



VARIABLE SPEED DRIVES & 3 PHASE INDUCTION MOTOR



Applications Solved...

www.invertek.com.sg

INVERTEK motors are designed and manufactured to meet the most arduous service conditions such as mining, petrochemical, marine or tropical environments. The motors are made from high quality materials and workmanship, to survive in the toughest conditions.

INTERNATIONAL STANDARDS

- International Electro-technical Commission-IEC 72.
- Australian Standards-AS 1359.
- British Standards-Bs 5000 and BS 4999.
- The requirements for European "CE" marking.

INTRODUCTION AND LIST OF PARTS
AS 1359-0. BS 4999-0

DEFINITIONS
IEC-34-1.AS 1359-1. BS 4999-116.

DIMENSION SYMBOLS
S 1359-2. BS 4999-103.

DIMENSION OF ROTATION AND MARKINGS
OF TERMINALS
IEC 34-8.AS 1359-3. BS 4999-108.

RATING PLATE MARKINGS
IEC34-8.AS 1359-4.

DESIGNATIONS AND DIMENSIONS
IEC 72AS 1359-10. BS 4999-141.

CLASSIFICATION OF TYPES OF ENCLOSURE
IEC 34-5.AS 1359-20. BS 4999-105 and AS 1939.

CLASSIFICATION OF METHODS OF COOLING
IEC 34-6.AS 1359-21. BS EN69934-6.

MOUNTING ARRANGEMENTS AND TYPES
OF CONSTRUCTION
IEC 34-7.AS 1359-22. BS EN60034-7.

DUTY AND RATINGS
IEC 34-1.AS 1359-30. BS EN60034-2 and BS 5000-10.

SERVICE AND OPERATING CONDITIONS
IEC 34-1.AS 1359-31.

TEMPERATURE LIMITS AND MEASUREMENTS
OF TEMPERATURE
IEC 34-1.AS 1359-32.

METHODS OF DETERMINING LOSSES AND
EFFICIENCY
IEC 34-1.AS 1359-33. BS 4999-102.

MEPS COMPLIANCE
AS 1359-5.2000

MEPS COMPLIANCE TEST METHODS
AS 1359-102.1

GENERAL CHARACTERISTICS
IEC34-12.AS 1359-41. BS EN60034-1.

VIBRATION LIMITS
IEC 34-14.AS 1359-50. BS 4999-142.

NOISE LEVEL LIMITS
IEC 34-9.AS 1359-51. BS EN60034-9.

TESTS
IEC 34-9.AS 1359-60. BS 4999-143.

TOLERANCES
IEC 34-1.AS 1359-69.

All **INVERTEK** motors are protected to a minimum of IP55, according to IEC Standard IP529

IP55 provides complete protection against accidental touch of parts under power or internal moving parts with tools, wires, or similar objects. Protected against intrusion of dust particles is not completely prevented, but dust particles will not deposit in such quantity that performance is compromised. Water jets from all directions have no measurable negative effect.

Higher IP ratings are available on request.

Classifies Protection against Touch and Intrusion of Foreign Particles

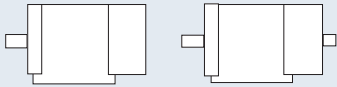
Code of 1st digit	Description	Level of Protection
0	No Protection	No protection against accidental touch of parts under power or moving parts
1	Protection against large foreign parts	Protection against accidental touch of parts under power in large areas or internal moving parts. Protected against intrusion of particles larger than 50mm diameter
2	Protection against medium foreign particles	Protection against accidental touch with fingers of parts under power or moving internal parts. Protected against intrusion of particles larger than 12mm diameter.
3	Protection against small foreign particles	Protection against accidental touch of parts under power or internal moving part with tools, wires or similar objects with thickness of larger than 2.5mm. Protected against intrusion of particles larger than 1mm.
4	Protection against grain-sized particles	Protection against accidental touch of parts under power or internal moving parts with tools, wires, or similar objects with a size larger than 1mm. Protected against intrusion of parts larger than 1mm.
5	Protection against dust deposit	Complete protection against accidental touch of parts under power or internal moving parts with tools, wires, or similar objects. Protected against intrusion of dust particles is not completely prevented, but dust particles will not deposit in such quantity that performance is compromised.
6	Protection against intrusion	Complete protection against accidental touch of parts under or internal moving parts. Protected against detrimental dust deposition. Intrusion of dust is not completely prevented, but will not have a detrimental effect on the performance of the device.

Classifies Protection against Intrusion of Water

Code of 2nd digit	Description	Level of Protection
0	No Protection	No designated protection.
1	Protection against vertical water droplets	Water droplets falling vertically onto the device have not negative effect.
2	Protection against oblique falling droplets	Water droplets falling at an angle of not more than 15 om the vertical onto the device have no negative effect.
3	Protection against water splash	Water, falling at an angle of no more than 60 om vertical has no negative effect on the device.
4	Protection against water spray	Water spray from all directions has no negative effect on the device.
5	Protection against water jet	Water jet from all directions has no measurable negative effect.
6	Protection against flooding	Water has no negative effect during temporarily flooding.
7	Protection against submersion	Water will not penetrate for a defined period and depth of submersion.
8	Protection while permanently submersed	Water will not penetrate for an indefinite period of submersion at a defined depth

FOOT MOUNTING HORIZONTAL

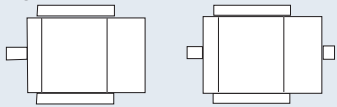
B3



IM1001

IM1002

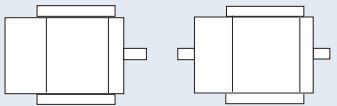
B6



IM1051

IM1052

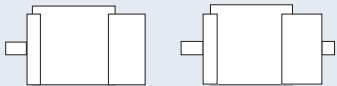
B7



IM1601

IM1062

B6



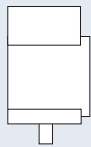
IM1071

IM1072

FOOT MONTING VERTICAL

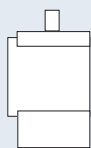
V5

IM1011



V6

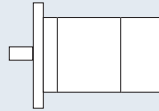
IM1031



FLANGE MOUNTING

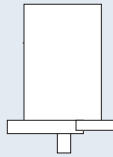
B5

IM3001



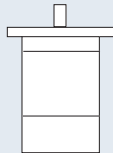
V1

IM3011



V3

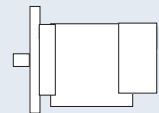
IM3031



FOOT/FLANGE MOUNTING

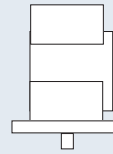
B3/B5

IM2001



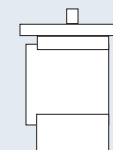
V1/V5

IM2011



V3/V6

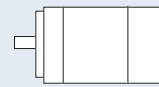
IM2031



FACE MOUNTING

B14

IM3601



V18

IM3611



V19

IM3631



FOOT/FACE MOUNTING

B3/B14

IM2101



V5/V18

IM2111

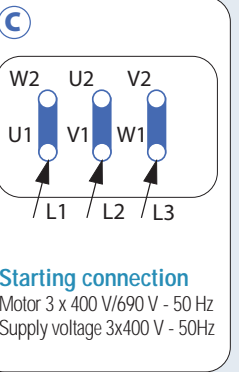
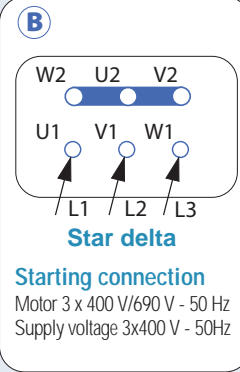
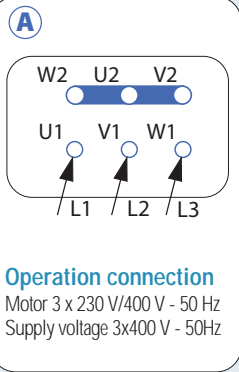


