Technical Documentation

NORDENHAM

Technology in Motion

FLAMEPROOF THREE-PHASE MOTORS

Technology in Motion

FLAMEPROOF THREE-PHASE MOTORS

We don’t just manufacture motors. We turn our customer’s ambitious ideas into modern, innovative products which are as unique as they are revolutionary. We get you there with our blend of reliability, creativity and flexibility.

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Energy Efficiency

Safety, longevity and eco-friendliness have always been deeply rooted in our corporate philosophy. This has led us to develop energy-efficient motors a long time ago, independent of the latest European directives regarding responsible use of energy and resources.

IEC 60034-30
In an effort to harmonize the many different national efficiency requirements, the international standard IEC 60034-30:2008 is a first step to achieve consistent international efficiency standards for three-phase low voltage motors in the output range from 0.75 kW and 375kW. There are now three International Efficiency classes: IE1, IE2, and IE3. IE3 has the strictest requirements, and even stricter requirements are being defined.

The main difference between the former voluntary commitment of CEMEP, the European sector committee for electrical drives, from the year 1998 and today's international requirements is - apart from the reversed numbering - also the obligation to measure efficiency using the new procedures defined by IEC 60034-2-1:2007.

The scope of IEC 60034-30 includes motors with the following properties:
- 50 Hz and/or 60 Hz
- Rated voltages up to 1000 V
- Rated power from 0.75 kW to 375 kW
- 2, 4 or 6 poles
- S1 - continuous operation
- S3 - Periodic operation with operating periods > 80%.

This does not include motors
- which have been specifically designed for inverter operation or
- which are an integral part of an assembly and can therefore not be tested separately.

EuP Directive 2005/32/EC and ErP Directive 2009/125/EC
The EuP directive is the legal basis for implementing the political objective to reduce CO_2 emissions in Europe (2005/32/EG, energy using products). It was modified in 2009 to focus on eco-friendly design of all products consuming energy (ErP directive; 2009/125/EG). The directive contains a number of different product-related implementing regulations.

Motor regulation No. 640/2009
This regulation defines requirements for eco-friendly design of electrical motors and the use of electronic speed controls with respect to placing them on the market and commissioning them.

These requirements also apply when the motors are incorporated into other products.

The scope of application is limited compared with the IEC 60034-30 standard and there is a schedule for implementing the requirements.

The ErP motor regulation does not apply to motors
- designed for use in a liquid;
- which are an integral part of an assembly and can therefore not be tested separately;
- which are operated in altitudes of more than 1000 meters above sea level;
- which are operated in ambient temperatures of more than 40 °C;
- which reach operating temperatures exceeding 400 °C;
- which are operated at ambient temperatures below -15 °C (any type of motor);
- whose coolant temperatures are below 5 °C or above 25 °C at the inlet of a product;
- which are operated in potentially explosives atmospheres according to directive 94/9/EC (ATEX);
- brake motors.

The different motor requirements will come into force according to the following schedule:
- On 16 June 2011, motors must meet at least the requirements of IE2.
- From 1 January 2015, motors with a rated power of 7.5 to 375 kW must either reach IE3 or IE2 and feature speed control.
- From 1 January 2017, motors with a rated power of 0.75 to 7,5 kW must either reach IE3 or IE2 and feature speed control.

The statutory requirements only apply when the European manufacturer or importer introduces the motor to the market for the first time.
Motors that are already available on the market may continue to be sold and commissioned after the effective date.

While this is not mandatory for explosion-proof motors, our motors already meet the efficiency classes specified by IE 60034-30 today.

Depending on the design, our energy-saving motors are conform with the following efficiency requirements:

1. IE2 Level - High Efficiency according to IEC 60034-30 for international use (introduction on 16 June 2011).
2. IE3 Level - Premium Efficiency according to IEC 60034-30 for international use (introduction on 1 January 2011).
3. Minimum Energy Performance Standard (MEPS) according to AS/NZS 1359.5 for Australia and New Zealand.
4. High efficiency (Heff) according to AS/NZS 1359.5 for Australia and New Zealand.
5. Level 2 according to the China Energy Label base on GB 18613-2006.

Identification

These types of motors have the letter Y in their designation and are labeled with the associated efficiency class IE and the rated efficiency, e.g. CD 80M1-2Y3 IE3 - 82.8%.

The high level of efficiency is achieved by:

1. Larger diameters and longer stator cores with identical IEC mounting dimensions with respect to shaft height
2. Increased use of copper
3. Use of higher-quality electrical sheets
4. Use of shaft seals for protection types IP 55 and 56 with lower losses
5. Modified ventilation system for standard and low-noise versions (CD...A)

Type designation	CD...Y2	CD...Y3	CD...Y	CD...Y2	CD...Y3	CD...Y	CD...Y2	CD...Y3	CD...Y	CD...Y
Output [kW]	**IEC IE2** 2-polig	**IEC IE3**	**AS/NZS MEPS**	**IEC IE2** 4-pole	**IEC IE3**	**AS/NZS MEPS**	**IEC IE2** 6-pole	**IEC IE3**	**AS/NZS MEPS**	**AS/NZS MEPS** 8-pole
0,75	77,4	80,7	78,5	79,6	82,5	80,5	75,9	78,9	76,0	71,8
1,1	79,6	82,7	80,6	81,4	84,1	82,2	78,1	81	78,3	74,7
1,5	81,3	84,2	82,6	82,8	85,3	83,5	79,8	82,5	79,9	76,8
2,2	83,2	85,9	84,1	84,3	86,7	84,9	81,8	84,3	81,9	79,4
3	84,6	87,1	85,3	85,5	87,7	86,0	83,3	85,6	83,5	81,3
4	85,8	88,1	86,3	86,6	88,6	87,0	84,6	86,8	84,7	82,8
5,5	87	89,2	87,2	87,7	89,6	87,9	86	88	86,1	84,5
7,5	88,1	90,1	88,3	88,7	90,4	88,9	87,2	89,1	87,3	86,0
11	89,4	91,2	89,5	89,8	91,4	89,9	88,7	90,3	88,7	87,7
15	90,3	91,9	90,3	90,6	92,1	90,8	89,7	91,2	89,6	88,9
18,5	90,9	92,4	90,8	91,2	92,6	91,2	90,4	91,7	90,3	89,7
22	91,3	92,7	91,2	91,6	93	91,6	90,9	92,2	90,8	90,2
30	92	93,3	92,0	92,3	93,6	92,3	91,7	92,9	91,6	91,2
37	92,5	93,7	92,5	92,7	93,9	92,8	92,2	93,3	92,2	91,8
45	92,9	94	92,9	93,1	94,2	93,1	92,7	93,7	92,7	92,4
55	93,2	94,3	93,2	93,5	94,6	93,5	93,1	94,1	93,1	92,9
75	93,8	94,7	93,9	94	95	94,0	93,7	94,6	93,7	93,7
90	94,1	95	94,2	94,2	95,2	94,4	94	94,9	94,2	94,1
110	94,3	95,2	94,5	94,5	95,4	94,7	94,3	95,1	94,5	94,5
132	94,6	95,4	94,8	94,7	95,6	94,9	94,6	95,4	94,8	94,8
160	94,8	95,6	95,0	94,9	95,8	95,2	94,8	95,6	95,1	95,2
≥200	95	95,8	-	95,1	96	-	95	95,8	-	-

Examples of different efficiency requirements (50 Hz)

Certificates and Standards

We apply the most stringent quality criteria, which are checked annually by official government agencies. The certification of the quality assurance was implemented for the first time in 1992. Today we have certifications in accordance with:

- **DIN EN ISO 9001:2008** for the Quality Management System and
- **ATEX 95** according to **94/9/EG, Appendix IV** for the production of totally enclosed flameproof motors.

The conservation of our environment through the promotion of non-polluting manufacturing methods, materials and chemicals in energy-saving motors and drives was identified at an early stage and has been incorporated into the products. These activities, up to the employment of VOC-optimized paint, resulted in the following certification:

- **DIN EN ISO 14001:2005** for the Environmental Management System

In order to ensure the universal application of the motors within future global markets, conformity certificates have been issued for the motors through various domestic and foreign certifications authorities.

- **Explosion protection certifications e.g.:**
  - PTB for Europe
  - GOST for Russia
  - GOST for Belarus
  - NEPSI for China
  - TestSafe for Australia
  - IECEx worldwide

- **Ship classification authorities e.g.:**
  - Germanischer Lloyd
  - Lloyd's Register
  - Nippon Kaiji Kyokai
  - American Bureau of Shipping
  - Russian Maritime Register of Shipping

All motors meet the following international standards and specifications.

Apart from these guidelines, the motors also meet many customer specifications from the chemical and petrochemical and machine building industries.

On request, motors can also be supplied according to the recommendations of the VIK (German association of industrial energy businesses). This makes our motors particularly suitable for the special service conditions of the basic materials industry or refineries. These motor types are labeled with VIK on the rating plate.

Standards

Country Title	**International** **IEC** International Electrotechnical Commission	**Europe** **EN** – CENELEC European Commitee for Electotechnical Standardisation	**Germany** **DIN/VDE** German Industrial Standard Association of German Electrotechnicians
Rotating electrical machines Rating and operating behavior	IEC 60034-1	EN 60034-1	DIN EN 60034-1/ VDE 0530 Part 1
Process for determining losses and efficiency of rotating electrical machines by means of testing	IEC 60034-2-1	EN 60034-2-1	DIN EN 60034-2-1 VDE 0530 Part 2
Protection types of rotating electrical machines based on overall construction (IP code) - Introduction	IEC 60034-5	EN 60034-5	DIN EN 60034-5/ VDE 0530 Part 5
Classification of the cooling processes (IC code)	IEC 60034-6	EN 60034-6	DIN EN 60034-6/ VDE 0530 Part 6
Classification of the design types, the installation types and the terminal box location (IM-Code)	IEC 60034-7	EN 60034-7	DIN EN 60034-7/ VDE 0530 Part 7
Terminal markings and direction of rotation	IEC 60034-8	EN 60034-8	DIN EN 60034-8/ VDE 0530 Part 8
Noise emission limit values	IEC 60034-9	EN 60034-9	DIN EN 60034-9/ VDE 0530 Part 9
Starting performance of three-phase motors with squirrel-cage rotor, except for pole-changing motors	IEC 60034-12	EN 60034-12	DIN EN 60034-12/ VDE 0530 Part 12
Mechanical vibrations of certain machines with a shaft height of 56 mm and higher; measurement, evaluation and limit values of the vibration	IEC 60034-14	EN 60034-14	DIN EN 60034-14/ VDE 0530 Part 14
Efficiency classification of three-phase motors with squirrel-cage rotors, except for pole-changing motors (IE code)	IEC 60034-30	EN 60034-30	DIN EN 60034-30/ VDE 0530 Part 30
Balancing value	ISO 1940	-	DIN ISO 1940
IEC standard voltages	IEC 60038	-	DIN IEC 60038
Evaluation and classifications of electric insulation according to its thermal behavior	IEC 60085	-	DIN IEC 60085
Three-phase induction motors for general use with standardized dimensions and powers	IEC 60072-1[1]	EN 50347 [2]	DIN EN 50347[2]
Explosive atmosphere - Part 0: Equipment General requirements	IEC 60079-0	EN 60079-0	DIN EN 60079-0 VDE 0170 Part 1
Explosive atmosphere - Part 1: Equipment protection through flameproof enclosure "d"	IEC 60079-1	EN 60079-1	DIN EN 60079-1 VDE 0170 Part 5
Explosive atmosphere - Part 7: Equipment protection through increased safety "e"	IEC 60079-7	EN 60079-7	DIN EN 60079-7 VDE 0170 Part 6
Electrical equipment for use in areas with inflammable dust - general requirements	IEC 61241-0	EN 61241-0	DIN EN 61241-0 VDE 0170 Part 15
Electrical equipment for use in areas with inflammable dust - protection of the housing	IEC 61241-1	EN 61241-1	DIN EN 61241-1 VDE 0170 Part15-1

Note:
Motors series dBD..., CD ... and BD ... meet the EN... and VDE ... standards and specifications.
As a result of compliance with the above-mentioned IEC publications, special adaptation to foreign specifications is not required.

1) Applies only for dimensions and frame sizes
2) Concerns only single-speed motors of the Basic Series CD ... and BD to 315M for temperature class T4

Explosion protection types of electrical machines

Ignition protection type Letter symbol	Construction Requirements	Protection concept	Type of electrical machine
Flameproof enclosure "d" 	DIN EN60079-1, VDE 0170 Part 5 Equipment for use in zones 1+2[1]	All potential ignition sources are housed inside a flameproof enclosure whose unavoidable sealing surfaces are therefore designed as flameproof joints, so that, in case of ignition of an explosive atmosphere inside the enclosure, the explosive atmosphere is not transferred to the potentially explosive atmosphere surrounding the enclosure.	All types of motors, e.g. ● squirrel-cage motors ● slipring motors ● commutator motors For all modes of operation (S1 to S10) for severe starting conditions and variable-speed drive units, e.g. by means of frequency inverters.
Increased safety "e" 	DIN EN 60079-7, VDE 0170 Part 6 Equipment for use in zones 1+2[1]	Here, steps must be taken to ensure that the creation of sparks, electric arcs and inadmissible heating processes is prevented during proper operation of the equipment.	Only squirrel-cage motors with adapted motor protection switch. t_E-time requirement!
Protection type "n" 	DIN EN 60079-15, VDE Part 16 Electrical equipment for explosive atmospheres. Equipment for use in zone 2[1] (Zone 2 equipment)	Ignition protection type for electrical equipment ensuring that equipment cannot ignite the surrounding explosive atmosphere under normal operating conditions and under certain abnormal conditions. Common motor protection methods are: - non-sparking apparatus (nA) designed to minimize the risk of arcs or sparks; - vapor-proof housings (nR) designed to restrict access of gases, vapors and fog	Squirrel-cage motors of protection type IP20 for enclosed areas. For installation outdoors, protection type P44 or IPW24 motor protection switch. All types of motors, e.g. ● slipring motors ● commutator motors etc with motor protection switches and overpressure monitoring. Prevention of discharge of sparks created under normal operating conditions. Manufacturers' information about these measures.
Dust protection 	DIN EN 61241-1, VDE 0170 Part 15-1 Equipment for Zone 21 + 22[2]	The ignition protection type is based on the limitation of the maximum surface temperature of the casing and on the restriction of the dust entry, through the utilization "dust-sealed" or "dustproof" housings.	All electrical motors with protection through housings with limitation of the surface temperature

Note

1) DIN EN 60079-14, VDE 0165 Part 1, Electrical equipment for use in areas with gas explosion hazards (with the exception of mines)

2) DIN EN 61241-1, VDE 0170 Part 15-1, Electrical equipment for use in areas with inflammable dust.

Explosion protection of flameproof motors
The motors have been tested and certified in accordance with the new European Directive 94/9/ EC (ATEX 95) by the German Federal Institute of Physics and Metrology (PTB). They therefore comply with the latest European regulations. The directive regulates the type of devices and protective systems suitable for use in hazardous areas and has been applicable throughout Europe for the marketing of this equipment since 30 June 2003.

IECEx scheme certifications are available for all motors for international applications.

The three-phase motors of the version series dBD, CD and BD have the explosion protection category "flameproof enclosure", in accordance with IEC 60079-1 for the groups IIC and IIB and temperature classes T3 to T6.

The standard version of the CD series motors complies with the requirements of the highest explosion protection group (IIC) and temperature class T4, which also cover all lower groups and temperature classes. The BD and dBD series comply with the requirements of explosion protection group IIB and temperature class T4.

This certification does not contain electrical data for the tested motor. It merely confirms that the motor is inherently protected against explosion due to its flameproof construction. The specification of electrical data is the sole responsibility of the manufacturer. The observation of temperature limits is certified by means of appropriate tests.

Motors of temperature class T4 have the same output as standard, non-explosion-proof motors given equal dimensions. The rated output of temperature class T5 and T6 motors must be modified so that permissible enclosure temperatures are not exceeded.

The terminal box is, as standard the explosion protection rating "increased safety" (e.g. motor construction designation Ex de). To cater for the various installation methods used in different countries, motors can also be supplied with a terminal box with "flameproof enclosure" (motor designation Ex d IIC). The terminal compartment is designed according to the same explosion-proof group as the motor.

The motor chamber and the terminal compartment of both versions are isolated from each other to prevent explosion. The winding end leads are fed into the terminal compartment through flameproof cable entries.

Due to their high degree of protection, the motors can be used under all operating conditions in all zone 1 and 2 areas.

They can be used in hazardous areas in which the local and operational conditions can cause dangerous volume of gases and vapors to accumulate and mix with air to form a flammable mixture. Due to their construction, the motors are protected against ingress of water and against electrical, chemical, thermal and mechanical influences, to the extent that their explosion protection remains intact under normal use.

Construction designation of the motor – example:

CE 0044 Ex II 2G Ex de IIC T4

Explosion protection types and categories of electrical machines

Dust explosion protection EN 61241-1

Workplace	Presence of an explosive dust atmosphere	Sometimes	Seldom or short-term	Seldom or short-term
	Dust type	All types	Conductive	Non-conductive
	Zone	21	22	22
Operating resources	Device group	II	II	II
	Device category	2D	3D	3D
	Protection type	IP65	IP65	IP55
	Temperature Housing temperature	max. 120 °C	max. 120 °C	max. 120 °C
	Certificate	EG type examination certificate of the testing agency	EG type examination certificate of the testing agency	EG conformity declaration of the manufacturer
	Identification	II 2D Ex tD A21 IP65 T120°C	II 3D Ex tD A22 IP65 T120°C	II 3D Ex tD A22 IP55 T120°C

Dust explosion protection
Dust-explosion-protected motors are certified by PTB according to the new Directive 94/9/EC and meet DIN EN 61241-1.

A significant feature of the dust explosion protection is the IP protection type. Depending on environmental conditions, different requirements are placed on the dust sealing of the motor. The limitation of the surface temperature of the motors to a value which is below the ignition and glow temperature of the surrounding dust is also an important factor for dust explosion protection.

The user must determine the category and maximum permissible surface temperature according to frequency and probability of occurrence and the dust type.

Caution: Conducting and/or non-conducting dust changes the device category.

Construction designation of the motor:

CE 0044 Ex II 2D Ex tD A21 IP65 T120°C

The motors are also available in versions that are both dust and gas explosion proof.

Information on the introduction of the directive 94/9/EG (ATEX 95)
The regulations concerning the construction and operation of electrical equipment in hazardous areas have been laid down for many years in European standards under the directive 76/117/EC and several supplements. The transition to the two new directives 94/9/EC (ATEX 95) and 99/92/EC (ATEX 137) has involved a thorough revision and harmonizing of the European regulations.

Directive 94/9/EC harmonizes the regulations of the individual member states with regard to the previously differing requirements of apparatus and protective systems. Through these measures, the objectives of removing commercial barriers within the EC and of standardizing basic safety features have been achieved. In specialist circles, the directive is often referred to by the abbreviation "ATEX 95" (abbreviation of the French name for the directive).

In future, the construction requirements for operation in hazardous areas will be specified by the directive 99/92/EC (ATEX 137).

The integration of the directives into German law was implemented in 1996 with the same two-part structure: the Device Safety Law with the explosion protection law (ExVO) for ATEX 95, and through the operational safety ordinance (BetrSichV) for the ATEX 137. With this, a number of well-known specifications, including ElexV, have become invalid.

An essential feature of ATEX 95 is that devices and protective systems are classified and identified according to different categories. These categories were defined according to the zone divisions of operating areas, which is based on the likelihood of the presence of explosive atmosphere.

The external CE mark and the device group specified on the rating plate, such as "II 2G" for Zone 1 apparatus in explosive atmospheres consisting of gases, indicate that the motors are compliant with the requirements of the new directive. The affixing of the CE mark and the issuing of the relevant declaration of conformity by the manufacturer are subject to the following requirements:

- The manufacturer must have a certified quality assurance system in accordance with ISO 9000, with an additional certificate for quality assurance in the production of explosion-proof equipment in accordance with ATEX 95.
- The apparatus concerned must have an EC type testing certificate from an accredited test authority (not required for category 3 apparatus).

During the transition period (up to 30.06.2003) the manufacturer and the user had the right to proceed in accordance with both the old and the new regulations.

Permissible temperatures for electrical equipment

	DIN EN 60079, VDE 0170 explosion groups IIA; IIB; IIC	
Ignition temperature of the medium relative to the limit temperature	Temperature class	Permissible surface temperature of device incl. ambient temperature of 40 °C in seperate test (temperature limit)
über 450 °C	T1	450 °C
300–450 °C	T2	300 °C
200–300 °C	T3	200 °C
135–200 °C	T4	135 °C
100–135 °C	T5	100 °C
85–100 °C	T6	85 °C

Since 1 July 2003 all new products that are brought into the market must comply with the new ATEX 95 Directive. The supply of spares for the old versions must be ensured for a further ten years at least.

Existing equipment may still be operated, however, this must be upgraded by 30 June 2006 to comply with the minimum requirements of ATEX 137.

Permissible employment of motors according to their classification by zone division

Device group	Device Category classification	Zone	Definition acc. to Safety Ordinance (BetrSichV)	Certification compulsory
		For flammable gases, vapors and mists		
II	1G*	0	Zone 0 covers areas in which an explosive atmosphere, consisting of a mixture of air and gases, vapors or mist is present frequently, for long periods of time, or permanently.	yes
II	2G	1	Zone 1 covers areas in which an explosive atmosphere consisting of gases, vapors or mist is likely to occur from time to time.	yes
II	3G	2	Zone 2 covers areas in which an explosive atmosphere consisting of gases, vapors or mist is not likely to occur, and if it does, is likely to occur only rarely and for short periods of time	no
		For combustible dust		
II	1D*	20	Zone 20 covers areas in which an explosive atmosphere, consisting of a mixture of dust and air is present frequently, for long periods of time, or permanently.	yes
II	2D	21	Zone 21 covers areas in which an explosive atmosphere consisting of a mixture of dust and air is likely to occur from time to time.	yes
II	3D	22	Zone 22 covers areas in which an explosive atmosphere consisting of airborne dust is not likely to occur, and if it does, is likely to occur only rarely and for short periods of time.*	no

* Not common for electrical motors

Examples of the classification of flammable gases and vapors according to temperature class and explosion group DIN VDE 0165

	Group	Temperature classes T1	T2	T3	T4	T5	T6
Firedamp-protection	I	Methane (firedamp)	-	-	-	-	-
Explosion protection	IIA	Acetone, ammonia, benzene, acetic acid, ethane, ethyl acetate, ethyl-chloride, carbon momooxide, methane (firedamp) methanol, methyl-chloride, Propane, toluole	I amyl acetate, n butane, n butyl alcohol, cyclo-hexanon, acetic anhydride, natural gas, liquefied gas	Hexane, gasoline, Diesel fuels, aviation fuel, domestic oil, petroleum[1)]	Acetatedehyde, ether	-	-
	IIB	Coke-oven gas, water gas (carburetted)	1.3 butadiene ethyl alcohol, ethylene, ethylene oxyd	Petroleum[1)], isoprene, hydrogen sulphide	Ethyl ether	-	-
	IIC	Hydrogen	Acetylene	-	-	-	Carbon disulfide

Note
1) depending on composition

Flammable gases and vapors are classified by groups and temperature classes which are designated using short alphanumeric codes. Codes IIA to IIC refer to the group that defines the nature of the flameproof joint in the machines and codes T1-6 indicate the temperature class which stipulates the machine's permissible external temperature.

The group/temperature classes assigned to various gases and vapors are summarized in the table on top.

Note about the table:
Additional examples are provided in the publication "Safety engineering characteristics of combustible gases and vapors" by Nabert/Schön, Deutscher Eichverlag, Berlin.

Table of conformity certificates

Frame size/series	CD ... [1]		BD ... [2]	BD ... B(R) [3]	CEIGL ... [4]
63	08 ATEX 1045 X	IECEx PTB 06.0021	09 ATEX 1010 X		
71	08 ATEX 1045 X	IECEx PTB 06.0021	09 ATEX 1010 X		
80	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X	08 ATEX 1110 X	08 ATEX 1111 X
90	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X	08 ATEX 1110 X	08 ATEX 1111 X
100	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X	08 ATEX 1110 X	08 ATEX 1111 X
112	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X	08 ATEX 1110 X	08 ATEX 1111 X
132	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X	08 ATEX 1110 X	08 ATEX 1111 X
160	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X		08 ATEX 1111 X
180	08 ATEX 1056 X	IECEx PTB 06.0022	09 ATEX 1012 X		
200	08 ATEX 1081 X	IECEx PTB 06.0023	09 ATEX 1013 X		
225	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X		
250	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X		
280	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X		
315	08 ATEX 1087 X	IECEx PTB 06.0009	09 ATEX 1011 X		
355	08 ATEX 1082 X	IECEx PTB 06.0024	09 ATEX 1014 X		
400	08 ATEX 1083 X	IECEx PTB 06.0036	09 ATEX 1015 X		
450	08 ATEX 1085 X	IECEx PTB 06.0037	09 ATEX 1006 X		
500 [5]			09 ATEX 1008 X		

Notes on ATEX certificate (IECEX not a dust certificate)

1) Standard series group IIC: II 2G Ex de IIC T3...T6 or Ex d IIC T3...T6 and/or II 2D Ex tD A21 IP6X T200 °C - T85 °C
2) Standard series group IIB: II 2G Ex de IIC T3...T6 or Ex d IIC T3...T6 and/or II 2D Ex tD A21 IP6XT200 T200 °C - T85 °C
3) Motors with integrated brake/rotary encoder group IIB incl. hydrogen: II 2G Ex de IIB+H2 T3...T6 or Ex d IIB + H2 T3...T6 and/or II 2D Ex tD A21 IP6X T200 °C - T85 °C
4) Inverter box of compact drive
5) Type dBD

Conformity certificate for the explosion-protection rating "flameproof enclosure", temperature class T3...6 and dust protection through casings

There are EC version-type conformity certificates for the version series CD ..., BD ..., dBD... and BD...B/R according to the Directive 94/9/EC (ATEX 95) as well as certificates according to the IECEx scheme. These certificates, issued up to temperature class T6 for three-phase asynchronous motors of the explosion protection rating "d", do not include any ratings for the motor type. They merely confirm that the motor is explosion protected due to its tested flameproof construction. In addition, the following ratings, which differ from the standard versions, are certified. These figures must be stated on the motor's rating plate:

- Rated voltages up to 1000 V, from frame size 355 up to 6600 V
- Rated frequency under or over 50 Hz, e.g. 60 Hz
- Pole-changing motors, e.g. 4/2 or 6/4 poles
- Ambient temperatures from -55 °C to 60 °C
- below -20 °C also without heating
- Altitude of installations above 1000 m m.s.l.
- Installation of TF (thermistors acc. to DIN 44081) as sole protection against inadmissible heating with operating mode S1, S2, S3, S4, S5, S6, S7, S8, S9 or S10. The sole protection is achieved only through a combination of TF and tripping devices with conformity mark II (2)G.
- If built-in TF is the only means of protection, power can be fed using any frequency inverter with variable frequency for the motor speed regulation.
- Temperature classes T3 to T6
- Dust explosion protection II 2D for zone 21 and II 3D for use in zone 22

It is permissible to design the motors for several of the aforementioned deviations (e.g. for operating mode S2 and ambient temperature 60 °C).

Example: C D 112 M - 2 S

1	2	3	4	5	-	6	7
1 2 3	4 5 6	7 8 9	10 11	12	13 14 15 16 17 16	17 20 21 ...

Type Code

No.	Feature	Code	Meaning
1	Explosion protection type	d	**d** flameproof enclosure
		B	**B**-series
		C	**C**-series
2	Explosion protection type	C	flameproof enclosure II**C**
		CE	flameproof enclosure II**C** + increased safety **e**
		B	flameproof II**B**
		e (E)	**e** increased safety
		n	**n**on sparking version
3	Type of motor	AR	**A** compartment
		D	**d** three-phase motor; production site
		DP	**d** three-phase motor; production site Tamel, **P**oland
		E	**e** single-phase AC motor
		IGL	**IGL** Integrated inverter housing, Lenze
4	Height of shaft	- 63	Shaft height **63**
		- 71	etc.
		...	
5	Core length	K, S	**k** short
		M	**m**edium
		L	**l**ong
		L1	etc..
		...	
–	Hyphen		
6	No. of poles	4	**4**-pole
		8/4	**8/4**-pole
		12/8/4	**12/8/4**-pole
		...	
7	Version	**The naming sequence must be as follows:**	
		X	increased power
		Y	High efficiency according to Australian MEPS standard
		Y2	High efficiency IE2 acc. to EN 60034-30
		Y3	High efficiency IE3 acc. to EN 60034-30
			High-voltage motor
		A	**A**xial fan, dependent on direction of rotation, noise class 2
		AR	**A**xial fan **r**educed, noise class 3
		W	**W**ater-cooled, noise class 4
		B	**B** Spring-loaded brake (quiescent current)
		D	**D** Terminal box - flameproof enclosure
		E	**E** Terminal box - increased safety
		F	**F** axial fan with external drive
		I	**I** integrated inverter
		T	**IT** network
		K	**K** Cable type
		0	**0** without fan
		R	**R** integrated sensor (resolver)
		S	**S**pecial brake type K (attached brake)
		SV	**S**pecial brake type **V** (DS-attached)
		SVN	**S**pecial brake type **V** **n**on drive end (NS-attached)
		U	**U** peak voltage stability 2.15 kV
		0, 1, 2, ...	Design No.

If not specified, single-position could be dropped.

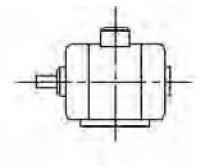
Up to frame size 355 - any number of poles - the motor bearings are designed so that they can be used as described below without modification:

– IM B3 as IM B6, IM B7, IM B8, IM V5*, IM V6*
– IM B5 as IM V1*, IM V3*
– IM B35 as IM V15*, IM V35*
– IM B14 as IM V18, IM V19

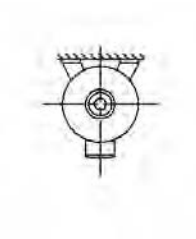
Exception: For the vertical version types marked with *, protective devices must be fitted to provide protection against dripping water and to prevent foreign bodies from falling into the units.

High-voltage motors from size 400 are available in the versions IM B3, IM B35 and IM V1.

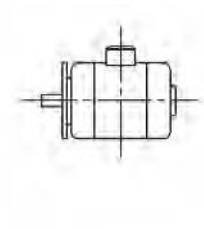
Available versions according to DIN IEC 60034 Part 7 — **Other designs on request**



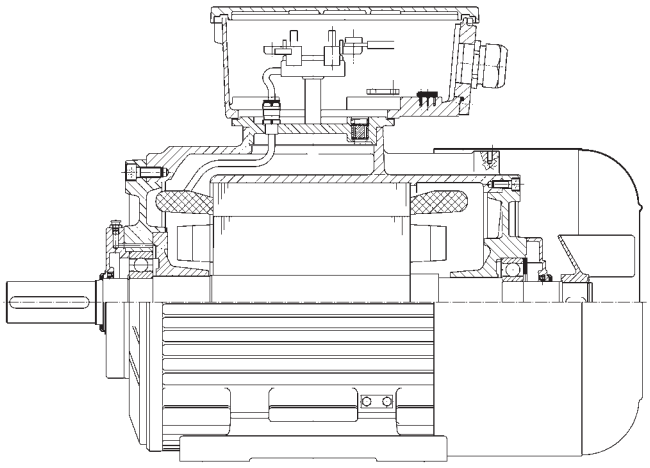
IEC Code I IEC Code II Explanation	IM B3 IM 1001 Foot mounting, feet at bottom	IM B35 IM 2001 Foot mounting, feet at bottom, with additonal flange, with access from housing side	IM B5 IM 3001 Flange bearing plate on drive side, with access from housing side	IM B6 IM 1051 Foot mounting, feet to the left side (viewed from drive side)	IM B7 IM 1061 Foot mounting, feet to the right side (viewed from drive side)

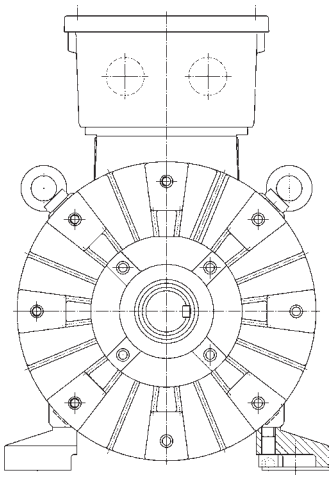


IEC Code I IEC Code II Explanation	IM B8 IM 1071 Foot mounting, feet on top	IM V1 IM 3011 Flange mounting on drive side of the flange, with access from housing side, drive side at bottom	IM V3 IM 3031 Flange mounting on drive side of the flange, with access from housing side, drive side on top	IM V5 IM 1011 Foot mounting, drive side at bottom	IM V6 IM 1031 Foot mounting, drive side on top



IEC Code I IEC Code II Explanation	IM B14 IM 3601 Flange mounting on drive side of the flange, no access from housing side	IM V18 IM 3611 Flange mounting on drive side of the flange, no access from housing side, drive side on top	IM V19 IM 3631 Flange mounting on drive side of the flange, no access from housing side, drive side on top	IM B34 IM 2101 Foot mounting, feet at bottom, with additional flange on drive side of the flange, no access from housing side	IM V15 / IM V35 IM 2011 / IM 2031 Foot mounting, with addional flange on drive side of the flange, drive side at bottom/top, with access from housing side





Materials for housings, end shields, terminal boxes, and fans

Frame size	Housing type	End shield	Terminal compartment	Fan cowl	Radial-flow fan		Axial-flow fan	
	Material	Feet		Ex e	Ex d		2-pole	4, 6, 8-pole
63	Grey cast iron	Steel	Grey cast iron	Grey cast iron	Grey cast iron	not applicable	not applicable	not applicable
71		Grey cast iron		bolted	bolted	Sheet steel	Plastic[1]	Plastic[1]
80		bolted						
90								
100								
112								
132								Plastic
160								
180								
200								
225							Cast-alumi-	Cast-alumi-
250							num-alloy[2]	num-alloy[2]
280								
315								
355					Welded		Welded	Welded
400	Welded	Welded			steel		steel	steel
450	steel	steel	Welded Steel					

Note

1) For special operating conditions, e.g. low temperature, fans made of cast aluminum or steel can also be supplied for the frame size range 63 to 160.

2) Fans of steel on request

Labeling

Rating and test information is contained on a single name plate attached to the housing. The Ex e terminal compartment cover contains a duplicate as per VIK regulations. The name plates are made of stainless steel (material 1.4300).

Installation at Normal, High and Low Temperatures

The standard motors are suitable for installation outdoors, in humid and dusty atmospheres (industrial climate) at ambient temperatures from -20 °C to +40 °C. Special-purpose versions for an extended ambient temperature range from -55 °C to +60 °C are available. In these cases a corresponding construction designation is made on the test label.

At ambient temperatures of more than +30 °C, the motors must not be exposed to direct sunlight. The motors can be fitted with an optional sunroof for this purpose.

At ambient temperatures of more than +40 °C performance can be impaired depending on the motor version (see page 51).

For temperatures lower than -20 °C, the motors are supplied in two versions, with or without heating. In case of implementations with heating, the heating must be used to prevent a drop of the motor temperature below -20 °C (see page 48). The motor is heated through the motor winding.

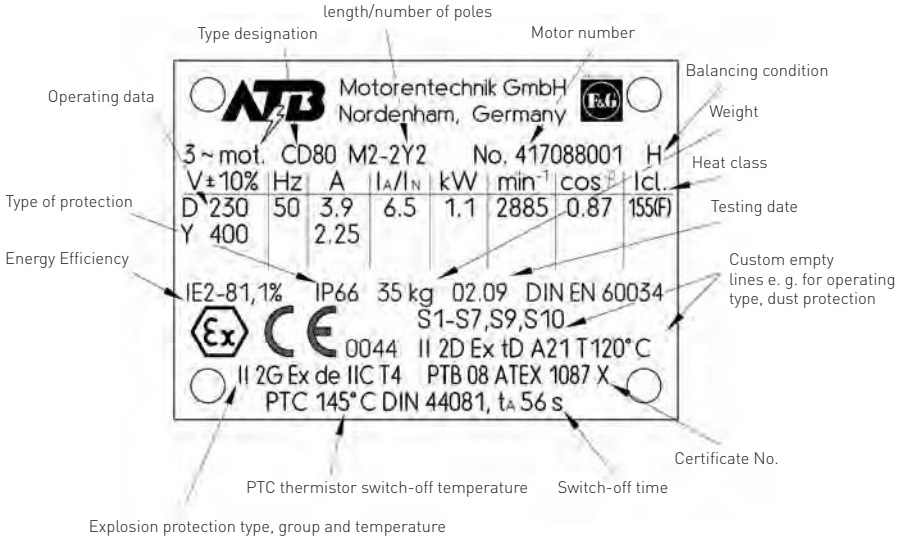
Motors intended for on-board or offshore installation can be manufactured according to the regulations of the respective classification authorities. To ensure safe on-deck installation, the motors have a series of additional design features (see page 37). For motors of this type, construction-type conformity certificates from different ship classification authorities, e.g. Germanischer Lloyd, are available.

Use at low temperatures with heating through the motor winding

Component	- 40 °C
Identification	normal
Heater	required
Fan	special
Cable entry	special
Plug	special
Temperature monitoring	special

Use at low temperatures without heating

Component	- 40 °C	- 55 °C
Identification	special	special
Item testing - components	increased	increased
Steel parts	sonder	special
Fastening screws	sonder	special
Fan	sonder	special
Eye bolts	special	special
shaft seal	normal	special
Bearing grease	normal	special
Bearing	normal	special
Cable entry	special	special
Plug	special	special
Paintwork	normal	special



Example of a rating plate

Protection Types, Paintwork, Tropicalized Version

Paintwork systems	Standard paintwork	Standard paintwork, special colors according to RAL	Special interior paintwork	Acid protection + Inshore	Offshore Standard (ST)	Offshore Spezial (SP)	Offshore acc. to NORSOK (NO)
Pretreatment of parts	All parts cleaned and degreased, sandblasted according to SA 2,5 ISO 8501-1)						
1. Primer	For cast surfaces Single component alkyd resin base min. 20 µm Steel surfaces Single component product based on polyvinylbutyral min. 25 µm					Two-compo-nent zinc epoxy paint min. 70 µm	Two-component Zinc epoxy primer with high zinc content min. 75 µm
2. Primer			Two-compnent polyacryic base, low solvent, content min. 60 µm		Two-compo-nent epoxy primer, min. 120 µm	Two- compo-nent, poly-acrylic base, low solvent content, min. 60 µm	Two-component epoxy primer/ coat with high solids content min. 175 µm
Top coat	Two-component acrylic resin, single coat paint, min. 60 µm	Two-component acrylic resin, single coat paint min. 60 µm		Two-component acrylic resin, single coat paint, min. 80 µm			Two-component acrylic top coat min. 60 µm
Paint thickness	min. 80 µm	min. 80 µm	min. 80 µm	min. 160 µm	min. 200 µm	min. 210 µm	min. 310 µm
Color	RAL 5009	RAL		RAL 7031, 7032 ...			RAL 7038
Mechanical strength	Non-abrasive, elastic, scratch-resistant impact-resistant						
Corrosion resistance	resistant to water, steam and saltwater				Highly resistant to water, steam and saltwater		
Chemical resistance	Resistant to solvents, chemicals, synthetic coolants, hydraulic liquids and cleaning agents				Highly resistant to solvents, chemicals, synthetic coolants, hydraulic liquids and cleaning agents		
Temperature range	–40 °C to +130 °C		–55 °C to +130 °C				

Note: Custom paintwork available on request.

Available protection types to DIN IEC 60034-5

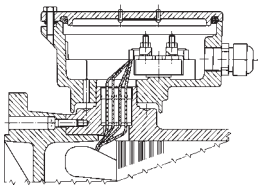
Temperature class Height of shaft	T4 RT ≤ 40 °C	T4 RT > 40 ≤ 60 °C	T6 RT ≤ 40 °C
63–450	IP55	IP55[2]	IP55
63–450	IP56	-	-
63–355[3]	IP66[1]	-	-
63–315[4]	IP55	IP55[2]	-

Note:
1) IP66 not covered by DIN EN 60034 Part 5
2) Output adaptation required
3) Larger motors available on request
4) Type CD ... X

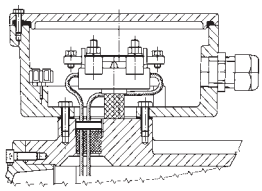
Tropicalized version
We recommend the following version for use in the special climatic conditions of the tropics:

- Protection type IP56
- Stainless steel screws
- Double impregnated stator winding
- Special interior paintwork
- Inshore Paintwork

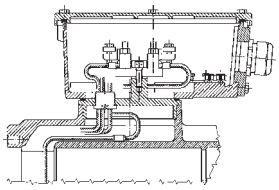
This ensures optimum protection against humidity and mildew.



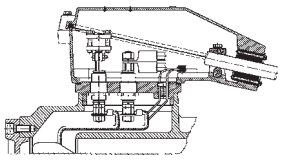
Frame size 63–112



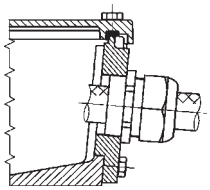
Frame size 132–160



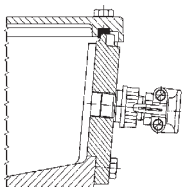
Frame size 180–280 (450)
From frame size 315
with conductor bushing



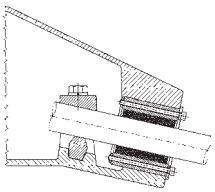
Frame size 250–315 (450)
Frame size 250 and 280 with
connection plate as for 180-280



Version 1
Cable gland according to EN 60079-7
(screw gland) for
fixed cables



Version 3
Cable gland according to EN 60079-7,
with strain relief, anti-rotation protection and
kink protection for
cables of mobile equipment.



Version 9
Split terminal box with internal strain
relief clamp,
cable gland according to EN 60079-7

Protection type
For the gas explosion protection according to EN 60079-7 of the explosion protection rating "increased safety" Ex e II, as well as the protection type IP56 according to DIN EN 60034 Part 5 or according to EN 60079-1, the terminal boxes meet the explosion protection rating Ex d IIC. For dust explosion protection they are implemented in the protection type IP 66 according to EN 61241-1. In case of explosion protection Ex e II and dust explosion protection they are provided with a cable entry corresponding to the protection type and an oil-resistant cover seal. The cover fixing screws are protected against corrosion and captive mounted (not for high voltage). Cable entries with Ex d IIC explosion protection available on request.

Position
The terminal boxes in the standard version are fitted to the top of the machine. On request they can also be fitted on the side. From frame size 63, they can be rotated by 4 x 90 degrees to enable connection from all directions. From frame size 132, this can be achieved without rotating the connection plate. The rotation of the main terminal box may be restricted if additional terminal boxes are fitted.

Power line bushings and terminals
The winding end leads are fed into the terminal box through flameproof cable entries.
For low-voltage motors multiple penetration or single penetration systems are used for AC voltages up to at least 690 V.
Special versions for 1100 V are also available (extra-cost option). High-voltage motors are fitted with single penetration systems according to the rated voltage. For frame sizes 315-450, the terminals for connection without cable lugs are placed directly on the conductor bushings.

Terminal boxes, standard version Ex e II
The terminal boxes of the low voltage motors have metric threads, assigned in accordance with DIN 42 925 with cable glands to DIN EN 50 262, certified to DIN EN 60079-7. For frame size 180 and above, they are equipped with a screw-on plate. Above frame size 250, longitudinally split terminal boxes are also available. An additional terminal box for thermal monitoring or anti-condensation heaters is also available above frame size 132. It is bolted to the motor terminal box or, on frame sizes 355 to 450, fitted to the housing. The high-voltage motor terminal boxes conform to DIN 42 962. On request, the star point can be located in a second terminal box. The boxes are protected to Ex e II "increased safety", as defined by EN 60079-7, and are supplied in Version 9. The various cable gland components (extra-cost option) and their thread sizes are listed in the table on page 22.

Mains cable entries for Ex e terminal boxes

Version	Size	63	71	80	90	100	112	132	160	180	200	225	250	280	315	355	400–450	high voltage
1	Thread type	1x M25 x1,5				1x M32 x1,5			1x M40 x1,5		1x M50 x1,5		1x M63 x1,5			not available		
	For Cable External dia. mm	13–19				12–21			17–28		21–35		27–48			not available		
3	Thread type	1x M25 x1,5				1x M32 x1,5			1x M40 x1,5		1x M50 x1,5		1x M63 x1,5			1x M80 x 2		on request
	For Cable External dia. mm	11–16				15–20			19–27		26–34		35–46			64–68		on request
9	For Cable External dia. mm	not available											1x dia. 48–70 2x dia. 26–48			1x dia. 48–70 2x dia. 48–70		1x dia. 26–48

= Standard version

Notes
From size 132 in pole-changing version or Y/A startup 2 cable entries for each box. For thermal monitoring with all versions there is 1 additional cable gland (M25 x 1.5). For heating with all versions there is 1 additional screw gland (M25 x 1.5). For rated currents in excess of 400A the terminal boxes are fitted with 2 cable entries.

Possible cross-sections with Ex e for low voltage

Frame size	Max. cross-section [mm²]	Max. rated current [A]	Terminal type	Number of terminals	Thread size
63–112	4	25	Clamp terminal[2]	6	M5
132, 160	10	63	Clamp terminal[2]	6	M6
180–225	70	100	Saddle terminal[2]	6	M8
250–280	120	250	Saddle terminal[2]	6	M12
315	150	315[1]	Round terminal[2]	6	M12
355–450	300	400[1]	Round terminal[2]	6	M16
355–450	400	630[1]	Universial terminal[3]	6	M20

Note
1) Material: Cu
2) suitable for connection with and without cable lugs
3) suitable for connection with cable lugs

Terminal box Ex d IIC

The terminal boxes have the explosion protection rating Ex d IIC according to EN 60079-1. A threaded bore to DIN ISO 13 is standard on all terminal boxes. On request, different thread types can also be supplied, e.g. NPT. Please specify the required thread dimensions when placing your order.

Note: Cable gland parts in protection type Ex d IIC housings must also conform with and be certified to EN 60079-1. These parts are not included in the scope of delivery. Explosion-proof terminal boxes can be supplied for high-voltage motors.

Entry thread for Ex d terminal boxes for low-voltage motors

Frame size	63	71	80	90	100	112	132	160	180	200	225	250	280	315	355–450
Thread type ISO-DIN 13	1 x M25 x1,5				1 x M32 x1,5			1 x M40 x1,5		1 x M50 x 1,5		1 x M63 x1,5			1 x M80 x2
Nema type NPT	3/4"				1"			1¼"		1½"		2"			3"

Note: For thermal monitoring with all versions an additional thread 1 x M25 x1.5 or 1 x NPT 1/2" is available on request.

3 ends 400 V[1], 6 ends 400/690 V[1] - Cable NSSHöu

Frame size	Number of poles	3 winding end leads + PE – starting DOL		6 winding end leads + PE – Y / Δ startup – pole-changing	
		without temperature monitoring	with temperature monitoring	without temperature monitoring	with temperature monitoring
63	2–4	1 cable	1 cable	1 cable	1 cable
71	2–8	4 strands	7 strands	7 strands	10 strands
80	2–8	cross-section 1,5 mm²	cross-section 1,5 mm²	cross-section 1,5 mm²	cross-section 1,5 mm²
90	2–8	max. 20 A	max. 20 A	max. 20 A	max. 20 A
100	2–8	outer dia approx. 13 mm	outer dia approx.17,5 mm	outer dia approx. 17,5 mm	outer dia approx. 19,5 mm
112	2–8				
132	2–8	1 cable	2nd additional	2 cables	
160	2–8	4 strands	cable with 4 strands	4 strands each	
		cross-section 4 mm²	cross-section 1,5 mm²	cross-section 4 mm²	
		max. 36 A	max. 20 A	max. 36 A	
		outer dia approx. 18 mm	outer dia approx. 13 mm	outer dia approx. 18 mm	
180	2–8	1 cable			third additional
200	L1-2	4 strands			cable with 4 strands
	4–8	cross-section 10 mm²			cross-section 1,5 mm²
		max. 65 A			max. 20 A
		outer dia approx. 24 mm			outer dia approx. 13 mm
	L2-2	1 cable		2 cables	
225	2–4	4 strands		4 strands each	
		cross-section 16 mm²		cross-section 16 mm²	
		max. 87 A		max. 87 A	
		outer dia approx. 28 mm		outer dia approx. 28 mm	
250	2–4	only for 500 V			
		1 cable			
		4 strands			
		cross-section 16 mm²			
		max. 87 A			
		outer dia approx. 28 mm			
280	2–8	only for 690 V			

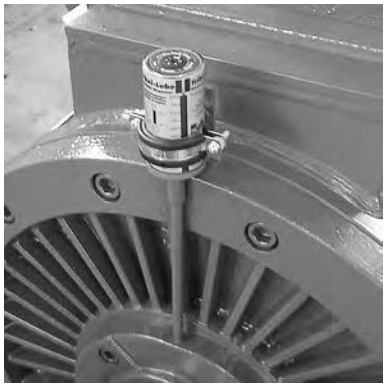
Note:
Cable included. Cable length 1.5 m. Special lengths on request.
1) Standard rating 50 Hz. Admissible currents must be taken into account for different specifications.

Motor with direct cable connection

II

Bearing seals
The motors are fitted with external radial or axial seals. Vertical construction types with upward-facing shaft can be fitted with a combined radial and axial seal on request. The seals prevent ingress of water along the shaft into the bearing housing. They have good abrasion resistance and thermal stability and are also resistant to mineral oils, saline solutions and diluted acids. Seals for media not listed above are available on request.

Lubrication
The bearings of motors up to frame size 280 have lifetime lubrication. The deep-groove ball bearings, which are sealed on both sides, are pre-packed with polyurea fiber grease by the bearing manufacturer. They are therefore maintenance-free for the time specified in the upper table on page 31.



Long-term dispenser

Relubrication and relubrication schedules
Motors above frame size 315 are equipped with relubrication devices with grease distributors. Relubrication devices are also fitted to motors from frame size 225 that are equipped with roller bearings for heavy loads.

Bearings with relubrication devices are packed with lithium-saponified grease. The relubrication intervals are listed in the lower table on page 31.

Lubrication intervals must be halved for vertical designs (V design).

The relubrication must be implemented with the same grease type, i.e. grease with same saponification component and same consistency. ATB employs a lithium-saponified anti-friction roller bearing grease with a drop point above 185 °C (e.g. Esso Unirex N 3), see also motor label.

The collecting chamber in the bearing cover is large enough to contain the used grease accumulating during normal service life. Flat grease nipples to DIN 3404 with thread size M10 x 1 are used for lubrication.

It is possible to employ long-term dispensers for relubrication. They remain free from maintenance for max. 12 months, according to case of application. The explosion protection rating of the dispensers is II 2 G Ex ib IIC T6.

Nominal service life
In pure coupling operation, the theoretical service life is more than 50,000 operating hours.

The max. admissible radial and axial loads are specified in the tables on pages 27 to 29. The calculations are based on a service life of the roller bearings of 20,000 hours.

Drives with higher radial loads such as belt drives can be designed with roller bearings on request, see page 29. The minimum radial load specified must be maintained in order to ensure that the bearings roll correctly. For higher axial bearing loads such as occurring with helical gear, special solutions are available on request.

IE1 Version

Frame size series CD ...	Number of poles	Drive-end bearing, all construction types Standard (fixed bearings)		reinforced bearing[2]	Non-drive end (all construction types) floating bearings)
63	2, 4	6202 2ZR	-	-	6004 2ZR
71	2, 4, 6, 8	6202 2ZR	-	-	6004 2ZR
80	2, 4, 6, 8	6204 2ZR	-	-	6204 2ZR
90	2, 4, 6, 8	6205 2ZR	-	-	6205 2ZR
100	2, 4, 6, 8	6206 2ZR C3	-	NU 206	6206 2ZR C3
112	2, 4, 6, 8	6306 2ZR C3	-	NU 306	6206 2ZR C3
132	2, 4, 6, 8	6308 2ZR C3	-	NU 308	6308 2ZR C3
160	2, 4, 6, 8	6309 2ZR C3	-	NU 309	6309 2ZR C3
180	2, 4, 6, 8	6310 2ZR C3	-	NU 310	6310 2ZR C3
200	2, 4, 6, 8	6312 2ZR C3	-	NU 312	6312 2ZR C3
225	2, 4, 6, 8	6313 2ZR C3	-	NU 313	6313 2ZR C3
250	2, 4, 6, 8	6315 2ZR C3	-	NU 315	6313 2ZR C3
280	2, 4, 6, 8	6316 2ZR C3	-	NU 316	6315 2ZR C3
315	2	6316 C3	-	NU 316	6316 C3
	4, 6, 8	6318 C3	-	NU 318	6316 C3
355	2	6318 C3	-	NU 318	6318 C3
	4, 6, 8	6320 C3	-	NU 320	6318 C3
			Only construction type V1[1], V3[1]		**Construction type B3, B5**
400	2	6318 C3	7318 B	NU 318	6318 C4
	4, 6, 8	6322 C3	7322 B	NU 322	6320 C3
450	2	6318 C3	7318 B	NU 318	6318 C4
	4, 6, 8	6324 C3	7324 B	NU 324	6322 C3

Hinweis
1) for vertical operation only
2) Min. radial load required.
See page 29. Non-drive end designed as fixed bearing.

