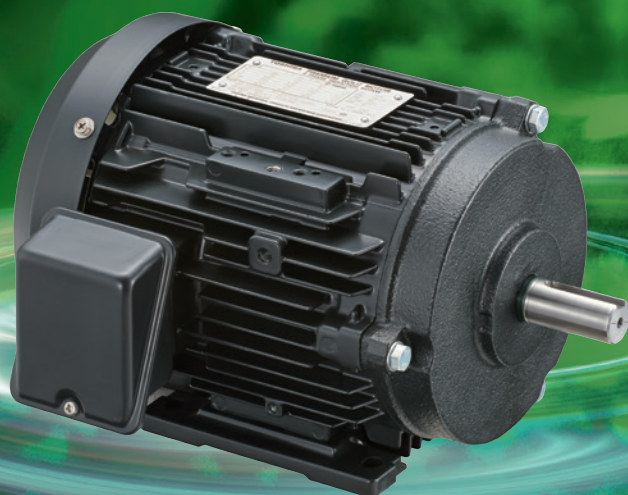


TOSHIBA

Low Voltage Three-Phase Squirrel-cage Induction Motor

Premium Gold Motor

PGM Premium
Gold Motor



Compliant with 2015
Energy Saving Act Standard

Premium Efficiency for the Green Earth

Toshiba's high-efficiency motor technology, cultivated over more than 120 years, brings additional value to industrial equipment and the global environment.



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The Successor of 120 Years of Tradition, Leading the Way to a Bright Future Introducing the Premium Gold Motor (PGM)

High-efficiency Technology, Inherited from the Past, Created the Premium Gold Motor (PGM)

In 1978, 83 years after Toshiba introduced the first domestically-manufactured induction motor in 1895, we introduced the pioneering high-efficiency motor, "Gold Motor." Since then, we have continued to comply with the subsequently established high-efficiency motor regulations. Now, we have introduced a new era: the premium efficiency motor "Premium Gold Motor" (PGM), which complies with the Top Runner scheme.

- 1982 : JEM (Japan Electrical Manufacturers) -TR137 "Totally Enclosed Energy Saving Motors" standard enacted
- 1997 : USA's Energy Policy Act (EPA) enforced
- 2000, Jul. : JIS C 4212 "High Efficiency Low Voltage Three Phase Induction Motor" standard enacted
- 2010, Dec.: USA's Energy Independence and Security Act (EISA) enforced
- 2011, Jun.: Commission Regulation (EC) No.640/2009 enforced
- 2012, Sep.: China's Energy Efficiency Goal Code of Practice (GB3 class) was revised
- 2013, Oct. : Japan's Act on the Rational Use of Energy (Energy Saving Act) partially revised
- 2013, Nov.: "Manufacturers' Criteria Regarding Improvement of AC Motors" enacted by notification of Japan's Ministry of Economy, Trade and Industry
- 2015, Apr. : Top Runner scheme launched

Compliant with Top Runner Scheme and IE3 for Japan's 3 Power Ratings

PGM fulfills the targeted standards of Energy Saving Act, which commenced in fiscal year 2015. In addition, PGM also achieved efficiency level IE3 (premium efficiency) set by JIS C 4034-30:2011 for each of Japan's power supply voltages: 200V-50Hz and 200/220V-60Hz (as well as 400V class).

For details of the Energy Saving Act standards (Standard Energy Efficiency), please refer to the link below.
https://www.enecho.meti.go.jp/category/saving_and_new/saving/enterprise/equipment/pdf/27_koryu.pdf

With 230V-60Hz as Standard, in Conformance with US High-Efficiency Regulations

PGM has 4 ratings (200V-50Hz, 200/220/230V-60Hz) available as standard. This includes 3 ratings for Japan (200V-50Hz, 200/220V-60Hz), in addition to 230V-60Hz for the US. The US rating, 230V-60Hz, complies with the Energy Independence and Security Act (EISA), and a Conformity Certification No. (CC No.) is displayed on the unit.

*PGM does not conform to UL standards.

Highly-Rated Reliability of Characteristics and Performance

Our IE3 motor manufacture plant in Vietnam is accredited as a motor efficiency testing laboratory by the NVLAP, administered by NIST, a leading US institution in the field of high-efficiency motors. Conformity Certification Numbers (CC No.) issued by the DOE are awarded only to the test results conducted at certified efficiency testing laboratories.

*NIST: National Institute of Standards and Technology
*NVLAP: National Voluntary Laboratory Accreditation Program
*DOE: United States Department of Energy

Maintains Compatibility with Toshiba Standard-Efficiency Motors in Same Frame Size

PGM's mounting dimensions (frame size) are identical to Toshiba's standard-efficiency motors. With this compatibility, replacing an existing standard-efficiency motor with PGM is simple. Furthermore, PGM's total length is comparable to our standard-efficiency motors.

Reliability is Further Enhanced by Using Insulation Class 155 (F) (Temperature Rise B) for All Models

Insulation class 155 (F) is used for all models to restrain temperature rise to a maximum of B-rise, thereby further enhancing reliability of insulation.

Our Premium Gold Motor has Potential to Contribute to the Protection of the Environment.

Improved Energy-Saving Effect: Loss Reduction of 30–40% in Comparison to Toshiba's Standard-Efficiency Motors

Due to PGM's loss reduction of 30–40%, the difference in initial purchase cost between PGM and Toshiba's standard efficiency motor can be recouped within a short period. PGM achieves an improved energy-saving effect through lower running costs than those of existing high-efficiency motors (Gold Motor).

*Result of in-house test comparison between Toshiba's standard-efficiency motors and our Premium Gold Motor at rated output. Loss reduction rate and payback period may vary depending on usage conditions.

Electricity Cost Saving Calculation

The formula below indicates annual electricity cost savings (S) through use of PGM. (Unit: JPY per year)

$$S = W \times C \times N$$

W = Input power difference (kW) between Toshiba's standard-efficiency motor and PGM
(For details of input power difference between Toshiba's standard-efficiency motor and PGM, please see values stated in Electrical Characteristics.)

C = Electricity cost (JPY/kWh)

*Electricity cost includes the basic charge, taxes, etc., in addition to the actual cost of electricity, from contracted provider.

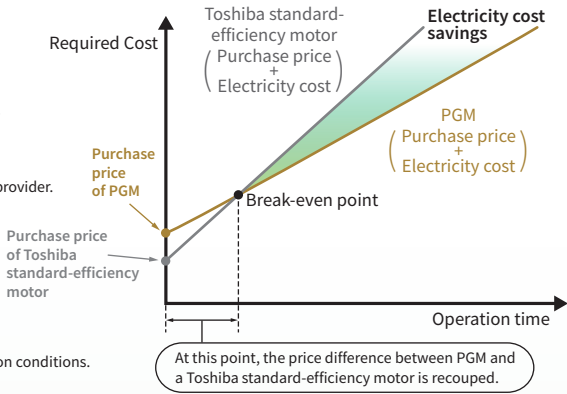
N = Annual operation time (h/year)

<Example>

4-pole-3.7kW-200V-50Hz, Operation time: 5,000h/year, Electricity cost: 16 yen/kWh
W=0.363kW (from table below), C=16 yen/kWh, N=5,000h/year

Electricity Cost Savings (S) = $W \times C \times N = 0.363 \times 16 \times 5,000 = 29,040$ yen

*The above is a calculated value, not a guaranteed value. Electricity cost savings may vary according to calculation conditions.



Cost Payback Period Calculation

The formula below indicates the payback period of the purchase price difference between PGM and a Toshiba standard-efficiency motor.

$$\text{Cost Payback Period (Years)} = \frac{[\text{Purchase price of PGM (JPY)}] - [\text{Purchase cost of Toshiba standard-efficiency motor (JPY)}]}{\text{Annual electricity cost savings (S) (Unit: JPY per year)}}$$

Output [kW]	Voltage [V]	Frequency [Hz]	Input Power Difference between Standard-Efficiency Motor and PGM [kW] (at 100% load)		
			2P	4P	6P
0.75	200	50	0.040	0.047	0.116
	200	60	0.060	0.047	0.112
	220	60	0.066	0.048	0.090
1.5	200	50	0.111	0.136	0.307
	200	60	0.082	0.106	0.273
	220	60	0.089	0.095	0.229
2.2	200	50	0.143	0.236	0.478
	200	60	0.129	0.201	0.460
	220	60	0.156	0.156	0.362
3.7	200	50	0.265	0.363	0.455
	200	60	0.309	0.355	0.497
	220	60	0.336	0.295	0.411
5.5	200	50	0.292	0.421	0.636
	200	60	0.341	0.383	0.675
	220	60	0.407	0.322	0.577

Output [kW]	Voltage [V]	Frequency [Hz]	Input Power Difference between Standard-Efficiency Motor and PGM [kW] (at 100% load)		
			2P	4P	6P
7.5	200	50	0.391	0.528	0.376
	200	60	0.442	0.432	0.407
	220	60	0.345	0.396	0.393
11	200	50	0.460	0.744	0.632
	200	60	0.384	0.797	0.678
	220	60	0.514	0.647	0.639
15	200	50	0.491	1.090	0.271
	200	60	0.512	1.210	0.257
	220	60	0.542	0.889	0.303
18.5	200	50	0.464	0.794	0.608
	200	60	0.404	0.791	0.636
	220	60	0.465	0.695	0.631
22	200	50	1.110	0.810	0.590
	200	60	1.150	0.832	0.563
	220	60	1.330	0.714	0.675

Output [kW]	Voltage [V]	Frequency [Hz]	Input Power Difference between Standard-Efficiency Motor and PGM [kW] (at 100% load)		
			2P	4P	6P
30	200	50	1.24	1.16	1.32
	200	60	1.21	1.16	1.27
	220	60	1.16	1.11	1.21
37	200	50	1.34	1.16	1.21
	200	60	2.09	1.37	1.49
	220	60	2.03	1.23	1.22
45	200	50	2.69	1.87	1.51
	200	60	3.46	1.97	1.62
	220	60	3.25	1.80	1.49
55	200	50	2.69	2.58	—
	200	60	3.54	3.26	—
	220	60	3.17	2.70	—

Variable Speed Drive Enhances Energy-Saving Effect

PGM's energy-saving effect is combined with an additional energy-saving effect at low speeds through Variable Speed Drive (VSD). By reducing loss and thereby reducing heat generation, allowable torque at low speed is improved in comparison to Toshiba's standard-efficiency motors. (Please inquire for further detail.) Allowable torque at low speed for 4-Pole or 6-Pole motors: 100% constant torque operation at 1:10 (6~60Hz). In the case of vector control, 100% constant torque operation at 1:20 (3~60Hz) is possible.

Top-Mounted Terminal Box Available

In order to meet the various needs of our clients, a top-mounted terminal box is available for motors of frame size 90L or above. The use of a top-mounted terminal box enables reduction of the overall motor width.



Low Noise Levels

Low noise levels are achieved while maintaining cooling performance, through our pursuit of optimal shapes for fans and fan covers using fluid analysis. Even our 2-Pole-60Hz motors are able to achieve low noise levels of under 80 dB (A).

Support for Additional Options and Compliance with Overseas Efficiency Regulations

Additional options are available, including position of terminal box, rotational direction, shaft end screw, mounting direction (shaft up, shaft down, horizontal shaft), corrosion protection class C2, and frame earth terminal. In addition, PGM is compliant with overseas efficiency regulations. (For details, please refer to p.7.)

IP55 Protection Rating for Outdoor Use Improves Environmental Durability

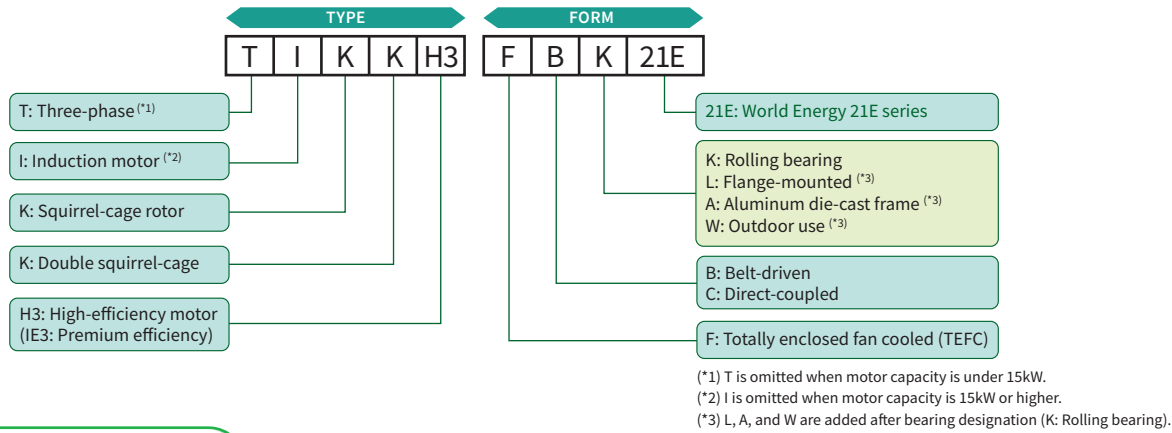
Our PGM for outdoor use has an IP55 protection rating as standard for enhanced environmental durability. The global standard IP55 rating guarantees better protection from solid mater and water infiltration than the conventional IP44 protection rating.

Type & Form

The type and form designation (model numbers) of Toshiba three-phase motors are expressed as follows.

● TYPE: Indicates electrical features, e.g. number of phases, rotor structure, etc.

● FORM: Indicates mechanical features, e.g. enclosure, drive system, etc.



List of Models

Enclosure Construction		Totally Enclosed Fan Cooled (TEFC)											
Installation		Indoor						Outdoor					
Mounting		Foot-mounted			Shaft Down Flange-mounted			Foot-mounted			Shaft Down Flange-mounted		
Form Code		FCKA21E, FBKA21E, FCK21E, FBK21E			FCKLA21E, FCKL21E			FCKAW21E, FBKAW21E, FCKW21E, FBKW21E			FCKLAW21E, FCKLW21E		
Voltage		200V Class											
No. of Poles		2	4	6	2	4	6	2	4	6	2	4	6
Output (kW)	0.75	●★	●★	●★	●	●	●	●	●★	●	●	●	※
	1.5	●★	●★■	●★	●	●	●	●	●★	●	●	●	※
	2.2	●★	●★■	●★	●	●	●	●	●★	●	●	●	※
	3.7	●★	●★■	●★	●	●	●	●	●★	●	●	●	※
	5.5	●★	●★■	●★	●	●	●	●	●★	●	●	●	※
	7.5	●★	●★□	●★	●	●	●	●	●★	●	●	●	※
	11	●★	●★□	●★	○	○	●	●	●★	●	●	●	※
	15	○★	●★□	○★	○	○	※	○	●★	●	●	●	※
	18.5	○	●★■	○★	※	○	※	○	●★	●	※	※	※
	22	○	●★■	○★	※	○	※	○	●★	●	※	※	※
	30	○	●★■	○★	※	○	※	○	●★	●	※	※	※
	37	●	●★■	●★	※	●	※	●	●★	●	※	※	※
45	●	●★■	●★	※	※	※	●	●★	●	※	※	※	
55	●	●★■	—	※	※	—	●	●★	—	※	※	—	
Voltage		400V Class											
No. of Poles		2	4	6	2	4	6	2	4	6	2	4	6
Output (kW)	0.75	●	●★	●	●	●	※	●	●★	※	●	●	※
	1.5	●	●★■	●	●	●	※	●	●★	※	●	●	※
	2.2	●	●★■	●	●	●	※	●	●★	※	●	●	※
	3.7	●	●★■	●	●	●	※	●	●★	※	●	●	※
	5.5	●	●★■	●	●	●	※	●	●★	※	●	●	※
	7.5	●	●★□	●	●	●	※	●	●★	※	●	●	※
	11	●	●★□	●	○	○	※	●	●★	※	●	●	※
	15	○	●★□	○	○	○	※	○	●★	※	●	●	※
	18.5	○	●★■	○	※	○	※	○	●★	※	※	※	※
	22	○	●★■	○	※	○	※	○	●★	※	※	※	※
	30	○	●★■	○	※	○	※	○	●★	※	※	※	※
	37	●	●★■	●	※	●	※	●	●★	※	※	※	※
45	●	●★■	●★	※	※	※	●	●★	●	※	※	※	
55	●	●★■	—	※	※	—	●	●★	—	※	※	—	

●: 200V class MTS (make-to-stock) models (200/200/220/230V-50/60/60/60Hz)

●: 400V class MTS models (400/400/440/460V-50/60/60/60Hz)

●: 200V/400V dual class MTS models (200/400/200/400/220/440/230/460V-50/60/60/60/60/60Hz)

○: 200V class (SPD: surge protection device) MTS models (200/200/220/230V-50/60/60/60Hz)

○: Semi-MTO (make-to-order) models (Please inquire for details.)

■: 200V class MTS models with top-mounted terminal box (200/200/220/230V-50/60/60/60Hz)

■: 400V class MTS models with top-mounted terminal box (400/400/440/460V-50/60/60/60Hz)

■: 200V/400V dual class MTS models with top-mounted terminal box (200/400/200/400/220/440/230/460V-50/60/60/60/60/60Hz)

□: 200V class (SPD: surge protection device) MTS models (200/200/220/230V-50/60/60/60Hz)

□: Semi-MTO (make-to-order) models (Please inquire for details.)

★: 200V class MTS models with terminal box on opposite side (200/200/220/230V-50/60/60/60Hz)

★: 400V class MTS models with terminal box on opposite side (400/400/440/460V-50/60/60/60Hz)

★: 200V/400V dual class MTS models with terminal box on opposite side (200/400/200/400/220/440/230/460V-50/60/60/60/60/60Hz)

★: 200V class (SPD: surge protection device) MTS models with terminal box on opposite side (200/200/220/230V-50/60/60/60Hz)

★: Semi-MTO (make-to-order) models (Please inquire for details.)

