FANUC BUILT-IN SPINDLE MOTOR

Bi I series

DESCRIPTIONS

B-65292EN/04

NOTE TO USERS

Before getting started

- Before using a built-in motor made by FANUC, you should first thoroughly read this manual. This manual includes many important things to do or not to do.
- The products in this manual are controlled based on Japan's "Foreign Exchange and Foreign Trade Law". The export from Japan may be subject to an export license by the government of Japan.
  Further, re-export to another country may be subject to the license of the government of the country from where the product is re-exported. Furthermore, the product may also be controlled by re-export regulations of the United States government.
  Should you wish to export or re-export these products, please contact FANUC for advice.
- If a procedure is not described, it should not be attempted. If you want to do that, please get a permission form FANUC beforehand. We cannot compensate for the trouble which occurs without our permission.
- We recommend to keep a spare built-in motor for maintenance.
- Consider the spindle structure for easy maintenance.
- No part of this manual may be reproduced in any form.
- All specifications and designs are subject to change without notice.

SAFETY PRECAUTIONS

This "Safety Precautions" section describes the precautions which must be observed to ensure safety when using FANUC BUILT-IN SPINDLE MOTOR B*i*I series.
Users of any spindle motor model are requested to read this manual carefully before using the spindle motor.
The users are also requested to read this manual carefully and understand each function of the motor for correct use.
The users are basically forbidden to do any behavior or action not mentioned in this manual. They are invited to ask FANUC previously about what behavior or action is prohibited.

Contents

DEFINITION OF WARNING, CAUTION, AND NOTE

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warning and Caution according to their bearing on safety. Also, supplementary information is described as a Note. Read the Warning, Caution, and Note thoroughly before attempting to use the machine.

> ⚠ **WARNING**
> Applied when there is a danger of the user being injured or when there is a damage of both the user being injured and the equipment being damaged if the approved procedure is not observed.

> ⚠ **CAUTION**
> Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

> **NOTE**
> The Note is used to indicate supplementary information other than Warning and Caution.

- Read this manual carefully, and store it in a safe place.

WARNING

⚠ WARNING

- Be safely dressed when handling a motor.

Wear safety shoes or gloves when handling a motor as you may get hurt on any edge or protrusion on it or electric shocks.

- Use a crane or lift to move a motor from one place to another.

Motors are heavy. When moving them, use a crane or lift as required. (The weights of the motors are indicated in this manual.)
When moving a motor using a crane or lift, use a hanging bolt if the motor has a corresponding tapped hole, or textile rope if it has no tapped hole. If a motor is attached with a machine or any other heavy stuff, do not use a hanging bolt to move the motor as the hanging bolt and/or motor may get broken.
When moving a motor, be careful not to apply excessive force to its windings as the windings may break and/or their insulation may deteriorate.

- Do not touch a motor with a wet hand.

A failure to observe this caution is vary dangerous because you may get electric shocks.

- Before starting to connect a motor to electric wires, make sure they are isolated from an electric power source.

A failure to observe this caution is vary dangerous because you may get electric shocks.

- Do not bring any dangerous stuff near a motor.

Motors are connected to a power line, and may get hot. If a flammable is placed near a motor, it may be ignited, catch fire, or explode.

- Be sure to ground a motor frame.

To avoid electric shocks, be sure to connect the grounding terminal in the terminal box to the grounding terminal of the machine.

- Do not ground a motor power wire terminal or short-circuit it to another power wire terminal.

A failure to observe this caution may cause electric shocks or a burned wiring.

* Some motors require a special connection such as a winding changeover. Refer to their respective motor specification manuals for details.

- Connect power wires securely so that they will not get loose.

A failure to observe this caution may cause a wire to be disconnected, resulting in a ground fault, short circuit, or electric shock.

⚠ WARNING

- Do not supply the power to the motor while any terminal is exposed.

A failure to observe this caution is very dangerous because you may get electric shocks if your body or any conductive stuff touches an exposed terminal.

- Do not get close to a rotary section of a motor when it is rotating.

A rotating part may catch your cloths or fingers. Before starting a motor, ensure that there is no stuff that can fly away (such as a key) on the motor.

- Before touching a motor, shut off the power to it.

Even if a motor is not rotating, there may be a voltage across the terminals of the motor.
Especially before touching a power supply connection, take sufficient precautions.
Otherwise you may get electric shocks.

- Do not touch any terminal of a motor for a while (at least 5 minutes) after the power to the motor is shut off.

High voltage remains across power line terminals of a motor for a while after the power to the motor is shut off. So, do not touch any terminal or connect it to any other equipment. Otherwise, you may get electric shocks or the motor and/or equipment may get damaged.

- To drive a motor, use a specified amplifier and parameters.

An incorrect combination of a motor, amplifier, and parameters may cause the motor to behave unexpectedly. This is dangerous, and the motor may get damaged.

- Do not touch a motor when it is running or immediately after it stops.

A motor may get hot when it is running. Do not touch the motor before it gets cool enough. Otherwise, you may get burned.

- Ensure that motors and related components are mounted securely.

If a motor or its component slips out of place or comes off when the motor is running, it is very dangerous.

- When designing and assembling a machine tool, make it compliant with EN60204-1.

To ensure the safety of the machine tool and satisfy European standards, when designing and assembling a machine tool, make it compliant with EN60204-1. For details of the standards, refer to the standards.

CAUTION

⚠ CAUTION

- FANUC motors are designed for use with machines. Do not use them for any other purpose.

If a FANUC motor is used for an unintended purpose, it may cause an unexpected symptom or trouble. If you want to use a motor for an unintended purpose, previously consult with FANUC.

- Ensure that a base or frame on which a motor is mounted is strong enough.

Motors are heavy. If a base or frame on which a motor is mounted is not strong enough, it is impossible to achieve the required precision.

- Be sure to connect motor cables correctly.

An incorrect connection of a cable cause abnormal heat generation, equipment malfunction, or failure. Always use a cable with an appropriate current carrying capacity (or thickness). For how to connect cables to motors, refer to their respective specification manuals.

NOTE

NOTE

- Do not step or sit on a motor.

If you step or sit on a motor, it may get deformed or broken. Do not put a motor on another unless they are in packages.

- When storing a motor, put it in a dry (non-condensing) place at room temperature (0 to 40 °C).

If a motor is stored in a humid or hot place, its components may get damaged or deteriorated. In addition, keep a motor in such a position that its shaft is held horizontal and its terminal box is at the top.

- Do not remove a nameplate from a motor.

If a nameplate comes off, be careful not to lose it. If the nameplate is lost, the motor becomes unidentifiable, resulting in maintenance becoming impossible. For a nameplate for a built-in spindle motor, keep the nameplate with the spindle.

- Do not apply shocks to a motor or cause scratches to it.

If a motor is subjected to shocks or is scratched, its components may be adversely affected, resulting in normal operation being impaired. Be very careful when handling plastic portions, sensors, and windings, because they are very liable to break. Especially, avoid lifting a motor by pulling its plastic portion, winding, or power cable.

- Do not conduct dielectric strength or insulation test for a sensor.

Such a test can damage elements in the sensor.

- When testing the winding or insulation resistance of a motor, satisfy the conditions stipulated in IEC34.

Testing a motor under a condition severer than those specified in IEC34 may damage the motor.

- Do not disassemble a motor.

Disassembling a motor may cause a failure or trouble in it.
If disassembly is in need because of maintenance or repair, please contact a service representative of FANUC.

- Do not modify a motor.

Do not modify a motor unless directed by FANUC. Modifying a motor may cause a failure or trouble in it.

- Use a motor under an appropriate environmental condition.

Using a motor in an adverse environment may cause a failure or trouble in it. Refer to their respective specification manuals for details of the operating and environmental conditions for motors.

NOTE

- Do not apply a commercial power source voltage directly to a motor.

Applying a commercial power source voltage directly to a motor may result in its windings being burned. Be sure to use a specified amplifier for supplying voltage to the motor.

- For a motor with a terminal box, make a conduit hole for the terminal box in a specified position.

When making a conduit hole, be careful not to break or damage unspecified portions. Refer to an applicable specification manual.

- Before using a motor, measure its winding and insulation resistances, and make sure they are normal.

Especially for a motor that has been stored for a prolonged period of time, conduct these checks. A motor may deteriorate depending on the condition under which it is stored or the time during which it is stored. For the winding resistances of motors, refer to their respective specification manuals, or ask FANUC. For insulation resistances, see the following table.

- To use a motor as long as possible, perform periodic maintenance and inspection for it, and check its winding and insulation resistances.

Note that extremely severe inspections (such as dielectric strength tests) of a motor may damage its windings. For the winding resistances of motors, refer to their respective specification manuals, or ask FANUC. For insulation resistances, see the following table.

MOTOR INSULATION RESISTANCE MEASUREMENT

Measure an insulation resistance between each winding and motor frame using an insulation resistance meter (500 VDC). Judge the measurements according to the following table.

Insulation resistance	Judgment
100 MΩ or higher	Acceptable
10 to 100 MΩ	The winding has begun deteriorating. There is no problem with the performance at present. Be sure to perform periodic inspection.
1 to 10 MΩ	The winding has considerably deteriorated. Special care is in need. Be sure to perform periodic inspection.
Lower than 1 MΩ	Unacceptable. Replace the motor.

INTRODUCTION

This manual includes information of following models.

FANUC BUILT-IN SPINDLE MOTOR B*i*I series

- **Standard type**

Single winding	Double windings (Speed range switching control)
B*i*I 50S/30000	B*i*I 80S/20000
B*i*I 50M/25000	B*i*I 112SS/20000
B*i*I 50L/25000	B*i*I 112S/15000
B*i*I 80M/15000	B*i*I 112L/15000
B*i*I 80L/8000	B*i*I 112LL/15000
B*i*I 100S/12500	B*i*I 132M/14000
B*i*I 112M/15000	B*i*I 132L/14000
	B*i*I 160S/13000
	B*i*I 160M/13000
	B*i*I 160L/13000
	B*i*I 160LL/13000
	B*i*I 170S/6000
	B*i*I 170M/6000
	B*i*I 180M/6000
	B*i*I 180L/6000
	B*i*I 180LL/8000
	B*i*I 200S/6000
	B*i*I 200M/6000
	B*i*I 200L/6000
	B*i*I 250S/6000
	B*i*I 250M/3000

- **High-speed type**

Single winding	Double windings (Speed range switching control)
B*i*I 40S/70000	B*i*I 60S/50000
B*i*I 40M/70000	B*i*I 100S/20000
B*i*I 60SS/50000	B*i*I 100S/30000
B*i*I 80S/40000	B*i*I 100L/30000
	B*i*I 112S/20000
	B*i*I 112M/20000
	B*i*I 112L/20000
	B*i*I 112L/25000
	B*i*I 160M/20000
	B*i*I 160L/20000
	B*i*I 160LL/20000
	B*i*I 200S/10000

- **High-speed high-output type**

Single winding	Double windings (Speed range switching control)
B*i*I 80L/40000 TYPE M B*i*I 112L/30000 TYPE M B*i*I 160M/20000 TYPE M	

⚠ CAUTION
The motors cannot be driven normally if incorrect handling or assembling is applied. Read Part II, “STATOR AND ROTOR”, especially Chapter 2, “GENERAL”, before designing or assembling the spindle.

NOTE
1 The above models with some exceptions are certified by a certification organization (TÜV Rheinland).
2 Many drawings in this manual are drawn by Third Angle Projection Method.
3 Amplifier information is in the latest edition of Descriptions FANUC SERVO AMPLIFIER αi series (B-65282EN). Refer to the manual to get information about the amplifier.

CONSTRUCTION

This manual consists of following three parts.

I. SPECIFICATIONS

Output characteristics, dimensions, cooling conditions, and so on are shown here.

II. STATOR AND ROTOR

Installation instructions for the built-in motor are shown here. Refer to this part when you design or assemble a spindle.

II. SENSOR

Installation instructions for the sensor are shown here. Refer to this part when you design or assemble a spindle.

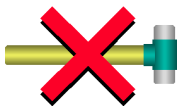
APPENDIX

Load meters, the formula for calculating the acceleration time, stepped sleeve reference diagrams, specification drawing numbers, parameters for individual models, information relating to contactors, sensor information, and so on are provided.

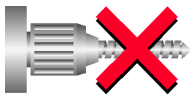
HANDLING OF BUILT-IN MOTOR

> ⚠ **CAUTION**
> You should read this clause before handling a built-in motor.
> If you handle the motor incorrectly, some trouble or accident will occur. Refer to Part II, “STATOR AND ROTOR”.
> The word “Motor” described here means stator, rotor, sensor and all parts of the motor.

- Avoid impact or excessive force. It will damage motor parts. Often it will not operate normally if motor parts are damaged.



- Do not machine on the parts without FANUC’s permission. Machine only on the parts designated by FANUC.

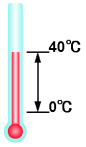


- Rotor may be deformed by incorrect method of machining. Refer to the Part II, “STATOR AND ROTOR” for correct instructions.

- Protect the motor from water, oil, solvent and other chemicals that may damage the motor insulation, and from conductive dust that may cause shorts in the motor.

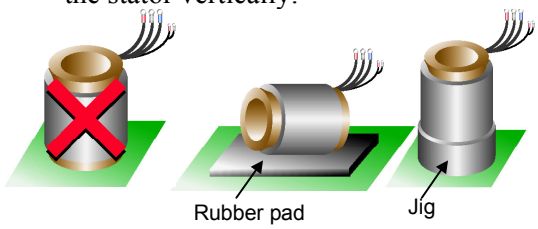
- Synthetic coolants and strong alkali coolants may adversely affect the motor to a remarkable extent. So, keep such coolants away from the motor.

- Do not heat or cool if it is unnecessary. Especially be careful to the heat shock.



- Some magnetic elements are used for a sensor and must be kept away from magnetic fields. A screw driver which had magnetic tip may damage the sensor.

- Place the stator sidewise as shown to store. Using a rubber pad is preferable. Use jigs to protect the windings if you want to store the stator vertically.



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APPENDIX

I. SPECIFICATIONS

CONSTRUCTION OF THIS PART

This part includes followings.

NOTE
Refer to Part II, “STATOR AND ROTOR” before installing a motor in a spindle. The part describes how to handle, assemble, and modify motors properly and contains information required to satisfy IEC and other standards.

1 SPECIFICATIONS

1.1 STANDARD TYPE

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC.
  (except for the B*i*I 80L/40000 TYPE M, B*i*I 112L/25000, B*i*I 112L/30000 TYPE M, B*i*I 160M/20000 TYPE M, B*i*I 160LL/20000, and B*i*I 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition.
  Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

Bi 50S/30000 1612-B170#0AB8	Bi 50M/25000 1613-B170#1AB2	Bi 50L/25000 1615-B120#ZAB8	Model name Type No.(A06B-) *5		Item
0.75 (7)	1.0 (6)	1.5 (12)	kW (A)	S1 continuous (Max. current)	*1 Rated output
1.1 10min. (9)	1.2 10min. (7)			S2 short time Rated minutes (Max. current)	
				S3 40% (Max. current)	
		3.7 (23)		S3 25% (Max. current)	
10000	8000	10000	min^{-1}	Base	*2 Rated speed
25000	20000	17000		Power constant	
25000	20000	25000		Maximum	
0.72	1.19	1.4	Nm	S1 continuous	Rated Max. torque
1.05	1.43	3.5		S2 or S3	
0.75	0.65	0.74	Power factor		
115-220	130-220	144-220	V_{AC}	Rated voltage of motor input *3	
Δ	Δ	Δ	Winding connection		
Connection A	Connection A	Connection B	Power leads connection *6		
4	4	4	Number of poles		
743	886	303	mΩ±5%	Resistance of winding *9	
F	F	F	Insulation class		
≤105	≤105	≤105	K	Temperature rise of winding	
3	3	3	mm	Required clearance	
130	130	140	±5°C	Overheating temperature setting	
IC9U7A7	IC9U7A7	IC9U7A7	IC code		
20	20	20	°C	Temperature	Coolant
≤2	≤2	≤4	K	Temperature	
≥6.0	≥12.0	≥12.0	Liter/min	Flowing rate	
1.87	1.87	1.87	J/g·K	Specific heat	
0.78	0.78	0.78	g/cm^3	Density	
≤2940	≤2940	≤2940	kPa	Pressure *10	
≥150	≥400	≥1200	W	Capacity of cooler *11	
T211	T201	T211	Sensor *4		
1.3	1.7	3	kg	Stator	Weight
0.18	0.3	0.6		Rotor	
0.00008	0.0001	0.0002	kgm^2	Rotor inertia	
1.3	1.4	4.4	kW	Allowable overload *7	
2.2	2.2	5.5	Spindle amplifier (αiSP-)		
-	-	-	AC reactor (A81L-0001-) *12		
0.75/1.45	1.0/1.7	1.5/4.6	kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item		Model name / Type No.(A06B-)	BiI 80S/20000 1621-B120#ZAB2 Low	BiI 80S/20000 1621-B120#ZAB2 High	BiI 80M/15000 1623-B170#ZAB1	BiI 80L/8000 1625-B170#ZAB1
*1 Rated output	S1 continuous (Max. current)	kW (A)	1.5 (10)	1.5 (13)	1.5 (11)	1.1 (20)
	S2 short time Rated minutes (Max. current)		2.2 5min. (16)		2.2 15min. (14)	3.7 30min. (28)
	S3 40% (Max. current)					
	S3 25% (Max. current)			3.7 (21)		
*2 Rated speed	Base	min^{-1}	4500	8000	3000	1500
	Power constant		10000	20000	12000	8000
	Maximum		15000	20000	15000	8000
Rated Max. torque	S1 continuous	Nm	3.2		4.8	7.0
	S2 or S3		7.0		7.0	24
Power factor			0.69		0.68	0.74
Rated voltage of motor input *3		V_{AC}	122-220		144-220	114-220
Winding connection			Y	Δ	Δ	Δ
Power leads connection *6			Connection E		Connection A	Connection A
Number of poles			4		4	4
Resistance of winding *9		$m\Omega \pm 5\%$	754	251	436	427
Insulation class			F		F	F
Temperature rise of winding		K	≤105		≤105	≤105
Required clearance		mm	3		3	3
Overheating temperature setting		$\pm 5°C$	130		130	130
IC code			IC9U7A7		IC9U7A7	IC9U7A7
Coolant	Temperature	°C	20	20	20	20
	Temperature	K	≤2	≤2	≤2	≤5
	Flowing rate	Liter/min	≥12.0		≥12.9	≥12.1
	Specific heat	J/g.K	1.87		1.87	1.87
	Density	g/cm^3	0.78		0.78	0.78
	Pressure *10	kPa	≤2940		≤2940	≤2940
Capacity of cooler *11		W	≥1000		≥1160	≥1160
Sensor *4			T201		T401	T401
Weight	Stator	kg	4		6	9
	Rotor		1.2		3	4
Rotor inertia		kgm^2	0.002		0.003	0.004
Allowable overload *7		kW	2.6	4.4	2.6	4.4
Spindle amplifier (αiSP)			5.5		2.2	5.5
AC reactor (A81L-0001-) *12			-		-	-
Date for choice of αiPS *8		kW	1.5/4.8		1.5/2.7	1.1/4.8

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

Bi 100S/12500 1641-B120#ZAB1	Bi 112SS/20000 1661-B120#ZAB2		Model name Type No.(A06B-) *5		Item
	Low	High			
2.2 (21)	2.2 (28)	2.2 (17)	kW (A)	S1 continuous (Max. current)	*1 Rated output
3.7 30min. (29)				S2 short time Rated minutes (Max. current)	
	5.5 (31)	5.5 (33)		S3 40% (Max. current)	
	5.5(S3 10%) (53)			S3 25% (Max. current)	
1500	1070	5000	min^{-1}	Base	*2 Rated speed
8000	5000	20000		Power constant	
12500	5000	20000		Maximum	
14	20		Nm	S1 continuous	Rated Max. torque
24	49			S2 or S3	
0.75	0.66		Power factor		
105-220	99-220		V_{AC}	Rated voltage of motor input *3	
Δ	Y	Δ	Winding connection		
Connection B	Connection E		Power leads connection *6		
4	4		Number of poles		
328	510	170	mΩ±5%	Resistance of winding *9	
F	F		Insulation class		
≤105	≤105		K	Temperature rise of winding	
3	3		mm	Required clearance	
140	140		±5°C	Overheating temperature setting	
IC9U7A7	IC9U7A7		IC code		
20	20	20	°C	Temperature	Coolant
≤3	≤4	≤4	K	Temperature	
≥12.0	≥13.0		Liter/min	Flowing rate	
1.87	1.87		J/g·K	Specific heat	
0.78	0.78		g/cm^3	Density	
≤2940	≤2940		kPa	Pressure *10	
≥1160	≥4900		W	Capacity of cooler *11	
T401	T201		Sensor *4		
11	7		kg	Stator	Weight
5	3			Rotor	
0.008	0.008		kgm^2	Rotor inertia	
4.4	6.6		kW	Allowable overload *7	
5.5	11		Spindle amplifier (αiSP)		
-	-		AC reactor (A81L-0001-) *12		
2.2/5.5	2.2/7.9		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
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*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item			Model name Type No.(A06B-)	Bi I 112S/15000 1671-B120#ZAB1		Bi I 112M/15000 1673-B120#ZAB1
				Low	High	
*1 Rated output	S1 continuous (Max. current)	kW (A)		5.5 (66)	5.5 (40)	5.5 (41)
	S2 short time Rated minutes (Max. current)				7.5 30min. (48)	7.5 30min. (50)
	S3 40% (Max. current)					
	S3 25% (Max. current)			7.5 (85)		
*2 Rated speed	Base	min^{-1}		1200	6000	1500
	Power constant			6000	15000	6000
	Maximum			6000	15000	15000
Rated Max. torque	S1 continuous	Nm		44		35
	S2 or S3			60		48
Power factor				0.63		0.77
Rated voltage of motor input *3		V_{AC}		79-220		138-220
Winding connection				Y	Δ	Δ
Power leads connection *6				Connection E		Connection B
Number of poles				4		4
Resistance of winding *9		$m\Omega \pm 5\%$		95	32	112
Insulation class				H		F
Temperature rise of winding		K		≤125		≤105
Required clearance		mm		3		3
Overheating temperature setting		$\pm 5°C$		155		140
IC code				IC9U7A7		IC9U7A7
Coolant	Temperature	°C		20	20	20
	Temperature	K		≤5	≤5	≤3
	Flowing rate	Liter/min		≥13.2		≥12.9
	Specific heat	J/g.K		1.87		1.87
	Density	g/cm^3		0.78		0.78
	Pressure *10	kPa		≤2940		≤2940
Capacity of cooler *11		W		≥5200		≥1160
Sensor *4				T401		T401
Weight	Stator	kg		10		25
	Rotor			5		8
Rotor inertia		kgm^2		0.012		0.018
Allowable overload *7		kW		9.0		9.0
Spindle amplifier (αiSP)				22		11
AC reactor (A81L-0001-) *12				-		-
Date for choice of αiPS *8		kW		5.5/9.9		5.5/12

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC.
  (except for the Bi I 80L/40000 TYPE M, Bi I 112L/25000, Bi I 112L/30000 TYPE M, Bi I 160M/20000 TYPE M, Bi I 160LL/20000, and Bi I 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition.
  Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

B*i*I 112L/15000 1675-B100#ZAB1		B*i*I 112LL/15000 1676-B100#ZAB1		Model name Type No.(A06B-) *5		
Low	High	Low	High			Item
15 (88)	18.5 (107)	15 (88)	18.5 (117)	kW (A)	S1 continuous (Max. current)	Rated output *1
18.5 15min. (105)	22 15min. (123)	18.5 15min. (107)	22 30min. (132)		S2 short time Rated minutes (Max. current)	
					S3 40% (Max. current)	
18.5 (139)		18.5 (137)			S3 25% (Max. current)	
1500	5000	1200	3500	min^{-1}	Base	Rated speed *2
3500	12500	2800	12000		Power constant	
3500	15000	4500	15000		Maximum	
95		119		Nm	S1 continuous	Rated Max. torque
167		204			S2 or S3	
0.74		0.73		Power factor		
133-220		148-220		V_{AC}	Rated voltage of motor input *3	
Y	Y	Y	Y	Winding connection		
Connection D		Connection D		Power leads connection *6		
4		4		Number of poles		
91	40	100	44	mΩ±5%	Resistance of winding *9	
H		H		Insulation class		
≤125		≤125		K	Temperature rise of winding	
3		3		mm	Required clearance	
180		180		±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7		IC code		
20	20	20	20	°C	Temperature	Coolant
≤12	≤15	≤18	≤18	K	Temperature	
≥12.0		≥12.9		Liter/min	Flowing rate	
1.87		1.87		J/g·K	Specific heat	
0.78		0.78		g/cm^3	Density	
≤2940		≤2940		kPa	Pressure *10	
≥4200		≥5200		W	Capacity of cooler *11	
T401		T401		Sensor *4		
28		38		kg	Stator	Weight
10		12			Rotor	
0.022		0.028		kgm^2	Rotor inertia	
22.2	26.4	22.2	26.4	kW	Allowable overload *7	
30		30		Spindle amplifier (αiSP)		
-		-		AC reactor (A81L-0001-) *12		
18.5/29.4		18.5/27.6		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item			Model name Type No.(A06B-)	BiI 132M/14000 1713-B100#ZAB1		BiI 132L/14000 1705-B140#ZAB1	
				Low	High	Low	High
*1 Rated output	S1 continuous (Max. current)	kW (A)		15 (81)	18.5 (99)	15 (100)	22 (124)
	S2 short time Rated minutes (Max. current)			18.5 15min. (97)	22 10min. (114)	22,18.5,18.5 5,15,30min. (141,121,115)	25 30min. (133)
	S3 40% (Max. current)						
	S3 25% (Max. current)			18.5 (119)			
*2 Rated speed	Base	min^{-1}		1400	5000	1000	5500
	Power constant			2500	14000	2000	14000
	Maximum			2500	14000	3000	14000
Rated Max. torque	S1 continuous	Nm		102		143	
	S2 or S3			161		233	
Power factor				0.81		0.74	
Rated voltage of motor input *3		V_{AC}		135-220		123-220	
Winding connection				Y	Y	Y	Δ
Power leads connection *6				Connection D		Connection H	
Number of poles				4		4	
Resistance of winding *9		$m\Omega\pm5\%$		69	29	114	19
Insulation class				F		F	
Temperature rise of winding		K		≤105		≤105	
Required clearance		mm		3		3	
Overheating temperature setting		$\pm5°C$		155		155	
IC code				IC9U7A7		IC9U7A7	
Coolant	Temperature	°C		20	20	20	20
	Temperature	K		≤7	≤19	≤7	≤17
	Flowing rate	Liter/min		≥13.5		≥13.5	
	Specific heat	J/g.K		1.87		1.87	
	Density	g/cm^3		0.78		0.78	
	Pressure *10	kPa		≤2940		≤2940	
Capacity of cooler *11		W		≥5200		≥5200	
Sensor *4				T401		T401	
Weight	Stator	kg		43		42	
	Rotor			10		14	
Rotor inertia		kgm^2		0.028		0.039	
Allowable overload *7		kW		18	26.4	26.4	30
Spindle amplifier (αiSP)				30		30	
AC reactor (A81L-0001-) *12				-		-	
Date for choice of αiPS *8		kW		18.5/27.3		22/35	

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC.
  (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition.
  Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

Bi 160S/13000 1721-B120#ZAB1		Bi 160M/13000 1723-B120#ZAB1		Model name Type No.(A06B-) *5		
Low	High	Low	High			Item
11 (62)	11 (73)	5.5 (58)	11 (79)	kW (A)	S1 continuous (Max. current)	*1 Rated output
15 30min. (72)	15 30min. (91)				S2 short time Rated minutes (Max. current)	
15 (91)			18.5 (112)		S3 40% (Max. current)	
		7.5(S3 15%) (100)	18.5 (126)		S3 25% (Max. current)	
750	1400	300	850	min^{-1}	Base	*2 Rated speed
1400	6000	850	3250		Power constant	
1400	13000	850	13000		Maximum	
140		175		Nm	S1 continuous	Rated
208		326			S2 or S3	Max. torque
0.77		0.71		Power factor		
136-220		109-220		V_{AC}	Rated voltage of motor input *3	
Y	Δ	Y	Δ	Winding connection		
Connection E		Connection E		Power leads connection *6		
4		4		Number of poles		
192	64	273	91	mΩ±5%	Resistance of winding *9	
F		H		Insulation class		
≤105		≤125		K	Temperature rise of winding	
3		3		mm	Required clearance	
140		180		±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7		IC code		
20	20	20	20	°C	Temperature	Coolant
≤8	≤6	≤6	≤4	K	Temperature	
≥14.5		≥14.5		Liter/min	Flowing rate	
1.87		1.87		J/g·K	Specific heat	
0.78		0.78		g/cm^3	Density	
≤2940		≤2940		kPa	Pressure *10	
≥5200		≥2900		W	Capacity of cooler *11	
T401		T401		Sensor *4		
35		37		kg	Stator	Weight
13		16			Rotor	
0.059		0.070		kgm^2	Rotor inertia	
18		9.0	22.2	kW	Allowable overload *7	
22		30		Spindle amplifier (αiSP)		
-		-		AC reactor (A81L-0001-) *12		
11/17.9		11/28.6		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item		Model name / Type No.(A06B-)	BiI 160L/13000 1725-B120#ZAB1		BiI 160LL/13000 1726-B100#ZAB1	
			Low	High	Low	High
*1 Rated output	S1 continuous (Max. current)	kW (A)	7.5 (68)	7.5 (65)	15 (84)	25 (114)
	S2 short time Rated minutes (Max. current)		11 30min. (78)	11 30min. (88)	22 10min. (114)	30 30min. (133)
	S3 40% (Max. current)		11 (93)			
	S3 25% (Max. current)				22 (133)	
*2 Rated speed	Base	min^{-1}	360	800	600	2500
	Power constant		800	10000	2000	10000
	Maximum		800	13000	3000	13000
Rated Max. torque	S1 continuous	Nm	199		238	
	S2 or S3		292		420	
Power factor			0.74		0.80	
Rated voltage of motor input *3		V_{AC}	93-220		133-220	
Winding connection			Y	Δ	Y	Y
Power leads connection *6			Connection E		Connection D	
Number of poles			4		4	
Resistance of winding *9		$m\Omega \pm 5\%$	208	69	133	62
Insulation class			F		H	
Temperature rise of winding		K	≤105		≤125	
Required clearance		mm	3		3	
Overheating temperature setting		±5°C	155		155	
IC code			IC9U7A7		IC9U7A7	
Coolant	Temperature	°C	20	20	20	20
	Temperature	K	≤9	≤9	≤17	≤17
	Flowing rate	Liter/min	≥13.5		≥10.1	
	Specific heat	J/g.K	1.87		1.87	
	Density	g/cm^3	0.78		0.78	
	Pressure *10	kPa	≤2940		≤2940	
Capacity of cooler *11		W	≥2900		≥3740	
Sensor *4			T401		T401	
Weight	Stator	kg	52		65	
	Rotor		23		28	
Rotor inertia		kgm^2	0.101		0.121	
Allowable overload *7		kW	13.2		26.4	36
Spindle amplifier (αiSP)			22		30	
AC reactor (A81L-0001-) *12			-		-	
Date for choice of αiPS *8		kW	7.5/16.4		25/39.4	

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

BiI 170S/6000 1732-B120#1AB6		BiI 170M/6000 1733-B120#1AB6		Model name Type No.(A06B-) *5		
Low	High	Low	High			Item
11 (76)	11 (83)	11 (98)	22 (105)	kW (A)	S1 continuous (Max. current)	*1 Rated output
15 30min. (83)	15 30min. (101)	15 30min. (106)	25 30min. (118)		S2 short time Rated minutes (Max. current)	
15 (101)					S3 40% (Max. current)	
		15 (127)			S3 25% (Max. current)	
665	1300	490	1700	min^{-1}	Base	*2 Rated speed
1300	6000	1500	3000		Power constant	
1300	6000	1500	6000		Maximum	
158		214		Nm	S1 continuous	Rated
223		292			S2 or S3	Max. torque
0.68		0.78		Power factor		
127-220		109-220		V_{AC}	Rated voltage of motor input *3	
Y	Δ	Y	Δ	Winding connection		
Connection E		Connection E		Power leads connection *6		
6		6		Number of poles		
162	54	144	48	mΩ±5%	Resistance of winding *9	
H		H		Insulation class		
≤125		≤125		K	Temperature rise of winding	
3		3		mm	Required clearance	
155		155		±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7		IC code		
20	20	20	20	°C	Temperature	Coolant
≤8	≤8	≤15	≤15	K	Temperature	
≥14.5		≥14.5		Liter/min	Flowing rate	
1.87		1.87		J/g·K	Specific heat	
0.78		0.78		g/cm^3	Density	
≤2940		≤2940		kPa	Pressure *10	
≥2600		≥5200		W	Capacity of cooler *11	
T511		T511		Sensor *4		
29		39		kg	Stator	Weight
18		23			Rotor	
0.08		0.12		kgm^2	Rotor inertia	
18		18	30	kW	Allowable overload *7	
22		26(A06B-6141-H026#H580)*13		Spindle amplifier (αiSP)		
-		-		AC reactor (A81L-0001-) *12		
11/29		22/31		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.
*13 The amplifier applicable to the BiI 170M/6000 is the αiSP 26 (A06B-6141-H026#H580).
When the αiSP 26 (A06B-6111-H026#H550 or A06B-6111-H026#H570) is to be used for driving the motor, contact our sales department.

Item		Model name / Type No.(A06B-)	Bi I 180M/6000 1743-B100#ZAB1		Bi I 180L/6000 1745-B100#ZAB1	
			Low	High	Low	High
*1 Rated output	S1 continuous (Max. current)	kW (A)	11 (52)	11 (78)	18.5 (83)	22 (97)
	S2 short time Rated minutes (Max. current)		15 20min. (67)	15 30min. (99)	22 30,15min. (96,129)	30 30min. (125)
	S3 40% (Max. current)		15 (74)			
	S3 25% (Max. current)		15 (93)			
*2 Rated speed	Base	min^{-1}	450	800	500	1500
	Power constant		800	6000	800	2500
	Maximum		800	6000	1500	6000
Rated Max. torque	S1 continuous	Nm	233		353	
	S2 or S3		477		600	
Power factor			0.82		0.83	
Rated voltage of motor input *3		V_{AC}	115-220		157-220	
Winding connection			Y	Y	Y	Y
Power leads connection *6			Connection D		Connection D	
Number of poles			4		4	
Resistance of winding *9		$m\Omega \pm 5\%$	258	117	137	70
Insulation class			F		H	
Temperature rise of winding		K	$\leq$105		$\leq$125	
Required clearance		mm	3		3	
Overheating temperature setting		$\pm 5^{\circ}C$	140		155	
IC code			IC9U7A7		IC9U7A7	
Coolant	Temperature	°C	20	20	20	20
	Temperature	K	$\leq$16	$\leq$16	$\leq$16	$\leq$12
	Flowing rate	Liter/min	$\geq$13.8		$\geq$9.7	
	Specific heat	J/g.K	1.87		1.87	
	Density	g/cm^3	0.78		0.78	
	Pressure *10	kPa	$\leq$2940		$\leq$2940	
Capacity of cooler *11		W	$\geq$4900		$\geq$3740	
Sensor *4			T401		T401	
Weight	Stator	kg	63		70	
	Rotor		38		40	
Rotor inertia		kgm^2	0.190		0.260	
Allowable overload *7		kW	18		26.4	36
Spindle amplifier (αiSP)			30		30	
AC reactor (A81L-0001-) *12			-		-	
Date for choice of αiPS *8		kW	11/25.6		22/34.8	

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the Bi I 80L/40000 TYPE M, Bi I 112L/25000, Bi I 112L/30000 TYPE M, Bi I 160M/20000 TYPE M, Bi I 160LL/20000, and Bi I 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

BiI 180LL/8000 1746-B100#ZAB1		BiI 200S/6000 1752-B120#2AB3		Model name Type No.(A06B-) *5		
Low	High	Low	High			Item
18.5 (112)	22 (121)	15 (98)	15 (112)	kW (A)	S1 continuous (Max. current)	*1 Rated output
22 30min. (131)	25 30min. (131)	22 15min. (103)	22 15min. (156)		S2 short time Rated minutes (Max. current)	
					S3 40% (Max. current)	
		22 (155)			S3 25% (Max. current)	
350	1300	544	950	min^{-1}	Base	*2 Rated speed
1200	8000	950	3500		Power constant	
1500	8000	950	5000		Maximum	
505		263		Nm	S1 continuous	Rated
600		456			S2 or S3	Max. torque
0.80		0.72		Power factor		
146-220		104-220		V_{AC}	Rated voltage of motor input *3	
Y	Y	Y	Δ	Winding connection		
Connection D		Connection E		Power leads connection *6		
4		6		Number of poles		
112	46	104	35	mΩ±5%	Resistance of winding *9	
H		H		Insulation class		
≤125		≤125		K	Temperature rise of winding	
3		3		mm	Required clearance	
155		180		±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7		IC9U7A7		
20	20	20	20	°C	Temperature	Coolant
≤19	≤16	≤10	≤4	K	Temperature	
≥12.0		≥12.0		Liter/min	Flowing rate	
1.87		1.87		J/g·K	Specific heat	
0.78		0.78		g/cm^3	Density	
≤2940		≤2940		kPa	Pressure *10	
≥4900		≥3800		W	Capacity of cooler *11	
T401		T611		Sensor *4		
102		52		kg	Stator	Weight
48		23			Rotor	
0.307		0.188		kgm^2	Rotor inertia	
26.4	30	26.4		kW	Allowable overload *7	
30		37		Spindle amplifier (αiSP)		
-		-		AC reactor (A81L-0001-) *12		
22/35.1		15/41		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item		Model name / Type No.(A06B-)	Bi I 200M/6000 1753-B120#ZAB3		Bi I 200L/6000 1755-B120#ZAB6	
			Low	High	Low	High
*1 Rated output	S1 continuous (Max. current)	kW (A)	15 (96)	15 (103)	15 (131)	15 (131)
	S2 short time Rated minutes (Max. current)		22 30min. (116)	22 30min. (142)	22 30min. (184)	22 30min. (183)
	S3 40% (Max. current)					
	S3 25% (Max. current)		22 (132)		22 (199)	
*2 Rated speed	Base	min^{-1}	485	900	360	650
	Power constant		900	3800	650	4500
	Maximum		900	6000	650	6000
Rated Max. torque	S1 continuous	Nm	295		398	
	S2 or S3		433		700	
Power factor			0.74		0.76	
Rated voltage of motor input *3		V_{AC}	119-220		98-220	
Winding connection			Y	Δ	Y	Δ
Power leads connection *6			Connection E		Connection E	
Number of poles			6		6	
Resistance of winding *9		$m\Omega \pm 5\%$	116	39	74	25
Insulation class			H		H	
Temperature rise of winding		K	≤125		≤125	
Required clearance		mm	3		3	
Overheating temperature setting		±5°C	180		180	
IC code			IC9U7A7		IC9U7A7	
Coolant	Temperature	°C	20	20	20	20
	Temperature	K	≤12	≤10	≤16	≤8
	Flowing rate	Liter/min	≥12.0		≥12.0	
	Specific heat	J/g.K	1.87		1.87	
	Density	g/cm^3	0.78		0.78	
	Pressure *10	kPa	≤2940		≤2940	
Capacity of cooler *11		W	≥3740		≥4900	
Sensor *4			T611		T511	
Weight	Stator	kg	56		74	
	Rotor		25		31	
Rotor inertia		kgm^2	0.206		0.258	
Allowable overload *7		kW	26.4		26.4	
Spindle amplifier (αiSP)			30		45	
AC reactor (A81L-0001-) *12			-		-	
Date for choice of αiPS *8		kW	15/29		15/28.9	

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the Bi I 80L/40000 TYPE M, Bi I 112L/25000, Bi I 112L/30000 TYPE M, Bi I 160M/20000 TYPE M, Bi I 160LL/20000, and Bi I 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

B*i*I 250S/6000 1772-B140#ZAB3		B*i*I 250M/3000 1773-B140#ZAB6		Model name Type No.(A06B-) *5		
Low	High	Low	High			Item
22 (154)	22 (143)	37 (197)	37 (169)	kW (A)	S1 continuous (Max. current)	Rated output *1
26 30min. (178)	26 30min. (159)	45 30,15min. (233,267)	45 30min. (257)		S2 short time Rated minutes (Max. current)	
					S3 40% (Max. current)	
					S3 25% (Max. current)	
410	1000	360	650	min^{-1}	Base	Rated speed *2
1000	4000	650	2000		Power constant	
1000	4000	650	3000		Maximum	
512		981		Nm	S1 continuous	Rated
605		1432			S2 or S3	Max. torque
0.72		0.75		Power factor		
112-220		133-220		V_{AC}	Rated voltage of motor input *3	
Y	Δ	Y	Δ	Winding connection		
Connection J		Connection J		Power leads connection *6		
6		6		Number of poles		
180	60	53	18	mΩ±5%	Resistance of winding *9	
H		H		Insulation class		
≤125		≤125		K	Temperature rise of winding	
3		3		mm	Required clearance	
180		180		±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7		IC code		
20	20	20	20	°C	Temperature	Coolant
≤15	≤15	≤19	≤12	K	Temperature	
≥18.5		≥18.5		Liter/min	Flowing rate	
1.87		1.87		J/g·K	Specific heat	
0.78		0.78		g/cm^3	Density	
≤2940		≤2940		kPa	Pressure *10	
≥6600		≥8500		W	Capacity of cooler *11	
T611		T511		Sensor *4		
96		140		kg	Stator	Weight
54		75			Rotor	
0.694		0.920		kgm^2	Rotor inertia	
31.2		60		kW	Allowable overload *7	
45		55		Spindle amplifier (αiSP)		
-		-		AC reactor (A81L-0001-) *12		
22/34		37/58.6		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

1.2 HIGH-SPEED TYPE

Item			Model name Type No.(A06B-) *5	BiI 40S/70000 1601-B120#ZNB8	BiI 40M/70000 1602-B170#0NB8	BiI 60SS/50000 1616-B170#1NB8
*1 Rated output	S1 continuous (Max. current)	kW (A)		0.55 ( )	3.0 (24)	3.7 (24)
	S2 short time Rated minutes (Max. current)			0.75 15min. ( )	3.5 10min. (26)	5.5 10min. (33)
	S3 40% (Max. current)					
	S3 25% (Max. current)					
*2 Rated speed	Base	min^{-1}		70000	30000	15000
	Power constant			-	50000	30000
	Maximum			70000	50000	50000
Rated Max. torque	S1 continuous	Nm		0.075	0.95	2.3
	S2 or S3			0.10	1.1	3.5
Power factor					0.81	0.81
Rated voltage of motor input *3		V_{AC}			109-220	121-220
Winding connection				Δ	Δ	Δ
Power leads connection *6				Connection L	Connection L	Connection L
Number of poles				2	2	2
Resistance of winding *9		$m\Omega \pm 5\%$		99	170	186
Insulation class				F	F	H
Temperature rise of winding		K		$\leq$105	$\leq$105	$\leq$125
Required clearance		mm		3	3	3
Overheating temperature setting		$\pm$5°C		140	140	155
IC code				IC9U7A7	IC9U7A7	IC9U7A7
Coolant	Temperature	°C		20	20	20
	Temperature	K		$\leq$3	$\leq$3	$\leq$4
	Flowing rate	Liter/min		$\geq$14.5	$\geq$14.5	$\geq$12.0
	Specific heat	J/g.K		1.78	1.87	1.87
	Density	g/cm^3		0.87	0.78	0.78
	Pressure *10	kPa		$\leq$2940	$\leq$2940	$\leq$2940
Capacity of cooler *11		W		$\geq$1500	$\geq$900	$\geq$1000
Sensor *4				T211	T211	T211
Weight	Stator	kg		1.3	3.5	3.1
	Rotor			0.3	0.4	0.7
Rotor inertia		kgm^2		0.00008	0.00013	0.00046
Allowable overload *7		kW		0.90	4.2	6.6
Spindle amplifier (αiSP)				2.2	11	11
AC reactor (A81L-0001-) *12				0142	0142	0142
Date for choice of αiPS *8		kW		0.55/1	3/4.7	3.7/6.9

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC.
  (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition.
  Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

BiI 60S/50000 1617-B120#3NB8		BiI 80S/40000 1631-B120#YNB8	Model name Type No.(A06B-) *5		Item
Low	High				
1.5 (34)	5.5 (36)	13 (96)		S1 continuous (Max. current)	
	7.5 10min. (45)	18.5 1min. (127)	kW (A)	S2 short time Rated minutes (Max. current)	*1 Rated output
2.2 (56)				S3 40% (Max. current)	
				S3 25% (Max. current)	
3800	30000	30000	min^{-1}	Base	*2 Rated speed
15000	50000	40000		Power constant	
15000	50000	40000		Maximum	
3.8		4.1	Nm	S1 continuous	Rated Max. torque
7.0		5.9		S2 or S3	
0.70		0.66	Power factor		
48-220		146-220	V_{AC}	Rated voltage of motor input *3	
Y	Δ	Δ	Winding connection		
Connection N		Connection M	Power leads connection *6		
2		2	Number of poles		
110	36	21	mΩ±5%	Resistance of winding *9	
H		F	Insulation class		
≤125		≤105	K	Temperature rise of winding	
3		3	mm	Required clearance	
140		140	±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7	IC code		
20	20	20	°C	Temperature	Coolant
≤6	≤6	≤11	K	Temperature	
≥12.0		≥14.5	Liter/min	Flowing rate	
1.87		1.78	J/g·K	Specific heat	
0.78		0.87	g/cm^3	Density	
≤2940		≤2940	kPa	Pressure *10	
≥1600		≥6000	W	Capacity of cooler *11	
T211		T211	Sensor *4		
5.3		8	kg	Stator	Weight
1		2		Rotor	
0.00061		0.003	kgm^2	Rotor inertia	
2.6	9.0	22.2	kW	Allowable overload *7	
22		45	Spindle amplifier (αiSP)		
0142		0154	AC reactor (A81L-0001-) *12		
5.5/9		13/24.4	kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item		Model name / Type No.(A06B-)	BiI 100S/20000 1641-B121#XNB7		BiI 100S/30000 1641-B122#9PB8	
			Low	High	Low	High
Rated output *1	S1 continuous (Max. current)	kW (A)	7.5 (49)	11 (69)	11 (72)	11 (94)
	S2 short time Rated minutes (Max. current)		11 10min. (64)	15 30min. (83)	15 30min. (87)	15 30min. (113)
	S3 40% (Max. current)					
	S3 25% (Max. current)				15 (116)	
Rated speed *2	Base	min^{-1}	3800	7500	7500	12000
	Power constant		5500	12000	12000	25000
	Maximum		5500	20000	12000	30000
Rated Max. torque	S1 continuous	Nm	19		14	
	S2 or S3		32		29	
Power factor			0.67		0.51	
Rated voltage of motor input *3		V_{AC}	149-220		132-220	
Winding connection			Y	Δ	Y	Δ
Power leads connection *6			Connection E		Connection N	
Number of poles			4		4	
Resistance of winding *9		$m\Omega \pm 5\%$	150	50	44	15
Insulation class			F		F	
Temperature rise of winding		K	≤105		≤105	
Required clearance		mm	3		3	
Overheating temperature setting		±5°C	140		140	
IC code			IC9U7A7		IC9U7A7	
Coolant	Temperature	°C	20	20	20	20
	Temperature	K	≤6	≤6	≤9	≤9
	Flowing rate	Liter/min	≥14.5		≥14.5	
	Specific heat	J/g.K	1.87		1.87	
	Density	g/cm^3	0.78		0.78	
	Pressure *10	kPa	≤2940		≤2940	
Capacity of cooler *11		W	≥2900		≥2900	
Sensor *4			T411		T211	
Weight	Stator	kg	11		11	
	Rotor		4		4	
Rotor inertia		kgm^2	0.007		0.007	
Allowable overload *7		kW	13.2	18	18	
Spindle amplifier (αiSP)			22		30	
AC reactor (A81L-0001-) *12			-		0154	
Date for choice of αiPS *8		kW	11/20.6		11/19.8	

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

Bi 100L/30000 1655-B120#0NB8		Bi 112S/20000 1662-B120#ZAB7		Model name Type No.(A06B-) *5		
Low	High	Low	High			Item
13 (100)	18.5 (108)	7.5 (58)	11 (70)	kW (A)	S1 continuous (Max. current)	Rated output *1
18.5 10min. (133)	22 10min (124)		15,18.5 30,10min (84,100)		S2 short time Rated minutes (Max. current)	
					S3 40% (Max. current)	
		11(25%,15%) (78,98)			S3 25% (Max. current)	
3350	9000	2300	6000	min^{-1}	Base	Rated speed *2
10000	30000	6000	20000		Power constant	
10000	30000	6000	20000		Maximum	
37		31		Nm	S1 continuous	Rated
53		60			S2 or S3	Max. torque
0.88		0.75		Power factor		
100-220		123-220		V_{AC}	Rated voltage of motor input *3	
Y	Δ	Y	Δ	Winding connection		
Connection E		Connection E		Power leads connection *6		
2		4		Number of poles		
41	14	170	57	mΩ±5%	Resistance of winding *9	
H		F		Insulation class		
≤125		≤105		K	Temperature rise of winding	
3		3		mm	Required clearance	
140		140		±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7		IC code		
20	20	20	20	°C	Temperature	Coolant
≤14	≤14	≤8	≤14	K	Temperature	
≥12.0		≥12.0		Liter/min	Flowing rate	
1.87		1.87		J/g·K	Specific heat	
0.78		0.78		g/cm^3	Density	
≤2940		≤2940		kPa	Pressure *10	
≥4000		≥4000		W	Capacity of cooler *11	
T211		T411		Sensor *4		
30		10		kg	Stator	Weight
7		5			Rotor	
0.011		0.011		kgm^2	Rotor inertia	
22.2	26.4	13.2	22.2	kW	Allowable overload *7	
30		30		Spindle amplifier (αiSP)		
-		-		AC reactor (A81L-0001-) *12		
18.5/27.4		11/24.4		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item		Model name / Type No.(A06B-)	BiI 112M/20000 1673-B100#YNB7		BiI 112L/20000 1675-B100#YNB7	
			Low	High	Low	High
*1 Rated output	S1 continuous (Max. current)	kW (A)	10 (83)	15 (98)	15 (87)	18.5 (103)
	S2 short time Rated minutes (Max. current)		15 10min. (112)	18.5 30min. (111)	18.5 15min. (101)	22 15min. (118)
	S3 40% (Max. current)					
	S3 25% (Max. current)				18.5 (117)	
*2 Rated speed	Base	min^{-1}	1500	10000	1800	8000
	Power constant		6000	20000	4000	20000
	Maximum		6000	20000	4000	20000
Rated Max. torque	S1 continuous	Nm	64		80	
	S2 or S3		95		118	
Power factor			0.73		0.67	
Rated voltage of motor input *3		V_{AC}	114-220		161-220	
Winding connection			Y	Y	Y	Y
Power leads connection *6			Connection D		Connection D	
Number of poles			4		4	
Resistance of winding *9		$m\Omega\pm5\%$	82	37	91	40
Insulation class			F		H	
Temperature rise of winding		K	$\leq$105		$\leq$125	
Required clearance		mm	3		3	
Overheating temperature setting		$\pm5^{\circ}C$	140		180	
IC code			IC9U7A7		IC9U7A7	
Coolant	Temperature	°C	20	20	20	20
	Temperature	K	$\leq$8	$\leq$10	$\leq$10	$\leq$12
	Flowing rate	Liter/min	$\geq$12.0		$\geq$12.0	
	Specific heat	J/g.K	1.87		1.87	
	Density	g/cm^3	0.78		0.78	
	Pressure *10	kPa	$\leq$2940		$\leq$2940	
Capacity of cooler *11		W	$\geq$4000		$\geq$4000	
Sensor *4			T411		T411	
Weight	Stator	kg	25		28	
	Rotor		8		9	
Rotor inertia		kgm^2	0.017		0.021	
Allowable overload *7		kW	18	22.2	22.2	26.4
Spindle amplifier (αiSP)			30		30	
AC reactor (A81L-0001-) *12			-		-	
Date for choice of αiPS *8		kW	15/25.6		18.5/27.9	

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

Bi 112L/25000 1675-B140#XPB7		Bi 160M/20000 1723-B140#YNB7		Model name Type No.(A06B-) *5		
Low	High	Low	High			Item
15 (70)	25 (77)	11 (62)	18.5 (105)	kW (A)	S1 continuous (Max. current)	Rated output *1
	37 15min (96)	15 15min. (73)	22 30min. (121)		S2 short time Rated minutes (Max. current)	
		15 (87)			S3 40% (Max. current)	
25(25%,15%) (99, 121)		15 (108)			S3 25% (Max. current)	
2000	8000	850	4200	min^{-1}	Base	Rated speed *2
8000	15000	3000	20000		Power constant	
8000	25000	3000	20000		Maximum	
72		124		Nm	S1 continuous	Rated
159		239			S2 or S3	Max. torque
0.61		0.82		Power factor		
245-460		134-220		V_{AC}	Rated voltage of motor input *3	
Y	Y	Y	Δ	Winding connection		
Connection P		Connection F		Power leads connection 6*		
4		4		Number of poles		
155	39	166	14	mΩ±5%	Resistance of winding *9	
H		H		Insulation class		
≤125		≤125		K	Temperature rise of winding	
3		3		mm	Required clearance	
180		180		±5°C	Overheating temperature setting	
IC9U7A7		IC9U7A7		IC code		
20	20	20	20	°C	Temperature	Coolant
≤18	≤18	≤7	≤18	K	Temperature	
≥12.0		≥13.5		Liter/min	Flowing rate	
1.87		1.87		J/g·K	Specific heat	
0.78		0.78		g/cm^3	Density	
≤2940		≤2940		kPa	Pressure *10	
≥5500		≥5800		W	Capacity of cooler *11	
T411		T411		Sensor *4		
28		37		kg	Stator	Weight
9		15			Rotor	
0.021		0.068		kgm^2	Rotor inertia	
30	44.4	18	26.4	kW	Allowable overload *7	
75HV		30		Spindle amplifier (αiSP)		
0154		-		AC reactor (A81L-0001-) *12		
25/48.8		18.5/29		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

Item			Model name / Type No.(A06B-)			
			BiI 160L/20000 1725-B140#YNB7		BiI 160LL/20000 1726-B140#YNB7	
			Low	High	Low	High
*1 Rated output	S1 continuous (Max. current)	kW (A)	15 (96)	25 (115)	32 (82)	50 (119)
	S2 short time Rated minutes (Max. current)		22 10min. (123)	30 30min. (132)	44 10min. (106)	55 30min. (123)
	S3 40% (Max. current)					
	S3 25% (Max. current)				44 (135)	
*2 Rated speed	Base	min^{-1}	750	2500	1600	12000
	Power constant		2000	6000	4000	20000
	Maximum		3000	20000	6000	20000
Rated Max. torque	S1 continuous	Nm	191		191	
	S2 or S3		263		350	
Power factor			0.81		0.80	
Rated voltage of motor input *3		V_{AC}	136-220		263-460	
Winding connection			Y	Y	Y	Δ
Power leads connection *6			Connection G		Connection Q	
Number of poles			4		4	
Resistance of winding *9		$m\Omega \pm 5\%$	112	28	124	10
Insulation class			F		H	
Temperature rise of winding		K	≤105		≤125	
Required clearance		mm	3		3	
Overheating temperature setting		±5°C	155		155	
IC code			IC9U7A7		IC9U7A7	
Coolant	Temperature	°C	20	20	20	20
	Temperature	K	≤11	≤16	≤18	≤18
	Flowing rate	Liter/min	≥12.0		≥19.5	
	Specific heat	J/g.K	1.87		1.87	
	Density	g/cm^3	0.78		0.78	
	Pressure *10	kPa	≤2940		≤2940	
Capacity of cooler *11		W	≥4500		≥8500	
Sensor *4			T411		T411	
Weight	Stator	kg	52		65	
	Rotor		22		27	
Rotor inertia		kgm^2	0.098		0.119	
Allowable overload *7		kW	26.4	36	52.8	66
Spindle amplifier (αiSP)			30		75HV	
AC reactor (A81L-0001-) *12			-		0154	
Date for choice of αiPS *8		kW	25/39.6		50/76.3	

NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

Bi I 200S/10000 1752-B120#4BB6		Model name Type No.(A06B-) *5		
Low	High			Item
22 (88)	30 (114)	kW (A)	S1 continuous (Max. current)	*1 Rated output
30 30min. (115)	37 30min. (136)		S2 short time Rated minutes (Max. current)	
			S3 40% (Max. current)	
30 (141)			S3 25% (Max. current)	
950	2000	min^{-1}	Base	*2 Rated speed
3000	10000		Power constant	
3000	10000		Maximum	
221		Nm	S1 continuous	Rated Max. torque
382			S2 or S3	
0.77		Power factor		
203-460		V_{AC}	Rated voltage of motor input *3	
Y	Δ	Winding connection		
Connection E		Power leads connection *6		
6		Number of poles		
104	35	mΩ±5%	Resistance of winding *9	
H		Insulation class		
≤125		K	Temperature rise of winding	
3		mm	Required clearance	
180		±5°C	Overheating temperature setting	
IC9U7A7		IC code		
20	20	°C	Temperature	Coolant
≤17	≤17	K	Temperature	
≥12.0		Liter/min	Flowing rate	
1.87		J/g·K	Specific heat	
0.78		g/cm^3	Density	
≤2940		kPa	Pressure *10	
≥5000		W	Capacity of cooler *11	
T511		Sensor *4		
52		kg	Stator	Weight
23			Rotor	
0.183		kgm^2	Rotor inertia	
36	44.4	kW	Allowable overload *7	
75HV		Spindle amplifier (αiSP)		
-		AC reactor (A81L-0001-) *12		
30/48.8		kW	Date for choice of αiPS *8	

*1 Data indicate the output of constant power range.
*2 This speed is applied for S1 continuous rated. Refer to Chapter 2, “POWER CURVES” for details.
*3 This is not an input voltage of amplifier. This indicates that the input voltage of motor is changed when the motor output changes within the rated output and speed.
*4 A860-2150-Txxx. For velocity and position feedback. Install to a rotating axis. Typical sensors are indicated. A suitable sensor can be selected according to the application. Refer to Part III, “SENSOR”.
*5 The number indicates the type number of the standard model. For other specification numbers such as of a model with a different sensor, refer to Appendix H, “SPECIFICATION NUMBER”.
*6 Refer to Section 3.3, “POWER LEADS CONNECTION” in the Part II, “STATOR AND ROTOR”.
*7 Reference data, applied for 1 minute. This value is not guaranteed.
*8 Reference data of Continuous/Maximum(at acceleration) output for the choice of Power Supply (αiPS).
*9 The resistance of winding indicates reference data between the amplifier (αiSP) and motor after motor power leads connection (the actual resistance differs slightly depending on the length of the used power cable). To measure the resistance of winding, refer to Section 3.2, “CHECKING THE WINDING RESISTANCE” in Part II, “STATOR AND ROTOR” before connection.
*10 The indicated value may be unachievable depending on the performance of the O-ring used. Adjust the coolant pressure according to the O-ring you use.
*11 Actual calorie which must be removed from the motor is calculated as follows.
Q(W)=Flowing rate(ℓ/min)×Specific heat(J/gK)×Density(g/cm^3)×Temperature rise(K)×1000÷60
*12 The model for which this item is given requires an AC reactor between the motor and amplifier (αiSP). Refer to 1.4, “REACTOR” in Part II, “STATOR AND ROTOR”.

