

Keeps your machinery running!

### Certificates

Lönne motors can be delivered with following certificates according to EN 10204

#### **Type 2.1: Declaration of compliance with the order**

Document in which the manufacturer declares that the products supplied are in compliance with the requirements of the order, without inclusion of test results.

#### **Type 2.2: Test report**

Document in which the manufacturer declares that the products supplied are in compliance with the requirements of the order and in which he supplies test results based on non-specific inspection.

#### **Type 3.1: Inspection certificate**

Document issued by the manufacturer in which he declares that the products supplied are in compliance with the requirements of the order and in which he supplies test results. The test unit and the tests to be carried out are defined by the product specification, the official regulation and corresponding rules and/ or the order.

The document is validated by the manufacturer's authorized inspection representative, independent of the manufacturing department.

#### **Type 3.2: Inspection certificate**

Document prepared by both the manufacturer's authorized inspection representative, independent of the manufacturing department and either the purchaser's authorized inspection representative or the inspector designated by the official regulations and in which they declare that the products supplied are in compliance with the requirements of the order and in which test results are supplied.

The motors will be tested in our own test field in Helsingborg or at an external institute. For classified inspection report will the surveyor be appointed by ourselves or by our clients.

#### **Marine Classifications:**

The most common Marine Classification Bureaus are: Det Norske Veritas, Lloyd's Register of Shipping, ABS, Bureau Veritas, Germanischer Lloyd, China Classification Society, Nippon Kaiji Kyokai.

**Type Approval Certificates for Maritime Sector, please see page 41.**



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The dimensions are in mm.  
Illustrations are not binding.

<b>Index</b>	<b>Page</b>
New Ecodesigns Requirements for Electric Motors	4
Energy saving motors 2 Pole / 4 Pole / 6 Pole /8 Pole	6
Marine Motors 2 Pole / 4 Pole / 6 Pole / 8 Pole	10
2- speed Motors 2/4 Pole 4/6 Pole 4/8 Pole	14
New IE3 Premium Efficiency	17
Dimensions Shafts and Flanges	18
Overaall Dimensions	20
Single phase Motors	24
Mounting Options	26
Spare part illustration	27
Terminal Marking/ Connections	28
Brakes	29
External Cooling Fan Unit	30
Design, Painting Colours, Balance and Vibration Severity	31
Bearing and Lubrication	32
Degree of Protection	33
Insulation System	34
Ambient Temperature and Humidity	35
Motor Protection and Anti Condensation Heaters	36
Technical Information Noise Level	37
Safety and Commissioning for Low Voltage Asynchronous Moto	38
Optimal, Energy Saving Operations by Frequency Inverters	40
Type Approval DNV	41
Flameproof Motors Ex d, Ex de IIB, II	42
General aspects of the Atex Directive	43
Combines type of Protection	45
Supplementary Marking	46
Example of Markings	47
Motors fed by Ferquency Converters	48
EMC REquirements for the Installation	49
Tables EEx d IIB, IP65 2 Pole / 4 Pole / 6 Pole / 8 Pole	50
Dimensions D5 71- 132 IM Series	54
Water Jacket, Three Phase, Squirrel Cage, Induction Motors	63
General Features	64
Technical Features	65
Sound Levels	66
Technical Data Low Voltage	67
Standard Configuration Options	68
Terminal Box Dimensions	69
Important addresses and phone numbers. General info.	71

## New Ecodesign Requirements for Electric Motors

### Implementing Directive 2005/32/ EC of the European Parliament and of the Council

#### New Efficiency Classes

Electric motors are the most important type of electric load in industries within the Community where motors are used in the production process. The systems in which these motors are operated account for about 70% of the electricity consumed by the industry. There is a total potential for cost-effective improvement of the energy efficiency of these motor systems by about 20% to 30%. One of the major factors in such improvements is the use of energy efficient motors. Consequently, motors in electric motor systems represent a priority product for which ecodesign requirements should be established.

Lönne has a long record of successful solutions within drive and motion technology.

Different energy efficiency standard exists worldwide for asynchronous motors. To promote international harmonization, the international standard IEC 60034-30:2008 (Rotating electrical machines- Part 30: Efficiency classes of single speed, three phase, induction motors [IE code]) was created.

This groups low voltage asynchronous motors into new efficiency classes (Valid since October 2008). The Efficiency of IEC 60034-30:2008 are based on losses determined in accordance with IEC 60034-2-2: 2007 standard. This has been valid since November 2007 and will replace the previous standard IEC 60034-2:1996 as of November 2010. The supplementary losses are now measured and no longer added as percentage.

#### The changes become effective on the following dates below:

##### Already valid from 16.06.2011

The legally specified minimum efficiency IE2 for induction motors in S1 duty must be maintained according to the EU regulation.

##### From 01.01.2015

The legally specified minimum efficiency IE3 must be maintained for power ratings **from 7.5 kW** to 375 kW or as alternative, an IE2 motor plus frequency inverter.

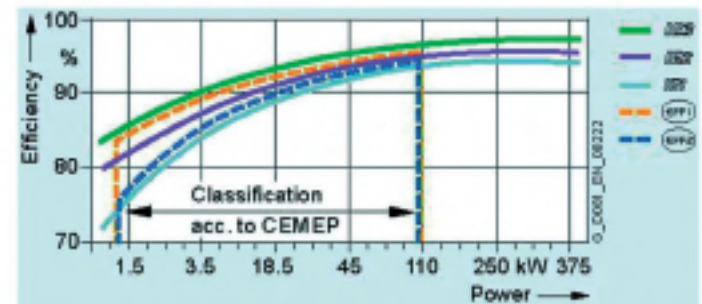
##### From 01.01.2017

The legally specified minimum efficiency IE3 must be maintained for power ratings **from 0.75 kW** to 375 kW or as alternative, an IE2 motor plus frequency inverter.

#### Background information .

The EuP directive (Energy Using Products) is implemented in the national laws of EU member countries. The framework conditions for the European directives have already been agreed. EU Directive 2005/32/ EC (=EuP Directive) is based on IEC 60034-30:2008 with regard to the minimum efficiency values. This directive is implemented in European countries under a form of Energy Using Product Directive.

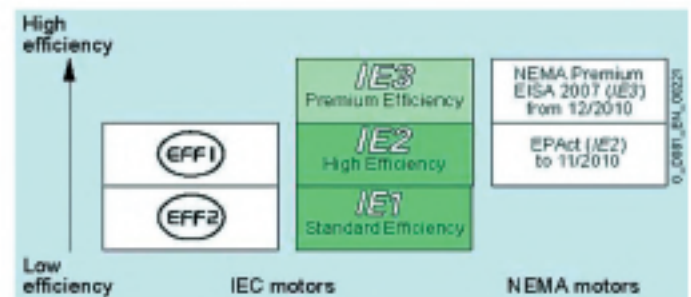
The following table shows examples of the efficiency values according to the new and old losses calculating the methods.



#### New standard classes for efficiency

A new nomenclature applies to the new efficiency classes (IE= International Efficiency):

- IE1 (Standard Efficiency)
- IE2 (High Efficiency)
- IE3 (Premium Efficiency)



**EU Regulations**

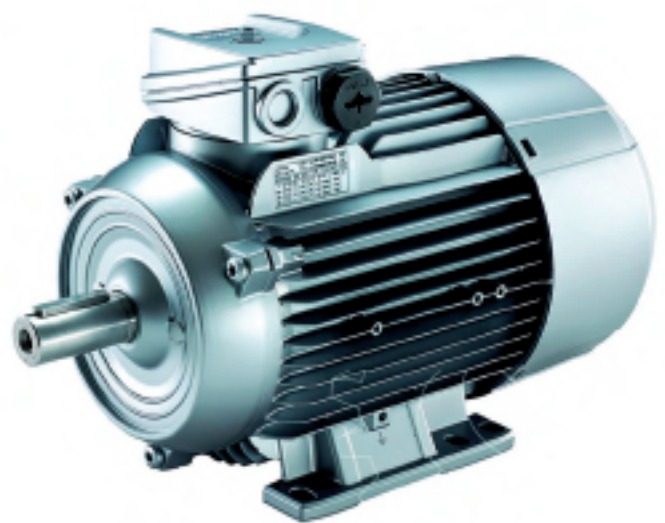
	Old	New
	<b>CEMEP</b> Voluntary EU Agreement	<b>EU Regulation</b> No 640/2009 passed 07/2009 based upon standard IEC 60034-30
Description	Voluntary agreement between the EU Commission and the European Manufacturers Association CEMEP.	The EU Regulation does apply to all EU countries. IEC 60034-2-1: 2007 is the basis for determining the losses and therefore the efficiency.
Number of poles	2, 4	2, 4, 6
Power range	1,1 – 90 kW	0,75 – 375 kW
Level	EFF3 - Standard EFF2 - Improved efficiency EFF1 - High efficiency	IE1 - Standard Efficiency IE2 - High Efficiency IE3 - Premium Efficiency
Voltage	400 V, 50 Hz	1000 V, 50/60 Hz
Degree of protection	IP5X	all
Motors with brake	no	no
Geared motors	no	yes
Ex motors	no	EU Regulation – NO in the sense of Directive 94/9/EC
Validity	Voluntary agreement; is withdrawn with the implementation of domestic legislation.	Standard IEC 60034-30, valid since October 2008; EU Regulation is becoming effective on 16.06.2011. This means that manufacturers may no longer market IE1 motors in the European Economic Area.

**Exceptions in the EU Regulation**

- Motors that have been designed so that they can be operated completely submerged in a liquid;
- Motors that are completely integrated into a product (e.g. a gear unit, a pump, a fan or a compressor) where the motor efficiency cannot be determined independently from this product;
- Motors that have been specifically designed for operation under the following conditions:
  - at altitudes greater than 1000 meters above sea level;
  - at ambient temperatures above 40 °C;
  - at max. operating temperatures above 400 °C;
  - at ambient temperatures below -15 °C (any motor)
  - at cooling liquid temperatures at the product intake of below 5 °C or above 25 °C;
  - in hazardous zones in the sense of Directive 94/9/EC of the European Parliament and Council;
- Brake motors

**The following motors are not involved**

- 8-pole motors
- Pole-changing motors
- Synchronous motors
- Motors for intermittent duty S2 ... S9
- Motors that have been specifically developed for inverter operation



**Energy- saving motors with "high efficiency" IE2 according to IEC 60034-30**

Technical data for standard execution, S1- duty, IP55, 2- Pole Motors

2-Pole Motors												
Type	Output		RPM		Torque	Amp.		Eff.	Efficiency η [%]			Kg
	kW	kW	50Hz	60Hz	Nm	50Hz	60Hz	class.	100%load	75% Load	cos ph φ	IM 1001
	50Hz	60Hz	400V	460V	50Hz	400V	460V	50Hz	50Hz	50Hz	50Hz	
9AA 80M02	0,75	0,86	2870	3444	3	1,71	1,71	IE2	77,4	77,4	0,82	9,8
9AA 80M02	1,1	1,3	2880	3432	4	2,25	2,25	IE2	79,6	79,6	0,89	12,3
9AA 90S02	1,5	1,75	2890	3468	5	3,05	3,05	IE2	81,3	81,3	0,87	15
9AA 90L02	2,2	2,55	2890	3468	7	4,4	4,4	IE2	83,2	83,2	0,87	18,6
1T29 C 100L-2	3	3,45	2905	3486	10	6,1	6,1	IE2	84,6	85,2	0,84	32
1T29 A 100L-2	3	3,45	2905	3486	10	6,1	6,1	IE2	84,6	85,2	0,84	21
1T29 C 100L-2 a)	4	4,6	2905	3488	13	7,8	7,8	IE2	85,8	87,2	0,86	45
1T29 A 100L-2 a)	4	4,6	2905	3486	13	7,8	7,8	IE2	85,8	86,3	0,86	26
1T29 C 112M-2	4	4,6	2950	3540	13	7,8	7,8	IE2	85,8	86,7	0,86	39
1T29 A 112M-2	4	4,6	2950	3540	13	7,8	7,8	IE2	85,8	86	0,86	27
1T29 C 112M-2 a)	5,5	6,3	2950	3540	18	10,3	10,3	IE2	87	87,2	0,89	53
1T29 A 112M-2 a)	5,5	6,3	2950	3540	18	10,3	10,3	IE2	87	87,5	0,89	34
1T29 C 132S-2	5,5	6,3	2950	3540	18	10,5	10,5	IE2	87	88	0,87	57
1T29 A 132S-2	5,5	6,3	2950	3540	18	10,4	10,4	IE2	87	87,5	0,87	39
1T29 C 132S-2	7,5	8,7	2950	3540	24	14,1	14,1	IE2	88,1	88,7	0,87	61
1T29 A 132S-2	7,5	8,6	2950	3540	24	14,1	14,1	IE2	88,1	88,7	0,87	43
1T29 C 132M-2 a)	11	12,6	2950	3540	36	20	20	IE2	89,4	90,2	0,89	80
1T29 A 132M-2 a)	11	12,6	2955	3546	36	20	20	IE2	89,4	90,2	0,89	57
1T29 C 160M-2	11	12,6	2955	3546	36	20,5	20,5	IE2	89,4	90	0,87	96
1T29 A 160M-2	11	12,6	2955	3546	36	20,5	20,5	IE2	89,4	89,5	0,87	67
1T29 C 160M-2	15	17,3	2948	3538	48	27	27	IE2	90,3	90,9	0,88	104
1T29 A 160M-2	15	17,3	2945	3534	48	27	27	IE2	90,3	90,9	0,88	75
1T29 C 160L-2	18,5	21,3	2955	3546	60	33,5	33,5	IE2	90,9	91,2	0,88	113
1T29 A 160L-2	18,5	21,3	2955	3546	60	33,5	33,5	IE2	90,9	91,2	0,88	84
1T29 C 160L-2 a)	22	25,3	2955	3546	71	39	39	IE2	91,3	91,7	0,89	128
1T29 A 160L-2 a)	22	25,3	2955	3546	71	39	39	IE2	91,3	91,7	0,89	94
16BG 183-2MA	22	24,5	2955	3555	71	39,5	38,5	IE2	91,3	92	0,88	170
16BG 206-2MA	30	33,5	2960	3560	97	53,5	52	IE2	92	92,1	0,88	220
16BG 207-2MA	37	41,5	2960	3560	119	65	63	IE2	92,5	92,7	0,89	250
16BG 208-2MA a)	45	51	2960	3560	145	79	78	IE2	92,9	92,3	0,89	300
16BG 223-2MA	45	51	2965	3565	145	79	78	IE2	92,9	92,9	0,88	300
16BG 228-2MA a)	55	62	2965	3565	177	96	94	IE2	93,2	93,3	0,89	390
16BG 253-2MB	55	62	2970	3570	177	96	94	IE2	93,2	93,3	0,89	380
16BG 258-2MB a)	75	84	2975	3575	241	133	128	IE2	93,8	94	0,89	470
16BG 280-2MB	75	84	2978	3578	241	133	128	IE2	93,8	93,5	0,87	500
16BG 283-2MB	90	101	2975	3575	289	157	151	IE2	94,1	94	0,88	570
16BG 288-2MB a)	110	123	2978	3578	352	187	184	IE2	94,3	94,6	0,9	660
16BG 310-2MB	110	123	2982	3582	352	187	184	IE2	94,3	94,2	0,9	750
16BG 313-2MB	132	148	2982	3582	423	220	215	IE2	94,6	94,5	0,91	915
16BG 316-2MB	160	184	2982	3580	512	265	260	IE2	94,8	94,9	0,92	960
16BG 317-2MB	200	224	2982	3580	640	330	320	IE2	95	95,2	0,92	1200
16BG 318-2MB	250	280	2986	3585	800	415	400	IE2	95	94,9	0,91	1280
16BG 312-2MA	315	353	2986	3586	1007	540	515	IE2	95	94,7	0,89	1355

Additional data for 60Hz on request. Other Sizes and Voltages on request.  
1T29 A = Aluminium 1T29 C = Cast Iron.

**a) Increased rated output.**

Please note that the data for the efficiency grades are according to the EU nomenclatures .  
On request, we can provide you with real measured value.

$$\text{Formula for current with new voltage: } I'n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$$

**Energy- saving motors with "high efficiency" IE2 according to IEC 60034-30**

Technical data for standard execution, S1- duty, IP55, 4- Pole Motors

4- pole motors												
Type	Output		RPM		Torque	Amp.		Eff.	Efficiency η [%]			Kg
	kW	kW	50Hz	60Hz	Nm	50Hz	60Hz	class.	100%load	75% Load	cos ph φ	IM 1001
	50Hz	60Hz	400V	460V	50Hz	400V	460V	50Hz	50Hz	50Hz	50Hz	
9AA 80M04	0,75	0,86	1440	1728	5	1,81	1,8	IE2	79,6	79,6	0,75	12,3
9AA 90S04	1,1	1,3	1440	1728	7	2,55	2,55	IE2	81,4	81,4	0,77	15
9AA 90L04	1,5	1,75	1440	1728	10	3,4	3,4	IE2	82,8	82,8	0,77	18
1T28 C 100L-4	2,2	2,55	1455	1746	14	4,65	4,65	IE2	84,3	85,1	0,81	32
1T29 A 100L-4	2,2	2,55	1455	1746	14	4,65	4,65	IE2	84,3	85,1	0,81	21
1T29 C 100L-4	3	3,45	1455	1746	20	6,2	6,2	IE2	85,5	86,7	0,82	37
1T29 A 100L-4	3	3,45	1455	1746	20	6,2	6,2	IE2	85,5	86,7	0,82	25
1T29 C 100L-4 a)	4	4,6	1460	1752	26	8,3	8,3	IE2	86,6	87,4	0,8	46
1T29 A 100L-4 a)	4	4,6	1460	1752	26	8,3	8,3	IE2	86,6	87,4	0,8	30
1T29 C 112M-4	4	4,6	1460	1752	26	8,2	8,2	IE2	86,6	87,3	0,81	46
1T29 A 112M-4	4	4,6	1460	1752	26	8,2	8,2	IE2	86,6	87,3	0,81	29
1T29 C 112M-4 a)	5,5	6,3	1460	1752	36	11,2	11,2	IE2	87,7	88,1	0,81	58
1T29 A 112M-4 a)	5,5	6,3	1460	1752	36	11,2	11,2	IE2	87,7	88,1	0,81	34
1T29 C 132S-4	5,5	6,3	1465	1758	36	11,3	11,3	IE2	87,7	89	0,8	61
1T29 A 132S-4	5,5	6,3	1465	1758	36	11,3	11,3	IE2	87,7	87,9	0,8	42
1T29 C 132M-4	7,5	8,6	1465	1758	49	14,7	14,7	IE2	88,7	90,3	0,83	75
1T29 A 132M-4	7,5	8,6	1465	1758	49	14,7	14,7	IE2	88,7	90,3	0,83	49
1T29 C 132M-4 a)	11	12,6	1465	1758	72	21	21	IE2	89,8	90,6	0,84	80
1T29 A 132M-4 a)	11	12,6	1465	1758	72	21	21	IE2	89,8	90,6	0,84	64
1T29 C 160M-4	11	12,6	1470	1764	71	21	21	IE2	89,8	90,9	0,85	96
1T29 A 160M-4	11	12,6	1470	1764	71	21	21	IE2	89,8	90,9	0,85	71
1T29 C 160L-4	15	17,3	1475	1770	97	28	28	IE2	90,6	91,3	0,85	104
1T29 A 160L-4	15	17,3	1475	1770	97	28	28	IE2	90,6	91,3	0,85	83
1T29 C 160L-4 a)	18,5	21,3	1475	1770	120	34,5	34,5	IE2	91,2	91,7	0,85	118
1T29 A 160L-4 a)	18,5	21,3	1475	1770	120	34,5	34,5	IE2	91,2	91,7	0,85	100
16BG 183-4-MA	18,5	21,3	1470	1770	120	35,5	35	IE2	91,2	91,5	0,83	160
16BG 186-4MA	22	25,3	1465	1770	143	41,5	41	IE2	91,6	92	0,84	185
16BG 207-4MA	30	34,5	1475	1770	195	55	55	IE2	92,3	92,8	0,85	225
16BG 220-4MA	37	42,5	1470	1770	240	66	65,5	IE2	92,7	93,6	0,87	285
16BG 223-4MA	45	52	1475	1775	291	80	80	IE2	93,1	93,6	0,87	315
16BG 228-4MA a)	55	63	1480	1780	355	100	99	IE2	93,1	93,9	0,86	355
16BG 253-4MA	55	63	1480	1780	355	100	99	IE2	93,5	93,7	0,85	390
16BG 258-4MA a)	75	86	1485	1785	482	132	130	IE2	94	94,3	0,87	495
16BG 280-4MB	75	86	1485	1785	482	132	130	IE2	94	94,3	0,87	560
16BG 283-4MB	90	104	1486	1785	578	159	158	IE2	94,2	94,6	0,87	640
16BG 288-4MB a)	110	127	1486	1785	705	195	195	IE2	94,5	94,6	0,86	710
16BG 310-4MB	110	127	1490	1788	705	195	195	IE2	94,5	94,6	0,86	750
16BG 313-4MB	132	152	1488	1786	847	230	231	IE2	94,7	94,9	0,87	870
16BG 316-4MB	160	184	1488	1786	1027	280	275	IE2	94,9	95,2	0,87	950
16BG 317-4MB	200	230	1490	1788	1282	350	348	IE2	95,1	95,3	0,87	1120
16BG 318-4MA	250	288	1488	1788	1605	435	430	IE2	95,1	95,2	0,87	1290
16BG 312-4MA	315	362	1488	1788	2022	560	550	IE2	95,1	94,9	0,86	1500

Additional data for 60Hz on request. Other Sizes and Voltages on request.  
1T29 A = Aluminium og 1T29 C = Cast Iron.

**a) Increased rated output.**

Please note that the data for the efficiency grades are according to the EU nomenclatures .  
On request, we can provide you with real measured value.

Formula for current with new voltage:  $I_n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$

**Energy- saving motors with "high efficiency" IE2 according to IEC 60034-30**

Technical data for standard execution, S1- duty, IP55, 6- Pole Motors

6-Pole Motors												
Type	Output		RPM		Torque	Amp.		Eff.	Efficiency η [%]		cos φ	Kg
	kW	kW	50Hz	60Hz	Nm	50Hz	60Hz	class.	100%load	75% Load	50Hz	
			400V	460V		50Hz	400V		460V	50Hz		
9AA 90S08	0,75	0,96	925	1110	8	1,98	1,98	IE2	75,9	75,9	0,72	15,7
9AA 90L08	1,1	1,3	940	1128	11	2,9	2,9	IE2	78,1	78,1	0,7	19
1TZ9 C 100L-6	1,5	1,75	970	1164	15	3,7	3,7	IE2	79,8	80,2	0,73	36
1TZ9 A 100L-6	1,5	1,75	970	1164	15	3,7	3,7	IE2	79,8	80,2	0,73	25
1TZ9 C 100L-6 a)	2,2	2,55	965	1158	22	5,1	5,1	IE2	81,8	82,5	0,76	49
1TZ9 A 100L-6 a)	2,2	2,55	965	1158	22	5,1	5,1	IE2	81,8	82,5	0,76	30
1TZ9 C 112M-6	2,2	2,55	965	1158	22	5,2	5,2	IE2	81,8	82,5	0,74	56
1TZ9 A 112M-6	2,2	2,55	965	1158	22	5,2	5,2	IE2	81,8	82,5	0,75	29
1TZ9 C 112M-6 a)	3	3,45	960	1152	30	6,6	6,6	IE2	83,3	84,1	0,79	53
1TZ9 A 112M-6 a)	3	3,45	960	1152	30	6,6	6,6	IE2	83,3	84,1	0,79	34
1TZ9 C 132S-6	3	3,45	970	1164	30	7	7	IE2	83,3	84	0,74	56
1TZ9 A 132S-6	3	3,45	970	1164	30	7	7	IE2	83,3	84	0,74	38
1TZ9 C 132M-6	4	4,6	970	1164	39	8,7	8,7	IE2	84,6	85,8	0,78	81
1TZ9 A 132M-6	4	4,6	970	1164	39	8,7	8,7	IE2	84,6	85,8	0,78	43
1TZ9 C 132M-6	5,5	6,3	970	1164	54	12	12	IE2	86	87,4	0,77	70
1TZ9 A 132M-6	5,5	6,3	970	1164	54	12	12	IE2	86	87,4	0,77	52
1TZ9 C 132M-6 a)	7,5	8,6	970	1164	74	16,1	16,1	IE2	87,2	87,8	0,77	87
1TZ9 A 132M-6 a)	7,5	8,6	970	1164	74	16,1	16,1	IE2	87,2	87,2	0,77	64
1TZ9 C 160M-6	7,5	8,6	975	1170	73	16,1	16,1	IE2	87,2	87,7	0,77	108
1TZ9 A 160M-6	7,5	8,6	975	1170	73	16,1	16,1	IE2	87,2	87,7	0,77	77
1TZ9 C 160L-6	11	12,6	975	1170	108	22,5	22,5	IE2	88,7	89,5	0,8	122
1TZ9 A 160L-6	11	12,6	975	1170	108	22,5	22,5	IE2	88,7	89,5	0,8	93
1TZ9 C160L-6 a)	15	17,3	975	1170	147	30	30	IE2	89,7	90,6	0,81	147
1TZ9 A 160L-6 a)	15	17,3	975	1170	147	30	30	IE2	89,7	90,6	0,81	115
16BG 186-6AA	15	18	975	1170	147	30	30	IE2	89,7	90,5	0,81	175
16BG 206-6AA	18,5	22	978	1174	181	36,5	36,5	IE2	90,4	91	0,81	210
16BG 207-6AA	22	26,5	978	1174	215	42,5	42,5	IE2	90,9	91,5	0,82	240
16BG 223-6AA	30	36	980	1176	292	57	57	IE2	91,7	92,2	0,83	325
16BG 228-6AA a)	37	44,5	980	1176	359	70	70	IE2	92,2	93,1	0,84	355
16BG 253-6AA	37	44,5	980	1176	359	70	70	IE2	92,2	92,6	0,83	405
16BG 258-6AA a)	45	54	985	1182	435	82	82	IE2	92,7	92,9	0,83	355
16BG 280-6AA	45	54	985	1182	435	82	82	IE2	92,7	92,9	0,85	420
16BG 283-6AA	55	66	988	1186	532	100	100	IE2	93,1	93,3	0,85	570
16BG 288-6AA a)	75	90	988	1186	723	139	139	IE2	93,7	93,7	0,83	615
16BG 310-6AB	75	90	990	1188	723	139	139	IE2	93,7	93,7	0,83	760
16BG 313-6AB	90	108	990	1188	868	163	163	IE2	94	94,1	0,85	935
16BG 316-6AB	110	132	990	1188	1061	198	198	IE2	94,3	94,4	0,85	1010
16BG 317-6AB	132	158	990	1188	1273	235	235	IE2	94,6	94,6	0,85	1180
16BG 318-6AB	160	192	990	1188	1543	285	285	IE2	94,8	94,9	0,86	1245
16BG 312-6MA	200	240	990	1190	1929	365	365	IE2	95	95,15	0,83	1395

Additional data for 60Hz on request.  
Other Sizes and Voltages on request.  
1TZ9 A = Aluminium og 1TZ9 C = Cast Iron.

**a) Increased rated output.**

Please note that the data for the efficiency grades are according to the EU nomenclatures .  
On request, we can provide youwith real measured value.

Formula for current with new voltage:  $I_n(\text{new}) = I_n(\text{with } 400V) \cdot \frac{400}{U(\text{new voltage})}$



**Energy- saving motors with "high efficiency "**

Technical data for standard execution, S1- duty, IP55, 8- Pole Motors

8- pole Motors												
Type	Output		RPM		Torque	Amp.		Eff.	Efficiency η [%]			Kg
	kW	kW	50Hz	60Hz	Nm	50Hz	60Hz	class.	100%load	75% Load	cos ph φ	IM 1001
	50Hz	60Hz	400V	460V	50Hz	400V	460V	50Hz	50Hz	50Hz	50Hz	
1TZ9 C 100L-8	0,75	0,86	725	870	10	2,8	2,8		68,3	65,8	0,58	32
1TZ9 A 100L-8	0,75	0,86	725	870	10	2,8	2,8		68,3	65,8	0,58	21
1TZ9 C 100L-8	1,1	1,3	725	870	14	4	4		68,3	65,4	0,58	36
1TZ9 A 100L-8	1,1	1,3	725	870	14	4	4		68,3	65,4	0,58	25
1TZ9 C 112M-8	1,5	1,75	720	864	20	4,25	4,25		75,8	76	0,67	51
1TZ9 A 112M-8	1,5	1,75	720	864	20	4,2	4,2		75,8	76	0,67	29
1TZ9 C 132S-8	2,2	2,55	725	870	29	6,2	6,2		78,8	79,3	0,65	59
1TZ9 A 132S-8	2,2	2,55	725	870	29	6,2	6,2		78,8	79,3	0,65	41
1TZ9 C 132M-8	3	3,45	730	876	39	8,1	8,1		82,7	83	0,65	67
1TZ9 A 132M-8	3	3,45	730	876	39	8,1	8,1		82,7	83	0,65	49
1TZ9 C 160M-8	4	4,6	730	876	52	9,7	9,7		86,2	86,9	0,69	98
1TZ9 A 160M-8	4	4,6	730	876	52	9,7	9,7		86,2	86,9	0,69	69
1TZ9 C 160M-8	5,5	6,3	735	882	72	13,3	13,3		86,7	87,5	0,69	111
1TZ9 A 160M-8	5,5	6,3	735	882	72	13,3	13,3		86,7	87,5	0,69	82
1TZ9 C 160L-8	7,5	8,6	730	876	96	17,3	17,3		86,9	88,2	0,72	123
1TZ9 A 160L-8	7,5	8,6	730	876	96	17,3	17,3		86,9	88,2	0,72	94
16BG 166-8-AB	11	13,2	725	870	145	23,5	23,5		88,7	89,6	0,76	165
16BG 207-8AB	15	18	725	870	198	30,5	30,5		89,3	89,6	0,8	235
16BG 220-8AB	18,5	22	730	876	245	36	36		91,1	91,8	0,81	295
16BG 223-8AB	22	26,5	730	876	288	43	43		91,6	92,1	0,81	335
16BG 253-8AB	30	36	735	882	390	57	57		92,8	93,3	0,82	435
16BG 280-8AB	37	44,5	738	886	479	66	71		93,1	93,3	0,81	510
16BG 283-8AB	45	54	738	886	582	102	87		93,7	94	0,81	560
16BG 310-8AB	55	66	740	888	710	138	102		94,3	94,4	0,82	750
16BG 313-8AB	75	90	740	888	968	164	138		94,5	94,7	0,83	840
16BG 316-8AB	90	108	740	888	1161	160	164		94,7	95,1	0,84	1005
16BG 317-8AB	110	132	740	888	1420	193	200		94,8	95,1	0,84	1100
16BG 318-8AB	132	158	740	888	1704	230	240		94,9	95,2	0,84	1270
16BG 312-8MB	160	192	738	886	2070	300	315		94,6	95,1	0,81	1380

Additional data for 60Hz on request.  
Other Sizes and Voltages on request.  
1TZ9 A = Aluminium og 1TZ9 C = Cast Iron.

**a) Increased rated output.**

Please note that the data for the efficiency grades are according to the EU nomenclatures .  
On request, we can provide youwith real measured value.

Formula for current with new voltage:  $I_n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$

**Technical data for Marine Motors**

**2- pole Motors (Ambient temperature -20°C - 45°C) S1 Duty, IP 55**

Type	Output		RPM		Amp		Eff							
	kW 50Hz	kW 60Hz	50Hz	60Hz	50Hz 400V	60Hz 440-480V		n[%]	cos φ	Ist. In	Mst. Mn	Mmax Mn	Kg IM 1001	inertia (kgm2)
7AA63M02K	0,18	0,21	2820	3420	0,51	0,5		63	0,82	3,7	2	2,2	3,5	0,000
7AA63M02	0,25	0,29	2830	3420	0,68	0,67		65	0,82	4	2	2,2	4,1	0,000
7AA63M02V a)	0,45	0,52	2720	3320	1,09	1,02		67	0,88	4,2	2	2,2	5,2	0,000
7AA71M02K	0,37	0,43	2740	3340	1	0,98		66	0,82	3,5	2,3	2,3	5	0,000
7AA71M02	0,55	0,63	2800	3400	1,36	1,32		71	0,82	4,3	2,5	2,6	6,6	0,000
7AA71M02V a)	0,94	1,08	2735	3290	2,3	2,2		73	0,82	4,7	3,1	2,6	7	0,001
7AA80M02K	0,75	0,86	2855	3455	1,73	1,68		73	0,86	5,6	2,3	2,4	8,2	0,001
7AA80M02	1,1	1,3	2845	3435	2,4	2,4		77	0,87	6,1	2,6	2,7	9,9	0,001
7AA80M02V a)	1,75	2	2840	3440	4	4		75	0,84	6,1	2,6	2,3	13	0,001
7AA90S02	1,5	1,75	2840	3460	3,25	3,2		78	0,85	5,5	2,4	2,7	12	0,002
7AA90S02V a)	2,9	3,35	2825	3425	6,3	6,3		81	0,83	6,6	3,4	3,7	16	0,002
7AA90L02	2,2	2,55	2880	3480	4,55	4,5		81	0,85	6,3	2,8	3,1	15	0,002
7AA90L02V a)	3,8	4,3	2810	3440	7,9	7,4		82	0,85	6	3,1	3,2	20	0,002
7AA100L02	3	3,45	2890	3490	6,1	5,9		84	0,85	6,8	2,8	3	21	0,004
7BA100L02	3	3,45	2890	3490	6,1	5,9		84	0,85	6,8	2,8	3	28	0,004
7AA100L02V a)	4,6	5,3	2880	3475	9,9	9,5		85	0,79	7,8	3,8	4,5	27	0,005
7BA100L02V a)	4,6	5,3	2880	3470	9,8	9,4		85	0,81	7,8	3,8	4,5	35	0,005
7AA112M02	4	4,6	2905	3505	7,8	7,6		86	0,86	7,2	2,6	2,9	29	0,006
7BA112M02	4	4,6	2905	3505	7,8	7,6		85	0,87	7,2	2,6	2,9	39	0,006
7AA112M02V a)	5,5	6,3	2900	3495	10,7	10,5		86	0,87	7,5	2,6	3,4	37	0,008
7BA112M02V a)	5,5	6,3	2900	3500	10,7	10,5		86	0,87	7,5	2,6	3,4	37	0,008
7AA132S02K	5,5	6,3	2925	3525	10,3	10,1		86,5	0,89	5,5	2	2,8	40	0,016
7BA132S02K	5,5	6,3	2895	3525	10,3	10,1		86	0,9	6,1	1,8	3,2	51	0,016
7AA132S02	7,5	8,6	2930	3530	13,8	13,5		87	0,89	6,3	2,3	3	48	0,021
7BA132S02	7,5	8,6	2930	3530	13,8	13,5		86,5	0,9	6,9	2,4	3,4	58	0,021
7AA132M02V a)	11	12,6	2905	3505	21,7	21		86	0,85	7,5	2,6	3,6	58	0,026
7BA132M02V a)	11	12,6	2900	3500	20,6	19,7		85	0,91	7,5	2,6	3,6	71	0,026
7AA160M02K	11	12,6	2940	3540	20	19,8		88	0,88	6	1,9	2,8	68	0,034
7BA160M02K	11	12,6	2940	3540	20,4	19,8		87	0,88	5,8	1,8	2,6	91	0,034
7AA160M02	15	17,3	2930	3530	26,5	26,5		88,5	0,9	6,4	2,2	3	76	0,04
7BA160M02	15	17,3	2940	3530	26,5	26,5		88,5	0,9	6,4	2,1	3	100	0,04
7AA160L02	18,5	21,3	2940	3540	32,5	32		90	0,91	7,1	2,6	3,4	87	0,052
7BA160L02	18,5	21,3	2940	3540	32,5	32		89	0,91	6,9	2,4	3,4	115	0,052
7AA160L02V a)	24,5	28	2920	3515	45,5	44		89	0,87	7,5	2,6	3,4	120	0,06
14BG183-2AA b)	22	24,5	2945	3535	40,5	40,5		91,6	0,86	6,4	2,5	3,4	145	0,068
14BG188-2AA a) b)	30	33,5	2950	3540	54	54		92,8	0,86	7,1	2,4	3,4	175	0,086
14BG206-2AA b)	30	33,5	2950	3540	54	54		91,8	0,88	6,5	2,3	3	205	0,129
14BG207-2AA b)	37	41,5	2955	3545	65	65		92,9	0,89	7,2	2,5	3,3	225	0,153
14BG208-2AA a) b)	45	51	2955	3545	78	78		93,6	0,89	6,9	2,5	3,2	255	0,182
14BG223-2AA b)	45	51	2960	3550	79	79		93,6	0,88	6,7	2,4	3,1	285	0,217
14BG228-2AA a) b)	55	62	2960	3550	94	94		94,8	0,89	7,3	2,6	3,2	335	0,266
14BG253-2AB b)	55	62	2970	3565	96	96		93,6	0,88	6,7	2,1	3,1	375	0,403
14BG258-2AA a) b)	75	84	2970	3565	130	130		94,5	0,88	7,1	2,4	3,1	420	0,483
14BG280-2AB	75	84	2975	3570	130	130		94,5	0,88	7,5	2,5	3,1	500	0,751
14BG283-2AB b)	90	101	2975	3570	154	154		95,1	0,89	7,2	2,6	3,1	540	0,832
14BG288-2AB a) b)	110	123	2975	3570	184	184		95,5	0,9	7	2,5	3	630	1
14BG310-2AB	110	123	2982	3580	190	190		94,6	0,88	7,2	2,4	3,1	720	1,19
14BG313-2AB b)	132	148	2982	3580	225	225		95,1	0,9	6,9	2,4	3	775	1,39
14BG316-2AB	160	180	2982	3580	265	265		95,5	0,91	7	2,4	3	900	1,62
14BG317-2AB	200	224	2982	3580	325	325		95,9	0,92	6,7	2,3	2,9	1015	2,09
14BG318-2AB a)	250	280	2982	3580	410	410		96	0,92	6,7	2,4	2,8	1230	2,46
14BG319-2AA a)	315	353	2988	3585	530	530		96,4	0,89	9,2	3,4	3,8	1355	2,78
B5C355LC-2	355	426	2980	3576	591	657		96,4	0,9	7,2	2,1	2,2	2030	5,2
B5C355LD-2	400	480	2980	3576	666	608		96,5	0,9	7,2	2,1	2,1	2180	5,9
B5C355LE-2	450	510	2980	3576	749	814		96,5	0,9	7,2	2,2	2,2	2310	6,5
B5C400LA-2	500	600	2981	3577	840	759		96,7	0,89	6,3	1,8	2	2680	8,2
B5C400LB-2	560	672	2981	3577	929	1010		96,8	0,9	6,8	1,7	2	2850	9,1
B5C400LC-2	630	708	2981	3577	1043	952		97	0,9	7,8	2	2,2	3030	10

a) Increased rated output.

b) Two parallel terminals per phase are required for mains feed 230V.

