

Introducing  
A brand new series of Super Performers



Datasheet

**champion series motors**  
FRAME SIZE 160M-355L

**SIEMENS**

# TEFC

## 3 Phase Squirrel Cage Induction Motors

Siemens CHAMPION Series Cage Motors are suitable for the most diverse applications. The Motors are available in the wide range from frame sizes 63 to 355L. These Motors conform to (EFF1) and (EFF2) requirements for efficiency. These motors have a high efficiency and high uptime. Consequently the productivity is higher and energy consumption lower. The motors have low life cycle costs, hence great saving!!!

This datasheet deals specifically with motors from frame sizes 160M to 355L.

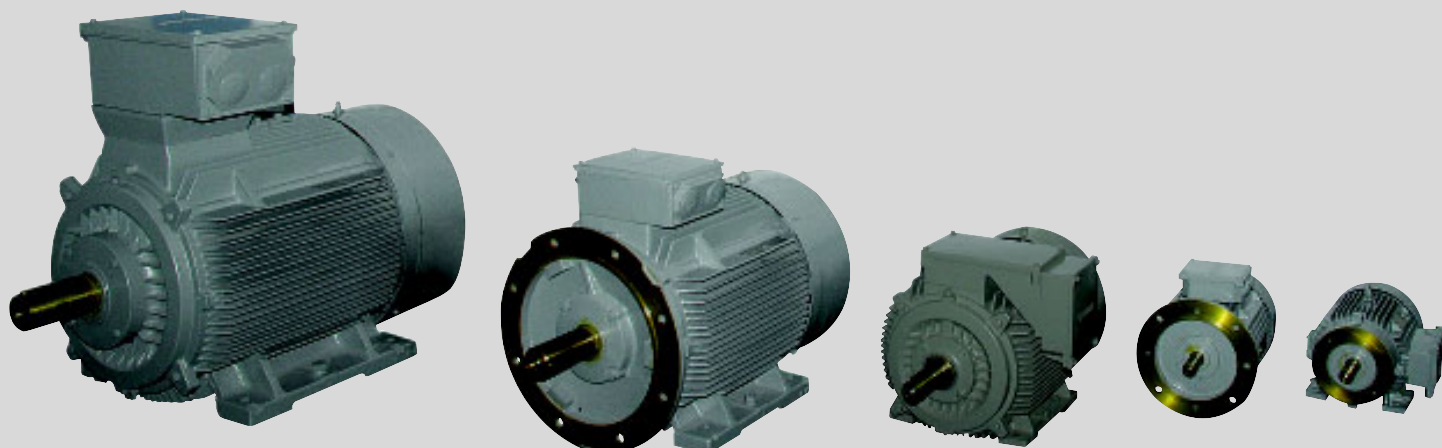
- 5.5 kW to 315 kW
- Universal implementation
- Improved operating performance
- High serviceability
- Optimised solutions

The active parts of the TEFC CHAMPION Cage Motors have been optimised to meet the requirements of efficiency values of (EFF1) and (EFF2), as per IS:12615-2004.

All these motors have 'CE' marking (on the ratingplate) in conformance to Machinery Directive 98/37/EC, EC Low Voltage Directive 2006/95/EC and EMC Directive 89/336/EEC.

<b>SIEMENS</b> 3~Ind. Mot. (EFF1) CE					
IEC 60034-1 IS:325		IS:12615		Amb.50°C	
%Eff 94.2	IP55	Duty S1	Ins.Cl. F		
1SE0 254-4YA80			Frame 250M		
⌀ No. N8/		Wt 495 kg ⌀			
Hz	V	kW	A	rpm	pf.
50	415Δ	55	96	1480	0.85
± 5%	± 10%				
<b>CHAMPION</b>			MADE IN INDIA		

<b>SIEMENS</b> 3~Ind. Mot. (EFF2) CE					
IEC 60034-1 IS:325		IS:12615		Amb.50°C	
%Eff 93.6	IP55	Duty S1	Ins.Cl. F		
1LA0 224-4YA80			Frame 225M		
⌀ No. N8/		Wt 345 kg ⌀			
Hz	V	kW	A	rpm	pf.
50	415Δ	45	78	1475	0.86
± 5%	± 10%				
<b>CHAMPION</b>			MADE IN INDIA		



# Motors of international design and quality

## Range

CHAMPION Series Motors are available from frame sizes 63 – 355L (0.12kW – 315kW in 4Pole). This data sheet specifically deals with motors from 160M-355L frames.

## Standards

Performance conforms to IS: 325, IEC 60034-1 and dimensions conform to IS:1231, IS:8223.

## Ratings

Motors are rated for continuous duty at an ambient of 50°C and site altitudes up to 1000m above mean sea level.

## Voltage and Frequency

Motors are designed for 3 phase, 415 V ±10%, 50 Hz ±5%, supply. Any other voltage/frequency available on request.


## Protection

Motors have IP55 degree of protection as a standard feature. This degree of protection conforms to IS: 4691. All motor, which have a shaft extension pointing upwards, must have a means (provided by the user) of preventing the ingress of liquids along the shaft.

For all motors with the shaft end pointing downwards, the version 'with canopy' is recommended.

If the motors are operated or stored outdoors, a shielding or an additional cover is recommended, so as to avoid long-term effects when exposed to direct, intensive sunlight, rain, snow.

Frame	1SE0		1LA0	
Eff-class	160 - 225	250 - 355	160 - 225	250 - 355
2 Pole				
4 Pole		<b>EFF 1</b>		<b>EFF 2</b>
6 Pole				
8 Pole				

 range available

## Winding Protection

Embedding of PTC thermistors in the stator winding is feasible and can be provided on request.

## Motor frame

Motors are supplied in a robust, rugged cast iron frame with integral feet.

## Terminal Box

Standard location of the terminal box is on the top of the housing. Terminal box on right or left hand side of housing available on request. The terminal boxes can be rotated in steps of 90° in each position. The terminal box also has IP55 degree of protection.

Side mounted terminal boxes are provided with adaptor piece. Change in position at site from LHS to RHS or vice-

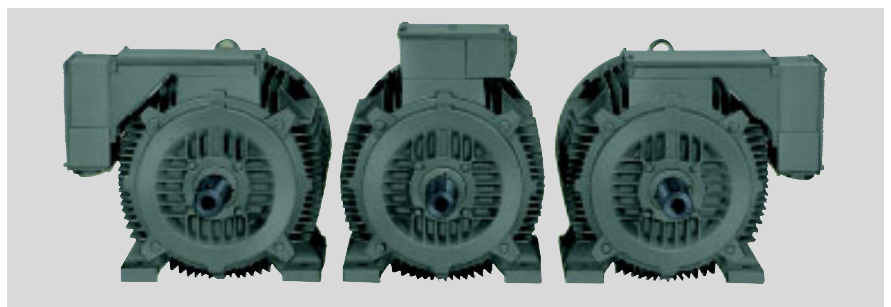
versa is possible by opening only eight bolts. No special skill is required to change the terminal box location.

CHAMPION Series motors for frame sizes 280 and 315 are provided with one size larger terminal box as a standard features. Please refer below table for details.

## Insulation System

Motors are provided with dual coat winding wires and Class 'F' insulation system. In the case of utilization to Class 'F' temperature limits, either the ambient temperature can go upto 55°C for the same rated output or the rated output may be increased by 10%.

**Adequate space in Terminal box to accommodate your cables!**



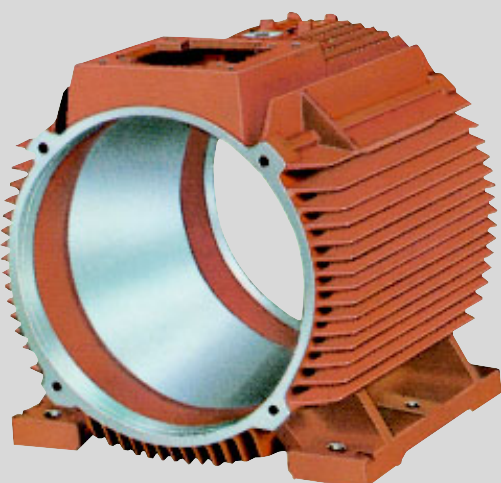
## Terminal Box Data

For Motor		Type of Terminal Box	Terminal Size	Max. Current Capacity per Terminal in Amps	Max. perm. conductor cross sec. area mm <sup>2</sup>	B.S. Conduit entry (IS:1653) in mm
Frame size	Type 1LA0					
160	16._	1XB1 223	M6	63	3½ x 25	2 x 31.8
180	18._					
200	20._	1XB7 322	M8	100	3½ x 35*	2 x 51
225	22._					
250	25._	1XB7 422	M10	200	3½ x 120	2 x 51
280	28._	1XB7 522	M12	400	3½ x 240	2 x 63.5
315	31._	1XB7 622	M16	630	3½ x 400	2 x 63.5
355	35._					

Method of Starting : DOL or Star-Delta

No of Terminals: 6

\*50 mm<sup>2</sup> for DOL starting only





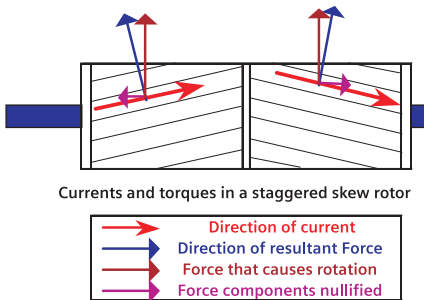
# Energy Saving, Cost Saving

## Die-Cast Rotors



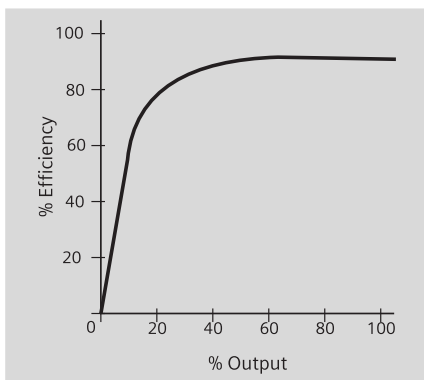
Complete range of motors is provided with high pressure aluminum die-cast rotors which ensures enhanced reliability due to elimination of joints that exists in a brazed rotor.