Bearing-type codes:

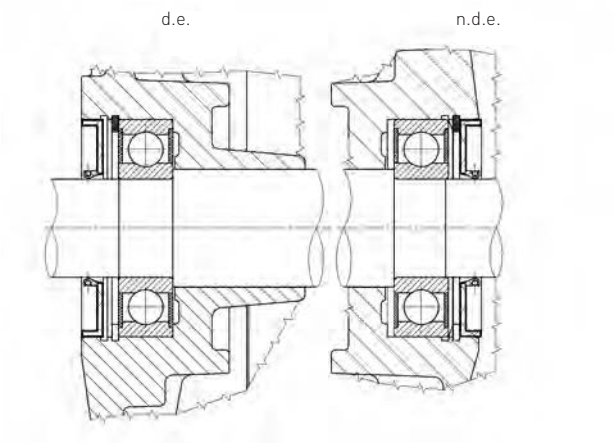
example 6315.2Z.WT.C3
6315 = bearing size
2Z (2ZR) = non-rubbing double seal
C3 = bearing clearance
WT = Polyurea grease

IE2, IE3 and MEPS

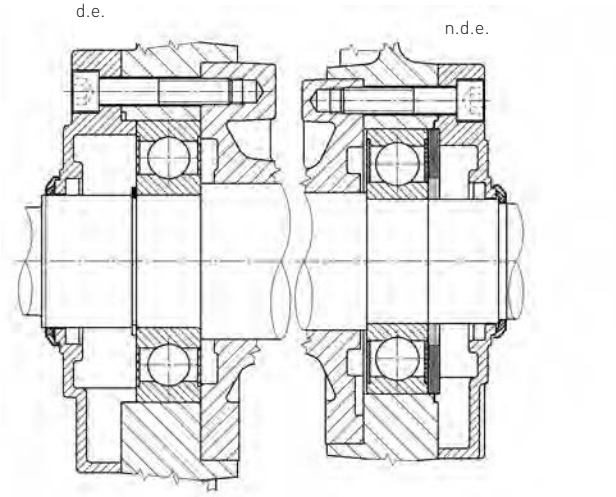
Series CD ...Y2,Y3,Y	Number of poles	Drive-end bearing all construction types Standard (fixed bearings)	reinforced bearing[2]	Non-drive-end bearings all construction types (floating bearings)
80	2, 4, 6, 8			6205 2Z
90	2, 4, 6, 8	6206 2Z C3		6206 2Z C3
100	2, 4, 6, 8	6306 2Z C3	NU 306	6206 2Z C3
112	2, 4, 6, 8	6308 2Z C3	NU 308	6308 2Z C3
132	2, 4, 6, 8	6308 2Z C3	NU 308	6308 2Z C3
160	2, 4, 6, 8	6309 2Z C3	NU 309	6309 2Z C3
180	2, 4, 6, 8	6310 2Z C3	NU 310	6310 2Z C3
200	2, 4, 6, 8	6312 2Z C3	NU 312	6312 2Z C3
225	2, 4, 6, 8	6313 2Z C3	NU 313	6313 2Z C3
250	2, 4, 6, 8	6315 2Z C3	NU 315	6313 2Z C3
280	2, 4, 6, 8	6316 2Z C3	NU 316	6315 2Z C3
315	2	6316 C3	NU 316	6316 C3
	4, 6, 8	6318 C3	NU 318	6316 C3
355	8	6320 C3	NU 320	6318 C3

Series CD ...XY	Number of poles	Drive-end bearing all construction types Standard (fixed bearings)	reinforced bearing[2]	Non-drive-end bearings all construction types (floating bearings)
250S	2, 4, 6, 8	6315 2Z C3	NU 315	6313 2Z C3
250M	2, 4, 6, 8	6316 2Z C3	NU 316	6315 2Z C3
280S	2, 4, 6, 8	6316 2Z C3	NU 316	6315 2Z C3
280M	2	6316 C3	NU 316	6316 C3
	4, 6, 8	6318 C3	NU 318	6316 C3
315	2	6316 C3	NU 316	6316 C3
	4, 6, 8	6318 C3	NU 318	6316 C3

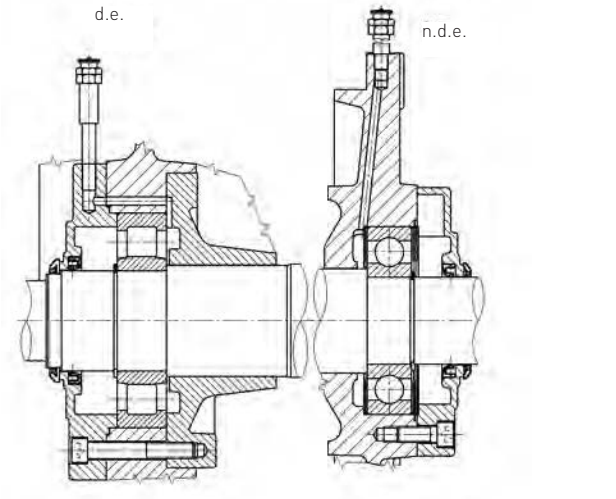
Bearing and seal arrangement



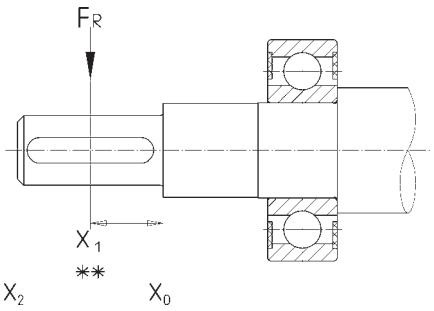
Fixed bearing d.e. with radial shaft seal ring
Standard for sizes 63 to 160



Fixed bearing d.e. with axial shaft seal ring
Standard for sizes from 180



Reinforced bearing d.e. (floating bearing; optional from size 100)
with relubrication (optional from size 225) and
combination seal (optional from size 80)



The distance of the point of application of force F_R from the shaft collar should be no greater than the length of the shaft end.

F_R = max. radial axle load (e.g. overhung belt load + weight of belt pulley) [N]

F = Belt pull [N] = $\frac{2 \times K \times M}{D}$

M = Torque [Nm] = $\frac{9550 \times P}{n}$

P = Rated motor output [kW]
n = Rated motor speed [rpm]
D = Pulley diameter [m]
K = Pre-tension factor, dependent on belt type and approximated as follows:
K = 3 for normal flat belts without tensioning pulley
K = 2 for normal flat belts with tensioning
K = 2.2 for V-belts or special-purpose flat belts

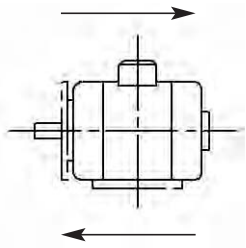
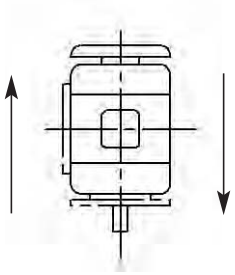
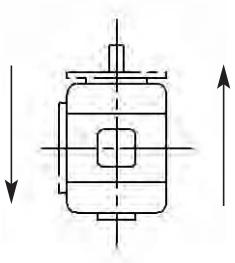
Specifications from size 400 only apply to horizontal shafts.

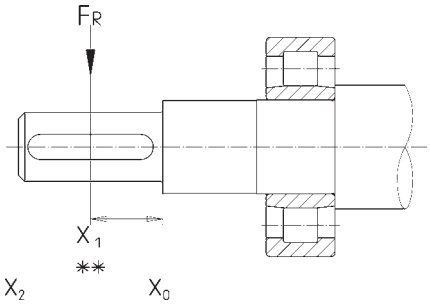
Permissible radial bearing load F_R [N] (deep groove bearing)

Frame size	Poles	x_2	x_1	x_0
63	2	400	420	450
	4	500	540	570
71	2	390	420	450
	4	490	530	570
	6	560	600	650
	8	610	660	720
80	2	650	710	780
	4	830	900	980
	6	940	1020	1120
	8	1040	1130	1240
80 Y	2	700	770	840
90	4	880	970	1060
	6	1010	1100	1220
	8	1110	1220	1340
90 Y	2	950	1050	1160
100	4	1200	1310	1460
	6	1360	1500	1670
	8	1510	1660	1840
100 Y	2	1400	1540	1700
112	4	1760	1930	2130
	6	2010	2200	2440
	8	2220	2430	2690
112 Y	2	1960	2160	2400
132 (Y)	4	2450	2700	3000
	6	2810	3090	3430
	8	3110	3430	3810
160 (Y)	2	2340	2590	2890
	4	2960	3270	3650
	6	3370	3730	4160
	8	3720	4110	4590
180 (Y)	2	3180	3530	3970
	4	3970	4410	4960
	6	4550	5060	5700
	8	5010	5570	6270
200 (Y)	2	3900	4280	4700
	4	4930	5410	6000
	6	5650	6190	6900
	8	6210	6800	7500
225 (Y)	2	4400	4800	5200
	4	5300	5800	6500
	6	6000	6700	7500
	8	6700	7400	8300
250 (Y)	2	5300	5800	6400
	4	6600	7200	8000
	6	7600	8300	9200
	8	8300	9100	10100
280 (Y)	2	5800	6200	6800
250M XY	4	7200	7800	8500
	6	8400	9100	9900
	8	7700	8700	10000
315 (Y)	2	5200	5600	5900
280M XY	4	7500	8100	8800
	6	8400	9100	9900
	8	7600	8232	8979
355 (Y)	2	6300	6600	7000
	4	9200	9800	10400
	6	10300	10900	11700
	8	10280	10941	11692
400	2	5100	5400	5700
	4	9300	10000	10800
	6	10500	11300	12100
	8	11400	12200	13100
450	2	4100	4400	4600
	4	8300	8800	9500
	6	9200	9900	10600
	8	10100	10700	11500

Permissible axial load, deep groove ball bearing

permissible axial bearing load F_A [N]. 50 Hz

For construction types	Frame size	3000 rpm Load to ← N	3000 rpm Load to →N	1500 rpm Load to ←N	1500 rpm Load to →N	1000 rpm Load to ← N	1000 rpm Load to →N	750 rpm Load to ← N	750 rpm Load to →N
IM B3, IM B5, IM B35	**63**	200	500	300	600	-	-	-	-
	**71**	200	500	300	600	400	700	500	800
	80	500	700	700	800	800	1000	1000	1100
	80 Y / 90	500	700	700	900	900	1100	1000	1200
	90 Y / 100	900	1000	1200	1300	1400	1500	1500	1700
	100 Y / 112	1300	1400	1700	1800	2000	2200	2300	2400
	112 Y / 132 (Y)	1700	2100	2300	2700	2800	3200	3100	3600
	160 (Y)	2100	2700	3000	3500	3500	4100	4000	4600
	180 (Y)	2500	3200	3400	4100	4100	4800	4600	5400
	200 (Y)	3200	4100	4400	5300	5300	6200	6100	6900
	225 (Y)	3400	4900	4800	6300	5700	7300	6600	8100
	250 (Y)	4300	5800	5900	7400	7100	8600	8100	9600
	280 (Y)	4500	6300	6200	8000	7600	9400	8500	10300
	315 (Y)	4100	5900	6600	8600	7800	9800	9100	11100
	355 (Y)	4700	6700	6800	10400	8400	12000	9900	13500
	400	4200	6200	7300	11300	8700	12700	9900	13900
	450	3700	5700	6300	10700	7900	12300	9100	13500
		↓ N	↑ N	↓ N	↑ N	↓ N	↑ N	↓ N	↑ N
IM V1, IM V5, IM V15	**63**	200	500	600	400	-	-	-	-
	**71**	200	500	300	600	400	700	500	800
	80	500	700	700	900	800	1000	900	1200
	80 Y / 90	500	800	700	1000	800	1200	900	1300
	90 Y /100	800	1100	1100	1400	1300	1600	1400	1800
	100 Y /112	1200	1500	1600	2000	1900	2400	2200	2600
	112 Y /132 (Y)	1500	2300	2100	3000	2500	3500	2900	3900
	160 (Y)	1800	3100	2600	4000	3100	4700	3500	5200
	180 (Y)	2100	3700	2800	4900	3400	5600	4000	6300
	200 (Y)	2600	4900	3700	6300	4500	7300	5100	8200
	225 (Y)	2600	5900	3700	7700	4500	8900	5400	9800
	250 (Y)	3300	7100	4500	9300	5500	10700	6300	12000
	280 (Y)	3000	8300	4100	10800	5500	12100	6100	13700
	315 (Y)	600	10400	1800	14900	2000	17600	3300	18900
	355 (Y)	100	12800	700	18800	1100	21900	2500	23400
	400	7300	0	19400	0	22100	0	23600	0
	450	4800	0	14700	0	16900	0	18000	0
		↓ N	↑ N	↓ N	↑ N	↓ N	↑ N	↓ N	↑ N
IM V3, IM V6, IM V35	**63**	500	200	600	400	-	-	-	-
	**71**	500	200	600	400	700	500	700	500
	80	600	500	800	700	900	900	1100	1000
	80 Y / 90	700	600	900	800	1000	1000	1100	1100
	90 Y / 100	900	900	1200	1300	1400	1500	1600	1700
	110 Y / 112	1300	1400	1700	1900	2000	2200	2300	2500
	112 Y / 132 (Y)	2000	1900	2500	2600	2900	3100	3300	3400
	160 (Y)	2400	2600	3100	3500	3600	4200	4000	4700
	180 (Y)	2800	3000	3600	4100	4200	4900	4700	5600
	200 (Y)	3500	4100	4600	5400	5300	6500	5900	7300
	225 (Y)	4100	4400	5200	6200	6000	7400	6900	8300
	250 (Y)	4800	5600	6100	7700	7100	9200	7800	10500
	280 (Y)	4800	6500	5900	9000	7300	10300	7900	11900
	315 (Y)	2400	8600	3800	12900	4000	15600	5300	16900
	355 (Y)	2100	10800	4300	15200	4700	18300	6100	19800
	400	7300	0	19400	0	22100	0	23600	0
	450	4800	0	14700	0	16900	0	18000	0



The distance of the point of application of force F_R from the shaft collar should be no greater than the length of the shaft end.

F_R = max. radial axle load (e.g. overhung belt load + weight of belt pulley) [N]

F = Belt load [N] = $\frac{2 \times K \times M}{D}$

M = Torque [Nm] = $\frac{9550 \times P}{n}$

P = Rated motor output [kW]
n = Rated motor speed [rpm]
D = Pulley diameter [m]
K = Pre-tension factor, dependent on belt type and approximated as follows:
K = 3 for normal flat belts without tensioning pulley
K = 2 for normal flat belts with tensioning
K = 2.2 for V-belts or special-purpose flat belts

Specifications from size 400 only apply to horizontal shafts.

Minimum loading $F_{R\,min}$ at x_0
Due to their reinforced design, the bearings must be loaded with at least the forces indicated in the table. Even a test operation without a load can result in damage.

Permissible radial bearing load F_R[N] cylindrical roller bearing, min. load

Frame size	Number of poles	x_2	x_1	x_0	$F_{R\,min}$ at x_0
90 Y	2	2759	3033	3367	220
100	4	3392	3729	4139	205
	6	3826	4206	4669	200
	8	4176	4590	5095	198
100 Y	2	3702	4054	4480	277
112	4	3766	4984	5507	255
	6	3766	5621	6212	248
	8	3766	6137	6780	245
112 Y	2	5782	6363	7073	475
132 (Y)	4	6451	7814	8686	428
	6	6451	8818	9802	412
	8	6451	9641	10717	404
160 (Y)	2	3900	5582	7958	599
	4	3900	5582	9803	536
	6	3900	5582	9803	515
	8	3900	5582	9803	505
180 (Y)	2	7912	8735	9749	748
	4	8900	10715	11959	662
	6	8900	12108	13513	633
	8	8900	13196	14727	619
200 (Y)	2	10869	11918	13191	1102
	4	12180	14680	16248	957
	6	12180	16575	18345	909
	8	12180	18050	19978	885
225 (Y)	2	12850	14319	15672	1302
	4	12850	17158	19220	1124
	6	12850	19377	21706	1065
	8	12850	19392	23719	1035
250 (Y)	2	12300	18385	20871	1795
	4	12300	18385	25620	1519
	6	12300	18385	28920	1427
	8	12300	18385	31497	1381
280 (Y)	2	15300	20423	22313	2060
	4	15300	22611	27359	1733
	6	15300	22611	31044	1624
	8	15300	22611	31044	1570
315 (Y)	2	9800	14183	21892	2060
L3	2	5800	8394	15187	2060
	4	13500	20566	32744	2228
L3	4	8500	12949	27171	2228
	6,8	12500	19043	36426	2073
L3	6,8	7600	11578	24294	2073
355 (Y)	2	16800	24127	25751	2692
L3	2	15000	21542	25481	2692
	4	12400	18475	36219	2930
L3	4	12000	17879	35051	2930
	6	10280	15316	30027	2698
	8	10280	15316	30027	2698
400	2	22171	23265	24472	2581
	4	20000	30096	45197	3675
	6	19000	28591	50501	3369
	8	18000	27087	54618	3216
450	2	20598	21823	23202	2692
	4	40000	47774	51495	4409
L2	4	34200	47537	50949	4409
	6	32500	49311	56917	4023
	8	31000	47034	61566	3829

Rotor weights for CD series, ..(Y2,Y3,Y)

Rotor weights [kg]

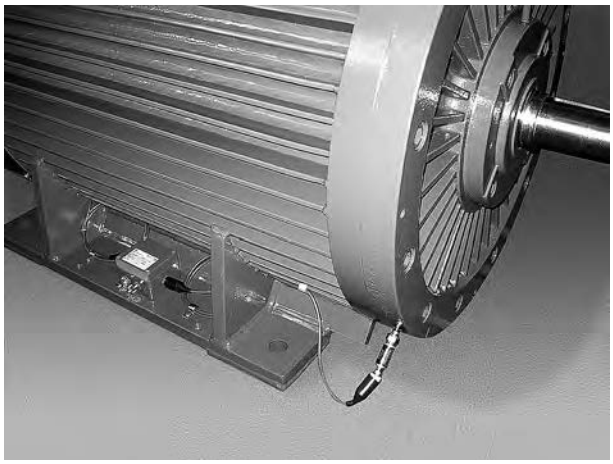
Frame size		Typ-Y	2p = 2 3000 rpm	2p = 4 1500 rpm	2p = 6 1000 rpm	2p = 8 750 rpm
63	M1		1,5	1,8		
	M2		1,5	1,8		
71	M1		1,4	1,5		
	M2		1,6	1,9	2,6	2,6
80	M1		2,2	2,7	3,7	3,7
	M2		2,7	3,3	4,5	4,5
90	S	80M1...Y2,Y3,Y	3,0	3,7	4,5	4,5
	L	80M2...Y2,Y3,Y	3,5	4,4	5,8	5,8
100	L		4,9		8,4	
	L1	90S...Y2,Y3,Y	4,9	5,8	6,9	6,9
	L2	90L...Y2,Y3,Y	5,6	6,8	8,4	8,4
112	M	100L...Y2,Y3,Y	6,5	9,9	12,1	12,1
132	S	112M...Y2,Y3,Y		15,2	19,0	17,6
	S1	112M...Y2,Y3,Y	10,7			
	S2		12,4			
		132S2...Y2,Y3,Y	15,7			
	M	132S...Y2,Y3,Y		16,7	17,3	16,0
		132M...Y2,Y3,Y		23,7		19,2
	M1	132M...Y2,Y3,Y			19,4	
	M2	132M2...Y2,Y3,Y			22,2	
		132M2...Y2,Y3,Y		24,5		
160	M			31,9	38,1	
		...Y2,Y3,Y		33,0	40,9	
	M1	...Y2,Y3,Y	20,8			28,7
	M2	...Y2,Y3,Y	24,7			34,3
	L		27,5	33,0	40,9	
		...Y2	27,5	34,1	40,9	
		...Y3, Y	27,5	37,3	46,2	42,7
180	M		38,5	48,5		
		...Y2,Y3,Y	38,5	51,6		
	L			51,6	61,4	67,6
		...Y2		51,6	61,4	67,6
		...Y3, Y		55,9	61,4	67,6
200	L	...Y2,Y3,Y		74,0		95,9
	L1	...Y2,Y3,Y	50,4		51,1	
	L2	...Y2,Y3,Y	61,4		84,4	
225	S	...Y2,Y3,Y	93,7		104,3	
	M	...Y2,Y3,Y	76,0	108,0	122,0	122,0
250	M	...Y2,Y3,Y	99,0	136,0	156,0	176,0
280	S	...Y2,Y3,Y	109,0	144,0	148,0	179,0
	M	...Y2,Y3,Y	122,0	163,0	171,0	207,0
315	S	...Y2,Y3,Y	155,0	215,0	269,0	250,0
	M	...Y2,Y3,Y	181,0	261,0	300,0	290,0
	L1	...Y2,Y3,Y	208,0	293,0	360,0	338,0
	L2	...Y2,Y3,Y	260,0	465,0	491,0	452,0
	L3	...Y2,Y3,Y	340,0	465,0	576,0	576,0
355	M				582,5	629,0
	L1		450,0	605,0	727,0	727.0
	L2		486,0	656,0	879,0	880,0
	L3		548,0	737,0		
400	M			856,0	1006,0	1147,0
	L		688,0	936,0	1107,0	1264,0
450	M			1066,0	1237,0	1399,0
	L			1148,0	1340,0	1541,0

Maintenance-free service life with lifetime lubrication and coupling operation for horizontal mounting

Motors with standard output Frame size	Number of poles	RT 40 °C	Motors with increased output (...X, ...W) Frame size	Number of poles	RT 40 °C
63–71	2 4, 6, 8	20000 h 40000 h	**63–71**	2 4, 6, 8	20000 h 40000 h
80–90	2 4, 6, 8	20000 h 40000 h	**80–90**	2 4, 6, 8	15000 h 30000 h
100–132	2 4, 6, 8	20000 h 40000 h	**100–132**	2 4, 6, 8	10000 h 20000 h
160–280	2 4, 6, 8	20000 h 40000 h	**160–280**	2 4, 6, 8	7500 h 15000 h

Relubrication intervals for horizontal construction type

	Motors with standard output Relubrication interval rpm		Motors with increased output (...X, ...W) Relubrication interval rpm	
Room temperature	up to 1800 rpm	up to 3600 rpm	up to 1800 rpm	up to 3600 rpm
40 °C	5000 h	2500 h	5000 h	2500 h
50 °C	2500 h	1000 h	2500 h	1000 h
60 °C	2000 h	500 h	-	-



Vibration recorder and box

Bearing monitoring

For bearing status monitoring, the motors can be equipped with temperature sensors as well as shock pulse and vibration sensors.

PT100 temperature sensors are mounted within the flameproof enclosure at the bearing points. Standard implementation uses 2 wire circuits, 3 or 4 wire circuits on request. The connection is implemented either in the main terminal box or in separate additional terminal boxes, which are attached to the main terminal box or to the motor housing, depending on the version. Wiring and boxes can be implemented based on explosion protection ratings Ex d, Ex e or Ex i.

Shock pulse nipples can be mounted externally at the end shields for the wear status monitoring above frame size 132. In this way, monitoring with mobile recording units is possible. For remote monitoring, use shock pulse or vibration sensors with hard wiring. The individual sensors are combined in a separate terminal box. The connection is implemented using explosion protection rating Ex ia IIC T4.

Bearing eddy currents, insulated bearings, mechanical limit speeds

Bearing eddy currents, insulated bearings
Through magnetic asymmetries on mains-powered motors, a voltage can occur along the shaft. This shaft voltage leads to transients between rotor and stator which flow through the roller bearings. If the voltage exceeds a peak value of 500 mV, the bearings may be damaged. This danger exists only for greater shaft heights.

This effect can be amplified through operation with frequency inverter. The implementation of the inverter has a decisive influence in this case. Pulse-controlled AC inverters generate particularly high-frequency voltages and currents, depending on the clock frequency and pulse modulation. Output filters in the inverters minimize these effects.

To avoid damaged bearings, an insulated bearing is therefore always installed on the non-drive end for inverter operation with motors from frame size 315. The operator must also provide for a large-area grounding of the motor housing to allow the currents circulating between inverter and stator to be diverted.

High-voltage motors are provided with an insulated bearing on the non-drive end as standard.

Mechanical speed limits
If the motors operate above the rated speed, the limit values of the roller bearings, the strength of the rotating parts, critical rotor speeds and the tip speed of the fans need to be considered. The speeds limits indicated in the opposite table can make necessary measures such as special fans, special bearings or special balancing.

The rotation speeds indicated for inverter operation in the operating data from page 58 are achieved with the standard motor.

Mechanical speed limits

Number of poles	size	63/71	80	90	100	112	132	160	180	200	225	250	280	315	355	400	450
2	[rpm]	6000	6000	6000	6000	6000	6000	6000	5220	5220	5220	4000	3600	3600	3600	3600	3600
	[Hz]	100	100	100	100	100	100	100	87	87	87	67	60	60	60	60	60
4	[rpm]	4500	4500	4500	4500	4500	4500	4500	4000	4000	4000	4000	3000	3000	3000	1500	1500
	[Hz]	150	150	150	150	150	150	150	133	133	133	133	100	100	100	100	100
6	[rpm]	4000	4000	4000	4000	4000	4000	4000	3600	3600	3000	3000	2500	2500	2500	2000	2000
	[Hz]	200	200	200	200	200	200	200	180	180	150	150	125	125	125	100	100
8	[rpm]	4000	4000	4000	4000	4000	4000	4000	3600	3600	3000	3000	2500	2500	2500	1500	1500
	[Hz]	267	267	267	267	267	267	267	240	240	200	200	167	167	167	100	100

Shaft ends
The motors normally have a free shaft end with dimensions conforming to EN 50347.

From frame size 63, the shaft ends have an internal thread to DIN 332 type "D". The feather-keys are designed to DIN 6885 Sheet 1.

Motors with special shafts and/or a second shaft end are available on request at extra cost (does not apply to motors with axial fan and motors with attachments at the non-drive end, e.g. tachometer).

Running smoothness of the shaft ends
The running smoothness of the shaft ends corresponds to EN 50347. On request, the values can be reduced by 50% (extra-cost option).

Balancing
The motors are dynamically balanced with half feather-key. The balance quality corresponds according to DIN ISO 1940 minimum Q2.5. Special variants, balanced with a full feather-key, are an extra-cost option.

In conformance with DIN ISO 8821, the shaft end faces of the motors are marked as follows:
H = Half-feather key balancing
F = Full-feather key balancing
N = Balancing without feather key

Vibration amplitude
The mechanical vibrations according to EN 60034-14 correspond to Stage A in the standard version. In case of special requirements on the mechanical quiet running, low-vibration version can be supplied (reduced) to level B (extra cost option).

Vibration level with free suspension

v_{eff} [mm/s]	Frame size 63–132	160–280	315–450
Level A	1,6	2,2	2,8
Level B	0,7	1,1	1,8

Foundations
Foundations must meet the requirements and ratings of DIN ISO 10816-3. They must be designed to be rigid or elastic according to the standard.

Operating noise levels
Noise levels are well below those specified in EN 60034-9. Noise measurements are performed according to EN ISO 3744 and EN 21680 according to class 2 in an anechoic room.

The sound pressure level "Lp" and the sound power level "L_w" in dB(A) are indicated for the individual frame sizes in the operating datasheets. They apply for rated loads at 50 Hz, plus a tolerance of +3 dB(A).

For available variants of low-noise motors, see page 35.

Cooling air quantity and permissible back pressure
If the motors are to be operated above piping systems or under sound insulation cowls, the minimum cooling air quantities listed in the table below must be adhered to. The maximum back-pressures must not be exceeded to allow the self-ventilation to work properly.

Cooling air quantity and permissible back pressure

	3000 rpm		1500 rpm		1000 rpm		750 rpm	
Frame size	Air volume pressure m^3/s	Permissible back pressure Pa	Air volume m^3/s	Permissible back pressure Pa	Air volume m^3/s	Permissible back pressure Pa	Air volume m^3/s	Permissible back pressure Pa
71	0,01	20	0,01	10	0,01	5	0,01	3
80	0,03	30	0,03	10	0,02	5	0,01	3
90	0,05	40	0,03	10	0,02	6	0,01	4
100	0,07	50	0,07	12	0,03	8	0,02	4
112	0,08	50	0,06	12	0,03	8	0,02	5
132	0,10	70	0,10	18	0,07	10	0,05	5
160	0,20	90	0,20	30	0,10	15	0,08	8
180	0,40	100	0,30	40	0,15	20	0,10	10
200	0,50	120	0,30	50	0,20	25	0,15	12
225	0,60	120	0,60	50	0,30	30	0,23	15
250	0,70	140	0,50	60	0,33	35	0,28	20
280	0,70	160	0,70	80	0,45	45	0,33	25
315	1,00	160	1,00	80	0,60	45	0,45	25
355	1,50	160	1,20	80	1,00	45	0,80	25
400	2,20	180	1,90	100	1,70	55	1,50	35
450	2,90	200	2,50	120	2,20	65	2,00	45

Noise class 1 Standard version
Radial-flow fans that are suited for rotation in both directions are employed for the standard type. The fans used are capable of conveying large volumes of air efficiently and at low noise levels.

Noise class 2 axial-flow fans, series ...A - low-noise
For more exacting requirements, we recommend the low-noise variant with bi-directional axial-flow fan. These fans are available for 2-pole motors from frame size 112 and 4-pole motors from frame size 132. Through the aerodynamic design and the optimum angle of attack of the fan blades, a noise reduction for 2-pole motors of up to 10 dB(A) is achieved compared with the standard version.

Noise class 3 axial-flow fans in special-purpose design, series ...AR - very low-noise
For applications requiring extremely low noise levels, ATB has developed a range of exceptionally quiet, surface-cooled three-phase motors. Featuring a 2-pole design, these motors are approx. 12 dB(A) quieter than their standard, radial-flow fan counterparts, and are quieter even than the low-noise axial-flow fan motors.

For tables with the operating data for classes 1 to 3, see pages 58 and 60.

Noise class 4 Water-cooled, series ...W - lowest-noise version
The water-cooled ATB motors offer the following advantages:
- Reduced noise level due to omission of fan
- Prevention of air turbulence in dusty atmospheres (risk of dust explosion)
- Increased output compared to EN 50347 by a rating stage
- Mounting dimensions of IEC frame sizes are maintained
- Good heat removal without dissipation into surrounding air
- Potential for use of dissipated heat in heat exchangers

The motor housing is a welded steel construction and is double-walled for water-cooling. To prevent corrosion, the water jacket is coated internally with several layers of synthetic material.

The specified output values apply at a maximum water inlet temperature of 30 °C. The maximum permissible suspended matter content is 30 mg/l.

All motors are equipped with PTC thermistor temperature sensors for overload protection. Cooling water flow monitoring devices are therefore not required.

For tables with operating data, see page 94.

Frequency inverter operation
All systems are suitable for inverter operation without any restrictions.

Radial-flow fan, bi-directional
(noise class 1)

Axial-flow fan, fan cowl with inlet opening, uni-directional
(noise class 2 and 3)

Water-cooled motors,
(noise class 4)

Sound pressure level

Noise class	1	2 Standard version (radial-flow fan) Temperature class T4, 50 Hz		3 Series ...A low-noise version (axial-flow fan) Temperature class T4, 50 Hz		4 Series...AR extremely low-noise version (axial-flow fan) Temperature class T4, 50 Hz		Series ...W low-noise version water-cooled Temperature class T4, 50 Hz		
Frame size	output P_2 [kW]	Sound pressure level L_p [dB (A)]	Sound output level L_W [dB (A)]	Sound pressure level L_p [dB (A)]	Sound output level L_W [dB (A)]	Sound pressure level L_p [dB (A)]	Sound output level L_W [dB (A)]	Leistung P_2 [kW]	Sound pressure level L_p [dB (A)]	Sound output level L_W [dB (A)]
ns = 3000 rpm, 2p = 2										
112 M-2	4	63	75	55	67	-	-	-	-	-
112 M-2Y	4	63	76	55	68	-	-	-	-	-
132 S1-2 (Y)	5,5	63	76	55	68	54	67	-	-	-
132 S2-2 (Y)	7,5	63	76	55	68	54	67	-	-	-
160 M1-2 (Y)	11	66	79	56	69	54	67	15	50	63
160 M2-2 (Y)	15	66	79	56	69	54	67	18,5	50	63
160 L-2 (Y)	18,5	66	79	56	69	54	67	22	50	63
180 M-2 (Y)	22	69	82	58	71	57	70	30	51	64
200 L1-2 (Y)	30	71	85	60	74	58	72	37	52	66
200 L2-2 (Y)	37	71	85	60	74	58	72	45	52	66
225 M-2 (Y)	45	72	86	60	74	59	73	55	54	68
250 M-2 (Y)	55	75	89	64	78	62	76	75	57	71
280 S-2 (Y)	75	76	90	66	80	64	78	90	59	73
280 M-2 (Y)	90	76	90	66	80	64	78	110	59	73
315 S-2 (Y)	110	76	91	66	81	64	79	132	60	75
315 M-2 (Y)	132	76	91	66	81	64	79	160	60	75
315 L1-2 (Y)	160	76	91	66	81	64	79	200	60	75
315 L2-2 (Y)	200	76	91	66	81	64	79	250	60	75
315 L3-2 (Y)	250	76	91	66	81	64	79	315	60	75
355 L1-2 (Y)	315	81	96	68	84	66	82	355	60	76
355 L2-2 (Y)	355	81	96	68	84	66	82	400	60	76
355 L3-2 (Y)	400	81	96	68	84	66	82	-	-	-
ns = 1500 rpm, 2p = 4										
132 S-4 (Y)	5,5	57	70	55	68	-	-	-	-	-
132 M-4 (Y)	7,5	57	70	55	68	-	-	-	-	-
160 M-4 (Y)	11	62	75	56	69	-	-	-	-	-
160 L-4 (Y)	15	62	75	56	69	-	-	-	-	-
180 M-4 (Y)	18,5	60	73	57	70	56	69	22	51	64
180 L-4 (Y)	22	60	73	57	70	56	69	27	51	64
200 L-4 (Y)	30	61	75	58	72	57	71	37	51	65
225 S-4 (Y)	37	63	77	59	73	58	72	45	52	66
225 M-4 (Y)	45	63	77	59	73	58	72	55	52	66
250 M-4 (Y)	55	65	79	64	78	63	77	70	56	70
280 S-4 (Y)	75	68	82	66	80	65	79	90	58	72
280 M-4 (Y)	90	68	82	66	80	65	79	110	58	72
315 S-4 (Y)	110	69	84	66	81	65	80	132	57	72
315 M-4 (Y)	132	69	84	66	81	65	80	160	57	72
315 L1-4 (Y)	160	69	84	66	81	65	80	200	57	72
315 L2-4 (Y)	200	69	84	66	81	65	80	250	57	72
315 L3-4 (Y)	250	69	84	66	81	65	80	315	57	72
355 L1-4 (Y)	315	72	88	68	84	67	83	355	58	74
355 L2-4 (Y)	355	72	88	68	84	67	83	400	58	74
355 L3-4 (Y)	400	72	88	68	84	67	83	400	58	74

Electrical machines installed on ships - especially on the top deck -, on oil rigs, in port facilities and in sewage treatment plants, must be able to withstand a high level of corrosive attack from the humid, saline atmosphere and occasional flooding. The same applies to fan motors in cooling systems and cooling towers.

For these areas of application, motors have been developed by ATB in special corrosion-resistant implementation. In addition to the many features of the industrial motor series, such as

– long life;
– long maintenance intervals;
– high efficiency and performance
– low sound pollution of the environment,

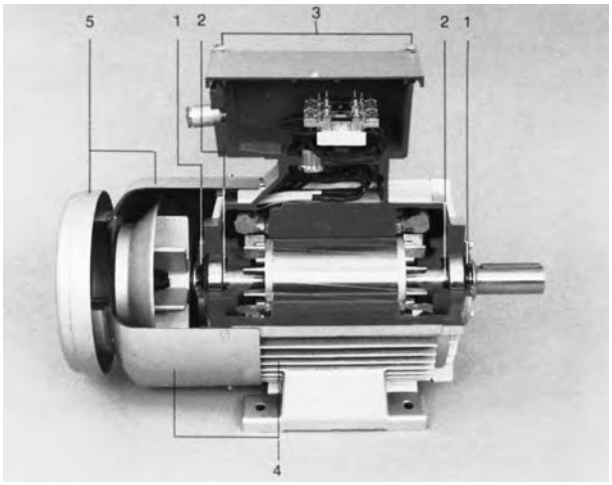
These motors incorporate a series of measures designed to protect the surface, the seals and the ventilation system from the effects of water and chemical.

These special-purpose motors are certified for use in maritime applications by Germanischer Lloyd, Nippon Kaiji Kyobai, and Lloyd's Register.

An anti-condensation heater can be fitted to the motors in order to prevent excessive condensation on the stator winding due to high temperature fluctuations and load changes (e.g. during intermittent use).

This heater takes the form of heating strips attached to the winding heads. Anti-condensation heating is also possible through feeding of the stator coil with a reduced voltage.

In addition, the windings can be protected by encapsulating them. This method can be used instead of an anti-condensation heater.



1. Saltwater-resistant double seals
2. Corrosion-resistant shafts
3. Stainless-steel fastening screws
4. Saltwater-resistant multilayer special paintwork, also with zinc primer
5. Reinforced fan cowl with canopy and baffle plate to protect fan in high seas

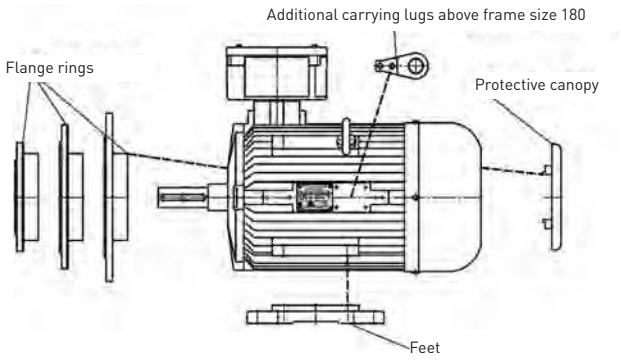
Special-purpose variants for on-deck installation

Components	Measures
Protection type of motor and terminal box	IP56 tested to DIN EN 60034, Part 5
Shafts	The motor shafts are made from stainless steel.
Shaft area seals D and N ends	For frame sizes up to 160, radial shaft seals to DIN 3760 are used From frame size 180, motors are fitted with a combined sealing system consisting of a radial and an axial seal
Fan cowl, canopy	Frame sizes 71 to 160 have reinforced fan cowls, Material thickness 2 mm From frame size 180 fan cowls for all construction types with canopy and baffle plate material thickness ←= 3mm
Fan	Fan in saltwater-resistant aluminum alloy or steel
Fastening screws	Stainless steel screws (A 2-70) used throughout
Cable gland	If supplied with cable gland, metal cable glands certified to DIN EN 60079 are used
Paintwork	Special paintwork with zinc primer

The Flexi Mount Motor was designed to simplify warehouse stock keeping through the universal employment of one type of motor.

The illustration shows how the flanges, the feet, the lugs and the protective cowl can be replaced. Thus all possible versions according to EN 60034-7 can be achieved from a basic motor.

All these work operations are feasible without opening the flameproof chamber. No authorization from any authority is necessary for restarting operation. The conversion is reversible, so that one motor after another can be employed at different locations.



Available flanges

Frame size	FF flange dia. in mm[1]												FT flange dia. in mm[1]							
	100	115	130	165	215	265	300	350	400	500	600	740	65	75	85	100	115	130	165	215
	FF flange dia. in mm[2]												FT flange dia. in mm[2]							
	120	140	160	200	250	300	350	400	450	550	660	800	80	90	105	120	140	160	200	250
63	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	O	O	O
71	O	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	O	O
80	O	O	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	O
80 (Y)		O	O	O	X	O	O	O	O	O	O	O	O	O	X	O	O	O	O	O
90 (Y)		O	O	X	O	O	O	O	O	O	O	O			O	O	X	O	O	O
100 (Y)			O	O	X	O	O	O	O	O	O	O					O	X	O	O
112 (Y)			O	O	X	O	O	O	O	O	O	O						X	O	O
132 (Y)					O	X	O	O	O	O	O	O						O	X	O
160 (Y)					O	O	X	O	O	O	O	O								X
180 (Y)						O	X	O	O	O	O	O								
200 (Y)							O	X	O	O	O	O								
225 (Y)								O	X	O	O	O								
250 (Y)										X	O	O								
280 (Y)										X	O	O								
315 (Y)										O	X	O								
355 (Y)												X								

X = Standard
O = Special flange (extra cost option)

All other versions require an intermediate ring (extra cost option).

Note
1) new designation to EN 50347
2) old designation to DIN 42948

ATB motors are designed to cover a wide range of applications. To meet the special requirements associated with each of these uses, a series of attachments has been developed. The standard attachment and use of brakes, tachogenerators and pulse generators, as well as reverse running locks, enables you to save costs. With the installation of one component, different combinations of special-purpose versions can be achieved.

Attachments are available for frame sizes of 80 and higher. Explosion-proof equipment is connected to a reinforced fan cowl and either coupled to the motor shaft directly or by means of a backlash-free coupling.

For IE2 or IE3 motor versions, the shaft length may be exceeded by the attachment for design reasons.

For IE1 frame sizes 80 to 132 brakes and rotary encoders can be incorporated directly into the explosion-proof motor housing.

Tachogenerator
Actual-value sensors are employed for the electrical remote measurement, as well as regulation of the motor speed. These devices convert the input variable "rotation speed" into an analog or digital electric signal.

Attached devices are connected using a separate terminal box.

In case of motors with integrated sensor (...R series), the connection is implemented in the main terminal box.

Motor with integrated incremental sensor

Reverse-running lock
In the operation of conveying systems or pumps, the reverse-running lock prevents reverse-running after the shutdown of the motor.

For the frame sizes 80 to 100, locking ball bearing can be used. This is especially recommended if this version should be combined with another attachment. Although the locking bodies are integrated into the bearings, the load-bearing capacity of the bearings is reduced only slightly compared to normal bearings. Since the locking bodies rub against the raceways, however, the maximum rotation speed is limited to 1500 rpm and a reduced bearing service life is to be expected.

From frame size 90, the reverse-running lock can also be mounted onto a reinforced fan cowl directly on the extended motor shaft. This reverse-running lock is designed so that the clamping pieces lift off the stationary outer ring due to the centrifugal force if the minimum speed is maintained. No additional frictional forces or noise are therefore generated with this version.

Reverse-running lock specifications

Frame size	Locking-bearing DS type	Rated torque [Nm]	Useful life at 1500 rpm [h]
80	ZZ 6204 L	32	3800
80 Y / 90	FC 6205	40	5600
90 Y / 100	ZZ 6206 M	110	1900

Frame size	Reverse-running lock Type	Rated torque [Nm]	Lift-off speed [U/min]
90	FXM 31-17 DX	100	890
100	FXM 38-17 DX	150	860
112	FXM 38-17 DX	150	860
132	FXM 38-17 DX	150	860
160	FXM 66-25 DX	800	700
180	FXM 66-25 DX	800	700
200	FXM 86-25 DX	1350	630
225	FXM 86-25 DX	1350	630
250	on request		
280	on request		

Brake motors with attached brake

Our motors can be supplied with flameproof spring-loaded brakes in two variants. Attached as a flange version on the drive side (...SV type) or attached to a reinforced fan cowl on the non-drive side of the motor (..SVN or ...S types).

The electrical connection is made in a separate terminal compartment cast on to the brake.

Type...SV and ...SVN series

With flange motors of frame sizes 63 to 280 (e.g. B5 or B14 types), we recommend attaching this brake directly to the drive-side shaft end and the motor flange.
The brake then provides the IEC connection dimensions for shaft and flange for attaching it to the machine (...SV type).

For foot-mounted motors, the brake can be attached to a reinforced fan cowl on the non-drive side of the motor (…SVN type).

This brake is available in the following versions:

- Frame size 63 - 160 all pole configurations
  Frame size180 - 225 only 4, 6 or 8 poles
  or 2-poles S3 40%
  Frame size 250 - 280 only 4, 6, 8 poles
- Terminal box Ex d
- 5 to 1200 Nm depending on frame size (for standard assignments, see page 87)
- 24 to 690 VAC 1~, 50/60 Hz,
  (for brake sizes 80 to 160 also 3~) 24 to 300 VDC
- Category 2 G / 2D / 2GD
- Protection type Ex d / Ex tD A21
  Protection group IIB / IIC
- Temperature class T3 / T4 / T5
- maximum surface temperature T200°C / T135°C / T100°C
- Protection type IP66
- Ambient temperature -20 to +40 °C / -50 to +55 °C
- thermal protection by means of thermo switch (in addition, PTC thermistor as an option)
- Manual ventilation (optional; not for 250/280)
- Micro switch (optional)
- Anti-condensation heater (optional)
- Special flanges or shafts on request

Type CD...SV series

Type... S series

This brake is always attached to a reinforced fan cowl on the non-drive side of the motor. Properties:

- Frame sizes 80 to 200
- Terminal compartment Ex e
- 10 to 270 Nm depending on frame size (for standard assignment, see page 90)
- 110 to 400 VAC 1~, 50/60 Hz 12 up to 356VDC
- Category 2 G / 2D / 2GD
- Protection type Ex de / Ex tD A21
- Protection group IIC
- Temperature class T5
- Maximum surface temperature T100°C
- Protection type IP67
- Ambient temperature -20 °C to +40 °C
- Thermal protection by means of thermo switch
- Manual ventilation (optional)
- Micro switch (optional)

Motor with attached type... S brake

Direct transmission mounting
Motors with oil proof flanges can be fitted directly to transmission units. The shafts of these motors are sealed with radial seal rings to DIN 3760. The available flanges are listed in the table on page 38.

The seal rings must be spray or mist lubricated.

Motors up to frame size 450 have the fixed bearing on the drive side, in order to limit the thermal expansion of the rotor to the transmission.

Motor with attached transmission

II

BD...B type series

Construction
For frame sizes 80 to 132 motors, the brake is enclosed in a flameproof adapter housing mounted on the non-drive end of the motor to form a single unit. The ignition protection type is II 2G Ex d(e) IIB + H2 T4 or II 2D Ex tD A21 IP65 T120°C.

The system is completely maintenance-free for the lifespan of the brake linings.

Connection
The brake coil is energized by a silicon rectifier fitted inside the flameproof enclosure. The brake can be controlled from the AC or DC side.

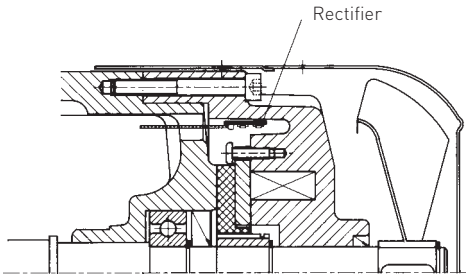
For operation from the DC side, a brake coil connection is fed into the terminal compartment. In addition, the motor is equipped with a protective resistor. If this layout is to be used for AC brake operation, a connection is not required in the terminal box. Instead, the connection shown in the circuit diagram must be established. On pole-changing and rectifier-supplied motors, the brake coil must be supplied from an external power source.

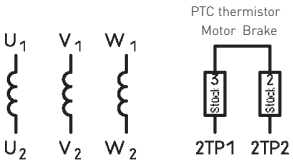
Motor voltages
Frame sizes 80 to 112: 230 V to 690 V
Frame size 132: 400 V to 690 V

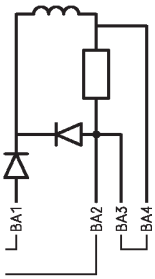
Brake voltages
For brake coil data, see page 92.
Non-standard voltages are available at extra cost.

Protective devices
To protect the motor from excessive temperatures to DIN EN 60079-14 VDE 0165, three series-connected PTC thermistor temperature sensors are installed in the winding head (warmest point) of the three stator winding phases.

In addition, each motor is equipped with a PTC thermistor temperature sensor in the brake coil and on the non-drive-end shield. The temperature sensor are connected in series and protect the motor and brake from overloading or overheating.



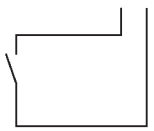




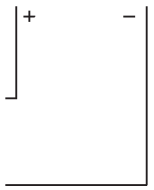
Terminals BA1 and BA2 can be connected directly with the motor terminals to supply the brake. Please compare motor/brake voltage to determine whether connection must be made to U_1/U_2 or to U_1/V_1.

Terminals BA3 and BA4 must be bridged.
It is also possible to apply an external voltage to terminals BA1 and BA2. Please note the voltage rating on the rating plate. Terminals BA3 and BA4 must be bridged.

For fast brake response (DC-side switch-off), the bridge between BA3 and BA4 can be replaced with a contact. The contact must switch at the same time as the brake voltage supply.



For emergency release of the brake, e.g. to rotate the motor by hand, a DC voltage can be applied across terminals 1 and 4 (disconnect other wiring first and observe polarity).



Voltage $U_{=} = U_{\sim} \times 0{,}45$.

Voltage U~ ; see brake voltage on the rating plate.

Operating data
For electrical motor ratings not specified in the operating data on page 88 (e.g. torque data), see the specifications for three-phase motors starting on page 58.

Switching times, overtravel
The table on the next page shows nominal brake response and recovery times and revolutions following power-off. The values were obtained in series testing.

Switching times, overtravel

Frame size BD ... B	Response time AC switch-off t_{11} ~ [ms]	DC switch-off t_{11} = [ms]	Recovery time t_2 [ms]	Overtravel[1] AC switch-off revolutions	DC switch-off revolutions
80M1-2	150	30	90	10	2
80M2-2	150	30	90	11	2
90S-2	250	45	110	15	2
90L-2	250	45	110	16	3
100L-2	300	50	150	19	3
112M-2	300	50	150	24	3
132S1-2	350	50	230	25	4
132S2-2	350	90	230	27	4
80M1-4	150	30	90	4	1
80M2-4	150	30	90	4	1
90S-4	250	45	110	5	1
90L-4	250	45	110	5	1
100L1-4	300	50	150	6	1
100L2-4	300	50	150	7	1
112M-4	300	50	170	11	1
132S-4	350	90	230	12	2
132M-4	350	90	230	13	2
80M1-6	150	30	90	3	1
80M2-6	150	30	90	3	1
90S-6	250	45	110	4	1
90L-6	250	45	110	4	1
100L-6	300	50	150	6	1
112M-6	300	50	150	7	1
132S-6	350	90	230	7	1
132M1-6	350	90	230	8	2
132M2-6	350	90	230	8	2
80M1-8	150	30	90	2	1
80M2-8	150	30	90	2	1
90S-8	250	45	110	3	1
90L-8	250	45	110	3	1
100L1-8	300	50	150	3	1
100L2-8	300	50	150	4	1
112M-8	300	50	150	6	1
132S-8	350	90	230	7	2
132M-8	350	90	230	7	2

Note:
1) The overtravel of the motors was measured without additional centrifugal masses.

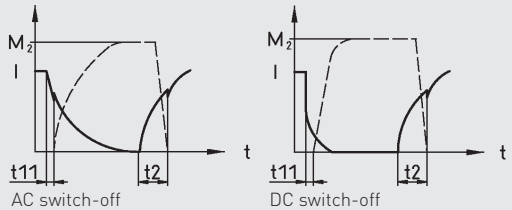
Brake torque, wear values

Through a combination of different coupling springs and brake disks, the brake torques can be adjusted (see table).

Brake torque[1], wear values

Frame size BD...B	Rated torque M_2 [Nm]	Wear $Qr_{0,1}$ [J]	$Qr_{ges.}$ [J]	Brake disk new thickness [mm]
80	8	$65x10^6$	$162x10^6$	6,9
	10[2]	$65x10^6$	$162x10^6$	6,9
	11,5	$13x10^6$	$13x10^6$	6,9
	16	$13x10^6$	$13x10^6$	6,9
90	16	$100x10^6$	$500x10^6$	8
	20[2]	$100x10^6$	$500x10^6$	8
	23	$20x10^6$	$20x10^6$	8
	32	$20x10^6$	$20x10^6$	8
100	32	$130x10^6$	$600x10^6$	10,4
	40	$130x10^6$	$600x10^6$	10,4
	46[2]	$30x10^6$	$45x10^6$	10,4
	64	$30x10^6$	$45x10^6$	10,4
112	32	$130x10^6$	$600x10^6$	10,4
	40	$130x10^6$	$600x10^6$	10,4
	46[2]	$30x10^6$	$45x10^6$	10,4
	64	$30x10^6$	$45x10^6$	10,4
132	60	$130x10^6$	$700x10^6$	11,15
	75	$130x10^6$	$700x10^6$	11,15
	86[2]	$65x10^6$	$130x10^6$	11,15
	100	$65x10^6$	$130x10^6$	11,15

Note:
1) Tolerance -20%/+40% at 1m/s friction speed
2) Standard torque



t11 = Response times
t2 = Recovery time

The possible friction work Qr can be calculated according to the following formulae. Please take the wear limits from the table.

$$Q_r = \frac{J \times n^2}{182,4} \times \frac{M_2}{M_v} \quad [J]$$

$$M_v = M_2 + (-)^* M_L \quad [Nm]$$

Q_r [J] = Existing friction work per braking operation
$Q_{r\,0,1}$ [J] = friction work per 0.1 mm of wear
$Q_{r\,ges.}$ [J] = Friction work up to brake disk change
J [kgm²] = Moment of inertia
N [rpm] = Rotation speed
M_2 [Nm] = Rated torque
M_V [Nm] = Retardation torque
M_L [Nm] = Load torque

* Sign in brackets (-) applies in case of load braking downwards

CD...I type series

Compact drives with the explosion protection types II 2G Ex de IIC T4 or II 2D Ex tD A21 IP65 T120 °C consist of a flameproof ATB type CD motor with a type CEIGL flameproof frequency inverter attached. It is suitable for rotation-speed-controlled applications in explosion-hazard areas of zones 1 and 21.

Frequency range

The certification covers a frequency range from 2 to 100 Hz. Compact drives are therefore suitable for use in drive solutions up to 6000 rpm. Above 50 Hz, the drive is designed for operation in the field-weakening range, i.e. with constant power.

Monitoring

The thermal monitoring of motor and inverter is implemented through PTC thermistor temperature sensors. Optionally a certified thermistor tripping device, as well as an input contactor, can be installed in the inverter casing. A compact drive with galvanic separation can therefore provide the necessary switching functionality in case of a fault in an explosion-hazard area, without additional switching devices.

Frequency inverter

A full-featured LENZE 8200 vector frequency inverter is used to drive the motor with field-oriented vector control and a switching frequency of 4 kHz., providing excellent running and control characteristics across the entire speed and torque range. The adaptation of the inverter to the motor with the recording of the motor parameters, as well as the base parameterization of the frequency inverter, is carried out during final inspection and testing.

Control

The compact drive is controlled using various exchangable frequency inverter modules according to user requirements. These modules are available for bus systems such as PROFIBUS-DP, interbus or CAN-Bus or as I/O modules for conventional control over analog set point value and ON/OFF contacts.

Compact Drive Type CD 132 M-4

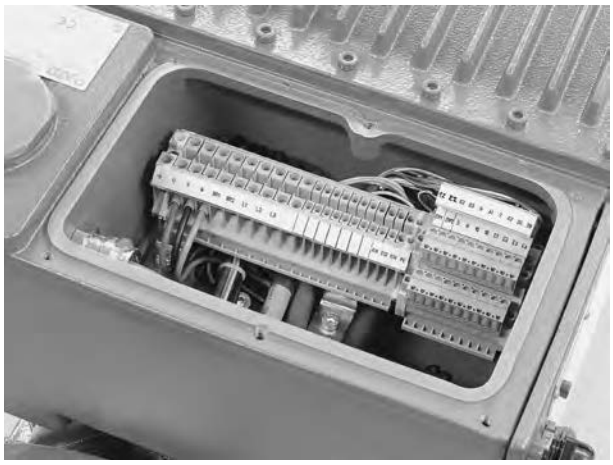
Specifications

Ignition protection type	**flameproof enclosure/dust protection** II 2G Ex de IIC T4 II 2D Ex tD A21 IP65 T120 °C
Inverter casing certification	PTB 08 ATEX 1111X
Frame sizes	80 to 160
Supply voltage	380 to 500 V ±10 %, 50/60 Hz
Range of power	0,55 bis 11 kW
Maximum current	150 % I_n for 60 s in 10 min
Leakage current to PE (to EN 50178)	> 3,5 mA Fixed installations required
Fixed installations required	double PE
Output frequency	2 to 50/100 Hz
Frequency resolution absolute	0,02 Hz
Protective insulation of control circuits	Safe isolation of PELV to EN 50178
EMC	Compliance with requirements of EN 61800-3/A11

EMC

To limit power line interference, the inverter is equipped with a line reactor integrated into the flameproof casing as well as an EMC filter for grounded mains networks. The compact drive therefore meets the prerequisites of the specifications of the EMC Directive 2004/108/EC as well as the low-voltage Directive 2006/42/EC, i.e. conformity with DIN EN 61800-3/A11 and compliance with the limit value class A according to DIN EN 55011.

