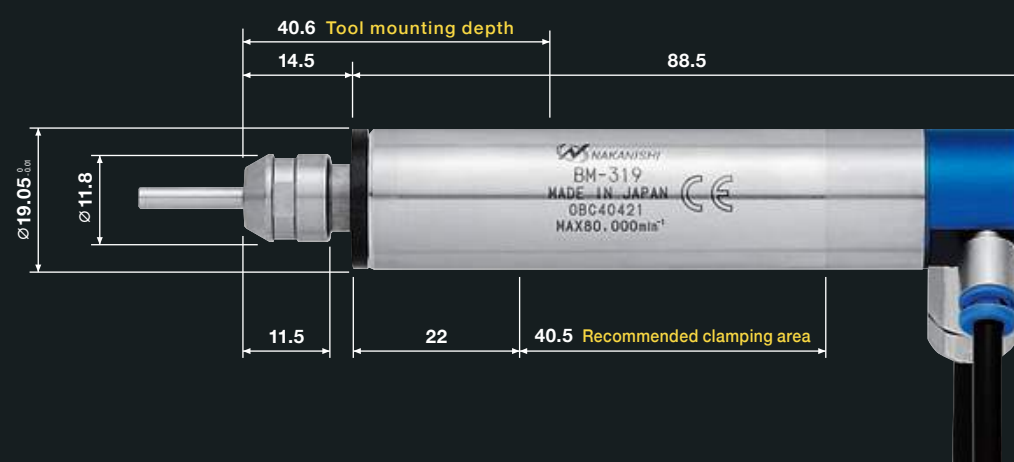
iSpeed3 SERIES

Shown In Actual Size

# Straight type motor spindle

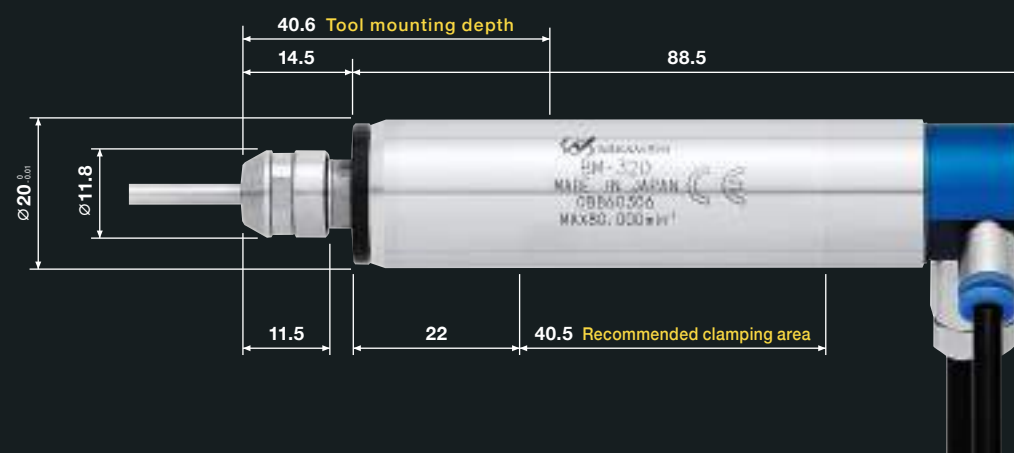
## BM-319

With 50cm joint cord

O.D.  $\phi$ 19.05mm

## BM-320

With 50cm joint cord

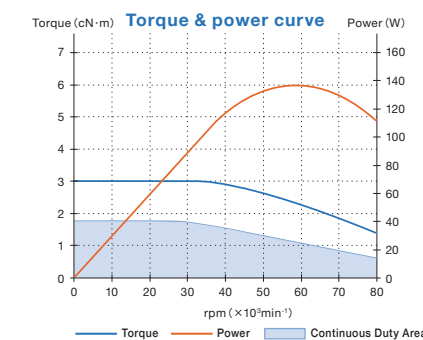
O.D.  $\phi$ 20mm

# Specifications

DXF data DXF files are available on our website

Order by Code No.

