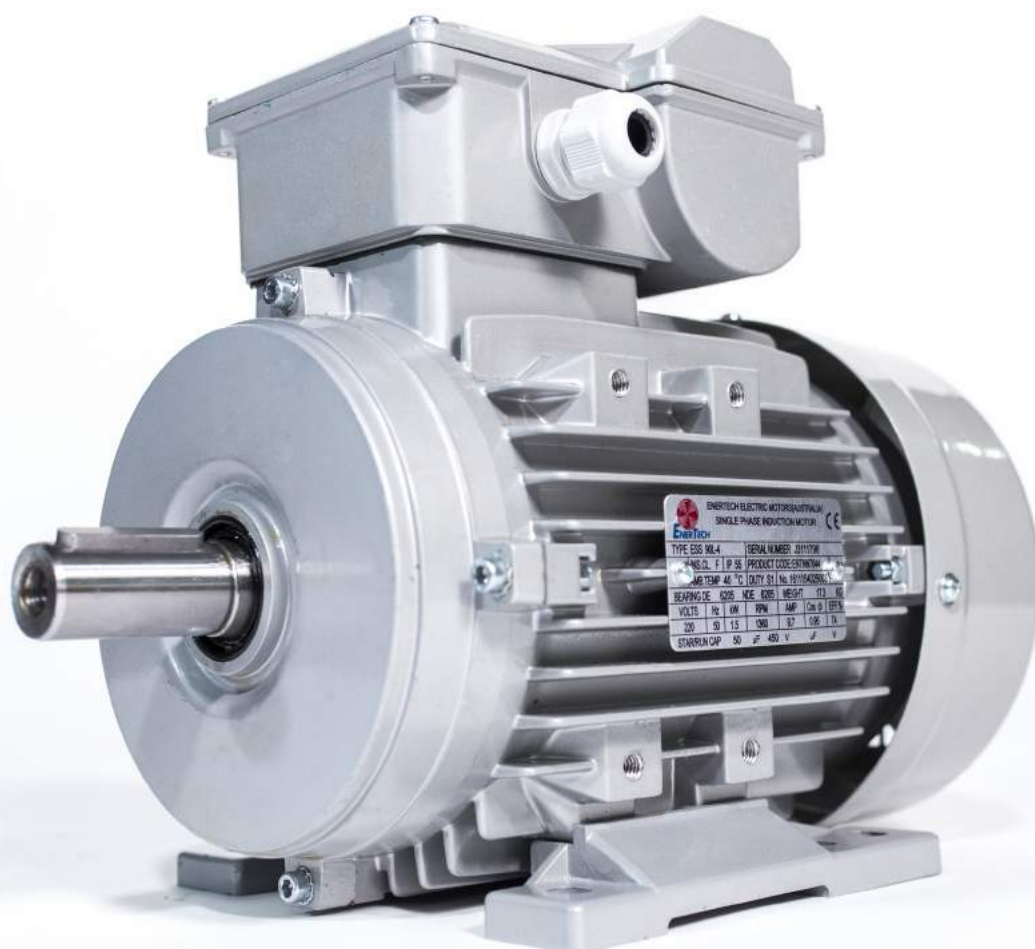


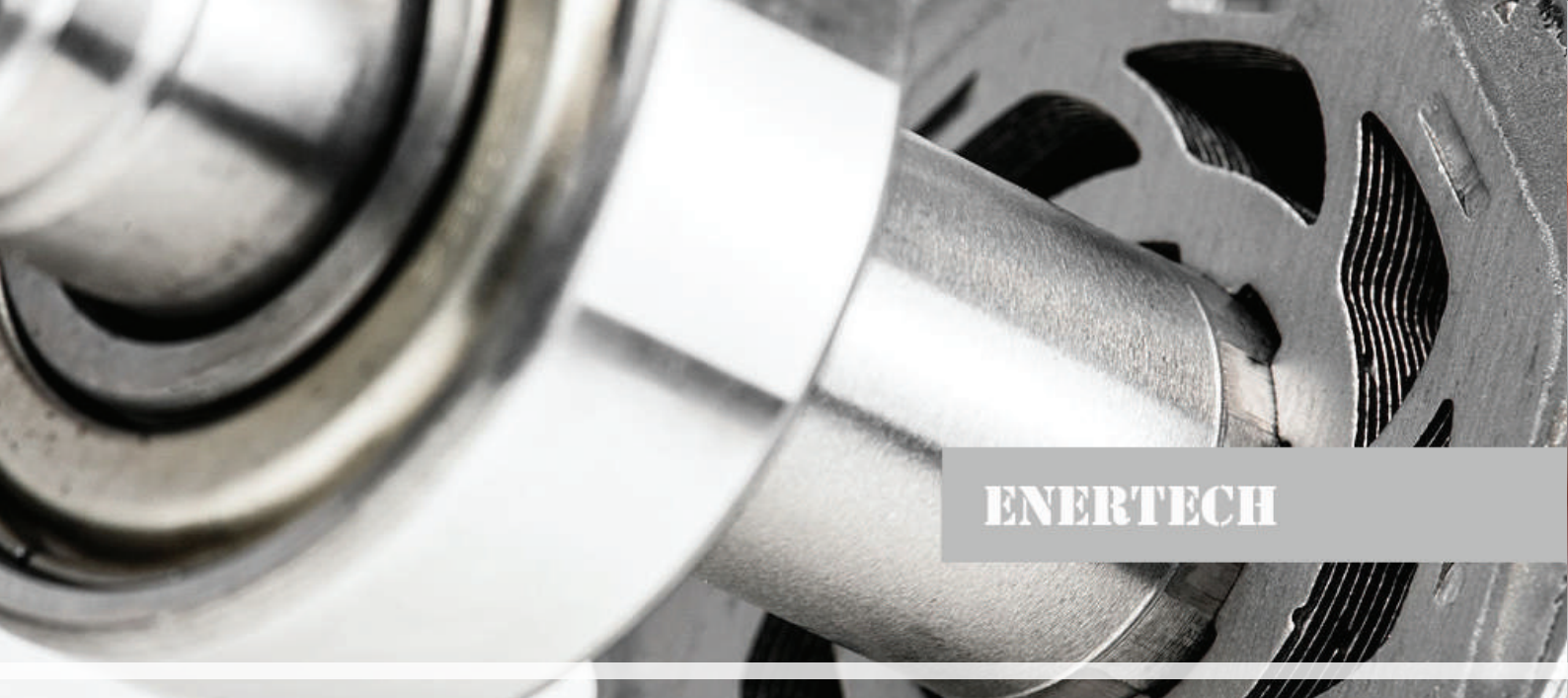


ESS-ESD PRODUCT CATALOGUE

CORE VALUES

PEACE OF MIND EFFICIENCY FAIRNESS RESPONSIBILITY CUSTOMER ORIENTATION GROWING DEVELOPED

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Introduction

Enertech single phase Motors are an ideal general purpose motor range in cap start-cap run (ESD), cap-run (ESS).

ESS series aluminum housing single-phase capacitor-run asynchronous motors, with latest design are made of selected quality material and conform to the IEC standard. ESS motors are reliable in operation, good appearance, and can be maintained easily, while with low noise, little vibration and at the same time, light weight and simple in construction. The starting torque is 0.45~0.75 of full load torque.

This series motors are suitable where the requirements of starting torque is low and long-term continuous operation, such as home electric appliances, pumps, fans, etc.

ESD series aluminum housing, single-phase, dual-capacitor asynchronous motors. ESD motors have good performance, safety and reliable operation. The starting torque is 2.5 of full load torque.

This series motors are suitable for the occasion where the requirements of high starting torque and high load,





General specification

ENERTECH



General specification

Enertech motors are built to comply with the requirements of the following international standards and regulation:

1. International Electrotechnical commission - IEC 60034 and IEC 60072.
2. British Standards - BS5000 and BS 4999.
3. Australian Standards - AS 1359.
4. The requirements of European EC marking. Low voltage Directive 73/23 (1973), modified by Directive 93/68 (1993) and the EMC - Directive 89/336. These Enertech motors are designed to use with other machinery, and they should only be used if the complete machinery is in conformity with the provisions of the Directive of safety of machinery (89/93/EEC).
5. CEMEP agreement-all motors with standard rating included in this catalogue comply with IE1 efficiency (class EFF2)* and bear the corresponding label on the rating plate. For efficiency data at 50%, 75% and full

Title	IEC	BS	CENELEC
General requirements for electrical machines	60034-1	4999-1 4999-69	EN 60034 -1
Methods of determining losses and efficiency	60034-2	4999-34	HD 53 2
Degrees of protection.	60034-5	4999-20	EN60034-5
Methods of cooling	60034-6	4999-21	EN60034-6
Mounting arrangements	60034-7	4999-22	EN 60034-7