Most designs are provided with staggered skew rotors, which eliminates axial thrust on the bearings generated due to skewing of the rotor as shown below.



## Efficiency

Efficiency of motors conforms to  $\text{EFF1}$  and  $\text{EFF2}$  and generally remains unchanged from 100% to 60% of rated output utilisation.



Therefore while reducing your electricity bills, these motors help you save money and can be better looked upon as "Money saving motors" (refer case studies given on page nos. 6 and 7)

## Noise Level

Motors are designed for low noise levels in accordance with IS: 12065.

## Balance and vibration severity

All the rotors are dynamically balanced with half key in position to vibration severity grade 'normal' as per IS 12075.

## Cooling and Ventilation

Type of cooling is IC 411 as per IS:6362 (IEC 34 -6:1991). All the motors have radial flow straight blade fan.

Even 2 pole motors with bi-directional fan

Entire range, even 315kW 2Pole motor is suitable for bi-directional operation. Cooling is independent of the direction of rotation of fan.

## Paint

The normal paint is in shade RAL 7037 (Dusty Grey). This paint is suitable for climate group 'worldwide' as per DIN IEC 60721 Part 2-1, and also for aggressive atmospheres upto 1% acid and alkali

## Types of Construction

	Type of construction / mounting	Frame size
	IMB3	160M-355L
	IMB5	160M-315M <sup>2)</sup>
	IMB35	160M-355L
	IMB6*, IMB7*, IMB8	160M-315L
	IMV5* without canopy	160M-280M 315M, 315L <sup>1)</sup>
	IMV5* with canopy	160M-315L <sup>1)</sup>
	IMV1 without canopy	160M-280M <sup>2)</sup> 315M-355L <sup>1)</sup>
	IMV1 with canopy	160M-355L <sup>1)</sup>
	IMV3	160M-280M 315M
	IMV6*	160M-280M 315M, 315L <sup>1)</sup>

\* For installation of foot mounting motors on a wall, **adequate support** should be provided for the mounting feet.

Two pole motors in 315L and above must be stored, transported and used only in the construction/ mounting as ordered in view of special bearing on NDE.

concentration or permanent dampness in sheltered rooms. However special paint and paint shades are available on request.

## Construction

Standard motors are horizontal foot mounted with single shaft extension (IMB3 as per IS: 2253). Frame sizes 160M-315L (except 2 pole motors of frame size 315) in IMB3 construction, can be mounted in IMB6, IMB7, IMB8, IMV5 and IMV6 construction. Other types of construction as shown below, available on request.

## Dual Mounting holes

Dual mounting holes are provided at the NDE for the frames 180M/L, 225S/M, 280S/M and 315S/M. For example 18.5kW 4Pole motor can be replaced with 22kW 4Pole motor without any change in position of the foundation bolts.

**For frames 200 and 250, IS:1231 defines only 200L and 250M as valid frames for TEFC Motors.**

1) Two pole motors for 60Hz cannot be supplied from frame size 315L upwards.

2) The motors are delivered ex-works with two eyebolts corresponding to the type of construction 'IMB5' one of which may be repositioned according to IMV1 or IMV3. It should be observed that the through hole of the eyebolt is fitted at right angles to the direction of force.

### Earthing Terminals

All motors are provided with 4 earthing terminals, two in the terminal box and one on each foot.

### Converter Operation

1LA0 motors for use with converters can be offered with dielectrically strengthened special insulation scheme. For constant torque applications at lesser than 10% of rated speed, to avoid damage from bearing currents, insulated bearing at the NDE is recommended for frame sizes 280 and above.

Note: We have a range of separately cooled 1PQ motors specially engineered for constant torque applications. For self cooled constant torque application motors, please refer to us for selection.

### Re-rating factors

The re-rating factors applicable under different conditions are as follows.

### Altitude of Location

Altitude above Mean Sea Level in Metres	Permissible Output as % of Rated Value
1000	100
1500	97
2000	94
2500	90
3000	86
3500	82
4000	77

### Bearing System

CHAMPION Series motors are provided with 63 series bearing with C3 clearance as standard feature, with L10 life as 50,000 hours for equipments coupled through a direct flexible coupling. These bearings are suitable for variety of loads coupled with direct or belt transmission. It is advisable to check the permitted bearing loads, if high cantilever forces are exerted at the drive end, e.g. owing

**50,000 hours bearing life - Highest in class**

to belt transmissions. In such cases, motors can be fitted with strengthened / appropriate bearings on request.

CHAMPION Series motors with frames 160 and above are provided with on-line greasing arrangement as a standard feature. This feature will ensure easy maintenance, higher uptime and easy troubleshooting at site.

**On-line greasing arrangement – Improved uptime**

### Bearing Data

Frame size	Poles	Bearing Type			
		Horizontal Construction		Vertical Construction	
		Drive end	Non-Drive end	Drive end	Non-Drive end
160 M,L	2...8	6309 C3	6309 C3	6309 C3	6309 C3
180 M, L	2...8	6310 C3	6310 C3	6310 C3	6310 C3
200 L	2...8	6312 C3	6312 C3	6312 C3	6312 C3
225 S, M	2...8	6313 C3	6313 C3	6313 C3	6313 C3
250 M	2...8	6315 C3	6315 C3	6315 C3	6315 C3
280 S,M	2	6315 C3	6315 C3	6315 C3	6315 C3
	4...8	6317 C3	6317 C3	6317 C3	6317 C3
315 S,M	2	6317 C3	6317 C3	6317 C3	6317 C3
	4...8	6319 C3	6319 C3	6319 C3	6319 C3
315 L	2	6317 C3	6317 C3	6317 C3	7317 B
	4...8	6319 C3	6319 C3	6319 C3	6319 C3
355 L	2	6317 C3	6317 C3	6317 C3	7317 B
	4...8	6322 C3	6322 C3	6322 C3	6322 C3

### Variation in supply voltage and frequency

Voltage Variation %	Frequency Variation %	Combined Voltage and Frequency Variation %	Permissible Output as % of Rated Value
± 6	±3	±9	100
±10	±5	±10	100
±12.5	±5	±12.5	95
±15	±5	±15	90

### Packing Case Dimensions For "1LA/1SE" motors

For Motor		Packing Case Dimensions L x B x H (mm) for		
		Foot Mounted Motor		Flange Motor
Frame Size	Type	T. Box on Top	T. Box on side	
160	1LA0/SE0 16	850x494x642	970x649x682	840x600x600
180	1LA0/SE0 18	900x519x687	900x680x650	900x680x650
200	1LA0/SE0 20	1018x598x741	990x700x650	990x700x650
225	1LA0/SE0 22	1078x634x791	1060x745x705	1060x745x705
250	1SE025	1195x795x895	1200x800x900	1275x865x965
280	1SE0 28	1275x765x1110	1275x955x965	1275x865x1050
315	1SE0 31	1645x975x1245	1645x1105x1115	1325x854x1550
355	1SE0 35	1945x1095x1345	1945x1095x1345	1365x984x1780

### Ambient Temperature/Temperature rise

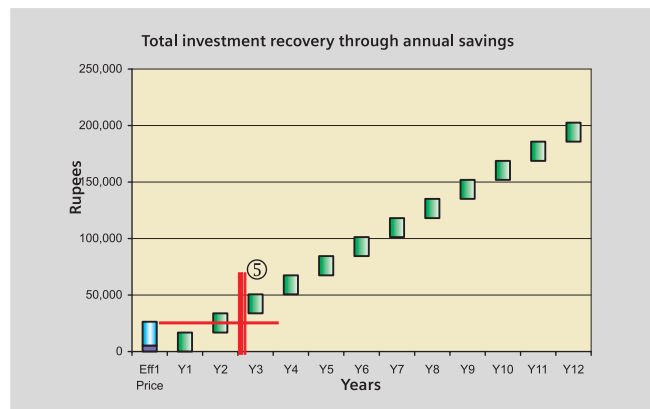
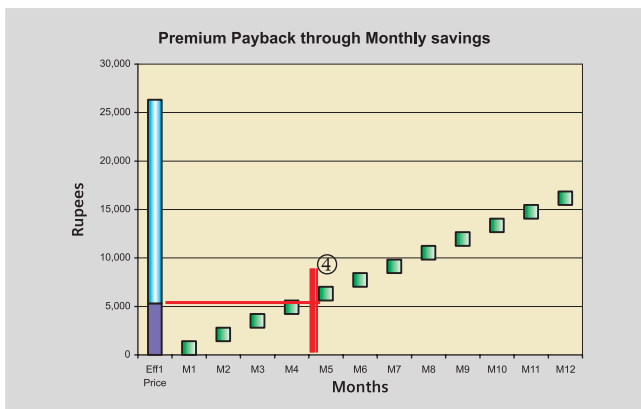
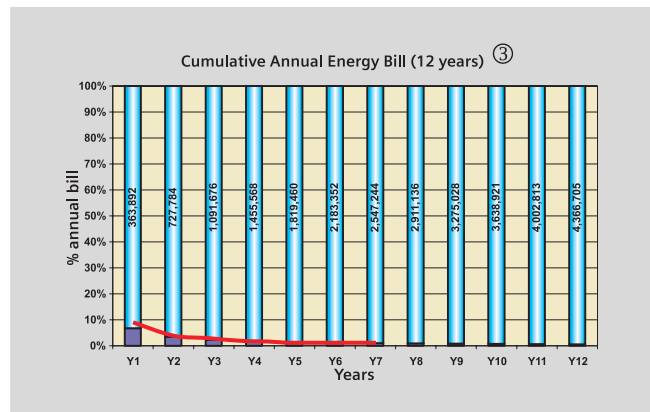
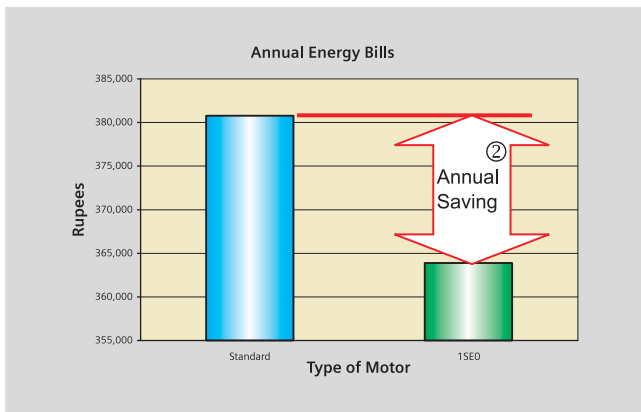
Maximum Ambient Temperature °C	Restriction on Temp. Rise (Resistance Method) °C	Permissible Output as % of Rated Value
<30	-	107
30-50	70	100
55	65	95