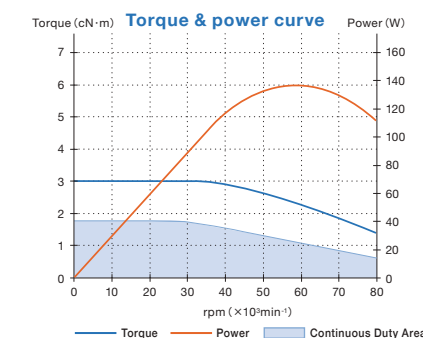
## BM-319

Code No. **7810** Model **BM-319**

O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 19.05mm	80,000min $^{-1}$	140w	Within1 $\mu$ m	210g
Standard Accessories	Collet nut (CHN-A) / Wrench (8 $\times$ 5) · (9 $\times$ 11) : 1pc. each			
Options	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

※ Cord length L=0.5m  
 ※ Collet is sold separately.

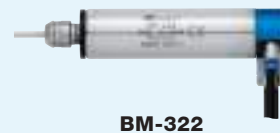
## BM-320

Code No. **7811** Model **BM-320**

O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 20mm	80,000min $^{-1}$	140w	Within1 $\mu$ m	230g
Standard Accessories	Collet nut (CHN-A) / Wrench (8 $\times$ 5) · (9 $\times$ 11) : 1pc. each			
Options	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

※ Cord length L=0.5m  
 ※ Collet is sold separately.

Spindle Guide



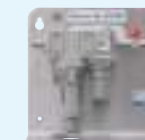
BM-322



EMCD-BM3



iSpeed3 CONTROLLER



AL-C1204

iSpeed3 SERIES

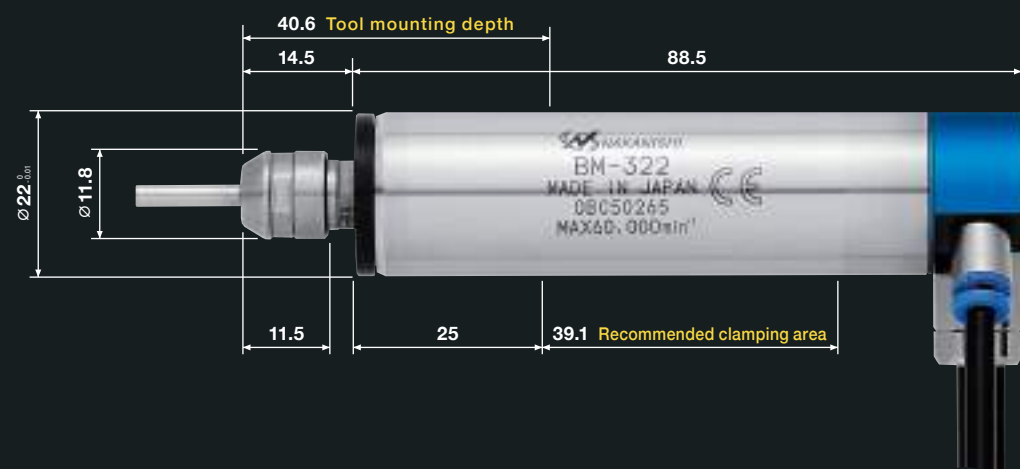
Shown In Actual Size

# Straight type motor spindle

**BM-322**  
With 50cm joint cord



O.D.  $\phi$ 22mm



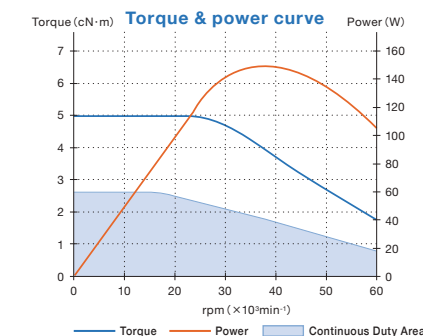
## Specifications

**DXF data** DXF files are available on our website

Order by Code No.

