TMEiC

We drive industry

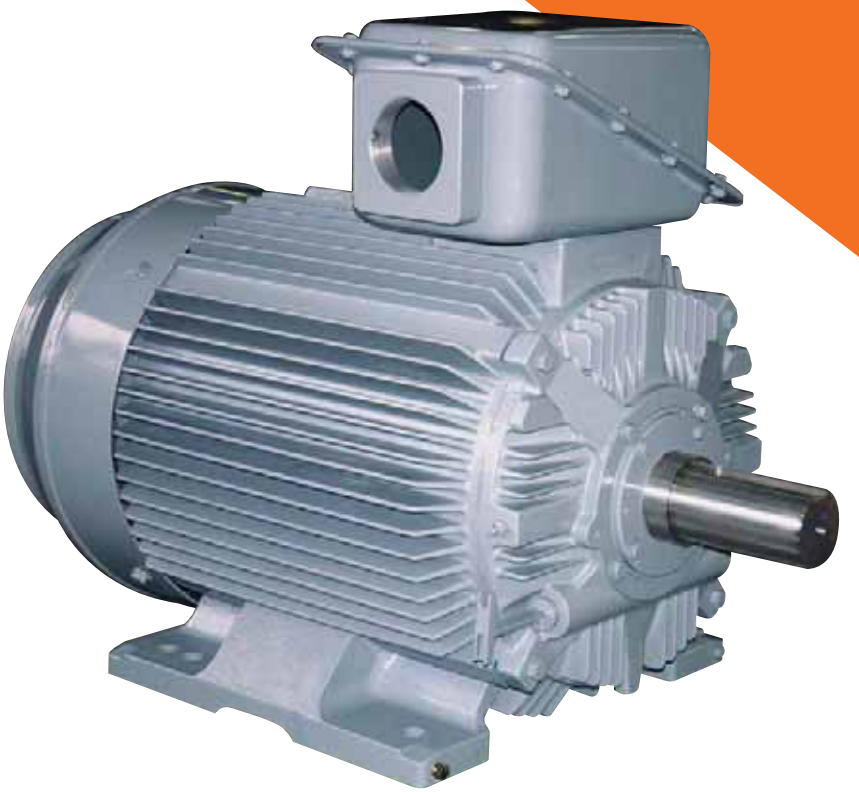
Low and Medium Voltage Motors

21-FII Series

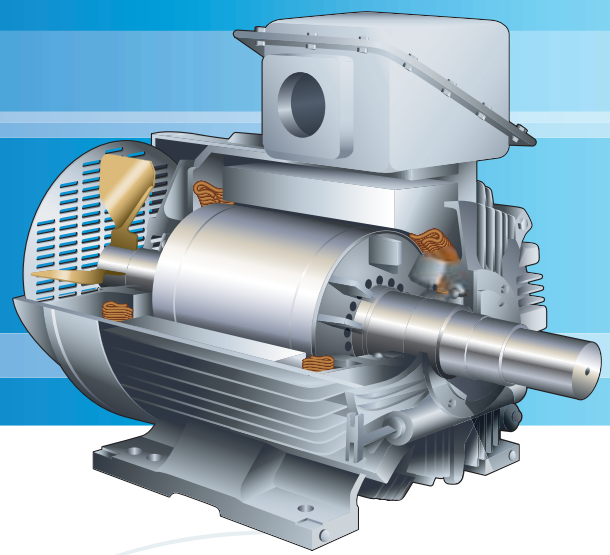
New High Efficiency Design

37 kW – 1,400 kW

(50 HP – 1,850 HP)



Meets World Wide 21-FII Series



Technical Features / Benefits:

- High performance reduces cost of ownership
- Compact size reduces cost of installation
- New casting construction provides low noise and low vibration
- High quality insulation system provides mechanical rigidity and electrical reliability

1 Highly-Reliable Aluminum Die Cast Rotor

Expanded range of applications for an aluminum die cast rotor. This rotor construction has resulted in greater capacity, high reliability, high frequent starting duty and lower rotor inertia.

2 Expansion of Cast Iron Fin Frame

Improved ventilation flow and higher efficiency result in greater frame size capacity.

3 Improved Bearing Maintenance

Improved bearing housing construction and a longer bearing re-greasing interval lengthened to twice that of previous designs result in less maintenance and improved performance.

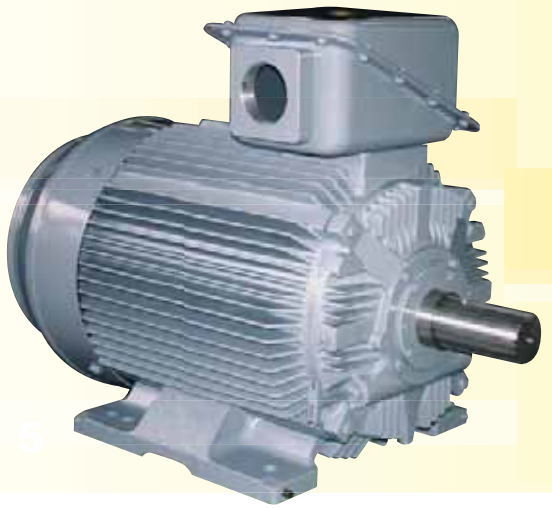
Ball or roller bearings are equipped with grease supply nipple discharge devices for easy grease exchange.

