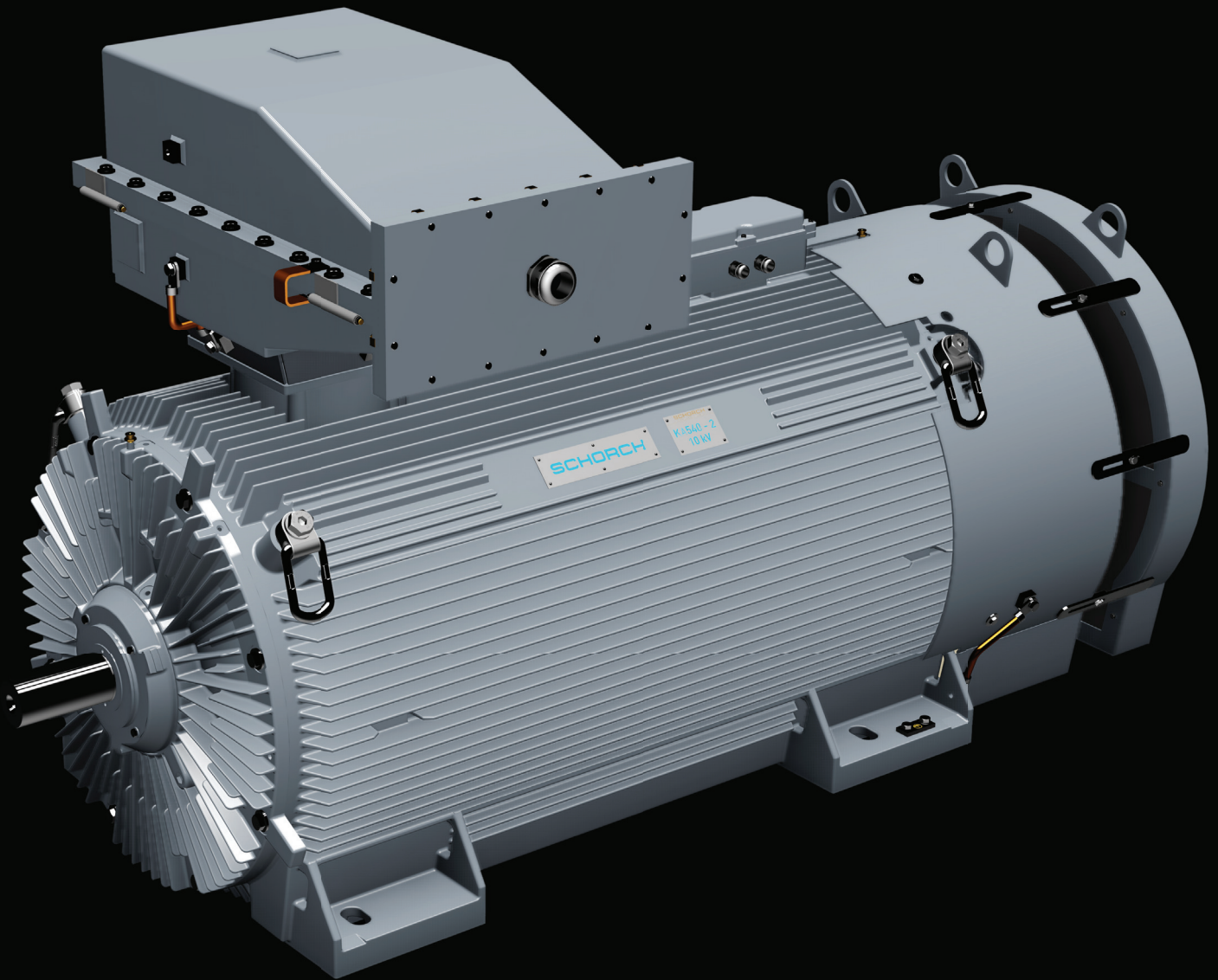




Totally Enclosed Fan Cooled Medium Voltage Induction motors KA5



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

Industry technology



Water Treatment



Industrial HVAC

E-mobility



Electric Ships



Electric Aircraft



HVAC



Water Supply



Industry



Chemicals, Oil & Gas



Electric Vehicles



E-bike

Automation



Engineering Machinery



Process Automation

Industry Services



Full Lifecycle Services



Industrial IOT

Clean Energy



Electricity Management



New Energy

1. About us 1

2. Wolong Portfolio 2

3. Motor Basic information 3

3.1 Standards and Regulations 3

3.2 Mounting arrangements 3

3.3 Cooling 4

3.4 Degrees of protection 6

3.5 Insulation System 7

3.6 Voltage and frequency 8

3.7 Surface treatment 9

3.8 Rating plate 10

3.9 Motors in brief 11

3.10 DOL starting 13

3.11 Variable speed drive 17

3.12 Ordering information 18

4. Electrical Design 19

4.1 Technical data 6.6 kV 19

4.2 Technical data 9 kV 25

4.3 Technical data 10 kV 29

4.2 Technical data 11 kV 33

5. Mechanical Design 37

5.1 Lifting lugs 37

5.2 Bearings 38

5.3 Bearing assembly 39

5.4 Terminal box 49

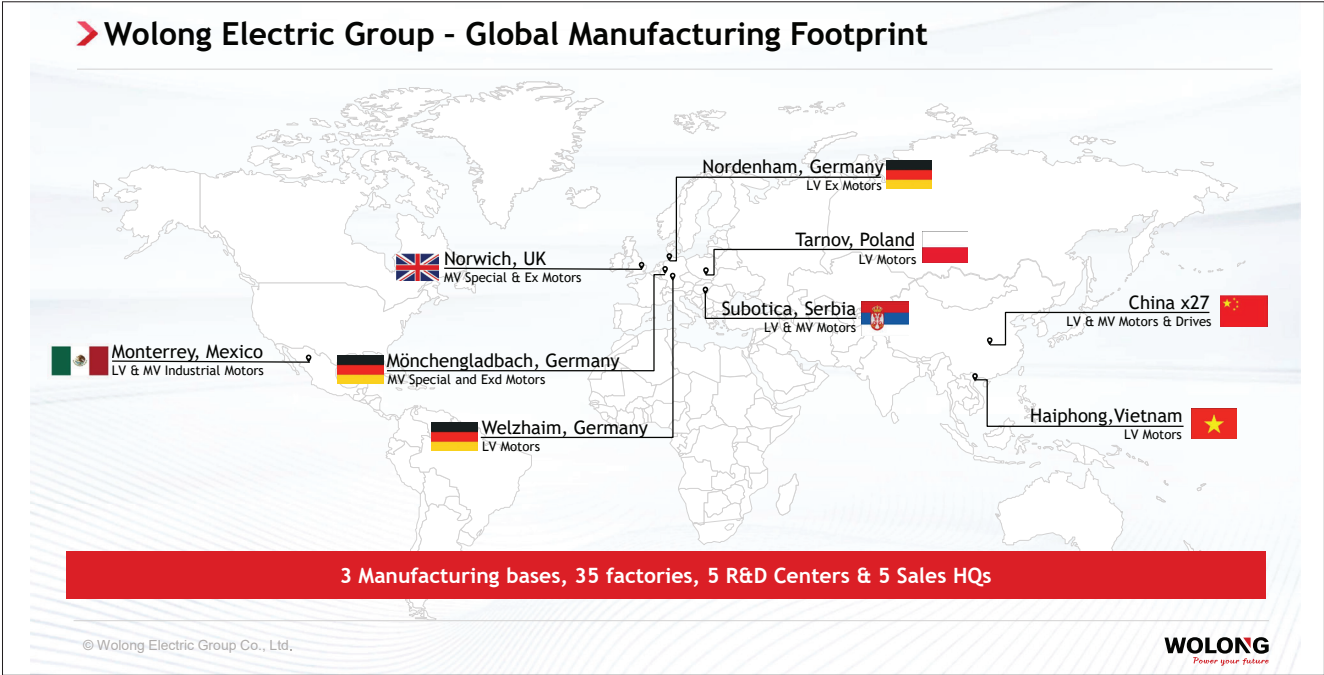
5.5 Motor Construction 55

6. Derating factors for high altitude - high ambient temperature 56

7. Dimension drawings 57

8. Options 61

Wolong, founded in 1984 and headquartered 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 accumalate more than 140 years of experience in both LV and MV design and manufacturing.

BROOK CROMPTON
a WOLONG company

Manufacturing and designing industrial LV motors since 1878.

SCHORCH
a WOLONG company

Manufacturing and designing industrial 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.

GE INDUSTRIAL MOTORS
a WOLONG company

Manufacturing and designing LV and MV NEMA motors since 1889.

MORLEY
a WOLONG company

Manufacturing and designing MV mining motors since 1897.

ATB
a WOLONG company

Manufacturing and designing LV & MV motors since 1919.

China Nanyang Electric
a WOLONG company

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

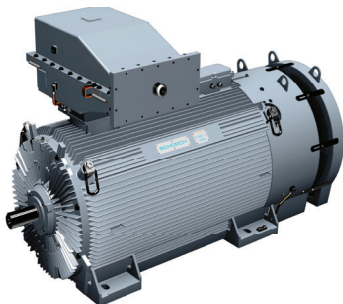
ATB Wolong Portfolio

Low Voltage motors



- Safe area**
Aluminum IEC 63-200 IE3, IE4
Cast Iron IEC 80-560 IE3, IE4
Single phase IEC 56-100 IE2
- Motors for explosives atmospheres**
Ex ec / Ex tb / tc
Aluminum IEC 63-180 IE3
Cast iron IEC 80-315 IE3
Ex eb
Aluminum IEC 63-180 IE3
Cast iron IEC 80-315 IE3
Ex db / Ex db eb IIB/C
Cast iron IEC 63-500 IE3, IE4
Compact drive IEC 80-160
- 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 185-2240kW, 6/10/11kV
IC511 315-12800kW, 6/10/11kV
IC611 315-12800kW, 6/10/11kV
IC81W 450-15000kW, 6/10kV
- Motors for explosives atmospheres**
Ex ec
IC411 185-2240kW, 6/10/11kV
IC611 315-12800kW, 6/10/11kV
IC81W 450-15000kW, 6/10kV
Exp
IC411 160-2000kW, 6/10/11kV
IC511 315-13200kW, 6/10/11kV
IC611 315-12800kW, 6/10/11kV
IC81W 450-15000kW, 6/10kV
Exd
IC411 185-2240kW, 6/10kV
IC511 375-6900kW, 6/10kV
- Industry and application specific**
Slipring
IEC 355-710, 200-8000kW, 6/11kV
Permanent magnet
- Synchronous**
Safe area
1.5-135MW 6/11kV
Exp
1.5-100MW 6/11kV

Drives



- Medium Voltage**
200-8000kW air cooled 3.3-11kV
4000-32000kW water cooled, 6-11kV
- 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
- 133-180mm single/146-180mm double inlet
- Max static pressure 626Pa
Centrifugal backward-curved fans
- 133-630mm, max static pressure 900Pa
Axial fans 450-900mm
- Max static pressure 270Pa

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

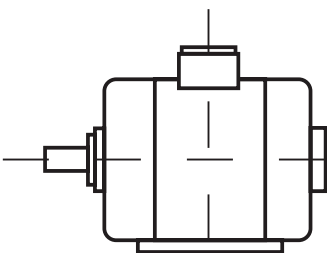
3.1 Standards & Regulations

International standards
Motors from KA5 series are in conformity with all relevant standards.

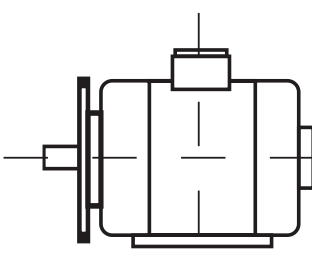
Electrical		Mechanical	
IEC EN 60034-1	Rating and performannce	IEC EN 60072	Dimension and output series
IEC EN 60034-2-1	Efficiency measurement	IEC EN 60034-5	Degrees of protection
IEC EN 60034-8	Terminal Markings	IEC EN 60034-6	Methods of cooling
IEC EN 60034-12	Starting Performance	IEC EN 60034-7	Types of construction
IEC EN 60038	Standard Voltages	IEC EN 60034-9	Noise limits
IEC EN 60085	Electrical Insulation	IEC EN 60034-14	Vibrations
		ISO 1940-1	Balancing value
		EN 50102	IK code

3.2 Mounting arrangements

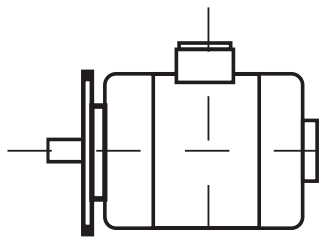
Totally Enclosed Fan Cooled KA5 motors are available in the following mouting arrangements.



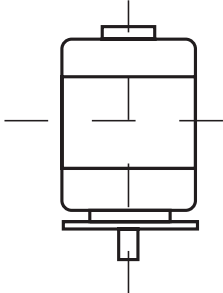
IM B3 (IM 1001) Horizontal foot mounted



IM B35 (IM 2001) Horizontal foot/flange mounted



IM B5 (IM 3001) Horizontal flange mounted



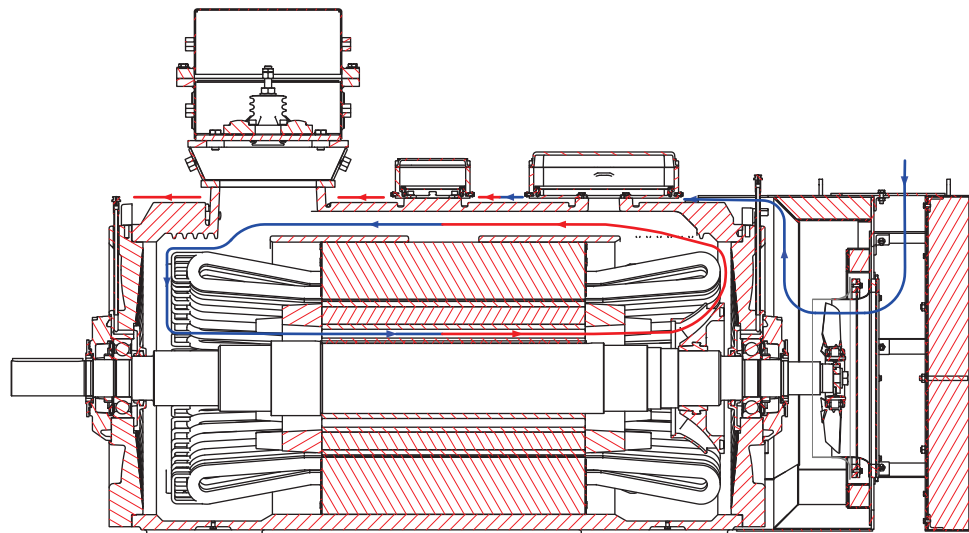
IM V1 (IM 3011) Vertical mounted shaft downwards

3.3 Cooling

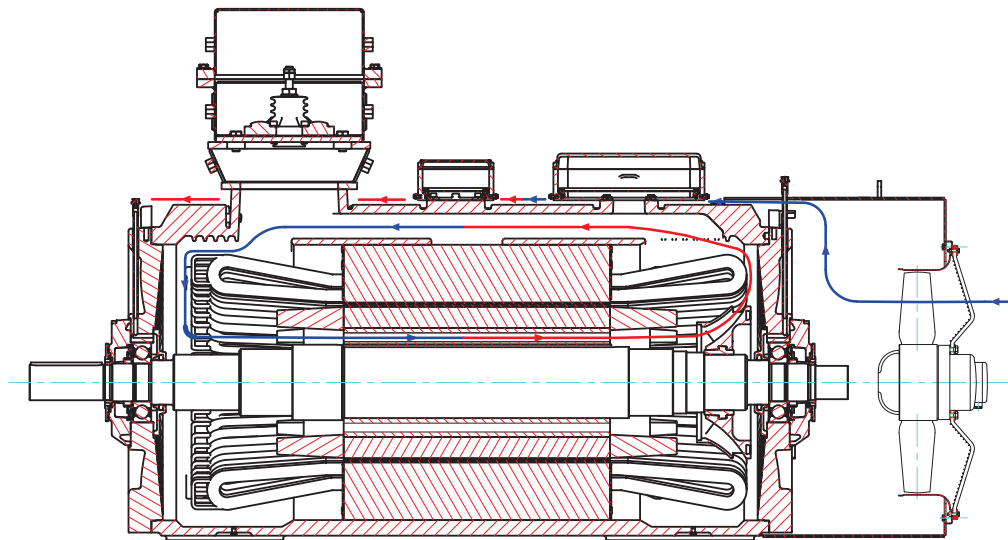
IEC 60034-6 is the international standard that identifies circuit arrangements and the methods of movement of coolant in rotating electrical machines.
The designation of the method of cooling consists of the letters „IC“ followed by numbers and letters.
This coding is explained below:

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

KA5 series motors are of Totally Enclosed Fan Cooled type and as standard delivered as IC411. This means that KA5 motors are equipped with a shaft mounted fan providing efficient airflow to allow S1 duty full time operation.



Alternatively KA5 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 advantageous especially in variable speed drive application where the use of an external fan enables better cooling at low speeds and a higher loadability.



3.4 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 protection of the machine against ingress of solid foreing objects and the protection againsts harmful 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.

Explanation of the IP codes

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 150mm and 1000mm
		8	Protected againts submersion

KA5 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)

KA5 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
0:	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 KA5)
09:	10
10:	20

Explanation of the IK codes

3.5 Insulation System

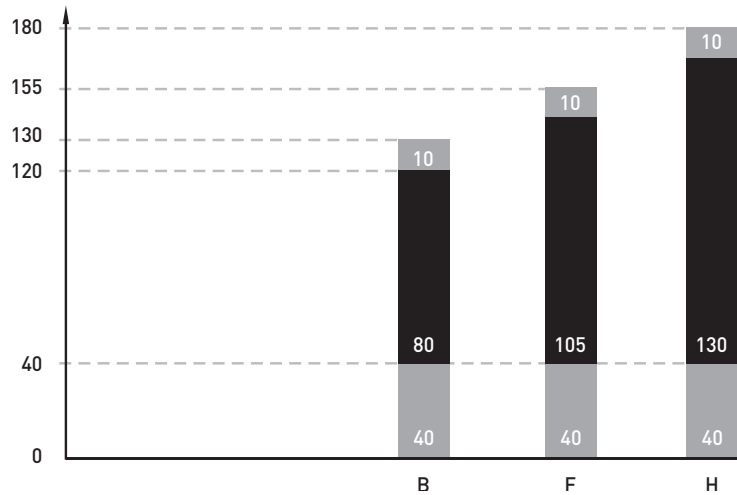
Schorch insulation system, Schorch V-Celastec is a insulation system that meets the requirements of F-class. KA5 motors are provided with this system as standard. Insulation system to meet the H-class insulation class is available as option

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 4 xUN + 5 kV so that additional protective measures against overvoltages have to be taken only in exceptional cases.



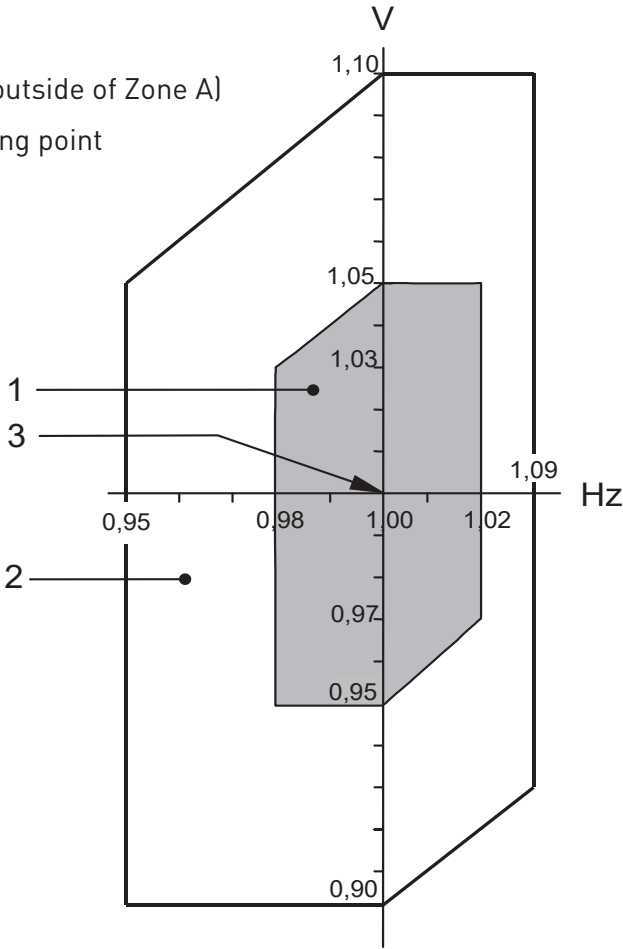
Thermal class 130 (B)	Thermal class 155 (F)	Thermal class 180 (H)
Nominal ambine temperature 40°C	Nominal ambine temperature 40°C	Nominal ambine temperature 40°C
Max permissible temperature rise 80K	Max permissible temperature rise 105K	Max permissible temperature rise 125K
Hot temperature margin 10K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

3.6 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 +/-5%. Below figure illustrates the zones.

Voltage and frequency limits for motors:

- 1. Zone A
- 2. Zone B (area outside of Zone A)
- 3. Nominal / rating point



KA5 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.

3.7 Surface Treatment

Schorch standard painting system W-120 for KA5-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 7031 (blue grey).

W-120 Paint system, [C3]		
Primer coat	Feidolux primer	40 micros
Intermediate coat	Acrylic - Polyurethane texture finish paint	50 micros
Top coat	Acrylic - Polyurethane enamel finish paint	30 micros
Total paint thicknes		120 micros

* Arithmetic mean

Other paint systems are available as option for C4, C5 and CX corrosion categories.

