WOLONG
Power your future

WEX3

Low Voltage Induction Motors for Explosive Atmospheres

www.wolong-electric.com

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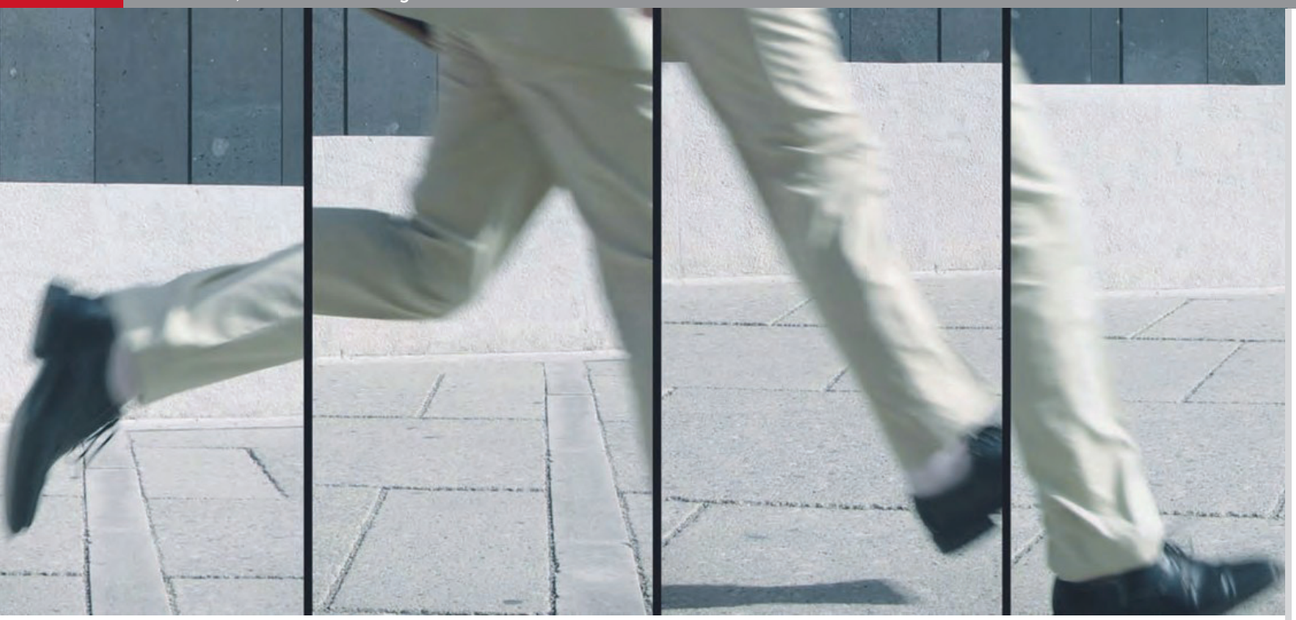
SCHORCH
a WOLONG company



Vision

Wolong vision is to become the world no 1 in motor industry. Our vision leans on to the operation principles of technological leadership, accurate and lean processes, providing first class services and reliable products to our global customers to save energy.

Wolong is committed to achieve this vision by providing green, energy-saving and efficient power to the world. Making better living and contributing to the goals of reducing CO2 emissions and carbon neutrality.

Mission

Drive the future with science and technology, providing inexhaustible and efficient power for the world.

Focus industry segments

Green Buildings

Home appliances

Home appliances

HVAC

Water Supply

Industry technology

Water Treatment

Industrial HVAC

Industry

Chemicals, Oil & Gas

E-mobility

Electric Ships

Electric Aircraft

Electric Vehicles

E-bike

Automation

Engineering Machinery

Process Automation

Industry Services

Full Lifecycle Services

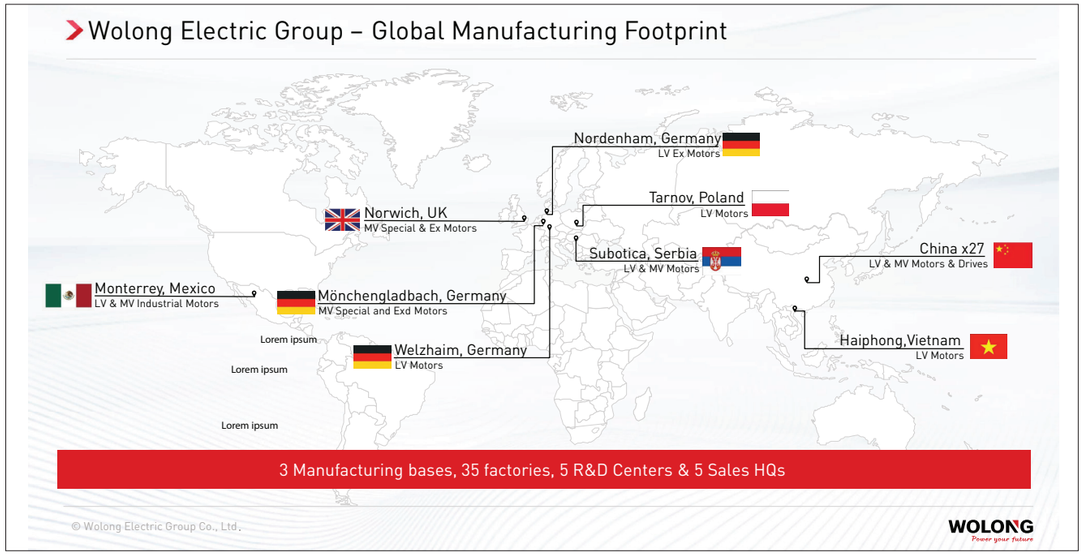
Industrial IOT

Clean Energy

Electricity Management

New Energy

Wolong, founded in 1984 and headquarted in Shaoxing, Zhejiang Province is a global leading industrial enterprise committed to providing safe, energy efficient and sustainable cutting edge power drive solutions with full lifecycle services to global users both in Low and Medium Voltage. After almost 40 years of innovative development and several acquisitions Wolong has established 35 manufacturing plants across the world in countries such as China, Germany, Poland, Serbia, Mexico, UK and Vietnam with 18 000 employees globally. Today Wolong is one of the leading manufacturers of Power Drive System solutions and world's 3rd largest producer of electric motors.



Family of Brands

Wolong group constitutes of several excellent brands which accumulalate more than 140 years of experience in both LV and MV design and manufacturing.

BROOK CROMPTON a WOLONG company — Manufacturing and designing industrical LV motors since 1878.

SCHORCH a WOLONG company — Manufacturing and designing industrical LV & MV Explosion proof and special motors since 1882.

LAURENCE SCOTT a WOLONG company — Manufacturing and designing MV motors for offshore and nuclear power plants since 1883.

MORLEY a WOLONG company — Manufacturing and designing MV mining motors since 1897.

ATB a WOLONG company — Manufacturing and designing LV & MV motors since 1919.

a WOLONG company — Manufacturing and designing explosiong proof motors since 1970.
China Nanyang Electric is the largest explosion motor manufacturer in China.

ATB Wolong Portfolio

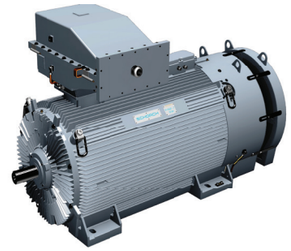
Low Voltage motors

Safe area
Aluminum IEC 63-200 IE3, IE4
Aluminum NEMA 56-286T
Cast Iron IEC 80-560 IE3, IE4
Cast Iron NEMA 143T-586
Single phase IEC 56-100 IE2
Permanent magnet motors 56-315

Motors for explosives atmospheres
Ex ec / Ex tb / tc
Aluminum IEC 71-180 IE3
Cast iron IEC 80-315 IE3
Ex eb
Aluminum IEC 71-180 IE2
Cast iron IEC 80-315 IE2
Ex db / Ex db eb IIB/C
Cast iron IEC 63-500 IE3, IE4
Ex db I Mb 80-355 IE3

Industry and application specific
Smoke extraction F200/250/300/400
Aluminum IEC 63-180 IE3
Cast iron IEC 80-355 IE3
Marine
Aluminum IEC 63-180 IE3
Cast iron IEC 80-355 IE3
Permanent magnet
Aluminum IEC 56-132 IE4+
Cast iron IEC 56-132 IE4+
High speed
IEC 112-800 up to 22000rpm

Medium Voltage motors



Safe area
IC411 185-2240 kW, 6/10/11 kV
IC511 315-12800 kW, 6/10/11 kV
IC611 315-12800 kW, 6/10/11 kV
IC81W 450-15000 kW, 6/10 kV

Motors for explosives atmospheres
Ex ec
IC411 185-2240 kW, 6/10/11 kV
IC611 315-12800 kW, 6/10/11 kV
IC81W 450-15000 kW, 6/10 kV
Exp
IC411 160-2000 kW, 6/10/11 kV
IC511 315-13200 kW, 6/10/11 kV
IC611 315-12800 kW, 6/10/11 kV
IC81W 450-15000 kW, 6/10 kV
Exd
IC411 185-2240 kW, 6/10 kV
IC511 375-6900 kW, 6/10 kV

Industry and application specific
Slipring
IEC 355-710, 200-8000 kW, 6/11 kV
Permanent magnet
Synchronous
Safe area
1.5-135 MW 6/11 kV
Exp
1.5-100 MW 6/11 kV

Drives

Medium Voltage
200-8000 kW air cooled 3.3-11 kV
4000-32000 kW water cooled, 6-11 kV

Low voltage
Product range under development

EC Motors & Fans

EC motors
EM42-56 0.09-1.5kW IE4+
EC112-160 1.1-7.5kW IE4+

EC fans
Centrifugal forward -curved fans
- 133-180 mm single/146-180 mm double inlet
- Max static pressure 626 Pa

Centrifugal backward-curved fans
- 133-630 mm, max static pressure 900 Pa

Axial fans 450-900 mm
- Max static pressure 270 Pa

Spare Parts	Capital Spares	Repair	Preventive Maintenance	Replacement	Advanced Services and Service Contracts
Services					

• Spare parts
• Spare parts packages
• Spare parts
• Maintenance kits
	• Spare stators
	• Spare rotors
	• Spare motors
		• Workshop repair
		• Field repair
		• Technical support
			• Life expectancy analysis
			• Preventive services based on operational hours
			  • S1 8000 h
			  • S2 16000 h
			  • S3 24000 h - 40000 h
			  • S4 60000 h - 80000 h
				• Active products
				• Classic products
				• Replica
				• End of life cycle services
					• Installation
					• Commissioning
					• Condition assessment
					  • Bearings
					  • Insulation
					• iMotorlinx
					• Extensions
					• Upgrades
					• Retrofits
					• Site surveys / Audits I Value add services
					• Service Contract

3. ATEX and IECEx certifications

ATEX Directives align the technical and legal requirements for products used in potentially explosive atmospheres. The ATEX Product Directive 2014/34/EU (ATEX 114), effective from 20th April 2016 (and replacing the former 94/9/EC or ATEX 95), places responsibilities on the equipment manufacturer as they need to comply with Essential Health and Safety Requirements and follow a Conformity Assessment Producedure, whereas the Worker Protection Directive 1999/92/EC - ATEX 153 (formerly known as ATEX 137) places obligations on the end users who must prepare an Explosion Protection Document based on risk assessments of their work places and work equipment. According to the regulations, low voltage motors for explosive atmospheres are exempted from the Low Voltage Directive, the EMC Directive and the Machinery Directive

IECEx System

The IECEx System is a certification system that covers equipment, service facilities and personnel competencies and includes a conformity mark licensing system. The aim of the System is "to facilitate international trade in equipment and services for use in explosive atmospheres, while maintaining the required level of safety". It is a voluntary system providing an internationally accepted means of proving that products and services are in compliance with IEC standards. IECEx certification involves – in addition to product tests – assessment of quality control procedures and testing plans, audits of manufacturing plants, and routine on-going surveillance and inspections.

IECEx is well present over 30 countires and it aims to be the world approval system for electrical equipment intended for installation in potentially explosives atmospheres. Product Certification under the IECEx Scheme requires the involvement of an IECEx Approved Certification Body (ExCB) to test products and samples according to IEC standards. They also issue the IECEx Test Report known as ExTR. Additionally, it is mandatory to comply with a Quality Management System assessed to be in conformity with ISO 9001, including specific Ex requirements from ISO/IEC80079-34. After the results of an on-site assessment of the manufacturer's quality management system has been conducted by the ExCB, and found to be in compliance with the requirements of the IECEx Certified Equipment Scheme and the document IECEx OD 005, an IECEx Quality Assessment Report (QAR) is provided. Finally the ExCB will review and endorse the ExTR and QAR and then issue the IECEx Certificate of Conformity (CoC). IECEx certificates are issued electronically and are all available for viewing or printing on the IECEx public access website www.iecex.com

Who is responsible for the certification work?

A manufacturer needing to have equipment certified under the IECEx System can apply to an IECEx Competent Body (ExCB) in any member country. At present there are more than 30 IECEx member countries. The ExCB performs or coordinates the activities of certification. A quality assessment of the manufacturer is undertaken by the ExCB itself, and the auditor issues an IECEx Quality Assessment Report (QAR). Type testing of product samples is performed on behalf of the ExCB by an IECEx Assessment and Testing Laboratory (ExTL). On completion of its work the ExTL's assessment engineer prepares an IECEx Test Report (ExTR). The ExTR is then submitted to the ExCB for endorsement. Based on the QAR and ExTR, the ExCB then issues the Certificate of Conformity (CoC). The CoC provides internationally accepted verification that the equipment in question is in compliance with the relevant IEC standards. Once formally issued by the ExCB, both the ExTR and QAR are registered on the IECEx Internet site. This provides verification that an ExTR and QAR exist for the product and manufacturer. Additionally manufacturers provide the certification number on the product rating plate.

3.1 Hazardous Areas

Explosive Atmosphere is defined as a mixture with air, under atmospheric conditions, of flammable substances in the form of gas, vapors, dust, fibers, or flyings which, after ignition, permits self-sustaining propagation by the IEC 60079-10-1 and IEC 60079-10-2 standards whereas a Hazardous Area is "an area in which an explosive atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment". Explosions may occur either due to the transfer of flames or through overheating. For this reason, motors with flameproof protection are constructed in such a way as to prevent propagation of an internal explosion in to the hazardous area in which they are installed.

Hazardous areas are classified through Zones, Groups and Temperature Classes.

The classifications according to the International Electrotechnical Commission (IEC) are shown below

Classification per Zones: based upon the frequency of the occurrence and duration of an explosive atmosphere and based on the type of flammable material (gases/vapors or dusts):

IEC Zone 0 (gases/vapours) or 20 (dusts)

An explosive atmosphere with continuous grade of release

IEC Zone 1 (gases/vapours) or 21 (dusts)

An explosive atmosphere with primary grade of release

IEC Zone 2 (gases/vapours) or 22 (dusts)

An explosive atmosphere with secondary grade of release

3.2 Equipment Protection Levels - EPL and markings

Traditional classification of hazardous area by IEC 60079-10 and IEC 60079-10-2 considers the possibility of explosion. The latest revisions of the IEC and EN standards introduce a new risk assessment approach known as the equipment protection level, which identify products according to the ignition risk they might cause and the hazardous area itself. This means that EPL for a given product indicates its ignition risk, regardless of its protection type. This makes the selection of equipment for different zones easier. EPLs also enable a true risk assessment approach, where the potential consequences of a possible explosion are taken into consideration.

The latest revisions of the standards IEC/EN 60079-7 and IEC/EN 60079-1 have introduced some new markings for equipment suitable for locations where there is a potential risk of gas present. The non-sparking protection method is no longer used on rotating electrical machines, instead there are two levels of increased safety protection introduced in edition 5 of IEC/EN 60079-7. One higher level of protection with EPL Gb that technically corresponds to the old Ex e, an a new lower level with EPL Gc that corresponds to Ex nA as previously defined in IEC/EN 60079-15. Further have also several levels of protection been introduced in edition 7 of IEC/EN 60079-1 for flame proof protection. These two changes does affect the markings used both flameproof, increased safety and non-sparking equipment for group II as shown in the table on the following page.