NOT INVOLVED IN EU REGULATIONS 640/2009 AND IEC 60034-30

Formula for current with new voltage:  $I'n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$

**Technical data for Marine Motors**

**4- pole Motors (Ambient temperature -20°C - 45°C) S1 Duty, IP 55**

Type	Output		RPM		Amp		Eff							
	kW 50Hz	kW 60Hz	50Hz	60Hz	50Hz 400V	60Hz 440-480V		n[%]	cos φ	Ist. In	Mst. Mn	Mmax Mn	Kg IM 1001	Inertia (kgm2)
7AA63M04K	0,12	0,14	1350	1650	0,42	0,41		55	0,75	2,8	1,9	2	3,5	0,000
7AA63M04	0,18	0,21	1350	1650	0,56	0,57		60	0,77	3	1,9	1,9	4,1	0,000
7AA63M04V a)	0,29	0,33	1330	1640	0,95	1		61	0,71	2,9	2,5	2,2	4,5	0,000
7AA71M04K	0,25	0,29	1350	1650	0,77	0,75		60	0,78	3	1,9	1,9	4,8	0,001
7AA71M04	0,37	0,43	1370	1670	1,05	1,04		65	0,78	3,3	1,9	2,1	6	0,001
7AA71M04V a)	0,6	0,69	1350	1655	1,6	1,5		70	0,79	4,1	2,4	2,1	7,4	0,001
7AA80M04K	0,55	0,63	1395	1695	1,45	1,41		67	0,81	3,9	2,2	2,2	8	0,002
7AA80M04	0,75	0,86	1395	1695	1,86	1,8		72	0,81	4,2	2,3	2,3	9,4	0,002
7AA80M04V a)	1,25	1,45	1340	1640	3,1	3,1		71	0,82	4,7	2,8	2,9	12	0,003
7AA90S04	1,1	1,3	1415	1715	2,55	2,55		77	0,81	4,6	2,3	2,4	12	0,003
7AA90L04	1,5	1,75	1420	1720	3,4	3,3		79	0,81	5,3	2,4	2,6	15	0,004
7AA90L04V	2,5	2,9	1380	1680	5,9	5,9		76	0,81	4,5	2,8	2,6	20	0,004
7AA100L04K	2,2	2,55	1420	1720	4,7	4,6		82	0,82	5,6	2,5	2,8	25	0,005
7BA100L04K	2,2	2,55	1420	1720	4,7	4,6		81	0,82	5,6	2,5	2,8	28	0,005
7AA100L04	3	3,45	1420	1720	6,4	6,2		83	0,82	5,6	2,7	3	26	0,006
7BA100L04	3	3,45	1410	1710	6,4	6,2		82,6	0,83	5,6	2,7	3	30	0,006
7AA100L04V a)	3,8	4,3	1400	1680	9,1	9,1		78	0,77	5,6	3	2,9	29	0,007
7AA112M04	4	4,6	1440	1740	8,2	7,9		85	0,83	6	2,7	3	32	0,011
7BA112M04	4	4,6	1440	1740	8,2	7,9		85	0,83	6	2,7	3	40	0,011
7AA112M04V a)	5,5	6,3	1440	1730	12,1	11,5		82	0,79	6,8	3	3	37	0,014
7BA112M04V a)	5,5	6,3	1435	1730	12,7	12,1		81	0,77	6,5	3,3	3,4	46	0,014
7AA132S04	5,5	6,3	1455	1755	11,4	10,9		86	0,81	6,3	2,5	3,1	42	0,018
7BA132S04	5,5	6,3	1455	1755	11,4	10,9		85,7	0,81	6,3	2,5	3,1	55	0,018
7AA132M04	7,5	8,6	1455	1755	15,2	14,7		87	0,82	6,7	2,7	3,2	49	0,024
7BA132M04	7,5	8,6	1455	1755	15,2	14,7		87	0,82	6,7	2,7	3,2	61	0,024
7AA132M04V a)	10	11,5	1440	1745	20,5	19,8		86	0,82	7,4	3,2	3,5	61	0,031
7BA132M04V a)	10	11,5	1440	1745	21	19,8		85	0,81	7	3,3	3,7	76	0,031
7AA160M04	11	12,6	1460	1760	21,5	21		88,5	0,84	6,2	2,2	2,7	76	0,04
7BA160M04	11	12,6	1460	1760	21,5	21		88,4	0,84	6,6	2,7	2,7	92	0,04
7AA160L04	15	17,3	1460	1760	28,5	28		90	0,84	6,5	2,6	3	79	0,052
7BA160L04	15	17,3	1460	1760	28,5	28		89,4	0,84	6,5	2,6	3	118	0,052
7AA160L04V a)	22	25,3	1455	1750	44	43		88	0,83	7,5	2,9	2,8	95	0,045
14BG183-4AA b)	18,5	21,3	1465	1760	35	35		90,4	0,84	6,7	2,4	3,1	140	0,099
14BG186-4AA b)	22	25,3	1465	1760	41,5	41,5		91	0,84	6,9	2,5	3,2	155	0,117
14BG188-4AA a) b)	30	34,5	1465	1760	59	59		91,7	0,8	6,3	2,6	2,9	180	0,144
14BG207-4AA b)	30	34,5	1465	1760	56	56		91,6	0,85	6,7	2,5	3,4	205	0,191
14BG208-4AA a) b)	37	42,5	1465	1760	70	70		92,5	0,83	6,5	2,6	3	230	0,234
14BG220-4AA b)	37	42,5	1475	1770	68	68		92,2	0,85	6,7	2,5	3,1	265	0,374
14BG223-4AA b)	45	52	1475	1770	81	81		93,1	0,86	7,2	2,7	3,2	300	0,447
14BG228-4AA a) b)	55	63	1475	1770	99	99		93,4	0,86	6,5	2,5	2,7	330	0,486
14BG253-4AA	55	63	1480	1775	100	100		93,5	0,85	6,1	2,4	2,8	390	0,688
14BG258-4AA a) b)	75	86	1482	1780	136	136		94,3	0,85	7	2,5	3	460	0,856
14BG280-4AA b)	75	86	1485	1780	136	136		94,2	0,85	7,1	2,5	3	535	1,19
14BG283-4AA b)	90	104	1485	1780	160	160		94,6	0,86	7,4	2,5	3	580	1,39
14BG288-4AA a) b)	110	127	1488	1785	198	198		95,2	0,84	7,9	2,8	3,3	680	1,71
14BG310-4AA	110	127	1488	1785	198	198		94,6	0,85	6,4	2,5	2,8	730	1,94
14BG313-4AA	132	152	1488	1785	235	235		95,2	0,85	6,8	2,7	2,9	810	2,31
14BG316-4AA	160	184	1486	1785	280	280		95,7	0,86	6,8	2,7	2,8	955	2,88
14BG317-4AA	200	230	1486	1785	340	340		95,9	0,88	6,5	2,6	2,8	1060	3,46
14BG318-4AA a)	250	288	1488	1785	430	430		96,1	0,87	7,7	3,1	3,2	1290	4,22
14BG319-4AA a)	315	362	1488	1785	550	550		96,3	0,86	7,3	3,3	3,1	1500	5,0
B5C355LC-4	355	426	1490	1788	624	679		95,6	0,86	6,2	1,9	2,3	2100	8,3
B5C355LD-4	400	480	1490	1788	702	641		95,8	0,86	6,2	1,9	2,4	2250	9,4
B5C355LE-4	450	510	1490	1788	778	845		96,1	0,87	6,2	1,9	2,3	2360	10,2
B5C355LF-4	500	570	1490	1788	835	763		96,2	0,9	6,5	1,2	2,8	2430	11,2
B5C400LA-4	560	672	1490	1788	969	1048		96,5	0,87	6,6	2	2,3	2700	11,4
B5C400LB-4	630	720	1490	1788	1083	990		96,6	0,87	6,6	2	2,4	2900	13
B5C400LC-4	710	816	1490	1788	1220	1327		96,7	0,87	6,9	0,9	2,5	3100	18

a) Increased rated output.

b) Two parallel terminals per phase are required for mains feed 230V.

NOT INVOLVED IN EU REGULATIONS 640/2009 AND IEC 60034-30

Formula for current with new voltage:  $I'n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$

**Technical data for Marine Motors**

**6- pole Motors (Ambient temperature -20°C - 45°C) S1 Duty, IP 55**

Type	Output		RPM		Amp		Eff							
	kW 50Hz	kW 60Hz	50Hz	60Hz	50Hz 400V	60Hz 440-480V		n[%]	cos φ	Ist. In	Mst. Mn	Mmax Mn	Kg IM 1001	inertia (kgm2)
7AA63M06K	0,06	0,07	870	1080	0,33	0,32		39	0,66	2	1,8	1,8	3,5	0,000
7AA63M06	0,09	0,11	850	1070	0,47	0,46		42	0,66	2,2	1,8	1,5	4,1	0,000
7AA63M06V a)	0,12	0,14	890	1090	0,64	0,63		45	0,61	2,2	1,8	1,9	6,1	0,000
7AA71M06K	0,18	0,21	850	1050	0,72	0,67		54	0,68	2,3	2,1	1,9	6,3	0,001
7AA71M06	0,25	0,29	860	1060	0,79	0,77		61	0,76	2,7	2,2	2	6,3	0,001
7AA80M06K	0,37	0,43	920	1125	1,2	1,19		62	0,72	3,1	1,9	2,1	7,5	0,002
7AA80M06	0,55	0,63	910	1110	1,6	1,55		67	0,74	3,4	2,1	2,2	9,4	0,002
7AA90S06	0,75	0,86	915	1115	2,1	2		69	0,76	3,7	2,2	2,2	12	0,003
7AA90L06	1,1	1,3	915	1115	2,9	2,9		72	0,77	3,8	2,3	2,3	15	0,004
7AA100L06	1,5	1,75	925	1125	3,9	3,85		74	0,75	4,2	2,2	2,4	22	0,006
7BA100L06	1,5	1,75	930	1120	4	3,9		72	0,75	4,5	2,1	2,3	31	0,006
7AA112M06	2,2	2,55	940	1140	5,2	5,1		78	0,78	4,6	2,2	2,5	27	0,011
7BA112M06	2,2	2,55	940	1140	5,75	5,4		77	0,72	4,8	2,2	2,6	36	0,011
7AA112M06V a)	3	3,45	940	1140	7	6,8		80	0,78	4,8	2,4	2,4	28	0,015
7BA112M06V a)	3	3,45	930	1135	7,4	7,2		78	0,75	4,6	2,2	2,3	42	0,015
7AA132S06	3	3,45	950	1145	7,2	7,1		79	0,76	4,2	1,9	2,2	40	0,015
7BA132S06	3	3,45	950	1150	7,5	7,3		78	0,74	4,2	1,9	2,1	52	0,015
7AA132S06V a)	4	4,6	950	1150	9,4	9,2		80,5	0,76	4,5	2,1	2,4	48	0,019
7BA132S06V a)	4	4,6	950	1150	9,9	9,5		81	0,72	5	2,4	2,9	59	0,019
7AA132M06	5,5	6,3	950	1150	12,6	12,6		83	0,76	5	2,3	2,6	55	0,025
7BA132M06	5,5	6,3	950	1150	13,9	12,9		81	0,71	5,3	2,5	2,9	64	0,025
7AA160M06	7,5	8,6	960	1160	17	16,8		86	0,74	4,6	2	2,5	74	0,041
7BA160M06	7,5	8,6	960	1150	17,2	16,7		84	0,75	4,6	2	2,2	100	0,041
7AA160L06	11	12,6	960	1160	24,5	24,2		87,5	0,74	4,8	2,3	2,6	102	0,049
7BA160L06	11	12,7	960	1160	24,5	24,6		86	0,75	4,8	2,2	2,3	121	0,049
14BG186-6AA	15	18	965	1160	29,5	29,5		88,9	0,83	5,3	2,3	2,5	150	0,175
14BG188-6AA a) b)	18,5	22	970	1165	37,5	37,5		89,6	0,8	4,9	2,3	2,4	175	0,203
14BG206-6AA	18,5	22	975	1170	36,5	36,5		89,8	0,81	5,6	2,5	2,5	195	0,238
14BG207-6AA	22	26,5	975	1170	43,5	43,5		90,3	0,81	5,7	2,6	2,5	205	0,287
14BG208-6AA a) b)	30	36	975	1170	60	60		90,9	0,8	5,8	2,6	2,6	245	0,362
14BG223-6AA b)	30	36	978	1175	57	57		91,8	0,83	5,6	2,7	2,5	280	0,492
14BG228-6AA a) b)	37	44,5	978	1175	70	70		92,2	0,83	5,9	2,5	2,8	325	0,624
14BG253-6AA	37	44,5	980	1175	70	70		92,3	0,83	6	2,7	2,3	370	0,762
14BG258-6AA	45	54	982	1180	84	84		93,3	0,83	6,3	2,7	2,3	405	0,934
14BG280-6AA	45	54	985	1180	83	83		92,4	0,85	6,1	2,4	2,4	475	1,12
14BG283-6AA	55	66	985	1180	100	100		92,7	0,86	6,3	2,5	2,5	510	1,37
14BG288-6AA a) b)	75	90	985	1180	136	136		93,8	0,85	6,8	3	2,8	570	1,65
14BG310-6AA	75	90	988	1180	138	138		93,5	0,84	6,5	2,5	2,8	685	2,1
14BG313-6AA	90	108	988	1185	164	164		93,9	0,84	6,8	2,6	2,9	750	2,5
14BG316-6AA	110	132	988	1185	196	196		94,3	0,86	6,8	2,5	2,9	890	3,2
14BG317-6AA	132	158	988	1185	235	235		94,8	0,86	7,3	3,1	3	980	4,02
14BG318-6AA	160	192	988	1185	285	285		95	0,86	7,5	3	3	1180	4,71
14BG319-6AA	200	240	990	1185	355	355		95,5	0,85	7	2,8	2,9	1285	5,72
B5C355LB-6	250	300	990	1188	445	485		95,5	0,85	6	2,1	2,1	1890	13,1
B5C355LC-6	315	364	990	1188	553	508		95,7	0,86	6,3	2,3	2,3	2315	17
B5C355LD-6	355	392	990	1188	614	672		96	0,87	6,5	2,4	2,4	2390	18,6
B5C400LA-6	400	480	992	1190	719	655		96	0,84	6,9	2,5	2,5	2680	17,5
B5C400LB-6	450	540	992	1190	796	865		96,2	0,85	7,2	2,5	2,5	2850	19,5
B5C400LC-6	500	600	993	1192	890	816		96,3	0,84	7,7	2,6	2,6	3070	22
B5C400LD-6	560	672	994	11923	966	1051		96,3	0,87	6,9	2,6	2,6	3200	30

a) Increased rated output.

b) Two parallel terminals per phase are required for mains feed 230V.

NOT INVOLVED IN EU REGULATIONS 640/2009 AND IEC 60034-30

Formula for current with new voltage:  $I'n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$

**Technical data for Marine Motors**

**8- pole Motors (Ambient temperature -20°C - 45°C) S1 Duty, IP55**

Type	Output		RPM		Amp		Eff							
	kW 50Hz	kW 60Hz	50Hz	60Hz	50Hz 400V	60Hz 440-480V		n[%]	cos φ	Ist. In	Mst. Mn	Mmax Mn	Kg IM 1001	Inertia (kgm2)
7AA63M08	0,06	0,07	630	795	0,46	0,43		32	0,6	2,2	1,9	1,7	6,3	0,001
7AA71M08K	0,09	0,1	630	780	0,36	0,35		53	0,68	2,2	1,9	1,7	6,3	0,001
7AA71M08	0,12	0,14	645	795	0,51	0,51		53	0,64	2,2	2,2	2	6,3	0,001
7AA71M08	0,18	0,21	610	780	0,95	0,82		48	0,61	1,9	1,9	2	6,5	0,001
7AA80M08K	0,18	0,21	675	830	0,75	0,75		51	0,68	2,3	1,7	1,9	7,5	0,002
7AA80M08	0,25	0,29	685	835	1,03	1		55	0,64	2,6	2	2,2	9,4	0,002
7AA90S08	0,37	0,43	675	825	1,13	1,1		63	0,75	2,9	1,6	1,8	10	0,003
7AA90L08	0,55	0,63	675	825	1,58	1,5		66	0,76	3	1,7	1,9	13	0,004
7AA90L08V	0,75	0,86	655	810	2,7	2,5		61	0,67	3,4	1,9	2,1	14	0,005
7AA100L08K	0,75	0,86	680	830	2,15	2,1		66	0,76	3	1,7	1,9	19	0,005
7BA100L08K	0,75	0,86	680	830	2,2	2,15		67	0,76	3	1,6	1,9	22	0,005
7AA100L08	1,1	1,3	680	830	2,9	2,9		72	0,76	3,4	1,9	2,1	22	0,007
7BA100L08	1,1	1,3	670	820	3	2,9		70	0,75	3,1	1,7	2	28	0,007
7AA112M08	1,5	1,75	705	855	3,85	3,8		74	0,76	3,7	1,8	2,1	24	0,013
7BA112M08	1,5	1,75	705	855	3,85	3,8		74	0,76	4,0	1,8	2,1	33	0,013
7AA112M08V a)	2,2	2,55	695	845	6,2	5,8		74	0,7	4,2	2,1	2,5	41	0,019
7BA112M08V a)	2,2	2,55	695	845	6,2	5,8		74	0,7	3,9	2,2	2,3	50	0,019
7AA132S08	2,2	2,55	690	840	6,3	6		75	0,69	3,9	1,9	2,3	53	0,014
7BA132S08	2,2	2,55	690	840	6,3	6		73	0,69	3,6	2	2,3	56	0,014
7AA132S08V a)	3	3,45	700	845	7,6	7,4		77	0,74	4,1	2,1	2,4	38	0,019
7BA132S08V a)	3	3,45	690	840	8,15	8,1		77	0,69	3,7	2,1	2,4	58	0,019
7AA132M08	3	3,45	700	845	7,6	7,4		77	0,74	4,1	2,1	2,4	55	0,019
7BA132M08	3	3,45	690	840	8,15	8,1		77	0,69	3,7	2,1	2,4	60	0,019
7AA132M08V a)	4	4,6	690	845	11,5	10,9		74	0,68	3,9	2,2	2,4	53	0,025
7BA132M08V a)	4	4,6	690	845	11,5	10,9		74	0,68	3,9	2,2	2,4	65	0,025
7AA160M08K	4	4,6	715	865	10	9,8		80	0,72	4,5	2,2	2,6	70	0,035
7BA160M08K	4	4,6	710	860	10,3	9,9		78	0,72	4,3	2	2,4	90	0,035
7AA160M08	5,5	6,3	710	860	13	12,8		83,5	0,73	4,7	2,3	2,7	70	0,043
7BA160M08	5,5	6,3	710	860	13,1	12,8		83	0,75	4,7	2,2	2,4	97	0,043
7AA160L08	7,5	8,6	715	865	17,6	17,4		85,5	0,72	5,3	2,7	3	91	0,062
7BA160L08	7,5	8,6	710	860	18,1	17,4		83	0,72	5,3	2,5	2,9	121	0,062
14BG186-8AB	11	13,2	725	870	25	25		87,5	0,73	4,2	1,7	2,1	150	0,169
14BG188-8AB a) b)	15	18	720	865	34	34		87,8	0,73	4,5	2	2,4	165	0,206
14BG207-8AB	15	18	725	870	32,5	32,5		87,7	0,76	4,9	2,2	2,6	205	0,29
14BG208-8AB a)	18,5	22	725	870	39	39		88,3	0,78	5,2	2,4	2,6	230	0,367
14BG220-8AB	18,5	22	730	875	38,5	38,5		89,4	0,78	5,5	2,3	2,7	270	0,482
14BG223-8AB	22	26,5	730	875	45	45		89,7	0,79	5,6	2,3	2,8	290	0,551
14BG228-8AB a) b)	30	36	730	875	61	61		90,4	0,79	5,6	2,6	2,8	340	0,658
14BG253-8AB	30	36	730	875	58	58		91,4	0,81	5,5	2,3	2,6	385	0,837
14BG258-8AB a)	37	44,5	730	875	71	71		91,9	0,82	5,6	2,4	2,6	430	1,06
14BG280-8AB	37	44,5	735	880	72	72		92	0,81	5	2,2	2,1	475	1,11
14BG283-8AB	45	54	735	880	87	87		92,4	0,81	5,1	2,2	2,1	515	1,35
14BG288-8AB a)	55	66	735	880	106	106		92,9	0,81	5,6	2,4	2,3	565	1,63
14BG310-8AB	55	66	740	885	106	106		93	0,81	5,8	2,2	2,6	680	2,08
14BG313-8AB	75	90	738	885	140	140		93,3	0,83	5,7	2,2	2,6	745	2,48
14BG316-8AB	90	108	738	885	168	168		93,4	0,83	5,8	2,2	2,7	865	3,14
14BG317-8AB	110	132	738	885	205	205		94	0,83	6,1	2,4	2,8	1020	3,95
14BG318-8AB a)	132	158	738	885	245	245		94,2	0,83	6,5	2,5	2,9	1100	4,52
14BG319-8AB a)	160	184	738	886	290	290		94,5	0,84	6,5	2,6	2,9	1325	4,8
B5C355LB-8	200	240	740	888	366	398		95,2	0,83	5,6	2	2,1	1910	15,4
B5C355LC-8	250	300	740	888	456	416		95,5	0,83	5,8	2	2	2240	18,8
B5C355LD-8	315	348	740	888	574	624		95,5	0,83	6	1,5	2,6	2390	21,4
B5C400LB-8	355	426	743	892	655	599		95,5	0,82	6	1,3	2,3	2850	21
B5C400LC-8	400	480	743	892	737	801		95,7	0,82	6,2	1,3	2,3	3070	24
B5C400LD-8	450	526	743	892	835	756		95,8	0,81	5,8	1,3	2,3	3230	27,5

a) Increased rated output.

b) Two parallel terminals per phase are required for mains feed 230V.

NOT INVOLVED IN EU REGULATIONS 640/2009 AND IEC 60034-30

Formula for current with new voltage:  $I'n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$

**2/4- Pole Motors (2- speed)**

**Technical data for standard execution, S1- duty, IP55, 380-420V 50Hz. ( Single winding –Dahlander )**

Fan / pump duty						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA71M21- V	0,14	0,65	1410	2650	0,58	1,80
7AA80M21K- V	0,15	0,70	1400	2740	0,39	1,76
7AA80M21- V	0,25	0,95	1385	2780	0,61	2,40
7AA90S21- V	0,33	1,40	1420	2835	0,78	3,50
7AA90L21- V	0,50	2,00	1420	2835	1,08	4,80
7AA/ BA100L21K- V	0,65	2,50	1430	2865	1,44	5,40
7AA/ BA100L21- V	0,80	3,10	1425	2860	1,70	7,00
7AA/ BA112M21- V	1,10	4,40	1445	2885	2,50	10,7
7AA/ BA132S21- V	1,45	5,90	1455	2920	3,00	12,8
7AA/ BA132M21- V	2,00	8,00	1455	2930	4,00	16,0
7AA/ BA160M21- V	2,90	11,5	1455	2930	5,70	22,0
7AA/ BA160L21- V	4,30	17,0	1455	2930	8,40	31,0
14BG183-0BA	4,80	18,0	1465	2935	9,10	33,5
14BG186-0BA	5,80	21,5	1470	2950	11,2	38,5
14BG207-0BA	8,40	31,0	1475	2950	15,5	55,0
14BG220-0BA	10,5	38,0	1475	2955	20,0	68,0
14BG223-0BA	13,0	45,0	1475	2960	23,0	78,0
14BG253-0BA	15,0	55,0	1480	2960	27,0	102
14BG280-0BA	18,0	67,0	1490	2972	32,5	120
14BG283-0BA	22,0	80,0	1490	2975	39,5	140
14BG310-0BA	26,0	90,0	1492	2978	47,0	162
14BG313-0BA	32,0	110	1492	2976	57,0	190
14BG316-0BA	35,0	140	1492	2974	62,0	230
14BG317-0BA	45,0	170	1492	2976	78,0	280

Constant torque						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA63M21K	0,10	0,15	1330	2650	0,41	0,51
7AA63M21	0,15	0,20	1330	2700	0,51	0,58
7AA71M21K	0,21	0,28	1375	2700	0,70	1,10
7AA71M21	0,30	0,43	1380	2770	0,89	1,30
7AA80M21K	0,48	0,60	1390	2810	1,25	1,60
7AA80M21	0,70	0,85	1390	2810	1,75	2,10
7AA90S21	1,10	1,40	1390	2810	2,70	3,60
7AA90L21	1,50	1,90	1390	2860	3,40	4,50
7AA/ BA100L21K	2,00	2,40	1400	2880	4,25	5,50
7AA/ BA100L21	2,60	3,10	1400	2850	5,50	7,60
7AA/ BA112M21	3,70	4,40	1420	2885	8,00	10,5
7AA/ BA132S21	4,70	5,90	1450	2920	9,70	12,5
7AA/ BA132M21	6,50	8,00	1450	2930	13,6	16,7
7AA/ BA160M21	9,30	11,5	1455	2930	18,3	23,4
7AA/ BA160L21	13,0	17,0	1455	2930	25,6	32,0
14BG183-0AA	15,0	18,0	1470	2940	28,0	33,5
14BG186-0AA	18,0	21,5	1465	2940	33,5	38,5
14BG207-0AA	26,0	31,0	1465	2950	48,0	55,0
14BG220-0AA	32,0	38,0	1475	2955	58,0	69,0
14BG223-0AA	38,0	45,0	1475	2960	68,0	78,0
14BG253-0AA	46,0	55,0	1480	2960	84,0	102
14BG280-0AA	63,0	75,0	1485	2965	112	134
14BG283-0AA	73,0	87,0	1487	2975	130	155
14BG310-0AA	85,0	100	1490	2976	156	182
14BG313-0AA	100	120	1488	2978	177	212
14BG316-0AA	120	145	1488	2976	209	242
14BG317-0AA	145	172	1490	2976	250	282

**Technical data for standard execution, S1- duty, IP55, 440-480V 60Hz. ( Single winding –Dahlander )**

Fan / pump duty						
Type	Output kW		RPM		AMP (460)	
	Low	High	Low	High	Low	High
7AA71M21- V	0,16	0,73	1692	3180	0,58	1,80
7AA80M21K- V	0,17	0,78	1680	3288	0,39	1,76
7AA80M21- V	0,29	1,06	1662	3336	0,61	2,40
7AA90S21- V	0,38	1,57	1704	3402	0,78	3,50
7AA90L21- V	0,58	2,24	1704	3402	1,08	4,80
7AA/ BA100L21K- V	0,75	2,80	1716	3438	1,44	5,40
7AA/ BA100L21- V	0,92	3,47	1710	3432	1,70	7,00
7AA/ BA112M21- V	1,27	4,93	1734	3462	2,50	10,7
7AA/ BA132S21- V	1,67	6,61	1746	3504	3,00	12,8
7AA/ BA132M21- V	2,30	8,96	1746	3516	4,00	16,0
7AA/ BA160M21- V	3,34	12,9	1746	3516	5,70	22,0
7AA/ BA160L21- V	4,95	19,0	1746	3516	8,40	31,0
14BG183-0BA	5,52	20,2	1758	3522	9,10	33,5
14BG186-0BA	6,67	24,1	1764	3540	11,2	38,5
14BG207-0BA	9,66	34,7	1770	3540	15,5	55,0
14BG220-0BA	12,1	42,6	1770	3546	20,0	68,0
14BG223-0BA	15,0	50,4	1770	3552	23,0	78,0
14BG253-0BA	17,3	61,6	1776	3552	27,0	102
14BG280-0BA	20,7	75,0	1788	3566	32,5	120
14BG283-0BA	25,3	89,6	1788	3570	39,5	140
14BG310-0BA	29,9	101	1790	3574	47,0	162
14BG313-0BA	36,8	123	1790	3571	57,0	190
14BG316-0BA	40,3	157	1790	3568	62,0	230
14BG317-0BA	51,8	190	1790	3571	78,0	280

Constant torque						
Type	Output kW		RPM		AMP (460)	
	Low	High	Low	High	Low	High
7AA63M21K	0,12	0,17	1596	3180	0,41	0,51
7AA63M21	0,17	0,22	1596	3240	0,51	0,58
7AA71M21K	0,24	0,31	1650	3240	0,70	1,10
7AA71M21	0,35	0,48	1656	3324	0,89	1,30
7AA80M21K	0,55	0,67	1668	3372	1,25	1,60
7AA80M21	0,81	0,95	1668	3372	1,75	2,10
7AA90S21	1,27	1,57	1668	3372	2,70	3,60
7AA90L21	1,73	2,13	1668	3432	3,40	4,50
7AA/ BA100L21K	2,30	2,69	1680	3456	4,25	5,50
7AA/ BA100L21	2,99	3,47	1680	3420	5,50	7,60
7AA/ BA112M21	4,26	4,93	1704	3462	8,00	10,5
7AA/ BA132S21	5,41	6,61	1740	3504	9,70	12,5
7AA/ BA132M21	7,48	9,00	1740	3516	13,6	16,7
7AA/ BA160M21	10,7	12,9	1746	3516	18,3	23,4
7AA/ BA160L21	15,0	19,0	1746	3516	25,6	32,0
14BG183-0AA	17,3	20,2	1764	3528	28,0	33,5
14BG186-0AA	20,7	24,1	1758	3528	33,5	38,5
14BG207-0AA	29,9	34,7	1758	3540	48,0	55,0
14BG220-0AA	36,8	42,6	1770	3546	58,0	69,0
14BG223-0AA	43,7	50,4	1770	3552	68,0	78,0
14BG253-0AA	52,9	61,6	1776	3552	84,0	102
14BG280-0AA	72,5	84,0	1782	3558	112	134
14BG283-0AA	84,0	97,4	1784	3570	130	155
14BG310-0AA	97,8	112	1788	3571	156	182
14BG313-0AA	115	134	1786	3574	177	212
14BG316-0AA	138	162	1786	3571	209	242
14BG317-0AA	167	193	1788	3571	250	282

**Technical data for standard execution, S1- duty, IP55, 380-420V 50Hz. ( Separate windings )**

Fan / pump duty						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA80M21- V2	0,20	0,75	1435	2820	0,60	1,90
7AA90L21- V2	0,25	1,10	1465	2865	0,87	2,30
7AA90L21- V2	0,30	1,50	1460	2810	0,93	3,10
7AA112M21- V2	0,45	2,20	1490	2950	3,45	5,70
7AA112M21- V2	0,75	3,00	1485	2925	3,50	6,70

Formula for current with new voltage:  $I_n(\text{new}) = I_n(\text{with } 400V) \cdot \frac{400}{U(\text{new voltage})}$

Other voltages on request.

**4/6- Pole Motors (2- speed)**

Technical data for standard execution, S1- duty, IP55, 380-420V 50Hz. (Separate windings )

Fan / pump duty						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA80M25K- V	0,12	0,40	940	1430	0,51	1,38
7AA80M25- V	0,18	0,55	930	1420	0,73	1,62
7AA90S25- V	0,29	0,80	950	1430	1,07	2,10
7AA90L25- V	0,38	1,10	955	1430	1,33	2,65
7AA/ BA100L25K- V	0,60	1,70	950	1410	1,75	3,80
7AA/ BA100L25- V	0,75	2,10	950	1420	2,30	4,55
7AA/ BA112M25- V	0,90	3,00	980	1450	3,00	6,70
7AA/ BA132S25- V	1,20	3,90	975	1460	3,50	8,40
7AA/ BA132M25- V	1,70	5,40	975	1460	4,55	11,4
7AA/ BA160M25- V	2,50	7,20	980	1470	6,40	14,4
7AA/ BA160L25- V	3,70	12,0	980	1470	9,30	23,3
14BG183-1BD	5,50	16,0	960	1460	12,0	31,5
14BG186-1BD	6,50	19,0	960	1460	14,0	36,5
14BG207-1BD	9,50	26,0	975	1460	20,0	49,0
14BG220-1BD	12,0	34,0	980	1465	24,5	63,0
14BG223-1BD	14,5	40,0	980	1470	28,5	72,0
14BG253-1BD	18,0	52,0	980	1475	34,0	91,0
14BG280-1BD	25,0	70,0	980	1480	47,0	124
14BG283-1BD	30,0	82,0	985	1480	56,0	148
14BG310-1BD	33,0	92,0	990	1490	63,0	176
14BG313-1BD	45,0	120	990	1485	85,0	215
14BG316-1BD	50,0	150	990	1485	93,0	260
14BG317-1BD	55,0	170	990	1490	102	310
14BG319-1BD	75,0	250	990	1485	136	430

Constant torque						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA/ BA100L25K	0,90	1,30	900	1415	2,70	3,20
7AA/ BA100L25	1,10	1,70	915	1420	3,30	4,20
7AA/ BA112M25	1,50	2,30	950	1460	4,20	5,70
7AA/ BA132S25	2,00	3,10	965	1470	4,80	6,70
7AA/ BA132M25	2,80	4,30	965	1465	7,00	9,60
7AA/ BA160M25	4,30	6,60	970	1470	10,4	14,2
7AA/ BA160L25	6,30	9,50	970	1470	15,0	18,1
14BG183-1AD	9,50	14,0	960	1465	21,0	28,0
14BG186-1AD	11,0	16,5	955	1465	23,5	32,0
14BG207-1AD	16,0	24,0	965	1465	32,5	45,0
14BG220-1AD	21,0	31,0	975	1465	41,5	57,0
14BG223-1AD	25,0	37,0	970	1465	48,0	66,0
14BG253-1AD	32,0	47,0	980	1480	60,0	85,0
14BG280-1AD	45,0	66,0	986	1480	86,0	117
14BG283-1AD	54,0	80,0	980	1480	99,0	143
14BG310-1AD	62,0	92,0	990	1486	121	170
14BG313-1AD	75,0	110	990	1490	141	200
14BG316-1AD	90,0	132	986	1486	164	230
14BG317-1AD	110	160	990	1490	205	290

Technical data for standard execution, S1- duty, IP55, 440-480V 60Hz. (Separate windings )

Fan / pump duty						
Type	Output kW		RPM		AMP (460)	
	Low	High	Low	High	Low	High
7AA80M25K- V	0,14	0,46	1128	1716	0,51	1,38
7AA80M25- V	0,21	0,63	1116	1704	0,73	1,62
7AA90S25- V	0,34	0,92	1140	1716	1,07	2,10
7AA90L25- V	0,44	1,27	1146	1716	1,33	2,65
7AA/ BA100L25K- V	0,69	1,96	1140	1692	1,75	3,80
7AA/ BA100L25- V	0,86	2,42	1140	1704	2,30	4,55
7AA/ BA112M25- V	1,04	3,45	1176	1740	3,00	6,70
7AA/ BA132S25- V	1,38	4,49	1170	1752	3,50	8,40
7AA/ BA132M25- V	1,96	6,21	1170	1752	4,55	11,4
7AA/ BA160M25- V	2,88	8,28	1176	1764	6,40	14,4
7AA/ BA160L25- V	4,26	13,8	1176	1764	9,30	23,3
14BG183-1BD	6,60	18,4	1176	1764	12,0	31,5
14BG186-1BD	7,80	21,9	1176	1764	14,0	36,5
14BG207-1BD	11,4	29,9	1176	1764	20,0	49,0
14BG220-1BD	14,4	39,1	1176	1764	24,5	63,0
14BG223-1BD	17,4	46,0	1176	1764	28,5	72,0
14BG253-1BD	21,6	59,8	1182	1770	34,0	91,0
14BG280-1BD	30,0	80,5	1182	1770	47,0	124
14BG283-1BD	36,0	94,3	1182	1770	56,0	148
14BG310-1BD	39,6	106	1188	1786	63,0	176
14BG313-1BD	54,0	138	1188	1782	85,0	215
14BG316-1BD	60,0	173	1188	1782	93,0	260
14BG317-1BD	66,0	196	1188	1788	102	310
14BG319-1BD	82,5	288	1188	1782	136	430

Constant torque						
Type	Output kW		RPM		AMP (460)	
	Low	High	Low	High	Low	High
7AA/ BA100L25K	1,04	1,50	1080	1698	2,70	3,20
7AA/ BA100L25	1,27	1,96	1098	1704	3,30	4,20
7AA/ BA112M25	1,73	2,65	1140	1752	4,20	5,70
7AA/ BA132S25	2,30	3,57	1158	1764	4,80	6,70
7AA/ BA132M25	3,22	4,95	1158	1758	7,00	9,60
7AA/ BA160M25	4,95	7,59	1164	1764	10,4	14,2
7AA/ BA160L25	7,25	10,9	1164	1764	15,0	18,1
14BG183-1AD	11,4	16,1	1152	1758	21,0	28,0
14BG186-1AD	13,2	19,0	1146	1758	23,5	32,0
14BG207-1AD	19,2	27,6	1158	1758	32,5	45,0
14BG220-1AD	25,2	35,7	1170	1758	41,5	57,0
14BG223-1AD	30,0	42,6	1164	1758	48,0	66,0
14BG253-1AD	38,4	54,1	1176	1776	60,0	85,0
14BG280-1AD	54,0	75,9	1183	1776	86,0	117
14BG283-1AD	64,8	92,0	1176	1776	99,0	143
14BG310-1AD	74,4	106	1188	1783	121	170
14BG313-1AD	90,0	127	1188	1788	141	200
14BG316-1AD	108	152	1183	1783	164	230
14BG317-1AD	132	184	1188	1788	205	290

Formula for current with new voltage:  $I'n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$

Other voltages on request.