Terminal markings and direction of rotation	60034-8	4999-3	HD 53 8S4
Noise limits	60034-9	4999-51	EN 60034-9
Starting performance	60034-12	4999-112	EN 60034-12
Mechanical vibration	60034-14	4999-50	EN 60034-14
Standard voltages	60034-38	-	HD 472 S1
Dimensions and output ratings	60072	-	-
Mounting dimensions and relationship framesize - output ratings	60072	4999-10 51-110	HD 231
Shaft dimensions	60072	-	HD 231
Classification of environmental conditions	600721-2-1	-	-
Insulation material	60085	-	-

Vibration

Standard motors are designed for vibration quality level class A (normal).

For special requirements relate to smooth running or a low-vibration, vibration quality level class B is available on request.

The vibrational characteristics and behavior of electrical motors is specified in IEC 60034-14.



General specification

Shaft

ESS, ESD motors have standard shaft extension lengths which provided with standard key, drilled and tapped hole. Non standard shaft extensions are available upon special order, with shaft design outlined on a detailed drawing. Shaft extension run out, concentricity and perpendicularity to face of standard flange mount motors, comply with normal grade tolerance as specified in IEC 60072-1 and AS1359. Precision grade tolerance is available upon special order.

Finish

Standard EnerTech motors are painted with RAL 7038. Other colors are also available.

The finishing coat of enamel paint is sufficient for normal conditions.

To protect the drives against corrosion and external influences, high-quality coatings based on 2-K epoxy resin are offered in various different colors

Direct sunlight can change the color. If color stability is required, it is recommended to use a polyurethane-based paint

All paint finishes can be painted over with commercially available paints. Special paint with increased layer thickness available on request.

Cooling and ventilation

The standard cooling method is totally Enclosed fan-cooled (TEFC) in accordance with cooling method IC 411 acc. to IEC- 60034-6.

All motors have radial-flow fans in the standard version that cool regardless of the direction of rotation of the motor. The air flow is forced from the non-drive end (NDE) to the drive end (DE).

Standard motors are equipped with radial-flow plastic fans.

Enclosure

The standard degree of protection is IP55.

The IP55 enclosure means complete hoseproof and dustproof protection. A higher degree of protection is available.