ATEX

Category 3
Old : Ex nA IIC T3 Gc
New : Ex ec IIC t3 Gc

Category 2
Old : Exd IIB/C T4 Gb
New Ex db IIB/C T4 Gb

Old : Exde IIB/C T4 Gb
New : Ex db eb IIB/C T4 Gb

Category 1
No motors allowed

Zone 2/22: abnormal condition, explosive atmosphere is not likely to occure in normal operation
EPL „c" required

Zone 1/21: occasional presence of explosive atmosphere in normal operation
EPL „b" required

Zone 0/20: continuous presence of explosive atmosphere is
EPL „a" required

IECEx

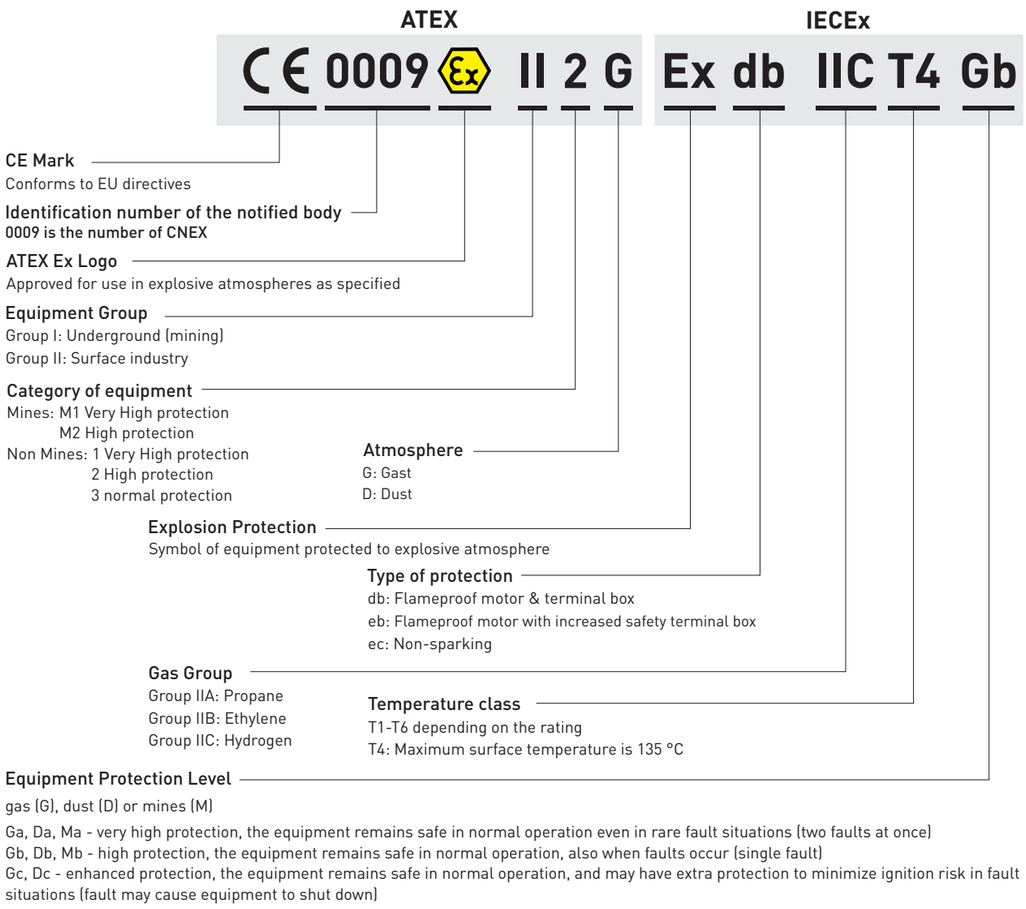
Old : Ex nA IIC T3 Gc
New : Ex ec IIC T3 Gc

Old : Exd IIB/C T4 Gb
New Ex db IIB/C T4 Gb

Old : Exde IIB/C T4 Gb
New : Ex db eb IIB/C T4 Gb

No motors allowed

Markings on the left hand side grey square only appear for ATEX certified products. Right hand side markings apply for both ATEX and IEC certified products.



Ga, Da, Ma - very high protection, the equipment remains safe in normal operation even in rare fault situations (two faults at once)
Gb, Db, Mb - high protection, the equipment remains safe in normal operation, also when faults occur (single fault)
Gc, Dc - enhanced protection, the equipment remains safe in normal operation, and may have extra protection to minimize ignition risk in fault situations (fault may cause equipment to shut down)

3.3 Energy efficiency

The most relevant IEC standards related to the energy efficiency of low voltage motors are IEC 60034-30-1:2014 and IEC 60034-2-1:2014. These standards were created as part of an attempt to harmonize different motor testing methods such as CSA390-10 and IEEE 112 well used in the Norther America and classification of products based on efficiency classes. IEC 60034-30-1:2014 defines International Efficiency (IE) classes for single speed, three-phase, 50 Hz and 60 Hz induction motors. The efficiency levels defined in IEC 60034-30-1 are based on the test method specified in IEC 60034-2-1:2014.

Minimum energy performance standards

While the IEC as an international standardization organization sets guidelines for motor testing and efficiency classes, the organization does not regulate efficiency levels in countries. The biggest drivers for mandatory Minimum Energy Performance Standard (MEPS) levels for electric motors are global climate change, government targets to curb CO_2 emissions and rising electricity demand, especially in developing countries. The whole value chain, from manufacturer up to end user, must be aware of the legislation in order to meet local requirements, to save energy and reduce the carbon footprint.

Harmonized global standards and the increasing adoption of MEPS around the world are good news for all of us. However, it is important to remember that harmonization is an ongoing process. Even though MEPS are already in effect in several regions and countries, they are evolving and differ in terms of scope and requirements. At the same time, more countries are planning to adopt their own MEPS regulations.

IEC 60034-1-30

This standard defines the International Efficiency (IE) classes for single speed electric motors that are rated according to IEC 60034-1 or IEC 60079-0 (explosive atmospheres) and designed for operation on sinusoidal voltage.

- IE4 = Super premium efficiency
- IE3 = Premium efficiency (60 Hz values are identical with NEMA Premium and CSA)
- IE2 = High efficiency
- IE1 = Standard efficiency

Standard covers the power range from 0.12 kW up to 1000 kW for motors rated for direct on-line operation.

- Single speed electric motors (single and three[1]phase), 50 and 60 Hz
- 2, 4, 6 and 8 poles
- Rated output PN from 0.12 kW to 1000 kW
- Rated voltage UN above 50 V up to 1 kV
- Motors capable of continuous operation at their rated power with a temperature rise within the specified insulation temperature class
- Motors, marked with any ambient temperature within the range of -20 °C to +60 °C
- Motors, marked with an altitude up to 4000 m above sea level

The following motors are excluded from IEC 60034-30-1:

Single-speed motors with 10 or more poles or multi-speed motors

- Motors completely integrated into a machine (for example pump, fan or compressor) that cannot be tested separately from the machine
- Brake motors, when the brake cannot be dismantled or separately fed

Nominal efficiency values per IE-class according to IEC 60034-30-1:2014. Efficiency determination method acc. to IEC 60034-2-1:2014

Output power	IE1				IE2				IE3				IE4			
kW	2-pole	4-pole	6-pole	8-pole	2-pole	4-pole	6-pole	8-pole	2-pole	4-pole	6-pole	8-pole	2-pole	4-pole	6-pole	8-pole
0.12	45.0	50.0	38.3	31.0	53.6	59.1	50.6	39.8	60.8	64.8	57.7	50.7	66.5	69.8	64.9	62.3
0.18	52.8	57.0	45.5	38.0	60.4	64.7	56.6	45.9	65.9	69.9	63.9	58.7	70.8	74.7	70.1	67.2
0.20	54.6	58.5	47.6	39.7	61.9	65.9	58.2	47.4	67.2	71.1	65.4	60.6	71.9	75.8	71.4	68.4
0.25	58.2	61.5	52.1	43.4	64.8	68.5	61.6	50.6	69.7	73.5	68.6	64.1	74.3	77.9	74.1	70.8
0.37	63.9	66.0	59.7	49.7	69.5	72.7	67.6	56.1	73.8	77.3	73.5	69.3	78.1	81.1	78.0	74.3
0.40	64.9	66.8	61.1	50.9	70.4	73.5	68.8	57.2	74.6	78.0	74.4	70.1	78.9	81.7	78.7	74.9
0.55	69.0	70.0	65.8	56.1	74.1	77.1	73.1	61.7	77.8	80.8	77.2	73.0	81.5	83.9	80.9	77.0
0.75	72.1	72.1	70.0	61.2	77.4	79.6	75.9	66.2	80.7	82.5	78.9	75.0	83.5	85.7	82.7	78.4
1.1	75.0	75.0	72.9	66.5	79.6	81.4	78.1	70.8	82.7	84.1	81.0	77.7	85.2	87.2	84.5	80.8
1.5	77.2	77.2	75.2	70.2	81.3	82.8	79.8	74.1	84.2	85.3	82.5	79.7	86.5	88.2	85.9	82.6
2.2	79.7	79.7	77.7	74.2	83.2	84.3	81.8	77.6	85.9	86.7	84.3	81.9	88.0	89.5	87.4	84.5
3	81.5	81.5	79.7	77.0	84.6	85.5	83.3	80.0	87.1	87.7	85.6	83.5	89.1	90.4	88.6	85.9
4	83.1	83.1	81.4	79.2	85.8	86.6	84.6	81.9	88.1	88.6	86.8	84.8	90.0	91.1	89.5	87.1
5.5	84.7	84.7	83.1	81.4	87.0	87.7	86.0	83.8	89.2	89.6	88.0	86.2	90.9	91.9	90.5	88.3
7.5	86.0	86.0	84.7	83.1	88.1	88.7	87.2	85.3	90.1	90.4	89.1	87.3	91.7	92.6	91.3	89.3
11	87.6	87.6	86.4	85.0	89.4	89.8	88.7	86.9	91.2	91.4	90.3	88.6	92.6	93.3	92.3	90.4
15	88.7	88.7	87.7	86.2	90.3	90.6	89.7	88.0	91.9	92.1	91.2	89.6	93.3	93.9	92.9	91.2
18.5	89.3	89.3	88.6	86.9	90.9	91.2	90.4	88.6	92.4	92.6	91.7	90.1	93.7	94.2	93.4	91.7
22	89.9	89.9	89.2	87.4	91.3	91.6	90.9	89.1	92.7	93.0	92.2	90.6	94.0	94.5	93.7	92.1
30	90.7	90.7	90.2	88.3	92.0	92.3	91.7	89.8	93.3	93.6	92.9	91.3	94.5	94.9	94.2	92.7
37	91.2	91.2	90.8	88.8	92.5	92.7	92.2	90.3	93.7	93.9	93.3	91.8	94.8	95.2	94.5	93.1
45	91.7	91.7	91.4	89.2	92.9	93.1	92.7	90.7	94.0	94.2	93.7	92.2	95.0	95.4	94.8	93.4
55	92.1	92.1	91.9	89.7	93.2	93.5	93.1	91.0	94.3	94.6	94.1	92.5	95.3	95.7	95.1	93.7
75	92.7	92.7	92.6	90.3	93.8	94.0	93.7	91.6	94.7	95.0	94.6	93.1	95.6	96.0	95.4	94.2
90	93.0	93.0	92.9	90.7	94.1	94.2	94.0	91.9	95.0	95.2	94.9	93.4	95.8	96.1	95.6	94.4
110	93.3	93.3	93.3	91.1	94.3	94.5	94.3	92.3	95.2	95.4	95.1	93.7	96.0	96.3	95.8	94.7
132	93.5	93.5	93.5	91.5	94.6	94.7	94.6	92.6	95.4	95.6	95.4	94.0	96.2	96.4	96.0	94.9
160	93.8	93.8	93.8	91.9	94.8	94.9	94.8	93.0	95.6	95.8	95.6	94.3	96.3	96.6	96.2	95.1
200	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.3	95.4
250	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.5	95.4
315	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.6	95.4
355	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.6	95.4
400	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.6	95.4
450	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.6	95.4
500-1000	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.6	95.4

IEC-60034-2-1:2014

This standard defines three different testing methods for the determination of efficiency of rotating electrical machines. These methods are knows as Method 2-1-1A: Direct measurement of input and output, 2-1-1B: Summation of losses with additional load losses according to the method of residual loss and Method 2-1-1C: Summation of losses with additional load losses from assigned allowance. ATB-Wolong is using the low uncertainty Method 2-1-1B. The respective loss components are iron losses, windage and friction losses, stator and roto losses and additional load losses. These losses are calculated by parameters measured and derived during the testing of the motor and hence by their summation the motor efficiency is determined accurately.

3.4 EU Regulation

Motor Regulation EU 2019/1781
The Ecodesign Directive 2009/125/EC establishes, across the EU, a framework for setting eco-design requirements for energy-related products. It is a key instrument of EU policy for improving the energy efficiency and other aspects of the environmental performance of products placed on the market. Requirements for the eco-design of electric motors and the use of variable speed drives were set out in Regulation (EC) 640/2009 on 22nd July 2009 and in its amendment Regulation (EU) 4/2014 on 6th January 2014. This regulation was superseded on 25th October 2019 by Regulation (EU) 2019/1781, which sets out new statutory requirements for motors and drives and its amendment Regulation (EU) 2021/341 from 23rd of February 2021. The first step of the Regulation (EU) 2019/1781 took place 1st July 2021, whereas the second step on 1st of July 2023.

EU 2019/1781, second step applies to 3phase and single phase induction motors:
- rated for operation on 50 Hz, 60 Hz or 50/60 Hz supplies and
- are rated for continuous duty ie. Duty class S1, S3 => 80% or S6 => 80%
- pole numbers 2-, 4-, 6- and 8-poles
- for explosive atmospheres Ex eb, Ex ec, Ex tb, Ex tc, Ex db, Ex db eb and Ex dc - brake motors (with the exception of motors with an integrated brake which forms an integral part of the inner motor construction and can neither be removed nor powered by a separate power source during the testing of the motor efficiency
- Totally Enclosed Air Over (TEAO) rated motors

This regulation doesn't apply to:
- motors with brushes, commutator, slip rings or other electrical connections to the rotor, often described as multi-speed motors
- motors rated above 1000 V eg High Voltage motors

Majors exceptions include:
- Mining motors (Group I as defined in Annex I, point 1 of Directive 2014/34/EU)
- Totally Enclosed Non-Ventilated (TENV) motors The minimum efficiency class requirements for low voltage motors are as follows from 1st July 2023 onwards:
- IE4 for 2, 4 and 6-pole motors with output power 75-200 kW, which are not brake motors, Ex eb increased safety motors, or other explosion-protected motors.
- IE3 for 2, 4 and 6-poles safe area motors from 0.75 kW up to 1000 kW, but not between 75-200 kW 8-pole from 0.75 - 1000 kW
- IE3 for 8-pole safe are motors from 0.75-1000 kW
- IE3 for Motors for explosive atmospheres; Ex ec, Ex tb, Ex tc, Ex db, Ex db eb and Ex dc from 0.75 to 1000 kW
- IE3 for brake motors or Totally Enclosed Air Over (TEAO) motors from 0.75 up to 1000 kW
- IE2 for single phase motors and three phase Ex eb increased safety motors from 0.12 to 1000 kW

Regulation also applies for the first time for low voltage (max 1000 V) three phase variable speed drives within the output range 0.12 to 1000 kW.

Major exceptions from the Regulation are the following:

- Regenerative drives (active front end, AFE)
- Low-harmonic drives (THD < 10%)
- Multiple AC-output drives
- 1-phase drives

3.5 Standards

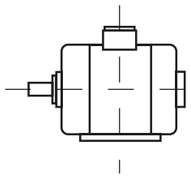
International standards
Motors from WEX3 series are in conformity with all relevant standards IEC, EN and ISO standards.

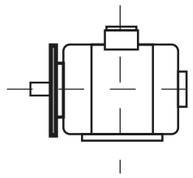
Standards for explosive atmospheres:	
IEC/EN 60079-0	Equipment - General requirements
IEC/EN 60079-1	Equipment protection by flameproof enclosures "d"
IEC/EN 60079-7	Equipment protection by increased safety "e"
IEC/EN 60079-10	Classification of hazardous areas (gas areas)
IEC/EN 60079-14	Electrical installations design, selection and erection
IEC/EN 60079-15*	Equipment protection by type of "n"
IEC/EN 60079-17	Electrical installations inspections and maintenance
IEC/EN 60079-19	Equipment repair, overhaul and maintenance
IEC/EN 60079-31	Equipment dust ignition protection by enclosure "t"
IEC 60050-426	Equipment for explosive atmospheres
IEC 60079-10-1	Classification of areas - Explosive gas atmospheres
IEC 60079-10-2	Classification of areas - Combustble dust atmospheres

* Included in IEC/EN 60079-7 rev 2015

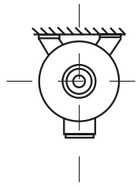
4.1 Mounting arrangements

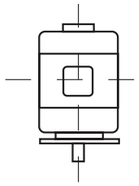
Induction Motors WEX3 are are available in the following mouting arrangements.



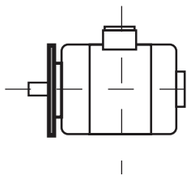


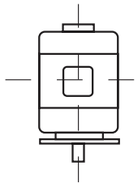
IEC Code I	**IM B3**	**IM B35**
IEC Code II	**IM 1001**	**IM 2001**
Explanation	Foot mounting, feet at bottom	Foot mounting, feet at bottom, with additional flange mounting, with access from housing side



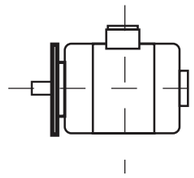


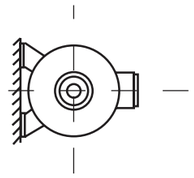
IEC Code I	**IM B8**	**IM V1**
IEC Code II	**IM 1071**	**IM 3011**
Explanation	Foot mounting, feet above	Flange mounting on drive side of the flange, with access from housing side, drive side below

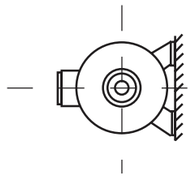




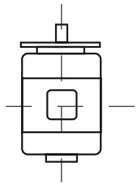
IEC Code I	**IM B14**	**IM V18**
IEC Code II	**IM 3601**	**IM 3611**
Explanation	Flange mounting on drive side of the flange, no access from	Flange mounting on drive side of the flange, no access from side below

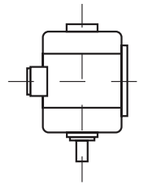


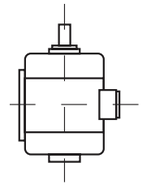




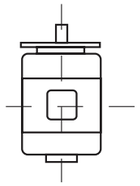
IM B5	**IM B6**	**IM B7**
IM 3001	**IM 1051**	**IM 1061**
Flange bearing plate on drive side, with access from housing side	Foot mounting, feet to the left side (viewed from drive side)	Foot mounting, feet to the right side (viewed from drive side)

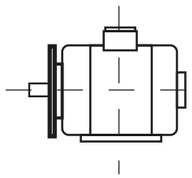


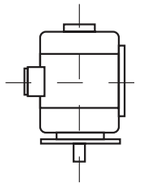




IM V3	**IM V5**	**IM V6**
IM 3031	**IM 1011**	**IM 1031**
Flange mounting on drive side of the flange, with access from housing side, drive side above	Foot mounting, drive side below	Foot mounting, drive side above







IM V19	**IM B34**	**IM V15 / IM V35**
IM 3631	**IM 2101**	**IM 2011 / IM 2031**
Flange mounting on drive side of the flange, no access from side above	Foot mounting, feet at bottom, with additional flange mounting on no access from housing side	Foot mounting, with additional flange mounting on drive side of the flange, drive side below/above, access from housing side

4.2 Cooling

IEC 60034-6 is the international standard that identifies circuit arrangements and the methods of movement of coolant in rotating electrical machines.