All the re-rating factors are applicable for motors without # or @ marks in the selection and ordering data. For motors with these marks please enquire.

# Case Study - 1:

## Standard EFF2 motor Vs Siemens EFF1 motor

Customer: ABC Cement			
Project: Andhra Pradesh			
Equipment Name / Tag number: Compressor / GRA-TDP-125			
Type of Motor		Standard	1SE0
Motor Rating		11 kW / 4 P	
Rated output of the motor	kW	11	11
Motor Type		Make X <sup>①</sup>	1SE0 163-4YL..
Efficiency compared to the value stipulated in IS:12615-2004		EFF2	>EFF1
How much is the motor loaded as a % of the rated?		85%	85%
Rated speed of the motor	rpm	1,440	1,475
Efficiency		88.4%	92.5%
Power Tariff	Rs./kWH	4.5	4.5
Operation of the motor per annum	hours	8,000	8,000
Energy consumption per annum	kWH	84,615	80,865
Energy Saved per annum over standard motor	kWH	---	3,751
Annual Energy Bill	Rs.	380,769	363,892
Savings towards energy bill per annum	Rs.	---	16,877 <sup>②</sup>
Savings towards energy bill per month	Rs.	---	1,406
Purchase price of a new motor [exclusive of taxes and duties]	Rs.	21,011	26,316
"Incremental" investment over a standard motor	Rs.		5,306
Payback of incremental investment (Premium)	months		3-Months,23-days <sup>④</sup>
Payback of total investment (Purchase Price)	years		1-Year, 7-Months <sup>⑤</sup>

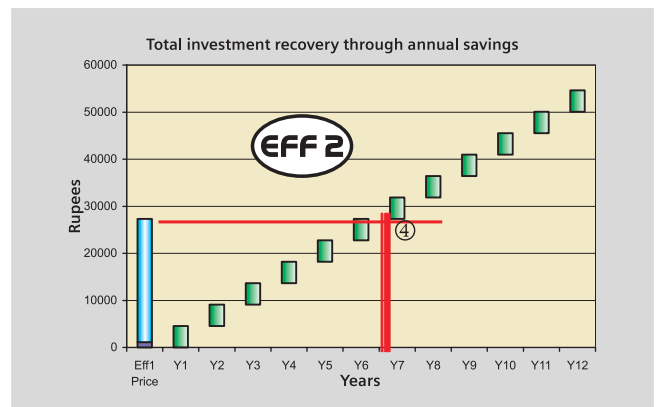
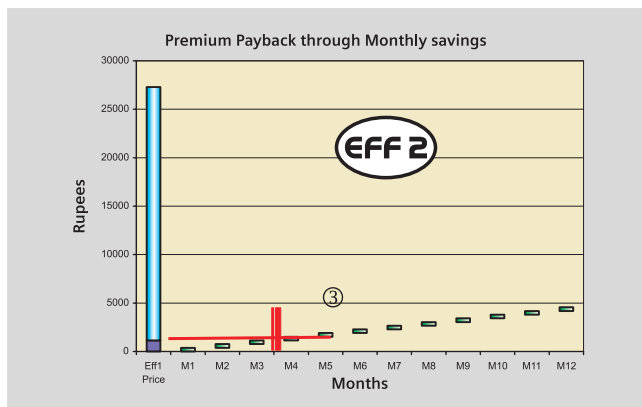
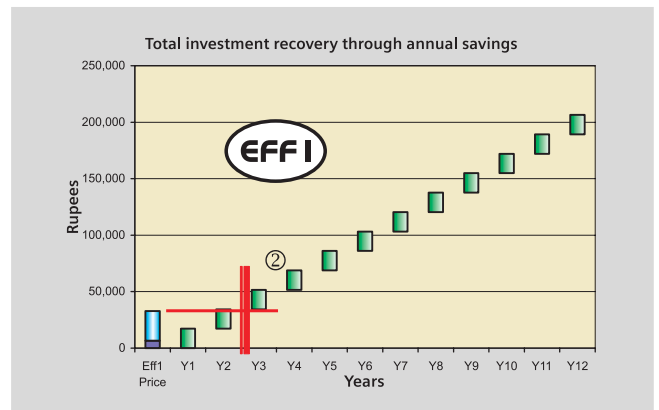
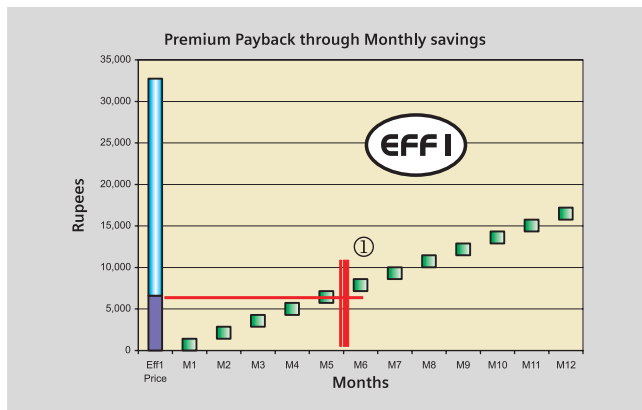


① Any Make having efficiency level Eff2 as per IS:12615-2004  
 ③ Purchase price is less than 1% of the total operating cost over the lifetime.

# Case Study - 2:

## Standard EFF2 motor Vs Siemens EFF1 & EFF2 motors

Customer: ABC Cement			
Project: Andhra Pradesh			
Equipment Name / Tag number: Compressor / GRA-TDP-128			
Type of Motor	Standard	1LA0	1SE0
Motor Rating	15kW / 4P		
Rated output of the motor	kW	15	15
Motor Type	Make X	1LA0 166-4YA..	1SE0 166-4YL..
Efficiency compared to the value stipulated in IS:12615-2004	EFF2	>EFF2	>EFF1
How much is the motor loaded as a % of the rated?		85.0%	85.0%
Rated speed of the motor	rpm	1440	1475
Efficiency		89.4%	92.5%
Power Tariff	Rs./kWH	4.5	4.5
Operation of the motor per annum	hours	8,000	8,000
Energy consumption per annum	kWH	114,094	113,082
Energy Saved per annum over standard motor	kWH	---	3,824
Annual Energy Bill	Rs.	513,423	496,216
Savings towards energy bill per annum	Rs.	---	17,207
Savings towards energy bill per month	Rs.	---	1434
Purchase price of a new motor [exclusive of taxes and duties]	Rs.	26,157	32,754
"Incremental" investment over a standard motor	Rs.		6,597
Payback of incremental investment (Premium)	months		2-Months, 29-days <sup>①</sup>
Payback of total investment (Purchase Price)	years		6-Years <sup>②</sup>



Comparison of Siemens make Eff1 and Eff2 motors with any other make having efficiency same as Eff2 specified in IS:12615-2004

Rated Output	Frame Size	Order no. (for order no. suffixes for voltage and type of construction, see table below)	Operating characteristics at rated output					Locked rotor current	Locked rotor torque	Break down Torque	Rotor Class	GD <sup>2</sup> of rotor	Motor Weight
			Rated current at 415V	Efficiency (EFFI)	Power factor	Rated speed	Rated torque	For direct-on-line starting as multiples of rated					
kW			A	%		rev/min	kgf.m	current	torque	torque	KL	kgf.m <sup>2</sup>	kg
<b>3000 rev/min, 2 Pole, 415V ±10%, 50Hz ±5%, Combined V &amp; F 10%, Ambient 50°C, IP55, Insulation Class F</b>													
9.3	160M	1SE0 163-2YK..	16.4	90.0	0.88	2940	3.1	7.0	2.6	3.0	16	0.35	165
11	160M	1SE0 163-2YL..	19.2	91.0	0.88	2940	3.6	7.0	2.6	3.0	16	0.35	165
15	160M	1SE0 164-2YL..	26.3	91.5	0.87	2940	5	7.0	2.4	3.0	16	0.35	165
18.5	160L	1SE0 166-2YK..	32.1	92.2	0.87	2944	6.1	7.0	2.6	3.0	16	0.38	180
<b>1500 rev/min, 4 Pole, 415V ±10%, 50Hz ±5%, Combined V &amp; F 10%, Ambient 50°C, IP55, Insulation Class F</b>													
9.3	160M	1SE0 163-4YK..	17.2	92.0	0.82	1475	6.1	7.0	2.2	2.5	16	0.52	141
11	160M	1SE0 163-4YL..	20.5	92.5	0.81	1475	7.3	7.0	2.2	2.5	16	0.52	141
13	160L	1SE0 166-4YK..	23.9	92.5	0.82	1475	8.6	7.0	2.2	2.5	16	0.64	165
15	160L	1SE0 166-4YL..	27.6	92.5	0.82	1475	9.9	7.0	2.2	2.5	16	0.64	165
18.5	180M	1SE0 183-4YL..	33.2	92.5	0.84	1470	12.3	7.0	2.0	2.3	10	0.76	190
22	180L	1SE0 186-4YL..	39.4	92.6	0.84	1470	14.6	7.0	2.0	2.3	10	0.93	216
30	200L	1SE0 207-4YL..	52.1	93.2	0.86	1470	19.9	7.0	2.4	2.5	16	1.42	265
37	225S	1SE0 221-4YK..	62.9	94.2	0.87	1480	24.4	7.0	2.3	2.3	16	2.16	335
45	225M	1SE0 223-4YL..	76.4	94.2	0.87	1480	29.6	7.0	2.3	2.3	16	2.5	350

Motor insulation utilised to class B limits.

