FELM

Electric Motors - www.felm.it

FLAMEPROOF MOTORS



IE3 – series H

II 2G Ex db eb IIB or IIC T3/T4/T5/T6 Gb
II 2G Ex db IIB or IIC T3/T4/T5/T6 Gb
II 2D Ex tb IIIC T100°C/T130°C/T160°C Db IP6x

Series: H5AT 71-112 - aluminium frame
Series: H7AT 71-315 - cast iron frame



04/2022

CESI

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CESI-ATEX

Schema di certificazione

ACCREDIA
PRD N. 018B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

NOTIFICATION

[1] **PRODUCT QUALITY ASSURANCE NOTIFICATION**

[2] **Equipment or Protective System or Component intended for use in potentially explosive atmospheres Directive 2014/34/EU**

[3] Notification number:

CESI 22 ATEX 005 Q

[4] Equipment or component type: Three-phase asynchronous motors series 5AT 71-80-90-100-112
EU type examination certificate CESI 22 ATEX 001 X
Three-phase asynchronous motors series 7AT 71-80-90-100-112-132-160-180-200-225-250-280-315
EU type examination certificate CESI 22 ATEX 002 X

Protection concepts: Flameproof enclosures "d"
Increased safety "e" for terminal boxes
Dust ignition protection by enclosure "t"

[5] Applicant: FELM s.r.l.
Via Varese 17
20001 Inveruno - MI

[6] Manufacturer: FELM s.r.l.
Via Varese 17
20001 Inveruno - MI

[7] CESI, notified body n. 0722 in accordance with Articles 17 and 21 of the Directive of the European Parliament and of the Council of 26 February 2014, notifies to the applicant that the actual manufacturer has a production quality system which complies to Annex VII of the Directive.

[8] This notification is based on the audit report n. EX-C2003868.

This notification can be withdrawn if the manufacturer no longer satisfies the requirement of Annex VII.

Results of periodical re-assessment of the quality system are a part of this notification.

[9] This notification is **valid until 3/07/2025** and can be withdrawn if the Manufacturer does not satisfy the product quality assurance re-assessment.

[10] According to Article 16 [3] of the Directive 2014/34/EU the CE marking shall be followed by the identification n. 0722 identifying the notified body involved in the production control stage.

This notification may only be reproduced in its entirety and without any change.

Date of issue 9th March 2022 - Translation issued on 9th March 2022

Prepared	Verified	Approved
Elena Bregoli	Sergio G. Giugno	Roberto Piccin

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ATEX B9003480-0EN





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GENERAL INFORMATION

This catalogue contains basic technical data for low voltage three phase squirrel cage asynchronous motors in explosion-proof design.
Explosion proof motors are distinguished by high material quality, robust design, high index of IP protection, bearings greased for life, weather and corrosion resistant fi nal coating and high dielectric strength insulation system intended to be fed by a static frequency converter.
Danger of explosion is always present in mining and many other sectors of industry.
A risk of explosion is always present when gases, vapours, mists or dusts mix with air in explosive ratio near ingniton source. Then there is possibility of releasing a minimum ignition energy.
Explosion proof equipment is designed in various types of protection in such a way that it can, if properly used, prevent an explosion.
Local conditions must be divided into danger zones defi ned by the end user while cooperating with appropriate establishment.
according to frequency and duration of appearance of an explosive gas atmosphere.

FELM® Explosion-proof motors offer various advantages:

- motors are designed according to Directive 2014/34/EU
- high efficiency and power factor
- low noise level
- modern design
- adaptability to different demands of electric motor drives (special mechanical and electrical designs)
- insulation system in F class with temperature rise in B class
- safety in operation
- recyclable parts and components
- simple maintenan

- Notify body: CESI Italy
- *ATEX Certificate according to directive 2014/34/EU:*
- Harmonized with last edition of standards:
  - EN 60079-0: 2018
  - EN 60079-1: 2014
  - EN 60079-7: 2015/A1:2018
  - EN 60079-31: 2014
- Fulfill other directive: EMC Directive 2014/30/EU, Low Voltage 2014/35/EU,
- Machine Directive 2006/42/EC, Hazardous substance 2011/65/EU and ErP 2009/125/EC

- Series: H5AT 71-112 - aluminium frame - CESI 22 ATEX 001 X
- Series: H7AT 71-315 - cast iron frame - CESI 22 ATEX 002 X

1) Series: H5AT 71-112 aluminium housing

Main product description:

Product: Three phase cage Induction motors with aluminum frame Design: Explosion proof motors
Marking for ambient temperature: -20°C to +40°C:

II 2G Ex db eb IIC T3/T4/T5/T6 Gb
II 2G Ex db IIC T3/T4/T5/T6 Gb
II 2D Ex tb IIIC T100°C/T130°C/T160°C Db IP6x

Type: H5AT
IEC sizes: 71-80-90-100-112
Rated frequency: 50/60 Hz
Number of poles: 2 to 8 Duty type: S1- S10
Insulation class: F-H (with temperature rise: B class) Ambient temperature: -20°C to +40°C
Rated power: at S1 duty to 4,5 kW
Degree of protection for motors and for terminals boxes: IP55
Corrosion protection painting system and color tone: RAL 7031 C4-M

Main additional design options

Other or multi-range voltages and frequencies
Motors efficiency class IE2 and IE3 acc. To EN 60034-30
Other number of poles (poles 10,12,16, ..) and multi-speed motors
Design for work through frequency converter
Other mounting arrangements
Thermal protection (PTC - thermistors or thermo-switches or RTDs)
Double shaft extension
Special flanges and shaft ends
Terminal box on right or left side
Other color tones and/or surface paints
Non ventilated (cooling method IC 410)
Windings for tropical environments
Space heaters fitted to the windings
Marine use design (ABT design)
Index of protection: IP55, IP56, IP65, IP66
Drain holes

Series: H5AT 71-112 aluminium housing

Roller bearings
Preparation for SPM vibration monitoring on DE and NDE (4mm non-threaded hole, SPM device sealed)
For duty type S2-S10 according to IEC standard
Other temperature classes T3 and T5, T6
Other painting systems (C5M-M, C5M-H) and color tones
For other environment temperatures (-20°C to +50°C and -20°C to +60°C)
Explosive class mark II B and temperature class T3 - environment temperatures (-20°C to +80°C)
Marking for ambient temperature: -20°C to +80°C:

II 2G Ex db eb IIB T3 Gb
II 2G Ex db IIB T3 Gb
II 2D Ex tb IIIC T160ºC Db IP6x

Main mountings
with ATEX Ex db (e) protected brake
with ATEX Ex db (e) encoder (Scancon)

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2) Series: H7AT 71-315 cast iron

Main product description:
Product: Three phase cage induction motors with cast iron frame Design:
Explosion proof motors, flameproof enclosure
Marking for ambient temperature: -20°C to +40°C:

II **2G Ex db eb IIC T3/T4/T5/T6 Gb**
II 2G Ex db IIC T3/T4/T5/T6 Gb
II 2D Ex tb IIIC T100°C/T130°C/T160°C Db IP6x
I M2 Ex db eb I Mb I M2 Ex db I Mb

Type: H7AT
IEC sizes: 90-100-112-132-160-180-200-225-250-280-315
Rated frequency: 50/60 Hz
Number of poles: 2 to 8
Duty type: S1- S10
Insulation class: F-H (with temperature rise: B class)
Ambient temperature: -20°C to +40°C
Rated power: at S1 duty to 225 kW
Degree of protection for motors and for terminals boxes: IP55
Corrosion protection painting system and color tone: RAL 7031 C4-M

Series: H7AT 71-315 cast iron

Main additional design options

Other or multi-range voltages and frequencies
Motors efficiency class IE2 and IE3 acc. To EN 60034-30
Other number of poles (poles 10,12,16, ...) and multi-speed motors
Design for work with frequency converter
Other mounting arrangements
Thermal protection (PTC - thermistors or thermos - switches)
Double shaft extension
Special flanges and shaft ends
Terminal box on right or left side
Other color tones and/or surface paints
Non ventilated (cooling method IC 410)
Windings for tropical environments
Space heaters fitted to the windings
Marine use design (ABT design)
Index of protection: IP55, IP56, IP65, IP66, IP67
Drain holes
Roller bearings - not for motors IEC sizes: 71-80-90-100-112
Preparation for SPM vibration monitoring on DE and NDE for 71-112 (4mm non-threaded hole, SPM device sealed)
Preparation for M8 SPM vibration monitoring on DE and NDE for 132-315 (8mm threaded hole, SPM device screwed in)
For duty type S2-S10 according to IEC standard
Other temperature classes T3, T5 and T6
Other painting systems (C5M-M, C5M-H) and color tones

For other environment temperatures (-20°C to +50°C and -20°C to +60°C)
Explosive class mark IIB and temperature class T3 - environment temperatures (-20°C to +80°C)
Marking for ambient temperature: -20°C to +80°C:
II 2G Ex db eb IIB T3 Gb II 2G Ex db IIB T3 Gb
II 2D Ex tb IIIC T160°C Db IP6x

Main mountings
with ATEX Ex db (eb) protected brake
with ATEX Ex db (eb) protected forced ventilation (cooling method IC416) - not for motors IEC sizes: 71-80-90-100- 112
with ATEX Ex db (eb) encoder (Scancon)

Ex protection concept

Each explosion-proof protected electrical device is marked according to standard IEC EN 60079-0 with rating name plate with data for explosion-proof protection, Examples for identification of EX protection on EX device.