The designation of the method of cooling consists of the letters „IC“ followed by numbers and letters.

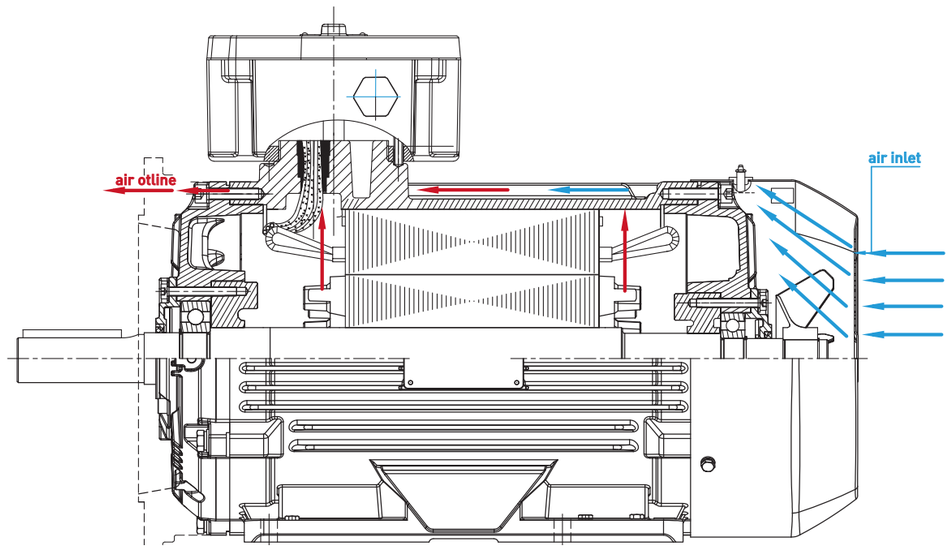
This coding is explained below:

IC	4	(A)	1	(A)	1
Internation Cooling	Circuit arrangement	Primary coolant	Method of movement of primary coolant	Secondary coolanf	Method of movement of secondary coolant
	0=Free circulation (open circuit)	A=Air (omitted for simplified designation)	0=Free convection	A=For air (omitted for simplified designation)	0=Free convection
	4=Free circulation (open cisrcuit)		1=Self-circulation	W=For water	1=Self-circulation
			6=Machine-mounted independent component		6=Machine mounted Independent component
					8=Relative displacment

WEX3 series motors are of Totally Enclosed Fan Cooled type and as standard delivered as IC411.

This means that WEX3 motors are equipped with a shaft mounted fan providing efficient airflow to allow S1 duty full time operation.

WEX3 series motors are equipped as standard with a bi-directional radial-flow fan at the NDE side of the shaft. Below picture illustrates the air flow for IC411



Alternatively WEX3 series motors can be provided by an external cooling fan unit which corresponds to IC 416 Totally Enclosed Force Ventilated. The use of an external fan is advantageus especially in variable speed drive application where the use of an external fan enables better cooling at low speeds and a higher loadability.

4.3 Degrees of protection

IP Code (Ingress Protection)

IP code eg. classification of degrees of protection is described in IEC 60034-5 and EN 60529 standards. IP code defines the level of protection of persons against getting in contact with live parts and againsts contact with moving parts inside the enclosure.

Additionally IP code also includes the proctection of the machine against ingress of solid foreing objects and the protection againsts harmfull effects due to ingress of water and dust.

These degrees of protection are expressed as „IP“ followed by two numbers e.g. IP55.

The first digit shows the extent to which the equipment is protected against particles and the second indicates the extent of protection against water.

Ingress protection IP 55			
First digit		Second digit	
4	Protected against a solid object 1mm or greater	5	**Protected againts jests of water from any direction**
5	**Dust protected**	6	Protected against powerful jets of water from any direction
6	Dust tight	7	Protected againts immersion between dept of 150 mm and 1000 mm
		8	Protected againts submersion

WEX3 series of motors are delivered as standard with degrees of protection IP55.

Other degrees of protection such as IP56, IP65 and IP66 are available as option.

IK Rating (Impact protection)

WEX3 series of motors are delivered as standard with impact rating IK08

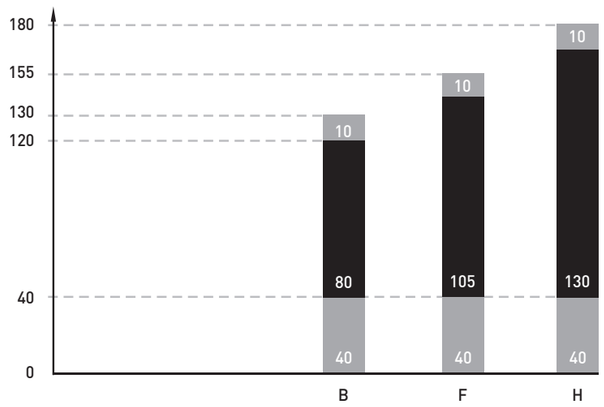
IK code defines the degree of protection provided by enclosures for electrical equipment against external mechanical impacts.

IK rating classifies products by its resistance to impacts by impact energy.

IK code	Impact energy /Joule
00:	Not protected acc. to EN 50102
01:	0.15
02:	0.2
03:	0.35
04:	0.5
05:	0.7
06:	1
07:	2
08:	5 (standard for WEX3
09:	10
10:	20

4.4 Insulation System

ATB -Wolong standard insulation system for WEX3 series meets the requirements of F-class. The main purpose for the insulation material is to prevent, limit and direct the electric current flux and primarily to block the current flux from a cable to the ground or to the lowest potential. However it also serves to provide mechanical support, protects the cable from degradation caused by the environment's influences and to transfer the heat to the external environment Motor insulation is affected by several factors including moisture, vibration, corrosive environments, and others. Among all these factors, the operating temperature of the insulating materials is the most critical. The motor lifetime is reduced by half when operating 10 °C above the rated temperature of the class of the insulating material. Therefore the lifetime of the insulation system depends on the quality level of the insulation materials, whereas the type and quality of the insulation impact the cost, weight, performance and the lifetime of the motor. To ensure a longer lifetime for the electric motor, the use of thermal sensors is recommended for the winding protection. Insulation lifetime refers to permanent aging of the insulation material which becomes dry and loses its insulation properties. As a result, it will not withstand the voltage applied to it, thus causing short-circuit. Experience shows that the insulation has a practically unlimited duration, if its temperature is kept below the limit of its thermal class. Any increasing value above such a limit will reduce the insulation lifetime proportionally. Such a limit of temperature is much lower than the temperature that causes insulation burnout and it depends on the type of used material. This limit of temperature refers to insulation's hottest spot and not necessarily to the whole insulation. On the other hand, a single weak spot in the insulation is enough to damage the winding completely. With the increasing use of frequency inverters for the speed control of induction motors, other application criteria must also be considered for the preservation of the insulation system. The impulse withstand level of the windings is well above the specified minimum of $2xU_N$ + 1000 V so that additional protective measures against overvoltages have to be taken only in exceptional cases.

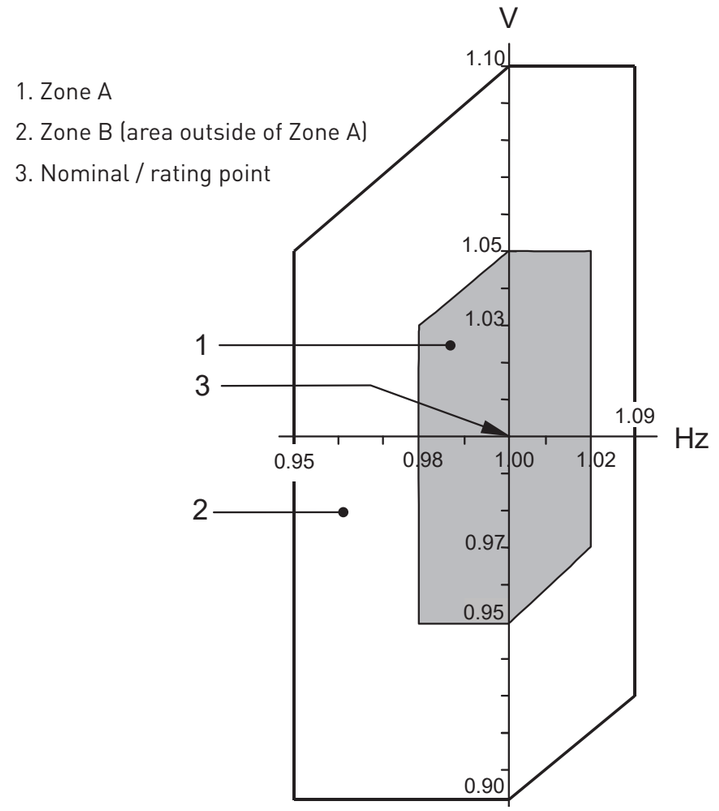


Thermal class 130 (B)	Thermal class 155 (F)	Thermal class 180 (H)
Nominal ambine temperature 40 ºC	Nominal ambine temperature 40 ºC	Nominal ambine temperature 40 ºC
Max permissible temperature rise 80 K	Max permissible temperature rise 105 K	Max permissible temperature rise 125 K
Hot temperature margin 10 K	Hot temperature margin 10 K	Hot temperature margin 10 K

4.5 Voltage and Frequency

IEC 60034-1 defines the impact to temperature rise caused by voltage and frequency fluctuations. The standard divides these combinations into two zones, A and B. A is the combination of voltage variation of ±5% and frequency variation of ±2%. In case nothing else is defined default assumption is that operation occurs within Zone A limits. Zone B is the combination of voltage variation of ±10% and frequency variation of +3 / -5%. Below figure illustrates the zones.

Voltage and frequency limits for motors:



WEX3 motors are capable of supplying the rated torque in both zones A and B, although the temperature rise will be higher than that at rated voltage and frequency. Extended operation at Zone B is not recommended.

4.6 Surface Treatment options for WEX3 series

ATB - Wolong standard painting system for WEX3 series meets the corrosive category C3 as per DIN EN ISO 12944-2 standard. It is suitable for motor installed in slightly sever industrial environments with low relative humidity, normal temperature variations and presence of SO2. Standard motor top coat is RAL 5012.

Standard Paint system (C3) cast iron motors		
Primer coat	Epoxy primer H0601	40 micros
Intermediate coat	Epoxy primer	40 micros
Top coat	Polyurethane texture finish paint S0402	40 micros
Total paint thicknes		**120 micros**

* Arithmetic mean

C4 Paint system (C4) cast iron motors		
Primer coat	Phosphating primer	40 micros
Intermediate coat	Epoxy primer	80micros
Top coat	Polyurethane texture finish paint S0402	80micros
Total paint thicknes		**160 micros**

C5 Paint system (C5) cast iron motors		
Primer coat	Epox-zinc rich primer	60 micros
Intermediate coat	Epoxy mica-iron oxide intermediate paint	120micros
Top coat	Polyurethane texture finish paint S0402	80 micros
Total paint thicknes		**260 micros**

** C5 available only for production orders.

4.7 DOL starting

One of the most important characteristic to be verified in motor selection is the driven load moment of inertia as this impacts directly the motor's capability to start and drive the load.

Moment of inertia is the resistance of an object to change its rotation movement around the shaft. This depends on the shaft around which it is rotating, the shape of the object and the distribution of its mass. kgm^2 is the unit used for moment of inertia.

The total moment of inertia J_T is equal to the driven load inertia J_{Ext} + the motor inertia J_m . These are essential for starting time calculation. In case the machine is driven through gear box or pulley/belt assembly the moment of inertia should be considered for the motor speed (J_{ms}) as below:

$J_{ms} = J_{Ext}$ (load speed/motor speed)*2 (kgm^2)

Another important detail that has an impact on the starting time is the fact whether motor gets a full nominal voltage from the network or not eg. For WEX3 motors in case the $J_{T\,max}$ equal to J_{per}, the voltage drop is less than 15% and the resistancing quadratique torque (pump, fan) is not more than 0.35 x the motor nominal torgue, the motor can start 2 times cold and 1 time warm assuming cooling down between the starts.

4.8 Variable Speed Drive

Variable Speed Drives fed induction motors are the most common solution used in the industry and this is currently the most efficient method for the speed control of induction motors. The use of Variable Speed Drive provides several benefits when compared to other speed control methods. Most common benefits are remote, flexible control, increased quality and productivity through better energy performance eg. lower operational costs of the overall application.

Impact of frequency converter to the motor.

There are several implications from the use of the variable speed drive to the motors. Induction motors driven by PWM type variable speed drive are subject to harmonics that can increase the losses and the temperature as well as the noise and vibration levels, when compared to the sinusoidal supply. The VSD influence on the motor depends on several factors related to the control, such as switching frequency, the effective pulse width, pulse number etc. For WE series motor the recommended minimum switching frequency is 2.5 kHz. Harmonics generated by a PWM type variable speed drive can be mitigated by installation of output filters, such as load reactance, du/dt filters, sinusoidal filters. Pulse Width Modulation quality improvement (optimization of pulse patterns) and the increase of the switching frequency are other means of mitigation. Other effects may also appear when induction motors are fed by variable speed drive such as dielectric stress of the insulation system and shaft currents that reduce bearing life. Temperature rise of the winding can be higher when fed by frequency inverter than when fed by sinusoidal voltage supply. This higher temperature rise results from the motor losses' growth due to the high harmonic components of the PWM signal and the often reduced heat transfer resulting from speed variation of selfventilated motors operating at low frequencies. The overheating of the winding can be mitigated by rated torque derating or by the use of external cooling system non-dependent of the motor speed.

Winding insulation

Modern frequency converters use power transistors (typically IGBTs), whose switching process occurs at very high frequencies. To achieve such switching, the transistors have very fast times for conducting initiation and blocking which result in voltage pulses with a high du/dt (rate of voltage change over time). When squirrel cage induction motors are fed by frequency, those pulses combined with the cable and motor impedance may cause repetitive overvoltage at the motor terminals. This phenomen may degrade the motor insulation system and may result in shorter motor lifetime. For WE range the standard insulation used up to 500 V is suitable for high frequency surge voltage up to 1.6 kV with rise time of 2µs. In case the inverter type is not known the output power is reduced by 30% and the insultation system is improved for the voltage peaks for Uph-ground_p-p ≤Un and Uph-ph_p-p ≤ 1/4xUn.

For 690 V supply with inverter we have reinforced insulation which is meeting the EN 60034-18-41 IVIC C-class requirement. This means Phase to phase peak voltage mx 2.15 kV with rise time greater than 0.3µs.

Bearing currents

The phenomenon of induced shaft current also known as bearing current is caused by unbalanced waveforms present in the magnetic circuit of the motor. The usual causes of this problem are eccentricities and other imperfection resulting from the manufacturing process. With the introduction of PWM inverters this problem has become more relevant, now occurring also with lower power machines, since the motors are now fed with unbalanced waveforms that have high frequency components. The causes of shaft induced voltage owing to the PWM inverters supply is added to those intrinsic voltages of the motor which also causes current circulation through the bearings. The basic reason for bearing currents to occur within a PWM inverter fed motor is due to the common mode voltage. Bearing current is not caused by the motor but by the supply voltage of the grid sinusoidal or of the inverter. The high frequency of the common mode voltage generated by the frequency inverter ensures that the capacitive reactance within the motor become low, allowing the current to pass through the coupling formed by the rotor, shaft and bearing toward the earth. For mitigation ATB - Wolong WE series motors are equipped with insulated bearings for frame size 315 when used in frequency converter duty. To mitigate the bearing voltage common mode filters must be used in frequency converter duty.

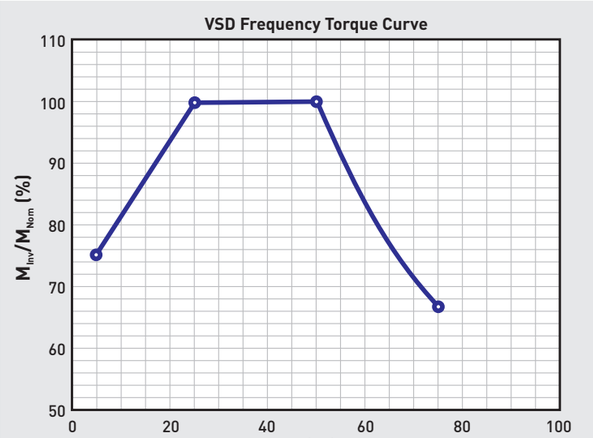
Cooling

When the motor is operated at low speeds the cooling capacity of the fan fitted on the shaft will decrease in proportion of the speed. In variable torque loads, when the torque is reduced with decreasing speed, such as with centrifugal pumps and fans, this reduction in cooling air often stays in balance with the reduction in motor losses as the load is reduced with speed. In constant torque loads, the motor's temperature rise limits will likely to be exceeded if the low-efficiency motor is being used in which case a forced ventilation must be considered. However, IE3 premium efficiency and IE4 super premium efficiency motors generate less heat which means they have a higher thermal reserve and may not need forced ventilation but of course this depends on the extent of the speed reduction."