**4/8- Pole Motors (2- speed)**

Technical data for standard execution, S1- duty, IP55, 380-420V 50Hz. (Single winding- Dahlander)

Fan / pump duty						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA71M23 - V	0,06	0,30	660	1355	0,52	0,87
7AA80M23K - V	0,10	0,50	680	1375	0,57	1,28
7AA80M23 - V	0,15	0,70	685	1380	0,77	1,76
7AA90S23 - V	0,22	1,00	695	1370	1,25	2,40
7AA90L23 - V	0,33	1,50	700	1375	1,80	3,30
7AA/ BA100L 23K - V	0,50	2,00	710	1415	2,50	4,30
7AA/ BA100L 23 - V	0,65	2,50	700	1400	2,80	5,30
7AA/ BA112M 23 - V	0,90	3,60	720	1440	4,70	8,00
7AA/ BA132S 23 - V	1,10	4,70	720	1455	3,30	10,3
7AA/ BA132M 23 - V	1,40	6,40	720	1455	4,40	13,3
7AA/ BA160M 23 - V	2,20	9,50	725	1465	6,50	19,7
7AA/ BA160L 23 - V	3,30	14,0	730	1470	9,30	28,6
14BG183-0BB	4,50	16,0	725	1465	12,6	31,0
14BG186-0BB	5,00	18,5	725	1470	14,2	35,0
14BG207-0BB	7,50	28,0	730	1475	21,5	52,0
14BG220-0BB	9,50	35,0	738	1478	26,0	64,0
14BG223-0BB	11,5	42,0	738	1475	30,5	75,0
14BG253-0BB	14,5	52,0	740	1480	38,0	94,0
14BG280-0BB	19,0	70,0	740	1480	49,0	124
14BG283-0BB	23,0	83,0	740	1485	58,0	146
14BG310-0BB	26,0	95,0	742	1484	66,0	172
14BG313-0BB	30,0	115	744	1488	82,0	215
14BG316-0BB	35,0	140	744	1486	88,0	245
14BG317-0BB	45,0	175	744	1490	124	315

Constant torque						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA80M23	0,18	0,37	700	1400	1,30	0,94
7AA90S23	0,35	0,50	675	1365	1,19	1,41
7AA90L23	0,50	0,70	675	1380	1,60	2,10
7AA/ BA100L 23K	0,70	1,10	690	1380	2,10	3,25
7AA/ BA100L 23K	0,90	1,50	680	1400	2,50	3,65
7AA/ BA112M 23	1,40	1,90	690	1410	4,00	5,20
7AA/ BA132S 23	1,80	3,60	720	1430	6,30	7,20
7AA/ BA132M 23	2,50	5,00	720	1430	8,20	10,0
7AA/ BA160M 23	3,50	7,00	725	1450	11,7	13,9
7AA/ BA160L 23	5,60	11,0	725	1450	18,5	21,1
14BG186-0AB	11,0	18,0	730	1466	28,5	34,5
14BG207-0AB	17,0	27,0	732	1465	39,0	46,5
14BG220-0AB	22,0	32,0	730	1468	46,0	55,0
14BG223-0AB	25,0	37,0	732	1470	52,0	63,0
14BG253-0AB	32,0	47,0	735	1475	67,0	80,0
14BG280-0AB	38,0	56,0	738	1478	78,0	94,0
14BG283-0AB	46,0	67,0	740	1480	95,0	114
14BG310-0AB	56,0	82,0	740	1480	114	140
14BG313-0AB	78,0	115	742	1486	166	192
14BG316-0AB	92,0	135	738	1478	180	225
14BG317-0AB	115	160	738	1482	215	260

Technical data for standard execution, S1- duty, IP55, 440-460V 60Hz. (Single winding- Dahlander)

Fan / pump duty						
Type	Output kW		RPM		AMP (460)	
	Low	High	Low	High	Low	High
7AA71M23 - V	0,07	0,35	792	1626	0,52	0,87
7AA80M23K - V	0,12	0,58	816	1650	0,57	1,28
7AA80M23 - V	0,18	0,81	822	1656	0,77	1,76
7AA90S23 - V	0,26	1,15	834	1644	1,25	2,40
7AA90L23 - V	0,40	1,73	840	1650	1,80	3,30
7AA/ BA100L 23K - V	0,60	2,30	852	1698	2,50	4,30
7AA/ BA100L 23 - V	0,78	2,88	840	1680	2,80	5,30
7AA/ BA112M 23 - V	1,08	4,14	864	1728	4,70	8,00
7AA/ BA132S 23 - V	1,32	5,41	864	1746	3,30	10,3
7AA/ BA132M 23 - V	1,68	7,36	864	1746	4,40	13,3
7AA/ BA160M 23 - V	2,64	10,9	870	1758	6,50	19,7
7AA/ BA160L 23 - V	3,96	16,1	876	1764	9,30	28,6
14BG183-0BB	5,40	18,4	882	1770	12,6	31,0
14BG186-0BB	6,00	21,3	882	1770	14,2	35,0
14BG207-0BB	9,00	32,2	882	1770	21,5	52,0
14BG220-0BB	11,4	40,3	882	1770	26,0	64,0
14BG223-0BB	13,8	48,3	888	1776	30,5	75,0
14BG253-0BB	17,4	59,8	888	1776	38,0	94,0
14BG280-0BB	22,8	80,5	888	1776	49,0	124
14BG283-0BB	27,6	95,5	888	1776	58,0	146
14BG310-0BB	31,2	109	893	1788	66,0	172
14BG313-0BB	36,0	132	893	1786	82,0	215
14BG316-0BB	42	161	893	1783	88,0	245
14BG317-0BB	54	201	893	1788	124	315

Constant torque						
Type	Output kW		RPM		AMP (460)	
	Low	High	Low	High	Low	High
7AA80M23	0,22	0,43	840	1680	1,30	0,94
7AA90S23	0,42	0,58	810	1638	1,19	1,41
7AA90L23	0,60	0,81	810	1656	1,60	2,10
7AA/ BA100L 23K	0,84	1,27	828	1656	2,10	3,25
7AA/ BA100L 23	1,08	1,73	816	1680	2,50	3,65
7AA/ BA112M 23	1,68	2,19	828	1692	4,00	5,20
7AA/ BA132S 23	2,16	4,14	864	1716	6,30	7,20
7AA/ BA132M 23	3,00	5,75	864	1716	8,20	10,0
7AA/ BA160M 23	4,20	8,05	870	1740	11,7	13,9
7AA/ BA160L 23	6,72	12,7	870	1740	18,5	21,1
14BG186-0AB	13,2	20,7	876	1759	28,5	34,5
14BG207-0AB	20,4	31,1	878	1758	39,0	46,5
14BG220-0AB	26,4	36,8	876	1761	46,0	55,0
14BG223-0AB	30,0	42,6	878	1764	52,0	63,0
14BG253-0AB	38,4	54,1	882	1770	67,0	80,0
14BG280-0AB	45,6	64,4	886	1774	78,0	94,0
14BG283-0AB	55,2	77,1	888	1776	95,0	114
14BG310-0AB	67,2	94,3	888	1776	114	140
14BG313-0AB	93,6	132	890	1783	166	192
14BG316-0AB	110	155	886	1774	180	225
14BG317-0AB	138	184	886	1778	215	260

Technical data for standard execution, S1- duty, IP55, 380-420V 50Hz. ( Separate windings)

Fan / pump duty						
Type	Output kW		RPM		AMP (400)	
	Low	High	Low	High	Low	High
7AA90L23 - V2	0,18	0,75	715	1445	1,40	2,20
7AA90L23 - V2	0,29	1,00	690	1420	1,50	2,60
7AA100L23 - V2	0,37	1,50	720	1455	2,10	4,10
7AA100L23 - V2	0,50	2,20	710	1435	2,50	5,40
7AA112M23 - V2	0,60	3,00	730	1445	3,30	6,70
7AA132S23 - V2	0,55	4,00	740	1465	2,80	8,80
7AA132M23 - V2	0,85	5,50	735	1455	3,70	10,8
7AA160M23 - V2	1,40	6,00	730	1475	5,00	13,2
7AA160L23 - V2	1,60	12,0	735	1465	5,60	24,3

Formula for current with new voltage:  $I'n \text{ (new)} = I_n \text{ (with 400V)} \cdot \frac{400}{U \text{ (new voltage)}}$  Other voltages on request



**New Efficiency IE3**

Self-ventilated energy-saving motors according to IEC 60034-30- Cast-iron series. Technical data for standard execution, S1- duty, IP55.

2-Pole Motors												
Type	Output		RPM		Torque.	Amp.		Eff.	Efficiency η [%]			Kg
	kW 50Hz	kW 60Hz	50Hz 400V	60Hz 460V	Nm 50Hz	50Hz 400V	60Hz 460V	class. 50Hz	100%load 50Hz	75% Load 50Hz	cos ph φ 50Hz	
1T29 C 180M-2-	22		2850	3550	71	38,5	38,5	IE3	92,7	93	0,89	160
1T29 C 200L-2	30	33,5	2955	3555	97	53	53	IE3	93,3	93,7	0,87	225
1T29 C 200L-2	37	41,5	2955	3555	120	65	65	IE3	93,7	94,1	0,88	250
1T29 C 225M-2	45	51	2960	3560	145	78	78	IE3	94	94,5	0,89	315
1T29 C 250M-2	55	62	2965	3565	177	95	95	IE3	94,3	93,5	0,89	385
1T29 C 280S-2-	75	84	2870	3570	241	128	128	IE3	94,7	94,8	0,89	510
1T29 C 280M-2	90	101	2878	3578	289	152	152	IE3	95	95,1	0,9	590
1T29 C 315S-2	110	123	2875	3575	352	183	183	IE3	95,2	95,4	0,91	750
1T29 C 315M-2	132	148	2882	3582	423	220	220	IE3	95,4	95,5	0,91	880
1T29 C 315L-2	160	184	2882	3582	512	265	265	IE3	95,6	95,7	0,92	980
1T29 C 315L-2-	200	224	2882	3582	640	330	330	IE3	95,8	95,9	0,92	1150
4- pole Motors												
1T29 C 180M-4	18,5	21,3	1470	1770	120	35	35	IE3	92,6	93,2	0,82	165
1T29 C 180L-4	22	25,3	1470	1770	143	41	41	IE3	93	93,7	0,83	170
1T29 C 200L-4	30	34,5	1470	1770	195	55	55	IE3	93,6	94,3	0,84	240
1T29 C 225S-4	37	42,5	1478	1778	239	66	66	IE3	93,9	94,5	0,86	285
1T29 C 225M-4	45	52	1478	1778	291	80	80	IE3	94,2	94,9	0,86	320
1T29 C 250M-4	55	63	1480	1780	354	96	96	IE3	94,6	95,1	0,87	420
1T29 C 280S-4	75	86	1482	1782	482	133	133	IE3	95	95,3	0,86	570
1T29 C 280M-4	90	104	1485	1785	579	157	157	IE3	95,2	95,5	0,87	670
1T29 C 315S-4	110	127	1485	1785	706	191	191	IE3	95,4	95,8	0,87	760
1T29 C 315M-4	132	152	1488	1788	846	230	230	IE3	95,6	95,9	0,87	960
1T29 C 315L-4	160	184	1490	1790	1025	275	275	IE3	95,8	96,1	0,87	990
1T29 C 315L-4	200	230	1490	1790	1284	340	340	IE3	96	96,3	0,88	1190
6- pole motors												
1T29 C 180L-6	15	18	975	1170	147	29,5	29,5	IE3	91,2	92,4	0,8	180
1T29 C 200L-6	18,5	22	978	1174	181	37	37	IE3	91,7	92,5	0,79	215
1T29 C 200L-6	22	26,5	978	1174	215	43,5	43,5	IE3	92,2	93,1	0,79	230
1T29 C 225M-6	30	36	982	1178	292	56	56	IE3	92,8	93,6	0,83	325
1T29 C 250M-6	37	44,5	985	1182	359	67	67	IE3	93,3	94	0,85	405
1T29 C 280S-6	45	54	988	1186	435	82	82	IE3	93,7	94,3	0,85	510
1T29 C 280M-6	55	66	988	1186	532	99	99	IE3	94,1	94,5	0,85	560
1T29 C 315S-6	75	90	990	1188	723	136	136	IE3	94,6	94,7	0,84	750
1T29 C 315M-6	90	108	991	1189	867	161	161	IE3	94,9	95,1	0,85	890
1T29 C 315L-6	110	132	991	1189	1060	199	199	IE3	95,1	95,3	0,84	990
1T29 C 315L-6	132	158	991	1189	1272	240	240	IE3	95,4	95,3	0,84	1110
1T29 C 315L-6	160	192	991	1189	1542	290	290	IE3	95,6	95,8	0,83	1160

Additional data for 60Hz on request. Other Sizes and Voltages on request.  
 1T29 A = Aluminium 1T29 C = Cast Iron.  
 Please note that the data for the efficiency grades are according to the EU nomenclatures .  
 On request, we can provide you with real measured value.

Formula for current with new voltage:  $I_n(\text{new}) = I_n(\text{with } 400V) \cdot \frac{400}{U(\text{new voltage})}$

**Dimensions Shaft/ Flanges**

IEC	Type	Shaft			
		D	E	F	G +GD
63	63	11	23	4	12,5
71	71	14	30	5	16
80	80	19	40	6	21,5
90	90S	24	50	8	27
	90L	24	50	8	27
100	100L	28	60	8	31
112	112M	28	60	8	31
132	132S,M	38	80	10	41
160	160M,L	42	110	12	59
180	183,186,188	48	110	14	51,5
200	207,208	55	110	16	59
225S	220-4,8	60	140	18	64
225M	223,228-2	55	110	16	59
	223,228-4,6,8	60	140	18	64
250M	253,258,2	60	140	18	64
	253,258-4,6,8	65	140	18	69
280S	280-2	65	140	18	69
	280-4,6,8	75	140	20	79,5
315S	310-2	65	140	18	69
	310-4,6,8	80	170	22	85
315M	313-2	65	140	18	69
	313-4,6,8	80	170	22	85
315L	316,317-2	65	140	18	69
	316,317-4,6,8	80	170	22	85
	318,319-2	65	140	18	69
	312,318,319-4	85	170	22	90
	318-6,8	80	170	22	85
	312,319-6,8	85	170	22	90
355	355-2	80	170	22	85
	355-4,6,8	100	210	28	110
400	400-2	80	170	22	85
	400-4,6,8	110	210	28	120
450	450-6,8	120	210	32	130
500	500-8	140	250	36	155

IEC	Type	B5 Flange					
		M	N	P	LA	S	T
63	All	115	95	140	8	4xØ10	3
71	All	130	110	160	9	4xØ10	4
80	All	165	130	200	10	4xØ12	4
90	All	165	130	200	10	4xØ12	4
100	All	215	180	250	11	4xØ15	4
112	All	215	180	250	11	4xØ15	4
132	All	265	230	300	12	4xØ15	4
160	All	300	250	350	13	4xØ19	5
180	All	300	250	350	13	4xØ18	5
200	All	350	300	400	15	4xØ18	5
225	All	400	350	450	16	8xØ18	5
250	All	500	450	550	18	8xØ18	5
280	All	500	450	550	18	8xØ22	5
315	310,13,16,17,18,19-2	600	550	660	22	8xØ22	6
	310,13,16,17 -4,6,8	600	550	660	22	8xØ22	6
	318 -4 ; 319 -4,6,8	740	680	800	25	8xØ24	6
355	All	740	680	800	-	4xØ28	6
400	All	940	880	1000	-	4xØ28	6
450	All	940	880	1000	-	4xØ28	6
500	All	1080	1000	1150	-	4xØ28	6

IEC	Type	B14A Flange				
		M	N	P	S	T
63	All	75	60	90	M5	3
71	All	85	70	105	M6	3
80	All	100	80	120	M6	3
90	All	115	95	140	M8	3
100	All	130	110	160	M8	4
112	All	130	110	160	M8	4
132	All	165	130	200	M10	4

IEC	Type	B14B Flange				
		M	N	P	S	T
63	All	100	80	120	M6	3
71	All	115	95	140	M8	3
80	All	130	110	160	M8	4
90	All	130	110	160	M8	4
100	All	165	130	200	M10	4
112	All	165	130	200	M10	4

Data for second shaft execution on request.

Notes on the dimension Dimension drawings according to DIN EN 50347 and IEC 60072					
Dimension designation	Shaft Dimension		Dimension designation	Dimension	
	ISO fit acc. to DIN ISO 286-2			Dimension	Permitted deviation
<b>D, DA</b>	<30mm	j6	<b>A, B</b>	<250	±0,75
	>30<50	k6		>250<500	±1,0
	Over 50	m6		>500<750	±1,5
<b>N</b>	<250	j6	<b>M</b>	>750<1000	±2,0
	>250	h6		<200	±0,25
				>200<500	±0,5
<b>F, FA</b>		H9	<b>H</b>	>500	±1,0
				>200	±0,5
				<250	±1,0
			<b>E, EA</b>		-0,5

The bore holes in couplings and belt pulleys should have an ISO of at least H7.

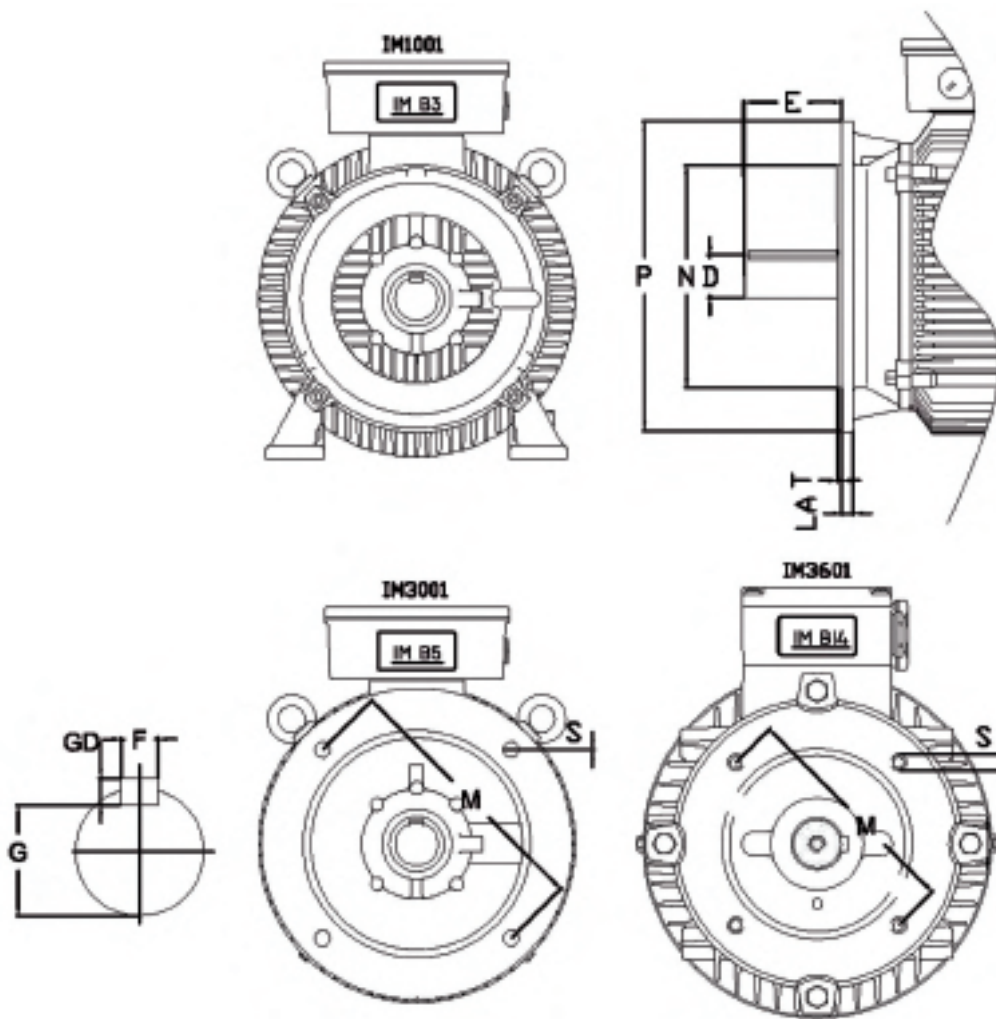
The keyways and the featherkeys (bold dimensions GA, GC, F and FA) conform to DIN 6885, Part 1

**All dimensions stated are in mm**

The shaft extensions specified in the dimension tables (DIN 748) and centring spigot diameters (DIN 42 948) specified in the dimension tables concerning all motors in this catalogue, are designed with the following fits: ISO fit acc. To DIN ISO 286-2

**Illustration, dimensions Shaft/ Flanges**

Shaft and rotor



**Shaft extension**

60° centre hole to DIN 332. Part 2 with M3 to M24 tapped hole depending on the shaft diameter. (see dimension tables).

The second shaft extension can transmit the full rated output via an output coupling up to frame size 315M (please enquire about reduced transmitted power for frame size 315L and above).

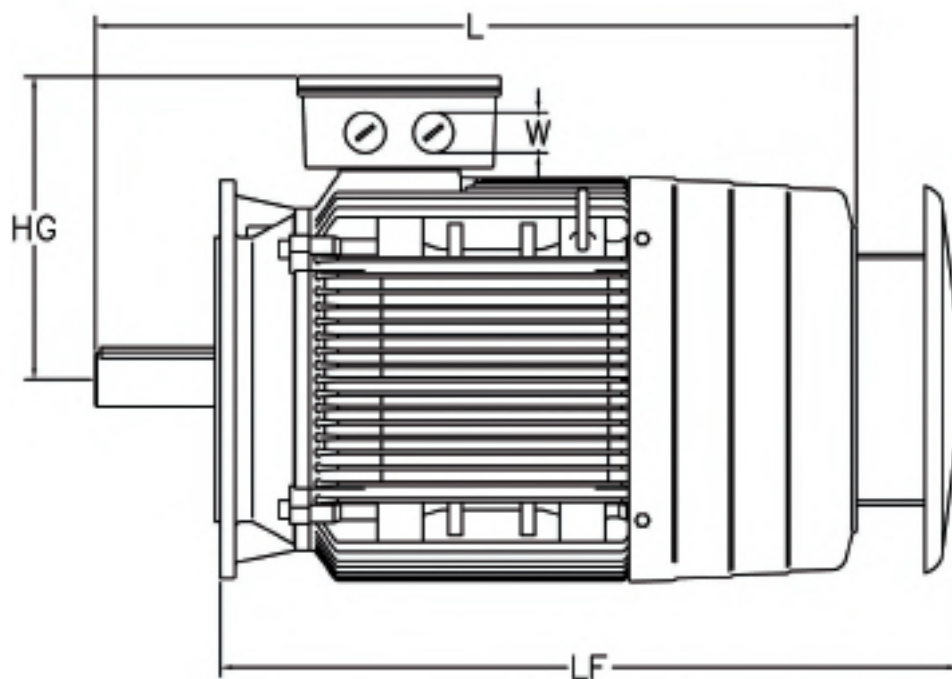
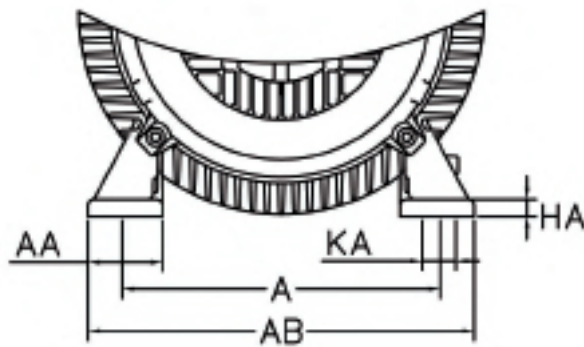
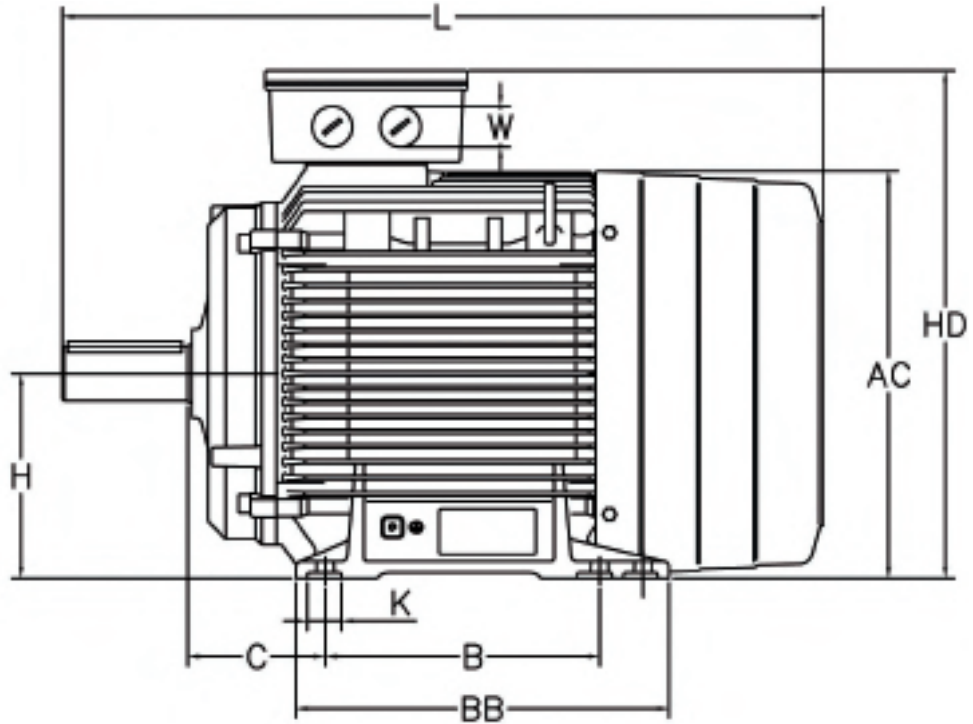
Please also enquire about the transmitted power and maximum cantilever force if belt pulleys, chains or gear pinions are used on the second shaft extension.

The non drive end (NDE) of frame sizes 100L to 160L has an M8 centre hole, DR form. The non drive end (NDE) of the 14BG and 16BG motors of frame sizes 180M to 315L, has an M16 centre hole, DS form.

Diameter mm	Thread mm
7... 10	DR M3
>10... 13	DR M4
>13... 16	DR M5
>16... 21	DR M6
>21... 24	DR M8
>24... 30	DR M10
>30... 38	DR M12
>38... 50	DR M16
>50... 85	DR M20
>85... 130	DR M24

Dimensions and tolerances for keyways and keys are in designed to DIN EN 50347. The motors are always supplied with a key inserted in the shaft.

**Overall Dimensions Illustration 7AA, 7BA, 14BG**



**Overall Dimensions 7AA, 7BA, 14BG Marine Motors**

IEC	Type	A	AA	AB	AC	B	BB	C	H	HA	HD	HG	K	KA	L	LF	W
63	7AA 63	100	27	120	118	80	96	40	63	7	164	101	6	9	170	-	M16/ M25
71	7AA 71	112	31	132	139	90	106	45	71	7	182	111	7	10	240/240*	-	M16/ M25
80	7AA 80	125	31	1150	157	100	118	50	80	8	200	120	9	13	274/314	-	M16/ M25
90	7AA 90S	140	31	165	174	100	143	56	90	10	218	128	10	14	331	-	M16/ M25
	7AA 90L	140	31	165	174	125	143	56	90	10	218	128	10	14	331/374*	-	M16/ M25
100	7AA/7BA 100L	160	42	196	196	140	176	63	100	12	234/260**	134	12	16	372/409*	363/400*	M32
112	7AA/7BA 112M	190	46	226	220	140	176	70	112	12	259/287**	147	12	16	393/432*	385/423*	M32
132	7AA/7BA 132S	216	53	256	259	140	180	89	132	15	296/323**	164	12	16	454	426	M32
132	7AA/7BA 132M	216	53	256	259	178	218	89	132	53	296/323**	164	12	16	454/ ***	426/ ***	M32
160	7AA/7BA 160M	254	60	300	314	210	256	108	160	18	351/383**	191	12	16	588	531	M32
160	7AA/7BA 160L	254	60	300	314	254	300	108	160	18	351/383**	191	12	16	588	531	M40
180M	14BG 186-4,6,8L	279	65	340	364	241	328	121	180	20	442	262	15	19	670	760	M40
180L	14BG 186-4,6,8	279	65	340	364	279	328	121	180	20	442	262	15	19	720	810	M40
	14BG 188-2,4,6,8	279	65	340	364	279	328	121	180	20	442	262	15	19	720	810	M40
200L	14BG 206-2,6	318	70	380	402	305	355	133	200	25	500	300	19	25	720	810	M50
	14BG 207-2,4,6,8	318	70	380	402	305	355	133	200	25	500	300	19	25	720	810	M50
	14BG 208-2,6	318	70	380	402	305	355	133	200	25	500	300	19	25	777	867	M50
	14BG 208-4,8	318	70	380	402	305	355	133	200	25	500	300	19	25	720	810	M50
225S	14BG 220-4,8	356	80	436	445	286	361	149	225	34	550	325	19	25	790	890	M50
225M	14BG 223-2	356	80	436	445	311	361	149	225	34	550	325	19	25	760	860	M50
	14BG 223-4,6,8	356	80	436	445	311	361	149	225	34	550	325	19	25	790	890	M50
	14BG 228-2	356	80	436	455	311	361	149	225	34	550	325	19	25	820	920	M50
	14BG 228-4,6,8	356	80	436	455	311	361	149	225	34	550	325	19	25	850	950	M50
250M	14BG 253-2	406	100	490	495	349	409	168	250	40	642	392	24	30	890	990	M63
	14BG 253-4,6,8	406	100	490	495	349	409	168	250	40	642	392	24	30	890	990	M63
	14BG 258-2	406	100	490	495	349	409	168	250	40	642	392	24	30	890	990	M63
	14BG 258-4	406	100	490	495	349	409	168	250	40	642	392	24	30	960	1060	M63
	14BG 258-6,8	406	100	490	495	349	409	168	250	40	642	392	24	30	890	990	M63
280S	14BG 280-2	457	100	540	555	368	479	190	280	40	712	432	24	30	960	1070	M63
	14BG 280-4,6,8	457	100	540	555	419	479	190	280	40	712	432	24	30	960	1070	M63
280M	14BG 283-2	457	100	540	555	419	479	190	280	40	712	432	24	30	960	1070	M63
	14BG 283-4,6,8	457	100	540	555	419	479	190	280	40	712	432	24	30	960	1070	M63
	14BG 288-2	457	100	540	555	419	479	190	280	40	712	432	24	30	1070	1180	M63
	14BG 288-4	457	100	540	555	419	479	190	280	40	712	432	24	30	1070	1180	M63
	14BG 288-6,8	457	100	540	555	419	479	190	280	40	712	432	24	30	960	1070	M63
315S	14BG 310-2	508	120	610	610	406	527	216	315	50	975	660	28	35	1072	1182	M63
	14BG 310-4,6,8	508	120	610	610	457	527	216	315	50	975	660	28	35	1102	1212	M63
315M	14BG 313-2	508	120	610	610	457	527	216	315	50	975	660	28	35	1072	1182	M63
	14BG 313-4,6,8	508	120	610	610	457	527	216	315	50	975	660	28	35	1072	1182	M63
315L	14BG 316/317-2	508	120	610	610	508	578	216	315	50	975	660	28	35	1232	1342	M63
	14BG 316/317-4,6,8	508	120	610	610	508	578	216	315	50	975	660	28	35	1262	1372	M63
	14BG 318-2	508	120	610	610	508	666	216	315	50	975	660	28	35	1372	1482	M63
	14BG 318-4,6	508	120	610	610	508	578	216	315	50	975	660	28	35	1402	1512	M63
	14BG 318-8	508	120	610	610	508	578	216	315	50	975	660	28	35	1262	1372	M63
	14BG 319-2	508	120	610	610	508	666	216	315	50	975	660	28	35	1372	1482	M63
	14BG 319-4	508	120	610	610	508	666	216	315	50	975	660	28	35	1546	1656	M72
	14BG 319-6,8	508	120	610	610	508	666	216	315	50	975	660	28	35	1486	1596	M72
355	355-2	630	315	760	790	630	1140	254	355	52	1020	665	35	35	1840	2020	-
	355-4,6,8	630	315	760	790	630	1140	254	355	52	1020	665	35	35	1940	2080	-
400	400-2	686	160	810	865	710	1120	280	400	45	1100	700	35	35	1880	2060	-
	400-4,6,8	686	160	810	865	710	1120	280	400	45	1100	700	35	35	1925	2065	-
450	450-6,8	800	225	980	1035	900	1495	280	450	45	1310	860	35	35	2400	2540	-
500	500-8	900	180	1080	1095	1120	1600	315	500	65	1365	865	42	42	2520	2620	-

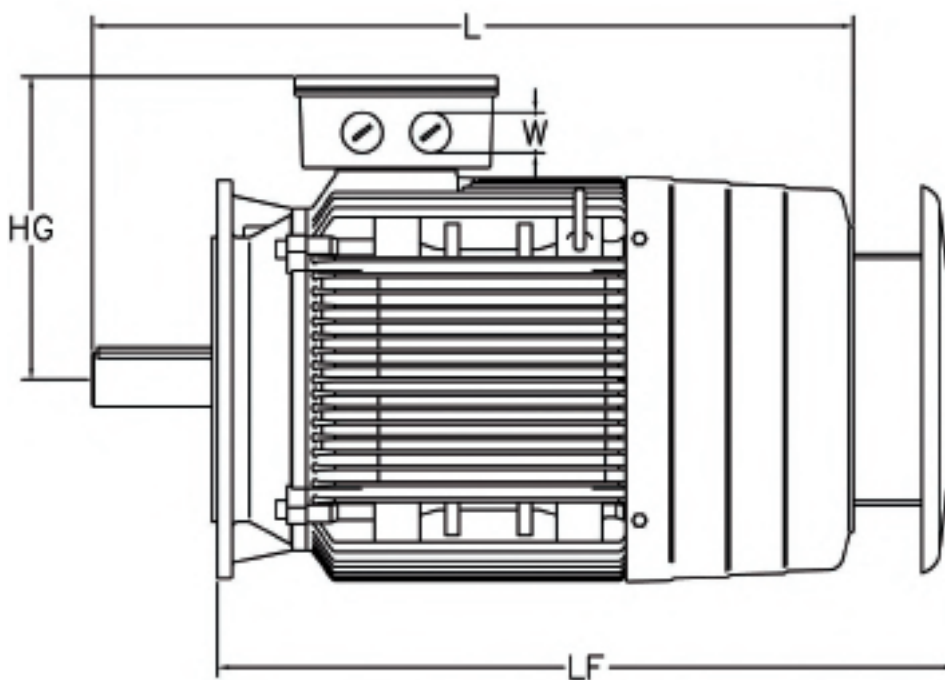
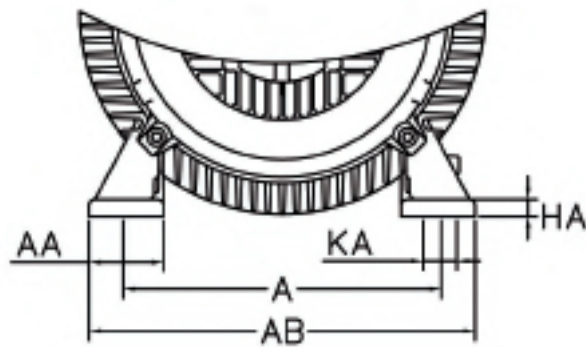
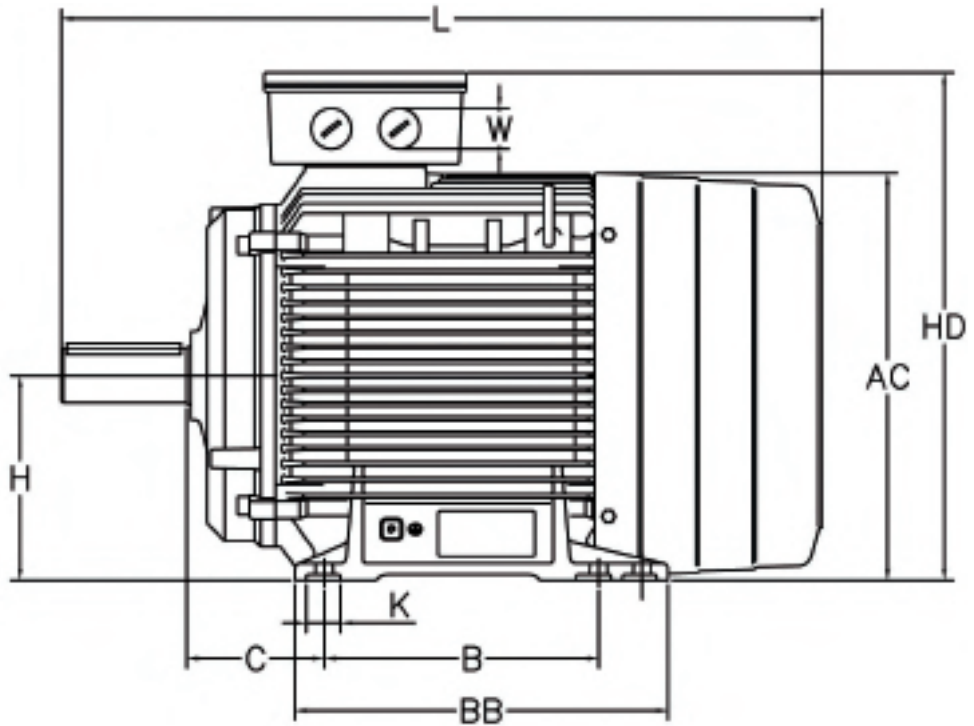
These dimensions are considered as basic in accordance with IEC 72

\*Note: extra type with higher outputs (sample 63M02V)