Connections
The connections of the supply voltage and control are implemented in an explosion-protected Ex e terminal compartment of the inverter casing. A manual terminal with keyboard and LC display is available for display of operating data, parameters and diagnostics. This "key pad" is connected to the frequency inverter via a plug to the explosion-protection Ex e terminal compartment. However, it is not explosion-proof and thus designed for short-term operation only.



Compact motor terminal compartment

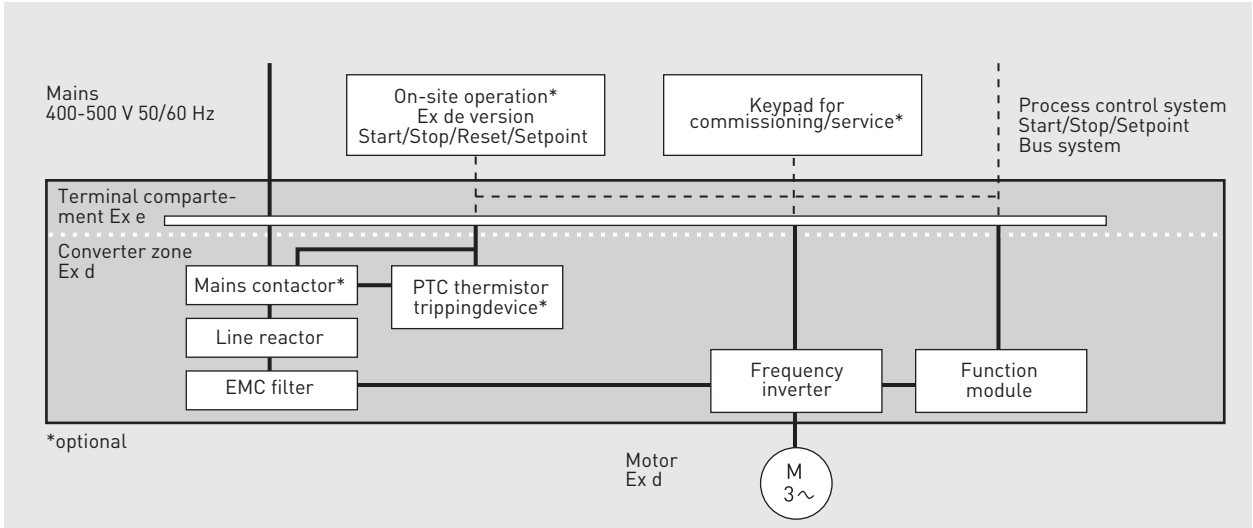
Entries for mains supply cables

Frame size	80	90	100	112	132	160
Thread type	2x M25x1,5 1x M16x1,5				1x M32x1,5 1x M25x1,5 1x M16x1,5	
for cable outer dia. mm	8–17 6–11				12–21 8–17 6–11	

Through the compact connection of a motor with frequency inverter, for employment in almost all explosion-hazard areas, with the following advantages for the user:

- With certification according to ATEX 95, the motor can be used in zones 1 and 21 throughout Europe - with no additional national acceptance.
- Simplified planning process
- No additional control cabinet or switching system
- Cost reduction through short feed to the motor. No shielded cables necessary.
- Feed to the compact drive without EMC problems through the use of network and EMC filters on the motor.
- Lower number of different part types and thus cost reduction through utilization of an inverter wide-voltage device for 400 V to 500 V mains voltage.
- No version limitation since a standard ATB flameproof motor Ex d is used.
- The version is available as a universal chemical industry motor (flexi mount motor).

For tables with operating data, see page 93.



Functional diagram

CD...H type series

The high-voltage three-phase motors are explosion-proof with a flameproof enclosure, in accordance with DIN EN 60079-1 for Group IIC and temperature classes T3 to T6.

Winding

According to design, round-wire random-wound windings or conventional form-wound coils are employed. The thermal application meets insulation class B. Only in special cases, the class F limit is slightly exceeded.

Design

- Series CD 355...H to CD 450...H
- Acceptance for category II 2G for use in zones 1 and 2
- Acceptance for category II 2G for use in zones 21 and 22
- Temperature classes T3 to T6
- Power range from 160 to approx. 700 kW (for 1500 rpm)
- Rated voltage from 3 kV to 6.6 kV
- 50Hz for 2 to 8 poles, 60 Hz for 4 to 8 poles
- Self-cooling (IC411) with fans which are independent of the direction of rotation
- Low-noise design with axial fans which are dependent of the direction of rotation
- Anti-condensation heater
- Low temperature up to -55 °C without heater
- Ambient temperatures of up to 60 °C
- Altitude of installation above 1000 m m.s.l.
- Installation of temperature sensors such as PT 100, PTC thermistors or KTY in winding and bearing for additional protection
- Customer-specific special-purpose versions

For tables with operating data, see page 95.

High voltage motor Ex d IIC

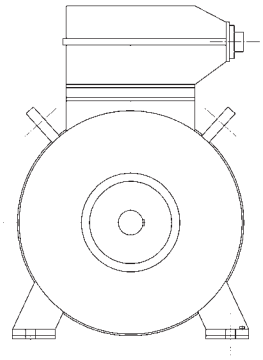
Connection

For rated voltage of up to 6.6 kV, the motors can be connected using terminal boxes with the "increased safety" or "flameproof enclosure" protection type. The box is mounted on top as standard arrangement. Side versions are possible. The boxes can be rotated by 4x90° in each case in order to enable connection from all directions. This is possible without rotating the connecting terminals.

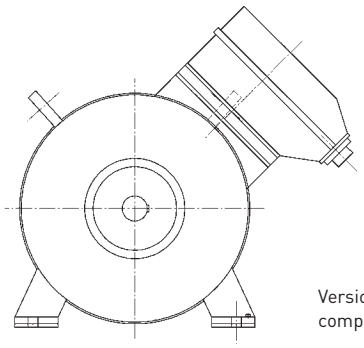
On request, the star point can be located in a second terminal compartment. In this case, main- and star-point boxes are installed on a flameproof adapter piece mounted on the motor support. By replacing the terminals between the two boxes, it is also possible to switch voltages.

Bearings

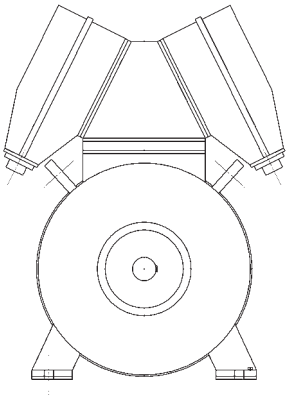
All high-voltage motors are already equipped with an insulated bearing on the non-drive end in the standard version.



Standard version



Version with main terminal compartment under 45°



Motor with main and star point terminal compartment

Protective device
According to DIN EN 60079-14 and VDE 0165-1, all motor poles must be protected against overheating by motor protection switches or equivalent protective equipment. For example, a winding temperature monitoring system using PTC thermistor temperature sensors according to DIN 44081 in combination with an approved tripping device is an equivalent protective device. Motors up to 200 kW (2 or 4 poles), motors up to 160 kW (6 poles) and 132 kW (8 poles) can be equipped with this protective facility as the sole motor protection.

All motors can be protected by PTC thermistor temperature sensors in addition to the motor circuit breaker.

This protection method is specified in operating modes other than S1, such as inverter operation, short-time operation, switching operation, long starting times, etc. It also provides protection in case of reduced cooling airflow and excessive ambient temperature.
Motors certified for operating modes S1 to S7, as well as S9 and S10, with temperature sensors as the sole protection, are therefore approved for use with all frequency inverters (operating data see pages 59, 61, 65).

Motors with temperature sensors as the sole protection are generally also approved for use with frequency inverters. The temperature sensor provides the overload protection. Short-circuit protection must be provided by the frequency inverter and/or a motor protection switch.

Temperature sensor protection consists of three series-connected PTC thermistors fitted to the winding head (warmest point) of the three phases of the stator winding. For motors with up to 3 separate windings, 3 temperature sensors are employed in each case; all sensors are connected in series.

The designations of the temperature sensor terminals in the terminal compartment are TP1 and TP2.

The PTCs have to be connected to an certified PTC-tripping device marked II(2) G.

Versions with additional temperature sensors, e.g. for warning or reserve, are available on request.

Heater
Heating elements will be used to avoid condensation or to protect the motor against low-temperatures below –20 °C. The anti-condensation heating can be implemented using the motor winding or separate heating strips. Heating for protection against motor temperatures below -20 °C can only be implemented with the motor winding.

Motor winding
The anti-condensation heating via the motor winding is achieved by an reduced AC voltage via terminals U1 and V1. The heating voltage in table (page 47) relate to 50 and 60 Hz in star or delta circuit layout and to all frame sizes of the respective frame sizes for 2-pole to 8-pole designs (2p = 2 to 2p = 8). The stated apparent output is a minimum value, i.e. the next higher output type must be used as the transformer rating. For precise matching, the transformer must have voltage taps of ±10%. Provisions must be made to ensure that motor voltage and heating voltage cannot be applied at the same time.

The heating power is shown in the table.

When using the heater to protect the motor from temperatures below –20 °C, note that the heater itself is not explosion-proof. It may not be used to heat up the motor from temperatures of less than –20 °C to at least –20 °C, because at motor housing temperatures below –20 °C the flameproof enclosure will lose the approval and the motor must not be used at these low temperatures. The heating is only suitable for preventing a drop of the motor temperature to below –20 °C when the motor is not in use.

For applications where motor temperatures below –20 °C (down to –55 °C) are required, we offer a special version without heaters (see page 19).

Heating strips
The heater version providing protection against condensation with heating strips, self-limiting explosion-proof heating strips are used. These provide optimum protection of the winding against damage and the heater may also be used when the motor temperature is below –20 °C.

Two voltage ranges are available: 110 - 120 V or 208 - 254 V.

The heating power is shown in the table.

Heater data

Frame size	for prevention of condensation with heating strip	over the motor winding						for protection of temperatures below –20 °C to –40 °C[1] over motor winding					
	Output	Output	Heating voltage for motor rated voltage					Output	Heating voltage for motor rated voltage				
			230 V	400 V	460 V	500 V	690 V		230 V	400 V	460 V	500 V	690 V
	[W]	[VA]	[V]	[V]	[V]	[V]	[V]	[VA]	[V]	[V]	[V]	[V]	[V]
63	23	25	45	75	90	100	130	65	70	120	140	160	210
71	23	40	35	65	75	85	110	100	60	100	120	135	175
80	23	50	30	55	65	75	100	125	50	90	100	115	155
90	23	70	25	45	50	60	80	175	40	70	80	95	125
100	23	100	25	40	50	55	70	250	40	65	75	85	115
112	23	150	20	40	45	50	65	375	35	60	70	80	105
132	46	200	20	35	40	45	60	500	30	55	65	70	90
160	46	300	17	30	35	40	50	750	25	45	55	60	80
180	80	400	15	25	30	35	45	1000	25	40	50	55	70
200	80	500	13	20	25	30	40	1250	20	35	40	45	60
225	120	650	13	20	25	30	40	1650	20	35	40	45	60
250	120	800		20	25	30	35	2000		35	40	45	60
280	240	1200		20	20	25	30	3000		30	35	40	50
315	240	1600		17	20	25	30	4000		30	35	40	50
355	360	2300		15	18	20	25	5700		25	28	30	40
400	600	3000		12	14	16	20	7500		20	22	25	30
450	1000	4000		10	12	13	17	10000		15	18	20	20

Note:
1) Outputs for temperatures up to 55 °C on request

Rated voltage

The explosion-proof, flameproof three-phase asynchronous motors are generally available for the following rated voltages:

Rated voltage

50 Hz	230/400 V	Delta/Star[1)]
	400/690 V	Delta/Star[2)]
	500 V	Star[3)]
	500 V	Delta
60 Hz	266/460 V	Delta/Star [1)]
	460 V	Delta [2)]

Notes:
1) Standard up to frame size 112
2) Standard up from frame size 132
3) Standard
Tolerances to IEC/EN 60034-1. Special voltages on request.

Insulation

All materials used for insulation of the winding and the winding end leads comply with insulation class F.
Utilization of the over temperature limit in S1 continuous operation corresponds to insulation class B for constant-speed motors.
Motors of the series ...X with increased performance and pole-switching motors are utilized in accordance with insulation class F.
The limit overtemperature for the winding insulated to thermal class F, according to IEC/EN 60034-1, is 105 K at an ambient temperature of RT 40 °C. In case of utilization to insulation class B, the permissible winding temperature increase is 80 K at an ambient temperature of RT 40 °C according to IEC/EN 60034-1. The high-grade materials used for the insulation system provide optimum protection against the influence of aggressive gases, vapors, dust oil and air humidity.

Winding end leads

The motors have six winding end leads: U1, V1, W1, U2, V2 and W2. In case of motors with high output and delta circuit connection with a rated current of 400 A or higher, two parallel mains supply lines are required in each case, because the connection terminals have a current limit.
For delta connection from 690 A and star connection from 400 A rated current, duplicate winding ends are provided. The three motor connections to the six terminals are U, U; V, V; and W, W. Here also, two parallel mains connections are needed in each case.

Pole-changing motors

Pole-changing motors have the same design and dimensions as the constant-speed three-phase asynchronous motors. The special features of the pole-changing motors are listed below.

Frame sizes

80–355	4/2 poles
90–355	8/4 poles
90–355	6/4 poles

Other pole combinations and frame sizes are available on request.

In the standard version, the pole-changing motors are designed for about the same torque (see pp. 84). For motors with a Dahlander pole-changing circuit, this corresponds to the circuit Δ/YY.

For special applications of e.g. fan, centrifugal pumps, etc., the pole-changing motors are designed for approximately quadratic torque (see pp. 87). For motors with a Dahlander pole-changing circuit, this corresponds to the circuit Y/YY.

These motors are supplied for the standard rated voltages 400, 500 and 690 V for a rated frequency of 50 Hz. With special windings, these motors can also be used for any voltage within the voltage range from 400 to 690 V.
Other voltages and frequencies are available on request.
The thermal utilization of the motors corresponds to insulation class "F".

Insulation system

Insulation class according to IEC/EN 60034	Insulation system Wire/Surface insulation	Impregnation
F	Enameled wires to DIN 46416-5 Part 5 Grade 2, Temperature index 200 on the basis of polyester and aromatic polyamides	Impregnating resins to insulation class F to DIN EN 60464-2 applied in continuous operation, from frame size 225 hardened by rolling

Operating Characteristics for Motors up to 690 V

Efficiency, power factor
The efficiency values and power factors listed in the tables apply to operation at rated output, rated voltage and rated frequency. Efficiencies have been determined according to IEC/EN 60034-2-1; tolerances to IEC/EN 60034-1.

The efficiency and power factor values at partial load are listed on page 76. These values apply to the rated output at 50 Hz.

Output, operating mode
The output values in the tables apply at rated voltage and rated speed in continuous operation S1, a coolant temperature up to 40 °C and an altitude of up to 1000 m above m.s.l.
For higher ambient temperatures and altitudes above 1000 meters, output reductions become necessary. The tables below apply to standard motors (temperature class T4).

Coolant temperature [°C]	Reduction of the rated output to approx.	
40	100 %	see "Operating data"
45	94 %	
50	91 %	
55	88 %	
60	84 %	

Height above m.s.l. [m]	Reduction of the rated output to approx.	
1000	100 %	see "Operating data"
1500	97 %	
2000	94 %	

If, for installation above 1000 m above m.s.l., the coolant temperature is reduced according to the table below, no power reduction is necessary. See also IEC/EN 60034-1.

Altitude of installation above m.s.l. [m]		Maximum Coolant temperature [°C]
0	to 1000	40
1000	1500	35
1500	2000	30

These are listed in the tables below: Additional testing may be required for motors with a coolant temperature deviating from 40°C, at an installation altitude other than 1000 m above sea level and whose outputs differ from the standard version.

Special acceptance tests are also required for non-S1 operating modes according to IEC/EN 60034-1. When making an inquiry, please provide the relevant information as required by paragraphs 4 and 6 of these regulations.

A winding temperature monitoring system ensures optimum utilization of the motor, as well as overload protection (see page 48).

Overload, starting current
The motors can be overloaded in accordance with the requirements of IEC/EN 60034-1. At operating temperature, they can run for two minutes at 1.5 times their rated current without incurring damage and can take 1.6 times their rated torque for 15 seconds.

The over-current relays which must be fitted according to the installation regulations for electrical equipment in hazardous areas only allow limited startup times. This results in limited moments of inertia to be accelerated. This means that up to 2x consecutive startups are possible up to frame size 315 and 1x startup from frame size 355.

Starting current, apparent starting output
The values of the starting current as a multiple of the rated current indicated under operating data are measured variables from a type test sample. From the values of the starting current relationship, the ratio of the starting apparent power to the rated motor output results from the following relationship:

$$\frac{S_A}{P_2} = I_A/I_N \frac{1}{\eta \times \cos \varphi}$$

Torque
The motors have squirrel-cage rotors whose cages are die-cast aluminum constructions, with 2 to 8 poles, on frame sizes 63 to 315L2 and, in larger sizes, they are implemented as hard-soldered coppered bar constructions for direct actuation. The starting and stalling torques, expressed as multiples of the rated torques, are listed in the specifications tables. The specifications are type sample measured values.

If the voltage deviates from the rated value, torques (starting torque, acceleration torque and stalling torque) change approximately as a function of the square of the voltage.

Direction of rotation
In general, the motors can rotate in both directions. Motors with self-driven axial-flow fans are an exception (series ...A, ...AR). These fans are dependent on the direction of rotation. The direction of rotation is displayed by an arrow on the fan cowl. Certified circuit diagrams are supplied with the motors.

Permissible startup times

Rated output	2p = 2 permissible startup time[1]		2p = 4 permissible startup time[1]		2p = 6 permissible startup time[1]		2p = 8 permissible startup time[1]	
	cold	warm	cold	warm	cold	warm	cold	warm
P_2 [kW]	t [s]	t [s]	t [s]	t [s]	t [s]	t [s]	t [s]	t [s]
0,12	-	-	90	62	-	-	100	59
0,18	60	40	90	62	-	-	100	59
0,25	60	40	90	62	80	63	100	59
0,37	60	40	90	62	79	62	100	59
0,55	60	40	90	62	55	40	100	59
0,75	50	36	75	50	85	55	95	56
1,1	47	31	60	38	80	50	108	69
1,5	45	27	46	26	73	42	108	81
2,2	45	20	46	25	65	46	104	72
3	42	20	46	22	51	39	80	50
4	35	19	39	23	46	34	85	55
5,5	30	19	43	25	45	29	84	54
7,5	35	19	42	22	35	22	87	58
11	35	19	39	23	38	19	81	45
15	41	21	46	24	43	22	59	41
18,5	39	20	46	23	46	27	46	29
22	39	20	52	24	43	21	59	40
30	39	20	52	25	60	31	57	33
37	53	21	56	28	57	28	66	45
45	69	32	62	26	75	45	74	44
55	74	29	45	25	80	56	77	48
75	85	39	56	23	64	36	61	40
90	84	42	59	25	49	22	60	30
110	97	45	62	23	60	30	60	30
132	103	48	63	26	60	30	60	30
160	100	50	60	30	60	30	60	30
200	100	50	60	30	60	30	60	30
250	100	50	60	30	60	30	60	30
315	100	50	60	30	60	30	60	30
355	100	50	60	30	60	30	60	30
400	100	50	60	30	60	30	60	30
450	-	-	60	30	60	30	-	-

Note
1) These times can be achieved only with winding temperature monitoring with PTC thermistor temperature sensors.

Switching frequency
For standard version motors (temperature class T4) the start-up times indicated in the table are allowed with temperature rise "F" and winding temperature monitoring using PTC thermistors.

The following cases are distinguished:
1. Number of starts with constant load torque

2. Number of starts with load torque rising to rated torque as a square of the speed (quadratic load torque).

The values given apply for an inertia factor FI = 1, i.e. they do not take the external moment of inertia into account. External moments of inertia can be included using the FI factor according to the equation

$$S = \frac{S_{Catalogue}}{FI} \quad [S/h]$$

$$\text{mit } FI = \frac{J_{Zus.} + J_{Mot.}}{J_{Mot.}}$$

The operating frequencies listed for motors under load involve accelerations only, in contrast to the no-load operating frequencies. If the motors are decelerated with reverse current, these values must be divided by the K factor.

This K factor is:

K = 2.5 for constant load torque
K = 3.2 for quadratic load torque

The resulting relationship is:

$$S = \frac{S_{Catalogue}[S/h]}{FI \times K}$$

[S/h] switching operations per hour

Startups per hour

Rated Output P_2 [kW]	2p = 2 Startups per hour FI = 1 Load torque const. [S/h]	quadr. [S/h]	2p = 4 Startups per hour FI = 1 Load torque const. [S/h]	quadr. [S/h]	2p = 6 Startups per hour FI = 1 Load torque const. [S/h]	quadr. [S/h]	2p = 8 Startups per hour FI = 1 Load torque const. [S/h]	quadr. [S/h]
0,12			11000	12000			6000	10200
0,18	8000	11000	11000	12000			6000	10200
0,25	8000	11000	11000	12000	10800	11450	6000	10200
0,37	8000	11000	11000	12000	10800	11450	5000	8500
0,55	8000	11000	10800	11550	10800	11450	5000	8500
0,75	7850	10500	10800	11550	6300	10590	4000	6800
1,1	5700	7560	6200	9550	5900	8880	6100	9900
1,5	3260	4410	3420	6480	2950	4580	9200	10500
2,2	1410	1960	2960	4400	2800	4100	4500	6930
3	980	1260	1930	2690	2600	3780	3900	5500
4	820	1200	2600	3490	2400	3460	2750	4530
5,5	610	880	1520	2050	2300	3150	2420	3480
7,5	780	1040	1000	1360	1340	1800	2190	3180
11	300	400	990	1360	720	1000	1100	1640
15	240	320	510	750	630	860	1330	1850
18,5	180	240	460	620	540	820	770	1040
22	130	170	130	180	400	540	1080	1430
30	65	100	300	400	290	380	410	560
37	55	75	230	310	170	240	370	560
45	50	65	110	170	200	280	205	305
55	40	55	95	130	220	310	270	305
75	30	45	70	100	100	170	220	330
90	25	35	40	65	90	150	120	180
110	18	27	23	30	80	125	170	230
132	16	25	30	55	70	100	150	190
160	12	22	30	45	55	85	150	190
200	8	20	22	35	50	75	150	190
250	8	18	18	30	40	60		
315	8	18	18	30				

Notes
Frame size 355 to 450 on request.
Switching operation can be implemented only with winding temperature monitoring using PTC thermistor temperature sensors.

Frequencies above the rated frequency of 50 Hz
If the frequency continues to increase beyond the drive's rated value, the speed increases accordingly.

The speeds corresponding to the maximum frequencies must not exceed the motor's speed limit. If a motor is operated above its rated frequency, it will generate more noise.

To prevent excessive noise generation, the use of a motor with a separately driven external fan is recommended.
For operation above the rated frequency (50 Hz), there are two basic operating modes:

Three phase motors operated with a frequency inverter at constant flux up to 87 Hz
If the motor is operated above its rated frequency, at a voltage that increases in linear proportion with frequency, the magnetic flux remains constant. Because the core losses increase out of proportion to the frequency, the maximum torque is lower than it is at 50 Hz (see illustrations of torque characteristic pages 56 and 57).
The specifications tables list the output at 87 Hz or at the maximum frequency for 2-pole motors. If voltage increase with frequency is linear, make sure that the voltage limits are not exceeded (see maximum permissible voltage load).

Three phase motors operated with a frequency inverter at constant voltage above 50 Hz
If the motor runs above the mains frequency, at a constant voltage, field weakening occurs.
The flux of the motor drops inversely proportion to the frequency. In the range above the rated frequency (50 Hz to 87 Hz), the motor's output remains approximately constant i.e. the torque drops inversely proportion to the frequency (see torque characteristic pages 56 and 57).

The maximum frequency for two-pole motors is listed in the specifications tables.

Power and torque values
The output values for inverter operation listed in the tables apply for continuous S1 operation at an ambient temperature up to 40 °C and an altitude up to 1000 meters. Values for higher room temperatures and altitudes available on request.

The output figures apply for an inverter with
– a direct-current intermediate circuit (I-type inverter)
– a direct-voltage intermediate circuit with block or pulsed voltage (U-type inverter)

The thermal utilization of the motors corresponds to thermal class F.

For torque characteristics, see pages 56 and 57.

Noise generation of three-phase motors in frequency inverter operation
Due to the harmonic oscillations, noise levels are higher in frequency inverter operation than they are at mains frequency. Without the use of a sinusoidal phase filter, the increase on the U-type inverter is about 7-15 dB(A); on the I-type inverter, it is about 3 dB(A).

If a filter is used with the U-type inverter, the noise levels at frequencies < 50 Hz do not exceed the values with mains operation.

The noise increase from self-ventilated motors at frequencies > 50 Hz can be taken from the following table.

Guideline values for the increase of the sound pressure level through increase of the fan noise

F [Hz]	Δ LP [dB(A)]
50	0
60	≤ 5
70	≤ 9
80	≤ 12
87	≤ 15

For low-noise drives with inverters, we offer special motors as listed on page 35.

Motors with separately driven external fans
Motors with separately driven external fans are recommended for drives with larger control ranges and constant load torque, as well as for operation above 50 Hz in order to avoid noise increase.

The fan motor meets the explosion protection rating "flameproof enclosure".

The motor's electrical control system must ensure that the main motor can only operate while the external fan is running.

Installation note
If the current-limited inverter power output is not insulated from the mains, one of the following measures must be implemented to protect the ground conductor from overload as specified in DIN EN 50178, VDE 0160 (Installation of electronic equipment in low voltage installations).

When dimensioning the protective device in the main poles, one must take into account that, in the event of a fault, the PE conductor current can be greater than the main pole current. In this case, the protective conductor must be designed for the fault current.

All the specifications of the inverter manufacturer with regard to this fault must be observed.

Permissible voltage load
With frequency-inverter operation, voltage peaks are created by the switching operations which place additional stress on the terminals and winding insulation. This is the case to an extreme degree if, in the case of pulse-controlled AC inverters with very steep rises, vibrations are created on the line which can even overlay under unfavorable conditions.
The following values of the permissible voltage loading capacity through voltage peaks (limit values of the terminals and winding insulation) are safe.

1. The air and creep sections of the **terminals** are designed for an effective rated voltage of 750 V on the basis of DIN EN 50019 - explosion protection type "Increased safety e". The permissible transient over voltage surge in frequency inverter operation of the motors is 2.15 kV phase-to-phase and phase-to-ground.

2. **Standard windings** for effective rated voltages of 230/400 V and 500 V have a peak-voltage resistance of 1.6kV phase-to-phase and phase-to-ground at continuous heating according to the heat class F. These motors can be used with frequency inverters with NO additional filter.

3. **Standard windings** for effective rated voltages of 400 V/690 V have a peak-voltage resistance of 1.6 kV phase-to-phase and phase-to-ground at continuous heating according to heat class F. These motors can be used with frequency inverters WITH an additional filter.

4. **Special windings** for an effective rated voltage of 690 V have a peak-voltage resistance of 2.15 kV phase-to-phase and phase-to-ground at continuous heating according to heat class F. These motors can be used with a frequency inverter WITHOUT additional filters. They are identified with the letter "U" at the end of the type designation of the motor. This special winding can be implemented in motors of frame size 315 or higher and requires a reduction of output.

Torque characteristic on the frequency inverter, 50 Hz mains, Temperature class T4

2p = 2

Diagram 1: Frame size 63-160

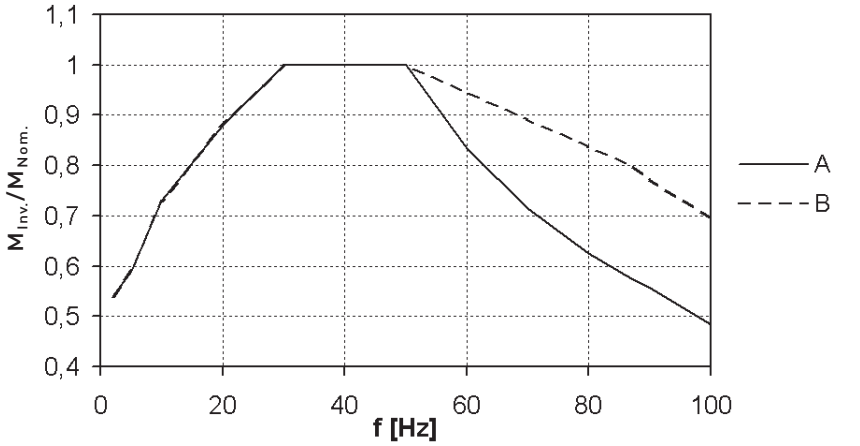


Diagramm 2: Frame size 180–225

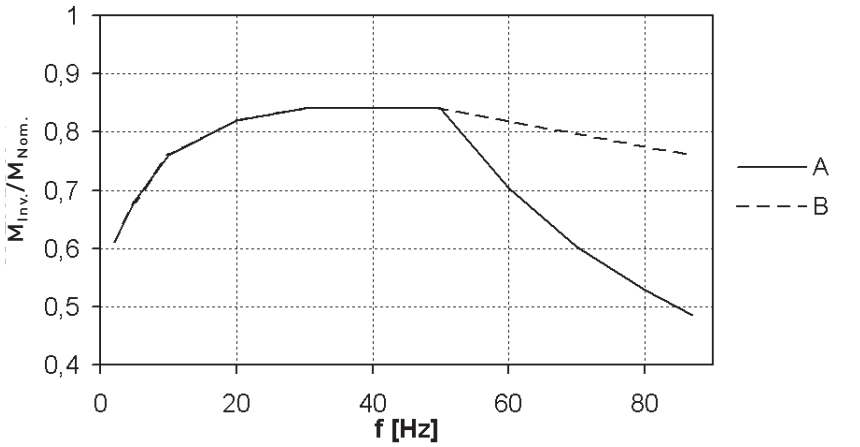
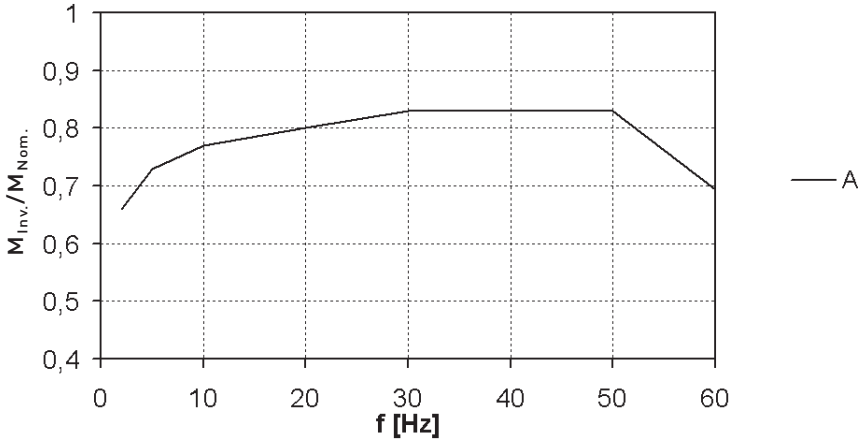


Diagramm 3: Frame size 250–400



Curce A: Field weakening range above 50Hz
Curve B: Field weakening range above 87Hz

Diagram 4: Frame sizes 63 to 160

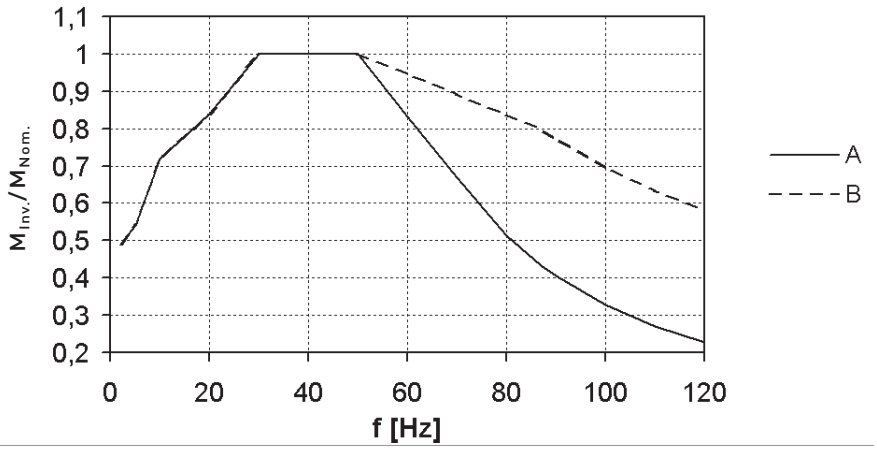


Diagram 5: Frame sizes 180 to 200

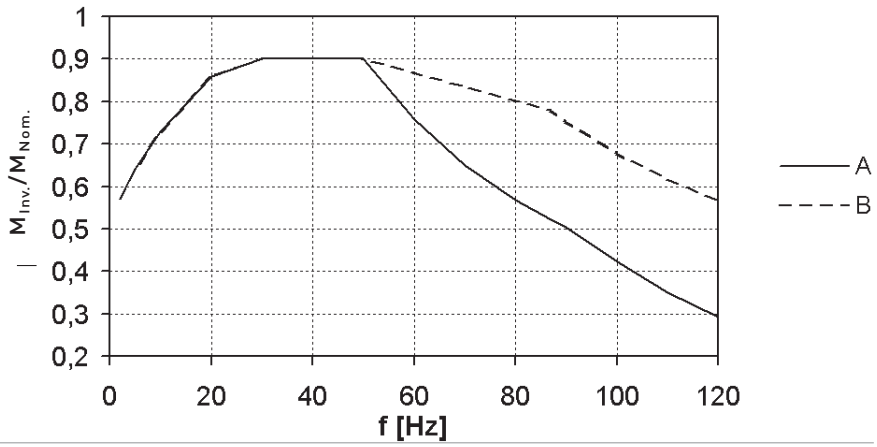
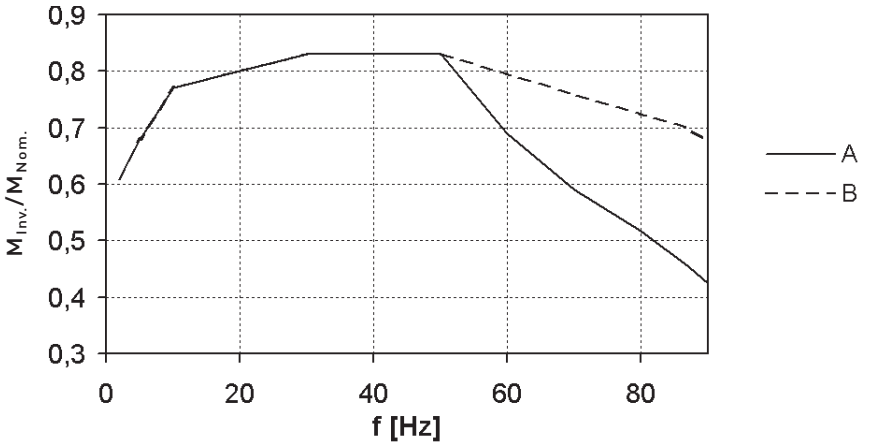


Diagram 6: Frame sizes 225 to 450



Curve A: Field weakening range above 50 Hz
Curve B: Field weakening range above 87Hz

Temperature class T4
ns = 3000 rpm, 2p = 2

Frame size	Output	Rated current at		rpm	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan		Noise levels with axial-flow fan Type ...A	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]	L_P [dB(A)]	L_W [dB(A)]
CD...						Efficiency according to manufacturer standard										
63M1-2	**0,18**	0,59	0,47	2905	66	0,67	0,59	4,6	6,8	6,5	0,00028	16	49	61	-	-
63M2-2	**0,25**	0,69	0,55	2860	70	0,75	0,83	3,4	5,8	4,7	0,00028	16	49	61	-	-
71M1-2	**0,37**	0,89	0,71	2800	71,5	0,84	1,26	2,7	5,2	3,5	0,00028	16	51	63	-	-
71M2-2	**0,55**	1,34	1,08	2810	72	0,82	1,87	2,8	5,5	3,6	0,00039	17	51	63	-	-
CD...					**IE1**	Efficiency according to IEC 60034-30										
80M1-2	**0,75**	1,73	1,38	2790	74,5	0,84	2,57	2,7	4,8	3,3	0,00058	24	55	67	-	-
80M2-2	**1,1**	2,5	1,99	2820	78	0,82	3,73	2,8	5,5	3,5	0,0008	25	55	67	-	-
90S-2	**1,5**	3,25	2,6	2840	77,8	0,86	5	2,9	5,9	3,2	0,0013	31	60	72	-	-
90L-2	**2,2**	4,55	3,65	2850	82	0,85	7,4	3	6,3	3,5	0,0018	35	60	72	-	-
100L-2	**3**	6,1	4,85	2850	82	0,87	10,1	2,7	6,8	3,3	0,0029	45	63	75	-	-
112M-2	**4**	7,7	6,2	2880	85	0,88	13,3	2,3	6,5	3,1	0,0051	53	63	75	55	67
132S1-2	**5,5**	10,7	8,5	2880	85,5	0,87	18,2	2,5	6,4	3,3	0,0089	95	63	76	55	68
132S2-2	**7,5**	14,4	11,5	2910	86,5	0,87	24,6	2,7	6,8	3,5	0,0125	100	63	76	55	68
160M1-2	**11**	20	16	2925	89	0,89	36	2,8	6,6	3,2	0,032	163	66	79	56	69
160M2-2	**15**	26,5	21,5	2920	89	0,91	49	2,8	6,8	3,2	0,043	173	66	79	56	69
160L-2	**18,5**	32	25,5	2925	90,5	0,92	60	2,6	6,8	3,1	0,052	188	66	79	56	69
180M-2	**22**	38	30,5	2925	91,2	0,92	72	2,5	6,9	3	0,075	196	69	82	58	71
200L1-2	**30**	52	42	2955	92	0,90	97	2,6	7,2	2,9	0,13	254	71	85	60	74
200L2-2	**37**	63	51	2955	92,5	0,91	120	2,7	7,2	3	0,16	278	71	85	60	74
225M-2	**45**	79	63	2960	92,8	0,89	145	2,5	7,1	3	0,24	400	72	86	60	74
250M-2	**55**	96	77	2970	93,2	0,89	177	2,4	7,1	2,8	0,4	545	75	89	64	78
280S-2	**75**	130	104	2970	93,6	0,89	241	2,2	6,8	2,7	0,65	700	76	90	66	80
280M-2	**90**	154	123	2970	93,8	0,90	289	2,4	6,8	2,8	0,78	762	76	90	66	80
315S-2	**110**	190	152	2975	94	0,89	353	2	6,5	2,4	1,4	960	76	91	66	81
315M-2	**132**	225	182	2975	94,3	0,89	424	2,1	6,8	2,5	1,6	1025	76	91	66	81
315L1-2	**160**	270	215	2975	94,5	0,90	514	2,4	6,9	2,7	1,9	1065	76	91	66	81
315L2-2	**200**	240	270	2980	94,7	0,90	641	2,3	6,9	2,6	2,2	1270	76	91	66	81
315L3-2	**250**	410[1]	325	2980	96	0,92	801	1,7	7,2	2,7	2,8	1420	76	91	66	81
355L1-2	**315**	510[1]	410[1]	2980	96,6	0,92	1009	1,5	6,7	2,8	4,5	1900	81	97	68	84
355L2-2	**355**	570[1]	455[1]	2985	96,8	0,93	1136	1,4	6,9	2,7	5	2050	81	97	68	84
CD...						Efficiency according to manufacturer standard										
355L3-2	**400**	640[1]	515[1]	2985	96,8	0,93	1280	1,3	7	2,8	5,5	2350	81	97	68	84
400L-2	**450**	710[1]	570[1]	2990	97	0,94	1437	1,1	7,2	2,8	8,5	2910	81	97	-	-

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Temperature class T4, ns = 3000 rpm, 2p = 2

Ambient temperature 40 °C, winding temperature increase within thermal class F

Operation with	Mains	Inverter										Inverter	
Ventilation		Self ventilation										Forced ventilation	
Torque characteristic	-	decreasing quadratic		constant		constant		constant		constant		constant	
Freqquency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		50–87 Hz[1]		5–87 Hz[1]	
Control range	-	1:10		1:2,5		1:5		1:10					
Speed range	-	300–3000 rpm		1200–3000 rpm		600–3000 rpm		300–3000 rpm		3000–5220 rpm		300–5220 rpm	
Output/torque	P_2 [kW]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 87 Hz	M_U [Nm]	P_U [kW] 50 Hz	P_U [kW] 87 Hz
63M1-2	0,18	0,18	0,59	0,16	0,52	0,14	0,46	0,12	0,39	0,25	0,47	-	-
63M2-2	0,25	0,25	0,83	0,22	0,73	0,19	0,63	0,15	0,49	0,37	0,7	-	-
71M1-2	0,37	0,37	1,25	0,35	1,2	0,3	1	0,22	0,74	0,55	1	-	-
71M2-2	0,55	0,55	1,9	0,52	1,8	0,45	1,5	0,33	1,1	0,8	1,5	-	-
80M1-2	0,75	0,75	2,57	0,7	2,4	0,6	2	0,5	1,7	1,1	2	-	-
80M2-2	1,1	1,1	3,73	1	3,4	0,9	3	0,75	2,5	1,6	2,9	-	-
90S-2	1,5	1,5	5	1,4	4,7	1,2	4	1	3,3	2,2	4	-	-
90L-2	2,2	2,2	7,4	2	6,7	1,7	5,7	1,4	4,7	3,3	6	-	-
100L-2	3	3	10,1	2,7	8,9	2,2	7,2	1,8	5,9	4,5	8,2	-	-
112M-2	4	4	13,3	3,7	12	3,2	11	2,5	8,2	6	11	-	-
132S1-2	5,5	5,5	18,2	5	16	4,5	15	3,7	12	8	15	5,5	8
132S2-2	7,5	7,5	24,6	7	23	6	20	5	16	11	20	7,5	10,5
160M1-2	11	11	36	10	32	9	29	7,5	24	16	29	11	15
160M2-2	15	14,5[2]	47	13	42	12	39	10	32	21	38	14,5	20
160L-2	18,5	17,5[2]	57	16	52	15	49	12,5	41	26	48	17,5	25
180M-2	22	21[2]	68	20	65	18	58	15	49	30	55	21	29
200L1-2	30	28[2]	103	31	100	28	90	27	87	49	90	32	45
200L2-2	37	32[2]	103	31	100	28	90	27	87	49	90	32	45
225M-2	45	38[2]	123	37	119	34	110	32	103	60	110	38	55

Frequency Speed range										50–60 Hz[1] 3000–3600 rpm		5–60 Hz[1] 300–3600 rpm	
250M-2	55	47[2]	151	45	145	43	138	41	132	47	126	47	47
280S-2	75	62[2]	199	60	193	58	186	55	177	62	166	62	62
280M-2	90	75[2]	241	73	234	70	225	67	215	75	201	75	75
315S-2	110	95[2]	304	90	288	88	282	85	272	95	258	95	95
315M-2	132	115	369	110	353	105	336	100	320	115	307	115	115
315L1-2	160	140	449	135	433	128	410	120	385	140	374	140	140
315L2-2	200	175	560	165	528	160	512	150	480	175	467	175	175
315L3-2	250	215	688	205	656	200	640	185	592	215	720	215	215
355L1-2	315	270	865	260	832	250	800	235	752	270	813	270	270
355L2-2	355	305	976	295	944	285	912	265	848	305	918	305	305
355L3-2	400	345	1104	335	1072	320	1024	300	960	345	1038	345	345
400L-2	450	390	1245	375	1197	360	1149	340	1085	390	201	390	390

Notes:
1) Higher frequencies on request
2) With inverter operation with output filter and practically sinusoidal output voltage, output power as P_2

Output for inverter operation (indicative values), torque characteristic on page 56,
overload protection through temperature sensor

Temperature class T4, ns = 1500 rpm, 2p = 4

Frame size	Output	Rated current at		rpm	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan		Noise levels with axial-flow fan Type ...A	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]	L_P [dB(A)]	L_W [dB(A)]
CD...																
63M1-4	**0,12**	0,43	0,34	1445	67	0,60	0,79	3,9	5,6	3,9	0,00046	16	44	56	-	-
63M2-4	**0,18**	0,53	0,42	1415	70	0,70	1,21	2,7	4,7	2,7	0,00046	16	44	56	-	-
71M1-4	**0,25**	0,66	0,53	1370	68,5	0,80	1,74	2	3,9	2,3	0,00046	16	45	57	-	-
71M2-4	**0,37**	0,94	0,75	1380	71	0,80	2,56	2,2	3,9	2,3	0,00063	17	45	57	-	-
80M1-4	**0,55**	1,38	1,10	1380	72	0,80	3,8	2	3,8	2,3	0,00092	24	46	58	-	-
CD...					**IE1**											
80M2-4	**0,75**	1,81	1,45	1400	75,5	0,79	5,1	2,1	4,5	2,5	0,0013	25	46	58	-	-
90S-4	**1,1**	2,55	2,05	1400	76	0,83	7,5	2,1	4,8	2,5	0,0021	31	49	61	-	-
90L-4	**1,5**	3,35	2,65	1505	79	0,82	10,2	2,3	5	2,7	0,0029	35	49	61	-	-
100L1-4	**2,2**	4,95	3,95	1420	80	0,80	14,8	2,4	5,4	2,8	0,0046	44	52	64	-	-
100L2-4	**3**	6,5	5,2	1415	81,7	0,82	20,2	2,3	5,5	2,7	0,0056	46	52	64	-	-
112M-4	**4**	8,1	6,5	1435	85	0,84	26,6	2,7	6,8	3,2	0,0110	59	54	66	-	-
132S-4	**5,5**	10,8	8,6	1440	86,5	0,85	36,5	2,5	6,4	2,7	0,0220	100	57	70	55	68
132M-4	**7,5**	14,3	11,4	1440	88	0,86	50	2,7	6,5	2,8	0,030	110	57	70	55	68
160M-4	**11**	21	16,7	1460	89,5	0,85	72	2,5	6,6	2,8	0,057	168	62	75	59	69
160L-4	**15**	28	22,5	1455	90	0,86	98	2,8	6,7	3,1	0,079	184	62	75	59	69
180M-4	**18,5**	35	28	1460	91	0,84	121	2,9	6,7	3	0,13	198	60	73	57	70
180L-4	**22**	41,5	33	1460	91,5	0,84	144	3	6,9	3	0,155	217	60	73	57	70
200L-4	**30**	53	42,5	1460	92,2	0,88	196	2,6	6,8	2,9	0,25	274	61	75	58	72
225S-4	**37**	66	52	1465	92,6	0,88	241	2,7	6,7	2,6	0,4	372	63	77	59	73
225M-4	**45**	80	64	1470	92,8	0,88	292	2,7	6,5	2,6	0,48	402	63	77	59	73
250M-4	**55**	96	77	1470	93,2	0,89	357	2,9	7,1	2,9	0,75	573	65	79	64	78
280S-4	**75**	134	107	1480	93,8	0,86	484	2,6	6,8	2,5	1,25	740	68	82	66	80
280M-4	**90**	161	129	1480	94	0,86	581	2,8	6,9	2,6	1,48	820	68	82	66	80
315S-4	**110**	198	159	1485	94,2	0,85	707	2,5	6,7	2,5	2,2	1040	69	84	66	81
315M-4	**132**	235	190	1485	94,4	0,85	849	2,6	6,8	2,6	2,7	1120	69	84	66	81
315L1-4	**160**	285	225	1485	94,7	0,86	1029	2,7	6,9	2,6	3,1	1210	69	84	66	81
315L2-4	**200**	355	285	1485	94,9	0,86	1286	2,7	6,9	2,6	3,9	1430	69	84	66	81
315L3-4	**250**	430[1]	345	1490	96,2	0,87	1602	1,7	7,3	2,7	4,6	1565	69	84	66	81
355L1-4	**315**	525[1]	420[1]	1490	96,3	0,90	2019	1,5	6,9	2,7	6,1	2050	72	88	68	84
355L2-4	**355**	590[1]	470[1]	1490	96,6	0,90	2275	1,6	6,9	2,8	6,7	2200	72	88	68	84
CD...																
355L3-4	**400**	665[1]	530[1]	1490	97	0,90	2564	1,5	7	2,8	7,4	2430	72	88	68	84
400M-4	**450**	735[1]	590[1]	1495	97	0,91	2875	1,1	7,3	2,7	18	2850	78	94	-	-
400L-4	**500**	815[1]	655[1]	1495	97,1	0,91	3194	1,1	7,3	2,7	20	3230	78	94	-	-
450M-4	**560**	915[1]	730[1]	1495	97,2	0,91	3577	1	6,8	2,7	26	3500	79	95	-	-
450L-4	**630**	1025[1]	820[1]	1495	97,4	0,91	4024	1	6,8	2,7	31	3800	79	95	-	-
500...	on request															

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Inverter Operation 50 Hz

Temperature class T4, ns = 1500 rpm, 2p = 4

Ambient temperature 40 °C, winding temperature increase within thermal class F

Operation with	Mains	Inverter										Inverter	
Ventilation		Self ventilation										Forced ventilation	
Torque characteristic	-	decreasing quadratic		constant		constant		constant		constant		constant	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		50–87 Hz[1]		5–87 Hz[1]	
Control range	-	1:10		1:2,5		1:5		1:10					
Speed range	-	150–1500 rpm		600–1500 rpm		300–1500 rpm		150–1500 rpm		1500–2610 rpm		150–2610 rpm	
Output/torque	P_2 [kW]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 87 Hz	M_U [Nm]	P_U [kW] 50 Hz	P_U [kW] 87 Hz
63M1-4	0,12	0,12	0,79	0,11	0,73	0,09	0,59	0,08	0,53	0,18	0,68	-	-
63M2-4	0,18	0,18	1,2	0,16	1,08	0,14	0,94	0,11	0,79	0,25	0,96	-	-
70M1-4	0,25	0,25	1,74	0,22	1,5	0,19	1,25	0,15	1	0,37	1,4	-	-
71M2-4	0,37	0,37	2,56	0,33	2,2	0,28	1,9	0,22	1,5	0,55	2	-	-
80M1-4	0,55	0,55	3,8	0,52	3,5	0,45	3	0,33	2,2	0,8	2,9	-	-
80M2-4	0,75	0,75	5,1	0,7	4,8	0,6	4	0,5	3,3	1,1	4	-	-
90S-4	1,1	1,1	7,5	1	6,7	0,9	6	0,75	5	1,6	5,9	-	-
90L-4	1,5	1,5	10,2	1,4	9,5	1,2	8	1	6,7	2,2	8	-	-
100L1-4	2,2	2,2	14,8	2	13	1,7	11	1,4	9,3	3,3	12	-	-
100L2-4	3	3	20,2	2,8	19	2,2	15	1,8	12	4,5	16	-	-
112M-4	4	4	26,6	3,6	24	3	20	2,5	16	6	22	-	-
132S-4	5,5	5,5	36,5	5	33	4,4	29	3,7	24	8	29	5,5	8
132M-4	7,5	7,5	50	7	46	6	39	5	33	11	40	7,5	10,5
160M-4	11	11	72	10	65	9	58	7,5	49	16	59	11	15
160L-4	15	15	98	13,5	88	12	78	10	65	21	79	15	20
180M-4	18,5	18[2]	118	98	111	15	97	12,5	81	26	95	18	25
180L-4	22	21[2]	137	20	130	18	117	15	97	30	110	21	29
200L-4	30	28[2]	183	27	176	24	156	21	136	40	146	28	37
225S-4	37	32[2]	208	31	201	29	188	26	168	49	179	32	45
225M-4	45	38[2]	247	37	240	35	227	32	207	60	220	38	55
250M-4	55	46[2]	298	45	291	43	278	41	265	70	256	46	65
280S-4	75	62[2]	400	60	386	58	373	55	354	95	348	62	88
280M-4	90	75[2]	482	73	470	70	450	66	424	110	402	75	105
315S-4	110	95[2]	610	90	577	88	564	83	532	140	512	95	130
315M-4	132	115	737	110	705	105	673	100	641	165	604	115	157
315L1-4	160	140	897	135	865	128	820	120	769	200	732	140	190
315L2-4	200	175	1122	165	1058	160	1026	150	961	250	915	175	240
315L3-4	250	215	1378	205	1314	200	1282	185	1186	310	1134	215	305
355L1-4	315	270	1731	260	1666	250	1602	235	1506	395	1445	270	385
355L2-4	355	305	1955	295	1891	285	1827	265	1698	440	1610	305	425
355L3-4	400	345	2209	335	2145	320	2048	300	1920	495	1820	345	480
400M-4	450	390	2500	375	2405	360	2307	340	2179	560	2050	390	540
400L-4	500	435	2778	415	2650	400	2553	380	2425	620	2274	435	600
450M-4	560	485	3097	465	2969	450	2873	425	2713	695	2549	485	670
450L-4	630	545	3480	525	3352	505	3224	475	3032	785	2879	545	755

Notes:
1) Higher frequencies on request
2) For inverter operation with output filter and practically sinusoidal output voltage, output power same as P_2

Output for inverter operation (indicative values), torque characteristic on page 57, overload protection through temperature sensor.