BM-322

Code No. **7814** Model **BM-322**



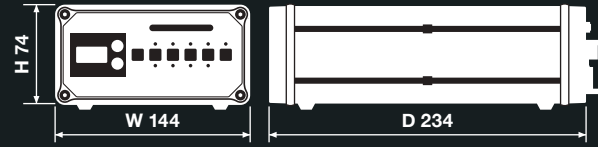
O.D.	Max. rpm	Max. power	Spindle Accuracy	Weight
$\phi$ 22mm	60,000 $\text{min}^{-1}$	150w	Within 1 $\mu\text{m}$	250g
<b>Standard Accessories</b>	Collet nut (CHN-A) / Wrench (8×5) · (9×11) : 1pc. each			
<b>Options</b>	Collet (CHA Group) : $\phi$ 0.5~ $\phi$ 4.0mm <b>p.23</b> Motor cord : Length 3m (9261), 5m (9262), 7m (9263)			

※ Cord length L=0.5m  
※ Collet is sold separately.



# iSpeed3 Controller

## iSpeed3 CONTROLLER Controller



### External Input / Output Control Signal Operation

●External Input  
Motor Rotating / Stopped, Error Released, Rotating Direction, Motor Speed Setting and etc.

●External Monitor  
Motor Current, Error, Warning, Rotating pulse and etc.

●Parameter Setting  
Maximum motor speed setting, Fix the motor speed  
※For more information, please refer to the operation manual on our website.

Plug type	Code No.
200V (C Type)	8479

※ 8477 (100V), 8478 (120V), 8480 (230V) are available.

Plug type	Area	Product
100V (A Type)	Japan	
120V (B Type)	USA Canada	
200V (C Type)	Without plug	
230V (D Type)	Europe	

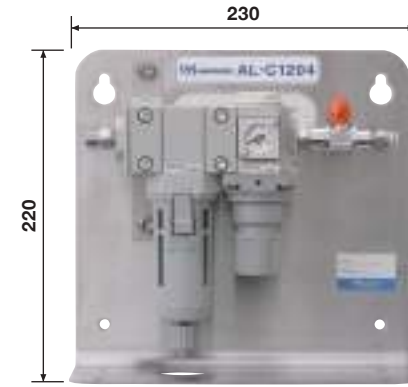
※ Please select Voltage for purchasing.



Motor output	Speed Range	Max. power	Power consumption	Air consumption	Weight
2 Motor spindles (Can't be operated simultaneously.)	1,000~80,000min <sup>-1</sup>	150w	0.65A (200V)	1 spindle : 30Nℓ/min (0.25MPa) 2 spindles : 60Nℓ/min (0.25MPa)	3.5kg
Standard Accessories	Power cord : 2m / Air hose with filter (K-251 : 2058) : 2m / Motor connector cap : 2pcs. Bracket : 2pcs. / Plate nut : 4pcs. / M3 bolt : 4pcs. / Fuse : 2pcs.				

# Accessories (Air line kit, Motor cord)

## AL-C1204 Air line kit



1.9kg

※Recommendation of nominal filtration rating: 0.3μm, Pressure range: 0.1-1.0MPa  
Recommendation of air filter: M2000-WS (CKD)

Code No.	4504	Model	AL-C1204
Standard Accessories	Hose pipe (K-260) : 2m		

## Motor cord

Motor cord	Code No.	Model	Length	Standard Accessories	Compatible model
 Straight type 4M 6M 8M	9264	EMCD-BM3S-4M	4m	Air hose Connector cap (Included)	BMF-319 · BMF-320 BMF-322 · BMF-325 BMJ-319 · BMJ-320 BMJ-322 · BMJ-325
	9265	EMCD-BM3S-6M	6m		
	9266	EMCD-BM3S-8M	8m		
 Angle type 4M 6M 8M	9267	EMCD-BM3A-4M	4m	Air hose Connector cap (Included)	BMF-319 · BMF-320 BMF-322 · BMF-325 BMJ-319 · BMJ-320 BMJ-322 · BMJ-325
	9268	EMCD-BM3A-6M	6m		
	9269	EMCD-BM3A-8M	8m		
 Joint type 3M 5M 7M	9261	EMCD-BM3-3M	3m	Air hose Connector cap (Included)	BM-319F · BM-320F BM-322FL · BM-322FR BM-322FS BM-319 · BM-320 BM-322 · BM-325
	9262	EMCD-BM3-5M	5m		
	9263	EMCD-BM3-7M	7m		