1.3 HIGH-SPEED AND HIGH-POWER TYPE

			Model name	BiI 80L/40000 TYPE M	BiI 112L/30000 TYPE M	BiI 160M/20000 TYPE M
			Type No.(A06B-) *5	Undecided	Undecided	Undecided
*1 Rated output	S1 continuous (Max. current)	kW (A)		75 ( )	80 ( )	90 ( )
	S2 short time Rated minutes (Max. current)			85 5min ( )	100 5min. ( )	150 5min. ( )
	S3 40% (Max. current)					
	S3 25% (Max. current)			85 ( )	100 ( )	150 ( )
*2 Rated speed	Base	min^{-1}		40000	30000	20000
	Power constant			40000	30000	20000
	Maximum			40000	30000	20000
Rated Max. torque	S1 continuous	Nm		18	25	43
	S2 or S3			20	31	72
Power factor				-	-	-
Rated voltage of motor input *3		V_{AC}		-	-	-
Winding connection				-	-	-
Power leads connection *6				Connection R	Connection R	Connection R
Number of poles				-	-	-
Resistance of winding *9		$m_{\Omega\pm}5\%$		-	-	-
Insulation class				-	-	-
Temperature rise of winding		K		-	–	–
Required clearance		mm		-	-	-
Overheating temperature setting		$\pm$5°C		-	-	-
IC code				-	-	-
Coolant	Temperature	°C		-	-	-
	Temperature	K		-	–	–
	Flowing rate	Liter/min		-	–	–
	Specific heat	J/g.K		-	-	-
	Density	g/cm^3		-	-	-
	Pressure *10	kPa		–	–	–
Capacity of cooler *11		W		–	–	–
Sensor *4				T211	T411	T411
Weight	Stator	kg		24	40	62
	Rotor			4	9	15
Rotor inertia		kgm^2		0.005	0.021	0.068
Allowable overload *7		kW		-	-	-
Spindle amplifier (αiSP)				75HV × 2	100HV × 2	100HV × 2
AC reactor (A81L-0001-) *12				0154 × 2	0154 × 2	0154 × 2
Date for choice of αiPS *8		kW		75/102	80/120	90/180

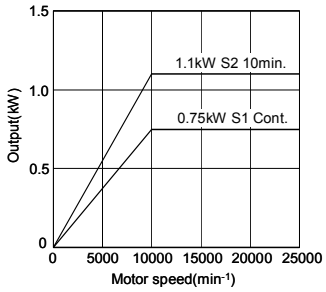
NOTE
- All specifications are guaranteed when using FANUC's amplifier and providing the cooling system required.
- All specification are guaranteed when input voltage of amplifier is 200-230VAC. (except for the BiI 80L/40000 TYPE M, BiI 112L/25000, BiI 112L/30000 TYPE M, BiI 160M/20000 TYPE M, BiI 160LL/20000, and BiI 200S/10000 with the 400 V specification)
- IEC34 and VDE0110 etc. should be applied to conform to CE marking when installing the motor in a spindle. Refer to the standards for details.
- Use motors under following condition. Room temperature form 0 to 40°C, 1000m or less above sea level, vibration acceleration of 1 G or less at no load or 10 G or less at cutting, dry environment, non-condensation.

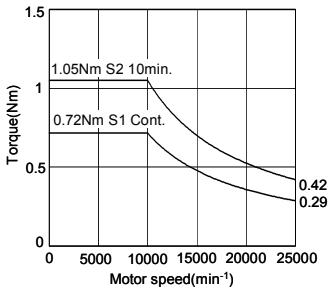
2 POWER CURVES

2.1 STANDARD TYPE

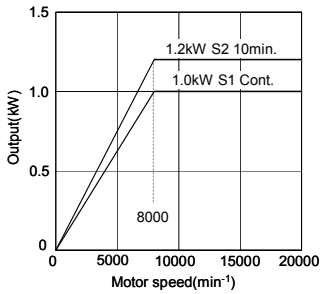
This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

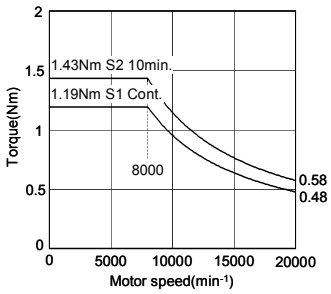
BiI 50S/30000 (A06B-1612-B170#0AB8)



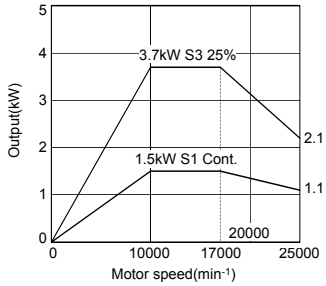


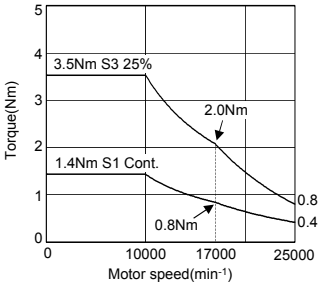
BiI 50M/25000 (A06B-1613-B170#1AB2)





BiI 50L/25000 (A06B-1615-B120#ZAB8)

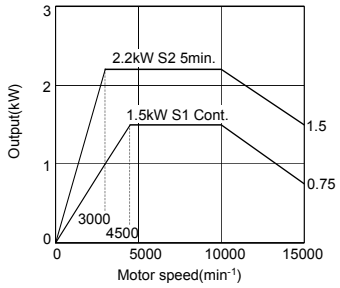


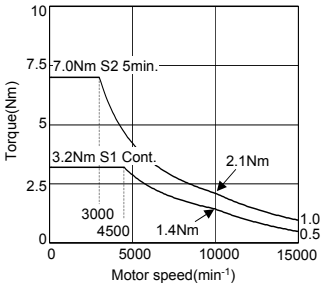


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

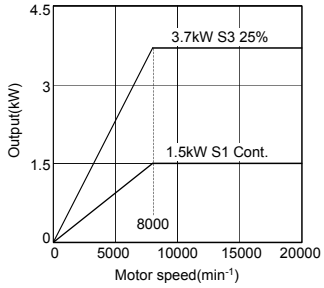
B*i*I 80S/20000 (A06B-1621-B120#ZAB2)

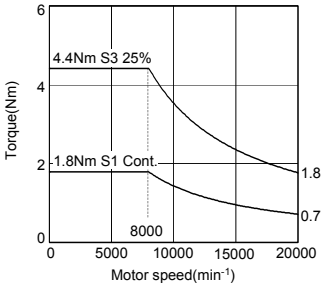
• Low winding



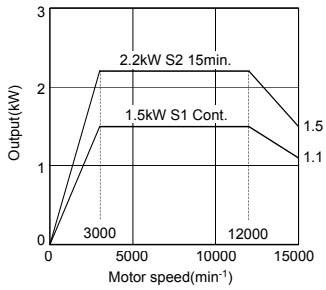


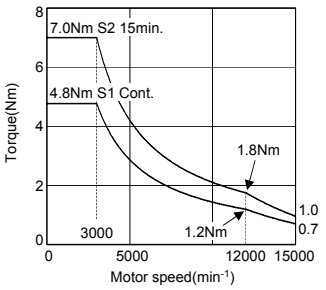
• High winding



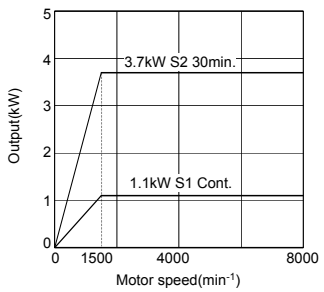


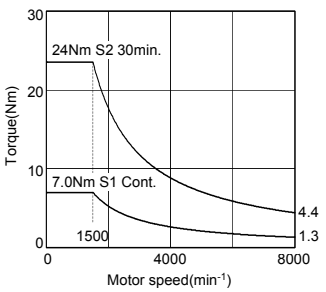
B*i*I 80M/15000 (A06B-1623-B170#ZAB1)





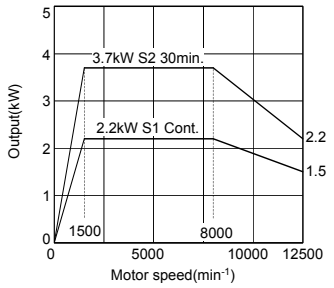
B*i*I 80L/8000 (A06B-1625-B170#ZAB1)

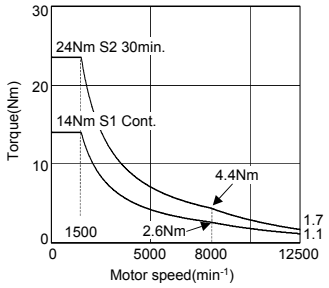




This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

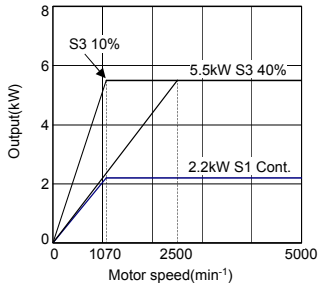
B*i*I 100S/12500 (A06B-1641-B120#ZAB1)

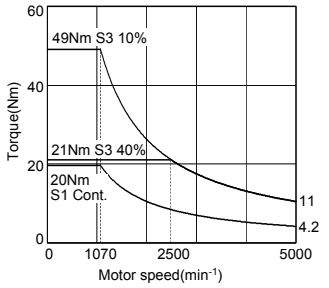




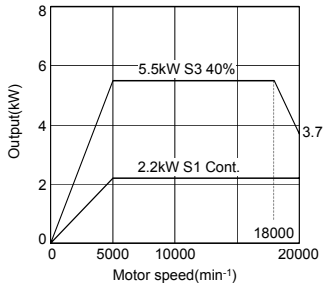
B*i*I 112SS/20000 (A06B-1661-B120#ZAB2)

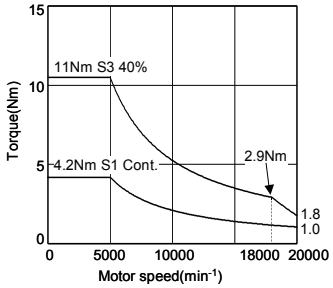
- Low winding





- High winding

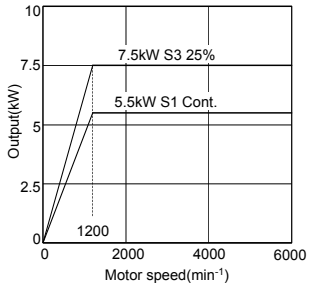


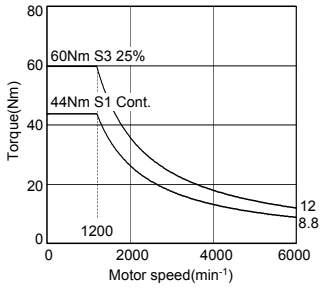


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

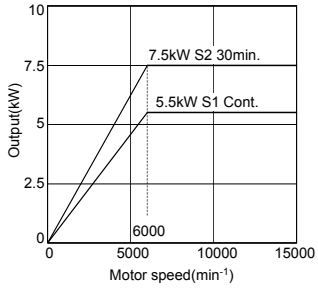
B*i*I 112S/15000 (A06B-1671-B120#ZAB1)

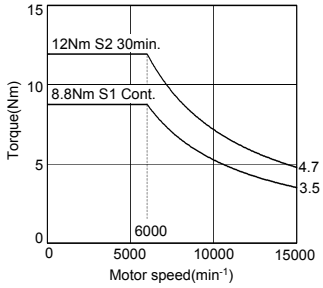
- Low winding



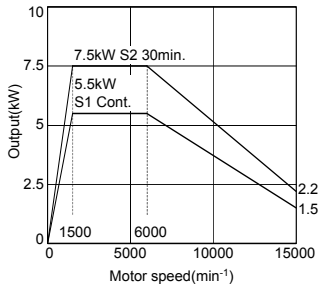


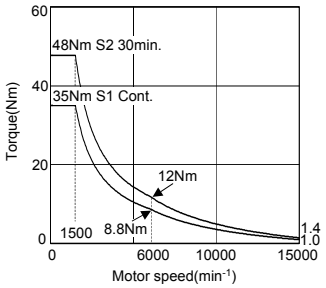
- High winding





B*i*I 112M/15000 (A06B-1673-B120#ZAB1)

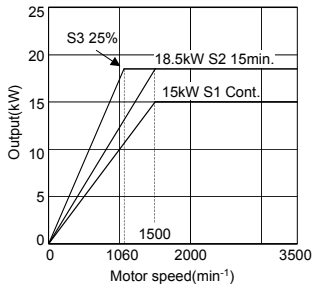


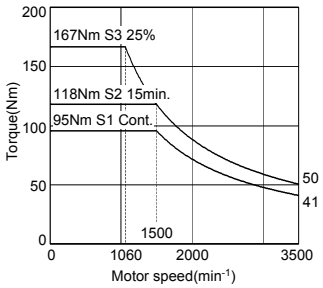


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

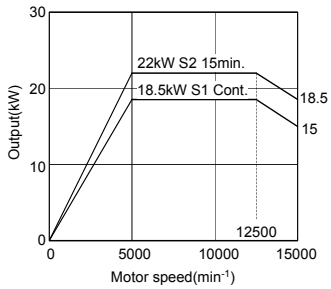
B*i*I 112L/15000 (A06B-1675-B100#ZAB1)

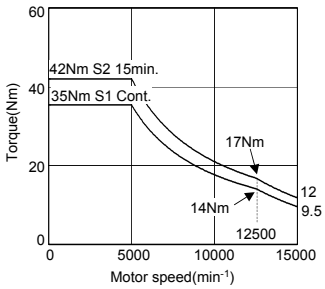
• Low winding





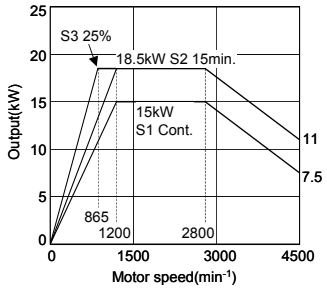
• High winding

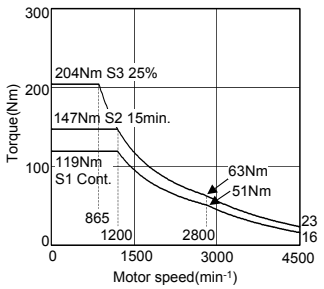




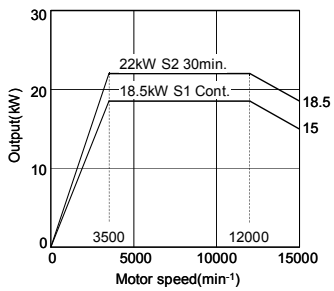
B*i*I 112LL/15000 (A06B-1676-B100#ZAB1)

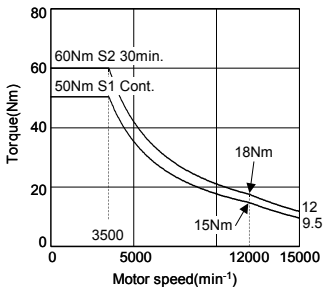
• Low winding





• High winding

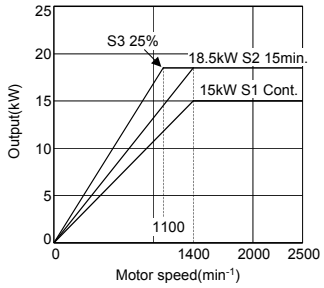


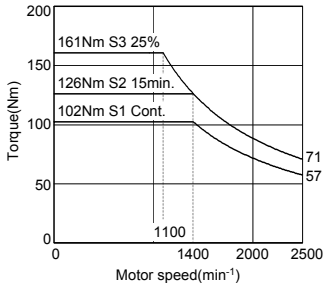


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

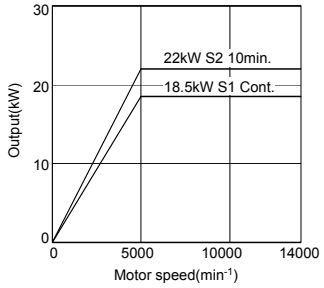
B*i*I 132M/14000 (A06B-1713-B100#ZAB1)

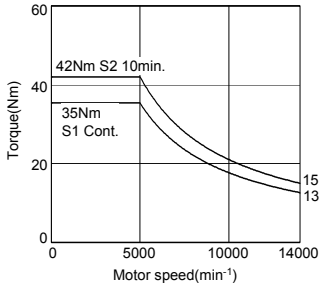
• Low winding





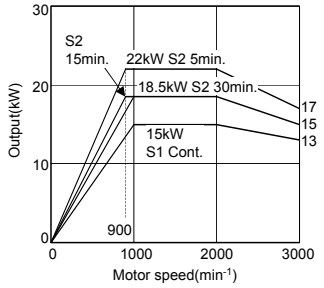
• High winding

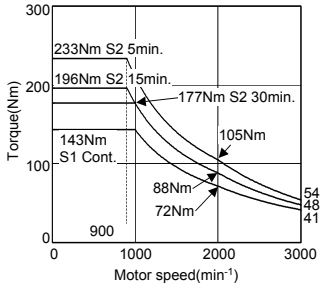




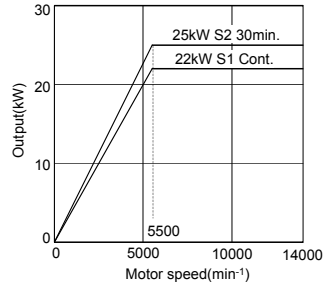
B*i*I 132L/14000 (A06B-1705-B140#ZAB1)

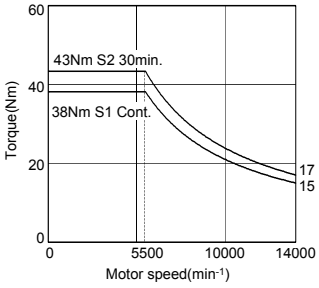
• Low winding





• High winding

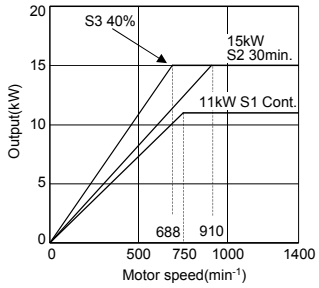


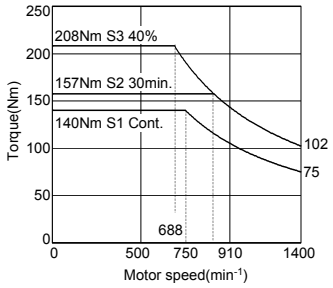


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

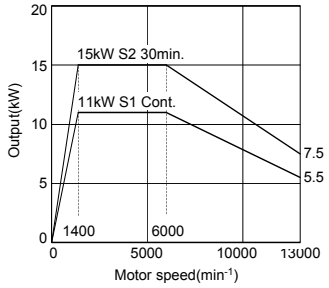
B*i*I 160S/13000 (A06B-1721-B120#ZAB1)

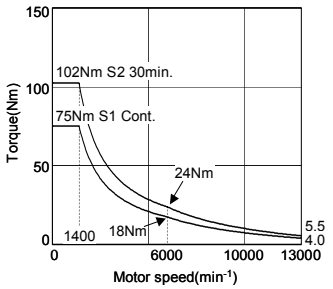
• Low winding





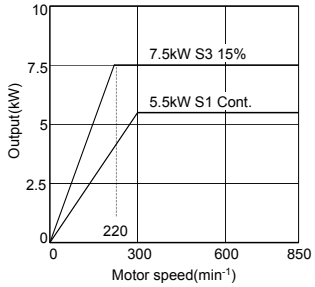
• High winding

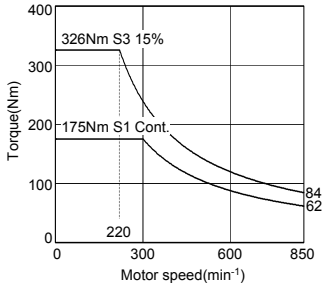




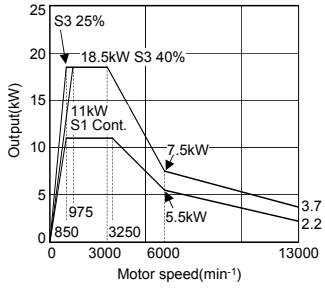
B*i*I 160M/13000 (A06B-1723-B120#ZAB1)

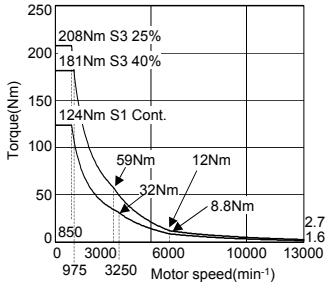
• Low winding





• High winding

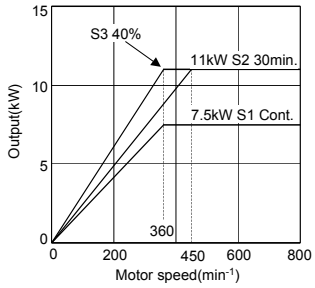


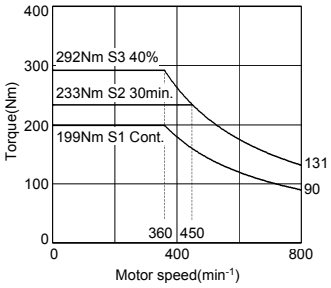


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

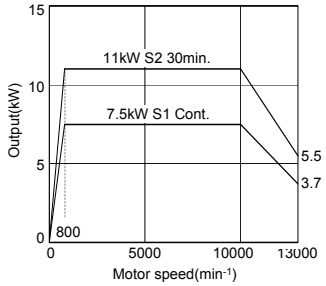
B*i*I 160L/13000 (A06B-1725-B120#ZAB1)

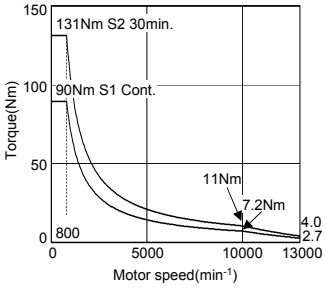
• Low winding





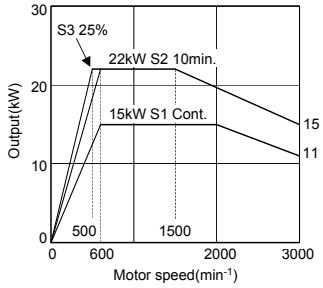
• High winding

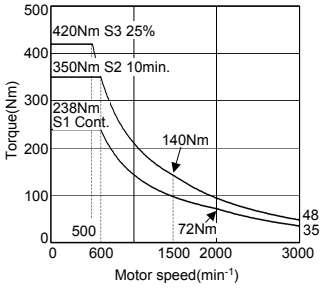




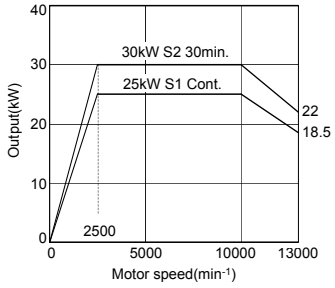
B*i*I 160LL/13000 (A06B-1726-B100#ZAB1)

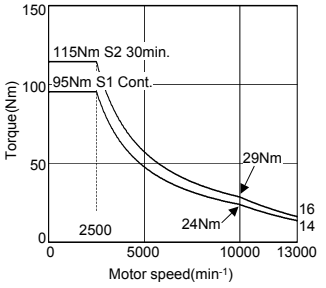
• Low winding





• High winding

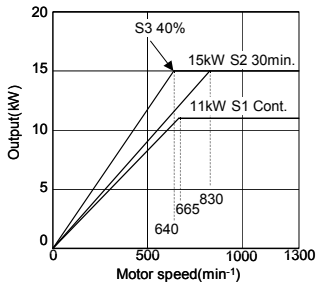


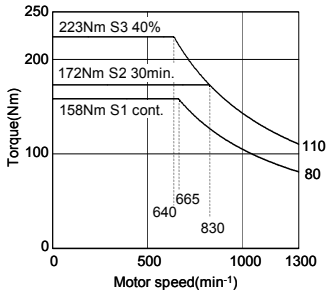


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

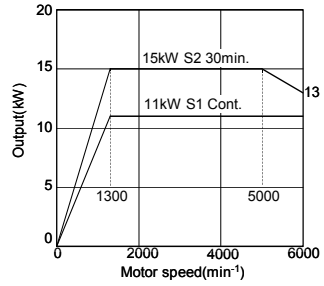
B*i*I 170S/6000 (A06B-1732-B120#1AB6)

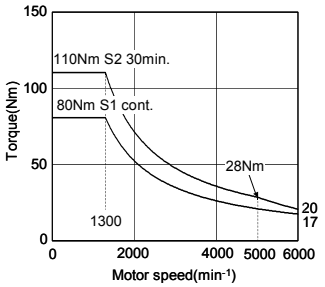
• Low winding





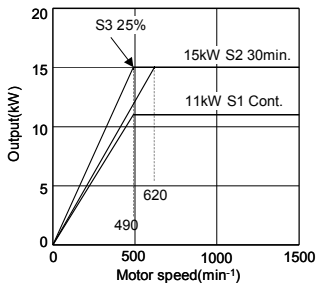
• High winding

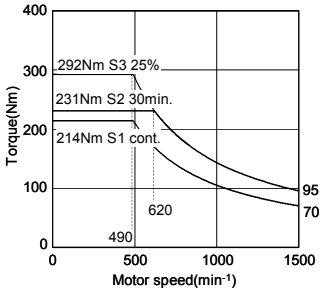




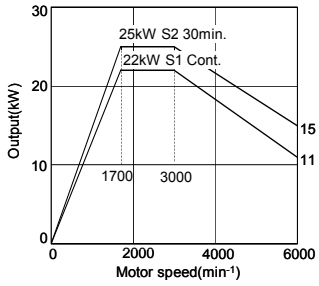
B*i*I 170M/6000 (A06B-1733-B120#1AB6)

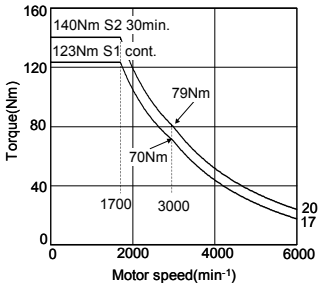
• Low winding





• High winding

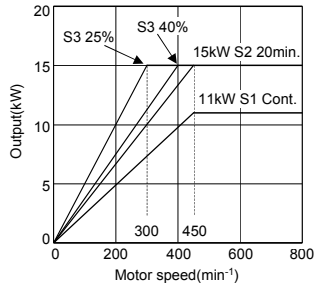


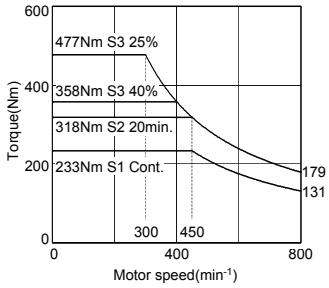


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

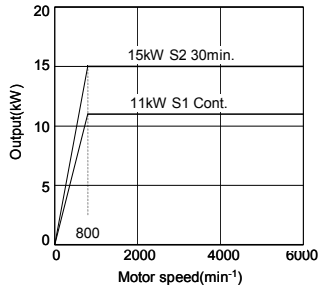
B*i*I 180M/6000 (A06B-1743-B100#ZAB1)

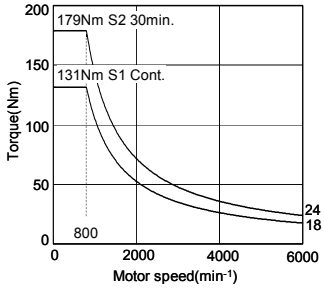
• Low winding





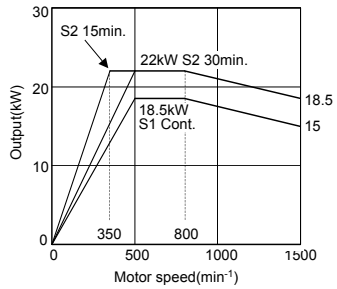
• High winding

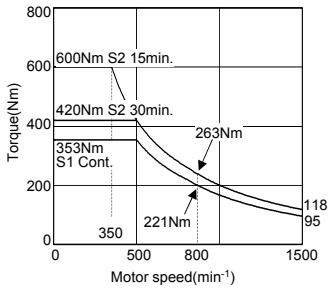




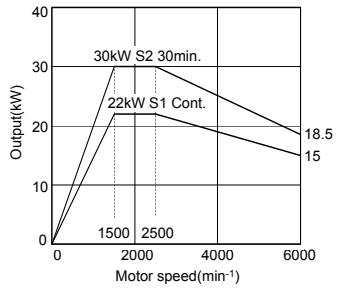
B*i*I 180L/6000 (A06B-1745-B100#ZAB1)

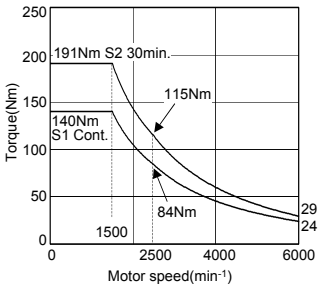
• Low winding





• High winding

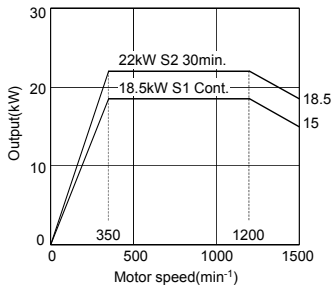


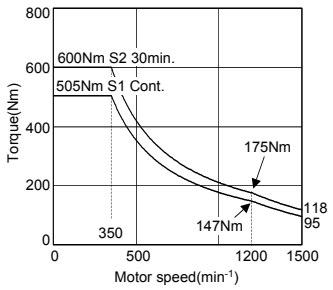


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

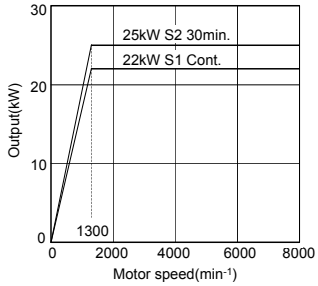
B*i*I 180LL/8000 (A06B-1746-B100#ZAB1)

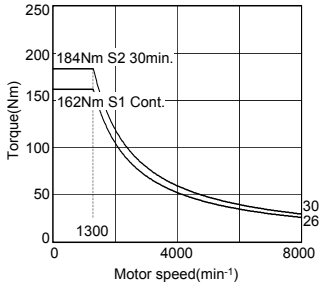
■Low winding



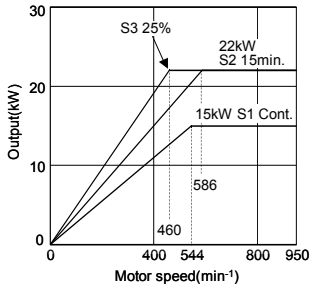


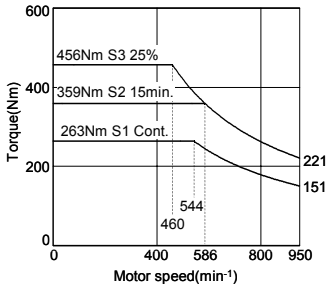
■High winding

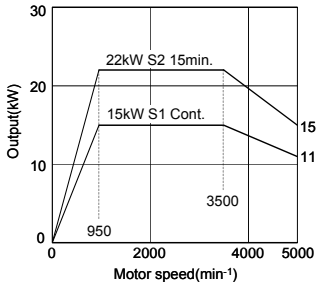


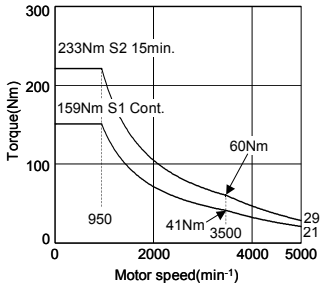


B*i*I 200S/6000 (A06B-1752-B120#2AB3)





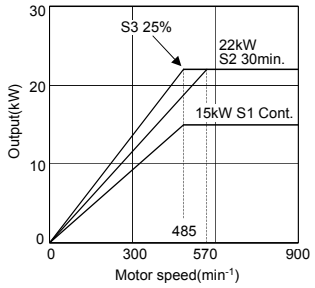


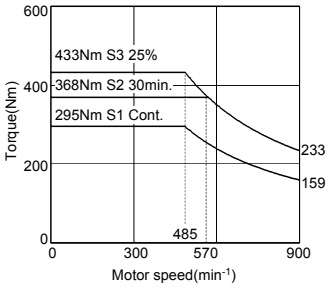


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

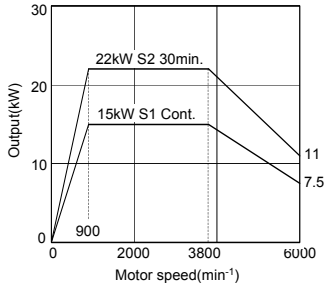
B*i*I 200M/6000 (A06B-1753-B120#ZAB3)

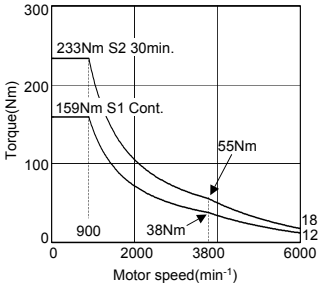
• Low winding





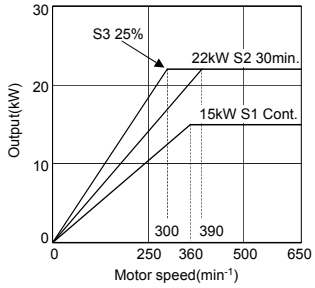
• High winding

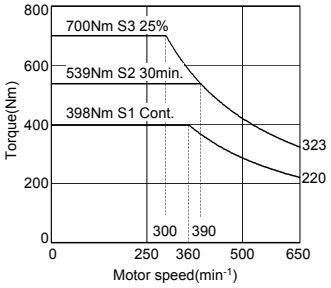




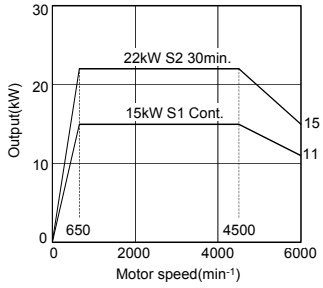
B*i*I 200L/6000 (A06B-1755-B120#ZAB6)

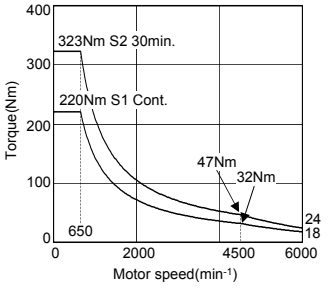
• Low winding





• High winding

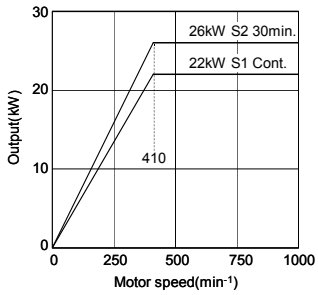


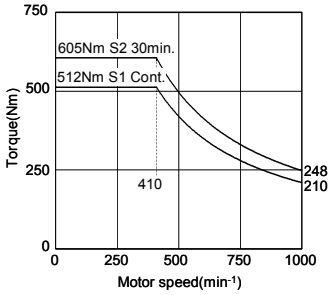


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

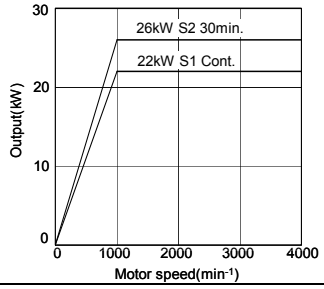
B*i*I 250S/6000 (A06B-1772-B140#ZAB3)

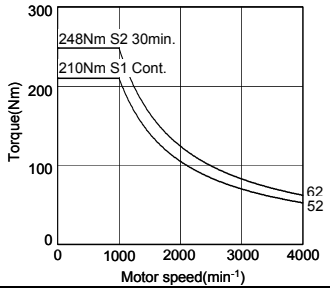
• Low winding





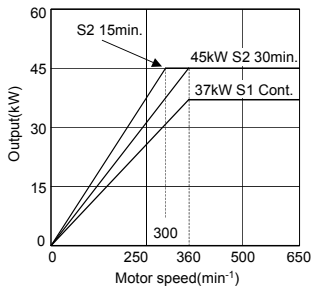
• High winding

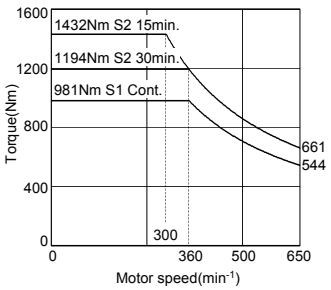




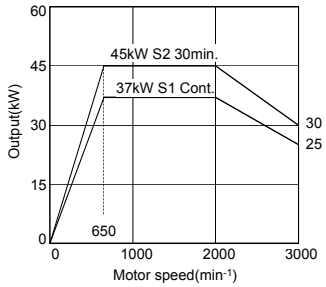
B*i*I 250M/3000 (A06B-1773-B140#ZAB6)

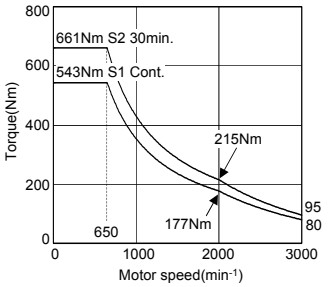
• Low winding





• High winding

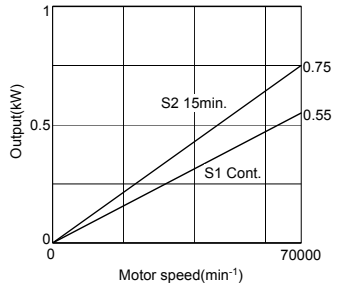


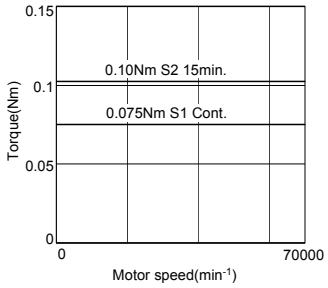


2.2 HIGH-SPEED TYPE

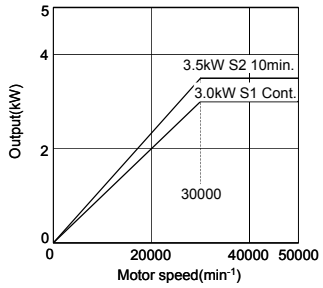
This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

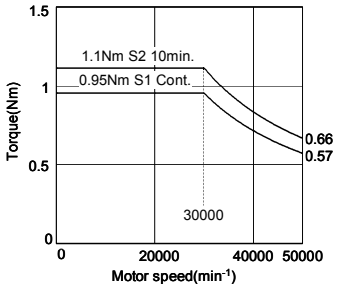
BiI 40S/70000 (A06B-1601-B120#ZNB8)



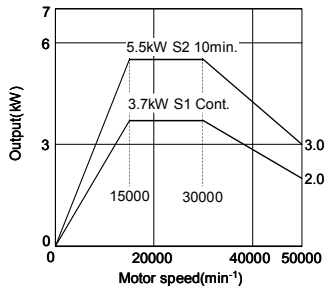


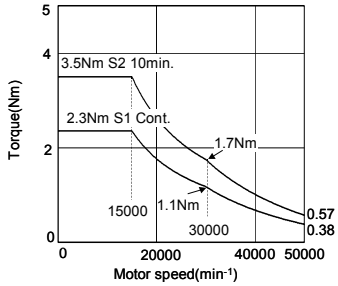
BiI 40M/70000 (A06B-1602-B170#0NB8)





BiI 60SS/50000 (A06B-1616-B170#1NB8)

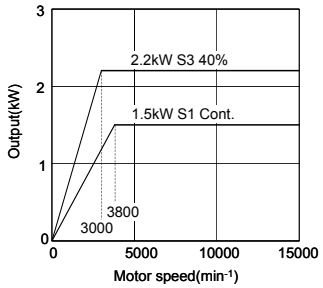


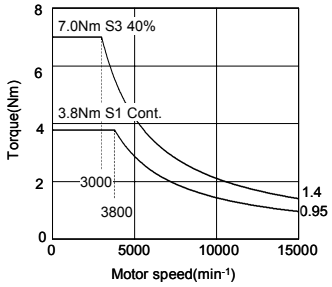


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

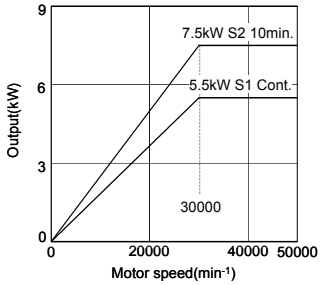
B*i*I 60S/50000 (A06B-1617-B120#3NB8)

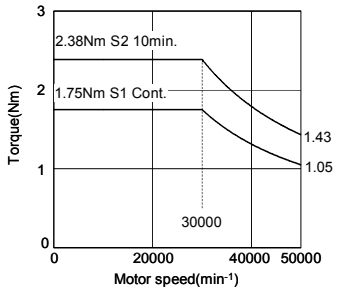
• Low winding



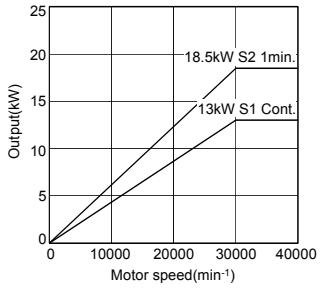


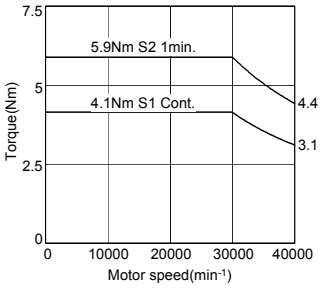
• High winding





B*i*I 80S/40000 (A06B-1631-B120#YNB8)

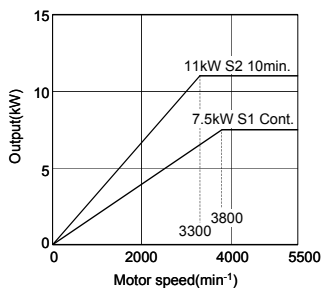


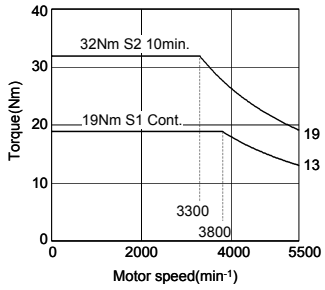


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

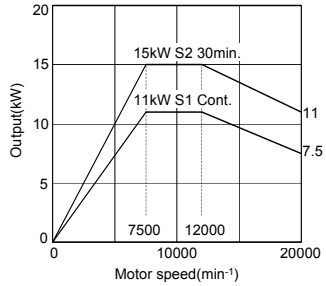
B*i*I 100S/20000 (A06B-1641-B121#XNB7)

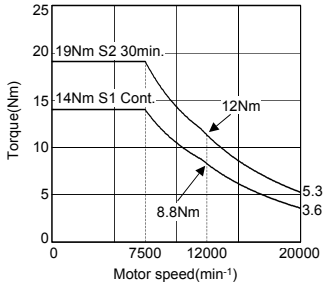
• Low winding





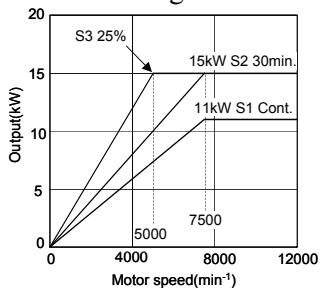
• High winding

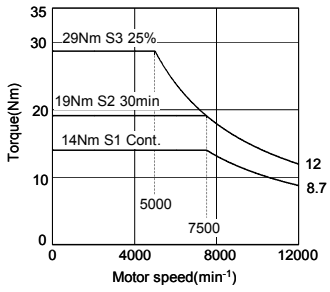




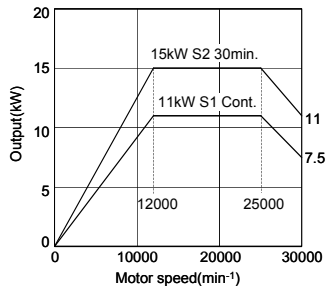
B*i*I 100S/30000 (A06B-1641-B122#9PB8)

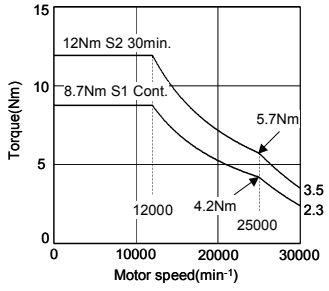
• Low winding





• High winding

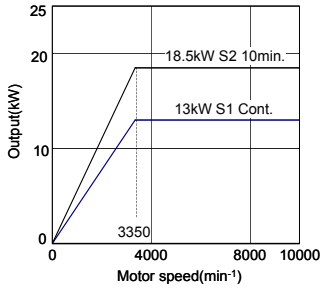


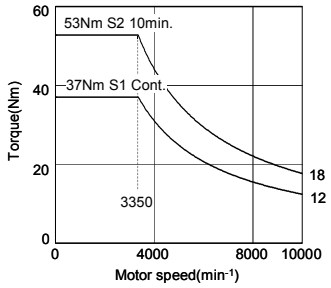


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

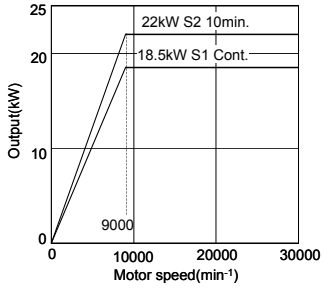
B*i*I 100L/30000 (A06B-1655-B120#0NB8)

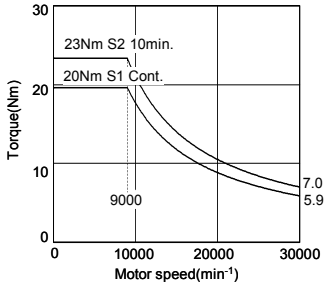
• Low winding





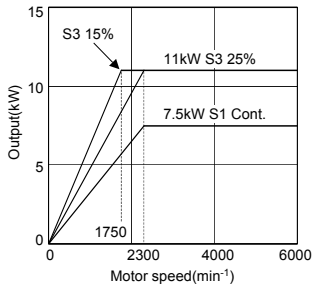
• High winding

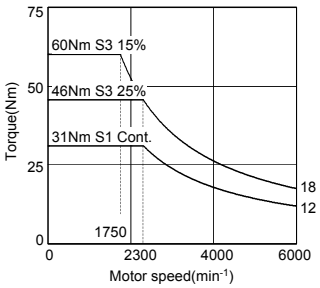




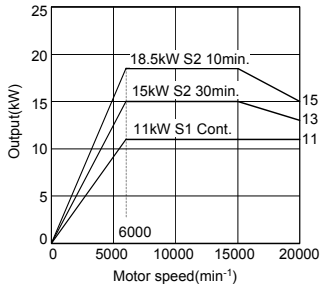
B*i*I 112S/20000 (A06B-1662-B120#ZAB7)

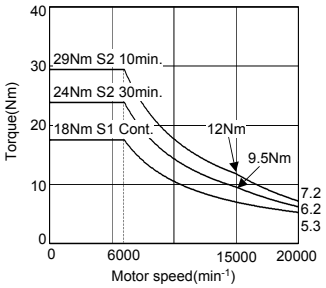
• Low winding





• High winding

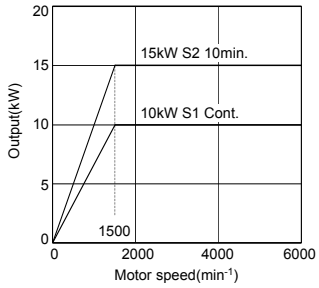


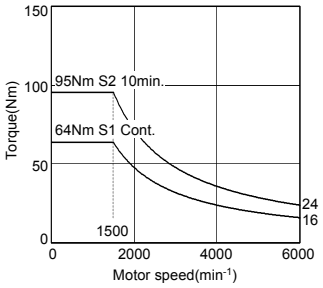


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

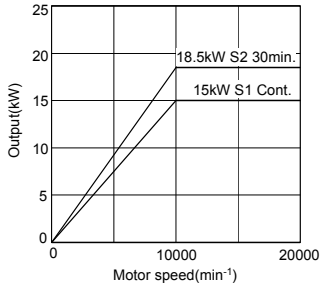
B*i*I 112M/20000 (A06B-1673-B100#YNB7)

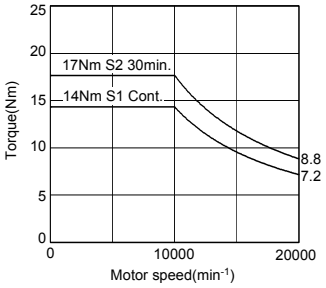
• Low winding





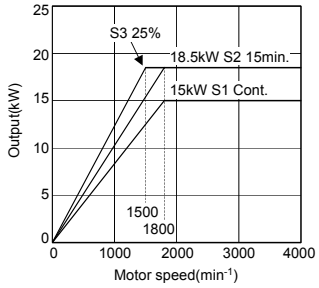
• High winding

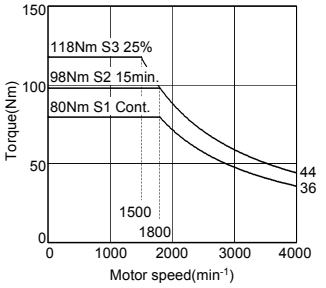




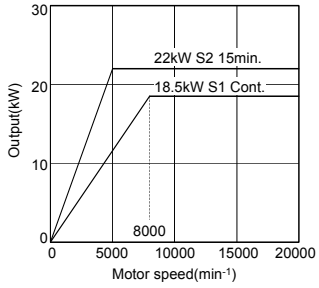
B*i*I 112L/20000 (A06B-1675-B100#YNB7)

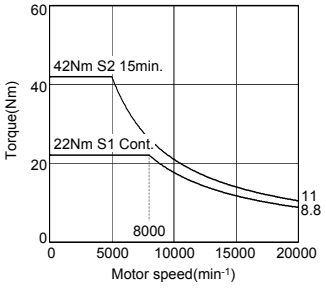
• Low winding





• High winding

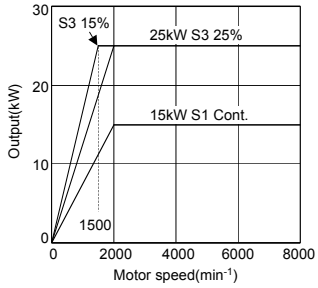


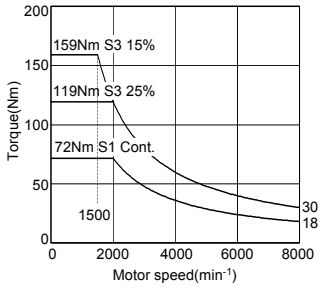


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

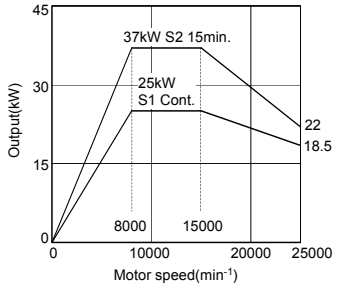
B*i*I 112L/25000 (A06B-1675-B140#XPB7)

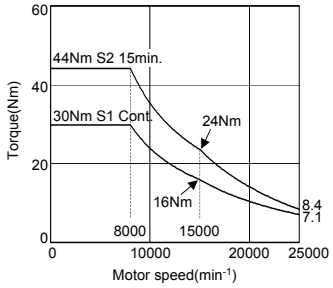
• Low winding





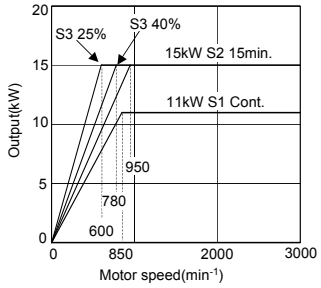
• High winding

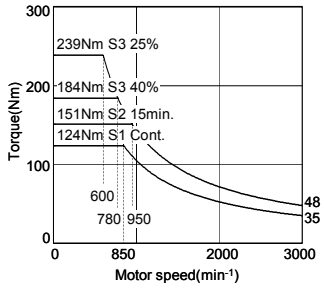




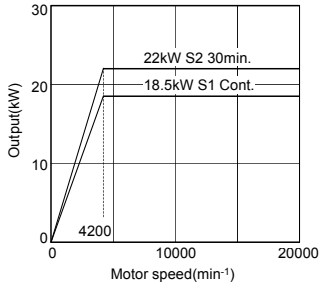
B*i*I 160M/20000 (A06B-1723-B140#YNB7)

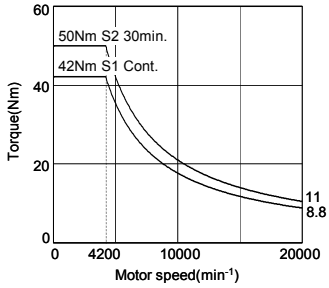
• Low winding





• High winding

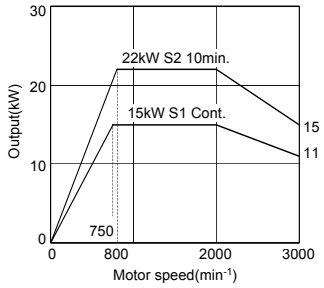


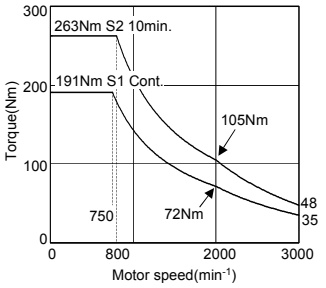


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

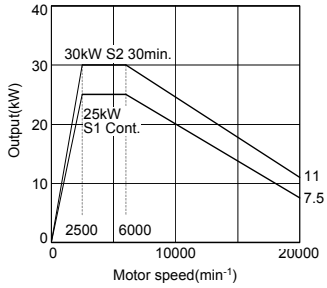
B*i*I 160L/20000 (A06B-1725-B140#YNB7)

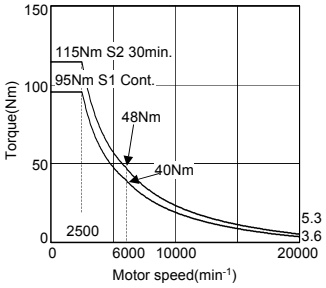
• Low winding





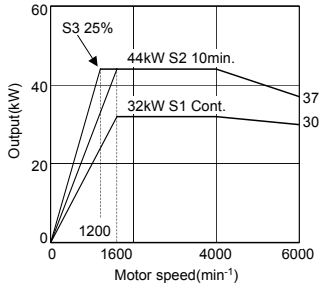
• High winding

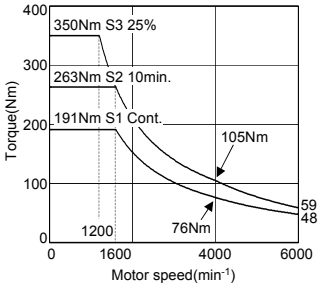




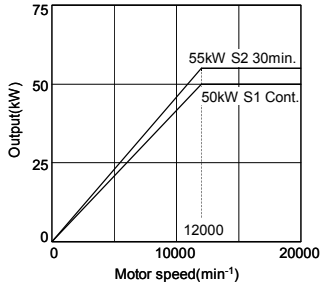
B*i*I 160LL/20000 (A06B-1726-B140#YNB7)

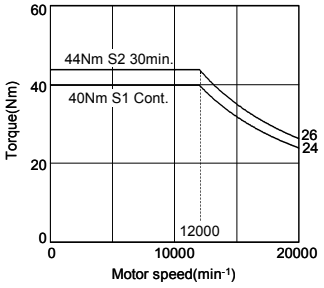
• Low winding





• High winding

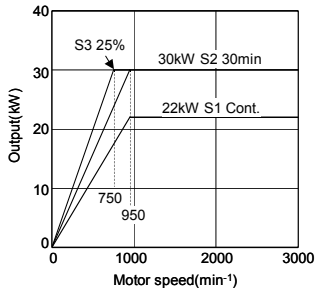


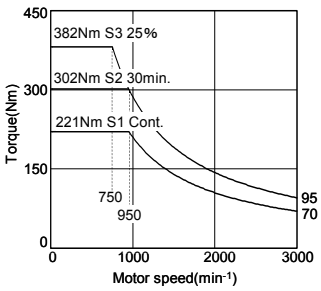


This section provides the power curves of typical models. It is possible to improve the output and torque by changing the spindle amplifier used, parameters, power supply voltage, and so on. For details, contact our sales department.

