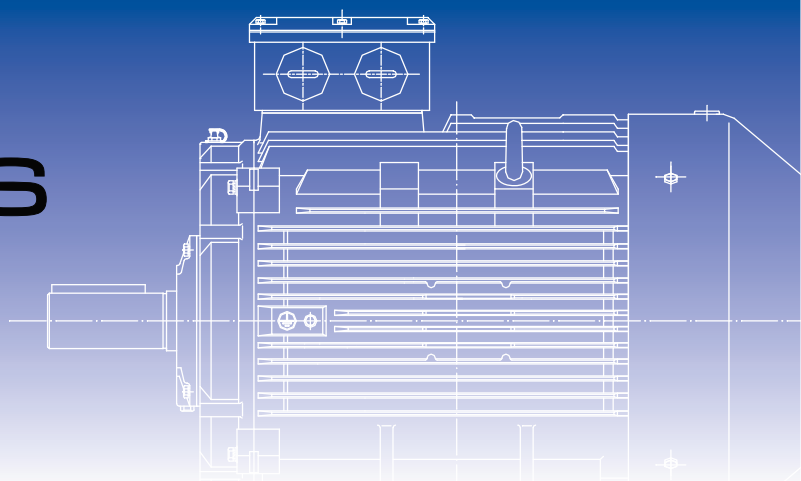


# TPM Series

IE2 High Efficiency



CAST IRON  
Frame 71-355

21088E

**BROOK  
CROMPTON**

# NEW EFFICIENCY CLASSES FOR LOW-VOLTAGE THREE-PHASE MOTORS (IE- CODE)

Along with the international discussion on energy efficiency a worldwide harmonized energy efficiency classification system has been established for low-voltage three-phase asynchronous motors.

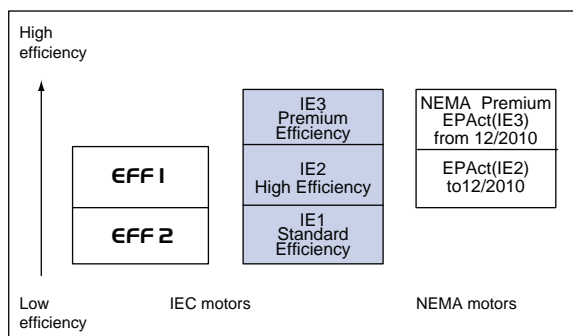
The efficiency factor defines the efficiency of motors when transforming electrical into mechanical energy. For many years low-voltage three-phase motors in the European Union have been sold in three efficiency classes EFF3, EFF2 and EFF1. Energy efficiency classification systems have been introduced and well-proven in many countries all over the world. They unfortunately differ from each other in terms of scope, wording and values. That was the reason for the International Electrotechnical Commission IEC to develop and publish an energy efficiency standard which replaces all the different national issues. In parallel IEC developed and issued a new standard for the determining the motor efficiencies. The new standard IEC 60034-30 defines and harmonizes worldwide the efficiency classes IE1, IE2 and IE3 for low-voltage three-phase motors.

## New international efficiency classes of motors (IE = International Efficiency)

The new EN 60034-30:2009 defines worldwide the following efficiency classes of low-voltage three-phase asynchronous motors in the power range from 0.75 kW to 375 kW.

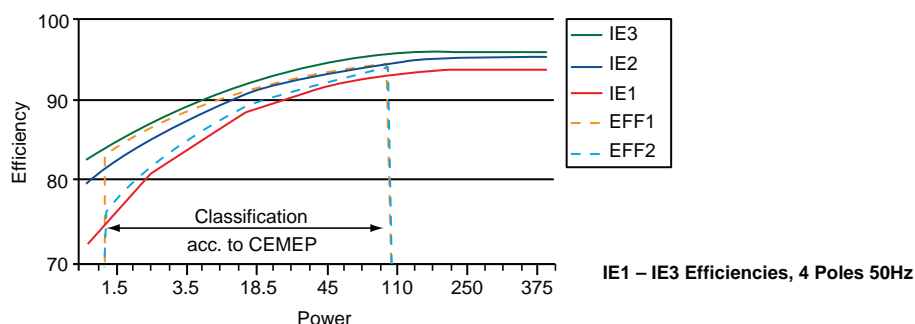
- **IE1 = Standard Efficiency (comparable to EFF2)**
- **IE2 = High Efficiency (comparable to EFF1)**
- **IE3 = Premium Efficiency**

The higher the efficiency class the higher is the complexity of motor production and the higher is the amount of material to be used (as for instance copper). The motor price will increase accordingly. In relation to the motor life time the purchase price is only a few percentage points and due the saved energy cost the pay-back period is short.



## New method for determining the efficiency

The method for measuring the efficiency of low-voltage three-phase asynchronous motors was revised with the new EN 60034-2-1:2007 standard. The new standard significantly increases the accuracy under defined laboratory conditions. It will replace the previous standard EN 60034-2:1996. The new standard can be applied from now. The old standard will become void in November 2010. The efficiency levels according to EN 60034-30 are measured with the new method stipulated in EN 60034-2-1. In a direct comparison of both measuring methods at the same motor, it is expected that the efficiency levels determined according to the new method are up to a few percentage points below the efficiency levels using the old method. To achieve compatibility with the old EFF1 and EFF2 classes, the limit values of IE2 and IE1 classes were lowered slightly. For example, a today's 11 kW, 4-pole EFF1 motor with 91,0% efficiency is identical with a new IE2 motor with 89,8% efficiency. The motor has not physically changed but measured with two different methods. The EN 60034-30 defines requirements of efficiency classes, creating internationally consistent provisions. It has no legislative power and does not define mandatory efficiency levels to be used for the motors under this scope. This is left to the respective legislation in the individual countries or regions.



## GENERAL SPECIFICATION

### SPECIFICATION

Cast iron motors are suitable for almost all applications and are designed to operate in an ambient temperature of -20°C to +40°C and at an altitude not exceeding 1000m above sea level.

### INSULATION AND TEMPERATURE RISE

Standard motors are designed complying with Class F insulation system, but temperature rise is checked according to Class B. That improves motor's useful life and reliability.

### COOLING

The standard cooling method is Totally Enclosed Fan Cooled (TEFC) in accordance with code IC 411 of IEC 60034-6.

### ENCLOSURE

The standard protection degree is IP55, which offer complete protection against contacting with live or moving parts inside the enclosure and against water splashing from any direction. More higher degree of protection is available.

### TERMINAL BOX

Terminal boxes on all motors are of a generous size for easy of connection and maintenance.

### VOLTAGE

Standard voltage are 415V 50Hz, 400V 50Hz and 380V 50Hz, but any single voltage in the range of 200-660V could be designed.

### STARTING

Direct-on-line starting can be used on all frame sizes. Single speed, single voltage motors above 2.2kW are provided with 6 terminals that can be used for star-delta starting if required. All motors, when started direct-on-line, will meet the requirements of IEC 60034-12.

### SHAFTS

All shaft diameters are machined to IEC 60072. For ease of fitting, removing or securing fitments, a tapped hole in the drive end shaft is provided as standard on all motor shafts.

### BALANCING

All motors are dynamically balanced to IEC 60072. Reduced and special balances are available.

### TOLERANCES ON MAIN PERFORMANCE PARAMETERS

IEC 60034-1, specifies allow tolerances for efficiency, power factor, speed, locked rotor torque, pullout torque, starting current and moment of inertia.

### QUALITY TESTING

All motors are tested to strict engineering tolerances and are subject to mechanical and electrical tests at intermediate and final stages of manufacture. Individual motors are also tested to specific customer requirements.

### QUALITY ASSURANCE

Stringent quality procedures are observed from first design to finished product in accordance with the ISO9001 documented quality systems. Our factory has assessed to meeting these requirements, a further assurance that only the highest possible standards of quality are accepted.

## STANDARDS COMPLIANCE

**BROOK CROMPTON** motors are designed and built to suit all industrial requirements, including operation outside in the weather, in the tropics, or sub zero temperatures.

**BROOK CROMPTON** motors are built to comply with the requirements of the following international standards:

1. International Electrotechnical Commission-IEC60034 and IEC60072.
2. British Standards-BS 5000 and BS 4999.
3. Australian Standards-AS 1359.
4. The requirements for European "CE" marking, Low Voltage Directive 73/23(1973), modified by Directive 93/68(1993) & the EMC-Directive 89/336. These motors are designed for use with other machineries, and they should only be used if the complete machinery is in conformity with the Directive for Safety of Machinery(89/392/EEC).