	Group	*Device category*	Zone	Type of protection	Temp. class	Protection
Gas and Vapour **(G)**	I	M2	/	Ex db eb I Ex db I	-	IP 55
				Ex db eb IIC Gb Ex db IIC Gb	T3, T4, T5, T6*	IP55, IP65, IP56, IP66
	II	2G	1	Ex db eb IIC Gb Ex db IIC Gb	T3, T4, T5, T6*	IP55, IP65, IP56, IP66
		3G	2	Ex nA IIC Gc	T3, T4	
Dust **(D)**	II	2D	21	Ex tb IIIC Db *conductive dust*	T130°C T160°C Max housing	IP66
		3D	22	Ex tc IIIC Dc non conductive dust		

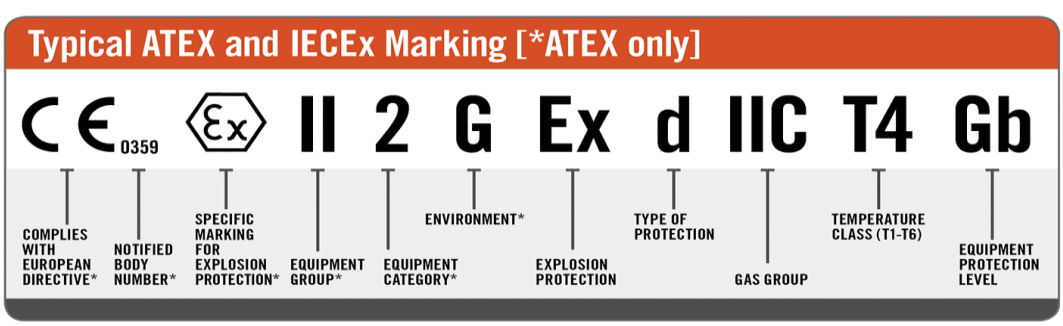
T6* not for all power

Overview of Ex FELM electric motors

An overview of all out products for areas of application categories, types of protection and adequate indexes of motor mechanical protection is given in the table below.

ATEX Mark				Marking according to standard			EPL (IEC)	IP
	II	2	G	Ex db eb	IIC	T4	Gd	
Ex symbol	Group	Category	Dust Flammable Gas	Protection	Gas Group	Temperature Surface Temp. Max	Dust Flammable Gas	
	II	2	D	Ex tb	IIC	T 130°C	Db	IP66

Example



Explosive atmosphere

Explosion is a sudden chemical reaction of flammable substance with air, including release of large amounts of energy. Flammable substances can be: gases, flammable fluids, vapor or dust.

Extensive protection from explosion implies:

prevention from a potentially explosive atmosphere occurrence, prevention from ignition of potentially explosive atmosphere and retaining or limiting area of explosion effects.

Explosion-proof equipment as a way of explosion prevention are to be applied in the following areas:

- Group I – mining
- Group II – other than mines.

Areas are divided into danger zones acc. to IEC/EN 60079-10-1 for gas atmospheres and IEC/EN 60079-10-2 for dust atmospheres:

- Gases, Vapors: zones 0, 1 and 2
- Dusts: zones 20, 21 and 22.

The principles allow a design in various safety categories in accordance with the Directive 2014/34/EU or the Equipment Protection Level (EPL) according to EN 60079-0:

Category 1 - very high level of protection and thus a very high degree of safety
Category 2 - high level of protection and therefore a high degree of safety
Category 3 - normal level of protection and therefore a normal degree of safety

EPL a – very high level of protection
EPL b – high level of protection
EPL c – with normal level of protection

<table>
<tr><th>Group</th><th>Categories ATEX</th><th>IEC</th><th>Zone</th><th>Explosive atmosphere</th></tr>
<tr><td rowspan="2">Mining I</td><td>M1</td><td>Ma</td><td rowspan="2">/</td><td>>1,5% CH4</td></tr>
<tr><td>M2</td><td>Mb</td><td>< 1,5% CH4</td></tr>
<tr><td rowspan="3">Other than mines - II</td><td>1G, 1D</td><td>Ga, Da</td><td>0,20</td><td>Continuously, long periods or frequently</td></tr>
<tr><td>2G, 2D</td><td>Gb, Db</td><td>1,21</td><td>Likely to occur, occasionally</td></tr>
<tr><td>3G, 3D</td><td>Gc, Dc</td><td>2,22</td><td>Not likely to occur, short period only</td></tr>
<tr><td rowspan="3">EPL –Equipment Protection Level</td><td colspan="2" rowspan="3">G gas
D dust</td><td colspan="2">a- very high protection level</td></tr>
<tr><td colspan="2">b- high protection level</td></tr>
<tr><td colspan="2">c- extended protection level</td></tr>
<tr><td colspan="5">Furthermore, a distinction is made between various explosion groups as well as temperature classes. These are included in a hazard assessment.</td></tr>
</table>

Temperature classes of electrical devices

All electrical and non-electrical devices intended to be used in dangerous explosive atmosphere areas and classified into temperature classes can have temperature rise according to the table below. Temperature classes also classify gases and vapours into adequate temperature groups according to their ignition temperature. Basis for such classification is that heated surfaces of electrical devices as well as gases and vapours, respectively flammable dust of equal temperature class can not ever be the cause of an ignition of explosive atmosphere environment. Maximum allowedovertemperatures are defined for agreed ambient temperature of 40°C. In case of a higher ambient temperature, the allowed overtemperature is lowered for the same figure of difference between ambient temperature increase in comparison with 40°C. Data given in the table below show that for underground mining temperature rise is limited in relation to the smouldering temperature of flammable coal dust. Devices for group II are classified into six different temperature classes, markings T1 to T6, according to temperature rise and ignition temperature of gases and ignition temperature of gases and evaporation of flammable fluids.

Group	Temperature °C	Temperature class °C	Maximum Surface Temperature °C	Ignition temperature °C
I	-	200	160	-
II	T1	450	410	> 450
	T2	300	260	300 – 450
	T3	200	160	200 – 300
	T4	135	95	135 – 200
	T5	100	60	100 – 135
	T6	85	45	< 100

Classification of flammable substances

Clasification of flammable substances in classes A, B and C is made according to the width of a prescribed protective gap of MESG (Maxium Experimental Safe Gap) which has an affect on flame penetration ability originating from enclosure by coincidental combustion of mixture of flammable substances with air through such a gap. This ability decreases from class C to class A, which means that the demands placed on explosion protection design are increasing from class A to class C.

CLASSIFICATION OF MOST COMMON GASES AND VAPOURS ACC, TO GAS GROUP AND TEMP, CLASS						
	T1	**T2**	**T3**	**T4**	**T5**	**T6**
I	Methane					
IIA	Ammonia - Ethane Propane - Benzolane Ethylacetate Methanol - Acetone	Ethyl alcohol i-Amyilacetat n-butane n-butyl alcohol	Gasoline- Kerosene n-hexane Diesel fuels	Ethyl Ether Acetaldehyde Benzaldehyde Dibutyl Ether Dihexyl Ether	-	-
IIB	City gas	Ethylene	Hydrogene sulphide	Ethyl Ether Diethyl Ether	-	-
IIC	Hydrogen	Acetylene	-	-	-	Carbon disulphide

Dust

For different types of flammable solids – dusts and flyings – the ignition temperature has also been defined and coded in the document IEC 60079-0. More energy is necessary for activating the explosion in the air than with gases and vapours. Dust in its deposited form (layer) has a different ignition temperature than in its stirred form (cloud). The permissible surface temperature systems, equipment and components accessible to dust is determined by subtracting 75 K (Tperm L = Tmin L - 75 K) from the value determined for the dust layer and by multiplying by 2/3 (Tperm C = 2/3Tmin C) of the value determined for the dust cloud.
Smaller of the two values determined in this way corresponds to the lowest permissible surface temperature of the equipment (Tperm L > Tperm < Tperm C).

