

Cast Iron Frame Construction
Low and High-voltage Motors

21-FII Series



Meeting Worldwide 21-F II Series



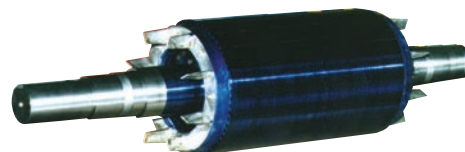
Technical Features / Benefits:

- *Running cost reduced by excellent performance characteristics.*
- *Compact size reduces installation cost.*
- *Casting construction provides lower noise and lower vibration.*
- *High quality insulation system provides mechanical rigidity and electrical reliability.*

1 Highly reliable Aluminum Die Casting Rotor

The range of utilization of aluminum die casting rotor is expanded by established casting process.

This rotor construction has realized capacity expansion, high reliability, high frequent starting duty and lower rotor inertia.



2 Expanding application of cast iron fin frame

Frame size capacity is expanded by improving ventilation flow and higher efficiency.

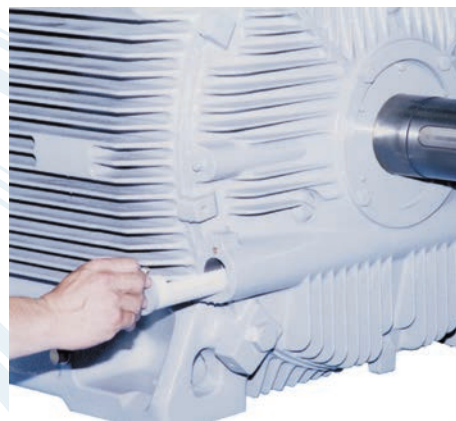
3 Improved maintenance of bearings

The bearing housing construction has been improved, and the regreasing interval of bearings in the 21-F II series is lengthened to 2 times as that of our previous series.

The motors with ball or roller bearings are equipped with the grease supply nipple and discharge devices which can be used to exchange the grease easily.

The grease inlet nipples are located on the side of the bearing housing of the frame, and the grease is discharged into the cassette which can be drawn to the side direction of the bearing housing. Therefore the regreasing can be done easily and safely while the motor is operating. The pulling out direction of the grease discharging device (cassette) can be changed to opposite direction if necessary.

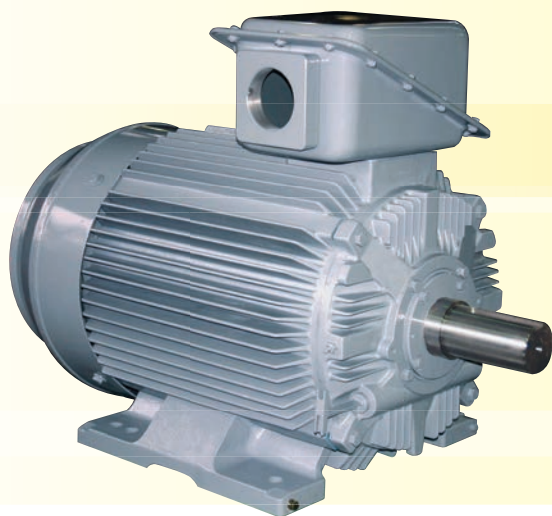
In addition, this construction prevents the leakage of grease and the excessive temperature rise because of the supplement of grease since there is no overgreasing.



4 Main terminal box

The main terminal box is located on the top of the motor frame, and the cables can be connected from every 90 or 180 degree angles. Furthermore, there is a sufficient space in the terminal box for easy connection of incoming cables. It is possible to mount on a slant (left and right) position when the side mount cable entry is required.

e Market Needs



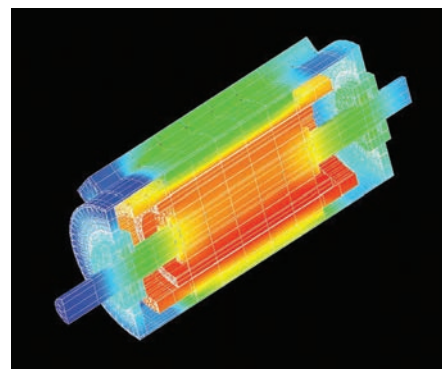
21-FII Series

Output	37kW(50HP)~2250kW(3010HP)
Poles	2P*~10P
Voltage	up to 6600V
Enclosure	TEFC
Frame size	250~630(IEC basis)
Thermal class	F

* 2 pole motor is not applied to more than 400 frame size.

5 Highly efficient ventilation and cooling construction

Using three dimensional thermal conduction analysis tools, We have optimized both efficiency and rating for each frame size. This analysis enables us to provide a compact size motor with higher efficiency.



Three dimensional thermal conduction analysis

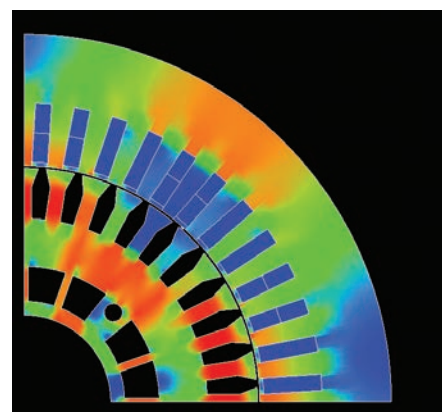
6 Compact size

Compact size machine is realized by the improved cooling effect.

Therefore, 21-FII series motors can be easily handled for installation, transportation, and minimizes installation space.

7 Lower noise & lower vibration

Quiet operation is achieved through improved cooling and investigating the magnetic phenomenon of the machines referring to magnetic field analysis.



Magnetic field analysis

8 Quality-Certified by Third Parties

The 21-FII series motors are manufactured to meet ISO9001 and ISO14001, having been certified by third parties such as Lloyds, Baseefa, CSA etc.

9 Conforming to the international standards

Meets international standards such as IEC, NEMA, BS, AS etc. Degree of protection is available for IP44 to IP55.