Values subject to tolerance as per IS:325. Motor performance conforms to IS:12615-2004.

Order No. Suffixes		Last place but one : Figure denoting voltage		Last place : Figure denoting type of construction				
Motor type		415V, 50 Hz ±10/5/10 variation	Other Voltage and/or Frequency or higher supply variation*	IMB3	At additional price			
					IMB5	IMV1 without canopy	IMV1 with canopy	IMB35 <sup>£</sup>
1SE0 163 - 223	2P & 4P	8	9	0	1	1	4	6

\* Details of voltage/connection/frequency/V&F variation should be additionally given in plain text.

£ For motor type 1SE0 in 160 frame, for IMB35 dimension 'C' will be non-standard.







Rated Output	Frame Size	Motor Type	Operating characteristics at rated output					Locked rotor current	Locked rotor torque	Break down Torque	Rotor Class	GD <sup>2</sup> of rotor	Motor Weight
			Rated current	Efficiency	Power factor	Rated speed	Rated torque	For direct-on-line starting as multiples of rated					
			A	%		rpm	kgf.m	current	torque	torque			
<b>3000 rev/min, 2-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
11	160M	1LA0 164-2YC..	20	88.4%	0.88	2920	3.7	6.0	2.0	2.9	KL10	0.22	135
15	160M	#1LA0 165-2YC..	26	89.5%	0.88	2920	5.0	6.0	1.8	2.5	KL10	0.22	135
18.5	160L	#1LA0 166-2YC..	32	90.5%	0.88	2910	6.2	6.0	2.1	2.5	KL10	0.26	145
22	180M	#1LA0 183-2YA..	38	91.5%	0.87	2940	7.3	6.0	2.1	2.7	KL16	0.31	165
30	200L	1LA0 207-2YB..	51	92.5%	0.88	2950	9.9	6.0	2.1	2.7	KL13	0.64	250
37	200L	#1LA0 208-2YB..	63	92.5%	0.88	2950	12.2	6.0	2.1	2.7	KL13	0.64	250
45	225M	1LA0 223-2YB..	76	93.7%	0.88	2955	14.8	6.0	2.1	2.7	KL13	0.96	310
<b>1500 rev/min, 4-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
11	160M	1LA0 163-4YA..	21	89.2%	0.81	1450	7.4	6.0	2.4	2.4	KL16	0.22	130
15	160L	1LA0 166-4YA..	29	90.2%	0.81	1450	10.1	6.0	2.4	2.4	KL16	0.26	140
18.5	180M	1LA0 183-4YA..	34	91.3%	0.83	1463	12.3	6.0	2.5	2.5	KL16	0.52	165
22	180L	1LA0 186-4YA..	40	91.7%	0.83	1460	14.7	6.0	2.5	2.5	KL16	0.60	180
30	200L	1LA0 207-4YA..	54	92.5%	0.84	1470	19.9	6.0	2.4	2.4	KL16	0.96	240
37	225S	1LA0 221-4YA..	64	93.5%	0.86	1475	24.4	6.0	2.5	2.5	KL16	1.91	310
45	225M	1LA0 224-4YA..	78	93.6%	0.86	1475	29.7	6.0	2.5	2.5	KL16	2.20	345
<b>1000 rev/min, 6-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
7.5	160M	1LA0 163-6YB..	15	87.0%	0.78	955	7.6	5.5	2.1	2.5	KL13	0.22	130
11	160L	1LA0 166-6YB..	22	88.5%	0.80	955	11.2	5.5	2.1	2.5	KL13	0.28	145
15	180L	1LA0 186-6YA...	30	89.5%	0.79	970	15.1	6.0	2.5	2.3	KL16	0.80	170
18.5	200L	1LA0 206-6YA...	36	90.5%	0.78	975	18.5	6.0	2.5	2.3	KL16	1.16	220
22	200L	1LA0 207-6YA...	42	91.2%	0.79	975	22.0	6.0	2.5	2.3	KL16	1.32	235
30	225M	#1LA0 223-6YA...	56	92.0%	0.81	978	29.9	6.0	2.4	2.3	KL16	2.28	305
<b>750 rev/min, 8-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
5.5	160M	@1LA0 164-8YB..	13	84.5%	0.72	710	7.5	4.5	1.9	2.3	KL13	0.22	130
7.5	160L	1LA0 166-8YB..	17	85.5%	0.72	710	10.3	4.5	1.9	2.3	KL13	0.28	145
11	180L	1LA0 186-8YB..	25	87.5%	0.71	725	14.8	5.0	2.0	2.2	KL13	0.84	175
15	200L	1LA0 207-8YB..	31	89.0%	0.76	725	20.2	5.0	2.0	2.2	KL13	1.48	245
18.5	225S	1LA0 220-8YB..	36	90.5%	0.78	728	24.8	5.0	1.9	2.2	KL13	2.32	300
22	225M	1LA0 223-8YB..	45	90.5%	0.76	728	29.4	5.2	2.0	2.2	KL13	2.64	325

Temperature rise limited to Class B rise for all motors except those marked # and @.

(All values subject to tolerance as per IS : 325.)

# Temperature rise 75K

Efficiency Class is as per IS : 12615.

@ Temperature rise 95K

Order No. Suffixes						
Motor type	Last place but one : Figure denoting voltage			Last place : Figure denoting construction		
	415V, 50 Hz Standard V & f variation	* Other Voltage and/or Frequency (& voltage & frequency variation)	IMB3	At additional price		
				IMB5	IMV1 without canopy	IMV1 with canopy
1LA0 160 to 225	8	9	0	1	1	4 6

\* Details of voltage/connection/frequency/voltage and frequency variation should be additionally given in plain text.

Rated Output	Frame Size	Motor Type	Operating characteristics at rated output					Locked rotor current	Locked rotor torque	Break down Torque	Rotor Class	GD <sup>2</sup> of rotor	Motor Weight
			Rated current	Efficiency	Power factor	Rated speed	Rated torque	For direct-on-line starting as multiples of rated					
			A	%		rpm	kgf.m	current	torque	torque			
<b>3000 rev/min, 2-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
55	250M	1SE0254-2YB..	90	94.0%	0.90	2970	18.0	7.0	2.1	2.7	KL13	1.80	425
75	280S	1SE0281-2YB..	124	94.6%	0.89	2975	24.6	7.0	2.0	2.3	KL13	3.68	625
90	280M	1SE0284-2YB..	148	95.0%	0.89	2975	29.5	7.0	1.9	2.7	KL13	4.25	665
110	315S	1SE0311-2YC..	181	95.0%	0.89	2980	36.0	7.0	1.8	2.7	KL10	5.20	820
132	315M	1SE0314-2YC..	214	95.3%	0.90	2980	43.1	7.0	1.8	2.7	KL10	6.00	880
160	315L	1SE0318-2YC..	258	95.7%	0.90	2980	52.3	7.0	1.8	2.7	KL10	9.20	1120
200	315L	@ 1SE0319-2YC..	323	95.7%	0.90	2985	65.3	7.0	1.8	2.7	KL10	9.20	1120
250	355L	1SE0356-2YC..	397	96.2%	0.91	2985	81.6	7.0	1.6	2.8	KL10	13.20	1470
315	355L	# 1SE0357-2YC..	500	96.3%	0.91	2985	102.8	7.0	1.6	2.8	KL10	16.00	1650
<b>1500 rev/min, 4-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
55	250M	1SE0254-4YA..	96.0	94.2%	0.85	1480	36.1	7.0	2.5	2.5	KL16	3.8	495
75	280S	1SE0281-4YA..	130.0	94.7%	0.85	1485	49.1	7.0	2.5	2.5	KL16	5.9	650
90	280M	1SE0284-4YA..	157.0	95.2%	0.84	1485	59.0	7.0	2.5	2.5	KL16	6.9	700
110	315S	1SE0311-4YA..	189.0	95.5%	0.85	1488	72.0	7.0	2.4	2.4	KL16	8.4	865
132	315M	1SE0314-4YA..	226.0	95.7%	0.85	1488	86.4	7.0	2.4	2.4	KL16	11.7	960
160	315L	1SE0318-4YA..	270.0	95.8%	0.86	1488	104.7	7.0	2.4	2.4	KL16	14.7	1115
200	315L	@ 1SE0319-4YA..	336.0	96.2%	0.86	1485	131.1	6.0	2.5	2.5	KL16	16.80	1220
250	355L	1SE0356-4YB..	420.0	96.2%	0.86	1488	163.6	6.5	2.1	2.5	KL13	24.00	1590
315	355L	1SE0357-4YB..	529.0	96.3%	0.86	1488	206.2	6.5	2.1	2.5	KL13	29.60	1790
<b>1000 rev/min, 6-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
37	250M	1SE0254-6YA..	67	93.0%	0.82	980	36.8	6.5	2.3	2.3	KL16	3.56	420
45	280S	1SE0281-6YA..	80	93.4%	0.84	984	44.5	6.5	2.4	2.3	KL16	5.20	555
55	280M	1SE0284-6YA..	97	93.8%	0.84	984	54.4	6.5	2.4	2.3	KL16	6.00	595
75	315S	1SE0311-6YA..	130	94.2%	0.85	985	74.2	6.5	2.3	2.5	KL16	9.60	800
90	315M	1SE0314-6YA..	156	94.5%	0.85	985	89.0	6.5	2.3	2.5	KL16	11.60	860
110	315L	1SE0318-6YA..	190	94.7%	0.85	985	108.8	6.5	2.3	2.5	KL16	15.00	1030
132	315L	1SE0319-6YB..	227	95.0%	0.85	985	130.5	6.5	2.1	2.3	KL13	19.80	1170
160	355L	1SE0356-6YB..	275	95.4%	0.85	988	157.7	6.0	2.1	2.3	KL13	24.00	1460
200	355L	1SE0357-6YB..	343	95.5%	0.85	988	197.2	6.0	2.1	2.3	KL13	30.00	1580
250	355L	1SE0358-6YB..	428	95.7%	0.85	988	246.5	6.0	2.1	2.3	KL13	36.40	1790
<b>750 rev/min, 8-Pole, 415V±10%, 50Hz±5%, Combined V and F ±10%, Ambient 50°C, IP55, Class F insulation</b>													
30	250M	1SE0254-8YB..	57	92.0%	0.80	730	40.0	5.0	2.1	2.2	KL13	4.40	450
37	280S	1SE0281-8YB..	69	92.0%	0.81	732	49.2	5.5	2.1	2.2	KL13	5.60	575
45	280M	1SE0284-8YB..	83	92.5%	0.82	732	59.9	5.5	2.1	2.2	KL13	6.40	615
55	315S	1SE0311-8YB..	100	93.0%	0.82	737	72.7	5.5	2.1	2.4	KL13	9.20	785
75	315M	1SE0314-8YB..	136	93.5%	0.82	737	99.1	5.5	2.1	2.4	KL13	12.00	900
90	315L	1SE0318-8YB..	162	94.0%	0.82	737	118.9	5.5	2.1	2.4	KL13	17.60	1130
110	315L	1SE0319-8YB..	198	94.3%	0.82	737	145.4	5.5	2.1	2.4	KL13	19.50	1250
132	355L	1SE0356-8YB..	240	94.5%	0.81	738	174.2	6.0	2.1	2.2	KL13	24.80	1440
160	355L	1SE0357-8YB..	291	94.5%	0.81	738	211.2	6.0	2.1	2.2	KL13	30.00	1580
200	355L	1SE0358-8YB..	362	95.0%	0.81	740	263.2	6.0	2.1	2.2	KL13	37.20	1790