K-1 Paint system [C4]		
Primer coat	Feidolux primer	80 micros
Intermediate coat	Acrylic - Polyurethane texture finish paint	40 micros
Top coat	Acrylic - Polyurethane enamel finish paint	40 micros
Total paint thicknes		160 micros

K-3 Paint system 240 [C5]		
Primer coat	Epox-zinc dust primer special	80 micros
Intermediate coat	Epox-zinc phoshate special	120 micros
Top coat	Acrylic - Polyurethane special	40 micros
Total paint thicknes		240 micros

K-3 Paint system 320 [CX]		
Primer coat	Epox-zinc dust primer special	80 micros
Intermediate coat	Epox-zinc phoshate special	200 micros
Top coat	Acrylic - Polyurethane special	40 micros
Total paint thicknes		320 micros

Atmospheric corrosivity categories and examples of typical environments

Corrosivity category	Examples of typical environments (infornative only)	
	Exterior	Interior
C1	-	Heated buildings with clean atmos-pheres, e.g., offices, shops, schools, hotels
C2	Atmospheres with low levels of pollution: mostly rural areas	Unheated buildings where condensation can occur, e.g., depots, sports halls
C3	Urban and industrial atmospheres, moderate sulfur dioxide pollution; coastal areas with low salinity	Production rooms with high humidity and some air pollution, e.g., food-processing plants, laundries, breweries, dairies
C4	Industrial areas and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal ship- and boatyards
C5	Industrial areas with high humidity and an aggressive atmosphere, and coastal areas with high salinity	Buildings or areas with almost permanent condensation and with high pollution
CX	Offshore areas with high salinity, and industrial areas with extreme humidity and an aggressive atmosphere, and sub-tropical and tropical atmospheres	Industrial areas with extreme humidity and an aggressive atmosphere

3.8 Rating plate

Motor performance values are indicated on its main rating plate.

Below an example of KA5 rating plate for DOL and VSD duty.

SCHORCH		
D - 41238 Mönchengladbach		
Type KA5409X-BH01E-Z	IEC 400X IMB3	2023 Nr.85007402/1
3 ~ MOT. IP55	Th.Cl.155/120°C	-20°C ≤T _{amb} ≤+40°C 4.45 t
UVW		H
50 Hz		
800 kW		
S1		
6000 V Y		
90 A		
cosφ=0.88		
1490 /min		
bearing DE: 6324 C3		
bearing NDE: 6324 C3		
per bearing after 2200h/80g grease		EN60034 IEC60034
DIN 51825-K3K li-soap/mineral-oil		Made in Germany

SCHORCH		CE
D - 41238 Mönchengladbach		
Type KA5409X-BH01E-Z	IEC 400X IMB3	2023 Nr.44074101/1
3 ~ MOT. IP55	Th.Cl.155/120°C	-20°C ≤T _{amb} ≤+40°C 2.9 t
heating:		
230V/200W/0.86A	WVU	H
converter operation		S1
U-converter IGBT		
cosφ = 0.91	at	50 Hz
39.0 -	50.0 -	63.0 Hz
5148 -	6600 -	6600 V Y
171 -	360 -	360 kW
5148 -	6600 -	6600 Nm
22 -	36 -	36 A
2326 -	2976 -	3155 /min
bearing DE: 6317 M C3		after 2000h/35g grease
bearing NDE: 6317 M C3 ISOL		after 2000h/35g grease
DIN 51825-K3K li-soap/mineral-oil		
EN60034 IEC60034		

3.9 Motors in Brief Standard B3 mounting

Voltage range: 3000-11000V

Motor frame size			355
Stator frame and endshields	Material		cast iron
Feet	Material		cast iron
Bearings	D-end	2-pole	6317
	N-end	2-pole	6317
	D-end	4-12 pole	6322
	N-end	4-12 pole	6322
	Bearings locked at - D-end or N-end?		D-end
Shaft sealing	D-end	2-pole	Labyrinth
	N-end	4-12 pole	Labyrinth
Lubrication	Type of grease, size of grease nipples		K3K to DIN 51825, flat grease nipple M10x1 DIN 3404 for all frame sizes
Condition monitoring measuring nipples			M8
Rating plate	Material		Stainless steel
Terminal box	S235JR G2 temp range -20C...+40C		Stainless steel
External screws	Material		Steel
Cable gland entry	Material		Non-drilled steel plate as standard
Fan	Material		cast Aluminum
Fan cover	Material		Steel sheet
Rotor	Material 2p		cast Aluminum
Rotor	Material 4p		cast Aluminum
Rotor	Material >4p		cast Aluminum
Rotorshaft	Material		S355J2G3
Balancing method and grade			Balancing with half key, grade 2,5, shaft marked with „H“
Vibration level			Standard grade A for rigid mounting according to IEC 60034-14
Keyway			N9
Stator winding	Type and material		multilayer mica insulation with VPI impregnation
	Insulation class / temperature rise		F/B F/F
	Winding protection (type and no.)		6 PT100, 3-wire (for motors in VSD duty also 3xPTC 150C is provided)
Drain holes	Material and closed or open		
Enclosure degree of protection			
Cooling method			
Surface treatment	Paint type and total DFT (W)		synth. resin, DFT=120 my
	Corrosion category		standard C3
	Top color shade		standard RAL 7031

400	450	500	560
cast iron	cast iron	cast iron	cast iron
cast iron	cast iron	cast iron	cast iron
6317	NU220+6024	NU1022+6022	NU1032+6032
6317	NU220	NU1022	NU1032
6322	6326	6330	6330
6322	6326	6330	6330
D-end	D-end	D-end	D-end
Labyrinth	Labyrinth	Labyrinth	Labyrinth
Labyrinth	Labyrinth	Labyrinth	Labyrinth
K3K to DIN 51825, flat grease nipple M10x1 DIN 3404 for all frame sizes	K3K to DIN 51825, flat grease nipple M10x1 DIN 3404 for all frame sizes	K3K to DIN 51825, flat grease nipple M10x1 DIN 3404 for all frame sizes	K3K to DIN 51825, flat grease nipple M10x1 DIN 3404 for all frame sizes
M8	M8	M8	M8
Stainless steel	Stainless steel	Stainless steel	Stainless steel
Stainless steel	Stainless steel	Stainless steel	Stainless steel
Steel	Steel	Steel	Steel
Non-drilled steel plate as standard	Non-drilled steel plate as standard	Non-drilled steel plate as standard	Non-drilled steel plate as standard
cast Aluminum	cast Aluminum	cast Aluminum	cast Aluminum
Steel sheet	Steel sheet	Steel sheet	Steel sheet
cast Aluminum	copper	copper	copper
cast Aluminum	cast Aluminium	cast Aluminium	copper
cast Aluminum	cast Aluminum	cast Aluminum	cast Aluminum
S355J2G3	S355J2G3	S355J2G3	S355J2G3
balancing with half key, grade 2,5, shaft marked with „H“	balancing with half key, grade 2,5, shaft marked with „H“	balancing with half key, grade 2,5, shaft marked with „H“	balancing with half key, grade 2,5, shaft marked with „H“
Standard grade A for rigid mounting according to IEC 60034-14	Standard grade A for rigid mounting according to IEC 60034-14	Standard grade A for rigid mounting according to IEC 60034-14	Standard grade A for rigid mounting according to IEC 60034-14
N9	N9	N9	N9
multilayer mica insulation with VPI impregnation	multilayer mica insulation with VPI impregnation	multilayer mica insulation with VPI impregnation	multilayer mica insulation with VPI impregnation
F/B F/F	F/B F/F	F/B F/F	F/B F/F
6 PT100, 3-wire (for motors in VSD duty also 3xPTC 150C is provided)	6 PT100, 3-wire (for motors in VSD duty also 3xPTC 150C is provided)	6 PT100, 3-wire (for motors in VSD duty also 3xPTC 150C is provided)	
M8 closed			
IP55			
IC 411			
synth. resin, DFT=120 my	synth. resin, DFT=120 my	synth. resin, DFT=120 my	synth. resin, DFT=120 my
standard C3	standard C3	standard C3	standard C3
standard RAL 7031	standard RAL 7031	standard RAL 7031	standard RAL 7031

3.10 DOL starting

One of the most important characteristic to be verified in motor selection is the driven load moment of inertia as this reflects directly to 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. kgm² 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 :

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

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. what is the max permissible voltage drop at starting.

In the below table we have precalculated the starting times from cold, with the max external moment of inertia stated in the table and with 90% of rated voltage. Motor being capable to start three times from cold and two times from hot, assuming adequate cooling down time between consecutive starts.

Additionally the max. stalling time hot at 100% rated voltage is indicated.

Starting & stalling time calculation										
Frequency	Pole	Frame size	Rated voltage	Rated output	Motor type Catalogue no.	Moment of inertia	External Moment of inertia	Rated speed torque p.u. for squared load with 3cold/2warm starts and J _{extmax} T _{nr} p.u. 1	Starting time cold with J _{extmax} at 90% rated voltage	Max. stalling time hot at 100% rated voltage
f1 Hz			kV	kW		Motor kgm ²	Max kgm ²		s	s
2-pole										
50	2	400	10	355	KA5404X-AH01H	6.28	7.89	0.90	12.7	23.4
50	2	400	10	420	KA5400X-AH01H	6.95	35.58	0.90	35.4	44.9
50	2	400	10	480	KA5408X-AH01H	7.63	43.95	0.90	27.7	38.4
50	2	400	10	540	KA5409X-AH01H	8.24	45.36	0.90	19.1	27.9
50	2	450	10	610	KA5454X-AH01H	15.46	17.32	0.85	43.8	45.0
50	2	450	10	660	KA5450X-AH01H	16.84	13.83	0.85	41.0	43.6
50	2	450	10	720	KA5458X-AH01H	18.01	21.29	0.85	41.4	40.4
50	2	450	10	800	KA5459X-AH01H	19.28	27.29	0.85	40.8	36.6
50	2	500	10	860	KA5504X-AH01H	32.86	47.55	0.90	35.8	30.4
50	2	500	10	950	KA5500X-AH01H	34.68	59.92	0.90	33.6	24.4
50	2	500	10	1040	KA5508X-AH01H	37.74	71.12	0.90	32.9	21.6
50	2	560	10	1600	KA5560X-AH01H	68.86	48.14	0.85	47.7	33.4
50	2	560	10	1800	KA5569X-AH01H	70.49	85.86	0.85	51.3	27.7

Starting & stalling time calculation										
Frequency	Pole	Frame size	Rated voltage	Rated output	Motor type Catalogue no.	Moment of inertia	External Moment of inertia	Rated speed torque p.u. for squared load with 3cold/2warm starts and J _{extmax} T _{nr} p.u. 1	Starting time cold with J _{extmax} at 90% rated voltage	Max. stalling time hot at 100% rated voltage
f1 Hz			kV	kW		Motor kgm ²	Max kgm ²		s	s
4-pole										
50	4	400	10	400	KA5404X-BH01H	9.32	114.72	0.90	24.8	33.2
50	4	400	10	450	KA5400X-BH01H	10.37	174.34	0.90	31.7	42.6
50	4	400	10	500	KA5408X-BH01H	11.57	253.83	0.90	35.4	47.4
50	4	400	10	560	KA5409X-BH01H	12.67	333.41	0.90	33.0	44.3
50	4	400	10	630	KA5454X-BH01H	16.99	509.24	0.90	46.6	25.0
50	4	450	10	710	KA5457X-BH01H	18.63	585.05	0.90	39.9	23.2
50	4	450	10	800	KA5450X-BH01H	21.40	571.13	0.90	38.2	23.4
50	4	450	10	900	KA5458X-BH01H	23.16	647.22	0.90	39.5	22.0
50	4	500	10	1000	KA5504X-BH01H	31.98	314.13	0.90	27.0	24.2
50	4	500	10	1120	KA5507X-BH01H	36.12	352.91	0.90	30.3	23.3
50	4	500	10	1250	KA5500X-BH01H	39.98	518.77	0.90	32.7	21.2
50	4	500	10	1400	KA5508X-BH01H	42.68	581.05	0.90	23.4	14.7
50	4	560	10	1750	KA5560X-BH01H	127.37	552.92	0.90	46.2	24.1
50	4	560	10	1950	KA5568X-BH01H	138.27	510.41	0.90	42.5	21.0
6-pole										
50	6	400	10	355	KA5404X-CH01H	14.91	129.89	0.90	8.8	11.2
50	6	400	10	400	KA5400X-CH01H	16.68	154.66	0.90	13.5	16.7
50	6	400	10	450	KA5408X-CH01H	18.48	152.32	0.90	18.2	15.8
50	6	400	10	500	KA5409X-CH01H	20.32	167.47	0.80	19.7	19.3
50	6	450	10	630	KA5454X-CH01H	26.81	633.74	0.90	26.0	35.0
50	6	450	10	710	KA5450X-CH01H	29.74	654.34	0.90	25.9	29.5
50	6	450	10	800	KA5458X-CH01H	32.43	738.17	0.90	26.0	34.6
50	6	500	10	1000	KA5500X-CH01H	62.73	567.22	0.65	36.5	48.3
50	6	500	10	1120	KA5508X-CH01H	69.52	714.56	0.65	38.3	50.2
50	6	560	10	1250	KA5564X-CH01H	108.50	1348.71	0.90	22.9	28.3
50	6	560	10	1400	KA5560X-CH01H	123.89	1256.72	0.90	23.9	33.0
50	6	560	10	1600	KA5568X-CH01H	137.39	1746.14	0.90	23.5	25.2
8-pole										
50	8	400	10	250	KA5404X-DH01H	18.29	489.58	0.90	32.2	39.9
50	8	400	10	280	KA5400X-DH01H	19.67	452.14	0.90	30.8	38.4
50	8	400	10	315	KA5408X-DH01H	20.95	462.44	0.90	32.6	40.6
50	8	400	10	355	KA5409X-DH01H	22.10	493.98	0.90	34.6	42.0
50	8	450	10	400	KA5454X-DH01H	24.57	783.75	0.90	39.2	51.7
50	8	450	10	500	KA5450X-DH01H	29.98	1031.10	0.90	37.2	59.6
50	8	450	10	560	KA5458X-DH01H	33.11	989.45	0.90	38.3	65.8
50	8	500	10	630	KA5504X-DH01H	57.85	964.66	0.75	51.1	70.5
50	8	500	10	710	KA5500X-DH01H	64.89	1028.52	0.70	48.7	66.9
50	8	500	10	800	KA5508X-DH01H	71.94	962.16	0.70	50.5	69.1
50	8	560	10	850	KA5564X-DH01H	121.52	2572.22	0.70	98.9	125.7
50	8	560	10	950	KA5560X-DH01H	134.50	2539.97	0.70	96.1	122.7

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Starting & stalling time calculation										
Frequency	Pole	Frame size	Rated voltage	Rated output	Motor type Catalogue no.	Moment of inertia	External Moment of inertia	Rated speed torque p.u. for squared load with 3cold/2warm starts and J_{extmax} T_{nr} p.u.	Starting time cold with J_{extmax} at 90% rated voltage	Max. stalling time hot at 100% rated voltage
f1 Hz			kV	kW		Motor kgm ²	Max kgm ²	1	s	s
2-pole										
50	2	355	6	400	KA5354X-AH01E	4.69	8.79	0.60	19.1	22.7
50	2	355	6	450	KA5355X-AH01E	5.09	51.56	0.90	40.7	43.6
50	2	355	6	500	KA5358X-AH01E	5.41	60.70	0.90	35.6	35.0
50	2	355	6	520	KA5359X-AH01E	5.60	49.43	0.90	36.5	36.8
50	2	400	6	560	KA5404X-AH01E	8.04	66.64	0.90	53.6	35.3
50	2	400	6	630	KA5400X-AH01E	8.69	85.84	0.90	46.4	27.8
50	2	400	6	710	KA5408X-AH01E	9.16	91.78	0.90	32.8	19.3
50	2	400	6	750	KA5409X-AH01E	9.59	92.72	0.90	36.8	20.8
50	2	450	6	800	KA5454X-AH01E	17.52	63.45	0.80	53.3	32.8
50	2	450	6	860	KA5450X-AH01E	18.62	77.23	0.80	52.0	30.4
50	2	450	6	930	KA5458X-AH01E	20.21	80.47	0.80	48.8	29.2
50	2	450	6	1000	KA5459X-AH01E	21.37	94.21	0.80	44.4	26.5
50	2	500	6	1060	KA5504X-AH01E	36.36	129.29	0.80	38.8	18.4
50	2	500	6	1200	KA5500X-AH01E	39.76	123.22	0.80	35.1	16.3
50	2	500	6	1320	KA5508X-AH01E	43.25	124.27	0.80	31.7	14.4
50	2	500	6	1350	KA5509X-AH01E	43.82	122.61	0.80	32.9	14.7
50	2	560	6	1600	KA5564X-AH01E	67.61	199.58	0.80	74.5	32.9
50	2	560	6	1800	KA5560X-AH01E	68.86	243.71	0.80	64.8	25.4
50	2	560	6	2000	KA5568X-AH01E	70.76	142.64	0.80	50.5	25.1
50	2	560	6	2100	KA5569X-AH01E	73.48	122.82	0.80	44.3	24.0
4-pole										
50	4	355	6	400	KA5354X-BH01E	7.32	75.31	0.85	35.1	35.8
50	4	355	6	450	KA5355X-BH01E	7.91	102.60	0.85	34.6	30.4
50	4	355	6	500	KA5358X-BH01E	8.51	94.90	0.90	30.4	25.0
50	4	355	6	560	KA5359X-BH01E	9.25	134.27	0.90	28.8	21.8
50	4	400	6	630	KA5404X-BH01E	12.77	232.86	0.90	90.1	55.9
50	4	400	6	710	KA5400X-BH01E	13.84	530.62	0.90	74.1	67.8
50	4	400	6	800	KA5408X-BH01E	15.25	668.08	0.90	63.3	34.3
50	4	450	6	900	KA5454X-BH01E	21.14	600.50	0.90	42.1	20.3
50	4	450	6	1000	KA5450X-BH01E	23.41	1232.99	0.90	79.9	19.6
50	4	450	6	1120	KA5458X-BH01E	25.93	630.13	0.90	41.2	18.8
50	4	500	6	1250	KA5504X-BH01E	35.85	697.46	0.90	36.4	16.1
50	4	500	6	1400	KA5500X-BH01E	40.14	752.98	0.90	34.5	15.0
50	4	500	6	1600	KA5508X-BH01E	44.39	742.22	0.90	29.9	12.9
50	4	560	6	1800	KA5564X-BH01E	121.32	629.63	0.90	43.3	19.4
50	4	560	6	2000	KA5560X-BH01E	132.31	557.35	0.90	40.3	17.6
50	4	560	6	2240	KA5568X-BH01E	144.21	488.23	0.90	38.4	16.1

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Starting & stalling time calculation										
Frequency	Pole	Frame size	Rated voltage	Rated output	Motor type Catalogue no.	Moment of inertia	External Moment of inertia	Rated speed torque p.u. for squared load with 3cold/2warm starts and J_{extmax} T_{nr} p.u.	Starting time cold with J_{extmax} at 90% rated voltage	Max. stalling time hot at 100% rated voltage
f1 Hz			kV	kW		Motor kgm ²	Max kgm ²	1	s	s
6-pole										
50	6	355	6	315	KA5354X-CH01E	7.25	373.40	0.90	78.7	106.3
50	6	355	6	355	KA5355X-CH01E	8.19	230.20	0.83	90.2	126.4
50	6	355	6	400	KA5358X-CH01E	9.05	144.46	0.80	81.3	114.6
50	6	400	6	450	KA5404X-CH01E	16.54	152.32	0.80	52.1	49.3
50	6	400	6	500	KA5400X-CH01E	18.09	199.29	0.80	34.5	46.1
50	6	400	6	560	KA5408X-CH01E	20.02	213.29	0.80	38.2	44.1
50	6	400	6	630	KA5409X-CH01E	22.10	351.39	0.80	37.5	43.6
50	6	450	6	710	KA5454X-CH01E	33.69	1008.18	0.90	44.4	55.5
50	6	450	6	800	KA5450X-CH01E	37.92	1401.49	0.90	71.3	54.5
50	6	450	6	900	KA5458X-CH01E	41.75	945.75	0.90	50.8	54.0
50	6	500	6	1000	KA5504X-CH01E	57.33	362.97	0.80	46.3	54.9
50	6	500	6	1120	KA5500X-CH01E	63.07	474.94	0.80	46.2	50.7
50	6	500	6	1250	KA5508X-CH01E	69.52	382.02	0.80	51.4	48.5
50	6	560	6	1400	KA5564X-CH01E	108.50	2296.58	0.90	41.5	26.4
50	6	560	6	1600	KA5560X-CH01E	123.89	2133.70	0.90	35.3	24.7
50	6	560	6	1800	KA5568X-CH01E	137.39	4048.98	0.90	51.5	20.5
8-pole										
50	8	355	6	200	KA5354X-DH01E	9.24	150.71	0.80	32.4	37.2
50	8	355	6	220	KA5355X-DH01E	10.14	185.73	0.70	28.5	36.7
50	8	355	6	250	KA5358X-DH01E	11.41	205.91	0.80	34.9	45.0
50	8	355	6	280	KA5359X-DH01E	12.58	310.59	0.70	40.6	52.2
50	8	400	6	315	KA5404X-DH01E	16.97	476.15	0.83	80.4	95.8
50	8	400	6	355	KA5400X-DH01E	19.17	485.67	0.79	86.4	102.1
50	8	400	6	400	KA5408X-DH01E	21.75	658.23	0.76	130.4	110.9
50	8	400	6	450	KA5409X-DH01E	23.36	594.82	0.80	72.5	89.5
50	8	450	6	500	KA5454X-DH01E	31.65	1005.75	0.85	89.1	87.8
50	8	450	6	560	KA5450X-DH01E	35.15	1486.58	0.85	80.2	78.2
50	8	450	6	630	KA5458X-DH01E	39.04	2325.75	0.85	84.9	69.5
50	8	500	6	710	KA5504X-DH01E	59.05	805.20	0.75	75.7	104.4
50	8	500	6	800	KA5500X-DH01E	66.44	1008.80	0.83	66.5	91.0
50	8	500	6	900	KA5508X-DH01E	73.49	1082.54	0.80	72.5	91.8
50	8	560	6	1000	KA5564X-DH01E	121.52	2912.50	0.79	110.5	105.0
50	8	560	6	1100	KA5560X-DH01E	134.50	1739.27	0.79	73.3	102.2
50	8	560	6	1200	KA5568X-DH01E	147.48	3829.15	0.79	121.3	99.4
50	8	560	6	1350	KA5569X-DH01E	159.28	4020.33	0.79	104.2	79.6

3.11 Variable Speed Drive

Motors with 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.

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 KA5 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.

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 phenomenon may degrade the motor insulation system and may result in shorter motor lifetime. For KA5 range the d_u/d_t max is 12 kV/s up to U_n 7000 V and d_u/d_{tmax} 18 kV/s for U_n above 7000 V.

In case the inverter type is not known the output power is reduced by 30% and the insulation system is improved for the voltage peaks for $U_{ph-ground_p-p} = < U_n$ and $U_{ph-ph_p-p} = < 1,8 \times U_n$.

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 Schorch motors are equipped with insulated bearings for frame size 355 and with insulated endshields when used in frequency converter duty. Schorch motors do not have problems with shaft voltages. To mitigate the bearing voltage common mode filters must be used in frequency converter duty.