※: MTO models

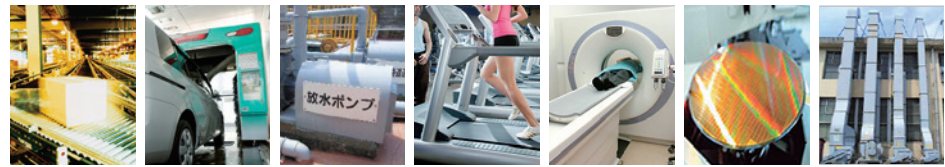
Standard Specifications

Item		Description																														
1	No. of Poles Output Range	2-Pole: 0.75–55kW, 4-Pole: 0.75–55kW, 6-Pole: 0.75–45kW																														
2	Rated Voltage Rated Frequency	200 / 200 / 220 / 230V-50 / 60 / 60 / 60Hz 400 / 400 / 440 / 460V-50 / 60 / 60 / 60Hz 200 / 400 / 200 / 400 / 220 / 440 / 230 / 460V-50 / 50 / 60 / 60 / 60 / 60 / 60 / 60Hz Single rating possible (under 600V) 400V class models and 200V/400V dual class models are equipped with reinforced insulation for inverter use.																														
3	Enclosure Construction and Form Code	<table><tr><th rowspan="2">Enclosure Construction</th><th rowspan="2">Protection Rating</th><th rowspan="2">Cooling System</th><th rowspan="2">Mounting *1 *2</th><th>Form Code</th><th>Form Code</th></tr><tr><th>2-Pole and Direct Driven</th><th>Direct & Belt-driven</th></tr><tr><td rowspan="4">Totally Enclosed Fan Cooled (TEFC)</td><td rowspan="2">IP44 (Indoor)</td><td rowspan="2">IC411</td><td>Foot-mounted IMB3</td><td>FCKA21E FCK21E</td><td>FBKA21E FBK21E</td></tr><tr><td>Shaft Down Flange-mounted IMV1</td><td>FCKLA21E FCKL21E</td><td>—</td></tr><tr><td rowspan="2">IP55 (Outdoor)</td><td rowspan="2">IC411</td><td>Foot-mounted IMB3</td><td>FCKAW21E FCKW21E</td><td>FBKAW21E FBKW21E</td></tr><tr><td>Shaft Down Flange-mounted IMV1</td><td>FCKLAW21E FCKLW21E</td><td>—</td></tr></table>						Enclosure Construction	Protection Rating	Cooling System	Mounting *1 *2	Form Code	Form Code	2-Pole and Direct Driven	Direct & Belt-driven	Totally Enclosed Fan Cooled (TEFC)	IP44 (Indoor)	IC411	Foot-mounted IMB3	FCKA21E FCK21E	FBKA21E FBK21E	Shaft Down Flange-mounted IMV1	FCKLA21E FCKL21E	—	IP55 (Outdoor)	IC411	Foot-mounted IMB3	FCKAW21E FCKW21E	FBKAW21E FBKW21E	Shaft Down Flange-mounted IMV1	FCKLAW21E FCKLW21E	—
		Enclosure Construction	Protection Rating	Cooling System	Mounting *1 *2	Form Code	Form Code																									
						2-Pole and Direct Driven	Direct & Belt-driven																									
		Totally Enclosed Fan Cooled (TEFC)	IP44 (Indoor)	IC411	Foot-mounted IMB3	FCKA21E FCK21E	FBKA21E FBK21E																									
Shaft Down Flange-mounted IMV1	FCKLA21E FCKL21E				—																											
IP55 (Outdoor)	IC411		Foot-mounted IMB3	FCKAW21E FCKW21E	FBKAW21E FBKW21E																											
			Shaft Down Flange-mounted IMV1	FCKLAW21E FCKLW21E	—																											
*1: For use of foot-mounted models with shaft down: Frame sizes 80M–160L are compatible as standard. For use of flange-mounted models with horizontal shaft: Frame sizes 80M–160L are compatible as standard. Compatibility may not be possible depending on environment, loading conditions, etc. Please contact us regarding cases of specialized use. *2: Please contact us regarding use of mounting methods other than those listed above (e.g. shaft up, etc.).																																
4	Insulation Class	155(F)																														
5	Maximum Temperature Rise	80K (130 (B) Rise)																														
6	Time Rating	S1 (continuous duty)																														
7	Rotational Direction*	Counterclockwise, as viewed from load side																														
8	Ambient Environment	Coolant Temperature	-30–40°C (operating temperature range)																													
		Humidity	Up to 100% (no condensation)																													
		Altitude	Up to 1000m																													
		Gas & Steam	No corrosives, flammable gases, or steam																													
9	Terminal Box	Model		Mounting Position	Conduit Entry Direction																											
		Foot-mounted	Left, as viewed from load side	Indoor Use: Downward (Rotatable in 90 degree increments) Outdoor Use (Frame sizes 80M–160L): To anti-load side (Rotatable in 90 degree increments)																												
			Right, as viewed from load side	Outdoor Use (Frame sizes 180M–225S): Downward (Rotatable in 90 degree increments)																												
		Upper Frame*	Left, as viewed from load side (Rotatable in 90 degree increments)																													
Flange-mounted		Frame	Downward (Rotatable in 90 degree increments)																													
*Frame size 90L and higher																																
10	Lead Wires	Frame Size	No. of Lead Wires	Connection Type																												
		80M–112M	3	Screw terminal block connection																												
		132S–160L	6	Stud terminal block connection (star-delta starting possible)																												
		180M–225S	6, 12	Lead wire crimp terminal connection (star-delta starting possible)																												
6P-3.7kW allows direct on-line (DOL) start. 200V/400V dual class models have 12 lead wires.																																
11	Coating	Dark green (approximate color match to JIS code 3.74BG3.04/1.25)																														
12	Standard	JIS C 4213 : 2014																														

*Can also be used clockwise; please inquire for details.

List of Specifications for Major Applications

Our Premium Gold Motor is Used in a Wide Range of Applications!



Applied Specifications			Details												
Different Voltage	Non-standard voltage/frequency combinations	Standard: 200V class: 200/200/220/230V-50/60/60/60Hz 400V class: 400/400/440/460V-50/60/60/60Hz	○	■	■			■				■			■
	Variable Speed Drive (VSD)	Available for both 200V and 400V class	◎	■	■			■	■	■	■	■	■	■	■
Variable Speed Drive (VSD)	Constant torque operation	Constant torque operation at 1:10 (6~60Hz) is possible (4-Pole, 6-Pole standard stock models)	◎ *1	■				■	■	■	■			■	■
	Outdoor use	Outdoor standard: IP55	◎	■	■					■	■				
Ambient Environment	Ambient temperature	Outside range of -30~40°C	△		■			■			■				
	Corrosion protection class C1		△	■											
	Corrosion protection class C2, C3		○	■											
	Cast iron frame	Suitable for corrosive environments, etc. Standard: Fr80M~160L: Aluminum	△	■											
	Fan and fan cover material	Fan: Replace plastic → cast iron Fan cover: Replace steel sheet → cast iron	△	■											
Frequency of Operation	High starting frequency		△						■	■					
Specified Characteristics	Starting current, Efficiency, Starting torque, Maximum torque		△	■						■					■
Specified Precision	Assembly precision	Perpendicularity, Eccentricity, Shaft runout, End play	△	■	■										■
	Vibration, Noise	Low vibration, Low noise	△	■	■			■							■
Mounting Method	Foot-mounted	Available in standard stock	◎	■	■			■	■	■	■				■
	Flange-mounted	Available in standard stock	◎	■	■					■	■				■
	Foot-mounted flange		○	■				■							
Specified Mounting Dimensions	Flange dimensions		△	■											
	Shaft end dimensions, Double shaft		△	■	■										■
	Double shaft, Shaft material, Shaft end shape	Stainless steel, Screws, Screw holes, Tapers	△	■	■				■	■					■
Specified Load	Radial load, Thrust load		△	■	■				■	■					
Terminal Box	Mounting position (Top, Opposite side)	Opposite side: Right, as viewed from shaft end	◎	■	■										
	Specified conduit tube thread size, Dustproof seal		△	■	■										
	No terminal box	Lead terminal exposed	△	■	■			■							
Bearing	Open type (for refueling)		△	■											
	AC bearing		○	■	■										
Space Heater			△	■				■							
Nameplate	Attached nameplate	Unit number, Rotational direction, Connection	○	■	■										■
Specified Coating Color	Non-standard	Standard color: Dark green (approximate color match to JIS code 3.74BG3.04/1.25)	○	■	■										
For Overseas Markets *2	USA	Please refer to p.35.	◎ *3	■											■
	China		○	■											
	EU		○	■											
	Russia		△	■											
Applicable Products	Gear motors	Please refer to the Gear Motor Catalog.	—						■	■					
	Brake motors	Please refer to the Brake Motor Catalog	—						■	■					
	Explosion-proof motors	Please refer to the Explosion-Proof Motor Catalog.	—	■	■										
	PM (Permanent Magnet) motors	Please refer to the PM Motor Catalog.	—	■	■			■							■

*1. Please contact us in the case of 2-Pole models, 50Hz base frequency, etc.
*2. High-efficiency regulations are subject to fluid changes, so please inquire regarding the latest information as necessary.
*3. PGM does not conform to UL standards.
*4. In some cases, the above specifications may not be available due to frame sizes, various non-standard conditions, and regulations. Please contact us for details.

Indoor Use/
Totally Enclosed
Fan Cooled/
Foot-Mounted
0.75kW–55kW

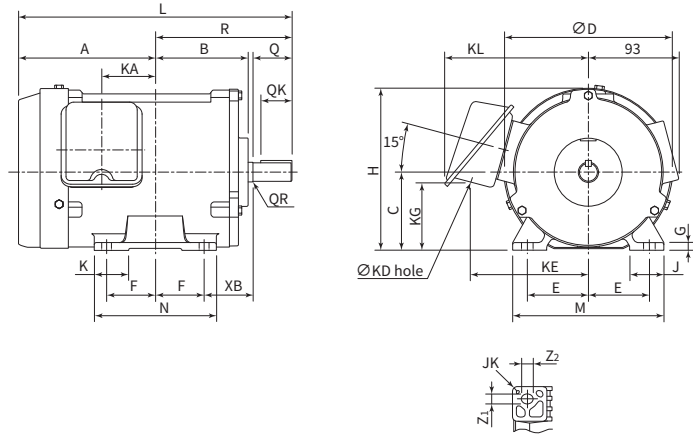


Figure 1

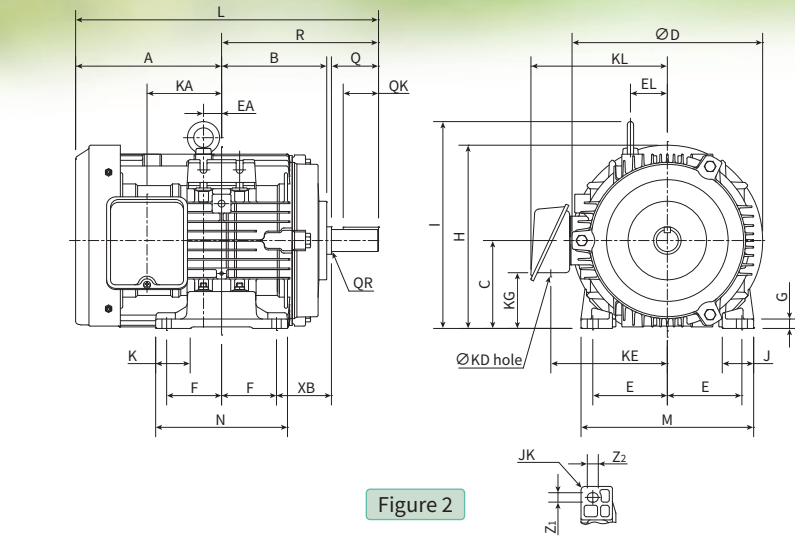


Figure 2

Common Shaft End

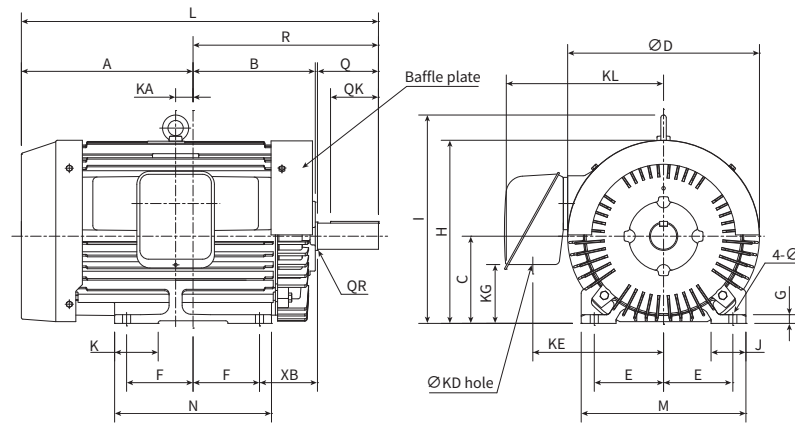
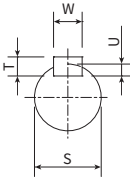


Figure 3

Type & Form	Frame Size	Output (kW)			Figure No.	Dimensions (mm)																						Bearing No.								Approx. Weight (kg)			Frame Size																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
		2-Pole	4-Pole	6-Pole		A	B	C	D	E	F	G	H	I	J	K	L	M	N	R	Z (Z ₁ ×Z ₂)	XB		JK	EA	EL	Terminal Box					Shaft End								2-Pole		4-Pole and over		2-Pole	4-Pole	6-Pole																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Up to 3.7kW IKH3- FCKA21E/ FBKA21E	80M	0.75	—	—	1	140	95	80	172	62.5	50	8	166	—	35	35	280	155	125	140	10×12	50		5	—	—	55	22	121	69	147	40	32	0.5	19	6	6	3.5	6204ZZC3	6204ZZC3	—	—	10	—	—	80M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
		—	0.75			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

- (1) Tolerance of C dimensions is 0 – -0.5.
(2) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); $\phi 19$ –28mm: j6, $\phi 38$ –48mm: k6, $\phi 55$ mm or longer: m6.
(3) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
(4) Standard drive systems are as follows: 2-Pole: direct driven, 4-Pole: belt-driven. Please contact us for further information about belt applications.
(5) Sealed ball bearings (enclosed grease type) are equipped as standard.
(6) Motors of frame size 90L or less are not equipped with eye bolts.
(7) The following models are not equipped with baffle plates as shown above: 2-Pole: 22, 30kW, 4-Pole: 18.5, 22, 30, 37, 45kW, 6-Pole: 15, 18.5, 22, 30, 45kW.

Indoor Use/
Totally Enclosed Fan Cooled/
Foot-Mounted
(Top-Mounted Terminal Box)
0.75kW-55kW

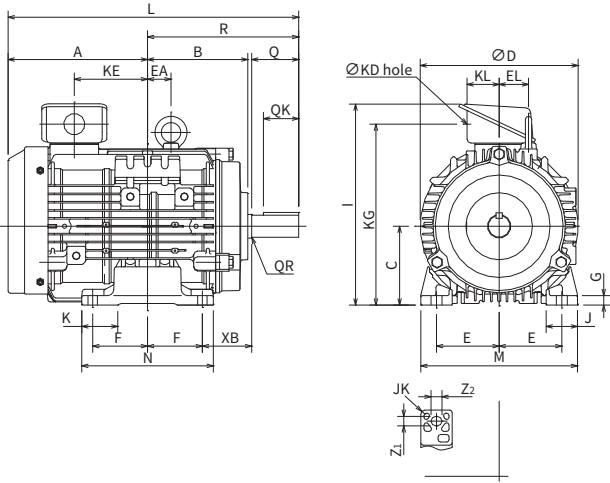


Figure 1

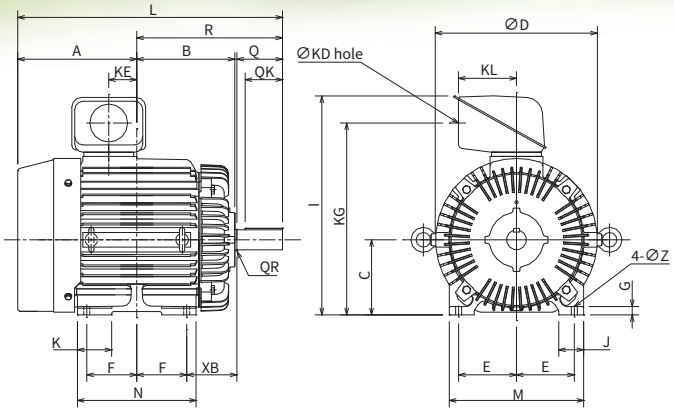


Figure 2

Common Shaft End

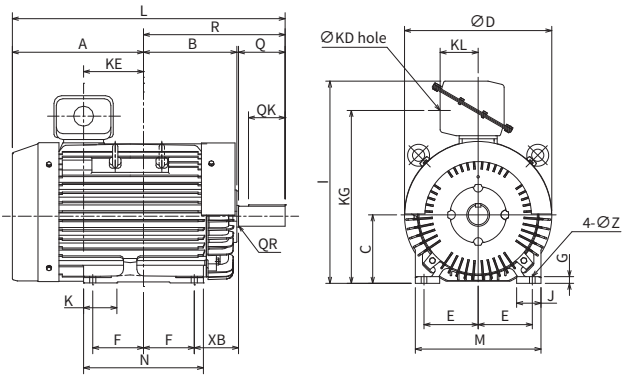
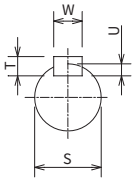


Figure 3

Type & Form	Frame Size	Output (kW)			Figure No.	Dimensions (mm)																				Bearing No.												Approx. Weight (kg)			Frame Size																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		2-Pole	4-Pole	6-Pole		A	B	C	D	E	F	G	I	J	K	L	M	N	R	Z (Z ₁ ×Z ₂)	XB		JK	EA	EL	Terminal Box				Shaft End								2-Pole		4-Pole and over		2-Pole	4-Pole	6-Pole																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Up to 3.7kW IKH3-FCKA21E/FBKA21E Up to 11kW IKKH3-FCKA21E/FBKA21E 15kW and over TKKH3-FCKA21E/FBKA21E	90L	1.5 2.2	1.5	0.75	1	154.5	113.5	90	202	70	62.5	10	246	40	40	323	176	149	168.5	10×12	56		5	—	—	27	70	219.5	41	50	40	0.5	24	8	7	4	6205C3	6205C3	6205C3	6205C3	18 22	21	18	90L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	100L	—	2.2 —	—		1.5	178 207	128	100	202	80	70	12	256	40	46	371 400	200	168	193	12×14	63		5	—	37.5	27	93.5	229.5	41	60	45	0.5	28	8	7	4	—	—	6206C3	6205C3	—	29 —	— 32	100L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
	112M	3.7 —	3.7 —	—		2.2	186 219	134	112	243	95	70	12	287	40	44	386 419	220	168	200	12×14	70		5	—	47	27	95	260.5	41	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	33 —	39 —	— 45	112M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
	132S	5.5 7.5	5.5	3.7		210.5	152	132	285	108	70	15	344	50	50	449.5	260	175	239	12×14	89		5	43.5	56.5	35	85	313.5	65	80	63	0.5	38	10	8	5	6308C3	6208C3	6308C3	6208C3	55 59	60	59	132S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	132M	—	7.5	5.5		229.5	171	132	285	108	89	15	344	50	50	487.5	260	213	258	12×14	89		5	26.5	56.5	35	104	313.5	65	80	63	0.5	38	10	8	5	—	—	—	71	74	132M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	160M	11 15	11	7.5		290	206	160	324	127	105	18	439.5	60	60	613	308	250	323	14.5×18.5	108		5	−2	—	52	126	386.5	90	110	90	2	42	12	8	5	6310C3	6208C3	6310C3	6208C3	92 103	102	96	160M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	160L	18.5	15	11		268	228	160	324	127	127	18	439.5	60	60	613	308	294	345	14.5×18.5	108		—	20	—	52	104	386.5	90	110	90	2	42	12	8	5	—	—	116	119	116	160L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	TKKH3-FCK21E/FBK21E	180M	22	18.5 22		15	2	287	236.5	180	391	139.5	120.5	20	525	60	82.5	638.5	324	286	351.5	14.5	121		—	—	—	91	67.5	460	140	110	90	0.5	48	14	9	5.5	6212C3	6310C3	6310C3	6310C3	195	185 190	175	180M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
180L		30	30	18.5 22	3	346	255.5	180	391	139.5	139.5	20	525	60	82.5	716.5	324	324	370.5	14.5	121		—	—	—	91	126.5	460	140	110	90	1.5	55	16	10	6	6212C3	6310C3	6312C3	6310C3	235	235	215 230	180L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
200L		37 45	—	—		394	280.5	200	441	159	152.5	20	565	80	100	789.5	378	360	395.5	18.5	133	—	—	—	91	180	500	140	110	90	1.5	55	16	10	6	6312C3	6312C3	—	—	330 340	—	—	200L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		—	37 45	30 37												819.5			425.5										140	110	1.5	60	18	11	7	—	—	6313C3	6312C3	—	335 370	345 350																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
225S		55 —	—	—		381	287	225	484	178	143	22	665	80	120	783 813	413	366	402 432	18.5	149								—	—	—	91	158	568	125	110 140	90 110	1.5 1.5	55 65	16 18	10 11	6 7		6312C3 —	6312C3 —	— 6315C3	— 6312C3	405 —	— 435	— 420																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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(1) Tolerance of C dimensions is 0 ~ -0.5.
(2) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); φ19-28mm: j6, φ38-48mm: k6, φ55mm or longer: m6.
(3) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
(4) Standard drive systems are as follows: 2-Pole: direct driven, 4-Pole: belt-driven. Please contact us for further information about belt applications.
(5) Sealed ball bearings (enclosed grease type) are equipped as standard.
(6) Motors of frame size 90L or less are not equipped with eye bolts.
(7) The following models are not equipped with baffle plates as shown above: 2-Pole: 22, 30kW, 4-Pole: 18.5, 22, 30, 37, 45kW, 6-Pole: 15, 18.5, 22, 30, 45kW.