Re-greasing can be done easily and safely while the motor is operating. Grease inlet nipples are located on the side of the bearing housing of the frame. Grease is discharged into a quickly removable cassette for periodic emptying. The pull-out direction of the grease discharging cassette shown on the right can be changed to the other side if necessary.

4 Main Terminal Box

The standard main terminal box is located on top of the motor frame and rotated every 90° for easier cable entry. Sufficient space for easy incoming cable connection is provided. As an option, the terminal box can be mounted on a slant (left or right) when required for side mount cable entry.

Market Needs

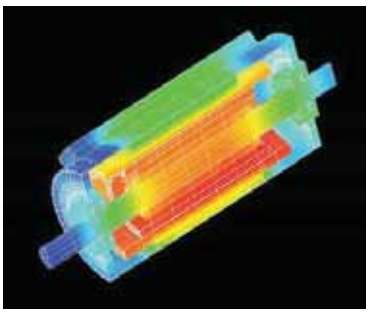


Output	37 kW (50 HP) up to 1,400 kW (1,850 HP)
Poles	2* up to 10
Voltage	400 V up to 6,600 V, 50 or 60 HZ
Enclosures	Totally Enclosed Fan Cooled (TEFC)
Frame Size	250 up to 500 (IEC basis)
Thermal Class	F

* 2 pole motor is not applied to frame sizes above 400

5 Highly Efficient Ventilation and Cooling Construction

Using three-dimensional thermal conduction analysis tools, efficiency and ratings have been optimized for each frame size. This analysis enables design of compact size motors with higher efficiency than other designs.



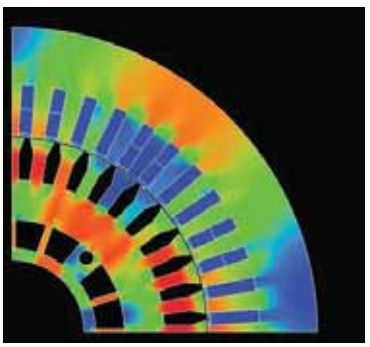
Three dimensional thermal conduction analysis

6 Compact Size

Improved cooling reduces the machine size and footprint. This makes 21-FII series motors easy to install and transport.

7 Quiet Operation

Quiet operation is achieved through improved cooling and graphical magnetic field analysis, illustrated to the right. The result is a motor with low noise and low vibration.



Magnetic field analysis

8 Quality-Certified by Third Parties

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

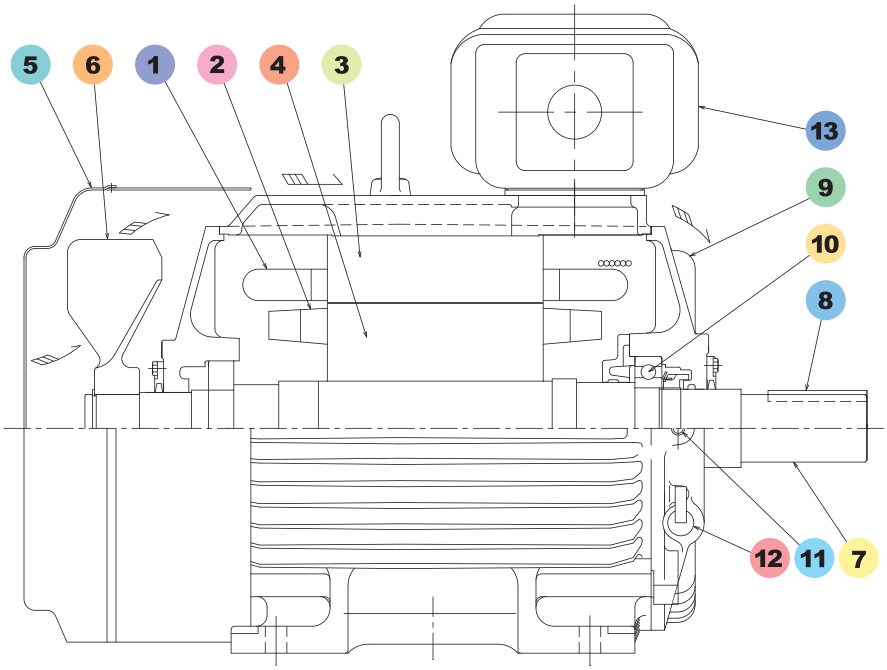
9 Meets International Standards

Meets international standards including IEC, NEMA, BS, AS, and others. The degree of protection available is IP44 to IP55 for all FII machines.