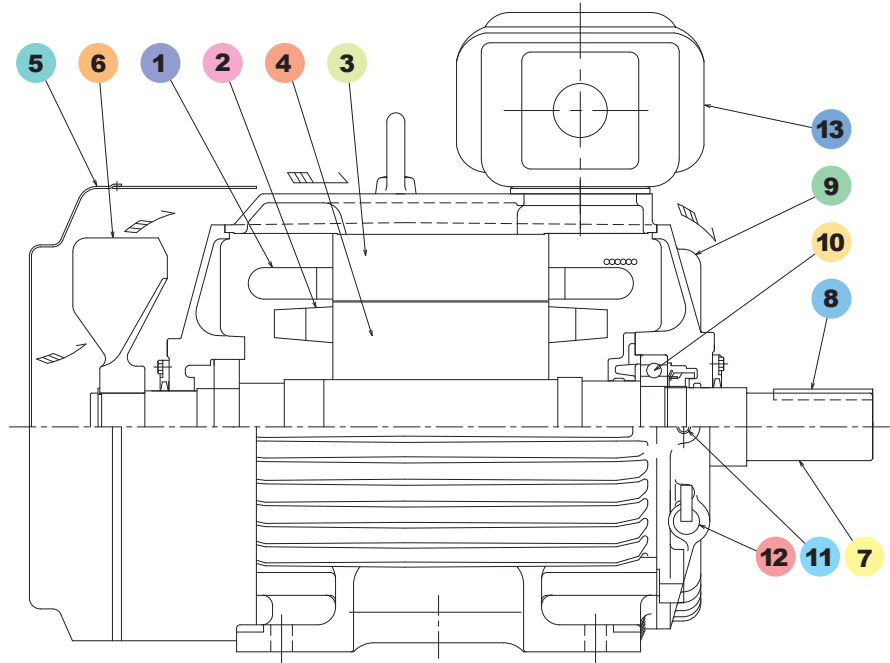


GENERAL CONSTRUCTION

Frame size 250SC~280MD

Part No. Part Name

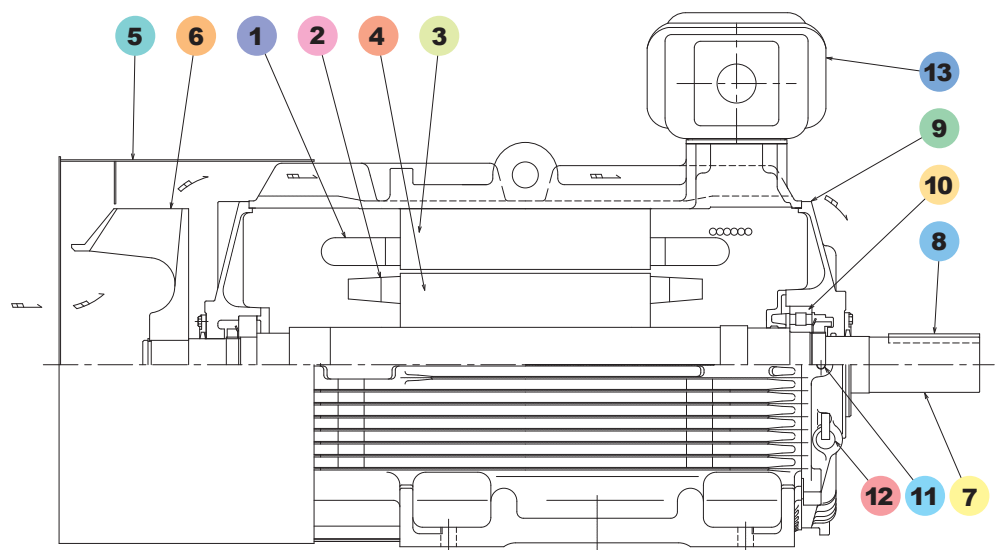
- 1 — Stator coil
- 2 — End ring
- 3 — Stator core
- 4 — Rotor core
- 5 — Fan cover
- 6 — External fan
- 7 — Shaft
- 8 — Shaft end key
- 9 — Bearing bracket
- 10 — Bearing
- 11 — Grease inlet
- 12 — Grease outlet
- 13 — Terminal box



Frame size 280L

Part No. Part Name

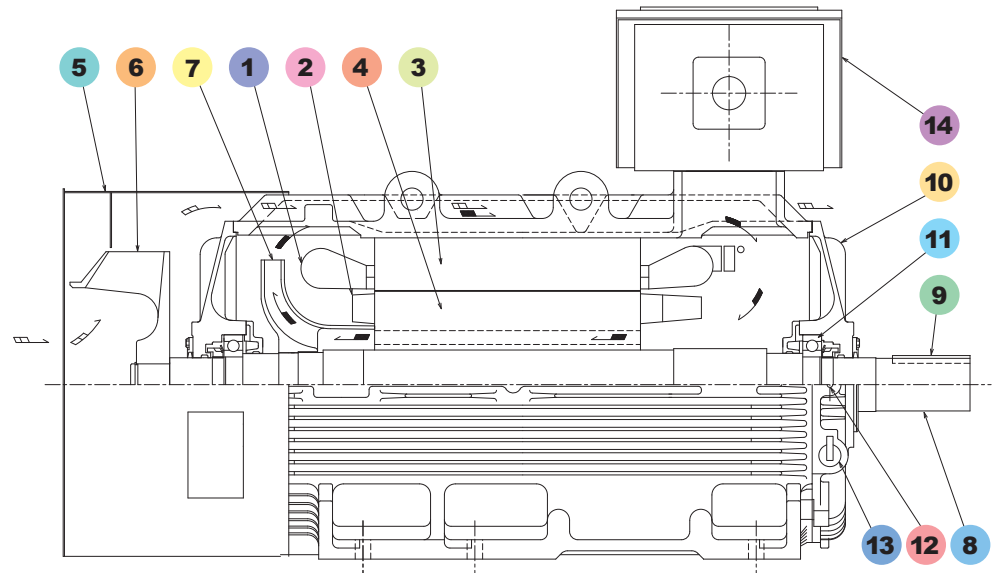
- 1 — Stator coil
- 2 — End ring
- 3 — Stator core
- 4 — Rotor core
- 5 — Fan cover
- 6 — External fan
- 7 — Shaft
- 8 — Shaft end key
- 9 — Bearing bracket
- 10 — Bearing
- 11 — Grease inlet
- 12 — Grease outlet
- 13 — Terminal box