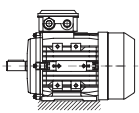
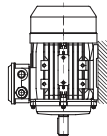
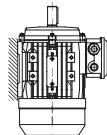
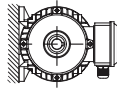
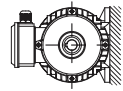
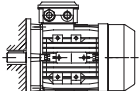
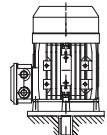
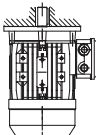
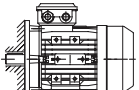
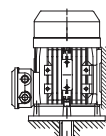
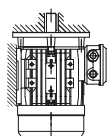
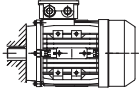
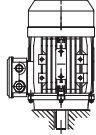
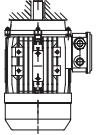
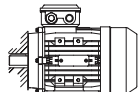
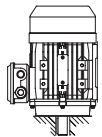
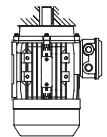
Noise

The permitted noise levels of electrical machines are fixed in IEC60034 - 9. The noise level of EnerTech motors is well below these limit value.

The specified values are valid at 50 Hz at rated output. The tolerance is +3 dB (A). At 60 Hz, the values are approximately 4 dB (A) higher.

For more details, please refer to the performance data tables.

Mountings.

Foot mount		
		
B3 (IM1001)*	V5 (IM1011)	V6 (IM1031)
		
B6 (IM1051)	B7 (IM1061)	B8 (IM1071)
Large flange mount		
		
B5 (IM3001)*	V1 (IM3011)*	V3 (IM3031)
Large flange and feet		
		
B3/B5 (IM2001)*	V1/V5 (IM2011)	V3/V6 (IM2031)
Small flange mount		
		
B14 (IM3601)	V18 (IM3611)	V19 (IM3631)
Small flange and feet		
		
B3/B14 (IM2101)	V5/V18 (IM2111)	V6/V19 (IM2131)

General specification

Against solar radiation

High solar radiation will result in undue temperature rise. In these circumstances motors should be screened from solar radiation by placement of adequate sunshades which do not inhibit air flow.

Degree of protection

All motors are designed to IP55 degree of protection. Enclosure designations comply with IEC or AS60529. They can be installed in dusty or humid environments. The motors are suitable for operation in tropical climates.

Guide value <60 % relative air humidity at CT 40 °C
Most motors can be supplied in IP56, IP65 and IP66 degrees of protection on request.

IP standards explanation

IP	5	5
	1	2

International protection rating prefix (IEC 60034 - 5)

First numeral

First characteristic numeral:

4 = Protected against solid object greater than 1.0 mm:
Wires or strips of thickness greater than 1.0 mm,
solid objects exceeding 1.0 mm

5 = Dust protected: Ingress of dust is not totally prevented but it does not enter in sufficient quantity to interfere with satisfactory operation of the equipment.

6 = Dust tight: No ingress of dust.

Second numeral

Second characteristic numeral:

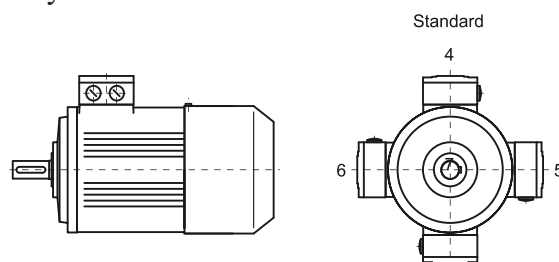
4 = Protected against splashing water: Water splashed against the enclosure from any direction shall have no harmful effect.

5 = Protected against water jets: Water projected by a nozzle against the enclosure from any direction shall have no harmful effect.

6 = Protected against heavy seas: Water from heavy seas or water projected in powerful jets (larger nozzle and higher pressure than second numeral 5) shall not enter the enclosure in harmful quantities.

Terminal box

Aluminum terminal box: The terminal box is located on the top of the motor housing as standard, and can be rotated by 4 x 90°.



Bearing lubrication

The nominal bearing lifetime is defined acc. To standardized calculation procedures (DIN ISO 281) and is reached or even exceeded for 90% of the bearings when the motors are operated in compliance with the data provided in the catalog. Under average operating conditions, a lifetime (L10h) of 100 000 hours can be achieved.

Generally, the bearing lifetime is defined by the bearing size, the bearing load, the operating conditions, the speed and the grease lifetime.

Insulation

The insulation system is Class F (150K) and the motors are designed to operate with Class B (80K).

This ensures long life and reliability with the ability to withstand ambient temperatures as high as 540C or up to 15% overload in adverse electrical supply situations.

	Insulation class		
	B	F	H
Max. permissible winding temp. (°C)	130	155	180
Less ambient temp. (°C)	-40	-40	-40
Less hotspot allowance (K)	-10	-10	-15
Equals max. permissible temp.rise (K)	80	150	125
Less max. design temp. rise (K)	-80	-80	-80
Equals min. safety margin (K)	-	25	45



General specification

Duty

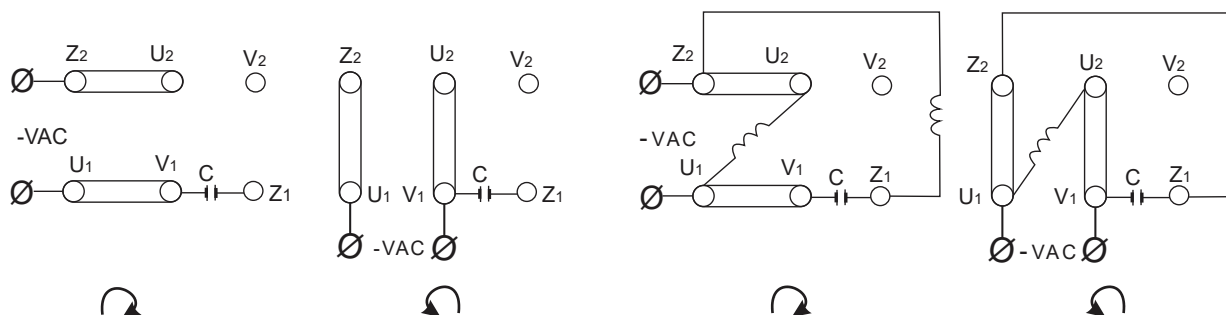
Enertech motors are supplied suitable for S1 operation (continuous operation under rated load). When the motor is operate under any other type of duty the following information should be supplied to determine the correct motor size:

1. Continuous duty S1: The motor works at a constant load for enough time to reach temperature equilibrium.
2. Short time duty S2: The motor works at a constant load, but not long enough to reach temperature equilibrium, and the rest periods are long enough for the motor to reach ambient temperature.
3. Intermittent periodic duty S3: Sequential, identical run and rest cycles with constant load. Temperature equilibrium is never reached. Starting current has little effect on temperature rise.
4. Intermittent periodic duty with starting S4: Sequential identical start, run and rest cycles with constant load. Temperature equilibrium is not reached, but starting current affects temperature rise.
5. Intermittent periodic duty with electric braking S5: Sequential, identical cycles of starting, running at constant load, electric braking and rest. Temperature equilibrium is not reached.
6. Continuous operation with intermittent load S6: Sequential, identical cycles of running with constant load and running with no load. No rest periods.
7. Continuous operation with electric braking S7: Sequential, identical cycles of starting, running at constant load and electric braking. No rest periods.
8. Continuous operation with periodic changes in load and speed S8: Sequential, identical, duty cycles of start, run at constant load and given speed, then run at other constant loads and speeds. No rest periods.

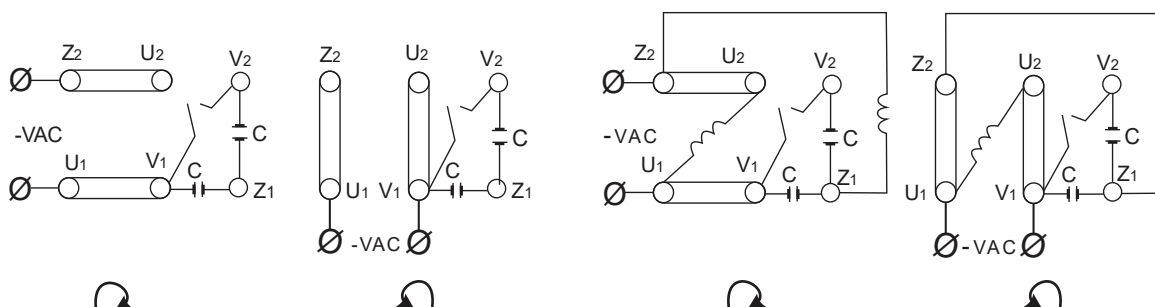
Connection

A motor's rated voltage must agree with the power supply line-to-line voltage. It is carefullly to ensure the correct connection to the motor terminals.

Connection diagram for ESS Series:

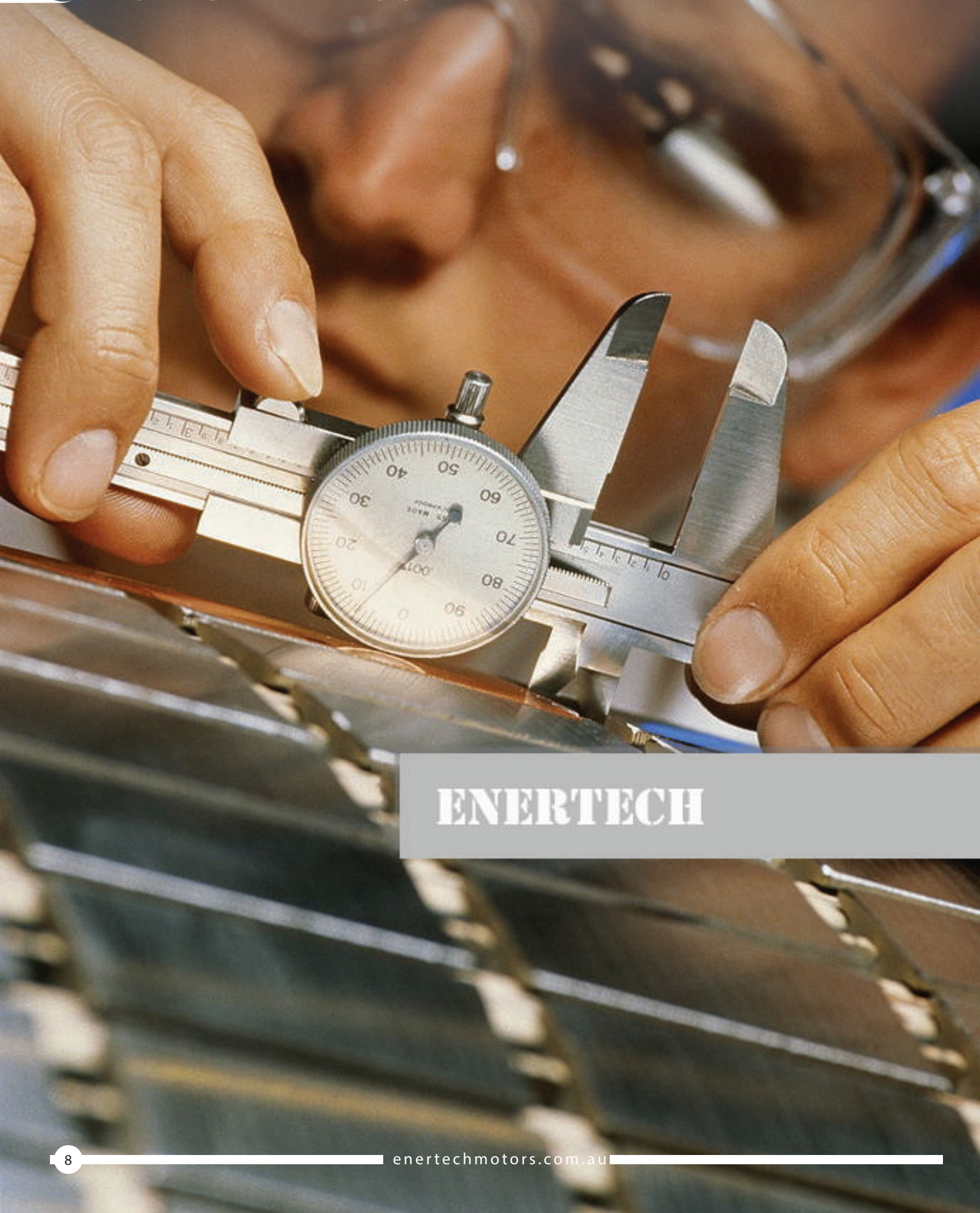


Connection diagram for ESD series:





Performance Data



ENERTECH

Performance Data

ESS-Single phase capacitor-run motors Asynchronous speed 50 Hz

Power	Motor frame	Speed	Efficiency	Power factor	Current		Torque		Break	Capacitor	Noise	Weight of
[kW]		[r/min]	[%]	[cosφ]	Full load	Locked rotor	Full load	Locked rotor	down	Run	level	foot mount
					I_N	T_L	T_N	T_L/T_N	T_B/T_N	[μF/volts]	[μF/volts]	motor
					[A]	[A]	[Nm]					[kg]
3000r/min = 2 poles												
0.18	63A	2750	62	0.93	1.40	4.5	0.6	0.7	1.8	10μF/450V	70	4
0.25	63B	2750	65	0.93	1.80	6	0.9	0.65	1.75	12μF/450V	70	4.7
0.37	71A	2640	66	0.94	2.60	8	1.3	0.72	1.65	14μF/450V	75	6.1
0.55	71B	2760	71	0.95	3.60	14	1.9	0.7	1.8	20μF/450V	75	7.7
0.75	80A	2735	73	0.98	4.05	16	2.6	0.68	1.75	25μF/450V	75	10.25
1.1	80B	2720	74	0.98	6.60	23	3.9	0.65	1.8	35μF/450V	78	11.6
1.5	90S	2755	76	0.98	8.50	31	5.2	0.65	1.8	50μF/450V	80	14.55
2.2	90L	2765	77	0.98	12.30	51	7.6	0.65	1.8	70μF/450V	80	17.8
3	100L	2765	77	0.99	16.90	64	10.3	0.55	1.75	90μF/450V	83	23.7
1500r/min = 4 poles												
0.25	71A	1320	56	0.94	2.00	5	1.8	0.75	1.6	16μF/450V	65	6.2
0.37	71B	1325	58	0.94	2.90	7	2.7	0.7	1.55	20μF/450V	68	7.3
0.55	80A	1340	64	0.94	10.60	11	3.9	0.7	1.7	25μF/450V	73	10.05
0.75	80B	1340	64	0.94	5.30	15	5.4	0.7	1.75	35μF/450V	73	11.4
1.1	90S	1355	72	0.95	7.00	22	7.8	0.68	1.8	40μF/450V	75	14.4
1.5	90L	1360	74	0.95	9.30	32	10.5	0.68	1.8	50μF/450V	78	17.5
2.2	100L A	1390	78	0.97	12.60	49	15.1	0.48	1.75	70μF/450V	80	24.5
3	100L B	1380	79	0.99	16.50	61	20.8	0.45	1.6	90μF/450V	80	32
1000r/min = 6 poles												
0.09	63A	900	46	0.92	0.92	2	1.0	0.8	1.45	8μF/450V	63	5.1
0.12	63B	900	54	0.92	1.05	3	1.3	0.75	1.45	11μF/450V	63	6
0.18	71A	900	55	0.92	1.55	4	1.9	0.7	1.5	16μF/450V	68	6.3
0.25	71B	900	57	0.92	2.07	5	2.7	0.68	1.5	20μF/450V	68	7.6
0.37	80A	900	62	0.92	2.82	8	3.9	0.68	1.6	25μF/450V	68	9
0.55	80B	900	63	0.93	4.08	14	5.8	0.68	1.6	30μF/450V	70	11.6
0.75	90S	900	66	0.95	5.20	16	8.0	0.65	1.6	40μF/450V	70	13.5
1.1	90L	900	67	0.95	7.51	5	11.7	0.62	1.6	50μF/450V	70	16.2

Performance Data

ESD - Single phase dual capacitor motors Asynchronous speed 50Hz

Power	Motor frame	Speed	Efficiency	Power factor	Current		Torque			Rate (N.M)	Capacitor		Noise level	Weight of foot mount motor
					Full load	Locked rotor	Full load	Locked rotor	Break down		Run Cap	Start Cap		
[kW]		[r/min]	[%]	[cosφ]	I _N [A]	T _L [A]	T _N [Nm]	T _L /T _N	T _B /T _N		[μF/volts]	[μF/volts]	dB (A)	[kg]