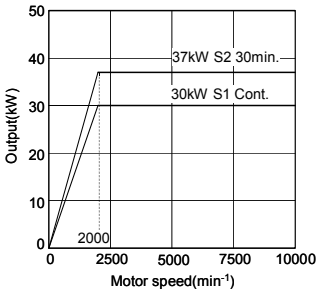
B*i*I 200S/10000 (A06B-1752-B120#4BB6)

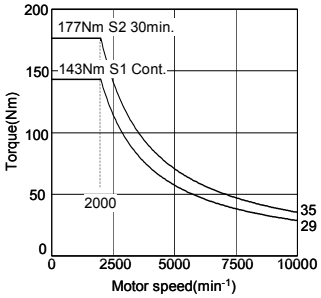
• Low winding





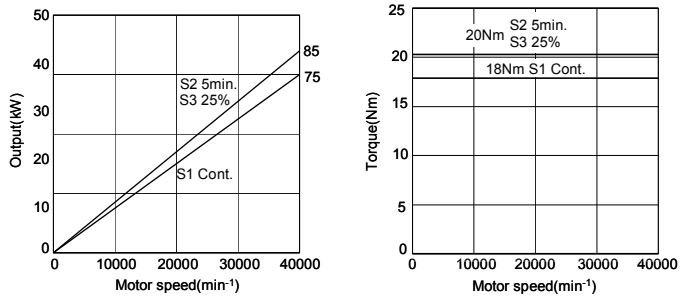
• High winding



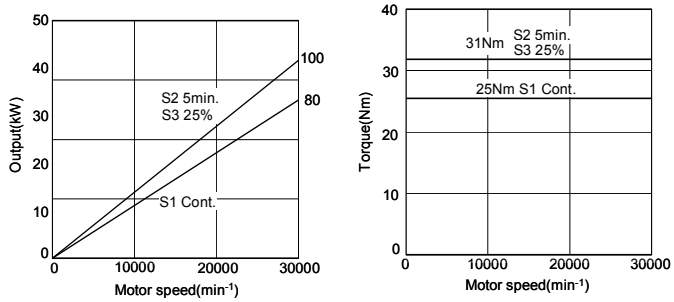


2.3 HIGH-SPEED AND HIGH-POWER TYPE

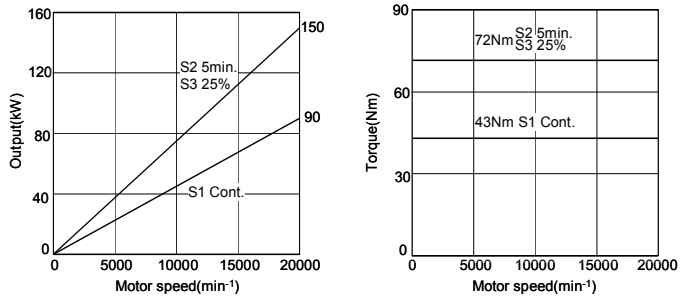
BiI 80L/40000 TYPE M



BiI 112L/30000 TYPE M



BiI 160M/20000 TYPE M



II. STATOR AND ROTOR

CONSTRUCTION OF THIS PART

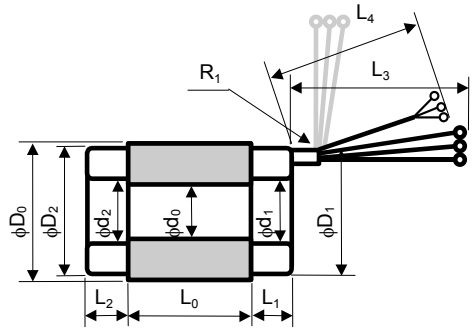
This part includes followings.

NOTE
Refer to Part II, “STATOR AND ROTOR” before installing a motor in a spindle. The part describes how to handle, assemble, and modify motors properly and contains information required to satisfy IEC and other standards.

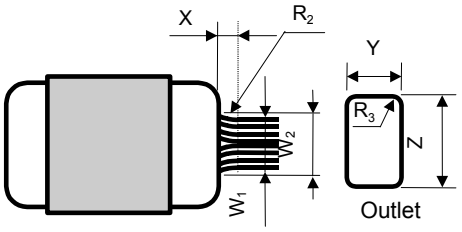
1 DIMENSIONS

1.1 STATOR

1.1.1 Standard Type



Side view(cut away)



Upper view

Unit: mm

	Model name	Type No. (A06B-)	ϕD_0	ϕD_1	ϕD_2	ϕd_0	ϕd_1	ϕd_2	$L_0+L_1+L_2$	L_0	L_1	L_2	L_3	L_4
Standard type	B*i*I 50S/30000	1612-B170#0AB8	88±0.01	84^{+0}	84^{+0}	(49)	52^{-0}	52^{-0}	71	30	23^{+0}	18^{+0}	1000±20	1000±20
	B*i*I 50M/25000	1613-B170#1AB2	88±0.01	82^{+0}	82^{+0}	(49)	51^{-0}	51^{-0}	100	45	31^{+0}	24^{+0}	1000±20	1000±20
	B*i*I 50L/25000	1615-B120#ZAB8	88±0.01	82^{+0}	82^{+0}	(49)	51^{-0}	51^{-0}	154	92	38^{+0}	24^{+0}	1000±20	1000±20
	B*i*I 80S/20000	1621-B120#ZAB2	120±0.01	114^{+0}	114^{+0}	(75)	76^{-0}	76^{-0}	135	58	42^{+0}	35^{+0}	2000±30	2000±30
	B*i*I 80M/15000	1623-B170#ZAB1	120±0.01	112^{+0}	112^{+0}	(75)	76^{-0}	76^{-0}	195	120	40^{+0}	35^{+0}	1000±20	1000±20
	B*i*I 80L/8000	1625-B170#ZAB1	120±0.01	112^{+0}	112^{+0}	(75)	76^{-0}	76^{-0}	245	170	40^{+0}	35^{+0}	2000±30	2000±30
	B*i*I 100S/12500	1641-B120#ZAB1	156±0.01	142^{+0}	142^{+0}	(100)	101^{-0}	101^{-0}	202	110	49^{+0}	43^{+0}	2000±30	2000±30
	B*i*I 112SS/20000	1661-B120#ZAB2	159±0.01	155^{+0}	155^{+0}	(115)	118^{-0}	118^{-0}	155	80	42.5^{+0}	32.5^{+0}	2000±30	2000±30
	B*i*I 112S/15000	1671-B120#ZAB1	180±0.01	174^{+0}	174^{+0}	(115)	118^{-0}	118^{-0}	219	115	57^{+0}	47^{+0}	2000±30	2000±30
	B*i*I 112M/15000	1673-B120#ZAB1	180±0.01	166^{+0}	166^{+0}	(115)	119^{-0}	119^{-0}	284	180	57^{+0}	47^{+0}	2000±30	2000±30
	B*i*I 112L/15000	1675-B100#ZAB1	180±0.01	174^{+0}	174^{+0}	(115)	119^{-0}	119^{-0}	330	226	57^{+0}	47^{+0}	2000±30	2000±30
	B*i*I 112LL/15000	1676-B100#ZAB1	180±0.01	174^{+0}	174^{+0}	(115)	117^{-0}	117^{-0}	394	280	62^{+0}	52^{+0}	2000±30	2000±30
	B*i*I 132M/14000	1713-B100#ZAB1	240±0.02	232^{+0}	232^{+0}	(132)	138^{-0}	138^{-0}	280	160	70^{+0}	50^{+0}	2000±30	2000±30
	B*i*I 132L/14000	1705-B140#ZAB1	210±0.02	206^{+0}	206^{+0}	(132)	137^{-0}	137^{-0}	360	226	77^{+0}	57^{+0}	2000±30	2000±30
	B*i*I 160S/13000	1721-B120#ZAB1	240±0.02	228^{+0}	228^{+0}	(160)	163^{-0}	163^{-0}	270	150	65^{+0}	55^{+0}	2000±30	2000±30
	B*i*I 160M/13000	1723-B120#ZAB1	240±0.02	214^{+0}	210^{+0}	(160)	163^{-0}	163^{-0}	305	182	64^{+0}	59^{+0}	2000±30	2000±30
	B*i*I 160L/13000	1725-B120#ZAB1	240±0.02	228^{+0}	228^{+0}	(160)	163^{-0}	163^{-0}	402	272	69^{+0}	61^{+0}	2000±30	2000±30
	B*i*I 160LL/13000	1726-B100#ZAB1	240±0.02	226^{+0}	226^{+0}	(160)	161^{-0}	161^{-0}	461	332	75^{+0}	54^{+0}	2000±30	2000±30
	B*i*I 170S/6000	1732-B120#1AB6	240±0.02	234^{+0}	234^{+0}	(170)	173^{-0}	173^{-0}	265	150	65^{+0}	50^{+0}	2000±30	2000±30
	B*i*I 170M/6000	1733-B120#1AB6	240±0.02	234^{+0}	234^{+0}	(170)	173^{-0}	173^{-0}	335	220	65^{+0}	50^{+0}	2000±30	2000±30
	B*i*I 180M/6000	1743-B100#ZAB1	292±0.03	281^{+0}	280^{+0}	(190)	199^{-0}	199^{-0}	367	212	84^{+0}	71^{+0}	2000±30	2000±30
	B*i*I 180L/6000	1745-B100#ZAB1	292±0.03	281^{+0}	281^{+0}	(190)	197^{-0}	197^{-0}	463	302	86^{+0}	75^{+0}	2000±30	2000±30
	B*i*I 180LL/8000	1746-B100#ZAB1	292±0.03	281^{+0}	281^{+0}	(190)	197^{-0}	197^{-0}	517	362	86^{+0}	69^{+0}	2000±30	2000±30
	B*i*I 200S/6000	1752-B120#2AB3	300±0.03	292^{+0}	292^{+0}	(210)	216^{-0}	216^{-0}	302	170	73^{+0}	59^{+0}	2000±30	2000±30
	B*i*I 200M/6000	1753-B120#ZAB3	300±0.03	292^{+0}	292^{+0}	(210)	216^{-0}	216^{-0}	322	190	73^{+0}	59^{+0}	2000±30	2000±30
	B*i*I 200L/6000	1755-B120#ZAB6	300±0.03	292^{+0}	292^{+0}	(210)	216^{-0}	216^{-0}	394	250	85^{+0}	59^{+0}	2000±30	2000±30
	B*i*I 250S/6000	1772-B140#ZAB3	370±0.03	350^{+0}	350^{+0}	(265)	267^{-0}	267^{-0}	395	232	89^{+0}	74^{+0}	2000±30	2000±30
	B*i*I 250M/3000	1773-B140#ZAB6	370±0.03	350^{+0}	350^{+0}	(265)	267^{-0}	267^{-0}	522	352	97^{+0}	73^{+0}	2000±30	2000±30

NOTE

- A tolerance of D_0 represents a machining dimension. The core is laminated, and a distortion of about 0.1mm may occur in subsequent processes which include winding. However, the tolerance of D_0 is allowable for shrink fitting.
- The values in parentheses are for reference. These dimensions are managed by FANUC. It is not necessary to machine.
- To obtain a rated output, use a cooling jacket or equivalent that shown in Section 1.3, “COOLING JACKET”. Motors are developed with those cooling jackets. Refer to Section 1.3, “COOLING JACKET”.
- Read Chapters 2, “GENERAL” and 3, “STATOR ASSEMBLY” before designing and assembling a spindle. The motor cannot be driven normally if handle incorrectly.

Unit: mm

	Model name	Type No. (A06B-)	W_1	W_2	R_1	R_2	R_3	X	Y	Z
Standard type	B*i*I 50S/30000	1612-B170#0AB8	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	B*i*I 50M/25000	1613-B170#1AB2	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	B*i*I 50L/25000	1615-B120#ZAB8	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	B*i*I 80S/20000	1621-B120#ZAB2	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	B*i*I 80M/15000	1623-B170#ZAB1	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	B*i*I 80L/8000	1625-B170#ZAB1	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	B*i*I 100S/12500	1641-B120#ZAB1	40	50	10-15	20-25	3-5	3 and larger	20 and larger	60 and larger
	*B*i*I 112SS/20000	1661-B120#ZAB2	50	60	20-25	25-30	3-5	3 and larger	20 and larger	70 and larger
	B*i*I 112S/15000	1671-B120#ZAB1	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 112M/15000	1673-B120#ZAB1	50	60	20-25	25-30	3-5	3 and larger	20 and larger	70 and larger
	B*i*I 112L/15000	1675-B100#ZAB1	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 112LL/15000	1676-B100#ZAB1	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 132M/14000	1713-B100#ZAB1	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	B*i*I 132L/14000	1705-B140#ZAB1	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	B*i*I 160S/13000	1721-B120#ZAB1	50	60	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 160M/13000	1723-B120#ZAB1	50	60	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 160L/13000	1725-B120#ZAB1	50	60	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 160LL/13000	1726-B100#ZAB1	50	60	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 170S/6000	1732-B120#1AB6	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 170M/6000	1733-B120#1AB6	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 180M/6000	1743-B100#ZAB1	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	B*i*I 180L/6000	1745-B100#ZAB1	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	B*i*I 180LL/8000	1746-B100#ZAB1	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	B*i*I 200S/6000	1752-B120#2AB3	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	B*i*I 200M/6000	1753-B120#ZAB3	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	B*i*I 200L/6000	1755-B120#ZAB6	80	90	40-45	40-45	3-5	3 and larger	40 and larger	110 and larger
	B*i*I 250S/6000	1772-B140#ZAB3	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	B*i*I 250M/3000	1773-B140#ZAB6	90	100	40-45	40-45	3-5	3 and larger	50 and larger	110 and larger

NOTE

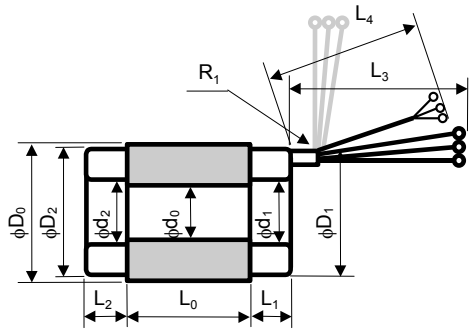
- R_1 is the minimum bending radius of power leads.
- Y, Z, and R_3 indicate a recommended outlet size at position X.
- If power leads or thermistor leads (THR leads) is too long, it may be cut to a usable length.
- A marking such as U, V, or W is applied at the end of each power lead. After cutting a power lead, make the power lead capable of being determined which marking is applied on it.
- The thermistor line of the *B*i*I 112SS/20000 extends from a tap of the power line, starting from a position 180 degrees out of phase. Provide a tap specific to the thermistor line at a position 180 degrees apart from the power line. An alternative is to draw the thermistor line together with the power line while winding the thermistor line along the external coil diameter.

	Model name	Type No. (A06B-)	Power leads cross-sectional area (mm^2)	Number of power leads	Diameter of power leads (mm)	Size of power lead crimp terminal	Power leads Connection
Standard type	** B*i*I 50S/30000	1612-B170#0AB8	2	3	2.8	M4	Connection A
	** B*i*I 50M/25000	1613-B170#1AB2	2	3	2.8	M4	Connection A
	B*i*I 50L/25000	1615-B120#ZAB8	2	6	2.8	M4	Connection B
	B*i*I 80S/20000	1621-B120#ZAB2	2	6	2.8	M5	Connection E
	B*i*I 80M/15000	1623-B170#ZAB1	2	3	2.8	None	Connection A
	B*i*I 80L/8000	1625-B170#ZAB1	2	3	2.8	M5	Connection A
	B*i*I 100S/12500	1641-B120#ZAB1	3.5	6	3.5	M5	Connection B
	B*i*I 112SS/20000	1661-B120#ZAB2	5.5	6	4.4	M6	Connection E
	B*i*I 112S/15000	1671-B120#ZAB1	14	6	6.5	M8	Connection E
	B*i*I 112M/15000	1673-B120#ZAB1	5.5	6	4.4	M6	Connection B
	B*i*I 112L/15000	1675-B100#ZAB1	14	6	6.5	M8	Connection D
	B*i*I 112LL/15000	1676-B100#ZAB1	14	6	6.5	M8	Connection D
	B*i*I 132M/14000	1713-B100#ZAB1	22	6	8.6	M8	Connection D
	B*i*I 132L/14000	1705-B140#ZAB1	14	12	6.5	M10	Connection H
	B*i*I 160S/13000	1721-B120#ZAB1	14	6	6.5	M6	Connection E
	B*i*I 160M/13000	1723-B120#ZAB1	14	6	6.5	M6	Connection E
	B*i*I 160L/13000	1725-B120#ZAB1	14	6	6.5	M6	Connection E
	B*i*I 160LL/13000	1726-B100#ZAB1	14	6	6.5	M8	Connection D
	B*i*I 170S/6000	1732-B120#1AB6	14	6	6.5	M8	Connection E
	B*i*I 170M/6000	1733-B120#1AB6	14	6	6.5	M8	Connection E
	B*i*I 180M/6000	1743-B100#ZAB1	14	6	6.5	M8	Connection D
	B*i*I 180L/6000	1745-B100#ZAB1	22	6	8.6	M8	Connection D
	B*i*I 180LL/8000	1746-B100#ZAB1	22	6	8.6	M8	Connection D
	B*i*I 200S/6000	1752-B120#2AB3	22	6	8.6	M8	Connection E
	B*i*I 200M/6000	1753-B120#ZAB3	22	6	8.6	M8	Connection E
	B*i*I 200L/6000	1755-B120#ZAB6	30	6	9.6	M10	Connection E
	B*i*I 250S/6000	1772-B140#ZAB3	14	12	6.5	M8	Connection J
	B*i*I 250M/3000	1773-B140#ZAB6	22	12	8.6	M8	Connection J

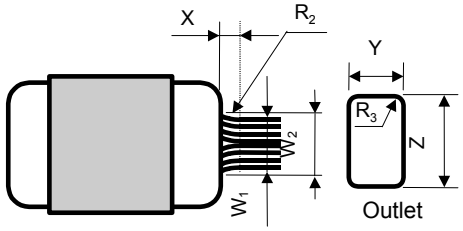
NOTE

- Thermistor leads (THR leads) are available in two types: the shield cable type and the solid wire type (using two solid wires). The average finished diameter of the shield cable type is 5.2 ±0.3 mm. Use the diameter of the thermistor lead (5.2) as the minimum bending radius. The models marked ** use the solid wire type. The average finished diameter of this type is 1.8 mm for each of the two wires.
- A crimp terminal is attached to each thermistor lead (THR lead).
- To obtain a rated output, use a cooling jacket or equivalent that shown in Section 1.3, “COOLING JACKET”. Motors are developed with those cooling jackets. Refer to Section 1.3, “COOLING JACKET”.
- Refer to Section 3.3, “POWER LEADS CONNECTIONS for details of power leads connection.
- Read Chapters 2, “GENERAL” and 3, “STATOR ASSEMBLY” before designing and assembling a spindle. The motor cannot be driven normally if handle incorrectly.

1.1.2 High-speed Type



Side view(cut away)



Upper view

Unit: mm

	Model name	Type No. (A06B-)	ϕD_0	ϕD_1	ϕD_2	ϕd_0	ϕd_1	ϕd_2	$L_0+L_1+L_2$	L_0	L_1	L_2	L_3	L_4
High-speed type	B*i*I 40S/70000	1601-B120#ZNB8	88±0.01	82^{+0}	82^{+0}	(44)	46^{-0}	46^{-0}	71	30	25^{+0}	16^{+0}	1000±20	1000±20
	B*i*I 40M/70000	1602-B170#0NB8	88±0.01	82^{+0}	82^{+0}	(44)	46^{-0}	46^{-0}	91	50	25^{+0}	16^{+0}	2000±30	2000±30
	B*i*I 60SS/50000	1616-B170#1NB8	110±0.01	106^{+0}	106^{+0}	(62)	63^{-0}	63^{-0}	106	45	34^{+0}	27^{+0}	2000±30	2000±30
	B*i*I 60S/50000	1617-B120#3NB8	110±0.01	106^{+0}	106^{+0}	(62)	63^{-0}	63^{-0}	145	70	43^{+0}	32^{+0}	2000±30	2000±30
	B*i*I 80S/40000	1631-B120#YNB8	150±0.01	150^{+0}	146^{+0}	(90)	91^{-0}	91^{-0}	135	56	44^{+0}	35^{+0}	2000±30	2000±30
	B*i*I 100S/20000	1641-B121#XNB7	156±0.01	144^{+0}	144^{+0}	(100)	101^{-0}	101^{-0}	200	110	46^{+0}	44^{+0}	2000±30	2000±30
	B*i*I 100S/30000	1641-B122#9PB8	156±0.01	150^{+0}	144^{+0}	(100)	101^{-0}	101^{-0}	210	110	58^{+0}	42^{+0}	2000±30	2000±30
	B*i*I 100L/30000	1655-B120#0NB8	180±0.01	176^{+0}	172^{+0}	(100)	103^{-0}	104^{-0}	310	200	68^{+0}	42^{+0}	2000±30	2000±30
	B*i*I 112S/20000	1662-B120#ZAB7	159±0.01	155^{+0}	155^{+0}	(115)	118^{-0}	118^{-0}	200	115	52^{+0}	33^{+0}	2500±30	2500±30
	B*i*I 112M/20000	1673-B100#YNB7	180±0.01	174^{+0}	174^{+0}	(115)	119^{-0}	119^{-0}	272	180	50^{+0}	42^{+0}	2000±30	2000±30
	B*i*I 112L/20000	1675-B100#YNB7	180±0.01	174^{+0}	174^{+0}	(115)	119^{-0}	119^{-0}	330	226	57^{+0}	47^{+0}	2000±30	2000±30
	B*i*I 112L/25000	1675-B140#XPB7	180±0.01	174^{+0}	174^{+0}	(115)	118^{-0}	118^{-0}	335	226	62^{+0}	47^{+0}	2000±30	2000±30
	B*i*I 160M/20000	1723-B140#YNB7	240±0.02	234^{+0}	234^{+0}	(160)	163^{-0}	163^{-0}	321	182	77^{+0}	62^{+0}	2000±30	2000±30
	B*i*I 160L/20000	1725-B140#YNB7	240±0.02	234^{+0}	234^{+0}	(160)	163^{-0}	163^{-0}	406	272	72^{+0}	62^{+0}	2000±30	2000±30
	B*i*I 160LL/20000	1726-B140#YNB7	240±0.02	234^{+0}	234^{+0}	(160)	161^{-0}	161^{-0}	466	332	72^{+0}	62^{+0}	2000±30	2000±30
	B*i*I 200S/10000	1752-B120#4BB6	300±0.03	292^{+0}	292^{+0}	(210)	216^{-0}	216^{-0}	302	170	73^{+0}	59^{+0}	2000±30	2000±30

NOTE

- A tolerance of D_0 represents a machining dimension. The core is laminated, and a distortion of about 0.1mm may occur in subsequent processes which include winding. However, the tolerance of D_0 is allowable for shrink fitting.
- The values in parentheses are for reference. These dimensions are managed by FANUC. It is not necessary to machine.
- To obtain a rated output, use a cooling jacket or equivalent that shown in Section 1.3, “COOLING JACKET”. Motors are developed with those cooling jackets. Refer to Section 1.3, “COOLING JACKET”.
- Read Chapters 2, “GENERAL” and 3, “STATOR ASSEMBLY” before designing and assembling a spindle. The motor cannot be driven normally if handle incorrectly.

Unit: mm

	Model name	Type No. (A06B-)	W_1	W_2	R_1	R_2	R_3	X	Y	Z
High-speed type	BiI 40S/70000	1601-B120#ZNB8	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	BiI 40M/70000	1602-B170#0NB8	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	BiI 60SS/50000	1616-B170#1NB8	20	30	10-15	10-15	3-5	3 and larger	20 and larger	40 and larger
	BiI 60S/50000	1617-B120#3NB8	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	BiI 80S/40000	1631-B120#YNB8	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	BiI 100S/20000	1641-B121#XNB7	30	40	25-30	25-30	3-5	3 and larger	25 and larger	50 and larger
	BiI 100S/30000	1641-B122#9PB8	50	60	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	BiI 100L/30000	1655-B120#0NB8	60	70	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	BiI 112S/20000	1662-B120#ZAB7	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	BiI 112M/20000	1673-B100#YNB7	60	70	25-30	30-35	3-5	3 and larger	25 and larger	80 and larger
	BiI 112L/20000	1675-B100#YNB7	50	60	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	BiI 112L/25000	1675-B140#XPB7	70	80	30-35	30-35	3-5	3 and larger	30 and larger	90 and larger
	BiI 160M/20000	1723-B140#YNB7	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	BiI 160L/20000	1725-B140#YNB7	80	90	35-40	35-40	3-5	3 and larger	40 and larger	100 and larger
	BiI 160LL/20000	1726-B140#YNB7	80	90	35-45	35-40	3-5	3 and larger	40 and larger	100 and larger
	BiI 200S/10000	1752-B120#4BB6	80	90	35-45	35-40	3-5	3 and larger	40 and larger	100 and larger

NOTE

- R_1 is the minimum bending radius of power leads.
- Y, Z, and R_3 indicate a recommended outlet size at position X.
- If power leads or thermistor leads (THR leads) is too long, it may be cut to a usable length.
  A marking such as U, V, or W is applied at the end of each power lead. After cutting a power lead, make the power lead capable of being determined which marking is applied on it.

	Model name	Type No. (A06B-)	Power leads cross-sectional area (mm^2)	Number of power leads	Diameter of power leads (mm)	Size of power lead crimp terminal	Power leads Connection
High-speed type	B*i*I 40S/70000	1601-B120#ZNB8	2	3	2.8	M4	Connection L
	** B*i*I 40M/70000	1602-B170#0NB8	3.5	3	3.5	M4	Connection L
	** B*i*I 60SS/50000	1616-B170#1NB8	3.5	3	3.5	M5	Connection L
	B*i*I 60S/50000	1617-B120#3NB8	8	6	5.1	M8	Connection N
	B*i*I 80S/40000	1631-B120#YNB8	8	6	5.1	M8	Connection M
	B*i*I 100S/20000	1641-B121#XNB7	8	6	5.1	M8	Connection E
	B*i*I 100S/30000	1641-B122#9PB8	14	6	6.5	M8	Connection N
	B*i*I 100L/30000	1655-B120#0NB8	14	6	6.5	M8	Connection E
	B*i*I 112S/20000	1662-B120#ZAB7	14	6	6.5	M8	Connection E
	B*i*I 112M/20000	1673-B100#YNB7	14	6	6.5	M8	Connection D
	B*i*I 112L/20000	1675-B100#YNB7	14	6	6.5	M8	Connection D
	B*i*I 112L/25000	1675-B140#XPB7	8	12	5.1	M8	Connection P
	B*i*I 160M/20000	1723-B140#YNB7	14	12	6.5	M8	Connection F
	B*i*I 160L/20000	1725-B140#YNB7	14	12	6.5	M8	Connection G
	B*i*I 160LL/20000	1726-B140#YNB7	14	12	6.5	M8	Connection Q
	B*i*I 200S/10000	1752-B120#4BB6	22	6	8.6	M8	Connection E

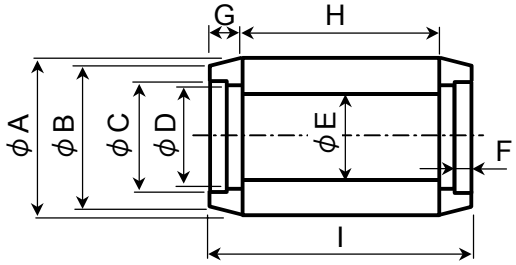
NOTE

- Thermistor leads (THR leads) are available in two types: the shield cable type and the solid wire type (using two solid wires). The average finished diameter of the shield cable type is 5.2 $\pm$0.3 mm. Use the diameter of the thermistor lead (5.2) as the minimum bending radius.
  The models marked ** use the solid wire type. The average finished diameter of this type is 1.8 mm for each of the two wires.
- A crimp terminal is attached to each thermistor lead (THR lead).
- To obtain a rated output, use a cooling jacket or equivalent that shown in Section 1.3, “COOLING JACKET”. Motors are developed with those cooling jackets. Refer to Section 1.3, “COOLING JACKET”.
- Refer to Section 3.3, “POWER LEADS CONNECTIONS for details of power leads connection.
- Read Chapters 2, “GENERAL” and 3, “STATOR ASSEMBLY” before designing and assembling a spindle. The motor cannot be driven normally if handle incorrectly.

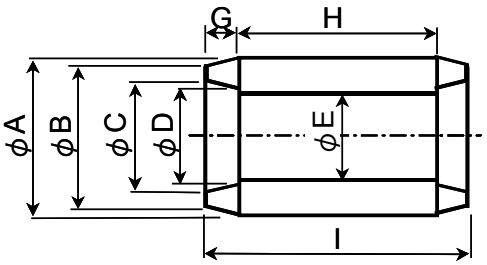
1.2 ROTOR

1.2.1 Dimensions of Rotor

Type A



Type C



Unit: mm

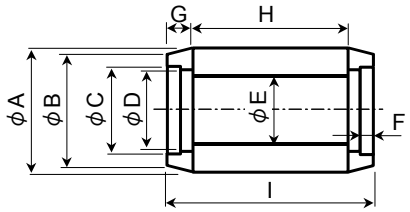
	Model name	Type No. (A06B-)	Type	ϕA	ϕB	ϕC	ϕD	ϕE	F	G	H	I
Standard type	BiI 50S/30000	1612-B170#0AB8	C	49±0.2 (48.6±0.01)	44	36.6	35.8	34.8	-	5	28	38
	BiI 50M/25000	1613-B170#1AB2	C	49±0.2 (48.6±0.01)	44	36.6	35.8	34.8	-	5	45	55
	BiI 50L/25000	1615-B120#ZAB8	C	49±0.2 (48.6±0.01)	44	38.3	35.8	34.8	-	5	90	100
	BiI 80S/20000	1621-B120#ZAB2	C	74.3+0.2/-0 (74.0±0.01)	73.4	53.5	51	41	-	7	56	70
	BiI 80M/15000	1623-B170#ZAB1	A	74.15±0.1 (73.90±0.01)	72	44	41.7	41	3	9	118	136
	BiI 80L/8000	1625-B170#ZAB1	A	74.15±0.1 (73.90±0.01)	72	44	41.7	41	3	9	168	186
	BiI 100S/12500	1641-B120#ZAB1	A	99.2 (99.00±0.01)	96	62	58.2	58	8	13	108	134
	BiI 112SS/20000	1661-B120#ZAB2	C	114.5+0.2/-0 (114.2±0.01)	89	84	80	74	-	11	78	100
	BiI 112S/15000	1671-B120#ZAB1	A	114.5+0.2/-0 (114.2±0.01)	111	76.5	74.4	74	5	15	113	143
	BiI 112M/15000	1673-B120#ZAB1	A	114.5+0.2/-0 (114.2±0.01)	111	76.5	74.4	74	5	15	178	208
	BiI 112L/15000	1675-B100#ZAB1	A	114.5+0.2/-0 (114.2±0.01)	111	76.5	74.4	74	5	15	224	254
	BiI 112LL/15000	1676-B100#ZAB1	A	114.5+0.2/-0 (114.2±0.01)	111	76.5	74.4	74	5	15	278	308
	BiI 132M/14000	1713-B100#ZAB1	C	131.5+0.3/-0 (131.2±0.01)	128	103	91	74	-	15	158	188
	BiI 132L/14000	1705-B140#ZAB1	A	131.5+0.3/-0 (131.2±0.01)	128	76.5	74.4	74	5	15	224	254
	BiI 160S/13000	1721-B120#ZAB1	A	159.2±0.1 (158.91±0.02)	155	104	102	101	7	18	148	184
	BiI 160M/13000	1723-B120#ZAB1	A	159.2+0.2/-0 (158.91±0.02)	155	104	102	101	7	18	180	216
	BiI 160L/13000	1725-B120#ZAB1	A	159.2+0.2/-0 (158.91±0.02)	155	104	102	101	7	18	270	306
	BiI 160LL/13000	1726-B100#ZAB1	A	159.0+0.2/-0 (158.72±0.02)	155	101.4	101.4	101	-	18	330	366
	BiI 170S/6000	1732-B120#1AB6	C	169.3+0.2/-0 (169.0±0.02)	165	121	129	110	-	15	148	178
	BiI 170M/6000	1733-B120#1AB6	C	169.3+0.2/-0 (169.0±0.02)	165	121	129	110	-	15	218	248

	Model name	Type No. (A06B-)	Type	ϕA	ϕB	ϕC	ϕD	ϕE	F	G	H	I
Standard type	B*i*I 180M/6000	1743-B100#ZAB1	A	188.7 (188.32±0.02)	187	127	125	124	5	18	210	246
	B*i*I 180L/6000	1745-B100#ZAB1	A	188.8 (188.48±0.02)	185	127	125	124	5	18	300	336
	B*i*I 180LL/8000	1746-B100#ZAB1	A	189.2 (188.48±0.02)	187	127	125	124	5	18	360	396
	B*i*I 200S/6000	1752-B120#2AB3	A	209.5+0.1/-0 (209.2±0.02)	204	150	146.5	146	4	15	168	198
	B*i*I 200M/6000	1753-B120#ZAB3	A	209.5±0.1 (209.2±0.02)	204	150	146.5	146	4	15	188	218
	B*i*I 200L/6000	1755-B120#ZAB6	A	209.5±0.1 (209.2±0.02)	204	150	146.5	146	4	15	248	278
	B*i*I 250S/6000	1772-B140#ZAB3	A	264.1+0.2/-0 (263.8±0.02)	260	-	168.5	168	-	21	230	272
	B*i*I 250M/3000	1773-B140#ZAB6	A	264.1+0.2/-0 (263.8±0.02)	260	-	168.5	168	-	21	350	392

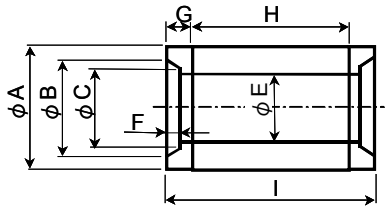
NOTE

- The tolerance of dimension I in the above table is all ±2 mm. This tolerance is determined by adding variations in dimensions G and H.
- The dimensions enclosed in parentheses under ϕA indicate finally finished dimensions. Finish the rotor into these dimensions. FANUC does not perform final finish machining.
- For type A rotors, finish ϕD and ϕE to the same dimension, and fit the ϕD section into the spindle by heat shrink fitting in the same way as for the ϕE section.
- For type B rotors, finish the inner surface of the rotor to obtain the uniform inner diameter throughout the whole length of the rotor except the F section, and fit the rotor into the spindle by heat shrink fitting. Relief machining is not permitted.
- When cutting fluid is used for machining, remove moisture completely from the core after machining.
- Machine on the parts designated by FANUC. Incorrect machining will affect the motor life. Read Chapter 4, “ROTOR ASSEMBLY” before machining.

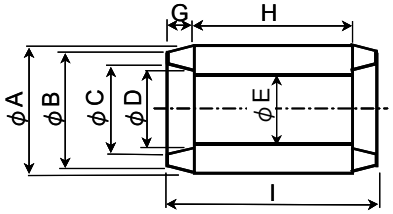
Type A



Type B



Type C

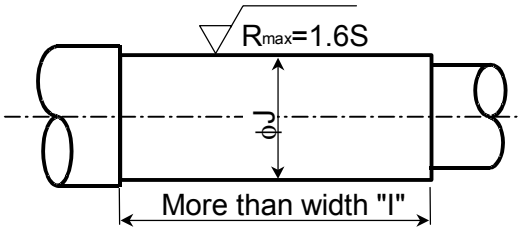


	Model name	Type No. (A06B-)	Type	ϕA	ϕB	ϕC	ϕD	ϕE	F	G	H	I
High-speed type	B*i*I 40S/70000	1601-B120#ZNB8	B	44.0 (43.4±0.01)	31	28	-	28	(6.8)	8	28	44
	B*i*I 40M/70000	1602-B170#0NB8	B	44.0 (43.4±0.01)	31	28	-	28	(6.8)	8	48	64
	B*i*I 60SS/50000	1616-B170#1NB8	B	61.4 (61.1±0.01)	-	40.3	-	37	(8.8)	11.5	45	68
	B*i*I 60S/50000	1617-B120#3NB8	B	61.4 (61.1±0.01)	-	40.3	-	37	(8.8)	11.8	68	91.6
	B*i*I 80S/40000	1631-B120#YNB8	B	90±0.1 (89.4±0.01)	-	-	-	59.5±0.1	-	12.8	56	81.6
	B*i*I 100S/20000	1641-B121#XNB7	B	99.3 +0.2/-0 (98.6±0.01)	-	-	-	70	-	12.5	108	133
	B*i*I 100S/30000	1641-B122#9PB8	B	99.1 (98.8±0.01)	-	73.5	-	70	(10.3)	12.8	108	133.6
	B*i*I 100L/30000	1655-B120#0NB8	B	98.9 (98.6±0.01)	98.4	61.2	-	58	(10)	12.5	198	223
	B*i*I 112S/20000	1662-B120#ZAB7	C	114.5 +0.2/-0 (114.2±0.01)	89	84	80	74	-	11	113	135
	B*i*I 112M/20000	1673-B100#YNB7	B	113.7+0.2/-0 (113.4±0.01)	(76.8)	(76)	-	74	(11.6)	(14.8)	178	207
	B*i*I 112L/20000	1675-B100#YNB7	B	113.7+0.2/-0 (113.4±0.01)	(76.8)	(76)	-	74	(11.6)	(14.8)	224	254
	B*i*I 112L/25000	1675-B140#XPB7	B	113.7+0.2/-0 (113.4±0.01)	(76.8)	(76.8)	-	74	(11.1)	(14.8)	224	254
	B*i*I 160M/20000	1723-B140#YNB7	B	159.8±0.2 (158.92±0.01)	105± 0.5	105± 0.5	-	101	(13.8)	(17.8)	180	216
	B*i*I 160L/20000	1725-B140#YNB7	B	159.2+0.3/-0 (158.92±0.01)	(105.1)	(105.1)	-	101.4	(13.8)	(17.8)	270	306
	B*i*I 160LL/20000	1726-B140#YNB7	B	159.2+0.3/-0 (158.92±0.01)	(105.1)	(105.1)	-	101.4	(13.8)	(17.8)	330	366
	B*i*I 200S/10000	1752-B120#4BB6	A	209.5+0.1/-0 (209.2±0.02)	(205)	(150)	146.5	146	(4)	(15)	168	198

NOTE

- The tolerance of dimension l in the above table is all ±2 mm. This tolerance is determined by adding variations in dimensions G and H.
- The dimensions enclosed in parentheses under ϕA indicate finally finished dimensions. Finish the rotor into these dimensions. FANUC does not perform final finish machining.
- For type A rotors, finish ϕD and ϕE to the same dimension, and fit the ϕD section into the spindle by heat shrink fitting in the same way as for the ϕE section.
- For type B rotors, finish the inner surface of the rotor to obtain the uniform inner diameter throughout the whole length of the rotor except the F section, and fit the rotor into the spindle by heat shrink fitting. Relief machining is not permitted.
- When cutting fluid is used for machining, remove moisture completely from the core after machining.
- Machine on the parts designated by FANUC. Incorrect machining will affect the motor life. Read Chapter 4, “ROTOR ASSEMBLY” before machining.

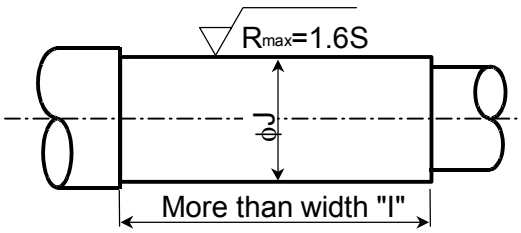
1.2.2 Size of Spindle Shaft



Unit: mm

	Model name	Type No. (A06B-)	Rotor inner surface not machined	Rotor inner surface machined	
			ϕJ	ϕJ	Interference for shrinking
Standard type	Bi I 50S/30000	1612-B170#0AB8	34.827 ≤ J ≤ 34.832	35.0 ≤ J ≤ 35.5	10 to 30μm
	Bi I 50M/25000	1613-B170#1AB2	34.827 ≤ J ≤ 34.832	35.0 ≤ J ≤ 35.5	10 to 30μm
	Bi I 50L/25000	1615-B120#ZAB8	34.827 ≤ J ≤ 34.832	35.0 ≤ J ≤ 35.5	10 to 30μm
	Bi I 80S/20000	1621-B120#ZAB2	-	41.4 ≤ J ≤ 42.0	20 to 40μm
	Bi I 80M/15000	1623-B170#ZAB1	-	41.7 ≤ J ≤ 42.0	25 to 65μm
	Bi I 80L/8000	1625-B170#ZAB1	-	41.7 ≤ J ≤ 42.0	25 to 65μm
	Bi I 100S/12500	1641-B120#ZAB1	-	58.4 ≤ J ≤ 59.0	30 to 70μm
	Bi I 112SS/20000	1661-B120#ZAB2	-	74.6 ≤ J ≤ 77.0	60 to 90μm
	Bi I 112S/15000	1671-B120#ZAB1	-	74.6 ≤ J ≤ 77.0	40 to 80μm
	Bi I 112M/15000	1673-B120#ZAB1	-	74.6 ≤ J ≤ 77.0	40 to 80μm
	Bi I 112L/15000	1675-B100#ZAB1	-	74.6 ≤ J ≤ 77.0	40 to 80μm
	Bi I 112LL/15000	1676-B100#ZAB1	-	74.6 ≤ J ≤ 77.0	40 to 80μm
	Bi I 132M/14000	1713-B100#ZAB1	-	74.6 ≤ J ≤ 77.0	50 to 80μm
	Bi I 132L/14000	1705-B140#ZAB1	-	74.6 ≤ J ≤ 77.0	50 to 80μm
	Bi I 160S/13000	1721-B120#ZAB1	-	101.4 ≤ J ≤ 103.0	60 to 100μm
	Bi I 160M/13000	1723-B120#ZAB1	-	101.4 ≤ J ≤ 103.0	60 to 100μm
	Bi I 160L/13000	1725-B120#ZAB1	-	101.4 ≤ J ≤ 103.0	60 to 100μm
	Bi I 160LL/13000	1726-B100#ZAB1	-	101.4 ≤ J ≤ 103.0	60 to 100μm
	Bi I 170S/6000	1732-B120#1AB6	-	110.4 ≤ J ≤ 113.0	35 to 75μm
	Bi I 170M/6000	1733-B120#1AB6	-	110.4 ≤ J ≤ 113.0	35 to 75μm
	Bi I 180M/6000	1743-B100#ZAB1	-	124.4 ≤ J ≤ 126.1	40 to 80μm
	Bi I 180L/6000	1745-B100#ZAB1	-	124.4 ≤ J ≤ 126.1	40 to 80μm
	Bi I 180LL/8000	1746-B100#ZAB1	-	124.4 ≤ J ≤ 126.1	40 to 80μm
	Bi I 200S/6000	1752-B120#2AB3	-	146.4 ≤ J ≤ 147.0	40 to 80μm
	Bi I 200M/6000	1753-B120#ZAB3	-	146.4 ≤ J ≤ 147.0	40 to 80μm
	Bi I 200L/6000	1755-B120#ZAB6	-	146.4 ≤ J ≤ 147.0	40 to 80μm
	Bi I 250S/6000	1772-B140#ZAB3	-	168.4 ≤ J ≤ 170.0	37 to 67μm
	Bi I 250M/3000	1773-B140#ZAB6	-	168.4 ≤ J ≤ 170.0	37 to 67μm

NOTE
- For a model for which no data is indicated for "Rotor inner surface not machined," machine the inner surface of the rotor and spindle so that the specified range of the "interference for shrinking" is reserved. Determine the diameter of the spindle within the range indicated as dimension J in the table.
- For a model for which data is indicated for “Rotor inner surface not machined,” no inner surface machining is recommended. Finish the spindle within the dimension J range. When machining the inner surface of the rotor, follow the above note.
- When cutting fluid is used for machining, remove moisture completely from the core after machining.
- Machine on the parts designated by FANUC. Incorrect machining will affect the motor life. Read Chapter 4, “ROTOR ASSEMBLY” before machining.



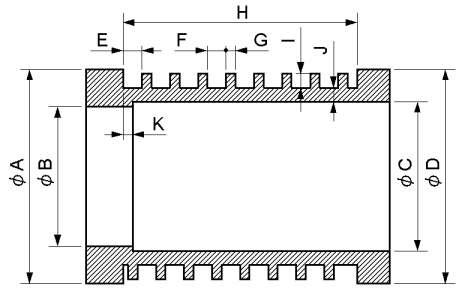
Unit: mm

	Model name	Type No. (A06B-)	Rotor inner surface	Rotor inner surface machined	
			ϕJ	ϕJ	Interference for shrinking
High-speed type	BiI 40S/70000	1601-B120#ZNB8	28.090 ≤ J ≤ 28.095	-	53 to 63μm
	BiI 40M/70000	1602-B170#0NB8	28.090 ≤ J ≤ 28.095	-	53 to 63μm
	BiI 60SS/50000	1616-B170#1NB8	-	37 ≤ J ≤ 39	50 to 80μm
	BiI 60S/50000	1617-B120#3NB8	-	37 ≤ J ≤ 39	50 to 80μm
	BiI 80S/40000	1631-B120#YNB8	-	J=60.2	110 to 130μm
	BiI 100S/20000	1641-B121#XNB7	-	70.4 ≤ J ≤ 70.5	35 to 55μm
	BiI 100S/30000	1641-B122#9PB8	-	70.4 ≤ J ≤ 70.5	95 to 120μm
	BiI 100L/30000	1655-B120#0NB8	-	58 ≤ J ≤ 60	75 to 105μm
	BiI 112S/20000	1662-B120#ZAB7	-	74.4 ≤ J ≤ 77.0	60 to 90μm
	BiI 112M/20000	1673-B100#YNB7	-	74.4 ≤ J ≤ 77.0	115 to 130μm
	BiI 112L/20000	1675-B100#YNB7	-	74.4 ≤ J ≤ 77.0	115 to 130μm
	BiI 112L/25000	1675-B140#XPB7	-	74.4 ≤ J ≤ 75.0	125 to 145μm
	BiI 160M/20000	1723-B140#YNB7	101.13 ≤ J ≤ 101.14	101.4 ≤ J ≤ 103.0	130 to 155μm
	BiI 160L/20000	1725-B140#YNB7	-	101.4 ≤ J ≤ 103.0	130 to 155μm
	BiI 160LL/20000	1726-B140#YNB7	-	101.4 ≤ J ≤ 103.0	130 to 155μm
	BiI 200S/10000	1752-B120#4BB6	-	146.4 ≤ J ≤ 147.0	110 to 150μm

NOTE

- For a model for which no data is indicated for "Rotor inner surface not machined," machine the inner surface of the rotor and spindle so that the specified range of the "interference for shrinking" is reserved. Determine the diameter of the spindle within the range indicated as dimension J in the table.
- For a model for which data is indicated for “Rotor inner surface not machined,” no inner surface machining is recommended. Finish the spindle within the dimension J range. When machining the inner surface of the rotor, follow the above note.
- When cutting fluid is used for machining, remove moisture completely from the core after machining.
- Machine on the parts designated by FANUC. Incorrect machining will affect the motor life. Read Chapter 4, “ROTOR ASSEMBLY” before machining.

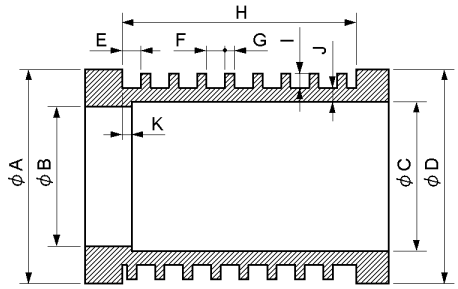
1.3 COOLING JACKET (REFERENCE)



Unit: mm

	Model name	Type No. (A06B-)	ϕA	ϕB	ϕC	ϕD	E	F	G	H	I	J	K
Standard type	BiI 50S/30000	1612-B170#0AB8	127	87	88	120	18	11	4	54	7	11	11
	BiI 50M/25000	1613-B170#1AB2	127	87	88	120	18	11	4	69	7	11	11
	BiI 50L/25000	1615-B120#ZAB8	127	87	88	120	18	11	4	116	7	11	11
	BiI 80S/20000	1621-B120#ZAB2	150	119	120	145	21	16.5	3.5	87	6.8	6	14
	BiI 80M/15000	1623-B170#ZAB1	144	119	120	145	10	21.5	3.5	121.5	6	5.5	1
	BiI 80L/8000	1625-B170#ZAB1	144	119	120	145	10	21.5	3.5	171.5	6	5.5	1
	BiI 100S/12500	1641-B120#ZAB1	177	155	156	180	10	20	5	102	5	5.5	-4
	BiI 112SS/20000	1661-B120#ZAB2	195	158	159	191	20	8.5	3.5	139	11.5	6.5	28
	BiI 112S/15000	1671-B120#ZAB1	230	178	180	220	20	8.5	4.5	130	10	15	5
	BiI 112M/15000	1673-B120#ZAB1	230	178	180	220	20	8.5	4.5	195	10	15	5
	BiI 112L/15000	1675-B100#ZAB1	230	178	180	220	20	8.5	4.5	241	10	15	5
	BiI 112LL/15000	1676-B100#ZAB1	230	178	180	220	20	8.5	4.5	295	10	15	5
	BiI 132M/14000	1713-B100#ZAB1	302	238	240	290	27	10	5	209	13.8	14	14
	BiI 132L/14000	1705-B140#ZAB1	292	208	210	280	22	10	6	273	21.8	16	14
	BiI 160S/13000	1721-B120#ZAB1	302	238	240	290	15	12	4	227	14.8	14	31.5
	BiI 160M/13000	1723-B120#ZAB1	302	238	240	290	25	12	4	259	14.8	14	31.5
	BiI 160L/13000	1725-B120#ZAB1	302	238	240	290	25	12	4	349	14.8	14	31.5
	BiI 160LL/13000	1726-B100#ZAB1	312	238	240	300	32.5	13	5	408	16	18	26
	BiI 170S/6000	1732-B120#1AB6	264	240	242	267	32	13	5	200	16	18	26
	BiI 170M/6000	1733-B120#1AB6	264	240	242	267	32	13	5	270	16	18	26
	BiI 180M/6000	1743-B100#ZAB1	315	286	292	350	21	14	4	240	5	9	24
	BiI 180L/6000	1745-B100#ZAB1	333	288	292	329	26	11	3	343	10	11	20.5
	BiI 180LL/8000	1746-B100#ZAB1	336	288	292	336	16	11	4	361	5	17	-11
	BiI 200S/6000	1752-B120#2AB3	353	298	300	348	34	14	5	220	14.8	12	16
	BiI 200M/6000	1753-B120#ZAB3	353	298	300	348	34	14	5	240	14.5	12	25
	BiI 200L/6000	1755-B120#ZAB6	353	298	300	348	34	14	5	300	14.5	12	25
	BiI 250S/6000	1772-B140#ZAB3	446	366	370	443	25	14	4	282	21.5	15.5	13
	BiI 250M/3000	1773-B140#ZAB6	470	366	370	435	25	14	4	367	15.5	18	5

NOTE
- Recommended material is FC iron.
- These data do not include interference for the stator shrink fitting. Calculate the proper interference to fit the stator correctly. Refer to Chapter 3, “STATOR ASSEMBLY” for details of interference.
- These cooling jacket were used for test of built-in spindle motor at FANUC. These dimensions are just for reference. But the rated output may be changed if the dimensions vary much from these. Because this is one of the cooling conditions.
- Number of spirals are not the same with the figure above. Calculate the actual number of spirals using data shown in the table.



Unit: mm

	Model name	Type No. (A06B-)	ϕA	ϕB	ϕC	ϕD	E	F	G	H	I	J	K
High-speed type	BiI 40S/70000	1601-B120#ZNB8	120	87	88	120	6	6	2	46	7.5	8	4.5
	BiI 40M/70000	1602-B170#0NB8	120	87	88	120	6	6	2	66	7.5	8	4.5
	BiI 60SS/50000	1616-B170#1NB8	152	107	110	145	18	11	4	66	11.3	8.5	10.4
	BiI 60S/50000	1617-B120#3NB8	152	107	110	145	18	11	4	90	11.3	8.5	10.4
	BiI 80S/40000	1631-B120#YNB8	190	148	150	180	17	9	5	78	9	9	10.5
	BiI 100S/20000	1641-B121#XNB7	177	155	156	180	10	20	5	102	5	5.5	-4
	BiI 100S/30000	1641-B122#9PB8	177	155	156	180	10	20	5	102	5	5.5	-4
	BiI 100L/13000	1655-B120#0NB8	232	178	180	220	10	20	5	227	11.3	10.1	9.5
	BiI 112S/20000	1662-B120#ZAB7	207	158	159	195	19	8.5	3.5	150	11	8.5	10
	BiI 112M/20000	1673-B100#YNB7	230	178	180	220	20	8.5	4.5	195	10	15	5
	BiI 112L/20000	1675-B100#YNB7	230	178	180	220	20	8.5	4.5	241	10	15	5
	BiI 112L/25000	1675-B140#XPB7	230	178	180	220	20	8.5	4.5	241	10	15	5
	BiI 160M/20000	1723-B140#YPB7	302	238	240	290	25	12	4	259	14.8	14	31.5
	BiI 160L/20000	1725-B140#YNB7	302	238	240	290	25	12	4	349	14.8	14	31.5
	BiI 160LL/20000	1726-B140#YNB7	312	238	240	300	32.5	13	5	408	16	18	26
	BiI 200S/10000	1752-B120#4BB6	353	298	300	348	34	14	5	220	14.8	12	16

NOTE

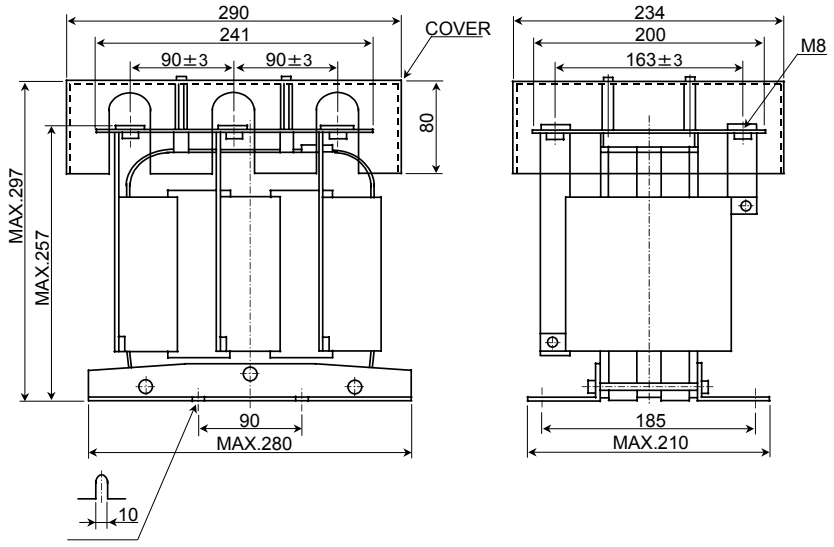
- Recommended material is FC iron.
- These data do not include interference for the stator shrink fitting. Calculate the proper interference to fit the stator correctly. Refer to Chapter 3, “STATOR ASSEMBLY” for details of interference.
- These cooling jacket were used for test of built-in spindle motor at FANUC. These dimensions are just for reference. But the rated output may be changed if the dimensions vary much from these. Because this is one of the cooling conditions.
- Number of spirals are not the same with the figure above. Calculate the actual number of spirals using data shown in the table.

1.4 REACTOR

When a specification number is indicated in the AC reactor column of a motor model in the table presented in Chapter 1, "SPECIFICATIONS", in Part I, "SPECIFICATIONS", a reactor must be installed between the amplifier (αiSP) and the motor.
Connect the following reactor specified for each model.
For reactor connection, refer to "2.5 CABLE CONNECTION (OUTLINE)" in "II. INSTRUCTION."

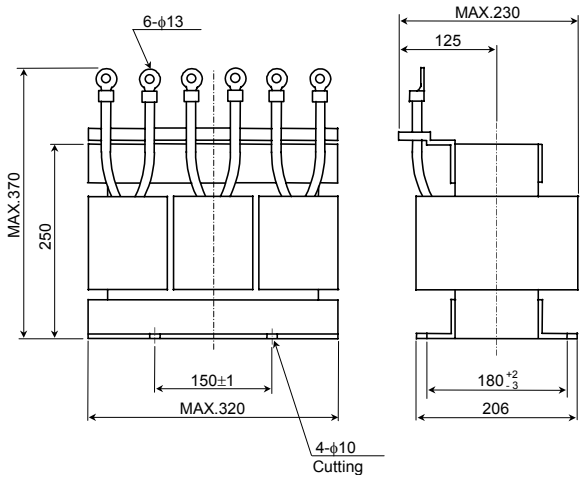
(Specification number : A81L-0001-0142)

Inductance: 0.08 mH, three phases, rated current: 180 A,
insulation class: H, highest temperature: 125°C, weight: 30 kg



(Specification number : A81L-0001-0154)

Inductance: 0.08 mH, three phases, rated current: 180 A,
insulation class: H, highest temperature: 115°C, weight: 58 kg



NOTE

- If the specified reactor is not used, the life of the motor may adversely be affected considerably.
- Consider the setting place of the reactor. There is a possibility of high temperature rise up to about 100°C.
- Protect the reactor from oil, water and conductive dust.
- These are sample drawing. Actual figure may be different from the drawing above.
- The A81L-0001-0142 is supplied with an acrylic cover on the terminals.

2 GENERAL

2.1 NOTES

Prohibition against machining any part that is not designated by FANUC

Note the following points to use built-in spindle motors properly.

> ⚠ **CAUTION**
> 1 Never machine the stator. Also never machine any pin hole for fixing the stator.
> 2 Do not machine parts of the rotor unless designated by FANUC. For details, refer to Chapter 4, “ROTOR ASSEMBLY".

Liquid cooling

FANUC's built-in spindle motors are developed based on liquid cooling. You will not obtain the rated output by air cooling. Use liquid cooling system so that the rated output can be obtained.

Recommended coolant : ISO VG2 (e.g. Idemitsu Super Multi 2)

Be sure to use a coolant for which a manufacturing safety data sheet (MSDS) is issued. When handing the coolant, refer to the data sheet. When disposing of coolant, follow the related government and local laws and rules.

Thermistor

Do not cool the thermistor locally. Over heat of motor may not be detected. A thermistor is located in the coil in the power lead outlet of the stator.

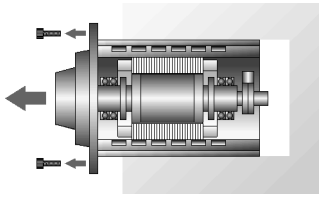
> **NOTE**
> In normal conditions, the thermistor resistance is 55 to 68 kΩ at a temperature of 20°C.

Easy maintenance

Consider some structure for easy maintenance.

The structure that stator, rotor and sensor can be disassembled by each unit (spindle unit) is preferable.

Be sure to prepare a spare spindle unit for replacement.



Dry condition

A built-in spindle motor is an electric component. It may be damaged by liquid like water and oil. Therefore keep away from these. And also, keep away from the outer air. To supply air into a spindle, use complete dry air, if not water will condense on and in the motor. Air containing moisture may cause failure when it condenses in the motor.

Coolant

Take measures not to allow coolant to penetrate into the spindle. Avoid using synthetic coolants and strong alkali coolants.

Record the manufacturing number

Write down and remember the serial number on the lead wire of stator, and the manufacturing number on the side of rotor, so that you can find the manufacturing number of the motor that is used in the machine tool when maintenance.

Check resistance and insulation

Before and after assembling a spindle, check the resistance and insulation of winding. And also, check these on regular intervals.

> ⚠ **WARNING**
> Shut down the power supply and disconnect the leads which are connected to the amplifier before measuring to prevent an electric shock.
> And insulate the terminals that are not used.