Motor loadability with variable speed drive

Above graph illustrates the motor loadability at different speeds

50Hz



a) 5-50 Hz: Variable torque (VT10:1)

b) 25-50 Hz, 100% TN: Constant torque CT2:1, 100% TN)

c) 5-50 Hz, 75% TN: Constant Torque (CT10:1, 75% TN)

d) 50-75 Hz, 100% P2: Constant Power (CP,100% P2)

4.9 Balancing and Limits of Vibrations Severity

Balancing

Rotors for WEX3 motors are dynamically balanced with a half key.

Balancing grade for standard motor rotors is G=2.5 which corresponds to the vibration level A requirements according to IEC 60034-14. Higher Grade G1.0 to reach the vibration level B requirements is available as option.

Limits of Vibration Severity

Vibration measurement is carried out at rated voltage motr uncoupled under no/load conditions. Below table illustrates the displacement and velocity for vibration grade A and B under freesuspension and under rigid mounting.

Vibration Grade	Frame Mounting size	56 ⩽ FS ⩽ 132			132 < FS ⩽ 280			FS > 280		
	(mm)	Displace-ment (µm)	Velocity (mm/s)	Acc m/s^2	Displace-ment (µm)	Velocity (mm/s)	Acc m/s^2	Displace-ment (µm)	Velocity (mm/s)	Acc m/s^2
A	Free suspension	25	1,6	2.5	35	2.2	3.5	45	2.8	4.4
	Rigid mounting	21	1.3	2.0	29	1.8	2.8	37	2.3	3.6
B	Free suspension	11	0.7	1.1	18	1.1	1.7	29	1.8	2.8
	Rigid mounting	-	-	-	14	0.9	0.9	24	1.5	2.4

Based on ISO 8821 half key must be used for balancing. All rotors are balanced dynamically with an inserted half-key in place. As option it is possible to balance the rotor without the key or with full key.

In order to avoid undue vibration and adverse effect on bearing life the shaft fitments such as couplings, pulleys, gears and fans must also be balanced in a same way.

4.10 Rating plate

Motor rating plate includes the performance values with different connections at the rated speed.

The corresponding IE-class and minimum efficiency values at nominal and 75% and 50% load are also included.

Below is a typical example for the WEX3 plate for DOL use. The motor has also a separate plate as standard for operation with a Variable Speed Drive.

SCHORCH
a WOLONG *company*

EXPLOSION PROOF
INDUCTION MOTOR

3~mot. **WEX3-180M-2** SERIAL NO. **23I0Y21AW88701** IEC60034

IM **B3** IP **55** Ins.cl. **155(F)** Lp **69** dB(A) **238** kg DATE **9.2023**

V	Hz	kW	SF.	A	EFF.–Cl.	cosø	r/min	BRG. DE.
△ 400	50	22	1.0	38.5	92.7%-IE3	0.89	2959	6310/C3-2Z
Y 690	50	22	1.0	22.3	92.7%-IE3	0.89	2959	BRG. NDE.
IE3-50 Hz - 92.7% (100%) - 93.1 (75%) - 93.1 (50%)								6308/C3-2Z

CE 0470 Ex II 2 G H DUTY S1 PTC **150** ℃ t_A **9** s
Ex db II B T4 Gb
CNEX 19ATEX 0006X ECEX CNEX 19.0007X

Wolong Electric Nanyang Explosion Protection Group Co., Ltd.
No.1,Funiu Road,Nanyang City,Henan,China

DOL rating plate

The physical size of the rating plate is different depending of the motor frame size.

4.11 Ordering information

Product code

For the identification of Schorch WEX3 products the following alphameric code is used.

WEX 3 - 160 L 2 - 2

- Product series WEX
- 3 = Efficieny class IE3
- Frame size
- Frame length
- Core length
- Pole number

WEX3
Low Voltage Induction Motors
for Explosive Atmospheres

4.12 Motor in brief

Motor frame size			80	90	100	112	132	160	180	200	225	250	280	315	355
Stator frame and endshields	Material		cast iron												
Feet, fixed	Material		cast iron												
Bearings	D-end	2-pole	6204ZZ	6205ZZ	6206ZZ	6206ZZ	6208ZZ	6309ZZ	6310ZZ	6312	6312	6313	6314	6316	6318
	N-end	2-pole	6204ZZ	6203ZZ	6205ZZ	6205ZZ	6205ZZ	6307ZZ	6308ZZ	6212	6312	6313	6314	6316	6318
	D-end	4-8 pole	6204ZZ	6205ZZ	6206ZZ	6206ZZ	6208ZZ	6309ZZ	6310ZZ	6312	6313	6314	6317	6319	6322
	N-end	4-8 pole	6204ZZ	6203ZZ	6205ZZ	6205ZZ	6205ZZ	6307ZZ	6308ZZ	6212	6312	6313	6314	6319	6322
	Bearings locked at		D-end												
Shaft sealing	D-end	2-pole	V-ring												
	N-end	4-8 pole	V-ring												
Lubrication	Type of grease, size of grease nipples		Permanently greased for		life double shielded bearings					Regreasable, flat M10x1 grease nipples					
Rating plate	Material		Stainless steel												
Terminal box	Material		Cast iron												
External screws	Material		Dacromet bolts												
Cable entry	Main entry		2xM25	2xM25	2xM32	2xM32	2xM32	2xM40	2xM50	2xM50	2xM50	2xM63	2xM63	2xM63	2xM80
	Aux entry		1xM25		1xM25	1xM25	1xM25	1xM25	1xM25	1xM25	1xM25	1xM25	1xM25	1xM25	1xM25
			Main enties are provided with cable glands and aux. entries with certified blind plugs												
Fan	Material		Plastic, Nylon 6												
Fan cover	Material		Steel sheet												
Rotor	Material		Pressure die cast aluminum												
Balancing method and grade			Dynamic, grade G 2.5												
Vibration level			Grade A												
Keyway			Half-key												
Stator winding	Type and material		Vacuum impregnation												
	Insulation class / temperature rise		F(155) / B (80) K												
	Winding protection (type and no.)		PTC termistors 3x150C												
Drain holes	Material and closed or open		Drain holes are not included as standard. Available as option.												
Enclosure degree of protection			IP55												
Cooling method			IC 411												
Surface treatment	Paint type and total DFT		Epoxy paint DFT=120 my												
	Corrosion category		standard C3												
	Top color shade		Motor RAL 5012												

WEX3
Low Voltage Induction Motors
for Explosive Atmospheres

5.1 Electrical data IE3, 50 Hz

2-pole

Motor type	Rated power	Rated current (A)			Speed	Efficiency			Powe factor			Locked torque/ rated torque	Locked current/ rated current	Max torque/ rated torque	Noise Lw/Lp	Vibration	Rotary inertia	Weight	Torque	Synchro-speed	DE bearing	NDE bearing
	kW	In 380 V	In 400 V	In 415 V	r/min	100%	75%	50%	100%	75%	50%				dB (A)	mm/s	kgm²	kg	Nm	r/min		
WEX3-80M1-2	0.75	1.7	1.6	1.6	2857	80.7	81.4	80.1	0.83	0.79	0.71	2.3	6.8	2.3	64/56	1.3	0.0012	32	2.5	3000	6204-2Z/C3	6204-2Z/C3
WEX3-80M2-2	1.1	2.4	2.28	2.18	2854	82.7	83.2	82.3	0.83	0.81	0.73	2.3	7.3	2.3	64/56	1.3	0.0014	34	3.7	3000	6204-2Z/C3	6204-2Z/C3
WEX3-90S-2	1.5	3.2	3.04	2.91	2859	84.2	85.4	83.8	0.84	0.81	0.75	2.3	7.6	2.3	72/64	1.3	0.0016	40	5	3000	6205-2Z/C3	6203-2Z/C3
WEX3-90L-2	2.2	4.6	4.37	4.18	2863	85.9	86.8	85.1	0.85	0.80	0.74	2.3	7.8	2.3	72/64	1.3	0.0018	42	7.3	3000	6205-2Z/C3	6203-2Z/C3
WEX3-100L-2	3	6	5.7	5.45	2901	87.1	88.9	87.2	0.87	0.83	0.77	2.3	8.1	2.3	76/68	1.3	0.0058	63	9.9	3000	6206-2Z/C3	6205-2Z/C3
WEX3-112M-2	4	7.8	7.41	7.09	2897	88.1	88.7	88.2	0.88	0.84	0.77	2.3	8.3	2.3	77/69	1.3	0.0076	63	13.2	3000	6206-2Z/C3	6206-2Z/C3
WEX3-132S1-2	5.5	10.6	10.07	9.64	2916	89.2	89.5	88.3	0.88	0.84	0.77	2.2	8.0	2.3	76/68	1.3	0.0159	80	18	3000	6208-2Z/C3	6305-2Z/C3
WEX3-132S2-2	7.5	14.2	13.49	12.91	2907	90.1	91.1	90.4	0.89	0.86	0.80	2.2	7.8	2.3	76/68	1.3	0.0195	87	24.6	3000	6208-2Z/C3	6305-2Z/C3
WEX3-160M1-2	11	20.6	19.57	18.73	2934	91.2	91.8	91.5	0.89	0.86	0.80	2.2	7.9	2.3	75/67	1.8	0.05	174	35.8	3000	6309/C3	6307/C3
WEX3-160M2-2	15	27.9	26.51	25.36	2930	91.9	93.0	92.2	0.89	0.86	0.80	2.2	8.0	2.3	75/67	1.8	0.057	184	48.9	3000	6309/C3	6307/C3
WEX3-160L-2	18.5	34.2	32.49	31.09	2937	92.4	93.0	93.1	0.89	0.88	0.82	2.2	8.1	2.3	75/67	1.8	0.067	206	60.1	3000	6309/C3	6307/C3
WEX3-180M-2	22	40.5	38.48	36.82	2937	92.7	93.1	93.1	0.89	0.88	0.82	2.2	8.2	2.3	85/77	1.8	0.098	238	71.5	3000	6310/C3	6308/C3
WEX3-200L1-2	30	54.9	52.16	49.91	2966	93.3	93.6	93.2	0.89	0.88	0.82	2.2	7.5	2.3	87/79	1.8	0.2	310	96.6	3000	6312/C3	6212/C3
WEX3-200L2-2	37	67.4	64.03	61.27	2963	93.7	94.1	93.5	0.89	0.87	0.81	2.2	7.5	2.3	87/79	1.8	0.23	320	119.2	3000	6312/C3	6212/C3
WEX3-225M-2	45	81.7	77.62	74.27	2959	94.0	94.2	94.0	0.89	0.87	0.81	2.2	7.6	2.3	89/82	1.8	0.41	460	145.2	3000	6312/C3	6312/C3
WEX3-250M-2	55	99.6	94.62	90.55	2964	94.3	94.7	94.3	0.89	0.88	0.82	2.2	7.6	2.3	89/82	1.8	0.48	510	177.2	3000	6313/C3	6313/C3
WEX3-280S-2	75	135.2	128.44	122.91	2977	94.7	94.9	94.5	0.89	0.88	0.82	2.0	6.9	2.3	91/83	2.3	0.89	630	240.6	3000	6314/C3	6314/C3
WEX3-280M-2	90	161.7	153.62	147	2978	95.0	95.1	94.8	0.89	0.88	0.82	2.0	7.0	2.3	91/83	2.3	1.08	705	288.6	3000	6314/C3	6314/C3
WEX3-315S-2	110	195.07	185.32	177.34	2975	95.2	95.3	95.0	0.89	0.88	0.82	1.9	7.1	2.2	95/85	2.3	1.76	1070	352.52	3000	6316/C3	6316/C3
WEX3-315M-2	132	233.59	221.91	212.35	2974	95.4	95.5	95.2	0.89	0.88	0.82	1.9	7.1	2.2	95/85	2.3	1.88	1100	423.02	3000	6316/C3	6316/C3
WEX3-315L1-2	160	279.44	265.47	254.04	2974	95.6	95.8	95.3	0.89	0.88	0.82	1.9	7.1	2.2	95/85	2.3	2.077	1175	512.75	3000	6316/C3	6316/C3
WEX3-315L-2	185	322.77	306.63	293.43	2975	95.7	95.8	95.6	0.89	0.88	0.82	1.9	7.1	2.2	95/85	2.3	2.35	1235	592.87	3000	6316/C3	6316/C3
WEX3-315L2-2	200	348.57	331.14	316.88	2978	95.8	96.0	95.7	0.89	0.88	0.82	1.9	7.1	2.2	95/85	2.3	2.77	1395	640.94	3000	6316/C3	6316/C3
WEX3-355S1-2	185	322.43	306.31	293.12	2986	95.8	95.8	95.4	0.89	0.88	0.82	1.9	7.1	2.2	98/88	2.3	3.46	1535	592.87	3000	6318/C3	6318/C3
WEX3-355S2-2	200	348.57	331.14	316.88	2987	95.8	95.8	95.4	0.89	0.88	0.82	1.9	7.1	2.2	98/88	2.3	4.38	1690	640.94	3000	6318/C3	6318/C3
WEX3-355M1-2	220	383.43	364.26	348.57	2985	95.8	95.9	95.5	0.89	0.88	0.82	1.8	7.1	2.2	98/88	2.3	4.38	1690	705.03	3000	6318/C3	6318/C3
WEX3-355M2-2	250	435.71	413.92	396.1	2987	95.8	95.9	95.5	0.90	0.88	0.83	1.8	7.1	2.2	98/88	2.3	4.96	1785	801.17	3000	6318/C3	6318/C3
WEX3-355L1-2	280	488	463.6	443.64	2985	95.8	95.9	95.5	0.90	0.88	0.83	1.8	7.1	2.2	98/88	2.3	4.97	1865	897.32	3000	6318/C3	6318/C3
WEX3-355L2-2	315	549	521.55	499.09	2987	95.8	95.9	95.5	0.90	0.88	0.83	1.8	7.1	2.2	98/88	2.3	5.95	2025	1009.48	3000	6318/C3	6318/C3
WEX3-355LX1-2	355	623	591.85	566.36	2987	95.8	95.9	95.5	0.90	0.88	0.83	1.8	7.1	2.2	98/88	2.3	6.7	2165	1135	3000	6318/C3	6318/C3
WEX3-355LX2-2	375	661	627.95	600.91	2986	95.8	95.9	95.5	0.90	0.88	0.83	1.8	7.1	2.2	98/88	2.3	6.7	2180	1199	3000	6318/C3	6318/C3

WEX3 Flame proof motors Ex db / Ex db eb IIB/C T4

WEX3
Low Voltage Induction Motors
for Explosive Atmospheres

4-pole

Motor type	Rated power	Rated current (A)			Speed	Efficiency			Powe factor		
	kW	In 380 V	In 400 V	In 415 V	r/min	100%	75%	50%	100%	75%	50%
WEX3-80M1-4	0.55	1.4	1.33	1.27	1430	80.8	80.6	80.3	0.75	0.65	0.50
WEX3-80M2-4	0.75	1.8	1.71	1.64	1435	82.5	83.7	82.1	0.75	0.66	0.51
WEX3-90S-4	1.1	2.6	2.47	2.36	1422	84.1	85.6	85.4	0.75	0.70	0.63
WEX3-90L-4	1.5	3.6	3.42	3.27	1420	85.3	86.5	86.7	0.75	0.70	0.63
WEX3-100L1-4	2.2	4.8	4.56	4.36	1446	86.7	86.9	86.2	0.81	0.76	0.64
WEX3-100L2-4	3	6.3	5.99	5.73	1441	87.7	88.4	87.5	0.82	0.77	0.67
WEX3-112M-4	4	8.4	7.98	7.64	1450	88.6	88.7	88.8	0.82	0.77	0.66
WEX3-132S-4	5.5	11.4	10.83	10.36	1457	89.6	90.2	89.7	0.82	0.77	0.67
WEX3-132M-4	7.5	15.2	14.44	13.82	1451	90.4	91.3	91.0	0.83	0.78	0.69
WEX3-160M-4	11	21.5	20.43	19.55	1465	91.4	92.3	91.6	0.85	0.81	0.70
WEX3-160L-4	15	28.8	27.36	26.18	1469	92.1	93.0	92.2	0.86	0.81	0.70
WEX3-180M-4	18.5	35.3	33.54	32.09	1475	92.6	92.9	92.6	0.86	0.81	0.71
WEX3-180L-4	22	41.8	39.71	38	1477	93.0	93.4	93.2	0.86	0.81	0.71
WEX3-200L-4	30	56.6	53.77	51.45	1478	93.6	94.0	93.6	0.86	0.82	0.72
WEX3-225S-4	37	69.6	66.12	63.27	1475	93.9	94.1	94.0	0.86	0.82	0.75
WEX3-225M-4	45	84.4	80.18	76.73	1471	94.2	94.5	94.4	0.86	0.84	0.77
WEX3-250M-4	55	102.7	97.57	93.36	1477	94.6	95.1	94.4	0.86	0.83	0.74
WEX3-280S-4	75	136.3	129.49	123.91	1484	95.0	95.2	94.8	0.88	0.85	0.78
WEX3-280M-4	90	163.2	155.04	148.36	1483	95.2	95.5	95.1	0.88	0.85	0.78
WEX3-315S-4	110	199.08	189.13	180.98	1485	95.4	95.6	95.2	0.89	0.85	0.78
WEX3-315M-4	132	238.4	226.48	216.73	1484	95.6	95.8	95.3	0.89	0.85	0.78
WEX3-315L1-4	160	285.12	270.86	259.2	1487	95.8	96.0	95.5	0.89	0.85	0.78
WEX3-315L-4	185	329.33	312.86	299.39	1487	95.9	96.0	95.6	0.89	0.85	0.78
WEX3-315L2-4	200	355.66	337.88	323.33	1487	96.0	96.2	95.7	0.89	0.85	0.78
WEX3-355S1-4	185	328.99	312.54	299.08	1489	96.0	96.2	95.7	0.89	0.85	0.78
WEX3-355S2-4	200	355.66	337.88	323.33	1489	96.0	96.2	95.7	0.89	0.85	0.78
WEX3-355M1-4	220	386.88	367.54	351.71	1490	96.0	96.2	95.7	0.89	0.85	0.78
WEX3-355M2-4	250	439.64	417.66	399.67	1490	96.0	96.2	95.7	0.89	0.85	0.78
WEX3-355L1-4	280	492.39	467.77	447.63	1489	96.0	96.2	95.7	0.89	0.85	0.78
WEX3-355L2-4	315	553.94	526.24	503.58	1488	96.0	96.2	95.7	0.89	0.85	0.78
WEX3-355LX1-4	355	631	599.45	573.64	1489	96.0	96.2	95.7	0.88	0.85	0.78
WEX3-355LX2-4	375	667	633.65	606.36	1488	96.0	96.2	95.7	0.88	0.85	0.78