3.12 Ordering information

Product code

For the identification of Schorch products a 12-digit alphanumeric code is used.

The code is divided into two parts for easier reading.

Part I

1234567

Example: KA5355X

Type

K Squirrel - cage motor {Base design}

D Squirrel - cage motor for U· puls controlled converter supply

Ventilation

A Self ventilated

G Force ventilated

Model

Frame size

Speed (as a function of number of poles and frequency)

Design

(e. g. No. of terminals and cable entries)

Type of construction

Voltage and connection

Additional information for special designs

Part II

8910111213

AH01EZ

Number of poles 2p

Symbol 50Hz 60Hz

2 A P

4 B Q

5 C R

8 D S

10 E T

12 F U

4 - 2 G V

8 - 4 H W

6 - 4 J X

8 - 6 K Y

8 - 6 - 4 L -

Speeds in rpm stated in this catalogue apply to 50 Hz and are indicated in the product code by letters from A to L. For 60 Hz motors the respective letter from the following table is to be entered in position 8.

¹⁾ For different numbers of poles and frequencies a Z is to be placed in position 8. Additional information concerning the two features to be given in clear.

Voltage codes E = 6,6 kV, Z=9 kV, H=10 kV, J=11 kV

4.1 Technical data 6.6 kV

6.6 kV cast iron IP55 IC411, F-class insulation with B-class temperature rise

Selection data

Frame size	Rated output (safe area)		Motor type Catalogue no.	Rated speed rpm	Efficiency		Power factor	
	kW				4/4 load	3/4 load	4/4 load	3/4 load
					%	%	cos φ	cos φ
6.6 kV, 50 Hz								
2-pole								
355	400		KA5354X-AH01E	2975	95.4	94.9	0.91	0.91
	450		KA5355X-AH01E	2975	95.9	95.6	0.91	0.91
	500		KA5358X-AH01E	2976	96.4	96.1	0.91	0.90
	520		KA5359X-AH01E	2974	96.5	96.3	0.92	0.92
400	560		KA5404X-AH01E	2978	95.7	95.3	0.91	0.91
	630		KA5400X-AH01E	2979	96.2	95.9	0.91	0.91
	710		KA5408X-AH01E	2981	96.7	96.4	0.9	0.88
	750		KA5409X-AH01E	2979	96.8	96.7	0.91	0.91
450	800		KA5454X-AH01E	2986	96.6	96.1	0.91	0.90
	860		KA5450X-AH01E	2987	96.7	96.1	0.91	0.90
	930		KA5458X-AH01E	2987	96.8	96.3	0.91	0.90
	1000		KA5459X-AH01E	2988	97.0	96.5	0.91	0.90
500	1060		KA5504X-AH01E	2990	96.6	95.6	0.91	0.91
	1200		KA5500X-AH01E	2990	96.8	95.9	0.92	0.91
	1320		KA5508X-AH01E	2990	96.9	96.1	0.92	0.92
	1350		KA5509X-AH01E	2990	96.9	96.1	0.92	0.92
560	1600		KA5564X-AH01E	2991	96.9	96.6	0.92	0.93
	1800		KA5560X-AH01E	2992	97.0	96.7	0.92	0.92
	2000		KA5568X-AH01E	2991	97.1	96.9	0.92	0.93
	2100	¹⁾	KA5569X-AH01E	2991	97.1	96.9	0.92	0.93

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

Rated current	Rated torque	Locked rotor current	Locked rotor torque	Break-down torque	Moment of inertia	Sound pressure level	Motor Weight
A	Nm	I_{LR}/I_{rated} p.u.	T_{LR}/T_{rated} p.u.	T_B/T_{rated} p.u.	Motor kgm ²	L_p dB(A)	m kg
44.5	1,284	5.1	0.87	2.2	4.7	83	2692
49.5	1,445	5.1	0.88	2.2	5.1	83	2785
55.0	1,605	5.3	0.94	2.4	5	83	2856
56.0	1,670	5.2	0.93	2.4	5.6	83	2899
62.0	1,796	5.3	0.83	2.2	8.0	83	3448
69.0	2,020	5.6	0.88	2.3	8.7	83	3559
79.0	2,275	6.1	0.98	2.7	9	83	3634
82.0	2,404	5.6	0.89	2.3	10	83	3708
88.0	2,559	5.1	0.57	2.3	18	85	4629
94.0	2,750	5.2	0.59	2.4	19	85	4769
102.0	2,973	5.4	0.6	2.4	20	85	4955
109.0	3,196	5.7	0.64	2.6	21	85	5131
116.0	3,386	6.1	0.79	2.5	36	85	6095
130.0	3,833	6.1	0.77	2.4	40	85	6414
142.0	4,216	6.3	0.79	2.4	43	85	6761
146.0	4,312	6.1	0.76	2.3	44	85	6840
173.0	5,109	5.8	0.67	2.4	68	85	8997
194.0	5,745	6.5	0.76	2.7	69	85	9083
215.0	6,386	5.7	0.66	2.3	71	85	9215
225.0	6,705	5.7	0.66	2.3	73	85	9465

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Frame size	Rated output (safe area)		Motor type Catalogue no.	Rated speed rpm	Efficiency		Power factor	
					4/4 load %	3/4 load %	4/4 load cos φ	3/4 load cos φ

6.6 kV, 50 Hz

4-pole								
355	400		KA5354X-BH01E	1486	94.6	93.9	0.85	0.81
	450		KA5355X-BH01E	1486	95.2	94.7	0.85	0.81
	500		KA5358X-BH01E	1486	95.7	95.3	0.84	0.81
	560		KA5359X-BH01E	1486	96.2	95.9	0.84	0.81
400	630		KA5404X-BH01E	1488	96.1	95.9	0.86	0.85
	710		KA5400X-BH01E	1488	96.3	96.0	0.85	0.83
	800		KA5408X-BH01E	1489	96.4	96.1	0.85	0.82
450	900		KA5454X-BH01E	1489	96.3	96.1	0.88	0.86
	1000		KA5450X-BH01E	1489	96.5	96.3	0.88	0.87
	1120		KA5458X-BH01E	1488	96.6	96.5	0.89	0.88
500	1250		KA5504X-BH01E	1491	96.7	96.3	0.9	0.88
	1400		KA5500X-BH01E	1491	96.9	96.6	0.91	0.89
	1600		KA5508X-BH01E	1491	97.0	96.7	0.91	0.90
560	1800		KA5564X-BH01E	1496	95.7	94.9	0.88	0.86
	2000		KA5560X-BH01E	1495	95.7	95.0	0.89	0.87
	2240		KA5568X-BH01E	1495	95.8	95.0	0.89	0.88

6-pole								
355	315		KA5354X-CH01E	991	95.1	94.6	0.82	0.79
	355		KA5355X-CH01E	991	95.4	95.1	0.85	0.83
	400		KA5358X-CH01E	990	95.6	95.4	0.86	0.85
400	450		KA5404X-CH01E	992	95.3	95.0	0.83	0.82
	500		KA5400X-CH01E	992	95.3	95.0	0.82	0.81
	560		KA5408X-CH01E	992	95.4	95.1	0.83	0.81
	630		KA5409X-CH01E	993	95.7	95.4	0.83	0.82
450	710		KA5454X-CH01E	993	96.1	95.8	0.87	0.84
	800		KA5455X-CH01E	993	96.2	96.0	0.88	0.87
	900		KA5458X-CH01E	992	96.3	96.2	0.89	0.88
500	1000		KA5504X-CH01E	994	96.7	96.5	0.90	0.89
	1120		KA5500X-CH01E	994	96.8	96.6	0.91	0.89
	1250		KA5508X-CH01E	994	96.8	96.7	0.91	0.90
560	1400		KA5564X-CH01E	995	96.6	96.3	0.88	0.85
	1600		KA5560X-CH01E	995	96.7	96.4	0.88	0.86
	1800		KA5568X-CH01E	995	96.8	96.5	0.88	0.85

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Rated current A	Rated torque Nm	Locked rotor current	Locked rotor torque	Break-down torque	Moment of inertia	Sound pressure level	Motor Weight m kg
		I_{LR}/I_{rated} p.u.	T_{LR}/T_{rated} p.u.	T_B/T_{rated} p.u.	Motor kgm ²	L_p dB(A)	

48.0	2,571	5.9	0.92	2.2	7	80	2738
54.0	2,892	5.7	0.95	2.2	8	80	2851
60.0	3,213	5.9	0.99	2.2	9	80	2937
67.0	3,599	6.0	1.03	2.3	9	80	3060
73.0	4,043	3.9	0.75	2	13	80	3596
83.0	4,557	5.3	0.96	2.1	14	80	3722
94.0	5,131	5.5	1.03	2.3	15	83	3909
102.0	5,772	6.9	0.87	2.6	21	83	4714
113.0	6,414	5.6	0.92	2.3	23	83	4937
125.0	7,188	5.4	0.89	2.2	26	83	5208
138.0	8,006	5.7	0.93	2.2	36	83	6231
153.0	8,967	5.8	0.84	2.2	40	83	6608
174.0	10,248	5.8	0.84	2.2	44	83	7015
205.0	11,491	5.0	0.45	2.5	121	83	9092
225.0	12,776	5.4	0.5	2.5	132	83	9527
255.0	14,309	5.2	0.48	2.3	144	83	10127

39.0	3,036	4.5	0.67	2.2	7	81	2633
42.0	3,421	4.3	0.61	2	8	81	2785
47.0	3,859	3.9	0.7	1.8	9	81	2902
55.0	4,332	5.9	0.8	2.3	17	81	3419
62.0	4,814	6.0	0.81	2.4	18	81	3466
68.0	5,391	5.2	0.7	2.1	20	81	3625
76.0	6,059	5.2	0.69	2.1	22	81	3915
82.0	6,828	5.5	0.72	2.4	34	81	4703
91.0	7,694	5.2	0.67	2.2	38	81	4987
101.0	8,664	4.9	0.74	2.2	42	81	5239
111.0	9,608	5.6	0.87	2.3	57	81	6034
122.0	10,761	5.5	0.86	2.2	63	81	6295
137.0	12,010	5.5	0.74	2.2	70	81	6664
158.0	13,437	6.0	1.13	2.6	109	81	8195
181.0	15,357	6.0	1.12	2.6	124	81	8743
205.0	17,276	6.6	1.04	2.8	137	81	9277

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Frame size	Rated output (safe area)		Motor type Catalogue no.	Rated speed rpm	Efficiency		Power factor	
					4/4 load %	3/4 load %	4/4 load cos φ	3/4 load cos φ

6.6 kV, 50 Hz

8-pole								
355	200		KA5354X-DH01E	743	93.3	93.0	0.75	0.70
	220		KA5355X-DH01E	742	93.5	93.3	0.77	0.72
	250		KA5358X-DH01E	743	94.0	93.7	0.76	0.71
	280		KA5359X-DH01E	742	94.2	94.1	0.77	0.73
400	315		KA5404X-DH01E	744	94.6	93.9	0.72	0.67
	355		KA5400X-DH01E	744	94.7	94.1	0.74	0.70
	400		KA5408X-DH01E	744	94.8	94.3	0.76	0.72
	450		KA5409X-DH01E	744	94.8	94.2	0.74	0.70
450	500		KA5454X-DH01E	744	95.4	95.4	0.78	0.71
	560		KA5450X-DH01E	744	95.5	95.4	0.77	0.71
	630		KA5458X-DH01E	744	95.5	95.4	0.76	0.70
500	710		KA5504X-DH01E	745	96.0	95.8	0.82	0.78
	800		KA5500X-DH01E	745	96.0	95.8	0.81	0.75
	900		KA5508X-DH01E	745	96.1	96.0	0.82	0.77
560	1000		KA5564X-DH01E	744	96.6	96.6	0.83	0.81
	1100		KA5560X-DH01E	744	96.6	96.6	0.83	0.81
	1200		KA5568X-DH01E	744	96.7	96.6	0.83	0.81
	1350		KA5569X-DH01E	744	96.7	96.6	0.83	0.81

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

** Other pole numbers available on request.

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Rated current	Rated torque	Locked rotor current I_{LR}/I_{rated}	Locked rotor torque T_{LR}/T_{rated}	Break-down torque T_B/T_{rated}	Moment of inertia Motor kgm ²	Sound pressure level L _p dB(A)	Motor Weight m kg
A	Nm	p.u.	p.u.	p.u.			

27.5	2,571	4.2	0.55	2.4	9	81	2484
29.5	2,832	4.0	0.52	2.3	10	81	2559
33.5	3,213	4.3	0.61	2.1	11	81	2709
37.0	3,604	3.9	0.61	1.9	13	81	2834
44.5	4,043	4.7	0.98	2.4	17	81	3455
48.5	4,557	4.6	0.93	2.2	19	81	3634
53.0	5,134	4.6	0.88	2.1	22	81	3792
62.0	5,776	4.5	0.77	2.3	23	81	3934
65.0	6,418	4.4	0.41	1.9	32	81	4673
73.0	7,188	4.5	0.44	2	35	81	4868
84.0	8,087	4.6	0.46	2.1	39	81	5128
87.0	9,101	5.2	0.65	2.4	59	81	6057
99.0	10,255	5.5	0.72	2.5	66	81	6400
110.0	11,537	5.4	0.69	2.4	73	81	6749
120.0	12,836	4.8	1.11	2.1	122	81	8619
132.0	14,120	4.4	0.72	1.95	135	81	9131
144.0	15,403	4.8	1.13	2.1	147	81	9606
162.0	17,329	4.8	0.76	2.1	159	81	10069

4.2 Technical data 9 kV

9 kV cast iron IP55 IC411, F-class insulation with B-class temperature rise

Selection data

Frame size	Rated output (safe area) kW	Motor type Catalogue no.	Rated speed rpm	Efficiency		Power factor	
				4/4 load %	3/4 load %	4/4 load cos φ	3/4 load cos φ

9 kV, 50Hz

2-pole								
400	355		KA5404X-AH01Z	2981	95.0	94.7	0.89	0.88
	420		KA5400X-AH01Z	2981	95.7	95.4	0.9	0.89
	480		KA5408X-AH01Z	2982	95.9	95.6	0.9	0.89
	540		KA5409X-AH01Z	2983	96.1	95.7	0.89	0.86
450	610		KA5454X-AH01Z	2986	96.1	95.5	0.9	0.90
	660		KA5450X-AH01Z	2986	96.1	95.5	0.91	0.91
	720		KA5458X-AH01Z	2987	96.3	95.6	0.91	0.91
	800		KA5459X-AH01Z	2987	96.5	96.0	0.91	0.91
500	860	¹⁾	KA5504X-AH01Z	2989	95.4	95.3	0.91	0.91
	950	¹⁾	KA5500X-AH01Z	2990	95.8	94.7	0.91	0.91
	1040		KA5508X-AH01Z	2990	96.0	94.9	0.92	0.92
560	1600		KA5560X-AH01Z	2991	96.8	96.5	0.92	0.93

4-pole								
400	400		KA5404X-BH01Z	1490	95.1	94.7	0.83	0.80
	450		KA5400X-BH01Z	1490	95.3	94.9	0.84	0.80
	500		KA5408X-BH01Z	1490	95.4	95.0	0.84	0.80
	560		KA5409X-BH01Z	1491	95.5	95.0	0.82	0.78
450	630		KA5454X-BH01Z	1491	95.3	95.8	0.83	0.79
	710		KA5457X-BH01Z	1491	95.9	95.5	0.85	0.82
	800		KA5450X-BH01Z	1490	95.9	95.6	0.88	0.86
	900		KA5458X-BH01Z	1490	96.1	95.9	0.88	0.86
500	1000		KA5504X-BH01Z	1490	96.0	95.5	0.9	0.89
	1120		KA5507X-BH01Z	1490	96.5	96.2	0.9	0.90
	1250		KA5500X-BH01Z	1490	96.4	96.0	0.91	0.90
	1400		KA5508X-BH01Z	1492	96.5	96.1	0.9	0.89
560	1550		KA5564X-BH01Z	1496	95.2	94.3	0.88	0.86
	1750		KA5560X-BH01Z	1495	95.3	94.5	0.88	0.87
	1950		KA5568X-BH01Z	1495	95.3	94.5	0.89	0.87

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

Rated current	Rated torque	Locked rotor current	Locked rotor torque	Break-down torque	Moment of inertia	Sound pressure level	Motor Weight
A	Nm	I_{LR}/I_{rated} p.u.	T_{LR}/T_{rated} p.u.	T_B/T_{rated} p.u.	Motor kgm²	L_p dB(A)	m kg

21.5	1,137	5.7	0.88	2.5	6.3	81	2991
25.0	1,346	5.7	0.88	2.5	6.9	83	3042
29.0	1,537	6.0	0.94	2.7	8	83	3147
33.0	1,729	6.7	1.06	3	8	83	3260
36.5	1,951	4.8	0.53	2.3	15	83	4284
39.0	2,111	4.9	0.53	2.3	17	83	4442
43.0	2,302	5.0	0.55	2.3	18	83	4587
47.5	2,558	5.2	0.56	2.3	19	83	4764
51.0	2,748	5.4	0.7	2.5	33	83	5702
57.0	3,034	5.7	0.72	2.3	35	85	5859
61.0	3,322	5.9	0.75	2.3	38	85	6156
94.0	5,109	5.6	0.65	2.3	69	85	8902

26.5	2,564	5.5	1.01	2.3	9	80	3094
29.0	2,884	5.5	1.02	2.3	10	80	3239
32.5	3,205	5.8	1.07	2.4	12	80	3396
37.5	3,587	6.1	1.27	2.7	13	80	3466
41.5	4,035	6.3	1.18	2.8	17	80	4202
45.0	4,548	6.4	1.07	2.8	19	80	4496
49.5	5,128	6.3	0.89	2.5	21	80	4635
55.0	5,768	6.1	1	2.5	23	83	4820
60.0	6,409	5.3	0.85	2.1	32	83	5746
67.0	7,179	5.1	0.68	2	36	83	5963
74.0	8,012	5.5	0.79	2.1	40	83	6488
84.0	8,961	6.3	0.91	2.4	43	83	6710
96.0	9,895	5.6	0.52	2.6	115	83	8607
108.0	11,179	5.3	0.49	2.4	127	83	9161
120.0	12,457	5.2	0.49	2.4	138	83	9637

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Frame size	Rated output (safe area)	Motor type Catalogue no.	Rated speed	Efficiency		Power factor	
				4/4 load	3/4 load	4/4 load	3/4 load
	kW				%	%	cos φ

9 kV, 50 Hz

6-pole								
400	355		KA5404X-CH01Z	995	94.7	94.0	0.77	0.72
	400		KA5400X-CH01Z	994	94.9	94.4	0.81	0.76
	450		KA5408X-CH01Z	994	95.0	94.7	0.83	0.80
	500		KA5409X-CH01Z	993	95.1	94.9	0.84	0.82
450	630		KA5454X-CH01Z	994	95.8	95.4	0.81	0.77
	710		KA5450X-CH01Z	994	96.0	95.8	0.84	0.80
	800		KA5458X-CH01Z	994	96.1	95.9	0.85	0.81
500	900		KA5504X-CH01Z	993	96.4	96.3	0.91	0.91
	1000		KA5500X-CH01Z	993	96.4	96.4	0.91	0.91
	1120		KA5508X-CH01Z	993	96.5	96.5	0.92	0.91
560	1250		KA5564X-CH01Z	996	96.3	95.9	0.87	0.84
	1400		KA5560X-CH01Z	995	96.4	96.1	0.88	0.86
	1600		KA5568X-CH01Z	996	96.5	96.2	0.88	0.85

8-pole								
400	250		KA5404X-DH01Z	746	93.4	92.3	0.66	0.59
	280		KA5400X-DH01Z	746	93.6	92.6	0.68	0.61
	315		KA5408X-DH01Z	745	93.9	93.0	0.69	0.63
	355		KA5409X-DH01Z	745	94.1	93.3	0.70	0.64
450	400		KA5454X-DH01Z	744	94.9	94.7	0.73	0.65
	500		KA5450X-DH01Z	743	95.1	95.1	0.78	0.72
	560		KA5458X-DH01Z	742	95.1	95.2	0.79	0.75
500	630		KA5504X-DH01Z	745	95.7	95.5	0.81	0.76
	710		KA5500X-DH01Z	745	95.8	95.6	0.83	0.79
	800		KA5508X-DH01Z	745	95.9	95.8	0.84	0.81
560	850		KA5564X-DH01Z	744	96.9	97.0	0.83	0.81
	950		KA5560X-DH01Z	744	96.4	96.4	0.83	0.81
	1070		KA5568X-DH01Z	744	96.4	96.4	0.83	0.81
	1200		KA5569X-DH01Z	744	96.5	96.4	0.83	0.81

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

** Other pole numbers available on request.

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Rated current	Rated torque	Locked rotor current	Locked rotor torque	Break-down torque	Moment of inertia	Sound pressure level	Motor Weight m kg
		I_{LR}/I_{rated}	T_{LR}/T_{rated}	T_B/T_{rated}	Motor	L_p	
		p.u.	p.u.	p.u.	kgm ²	dB(A)	

25.0	3,407	7.1	1.06	3	15	79	3234
27.0	3,843	6.6	0.92	2.7	17	80	3389
29.5	4,323	6.1	0.83	2.4	18	80	3473
32.5	4,809	5.6	0.74	2.2	20	80	3650
42.5	6,053	5.6	0.98	2.8	27	80	4468
46.0	6,821	6.0	0.8	2.6	30	80	4753
51.0	7,686	5.6	0.89	2.8	32	80	4962
53.0	8,656	5.1	0.69	2.1	57	83	5880
59.0	9,617	5.1	0.69	2.1	63	83	6185
66.0	10,771	5.1	0.69	2.1	70	83	6514
77.0	11,985	7.0	1.1	3	109	83	8010
86.0	13,437	6.4	0.99	2.7	124	83	8535
98.0	15,341	6.9	1.08	3	137	83	9113

21.0	3,200	5.6	1.1	3.1	18	81	3420
23.0	3,584	5.5	1.04	2.9	20	81	3545
25.0	4,038	5.3	1	3.1	21	81	3652
28.0	4,551	5.2	0.98	2.7	22	81	3764
30.0	5,134	5.0	0.8	2.5	25	81	4422
35.0	6,427	4.5	0.69	2.1	30	81	4794
38.5	7,208	4.3	0.64	1.9	33	81	5066
42.5	8,076	5.4	0.66	2.6	58	81	5934
47.0	9,101	5.3	0.62	2.4	65	81	6276
51.0	10,255	5.1	0.6	2.3	72	81	6609
55.0	10,911	4.5	0.69	2	122	81	8568
62.0	12,194	4.4	0.68	2	135	81	9022
69.0	13,735	4.4	0.69	2	147	81	9368
77.0	15,403	4.7	0.72	2.1	159	81	9820