Standards	IEC	CEN/CENELEC	BS
<b>IEC60034</b>			
<b>General Requirements for Electrical machines</b>	60034-1	EN60034-1	4999-1 4999-69
<b>Methods of Determining Losses &amp; Efficiency</b>	60034-2	HD 53 2	4999-34
<b>Degrees of Protection</b>	60034-5	EN 60034-5	4999-20
<b>Method of Cooling</b>	60034-6	EN 60034-6	4999-21
<b>Mounting arrangements</b>	60034-7	EN 60034-7	4999-22
<b>Terminal Markings and Direction of Rotation</b>	60034-8	HD53 8 S4	4999-3
<b>Noise limits</b>	60034-9	EN60034-9	4999-51
<b>Starting Performance</b>	60034-12	EN60034-12	4999-112
<b>Mechanical vibration</b>	60034-14	EN60034-14	4999-50
<b>Standard voltages</b>	60038	HD 472 S1	
<b>Dimensions &amp; Output ratings</b>	60072		
<b>Mounting Dimensions &amp; relationship frame sizes-output ratings.</b>	60072	HD 231	4999-10 51-110
<b>Shaft dimensions</b>	60072	HD 231	4999-10
<b>Classification of environmental conditions</b>	600721-2-1		
<b>IEC60085</b>			
<b>Insulation material</b>	60085		
<b>Efficiency of TPM series</b>	60034-30 IE2		

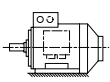
# TECHNICAL INFORMATION

## DEGREES OF PROTECTION (IEC 60034-5)

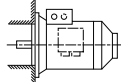
1st Digit	Protection Against Foreign Object	2nd Digit	Protection Against Moisture
0	Not Protected	0	Not Protected
1	Protected Against Objects > 50 mm	1	Protected Against Dripping Water
2	Protected Against Objects > 12 mm	2	Protected Against Dripping Water Titled 15°N
3	Protected Against Objects > 2.5 mm	3	Protected Against Spraying Water
4	Protected Against Objects > 1.0 mm	4	Protected Against Splashing Water
5	Dust Protected	5	Protected Against Water Jets
6	Dust Tight	6	Protected Against Heavy Seas
7	Not Applicable	7	Protected Against the Effect of Immersion
8	Not Applicable	8	Protected Against Submersion

## MOUNTING ARRANGEMENTS (IEC60034-7)

Horizontal shaft:



**IM B3**  
**IM 1001**  
foot mounted



**IM B5**  
**IM 3001**  
flange at DE  
no feet



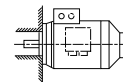
**IM B6**  
**IM 1051**  
foot wall mounted with  
feet on left-hand side  
when viewed from DE



**IM B7**  
**IM 1061**  
foot wall mounted with  
feet on right-hand side  
when viewed from DE

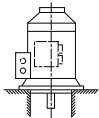


**IM B8**  
**IM 1071**  
ceiling mounted  
with feet  
above motor

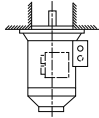


**IM B14**  
**IM 3601**  
face at DE  
no feet

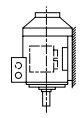
Vertical shaft:



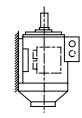
**IM V1**  
**IM 3011**  
flange at DE  
shaft down  
no feet



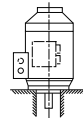
**IM V3**  
**IM 3031**  
flange at DE  
shaft up  
no feet



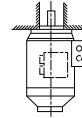
**IM V5**  
**IM 1011**  
vertical foot  
wall mounted  
shaft down



**IM V6**  
**IM 1031**  
vertical foot  
wall mounted  
shaft up



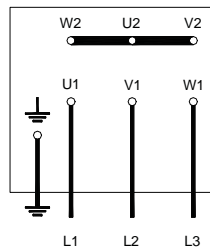
**IM V18**  
**IM 3611**  
face at DE  
shaft down  
no feet



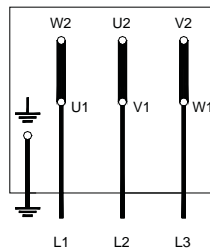
**IM V19**  
**IM 3631**  
face at DE  
shaft down  
no feet

## CONNECTION DIAGRAMS

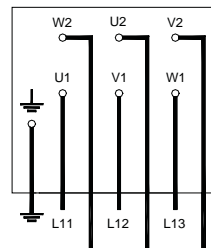
Three Phase motors with cage rotor



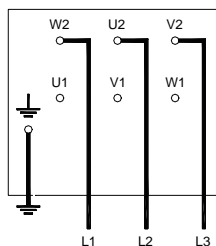
Star Connection



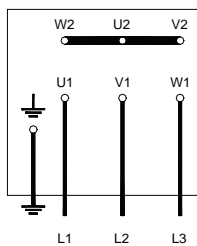
Delta Connection



Connection to  
Star-Delta Starter

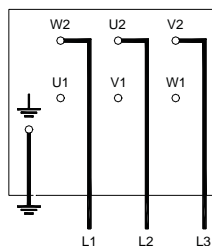


Low speed

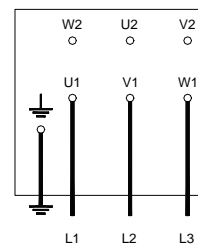


High Speed

Multi-speed motors in  
Dahlander Connection  
(Tapped winding)



Low speed



High Speed

Multi-speed motors  
2 separate windings

## INDICATIVE OPERATING COST SAVINGS

**Below is a typical example of the cost saving of a Brook Crompton TPM IE2 Motor when compared to standard efficiency motor:**

For a factory with 50 units of 37kW 4p motor with running of 24 hours, 365 days, yearly.  
Using a 37kW 4 Pole motor the cost savings can be calculated as follows:

$$S = kW \times \text{Power Cost} \times \text{Running time} \times ((100/\text{Std Eff}) - (100/\text{IE2 Eff}))$$

<b>kW = rated motor output</b>	<b>= 37kW</b>
<b>Power cost = Energy cost per kW hr</b>	<b>= RM0.30</b>
<b>Running time = running time in hrs/year</b>	<b>= 8760 hrs - 365 Days</b>
<b>Std Eff = Standard Efficiency Motor</b>	<b>= 91.30%</b>
<b>IE2 Eff = Brook Crompton TPM IE2 Motor</b>	<b>= 92.70%</b>
<b>S = annual saving in RM</b>	<b>= RM1,608.44</b>
<b>Total Saving for 50 units motor per annum</b>	<b>= RM80,422.00</b>

### Pay-Back Example

<b>Initial cost Brook Crompton TPM IE2 Motor</b>	<b>= RM 6000</b>
<b>Cost of Standard Efficiency Motor</b>	<b>= RM 4500</b>
<b>Purchase Price Different</b>	<b>= RM 1500</b>
<b>Additional Price Pay-Back Period</b>	<b>= 0.93 years</b>
<b>Purchase price Pay-Back period</b>	<b>= 3.73years</b>

### Conclusion

Total saving per annum for 50 units motor will be RM80,422.00

Users should place high priority on the cost saving advantages to purchase Brook Crompton TPM IE2 motor.

Users will quickly be recovered by reduced running cost of Brook Crompton TPM IE2 motors.

Will need less than ONE year for return of investment

## PERFORMANCE DATA

### 2 POLES - 3000 RPM SYNCHRONOUS SPEED 50HZ

MOTOR TYPE	OUTPUT kW	FULL LOAD SPEED (rpm)	INL 400V (amps)	IFL 380V (amps)	IFL 400V (amps)	IFL 415V (amps)	EFFICIENCY, $\eta$ @			POWER FACTOR, $\cos \theta$ @			IST IFL	FULL LOAD TORQUE N·m	TST TFL	TPU TFL	TM TFL	M of I J (kg·m <sup>2</sup> )	NOISE LEVEL 1m dB(A)	NET WEIGHT (kg)
							100%FL	75%FL	50%FL	100%FL	75%FL	50%FL								
TPM-DF 80I-2	0.75	2860	0.94	1.8	1.7	1.6	77.4	77.0	73.8	0.83	0.77	0.66	6.3	2.5	2	3	0.0012	65	17.5	
TPM-DF 80S-2	1.1	2860	1.1	2.5	2.3	2.3	79.6	79.9	78.1	0.85	0.8	0.69	6.5	3.7	2	2.9	0.0017	65	19.5	
TPM-DF 90S-2	1.5	2860	0.91	3.2	3.0	2.9	81.3	81.7	80.1	0.88	0.86	0.80	5.5	5.0	2.2	2.6	0.0026	70	28	
TPM-DF 90L-2	2.2	2865	1.2	4.5	4.2	4.1	83.2	83.9	82.9	0.9	0.87	0.83	6.1	7.4	2.2	2.5	0.0034	72	32	
TPM-DF 100L-2	3	2890	1.6	6.0	5.7	5.5	84.6	84.7	83.1	0.9	0.88	0.82	7.3	9.9	2.3	2.8	0.006	75	38.5	
TPM-DF 112M-2	4	2895	2.4	7.9	7.5	7.2	85.8	86.3	85.5	0.9	0.87	0.79	7.1	13.2	2.2	2.9	0.0086	76	40	
TPM-DF 132S1-2	5.5	2910	2.6	10.6	10.0	9.7	87	87.3	86.3	0.91	0.89	0.83	6.9	18.0	2.1	2.9	0.016	78	62	
TPM-DF 132S2-2	7.5	2910	4.2	14.2	13.5	13.0	88.1	88.8	88.4	0.91	0.89	0.84	7.3	24.6	2.2	2.8	0.0188	80	69	
TPM-DF 160M1-2	11	2940	5.1	20.5	19.5	18.8	89.4	89.8	86.8	0.91	0.89	0.84	7.3	35.7	2.1	2.9	0.0618	86	125	
TPM-DF 160M2-2	15	2940	6.8	27.7	26.3	25.4	90.3	90.0	88.5	0.91	0.89	0.84	7.3	48.7	2.2	2.7	0.0674	86	135	
TPM-DF 160L-2	18.5	2935	6.9	33.6	31.9	30.8	90.9	90.8	89.8	0.92	0.91	0.87	6.8	60.2	2	2.7	0.0808	86	151	
TPM-DF 180M-2	22	2945	12.7	40.7	38.6	37.2	91.3	90.9	89.2	0.9	0.87	0.79	7.2	71.3	2.2	2.8	0.1003	89	182	
TPM-DF 200L1-2	30	2960	14.8	54.4	51.7	49.9	92	91.7	90.4	0.91	0.89	0.83	7	96.8	2.1	2.9	0.189	92	262	
TPM-DF 200L2-2	37	2960	19.4	66.8	63.4	61.2	92.5	92.3	91.2	0.91	0.88	0.81	7	119.4	2.2	2.8	0.1971	92	274	
TPM-DF 225M-2	45	2970	22.2	81.8	77.7	74.9	92.9	92.6	91.4	0.9	0.88	0.82	6.8	144.7	2	2.8	0.3619	92	380	
TPM-DF 250M-2	55	2975	32.1	101.9	96.8	93.3	93.2	92.8	91.5	0.88	0.85	0.78	6.7	176.6	2.1	2.7	0.4387	93	426	
TPM-DF 280S-2	75	2980	36.1	133.5	126.8	122.2	93.8	93.3	91.9	0.91	0.88	0.83	6.9	240.4	2.4	2.9	0.8084	94	573	
TPM-DF 280M-2	90	2980	43.6	159.7	151.7	146.2	94.1	93.7	92.5	0.91	0.88	0.82	7.1	288.4	2.6	2.9	0.9208	94	625	
TPM-DF 315S-2	110	2980	44.9	194.8	185.0	178.3	94.3	93.8	92.5	0.91	0.86	0.79	6.9	352.5	2	2.9	1.693	96	895	
TPM-DF 315M-2	132	2980	49	230.4	218.9	211.0	94.6	94.2	93.1	0.92	0.91	0.87	6.9	423.0	2	2.9	1.8746	96	1009	
TPM-DF 315L1-2	160	2980	48.2	275.7	262.0	252.5	94.8	94.3	93.0	0.93	0.92	0.9	6.3	512.8	2	2.7	2.2144	99	1128	
TPM-DF 315L2-2	200	2975	54.5	343.9	326.7	314.9	95	94.6	93.5	0.93	0.93	0.91	6.1	642.0	2	2.5	2.5171	99	1269	
TPM-DF 355M-2	250	2980	63.1	429.9	408.4	393.7	95	94.7	93.6	0.93	0.93	0.92	5.8	801.2	2.2	2.9	3.8265	103	1627	
TPM-DF 355L-2	315	2980	75.2	541.7	514.6	496.0	95	94.7	93.7	0.93	0.93	0.92	5.9	1009.5	2.4	2.9	4.5516	103	1780	