\*\*Note: HD dimension Type 7BA

\*\*\*Note: Measures for 132M0..V on request

**Overall Dimensions Illustration 9AA, 1T29, 16BG**



**Overall Dimensions 9AA, 1TZ9, 16BG IE2**

IEC	Type	A	AA	AB	AC	B	BB	C	H	HA	HD	HG	K	KA	L	LF	W
80	9AA80M02K	125	30,5	150	163	100	118	50	80	8	200	120	9,5	13,5	273,5	299,5	M16/ M25
	9AA80M 2,4	125	30,5	150	163	100	118	50	80	8	200	120	9,5	13,5	316	334,5	M16/ M25
90	9AA90S 2,4	140	30,5	165	180	100	143	56	90	10	218	128	10	14	331	382,5	M16/ M25
	9AA90L 2,4	140	30,5	165	180	125	143	56	90	10	218	128	10	14	374	409,5	M16/ M25
100	1TZ9100L	160	42	196	198	140	176	63	100	12	266	166	12	16	395,5	428,5	M32
	1TZ9100L*	160	42	198	198	140	176	63	100	12	266	166	12	16	430,5	463,5	M32
112	1TZ9112M	190	46	226	222	140	176	70	112	12	289	177	12	16	389	422	M32
	1TZ9112M*	190	46	226	222	140	176	70	112	12	289	177	12	16	414	447	M32
132	1TZ9132S	216	53	256	262	140	218	89	132	15	334	202	12	16	465	500,5	M32
	1TZ9132M	216	53	256	262	178	218	89	132	15	334	202	12	16	465	500,5	M32
	1TZ9132M*	216	53	256	262	178	218	89	132	15	334	202	12	16	515	550,5	M32
160	1TZ9160M	254	60	300	314	210	300	108	160	18	396,5	236,5	15	19	604	638	M40
	1TZ9160L	254	60	300	314	254	300	108	160	18	396,5	236,5	15	19	604	638	M40
	1TZ9160L*	254	60	300	314	254	300	108	160	18	396,5	236,5	15	19	664	698	M40
180M	16BG183-2	279	65	340	364	241	328	121	180	20	442	262	15	19	720	810	M40
	16BG183-4	279	65	340	364	241	328	121	180	20	442	262	15	19	670	760	M40
180L	16BG186-4,6,8	279	65	340	364	279	328	121	180	20	442	262	15	19	720	810	M40
200L	16BG206-2 & 6	318	70	380	402	305	355	133	200	25	500	300	19	25	720	810	M50
	16BG207- 2 & 6	318	70	380	402	305	355	133	200	25	500	300	19	25	777	867	M50
	16BG207- 4 & 8	318	70	380	402	305	355	133	200	25	500	300	19	25	720	810	M50
225S	16BG220- 4 & 8	356	80	436	445	286	361	149	225	34	550	325	19	25	790	890	M50
225M	16BG223-2	356	80	436	445	311	361	149	225	34	550	325	19	25	820	920	M50
	16BG223-4,6,8	356	80	436	445	311	361	149	225	34	550	325	19	25	850	950	M50
250M	16BG253-2	406	100	490	495	349	409	168	250	40	642	392	24	30	890	990	M63
	16BG253-4	406	100	490	495	349	409	168	250	40	642	392	24	30	960	1060	M63
	16BG253- 6 & 8	406	100	490	495	349	409	168	250	40	642	392	24	30	890	990	M63
280S	16BG280-2	457	100	540	555	368	479	190	280	40	712	432	24	30	960	1070	M63
	16BG280- 4,6,8	457	100	540	555	368	479	190	280	40	712	432	24	30	960	1070	M63
280M	16BG283-2	457	100	540	555	419	479	190	280	40	712	432	24	30	1070	1180	M63
	16BG283-4	457	100	540	555	419	479	190	280	40	712	432	24	30	1070	1180	M63
	16BG283-6 & 8	457	100	540	555	419	479	190	280	40	712	432	24	30	960	1070	M63
315S	16BG310-2	508	120	610	610	406	527	216	315	50	815	500	28	35	1072	1182	M63
	16BG310-4,6,8	508	120	610	610	406	527	216	315	50	815	500	28	35	1102	1212	M63
315M	16BG313-8	508	120	610	610	457	527	216	315	50	815	500	28	35	1102	1212	M63
	16BG313-2	508	120	610	610	457	578	216	315	50	815	500	28	35	1232	1342	M63
	16BG313-4 & 6	508	120	610	610	457	578	216	315	50	815	500	28	35	1262	1372	M63
315L	16BG316-2	508	120	610	610	508	578	216	315	50	815	500	28	35	1232	1342	M63
	16BG316- 4 & 6	508	120	610	610	508	578	216	315	50	815	500	28	35	1262	1372	M63
	16BG316-8	508	120	610	610	508	578	216	315	50	815	500	28	35	1262	1372	M63
	16BG317-8	508	120	610	610	508	578	216	315	50	815	500	28	35	1262	1372	M63
	16BG317-2	508	120	610	610	508	666	216	315	30	815	500	28	35	1372	1482	M63
	16BG317-4 & 6	508	120	610	610	508	666	216	315	30	815	500	28	35	1402	1512	M63
	16BG318- 6 & 8	508	120	610	610	508	666	216	315	30	815	500	28	35	1402	1512	M63
	16BG 318-2	508	120	610	610	508	648	216	315	50	815	500	28	35	1372	1517	-
	16BG 312-2	508	120	610	610	508	648	216	315	50	815	500	28	35	1372	1517	-
16BG 318-4	508	120	610	610	508	666	216	315	50	815	500	28	35	1462	1607	-	
16BG 312-4&6	508	120	610	625	508	666	216	315	30	815	500	28	35	1546	1691	-	
16BG 312-8	508	120	610	625	508	666	216	315	30	815	500	28	35	1486	1631	-	

Flanges and Shafts: Page 18 and 19

These dimensions are considered as basic in accordance with IEC 72

\*Note: extra type with higher outputs (sample 63M02V)

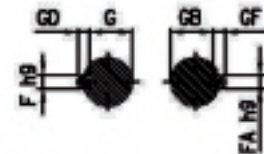
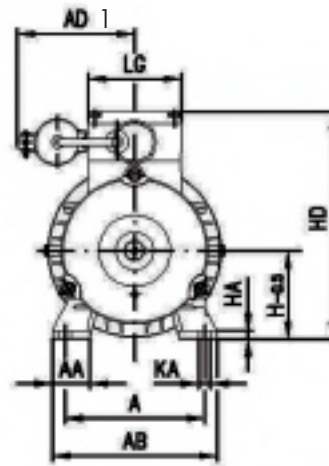
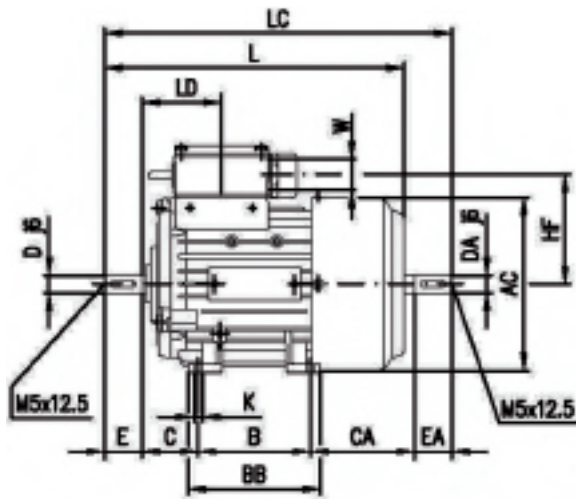
\*\*Note: HD dimension Type 7BA

**Single phase motors, Fan Pump Drive**

Technical data for standard execution, S1- duty, IP55, 230V 50Hz

Low start torque ( fan duty)

Type	Output kW	RPM	Amp. (230V)	cos φ	Ist. In	Mst. Mn	Mmax Mn	Kg IM 1001	Working cap. (450V)	Starting cap. (320V)
7JB63M02K	0,18	2895	1,34	0,94	4,3	0,51	2,50	4,2	5	
7JB63M02	0,25	2850	1,60	0,99	3,8	0,49	1,90	4,8	8	
7JB71M02K	0,37	2895	2,85	0,87	4,2	0,50	2,70	6,2	12	
7JB71M02	0,55	2860	4,15	0,89	4,0	0,42	2,10	8,1	16	
7JB80M02K	0,75	2805	4,90	0,94	5,6	0,32	2,36	9,5	16	
7JB80M02	1,10	2810	6,60	0,97	6,1	0,35	2,53	11,1	25	
7JB90S02	1,50	2820	9,20	0,96	6,2	0,42	3,13	14,6	40	
7JB90L02	2,20	2750	13,4	0,98	4,5	0,37	1,75	17,3	50	
7JB63M04K	0,12	1415	1,00	0,90	5,1	0,41	2,50	24,2	4	
7JB63M04	0,18	1385	1,57	0,86	2,6	0,38	1,58	4,3	5	
7JB71M04K	0,25	1400	1,86	0,99	2,6	0,54	1,66	4,9	10	
7JB71M04	0,37	1395	2,65	0,95	2,3	0,54	1,58	6,2	14	
7JB80M04K	0,55	1415	3,70	0,96	2,6	0,52	1,60	7,4	14	
7JB80M04	0,75	1405	4,80	0,96	3,0	0,50	1,70	9,4	20	
7JB80M04	0,75	1405	4,80	0,96	3,1	0,40	1,64	10,4	20	
7JB90S04	1,10	1420	6,60	0,98	3,1	0,37	1,78	13,9	30	
7JB90L04	1,50	1430	8,70	0,97	3,7	0,35	1,80	17,1	40	
7JB100L04	2,20	1445	13,7	0,93	3,6	0,43	1,92	27,1	60	



Type 7JB	A	AA	AB	AC	AD	B	BB	C	CA	H	HA	HD	HF	K	KA	L	LC	LD	LG	W	D-DA	E-EA	F-FA	G-GB	GD-GF
63- M..K 63- M	100	27	120	118	94	80	96	40	66 92	63	7	164	77,5	7	10	202,5 228,5	232 258	69,5	75		11	23	4	8,5	4
71	112	30,5	132	139	94,5	90	106	45	83	71	7	182	87,5	7	10	240	278	63,5	75		14	30	5	11	5
80 80M02	125	30,5	150	156,5	103,5	100	118	50	94 137	80	8	200	96,5	9,5	13,5	273,5 316	324 366,5	63,5	75	M25X 1,5	19	40	6	15,5	6
90 90L02	140	30,5	165	173,5	109	100	143	56	143 186	90	10	218	105	10	14	331 374	389 432	79	75		24-19	50-40	8-6	20-15,5	7-6
100	160	42	196	196	138	140	176	63		100	12	263	123	12	16	425		102	120		28	60	8	24	7

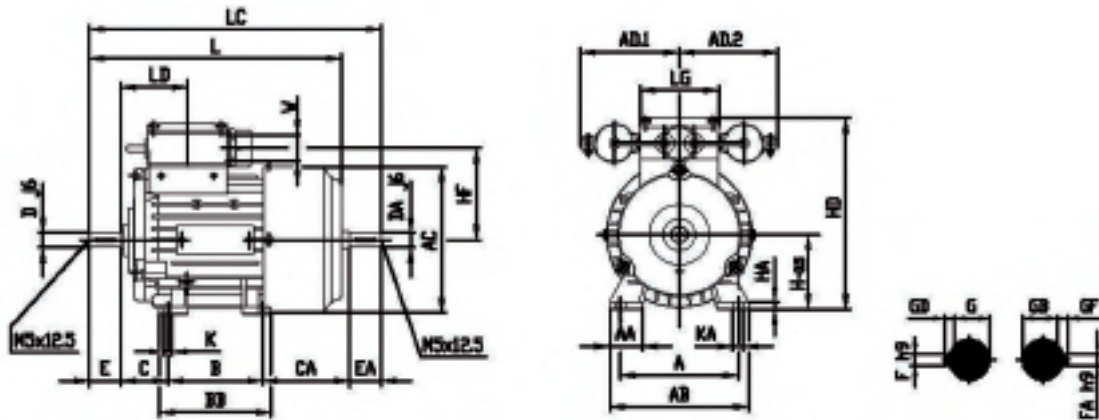


**Single phase motors, Constant Torque**

Technical data for standard execution, S1- duty, IP55, 230V 50Hz

High start torque

Type	Output kW	RPM	Amp. (230V)	cos φ	Ist. In	Mst. Mn	Mmax Mn	Kg IM 1001	Working cap. (450V)	Starting cap. (320V)
7JE63M02K	0,18	2895	1,34	0,94	5,2	1,9	2,5	4,5	5	25
7JE63M02	0,25	2850	1,6	0,99	4,6	1,8	1,9	5,1	8	25
7JE71M02K	0,37	2800	2,7	0,94	3,9	1,4	1,66	6,5	10	40
7JE71M02	0,55	2820	3,55	0,95	4	1,4	1,72	8,5	12	40
7JE80M02K	0,75	2845	4,7	0,98	4,1	1,41	1,6	9,9	18	60
7JE80M02	1,1	2860	6,7	0,98	4,4	1,4	1,75	11,4	25	80
7JE90S02	1,5	2845	9,25	0,98	4,5	2	2,04	14,9	35	120
7JE90L02	2,2	2830	13,3	0,97	4,8	1,85	2,15	17,8	40	160
7JE100L02	3	2840	17,5	0,97	5,3	2,1	2,5	24,9	60	180
7JE63M04K	0,12	1415	1	0,9	3,65	1,94	1,57	4,5	4	16
7JE63M04	0,18	1385	1,57	0,86	3,7	1,77	1,66	5,3	5	25
7JE71M04K	0,25	1400	1,86	0,99	3,4	1,6	1,58	6,5	10	25
7JE71M04	0,37	1395	2,65	0,95	3,2	1,8	1,6	7,7	14	25
7JE80M04K	0,55	1415	3,7	0,96	3,6	1,7	1,7	9,8	14	40
7JE80M04	0,75	1405	4,8	0,96	3,9	1,91	1,64	10,9	20	60
7JE90S04	1,1	1420	6,6	0,98	3,8	1,62	1,78	14,3	30	80
7JE90L04	1,5	1430	8,7	0,97	4,3	1,85	1,8	17,4	40	120
7JE100L04	2,2	1440	12,9	0,96	4,4	2,6	1,92	27,6	60	180



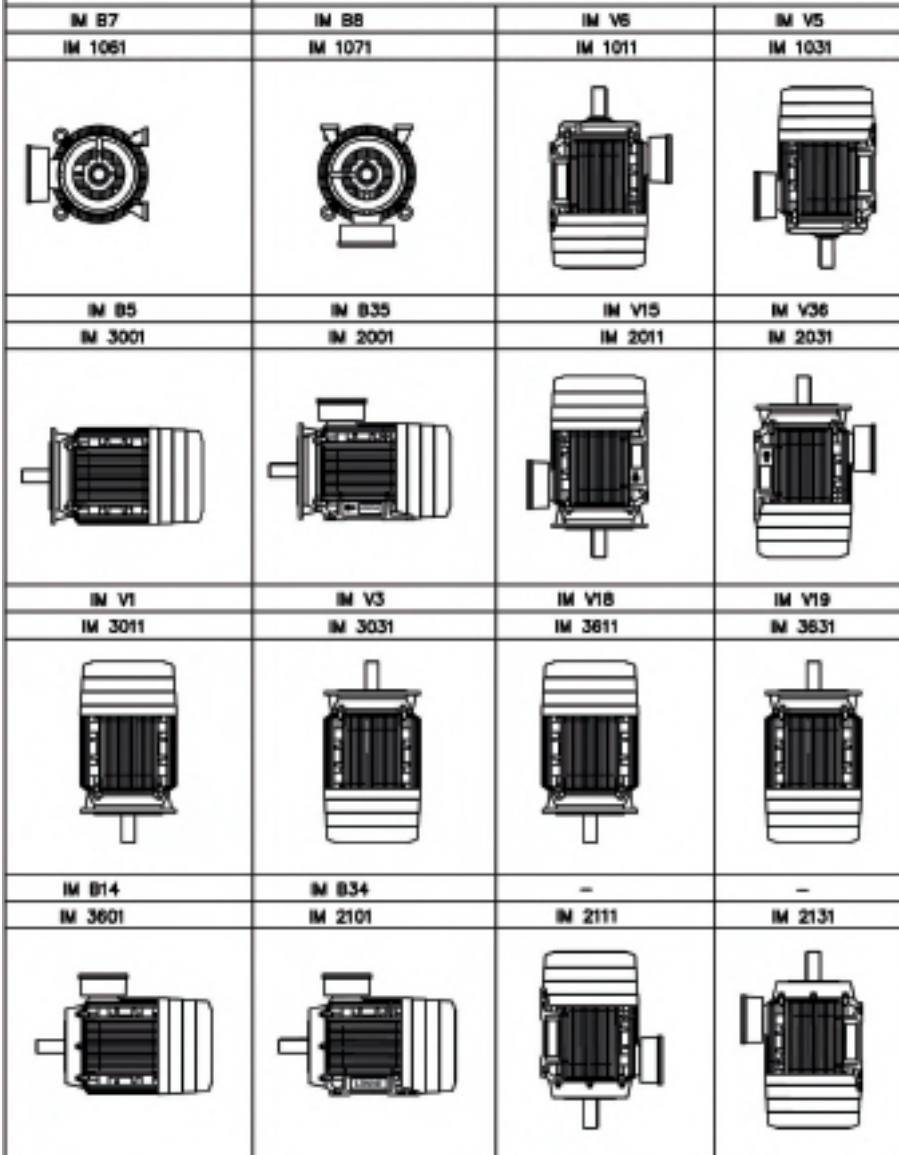
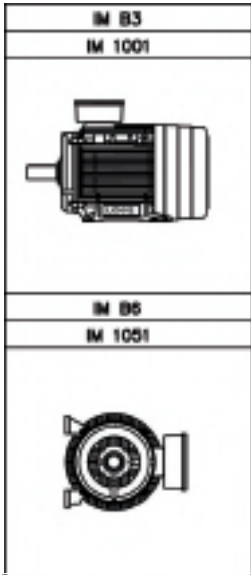
Type 7JE	A	AA	AB	AC	AD1	AD2	B	BB	C	H	HA	HD	HF	K	KA	L	LD	LG	W	D	E	F	G	GD
<b>63- M..K 63- M</b>	100	27	120	118	99	94	80	86	40	63	7	64	77,5	7	10	253,5 279,5	69,5	75	M25X 1,5	11	23	4	8,5	4
<b>71</b>	112	30,5	132	139	99,5	94,5	90	106	45	71	7	182	87,5	7	10	292	63,5	75	M25X 1,5	14	30	5	11	5
<b>80</b>	125	30,5	150	156,5	94	94	100	118	50	80	8	200	96,5	9,5	13,5	328	63,5	75	M25X 1,5	19	40	6	15,5	6
<b>90</b>	140	30,5	165	173,5	109	114	100	143	56	90	10	218	104,5	10	14	383	79	75	M25X 1,5	24	50	8	20	7
<b>100</b>	160	42	196	196	138	138	140	176	63	100	12	263	123	12	16	458	102	120	M25X 1,5	28	60	8	24	7

**Mounting Options**

**Standards**

All Lönne- motors are manufactured according to norms as following standards:

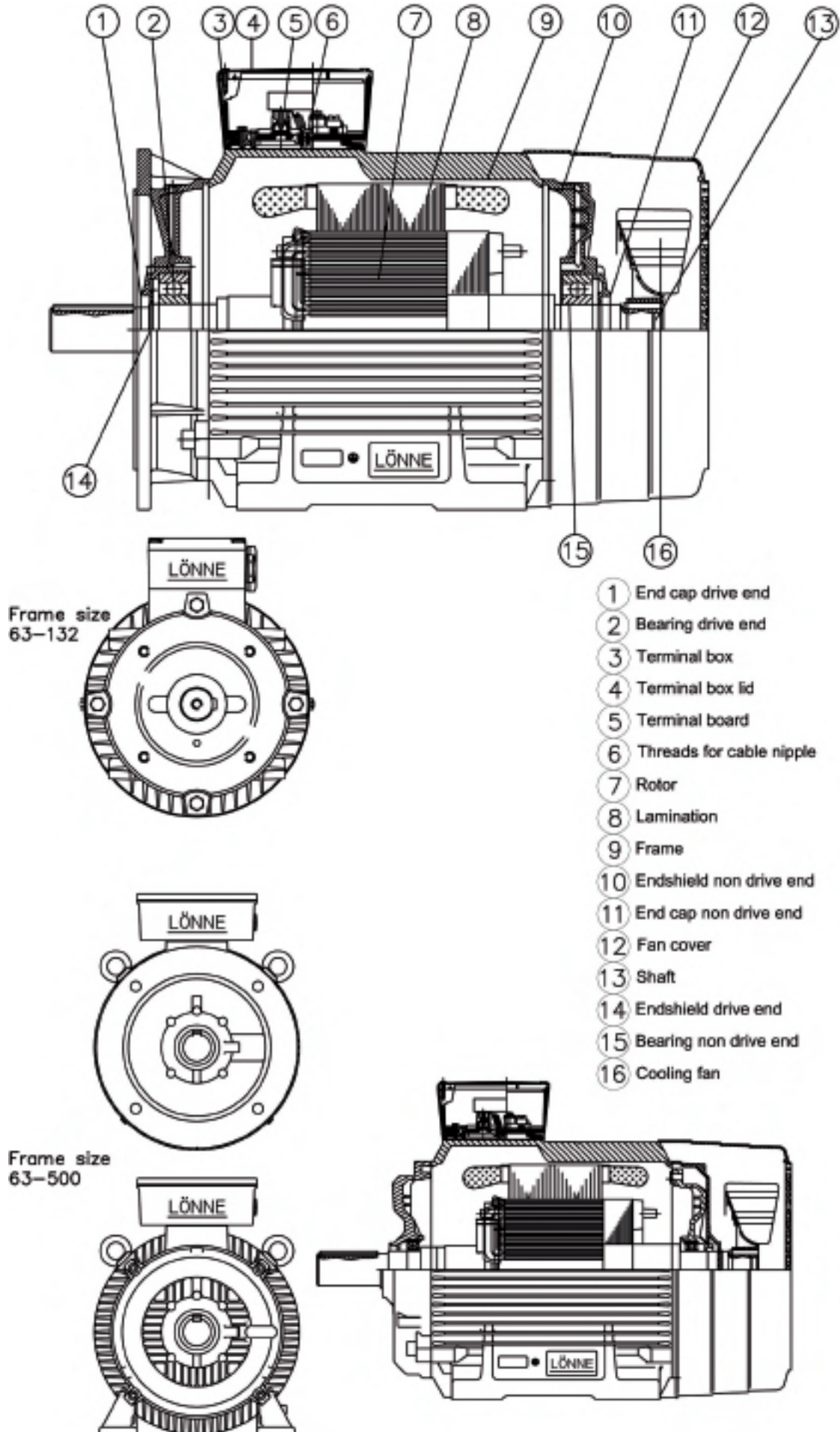
EN 50347	EN 60034-6	EN 60034-11	IEC 60038
EN 60034-1	EN 60034-7	EN 60034-12	IEC 60085
EN 60034-2	EN 60034-8	EN 60034-14	DIN 42925
EN 60034-5	EN 60034-9	IEC 60072	DIN ISO 10816



On occasions of ordering mounting forms at frame size 315 or larger, please consult Lönne. If foot mounted motors larger than frame size 180 M are mounted on the wall, it is recommended to support the motor feet.

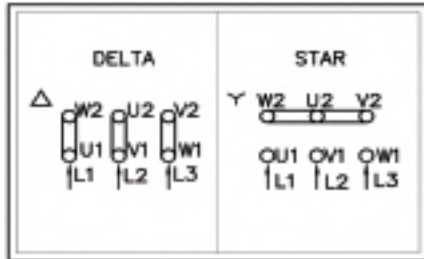
acc. EN 60034-7

Spare part Illustration

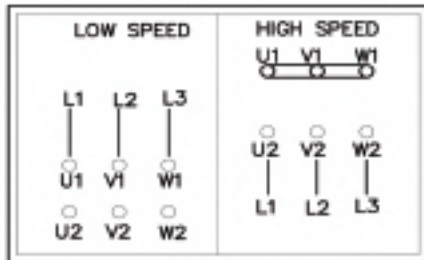


**Terminal Marking/ Connections**

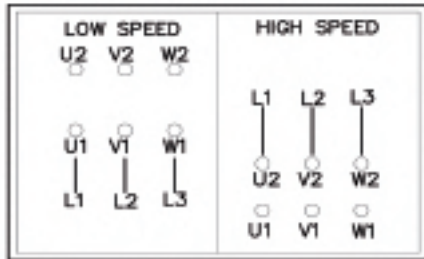
**Three-phase motors  
Single speed**



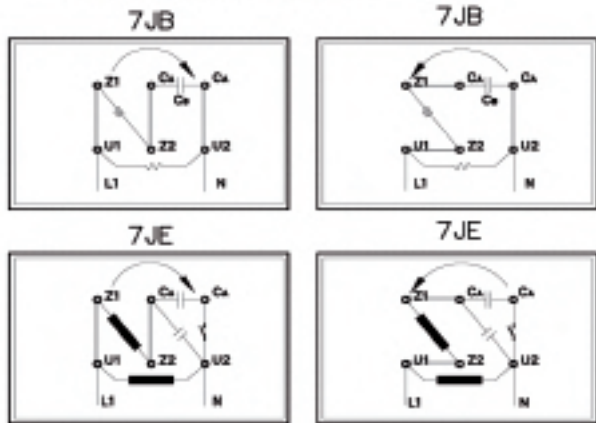
**2-Speed motors  
Dahlander-connection  
750-1500 and 1500-3000rpm**



**Separate windings  
1000-1500, 750-3000 and 750-1000**

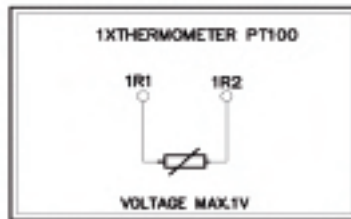


**Single phase motors**

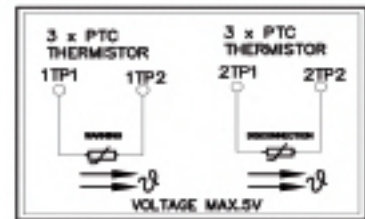


- A11 : 3PTC thermistors for tripping
- A12 : 6PTC thermistors for warning and tripping
- A23 : 1x temperature sensor KTY84-130
- A25 : 2x temperature sensor KTY84-130
- K45/K46/1VT: Anticondensation heaters
- A31 : 1x temperature detector for tripping
- A60 : 3x resistance thermometers PT100
- A61 : 6x resistance thermometers PT100
- A62 : 1x thermometer PT100
- A72 : 2screwed-in resistance thermometers (basic circuit) for rolling-contact bearing

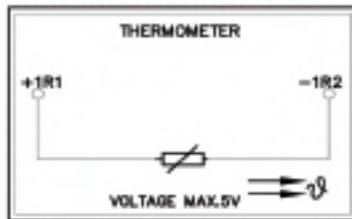
**A62**



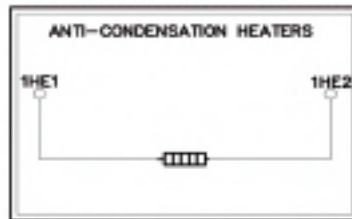
**A12**



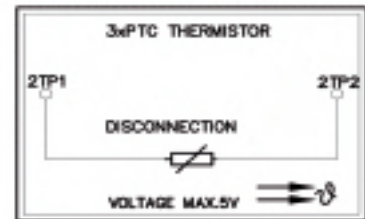
**A23**



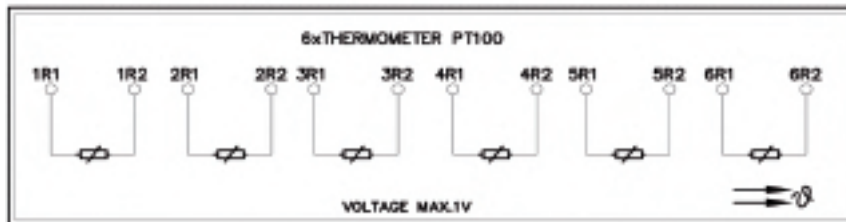
**K45/K46 /1VT**



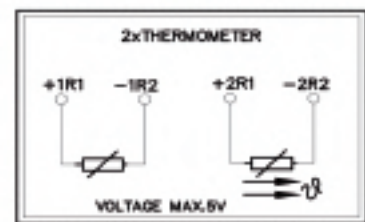
**A11**



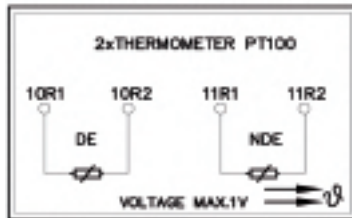
**A61**



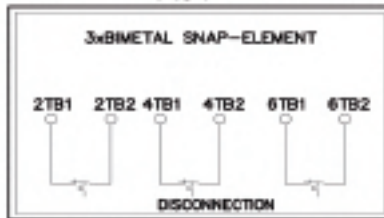
**A25**



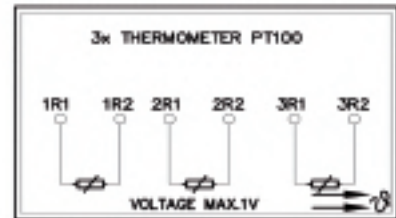
**A72**



**A31**



**A60**



**Brakes**

**Design and mode of operation.**

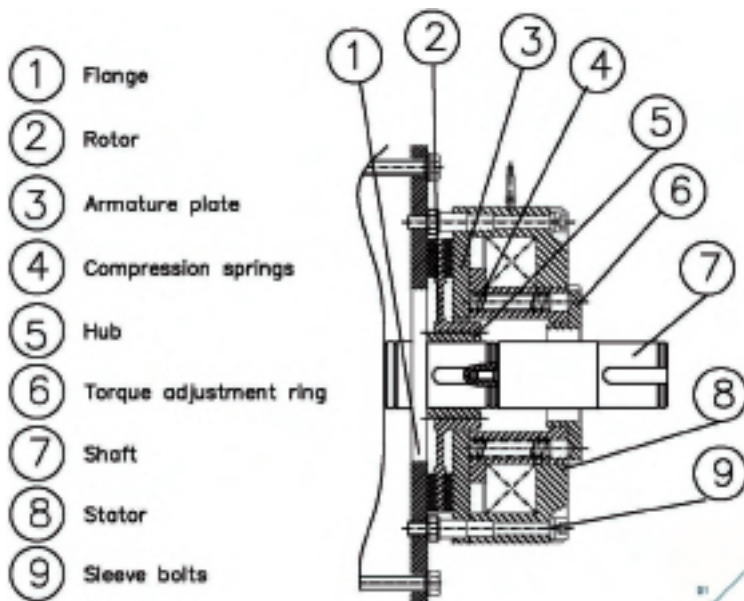
The brake takes the form of a single- disk brake with two friction surfaces.

The braking torque is generated by friction when pressure is applied by one or more pressure springs in the deenergized state. The brake is released electromagnetically. When the motor brakes, the rotor which can be axially shifted on the hub or the shaft, is pressed

via the armature disk against the friction surface by means of the springs. In the braked state there is a gap  $S_{Gap}$  between the armature disc and the solenoid component. To release the brake, the solenoid is energized with DC voltage. The resulting magnetic force pulls the armature disk against the spring force on to the solenoid component. The spring force is then no longer applied to the rotor which can rotate freely.

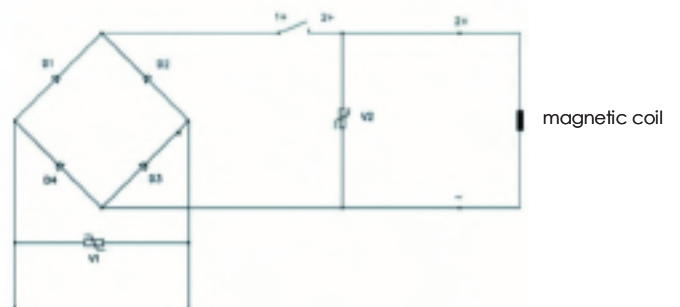
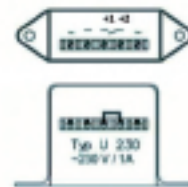
Operation Values for spring- operated brakes with standard excitation.											
For motor Frame Size	Brake type	Rated brake torque Nm	Voltage AC via rectifier to DC (Coil)	Current/ power		Brake applica- tion time ms	Brake release time. Ms	Noise level $L_p$ with rated air gap db (A)	Brake moment of inertia	Dimension Length increase on all types $\Delta l$ mm	
				A	W						
63	2LM8 005-1NA10	5	AC 230 / DC205	0.11	20	25	56	77	0.000013	51	
71	2LM8 005-2NA10	5	AC 230 / DC205	0.11	20	25	56	77	0.000013	51	
80	2LM8 010-3NA10	10	AC 230 / DC205	0.14	25	26	70	75	0.000045	54	
90	2LM8 020-4NA10	20	AC 230 / DC205	0.17	32	37	90	75	0.00016	75	
100	2LM8 040-5NA10	40	AC 230 / DC205	0.22	40	43	140	80	0.00036	78	
112	2LM8 060-6NA10	60	AC 230 / DC205	0.28	53	60	210	77	0.00063	87	
132	2LM8 100-7NA10	100	AC 230 / DC205	0.31	55	50	270	77	0.0015	106	
160	2LM8 260-8NA10	260	AC 230 / DC205	0.50	100	165	340	79	0.0073	129	
180	2LM8 315-0NA10	315	AC 230 / DC205	0.56	100	152	410	79	0.0073	125	
200	2LM8 400-0NA10	400	AC 230 / DC205	0.61	110	230	390	93	0.0200	137	
225	2LM8 400-0NA10	400	AC 230 / DC205	0.61	110	230	390	93	0.0200	239	

**Design of the 2LM8 Spring- operated disk brake**



**Type U230**

Technical data:  
max.input voltage 275V AC  
max.DC current 1A



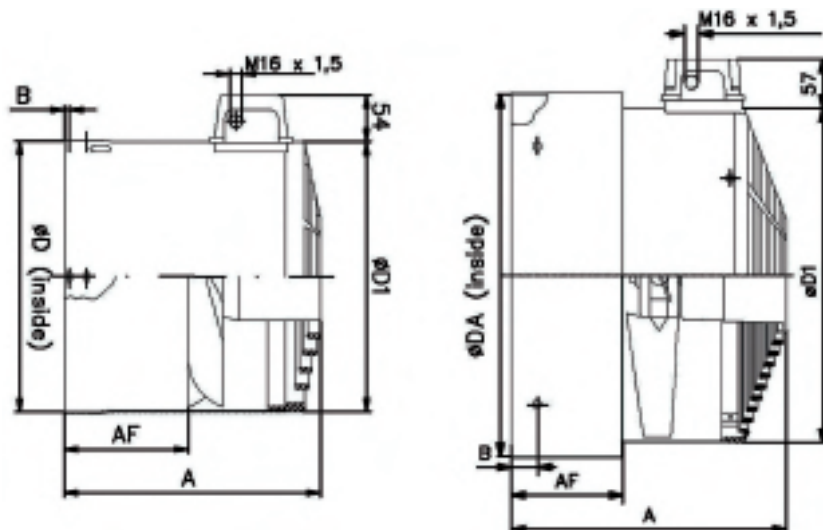
**External Cooling Fan Unit**

Item name		type number	IP	1~D 230-277V	3~D 220-290V	3~Y 380-500V	1~D 230-277V	3~D 220-332 V	3~Y 380-575V
size 63	A=151mm	17.00.0061	66	0,10A / 27W	0,10A / 29W	0,05A / 29W	0,11A / 38W	0,10A / 32W	0,06A / 32W
size 71	A=165mm	17.00.0062	66	0,10A / 28W	0,10A / 30W	0,05A / 30W	0,12A / 41W	0,10A / 33W	0,06A / 33W
size 80	A=166mm	17.00.0063	66	0,11A / 29W	0,10A / 31W	0,05A / 31W	0,13A / 44W	0,10A / 34W	0,06A / 34W
size 90	A=195mm	17.00.0064	66	0,25A / 71W	0,28A / 85W	0,16A / 85W	0,25A / 88W	0,26A / 90W	0,15A / 90W
size 100	A=200mm	17.00.0065	66	0,31A / 86W	0,35A / 100W	0,19A / 100W	0,29A / 79W	0,32A / 105W	0,18A / 105W
size 112	A=255mm	17.00.0654	66	0,26A / 73W	0,27A / 85W	0,15A / 85W	0,39A / 95W	0,28A / 94W	0,16A / 94W
size 132	A=252mm	17.00.0197	66	0,40A / 115W	0,45A / 138W	0,24A / 138W	0,31A / 107W	0,41A / 148W	0,24A / 148W
size 160	A=295mm	17.00.0181	66	0,96A / 236W	0,76A / 220W	0,43A / 220W	0,31A / 107W	0,94A / 284W	0,56A / 284W
size 180	A=320mm	17.00.0284	66	0,96A / 236W	0,76A / 220W	0,43A / 220W	0,59A / 185W	0,94A / 284W	0,56A / 284W
size 200	A=320mm	17.00.0283	66	0,96A / 236W	0,76A / 220W	0,43A / 220W	0,59A / 185W	0,94A / 284W	0,56A / 284W
					<b>3~D 220-290V</b>	<b>3~Y 380-500V</b>			<b>3~Y 380-690V</b>
size 225	A=411mm	17.00.1088	66		0,87A / 335W	0,5A / 335W		0,87A / 355W	0,5A / 335W
size 250	A=435mm	17.00.1089	66		0,87A / 335W	0,5A / 335W		0,87A / 355W	0,5A / 335W
					<b>3~D 220-400V</b>	<b>3~Y 380-690V</b>			<b>3~Y 380-690V</b>
size 280	A=449mm	17.00.1090	66		1,58A / 650W	0,91A / 650		1,58A / 650W	0,91A / 650
size 315	A=473mm	17.00.1091	66		1,58A / 650W	0,91A / 650		1,58A / 650W	0,91A / 650

**External cooling units dimension table**

type	item name b	type number	L +	A	AF	B	D	D1	Air Volume
size 63	A=151mm	17.00.0061	89,5	151	56	5,5	116	124	47m3/ h
size 71	A=165mm	17.00.0062	89,5	165	70	5,5	138	139	60m3/ h
size 80	A=166mm	17.00.0063	118,5	166	71	5,5	155	157	88m3/ h
size 90	A=195mm	17.00.0064	99,5	195	90	5,5	172	177	169m3/ h
size 100	A=200mm	17.01.0065	99	200	95	6	194	195	208m3/ h
size 112	A=255mm	17.00.0654	142	255	150	6	219	219	295m3/ h
size 132	A=252mm	17.00.0197	121	252	125	6	258	258	450m3/ h
size 160	A=295mm	17.00.0181	146	292	143	6	312	311	780m3/ h
									<b>DA</b>
size 180	A=320mm	17.00.0284	120	320	168	50	350	311	860m3/ h
size 200	A=320mm	17.00.0283	115	320	168	55	390	311	950m3/ h
size 225	A=411mm	17.00.1088	194	411	216	65	424	385	1350m3/ h
size 250	A=435mm	17.00.1089	195	435	240	73	475	385	1500m3/ h
size 280	A=449mm	17.00.1090	205	449	249	73	525	480	2800m3/ h
size 315	A=473mm	17.00.1091	202	473	273	58	586	480	3200m3/ h

L + = Additional length to standard fan cover

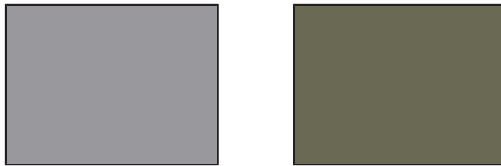


**Design, Painting Colours, Balance and Vibration Severity**

Type	Design
7AA63 - 90	Aluminium housing and terminal box(turnable 4x90°)
7AA100 - 160	Aluminium housing and terminal box, cast iron end shields and flanges. The terminal box cable entries are located in the terminal box cast on the frame. (The cable entry rotate by 180°) Foot mounted motors of frame size 112-160 are of bolt on design. (FS 100 on request).
7BA100 - 160	Cast iron housing, end- shields and flanges. Cast iron terminal box(turnable 4x90°) Foot mounted motors of frame size 100-160 are of bolt on design.
1T29 A	Aluminium housing and terminal box(turnable 4x90°), aluminium end shields and B5 flange. Flange B14 cast iron.Snap in fancover in reinforced plastic. Frame for B5 motors are delivered with option for bolt on design.
14BG/16GB 180-315	Cast iron housing, end- shields and flanges. Cast iron terminal box(turnable 4x90°) Frame size 180 –315 Plastic fan cover, metal as option. Motors in mounting form B5, can be modified with bolt on feet.
355 - 400	Cast iron housing, end- shields and flanges. Cast iron terminal box(turnable)

**Colours and paint finish**

All motors frame size 63 - 160 are painted with **RAL 7030**. Frame size 180-355 are painted with **RAL 7005**.