V6/V19

IM2131



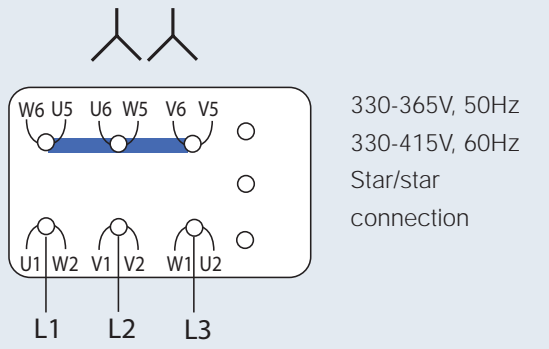
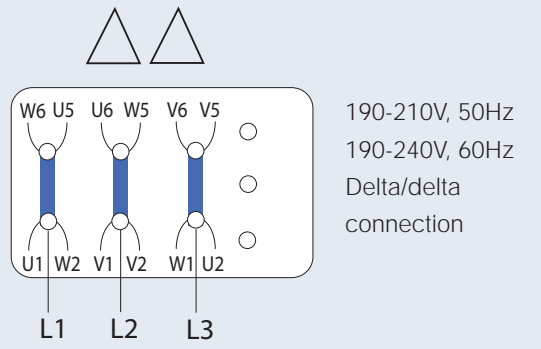
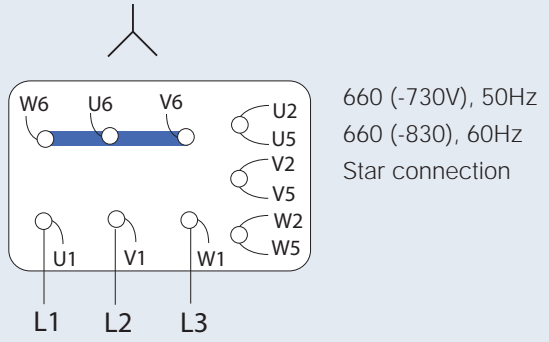
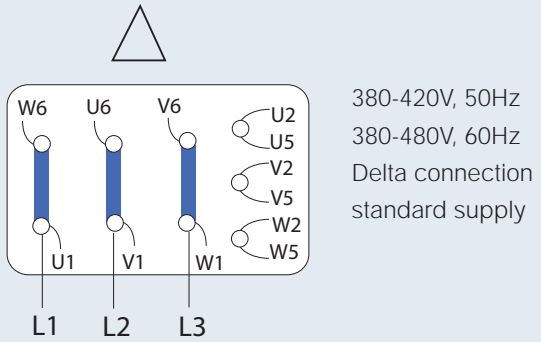
Standard Terminal Board Connections



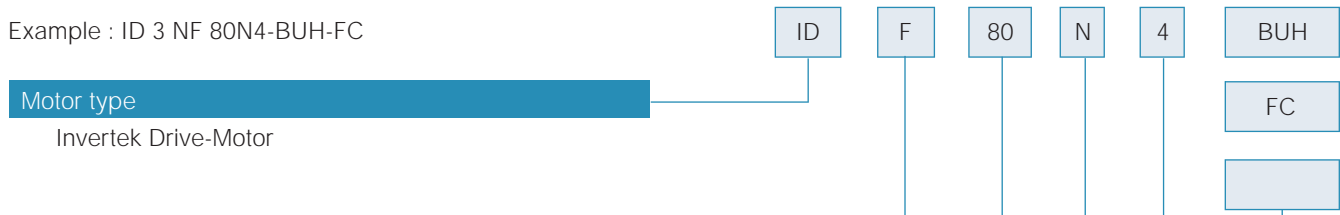
A Motors with a low power ($\leq 2.2kW$) are usually immediately actuated in the Y state (Direct On Line, DOL). A motor is used for this with a winding that is suitable for 3 x Δ 230 V/Y400 V-50 Hz for a supply voltage of, for example, 3 x 400 V-50 Hz.

B When the power is larger, motors should, by preference, be connected in the Y state during the initial period in such a way that the winding will then be suitable for $\sqrt{3}$ x the network supply voltage. The motors will, in fact, start to run based on an undervoltage which means that the starting current will be limited considerably during the initial period. You should use a motor with a winding that is suitable for 3 x Δ 400 V-50 Hz with regard to supply voltage of, for example, 3 x 400 V-50 Hz.

Special Terminal Board Connection upon request



Example : ID 3 NF 80N4-BUH-FC



Motor type
Invertek Drive-Motor

Motor mounting

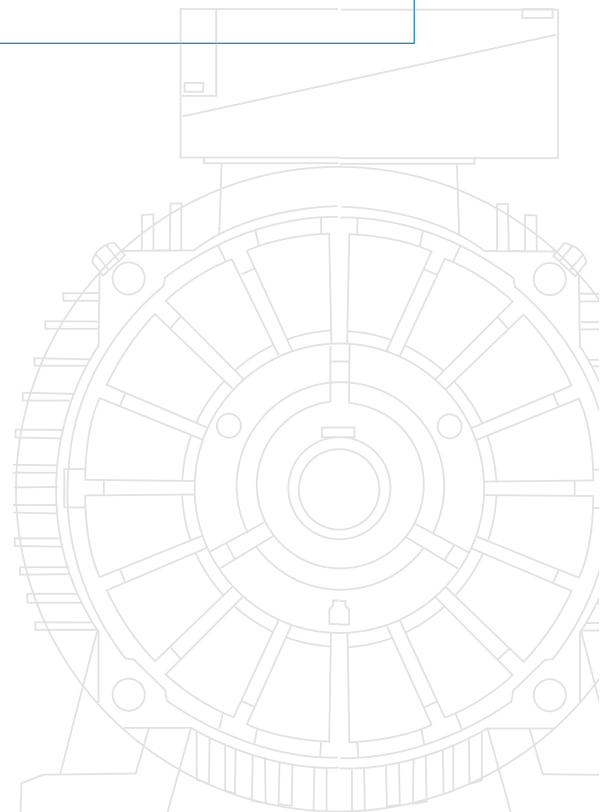
F	Flange mounted B5 - IEC
G	Foot mounted B3
SF	Flange mounted B14 - IEC
G/F	Foot - flange execution B35

Size
63, 71, 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315 / IEC-size

Stator length
K, N, S, L, M, ML, MA, MP, LA, LK, SA

Number of poles
2-, 4-, 6-, 8- polig / pole

- BUH ----- Brake unit
- FC ----- Force cooling Fan
- EN ----- Encoder
- KTY ----- Temperature Sensor
- PTC ----- Thermistor Protection
- ACH ----- Anti-condensation Heater
- CDH ----- Condensation Drain Hole
- SS ----- Second Shaft
- SP ----- Special design
- Etc..