General Construction

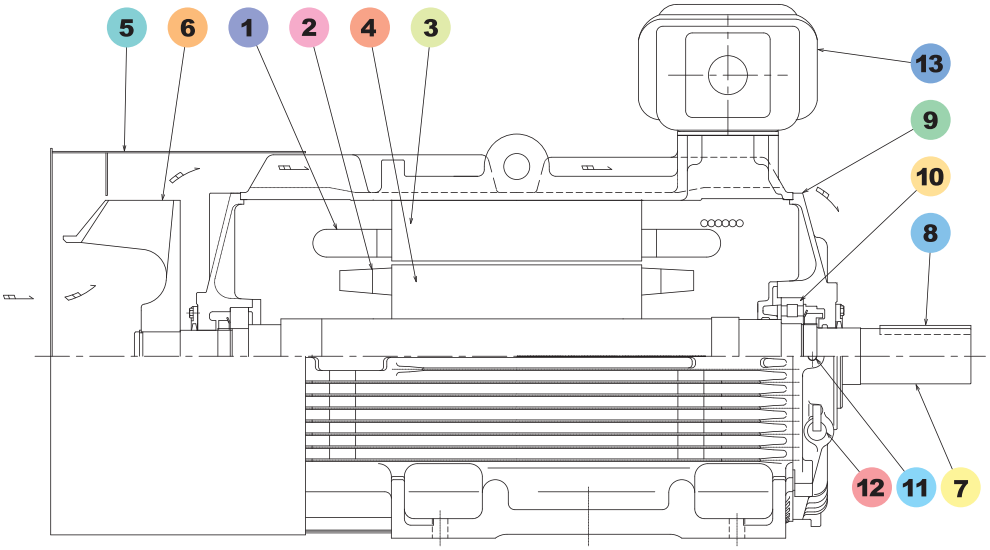
Frame size 250SA~280MD

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



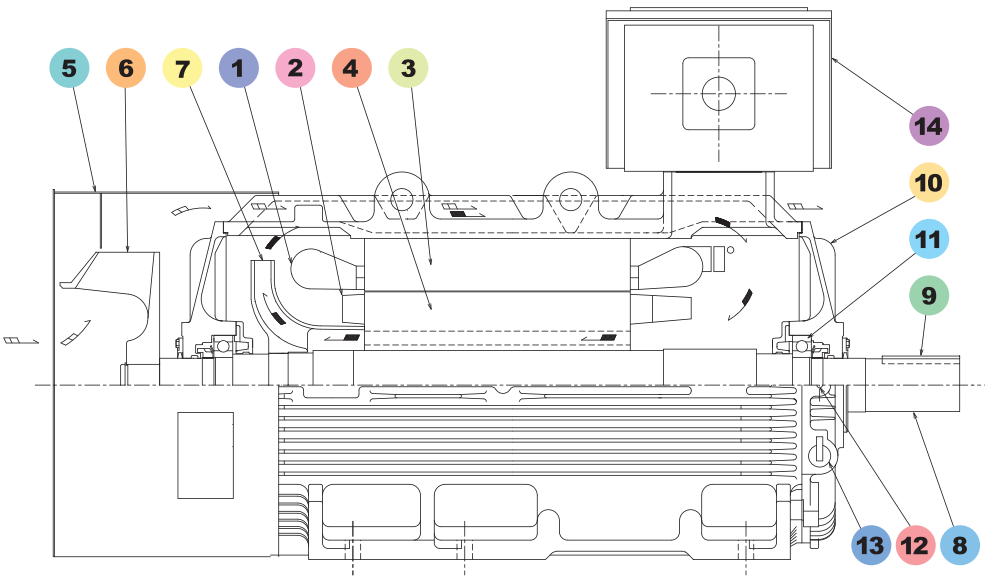
Frame size 280L

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



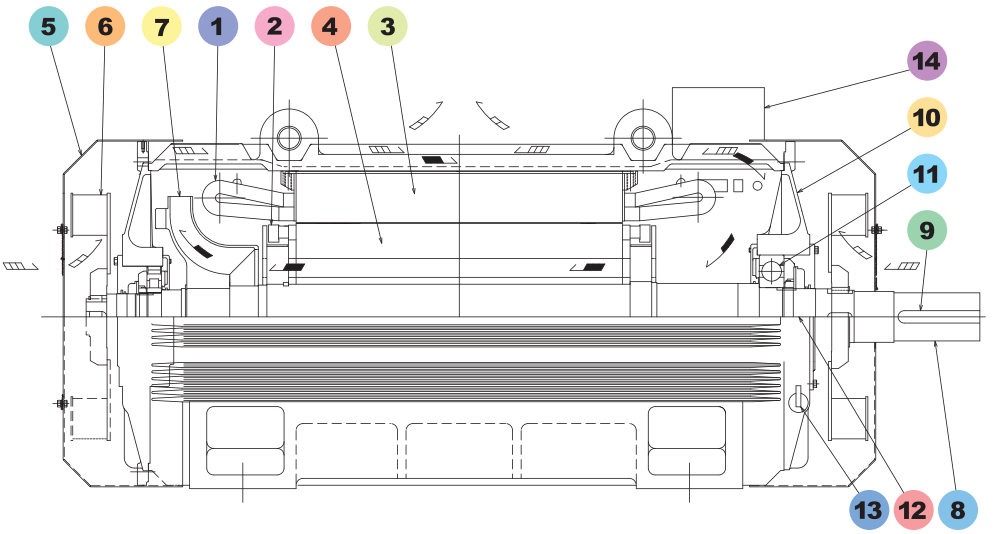
Frame size 315H～450

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

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

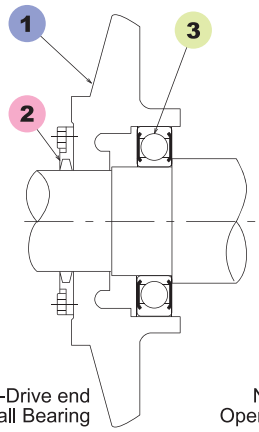


BEARING ARRANGEMENTS

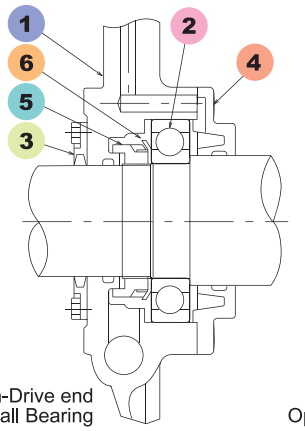
Bearing Construction of Grease Lubricating Type Anti-friction Bearings (for Direct Coupled)