Examples	Designation of solid material	A - deposit values (°C)	B - values cloud (°C)	Permissible limiting temperature lower value of the calculation (A-75K) or 2/3*B
Dust from natural materials	Cotton	350	560	275
	Cellulose	370	500	295
	Sugar beet	290	460	215
	Starch	290	440	215
	Wheat flour	450	480	320
	Sawdust (wood)	300	400	225
	Coal dust	225	380	150
Dust of chemical technical products	Cellulose ether	275	330	200
	Polyvynil acetate	340	500	265
	Unvulcanised rubber	220	460	145
Metal dust	Aluminium	280	530	205
	Magnesium	410	610	355
	Zinc	440	570	365

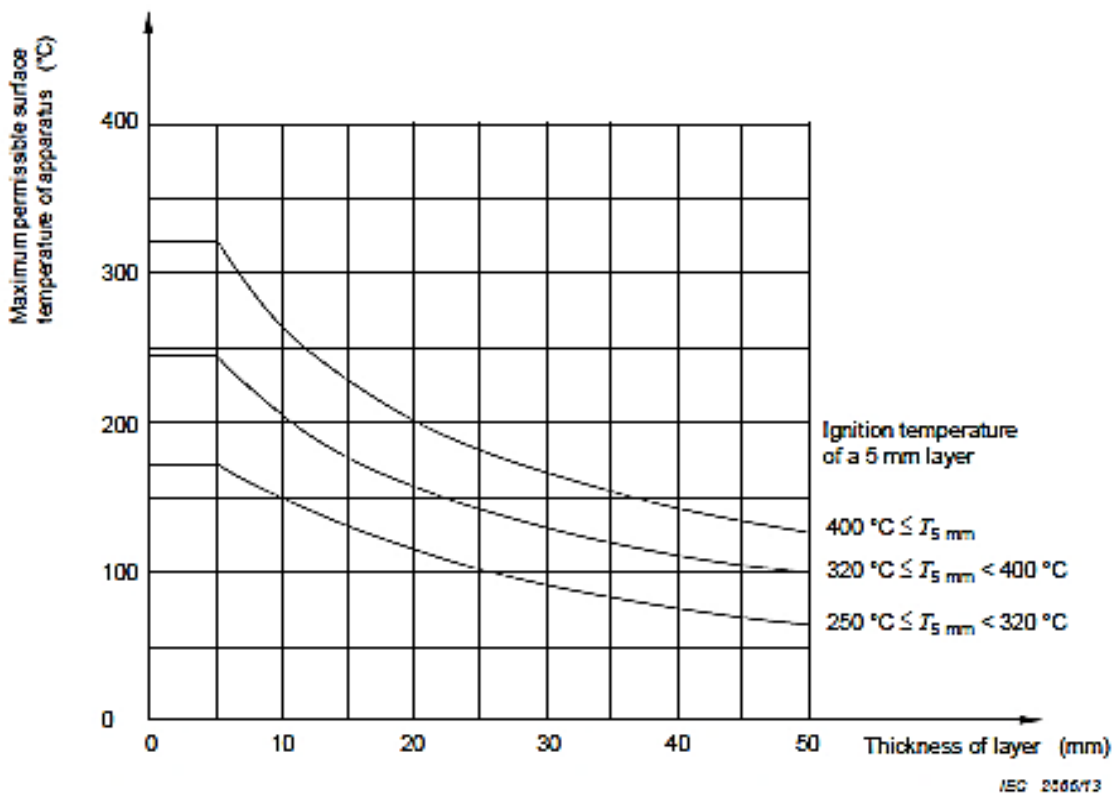
Layers of dust exceeding 5 mm

If deposits of dust with thickness of more than 5 mm to 50 mm can accumulate on devices the maximum permissible surface temperature must be reduced accordingly. The diagram from the standard EN 60079-14 can be of use in this case.

Where dust types have an ignition temperature (smouldering temperature for 5 mm layer thickness) less than 250°C or where there is doubt about the characteristic curve, the dependence must be determined by doing laboratory tests.

Conductivity of the dust **The various types of dust are divided into three subgroups.**

Dust Groups	**Description**
III A	Combustible flyings
III B	Non conductive dust *specific electrical resistance* > 10^3
III C	Conductive dust *specific electrical resistance* < 10^3



Electrical features

Voltage and frequency

Acc. to EN 60034-1 standard voltages and frequency fluctuations can be in the Category A (combination of voltage deviation +-5 % and frequency deviation +-2 %) and Category B (combination of voltage deviation +-10 % and frequency deviation +3/–5%). Our motors can supply a rated torque in both Category A and Category B. In Category A the temperature rise is 10 K higher than during rated duty. According to the standard longer duty is not recommended for Category B. IEC 60038 standard prescribes a tolerance of +-10 % for mains voltages of 230 V, 400 V and 690 V.

Three-phase squirrel cage induction motors with rated power up to 2,2 kW are made, as standard, for voltage 230/400V (connection D/Y), and motors with rated power 3 kW and above for voltage 400/690V (connection D/Y). Nominal frequency is 50Hz.

Electric motors designed for power source frequency of 50 Hz can be connected to the power source with frequency of 60 Hz, whereas revolving speed of the motor will be increased by approximately 20%. The outputs characteristic are given in the technical data tables for both 50 Hz and 60 Hz. If the voltage of power source is simultaneously increased with frequency increase in the same ratio, motor can be loaded with approximately 15% higher power than the powers given in the table Technical data. Values Ik/In, Mk/Mn and Mmax/ Mn remain the same. If frequency is increased and voltage of power source remains the same, the motor power must not be increased and values Ik/In, Mk/Mn i Mm/Mn are reduced to 85% of values given in the table Technical data. Electric motors intended to be used for other voltage and frequency combinations are designed on request.

Thermal protection

Unlike the electrical protection which is placed outside the motor, thermal protection is inserted into the motor winding and directly reacts to the rise in temperature on which life time of insulation system is directly dependent on. In this way it is possible to protect the motors from overheating due to heavy duty starts and many starting cycles in a short period of time and similar. Thermal protection is built in on request and executed as follows:

- 3 thermal probes PTC T150 connected in a series – leads connected to the fasteners in the terminal box. It is necessary to connect the thermal relays on the probe leads for controlling of contactor circuit through relay contacts for such kind of protection.
- 3 thermal switch T150 bimetal switches connected in a series – leads connected to the fasteners in the terminal box. For this kind of protection it is enough to connect the thermal switches to contactor holding circuit which will, in case a motor should overheat, open the contacts, cut off the contactor holding circuit and by doing so cut off the motor from the supplying net. When motor is cooled down, switch contacts will close and the motor must be manually restarted by pressing the contactor push button.

On request, electric motors can be equipped with different types of thermal as well as different characteristics (PTC 120, T 130, PT100…).

When the motor is equipped with thermal protection of any kind, additional cable gland M20 is mounted on the terminal box.

For temperature class T3 3PTC T150 is used and for temperature class T4 3PTC T130 is used.

Shaft

Depending on the rated outputs, the shaft dimensions are adjusted to the motor frame sizes.
Motor shafts of special steel or dimensions are available on request. Dimensions and tolerances for keyways and keys are designed according to EN 50347.

Bearings

The motors frame sizes 71 up to 250 have a permanently greased lubricated anti-friction bearings. Motors frame size 280 and 315 have regressing devices. Regreasing intervals, grease quantity and grease grade are quoted on an auxiliary motor name-plate. Heavy-duty roller bearing arrangements at drive end for increased radial load and regreasing devices are available on request.
2RS bearings can be used on request.