3000r/min = 2 poles

0.18	63A	2710	63	0.9	1.38	8	0.6	2.5	1.6	0.63	10μF/450V	30μF/250V	70	3.9
0.25	63B	2710	64	0.9	1.89	10	0.9	2.5	1.6	0.88	12μF/450V	40μF/250V	73	4.4
0.37	71A	2780	65	0.93	2.66	15	1.3	2.5	1.8	1.27	12μF/450V	75μF/250V	75	6.1
0.55	71B	2790	68	0.93	3.78	20	1.9	2.5	1.8	1.88	16μF/450V	100μF/250V	76	7
0.75	80A	2800	72	0.93	4.87	30	2.6	2.5	1.8	2.56	20μF/450V	100μF/250V	76	9
1.1	80B	2810	73	0.93	7.04	40	3.7	2.5	1.8	3.74	30μF/450V	150μF/250V	79	10.3
1.5	90S	2810	74	0.93	9.48	55	5.1	2.5	1.8	5.10	40μF/450V	200μF/300V	84	16.3
2.2	90L	2810	75	0.94	13.57	75	7.5	2.5	1.8	7.48	50μF/450V	250μF/300V	84	16.7
3.0	100L	2830	77	0.95	17.83	110	10.1	2.5	1.7	10.13	60μF/450V	400μF/300V	88	25
3.7	112MA	2850	78	0.96	21.48	140	12.4	2.5	1.7	12.40	60μF/450V	600μF/300V	90	33
4.0	112MB	2850	80	0.98	22.18	150	13.4	2.5	1.7	13.41	60μF/450V	600μF/300V	90	34.2

1500r/min = 4 poles

0.12	63A	1350	55	0.9	1.05	6	0.8	2.5	1.6	0.85	10μF/450V	30μF/250V	64	4.1
0.18	63B	1350	56	0.9	1.55	8.5	1.3	2.5	1.6	1.27	12μF/450V	40μF/250V	64	4.5
0.25	71A	1380	60	0.9	2.01	10	1.7	2.5	1.7	1.73	12μF/450V	50μF/250V	66	5.9
0.37	71B	1380	63	0.9	2.84	15	2.6	2.5	1.7	2.56	16μF/450V	75μF/250V	68	6.9
0.55	80A	1400	66	0.9	4.03	20	3.8	2.5	1.8	3.75	20μF/450V	100μF/250V	71	9.6
0.75	80B	1410	69	0.9	5.25	30	5.1	2.5	1.8	5.08	25μF/450V	100μF/250V	71	10.9
1.1	90S	1410	71	0.93	7.24	40	7.5	2.5	1.8	7.45	35μF/450V	150μF/250V	74	13.8
1.5	90L	1400	73	0.93	9.61	55	10.2	2.5	1.8	10.24	40μF/450V	200μF/300V	79	16.7
2.2	100LA	1430	74	0.93	13.90	75	14.7	2.5	1.8	14.70	50μF/450V	300μF/300V	79	22.8
3	100LB	1440	75	0.93	18.70	110	19.9	2.5	1.8	19.91	60μF/450V	500μF/300V	83	28.7
3.7	112MA	1440	77	0.95	21.99	140	24.5	2.5	1.7	24.55	60μF/450V	600μF/300V	86	31
4.0	112MB	1440	80	0.97	22.41	150	26.5	2.5	1.7	26.54	60μF/450V	600μF/300V	86	32.8



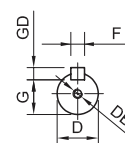
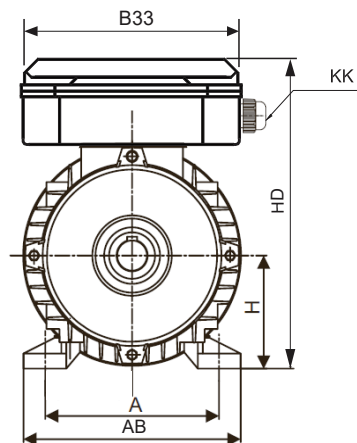
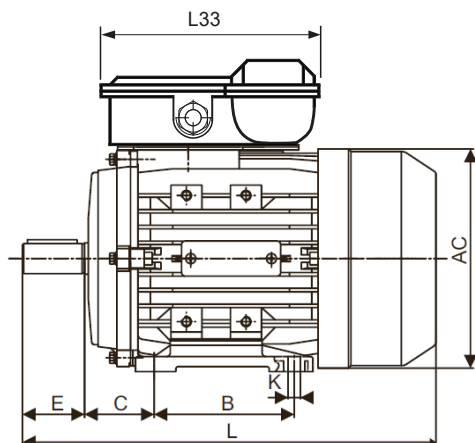
Motors dimensions data



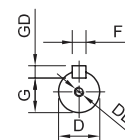
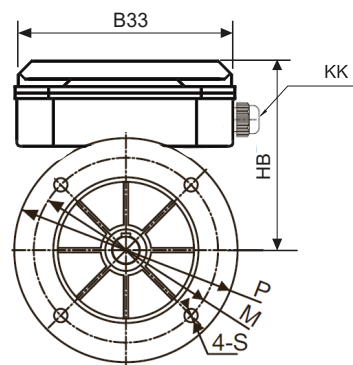
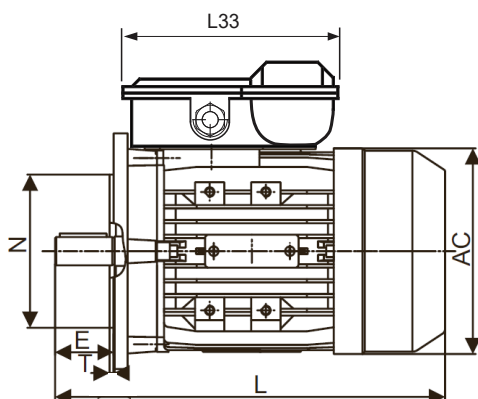
Motors dimensions data