IE 1
Mains operation 50 Hz

Temperature class T4, ns = 1000 rpm, 2p = 6

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan Type ...A	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
CD...						Efficiency according to manufacturer standard								
71M2-6	0,25	0,82	0,66	920	62	0,71	2,6	2,2	3,5	2,6	0,0012	17	44	56
80M1-6	0,37	1,12	0,90	925	67	0,71	3,8	2,5	4,1	2,8	0,0019	24	44	56
80M2-6	0,55	1,6	1,28	925	69	0,72	5,7	2,4	4	2,7	0,0025	25	44	56
CD...					IE1	Efficiency according to IEC 60034-30								
90S-6	0,75	2,15	1,72	910	70,2	0,75	7,9	1,8	3,4	2,1	0,0033	31	47	59
90L-6	1,1	3,05	2,45	920	73	0,73	11,4	2	3,7	2,2	0,0046	35	47	59
100L-6	1,5	3,75	3	945	77	0,75	15,2	2,5	4,9	3	0,0095	46	50	62
112M-6	2,2	5,2	4,2	950	81	0,75	22,1	2,7	5,6	3,1	0,017	59	53	65
132S-6	3	6,7	5,4	965	82,6	0,78	29,7	2,7	6,3	3,1	0,031	100	56	69
132M1-6	4	8,7	7	965	83,6	0,79	39,6	2,6	6	3	0,037	104	56	69
132M2-6	5,5	11,6	9,3	960	84,6	0,81	55	2,6	6,4	3	0,043	112	56	69
160M-6	7,5	14,8	11,8	960	86,1	0,85	75	2,5	6,8	3,3	0,087	170	58	71
160L-6	11	21	16,9	965	87,5	0,86	109	2,5	6,7	3,2	0,12	190	58	71
180L-6	15	29	23	965	89,1	0,84	148	2,4	6,9	3,2	0,19	215	58	71
200L1-6	18,5	35,5	28,5	975	89,7	0,84	181	1,9	6,3	2,7	0,28	270	58	71
200L2-6	22	41,5	33	970	90,4	0,85	217	2,2	6,8	3	0,31	280	58	72
225M-6	30	57	45,5	975	90,9	0,84	294	2,8	6,6	2,5	0,69	404	58	72
250M-6	37	70	56	980	91,4	0,84	361	2,8	6,6	2,6	1,03	570	58	76
280S-6	45	85	68	985	92,4	0,83	436	2,8	5,8	2,4	1,35	720	62	77
280M-6	55	105	84	985	92,5	0,82	533	2,7	5,8	2,3	1,7	770	62	77
315S-6	75	134	107	990	93	0,87	723	2,6	6,4	2,4	4,3	995	65	79
315M-6	90	158	127	990	93,3	0,88	868	2,6	6,5	2,4	5	1050	65	79
315L1-6	110	193	154	990	93,6	0,88	1061	2,7	6,5	2,5	6	1145	69	84
315L2-6	132	230	185	990	93,8	0,88	1273	2,7	6,7	2,5	7,3	1265	69	84
315L3-6	160	2280	225	990	94,3	0,88	1543	2,6	6,8	2,5	8,3	1440	69	84
355M-6	200	345	275	990	94,8	0,88	1929	1,8	6,7	2,7	11,3	1750	74	90
355L1-6	250	430[1]	345	990	95,9	0,88	2411	1,8	6,7	2,7	13,8	1950	74	90
355L2-6	315	540[1]	430[1]	990	96	0,88	3039	1,7	6,9	2,6	17,6	2300	74	90
400M-6	355	595[1]	475[1]	994	96,6	0,89	3411	1,1	6,6	2,7	27	2850	78	94
CD...						Efficiency according to manufacturer standard								
400L-6	400	670[1]	535[1]	994	96,6	0,89	3843	1,1	6,8	2,6	31	3230	78	94
450M-6	450	755[1]	605[1]	995	96,6	0,89	4319	1,2	6,8	2,8	46	3500	78	94
450L-6	500	835[1]	670[1]	995	97	0,89	4799	1,1	6,8	2,7	51	3800	78	94
500...	on request													

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Temperature class T4, ns = 1000 rpm, 2p = 6

Ambient temperature 40 °C, winding temperature increase within thermal class F

Operation with	Mains	Inverter										Inverter	
Ventilation		Self ventilation										Forced ventilation	
Torque characteristic	-	decreasing quadratic		constant		constant		constant		constant		constant	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		50–87 Hz[1]		5–87 Hz[1]	
Control range	-	1:10		1:2,5		1:5		1:10					
Speed range	-	100–1000 rpm		400–1000 rpm		200–1000 rpm		100–1000 rpm		1000–1740 rpm		100–1740 rpm	
Output/torque	P_2 [kW]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 87 Hz	M_U [Nm]	P_U [kW] 50 Hz	P_U [kW] 87 Hz
71M2-6	0,25	0,25	2,6	0,22	2,2	0,18	1,8	0,16	1,6	0,37	2	-	-
80M1-6	0,37	0,37	3,8	0,33	3,4	0,27	2,7	0,22	2,2	0,55	3	-	-
80M2-6	0,55	0,55	5,7	0,5	5,1	0,4	4	0,33	3,3	0,8	4,4	-	-
90S-6	0,75	0,75	7,9	0,65	6,7	0,55	5,5	0,42	4,2	1,1	6	-	-
90L-6	1,1	1,1	11,4	0,9	9,2	0,8	8	0,6	6	1,6	8,8	-	-
100L-6	1,5	1,5	15,2	1,4	14	1,1	11	0,9	9	2,2	12	-	-
112M-6	2,2	2,2	22,1	2	20	1,7	17	1,3	13	3,3	18	-	-
132S1-6	3	3	29,7	2,7	27	2,2	22	1,8	18	4,5	25	3	4,2
132M1-6	4	4	40	3,5	35	3	30	2,5	25	6	33	4	5,5
132M2-6	5,5	5,5	55	4,8	48	4	40	3,3	33	8	44	5,5	7,6
160M-6	7,5	7,5	75	7	69	6	59	5	49	11	60	7,5	10,5
160L-6	11	11	109	10	98	9	88	7,5	73	16	88	11	15
180L-6	15	15	148	13	128	12	118	10	98	21	115	15	20
200L1-6	18,5	17,5[2]	171	16	157	14	137	12	118	26	143	17,5	24
200L2-6	22	20[2]	196	19	186	17	167	15	147	30	165	20	28
225M-6	30	27[2]	262	25	242	23	223	21	204	40	220	27	37
250M-6	37	33[2]	320	31	301	29	281	26	252	49	269	33	45
280S-6	45	40[2]	386	37	357	35	338	32	309	60	329	40	55
280M-6	55	47[2]	453	45	434	43	415	41	396	70	384	47	65
315S-6	75	65[2]	627	62	598	58	559	56	540	95	521	65	88
315M-6	90	78[2]	752	73	704	70	675	68	656	110	604	78	105
315L1-6	110	95[2]	916	90	868	88	849	85	820	140	768	95	130
315L2-6	132	115	1109	110	1061	105	1013	100	965	165	906	115	157
315L3-6	160	140	1351	135	1302	128	1235	120	1158	200	1098	140	190
355M-6	200	170	1640	165	1592	160	1543	150	1447	250	1372	170	240
355L1-6	250	215	2074	205	1978	200	1929	190	1833	310	1701	215	305
355L2-6	315	270	2605	260	2508	250	2412	235	2267	395	2168	270	385
400M-6	355	305	2942	295	2846	285	2749	265	2556	440	2115	305	425
400L-6	400	345	3328	335	3232	320	3087	300	2894	495	2717	345	480
450M-6	450	390	2762	375	3617	360	3473	340	3280	560	3074	390	540
450L-6	500	435	4196	415	4003	400	3859	375	3618	620	3404	435	600

Notes:
1) Higher frequencies on request
2) For inverter operation with output filter and practically sinusoidal output voltage, output power same as P_2

Output for inverter operation (indicative values), torque characteristic on page 57, overload protection through temperature sensor

Temperature class T4, ns = 750 rpm, 2p = 8

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
CD...						Efficiency according to manufacturer standard								
71M2-8	**0,12**	0,52	0,42	680	51	0,65	1,7	1,9	2,6	2,4	0,0012	17	41	53
80M1-8	**0,18**	0,66	0,52	690	61	0,65	2,5	2,2	3,2	2,6	0,0019	24	42	54
80M2-8	**0,25**	0,91	0,73	690	62	0,64	3,5	2,2	3,2	2,5	0,0025	25	42	54
90S-8	**0,37**	1,30	1,04	690	63	0,65	5,1	1,8	3	2,2	0,0033	31	46	58
90L-8	**0,55**	1,85	1,48	690	67	0,65	7,6	1,8	3,1	2,2	0,0046	35	46	58
100L1-8	**0,75**	2,3	1,85	710	71	0,66	10,1	2,4	4	2,6	0,008	44	49	61
100L2-8	**1,1**	3,15	2,5	695	69	0,73	15,1	2	3,8	2,4	0,0095	46	49	61
112M-8	**1,5**	4,15	3,3	710	78	0,67	20,2	2,2	4,6	2,8	0,017	59	52	64
132S-8	**2,2**	5,0	4,0	695	80	0,79	30	2	4,1	2,3	0,029	97	53	66
132M-8	**3**	6,9	5,6	705	81	0,77	41	2,4	4,6	2,7	0,036	113	53	66
160M1-8	**4**	8,7	7	715	85	0,78	53	1,8	4,6	2,3	0,071	157	54	67
160M2-8	**5,5**	12	9,6	720	86	0,77	73	2,1	5,4	2,8	0,105	170	54	67
160L-8	**7,5**	16,3	13	720	86,5	0,77	99	2,2	5,6	2,9	0,136	190	54	67
180L-8	**11**	22,5	18,1	725	89	0,79	145	2,4	6,4	3	0,22	215	56	69
200L-8	**15**	30	24	730	89,5	0,80	196	2,4	6,9	3,2	0,4	280	56	70
225S-8	**18,5**	37,5	30	730	90	0,79	242	2,2	6,3	3	0,56	372	57	71
225M-8	**22**	44	35,5	730	91	0,79	288	2,2	6,6	3	0,69	404	57	71
250M-8	**30**	57	45,5	735	92,5	0,82	390	2	6,8	3	1,2	550	58	72
280S-8	**37**	70	56	735	92,8	0,82	481	2,1	6,2	2,8	1,9	740	61	75
280M-8	**45**	85	67	735	92,8	0,82	585	2	6,3	2,6	2,3	800	61	75
315S-8	**55**	103	83	740	92,5	0,83	710	2,5	6	2,6	4,3	995	68	83
315M-8	**75**	140	112	740	93	0,83	968	2,5	6,3	2,5	5	1050	68	83
315L1-8	**90**	168	134	740	93,2	0,83	1161	2,6	6,6	2,6	6	1145	68	83
315L2-8	**110**	210	166	740	93,2	0,82	1420	2,7	6,8	2,7	7,3	1265	68	83
315L3-8	**132**	250	199	735	93,4	0,82	1715	2,5	6,3	2,5	8,3	1440	68	83
355M-8	**160**	295	235	740	95,1	0,83	2065	1,9	6,4	2,4	11,4	1750	70	86
355L1-8	**200**	370	295	745	95,8	0,82	2564	1,7	6,6	2,5	13,9	1950	70	86
355L2-8	**250**	460[1]	370	745	95,8	0,82	3205	1,2	6,1	2,4	17,7	2300	70	86
400M-8	**315**	570[1]	455[1]	745	96,2	0,83	4038	1,2	6,2	2,4	30	3100	73	89
400L-8	**355**	640[1]	515[1]	745	96,3	0,83	4551	1	6,1	2,36	34	3440	73	89
450M-8	**400**	710[1]	570[1]	745	96,6	0,84	5128	1	6,1	2,2	51	3750	74	90
450L-8	**450**	800[1]	640[1]	745	96,7	0,84	5768	1	6,1	2,2	57	4050	74	90
500...	on request													

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Inverter Operation 50 Hz

Temperature class T4, ns = 750 rpm, 2p = 8

Ambient temperature 40 °C, winding temperature increase within thermal class F

Operation with	Mains	Inverter										Inverter	
Ventilation		Self ventilation										Forced ventilation	
Torque characteristic	-	decreasing quadratic		constant		constant		constant		constant		constant	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		50–87 Hz[1]		5–87 Hz[1]	
Control range	-	1:10		1:2,5		1:5		1:10					
Speed range	-	75–750 rpm		300–750 rpm		150–750 rpm		75–750 rpm		750–1305 rpm		75–1305 rpm	
Output/torque	P_2 [kW]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 87 Hz	M_U [Nm]	P_U [kW] 50 Hz	P_U [kW] 87 Hz
71M2-8	0,12	0,12	1,7	0,11	1,5	0,1	1,4	0,08	1,1	0,18	1,3	-	-
80M1-8	0,18	0,18	2,5	0,16	2,2	0,13	1,7	0,11	1,5	0,25	1,8	-	-
80M2-8	0,25	0,25	3,5	0,22	3	0,18	2,4	0,16	2,2	0,37	2,7	-	-
90S-8	0,37	0,37	5,1	0,33	4,4	0,27	3,6	0,22	3	0,55	4	-	-
90L-8	0,55	0,55	7,6	0,5	6,7	0,4	5,4	0,33	4,4	0,8	5,9	-	-
100L1-8	0,75	0,75	10,1	0,65	8,7	0,55	7,4	0,42	5,6	1,1	8	-	-
100L2-8	1,1	1,1	15,1	0,9	12	0,8	11	0,6	8,1	1,6	12	-	-
112M-8	1,5	1,5	20,2	1,4	19	1,1	15	0,9	12	2,2	16	-	-
132S-8	2,2	2,2	30	2	27	1,7	23	1,3	17	3,3	24	2,2	3,1
132M-8	3	3	41	2,7	36	2,2	29	1,8	24	4,5	33	3	4,2
160M1-8	4	4	53	3,5	46	3	40	2,5	33	6	44	4	5,5
160M2-8	5,5	5,5	73	4,8	64	4	52	3,3	44	8	59	5,5	7,6
160L-8	7,5	7,5	99	7	92	5,5	72	4,5	59	11	80	7,5	10,5
180L-8	11	11	145	10	131	8	104	7	91	16	117	11	15
200L-8	15	15	196	13	170	11	143	10	130	21	154	15	20
225S-8	18,5	18,5	242	16	208	14	181	12	155	26	190	18,5	25
225M-8	22	22	288	19	245	17	219	15	194	30	220	22	29
250M-8	30	27[2]	348	25	323	23	297	21	271	40	293	27	37
280S-8	37	33[2]	426	31	400	29	374	26	336	49	359	33	45
280M-8	45	40[2]	516	37	478	35	452	32	413	60	439	40	55
315S-8	55	48[2]	619	45	581	43	555	41	529	70	512	48	65
315M-8	75	65[2]	839	62	800	58	749	56	723	95	695	65	88
315L1-8	90	78[2]	1007	73	942	70	903	68	878	110	805	78	105
315L2-8	110	95[2]	1226	90	1161	88	1136	85	1097	140	1025	95	130
315L3-8	132	115	1484	110	1420	105	1309	100	1247	165	1027	115	157
355M-8	160	140	1807	135	1743	128	1596	120	1496	200	1464	140	190
355L1-8	200	170	2194	165	2129	160	1994	150	1870	250	1830	170	240
355L2-8	250	215	2775	205	2646	200	2493	190	2368	310	2269	215	305
400M-8	315	270	3484	260	3355	250	3116	235	2929	395	2891	270	385
400L-8	355	305	3935	295	3807	285	3553	265	3303	440	3220	305	425
450M-8	400	345	4452	335	4323	320	3989	300	3740	495	3622	345	480
450L-8	450	390	5033	375	4839	360	4488	340	4239	560	4098	390	540

Notes:
1) Higher frequencies on request
2) For inverter operation with output filter and practically sinusoidal output voltage, output power as P_2

Output for inverter operation (indicative values), torque characteristic on page 57,
overload protection through temperature sensor

IE2
Mains operation 50 Hz

Temperature class T4,
ns = 3000 rpm, 2p = 2

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan Type ...A			
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]	L_P [dB(A)]	L_W [dB(A)]
CD...					Efficiency according to manufacturer standard											
63M1-2	**0,18**	0,59	0,47	2905	66	0,67	0,59	4,6	6,8	6,5	0,00028	16	49	61	-	-
63M2-2	**0,25**	0,69	0,55	2860	70	0,75	0,83	3,4	5,8	4,7	0,00028	16	49	61	-	-
71M1-2	**0,37**	0,89	0,71	2800	71,5	0,84	1,26	2,7	5,2	3,5	0,00028	16	51	63	-	-
71M2-2	**0,55**	1,34	1,08	2810	72	0,82	1,87	2,8	5,5	3,6	0,00039	17	51	63	-	-
CD...Y2					IE2Efficiency according to IEC 60034-30											
80M1-2	**0,75**	1,58	1,26	2890	79	0,87	2,48	3	6,6	3,6	0,0013	31	55	67	-	-
80M2-2	**1,1**	2,25	1,80	2885	81,1	0,87	3,64	2,9	6,5	3,5	0,0018	35	55	67	-	-
90S-2	**1,5**	3	2,4	2895	82,7	0,88	4,95	3	6,8	3,5	0,0029	45	60	72	-	-
90L-2	**2,2**	4,25	3,4	2900	84,5	0,88	7,2	3	6,9	3,6	0,0039	48	60	72	-	-
100L-2	**3**	5,7	4,6	2910	85,8	0,88	9,8	2,5	6,9	2,9	0,0051	53	63	75	-	-
112M-2	**4**	7,6	6,1	2930	86,9	0,87	13	2,8	6,9	3,6	0,0089	95	63	76	55	67
132S1-2	**5,5**	10,1	8,1	2925	88,1	0,89	18	2,5	7	3,3	0,0125	103	63	76	55	68
132S2-2	**7,5**	13,7	10,9	2930	89,1	0,89	24,4	2,7	7,1	3,5	0,0177	115	63	76	55	68
160M1-2	**11**	20	16,2	2940	90,3	0,87	35,7	3	7,3	3,6	0,032	163	66	79	56	69
160M2-2	**15**	26,5	21	2940	91,1	0,9	48,7	2,8	7,2	3,2	0,043	173	66	79	56	69
160L-2	**18,5**	32	25,5	2940	91,6	0,91	60	2,7	7,2	3,1	0,052	188	66	79	56	69
180M-2	**22**	38	30,5	2945	92	0,91	71	2,6	7,5	3,2	0,075	196	69	82	58	71
200L1-2	**30**	52	41,5	2955	92,7	0,9	97	2,7	7,5	3,1	0,13	254	71	85	60	74
200L2-2	**37**	63	50	2955	93,1	0,91	120	2,7	7,2	3	0,16	278	71	85	60	74
225M-2	**45**	77	62	2960	93,4	0,9	145	2,7	7,3	3	0,24	400	72	86	60	74
250M-2	**55**	95	76	2970	93,8	0,89	177	2,4	7,1	2,8	0,4	545	75	89	64	78
280S-2	**75**	129	103	2970	94,2	0,89	241	2,2	6,8	2,7	0,65	700	76	90	66	80
280M-2	**90**	153	122	2970	94,5	0,90	289	2,4	6,8	2,8	0,78	762	76	90	66	80
315S-2	**110**	188	151	2975	94,8	0,89	353	2	6,5	2,4	1,4	960	76	91	66	81
315M-2	**132**	225	180	2975	95	0,89	424	2,1	6,8	2,5	1,6	1025	76	91	66	81
315L1-2	**160**	270	215	2975	95,2	0,9	514	2,4	6,9	2,7	1,7	1065	76	91	66	81
315L2-2	**200**	335	270	2980	95,4	0,9	614	2,3	6,9	2,6	2,2	1270	76	91	66	81
315L3-2	**250**	410[1]	325	2980	96	0,92	801	1,7	7,2	2,7	2,8	1420	76	91	66	81
355L1-2	**315**	510[1]	410[1]	2980	96,6	0,92	1009	1,5	6,7	2,8	4,5	1900	81	97	68	84
355L2-2	**355**	570[1]	455[1]	2985	96,8	0,93	1136	1,4	6,9	2,7	5	2050	81	97	68	84
CD...					Efficiency according to manufacturer standard											
355L3-2	**400**	640[1]	515[1]	2985	96,8	0,93	1280	1,3	7	2,8	5,5	2350	81	97	-	-
400L-2	**450**	710[1]	570[1]	2990	97	0,94	1437	1,1	7,2	2,8	8,5	2910	81	97	-	-

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Ambient temperature 40 °C, winding temperature increase within thermal class F

Operation with	Mains	Inverter										Inverter	
Ventilation		Self ventilation										Forced ventilation	
Torque characteristic	-	decreasing quadratic		constant		constant		constant		constant		constant	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		50–87 Hz[1]		5–87 Hz[1]	
Contol range	-	1:10		1:2,5		1:5		1:10					
Speed range	-	300–3000 rpm		1200–3000 rpm		600–3000 rpm		300–3000 rpm		3000–5220 rpm		300–5220 rpm	
Output/torque	P_2 [kW]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 87 Hz	M_U [Nm]	P_U [kW] 50 Hz	P_U [kW] 87 Hz
CD...													
63M1-2	0,18	0,59	0,16	0,52	0,14	0,46	0,12	0,39	0,25	0,47	-	-	
63M2-2	0,25	0,25	0,83	0,22	0,73	0,19	0,63	0,15	0,49	0,37	0,7	-	-
71M1-2	0,37	0,37	1,25	0,35	1,2	0,3	1	0,22	0,74	0,55	1	-	-
71M2-2	0,55	0,55	1,9	0,52	1,8	0,45	1,5	0,33	1,1	0,8	1,5	-	-
CD...Y2													
80M1-2	0,75	0,75	2,48	0,7	2,4	0,6	2	0,5	1,7	1,1	2	-	-
80M2-2	1,1	1,1	3,64	1	3,4	0,9	3	0,75	2,5	1,6	2,9	-	-
90S-2	1,5	1,5	4,95	1,4	4,7	1,2	4	1	3,3	2,2	4	-	-
90L-2	2,2	2,2	7,2	2	6,7	1,7	5,7	1,4	4,7	3,3	6	-	-
100L-2	3	3	9,8	2,7	8,9	2,2	7,2	1,8	5,9	4,5	8,2	-	-
112M-2	4	4	13	3,7	12	3,2	11	2,5	8,2	6	11	-	-
132S1-2	5,5	5,5	18	5	16	4,5	15	3,7	12	8	15	5,5	8
132S2-2	7,5	7,5	24,4	7	23	6	20	5	16	11	20	7,5	10,5
160M1-2	11	11	35,7	10	32	9	29	7,5	24	16	29	11	15
160M2-2	15	14,5[2]	47	13	42	12	39	10	32	21	38	14,5	20
160L-2	18,5	17,5[2]	57	16	52	15	49	12,5	41	26	48	17,5	25
180M-2	22	21[2]	68	20	65	18	58	15	49	30	55	21	29
200L1-2	30	28[2]	90	27	87	24	77	22	71	40	73	28	38
200L2-2	37	32[2]	103	31	100	28	90	27	87	49	90	32	45
225M-2	45	38[2]	123	37	119	34	110	32	103	60	110	38	55
Frequency										50-60 Hz[1]		5-60 Hz[1]	
Speed range										3000-3600 rpm		300-3600 rpm	
250M-2	55	47[2]	151	45	145	43	138	41	132	47	126	47	47
280S-2	75	62[2]	199	60	193	58	186	55	177	62	166	62	62
280M-2	90	75[2]	241	73	234	70	225	67	215	75	201	75	75
315S-2	110	95[2]	304	90	288	88	282	85	272	95	258	95	95
315M-2	132	115	369	110	353	105	336	100	320	115	307	115	115
315L1-2	160	140	449	135	433	128	410	120	385	140	374	140	140
315L2-2	200	175	560	165	528	160	512	150	480	175	467	175	175
315L3-2	250	215	688	205	656	200	640	185	592	215	720	215	215
355L1-2	315	270	865	260	832	250	800	235	752	270	813	270	270
355L2-2	355	305	976	295	944	285	912	265	848	305	918	305	305
CD...													
355L3-2	400	345	1104	335	1072	320	1024	300	960	345	1038	345	345
400L-2	450	390	1245	375	1197	360	1149	340	1085	390	201	390	390

Notes:
1) Higher frequencies on request
2) For inverter operation with output filter and practically sinusoidal output voltage, output power as P_2

Overload protection using temperature sensor

IE2
Mains operation 50 Hz

Temperature class T4,
ns = 1500 rpm, 2p = 4

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan Type ...A			
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]	L_P [dB(A)]	L_W [dB(A)]
CD...					Efficiency according to manufacturer standard											
63M1-4	**0,12**	0,43	0,34	1445	62	0,60	0,79	3,9	5,6	3,9	0,00046	16	44	56	-	-
63M2-4	**0,18**	0,53	0,42	1415	70	0,70	1,21	2,7	4,7	2,7	0,00046	16	44	56	-	-
71M1-4	**0,25**	0,66	0,53	1370	68,5	0,80	1,74	2	3,9	2,3	0,00046	16	45	57	-	-
71M2-4	**0,37**	0,94	0,75	1380	71	0,80	2,56	2,2	3,9	2,3	0,00063	17	45	57	-	-
80M1-4	**0,55**	1,38	1,10	1380	72	0,80	3,8	2	3,8	2,3	0,00092	24	46	58	-	-
CD...Y2					IE2 Efficiency according to IEC 60034-30											
80M2-4	**0,75**	1,71	1,37	1445	81	0,78	5	3,2	6,8	4,2	0,0029	35	46	58	-	-
90S-4	**1,1**	2,4	1,92	1455	82,7	0,8	7,2	2,4	6,8	3,1	0,0046	44	49	61	-	-
90L-4	**1,5**	3,2	2,55	1450	84	0,81	9,9	2,5	6,9	3,2	0,0056	46	49	61	-	-
100L1-4	**2,2**	4,4	3,55	1450	85,5	0,84	14,5	2,9	7,3	3,3	0,011	59	52	64	-	-
100L2-4	**3**	6,0	4,75	1450	86,6	0,84	18,8	3,1	7,4	3,6	0,011	59	52	64	-	-
112M-4	**4**	7,9	6,4	1460	87,6	0,83	26,2	3	7,2	3,4	0,022	100	54	66	-	-
132S-4	**5,5**	10,5	8,4	1460	88,6	0,85	36	3,2	7,1	3,5	0,03	113	57	70	55	68
132M-4	**7,5**	14,1	11,3	1460	89,5	0,86	49	3,1	7,4	3,3	0,041	125	57	70	55	68
160M-4	**11**	20,5	16,5	1470	90,6	0,85	71	2,8	7,1	3,1	0,079	184	62	75	59	69
160L-4	**15**	28,5	23	1470	91,3	0,83	97	3	7,4	3,3	0,083	187	62	75	59	69
180M-4	**18,5**	35	28	1470	91,9	0,83	120	3,3	7,4	3,4	0,155	217	60	73	57	70
180L-4	**22**	41,5	33	1470	92,3	0,83	143	3,3	7,3	3,3	0,164	225	60	73	57	70
200L-4	**30**	55	44	1470	92,9	0,85	195	3,1	7,6	3,3	0,25	274	61	75	58	72
225S-4	**37**	67	54	1475	93,3	0,85	240	3	7,1	2,9	0,4	372	63	77	59	73
225M-4	**45**	81	65	1475	93,6	0,86	291	3,1	7,2	3	0,48	402	63	77	59	73
250M-4	**55**	96	77	1475	94	0,88	356	3,1	7,3	3	0,75	588	65	79	64	78
280S-4	**75**	135	108	1480	94,5	0,85	484	3	7,4	2,8	1,25	740	68	82	66	80
280M-4	**90**	161	129	1485	94,7	0,85	579	3,2	7,8	3	1,48	820	68	82	66	80
315S-4	**110**	197	157	1485	94,9	0,85	707	2,5	6,7	2,5	2,2	1040	69	84	66	81
315M-4	**132**	235	189	1485	95,1	0,85	849	2,6	6,8	2,6	2,7	1120	69	84	66	81
315L1-4	**160**	280	225	1485	95,3	0,86	1026	2,7	6,9	2,6	3,1	1210	69	84	66	81
315L2-4	**200**	350	280	1485	95,5	0,86	1286	2,7	6,9	2,6	3,9	1430	69	84	66	81
315L3-4	**250**	430[1]	345	1490	96,2	0,87	1602	1,7	7,3	2,7	4,6	1565	69	84	66	81
355L1-4	**315**	525[1]	420[1]	1490	96,3	0,90	2019	1,5	6,9	2,7	6,1	2050	72	88	68	84
355L2-4	**355**	590[1]	470[1]	1490	96,6	0,90	2275	1,6	6,9	2,8	6,7	2200	72	88	68	84
CD...					Efficiency according to manufacturer standard											
355L3-4	**400**	665[1]	530[1]	1490	97	0,90	2564	1,5	7	2,8	7,4	2430	72	88	68	84
400M-4	**450**	735[1]	590[1]	1495	97	0,91	2875	1,1	7,3	2,7	18	2850	78	94	-	-
400L-4	**500**	815[1]	655[1]	1495	97,1	0,91	3194	1,1	7,3	2,7	20	3230	78	94	-	-
450M-4	**560**	915[1]	730[1]	1495	97,2	0,91	3577	1	6,8	2,7	26	3500	79	95	-	-
450L-4	**630**	1025[1]	820[1]	1495	97,4	0,91	4024	1	6,8	2,7	31	3800	79	95	-	-
500...	on request															

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Ambient temperature 40 °C, winding temperature increase within thermal class F

Operation with	Mains	Inverter										Inverter	
Ventilation		Self ventilation										Forced ventilation	
Torque characteristic	-	decreasing quadratic		constant		constant		constant		constant		constant	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		50–87 Hz[1)]		5–87 Hz[1)]	
Regelbereich	-	1:10		1:2,5		1:5		1:10					
Drehzahlbereich	-	150–1500 rpm		600–1500 rpm		300–1500 rpm		150–1500 rpm		1500–2610 rpm		150–2610 rpm	
Leistung / Moment	P_2 [kW]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 87 Hz	M_U [Nm]	P_U [kW] 50 Hz	P_U [kW] 87 Hz
CD...													
63M1-4	0,12	0,12	0,79	0,11	0,73	0,09	0,59	0,08	0,53	0,18	0,68	-	-
63M2-4	0,18	0,18	1,2	0,16	1,08	0,14	0,94	0,11	0,79	0,25	0,96	-	-
71M1-4	0,25	0,25	1,74	0,22	1,5	0,19	1,25	0,15	1	0,37	1,4	-	-
71M2-4	0,37	0,37	2,56	0,33	2,2	0,28	1,9	0,22	1,5	0,55	2	-	-
80M1-4	0,55	0,55	3,8	0,52	3,5	0,45	3	0,33	2,2	0,8	2,9	-	-
CD...Y2													
80M2-4	0,75	0,75	5	0,7	4,8	0,6	4	0,5	3,3	1,1	4	-	-
90S-4	1,1	1,1	7,2	1	6,7	0,9	6	0,75	5	1,6	5,9	-	-
90L-4	1,5	1,5	9,9	1,4	9,5	1,2	8	1	6,7	2,2	8	-	-
100L1-4	2,2	2,2	14,5	2	13	1,7	11	1,4	9,3	3,3	12	-	-
100L2-4	3	3	18,8	2,8	19	2,2	15	1,8	12	4,5	16	-	-
112M-4	4	4	26,2	3,6	24	3	20	2,5	16	6	22	-	-
132S-4	5,5	5,5	36	5	33	4,4	29	3,7	24	8	29	5,5	8
132M-4	7,5	7,5	49	7	46	6	39	5	33	11	40	7,5	10,5
160M-4	11	11	71	10	65	9	58	7,5	49	16	59	11	15
160L-4	15	15	97	13,5	88	12	78	10	65	21	79	15	20
180M-4	18,5	18[2)]	118	98	111	15	97	12,5	81	26	95	18	25
180L-4	22	21[2)]	137	20	130	18	117	15	97	30	110	21	29
200L-4	30	28[2)]	183	27	176	24	156	21	136	40	146	28	37
225S-4	37	32[2)]	208	31	201	29	188	26	168	49	179	32	45
225M-4	45	38[2)]	247	37	240	35	227	32	207	60	220	38	55
250M-4	55	46[2)]	298	45	291	43	278	41	265	70	256	46	65
280S-4	75	62[2)]	400	60	386	58	373	55	354	95	348	62	88
280M-4	90	75[2)]	482	73	470	70	450	66	424	110	402	75	105
315S-4	110	95[2)]	610	90	577	88	564	83	532	140	512	95	130
315M-4	132	115	737	110	705	105	673	100	641	165	604	115	157
315L1-4	160	140	897	135	865	128	820	120	769	200	732	140	190
315L2-4	200	175	1122	165	1058	160	1026	150	961	250	915	175	240
315L3-4	250	215	1378	205	1314	200	1282	185	1186	310	1134	215	305
355L1-4	315	270	1731	260	1666	250	1602	235	1506	395	1445	270	385
355L2-4	355	305	1955	295	1891	285	1827	265	1698	440	1610	305	425
CD...													
355L3-4	400	345	2209	335	2145	320	2048	300	1920	495	1820	345	480
400M-4	450	390	2500	375	2405	360	2307	340	2179	560	2050	390	540
400L-4	500	435	2778	415	2650	400	2553	380	2425	620	2274	435	600
450M-4	560	485	3097	465	2969	450	2873	425	2713	695	2549	485	670
450L-4	630	545	3480	525	3352	505	3224	475	3032	785	2879	545	755

Notes:
1) Higher frequencies on request.
2) For inverter operation with output filter and practically sinusoidal output voltage, output power as P_2

Overload protection using temperature sensor

IE2
Mains Operation 50 Hz

Temperature class T4,
ns = 1000 rpm, 2p = 6

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
CD...						**Efficiency according to manufacturer standard**								
71M2-6	**0,25**	0,82	0,66	920	62	0,71	2,6	2,2	3,5	2,6	0,0012	17	44	56
80M1-6	**0,37**	1,12	0,90	925	67	0,71	3,8	2,5	4,1	2,8	0,0019	24	44	56
80M2-6	**0,55**	1,6	1,28	925	69	0,72	5,7	2,4	4	2,7	0,0025	25	44	56
CD...Y2					**IE2**	**Efficiency according to IEC 60034-30**								
90S-6	**0,75**	2	1,60	955	77,4	0,70	7,5	2,7	5,5	3,1	0,0080	44	47	59
90L-6	**1,1**	2,75	2,2	955	79,5	0,72	11	2,8	5,9	3,1	0,0095	46	47	59
100L-6	**1,5**	3,75	3,0	965	81,1	0,71	14,8	3	6,8	3,3	0,017	59	50	62
112M-6	**2,2**	4,9	3,9	965	83	0,78	21,8	2,6	6,8	3,1	0,031	100	53	65
132S-6	**3**	6,9	5,5	970	84,4	0,74	29,5	3,2	7,1	3,7	0,031	100	56	69
132M1-6	**4**	8,9	7,1	965	85,7	0,76	39,6	2,9	6,9	3,7	0,037	104	56	69
132M2-6	**5,5**	11,3	9	965	87	0,81	54	2,7	7,2	3,4	0,048	117	56	69
160M-6	**7,5**	14,6	11,7	970	88,1	0,84	74	2,8	7,5	3,8	0,12	190	58	71
160L-6	**11**	22	17,5	975	89,5	0,81	108	2,9	7,6	3,9	0,12	190	58	71
180L-6	**15**	29	23,5	975	90,4	0,82	147	2,7	7,4	3,8	0,19	215	58	71
200L1-6	**18,5**	35,5	28,5	975	91	0,83	181	2,5	7	3,5	0,28	270	58	71
200L2-6	**22**	41,5	33	975	91,5	0,84	215	2,2	6,9	3,2	0,31	280	58	72
225M-6	**30**	57	45	985	92,3	0,83	291	3	6,9	2,7	0,69	404	58	72
250M-6	**37**	69	56	985	92,7	0,83	359	3	6,8	2,7	1,03	570	58	76
280S-6	**45**	84	67	985	93,5	0,83	436	2,8	5,8	2,4	1,35	720	62	77
280M-6	**55**	103	83	985	93,6	0,82	533	2,7	5,8	2,3	1,7	770	62	77
315S-6	**75**	131	105	990	94,1	0,88	723	3	7,2	2,7	4,3	995	65	79
315M-6	**90**	156	125	990	94,4	0,88	868	3,2	7,7	2,8	5	1050	65	79
315L1-6	**110**	191	152	990	94,7	0,88	1061	3,3	7,8	2,8	6	1145	69	84
315L2-6	**132**	230	182	990	95	0,88	1273	3,2	7,7	2,8	7,3	1265	69	84
315L3-6	**160**	275	220	990	95,2	0,88	1543	3,3	7,8	2,8	8,3	1440	69	84
355M-6	**200**	345	275	990	95,5	0,88	1929	1,8	6,7	2,7	11,3	1750	74	90
355L1-6	**250**	430[1]	345	990	95,9	0,88	2411	1,8	6,7	2,7	13,8	1950	74	90
355L2-6	**315**	540[1]	430[1]	990	96	0,88	3039	1,7	6,9	2,6	17,6	2300	74	90
400M-6	**355**	595[1]	475[1]	994	96,6	0,89	3411	1,1	6,6	2,7	27	2850	78	94
CD...						**Efficiency according to manufacturer standard**								
400L-6	**400**	670[1]	535[1]	994	96,6	0,89	3843	1,1	6,8	2,6	31	3230	78	94
450M-6	**450**	755[1]	605[1]	995	96,6	0,89	4319	1,2	6,8	2,8	46	3500	78	94
450L-6	**500**	835[1]	670[1]	995	97	0,89	4799	1,1	6,8	2,7	51	3800	78	94
500...	on request													

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Inverter Operation 50 Hz

Temperature class T4, ns = 1000 rpm, 2p = 6

Ambient temperature 40 °C, winding temperature increase within thermal class F

Operation with	Mains	Inverter										Inverter	
Ventilation		Self ventilation										Forced ventilation	
Torque characteristic	-	decreasing quadratic		constant		constant		constant		constant		constant	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		50–87 Hz[1]		5–87 Hz[1]	
Control range	-	1:10		1:2,5		1:5		1:10					
DSpeed range	-	100–1000 rpm		400–1000 rpm		200–1000 rpm		100–1000 rpm		1000–1740 rpm		100–1740 rpm	
Output/torque	P_2 [kW]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 50 Hz	M_U [Nm]	P_U [kW] 87 Hz	M_U [Nm]	P_U [kW] 50 Hz	P_U [kW] 87 Hz
CD...													
71M2-6	0,25	0,25	2,6	0,22	2,2	0,18	1,8	0,16	1,6	0,37	2	-	-
80M1-6	0,37	0,37	3,8	0,33	3,4	0,27	2,7	0,22	2,2	0,55	3	-	-
80M2-6	0,55	0,55	5,7	0,5	5,1	0,4	4	0,33	3,3	0,8	4,4	-	-
CD...Y2													
90S-6	0,75	0,75	7,5	0,65	6,7	0,55	5,5	0,42	4,2	1,1	6	-	-
90L-6	1,1	1,1	11	0,9	9,2	0,8	8	0,6	6	1,6	8,8	-	-
100L-6	1,5	1,5	14,8	1,4	14	1,1	11	0,9	9	2,2	12	-	-
112M-6	2,2	2,2	21,8	2	20	1,7	17	1,3	13	3,3	18	-	-
132S1-6	3	3	29,5	2,7	27	2,2	22	1,8	18	4,5	25	3	4,2
132M1-6	4	4	39,6	3,5	35	3	30	2,5	25	6	33	4	5,5
132M2-6	5,5	5,5	54	4,8	48	4	40	3,3	33	8	44	5,5	7,6
160M-6	7,5	7,5	74	7	69	6	59	5	49	11	60	7,5	10,5
160L-6	11	11	108	10	98	9	88	7,5	73	16	88	11	15
180L-6	15	15	147	13	128	12	118	10	98	21	115	15	20
200L1-6	18,5	17,5[2]	171	16	157	14	137	12	118	26	143	17,5	24
200L2-6	22	20[2]	196	19	186	17	167	15	147	30	165	20	
225M-6	30	27[2]	262	25	242	23	223	21	204	40	220	27	37
250M-6	37	33[2]	320	31	301	29	281	26	252	49	269	33	45
280S-6	45	40[2]	386	37	357	35	338	32	309	60	329	40	55
280M-6	55	47[2]	453	45	434	43	415	41	396	70	384	47	65
315S-6	75	65[2]	627	62	598	58	559	56	540	95	521	65	88
315M-6	90	78[2]	752	73	704	70	675	68	656	110	604	78	105
315L1-6	110	95[2]	916	90	868	88	849	85	820	140	768	95	130
315L2-6	132	115	1109	110	1061	105	1013	100	965	165	906	115	157
315L3-6	160	140	1351	135	1302	128	1235	120	1158	200	1098	140	190
355M-6	200	170	1640	165	1592	160	1543	150	1447	250	1372	170	240
355L1-6	250	215	2074	205	1978	200	1929	190	1833	310	1701	215	305
355L2-6	315	270	2605	260	2508	250	2412	235	2267	395	2168	270	385
400M-6	355	305	2942	295	2846	285	2749	265	2556	440	2115	305	425
CD...													
400L-6	400	345	3328	335	3232	320	3087	300	2894	495	2717	345	480
450M-6	450	390	2762	375	3617	360	3473	340	3280	560	3074	390	540
450L-6	500	435	4196	415	4003	400	3859	375	3618	620	3404	435	600

Notes:
1) Higher frequencies on request.
2) For inverter operation with output filter and practically sinusoidal output voltage, output power as P_2.

Overload protection using temperature sensor

IE3/MEPS
Mains Operation 50 Hz

Temperature class T4,
ns = 3000 rpm, 2p = 2

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan		Noise levels with axial-flow fan Type ...A	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M	M_A/M_N [Nm]	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]	L_P [dB(A)]	L_W [dB(A)]
CD...						Efficiency according to manufacturer standard										
63M1-2	**0,18**	0,59	0,47	2905	66	0,67	0,59	4,6	6,8	6,5	0,00028	16	49	61	-	-
63M2-2	**0,25**	0,69	0,55	2860	70	0,75	0,83	3,4	5,8	4,7	0,00028	16	49	61	-	-
71M1-2	**0,37**	0,89	0,71	2800	71,5	0,84	1,26	2,7	5,2	3,5	0,00028	16	51	63	-	-
71M2-2	**0,55**	1,34	1,08	2810	72	0,82	1,87	2,8	5,5	3,6	0,00039	17	51	63	-	-
CD...Y3					**IE3**	**Efficiency according to IEC 60034-30**										
80M1-2	**0,75**	1,5	1,20	2890	82,8	0,87	2,48	3	6,6	3,6	0,0013	31	55	67	-	-
80M2-2	**1,1**	2,2	1,74	2885	83,7	0,87	3,64	2,9	6,5	3,5	0,0018	35	55	67	-	-
90S-2	**1,5**	2,9	2,3	2895	84,7	0,88	4,95	3	6,8	3,5	0,0029	45	60	72	-	-
90L-2	**2,2**	4,2	3,35	2900	86,4	0,88	7,2	3	6,9	3,6	0,0039	48	60	72	-	-
100L-2	**3**	5,6	4,45	2910	88,1	0,88	9,8	2,5	6,9	2,9	0,0051	53	63	75	-	-
112M-2	**4**	7,5	6	2930	88,4	0,87	13	2,8	6,9	3,6	0,0089	95	63	76	55	67
132S1-2	**5,5**	10	8	2925	89,5	0,89	18	2,5	7	3,3	0,0125	103	63	76	55	68
132S2-2	**7,5**	13,5	10,8	2930	90,3	0,89	24,4	2,7	7,1	3,5	0,0177	115	63	76	55	68
160M1-2	**11**	20	16	2940	91,3	0,87	35,7	3	7,3	3,6	0,032	163	66	79	56	69
160M2-2	**15**	26	21	2940	92	0,9	48,7	2,8	7,2	3,2	0,043	173	66	79	56	69
160L-2	**18,5**	31,5	25,5	2940	92,5	0,91	60	2,7	7,2	3,1	0,052	188	66	79	56	69
180M-2	**22**	37,5	30	2945	92,9	0,91	71	2,6	7,5	3,2	0,075	196	69	82	58	71
200L1-2	**30**	51	41	2955	93,5	0,9	97	2,7	7,5	3,1	0,13	254	71	85	60	74
200L2-2	**37**	63	51	2955	93,8	0,9	120	2,8	7,6	3,2	0,16	278	71	85	60	74
225M-2	**45**	77	61	2960	94,2	0,9	145	2,7	7,3	3	0,24	400	72	86	60	74
250M-2	**55**	96	76	2970	94,4	0,88	177	2,8	7,5	3,1	0,4	545	75	89	64	78
280S-2	**75**	130	104	2975	94,8	0,88	241	2,3	7,1	2,8	0,65	700	76	90	66	80
280M-2	**90**	157	126	2980	95,1	0,87	288	2,4	7,4	2,9	0,78	762	76	90	66	80
315S-2	**110**	187	150	2975	95,4	0,89	353	2,2	7,1	2,6	1,4	960	76	91	66	81
315M-2	**132**	220	177	2975	95,8	0,9	424	2,1	6,8	2,5	1,6	1025	76	91	66	81
315L1-2	**160**	270	215	2980	95,9	0,9	514	2,4	7,4	2,7	1,7	1065	76	91	66	81
315L2-2	**200**	335	265	2980	96	0,9	614	2,3	6,9	2,6	2,2	1270	76	91	66	81
315L3-2	**250**	410[1]	325	2980	96	0,92	801	1,7	7,2	2,7	2,8	1420	76	91	66	81
355L1-2	**315**	510[1]	410[1]	2980	96,6	0,92	1009	1,5	6,7	2,8	4,5	1900	81	97	68	84
355L2-2	**355**	570[1]	455[1]	2985	96,8	0,93	1136	1,4	6,9	2,7	5	2050	81	97	68	84
CD...						Efficiency according to manufacturer standard										
355L3-2	**400**	640[1]	515[1]	2985	96,8	0,93	1280	1,3	7	2,8	5,5	2350	81	97	68	84
400L-2	**450**	710[1]	570[1]	2990	97	0,94	1437	1,1	7,2	2,8	8,5	2910	81	97	-	-

Notes:
Efficiency according to AS/NZS 1359.5 in the 0.75 kW to 185 kW output range, CD...Y series.
For inverter data, see page 67

1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series.

Frame size	Output	Rated current at 400 V	Rated current at 500 V	Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan		Noise levels with axial-flow fan Type ...A	
	P_2 [kW]	I [A]	I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]	L_P [dB(A)]	L_W [dB(A)]
CD...						Efficiency according to manufacturer standard										
63M1-4	**0,12**	0,43	0,34	1445	62	0,60	0,79	3,9	5,6	3,9	0,00046	16	44	56	-	-
63M2-4	**0,18**	0,53	0,42	1415	70	0,70	1,21	2,7	4,7	2,7	0,00046	16	44	56	-	-
71M1-4	**0,25**	0,66	0,53	1370	68,5	0,80	1,74	2	3,9	2,3	0,00046	16	45	57	-	-
71M2-4	**0,37**	0,94	0,75	1380	71	0,80	2,56	2,2	3,9	2,3	0,00063	17	45	57	-	-
80M1-4	**0,55**	1,38	1,10	1380	72	0,80	3,8	2	3,8	2,3	0,00092	24	46	58	-	-
CD...Y3					**IE3**	**Efficiency according to IEC 60034-30**										
80M2-4	**0,75**	1,68	1,34	1445	82,6	0,78	5	3,2	6,8	4,2	0,0029	35	46	58	-	-
90S-4	**1,1**	2,35	1,89	1455	84,2	0,8	7,2	2,4	6,8	3,1	0,0046	44	49	61	-	-
90L-4	**1,5**	3,15	2,5	1450	85,5	0,81	9,9	2,5	6,9	3,2	0,0056	46	49	61	-	-
100L1-4	**2,2**	4,35	3,45	1450	87,1	0,84	14,5	2,9	7,3	3,3	0,011	59	52	64	-	-
100L2-4	**3**	5,9	4,7	1450	87,8	0,84	18,8	3,1	7,4	3,6	0,011	59	52	64	-	-
112M-4	**4**	7,8	6,3	1460	88,7	0,83	26,2	3	7,2	3,4	0,022	100	54	66	-	-
132S-4	**5,5**	10,4	8,3	1460	89,6	0,85	36	3,2	7,1	3,5	0,03	113	57	70	55	68
132M-4	**7,5**	13,9	11,1	1460	90,5	0,86	49	3,1	7,4	3,3	0,041	125	57	70	55	68
160M-4	**11**	20,5	16,3	1470	91,5	0,85	71	2,8	7,1	3,1	0,079	184	62	75	59	69
160L-4	**15**	28,5	22,5	1470	92,1	0,83	97	3,1	7,4	3,4	0,092	208	62	75	59	69
180M-4	**18,5**	34,5	28	1470	92,7	0,83	120	3,3	7,4	3,4	0,155	217	60	73	57	70
180L-4	**22**	41	33	1470	93,2	0,83	143	3,2	7,3	3,4	0,25	274	60	73	57	70
200L-4	**30**	54	43,5	1470	93,8	0,85	195	3,1	7,6	3,3	0,25	274	61	75	58	72
225S-4	**37**	67	54	1475	93,9	0,85	240	3	7,1	2,9	0,4	372	63	77	59	73
225M-4	**45**	80	64	1475	94,3	0,86	291	3,1	7,2	3	0,48	402	63	77	59	73
250M-4	**55**	95	76	1475	94,6	0,88	356	3,1	7,3	3	0,75	588	65	79	64	78
280S-4	**75**	134	107	1480	95,2	0,85	484	3	7,4	2,8	1,25	740	68	82	66	80
280M-4	**90**	160	128	1485	95,3	0,85	579	3,2	7,8	3	1,48	820	68	82	66	80
315S-4	**110**	198	158	1485	95,6	0,84	707	2,7	6,9	2,7	2,2	1040	69	84	66	81
315M-4	**132**	235	189	1485	95,8	0,84	849	2,7	7	2,7	2,7	1120	69	84	66	81
315L1-4	**160**	285	230	1490	96	0,84	1026	2,8	7,4	2,8	3,1	1210	69	84	66	81
315L2-4	**200**	355	285	1490	96,1	0,85	1286	2,6	6,9	2,6	3,9	1430	69	84	66	81
315L3-4	**250**	430[1]	345	1490	96,2	0,87	1602	1,7	7,3	2,7	4,6	1565	69	84	66	81
355L1-4	**315**	525[1]	420[1]	1490	96,3	0,90	2019	1,5	6,9	2,7	6,1	2050	72	88	68	84
355L2-4	**355**	590[1]	470[1]	1490	96,6	0,90	2275	1,6	6,9	2,8	6,7	2200	72	88	68	84
CD...						Efficiency according to manufacturer standard										
355L3-4	**400**	665[1]	530[1]	1490	97	0,90	2564	1,5	7	2,8	7,4	2430	72	88	68	84
400M-4	**450**	735[1]	590[1]	1495	97	0,91	2875	1,1	7,3	2,7	18	2850	78	94	-	-
400L-4	**500**	815[1]	655[1]	1495	97,1	0,91	3194	1,1	7,3	2,7	20	3230	78	94	-	-
450M-4	**560**	915[1]	730[1]	1495	97,2	0,91	3577	1	6,8	2,7	26	3500	79	95	-	-
450L-4	**630**	1025[1]	820[1]	1495	97,4	0,91	4024	1	6,8	2,7	31	3800	79	95	-	-
500...	on request															

Notes:
Efficiency according to AS/NZS 1359.5 in the 0.75 kW to 185 kW output range, CD...Y series.
For inverter data, see page 67.

1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

IE3 / MEPS
Mains Operation 50 Hz

Temperature class T4,
ns = 1000 rpm, 2p = 6

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
CD...						**Efficiency according to manufacturer standard**								
71M2-6	**0,25**	0,82	0,66	920	62	0,71	2,6	2,2	3,5	2,6	0,0012	17	44	56
80M1-6	**0,37**	1,12	0,90	925	67	0,71	3,8	2,5	4,1	2,8	0,0019	24	44	56
80M2-6	**0,55**	1,6	1,28	925	69	0,72	5,7	2,4	4	2,7	0,0025	25	44	56
CD...Y3					**IE3**	**Efficiency according to IEC 60034-30**								
90S-6	**0,75**	1,96	1,56	955	79,1	0,70	7,5	2,7	5,5	3,1	0,0080	44	47	59
90L-6	**1,1**	2,7	2,15	955	81,4	0,72	11	2,8	5,9	3,1	0,0095	46	47	59
100L-6	**1,5**	3,65	2,9	965	83,5	0,71	14,8	3	6,8	3,3	0,017	59	50	62
112M-6	**2,2**	4,75	3,8	965	85,5	0,78	21,8	2,6	6,8	3,1	0,031	100	53	65
132S-6	**3**	6,8	5,5	970	85,7	0,74	29,5	3,2	7,1	3,7	0,031	100	56	69
132M1-6	**4**	8,7	7	965	87	0,76	39,6	2,9	6,9	3,7	0,037	104	56	69
132M2-6	**5,5**	11,1	8,9	965	88,3	0,81	54	2,7	7,2	3,4	0,048	117	56	69
160M-6	**7,5**	14,4	11,5	970	89,4	0,84	74	2,8	7,5	3,8	0,12	190	58	71
160L-6	**11**	21	16,7	975	90,5	0,84	108	3	7,6	3,9	0,14	220	58	71
180L-6	**15**	29	23	975	91,5	0,82	147	2,7	7,4	3,8	0,19	215	58	71
200L1-6	**18,5**	35	28	975	92	0,83	181	2,5	7	3,5	0,28	270	58	71
200L2-6	**22**	41	32,5	975	92,4	0,84	215	2,2	6,9	3,2	0,31	280	58	72
225M-6	**30**	56	45	985	93	0,83	291	3	6,9	2,7	0,69	404	58	72
250M-6	**37**	69	55	985	93,5	0,83	359	3	6,8	2,7	1,03	570	58	76
280S-6	**45**	84	67	990	93,9	0,82	434	2,8	6,6	2,4	1,35	720	62	77
280M-6	**55**	104	83	985	94,4	0,81	533	2,8	6,5	2,4	1,7	770	62	77
315S-6	**75**	130	104	990	94,9	0,88	723	3	7,2	2,7	4,3	995	65	79
315M-6	**90**	155	124	990	95,2	0,88	868	3,2	7,7	2,8	5	1050	65	79
315L1-6	**110**	189	151	990	95,5	0,88	1061	3,3	7,8	2,8	6	1145	69	84
315L2-6	**132**	225	181	990	95,6	0,88	1273	3,2	7,7	2,8	7,3	1265	69	84
315L3-6	**160**	275	220	990	95,8	0,88	1543	3,3	7,8	2,8	8,3	1440	69	84
355M-6	**200**	345	275	990	95,9	0,87	1929	1,8	6,7	2,7	11,3	1750	74	90
355L1-6	**250**	430[1]	345	990	95,9	0,88	2411	1,8	6,7	2,7	13,8	1950	74	90
355L2-6	**315**	540[1]	430[1]	990	96	0,88	3039	1,7	6,9	2,6	17,6	2300	74	90
400M-6	**355**	595[1]	475[1]	994	96,6	0,89	3411	1,1	6,6	2,7	27	2850	78	94
CD...						**Efficiency according to manufacturer standard**								
400L-6	**400**	670[1]	535[1]	994	96,6	0,89	3843	1,1	6,8	2,6	31	3230	78	94
450M-6	**450**	755[1]	605[1]	995	96,6	0,89	4319	1,2	6,8	2,8	46	3500	78	94
450L-6	**500**	835[1]	670[1]	995	97	0,89	4799	1,1	6,8	2,7	51	3800	78	94
500...	on request													

Notes:
Efficiency according to AS/NZS 1359.5 in the 0.75 kW to 185 kW output range, CD...Y series.
For inverter data, see page 67.