**Balance and vibration severity.**

All of the rotors are dynamically balanced with half key. The vibrational characteristics and behaviour of electrical machinery is specified in EN 60034-14. "Half key balancing" is specified here based on ISO 8821. The balancing is stamped on the face of the shaft on the drive- end.

Vibration grade	Shaft height mm	66 ≤ H ≤ 132			132 ≤ H ≤ 280			H > 280		
		Mounting	Displac. µm	Vel. mm/s	Acc. m/s²	Displc. µm	Vel. mm/s	Acc. m/s²	Displac. µm	Vel. mm/s
A	Free suspension	25	1,6	2,5	35	2,2	3,5	45	2,8	4,4
	Rigid Mounting	21	1,3	2	29	1,8	2,8	37	2,3	3,6
B	Free suspension	11	0,7	1,1	18	1,1	1,7	29	1,8	2,8
	Rigid Mounting				14	0,9	1,4	24	1,5	2,4

Grade "A" applies to machines with no special vibration requirements.

Grade "B" applies to machines with special vibration requirements. Rigid mounting is not considered acceptable for Machines with shaft heights less than 132 mm

The interface frequencies for displacement/velocity and velocity/acceleration are 10Hz and 250 Hz respectively.

**Note 1** The manufacturer and the purchaser should take into account that the instrumentation can have a measurement tolerance of ± 10%

**Note 2** The shaft height of a machine without feet, or a machine with raised feet, or any vertical machine is to be taken as the shaft height of a machine in the same basic frame, but of the horizontal shaft foot-mounting type.

### Bearing and lubrication

The nominal bearing lifetime is defined acc. To standardized calculation procedures (DIN ISO 281). Under average operating conditions, a lifetime (Lh10) of 100,000 hours can be achieved.

Frame size Type	Poles	D- end bearing	N- end bearing	Lubrication
7AA63	2 to 8	6201- ZZ C3	6201- ZZ C3	Closed non- lubricated bearings
7AA71	2 to 8	6202-2Z C3	6202-2Z C3	Closed non- lubricated bearings
7AA80 / 9AA	2 to 8	6204-2Z C3	6204-2Z C3	Closed non- lubricated bearings
7AA90 / 9AA	2 to 8	6205-2Z C3	6205-2Z C3	Closed non- lubricated bearings
7AA100	2 to 8	6206-2Z C3	6205-2Z C3	Closed non- lubricated bearings
7BA100 / 1TZ9	2 to 8	6206-2Z C3	6206-2Z C3	Closed non- lubricated bearings
7AA112 / 1TZ9A	2 to 8	6206-2Z C3	6206-2Z C3	Closed non- lubricated bearings
7BA112 / 1TZ9C	2 to 8	6306-2Z C3	6306-2Z C3	Closed non- lubricated bearings
7AA132 / 1TZ9A	2 to 8	6208-2Z C3	6208-2Z C3	Closed non- lubricated bearings
7BA132 / 1TZ9C	2 to 8	6308-2Z C3	6308-2Z C3	Closed non- lubricated bearings
7AA160 / 1TZ9A	2 to 8	6209-2Z C3	6209-2Z C3	Closed non- lubricated bearings

				Lubrication interval (hours)	Quantity of Grease (gram)
7BA160 / 1TZ9C	2	6309 C3	6309 C3	4000 h	20g
7BA160 / 1TZ9C	2 to 8	6309 C3	6309 C3	8000 h	20g
14/16BG. Frame size 180	2	6310 C3	6310 C3	4000 h	20g
14/16BG. Frame size 180	4 to 8	6310 C3	6310 C3	8000 h	20g
14/16BG. Frame size 200	2	6312 C3	6312 C3	4000 h	20g
14/16BG. Frame size 200	4 to 8	6312 C3	6312 C3	8000 h	20g
14/16BG. Frame size 225	2	6313 C3	6313 C3	4000 h	20g
14/16BG. Frame size 225	4 to 8	6313 C3	6313 C3	8000 h	20g
14/16BG. Frame size 250	2	6315 C3	6315 C3	4000 h	25g
14/16BG. Frame size 250	4 to 8	6315 C3	6315 C3	8000 h	25g
14/16BG. Frame size 280	2	6217 C3	6217 C3	4000 h	25g
14/16BG. Frame size 280	4 to 8	6317 C3	6317 C3	8000 h	30g
14/16BG.310-317 Frame size 315	2	6316 C3	6316 C3	3000 h	30g
14/16BG.318-319 Frame size 315	2	6316 C3	6316 C3	2000 h	30g
14/16BG.310-317 Frame size 315	4	6319 C3	6319 C3	6000 h	40g
14/16BG.318-319 Frame size 315	4	6319 C3	6319 C3	3000 h	40g
14/16BG.310-319 Frame size 315	6..8	6319 C3	6319 C3	6000 h	40g

Horizontally mounted motors and coolant temperature up to 40°C, the grease lifetime should be:

Approx. 40,000 operation hours for speeds of 1500 rpm

Approx. 20,000 operation hours for speeds of 3000 rpm

Irrespective of the number of operation hours, the grease should be renewed every 3 years because of ageing.

In the case of motors operating under special conditions, such as vertical motor position, frequent operation at maximum speed  $n_{max}$ , heavy vibration, sudden load changes and frequent reversing operation, the bearing should be changed at considerably more frequent intervals than at the operating hour stated above.

### Electric Motors Marine and Industrial

Type of grease for standard machines: (Fa.ESSO / UNIREX N3), grease lifetime and lubrication intervals are valid for this type of grease only. Compensatory greases must conform to DIN 51825- KL3N at least. In this case the lubrication intervals at  $KT > 25^\circ C$  are to be reduced. Special greases are introduced on the lubricating data plate. If the coolant temperature is increased by 10K, the grease life and regreasing interval are halved. Only relubricate bearings when the motor has a speed of at least  $n > 300$  rpm.

### Sample of Lubrication nameplate

D- end bearing	N- end bearing
6317C3	6317C3
Coolant temp.	40°C
Operating hours	8000 h
Quantity of D- end/ N- end	30 g
At each lubrication point. Press in during operation	
Grease DIN 51 825 - K3P-20 Li- soap	
Delivered with ESSO UNIREX N3	

### Insulated bearings

To prevent damage as a result of bearing currents, insulated bearings can be supplied at the non- drive end NDE from frame size 225 to 315 and are recommended for frame size 280 and above.



## Degree of Protection

All motors are designed to IP55 degree of protection. They can be installed in dusty or humid environments. The motors are suitable for operating in tropical climates. Guide value <60%, relative humidity at KT40°C. Other requirements are available on request. Most motors can be supplied in IP56 and IP65 degree of protection on request.

### IP First number - Protection against solid objects

0	No special protection
1	Protected against solid objects up to 50mm, e.g. accidental touch by hands
2	Protected against solid objects up to 12mm, e.g. fingers
3	Protected against solid objects over 2.5mm (tools and wires)
4	Protected against solid objects over 1mm (tools, wire, and small wires)
5	Protected against dust limited ingress (no harmful deposit)
6	Totally protected against dust

### IP Second number - Protection against liquids

0	No protection
1	Protection against vertically falling drops of water e.g. condensation
2	Protection against direct sprays of water up to 15° from vertical
3	Protected against direct sprays of water up to 60° from the vertical
4	Protection against water sprayed from all directions ° limited ingress permitted
5	Protected against low pressure jets of water from all directions ° limited ingress
6	Protected against low pressure jets of water, e.g. for use on ship decks - limited ingress permitted
7	Protected against the effect of immersion between 15cm and 1m
8	Protects against long periods of immersion under pressure

## Insulation System

For details of order codes for use in temperature class F, see "DURIGNIT IR 2000 insulation system" under "windings and insulation".

The following applies to all motors: The motors can withstand 1.5 times the rated current at rated voltage and frequency for two minutes (DIN EN 60034).

Ambient temperature:

All motors can be used in standard version at ambient temperatures between -20 and +40 °C.

Motors can be used in temperature class F

- at 40° C with service factor 1.1, i.e. the motor can be continuously overloaded with 10 % of the rated output (for motors of 16BG and 9AA series, with the exception of 9AA with increased output, with service factor 1.15, i.e. 15 % of the rated output).

- above 40° C at rated output

When motors are used in temperature class B for higher ambient temperatures and site altitudes derating occurs in accordance with the table "Reduction factor k HT for different site altitudes and/ or ambient temperatures".

For other temperatures special measures are necessary. When brakes are to be mounted on motors intended for operation at temperatures below freezing, please contact your local Lönne office.

## Winding and insulation

### DURIGNIT IR 2000 insulation system

The DURIGNIT IR 2000 insulation system comprises high- grade enameled wires and insulating sheet materials combined with solvent-free impregnating resin.

The system ensures a high level of mechanical and electrical strength as well as good serviceability and a long motor life. The insulation system protects the winding against aggressive gases, vapours, dust, oil and increased air humidity. It can withstand the usual vibration stressing. The insulation is suitable up to an absolute air humidity of 30 g water per m<sup>3</sup> of air. Moisture condensation should be prevented from forming on the winding. Please contact your local Lönne office if higher values are present. Please enquire about extreme applications.

### Winding and insulation design with regard to temperature class and air humidity

All motors are designed for temperature class F. At rated output with line- fed operation, the motors can be used in temperature class B.

### Temperature class F, used in accordance with F, with service factor (SF)

For all 7AA/7BA and 14BG motors for line- fed operation in frame sizes 63 to 315 for rated output given in the selection table and rated output given in the selection table and rated voltage, a service factor of 1.1 can be specified.

### Temperature class F, used in accordance with F, for increased output

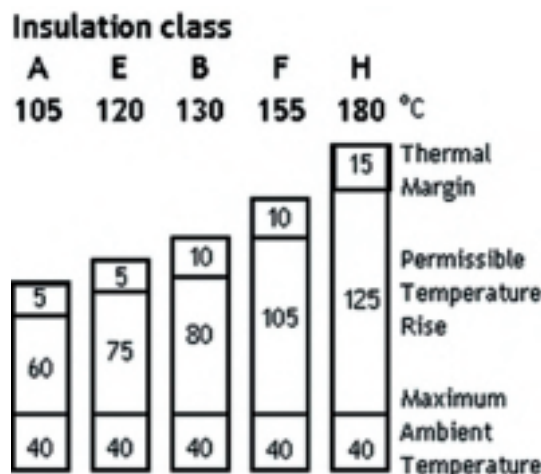
For motors supplied from stock for use in accordance with temperature class F, the rated output according to the selection and ordering data can be increased by 10 %.

### Temperature class H for rated output and maximum ambient temperature (AT) 60 °C

For motors of series 7AA/7BA and 14BG use in accordance with temperature class H is permitted at rated output and at a maximum ambient temperature of a 60 °C. The specified grease life applies at an ambient temperature of 40 °C. For a 10 K increase in ambient temperature, the grease life of lubrication interval is halved. Please contact your local Lönne office.

### Temperature class F, used in accordance with B, ambient temperature 45 °C, approx. 4% derating

For motors of series 7AA/7BA and 14BG a version can be ordered that is designed to temperature class F, for use in accordance with temperature class B at a maximum ambient temperature of 45 °C at 4% derating.



## Ambient Temperature and Humidity

### Temperature class F, used in accordance with B, ambient temperature 50 °C, approx. 8% derating

For motors of series 7AA/7BA and 14BG a version can be ordered that is designed to temperature class F, for use in accordance with temperature class B at a maximum ambient temperature of 50 °C at 8% derating.

### Temperature class F, used in accordance with B, ambient temperature 55 °C, approx. 13% derating

For motors of series 7AA/7BA and 14BG a version can be ordered that is designed to temperature class F, for use in accordance with temperature class B at a maximum ambient temperature of 55 °C at 13% derating.

### Temperature class F, used in accordance with B, ambient temperature 60 °C, approx. 18% derating

For motors of series 7AA/7BA and 14BG a version can be ordered that is designed to temperature class F, for use in accordance with temperature class B at a maximum ambient temperature of 60 °C at 18% derating. Please contact your local Lönne office.

### Increased air temperature/ humidity with more than 60 g up to 100 g water per m3 of air

For motors of series 7AA/7BA and 14BG a version can be ordered for increased air humidity of between 60 and 100 g water per m3 of air depending on the temperatures as listed in table below. In this case, the external bolts can be supplied in rust- proof material. This option not include any condensation protection, so an anti- condensation heater (order code K45/ K46) must be ordered separately if required. Please contact your local Lönne office.

### Increased air temperature/ humidity with 30 to 60 g water per m3 of air

For motors of series 7AA/7BA and 14BG a version can be ordered for increased air humidity of between 30 and 60 g water per m3 of air depending on the temperatures as listed in table below. In this case, the external bolts can be supplied in rust- proof material. This option not include any condensation protection, so an anti- condensation heater ( order code K45/ K46) must be ordered separately if required. Please contact your local Lönne office.

Relativehumidity	Temp 20° C	30° C	40° C	50° C	60° C	70° C	80° C	90° C
10%	2	3	5	8	13	20	29	42
15%	3	5	8	12	19	30	44	63
20%	3	6	10	17	26	39	58	84
25%	4	8	13	21	32	49	73	105
30%	5	9	15	25	39	59	87	126
35%	6	11	18	29	45	69	102	146
40%	7	12	20	33	52	79	116	167
45%	8	14	23	37	58	89	131	188
50%	9	15	26	41	65	98	145	209
55%	10	17	28	43	71	108	160	230
60%	10	19	31	50	78	118	174	251
65%	11	20	33	54	84	128	189	272
70%	12	21	36	58	91	138	203	293
75%	13	23	38	62	97	148	218	314
80%	14	24	41	66	104	157	233	335
85%	15	26	43	70	110	167	247	356
90%	16	27	46	74	117	177	262	377
95%	16	29	49	79	123	187	276	398
100%	17	30	51	83	130	197	291	419

The values in the table with a light blue background are covered by the standard version (up to 30 g water per m3 of air)

The values in the table with a light grey background are covered by order code C19 (30 to 60 g of water per m3 of air)

The values in the table with a medium blue background are covered by order code C26 (60 to 100 g of water per m3 of air)

Please contact your Lönne office regarding requirements exceeding 100 g water per m3 of air.

## Motor Protection and Anti Condensation Heaters

For current- sensitive motor protection, the protective switch has to be set to the rated current given on the name plate.

This motor protection is inadequate for high number of operations, short- time operation, coolant breakdown or for fluctuations in coolant temperature. In this case motors should be protected by direct temperature protection (extra price):

- **Thermal protector switch**

When reaching the limiting temperature, the switch opens the control circuit. The NC- switch closes the circuit when the temperature decreases essential.  
Contact rating: 1,6 Amps for 250 VAC.

- **Thermistor protection**

The embedded temperature sensors are able to work only in conjunction with a tripping unit. When reaching the limiting temperature, the thermistor changes its resistance almost Instantaneously.

This action is utilized in conjunction with the tripping unit to monitor motor temperature. The relay incorporated in the device has a change- over contact, in which the contacts can be used for the control system.

Advantages: the protection system is self- monitoring; low switching tolerance; quick reconnection of the drive.

- **Measuring of winding or bearing temperatures**

The temperature of the motor winding or bearings can be directly measured by incorporated temperature sensors PT 100 or KTY- sensors.

In standard the connection of the temperature protection is with a terminal block inside the main terminal box. On request the connection in a separate mounted terminal box is possible.

- **WARNING: Thermometer voltage max 1V / Thermistors voltage max 5V.**

## Anti condensation heaters

Frame size	Anti- condensation heaters	
	230V	115V
63-71	8W Code 1VT	8W Code 1VT
80	12,5W Code 1VT	12,5W Code 1VT
90-100	25W Code 1VT	25W Code 1VT
112-132	26W Code 1VT	26W Code 1VT
160	40W Code 1VT	40W Code 1VT
180	50W Code K45	50W Code K46
200	55W Code K45	55W Code K46
225-250	92W Code K45	92W Code K46
280-315	109W Code K45	105W Code K46

Motors whose windings area at risk of condensation due the climatic conditions, e, g, inactive motors in humid atmospheres or motors that are subjected to widely fluctuating temperatures can be equipped with anti- condensation heaters.

## Technical information Noise Level

### Mechanical design

#### Noise(mains- fed operation)

The noise levels are measured in accordance with DIN EN 21 680-1 in a dead room with rated power. Lp<sub>fA</sub> is specified in dB (A) as the A- weighted measuring- surface sound pressure level.

This value is the spatial mean value of the test hemisphere. This test is hemi- sphere is a cuboid at a distance of 1 m from the machine surface. In addition, the sound power level LWA is specified in dB (A). The values are applicable at 50 Hz with a tolerance of + 3 dB. They are approximately 4 dB (A) higher at 60 Hz. Please enquire about the noise levels for polechanging motors, motors with an increased power output or motors for converter- fed operation.

A- weighted measuring- surface sound pressure level and sound power level at rated power										
Standard design										
Type series	Size	Measuring- surface sound pressure level (Lp <sub>fA</sub> )								
		Sound power level (LWA)								
		2- pole		4- pole		6- pole		8- pole		
		Lp <sub>fA</sub>	LWA	Lp <sub>fA</sub>	LWA	Lp <sub>fA</sub>	LWA	Lp <sub>fA</sub>	LWA	
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	
<b>7BA</b>	63	49	60	42	53	39	50	-	-	
	71	52	63	44	55	39	50	36	47	
	80	56	67	47	58	40	51	41	52	
	90	60	72	48	60	43	55	41	53	
	100	62	74	53	65	47	59	45	57	
	112	63	75	53	65	52	64	49	61	
	132	68	80	62	74	63	75	53	65	
<b>14BG</b>	160	70	82	66	78	66	78	63	75	
	180	69	82	65	78	59	72	67	80	
	200	73	86	66	79	59	72	57	70	
	225	73	86	66	79	60	73	61	74	
	250	75	88	67	80	61	74	55	68	
	280	74	87	70	83	61	74	58	71	
<b>16BG</b>	315	79	92	70	83	65	78	64	77	
	180	67	80	60	73	56	69	66	79	
	200	71	84	62	75	59	72	66	79	
	225	71	84	60	73	59	72	58	71	
	250	71	84	65	78	60	73	57	70	
<b>14BG</b>	280	73	86	67	80	58	71	58	71	
	315	76	89	68	81	61	74	64	77	
	180	71	84	65	78	59	72	67	80	
	increased power	200	73	86	66	79	61	74	57	70
	225	73	86	66	79	60	73	61	74	
	250	75	88	67	80	61	74	55	68	
	280	74	87	70	83	61	74	58	71	
	315	-	-	-	-	65	78	64	77	

In order to reduce noise levels, 2- pole motors with frame size 132 S or larger can be fitted with an axial- flow fan that is suitable for one direction of rotation only.

Clockwise rotation  
Order Code **K37**

Antiklockwise rotation  
Order Code **K38**

1) The standard motors have an axial- flow fan for clockwise rotation. Order Code K37 is not needed For counterclockwise rotation please state Order Code K38.

2) Not required for 16BG motors because these motors are already noise optimized.

Low- noise design			
Type series	Size	2- pole motors	
		Lp <sub>fA</sub>	LWA
		dB(A)	dB(A)
<b>7AA // BA</b>	132	64	76
	160	64	76
<b>14BG/16BG</b>	180	65	78
<b>2)</b>	200	70	83
	225	68	81
	280	72	85
	315	74	87

The motors up to frame size 315 L are up to 80 mm longer than normal. A second shaft extension and or rotary pulse encoder mounting is not possible.

## Safety and Commissioning for Low Voltage Asynchronous Motors

In accordance with L.V. directive 73/23/ EEC

### 1 General Information

Electric motors have dangerous voltage carrying and rotating components as well as surfaces that may become hot. All work involved in the transport, connection, commissioning and regular maintenance must be carried out by qualified, responsible specialists (note VDE 0105; IEC 364). Improper behaviour may result in serious injury and damage to property. The applicable national, local and works regulations and requirements must be complied with.

### 2 Intended use

These motors are intended for commercial installations. They comply with the harmonized standards of the EN60034 (VDE 0530) series. Utilization in areas subject to explosion hazard is not permitted, unless expressly intended for this purpose (see additional notes). In certain special cases, for example. On use in noncommercial installations, it requirements are more strict (e.g. protection against contact with children's fingers), it is the responsibility of the customer to ensure compliance on installing the equipment. The motors are rated for ambient temperatures of -20°C to +40°C and site altitudes <1000m above sea level. Any contradictory information. On the rating plate must be observed. The conditions on site must correspond to all rating plate specifications. Low voltage motors are components for installation in machinery in terms of the Machine directive 89/392/ EEC. Commissioning must not take place until it has been proved that the end product conforms with this guideline (please note EN 60204-1).

### 3 Transport and storage

Any damage detected after dispatch should be reported immediately to the transport company and commissioning must be postponed.

Tighten the eyebolts. They are designed for the weight of the motor only therefore do not attach any additional loads. If necessary, use suitable, adequately dimensioned transporting equipment (e.g. rope guides). Remove existing shipping braces before commissioning; and reuse for subsequent transport. If motors are stored, a dry, dust-free and low vibration ( $V_{rms} < 0.2 \text{ mm/s}$ ) environment is important (to avoid bearing standstill damage). On longterm storage, the regrease interval of the bearings is reduced. Before commissioning, measure the impedance of the insulation. It values <1kW per volt of rated voltage are measured; the windings must be dried out. When motors with roller bearings for increased cantilever force are operated the, value of cantilever force must be minimal 30% of permissible cantilever force (see catalogue). Operating with smaller cantilever force is the cause of bearing faults.

### 4 Installation

Ensure an even underlying surface, good foot or flange fixing and precise alignment for direct coupling. It is important to ensure that the mounting conditions do not cause resonance with the rotational frequency and the doubled supply frequency. Turn the rotor by hand and listen for any unusual grinding noises. Check the direction of rotation in the decoupled state (note section 5).

Only mount or remove drive components (belt pulley, coupling, etc.) using suitable tools (heat up), and cover to shield against contact. Avoid unpermissible belt tensions (see catalogue and technical data). The balancing type is specified on the shaft end face or rating plate (H = half- and F= full- key balancing). On mounting the drive, note the balancing type! In the case of half key balancing, the protruding, visible part of the half featherkey must be removed. A canopy is recommended for designs with the shaft end pointing downwards, and with the shaft end pointing upwards a cover must be provided by the customer to prevent foreign bodies from falling into the fan.

## Safety and Commissioning for Low Voltage Asynchronous Motors

Do not obstruct ventilation! Discharged air, also from neighbouring equipment, must not be sucked in again immediately. Checking of bearing grease must be carried out when motors are longer than 12 months storage. When storage conditions are the cause of grease depreciation (presence of condensate, consistency change) the grease must be exchanged. Grease exchange must be carried out no later than in three year interval.

### 5 Electrical connection

Work is only permitted to be carried out by qualified specialists on the stationary motor, while disconnected and prevented from being switched on again. This also applies for the auxiliary power


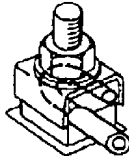
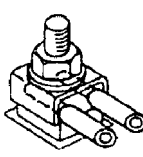
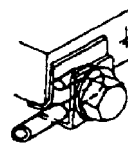
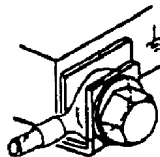
circuits (e.g. Anti- condensation heaters). Check that the equipment is potential- free! If the tolerance limits are exceeded that are specified in EN 60034, part 1 / IEC 34-1 (voltage  $\pm 5\%$ , frequency  $\pm 2\%$ , shape of curve, symmetry) the heating effect is increased and the electromagnetic compatibility is affected. Please note the specifications on the rating plate and the connection diagram in the terminal box. Connections must be made in such a way as to ensure that a permanently safe electrical connection is maintained (no protruding wire ends) use the corresponding cable end pieces. Create a safe earth continuity connection.

### Tightening torques for terminal board connections.

	M4	M5	M6	M8	M10	M12	M16
Tightening torque (Nm)	0,8...1,2	1,8...2,5	2,7...4	5,5...8	9...13	14...20	27...40

Clearances in air between bare live parts themselves and between bare live parts and earth must be  $> 5,5 \text{ mm}$  ( $U_{\text{rated}} < 690 \text{ V}$ ) If must be ensured that the terminal box does not contain foreign bodies, dirt or humidity. Seal any unused cable entry openings against

dust and water. Secure the featherkey on test operation without drive components. For motors with brakes, check that the brakes are operating perfectly before commissioning.

25 mm <sup>2</sup>	10 mm <sup>2</sup>	25 mm <sup>2</sup>	10 mm <sup>2</sup>	25 mm <sup>2</sup>
				
If connections are made with DIN cable lugs, bend the cable lugs downwards.	Connecting a single conductor with a terminal clip.	Connecting a single conductor with a terminal clip.	If connections are made with DIN cable lugs, under the outer earthing angle.	If connections are made with DIN cable lugs.

### 6 Operation

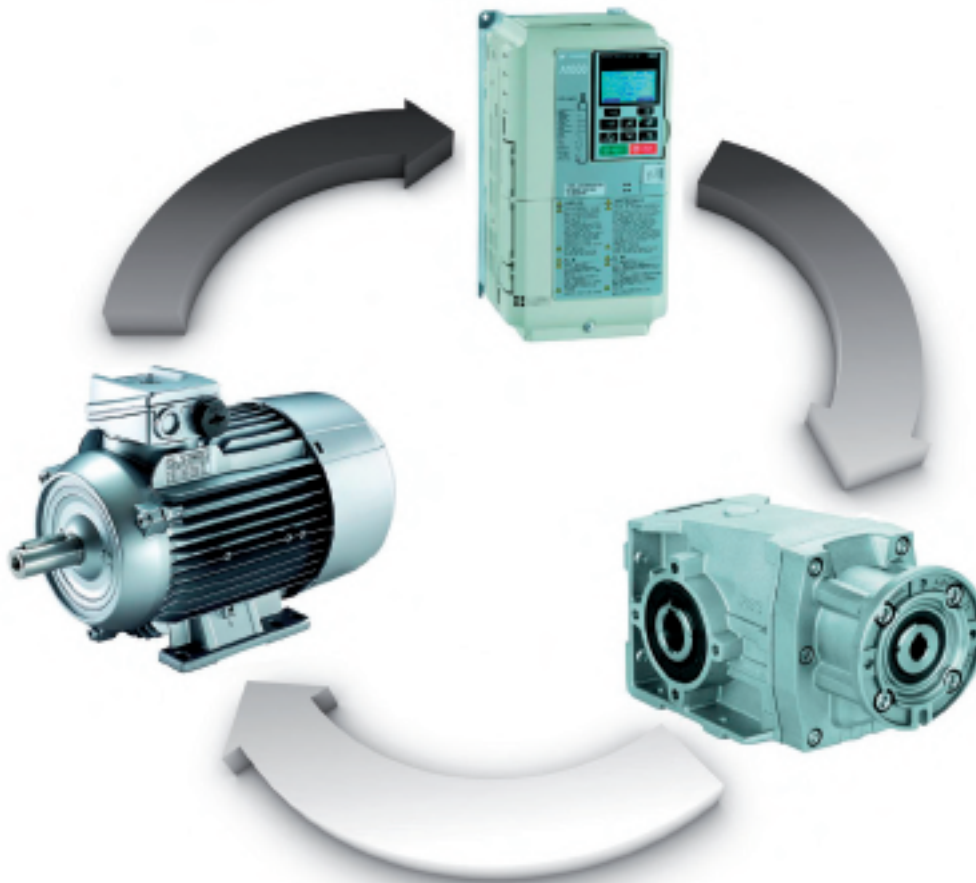
Vibration levels of  $V_{\text{rms}} < 3,5 \text{ mm/s}$  ( $P_N \leq 15 \text{ kW}$ ) or  $V_{\text{rms}} < 4,5 \text{ mm/s}$  ( $P_N > 15 \text{ kW}$ ) are quite acceptable in the coupled state. If deviations from normal operation occur - e.g. increased temperatures, noises, vibration - the motor should be switched off in the event of doubt. Determine the causes and contact the manufacturer if necessary. Do not disconnect protective equipment, even under test operation. Under dirty operating conditions, clean the air channels regularly. Open any closed condensate water holes from time to time!

For motors without regreasing facilities, bearing or grease replacement must be carried out in accordance with the manufacturer's instructions, or after 3 years, whichever is sooner. Bearings with regreasing facilities must be regreased when the motor is running. Please note the greasing plate!

In case the motors with separate ventilation, the separately- driven fan must be switched on throughout motor operation.

**Optimal, Energy Saving Operations by Frequency Inverters**

**High efficiency Electric Motors and Gear Boxes.  
Optimized operations with the new generation  
of Yaskawa Frequency Inverters.**



**Products**

Lönne keeps a large stock of electric motors, frequency inverters, gear boxes, bearings and open transmissions. Within all product groups, there are energy- and cost saving possibilities.

For technical info, please contact us for personal assistance. We can also supply you with a hard copy of our new product catalogue which covers our total product range!

**Solutions**

Lönne engineers are highly recognized for making long lasting, stable, cost- and powersaving solutions. In order to utilize the energy- and cost saving abilities of each product in any assembly, it is of vital importance to pick the correct combination of products. Experienced seniors mixed with young, aspiring competence work together for optimal solutions.

**Services**

Repairs and maintenance are environmental protection in practice. High quality motors in most incidents, can be maintained and mended instead of being scrapped. A healthy motor also keeps the machinery safe at an optimal level during operation, as is for any part in a machinery.



**Type Approvals 14 BG/16BG and 14BL/16BL**



## DET NORSKE VERITAS

### TYPE APPROVAL CERTIFICATE

**CERTIFICATE NO. E-99263**  
This Certificate consists of 8 pages

This is to certify that the  
**Electric Motor**  
with type designation(s)  
**14BG/BP 180M up to 315L and 16BG/BP 180M up to 315L**

*Holder of certificate*  
**Lønne Scandinavia AS**  
NYBORG, Norway

*is found to comply with*  
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

*Application*  
For installation in non hazardous area.

Enclosure class	IP55 - IP74
Insulation class	F
Temp. class (°C)	155
Voltage (V)	208 - 728
Power (kW)	11 - 315
Frequency (Hz)	50 - 60
Speed (RPM)	600 - 3600

*Place and date*  
Havik, 2010-06-14  
for DET NORSKE VERITAS AS



Mark Laumann  
Head of Section



Local Office  
Bergen

*This Certificate is valid until*  
2014-06-30



Nikolay Filov  
Surveyor

Notes: This Certificate is subject to technical conditions entered, any significant change in design or construction may render this Certificate invalid. The validity date refers to the Type Approval Certificate and not to the approval of equipment/system installed.

DET NORSKE VERITAS AS    HAVIKVEIEN 1, 5018 HAVIK, NORWAY    TEL: +47 87 37 38 00    FAX: +47 87 37 38 11  
Form No. 20.01a Issue January 09    Page 1 of 8



## DET NORSKE VERITAS

### TYPE APPROVAL CERTIFICATE

**CERTIFICATE NO. E-99264**  
This Certificate consists of 5 pages

This is to certify that the  
**Electric Motor**  
with type designation(s)  
**14 / 16 BL 180M up to 315L**

*Holder of certificate*  
**Lønne Scandinavia AS**  
NYBORG, Norway

*is found to comply with*  
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

*Application*  
For installation in non hazardous area.

Enclosure class	IP55 - IP56
Insulation class	F
Temp. class (°C)	155
Voltage (V)	208 - 728
Power (kW)	11 - 315
Frequency (Hz)	50 - 60
Speed (RPM)	878 - 1786

*Place and date*  
Havik, 2010-06-14  
for DET NORSKE VERITAS AS



Mark Laumann  
Head of Section



Local Office  
Bergen

*This Certificate is valid until*  
2014-06-30

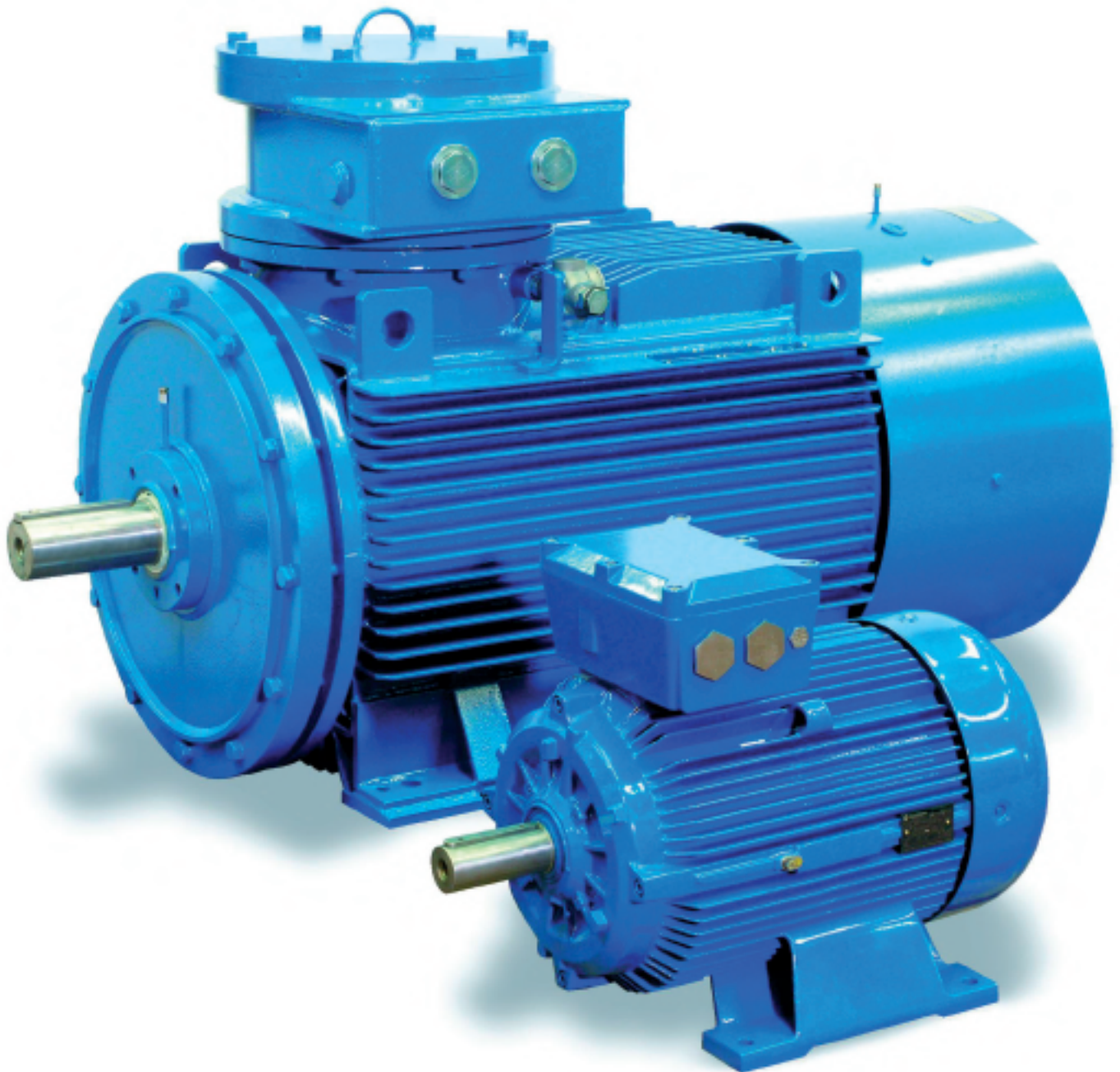


Nikolay Filov  
Surveyor

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**Flameproof Motors for hazardous areas.**



## General aspects of the ATEX Directive

The directive 94/9/EC, better known as ATEX from the French term *ATmosphères EXplosibles*, is a European Community Directive, which defines the minimum health and safety requirements for apparatus intended for use in potentially dangerous environments. The directive is adopted by the European Union (EU) to facilitate free trade in the EU of products to which the Directive applies.