Frame size 315H~450

Part No. Part Name

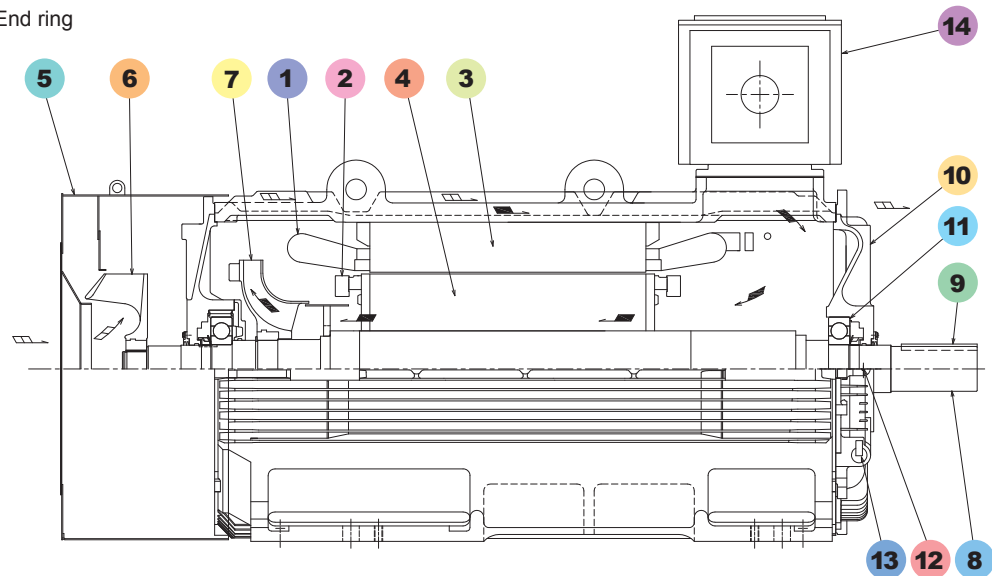
- 1 — Stator coil
- 2 — End ring
- 3 — Stator core
- 4 — Rotor core
- 5 — Fan cover
- 6 — External fan
- 7 — Internal fan
- 8 — Shaft
- 9 — Shaft end key
- 10 — Bearing bracket
- 11 — Bearing
- 12 — Grease inlet
- 13 — Grease outlet
- 14 — Terminal box



Frame size 500~630

Part No. Part Name

- 1 — Stator coil
- 2 — Short-circuit ring / End ring
- 3 — Stator core
- 4 — Rotor core
- 5 — Fan cover
- 6 — External fan
- 7 — Internal fan
- 8 — Shaft
- 9 — Shaft end key
- 10 — Bearing bracket
- 11 — Bearing
- 12 — Grease inlet
- 13 — Grease outlet
- 14 — Terminal box



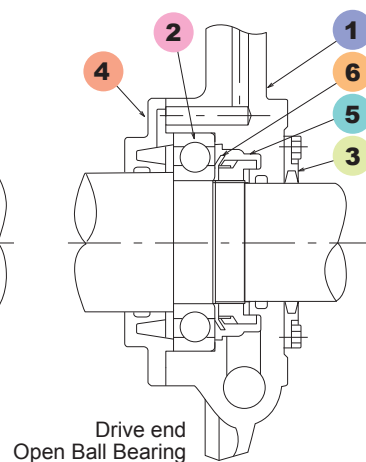
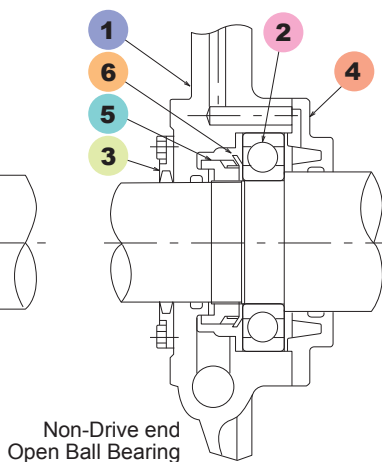
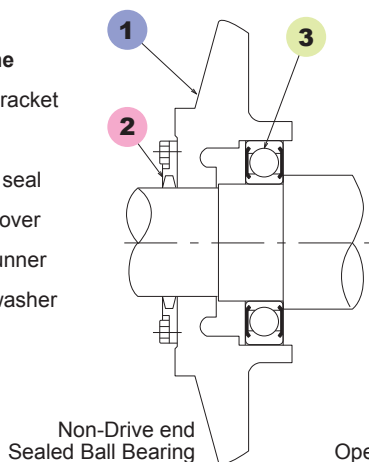
BEARING ARRANGEMENTS

Bearing Construction of Grease Lubricating Type Anti-friction Bearings (for Direct Coupled)

Frame size 250SC~315H

Part No. Part Name

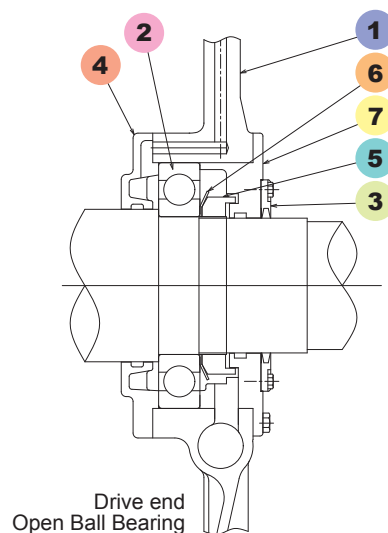
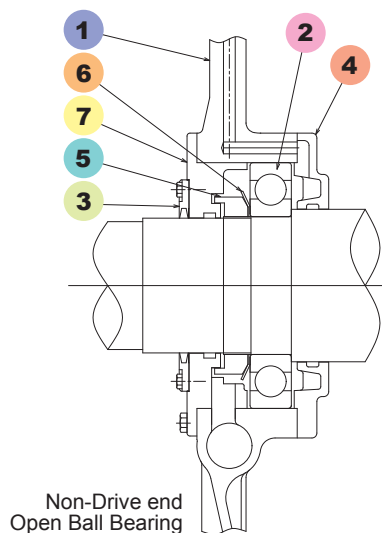
- 1 — Bearing bracket
- 2 — Bearing
- 3 — Labyrinth seal
- 4 — Bearing cover
- 5 — Grease runner
- 6 — Bearing washer



Frame size 355H~450

Part No. Part Name

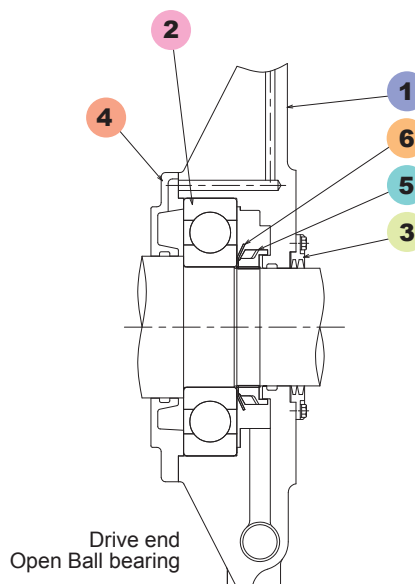
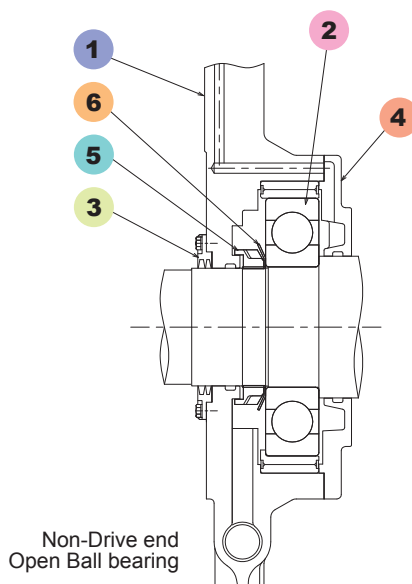
- 1 — Bearing bracket
- 2 — Bearing
- 3 — Labyrinth seal
- 4 — Inner bearing cover
- 5 — Grease runner
- 6 — Bearing washer
- 7 — Outer bearing cover