1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series.

MEPS
Mains Operation 50 Hz

Temperature class T4, ns = 750 rpm, 2p = 8

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan	
	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
CD...						**Efficiency according to manufacturer standard**								
71M2-8	**0,12**	0,52	0,42	680	51	0,65	1,7	1,9	2,6	2,4	0,0012	17	41	53
80M1-8	**0,18**	0,66	0,52	690	61	0,65	2,5	2,2	3,2	2,6	0,0019	24	42	54
80M2-8	**0,25**	0,91	0,73	690	62	0,64	3,5	2,2	3,2	2,5	0,0025	25	42	54
90S-8	**0,37**	1,30	1,04	690	63	0,65	5,1	1,8	3	2,2	0,0033	31	46	58
90L-8	**0,55**	1,85	1,48	690	67	0,65	7,6	1,8	3,1	2,2	0,0046	35	46	58
CD...Y						**Efficiency according to AS/NZS 1359,5**								
100L1-8	**0,75**	2,2	1,76	720	77	0,64	9,9	2,3	5	2,9	0,017	59	49	61
100L2-8	**1,1**	3,0	2,4	715	78	0,68	14,7	2,2	4,8	2,7	0,017	59	49	61
112M-8	**1,5**	3,55	2,85	705	80,6	0,76	20,3	2	4,9	2,6	0,029	97	52	64
132S-8	**2,2**	5,4	4,35	710	81,2	0,72	29,6	2,3	5,4	2,7	0,029	97	53	66
132M-8	**3**	7,3	5,8	715	82,9	0,72	40	2,7	6,3	3,1	0,036	113	53	66
160M1-8	**4**	8,8	7	725	85,5	0,77	53	1,9	5,6	2,6	0,071	157	54	67
160M2-8	**5,5**	12	9,6	725	87,1	0,76	72	2,3	6	3,1	0,105	170	54	67
160L-8	**7,5**	16,6	13,3	725	87,9	0,74	99	2,4	6,1	3,2	0,136	190	54	67
180L-8	**11**	23	18,3	725	89,2	0,78	145	2,6	6,9	3,3	0,22	215	56	69
200L-8	**15**	31	25	730	90,3	0,77	196	2,4	7,1	3,3	0,4	280	56	70
225S-8	**18,5**	37,5	30	735	91,1	0,78	240	2,3	7,1	3,1	0,56	372	57	71
225M-8	**22**	44,5	35,5	735	91,5	0,78	286	2,4	7,2	3,4	0,69	404	57	71
250M-8	**30**	57	45,5	735	92,5	0,82	390	2	6,8	2,8	1,2	550	58	72
280S-8	**37**	70	56	735	92,9	0,82	481	2	6,5	2,9	1,9	740	61	75
280M-8	**45**	85	68	740	93,2	0,82	581	2,2	6,7	2,9	2,3	800	61	75
315S-8	**55**	106	84	740	94	0,8	710	2	7,1	2,7	4,3	995	68	83
315M-8	**75**	143	115	740	94,5	0,8	968	2	7	2,7	5	1050	68	83
315L1-8	**90**	171	137	740	94,9	0,8	1161	2,1	7,2	2,8	6	1145	68	83
315L2-8	**110**	205	165	740	95,2	0,81	1420	2	7,1	2,7	7,3	1265	68	83
315L3-8	**132**	250	200	740	95,4	0,8	1704	2,1	7,3	2,8	8,3	1440	68	83
355M-8	**160**	295	235	745	95,8	0,82	2051	1,9	7,2	2,7	11,4	1750	70	86
CD...						**Efficiency according to manufacturer standard**								
355L1-8	**200**	370	295	745	95,8	0,82	2564	1,7	6,6	2,5	13,9	1950	70	86
355L2-8	**250**	460[1]	370	745	95,8	0,82	3205	1,2	6,1	2,4	17,7	2300	70	86
400M-8	**315**	570[1]	455[1]	745	96,2	0,83	4038	1,2	6,2	2,4	30	3100	73	89
400L-8	**355**	640[1]	515[1]	745	96,3	0,83	4551	1	6,1	2,36	34	3440	73	89
450M-8	**400**	710[1]	570[1]	745	96,6	0,84	5128	1	6,1	2,2	51	3750	74	90
450L-8	**450**	800[1]	640[1]	745	96,7	0,84	5768	1	6,1	2,2	57	4050	74	90
500...	on request													

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series.
For inverter data, see page 65.

IE1
Partial Load Data 50 Hz

Efficiency [%]

Frame size	2p = 2 P / P_N				2p = 4 P / P_N				2p = 6 P / P_N				2p = 8 P / P_N			
CD...	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1
63M1	38	53	62	**66**	40	55	63	**67**	-	-	-	**-**	-	-	-	**-**
63M2	46	61	67	**70**	50	63	68	**70**	-	-	-	**-**	-	-	-	**-**
71M1	53	65	71	**71,5**	56	67	69	**68,5**	-	-	-	**-**	-	-	-	**-**
71M2	54	67	71,5	**72**	60	70	72	**71**	38	53	60	**62**	27	41	48	**51**
80M1	58	69	74	**74,5**	62	71	73	**72**	44	60	65	**67**	37	52,5	58,5	**61**
80M2	63	74	78	**78**	64	75	76,5	**75,5**	49	64	68,5	**69**	38	53	59	**62**
90S	64	75	77	**77,8**	64	74	76,5	**76**	54	67	70	**70,2**	39	54	61	**63**
90L	68	78,5	81	**82**	67,5	77,5	79,5	**79**	55	68,5	72,7	**73**	46	61	66,5	**67**
100L1	-	-	-	**-**	65	77	79,5	**80**	-	-	-	**-**	47	62	68,5	**71**
100L/L2	69	79,5	81,5	**82**	68	78,5	81,5	**81,7**	61,5	73	76,8	**77**	53	65,5	69,3	**69**
112M	75	84	85,5	**85**	75	83	85,2	**85**	68	77,5	80,5	**81**	62	73,5	77	**78**
132S/S1	70	81	84,5	**85,5**	77	85	86,8	**86,5**	71,6	80,1	82,5	**82,6**	68,5	78,7	81	**80**
132S2	74	83,5	86	**86,5**	-	-	-	-	-	-	-	-	-	-	-	**-**
132M/M1	-	-	-	**-**	79,5	87	88,3	**88**	72,1	81	83,5	**83,6**	69	79	81,4	**81**
132M2	-	-	-	**-**	-	-	-	-	76,8	84	84,7	**84,6**	-	-	-	**-**
160M/M1	76	86	88,5	**89**	81,5	87,7	89,7	**89,5**	77,3	84,2	86,1	**86,1**	72,5	82	84,9	**85**
160M2	81	87,5	89	**89**	-	-	-	-	-	-	-	**-**	73,5	82,5	85,2	**85**
160L	83,5	89,5	90,7	**90,5**	83,7	89,3	90,3	**90**	81,5	87	88	**87,5**	77	84,8	86,5	**86,5**
180M	86,6	91	91,5	**91,2**	85,8	90,8	91,5	**91**	-	-	-	**-**	-	-	-	**-**
180L	-	-	-	**-**	88,2	91,3	91,8	**91,5**	82,6	88,8	89,3	**89,1**	82	88,3	89,5	**89**
200L/L1	85,6	90,7	92,1	**92**	88,2	92,3	92,5	**92,2**	86,2	89,7	90	**89,7**	85,5	89,5	90	**89,5**
200L2	86	91,8	92,5	**92,5**	-	-	-	-	85,5	89,6	90,4	**90,4**	-	-	-	**-**
225S	-	-	-	**-**	87,9	92	92,7	**92,6**	-	-	-	**-**	82,5	88,7	90	**90**
225M	86	91,5	92,7	**92,8**	88,1	92,2	92,9	**92,8**	86,5	90,7	91,3	**90,9**	84,3	89,8	91,2	**91**
250M	86,3	91,8	93,1	**93,2**	89,8	92,9	93,3	**93,2**	86,5	90,9	91,6	**91,4**	88	92	92,7	**92,5**
280S	87,6	92,3	93,4	**93,6**	90	93,3	94	**93,8**	87,4	91,8	92,5	**92,4**	88	92	92,5	**92,8**
280M	88	92,5	93,7	**93,8**	90,1	93,4	94,1	**94**	87,6	92	92,6	**92,5**	88,1	92,3	93	**92,8**
315S	91,6	93,9	94,3	**94**	90,9	93,5	94,3	**94,2**	90	92,8	93,4	**93**	88	92	92,9	**92,5**
315M	91,3	93,8	94,2	**94,3**	90,9	93,6	94,5	**94,4**	90,1	93	93,6	**93,3**	88,5	92,5	93,4	**93**
315L1	91,7	94	94,3	**94,5**	91,2	94,1	94,9	**94,7**	90,6	93,3	94	**93,6**	89	92,8	93,5	**93,2**
315L2	91,9	94,1	94,5	**94,7**	91,5	94,2	95	**94,9**	91,1	93,6	94,2	**93,8**	89,5	93	93,6	**93,2**
315L3	92	95,1	95,8	**96**	92,3	95,2	96,2	**96,2**	91,6	94,2	94,6	**94,3**	90	93,2	93,8	**93,4**
355M	-	-	-	**-**	-	-	-	**-**	92,3	94,8	95	**94,8**	91	94,5	95	**95,1**
355L1	93	96,5	96,8	**96,6**	93	96	96,5	**96,3**	93,2	95,7	96,1	**95,9**	91,7	95	95,7	**95,8**
355L2	93,3	95,7	96,8	**96,8**	93,2	96,2	96,6	**96,6**	93,3	95,8	96,1	**96**	91,7	95	95,8	**95,8**
355L3	93,2	95,7	96,9	**96,8**	93,6	96,5	97,1	**97**	-	-	-	**-**	-	-	-	**-**
400M	-	-	-	**-**	93,9	96,4	96,9	**97**	94,3	96,4	96,8	**96,6**	94	95,8	96,3	**96,2**
400L	93,7	96,2	97	**97**	94,4	96,6	97,1	**97,1**	94,1	96,3	96,8	**96,6**	93,5	95,7	96,3	**96,3**
450M	-	-	-	**-**	93,8	96,3	97,1	**97,2**	93,5	96,4	96,6	**96,6**	94,1	96,3	96,7	**96,6**
450L	-	-	-	**-**	95,1	97	97,4	**97,4**	94,8	96,8	97,1	**97**	94,5	96,4	96,8	**96,7**

Frame size	2p = 2 P / P_N				2p = 4 P / P_N				2p = 6 P / P_N				2p = 8 P / P_N			
CD...	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1
63M1	0,38	0,50	0,60	**0,67**	0,31	0,42	0,52	**0,60**	-	-	-	**-**	-	-	-	**-**
63M2	0,41	0,56	0,67	**0,75**	0,35	0,49	0,61	**0,70**	-	-	-	**-**	-	-	-	**-**
71M1	0,49	0,65	0,78	**0,84**	0,42	0,62	0,73	**0,80**	-	-	-	**-**	-	-	-	**-**
71M2	0,48	0,64	0,76	**0,82**	0,42	0,62	0,73	**0,80**	0,36	0,49	0,61	**0,71**	0,36	0,46	0,56	**0,65**
80M1	0,53	0,70	0,80	**0,84**	0,43	0,62	0,74	**0,80**	0,33	0,48	0,61	**0,71**	0,34	0,46	0,56	**0,65**
80M2	0,45	0,67	0,78	**0,82**	0,42	0,61	0,72	**0,79**	0,36	0,52	0,64	**0,72**	0,31	0,43	0,53	**0,64**
90S	0,48	0,69	0,80	**0,86**	0,46	0,66	0,77	**0,83**	0,37	0,55	0,67	**0,75**	0,31	0,44	0,56	**0,65**
90L	0,48	0,69	0,79	**0,85**	0,45	0,65	0,77	**0,82**	0,35	0,52	0,64	**0,73**	0,30	0,44	0,57	**0,65**
100L1	-	-	-	**-**	0,39	0,60	0,72	**0,80**	-	-	-	**-**	0,32	0,44	0,56	**0,66**
100L/L2	0,50	0,70	0,80	**0,87**	0,39	0,44	0,65	**0,76**	0,35	0,54	0,67	**0,75**	0,35	0,50	0,64	**0,73**
112M	0,59	0,78	0,85	**0,88**	0,44	0,65	0,77	**0,84**	0,36	0,54	0,66	**0,75**	0,30	0,47	0,56	**0,67**
132S/S1	0,56	0,76	0,84	**0,87**	0,50	0,70	0,80	**0,85**	0,37	0,57	0,69	**0,78**	0,41	0,60	0,72	**0,79**
132S2	0,55	0,75	0,83	**0,87**	-	-	-	**-**	-	-	-	**-**	-	-	-	**-**
132M/M1	-	-	-	**-**	0,51	0,72	0,81	**0,86**	0,38	0,57	0,72	**0,79**	0,39	0,58	0,70	**0,77**
132M2	-	-	-	**-**	-	-	-	**-**	0,41	0,62	0,75	**0,81**	-	-	-	**-**
160M/M1	0,62	0,80	0,86	**0,89**	0,51	0,72	0,81	**0,85**	0,49	0,70	0,80	**0,85**	0,41	0,61	0,72	**0,78**
160M2	0,71	0,86	0,90	**0,91**	-	-	-	**-**	-	-	-	**-**	0,39	0,59	0,71	**0,77**
160L	0,72	0,87	0,91	**0,92**	0,56	0,76	0,83	**0,86**	0,53	0,73	0,82	**0,86**	0,37	0,58	0,70	**0,77**
180M	0,72	0,86	0,89	**0,92**	0,51	0,73	0,81	**0,84**	-	-	-	**-**	-	-	-	**-**
180L	-	-	-	**-**	0,53	0,74	0,81	**0,84**	0,48	0,70	0,79	**0,84**	0,39	0,61	0,74	**0,79**
200L/L1	0,65	0,83	0,88	**0,90**	0,60	0,79	0,86	**0,88**	0,51	0,72	0,80	**0,84**	0,40	0,60	0,74	**0,80**
200L2	0,68	0,85	0,89	**0,91**	-	-	-	**-**	0,5	0,71	0,82	**0,85**	-	-	-	**-**
225S	-	-	-	**-**	0,63	0,82	0,87	**0,88**	-	-	-	**-**	0,40	0,62	0,73	**0,79**
225M	0,65	0,84	0,88	**0,89**	0,62	0,81	0,86	**0,88**	0,52	0,72	0,81	**0,84**	0,39	0,61	0,73	**0,79**
250M	0,70	0,88	0,89	**0,89**	0,64	0,82	0,88	**0,89**	0,53	0,74	0,81	**0,84**	0,47	0,69	0,78	**0,82**
280S	0,69	0,85	0,89	**0,89**	0,62	0,80	0,85	**0,86**	0,53	0,74	0,8	**0,83**	0,45	0,66	0,77	**0,82**
280M	0,72	0,88	0,90	**0,90**	0,62	0,80	0,85	**0,86**	0,53	0,74	0,81	**0,82**	0,45	0,68	0,78	**0,82**
315S	0,74	0,87	0,89	**0,89**	0,62	0,80	0,84	**0,85**	0,58	0,78	0,85	**0,87**	0,46	0,68	0,78	**0,83**
315M	0,75	0,87	0,89	**0,89**	0,62	0,80	0,84	**0,85**	0,62	0,81	0,87	**0,88**	0,47	0,69	0,79	**0,83**
315L1	0,73	0,87	0,90	**0,90**	0,59	0,79	0,85	**0,86**	0,60	0,80	0,86	**0,88**	0,47	0,68	0,79	**0,83**
315L2	0,75	0,87	0,90	**0,90**	0,58	0,78	0,85	**0,86**	0,62	0,81	0,86	**0,88**	0,47	0,68	0,78	**0,82**
315L3	0,79	0,87	0,91	**0,92**	0,64	0,80	0,85	**0,87**	0,61	0,8	0,86	**0,88**	0,48	0,69	0,78	**0,82**
355M	-	-	-	**-**	-	-	-	**-**	0,60	0,80	0,86	**0,88**	0,45	0,67	0,78	**0,83**
355L1	0,83	0,91	0,92	**0,92**	0,67	0,84	0,89	**0,90**	0,61	0,81	0,85	**0,88**	0,46	0,67	0,78	**0,82**
355L2	0,83	0,91	0,92	**0,93**	0,70	0,85	0,89	**0,90**	0,61	0,81	0,85	**0,88**	0,48	0,69	0,79	**0,82**
355L3	0,83	0,91	0,92	**0,93**	0,70	0,85	0,89	**0,90**	-	-	-	**-**	-	-	-	**-**
400M	-	-	-	**-**	0,65	0,83	0,89	**0,91**	0,68	0,84	0,88	**0,89**	0,50	0,71	0,80	**0,83**
400L	0,82	0,92	0,93	**0,94**	0,67	0,85	0,89	**0,91**	0,68	0,84	0,88	**0,89**	0,49	0,71	0,80	**0,83**
450M	-	-	-	**-**	0,68	0,84	0,89	**0,91**	0,65	0,83	0,88	**0,89**	0,53	0,74	0,81	**0,84**
450L	-	-	-	**-**	0,69	0,85	0,90	**0,91**	0,61	0,83	0,88	**0,89**	0,54	0,75	0,82	**0,84**

IE2
Partial Load Data 50 Hz

Efficiency [%]

Frame size	2p = 2 P / P_N				2p = 4 P / P_N				2p = 6 P / P_N			
CD...(Y2)	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1
63M1	38	53	62	**66**	40	55	63	**67**	-	-	-	**-**
63M2	46	61	67	**70**	50	63	68	**70**	-	-	-	**-**
71M1	53	65	71	**71,5**	56	67	69	**68,5**	-	-	-	**-**
71M2	54	67	71,5	**72**	60	70	72	**71**	38	53	60	**62**
80M1	64	75,5	78,5	**79**	62	71	73	**72**	44	60	65	**67**
80M2	64,5	77,7	80,6	**81,1**	63,5	76,5	80	**81**	49	64	68,5	**69**
90S	70,2	79,9	82,4	**82,7**	66,5	78	82	**82,7**	57	71,5	76	**77,4**
90L	74,7	82,6	84,5	**84,5**	68,5	80,5	83,5	**84**	62,5	75	78,8	**79,5**
100L1	-	-	-	**-**	74	83	85,5	**85,5**	-	-	-	**-**
100L/L2	79,7	85,3	86,3	**85,8**	76	84	86,5	**86,6**	64	75,5	80,6	**81,1**
112M	77,7	84,8	86,6	**86,9**	77,4	85,4	87,4	**87,6**	70	80,2	82,8	**83**
132S/S1	81	87,1	88,2	**88,1**	78,7	86,3	88,3	**88,6**	71	81,8	84	**84,4**
132S2	82,6	88,3	89,3	**89,1**	-	-	-	**-**	-	-	-	**-**
132M/M1	-	-	-	**-**	80,4	87,8	89,5	**89,5**	76,3	84	85,8	**85,7**
132M2	-	-	-	**-**	-	-	-	**-**	75,8	84,5	86,8	**87**
160M/M1	82,9	88,9	90,2	**90,3**	82	88,7	90,4	**90,6**	79,3	86,3	88	**88,1**
160M2	85,9	90,4	91,3	**91,1**	-	-	-	**-**	-	-	-	**-**
160L	87,7	91,3	91,9	**91,6**	82,9	89,4	91,1	**91,3**	78,5	86,3	89,3	**89,5**
180M	84,7	90,4	91,8	**92**	85,7	90,8	92	**91,9**	-	-	-	**-**
180L	-	-	-	**-**	86,6	91,4	92,4	**92,3**	82,9	89	90,4	**90,4**
200L/L1	86	91,2	92,5	**92,7**	87	92	93	**92,9**	86	89,5	91,4	**91**
200L2	86	91,7	93	**93,1**	-	-	-	**-**	86,7	91,2	92	**91,5**
225S	-	-	-	**-**	88	92,4	93,5	**93,3**	-	-	-	**-**
225M	88,5	92,4	93,3	**93,4**	89,1	93	93,8	**93,6**	87,1	91,7	92,4	**92,3**
250M	86,5	91,8	93,5	**93,8**	90,3	93,4	94,1	**94**	86,3	91,6	92,8	**92,7**
280S	88,2	92,8	93,9	**94,2**	89,3	93,5	94,4	**94,5**	88,4	92,8	93,6	**93,5**
280M	88,7	93	94,2	**94,5**	90,3	93,9	94,7	**94,7**	88,7	92,9	93,6	**93,6**
315S	92,5	94,8	95	**94,8**	91	94,1	95	**94,9**	91	93,8	94,5	**94,1**
315M	92,4	94,7	95	**95**	91,5	94,3	95,1	**95,1**	91	94	94,6	**94,4**
315L1	92,5	94,8	95,1	**95,2**	91,7	94,7	95,3	**95,3**	91,5	94,2	94,9	**94,7**
315L2	92,7	94,9	95,2	**95,4**	92	94,8	95,6	**95,5**	92	94,5	95,2	**95**
315L3	92	95,1	95,8	**96**	92,3	95,2	96,2	**96,2**	92,3	94,9	95,5	**95,2**
355M	-	-	-	**-**	-	-	-	**-**	93	95,5	95,8	**95,5**
355L1	93	96,5	96,8	**96,6**	93	96	96,5	**96,3**	93,2	95,7	96,1	**95,9**
355L2	93,3	95,7	96,8	**96,8**	93,2	96,2	96,6	**96,6**	93,3	95,8	96,1	**96**
355L3	93,2	95,7	96,9	**96,8**	93,6	96,5	97,1	**97**	-	-	-	**-**
400M	-	-	-	**-**	93,9	96,4	96,9	**97**	94,3	96,4	96,8	**96,6**
400L	93,7	96,2	97	**97**	94,4	96,6	97,1	**97,1**	94,1	96,3	96,8	**96,6**
450M	-	-	-	**-**	93,8	96,3	97,1	**97,2**	93,5	96,4	96,6	**96,6**
450L	-	-	-	**-**	95,1	97	97,4	**97,4**	94,8	96,8	97,1	**97**

Frame size	2p = 2 P / P_N				2p = 4 P / P_N				2p = 6 P / P_N			
CD...(Y2)	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1
63M1	0,38	0,50	0,60	**0,67**	0,31	0,42	0,52	**0,60**	-	-	-	**-**
63M2	0,41	0,56	0,67	**0,75**	0,35	0,49	0,61	**0,70**	-	-	-	**-**
71M1	0,49	0,65	0,78	**0,84**	0,42	0,62	0,73	**0,80**	-	-	-	**-**
71M2	0,48	0,64	0,76	**0,82**	0,42	0,62	0,73	**0,80**	0,36	0,49	0,61	**0,71**
80M1	0,52	0,73	0,83	**0,87**	0,43	0,62	0,74	**0,80**	0,33	0,48	0,61	**0,71**
80M2	0,56	0,75	0,83	**0,87**	0,38	0,59	0,71	**0,78**	0,36	0,52	0,64	**0,72**
90S	0,57	0,76	0,84	**0,88**	0,39	0,60	0,72	**0,80**	0,32	0,49	0,61	**0,70**
90L	0,57	0,77	0,85	**0,88**	0,39	0,61	0,73	**0,81**	0,32	0,51	0,64	**0,72**
100L1	-	-	-	**-**	0,46	0,68	0,79	**0,84**	-	-	-	**-**
100L/L2	0,60	0,79	0,85	**0,88**	0,45	0,66	0,78	**0,84**	0,30	0,48	0,63	**0,71**
112M	0,53	0,74	0,83	**0,87**	0,43	0,65	0,77	**0,83**	0,35	0,58	0,71	**0,78**
132S/S1	0,64	0,82	0,87	**0,89**	0,47	0,69	0,80	**0,85**	0,32	0,55	0,67	**0,74**
132S2	0,64	0,81	0,87	**0,89**	-	-	-	**-**	-	-	-	**-**
132M/M1	-	-	-	**-**	0,48	0,71	0,81	**0,86**	0,36	0,57	0,69	**0,76**
132M2	-	-	-	**-**	-	-	-	**-**	0,36	0,61	0,75	**0,81**
160M/M1	0,56	0,77	0,84	**0,87**	0,52	0,73	0,82	**0,85**	0,45	0,67	0,79	**0,84**
160M2	0,65	0,83	0,88	**0,90**	-	-	-	**-**	-	-	-	**-**
160L	0,66	0,83	0,89	**0,91**	0,45	0,67	0,78	**0,83**	0,32	0,60	0,74	**0,81**
180M	0,64	0,82	0,89	**0,91**	0,49	0,70	0,79	**0,83**	-	-	-	**-**
180L	-	-	-	**-**	0,51	0,72	0,80	**0,83**	0,43	0,65	0,76	**0,82**
200L/L1	0,65	0,82	0,88	**0,90**	0,50	0,72	0,81	**0,85**	0,45	0,67	0,77	**0,83**
200L2	0,68	0,85	0,89	**0,91**	-	-	-	**-**	0,47	0,69	0,79	**0,84**
225S	-	-	-	**-**	0,57	0,76	0,83	**0,85**	-	-	-	**-**
225M	0,67	0,84	0,89	**0,90**	0,56	0,76	0,83	**0,86**	0,50	0,72	0,8	**0,83**
250M	0,70	0,88	0,89	**0,89**	0,63	0,79	0,86	**0,88**	0,49	0,71	0,80	**0,83**
280S	0,69	0,85	0,89	**0,89**	0,55	0,76	0,82	**0,85**	0,53	0,74	0,80	**0,83**
280M	0,72	0,88	0,90	**0,90**	0,59	0,77	0,83	**0,85**	0,53	0,74	0,81	**0,82**
315S	0,74	0,87	0,89	**0,89**	0,62	0,80	0,84	**0,85**	0,62	0,8	0,87	**0,88**
315M	0,75	0,87	0,89	**0,89**	0,62	0,80	0,84	**0,85**	0,62	0,81	0,87	**0,88**
315L1	0,73	0,87	0,90	**0,90**	0,59	0,79	0,85	**0,86**	0,60	0,80	0,86	**0,88**
315L2	0,75	0,87	0,90	**0,90**	0,58	0,78	0,85	**0,86**	0,62	0,81	0,86	**0,88**
315L3	0,79	0,87	0,91	**0,92**	0,64	0,80	0,85	**0,87**	0,61	0,8	0,86	**0,88**
355M	-	-	-	**-**	-	-	-	**-**	0,60	0,80	0,86	**0,88**
355L1	0,83	0,91	0,92	**0,92**	0,67	0,84	0,89	**0,90**	0,61	0,81	0,85	**0,88**
355L2	0,83	0,91	0,92	**0,93**	0,70	0,85	0,89	**0,90**	0,61	0,81	0,85	**0,88**
355L3	0,83	0,91	0,92	**0,93**	0,70	0,85	0,89	**0,90**	-	-	-	**-**
400M	-	-	-	**-**	0,65	0,83	0,89	**0,91**	0,68	0,84	0,88	**0,89**
400L	0,82	0,92	0,93	**0,94**	0,67	0,85	0,89	**0,91**	0,68	0,84	0,88	**0,89**
450M	-	-	-	**-**	0,68	0,84	0,89	**0,91**	0,65	0,83	0,88	**0,89**
450L	-	-	-	**-**	0,69	0,85	0,90	**0,91**	0,61	0,83	0,88	**0,89**

IE3 / MEPS
Partial Load Data 50 Hz

Efficiency [%]

Frame size	2p = 2 P / P_N				2p = 4 P / P_N				2p = 6 P / P_N			
CD...(Y3/Y)	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1
63M1	38	53	62	**66**	40	55	63	**67**	-	-	-	**-**
63M2	46	61	67	**70**	50	63	68	**70**	-	-	-	**-**
71M1	53	65	71	**71,5**	56	67	69	**68,5**	-	-	-	**-**
71M2	54	67	71,5	**72**	60	70	72	**71**	38	53	60	**62**
80M1	68	79,2	82,3	**82,8**	62	71	73	**72**	44	60	65	**67**
80M2	70	80,2	83,4	**83,7**	64,7	77,8	81,7	**82,6**	49	64	68,5	**69**
90S	71,9	81,8	84,4	**84,7**	67,6	79,3	83,3	**84,2**	60,5	74,2	78,1	**79,1**
90L	76,4	84,5	86,4	**86,4**	70	81,9	85	**85,5**	63	76,3	80,5	**81,4**
100L1	-	-	-	**-**	75,5	84,7	86,9	**87,1**	-	-	-	**-**
100L/L2	81,8	87,6	88,6	**88,1**	77	85,1	87,6	**87,8**	66	77,7	83	**83,5**
112M	79	86,3	88,1	**88,4**	78,4	86,5	88,5	**88,7**	71,8	82,6	85,3	**85,5**
132S/S1	82,3	88,5	89,7	**89,5**	79,6	87,3	89,3	**89,6**	71,9	83,1	85,5	**85,7**
132S2	83,7	89,5	90,5	**90,3**	-	-	-	**-**	-	-	-	**-**
132M/M1	-	-	-	**-**	81,4	88,8	90,5	**90,5**	77,5	85,2	87,1	**87**
132M2	-	-	-	**-**	-	-	-	**-**	77	85,8	88,1	**88,3**
160M/M1	83,8	89,9	91,2	**91,3**	82,9	89,6	91,2	**91,5**	80,5	87,6	89,3	**89,4**
160M2	86,7	91,3	92,2	**92**	-	-	-	**-**	-	-	-	**-**
160L	88,6	92,2	92,8	**92,5**	84,1	90,3	91,9	**92,1**	81	89	90,5	**90,5**
180M	85,6	91,3	92,7	**92,9**	86,4	91,6	92,8	**92,7**	-	-	-	**-**
180L	-	-	-	**-**	87,4	92,3	93,3	**93,2**	83,9	90,1	91,5	**91,5**
200L/L1	87,7	92,5	93,5	**93,5**	87,8	92,9	93,9	**93,8**	87,3	91,9	92,4	**92**
200L2	88,7	92,9	93,9	**93,8**	-	-	-	**-**	87,5	92,1	92,8	**92,4**
225S	-	-	-	**-**	88,8	92,9	94	**93,9**	-	-	-	**-**
225M	88,6	93,1	94,1	**94,2**	89,8	93,7	94,5	**94,3**	87,7	92,4	93,1	**93**
250M	86,3	92,3	94,2	**94,4**	90,9	93,9	94,7	**94,6**	87,1	92,4	93,6	**93,5**
280S	88,5	93,1	94,3	**94,8**	89,8	94,1	95,1	**95,2**	88,6	93,1	93,9	**93,9**
280M	89	93,3	94,7	**95,1**	90,8	94,5	95,3	**95,3**	88,9	93,3	94,3	**94,4**
315S	92,7	95	95,5	**95,4**	91,6	94,9	95,6	**95,6**	91,2	94,5	95,1	**94,9**
315M	92,3	94,8	95,6	**95,8**	92,4	95,3	95,9	**95,8**	91,3	94,7	95,2	**95,2**
315L1	92,8	95	95,8	**95,9**	92,6	95,5	96,1	**96**	91,6	94,9	95,6	**95,5**
315L2	93	95	95,5	**96**	93,3	95,8	96,3	**96,1**	92,3	95,1	95,7	**95,6**
315L3	92	95,1	95,8	**96**	92,3	95,2	96,2	**96,2**	92,6	95,3	95,8	**95,8**
355M	-	-	-	**-**	-	-	-	**-**	93,2	95,7	96	**95,9**
355L1	93	96,5	96,8	**96,6**	93	96	96,5	**96,3**	93,2	95,7	96,1	**95,9**
355L2	93,3	95,7	96,8	**96,8**	93,2	96,2	96,6	**96,6**	93,3	95,8	96,1	**96**
355L3	93,2	95,7	96,9	**96,8**	93,6	96,5	97,1	**97**	-	-	-	-
400M	-	-	-	**-**	93,9	96,4	96,9	**97**	94,3	96,4	96,8	**96,6**
400L	93,7	96,2	97	**97**	94,4	96,6	97,1	**97,1**	94,1	96,3	96,8	**96,6**
450M	-	-	-	**-**	93,8	96,3	97,1	**97,2**	93,5	96,4	96,6	**96,6**
450L	-	-	-	**-**	95,1	97	97,4	**97,4**	94,8	96,8	97,1	**97**

Frame size	2p = 2 P / P_N				2p = 4 P / P_N				2p = 6 P / P_N			
CD...(Y3/Y)	0,25	0,5	0,75	1	0,25	0,5	0,75	1	0,25	0,5	0,75	1
63M1	0,38	0,50	0,60	**0,67**	0,31	0,42	0,52	**0,60**	-	-	-	-
63M2	0,41	0,56	0,67	**0,75**	0,35	0,49	0,61	**0,70**	-	-	-	-
71M1	0,49	0,65	0,78	**0,84**	0,42	0,62	0,73	**0,80**	-	-	-	-
71M2	0,48	0,64	0,76	**0,82**	0,42	0,62	0,73	**0,80**	0,36	0,49	0,61	**0,71**
80M1	0,52	0,73	0,83	**0,87**	0,43	0,62	0,74	**0,80**	0,33	0,48	0,61	**0,71**
80M2	0,56	0,75	0,83	**0,87**	0,38	0,59	0,71	**0,78**	0,36	0,52	0,64	**0,72**
90S	0,57	0,76	0,84	**0,88**	0,39	0,60	0,72	**0,80**	0,32	0,49	0,61	**0,70**
90L	0,57	0,77	0,85	**0,88**	0,39	0,61	0,73	**0,81**	0,32	0,51	0,64	**0,72**
100L1	-	-	-	**-**	0,46	0,68	0,79	**0,84**	-	-	-	**-**
100L/L2	0,60	0,79	0,85	**0,88**	0,45	0,66	0,78	**0,84**	0,30	0,48	0,63	**0,71**
112M	0,53	0,74	0,83	**0,87**	0,43	0,65	0,77	**0,83**	0,35	0,58	0,71	**0,78**
132S/S1	0,64	0,82	0,87	**0,89**	0,47	0,69	0,80	**0,85**	0,32	0,55	0,67	**0,74**
132S2	0,64	0,81	0,87	**0,89**	-	-	-	**-**	-	-	-	**-**
132M/M1	-	-	-	**-**	0,48	0,71	0,81	**0,86**	0,36	0,57	0,69	**0,76**
132M2	-	-	-	**-**	-	-	-	**-**	0,36	0,61	0,75	**0,81**
160M/M1	0,56	0,77	0,84	**0,87**	0,52	0,73	0,82	**0,85**	0,45	0,67	0,79	**0,84**
160M2	0,65	0,83	0,88	**0,90**	-	-	-	**-**	-	-	-	**-**
160L	0,66	0,83	0,89	**0,91**	0,45	0,67	0,78	**0,83**	0,42	0,66	0,78	**0,84**
180M	0,64	0,82	0,89	**0,91**	0,49	0,70	0,79	**0,83**	-	-	-	**-**
180L	-	-	-	**-**	0,51	0,72	0,80	**0,83**	0,43	0,65	0,76	**0,82**
200L/L1	0,65	0,82	0,88	**0,90**	0,50	0,72	0,81	**0,85**	0,45	0,67	0,77	**0,83**
200L2	0,68	0,85	0,89	**0,90**	-	-	-	**-**	0,47	0,69	0,79	**0,84**
225S	-	-	-	-	0,57	0,76	0,83	**0,85**	-	-	-	-
225M	0,67	0,84	0,89	**0,90**	0,56	0,76	0,83	**0,86**	0,50	0,72	0,80	**0,83**
250M	0,60	0,80	0,86	**0,88**	0,63	0,79	0,86	**0,88**	0,49	0,71	0,80	**0,83**
280S	0,67	0,82	0,88	**0,88**	0,55	0,76	0,82	**0,85**	0,51	0,72	0,79	**0,82**
280M	0,65	0,81	0,86	**0,87**	0,59	0,77	0,83	**0,85**	0,50	0,71	0,78	**0,81**
315S	0,74	0,87	0,89	**0,89**	0,61	0,79	0,83	**0,84**	0,62	0,8	0,87	**0,88**
315M	0,75	0,87	0,89	**0,90**	0,61	0,78	0,83	**0,84**	0,62	0,81	0,87	**0,88**
315L1	0,73	0,87	0,90	**0,90**	0,59	0,77	0,83	**0,84**	0,60	0,80	0,86	**0,88**
315L2	0,75	0,87	0,90	**0,90**	0,58	0,78	0,83	**0,85**	0,62	0,81	0,86	**0,88**
315L3	0,79	0,87	0,91	**0,92**	0,64	0,80	0,85	**0,87**	0,61	0,8	0,86	**0,88**
355M	-	-	-	**-**	-	-	-	**-**	0,60	0,80	0,85	**0,87**
355L1	0,83	0,91	0,92	**0,92**	0,67	0,84	0,89	**0,90**	0,61	0,81	0,85	**0,88**
355L2	0,83	0,91	0,92	**0,93**	0,70	0,85	0,89	**0,90**	0,61	0,81	0,85	**0,88**
355L3	0,83	0,91	0,92	**0,93**	0,70	0,85	0,89	**0,90**	-	-	-	**-**
400M	-	-	-	**-**	0,65	0,83	0,89	**0,91**	0,68	0,84	0,88	**0,89**
400L	0,82	0,92	0,93	**0,94**	0,67	0,85	0,89	**0,91**	0,68	0,84	0,88	**0,89**
450M	-	-	-	**-**	0,68	0,84	0,89	**0,91**	0,65	0,83	0,88	**0,89**
450L	-	-	-	**-**	0,69	0,85	0,90	**0,91**	0,61	0,83	0,88	**0,89**

Increased Output
Mains Operation 50 Hz

Temperature class T4,
ns = 3000 rpm, 2p = 2

Ambient temperature 40 °C, winding temperature increase within thermal class F

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[1]	Noise levels with radial-flow fan	
CD...X	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
Efficiency according to manufacturer standard														
63M1-2	**0,25**	0,69	0,55	2860	70	0,75	0,83	3,4	5,8	4,7	0,00028	16	49	61
63M2-2	**0,37**	0,89	0,71	2800	71,5	0,84	1,26	2,7	5,2	3,5	0,00028	16	49	61
71M1-2	**0,46**	1,43	1,15	2720	66	0,84	1,62	2,1	4,2	2,5	0,00028	16	57	69
71M2-2	**0,75**	1,91	1,53	2730	70	0,81	2,62	2,7	4,7	3,2	0,00039	17	57	69
80M1-2	**1**	2,65	2,1	2750	68	0,80	3,47	2,4	4,2	3	0,00058	24	59	71
80M2-2	**1,4**	3,3	2,65	2805	76,5	0,80	4,8	3,2	5,6	3,6	0,0008	25	59	71
90S-2	**1,9**	4,2	3,35	2830	78	0,84	6,4	2,2	5,8	3,1	0,0013	31	60	72
90L-2	**2,7**	6,2	4,95	2830	78	0,81	9,1	2,5	5,5	3,5	0,0018	35	60	72
100L-2	**3,4**	7,5	6	2845	80	0,82	11,4	2,8	5,8	3,5	0,0029	45	64	76
112M-2	**5**	9,9	7,9	2870	83,5	0,87	16,6	2,3	6,8	3	0,0051	53	66	78
132S1-2	**6,6**	14,3	11,4	2900	81,5	0,82	21,7	2,7	6,4	3,2	0,0089	95	69	82
132S2-2	**9**	18,7	15	2910	83,5	0,83	29,5	2,7	6,8	3,5	0,0125	100	69	82
160M1-2	**13,5**	27	21,5	2930	86	0,84	44	2,5	6,9	3,2	0,032	163	80	93
160M2-2	**18,5**	34,5	27,5	2910	87,5	0,89	61	2,5	6,5	3,2	0,043	173	80	93
160L-2	**22**	39,5	31,5	2915	89	0,9	72	2,8	6,9	3,4	0,052	188	80	93
180M-2	**30**	55	44	2915	89,5	0,88	98	2,7	6,9	3,1	0,075	196	83	96
200L1-2	**37**	66	53	2955	91,4	0,89	120	3	7,2	3,3	0,13	254	85	99
200L2-2	**45**	81	65	2955	92	0,87	145	2,8	7,2	3,3	0,16	278	85	99
225M-2	**55**	103	81	2965	92,6	0,84	177	2,9	7,1	3,7	0,24	400	87	101
250M-2	**70**	139	111	2970	91	0,80	225	2,9	7,2	3,5	0,4	545	87	101
280S-2	**90**	162	130	2970	92,2	0,87	289	2,2	6,6	2,5	0,65	700	89	103
280M-2	**110**	200	160	2975	93,3	0,85	353	2,4	7,3	2,6	0,78	762	89	103
315S-2	**132**	230	185	2975	93,6	0,88	242	1,9	6,5	2,3	1,4	960	90	105
315M-2	**160**	280	225	2975	93	0,89	514	1,8	6,7	2,4	1,6	1025	90	105
315L1-2	**200**	320	255	2975	93,5	0,89	594	2	6,9	2,6	1,9	1065	90	105
315L2-2	**230**	400	320	2975	93,5	0,89	738	2	6,9	2,6	2,2	1270	90	105

Note:
1) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Ambient temperature 40 °C, winding temperature increase within thermal class F

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan	
CD...X	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
Efficiency according to manufacturer standard														
63M1-4	**0,18**	0,53	0,42	1415	70	0,70	1,2	2,7	4,7	2,7	0,00046	16	44	56
63M2-4	**0,25**	0,66	0,53	1370	68,5	0,80	1,74	2	3,9	2,5	0,00046	16	44	56
71M1-4	**0,37**	1,03	0,82	1350	65	0,80	2,62	1,7	3,6	2,3	0,00046	16	46	58
71M2-4	**0,5**	1,42	1,15	1335	67	0,79	3,58	2,1	3,6	2,7	0,00063	17	46	58
80M1-4	**0,7**	1,99	1,59	1310	65	0,78	5,1	2	3,5	2,2	0,00092	24	47	59
80M2-4	**1**	2,7	2,15	1350	70	0,77	7,1	2,3	4,1	2,5	0,0013	25	47	59
90S-4	**1,4**	3,25	2,6	1380	75,5	0,83	9,7	2	4,9	2,5	0,0021	31	49	61
90L-4	**2**	4,6	3,7	1360	75	0,83	14	2	4,2	2,2	0,0029	35	49	61
100L1-4	**2,5**	6,2	4,9	1415	76	0,77	16,9	2,3	5,7	2,7	0,0046	44	52	64
100L2-4	**3,4**	7,6	6,1	1400	78,8	0,82	23,2	2,1	5,5	2,8	0,0056	46	52	64
112M-4	**5**	11,1	8,9	1420	81	0,80	33,6	2,6	6,4	3	0,011	59	54	66
132S-4	**6,6**	13,4	10,7	1435	83,6	0,85	44	2,6	6,3	2,9	0,022	100	59	72
132M-4	**9**	18,3	14,6	1435	85,7	0,83	60	2,7	6,3	3	0,03	110	59	72
160M-4	**13,5**	27,5	22	1460	87,5	0,81	88	2,6	6,9	3	0,057	168	67	80
160L-4	**17,5**	34	27	1455	88,6	0,84	115	2,5	6,8	2,9	0,079	184	67	80
180M-4	**22**	43,5	35	1460	90	0,81	144	3,1	6,7	3,2	0,13	198	73	86
180L-4	**27**	52	42	1460	91	0,82	177	3	7,2	3,1	0,155	217	73	86
200L-4	**37**	68	55	1460	91	0,86	242	2,9	7,2	3	0,25	274	76	90
225S-4	**45**	81	65	1465	92	0,87	293	2,6	6,5	2,6	0,4	372	79	93
225M-4	**55**	100	80	1475	92,5	0,86	356	2,6	6,5	2,8	0,48	402	79	93
250M-4	**70**	127	102	1475	92	0,86	453	2,9	7,2	3,4	0,75	573	80	94
280S-4	**90**	168	134	1480	93,2	0,83	581	2,8	6,9	2,8	1,25	740	82	96
280M-4	**110**	200	161	1480	93,7	0,84	710	2,9	6,9	3	1,48	820	82	96
315S-4	**132**	245	194	1480	93,5	0,84	851	2,2	6,9	2,4	2,2	1040	84	99
315M-4	**160**	290	230	1480	94	0,85	1032	2,4	6,5	2,6	2,7	1120	84	99
315L1-4	**200**	360	290	1485	94,3	0,85	1190	2,5	6,9	2,5	3,3	1210	84	99
315L2-4	**230**	410[1]	325	1485	94,7	0,86	1479	2,5	6,9	2,7	3,9	1430	84	99

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Temperature class T4,
ns = 1500/3000 rpm, 2p = 4/2

Ambient temperature 40 °C, winding temperature increase within thermal class F

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[2]	Noise levels with radial-flow fan	
CD...	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
80M1-4/2	**0,5**	1,45	1,16	1400	66,5	0,75	3,4	1,9	3,9	2,5	0,00111	24	47	59
	0,65	1,69	1,35	2800	62,5	0,89	2,2	2,2	4,2	3			65	77
80M2-4/2	**0,7**	1,92	1,54	1400	70	0,75	4,8	2,1	4	2,7	0,00148	25	47	59
	0,85	2,15	1,71	2820	66	0,87	2,9	2,4	4,8	3,2			65	77
90S-4/2	**1,1**	2,7	2,15	1390	70	0,84	7,6	1,8	4,2	2,2	0,00238	31	52	64
	1,4	3,15	2,5	2810	70	0,92	4,8	1,9	4,9	3			69	81
90L-4/2	**1,5**	3,55	2,85	1400	74	0,82	10,2	2	4,7	2,3	0,00318	35	52	64
	1,9	4,1	3,25	2840	73	0,92	6,4	2,2	5,4	3,1			69	81
100L-4/2	**2,6**	5,9	4,7	1410	78	0,82	17,6	2,2	4,8	2,7	0,00608	46	55	67
	3,2	6,5	5,2	2870	78	0,91	10,6	2	5,8	2,8			75	87
112M-4/2	**3,7**	7,6	6,1	1430	82,5	0,85	24,7	2,1	6,1	3	0,0122	59	56	68
	4,4	8,9	7,1	2895	78,5	0,91	14,5	2,5	6,8	3,3			76	88
132S-4/2	**5**	10,1	8,1	1440	85	0,84	33,2	2	5,6	2,8	0,0238	100	62	75
	6	12,2	9,7	2905	79	0,90	19,7	2,5	6,6	3,3			80	93
132M-4/2	**7**	14,1	11,3	1445	86,5	0,83	46	2,6	6,5	2,9	0,0323	110	62	75
	9	17,5	14	2910	82,5	0,90	29,5	2,4	6,9	3,3			80	93
160M-4/2	**9,5**	18,7	14,9	1455	87,5	0,84	62	2,3	6	2,8	0,0625	168	57	70
	11	20	16	2930	87	0,91	36	2,6	6,9	3,2			68	81
160L-4/2	**13**	25	20	1455	88,5	0,84	85	2,3	6	2,8	0,085	184	57	70
	16	28,5	23	2930	87,5	0,92	52	2,6	6,9	3,2			68	81
180M-4/2	**16,5**	32	25,5	1460	89,5	0,83	108	2,8	6,5	2,7	0,13	198	58	71
	20	36,5	29,5	2930	87,5	0,90	65	2,8	7	3,1			69	82
180L-4/2	**19**	36,5	29,5	1465	90	0,83	124	3,1	6,6	2,9	0,155	217	58	71
	25	45,5	36,5	2940	88	0,90	81	2,9	7,1	3,2			69	82
200L-4/2	**26**	47	37,5	1470	91,5	0,87	169	2,8	6,8	3,1	0,25	274	60	74
	31	54	43	2955	90	0,92	100	2,7	7,2	3,5			73	87
225S-4/2	**32**	59	47	1470	91,5	0,86	208	2,6	6,5	2,5	0,4	372	61	75
	38	66	53	2950	90	0,92	123	2,6	7,2	3			74	88
225M-4/2	**38**	69	55	1470	92,5	0,86	247	2,8	6,5	2,7	0,48	402	61	75
	46	79	63	2955	91,5	0,92	149	2,8	7,2	3,2			74	88
250M-4/2	**46**	82	65	1470	92,5	0,88	299	2,7	6,5	2,8	0,75	573	63	77
	55	94	75	2955	91	0,93	178	2,9	7,1	3,3			76	90
280S-4/2	**63**	113	90	1480	93,5	0,86	407	2,8	6,5	2,5	1,25	740	65	79
	75	129	103	2975	92	0,91	241	2,6	7	3,1			78	92
280M-4/2	**73**	131	105	1485	93,5	0,86	469	2,8	6,5	2,6	1,48	820	65	79
	87	150	120	2970	92	0,91	280	2,4	7,1	3,2			78	92
315S-4/2	**85**	155	124	1485	94	0,84	547	2,5	6,5	2,4	2,2	1040	67	82
	100	174	139	2975	92	0,90	321	2,1	7	2,8			80	95
315M-4/2	**100**	179	143	1485	95	0,85	643	2,6	6,6	2,6	2,7	1120	67	82
	125	215	172	2975	92	0,91	401	2,3	7,1	3			80	95
315L1-4/2	**120**	215	172	1485	95	0,85	772	2,6	6,5	2,4	3,3	1210	67	82
	150	260	205	2975	92	0,91	482	2,3	7	2,9			80	95
315L2-4/2	**145**	260	205	1485	95	0,85	932	2,6	6,5	2,4	3,8	1430	67	82
	175	300	240	2975	92	0,91	562	2,3	7	2,9			80	95
355S-4/2	**160**	280	220	1485	95,5	0,87	1029	1,3	6,4	2,4	5,1	1800	70	86
	200	330	265	2980	94	0,93	641	1,4	6,9	2,7			82	98
355M1-4/2	**180**	315	250	1485	95,5	0,87	1158	1,3	6,6	2,3	5,6	1900	70	86
	220	365	290	2980	94	0,93	705	1,3	7,1	2,6			82	98
355M2-4/2	**200**	345	280	1485	95,5	0,87	1286	1,3	6,5	2,3	6	2050	70	86
	250	415[1]	330	2985	94	0,93	800	1,3	7	2,6			82	98
355L-4/2	**220**	380	305	1485	96	0,87	1415	1,3	6,5	2,3	6,7	2200	70	86
	280	460[1]	370	2985	94,5	0,93	896	1,3	7	2,6			82	98

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Ambient temperature 40 °C, winding temperature increase within thermal class F

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[1]	Noise levels with radial-flow fan	
CD...	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
90S-6/4	**0,45**	1,5	1,2	940	62	0,70	4,6	1,8	3,5	2,3	0,0038	31	52	64
	0,65	1,77	1,42	1435	68	0,78	4,3	1,7	4,2	2,5			55	67
90L-6/4	**0,6**	1,91	1,53	940	63	0,72	6,1	1,8	3,6	2,3	0,0051	35	52	64
	0,9	2,3	1,86	1435	71	0,80	6	1,7	4,6	2,5			55	67
100L1-6/4	**0,9**	2,5	1,98	945	69	0,76	9,1	1,7	3,8	2,1	0,008	44	53	65
	1,3	3,05	2,45	1450	76,5	0,80	8,6	2	5,9	2,8			57	69
100L2-6/4	**1,1**	3,05	2,4	940	69	0,76	11,2	1,7	3,8	2,1	0,0105	46	53	65
	1,7	3,95	3,15	1445	77,5	0,8	11,2	1,9	5,5	2,6			57	69
112M-6/4	**1,5**	3,6	2,9	950	74	0,81	15,1	1,8	4,6	2,2	0,019	59	54	66
	2,4	5,1	4,05	1425	76,5	0,89	16,1	1,7	4,8	2,4			59	71
132S-6/4	**2,2**	5,2	4,2	960	75	0,81	21,9	1,6	4,6	2,6	0,033	104	59	72
	3,3	7,1	5,7	1450	78	0,86	21,7	1,7	5,9	2,6			62	75
132M-6/4	**3**	7	5,6	965	76,5	0,81	29,7	1,7	5,5	2,6	0,046	112	59	72
	4,5	9,2	7,4	1455	80	0,88	29,5	1,8	6,3	2,7			62	75
160M-6/4	**4,5**	10	8	970	80,5	0,81	44,3	2,1	6,4	2,9	0,095	170	64	77
	6,6	12,8	10,2	1445	82	0,91	43,6	1,8	6,3	2,7			70	83
160L-6/4	**6,5**	13,2	10,5	960	81	0,88	65	1,6	5,5	2,5	0,13	190	64	77
	9,5	18,1	14,5	1465	85	0,89	62	1,9	6,9	3			70	83
180L-6/4	**11**	23,5	18,9	975	85	0,79	108	2,4	6,9	3,2	0,155	215	56	69
	16	29,5	23,5	1465	87	0,90	104	1,8	6,6	2,8			63	76
200L-6/4	**16**	32,5	26	975	86,5	0,82	155	2	6,6	2,9	0,338	280	56	70
	24	43,5	35	1470	89	0,89	156	1,8	6,9	2,9			63	77
225S-6/4	**21**	40	32	975	89	0,85	206	2,8	6,5	2,8	0,4	372	60	74
	31	54	43	1470	90	0,92	201	2,2	6,7	2,9			67	81
225M-6/4	**25**	47	37,5	975	89,5	0,86	245	2,9	6,7	2,9	0,48	404	60	74
	37	64	51	1470	91	0,92	240	2,4	6,9	3			67	81
250M-6/4	**32**	59	47	975	90	0,87	313	2,9	6,9	2,8	0,75	570	61	75
	47	81	65	1475	91	0,92	304	2,4	7,1	2,9			68	82
280S-6/4	**45**	89	71	980	91	0,8	439	2,9	6,3	2,8	1,02	740	62	76
	66	118	86	1480	92,5	0,87	426	2,7	7,1	3,1			70	84
280M-6/4	**54**	107	86	980	91	0,80	526	3,2	6,7	3	1,27	820	62	76
	80	142	113	1475	92,5	0,88	518	2,6	7	3			70	84
315S-6/4	**60**	114	91	985	92,5	0,82	582	2,4	6,6	2,3	2,2	996	63	78
	85	147	118	1480	93,5	0,89	547	2,5	6,9	2,5			71	86
315M-6/4	**70**	134	107	985	93	0,81	679	2,5	6,7	2,4	2,7	1096	63	78
	100	173	138	1480	94	0,89	643	2,6	6,9	2,5			71	86
315L1-6/4	**85**	161	129	985	93	0,82	824	2,6	6,8	2,5	3,3	1221	63	78
	120	205	164	1480	94	0,90	772	2,7	7	2,6			71	86
315L2-6/4	**100**	182	145	985	93,5	0,85	970	2,6	6,8	2,5	3,9	1290	63	78
	140	235	189	1485	95	0,90	900	2,7	7	2,6			71	86
355S-6/4	**110**	192	154	985	94	0,88	1067	1,7	6,8	2,4	8,9	1750	83	83
	160	265	215	1485	95	0,91	1029	1,6	6,8	2,3			92	92
355M-6/4	**130**	225	181	985	94	0,88	1260	1,7	6,8	2,3	10,9	1950	83	83
	180	300	240	1485	95	0,91	1152	1,6	7	2,2			92	92
355L-6/4	**150**	260	210	990	94,5	0,88	1454	1,6	6,9	2,3	12,6	2200	83	83
	210	350	280	1485	95	0,91	1351	1,6	6,9	2,3			92	92