Temperature rise limited to Class B rise for all motors except those marked # and @.

(All values subject to tolerance as per IS : 325.)

# Temperature rise 75K

Efficiency Class is as per IS : 12615.

@ Temperature rise 95K

Order No. Suffixes								
Motor type	Last place but one : Figure denoting voltage				Last place : Figure denoting construction			
	415V, 50 Hz		* Other Voltage and/or Frequency (& voltage & frequency variation)	IMB3	At additional price			
	Standard V & f variation				IMB5	IMV1 without canopy	IMV1 with canopy	IMB35
1SE0 254 to 314	8		9	0	1	1	4	6
1SE0 318 to 358	8		9	0	-	8	4	6

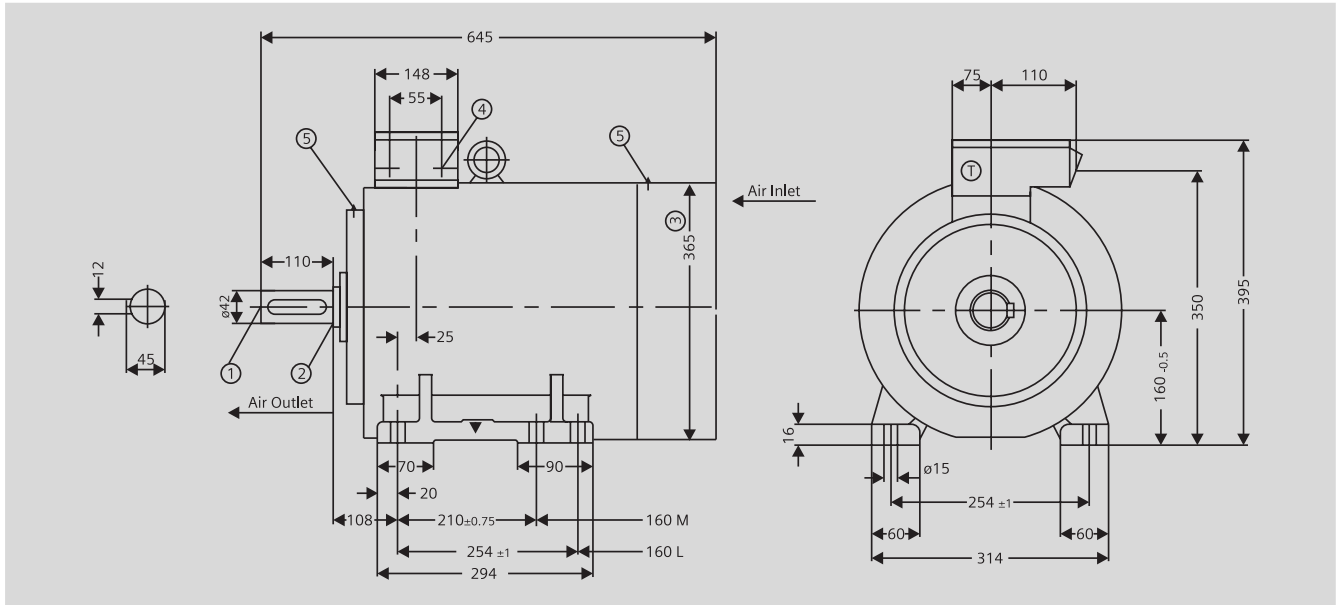
\* Details of voltage/connection/frequency/voltage and frequency variation should be additionally given in plain text.

Efficiency class will be stamped on the name-plates for motors covered under IS:12615-2004 only