Frame size 500~630

Part No. Part Name

- 1 — Bearing bracket
- 2 — Bearing
- 3 — Labyrinth seal
- 4 — Inner bearing cover
- 5 — Grease runner
- 6 — Bearing washer

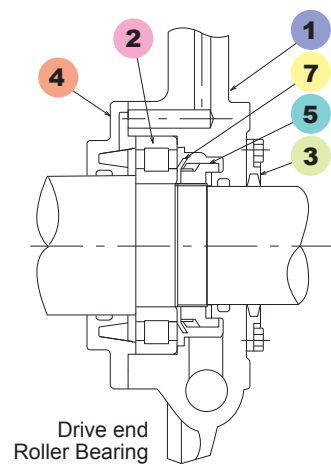
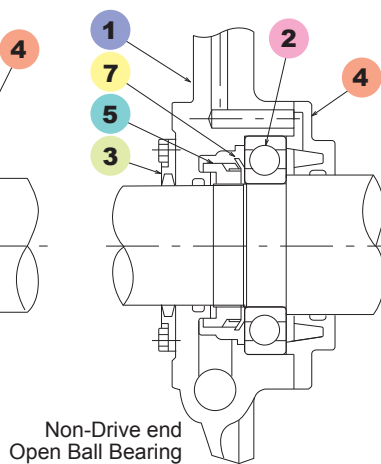
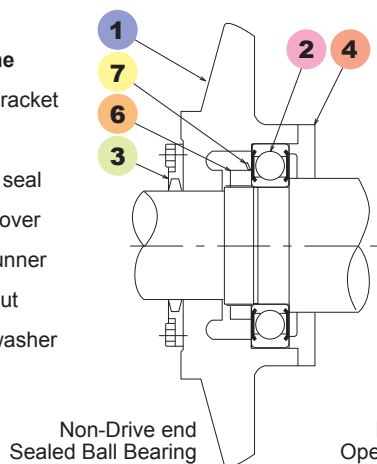


Bearing Construction of Grease Lubricating Type Anti-friction Bearings (for Belt Drive)

Frame size 250SC~315H

Part No. Part Name

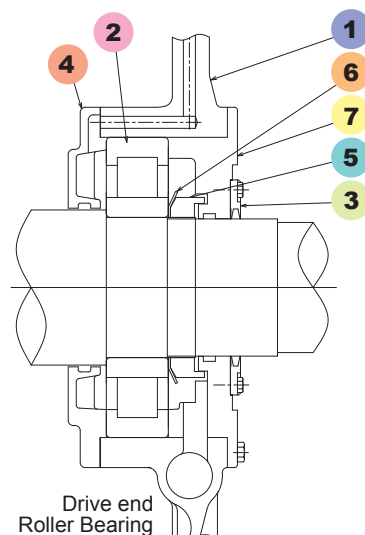
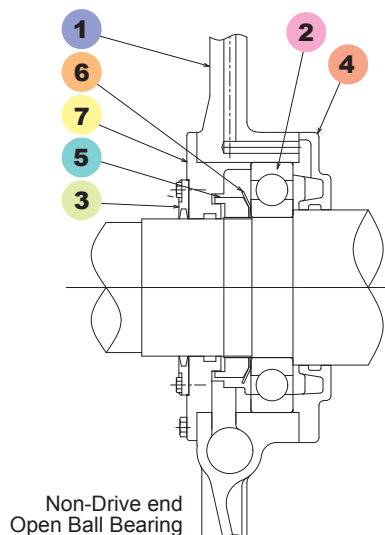
- 1 — Bearing bracket
- 2 — Bearing
- 3 — Labyrinth seal
- 4 — Bearing cover
- 5 — Grease runner
- 6 — Bearing nut
- 7 — Bearing washer



Frame size 355H~400H

Part No. Part Name

- 1 — Bearing bracket
- 2 — Bearing
- 3 — Labyrinth seal
- 4 — Inner bearing cover
- 5 — Grease runner
- 6 — Bearing washer
- 7 — Outer bearing cover