- Winding resistance

Use milli-ohm meter to measure the winding resistance according to the following procedure. Insulate the terminals that are not used while measuring. For details of the measuring method and winding resistance, refer to Section 2.2, "CHECKING THE WINDING RESISTANCE."

> **NOTE**
> Use milli-ohm meter to measure the resistance. General ohm meter cannot measure the resistance correctly.

- Insulation between winding and frame

Measure at 500VDC with mega-ohm tester. And judge according to following.

Over 100MΩ
: Good

10 - 100MΩ
: Deterioration has begun. It does not affect normal use. But check the insulation on regular intervals.

1 - 10MΩ
: Special care is required. Check the insulation on regular intervals.

Under 1MΩ
: Damaged. Change the motor to the new one.

> ⚠ **CAUTION**
> Shut down the power supply and disconnect the leads connected to the amplifier before checking the resistance and insulation to prevent an electric shock. Also insulate the terminals that are not used.

2.2 PROTECTION CLASS (WATER AND DUST PROOF)

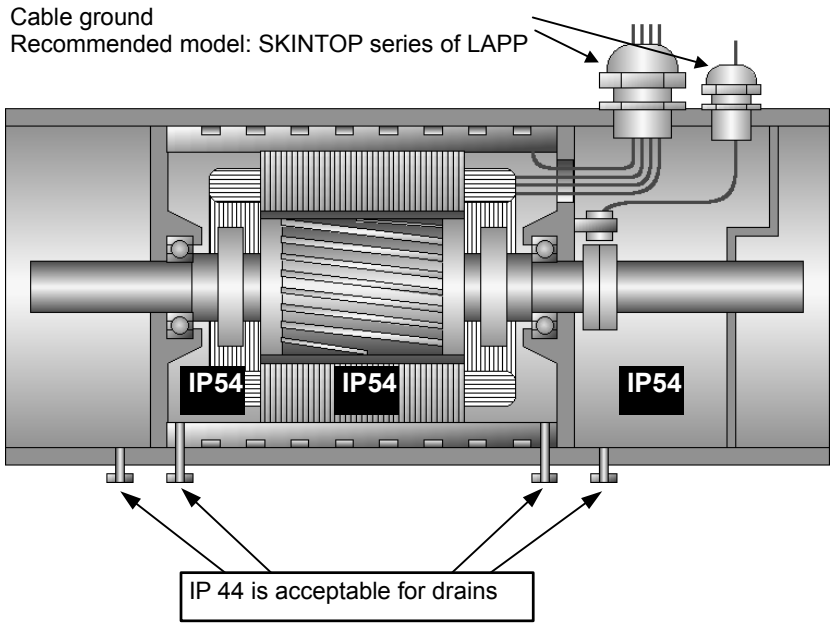
Protection class of a spindle should be IP54 or more, and the part of drain should be IP44 or more.
(Refer to the IEC34-5 standard for details of IP.)

When appropriate protection is not maintained, contamination like oil, water, cutting dust and so on have to be removed through drains. Some structure of the spindle has to be prepared so that the contamination cannot reach the motor and sensor.

When you need the lubrication system using oil and air inside a spindle, an insulating oil has to be used for lubrication. And a drain also has to be prepared to remove the oil and its mist from the spindle.

Recommended insulating oil
for cooling : Idemitsu Super Multi 2 (ISO VG2)
for lubrication : Mulpose 32, Nippon oil Corporation

(When oil and air lubrication is used)



Example of IP44 drain:
6 - 10mm of drain hole diameter, with net of 1mm or less meshes.

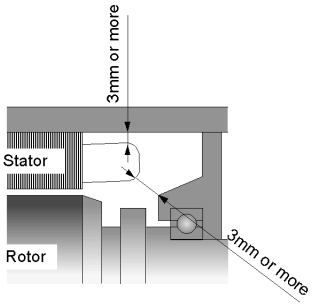
⚠ CAUTION
FANUC cannot guarantee the normal operation and safety, when the motor is not protected from contamination.

NOTE
When a motor of the plastic mold stator type (TYPE M) is used, it must be handled in the same way as described above.

2.3 CLEARANCE AND CREEPAGE (DISTANCE FOR INSULATION)

Clearance

Clearance between windings and other metallic materials has to be 3mm or more (For TYPE M, 1 mm or more), and this condition has to be applied for all directions of windings. These are described in IEC664-1. Refer to IEC664-1 for details to conform to CE marking.



Creepage distance

Creepage distance depends on materials used for insulation. In the case of general plastic material under IP54 condision, it has to be 2.5mm or more. Refer to IEC644-1 for details.

NOTE
Clearance and creepage distance described here change depending on environment and materials. Therefore confirm actual value that is suitable for your machine system.

Terminal block and connector

Use IEC- or UL-certified terminal blocks and connectors for power leads connection when required.
For the clearance and creepage distance between terminals, conform to IEC664-1.

2.4 SATISFYING STANDARDS

Note on assembly

When installing a built-in spindle motor on a machine, satisfy Article 19 of IEC60204-1. For details, refer to the standard.

IEC60204-1 (excerpts from the standard)

19 TESTS AND VERIFICATION

19.1 GENERAL

This standard specifies general requirements for electric equipment mounted on machines. Tests related to special types of machines are specified in specific product standards. If no product standard specific to a machine is specified, one or more tests listed below may be conducted as appropriate tests, but continuity in the protection bonding circuit shall always be verified (refer to Article 19.2).

- Verification of the match between electric equipment and technical document
- Continuity in the protection bonding circuit (Refer to Article 19.2.)
- Insulation resistance test (Refer to Article 19.3.)
- Voltage test (Refer to Article 19.4.)
- Protection against residual voltage (Refer to Article 19.5.)
- Function test (Refer to Article 19.6.)

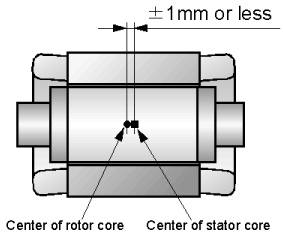
It is desirable to conduct the above tests in the listed order. If electric equipment is modified, the requirements in Article 19.7 shall be applied.

(The rest is omitted.)

2.5 DEVIATION

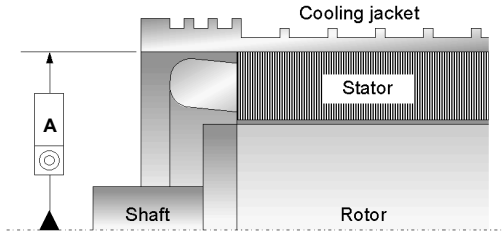
Deviation of stator and rotor

Deviation between center of stator core and center of rotor core must be ±1mm or less. (The rotor core does not extend off the end faces of the stator core.) Over 1mm deviation causes reduction of output power.



Eccentricity of stator and cooling jacket

To prevent the stator from being eccentric, the eccentricity of the inner wall of the cooling jacket to the spindle center must satisfy the following:



Rotor dimension	Eccentricity A of inner wall of jacket (mm)
Less than 90 mm	0.025 max
90 mm or more	0.05 max

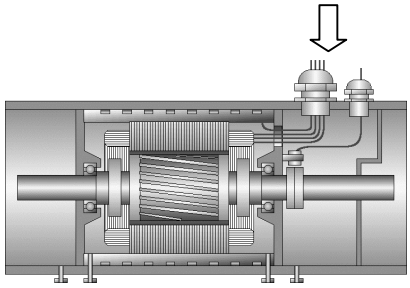
2.6 MEASURES AGAINST PENETRATION OF FOREIGN MATTER

Motors are electric products driven on a high voltage. If water, lubricant, or coolant penetrates into a motor, the insulation performance lowers, which can cause electrical leak or short-circuit. This can not only damage the motor but also lead to very dangerous accidents such as electrical shock. In particular, coolant remaining in the motor can result in serious damage to the motor; for example, materials that make up the stator can deteriorate quickly. This section provides several notes on the structure of a spindle with a built-in spindle motor, to prevent penetration of foreign matter and use the motor while maintaining its electrical properties and safety. Read the following as reference information to use the motor for extended periods of time.

Measures against penetration through outlets of power and signal wires

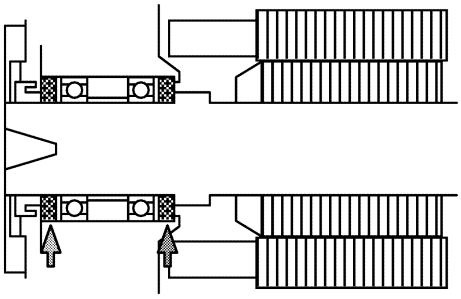
- Parts from which power and signal wires are drawn are generally open, and so foreign matter can easily penetrate through these parts. Therefore such a part is one of those parts that most require preventive measures against penetration.
- FANUC recommends the use of a cable gland to prevent penetration. The recommended product is indicated below. For details of the cable gland, contact the manufacturer.

[Recommended product]
Manufacturer: LAPP
Name: SKINTOP series



Measures against penetration through rotational slide movement parts

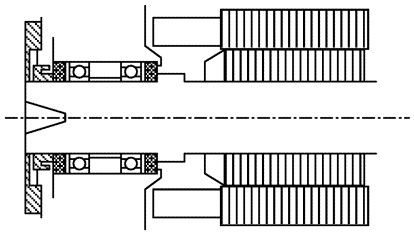
- When insulating oil is used for bearing lubrication, measures against possible penetration of the oil into the motor need to be considered.
- To prevent penetration, for example, install an oil seal between the shaft and the bearing case.



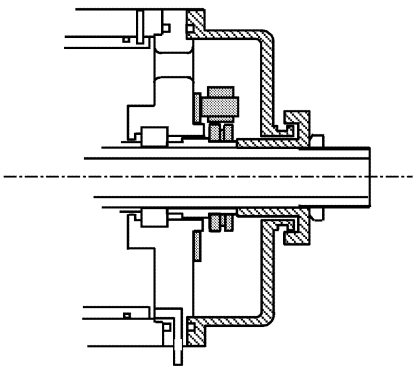
Example of preventing oil penetration by oil seal (shaded area)

Using a labyrinth structure for penetration prevention

A labyrinth structure (indicated by hatching in the figure below) is generally useful for preventing penetration of foreign matter from the front and rear ends of the spindle. This preventive method can be further enhanced by installing a dust seal (shaded area in the figure) behind the labyrinth structure and introducing air pressure into the spindle to blow foreign matter off. Use of a dust seal only is not enough for preventing penetration of coolant. Be sure to use a labyrinth structure and air pressure (air blow) together with the dust seal.



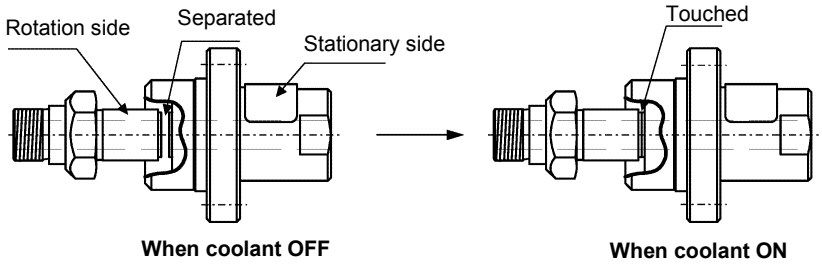
Example of using a labyrinth structure at the front end of the spindle (hatched area)
Example of a dust seal structure (shaded area)



Example of using a labyrinth structure at the rear end of the spindle (hatched area)

Using a drain structure for penetration prevention

- For a spindle that uses a spindle through coolant structure, measures against penetration of coolant leaking from the lip (sealed surface) of the rotary joint must be taken.
- The rotary joint is a consumable part. Check and replace it periodically.



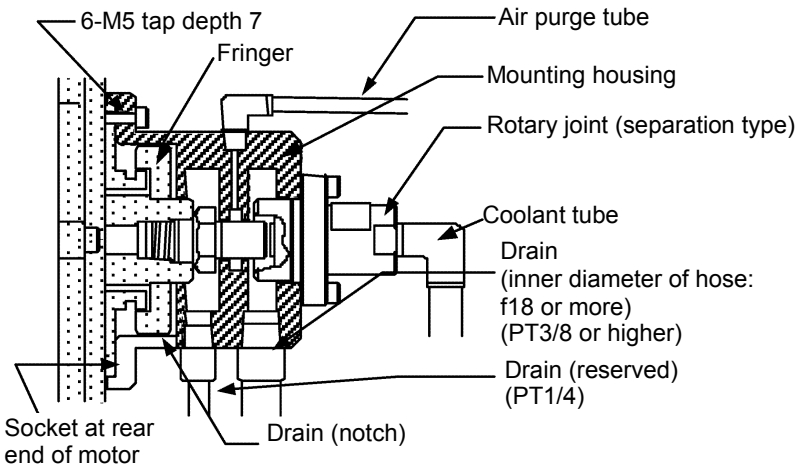
Example of a rotary joint

- Use of a drain structure is recommended to drain leaks from the rotary joint. Specifically, add a drain tube and provide a large notch not to create a closed space in the periphery of the lip (seal surface), so that coolant does not remain around the lip.

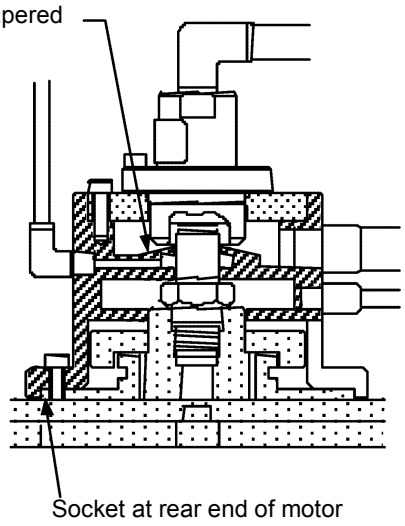
- In addition to the above measures, it is important to test the actual machine to ensure that even when the end user should carelessly install a tool that does not support the spindle through coolant structure, coolant does not enter the spindle.

The following shows examples in which a rotary joint is attached to the rear end of a through type motor.

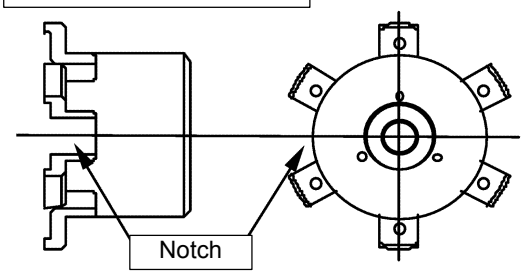
When the motor is installed horizontally



When the motor is installed downward vertically



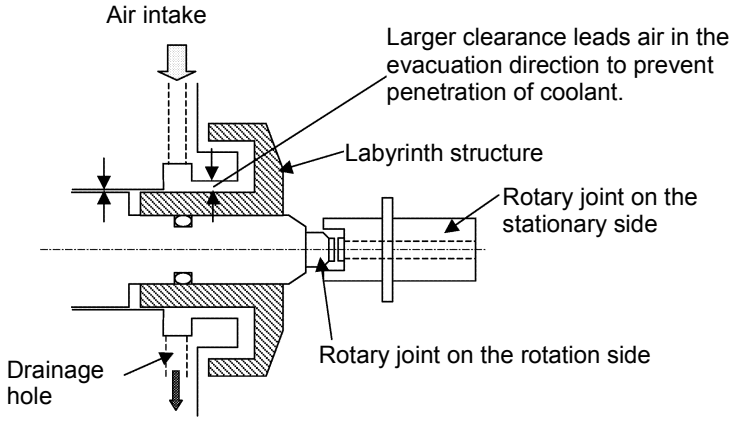
Notch in mounting housing



Example of measures against coolant prevention when a rotary joint is attached to a through type motor

Using air pressure for penetration prevention

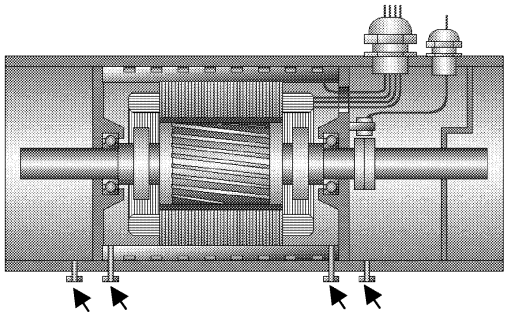
- Penetration of foreign matter is prevented by ejecting air toward the path through which foreign matter is expected to penetrate (air seal). To do this, the pressure inside the spindle that includes the motor is increased by applying air from the outside.
- Supply the air seal when the operation ready signal on the machine side is ON, and stop the air seal when the signal is OFF. In this case, the operation ready signal on the machine side should be turned OFF about two hours after the spindle is stopped. This can prevent air and mist from being drawn into the spindle due to temperature drop in the spindle.
- It is important that air used should be dry and clean air that has undergone filters and a mist separator.
- When used with the labyrinth structure and drain structure mentioned before, this method is very effective in penetration prevention. (See the figure below.)
- As a result of the use of external air, if air flows even when the pressure inside the spindle is made positive, negative pressure may partly exist in rare cases. Then, contrary to the original purpose, coolant may be drawn into the spindle. Therefore, whenever applying external air to the inside of the spindle, be sure to check that positive air is observed in every breathing part.



Example of using both air pressure and a labyrinth structure as preventive measures (at the rear end of the spindle)

Measures to be taken when foreign matter has penetrated into the motor

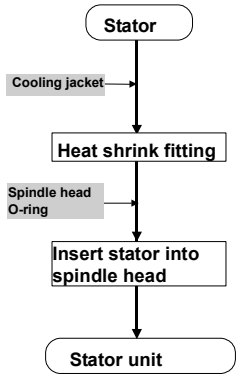
- It is most important that penetration of foreign matter into the motor is prevented by taking measures described before. However, in case penetration should occur, provide drainage holes in the space where the motor is built.
- If drainage holes are not provided, foreign matter penetrating into the motor resides there, which will degrade the insulation of the motor earlier than when drainage holes are provided.



Example of providing drainage holes

3 STATOR ASSEMBLY

This chapter describes how to assemble a stator. An outline is shown below. Read the notes described above in addition to this chapter carefully before assembling a stator.



For cooling jackets, Chapter 1, "DIMENSIONS" lists reference dimensions.

NOTE
Never machine the stator.

3.1 HEAT SHRINK FITTING

- Stator outer diameter is machined within the proper tolerance. But it sometimes has distortion of 0.1mm after winding procedure. Even if there is the distortion of 0.1mm in the stator outer diameter, it is an allowable distortion for heat shrink with a cooling jacket. But the jacket will deform when it is not enough thick.

- A stator is made of laminated steel, and a gap may be generated between layers around the perimeter. Use the stator fit into the jacket by shrinking with ignoring the gap.

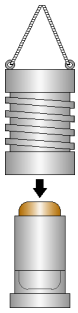
- In principle it is recommended that the installation of the stator into the jacket be by shrinking. The following is the recommended value of the shrinkage amount. In actual practice it is recommended that a shrinkage margin (interference) be used.

Outer diameter of stator	Shrinkage margin(mm)
ϕ180mm or smaller	0.01 to 0.02
ϕ181 to ϕ240mm	0.01 to 0.03
ϕ241mm or larger	0.02 to 0.05

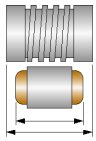
NOTE
Shrinkage margin shown above must be applied to the diameter of the stator. And these data are for the iron jacket. In case of other material is used, shrinkage margin must change according to the material characteristics.

- For method of heating of cooling jacket, an electric oven is the best.

- Handle with care when you install the stator so that the winding is not damaged. Refer to the figure at right before shrinking.



- It is the best for the winding if the cooling jacket covers all of it.



⚠ WARNING
When installing the stator, the jacket becomes very hot. Also the jacket or stator is very heavy. Therefore be careful not to get hurt or burnt.

3.2 CHECKING THE WINDING RESISTANCE

Measure the winding resistance before connecting the power leads of the stator. For the measured values, see the table below according to the marking on each power lead.

> ⚠ **CAUTION**
> Shut down the power supply and disconnect the leads connected to the amplifier before checking the resistance to prevent an electric shock.
> Also insulate the terminals that are not used.

> **NOTE**
> Use a milli-ohm meter to measure the resistance. Ordinary resistance meters cannot measure the resistance correctly.

Unit: mΩ

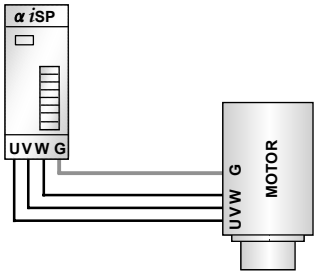
	Model name	Measured leads / Type No. (A06B-)	U-V V-W W-U	U-X V-Y W-Z	U_1-V_1 V_1-W_1 W_1-U_1	U_2-V_2 V_2-W_2 W_2-U_2	U-X_1 V-Y_1 W-Z_1	U_2-X V_2-Y W_2-Z
Standard type	BiI 50S/30000	1612-B170#0AB8	706-780	-	-	-	-	-
	BiI 50M/25000	1613-B170#1AB8	841-931	-	-	-	-	-
	BiI 50L/25000	1615-B120#ZAB8	-	432-478	-	-	-	-
	BiI 80S/20000	1621-B120#ZAB2	-	358-396	-	-	-	-
	BiI 80M/15000	1623-B170#ZAB1	419-463	-	-	-	-	-
	BiI 80L/8000	1625-B170#ZAB1	406-450	-	-	-	-	-
	BiI 100S/12500	1641-B120#ZAB1	-	467-517	-	-	-	-
	BiI 112SS/20000	1661-B120#ZAB2	-	242-268	-	-	-	-
	BiI 112S/15000	1671-B120#ZAB1	-	45-50	-	-	-	-
	BiI 112M/15000	1673-B120#ZAB1	-	160-176	-	-	-	-
	BiI 112L/15000	1675-B100#ZAB1	-	-	97-108	42-47	-	-
	BiI 112LL/15000	1676-B100#ZAB1	-	-	95-105	40-46	-	-
	BiI 132M/14000	1713-B100#ZAB1	-	-	65-73	27-31	-	-
	BiI 132L/14000	1705-B140#ZAB1	-	-	-	-	27-30	27-30
	BiI 160S/13000	1721-B120#ZAB1	-	91-101	-	-	-	-
	BiI 160M/13000	1723-B120#ZAB1	-	126-140	-	-	-	-
	BiI 160L/13000	1725-B120#ZAB1	-	98-110	-	-	-	-
	BiI 160LL/13000	1726-B100#ZAB1	-	-	126-140	58-66	-	-
	BiI 170S/6000	1732-B120#1AB6	-	77-85	-	-	-	-
	BiI 170M/6000	1733-B120#1AB6	-	68-76	-	-	-	-
	BiI 180M/6000	1743-B100#ZAB1	-	-	242-273	110-124	-	-
	BiI 180L/6000	1745-B100#ZAB1	-	-	130-144	66-74	-	-
	BiI 180LL/8000	1746-B100#ZAB1	-	-	106-118	44-49	-	-
	BiI 200S/6000	1752-B120#2AB3	-	49-55	-	-	-	-
	BiI 200M/6000	1753-B120#ZAB3	-	55-61	-	-	-	-
	BiI 200L/6000	1755-B120#ZAB6	-	35-39	-	-	-	-
	BiI 250S/6000	1772-B140#ZAB3	-	-	-	-	43-47	43-47
	BiI 250M/3000	1773-B140#ZAB6	-	-	-	-	50-56	50-56

Unit: mΩ

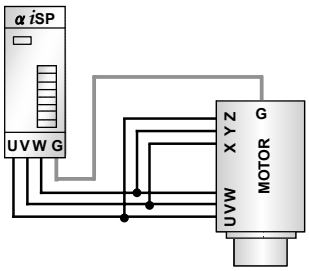
	Model name	Measured leads / Type No. (A06B-)	U-V V-W W-U	U-X V-Y W-Z	U_1-V_1 V_1-W_1 W_1-U_1	U_2-V_2 V_2-W_2 W_2-U_2	U-X_1 V-Y_1 W-Z_1	U_2-X V_2-Y W_2-Z
High-speed type	B*i*I 40S/70000	1601-B120#ZNB8	141-156	-	-	-	-	-
	B*i*I 40M/70000	1602-B170#0NB8	161-179	-	-	-	-	-
	B*i*I 60SS/50000	1616-B170#1NB8	177-195	-	-	-	-	-
	B*i*I 60S/50000	1617-B120#3NB8	-	52-57	-	-	-	-
	B*i*I 80S/40000	1631-B120#YNB8	-	28-32	-	-	-	-
	B*i*I 100S/20000	1641-B121#XNB7	-	68-76	-	-	-	-
	B*i*I 100S/30000	1641-B122#9PB8	-	20-23	-	-	-	-
	B*i*I 100L/30000	1655-B120#0NB8	-	19-22	-	-	-	-
	B*i*I 112S/20000	1662-B120#ZAB7	-	81-89	-	-	-	-
	B*i*I 112M/20000	1673-B100#YNB7	-	-	77-87	34-39	-	-
	B*i*I 112L/20000	1675-B100#YNB7	-	-	86-96	37-42	-	-
	B*i*I 112L/25000	1675-B140#XPB7	-	-	-	-	36-41	36-41
	B*i*I 160M/20000	1723-B140#YNB7	-	-	-	-	39-44	39-44
	B*i*I 160L/20000	1725-B140#YNB7	-	-	-	-	26-30	26-30
	B*i*I 160LL/20000	1726-B140#YNB7	-	-	-	-	29-33	29-33
	B*i*I 200S/10000	1752-B120#4BB1	-	49-55	-	-	-	-

3.3 POWER LEADS CONNECTION

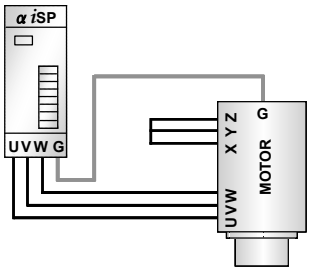
• Connection A



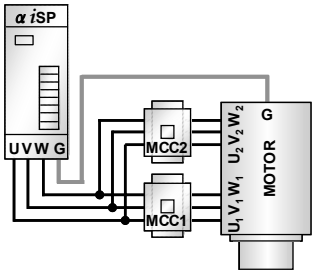
• Connection B



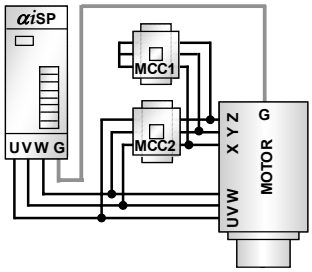
• Connection C



• Connection D



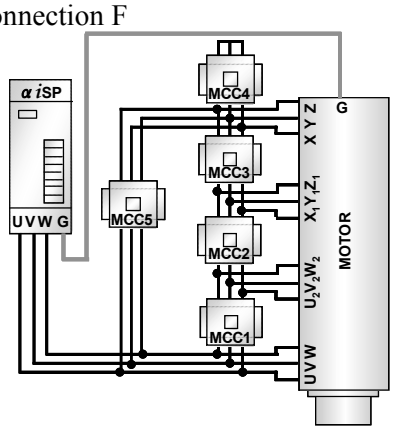
• Connection E



• Switching of MCC (Connection D, E)

	Low speed winding	High speed winding
MCC1	ON	OFF
MCC2	OFF	ON

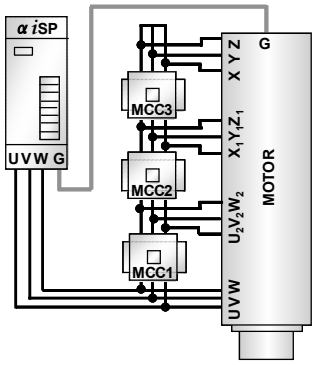
• Connection F



• Switching of MCC (Connection F)

	Low speed winding	High speed winding
MCC1	OFF	ON
MCC2	ON	OFF
MCC3	OFF	ON
MCC4	ON	OFF
MCC5	OFF	ON

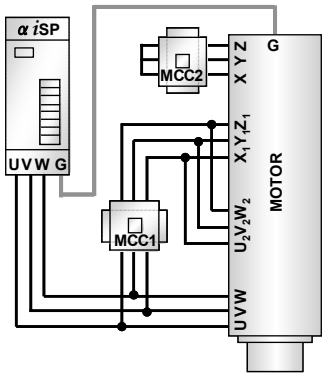
• Connection G



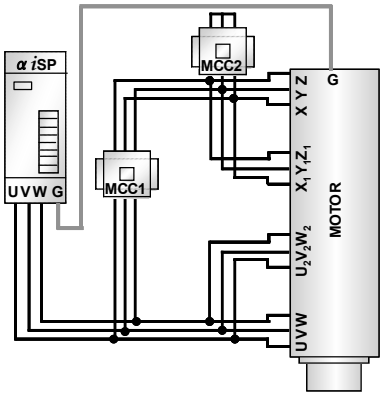
• Switching of MCC (Connection G)

	Low speed winding	High speed winding
MCC1	OFF	ON
MCC2	ON	OFF
MCC3	OFF	ON

• Connection H



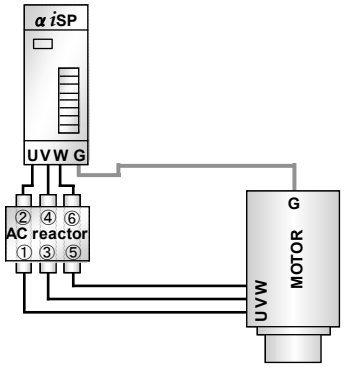
• Connection J



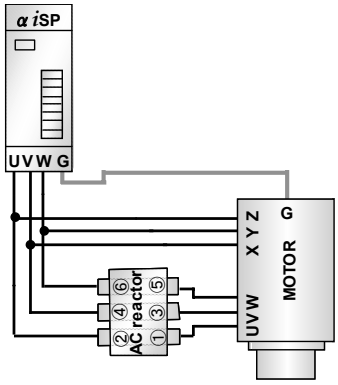
• Switching of MCC (Connection H, J)

	Low speed winding	High speed winding
MCC1	OFF	ON
MCC2	ON	OFF

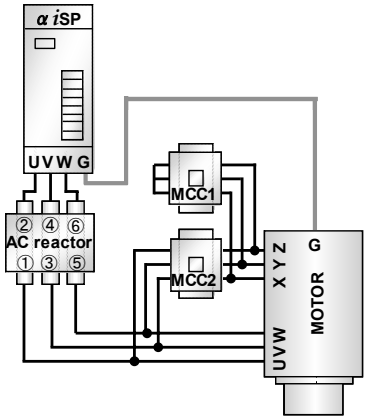
• Connection L



• Connection M



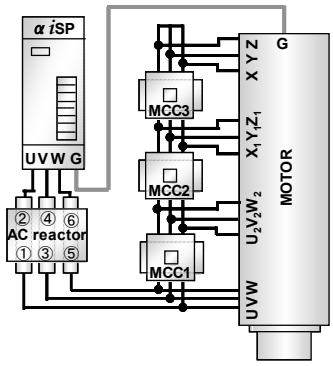
• Connection N



• Switching of MCC (Connection N)

	Low speed winding	High speed winding
MCC1	ON	OFF
MCC2	OFF	ON

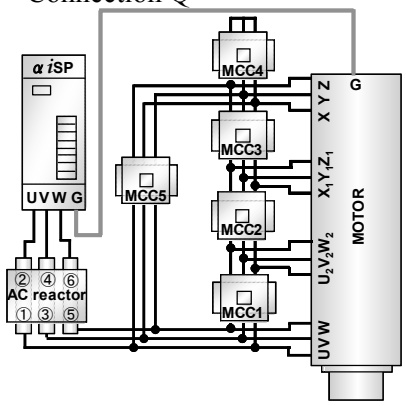
• Connection P



• Switching of MCC (Connection P)

	Low speed winding	High speed winding
MCC1	OFF	ON
MCC2	ON	OFF
MCC3	OFF	ON

• Connection Q



• Switching of MCC (Connection Q)

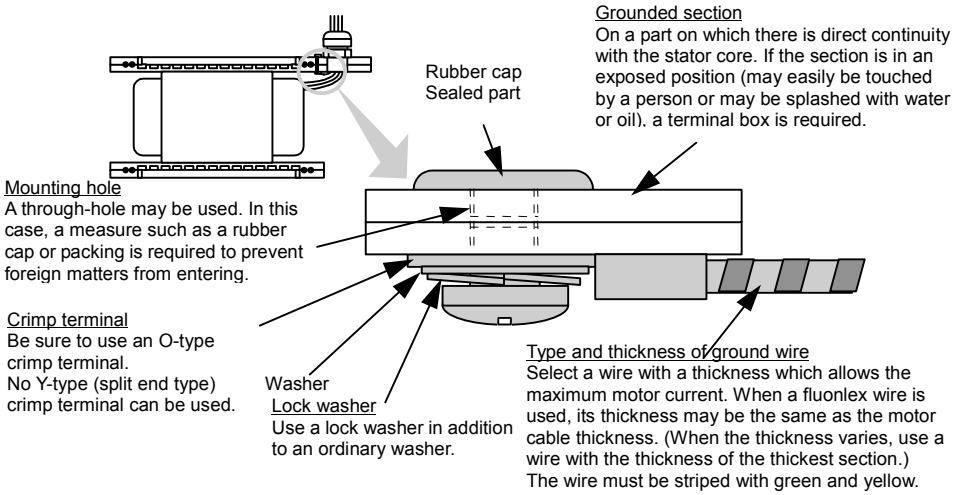
	Low speed winding	High speed winding
MCC1	OFF	ON
MCC2	ON	OFF
MCC3	OFF	ON
MCC4	ON	OFF
MCC5	OFF	ON

NOTE

1 MCC (switching unit) is not attached to the built-in motor.
2 Refer to Part I, "SPECIFICATIONS" for the connection of each model.
3 Use yellow-green stripe cable for the ground wire.
4 Use O-type crimp terminal and spring washer so that the terminal does not loosen.
5 Connect only one cable with one terminal except when the terminal is designed so that it may connect two or more cables.
6 Refer to the Descriptions (B-65282EN) of FANUC SERVO AMPLIFIER αi series to get more information about the connection of the motor and amplifier.
7 For the reactor A81L-0001-0154, U, X, V, Y, W, and Z correspond to numbers 1, 2, 3, 4, 5, and 6 indicated in the AC reactor in the connection diagrams.
8 For connection R, contact our sales department.

3.4 GROUNDING A MOTOR

Built-in spindle motors require frame grounding. Be sure to apply frame grounding for the motors.
The following shows an example of a CE marking correspondence.

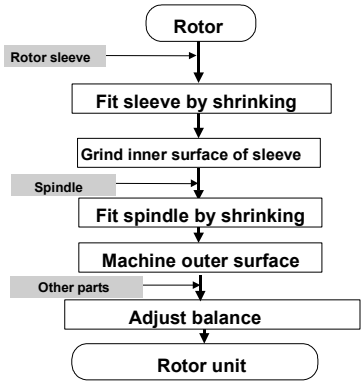


> ⚠ **WARNING**
> Be sure to ground the motor, referencing the above instructions, to prevent shock hazards and malfunctions.

> **NOTE**
> 1 If a motor is not grounded, a motor failure or malfunction may occur.
> 2 The motor is not supplied with ground wire and related parts. Prepare them, referencing the maximum current listed in Chapter 1, "SPECIFICATIONS" in Part I, "SPECIFICATIONS".

4 ROTOR ASSEMBLY

This chapter describes how to assemble a rotor. An outline is shown below. Read the notes described above in addition to this chapter carefully before assembling a rotor.



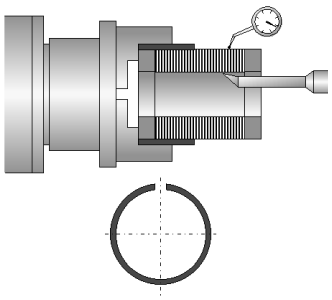
For rotor sleeves, Appendix E, "ROTOR SLEEVE" lists reference dimensions.

NOTE
1 Some rotor models require their inner surface to be machined before heat shrink fitting to the sleeve. For machining, see Section 4.1, "MACHINING AND FINISHING".
2 Rotor surfaces must not be machined unless otherwise specified by FANUC.

4.1 MACHINING AND FINISHING

Method

When machining the inner surface of the rotor, chuck the outer surface of the rotor based on the outer surface as shown in the figure.
As shown in the diagram, if the rotor is gripped by a divided jig, the chucking is more stable. Further, when the stroke of the tool axis is sufficiently longer than the rotor length, finish the rotor without changing the grip.



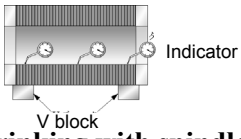
Precision

Outer and inner diameter of the rotor must be finished in the precision shown bellow.

Inner diameter (Machine the rotor alone.)

Circularity	20μm or better
Camber	30μm or better

Camber measuring (reference)



Outer diameter (Machine after shrinking with spindle.)

Roughness	12S or better
Circularity	40μm or better
Concentricity between rotor outer diameter and spindle center	25μm or better

Cutting condition (Reference)

	Roughing		**Semi-finishing**	**Finishing**
	Standard type	**High speed type**	**All types**	**All types**
Cutting speed (m/min.)	40	35	50	50
Feed speed (mm/rev.)	0.2	0.2	0.2	0.1
Depth of cut(mm)	1	1	0.35	0.1

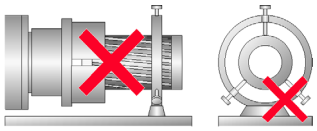
⚠ CAUTION
FANUC cutting conditions are shown above for reference. The above conditions do not guarantee that the rotor can always be machined without problems under the conditions. A rotor is made of layered silicon steel sheets up to 1 mm thick. A rotor may easily be deformed (bend, crack between layers, or elongation along the length) when machined with an unnatural method or cutting condition. In this case, it is desirable to moderate the conditions or replace the tip a little earlier.

Used tips (reference)

SANDVIK TPMT16T308-MM 2015 or TCMT16T308-MM 1025,
TUNGALLOY CNMG120404-TM TD915,
and etc.

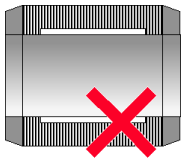
Avoiding using a steady rest

Avoid using as steady rest. As the rotor has slots on its outer wall, the runout of the rotor increases if it is supported by a rest.



Avoiding making a clearance on the inner wall

When machining a rotor, avoid making a clearance as shown at right. The inner wall of the rotor must form a perfectly cylindrical surface. As the rotor is made of laminated steel, it has low rigidity and is likely to be deformed at the clearance while operation.



Drying the rotor

When the rotor has been machined using coolant or the like, dry the rotor to remove oil and water completely.

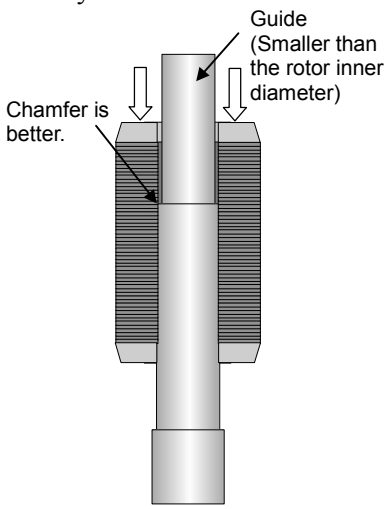
4.2 HEAT SHRINK FITTING

- Heat shrink fitting is recommended for mounting method of a rotor to a spindle. Use press machine when the interference is large. But in this case, avoid the deformation of the spindle and the rotor.

- When mounting the rotor, the rotor has to be heated in an electric oven to a maximum temperature of 200°C. 180°C is preferable. When heated to 200°C, the rotor color may change. But this will not affect the characteristics of the rotor.

- For the high speed type rotor, cool and heat shrink fitting is recommended, as the heat expansion of each part that is used in the rotor is different. Cool the spindle (in refrigerator), and heat the rotor (in electric oven), and then fit them.

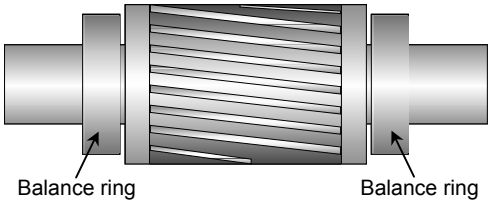
- If guided at the spindle shaft side at the insertion, it can be assembled smoothly



⚠ WARNING
When shrinking the rotor or spindle, it is very hot and heavy. Therefore, be careful not to get hurt or burnt.

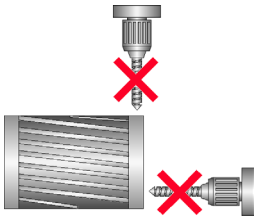
4.3 ADJUSTING THE BALANCE

- After the rotor is mounted on a spindle (see Section 4.2, “HEAT SHRINK FITTING”), balance the entire spindle by separately installing balance rings. It is recommended to use a Non-magnetic material like stainless steel for the ring. The outer diameter of the balance rings must be smaller than the outer diameter of the rotor.



- Never use taps and parts on the end faces of the rotor to make balance adjustments for the rotor and the entire spindle.

- Avoid machining on the rotor end ring. For example, do not make a balancing hole in it.



III. SENSOR

CONSTRUCTION OF THIS PART

This part includes followings.

1 SENSOR

αiBZ sensors and αiCZ sensors are available for use with built-in spindle motor BiI series. These sensors come in different specifications depending on the number of teeth on the sensor ring, the connector, and so on.
The αiBZ sensors and the αiCZ sensors differ in detection precision and resolution. Use a suitable sensor according to the purpose.

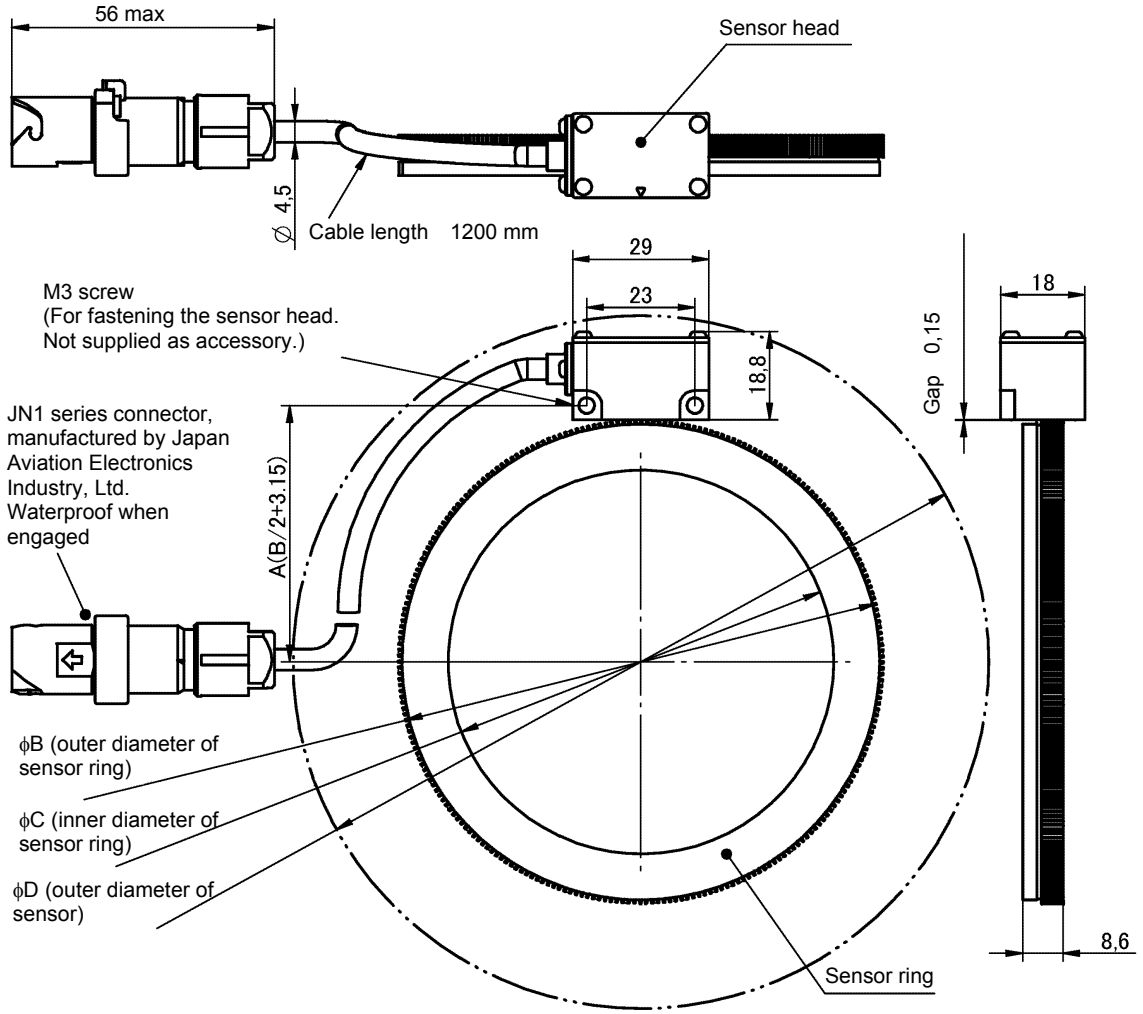
Sensor type	Specification	Application	Precision	Resolution
αiBZ sensor	A860-2150-Txxx A860-2155-Txxx A860-2120-Txxx (*1	Spindle with standard precision Machining center, etc.	10/1000° to 30/1000° (*2	360,000 per rotation
αiCZ sensor	A860-2140-Txxx A860-2161-Txxx (*1	Spindle for high-precision CS contour control Large lathe, etc.	2/1000° to 5/1000° (*2	3,600,000 per rotation

NOTE
*1: For details of A860-2120-Txxx and A860-2161-Txxx, see Appendix J, "OTHER SENSORS".
*2: The detection precision varies depending on the size of the sensor ring.

1.1 αiBZ SENSORS A860-2150-Txxx AND A860-2155-Txxx

1.1.1 Dimensions

[A860-2150-Txxx]

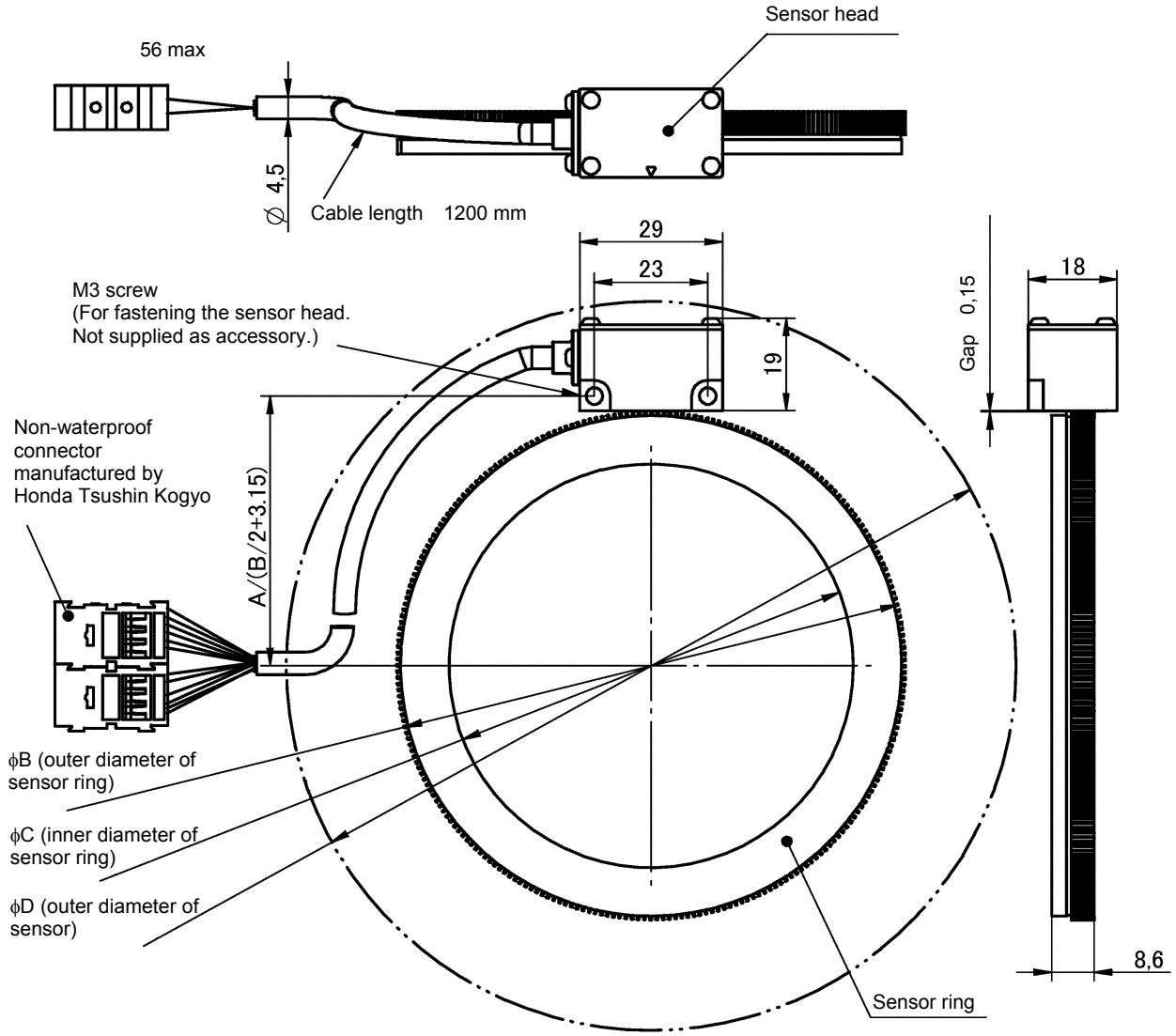


Accessories: Straight pin (JIS B 1354-1988, class A, normal diameter of ϕ3, normal length of 6) × 2, 0.15-mm thickness gage × 1

Unit: mm

Sensor type No.	No. of teeth	A	ϕB	ϕC	ϕD
A860-2150-T201	128	29.15	52+0/-0.020	40+0.016/-0	98
A860-2150-T211					
A860-2150-T311	192	41.95	77.6+0/-0.020	60+0/-0.018	122
A860-2150-T401	256	54.75	103.2+0/-0.020	82+0/-0.018	148
A860-2150-T404				88+0/-0.018	
A860-2150-T411				82+0/-0.018	
A860-2150-T511	384	80.35	154.4+0/-0.020	125+0.025/-0	198
A860-2150-T611	512	105.95	205.6+0/-0.020	160+0.020/-0.005	249

[A860-2155-Txxx]



Accessories: Straight pin (JIS B 1354-1988, class A, normal diameter of ϕ3, normal length of 6) × 2, 0.15-mm thickness gage × 1

Unit: mm

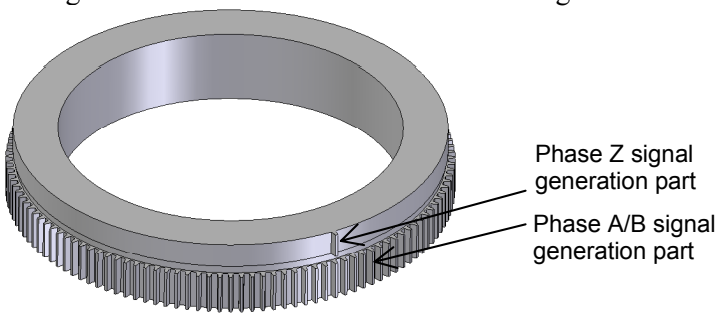
Sensor type No.	No. of teeth	A	ϕB	ϕC	ϕD
A860-2155-T201	128	29.15	52+0/-0.020	40+0.016/-0	98
A860-2155-T211					
A860-2155-T311	192	41.95	77.6+0/-0.020	60+0/-0.018	122
A860-2155-T401	256	54.75	103.2+0/-0.020	82+0/-0.018	148
A860-2155-T404				88+0/-0.018	
A860-2155-T411				82+0/-0.018	
A860-2155-T511	384	80.35	154.4+0/-0.020	125+0.025/-0	198
A860-2155-T611	512	105.95	205.6+0/-0.020	160+0.020/-0.005	249

NOTE

1 Use the sensor under 80°C.
2 Handle these precision parts with special care. In particular, never apply external force to the head of the sensor.
3 Fasten the sensor cable to the machine at an appropriate position not to apply force to the sensor head directly.
4 The sensor is waterproof to an IP67 rating. Note that, however, the waterproofness represented by IP indicates short-time resistance to water only and does not guarantee thorough waterproofness. Therefore, protect the sensor head against direct splash of coolant and so on by taking appropriate measures, e.g. by installing a cover.
5 When installing the sensor, observe the requirements described in "Installing the Sensor" mentioned later.
6 For easy maintenance, mount the αiBZ sensor at a position where it can be replaced easily.
7 Sensor rings with the same specification numbers can be replaced with each other.

1.1.2 Notes on the Sensor Ring

The sensor ring consists of the phase Z signal generation part and the phase A/B signal generation part. The new αiBZ sensors (A860-2150-Txxx and A860-2155-Txxx) are different from the conventional αiBZ sensors (A860-2120-Txxx) in that the new αiBZ sensors integrate the phase A/B signal generation section and the phase Z signal generation section into one piece, and that the phase Z signal generation section has a convex shape instead of a concave shape. When handling the sensor ring, be very careful not to deform or damage the teeth on the outer surface of the ring.

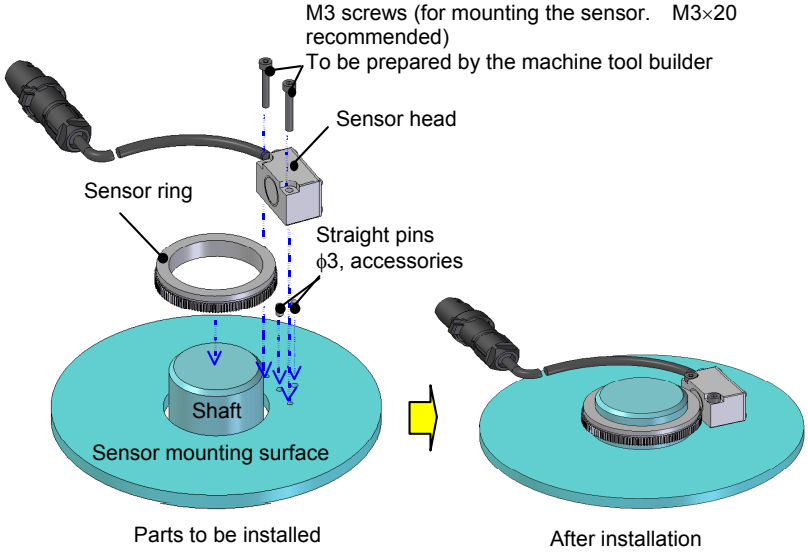


1.1.3 Installing the Sensor

Installation procedure

Install the sensor by following the steps explained below:

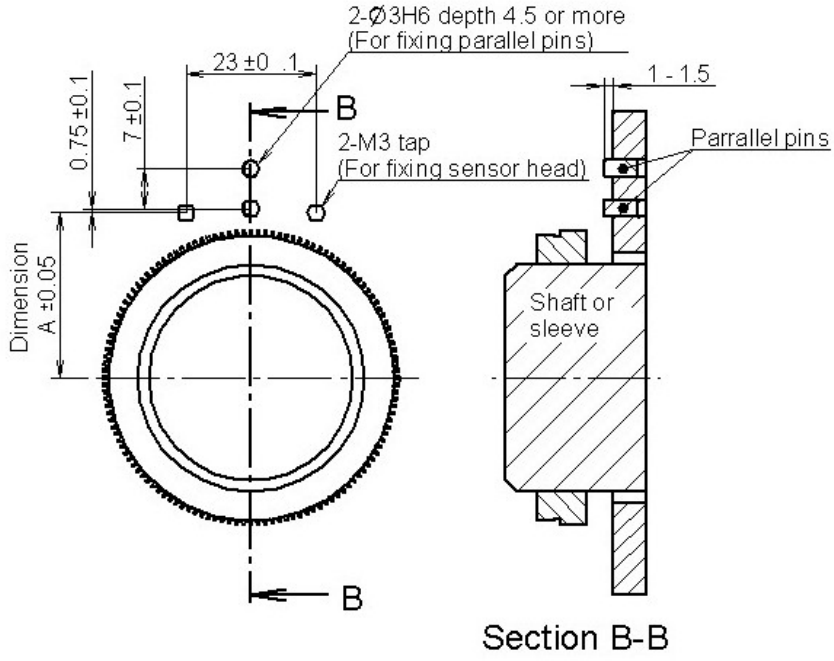
- Machine the sensor mounting surface as necessary, and insert straight pins.
- Fit the sensor ring into the machine shaft (or sleeve) by means of heat shrink fitting.
- Adjust the gap between the sensor head and sensor ring, and install the sensor in the machine.



* The connector in the above figure is A290-2150-Txxx.

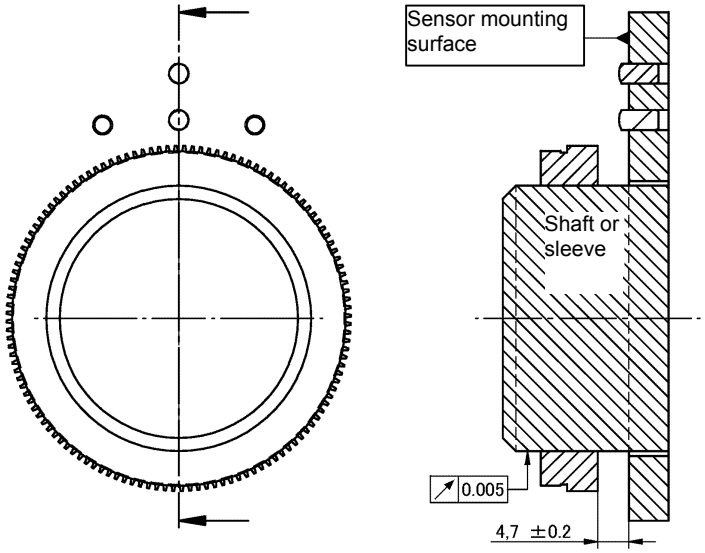
- Machining the sensor mounting surface

Machine the sensor mounting surface as shown in Fig. 3. In the 2-ϕ3H6 holes, insert the attached straight pins. These pins are used as the guide for the gap adjustment described later.



- Installing the sensor ring

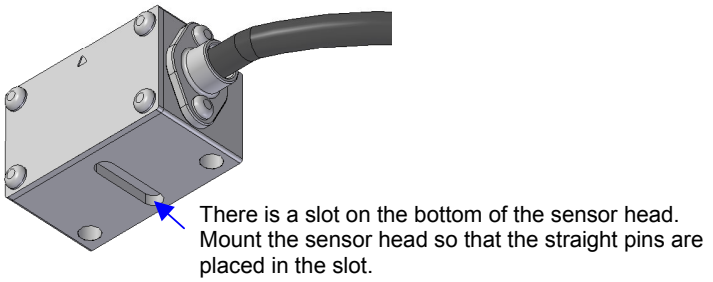
Fit the sensor ring into the shaft or sleeve by heat shrink fitting so that the bottom of the phase A/B signal generation part (gear) is 4.7 ±0.2 mm off the sensor mounting surface.
The runout of the shaft or sleeve part in which the sensor ring is fit by heat shrink fitting must be 0.005 mm or less.