■ INL = No Load Current    ■ IFL = Full Load Current    ■ IST = Locked Rotor Current    ■ TST = Locked Rotor Torque  
 ■ TPU = Pull Up Torque    ■ TM = Maximum Torque    ■ TFL = Full Load Torque

**PERFORMANCE DATA**  
**4 POLES - 1500 RPM SYNCHRONOUS SPEED 50HZ**

MOTOR TYPE	OUTPUT kW	FULL LOAD SPEED (rpm)	INL 400V (amps)	IFL 380V (amps)	IFL 400V (amps)	IFL 415V (amps)	EFFICIENCY, η @			POWER FACTOR, COS θ @			IST IFL	FULL LOAD TORQUE N·m	TST TFL	TPU TFL	TM TFL	M of I J (kg·m <sup>2</sup> )	NOISE LEVEL 1m dB(A)	NET WEIGHT (kg)
							100%FL	75%FL	50%FL	100%FL	75%FL	50%FL								
TPM-DF 802-4	0.75	1425	0.97	1.88	1.79	1.72	79.6	79.5	77.3	0.76	0.69	0.56	6	5.0	2.6	2.1	3	0.0036	58	23
TPM-DF 90S-4	1.1	1420	1.2	2.53	2.41	2.32	81.4	82.4	80.8	0.81	0.76	0.66	58	7.4	2.3	1.8	2.6	0.0044	60	27.5
TPM-DF 90L-4	1.5	1425	1.5	3.4	3.2	3.1	82.8	83.8	83.2	0.81	0.76	0.65	6.2	10.1	2.3	1.8	2.6	0.0056	60	32
TPM-DF 100L1-4	2.2	1440	2.1	4.8	4.5	4.4	84.3	84.5	83.0	0.83	0.78	0.67	6.8	14.6	2.3	1.8	2.7	0.0109	63	40.5
TPM-DF 100L2-4	3	1445	2.7	6.3	6.0	5.8	85.5	85.7	84.4	0.84	0.79	0.68	7	19.8	2.5	2	2.9	0.0144	61	46.5
TPM-DF 112M-4	4	1440	3.3	8.4	7.9	7.7	86.6	87.1	86.8	0.84	0.79	0.68	7	26.5	2.4	1.9	2.7	0.0171	63	50
TPM-DF 132S-4	5.5	1450	4.5	11.3	10.8	10.4	87.7	88.3	87.9	0.84	0.79	0.7	7.1	36.2	2.3	1.8	2.7	0.0385	69	70
TPM-DF 132M-4	7.5	1455	5.8	14.9	14.2	13.7	88.7	89.2	88.6	0.86	0.83	0.74	7.3	49.2	2.3	1.8	2.7	0.0514	69	85
TPM-DF 160M-4	11	1465	8.6	21.9	20.8	20.0	89.8	89.9	88.9	0.85	0.8	0.7	7.2	71.7	2.5	1.9	2.8	0.1076	70	126
TPM-DF 160L-4	15	1465	10.7	29.3	27.8	26.8	90.6	90.7	89.9	0.86	0.82	0.73	7.2	97.8	2.5	1.9	2.8	0.139	73	147
TPM-DF 180M-4	18.5	1470	13	35.4	33.7	32.4	91.2	91.4	90.7	0.87	0.83	0.74	7.2	120.2	2.3	1.8	3.4	0.1913	75	189
TPM-DF 180L-4	22	1475	16	41.9	39.8	38.4	91.6	91.7	91.0	0.87	0.82	0.73	7.6	142.4	2.5	2	3.5	0.2192	75	208
TPM-DF 200L-4	30	1475	19.1	56.1	53.3	51.4	92.3	92.5	92.0	0.88	0.84	0.76	7.4	194.2	2.1	1.7	3.1	0.3187	80	275
TPM-DF 225S-4	37	1480	23.5	68.9	65.5	63.1	92.7	92.6	91.6	0.88	0.84	0.76	6.8	238.8	2.1	1.7	3.1	0.6463	81	344
TPM-DF 225M-4	45	1485	31	84.4	80.2	77.3	93.1	92.9	91.8	0.87	0.83	0.74	7.4	289.4	2.4	1.9	3.4	0.7547	82	375
TPM-DF 250M-4	55	1480	33.7	102.7	97.6	94.1	93.5	93.4	92.5	0.87	0.84	0.76	7.2	354.9	2.4	1.8	3	0.9344	83	433
TPM-DF 280S-4	75	1485	44.6	137.8	130.9	126.1	94	93.8	92.8	0.88	0.85	0.77	7	482.3	2.3	1.8	3.2	1.7867	86	587
TPM-DF 280M-4	90	1490	53.6	165.0	156.7	151.0	94.2	94.0	93.1	0.88	0.85	0.77	7.3	576.8	2.5	2	3.3	2.1229	86	676
TPM-DF 315S-4	110	1490	54	196.5	186.7	179.9	94.5	94.2	93.2	0.9	0.88	0.83	7.6	705.0	2.4	1.9	2.9	3.8188	93	946
TPM-DF 315M-4	132	1485	57	235.3	223.5	215.5	94.7	94.6	93.8	0.9	0.88	0.84	6.8	848.9	2.2	1.7	2.6	3.8306	93	1042
TPM-DF 315L1-4	160	1485	55.7	281.5	267.4	257.8	94.9	94.9	94.2	0.91	0.9	0.87	6	1029.0	2	1.6	2.4	4.6727	97	1130
TPM-DF 315L2-4	200	1485	66.2	351.1	333.6	321.5	95.1	95.2	94.7	0.91	0.9	0.88	6	1286.2	2	1.6	2.4	5.3463	97	1243
TPM-DF 355M-4	250	1490	88.5	438.9	417.0	401.9	95.1	94.9	94.1	0.91	0.9	0.87	6.3	1602.3	2.2	1.7	2.5	8.2188	101	1661
TPM-DF 355L-4	315	1490	115.7	553.0	525.4	506.4	95.1	94.9	94.1	0.91	0.9	0.86	7	2019.0	2.3	1.8	2.7	10.5146	101	1924

■ INL = No Load Current    ■ IFL = Full Load Current    ■ IST = Locked Rotor Current    ■ TST = Locked Rotor Torque  
 ■ TPU = Pull Up Torque    ■ TM = Maximum Torque    ■ TFL = Full Load Torque



## PERFORMANCE DATA

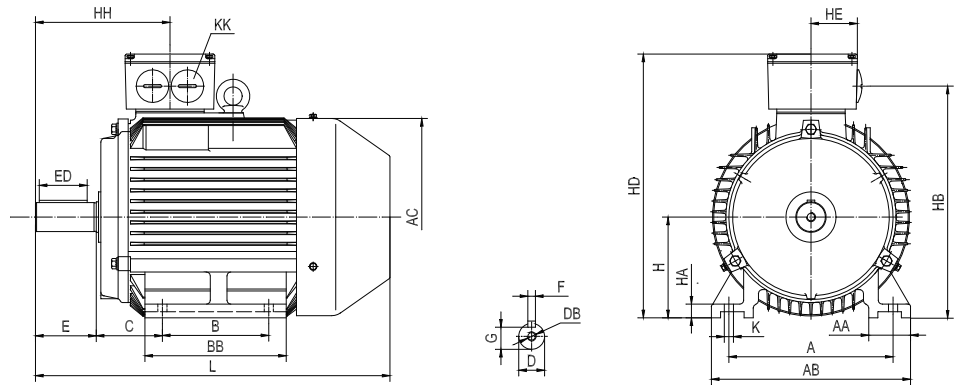
### 6 POLES - 1000 RPM SYNCHRONOUS SPEED 50Hz