4.3 Technical data 10 kV

10 kV cast iron IP55 IC411, F-class insulation with B-class temperature rise

Selection data

Frame size	Rated output (safe area)	Motor type Catalogue no.	Rated speed rpm	Efficiency		Power factor	
				4/4 load %	3/4 load %	4/4 load cos φ	3/4 load cos φ
	kW						

10 kV, 50Hz

2-pole								
400	355		KA5404X-AH01H	2981	95.0	94.7	0.89	0.88
	420		KA5400X-AH01H	2981	95.7	95.4	0.9	0.89
	480		KA5408X-AH01H	2982	95.9	95.6	0.9	0.89
	540		KA5409X-AH01H	2983	96.1	95.7	0.89	0.86
450	610		KA5454X-AH01H	2986	96.1	95.5	0.9	0.90
	660		KA5450X-AH01H	2986	96.1	95.5	0.91	0.91
	720		KA5458X-AH01H	2987	96.3	95.6	0.91	0.91
	800		KA5459X-AH01H	2987	96.5	96.0	0.91	0.91
500	860	1)	KA5504X-AH01H	2989	95.4	95.3	0.91	0.91
	950	1)	KA5500X-AH01H	2990	95.8	94.7	0.91	0.91
	1040		KA5508X-AH01H	2990	96.0	94.9	0.92	0.92
560	1600		KA5560X-AH01H	2991	96.8	96.5	0.92	0.93
	1800		KA5569X-AH01H	2992	96.8	96.6	0.93	0.93

4-pole								
400	400		KA5404X-BH01H	1490	95.1	94.7	0.83	0.80
	450		KA5400X-BH01H	1490	95.3	94.9	0.84	0.80
	500		KA5408X-BH01H	1490	95.4	95.0	0.84	0.80
	560		KA5409X-BH01H	1491	95.5	95.0	0.82	0.78
450	630		KA5454X-BH01Z	1491	95.3	95.8	0.83	0.79
	710		KA5457X-BH01Z	1491	95.9	95.5	0.85	0.82
	800		KA5450X-BH01H	1490	95.9	95.6	0.88	0.86
	900		KA5458X-BH01H	1490	96.1	95.9	0.88	0.86
500	1000		KA5504X-BH01H	1490	96.0	95.5	0.9	0.89
	1120		KA5507X-BH01H	1490	96.5	96.2	0.9	0.90
	1250		KA5500X-BH01H	1490	96.4	96.0	0.91	0.90
	1400		KA5508X-BH01H	1492	96.5	96.1	0.9	0.89
560	1550		KA5564X-BH01H	1496	95.2	94.3	0.88	0.86
	1750		KA5560X-BH01H	1495	95.3	94.5	0.88	0.87
	1950		KA5568X-BH01H	1495	95.3	94.5	0.89	0.87

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

Rated current	Rated torque	Locked rotor current	Locked rotor torque	Break-down torque	Moment of inertia	Sound pressure level	Motor Weight
A	Nm	I_{LR}/I_{rated} p.u.	T_{LR}/T_{rated} p.u.	T_B/T_{rated} p.u.	Motor kgm ²	L_p dB(A)	m kg

24.0	1,137	5.7	0.88	2.5	6.3	81	2991
28.0	1,346	5.7	0.88	2.5	6.9	83	3042
32.0	1,537	6.0	0.94	2.7	8	83	3147
36.5	1,729	6.7	1.06	3	8	83	3260
40.5	1,951	4.8	0.53	2.3	15	83	4284
43.5	2,111	4.9	0.53	2.3	17	83	4442
47.5	2,302	5.0	0.55	2.3	18	83	4587
53.0	2,558	5.2	0.56	2.3	19	83	4764
57.0	2,748	5.4	0.7	2.5	33	83	5702
63.0	3,034	5.7	0.72	2.3	35	85	5859
68.0	3,322	5.9	0.75	2.3	38	85	6156
104.0	5,109	5.6	0.65	2.3	69	85	8902
115.0	5,745	6.2	0.71	2.5	70	85	9108

29.5	2,564	5.5	1.01	2.3	9	80	3094
32.5	2,884	5.5	1.02	2.3	10	80	3239
36.0	3,205	5.8	1.07	2.4	12	80	3396
41.5	3,587	6.1	1.27	2.7	13	80	3466
46.0	4,035	6.3	1.18	2.8	17	80	4202
50.0	4,548	6.4	1.07	2.8	19	80	4496
55.0	5,128	6.3	0.89	2.5	21	80	4635
61.0	5,768	6.1	1	2.5	23	83	4820
67.0	6,409	5.3	0.85	2.1	32	83	5746
74.0	7,179	5.1	0.68	2	36	83	5963
82.0	8,012	5.5	0.79	2.1	40	83	6488
93.0	8,961	6.3	0.91	2.4	43	83	6710
107.0	9,895	5.6	0.52	2.6	115	83	8607
120.0	11,179	5.3	0.49	2.4	127	83	9161
133.0	12,457	5.2	0.49	2.4	138	83	9637

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Frame size	Rated output (safe area)	Motor type Catalogue no.	Rated speed	Efficiency		Power factor	
					4/4 load	3/4 load	
	kW				%	%	cos φ

10 kV, 50 Hz

6-pole								
400	355		KA5404X-CH01H	995	94.7	94.0	0.77	0.72
	400		KA5400X-CH01H	994	94.9	94.4	0.81	0.76
	450		KA5408X-CH01H	994	95.0	94.7	0.83	0.80
	500		KA5409X-CH01H	993	95.1	94.9	0.84	0.82
450	560		KA5454X-CH01H	994	95.8	95.4	0.81	0.77
	630		KA5450X-CH01H	994	96.0	95.8	0.84	0.80
	800		KA5458X-CH01H	994	96.1	95.9	0.85	0.81
500	900		KA5504X-CH01H	993	96.4	96.3	0.91	0.91
	1000		KA5500X-CH01H	993	96.4	96.4	0.91	0.91
	1120		KA5508X-CH01H	993	96.5	96.5	0.92	0.91
560	1250		KA5564X-CH01H	996	96.3	95.9	0.87	0.84
	1400		KA5560X-CH01H	995	96.4	96.1	0.88	0.86
	1600		KA5568X-CH01H	996	96.5	96.2	0.88	0.85

8-pole								
400	250		KA5404X-DH01H	746	93.4	92.3	0.66	0.59
	280		KA5400X-DH01H	746	93.6	92.6	0.68	0.61
	315		KA5408X-DH01H	745	93.9	93.0	0.69	0.63
	355		KA5409X-DH01H	745	94.1	93.3	0.70	0.64
450	400		KA5454X-DH01H	744	94.9	94.7	0.73	0.65
	500		KA5450X-DH01H	743	95.1	95.1	0.78	0.72
	560		KA5458X-DH01H	742	95.1	95.2	0.79	0.75
500	630		KA5504X-DH01H	745	95.7	95.5	0.81	0.76
	710		KA5500X-DH01H	745	95.8	95.6	0.83	0.79
	800		KA5508X-DH01H	745	95.9	95.8	0.84	0.81
560	850		KA5564X-DH01H	744	96.9	97.0	0.83	0.81
	950		KA5560X-DH01H	744	96.4	96.4	0.83	0.81
	1070		KA5568X-DH01H	744	96.4	96.4	0.83	0.81
	1200		KA5569X-DH01H	744	96.5	96.4	0.83	0.81

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

** Other pole numbers available on request.

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Rated current	Rated torque	Locked rotor current	Locked rotor torque	Break-down torque	Moment of inertia	Sound pressure level	Motor Weight m kg
		I_{LR}/I_{rated}	T_{LR}/T_{rated}	T_B/T_{rated}	Motor	L_p	
		p.u.	p.u.	p.u.	kgm ²	dB(A)	

28.0	3,407	7.1	1.06	3	15	79	3234
30.0	3,843	6.6	0.92	2.7	17	80	3389
33.0	4,323	6.1	0.83	2.4	18	80	3473
36.0	4,809	5.6	0.74	2.2	20	80	3650
47.0	6,053	5.6	0.98	2.8	27	80	4468
51.0	6,821	6.0	0.8	2.6	30	80	4753
57.0	7,686	5.6	0.89	2.8	32	80	4962
59.0	8,656	5.1	0.69	2.1	57	83	5880
66.0	9,617	5.1	0.69	2.1	63	83	6185
73.0	10,771	5.1	0.69	2.1	70	83	6514
86.0	11,985	7.0	1.1	3	109	83	8010
95.0	13,437	6.4	0.99	2.7	124	83	8535
109.0	15,341	6.9	1.08	3	137	83	9113

23.5	3,200	5.6	1.1	3.1	18	81	3420
25.5	3,584	5.5	1.04	2.9	20	81	3545
28.0	4,038	5.3	1	3.1	21	81	3652
31.0	4,551	5.2	0.98	2.7	22	81	3764
33.5	5,134	5.0	0.8	2.5	25	81	4422
39.0	6,427	4.5	0.69	2.1	30	81	4794
43.0	7,208	4.3	0.64	1.9	33	81	5066
47.0	8,076	5.4	0.66	2.6	58	81	5934
52.0	9,101	5.3	0.62	2.4	65	81	6276
57.0	10,255	5.1	0.6	2.3	72	81	6609
61.0	10,911	4.5	0.69	2	122	81	8568
69.0	12,194	4.4	0.68	2	135	81	9022
77.0	13,735	4.4	0.69	2	147	81	9368
86.0	15,403	4.7	0.72	2.1	159	81	9820

4.4 Technical data 11 kV

11 kV cast iron IP55 IC411, F-class insulation with B-class temperature rise

Selection data

Frame size	Rated output (safe area) kW	Motor type Catalogue no.	Rated speed rpm	Efficiency		Power factor	
				4/4 load %	3/4 load %	4/4 load cos φ	3/4 load cos φ

11 kV, 50Hz

2-pole								
400	310		KA5404X-AH01J	2981	95.0	94.7	0.89	0.88
	370		KA5400X-AH01J	2981	95.7	95.4	0.9	0.89
	420		KA5408X-AH01J	2982	95.9	95.6	0.9	0.89
	475		KA5409X-AH01J	2983	96.1	95.7	0.89	0.86
450	535		KA5454X-AH01J	2986	96.1	95.5	0.9	0.90
	580		KA5450X-AH01J	2986	96.1	95.5	0.91	0.91
	635		KA5458X-AH01J	2987	96.3	95.6	0.91	0.91
	705		KA5459X-AH01J	2987	96.5	96.0	0.91	0.91
500	755		KA5504X-AH01J	2990	95.4	95.3	0.91	0.91
	835	1)	KA5500X-AH01J	2987	95.8	94.7	0.91	0.91
	915	1)	KA5508X-AH01J	2990	96.0	94.9	0.92	0.92
560	1410		KA5560X-AH01J	2987	96.8	96.5	0.92	0.93
	1585		KA5569X-AH01J	2992	96.8	96.6	0.93	0.93

4-pole								
400	350		KA5404X-BH01J	1490	95.1	94.7	0.83	0.80
	395		KA5400X-BH01J	1490	95.3	94.9	0.84	0.80
	440		KA5408X-BH01J	1490	95.4	95.0	0.84	0.80
	495		KA5409X-BH01J	1491	95.5	95.0	0.82	0.78
450	555		KA5454X-BH01J	1491	95.3	95.8	0.83	0.79
	625		KA5457X-BH01J	1491	95.9	95.5	0.85	0.82
	705		KA5450X-BH01J	1490	95.9	95.6	0.88	0.86
	790		KA5458X-BH01J	1490	96.1	95.9	0.88	0.86
500	880		KA5504X-BH01J	1490	96.0	95.5	0.9	0.89
	985		KA5507X-BH01J	1490	96.5	96.2	0.9	0.90
	1100		KA5500X-BH01J	1490	96.4	96.0	0.91	0.90
	1230		KA5508X-BH01J	1492	96.5	96.1	0.9	0.89
560	1365		KA5564X-BH01J	1496	95.2	94.3	0.88	0.86
	1540		KA5560X-BH01J	1495	95.3	94.5	0.88	0.87
	1715		KA5568X-BH01J	1495	95.3	94.5	0.89	0.87

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

Rated current A	Rated torque Nm	Locked rotor current I_{LR}/I_{rated} p.u.	Locked rotor torque T_{LR}/T_{rated} p.u.	Break-down torque T_B/T_{rated} p.u.	Moment of inertia Motor kgm ²	Sound pressure level L_p dB(A)	Motor Weight m kg
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26.5	1,137	5.7	0.88	2.5	6.3	81	2991
31.0	1,346	5.7	0.88	2.5	6.9	83	3042
35.0	1,537	6.0	0.94	2.7	8	83	3147
40.0	1,729	6.7	1.06	3	8	83	3260
44.5	1,951	4.8	0.53	2.3	15	83	4284
48.0	2,111	4.9	0.53	2.3	17	83	4442
52.0	2,302	5.0	0.55	2.3	18	83	4587
58.0	2,558	5.2	0.56	2.3	19	83	4764
63.0	2,748	5.4	0.7	2.5	33	83	5702
69.0	3,034	5.7	0.72	2.3	35	85	5859
75.0	3,322	5.9	0.75	2.3	38	85	6156
114.0	5,109	5.6	0.65	2.3	69	85	8902
126.0	5,745	6.2	0.71	2.5	70	85	9108

32.5	2,564	5.5	1.01	2.3	9	80	3094
36.0	2,884	5.5	1.02	2.3	10	80	3239
39.5	3,205	5.8	1.07	2.4	12	80	3396
45.5	3,587	6.1	1.27	2.7	13	80	3466
51.0	4,035	6.3	1.18	2.8	17	80	4371
55.0	4,548	6.4	1.07	2.8	19	80	4371
60.0	5,128	6.3	0.89	2.5	21	80	4208
67.0	5,768	6.1	1	2.5	23	83	4820
74.0	6,409	5.3	0.85	2.1	32	83	5746
81.0	7,179	5.1	0.68	2	36	83	5963
90.0	8,012	5.5	0.79	2.1	40	83	6488
102.0	8,961	6.3	0.91	2.4	43	83	6710
118.0	9,895	5.6	0.52	2.6	115	83	8607
132.0	11,179	5.3	0.49	2.4	127	83	9161
146.0	12,457	5.2	0.49	2.4	138	83	9637

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

Frame size	Rated output (safe area)	Motor type Catalogue no.	Rated speed	Efficiency		Power factor	
				4/4 load	3/4 load	4/4 load	3/4 load
	kW				%	%	cos φ

11 kV, 50 Hz

6-pole								
400	310		KA5404X-CH01J	995	94.7	94.0	0.77	0.72
	350		KA5400X-CH01J	994	94.9	94.4	0.81	0.76
	395		KA5408X-CH01J	994	95.0	94.7	0.83	0.80
	440		KA5409X-CH01J	993	95.1	94.9	0.84	0.82
450	555		KA5454X-CH01J	994	95.8	95.4	0.81	0.77
	625		KA5450X-CH01J	994	96.0	95.8	0.84	0.80
	705		KA5458X-CH01J	994	96.1	95.9	0.85	0.81
500	790		KA5504X-CH01J	993	96.4	96.3	0.91	0.91
	880		KA5500X-CH01J	993	96.4	96.4	0.91	0.91
	985		KA5508X-CH01J	993	96.5	96.5	0.92	0.91
560	1100		KA5564X-CH01J	996	96.3	95.9	0.87	0.84
	1230		KA5560X-CH01J	995	96.4	96.1	0.88	0.86
	1410		KA5568X-CH01J	996	96.5	96.2	0.88	0.85

8-pole								
400	220		KA5404X-DH01J	746	93.4	92.3	0.66	0.59
	245		KA5400X-DH01J	746	93.6	92.6	0.68	0.61
	275		KA5408X-DH01J	745	93.9	93.0	0.69	0.63
	310		KA5409X-DH01J	745	94.1	93.3	0.70	0.64
450	350		KA5454X-DH01J	744	94.9	94.7	0.73	0.65
	440		KA5450X-DH01J	743	95.1	95.1	0.78	0.72
	495		KA5458X-DH01J	742	95.1	95.2	0.79	0.75
500	555		KA5504X-DH01J	745	95.7	95.5	0.81	0.76
	625		KA5500X-DH01J	745	95.8	95.6	0.83	0.79
	705		KA5508X-DH01J	745	95.9	95.8	0.84	0.81
560	750		KA5564X-DH01J	744	96.9	97.0	0.83	0.81
	835		KA5560X-DH01J	744	96.4	96.4	0.83	0.81
	940		KA5568X-DH01J	744	96.4	96.4	0.83	0.81
	1055		KA5569X-DH01J	744	96.5	96.4	0.83	0.81

* All motors have B-class temperature rise by resistance method except the ones indicated with ¹⁾ have F-class temperature rise.

** Other pole numbers available on request.

Totally Enclosed Fan Cooled
Medium Voltage Induction motors KA5

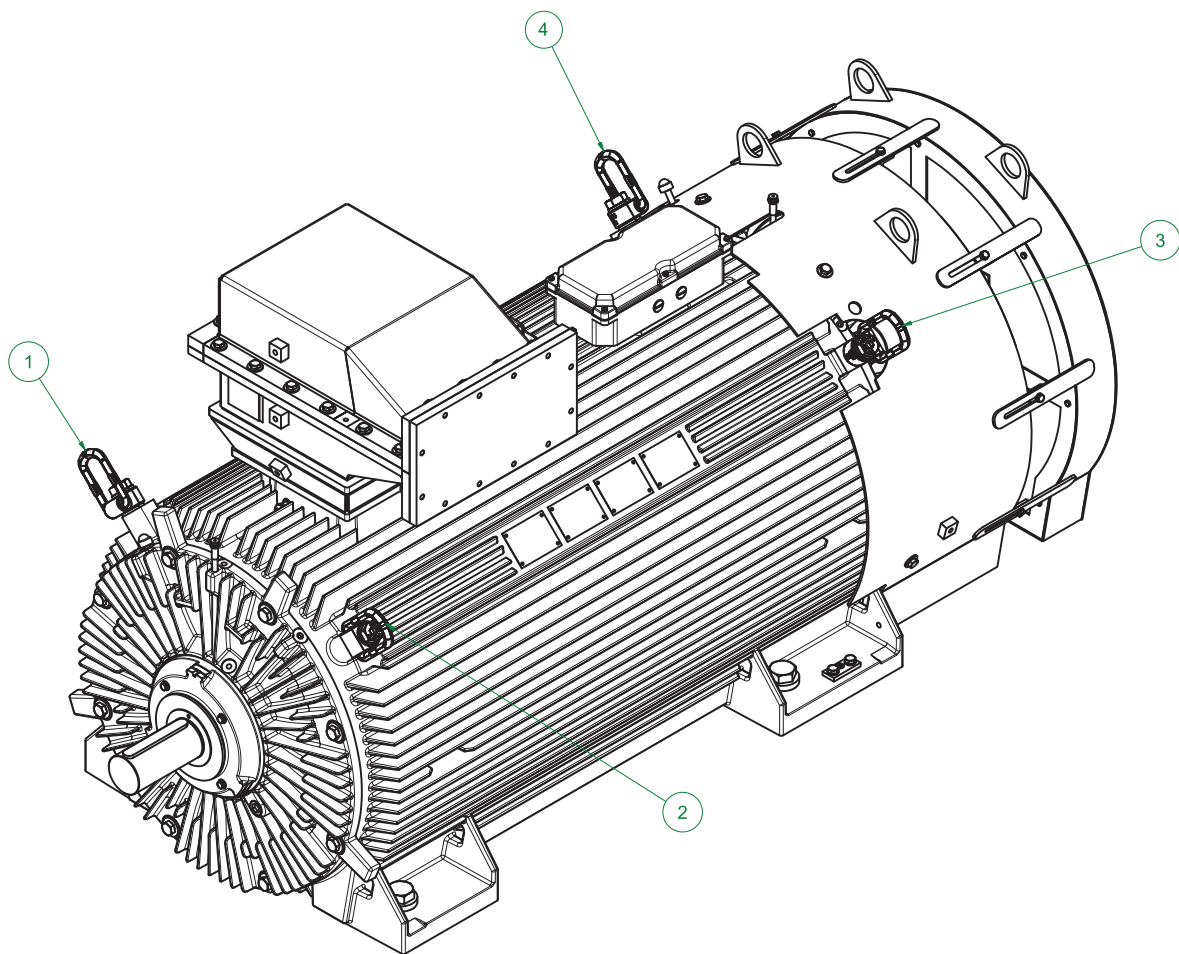
Rated current	Rated torque	Locked rotor current	Locked rotor torque	Break-down torque	Moment of inertia	Sound pressure level	Motor Weight m kg
		I_{LR}/I_{rated}	T_{LR}/T_{rated}	T_B/T_{rated}	Motor	L_p	
		p.u.	p.u.	p.u.	kgm ²	dB(A)	

31.0	3,407	7.1	1.06	3	15	79	3234
33.0	3,843	6.6	0.92	2.7	17	80	3389
36.5	4,323	6.1	0.83	2.4	18	80	3473
39.5	4,809	5.6	0.74	2.2	20	80	3650
52.0	6,053	5.6	0.98	2.8	27	80	4468
56.0	6,821	6.0	0.8	2.6	30	80	4753
63.0	7,686	5.6	0.89	2.8	32	80	4962
65.0	8,656	5.1	0.69	2.1	57	83	5880
73.0	9,617	5.1	0.69	2.1	63	83	6185
80.0	10,771	5.1	0.69	2.1	70	83	6514
95.0	11,985	7.0	1.1	3	109	83	8010
104.0	13,437	6.4	0.99	2.7	124	83	8535
120.0	15,341	6.9	1.08	3	137	83	9113

23.5	3,200	5.6	1.1	3.1	18	81	3420
25.5	3,584	5.5	1.04	2.9	20	81	3545
28.0	4,038	5.3	1	3.1	21	81	3652
31.0	4,551	5.2	0.98	2.7	22	81	3764
33.5	5,134	5.0	0.8	2.5	25	81	4422
39.0	6,427	4.5	0.69	2.1	30	81	4794
43.0	7,208	4.3	0.64	1.9	33	81	5066
47.0	8,076	5.4	0.66	2.6	58	81	5934
52.0	9,101	5.3	0.62	2.4	65	81	6276
57.0	10,255	5.1	0.6	2.3	72	81	6609
61.0	10,911	4.5	0.69	2	122	81	8568
69.0	12,194	4.4	0.68	2	135	81	9022
77.0	13,735	4.4	0.69	2	147	81	9368
86.0	15,403	4.7	0.72	2.1	159	81	9820

5.1 Lifting lugs

Each motor has 4 lifting lugs and it can be lifted using two diagonal lifting lugs. This allows choosing the proper pair of lifting lugs considering the mounting position of the main terminal boxes. For example for a motor that has main terminal box with cable entry facing to the right hand side seen from Drive-End (DE) side, the best lifting lug pairs would be 1 and 3 (See picture below), especially for 11kV motors as they are equipped with relatively large main terminal box.