- ID motors have cast iron stator frames, end shields and terminal boxes.
- MS motors have aluminium stator frames, terminal boxes and cast iron end shields.
- MS motors have bolt on feet, which can be located at 90 degree mounting locations, so that the terminal box can be on top or on either side.
- IP55 as a minimum-higher ratings are available on request. Care must be taken when mounting motors in a nonstandard mounting position to maintain the IP rating of the motor.
- Cooling to IC0141 up to 355 frames.
- All motors are available in B3 (IM1001), B3/5 (IM2001), and VI (IM3031) configuration. All standard motors up to 280 frame may be mounted in any direction, i.e. shaft up, shaft down, etc. They can also be mounted B5 (IM3001).
- B14A and B14B flanges are available up to 160-frame size.
- Standard motors are rated for continuous duty at full nameplate rating - S 1.
- Standard voltage is 415v 50Hz.
- Voltage tolerance is +/- 0%. Voltages beyond these limits will cause a high winding temperature rise.
- INVERTEK motors are designed for operation in high ambient temperatures of 40 deg C or more. The standard data relates to ambient up to 40 deg C. and altitudes below 1000 meters.
- Standard motors have Class F (155 deg C.) insulation, with a Class B (80 deg C.) temperature rise. Class H insulation motors (180 deg C.) are available on request only high quality polyester covered copper winding wire is used in conjunction with inorganic high temperature polyester varnish.
- Stator and rotor laminations are produced from low loss, double insulated, silicon electrical steel. All motors are designed for high efficiency and low temperature rise giving a long economical service life.
- In general INVERTEK motors have high starting torques and low starting currents because the rotors have a double cage design which is pressure die cast in high purity aluminium.
- These motors have very low vibration levels due to high precision balancing of the rotors and fans. Most motors have vibration levels of less than 1 mm/sec.
- High quality vacuum degassed SKF or NSK bearings are used on motors. In general the bearings have C3 clearances and are preloaded with a wave washer on the drive end which increases bearing life and reduces bearing noise. The nondrive end bearing is locked to prevent shaft "float." Motors up to 132 frames have "ZZ" sealed for life bearing, while motors from 160 frames and above have open bearing with "flush through" greasing facilities. In line with current practice, motors up to 280 frames have deep groove ball bearing at both ends, while the 315 and 355 frame motors have a roller bearing on the drive end. Roller bearings can be fitted on the drive end of any motor on request.
- Recommended grease for re-greasing is Shell Alvania R3.
- Special bearing arrangements can be accommodated such as fitting angular contact, or 4-point contact QJ bearings, for thrust loads.
- All bearings are protected from the external environment with oil seals on the drive and non-drive end.
- Labyrinth seals can be fitted as an option for external, protection of bearings for 160 frames and above.
- Standard noise levels, (sound pressure at 1 meter), are well within the requirements of most standards, and are generally below 80 dB (A) for small motors and 85 dB (A) for large motors.
- All standard motors are designed to run in either direction.
- Shafts are made from high quality carbon steel.
- Stator frames are made of T200 grade cast iron from 80 frame upwards 80 to 132 are also available in aluminium.
- End shields for all motors are made from T200 cast iron.
- Terminal boxes are made from aluminium for MDIA motors, and cast iron for ID 1 C motors. For 160 frame and above, all terminal boxes are cast iron. All terminal boxes are top mounted.
- Cable gland entries are metric as standard and the thread sizes are specified with the dimensional data in this brochure.

- Fans are made from glass-reinforced polypropylene for small motors up to 280 frame size. The 315/355 frame motors have aluminium.
- Fan Cowlings are made from pressed steel for all motors up to 315 frame, and from cast iron for 355 frame.
- Motors can be supplied with force ventilation systems for variable (VVVF) frequency applications.
- Rain hoods are available for motors mounted shaft down.
- RTD's or thermostats can be supplied as an option.
- Anti-condensation heaters can be fitted as an option to all motors and recommended for IP56 and IP66 motors.
- All motors can be supplied with separate terminal boxes for heaters and/or thermistors.
- All bolts and screws are zinc electroplated as protection against corrosion.
- All cast iron motor parts are cleaned and primed (polyvinylbutyral and epoxy) to 25 microns or more before machining. Aluminium parts are painted with etch-primer on external surfaces. The final topcoat of paint is air-drying enamel. Based on epoxy polymer resins to 25 micron or more in thickness.
- 80-180 frames are available in aluminium and cast iron. 200-355 frames are only available in cast iron.

Duty Cycles

S1 Continuous Duty	Operation under constant load, lasting long enough to allow the machine to reach thermal equilibrium.
S2 Short-Time Duty	Operation under constant load, for a time too short to allow the machine to reach thermal equilibrium. Idle time of the machine is long enough to allow the machine to cool down to ambient temperature. Standard duration of short-term operation: 10, 30, 60 and 90 minutes.
S3 Intermittent Periodic	Operation under repeated, constant load in specified cycles. Neither operating nor resting period are long enough to allow the motor to reach thermal equilibrium. The starting losses are small and do not essentially influence the temperature rise. The nominal values of relative starting time are 15, 25, 40, 60% at a daily 10-minute cycle.
S4 Intermittent Periodic	Operation under repeated, constant load in specified cycles. The start of the motor influences the temperature rise.

Insulation

The components of the insulation system are selected so as to ensure good protection against chemically aggressive gases, vapours, dust, oil and air humidity. All materials used for insulating the winding and winding ends correspond to insulating Class F or H according to IEC 60085:

- Enamel-insulated copper wires with temperature index 200 (Class H);
- Insulating sheet on polyester base (Class F);
- Impregnation with phenolic resins modified with polyester resins (Class H);

Limited temperature for insulating material according to IEC 60085

Insulation Class	Limit Temperature (°C)
B	130
F	155
H	180

Temperature Rise

Standard single-speed continuous duty (SI) motors have temperature rise within Class B limit. Motors with higher output and pole-changing motors normally have temperature rise within Class F limit.

Insulation Class	Max. Temperature Rise (°C)
B	80
F	105
H	125

Temperature rises specified at a reference ambient air temperature of 40°C.

Clearance C3 not regreasable
Regreasable open bearings
C3 with automatic grease relief

FRAME SIZE	POLES	DE	NDE
63	2-4	6201ZZ CM	6201ZZ CM
71	2-6	6202ZZ CM	6202ZZ CM
80	2-4	6204ZZ CS	6204ZZ CS
	6-8	6205ZZ CM	6205ZZ CM
90	2-4	6205ZZ C3	6205ZZ C3
	6-8	6205ZZ CM	6205ZZ CM
100	2-4	6206ZZ C3	6206ZZ C3
	6-8	6206ZZ CM	6206ZZ CM
112	2-4	6206ZZ C3	6206ZZ C3
	6-8	6206ZZ CM	6206ZZ CM
132	2-4	6208ZZ C3	6208ZZ C3
	6-8	6308ZZ CM	6308ZZ CM
160	2-4	6309ZZ C3	6309ZZ C3
	6-8	6309ZZ CM	6309ZZ CM
180	2-4	6311 C3	6311 C3
	6-8	6311 CM	6311 CM
200	2-4	6312 C3	6312 C3
	6-8	6312 CM	6312 CM
225	2-4	6313 C3	6313 C3
	6-8	6313 CM	6313 CM
250	2-4	6314 C3	6314 C3
	6-8	6314 CM	6314 CM
280	2-4	6317 C3	6317 C3
	6-8	6317 CM	6317 CM
315	2	6319 C3	6319 C3
	4-8	2319 C3	2319 C3
355	2	6322 C3	6322 C3
	4-8	2322 C3	2322 C3

NOTES:

1. Recommended greases : Shell Alvania R3

2 POLE - 3000 RPM SYNCHRONOUS SPEED 50 Hz

MODEL	Output Power		Full Load						TST / TPL	IST / IFL	TMAX / TFL	Weight kg
			380V	400V	415V	Speed (r/min)	Eff (%)	Power Factor				
	Current (A)	Current (A)	Current (A)									
	kW	HP										
ID-63K-2	0.18	0.25	0.53	0.50	0.48	2720	65	0.80	2.2	5.5	2.2	10
ID-63N-2	0.25	0.34	0.69	0.66	0.63	2720	68	0.81	2.2	5.5	2.2	11
ID-71K-2	0.37	0.50	0.99	0.94	0.91	2740	70	0.81	2.2	6.1	2.2	14
ID-71N-2	0.55	0.75	1.40	1.33	1.28	2740	73	0.82	2.2	6.1	2.3	14
ID-80K-2	0.75	1	1.83	1.74	1.68	2830	75	0.83	2.2	6.1	2.3	15
ID-80N-2	1.1	1.5	2.58	2.45	2.37	2830	77	0.84	2.2	7.0	2.3	16
ID-90S-2	1.5	2	3.43	3.26	3.14	2840	79	0.84	2.2	7.0	2.3	22
ID-90L-2	2.2	3	4.85	4.61	4.45	2840	81	0.85	2.2	7.0	2.3	25
ID-100L-2	3	4	6.31	6.00	5.78	2870	83	0.87	2.2	7.5	2.3	33
ID-112M-2	4	5.5	8.13	7.72	7.44	2890	85	0.88	2.2	7.5	2.3	40
ID-132S1-2	5.5	7.5	11.0	10.49	10.11	2900	86	0.88	2.2	7.5	2.3	59
ID-132S2-2	7.5	10	14.9	14.14	13.63	2900	87	0.88	2.2	7.5	2.3	62
ID-160M1-2	11	15	21.2	20.18	19.45	2930	88.4	0.89	2.2	7.5	2.3	107
ID-160M2-2	15	20	28.6	27.21	26.23	930	89.4	0.89	2.2	7.5	2.3	117
ID-160L-2	18.5	25	34.7	32.97	31.78	2930	90.0	0.90	2.2	7.5	2.3	134
ID-180M-2	22	30	41.3	39.20	37.79	2940	90.0	0.90	2.0	7.5	2.3	169
ID-200L1-2	30	40	55.5	52.76	50.85	2950	91.2	0.90	2.0	7.5	2.3	220
ID-200L2-2	37	50	67.9	64.50	62.17	2950	92.0	0.90	2.0	7.5	2.3	239
ID-225M-2	45	60	82.3	78.19	75.37	2970	92.3	0.90	2.0	7.5	2.3	297
ID-250M-2	55	75	100.4	95.36	91.91	2970	92.5	0.90	2.0	7.5	2.3	380
ID-280S-2	75	100	136.1	129.34	124.66	2970	93.0	0.90	2.0	7.5	2.3	510
ID-280M-2	90	125	160.2	152.19	146.69	2970	93.8	0.91	2.0	7.5	2.3	540
ID-315S-2	110	150	195.4	185.62	178.91	2980	94.0	0.91	1.8	7.1	2.2	920
ID-315M-2	132	180	233.2	221.56	213.55	2980	94.5	0.91	1.8	7.1	2.2	970
ID-315L1-2	160	220	279.3	265.36	255.77	2980	94.6	0.92	1.8	7.1	2.2	1080
ID-315L2-2	200	270	348.4	331.00	319.03	2980	94.8	0.92	1.8	7.1	2.2	1170
ID-355M1-2	220	300	381.3	362.19	349.10	2985	95.3	0.92	1.6	7.1	2.2	1650
ID-355M2-2	250	335	432.8	411.15	396.29	2985	95.4	0.92	1.6	7.1	2.2	1690
ID-355L1-2	280	375	484.2	460.00	443.37	2985	95.5	0.92	1.6	7.1	2.2	1650
ID-355L2-2	315	425	544.2	516.96	498.27	2985	95.6	0.92	1.6	7.1	2.2	1850

TST = Starting Torque **IST** = Starting Current **TMAX** = Maximum Torque

TFL = Full Load Torque **IFL** = Full Load Current

4 POLE - 1500 RPM SYNCHRONOUS SPEED 50 Hz

MODEL	Output Power		Full Load						TST / TPL	IST / IFL	TMAX / TFL	Weight kg
			380V	400V	415V	Speed (r/min)	Eff (%)	Power Factor				
	Current (A)	Current (A)	Current (A)									
ID-63K-4	0.12	0.16	0.44	0.42	0.41	1310	57.0	0.72	2.3	5.2	2.2	11
ID-63N-4	0.18	0.25	0.62	0.59	0.57	1310	60.0	0.73	2.3	5.2	2.2	11
ID-71K-4	0.25	0.34	0.79	0.75	0.72	1330	65.0	0.74	2.3	5.2	2.2	14
ID-71N-4	0.37	0.5	1.12	1.06	1.02	1330	67.0	0.75	2.3	5.2	2.2	14
ID-80K-4	0.55	0.75	1.57	1.49	1.44	1390	71.0	0.75	2.3	5.2	2.3	15
ID-80N-4	0.75	1.0	2.05	1.95	1.88	1390	73.0	0.76	2.3	6.0	2.3	16
ID-90S-4	1.1	1.5	2.85	2.71	2.61	1400	76.2	0.77	2.3	6.0	2.3	22
ID-90L-4	1.5	2	3.68	3.49	3.37	1400	78.5	0.79	2.3	6.0	2.3	27
ID-100L1-4	2.2	3	5.09	4.48	4.67	1430	81.0	0.81	2.3	7.0	2.3	34
ID-100L2-4	3	4	6.73	6.39	6.16	1430	82.6	0.82	2.3	7.0	2.3	35
ID-112M-4	4	5.5	8.82	8.38	8.08	1440	84.0	0.82	2.3	7.0	2.3	44
ID-132S-4	5.5	7.5	11.7	11.6	10.76	1440	85.7	0.83	2.3	7.0	2.3	61
ID-132M-4	7.5	10	15.6	14.81	14.28	1440	87.0	0.84	2.3	7.0	2.3	73
ID-160M-4	11	15	22.2	21.13	20.37	1469	88.4	0.85	2.2	7.0	2.3	113
ID-160L-4	15	20	30.0	28.49	27.46	1460	89.4	0.85	2.2	7.5	2.3	133
ID-180M-4	18.5	25	36.1	34.31	33.07	1470	90.5	0.86	2.2	7.5	2.3	167
ID-180L-4	22	30	42.7	40.58	39.11	1470	91.0	0.86	2.2	7.5	2.3	181
ID-200L-4	30	40	57.6	54.73	52.75	1470	92.0	0.86	2.2	7.2	2.3	232
ID-225S-4	37	50	69.9	66.36	63.97	1480	92.5	0.87	2.2	7.2	2.3	287
ID-225M-4	45	60	84.7	80.45	77.54	1480	92.8	0.87	2.2	7.2	2.3	322
ID-250M-4	55	75	103.3	98.12	94.57	1480	93.0	0.87	2.2	7.2	2.3	385
ID-280S-4	75	100	139.6	132.66	127.86	1480	93.8	0.87	2.2	7.2	2.3	510
ID-280M-4	90	125	166.9	158.51	152.78	1490	94.2	0.87	2.2	7.2	2.3	600
ID-315S-4	110	150	201.0	190.93	184.03	1490	94.5	0.88	2.1	6.9	2.2	930
ID-315M-4	132	180	240.4	228.39	220.13	1490	94.8	0.88	2.1	6.9	2.2	1010
ID-315L1-4	160	220	287.8	273.44	263.55	1490	94.9	0.89	2.1	6.9	2.2	1070
ID-355L2-4	200	270	359.4	341.44	329.09	1490	95.0	0.89	2.1	6.9	2.2	1170
ID-315L2-4	220	300	390.1	370.63	357.23	1490	95.2	0.90	2.1	6.9	2.2	1690
ID-355M2-4	250	335	442.9	420.7	405.5	1490	95.3	0.90	2.1	6.9	2.2	1720
ID-355L1-4	280	375	495.5	470.7	453.7	1490	95.4	0.90	2.1	6.9	2.2	1650
ID-355L2-4	315	425	556.3	528.4	509.3	1490	95.6	0.90	2.1	6.9	2.2	1950