OUTLINE DRAWINGS

Fig.1

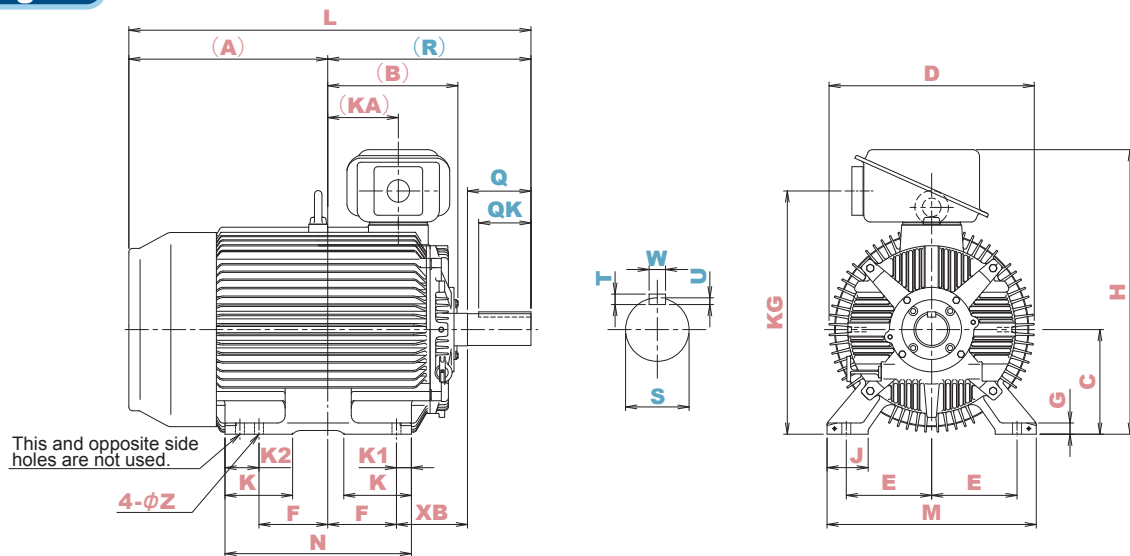


Fig.2

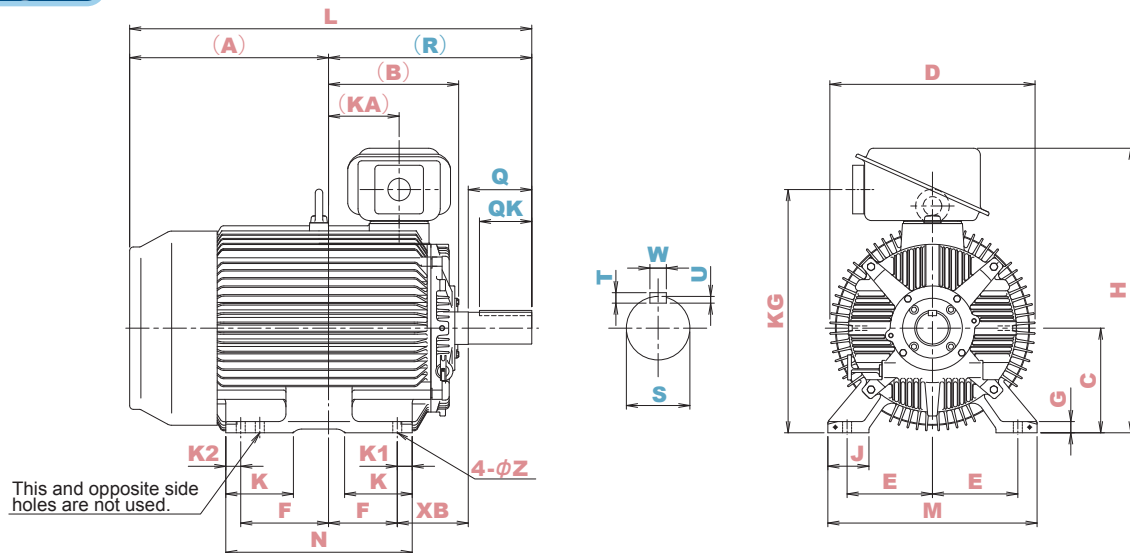
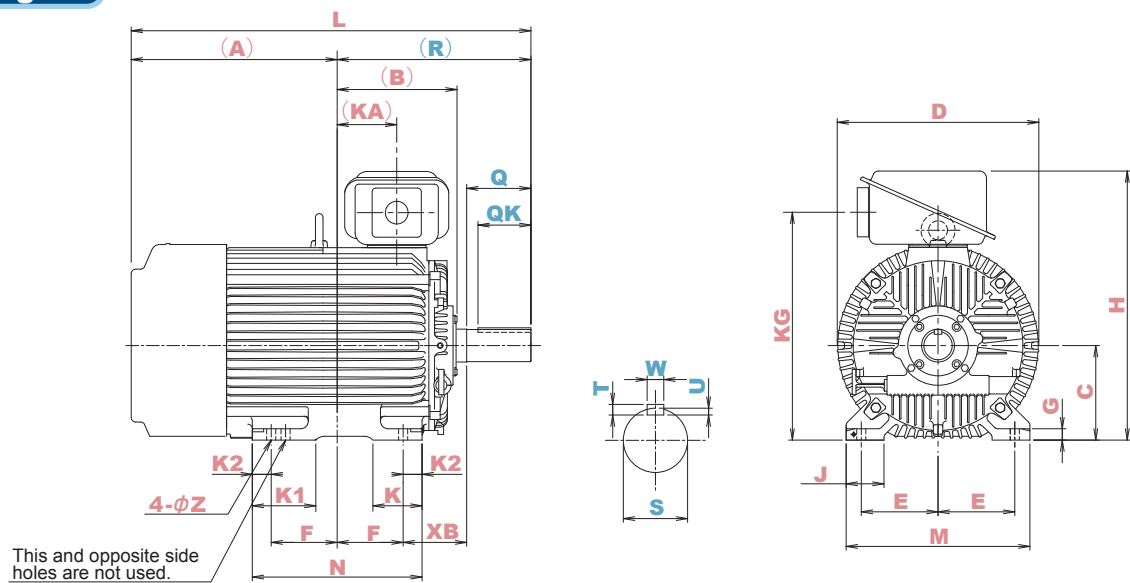
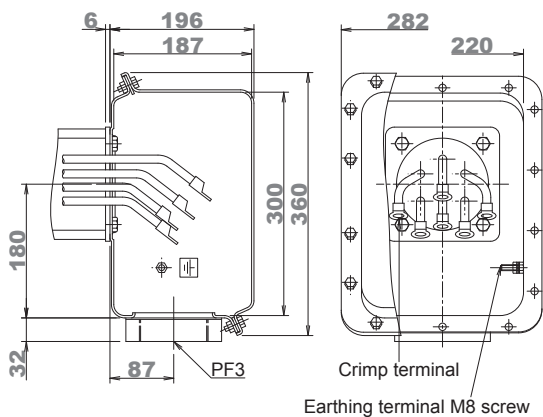


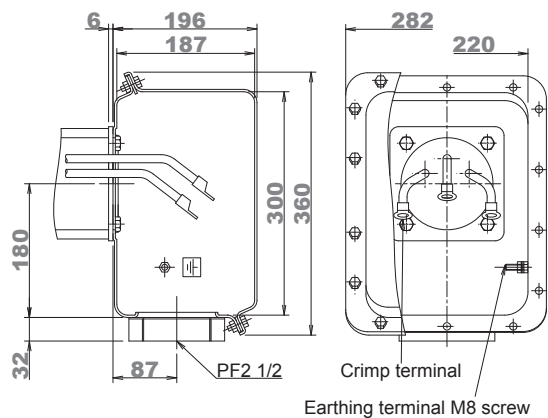
Fig.3



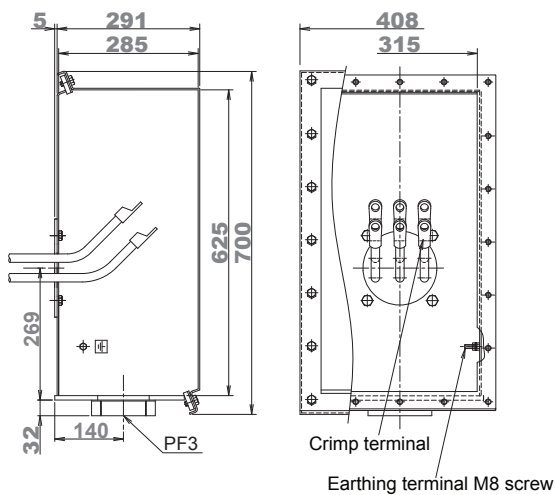
For low voltage and
Frame size 280L and smaller



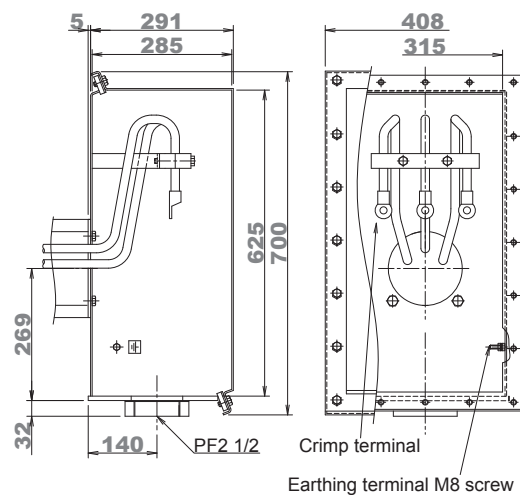
For 3kV class and
Frame size 280L and smaller



For low voltage and Frame size 315H



3kV class and Frame size 315H~450,
6kV class and Frame size 280L~450



For Fr. 500 or higher,
please contact us since
it's special construction.