Notes:
1) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Pole-changing Motors
Mains Operation 50 Hz

Temperature class T4,
ns = 750/1500 rpm, 2p = 8/4

Ambient temperature 40 °C, winding temperature increase within thermal class F

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight[1]	Noise levels with radial-flow fan	
CD...	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
90S-8/4	**0,4**	1,62	1,3	695	57,5	0,62	5,5	1,6	2,9	2	0,0038	31	49	61
	0,6	1,46	1,17	1395	69	0,86	4,1	1,6	4,2	2,3			52	64
90L-8/4	**0,55**	2,1	1,68	700	60	0,63	7,5	1,6	3,3	2,2	0,0051	35	49	61
	0,8	1,84	1,47	1410	72	0,87	5,4	1,8	4,6	2,6			52	64
100L1-8/4	**0,9**	3,05	2,45	690	60	0,71	12,5	1,6	3,2	2,1	0,008	44	52	64
	1,3	3	2,45	1385	69,5	0,89	8,9	1,6	4,2	2,2			55	67
100L2-8/4	**1**	3,1	2,5	700	65	0,71	13,6	1,7	3,7	2,2	0,011	46	52	64
	1,6	3,6	2,9	1395	71	0,9	11	1,7	4,5	2,4			55	67
112M-8/4	**1,5**	4,6	3,7	710	72,5	0,65	20,2	2	4,4	2,2	0,019	59	52	64
	2,5	5,1	4,1	1410	78	0,90	16,9	1,9	5,2	2,3			56	68
132S-8/4	**2,3**	6,8	5,4	720	75	0,65	30,5	1,8	4,4	2,6	0,0325	97	53	66
	3,6	7,2	5,8	1440	81	0,89	23,8	1,8	5,8	2,5			62	75
132M-8/4	**3**	8,5	6,7	720	78	0,66	40	2	4,6	2,7	0,046	113	53	66
	5	9,7	7,8	1440	82,5	0,90	33	1,9	5,8	2,6			62	75
160M1-8/4	**4,7**	11,5	9,2	720	81	0,73	62	1,7	4,8	2,5	0,081	157	54	67
	5,5	12,2	9,8	1445	76,5	0,85	36,3	2,1	5,7	3			66	79
160M2-8/4	**5,5**	12,3	9,8	715	83	0,78	73	1,7	4,6	2,2	0,108	170	54	67
	7,5	14,8	11,9	1440	81	0,90	50	2	6,1	2,8			66	79
160L-8/4	**7**	16,3	13	720	84	0,74	93	2	5,5	2,7	0,145	190	54	67
	11	22	17,5	1445	81,5	0,89	73	2	6,6	3			66	79
180L-8/4	**11**	25	20	725	86,5	0,73	145	2	6	2,8	0,243	215	53	66
	18	32	25,5	1460	88,5	0,92	118	2	6,9	3,1			63	76
200L-8/4	**17**	41	33	730	88	0,68	222	2,2	6,4	3,5	0,438	280	53	67
	27	47	37,5	1470	91	0,91	175	2	7,3	3,6			63	77
225S-8/4	**22**	48,5	39	730	88,5	0,74	288	2,3	6,4	3,3	0,625	372	56	70
	32	56	45	1470	90,5	0,91	208	2,1	7,3	3,5			67	81
225M-8/4	**26**	53	43	730	90	0,78	340	2,4	6,5	3,4	0,75	404	56	70
	38	65	52	1470	91	0,91	247	22	7,3	3,6			67	81
250M-8/4	**32**	65	52	735	90,8	0,78	416	1,9	6,8	2,9	1,28	570	55	69
	47	80	64	1480	92	0,92	303	2	7,4	3,3			68	82
280S-8/4	**42**	85	68	735	91,5	0,78	546	2,1	6,4	2,5	2	740	58	72
	60	101	81	1475	92,5	0,93	388	2,1	7,2	3,1			70	84
280M-8/4	**50**	98	78	735	92	0,80	650	2,1	6,5	2,4	2,4	810	58	72
	72	120	96	1475	93	0,93	466	2	7,2	3			70	84
315S-8/4	**60**	114	91	740	92,5	0,82	774	2,6	6,5	2,5	4,4	996	67	82
	90	150	120	1480	93	0,93	581	2,5	7	2,6			79	94
315M-8/4	**75**	143	114	740	92,5	0,82	968	2,6	6,3	2,5	5,4	1096	67	82
	110	184	147	1480	93	0,93	710	2,5	7,1	2,7			79	94
315L1-8/4	**90**	170	136	740	93	0,82	1161	2,7	6,6	2,6	6,6	1221	67	82
	132	220	175	1480	93,5	0,93	852	2,5	7,1	2,9			79	94
315L2-8/4	**115**	215	173	740	92,5	0,83	1484	2,6	6,6	2,5	8	1320	67	82
	160	265	215	1480	93	0,93	1032	2,6	7,1	3			79	94
355M-8/4	**120**	230	185	745	94	0,8	1538	1,3	6,6	2,4	8,9	1750	69	85
	175	320	255	1485	94,5	0,93	1125	1,5	7,3	2,5			76	92
355L1-8/4	**140**	265	215	745	95	0,80	1795	1,4	6,9	2,5	10,9	1950	69	85
	215	345	275	1490	95,3	0,95	1378	1,6	7,6	2,3			76	92
355L2-8/4	**165**	315	250	745	95	0,80	2115	1,3	6,8	2,4	12,6	2200	69	85
	250	400	320	1490	95,5	0,94	1602	1,5	7,6	2,4			76	92

Notes:
1) Construction type B3 with terminal box of type EAR

These values also apply to the BD... series

Ambient temperature 40 °C, winding temperature increase within thermal class F

Frame size	2p = 4/2 1500/3000 rpm Output		Frame size	2p = 6/4 1000/1500 rpm Output		Frame size	2p = 8/4 750/1500 rpm Output	
CD...	P_2 [kW]		CD...	P_2 [kW]		CD...	P_2 [kW]	
80M1	0,17	0,65	-	-	-	-	-	-
80M2	0,25	0,85	-	-	-	-	-	-
90S	0,37	1,4	**90S**	0,3	1	**90S**	0,13	0,6
90L	0,5	1,9	**90L**	0,4	1,3	**90L**	0,18	0,8
100L	0,85	3,2	**100L1**	0,6	1,8	**100L1**	0,3	1,3
-	-	-	**100L2**	0,75	2,4	**100L2**	0,33	1,6
112M	1,2	4,4	**112M**	0,9	3	**112M**	0,5	2,5
132S	1,7	6	**132S**	1,3	4,3	**132S**	0,75	3,6
132M	2,3	9	**132M**	1,8	5,5	**132M**	1	5
160M	3,1	11	**160M**	3	9	**160M1**	1,6	5,5
160L	4,3	16	**160L**	3,5	12	**160M2**	1,8	7,5
-	-	-	-	-	-	**160L**	2,3	11
180M	5,5	20	-	-	-	-	-	-
180L	6,3	25	**180L**	6,5	19	**180L**	3,7	18
200L	8,7	31	**200L**	9,5	26	**200L**	5,7	27
225S	11	38	**225S**	12	34	**225S**	7,3	32
225M	13	46	**225M**	14,5	40	**225M**	8,7	38
250M	15	55	**250M**	18	52	**250M**	11	47
280S	21	75	**280S**	25	70	**280S**	14	60
280M	24	87	**280M**	30	82	**280M**	17	72
315S	28	100	**315S**	32	95	**315S**	20	90
315M	33	125	**315M**	37	115	**315M**	25	110
315L1	40	150	**315L1**	47	135	**315L1**	30	132
315L2	48	175	**315L2**	55	160	**315L2**	38	160
355S	53	200	**355S**	60	185	-	-	-
355M1	60	220	**355M**	70	200	**355M**	40	175
355M2	67	250	**355L**	80	230	**355L1**	47	215
355L	73	280	-	-	-	**355L2**	55	250

These values also apply to the BD... series

Motors with Integral Brake
Mains Operation 50 Hz

Temperature class T4
2p = 2, 4, 6, 8

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Starting torque	Starting current	Motor torque	Braking torque[1]	Brake type	Moment of inertia	Weight[2]	Permissible switching operations for operating mode S4 15, 20, 40 oder 60% ED			
BD...B	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M_A/M_N	I_A/I_N	M [Nm]	M_B [Nm]		J [kgm²]	m [kg]	Fl = 1,5 [S/h]	Fl = 2 [S/h]	Fl = 3 [S/h]	Fl = 4 [S/h]
ns = 3000 rpm, 2p = 2						**Efficiency according to manufacturer standard**											
80M1-2	**0,75**	1,84	1,47	2790	70	0,84	2,7	4,8	2,57	10	M 8	0,000925	26	1110	935	710	570
80M2-2	**1,1**	2,6	2,05	2820	75	0,82	2,8	5,5	3,7	10	M 8	0,00118	27	580	495	435	320
90S-2	**1,5**	3,25	2,6	2840	77	0,86	2,7	5,5	5	20	M 16	0,00193	38	130	115	90	80
90L-2	**2,2**	4,6	3,7	2850	81	0,85	2,7	5,6	7,4	20	M 16	0,00240	42	184	165	135	115
100L-2	**3**	6,1	4,85	2850	82	0,87	2,7	6,8	10,1	46	M 32	0,00365	51	71	65	54	47
112M-2	**4**	7,8	6,2	2880	84	0,88	2,3	6,5	13,3	46	M 32	0,00638	64	140	120	95	75
132S1-2	**5,5**	10,9	8,7	2880	84	0,87	2,5	6,4	18,2	86	M 60	0,013	113	53	46	37	30
132S1-2	**7,5**	14,6	11,7	2910	85	0,87	2,7	6,8	24,7	86	M 60	0,0159	118	70	60	45	40
ns = 1500 rpm, 2p = 4						**Efficiency according to manufacturer standard**											
80M1-4	**0,55**	1,38	1,1	1380	72	0,8	2	3,8	3,8	10	M 8	0,0013	26	1340	1185	960	800
80M2-4	**0,75**	1,85	1,48	1400	74	0,79	2,1	4,2	5,2	10	M 8	0,00168	27	1340	1170	930	640
90S-4	**1,1**	2,55	2,05	1400	75	0,83	2,1	4,8	7,5	20	M 16	0,003	38	230	205	170	145
90L-4	**1,5**	3,4	2,7	1405	78	0,82	2,3	5	10,3	20	M 16	0,00525	42	270	245	200	170
100L1-4	**2,2**	5	4	1420	79	0,8	2,4	5,4	14,8	46	M 32	0,00688	51	235	215	185	165
100L2-4	**3**	6,6	5,2	1415	79,5	0,83	2,3	5,5	20,1	46	M 32	0,007	54	110	105	90	80
112M-4	**4**	8,2	6,5	1435	84	0,84	2,7	6,8	26,5	46	M 32	0,0133	69	220	210	180	160
132S-4	**5,5**	11	8,8	1440	85	0,85	2,5	6,2	36,5	86	M 60	0,0263	118	100	95	75	65
132M-4	**7,5**	14,5	11,6	1440	87	0,86	2,7	6,5	50	86	M 60	0,0348	128	100	90	75	65
ns = 1000 rpm, 2p = 6						**Efficiency according to manufacturer standard**											
80M1-6	**0,37**	1,12	0,9	925	67	0,71	2,5	4,1	3,8	10	M 8	0,0024	26	1120	950	725	590
80M2-6	**0,55**	1,6	1,28	925	69	0,72	2,4	4	5,7	10	M 8	0,003	27	1145	980	765	620
90S-6	**0,75**	2,2	1,75	910	66	0,75	1,8	3,4	7,8	20	M 16	0,00445	38	675	605	500	425
90L-6	**1,1**	3,1	2,5	920	70	0,73	2	3,7	11,4	20	M 16	0,00573	42	125	115	100	85
100L-6	**1,5**	3,8	3,05	945	76	0,75	2,5	4,9	15,2	46	M 32	0,0113	54	240	215	175	145
112M-6	**2,2**	5,47	4,3	950	80	0,74	2,7	5,6	22,1	46	M 32	0,0198	69	595	530	425	355
132S-6	**3**	6,7	5,4	965	83	0,78	2,7	6,3	29,8	86	M 60	0,0347	118	390	350	290	250
132M1-6	**4**	8,8	7	960	83,5	0,79	2,6	6	40	86	M 60	0,0415	124	215	195	160	140
132M2-6	**5,5**	11,6	9,3	960	84,5	0,81	2,6	6,4	55	86	M 60	0,0498	133	125	110	95	80
ns = 750 rpm, 2p = 8						**Efficiency according to manufacturer standard**											
80M1-8	**0,18**	0,66	0,52	690	61	0,65	2,2	3,2	2,5	10	M 8	0,0023	26	1125	940	710	580
80M2-8	**0,25**	0,91	0,73	690	62	0,64	2,2	3,2	3,5	10	M 8	0,0029	27	1125	940	710	580
90S-8	**0,37**	1,3	1,04	690	63	0,65	1,8	3	5,1	20	M 16	0,0039	38	1285	1090	920	780
90L-8	**0,55**	1,92	1,54	690	64,5	0,64	1,8	3,1	7,6	20	M 16	0,0052	42	1160	980	830	690
100L1-8	**0,75**	2,35	1,87	710	70	0,66	2,4	4	10,2	46	M 32	0,0094	51	970	820	690	570
100L2-8	**1,1**	3,1	2,5	695	70	0,73	2	3,8	15,1	46	M 32	0,0109	54	880	750	630	520
112M-8	**1,5**	4,2	3,35	710	77	0,67	2,2	4,6	20,5	46	M 32	0,0198	69	680	560	480	406
132S-8	**2,2**	5	4	695	80	0,79	2	4,1	30	86	M 60	0,0331	113	650	550	460	380
132M-8	**3**	7	5,6	705	80,5	0,77	2,4	4,6	41	86	M 60	0,0401	122	630	520	450	360

Notes:
1) Efficiency according to manufacturer standard
2) Construction type B3 with terminal box of type EAR

Frame size	Output	Rated current at		Speed	Efficiency	Power factor	Starting torque	Starting current	Motor torque	Braking Torque[1]	Brake Type	Moment of Inertia	Weight[2]	Permissible switching operations for operating mode S4 15, 20, 40 oder 60% ED			
BD...B	P_2 [kW]	400 V I [A]	500 V I [A]	n [rpm]	η [%]	cos φ	M_A/M_N	I_A/I_N	M [Nm]	M_B [Nm]		J [kgm²]	m [kg]	Fl = 1,5 [S/h]	Fl = 2 [S/h]	Fl = 3 [S/h]	Fl = 4 [S/h]
ns = 750/1500 rpm, 2p = 8/4																	
90S-8/4	**0,4**	1,62	1,3	695	57,5	0,62	1,6	2,9	5,5	20	M 16	0,0049	38	on request			
	0,6	1,46	1,17	1395	69	0,86	1,6	4,2	4,1								
90L-8/4	**0,55**	2,1	1,68	700	60	0,63	1,6	3,3	7,5	20	M 16	0,0069	42				
	0,8	1,84	1,47	1410	72	0,87	1,8	4,6	5,4								
100L1-8/4	**0,9**	3,05	2,45	690	60	0,71	1,6	3,2	12,5	46	M 32	0,0098	51	on request			
	1,3	3	2,45	1385	69,5	0,89	1,5	4,2	9								
100L2-8/4	**1**	3,1	2,5	700	65	0,71	1,7	3,7	13,6	46	M 32	0,0138	54				
	1,6	3,6	2,9	1395	71	0,9	1,6	4,5	11								
112M-8/4	**1,5**	4,6	3,7	710	72,5	0,65	2	4,4	20,2	46	M 32	0,0218	69	on request			
	2,5	5,1	4,1	1410	78	0,9	1,9	5,2	16,9								
132S-8/4	**2,3**	6,8	5,4	720	75	0,65	1,8	4,4	30,5	86	M 60	0,0353	127	on request			
	3,6	7,2	5,8	1440	81	0,89	1,8	5,8	23,8								
132M-8/4	**3**	8,5	6,7	720	78	0,66	2	4,6	40	86	M 60	0,0498	138				
	5	9,7	7,8	1440	82,5	0,9	1,9	5,8	33								
ns = 750/3000 rpm, 2p = 8/2																	
80M1-8/2	**0,1**	0,5	0,4	685	46,5	0,62	1,5	2,3	1,39	10	M 8	0,0015	26	on request			
	0,4	1,07	0,86	2870	62,5	0,86	2,3	5,5	1,33								
80M2-8/2	**0,14**	0,69	0,55	685	47	0,62	1,4	2,5	1,95	10	M 8	0,0019	27				
	0,56	1,51	1,21	2870	63	0,85	2	6	1,86								
90S-8/2	**0,2**	0,95	0,76	710	49	0,62	1,9	2,3	2,7	20	M 16	0,0035	38	on request			
	0,8	2	1,61	2885	63	0,91	2,3	5,5	2,65								
90L-8/2	**0,3**	1,37	1,1	710	51	0,62	1,7	2,8	4	20	M 16	0,0058	42				
	1,1	2,55	2,05	2885	68	0,91	2,1	6,2	3,6								
100L1-8/2	**0,33**	1,42	1,14	715	54	0,62	1,9	3	4,4	46	M32	0,0069	51	on request			
	1,3	2,85	2,25	2885	72	0,92	1,8	6	4,3								
100L2-8/2	**0,4**	1,68	1,34	715	55,5	0,62	1,9	3,3	5,3	46	M 32	0,007	54				
	1,5	3,2	2,55	2890	73,5	0,92	1,8	6,1	5								
112M-8/2	**0,55**	2,15	1,72	715	59,5	0,62	1,6	3,2	7,3	46	M 32	0,011	69	on request			
	2,2	4,9	3,95	2920	78,5	0,92	2,5	7,2	7,2								
132S-8/2	**0,8**	2,95	2,35	720	60	0,65	1,7	3,2	10,6	86	M 60	0,0286	127	on request			
	3,2	6,6	5,3	2925	76,5	0,92	2,5	7,2	10,4								
132M-8/2	**1,1**	3,8	3,05	725	65	0,64	2,1	3,5	14,5	86	M 60	0,037	138				
	4,2	8,1	6,5	2935	80,5	0,93	2,6	7,2	13,7								

Notes:
1) Tolerance -20%/+40% at 1m/s friction speed
2) Construction type B3 with terminal box of type EAR

Temperature class T4, Type ...S

Frame size	Output	Motor torque	Braking torque	Brake type	Moment of inertia	Weight
CD...S	P_2 [kW]	M [Nm]	M_B [Nm]		J_B [kgm²]	m_B [kg]
ns = 3000 rpm, 2p = 2						
80M1-2	**0,75**	2,57	10	10	0,0025	15
80M2-2	**1,1**	3,73	10	10	0,0025	15
90S-2	**1,5**	5	20	11	0,0025	15
90L-2	**2,2**	7,4	20	11	0,0025	15
100L-2	**3**	10,1	50	13	0,0215	29
112M-2	**4**	13,3	50	13	0,0215	29
132S1-2	**5,5**	18,2	50	13	0,0215	29
132S2-2	**7,5**	24,6	100	16	0,0215	29
160M1-2	**11**	36	150	19	0,125	57
160M2-2	**15**	49	150	19	0,125	57
160L-2	**18,5**	60	150	19	0,125	57
180M-2	**22**	72	150	19	0,125	57
200L1-2	**30**	97	270	24	0,125	57
200L2-2	**37**	120	270	24	0,125	57
ns = 1500 rpm, 2p = 4						
80M1-4	**0,55**	3,8	10	10	0,0025	15
80M2-4	**0,75**	5,1	10	10	0,0025	15
90S-4	**1,1**	7,5	20	11	0,0025	15
90L-4	**1,5**	10,2	20	11	0,0025	15
100L1-4	**2,2**	14,8	50	13	0,0215	29
100L2-4	**3**	20,2	50	13	0,0215	29
112M-4	**4**	26,6	50	13	0,0215	29
132S-4	**5,5**	36,5	50	13	0,0215	29
132M-4	**7,5**	50	100	16	0,0215	29
160M-4	**11**	72	150	19	0,125	57
160L-4	**15**	98	150	19	0,125	57
180M-4	**18,5**	121	150	19	0,125	57
180L-4	**22**	144	270	24	0,125	57
200L-4	**30**	196	270	24	0,125	57

Frame size	Output	Motor torque	Braking moment	Brake type	Moment of inertia	Weight
CD...S	P_2 [kW]	M [Nm]	M_B [Nm]		J_B [kgm²]	m_B [kg]
ns = 1000 rpm, 2p = 6						
80M1-6	**0,37**	3,8	10	10	0,0025	15
80M2-6	**0,55**	5,7	10	10	0,0025	15
90S-6	**0,75**	7,9	20	11	0,0025	15
90L-6	**1,1**	11,4	20	11	0,0025	15
100L-6	**1,5**	15,2	50	13	0,0215	2
112M-6	**2,2**	22,1	50	13	0,0215	29
132S1-6	**3**	29,7	50	13	0,0215	29
132M1-6	**4**	39,6	50	13	0,0215	29
132M2-6	**5,5**	55	100	16	0,0215	29
160M-6	**7,5**	75	150	19	0,125	57
160L-6	**11**	109	150	19	0,125	57
180L-6	**15**	148	270	24	0,125	57
200L1-6	**18,5**	181	270	24	0,125	57
200L2-6	**22**	217	270	24	0,125	57
ns = 750 rpm, 2p = 8						
80M1-8	**0,18**	2,5	10	10	0,0025	15
80M2-8	**0,25**	3,5	10	10	0,0025	15
90S-8	**1,1**	5,1	20	11	0,0025	15
90L-8	**1,5**	7,6	20	11	0,0025	15
100L1-8	**0,75**	10,1	50	13	0,0215	29
100L2-8	**1,1**	15,1	50	13	0,0215	29
112M-8	**1,5**	20,2	50	13	0,0215	29
132S-8	**2,2**	30	50	13	0,0215	29
132M-8	**3**	41	50	13	0,0215	29
160M1-8	**4**	53	150	19	0,125	57
160M2-8	**5,5**	73	150	19	0,125	57
160L-8	**7,5**	99	150	19	0,125	57
180L-8	**11**	145	270	24	0,125	57
200L-8	**15**	196	270	24	0,125	57

Frame size	Output	Motor torque	Braking torque	Brake type	Weight
CD...SV CD...SVN	P_2 [kW]	M [Nm]	M_B [Nm]		m_B [kg]
ns = 3000 rpm, 2p = 2					
63M1-2	**0,18**	0,59	6	63	15
63M2-2	**0,25**	0,83	6	63	15
71M1-2	**0,37**	1,26	6	71	16
71M2-2	**0,55**	1,87	6	71	16
80M1-2	**0,75**	2,57	18	80	32
80M2-2	**1,1**	3,73	18	80	32
90S-2	**1,5**	5	18	90	34
90L-2	**2,2**	7,4	18	90	34
100L-2	**3**	10,1	30	100	50
112M-2	**4**	13,3	40	112	50
132S1-2	**5,5**	18,2	100	132	78
132S2-2	**7,5**	24,6	100	132	78
160M1-2	**11**	36	120	160	82
160M2-2	**15**	49	120	160	82
160L-2	**18,5**	60	120	160	82
180M-2*	**22**	72	250	180	135
200L1-2*	**30**	97	390	200	150
200L2-2*	**37**	120	390	200	150
ns = 1500 rpm, 2p = 4					
63M1-4	**0,12**	0,79	6	63	15
63M2-4	**0,18**	1,21	6	63	15
71M1-4	**0,25**	1,74	6	71	16
71M2-4	**37**	2,56	6	71	16
80M1-4	**0,55**	3,8	18	80	32
80M2-4	**0,75**	5,1	18	80	32
90S-4	**1,1**	7,5	18	90	34
90L-4	**1,5**	10,2	18	90	34
100L1-4	**2,2**	14,8	30	100	50
100L2-4	**3**	20,2	30	100	50
112M-4	**4**	26,6	40	112	50
132S-4	**5,5**	36,5	100	132	78
132M-4	**7,5**	50	100	132	78
160M-4	**11**	72	120	160	82
160L-4	**15**	98	120	160	82
180M-4	**18,5**	121	250	180	135
180L-4	**22**	144	250	180	135
200L-4	**30**	196	390	200	150
225S-4	**37**	241	390	225	175
225M-4	**45**	292	390	225	175
250M-4	**55**	357	900	250	265

Frame size	Output	Motor torque	Braking moment	Brake type	Weight
CD...S CD...SVN	P_2 [kW]	M [Nm]	M_B [Nm]		m_B [kg]
ns = 1000 rpm, 2p = 6					
71M-6	**0,25**	2,6	6	71	16
80M1-6	**0,37**	3,8	18	80	32
80M2-6	**0,55**	5,7	18	80	32
90S-6	**0,75**	7,9	18	90	34
90L-6	**1,1**	11,4	18	90	34
100L-6	**1,5**	15,2	30	100	50
112M-6	**2,2**	22,1	40	112	50
132S1-6	**3**	29,7	100	132	78
132M1-6	**4**	39,6	100	132	78
132M2-6	**5,5**	55	100	132	78
160M-6	**7,5**	75	120	160	82
160L-6	**11**	109	120	160	82
180L-6	**15**	148	250	180	135
200L1-6	**18,5**	181	390	200	150
200L2-6	**22**	217	390	200	150
225M-6	**30**	294	390	225	175
250M-6	**37**	361	900	250	265
280S-6	**45**	436	1000	280	265
280M-6	**55**	533	1000	280	265
ns = 750 rpm, 2p = 8					
80M1-8	**0,18**	2,5	18	80	32
80M2-8	**0,25**	3,5	18	80	32
90S-8	**1,1**	5,1	18	90	34
90L-8	**1,5**	7,6	18	90	34
100L1-8	**0,75**	10,1	30	100	50
100L2-8	**1,1**	15,1	30	100	50
112M-8	**1,5**	20,2	100	132	50
132S-8	**2,2**	30	100	132	78
132M-8	**3**	41	100	132	78
160M1-8	**4**	53	120	160	82
160M2-8	**5,5**	73	120	160	82
160L-8	**7,5**	99	120	180	82
180L-8	**11**	145	250	180	135
200L-8	**15**	196	390	200	150
225S-8	**18,5**	242	390	225	175
225M-8	**22**	288	390	225	175
250M-8	**30**	390	900	250	265
280S-8	**37**	481	1000	280	265
280M-8	**45**	585	1000	280	265

* only S3 40%

Note:
CD... type SVN only available from frame size 80.

Coil Data for Brakes

Integral brakes, type ...B

Frame size Motor	Voltage U = [V]	Current I = [A]	Resistance R_{min} [Ω]	Voltage U ~ [V]	Current I ~ [A]
80	24	1,09	22	-	-
	103	0,29	369	230	0,46
	130	0,23	567	290	0,36
	176	0,19	910	400	0,3
90	24	1,5	16	-	-
	103	0,36	290	230	0,57
	130	0,35	376	290	0,55
	176	0,26	684	400	0,41
100 and 112	24	1,85	13	-	-
	103	0,42	244	230	0,66
	130	0,35	376	290	0,55
	176	0,31	575	400	0,49
132	24	2,93	8,58	-	-
	130	0,56	232	290	0,88
	176	0,49	360	400	0,77

External brakes, type ...S

Frame size Brake	Torque M [Nm]	Voltage U = [V]	Current I = [A]	Resistance R_{min} [Ω]	Voltage U ~ [V]	Current I ~ [A]
10/11	10 or 20	24	2,1	11,6	-	-
		98	0,55	177	110	0,61
		205	0,27	770	230	0,3
		215	0,225	954	240	0,25
		258	0,21	1197	270	0,23
		356	0,14	2571	400	0,16
13/16	50 or 100	24	2,93	8,2	-	-
		98	0,8	122,4	110	0,89
		205	0,39	536	230	0,44
		215	0,346	621	240	0,38
		258	0,31	838	270	0,34
		356	0,2	1685	400	0,24
19/24	150 or 270	24	3,08	7,8	-	-
		98	0,85	116	110	0,94
		205	0,4	516	230	0,45
		215	0,4	538	240	0,44
		356	0,25	1438	400	0,28

Compact drive
Temperature class T4,
2p = 2, 4

Operation with	Mains	Inverter										Inverter	
Torque characteristic	-	decr. quadratic		constant		constant		constant		constant		decreasing	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		2–50 Hz		50–100 Hz	
Control range	-	1:10		1:2,5		1:5		1:10		1:25			
Speed range	-	300–3000 rpm		1200–3000 rpm		600–3000 rpm		300–3000 rpm		120–3000 rpm		3000–6000 rpm	
Power/torque	P_2[kW]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 50 Hz	Mu[Nm]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 100 Hz	M_u[Nm]
80M1-2 I	**0,75**	0,75	2,6	0,7	2,4	0,6	2	0,5	1,7	0,47	1,6	0,75	1,2
80M2-2 I	**1,1**	1,1	3,7	1	3,4	0,9	3	0,75	2,5	0,7	2,35	1,1	1,75
90S-2 I	**1,5**	1,5	5	1,4	4,7	1,2	4	1	3,3	0,94	3,3	1,35	2,2
90L-2 I	**2,2**	2,2	7,4	2	6,7	1,7	5,7	1,4	4,7	1,3	4,4	2	3,2
100L-2 I	**3**	3	10	2,7	8,9	2,2	7,2	1,8	5,9	1,7	5,5	2,7	4,5
112M-2 I	**4**	4	13	3,7	12	3,2	11	2,5	8,2	2,35	7,7	3,6	5,8
132S1-2 I	**5,5**	5,5	18	5	16	4,5	15	3,7	12	3,3	10,8	5,2	8,3
132S2-2 I	**7,5**	7,5	25	7	23	6	20	5	16	4,5	14,4	6,5	10,3
160M1-2 I	**11**	11	36	10	32	9	29	7,5	24	6,6	21,5	8,4	13,4

V

Operation with	Mains	Inverter										Inverter	
Torque characteristic	-	decr. quadratic		constant		constant		constant		constant		decreasing	
Frequency	50 Hz	5–50 Hz		20–50 Hz		10–50 Hz		5–50 Hz		2–50 Hz		50–100 Hz	
Control range	-	1:10		1:2,5		1:5		1:10		1:25			
Speed range	-	150–1500 rpm		600–1500 rpm		300–1500 rpm		150–1500 rpm		60–1500 rpm		1500–3000 rpm	
Power/torque	P_2[kW]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 50 Hz	Mu[Nm]	P_u[kW] 50 Hz	M_u[Nm]	P_u[kW] 100 Hz	M_u[Nm]
80M1-4 I	**0,55**	0,55	3,8	0,52	3,5	0,45	3	0,33	2,2	0,31	2,05	0,49	1,5
80M2-4 I	**0,75**	0,75	5,2	0,7	4,8	0,6	4	0,5	3,3	0,47	3,1	0,69	2,2
90S-4 I	**1,1**	1,1	7,5	1	6,7	0,9	6	0,75	5	0,7	4,7	1	3,1
90L-4 I	**1,5**	1,5	10	1,4	9,5	1,2	8	1	6,7	0,94	6,3	1,35	4,3
100L1-4 I	**2,2**	2,2	15	2	13	1,7	11	1,4	9,3	1,3	8,7	2	6,4
100L2-4 I	**3**	3	20	2,8	19	2,2	15	1,8	12	1,7	11,3	2,7	8,6
112M-4 I	**4**	4	27	3,6	24	3	20	2,5	16	2,35	15	3,6	11,4
132S-4 I	**5,5**	5,5	37	5	33	4,4	29	3,7	24	3,3	21,6	5,2	16,5
132M-4 I	**7,5**	7,5	50	7	46	6	39	5	33	4,5	29,7	6,5	20,7
160M-4 I	**11**	11	72	10	65	9	58	7,5	49	6,6	44	8,4	26,7

Noise Class 4, Water-Cooled Motors
Mains Operation 50 Hz

Temperature class T4,
2p = 2, 4

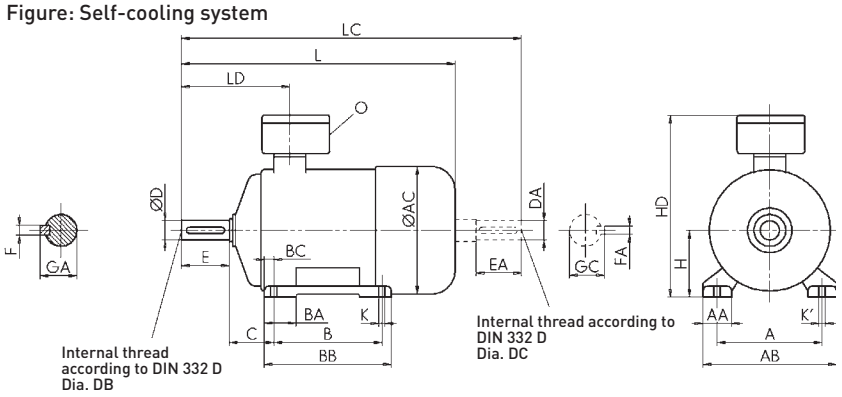
Frame size	Output	Current at	Nominal speed	Efficiency	Power factor	Starting torque	Starting current	Weight[2]	Cooling water quantity	Noise levels	
CD...W	P_2 [kW]	400 V I [A]	n [rpm]	η [%]	cos φ	M_A/M_N	I_A/I_N	m [kg]	[l/min] 30 °C	L_P [dB(A)]	L_W [dB(A)]
ns = 3000 rpm, 2p = 2					**Efficiency according to manufacturer standard**						
160M1-2	**15**	28,5	2915	87,5	0,87	2,5	6,5	125	6	51	64
160M2-2	**18,5**	33,5	2915	89	0,89	2,5	6,5	140	6	51	64
160L-2	**22**	39,5	2915	89,5	0,9	2,7	6,8	150	6	51	64
180M-2	**30**	54	2915	90	0,89	2,6	6,9	170	7	51	64
200L1-2	**37**	69	2950	91,5	0,85	3	7,2	270	9	52	66
200L2-2	**45**	79	2950	92	0,85	3	7,2	290	9	52	66
225M-2	**55**	101	2965	92,5	0,85	2,8	7,1	455	5	54	68
250M-2	**75**	139	2970	92,5	0,84	2,7	6,9	564	10	57	71
280S-2	**90**	155	2970	93	0,9	2	6,5	665	11	59	73
280M-2	**110**	192	2970	93	0,89	2,1	6,8	776	11	59	73
315S-2	**132**	225	2975	94,5	0,89	1,9	6,3	1010	12	60	75
315M-2	**160**	270	2975	95,5	0,89	1,8	6,7	1100	12	60	75
315L1-2	**200**	340	2975	95,5	0,89	2	6,9	1200	15	60	75
315L2-2	**250**	420[1]	2980	96	0,9	1,7	6,9	1300	17	60	75
315L3-2	**315**	515[1]	2980	96	0,92	1,5	6,8	1450	17	60	76
355L1-2	**355**	575[1]	2985	96,5	0,92	1,5	6,8	2100	18	60	76
355L2-2	**400**	650[1]	2985	96,8	0,92	1,5	6,8	2300	20	60	76
ns = 1500 rpm, 2p = 4					**Efficiency according to manufacturer standard**						
160M-4	**13,5**	29	1450	86,5	0,78	2,6	6,1	130	6	51	64
160L-4	**18,5**	36	1450	89	0,84	2,5	6,2	150	6	51	64
180M-4	**22**	43,5	1460	90	0,81	3,1	6,7	170	7	51	64
180L-4	**27**	53	1455	90	0,81	3	6,5	190	7	51	64
200L-4	**37**	67	1460	91	0,87	2,7	6,8	295	7	51	65
225S-4	**45**	81	1465	92	0,87	2,6	6,3	441	9	52	66
225M-4	**55**	100	1470	92,5	0,86	2,6	6,5	480	9	52	66
250M-4	**70**	127	1475	92,5	0,86	2,9	7,1	590	10	56	70
280S-4	**90**	163	1480	93,5	0,85	2,7	6,7	745	11	58	72
280M-4	**110**	199	1480	94	0,85	2,9	6,9	850	11	58	72
315S-4	**132**	235	1485	95	0,86	2,2	6,6	1050	12	57	72
315M-4	**160**	290	1485	95,5	0,84	2,8	6,8	1115	12	57	72
315L1-4	**200**	350	1485	95,5	0,86	2,5	6,8	1200	15	57	72
315L2-4	**250**	435[1]	1490	96	0,86	2	6,9	1300	17	57	72
315L3-4	**315**	545[1]	1490	96	0,87	1,5	6,8	1600	17	58	74
355L1-4	**355**	590[1]	1490	96,5	0,9	1,5	6,8	2250	18	58	74
355L2-4	**400**	665[1]	1490	96,7	0,9	1,5	6,8	2450	20	58	74

Notes:
1) Two parallel cables are required in each case
2) Construction type B3 with terminal box of type EAR

Frame size	Output	Rated current for 6000 V	Speed	Efficiency	Power factor	Torque	Starting torque	Starting current	Stalling torque	Moment of inertia	Weight	Noise levels with radial-flow fan	
CD...H	P_2 [kW]	I [A]	n [rpm]	η [%]	cos φ	M [Nm]	M_A/M_N	I_A/I_N	M_K/M_N	J [kgm²]	m [kg]	L_P [dB(A)]	L_W [dB(A)]
ns = 3000 rpm, 2p = 2													
355M-2	**160**	18,1	2981	94,5	0,9	513	1,1	6,5	2,5	2,6	1825	82	98
355L1-2	**200**	22,5	2981	94,8	0,9	641	1,1	6,6	2,5	3,1	2008	82	98
355L2-2	**250**	28	2982	95	0,91	801	1,1	6,6	2,6	3,4	2100	82	98
400M-2	**280**	31	2982	95,3	0,91	897	1	6,4	2,6	7,7	2389	82	98
400L-2	**315**	35	2982	95,5	0,91	1009	1	6,5	2,6	10,1	2800	82	98
450M1-2	**355**	39,5	2985	95,8	0,9	1136	0,9	6,6	2,7	9,4	3268	85	101
450M2-2	**400**	44,5	2987	96	0,9	1279	0,9	6,6	2,7	10,6	3437	85	101
450L1-2	**450**	49,5	2987	96,2	0,91	1439	0,9	6,5	2,6	12,6	3699	85	101
450L2-2	**500**	55	2988	96,4	0,91	1598	0,9	6,6	2,7	14,6	3962	85	101
450L3-2	**560**	61	2988	96,5	0,91	1790	0,9	6,5	2,6	16,8	4262	85	101
ns = 1500 rpm, 2p = 4													
355M1-4	**160**	19,3	1488	94,8	0,84	1027	1,2	6,6	2,4	4,2	1800	73	89
355M2-4	**220**	26,5	1488	95,2	0,84	1412	1,2	6,6	2,4	5	1950	73	89
355L-4	**280**	33,5	1488	95,4	0,84	1797	1,2	6,6	2,4	5,9	2213	73	89
400M-4	**315**	37	1490	95,6	0,86	2019	1,1	6,6	2,5	12,9	3460	79	95
400L1-4	**355**	41,5	1490	95,8	0,86	2275	1,1	6,5	2,4	14,5	3665	79	95
400L2-4	**400**	46,5	1490	96	0,86	2564	1,1	6,6	2,5	16,4	3900	79	95
450M1-4	**450**	53	1491	96	0,85	2882	1	6,5	2,5	18,5	3887	80	96
450M2-4	**500**	59	1491	96,1	0,85	3203	1	6,6	2,5	20,7	4112	80	96
450L1-4	**560**	66	1492	96,2	0,85	3584	1	6,7	2,6	23,3	4375	80	96
450L2-4	**630**	73	1492	96,3	0,86	4033	0,9	6,5	2,4	26,2	4675	80	96
450L3-4	**710**	82	1492	96,5	0,86	4545	1	6,5	2,5	29,5	5012	80	96
ns = 1000 rpm, 2p = 6													
355M-6	**160**	21	990	94,2	0,78	1543	1,2	6	2,2	5	1950	75	91
355L-6	**200**	26	990	94,3	0,79	1929	1,2	5,9	2,1	5,9	2179	75	91
400M-6	**250**	31	991	95,2	0,81	2409	1,2	6,4	2,3	12,9	3460	78	94
400L1-6	**280**	35	991	95,4	0,81	2698	1,2	6,5	2,3	14,5	3665	78	94
400L2-6	**315**	39	991	95,6	0,81	3036	1,2	6,5	2,3	16,4	3900	78	94
450M1-6	**355**	42,5	991	95,6	0,84	3421	1	6,3	2,4	29,1	4112	78	94
450M2-6	**400**	47,5	991	95,7	0,85	3855	1	6,3	2,4	32,7	4375	78	94
450L1-6	**450**	53	991	95,7	0,86	4337	1	6,3	2,4	36,8	4675	78	94
450L2-6	**500**	58	992	95,8	0,86	4814	1	6,4	2,4	41,5	5012	78	94
ns = 750 rpm, 2p = 8													
400M-8	**160**	21,5	742	94,2	0,76	2059	1,1	5,3	2	12,9	3460	74	90
400L1-8	**200**	27	742	94,5	0,76	2574	1,1	5,5	2	14,5	3665	74	90
400L2-8	**240**	32	742	94,6	0,76	3089	1,1	5,5	2	16,4	3900	74	90
450M1-8	**280**	37	743	94,6	0,77	3599	1,1	5,8	2,3	29,1	4112	74	90
450M2-8	**315**	41	743	94,7	0,78	4049	1	5,7	2,3	32,7	4375	74	90
450L1-8	**355**	47	743	94,8	0,77	4563	1	5,9	2,4	36,8	4675	74	90
450L2-8	**400**	52	744	94,9	0,78	5134	1	6	2,4	41,5	5012	74	90

Construction type IM B3, IM B6, IM B7, IM B8, IM V5[1)], IM V6

Figure: Self-cooling system



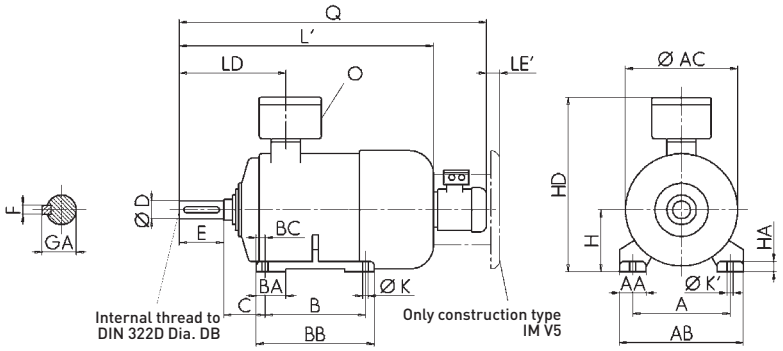
Frame size 63 in T4, unventilated
Carrying lugs from frame size 90.
Measure AC measured from screw head
Measure HD relates to terminal box Ex e.
The box can be rotated by 4x90°.
This also applies to the BD... series.

Note:
1) Construction type IM V5 with protective canopy, see page 101

Type CD...	A	AA	AB	AC	B	BA	BB	BC	C	H -0,5	HA	HD	K H17	K' H17	L Number of poles 2	4	6	8
63M	100	20	120	134	80	25	100	10	40	63	6	227	Ø 7	–	239	239	239	239
71M	112	30	139	145	90	25	110	10	45	71	10	235	Ø 7	–	278	278	278	278
80M	125	35	160	163	100	35	130	15	50	80	12	260	Ø 10	–	313	313	313	313
90S	140	40	180	183	100	40	130	15	56	90	12	275	Ø 10	–	364	364	364	364
90L	140	40	180	183	125	40	155	15	56	90	12	275	Ø 10	–	364	364	364	364
100L	160	45	200	201	140	45	175	17,5	63	100	15	305	Ø 12	–	415	415	415	415
112M	190	50	235	225	140	50	175	17,5	70	112	17	317	Ø 12	–	425	425	425	425
132S	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–	529	529	529	529
132M	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø12	–	529	529	529	529
160M	254	65	310	318	210	100	300	23	108	160	25	477	15	20	713	676	676	676
160L	254	65	310	318	254	100	300	23	108	160	25	477	15	20	713	676	676	676
180M	279	75	350	353	241	100	340	30	121	180	25	545	15	20	726	726	–	–
180L	279	75	350	353	279	100	340	30	121	180	25	545	15	20	-	726	726	726
200L	318	80	390	393	305	90	365	30	133	200	30	581	20	26	789	789	789	789

Type CD...	A	AA	AB	AC	B	BA	BB	BC	C	H	HA	HD	K H17	K' H17	L Number of poles 2	4	6	8
225S	356	85	450	455	286	90	370	29,5	149	225-0,5	35	634	20	26	-	937	-	888
225M	356	85	450	455	311	90	370	29,5	149	225-0,5	35	634	20	26	907	937	888	888
250M	406	105	510	493	349	110	420	35,5	168	250-0,5	40	721	26	35	1000	1000	934	934
280S	457	110	570	548	368	120	500	40,5	190	280-1	45	791	26	35	1109	1109	1109	1109
280M	457	110	570	548	419	120	500	40,5	190	280-1	45	791	26	35	1109	1109	1109	1109
315S	508	150	630	635	406	210	615	53	216	315-1	40	896	39	30	1268	1298	1218	1218
315M	508	150	630	635	457	210	615	53	216	315-1	40	896	39	30	1268	1298	1218	1218
315L1	508	150	630	635	508	210	615	53	216	315-1	40	896	39	30	1268	1298	1218	1298
315L2	508	150	630	635	508	210	615	53	216	315-1	40	896	39	30	1468	1498	1418	1498
315L3	508	150	630	635	508	210	615	53	216	315-1	40	896	39	30	1468	1498	1416	1498
355M	610	180	720	725	560	220	720	45	254	355-1	50	1084	30	39	-	-	1597	1597
355L1	610	180	720	725	630	220	720	45	254	355-1	50	1084	30	39	1667	1697	1597	1597
355L2	610	180	720	725	630	220	720	45	254	355-1	50	1084	30	39	1667	1667	1597	1597
355L3	610	180	720	725	630	220	720	45	254	355-1	50	1084	30	39	1747	1777	-	-
400S	686	130	800	810	560	150	870	80	280	400-1	34	1146	35	35	-	1907	1907	1907
400M	686	130	800	810	630	150	870	80	280	400-1	34	1146	35	35	1837	1907	1907	1907
400L	686	130	800	810	710	150	870	80	280	400-1	34	1146	35	35	1837	1907	1907	1907
450S	760	150	900	910	630	180	1000	80	280	450-1	35	1264	35	35	1838	1908	1908	1908
450M	760	150	900	910	710	180	1000	80	280	450-1	35	1264	35	35	1838	1908	1908	1908
450L1	760	150	900	910	840	180	1000	80	280	450-1	35	1264	35	35	1838	1908	1908	1908
450L2	760	150	900	910	840	180	1000	80	280	450-1	35	1264	35	35	1983	2053	2053	2053

External cooling system



Note:

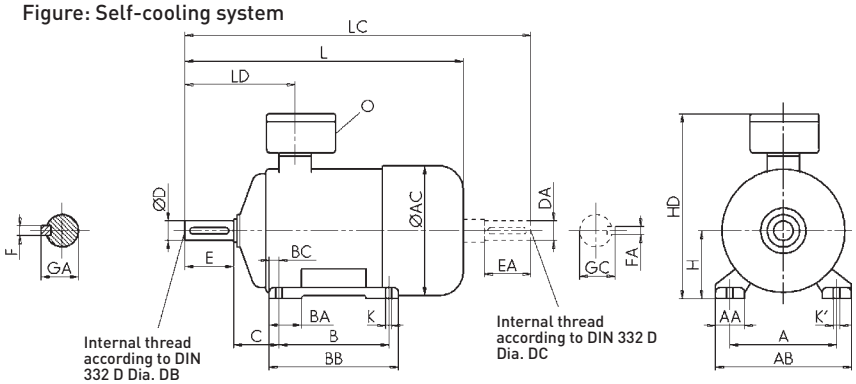
1) For types 250 to 400-4, 6, 8 with measures DA, EA, GC, FA, and DC, the 2-pole specifications apply. For types 450-6, 8 DA, EA, GC, FA, DC , the 4-pole specifications apply.

Type CD...	LC Number of poles 2	4	6, 8	LD	O	Shaft end D, DA	E, EA	GA, GC	F, FA	DB, DC	Fan motor Type CD ...	Type CD...F L' Number of poles 2	4,6,8	Q 2	4,6,8	LE'
63M	274	274	274	104	2x M25x1,5	11j6	23	12,5	4	M4	–	–	–	-	–	–
71M	334	334	334	111	2x M25x1,5	14j6	30	16	5	M5	–	–	–	-	–	–
80M	387	387	387	116	2x M25x1,5	19j6	40	21,5	6	M6	–	–	–	-	–	–
90S	445	445	445	137	2x M25x1,5	24j6	50	27	8	M6	–	–	–	-	–	–
90L	445	445	445	137	2x M25x1,5	24j6	50	27	8	M8	–	–	–	-	–	–
100L	510	510	510	149	2x M32x1,5	28j6	60	31	8	M10	–	–	–	-	–	–
112M	526	526	526	154	2x M32x1,5	28j6	60	31	8	M10	63M1-4	515	515	731	731	30
132S	645	645	645	226	2x M32x1,5	38k6	80	41	10	M12	63M1-4	606	606	822	822	36
132M	645	645	645	226	2x M32x1,5	38k6	80	41	10	M12	63M1-4	606	606	822	822	36
160M	864	864	864	261	2x M40x1,5	42k6	110	45	12	M16	63M1-4	757	757	972	972	38
160L	864	864	864	261	2x M40x1,5	42k6	110	45	12	M16	63M1-4	757	757	972	972	38
180M	909	909	-	369	2x M40x1,5	48k6	110	51,5	14	M16	63M1-4	746	746	960	960	38
180L	-	909	909	369	2x M40x1,5	48k6	110	51,5	14	M16	63M1-4	746	746	960	960	38
200L	983	983	983	390	2x M50x1,5	55m6	110	59	16	M20	63M1-4	803	803	1018	1018	38

Type CD...	LC Number of poles 2	4	6,8	LD No. of poles 2	4,6,8	O	Shaft end D_{m6}, DA_{m6}[1] 2	4	6+8	E, EA[1] 2	4,6,8	GA, GC[1] 2	4	6+8	F, FA[1] 2	4,6,8	DB, DC[1] 2	4,6,8	Fan motor Type CD ...	Type CD...F L' Number of poles 2	4,6,8	Q 2	4,6,8	LE'
225S	-	1175	1175	-	377	2x M50x1,5	-	60	60	-	140	-	64	64	-	18	-	M20	63M1-4	-	938	-	1153	38
225M	1145	1145	1145	347	377	2x M50x1,5	55	60	60	110	140	59	64	64	16	18	M20	M20	63M1-4	908	938	1123	1153	38
250M	1250	1250	1250	482	482	2x M63x1,5	60	65	65	140	140	64	69	69	18	18	M20	M20	63M1-4	1019	1019	1234	1234	38
280S	1375	1375	1375	483	483	2x M63x1,5	65	75	75	140	140	69	79,5	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
280M	1375	1375	1375	483	483	2x M63x1,5	65	75	75	140	140	69	79,5	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
315S	1543	1573	1573	496	526	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315M	1543	1573	1573	496	526	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L1	1543	1573	1573	496	526	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L2	1743	1773	1773	496	526	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1483	1513	1729	1759	42
315L3	1743	1773	1773	496	526	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1483	1513	1729	1759	42
355M	-	-	1980	672	702	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	-		-	-	-	- -
355L1	1925	1980	1980	672	702	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	80M1-4	1812	1842	2083	2113	40
355L2	1950	1980	1980	672	702	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	80M1-4	1812	1842	2083	2113	40
355L3	2030	2060	-	672	702	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	80M1-4	1892	1922	2163	2193	40
400S	-	2190	2190	718	788	2x M95x2	75	100	100	140	210	79,5	106	106	20	28	M20	M24	80M2-4	-	1907	-	2178	40
400M	2120	2190	2190	718	788	2x M95x2	75	100	100	140	210	79,5	106	106	20	28	M20	M24	80M2-4	1837	1907	2108	2178	40
400L	2120	2190	2190	718	788	2x M95x2	75	100	100	140	210	79,5	106	106	20	28	M20	M24	80M2-4	1837	1907	2108	2178	40
450S	2140	2280	2280	756	826	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	1880	1950	2192	2262	40
450M	2140	2280	2280	756	826	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	1880	1950	2192	2262	40
450L1	2140	2280	2280	756	826	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	1880	1950	2192	2262	40
450L2	-	2425	2425	756	826	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	2025	2095	2337	2407	40

Construction type IM B3, IM B6, IM B7, IM B8, IM V5 [1], IM V6

Figure: Self-cooling system



Carrying lugs from frame size 90.
Measure AC measured from screw head
Measure HD relates to terminal box Ex e.
The box can be rotated by 4x90°.

Note:
1) Construction type IM V5 with protective canopy; for LE measure, see page 101.