TST = Starting Torque **IST** = Starting Current **TMAX** = Maximum Torque

TFL = Full Load Torque **IFL** = Full Load Current

6 POLE - 1000 RPM SYNCHRONOUS SPEED 50 Hz

MODEL	Output Power		Full Load						TST / TPL	IST / IFL	TMAX / TFL	Weight kg
			380V	400V	415V	Speed (r/min)	Eff (%)	Power Factor				
	Current (A)	Current (A)	Current (A)									
ID-71K-6	0.18	0.25	0.74	0.70	0.68	850	56.0	0.66	1.9	4.0	2.0	13
ID-71N-6	0.25	0.34	0.95	0.90	0.87	850	59.0	0.68	1.9	4.0	2.0	14
ID-80K-6	0.37	0.50	1.30	1.23	1.19	890	62.0	0.70	1.9	4.7	2.0	15
ID-80N-6	0.55	0.75	1.79	1.70	1.64	890	65.0	0.72	1.9	4.7	2.1	16
ID-90S-6	0.75	1	2.19	2.08	2.00	910	72.4	0.72	2.0	5.5	2.1	23
ID-90L-6	1.1	1.5	3.00	2.85	2.75	910	76.2	0.73	2.0	5.5	2.1	25
ID-100L-6	1.5	2	3.88	3.69	3.55	940	77.3	0.76	2.0	5.5	2.1	33
ID-112M-6	2.2	3	5.53	5.25	5.06	940	79.6	0.76	2.0	6.5	2.1	39
ID-132S-6	3	4	7.37	7.00	6.75	960	81.4	0.76	2.1	6.5	2.1	56
ID-132M1-6	4	5.5	9.63	9.15	8.82	960	83.0	0.76	2.1	6.5	2.1	71
ID-132M2-6	5.5	7.5	12.8	12.19	11.75	960	84.6	0.77	2.1	6.5	2.1	75
ID-160M-6	7.5	10	17.0	16.14	15.56	970	86.0	0.78	2.1	6.5	2.1	108
ID-160L-6	11	15	24.2	22.97	22.14	970	87.5	0.79	2.1	6.5	2.1	131
ID-180L-6	15	20	31.6	30.03	28.95	970	89.0	0.81	2.0	7.0	2.1	171
ID-200L1-6	18.5	25	38.6	36.63	35.31	970	90.0	0.81	2.1	7.0	2.1	216
ID-200L2-6	22	30	44.7	42.51	40.97	970	90.0	0.83	2.1	7.0	2.1	225
ID-225M-6	30	40	59.3	56.34	54.30	980	91.5	0.84	2.0	7.0	2.1	286
ID-250M-6	37	50	71.1	67.50	65.06	980	92.0	0.86	2.1	7.0	2.1	380
ID-280S-6	45	60	85.9	81.65	78.70	980	92.5	0.86	2.1	7.0	2.0	465
ID-280M-6	55	75	104.7	99.47	95.88	980	92.8	0.86	2.1	7.0	2.0	540
ID-315S-6	75	100	141.7	134.63	129.76	990	93.5	0.86	2.0	7.0	2.0	861
ID-315M-6	90	125	169.5	161.04	155.22	990	93.8	0.86	2.0	7.0	2.0	940
ID-315L1-6	110	150	206.7	196.41	189.31	990	94.0	0.86	2.0	6.7	2.0	1110
ID-315L2-6	132	180	244.7	232.49	224.08	990	94.2	0.87	2.0	6.7	2.0	1175
ID-355M1-6	160	220	292.3	277.71	267.68	990	94.5	0.88	1.9	6.7	2.0	1690
ID-355M2-6	200	270	364.6	346.41	333.89	990	94.7	0.88	1.9	6.7	2.0	1870
ID-355L1-6	220	300	400.7	380.65	366.89	990	94.8	0.88	1.9	6.7	2.0	1900
ID-355L-6	250	335	454.8	432.10	416.48	990	94.9	0.88	1.9	6.7	2.0	1980

TST = Starting Torque **IST** = Starting Current **TMAX** = Maximum Torque

TFL = Full Load Torque **IFL** = Full Load Current

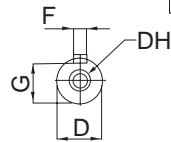
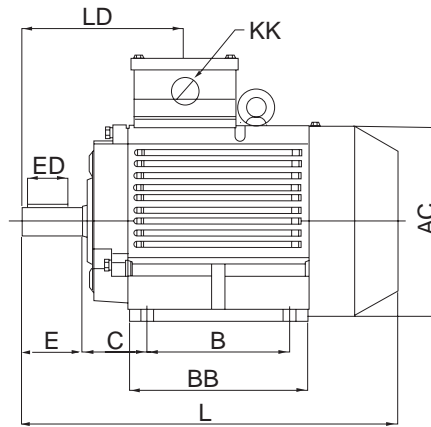
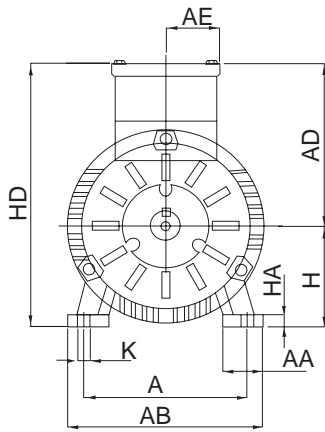
8 POLE - 750 RPM SYNCHRONOUS SPEED 50 Hz