Indoor Use/
Totally Enclosed Fan Cooled/
Foot-Mounted
(Terminal Box on Opposite Side)
0.75kW-55kW

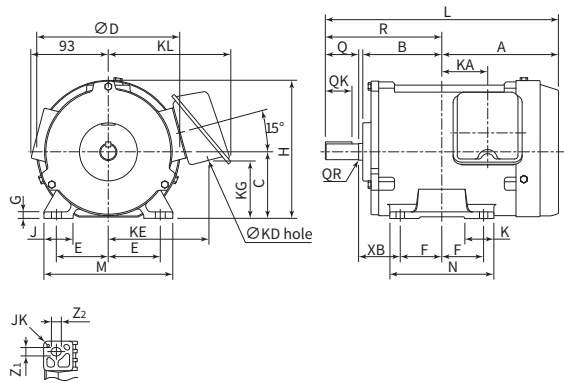


Figure 1

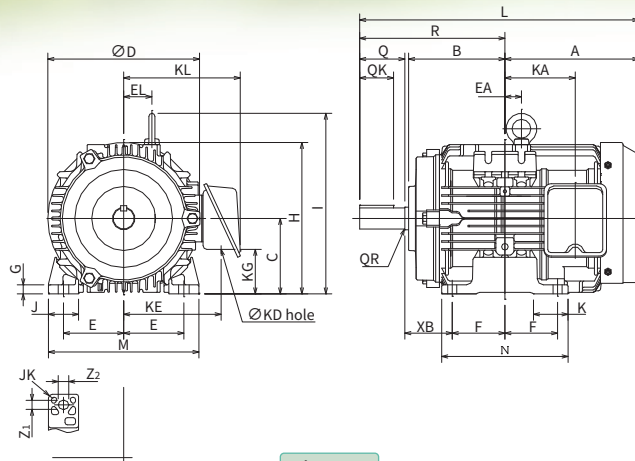


Figure 2

Common Shaft End

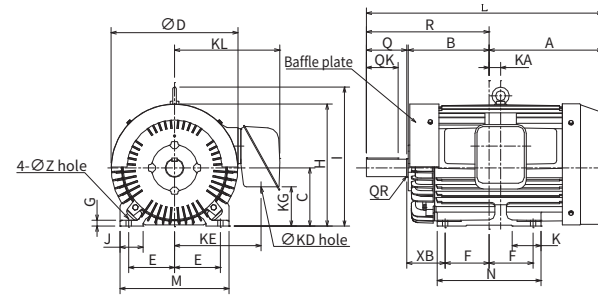
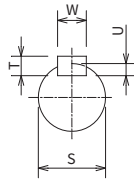


Figure 3

Type & Form	Frame Size	Output (kW)			Figure No.	Dimensions (mm)																								Bearing No.												Approx. Weight (kg)			Frame Size																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
		2-Pole	4-Pole	6-Pole		A	B	C	D	E	F	G	H	I	J	K	L	M	N	R	Z (Z ₁ ×Z ₂)	XB		JK	EA	EL	Terminal Box					Shaft End					2-Pole		4-Pole and over		2-Pole																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
																											KA	KD	KE	KG	KL	Q	QK	QR	S	W	T	U	Load Side	Anti-load Side	Load Side	Anti-load Side	2-Pole	4-Pole		6-Pole																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Up to 3.7kW IKH3- FCKA21E/ FBKA21E	80M	0.75	—	—	1	140	95	80	172	62.5	50	8	166	—	35	35	280	155	125	140	10×12	50		5	—	—	55	22	121	69	147	40	32	0.5	19	6	6	3.5	6204ZZC3	6204ZZC3	—	—	10	—	—	80M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		—	0.75			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

(1) Tolerance of C dimensions is 0 – -0.5.
(2) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); $\phi 19$ –28mm: j6, $\phi 38$ –48mm: k6, $\phi 55$ mm or longer: m6.
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(5) Sealed ball bearings (enclosed grease type) are equipped as standard.
(6) Motors of frame size 90L or less are not equipped with eye bolts.
(7) The following models are not equipped with baffle plates as shown above: 2-Pole: 22, 30kW, 4-Pole: 18.5, 22, 30, 37, 45kW, 6-Pole: 15, 18.5, 22, 30, 45kW.

Indoor Use/
Totally Enclosed
Fan Cooled/
Flange-Mounted
0.75kW–55kW

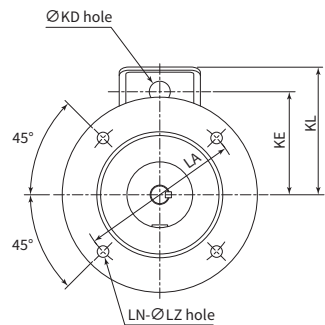
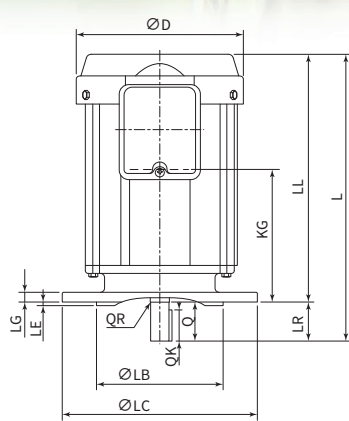


Figure 1

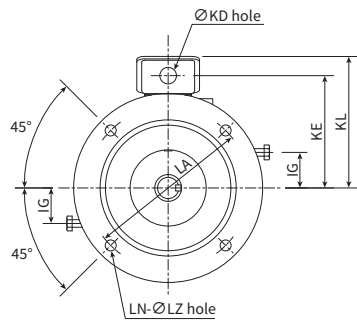
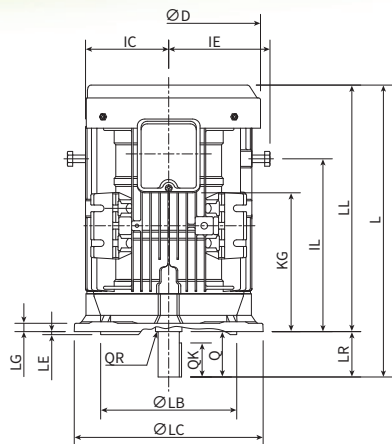


Figure 2

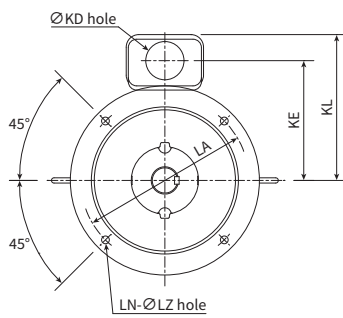
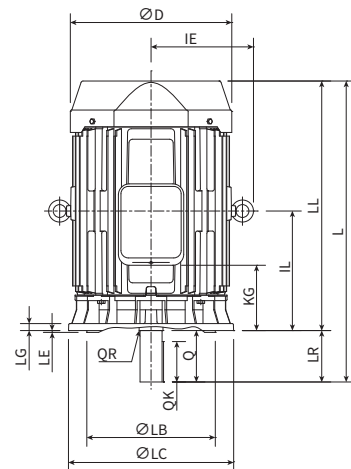


Figure 3a

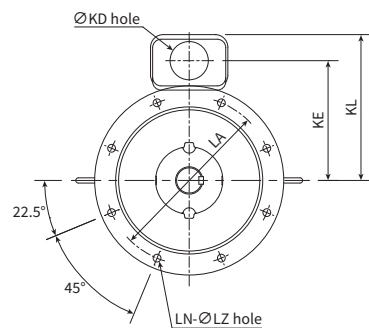
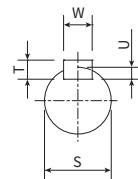


Figure 3b

Common Shaft End



Type & Form	Flange No.	Output (kW)			Frame Size	Figure No.	Dimensions (mm)																	Bearing No.												Approx. Weight (kg)			Flange No.			
		2-Pole	4-Pole	6-Pole			D	IE	IC	IG	IL	L	LL	LR	Terminal Box					Flange						Shaft End						2-Pole		4-Pole and over		2-Pole	4-Pole	6-Pole				
															KD	KE	KG	KL		LA	LB	LC	LE	LG	LN	LZ	Q	QK	QR	S	W	T	U	Load Side	Anti-load Side					Load Side	Anti-load Side	
Up to 3.7kW IKH3- FCKLA21E	FF165	0.75	—	—	80M	1	172	—	—	—	—	275.5	235.5	40	22	105.5	117.5	132		165	130	200	3.5	10	4	12	40	32	0.5	19	6	6	3.5	6204ZZC3	6204ZZC3	—	—	12	—	—	FF165	
		—	0.75	—			293.5	253.5	135.5	165	130	200	3.5		10	4	12			50	40	0.5	24	8	7	4	—	—	6204ZZC3	6204ZZC3	—	16	—									
	FF165	1.5	1.5	0.75	90L	2	202	—	88.5	—	—	323	273	50	27	129.5	147.5	156		165	130	200	3.5	10	4	12	50	40	0.5	24	8	7	4	6205C3	6205C3	6205C3	6205C3	19	22	19	FF165	
		2.2	—	—			352	302	165	130	200	3.5	10		4	12	50			40	0.5	24	8	7	4	6205C3	6205C3	6205C3	6205C3	23	—	—										
	FF215	—	2.2	—	100L	2	202	122	98	37.5	224	371	311	60	27	129.5	185.5	156		215	180	250	4	16	4	14.5	60	45	0.5	28	8	7	4	—	—	6206C3	6205C3	—	32	—	FF215	
		—	—	1.5			400	340	215	180	250	4	16		4	14.5	60			45	0.5	28	8	7	4	—	—	6206C3	6205C3	—	—	35	—									
	FF215	3.7	3.7	—	112M	2	243	134	110	47	228.5	386	326	60	27	148.5	194	175		215	180	250	4	13	4	14.5	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	35	41	—	FF215	
		—	—	2.2			419	359	215	180	250	4	13		4	14.5	60			45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	—	—	47										
	FF265	5.5	5.5	3.7	132S	2	285	155	130	61	252.5	449.5	369.5	80	35	181.5	179	212		265	230	300	4	12	4	14.5	80	63	0.5	38	10	8	5	6308C3	6208C3	6308C3	6208C3	58	62	63	62	FF265
		7.5					285	155	130	61	202	487.5	407.5		80	35	181.5			217	212	265	230	300	4	12	4	14.5	80	63	0.5	38	10	8	5			—	—	—	74	77
FF300	11	11	7.5	160M	2	324	179.5	154.5	54	235	613	503	110	52	226.5	252	279.5		300	250	350	5	14	4	18.5	110	90	2	42	12	8	5	6310C3	6208C3	6310C3	6208C3	97	108	107	101	FF300	
	15					324	179.5	154.5	54	235	613	503		110	52	226.5			252	279.5	300	250	350	5	14	4	18.5	110	90	2	42	12					8	5	121	124	121	FF300
TKKH3- FCKL21E	FF350	22	18.5	15	180M	3a	391	255	—	—	241.5	638.5	528.5	110	91	280	101.5	345		350	300	400	5	15	4	18.5	110	90	0.5	48	14	9	5.5	6212C3	6310C3	6310C3	6310C3	200	190	180	FF350	
		22	391				255	—	—	280.5	716.5	606.5	110		91	280	140.5			345	350	300	400	5	15	4	18.5	110	90	1.5	55	16	10					6	6212C3	6312C3		6310C3
	FF400	37	—	200L	3b	441	279	—	—	325.5	789.5	679.5	110	91	300	185.5	365		400	350	450	5	19	8	18.5	110	90	1.5	55	16	10	6	6312C3	6312C3	—	—	325	335	—	—	FF400	
		45	37								30															819.5	140	110	110	90	1.5	60	18	11	7	—	—	6313C3	6312C3	—		330
	FF500	—	37	45	37	225S	484	311	—	—	325.5	797.5	687.5	110	91	343	200.5	440		500	450	550	5	22	8	18.5	110	90	1.5	55	16	10	6	6312C3	6312C3	—	—	410	—	—	FF500	
		—	45	37	827.5	140						140															110	110	1.5	65	18	11	7	—	—	6315C3	6312C3	—	440	425		

- (1) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); $\phi 19$ –28mm: j6, $\phi 38$ –48mm: k6, $\phi 55$ mm or longer: m6.
(2) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
(3) Tolerance of LB dimensions is JIS B 0401: j6.
(4) Sealed ball bearings (enclosed grease type) are equipped as standard.
(5) Motors of frame size 90L or less are not equipped with eye bolts.

Outdoor Use/
Totally Enclosed
Fan Cooled/
Foot-Mounted
0.75kW–55kW

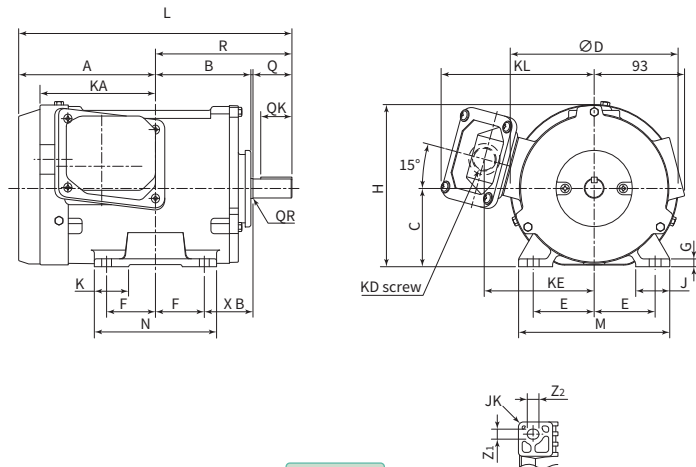


Figure 1

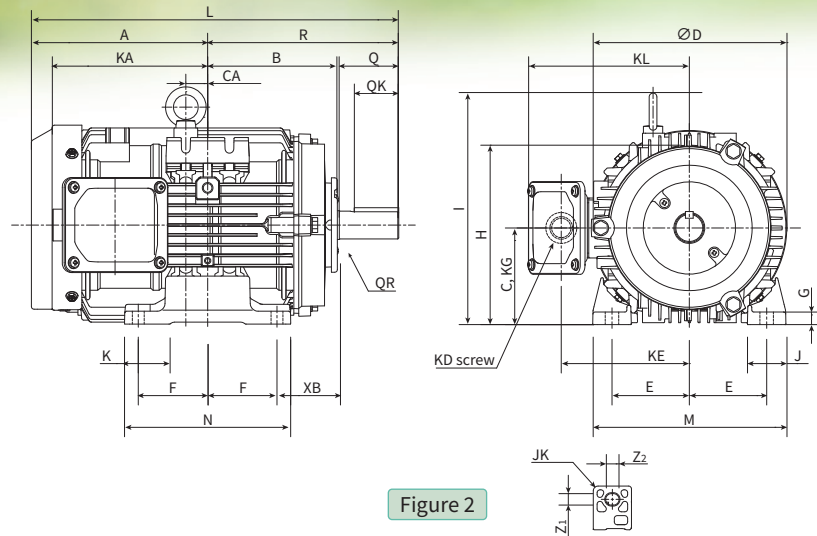


Figure 2

Common Shaft End

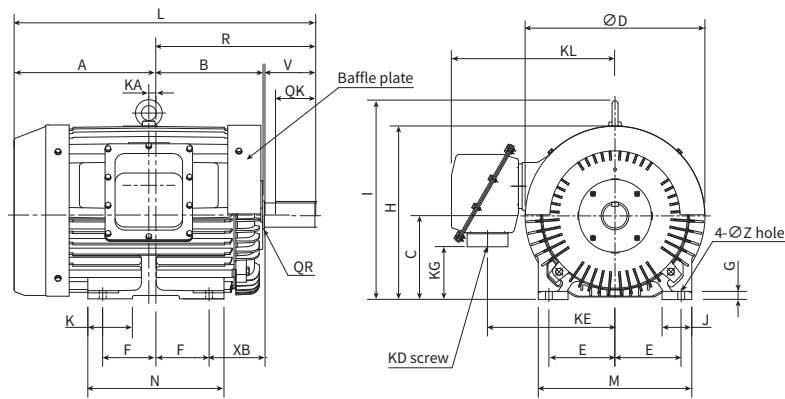
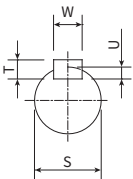


Figure 3

Type & Form	Frame Size	Output (kW)			Figure No.	Dimensions (mm)																				Bearing No.										Approx. Weight (kg)			Frame Size							
		2-Pole	4-Pole	6-Pole		A	B	C	D	E	F	G	H	I	J	K	L	M	N	R	Z (Z ₁ ×Z ₂)	XB		JK	EA	EL	Terminal Box					Shaft End								2-Pole		4-Pole and over		2-Pole	4-Pole	6-Pole
																											KA	KD	KE	KG	KL	Q	QK	QR	S	W	T	U		Load Side	Anti-load Side	Load Side	Anti-load Side			
Up to 3.7kW IKH3- FCKAW21E/ FBKAW21E	80M	0.75	—	—	1	140	98	80	172	62.5	50	8	166	—	35	35	280	155	125	140	10×12	50		5	—	—	118	G3/4 (22)	113	—	158	40	32	0.5	19	6	6	3.5	6204ZZC3	6204ZZC3	—	—	10.5	—	—	80M
		—	0.75			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
	90L	1.5 2.2	1.5	0.75	2	154.5	116.5	90	202	70	62.5	10	191	—	40	40	323	176	149	168.5	10×12	56		5	—	—	133	G3/4 (22)	132.5	—	167.5	50	40	0.5	24	8	7	4	6205C3	6205C3	6205C3	6205C3	18.5 23	22	18.5	90L
		—	2.2	—		178	131	100	202	80	70	12	201	239.5	40	46	371 400	200	168	193	12×14	63		5	22	37.5	156.5	G3/4 (22)	132.5	—	167.5	60	45	0.5	28	8	7	4	—	—	6206C3	6205C3	—	30	—	100L
	112M	3.7 —	3.7 —	—	2	186 219	138	112	243	95	70	12	233.5	263.5	40	44	386 419	220	168	200	12×14	70		5	23	47	158	G3/4 (22)	151.5	—	186.5	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	34 —	40 —	33 46	112M
		5.5 7.5	5.5	3.7		210.5	156	132	285	108	70	15	274.5	313	50	50	449.5	260	175	239	12×14	89		5	24	61	196	G1 1/2 (42)	201.5	—	263	80	63	0.5	38	10	8	5	6308C3	6208C3	6308C3	6208C3	56 60	61	60	132S
	132M	—	7.5	5.5	229.5	175	132	285	108	89	15	274.5	313	50	50	487.5	260	213	258	12×14	89		5	24	61	215	G1 1/2 (42)	201.5	—	263	80	63	0.5	38	10	8	5	—	—	6308C3	6208C3	—	72	75	132M	
	160M	11 15	11	7.5	290	210	160	324	127	105	18	322	365.5	60	60	613	308	250	323	14.5×18.5	108		5	22	54	237	G1 1/2 (42)	221.5	—	282.5	110	90	2	42	12	8	5	6310C3	6208C3	6310C3	6208C3	93 104	103	97	160M	
	160L	18.5	15	11	268	232	160	324	127	127	18	322	365.5	60	60	613	308	294	345	14.5×18.5	108		5	—	54	215	G1 1/2 (42)	221.5	—	282.5	110	90	2	42	12	8	5					117	120	117	160L	
	TKKH3- FCKW21E/ FBKAW21E	180M	22	18.5 22	15	3	287	237.5	180	391	139.5	120.5	20	375.5	434	60	82.5	638.5	324	286	351.5	14.5	121		—	—	—	—	G3 (82)	293	82	390	110	90	0.5	48	14	9	5.5	6212C3	6310C3	6310C3	6310C3	195	185 190	175
180L		30	30	18.5 22	346		256.5	180	391	139.5	139.5	20	375.5	434	60	82.5	716.5	324	324	370.5	14.5	121		—	—	—	20	G3 (82)	293	82	390	110	90	1.5	55	16	10	6	6212C3	6312C3		—		—	235	235
200L		37 45	—	—	394		281.5	200	441	159	152.5	20	420	478	80	100	789.5	378	360	395.5	18.5	133		—	—	—	40	G3 (82)	313	112	410	110	90	1.5	55	16	10	6	6312C3	6312C3	—	—	325 335	—	—	200L
		—	37 45	30 37													819.5			425.5			140									110	1.5	60	18	11	7	—	—	6313C3	6312C3	—	—	330 365	340 345	
225S		55 —	—	—	381		288	225	484	178	143	22	467	535	80	120	783 813	413	366	402 432	18.5	149		—	—	—	19	G3 (82)	343	142	440	110 140	90 110	1.5 1.5	55 65	16 18	10 11	7	6312C3 —	6312C3 —	— 6315C3	— 6312C3	400 —	— 430	— 415	225S

- (1) Tolerance of C dimensions is 0 – -0.5.
(2) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); $\phi 19$ –28mm: j6, $\phi 38$ –48mm: k6, $\phi 55$ mm or longer: m6.
(3) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
(4) Standard drive systems are as follows: 2-Pole: direct driven, 4-Pole: belt-driven. Please contact us for further information about belt applications.
(5) Sealed ball bearings (enclosed grease type) are equipped as standard.
(6) Motors of frame size 90L or less are not equipped with eye bolts.
(7) The following models are not equipped with baffle plates as shown above: 2-Pole: 22, 30kW, 4-Pole: 18.5, 22, 30, 37, 45kW, 6-Pole: 15, 18.5, 22, 30, 45kW.