Series H5AT/H7AT

IEC FRAME	Bearings type D.E./N.D.E.
71	6203 ZZ C3
80	6204 ZZ C3
90	6205 ZZ C3
100	6206 ZZ C3
112	6306 ZZ C3
132	6208 ZZ C3
160	6309 ZZ C3
180	6310 ZZ C3
200	6312 ZZ C3
225	6313 ZZ C3
250	6314 ZZ C3
280	6316 C3
315	6319 C3

Standard bearing grease is LGHP 2 by SKF

Type of cooling

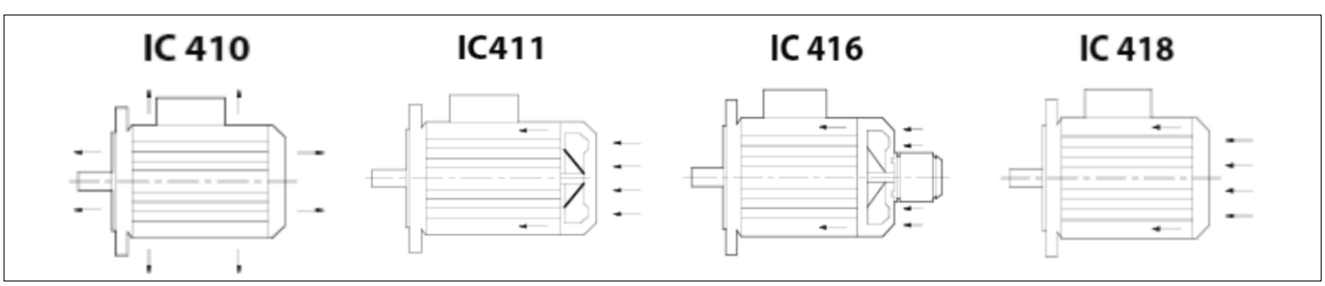
Designation system concerning methods of cooling refers to the standard IEC 60034-6. The most common cooling methods are shown in the Table below.

Motors are completely closed while cooling is generated through heat transfer over the ribbed housing with fan mounted on the motor shaft on the outside of the motor and protected with a fan cap (IC 411 in acc. with IEC 60034-6). Fan is designed in such a manner that it enables a motor to be loaded with rated parameters regardless of the direction of rotation. Motors must be mounted to enable cooling air to stream around without any obstacle. Incoming air openings on a fan cap must be opened and the distance between the fan cap and obstacle, which can block air entering, must be at least half of motor frame size expressed in mm.

Three-phase motors can operate in specific conditions when it is possible to remove the fan and fan cap:

in a situation when machine has an external ventilation, i.e. motor is in the air stream of an external ventilation adequate or better than its own (IC418). In this case a motor has the same characteristics as a self ventilated motor. For special duty types motors can be equipped with an independently driven fan (IC416).

Code	Description
IC 410	Cooling over surface through natural convection and radiation. Closed motor without external fan.
IC 411	Cooling over flat and ribbed surfaces with fan mounted on motor shaft.
IC 416	Forced ventilated motor, with independently driven fan.
IC 418	Air stream cooled closed motors. Cooling air stream as result of operation of motor drive system (e.g. fan drive).



Noise

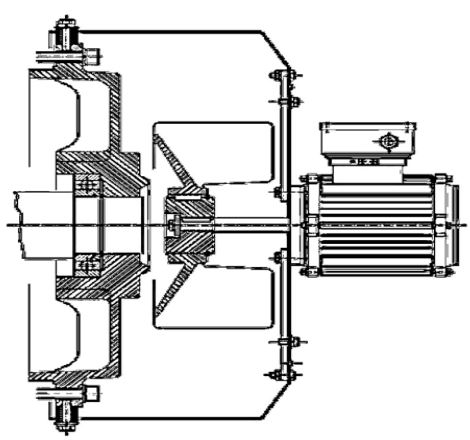
The motors are characterized by low noise level. Noise level of all our motors is significantly below values allowed by the directive IEC 60034-9. Noise level values (Sound Pressure Lp and Sound Power Lw) for different motor frame sizes and polarities at rated load are given in the Table below.

IEC	Lp dB (A)	Lw dB (A)	Lp dB (A)	Lw dB (A)	Lp dB (A)	Lw dB (A)	Lp dB (A)	Lw dB (A)
	Pole 2		Pole 4		Pole 6		Pole 8	
71	56	68	45	57	42	54	40	52
80	59	71	48	60	44	56	42	54
90	63	75	52	64	46	58	45	57
100	65	77	55	67	50	62	48	60
112	67	79	56	68	55	67	51	63
132	72	84	60	72	58	70	55	67
160	74	87	64	76	62	74	58	70
180	75	88	69	82	66	76	61	74
200	77	90	70	83	65	78	62	75
225	78	91	72	85	65	78	63	76
250	79	92	73	86	67	80	63	76
280	79	92	74	88	69	83	64	78
315	80	94	76	90	71	85	66	80

Forced cooling for three-phase induction motors

Supply of cooling air in self ventilated motors at low speeds will be reduced while mechanical loses causing additional motor overloading at a higher motor speed shall be in-creased which additionally overloads the motor and results in poor system energy indicators (e.g.)

Forced ventilation assembly assures equal cooling air supply within complete speed regulation range because motor fan is supplied independently from a power source of constant voltage and frequency.



IE3 Pole 2

IE3 - Pole 2			3000 min¹				400V/50Hz				Ex db eb B3		
P (kW)	Motor type	n (min¹)	η 100%	η 75%	η 50%	cosφ	I_n (A)	I_k/I_n	M_n (Nm)	M_k/M_n	M_{max}/M_n	J (kgm²)	m (Kg)
	Aluminium												
0,37	H5AT 71A-2	2780	73,8	72,3	68,1	0,74	0,97	4,1	1,3	2,5	2,8	0,0002675	10
0,55	H5AT 71B-2	2790	77,8	77,5	73,7	0,72	1,4	4,6	1,9	3,1	3,3	0,0003864	11
0,75	H5AT 80A-2	2840	80,7	79	76	0,79	1,69	5,4	2,5	2,9	3,2	0,0006	14,8
1,1	H5AT 80B-2	2840	82,7	82,7	81,9	0,8	2,4	5,8	3,7	2,9	3,2	0,0008	15,3
1,5	H5AT 90S-2	2850	84,2	84,1	83,7	0,79	3,25	5,7	5	2,7	3,5	0,0014	19
2,2	H5AT 90L-2	2875	85,9	86,6	85,6	0,8	4,6	6,8	7,3	3,6	4,1	0,0027	22,5
3	H5AT 100L-2	2910	87,1	87	86,5	0,81	6,1	8	9,8	3,9	4,3	0,0040	30,5
4	H5AT 112M-2	2925	88,1	87,4	87,4	0,79	8,25	9	13,1	3,3	4,4	0,0063	39
	Cast iron												
0,37	H7AT 71A-2	2780	73,8	72,3	68,1	0,74	0,97	4,1	1,3	2,5	2,8	0,0002675	14
0,55	H7AT 71B-2	2790	77,8	77,5	73,7	0,72	1,4	4,6	1,9	3,1	3,3	0,0003864	15
0,75	H7AT 80A-2	2840	80,7	79	76	0,79	1,69	5,4	2,5	2,9	3,2	0,0006	19,1
1,1	H7AT 80B-2	2840	82,7	82,7	81,9	0,8	2,4	5,8	3,7	2,9	3,2	0,0008	19,8
1,5	H7AT 90S-2	2850	84,2	84,1	83,7	0,79	3,25	5,7	5	2,7	3,5	0,0014	26
2,2	H7AT 90LX-2	2875	85,9	86,6	85,6	0,8	4,6	6,8	7,3	3,6	4,1	0,0027	33
3	H7AT 100L-2	2910	87,1	87	86,5	0,81	6,1	8	9,8	3,9	4,3	0,0040	41
4	H7AT 112M-2	2925	88,1	87,4	87,4	0,79	8,25	9	13,1	3,3	4,4	0,0063	53
5,5	H7AT 132SA-2	2935	89,2	88,7	87,6	0,85	10,4	9,8	17,9	3,6	4,4	0,0165	88
7,5	H7AT 132SB-2	2940	90,1	88,8	87,8	0,86	13,9	10,0	24,4	3,6	4,4	0,0198	94
11	H7AT 160MA-2	2950	91,2	90,8	90	0,89	19,5	10	36	3,1	4,9	0,0448	158
15	H7AT 160MB-2	2950	91,9	91,6	90,7	0,89	26,4	9,8	49	3,3	4,9	0,0535	164
18,5	H7AT 160L-2	2950	92,4	92,1	90,5	0,9	32	10,4	60	3,8	4,4	0,0622	182
22	H7AT 180M-2	2945	92,7	92	91	0,92	37	8,5	71	3,8	4,1	0,1060	235
30	H7AT 200LA-2	2965	93,3	92,8	92	0,89	52	10,1	97	2,7	2,9	0,1551	290
37	H7AT 200LB-2	2965	93,7	92,8	92,1	0,89	64	9,6	119	2,9	3,1	0,1861	314
45	H7AT 225M-2	2970	94	93,4	92,2	0,88	78,5	9,6	145	3	3,6	0,2602	385
55	H7AT 250M-2	2975	94,3	93,7	93	0,89	94,5	9,9	177	3,1	3,2	0,4255	485
75	H7AT 280S-2	2980	94,7	93,9	93,3	0,85	134,5	8	240	3	3,3	0,6105	650
90	H7AT 280M-2	2985	95	94,3	93,4	0,85	161	8	288	2,9	3,2	0,7326	679
110	H7AT 315S-2	2985	95,2	94,5	93,5	0,9	185	9,2	352	2,2	2,6	1,4432	1030
132	H7AT 315M-2	2985	95,4	94,7	93,6	0,91	219	8,4	422	1,9	2,4	1,7319	1080
160	H7AT 315LA-2	2985	95,6	95,2	94	0,9	268	11,5	512	2,4	2,6	2,0992	1175
200	H7AT 315LXB-2	2985	95,8	95,4	94,7	0,91	330	9,8	640	2,1	2,5	2,5191	1350