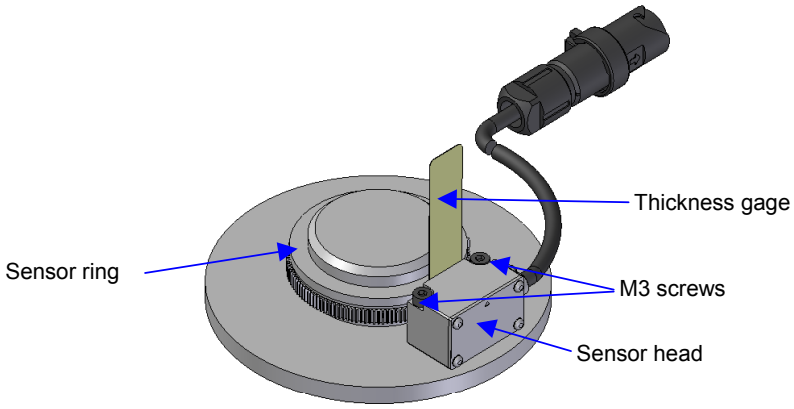
- Installing the sensor head

Install the αiBZ sensor head by following the steps below:

- Place the sensor head on the sensor mounting surface so that the straight pins are positioned in the slot of the sensor head, and fasten the sensor head temporarily. When mounting the sensor head, be careful not to hit the sensor head against the sensor ring.



- Insert the thickness gage (supplied as an accessory; t = 0.15 mm) between the sensor ring and the sensor head, and while lightly pressing the sensor head against the thickness gage, tighten the sensor mounting screws (recommended tightening torque: 1.3Nm ±10%). Apply a thread locker to the sensor mounting screws to prevent them from becoming loose.



* The connector in the above figure is A290-2150-T***.

- Pull out the thickness gage, and slowly turn the spindle to ensure that the sensor ring and the sensor head do not touch.
- Check that the gap between the sensor ring and the sensor is at least 0.1 mm.

1.1.4 Interference of the Sensor Ring

The following table lists the interference for heat shrink fitting for the sensor ring at each maximum speed.

Unit: μm

Max. speed (min^{-1})	Type No. : A860-2150-Txxx、A860-2155-Txxx							
	T201	T211	T311	T401	T404	T411	T511	T611
3000	ϕ6 to ϕ32	ϕ6 to ϕ32	ϕ6 to ϕ34	ϕ7 to ϕ35	ϕ7 to ϕ35	ϕ7 to ϕ35	ϕ8 to ϕ43	ϕ11 to ϕ41
3500	↓	↓	↓	↓	↓	↓	ϕ9 to ϕ44	ϕ13 to ϕ43
4500	↓	↓	↓	↓	↓	↓	ϕ11 to ϕ46	ϕ19 to ϕ49
6000	↓	↓	ϕ7 to ϕ35	ϕ9 to ϕ37	ϕ9 to ϕ37	ϕ9 to ϕ37	ϕ15 to ϕ50	ϕ29 to ϕ59
8000	↓	↓	ϕ8 to ϕ36	ϕ11 to ϕ39	ϕ11 to ϕ39	ϕ11 to ϕ39	ϕ24 to ϕ59	ϕ47 to ϕ77
10000	↓	↓	ϕ9 to ϕ37	ϕ14 to ϕ42	ϕ15 to ϕ43	ϕ14 to ϕ42	ϕ35 to ϕ70	ϕ71 to ϕ101
12000	ϕ7 to ϕ33	ϕ7 to ϕ33	ϕ11 to ϕ39	ϕ18 to ϕ46	ϕ19 to ϕ47	ϕϕ18 to ϕ46	ϕ47 to ϕ82	
15000	ϕ8 to ϕ34	ϕ8 to ϕ34	ϕ13 to ϕ41	ϕ26 to ϕ54	ϕ28 to ϕ56	ϕ26 to ϕ54	ϕ71 to ϕ106	
20000	ϕ10 to ϕ36	ϕ10 to ϕ36	ϕ19 to ϕ47			ϕ41 to ϕ69		
25000		ϕ12 to ϕ38	ϕ27 to ϕ55			ϕ62 to ϕ90		
30000		ϕ15 to ϕ41	ϕ37 to ϕ65			ϕ87 to ϕ115		
40000		ϕ23 to ϕ49	ϕ61 to ϕ89					
50000		ϕ33 to ϕ59						
60000		ϕ43 to ϕ69						
70000		ϕ57 to ϕ83						

NOTE

1 From the above table, select the suitable interference according to the maximum speed and the type of the ring used. If an incorrect interference is applied, the ring will be damaged or loosen while the spindle rotates.

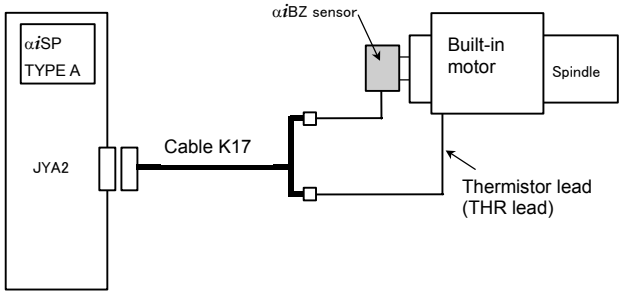
2 These rings cannot be used at a speed higher than the specified speed shown in the above table.

1.1.5 CONNECTION

1.1.5.1 Connecting A860-2150-Txxx

Connection diagram (outline)

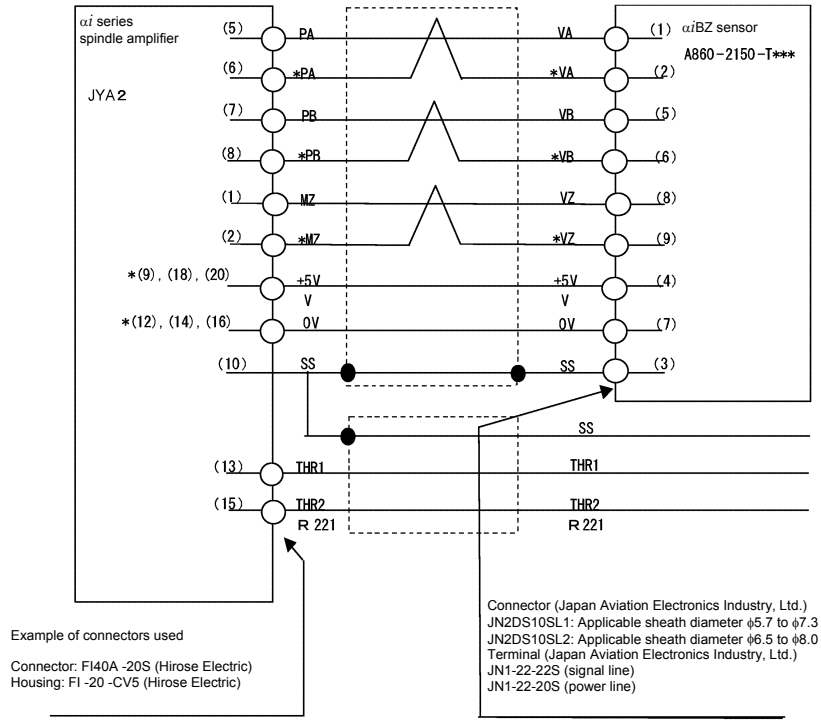
Connect the αiSP and αiBZ sensor as shown in the figure below.



For details of connection and connector pin assignment, refer to the next page.

NOTE
1 Prepare the cable K17 by yourself.
2 Thermistor lead is connected to the motor.
3 The cable K17 may be relayed in the middle. In this case, use a connector with IP54 or more or a terminal box at the relay part.
4 Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER αi series for more detail information.

Connection (Details)



Recommended cable: A66L-0001-0482

Cable length	28 m or less
5V, 0V	0.3mm^2 (To be connected one of the cables marked *)
VA,*VA,VB,*VB,VZ,*VZ	0.2mm^2 twisted pair × 4 pairs

Crimping tool specification

A06B-6114-K201/JN1S : For 0.3mm^2

A06B-6114-K201/JN1L : For 0.18 mm^2 and 0.5 mm^2

Connector kit specification

A06B-6114-K204/S : Straight plug (including contacts)

Connector pin layout

Connector JYA2

9	5V	10	#	19	#	20	5V
7	PB	8	*PB	17	#	18	5V
5	PA	6	*PA	15	THR2	16	0V
3	#	4	#	13	THR1	14	0V
1	MZ	2	*MZ	11	#	12	0V

NOTE

Do not connect wires to the pins marked with #; I/O signals for an optional printed circuit board may have been connected to these pins.

Sensor connector

		10		9	*VZ	8	VZ
7	0V	6	*VB	5	VB	4	5V
		3	SS	2	*VA	1	VA

Checking the output signal level

The output signal level of the αiBZ sensor is designed to fall within a specified range if the sensor head is mounted correctly. Depending on the mounting status, the output signal may exceed the specified range, which can lead to malfunction. Therefore, make sure that the output signal level is within the specified range.

Electrical specifications

Item			Specification
Power supply voltage			5V±5%
Current consumption			0.05 A or less
Output signal	VA,VB	A860-2150-T201 A860-2150-T211	128λ/rotation
		A860-2150-T311	192λ/rotation
		A860-2150-T401 A860-2150-T404 A860-2150-T411	256λ/rotation
		A860-2150-T511	384λ/rotation
		A860-2150-T611	512λ/rotation
	VZ	Common to all types	1λ/rotation

Resolution and precision

Name	Resolution during Cs contour control	Precision (typ.)
A860-2150-T201 A860-2150-T211	360,000/rotation	30/1000°
A860-2150-T311		25/1000°
A860-2150-T401 A860-2150-T404 A860-2150-T411		20/1000°
A860-2150-T511		15/1000°
A860-2150-T611		10/1000°

NOTE

1 In the above table, precision is indicated with typical values but not with guaranteed values.

2 The indicated precision does not consider the effect of the error due to runout in sensor ring installation. How much the runout in sensor ring installation affects the precision is calculated as follows:

Error amount (°) = A (mm) × 360/B (mm)

A: Axis runout of the machine spindle or sleeve on the sensor ring mounting plane

B: Perimeter of the sensor ring

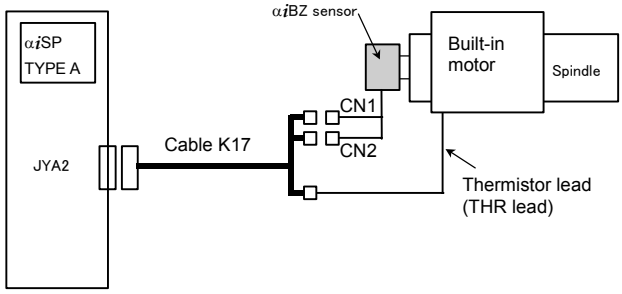
Example: If the axis runout on the mounting plane is 0.005 mm when a 256 λ sensor ring (103.2 in diameter) is used, the error amount is calculated as follows:

$0.005 \times 360/(103.2 \times \pi) = 0.0055$ (°)

1.1.5.2 Connecting A860-2155-Txxx

Connection diagram (outline)

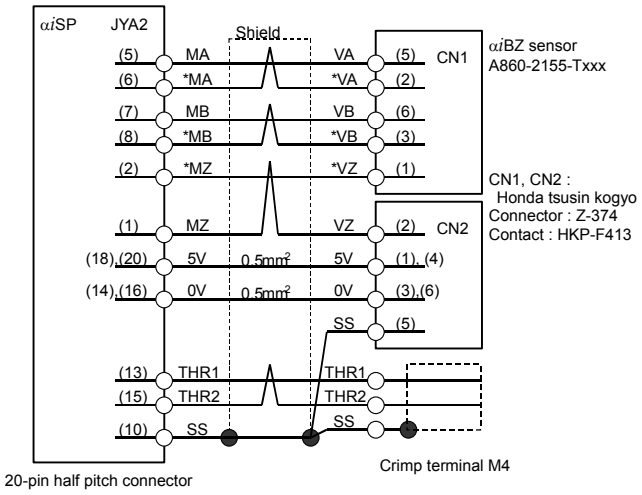
Connect the αiSP and αiBZ sensor as shown in the figure below.



For details of connection and connector pin assignment, refer to the next page.
Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER αi series for cable 17 and more detail information.

NOTE
1 Prepare the cable K17 by yourself.
2 Thermistor lead is connected to the motor.
3 There is no problem that the cable K17 is connected on the way to CN1 and CN2. But use IP54 or more connector or terminal box.
4 Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER αi series for more detail information.

Connection (Details)



Cable specification :
0.18mm^2 twisted pair 4 pairs + 0.5mm^2 6 common shelded cable
Recommended wire : A66L-0001-0368

> ⚠ **CAUTION**
> When only one lead is to be connected for 5V and 0V each, use 20-pin and 16-pin connectors to prevent damage to the sensor due to wrong connector connection.

Pin assignment

Connector JYA2

9	5V	10	#	19	#	20	5V
7	MB	8	*MB	17	#	18	5V
5	MA	6	*MA	15	THR2	16	0V
3	#	4	#	13	THR1	14	0V
1	MZ	2	*MZ	11	#	12	0V

> **NOTE**
> Do not connect the pins marked with # because input/output signals for an option PCB may be connected.

Connector CN1

1	*VZ	4	
2	*VA	5	VA
3	*VB	6	VB

Connector CN2

1	5V	4	5V
2	VZ	5	SS
3	0V	6	0V

Checking the output signal level

The output signal level of the αiBZ sensor is designed to fall within a specified range if the sensor head is mounted correctly. Depending on the mounting status, the output signal may exceed the specified range, which can lead to malfunction. Therefore, make sure that the output signal level is within the specified range.

Electrical specifications

Item			Specification
Power supply voltage			5V±5%
Current consumption			0.05 A or less
Output signal	VA,VB	A860-2155-T201 A860-2155-T211	128 λ /rotation
		A860-2155-T311	192 λ /rotation
		A860-2155-T401 A860-2155-T404 A860-2155-T411	256 λ /rotation
		A860-2155-T511	384 λ /rotation
		A860-2155-T611	512 λ /rotation
	VZ	Common to all types	1 λ /rotation

Resolution and precision

Name	Resolution during Cs contour control	Precision (typ.)
A860-2155-T201 A860-2155-T211	360,000/rotation	30/1000°
A860-2155-T311		25/1000°
A860-2155-T401 A860-2155-T404 A860-2155-T411		20/1000°
A860-2155-T511		15/1000°
A860-2155-T611		10/1000°

NOTE

1 In the above table, precision is indicated with typical values but not with guaranteed values.

2 The indicated precision does not consider the effect of the error due to runout in sensor ring installation. How much the runout in sensor ring installation affects the precision is calculated as follows:

Error amount (°) = A (mm) × 360/B (mm)

A: Axis runout of the machine spindle or sleeve on the sensor ring mounting plane

B: Perimeter of the sensor ring

Example: If the axis runout on the mounting plane is 0.005 mm when a 256 λ sensor ring (103.2 in diameter) is used, the error amount is calculated as follows:

$0.005 \times 360/(103.2 \times \pi) = 0.0055$ (°)

1.1.6 Feedback Signal Adjustment

Check the feedback signal after installing the BZ*i* sensor. Pins for checking are on the check board. The check board is not attached to the amplifier or to the motor. (Specification No. : A06B-6078-H001)
Refer to the MAINTENANCE MANUAL (B-65285EN) of FANUC SERVO MOTOR α*i* series for details of the check board.

> ⚠ **CAUTION**
> Do not contact the rings with the sensor when adjusting the gap between them. It will damage them.

> **NOTE**
> Check the feedback signal after setting the parameters concerning the sensor. The feedback signal is output correctly after CNC loads the parameters.

Pins for checking

Use pins shown below for the feedback signal checking.
Connect the check board to the JY1 connector of SPM and then check the output signals on the following terminals.

Main spindle

Speed feedback	Position feedback	One rotation signal	Sensor signal input connector
PA1,PB1	PA1,PB1	PS1	JYA2

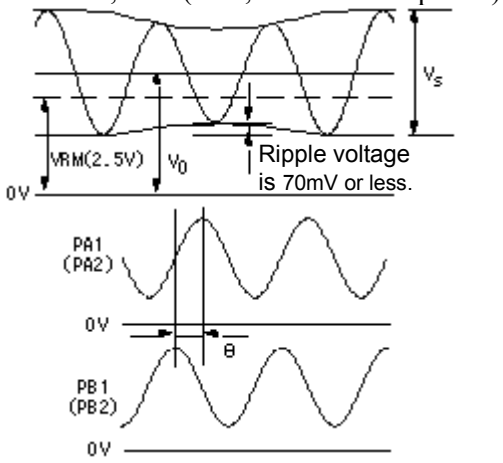
Sub spindle (in case of using sub spindle/spindle switching control)

Speed feedback	Position feedback	One rotation signal	Sensor signal input connector
PA2,PB2	PA2,PB2	PS2	JYA2

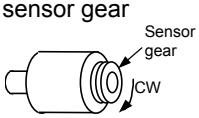
Speed and position feedback signal

Measuring condition :

Rotation : Clockwise, Counterclockwise
Speed : 1500min^{-1}
Pins : PA1, PB1 (PA2, PB2 for sub spindle)



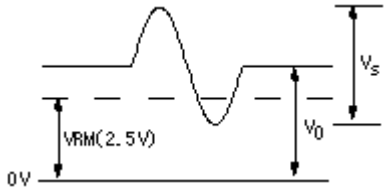
Mount the sensor so that the output signal ripple voltage is 70 mV or less.
Check that the measured value falls into the target value range listed below.

Point to be checked	Target value	Caution
Amplitude of Vs	0.5 – 1.2V_{p-p}	
Offset of V_O	2.5V±100mV	Use digital voltmeter and DC range.
Phase difference θ	90±3°	When the spindle rotates CW viewed from the sensor gear 

One rotation signal

Measuring condition :

Rotation : Clockwise, Counterclockwise
Speed : 1500min^{-1}
Pins : PS1 (PS2 for sub spindle)



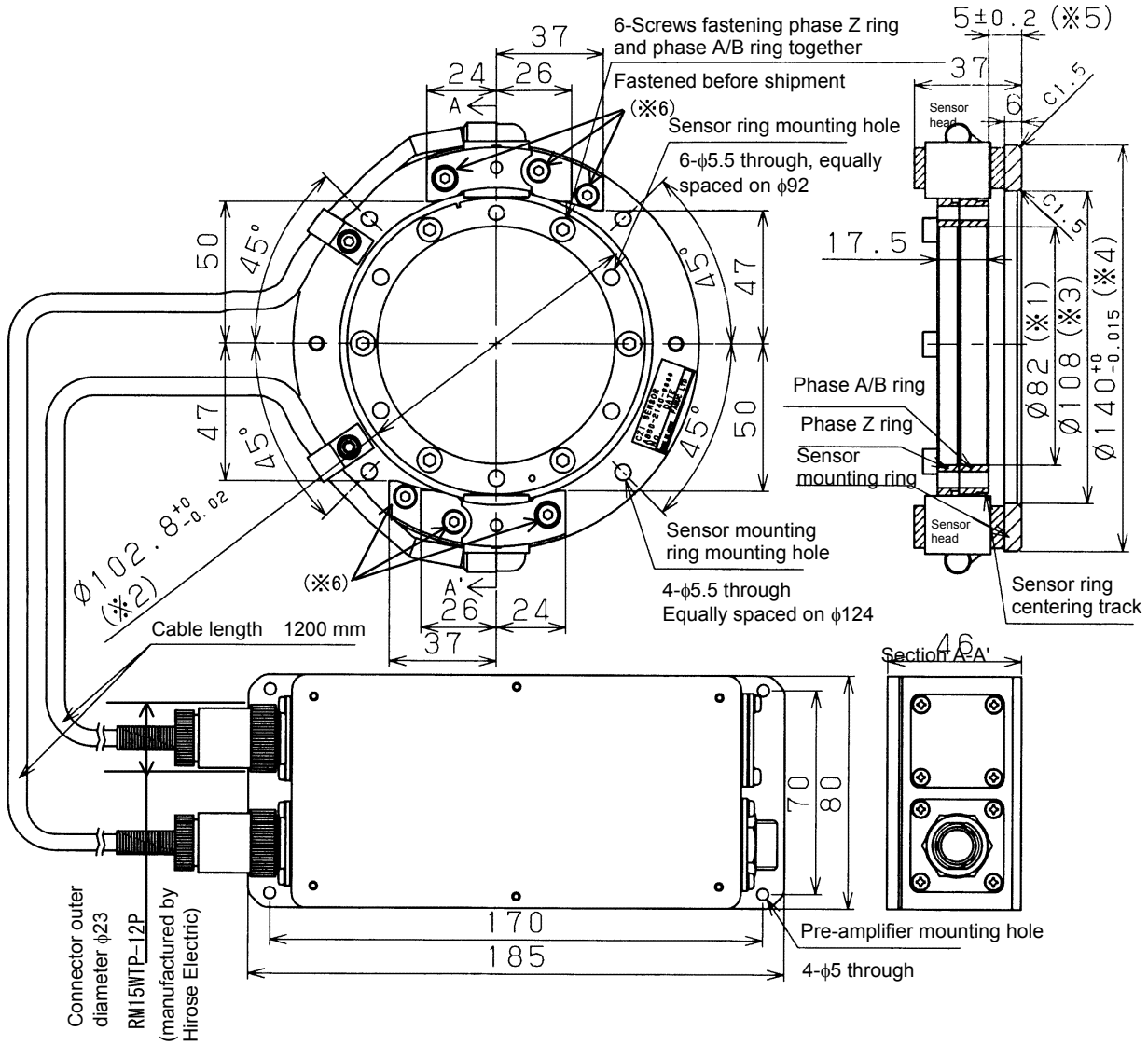
Check that the measured value falls into the target value range listed below.

Point to be checked	Target value	Caution
Amplitude of Vs	0.5V or more	
Offset of V_O	2.5V±100mV	Use digital voltmeter and DC range.

1.2 αiCZ SENSOR A860-2140-Txxx

1.2.1 Dimensions

A860-2140-T411

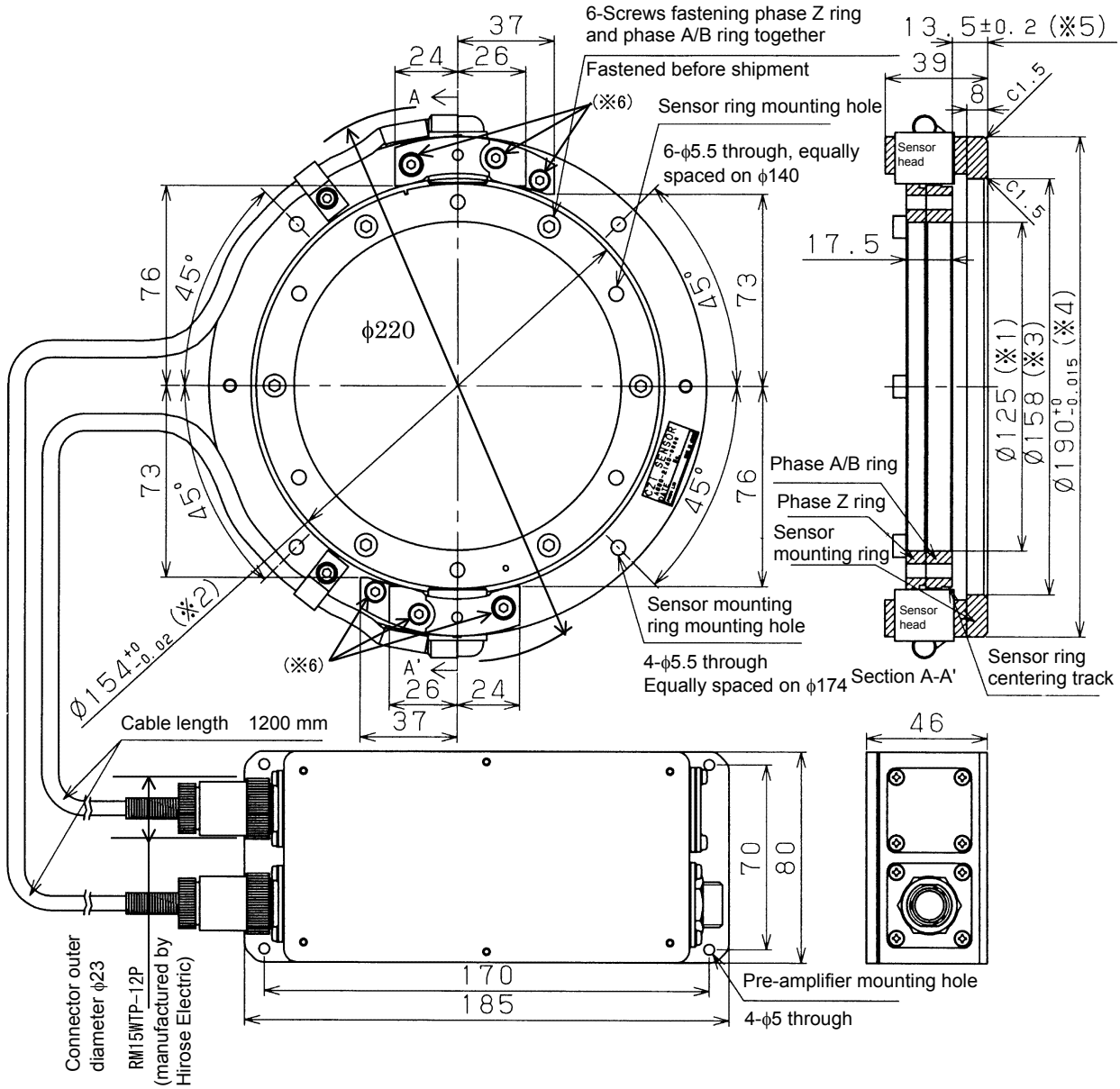


For details on how to install the sensor, see Subsection 1.2.2, "Installing the Sensor".

NOTE

- The inner diameter (*1) of the sensor ring is set with a plus tolerance. (*2) indicates the outer diameter of the tooth surface of the sensor ring.
- The inner diameter (*3) of the sensor mounting ring is set with a plus tolerance. (*4) indicates the outer diameter of the sensor mounting ring.
- (*5) indicates the distance from the bottom of the sensor mounting ring to the bottom of the sensor ring.
- The sensor head cannot be adjusted mechanically. So, do not loosen the screws marked (*6).
- Use the sensor at a temperature not higher than 50℃.
- Because the αiCZ sensor is adjusted as a combination of the sensor ring, sensor, and pre-amplifier in advance, they must be used as a set.
- Because the sensor is a precision part, it should be handled with special care. In particular, be careful not to apply external force to the sensor element.
- The sensor is an electronic part. To prevent chips, oil, water, and other harmful materials from being adhered to the sensor, take dust-proof and drip-proof measures on the machine side.
- The waterproofness of the pre-amplifier box is equivalent to IP55. However, if the pre-amplifier box is subject to successive splash of coolant or the like and is kept wet continuously, a failure can occur. Therefore, be careful not to splash coolant on the pre-amplifier box where possible.
- Vibration applied to the pre-amplifier box must be 1G or less.
- Perform shield wire connection. Connect the pre-amplifier box to ground or to the machine cabinet.
- For easy maintenance, install the sensor in a place where it can be replaced easily.

A860-2140-T511

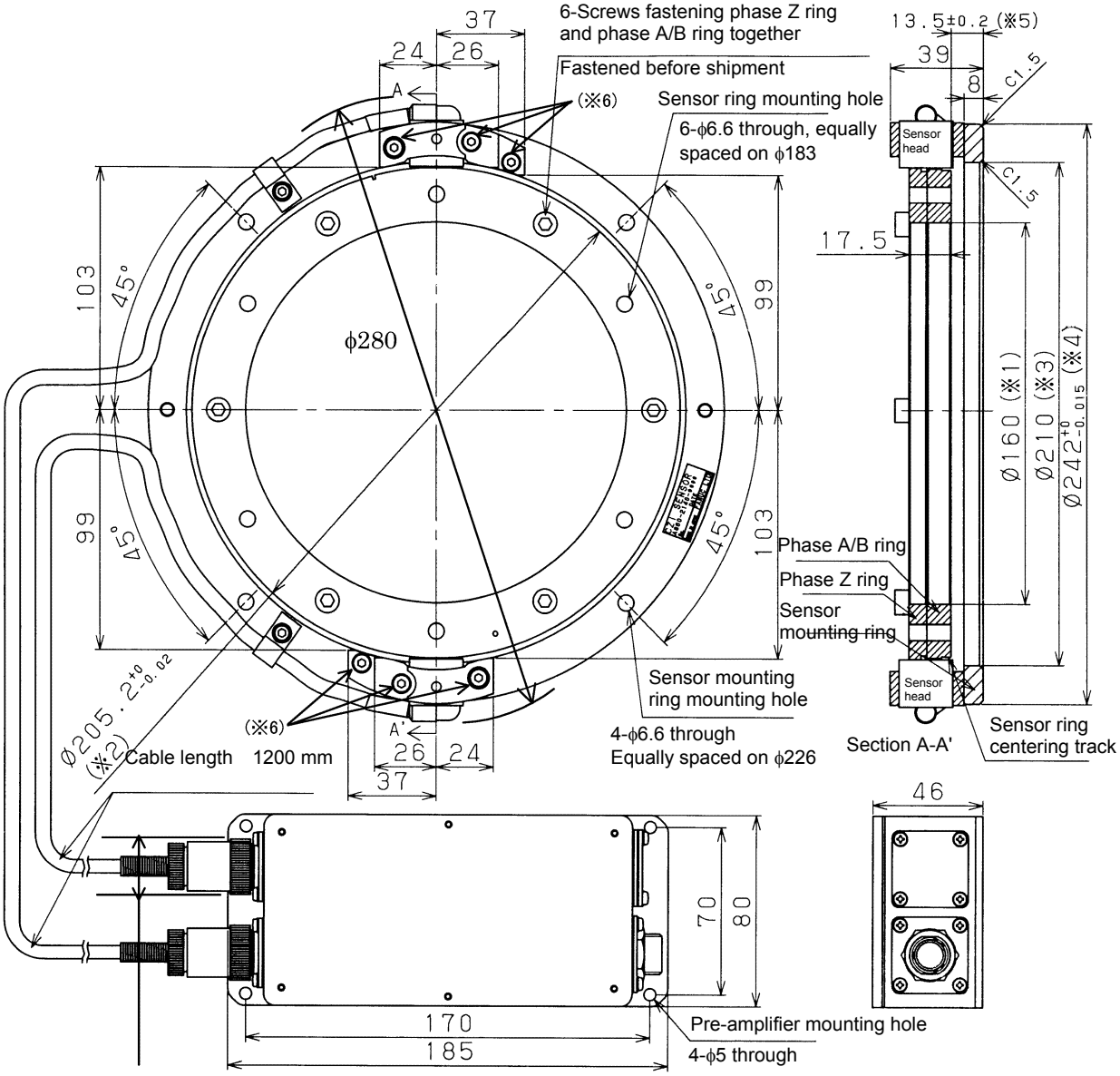


For details on how to install the sensor, see Subsection 1.2.2, "Installing the Sensor".

NOTE

- The inner diameter (*1) of the sensor ring is set with a plus tolerance. (*2) indicates the outer diameter of the tooth surface of the sensor ring.
- The inner diameter (*3) of the sensor mounting ring is set with a plus tolerance. (*4) indicates the outer diameter of the sensor mounting ring.
- (*5) indicates the distance from the bottom of the sensor mounting ring to the bottom of the sensor ring.
- The sensor head cannot be adjusted mechanically. So, do not loosen the screws marked (*6).
- Use the sensor at a temperature not higher than 50℃.
- Because the αiCZ sensor is adjusted as a combination of the sensor ring, sensor, and pre-amplifier in advance, they must be used as a set.
- Because the sensor is a precision part, it should be handled with special care. In particular, be careful not to apply external force to the sensor element.
- The sensor is an electronic part. To prevent chips, oil, water, and other harmful materials from being adhered to the sensor, take dust-proof and drip-proof measures on the machine side.
- The waterproofness of the pre-amplifier box is equivalent to IP55. However, if the pre-amplifier box is subject to successive splash of coolant or the like and is kept wet continuously, a failure can occur. Therefore, be careful not to splash coolant on the pre-amplifier box where possible.
- Vibration applied to the pre-amplifier box must be 1G or less.
- Perform shield wire connection. Connect the pre-amplifier box to ground or to the machine cabinet.
- For easy maintenance, install the sensor in a place where it can be replaced easily.

A860-2140-T611



For details on how to install the sensor, see Subsection 1.2.2, "Installing the Sensor".

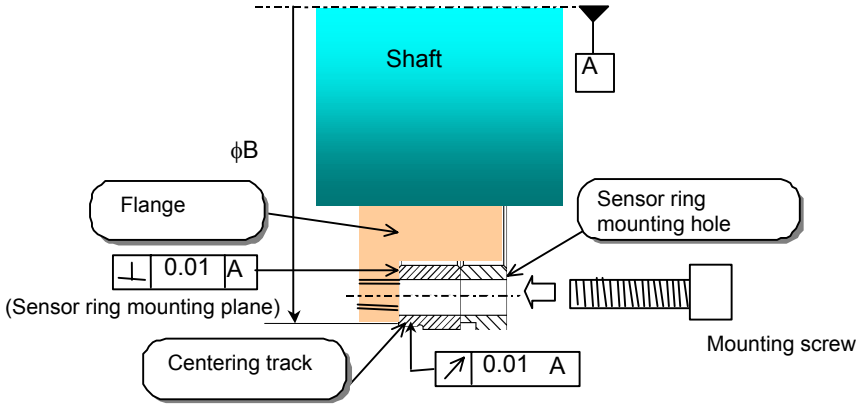
NOTE

- The inner diameter (*1) of the sensor ring is set with a plus tolerance. (*2) indicates the outer diameter of the tooth surface of the sensor ring.
- The inner diameter (*3) of the sensor mounting ring is set with a plus tolerance. (*4) indicates the outer diameter of the sensor mounting ring.
- (*5) indicates the distance from the bottom of the sensor mounting ring to the bottom of the sensor ring.
- The sensor head cannot be adjusted mechanically. So, do not loosen the screws marked (*6).
- Use the sensor at a temperature not higher than 50℃.
- Because the αiCZ sensor is adjusted as a combination of the sensor ring, sensor, and pre-amplifier in advance, they must be used as a set.
- Because the sensor is a precision part, it should be handled with special care. In particular, be careful not to apply external force to the sensor element.
- The sensor is an electronic part. To prevent chips, oil, water, and other harmful materials from being adhered to the sensor, take dust-proof and drip-proof measures on the machine side.
- The waterproofness of the pre-amplifier box is equivalent to IP55. However, if the pre-amplifier box is subject to successive splash of coolant or the like and is kept wet continuously, a failure can occur. Therefore, be careful not to splash coolant on the pre-amplifier box where possible.
- Vibration applied to the pre-amplifier box must be 1G or less.
- Perform shield wire connection. Connect the pre-amplifier box to ground or to the machine cabinet.
- For easy maintenance, install the sensor in a place where it can be replaced easily.

1.2.2 Installing the Sensor

Installing the sensor ring

Install the flange on the shaft side and screw it in the axis direction using the sensor ring mounting hole. In assembly, perform centering using the centering track so that the swing from the center of rotation is 10 μm or less.

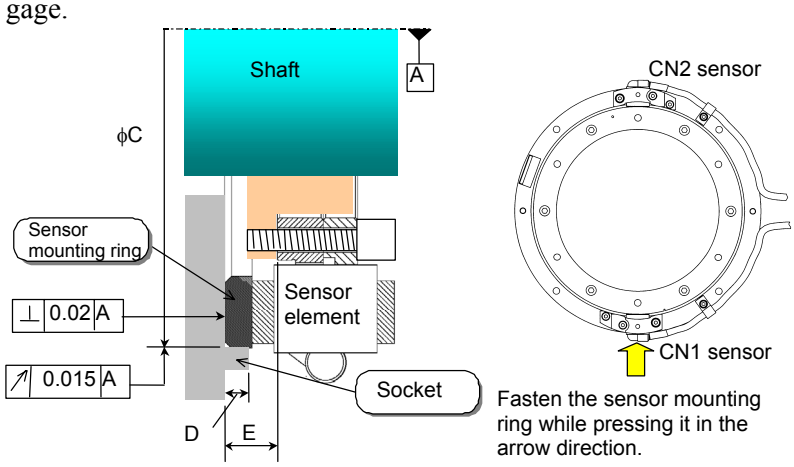


Specification	Outer diameter of centering track (ϕB)	Positions of sensor ring mounting holes	Mounting screw	Recommended tightening torque (Nm)
A860-2140-T411	ϕ101	6-ϕ5.5 through, equally spaced on ϕ92 circumference	M5	2.4 to 3.4
A860-2140-T511	ϕ152.2	6-ϕ5.5 through, equally spaced on ϕ140 circumference	M5	2.4 to 3.4
A860-2140-T611	ϕ203.4	6-ϕ6.6 through, equally spaced on ϕ183 circumference	M6	4.1 to 5.8

NOTE
- For centering, the outer diameter of the flange should be designed so that there is a gap of about 0.1 mm between the flange and the inner surface of the sensor ring.
- Secure the sensor ring on the end face with screws (avoid heat shrink fitting to mount the sensor ring).
- The sensor ring consists of a phase Z ring and a phase A/B ring, which are fastened together by using screws in advance. Never detach these screws. Spot facing is not provided. So, at the time of machine design, be careful not to cause interference with the screw heads.
- Centering must be performed with the centering track (the outer surface of the phase Z ring and the teeth pitch circle are not coaxial). When performing centering, use a tool such as a plastic hammer not to damage the gear teeth.
- Magnetic matter adhered to gear teeth can lead to a detection error. After centering is completed, remove such foreign matter by air blowing and so on.

Installing the sensor mounting ring

When installing the sensor mounting ring, provide a socket on the machine side, and fit the sensor mounting ring into the socket. (Dimensions of the socket on the machine side must satisfy the accuracy indicated in the table below. Otherwise, detection precision may lower.) When fastening the mounting ring with the screws, press the mounting ring against the socket from the CN1 sensor side as shown in the figure below. After the installation, check that the gap between the sensor ring and sensor is 0.08 mm or more by using a thickness gage.



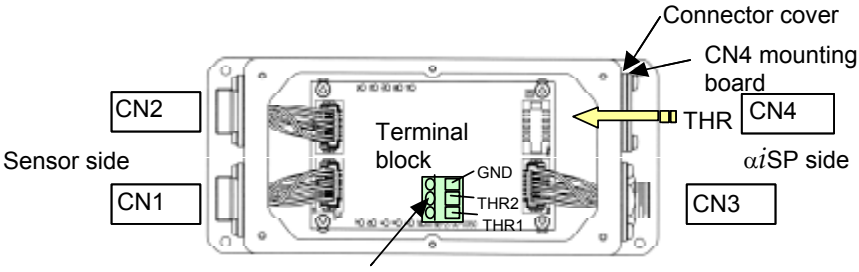
Specification	Outer diameter of sensor mounting ring	Inner diameter of socket (ϕC)	Socket height (D)	Distance between bottom of sensor mounting ring and bottom of sensor ring (E)
A860-2140-T411	ϕ140+0/-0.015	ϕ140+0.015/-0	5.5 or less	11.5±0.2
A860-2140-T511	ϕ190+0/-0.015	ϕ190+0.015/-0	7.5 or less	13.5±0.2
A860-2140-T611	ϕ242+0/-0.015	ϕ242+0.015/-0	7.5 or less	13.5±0.2

NOTE

Provide a socket on the machine side where possible, and fit the sensor mounting ring into the socket. Avoid making centering adjustments by tapping the outer surface of the sensor mounting ring.

Installing thermistor leads

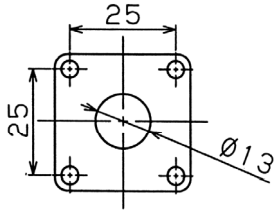
Open the lid of the pre-amplifier box, and remove the connector cover on the CN4 side. Draw the thermistor (THR) leads from CN4 and connect them to the terminal box on the printed circuit board.



Tighten with a flat-blade screwdriver. (Tightening torque: 0.3 N·m)

A cable clamp for the THR leads is to be prepared by the user. Use the attached CN4 connector mounting plate to secure the cable clamp.

Recommended cable clamp: SKINTOP by Lapp Kabel ST-7
Outer diameter of the THR cable: ϕ5.2±0.3
Hole diameter on the CN4 connector mounting plate: ϕ13



CN4 connector mounting plate

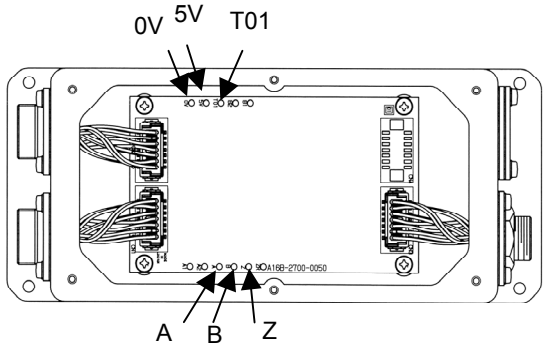
NOTE

1 Adjustments have been made for the sensor, pre-amplifier, and sensor ring at the same time. Therefore, use them as a set. The variable resistor on the printed circuit board in the pre-amplifier is also adjusted in advance. So, do not change it. Furthermore, because it is impossible to mechanically adjust the sensors, do not loosen the screws fastening the CN1 and CN2 sensors.
2 The connectors on the sensor side are labeled "CN1" (in black) and "DN2" (in blue). See the above figure, and make connections.

When checking the output signals

When checking the output signals, see "Electrical specifications" (the output signals need not be adjusted).

- When checking the waveform without connecting the signals to the α*i*SP, apply power to the 0V and 5V pins.
- Lissajous figure of the phase A/B output signal is a complete circle.



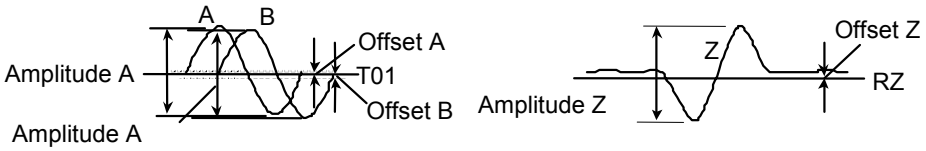
Electrical specifications

Item			Specification
Power supply voltage			5V±5%
Current consumption			150mA or less
Output signal	VA,VB	A860-2140-T411	512λ/rotation
		A860-2140-T511	768λ/rotation
		A860-2140-T611	1024λ/rotation
	VZ	Common to all types	1λ/rotation

Signal name	Check pin	Output amplitude	Offset
Phase A Phase B	A(Relative to T01) B(Relative to T01)	1000±100mVp-p	±50mV
Phase Z	Z(Relative to RZ)	660 to 1650mVp-p	±50mV

(Pre-amplifier output at ordinary room temperature and 500 min^{-1})

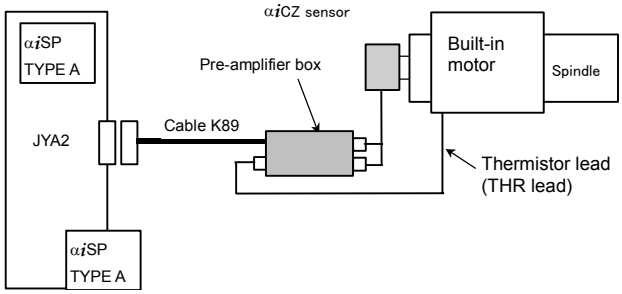
For connector pins, see "Connection specifications".



1.2.3 Connection

Connection diagram (outline)

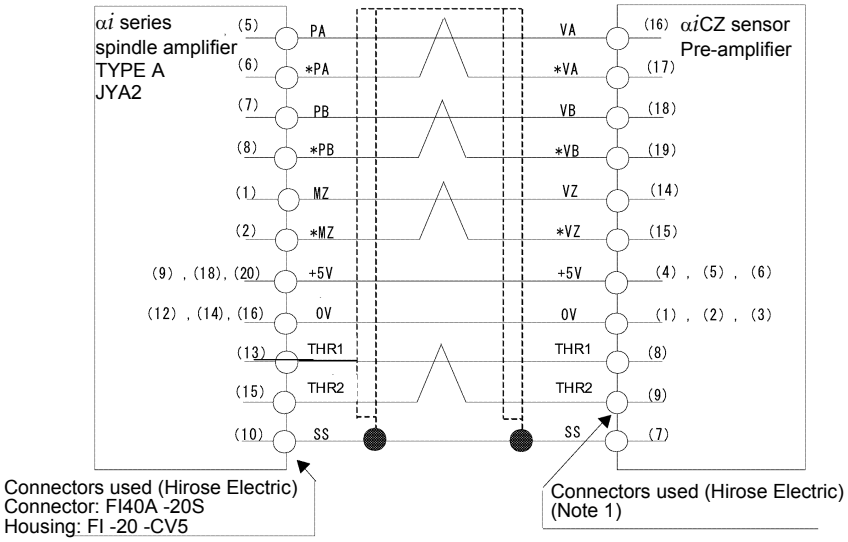
Connect the α*i*SP and α*i*CZ sensor as shown in the figure below.



For details of connection and connector pin assignment, refer to the next page.
Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER α*i* series for cable 17 and more detail information.

NOTE
1 Prepare the cable K89 by yourself.
2 Thermistor lead is connected to the motor.
3 The cable K89 may be relayed in the middle. In this case, use a connector with IP54 or more or a terminal box at the relay part.
4 Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER α*i* series for more detail information.

Connection (Details)



Cable specification	0.18mm^2 twisted pair × 4 pairs 0.18mm^2 × 6 Common shelded cable
5V,0V	(0.18mm^2 × 3) for each signal (To be connected one of the cables marked *)
VA,*VA,VB,*VB,VZ,*VZ,THR1,THR2	0.18mm^2 twisted pair × 4 pairs

NOTE

The following solder type or crimp type may be selected:

- Crimp type
  Crimp pins: HR22-SC-122 (15 pins are required per connector)
  Housing: HR22-12WTPA-20SC
  Crimping tool :
  HR22-TA-2428HC(Hirose Electric)
- Solder type
  HR22-12WTPA-20S

APPENDIX

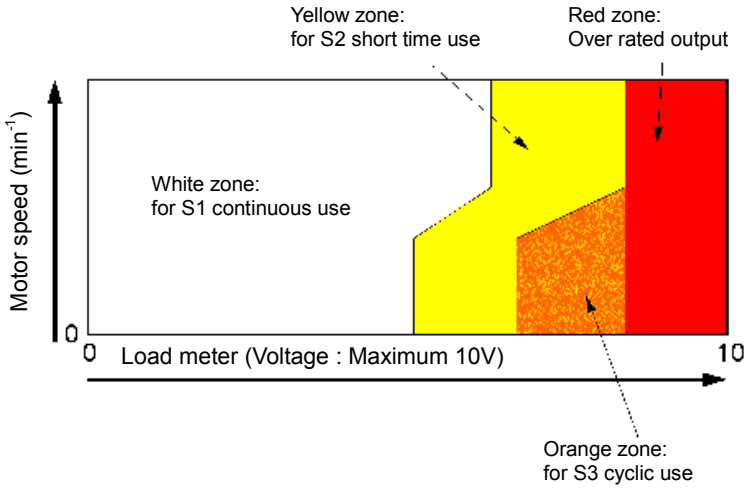
CONSTRUCTION OF APPENDIX

Appendix includes many reference data and information.

A LOAD METER

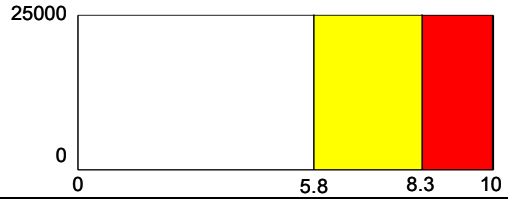
A load meter indicates the load factor. The load factor is the ratio of average output to the maximum output of the spindle motor when the spindle of the machine tool operates with no load and during cutting. Maximum output is equal to 10V. The voltage is output to pin No.16 of JY1 connector in spindle amplifier module(α*i*SP). Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER α*i* series for details of connector and pin assignment.

Explanation

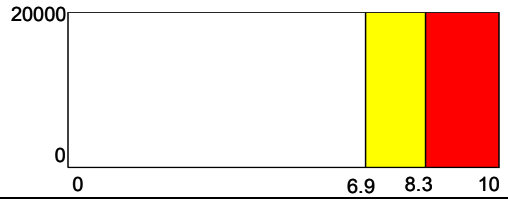


A.1 STANDARD TYPE

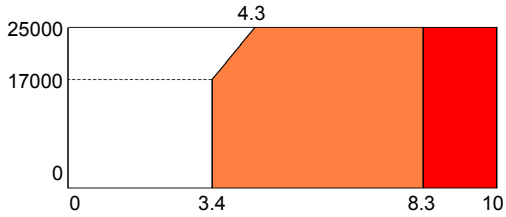
BiI 50S/30000 (A06B-1612-B170#0AB8)



BiI 50M/25000 (A06B-1613-B170#1AB2)

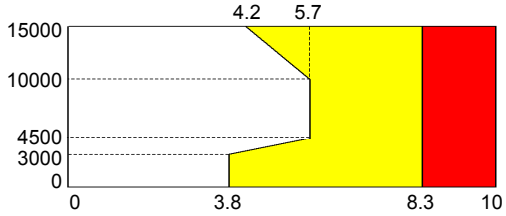


BiI 50L/25000 (A06B-1615-B120#ZAB8)

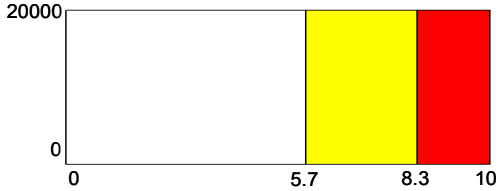


BiI 80S/20000 (A06B-1621-B120#ZAB2)

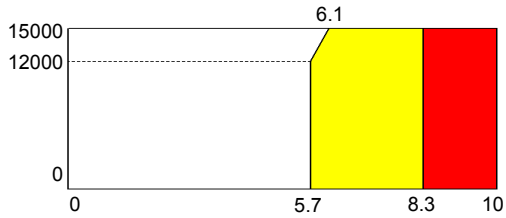
Low speed winding



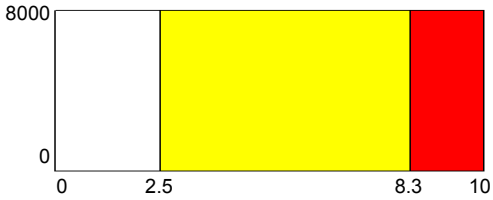
High speed winding



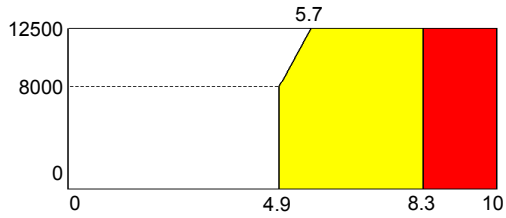
B*i*I 80M/15000 (A06B-1623-B170#ZAB1)



B*i*I 80L/8000 (A06B-1625-B170#ZAB1)

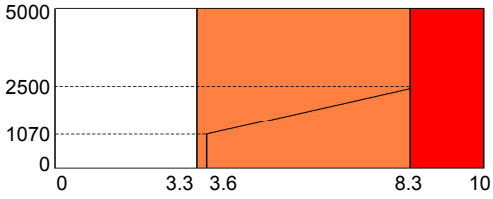


B*i*I 100S/12500 (A06B-1641-B120#ZAB1)

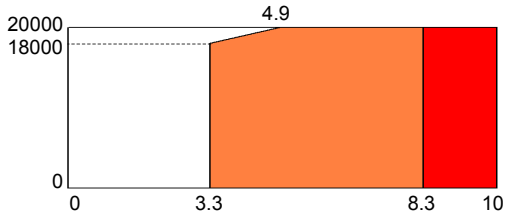


B*i*I 112SS/20000 (A06B-1661-B120#ZAB2)

Low speed winding

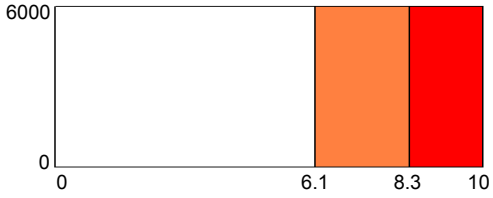


High speed winding

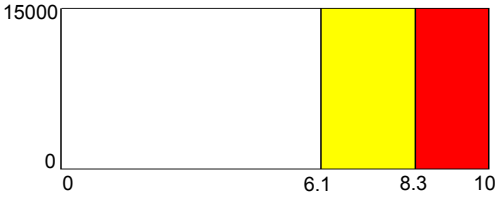


B*i*I 112S/15000 (A06B-1671-B120#ZAB1)

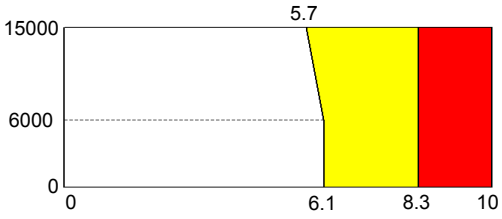
Low speed winding



High speed winding

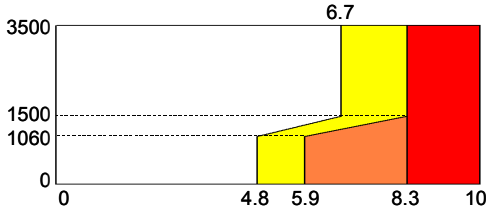


B*i*I 112M/15000 (A06B-1673-B120#ZAB1)

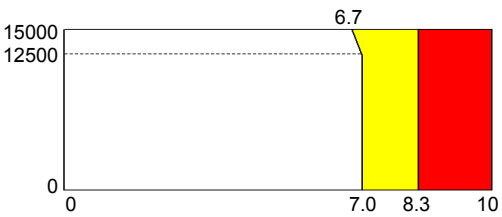


B*i*I 112L/15000 (A06B-1675-B100#ZAB1)

Low speed winding

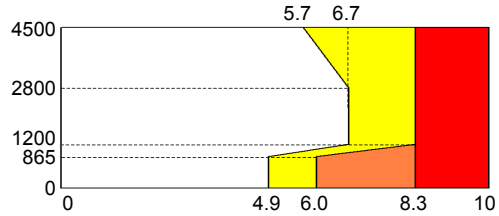


High speed winding

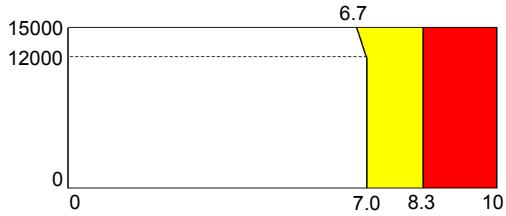


B*i*I 112LL/15000 (A06B-1676-B100#ZAB1)

Low speed winding

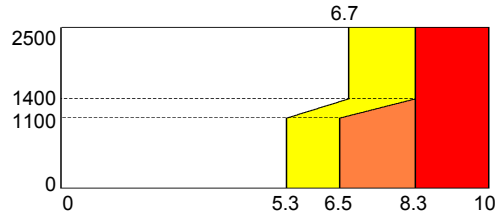


High speed winding

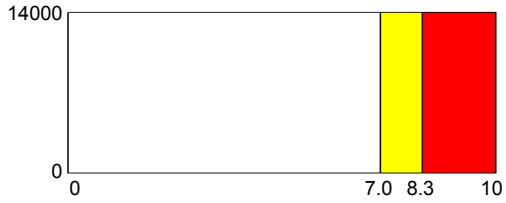


B*i*I 132M/14000 (A06B-1713-B100#ZAB1)

Low speed winding

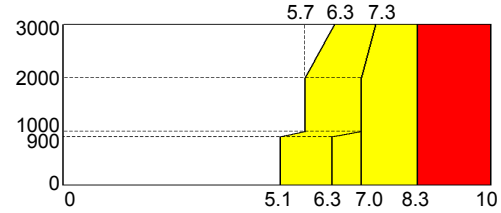


High speed winding

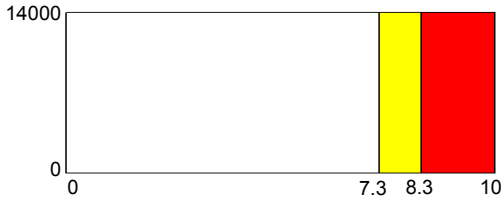


B*i*I 132L/14000 (A06B-1705-B140#ZAB1)

Low speed winding

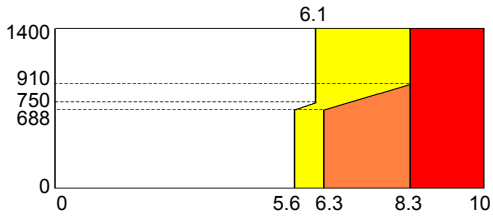


High speed winding

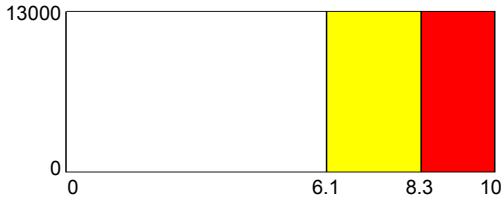


B*i*I 160S/13000 (A06B-1721-B120#ZAB1)

Low speed winding

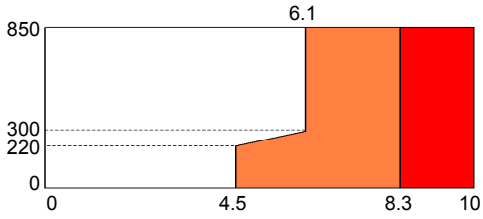


High speed winding

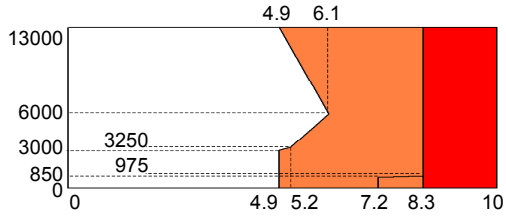


B*i*I 160M/13000 (A06B-1723-B120#ZAB1)