Outdoor Use/
Totally Enclosed
Fan Cooled/
Flange-Mounted
0.75kW–55kW

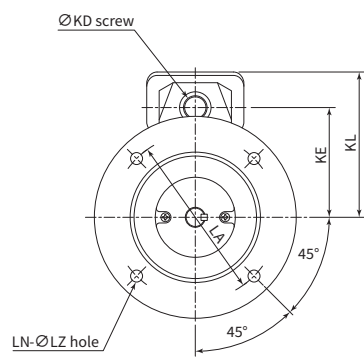
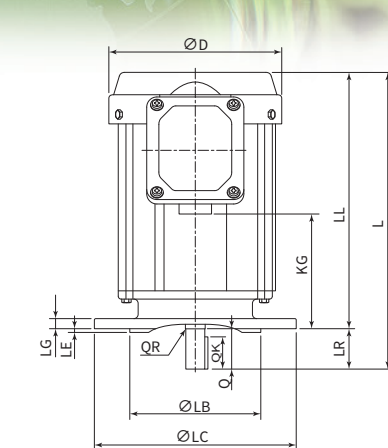


Figure 1

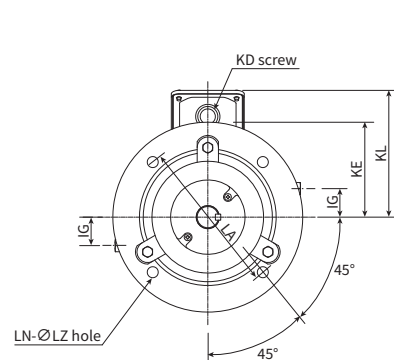
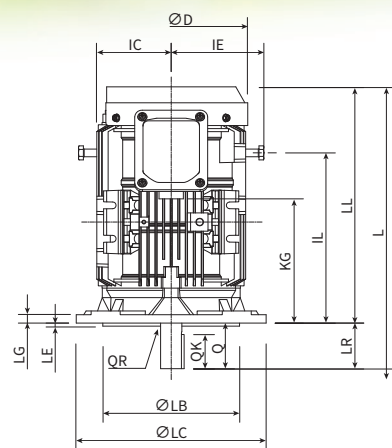


Figure 2

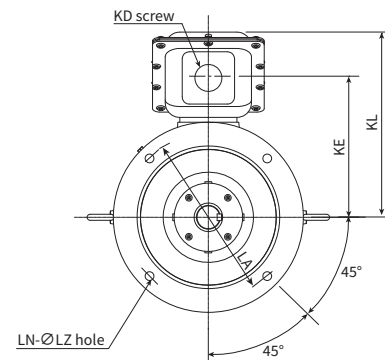
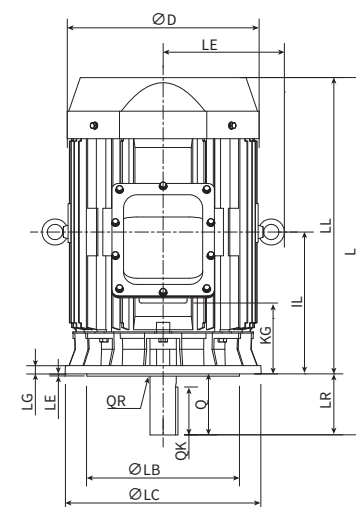


Figure 3a

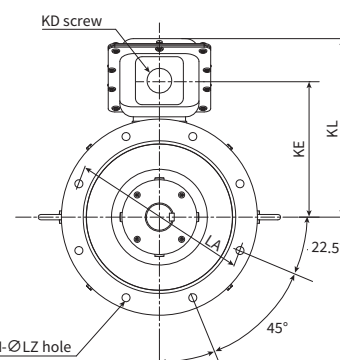
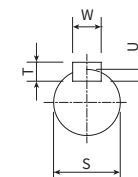


Figure 3b

Common Shaft End



Type & Form	Flange No.	Output (kW)			Frame Size	Figure No.	Dimensions (mm)																				Bearing No.												Approx. Weight (kg)			Flange No.																																																																																																																																																																																																																																																																																																																																																																														
		2-Pole	4-Pole	6-Pole			D	IE	IC	IG	IL	L	LL	LR	Terminal Box				LA	LB	Flange				Q	QK	QR	Shaft End				2-Pole		4-Pole and over		2-Pole	4-Pole	6-Pole																																																																																																																																																																																																																																																																																																																																																																																		
															KD	KE	KG	KL			LE	LG	LN	LZ				S	T	U	Load Side	Anti-load Side	Load Side	Anti-load Side																																																																																																																																																																																																																																																																																																																																																																																						
Up to 3.7kW IKH3- FCKLAW21E	FF165	0.75	—	—	80M	1	172	—	—	—	—	275.5	235.5	40	G3/4 (22)	108.5	95.5	144		165	130	200	3.5	10	4	12	40	32	0.5	19	6	6	3.5	6204ZZC3	—	—	—	—	12.5	—	—	FF165																																																																																																																																																																																																																																																																																																																																																																														
		—	0.75									293.5	253.5		113.5		6204ZZC3																	6204ZZC3	6204ZZC3	6204ZZC3	16.5	—	—																																																																																																																																																																																																																																																																																																																																																																																	
	FF165	1.5	1.5	0.75	90L		202	—	88.5	—	—	323	273	50	G3/4 (22)	132.5	125.5	168		165	130	200	3.5	10	4	12	50	40	0.5	24	8	7	4	6205C3	6205C3	6205C3	6205C3	19.5	23	19.5	FF165																																																																																																																																																																																																																																																																																																																																																																															
		2.2	—	352								302	6205C3		6205C3																			6205C3	6205C3	24	—	—																																																																																																																																																																																																																																																																																																																																																																																		
	FF215	—	2.2	—	100L		202	122	98	37.5	224	371	311	60	G3/4 (22)	132.5	163.5	168		215	180	250	4	16	4	14.5	60	45	0.5	28	8	7	4	—	—	6206C3	6205C3	—	33	—	FF215																																																																																																																																																																																																																																																																																																																																																																															
		—	—	400								340	6206C3		6205C3																			—	—	36																																																																																																																																																																																																																																																																																																																																																																																				
	Up to 11kW IKKH3- FCKLAW21E	FF215	3.7	3.7	—	112M		243	134	110	47	228.5	386	326	60	G3/4 (22)	151.5	172	187		215	180	250	4	13	4	14.5	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	36	42	—	FF215																																																																																																																																																																																																																																																																																																																																																																														
			—	—	419								359	6207C3		6206C3																			6207C3	6206C3	—	—	48																																																																																																																																																																																																																																																																																																																																																																																	
	15kW and over TKKH3- FCKLAW21E	FF265	5.5	5.5	3.7	132S	2	285	155	130	61	252.5	449.5	369.5	80	G1 1/2 (42)	201.5	133	263		265	230	300	4	12	4	14.5	80	63	0.5	38	10	8	5	6308C3	6208C3	6308C3	6208C3	59	63	64	63	FF265																																																																																																																																																																																																																																																																																																																																																																													
			7.5													6308C3																			6208C3	6308C3			6208C3	6308C3	6208C3	6308C3		6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3	6308C3	6208C3

- (1) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); $\phi 19-28\text{mm}$: j6, $\phi 38-48\text{mm}$: k6, $\phi 55\text{mm}$ or longer: m6.
(2) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
(3) Tolerance of LB dimensions is JIS B 0401: j6.
(4) Sealed ball bearings (enclosed grease type) are equipped as standard.
(5) Motors of frame size 90L or less are not equipped with eye bolts.

Indoor Use/
Totally Enclosed
Fan Cooled/
Cast Iron Frame/
Foot-Mounted
0.75kW-18.5kW

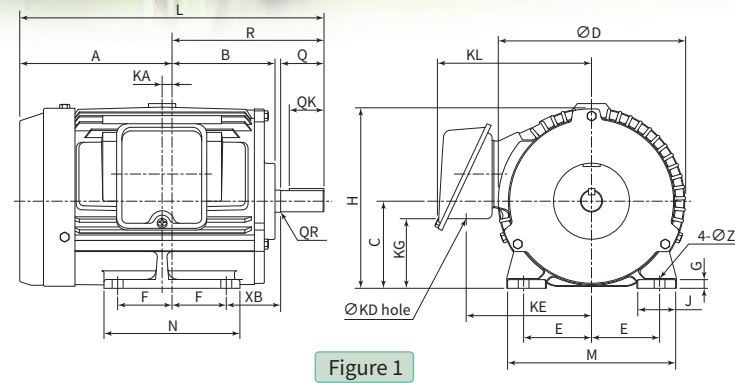


Figure 1

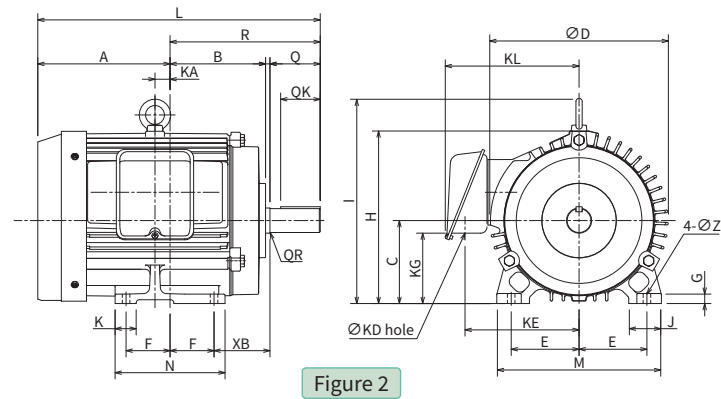
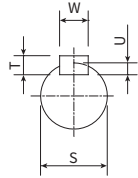


Figure 2

Common Shaft End



Type & Form	Frame Size	Output (kW)			Figure No.	Dimensions (mm)																				Bearing No.				Approx. Weight (kg)			Frame Size															
		2-Pole	4-Pole	6-Pole		A	B	C	D	E	F	G	H	I	J	K	L	M	N	R	Z	XB		JK	EA	EL	Terminal Box							Shaft End								2-Pole		4-Pole and over		2-Pole	4-Pole	6-Pole
																											KA	KD	KE	KG	KL	Q		QK	QR	S	W	T	U	Load Side	Anti-load Side	Load Side	Anti-load Side					
Up to 3.7kW IKH3- FCK21E/ FBK21E	80M	0.75	—	—	1	140	95	80	173	62.5	50	8	166	—	35	—	280	155	125	140	10	50		3	—	—	9	22	115.5	64	142	40	32	0.5	19	6	6	3.5	6204ZZC3	6204ZZC3	—	—	14	—	—	80M		
		—	0.75			—	—	154.5	113.5	90	202	70	62.5	10	190	232	38	31	323	172	149	168.5	10	56		5	17.5	—	17.5	27	129.5	79	156	50	40	0.5	24	8	7	4	6205C3	6205C3	6205C3	6205C3	27 31	30	27	90L
Up to 11kW IKKH3- FCK21E/ FBK21E	90L	1.5	1.5	0.75	2	178	128	100	202	80	70	12	200	242	38	32	371	196	168	193	12	63		5	22	—	22	27	129.5	79	156	60	45	0.5	28	8	7	4	—	—	6206C3	6205C3	—	—	40	—	—	100L
		2.2	—	1.5		207	134	112	243	95	70	12	232	274	40	36	400	220	168	200	12	70		5	23	—	23	27	145.5	101	172	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	48 —	54 —	43 60	112M		
15kW and over TKKH3- FCK21E/ FBK21E	112M	3.7	3.7	—	2	186	134	112	243	95	70	12	232	274	40	36	386	220	168	200	12	70		5	23	—	23	27	145.5	101	172	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	75 79	80	79	132S		
		—	—	2.2		219	134	112	243	95	70	12	232	274	40	36	419	220	168	200	12	70		5	23	—	23	27	145.5	101	172	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	—	—	60	112M		
	132S	5.5	5.5	3.7		210.5	152	132	285	108	70	15	274	325	50	33.5	449.5	260	175	239	12	89		5	24	—	24	35	181.5	112	212	80	63	0.5	38	10	8	5	6308C3	6208C3	6308C3	6208C3	—	—	79	132S		
	132M	—	7.5	5.5		229.5	171	132	285	108	89	15	274	325	50	33.5	487.5	260	213	258	12	89		5	24	—	24	35	181.5	112	212	80	63	0.5	38	10	8	5	—	—	—	95	98	132M				
	160M	11	11	7.5	2	280	206	160	324	127	105	18	322	373	60	60	603	308	250	323	14.5	108		5	—	—	—	52	226.5	120	279.5	110	90	2	42	12	8	5	6310C3	6208C3	6310C3	6208C3	124 135	134	128	160M		
		15	—	—		268	228	160	324	127	127	18	322	373	60	60	613	308	294	345	14.5	108		5	—	—	—	52	226.5	120	282	110	90	2	42	12	8	5	—	—	158	161	158	160L				

(1) Tolerance of C dimensions is 0 ~ -0.5. (2) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); $\phi 19-28\text{mm}$: j6, $\phi 38-48\text{mm}$: k6, $\phi 55\text{mm}$ or longer: m6.
(3) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
(4) Standard drive systems are as follows: 2-Pole: direct driven, 4-Pole: belt-driven. Please contact us for further information about belt applications.
(5) Sealed ball bearings (enclosed grease type) are equipped as standard. (6) Motors of frame size 80M are not equipped with eye bolts.

Indoor Use/
Totally Enclosed
Fan Cooled/
Cast Iron Frame/
Flange-Mounted
0.75kW-18.5kW

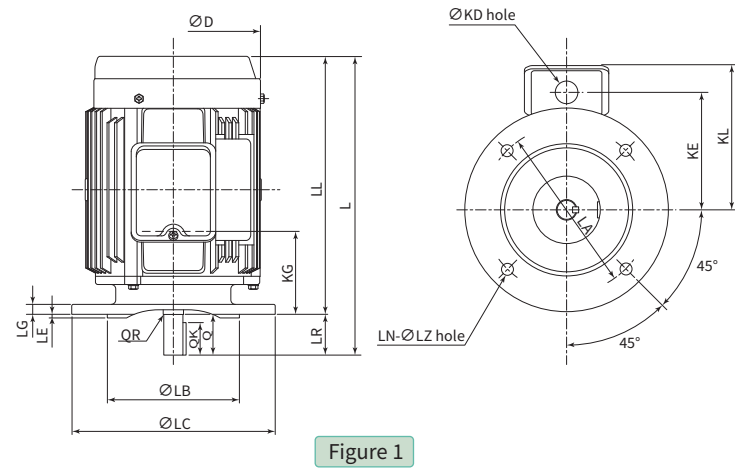


Figure 1

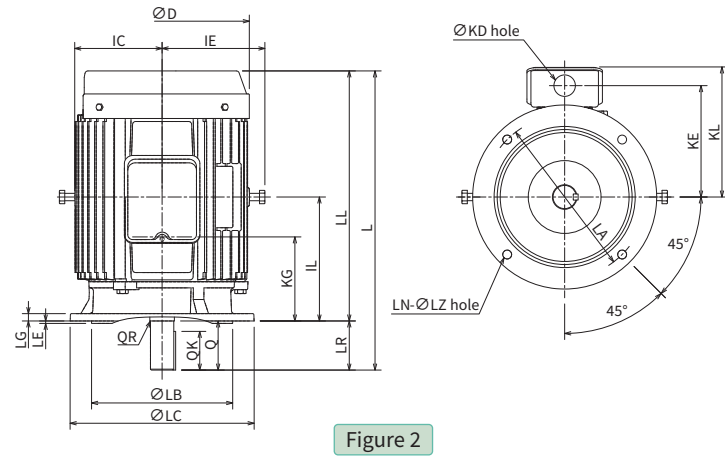
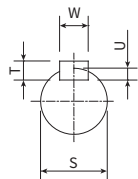


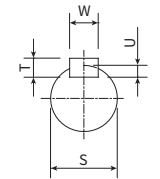
Figure 2

Common Shaft End



Type & Form	Flange No.	Output (kW)			Frame Size	Figure No.	Dimensions (mm)																					Bearing No.								Approx. Weight (kg)			Flange No.			
		2-Pole	4-Pole	6-Pole			D	IE	IC	IL	L	LL	LR	Terminal Box				Flange						Shaft End								2-Pole		4-Pole and over		2-Pole	4-Pole	6-Pole				
														KD	KE	KG	KL	LA	LB	LC	LE	LG	LN	LZ	Q	QK	QR	S	W	T	U	Load Side	Anti-load Side	Load Side	Anti-load Side							
Up to 3.7kW IKH3- FCKL21E	FF165	0.75	—	—	80M	1	172	—	—	—	293.5	253.5	40	22	115.5	81.5	142		165	130	200	3.5	10	4	12	40	32	0.5	19	6	6	3.5	6204ZZC3	6204ZC3	—	—	15.5	—	—	FF165		
		—	0.75																														—	—	—	—	6204ZC3	6204ZC3	—		—	19.5
Up to 11kW IKKH3- FCKL21E	FF165	1.5	1.5	0.75	90L	2	202	124.5	100.5	136	323	273	50	27	129.5	95	156		165	130	200	3.5	10	4	12	50	40	0.5	24	8	7	4	6205C3	6205C3	6205C3	6205C3	28	31	28	FF165		
		2.2	—	—							352	302																					32	32	32	—	—					
Up to 11kW IKKH3- FCKL21E	FF215	—	2.2	—	100L	2	202	124.5	100.5	155	371	311	60	27	129.5	114	156		215	180	250	4	16	4	14.5	60	45	0.5	28	8	7	4	—	—	6206C3	6205C3	—	42	—	FF215		
		—	—	1.5							400	340																					—	—	45							
Up to 11kW IKKH3- FCKL21E	FF215	3.7	3.7	—	112M	2	243	144.5	120.5	163	386	326	60	27	145.5	122	172		215	180	250	4	13	4	14.5	60	45	1.5	28	8	7	4	6207C3	6206C3	6207C3	6206C3	50	56	—	FF215		
		—	—	2.2							419	359																					—	—	62							
15kW and over TKKH3- FCKL21E	FF265	5.5	5.5	3.7	132S	2	285	167.5	142.5	183	449.5	369.5	80	35	181.5	118	212		265	230	300	4	12	4	14.5	80	63	0.5	38	10	8	5	6308C3	6208C3	6308C3	6208C3	76	81	80	FF265		
	7.5	132M			285		167.5	142.5	202	487.5	407.5	80	35	181.5	137	212		265	230	300	4	12	4	14.5	80	63	0.5	38	10	8	5	—	—	80			96	99	FF265			
	FF265	—	7.5	5.5	132M		285	167.5	142.5	202	487.5	407.5	80	35	181.5	137	212		265	230	300	4	12	4	14.5	80	63	0.5	38	10	8	5	—	—	—	—	—	—	FF265			
	FF300	11	11	7.5	160M		324	187	162	213	603	493	110	52	226.5	123	279.5		300	250	350	5	14	4	18.5	110	90	2	42	12	8	5	6310C3	6208C3	6310C3	6208C3	131	142	141	135	FF300	
15kW and over TKKH3- FCKL21E	FF300	18.5	15	11	160L	2	324	187	162	235	613	503	110	52	226.5	145	279.5		300	250	350	5	14	4	18.5	110	90	2	42	12	8	5			6310C3	6208C3	6310C3	6208C3	161	164	161	FF300

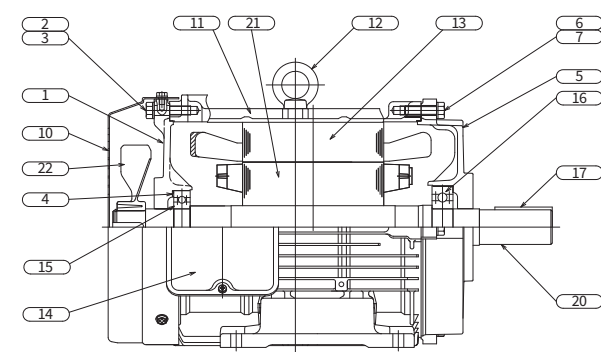
(1) Tolerance of S is stipulated by JIS B 0401 (dimensional tolerance and fit); $\phi 19-28\text{mm}$: j6, $\phi 38-48\text{mm}$: k6, $\phi 55\text{mm}$ or longer: m6.
(2) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
(3) Tolerance of LB dimensions is JIS B 0401: j6. (4) Sealed ball bearings (enclosed grease type) are equipped as standard. (5) Motors of frame size 80M are not equipped with eye bolts.