# Accessories (Collet, etc.)

Collet	Code No.	Model	I.D.	Compatible model
<p>Collet CHA Group</p>	<b>91494</b>	CHA-3.0AA	ø3.0AA*	BMF-319 · BMF-320 BMF-322 · BMF-325 BMJ-319 · BMJ-320 BMJ-322 · BMJ-325 BM-319F · BM-320F BM-322FL · BM-322FR BM-322FS BM-319 · BM-320 BM-322 · BM-325  *High precision type AA (Run-out Accuracy within 2 μm)
	<b>91496</b>	CHA-3.175AA	ø3.175AA*	
	<b>91495</b>	CHA-4.0AA	ø4.0AA*	
	<b>91492</b>	CHA-2.35	ø2.35	
	<b>91430</b>	CHA-3.0	ø3.0	
	<b>91493</b>	CHA-3.175	ø3.175	
	<b>91440</b>	CHA-4.0	ø4.0	
	—	CHA-□□	ø0.5, ø0.6, ø0.7, ø0.8, ø0.9	
	—	CHA-□□	ø1.1, ø1.2, ø1.3, ø1.4, ø1.7, ø1.8, ø1.9 ø2.1, ø2.2, ø2.3, ø2.4, ø2.6, ø2.7, ø2.8, ø2.9 ø3.1, ø3.2, ø3.3, ø3.4, ø3.6, ø3.7, ø3.8, ø3.9	
	—	CHA-□□	ø1.0, ø1.5, ø2.0, ø2.5, ø3.5	
—	CHA-□□	ø1.6		

Collet nut	Code No.	Model	Description	Compatible model
	<b>2102</b>	CHN-A	Collet nut for CHA collet	BMF-319 · BMF-320 · BMF-322 BMF-325 · BMJ-319 · BMJ-320 BMJ-322 · BMJ-325 · BM-319F BM-320F · BM-322FL BM-322FR · BM-322FS BM-319 · BM-320 BM-322 · BM-325

Spacer · Bush	Code No.	Model	Description	Compatible model
	<b>1882</b>	SP-22×10L	Spacer (for BM-322FL / BM-322FR) Dimensions : ø22 (I.D.) × 10mm	BM-322FL · BM-322FR
	<b>1875</b>	RB-20×23	ø23 Bush Dimensions : ø20 (I.D.) × ø23 (O.D.) × 40mm	BMJ-320 · BM-320 BMF-320
	<b>1876</b>	RB-20×22.8	ø22.8 Bush Dimensions : ø20 (I.D.) × ø22.8 (O.D.) × 40mm	BMJ-320 · BM-320 BMF-320
	<b>1877</b>	RB-20×22	ø22 Bush Dimensions : ø20 (I.D.) × ø22 (O.D.) × 40mm	BMJ-320 · BM-320 BMF-320
	<b>1878</b>	RB-20×25	ø25 Bush Dimensions : ø20 (I.D.) × ø25 (O.D.) × 40mm	BMJ-320 · BM-320 BMF-320
	<b>1879</b>	RB-20×25.4	ø25.4 Bush Dimensions : ø20 (I.D.) × ø25.4 (O.D.) × 40mm	BMJ-320 · BM-320 BMF-320
	<b>1883</b>	RB-22×25×34L	ø25 Bush Dimensions : ø22 (I.D.) × ø25 (O.D.) × 33.5mm	BM-322FL · BM-322FR BM-322FS · BMF-322 BMJ-322 · BM-322
	<b>1884</b>	RB-22×25.4×34L	ø25.4 Bush Dimensions : ø22 (I.D.) × ø25.4 (O.D.) × 33.5mm	BM-322FL · BM-322FR BM-322FS · BMF-322 BMJ-322 · BM-322
<b>1887</b>	RB-19.05×25.4×36L	ø25.4 Bush Dimensions : ø19.05 (I.D.) × ø25.4 (O.D.) × 36mm	BM-319F · BMJ-319 BM-319 · BMF-319	