Locked torque/ rated torque	Locked current/ rated current	Max torque/ rated torque	Noise Lw/Lp	Vibration	Rotary inertia	Weight	Torque	Synchro-speed	DE bearing	NDE bearing
			dB (A)	mm/s	kgm²	kg	Nm	r/min		
2.3	6.3	2.3	58/50	1.3	0.0024	34	3.7	1500	6204-2Z/C3	6204-2Z/C3
2.3	6.5	2.3	58/50	1.3	0.003	36	5	1500	6204-2Z/C3	6204-2Z/C3
2.3	6.6	2.3	61/53	1.3	0.0036	41	7.4	1500	6205-2Z/C3	6203-2Z/C3
2.3	6.9	2.3	61/53	1.3	0.0045	46	10.1	1500	6205-2Z/C3	6203-2Z/C3
2.3	7.5	2.3	64/56	1.3	0.011	45	14.5	1500	6206-2Z/C3	6205-2Z/C3
2.3	7.6	2.3	64/56	1.3	0.014	55	19.9	1500	6206-2Z/C3	6205-2Z/C3
2.3	7.7	2.3	65/57	1.3	0.02	68	26.3	1500	6206-2Z/C3	6206-2Z/C3
2.0	7.5	2.3	65/57	1.3	0.033	91	36	1500	6208-2Z/C3	6305-2Z/C3
2.0	7.4	2.3	65/57	1.3	0.037	98	49.4	1500	6208-2Z/C3	6305-2Z/C3
2.0	7.5	2.3	74/66	1.8	0.094	187	71.7	1500	6309/C3	6307/C3
2.0	7.5	2.3	74/66	1.8	0.11	210	97.5	1500	6309/C3	6307/C3
2.0	7.7	2.3	76/68	1.8	0.21	249	119.8	1500	6310/C3	6308/C3
2.0	7.8	2.3	76/68	1.8	0.23	267	142.2	1500	6310/C3	6308/C3
2.0	7.2	2.3	79/71	1.8	0.42	300	193.8	1500	6312/C3	6212/C3
2.0	7.3	2.3	73/65	1.8	0.49	430	239.5	1500	6313/C3	6312/C3
2.0	7.4	2.3	73/65	1.8	0.55	460	292.1	1500	6313/C3	6312/C3
2.0	7.4	2.3	78/70	1.8	0.89	520	355.6	1500	6314/C3	6313/C3
2.0	6.7	2.3	85/77	2.3	1.55	655	482.6	1500	6317/C3	6314/C3
2.0	7.0	2.3	85/77	2.3	1.86	730	579.5	1500	6317/C3	6314/C3
2.0	7.0	2.2	89/77	2.3	3.57	1105	707.41	1500	6319/C3	6319/C3
2.0	7.0	2.2	89/77	2.3	4.20	1185	848.89	1500	6319/C3	6319/C3
2.0	7.0	2.2	90/78	2.3	4.66	1270	1028.96	1500	6319/C3	6319/C3
2.0	7.0	2.2	90/78	2.3	4.83	1290	1189.73	1500	6319/C3	6319/C3
2.0	7.0	2.2	90/78	2.3	5.42	1420	1286.2	1500	6319/C3	6319/C3
2.0	7.0	2.2	94/82	2.3	6.88	1660	1187.33	1500	6322/C3	6322/C3
2.0	7.0	2.2	94/82	2.3	7.63	1740	1283.6	1500	6322/C3	6322/C3
2.0	7.0	2.2	94/82	2.3	8.17	1775	1411.96	1500	6322/C3	6322/C3
2.0	7.0	2.2	94/82	2.3	8.57	1830	1604.5	1500	6322/C3	6322/C3
2.0	7.0	2.2	94/82	2.3	8.56	1910	1797.04	1500	6322/C3	6322/C3
2.0	7.0	2.2	94/82	2.3	9.85	2040	2021.67	1500	6322/C3	6322/C3
2.0	7.0	2.2	94/82	2.3	10.60	2115	2277	1500	6322/C3	6322/C3
2.0	7.0	2.2	94/82	2.3	12.43	2295	2403	1500	6322/C3	6322/C3

WEX3 Flame proof motors Ex db / Ex db eb IIB/C T4

6-pole

Motor type	Rated power	Rated current (A)			Speed	Efficiency			Powe factor		
	kW	In 380 V	In 400 V	In 415 V	r/min	100%	75%	50%	100%	75%	50%
WEX3-80M1-6	0.37	1.1	1.05	1	905	73.5	73.4	73.3	0.70	0.62	0.50
WEX3-80M2-6	0.55	1.5	1.43	1.36	922	77.2	76.9	76.5	0.72	0.62	0.47
WEX3-90S-6	0.75	2	1.9	1.82	948	78.9	80.1	78.1	0.72	0.65	0.57
WEX3-90L-6	1.1	2.8	2.66	2.55	947	81.0	81.4	80.5	0.73	0.66	0.57
WEX3-100L-6	1.5	3.7	3.52	3.36	953	82.5	82.9	82.2	0.74	0.69	0.58
WEX3-112M-6	2.2	5.4	5.13	4.91	956	84.3	84.2	83.5	0.74	0.69	0.57
WEX3-132S-6	3	7.2	6.84	6.55	960	85.6	86.3	85.6	0.74	0.67	0.55
WEX3-132M1-6	4	9.5	9.03	8.64	961	86.8	87.6	87.2	0.74	0.68	0.56
WEX3-132M2-6	5.5	12.7	12.07	11.55	966	88.0	89.4	88.0	0.75	0.70	0.58
WEX3-160M-6	7.5	16.4	15.58	14.91	976	89.1	89.6	89.3	0.78	0.73	0.60
WEX3-160L-6	11	23.4	22.23	21.27	976	90.3	90.9	90.5	0.79	0.74	0.63
WEX3-180L-6	15	30.9	29.36	28.09	976	91.2	91.8	91.8	0.81	0.76	0.66
WEX3-200L1-6	18.5	37.8	35.91	34.36	984	91.7	92.2	92.0	0.81	0.76	0.67
WEX3-200L2-6	22	44.2	41.99	40.18	984	92.2	92.6	92.1	0.82	0.77	0.67
WEX3-225M-6	30	60.6	57.57	55.09	985	92.9	93.1	92.7	0.81	0.77	0.67
WEX3-250M-6	37	71.7	68.12	65.18	988	93.3	93.7	93.5	0.84	0.8	0.7
WEX3-280S-6	45	84.8	80.56	77.09	990	93.7	94.1	93.8	0.86	0.82	0.75
WEX3-280M-6	55	103.3	98.14	93.91	990	94.1	94.3	94.1	0.86	0.82	0.75
WEX3-315S-6	75	141.72	134.63	128.84	989	94.6	94.7	94.6	0.85	0.82	0.75
WEX3-315M-6	90	171.54	162.96	155.95	990	94.9	95.1	94.6	0.84	0.82	0.75
WEX3-315L1-6	110	206.76	196.42	187.96	989	95.1	95.2	94.8	0.85	0.82	0.75
WEX3-315L2-6	132	244.45	232.23	222.23	989	95.4	95.5	95.2	0.86	0.83	0.75
WEX3-355S-6	160	292.29	277.68	265.72	992	95.6	95.6	95.2	0.87	0.83	0.75
WEX3-355M1-6	185	337.61	320.73	306.92	992	95.7	95.9	95.4	0.87	0.83	0.75
WEX3-355M2-6	200	364.6	346.37	331.45	992	95.8	95.9	95.4	0.87	0.83	0.75
WEX3-355L1-6	220	401.06	381.01	364.6	992	95.8	95.9	95.4	0.87	0.83	0.75
WEX3-355L2-6	250	455.75	432.96	414.32	992	95.8	95.9	95.4	0.87	0.83	0.75
WEX3-355LX1-6	280	516	490.2	469.09	992	95.8	95.9	95.4	0.86	0.83	0.75
WEX3-355LX2-6	315	595	565.25	540.91	992	95.8	95.9	95.4	0.86	0.83	0.75

WEX3 Flame proof motors Ex db / Ex db eb IIB/C T4

Locked torque/ rated torque	Locked current/ rated current	Max torque/ rated torque	Noise Lw/Lp	Vibration	Rotary inertia	Weight	Torque	Synchro-speed	DE bearing	NDE bearing
			dB (A)	mm/s	kgm²	kg	Nm	r/min		
1.9	4.7	2.0	57/49	1.3	0.0031	25	3.9	1000	6204-2Z/C3	6204-2Z/C3
1.9	4.7	2.1	57/49	1.3	0.004	29	5.7	1000	6204-2Z/C3	6204-2Z/C3
2.1	5.8	2.1	57/49	1.3	0.0058	42	7.6	1000	6205-2Z/C3	6203-2Z/C3
2.1	5.9	2.1	57/49	1.3	0.0074	47	11.1	1000	6205-2Z/C3	6203-2Z/C3
2.1	6.0	2.1	61/53	1.3	0.016	64	15	1000	6206-2Z/C3	6205-2Z/C3
2.1	6.0	2.1	65/57	1.3	0.021	67	22	1000	6206-2Z/C3	6206-2Z/C3
2.0	6.2	2.1	69/62	1.3	0.025	75	29.8	1000	6208-2Z/C3	6305-2Z/C3
2.0	6.8	2.1	69/62	1.3	0.035	89	39.7	1000	6208-2Z/C3	6305-2Z/C3
2.0	7.1	2.1	69/62	1.3	0.048	100	54.4	1000	6208-2Z/C3	6305-2Z/C3
2.1	6.7	2.1	70/62	1.8	0.12	179	73.4	1000	6309/C3	6307/C3
2.1	6.9	2.1	70/62	1.8	0.17	224	107.6	1000	6309/C3	6307/C3
2.0	7.2	2.1	70/62	1.8	0.27	270	146.8	1000	6310/C3	6308/C3
2.1	7.2	2.1	76/68	1.8	0.41	285	179.5	1000	6312/C3	6212/C3
2.1	7.3	2.1	76/68	1.8	0.47	312	213.5	1000	6312/C3	6212/C3
2.0	7.1	2.1	76/68	1.8	0.97	450	290.8	1000	6313/C3	6312/C3
2.1	7.1	2.1	78/70	1.8	1.29	510	357.6	1000	6314/C3	6313/C3
2.1	7.2	2.0	80/72	2.3	2.71	630	434	1000	6317/C3	6314/C3
2.1	7.2	2.0	80/72	2.3	3.35	705	530.5	1000	6317/C3	6314/C3
2.0	7.0	2.0	85/73	2.3	4.12	1090	727.16	1000	6319/C3	6319/C3
2.0	7.0	2.0	85/73	2.3	4.87	1170	872.59	1000	6319/C3	6319/C3
2.0	7.0	2.0	85/73	2.3	5.42	1255	1066.5	1000	6319/C3	6319/C3
2.0	7.0	2.0	85/73	2.3	6.44	1420	1279.8	1000	6319/C3	6319/C3
1.9	7.0	2.0	91/79	2.3	10.10	1750	1551.27	1000	6322/C3	6322/C3
1.9	7.0	2.0	91/79	2.3	11.26	1840	1793.65	1000	6322/C3	6322/C3
1.9	7.0	2.0	91/79	2.3	12.45	1930	1939.09	1000	6322/C3	6322/C3
1.9	7.0	2.0	91/79	2.3	13.18	2075	2132.99	1000	6322/C3	6322/C3
1.9	7.0	2.0	91/79	2.3	14.82	2195	2423.86	1000	6322/C3	6322/C3
1.9	7.0	2.0	91/79	2.3	15.52	2250	2690	1000	6322/C3	6322/C3
1.9	7.0	2.0	91/79	2.3	15.99	2290	3026	1000	6322/C3	6322/C3

WEX3
Low Voltage Induction Motors
for Explosive Atmospheres

8-pole

Motor type	Rated power	Rated current (A)			Speed	Efficiency			Powe factor		
	kW	In 380 V	In 400 V	In 415 V	r/min	100%	75%	50%	100%	75%	50%
WEX3-100L1-8	0.75	2.3	2.19	2.09	701	75.0	74.2	73.9	0.67	0.59	0.46
WEX3-100L2-8	1.1	3.2	3.04	2.91	712	77.7	77.2	76.7	0.67	0.60	0.46
WEX3-112M-8	1.5	4	3.8	3.64	713	79.7	78.8	78.1	0.71	0.62	0.49
WEX3-132S-8	2.2	5.7	5.42	5.18	712	81.9	80.4	80.0	0.71	0.63	0.50
WEX3-132M-8	3	7.5	7.13	6.82	713	83.5	82.2	81.5	0.73	0.65	0.51
WEX3-160M1-8	4	9.8	9.31	8.91	718	84.8	84.3	84.1	0.73	0.65	0.52
WEX3-160M2-8	5.5	13.1	12.45	11.91	726	86.2	85.9	85.7	0.74	0.67	0.54
WEX3-160L-8	7.5	17.4	16.53	15.82	728	87.3	87.0	86.8	0.75	0.69	0.56
WEX3-180L-8	11	25.2	23.94	22.91	733	88.6	88.4	88.1	0.75	0.69	0.56
WEX3-200L-8	15	33.5	31.83	30.45	733	89.6	89.2	89.0	0.76	0.69	0.57
WEX3-225S-8	18.5	41	38.95	37.27	736	90.1	89.8	89.7	0.76	0.70	0.58
WEX3-225M-8	22	47.3	44.94	43	734	90.6	90.2	90.0	0.78	0.72	0.60
WEX3-250M-8	30	63.2	60.04	57.45	737	91.3	91	90.8	0.79	0.72	0.6
WEX3-280S-8	37	77.5	73.63	70.45	742	91.8	91.4	91.2	0.79	0.75	0.63
WEX3-280M-8	45	93.9	89.21	85.36	742	92.2	92.0	91.5	0.79	0.75	0.63
WEX3-315S-8	55	111.17	105.61	101.06	740	92.5	92.2	92.0	0.80	0.76	0.65
WEX3-315M-8	75	150.46	142.94	136.78	740	93.1	93.0	93.1	0.80	0.76	0.65
WEX3-315L1-8	90	177.78	168.89	161.62	741	93.4	93.2	93.1	0.80	0.78	0.66
WEX3-315L2-8	110	216.83	205.99	197.12	742	93.7	93.5	93.4	0.82	0.78	0.66
WEX3-355S-8	132	261.03	247.98	237.3	744	94.0	93.8	93.5	0.82	0.78	0.66
WEX3-355M-8	160	314.72	298.98	286.11	744	94.3	94.2	94.0	0.82	0.78	0.67
WEX3-355L1-8	185	363.89	345.7	330.81	745	94.5	94.2	94.0	0.82	0.78	0.67
WEX3-355L2-8	200	387.43	368.06	352.21	745	94.6	94.2	94.0	0.83	0.78	0.67
WEX3-355LX1-8	220	426	404.7	387.27	744	94.6	94.2	94.0	0.83	0.78	0.67
WEX3-355LX2-8	250	484	459.8	440	744	94.6	94.2	94.0	0.83	0.78	0.67

Locked torque/ rated torque	Locked current/ rated current	Max torque/ rated torque	Noise Lw/Lp	Vibration	Rotary inertia	Weight	Torque	Synchro-speed	DE bearing	NDE bearing
			dB (A)	mm/s	kgm²	kg	Nm	r/min		
1.8	4.0	2.0	59/51	1.3	0.012	65	10.2	750	6206-2Z/C3	6205-2Z/C3
1.8	5.0	2.0	59/51	1.3	0.016	72	14.8	750	6206-2Z/C3	6205-2Z/C3
1.8	5.0	2.0	61/53	1.3	0.023	64	20.1	750	6206-2Z/C3	6206-2Z/C3
1.8	6.0	2.0	64/56	1.3	0.029	103	29.5	750	6208-2Z/C3	6305-2Z/C3
1.8	6.0	2.0	64/56	1.8	0.04	122	40.2	750	6208-2Z/C3	6305-2Z/C3
1.9	6.0	2.0	68/60	1.8	0.082	155	53.2	750	6309/C3	6307/C3
1.9	6.0	2.0	68/60	1.8	0.1	169	72.3	750	6309/C3	6307/C3
1.9	6.0	2.0	68/60	1.8	0.14	206	98.4	750	6309/C3	6307/C3
2.0	6.5	2.0	70/62	1.8	0.26	268	143.3	750	6310/C3	6308/C3
2.0	6.6	2.0	73/65	1.8	0.51	359	195.4	750	6312/C3	6212/C3
1.9	6.6	2.0	73/65	1.8	0.76	431	240	750	6313/C3	6312/C3
1.9	6.6	2.0	73/65	1.8	0.87	392	286.2	750	6313/C3	6312/C3
1.9	6.5	2	75/67	1.8	1.34	480	388.7	750	6314/C3	6313/C3
1.9	6.6	2.0	76/67	2.3	2.48	615	476.2	750	6317/C3	6314/C3
1.9	6.6	2.0	76/67	2.3	3.00	630	579.1	750	6317/C3	6314/C3
1.8	6.6	2.0	82/70	2.3	4.41	1045	709.8	750	6319/C3	6319/C3
1.8	6.4	2.0	82/70	2.3	5.66	1155	967.91	750	6319/C3	6319/C3
1.8	6.4	2.0	82/70	2.3	6.74	1280	1161.49	750	6319/C3	6319/C3
1.8	6.4	2.0	82/70	2.3	8.00	1440	1419.59	750	6319/C3	6319/C3
1.8	6.4	2.0	89/77	2.3	12.69	1790	1703.51	750	6322/C3	6322/C3
1.8	6.4	2.0	89/77	2.3	14.51	1910	2064.86	750	6322/C3	6322/C3
1.8	6.4	2.0	89/77	2.3	16.09	2080	2387.5	750	6322/C3	6322/C3
1.8	6.4	2.0	89/77	2.3	17.52	2180	2581.08	750	6322/C3	6322/C3
1.8	6.4	2.0	89/77	2.3	17.80	2200	2820	750	6322/C3	6322/C3
1.8	6.4	2.0	89/77	2.3	20.32	2365	3209	750	6322/C3	6322/C3

WEX3 Flame proof motors Ex db / Ex db eb IIB/C T4

6. Derating factors for high altitude - high ambient temperature

For higher ambient temperatures above 40 °C and / or higher altitudes above 1000 m, the motor output power must be reducde by using a deratingn factor.