Frame size 250SA~315H

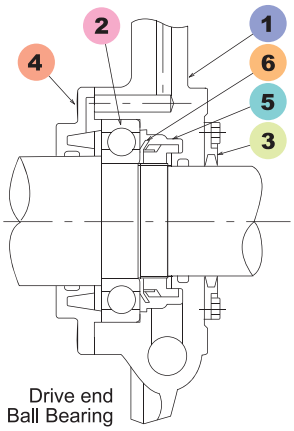
Part No.	Part Name
1	Bearing bracket
2	Bearing
3	Labyrinth seal
4	Bearing cover
5	Grease runner
6	Bearing washer



Non-Drive end
Sealed Ball Bearing



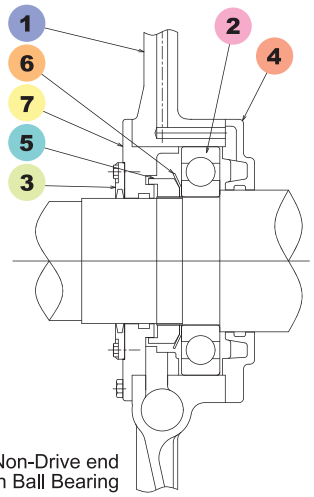
Non-Drive end
Open Ball Bearing



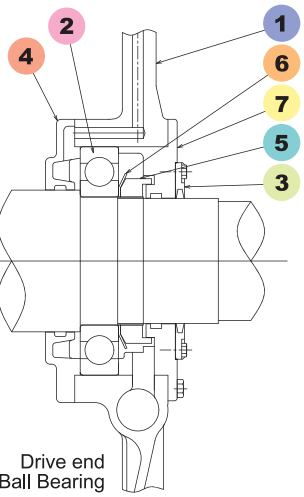
Drive end
Open Ball Bearing

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



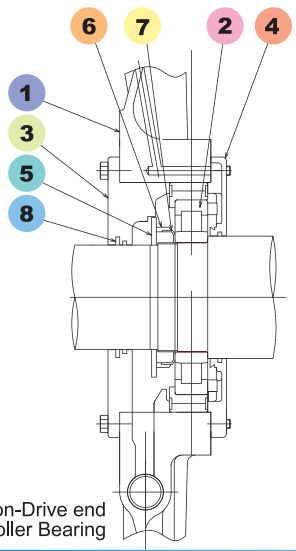
Non-Drive end
Open Ball Bearing



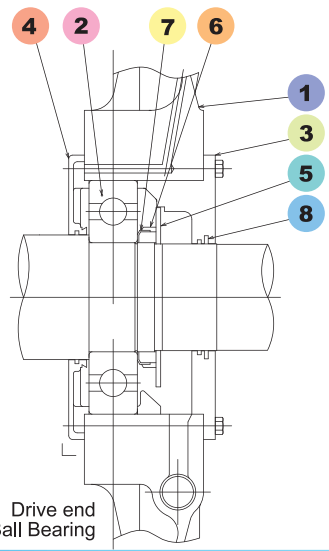
Drive end
Open Ball Bearing

Frame size 500

Part No.	Part Name
1	Bearing bracket
2	Bearing
3	Outside oil seal
4	Inside oil seal
5	Grease valve
6	Bearing nut
7	Bearing washer
8	Packing



Non-Drive end
Roller Bearing

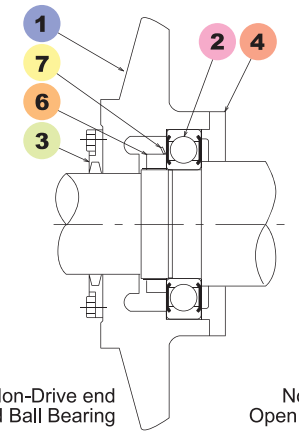


Drive end
Open Ball Bearing

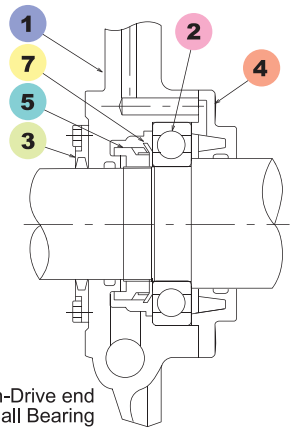
Bearing Construction of Grease Lubricating Type Anti-friction Bearings (for Belt Drive)

Frame size 250SA～315H

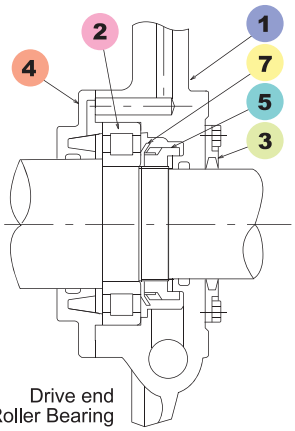
Part No.	Part Name
1	Bearing bracket
2	Bearing
3	Labyrinth seal
4	Bearing cover
5	Grease runner
6	Bearing nut
7	Bearing washer