The quantity and size of the lifting lugs per frame sizes are given in following table:

Motor frame size	315	355	400	450	500	560
lifting lugs	4xM20	4xM24	4xM24	4xM36	4xM36	4xM36

5.2 Bearings

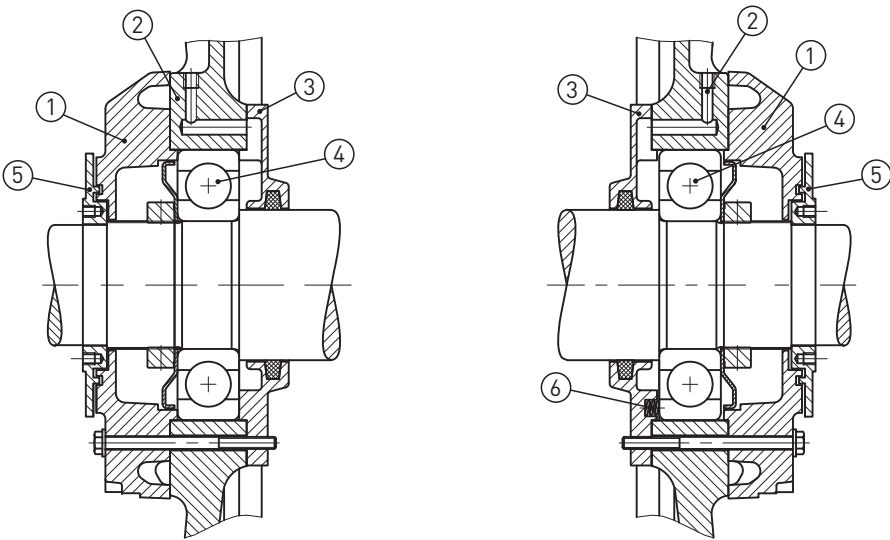
KA5 motor series bearing assembly design is based on the following basic conditions in accordance with L10 principle:

- > Minimum life time: 50 000 hours
- > No extra load on DE
- > Grease type: K3K to DIN 51825
- > Ambient: -20 °C to 40 °C
- > Running temperature: max. 100 °C
- > Reference temperature: 40 °C

FS	Mount	Poles	DE-Bearing type	NDE-Bearing type	Lubrication interval (hours)				Grease Qty (g)	
					2P	4P	6P	8P+	DE	NDE
315	H	2	6317 C3	6317 C3	2000				22	22
	H	4+	6322 C3	6322 C3		2500	4200	5200	40	40
	V	2	NU 317	6317 C3 7317 BG	2000				22	44
	V	4+	6322 C4	6322 C3		2500	4200	5200	40	40
355	H	2	6317 C3	6317 C3	2000				35	35
	H	4+	6322 C4	6322 C3		2500	4200	5200	60	60
	V	2	NU 317	6317 C3 7317 BG	2000				35	70
	V	4+	6322 C3	6322 C3		2200	3400	4100	60	60
400	H	2	6317 C3	6317 C3	2000				35	35
	H	4+	6322 C3	6322 C3		2200	3400	4100	80	80
	V	2	6317C4	6317 C3	2000				35	35
	V	4+	6322 C3	6322 C3		2200	3400	4100	80	80
450	H	2	6317 C3	6317 C3	2000				50	35
	H	4+	6324 C3	6326 C3		2000	3200	4000	80	80
	V	2	6317 C3	6317 C3 7317 BG	2000				35	70
	V	4+	6326 C3	6326 C4		2000	3200	400	80	80
500	H	2	NU 1022 C3 6022 C3	NU 1022	2000				50	35
	H	4+	6326 C3	6326 C3		1800	2900	3700	100	100
	V	2	NU1022	"7317 NU317"	2000				35	70
	V	4+	6326 C3	6326 C3 7326 BG		1800	2900	3700	100	200
560	H	2	NU 1032 C3 6032 C3	NU 1032	2000				85	50
	H	4+	6330 C3	6330 C3		1800	2900	3700	100	100
	V	2	NU1032	"7317 NU317"	2000				35	70
	V	4+	6330 C3	6330 C3 7330 BG		1800	2900	3700	100	200

5.3 Bearing assembly

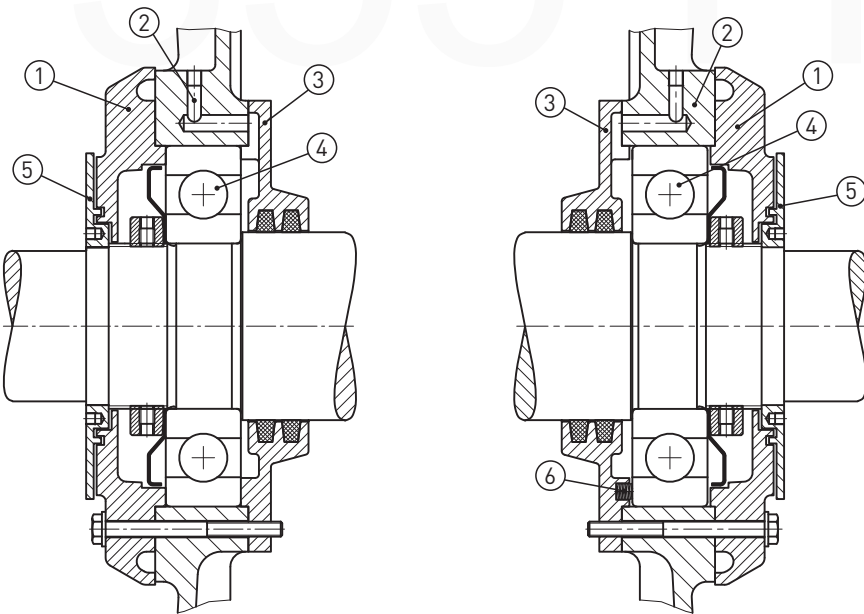
Standard bearing construction for horizontal mounting, frame size 315 and 355



D-end, axially locked

2 - pole motors

N-end, axially free



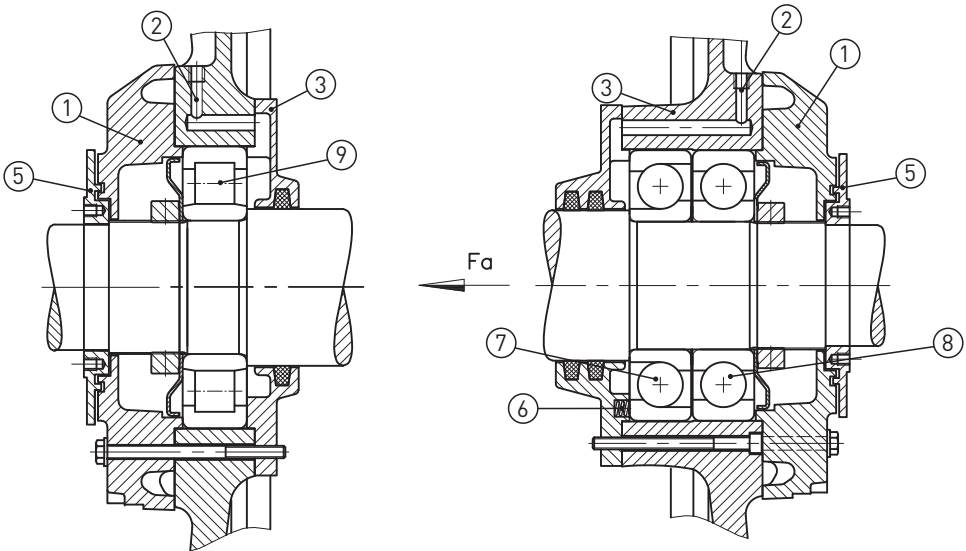
D-end, axially locked

4 + - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring

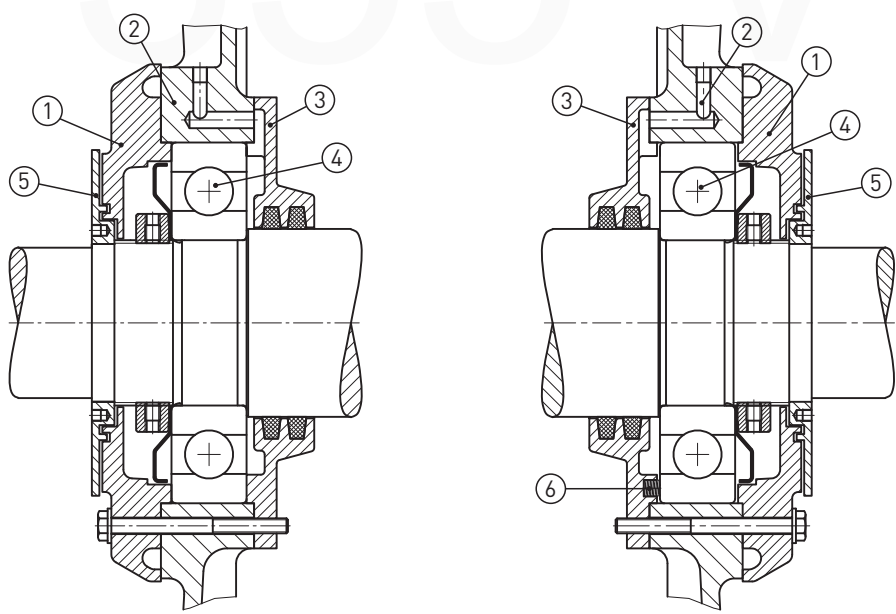
Standard bearing construction for verical mounting, frame size 315 and 355



D-end, axially locked

2 - pole motors

N-end, axially free



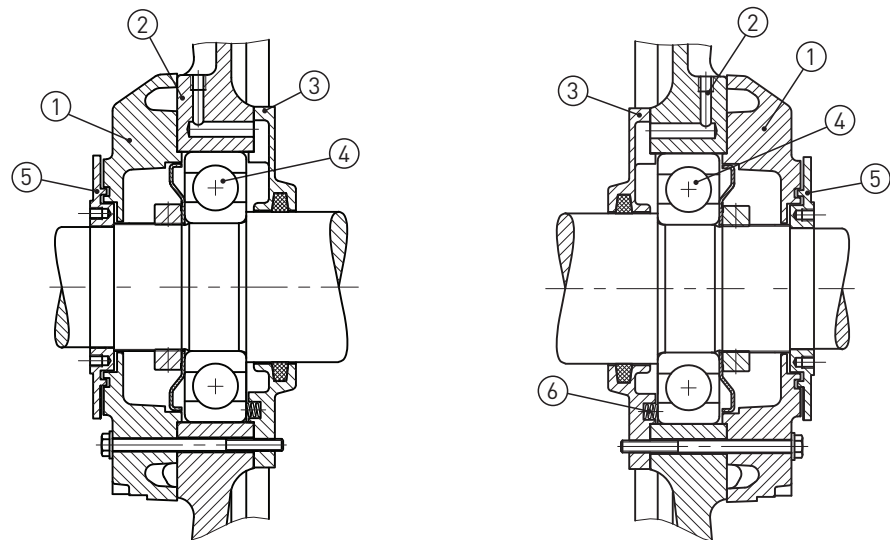
D-end, axially locked

4 + - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring
- 7. Ball bearing
- 8. Angular contact bearing
- 9. Roller bearing

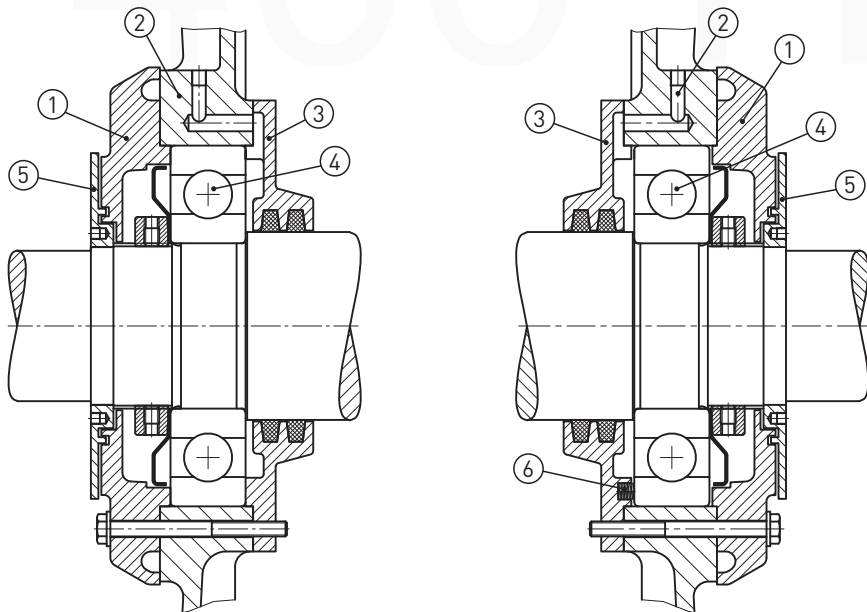
Standard bearing construction for horizontal mounting, frame size 400



D-end, axially locked

2 - pole motors

N-end, axially free



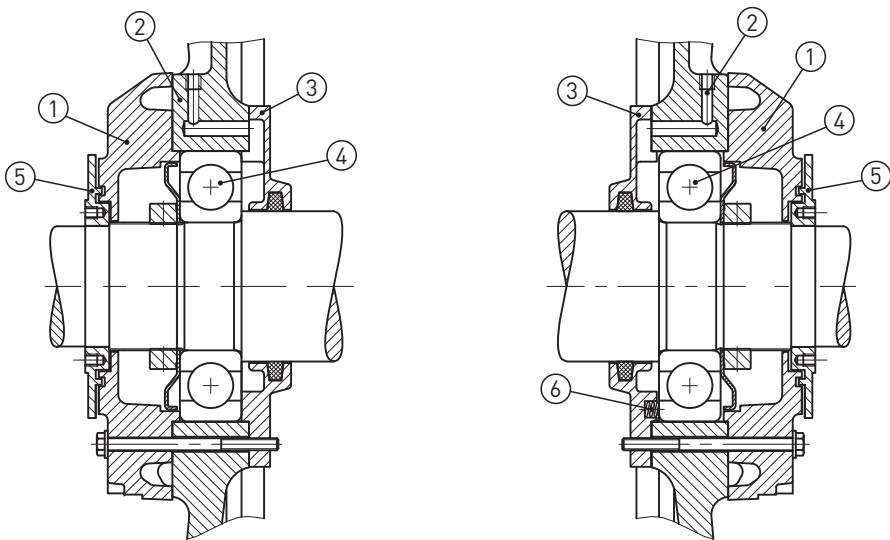
D-end, axially locked

4 + - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring

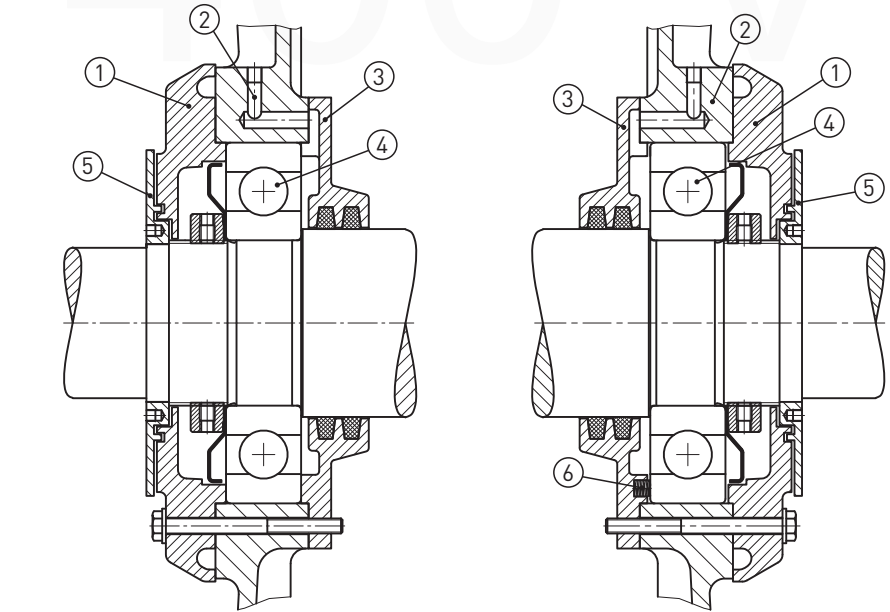
Standard bearing construction for vertical mounting, frame size 400



D-end, axially locked

2 - pole motors

N-end, axially free



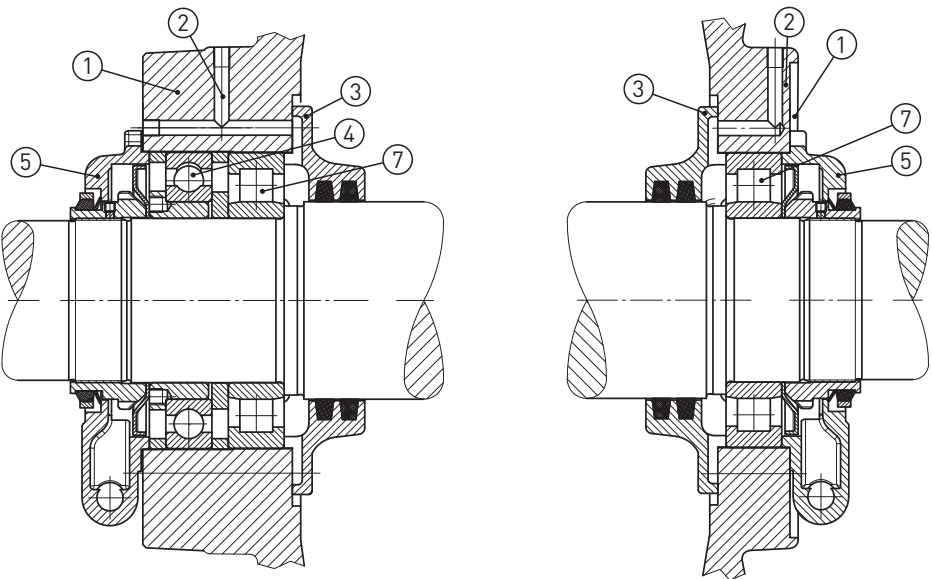
D-end, axially locked

4 + - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring

Standard bearing construction for horizontal mounting, frame size 450

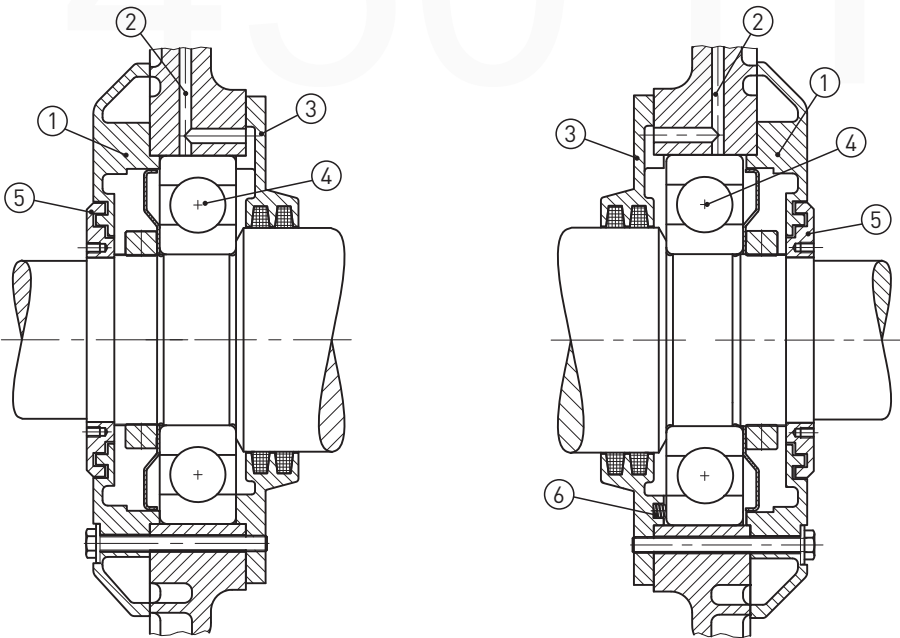


D-end, axially locked

2 - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring
- 7. Roller bearing

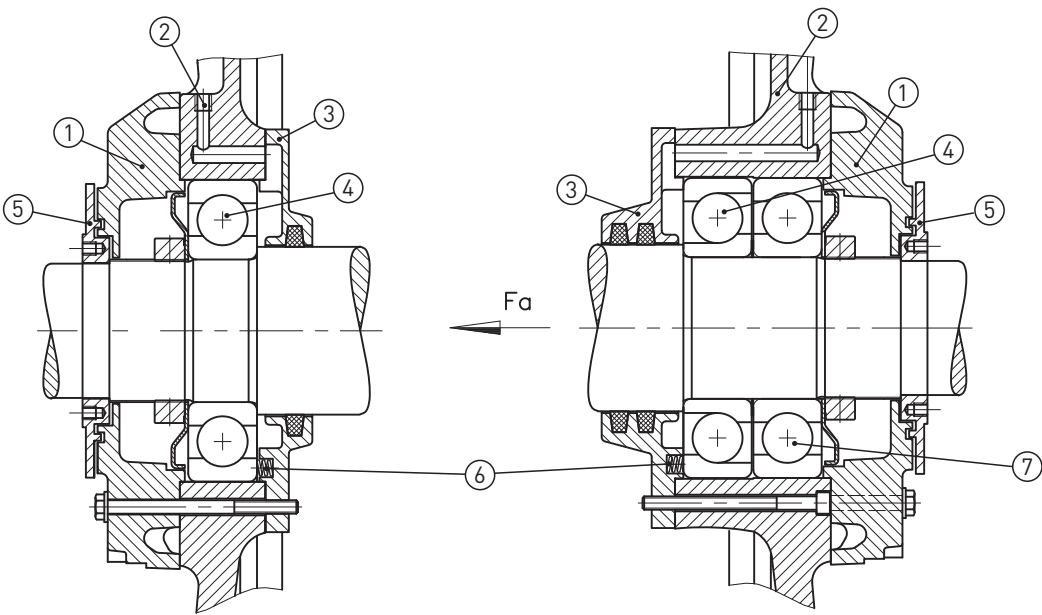


D-end, axially locked

4 + - pole motors

N-end, axially free

Standard bearing construction for vertical mounting, frame size 450

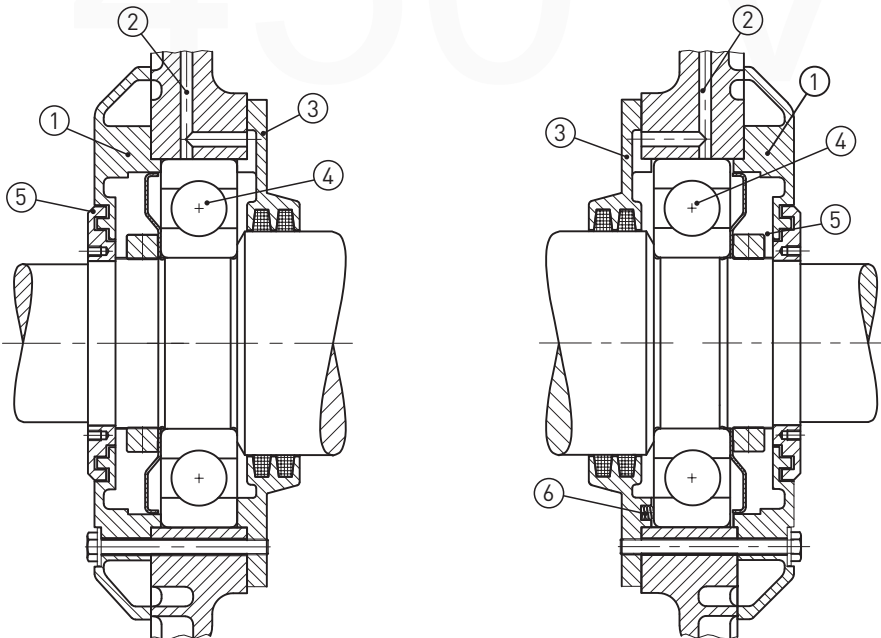


D-end, axially locked

2 - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring
- 7. Angular contact bearing