It conforms to the safety demands in essence by:

- The application of harmonised specific standards,
- The EC-type examination of products from a notified body, resulting in the appropriate certification,
- The manufacture of the product under a quality management system approved by a notified body.

In order to use electrical equipment in a potentially explosive atmosphere, such as combustible air – gas mixtures or combustible or conductive dust, the environment must first be classified in accordance with standard EN 60079-10 and with its related guide.

The classification, carried out by qualified competent professionals, identifying:

- the group of equipment,
- the category,
- the protection method,
- the temperature class, or the maximum surface temperature characteristics of the electrical motors to be used in this application.

### DANGEROUS AREAS

The dangerous environments are classified into **zones**, shown in the following scheme:

Gas	Dust	Presence of potentially explosive atmosphere
<b>Zone 0</b>	<b>Zone 20</b>	Always present, frequent or lasting long periods during normal operation. <b>The use of electric motors is not allowed.</b>
<b>Zone 1</b>	<b>Zone 21</b>	Incidental presence: likely to occur during normal operation of the equipment.
<b>Zone 2</b>	<b>Zone 22</b>	Accidental presence: unlikely to occur during normal operation of the equipment.

### GROUPS

The electrical apparatus is subdivided into two **groups** (EN 50014), according to the environments in which the equipment will operate.

Group	I	II
<b>Environment</b>	Used in subterranean mines and on the surface of mines in the presence of firedump and/or combustible dust.	Explosive atmospheres other than mines; surface industries.

### CATEGORIES

Each group is classified into **categories**, according to the level of protection the apparatus must have:

Group I	Category	M1	M2
	<b>Level of Protection</b>	Very high	High
<b>In the presence of explosive atmosphere</b>	The apparatus must remain operative	The electrical supply to the equipment must be interrupted	

Group II	Category	1	2	3
	<b>Level of Protection</b>	Very high	High	Normal
	<b>Presence of explosive atmosphere</b>	High probability (always, often, for extended periods)	Probable	Low probability (rare and for a short time)
<b>Zones in which the equipment may be fed and may operate</b>	0, 1, 2 and/or 20, 21, 22	only 1, 2 and/or 21, 22	only 2 and/or 22	

## General aspects of the ATEX Directive

The equipment belonging to group II is also specified by the **nature of the atmosphere** and can be arranged into the following categories:

**G** = mixture of air and gas, vapour or mist

**D** = mixture of air and combustible dust

Gas atmospheres are further divided into three sub – groups, according to the nature of the gas:

Group	Examples of some substances
<b>II A</b>	acetone, acetic acid, methanol, ethanol, benzene, ethane, methane, propane, toluene, xylene, combustible oil, kerosene, acetaldehyde, ethylbenzene, isoprene.
<b>II B</b>	coke-oven gas, ethylene, ethylene oxide, ethyl ether, formic aldehyde.
<b>II C</b>	hydrogen, acetylene, water gas, carbon sulphur.

A motor belonging to a particular group is also suitable for use in a lower group (e.g. a motor used in group IIB is also suitable for group IIA).

### TYPES OF PROTECTION

The EN 60079-10 standard classifies the dangerous areas, while the standard EN 60079-14 defines the compatibility between the protection method with the aforementioned dangerous zones. The types of protection are defined as follows:

For mixtures of air and gas, vapour or fog	For mixtures of air and dust
"d" - Flameproof enclosures (EN 50018)	IP y5 + maximum permitted surface temperature (y=6 for category 2D; y=5 for category 3D). Electrical apparatus intended for use in environments with the presence of combustible dust. (EN 50281-1-1). When only this method of protection is requested, it is not necessary for the motors to be explosion proof, but in addition to the grade of protection mentioned above, they must have a maximum surface temperature limited to a specified value.
"e" - Increased safety (EN 50019)	
"n" - in accordance with standard EN 50021	

### TEMPERATURE CLASS

See definition on page 45: "Maximum surface temperature"

### DEGREE OF PROTECTION IP56

Motors of Category 2G operating at a maximum ambient temperature of 40°C can be supplied on request with IP56 protection degree under the following temperature class:

- 2 pole motors: temperature class T3
- ≥ 4 pole motors: temperature class T3, T4

### DEFINITIONS

The present catalogue lists motors for use in potentially explosive atmosphere, relative to:

- Group I - Category M2, for motor sizes 160-315;
- Group II - Category 2G, 2D.

### EXPLOSIVE ATMOSPHERE

Is a mixture of flammable substances in the state of gas, vapour, mist and dust:

- with air,
- in which, after ignition, combustion spreads throughout the unconsumed mixture.

### POTENTIALLY EXPLOSIVE ATMOSPHERE

It is an atmosphere which could become explosive either as a result of local and/or operating environmental conditions. The ATEX directive applies to products for use in this environment.

### TYPE OF PROTECTION "d"

The electrical equipment has an enclosure suitable to:

- resist the internal pressure arising from the ignition of an explosive mixture within the equipment.
- avoid the transmission of the explosion to the external atmosphere in which the equipment is being used.
- ensure that the maximum external surface temperature is maintained within the limits specified by the temperature class of the equipment.

### TYPE OF PROTECTION – INCREASED SAFETY "e"

A type of protection in which additional measures are applied so as to give increased security against the possibility of

- excessive temperature,
- the occurrence of arcs and sparks both inside and on external parts of electrical apparatus which does not produce arcs or sparks in normal service.

## Combined type of protection "de"

Combines the essential requirements of protection types "d" and "e" (in accordance with standards EN 50018 and EN 50019) specifically:

- motor enclosures with protection "d" (in accordance with standard EN50018);
- terminal boxes with increased safety "e" (in accordance with standard EN 50019).

### COMBINED CATEGORY 2G/2D

Combines the essential safety requirements:

- of protection type "d" (in accordance with standard EN50018),
- of the protection mode for electrical apparatus intended for use in environments with the presence of combustible dust, protection degree IP65 (EN50281-1-1).

### MAXIMUM SURFACE TEMPERATURE

It is the maximum operating temperature reached in the most unfavourable conditions (but within relative limits) on the surface of the electrical apparatus.

For equipment of group I, the maximum surface temperature must not exceed 150°C.

The following table is relevant to apparatus of category 2G, which is based on a predetermined temperature classification:

Temperature class	T1	T2	T3	T4	T5	T6
Maximum Surface Temperature (°C)	450	300	200	135	100	85

The maximum surface temperature is:

- the temperature of the external surfaces, for motors with protection mode "d",
- the temperature of the external surfaces and of the internal points of the terminal box, for motors with protection mode "de"

In a potentially explosive atmosphere, the maximum surface temperature of the equipment must remain lower than the lowest possible spontaneous ignition temperature of the atmosphere surrounding it.

Electrical apparatus of category 2D are classified based on maximum surface temperature. This catalogue applies to motors having either of the following three maximum surface temperatures: T 150°C, T 135°C and T 100°C. In the case of atmospheres with combustible dust, the maximum permitted surface temperature depends on: the type of dust, the thickness of the layer of dust and on a safety factor used according to (EN 50281-1-2).

Motors of category 2G can also be used in installations requiring apparatus in category 3G, provided that they comply with the specified temperature class. Likewise, category 2D motors can be used in category 3D installations requiring the same or a higher maximum surface temperature.

## MARKINGS

According to the 94/4/EC Directive, motors come with 3 markings giving the indispensable indications to safely use the product. These indications let the user check the compatibility between the protection mode of the motor and the classification of the area of its installation.

The data shown on the nameplate must therefore contain, in addition to the functional information, the 3 markings described below in sequence (CE, specific and supplementary) and the reference to the notified body in charge of the certification.

### CE MARKING

The CE marking indicates that the D5 series motor conforms to all the applicable directives (and specifically to the ATEX directive).

It is a declaration of the manufacturer that the product conforms to the applicable directives and that the product conforms to the prototype on the basis of the quality check procedures it was submitted to.

The conformity procedure for the apparatus with respect to categories M2 and 2 demands for:

- EC-type examination released by a notified body (that issues the relative certification);
- product quality assurance (the product must be manufactured under a quality system which was valued and approved by a notified body).

### MARKING SPECIFIC TO THE PROTECTION FROM EXPLOSIONS

In accordance with the 94/4/EC directive and EN 50014 standard, the apparatus must be supplied with the markings specific to protection from explosions:

## Supplementary marking

The supplementary marking, in accordance with the 94/4/EC directive and to the EN 50014 standard, uses the following symbols:

<b>EEx</b>	indicating that the product conforms to one or more protection types, subject to the specific European standards;
<b>d, e,</b>	type of protection;
<b>I, II,</b>	equipment group with sub-group of gas for group I
<b>T3,</b>	temperature class (for category 2G) or maximum surface temperature (for category 2D).
<b>IP65</b>	protection degree of the motor enclosure for category 2D.
<b>T xxx°C</b>	maximum surface temperature for motors of category 2D and 3D.

## STANDARDS

### Standards relevant to electrical apparatus for potentially explosive atmospheres

Title	Standard
General requirements	EN 50014
Flameproof enclosure "d"	EN 50018
Increased safety "e"	EN 50019
Electrical apparatus for use in the presence of combustible dust – Electrical apparatus protected by enclosures – Construction and testing	EN 50281-1-1

### General standards for electric motors

Title	Standard
Rating and Performance	EN 60034-1 (*)
Methods for determining losses and efficiency	EN 60034-2 (*)
Classification of degrees of protection (IP code)	EN 60034-5 (*)
Methods of cooling (IC code)	EN 60034-6 (*)
Classification of type of construction and mounting arrangement (IM code)	EN 60034-7 (*)
Terminal markings and direction of rotation	EN 60034-8 (*)
Noise limits	EN 60034-9 (*)
Built-in thermal protections	IEC 60034-11
Starting performance of rotating electrical machines	EN 60034-12 (*)
Mechanical vibration	EN 60034-14 (*)
Standard Voltages	IEC 38
Dimensions and outputs for electrical machines	EN 60072-1 (*)
General purpose three-phase induction motors having standard dimensions and outputs	EN 50347

(\*) Exist as IEC standards.

## NOMENCLATURE OF THE D5 SERIES MOTORS

The D5 series motors are divided into the following types:

Series <sup>(1)</sup>	Specific Marking			Supplementary Marking			Polarity		Supply		Frame size where applicable
	Ex	Group	Category	Protection	Group	Temperature Class (Maximum surface temperature)	single	doublet	main	inverter	
D5C		II	2G	EEx d	II B	T3, T4, T5	X		X		71 - 400
D5D <sup>(2)</sup>								X			
D5X		II	2G	EEx de	II B	T3, T4, T5	X		X		71 - 400
D5E <sup>(2)</sup>								X			
D5F		II	2G	EEx d	II B	T3, T4	X			X	71 - 400
D5S				EEx de			X		X		
D5K		II	2G	EEx d	II C	T3, T4	X		X		160 - 315
D5Y								X		X	
D5R		II	2G	EEx d	II C	T3, T4	X			X	160 - 315
D5V				EEx de			X		X		
D5T		I	M2	EEx d,	I		X		X	<sup>(4)</sup>	160 - 315
D5U				EEx de				X		X	
D5A		II	2D	IP 65		(T 150°C) (T 135°C) (T 100°C)	X		X	<sup>(2)</sup>	71 - 400
D5B <sup>(2)</sup>								X		X	

1: Series name of combined category 2G/2D motors = Series name of category 2G motors.

2: The D5A motors can be supplied on request for frequency converter application with maximum surface temperature of T135°C or T150°C.

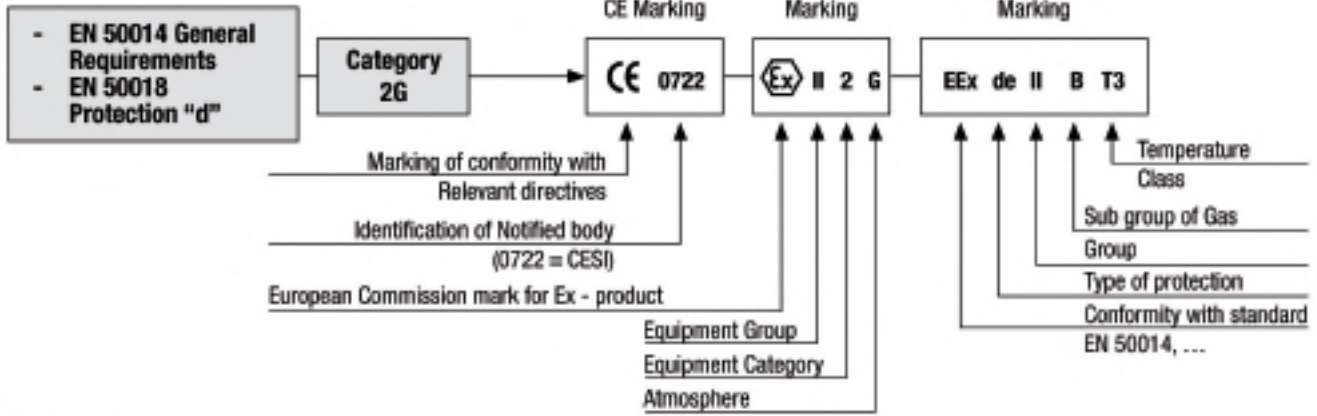
3: Motors available with Temperature Class T3 (D5D, D5E) and Maximum Surface Temperature T150°C (D5B).

4: The D5T motors can be supplied on request for frequency converter application with temperature Class T3.

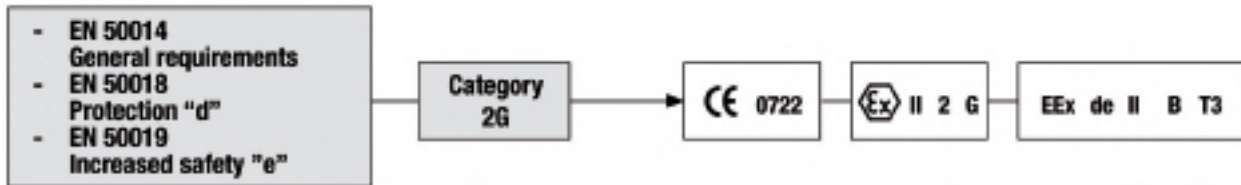
**Examples of markings**

The following indicates some examples of markings for D5 series motors

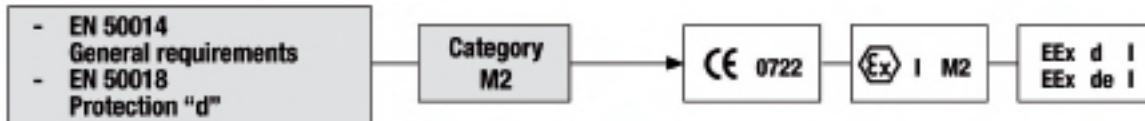
**D5X series.**



**D5X series.**



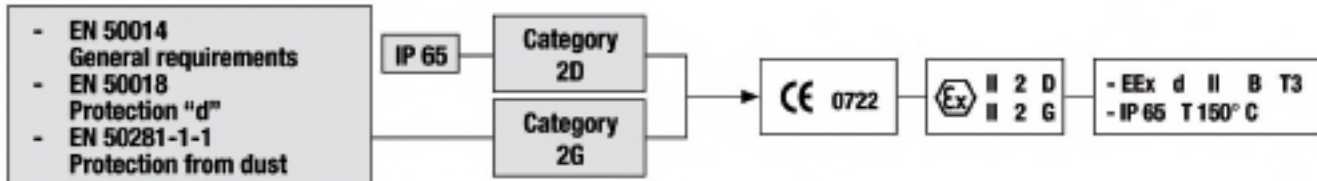
**D5T and D5U series.**



**D5A and D5B series.**

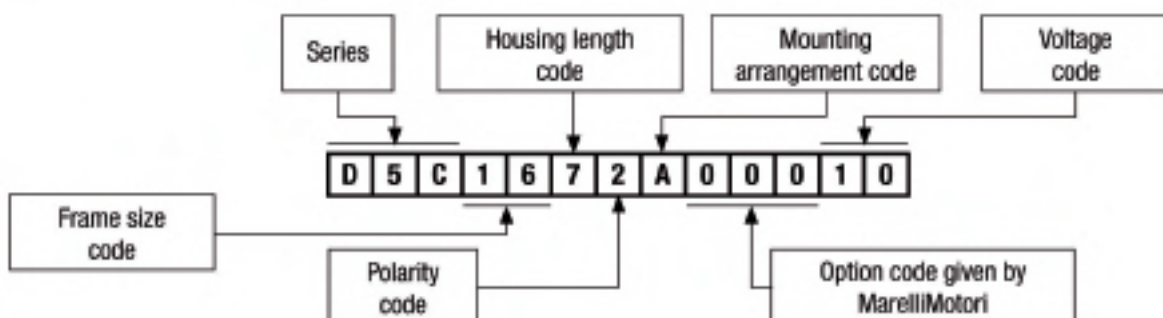


**D5C series - Combined category**



**PRODUCT CODE STRUCTURE**

MarelliMotori products are identified by 13 digit code show on the nameplate. The code is constructed as follows.



## Motors fed by frequency converter.

The operating characteristics of the motors described in this section of the catalogue refer to the electrical supply by frequency converter with a commutating frequency higher than 3kHz.

Motors fed by inverter and intended for use in installations in potentially explosive atmospheres must be:

- explicitly requested for this type of supply,
- specifically chosen considering the load and speed range,
- using appropriate passive thermal protection (thermistors, PT100), with connection to suitable supply system protection apparatus.
- given a nameplate identifying: supply characteristics of the frequency converter, torque and speed range.

The maximum supply frequency value is dependent on the frame and polarity of the motor, as shown in the following table.

Frame Size	N° poles	Temperature class T3	Temperature class T4
71 to 400	2	60 Hz	60 Hz
71 to 400	≥ 4	100 Hz	75 Hz

For motors ≥ 4 poles and supply frequency between 75-100 Hz contact MarelliMotori.

The performances of motors fed by frequency converter are given in the specific tables.

### EFFECTS OF INVERTER SUPPLY ON THE MOTOR

A motor supplied by a frequency converter (inverter) does not receive a purely sinusoidal feed (voltage, current), which leads to an increase in:

- additional losses,
- noise and vibrations,
- stresses on the electrical insulation,

As well as:

- the production of voltages and currents in the bearings,
- the need to provide additional solutions to satisfy the EMC requirements for the installation.

### ADDITIONAL LOSSES

Additional losses increase the heat of the motor, which may lead to an increase in the temperature of the bearings.

These effects must be considered (by using appropriate derating with respect to the supply by the mains), in particular for potentially explosive environments where limits to the maximum surface temperature are applied.

### NOISE VIBRATION

The increase in magnetic noise depends mainly on the commutating frequency of the inverter and as well as the harmonic content.

Self-ventilated motors, when running at frequencies higher than the rated value, give an increased noise level due to the increased ventilation. For speed values higher than the rated one, the maximum speed reachable by the motor or the critical speed of the system must not be exceeded.

In this case, the use of separate ventilation is recommended to reduce any possible excessive noise.

### EFFECTS ON ELECTRICAL INSULATION

The insulation system in a motor is subjected to an increased dielectric effect when fed by an inverter. Depending on the supply system characteristics, the indications given in the paragraph "Instructions for the correct use of motors fed by frequency converter" must be considered.

### GENERATION OF VOLTAGE AND CURRENT IN THE BEARINGS

The inverter induces high frequency voltages into the shaft, possibly causing bearing currents which must be avoided in all motors for potentially explosive atmospheres.

The paragraph "Instructions for the correct use of motors fed by frequency converter" gives the indications which must be followed for the use of insulated bearings / supports or of appropriate filters between the inverter and motor to avoid the risk of current circulation in the bearings.

D5 series motors from 280 to 400 frame size when designed for inverter application, are supplied with insulated N-End bearings.



## EMC requirements for the installation

The use of cables and connections conforming to EMC (electromagnetic compatibility) recommendations is necessary.

Supply cables to the motor must be both shielded and symmetrical.

The motor and the driven system must be properly earthed, to avoid possible voltages and currents in the bearings of the motor.

The additional instructions given by the inverter manufacturer must also be followed.

### INSTRUCTIONS FOR THE CORRECT USE OF MOTORS FED BY FREQUENCY CONVERTER

The type of the inverter and of the filters must be properly selected to guarantee a peak voltage at the motor terminals of less than 1060V.

The following table indicates the solutions to be applied on motors fed by frequency converters. They are classified with respect to the input voltage of the inverter.

Frame Size \ Voltage	$U_N \leq 500V$	$U_N \leq 690V$
$\leq 250$	Standard insulation	Standard insulation + filter dU/dt (*)
280 + 315	Reinforced insulation + insulated bearing	Reinforced insulation + insulated bearing + filter dU/dt (*)
355 + 400	Reinforced insulation + insulated bearing	Reinforced insulation + insulated bearing + filter dU/dt (*) + common mode filter (*)

(\*) Not scope of MarelliMotori supply.

## SELF-VENTILATED MOTORS

The ventilation in a self-ventilated motor is a function of the speed of the motor itself (and therefore also of the feeding frequency). Consequently the cooling and noise level vary according to the inverter output frequency, thus:

- in the frequency range lower than the rated value, a further power derating must be considered (see the relevant graphs in the dedicated section)
- in the frequency range higher than the rated value, the noise increases approximately by the values given in the following table:

Frequency [Hz]	60	75
Additional noise [dB(A)]	4 - 5	9

## MOTORS WITH FORCED VENTILATION

Forced ventilated motors are equipped with an auxiliary motor which must have a classification compatible with the main one.

The use of forced ventilation is recommended in the presence of wide range of speed variation and when constant torques are requested.

The operation of the main motor must be made dependent to the correct operation of the forced ventilation unit.

For the correct selection of motors fed by inverters, refer to the corresponding specific tables.

Frame size	Forced Ventilated Motor		Force Ventilation Unit	
	$\Delta I B3$ [mm]	$\Delta I V1$ [mm]	$\Delta p$ [kg]	Type
160-250	236	268	23-30	D5_71 MB4
280-315S	180-220	255-315	35-45	D5_80 MA4
315M	310	-	40	D5_80 MA4
355	256	-	40	D5_80 MB4
400	325	-	95	D5_112 M4

**EEx d IIB EEx de IIB IP65**

400V 50Hz / 440V 60Hz

RATED OUTPUT KW	MOTOR TYPE	PERFORMANCE AT RATED OUTPUT					PERFORMANCE AT RATED VOLTAGE					MOMENT OF INERTIA J kgm <sup>2</sup>	WEIGHT IN 1001 Approx. kg
		SPEED		EFFICIENCY η %	POWER FACTOR cos φ	400V 50Hz			STARTING CURRENT I <sub>s</sub> /I <sub>n</sub> p.u.	STARTING TORQUE T <sub>s</sub> / T <sub>n</sub> p.u.	BREAKDOWN TORQUE T <sub>MAX</sub> /T <sub>n</sub> p.u.		
		n 1/min	50 Hz			60 Hz	RATED CURRENT I A	RATED TORQUE T <sub>n</sub> Nm					

**3000/3600 min<sup>-1</sup> = 2 poles - 50/60 Hz**

**T1 + T4, T 135°C**

0,37 0,55	0,37 0,55	71 MA2 71 MB2	2730 2730	3330 3330	69,5 72,3	0,76 0,79	1,0 1,4	1,3 1,9	4,4 4,8	2,8 3,0	- -	0,0004 0,0005	15,3 17,3
0,75 1,1	0,75 1,1	80 MA2 80 MB2	2800 2830	3400 3430	74,1 77,5	0,83 0,84	1,8 2,4	2,6 3,7	5,6 5,9	2,4 2,6	2,3 2,6	0,0008 0,0010	20,8 22,8
1,5 2,2	1,6 2,3	90 S2 90 L2	2810 2850	3410 3450	78,7 81,1	0,84 0,83	3,3 4,7	5,1 7,4	6,1 6,4	2,5 2,7	2,6 2,8	0,0016 0,0022	26,8 32,3
3	3,2	100 LA2	2900	3500	83,0	0,84	6,2	9,9	6,8	2,1	2,6	0,0050	48,3
4	4,2	112 M2	2910	3510	84,4	0,85	8,1	13,1	7,2	2,5	2,9	0,0063	55,8
5,5 7,5	6 8	132 SA2 132 SB2	2915 2915	3515 3515	85,7 87,0	0,85 0,87	10,9 14,3	18,1 24,7	7,5 7,8	2,5 2,6	2,8 3,2	0,0160 0,0190	75,8 81,8
9	9,5	132 MB2	2915	3515	87,2	0,87	17,1	29,5	7,8	2,9	3,6	0,0230	91,8
11 15 18,5	12 16,5 20	160 MA2 160 MB2 160 L2	2920 2925 2925	3520 3525 3525	88,4 89,8 90,0	0,82 0,83 0,81	21,9 28,0 36,7	36 49 60	6,2 6,6 7,1	2,1 2,4 2,6	2,8 3,0 3,0	0,030 0,035 0,040	115 129 143
22	24	180 M2 *	2930	3530	90,5	0,84	41,8	72	7,0	2,5	3,0	0,048	154
30 37	33 40	200 LA2 200 LB2 *	2945 2945	3545 3545	92,0 92,2	0,87 0,87	54 67	97 120	6,8 6,9	2,3 2,4	2,9 3,0	0,165 0,180	189 209
45	50	225 M2	2950	3560	92,5	0,88	80	145	6,6	2,4	3,0	0,225	304
55	60	250 M2	2950	3560	93,0	0,87	98	177	6,7	2,4	3,0	0,250	336
75 90	83 100	280 S2 280 M2	2960 2960	3560 3560	93,6 94,2	0,87 0,88	133 157	242 290	6,8 7,2	2,3 2,3	2,7 2,7	0,350 0,416	484 517
110 132 160 200	121 158 182 240	315 SM2 315 MA2 * 315 MC2 315 MB2 *	2975 2970 2975 2980	3575 3570 3575 3580	94,3 94,3 94,4 94,7	0,87 0,86 0,87 0,87	194 235 281 351	353 424 513 640	6,4 6,5 6,5 6,5	2,4 2,5 2,5 2,5	2,4 2,5 2,5 2,5	0,95 0,95 1,12 1,30	780 780 827 887

**T1 + T3, T 150°C**

230 280 330	280 330 400	355 LX2 * 355 LW2 355 LY2 *	2960 2960 2960	3580 3580 3580	94,5 95,4 95,8	0,90 0,90 0,91	360 471 547	736 896 1056	6,5 6,5 6,8	2,0 2,0 2,1	2,8 3,0 3,0	4,4 5,1 6,0	1770 1950 2145
375 450 560	450 540 630	400 LX2 * 400 LW2 400 LY2 *	2980 2980 2980	3580 3580 3580	94,5 95,0 95,0	0,91 0,91 0,91	630 752 936	1201 1441 1793	7,0 7,0 7,2	2,2 2,2 2,2	2,8 3,0 3,0	7,9 8,9 10,0	2780 2940 3150

**T4, T 135°C**

200 250 280	200 250 280	355 LX2 * 355 LW2 355 LY2 *	2960 2960 2960	3580 3580 3580	94,5 95,4 95,8	0,90 0,90 0,91	339 420 464	640 800 896	6,5 6,5 6,8	2,0 2,0 2,1	2,8 3,0 3,0	4,4 5,1 6,0	1770 1950 2145
330 400 500	330 400 500	400 LX2 * 400 LW2 400 LY2 *	2980 2980 2980	3580 3580 3580	94,5 95,0 95,0	0,91 0,91 0,91	555 869 936	1056 1261 1601	7,0 7,0 7,2	2,2 2,2 2,2	2,8 3,0 3,0	7,9 8,9 10,0	2780 2940 3150

I<sub>s</sub> = Starting current, T<sub>s</sub> = Starting torque, T<sub>MAX</sub> = Breakdown torque.

Detailed data for 440V/60Hz on request.

\* Motor not multivoltage. Output values at 440V/60Hz refer to motors with dedicated winding.

**EEx d IIB EEx de IIB IP65**

400V 50Hz / 440V 60Hz

RATED OUTPUT KW	MOTOR TYPE	PERFORMANCE AT RATED OUTPUT					PERFORMANCE AT RATED VOLTAGE					MOMENT OF INERTIA J kgm <sup>2</sup>	WEIGHT IM 1001 Approx. kg
		SPEED		EFFICIENCY η %	POWER FACTOR cos φ	400V 50Hz							
		n 1/min				RATED CURRENT I A	RATED TORQUE T <sub>n</sub> Nm	STARTING CURRENT I <sub>s</sub> /I <sub>n</sub> p.u.	STARTING TORQUE T <sub>s</sub> /T <sub>n</sub> p.u.	BREAKDOWN TORQUE T <sub>MAX</sub> /T <sub>n</sub> p.u.			
50 60 Hz Hz		50 60 Hz Hz											

1500/1800 min<sup>-1</sup> = 4 poles - 50/60 Hz

T1 + T4, T 135°C

0,25 0,37	0,25 0,37	71 MA4 71 MB4	1380 1380	1680 1680	67,6 69,5	0,88 0,88	0,8 1,1	1,73 2,6	3,8 3,8	2,3 2,5	2,3 2,5	0,0005 0,0006	16,3 17,3
0,55 0,75	0,55 0,75	80 MA4 80 MB4	1380 1385	1680 1685	72,0 73,0	0,74 0,74	1,5 2,0	3,8 5,2	4,6 4,75	2,6 2,75	2,4 2,5	0,0013 0,0016	21,3 22,8
1,1 1,5	1,2 1,6	90 SA 90 LA	1380 1380	1680 1690	76,5 79,1	0,79 0,82	2,8 3,4	7,6 10,3	4,5 4,7	2,5 2,7	2,4 2,5	0,0033 0,0040	27,3 31,8
2,2 3	2,3 3,2	100 LA4 100 LB4	1420 1420	1720 1720	81,1 83,0	0,81 0,81	4,9 6,4	14,8 20,2	5,3 5,5	2,0 2,1	2,3 2,5	0,0073 0,0090	46,8 50,8
4	4,4	112 MA	1425	1720	84,2	0,83	8,3	26,8	5,7	2,4	2,7	0,0115	59,3
5,5 7,5	5,8 7,9	132 SA4 132 MA4	1440 1450	1740 1750	85,7 87,4	0,82 0,84	11,4 14,8	36,5 49,4	6,5 6,7	2,0 2,2	2,6 2,75	0,0238 0,0300	78,3 91,3
11 15 18,5	12 16 20	160 MA 160 LA 160 MA	1455 1460 1460	1760 1760 1765	88,6 89,4 90,0	0,81 0,81 0,82	22,1 29,9 36,2	72 96 121	5,2 5,8 6,2	2,0 2,2 2,3	2,1 2,4 2,5	0,034 0,075 0,090	123 135 148
22 30	24 33	180 LA 200 LA	1465 1470	1765 1765	90,5 91,6	0,84 0,84	41,8 56	143 195	6,3 6,4	2,4 2,4	2,5 2,8	0,110 0,180	177 205
37 45	40 50	225 SA 225 MA	1475 1475	1770 1775	92,5 92,5	0,86 0,86	67 82	239 291	6,5 6,5	2,3 2,4	2,8 2,8	0,320 0,410	302 332
55	60	250 MA	1475	1775	93,0	0,87	98	356	6,4	2,3	2,6	0,520	370
75 90	83 100	280 SA 280 MA	1480 1480	1780 1780	93,7 93,9	0,86 0,86	134 157	483 580	7,0 7,1	2,5 2,7	2,3 2,4	0,885 1,060	525 564
110 132 160 180 200	121 158 192 240	315 SM4 315 MA4 315 MC4 315 MD4	1488 1485 1485 1485	1780 1785 1785 1785	93,6 94,5 94,8 95,3	0,85 0,85 0,85 0,86	200 237 287 353	705 848 1028 1285	6,5 6,2 6,2 6,5	2,6 2,5 2,5 2,5	2,6 2,5 2,5 2,6	2,10 2,10 2,50 3,10	780 780 859 955

T1 + T3, T 150°C

250 300 330	300 350 400	355 LX4 355 LW4 355 LY4	1490 1490 1490	1790 1790 1790	95,4 95,4 95,7	0,87 0,87 0,87	435 522 572	1601 1921 2113	6,8 6,8 6,8	2,2 2,2 2,2	2,1 2,4 2,5	7,5 9,3 11,2	1730 1960 2180
375 450 560	450 540 630	480 LX4 480 LW4 480 LY4	1490 1490 1490	1790 1790 1790	95,5 95,5 95,5	0,88 0,88 0,88	644 773 962	2401 2881 3586	6,8 6,8 6,8	2,3 2,3 2,3	2,1 2,4 2,5	15,8 18,8 20,7	2880 3030 3240

T4, T 135°C

210 270 300	210 270 300	385 LX4 385 LW4 385 LY4	1490 1490 1490	1790 1790 1790	95,3 95,5 95,5	0,88 0,87 0,87	370 409 521	1345 1729 1921	6,8 6,8 6,8	2,2 2,2 2,2	2,4 2,4 2,5	7,5 9,3 11,2	1730 1960 2180
330 400 500	330 400 500	480 LX4 480 LW4 480 LY4	1490 1490 1490	1790 1790 1790	95,1 95,5 95,5	0,88 0,88 0,88	589 687 859	2113 2561 3201	6,8 6,8 7,2	2,3 2,3 1,2	2,2 2,3 2,5	15,8 18,8 20,7	2880 3030 3240

I<sub>s</sub> = Starting current, T<sub>s</sub> = Starting torque, T<sub>MAX</sub> = Breakdown torque.

Detailed data for 440V/60Hz on request.

• Motor not multivoltage. Output values at 440V/60Hz refer to motors with dedicated winding.

**EEx d IIB EEx de IIB IP65**

400V 50Hz / 440V 60Hz

RATED OUTPUT kW	MOTOR TYPE	PERFORMANCE AT RATED OUTPUT				PERFORMANCE AT RATED VOLTAGE					MOMENT OF INERTIA J kgm <sup>2</sup>	WEIGHT IM 1001 Approx. kg
		SPEED n 1/min 50 Hz 60 Hz	EFFICIENCY η %	POWER FACTOR cos φ	400V 50Hz							
					RATED CURRENT I A	RATED TORQUE T <sub>n</sub> Nm	STARTING CURRENT I <sub>s</sub> /I <sub>n</sub> p.u.	STARTING TORQUE T <sub>s</sub> /T <sub>n</sub> p.u.	BREAKDOWN TORQUE T <sub>max</sub> /T <sub>n</sub> p.u.			

1000/1200 min<sup>-1</sup> = 6 poles - 50/60 Hz

T1 + T4, T 135°C

0,37	0,44	80 MAB	930	1130	85,2	0,72	1,1	3,8	3,8	1,9	2,25	0,0024	21,3
0,55	0,66	80 MB6	930	1130	68,0	0,73	1,6	5,6	3,9	2,1	2,4	0,0028	23,3
0,75	0,9	90 SB	930	1130	71,1	0,73	2,1	7,7	4,6	2,1	2,3	0,0038	27,8
1,1	1,3	90 LB	930	1130	74,5	0,71	3,0	11,3	4,8	2,5	2,6	0,0050	34,3
1,5	1,8	100 LAG	940	1140	75,3	0,75	3,8	15,2	5,1	2,0	2,3	0,0100	47,3
2,2	2,6	112 M6	940	1140	78,2	0,75	5,4	22,3	5,3	2,0	2,5	0,0150	56,3
3	3,6	132 SAG	950	1150	80,1	0,76	7,1	30,2	5,5	2,1	2,4	0,0300	72,8
4	4,8	132 MAB	950	1150	81,0	0,78	8,1	40,2	5,7	2,3	2,6	0,0380	83,8
5,5	6,6	132 MB6	950	1150	82,0	0,78	12,4	55,3	6,2	2,5	2,8	0,0460	93,8
7,5	9	160 M6	965	1165	86,0	0,82	15,4	74	5,0	2,0	2,3	0,087	131
11	13,2	160 LB	967	1165	88,0	0,82	22,0	108	5,5	2,3	2,5	0,110	147
15	18	180 LB	970	1170	88,2	0,82	30,0	147	5,2	2,3	2,2	0,130	165
18,5	22	200 LAG	970	1170	88,2	0,83	36	162	5,2	2,1	2,3	0,170	185
22	26	200 LB6	972	1170	89,0	0,83	43	216	5,5	2,4	2,4	0,220	203
30	36	225 M6	975	1175	90,5	0,84	57	294	6,2	2,4	2,4	0,470	308
37	44	250 M6	975	1175	91,0	0,84	70	362	6,5	2,6	2,6	0,570	342
45	54	280 SB	980	1180	92,5	0,83	85	438	6,0	2,5	2,5	0,850	479
55	66	280 M6	980	1180	93,0	0,84	102	535	6,0	2,5	2,5	1,075	518
75	90	315 SM6	985	1185	94,0	0,83	138	726	6,3	2,6	2,6	2,60	748
90	108	315 MAB	985	1185	94,0	0,84	165	872	6,0	2,5	2,5	2,60	748
110	132	315 MB6	985	1185	94,0	0,84	201	1065	6,0	2,5	2,5	3,00	799
132	158	315 MC6	985	1185	93,3	0,85	240	1278	6,3	2,5	2,5	3,60	889
160	192	315 MD6	985	1185	94,8	0,86	283	1550	6,3	2,7	2,5	4,40	984

T1 + T3, T 150°C

200	240	355 LX6	990	1190	95,0	0,86	354	1927	6,2	2,2	2,3	11,2	1820
250	300	355 LW6	990	1190	95,0	0,86	442	2409	6,5	2,2	2,5	14,0	2060
280	330	355 LY6	990	1190	95,0	0,86	493	2698	6,5	2,2	2,2	15,5	2190
315	380	400 LX6	995	1190	95,0	0,87	551	3020	6,5	2,1	2,3	22,7	2860
355	420	400 LW6	995	1190	95,0	0,87	621	3404	6,5	2,1	2,5	25,5	3040
400	480	400 LY6	995	1190	95,0	0,87	690	3835	6,5	2,1	2,2	29,0	3300

T4, T 135°C

180	160	355 LX6	990	1190	95,0	0,86	283	1542	6,8	2,3	2,5	11,2	1820
230	230	355 LW6	990	1190	95,0	0,86	407	2216	7,0	2,3	2,6	14,0	2060
250	250	355 LY6	990	1190	95,0	0,86	440	2409	7,0	2,3	2,4	15,5	2190
280	280	400 LX6	995	1194	95,0	0,87	490	2685	6,8	2,2	2,4	22,7	2860
315	315	400 LW6	995	1194	95,0	0,87	551	3020	6,8	2,2	2,4	25,5	3040
350	350	400 LY6	995	1194	95,0	0,87	612	3356	7,0	2,2	2,4	29,0	3300

I<sub>s</sub> = Starting current, T<sub>s</sub> = Starting torque, T<sub>max</sub> = Breakdown torque.