Non-Drive end
Sealed Ball Bearing



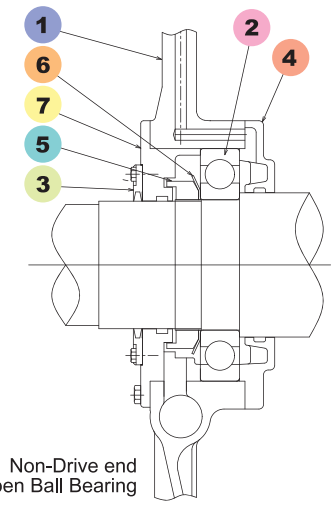
Non-Drive end
Open Ball Bearing



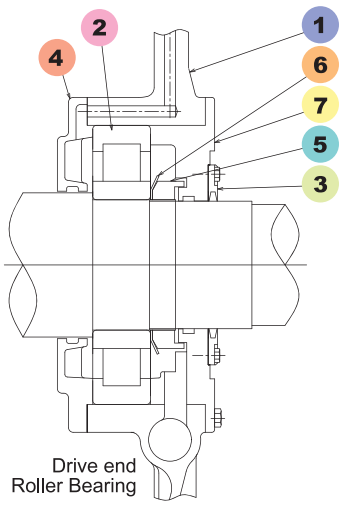
Drive end
Roller Bearing

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



Non-Drive end
Open Ball Bearing



Drive end
Roller Bearing

OUTLINE DRAWINGS

Fig.1

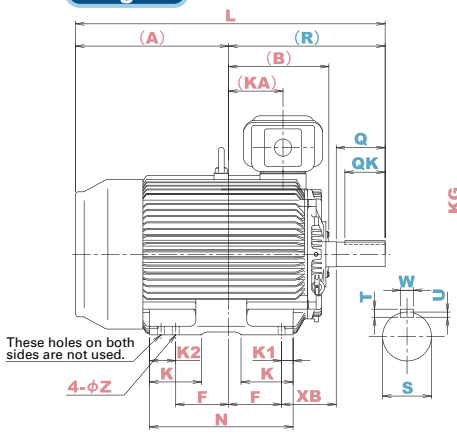
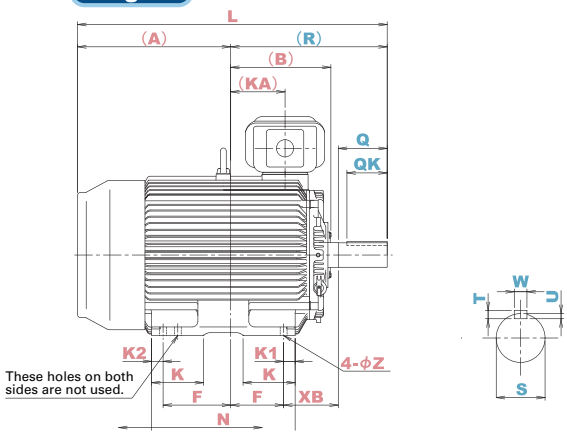


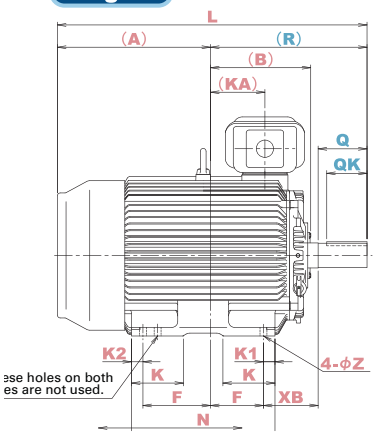
Fig.2



Frame Size	Poles	Voltage (kV)	Fig.	Dimensions													
				A	B	C	D	E	F	G	H	KA	KG	J	K	K1	
250SA	2 p	Up to 6.6	1	486.5	298	250	490	203	155.5	30	692	138.5	583	100	168	50	
	4 p & up			468.5													
250MA	2 p	Up to 6.6	2	467.5	317	250	490	230	174.5	30	692	157.5	586	100	168	50	
	4 p & up			449.5													
250MD	2 p	Up to 6.6	3	545.5	317	250	535	203	174.5	30	712	157.5	603	100	130	168	
	4 p & up	Up to 6.6															
280SA	2 p	Up to 6.6	1	550	348.5	280	550	228.5	184	30	762	189	653	110	181	40	
	4 p & up			532													
280MA	2 p	Up to 6.6	2	524.5	374	280	550	228.5	209.5	30	762	214.5	653	110	181	40	
	4 p & up			506.5													
280MD	2 p	Up to 6.6	3	596.5	374	280	587	228.5	209.5	30	782*9	210.5	673*9	110	130	181	
	4 p & up																
280L*5	2 p	Up to 6.6	4	886.5	393	280	640	228.5	228.5	30	822*10	214.5	713*10	110	160	160	
	4 p & up			828.5													
315H*6	2 p	Up to 6.6	5	939	541.5	315	707	254	355	35	996	306	840	130	175	428	
	4 p & up			881													
355H*7	2 p	3.0	5	976	669	355	764	305	450	40	1076	434	920	160	190	460	
	4 p & up																
400H*8	4 p & up	3.0	5	1060	745	400	900	343	500	40	1166	510	1010	165	230	420	
450	4 p & up	3.0	5	1174	801	450	950	375	500	40	1270	566	1114	200	280	280	
500	4 p & up	3.0	6	1175	1195	500	1030	475	625	40	1220	760	620	220	220	310	

Note: 1 The tolerance of shaft center height (C) is 0~0.5 mm for 250 frame, 0~1.0 mm for 280~450 frames, and -.02~-0.8 mm for 500 frame.
2 Shaft key and key way in accordance with JIS B130 (1976) & B0903 (1977). For 355 & 400 frames, shaft & bearing size may change per belt specification.
3 Radial clearance symbol bearing cannot be CM type.
4 ZZ bearing size indicates a sealed type bearing.
5 When specified, 315S or 315M frame is available.
6 When specified, 315L (2F=508) frame is available.