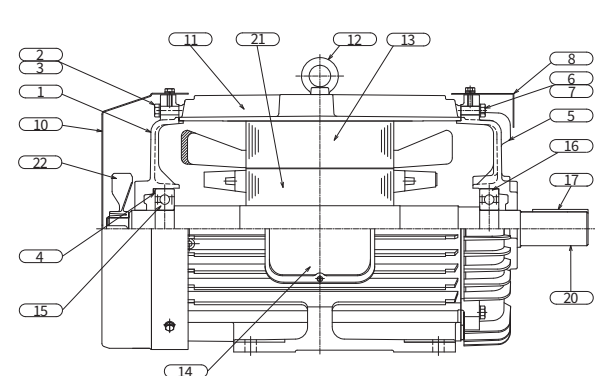
- (1) Tolerance of C dimensions is 0 – -0.5.
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- (3) Shaft end key and keyway conform with the parallel key and keyway of JIS B 1301. Dimensional deviation of the keyway is standard type (N9).
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- (5) Sealed ball bearings (enclosed grease type) are equipped as standard.
- (6) Motors of frame size 80M are not equipped with eye bolts.

Structural Drawings

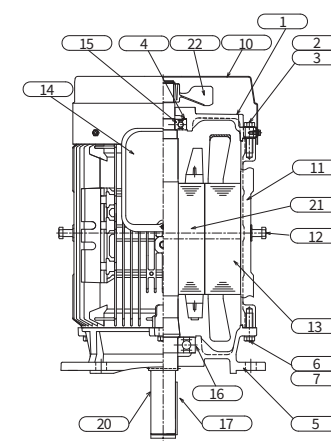
① Indoor Use/Aluminum Frame
Foot-Mounted/Horizontal Shaft (Fr.80M-160L)



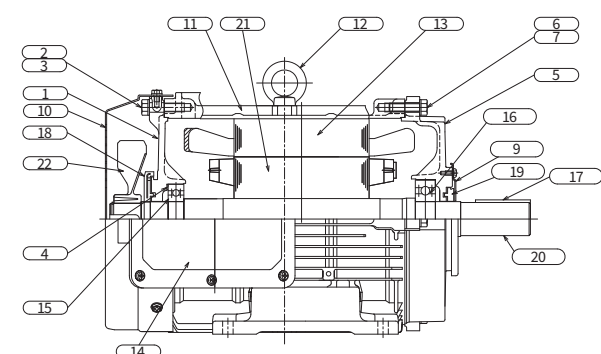
② Indoor Use/Cast Iron Frame
Foot-Mounted/Horizontal Shaft (Fr.180M-Fr.225S)



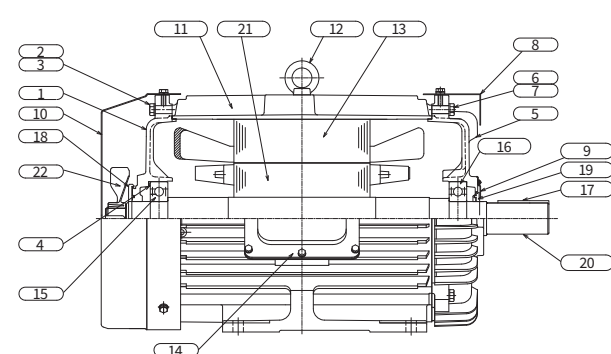
③ Indoor Use/Aluminum Frame
Flange-Mounted/Shaft Down (Fr.80M-160L)



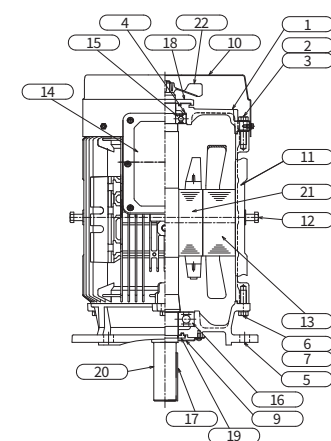
④ Outdoor Use/Aluminum Frame
Foot-Mounted/Horizontal Shaft (Fr.80M-160L)



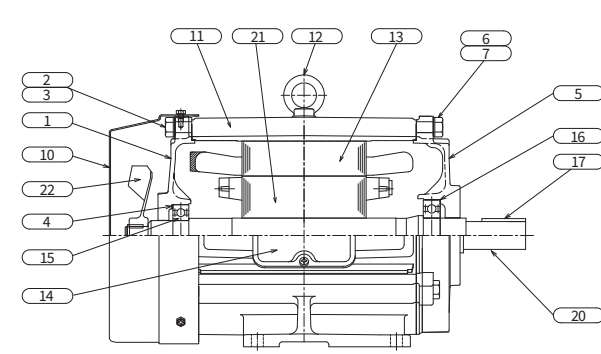
⑤ Outdoor Use/Cast Iron Frame
Foot-Mounted/Horizontal Shaft (Fr.180M-225S)



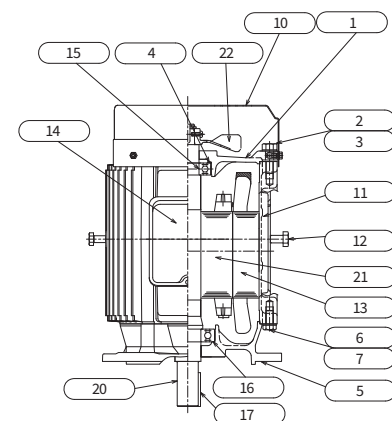
⑥ Outdoor Use/Aluminum Frame
Flange-Mounted/Shaft Down (Fr.80M-160L)



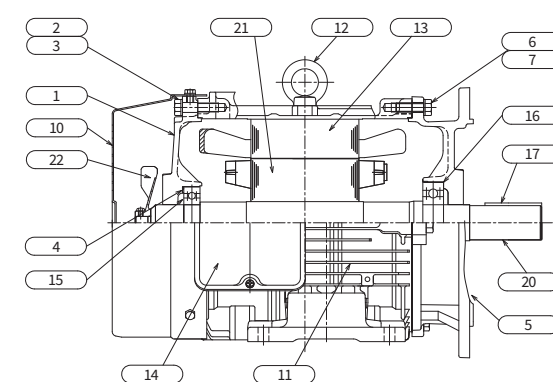
⑦ Indoor Use/Cast Iron Frame
Foot-Mounted/Horizontal Shaft (Fr.80M-160L)



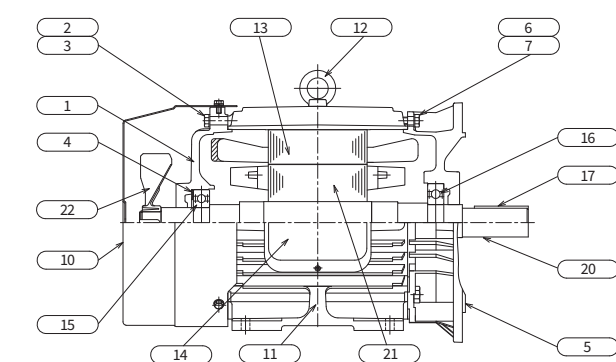
⑧ Indoor Use/Cast Iron Frame
Flange-Mounted/Shaft Down (Fr.80M-160L)



⑨ Indoor Use/Aluminum Frame
Foot-Mounted Flange/Horizontal Shaft (Fr.80M-160L)



⑩ Indoor Use/Cast Iron Frame
Foot-Mounted Flange/Horizontal Shaft (Fr.180M-225S)



Parts Number	Parts Name	Parts Number	Parts Name
1	Bearing bracket	14	Terminal box
2	Hexagon bolt	15	Bearing
3	Flat washer	16	Bearing
4	Preload spring washer	17	Shaft end key
5	Bearing bracket	18	Labyrinth collar
6	Hexagon bolt	19	Labyrinth collar
7	Flat washer	20	Shaft
8	Baffle plate	21	Rotor core
9	Cover	22	Cooling fan
10	Fan cover	23	Hexagon nut
11	Stator frame	24	Support plate
12	Eye bolt or hook	25	Cross-recessed pan head screw
13	Stator core		

Dimensions of Standard Terminal Box

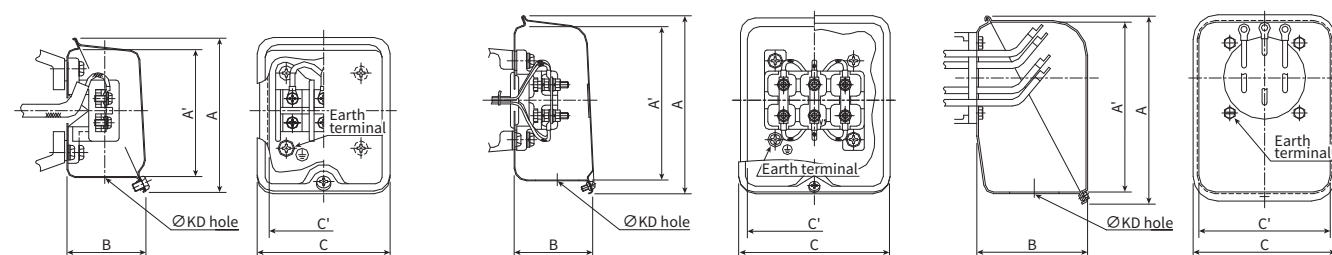


Figure 1

Figure 2

Figure 3

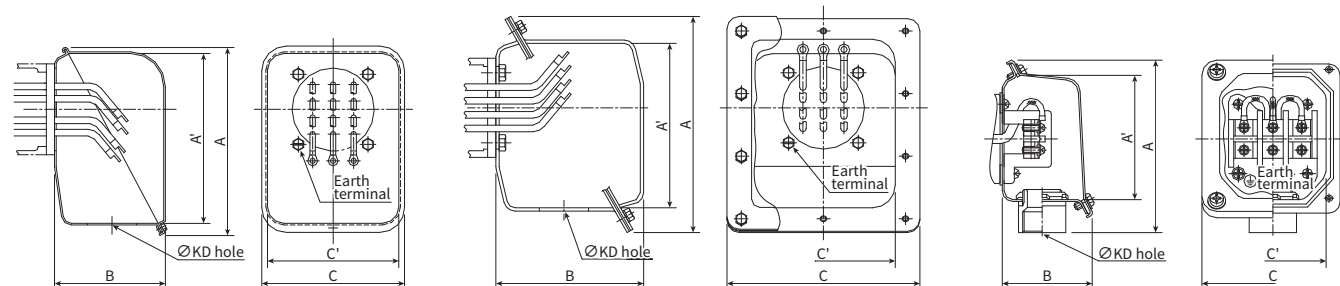


Figure 4

Figure 5

Figure 6

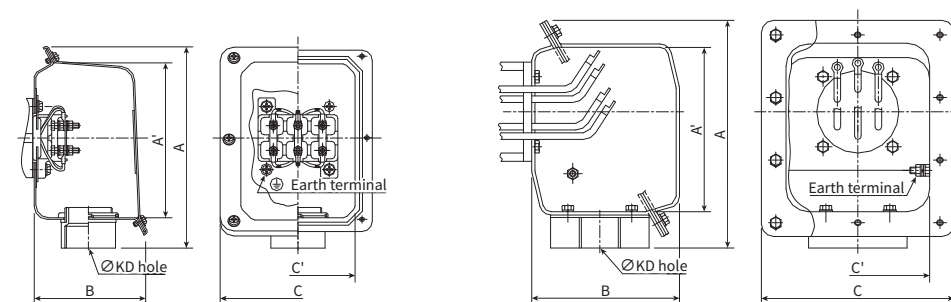


Figure 7

Figure 8

Indoor Use

Frame Size	Figure No.	Standard Dimensions (mm)						Earth Terminal Screw Size	Terminal Block Screw/Crimp Terminal Size	
		A	A'	B	C	C'	ØKD		200V Class	400V Class
80M~112M	1	97	80	50	83	68	22,27	M5	M4	
132S,M	2	143	125	65	123	108	35	M6	M5	
160M,L	2	173	150	112	142	123	52	M6	M5	
180M	3	225.5	203.5	135	174	160	91	M8	M6	
180L	3,4	225.5	203.5	135	174	160	91	M8	M6	
200L									M8	※
225S	5	263	201	180	235	175	91	M8	M8	※

※200V/400V dual class models use M8, 400V class custom-made models use M6.

Outdoor Use

Frame Size	Figure No.	Standard Dimensions (mm)						Earth Terminal Screw Size	Terminal Block Screw/Crimp Terminal Size	
		A	A'	B	C	C'	ØKD		200V Class	400V Class
80M~112M	6	116	83	62	96	72	G3/4 (22)	M5	M4	
132S~160L	7	203	155	116	158	116	G1 1/2 (42)	M6	M5	
180M,180L	8	278	201	180	235	175	G3 (82)	M8	M6	
200L,225S									M8	※

※200V/400V dual class models use M8, 400V class custom-made models use M6.

Wiring

1. Please comply with electrical installation technical standards, interior wiring regulations, and regulations set by power companies.

In particular, if the wiring distance is too long, voltage will drop significantly and motors may not start.

Please ensure the voltage drop in wiring is kept within 2%.

2. Standard motor lead wire connections are shown below.

No. of Terminals for Lead Wire		Lead Wire Connection Method												
3	Frame Size 80M-112M													
	Direct on-line (DOL) starting Internal wiring Power supply													
6	Frame Size 132S-160L		Frame Size 180M and over											
	Short-circuit plate Power supply Power supply Internal wiring Direct on-line (DOL) starting Star-delta starting Caution: Remove the short-circuit plate when connecting to a star-delta starter. (6P-3.7kW uses DOL starting.)		Star-delta starting Direct on-line (DOL) starting To star-delta starter To power supply											
12	200V/400V Dual Class Models													
	<table><tr><th colspan="2">Direct on-line (DOL) Starting</th><th colspan="2">Star-delta Starting</th></tr><tr><th>200V Class</th><th>400V Class</th><th>200V Class</th><th>400V Class</th></tr><tr><td> Power supply </td><td> Power supply </td><td> Star-delta starter Star-delta starter </td><td> Star-delta starter Star-delta starter </td></tr></table> ○ V₄ ○ V₂ ○ U₃ ○ U₁ ○ W₄ ○ W₂ ○ V₃ ○ V₁ ○ U₄ ○ U₂ ○ W₃ ○ W₁ Terminal Markings (Lead wire lead-out section)			Direct on-line (DOL) Starting		Star-delta Starting		200V Class	400V Class	200V Class	400V Class	Power supply	Power supply	Star-delta starter Star-delta starter
Direct on-line (DOL) Starting		Star-delta Starting												
200V Class	400V Class	200V Class	400V Class											
Power supply	Power supply	Star-delta starter Star-delta starter	Star-delta starter Star-delta starter											

3. Precautions for Use of Star-delta Starting

When using the two-contactor method during star-delta starting, please ensure to turn off the power switch at the mains.

If the power switch is on, the motor will continue to be supplied with voltage, which may cause deterioration of the motor's insulation or burnout.

This will not occur when using the three-contactor method. Therefore, the three-contactor method is strongly recommended.

Electrical Characteristics (2-Pole)