These derating factors are listed in the below table.

Site altitude above sea level	Site altitude above sea level coolant temperature					
	<30 °C	30-40 °C	45 °C	50 °C	55 °C	60 °C
1000 m	1.07	1	0.96	0.92	0.87	0.82
1500 m	1.04	0.97	0.93	0.89	0.84	0.82
2000 m	1	0.94	0.9	0.86	0.84	0.79
2500 m	0.96	0.9	0.86	0.83	0.78	0.74
3000 m	0.92	0.86	0.82	0.79	0.75	0.7
3500 m	0.88	0.82	0.79	0.75	0.71	0.67
4000 m	0.82	0.77	0.74	0.71	0.67	0.63

In addition to the motor output derating it is important to notice that the regreasing interevals for bearings are shorter at higher temperatures.

7.1 Lifting lugs

WEX3 motors are provided with lifting lugs as standard according to the below table

All eyebolts have to be used for lifting. When lifting the motor, swaying should be avoided.

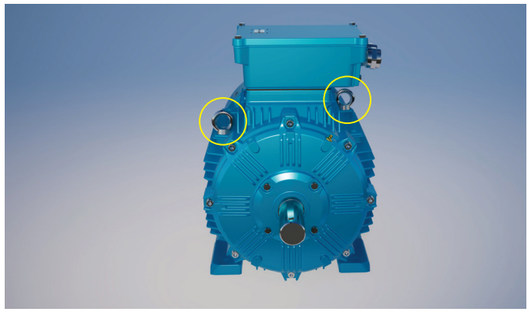


Figure 1.
FS 80-355 B3, B35 eyebolt position
(frame structure is fixed foot)

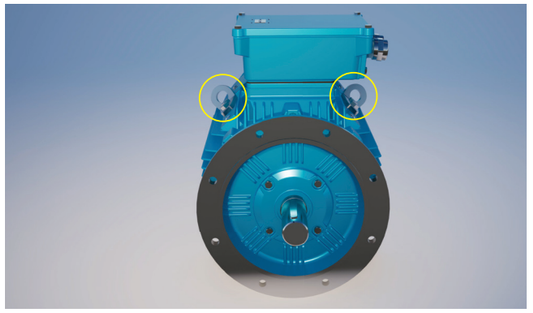


Figure 2.
FS 80-355 B5, V1, B14 eyebolt position
(frame structure is movable foot)

Frame size	Mounting type code	Lifting lug Quantity
80 to 355	B3, B35	2
80 to 355	V1, B5, B14	3

7.2 Heating Elements

Heating elemtens are installed into the windings to avoid condensation and corrosion damaging the windings in humid conditions and where ambient temparature varies considerably.

The below table defines the required power per frame size.

Frame size	Heater power
80-112	30 W
132-160	40 W
180-200	50 W
225-280	60 W
315	2x80 W
355	2x110 W

7.3 External Earthing

WEX3 motors are provided as standard with the followign external earthing provisions:

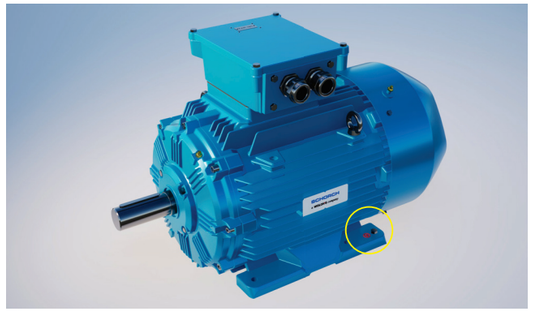


Figure 3.
FS 80-355 B3, B35 external earthing position

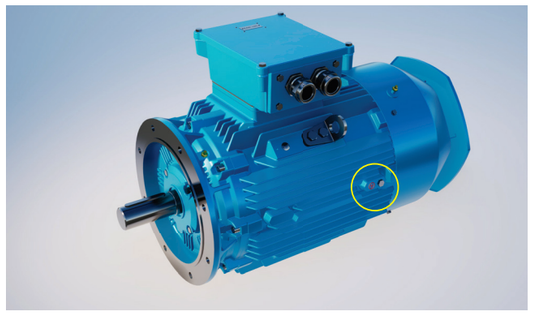


Figure 4.
FS 80-355 B5, V1, B14 external earthing position

Frame size	B3, B35 screw size of earthing	B14, B5, V1 screw size of earthing
80	M5	M5
90-112	M6	M6
132	M8	M10
160-355	M12	M12

7.4 Bearings

WEX3 motors are fitted as standard with single row deep groove ball bearings as per the below tables.

Bearing clearance is of C3 as standard, and bearings are locked at D-end. N-end bearings are equipped with wave spring to reduce bearing vibrarion and noise.

Alternatively standard bearings can be replaced as option with roller bearings which will enable the motor to be used in heavy duty appplications.

Frame size	Pole	D-end bearing	N-end bearing
80	2,4,6,8	6204ZZ	6204ZZ
90	2,4,6,8	6205ZZ	6203ZZ
100	2,4,6,8	6206ZZ	6205ZZ
112	2,4,6,8	6206ZZ	6206ZZ
132	2,4,6,8	6208ZZ	6305ZZ
160	2,4,6,8	6309ZZ	6307ZZ
180	2,4,6,8	6310ZZ	6308ZZ
200	2,4,6,8	6312	6212
225	2	6312	6312
225	4,6,8	6313	6312
250	2	6313	6313
250	4,6,8	6314	6313
280	2	6314	6314
280	4,6,8	6317	6314
315	2	6316	6316
315	4,6,8	6319	6319
355	2	6318	6318
355	4,6,8	6322	6322

Table 1. WEX3 motors

7.5 Bearing lifetime

The nominal life L10h of a bearing is defined according to ISO 281 as the number of operating hours achieved or exceeded by 90% of identical bearings in a large test series under specified conditions. 50% of bearings achieve at least five times this lifetime

As standard, motor frames up to and including 132 frame have double shielded permanetly greased for life bearings ‚ZZ' / ‚2Z' and no regreasing device. Motor frames 160 and above have re-greaseable bearings with grease relief. Re-lubricating devices are equipped with flat lubricating nipple M10 x1. When the lubricating intervals and grease quantities are followed then the theoretical bearing lifetime can be achieved. Motors are to be regreased while running.

The bearing lifetime of 2p motors with horizontal construction is at least 20,000 hours, and 4, 6, 8 poles motors is at least 40,000 hours. However the bearing lifetime is subject to the load cnditions of the application driven by the motor.

The regreasing intervals are specified in the following table. These apply for ambient temperatue of +25 °C.

Re-greasing intervals in hours for horizontal mounting (max ambient temperature 40 °C)

Motor type	Poles	The amount of fuel		Grease type
		grease quantities (g)	regreasing period (h)	
H160~H250	2	30	4,000	Mobil Unirex N2
H160~H250	4~8	40	8,000	
H280	2	30	3,000	
H280	4~8	40	6,000	
H315	2	30	2,000	
H315	4~8	40	5000	
H355	2	30	2,000	
H355	4~8	40	5000	

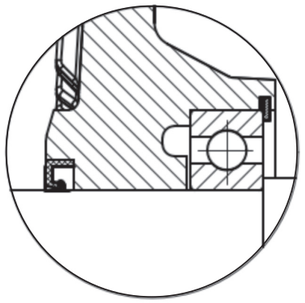
Notes:
When ambient T° higher than 40 °C for every 10 °C increase, the grease life and regreasing intervals must be divided by 2.

7.6 Bearing assembly and shaft sealing

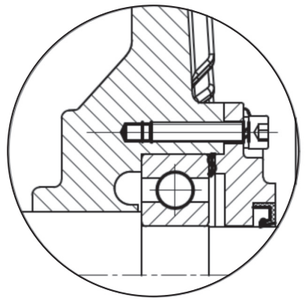
WEX3 motors are equipped as standard with nitrile rubber V-ring at both ends.

Figure 1. V-ring

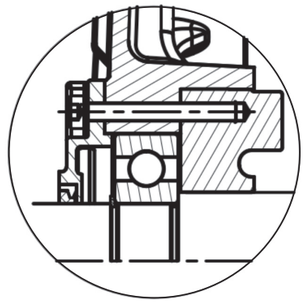
Bearing assembly



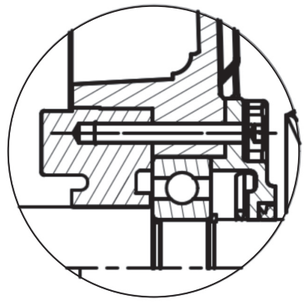
FS 80-132 DE bearing assembly



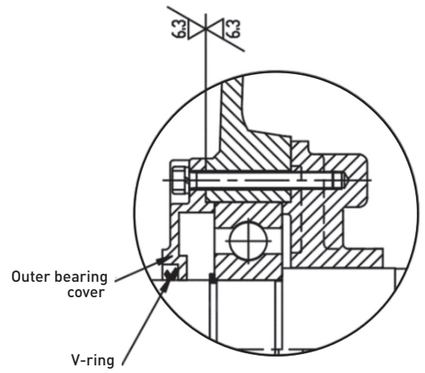
FS 80-132 NDE bearing assembly



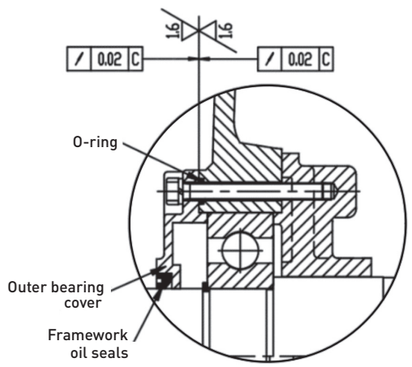
FS 160-355 DE bearing assembly



FS 160-355 NDE bearing assembly



IP55 bearing structure



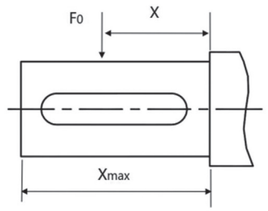
IP56, IP65, IP66 bearing structure

7.7 Permissible radial forces

WEX3 series motors are designed as standard for loads up to 100% with S.F. 1.15 for the rated torque. The permissible radial forces on the shaft D-end are presented in the below table.

The calculation assumes zero axial force at ambient temperature +25 °C, normal conditions and horizontal mounting IM1001 B3.

In order to calculate the permissible cantilever forces for a radial load, the line of force (i.e. the centerline of the pulley) of the cantilever force F0 (N) must lie within the free shaft extension (the shaft extensions length is dimension E in outline drawing). Dimension X is the distance between the point of application of force F0 and the shaft shoulder. Dimension Xmax corresponds to the length of the shaft extension (value E in outline drawing). The table below contains the permissible Radial Force values in Newtons.



Frame size	Permissible Radial Forces of shaft extension F_0 (N)							
	2-pole		4-pole		6-pole		8-pole	
	X=0 (N)	X=max (N)	X=0 (N)	X=max (N)	X=0 (N)	X=max (N)	X=0 (N)	X=max (N)
80	720	660	760	630	860	720	980	880
90	780	650	810	670	940	780	1060	880
100	1100	900	1110	910	1310	1070	1480	1210
112	1090	900	1080	890	1290	1060	1460	1200
132	1730	1360	1740	1400	2000	1610	2330	1880
160	2950	2330	3050	2410	3420	2700	3870	3060
180	3420	2740	3460	2820	4080	3320	4430	3610
200	4390	3640	4500	3730	5270	4370	5790	4800
225	4340	3620	5050	4030	5870	4690	6470	5170
250	4910	4000	5710	4650	6520	5310	7180	5840
280	5380	4500	6870	5750	8090	6770	9120	7630
315	6400	5550	7500	6310	8420	7080	9120	7670
355	6770	6070	8620	7560	9910	8690	11590	10160

When the radial force is applied between points x=o and x=max the permissible force F0 can be calculated with the following formula

$F_R=F_{X0}-X/E(F_{X0}-F_{xmax})$

7.8 Permissible axial forces

Frame size	Pole	Maximum permissible axial thrust based on 20 000 hours	
		Pushing (N)	Pulling (N)
H80	2	750	610
	4	960	820
	6	1110	970
	8	1240	1100
H90	2	530	660
	4	670	880
	6	770	1040
	8	870	1190
H100	2	780	890
	4	980	1170
	6	1150	1420
	8	1320	1630
H112	2	1080	880
	4	1350	1150
	6	1600	1400
	8	1810	1610
H132	2	1200	1400
	4	1520	1860
	6	1770	2220
	8	2030	2560
H160	2	2340	2340
	4	3150	3150
	6	3700	3700
	8	4300	4300
H180	2	2750	2750
	4	3650	3650
	6	4380	4380
	8	5000	5000

Frame size	Pole	Maximum permissible axial thrust based on 20 000 hours	
		Pushing (N)	Pulling (N)
H200	2	3450	3450
	4	4650	4650
	6	5650	5650
	8	6400	6400
H225	2	3430	3430
	4	5300	5300
	6	6450	6450
	8	7200	7200
H250	2	3950	3950
	4	6000	6000
	6	7300	7300
	8	8300	8300
H280	2	4300	4300
	4	7300	7300
	6	8700	8700
	8	10000	10000
H315	2	5300	5300
	4	8100	8100
	6	9700	9700
	8	11200	11200
H355	2	5200	5200
	4	9400	9400
	6	10600	10600
	8	12300	12300

7.9 Terminal boxes

Main Terminal box

There are two different main terminal box designs for WEX3 motor series. EAR-type which is of Ex eb increased safety protection and CAR which is of Ex db protection.

Main terminal box for WEX3 motors is located on top of the motor frame with D-end having cable entry to the right hand side seen from the D-end. Terminal box can be rotated by **4 x 90**.

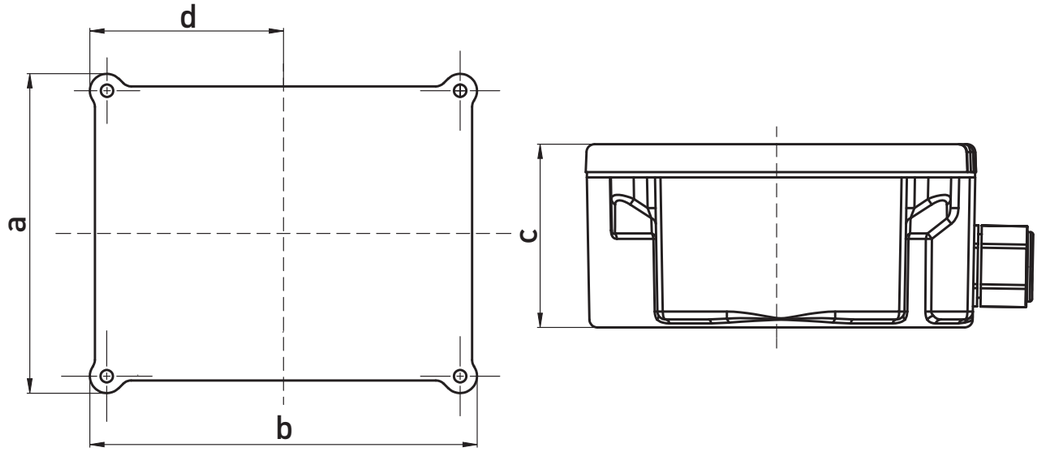
Motors are provid as standard with cable glands. The detaild quantity of cable entries, size of glands and the cable diameters they are suitable for are indicated in the below table.