MOTOR TYPE	OUTPUT kW	FULL LOAD SPEED (rpm)	INL 400V (amps)	IFL 380V (amps)	IFL 400V (amps)	IFL 415V (amps)	EFFICIENCY, $\eta$ @			POWER FACTOR, $\cos \theta$ @			IST IFL	FULL LOAD TORQUE N-m	TST TFL	TPU TFL	TM TFL	M of I J (kg-m <sup>2</sup> )	NOISE LEVEL 1m dB(A)	NET WEIGHT (kg)
							100%FL	75%FL	50%FL	100%FL	75%FL	50%FL								
TPM-DF 90S-6	0.75	935	1.4	2.1	2.0	1.9	75.9	76.2	73.1	0.72	0.64	0.51	5	7.7	2.3	1.8	2.8	0.0057	57	27
TPM-DF 90L-6	1.1	940	2.1	3.0	2.9	2.8	78.1	77.8	75.1	0.71	0.62	0.49	5.6	11.2	2.7	2.1	2.8	0.0072	57	31
TPM-DF 100L-6	1.5	950	2	3.8	3.6	3.4	79.8	80.1	78.0	0.76	0.69	0.58	5.5	15.1	1.9	1.5	2.5	0.0144	61	39
TPM-DF 112M-6	2.2	950	3	5.4	5.1	4.9	81.8	82.5	81.3	0.76	0.69	0.56	5.5	22.1	2.3	1.8	2.8	0.0229	65	50
TPM-DF 132S-6	3	960	3.7	7.2	6.8	6.6	83.3	84.1	83.1	0.76	0.7	0.58	5.8	29.8	2.1	1.7	2.6	0.039	69	63
TPM-DF 132M1-6	4	960	4.5	9.3	8.9	8.5	84.6	85.5	84.8	0.77	0.71	0.60	6	39.8	2	1.6	2.5	0.0499	69	69
TPM-DF 132M2-6	5.5	965	5.5	12.5	11.8	11.4	86	86.8	86.3	0.78	0.73	0.61	6.3	54.4	2.1	1.7	2.5	0.0714	69	84
TPM-DF 160M-6	7.5	970	7.3	16.8	15.9	15.3	87.2	87.4	86.3	0.78	0.73	0.62	6.4	73.8	2	1.6	2.7	0.1248	71	121
TPM-DF 160L-6	11	970	10.8	23.9	22.7	21.8	88.7	88.8	87.7	0.79	0.73	0.62	6.5	108.3	2	1.6	2.6	0.18	73	153
TPM-DF 180L-6	15	975	12	31.4	29.8	28.7	89.7	90.0	89.2	0.81	0.77	0.67	6.8	146.9	2	1.7	2.7	0.3415	73	194
TPM-DF 200L1-6	18.5	980	14.1	37.5	35.6	34.3	90.4	90.7	90.0	0.83	0.79	0.70	6.6	180.3	2	1.8	2.9	0.4894	75	244
TPM-DF 200L2-6	22	980	16.3	44.3	42.1	40.6	90.9	91.2	90.6	0.83	0.79	0.70	6.7	214.4	2	1.6	2.7	0.552	75	273
TPM-DF 225M-6	30	985	17.1	58.5	55.6	53.5	91.7	92.0	91.4	0.85	0.82	0.76	6.7	290.9	2.1	1.7	2.6	0.7063	76	312
TPM-DF 250M-6	37	985	20.8	70.9	67.4	64.9	92.2	92.4	92.0	0.86	0.83	0.77	6.9	358.7	2.4	1.9	2.7	1.1189	78	413
TPM-DF 280S-6	45	985	27.9	85.8	81.5	78.5	92.7	92.8	92.1	0.86	0.83	0.75	7.2	436.3	2.3	1.8	2.8	2.1645	80	557
TPM-DF 280M-6	55	985	32.7	104.4	99.2	95.6	93.1	93.2	92.6	0.86	0.83	0.76	7.2	533.2	2.2	1.7	2.7	2.6692	80	611
TPM-DF 315S-6	75	990	40.1	141.4	134.3	129.5	93.7	93.6	92.8	0.86	0.84	0.77	7.2	723.5	2	1.8	3	4.11	85	847
TPM-DF 315M-6	90	990	46.1	167.2	158.9	153.1	94	93.9	93.2	0.87	0.85	0.79	6.8	868.2	2	1.7	3	4.8746	85	1031
TPM-DF 315L1-6	110	990	55.2	203.7	193.5	186.5	94.3	94.2	93.5	0.87	0.85	0.79	6.7	1061.1	2.1	1.7	2.8	5.9125	85	1182
TPM-DF 315L2-6	132	990	62.5	243.7	231.5	223.1	94.6	94.4	94.0	0.87	0.84	0.80	7	1273.3	2.2	1.7	2.8	6.9504	85	1323
TPM-DF 355M1-6	160	990	72.4	288.1	273.7	263.8	94.8	94.7	93.7	0.89	0.87	0.82	6.9	1543.4	2	1.6	2.8	9.9993	90	1582
TPM-DF 355M2-6	200	990	84.9	359.4	341.4	329.1	95	94.9	94.2	0.89	0.87	0.83	6.6	1929.3	2	1.5	2.7	11.1898	90	1664
TPM-DF 355L-6	250	990	98.9	449.3	426.8	411.4	95	94.9	94.2	0.89	0.88	0.84	6.5	2411.6	2	1.5	2.7	14.0614	92	1757

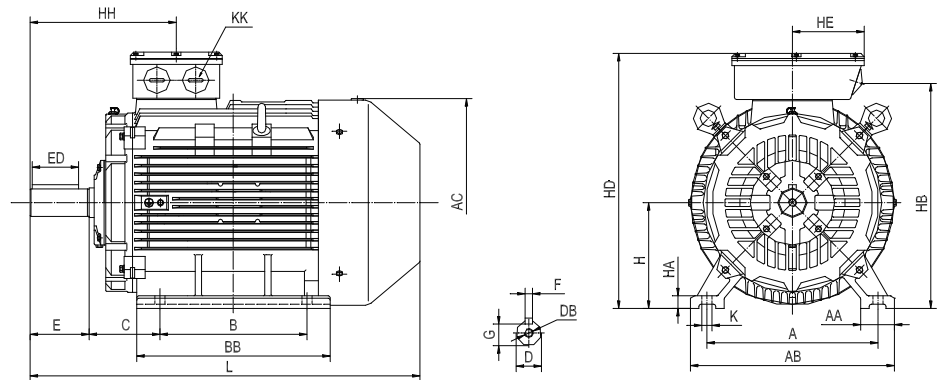
■ INL = No Load Current    ■ IFL = Full Load Current    ■ IST = Locked Rotor Current    ■ TST = Locked Rotor Torque  
 ■ TPU = Pull Up Torque    ■ TM = Maximum Torque    ■ TFL = Full Load Torque