Fig.4

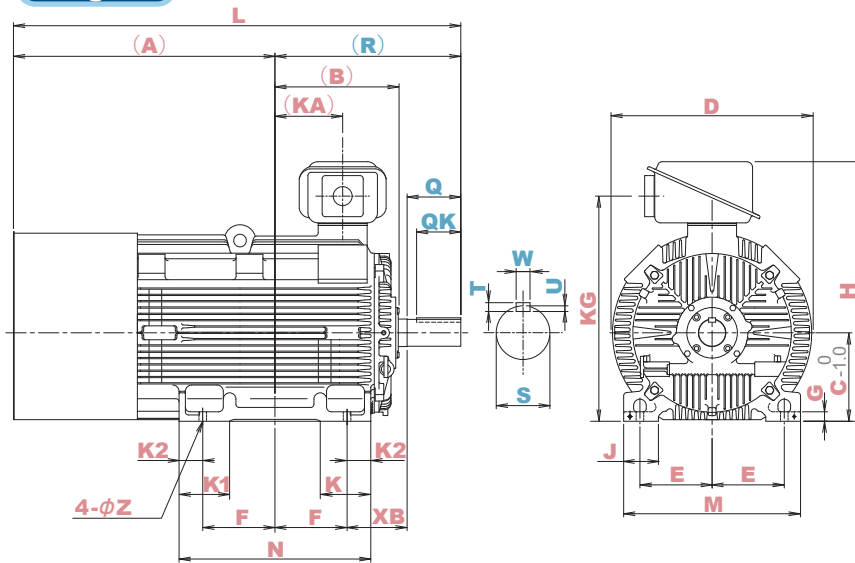
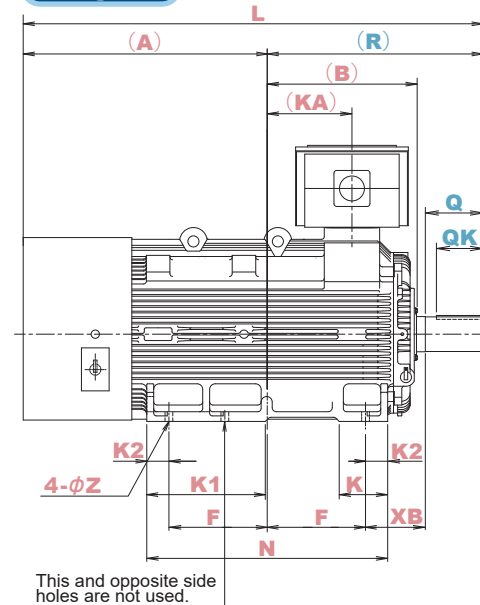


Fig.5



Dimensions for Totally Enclosed Fan Cooled Type (TEFC)

Frame size	Poles	Voltage	Fig.No.	Dimensions													
				A	B	C*1	D	E	F	G	H	KA	KG	J	K	K1	K2
250SC	2P	Low	Fig.1	578.5	298	250	479	203	155.5	30	702	138.5	593	100	130	50	88
	4P~			560.5													
250MC	2P	Low	Fig.2	559.5	317	250	479	203	174.5	30	702	157.5	593	100	130	50	50
	4P~			541.5													
250MD	2P	Low / High (3kV / 6kV)	Fig.3	545.5	317	250	535	203	174.5	30	712	157.5	603	100	130	168	50
	4P~																
280SC	2P	Low	Fig.1	622	348.5	280	532	228.5	184	30	772	138.5	593	100	130	40	91
	4P~			604													
280MC	2P	Low	Fig.2	596.5	374	280	532	228.5	209.5	30	772	214.5	663	110	181	40	40
	4P~			578.5													
280MD	2P	Low / High (3kV / 6kV)	Fig.3	596.5	374	280	587	228.5	209.5	30	782*9	210.5	673*9	110	130	181	40
	4P~																
280L*5	2P	Low / High (3kV / 6kV)	Fig.4	886.5	393	280	640	228.5	228.5	30	822*10	214.5	713*10	110	160	160	75
	4P~			828.5													
315H*6	2P	Low / High (3kV / 6kV)	Fig.5	939	541.5	315	707	254	355	35	996	306	840	130	175	428	80
	4P~			881													
355H*7	2P	Low / High (3kV / 6kV)	Fig.5	976	669	355	764	305	450	40	1076	434	920	160	190	460	80
	4P~																
400H*8	4P~	Low / High (3kV / 6kV)	Fig.5	1060	745	400	900	343	500	40	1166	510	1010	165	230	420	110
450	4P~	Low / High (3kV / 6kV)	Fig.6	1407	815	450	950	375	500	40	1444	435	1212	200	310	545	145
500*11	4P~	Low / High (3kV / 6kV)	Fig.6	1447	901	500	1036	475	625	45	1524	560	1292	230	400	675	145
560*11	4P~	Low / High (3kV / 6kV)	Fig.6	1502	905	560	1136	500	700	50	1634	635	1402	210	400	650	145
630*11	4P~	Low / High (3kV / 6kV)	Fig.6	1420	1133	630	1270	560	800	55	1780	755	1500	235	405	550	125

Note : *1 The tolerance of shaft center-height (C) are 0~0.5mm for 250 frame and 0~1.0mm for 280~630 frame.

*2 Shaft key and key way are in accordance with JIS B1301(1976) and B0903(1977).