MODEL	Output Power		Full Load						TST / TPL	IST / IFL	TMAX / TFL	Weight kg
			380V	400V	415V	Speed (r/min)	Eff (%)	Power Factor				
	Current (A)	Current (A)	Current (A)									
ID-80K-8	0.18	0.25	0.88	0.84	0.80	630	51.0	0.61	1.8	4.0	1.9	16
ID-80N-8	0.25	0.34	1.15	1.10	1.06	640	54.0	0.61	1.8	4.0	1.9	17
ID-90S-8	0.37	0.50	1.49	1.41	1.36	660	62.0	0.61	1.8	4.0	1.9	24
ID-90L-8	0.55	0.75	2.17	2.07	1.99	660	63.0	0.61	1.8	4.0	2.0	26
ID-100L-8	0.75	1	2.40	2.28	2.19	690	71.0	0.67	1.8	4.0	2.0	33
ID-100L2-8	1.1	1.5	3.32	3.15	3.04	690	73.0	0.69	1.8	5.0	2.0	34
ID-112M-8	1.5	2	24.40	4.18	4.03	680	75.0	0.69	1.8	5.0	2.0	39
ID-132S-8	2.2	3	6.04	5.73	5.53	710	78.0	0.71	1.8	6.0	2.0	62
ID-132M-8	3	4	7.90	7.51	7.24	710	79.0	0.73	1.8	6.0	2.0	66
ID-160M1-8	4	5.5	10.28	9.76	9.41	720	81.0	0.73	1.9	6.0	2.0	94
ID-160M2-8	5.5	7.5	13.61	12.9	12.5	720	83.0	0.74	2.0	6.0	2.0	106
ID-160L-8	7.5	10	17.8	16.9	16.3	720	85.5	0.75	2.0	6.0	2.0	128
ID-180L-8	11	15	25.1	23.9	23.0	730	87.5	0.76	2.0	6.6	2.0	170
ID-200L-8	15	20	34.1	32.4	31.2	730	88.0	0.76	2.0	6.6	2.0	220
ID-225S-8	18.5	25	41.1	39.0	37.6	730	90.0	0.76	1.9	6.6	2.0	270
ID-225M-8	22	30	47.4	45.0	43.4	740	90.5	0.78	1.9	6.6	2.0	295
ID-250M-8	30	40	63.4	60.2	58.1	740	91.0	0.79	1.9	6.6	2.0	370
ID-280S-8	37	50	77.8	73.9	71.2	740	91.5	0.79	1.9	6.6	2.0	475
ID-280M-8	45	60	94.1	89.4	86.1	740	92.0	0.97	1.9	6.6	2.0	555
ID-315S-8	55	75	111.2	105.6	101.8	740	92.8	0.81	1.8	6.6	2.0	905
ID-315M-8	75	100	151.3	143.7	138.5	740	93.0	0.81	1.8	6.6	2.0	981
ID-315L1-8	90	125	177.8	168.9	162.8	740	93.8	0.82	1.8	6.6	2.0	1070
ID-315L2-8	110	150	216.8	206.0	198.5	740	94.0	0.82	1.8	6.4	2.0	1160
ID-355M1-8	132	180	261.0	248.0	239.0	740	93.7	0.82	1.8	6.4	2.0	1800
ID-355M2-8	160	220	314.7	299.0	288.2	740	94.2	0.82	1.8	6.4	2.0	1890
ID-355L1-8	180	240	353.7	336.0	33.9	740	94.3	0.82	1.8	6.4	2.0	1970
ID-355L2-8	200	270	387.4	368.1	354.8	740	94.5	0.83	1.8	6.4	2.0	2040

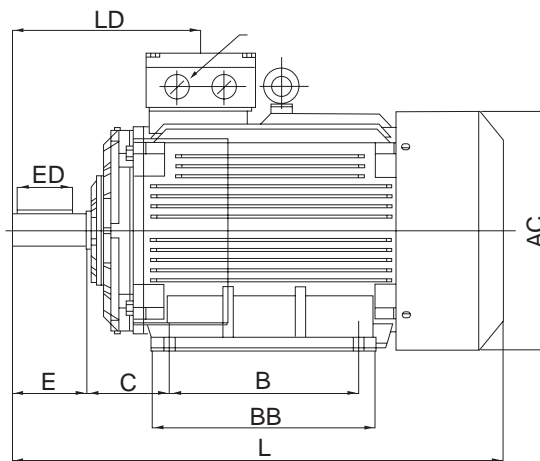
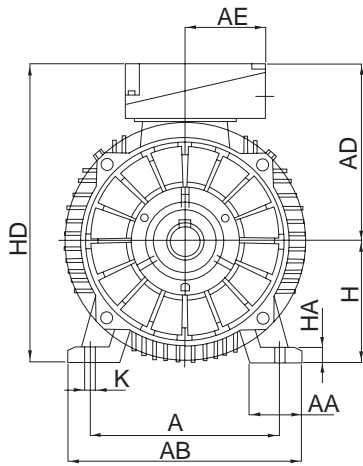
TST = Starting Torque **IST** = Starting Current **TMAX** = Maximum Torque

TFL = Full Load Torque **IFL** = Full Load Current

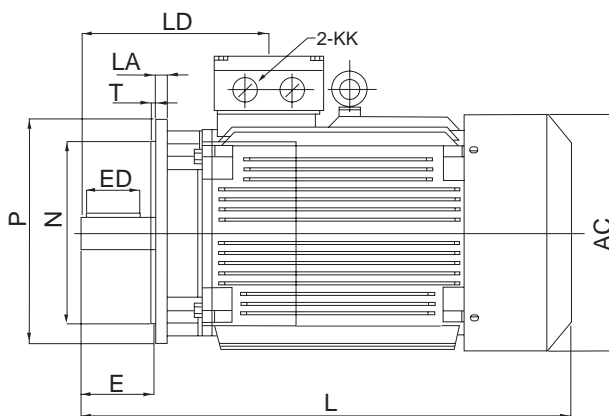
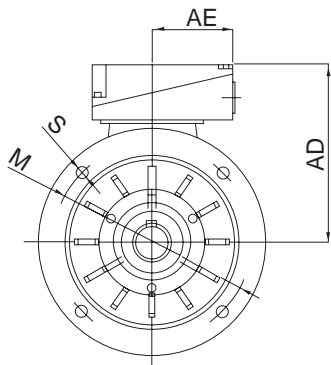
B3, 63-132 FRAME



B3, 160-355 FRAME



B5



OVERALL AND MOUNTING DIMENSIONS FROM 63 TO 160 FRAME SIZE

FRAME SIZE	INSTALLATION SIZE									INSTALLATION B14A					INSTALLATION B5					OVERALL DIMENSION				
	A	B	C	D	E	F	G	H	K	M	N	P	S	T	M	N	P	S	T	AB	AC	AD	HD	L
63	100	80	40	11	23	4	8.5	63	7	75	60	90	M5	2.5	115	95	140	10	3	135	130	70	180	225
71	112	90	45	14	30	5	11	71	7	85	70	105	M6	2.5	130	110	160	12	3.5	150	145	80	195	250
80	125	100	50	19	40	6	15.5	80	10	100	80	120	M6	3	165	130	200	12	3.5	165	175	145	214	295
90S	140	100	56	24	50	8	20	90	10	115	95	140	M8	3	165	130	200	12	3.5	180	195	155	250	315
90L	140	125	56	24	50	8	20	90	10	115	95	140	M8	3	165	130	200	12	3.5	180	195	155	250	340
100L	160	140	63	28	60	8	24	100	12	130	110	160	M8	3.5	215	180	250	15	4	205	215	180	270	385
112M	190	140	70	28	60	8	24	112	12	130	110	160	M8	3.5	215	180	250	14.5	4	230	240	190	300	400
132S	216	140	89	38	80	10	33	132	12	165	130	200	M10	3.5	265	230	300	15	4	270	275	210	345	470
132M	216	178	89	38	80	10	33	132	12	165	130	200	M10	3.5	265	230	300	15	4	270	275	210	345	510
160M	254	210	108	42	110	12	37	160	15	215	180	250	M12	4	300	250	350	19	5	320	330	255	420	615
160L	254	254	108	42	110	12	37	160	15	215	180	250	M12	4	300	250	350	19	5	320	330	255	420	670