200V

Output [kW]	Voltage [V]	Frequency [Hz]	Rated Current [A]	Rated Rotational Speed [min ⁻¹]	Load Characteristics									Starting Current [A]	Starting Torque [%]	Maximum Torque [%]	Efficiency Level (IE Code)
					50% Load			75% Load			100% Load						
					Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Energy Consumption Efficiency[%]	Power Factor [%]				
0.75	200	50	3.20	2870	2.05	79.6	66.5	2.51	81.4	79.5	3.09	80.8	86.7	20.4	229	301	IE3
	200	60	3.00	3445	1.75	81.4	75.9	2.29	82.7	85.8	2.94	81.6	90.3	19.0	185	246	
	220	60	2.80	3480	1.80	81.1	67.5	2.23	83.3	79.5	2.75	83.2	86.1	20.9	224	298	
	230	60	2.80	3490	1.85	80.1	63.5	2.23	83.0	76.3	2.69	83.5	83.7	21.9	245	325	
1.5	200	50	6.00	2890	3.47	88.2	70.7	4.57	87.4	81.4	5.81	86.4	86.3	46.0	285	358	IE3
	200	60	5.80	3460	3.16	86.5	79.2	4.35	86.6	86.2	5.68	85.5	89.2	40.0	224	300	
	220	60	5.40	3485	3.13	86.1	73.0	4.12	87.1	82.2	5.25	86.4	86.7	44.0	271	363	
	230	60	5.20	3495	3.16	85.7	69.5	4.06	87.1	79.8	5.10	86.8	85.2	46.0	296	397	
2.2	200	50	8.60	2875	4.96	89.5	71.6	6.55	89.1	81.7	8.42	87.3	86.4	76.6	330	309	IE3
	200	60	8.40	3445	4.48	89.1	79.5	6.23	88.4	86.5	8.21	86.6	89.4	68.0	260	262	
	220	60	7.60	3480	4.41	89.0	73.5	5.86	89.3	82.7	7.49	88.4	87.2	74.8	315	317	
	230	60	7.40	3495	4.44	88.5	70.3	5.76	89.2	80.5	7.26	88.7	85.7	78.2	344	346	
3.7	200	50	13.6	2910	7.42	90.1	79.8	10.2	89.9	87.7	13.2	88.7	91.4	112	244	336	IE3
	200	60	13.2	3490	6.84	90.2	86.6	9.73	89.9	91.6	12.9	88.6	93.4	96.0	197	277	
	220	60	12.2	3515	6.61	90.4	81.3	9.08	90.7	88.4	11.8	90.0	91.5	106	238	335	
	230	60	11.8	3525	6.59	90.0	78.3	8.87	90.6	86.6	11.4	90.2	90.3	110	261	366	
5.5	200	50	20.4	2920	11.3	90.9	77.5	15.3	90.8	85.6	19.8	90.0	89.2	146	282	347	IE3
	200	60	19.8	3500	10.3	90.5	84.8	14.7	90.3	89.9	19.3	89.5	91.8	123	223	277	
	220	60	18.2	3520	10.1	90.7	78.9	13.7	90.9	87.0	17.7	90.7	90.1	135	270	335	
	230	60	17.6	3530	10.0	90.2	76.2	13.4	90.7	85.3	17.1	90.8	89.0	141	295	366	
7.5	200	50	28.2	2920	16.5	91.3	71.7	21.7	91.4	81.8	27.6	90.7	86.5	218	334	398	IE3
	200	60	27.0	3505	14.3	91.7	82.6	20.0	91.6	88.8	26.3	90.7	90.8	181	269	326	
	220	60	25.0	3525	14.2	91.3	75.9	19.0	91.8	84.6	24.3	91.5	88.5	199	325	394	
	230	60	24.4	3535	14.4	90.7	71.9	18.8	91.5	82.0	23.7	91.5	86.8	208	356	431	
11	200	50	41.0	2940	22.9	91.9	75.4	30.7	92.2	84.3	39.3	91.9	87.9	282	243	326	IE3
	200	60	40.2	3520	20.7	91.4	83.8	29.2	91.6	89.1	38.5	91.0	90.7	236	202	270	
	220	60	36.8	3540	20.2	91.5	78.1	27.3	92.2	85.9	35.4	92.1	88.5	260	244	327	
	230	60	35.6	3545	20.2	91.1	75.0	26.7	92.1	84.1	34.3	92.2	87.4	271	267	357	
15	200	50	56.0	2940	32.3	92.4	72.5	42.8	92.7	81.9	54.5	92.2	86.2	438	268	377	IE3
	200	60	53.8	3525	28.3	92.2	83.1	39.6	92.5	88.6	52.1	92.0	90.4	364	220	311	
	220	60	49.8	3540	27.8	92.1	76.8	37.5	92.8	84.9	48.2	92.6	88.2	400	266	376	
	230	60	48.2	3550	28.2	91.7	72.8	37.1	92.6	82.2	47.0	92.6	86.5	419	291	411	
18.5	200	50	68.8	2940	39.0	92.8	73.8	52.3	93.2	82.3	67.0	92.6	86.1	580	300	410	IE3
	200	60	66.8	3525	34.9	92.0	83.3	49.3	92.4	88.0	65.0	91.7	89.6	490	245	334	
	220	60	61.4	3540	34.0	91.9	77.7	46.3	92.7	84.8	59.8	92.5	87.8	539	296	404	
	230	60	59.4	3550	34.3	91.5	74.0	45.6	92.5	82.5	58.2	92.5	86.3	564	324	442	
22	200	50	81.4	2960	47.3	92.7	72.5	62.4	93.5	81.7	79.2	93.3	85.9	752	260	390	IE3
	200	60	78.2	3550	41.8	92.6	82.0	58.2	93.2	87.7	76.1	92.9	89.8	640	219	320	
	220	60	72.4	3560	41.0	92.6	76.1	55.2	93.6	83.9	70.5	93.6	87.5	704	265	387	
	230	60	69.4	3560	41.4	92.2	72.3	54.5	93.4	81.4	68.7	93.5	85.9	736	290	423	
30	200	50	116	2970	75.2	92.2	62.4	93.1	93.5	74.7	114	93.8	81.2	1260	315	471	IE3
	200	60	105	3560	59.1	92.8	78.9	80.2	93.7	86.4	103	93.7	89.7	1040	256	383	
	220	60	98.0	3570	61.0	92.3	70.0	78.7	93.6	80.1	98.1	93.9	85.4	1144	310	463	
	230	60	96.0	3580	64.8	91.7	63.4	80.6	93.4	75.0	98.3	94.0	81.5	1196	339	507	
37	200	50	136	2965	81.6	93.4	70.1	107	94.1	79.7	135	94.1	84.3	1310	336	409	IE3
	200	60	130	3560	72.2	92.8	79.6	99.0	93.7	86.4	128	93.7	88.9	1090	286	330	
	220	60	121	3565	71.7	92.6	73.1	94.5	93.8	82.2	120	94.0	86.2	1199	346	399	
	230	60	118	3575	72.8	92.3	69.1	93.7	93.6	79.4	117	93.9	84.2	1254	378	436	
45	200	50	167	2965	100	93.1	69.8	131	94.0	79.2	165	94.0	83.7	1710	283	351	IE3
	200	60	158	3555	86.6	92.8	80.8	120	93.7	86.6	156	93.7	88.8	1420	241	286	
	220	60	147	3565	86.0	92.6	74.2	114	93.9	82.4	146	94.2	86.1	1562	292	346	
	230	60	143	3575	87.4	92.3	70.0	113	93.8	79.9	143	94.2	84.0	1633	319	378	
55	200	50	198	2965	113	94.1	74.6	151	94.8	83.0	193	94.8	86.6	1800	272	364	IE3
	200	60	192	3560	103	93.4	82.8	143	94.3	88.1	188	94.3	89.8	1550	237	297	
	220	60	178	3565	99.2	93.3	77.9	135	94.4	85.0	173	94.7	88.0	1705	287	359	
	230	60	173	3565	96.5	93.4	76.6	130	94.4	84.6	165	94.7	88.2	1783	313	393	

400V

Output [kW]	Voltage [V]	Frequency [Hz]	Rated Current [A]	Rated Rotational Speed [min ⁻¹]	Load Characteristics									Starting Current [A]	Starting Torque [%]	Maximum Torque [%]	Efficiency Level (IE Code)
					50% Load			75% Load			100% Load						
					Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Energy Consumption Efficiency[%]	Power Factor [%]				
0.75	400	50	1.60	2870	1.02	79.6	66.5	1.25	81.4	79.5	1.55	80.8	86.7	10.2	229	301	IE3
	400	60	1.50	3445	0.88	81.4	75.9	1.15	82.7	85.8	1.47	81.6	90.3	9.50	185	246	
	440	60	1.40	3480	0.90	81.1	67.5	1.12	83.3	79.5	1.37	83.2	86.1	10.5	224	298	
	460	60	1.40	3490	0.93	80.1	63.5	1.12	83.0	76.3	1.35	83.5	83.7	10.9	245	325	
1.5	400	50	3.00	2890	1.74	88.2	70.7	2.28	87.4	81.4	2.90	86.4	86.3	23.0	285	358	IE3
	400	60	2.90	3460	1.58	86.5	79.2	2.17	86.6	86.2	2.84	85.5	89.2	20.0	224	300	
	440	60	2.70	3485	1.57	86.1	73.0	2.06	87.1	82.2	2.63	86.4	86.7	22.0	271	363	
	460	60	2.60	3495	1.58	85.7	69.5	2.03	87.1	79.8	2.55	86.8	85.2	23.0	296	397	
2.2	400	50	4.30	2875	2.48	89.5	71.6	3.27	89.1	81.7	4.21	87.3	86.4	38.3	330	309	IE3
	400	60	4.20	3445	2.24	89.1	79.5	3.12	88.4	86.5	4.11	86.6	89.4	34.0	260	262	
	440	60	3.80	3480	2.21	89.0	73.5	2.93	89.3	82.7	3.75	88.4	87.2	37.4	315	317	
	460	60	3.70	3495	2.22	88.5	70.3	2.88	89.2	80.5	3.63	88.7	85.7	39.1	344	346	
3.7	400	50	6.80	2910	3.71	90.1	79.8	5.08	89.9	87.7	6.59	88.7	91.4	56.0	244	336	IE3
	400	60	6.60	3490	3.42	90.2	86.6	4.87	89.9	91.6	6.46	88.6	93.4	48.0	197	277	
	440	60	6.10	3515	3.30	90.4	81.3	4.54	90.7	88.4	5.89	90.0	91.5	52.8	238	335	
	460	60	5.90	3525	3.30	90.0	78.3	4.44	90.6	86.6	5.70	90.2	90.3	55.2	261	366	
5.5	400	50	10.2	2920	5.64	90.9	77.5	7.67	90.8	85.6	9.89	90.0	89.2	73.0	282	347	IE3
	400	60	9.90	3500	5.17	90.5	84.8	7.33	90.3	89.9	9.66	89.5	91.8	61.5	223	277	
	440	60	9.10	3520	5.04	90.7	78.9	6.85	90.9	87.0	8.83	90.7	90.1	67.7	270	335	
	460	60	8.80	3530	5.02	90.2	76.2	6.69	90.7	85.3	8.55	90.8	89.0	70.7	295	366	
7.5	400	50	14.1	2920	8.26	91.3	71.7	10.9	91.4	81.8	13.8	90.7	86.5	109	334	398	IE3
	400	60	13.5	3505	7.15	91.7	82.6	9.98	91.6	88.8	13.1	90.7	90.8	90.5	269	326	
	440	60	12.5	3525	7.10	91.3	75.9	9.50	91.8	84.6	12.2	91.5	88.5	99.6	325	394	
	460	60	12.2	3535	7.22	90.7	71.9	9.41	91.5	82.0	11.9	91.5	86.8	104	356	431	
11	400	50	20.5	2940	11.5	91.9	75.4	15.3	92.2	84.3	19.7	91.9	87.9	141	243	326	IE3
	400	60	20.1	3520	10.4	91.4	83.8	14.6	91.6	89.1	19.2	91.0	90.7	118	202	270	
	440	60	18.4	3540	10.1	91.5	78.1	13.7	92.2	85.9	17.7	92.1	88.5	130	244	327	
	460	60	17.8	3545	10.1	91.1	75.0	13.4	92.1	84.1	17.1	92.2	87.4	136	267	357	
15	400	50	28.0	2940	16.2	92.4	72.5	21.4	92.7	81.9	27.2	92.2	86.2	219	268	377	IE3
	400	60	26.9	3525	14.1	92.2	83.1	19.8	92.5	88.6	26.0	92.0	90.4	182	220	311	
	440	60	24.9	3540	13.9	92.1	76.8	18.8	92.8	84.9	24.1	92.6	88.2	200	266	376	
	460	60	24.1	3550	14.1	91.7	72.8	18.5	92.6	82.2	23.5	92.6	86.5	209	291	411	
18.5	400	50	34.4	2940	19.5	92.8	73.8	26.1	93.2	82.3	33.5	92.6	86.1	290	300	410	IE3
	400	60	33.4	3525	17.4	92.0	83.3	24.6	92.4	88.0	32.5	91.7	89.6	245	245	334	
	440	60	30.7	3540	17.0	91.9	77.7	23.2	92.7	84.8	29.9	92.5	87.8	270	296	404	
	460	60	29.7	3550	17.2	91.5	74.0	22.8	92.5	82.5	29.1	92.5	86.3	282	324	442	
22	400	50	40.7	2960	23.6	92.7	72.5	31.2	93.5	81.7	39.6	93.3	85.9	376	260	390	IE3
	400	60	39.1	3550	20.9	92.6	82.0	29.1	93.2	87.7	38.0	92.9	89.8	320	219	320	
	440	60	36.2	3560	20.5	92.6	76.1	27.6	93.6	83.9	35.3	93.6	87.5	352	265	387	
	460	60	34.7	3560	20.7	92.2	72.3	27.3	93.4	81.4	34.4	93.5	85.9	368	290	423	
30	400	50	58.0	2970	37.6	92.2	62.4	46.5	93.5	74.7	56.9	93.8	81.2	630	315	471	IE3
	400	60	52.5	3560	29.6	92.8	78.9	40.1	93.7	86.4	51.5	93.7	89.7	520	256	383	
	440	60	49.0	3570	30.5	92.3	70.0	39.4	93.6	80.1	49.1	93.9	85.4	572	310	463	
	460	60	48.0	3580	32.4	91.7	63.4	40.3	93.4	75.0	49.1	94.0	81.5	598	339	507	
37	400	50	68.0	2965	40.8	93.4	70.1	53.4	94.1	79.7	67.3	94.1	84.3	655	336	409	IE3
	400	60	65.0	3560	36.1	92.8	79.6	49.5	93.7	86.4	64.2	93.7	88.9	545	286	330	
	440	60	60.5	3565	35.8	92.6	73.1	47.2	93.8	82.2	59.9	94.0	86.2	600	346	399	
	460	60	59.0	3575	36.4	92.3	69.1	46.9	93.6	79.4	58.7	93.9	84.2	627	378	436	
45	400	50	83.5	2965	50.0	93.1	69.8	65.4	94.0	79.2	82.5	94.0	83.7	855	283	351	IE3
	400	60	79.0	3555	43.3	92.8	80.8	60.0	93.7	86.6	78.0	93.7	88.8	710	241	286	
	440	60	73.5	3565	43.0	92.6	74.2	57.2	93.9	82.4	72.8	94.2	86.1	781	292	346	
	460	60	71.5	3575	43.7	92.3	70.0	56.5	93.8	79.9	71.4	94.2	84.0	817	319	378	
55	400	50	99.0	2965	56.5	94.1	74.6	75.7	94.8	83.0	96.7	94.8	86.6	900	272	364	IE3
	400	60	96.0	3560	51.3	93.4	82.8	71.7	94.3	88.1	93.8	94.3	89.8	775	237	297	
	440	60	89.0	3565	49.6	93.3	77.9	67.4	94.4	85.0	86.6	94.7	88.0	853	287	359	
	460	60	86.5	3565	48.3	93.4	76.6	64.8	94.4	84.6	82.7	94.7	88.2	892	313	393	



Electrical Characteristics (4-Pole)

200V

Output [kW]	Voltage [V]	Frequency [Hz]	Rated Current [A]	Rated Rotational Speed [min ⁻¹]	Load Characteristics									Starting Current [A]	Starting Torque [%]	Maximum Torque [%]	Efficiency Level (IE Code)
					50% Load			75% Load			100% Load						
					Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Energy Consumption Efficiency[%]	Power Factor [%]				
0.75	200	50	3.80	1440	2.81	81.4	47.2	3.21	83.2	60.8	3.71	83.4	70.0	27.3	398	499	IE3
	200	60	3.40	1730	2.34	84.9	54.6	2.79	85.9	67.7	3.36	85.5	75.5	23.8	312	412	
	220	60	3.40	1745	2.49	83.3	47.5	2.85	85.4	60.7	3.31	85.6	69.5	26.2	378	499	
	230	60	3.40	1745	2.58	82.4	44.3	2.89	85.1	57.4	3.29	85.7	66.9	27.4	413	545	
1.5	200	50	6.80	1445	4.62	85.7	54.7	5.52	86.7	67.8	6.65	86.0	75.8	46.6	275	319	IE3
	200	60	6.40	1740	3.82	87.5	64.7	4.89	87.8	75.6	6.16	86.6	81.2	41.0	215	270	
	220	60	6.00	1750	4.01	86.9	56.4	4.86	88.2	68.9	5.88	87.8	76.3	45.1	260	327	
	230	60	6.00	1755	4.19	85.9	52.3	4.94	87.8	65.2	5.84	87.8	73.4	47.2	284	357	
2.2	200	50	10.6	1460	7.88	86.4	46.7	9.02	88.3	59.8	10.4	88.6	69.1	96.0	410	475	IE3
	200	60	9.40	1755	6.17	88.6	58.0	7.54	89.8	70.3	9.15	89.7	77.4	81.0	325	386	
	220	60	9.20	1765	6.69	87.5	49.3	7.77	89.5	62.3	9.08	89.9	70.7	89.1	393	467	
	230	60	9.20	1770	7.08	86.6	45.0	8.03	89.1	57.9	9.18	89.9	66.9	93.2	430	510	
3.7	200	50	15.6	1460	10.3	88.9	58.2	12.6	89.8	70.8	15.3	89.4	77.9	134	320	415	IE3
	200	60	14.6	1755	8.55	90.1	69.4	11.2	90.4	79.2	14.2	89.6	83.6	118	259	358	
	220	60	13.8	1765	8.84	89.7	61.2	11.0	90.7	73.2	13.5	90.5	79.5	130	313	433	
	230	60	13.6	1765	9.24	88.8	56.6	11.2	90.3	69.1	13.4	90.4	76.6	136	343	473	
5.5	200	50	23.4	1465	15.8	89.9	55.9	19.0	91.0	69.0	22.8	90.8	76.6	200	340	403	IE3
	200	60	21.4	1760	12.9	91.4	67.1	16.6	92.1	77.7	21.0	91.7	82.6	166	279	328	
	220	60	20.6	1765	13.5	90.8	58.9	16.5	92.0	71.3	20.1	92.0	78.2	183	338	397	
	230	60	20.4	1770	14.1	90.1	54.3	16.8	91.7	67.3	20.0	92.0	74.9	191	369	434	
7.5	200	50	30.8	1460	20.1	90.8	59.3	24.7	91.6	71.7	30.2	91.2	78.6	264	345	411	IE3
	200	60	28.6	1755	16.7	92.0	70.5	22.0	92.3	80.0	28.0	91.7	84.2	218	280	330	
	220	60	27.4	1765	17.2	91.6	62.5	21.6	92.5	74.0	26.6	92.4	80.1	240	339	399	
	230	60	26.6	1770	17.7	91.1	58.2	21.7	92.3	70.4	26.3	92.4	77.5	251	370	436	
11	200	50	46.0	1475	30.7	91.2	56.8	37.2	92.2	69.5	44.9	92.1	76.7	365	316	370	IE3
	200	60	42.0	1770	24.5	92.1	70.2	32.3	92.7	79.5	41.0	92.4	83.7	302	257	309	
	220	60	40.0	1775	25.6	91.6	61.6	31.9	92.7	73.3	39.1	92.8	79.5	332	311	374	
	230	60	39.4	1775	26.7	91.0	56.7	32.4	92.5	69.1	38.9	92.8	76.4	347	340	409	
15	200	50	58.8	1470	37.1	92.8	63.0	46.6	93.4	74.6	57.8	93.1	80.4	484	331	388	IE3
	200	60	55.6	1760	31.3	93.3	74.1	42.2	93.5	82.3	54.4	93.0	85.6	408	268	322	
	220	60	52.0	1770	31.8	92.9	66.6	41.0	93.5	77.1	51.2	93.4	82.3	449	324	390	
	230	60	50.6	1775	32.6	92.5	62.4	41.0	93.4	73.8	50.3	93.5	80.0	469	354	426	
18.5	200	50	74.0	1475	47.9	92.6	60.2	59.1	93.4	72.6	72.0	93.4	79.4	668	276	381	IE3
	200	60	69.0	1770	40.1	93.2	71.3	52.8	93.8	80.9	67.0	93.6	85.1	524	193	325	
	220	60	65.0	1775	41.3	92.8	63.4	51.6	93.8	75.3	63.6	93.9	81.3	576	234	393	
	230	60	64.0	1780	42.0	92.4	59.8	51.2	93.7	72.5	62.2	94.0	79.4	603	255	430	
22	200	50	84.0	1470	50.6	93.6	67.1	65.1	93.8	78.0	81.9	93.3	83.1	696	252	336	IE3
	200	60	80.0	1760	44.3	94.3	75.9	60.4	94.3	83.6	78.5	93.6	86.5	574	185	290	
	220	60	75.0	1770	44.3	94.3	69.1	57.7	94.7	79.2	73.0	94.3	83.9	632	224	351	
	230	60	74.0	1775	44.7	93.8	65.9	56.9	94.5	77.0	71.0	94.3	82.4	660	245	384	
30	200	50	114	1470	70.9	93.9	65.0	89.9	94.4	76.5	112	94.1	82.1	1090	274	366	IE3
	200	60	108	1765	60.4	94.4	75.9	82.0	94.6	83.8	106	94.1	86.9	890	205	315	
	220	60	101	1770	61.1	94.3	68.3	78.9	94.9	78.9	99.2	94.8	83.7	980	248	382	
	230	60	99.0	1775	61.8	93.9	64.9	77.9	94.7	76.5	96.6	94.8	82.2	1024	271	417	
37	200	50	144	1480	90.2	93.3	63.5	114	94.2	74.7	141	94.2	80.7	1500	250	388	IE3
	200	60	132	1775	73.4	94.2	77.2	100	94.7	84.4	129	94.5	87.3	1200	219	319	
	220	60	124	1780	74.9	93.8	69.1	97.5	94.7	78.9	122	94.8	83.8	1320	265	386	
	230	60	122	1785	76.8	93.4	64.8	97.1	94.5	75.9	120	94.8	81.9	1380	290	422	
45	200	50	172	1480	106	94.1	65.0	135	94.9	76.2	168	94.8	81.7	1780	233	382	IE3
	200	60	159	1775	87.6	95.0	78.0	120	95.3	85.1	156	95.0	87.8	1440	190	323	
	220	60	150	1780	89.1	94.6	70.1	116	95.3	79.9	147	95.3	84.5	1584	230	391	
	230	60	147	1785	93.0	94.4	64.3	117	95.3	75.9	146	95.4	81.3	1656	251	427	
55	200	50	200	1480	119	95.2	70.2	156	95.7	80.0	197	95.5	84.5	1960	240	357	IE3
	200	60	192	1775	104	95.5	80.1	144	95.7	86.3	188	95.4	88.4	1540	173	309	
	220	60	178	1780	103	95.3	73.5	137	95.8	82.2	175	95.8	86.1	1694	209	374	
	230	60	176	1780	105	95.1	69.2	136	95.8	79.5	171	95.9	84.1	1771	229	409	