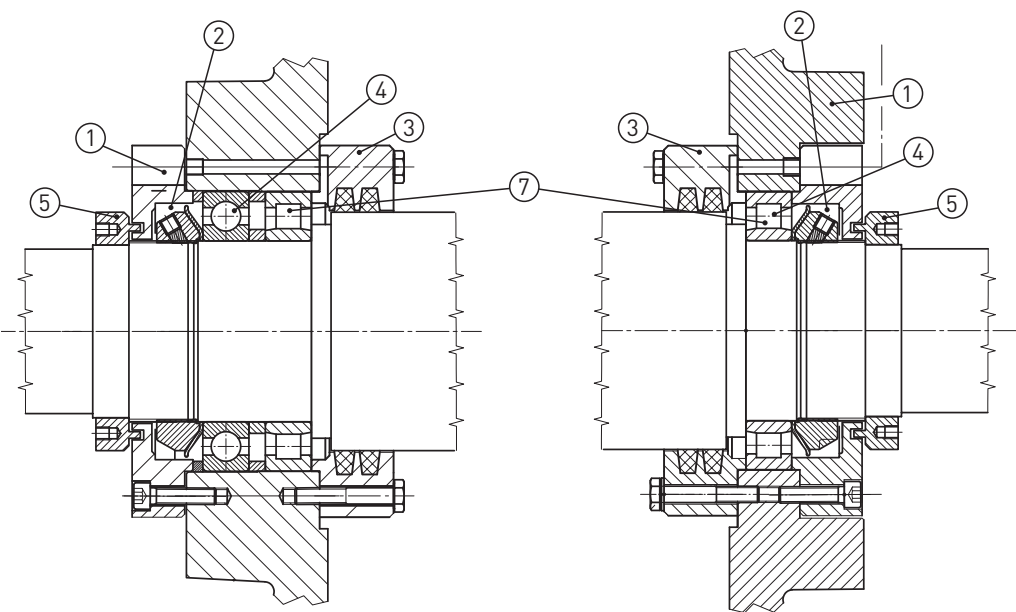


D-end, axially locked

4 + - pole motors

N-end, axially free

Standard bearing construction for horizontal mounting, frame size 500

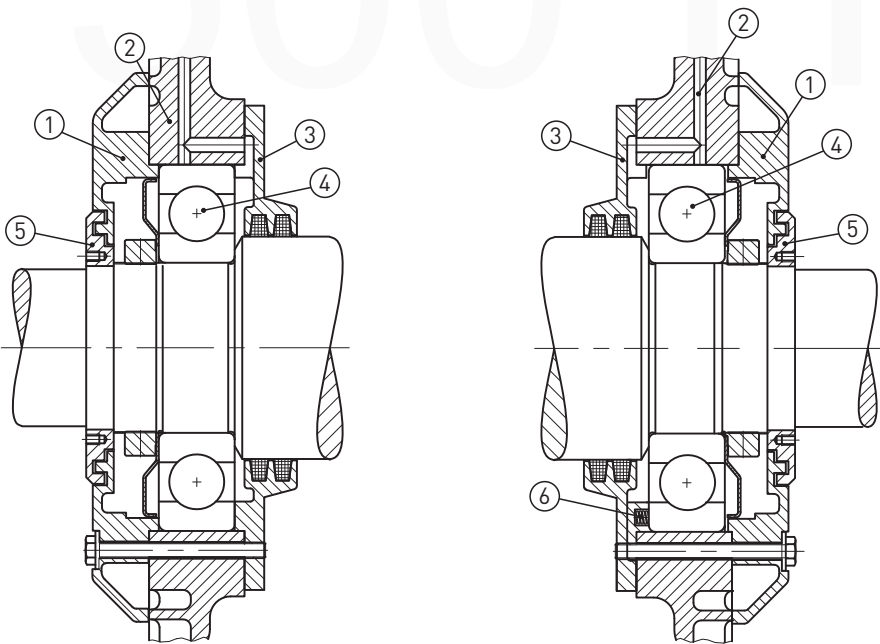


D-end, axially locked

2 - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring
- 7. Roller bearing

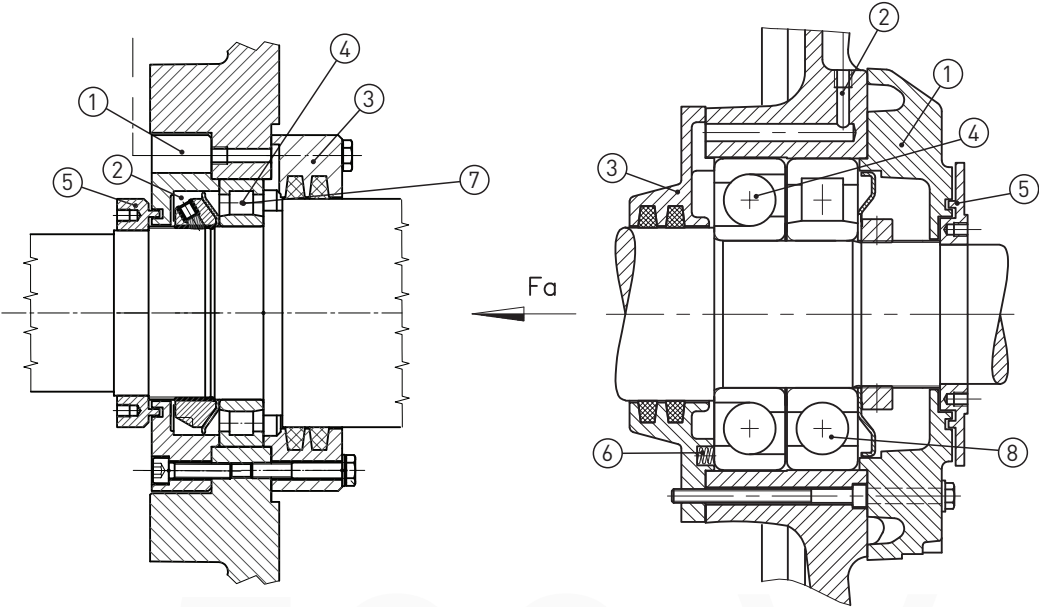


D-end, axially locked

4 + - pole motors

N-end, axially free

Standard bearing construction for vertical mounting, frame size 500

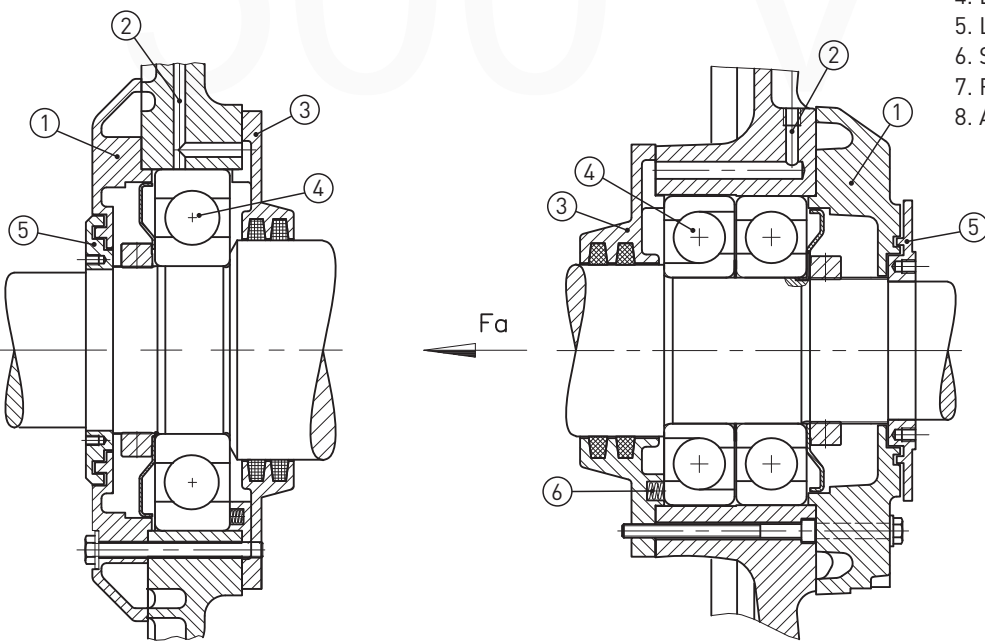


D-end, axially locked

2 - pole motors

N-end, axially free

- 1. Outer bearing cover
- 2. Grease valve
- 3. Inner bearing cover
- 4. Ball bearing
- 5. Labyrinth seal
- 6. Spring
- 7. Roller bearing
- 8. Angular contact bearing

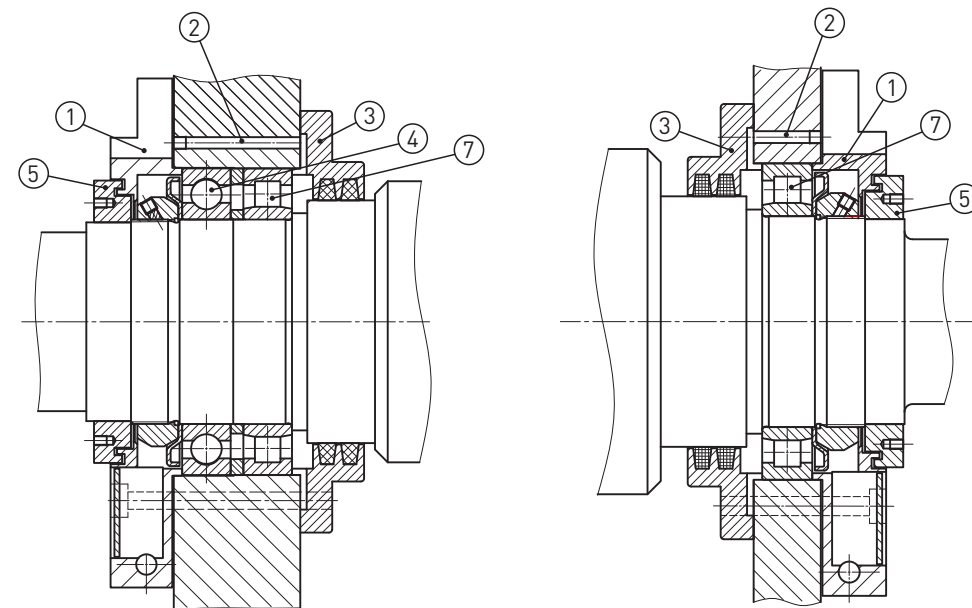


D-end, axially locked

4 + - pole motors

N-end, axially free

Standard bearing construction for horizontal mounting, frame size 560

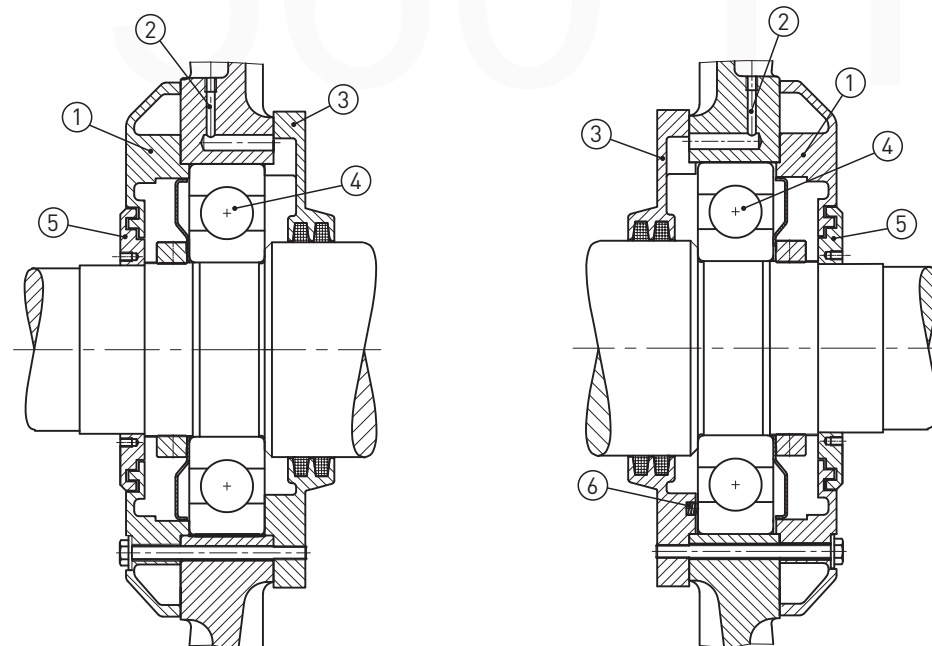


D-end, axially locked

2 - pole motors

N-end, axially free

1. Outer bearing cover
2. Grease valve
3. Inner bearing cover
4. Ball bearing
5. Labyrinth seal
6. Spring
7. Roller bearing

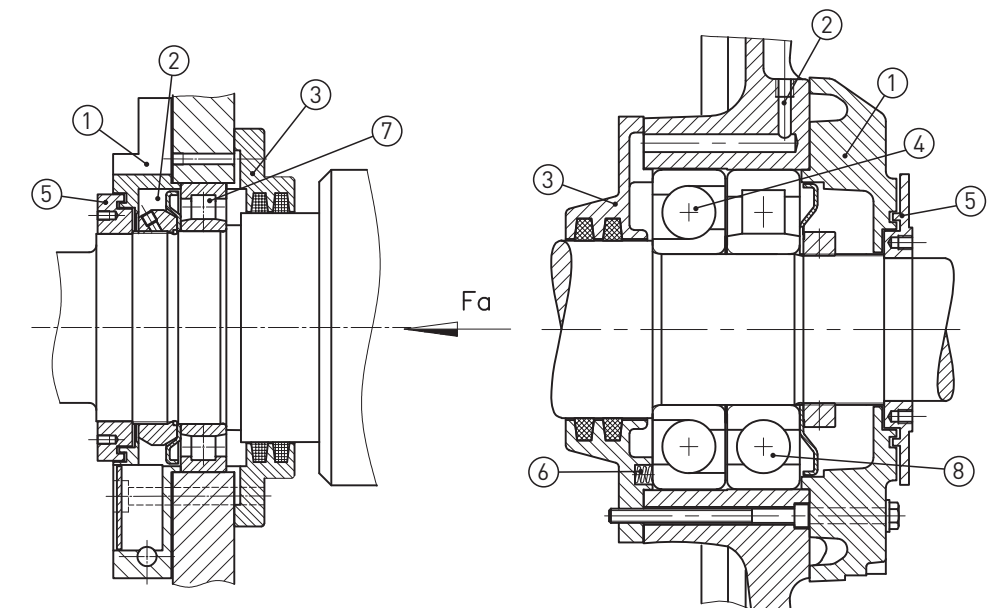


D-end, axially locked

4 + - pole motors

N-end, axially free

Standard bearing construction for vertical mounting, frame size 500

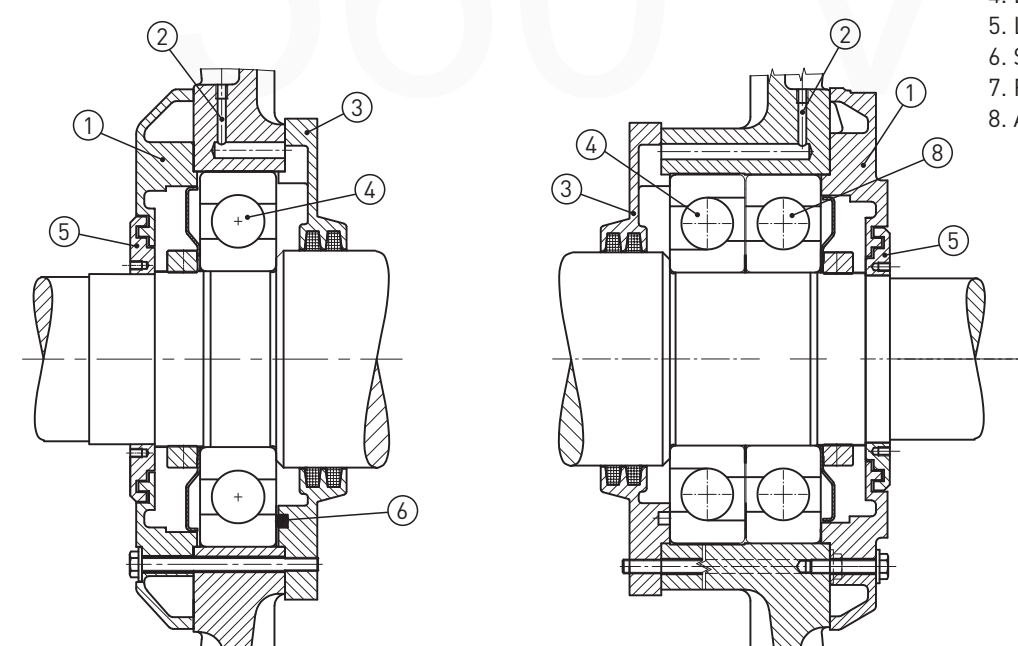


D-end, axially locked

2 - pole motors

N-end, axially free

1. Outer bearing cover
2. Grease valve
3. Inner bearing cover
4. Ball bearing
5. Labyrinth seal
6. Spring
7. Roller bearing
8. Angular contact bearing



D-end, axially locked

4 + - pole motors

N-end, axially free

5.4 Terminal boxes

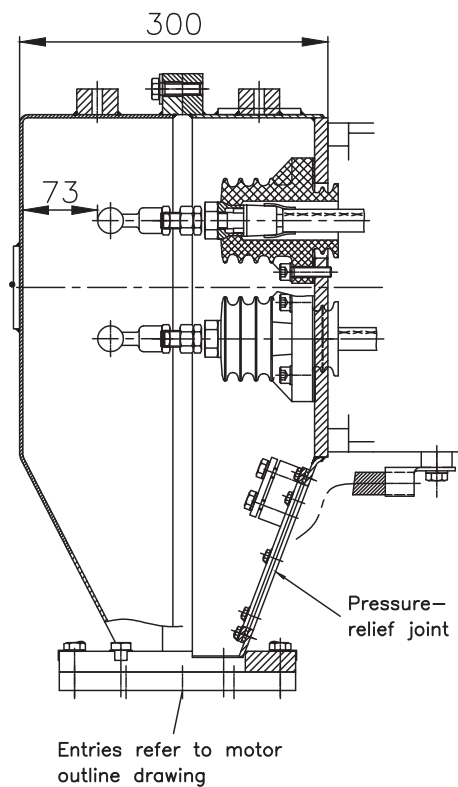
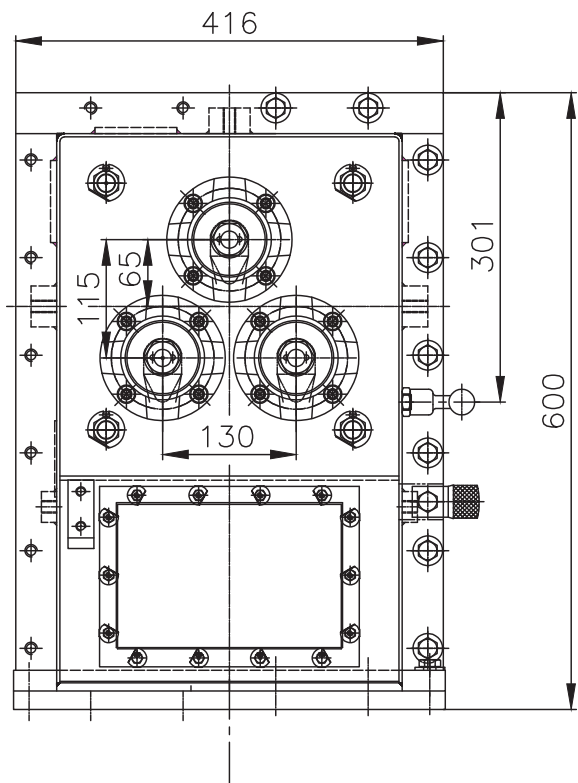
KA5 series of motors are delivered as standard with the below terminal box dimensions and characteristics.

Our standard delivery includes a blind plate for the main terminal box without any cable entry nor glands. Different cable entries (size and numbers) and glands are available on request.