OVERALL AND MOUNTING DIMENSIONS FROM 180 TO 355 FRAME SIZE

FRAME SIZE	INSTALLATION SIZE											INSTALLATION B5					OVERALL DIMENSION				
	P	A	B	C	D	E	F	G	H	K	M	N	P	S	T	AB	AC	AD	HD	L	
180M	2-8	279	241	121	48	110	14	42.5	180	15	300	250	350	19	5	355	380	280	455	700	
180L	2-8	279	279	121	48	110	14	42.5	180	15	300	250	350	19	5	355	380	280	455	740	
200L	2-8	318	305	133	55	110	16	49	200	19	350	300	400	19	5	420	400	305	480	770	
225S	4-8	356	286	149	60	140	18	53	225	19	400	350	450	19	5	435	470	335	555	815	
225M	2	356	311	149	55	110	16	49	225	19	400	350	450	19	5	435	470	335	555	840	
	4-8	356	311	149	60	140	18	53	225	19	400	350	450	19	5	435	470	335	555	845	
250M	2	406	349	168	60	140	18	53	250	24	500	450	550	19	5	490	510	370	615	910	
	4-8	406	349	168	65	140	18	58	250	24	500	450	550	19	5	490	510	370	615	910	
280S	2	457	368	190	65	140	18	58	280	24	500	450	550	19	5	550	580	410	680	985	
	4-8	457	368	190	75	140	20	67.5	280	24	500	450	550	19	5	550	580	410	680	985	
280M	2	457	419	190	65	140	18	58	280	24	500	450	550	19	5	550	580	410	680	1035	
	4-8	457	419	190	75	140	20	67.5	280	24	500	450	550	19	5	550	580	410	680	1035	
315S	2	508	406	216	65	140	18	58	315	28	600	550	660	24	6	635	645	530	845	1160	
	4-10	508	406	216	80	170	22	71	315	28	600	550	660	24	6	635	645	530	845	1270	
315M	2	508	457	216	65	140	18	58	315	28	600	550	660	24	6	635	645	530	845	1190	
	4-10	508	457	216	80	170	22	71	315	28	600	550	660	24	6	635	645	530	845	1300	
315L	2	508	508	216	65	140	18	58	315	28	600	550	660	24	6	635	645	530	845	1190	
	4-10	508	508	216	80	170	22	71	315	28	600	550	660	24	6	635	645	530	845	1300	
355M	2	610	560	254	75	140	20	67.5	355	28	740	680	800	24	6	730	710	655	1010	1500	
	4-10	610	560	254	95	170	25	80	355	28	600	550	660	24	6	730	710	655	1010	1530	
355L	2	610	630	254	75	140	20	67.5	355	28	600	550	660	24	6	730	710	655	1010	1500	
	4-10	610	630	254	95	170	25	80	355	28	600	550	660	24	6	730	710	655	1010	1530	

Marine & Offshore

The mechanical and electric basic model of rotor ni® electric motors is harmonised with marine and off-shore application.

In view of the often aggressive "salt" environment, the RN Series can nearly be supplied in full with cast-iron motor houses and motor shields. Rotor produces motors for set-up below and above deck and they can be equipped with a built-on disc brake. The motor windings are based on environmental temperatures of up to 50°C and are equipped with an anti moisture and anti-fungal treatment so that they can resist air humidity or no less than 96%.

These motors meet the varied criteria of the marine classification agencies and are supplied for "essential service" with a purchase certificate.

How can a rotor ni® electric motor be recognised in a marine execution?

All rotor ni marine motors are equipped with stainless steel rating plate that specifies the following.

- The nominal motor data and the rotor ni marine classification statement
- Any additional rating plates with supplementary data

The rating plate specifies the marine classification agency and the environmental temperatures based on which the agency's regulations are based (usually 50°C according to IEC 92-301)

If purchased, the purchase date and the certificate number of the certificate issued by the marine classification agency are specified on the rating plate. This rating plate and a fixed component of the motor will have been certified by the surveyor of the marine classification agency by a stamp.

Only the "marine classification" name logo of the marine classification agency and the production date are specified on the rating plate with regard to non-purchased marine motors. An additional rating plate will not be added.

Motors with a rating plate that do not specify "rotor ni marine classification" are, therefore, not marine motors and even though it is very probable that they would operate perfectly well on-board a vessel or off-shore installation, a factory declaration as a marine motor will never be issued.

A2.1 or 2.2 certificate can. In most cases, be drawn up anyway for marine motors that are not older than 1 year on request and after submitting the required data.

Environmental temperatures for marine motors and maximum temperatures of increase of the winding

Marine classification	Environmental temperatures °C	maximum DT windings % at installations class	
		F	H
IEC 34-1	40	105	135
IEC 92-301	50	90	115
Americana Bureau of shipping	50	95	115
Bureau Veritas	45	100	120
China Classification Society	50	100	120
China Corporation Register	45	95	110
Det Norske Veritas	45	100	120
Germanischer Lloyds	45	100	120
Korean Register of shipping	45	100	120
Lloyd's Register of Shipping	45	95	110
Nippon Kaji Kyokai	45	100	120
RINA	45	100	120
Russian Maritime Register	45	95	110

The temperature increase of the winding is determined by the resistance method.

Specific regulations apply to marine motors with regard to the mechanical model.

Marine

Classification Agencies

Rotor ni® electric motors can be certified in accordance with various classification agencies



Certificates

All rotor nl® motors are checked to ensure their correct operation after their assembly and are subjected to a high-voltage and a zero load test. Additional test procedures are performed at the test field. Multiple motors can be tested here under continuous or intermittent load at the same time. The electric and mechanical properties are determined in this way. This procedure is also necessary for the type inspection of new designs.

Rotor nl® motors can also be supplied with a factory declaration or a test certificate that will specify the test data of the relevant motor as well as other issues at the request of customers. Rotor uses the EN 10204 standard for this and you can select from 4 different certificates (see table 1).

EN 10204-2.1

The declaration of compliance 2.1 (factory declaration) is drawn up based on the motor numbers, invoice number and the order number of the customer. Test results are not included in this document.

EN 10204-2.2

Test report 2.2 (factory check certificate) is drawn up based on the motor data such as has been determined for the prototype (type test) supplemented by our experience figures (historical measurement data). We will also specify the order-linked data on the certificate. Multiple motors can be included on the certificate of one type.

EN 10204-3.1

Measurements are carried out with regard to the motor in a loaded and/or unloaded state for inspection certificate 3.1 (inspection report). This must be clear when the order is placed. This text is also referred to as the "routine test" and provides a reasonable certainty that, if the measurement results are within the accepted limits, the motor data agrees with the type test data. Order-linked data is also specified as is the case for the test report. A certificate is issued for each motor.

Table 1
Electric motor certificates

Standard	
EN 10204-2.1	Declaration of compliance with the order 2.1
En 10201-2.2	Test report 2.2.
EN 10204-3.1	Inspection Certificate 3.1*
EN 10204-3.2	Inspection certificate 3.2

* The customer must specify whether the motor must be tested with a load or without a load.

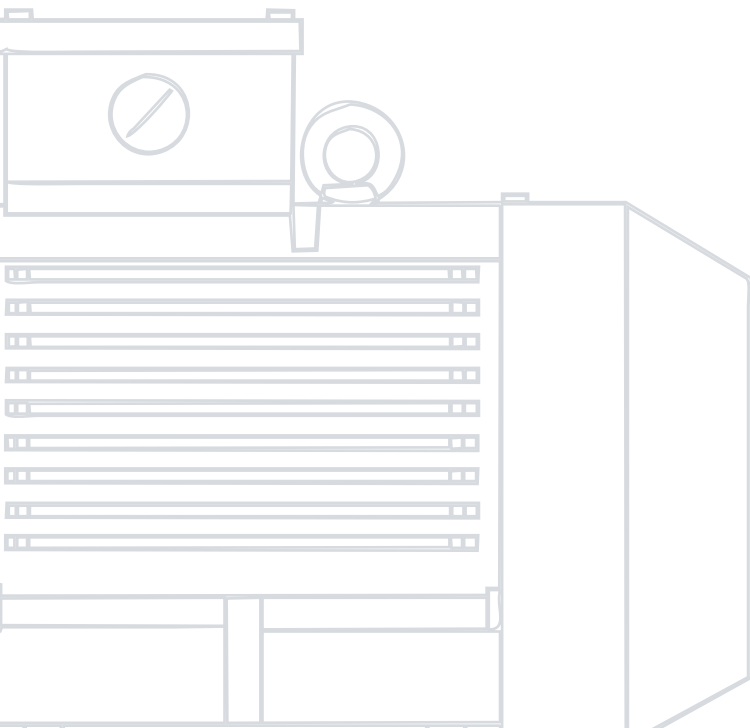
EN 10204-3.2

We have the measurement and/or the motor classified by an independent observer for inspection certificate 3.2 (classified inspection report). This observer (surveyor) can be appointed by ourselves or by the customer. In many cases, this surveyor will survey the motor at our test field. In other cases, the motor is measured by an external body.