Low speed winding

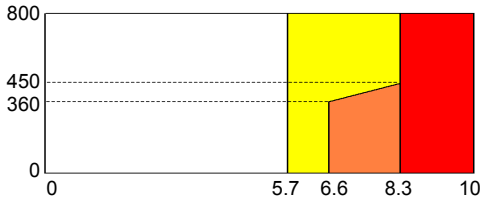


High speed winding

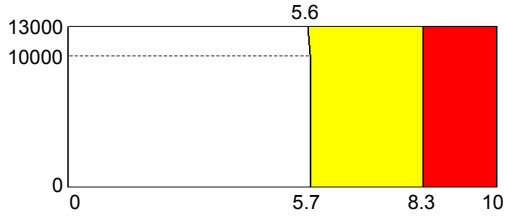


B*i*I 160L/13000 (A06B-1725-B120#ZAB1)

Low speed winding

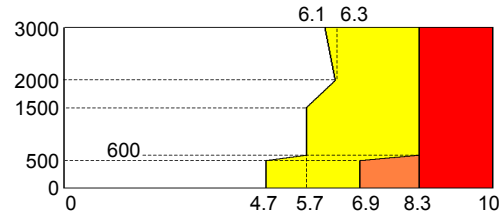


High speed winding

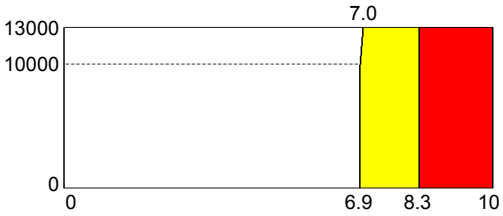


B*i*I 160LL/13000 (A06B-1726-B100#ZAB1)

Low speed winding

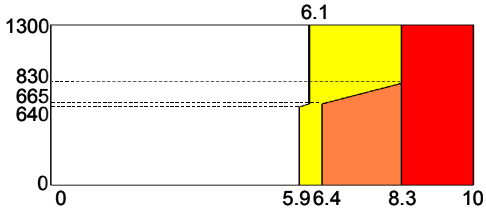


High speed winding

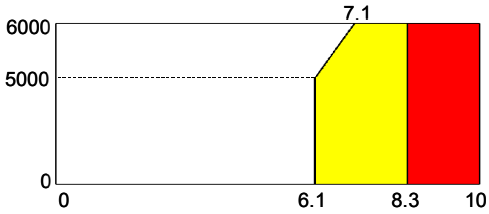


B*i*I 170S/6000 (A06B-1732-B120#1AB6)

Low speed winding

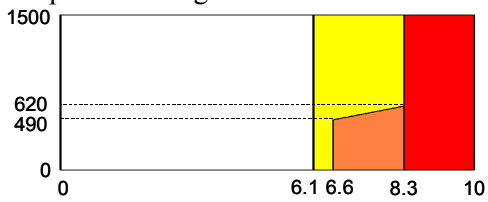


High speed winding



BiI 170M/6000 (A06B-1733-B120#1AB6)

Low speed winding



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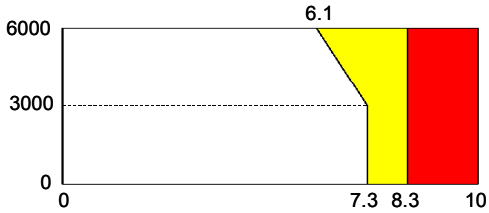
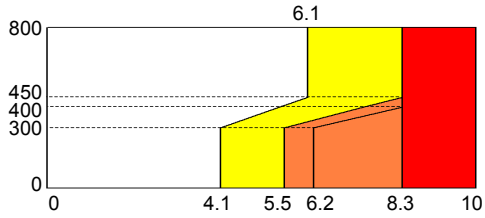


BiI 180M/6000 (A06B-1743-B100#ZAB1)

Low speed winding



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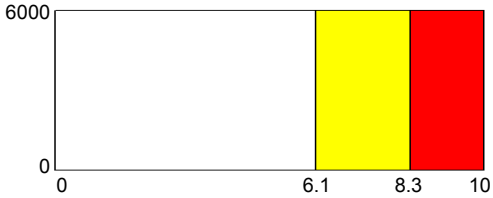
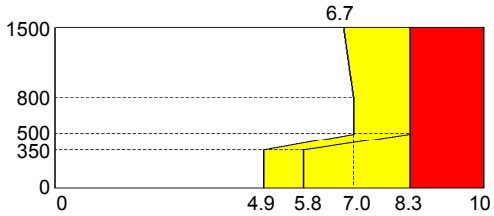


B*i*I 180L/6000 (A06B-1745-B100#ZAB1)

Low speed winding



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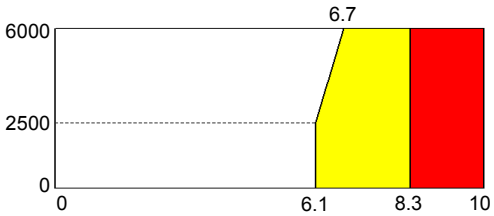
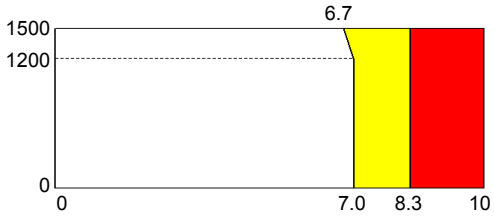
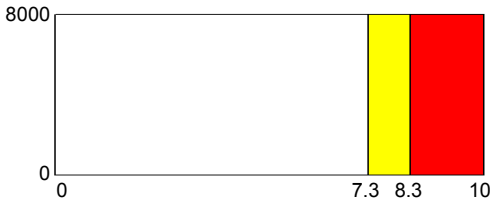


B*i*I 180LL/8000 (A06B-1746-B100#ZAB1)

Low speed winding

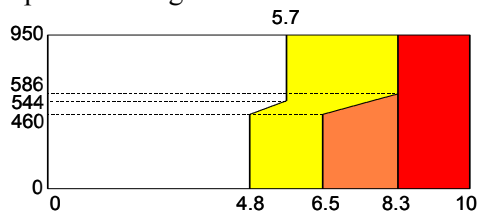


High speed winding

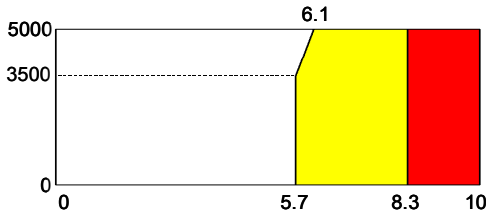


B*i*I 200S/6000 (A06B-1752-B120#2AB3)

Low speed winding

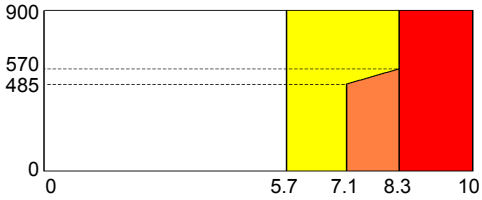


High speed winding



B*i*I 200M/6000 (A06B-1753-B120#ZAB3)

Low speed winding



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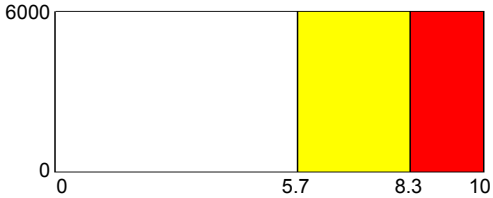
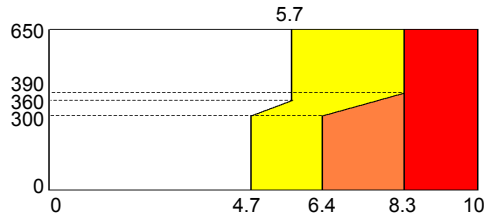
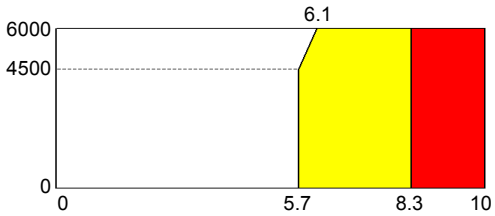


B*i*I 200L/6000 (A06B-1755-B120#ZAB6)

Low speed winding

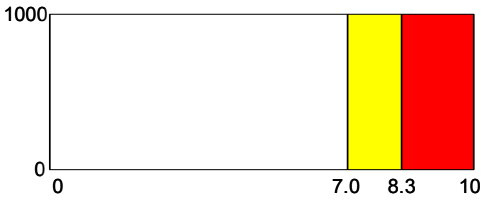


High speed winding

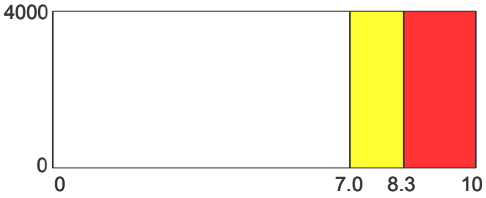


B*i*I 250S/6000 (A06B-1772-B140#ZAB3)

Low speed winding

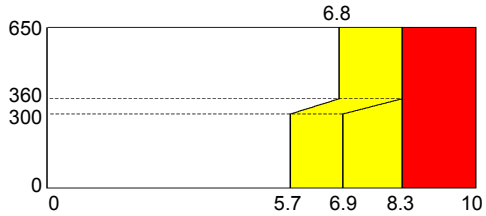


High speed winding

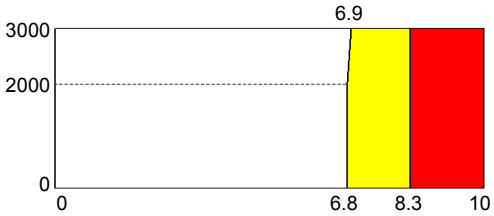


B*i*I 250M/3000 (A06B-1773-B140#ZAB6)

Low speed winding

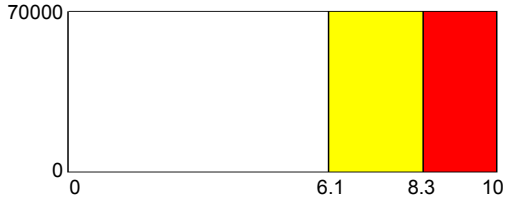


High speed winding

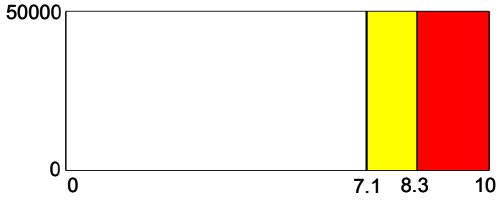


A.2 HIGH-SPEED TYPE

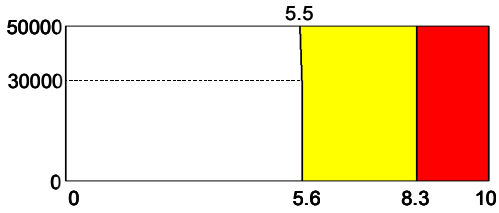
BiI 40S/70000 (A06B-1601-B120#ZNB8)



BiI 40M/70000 (A06B-1602-B170#0NB8)

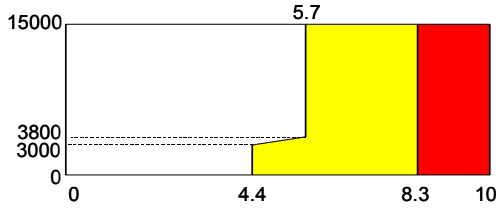


BiI 60SS/50000 (A06B-1616-B170#1NB8)

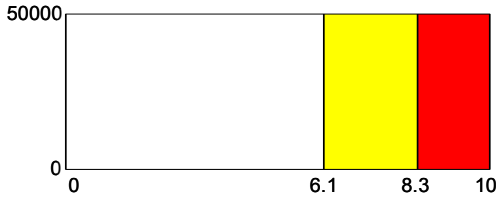


BiI 60S/50000 (A06B-1617-B120#3NB8)

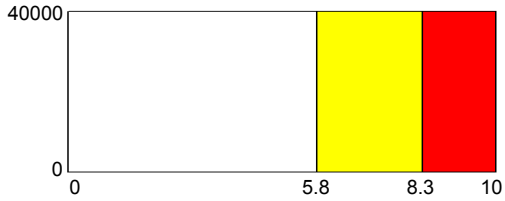
Low speed winding



High speed winding

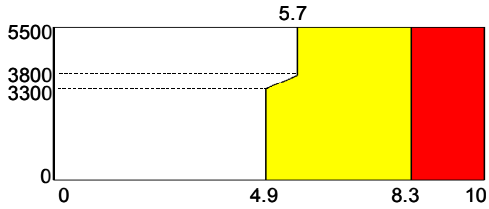


B*i*I 80S/40000 (A06B-1631-B120#YNB8)



B*i*I 100S/20000 (A06B-1641-B121#XNB7)

Low speed winding



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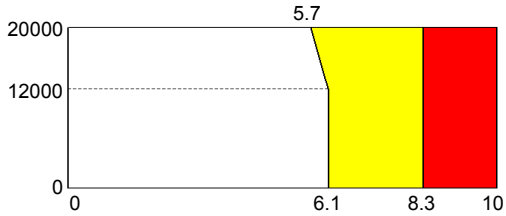
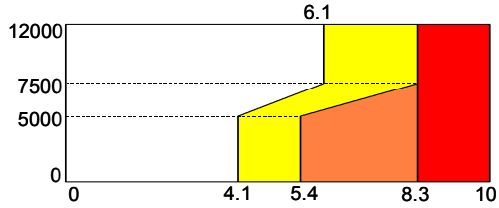
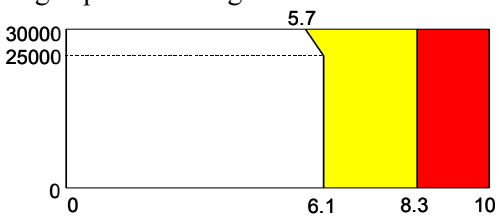


B*i*I 100S/30000 (A06B-1641-B122#9PB8)

Low speed winding

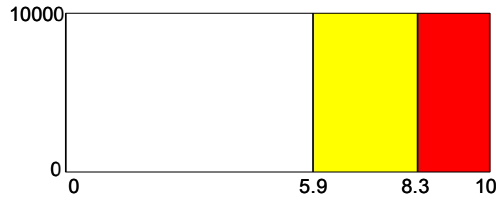


High speed winding

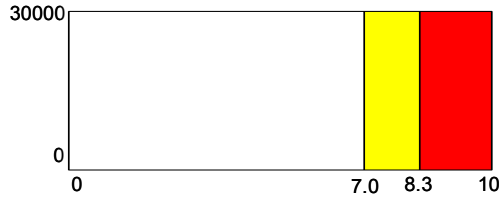


B*i*I 100L/30000 (A06B-1655-B120#0NB8)

Low speed winding

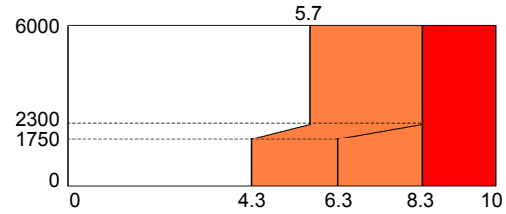


High speed winding

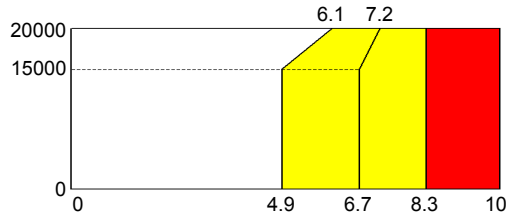


B*i*I 112S/20000 (A06B-1662-B120#ZAB7)

Low speed winding

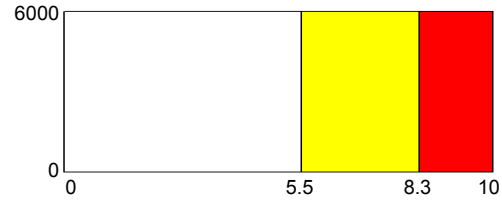


High speed winding

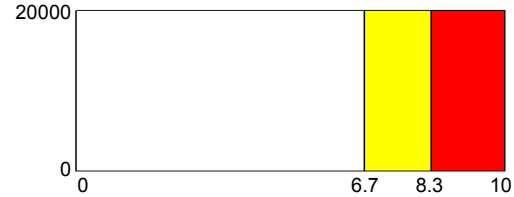


B*i*I 112M/20000 (A06B-1673-B100#YNB7)

Low speed winding

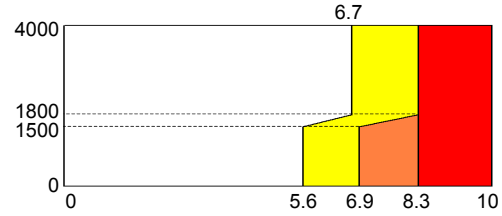


High speed winding



B*i*I 112L/20000 (A06B-1675-B100#YNB7)

Low speed winding



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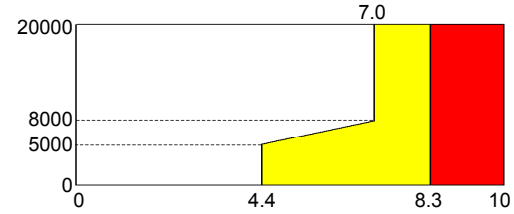
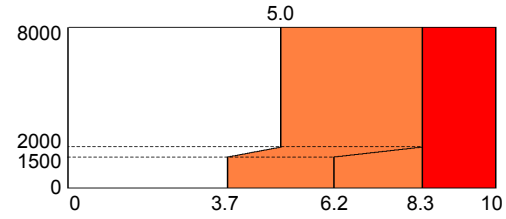
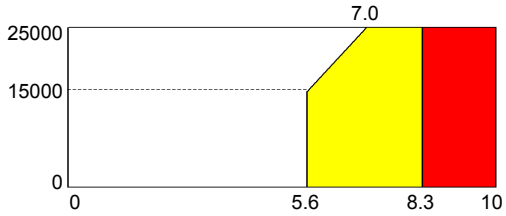


B*i*I 112L/25000 (A06B-1675-B140#XPB7)

Low speed winding

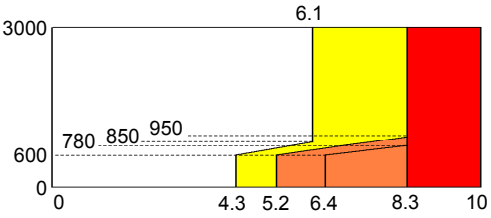


High speed winding

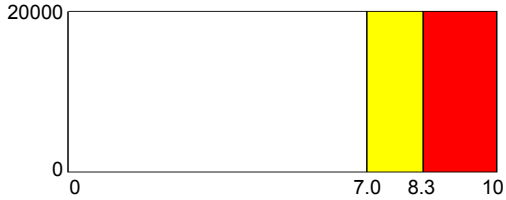


B*i*I 160M/20000 (A06B-1723-B140#YNB7)

Low speed winding

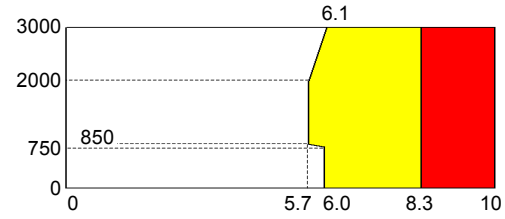


High speed winding

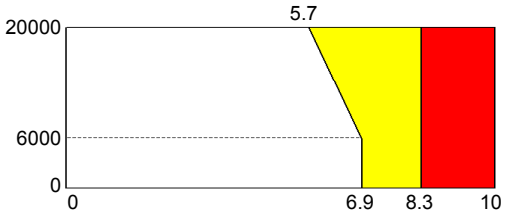


B*i*I 160L/20000 (A06B-1725-B140#YNB7)

Low speed winding

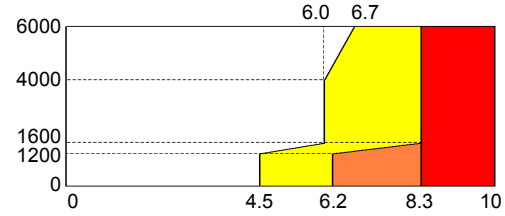


High speed winding

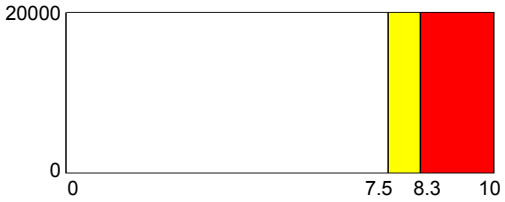


B*i*I 160LL/20000 (A06B-1726-B140#YNB7)

Low speed winding

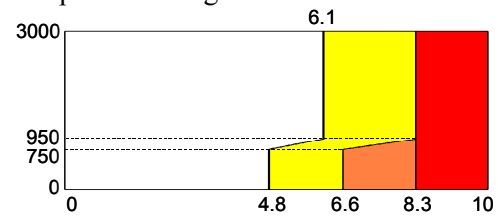


High speed winding

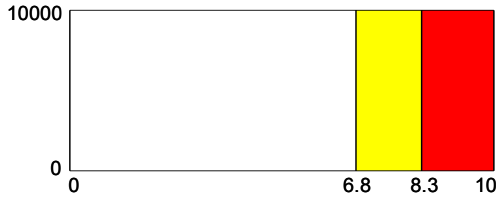


B*i*I 200S/10000 (A06B-1752-B120#4BB6)

Low speed winding



High speed winding



B DEFINITION OF RATING

The IEC34 standard uses symbols S1, S2, and S3 according to the types of motor rating. Each type of rating is described below:

Continuous rating (S1)

The motor can continuously be run at the indicated output.
Example)
15kW S1, 15kW S1 Cont.
Meaning)
The motor can continuously be run at an output of 15 kW.

Short-time rating (S2)

The motor can be run at the indicated output within the indicated time at room temperature.
Example)
18.5kW S2 30min.
Meaning)
The motor can be run at an output of 18.5 kW only for 30 minutes at room temperature.

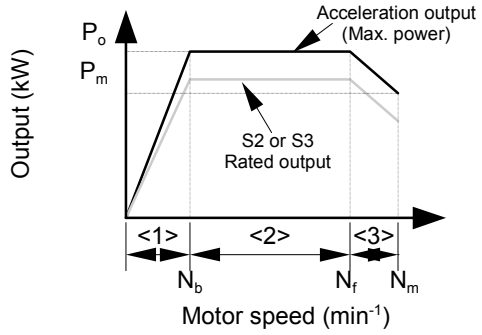
Cyclic rating (S3)

For the models described in the specifications, the motor runs and stops cyclically, where each cycle period is 10 minutes.
The ratio of the motor running time to 10 minutes is indicated as a percentage (%).
Example)
22kW S3 25%, 25% ED 22kW
Meaning)
The motor can be run at an output of 22 kW when the total of the motor running time is 2 minutes and 30 seconds in a 10-minute cycle. (The motor is stopped for the rest of 7 minutes and 30 seconds.)
Remarks)
ED means the cyclic rating (S3).
ED is an abbreviation of Einschaltdauer (running time) in German.

C ACCELERATION TIME

As a guideline, the acceleration output of the built-in spindle motor is 120% of the S2 or S3 rated output.

The acceleration time required for acceleration can be calculated from the expressions below. As the load torque of the machine is not considered in this calculation, the actual acceleration time is slightly longer than the time calculated here.



J_L	: Load inertia converted into motor shaft [kgm^2]
J_m	: Motor inertia [kgm^2]
P_o , P_m	: Output [kW]
N_b , N_f , N_m	: Motor speed [min^{-1}]

<1> Acceleration time (t_1)in the constant torque region ($0 \rightarrow N_b$)

$$t_1 = 0.01097 \cdot \frac{(J_L + J_m) \cdot N_b^{\,2}}{P_o \cdot 1000} \quad [\text{sec}]$$

<2> Acceleration time (t_2) in the constant output region ($N_b \rightarrow N_f$)

$$t_2 = 0.01097 \cdot \frac{(J_L + J_m) \cdot (N_f^{\,2} - N_b^{\,2})}{2 \cdot P_o \cdot 1000} \quad [\text{sec}]$$

<3> Acceleration time (t_3) in the output reduction region ($N_f \rightarrow N_m$)

$$t_3 = 0.01097 \cdot \frac{(J_L + J_m) \cdot (N_m - N_f) \cdot \left\{ (N_m - N_f) - \frac{P_o \cdot N_m - P_m \cdot N_f}{P_m - P_o} \cdot \ln \frac{P_m}{P_o} \right\}}{(P_m - P_o) \cdot 1000} \quad [\text{sec}]$$

$\therefore$ Total acceleration time (t) from 0 to N_m : $t=t_1+t_2+t_3$ [sec]

D COOLING CONDITION

IC code

IC code means "International Cooling" and it indicates the cooling system for a motor standardized in IEC34-6.
All FANUC's built-in AC spindle motors are developed under IC9U7A7 and this means all motors require separated oil cooling system. We have not recommended other cooling systems.

Actual calorie must be removed

You can calculate easily the actual calories that must be removed from the built-in motor according to the formula below using data shown in "I. SPECIFICATIONS". All data are got in the examinations based on IEC34 using the recommended cooling jacket .

$$\text{Removed calories } Q(W) = \frac{\{\text{Coolant temperature rise}(K)\} \times \{\text{Flow rate}(l/min.)\} \times \{\text{Specific heat}(J/gK)\} \times \{\text{Density}(g/cm^3)\} \times 1000}{60}$$

Capacity of cooler

Actual calories that must be removed can be calculated easily. But required minimum capacity of cooler will be different from this, as there are some heat diffusion to the environment and some heat production in the other parts used in the cooling system and in the spindle. Therefore considering safety,

Capacity of cooler =
Calculated calories+Produced calories in other parts
(You can deduct the calories if you know the diffusion to the environment.)

is preferable.

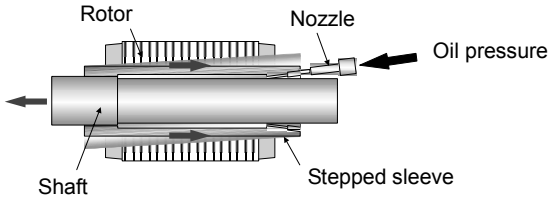
Coolant temperature setting

Physically, more calories can be removed if the coolant temperature is set lower. But the lower coolant temperature will cause condensation in or on the motor, and it will affect the motor life.

E ROTOR SLEEVE (REFERENCE)

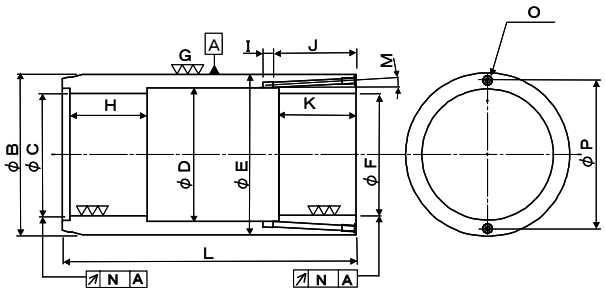
Rotor sleeve (Stepped sleeve)

Using a stepped sleeve in the inner diameter of rotor, the rotor can be separated from the shaft using the oil pressure (from 30MPa to 80MPa) in the stepped sleeve, and maintenance ability of rotor will be improved. Refer to the next page for reference.



NOTE
1 Shrink fit the stepped sleeve to the rotor, and then shrink fit the sleeve to the spindle. These reference data cannot be applied for other shrinking method. (It is not examined in FANUC.)
2 The stepped sleeve cannot be separated from the rotor. You can separated the shaft from the rotor sleeve.
3 Prepare the stepped sleeve and the nozzle by yourself. They are not attached to the motor.

Dimensions (Reference)



Unit : mm

	Model name	Type No. (A06B-)	ϕB	ϕC	ϕD	ϕF	H	I	J	K	L	M(deg)
Standard type	B*i*I 50S/30000	1612-B170#0AB8										
	B*i*I 50M/25000	1613-B170#1AB2										
	B*i*I 50L/25000	1615-B120#ZAB8										
	B*i*I 80S/20000	1621-B120#ZAB2										
	B*i*I 80M/15000	1623-B170#ZAB1										
	B*i*I 80L/8000	1625-B170#ZAB1										
	B*i*I 100S/12500	1641-B120#ZAB1	57	44.9	46	44.7	18	-	18	18	134	6
	B*i*I 112SS/20000	1661-B120#ZAB2	-	66.3	66.7	66.2	20	6.6 or less	19	18	128	6
	B*i*I 112S/15000	1671-B120#ZAB1	-	66.335	66.7	66.2	20	6.6 or less	23	18	168	6
	B*i*I 112M/15000	1673-B120#ZAB1	-	66.364	66.7	66.213	20	6.6 or less	27.6	20.65	219.15	6
	B*i*I 112L/15000	1675-B100#ZAB1	-	66.364	66.7	66.231	20	6.6 or less	27.6	20.65	290.3	6
	B*i*I 112LL/15000	1676-B100#ZAB1	-	66.364	66.7	66.231	20	6.6 or less	27.6	20.65	344.3	6
	B*i*I 132M/14000	1713-B100#ZAB1	-	59.6	59.6	59.005	20	6.6 or less	23	20	206	0
	B*i*I 132L/14000	1705-B140#ZAB1	-	59.1	61	58.9	20	6.6 or less	20	20	266	6
	B*i*I 160S/13000	1721-B120#ZAB1	100.5	85.27	86.5	85.07	50	6.6 or less	52	50	190.15	3
	B*i*I 160M/13000	1723-B120#ZAB1	100.5	85.27	86.5	85.07	25	6.6 or less	27.5	26	233.15	6
	B*i*I 160L/13000	1725-B120#ZAB1	100.5	85.27	86.5	85.07	25	6.6 or less	27.5	26	323.15	6
	B*i*I 160LL/13000	1726-B100#ZAB1	100.5	85.27	86.5	85.074	25	6.6 or less	29	26	383.15	6
	B*i*I 170S/6000	1732-B120#1AB6										
	B*i*I 170M/6000	1733-B120#1AB6										
	B*i*I 180M/6000	1743-B120#ZAB1	123.5	93.8	95.0	93.3	27	-	27	27	253	8
	B*i*I 180L/6000	1745-B100#ZAB1	123.5	93.8	95.0	93.3	27	-	27	27	343	8
	B*i*I 180LL/8000	1746-B100#ZAB1	123.5	93.8	95.0	93.3	27	-	27	27	403	8
	B*i*I 200S/6000	1752-B120#2AB3	-	105	106	104.9	48	6.6 or less	53.1	49.5	205.15	6
	B*i*I 200M/6000	1753-B120#ZAB3	-	105	106	104.9	48	6.6 or less	53.1	49.5	225.15	6
	B*i*I 200L/6000	1755-B120#ZAB6	-	122.4	123.7	122.1	49	6.6 or less	52	49	300.15	3
	B*i*I 250S/6000	1772-B140#ZAB3										
	B*i*I 250M/3000	1773-B140#ZAB6	166	149.8	151	149.5	63	6.6 or less	65.8	63	414.15	3

NOTE

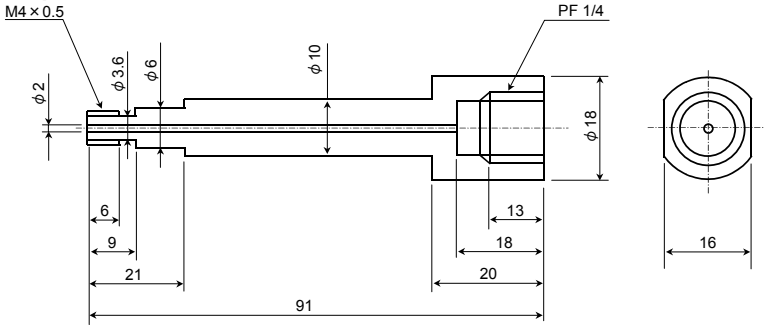
- All data shown above are just for reference. The model for which data is not indicated is not examined in FANUC.
- Material is HRC25-28, and heat treatment (refining) is recommended. Use magnetic material for the sleeve.
- ϕE and interference between the sleeve and the rotor must be as same as the data of "ϕE", "ϕJ" and "Interference" shown in the Chapter 1, "DIMENSIONS" in Part I, “STATOR AND ROTOR”.
- There is a possibility that the rotor cannot be separated from the spindle, if H and J are largely different form this table.
- Calculate ϕC, ϕF and their tolerance so that the Interference between the shaft and the sleeve is as same as "Interference" shown in the Subsection 1.2.2, "Size of Spindle Shaft" in Part I, “STATOR AND ROTOR”.
- Do not make a clearance between ϕE. and the inner surface of the rotor. It causes the deformation of the rotor.
- Consider the oil pressure, from 30MPa to 80Mpa.

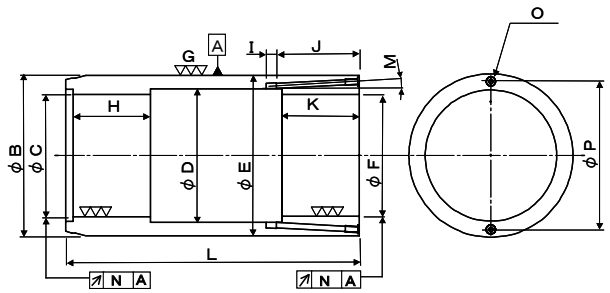
Unit : mm

	Model name	Type No. (A06B-)	N	ϕP	O
Standard type	BiI 50S/30000	1612-B170#0AB8			
	BiI 50M/25000	1613-B170#1AB2			
	BiI 50L/25000	1615-B120#ZAB8			
	BiI 80S/20000	1621-B120#ZAB2			
	BiI 80M/15000	1623-B170#ZAB1			
	BiI 80L/8000	1625-B170#ZAB1			
	BiI 100S/12500	1641-B120#ZAB1	0.02-0.05	(53)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112SS/20000	1661-B120#ZAB2	0.02-0.05	(74)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112S/15000	1671-B120#ZAB1	0.02-0.05	(74)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112M/15000	1673-B120#ZAB1	0.02-0.05	(67)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112L/15000	1675-B100#ZAB1	0.02-0.05	(76.5)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112LL/15000	1676-B100#ZAB1	0.02-0.05	(76.5)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 132M/14000	1713-B100#ZAB1	0.02-0.05	(67)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 132L/14000	1705-B140#ZAB1	0.02-0.05	(67)	2-M4×0.5 Depth 8: ϕ3.4; ϕ6 Counterboring Depth 1
	BiI 160S/13000	1721-B120#ZAB1	0.02-0.05	(95)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 160M/13000	1723-B120#ZAB1	0.02-0.05	(95)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 160L/13000	1725-B120#ZAB1	0.02-0.05	(95)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 160LL/13000	1726-B100#ZAB1	0.02-0.05	(96)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 170S/6000	1732-B120#1AB6			
	BiI 170M/6000	1733-B120#1AB6			
	BiI 180M/6000	1743-B100#ZAB1	0.02-0.05	(110)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 180L/6000	1745-B100#ZAB1	0.02-0.05	(110)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 180LL/8000	1746-B100#ZAB1	0.02-0.05	(110)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 200S/6000	1752-B120#2AB3	0.02-0.05	(122)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 200M/6000	1753-B120#ZAB3	0.02-0.05	(122)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 200L/6000	1755-B120#ZAB6	0.02-0.05	(135)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 250S/6000	1772-B140#ZAB3			
	BiI 250M/3000	1773-B140#ZAB6	0.02-0.05	(162)	2-M4×0.5 Depth 8: ϕ3.4; ϕ6 Counterboring Depth 1

NOTE
- All data shown above are just for reference. The model for which data is not indicated is not examined in FANUC.
- ϕN changes if the stopper is on the J side or if the L changes. Therefore change ϕN according to your spindle design.
- Tap of O is for the nozzle shown below.
- Consider the oil pressure, from 30MPa to 80MPa.

Nozzle (Reference)





Unit : mm

	Model name	Type No. (A06B-)	ϕB	ϕC	ϕD	ϕF	H	I	J	K	L	M(deg)
High-speed type	BiI 40S/70000	1601-B120#ZNB8										
	BiI 40M/70000	1602-B170#0NB8										
	BiI 60SS/50000	1616-B170#1NB8										
	BiI 60S/50000	1617-B120#3NB8										
	BiI 80S/40000	1631-B120#YNB8	59.2	46.9	48	46.7	15	-	15	15	113	6
	BiI 100S/20000	1641-B121#XNB7										
	BiI 100S/30000	1641-B122#9PB8										
	BiI 100L/30000	1655-B120#0NB8										
	BiI 112S/20000	1662-B120#ZAB7	73.5	59.1	61	58.9	20	6.6 or less	20	20	143	6
	BiI 112M/20000	1673-B100#YNB7	73.5	59.1	61	58.9	20	6.6 or less	20	20	208	6
	BiI 112L/20000	1675-B100#YNB7	73.5	59.1	61	58.9	20	6.6 or less	20	20	266	6
	BiI 112L/25000	1675-B140#XPB7										
	BiI 160M/20000	1723-B140#YNB7	100.5	85.2	86.5	85.0	25	6.6 or less	26	26	228	8
	BiI 160L/20000	1725-B140#YNB7	100.5	83.6	85.0	83.3	27	-	27	27	318	8
	BiI 160LL/20000	1726-B140#YNB7	101.5	77.1	79.0	76.9	30	6.6 or less	30	27	377	6
	BiI 200S/10000	1752-B120#4BB6										

NOTE

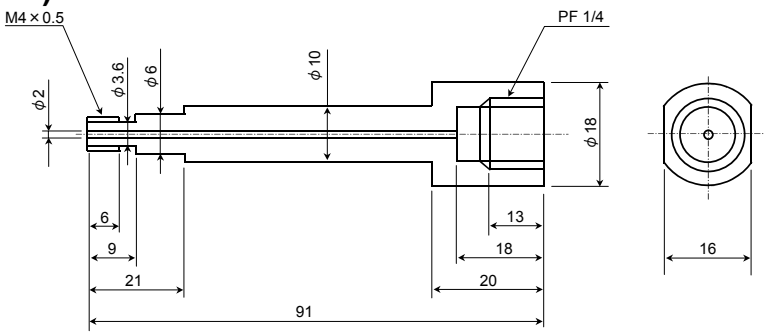
- All data shown above are just for reference. The model for which data is not indicated is not examined in FANUC.
- Material is HRC25-28, and heat treatment (refining) is recommended. Use magnetic material for the sleeve.
- ϕE and interference between the sleeve and the rotor must be as same as the data of "ϕE", "ϕJ" and "Interference" shown in the Chapter 1, "DIMENSIONS" in Part I, “STATOR AND ROTOR”.
- There is a possibility that the rotor cannot be separated from the spindle, if H and J are largely different form this table.
- Calculate ϕC, ϕF and their tolerance so that the Interference between the shaft and the sleeve is as same as "Interference" shown in the Subsection 1.2.2, "Size of Spindle Shaft" in Part I, “STATOR AND ROTOR”.
- Do not make a clearance between ϕE. and the inner surface of the rotor. It causes the deformation of the rotor.
- Consider the oil pressure, from 30MPa to 80Mpa.

Unit : mm

	Model name	Type No. (A06B-)	M	ϕN	O
High-speed type	BiI 40S/70000	1601-B120#ZNB8			
	BiI 40M/70000	1602-B170#0NB8			
	BiI 60SS/50000	1616-B170#1NB8			
	BiI 60S/50000	1617-B120#3NB8			
	BiI 80S/40000	1631-B120#YNB8	0.01	(55)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 100S/20000	1641-B121#XNB7			
	BiI 100S/30000	1641-B122#9PB8			
	BiI 100L/30000	1655-B120#0NB8			
	BiI 112S/20000	1662-B120#ZAB7	0.02-0.05	(67)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112M/20000	1673-B100#YNB7	0.02-0.05	(67)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112L/20000	1675-B100#YNB7	0.02-0.05	(67)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 112L/25000	1675-B140#XPB7			
	BiI 160M/20000	1723-B140#YNB7	0.02-0.05	(96)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 160L/20000	1725-B140#YNB7	0.02-0.05	(95)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 160LL/20000	1726-B140#YNB7	0.02-0.05	(90)	2-M4×0.5 Depth 8: ϕ2; ϕ6 Counterboring Depth 1
	BiI 200S/10000	1752-B120#4BB6			

NOTE
- All data shown above are just for reference. The model for which data is not indicated is not examined in FANUC.
- ϕN changes if the stopper is on the J side or if the L changes. Therefore change ϕN according to your spindle design.
- Tap of O is for the nozzle shown below.
- Consider the oil pressure, from 30MPa to 80MPa.

Nozzle (Reference)



F CONTACTOR (SPEED RANGE SWITCHING UNIT)

A speed range switching motor requires a contactor (speed range switching unit). The motor is supplied with no contactor. Place an order with FANUC for the contactor or prepare the contactor according to the specifications by yourself.

NOTE
When placing an order with FANUC, for details of each model such as the drawing number, specification, and dimensions, refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER αi series.

G PARAMETER LISTS

For each FANUC built-in spindle motor model, special parameters for driving the motor are provided. If the motor is driven with other than the predefined parameters, a problem may occur in the motor. So care should be taken.

Parameters related to the sensors and machine system must be set separately. For details, refer to the parameter manual (B-65280EN).

The CNC models indicated in the parameter tables are abbreviated as follows:

Model name	Abbreviation in parameter table
FANUC Series 30*i* FANUC Series 31*i* FANUC Series 32*i*	FS 30*i*
FANUC Series 16*i* FANUC Series 18*i* FANUC Series 21*i* FANUC Series 0*i*	FS 16*i*
FANUC Series 15*i*	FS 15*i*

CNCs supporting amplifier specifications in the parameter tables are indicated as follows:

Amplifier specification	CNC in parameter table
A06B-61xx-Hxxx#H550	FANUC Series 16*i* FANUC Series 18*i* FANUC Series 21*i* FANUC Series 0*i* FANUC Series 15*i*
A06B-61xx-Hxxx#H570	FANUC Series 30*i* FANUC Series 31*i* FANUC Series 32*i*

Parameter setting procedure

- Use model code 300 (when speed range switching is not performed) or 400 (when speed range switching is performed) to automatically set parameters.
  When parameter settings already adjusted are not to be initialized, automatic setting must not be performed.
- Set or modify parameters by manually entering data according to the table.
- Turn the power off then back on.

Setting the number of teeth of the motor sensor

- Set bits 2, 1, and 0 of parameter No. 4011 (FS 16*i*、and FS 30*i*) and parameter No. 3011 (FS 15*i*) according to the sensor used, as shown in the table below.
  (Example)
  When the sensor type No. is A860-2150-T201 (128 teeth):
  Bits 2, 1, and 0 of parameter No. 4011 (or No. 3011): 001

Bits 2, 1, and 0 of sensor parameter No. 4011 (No. 3011)

Sensor type No.	No. of teeth	Bits 2, 1, and 0 of parameter No. 4011
A860-2120-T201 A860-2150-T201 A860-2155-T201 A860-2120-T211 A860-2150-T211 A860-2155-T211	128	001
A860-2120-T401 A860-2150-T401 A860-2155-T401 A860-2120-T411 A860-2150-T411 A860-2155-T411	256	010
A860-2120-T511 A860-2150-T511 A860-2155-T511	384	101
A860-2120-T611 A860-2150-T611 A860-2155-T611	512	011
A860-2150-T311 A860-2155-T311	192	100

G.1 STANDARD TYPE

B*i*I 50S/30000 :A06B-1612-B170#0xxx*1 α*i*SP 2.2(TYPE A):A06B-6111-H002#H550(#H570)

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000000
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00001XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	25000
3039	4039	4039	0
3040	4040	4040	2 *2
3048	4048	4048	2 *2
3080	4080	4080	12870
3100	4100	4100	10550
3101	4101	4101	75
3102	4102	4102	14846
3103	4103	4103	0
3104	4104	4104	1100
3105	4105	4105	0
3106	4106	4106	3700
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	1886
3111	4111	4111	348
3112	4112	4112	200
3113	4113	4113	4862
3114	4114	4114	12800
3115	4115	4115	100
3116	4116	4116	11756
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	2
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	176
3128	4128	4128	115
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	130
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 50M/25000 :A06B-1613-B170#1xxx*1 α*i*SP 2.2(TYPE A):A06B-6111-H002#H550(#H570)

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000000
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00001XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	20000
3039	4039	4039	0
3040	4040	4040	2 *2
3048	4048	4048	2 *2
3080	4080	4080	20560
3100	4100	4100	8000
3101	4101	4101	90
3102	4102	4102	10280
3103	4103	4103	0
3104	4104	4104	1500
3105	4105	4105	0
3106	4106	4106	3600
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	2155
3111	4111	4111	237
3112	4112	4112	200
3113	4113	4113	3505
3114	4114	4114	0
3115	4115	4115	100
3116	4116	4116	10482
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	2
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	144
3128	4128	4128	130
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	130
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 50L/25000 :A06B-1615-B120#Zxxx*1 α*i*SP 5.5(TYPE A):A06B-6111-H006#H550(#H570)

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000000
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00001XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	25000
3039	4039	4039	0
3040	4040	4040	2 *2
3048	4048	4048	2 *2
3080	4080	4080	12875
3100	4100	4100	10000
3101	4101	4101	80
3102	4102	4102	10912
3103	4103	4103	0
3104	4104	4104	1200
3105	4105	4105	0
3106	4106	4106	3200
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	1019
3111	4111	4111	365
3112	4112	4112	200
3113	4113	4113	3790
3114	4114	4114	23040
3115	4115	4115	80
3116	4116	4116	9275
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	3
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	296
3128	4128	4128	0
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	140
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 80S/20000 :A06B-1621-B120#Zxxx*1 α*i*SP 5.5(TYPE A):A06B-6111-H006#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	00001100
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	238
3156	4156	4156	0	3039	4039	4039	0
3041	4041	4041	2*2	3040	4040	4040	2*2
3049	4049	4049	2*2	3048	4048	4048	2*2
3166	4166	4166	14165	3080	4080	4080	12882
3138	4138	4138	3100	3100	4100	4100	8200
3139	4139	4139	88	3101	4101	4101	82
3140	4140	4140	4993	3102	4102	4102	8392
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	3300	3104	4104	4104	2000
				3105	4105	4105	0
3143	4143	4143	6500	3106	4106	4106	4000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1048	3110	4110	4110	603
3147	4147	4147	259	3111	4111	4111	182
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	2466	3113	4113	4113	2403
3150	4150	4150	23040	3114	4114	4114	20480
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	11967	3116	4116	4116	11673
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	4	3119	4119	4119	4
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	296
3158	4158	4158	103	3128	4128	4128	105
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	130
				3169	4169	4169	0

NOTE • This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 80M/15000 :A06B-1623-B170#Zxxx*1 α*i*SP 2.2(TYPE A):A06B-6111-H002#H550(#H570)

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000000
3007	4007	4007	00000000
3008	4008	4008	00000000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00011XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	15000
3039	4039	4039	0
3080	4080	4080	10330
3100	4100	4100	3100
3101	4101	4101	100
3102	4102	4102	3557
3103	4103	4103	0
3104	4104	4104	5540
3105	4105	4105	0
3106	4106	4106	5540
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	690
3111	4111	4111	102
3112	4112	4112	200
3113	4113	4113	2100
3114	4114	4114	17920
3115	4115	4115	100
3116	4116	4116	10018
3117	4117	4117	90
3118	4118	4118	110
3119	4119	4119	5
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	176
3128	4128	4128	0
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	130
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 80L/8000 :A06B-1625-B170#Zxxx*1 α*i*SP 5.5(TYPE A):A06B-6111-H006#H550(#H570)

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000000
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00001XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	8000
3039	4039	4039	0
3080	4080	4080	65
3100	4100	4100	1650
3101	4101	4101	100
3102	4102	4102	2767
3103	4103	4103	0
3104	4104	4104	6000
3105	4105	4105	0
3106	4106	4106	6000
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	563
3111	4111	4111	217
3112	4112	4112	200
3113	4113	4113	1635
3114	4114	4114	0
3115	4115	4115	100
3116	4116	4116	9598
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	5
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	404
3128	4128	4128	115
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	130
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 100S/12500 :A06B-1641-B120#Zxxx*1 α*i*SP 5.5(TYPE A):A06B-6111-H006#H550(#H570)

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000000
3007	4007	4007	00000000
3008	4008	4008	00000000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00011XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	12500
3039	4039	4039	0
3080	4080	4080	19290
3100	4100	4100	1650
3101	4101	4101	100
3102	4102	4102	2672
3103	4103	4103	68
3104	4104	4104	5000
3105	4105	4105	0
3106	4106	4106	5000
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	586
3111	4111	4111	237
3112	4112	4112	200
3113	4113	4113	1138
3114	4114	4114	0
3115	4115	4115	85
3116	4116	4116	7142
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	8
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	202
3128	4128	4128	108
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	140
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 112SS/20000 :A06B-1661-B120#Zxxx[*1] **α*i*SP 11(TYPE A):A06B-6111-H011#H550(#H570)**

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	00001100
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	250
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	80	3080	4080	4080	45
3138	4138	4138	1415	3100	4100	4100	4800
3139	4139	4139	100	3101	4101	4101	50
3140	4140	4140	2171	3102	4102	4102	4845
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4000	3104	4104	4104	2300
				3105	4105	4105	0
3143	4143	4143	4000	3106	4106	4106	2300
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1077	3110	4110	4110	801
3147	4147	4147	402	3111	4111	4111	291
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	1070	3113	4113	4113	1070
3150	4150	4150	23040	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	9778	3116	4116	4116	7822
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	5	3119	4119	4119	5
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	300	3127	4127	4127	300
3158	4158	4158	125	3128	4128	4128	97
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 112S/15000 :A06B-1671-B120#Zxxx*1 α*i*SP 22(TYPE A):A06B-6111-H022#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	15000
				3023	4023	4023	400
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	85	3080	4080	4080	85
3138	4138	4138	1382	3100	4100	4100	6055
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	3777	3102	4102	4102	7505
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4300	3104	4104	4104	1600
				3105	4105	4105	0
3143	4143	4143	6500	3106	4106	4106	2000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1258	3110	4110	4110	1040
3147	4147	4147	417	3111	4111	4111	157
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	873	3113	4113	4113	699
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	10375	3116	4116	4116	8351
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	11	3119	4119	4119	14
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	164
3158	4158	4158	115	3128	4128	4128	115
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 112M/15000:A06B-1673-B120#Zxxx*1 α*i*SP 11(TYPE A):A06B-6111-H011#H550(#H570)

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000000
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00001XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	15000
3039	4039	4039	0
3080	4080	4080	19290
3100	4100	4100	1590
3101	4101	4101	100
3102	4102	4102	2349
3103	4103	4103	0
3104	4104	4104	5500
3105	4105	4105	0
3106	4106	4106	5500
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	718
3111	4111	4111	257
3112	4112	4112	200
3113	4113	4113	694
3114	4114	4114	0
3115	4115	4115	100
3116	4116	4116	8627
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	10
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	164
3128	4128	4128	110
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	140
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 112L/15000 : A06B-1675-B100#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	15000
				3023	4023	4023	233
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	70	3080	4080	4080	7760
3138	4138	4138	1295	3100	4100	4100	5000
3139	4139	4139	95	3101	4101	4101	75
3140	4140	4140	2184	3102	4102	4102	5755
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	3000	3104	4104	4104	1000
				3105	4105	4105	0
3143	4143	4143	3000	3106	4106	4106	1000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1886	3110	4110	4110	1006
3147	4147	4147	550	3111	4111	4111	288
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	876	3113	4113	4113	731
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	10197	3116	4116	4116	8548
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	11	3119	4119	4119	13
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	148	3127	4127	4127	143
3158	4158	4158	110	3128	4128	4128	105
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 112LL/15000:A06B-1676-B100#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	15000
				3023	4023	4023	192
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	18000	3080	4080	4080	12895
3138	4138	4138	1065	3100	4100	4100	3590
3139	4139	4139	100	3101	4101	4101	81
3140	4140	4140	1795	3102	4102	4102	4519
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4500	3104	4104	4104	2000
				3105	4105	4105	0
3143	4143	4143	6000	3106	4106	4106	2000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	2202	3110	4110	4110	958
3147	4147	4147	575	3111	4111	4111	268
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	689	3113	4113	4113	691
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	8800	3116	4116	4116	7389
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	14	3119	4119	4119	10
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	148	3127	4127	4127	143
3158	4158	4158	115	3128	4128	4128	115
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 132M/14000 : A06B-1713-B100#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	14000
				3023	4023	4023	179
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	95	3080	4080	4080	18005
3138	4138	4138	1220	3100	4100	4100	5050
3139	4139	4139	90	3101	4101	4101	85
3140	4140	4140	1901	3102	4102	4102	6264
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4000	3104	4104	4104	1500
				3105	4105	4105	0
3143	4143	4143	4000	3106	4106	4106	1500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	3352	3110	4110	4110	1631
3147	4147	4147	827	3111	4111	4111	393
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	296	3113	4113	4113	297
3150	4150	4150	20480	3114	4114	4114	20480
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	7382	3116	4116	4116	7393
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	15	3119	4119	4119	30
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	148	3127	4127	4127	143
3158	4158	4158	117	3128	4128	4128	105
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 132L/14000 :A06B-1705-B140#Zxxx[*1] **α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)**

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	11010000
				3019	4019	4019	00000100
				3020	4020	4020	14000
				3023	4023	4023	214
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	65	3080	4080	4080	83
3138	4138	4138	1000	3100	4100	4100	5550
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	2067	3102	4102	4102	7326
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	2800	3104	4104	4104	1500
				3105	4105	4105	0
3143	4143	4143	2800	3106	4106	4106	1500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	3351	3110	4110	4110	1207
3147	4147	4147	939	3111	4111	4111	304
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	301	3113	4113	4113	264
3150	4150	4150	23040	3114	4114	4114	32000
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	9027	3116	4116	4116	7429
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	32	3119	4119	4119	32
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	136
3158	4158	4158	0	3128	4128	4128	105
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 160S/13000 : A06B-1721-B120#Zxxx*1 α*i*SP 22(TYPE A):A06B-6111-H022#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	13000
				3023	4023	4023	107
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	70	3080	4080	4080	50
3138	4138	4138	770	3100	4100	4100	1450
3139	4139	4139	92	3101	4101	4101	90
3140	4140	4140	1069	3102	4102	4102	1873
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	6500	3104	4104	4104	5000
				3105	4105	4105	0
3143	4143	4143	6500	3106	4106	4106	5000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1508	3110	4110	4110	794
3147	4147	4147	561	3111	4111	4111	283
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	403	3113	4113	4113	411
3150	4150	4150	0	3114	4114	4114	20480
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	6472	3116	4116	4116	6520
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	24	3119	4119	4119	24
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	164
3158	4158	4158	105	3128	4128	4128	130
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
					4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 160M/13000 :A06B-1723-B120#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	13000
				3023	4023	4023	65
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	85	3080	4080	4080	52
				3082	4082	4082	30
3138	4138	4138	354	3100	4100	4100	988
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	872	3102	4102	4102	1779
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	10000	3104	4104	4104	5000
				3105	4105	4105	0
3143	4143	4143	10000	3106	4106	4106	5000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	3549	3110	4110	4110	2414
3147	4147	4147	699	3111	4111	4111	592
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	383	3113	4113	4113	383
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	6345	3116	4116	4116	6345
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	25	3119	4119	4119	25
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	202
3158	4158	4158	110	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 160L/13000 : A06B-1725-B120#Zxxx*1 α*i*SP 22(TYPE A):A06B-6111-H022#H550(#570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	13000
				3023	4023	4023	62
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	75	3080	4080	4080	13156
3138	4138	4138	430	3100	4100	4100	844
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	815	3102	4102	4102	1695
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	6000	3104	4104	4104	4100
				3105	4105	4105	0
3143	4143	4143	7200	3106	4106	4106	4000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1312	3110	4110	4110	967
3147	4147	4147	468	3111	4111	4111	304
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	308	3113	4113	4113	290
3150	4150	4150	0	3114	4114	4114	23040
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	5414	3116	4116	4116	5092
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	31	3119	4119	4119	33
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	176
3158	4158	4158	120	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 160LL/13000:A06B-1726-B100#Zxxx*[1] α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00000000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00011XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	13000
				3023	4023	4023	130
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	58	3080	4080	4080	75
3138	4138	4138	500	3100	4100	4100	2400
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	771	3102	4102	4102	3050
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	3200	3104	4104	4104	2500
				3105	4105	4105	0
3143	4143	4143	3200	3106	4106	4106	2500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1886	3110	4110	4110	1631
3147	4147	4147	541	3111	4111	4111	465
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	395	3113	4113	4113	330
3150	4150	4150	23040	3114	4114	4114	23040
3151	4151	4151	100	3115	4115	4115	85
3152	4152	4152	5116	3116	4116	4116	4482
3153	4153	4153	90	3117	4117	4117	100
3154	4154	4154	130	3118	4118	4118	115
3165	4165	4165	30	3119	4119	4119	29
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	144
3158	4158	4158	115	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 170S/6000 : A06B-1732-B120#1xxx*1 α*i*SP 22(TYPE A):A06B-6111-H022#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10001XXX
				3012	4012	4012	10000000
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	6000
				3023	4023	4023	217
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	95	3080	4080	4080	90
3138	4138	4138	710	3100	4100	4100	1340
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	1078	3102	4102	4102	1954
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4000	3104	4104	4104	2000
				3105	4105	4105	0
3143	4143	4143	6500	3106	4106	4106	4000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1040	3110	4110	4110	629
3147	4147	4147	380	3111	4111	4111	215
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	556	3113	4113	4113	556
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	10415	3116	4116	4116	10416
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	17	3119	4119	4119	17
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	164
3158	4158	4158	118	3128	4128	4128	115
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

BiI 170M/6000 : A06B-1733-B120#1xxx[*1] **αiSP 26(TYPE A):A06B-6141-H026#H580**

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15i	FS16i	FS30i		FS15i	FS16i	FS30i	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10001XXX
				3012	4012	4012	10000010
				3013	4013	4013	00001100
				3019	4019	4019	00000100
				3020	4020	4020	6000
				3023	4023	4023	170
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	75	3080	4080	4080	80
3138	4138	4138	560	3100	4100	4100	1850
3139	4139	4139	100	3101	4101	4101	89
3140	4140	4140	1207	3102	4102	4102	2135
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	7000	3104	4104	4104	4000
				3105	4105	4105	0
3143	4143	4143	10000	3106	4106	4106	6500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1810	3110	4110	4110	1068
3147	4147	4147	632	3111	4111	4111	364
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	503	3113	4113	4113	503
3150	4150	4150	0	3114	4114	4114	21760
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	9919	3116	4116	4116	9920
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	19	3119	4119	4119	19
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	136
3158	4158	4158	106	3128	4128	4128	116
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the αiBZ sensor. For the αiCZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- This parameter table can be used to drive the αiSP 26 (A06B-6141-H026#H580), not A06B-6111-H026#H550 or A06B-6111-H026#H570.
- For the maximum acceleration output, see the data for the αiPS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 180M/6000 : A06B-1743-B100#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00000000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00011XXX
				3012	4012	4012	10000000
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	6000
				3023	4023	4023	133
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	84	3080	4080	4080	48
3138	4138	4138	380	3100	4100	4100	850
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	457	3102	4102	4102	1621
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	3600	3104	4104	4104	3300
				3105	4105	4105	0
3143	4143	4143	3600	3106	4106	4106	3300
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	3017	3110	4110	4110	2011
3147	4147	4147	545	3111	4111	4111	393
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	300	3113	4113	4113	250
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	3835	3116	4116	4116	4035
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	10	3119	4119	4119	30
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	164
3158	4158	4158	110	3128	4128	4128	101
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 180L/6000:A06B-1745-B100#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00000000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00011XXX
				3012	4012	4012	10000000
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	6000
				3023	4023	4023	167
3156	4156	4156	0	3039	4039	4039	0
3041	4041	4041	8 *2				
3049	4049	4049	8 *2				
3166	4166	4166	50	3080	4080	4080	60
3138	4138	4138	390	3100	4100	4100	1500
3139	4139	4139	95	3101	4101	4101	75
3140	4140	4140	630	3102	4102	4102	1376
3141	4141	4141	0	3103	4103	4103	75
3142	4142	4142	6000	3104	4104	4104	4000
				3105	4105	4105	0
3143	4143	4143	6000	3106	4106	4106	4000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	2408	3110	4110	4110	1338
3147	4147	4147	673	3111	4111	4111	394
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	210	3113	4113	4113	184
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	5264	3116	4116	4116	4075
3153	4153	4153	30810	3117	4117	4117	90
3154	4154	4154	110	3118	4118	4118	110
3165	4165	4165	15	3119	4119	4119	45
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	143	3127	4127	4127	164
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 180LL/8000 :A06B-1746-B100#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	8000
				3023	4023	4023	186
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	85	3080	4080	4080	90
3138	4138	4138	404	3100	4100	4100	1324
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	641	3102	4102	4102	1878
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	8000	3104	4104	4104	2500
				3105	4105	4105	0
3143	4143	4143	8000	3106	4106	4106	4000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1892	3110	4110	4110	1138
3147	4147	4147	498	3111	4111	4111	280
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	217	3113	4113	4113	169
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	5447	3116	4116	4116	4259
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	130	3118	4118	4118	100
3165	4165	4165	44	3119	4119	4119	56
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	143	3127	4127	4127	136
3158	4158	4158	110	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 200S/6000:A06B-1752-B120#2xxx*1 α*i*SP 37(TYPE A):A06B-6111-H037#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00000000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10011XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	5000
				3023	4023	4023	190
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	100	3080	4080	4080	20570
3138	4138	4138	510	3100	4100	4100	1000
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	877	3102	4102	4102	1822
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	12500	3104	4104	4104	3900
				3105	4105	4105	0
3143	4143	4143	10500	3106	4106	4106	4500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1378	3110	4110	4110	1628
3147	4147	4147	415	3111	4111	4111	475
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	481	3113	4113	4113	285
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	12929	3116	4116	4116	7722
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	20	3119	4119	4119	34
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	176
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 200M/6000 :A06B-1753-B120#Zxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10001XXX
				3012	4012	4012	10000000
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	6000
				3023	4023	4023	150
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	70	3080	4080	4080	60
3138	4138	4138	542	3100	4100	4100	900
3139	4139	4139	80	3101	4101	4101	100
3140	4140	4140	766	3102	4102	4102	1790
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4000	3104	4104	4104	2500
				3105	4105	4105	0
3143	4143	4143	4000	3106	4106	4106	2500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1886	3110	4110	4110	1588
3147	4147	4147	563	3111	4111	4111	471
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	310	3113	4113	4113	269
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	8436	3116	4116	4116	7952
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	35	3119	4119	4119	31
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	176
3158	4158	4158	120	3128	4128	4128	105
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 200L/6000 :A06B-1755-B120#Zxxx*1 α*i*SP 45(TYPE A):A06B-6111-H045#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10001XXX
				3012	4012	4012	10000000
				3013	4013	4013	00011000
				3019	4019	4019	00000100
				3020	4020	4020	6000
				3023	4023	4023	108
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	90	3080	4080	4080	70
3138	4138	4138	400	3100	4100	4100	690
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	733	3102	4102	4102	1411
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	2500	3104	4104	4104	2500
				3105	4105	4105	0
3143	4143	4143	2500	3106	4106	4106	2500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	2121	3110	4110	4110	1358
3147	4147	4147	680	3111	4111	4111	428
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	305	3113	4113	4113	270
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	7656	3116	4116	4116	6400
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	5	3119	4119	4119	5
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	176
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 250S/6000 :A06B-1772-B140#Zxxx*1 α*i*SP 45 (TYPE A):A06B-6111-H045#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10001XXX
				3012	4012	4012	10000000
				3013	4013	4013	00011000
				3019	4019	4019	00000100
				3020	4020	4020	4000
				3023	4023	4023	250
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	90	3080	4080	4080	20570
3138	4138	4138	437	3100	4100	4100	1013
3139	4139	4139	0	3101	4101	4101	0
3140	4140	4140	791	3102	4102	4102	1366
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	5300	3104	4104	4104	3300
				3105	4105	4105	0
3143	4143	4143	4500	3106	4106	4106	3200
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1337	3110	4110	4110	770
3147	4147	4147	442	3111	4111	4111	191
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	192	3113	4113	4113	192
3150	4150	4150	0	3114	4114	4114	23040
3151	4151	4151	100	3115	4115	4115	90
3152	4152	4152	10650	3116	4116	4116	10650
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	50	3119	4119	4119	50
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	142	3127	4127	4127	142
3158	4158	4158	102	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

B*i*I 250M/3000 :A06B-1773-B140#Zxxx*1 α*i*SP 55(TYPE A):A06B-6111-H055#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10001XXX
				3012	4012	4012	10000000
				3013	4013	4013	00011000
				3019	4019	4019	00000100
				3020	4020	4020	3000
				3023	4023	4023	200
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	60	3080	4080	4080	60
3138	4138	4138	325	3100	4100	4100	650
3139	4139	4139	97	3101	4101	4101	100
3140	4140	4140	458	3102	4102	4102	1126
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	3500	3104	4104	4104	3500
				3105	4105	4105	0
3143	4143	4143	3500	3106	4106	4106	3500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1760	3110	4110	4110	1389
3147	4147	4147	524	3111	4111	4111	409
3148	4148	4148	13000	3112	4112	4112	13000
3149	4149	4149	150	3113	4113	4113	160
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	8249	3116	4116	4116	8339
3153	4153	4153	100	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	59	3119	4119	4119	59
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	146	3127	4127	4127	146
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.1, "STANDARD TYPE", in Part I, "SPECIFICATIONS".