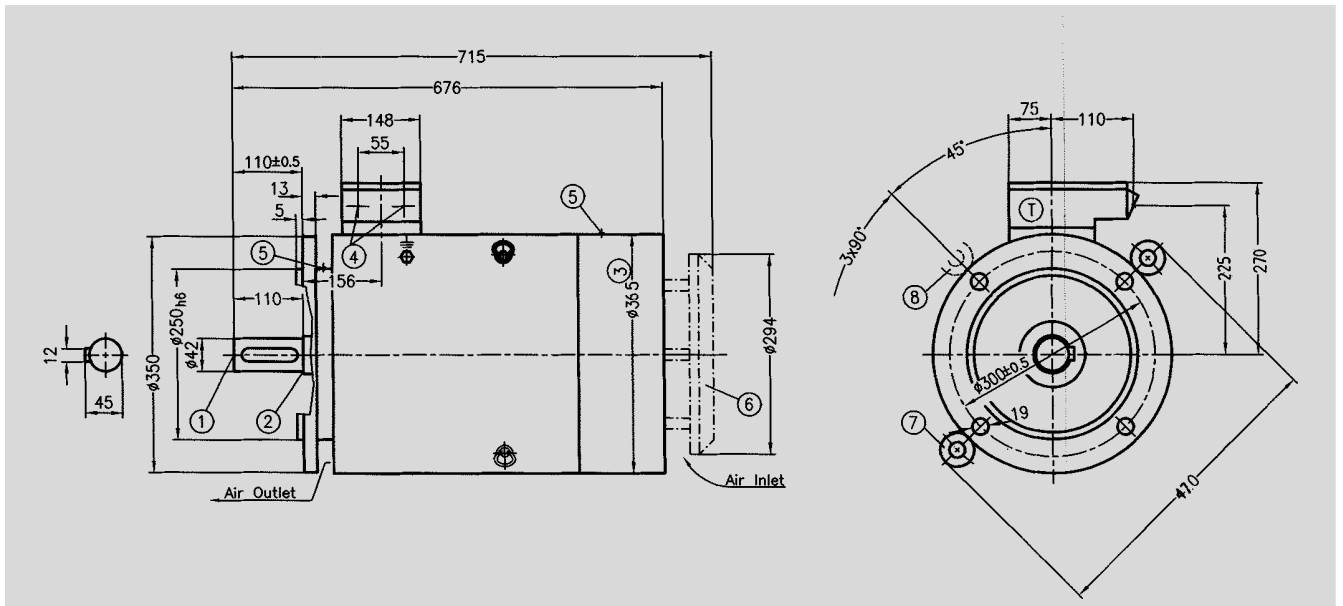
## Dimensional diagrams

Frame sizes: 1SE0 - 160M and 160L

Construction: IMB3, IMB6, IMB7, IMB8, IMV5, IMV6



Construction: IMB5 and IMV1



Dimensions in mm

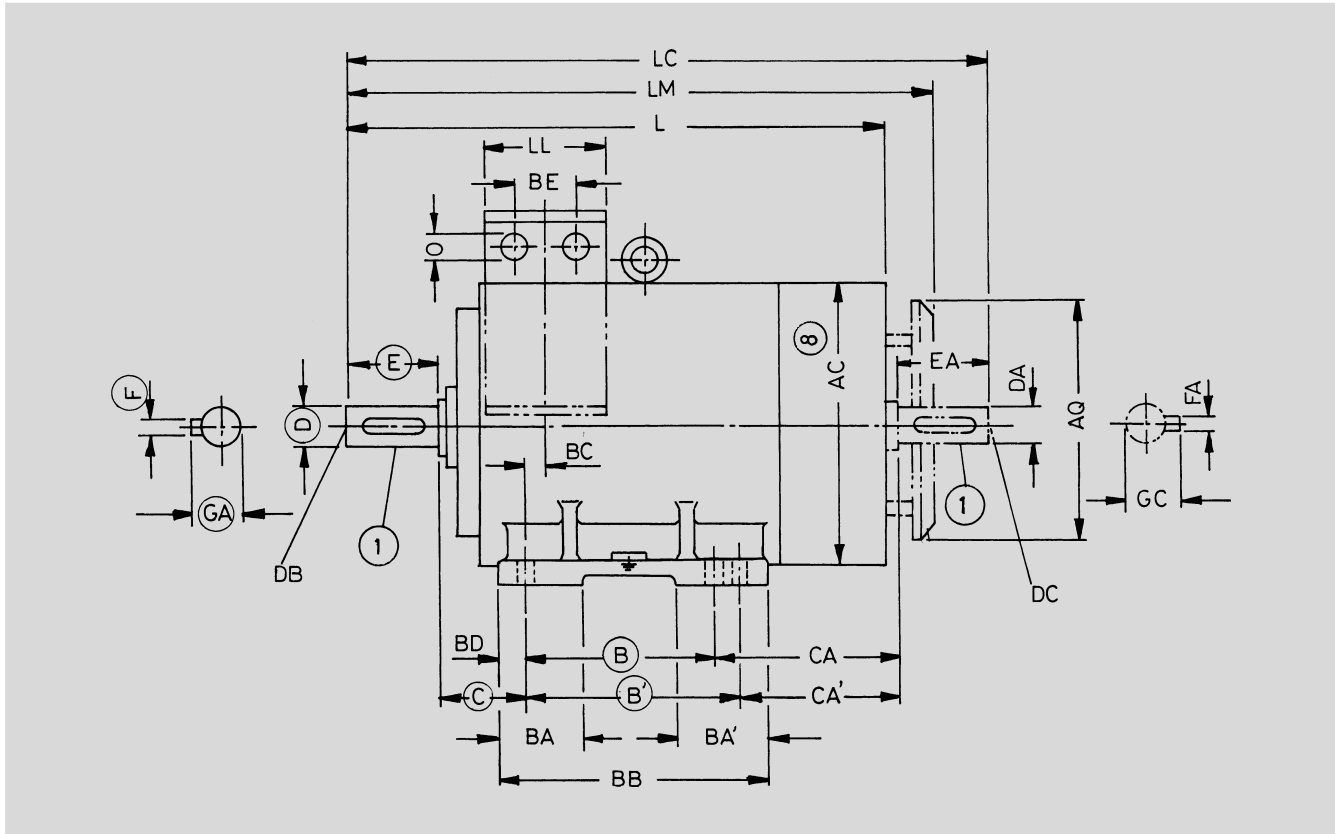
- ① Shaft extension  $\phi 42 \times 6 \times 110$  with protected center hole M16 X 36.
- ② Relief groove E1 x 0.2 as per IS:3428.
- ③ Measured over bolt heads.
- ④ 2 Nos. B.S. conduit entry 31.8 (1.25").
- ⑤ Grease nipple M10x1 as per IS:4009.
- ⑥ Canopy as per requirement
- ⑦ Eye bolt position for IMV1 Construction
- ⑧ Eye bolt position for IMB5 Construction
- ⑨ Terminal box: Type 1XB1 223  
Suitable for max. cable conductor cross section (mm sq): 25



## Dimensional diagrams

Frame sizes: 1SE0 180M - 355L  
1LA0 160M - 225M

Construction: IMB3, IMB6, IMB7, IMB8, IMV5, IMV6

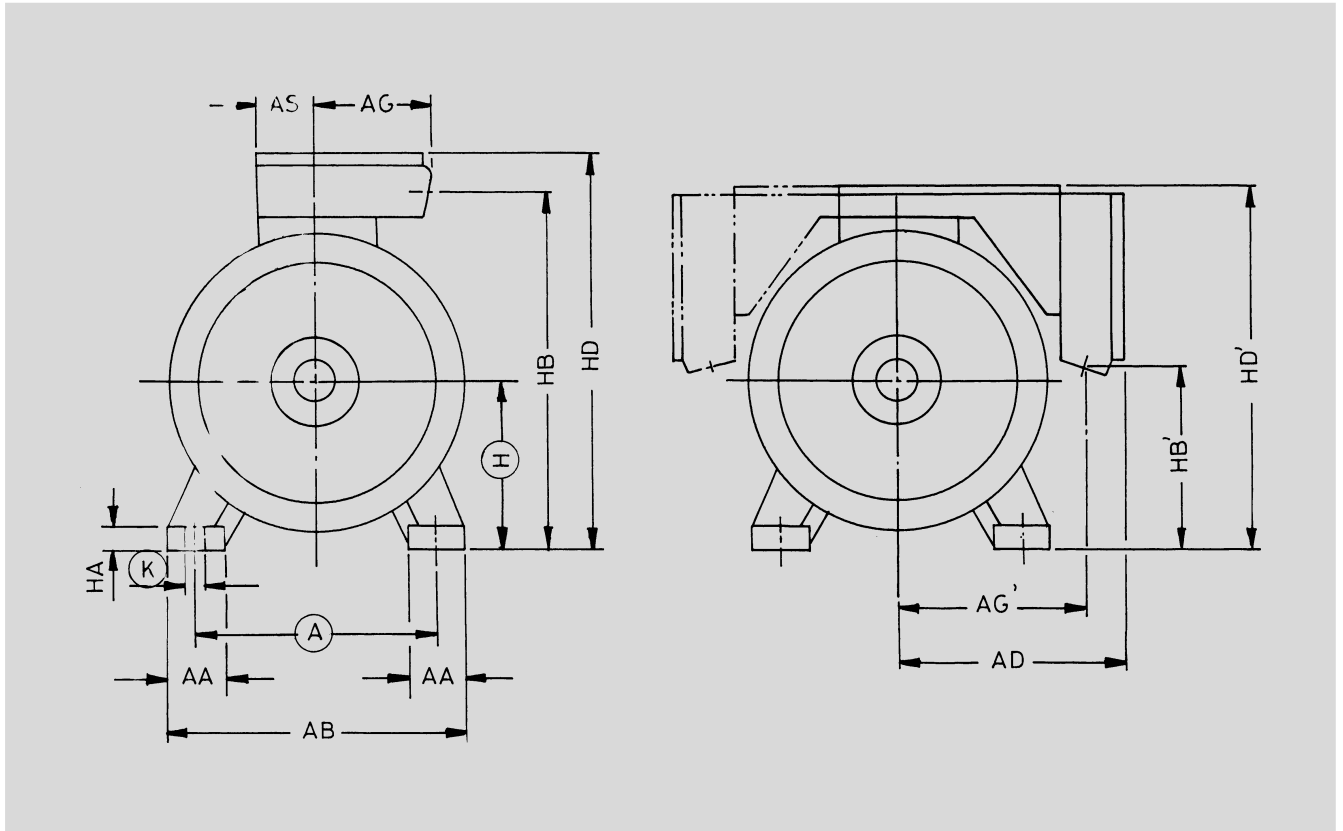


Frame size	No. of Poles	A	AA	AB	AC	AD	AG	AG'	AQ	AS	B	B'	BA	BA'	BB	BC	BD	BE	C	CA	CA'	H	HA	HB	HB'	HD
① 160M	2...8	254	60	314	315	260	110	215	294	75	210	-	70	70	250	39	20	55	108	183	-	160	20	350	165	395
① 160L	2...8										254			294												
180M	2...8	279	65	344	375	260	110	225	340	75	241	-	110	110	332	35	30.5	55	121	259	-	180	26	405	220	450
180L	2...8										-	279								-	221					
200L	2	318	80	398	415	335	155	275	380	100	305		85	85	355	42	25	85	133	239	-	200	34	450	190	510
200L	4...8																									
225S	2										286	-								269	-					
225S	4...8	356	80	436	470	335	155	275	425	100			110	110	386	25	50	85	149			225	34	500	240	560
225M	2																									
225M	4...8										-	311								-	244					
250M	2	406	100	506	520	460	200	365	470	120	349	-	115	115	425	39	46	85	168	283	-	250	42	585	255	680
250M	4...8																									
280S	2										368	-								317	-					
280S	4...8	457	100	557	575	550	250	430	525	135			100	155	483	30	30.5	100	190			280	42	700	260	820
280M	2																									
280M	4...8										-	419								-	266					
315S	2										406	-								358	-					
315S	4...8													171	527											
315M	2	508	120	628	645	660	285	530	590	165		457	120			32	35	135	216		307	315	52	830	290	960
315M	4...8																									
315L	2										508	-		120	578					396	-					
315L	4...8																									
355L	2	610	120	730	720	640	285	510	670	165	630	-	170	255	774	53	72	135	254	461	-	355	44	860	380	990
355L	4...8																									