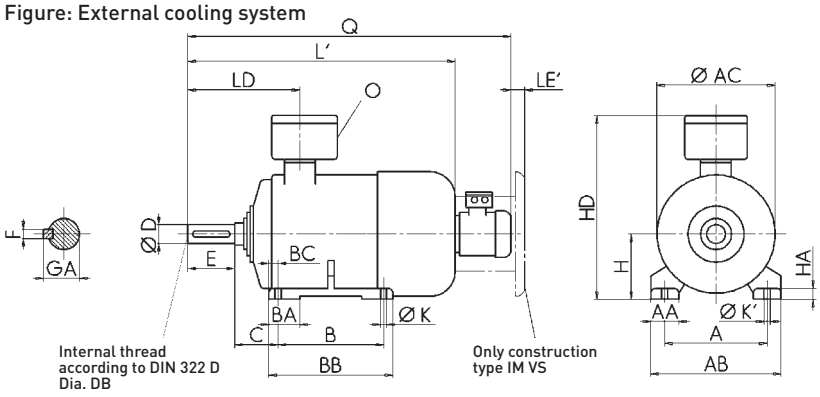
Type CD...Y2/Y3/Y	A	AA	AB	AC	B	BA	BB	BC	C	H -0,5	HA	HD	K H17	K' H17	L Number of poles 2	4	6	8
80M	125	35	160	158	100	37	130	15	50	80	12	271	Ø 10	–	343	343	343	343
90S	140	38	180	178	100	44	130	15	56	90	12	295	Ø 10	–	398	398	398	398
90L	140	38	180	178	125	44	155	15	56	90	12	295	Ø 10	–	398	398	398	398
100L	160	42	200	198	140	46	175	17,5	63	100	15	311	Ø 12	–	419	419	419	419
112M	190	45	235	218	140	46	175	17,5	70	112	17	337	Ø 12	–	517	517	517	517
132S	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–	–	529	529	529
132S1	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–	529	–	–	–
132S2	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–	579	–	–	–
132M	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–	–	579	–	597
132M1	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–	–	–	529	–
132M2	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–	–	–	579	–
160M	254	65	310	318	210	100	300	23	108	160	25	477	15	20	713	676	676	676
160L Y2	254	65	310	318	254	100	300	23	108	160	25	477	15	20	713	676	676	676
160L Y3,Y	254	65	310	318	254	100	300	23	108	160	25	477	15	20	713	711	711	676
180M	279	75	350	353	241	100	340	30	121	180	25	545	15	20	726	726	–	–
180L Y2	279	75	350	353	279	100	340	30	121	180	25	545	15	20	–	726	726	726
180L Y3,Y	279	75	350	353	279	100	340	30	121	180	25	545	15	20	–	776	726	726
200L	318	80	390	393	305	90	365	30	133	200	30	581	20	26	789	789	789	–

Type CD...Y2/Y3/Y	A	AA	AB	AC	B	BA	BB	BC	C	H	HA	HD	K H17	K' H17	L Number of poles 2	4	6	8
225S	356	85	450	455	286	90	370	29,5	149	225 -0,5	35	634	20	26	–	937	–	888
225M	356	85	450	455	311	90	370	29,5	149	225 -0,5	35	634	20	26	907	937	888	888
250M	406	105	510	493	349	110	420	35,5	168	250 -0,5	40	721	26	35	1000	1000	934	934
280S	457	110	570	548	368	120	500	40,5	190	280 -1	45	792	26	35	1109	1109	1109	1109
280M	457	110	570	548	419	120	500	40,5	190	280 -1	45	792	26	35	1109	1109	1109	1109
315S	508	150	630	635	406	210	615	53	216	315 -1	40	897	39	30	1268	1298	1218	1218
315M	508	150	630	635	457	210	615	53	216	315 -1	40	897	39	30	1268	1298	1218	1218
315L1	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30	1268	1298	1218	1298
315L2	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30	1468	1498	1418	1498
315L3	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30	1468	1498	1418	1498
355M	610	180	720	725	560	220	720	45	254	355 -1	50	1084	30	39	–	–	–	1697

Type CD...XY ****	A	AA	AB	AC	B	BA	BB	BC	C	H	HA	HD	K H17	K' H17	L Number of poles 2	4	6	8
250S	406	115	510	493	311	130	420	35,5	168	250 -0,5	35	721	22	22	1000	1000	934	934
250M	406	105	510	548	349	-	420	30	168	250 -0,5	45	762	26	26	1109	1109	1109	1109
280S	457	110	570	548	368	120	500	40,5	190	280 -1	45	792	26	35	1109	1109	1109	1109
280M	457	110	560	635	419	-	570	40	190	280 -1	48	862	26	26	1268	1268	1268	1268
315S	508	150	630	635	406	210	615	53	216	315 -1	40	897	39	30	1268	1298	1298	1298
315M	508	150	630	635	457	210	615	53	216	315 -1	40	897	39	30	1268	1298	1298	1298
315L1	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30	1468	1498	1298	1298
315L2	508	150	630	635	508	210	615	53	216	315-1	40	897	39	30	–	–	1498	1498

**** British Allocation

Figure: External cooling system



Note:
2) For types 250 to 315-4, 6, 8 with measures DA, EA, GC, FA, and DC, the 2-pole specifications apply.

Type CD...Y2/Y3/Y	LC Number of poles 2	4	6	8	LD	O	Shaft end D,DA	E,EA	GA,GC	F,FA	DB,DC	Fan motor Type CD...	Type CD...Y2F/Y3F/YF L' Number of poles 2	4	6	8	Q 2	4	6	8	LE'
80M	417	417	417	417	127	2x M25x1,5	19 j6	40	21,5	6	M6	–	–	–	–	–	–	–	–	–	–
90S	479	479	479	479	139	2x M25x1,5	24 j6	50	27	8	M8	–	–	–	–	–	–	–	–	–	–
90L	479	479	479	479	139	2x M25x1,5	24 j6	50	27	8	M8	–	–	–	–	–	–	–	–	–	–
100L	515	515	515	515	154	2x M32x1,5	28 j6	60	31	8	M10	–	–	–	–	–	–	–	–	–	–
112M	608	608	608	608	189	2x M32x1,5	28 j6	60	31	8	M10	63M1-4	515	515	515	515	731	731	731	731	30
132S	–	645	645	645	226	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	606	606	606	–	822	822	822	36
132S1	645	–	–	–	226	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	606	–	–	–	822	822	822	822	36
132S2	652	–	–	–	226	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	656	–	–	–	872	–	–	–	36
132M	–	652	645	645	226	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	656	–	606	–	872	–	822	36
132M1	–	–	645	645	226	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	–	606	–	–	–	822	–	36
132M2	–	–	652	652	226	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	–	656	–	–	–	872	–	36
160M	881	849	849	849	261	2x M40x1,5	42 k6	110	45	12	M16	63M1-4	757	757	757	757	972	972	972	972	38
160L Y2	881	849	849	849	261	2x M40x1,5	42 k6	110	45	12	M16	63M1-4	757	757	757	757	972	972	972	972	38
160L Y3/Y	881	884	884	849	261	2x M40x1,5	42 k6	110	45	12	M16	63M1-4	757	792	792	757	972	1007	1007	972	38
180M	909	909	–	–	369	2x M40x1,5	48 k6	110	51,5	14	M16	63M1-4	746	746	–	–	960	960	–	–	38
180L Y2	–	909	909	909	369	2x M40x1,5	48 k6	110	51,5	14	M16	63M1-4	–	746	746	746	–	960	960	960	38
180L Y3/Y	–	959	909	909	369	2x M40x1,5	48 k6	110	51,5	14	M16	63M1-4	–	756	746	746	–	1010	960	960	38
200L	983	909	909	909	390	2x M50x1,5	55 m6	110	59	16	M20	63M1-4	803	803	803	–	1018	1018	1018	–	38

Type CD...Y2/Y3/Y	LC Number of poles 2	4	6, 8	LD N. of. poles 2	4,6,8	O	Shaft end Dm6, DAm6[2] 2	4,6,8	E, EA[2] 2	4,6,8	GA, GC[2] 2	4,6,8	F,FA[2] 2	4,6,8	DB, DC[2] 2	4,6,8	Fan motor Type CD...	Type CD...Y2F/Y3F/YF L' Number of poles 2	4, 6, 8	Q 2	4, 6, 8	LE'
225S	–	1175	1175	–	377	2xM50x1,5	–	60	–	140	–	64	–	18	–	M20	63M1-4	–	938	–	1153	38
225M	1112	1175	1175	347	377	2xM50x1,5	55	60	110	140	59	64	16	18	M20	M20	63M1-4	908	938	1123	1153	38
250M	1250	1250	1184	482	482	2xM63x1,5	60	65	140	140	64	69	18	18	M20	M20	63M1-4	1019	1019	1234	1234	38
280S	1375	1375	1375	483	483	2xM63x1,5	65	75	140	140	69	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
280M	1375	1375	1375	483	483	2xM63x1,5	65	75	140	140	69	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
315S	1543	1573	1573	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315M	1543	1573	1573	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L1	1543	1573	1573	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L2	1743	1773	1773	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1483	1513	1729	1759	42
315L3	1743	1773	1773	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1483	1513	1729	1759	42
355M	–	–	1980	–	702	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24	–	–	–	–	–	–

Type CD...XY ****	LC Number of poles 2	4	6, 8	LD N. of. poles 2	4,6,8	O	Shaft end Dm6, DAm6[2] 2	4,6,8	E, EA[2] 2	4,6,8	GA, GC[2] 2	4,6,8	F,FA[2] 2	4,6,8	DB, DC[2] 2	4,6,8
250S	1250	1250	1184	482	482	2xM63x1,5	60	65*	140	140	64	69*	18	18*	M20	M20
250M	1375	1375	1375	483	483	2xM63x1,5	60	65*	140	140	64	69*	18	18*	M20	M20
280S	1375	1375	1375	483	483	2xM63x1,5	65	75**	140	140**	69	79,5**	18	20**	M20	M20
280M	1543	1543	1543	496	496	2xM63x1,5	65	75**	140	140**	69	79,5**	18	20**	M20	M20
315S	1543	1573	1573	496	526	2xM63x1,5	65	80***	140	170	69	85***	18	22	M20	M20
315M	1543	1573	1573	496	526	2xM63x1,5	65	80***	140	170	69	85***	18	22	M20	M20
315L1	1743	1773	1573	496	526	2xM63x1,5	65	80***	140	170	69	85***	18	22	M20	M20
315L2	–	–	1773	496	526	2xM63x1,5	65	80***	140	170	69	85***	18	22	M20	M20

* Diameter 70 for British Allocation on request - please Notes: Measure GA becomes 74.5 and measure F becomes 20

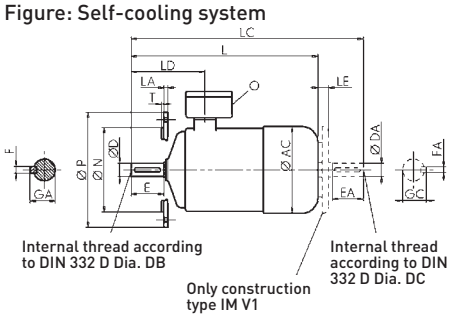
** Diameter 80 for British Allocation on request - please Notes: Measures L, LC, LD and E become 30mm longer, measure GA becomes 85 and measure F becomes 22

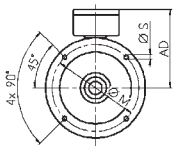
*** Diameter 85 for British Allocation on request - please Notes: Measure GA becomes 90 and measure F corresponds to the catalog.

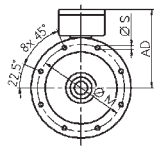
**** British Allocation

Bauform Construction type IM B5, IM V1[1], IM V3

Figure: Self-cooling system







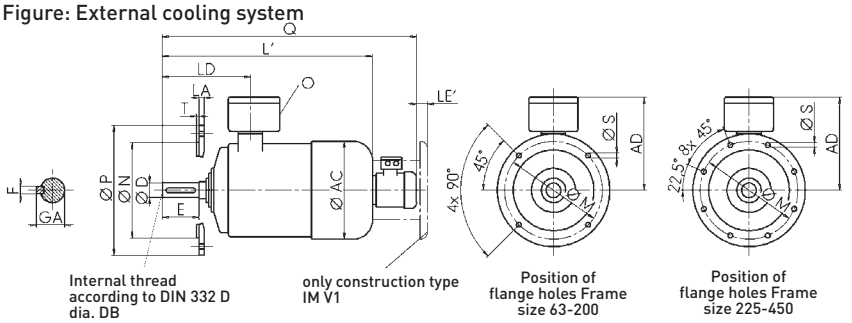
Frame size 63 in T4, unventilated
Mounting flange according to EN 50347, type FF.
Carrying lugs from frame size 90.
Measure AC measured from screw heads
Measure AD relates to terminal box Ex e.
The box can be rotated by 4x90°.
This also applies to the BD... series.
Frame sizes 400 to 450 only available in construction type V1.

Note:
1) Construction type IM V1 requires protective canopy, see LE measure on page 101; LC measure includes LE.

Type CD...	Mounting flange LA	M	N	P	S H17	T	AC	AD	L Number of poles 2	4	6	8	LC Number of poles 2	4	6	8
63M	9	115	95j6	140	10	3	134	164	239	239	239	239	274	274	274	274
71M	9	130	110j6	160	10	3,5	145	164	278	278	278	278	334	334	334	334
80M	12	165	130j6	200	12	3,5	163	180	313	313	313	313	387	387	387	387
90S	12	165	130j6	200	12	3,5	183	185	313	313	313	313	445	445	445	445
90L	12	165	130j6	200	12	3,5	183	185	364	364	364	364	445	445	445	445
100L	16	215	180j6	250	14,5	4	201	205	415	415	415	415	510	510	510	510
112M	16	215	180j6	250	14,5	4	225	205	424	425	425	425	526	526	526	526
132S+M	16	265	230j6	300	14,5	4	265	279	529	529	529	529	645	645	645	645
160M+L	20	300	250j6	350	18,5	5	318	317	713	676	676	676	864	864	864	831
180M	20	300	250j6	350	18,5	5	353	365	726	726	-	-	909	909	-	-
180L	20	300	250j6	350	18,5	5	353	365	-	726	726	726	-	909	909	909
200L	20	350	300h6	400	18,5	5	393	381	789	789	789	789	983	-	-	983

Type CD...	Mounting flange LA	M	N h6	P	S H17	T	AC	AD	L Number of poles 2	4	6	8	LC Number of poles 2	4	6	8
225S	22	400	350	450	18,5	5	455	409	-	936	-	-	-	1175	1175	-
225M	22	400	350	450	18,5	5	455	409	907	937	888	888	1111	1175	1175	1175
250M	18	500	450	550	18,5	5	493	471	1000	1000	934	934	1145	1145	1145	1145
280S	18	500	450	550	18,5	5	548	511	1109	1109	1109	1109	1251	1251	1185	1185
280M	18	500	450	550	18,5	5	548	511	1109	1109	1109	1109	1375	1375	1375	1375
315S	22	600	550	660	24	6	635	581	1268	1298	1218	1218	1543	1573	1573	1573
315M	22	600	550	660	24	6	635	581	1268	1298	1218	1218	1543	1573	1573	1573
315L1	22	600	550	660	24	6	635	581	1268	1298	1218	1298	1543	1573	1573	1573
315L2	22	600	550	660	24	6	635	581	1468	1498	1418	1498	1543	1573	1773	1773
315L3	22	600	550	660	24	6	635	581	1468	1498	1416	1498	1543	1573	1573	1573
355M	25	740	680	800	24	6	725	729	-	-	1597	1597	-	-	1980	1980
355L1	25	740	680	800	24	6	725	729	1667	1697	1597	1597	1825	1980	1980	1980
355L2	25	740	680	800	24	6	725	729	1667	1697	1597	1597	1950	1980	1980	1980
355L3	25	740	680	800	24	6	725	729	1747	1777	-	-	2030	2060	-	-
400S	28	940	880	1000	28	6	810	746	-	1907	1907	1907	-	2190	2190	2190
400M	28	940	880	1000	28	6	810	746	1837	1907	1907	1907	2120	2190	2190	2190
400L	28	940	880	1000	28	6	810	746	1837	1907	1907	1907	2120	2190	2190	2190
450S	28	940	880	1000	28	6	910	814	1838	1908	1908	1908	2140	2280	2180	2280
450M	28	940	880	1000	28	6	910	814	1838	1908	1908	1908	2140	2280	2180	2280
450L1	28	940	880	1000	28	6	910	814	1838	1908	1908	1908	2140	2280	2180	2280
450L2	28	940	880	1000	28	6	910	814	-	2053	2053	2053	-	2280	2180	2280

Figure: External cooling system



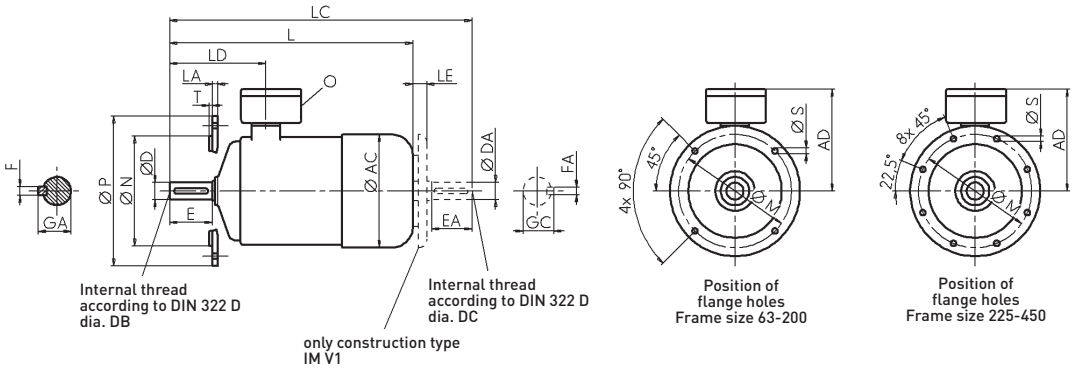
1) For types 250 to 400-4, 6, 8 with measures DA, EA, GC, FA and DC, the 2-pole specifications apply.
For type 450-6, 8 with measures DA, EA, GC, FA and DC, the 4-pole specifications apply

Type CD...	LD	LE Number of poles 2	4	6,8	O	Shaft end D,DA	E,EA	GA,GC	F,FA	DB,DC	Fan motor Type CD...	Type CD...F L' Number of poles 2	4,6,8	Q 2	4,6,8	LE'
63M	104	-	-	-	2x M25x1,5	11j6	23	12,5	4	M4	-	-	-	-	-	-
71M	111	25	25	25	2x M25x1,5	14j6	30	16	5	M5	-	-	-	-	-	-
80M	116	25	25	25	2x M25x1,5	19j6	40	21,5	6	M6	-	-	-	-	-	-
90S	137	25	25	25	2x M25x1,5	24j6	50	27	8	M8	-	-	-	-	-	-
90L	137	25	25	25	2x M25x1,5	24j6	50	27	8	M8	-	-	-	-	-	-
100L	149	30	30	30	2x M32x1,5	28j6	60	31	8	M10	-	-	-	-	-	-
112M	154	30	30	30	2x M32x1,5	28j6	60	31	8	M10	63M1-4	515	515	731	731	30
132S+M	226	30	30	30	2x M32x1,5	38k6	80	41	10	M12	63M1-4	606	606	822	822	36
160M+L	261	35	35	35	2x M40x1,5	42k6	110	45	12	M16	63M1-4	757	757	972	972	38
180M	369	63	63	-	2x M40x1,5	48k6	110	51,5	14	M16	63M1-4	746	746	960	960	38
180L	369	-	63	63	2x M40x1,5	48k6	110	51,5	14	M16	63M1-4	746	746	960	960	38
200L	390	74	74	74	2x M50x1,5	55m6	110	59	16	M20	63M1-4	803	803	1018	1018	38

Type CD...	LD		LE No. of poles 2	4	6,8	O	Shaft end Dm6,DAm6[1] 2	4	6,8	E,EA 2	4, 6,8	GA,GC[1] 2	4	6+8	F,FA[1] 2	4,6,8	DB,DC[1] 2	4,6,8	Fan motor Type CD...	Type CD...F L' Number of poles 2	4,6,8	Q 2	4,6,8	LE'
225S	-	377	-	85	85	2x M50x1,5	-	60	60	-	140	-	64	64	-	18	-	M20	63M1-4	-	938	-	1153	38
225M	347	377	85	85	85	2x M50x1,5	55	60	60	110	140	59	64	64	16	18	M20	M20	63M1-4	908	938	1123	1153	38
250M	482	482	94	94	94	2x M63x1,5	60	65	65	140	140	64	69	69	18	18	M20	M20	63M1-4	1019	1019	1234	1234	38
280S	483	483	110	110	110	2x M63x1,5	65	75	75	140	140	69	79,5	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
280M	483	483	110	110	110	2x M63x1,5	65	75	75	140	140	69	79,5	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
315S	496	526	115	115	115	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315M	496	526	115	115	115	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L1	496	526	115	115	115	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L2	496	526	115	115	115	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L3	496	526	115	115	115	2x M63x1,5	65	80	80	140	170	69	85	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
355M	672	702	130	130	130	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	-	-	-	-	-	-
355L1	672	702	130	130	130	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	80M1-4	1812	1842	2083	2113	40
355L2	672	702	130	130	130	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	80M1-4	1812	1842	2083	2113	40
355L3	672	702	130	130	130	2x M80x2	75	90	90	140	170	79.5	95	95	20	25	M20	M24	80M1-4	1892	1922	2163	2193	40
400S	716	786	130	130	130	2x M95x2	75	100	100	140	210	79,5	106	106	20	28	M20	M24	80M2-4	-	1907	-	2178	-
400M	716	786	130	130	130	2x M95x2	75	100	100	140	210	79,5	106	106	20	28	M20	M24	80M2-4	1837	1907	2108	2178	40
400L	716	786	130	130	130	2x M95x2	75	100	100	140	210	79,5	106	106	20	28	M20	M24	80M2-4	1837	1907	2108	2178	40
450S	704	774	130	130	130	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	1880	1950	2192	2262	40
450M	704	774	130	130	130	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	1880	1950	2192	2262	40
450L1	704	774	130	130	130	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	1880	1950	2192	2262	40
450L2	704	774	130	130	130	2x M95x2	75	100	110	140	210	79,5	106	116	20	28	M20	M24	90S-4	2025	2095	2337	2407	40

Construction type IM B5, IM V1[1)], IM V3

Figure: Self-cooling system



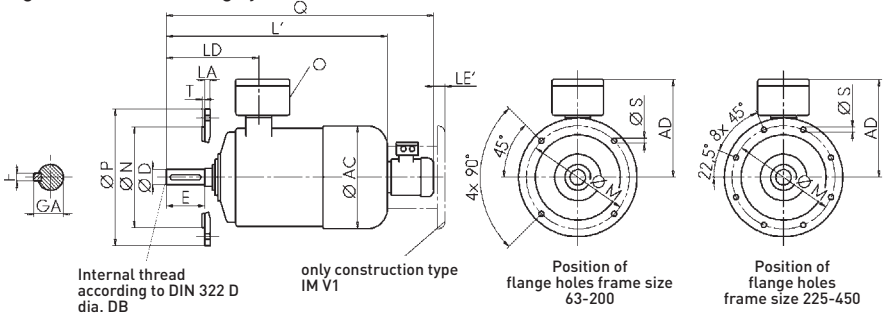
Type	Mounting flange LA	M	N	P	S H17	T	AC	AD	L Number of poles 2	4	6	8	LC Number of poles 2	4	6	8
CD...Y2/Y3/Y																
80M	12	165	130 j6	200	12	3,5	158	180	343	343	343	343	417	417	417	417
90S+L	12	165	130 j6	200	12	3,5	178	185	398	398	398	398	479	479	479	479
100L	16	215	180 j6	250	14,5	4	198	205	419	419	419	419	515	515	515	515
112M	16	215	180 j6	250	14,5	4	218	225	517	517	517	517	608	608	608	608
132S	16	265	230 j6	300	14,5	4	265	279	–	529	529	529	–	645	645	645
132S1	16	265	230 j6	300	14,5	4	265	279	529	–	–	–	645	–	–	–
132S2	16	265	230 j6	300	14,5	4	265	279	579	–	–	–	652	–	–	–
132M	16	265	230 j6	300	14,5	4	265	279	–	579	–	529	–	652	–	–
132M1	16	265	230 j6	300	14,5	4	265	279	–	–	529	–	–	–	645	645
132M2	16	265	230 j6	300	14,5	4	265	279	–	–	579	–	–	–	652	652
160M	20	300	250 j6	350	18,5	5	318	317	713	676	676	676	881	849	849	849
160L Y2	20	300	250 j6	350	18,5	5	318	317	713	676	676	676	881	849	849	849
160L Y3/Y	20	300	250 j6	350	18,5	5	318	317	713	711	711	676	811	884	884	849
180M	20	300	250 j6	350	18,5	5	353	365	726	726	–	–	909	909	–	–
180L Y2	20	300	250 j6	350	18,5	5	353	365	–	726	726	726	–	909	909	909
180L Y3/Y	20	300	250 j6	350	18,5	5	353	365	–	776	726	726	–	959	909	909
200L	20	350	300 h6	400	18,5	5	393	381	789	726	726	726	983	909	909	909

Type	Mounting flange LA	M	N h6	P	S H17	T	AC	AD	L Number of poles 2	4	6	8	LC Number of poles 2	4	6	8
CD...Y2/Y3/Y																
225S	22	400	350	450	18,5	5	455	409	–	937	–	888	–	1175	1175	1175
225M	22	400	350	450	18,5	5	455	409	907	937	888	888	1112	1175	1175	1175
250M	18	500	450	550	18,5	5	493	471	1000	1000	934	934	1250	1250	1184	1184
280S	18	500	450	550	18,5	5	548	512	1109	1109	1109	1109	1375	1375	1375	1375
280M	18	500	450	550	18,5	5	548	512	1109	1109	1109	1109	1375	1375	1375	1375
315S	22	600	550	660	24	6	635	582	1268	1298	1218	1218	1543	1573	1573	1573
315M	22	600	550	660	24	6	635	582	1268	1298	1218	1218	1543	1573	1573	1573
315L	22	600	550	660	24	6	635	582	1268	1298	1218	1298	1543	1573	1573	1573
315L2	22	600	550	660	24	6	635	582	1468	1498	1418	1498	1743	1773	1773	1773
315L3	22	600	550	660	24	6	635	582	1468	1498	1418	1498	1743	1773	1773	1773
355M	25	740	680	800	24	6	725	729	–	–	–	1697	–	–	–	1980

Type	Mounting flange LA	M	N h6	P	S H17	T	AC	AD	L Number of poles 2	4	6	8	LC Number of poles 2	4	6	8
CD...XY																
****																
250S	18	500	450	550	18,5	5	493	471	1000	1000	934	934	1250	1250	1184	1184
250M	18	500	450	550	18,5	5	548	512	1109	1109	1109	1109	1375	1375	1375	1375
280S	18	500	450	550	18,5	5	548	512	1109	1109	1109	1109	1375	1375	1375	1375
280M	22	600	550	550	18,5	5	635	582	1268	1268	1268	1268	1543	1543	1543	1543
315S	22	600	550	660	24	6	635	581	1268	1298	1298	1298	1543	1573	1573	1573
315M	22	600	550	660	24	6	635	581	1268	1298	1298	1298	1543	1573	1573	1573
315L1	22	600	550	660	24	6	635	581	1468	1498	1298	1298	1743	1773	1573	1573
315L2	22	600	550	660	24	6	635	581	–	–	1498	1498	–	–	1773	1773

**** British Allocation

Figure: External cooling system



Mounting flange according to EN 50347, type FF. Carrying lugs from frame size 90. Measure AC measured from screw head Measure AD refers to terminal box Ex e. The box can be rotated 4x90°.

Note:

1) Construction type IM V1 requires fan canopy, see LE measure; LC measure includes LE.
2) For types 250 to 315-4,6,8 with measures DA, EA, GC, FA and DC, the 2-pole specifications apply.

Type CD...Y2/Y3/Y	LD	LE Number of poles 2	4	6	8	O	Shaft end D,DA	E, EA	GA,GC	F,FA	DB,DC	Fan motor Type CD...	Type CD...Y2F/Y3F/YF L' Number of poles 2	4	6	8	Q 2	4	6	8	LE'
80M	127	25	25	25	25	2x M25x1,5	19 j6	40	21,5	6	M6	–	–	–	–	–	–	–	–	–	–
90S+L	139	25	25	25	25	2x M25x1,5	24 j6	50	27	8	M8	–	–	–	–	–	–	–	–	–	–
100L	154	30	30	30	30	2x M32x1,5	28 j6	60	31	8	M10	–	–	–	–	–	–	–	–	–	–
112M	189	30	30	30	30	2x M32x1,5	28 j6	60	31	8	M10	63M1-4	515	515	515	515	731	731	731	731	30
132S	226	30	30	30	30	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	606	606	606	–	822	822	822	36
132S1	226	30	30	30	30	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	606	–	–	–	822	822	822	822	36
132S2	226	30	30	30	30	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	656	–	–	–	872	–	–	–	38
132M	226	30	30	30	30	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	656	–	606	–	872	–	822	38
132M1	226	30	30	30	30	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	–	606	–	–	–	822	–	38
132M2	226	30	30	30	30	2x M32x1,5	38 k6	80	41	10	M12	63M1-4	–	–	656	–	–	–	872	–	38
160M	261	35	35	35	35	2x M40x1,5	42 k6	110	45	12	M16	63M1-4	757	757	757	757	972	972	972	972	38
160L Y2	261	35	35	35	35	2x M40x1,5	42 k6	110	45	12	M16	63M1-4	757	757	757	757	972	972	972	972	38
160L Y3/Y	261	35	35	35	35	2x M40x1,5	42 k6	110	45	12	M16	63M1-4	757	792	792	757	972	1007	1007	972	38
180M	369	63	63	–	–	2x M40x1,5	48 k6	110	51,5	14	M16	63M1-4	746	746	–	–	960	960	–	–	38
180L Y2	369	–	63	63	63	2x M40x1,5	48 k6	110	51,5	14	M16	63M1-4	–	746	746	746	–	960	960	960	38
180L Y3/Y	369	–	63	63	63	2x M40x1,5	48 k6	110	51,5	14	M16	63M1-4	–	756	746	746	–	1010	960	960	38
200L	390	74	74	74	74	2x M50x1,5	55 m6	110	59	16	M20	63M1-4	803	803	803	–	1018	1018	1018	–	38

Type	LD Number of poles 2	4,6,8	LE Number of poles 2	4	6,8	O	Shaft end Dm6, DAm6[2] 2	4,6,8	E, EA[2] 2	4,6,8	GA, GC[2] 2	4,6,8	F,FA[2] 2	4,6,8	DB, DC[2] 2	4,6,8	Fan motor Type CD...	Type CD...Y2F/Y3F/YF L' Number of poles 2	4, 6, 8	Q 2	4, 6, 8	LE'
225S	–	1175	1175	–	377	2xM50x1,5	–	60	–	140	–	64	–	18	–	M20	63M1-4	–	938	–	1153	38
225M	1112	1175	1175	347	377	2xM50x1,5	55	60	110	140	59	64	16	18	M20	M20	63M1-4	908	938	1123	1153	38
250M	1250	1250	1184	482	482	2xM63x1,5	60	65	140	140	64	69	18	18	M20	M20	63M1-4	1019	1019	1234	1234	38
280S	1375	1375	1375	483	483	2xM63x1,5	65	75	140	140	69	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
280M	1375	1375	1375	483	483	2xM63x1,5	65	75	140	140	69	79,5	18	20	M20	M20	71M2-4	1140	1140	1387	1387	41
315S	1543	1573	1573	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315M	1543	1573	1573	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L1	1543	1573	1573	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1283	1313	1529	1559	42
315L2	1743	1773	1573	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1483	1513	1729	1759	42
315L3	1743	1773	1773	496	526	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20	71M2-4	1483	1513	1729	1759	42
355M	–	–	1980	–	702	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24	–	–	–	–	–	–

Type CD...XY ****	LD Number of poles 2	4,6,8	LE Number of poles 2	4	6,8	O	Shaft end Dm6, DAm6[2] 2	4,6,8	E, EA[2] 2	4,6,8	GA, GC[2] 2	4,6,8	F,FA[2] 2	4,6,8	DB, DC[2] 2	4,6,8
250S	482	482	94	94	94	2xM63x1,5	60	65*	140	140	64	69	18	18	M20	M20
250M	483	483	110	110	110	2xM63x1,5	60	65*	140	140	69	79,5	18	20	M20	M20
280S	483	483	110	110	110	2xM63x1,5	65	75**	140	140	69	79,5	18	20	M20	M20
280M	496	526	115	115	115	2xM63x1,5	65	75**	140	140	69	85	18	22	M20	M20
315S	496	526	115	115	115	2xM63x1,5	65	80***	140	170	69	85	18	22	M20	M20
315M	496	526	115	115	115	2xM63x1,5	65	80***	140	170	69	85	18	22	M20	M20
315L1	496	526	115	115	115	2xM63x1,5	65	80***	140	170	69	85	18	22	M20	M20
315L2	496	526	115	115	115	2xM63x1,5	65	80***	140	170	69	85	18	22	M20	M20

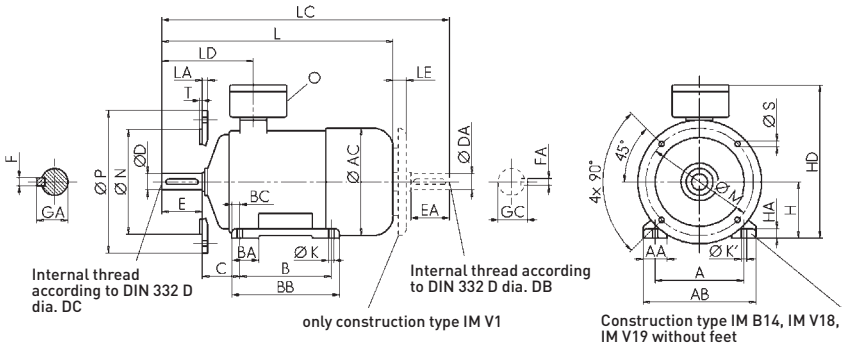
* Diameter 70 for British Allocation on request - please note: Measure GA becomes 74.5 and measure F becomes 20.

** Diameter 80 for British Allocation on request - please note: Measures L, LC, LD and E become 30mm longer, measure GA becomes 85 and measure F becomes 22

*** Diameter 85 for British Allocation on request - please note: Measure GA becomes 90 and measure F corresponds to the catalog.

**** British Allocation

Construction type IM B14, IM B34, IM V17[1)], IM V18[1)], IM V19, IM V37



Frame size 63 in T4, unventilated
Mounting flange according to EN 50347, type FF.
Carrying lugs from frame size 90.
Measure AC measured from screw heads
Measure HD refers to terminal box Ex e.
The box can be rotated by 4x90°.
This also applies to the BD... series.

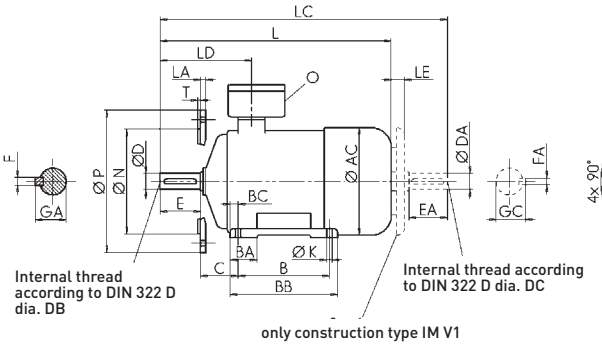
Note:
1) For construction type IM V17 and IM V18 fan canopy required

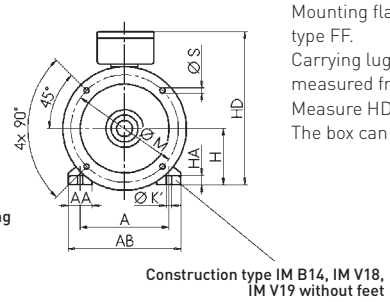
Type CD...	A	AA	AB	AC	B	BA	BB	BC	C	H -0,5	HA	HD	K H17	K' H17
63M	100	20	120	134	80	25	100	10	40	63	6	227	Ø 7	–
71M	112	30	139	145	90	25	110	10	45	71	10	235	Ø 7	–
80M	125	35	160	163	100	35	130	15	50	80	12	260	Ø 10	–
90S	140	40	180	183	100	40	130	15	56	90	12	275	Ø 10	–
90L	140	40	180	183	125	40	155	15	56	90	12	275	Ø 10	–
100L	160	45	200	201	140	45	175	17,5	63	100	15	305	Ø 12	–
112M	190	50	235	225	140	50	175	17,5	70	112	17	317	Ø 12	–
132S	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132M	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–

Type CD...	L	LC	LE	LD	O	Shaft end D, DA	E, EA	GA, GC	F, FA	DB, DC
63M	239	274	-	104	2x M25x1,5	11j6	23	12,5	4	M4
71M	278	334	25	111	2x M25x1,5	14j6	30	16	5	M5
80M	313	387	25	116	2x M25x1,5	19j6	40	21,5	6	M6
90S+L	364	445	25	137	2x M25x1,5	24j6	50	27	8	M8
100L	415	510	30	149	2x M32x1,5	28j6	60	31	8	M10
112M	425	526	30	154	2x M25x1,5	28j6	60	31	8	M10
132S+M	529	645	30	226	2x M25x1,5	38k6	80	41	10	M12

Type CD...	Mounting flange LA	M	N j6	P	S	T
63M	8	75	60	90	M5	2,5
71M	8	85	70	105	M6	2,5
80M	10	100	80	120	M6	3
90S+L	10	115	95	140	M8	3
100L	12	130	110	160	M8	3,5
112M	12	130	110	160	M8	3,5
132S+M	12	165	130	200	M10	3,5

Construction type IM B14, IM B34, IM V17[1)], IM V18[1)], IM V19, IM V37





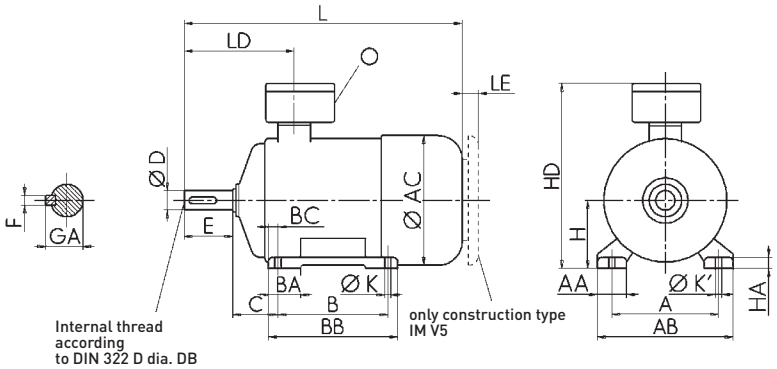
Mounting flange according to EN 50347, type FF.
Carrying lugs from frame size 90. Measure AC measured from screw head.
Measure HD refers to terminal box Ex e.
The box can be rotated by 4x90°.

Type CD...Y2/Y3/Y	A	AA	AB	AC	B	BA	BB	BC	C	H -0,5	HA	HD	K H17	K' H17
80M	125	35	160	158	100	37	130	15	50	80	12	271	Ø 10	–
90S	140	38	180	178	100	44	130	15	56	90	12	295	Ø 10	–
90L	140	38	180	178	125	44	155	15	56	90	12	295	Ø 10	–
100L	160	42	200	198	140	46	175	17,5	63	100	15	311	Ø 12	–
112M	190	45	235	218	140	46	175	17,5	70	112	17	337	Ø 12	–
132S	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132S1	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132S2	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132M	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–
132M1	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–
132M2	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–

Type	L Number of poles				LC Number of poles				LE	LD	O
CD...Y2/Y3/Y	2	4	6	8	2	4	6	8			
80M	343	343	343	343	417	417	417	417	25	127	2x M25x1,5
90S+L	398	398	398	398	479	479	479	479	25	139	2x M25x1,5
100L	419	419	419	419	515	515	515	515	30	154	2x M32x1,5
112M	517	517	517	517	608	608	608	608	30	189	2x M32x1,5
132S	–	529	529	529	–	645	645	645	30	226	2x M32x1,5
132S1	529	–	–	–	645	–	–	–	30	226	2x M32x1,5
132S2	579	–	–	–	652	–	–	–	30	226	2x M32x1,5
132M	–	579	–	529	–	652	645	645	30	226	2x M32x1,5
132M1	–	–	529	–	–	–	645	645	30	226	2x M32x1,5
132M2	–	–	579	–	–	–	652	652	30	226	2x M32x1,5

Type	Shaft end D,DA	E,EA	GA,GC	F,FA	DA,DC	Mounting flange LA	M	N j6	P	S	T
CD...Y2/Y3/Y											
80M	19 j6	40	21,5	6	M6	10	100	80	120	M6	3
90S+L	24 j6	50	27	8	M8	10	115	95	140	M8	3
100L	28 j6	60	31	8	M10	12	130	110	160	M8	3,5
112M	28 j6	60	31	8	M10	12	130	110	160	M8	3,5
132S+M	38 k6	80	41	10	M12	12	165	130	200	M10	3,5

Noise classes 2 and 3
Construction type IM B3, IM B6, IM B7, IM B8, IM V5[1)], IM V6



All motors have carrying lugs.
Measure AC measured from screw heads
Measure HD refers to "terminal box Ex e".
The box can be rotated by 4x90°.
This also applies to the BD... series.

Note:
1) Construction type IM V5 requires fan canopy, see LE measure on page 101.

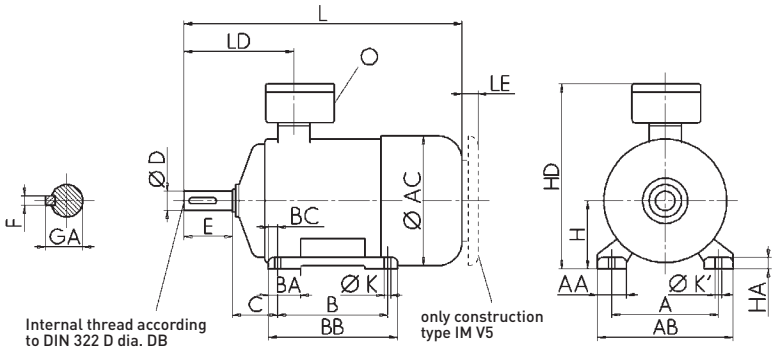
Type CD...A CD...AR	A	AA	AB	AC	B	BA	BB	BC	C	H-0,5	HA	HD	K H17	K' H17
132S	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132M	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–
160M	254	65	310	318	210	100	300	23	108	160	25	477	15	20
160L	254	65	310	318	254	100	300	23	108	160	25	477	15	20
180M	279	75	350	353	241	100	340	30	121	180	25	545	15	20
180L	279	75	350	353	279	100	340	30	121	180	25	545	15	20
200L	318	80	390	393	305	90	365	30	133	200	30	581	20	26

Type CD... A CD...AR	A	AA	AB	AC	B	BA	BB	BC	C	H	HA	HD	K H17	K' H17
225S	356	85	450	455	286	90	370	29,5	149	225-0,5	35	634	20	26
225M	356	85	450	455	311	90	370	29,5	149	225-0,5	35	634	20	26
250M	406	105	510	493	349	110	420	35,5	168	250-0,5	40	721	26	35
280S	457	110	570	548	368	120	500	40,5	190	280-1	45	791	26	35
280M	457	110	570	548	419	120	500	40,5	190	280-1	45	791	26	35
315S	508	150	630	635	406	210	615	53	216	315-1	40	896	39	30
315M	508	150	630	635	457	210	615	53	216	315-1	40	896	39	30
315L1	508	150	630	635	508	210	615	53	216	315-1	40	896	39	30
315L2	508	150	630	635	508	210	615	53	216	315-1	40	896	39	30
315L3	508	150	630	635	508	210	615	53	216	315-1	40	896	39	30
355M	610	180	720	725	560	220	720	45	254	355-1	50	1084	30	39
355L1	610	180	720	725	630	220	720	45	254	355-1	50	1084	30	39
355L2	610	180	720	725	630	220	720	45	254	355-1	50	1084	30	39
355L3	610	180	720	725	630	220	720	45	254	355-1	50	1084	30	39

Type CD...A CD...AR	L Number of poles 2	4	LD	O	Shaft end D	E	GA	F	DB
132S	582	582	226	2x M32x1,5	38k6	80	41	10	M12
132M	582	582	226	2x M32x1,5	38k6	80	41	10	M12
160M	732	732	261	2x M40x1,5	42k6	110	45	12	M16
160L	732	732	261	2x M40x1,5	42k6	110	45	12	M16
180M	741	741	369	2x M40x1,5	48k6	110	51,5	14	M16
180L	-	754	369	2x M40x1,5	48k6	110	51,5	14	M16
200L	795	815	390	2x M50x1,5	55m6	110	59	16	M20

Type CD...A CD...AR	L Number of poles 2	4	LD Number of poles 2	4	O	Shaft end Dm6 2	4	E 2	4	GA 2	4	F 2	4	DB 2	4
225S	-	932	-	377	2x M50x1,5	-	60	-	140	-	64	-	18	-	M20
225M	902	932	347	377	2x M50x1,5	55	60	110	140	59	64	16	18	M20	M20
250M	1014	1014	482	482	2x M63x1,5	60	65	140	140	64	69	18	18	M20	M20
280S	1123	1123	483	483	2x M63x1,5	65	75	140	140	69	79,5	18	20	M20	M20
280M	1123	1123	483	483	2x M63x1,5	65	75	140	140	69	79,5	18	20	M20	M20
315S	1232	1294	496	526	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315M	1232	1294	496	526	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L1	1232	1294	496	526	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L2	1432	1494	496	526	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L3	1432	1494	496	526	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
355M	1682	1682	672	702	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24
355L1	1682	1682	672	702	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24
355L2	1682	1682	672	702	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24
355L3	1762	1762	672	702	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24

Noise classes 2 and 3
Construction type IM B3, IM B6, IM B7, IM B8, IM V5[1)], IM V6



All motors have carrying lugs.
Measure AC measured from screw head
Measure HD refers to terminal box Ex e.
The box can be rotated 4x90°.

Note:
1) Construction type IM V5 with protective canopy, for measure LE see page 101.

Type CD...Y2/Y3/Y A CD...Y2/Y3/Y AR	A	AA	AB	AC	B	BA	BB	BC	C	H -0,5	HA	HD	K H17	K' H17
132S	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132S1	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132S2	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–
132M	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–
132M1	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–
132M2	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–
160M	254	65	310	318	210	100	300	23	108	160	25	477	15	20
160L Y2	254	65	310	318	254	100	300	23	108	160	25	477	15	20
160L Y3/Y	254	65	310	318	254	100	300	23	108	160	25	477	15	20
180M	279	75	350	353	241	100	340	30	121	180	25	545	15	20
180L Y2	279	75	350	353	279	100	340	30	121	180	25	545	15	20
180L Y3/Y	279	75	350	353	279	100	340	30	121	180	25	545	15	20
200L	318	80	390	393	305	90	365	30	133	200	30	581	20	26
Type CD...Y2/Y3/Y A CD...Y2/Y3/Y AR	**A**	**AA**	**AB**	**AC**	**B**	**BA**	**BB**	**BC**	**C**	**H**	**HA**	**HD**	**K H17**	**K' H17**
225S	356	85	450	455	286	90	370	29,5	149	225 -0,5	35	634	20	26
225M	356	85	450	455	311	90	370	29,5	149	225 -0,5	35	634	20	26
250M	406	105	510	493	349	110	420	35,5	168	250 -0,5	40	721	26	35
280S	457	110	570	548	368	120	500	40,5	190	280 -1	45	792	26	35
280M	457	110	570	548	419	120	500	40,5	190	280 -1	45	792	26	35
315S	508	150	630	635	406	210	615	53	216	315 -1	40	897	39	30
315M	508	150	630	635	457	210	615	53	216	315 -1	40	897	39	30
315L1	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30
315L2	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30
315L3	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30
355M	610	180	720	725	560	220	720	45	254	355 -1	50	1084	30	39
Type CD...XY A** CD...XY AR****	**A**	**AA**	**AB**	**AC**	**B**	**BA**	**BB**	**BC**	**C**	**H**	**HA**	**HD**	**K H17**	**K' H17**
250S	406	115	510	493	311	130	420	35,5	168	250 -0,5	35	721	22	22
250M	406	105	510	548	349	-	420	30	168	250 -0,5	45	762	26	26
280S	457	110	570	548	368	120	500	40,5	190	280 -1	45	792	26	35
280M	457	110	560	635	419	-	570	40	190	280 -1	48	862	26	26
315S	508	150	630	635	406	210	615	53	216	315 -1	40	897	39	30
315M	508	150	630	635	457	210	615	53	216	315 -1	40	897	39	30
315L1	508	150	630	635	508	210	615	53	216	315 -1	40	897	39	30

**** British Allocation

Note:
2) For types 250 to 315-4 with measure DA, EA, GC, FA and DC, the 2-pole specifications apply.

Type CD...Y2/Y3/Y A	L Number of poles		LD	O	Shaft end D,DA	E,EA	GA,GC	F,FA	DB,DC
CD...Y2/Y3/Y AR	2	4							
132S	–	582	226	2x M32x1,5	38 k6	80	41	10	M12
132S1	582	–	226	2x M32x1,5	38 k6	80	41	10	M12
132S2	632	–	226	2x M32x1,5	38 k6	80	41	10	M12
132M	–	632	226	2x M32x1,5	38 k6	80	41	10	M12
132M1	–	–	226	2x M32x1,5	38 k6	80	41	10	M12
132M2	–	–	226	2x M32x1,5	38 k6	80	41	10	M12
160M	732	732	261	2x M40x1,5	42 k6	110	45	12	M16
160L Y2	732	732	261	2x M40x1,5	42 k6	110	45	12	M16
160L Y3/Y	732	767	261	2x M40x1,5	42 k6	110	45	12	M16
180M	741	741	369	2x M40x1,5	48 k6	110	51,5	14	M16
180L Y2	–	755	369	2x M40x1,5	48 k6	110	51,5	14	M16
180L Y3/Y	–	805	369	2x M40x1,5	48 k6	110	51,5	14	M16
200L	795	815	390	2x M50x1,5	55 m6	110	59	16	M20

Type	L		LD		O	Shaft end									
CD...Y2/Y3/Y A	Number of poles		Number of poles			Dm6,		DAm6[2]		E, EA[2]		GA, GC[2]		F,FA[2]		DB, DC[2]	
CD...Y2/Y3/Y AR	2	4	2	4		2		4		2	4	2	4	2	4	2	4
225S	–	932	–	377	2xM50x1,5	–		60		–	140	–	64	–	18	–	M20
225M	902	932	347	377	2xM50x1,5	55		60		110	140	59	64	16	18	M20	M20
250M	1015	1015	482	482	2xM63x1,5	60		65		140	140	64	69	18	18	M20	M20
280S	1124	1124	483	483	2xM63x1,5	65		75		140	140	69	79,5	18	20	M20	M20
280M	1124	1124	483	483	2xM63x1,5	65		75		140	140	69	79,5	18	20	M20	M20
315S	1233	1295	496	526	2xM63x1,5	65		80		140	170	69	85	18	22	M20	M20
315M	1233	1295	496	526	2xM63x1,5	65		80		140	170	69	85	18	22	M20	M20
315L1	1233	1295	496	526	2xM63x1,5	65		80		140	170	69	85	18	22	M20	M20
315L2	1433	1495	496	526	2xM63x1,5	65		80		140	170	69	85	18	22	M20	M20
315L3	1433	1495	496	526	2xM63x1,5	65		80		140	170	69	85	18	22	M20	M20
355M	1682	1682	672	702	2x M80x2	75		90		140	170	79,5	95	20	25	M20	M24

Type	L		LD		O	Shaft end									
CD...XY A****	Number of poles		Number of poles			Dm6,		DAm6[2]		E, EA[2]		GA, GC[2]		F,FA[2]		DB, DC[2]	
CD...XY AR****	2	4	2	4		2		4		2	4	2	4	2	4	2	4
250S	1015	1015	482	482	2xM63x1,5	60		65*		140	140	64	69*	18	18*	M20	M20
250M	1124	1124	483	483	2xM63x1,5	60		65*		140	140	64	69*	18	18*	M20	M20
280S	1124	1124	483	483	2xM63x1,5	65		75**		140	140**	69	79,5**	18	20**	M20	M20
280M	1233	1295	496	496	2xM63x1,5	65		75**		140	140**	69	79,5**	18	20**	M20	M20
315S	1268	1298	496	526	2xM63x1,5	65		80***		140	170	69	85***	18	22	M20	M20
315M	1268	1298	496	526	2xM63x1,5	65		80***		140	170	69	85***	18	22	M20	M20
315L1	1468	1498	496	526	2xM63x1,5	65		80***		140	170	69	85***	18	22	M20	M20

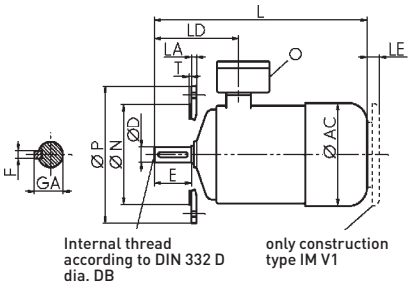
* Diameter 70 for British Allocation on request - please note: Measure becomes 74.5 and measure F becomes 20

** Diameter 80 for British Allocation on request - please note: Measures L, LC, LD and E become 30mm longer, measure GA becomes 85 and measure F becomes 22.

*** Diameter 85 for British Allocation on request - please note: Measure GA becomes 90 and measure F corresponds to the catalog

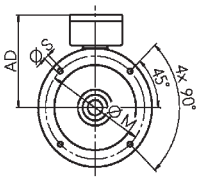
**** British Allocation

Noise classes 2 and 3
Construction type IM B5, IM V1[1)], IM V3

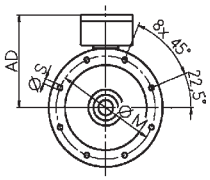


Internal thread according to DIN 332 D dia. DB

only construction type IM V1



Position of flange holes Frame size 132-200



Position of flange holes Frame size 225-355

Mounting flange according to EN 50347, type FF.
All motors have carrying lugs.
Measure AC measured from screw heads
Measure AD refers to terminal box Ex e.
The box can be rotated by 4x90°.
This also applies to the BD... series.