Fig.2



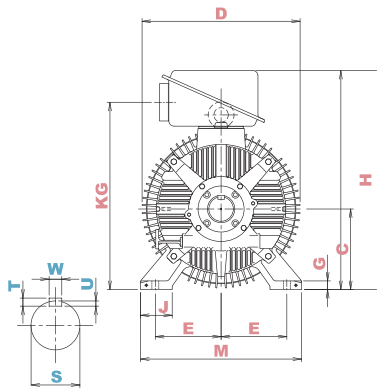
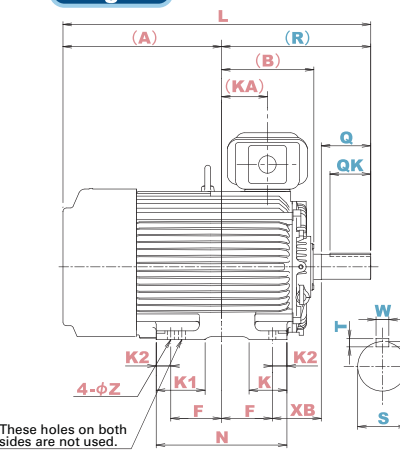
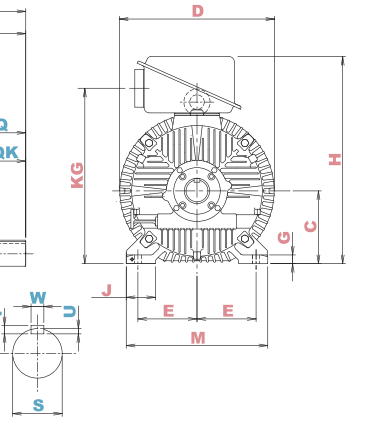


Fig.3





						Shaft End Dimensions							Bearing Sizes	
	K2	L	M	N	XB	Z	Q	QK	R	S	T	U	W	Load Side	Opp. Load side
	88	920	486	449	168	24	110	90	433.5	55m6	10	6	16	6312C3	6312C3
		932					140	110	463.5	75m6	12	7.5	20	D.C: 6218 B.D.: NU218	6216ZZ
	50	920	486	449	168	24	110	90	452.5	55m6	10	6	16	6312C3	6312C3
		932					140	110	482.5	75m6	12	7.5	20	D.C: 6218 B.D.: NU218	6216ZZ
	50	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	6216ZZ
		1058					170	140	512.5	85m6	14	9	22		
	91	1034	560	499	190	24	110	90	484	55m6	10	6	16	6312C3	6312C3
		1076					170	140	544	85m6	14	9	22	D.C.: 6220 B.D.: NU220	6216ZZ
	40	1034	560	499	190	24	110	90	509.5	55m6	10	6	16	6312C3	6312C3
		1076					170	140	569.5	85m6	14	9	22	D.C.: 6220 B.D.: NU220	6216ZZ
	40	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	6216ZZ
	75	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 B.D.: NU324	6216ZZ
		1457					210	170	628.5	110m6	16	10	28		6220
	80	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 B.D.: NU326	6220
		1662					210	170	781	125m6	18	11	32		
	80	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 B.D.: NU328	6224C3
		1930					250	200	954	130m6	18	11	32		
	110	2050	800	1220	280	35	210	160	990	120m6	18	11	32	D.C.: 6228C3 B.D.: NU328	6228C3
		2090					250	200	1030	130m6	18	11	32		
	140	2259	950	1280	335	42	250	200	1085	130m6	18	11	32	D.C.: 6288C3	6228C3
	180	2720	1120	1610	670	48	250	224	1545	130m6	18	11	32	D.C.: 6288C3	NU228

Note: 7 When specified, 355L (2F=630) or 344J (2F=800) frames are available.
8 When specified, 400K (2F=800) frame is available.
9 When supply voltage is 6 kV class, then dimensions H and KG become H=877 mm and KG=721 mm.

Note: 10 When supply voltage is 6 kV class, then dimensions H and KG become H=917 and KG=761 mm.
D.C. Direct Coupled.
B.D. Belted Drive.
The data in this table is subject to change without notice.