Detailed data for 440V/60Hz on request.

The motors shown on this page are not multivoltage. Output values at 440V/60Hz refer to motors with dedicated winding.

**EEx d IIB EEx de IIB IP65**

400V 50Hz / 440V 60Hz

RATED OUTPUT kW	MOTOR TYPE	PERFORMANCE AT RATED OUTPUT					PERFORMANCE AT RATED VOLTAGE					MOMENT OF INERTIA J kgm <sup>2</sup>	WEIGHT IM 1001 Approx. kg
		SPEED		EFFICIENCY $\eta$ %	POWER FACTOR cos $\phi$	400V 50Hz							
		n 1/min				RATED CURRENT I A	RATED TORQUE T <sub>n</sub> Nm	STARTING CURRENT I <sub>s</sub> /I <sub>n</sub> p.u.	STARTING TORQUE T <sub>s</sub> /T <sub>n</sub> p.u.	BREAKDOWN TORQUE T <sub>max</sub> /T <sub>n</sub> p.u.			
50 Hz	60 Hz	50 Hz	60 Hz										

750/900 min<sup>-1</sup> = 8 poles - 50/60 Hz

T1 + T4, T 135°C

0,18	0,22	80 MAB	660	810	93,0	0,72	0,7	2,6	3,5	2,0	1,8	0,0024	21,8
0,25	0,3	80 MBS	690	860	96,3	0,67	1,0	3,5	3,5	2,0	1,8	0,0027	22,8
0,37	0,44	90 S8	675	825	90,3	0,86	1,4	5,2	3,5	2,0	1,8	0,0037	27,3
0,55	0,66	90 L8	695	845	93,3	0,84	2,0	7,8	3,5	2,0	1,8	0,0050	35,8
0,75	0,9	100 LAB	680	830	70,5	0,69	2,2	10,5	4,0	2,1	2,0	0,0093	45,3
1,1	1,32	100 LBB	695	845	71,5	0,69	3,2	15,1	4,1	2,3	2,3	0,0123	50,3
1,5	1,8	112 MB	700	850	73,0	0,70	4,2	20,5	4,4	2,4	2,4	0,0168	58,8
2,2	2,6	132 SAB	710	840	75,0	0,74	5,7	29,6	4,4	2,0	2,2	0,0380	78,8
3	3,6	132 MAB	705	845	77,0	0,76	7,4	40,6	4,6	2,1	2,3	0,0460	92,8
4	4,8	160 MAB	710	860	81,5	0,73	9,7	54	4,2	1,9	2,1	0,080	115
5,5	6,6	160 MBB	720	870	82,4	0,74	13,0	73	4,2	1,9	2,1	0,092	123
7,5	9	160 LB	720	870	84,7	0,74	17,3	99	4,2	2,0	2,1	0,110	133
11	13,2	180 LB	725	875	86,7	0,75	24,4	145	4,5	2,0	2,2	0,160	188
15	18	200 LB	725	875	88,0	0,75	33	197	5,0	2,1	2,3	0,220	216
18,5	22	225 S8	730	880	89,0	0,76	40	242	5,2	2,2	2,4	0,420	294
22	26	225 MB	730	880	90,0	0,76	47	288	5,3	2,2	2,4	0,520	326
30	36	250 MB	730	880	91,0	0,76	63	392	5,5	2,3	2,5	0,620	356
37	44	280 S8	735	885	92,5	0,80	72	480	6,0	2,5	2,5	1,000	520
45	54	280 MB	735	885	93,0	0,80	87	584	6,0	2,5	2,5	1,250	553
55	66	315 SMB	740	890	93,5	0,81	105	709	6,5	2,3	2,4	2,80	778
75	90	315 MAB	740	890	93,8	0,82	141	967	6,0	2,1	2,2	2,80	778
90	108	315 MCB	740	890	94,4	0,83	166	1160	6,2	2,2	2,3	3,50	888
110	132	315 MDB	740	890	94,5	0,83	202	1418	6,2	2,2	2,3	4,00	924
132	158	315 MEB	740	890	94,6	0,83	243	1702	6,2	2,2	2,3	4,30	993

T1 + T3, T 150°C

160	180	355 LXB	740	890	94,8	0,84	290	2063	6,0	1,4	2,2	13,2	1840
200	240	355 LWB	743	890	95,3	0,84	361	2568	6,2	1,4	2,3	16,2	2040
220	270	355 LYB	744	893	95,6	0,85	391	2821	6,7	1,8	2,5	18,0	2170
250	300	400 LXB	745	893	95,6	0,80	472	3201	6,2	2,0	2,1	25,0	2760
280	330	400 LWB	745	894	95,5	0,80	530	3598	6,2	2,0	2,1	29,7	2940
315	380	400 LYB	745	894	95,6	0,80	585	4034	6,2	2,0	2,1	33,2	3200

T4, T 135°C

150	150	355 LXB	740	890	94,8	0,84	272	1934	6,6	1,5	2,4	13,2	1840
180	180	355 LWB	743	893	95,3	0,84	325	2311	6,8	1,5	2,5	16,2	2040
200	200	355 LYB	744	894	95,6	0,85	356	2565	7,2	2,0	2,6	18,0	2170
230	230	400 LXB	745	895	95,6	0,81	429	2945	6,6	2,1	2,2	25,0	2760
250	250	400 LWB	745	895	95,5	0,82	461	3201	6,8	2,2	2,3	29,7	2940
280	280	400 LYB	745	895	95,6	0,83	510	3598	6,8	2,2	2,2	33,2	3200

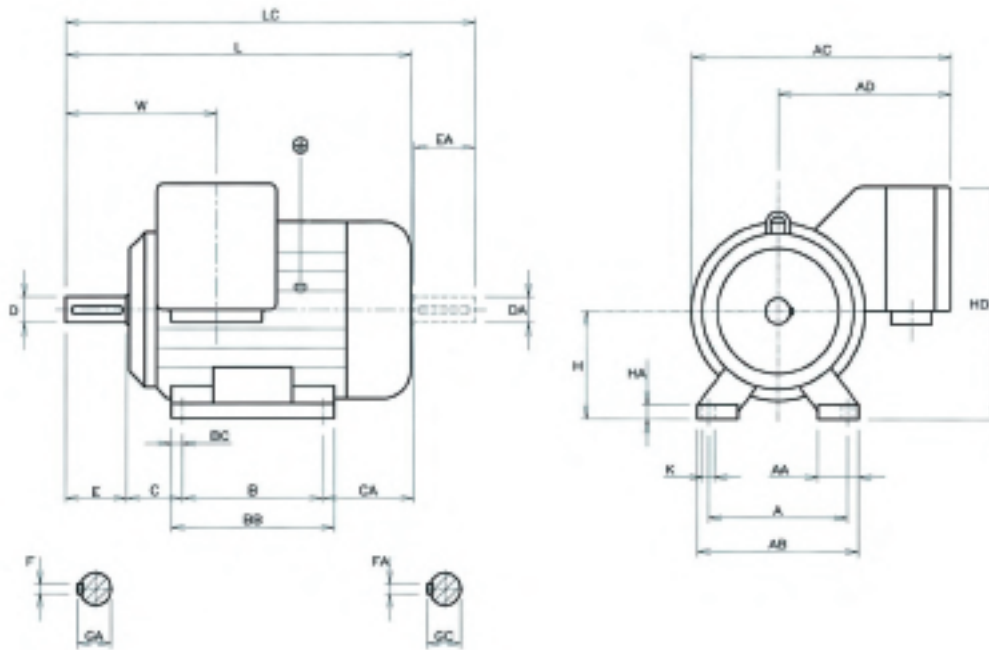
I<sub>s</sub> = Starting current, T<sub>s</sub> = Starting torque, T<sub>max</sub> = Breakdown torque.

Detailed data for 440V/60Hz on request.

The motors shown on this page are not multivoltage. Output values at 440V/60Hz refer to motors with dedicated winding.

**Dimensions**

**D5 71-132 IM B3**

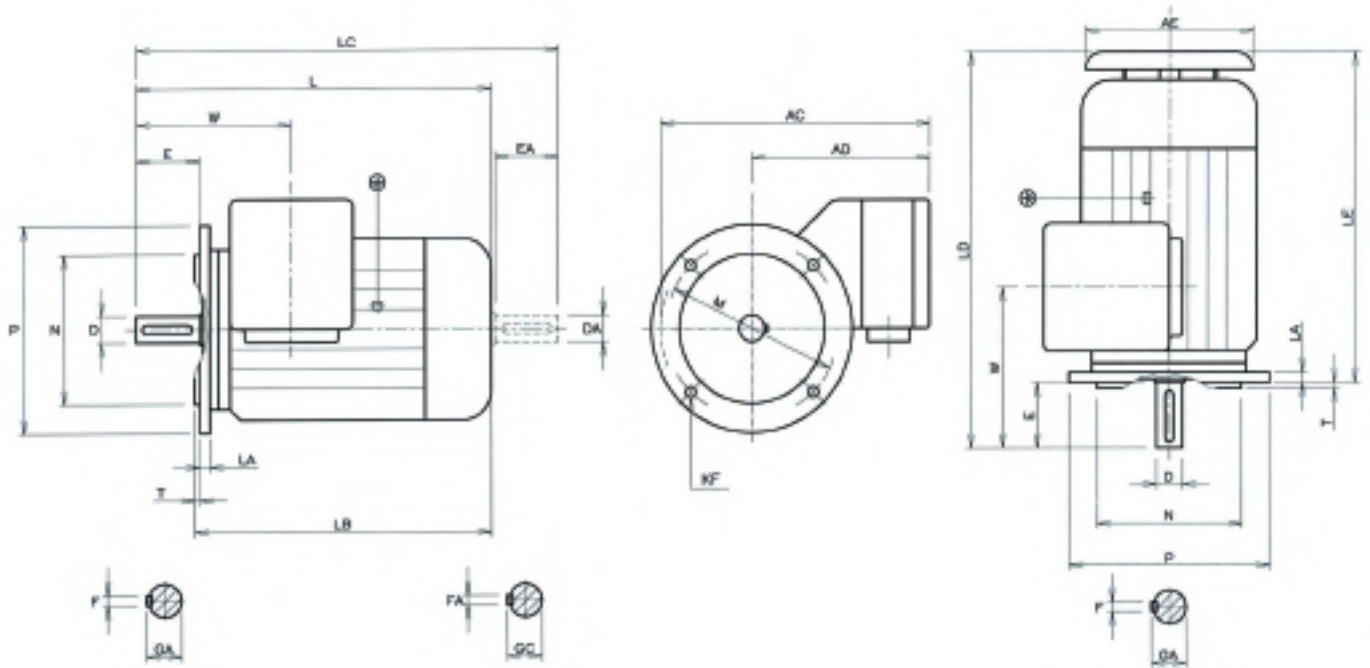


FRAME SIZE	A	AA	AB	AC	AD	B	BB	BC	C	CA	H	HA	HD	K
71	112	26	135	255	175	90	110	10	45	104	71	8	161	7
80	125	25	150	275	185	100	125	12,5	50	112	80	8	180	9
90	S	140	30	175	192	100	125	12,5	56	111	90	10	206	9
	L	140	30	175	302	125	150	12,5	56	126	90	10	206	9
100	L	160	31	195	336	140	170	15	63	138	100	12	240	12
112	M	180	38	225	336	140	170	15	70	171	112	12	252	12
132	S	216	41	255	386	140	185	22,5	89	168	132	15	273	12
	M	216	41	255	386	178	223	22,5	89	168	132	15	273	12

FRAME SIZE	L	LD	LC	W	SHAFT EXTENSION								
					D	E	F	GA	DA	EA	FA	GC	
71	266	297	290	120	14	30	5	16	14	30	5	16	
80	299	330	342	130	19	40	6	21,5	19	40	6	21,5	
90	S	314	345	367	142	24	50	8	27	24	50	8	27
	L	354	385	407	142	24	50	8	27	24	50	8	27
100	L	397	425	461	162	28	60	8	31	28	60	8	31
112	M	437	468	501	172	28	60	8	31	28	60	8	31
132	S	473	504	557	202	38	80	10	41	38	80	10	41
	M	511	542	595	202	38	80	10	41	38	80	10	41

**Dimensions**

**D5 71-132 IM B5 AND IM V1**

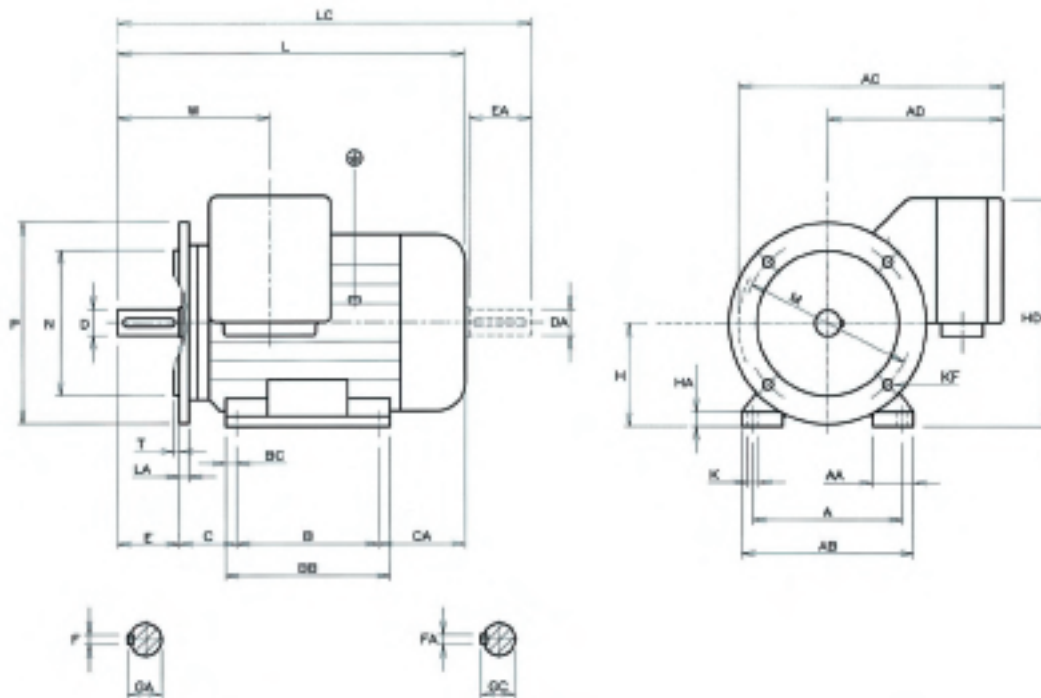


FRAME SIZE	AC	AD	AE	L	LB	LC	LD	W	LE	SHAFT EXTENSION								
										D	E	F	GA	DA	EA	FA	GC	
71	255	175	125	286	239	299	297	120	287	14	30	5	16	14	30	5	16	
80	275	185	182	299	262	342	330	130	290	19	40	6	21,5	19	40	6	21,5	
90	S	304	192	182	314	267	367	345	142	295	24	50	8	27	24	50	8	27
	L	304	192	182	354	307	407	328	142	335	24	50	8	27	24	50	8	27
100	L	336	214	212	337	341	461	428	172	368	28	60	8	31	28	60	8	31
112	M	336	214	212	437	381	501	468	172	408	28	60	8	31	28	60	8	31
	S	388	236	264	473	397	557	504	202	424	38	80	10	41	38	80	10	41
132	S	388	236	264	511	435	595	542	202	462	38	80	10	41	38	80	10	41
	M	388	236	264	511	435	595	542	202	462	38	80	10	41	38	80	10	41

FRAME SIZE	FLANGE B5						
	M	N	P	LA	KF	T	
71	130	110	160	8	9,5	3,5	
80	165	130	200	9	11,5	3,5	
90	S	165	130	200	9	11,5	3,5
	L	165	130	200	9	11,5	3,5
100	L	215	180	250	14	14,0	4
112	M	215	180	250	14	14,0	4
	S	265	230	300	14	14,0	4
132	S	265	230	300	14	14,0	4
	M	265	230	300	14	14,0	4

**Dimensions**

Dimensions D5 71-132 IM B35



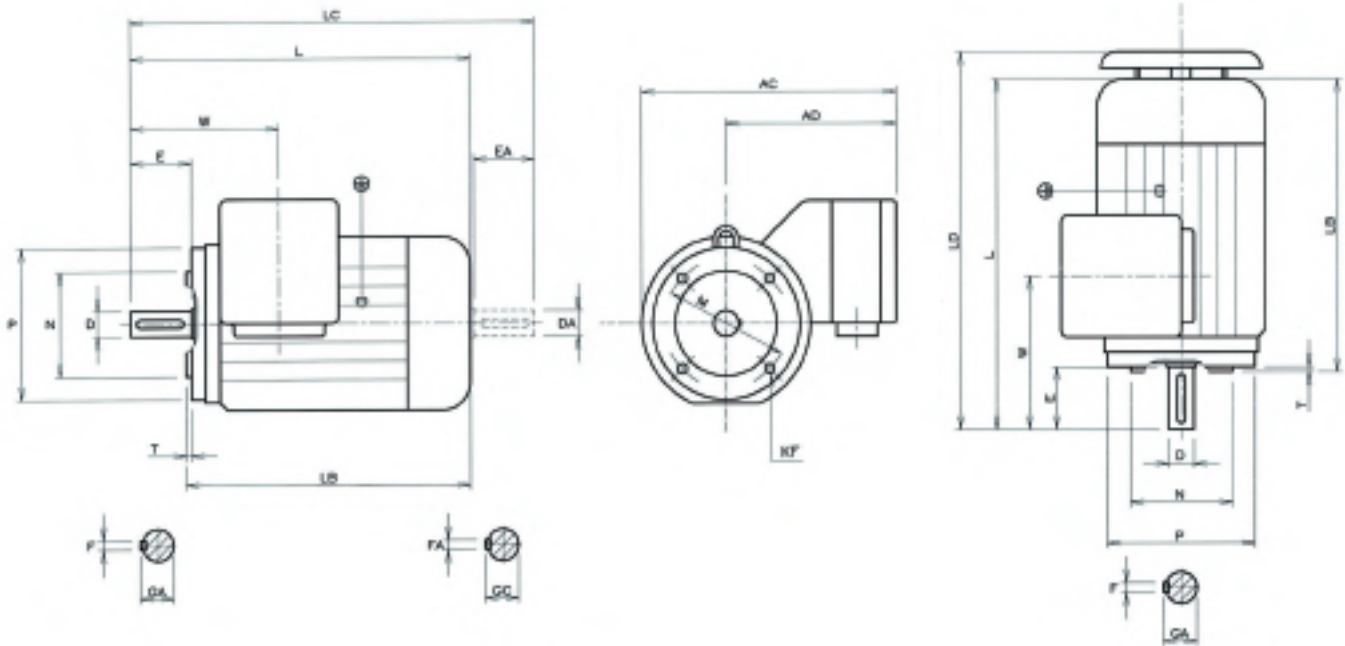
FRAME SIZE	A	AA	AB	AC	AD	B	BB	BC	C	CA	H	HA	HD	K
71	112	26	135	255	175	90	110	10	45	104	71	8	161	7
80	125	25	150	275	185	100	125	12.5	50	112	80	8	180	9
90	S	140	30	175	312	100	125	12.5	56	111	90	10	206	9
	L	140	30	175	302	102	125	12.5	56	126	90	10	206	9
100	L	160	31	195	336	114	140	15	63	138	100	12	240	12
112	M	190	39	225	396	140	170	15	70	171	112	12	252	12
132	S	216	41	255	396	140	185	22.5	89	168	132	15	273	12
	M	216	41	255	396	178	223	22.5	89	168	132	15	273	12

FRAME SIZE	L	LD	LC	W	FLANGE B5						SHAFT EXTENSION								
					M	N	P	LA	KF	T	D	E	F	GA	DA	EA	FA	GC	
71	266	297	298	120	130	110	160	6	9.5	3.5	14	30	5	16	14	30	5	16	
80	299	330	342	130	165	130	200	9	11.5	3.5	19	40	6	21.5	19	40	6	21.5	
90	S	314	345	367	142	165	130	200	9	11.5	3.5	24	50	8	27	24	50	8	27
	L	354	385	407	142	165	130	200	9	11.5	3.5	24	50	8	27	24	50	8	27
100	L	397	425	461	162	215	180	250	14	14.0	4	28	60	8	31	28	60	8	31
112	M	437	468	501	172	215	180	250	14	14.0	4	28	60	8	31	28	60	8	31
132	S	473	504	557	202	265	230	300	14	14.0	4	38	80	10	41	38	80	10	41
	M	511	542	595	202	265	230	300	14	14.0	4	38	80	10	41	38	80	10	41



**Dimensions**

Dimensions D5 71-112 IM B14 AND IM V18

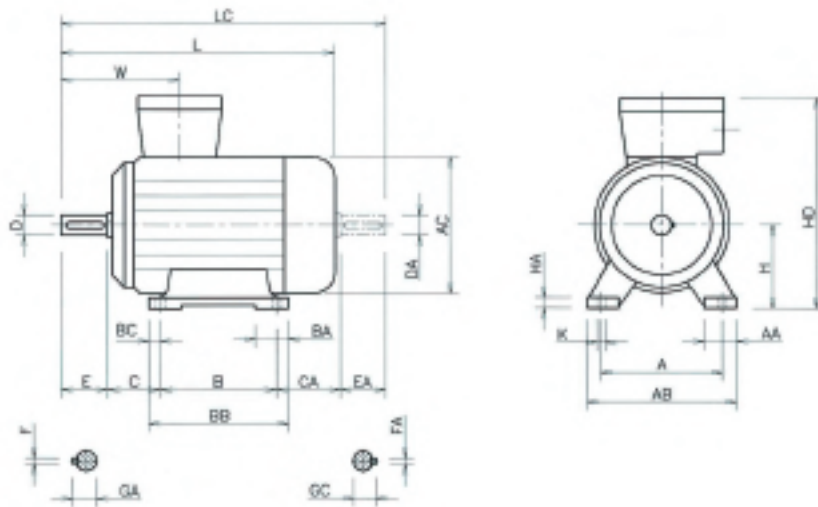


FRAME SIZE	AC	AD	AE	L	LB	LC	LD	W	FLANGE B14				
									M	N	P	KF	T
71	255	175	125	296	239	299	297	120	85	70	105	M6	2.5
80	275	185	182	299	262	342	330	130	100	80	129	M6	3.0
90	S	304	192	182	314	267	345	142	115	95	140	M8	3.0
	L	304	192	182	354	307	407	142	115	95	140	M8	3.0
100	L	336	214	212	397	341	428	172	130	110	169	M8	3.5
112	M	336	214	212	437	381	591	172	130	110	169	M8	3.5

FRAME SIZE	SHAFT EXTENSION										
	D	E	F	GA	DA	GA	DA	EA	FA	GC	
71	14	30	5	16	14	16	14	30	5	16	
80	19	40	6	21,5	19	21,5	19	40	6	21,5	
90	S	24	50	8	27	24	27	24	50	8	27
	L	24	50	8	27	24	27	24	50	8	27
100	L	28	60	8	31	28	31	28	60	8	31
112	M	28	60	8	31	28	31	28	60	8	31

**Dimensions**

Dimensions D5 160-315 IM B3



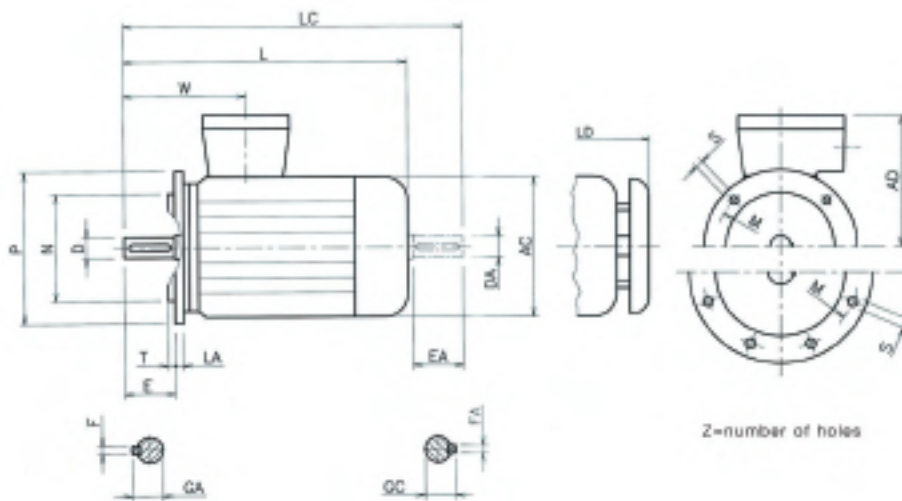
FRAME SIZE	POLES	A	AA	AB	AC	B	BA	BB	BC	C	CA	H	HA	HD	K	L	
D5_160	M	2-3	254	55	300	314	210	95	296	21	108	223	160	22	446	14	648
	L		254	55	300	314	254	95	296	21	108	179	160	22	446	14	648
D5_180	M	2-4	279	58	324	314	241	85	283	21	121	179	180	24	466	14	648
	L	4-3	279	58	324	354	279	90	321	21	121	216	180	24	466	14	723
D5_200	L	2-3	318	63	368	354	305	75	350	22,5	133	178	200	24	508	18	723
	S	4-3	358	76	406	411	286	100	360	24,5	149	260	225	28	593	18	830
D5_225	M	2	358	76	406	411	311	100	360	24,5	149	235	225	28	593	18	800
		4-3	358	76	406	411	311	100	360	24,5	149	235	225	28	593	18	830
D5_250	M	2	406	90	465	411	349	95	406	28,5	168	178	250	28	618	22	830
		4-3	406	90	465	411	349	95	406	28,5	168	178	250	28	618	22	830
D5_280	S	2	457	90	540	490	368	110	480	30,5	190	272	280	40	710	22	960
		4-3	457	90	540	490	368	110	480	30,5	190	272	280	40	710	22	960
	M	2	457	90	540	490	419	110	480	30,5	190	221	280	40	710	22	960
		4-3	457	90	540	490	419	110	480	30,5	190	221	280	40	710	22	960
D5_315	SM	2	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1102
	SM	4-3	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1132
	MA	2	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1102
	MA-MC	4-3	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1132
	MD	2	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1102
	MD-ME	4-3	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1132

FRAME SIZE	POLES	LC	W	SHAFT EXTENSION								
				D	E	F	GA	DA	EA	FA	GC	
D5_160	M	2-3	761	279	42	110	12	45	42	110	12	45
			761	279	42	110	12	45	42	110	12	45
D5_180	M	2-4	761	279	48	110	14	51,5	42	110	12	45
			836	296	48	110	14	51,5	42	110	12	45
D5_200	L	2-3	836	296	55	110	16	59	42	110	12	45
			945	318	60	140	18	64	55	110	16	59
D5_225	M	2	915	288	55	110	16	59	55	110	16	59
		4-3	945	318	60	140	18	64	55	110	16	59
D5_250	M	2	945	318	60	140	18	64	55	110	16	59
		4-3	945	318	65	140	18	69	55	110	16	59
D5_280	S	2	1110	350	65	140	18	69	60	140	18	64
		4-3	1110	350	75	140	20	79,5	60	140	18	64
	M	2	1110	350	65	140	18	69	60	140	18	64
		4-3	1110	350	75	140	20	79,5	60	140	18	64
D5_315	SM	2	1252	387	65	140	18	69	60	140	18	64
	SM	4-3	1282	417	80	170	22	85	65	140	18	69
	MA	2	1252	387	65	140	18	69	60	140	18	64
	MA-MC	4-3	1282	417	80	170	22	85	65	140	18	69
	MD	2	1252	387	70	140	20	74,5	60	140	18	64
	MD-ME	4-3	1282	417	80	170	25	95	65	140	18	69

Dimensions not valid for IIC motors.

**Dimensions**

Dimensions D5 160-315 IM B5 AND IM V1



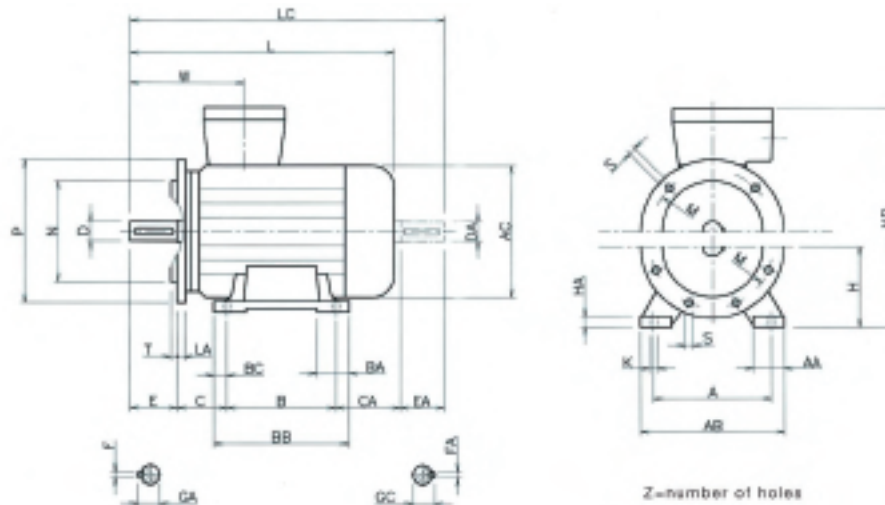
FRAME SIZE	POLES	AC	AD	L	LC	LD	W	SHAFT EXTENSION								
								D	E	F	GA	DA	EA	FA	GC	
D5_160	M	2-8	314	286	648	761	710	279	42	110	12	45	42	110	12	45
	L		314	286	648	761	710	279	42	110	12	45	42	110	12	45
D5_180	M	2-4	314	286	648	761	710	279	48	110	14	51,5	42	110	12	45
	L	4-8	354	308	723	836	790	296	48	110	14	51,5	42	110	12	45
D5_200	L	2-8	354	308	723	836	790	296	55	110	18	59	42	110	12	45
D5_225	S	4-8	411	368	830	945	885	318	60	140	18	64	55	110	16	59
		2	411	368	860	915	885	288	55	110	18	59	55	110	16	59
	M	4-8	411	368	830	945	885	318	60	140	18	64	55	110	16	59
D5_250	M	2	411	368	830	945	885	318	60	140	18	64	55	110	16	59
		4-8	411	368	830	945	885	318	65	140	18	69	55	110	16	59
D5_280	S	2	490	430	960	1110	1045	350	65	140	18	69	60	140	18	64
		4-8	490	430	960	1110	1045	350	75	140	20	79,5	60	140	18	64
	M	2	490	430	960	1110	1045	350	65	140	18	69	60	140	18	64
		4-8	490	430	960	1110	1045	350	75	140	20	79,5	60	140	18	64
D5_315	SM	2	604	505	1102	1252	1177	387	65	140	18	69	60	140	18	64
	SM	4-8	604	505	1132	1282	1207	417	80	170	22	85	65	140	18	69
	MA	2	604	505	1102	1252	1177	387	65	140	18	69	60	140	18	64
	MA-NC	4-8	604	505	1132	1282	1207	417	80	170	22	85	65	140	18	69
	MD	2	604	505	1102	1252	1177	387	70	140	20	74,5	60	140	18	64
	MD-ME	4-8	604	505	1132	1282	1207	417	90	170	25	95	65	140	18	69

FRAME SIZE	POLES	FLANGE							
		LA	M	N	P	S	T	Z	
D5_160	M	2-8	15	300	250	350	18	5	4
	L		15	300	250	350	18	5	4
D5_180	M	2-4	15	300	250	350	18	5	4
	L	4-8	15	300	250	350	18	5	4
D5_200	L	2-8	18	350	300	400	18	5	4
D5_225	S	4-8	16	400	350	450	18	5	8
		2	16	400	350	450	18	5	8
	M	4-8	16	400	350	450	18	5	8
D5_250	M	2	18	500	450	550	18	5	8
		4-8	18	500	450	550	18	5	8
D5_280	S	2	18	500	450	550	18	5	8
		4-8	18	500	450	550	18	5	8
	M	2	18	500	450	550	18	5	8
		4-8	18	500	450	550	18	5	8
D5_315	SM	2	22	600	550	660	22	6	8
	SM	4-8	22	600	550	660	22	6	8
	MA	2	22	600	550	660	22	6	8
	MA-NC	4-8	22	600	550	660	22	6	8
	MD	2	22	600	550	660	22	6	8
	MD-ME	4-8	22	600	550	660	22	6	8

Dimensions not valid for IIC motors.

**Dimensions**

Dimensions D5 160-315 IM B35



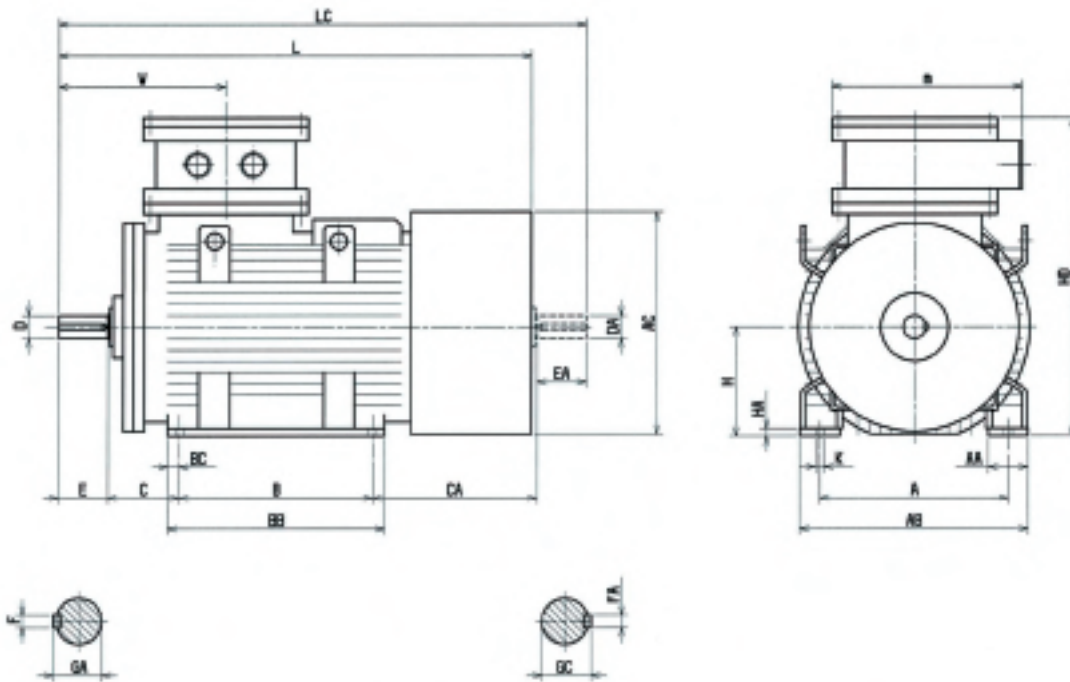
FRAME SIZE	POLES	A	AA	AB	AC	B	BA	BB	BC	C	CA	H	HA	HD	K	L	LC	
D5_160	M	2-8	254	55	300	314	210	95	296	21	108	223	180	22	446	14	648	761
	L		254	55	300	314	254	95	296	21	108	179	180	22	446	14	648	761
D5_180	M	2-4	279	58	324	314	241	85	283	21	121	179	180	24	466	14	648	761
	L	4-8	279	58	324	354	279	90	321	21	121	216	180	24	488	14	723	836
D5_200	L	2-8	318	63	368	354	305	75	330	22,5	133	178	200	24	508	18	723	836
D5_225	S	4-8	356	76	406	411	296	100	360	24,5	149	260	225	28	563	18	830	945
	M	2	356	76	406	411	311	100	360	24,5	149	235	225	28	563	18	800	915
D5_250	M	2	406	90	465	411	349	85	406	28,5	168	178	250	28	618	22	830	945
	M	4-8	406	90	465	411	349	95	406	28,5	168	178	250	28	618	22	830	945
D5_280	S	2	457	90	540	490	368	110	480	30,5	190	272	280	40	710	22	960	1110
		4-8	457	90	540	490	368	110	480	30,5	190	272	280	40	710	22	960	1110
	M	2	457	90	540	490	419	110	480	30,5	190	221	280	40	710	22	960	1110
		4-8	457	90	540	490	419	110	480	30,5	190	221	280	40	710	22	960	1110
D5_315	SM	2	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1102	1282
	SM	4-8	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1132	1282
	MA	2	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1102	1282
	MA-MC	4-8	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1132	1282
	MD	2	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1102	1282
	MD-ME	4-8	508	110	590	604	457	165	520	32	216	299	315	45	820	27	1132	1282

FRAME SIZE	POLES	W	SHAFT EXTENSION									FLANGE						
			D	E	F	GA	DA	EA	FA	GC	LA	M	N	P	S	T	Z	
D5_160	M	2-8	279	42	110	12	45	42	110	12	45	15	300	250	350	18	5	4
	L		279	42	110	12	45	42	110	12	45	15	300	250	350	18	5	4
D5_180	M	2-4	279	48	110	14	51,5	42	110	12	45	15	300	250	350	18	5	4
	L	4-8	296	48	110	14	51,5	42	110	12	45	15	300	250	350	18	5	4
D5_200	L	2-8	296	55	110	16	59	42	110	12	45	18	350	300	400	18	5	4
D5_225	S	4-8	318	60	140	18	64	55	110	16	59	16	400	350	450	18	5	8
	M	2	288	55	110	16	59	55	110	16	59	16	400	350	450	18	5	8
D5_250	M	2	318	60	140	18	64	55	110	16	59	18	500	450	550	18	5	8
	M	4-8	318	65	140	18	69	55	110	16	59	18	500	450	550	18	5	8
D5_280	S	2	350	65	140	18	69	60	140	18	64	18	500	450	550	18	5	8
		4-8	350	75	140	20	79,5	60	140	18	64	18	500	450	550	18	5	8
	M	2	350	65	140	18	69	60	140	18	64	18	500	450	550	18	5	8
		4-8	350	75	140	20	79,5	60	140	18	64	18	500	450	550	18	5	8
D5_315	SM	2	387	65	140	18	69	60	140	18	64	22	600	550	660	22	6	8
	SM	4-8	417	80	170	22	85	65	140	18	69	22	600	550	660	22	6	8
	MA	2	387	65	140	18	69	60	140	18	64	22	600	550	660	22	6	8
	MA-MC	4-8	417	80	170	22	85	65	140	18	69	22	600	550	660	22	6	8
	MD	2	387	70	140	20	74,5	60	140	18	64	22	600	550	660	22	6	8
	MD-ME	4-8	417	90	170	25	95	65	140	18	69	22	600	550	660	22	6	8

Dimensions not valid for IIC motors.