# TPM-DF SERIES DIMENSIONS FOOT MOUNT B3 IM1001

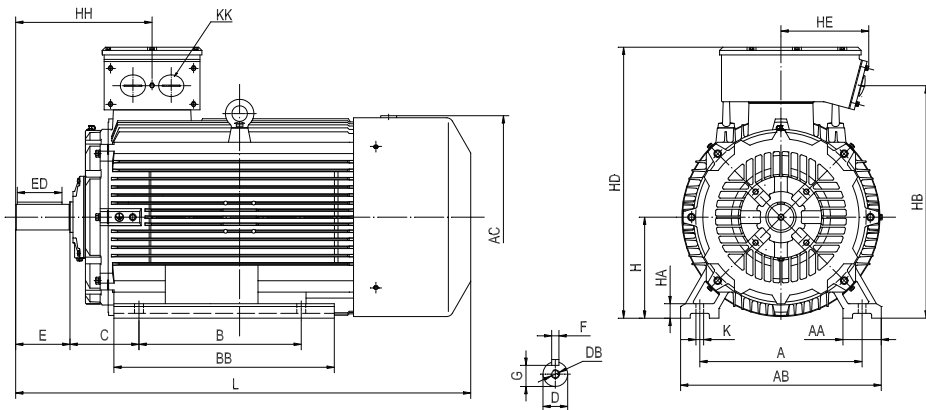
TPM-DF 80~132



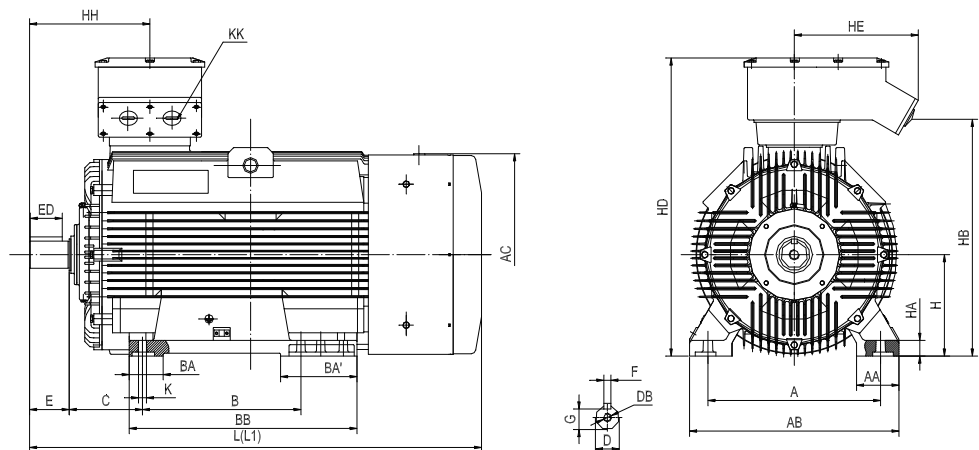
TPM-DF 160~280



TPM-DF 315



TPM-DF 355

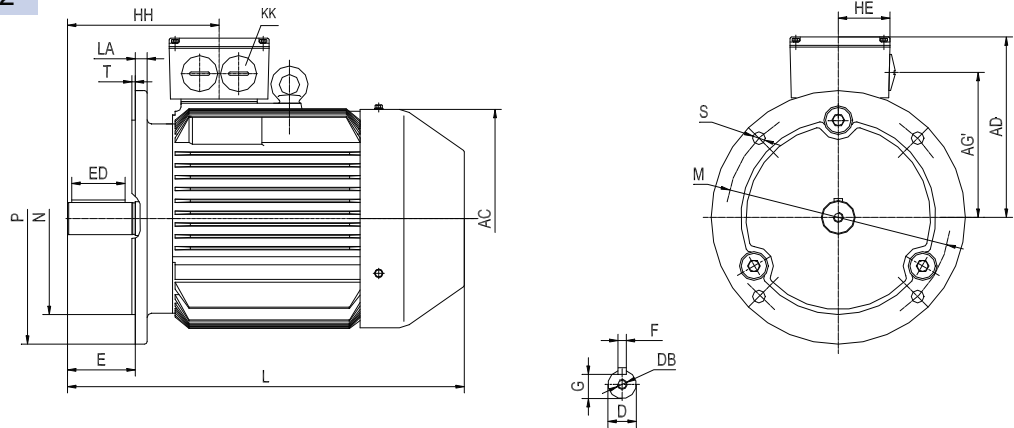


## TPM-DF SERIES DIMENSIONS FOOT MOUNT B3 IM1001

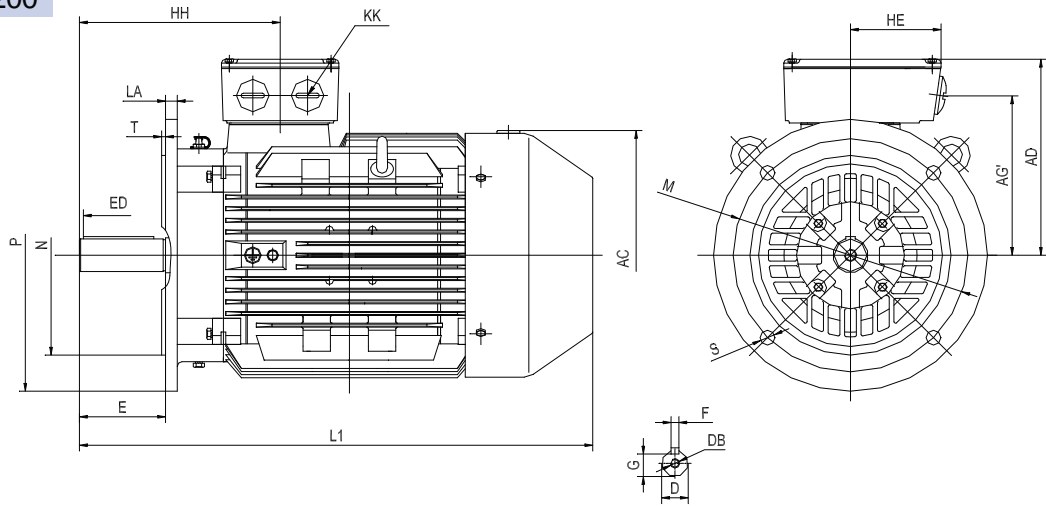
FRAME	A	AA	AB	AC	B	BB	C	D	DB	E	ED	F	G	H	HA	HB	HD	HE	HH	K	KK	L1	L
TPM-DF 80	125	36	160	159	100	173	50	19	M6X16	40	25	6	15.5	80	12	195	235	59	112	10	2-M25X1.5		335
TPM-DF 90S	140	38	180	176	100	190	56	24	M8X19	50	40	8	20	90	12	207	250	59	125	10	2-M25X1.5		365
TPM-DF 90L	140	38	180	176	125	215	56	24	M8X19	50	40	8	20	90	12	207	250	59	125	10	2-M25X1.5		390
TPM-DF 100L	160	40	200	200	140	233	63	28	M10X22	60	45	8	24	100	14	228	270	59	144	12	2-M25X1.5		430
TPM-DF 112M	190	45	226	220	140	180	70	28	M10X22	60	45	8	24	112	13	265	310	59	154	12	2-M32X1.5		395
TPM-DF 132S	216	55	262	260	140	186	89	38	M12X28	80	63	10	33	132	18	305	350	59	179	12	2-M32X1.5		470
TPM-DF 132M	216	55	262	260	178	224	89	38	M12X28	80	63	10	33	132	18	305	350	59	179	12	2-M32X1.5		510
TPM-DF 160M	254	65	320	330	210	268	108	42	M16X36	110	90	12	37	160	20	370	420	120	262	14.5	2-M40x1.5	625	620
TPM-DF 160L	254	65	320	330	254	312	108	42	M16X36	110	90	12	37	160	20	370	420	120	262	14.5	2-M40x1.5	670	665
TPM-DF 180M	279	70	355	380	241	311	121	48	M16X36	110	90	14	42.5	180	22	405	455	120	270	14.5	2-M40X1.5	700	690
TPM-DF 180L	279	70	355	380	279	349	121	48	M16X36	110	90	14	42.5	180	22	405	455	120	270	14.5	2-M40X1.5	740	730
TPM-DF 200L	318	70	388	420	305	383	133	55	M20X42	110	90	16	49	200	25	445	510	165.5	296	18.5	2-M50X1.5	780	790
TPM-DF 225S-4,6	356	75	431	470	286	380	149	60	M20X42	140	110	18	53	225	28	507	550	165.5	329	18.5	2-M50X1.5	820	830
TPM-DF 225M-2	356	75	431	470	311	405	149	55	M20X42	110	90	16	49	225	28	507	550	165.5	299	18.5	2-M50X1.5	820	830
TPM-DF 225M-4,6	356	75	431	470	311	405	149	60	M20X42	140	110	18	53	225	28	507	550	165.5	329	18.5	2-M50X1.5	850	860
TPM-DF 250M-2	406	80	490	510	349	460	168	60	M20X42	140	110	18	53	250	30	560	620	185	347	24	2-M63X1.5	935	930
TPM-DF 250M-4,6	406	80	490	510	349	460	168	65	M20X42	140	110	18	58	250	30	560	620	185	347	24	2-M63X1.5	935	930
TPM-DF 280S-2	457	90	542	580	368	519	190	65	M20X42	140	110	18	58	280	35	600	670	185	356	24	2-M63X1.5	1010	1010
TPM-DF 280S-4,6	457	90	542	580	368	519	190	75	M20X42	140	110	20	67.5	280	35	600	670	185	356	24	2-M63X1.5	1010	1010
TPM-DF 280M-2	457	90	542	580	419	570	190	65	M20X42	140	110	18	58	280	35	600	670	185	356	24	2-M63X1.5	1060	1060
TPM-DF 280M-4,6	457	90	542	580	419	570	190	75	M20X42	140	110	20	67.5	280	35	600	670	185	356	24	2-M63X1.5	1060	1060
TPM-DF 315S-2	508	120	628	645	406	617	216	65	M20x42	140	110	18	58	315	45	755	848	275	400	28	2-M63X1.5		1230
TPM-DF 315S-4,6,8	508	120	628	645	406	617	216	80	M20x42	170	140	22	71	315	45	755	848	275	430	28	2-M63X1.5		1260
TPM-DF 315M-4,6,8	508	120	628	645	457	690	216	80	M20x42	170	140	22	71	315	45	755	848	275	430	28	2-M63X1.5		1435
TPM-DF 315L-2	508	120	628	645	508	690	216	65	M20x42	140	110	18	58	315	45	755	848	275	400	28	2-M63X1.5		1405
TPM-DF 315L-4,6,8	508	120	628	645	508	690	216	80	M20x42	170	140	22	71	315	45	755	848	275	430	28	2-M63X1.5		1435
TPM-DF 355M-2	610	150	740	720	560	805	254	75	M24x50	140	110	20	67.5	355	55	838	1060	447	419	28	2-M63X1.5		1650
TPM-DF 355M-4,6,8	610	150	740	720	560	805	254	95	M24x50	170	140	25	86	355	55	838	1060	447	419	28	2-M63X1.5		1680
TPM-DF 355L-2	610	150	740	720	630	805	254	75	M24x50	140	110	20	67.5	355	55	838	1060	447	419	28	2-M63X1.5		1650
TPM-DF 355L-4,6,8	610	150	740	720	630	805	254	95	M24x50	170	140	25	86	355	55	838	1060	447	419	28	2-M63X1.5		1680