G.2 HIGH-SPEED TYPE

B*i*I 40S/70000 :A06B-1601-B120#Zxxx*1 α*i*SP 2.2(TYPE A):A06B-6111-H002#H550(#H570) requiring reactor

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000100
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00000XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	7000
3039	4039	4039	0
3040	4040	4040	2 *2
3048	4048	4048	2 *2
3080	4080	4080	50
3100	4100	4100	7040
3101	4101	4101	100
3102	4102	4102	11279
3103	4103	4103	0
3104	4104	4104	450
3105	4105	4105	0
3106	4106	4106	1000
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	1
3110	4110	4110	1508
3111	4111	4111	130
3112	4112	4112	200
3113	4113	4113	2038
3114	4114	4114	120
3115	4115	4115	90
3116	4116	4116	11968
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	3
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	164
3128	4128	4128	0
3129	4129	4129	0
3130	4130	4130	25800
3134	4134	4134	140
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 40M/70000 :A06B-1602-B170#0xxx*1 α*i*SP 11(TYPE A):A06B-6111-H011#H550(#H570) requiring reactor

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000100
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00000XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	5000
3039	4039	4039	0
3080	4080	4080	70
3100	4100	4100	3200
3101	4101	4101	100
3102	4102	4102	6047
3103	4103	4103	0
3104	4104	4104	500
3105	4105	4105	0
3106	4106	4106	1600
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	2694
3111	4111	4111	526
3112	4112	4112	200
3113	4113	4113	2452
3114	4114	4114	0
3115	4115	4115	100
3116	4116	4116	8891
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	4
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	140
3128	4128	4128	0
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	140
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 60SS/50000 :A06B-1616-B170#1xxx*1 α*i*SP 11(TYPE A):A06B-6111-H011#H550(#H570) requiring reactor

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000100
3007	4007	4007	00000000
3008	4008	4008	00010000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00000XXX
3012	4012	4012	10000010
3013	4013	4013	00001100
3019	4019	4019	00000100
3020	4020	4020	5000
3039	4039	4039	0
3080	4080	4080	14160
3100	4100	4100	1500
3101	4101	4101	70
3102	4102	4102	2816
3103	4103	4103	0
3104	4104	4104	950
3105	4105	4105	0
3106	4106	4106	2000
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	2514
3111	4111	4111	961
3112	4112	4112	200
3113	4113	4113	2641
3114	4114	4114	0
3115	4115	4115	80
3116	4116	4116	8210
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	4
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	178
3128	4128	4128	105
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	140
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 60S/50000 :A06B-1617-B120#3xxx*1 α*i*SP 22(TYPE A):A06B-6111-H022#H550(#H570) requiring reactor

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000100
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00000XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	5000
				3023	4023	4023	220
3166	4166	4166	70	3080	4080	4080	5195
3138	4138	4138	400	3100	4100	4100	3000
3139	4139	4139	85	3101	4101	4101	67
3140	4140	4140	2184	3102	4102	4102	4284
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	900	3104	4104	4104	750
				3105	4105	4105	0
3143	4143	4143	1800	3106	4106	4106	1750
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	3176	3110	4110	4110	2011
3147	4147	4147	783	3111	4111	4111	490
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	1955	3113	4113	4113	2087
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	90
3152	4152	4152	7140	3116	4116	4116	10476
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	5	3119	4119	4119	5
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	164
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 80S/40000 :A06B-1631-B120#Yxxx*1 α*i*SP 45(TYPE A):A06B-6111-H045#H550(#H570) requiring reactor

Parameter number			
FS15*i*	FS16*i*	FS30*i*	
3001	4001	4001	00000001
3002	4002	4002	00000001
3003	4003	4003	00000000
3004	4004	4004	00000000
3006	4006	4006	00000100
3007	4007	4007	00000000
3008	4008	4008	00000000
3009	4009	4009	00000000
3010	4010	4010	00000001
3011	4011	4011	00010XXX
3012	4012	4012	10000010
3013	4013	4013	00011000
3019	4019	4019	00000100
3020	4020	4020	4000
3039	4039	4039	0
3040	4040	4040	2 *2
3048	4048	4048	2 *2
3080	4080	4080	80
3100	4100	4100	3522
3101	4101	4101	100
3102	4102	4102	3522
3103	4103	4103	0
3104	4104	4104	800
3105	4105	4105	0
3106	4106	4106	800
3107	4107	4107	0
3108	4108	4108	0
3109	4109	4109	25
3110	4110	4110	2057
3111	4111	4111	420
3112	4112	4112	200
3113	4113	4113	1328
3114	4114	4114	0
3115	4115	4115	100
3116	4116	4116	7062
3117	4117	4117	90
3118	4118	4118	100
3119	4119	4119	7
3120	4120	4120	0
3124	4124	4124	0
3127	4127	4127	171
3128	4128	4128	0
3129	4129	4129	0
3130	4130	4130	25700
3134	4134	4134	140
3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 100S/20000 :A06B-1641-B121#Xxxx*1 α*i*SP 22(TYPE A):A06B-6111-H022#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00000000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00011XXX
				3012	4012	4012	10000000
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	275
3156	4156	4156	0	3039	4039	4039	0
3041	4041	4041	4 *2	3040	4040	4040	8 *2
3049	4049	4049	4 *2	3048	4048	4048	8 *2
3166	4166	4166	80	3080	4080	4080	17995
3138	4138	4138	3400	3100	4100	4100	7700
3139	4139	4139	80	3101	4101	4101	100
3140	4140	4140	4304	3102	4102	4102	10800
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	3758	3104	4104	4104	1405
				3105	4105	4105	0
3143	4143	4143	5637	3106	4106	4106	2809
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1130	3110	4110	4110	943
3147	4147	4147	355	3111	4111	4111	300
3148	4148	4148	200	3112	4112	4112	180
3149	4149	4149	1620	3113	4113	4113	1507
3150	4150	4150	100	3114	4114	4114	100
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	13293	3116	4116	4116	11341
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	5	3119	4119	4119	6
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	164
3158	4158	4158	110	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 100S/30000 :A06B-1641-B122#9xxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570) requiring reactor

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	30000
				3023	4023	4023	400
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	90	3080	4080	4080	20570
3138	4138	4138	5000	3100	4100	4100	12000
3139	4139	4139	75	3101	4101	4101	65
3140	4140	4140	9789	3102	4102	4102	16238
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	2000	3104	4104	4104	2000
				3105	4105	4105	0
3143	4143	4143	3500	3106	4106	4106	4000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1508	3110	4110	4110	928
3147	4147	4147	439	3111	4111	4111	258
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	1459	3113	4113	4113	1460
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	90
3152	4152	4152	14899	3116	4116	4116	23597
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	7	3119	4119	4119	7
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	164
3158	4158	4158	110	3128	4128	4128	110
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 100L/30000 :A06B-1655-B120#0xxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00000XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	30000
				3023	4023	4023	252
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	85	3080	4080	4080	7760
3138	4138	4138	3350	3100	4100	4100	9000
3139	4139	4139	90	3101	4101	4101	80
3140	4140	4140	7437	3102	4102	4102	15378
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	1500	3104	4104	4104	750
				3105	4105	4105	0
3143	4143	4143	1700	3106	4106	4106	900
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	3017	3110	4110	4110	2414
3147	4147	4147	904	3111	4111	4111	725
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	558	3113	4113	4113	418
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	4813	3116	4116	4116	3615
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	17	3119	4119	4119	23
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	171	3127	4127	4127	143
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 112S/20000 :A06B-1662-B120#Zxxx*[1] α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	300
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	23125	3080	4080	4080	7253
3138	4138	4138	2000	3100	4100	4100	6200
3139	4139	4139	80	3101	4101	4101	95
3140	4140	4140	4053	3102	4102	4102	8859
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	2500	3104	4104	4104	1500
				3105	4105	4105	0
3143	4143	4143	4000	3106	4106	4106	2500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	2623	3110	4110	4110	1724
3147	4147	4147	600	3111	4111	4111	328
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	1058	3113	4113	4113	1058
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	9998	3116	4116	4116	8996
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	20	3119	4119	4119	9
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	202
3158	4158	4158	110	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

BiI 112M/20000 :A06B-1673-B100#Yxxx*1 αiSP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	300
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	100	3080	4080	4080	80
3138	4138	4138	1660	3100	4100	4100	10000
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	2784	3102	4102	4102	11851
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	6000	3104	4104	4104	1500
				3105	4105	4105	0
3143	4143	4143	6000	3106	4106	4106	1500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1437	3110	4110	4110	1097
3147	4147	4147	293	3111	4111	4111	173
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	1118	3113	4113	4113	986
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	10426	3116	4116	4116	9233
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	8	3119	4119	4119	9
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	180	3127	4127	4127	148
3158	4158	4158	120	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	140
				3169	4169	4169	0

NOTE
- This parameter table is for the αiBZ sensor. For the αiCZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the αiPS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 112L/20000 :A06B-1675-B100#Yxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
3156	4156	4156	0	3020	4020	4020	20000
				3023	4023	4023	200
				3039	4039	4039	0
3041	4041	3041	3 *2				
3049	4049	3049	3 *2				
3166	4166	4166	90	3080	4080	4080	12895
3138	4138	4138	1640	3100	4100	4100	5000
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	2047	3102	4102	4102	5537
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	6000	3104	4104	4104	2000
				3105	4105	4105	0
3143	4143	4143	6000	3106	4106	4106	2000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1231	3110	4110	4110	670
3147	4147	4147	246	3111	4111	4111	167
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	1145	3113	4113	4113	1005
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	10911	3116	4116	4116	9613
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	5	3119	4119	4119	7
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	148	3127	4127	4127	143
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

BiI 112L/25000:A06B-1675-B140#Xxxx*1 αiSP 75HV(TYPE A):A06B-6121-H075#H550(#570) requiring reactor

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	00011000
				3019	4019	4019	00000100
				3020	4020	4020	25000
				3023	4023	4023	320
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	90	3080	4080	4080	90
3138	4138	4138	1710	3100	4100	4100	8100
3139	4139	4139	100	3101	4101	4101	100
3140	4140	4140	3744	3102	4102	4102	8977
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	6000	3104	4104	4104	2000
				3105	4105	4105	0
3143	4143	4143	8000	3106	4106	4106	2500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1472	3110	4110	4110	1231
3147	4147	4147	326	3111	4111	4111	201
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	1263	3113	4113	4113	931
3150	4150	4150	0	3114	4114	4114	120
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	14626	3116	4116	4116	13007
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	8	3119	4119	4119	10
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	200	3127	4127	4127	178
3158	4158	4158	120	3128	4128	4128	115
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the αiBZ sensor. For the αiCZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the αiPS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 160M/20000 :A06B-1723-B140#Yxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	150
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	12895	3080	4080	4080	18005
3138	4138	4138	740	3100	4100	4100	4260
3139	4139	4139	88	3101	4101	4101	93
3140	4140	4140	1344	3102	4102	4102	6014
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4500	3104	4104	4104	850
				3105	4105	4105	0
3143	4143	4143	5300	3106	4106	4106	1400
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	3715	3110	4110	4110	1588
3147	4147	4147	887	3111	4111	4111	368
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	354	3113	4113	4113	310
3150	4150	4150	20480	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	85
3152	4152	4152	4019	3116	4116	4116	4398
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	27	3119	4119	4119	31
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	143
3158	4158	4158	120	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 160L/20000 :A06B-1725-B140#Yxxx*1 α*i*SP 30(TYPE A):A06B-6111-H030#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	01010000
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	150
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	80	3080	4080	4080	11610
3138	4138	4138	800	3100	4100	4100	2250
3139	4139	4139	75	3101	4101	4101	100
3140	4140	4140	1063	3102	4102	4102	2637
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4800	3104	4104	4104	2500
				3105	4105	4105	0
3143	4143	4143	4800	3106	4106	4106	2500
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	1676	3110	4110	4110	1341
3147	4147	4147	498	3111	4111	4111	325
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	450	3113	4113	4113	293
3150	4150	4150	0	3114	4114	4114	20480
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	4809	3116	4116	4116	4358
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	30	3119	4119	4119	32
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	176	3127	4127	4127	144
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 160LL/20000 :A06B-1726-B140#Yxxx*1 α*i*SP 75HV(TYPE A):A06B-6121-H075#H550(#H570) requiring reactor

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	00001XXX
				3012	4012	4012	10000010
				3013	4013	4013	10011000
				3019	4019	4019	00000100
				3020	4020	4020	20000
				3023	4023	4023	300
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	19022	3080	4080	4080	80
3138	4138	4138	1300	3100	4100	4100	12000
3139	4139	4139	100	3101	4101	4101	73
3140	4140	4140	2191	3102	4102	4102	12466
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	1500	3104	4104	4104	1000
				3105	4105	4105	0
3143	4143	4143	1000	3106	4106	4106	900
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	2557	3110	4110	4110	1312
3147	4147	4147	666	3111	4111	4111	356
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	299	3113	4113	4113	290
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	4885	3116	4116	4116	8360
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	32	3119	4119	4119	33
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	165	3127	4127	4127	132
3158	4158	4158	107	3128	4128	4128	104
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	155
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

B*i*I 200S/10000 :A06B-1752-B120#4xxx*1 α*i*SP 75HV(TYPE A):A06B-6121-H075#H550(#H570)

Low speed winding				High speed winding			
Parameter number				Parameter number			
FS15*i*	FS16*i*	FS30*i*		FS15*i*	FS16*i*	FS30*i*	
				3001	4001	4001	00000001
				3002	4002	4002	00000001
				3003	4003	4003	00000000
				3004	4004	4004	00000000
				3006	4006	4006	00000000
				3007	4007	4007	00000000
				3008	4008	4008	00010000
				3009	4009	4009	00000000
				3010	4010	4010	00000001
				3011	4011	4011	10001XXX
				3012	4012	4012	10000010
				3013	4013	4013	00011000
				3019	4019	4019	00000100
				3020	4020	4020	10000
				3023	4023	4023	147
3156	4156	4156	0	3039	4039	4039	0
3166	4166	4166	80	3080	4080	4080	18005
3138	4138	4138	800	3100	4100	4100	2100
3139	4139	4139	100	3101	4101	4101	95
3140	4140	4140	1933	3102	4102	4102	4011
3141	4141	4141	0	3103	4103	4103	0
3142	4142	4142	4000	3104	4104	4104	2200
				3105	4105	4105	0
3143	4143	4143	7000	3106	4106	4106	4000
				3107	4107	4107	0
3144	4144	4144	0	3108	4108	4108	0
3145	4145	4145	25	3109	4109	4109	25
3146	4146	4146	2414	3110	4110	4110	1705
3147	4147	4147	673	3111	4111	4111	470
3148	4148	4148	200	3112	4112	4112	200
3149	4149	4149	305	3113	4113	4113	299
3150	4150	4150	0	3114	4114	4114	0
3151	4151	4151	100	3115	4115	4115	100
3152	4152	4152	8267	3116	4116	4116	8115
3153	4153	4153	90	3117	4117	4117	90
3154	4154	4154	100	3118	4118	4118	100
3165	4165	4165	31	3119	4119	4119	32
				3120	4120	4120	0
3155	4155	4155	0	3124	4124	4124	0
3093	4093	4093	164	3127	4127	4127	148
3158	4158	4158	0	3128	4128	4128	0
3159	4159	4159	0	3129	4129	4129	0
3161	4161	4161	25700	3130	4130	4130	25700
				3134	4134	4134	180
				3169	4169	4169	0

NOTE
- This parameter table is for the α*i*BZ sensor. For the α*i*CZ sensor, contact our sales department.
- *1 Three digits xxx vary depending on the sensor used.
- *2 The value marked with *2 in the table should be treated as the initial value when adjustments are made.
- When bit 2 of parameter No. 4006 is set to 1: the speed is set in units of 10 min^{-1}.
  (The unit of parameter No. 4020, No. 4100, No. 4102, No. 4108, No. 4138, No. 4140, and No. 4144 is 10 min^{-1}.)
- For the maximum acceleration output, see the data for the α*i*PS in Section 1.2, "HIGH-SPEED TYPE", in Part I, "SPECIFICATIONS".

H SPECIFICATION NUMBER

	Model name	Specification number	αiBZ sensor	Applicable amplifier (αiSP)
Standard type	**Bi 50S/30000**	A06B-1612-B170#0AB8 A06B-1612-B170#0AD8	A860-2150-T211 A860-2155-T211	A06B-6111-H002#H550 A06B-6111-H002#H570
	Bi 50M/25000	A06B-1613-B170#1AB2 A06B-1613-B170#1AD2	A860-2150-T201 A860-2155-T201	A06B-6111-H002#H550 A06B-6111-H002#H570
	Bi 50L/25000	A06B-1615-B120#ZAB8 A06B-1615-B120#ZAD8	A860-2150-T211 A860-2155-T211	A06B-6111-H006#H550 A06B-6111-H006#H570
	Bi 80S/20000	A06B-1621-B120#ZAB2 A06B-1621-B120#ZAD2 A06B-1621-B120#ZAB7 A06B-1621-B120#ZAD7 A06B-1621-B120#ZABY A06B-1621-B120#ZADY	A860-2150-T201 A860-2155-T201 A860-2150-T411 A860-2155-T411 A860-2150-T311 A860-2155-T311	A06B-6111-H006#H550 A06B-6111-H006#H570
	Bi 80M/15000	A06B-1623-B170#ZAB1 A06B-1623-B170#ZAD1 A06B-1623-B170#ZAB2 A06B-1623-B170#ZAD2 A06B-1623-B170#ZAB6 A06B-1623-B170#ZAD6 A06B-1623-B170#ZABY A06B-1623-B170#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H002#H550 A06B-6111-H002#H570
	Bi 80L/8000	A06B-1625-B170#ZAB1 A06B-1625-B170#ZAD1 A06B-1625-B170#ZAB2 A06B-1625-B170#ZAD2 A06B-1625-B170#ZAB6 A06B-1625-B170#ZAD6 A06B-1625-B170#ZABY A06B-1625-B170#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H006#H550 A06B-6111-H006#H570
	Bi 100S/12500	A06B-1641-B120#ZAB1 A06B-1641-B120#ZAD1 A06B-1641-B120#ZAB2 A06B-1641-B120#ZAD2 A06B-1641-B120#ZAB6 A06B-1641-B120#ZAD6 A06B-1641-B120#ZABY A06B-1641-B120#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H006#H550 A06B-6111-H006#H570
	Bi 112SS/20000	A06B-1661-B120#ZAB2 A06B-1661-B120#ZAD2 A06B-1661-B120#ZAB7 A06B-1661-B120#ZAD7 A06B-1661-B120#ZABY A06B-1661-B120#ZADY	A860-2150-T201 A860-2155-T201 A860-2150-T411 A860-2155-T411 A860-2150-T311 A860-2155-T311	A06B-6111-H011#550 A06B-6111-H011#570
	Bi 112S/15000	A06B-1671-B120#ZAB1 A06B-1671-B120#ZAD1 A06B-1671-B120#ZAB2 A06B-1671-B120#ZAD2 A06B-1671-B120#ZAB6 A06B-1671-B120#ZAD6 A06B-1671-B120#ZABY A06B-1671-B120#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H022#H550 A06B-6111-H022#H570

NOTE
- For motors using sensors not listed here, contact our sales department.
- Specifications of each model are shown in Part I, “SPECIFICATIONS”.
- A06B-61xx-Hxx#H550 is the αiSP for FANUC Series 16i and FANUC Series 15i.
  A06B-61xx-Hxx#H570 is the αiSP for FANUC Series 30i.
- For the specifications of the αiSP, refer to the Descriptions (B-65282EN) of FANUC SERVO AMPLIFIER αi series.
- Contact our sales department for details.

	Model name	Specification number	αiBZ sensor	Applicable amplifier (αiSP)
Standard type	**Bi 112M/15000**	A06B-1673-B120#ZAB1 A06B-1673-B120#ZAD1 A06B-1673-B120#ZAB2 A06B-1673-B120#ZAD2 A06B-1673-B120#ZAB6 A06B-1673-B120#ZAD6 A06B-1673-B120#ZABY A06B-1673-B120#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H011#H550 A06B-6111-H011#H570
	Bi 112L/15000	A06B-1675-B100#ZAB1 A06B-1675-B100#ZAD1 A06B-1675-B100#ZAB2 A06B-1675-B100#ZAD2 A06B-1675-B100#ZAB6 A06B-1675-B100#ZAD6 A06B-1675-B100#ZABY A06B-1675-B100#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 112LL/15000	A06B-1676-B100#ZAB1 A06B-1676-B100#ZAD1 A06B-1676-B100#ZAB2 A06B-1676-B100#ZAD2 A06B-1676-B100#ZAB6 A06B-1676-B100#ZAD6 A06B-1676-B100#ZABY A06B-1676-B100#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 132M/14000	A06B-1713-B100#ZAB1 A06B-1713-B100#ZAD1 A06B-1713-B100#ZAB2 A06B-1713-B100#ZAD2 A06B-1713-B100#ZAB6 A06B-1713-B100#ZAD6 A06B-1713-B100#ZABY A06B-1713-B100#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 132L/14000	A06B-1705-B140#ZAB1 A06B-1705-B140#ZAD1 A06B-1705-B140#ZAB2 A06B-1705-B140#ZAD2 A06B-1705-B140#ZAB6 A06B-1705-B140#ZAD6 A06B-1705-B140#ZABY A06B-1705-B140#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 160S/13000	A06B-1721-B120#ZAB1 A06B-1721-B120#ZAD1 A06B-1721-B120#ZAB2 A06B-1721-B120#ZAD2 A06B-1721-B120#ZAB6 A06B-1721-B120#ZAD6 A06B-1721-B120#ZABY A06B-1721-B120#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H022#H550 A06B-6111-H022#H570
	Bi 160M/13000	A06B-1723-B120#ZAB1 A06B-1723-B120#ZAD1 A06B-1723-B120#ZAB2 A06B-1723-B120#ZAD2 A06B-1723-B120#ZAB6 A06B-1723-B120#ZAD6 A06B-1723-B120#ZABY A06B-1723-B120#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 160L/13000	A06B-1725-B120#ZAB1 A06B-1725-B120#ZAD1 A06B-1725-B120#ZAB2 A06B-1725-B120#ZAD2 A06B-1725-B120#ZAB6 A06B-1725-B120#ZAD6 A06B-1725-B120#ZABY A06B-1725-B120#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H022#H550 A06B-6111-H022#H570

NOTE

- For motors using sensors not listed here, contact our sales department.
- Specifications of each model are shown in Part I, “SPECIFICATIONS”.
- A06B-61xx-Hxx#H550 is the αiSP for FANUC Series 16i and FANUC Series 15i.
  A06B-61xx-Hxx#H570 is the αiSP for FANUC Series 30i.
- For the specifications of the αiSP, refer to the Descriptions (B-65282EN) of FANUC SERVO AMPLIFIER αi series.
- Contact our sales department for details.

	Model name	Specification number	αiBZ sensor	Applicable amplifier (αiSP)
Standard type	**BiI 160LL/13000**	A06B-1726-B100#ZAB1 A06B-1726-B100#ZAD1 A06B-1726-B100#ZAB2 A06B-1726-B100#ZAD2 A06B-1726-B100#ZAB6 A06B-1726-B100#ZAD6 A06B-1726-B100#ZABY A06B-1726-B100#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T201 A860-2155-T201 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	BiI 170S/6000	A06B-1732-B120#1AB1 A06B-1732-B120#1AD1 A06B-1732-B120#1AB3 A06B-1732-B120#1AD3 A06B-1732-B120#1AB6 A06B-1732-B120#1AD6 A06B-1732-B120#1ABY A06B-1732-B120#1ADY	A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H022#H550 A06B-6111-H022#H570
	BiI 170M/6000	A06B-1733-B120#1AB1 A06B-1733-B120#1AD1 A06B-1733-B120#1AB3 A06B-1733-B120#1AD3 A06B-1733-B120#1AB6 A06B-1733-B120#1AD6 A06B-1733-B120#1ABY A06B-1733-B120#1ADY	A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6141-H026#H580
	BiI 180M/6000	A06B-1743-B100#ZAB1 A06B-1743-B100#ZAD1 A06B-1743-B100#ZAB3 A06B-1743-B100#ZAD3 A06B-1743-B100#ZAB6 A06B-1743-B100#ZAD6 A06B-1743-B100#ZABY A06B-1743-B100#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	BiI 180L/6000	A06B-1745-B100#ZAB1 A06B-1745-B100#ZAD1 A06B-1745-B100#ZAB3 A06B-1745-B100#ZAD3 A06B-1745-B100#ZAB6 A06B-1745-B100#ZAD6 A06B-1745-B100#ZABY A06B-1745-B100#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	BiI 180LL/8000	A06B-1746-B100#ZAB1 A06B-1746-B100#ZAD1 A06B-1746-B100#ZAB3 A06B-1746-B100#ZAD3 A06B-1746-B100#ZAB6 A06B-1746-B100#ZAD6 A06B-1746-B100#ZABY A06B-1746-B100#ZADY	A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	BiI 200S/6000	A06B-1752-B120#2AB3 A06B-1752-B120#2AD3 A06B-1752-B120#2AB1 A06B-1752-B120#2AD1 A06B-1752-B120#2AB6 A06B-1752-B120#2AD6 A06B-1752-B120#2ABY A06B-1752-B120#2ADY	A860-2150-T611 A860-2155-T611 A860-2150-T401 A860-2155-T401 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H037#H550 A06B-6111-H037#H570

NOTE

- For motors using sensors not listed here, contact our sales department.
- Specifications of each model are shown in Part I, “SPECIFICATIONS”.
- A06B-61xx-Hxx#H550 is the αiSP for FANUC Series 16i and FANUC Series 15i.
  A06B-61xx-Hxx#H570 is the αiSP for FANUC Series 30i.
- For the specifications of the αiSP, refer to the Descriptions (B-65282EN) of FANUC SERVO AMPLIFIER αi series.
- Contact our sales department for details.

	Model name	Specification number	αiBZ sensor	Applicable amplifier (αiSP)
Standard type	**Bi 200M/6000**	A06B-1753-B120#ZAB3 A06B-1753-B120#ZAD3 A06B-1753-B120#ZAB1 A06B-1753-B120#ZAD1 A06B-1753-B120#ZAB6 A06B-1753-B120#ZAD6 A06B-1753-B120#ZABY A06B-1753-B120#ZADY	A860-2150-T611 A860-2155-T611 A860-2150-T401 A860-2155-T401 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 200L/6000	A06B-1755-B120#ZAB6 A06B-1755-B120#ZAD6 A06B-1755-B120#ZAB1 A06B-1755-B120#ZAD1 A06B-1755-B120#ZAB3 A06B-1755-B120#ZAD3 A06B-1755-B120#ZABY A06B-1755-B120#ZADY	A860-2150-T511 A860-2155-T511 A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T311 A860-2155-T311	A06B-6111-H045#H550 A06B-6111-H045#H570
	Bi 250S/6000	A06B-1772-B140#ZAB3 A06B-1772-B140#ZAD3 A06B-1772-B140#ZAB1 A06B-1772-B140#ZAD1 A06B-1772-B140#ZAB6 A06B-1772-B140#ZAD6 A06B-1772-B140#ZABY A06B-1772-B140#ZADY	A860-2150-T611 A860-2155-T611 A860-2150-T401 A860-2155-T401 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6111-H045#550 A06B-6111-H045#570
	Bi 250M/3000	A06B-1773-B140#ZAB6 A06B-1773-B140#ZAD6 A06B-1773-B140#ZAB1 A06B-1773-B140#ZAD1 A06B-1773-B140#ZAB3 A06B-1773-B140#ZAD3 A06B-1773-B140#ZABY A06B-1773-B140#ZADY	A860-2150-T511 A860-2155-T511 A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T311 A860-2155-T311	A06B-6111-H055#H550 A06B-6111-H055#H570

NOTE

- For motors using sensors not listed here, contact our sales department.
- Specifications of each model are shown in Part I, “SPECIFICATIONS”.
- A06B-61xx-Hxx#H550 is the αiSP for FANUC Series 16*i* and FANUC Series 15*i*.
  A06B-61xx-Hxx#H570 is the αiSP for FANUC Series 30*i*.
- For the specifications of the αiSP, refer to the Descriptions (B-65282EN) of FANUC SERVO AMPLIFIER αi series.
- Contact our sales department for details.

	Model name	Specification number	αiBZ sensor	Applicable amplifier (αiSP)
High-speed type	Bi 40S/70000	A06B-1601-B120#ZNB8 A06B-1601-B120#ZND8	A860-2150-T211 A860-2155-T211	A06B-6111-H002#H550 A06B-6111-H002#H570
	Bi 40M/70000	A06B-1602-B170#0NB8 A06B-1602-B170#0ND8	A860-2150-T211 A860-2155-T211	A06B-6111-H011#H550 A06B-6111-H011#H570
	Bi 60SS/50000	A06B-1616-B170#1NB8 A06B-1616-B170#1ND8	A860-2150-T211 A860-2155-T211	A06B-6111-H011#H550 A06B-6111-H011#H570
	Bi 60S/50000	A06B-1617-B120#3NB8 A06B-1617-B120#3ND8	A860-2150-T211 A860-2155-T211	A06B-6111-H022#H550 A06B-6111-H022#H570
	Bi 80S/40000	A06B-1631-B120#YNB8 A06B-1631-B120#YND8 A06B-1631-B120#YNBY A06B-1631-B120#YNDY	A860-2150-T211 A860-2155-T211 A860-2150-T311 A860-2155-T311	A06B-6111-H045#H550 A06B-6111-H045#H570
	Bi 100S/20000	A06B-1641-B121#XNB7 A06B-1641-B121#XND7 A06B-1641-B121#XNB2 A06B-1641-B121#XND2 A06B-1641-B121#XNBY A06B-1641-B121#XNDY	A860-2150-T411 A860-2155-T411 A860-2150-T201 A860-2155-T201 A860-2150-T311 A860-2155-T311	A06B-6111-H022#H550 A06B-6111-H022#H570
	Bi 100S/30000	A06B-1641-B122#9PB8 A06B-1641-B122#9PD8 A06B-1641-B122#9PB7 A06B-1641-B122#9PD7 A06B-1641-B122#9PBY A06B-1641-B122#9PDY	A860-2150-T211 A860-2155-T211 A860-2150-T411 A860-2155-T411 A860-2150-T311 A860-2155-T311	A06B-6111-H030#550 A06B-6111-H030#570
	Bi 100L/30000	A06B-1655-B120#0NB7 A06B-1655-B120#0ND7 A06B-1655-B120#0NB8 A06B-1655-B120#0ND8 A06B-1655-B120#0NBY A06B-1655-B120#0NDY	A860-2150-T411 A860-2155-T411 A860-2150-T211 A860-2155-T211 A860-2150-T311 A860-2155-T311	A06B-6111-H030#550 A06B-6111-H030#570
	Bi 112S/20000	A06B-1662-B120#ZAB7 A06B-1662-B120#ZAD7 A06B-1662-B120#ZAB2 A06B-1662-B120#ZAD2 A06B-1662-B120#ZABY A06B-1662-B120#ZADY	A860-2150-T411 A860-2155-T411 A860-2150-T201 A860-2155-T201 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 112M/20000	A06B-1673-B100#YNB7 A06B-1673-B100#YND7 A06B-1673-B100#YNB2 A06B-1673-B100#YND2 A06B-1673-B100#YNBY A06B-1673-B100#YNDY	A860-2150-T411 A860-2155-T411 A860-2150-T201 A860-2155-T201 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 112L/20000	A06B-1675-B100#YNB7 A06B-1675-B100#YND7 A06B-1675-B100#YNB2 A06B-1675-B100#YND2 A06B-1675-B100#YNBY A06B-1675-B100#YNDY	A860-2150-T411 A860-2155-T411 A860-2150-T201 A860-2155-T201 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi 112L/25000	A06B-1675-B140#XPB7 A06B-1675-B140#XPD7 A06B-1675-B140#XPB8 A06B-1675-B140#XPD8 A06B-1675-B140#XPBY A06B-1675-B140#XPDY	A860-2150-T411 A860-2155-T411 A860-2150-T211 A860-2155-T211 A860-2150-T311 A860-2155-T311	A06B-6121-H075#H550 A06B-6121-H075#H570

NOTE

- For motors using sensors not listed here, contact our sales department.
- Specifications of each model are shown in Part I, “SPECIFICATIONS”.
- A06B-61xx-Hxx#H550 is the αiSP for FANUC Series 16i and FANUC Series 15i.
  A06B-61xx-Hxx#H570 is the αiSP for FANUC Series 30i.
- For the specifications of the αiSP, refer to the Descriptions (B-65282EN) of FANUC SERVO AMPLIFIER αi series.
- Contact our sales department for details.

	Model name	Specification number	αiBZ sensor	Applicable amplifier (αiSP)
High-speed type	**Bi I 160M/20000**	A06B-1723-B140#YNB7 A06B-1723-B140#YND7 A06B-1723-B140#YNB2 A06B-1723-B140#YND2 A06B-1723-B140#YNBY A06B-1723-B140#YNDY	A860-2150-T411 A860-2155-T411 A860-2150-T201 A860-2155-T201 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi I 160L/20000	A06B-1725-B140#YNB7 A06B-1725-B140#YND7 A06B-1725-B140#YNB2 A06B-1725-B140#YND2 A06B-1725-B140#YNBY A06B-1725-B140#YNDY	A860-2150-T411 A860-2155-T411 A860-2150-T201 A860-2155-T201 A860-2150-T311 A860-2155-T311	A06B-6111-H030#H550 A06B-6111-H030#H570
	Bi I 160LL/20000	A06B-1726-B140#YNB7 A06B-1726-B140#YND7 A06B-1726-B140#YNB2 A06B-1726-B140#YND2 A06B-1726-B140#YNBY A06B-1726-B140#YNDY	A860-2150-T411 A860-2155-T411 A860-2150-T201 A860-2155-T201 A860-2150-T311 A860-2155-T311	A06B-6121-H075#H550 A06B-6121-H075#H570
	Bi I 200S/10000	A06B-1752-B120#4BB1 A06B-1752-B120#4BD1 A06B-1752-B120#4BB3 A06B-1752-B120#4BD3 A06B-1752-B120#4BB6 A06B-1752-B120#4BD6 A06B-1752-B120#4BBY A06B-1752-B120#4BDY	A860-2150-T401 A860-2155-T401 A860-2150-T611 A860-2155-T611 A860-2150-T511 A860-2155-T511 A860-2150-T311 A860-2155-T311	A06B-6121-H075#H550 A06B-6121-H075#H570

NOTE

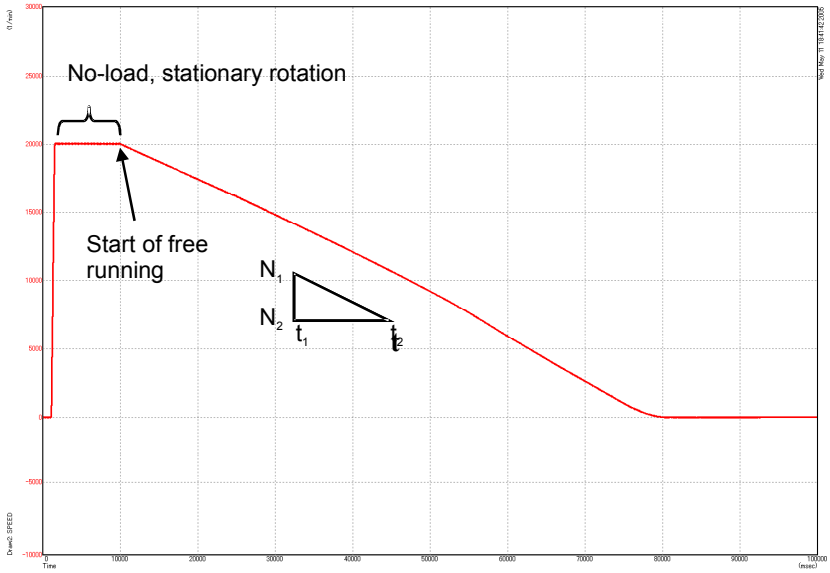
- For motors using sensors not listed here, contact our sales department.
- Specifications of each model are shown in Part I, “SPECIFICATIONS”.
- A06B-61xx-Hxx#H550 is the αiSP for FANUC Series 16i and FANUC Series 15i.
  A06B-61xx-Hxx#H570 is the αiSP for FANUC Series 30i.
- For the specifications of the αiSP, refer to the Descriptions (B-65282EN) of FANUC SERVO AMPLIFIER αi series.
- Contact our sales department for details.

OBTAINING MECHANICAL LOSS AT NO LOAD

Mechanical loss at no load can be estimated by using the servo guide for measurements and calculations as described below.

With this method, mechanical loss can be estimated when the motor is connected correctly and all parameter values are correct, and the load meter value at no load is high.

<1> Turn the motor at no load.
<2> Start measurement using the servo guide (measurement item: SPEED).
<3> Make the motor free run.
* Example: Enter 999 in parameter No. 4133 (motor model code).
<4> When the motor is free running after activating current is turned off, only the factor that decelerates the motor is mechanical loss. Therefore, mechanical loss can be approximately calculated from the waveform of the servo guide as follows:



Values required for calculation

J : Inertia of all axes [kgm^2]
(All rotating parts such as the rotor and the part inside the bearing)
N : Motor speed [min^{-1}]
t : Time [sec]

From the servo guide waveform, obtain the starting speed N_1 and time t_1 and the ending speed N_2 and time t_2 in the target period for calculation. The inclination in the above figure is the mechanical load torque (T), which is expressed as follows:

$$T = J * \frac{\Delta\omega}{\Delta t} = J * \frac{(N_2 - N_1)\frac{2\pi}{60}}{t_2 - t_1} \quad [\text{Nm}]$$

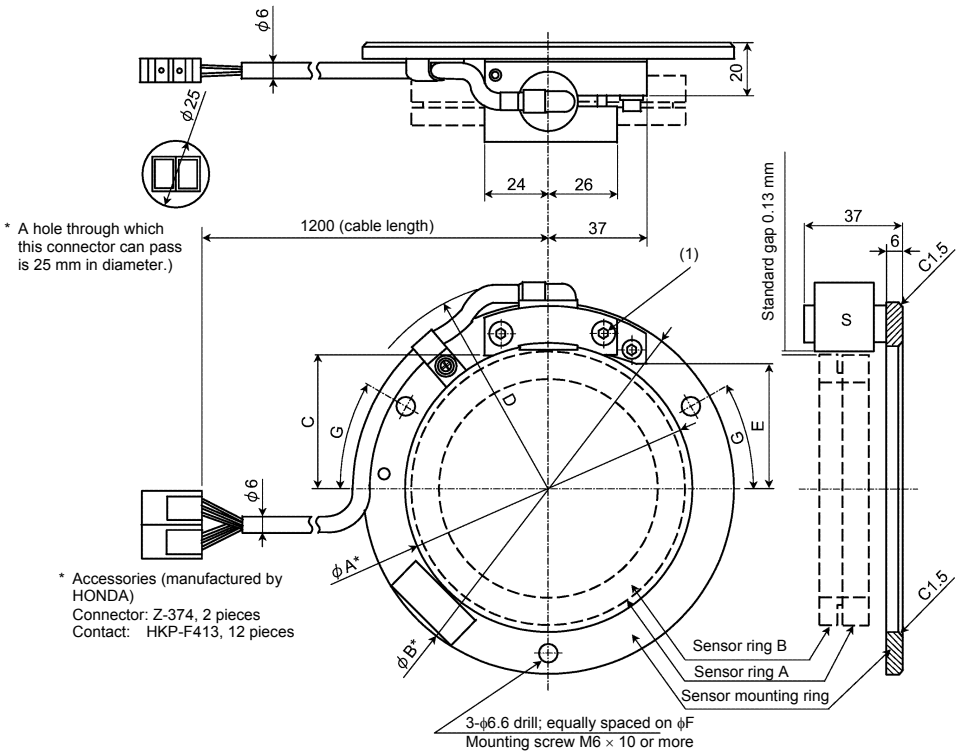
The average loss in this period is calculated using the average speed as follows:

$$P = T * \omega = T * \left(\frac{N_1 + N_2}{2} * \frac{2\pi}{60} \right) \quad [\text{W}]$$

J OTHER SENSORS

J.1 αiBZ SENSOR A860-2120-Txxx

J.1.1 Dimensions (with Mounting Ring)

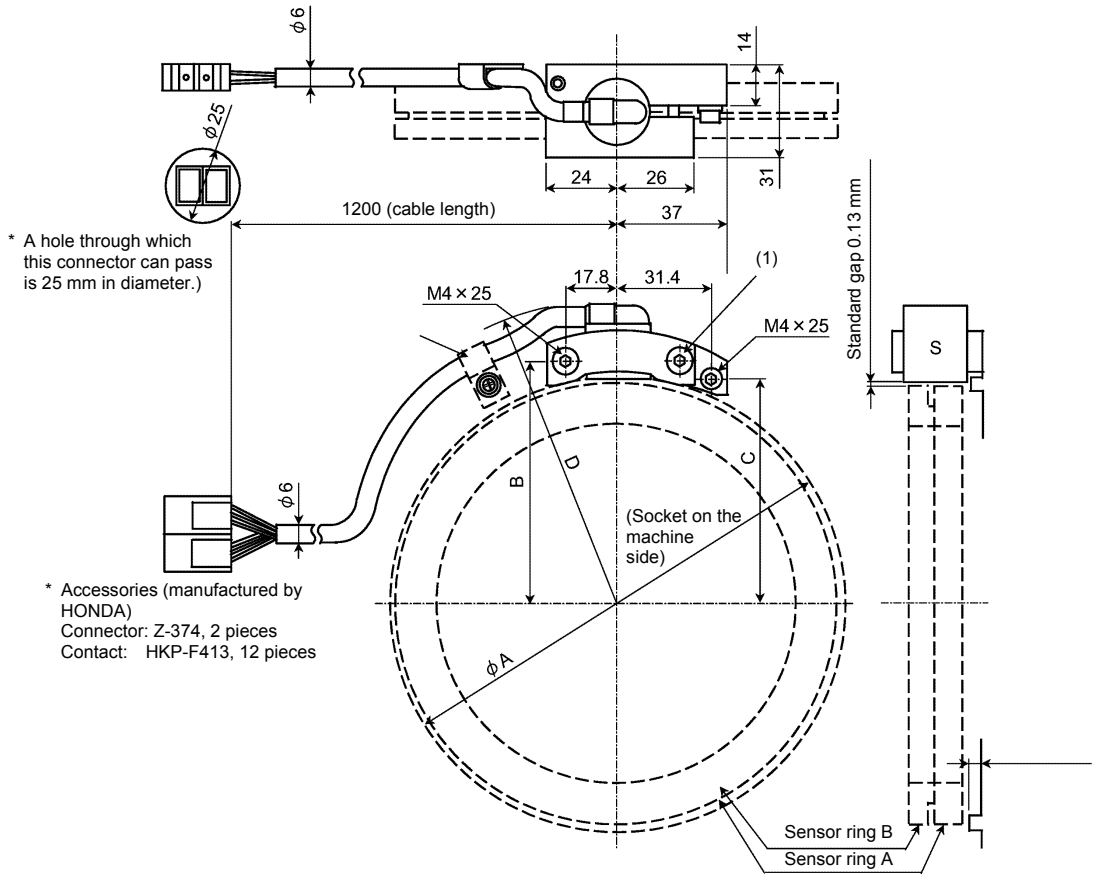


Sensor type No.	Sensor ring	No. of teeth	φA *	φB *	C	D	E	φF	G
A860-2120-T201 A860-2120-T211	Ring 1 Ring 2	128	56H6+0.019/-0.0	100h6+0.0/-0.022	25	R57	20	78	10°
A860-2120-T401 A860-2120-T411	Ring 3 Ring 4	256	108+0.040/+0.020	140h6+0.0/-0.025	51	R80	46	124	30°

For dimensions of sensor rings, see Subsection J.1.3, "Dimensions (Sensor Ring)".

NOTE
- Use the sensor under 80°C.
- Handle these precision parts with special care. In particular In particular, never apply external force to part S.
- The sensor is an electronic component. Therefore, take appropriate dust-proof and drip-proof measures on the machine side to keep the sensor free from chips, oil, and any other harmful materials.
- The dimensions marked with an asterisk (*) are dimensions of the sensor mounting ring. The socket on the machine side must be designed according to these dimensions. If the socket on the machine side is not made properly, the sensor may produce incorrect output.
- The gap between the sensor and sensor ring is pre-adjusted. Because of a dimensional error in the mounting socket and so on, the output signal may not satisfy the specified level. Therefore, when mounting the sensor, check the output signal. If the output signal does not satisfy the specified level, loosen the screws (1), which clamp the sensor, and adjust the gap. Tighten the screws (1) with a torque of 20 kgfcm or less. For the adjustment of the output signal, see Subsection J.1.7, "Feedback Signal Adjustment".
- Perform shield wire connection.
- For easy maintenance, install the sensor in a place where it can be replaced easily.
- Sensor rings with the same specification number can be replaced with each other.
- Sensor rings with different specification numbers cannot be used in combination.
- Mating connectors (accessories) are provided.

J.1.2 Dimensions (without Mounting Ring)

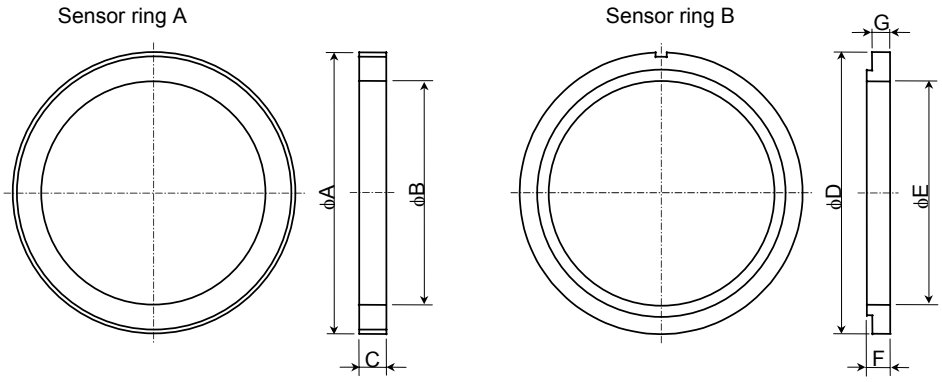


Sensor type No.	Sensor ring	No. of teeth	ϕA	B	C	D
A860-2120-T511	Ring 5	384	158+0.0/-0.025	84.3	78.3	R110
A860-2120-T611	Ring 6	512	210+0.0/-0.030	110.8	104.8	R140

For dimensions of sensor rings, see Subsection J.1.3, "Dimensions (Sensor Ring)".

NOTE
- Use the sensor under 80°C.
- Handle these precision parts with special care. In particular In particular, never apply external force to part S.
- The sensor is an electronic component. Therefore, take appropriate dust-proof and drip-proof measures on the machine side to keep the sensor free from chips, oil, and any other harmful materials.
- Mount the sensor while pressing it against the socket (dimension ϕA) on the machine (the height of the socket on the machine is 4.5 mm or less). If the socket on the machine side is not made properly, the sensor may produce incorrect output.
- The gap between the sensor and sensor ring is pre-adjusted. Because of a dimensional error in the mounting socket and so on, the output signal may not satisfy the specified level. Therefore, when mounting the sensor, check the output signal. If the output signal does not satisfy the specified level, loosen the screws (1), which clamp the sensor, and adjust the gap. Tighten the screws (1) with a torque of 20 kgfcm or less. For the adjustment of the output signal, see Subsection J.1.7, "Feedback Signal Adjustment".
- Use M4 × 25 mm screws for mounting.
- Perform shield wire connection.
- For easy maintenance, install the sensor in a place where it can be replaced easily.
- Sensor rings with the same specification number can be replaced with each other.
- Sensor rings with different specification numbers cannot be used in combination.
- Mating connectors (accessories) are provided.

J.1.3 Dimensions (Sensor Ring)



Dimensions of sensor rings

	Sensor ring A (phase A/B ring)			Sensor ring B (phase Z ring)			
	ϕA	**ϕB**	**C**	**ϕD**	**ϕE**	**F**	**G**
Ring 1,2	52+0.0/-0.020	40+0.016/-0.0	10±0.1	52+0.0/-0.020	40+0.016/-0.0	8.6±0.1	6.7
Ring 3,4	103.2+0.0/-0.020	82+0.0/-0.018	10±0.1	103.2+0.0/-0.020	82+0.0/-0.018	8.6±0.1	6.7
Ring 5	154.4+0.0/-0.020	125+0.025/-0.0	10±0.1	154.4+0.0/-0.020	125+0.025/-0.0	8.6±0.1	6.7
Ring 6	205.6+0.0/-0.020	160+0.020/-0.0	10±0.1	205.6+0.0/-0.020	160+0.020/-0.0	8.6±0.1	6.7

NOTE
- Press fit the rings into a sleeve, then install the sleeve in the spindle.
- A used ring can be recycled only once.
- The circumference has special teeth. Therefore, carefully protect against deformation and chipping due to external force.
- Check the sensor output signal. For the adjustment of the output signal see Subsection J.1.7, "Feedback Signal Adjustment".

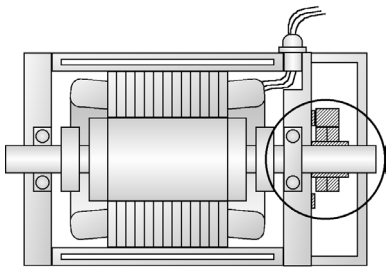
Maximum speed of sensor rings

	Ring 1	Ring 2	Ring 3	Ring 4	Ring 5	Ring 6
Sensor type No.	T201	T211	T401	T411	T511	T611
No. of teeth	128	128	256	256	384	512
Max. speed (min^{-1})	20,000	70,000	15,000	30,000	15,000	10,000

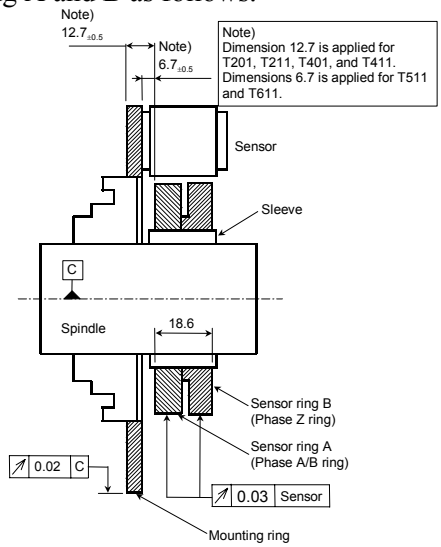
NOTE
The interference for shrink fitting varies depending on the maximum speed used. When designing sensor rings, see "Interference".

J.1.4 Installing the Sensor

Mount the BZ*i* sensor on the motor power lead side of the spindle so that sensor ring A and sensor (mounting ring and holder) are located at the motor side. If the sensor is installed incorrectly, the motor cannot be controlled normally.



Install sensor ring A and B as follows.



- Press fit the rings into the sleeve, and press fit the sleeve into the shaft. Make the phase A/B ring and phase Z ring in contact with each other.
- Mount the sensor so that the distance between the mid point of the thickness of the stack of the phase A/B ring and the phase Z ring (9.3 mm) and the center of the sensor is within ± 0.5 mm.
- The runout of the sleeve to the center of the shaft must be within 0.005 mm.
- The runout of the mounting ring to the center of the shaft must be within 0.02 mm.