# NAKANISHI Solutions LINE UP

## Electric Motors & Spindles

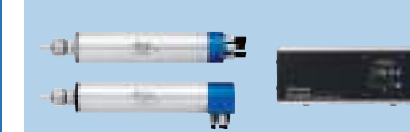


Application for CNC lathes / Special purpose machines

Application for machining centers and milling machines

### E4000 SERIES

1,000~40,000min<sup>-1</sup> Max.1,200W  
[ ø40mm ]



- World's highest power in this class
- Max. power: 1,200W, Max. torque: 1.0N·m

### E3000 SERIES

1,000~80,000min<sup>-1</sup> Max.350W  
[ ø30/25/20mm ]



- The largest product lines for various processing
- Space-saving solution for small CNC lathe

### HES SERIES

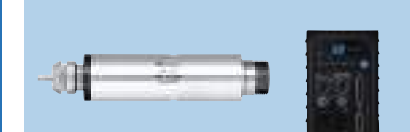
Max.80,000min<sup>-1</sup>  
[ For small diameter endmills and drills only ]



- The most cost effective solution to add high-speed machining capability
- 80,000min<sup>-1</sup>, 6.0cN·m
- BT, HSK A63, ST shanks are available
- Driven by E3000 Controller

### E2000 SERIES

1,000~50,000min<sup>-1</sup> Max.200W  
[ ø22.8/25mm ]



- Small size spindle allows multi-axis installation in limited space

### iSpeed3 SERIES

1,000~80,000min<sup>-1</sup> Max.150W  
[ ø19.05/20/22mm ]



- Super short motor spindle
- High efficiency brushless motor



- 50,000min<sup>-1</sup>, 8.75cN·m
- BT, NT, CAT, IT, HSK A, ST shanks are available
- Driven by E3000 Controller

## Air Motors & Spindles



Application for CNC lathes / Special purpose machines

### Air-Speed SERIES One-piece type

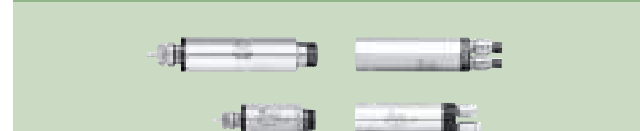
Max.30,000min<sup>-1</sup> Max.130W  
[ ø25/23/20/19.05mm ]



- Short body enables the spindle to mount in a limited space on a small NC/CNC lathe or on a special purpose machine

### Air-Speed SERIES Modular type

Max.30,000min<sup>-1</sup> Max.130W  
[ ø30/25/22.8mm ]



- Separate motor and spindle for flexible application changes
- Adjustable to various application through changing spindles

## Air Turbine Spindles

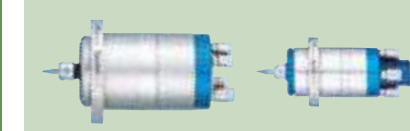


Application for CNC lathes / Special purpose machines

Application for machining centers and milling machines

### Xpeed SERIES

Max.160,000min<sup>-1</sup>  
[ ø65/40mm ]



- Extreme accuracy-Runout 1μm
- For high precision small diameter drilling, internal grinding of ceramics
- Long life of spindle thanks to contactless rotation mechanism

### PLANET SERIES

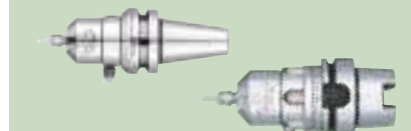
Max.65,000min<sup>-1</sup>



- A milling machine turns into a jig grinder
- For high precision internal grinding

### HTS SERIES

150,000min<sup>-1</sup>  
[ For small diameter endmills and drills only ]



- No thermal expansion on Z axis thanks to air turbine generating little heat
- Ultra high speed 150,000min<sup>-1</sup> with higher rigidity thanks to ceramic bearings
- BT, HSK E and straight (M2040) shanks are available