OUTLINE DRAWINGS

Fig.4

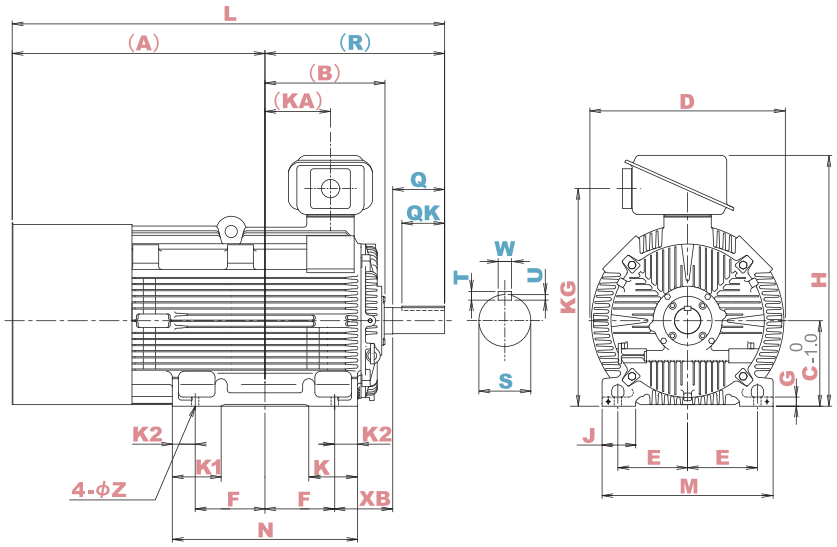


Fig 5

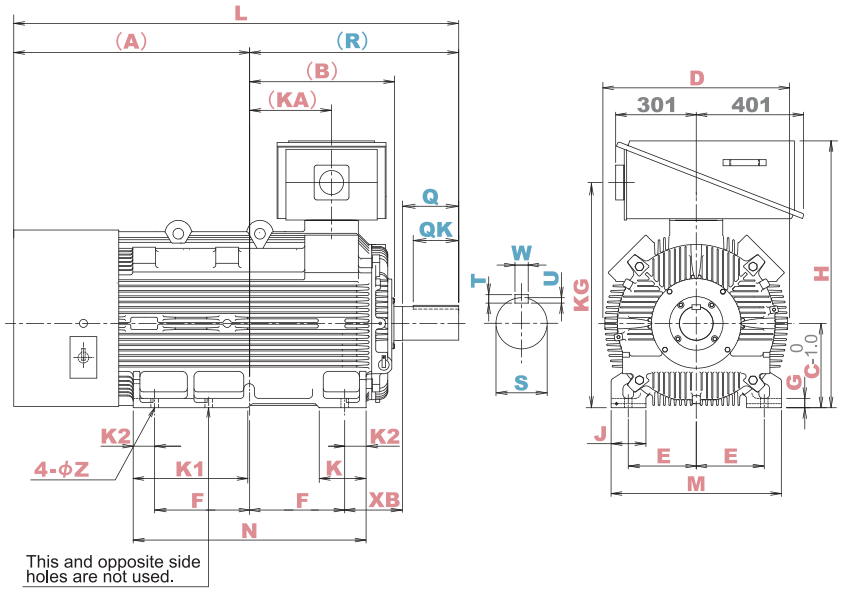
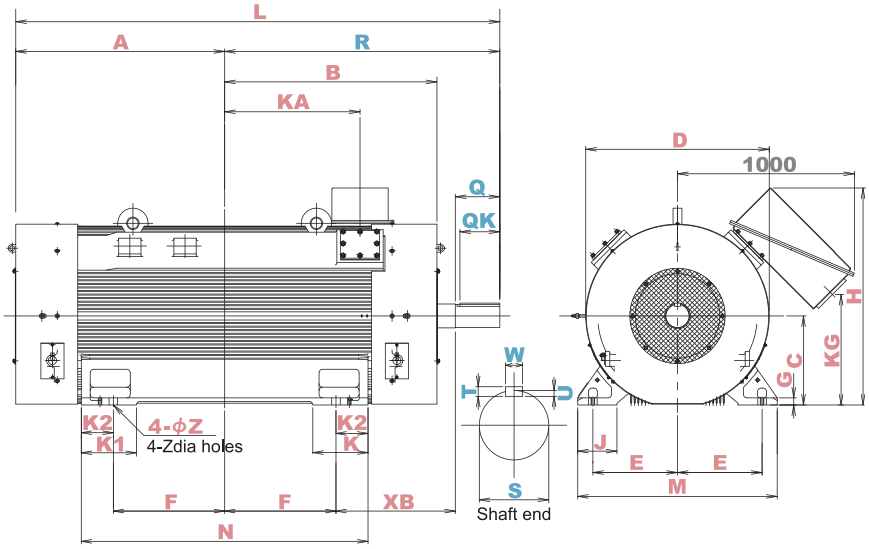
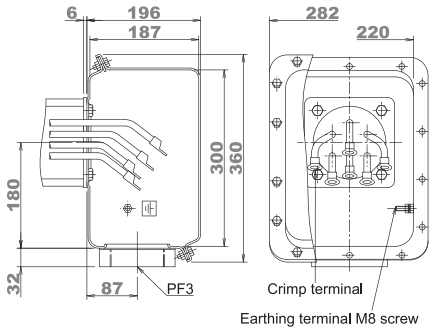


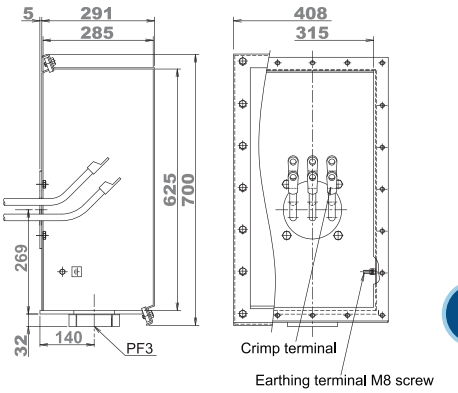
Fig.6



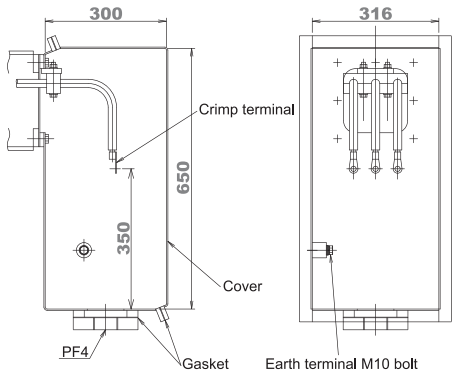
For low voltage and Frame size 280L and smaller