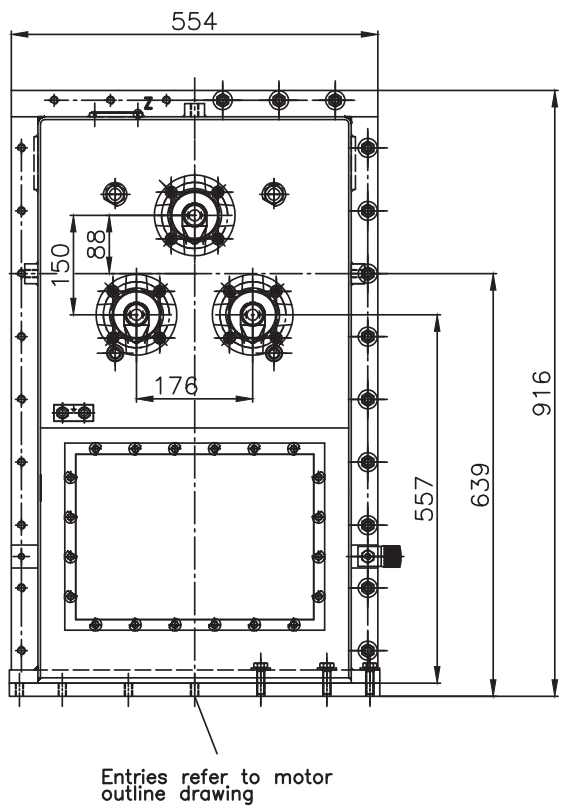
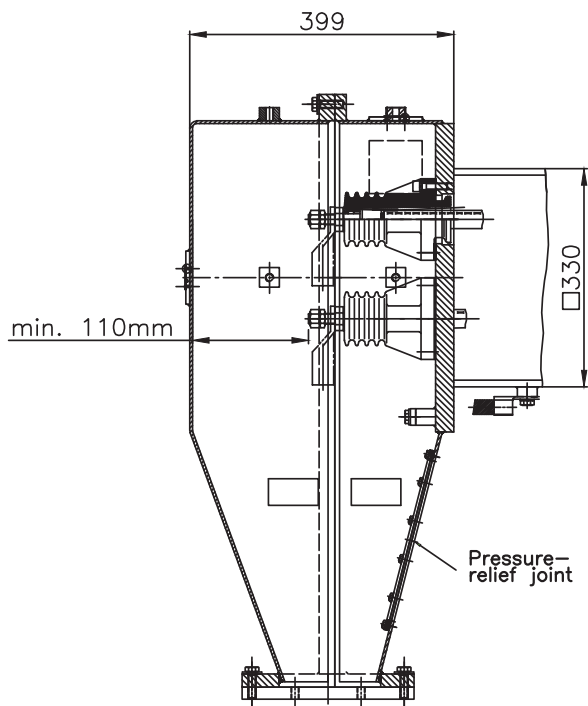
Pay attention to the main voltage as that defines the right main terminal boxes size.

Main terminal box

Main terminal box up to 6.6 kV						
Motor frame size	315	355	400	450	500	560
Max voltage	6,6 kV	6,6 kV	6,6 kV	6,6 kV	6,6 kV	6,6 kV
Degree of protection	IP 66	IP 66	IP 66	IP 66	IP 66	IP 66
Material	P275 NL2	P275 NL2	P275 NL2	P275 NL2	P275 NL2	P275 NL2
Terminal conductor size	M16	M16	M16	M16	M16	M16
Short circuit capacity (duration 200 ms)	35 kA	35 kA	35 kA	35 kA	35 kA	35 kA
Size and no of earthing bolts	-1x BM 10	1x BM 10	1x BM 10	1x BM 10	1x BM 10	1x BM 10



Main terminal box up to 11 kV						
Motor frame size	315	355	400	450	500	560
Max voltage	11 kV	11 kV	11 kV	11 kV	11 kV	11 kV
Degree of protection	IP 66	IP 66	IP 66	IP 66	IP 66	IP 66
Material	P275 NL2	P275 NL2	P275 NL2	P275 NL2	P275 NL2	P275 NL2
Terminal conductor size	M16	M16	M16	M16	M16	M16
Short circuit capacity	42 kA	42 kA	42 kA	42 kA	42 kA	42 kA
Size and no of earthing bolts	1x BM 10	1x BM 10	1x BM 10	1x BM 10	1x BM 10	1x BM 10



Auxiliary terminal boxes

When fitted with options for temperature detectors (PTC or PT100) these are connected in the main terminal box as standard. When needed these can be mounted into auxiliary terminal boxes, but this must be stated at the offer/order.

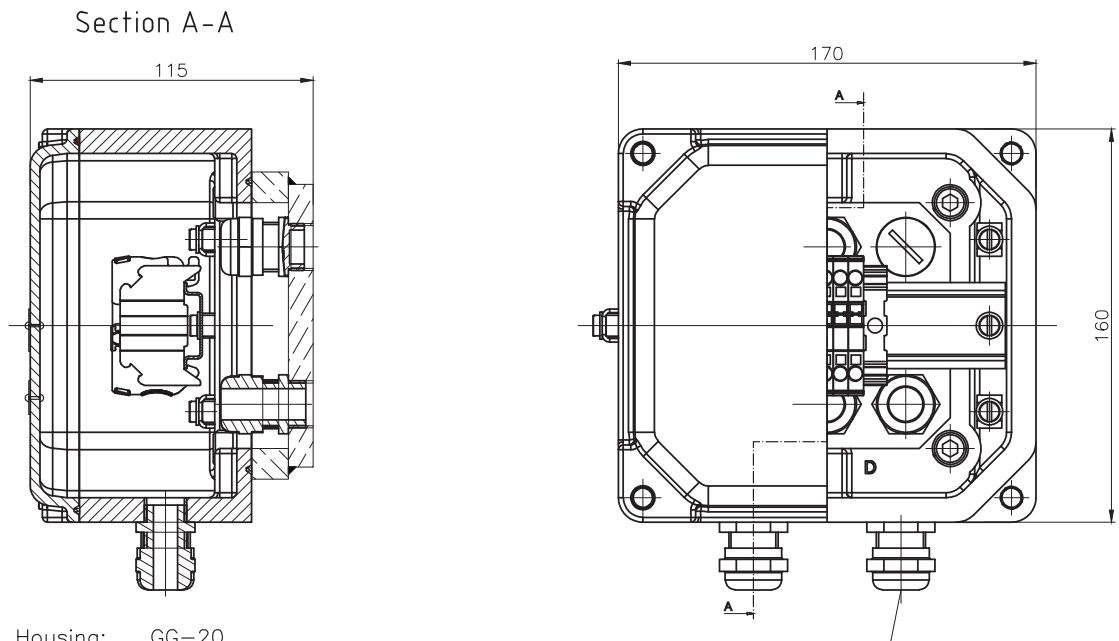
When fitted with heating elements or encoders these as connected into auxiliary terminal box as standard.

The type and size of the auxiliary terminal box depends on the number of connectors needed. The auxiliary terminal boxes are of cast iron as standard. Stainless steel can be provided as option.

Our standard delivery for temperature detectors are 2xM20 and for heaters 1xM20.

Auxiliary terminal box in cast iron (standard for KA5 series)						
Motor frame size	315	355	400	450	500	560
Max voltage	1 kV	1 kV	1 kV	1 kV	1 kV	1 kV
Degree of protection	IP 66	IP 66	IP 66	IP 66	IP 66	IP 66
Material (cast iron)	GG-20	GG-20	GG-20	GG-20	GG-20	GG-20
Terminal conductor size	PT 2,5 - PT 4	PT 2,5 - PT 4	PT 2,5 - PT 4	PT 2,5 - PT 4	PT 2,5 - PT 4	PT 2,5 - PT 4
Size and no of earthing bolts	PT 2,5 - PT 4 M5 extern	PT 2,5 - PT 4 M5 extern	PT 2,5 - PT 4 M5 extern	PT 2,5 - PT 4 M5 extern	PT 2,5 - PT 4 M5 extern	PT 2,5 - PT 4 M5 extern

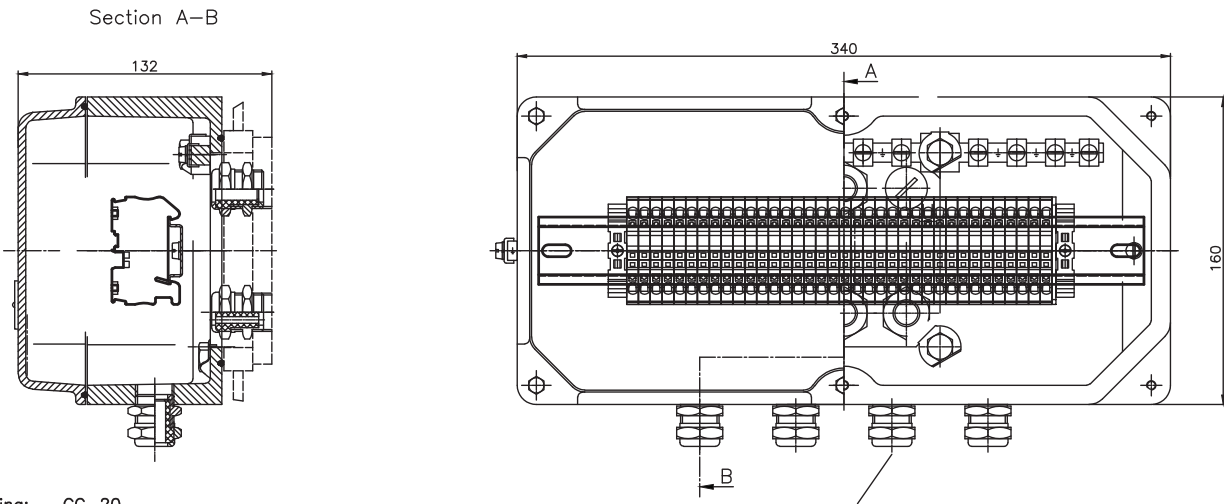
Max 5 connectors



Housing: GG-20
 $U_i \leq 500$ V
Degree of protection EN 60529: IP66
(after proper sealing of the cable entries)
Weight: approx. 7,9kg

Entries refer to motor outline drawing

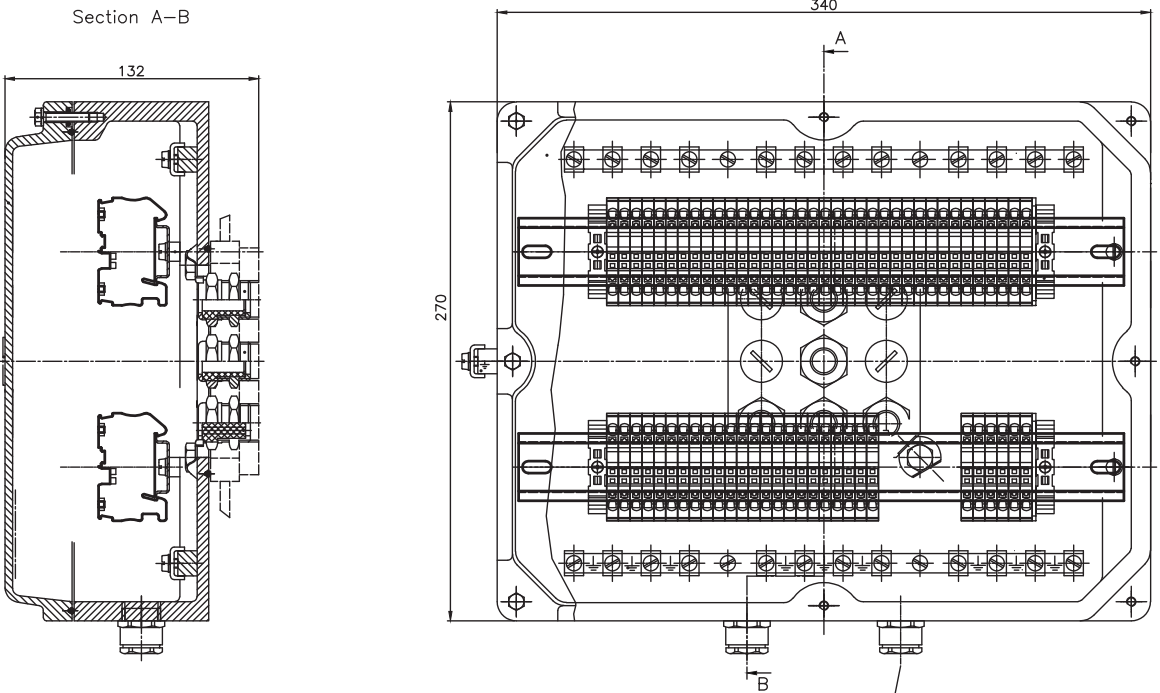
Max 30 connectors



Housing: GG-20
 $U_i \leq 500$ V
Degree of protection EN 60529: IP66
(after proper sealing of the cable entries)
Weight: approx. 10kg

Entries refer to motor outline drawing

Max 42 connectors



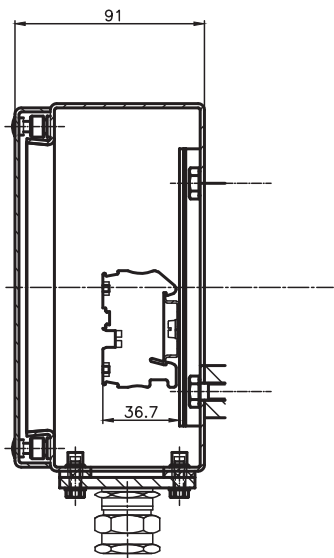
Housing: GG-20
 $U_i \leq 500$ V
Degree of protection EN 60529: IP66
(after proper sealing of the cable entries)
Weight: approx. 15kg

Entries refer to motor outline drawing

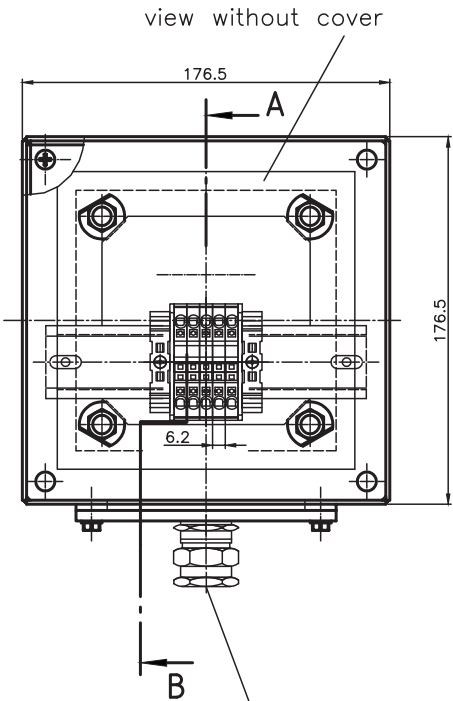
Auxiliary terminal box in stainless steel						
Motor frame size	315	355	400	450	500	560
Max voltage	1 kV	1 kV	1 kV	1 kV	1 kV	1 kV
Degree of protection	IP 66	IP 66	IP 66	IP 66	IP 66	IP 66
Material	316L	316L	316L	316L	316L	316L
Terminal conductor size	PT 2,5 - PT 16	PT 2,5 - PT 16	PT 2,5 - PT 16	PT 2,5 - PT 16	PT 2,5 - PT 16	PT 2,5 - PT 16
Size and no of earthing bolts	PT 2,5 - PT 16 M8 extern	PT 2,5 - PT 16 M8 extern	PT 2,5 - PT 16 M8 extern	PT 2,5 - PT 16 M8 extern	PT 2,5 - PT 16 M8 extern	PT 2,5 - PT 16 M8 extern

Max 5 connectors

Section A-B

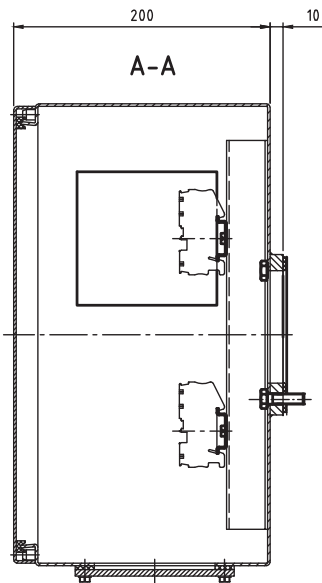


Housing: stainless steel I
 $U_i \leq 500$ V
Degree of protection EN 60529: IP66
(after proper sealing of the cable entries)
Type of protection: II 2G Ex eb IIC T5
PTB 00 ATEX 1052, IECEx PTB 07.0060
Weight: approx. 1,8kg

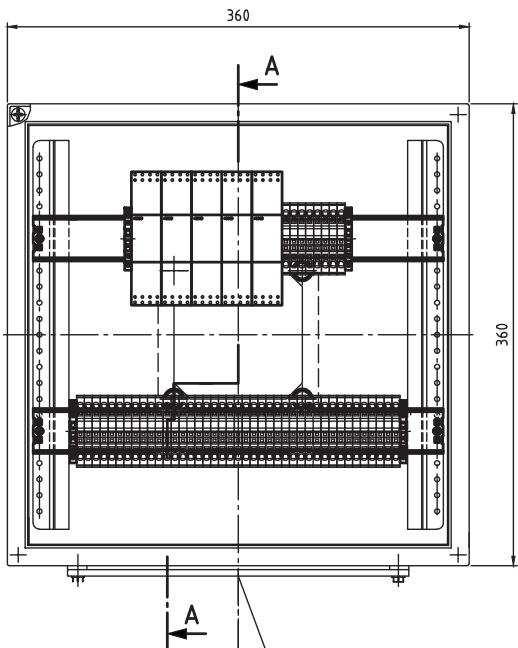


Entries refer to motor outline drawing

Max 30 connectors



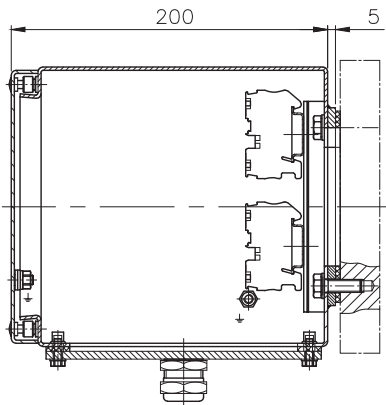
Housing: stainless steel
 $U_i \leq 500$ V
Degree of protection EN 60529: IP66-
(after proper sealing of the cable entries)
Type of protection: II 2G Ex eb II T5, PTB 00 ATEX 1052
Weight: approx. 6,1kg



Entries refer to motor outline drawing

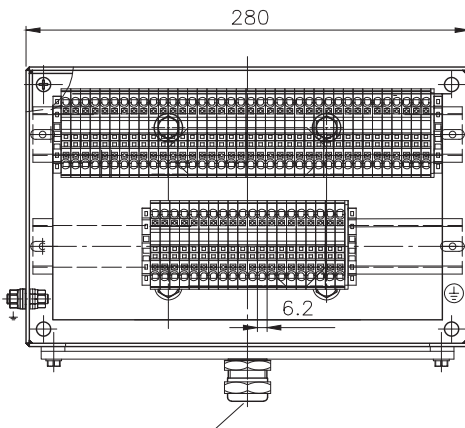
Max 42 connectors

Section A-B



Box frame: stainless steel
 $U_i \leq 500$ V
Degree of protection to EN 60529: IP66
(after proper sealing of the cable entries)
Type of protection: II 2G Ex e II T5, PTB 00 ATEX 1052, IECEx PTB 07.0060
Weight: approx. 3,1kg

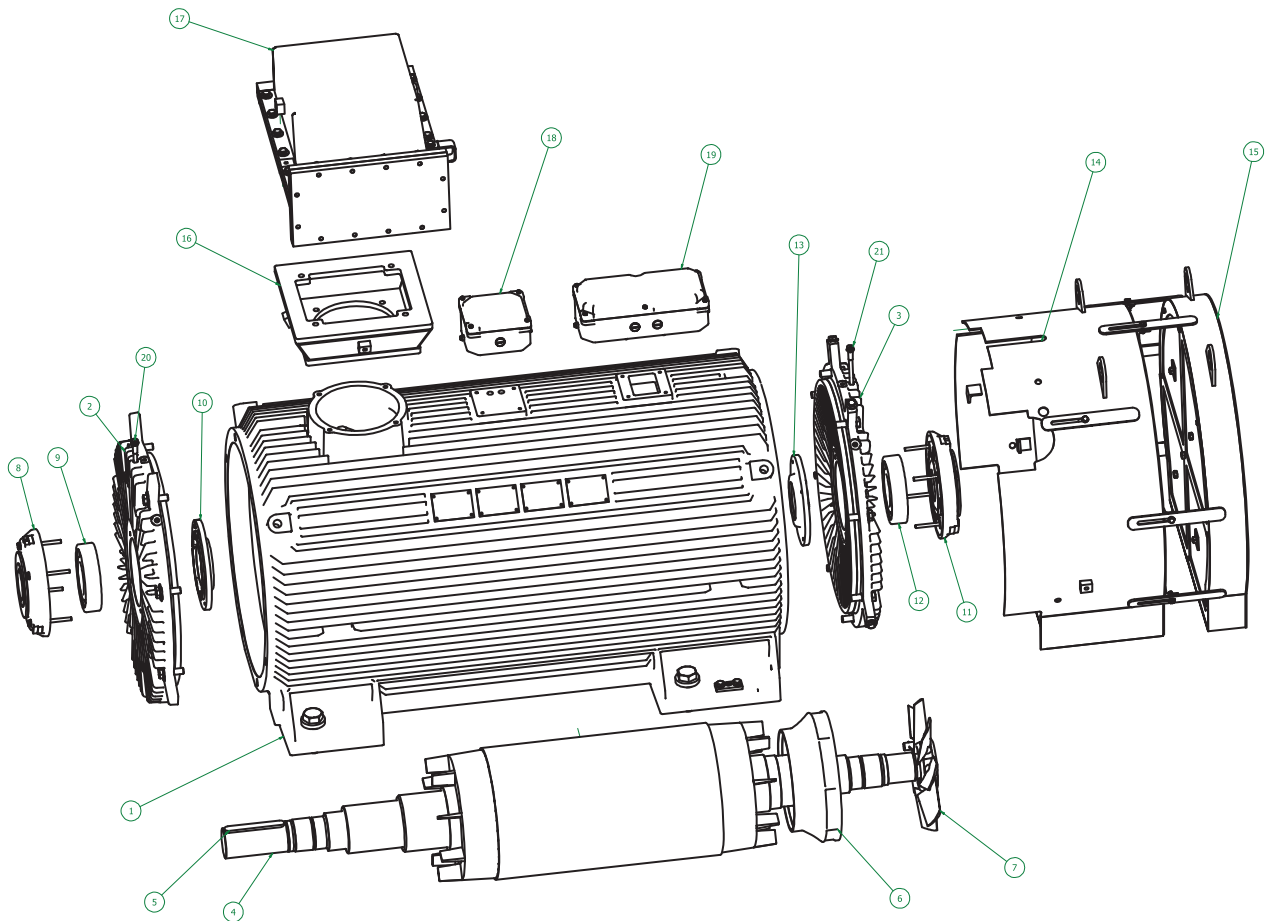
View without cover



Cable entry (refer to motor-outline drawing)

5.5 Motor construction

Exploded view of motor construction with key part list.