400V

Output [kW]	Voltage [V]	Frequency [Hz]	Rated Current [A]	Rated Rotational Speed [min ⁻¹]	Load Characteristics									Starting Current [A]	Starting Torque [%]	Maximum Torque [%]	Efficiency Level (IE Code)
					50% Load			75% Load			100% Load						
					Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Energy Consumption Efficiency[%]	Power Factor [%]				
0.75	400	50	1.90	1440	1.41	81.4	47.2	1.60	83.2	60.8	1.85	83.4	70.0	13.7	398	499	IE3
	400	60	1.70	1730	1.17	84.9	54.6	1.40	85.9	67.7	1.68	85.5	75.5	11.9	312	412	
	440	60	1.70	1745	1.24	83.3	47.5	1.43	85.4	60.7	1.66	85.6	69.5	13.1	378	499	
	460	60	1.70	1745	1.29	82.4	44.3	1.45	85.1	57.4	1.64	85.7	66.9	13.7	413	545	
1.5	400	50	3.40	1445	2.31	85.7	54.7	2.76	86.7	67.8	3.32	86.0	75.8	23.3	275	319	IE3
	400	60	3.20	1740	1.91	87.5	64.7	2.45	87.8	75.6	3.08	86.6	81.2	20.5	215	270	
	440	60	3.00	1750	2.01	86.9	56.4	2.43	88.2	68.9	2.94	87.8	76.3	22.6	260	327	
	460	60	3.00	1755	2.10	85.9	52.3	2.47	87.8	65.2	2.92	87.8	73.4	23.6	284	357	
2.2	400	50	5.30	1460	3.94	86.4	46.7	4.51	88.3	59.8	5.19	88.6	69.1	48.0	410	475	IE3
	400	60	4.70	1755	3.09	88.6	58.0	3.77	89.8	70.3	4.57	89.7	77.4	40.5	325	386	
	440	60	4.60	1765	3.35	87.5	49.3	3.89	89.5	62.3	4.54	89.9	70.7	44.6	393	467	
	460	60	4.60	1770	3.54	86.6	45.0	4.01	89.1	57.9	4.59	89.9	66.9	46.6	430	510	
3.7	400	50	7.80	1460	5.16	88.9	58.2	6.30	89.8	70.8	7.67	89.4	77.9	67.0	320	415	IE3
	400	60	7.30	1755	4.27	90.1	69.4	5.60	90.4	79.2	7.12	89.6	83.6	59.0	259	358	
	440	60	6.90	1765	4.42	89.7	61.2	5.48	90.7	73.2	6.75	90.5	79.5	64.9	313	433	
	460	60	6.80	1765	4.62	88.8	56.6	5.58	90.3	69.1	6.70	90.4	76.6	67.9	343	473	
5.5	400	50	11.7	1465	7.90	89.9	55.9	9.49	91.0	69.0	11.4	90.8	76.6	100	340	403	IE3
	400	60	10.7	1760	6.47	91.4	67.1	8.32	92.1	77.7	10.5	91.7	82.6	83.0	279	328	
	440	60	10.3	1765	6.75	90.8	58.9	8.24	92.0	71.3	10.0	92.0	78.2	91.3	338	397	
	460	60	10.2	1770	7.06	90.1	54.3	8.39	91.7	67.3	10.0	92.0	74.9	95.5	369	434	
7.5	400	50	15.4	1460	10.1	90.8	59.3	12.4	91.6	71.7	15.1	91.2	78.6	132	345	411	IE3
	400	60	14.3	1755	8.35	92.0	70.5	11.0	92.3	80.0	14.0	91.7	84.2	109	280	330	
	440	60	13.7	1765	8.60	91.6	62.5	10.8	92.5	74.0	13.3	92.4	80.1	120	339	399	
	460	60	13.3	1770	8.88	91.1	58.2	10.9	92.3	70.4	13.1	92.4	77.5	125	370	436	
11	400	50	23.0	1475	15.3	91.2	56.8	18.6	92.2	69.5	22.5	92.1	76.7	183	316	370	IE3
	400	60	21.0	1770	12.3	92.1	70.2	16.2	92.7	79.5	20.5	92.4	83.7	151	257	309	
	440	60	20.0	1775	12.8	91.6	61.6	15.9	92.7	73.3	19.6	92.8	79.5	166	311	374	
	460	60	19.7	1775	13.4	91.0	56.7	16.2	92.5	69.1	19.5	92.8	76.4	174	340	409	
15	400	50	29.4	1470	18.5	92.8	63.0	23.3	93.4	74.6	28.9	93.1	80.4	242	331	388	IE3
	400	60	27.8	1760	15.7	93.3	74.1	21.1	93.5	82.3	27.2	93.0	85.6	204	268	322	
	440	60	26.0	1770	15.9	92.9	66.6	20.5	93.5	77.1	25.6	93.4	82.3	224	324	390	
	460	60	25.3	1775	16.3	92.5	62.4	20.5	93.4	73.8	25.2	93.5	80.0	235	354	426	
18.5	400	50	37.0	1475	24.0	92.6	60.2	29.6	93.4	72.6	36.0	93.4	79.4	334	276	381	IE3
	400	60	34.5	1770	20.1	93.2	71.3	26.4	93.8	80.9	33.5	93.6	85.1	262	193	325	
	440	60	32.5	1775	20.6	92.8	63.4	25.8	93.8	75.3	31.8	93.9	81.3	288	234	393	
	460	60	32.0	1780	21.0	92.4	59.8	25.6	93.7	72.5	31.1	94.0	79.4	301	255	430	
22	400	50	42.0	1470	25.3	93.6	67.1	32.5	93.8	78.0	41.0	93.3	83.1	348	252	336	IE3
	400	60	40.0	1760	22.2	94.3	75.9	30.2	94.3	83.6	39.2	93.6	86.5	287	185	290	
	440	60	37.5	1770	22.2	94.3	69.1	28.9	94.7	79.2	36.5	94.3	83.9	316	224	351	
	460	60	37.0	1775	22.3	93.8	65.9	28.5	94.5	77.0	35.5	94.3	82.4	330	245	384	
30	400	50	57.0	1470	35.5	93.9	65.0	45.0	94.4	76.5	56.0	94.1	82.1	545	274	366	IE3
	400	60	54.0	1765	30.2	94.4	75.9	41.0	94.6	83.8	52.9	94.1	86.9	445	205	315	
	440	60	50.5	1770	30.6	94.3	68.3	39.5	94.9	78.9	49.6	94.8	83.7	490	248	382	
	460	60	49.5	1775	30.9	93.9	64.9	39.0	94.7	76.5	48.3	94.8	82.2	512	271	417	
37	400	50	72.0	1480	45.1	93.3	63.5	56.9	94.2	74.7	70.3	94.2	80.7	750	250	388	IE3
	400	60	66.0	1775	36.7	94.2	77.2	50.1	94.7	84.4	64.7	94.5	87.3	600	219	319	
	440	60	62.0	1780	37.5	93.8	69.1	48.8	94.7	78.9	61.2	94.8	83.8	660	265	386	
	460	60	61.0	1785	38.4	93.4	64.8	48.6	94.5	75.9	59.8	94.8	81.9	690	290	422	
45	400	50	86.0	1480	53.1	94.1	65.0	67.4	94.9	76.2	83.9	94.8	81.7	890	233	382	IE3
	400	60	79.5	1775	43.8	95.0	78.0	60.1	95.3	85.1	77.9	95.0	87.8	720	190	323	
	440	60	75.0	1780	44.5	94.6	70.1	58.2	95.3	79.9	73.3	95.3	84.5	792	230	391	
	460	60	73.5	1785	46.5	94.4	64.3	58.6	95.3	75.9	72.8	95.4	81.3	828	251	427	
55	400	50	100	1480	59.4	95.2	70.2	77.8	95.7	80.0	98.4	95.5	84.5	980	240	357	IE3
	400	60	96.0	1775	51.9	95.5	80.1	72.1	95.7	86.3	94.1	95.4	88.4	770	173	309	
	440	60	89.0	1780	51.5	95.3	73.5	68.7	95.8	82.2	87.5	95.8	86.1	847	209	374	
	460	60	88.0	1780	52.5	95.1	69.2	68.0	95.8	79.5	85.6	95.9	84.1	886	229	409	



Electrical Characteristics (6-Pole)

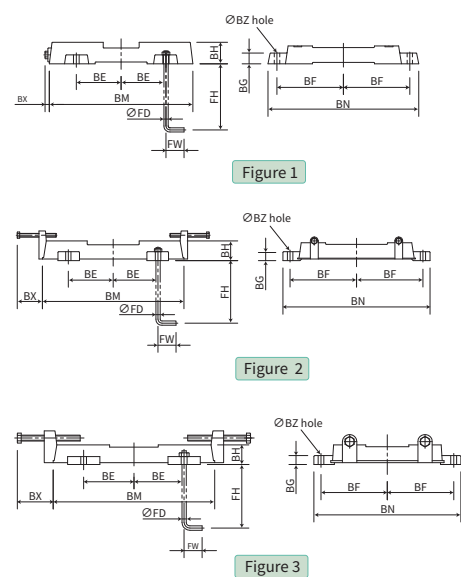
200V

Output [kW]	Voltage [V]	Frequency [Hz]	Rated Current [A]	Rated Rotational Speed [min ⁻¹]	Load Characteristics									Starting Current [A]	Starting Torque [%]	Maximum Torque [%]	Efficiency Level (IE Code)
					50% Load			75% Load			100% Load						
					Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Energy Consumption Efficiency[%]	Power Factor [%]				
0.75	200	50	4.20	960	2.92	79.8	46.4	3.34	81.9	59.5	3.87	81.9	68.3	24.4	238	350	IE3
	200	60	3.80	1155	2.41	83.3	54.0	2.90	83.9	66.7	3.52	83.2	74.0	21.0	200	326	
	220	60	3.80	1165	2.58	81.4	47.1	2.96	83.5	59.6	3.44	84.0	68.2	23.1	242	394	
	230	60	3.80	1165	2.69	80.6	43.4	3.03	83.2	56.0	3.46	84.0	64.9	24.2	265	431	
1.5	200	50	7.80	970	5.87	84.8	43.5	6.64	87.0	56.3	7.61	87.2	65.2	61.0	337	495	IE3
	200	60	7.00	1165	4.82	87.7	51.2	5.71	88.9	64.0	6.82	88.6	71.7	50.0	244	398	
	220	60	7.00	1170	5.19	86.1	44.0	5.89	88.3	56.8	6.76	88.8	65.6	55.0	295	481	
	230	60	7.00	1170	5.41	85.4	40.7	6.05	87.9	53.1	6.83	88.7	62.1	57.5	323	526	
2.2	200	50	10.6	970	7.06	88.7	50.7	8.42	89.7	63.1	10.1	89.3	70.7	84.0	330	538	IE3
	200	60	10.0	1165	6.04	89.8	58.6	7.56	90.3	69.8	9.38	89.5	75.6	68.0	255	459	
	220	60	9.60	1170	6.29	89.1	51.5	7.51	90.5	63.7	8.97	90.4	71.2	74.8	309	555	
	230	60	9.60	1170	6.48	88.6	48.0	7.57	90.3	60.6	8.90	90.6	68.5	78.2	337	607	
3.7	200	50	16.6	970	11.3	88.7	53.4	13.5	89.6	66.4	16.1	89.3	74.2	123	289	422	IE3
	200	60	15.6	1165	9.53	90.1	62.2	12.0	90.6	73.5	15.0	90.0	79.3	102	223	348	
	220	60	14.8	1170	9.94	89.5	54.5	12.0	90.7	67.1	14.4	90.6	74.6	112	270	421	
	230	60	14.8	1175	10.3	88.9	50.7	12.1	90.5	63.6	14.3	90.8	71.8	117	295	460	
5.5	200	50	23.8	970	15.5	91.1	56.4	18.9	91.6	68.9	23.0	91.1	75.9	176	250	390	IE3
	200	60	22.2	1160	13.3	92.2	64.8	17.2	92.2	75.3	21.5	91.7	80.4	145	178	286	
	220	60	21.2	1170	13.7	91.6	57.4	16.8	92.4	69.6	20.5	92.2	76.3	160	215	346	
	230	60	20.8	1175	14.1	91.3	53.7	16.9	92.2	66.4	20.2	92.3	73.9	167	235	378	
7.5	200	50	31.2	965	19.2	91.2	61.8	24.3	91.4	73.1	30.4	90.6	78.6	204	257	292	IE3
	200	60	30.0	1160	16.7	92.1	70.2	22.4	92.0	78.7	29.0	91.0	82.1	172	205	233	
	220	60	28.0	1170	17.0	91.8	63.1	21.6	92.4	73.9	27.1	91.9	79.1	189	248	282	
	230	60	27.4	1175	17.4	91.2	59.5	21.6	92.1	71.0	26.5	91.9	77.2	198	271	308	
11	200	50	45.4	965	28.0	91.8	61.8	35.4	91.9	73.3	44.1	91.1	79.0	308	268	305	IE3
	200	60	43.0	1160	24.2	93.0	70.6	32.4	92.8	79.2	41.9	91.7	82.7	260	214	243	
	220	60	40.4	1170	24.6	92.7	63.4	31.3	93.1	74.2	39.2	92.6	79.5	286	259	294	
	230	60	40.0	1170	25.4	91.8	59.2	31.5	92.7	71.0	38.7	92.6	77.1	299	283	321	
15	200	50	62.2	970	38.0	92.1	61.8	48.2	92.2	73.1	60.4	91.2	78.7	360	262	286	IE3
	200	60	59.4	1160	32.7	93.5	70.8	44.3	93.0	78.9	57.6	91.7	81.9	312	217	236	
	220	60	55.2	1170	33.3	93.0	63.5	42.7	93.3	74.0	53.7	92.6	79.1	343	263	333	
	230	60	54.2	1175	34.2	92.4	59.6	42.6	93.0	71.3	52.6	92.6	77.3	359	287	366	
18.5	200	50	79.2	975	52.1	91.9	55.8	63.3	92.7	68.3	76.6	92.4	75.4	524	303	329	IE3
	200	60	73.2	1170	42.9	93.3	66.7	55.9	93.6	76.6	70.8	93.0	81.1	450	249	270	
	220	60	69.8	1175	44.8	93.0	58.3	55.2	93.8	70.3	67.6	93.7	76.7	495	301	327	
	230	60	68.8	1180	46.1	92.7	54.3	55.5	93.7	66.9	66.7	93.8	74.2	518	329	357	
22	200	50	91.2	970	57.8	92.8	59.2	71.8	93.2	71.2	88.2	92.9	77.6	592	290	317	IE3
	200	60	85.6	1165	48.9	93.9	69.2	64.7	93.9	78.4	82.7	93.3	82.3	508	238	259	
	220	60	80.8	1175	50.1	93.7	61.5	63.0	94.2	72.9	77.9	94.0	78.8	559	288	313	
	230	60	78.4	1180	50.8	93.4	58.2	62.5	94.2	70.4	76.1	94.2	77.1	584	315	343	
30	200	50	122	980	79.5	94.2	57.8	98.1	94.6	70.0	120	94.2	76.7	952	347	389	IE3
	200	60	116	1175	68.1	94.7	67.1	88.9	94.8	77.1	113	94.2	81.6	816	279	313	
	220	60	110	1180	69.6	94.4	59.9	86.8	94.9	71.7	107	94.8	77.9	898	338	379	
	230	60	108	1185	71.0	94.1	56.4	86.6	94.8	68.8	105	94.8	75.9	938	369	414	
37	200	50	146	975	88.8	94.0	63.9	113	94.0	75.1	142	93.3	80.5	1000	297	349	IE3
	200	60	140	1170	77.5	95.6	72.1	105	95.1	80.1	136	94.1	83.2	860	239	281	
	220	60	130	1175	77.5	94.8	66.0	100	94.9	76.5	127	94.3	81.3	946	289	340	
	230	60	128	1180	78.8	94.1	62.6	99.6	94.6	74.0	124	94.2	79.7	989	316	372	
45	200	50	176	985	107	94.7	64.2	137	94.8	75.1	171	94.3	80.6	1300	273	396	IE3
	200	60	168	1175	92.3	95.3	73.9	125	95.2	81.7	162	94.5	84.7	1144	217	290	
	220	60	156	1180	92.7	95.1	67.0	120	95.3	77.2	152	95.0	82.0	1258	263	351	
	230	60	152	1185	95.0	95.0	62.6	120	95.3	74.0	149	95.1	79.8	1316	287	384	