IE3 Pole 4

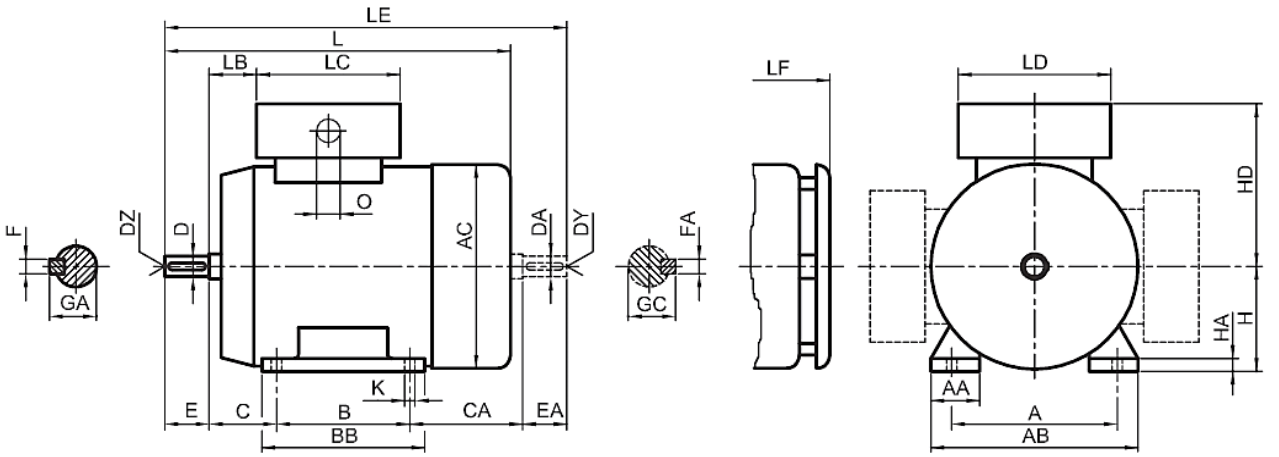
IE3 - Pole 4			1500 min^{1}				400V/50Hz				Ex db eb B3		
P (kW)	Motor type	n (min^{1})	η 100%	η 75%	η 50%	cosφ	I_n (A)	I_k/I_n	M_n (Nm)	M_k/M_n	M_{max}/M_n	J (kgm^{2})	m (Kg)
	Aluminium												
0,25	H5AT 71A-4	1405	73,5	73,9	71,3	0,71	0,69	4,2	1,7	2,4	2,6	0,0006	10,5
0,37	H5AT 71B-4	1400	77,3	76,0	71,0	0,71	0,97	4,5	2,5	2,5	2,7	0,0007932	11,8
0,55	H5AT 80A-4	1400	80,8	82,9	81,3	0,75	1,3	4,7	3,7	2,3	2,6	0,0013	15,3
0,75	H5AT 80B-4	1410	82,5	83	82	0,75	1,75	5,0	5,1	2,6	2,7	0,0016	16,5
1,1	H5AT 90S-4	1435	84,1	84,5	82,5	0,69	2,7	6,2	7,3	3,8	4	0,0036	22,5
1,5	H5AT 100LR-4	1445	85,3	85	83	0,74	3,4	6,9	9,9	3,3	3,5	0,0056	27,5
2,2	H5AT 112MR-4	1445	86,7	86,3	86	0,76	4,8	8	14,5	3,4	3,8	0,0096	34
3	H5AT 112MRA-4	1450	87,7	86,3	85,5	0,77	6,4	8,4	19,8	3,5	4	0,0122	40
	Castiron												
0,25	H7AT 71A-4	1405	73,5	73,9	71,3	0,71	0,69	4,2	1,7	2,4	2,6	0,0006	14,5
0,37	H7AT 71B-4	1400	77,3	76,0	71,0	0,71	0,97	4,5	2,5	2,5	2,7	0,0007932	15,8
0,55	H7AT 80A-4	1400	80,8	82,9	81,3	0,75	1,3	4,7	3,7	2,3	2,6	0,0013	19,6
0,75	H7AT 80B-4	1410	82,5	83	82	0,75	1,75	5,0	5,1	2,6	2,7	0,0016	20,8
1,1	H7AT 90LXR-4	1435	84,1	84,5	82,5	0,69	2,7	6,2	7,3	3,8	4	0,0036	30
1,5	H7AT 90LX-4	1435	85,3	85	83,5	0,72	3,5	5,9	10,0	3,5	3,8	0,0044	32
2,2	H7AT 100LA-4	1445	86,7	86,3	86	0,76	4,8	7,1	14,5	3,5	3,8	0,0081	47
3	H7AT 100LB-4	1460	87,7	87,6	87	0,79	6,2	7,1	19,6	2,4	3,2	0,0081	49
3	H7AT 100LB-4	1430	87,7	87,6	87,2	0,82	6	7,0	20,0	3	3,2	0,0081	49
4	H7AT 112M-4	1455	88,6	88	87,5	0,78	8,3	7,8	26,3	3,9	4	0,0165	61
5,5	H7AT 132S-4	1460	89,6	88,8	88	0,79	11,2	9,3	36	4	4,9	0,0350	96
7,5	H7AT 132MX-4	1460	90,4	90,2	89,4	0,82	14,6	8,2	49,1	3,5	4	0,0395	109
11	H7AT 160M-4	1470	91,4	90,8	89,8	0,82	21	8,9	71,5	3,8	3,8	0,0879	168
15	H7AT 160L-4	1470	92,1	91,9	90	0,82	28,5	8,7	97,4	3,7	3,8	0,1032	179
18,5	H7AZ 180M-4	1470	92,6	92	91,5	0,8	36	8,6	120	3,7	3,7	0,1515	220
22	H7AT 180L-4	1470	93	92,5	91,8	0,83	41	9,4	143	3,9	3,9	0,1893	240
30	H7AT 200L-4	1475	93,6	93,6	92,6	0,84	54	9,9	194	3,8	3,8	0,2916	318
37	H7AT 225S-4	1480	93,9	93,8	92,6	0,84	67,5	9,4	239	3,5	3,5	0,4623	395
45	H7AT 225M-4	1480	94,2	93,8	93,3	0,86	80	8,8	290	3,7	3,7	0,5420	420
55	H7AT 250M-4	1480	94,6	94	93,6	0,88	95	9,8	355	3,9	4,2	0,8415	510
75	H7AT 280S-4	1485	95	94,3	93,8	0,85	134	8,9	482	3,1	3,1	1,4240	720
90	H7AT 280M-4	1485	95,2	94,5	94	0,83	164	9,6	579	3,3	3,3	1,5822	740
110	H7AT 315S-4	1485	95,4	94,9	94,1	0,84	198	6,8	707	2	2,4	2,5874	1100
132	H7AT 315M-4	1485	95,6	95,0	94,5	0,85	234	6,8	849	1,9	2,3	3,0578	1170
160	H7AT 315LA-4	1490	95,8	95,4	94,9	0,83	290	7,2	1026	2	2,3	3,6851	1260
200	H7AT 315LXB-4	1490	96	95,5	95	0,81	370	7,1	1282	2	2,3	4,4387	1350