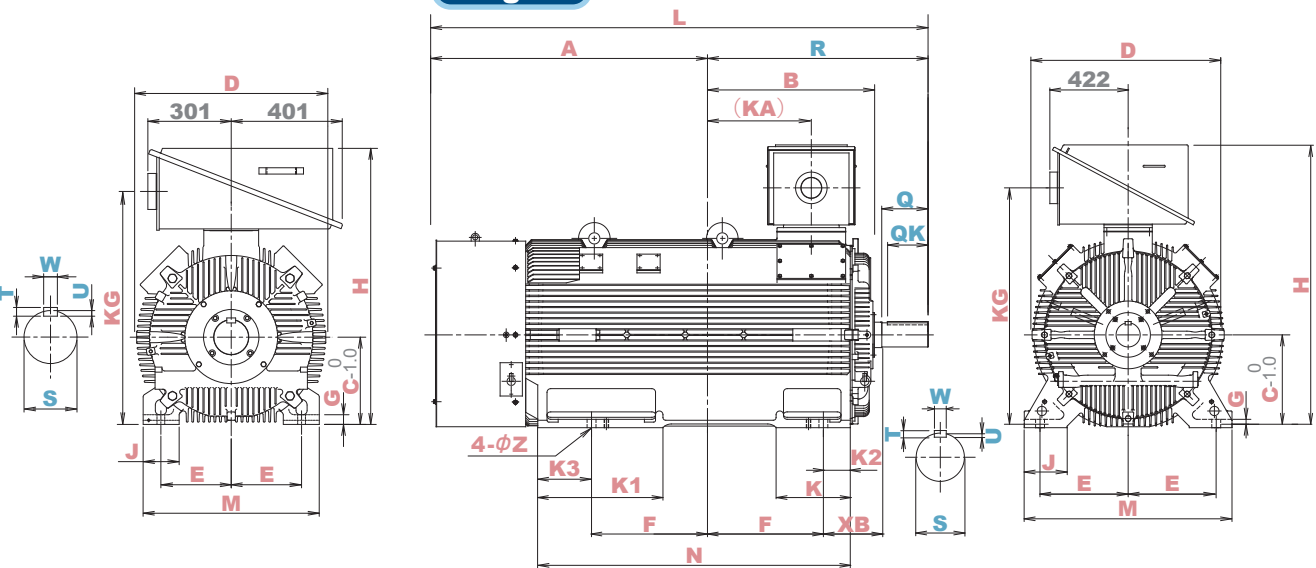
Regarding about 355 and 400 frames, the shaft size and bearing size may change as per the belt specification.

*3 No radial clearance symbol bearing shall be CM type.

*4 Bearing size indicated ZZ means used sealed type bearing.

*5 When specified 315S or 315M frame, it is available.