# TPM-DF SERIES DIMENSIONS FLANGE MOUNT B5 IM3001

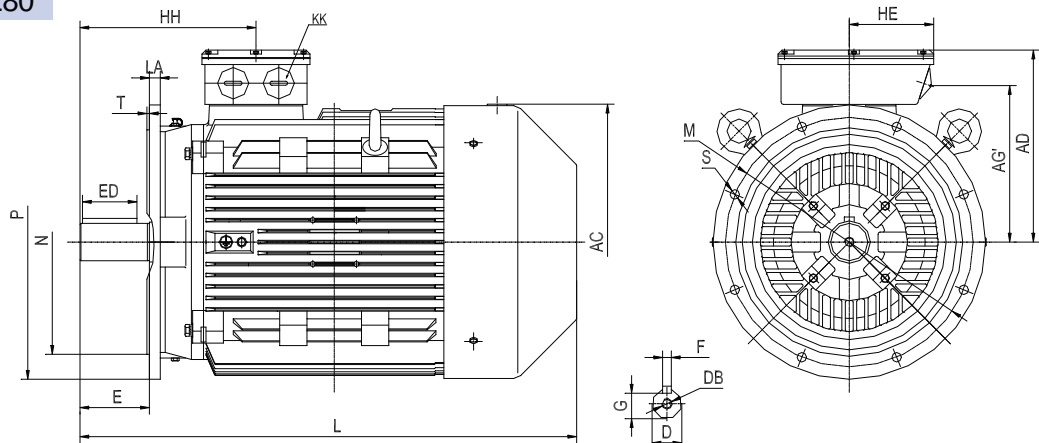
## TPM-DF 80~132



## TPM-DF 160~200



## TPM-DF 225~280

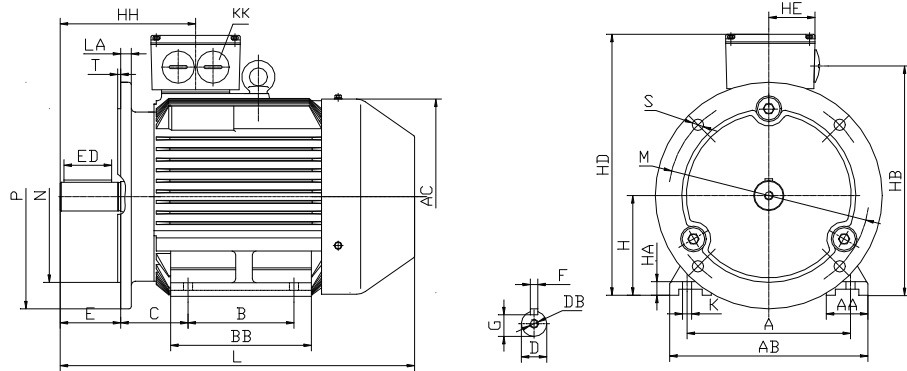


## TPM-DF SERIES DIMENSIONS FLANGE MOUNT B5 IM3001

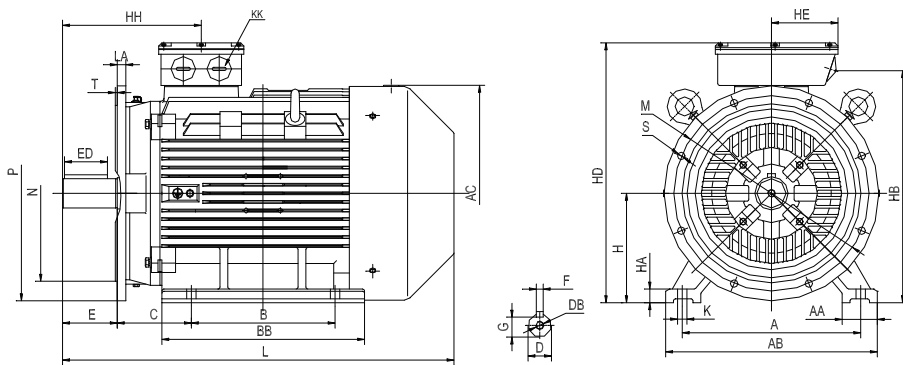
FRAME	AC	AD	AG'	D	DB	E	ED	F	G	HE	HH	KK	L1	L	LA	M	N	P	S	T
TPM-DF 80	159	155	115	19	M6X16	40	25	6	15.5	59	112	2-M25X1.5		335	12	165	130	200	4x12	3.5
TPM-DF 90S	176	156	117	24	M8X19	50	40	8	20	59	125	2-M25X1.5		365	12	165	130	200	4x12	3.5
TPM-DF 90L	176	156	117	24	M8X19	50	40	8	20	59	125	2-M25X1.5		390	12	165	130	200	4x12	3.5
TPM-DF 00L	200	170	128	28	M10X22	60	45	8	24	59	144	2-M25X1.5		430	15	215	180	250	4x14.5	4
TPM-DF 112M	220	198	162	28	M10X22	60	45	8	24	59	154	2-M32X1.5		395	14	215	180	250	4x14.5	4
TPM-DF 132S	260	218	182	38	M12X28	80	63	10	33	59	179	2-M32X1.5		470	14	265	230	300	4x14.5	4
TPM-DF 132M	260	218	182	38	M12X28	80	63	10	33	59	179	2-M32X1.5		510	14	265	230	300	4x14.5	4
TPM-DF 160M	330	260	215	42	M16x36	110	90	12	37	120	262	2-M40x1.5	625	620	15	300	250	350	4x18.5	5
TPM-DF 160L	330	260	215	42	M16x36	110	90	12	37	120	262	2-M40x1.5	670	665	15	300	250	350	4x18.5	5
TPM-DF 180M	380	275	225	48	M16X36	110	90	14	42.5	120	270	2-M40X1.5	700	690	18	300	250	350	4x18.5	5
TPM-DF 180L	380	275	225	48	M16X36	110	90	14	42.5	120	270	2-M40X1.5	740	730	18	300	250	350	4x18.5	5
TPM-DF 200L	420	320	254	55	M20X42	110	90	16	49	165.5	296	2-M50X1.5	780	790	18	350	300	400	4x18.5	5
TPM-DF 225S-4,6	470	345	282	60	M20X42	140	110	18	53	165.5	329	2-M50X1.5	820	830	20	400	350	450	8x18.5	5
TPM-DF 225M-2	470	345	282	55	M20X42	110	90	16	49	165.5	299	2-M50X1.5	820	830	20	400	350	450	8x18.5	5
TPM-DF 225M-4,6	470	345	282	60	M20X42	140	110	18	53	165.5	329	2-M50X1.5	850	860	20	400	350	450	8x18.5	5
TPM-DF 250M-2	510	370	310	60	M20X42	140	110	18	53	185	347	2-M63X1.5	935	930	22	500	450	550	8x18.5	5
TPM-DF 250M-4,6	510	370	310	65	M20X42	140	110	18	58	185	347	2-M63X1.5	935	930	22	500	450	550	8x18.5	5
TPM-DF 280S-2	580	387	314	65	M20X42	140	110	18	58	185	356	2-M63X1.5	1010	1010	22	500	450	550	8x18.5	5
TPM-DF 280S-4,6	580	387	314	75	M20X42	140	110	20	67.5	185	356	2-M63X1.5	1010	1010	22	500	450	550	8x18.5	5
TPM-DF 280M-2	580	387	314	65	M20X42	140	110	18	58	185	356	2-M63X1.5	1060	1060	22	500	450	550	8x18.5	5
TPM-DF 280M-4,6	580	387	314	75	M20X42	140	110	20	67.5	185	356	2-M63X1.5	1060	1060	22	500	450	550	8x18.5	5