Item number	Description
1	Frame
2	End shield DE
3	End shield NDE
4	Shaft
5	Shaft key
6	Inner fan
7	Outer fan
8	Bearing outer cover DE
9	Bearing DE
10	Bearing inner cover DE
11	Bearing outer cover NDE

Item number	Description
12	Bearing NDE
13	Bearing inner cover NDE
14	Outer fan cover
15	Noise absorber
16	Main Terminal box adapter
17	Main Terminal box
18	Auxiliary terminal box
19	Auxiliary terminal box
20	Lubrication DE
21	Lubrication NDE

6 Derating factors for high altitude - high ambient
temperature

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

These derating factors are listed in the below table.

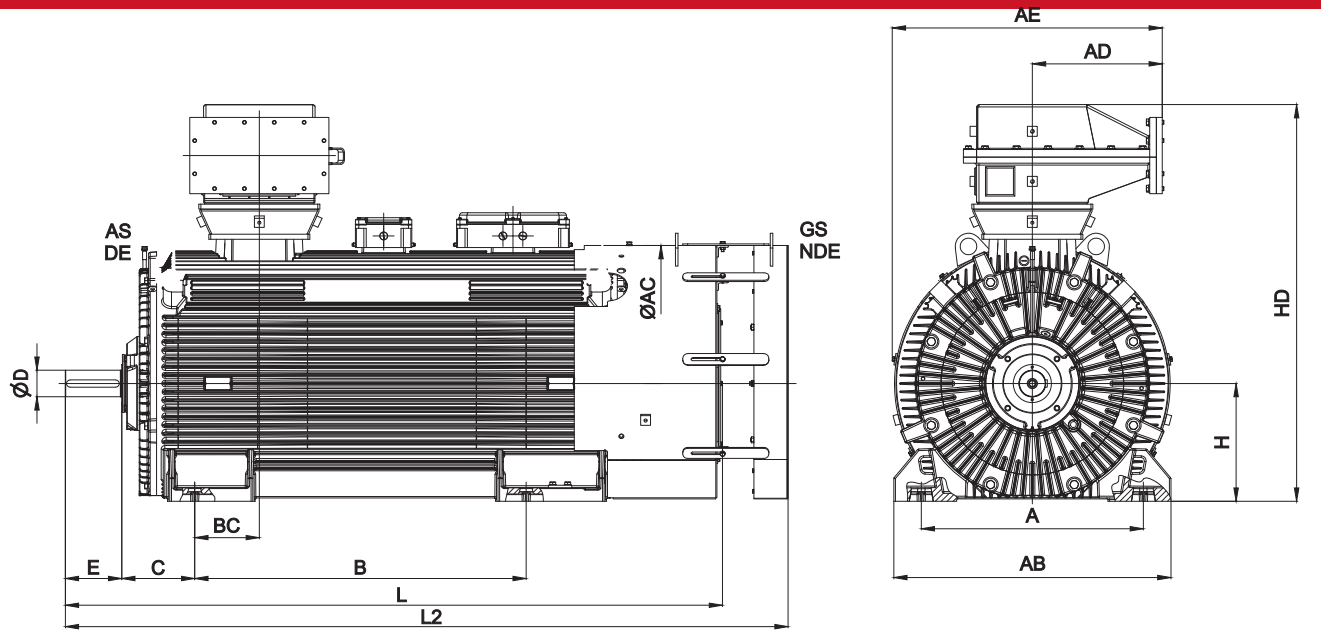
Site altitude above sea level	Site altitude above sea level coolant temperature					
	<30 °C	30-40 °C	45°C	50°C	55°C	60°C
1000m	1.07	1	0.96	0.92	0.87	0.82
1500m	1.04	0.97	0.93	0.89	0.84	0.82
2000m	1	0.94	0.9	0.86	0.84	0.79
2500m	0.96	0.9	0.86	0.83	0.78	0.74
3000m	0.92	0.86	0.82	0.79	0.75	0.7
3500m	0.88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

7. Dimension Drawings

Pay attention to the voltage as that has an impact on the main terminal box size and outer dimensions

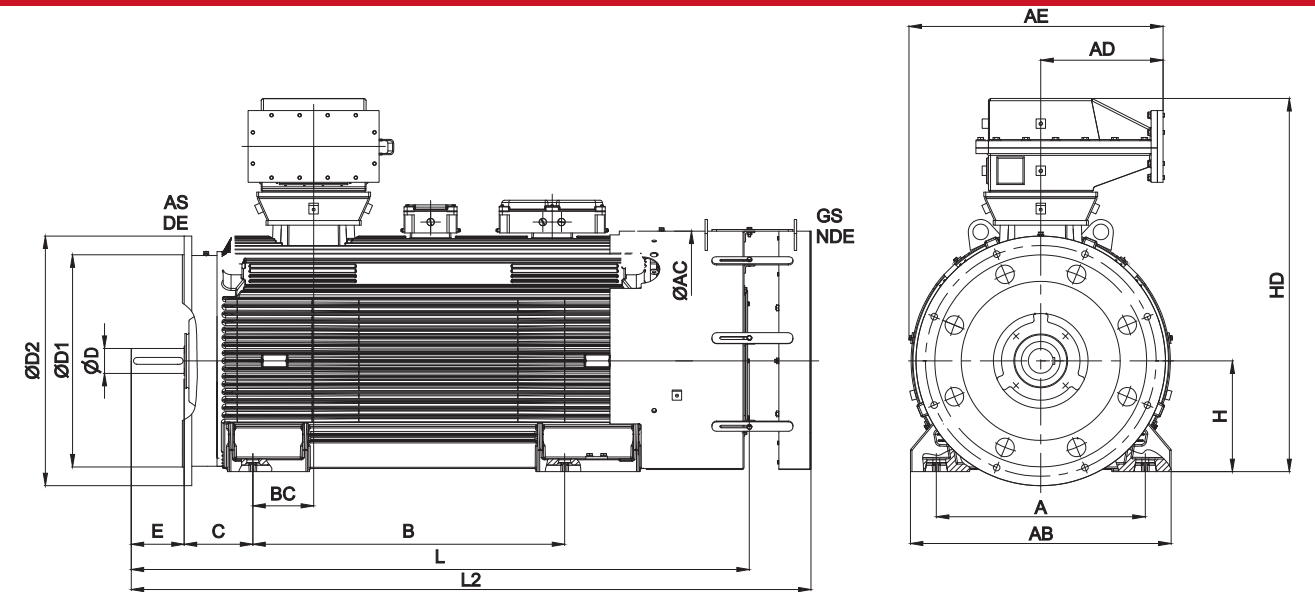
B3 - IM1001 Horizontal foot mounted motor



6.6 kV 50 Hz															
Frame size	NO. of poles	A	AB	AC	AD	AE	B	BC	C	D	E	H	HD	L	L2
355	2	670	836	832	392	815	1,000	195	220	80	170	355	1,196	1,982	2,185
400		750	900	912	392	854	1,120	180	239	80	170	400	1,286	2,106	2,320
450		850	1,030	1,006	392	895	1,250	200	280	90	170	450	1,386	2,277	2,490
500		950	1,130	1,116	392	950	1,320	220	249	100	170	500	1,486	2,406	2,640
560		1,060	1,270	1,256	392	1,020	1,400	205	315	120	210	560	1,616	2,697	2,935
355	4~12	670	836	832	392	815	1,000	195	219	100	210	355	1,196	2,027	2,280
400		750	900	912	392	854	1,120	180	238	100	210	400	1,286	2,151	2,425
450		850	1,030	1,006	392	895	1,250	200	264	110	210	450	1,386	2,307	2,605
500		950	1,130	1,116	392	950	1,320	220	250	120	210	500	1,486	2,453	2,780
560		1,060	1,270	1,256	392	1,020	1,400	205	265	140	250	560	1,616	2,708	3,060

11 kV 50 Hz															
Frame size	NO. of poles	A	AB	AC	AD	AE	B	BC	C	D	E	H	HD	L	L2
355	2	670	836	832	637	1,060	1,000	195	220	80	170	355	1,301	1,982	2,185
400		750	900	912	637	1,099	1,120	180	239	80	170	400	1,391	2,106	2,320
450		850	1,030	1,006	637	1,140	1,250	200	280	90	170	450	1,491	2,277	2,490
500		950	1,130	1,116	637	1,195	1,320	220	249	100	170	500	1,591	2,406	2,640
560		1,060	1,270	1,256	637	1,265	1,400	205	315	120	210	560	1,721	2,697	2,935
355	4~12	670	836	832	637	1,060	1,000	195	219	100	210	355	1,301	2,027	2,280
400		750	900	912	637	1,099	1,120	180	238	100	210	400	1,391	2,151	2,425
450		850	1,030	1,006	637	1,140	1,250	200	264	110	210	450	1,491	2,307	2,605
500		950	1,130	1,116	637	1,195	1,320	220	250	120	210	500	1,591	2,453	2,780
560		1,060	1,270	1,256	637	1,265	1,400	205	265	140	250	560	1,721	2,708	3,060

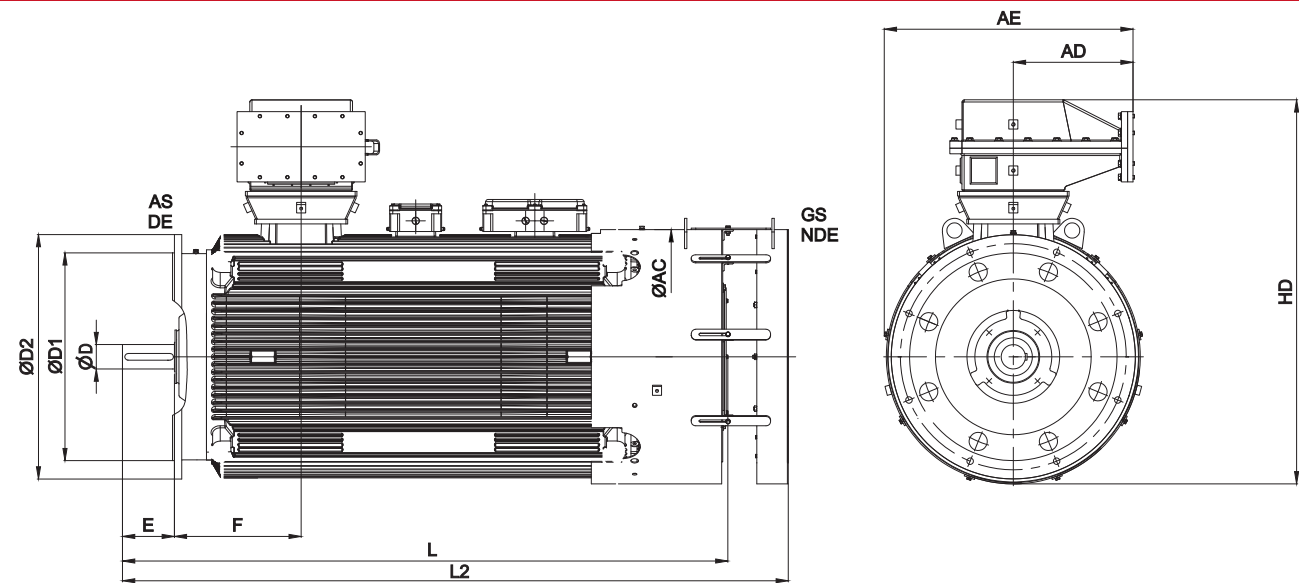
B35 - IM2001 Horizontal foot and flange mounted motor with feet



6.6 kV, 50 Hz																	
Frame size	NO. of poles	A	AB	AC	AD	AE	B	BC	C	D	D1	D2	E	H	HD	L	L2
355	2	670	836	832	392	815	1,000	195	220	80	680	800	170	355	1,196	1,982	2,185
400		750	900	912	392	854	1,120	180	239	80	780	900	170	400	1,286	2,106	2,320
450		850	1,030	1,006	392	895	1,250	200	280	90	880	1,000	170	450	1,386	2,277	2,490
500		950	1,130	1,116	392	950	1,320	220	249	100	1,000	1,150	170	500	1,486	2,406	2,640
560		1,060	1,270	1,256	392	1,020	1,400	205	315	120	1,120	1,270	210	560	1,616	2,697	2,935
355	4~12	670	836	832	392	815	1,000	195	219	100	680	800	210	355	1,196	2,027	2,280
400		750	900	912	392	854	1,120	180	238	100	780	900	210	400	1,286	2,151	2,425
450		850	1,030	1,006	392	895	1,250	200	264	110	880	1,000	210	450	1,386	2,307	2,605
500		950	1,130	1,116	392	950	1,320	220	250	120	1,000	1,150	210	500	1,486	2,453	2,780
560		1,060	1,270	1,256	392	1,020	1,400	205	265	140	1,120	1,270	250	560	1,616	2,708	3,060

11 kV, 50 Hz																	
Frame size	NO. of poles	A	AB	AC	AD	AE	B	BC	C	D	D1	D2	E	H	HD	L	L2
355	2	670	836	832	637	1,060	1,000	195	220	80	680	800	170	355	1,301	1,982	2,185
400		750	900	912	637	1,099	1,120	180	239	80	780	900	170	400	1,391	2,106	2,320
450		850	1,030	1,006	637	1,140	1,250	200	280	90	880	1,000	170	450	1,491	2,277	2,490
500		950	1,130	1,116	637	1,195	1,320	220	249	100	1,000	1,150	170	500	1,591	2,406	2,640
560		1,060	1,270	1,256	637	1,265	1,400	205	315	120	1,120	1,270	210	560	1,721	2,697	2,935
355	4~12	670	836	832	637	1,060	1,000	195	219	100	680	800	210	355	1,301	2,027	2,280
400		750	900	912	637	1,099	1,120	180	238	100	780	900	210	400	1,391	2,151	2,425
450		850	1,030	1,006	637	1,140	1,250	200	264	110	880	1,000	210	450	1,491	2,307	2,605
500		950	1,130	1,116	637	1,195	1,320	220	250	120	1,000	1,150	210	500	1,591	2,453	2,780
560		1,060	1,270	1,256	637	1,265	1,400	205	265	140	1,120	1,270	250	560	1,721	2,708	3,060

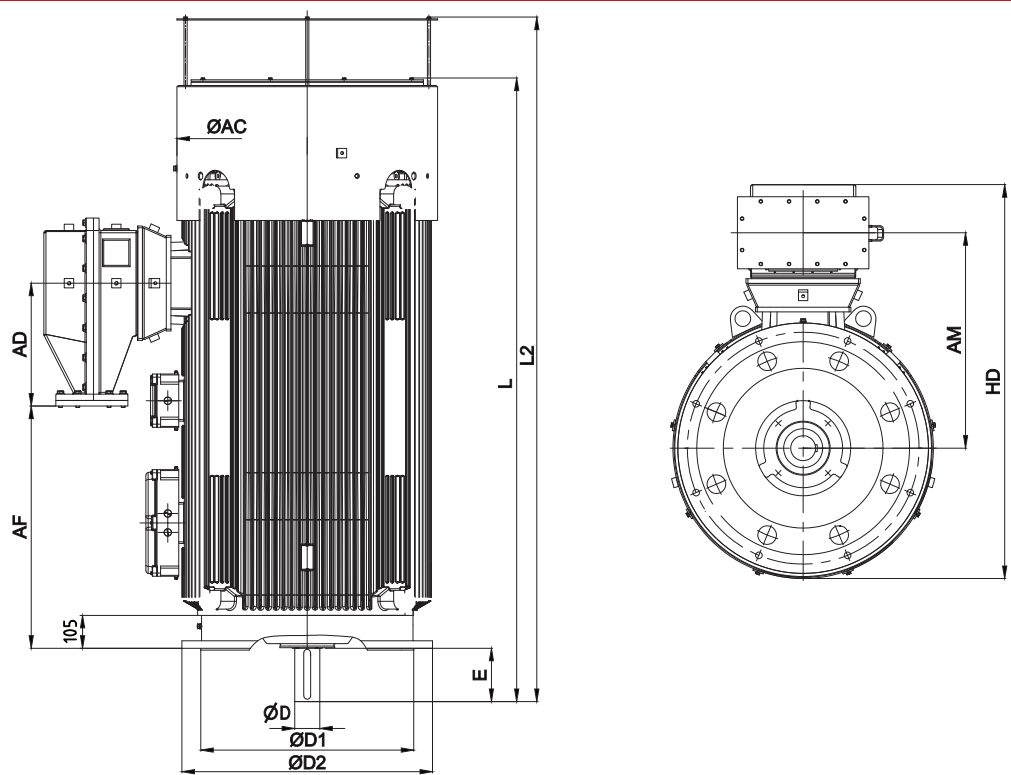
B5 - IM3001 Horizontal flange mounted motor



6.6 kV, 50 Hz												
Frame size	NO. of poles	AC	AD	AE	D	D1	D2	E	F	HD	L	L2
355	2	832	392	815	80	680	800	170	415	1,257	1,982	2,185
400		912	392	854	80	780	900	170	419	1,342	2,106	2,320
450		1,006	392	895	90	880	1,000	170	480	1,439	2,277	2,490
500		1,116	392	950	100	1,000	1,150	170	469	1,544	2,406	2,640
560		1,256	392	1,020	120	1,120	1,270	210	520	1,684	2,697	2,935
355	4~12	832	392	815	100	680	800	210	414	1,257	2,027	2,280
400		912	392	854	100	780	900	210	418	1,342	2,151	2,425
450		1,006	392	895	110	880	1,000	210	464	1,439	2,307	2,605
500		1,116	392	950	120	1,000	1,150	210	470	1,544	2,453	2,780
560		1,256	392	1,020	140	1,120	1,270	250	470	1,684	2,708	3,060

11 kV, 50 Hz												
Frame size	NO. of poles	AC	AD	AE	D	D1	D2	E	F	HD	L	L2
355	2	832	637	1,060	80	680	800	170	415	1,423	1,982	2,185
400		912	637	1,099	80	780	900	170	419	1,503	2,106	2,320
450		1,006	637	1,140	90	880	1,000	170	480	1,597	2,277	2,490
500		1,116	637	1,195	100	1,000	1,150	170	469	1,707	2,406	2,640
560		1,256	637	1,265	120	1,120	1,270	210	520	1,857	2,697	2,935
355	4~12	832	637	1,060	100	680	800	210	414	1,423	2,027	2,280
400		912	637	1,099	100	780	900	210	418	1,503	2,151	2,425
450		1,006	637	1,140	110	880	1,000	210	464	1,597	2,307	2,605
500		1,116	637	1,195	120	1,000	1,150	210	470	1,707	2,453	2,780
560		1,256	637	1,265	140	1,120	1,270	250	470	1,857	2,708	3,060

V1 - IM3011 Vertical flange mounted motor with protective cover



6.6 kV, 50 Hz												
Frame size	NO. of poles	AC	AD	AF	D	D1	D2	E	AM	HD	L	L2
355	2	832	392	793	80	680	800	170	688	1,257	1,982	2,185
400		912	392	903	80	780	900	170	733	1,342	2,106	2,320
450		1,006	392	1,003	90	880	1,000	170	783	1,439	2,277	2,490
500		1,116	392	1,113	100	1,000	1,150	170	833	1,544	2,406	2,640
560		1,256	392	1,298	120	1,120	1,270	210	903	1,684	2,697	2,935
355	4~12	832	392	793	100	680	800	210	688	1,257	2,027	2,280
400		912	392	903	100	780	900	210	733	1,342	2,151	2,425
450		1,006	392	1,003	110	880	1,000	210	783	1,439	2,307	2,605
500		1,116	392	1,113	120	1,000	1,150	210	833	1,544	2,453	2,780
560		1,256	392	1,298	140	1,120	1,270	250	903	1,684	2,708	3,060

11 kV, 50 Hz												
Frame size	NO. of poles	AC	AD	AF	D	D1	D2	E	AM	HD	L	L2
355	2	832	637	548	80	680	800	170	788	1,423	1,982	2,185
400		912	637	658	80	780	900	170	828	1,503	2,106	2,320
450		1,006	637	758	90	880	1,000	170	875	1,597	2,277	2,490
500		1,116	637	868	100	1,000	1,150	170	930	1,707	2,406	2,640
560		1,256	637	1,053	120	1,120	1,270	210	1,010	1,857	2,697	2,935
355	4~12	832	637	548	100	680	800	210	788	1,423	2,027	2,280
400		912	637	658	100	780	900	210	828	1,503	2,151	2,425
450		1,006	637	758	110	880	1,000	210	875	1,597	2,307	2,605
500		1,116	637	868	120	1,000	1,150	210	930	1,707	2,453	2,780
560		1,256	637	1,053	140	1,120	1,270	250	1,010	1,857	2,708	3,060

8. Options

Safe Area KA5 option list

Mounting
IM 3001 B5 Horizontal flange mounted with support
IM 2001 B35 Horizontal foot & flange mounted
IM 3011 V1 (2-pole always on request)
Protective cover for vertical mounting
Terminal box
Star point Terminal box with adapter 6kV
Star point Terminal box with adapter 10kV
Auxiliary terminal box 40 pins
Auxiliary terminal box with 80 connectors
Earthing
2x external earthing screw
External earthing screw in stainless steel
Degree of protection
IP56 with without metal fan for non heavy sea
IP65 with labyrinth seal (only for roller bearing)
Balancing
Rotor balancing with full key
Vibration grade B
Winding protection
Heaters connected in aux. Terminal box
3 PT100 in winding, type A 4 wire connected in aux. Terminal box
6 PT100 in winding, type A 4 wire connected in aux. Terminal box
1 PT100 in bearing, type A 4 wire connected in aux. Terminal box
1 double PT100 in bearing, type A 4 wire connected in aux. Terminal box
3 PTC in winding, connected in main Terminal box
6 PTC in winding, alarm and trip connected in main Terminal box

Bearing protection
M8 tapped holes prepared for SPM nipple
SPM nipples DE and NDE
SPM Nippel in t-box, not shielded, with measuring device, < 4m
Bearing thermometer w/o contact, without terminal box
Bearing thermometer with contact and separate t-box
2 transmitter for PT100 bearing 4-20 mA
3 transmitter for PT100 winding 4-20 mA
Bearings and lubrication
Roller bearing at DE is it same as reinforced bearing - only IMB3 standard bearing
Bearing insulation NDE palatal
Sleeve bearings
Automatic greasing device with batterie
Painting
Special RAL color (other than RAL 7031)
W paint system 120micros C3 L
K1 paint system 160micros C4 M
K3 paint system 240micros C5 L
K3 paint system 320micros CX
Testing
Routine test witnessed
Type test non witnessed
Type test witnessed
Encoders
Encoder - hollow shaft, not isolated for DOL
Encoder - hollow shaft, isolated

Other options are available on request.

SCHORCH

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