**Dimensions**

**D5 355-400 IM B3**

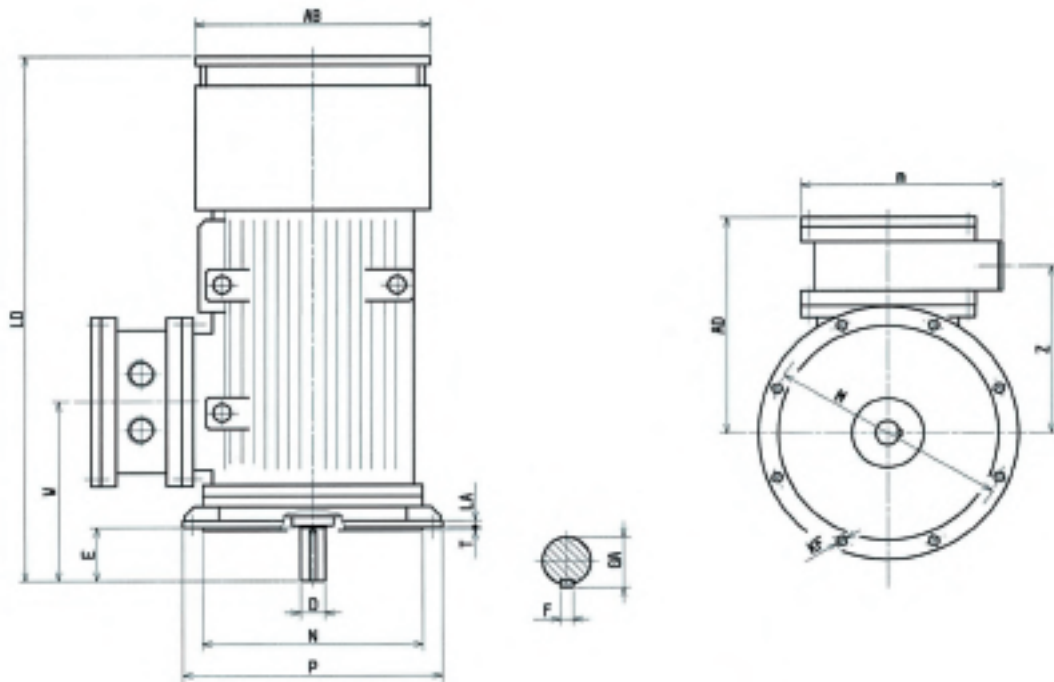


FRAME SIZE	POLES	A	AA	AB	AC	AD	AE	B	BB	BC	C	CA	H	HA	HD	K	L	LC	W	
D5_355	L	2	610	130	740	750	605	755	630	706	38	254	526	355	26	1050	27	1550	1605	550
		4-8	610	130	740	750	605	755	630	706	38	254	506	355	26	1050	27	1620	1765	620
D5_400	LX - LW - LY	2	696	150	836	805	730	820	710	880	85	280	655	400	35	1130	33	1780	1925	580
			LZ	696	150	836	805	730	820	710	1025	85	280	755	400	35	1130	33	1880	2025
	LX - LW - LY	4-8	696	150	836	805	730	820	710	880	85	280	655	400	35	1130	33	1850	1995	650
			LZ	696	150	836	805	730	820	710	1025	85	280	755	400	35	1130	33	1950	2095

FRAME SIZE	POLES	SHAFT EXTENSION								
		D	E	F	GA	DA	EA	FA	GC	
D5_355	L	2	75	140	20	79,5	75	140	20	79,5
		4-8	100	210	29	106	75	140	20	79,5
D5_400	L	2	75	140	20	79,5	75	140	20	79,5
		4-8	100	210	28	106	75	140	20	79,5

**Dimensions**

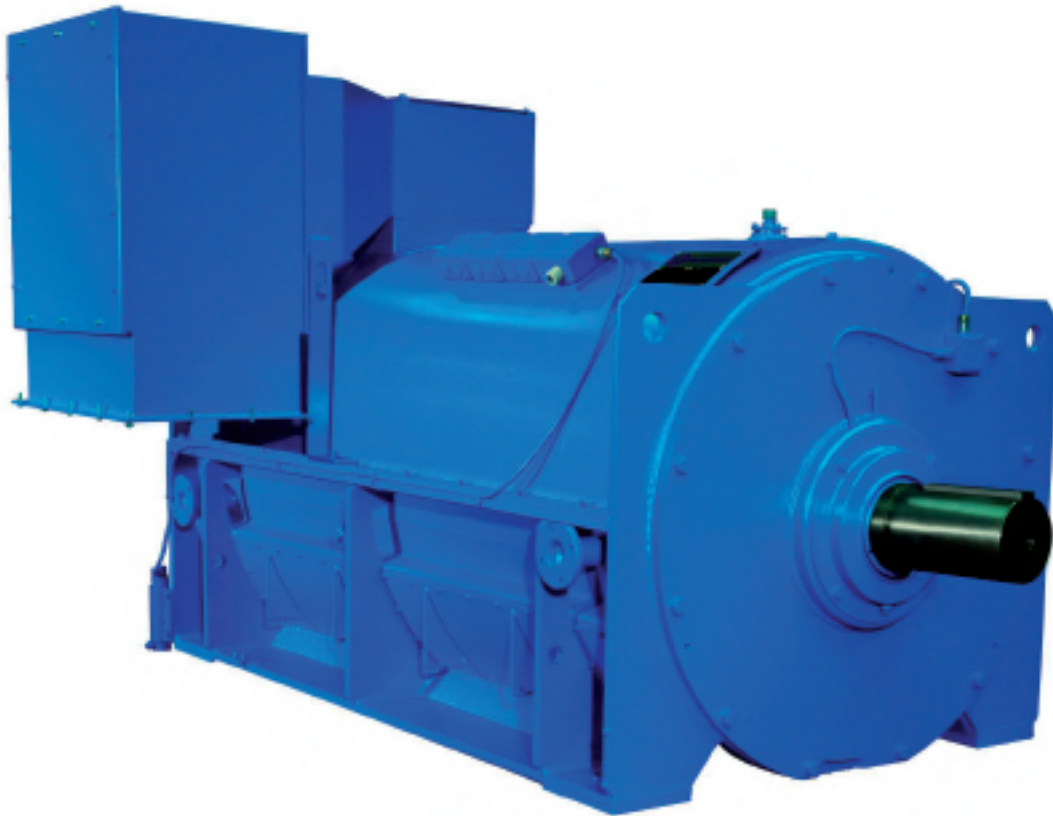
Dimensions D5 355-400 IM V1



FRAME SIZE	POLES	AB	AD	LD	m	Z	W	SHAFT EXTENSION				
								D	E	F	GA	
D5_355	L	2	755	605	1655	618	528	550	75	140	20	79,5
		4-8	755	605	1725	618	528	620	100	210	29	106
D5_400	LX - LW - LY	2	820	730	1880	618	578	580	75	140	20	79,5
			LZ	820	730	1880	618	578	580	75	140	20
	LX - LW - LY	4-8	820	730	1950	618	578	650	100	210	28	106
			LZ	820	730	2000	618	578	650	100	210	28

FRAME SIZE	POLES	FLANGE						
		M	N	P	LA	KF	T	
D5_355	L	2	740	680	800	25	n°8x24	6
		4-8	740	680	800	25	n°8x24	6
D5_400	L	2	940	880	1000	26	n°8x28	6
		4-8	940	880	1000	26	n°8x28	6

**Water Jacket, Three Phase, Squirrel Cage, Induction Motors**



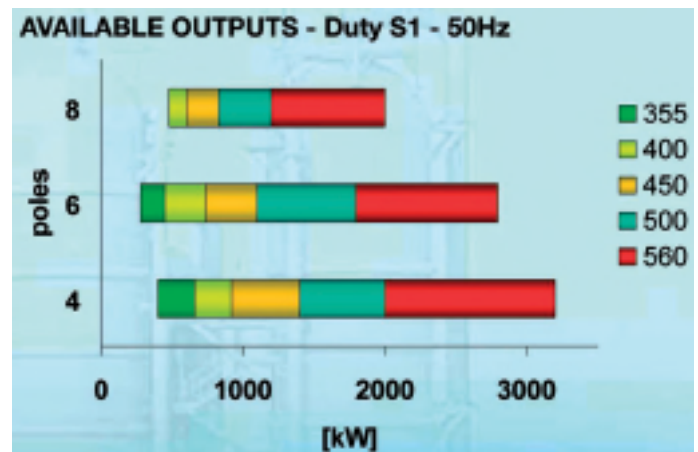
**WATER COOLED ASYNCHRONOUS MOTORS 355, 400, 450, 500 AND 560 FRAME SIZES**

This series of water cooled motors was designed for heavy duty applications where space and natural ventilation is limited.

The integral water jacket coolers provide an excellent power output for the compact motor size as compared to traditional heat exchanger designs.

These motors, originally designed for tight shipboard applications as main propulsion drives and auxiliary bow thrusters, now find themselves in heavy industry for compressors, pumps, rollers and other rotating equipment.

With Marelli Motori, Lönne offers the very best of manufacturing excellence and experience. Together the two parties are recognised as leading suppliers to Industrial, Petrochemical and Marine Industries offering a complete range of Low, Medium and High Voltage Motors and Generators. These quality products are backed up by an organisation of skilled people providing sales, service and technical support to the high standards demanded by customers.



**APPLICATIONS**

- Marine: main propulsion and thrusters, pumps, etc.
- Cement: vibrating equipment, kilns, mills, conveyor belts, fans, etc.
- Mining: mills, conveyor belts, compressors, fans, pumps, crushers, etc.
- Paper industry: chippers, mixers, debarkers, refineries, etc.
- Petrochemical: pumps, compressors
- Water: pumps
- Process industry: cranes, fans, exhausters, laminators, pumps, etc.
- Sugar and alcohol industry: chippers, debarkers, mills, etc.
- Hydropower application

**General Features**



**GENERAL FEATURES**

Robust construction designed for heavy, arduous and continuous duty in confined spaces.

**Standards**

IEC 60034, IEC 60072

**Approvals**

The motors are designed and built in accordance with marine register rules specifications and comply with: ABS, BV, CCS, DNV, GL, KR, LR, NK, RINA, RS.

**Mountings**

Vertical or horizontal  
Feet and/or flange mountings

**Construction**

Steel frame  
Cast iron or steel terminal boxes and shields  
Protection degree IP55  
Windings impregnated with VPI system (Vacuum Pressure Impregnation)  
Insulation class F  
Anti-corrosion and rust frame treatment  
Stainless steel nameplate  
Simple earthing  
Drainage hole  
PTCs in windings with terminals in auxiliary terminal box

**Supply**

Low or Medium Voltage  
(for marine application only low voltage allowed)  
Inverter

**Cooling**

Fresh water

**Sound Pressure**

Low noise level

**Bearings**

Rolling bearings  
Regreasing system  
Arrangement for SPM sensor

**Safety**

Water leakage sensor

**Advantages of Water Jacket Design**

No heating dissipation in the installed area  
Compact dimensions  
No dust circulation

**Recommended Uses**

When limited space is required  
When driven machine is already water cooled  
When low noise is required  
When switchboard is already water cooled



**Technical Features**

**DUTY TYPE**

The power outputs given in this catalogue refer to S1 duty type. The table below shows the correction factors to calculate the outputs for S2 duty.

S2 = S1		Frame size	S2 = 80	
4 poles	6-8 poles		4 poles	6-8 poles
1,30	1,30	355	1,10	1,10
1,30	1,25	400	1,10	1,05
1,25	1,20	450	1,05	1,05
1,15	1,15	500	1,05	1,05
1,15	1,15	560	1,05	1,05

**DEGREE OF PROTECTION**

Motors are normally provided with IP55 enclosure. A higher degree of protection is available on request.

**ENVIRONMENTAL CONDITIONS**

Electrical tables refer to a cooling water of +38°C. Please contact MarelliMotori for different environmental conditions and where cooling water temperature is less than 10°C.

**INSULATION**

All motors have class F insulation which allows a maximum winding temperature rise of 100°C with cooling fluid temperature of 38°C. On request class H insulation is also available.

**TEMPERATURE RISE**

The outputs shown in this catalogue refer to temperature rise Class F.

**PROTECTIVE TREATMENTS**

**External Surfaces.**  
Standard finish is a heavy duty epoxy- vinyl paint. Colour is RAL5010.  
Special paint finishes can be provided to protect against: acids, alkalis, salt air, anhydrous gases and sea water.

**Internal Surfaces**  
Special tropicalised treatment of internal surfaces and electrical windings and inner cooling channels are coated with rust protector.

**MATERIALS**

Durability and reliability determine the choice of materials. Fabricated steel frames and cast iron shields are designed for reduced weight. Terminal boxes for frame sizes up to 400LB are in cast iron and from 400LC to 560 frame size in fabricated steel. Please contact Lönne for different materials. Special steel shafts are available for high load applications.

**BALANCING AND VIBRATION GRADE**

The motors are dynamically balanced with a half key applied to the shaft extension in accordance with standard IEC 60034-14 to vibration grade reduced (A). On request vibration grade special (B) is also available.

**COOLING SYSTEM**

IC 7 A1 W7 (Self- circulating primary coolant with integral heat exchanger using remote fresh water). Reduces the noise level and it is ideal for constant torque, low speed, inverter applications. The cooling fluid must be clean water. Do not use:  
- sea water,  
- water with more than 120 mg/l of chloride.  
- water with solid content over 10 mg/l.  
Two flanged connections are provided for inlet and outlet of cooling water.  
On the appropriate name plate heat exchanger characteristics are indicated: flow rate, inlet/ outlet temperature, min/ max pressure.

Frame size mm	Flow rate l/min (*)	Inlet Temp. °C	Outlet Temp. °C	Max Pressure bar	Min Pressure bar
355	50	38	45	6	1
400	65	38	45	6	1
450	70	38	48	6	1
500	75	38	48	6	1
560	120	38	48	6	1

**Technical Features**

**SOUND LEVELS**

The electric tables show the sound pressure levels (Lp(A)) measured at no load conditions at one metre distance from the machine according to standard ISO R 1680 with tolerances of 3dB(A). The values do not depend on the supply frequency.

**BEARINGS**

Frame size	D-end		N-end	
	B3	V1	B3	V1
355	6322-C3	6322-C3	6322-C3	6322-C3
400	6322-C3	6322-C3	6322-C3	6322-C3
	6322-C3	6322-C3	6322-C3	7322
450	6326-C3	6326-C3	6326-C3	6326
	6326-C3	6326-C3	6326-C3	7326
500	6328-C3	6328-C3	6328-C3	6328
	6328-C3	6328-C3	6328-C3	7328
560	NU328-EC-C3	6238M-C3	NU234-EC-C3	6234
	6328W-C3			2 x 7328

On request high load configurations are also available: roller or sleeve bearings.

**DERATING FOR INVERTER SUPPLY**

The B4J and B5J series have been designed to satisfy the requirements of speed control by frequency converter supply. MarelliMotori therefore provides various solutions to obtain the best performances.

To select the best solution please contact MarelliMotori supplying the following information:

1. Load characteristics (quadratic torque, constant torque or torque curve for all other cases) of the driven equipment;
2. Electric supply and speed range;
3. Converter supply characteristics (peak voltage values at the motor terminals, rise time, etc.);
4. Maximum inverter overload (time and current value).

Inverter fed motors will be supplied with enhanced winding insulation and N- end insulated bearing.

**SAFETY**

The whole series is supplied with PT100 in windings and internal water leakage sensor as standard.

**APPROVALS**

In addition to meeting the electrical motor specifications, the B4J and B5J series also match the requirements of marine register rules for pressure vessels.

In particular our motors comply with: ABS, BV, CCS, DNV, GL, KR, LR, NK, RINA, RS.



**Technical Data**

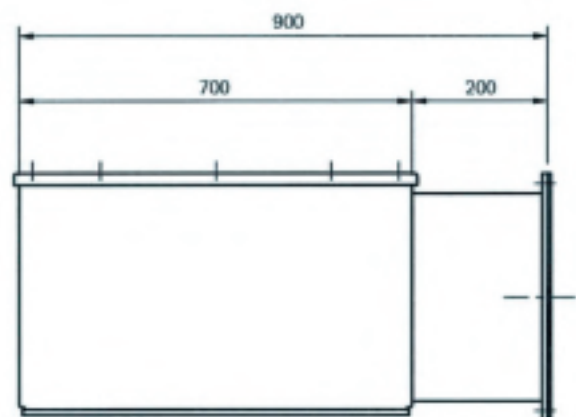
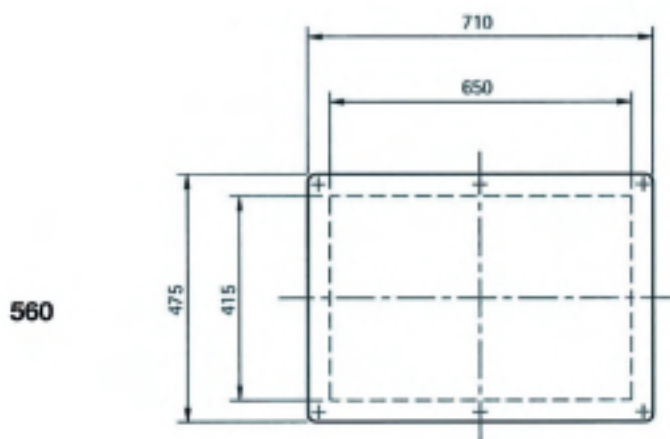
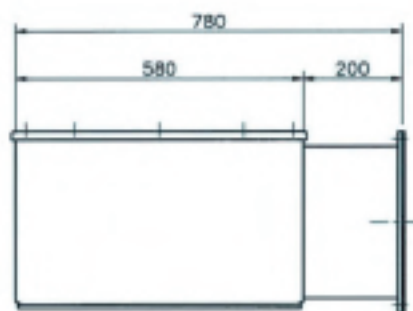
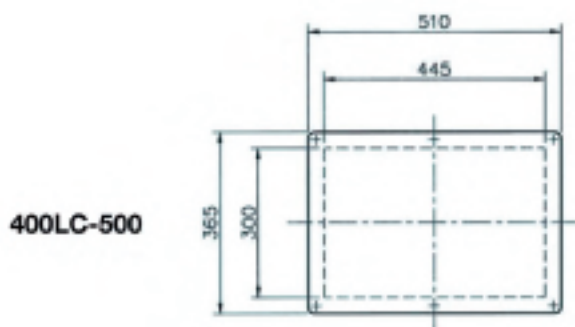
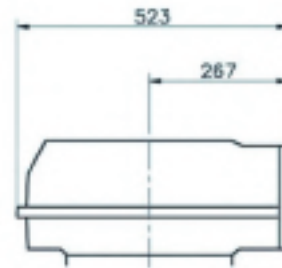
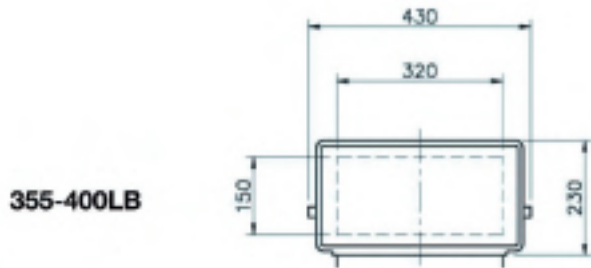
Low voltage 690V

Rated output		Motor type	Rated speed		Performances of rated outputs				DOL starting		Breakdown torque Tmax/Tn p.u.	Sound pressure level Lpa dB(A)	Moment of inertia J kg m <sup>2</sup>	Approx. Weight kg
50 Hz kW	60 Hz kW		50 Hz rpm	60 Hz rpm	Torque	50 Hz Current	Efficiency	Power factor	Current	Torque				
			Tn N m	In A	η %	cos φ	Is/In p.u.	Ts/Tn p.u.						
<b>4 poles</b>														
330	400	B4J 355 LA4	1434	1784	2121	327	96,0	0,88	5,6	2,1	2,5	69	6,2	1600
400	480	B4J 355 LB4	1436	1786	2566	395	96,3	0,88	5,6	2,1	2,5	69	7,4	1770
450	540	B4J 355 LC4	1436	1786	2889	444	96,4	0,88	5,6	2,0	2,4	69	8,4	1950
500	600	B4J 355 LD4	1436	1786	3210	487	96,6	0,89	5,6	2,0	2,5	69	9,5	2100
550	660	B4J 355 LF4	1437	1787	3529	535	96,7	0,89	5,6	2,0	2,4	69	10,6	2200
600	720	B4J 400 LA4	1436	1786	3852	604	96,7	0,86	5,3	0,8	2,1	71	14	2700
700	830	B4J 400 LB4	1436	1786	4494	696	96,8	0,87	5,4	0,9	2,2	71	17	2960
770	920	B4J 400 LC4	1436	1786	4943	774	96,9	0,86	5,5	0,9	2,1	71	19	3150
980	1150	B5J 450 LA4	1431	1791	6270	958	97,4	0,88	5,7	0,7	2,4	72	30	4040
1050	1250	B5J 450 LB4	1432	1792	6714	1015	97,4	0,89	6,0	0,8	2,5	72	33	4325
1180	1400	B5J 450 LC4	1432	1792	7545	1138	97,6	0,89	6,1	0,8	2,5	72	37	4680
1400	1690	B5J 500 LA4	1433	1793	8946	1364	97,7	0,88	5,3	0,6	2,1	78	49	5730
1560	1890	B5J 500 LB4	1433	1793	9986	1518	97,8	0,88	5,3	0,6	2,1	78	55	6180
1750	2090	B5J 500 LC4	1434	1794	11175	1683	97,9	0,89	5,8	0,6	2,3	78	62	6700
2000	2390	B5J 560 LA4	1434	1794	12771	1996	97,6	0,86	5,2	0,5	2,0	80	111	8220
2400	2890	B5J 560 LB4	1435	1795	15315	2365	97,7	0,87	5,8	0,6	2,1	80	139	9297
2700	3290	B5J 560 LC4	1436	1796	17218	2724	97,7	0,85	7,2	0,8	2,5	80	162	10355
<b>6 poles</b>														
230	280	B4J 355 LA6	990	1190	2216	243	95,4	0,83	5,4	2,2	2,2	66	11	1600
300	360	B4J 355 LB6	991	1191	2888	316	95,7	0,83	5,4	2,2	2,2	66	14	1820
380	460	B4J 355 LC6	992	1192	3654	394	96,1	0,84	5,7	2,5	2,4	66	18	2150
450	530	B4J 400 LA6	994	1194	4319	477	96,3	0,82	5,8	0,9	2,4	68	21	2670
530	630	B4J 400 LB6	994	1194	5087	547	96,7	0,84	5,8	0,9	2,4	68	27	3150
610	735	B4J 400 LC6	994	1194	5855	628	96,8	0,84	5,6	0,8	2,2	68	29	3250
760	900	B5J 450 LA6	994	1194	7294	772	97,0	0,85	5,5	0,8	2,3	70	41	4000
850	1000	B5J 450 LB6	994	1194	8158	863	97,1	0,85	5,3	0,8	2,2	70	46	4300
930	1100	B5J 450 LC6	994	1194	8926	943	97,2	0,85	5,2	0,8	2,2	70	52	4650
1130	1300	B5J 500 LA6	995	1195	10634	1145	97,3	0,85	5,7	0,7	2,3	73	71	5620
1300	1590	B5J 500 LB6	995	1195	12464	1299	97,5	0,86	5,3	0,7	2,1	73	82	6230
1570	1890	B5J 500 LC6	995	1195	15053	1669	97,5	0,86	5,6	0,7	2,2	73	97	6850
1800	2190	B5J 560 LA6	995	1195	17258	1780	97,4	0,87	5,3	0,6	2,3	75	206	8600
2100	2490	B5J 560 LB6	995	1195	20135	2074	97,5	0,87	5,4	0,6	2,3	75	237	9350
2400	2890	B5J 560 LC6	996	1196	22988	2370	97,5	0,87	5,8	0,6	2,5	75	268	10000
<b>8 poles</b>														
400	480	B4J 400 LA8	743	893	5136	430	95,0	0,82	5,5	1,2	2,1	68	26	2670
440	530	B4J 400 LB8	743	893	5630	470	95,7	0,82	5,6	1,2	2,1	68	30	3150
500	600	B4J 400 LC8	743	893	6420	533	95,8	0,82	5,4	1,2	2,1	68	33	3250
550	660	B5J 450 LA8	745	895	7043	568	96,5	0,84	4,8	1,0	2,1	69	35	4000
610	740	B5J 450 LB8	745	895	7811	622	96,6	0,85	4,7	1,0	2,1	69	61	4300
700	830	B5J 450 LC8	745	895	8964	713	96,7	0,85	4,7	1,0	2,1	69	69	4650
780	930	B5J 500 LA8	745	895	9986	794	96,8	0,85	4,7	0,7	2,3	71	95	5620
880	1050	B5J 500 LB8	745	895	11269	885	96,9	0,86	4,7	0,7	2,3	71	110	6230
1000	1200	B5J 500 LC8	746	896	12788	1004	97,0	0,86	5,0	0,9	2,3	71	122	6850
1250	1450	B5J 560 LA8	746	896	15085	1315	97,1	0,82	5,6	0,7	2,4	74	219	8450
1450	1650	B5J 560 LB8	746	896	18543	1526	97,1	0,82	5,6	0,7	2,4	74	252	9320
1700	2090	B5J 560 LC8	746	896	21740	1787	97,2	0,82	5,2	0,7	2,3	74	285	10100

**Standard Configuration and Options**

Description		Frame Size				
		355	400	450	500	560
<b>Degree of Protection</b>						
-	IP 55	S	S	S	S	S
125	IP 56	0	0	0	0	NA
<b>Insulation</b>						
100	Class H	0	0	0	0	0
<b>Painting</b>						
919	Non standard RAL colour	0	0	0	0	0
930	Epoxy-vinyl + polyacrylic	0	0	0	0	0
-	Tropicalisation	S	S	S	S	S
<b>Vibration Grade</b>						
-	Grade A	S	S	S	S	S
133	Grade B	0	0	0	0	0
<b>Bearings</b>						
128	D-end roller bearing	0	0	0	0	0
-*	Sleeve bearings	0	0	0	0	0
-	Regreasing device	S	S	S	S	S
-	Arrangement for SPM	S	S	S	S	S
122	PT100 in bearings	0	0	0	0	0
<b>Drain Holes</b>						
-	Drain holes	S	S	S	S	S
<b>Shaft</b>						
127	Second shaft extension	0	0	0	0	0
<b>Heating elements</b>						
109	Space heaters with terminals placed in auxiliary box	0	0	0	0	0
<b>Windings Protections</b>						
-	PTC (one series of 3 PTC in windings)	S	S	S	S	S
114	PTC (two series of 3 PTC in windings)	0	0	0	0	0
115	PT100 (one series of 3 PT100 in windings)	0	0	0	0	0
115	PT100 (two series of 3 PT100 in windings)	0	0	0	0	0
<b>Inverter Supply</b>						
175	Insulated bearing	0	0	0	0	0
178	Enhanced insulation for use with filter	0	0	0	0	0
178	Enhanced insulation for use without filter	0	0	0	0	0
161	Encoder	0	0	0	0	0

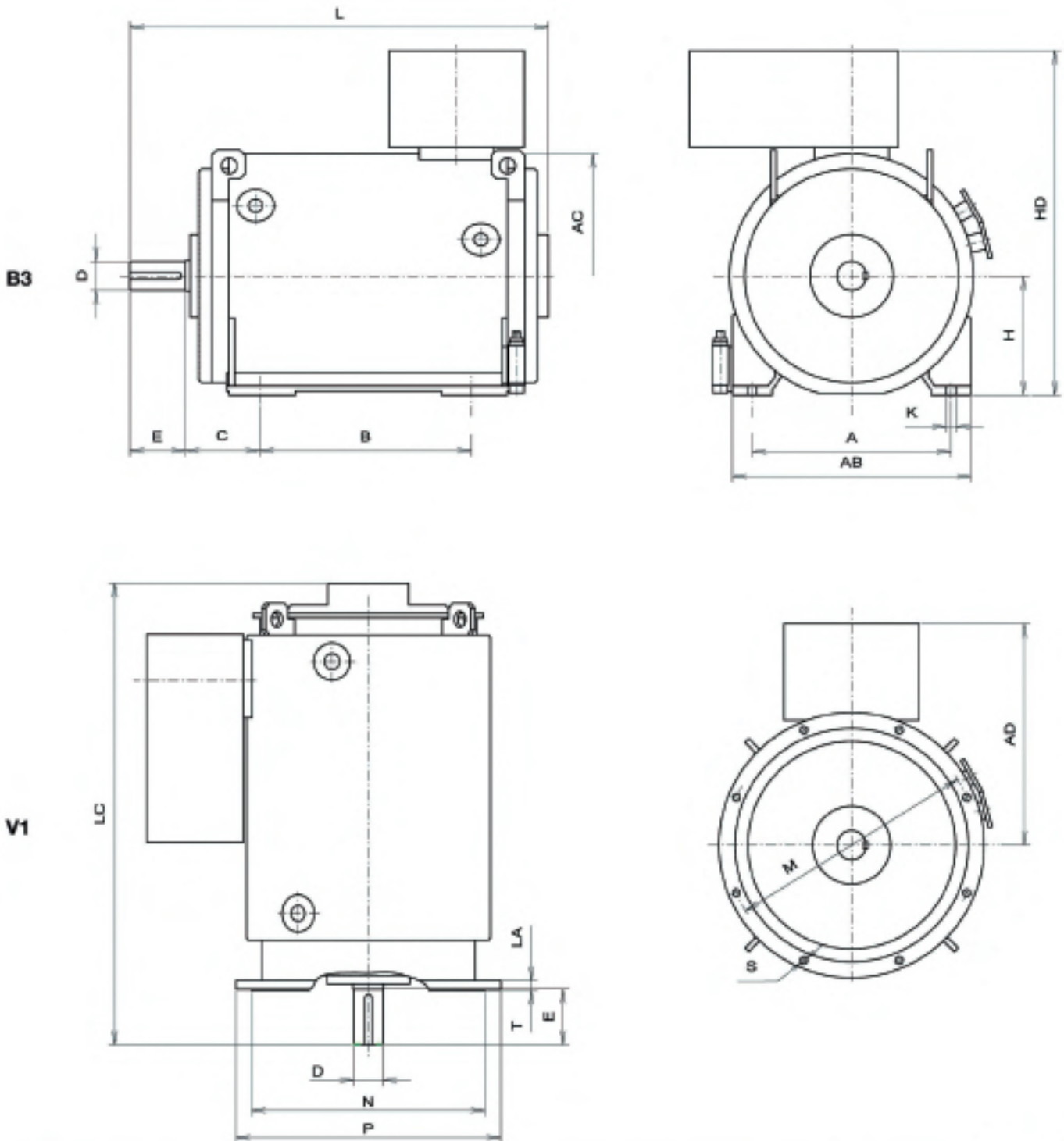
**Terminal Box Dimensions**



Dimensions in mm

Frame size	Terminal Block	Terminals	Maximum conductor cross section	Cable entrance
355 - 400 LB	Flat copper bars	Hole for M12 bolt	2 x 300 mm <sup>2</sup>	Undrilled gland plate
400 LC - 500	Flat copper bars	Hole for M12 bolt	4 x 300 mm <sup>2</sup>	Undrilled gland plate
560	Flat copper bars	Hole for M16 bolt	8 x 300 mm <sup>2</sup>	Undrilled gland plate

**Terminal Box Dimensions**



Dimensions in mm

Frame Size	Frame Length	Poles	A	AD	B	C	H	AD	HD	K	L	LC	D	E	LA	M	N	P	S	T
B4J 355	LA - LB	4-8	610	267	630	254	355	610	965	28	1405	1405	100	210	25	740	680	880	24	6
	LC - LF	4-8	610	267	630	254	355	610	965	28	1585	1585	100	210	25	740	680	880	24	6
B4J 400	LA - LB	4-8	686	267	710	280	400	657	1057	35	1785	1785	100	210	28	940	880	1000	28	6
	LC - LD	4-8	686	610	710	280	400	800	1200	35	1785	1785	100	210	28	940	880	1000	28	6
B5J 450	LA - LC	4-8	750	610	1120	280	450	865	1315	35	2000	2000	120	210	30	1080	1000	1150	28	6
B5J 500	LA - LC	4-8	900	610	1250	280	500	950	1450	42	2305	2380	130	250	30	1080	1000	1150	28	6
B5J 580	LA - LC	4-8	1120	610	1880	315	560	1180	1720	42	2690	3000	180	300	30	1320	1250	1400	28	8

**Important addresses and phone numbers**

<b>NORWAY</b>		
Bergen	Lønne Scandinavia AS	Phones/ Faxes
Postal address:	Visit address	ph: +47 55 39 10 00
Postboks 144 Ulset	Liamyrane 12,	fax: +47 55 39 11 00
N-5873 BERGEN	N-5132 NYBORG	24- h.service: +47 918 33 073
Oslo:	Lønne Scandinavia AS	Phones/ Faxes
Postal and visit address:	Frysjaeveien 40	ph: +47 22 02 10 30
	N-0884 OSLO	fax: +47 22 02 10 50
Ålesund:	Lønne Scandinavia AS	Phones/ Faxes
Postal address:	Visit address:	
Po.Box 7892	Spjelkavikveien 9	ph: +47 70 15 39 00
6022 Ålesund	N-6011 ÅLESUND	fax: +47 70 15 39 01
<b>SWEDEN</b>		
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	S-254 66 HELSINGBORG	fax: +46(0)42 38 03 09
		24- h. service: +46 (0) 70 885 5431
Stockholm:	Lønne Scandinavia AB	Phones/ Faxes
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	S- 115 23 STOCKHOLM	fax: +46-8 545 697 20
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		fax: +358(0)9342 43099
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<b>DENMARK</b>		
Vejle	Lønne Scandinavia AS	Phones/ Faxes
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.....DK-7100 VEJLE		fax: +45 76 40 87 01
		24- h. service: +45 24 45 74 03

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Solgaard Skog 7, P.O. Box 460, N-1502 MOSS, Norway. www  
Telephone +47 69 24 40 00 Fax +47 69 24 07 45  
24- h. service +47 924 32 085

**Price Policy**

Prices occur in special lists on requirement in specified currency, ex warehouse exclusive packaging. The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

**Terms of Sales and Delivery**

Terms of Sales and delivery are specified on our web site; www.lonne.com

**Lønne Scandinavia AS reserves the prohibition to publish pages or whole parts of this catalogue without a thorization.**

**Environmental Protection - Information Requirement**

Electric and electronic products, so- called EE products may contain toxins which can damage our health and the environment. Therefore, all importers and producers of EE products are obliged to take responsibility for their products until they have been scrapped and recycled. You may return any cast- off Lønne products to a Lønne Warehouse. Lønne is obliged to fulfil the authorities' requirements regarding an environmentally sound handling of EE-waste in accordance with the EE regulations.

**General**

Export and Import Regulations regarding Lønne Product Range of Drives and Controls will be subject to the Export Import Regulations actual in the area of delivery. We hereby reserve the right to change the content of data in this catalogue at any time without notice. Furthermore, our company shall not be held responsible for neither possible discrepancies in catalogue content nor any damage caused by wrong use of products or information.

## Lönne Main Catalogue Chapters:

- Chapter 1 Electric Motors
- Chapter 2 Generators
- Chapter 3 ECOiPM PMS Motors
- Chapter 4 Frequency Inverters
- Chapter 5 Servo Controls
- Chapter 6 Machine Controls
- Chapter 7 Worm Gear Boxes
- Chapter 8 Helical Gear Boxes
- Chapter 9 Torque Arm Speed Reducers
- Chapter 10 Planetary Gear Boxes
- Chapter 11 V-belt and V-belt Pulleys
- Chapter 12 Timing Belt and Timing Belt Pulleys
- Chapter 13 Chains and Sprockets
- Chapter 14 Couplings
- Chapter 15 Clamping Elements
- Chapter 16 Disk Brakes
- Chapter 17 Bearings
- Chapter 18 Vibrators



## Lönne

Lönne Scandinavia AS was founded in 1949 in Bergen, Norway. Present board member Mr Terje Lönne entered as second generation, and started the expansion into the Nordic market.

Lönne has specialized within electric motors, generators, frequency inverters, gearboxes, transmissions and bearings. Lönne reference list covers a wide range of customers within on shore, off shore, maritime and marine industries.

Step by step the company has grown to become a leading, Nordic supplier within drive technology. Lönne one stop shop concept is a strong force for customers whom operate the total value chain of drive technology components. Lönne is today widely recognized both as a supplier of high quality components and engineered solutions.

Lönne head quarter is located in Bergen, Norway, with subsidiaries in Denmark, Finland and Sweden. The central warehouse, workshop and testing department in Helsingborg provides quick delivery service overnight, to the Nordic market. Smaller express warehouses and workshops are also located in Bergen and Helsinki. See map on the back page for the total Lönne Group.

Lönne Service is a separate part of the Lönne Group. With a total of six workshops in Norway, Lönne Service is specializing in services and repairing of electric motors and generators, both towards on shore and off shore markets. Lönne Service is ranked to have one of the market's largest and most updated machine parks, operated by highly skilled personnel.

Lönne people take pride in every job done, with a high level of professionalism, and really care to **"keep your machinery running!"**

Lönne Quality Management System Standards is certified for ISO 9001:2008.

For further information, please have a look at our website or feel free to call us!

**Keeps your machinery running!**



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