J.1.5 Interference of the Sensor Ring

Max. speed (min^{-1})	A860-2120-T201 Ring 1	A860-2120-T211 Ring 2	A860-2120-T401 Ring 3	A860-2120-T411 Ring 4	A860-2120-T511 Ring 5	A860-2120-T611 Ring 6
3000	ϕ6 to ϕ32	ϕ6 to ϕ32	ϕ7 to ϕ35	ϕ7 to ϕ35	ϕ8 to ϕ43	ϕ11 to ϕ41
3500	↓	↓	↓	↓	ϕ9 to ϕ44	ϕ13 to ϕ43
4500	↓	↓	↓	↓	ϕ11 to ϕ46	ϕ19 to ϕ49
6000	↓	↓	ϕ9 to ϕ37	ϕ9 to ϕ37	ϕ15 to ϕ50	ϕ29 to ϕ59
8000	↓	↓	ϕ11 to ϕ39	ϕ11 to ϕ39	ϕ24 to ϕ59	ϕ47 to ϕ77
10000	↓	↓	ϕ14 to ϕ42	ϕ14 to ϕ42	ϕ35 to ϕ70	ϕ71 to ϕ101
12000	ϕ7 to ϕ33	ϕ7 to ϕ33	ϕ18 to ϕ46	ϕ18 to ϕ46	ϕ47 to ϕ82	-
15000	ϕ8 to ϕ34	ϕ8 to ϕ34	ϕ26 to ϕ54	ϕ26 to ϕ54	ϕ71 to ϕ106	-
20000	ϕ10 to ϕ36	ϕ10 to ϕ36	-	ϕ41 to ϕ69	-	-
25000	-	ϕ12 to ϕ38	-	ϕ62 to ϕ90	-	-
30000	-	ϕ15 to ϕ41	-	ϕ87 to ϕ115	-	-
40000	-	ϕ23 to ϕ49	-	-	-	-
50000	-	ϕ33 to ϕ59	-	-	-	-
60000	-	ϕ43 to ϕ69	-	-	-	-
70000	-	ϕ57 to ϕ83	-	-	-	-

NOTE

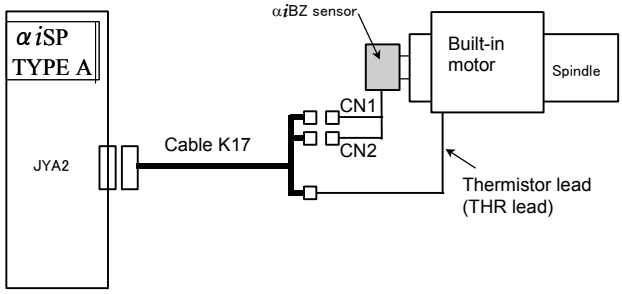
1 From the above table, select an appropriate interference according to the maximum speed and the type of the ring used. If incorrect interference is applied, the ring may loosen or deform while the spindle rotates.

2 These rings cannot be used at a speed higher than the speeds indicated in the above table.
For the maximum allowable speed for each ring, see Subsection J.1.3, "Dimensions (Sensor Ring)".

J.1.6 Connection

Connection diagram (outline)

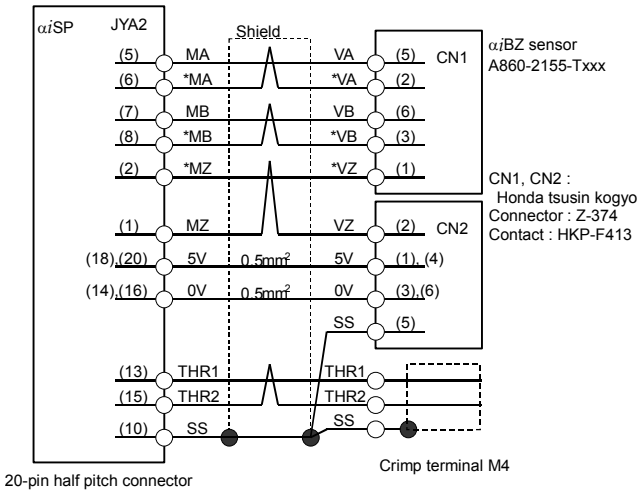
Connect the α*i*SP and α*i*BZ sensor as shown in the figure below.



For details of connection and connector pin assignment, refer to the next page.
Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER α*i* series for cable 17 and more detail information.

NOTE
1 Prepare the cable K17 by yourself.
2 Thermistor lead is connected to the motor.
3 There is no problem that the cable K17 is connected on the way to CN1 and CN2. But use IP54 or more connector or terminal box.
4 Refer to the DESCRIPTIONS (B-65282EN) of FANUC SERVO AMPLIFIER α*i* series for more detail information.

Connection (Details)



Cable specification :
0.18mm^2 twisted pair 4 pairs + 0.5mm^2 6 common shelded cable
Recommended wire : A66L-0001-0368

> ⚠ **CAUTION**
> When only one lead is to be connected for 5V and 0V each, use 20-pin and 16-pin connectors to prevent damage to the sensor due to wrong connector connection.

Pin assignment

Connector JYA2

9	5V	10	#	19	#	20	5V
7	MB	8	*MB	17	#	18	5V
5	MA	6	*MA	15	THR2	16	0V
3	#	4	#	13	THR1	14	0V
1	MZ	2	*MZ	11	#	12	0V

> **NOTE**
> Do not connect the pins marked with # because input/output signals for an option PCB may be connected.

Connector CN1

1	*VZ	4	
2	*VA	5	VA
3	*VB	6	VB

Connector CN2

1	5V	4	5V
2	VZ	5	SS
3	0V	6	0V

J.1.7 Feedback Signal Adjustment

Check the feedback signal after installing the BZ*i* sensor. Pins for checking are on the check board. The check board is not attached to the amplifier or to the motor. (Specification No. : A06B-6078-H001)
Refer to the MAINTENANCE MANUAL (B-65285EN) of FANUC SERVO MOTOR α*i* series for details of the check board.

> ⚠ **CAUTION**
> Do not contact the rings with the sensor when adjusting the gap between them. It will damage them.

> **NOTE**
> Check the feedback signal after setting the parameters concerning the sensor. The feedback signal is output correctly after CNC loads the parameters.

Pins for checking

Use pins shown below for the feedback signal checking.
Connect the check board to the JY1 connector of SPM and then check the output signals on the following terminals.

Main spindle

Speed feedback	Position feedback	One rotation signal	Sensor signal input connector
PA1,PB1	PA1,PB1	PS1	JYA2

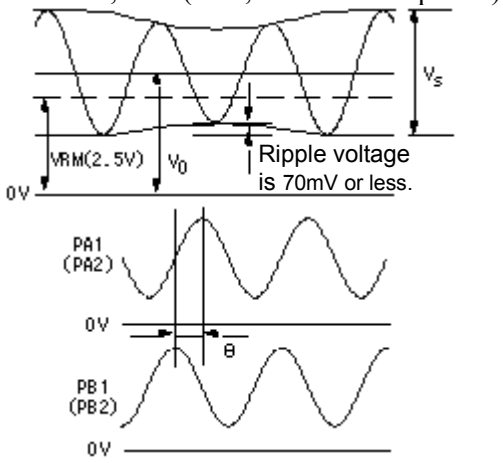
Sub spindle (in case of using sub spindle/spindle switching control)

Speed feedback	Position feedback	One rotation signal	Sensor signal input connector
PA2,PB2	PA2,PB2	PS2	JYA2

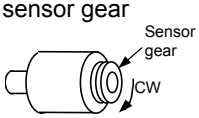
Speed and position feedback signal

Measuring condition :

Rotation : Clockwise, Counterclockwise
Speed : 1500min^{-1}
Pins : PA1, PB1 (PA2, PB2 for sub spindle)



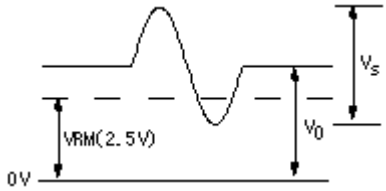
Mount the sensor so that the output signal ripple voltage is 70 mV or less.
Check that the measured value falls into the target value range listed below.

Point to be checked	Target value	Caution
Amplitude of Vs	0.5 – 1.2V_{p-p}	
Offset of V_O	2.5V±100mV	Use digital voltmeter and DC range.
Phase difference θ	90±3°	When the spindle rotates CW viewed from the sensor gear 

One rotation signal

Measuring condition :

Rotation : Clockwise, Counterclockwise
Speed : 1500min^{-1}
Pins : PS1 (PS2 for sub spindle)



Check that the measured value falls into the target value range listed below.

Point to be checked	Target value	Caution
Amplitude of Vs	0.5V or more	
Offset of V_O	2.5V±100mV	Use digital voltmeter and DC range.

J.2 αiCZ SENSOR A860-2161-Txxx

J.2.1 Notes

The αiSP and spindle software applicable to the αiCZ sensors (A860-2161-Txxx) described in this section are listed below.

Applicable αiSP drawing numbers and versions

Drawing number		Applicable unit version
200V system	A06B-6141-H002#H580	αi
	A06B-6141-H006#H580	
	A06B-6141-H011#H580	
	A06B-6141-H015#H580	
	A06B-6141-H030#H580	
	A06B-6141-H037#H580	
	A06B-6141-H055#H580	
400V system	A06B-6151-H006#H580	
	A06B-6151-H011#H580	
	A06B-6151-H015#H580	
	A06B-6151-H045#H580	
	A06B-6151-H075#H580	
	A06B-6151-H100#H580	
200V system	A06B-6141-H022#H580	C or later
	A06B-6141-H026#H580	
	A06B-6141-H045#H580	
400V system	A06B-6151-H030#H580	

Series and editions of applicable spindle software

Series	Edition	Applicable CNC
9D80	E (edition 05) or later	FS16*i* / 18*i* / 21*i* FS30*i* / 31*i* / 32*i* FS0*i* , FS15*i*

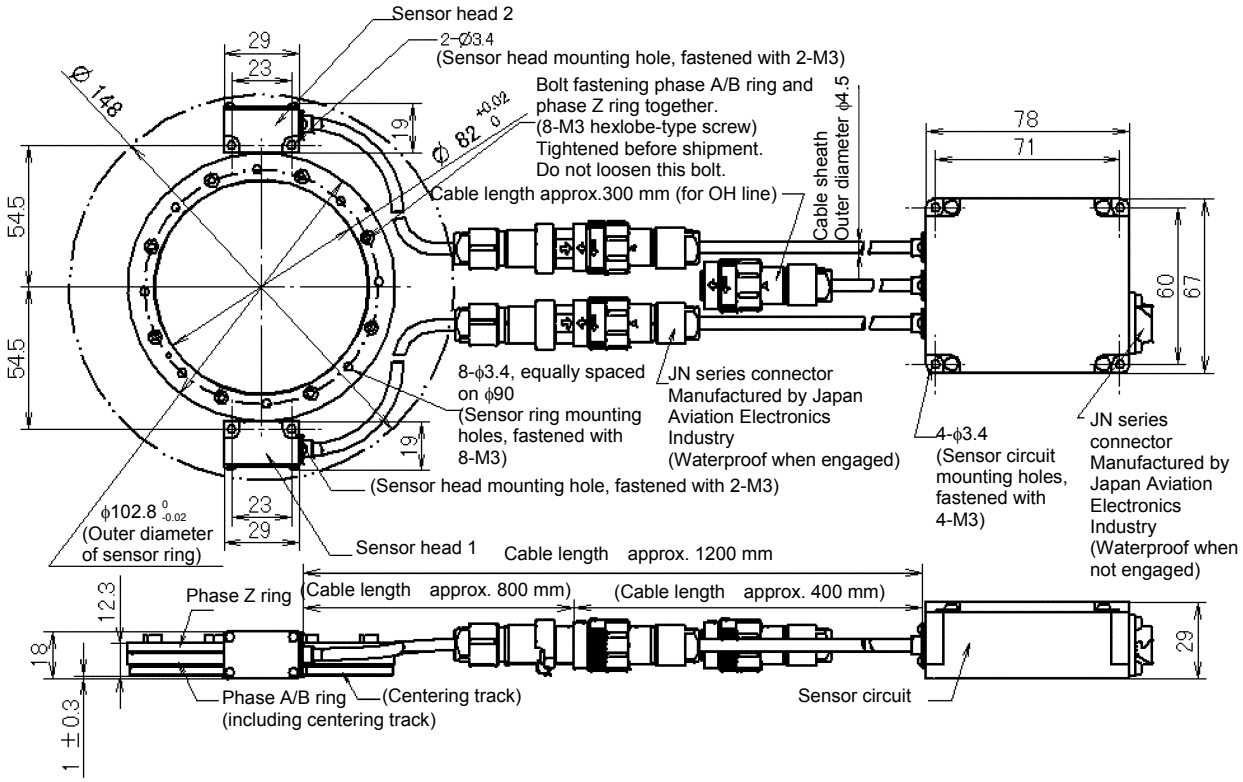
NOTE

1 With the αiCZ sensors described in this section, some functions are restricted. For details, contact our sales department.

2 When a αiCZ sensor described in this section is applied, parameters need to be set separately. For details, contact our sales department.

J.2.2 Dimensions

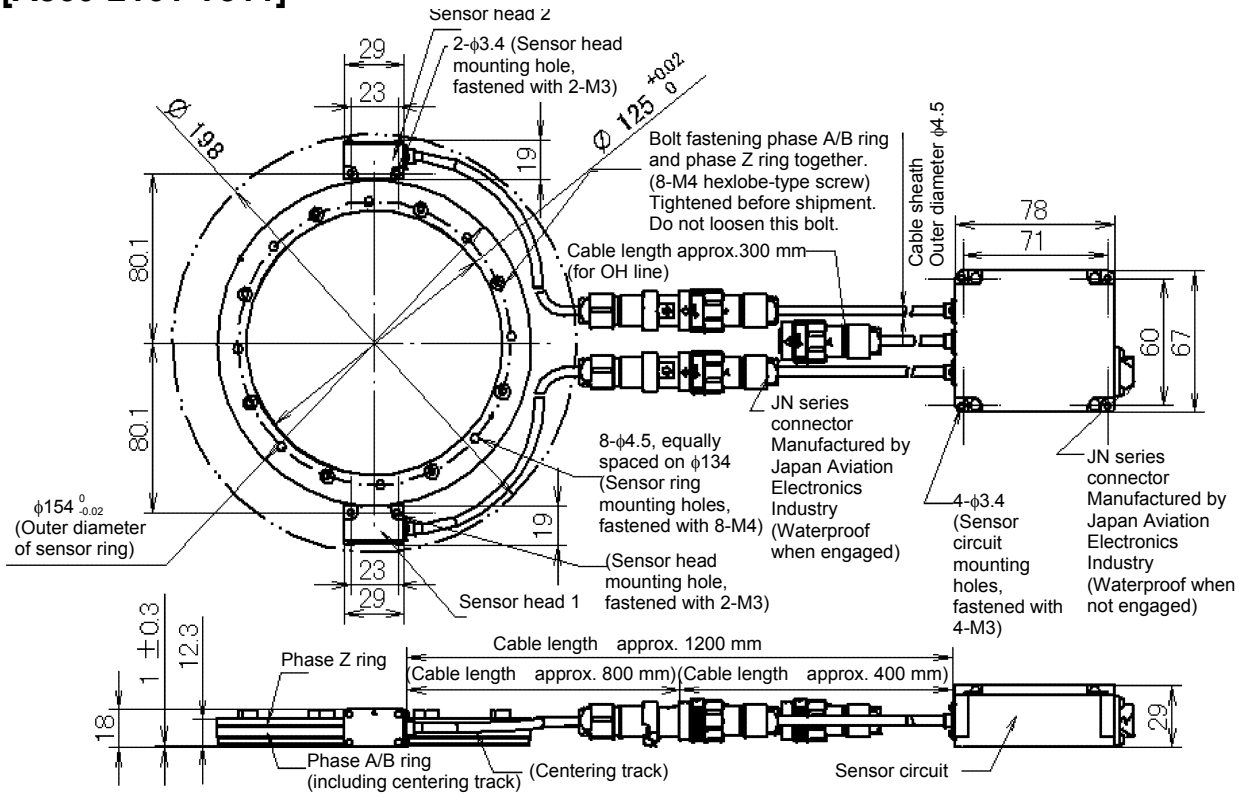
[A860-2161-T411]



NOTE

- Handle these precision parts with special care. In particular, never apply external force to the sensor head.
- Take appropriate dust-proof measures to keep the sensor free from chips and other foreign matter.
- The waterproofness of the αiCZ sensor is equivalent to IP67. However, if the sensor is subject to successive splash of coolant and is kept wet continuously, a failure can be caused. Therefore, take appropriate drip-proof measures not to splash coolant on the sensor where possible.
- For easy maintenance, install the sensor in a place where it can be replaced easily.
- Vibration applied to the sensor circuit must be 1G or less.
- Ground the sensor circuit. The bottom of the sensor circuit is unpainted, so the circuit can be grounded just by fastening the circuit with screws.
- Fasten the cable to the machine at a position near the sensor head not to apply load directly to the sensor head.
- The αiCZ sensor cables are all for movable parts.

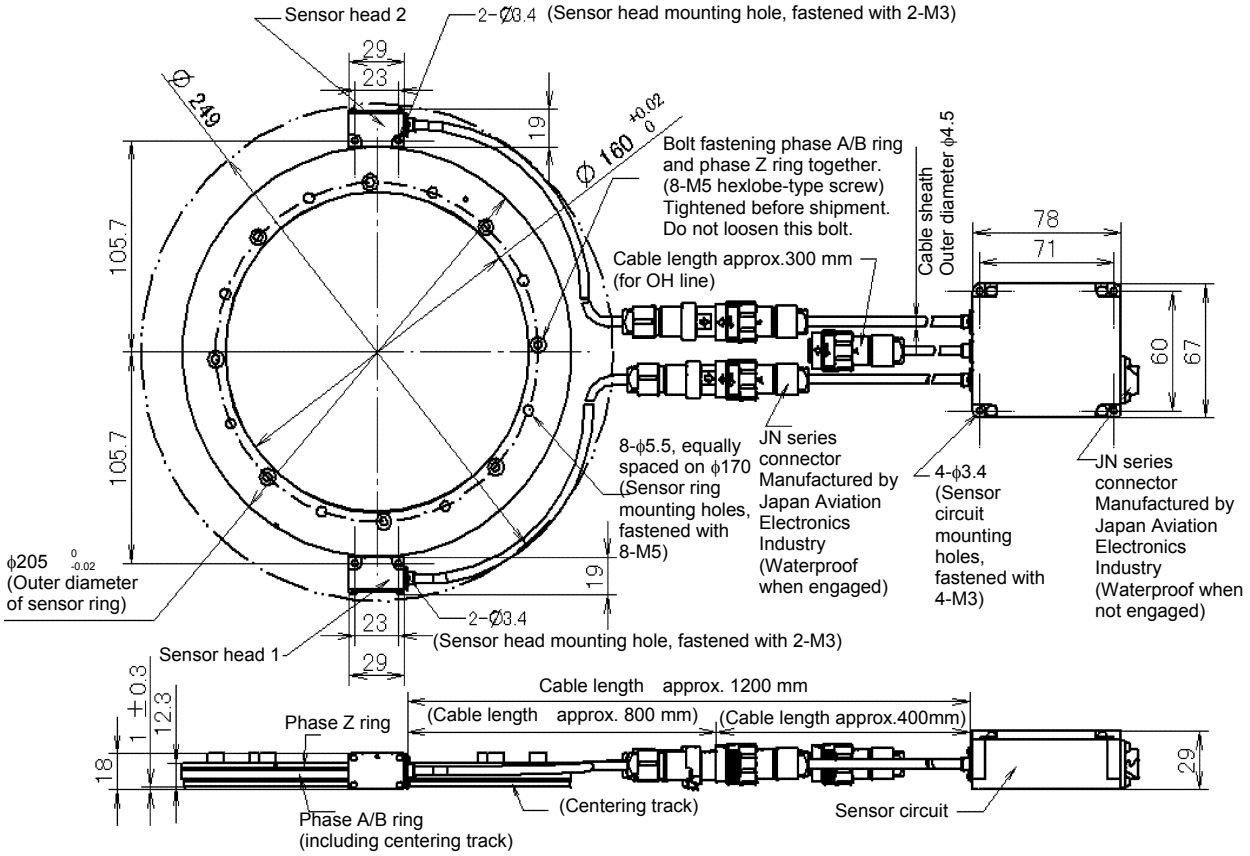
[A860-2161-T511]



NOTE

- Handle these precision parts with special care. In particular, never apply external force to the sensor head.
- Take appropriate dust-proof measures to keep the sensor free from chips and other foreign matter.
- The waterproofness of the αiCZ sensor is equivalent to IP67. However, if the sensor is subject to successive splash of coolant and is kept wet continuously, a failure can be caused. Therefore, take appropriate drip-proof measures not to splash coolant on the sensor where possible.
- For easy maintenance, install the sensor in a place where it can be replaced easily.
- Vibration applied to the sensor circuit must be 1G or less.
- Ground the sensor circuit. The bottom of the sensor circuit is unpainted, so the circuit can be grounded just by fastening the circuit with screws.
- Fasten the cable to the machine at a position near the sensor head not to apply load directly to the sensor head.
- The αiCZ sensor cables are all for movable parts.

[A860-2161-T611]



NOTE

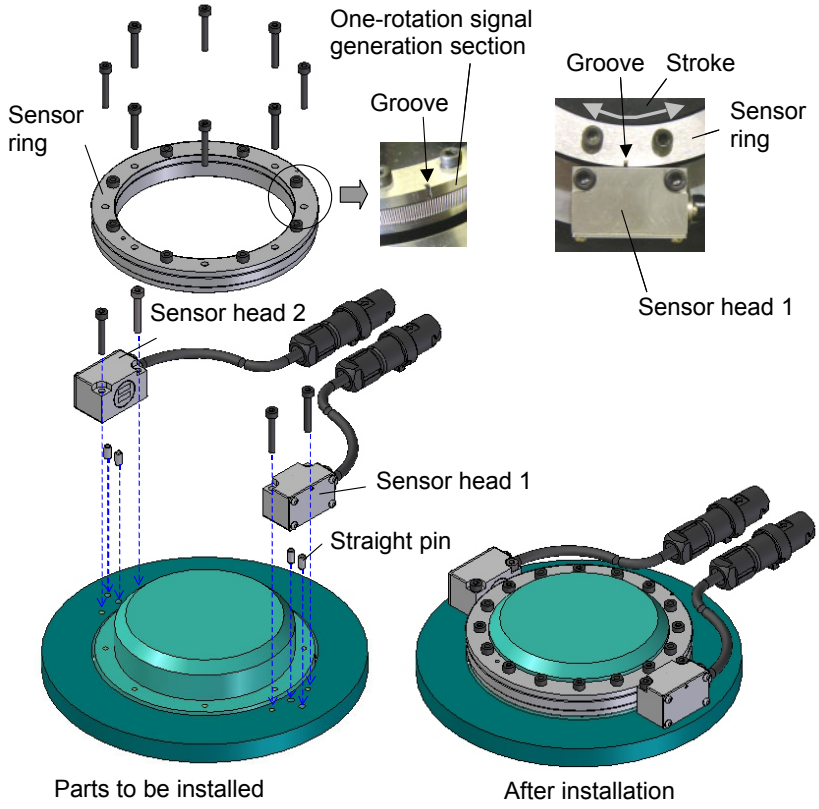
- Handle these precision parts with special care. In particular, never apply external force to the sensor head.
- Take appropriate dust-proof measures to keep the sensor free from chips and other foreign matter.
- The waterproofness of the αiCZ sensor is equivalent to IP67. However, if the sensor is subject to successive splash of coolant and is kept wet continuously, a failure can be caused. Therefore, take appropriate drip-proof measures not to splash coolant on the sensor where possible.
- For easy maintenance, install the sensor in a place where it can be replaced easily.
- Vibration applied to the sensor circuit must be 1G or less.
- Ground the sensor circuit. The bottom of the sensor circuit is unpainted, so the circuit can be grounded just by fastening the circuit with screws.
- Fasten the cable to the machine at a position near the sensor head not to apply load directly to the sensor head.
- The αiCZ sensor cables are all for movable parts.

J.2.3 Installing the Sensor

Outline

Install the α*i*CZ sensor in the machine by following the steps below:

- Machine the sensor mounting surface as necessary, and insert straight pins.
- Install the sensor ring in the shaft (or sleeve) of the machine, center the sensor ring, then fasten the ring with screws.
- Adjust the gap between each sensor head and the sensor ring, and install the sensor heads in the machine.

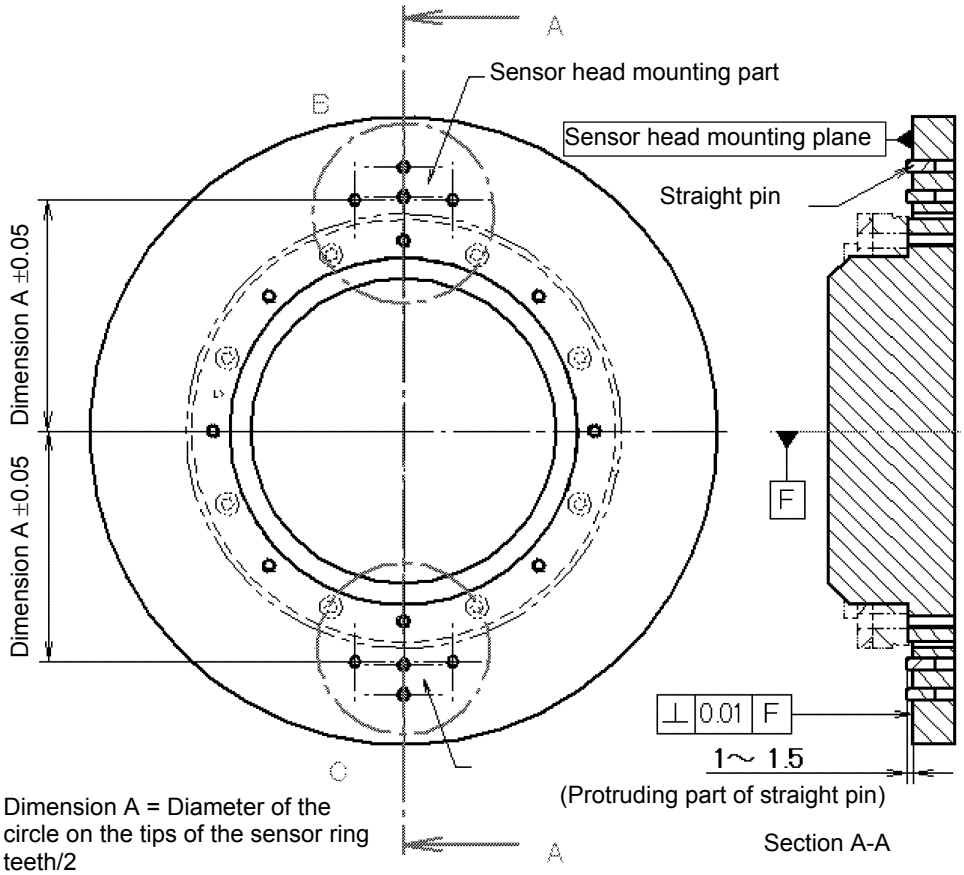


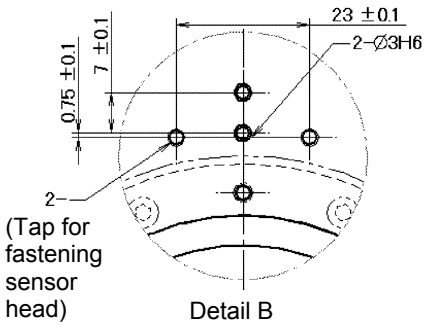
NOTE

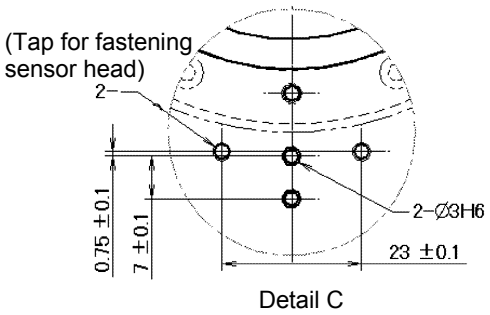
- The groove in the one-rotation signal generation section of the sensor ring must pass sensor head 1 within a stroke.

Dimensions of the sensor head mounting plane

Dimensions of the sensor head mounting plane are indicated below. In the 2-ϕ3H6 holes, insert supplied straight pins (JISB1354-1988, class A, normal diameter of ϕ3, normal length of 6). The straight pins are used as the guide at the time of gap adjustment described later.





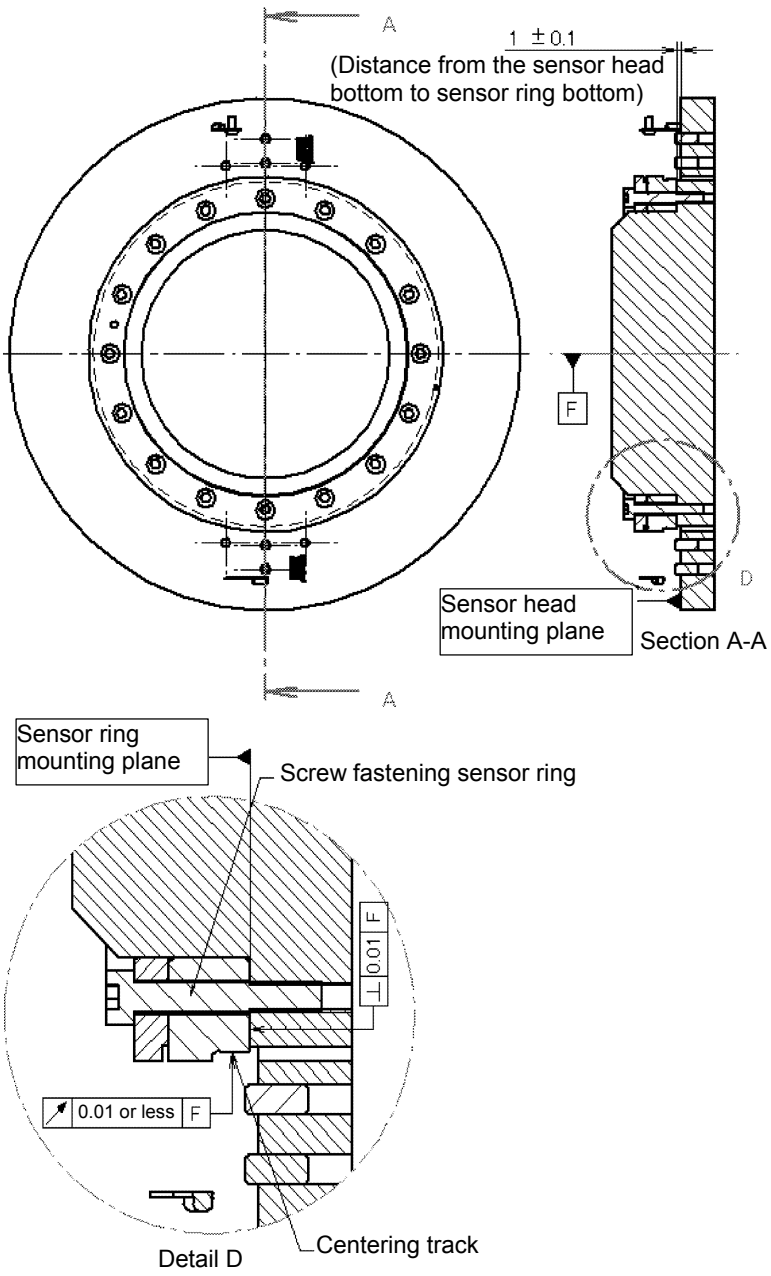


NOTE

- In designing, make sure that the positions of the taps for fastening the sensor heads after machine assembly, instead of the part having the sensor head mounting plane, must satisfy these dimensions.

Mounting the sensor ring

Center the sensor ring by using the centering track so that the runout to the rotation center is 0.01 mm or less. In the direction along the shaft, the sensor ring mounting plane must be 1 ±0.3 mm off the sensor head mounting plane. The perpendicularity of the sensor ring mounting plane must be 0.01 mm from the rotation center. Apply a thread locker or the like to the screws to prevent the screws from becoming loose.



Specification	Outer diameter of centering track (mm)	Positions of sensor ring mounting holes	Mounting screw	Recommended tightening torque (N·m)
A860-2161-T411	ϕ101	8-ϕ3.4 through, equally spaced on ϕ90 circumference	M3	1.5±5%
A860-2161-T511	ϕ152.2	8-ϕ4.5 through, equally spaced on ϕ134 circumference	M4	3.0±5%
A860-2161-T611	ϕ203.4	8-ϕ5.5 through, equally spaced on ϕ170 circumference	M5	6.0±5%

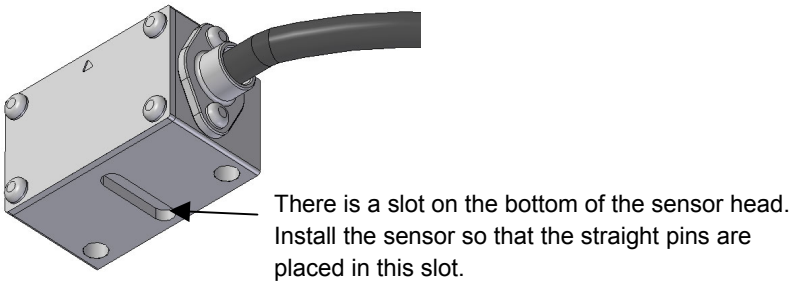
NOTE

- For centering, the outer diameter of the shaft (or sleeve) should be designed so that there is a gap of about 0.1 mm on one side between the outer surface of the shaft (or sleeve) and the inner surface of the sensor ring.
- Secure the sensor ring on an end face with screws (avoid shrink fitting to mount the sensor ring).
- The sensor ring consists of a phase Z ring and a phase A/B ring, which are fastened together by using screws in advance. Never detach these screws. Spot facing is not provided. So, at the time of machine design, be careful not to cause interference with the screw heads.
- Centering must be performed with the centering track (the outer surface of the phase Z ring and the teeth pitch circle are not coaxial). When performing centering, use a tool such as a plastic hammer not to damage the gear teeth.
- Magnetic matter adhered to gear teeth can lead to a detection error. After centering is completed, remove such foreign matter by air blowing.
- If the sensor ring is tightened with excessive torque, elastic deformation can occur in the sensor ring, resulting in deterioration in detection precision. Use the recommended tightening torque when mounting the sensor ring.

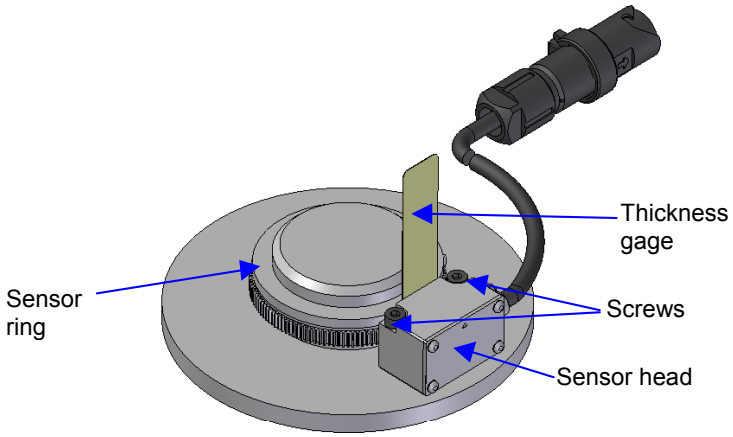
Installing the sensor head

Install the sensor head by following the steps below: (Sensor head 1 and sensor head 2 are installed in the same way.)

- Place the sensor head on the sensor mounting surface so that the straight pins are positioned in the slot of the sensor head, and fasten the sensor head temporarily. The magnet in the sensor head and the sensor ring attract each other. When installing the sensor head, be careful not to hit the sensor head against the sensor ring without placing the thickness gage between them (the impact can damage elements in the sensor head).



- Insert the thickness gage (accessory; t = 0.1 mm) between the sensor ring and sensor head, and while lightly pressing the sensor head against the thickness gage, tighten the screws (recommended tightening torque: 1.3 N·m ±10%). Apply a thread locker to the screws to prevent them from becoming loose.

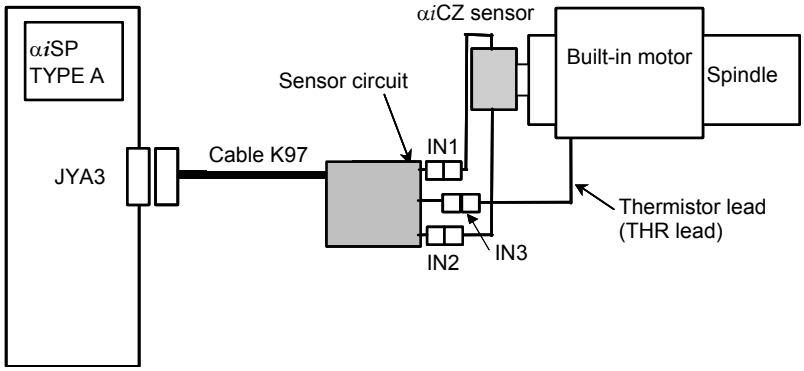


- Pull out the thickness gage, and slowly turn the sensor ring to ensure that the sensor ring and the sensor head do not touch.

J.2.4 Connection

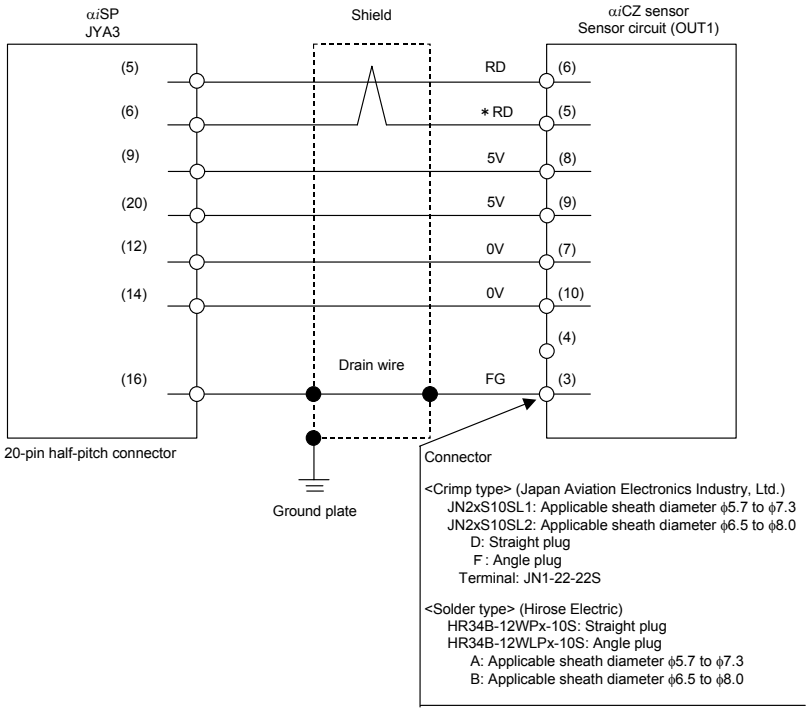
Connection diagram (outline)

Connect the α*i*SP and α*i*CZ sensor as shown in the figure below.



Connection (Details)

Cable K97

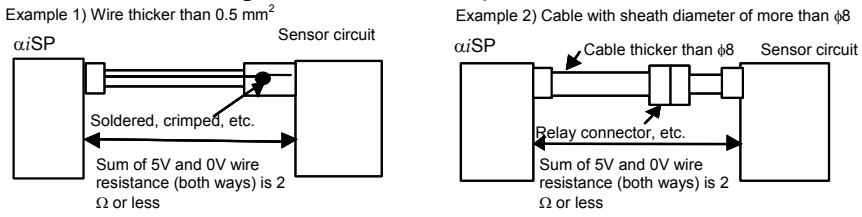


Wires used

Signal name	28 m or less	50m or less
5V, 0V, 6V	0.3 mm^2 × 5 Strand configuration: 12/0.18 or 60/0.08 Outer cover diameter: ϕ1.5 or less	0.5mm^2 × 5 Strand configuration: 20/0.18 or 104/0.08 Outer cover diameter: ϕ1.5 or less
RD, *RD	0.18 mm^2 or more Twisted pair Outer cover diameter: ϕ1.5 or less	0.18 mm^2 or more Twisted pair Outer cover diameter: ϕ1.5 or less
Drain wire	0.15 mm^2 or more	0.15 mm^2 or more

NOTE

- The ground plate to which the shield wires are attached should be placed near the αiSP so that the distance between the αiSP and the ground plate is as short as possible.
- In wiring, be careful not to run the power wires and signal wires in parallel.
- For detail information about cables such as cable K97, refer to "FANUC SERVO AMPLIFIER αi series Specifications" (B-65282EN).
- Cable K1 is to be prepared by the customer. The sum of the wire resistance of the 5V and 0V wires must be 2 Ω or less.
- The maximum applicable wire thickness of the connector on the sensor circuit side is 0.5 mm^2 (strand configuration: 20/0.18 or 104/0.08, outer cover diameter: ϕ1.5 or less), and the sheath diameter is ϕ 5.7 to ϕ8.0. If thicker wires or cables are to be used, the following treatment is required:



Specification of crimping tool

FANUC specification	Specification in Japan Aviation Electronics Industry	Applicable wire thickness
A06B-6114-K201#JN1E	CT150-2-JN1-E	21AWG(0.5mm^2:20/0.18) 23AWG(0.3mm^2) 25AWG(0.18mm^2)
A06B-6114-K201#JN1D	CT150-2-JN1-D	20AWG(0.5mm^2:104/0.08) 21AWG(0.5mm^2:20/0.18) 25AWG(0.18mm^2)

Specification of extractor

A06B-6114-K201/JN1R

Recommended cables

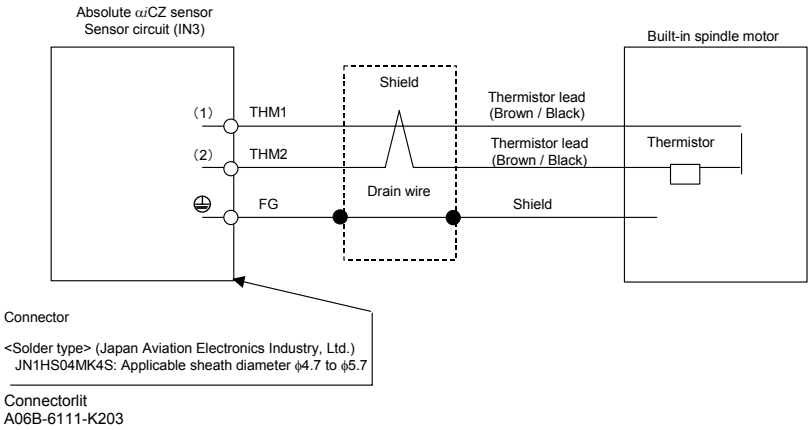
Cable specification	Outline	Crimping tool specification
A66L-0001-0460	Movable cable 28 m or less	A06B-6114-K201#JN1E (FANUC specification) CT150-2-JN1-E (specification in Japan Aviation Electronics Industry)
A66L-0001-0481	Fixed cable 28 m or less	
A66L-0001-0462	Movable cable 50 m or less	A06B-6114-K201#JN1D (FANUC specification) CT150-2-JN1-D (specification in Japan Aviation Electronics Industry)
A66L-0001-0491	Fixed cable 50 m or less	

Connector kit specification

<Crimping type>
A06B-6114-K204#S: Straight plug (including contacts)
A06B-6114-K204#E: Angle plug (including contacts)
<Solder type>
A06B-6114-K205#S: Straight plug
A06B-6114-K205#E: Angle plug

Treatment of thermistor leads of the built-in spindle motor

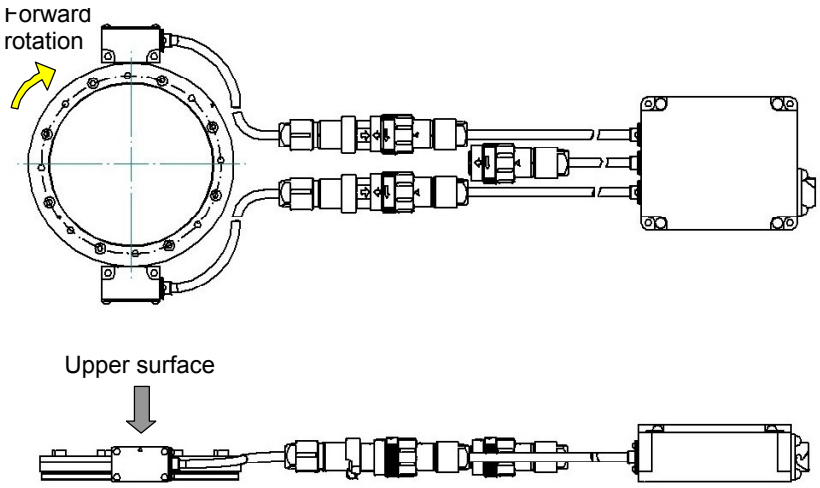
Cable K2



NOTE
- There is no connector supplied for the thermistor leads on the motor side. The connector is to be prepared by the customer.

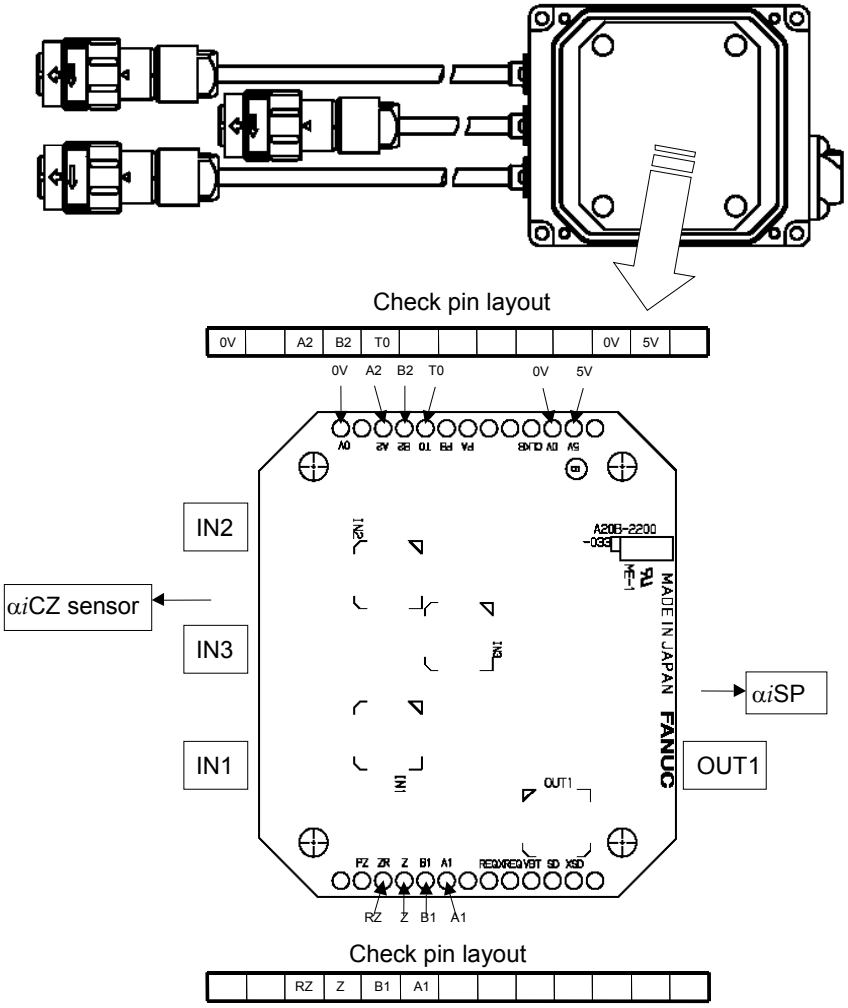
J.2.5 Direction of Rotation

When the sensor is viewed from the above as shown in the following figure, turning the sensor ring clockwise is referred to as forward rotation.



J.2.6 Checking the Feedback Signal Waveform

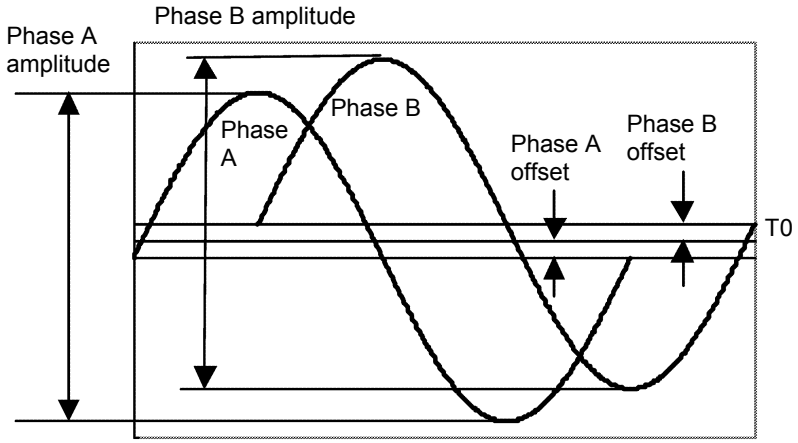
When checking signal waveforms directly, see the following figure:

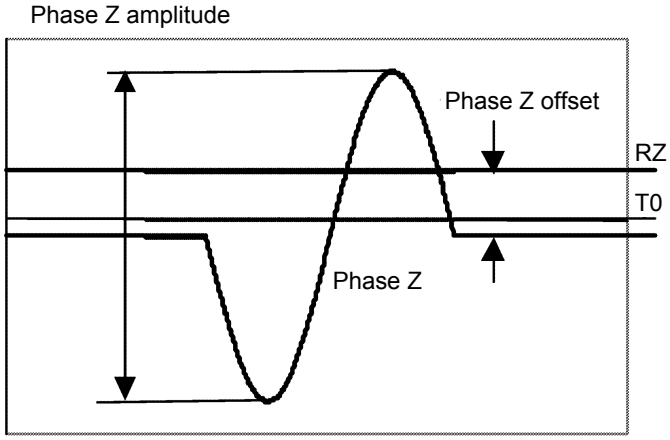


Apply power to the 0V and 5V pins.
Lissajous figure of the phase A/B output signal is a complete circle.
Phase A/B and phase Z signal waveforms (measured at check pins of the sensor circuit at ordinary room temperature and 500 min^{-1})

Signal name	Check pin	Output amplitude	Offset
Sensor head 1 phase A (after amplification) Sensor head 1 phase B (after amplification)	A1 B1	1,300 to 3,000mVp-p	±180mV
Sensor head 2 phase A (after amplification) Sensor head 2 phase B (after amplification)	A2 B2	1,300 to 3,000mVp-p	±180mV
Sensor head 1 phase Z	Z	400 to 600mVp-p	70 to 150mV Measure DC components of Z and RZ, and set their difference as the offset.

When measuring any of the above signals, connect the ground terminal of the oscilloscope to T0.





The following housing and crimping terminals are engaged in the check pin used in the α*i*CZ sensor.

Housing : HKP-13FS01(Specification in Honda Tsushin Kogyo)
Crimping terminal : HKP-F113(Specification in Honda Tsushin Kogyo),
AWG#24 to 28(ϕ1.0 to 1.5mm)
HKP-F213(Specification in Honda Tsushin Kogyo),
AWG#28 to 32(ϕ0.5 to 0.8mm)
Crimping tool : KP309D(Specification in Honda Tsushin Kogyo)

J.2.7 Interpolation Error Learning

The αiCZ sensor includes an automatic interpolation correction circuit that automatically learns interpolation errors and correct them. When learning conditions are satisfied, learning is performed automatically. When the sensor rotates one or more turns, learning is completed. The learning conditions vary depending on the model. For any model, however, learning at 30 min^{-1} is recommended.
For interpolation error leaning, be sure to rotate the sensor under the following conditions:

Learning conditions
A860-2161-T411 : 25 to 105min^{-1}, constant speed, one or more turns
A860-2161-T511 : 20 to 70min^{-1}, constant speed, one or more turns
A860-2161-T611 : 15 to 50min^{-1}, constant speed, one or more turns

Recommended learning conditions
Common to three models : 30min^{-1}, constant speed, one or more turns

- While power is supplied to the α*i*CZ sensor, interpolation error learning data is maintained in the sensor. When the power is removed, the data is not maintained. Also when a spindle alarm is issued, learning data is lost.
  To ensure precision, each time when the power has been turned on, rotate the sensor under the automatic learning conditions.
- When learning is not completed, the detection precision of the α*i*CZ sensor may lower.
- If it is difficult to rotate the sensor at least one turn to perform interpolation error learning, repeat forward and reverse rotations under the above rotation conditions to achieve at least one turn in total.

K SELECTION DATA TABLE

We suggest the correct and proper driving conditions and usage of the built-in AC spindle motor to our customers according to the following sheets that we received.

Please fill up the following sheets and submit to our sales department before you select and use the built-in AC spindle motor.

Selection data table

• Your Data

Company	
Your Name	
Section	
Tel. No.	
Fax. No.	

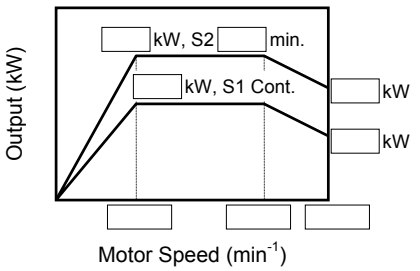
• Machine Type

Name	
Type	Lathe MC Others( )
Number of motors	/machine
Motor direction	Vertical Horizontal Others( )
Workpiece	
CNC model	
Required	/month

• Specification

Power supply	V Hz
Stator	Outer Diameter mm Length mm
Rotor	Inner Diameter mm Length mm
Sensor ring	Outer diameter mm Inner diameter mm
Acceleration	sec
Rigid tapping	Available Unavailable Arrival speed min^{-1} Acceleration time sec
Speed range switching	Available Unavailable Others( )

Output characteristics(Power curves)
Refer to the next page.



Please prepare another paper, if the pattern is different from this diagram.

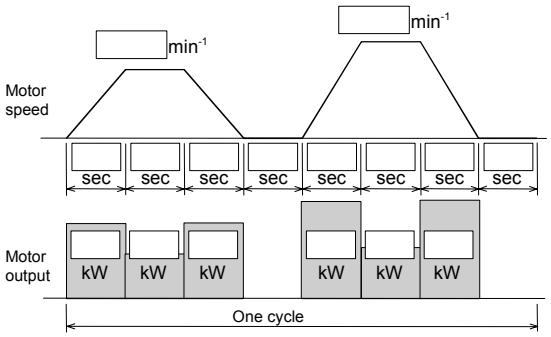
Please fill the cell with a drawing number of motor, if you would like to use a current model.

Drawing No.	A06B-

• Driving Condition

Maximum speed **Maximum torque**	min^{-1} Nm
Spindle inertia	kgm^2
Continuous Load **Maximum Load**	kW kW
Continuous working time	hours/day
Intermittent cutting	Available(G) Unavailable
Average power	kW

Cyclic time of cutting
Refer to the next page.



Please prepare another paper, if the pattern is different from this diagram.

• Remark

Please write down here, if there is some remark.

Note to users

1. Sever driving condition affect the motor life. Therefore please inform to us the final driving condition after it is defined.
2. The motor is assumed to be used at a place 1000 m or less above sea level at an ambient temperature of 0 to 40°C in an environment in which the motor is free from condensation.
3. For the protection class (water and dust proof) of a spindle, IP54 or more is recommended.
4. If a motor is not used under the above environmental conditions or recommended conditions, the motor may not deliver its 100% performance. After determining the final use conditions, contact FANUC again to check whether the conditions are acceptable.
5. Refer to the next page for your convenience.

How to fill out the selection data table

- Your Data

  We would like to use this data to give some information for you.

- Machine Type
  - Name

    Final commercial name of your machine for our distinction.
  - Number of motors

    Number of SPINDLE motors in the machine you are designing.
  - Workpiece

    If you would like to use some special piece, write the name into Others.
  - CNC model

    Model name of CNC.

    e.g. FS16*i*-MB,FS30*i*-MB5
  - Required

    Number of motor requirement per month. Estimated value is acceptable.

    If you use two spindle motors per machine, the number of motor requirement is multiplied by 2.

- Specification

  * If you would like to use a current model, you are not necessary to fill this section. In this case, please fill the cell of Drawing No.

    If you would like to use RIGID TAPPING, fill the cell of Rigid Tapping.
  - Power supply

    Voltage and frequency of power supply to an amplifier. (not to a motor)
  - Stator, Rotor, Sensor ring (αiBZ sensor)

    Select from the this manual or catalog of built-in spindle motor.
  - Acceleration

    Acceleration time from 0 to the maximum speed.
  - Rigid tapping

    Fill the cell if you would like to use RIGID TAPPING.
  - Speed range switching

    Check Unavailable if you do not want to use Speed range switching control.
  - Output characteristics (Power curves)

    Fill the cells for S1 continuous rating and S2 intermittent rating. If you would like to use a motor under S3 and other ratings, please prepare another paper.

    * For the definition of rating such as S1 and S2, refer to the IEC34 international standard.
  - Drawing No.

    Fill the cell if you would like to use a current model.

• Driving Condition

- Maximum speed, Maximum torque

  Maximum speed and torque of machine specification. If the machine has some differential, use values of motor speed and torque (not values of spindle).

- Spindle inertia

  Actual value of spindle inertia. Use SI unit.

- Continuous load, Maximum load

  Continuous and maximum load at cutting.

- Continuous working time

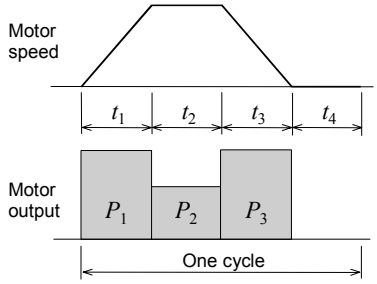
  Continuous working time of machine for a day, including intermittent intervals.

- Intermittent cutting

  If the machine used for intermittent heavy cutting, check Available. And write acceleration value. Estimated value used for your machine designing is acceptable.

- Average power

  Average power is calculated from the formula shown below.



Average power P_{avg}

$$P_{avg} = \sqrt{\frac{P_1^2 t_1 + P_2^2 t_2 + P_3^2 t_3 + \ldots}{t_1 + t_2 + t_3 + t_4 + \ldots}}$$

* If the average power exceeds the S1 continuous rated power, it influences a motor life. Therefore, you had better to define the average power within the S1 continuous rated power.

• Remark

Write remarks and special information if they are.

If you have any questions about the selection data table, contact our sales department freely.

INDEX

<S>

<W>

Revision Record

FANUC BUILT-IN SPINDLE MOTOR B*i*I series DESCRIPTIONS (B-65292EN)

04	Sep., 2007	**Rewriting throughout the manual** <1> Model names were changed. <2> An addition was made to the lineup. <3> Errors were corrected and descriptions were added to the blank sections. <4> Sensors were added. <5> Parameter tables were added.			
03	Feb., 2003	• The series name and model name were changed. • An addition was made to the α112L/25000i_B lineup. • Errors were corrected and descriptions were added to the blank sections.			
02	Jun., 2002	• A description of the αB80S/20000i was added. • Errors were corrected and descriptions were added to the blank sections.			
01	Dec., 2001	———————————————			
Edition	Date	Contents	Edition	Date	Contents