Fig.6

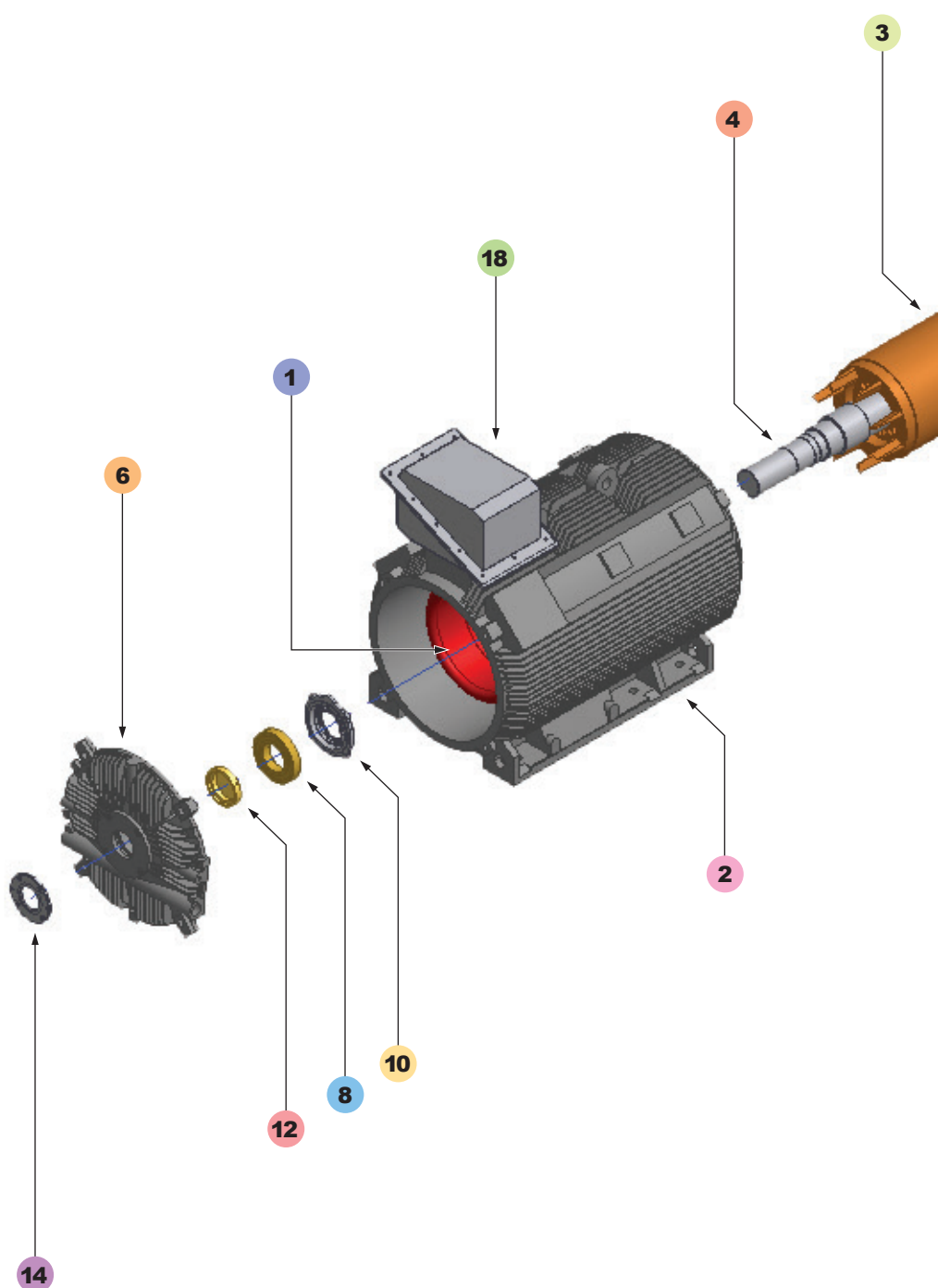


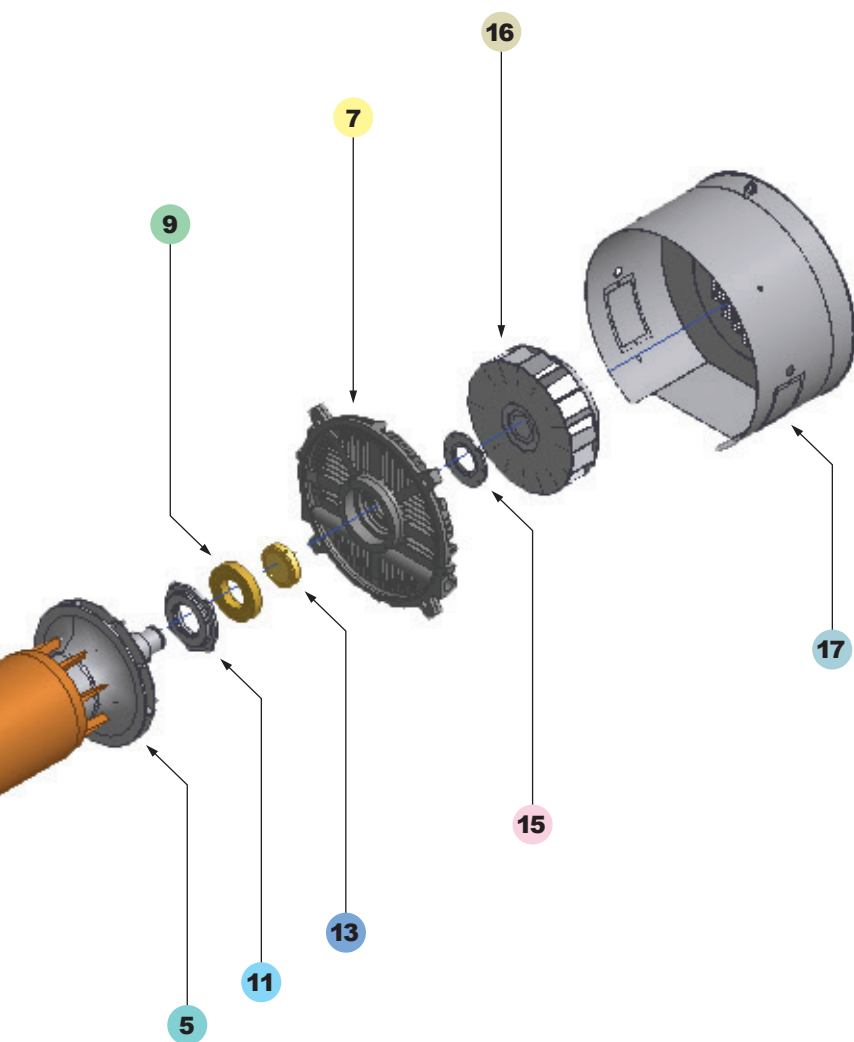
						Shaft end dimensions*2							Bearing sizes*3	
K3	L	M	N	XB	Z	Q	QK	R	S	T	U	W	Load side	Opp. Load side*4
—	1012	486	449	168	24	110	90	433.5	55m6	10	6	16	6312C3	6312C3
	1024					140	110	463.5	75m6	12	7.5	20	D.C.:6218 B.D.:NU218	6216ZZ
—	1012	486	449	168	24	110	90	452.5	55m6	10	6	16	6312C3	6312C3
	1024					140	110	482.5	75m6	12	7.5	20	D.C.:6218 B.D.:NU218	6216ZZ
—	998	486	449	168	24	110	90	452.5	55m6	10	6	16	6312C3	6312C3
	1028					140	110	482.5	75m6	12	7.5	20	D.C.:6218 B.D.:NU218	6217ZZ
	1058					170	140	512.5	85m6	14	9	22	6312C3	6312C3
—	1106	560	499	190	24	110	90	484	55m6	10	6	16	D.C.:6220 B.D.:NU220	6216ZZ
	1148					170	140	544	85m6	14	9	22	6312C3	6312C3
—	1106	560	499	190	24	110	90	509.5	55m6	10	6	16	6312C3	6312C3
	1148					170	140	569.5	85m6	14	9	22	D.C.:6220 B.D.:NU220	6216ZZ
—	1106	560	499	190	24	110	90	509.5	55m6	10	6	16	6312C3	6312C3
	1166					170	140	569.5	85m6	14	9	22	D.C.:6220 B.D.:NU220	6217ZZ
—	1415	560	607	190	24	110	90	528.5	55m6	10	6	16	6312C3	6312C3
	1417					170	140	588.5	85m6	14	9	22	D.C.:6220	6217ZZ
	1457					210	170	628.5	110m6	16	10	28	B.D.:NU324	6220
—	1650	636	870	216	28	140	110	711	65m6	11	7	18	6214C3	6214C3
	1622					170	140	741	95m6	14	9	25	D.C.:6220	6220
	1662					210	170	781	125m6	18	11	32	B.D.:NU326	6220
—	1820	710	1060	254	28	140	110	844	75m6	12	7.5	20	6216C3	6216C3
	1890					210	160	914	110m6	16	10	28	D.C.:6224C3	6224C3
	1930					250	200	954	130m6	18	11	32	B.D.:NU328	6228C3
—	2050	800	1220	280	35	210	160	990	120m6	18	11	32	D.C.:6228C3	6228C3
	2090					250	200	1030	130m6	18	11	32	B.D.:NU328	6228C3
400	2472	950	1545	315	42	250	220	1065	130m6	18	11	32	D.C.:6228C3	6228C3
290	2667	1120	1685	315	48	250	220	1190	130m6	18	11	32	D.C.:6328C3	6328C3
245	2787	1170	1790	335	48	250	220	1285	130m6	18	11	32	D.C.:6328C3	6328C3
165	2805	1310	1890	335	48	250	220	1385	130m6	18	11	32	D.C.:6328C3	6328C3

Note : *6 When specified 315L(2F=508) frame, it is available.
*7 When specified 355L(2F=630) or 355J(2F=800) frame, it is available.
*8 When specified 400K(2F=800) frame, it is available.
*9 When supply voltage is 6kV class, then dimensions H and KG becomes H=877mm and KG=721mm.
*10 When supply voltage is 6kV class, then dimensions H and KG becomes H=917mm and KG=761mm.
*11 For Fr. 500 or higher, the terminal box for low voltage differs in shape and dimensions.
D.C. means Direct Coupled, B.D. means Belted Drive.
These data given in this table are subject to change without notice.

21-F II in detail

This drawout view is an example for a basic construction of a totally-enclosed fan cooled type motor with rolling type bearings. (Type of construction IM B3, degree of protection IP44 and IC411 cooling method.)





Part No. Part Name

- 1** — Stator core and Stator coil
- 2** — Frame
- 3** — Rotor core
- 4** — Shaft
- 5** — Internal fan
- 6** — Bearing bracket,drive end
- 7** — Bearing bracket,non-drive end
- 8** — Bearing,drive end
- 9** — Bearing,non-drive end
- 10** — Bearing cover,drive end
- 11** — Bearing cover,non-drive end
- 12** — Grease runner,drive end
- 13** — Grease runner,non-drive end
- 14** — Labyrinth seal,drive end
- 15** — Labyrinth seal,non-drive end
- 16** — External fan
- 17** — Fan cover
- 18** — Terminal box



TMEiC Corporation

HEAD OFFICE : TOKYO SQUARE GARDEN, 3-1-1 Kyobashi, Chuo-ku, Tokyo 104-0031, Japan Phone : +81-3-3277-5511 Fax : +81-3-3277-5553