Note:
1) Construction type IM V1 requires fan canopy

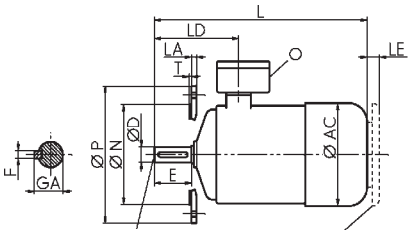
Type CD...A CD...AR	Mounting flange LA	M	N	P	S H17	T	AC	AD	L Number of poles 2	4	LD
132S	16	265	230j6	300	14,5	4	265	279	582	582	226
132M	16	265	230j6	300	14,5	4	265	279	582	582	226
160M	20	300	250j6	350	18,5	5	318	317	732	732	261
160L	20	300	250j6	350	18,5	5	318	317	732	732	261
180M	20	300	250j6	350	18,5	5	353	365	741	741	369
180L	20	300	250j6	350	18,5	5	353	365	-	754	369
200L	20	350	300h6	400	18,5	5	393	381	798	804	390

Type CD...A CD...AR	Mounting flange LA	M	N h6	P	S H17	T	AC	AD	L Number of poles 2	4	LD Number of poles 2	4
225S	22	400	350	450	18,5	5	455	409	-	932	-	377
225M	22	400	350	450	18,5	5	455	409	902	932	347	377
250M	18	500	450	550	18,5	5	493	471	1014	1014	482	482
280S	18	500	450	550	18,5	5	548	511	1123	1123	483	483
280M	18	500	450	550	18,5	5	548	511	1123	1123	483	483
315S	22	600	550	660	24	6	635	581	1232	1294	496	526
315M	22	600	550	660	24	6	635	581	1232	1294	496	526
315L1	22	600	550	660	24	6	635	581	1232	1294	496	526
315L2	22	600	550	660	24	6	635	581	1432	1494	496	526
315L3	22	600	550	660	24	6	635	581	1432	1494	496	526
355M	25	740	680	800	24	6	725	729	1682	1682	672	702
355L1	25	740	680	800	24	6	725	729	1682	1682	672	702
355L2	25	740	680	800	24	6	725	729	1682	1682	672	702
355L3	25	740	680	800	24	6	725	729	1762	1762	672	702

Type CD...A CD...AR	LE	O	Shaft end D	E	GA	F	DB
132S	30	2x M32x1,5	38k6	80	41	10	M12
132M	30	2x M32x1,5	38k6	80	41	10	M12
160M	63	2x M40x1,5	42k6	110	45	12	M16
160L	63	2x M40x1,5	42k6	110	45	12	M16
180M	63	2x M40x1,5	48k6	110	51,5	14	M16
180L	63	2x M40x1,5	48k6	110	51,5	14	M16
200L	74	2x M50x1,5	55m6	110	59	16	M20

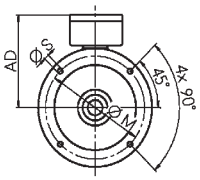
Type CD...A CD...AR	LE	O	Shaft end D m6		E		GA		F		DB	
			2	4	2	4	2	4	2	4	2	4
225S	85	2x M50x1,5	-	60	-	140	-	64	-	18	-	M20
225M	85	2x M50x1,5	55	60	110	140	59	64	16	18	M20	M20
250M	95	2x M63x1,5	60	65	140	140	64	69	18	18	M20	M20
280S	110	2x M63x1,5	65	75	140	140	69	79,5	18	20	M20	M20
280M	110	2x M63x1,5	65	75	140	140	69	79,5	18	20	M20	M20
315S	125	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315M	125	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L1	125	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L2	125	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L3	125	2x M63x1,5	65	80	140	170	69	85	18	22	M20	M20
355M	130	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24
355L1	130	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24
355L2	130	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24
355L3	130	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24

Noise classes 2 and 3
Construction type IM B5, IM V1[1)], IM V3

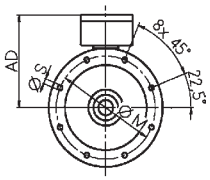


Internal thread according to DIN 322 D dia. DB

only construction type IM V1



Position of flange holes Frame size 132-200



Position of flange holes Frame size 225-355

All motors have carrying lugs.
Measure AC measured from screw head.
Measure HD refers to terminal box Ex e.
The box can be rotated 4x90°.

Note:
1) Construction type IM V1 with fan canopy, for measure LE see page 101.

Type CD...Y2/Y3/Y A CD...Y2/Y3/Y AR	Mounting flange LA	M	N	P	S H17	T	AC	AD	L Number of poles 2	4	LD
132S	16	265	230j6	300	14,5	4	265	279	-	582	226
132S1	16	265	230j6	300	14,5	4	265	279	582	-	226
132S2	16	265	230j6	300	14,5	4	265	279	632	-	226
132M	16	265	230j6	300	14,5	4	265	279	-	632	226
132M1	16	265	230j6	300	14,5	4	265	279	-	-	226
132M2	16	265	230j6	300	14,5	4	265	279	-	-	226
160M	20	300	250j6	350	18,5	5	318	317	732	732	261
160L Y2	20	300	250j6	350	18,5	5	318	317	732	732	261
160L Y3/Y	20	300	250j6	350	18,5	5	318	317	732	767	261
180M	20	300	250j6	350	18,5	5	353	365	741	741	369
180L Y2	20	300	250j6	350	18,5	5	353	365	-	755	369
180L Y3/Y	20	300	250j6	350	18,5	5	353	365	-	805	369
200L	20	350	300h6	400	18,5	5	393	381	795	815	390

Type CD...Y2/Y3/Y A CD...Y2/Y3/Y AR	Mounting flange LA	M	N h6	P	S H17	T	AC	AD	L Number of poles 2	4	LD Number of poles 2	4
225S	22	400	350	450	18,5	5	455	409	-	932	-	377
225M	22	400	350	450	18,5	5	455	409	902	932	347	377
250M	18	500	450	550	18,5	5	493	471	1015	1015	482	482
280S	18	500	450	550	18,5	5	548	512	1124	1124	483	483
280M	18	500	450	550	18,5	5	548	512	1124	1124	483	483
315S	22	600	550	660	24	6	635	582	1233	1295	496	526
315M	22	600	550	660	24	6	635	582	1233	1295	496	526
315L1	22	600	550	660	24	6	635	582	1233	1295	496	526
315L2	22	600	550	660	24	6	635	582	1433	1495	496	526
315L3	22	600	550	660	24	6	635	582	1433	1495	496	526
355M	25	740	680	800	24	6	725	729	1682	1682	672	702

Type CD...Y2/Y3/Y A**** CD...Y2/Y3/Y AR ****	Mounting flange LA	M	N h6	P	S H17	T	AC	AD	L Number of poles 2	4	LD Number of poles 2	4
250S	18	500	450	550	18,5	5	493	471	1015	1015	482	482
250M	18	500	450	550	18,5	5	548	512	1124	1124	483	483
280S	18	500	450	550	18,5	5	548	512	1124	1124	483	483
280M	22	600	550	550	18,5	5	635	582	1233	1295	496	526
315S	22	600	550	660	24	6	635	582	1233	1295	496	526
315M	22	600	550	660	24	6	635	582	1233	1295	496	526
315L1	22	600	550	660	24	6	635	582	1233	1295	496	526

Note:
2) For types 250 to 315-4 with measures DA, EA, GC, FA and DC, the 2-pole specifications apply.

Type CD...Y2/Y3/Y A CD...Y2/Y3/Y AR	LE	O	Shaft end D		E		GA		F		DB	
132S	30	2x M32x1,5	38 k6		80		41		10		M12	
132S1	30	2x M32x1,5	38 k6		80		41		10		M12	
132S2	30	2x M32x1,5	38 k6		80		41		10		M12	
132M	30	2x M32x1,5	38 k6		80		41		10		M12	
132M1	30	2x M32x1,5	38 k6		80		41		10		M12	
132M2	30	2x M32x1,5	38 k6		80		41		10		M12	
160M	63	2x M40x1,5	42 k6		110		45		12		M16	
160L Y2	63	2x M40x1,5	42 k6		110		45		12		M16	
160L Y3/Y	63	2x M40x1,5	42 k6		110		45		12		M16	
180M	63	2x M40x1,5	48 k6		110		51,5		14		M16	
180L Y2	63	2x M40x1,5	48 k6		110		51,5		14		M16	
180L Y3/Y	63	2x M40x1,5	48 k6		110		51,5		14		M16	
200L	74	2x M50x1,5	55 m6		110		59		16		M20	
Type CD...Y2/Y3/Y A CD...Y2/Y3/Y AR	LE	O	Shaft end D m6, DA m6[2]		E, EA[2]		GA, GC[2]		F,FA[2]		DB, DC[2]	
			2	4	2	4	2	4	2	4	2	4
225S	85	2xM50x1,5	-	60	-	140	-	64	-	18	-	M20
225M	85	2xM50x1,5	55	60	110	140	59	64	16	18	M20	M20
250M	95	2xM63x1,5	60	65	140	140	64	69	18	18	M20	M20
280S	110	2xM63x1,5	65	75	140	140	69	79,5	18	20	M20	M20
280M	110	2xM63x1,5	65	75	140	140	69	79,5	18	20	M20	M20
315S	125	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20
315M	125	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L1	125	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L2	125	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20
315L3	125	2xM63x1,5	65	80	140	170	69	85	18	22	M20	M20
355M	130	2x M80x2	75	90	140	170	79,5	95	20	25	M20	M24
Type CD...Y2/Y3/Y A**** CD...Y2/Y3/Y AR****	LE	O	Shaft end D m6, DA m6[2]		E, EA[2]		GA, GC[2]		F,FA[2]		DB, DC[2]	
			2	4	2	4	2	4	2	4	2	4
250S	95	2xM63x1,5	60	65*	140	140	64	69*	18	18*	M20	M20
250M	110	2xM63x1,5	60	65*	140	140	64	69*	18	18*	M20	M20
280S	110	2xM63x1,5	65	75**	140	140**	69	79,5**	18	20**	M20	M20
280M	125	2xM63x1,5	65	75**	140	140**	69	79,5**	18	20**	M20	M20
315S	125	2xM63x1,5	65	80***	140	170	69	85***	18	22	M20	M20
315M	125	2xM63x1,5	65	80***	140	170	69	85***	18	22	M20	M20
315L1	125	2xM63x1,5	65	80***	140	170	69	85***	18	22	M20	M20

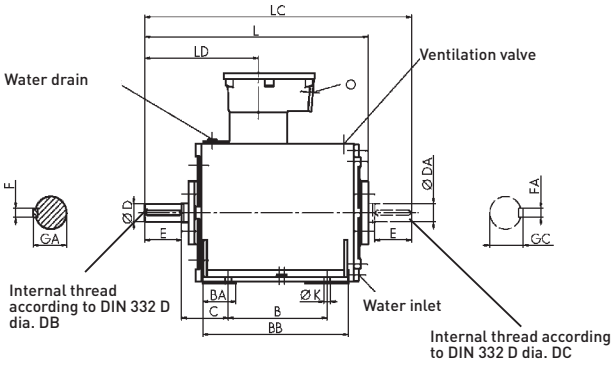
* Diameter 70 for British Allocation on request - please note: Measure becomes 74.5 and measure F becomes 20

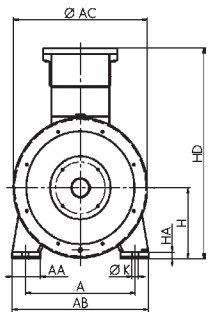
** Diameter 80 for British Allocation on request - please note: Measures L, LC, LD and E become 30mm longer, measure GA becomes 85 and measure F becomes 22.

*** Diameter 85 for British Allocation on request - please note: Measure GA becomes 90 and measure F corresponds to the catalog.

**** British Allocation

Noise class 4
Construction type IM B3, IM B6, IM B7, IM B8, IM V5, IM V6

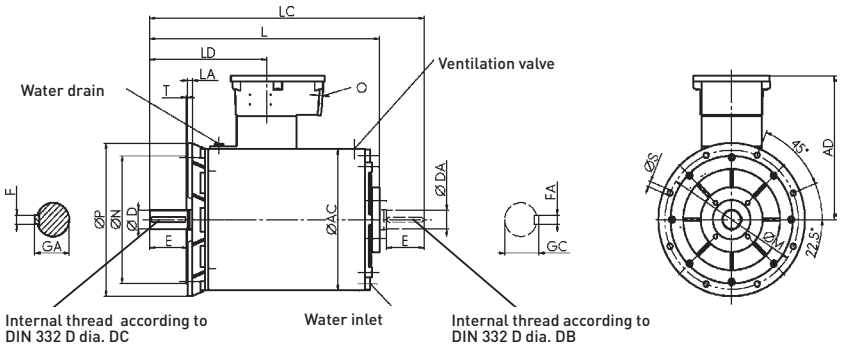




All motors have carrying lugs.
The box can be rotated by 4x90°.
Measure HD refers to terminal box Ex e.

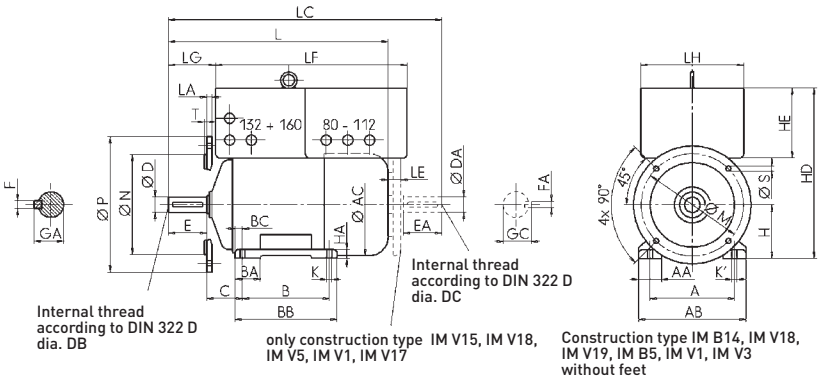
Type CD...W	A	AA	AB	AC	B	BA	BB	BC	C	H	HA	HD	K
160M	254	65	310	317	210	100	300	21,5	108	160-0,5	15	477	15
160L	254	65	310	317	254	100	300	21,5	108	160-0,5	15	477	15
180M	279	75	350	454	241	100	340	-	121	180-0,5	15	545	15
180L	279	75	350	454	279	100	340	-	121	180-0,5	15	545	15
200L	318	80	390	385	305	90	365	30	133	200-0,5	20	581	20
225S	356	85	450	440	286	90	370	29,5	149	225-0,5	25	634	20
225M	356	85	450	440	311	90	370	29,5	149	225-0,5	25	634	20
250M	406	105	510	480	349	110	420	-	168	250-0,5	30	721	26
280S	457	110	570	536	368	120	500	80,5	190	280-1	35	791	26
280M	457	110	570	536	419	120	500	80,5	190	280-1	35	791	26
315S	508	150	630	619	406	210	615	106,5	216	315-1	35	896	30
315M	508	150	630	619	457	210	615	106,5	216	315-1	35	896	30
315L1	508	150	630	619	508	210	615	106,5	216	315-1	35	896	30
315L2	508	150	630	619	508	210	615	106,5	216	315-1	35	896	30
355M	610	130	720	702	560	220	720	151,5	254	355-1	35	1084	30
355L1	610	130	720	702	630	220	720	151,5	254	355-1	35	1084	30
355L2	610	130	720	702	630	220	720	151,5	254	355-1	35	1084	30

Type CD...W	L Number of poles 2	4,6,8	LC Number of poles 2	4,6,8	LD Number of poles 2	4,6,8	O	Shaft end D, DA 2	4,6,8	E, EA 2	4,6,8	GA, GC 2	4,6,8	F, FA 2	4,6,8	DB, DC 2	4, 6, 8
160M	614	614	755	755	261	261	2x M40x1,5	42k6	42k6	110	110	45	45	12	12	M16	M16
160L	614	614	755	755	261	261	2x M40x1,5	42k6	42k6	110	110	45	45	12	12	M16	M16
180M	643	643	773	773	369	369	2x M40x1,5	48k6	48k6	110	110	51,5	51,5	14	14	M16	M16
180L	643	643	773	773	369	369	2x M40x1,5	48k6	48k6	110	110	51,5	51,5	14	14	M16	M16
200L	660	660	773	773	390	390	2x M50x1,5	55m6	55m6	110	110	59	59	16	16	M20	M20
225S	-	771	-	931	-	377	2x M50x1,5	-	60m6	-	140	-	64	-	18	-	M20
225M	741	771	871	931	347	377	2x M50x1,5	55m6	60m6	110	140	59	64	16	18	M20	M20
250M	880	880	1040	1040	482	482	2x M63x1,5	60m6	65m6	140	140	64	69	18	18	M20	M20
280S	983	983	1143	1143	483	483	2x M63x1,5	65m6	75m6	140	140	69	79,5	18	20	M20	M20
280M	983	983	1143	1143	483	483	2x M63x1,5	65m6	75m6	140	140	69	79,5	18	20	M20	M20
315S	1093	1123	1248	1308	496	526	2x M63x1,5	65m6	80m6	140	170	69	85	18	22	M20	M20
315M	1093	1123	1248	1308	496	526	2x M63x1,5	65m6	80m6	140	170	69	85	18	22	M20	M20
315L1	1093	1123	1248	1308	496	526	2x M63x1,5	65m6	80m6	140	170	69	85	18	22	M20	M20
315L2	1293	1323	1448	1508	496	526	2x M63x1,5	65m6	80m6	140	170	69	85	18	22	M20	M20
355M	1483	1783	1648	1978	672	702	2x M80x2	75m6	90m6	140	170	79,5	95	20	25	M20	M24
355L1	1483	1783	1648	1978	672	702	2x M80x2	75m6	90m6	140	170	79,5	95	20	25	M20	M24
355L2	1483	1783	1648	1978	672	702	2x M80x2	75m6	90m6	140	170	79,5	95	20	25	M20	M24



Mounting flange according to EN 50347, type FF.
All motors have carrying lugs.
Measure AD refers to terminal box Ex e.
The box can be rotated by 4x90°.

Type CD...W	Mounting flange LA	M	N	P	S H17	T	AC	AD
160M	20	300	250j6	350	18,5	5	317	317
160L	20	300	250j6	350	18,5	5	317	317
180M	20	300	250j6	350	18,5	5	454	365
180L	20	300	250j6	350	18,5	5	454	365
200L	20	350	300h6	400	18,5	5	385	381
225S	22	400	350h6	450	18,5	5	440	409
225M	22	400	350h6	450	18,5	5	440	409
250M	18	500	450h6	550	18,5	5	480	471
280S	18	500	450h6	550	18,5	5	536	511
280M	18	500	450h6	550	18,5	5	536	511
315S	22	600	550h6	660	24	6	619	581
315M	22	600	550h6	660	24	6	619	581
315L1	22	600	550h6	660	24	6	619	581
315L2	22	600	550h6	660	24	6	619	581
355M	25	740	680h6	800	24	6	702	729
355L1	25	740	680h6	800	24	6	702	729
355L2	25	740	680h6	800	24	6	702	729



Mounting flange according to EN 50347, type FF.
All motors have carrying lugs.
Measure AC measured from screw heads

Note:
1) Construction type IM V1, IM V5, IM V15, IM V17 and IM V18 with fan canopy

Type CD...I	A	AA	AB	AC	B	BA	BB	BC	C	H -0,5	HA	HD	K H17	K' H17	L	LC	LE	LF	LG	LH	HE	Weight approx. (kg)
80M	125	35	160	163	100	35	130	15	50	80	12	335	Ø 10	–	313	387	25	355	46	274	207	60
90S	140	40	180	183	100	40	130	15	56	90	12	348	Ø 10	–	364	445	25	355	67	274	207	66
90L	140	40	180	183	125	40	155	15	56	90	12	380	Ø 10	–	364	445	25	355	67	274	207	67
100L	160	45	200	201	140	45	175	17,5	63	100	15	390	Ø 12	–	415	510	30	355	79	274	207	79
112M	190	50	235	225	140	50	175	17,5	70	112	17	447	Ø 12	–	423	524	30	355	84	274	207	93
132S	216	60	266	265	140	60	187	23,5	89	132	20	447	Ø 12	–	529	645	30	456	95	358	209	154
132M	216	60	266	265	178	60	225	23,5	89	132	20	513	Ø 12	–	529	645	30	456	95	358	209	164
160M-2	254	65	310	318	210	100	300	23	108	160	25	513	15	20	708	863	35	456	130	358	209	222
160M-4	254	65	310	318	210	100	300	23	108	160	25	348	15	20	708	863	35	456	130	358	209	227

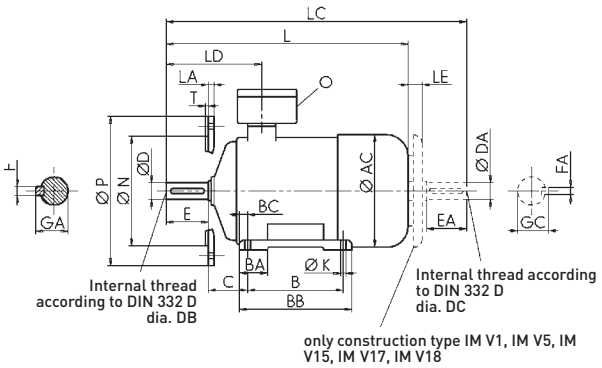
VII

Type CD...I	Shaft end dimensions D, DA	E, EA	GA, GC	F, FA	DB, DC	Construction types IM B35, IM B5, IM V1[1)], IM V3, IM V15[1)], IM V35 LA	M	N j6	P	S H17	T
80M	19j6	40	21,5	6	M6	12	165	130	200	12	3,5
90S+L	24j6	50	27	8	M8	12	165	130	200	12	3,5
100L	28j6	60	31	8	M10	16	215	180	250	14,5	4
112M	28j6	60	31	8	M10	16	215	180	250	14,5	4
132S	38k6	80	41	10	M12	16	265	230	300	14,5	4
132M	38k6	80	41	10	M12	16	265	230	300	14,5	4
160M	42k6	110	45	12	M16	20	300	250	350	18,5	5

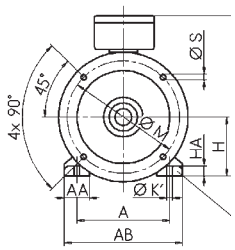
Type CD...I	Construction types IM B14, IM V18[1)], IM V19, IM B34, IM V17[1)], IM V37 LA	M	N j6	P	S	T
80M	10	100	80	120	M6	3
90S+L	10	115	95	140	M8	3
100L	12	130	110	160	M8	3,5
112M	12	130	110	160	M8	3,5
132S+M	12	165	130	200	M10	3,5

Motors with Integral Brake
Motors with External Brake

All construction types



only construction type IM V1, IM V5, IM V15, IM V17, IM V18



Construction type IM B5, IM V1, IM V3, IM B14, IM V18, IM V19 without feet

Mounting flange according to EN 50347, type FF.
All motors have carrying lugs.
Measure AC measured from screw heads
Measure HD refers to terminal box Ex e.
Terminal box can be rotated 4x90°.

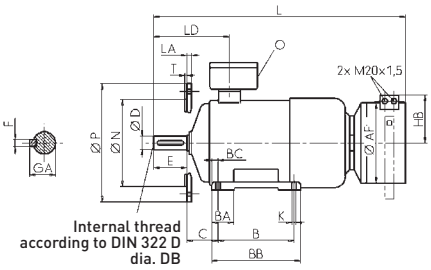
Type BD...B(R)	A	AA	AB	AC	B	BA	BB	BC	C	H-0,5	HA	HD	K H17	K' H17	L	LC	LD	LE
80M	125	35	160	163	100	35	130	15	50	80	12	260	Ø 10	–	367	437	116	25
90S	140	40	180	183	100	40	130	15	56	90	12	275	Ø 10	–	421	502	137	25
90L	140	40	180	183	125	40	155	15	56	90	12	275	Ø 10	–	421	502	137	25
100L	160	45	200	201	140	45	175	17,5	63	100	15	305	Ø 12	–	481	574	149	30
112M	190	50	235	225	140	50	175	17,5	70	112	17	317	Ø 12	–	502	597	154	30
132S	216	60	266	265	140	60	187	23,5	89	132	20	411	Ø 12	–	621	720	226	30
132M	216	60	266	265	178	60	225	23,5	89	132	20	411	Ø 12	–	621	720	226	30

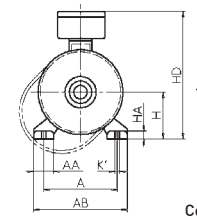
Type BD...B(R)	O	Shaft end D	DA	E	EA	GA	GC	F	FA	DB	DC
80M	2x M25x1,5	19j6	19j6	40	40	21,5	21,5	6	6	M6	M6
90S+L	2x M25x1,5	24j6	24j6	50	50	27	27	8	8	M8	M8
100L	2x M32x1,5	28j6	28j6	60	60	31	31	8	8	M10	M10
112M	2x M32x1,5	28j6	28j6	60	60	31	31	8	8	M10	M10
132S+M	2x M32x1,5	38k6	28k6	80	60	41	31	10	8	M12	M10

Type BD...B(R)	FF flanges LA	M	N j6	P	S H17	T	LE
80M	12	165	130	200	12	3,5	25
90S+L	12	165	130	200	12	3,5	25
100L	16	215	180	250	15	4	30
112M	16	215	180	250	15	4	30
132S+M	16	265	230	300	15	4	30

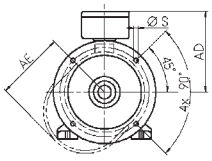
Type BD...B(R)	FT flanges LA	M	N j6	P	S	T
80M	10	100	80	120	M6	3
90S+L	10	115	95	140	M8	3
100L	12	130	110	160	M8	3,5
112M	12	130	110	160	M8	3,5
132S+M	12	165	130	200	M10	3,5

Motors with External Brake
Type CD...S





optionally with manual ventilation



Construction type IM B5, IM V1, IM V3, IM B14, IM V18, IM V19 without feet

Mounting flange according to EN 50347, type FF and FT.
All motors have carrying lugs. Measure AC measured from screw heads Measure AD refers to terminal box Ex e.
Terminal box can be rotated 4x90°.
This also applies to the BD... series.

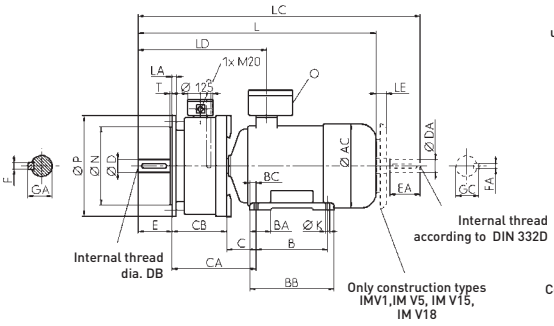
Note:
1) For types 250 to 280-4, 6, 8 with measures DA, EA, GC, FA and DC, the 2-pole specifications apply.

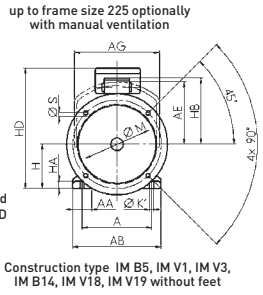
Type CD...S	A	AA	AB	AC	AD	B	BA	BB	BC	C	H	HA	HD	K H17	K' H17	L	LD
80M	125	35	160	163	180	100	35	130	15	50	80-0,5	12	260	Ø 10	–	452	116
90S	140	40	180	183	185	125	40	155	15	56	90-0,5	12	275	Ø 10	–	502	137
90L	140	40	180	183	185	125	40	155	15	56	90-0,5	12	275	Ø 10	–	502	137
100L	160	45	200	201	205	140	45	175	17,5	63	100-0,5	15	305	Ø 12	–	602	149
112M	190	50	235	225	205	140	50	175	17,5	70	112-0,5	17	317	Ø 12	–	608	154
132S	216	60	266	265	279	140	60	187	23,5	89	132-0,5	20	411	Ø 12	–	715	226
132M	216	60	266	265	279	178	60	225	23,5	89	132-0,5	20	411	Ø 12	–	715	226
160M	254	65	310	318	317	210	100	300	23	108	160-0,5	25	477	15	20	881	261
160L	254	65	310	318	317	254	100	300	23	108	160-0,5	25	477	15	20	881	261
180M	279	75	350	353	365	241	100	340	30	121	180-0,5	25	545	15	20	924	369
180L	279	75	350	353	365	279	100	340	30	121	180-0,5	25	545	15	20	924	369
200L	318	80	390	393	381	305	90	365	30	133	200-0,5	30	581	20	26	986	390
225S	356	85	450	455	409	286	90	370	29,5	149	225-0,5	35	634	20	26	on request	
225M	356	85	450	455	409	311	90	370	29,5	149	225-0,5	35	634	20	26	on request	
250M	406	105	510	493	471	349	110	420	35,5	168	250-0,5	40	721	26	35	on request	
280S	457	110	570	548	511	368	120	500	40,5	190	280-1	45	791	26	35	on request	
280M	457	110	570	548	511	419	120	500	40,5	190	280-1	45	791	26	35	on request	

	FF flanges						Shaft end									
Type	LA	M	N	P	S H17	T	D, DA[1]		E, EA[1]		GA, GC[1]		F, FA[1]		DB,DC	O
CD...S							2	4, 6, 8	2	4, 6, 8	2	4, 6, 8	2	4, 6, 8		
80M	12	165	130 j6	200	12	3,5	19 j6	19 j6	40	40	21,5	21,5	6	6	M6	2x M25x1,5
90S+L	12	165	130 j6	200	12	3,5	24 j6	24 j6	50	50	27	27	8	8	M8	2x M25x1,5
100L	16	215	180 j6	250	14,5	4	28 j6	28 j6	60	60	31	31	8	8	M10	2x M32x1,5
112M	16	215	180 j6	250	14,5	4	28 j6	28 j6	60	60	31	31	8	8	M10	2x M32x1,5
132S+M	16	265	230 j6	300	14,5	4	38 k6	38 k6	80	80	41	41	10	10	M12	2x M32x1,5
160M+L	20	300	250 j6	350	18,5	5	42 k6	42 k6	110	110	45	45	12	12	M16	2x M40x1,5
180M+L	20	300	250 j6	350	18,5	5	48 k6	48 k6	110	110	51,5	51,5	14	14	M16	2x M40x1,5
200L	20	350	300 h6	400	18,5	5	55 m6	55 m6	110	110	59	59	16	16	M20	2x M50x1,5
225S+M	22	400	350 h6	450	18,5	5	55 m6	60 m6	110	140	59	64	16	18	M20	2x M50x1,5
250M	18	500	450 h6	550	18,5	5	60 m6	65 m6	140	140	64	69	18	18	M20	2x M63x1,5
280S+M	18	500	450 h6	550	18,5	5	65 m6	75 m6	140	140	69	79,5	18	20	M20	2x M63x1,5

	FT flanges						Brake			
Type	LA	M	N j6	P	S	T	AE	AF	HB	Size
CD...S										
80M	10	100	80	120	M6	3	134	178	133	10
90S+L	10	115	95	140	M8	3	134	178	133	10/11
100L	12	130	110	160	M8	3,5	164	245	161	13
112M	12	130	110	160	M8	3,5	164	245	161	13
132S+M	12	165	130	200	M10	3,5	164	245	161	13/16
160M+L	-	-	-	-	-	-	215	330	205	19
180M+L	-	-	-	-	-	-	215	330	205	19/24
200L	-	-	-	-	-	-	215	330	205	24

Motors with external brake
Type CD...SV and CD...SVN

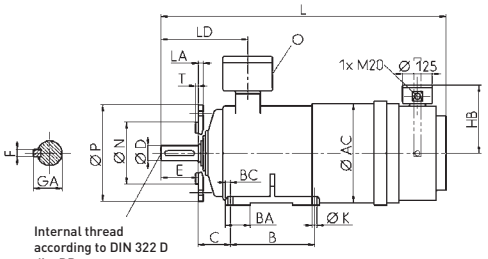


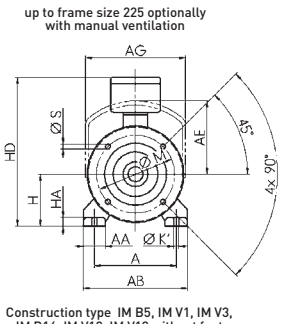


Note:
Mounting flange according to EN 50347, type FF and FT.
Type FF corresponds to Type B5.
Type FT corresponds to Type B14.

Measures not listed here correspond to the measures of type CD...S on page 118.

Type CD...SV	L			LC			LD		CA	CB	LE	Flange			DB	
	Number of poles			Number of poles			Number of poles					FF type				
	2	4	6, 8	2	4	6, 8	2	4, 6, 8				LA	N h8	P ±1	S	
63M	384	384	384	418	418	418	249	249	185	145	-	10	95	140	9,5	M4x10
71M	423	423	423	479	479	479	256	256	190	145	25	10	110	160	9,5	M4x10
80M	509	509	509	583	583	583	312	312	246	196	25	12	130	200	11,5	M6x20
90S+L	560	560	560	641	641	641	333	333	252	196	25	12	130	200	11,5	M6x20
100L	631	631	631	726	726	726	365	365	279	216	30	14	180	250	14,5	M8x20
112M	641	641	641	740	740	740	370	370	286	216	30	14	180	250	14,5	M8x20
132S+M	771	771	771	887	887	887	468	468	331	242	30	18	230	300	14,5	M10x25
160M+L	955	918	918	1105	1073	1073	503	503	350	242	63	18	250	350	18	M10x25
180M+L	1026	1026	1026	1209	1209	1209	669	669	421	300	63	21	250	350	18	M20x30
200L	1089	1089	1089	1283	1209	1209	690	690	433	300	74	21	300	400	18	M20x30
225S+M	1237	1267	1218	1441	1505	1505	677	707	449	300	85	21	350	448	18	M20x30
250M	-	1310	1244	-	1561	1495	-	792	478	310	94	26	450	550	18	M20x30
280S+M	-	1419	1419	-	1685	1685	-	793	500	310	110	26	450	550	18	M20x30

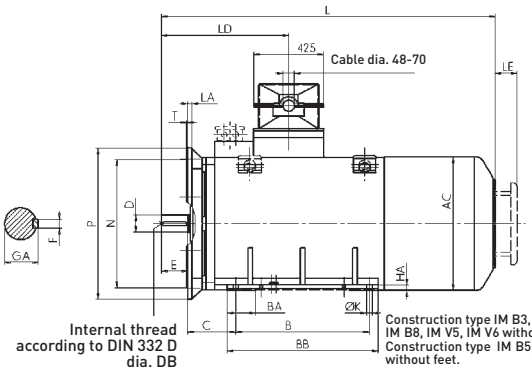


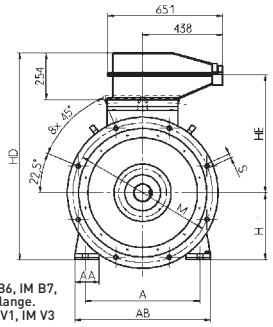


Note:
Mounting flange according to EN 50347, type FF.
Type FF corresponds to Type B5.
Type FT corresponds to Type B14.
Measures not listed here correspond to the measures of type CD...S on page 118.

Type CD...SVN	L
63M	not available
71M	not available
80M	576
90S+L	595
100L	672
112M	678
132S+M	811
160M+L	985
180M+L	1086
200L	1148
225S+M	on request
250M	on request
280S+M	on request

valid for Type CD...SV Type CD...SVN	Brake AE	AG	HB	Type
63M	205	205	185	63
71M	205	205	185	71
80M	230	250	215	80
90S+L	230	250	215	90
100L	255	305	240	100
112M	255	305	240	112
132S+M	290	355	265	132
160M+L	290	355	265	160
180M+L	320	370	282	180
200L	320	370	282	200
225S+M	320	370	282	225
250M	-	-	328	250
280S+M	-	-	328	280





Mounting flange according to EN 50347, type FF.
All motors have carrying lugs.
Measure AC measured from screw heads
Measure HD refers to terminal box Ex e,
type EAR 355 H6.

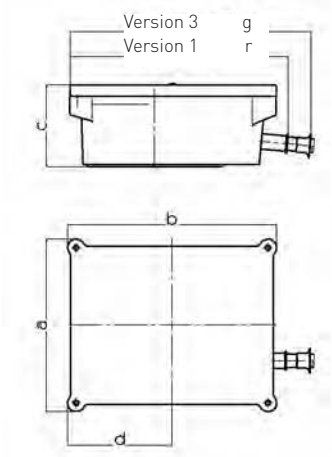
Note:
Sizes 400 and 450 with flange design are only available for V1.

Type CD...H	A	AA	AB	AC	B	BA	BB	C	H -1	HA	HD	HE	K	L Number of poles 2	L Number of poles 4	L Number of poles 6,8	LD Number of poles 2	LD Number of poles 4,6,8
355M	610	180	720	725	560	220	720	254	355	50	1130	651	30	1667	1697	1597	672	702
355L	610	180	720	725	630	220	720	254	355	50	1130	651	30	1747	1777	1597	672	702
400M	686	130	800	810	630	150	870	280	400	34	1192	668	35	1837	1908	1908	716	788
400L	686	130	800	810	710	150	870	280	400	34	1192	668	35	1977	2047	2047	718	788
450M	760	150	900	910	630	180	790	280	450	35	1310	736	35	1838	1908	1908	756	826
450L1	760	150	900	910	710	180	870	280	450	35	1310	736	35	1983	2053	2053	756	826
450L2	760	150	900	910	840	180	1000	280	450	35	1310	736	35	1983	2053	2233	756	826
450L3	760	150	900	910	840	180	1000	280	450	35	1310	736	35	2163	2233	-	756	826

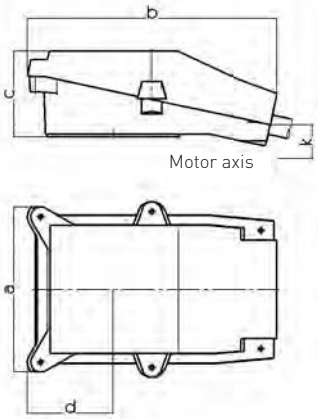
VII

Type CD...H	D m6 Number of poles 2	D m6 Number of poles 4, 6, 8	E Number of poles 2	E Number of poles 4, 6, 8	GA Number of poles 2	GA Number of poles 4, 6, 8	F Number of poles 2	F Number of poles 4, 6, 8	DB Number of poles 2	DB Number of poles 4, 6, 8	Mounting flange LA	M	N h6	P	S H17	T
355M	75	90	140	170	79,5	95	20	25	M20	M24	25	740	680	800	24	6
355L	75	90	140	170	79,5	95	20	25	M20	M24	25	740	680	800	24	6
400M	75	100	140	210	79,5	106	20	28	M20	M24	28	940	880	1000	28	6
400L	75	100	140	210	79,5	106	20	28	M20	M24	28	940	880	1000	28	6
450M	75	100	140	210	79,5	116	20	28	M20	M24	28	940	880	1000	28	6
450L1	75	100	140	210	79,5	116	20	28	M20	M24	28	940	880	1000	28	6
450L2	75	100	140	210	79,5	116	20	28	M20	M24	28	940	880	1000	28	6
450L3	75	100	140	210	79,5	116	20	28	M20	M24	28	940	880	1000	28	6

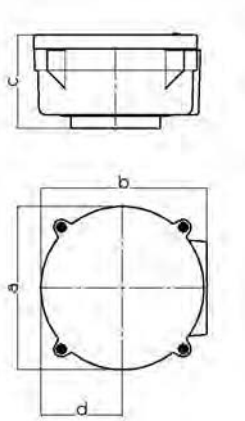
EAR - Ex e
Version 1 and 3



EAR - Ex e
Version 9 (VIK)



CAR - Ex d

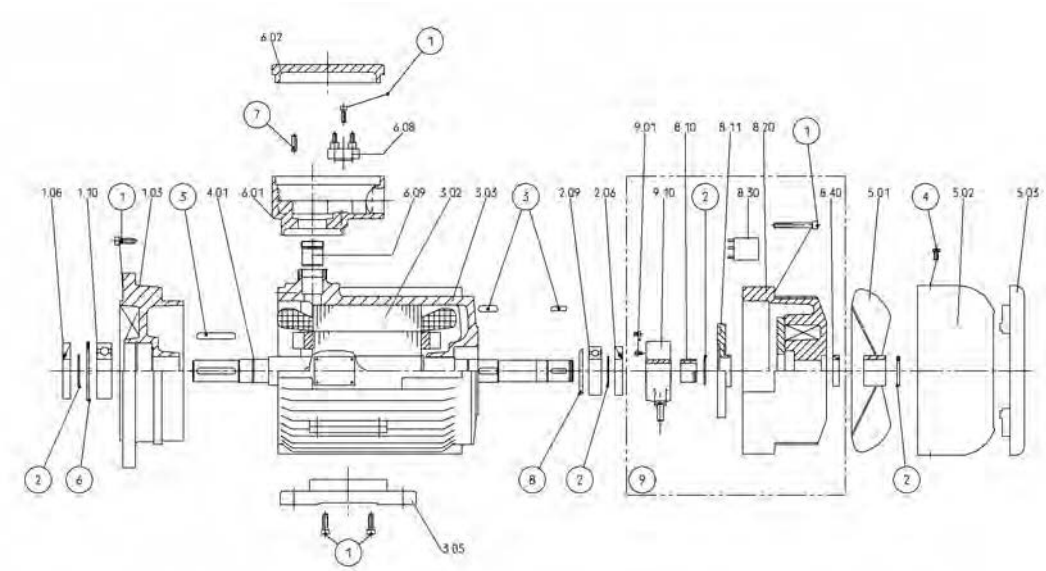


Protection type Cable entry Frame size Terminal boxes		EAR- Ex e Versions 1 and 3 a	b	c	d	r	g	CAR - Ex d without cable gland Frame size Terminal boxes		a	b	c	d
63	EAR 80	145	145	88	53	179	185	**63**	CAR 80	145	145	92	53
71	EAR 80	145	145	88	53	179	185	**71**	CAR 80	145	145	92	53
80	EAR 80	145	145	88	53	179	185	**80**	CAR 80	145	145	92	53
90	EAR 80	145	145	88	53	179	185	**90**	CAR 80	145	145	92	53
100	EAR 80	145	145	88	53	185	200	**100**	CAR 80	145	145	92	53
112	EAR 80	145	145	88	53	185	200	**112**	CAR 80	145	145	92	53
132	EAR 132	220	220	117	110	260	275	**132**	CAR 132	220	220	103	110
160	EAR 132	220	220	117	110	265	281	**160**	CAR 132	220	220	103	110
180	EAR 180	280	340	152	140	385	401	**180**	CAR 180	265	270	162	133
200	EAR 180	280	340	152	140	390	420	**200**	CAR 180	265	270	162	133
225	EAR 180	280	340	154	140	390	420	**225**	CAR 225	380	380	202	190
250	EAR 250	340	422	196	161	474	512	**250**	CAR 225	380	380	202	190
280	EAR 250	340	422	196	161	474	512	**280**	CAR 225	380	380	202	190
315	EAR 250	340	422	198	161	474	512	**315**	CAR 315	380	380	208	190
355	EAR 355	480	527	249	224	-	617	**355**	CAR 355	484	734	335	242
400	EAR 355	480	527	249	224	-	630	**400**	CAR 355	484	734	335	242
450	EAR 355	480	527	249	224	-	630	**450**	CAR 355	484	734	335	242

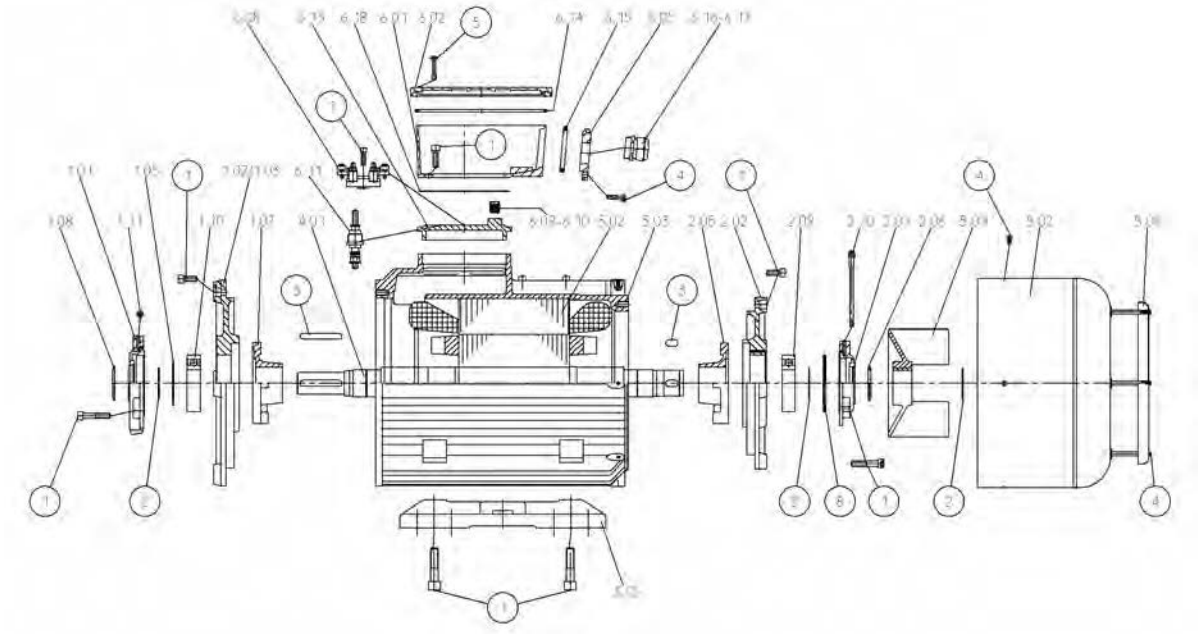
Protection type Cable entry Frame size Terminal boxes		EAR - Ex e Version 9 (VIK) a	b	c	d	k
250	EAR 250	356	512	186	179	317
280	EAR 250	356	512	186	179	357
315	EAR 250	356	512	186	179	427
355	EAR 355	415	621	249	221	541
400	EAR 355	415	621	249	221	558
450	EAR 355	415	621	249	221	626

Protection type Cable entry Type CD...XY* Terminal boxes		EAR - Ex e Versions 1 and 3 a	b	c	d	r	g	CAR - Ex d without cable gland Frame size Terminal boxes		a	b	c	d
250S	EAR 250	340	422	196	161	474	512	**250S**	CAR 225	380	380	202	190
250M	EAR 250	340	422	196	161	474	512	**250M**	CAR 225	380	380	202	190
280S	EAR 250	340	422	196	161	474	512	**280S**	CAR 225	380	380	202	190
280M	EAR 250	340	422	196	161	474	512	**280M**	CAR 315	380	380	208	190
315	EAR 250	340	422	196	161	474	512	**315**	CAR 315	380	380	208	190

* British Allocation



Exploded drawing for frame sizes 63 to 132



Exploded drawing for frame sizes 160 and up

① Screw according to DIN EN ISO 4762

② Circlip according to DIN 471

③ Feather key according to DIN 6885

④ Screw according to EN 2401 7

⑤ Screw according to DIN 7964

⑥ Circlip according to DIN 472

⑦ Threaded pin according to DIN 914

⑧ Belleville washer or shim

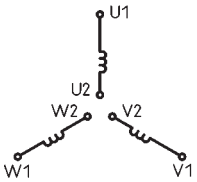
⑨ Only for brake motors and motors with built-in tachogenerator

The listed parts are available directly from the factory. Their design and combination depend on the motor supplied.

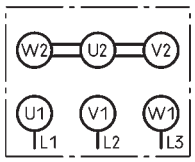
Please specify the following information when making an inquiry or placing an order:
– Part number and designation
– Motor type and construction type
– Motor number

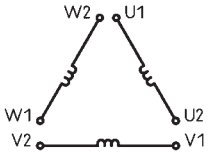
Spare parts list

Part No.	Designation
1	**Drive End Bearing**
1.01	Bearing cover d.e. outside
1.02	End shield d.e.
1.03	Flanged end shield d.e.
1.05	Grease slinger d.e. outside
1.07	Bearing cover d.e. inside
1.08	Shaft seal d.e.
1.10	Bearing d.e.
1.11	Regreasing unit d.e.
2	**Non-Drive End Bearing**
2.01	Bearing cover n.d.e. outside
2.02	Endshield n.d.e
2.05	Bearing cover n.d.e. inside
2.06	Shaft seal n.d.e.
2.08	Cup spring
2.09	Bearing n.d.e.
2.10	Regreasing unit n.d.e.
3	**Housing**
3.02	Complete stator winding
3.03	Housing
3.05	Feet (1 pair) machined
4	**Rotor**
4.01	Complete rotor
5	**Ventilation**
5.01	Fan
5.02	Fan cowl
5.03	Fan canopy
6	**Terminal box**
6.01	Terminal box
6.02	Terminal box cover
6.05	Cable entry plate
6.08	Complete terminal board
6.09	Core gland
6.10	Core gland for PTC thermistor
6.11	Conductor bushing
6.13	Bushing plate
6.14	Cover gasket
6.15	Entry plate gasket
6.16	Cable entry
6.17	Cable gland for PTC thermistor
6.18	Bushing plate gasket
8	**Brake**
8.10	Friction disc driver
8.11	Friction disc
8.20	Complete brake housing with coil
8.30	One-way rectifier
8.40	Shaft seal - brake
9	**Tachogenerator**
9.01	Tacho
9.10	Flexible mounting clip
9.20	Encoder housing
9.40	Shaft seal

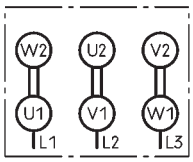


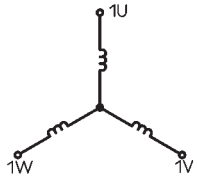
Y-connection



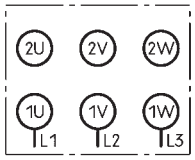


Δ-connection

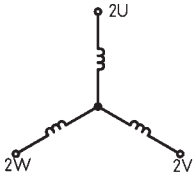




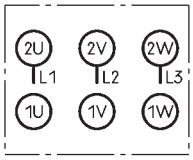
low speed

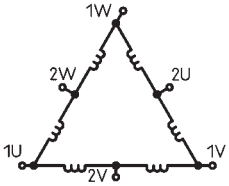


pole-changing

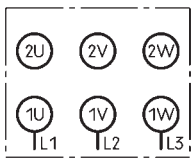


high speed

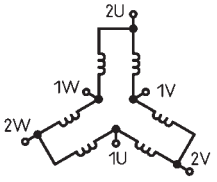




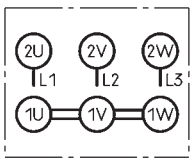
low speed

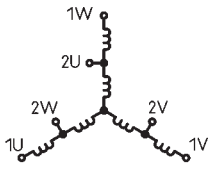


Dahlander pole-changing connection

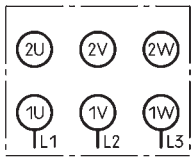


high speed

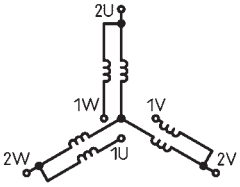




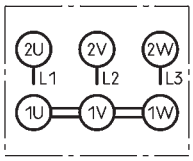
slow speed



Dahlander pole-changing connection



high speed



VIII

1 T P 1 - 1 T P 2	PTC-thermistor warning	U›2,5 V not allowed	Tripping device with II (G) label	Terminal stud	
2 T P 1 - 2 T P 2	PTC-thermistor switch-off				
1 R 1 - R 2 4 R 1 - 5 R 2	Resistance temperature sensor PT 100 / Winding 1 R 1 2 R 1 3 R 1 R 2	Resistance temperature sensor PT 100 / Bearing d.e. 4 R 1 4 R 2 n.d.e. 5 R 1 5 R 2		Winding size	Tightening torque (Nm)
				M4	1,2
				M5	2
				M6	3
				M8	6
				M10	10
1 H E 1 - 1 H E 2	Anti-condensation heater			M12	15,5
TB 1 - TB 2	Thermo switch Microtherm T10			M16	30

Note:
1) Requires tripping device with Ex label

Conversion of Technical Units

To SI units
(Systeme Internationale d'Unitée)

Power

1 kW = 1,36 PS = 102 kpm/s = 1000 Nm/s
1 PS = 0,736 kW = 75 kpm/s = 736 Nm/s

Energy

1 kWh = 3,6 x 10^6 J = 3,6 x 10^6 Nm
= 0,367 x 10^6 kpm
1 Ws = 1 J = 1 Nm = 0,102 kpm

Force

1 N = 0,102 kp
1 kp = 9,81 N

Torque

1 Nm = 0,102 kpm = 1 Ws
1 kpm = 9,81 Nm = 9,81 Ws

Pressure

1 Pa = 1 N/m^2
1 bar = 100 kPa
1 mm water column = 9,81 Pa

Moment of inertia

1 kgm^2 = 1 Ws^3 = 1 Nms^2 = 0,102 $kpms^2$

Output (three-phase motors)

$P_1 = U \times I \times \cos\varphi \times \sqrt{3} \times 10^{-3}$
$P_2 = P_1 \times \eta$
P1 = power input [kW]
P2 = power output [kW]
U = Voltage [V]
I = Current [A]
cos φ = Power factor
η = Efficiency

Power requirements of some driven machines

Lifting movement

$P = \frac{F \times v}{\eta} \times 10^{-3}$ [kW]

Rotation movement

$P = \frac{M \times n}{9550 \times \eta}$ [kW]

Fan operation

$P = \frac{V \times p}{\eta} \times 10^{-3}$ [kW]

Pump operation

$P = \frac{V \times p}{\eta} \times 10^{-3}$ [kW]

P = Power [kW]
F = Force [N]
v = Speed [m/s]
η = Efficiency
M = Torque [Nm]
n = Speed of rotation [1/min]
V = flow rate [m^3/s]
p = overall back pressure [N/m^2]

Torque

Torque resulting from motor output

$M = 9550 \frac{P_2}{n}$ [Nm]

P_2 = motor output [kW]
n = motor speed [1/min]

Conversion of torques for low or high transmission ratios

$M_2 = \frac{M_1 \times n_1}{n_2}$

n_1 = Motor speed [1/min]
M_1 = Motor torque [Nm]
n_2 = Working speed [1/min]
M_2 = Torque at n_2 [Nm]

Moment of inertia

Relationship with flywheel effect

$J = \frac{GD^2}{4}$

J = Moment of inertia [kgm^2]
GD^2 = flywheel effect [kgm^2]

Moment of inertia of masses in linear motion

$J = 91{,}2 \times m \left(\frac{v}{n}\right)^2$ [kgm^2]

m = Mass [kg]
v = speed [m/s]
n = Motor speed [1/min]

Conversion of moments of inertia to a different speed for low or high transmission ratios

$J_2 = J_1 \left(\frac{n_1}{n_2}\right)^2$

n_1 = Motor speed
J_1 = Moment of inertia at n_1
n_2 = Working speed
J_2 = Moment of inertia at n_2

Factor of inertia

$FI = \frac{J_{mot} + J_{zus}}{J_{mot}}$

J_{mot} = Moment of inertia of the motor
J_{zus} = Moment of inertia of the driven machine

Starting time

$ta = \frac{FI \times J_{mot} \times n}{9{,}55 \times M_b}$ [s]

$M_b = M_{mot} - M_{geg}$ [Nm]
FI = Factor of inertia
J_{mot} = Moment of inertia of the motor [kgm^2]
n = Motor speed [1/min]
M_b = Acceleration torque [Nm]
M_{mot} = Motor startup torques (averaged)
M_{geg} = Startup counter torques (averaged)

Acoustic formulae

Pressure level

$L_p = 20 \log \frac{p}{p_o}$ [dB]

Reference sound pressure

$p_o = 2 \times 10^{-5}$ [$\frac{N}{m^2}$]

Sound power level

$L_W = 10 \log \frac{p}{P_o}$ [dB]

Reference sound power

$P_o = 10^{-12}$ [W]

Sound power

$P = \frac{p^2}{\alpha \times c} A$ [W]

Sound impedance

$\alpha \times c = 408$ [$\frac{N \cdot s}{m^3}$]
at 100 mbar
and 20 °C

Measureing surface level

$L_s = 10 \log \frac{A}{A_o}$
$L_w = L_p + L_s$

L_p = Sound pressure level [dB]
p = Sound pressure [$\frac{N}{m^2}$]
p_o = Reference sound pressure
L_w = Sound pressure level [dB]
P = Sound power [W]
P_o = Reference sound power [W]
A = Reflecting area [m^2]
$\alpha \times c$ = Sound impedance [$\frac{N \cdot s}{m^3}$]
A_o = Reference area = 1 m^2
L_s = Measureing surface level [dB]

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