For ESS series

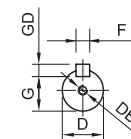
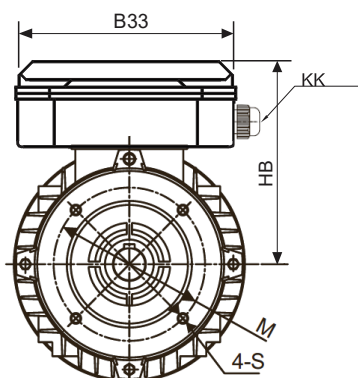
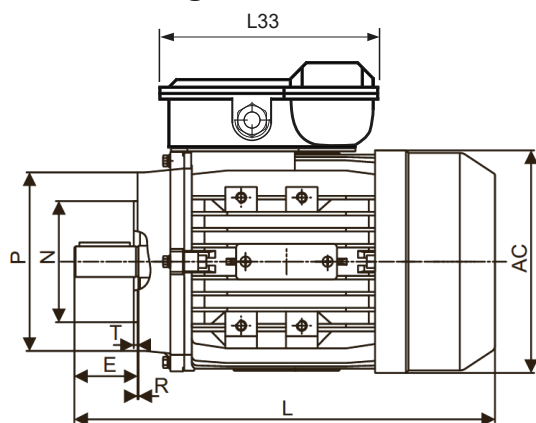
Dimensions foot mount B3



Dimensions flange mount B5 and V1



Dimensions face - flange B14



ESS Electric Motors Dimensions

Foot mount B3

Frame size	A	AB	AC	B	B33	C	D	DB	E	F	GD	G	H	HB	HD	K	KK	L	L33
56	90	110	120	71	77	36	9	M3	20	3	3	7.2	56	88	144	5.8X8.8	-	196	99
63	100	120	130	80	116	40	11	M4	23	4	4	8.5	63	118	181	7X10	M20	220	92
71	112	132	145	90	116	45	14	M5	30	5	5	11	71	125	196	7X10	M20	241	92
80	125	160	165	100	144	50	19	M6	40	6	6	15.5	80	146	226	10X13	M20	290	141
90S	140	175	185	100	144	56	24	M8	50	8	7	20	90	153	243	10X13	M20	312	141
90L	140	175	185	125	144	56	24	M8	50	8	7	20	90	153	243	10X13	M20	337	141
100L	160	196	205	140	144	63	28	M10	60	8	7	24	100	165	265	12X16	M20	369	141

Flange mount B5

Frame size	AC	B33	D	DB	E	F	G	H	HB	K	KK	L	L33	M	N	P	S	T
56	120	77	9	M3	20	3	7.2	56	88	5.8X8.8	-	196	99	100	80	120	7	3.0
63	130	116	11	M4	23	4	8.5	63	118	7X10	M20	220	92	115	95	140	10	3.0
71	145	116	14	M5	30	5	11	71	125	7X10	M20	241	92	130	110	160	10	3.5
80	165	144	19	M6	40	6	15.5	80	146	10X13	M20	290	141	165	130	200	12	3.5
90S	185	144	24	M8	50	8	20	90	153	10X13	M20	312	141	165	130	200	12	3.5
90L	185	144	24	M8	50	8	20	90	153	10X13	M20	337	141	165	130	200	12	3.5
100L	205	144	28	M10	60	8	24	100	165	12X16	M20	369	141	215	180	250	15	4.0

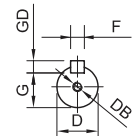
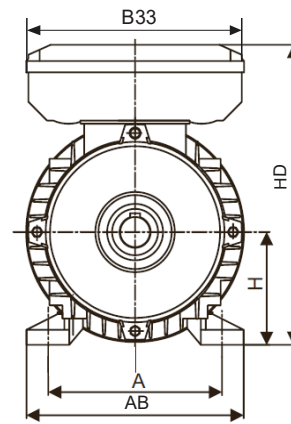
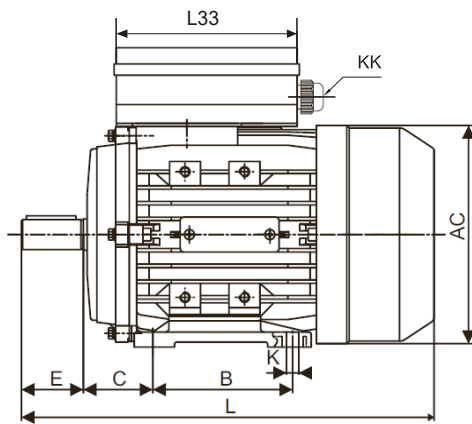
Flange mount B14

Frame size	AC	B33	D	DB	E	F	G	H	HB	K	KK	L	L33	M	N	P	S	T
56	120	77	9	M3	20	3	7.2	56	88	5.8X8.8	-	196	99	65	50	80	M5	2.5
63	130	116	11	M4	23	4	8.5	63	118	7X10	M20	220	92	75	60	90	M5	2.5
71	145	116	14	M5	30	5	11	71	125	7X10	M20	241	92	85	70	105	M6	2.5
80	165	144	19	M6	40	6	15.5	80	146	10X13	M20	290	141	100	80	120	M6	3.0
90S	185	144	24	M8	50	8	20	90	153	10X13	M20	312	141	115	95	140	M8	3.0
90L	185	144	24	M8	50	8	20	90	153	10X13	M20	337	141	115	95	140	M8	3.0
100L	205	144	28	M10	60	8	24	100	165	12X16	M20	369	141	130	110	160	M8	3.5
112M	230	148	28	M10	60	8	24	112	183	12X16	M25	416	150	130	110	160	M8	3.5