400V

Output [kW]	Voltage [V]	Frequency [Hz]	Rated Current [A]	Rated Rotational Speed [min ⁻¹]	Load Characteristics									Starting Current [A]	Starting Torque [%]	Maximum Torque [%]	Efficiency Level (IE Code)
					50% Load			75% Load			100% Load						
					Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Efficiency [%]	Power Factor [%]	Current [A]	Energy Consumption Efficiency[%]	Power Factor [%]				
0.75	400	50	2.10	960	1.46	79.8	46.4	1.67	81.9	59.5	1.94	81.9	68.3	12.2	238	350	IE3
	400	60	1.90	1155	1.20	83.3	54.0	1.45	83.9	66.7	1.76	83.2	74.0	10.5	200	326	
	440	60	1.90	1165	1.29	81.4	47.1	1.48	83.5	59.6	1.72	84.0	68.2	11.6	242	394	
	460	60	1.90	1165	1.35	80.6	43.4	1.52	83.2	56.0	1.73	84.0	64.9	12.1	265	431	
1.5	400	50	3.90	970	2.93	84.8	43.5	3.32	87.0	56.3	3.81	87.2	65.2	30.5	337	495	IE3
	400	60	3.50	1165	2.41	87.7	51.2	2.86	88.9	64.0	3.41	88.6	71.7	25.0	244	398	
	440	60	3.50	1170	2.60	86.1	44.0	2.94	88.3	56.8	3.38	88.8	65.6	27.5	295	481	
	460	60	3.50	1170	2.71	85.4	40.7	3.03	87.9	53.1	3.42	88.7	62.1	28.8	323	526	
2.2	400	50	5.30	970	3.53	88.7	50.7	4.21	89.7	63.1	5.03	89.3	70.7	42.0	330	538	IE3
	400	60	5.00	1165	3.02	89.8	58.6	3.78	90.3	69.8	4.69	89.5	75.6	34.0	255	459	
	440	60	4.80	1170	3.14	89.1	51.5	3.75	90.5	63.7	4.49	90.4	71.2	37.4	309	555	
	460	60	4.80	1170	3.24	88.6	48.0	3.79	90.3	60.6	4.45	90.6	68.5	39.1	337	607	
3.7	400	50	8.30	970	5.64	88.7	53.4	6.73	89.6	66.4	8.06	89.3	74.2	61.5	289	422	IE3
	400	60	7.80	1165	4.77	90.1	62.2	6.02	90.6	73.5	7.48	90.0	79.3	51.0	223	348	
	440	60	7.40	1170	4.97	89.5	54.5	5.98	90.7	67.1	7.19	90.6	74.6	56.1	270	421	
	460	60	7.40	1175	5.16	88.9	50.7	6.06	90.5	63.6	7.13	90.8	71.8	58.7	295	460	
5.5	400	50	11.9	970	7.73	91.1	56.4	9.44	91.6	68.9	11.5	91.1	75.9	88.0	250	390	IE3
	400	60	11.1	1160	6.65	92.2	64.8	8.58	92.2	75.3	10.8	91.7	80.4	72.5	178	286	
	440	60	10.6	1170	6.86	91.6	57.4	8.41	92.4	69.6	10.3	92.2	76.3	79.8	215	346	
	460	60	10.4	1175	7.04	91.3	53.7	8.45	92.2	66.4	10.1	92.3	73.9	83.4	235	378	
7.5	400	50	15.6	965	9.60	91.2	61.8	12.2	91.4	73.1	15.2	90.6	78.6	102	257	292	IE3
	400	60	15.0	1160	8.37	92.1	70.2	11.2	92.0	78.7	14.5	91.0	82.1	86.0	205	233	
	440	60	14.0	1170	8.49	91.8	63.1	10.8	92.4	73.9	13.5	91.9	79.1	94.6	248	282	
	460	60	13.7	1175	8.68	91.2	59.5	10.8	92.1	71.0	13.3	91.9	77.2	98.9	271	308	
11	400	50	22.7	965	14.0	91.8	61.8	17.7	91.9	73.3	22.1	91.1	79.0	154	268	305	IE3
	400	60	21.5	1160	12.1	93.0	70.6	16.2	92.8	79.2	20.9	91.7	82.7	130	214	243	
	440	60	20.2	1170	12.3	92.7	63.4	15.7	93.1	74.2	19.6	92.6	79.5	143	259	294	
	460	60	20.0	1170	12.7	91.8	59.2	15.7	92.7	71.0	19.3	92.6	77.1	150	283	321	
15	400	50	31.1	970	19.0	92.1	61.8	24.1	92.2	73.1	30.2	91.2	78.7	180	262	286	IE3
	400	60	29.7	1160	16.4	93.5	70.8	22.1	93.0	78.9	28.8	91.7	81.9	156	217	236	
	440	60	27.6	1170	16.7	93.0	63.5	21.4	93.3	74.0	26.9	92.6	79.1	172	263	333	
	460	60	27.1	1175	17.1	92.4	59.6	21.3	93.0	71.3	26.3	92.6	77.3	179	287	366	
18.5	400	50	39.6	975	26.1	91.9	55.8	31.6	92.7	68.3	38.3	92.4	75.4	262	303	329	IE3
	400	60	36.6	1170	21.5	93.3	66.7	27.9	93.6	76.6	35.4	93.0	81.1	225	249	270	
	440	60	34.9	1175	22.4	93.0	58.3	27.6	93.8	70.3	33.8	93.7	76.7	248	301	327	
	460	60	34.4	1180	23.0	92.7	54.3	27.8	93.7	66.9	33.4	93.8	74.2	259	329	357	
22	400	50	45.6	970	28.9	92.8	59.2	35.9	93.2	71.2	44.1	92.9	77.6	296	290	317	IE3
	400	60	42.8	1165	24.5	93.9	69.2	32.4	93.9	78.4	41.4	93.3	82.3	254	238	259	
	440	60	40.4	1175	25.0	93.7	61.5	31.5	94.2	72.9	39.0	94.0	78.8	279	288	313	
	460	60	39.2	1180	25.4	93.4	58.2	31.2	94.2	70.4	38.0	94.2	77.1	292	315	343	
30	400	50	61.0	980	39.8	94.2	57.8	49.0	94.6	70.0	59.9	94.2	76.7	476	347	389	IE3
	400	60	58.0	1175	34.1	94.7	67.1	44.5	94.8	77.1	56.4	94.2	81.6	408	279	313	
	440	60	55.0	1180	34.8	94.4	59.9	43.4	94.9	71.7	53.3	94.8	77.9	449	338	379	
	460	60	54.0	1185	35.5	94.1	56.4	43.3	94.8	68.8	52.3	94.8	75.9	469	369	414	
37	400	50	73.0	975	44.4	94.0	63.9	56.7	94.0	75.1	71.1	93.3	80.5	500	297	349	IE3
	400	60	70.0	1170	38.8	95.6	72.1	52.6	95.1	80.1	68.2	94.1	83.2	430	239	281	
	440	60	65.0	1175	38.8	94.8	66.0	50.2	94.9	76.5	63.3	94.3	81.3	473	289	340	
	460	60	64.0	1180	39.4	94.1	62.6	49.8	94.6	74.0	61.9	94.2	79.7	495	316	372	
45	400	50	88.0	985	53.4	94.7	64.2	68.4	94.8	75.1	85.5	94.3	80.6	650	273	396	IE3
	400	60	84.0	1175	46.1	95.3	73.9	62.7	95.2	81.7	81.1	94.5	84.7	572	217	290	
	440	60	78.0	1180	46.4	95.1	67.0	60.2	95.3	77.2	75.8	95.0	82.0	629	263	351	
	460	60	76.0	1185	47.5	95.0	62.6	60.0	95.3	74.0	74.4	95.1	79.8	658	287	384	

Slide Bases



Frame Size	Figure No.	Base Size (mm)								Sliding Distance (mm)	Bolts (mm)			Approx. Weight
		BE	BF	BG	BH	BM	BN	BX	BZ		FD	FH	FW	
80M	1	65	90	15	30	210	210	11	13	40	(10)	(70)	(40)	2.0
90L		70	105	15	30	225	240	12	13	40	(10)	(70)	(40)	2.2
100L		80	115	20	40	265	260	12	13	50	(10)	(70)	(40)	3.0
112M		95	115	20	40	285	260	12	13	50	(10)	(70)	(40)	3.5
132S		110	120	25	45	350	280	13	13	60	(10)	(70)	(40)	5.0
132M			140			355	318							6.0
160M		125	165	30	50	406	380	12	16	70	(12)	(110)	(50)	8.5
160L			185			404	420							10
*160M	2	125	165	26	50	406	372	70	16	70	(12)	(110)	(50)	9.0
*160L			185			412	420							9.5
180M	3	140	185	25	55	450	410	100	16	80	(12)	(110)	(50)	14
180L			205			450	450							16
200M		160	210	30	60	520	470	100	19	100	(16)	(170)	(65)	20
200L			230			520	510							22
225S		180	217.5	30	60	570	485	150	19	100	(16)	(250)	(65)	23
225M			230			570	510							25

Notes:
 1. In Figures 2 and 3, four sliding bolts are placed diagonally.
 2. Foundation bolts are not included.
 3. Measurements in parentheses () are the recommended dimensions when using foundation bolts.
 4. Asterisk* applies only to 160M and 160L Totally Enclosed Fan Cooled (TEFC) models.

Global Series

(Please contact us for further information)

Our US Series is available as standard stock. The other three Global Series (China, EU, and Russia Series) are available as make-to-order.

• US Series

Our US series conforms with the Premium Efficiency or Energy Efficient standards of the Energy Independence and Security Act (EISA).

The series is certified via Conformity Certification Numbers (CC No.).

*The US series does not conform to UL standards.

• China Series

Our China series conforms with Grade GB3 (GB18613:2020) of China Energy Label: Measures for the Administration of Energy Efficiency Labeling (CEL-007).

*The China series does not conform to the CCC Mark.

• Europe (EU) Series

Our Europe (EU) series conforms to the European Commission Regulation (EC) 2019/1781.

The series also conforms to the IE3 Efficiency standard and the CE Mark scheme.

• Russia Series

Our Russian series conforms with the EAC Mark safety certification for low-voltage motors.

• Legislation Timeline

Country/Region	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	...	2021	~
USA	EP Act: Energy Policy Act EPA Act (=IE2) Regulations			EISA: Energy Independence and Security Act NEMA Premium (=IE3) Regulations									
China	CEL-007: Measures for the Administration of Energy Efficiency Labeling Former GB2 (Standard Efficiency + α, GB18613-2006) Regulations					GB3 (= IE2, GB18613-2012) Regulations			GB2 (= IE3) Regulations			GB3(=IE3, GB18613:2020) Regulations	
Europe (EU)						European Commission Regulations IE2 Regulations			IE3 Regulations (7.5kW+) (0.75kW+)				

Selection and Application of Motors for Energy Saving

In order to achieve effective energy-saving with motors, factors such as selection, operation, and maintenance should be fully considered from various perspectives.

When selecting a motor, firstly the unit's voltage, frequency, number of poles, output power, frequency of use, and mounting method must be determined.

In addition, it is necessary to determine the ambient conditions of the installation location, the load connection method, and mechanical attachments.

Power Supply

Motors are designed to achieve optimal performance when operating in accordance with the rated voltage and rated frequency displayed on the unit's nameplate. Avoiding use of the unit in conditions other than those indicated on the nameplate, in addition to avoiding fluctuation in the voltage and frequency as far as possible, will lead to more effective energy saving.

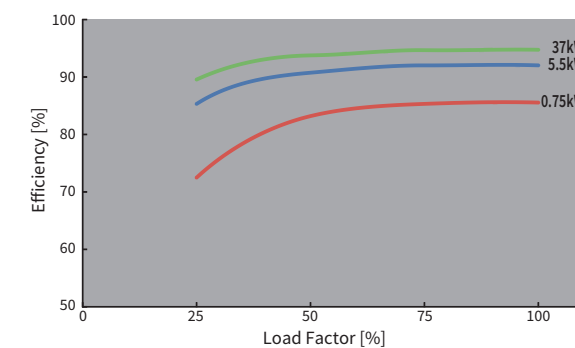
Motor Efficiency

Motors efficiency is the ratio of output to input. Load factor, output power, and the number of poles all correlate with motor efficiency, as shown below. Therefore, a full consideration of each of these elements is necessary when selecting a motor.

1. Load Factor and Efficiency

As illustrated in Figure 1, motors generally achieve maximum efficiency at between 75% to 100% of rated load, so operating within this output range (kW) will be the most efficient way to save energy. If load factor is too low, the motor model should be reconsidered.

Figure 1. Load Factor and Efficiency



2. Output and Efficiency

Typically, the efficiency of a motor at rated load (load factor 100%) rises in correlation with the motor capacity. However, as mentioned above, efficiency decreases when a motor is used under low load factor. Therefore, it is necessary to consider the load carefully before deciding on motor output. Furthermore, to reduce electrical loss due to idle running of motors, motors should be shut down when not in use, with consideration for the amount of energy used when starting.

3. Rotational Speed and Efficiency

Motor efficiency generally also depends on rotational speed. If the load is constant, the number of poles and rotational speed should be selected after careful consideration of factors such as the usage conditions from the perspective of energy-saving, and reduction gear efficiency. Additionally, if load characteristics require a motor to operate at variable speeds, the use of an inverter (Variable Speed Drive) or similar device will be necessary to control operation in accordance with fluctuating load.

Precaution when Using High-Efficiency Motors

High-efficiency motors generally rotate faster than standard-efficiency motors in order to reduce loss generation.

If standard-efficiency motors are replaced with high-efficiency motors in applications such as pumps, fans, etc., the rotational speed will be faster, thereby increasing output.

While motor efficiency will be higher, power consumption may increase with increased output power.

Furthermore, primary and secondary resistance may be lowered in order to reduce copper loss, resulting in higher starting current compared to standard-efficiency motors. In such cases, the breaker may need to be changed.

Notes for Operating Motors with Variable Speed Drive (VSD)

Starting Characteristics

When a motor is driven by VSD, its operation is restricted by the VSD's overload current rating, so the starting characteristics are different from those during commercial power supply operation.

Although the starting torque is lower with VSD than with commercial power supply, starting torque can be increased by adjusting the V/f pattern torque boost amount, or by employing vector control. (Maximum of 200%, depending on motor characteristics and VSD settings.)

If an even higher starting torque is needed, please select a VSD with larger capacity, and also consider the possibility of increasing the motor capacity.

Noise

The magnetic noise of motors driven by VSD is slightly higher than motors operated by commercial power supply. Moreover, when a motor is operated above rated speed, aeolian noise increases. Please exercise caution regarding use of VSD motors in settings where higher noise levels will be problematic.

Vibration

- (1) Toshiba VSDs use sine-wave PWM control, resulting in reduced vibration. However, vibration is slightly higher in low-load condition in comparison to motors operated by commercial power supply.
- (2) Vibration levels will be virtually insignificant if the motor is affixed firmly to a mechanical base and operated at proper load. However, vibrations may increase if the base is weak, load is low, or due to mechanical resonance. In such cases, mechanical countermeasures will be required, such as changing the base or coupling.

Operation of Reducers, Belts and Chains

- (1) If oil-lubricated reducers or gears are used at the interface of the motor and the load machine, please be aware that lubrication will worsen at low speeds.
- (2) When operating at frequencies exceeding 60Hz, power transmission mechanisms such as reducers, belts or chains may cause problems including noise generation, reduction in strength, or shortening of service life.
- (3) Please contact us for inquiries about the allowable operating range during VSD operation.

Increasing Frequency

If you wish to set the maximum frequency above 60Hz, please contact us for inquiries about the allowable operating range.

Moto-End Surge Voltage Suppression

In the system of operating a 400V-class high-efficiency motor driven by a voltage-type PWM VSD using a super high-speed switching device (such as IGBT), degradation of the motor wiring insulation may occur due to surge voltage depending on the power supply voltage, motor cable length, cable installation method, cable type, etc. Please implement countermeasures as follows, in accordance with motor type.

• Motors with standard insulation:

Install a surge voltage protection device, such as an AC reactor or a surge suppression filter, at the VSD output terminal, and ensure that surge voltage at the motor terminal is kept below 850V.

• Motors with reinforced insulation:

The motor terminal voltage peak value of a motor with reinforced insulation is a line voltage of 1250V. If surge voltage that exceeds this voltage is generated due to causes such as fluctuations in the VSD input voltage, please suppress the surge voltage by installing an AC reactor or surge suppression filter at the VSD output terminal, as above.

Input Voltage

If input voltage is significantly low due to vector control, etc., the use of a dedicated motor should be considered. If surge voltage that exceeds permissive voltage is generated due to causes such as fluctuations in the VSD input voltage, please suppress the surge voltage by installing an AC reactor or surge suppression filter at the VSD output terminal, as above.

Electrolytic Corrosion of Bearings

When a motor is driven by VSD, in rare cases electrolytic corrosion may occur due to factors such as the condition of the grease enclosed in the bearing, the wiring method, or operating conditions.

As a countermeasure, Toshiba offers the AEGIS Ring as an option, which can be anticipated to reduce shaft voltage.



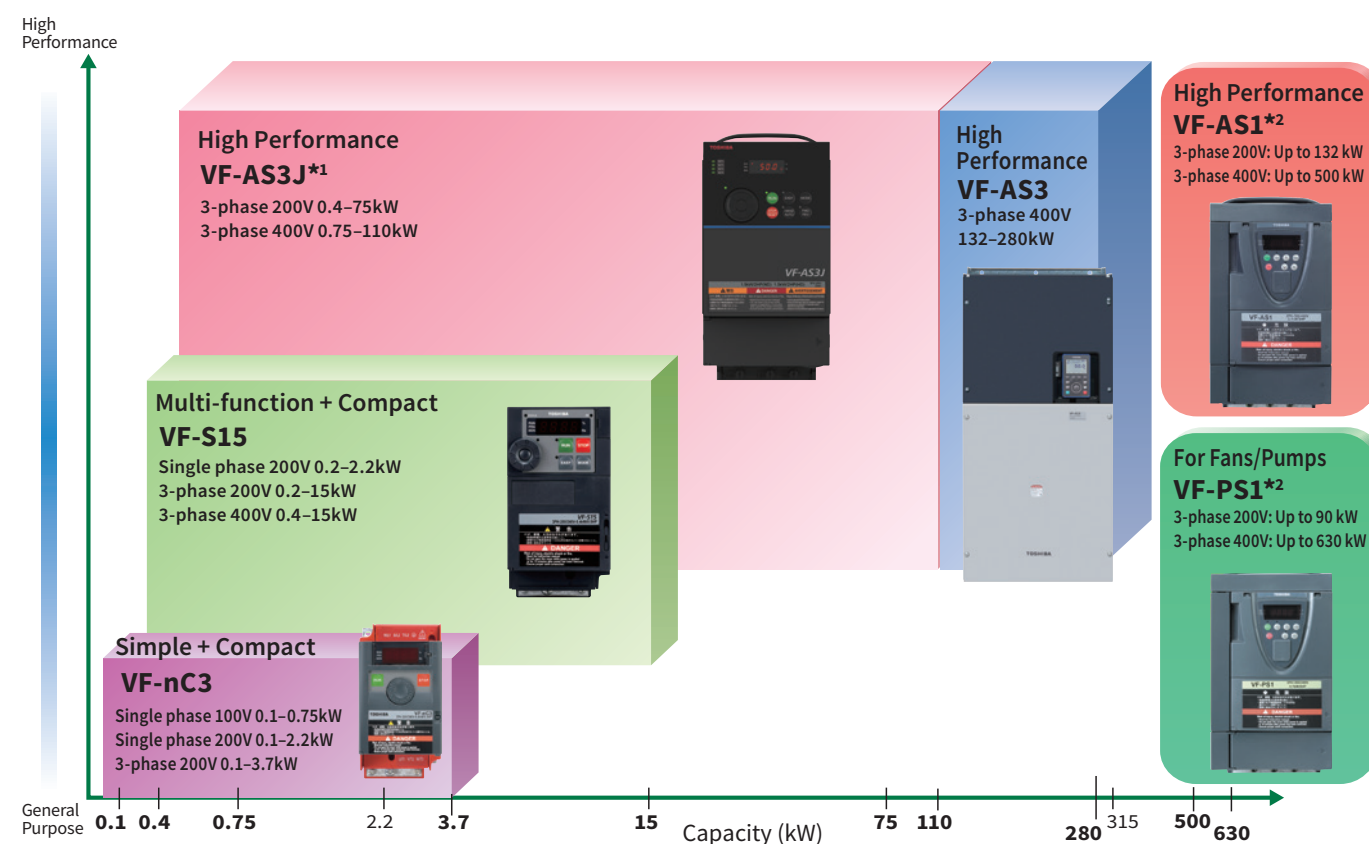
AEGIS Ring



AEGIS Ring in Use

Toshiba Variable Speed Drive (VSD) Series

From Simple Variable Speed Control to Vector Control: A Wide Range of Variations



*1: 200V-55kW, 400V-90kW planned for upcoming release

*2: Previously-released models in the capacity range of VF-AS3J and VF-AS3 will be gradually phased out.

Series Main Specifications

Model	Input Voltage Class	Capacity Range	Equipment Specifications	Panel Specifications		Control Specifications										Operating Specifications	
			Overload Current Rating	Settings Dial	Mode Switching Function	Local/Remote Switching Function	V/f Constant Control	Auto Energy-Saving Control	Sensorless Vector Control	Sensor Vector Control	Torque Control	Force Drive System	Commercial Power Supply/VSD Switching	Brake Sequence Function	Multistep Speed Operation	Pattern Operation	Dynamic Braking Function
VF-nC3	3-phase 200V	0.1–3.7 kW	150% for 60 seconds	●	●	●	●	●	●	●	●	●	●	●	15 steps	●	●
	Single phase 200V	0.1–2.2 kW															
	Single phase 100V	0.1–0.75 kW															
VF-S15	3-phase 200V	0.2–15 kW	150% for 60 seconds	●	●	●	●	●	●	●	●	●	●	●	15 steps	●	*2
	Single phase 200V	0.2–2.2 kW															
	3-phase 400V 100V	0.4–15 kW															
VF-AS3J/AS3 [HD rating]	3-phase 200V	0.4–75 kW	150% for 60 seconds	●	●	●	●	●	●	●	●	●	●	●	31 steps	●	*2
	3-phase 400V	0.75–280 kW															
VF-AS3J/AS3 [ND rating]	3-phase 200V	0.4–90 kW	120% for 60 seconds	●	●	●	●	●	●	*1	●	●	●	●	31 steps	●	*2
	3-phase 400V	0.75–315 kW															

*1: Available as an additional option.

*2: Built-in dynamic braking drive circuit. External braking resistor is available as an additional option.

For users of the products : Our variable speed drives are designed to control the speeds of three-phase motors for general industry.

Precautions

- * If you are using the motor on equipment that could seriously affect human lives or public functions (such as nuclear power control, traffic machinery, transport machinery, life-support system, chemical plant, various types of safety equipment, etc.), please contact us for consultation.
- * Though Toshiba's motors are made under a strict quality control, due to the environment and conditions, there is a possibility of malfunctioning. Please create a failsafe or back-up system on the equipment design, if there is any possibility of serious damage when the motor's malfunction.
- * The usage environment's limit range is stated in the catalog and manual. Please do not use it out of the usage environment range. It could cause accidents such as injuries and fire.
- * Please read the manual's safety instructions, and use the motor correctly.
- * If the motors are used for personal transports or elevators, please establish a protection device for safety of the equipping side.
- * Contact to your nearest Toshiba representative in advance if you are to use the product in a clean room or for a food product machine. If you use a standard product to which a special treatment has not been made, grease and oil may leach out of the spigot joint and the shaft pass-through part of the bearing bracket and the stator frame. You need to pay attention when using the product in a place where oil should not be spilled.

For further information, please contact your nearest Toshiba Representative.
The information in this brochure is subject to change without notice.

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2023-03 