Dimensions in mm



Construction : IMB3, IMB6, IMB7, IMB8, IMV5, IMV6



Frame size	No. of Poles	HD'	K	L	LC	LL	LM	O	Shaft Extension									
									Drive End					Non-drive End				
									D	DB	E	F	GA	DA	DC	EA	FA	GC
⑩ 160M	2....8	360	15	601	721	148	640	⑥	42	②	110	12	45	42	②	110	12	45
⑩ 160L	2....8			645	765		685											
180M	2....8	415	15	720	841	148	805	⑤	48	②	110	14	51.5	48	②	110	14	51.5
180L																		
200L	2	450	19	775	897	197	860	⑥	55	③	110	16	59	48	②	110	14	51.5
	4....8													55	③		16	59
225S	2	500	19	805	924	197	905	⑥	55	③	110	16	59	48	②	110	14	51.5
	4....8			60	③		140							18	64		55	③
225M	2	500	19	805	924	197	905	⑥	55	③	110	16	59	48	②	110	14	51.5
	4....8			60	③		140							18	64		55	③
250M	2	590	24	930	1050	234	1030	⑥	60	③	140	18	64	55	③	110	16	59
	4....8			65	③		140						18	69				
280S	2	645	24	1005	1155	266	1115	⑦	65	③	140	18	69	60	③	140	18	64
	4....8												75	③				
280M	2	645	24	1005	1155	266	1115	⑦	65	③	140	18	69	60	③	140	18	64
	4....8												75	③				
315S	2	740	28	1110	1260	330	1220	⑦	65	③	140	18	69	60	③	140	18	64
	4....8			80	③		170						22	85				
315M	2	740	28	1110	1260	330	1220	⑦	65	③	140	18	69	60	③	140	18	64
	4....8			80	③		170						22	85				
315L	2	740	28	1250	1400	330	1360	⑦	65	③	140	18	69	60	③	140	18	64
	4....8			80	③		170						22	85				
355L	2	855	28	1485	1625	330	1590	⑦	75	③	140	20	79.5	65	③	140	18	69
	4....8			95	④		170						25	100				

Dimensions in mm

- ① Shaft extension as per IS: 1231
- ② Protected centre hole M16 x 36
- ③ Protected centre hole M20 x 42
- ④ Protected centre hole M24 x 50
- ⑤ 2 Nos. B.S. Conduit Entry 31.8 (1¼")-IS:1653
- ⑥ 2 Nos. B.S. Conduit Entry 51 (2")-IS:1653
- ⑦ 2 Nos. B.S. Conduit Entry 63.5 (2½")-IS:1653
- ⑧ Measured over bolt heads
- ⑨ Terminals box can be rotated in steps of 90°
- ⑩ For 160 and 180 Frames slant of cable entry integral with Terminal Box. For 200 to 355 Frames Cable End Box of detachable type.
- ⑪ 1LA0 motor only. Refer page 11 for 1SE0 motor

**Definitive Dimensions (Upto 315L):**

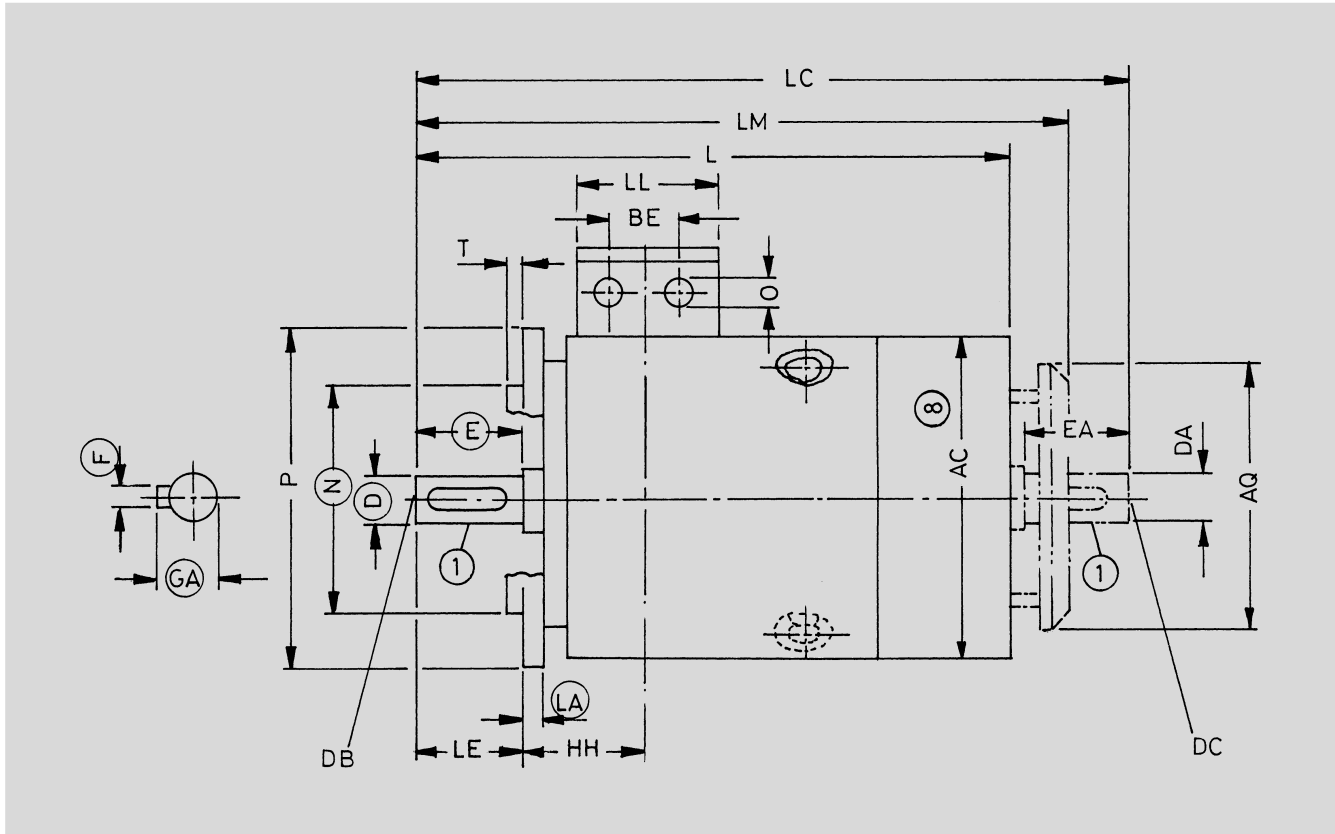
A, B, B', C, H, K, D, E, F, GA are binding dimensions for all standard motors.

All other dimensions are subject to change. For valid dimensions, please contact Regional Office in your region