# TPM-DF SERIES DIMENSIONS FOOT AND FLANGE MOUNT B35 IM2001

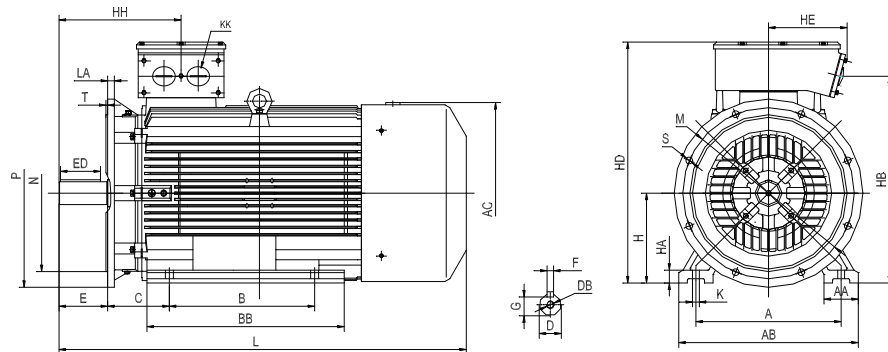
TPM-DF 80~132



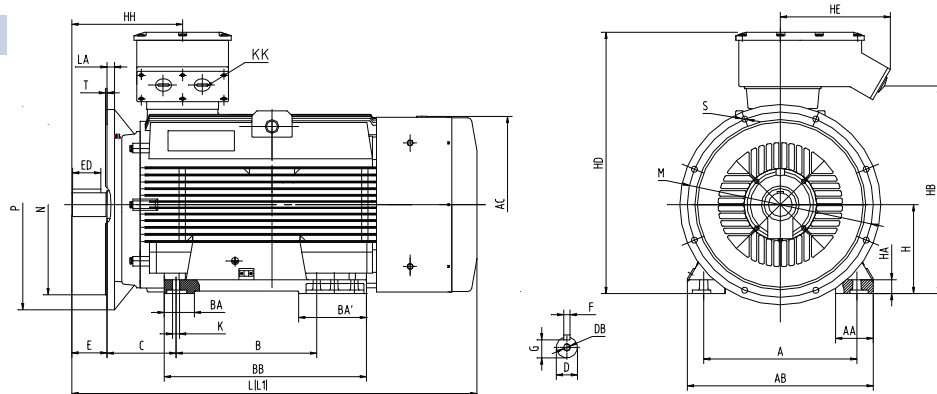
TPM-DF 160~280



TPM-DF 315



TPM-DF 355

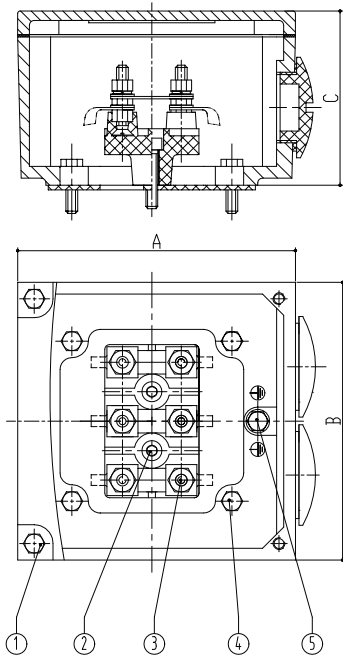


# TPM-DF SERIES DIMENSIONS FOOT AND FLANGE MOUNT B35 IM2001

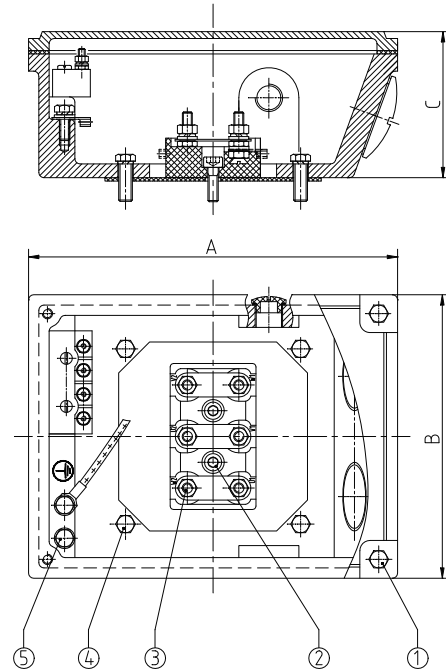
FRAME	A	AA	AB	AC	B	BB	C	D	DB	E	ED	F	G	H	HA	HB	HD	HE	HH	K	KK	L1	L	LA	M	N	P	S	T
TPM-DF 80	125	36	160	159	100	173	50	19	M6X16	40	25	6	15.5	80	10	195	235	59	112	10	2-M25X1.5		335	12	165	130	200	4x12	3.5
TPM-DF 90S	140	38	180	176	100	190	56	24	M8X19	50	40	8	20	90	12	207	250	59	125	10	2-M25X1.5		365	12	165	130	200	4x12	3.5
TPM-DF 90L	140	38	180	176	125	215	56	24	M8X19	50	40	8	20	90	12	207	250	59	125	10	2-M25X1.5		390	12	165	130	200	4x12	3.5
TPM-DF 00L	160	40	200	200	140	233	63	28	M10X22	60	45	8	24	100	14	228	270	59	144	12	2-M25X1.5		430	15	215	180	250	4x14.5	4
TPM-DF 112M	190	45	226	220	140	180	70	28	M10X22	60	45	8	24	112	13	265	310	59	154	12	2-M32X1.5		395	14	215	180	250	4x14.5	4
TPM-DF 132S	216	55	262	260	140	186	89	38	M12X28	80	63	10	33	132	18	305	350	59	179	12	2-M32X1.5		470	14	265	230	300	4x14.5	4
TPM-DF 132M	216	55	262	260	178	224	89	38	M12X28	80	63	10	33	132	18	305	350	59	179	12	2-M32X1.5		510	14	265	230	300	4x14.5	4
TPM-DF 160M	254	65	320	330	210	268	108	42	M16x36	110	90	12	37	160	20	370	420	120	262	14.5	2-M40x1.5	625	620	15	300	250	350	4x18.5	5
TPM-DF 160L	254	65	320	330	254	312	108	42	M16x36	110	90	12	37	160	20	370	420	120	262	14.5	2-M40x1.5	670	665	15	300	250	350	4x18.5	5
TPM-DF 180M	279	70	355	380	241	311	121	48	M16X36	110	90	14	42.5	180	22	405	455	120	270	14.5	2-M40X1.5	700	690	18	300	250	350	4x18.5	5
TPM-DF 180L	279	70	355	380	279	349	121	48	M16X36	110	90	14	42.5	180	22	405	455	120	270	14.5	2-M40X1.5	740	730	18	300	250	350	4x18.5	5
TPM-DF 200L	318	70	388	420	305	383	133	55	M20X42	110	90	16	49	200	25	445	510	165.5	296	18.5	2-M50X1.5	780	790	18	350	300	400	4x18.5	5
TPM-DF 225S-4.6	356	75	431	470	286	380	149	60	M20X42	140	110	18	53	225	28	507	550	165.5	329	18.5	2-M50X1.5	820	830	20	400	350	450	8x18.5	5
TPM-DF 225M-2	356	75	431	470	311	405	149	55	M20X42	110	90	16	49	225	28	507	550	165.5	299	18.5	2-M50X1.5	820	830	20	400	350	450	8x18.5	5
TPM-DF 225M-4.6	356	75	431	470	311	405	149	60	M20X42	140	110	18	53	225	28	507	550	165.5	329	18.5	2-M50X1.5	850	860	20	400	350	450	8x18.5	5
TPM-DF 250M-2	406	80	490	510	349	460	168	60	M20X42	140	110	18	53	250	30	560	620	185	347	24	2-M63X1.5	935	930	22	500	450	550	8x18.5	5
TPM-DF 250M-4.6	406	80	490	510	349	460	168	65	M20X42	140	110	18	58	250	30	560	620	185	347	24	2-M63X1.5	935	930	22	500	450	550	8x18.5	5
TPM-DF 280S-2	457	90	542	580	368	519	190	65	M20X42	140	110	18	58	280	35	600	670	185	356	24	2-M63X1.5	1010	1010	22	500	450	550	8x18.5	5
TPM-DF 280S-4.6	457	90	542	580	368	519	190	75	M20X42	140	110	20	67.5	280	35	600	670	185	356	24	2-M63X1.5	1010	1010	22	500	450	550	8x18.5	5
TPM-DF 280M-2	457	90	542	580	419	570	190	65	M20X42	140	110	18	58	280	35	600	670	185	356	24	2-M63X1.5	1060	1060	22	500	450	550	8x18.5	5
TPM-DF 280M-4.6	457	90	542	580	419	570	190	75	M20X42	140	110	20	67.5	280	35	600	670	185	356	24	2-M63X1.5	1060	1060	22	500	450	550	8x18.5	5
TPM-DF 315S-2	508	120	628	645	406	617	216	65	M20x42	140	110	18	58	315	45	755	848	275	400	28	2-M63X1.5	1185	1230	24	600	550	660	8x24	6
TPM-DF 315S-4.6	508	120	628	645	406	617	216	80	M20x42	170	140	22	71	315	45	755	848	275	430	28	2-M63X1.5	1215	1260	24	600	550	660	8x24	6
TPM-DF 315M-2	508	120	628	645	457	690	216	65	M20x42	140	110	18	58	315	45	755	848	275	400	28	2-M63X1.5	1360	1405	24	600	550	660	8x24	6
TPM-DF 315M-4.6	508	120	628	645	457	690	216	80	M20x42	170	140	22	71	315	45	755	848	275	430	28	2-M63X1.5	1390	1435	24	600	550	660	8x24	6
TPM-DF 315L-2	508	120	628	645	508	690	216	65	M20x42	140	110	18	58	315	45	755	848	275	400	28	2-M63X1.5	1360	1405	24	600	550	660	8x24	6
TPM-DF 315L-4.6	508	120	628	645	508	690	216	80	M20x42	170	140	22	71	315	45	755	848	275	430	28	2-M63X1.5	1390	1435	24	600	550	660	8x24	6
TPM-DF 355M-2	610	150	740	720	560	805	254	75	M24x50	140	110	20	67.5	355	55	838	1060	447	419	28	2-M63X1.5	1650	1650	24	740	680	800	8x24	6
TPM-DF 355M-4.6	610	150	740	720	560	805	254	95	M24x50	170	140	25	86	355	55	838	1060	447	419	28	2-M63X1.5	1680	1680	24	740	680	800	8x24	6
TPM-DF 355L-2	610	150	740	720	630	805	254	75	M24x50	140	110	20	67.5	355	55	838	1060	447	419	28	2-M63X1.5	1650	1650	24	740	680	800	8x24	6
TPM-DF 355L-4.6	610	150	740	720	630	805	254	95	M24x50	170	140	25	86	355	55	838	1060	447	419	28	2-M63X1.5	1680	1680	24	740	680	800	8x24	6

# TPM-DF SERIES TERMINAL BOX INFORMATION

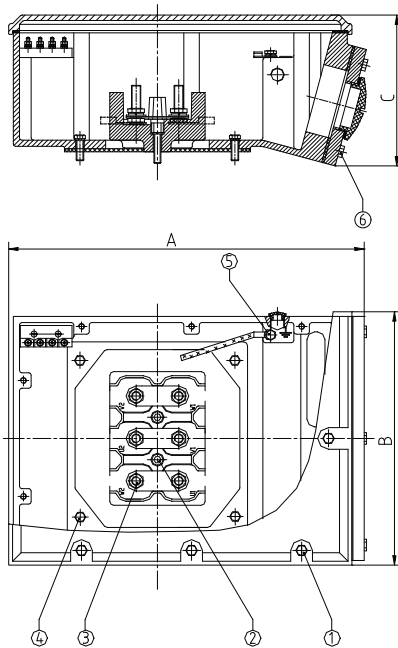
**TPM-DF 80~132**



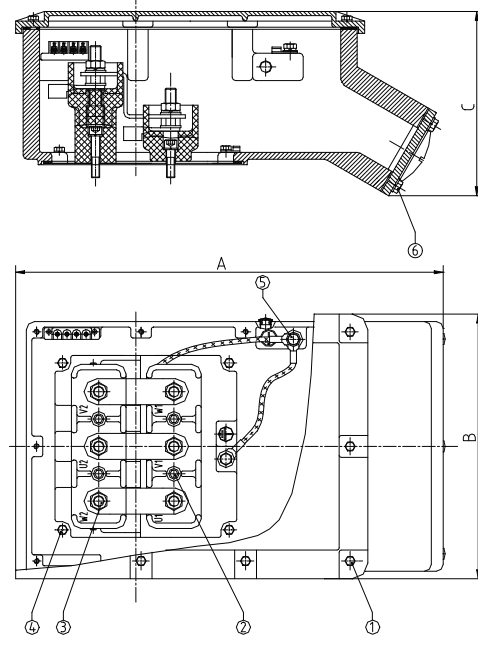
**TPM-DF 160~280**



**TPM-DF 315**



**TPM-DF 355**

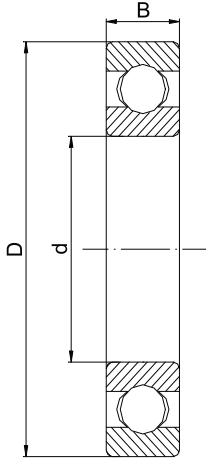


Frame	A	B	C	1	2	3	4	5	6	Metric Gland Sizes	PG Gland Sizes
TPM-DF 80-100	118	118	61	M5×16	M5×20	M4	M5×16	M5×12		2×M25×1.5	2×PG16
TPM-DF 112-132	118	118	77	M5×16	M5×25	M5	M5×20	M5×12		2×M32×1.5	2×PG21
TPM-DF 160-180	215	165	85	M6×20	M6×20	M6	M6×25	M6×16		2×M40×1.5	2×PG29
TPM-DF 200-225	285	190	102	M6×16	M8×25	M8	M8×25	M8×16		2×M50×1.5	2×PG36
TPM-DF 250-280	314	218	110	M6×20	M10×30	M10	M8×25	M10×20		2×M63×1.5	2×PG42
TPM-DF 315	460	317	190	M8×25	M10×55	M12	M12×30	M10×25	M8×30	2×M63×1.5	2×PG42
TPM-DF 355	620	390	275	M8×30	M12×60	M16	M12×40	M10×20	M10×40	2×M63×1.5	2×PG42