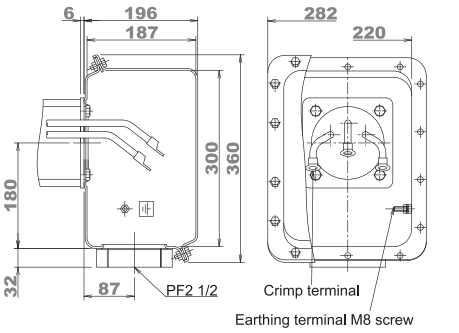
For low voltage and Frame size 315H



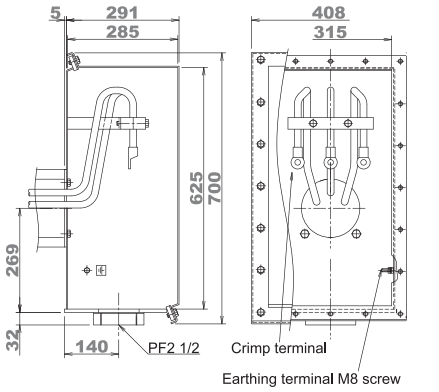
For Frame size 500



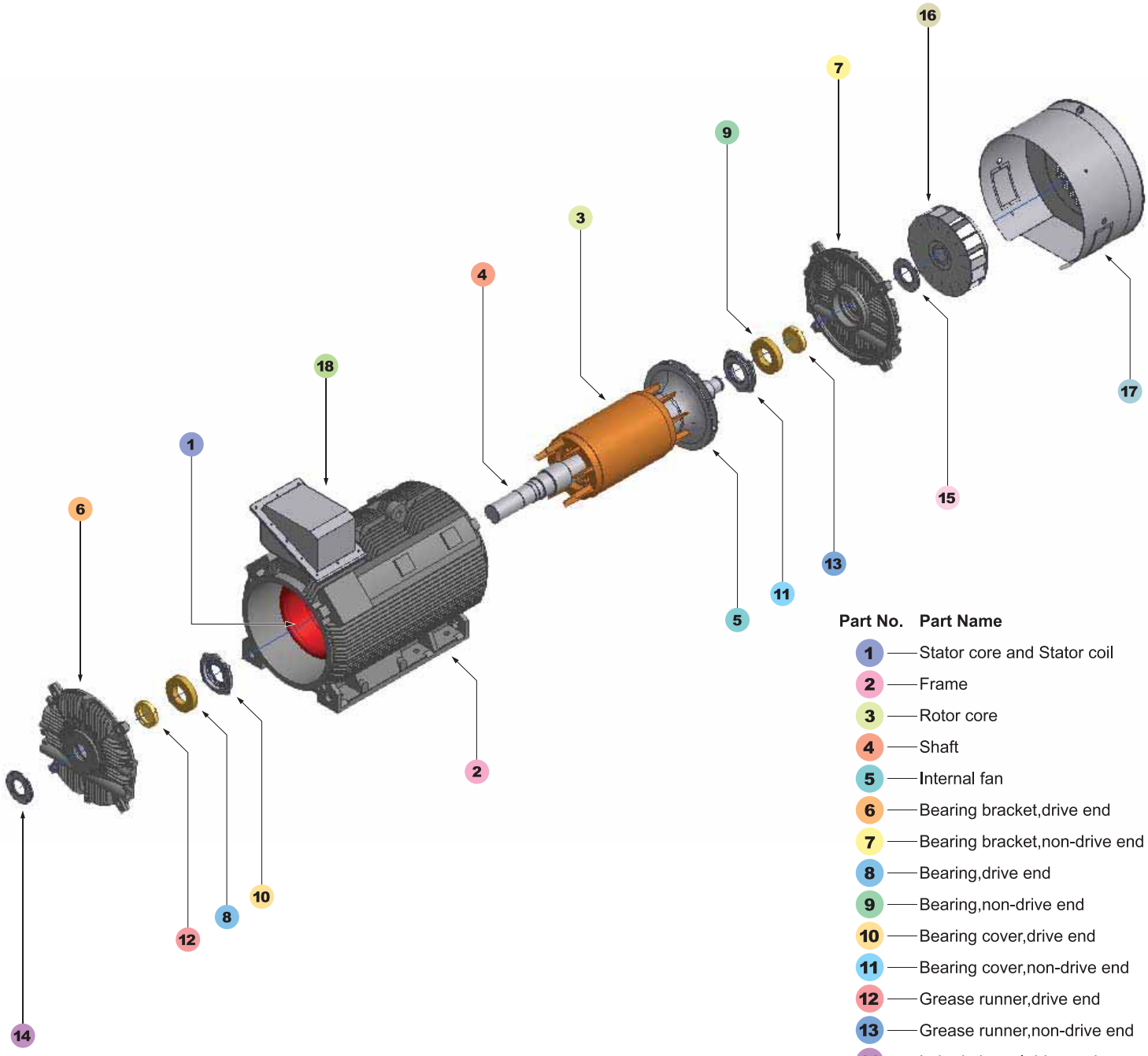
For 3kV class and Frame size 280L and smaller



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



21-FⅡ in detail



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

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