## Dimensional diagrams

Frame sizes: 1SE0 180M - 355L  
1LA0 160M - 225M

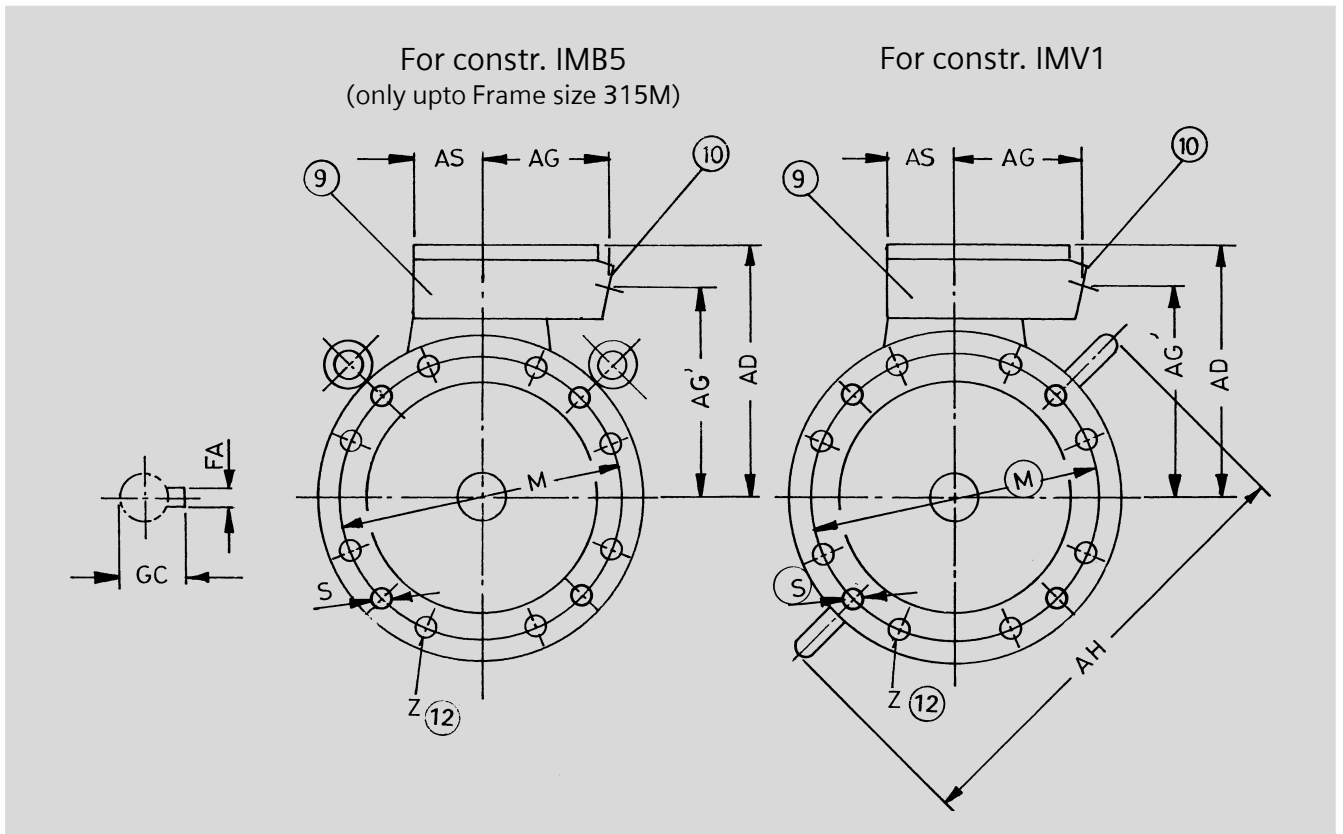
Construction: IMB5, IMV1



Frame size	No. of Poles	⑧	AC	AD	AG	AG'	AH	AQ	AS	BE	HH	L	LC	LE	LL	LM	O	Shaft Extension									
																		Drive End					Non-drive End				
																		D	DB	E	F	GA	DA	DC	EA	FA	GC
⑩ 160M	2...8	315	235	110	190	420	294	75	55	147	601	721	110	148	640	⑤	42	②	110	12	45	42	②	110	12	45	
⑩ 160L	2...8																										645
180M	2...8	375	260	110	225	470	340	75	55	156	720	841	110	148	805	⑤	48	②	110	14	51.5	48	②	110	14	51.5	
180L	2...8																										645
200L	2	415	335	155	250	530	380	100	85	175	775	897	110	197	860	⑥	55	③	110	16	59	48	②	110	14	51.5	
	4...8																										55
225S/M	2	470	335	155	275	580	425	100	85	174	805	924	110	197	905	⑥	55	③	110	16	59	48	②	110	14	51.5	
	4...8																										60
250M	2	520	430	200	335	645	470	120	85	207	930	1050	140	234	1030	⑥	60	③	140	18	64	55	③	110	16	59	
	4...8																										65
280S/M	2	575	540	250	420	700	525	135	100	220	1005	1155	140	266	1115	⑦	65	③	140	18	69	60	③	140	18	64	
	4...8																										75
315S/M	2	645	645	285	515	805	590	165	135	248	1110	1260	140	330	1220	⑦	65	③	140	18	69	60	③	140	18	64	
	4...8																										80
315L	2	645	645	285	515	805	590	165	135	248	1250	1400	140	330	1360	⑦	65	③	140	18	69	60	③	140	18	64	
	4...8																										80
355L	2	720	635	285	505	925	670	165	135	307	1485	1625	140	330	1590	⑦	75	③	140	20	79.5	65	③	140	18	69	
	4...8																										95

Dimensions in mm

Construction : IMB5, IMV1



Frame size	No. of Poles	Flange							
		⑪ Number	LA	M	N	P	S	T	⑫ Z
⑬ 160M	2...8	F300B	13	300	250	350	19	5	4
⑬ 160L	2...8								
180M	2...8	F350B	15	350	300	400	19	5	4
180L									
200L	2	F400B	16	400	350	450	19	5	8
225S/M	4...8								
250M	2	F500B	18	500	450	550	19	5	8
280S/M	4...8								
315S/M	2	F600B	22	600	550	660	24	6	8
315L	4...8								
355L	2	F740B	25	740	680	800	24	6	8
	4...8								

- ① Shaft extension as per IS: 1231
- ② Protected centre hole M16 x 36
- ③ Protected centre hole M20 x 42
- ④ Protected centre hole M24 x 50
- ⑤ 2 Nos. B.S. Conduit Entry 31.8 (1 1/4")-IS:1653
- ⑥ 2 Nos. B.S. Conduit Entry 51 (2")-IS:1653
- ⑦ 2 Nos. B.S. Conduit Entry 63.5 (2 1/2")-IS:1653
- ⑧ Measured over bolt heads
- ⑨ Terminals box can be rotated in steps of 90°
- ⑩ For 160 and 180 Frames, slant of Cable entry integral with Terminal Box. For 200 to 355 Frames Cable End Box of detachable type.
- ⑪ Flange as per IS: 2223
- ⑫ No. of fixing holes.
- ⑬ 1LA0 motor only. Refer page 11 for 1SE0 motor

**Definitive Dimensions (Upto 315L) :**  
M,N,S,D,E,F, GA and LA are binding dimensions for all standard motors.  
All other dimensions are subject to change. For valid dimensions, please contact Regional Office in your region.

Dimensions in mm

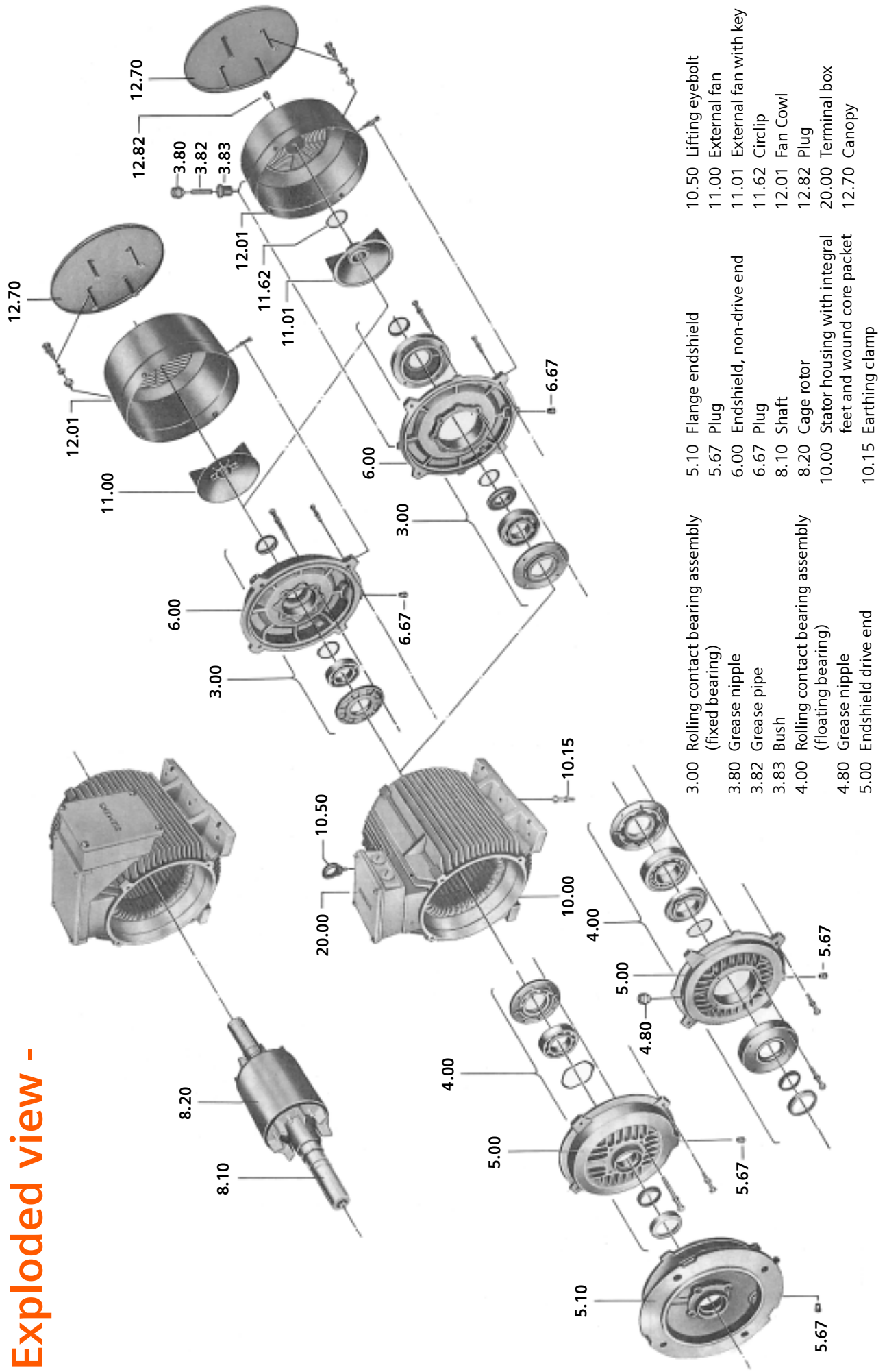
# Special Designs

The following special features/accessories can be provided on the motors, on request:

- Non-standard output
- Non-standard voltage and/or frequency
- 3no. PTC thermistors for trip (class B)
- 3no. PTC thermistors for trip (class F)
- 6no. (3 alarm + 3 trip) PTC thermistors, (class B)
- 6no. (3 alarm + 3 trip) PTC thermistors, (class F)
- 3no. PT 100 RTDs for windings
- Anticondensation heaters
- Epoxy gel coat on winding overhangs
- Non-standard paint shade
- Epoxy based paint
- Unpainted, only with primer
- Degree of protection IP56 / IP65
- Motors for converter fed operation
- Mounting arrangement for rotary pulse encoder - Hübner or Leine & Linde make or any other make of Parallel hollow shaft Encoders
- Non-standard shaft extension
- Standard Double shaft extension
- Non-standard Double shaft extension
- Vibration severity Grade A (IS: 12075) for frames 160M to 250M
- Roller bearing at Drive end
- Labyrinth seal
- Cable entry from DE/NDE with top mounted T. Box
- Terminal box on Right hand side (seen from drive end)
- Terminal box on Left hand side (seen from drive end)
- Larger size terminal box for frames upto 250M
- Flying leads (length to be specified)
- Different types of Constructions as shown on page 4
- Provision of threading for fixing Shock Pulse Monitoring [SPM] Probe for vibration measurement



# Exploded view -



- 3.00 Rolling contact bearing assembly (fixed bearing)
- 3.80 Grease nipple
- 3.82 Grease pipe
- 3.83 Bush
- 4.00 Rolling contact bearing assembly (floating bearing)
- 4.80 Grease nipple
- 5.00 Endshield drive end
- 5.10 Flange endshield
- 5.67 Plug
- 6.00 Endshield, non-drive end
- 6.67 Plug
- 8.10 Shaft
- 8.20 Cage rotor
- 10.00 Stator housing with integral feet and wound core packet
- 10.15 Earthing clamp
- 10.50 Lifting eyebolt
- 11.00 External fan
- 11.01 External fan with key
- 11.62 Circlip
- 12.01 Fan Cowl
- 12.82 Plug
- 20.00 Terminal box
- 12.70 Canopy

The graphic displayed here is solely for the purpose of explanation. The actual product may be different in appearance.

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