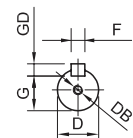
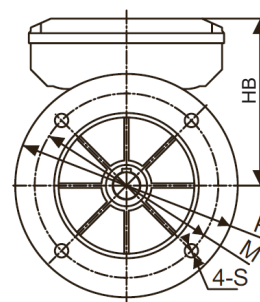
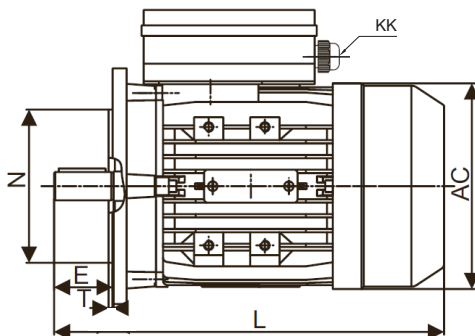
Motors dimensions data

For ESD series

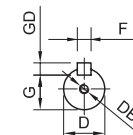
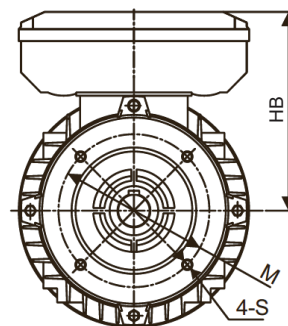
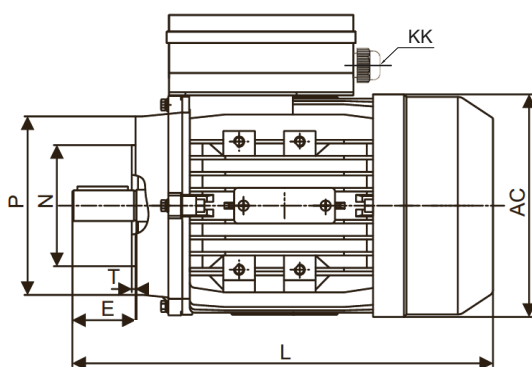
Dimensions foot mount B3



Dimensions flange mount B5 and V1



Dimensions face - flange B14



ESD Electric Motors Dimensions

Foot mount B3

Frame size	A	AB	AC	B	B33	C	D	DB	E	F	GD	G	H	HB	HD	K	KK	L	L33
56	90	110	120	71	77	36	9	M3	20	3	3	7.2	56	88	144	5.8X8.8	-	196	99
63	100	120	130	80	116	40	11	M4	23	4	4	8.5	63	118	181	7X10	M20	220	92
71	112	132	145	90	116	45	14	M5	30	5	5	11	71	125	196	7X10	M20	241	92
80	125	160	165	100	144	50	19	M6	40	6	6	15.5	80	146	226	10X13	M20	290	141
90S	140	175	185	100	144	56	24	M8	50	8	7	20	90	153	243	10X13	M20	312	141
90L	140	175	185	125	144	56	24	M8	50	8	7	20	90	153	243	10X13	M20	337	141
100L	160	196	205	140	144	63	28	M10	60	8	7	24	100	165	265	12X16	M20	369	141
112M	190	222	230	140	148	70	28	M10	60	8	7	24	112	183	295	12X16	M25	416	150

Flange mount B5

Frame size	AC	B33	D	DB	E	F	G	H	HB	K	KK	L	L33	M	N	P	S	T
56	120	77	9	M3	20	3	7.2	56	88	5.8X8.8	-	196	99	100	80	120	7	3.0
63	130	116	11	M4	23	4	8.5	63	118	7X10	M20	220	92	115	95	140	10	3.0
71	145	116	14	M5	30	5	11	71	125	7X10	M20	241	92	130	110	160	10	3.5
80	165	144	19	M6	40	6	15.5	80	146	10X13	M20	290	141	165	130	200	12	3.5
90S	185	144	24	M8	50	8	20	90	153	10X13	M20	312	141	165	130	200	12	3.5
90L	185	144	24	M8	50	8	20	90	153	10X13	M20	337	141	165	130	200	12	3.5
100L	205	144	28	M10	60	8	24	100	165	12X16	M20	369	141	215	180	250	15	4.0
112M	230	148	28	M10	60	8	24	112	183	12X16	M25	416	150		180	250	15	4.0

Flange mount B14

Frame size	AC	B33	D	DB	E	F	G	H	HB	K	KK	L	L33	M	N	P	S	T
56	120	77	9	M3	20	3	7.2	56	88	5.8X8.8	-	196	99	65	50	80	M5	2.5
63	130	116	11	M4	23	4	8.5	63	118	7X10	M20	220	92	75	60	90	M5	2.5
71	145	116	14	M5	30	5	11	71	125	7X10	M20	241	92	85	70	105	M6	2.5
80	165	144	19	M6	40	6	15.5	80	146	10X13	M20	290	141	100	80	120	M6	3.0
90S	185	144	24	M8	50	8	20	90	153	10X13	M20	312	141	115	95	140	M8	3.0
90L	185	144	24	M8	50	8	20	90	153	10X13	M20	337	141	115	95	140	M8	3.0
100L	205	144	28	M10	60	8	24	100	165	12X16	M20	369	141	130	110	160	M8	3.5
112M	230	148	28	M10	60	8	24	112	183	12X16	M25	416	150	130	110	160	M8	3.5



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