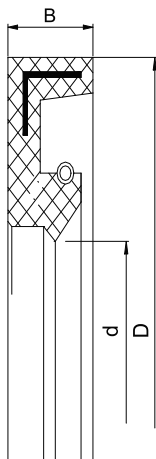
# TPM-DF SERIES BEARING & OIL SEALS INFORMATION

## BEARING DATA



FRAME	DE	d	D	B	NDE	d	D	B
TPM-DF 80	6204ZZCM	20	47	14	6204ZZCM	20	47	14
TPM-DF 90	6205ZZCM	25	52	15	6205ZZCM	25	52	15
TPM-DF 100	6206ZZCM	30	62	16	6206ZZCM	30	62	16
TPM-DF 112	6206ZZCM	30	62	16	6206ZZCM	30	62	16
TPM-DF 132	6208ZZCM	40	80	18	6208ZZCM	40	80	18
TPM-DF 160	6309C3	45	100	25	6309C3	45	100	25
TPM-DF 180	6311C3	55	120	29	6311C3	55	120	29
TPM-DF 200L	6312C3	60	130	31	6312C3	60	130	31
TPM-DF 225	6313C3	65	140	33	6313C3	65	140	33
TPM-DF 250	6314C3	70	150	35	6314C3	70	150	35
TPM-DF 280-2	6314C3	70	150	35	6314C3	70	150	35
TPM-DF 280-4,6,8	6317C3	85	180	41	6317C3	85	180	41
TPM-DF 315-2	6317C3	85	180	41	6317C3	85	180	41
TPM-DF 315-2 V1	6317C3	85	180	41	7317B	85	180	41
TPM-DF 315-4,6,8	6319C3	95	200	45	6319C3	95	200	45
TPM-DF 315-4,6,8 V1	6319C3	95	200	45	7319B	95	200	45
TPM-DF 355-2	6319C3	95	200	45	6319C3	95	200	45
TPM-DF 355-2 V1	6319C3	95	200	45	7319B	95	200	45
TPM-DF 355-4,6,8	NU322C3	110	240	50	6322C3	110	240	50
TPM-DF 355-4,6,8 V1	NU322C3	110	240	50	7322B	110	240	50

## OIL SEAL DATA



FRAME	DE			NDE		
	d	D	B	d	D	B
TPM-DF -80	20	35	7	20	35	7
TPM-DF -90	25	40	7	25	40	7
TPM-DF -100	30	42	7	30	42	7
TPM-DF -112	30	42	7	30	42	7
TPM-DF -132	40	55	8	40	55	8
TPM-DF 160	45	65	8	45	65	8
TPM-DF 180	55	72	8	55	72	8
TPM-DF 200	60	80	8	60	80	8
TPM-DF 225	65	85	10	65	85	10
TPM-DF 250	70	90	10	70	90	10
TPM-DF 280-2	70	90	10	70	90	10
TPM-DF 280-4,6,8	85	110	12	85	110	12
TPM-DF 315-2	85	110	12	85	110	12
TPM-DF 315-4,6,8	95	120	12	95	120	12

# SPECIFICATION, ARRANGEMENT & PARTS LIST

## TPM-DF FRAME

### Parts Description

- 1.Outer Bearing Cover D.E. with oil seal
- 2.Wave Spring D.E.
- 3.Bearing D.E.
- 4.Endshield D.E.
- 5.Inner Bearing Cover D.E.
- 6.Terminal Box
- 7.Terminal Box Lid
- 8.Stator Lamination Pack
- 9.Rotor with shaft
- 10.Stator Frame
- 11.Inner Bearing Cover N.D.E.
- 12.Endshield N.D.E.
- 13.Bearing N.D.E.
- 14.Outer Bearing Cover N.D.E.with oil seal
- 15.Fan
- 16.Fan Cowl

### Specification

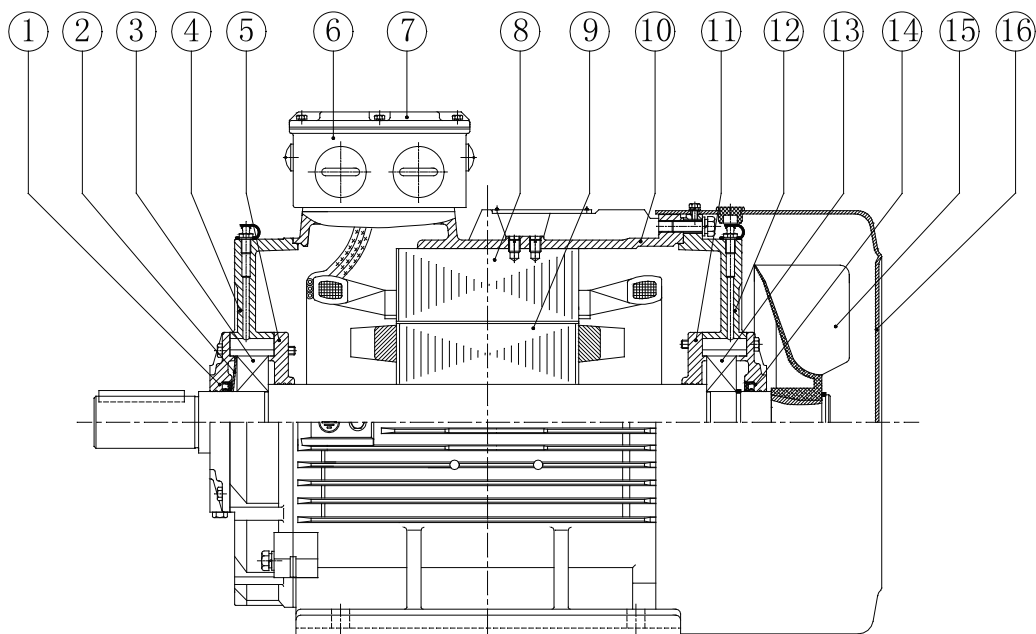
Standard Construction  
Cast iron Frame, Endshields, Terminal Box.  
Pressed Steel Fan Cowl.  
Cast iron Bearings cover  
Polypropylene, glass reinforced Fan  
NSK or equivalent Bearings

### Features

Dimensions and ratings to IEC60072.  
IP55  
Top mounted Terminal Box  
Terminal Box rotates in 90 deg. Increments  
Drilled and tapped hole in D.E. of shaft  
Cooling IC411

### Mounting

B3-Foot mounted  
B5-Flange mounted-horizontal.  
B3/B5-Foot and Flange mounted  
V1-Flange mounted-vertical



## BACKGROUND INFORMATION

The EuP Directive (Energy Using Products) will be implemented in the national legislation of EU countries. The boundary conditions for the European legislation have already been passed. The EU Directive 2005/32/EC (=EuP Directive) is based on IEC 60034-30 regarding minimum efficiencies. In Germany, this directive will be implemented with the so-called Energy-Using Products legislation (EBPG). The implementation measures regarding squirrel-cage induction motors are expected for April/May 2009.

	<b>CEMEP</b> Voluntary EU Agreement	<b>NEMA EPAAct</b>	<b>EuP Directive</b> based on standard IEC 60034-30 (EuP Directive still has to passed; EuP - Energy Using Products)
Description	Voluntary agreement between the EU Commission and the European Committee of Manufacturers of Electrical Machines and Power Electronics CEMEP	The current legislation in the US/CAN/MX also regulates efficiencies	The EuP Directive must be implemented in national legislation in all European Countries. IEC 60034-2-1 is the basis for determining losses and therefore determining the efficiency.
Number of poles	2,4	2,4,6	2,4,6
Power range	1.1 - 90 kW	0.75 - 150 kW	0.75 - 375kW
Level	Standard - EFF3 Improved Efficiency - EFF2 High Efficiency - EFF1	High Efficiency NEMA Premium	Standard Efficiency - IE1 High Efficiency - IE2 Premium Efficiency - IE3
Voltage	400 V, 50 Hz	230/460 V, 60 Hz	< 1000V, 50/60 Hz
Degree of protection	IP5X	Open + enclosed motors (IP23 + IP56)	All
Motor with brake	NO	YES	Being harmonized
Geared Motor	NO	NO	YES
Explosion-proof Motors	NO	YES	EuP Directive - being harmonized IEC 60034-30 - YES (however, explosion protection always has the higher priority)
Validity	Voluntary agreement; this will be withdrawn when national implementation comes into effect	Up to 12/2010 NEMA EPAAct (IE2) From 12/2010 NEMA Premium (IE3) minimum efficiency	Standard IEC 60034-30, valid since October 2008, EuP (measures still have to finally passed), legal transition period is then 36 months.

- Probably excluded: Explosion-proof motors according to ATEX, brake motors, smoke extraction motors
- Probable date 16.06.2011: IE2 minimum efficiency for motors from 0.75 kW – 375 kW
- Probable date 01.01.2015: IE3 minimum efficiency for motors from 7.5 kW – 375 kW or the combination of IE2 motor and frequency converter
- Probable date 01.01.2017: IE3 minimum efficiency for all motors from 0.75 kW – 375 kW or the combination of IE2 motor and frequency converter

**CEMEP** - Comité Européen de Constructeurs de Machines Électriques et d'Électronique de Puissance  
**NEMA**  
**IEC** - National Electrical Manufacturers Association  
**IE** - International Electrotechnical Commission  
 - International Efficiency