IE3 Pole 6

IE3 - Pole 6			1000 min^{1}				400V/50Hz				Ex db eb B3		
P (kW)	Motor type	n (min^{1})	η 100%	η 75%	η 50%	cosφ	I_n (A)	I_k/I_n	M_n (Nm)	M_k/M_n	M_{max}/M_n	J (kgm^{2})	m (Kg)
	Aluminium												
0,18	H5AT 71A-6	915	63,9	63,3	55,0	0,67	0,6	3,2	1,9	2	2,2	0,00099	10,4
0,25	H5AT 71B-6	920	68,6	66,2	59,2	0,61	0,86	3,3	2,6	2,2	2,5	0,00117	11,5
0,37	H5AT 80A-6	930	73,5	73,6	69,9	0,72	1	3,9	3,8	2	2,2	0,0022	15
0,55	H5AT 80B-6	925	77,2	75,5	70,2	0,67	1,53	4,1	5,7	2,3	2,5	0,02435	16,6
0,75	H5AT 90S-6	930	78,9	77,1	75,5	0,65	2,1	4,1	7,7	2,2	2,7	0,0028	20,5
1,1	H5AT 100LR-6	940	81	81,3	81	0,7	2,8	4,5	11,2	2,5	2,8	0,0104	28
1,5	H5AT 100L-6	950	82,5	82	81	0,62	4,2	5,5	15,1	3,2	3,6	0,0130	32
	Cast iron												
0,18	H7AT 71A-6	915	63,9	63,3	55,0	0,67	0,6	3,2	1,9	2	2,2	0,00099	14,4
0,25	H7AT 71B-6	920	68,6	66,2	59,2	0,61	0,86	3,3	2,6	2,2	2,5	0,00117	15,5
0,37	H7AT 80A-6	930	73,5	73,6	69,9	0,72	1	3,9	3,8	2	2,2	0,0022	19,3
0,55	H7AT 80B-6	925	77,2	75,5	70,2	0,67	1,53	4,1	5,7	2,3	2,5	0,02435	21,3
0,75	H7AT 90S-6	930	78,9	77,1	75,5	0,65	2,1	4,1	7,7	2,2	2,7	0,0028	27,5
1,1	H7AT 90LX-6	940	81	81,3	81	0,63	3,1	4,7	11,2	2,9	3,3	0,0044	33,5
1,5	H7AT 100L-6	950	82,5	82	81	0,62	4,2	5,5	15,1	3,2	3,6	0,0130	46
2,2	H7AT 112M-6	960	84,3	83	81,2	0,67	5,6	6,3	21,9	3,2	3,5	0,0215	58
3	H7AT 132S-6	965	85,6	85,5	84	0,67	7,5	5,6	30	2,8	3,1	0,0315	82
4	H7AT 132MA-6	960	86,8	87	86,5	0,76	8,7	5,9	40	2,4	2,7	0,0453	91,5
5,5	H7AT 132MXB-6	970	88	87,5	86	0,75	12	7,4	54	2,4	3,8	0,0516	104
7,5	H7AT 160M-6	975	89,1	89,0	87,5	0,75	16	8,8	73,5	3,5	4,4	0,1262	167
11	H7AT 160L-6	975	90,3	90,0	89	0,75	23,4	8,4	107,7	3,3	4,4	0,1514	180
15	H7AT 180L-6	980	91,2	91,1	90,9	0,79	30	8,7	146,2	2,8	4,2	0,2386	241
18,5	H7AT 200LA-6	980	91,7	91,7	91,0	0,79	36,5	7,7	180	2,4	3,4	0,2771	285
22	H7AT 200LB-6	980	92,2	92,2	92,0	0,78	44	8,1	214	2,6	3,8	0,3192	300
30	H7AT 225M-6	985	92,9	92,8	92,5	0,76	61	7,6	291	3,6	3,6	0,7262	390
37	H7AT 250M-6	985	93,3	93,2	92,5	0,76	75	7,9	359	3,4	3,4	1,0004	504
45	H7AT 280S-6	985	93,7	93,6	92,5	0,75	92	6,5	436	3,5	2,4	1,4675	660
55	H7AT 280M-6	990	94,1	94,0	93,5	0,75	112	6,6	531	3,4	2,2	1,7610	710
75	H7AT 315S-6	990	94,6	94,2	93,6	0,82	139	7,6	723	2,6	2,6	4,4698	960
90	H7AT 315M-6	990	94,9	94,4	93,8	0,83	165	7,0	868	2,4	2,4	5,5127	1110
110	H7AT 315LA-6	995	95,1	94,6	94	0,79	211	7,3	1056	2,5	2,5	6,7047	1235
132	H7AT 315LXB-6	995	95,4	94,6	94	0,79	252	7,2	1267	2,2	2,2	8,1946	1350

IE3 Pole 8

IE3 - Pole 8			750 min¹				400V/50Hz				Ex db eb B3		
P (kW)	Motor type	n (min¹)	η 100%	η 75%	η 50%	cosφ	I_n (A)	I_k/I_n	M_n (Nm)	M_k/M_n	M_{max}/M_n	J (kgm²)	m (Kg)
	Aluminium												
0,09	H5AT 71A-8	665	40,6	36	30	0,64	0,5	2	1,3	1,4	1,7	0,0007	10,1
0,12	H5AT 71B-8	665	50,7	45	39	0,56	0,6	2,2	1,7	1,7	1,9	0,0010	10,9
0,18	H5AT 80A-8	690	58,7	55,3	47,7	0,63	0,7	3	2,5	2	2,3	0,0017609	14
0,25	H5AT 80B-8	680	64,1	62,9	56,8	0,66	0,85	2,9	3,5	1,8	2	0,0022411	15,1
0,37	H5AT 90S-8	695	69,3	69,2	58,2	0,59	1,3	3,2	5,1	2,1	2,4	0,002844	20,5
0,55	H5AT 90L-8 - ND		Available only in 7AT (cast iron frame), not in 5AT (aluminum frame)										
0,75	H5AT 100LA-8	705	75	74	70	0,55	2,6	3,8	10,2	2,7	2,9	0,0104	31,5
1,1	H5AT 112MR-8	705	77,7	78	75,4	0,63	3,2	3,9	14,9	1,7	2,3	0,0148	36,5
	Cast iron												
0,09	H7AT 71A-8	665	40,6	36	30	0,64	0,5	2	1,3	1,4	1,7	0,0007	14,1
0,12	H7AT 71B-8	665	50,7	45	39	0,56	0,6	2,2	1,7	1,7	1,9	0,0010	14,9
0,18	H7AT 80A-8	690	58,7	55,3	47,7	0,63	0,7	3	2,5	2	2,3	0,0017609	18,3
0,25	H7AT 80B-8	680	64,1	62,9	56,8	0,66	0,85	2,9	3,5	1,8	2	0,0022411	19,4
0,37	H7AT 90S-8	695	69,3	69,2	58,2	0,59	1,3	3,2	5,1	2,1	2,4	0,002844	27,5
0,55	H7AT 90LX-8	700	73	70,2	64,4	0,55	1,97	3,6	7,5	2,5	2,9	0,003792	31,5
0,75	H7AT 100LA-8	705	75	74	70	0,55	2,6	3,8	10,2	2,7	2,9	0,0104	44
1,1	H7AT 112MR-8	710	77,7	78	76	0,58	3,5	4,5	14,8	2,7	3,1	0,0189	55
1,5	H7AT 112M-8	710	79,7	79,4	76,6	0,6	4,5	4,5	20	2,1	2,9	0,0215	57,5
2,2	H7AT 132S-8	710	81,9	81	78,8	0,7	5,5	4,9	29,6	2,5	2,6	0,0365	87
3	H7AT 132M-8	710	83,5	83	80,6	0,66	7,8	5,1	40,4	2,8	3,2	0,0394	92
4	H7AT 160MA-8	715	84,8	84,7	84,6	0,74	9,2	5,1	53,4	2	2,6	0,0791	137
5,5	H7AT 160MB-8	725	86,2	86	83,9	0,67	13,7	5,8	72,4	2,5	3,4	0,1044	149
7,5	H7AT 160L-8	725	87,3	87,3	86	0,72	17,2	5,9	99	2,3	2,9	0,1423	171
11	H7AT 180L-8	725	88,6	88,6	87,1	0,77	23	6	145	2,2	2,8	0,2371	218
15	H7AT 200L-8	730	89,6	89,6	85,3	0,74	32,5	5,9	196	2,1	2,8	0,4289	309
18,5	H7AT 225S-8	735	90,1	89,6	87,8	0,71	41	7,4	240	2,5	3,6	0,6040	375
22	H7AT 225M-8	735	90,6	91	90,6	0,75	46	7,3	286	2,2	2,9	0,7297	427
30	H7AT 250M-8	735	91,3	91,3	90,6	0,76	62	6,7	390	2	2,5	1,2449	520
37	H7AT 280S-8	735	91,8	91,8	91	0,78	74	6,1	481	1,9	2,4	1,9663	640
45	H7AT 280M-8	740	92,2	91,8	91,1	0,74	94	6,9	581	2,2	2,6	2,3594	684
55	H7AT 315S-8	745	92,5	91,5	90,5	0,78	109	8,9	705	2	2,4	4,5082	996
75	H7AT 315M-8	745	93,1	92,8	91,6	0,83	140	9,2	961	2,1	2,5	5,5602	1150
90	H7AT 315LA-8	745	93,4	93,1	91,7	0,8	173	9,3	1154	2,1	2,5	6,7604	1250
110	H7AT 315LXB-8	745	93,7	93,5	92	0,8	211	9,3	1410	2,1	2,5	8,2627	1350