Frame size	Main cable entries with cable glands	Outer cable diameter (sealing range) mm	Auxiliary cable entries with blind plugs	Earthing bolt for Ex eb type main terminal box (EAR)	Earthing bolt for Ex db type main terminal box (CAR)
80-100	2×M25×1.5	8~17.5	1×M25×1.5	2xM5	2xM5
112-132	2×M32×1.5	12~21	1×M25×1.5	2xM5	2xM5
160	2×M40×1.5	17~28	1×M25×1.5	2xM5	2xM5
180-200	2×M50×1.5	21~35	1×M25×1.5	2xM6	2xM6
225	2×M50×1.5	21~35	1×M25×1.5	2xM8	2xM6
250-315	2×M63×1.5	27~48	1×M25×1.5	2xM8	2xM8
355	2×M80×2	64~68	1×M25×1.5	2xM8	2xM8

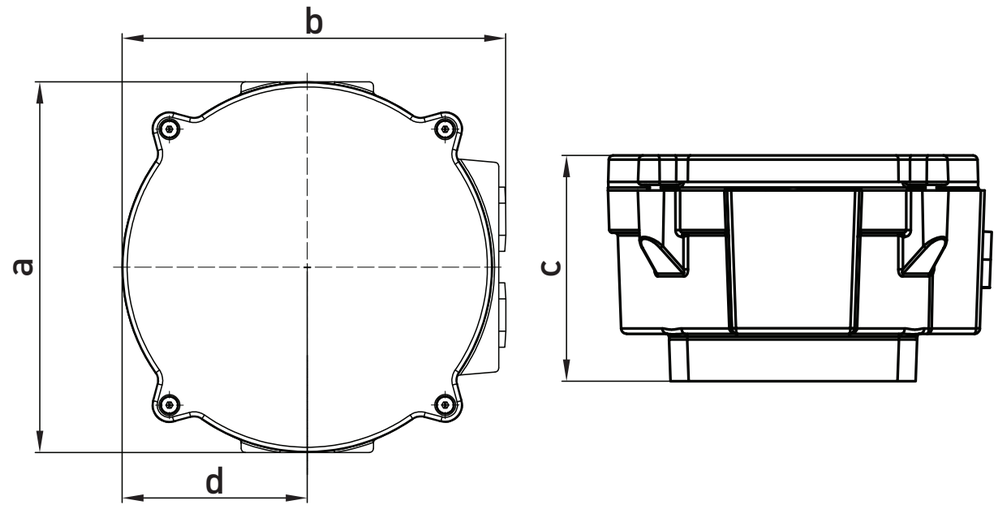
Main terminal box dimensions

Frame size	EAR-Ex eb					CAR-Ex db				
		a	b	c	d		a	b	c	d
80	EAR80	145	145	88	53	CAR80	145	145	92	53
90	EAR80	145	145	88	53	CAR80	145	145	92	53
100	EAR80	145	145	88	53	CAR80	145	145	92	53
112	EAR80	145	145	88	53	CAR80	145	145	92	53
132	EAR132	220	220	117	110	CAR132	220	220	103	110
160	EAR132	220	220	117	110	CAR132	220	220	103	110
180	EAR180	280	340	152	140	CAR180	265	270	162	133
200	EAR180	280	340	152	140	CAR180	265	270	162	133
225	EAR180	280	340	152	140	CAR225	380	380	202	190
250	EAR250	340	422	206	161	CAR225	380	380	202	190
280	EAR250	340	422	206	161	CAR225	380	380	202	190
315	EAR315	340	422	198	161	CAR315	484	492	293	242
355	EAR355	480	527	249	224	CAR355	484	740	371	242

Main terminal box type Ex eb (EAR)

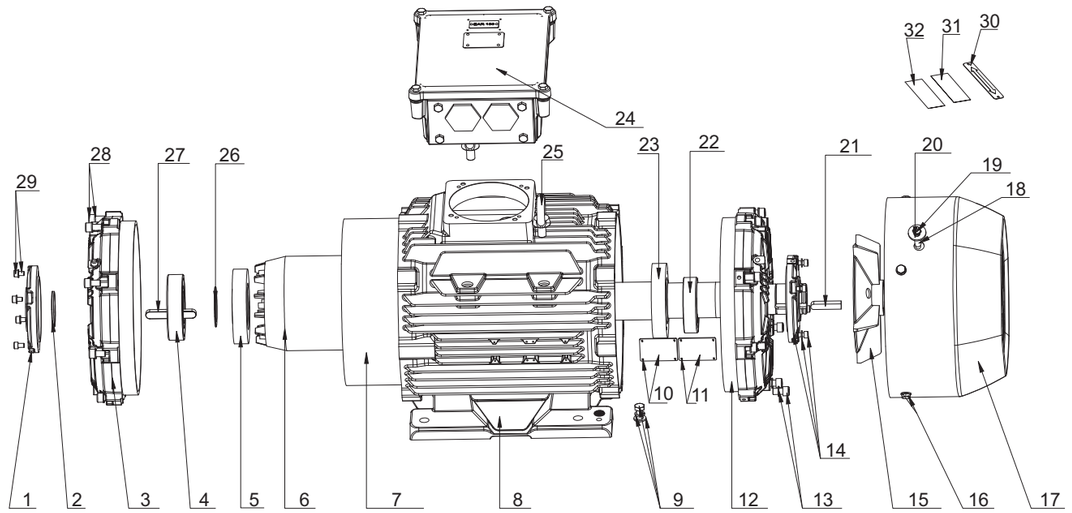


Main Terminal box type Ex db (CAR)



7.10 Motor Construction

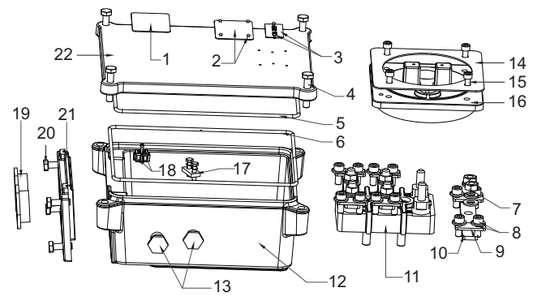
Exploded view of WEX3 200 B3 motor construction with key part list



Item number	Description
1	DE bearing outer cap
2	Oil seal
3	DE end shield
4	DE Bearing
5	DE bearing inner cap
6	Rotor
7	Stator
8	Frame
9	Earthing bolts + washer
10	Nameplate + Rivet
11	Label + Rivet
12	NDE end shield
13	Bolt + Spring washer
14	NDE bearing outer cap + BSW
15	Fan
16	Bolt + spiting washer -> (BSW)

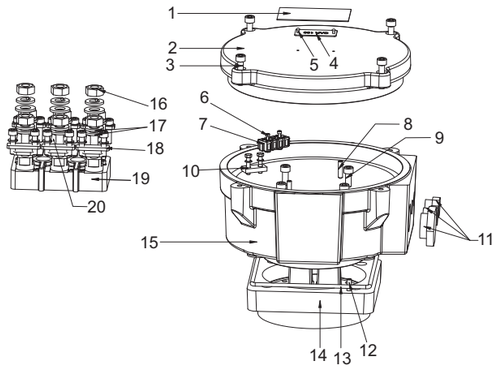
Item number	Description
17	Fan cover
18	Oil pipe
19	Grease plug
20	Oil nipple
21	Fan Key
22	NDE bearing
23	NDE bearing inner cap
24	Main terminal box
25	Eyebolts
26	Circlip for shaft
27	Key
28	Bolt + Spring washer
29	Bolt + Spring washer
30	Rotation plate
31	VFD plate
32	Regreasing plate

EAR Terminal Box



Item number	Description
1	Connection diagram
2	Warning plate + Rivet
3	Label + Rivet
4	Screw
5	Seal gasket
6	Seal gasket
7	Earthing screw
8	Cooper joint
9	Terminal plate
10	Connection strap
11	Mounting plate
12	Terminal box body
13	Cabel gland
14	Seal gasket
15	Screw
16	Intermediate plate
17	Earthing connection
18	Wiring terminal
19	Cabel gland
20	Screw
21	Enter - wire plate
22	Terminal box cap

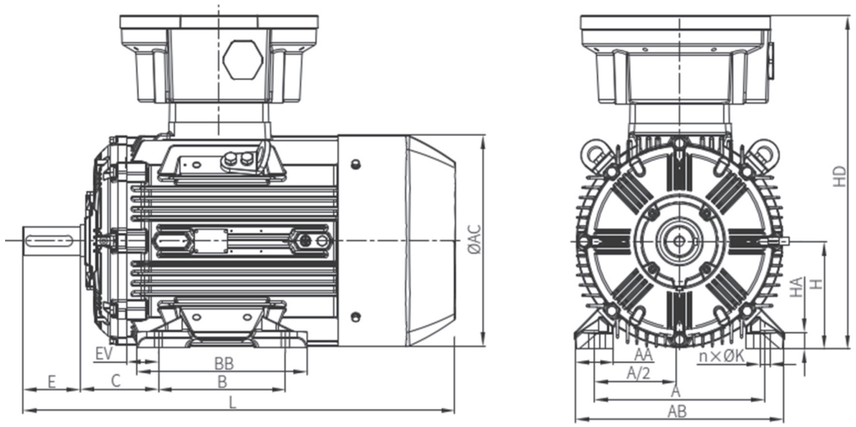
CAR Terminal Box



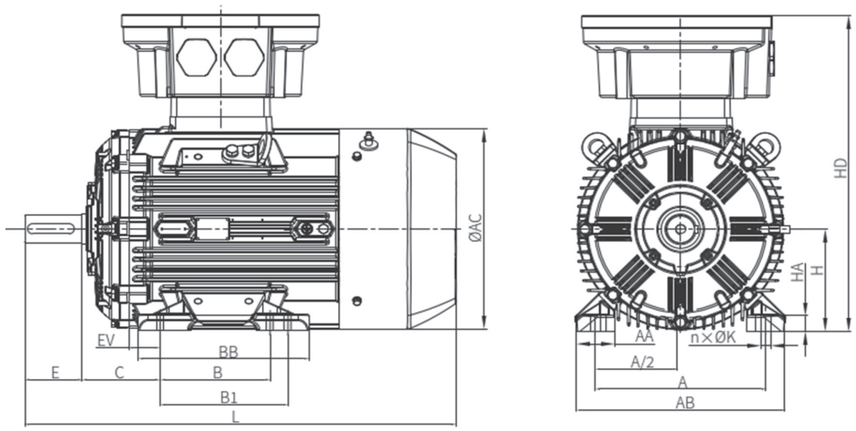
Item number	Description
1	Connection diagram
2	Terminal box cap
3	Screw
4	Label
5	Rivet
6	Screw
7	Wiring terminal
8	Hex socket set screw
9	Screw
10	Earthing connection
11	Cabel gland
12	Hex socket set screw
13	Seal gasket
14	Mounting plate
15	Terminal box body
16	Nuts
17	Washer
18	Cooper joint
19	Terminal plate
20	Connection strap

Foot mounted B3, IM 1001 mounting

IM B3
IM 1001
80 to 225



IM B55
IM 2001
250 to 355



Frame size	Poles	Mounting dimensions (mm)								Boundary dimension (mm)													
		A	A/2	B1	B	C	H	n	K	AA		EV		AB		BB		HA		AC	HD		L
										1)	2)	1)	2)	1)	2)	1)	2)	1)	2)		Ex db eb	Ex db	
80M	2-8	125	62.5	-	100	50	80	4	10	32	27.5	15	15	157	160	160	130	10	12	162	255	260	360
90S	2-8	140	70	-	100	56	90	4	10	37	34	12	15	172	180	200	155	10	12	175	275	280	396
90L	2-8	140	70	-	125	56	90	4	10	37	34	12	15	172	180	200	155	12	12	175	275	280	426
100L	2-8	160	80	-	140	63	100	4	12	45	38	18	17.5	200	200	215	175	15	15	212	303	310	465
112M	2-8	190	95	-	140	70	112	4	12	45	47	17	17.5	228	235	210	175	15	17	225	323	329	485
132S	2-8	216	108	-	140	89	132	4	12	56	50	22	23.5	262	266	250	187	18	20	249	392	395	515
132M	2-8	216	108	-	178	89	132	4	12	56	50	26	23.5	262	266	285	225	18	20	249	392	395	565
160M	2-8	254	127	-	210	108	160	4	14.5	65	60	22	23	314	310	320	250	20	25	315	450	455	668
160L	2-8	254	127	-	254	108	160	4	14.5	65	60	22	23	314	310	380	300	20	25	315	450	455	726
180M	2-8	279	139.5	-	241	121	180	4	14.5	68	57	27	23	349	350	350	325	22	25	358	542	555	690
180L	2-8	279	139.5	-	279	121	180	4	14.5	68	57	27	23	349	350	350	325	22	25	358	542	555	690
200L	2-8	318	159	-	305	133	200	4	18.5	84	70	28	30	388	390	400	365	25	30	396	582	595	832
225S	4,8	356	178	-	286	149	225	4	18.5	84	82	33	42	431	450	425	370	28	35	445	627	680	925
225M	2	356	178	-	311	149	225	4	18.5	84	82	33	42	431	450	465	370	28	35	445	627	680	935
225M	4-8	356	178	-	311	149	225	4	18.5	84	82	33	42	431	450	465	370	28	35	445	627	680	965
250M	2	406	203	-	349	168	250	4	24	82	85	48	35.5	484	510	465	420	30	35	496	732	740	968
250M	4-8	406	203	-	349	168	250	4	24	82	85	48	35.5	484	510	465	420	30	35	496	732	740	968
280S	2	457	228.5	-	368	190	280	4	24	89	100	61	40.5	542	570	495	500	34	40	555	792	800	1035
280S	4-8	457	228.5	-	368	190	280	4	24	89	100	61	40.5	542	570	495	500	34	40	555	792	800	1035
280M	2	457	228.5	-	419	190	280	4	24	89	100	61	40.5	542	570	545	500	34	40	555	792	800	1085
280M	4-8	457	228.5	-	419	190	280	4	24	89	100	61	40.5	542	570	545	500	34	40	555	792	800	1085
315S	2	508	254	406	457	216	315	6	28	114	146	50	55.5	628	636	620	614	40	40	627	915	1008	1230
315S	4-8	508	254	406	457	216	315	6	28	114	146	50	55.5	628	636	620	614	40	40	627	915	1008	1260
315M	2	508	254	406	457	216	315	6	28	114	146	50	55.5	628	636	620	614	40	40	627	915	1008	1230
315M	4-8	508	254	406	457	216	315	6	28	114	146	50	55.5	628	636	620	614	40	40	627	915	1008	1260
315L1	2	508	254	457	508	216	315	6	28	114	146	50	55.5	628	636	680	614	40	40	627	915	1008	1290
315L1	4-8	508	254	457	508	216	315	6	28	114	146	50	55.5	628	636	680	614	40	40	627	915	1008	1320
315L	2	508	254	-	508	216	315	4	28	114	146	50	55.5	628	636	800	614	40	40	627	915	1008	1410
315L	4	508	254	-	508	216	315	4	28	114	146	50	55.5	628	636	680	614	40	40	627	915	1008	1440
315L2	2	508	254	-	508	216	315	4	28	114	146	50	55.5	628	636	800	614	40	40	627	915	1008	1410
315L2	4,8	508	254	-	508	216	315	4	28	114	146	50	55.5	628	636	800	614	40	40	627	915	1008	1440
315L2	6	508	254	457	508	216	315	6	28	114	146	50	55.5	628	636	680	614	40	40	627	915	1008	1320
355S	2	610	305	500	560	254	355	6	28	146	171	81	48	740	727	810	720	45	50	720	1095	1215	1500
355S	4-8	610	305	500	560	254	355	6	28	146	171	81	48	740	727	810	720	45	50	720	1095	1215	1530
355M	2	610	305	500	560	254	355	6	28	146	171	81	48	740	727	810	720	45	50	720	1095	1215	1500
355M	4-8	610	305	500	560	254	355	6	28	146	171	81	48	740	727	810	720	45	50	720	1095	1215	1530
355L	2	610	305	-	630	254	355	4	28	146	171	46	48	740	727	920	720	45	50	720	1095	1215	1660
355L	4-8	610	305	-	630	254	355	4	28	146	171	46	48	740	727	920	720	45	50	720	1095	1215	1690

Notes:

a. 355L includes 355L1, 355L2, 355LX1, 355LX2

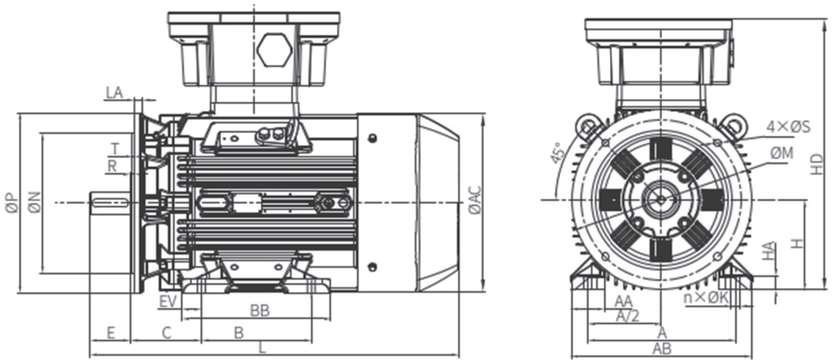
b. [1] suitable for fixed foot design, [2] suitable for loose feet design

c. Please page 56 for shaft information

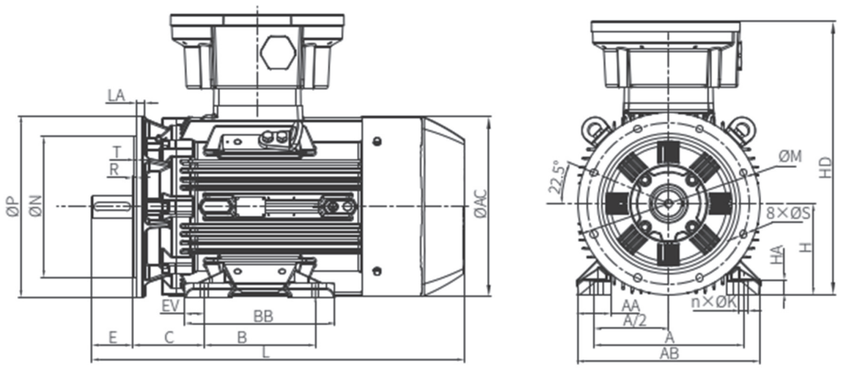
d. Ex db eb and Ex db motors differ in main terminal box design and dimensions. Please see page 48 for terminal box detailed information.