Approval certificate type

Rotor is authorised to independently measure and certify motors with a power of up to 300 kW (without the immediate presence of a surveyor) at its own test field. This means that motors for an essential service can be quickly supplied including a certificate. The surveyor had to be physically present whilst measurements were being taken in the past. This is all in the past for a number of classification agencies. Currently, Rotor BV has the approval type of DNV, BV, CSS Lloyd's, ABS, GL and RMRS.

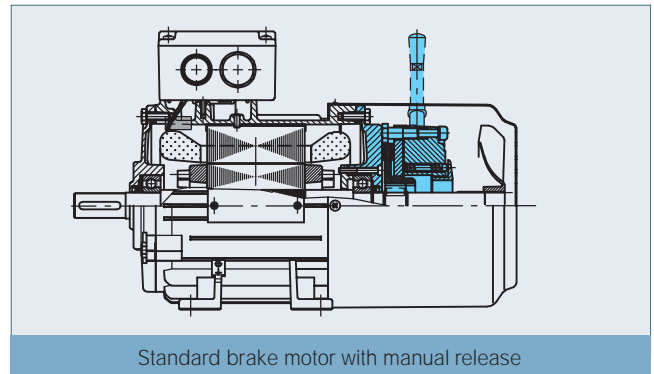


Special Motor and Options:

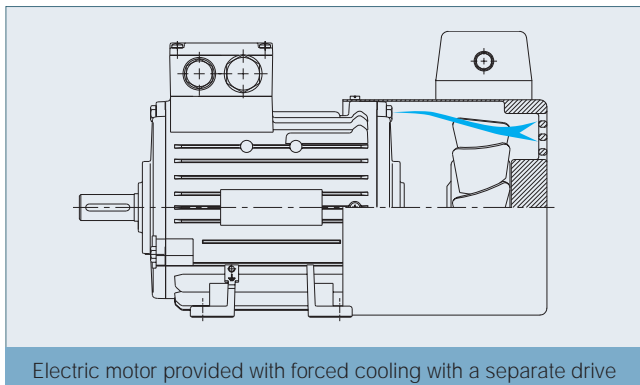
(A) Brake Motor

FRAME	Brake Torque (Nm)	FRAME	Brake Torque (Nm)
63	5	160	150
71	8	180	250
80	10	200	400
90	20	225	500
100	40	250	800
112	60	280	800
132	100	315	1000

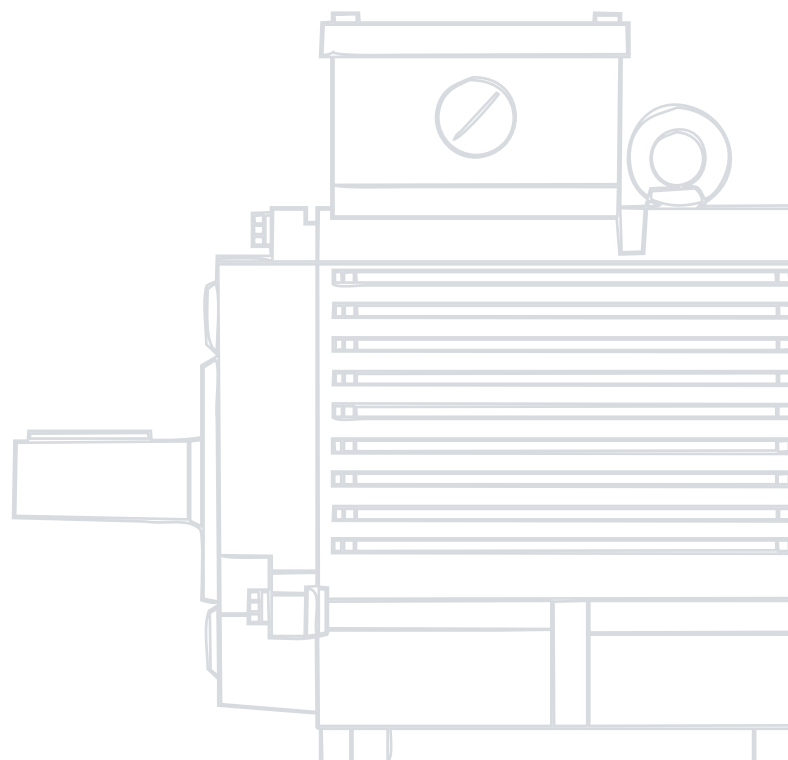
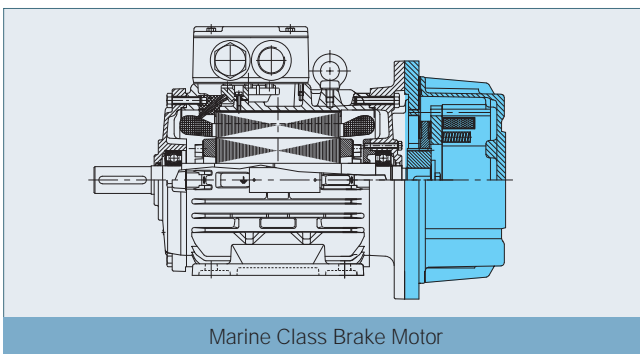
Different brake torques on request.



(B) Motor with Forced Cooling Fan
Supply for Fan Motor : 230V/415V / 3pH / 50Hz



(C) Marine Brake Motor (IP56)



Other Products:



Electric Motor / Ex-d Motor



Frequency Inverter



INVERTEK

**ideas for
motors
and drives**

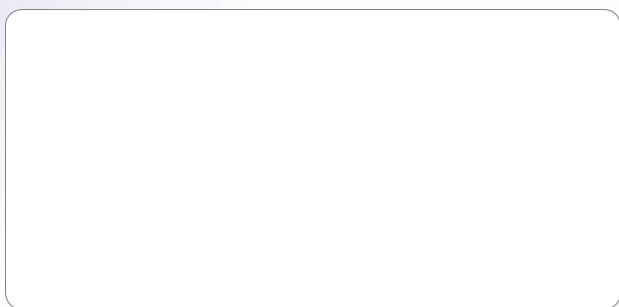


Starter / Control Panel



Soft Starter

Global drive solutions...



Invertek Drives Far East Pte Ltd

1 Bukit Batok Crescent,
WCEGA Plaza #07-01,
Singapore 658064
Tel : +65 6570 0880 Fax : +65 6262 6961
Email : sales@invertek.com.sg
Website : www.invertek.com.sg

Invertek Drives Ltd adopts a policy of continuous improvement and whilst every effort has been made to provide accurate and up to date information, the information contained in this catalogue should be used for guidance purposes only and does not form part of any contract.

All rights reserved. No part of this brochure may be reproduced or transmitted in any form or by any means, electrical or mechanical including photocopying, recording or by any other form of information storage

www.invertek.com.sg

© 2010 Invertek Drives Far East Pte Ltd. All rights reserved.