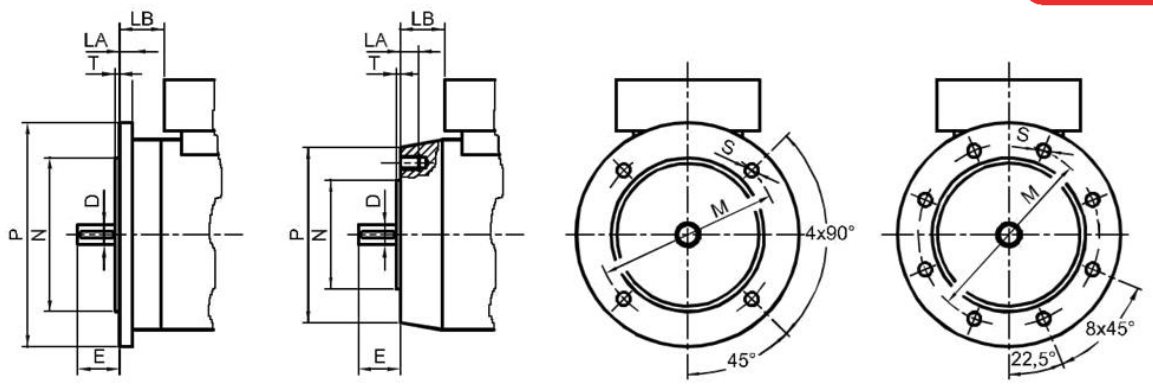


H Series – B3 – IE3 – Aluminium

5AT																	IM B3									
Motor type	AC	D/	DZ/	E/	F/	GA/	L	Terminal box „e"			Terminal box „d"			LE	LF	LG	A	AA	AB	B	B1	BB	C	H	HA	K
		DA	DY	EA	FA	GC		HD	LB	AE	HD	LB	AE													
5AT 71	139	14j6	M5	30	5	16	249	167	22	135	181	24	132	285	269	210	112	33	140	90	-	110	45	71	8	7
5AT 80	156	19j6	M6	40	6	21,5	281	181	32	135	195	34	132	315	301	239	125	37	160	100	-	125	50	80	10	9
5AT 90	176	24j6	M8	50	8	27	329	187	29	135	201	30	132	385	349	286	140	42	180	100	125	150	56	90	12	9
5AT 100	194	28j6	M10	60	8	31	373	187	39	135	201	40	132	440	393	325	160	47	200	140	-	175	63	100	14	13
5AT 112	218	28j6	M10	60	8	31	400	198	44	135	212	45	132	465	420	339	190	48	220	140	-	175	70	112	15	13

H Series – B3 – IE3 – Cast iron

7AT																	IM B3									
Motor type	AC	D/	DZ/	E/	F/	GA/	L	Terminal box „e"			Terminal box „d"			LE	LF	LG	A	AA	AB	B	B1	BB	C	H	HA	K
		DA	DY	EA	FA	GC		HD	LB	AE	HD	LB	AE													
7AT 90	176	24j6	M8	50	8	27	366	183	28	135	200	29	132	421	386	322	140	35	180	125	-	155	56	90	12	9
7AT 100	194	28j6	M10	60	8	31	439	193	29	135	210	30	132	504	459	389	160	40	200	140	-	175	63	100	13	12
7AT 112	218	28j6	M10	60	8	31	446	203	27	135	220	28	132	511	465	389	190	40	220	140	-	175	70	112	15	12
7AT 132S & M	257	38k6	M12	80	10	41	512	246	39	170	256	41	165	600	536	434	216	50	260	140	178	218	89	132	18	13
7AT 132MX	257	38k6	M12	80	10	41	562	246	39	170	256	41	165	650	586	484	216	50	260	140	178	218	89	132	18	13
7AT 160M & L	308	42k6	M16	110	12	45	662	299	48	208	303	52	200	775	689	580	254	62	320	210	254	304	108	160	25	15
7AT 180M & L	348	48k6	M16	110	14	51,5	705	317	62	208	321	66	200	820	732	630	279	65	350	241	279	334	121	180	28	15
7AT 200	391	55m6	M20	110	16	59	800	341	63	250	342	60	255	910	855	675	318	75	398	305	-	360	133	200	30	19
7AT 225S & M -2	425	55m6	M20	110	16	59	845	359	65	250	360	62	255	955	910	718	356	82	436	286	311	370	149	225	30	19
7AT 225S & M -4, -6, -8	425	60m6	M20	140	18	64	875	359	65	250	360	62	255	1015	940	748	356	82	436	286	311	370	149	225	30	19
7AT 250M -2	471	60m6	M20	140	18	64	920	384	64	280	397	62	285	1060	995	780	406	100	500	349	-	415	168	250	35	24
7AT 250M - 4, -6,-8	471	65m6	M20	140	18	69	920	384	64	280	397	62	285	1060	995	780	406	100	500	349	-	415	168	250	35	24
7AT 280S & M -2	533	65m6	M20	140	18	69	1043	434	82	280	447	80	285	1185	1130	896	457	112	555	368	419	533	190	280	40	24
7AT 280S & M - 4, -6,-8	533	75m6	M20	140	20	80	1043	434	82	280	447	80	285	1185	1130	896	457	112	555	368	419	533	190	280	40	24
7AT 315S & M -2	611	65m6	M20	140	18	69	1270	495	72	340x365	511	72	340x365	1415	1360	1110	508	120	628	406	457	586	216	315	45	28
7AT 315S & M - 4, -6,-8	611	80m6	M20	170	22	85	1300	495	72	340x365	511	72	340x365	1475	1390	1140	508	120	628	406	457	586	216	315	45	28
7AT 315L-2	611	65m6	M20	140	18	69	1270	495	72	340x365	511	72	340x365	1415	1360	1110	508	120	628	508	457	586	216	315	45	28
7AT 315L- 4, -6,-8	611	80m6	M20	170	22	85	1300	495	72	340x365	511	72	340x365	1475	1390	1140	508	120	628	508	457	586	216	315	45	28
7AT 315LX-2	611	65m6	M20	140	18	69	1350	495	72	340x365	511	72	340x365	1495	1440	1190	508	120	628	508	457	586	216	315	45	28
7AT 315LX- 4, -6,-8	611	80m6	M20	170	22	85	1380	495	72	340x365	511	72	340x365	1555	1470	1220	508	120	628	508	457	586	216	315	45	28



H Series – B5/B14 – IE3 – Aluminium

	IM B5						IM B14 - small						IM B14 - big					
Motor type	LA	M	N	P	S	T	LA	M	N	P	S	T	LA	M	N	P	S	T
5AT 71	10	130	110j6	160	9	3	11	85	70j6	105	M6	3	11	115	95j6	140	M8	3
5AT 80	10	165	130j6	200	11	3,5	13	100	80j6	120	M6	3	13	130	110j6	160	M8	3,5
5AT 90	10	165	130j6	200	11	3,5	13	115	95j6	140	M8	3,5	13	130	110j6	160	M8	3,5
5AT 100	15	215	180j6	250	15	4	15	130	110j6	160	M8	3,5	15	165	130j6	200	M10	3,5
5AT 112	15	215	180j6	250	15	4	15	130	110j6	160	M8	3,5	15	165	130j6	200	M10	3,5