Foot & Flange mounted B35, IM 2001 mounting

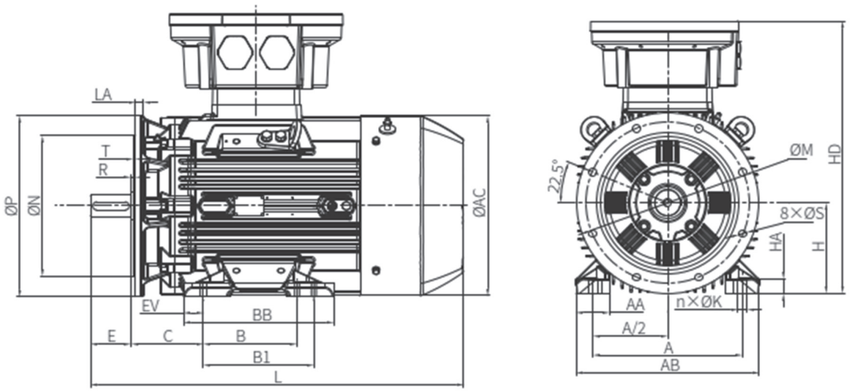
IM B35
IM 2001
80 to 200



IM B55
IM 2001
225



IM B35
IM 2001
250 to 355



Frame size	Poles	Mounting dimensions (mm)														Boundary dimension (mm)														
		A	A/2	B1	B	C	H	n	K	M	N	P	R	S	T	AA		EV		LA	AB		BB		HA		AC	HD		L
																1)	2)	1)	2)		1)	2)	1)	2)	1)	2)		Ex db eb	Ex db	
80M	2-8	125	62.5	-	100	50	80	4	10	165	130	200	0	12	3.5	32	27.5	15	15	12	157	160	160	130	10	12	162	255	260	360
90S	2-8	140	70	-	100	56	90	4	10	165	130	200	0	12	3.5	37	34	12	15	10	172	180	200	155	10	12	175	275	280	396
90L	2-8	140	70	-	125	56	90	4	10	165	130	200	0	12	3.5	37	34	12	15	10	172	180	200	155	12	12	175	275	280	426
100L	2-8	160	80	-	140	63	100	4	12	215	180	250	0	14.5	4	45	38	18	17.5	13	200	200	215	175	15	15	212	303	310	465
112M	2-8	190	95	-	140	70	112	4	12	215	180	250	0	14.5	4	45	47	17	17.5	13	228	235	210	175	15	17	225	323	329	485
132S	2-8	216	108	-	140	89	132	4	12	265	230	300	0	14.5	4	56	50	22	23.5	16	262	266	250	187	18	20	249	392	395	515
132M	2-8	216	108	-	178	89	132	4	12	265	230	300	0	14.5	4	56	50	26	23.5	16	262	266	285	225	18	20	249	392	395	565
160M	2-8	254	127	-	210	108	160	4	14.5	300	250	350	0	18.5	5	65	60	22	23	16	314	310	320	250	20	25	315	450	455	668
160L	2-8	254	127	-	254	108	160	4	14.5	300	250	350	0	18.5	5	65	60	22	23	16	314	310	380	300	20	25	315	450	455	726
180M	2-8	279	139.5	-	241	121	180	4	14.5	300	250	350	0	18.5	5	68	57	27	23	15	349	350	350	325	22	25	358	542	555	690
180L	2-8	279	139.5	-	279	121	180	4	14.5	300	250	350	0	18.5	5	68	57	27	23	15	349	350	350	325	22	25	358	542	555	690
200L	2-8	318	159	-	305	133	200	4	18.5	350	300	400	0	18.5	5	84	70	28	30	17	388	390	400	365	25	30	396	582	595	832
225S	4,8	356	178	-	286	149	225	4	18.5	400	350	450	0	18.5	5	84	82	33	42	22	431	450	425	370	28	35	445	627	680	925
225M	2	356	178	-	311	149	225	4	18.5	400	350	450	0	18.5	5	84	82	33	42	22	431	450	465	370	28	35	445	627	680	935
225M	4-8	356	178	-	311	149	225	4	18.5	400	350	450	0	18.5	5	84	82	33	42	22	431	450	465	370	28	35	445	627	680	965
250M	2	406	203	-	349	168	250	4	24	500	450	550	0	18.5	5	82	85	48	35.5	22	484	510	465	420	30	35	496	732	740	968
250M	4-8	406	203	-	349	168	250	4	24	500	450	550	0	18.5	5	82	85	48	35.5	22	484	510	465	420	30	35	496	732	740	968
280S	2	457	228.5	-	368	190	280	4	24	500	450	550	0	18.5	5	89	100	61	40.5	22	542	570	495	500	34	40	555	792	800	1035
280S	4-8	457	228.5	-	368	190	280	4	24	500	450	550	0	18.5	5	89	100	61	40.5	22	542	570	495	500	34	40	555	792	800	1035
280M	2	457	228.5	-	419	190	280	4	24	500	450	550	0	18.5	5	89	100	61	40.5	22	542	570	545	500	34	40	555	792	800	1085
280M	4-8	457	228.5	-	419	190	280	4	24	500	450	550	0	18.5	5	89	100	61	40.5	22	542	570	545	500	34	40	555	792	800	1085
315S	2	508	254	406	457	216	315	6	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	620	614	40	40	627	915	1008	1230
315S	4-8	508	254	406	457	216	315	6	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	620	614	40	40	627	915	1008	1260
315M	2	508	254	406	457	216	315	6	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	620	614	40	40	627	915	1008	1230
315M	4-8	508	254	406	457	216	315	6	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	620	614	40	40	627	915	1008	1260
315L1	2	508	254	457	508	216	315	6	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	680	614	40	40	627	915	1008	1290
315L1	4-8	508	254	457	508	216	315	6	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	680	614	40	40	627	915	1008	1320
315L	2	508	254	-	508	216	315	4	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	800	614	40	40	627	915	1008	1410
315L	4	508	254	-	508	216	315	4	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	680	614	40	40	627	915	1008	1440
315L2	2	508	254	-	508	216	315	4	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	800	614	40	40	627	915	1008	1410
315L2	4,8	508	254	-	508	216	315	4	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	800	614	40	40	627	915	1008	1440
315L2	6	508	254	457	508	216	315	6	28	600	550	660	0	24	6	114	146	50	55.5	22	628	636	680	614	40	40	627	915	1008	1320
355S	2	610	305	500	560	254	355	6	28	740	680	800	0	24	6	146	171	81	48	25	740	727	810	720	45	50	720	1095	1215	1500
355S	4-8	610	305	500	560	254	355	6	28	740	680	800	0	24	6	146	171	81	48	25	740	727	810	720	45	50	720	1095	1215	1530
355M	2	610	305	500	560	254	355	6	28	740	680	800	0	24	6	146	171	81	48	25	740	727	810	720	45	50	720	1095	1215	1500
355M	4-8	610	305	500	560	254	355	6	28	740	680	800	0	24	6	146	171	81	48	25	740	727	810	720	45	50	720	1095	1215	1530
355L	2	610	305	-	630	254	355	4	28	740	680	800	0	24	6	146	171	46	48	25	740	727	920	720	45	50	720	1095	1215	1660
355L	4-8	610	305	-	630	254	355	4	28	740	680	800	0	24	6	146	171	46	48	25	740	727	920	720	45	50	720	1095	1215	1690

Notes:

a. 355L includes 355L1, 355L2, 355LX1, 355LX2

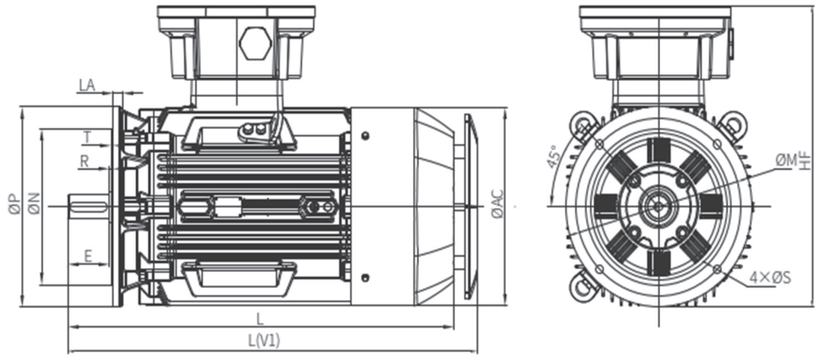
b. [1] suitable for fixed foot design, [2] suitable for loose feet design

c. Please page 56 for shaft information

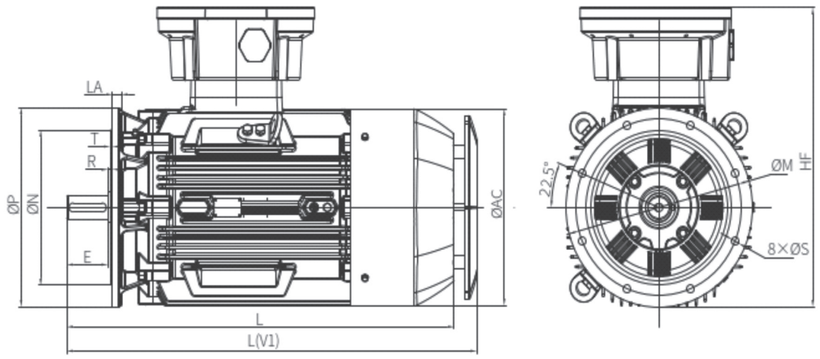
d. Ex db eb and Ex db motors differ in main terminal box design and dimensions. Please see page 48 for terminal box detailed information.

Foot & Flange mounted IM B5 / IM V1, IM 3001 / IM 3011 mounting

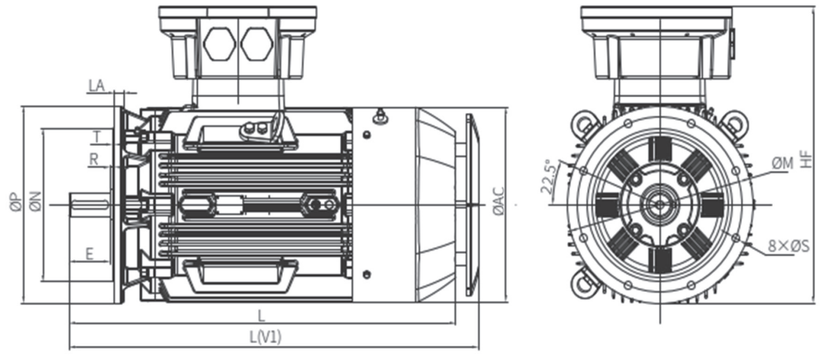
IM B5 / IM V1
IM 3001 / IM 3011
80 to 200



IM B5 / IM V1
IM 3001 / IM 3011
225 to 280



IM V1
IM 3011
315 to 355



Frame size	Poles	Mounting dimensions (mm)							Outline dimensions (mm)					
		H	M	N	P	R	S	T	LA	AC	HF		L (B5)	L (V1)
											Ex db eb	Ex db		
80M	2-8	80	165	130	200	0	12	3.5	12	162	275	280	360	385
90S	2-8	90	165	130	200	0	12	3.5	10	175	285	290	426	455
90L	2-8	90	165	130	200	0	12	3.5	10	175	285	290	426	455
100L	2-8	100	215	180	250	0	14.5	4	13	212	328	335	465	490
112M	2-8	112	215	180	250	0	14.5	4	13	225	336	342	485	520
132S	2-8	132	265	230	300	0	14.5	4	16	249	410	413	515	560
132M	2-8	132	265	230	300	0	14.5	4	16	249	410	413	563	610
160M	2-8	160	300	250	350	0	18.5	5	16	315	465	470	670	730
160L	2-8	160	300	250	350	0	18.5	5	16	315	465	470	730	786
180M	2-8	180	300	250	350	0	18.5	5	15	358	537	550	690	750
180L	2-8	180	300	250	350	0	18.5	5	15	358	537	550	690	750
200L	2-8	200	350	300	400	0	18.5	5	17	396	582	595	830	910
225S	4,8	225	400	350	450	0	18.5	5	22	445	627	680	965	1021
225M	2	225	400	350	450	0	18.5	5	22	445	627	680	935	990
225M	4-8	225	400	350	450	0	18.5	5	22	445	627	680	965	1020
250M	2	250	500	450	550	0	18.5	5	22	496	757	765	970	1050
250M	4-8	250	500	450	550	0	18.5	5	22	496	757	765	970	1050
280S	2	280	500	450	550	0	18.5	5	22	555	787	795	1085	1195
280S	4-8	280	500	450	550	0	18.5	5	22	555	787	795	1085	1195
280M	2	280	500	450	550	0	18.5	5	22	555	787	795	1085	1165
280M	4-8	280	500	450	550	0	18.5	5	22	555	787	795	1085	1165
315S	2	315	600	550	660	0	24	6	22	627	930	1023	1295	1375
315S	4-8	315	600	550	660	0	24	6	22	627	930	1023	1325	1405
315M	2	315	600	550	660	0	24	6	22	627	930	1023	1295	1375
315M	4-8	315	600	550	660	0	24	6	22	627	930	1023	1325	1405
315L	2	315	600	550	660	0	24	6	22	627	930	1023	1415	1495
315L	4-8	315	600	550	660	0	24	6	22	627	930	1023	1415	1525
355S	2	355	740	680	800	0	24	6	25	720	1140	1260	1500	1580
355S	4	355	740	680	800	0	24	6	25	720	1140	1260	1530	1610
355M	2	355	740	680	800	0	24	6	25	720	1140	1260	1500	1580
355M	4,8	355	740	680	800	0	24	6	25	720	1140	1260	1530	1610
355L	6	355	740	680	800	0	24	6	25	720	1140	1260	1660	1740
355L	2	355	740	680	800	0	24	6	25	720	1140	1260	1690	1770
355S	4-8	355	740	680	800	0	24	6	25	720	1095	1215	1530	1530
355M	2	355	740	680	800	0	24	6	25	720	1095	1215	1500	1500
355M	4-8	355	740	680	800	0	24	6	25	720	1095	1215	1530	1530
355L	2	355	740	680	800	0	24	6	25	720	1095	1215	1660	1660
355L	4-8	355	740	680	800	0	24	6	25	720	1095	1215	1690	1690

Notes:

a. Default flange is a round structure

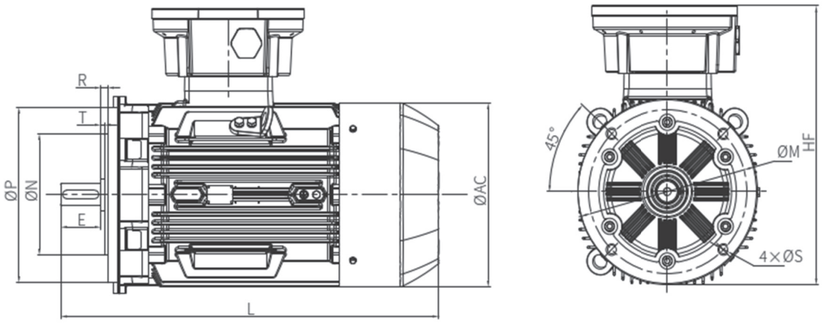
b. 355L includes 355L1, 355L2, 355LX1, 355LX2

c. Please page 56 for shaft information

d. Ex db eb and Ex db motors differ in main terminal box design and dimensions. Please see page 48 for terminal box detailed information.

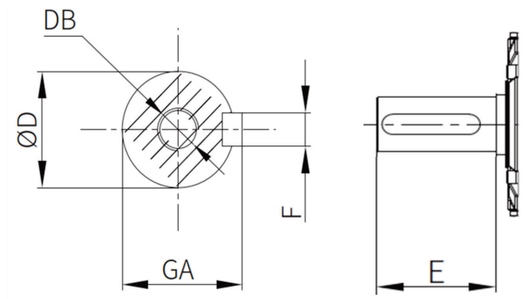
Foot & Flange mounted B14, IM 3601 mounting

IM B14 / IM V1
IM 3601 / IM 3611
80 to 112



Frame size	Poles	Mounting dimensions (mm)							Outline dimensions (mm)			
		H	M	N	P	R	S	T	AC	HF		L
										Ex db eb	Ex db	
80M	2-8	100	80	120	0	M6	3	162	280	329	280	360
90S	2-8	115	95	140	0	M8	3	175	290	396	290	426
90L	2-8	115	95	140	0	M8	3	175	290	396	290	426
100L	2-8	130	110	160	0	M8	3.5	212	335	425	335	465
112M	2-8	130	110	160	0	M8	3.5	225	342	448	342	485

Shaft details



Shaft dimensions						
Frame size	Poles	D	E	F	GA	DB
80	2~8	19	40	6	21.5	M6×20
90	2~8	24	50	8	27	M8×22
100 to 112	2~8	28	60	8	31	M10×22
132	2~8	38	80	10	41	M12×28
160	2~8	42	110	12	45	M12×28
180	2~8	48	110	14	51.5	M16×36
200	2~8	55	110	16	59	M20×42
225	2	55	110	16	59	M20×42
225	4~8	60	140	18	64	M20×42
250	2	60	140	18	64	M20×42
250	4~8	65	140	18	69	M20×42
280 to 315	2	65	140	18	69	M20×42
280	4~8	75	140	20	79.5	M20×42
315	4~8	80	170	22	85	M20×42
355	2	75	140	20	79.5	M24×50
355	4~8	95	170	25	90	M24×50

Shaft key			
Frame size	Poles	Type A (b×h×l)	Grooving screw
80	2~8	6×6×32	-
90	2~8	8×7×40	-
100	2~8	8×7×50	-
112	2~8	8×7×50	-
132	2~8	10×8×70	-
160	2~8	12×8×90	M4
180	2~8	14×9×100	M5
200	2~8	16×10×100	M5
225	2	16×10×100	M5
225	4~8	18×11×125	M6
250	2~8	18×11×125	M6
280	2	18×11×125	M6
280	4~8	20×12×125	M6
315	2	18×11×125	M6
315	4~8	22×14×140	M6
355	2	20×12×125	M6
355	4~8	25×14×140	M8

SCHORCH

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