H Series – B5/B14 – IE3 – Cast iron

	IM B5						IM B14 - small						IM B14 - big					
Motor type	LA	M	N	P	S	T	LA	M	N	P	S	T	LA	M	N	P	S	T
7AT 90	10	165	130j6	200	11	3,5	13	115	95j6	140	M8	3,5	13	130	110j6	160	M8	3,5
7AT 100	15	215	180j6	250	15	4	15	130	110j6	160	M8	3,5	15	165	130j6	200	M10	3,5
7AT 112	15	215	180j6	250	15	4	15	130	110j6	160	M8	3,5	15	165	130j6	200	M10	3,5
7AT 132S / M	18	265	230j6	300	14	4	16	215	180j6	250	M12	4						
7AT 132MX	18	265	230j6	300	14	4	16	215	180j6	250	M12	4						
7AT 160M / L	20	300	250j6	350	18	5												
7AT 180M / L	20	300	250j6	350	18	5												
7AT 200	20	350	300j6	400	19	5												
7AT 225S / M -2	22	400	350j6	450	19	5												
7AT 225S / M -4, -6, -8	22	400	350j6	450	19	5												
7AT 250M -2	22	500	450j6	550	19	5												
7AT 250M - 4, -6,-8	22	500	450j6	550	19	5												
7AT 280S / M -2	22	500	450j6	550	19	5												
7AT 280S / M - 4, -6,-8	22	500	450j6	550	19	5												
7AT 315S / M -2	25	600	550j6	660	24	6												
7AT 315S / M - 4, -6,-8	25	600	550j6	660	24	6												
7AT 315L-2	25	600	550j6	660	24	6												
7AT 315L- 4, -6,-8	25	600	550j6	660	24	6												
7AT 315LX-2	25	600	550j6	660	24	6												
7AT 315LX- 4, -6,-8	25	600	550j6	660	24	6												

Cable entry

Cable entry can be executed in several ways, depending on the position of the terminal box or mounting arrangements.
As a standard, motors are delivered with the entry thread acc. to table below. A threaded hole is closed with a plug in Ex protection ‘’e/eb’’ and IP68 for protection in transport and in storage. Before installation, plugs have to be replaced with appropriate cable gland or plug depending on the type of Ex and / or IP protection required in installation site. Auxilliary circuits are as a standard, connected to terminal blocks via multiwire bushing (wires 1,5mm2). Each element will have extra plug M20x1,5.

IEC Size	Heaters PTC Brakes	71 80 90	100 112	132	160	180	200	225	250 280	315
Number of terminals x contact screw thread		6xM4 6xM5	6xM4 6xM5	6xM4 6xM5	6xM5 or 6xM8	6xM5 or 6xM8	6xM5 6xM8 6xM12	6xM5 6xM8 6xM12	6xM8 6xM12	6xM12
Number and size of entry thread	1x M20x1,5	1x M20x1,5	1x M20x1,5	2x M32x1,5	2x M32x1,5	2x M40x1,5	2x M40x1,5	2x M50x1,5	2x M50x1,5	2x M63x1,5

On request are available cable glands or plugs made from
metal in protection ‘’d/db’’. Plastic cable glands in ‘’e/eb’’ are available for motors in protection Ex db eb while the motors in Ex db should have metal cable glands in ‘’d/db’’. As a standard, cable gland M63 is delivered made from metal. Appropriate external cable diameters for standard cable glands are shown in a table below.
On special customer request, motors can be delivered with special or bigger cable glands than the ones quoted in the table.

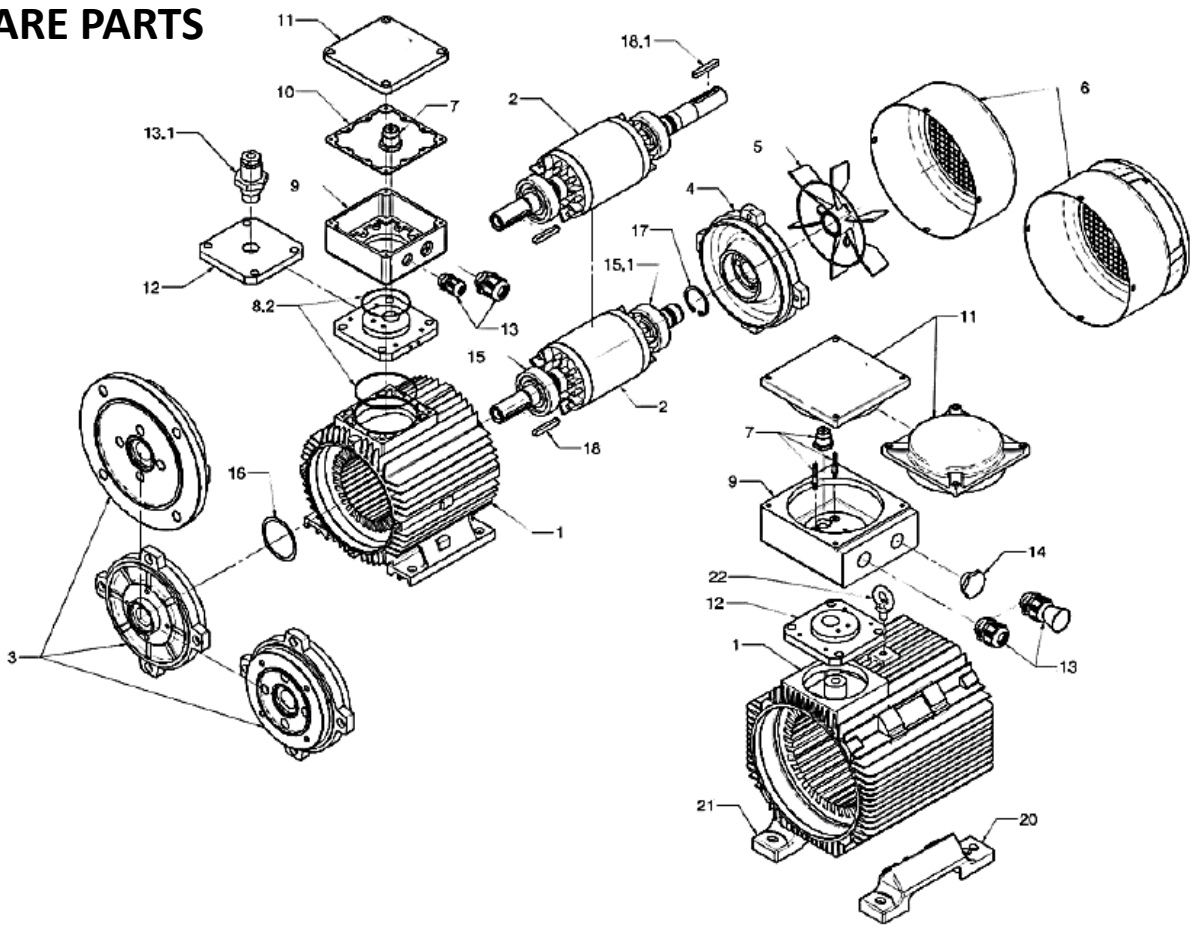
Vibrations

Motor quality level in correlation with the level of vibration is determined by the directive IEC 60034-14 as a figure of effective vibration speed.
Degree of quality is divided into two levels according to the Table of limited values for maximum vibration degree (s) and vibration speed (v) for the shaft height H.

Vibration level	Machine installation	Shaft Height H in mm		
		56 ≤ H ≤ 132	132 < H ≤ 280	H > 280
		Vrms mm/s		
A	Free suspension	1,6	2,2	2,8
	Rigid clamping	1,3	1,8	2,3
B	Free suspension	0,7	1,1	1,8
	Rigid clamping	-	0,9	1,5

In a standard design our rotors are dynamically balanced with a half key (acc. to DIN ISO 8821) and a vibration level A (normal).
The vibration level is valid for a rated frequency up to 60 Hz.
On request we can deliver a low-vibration in version B. For inverter feeding motors with frequencies greater than 60 Hz a standard quality level is a low-vibration version B.
Full key and without key balancing is available on request.

SPARE PARTS



No.	SPARE PARTS	No.	SPARE PARTS
1	Wound stator	14	Plug
2	Rotor (half-key balanced)	15	D.E. bearing
3	DE bearing shield - B3, B5, B14	15.1	N.D.E. bearing
4	NDE bearing shield	16	Resilient preloading washer
5	Fan	17	Circlip
6	Fan cover	17.1	Circlip
7	Terminal block/connector	18	Shaft key
8.2	O - seal	18.1	Shaft key N.D.E.
9	Terminal box	19	D.E. shaft seal
10	Terminal box lid seal	19.1	N.D.E. shaft key
11	Terminal box lid / lid	20	Right foot
12	Lid	21	Left foot
13	Cable gland	22	Lifting ring
13.1	Cable connector / cable gland		

All data (technical, dimensions, etc..) listed in the tables are indicative and not binding. The guaranteed values are upon request. Felm srl reserves the right to change the project, the technical characteristics and dimensions at any time without previous notice.

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