

Low and High Voltage Process Performance Motors

LV Motors for high ambient
temperatures



مرکز تخصصی فروش و خدمات انواع الکتروپمپ، گیربکس الکتروموتور

تلفن: ۰۵۱-۳۳۵۲۸۶۱

فکس: ۰۳۱۳۳۵۲۸۶۶

همراه: ۰۹۳۳۷۲۲۴۲۲

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فروش اینترنتی

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ABB

Making you more competitive

ABB's Process performance motor is engineered to the toughest demands of today's process industries. These motors use the best materials and construction methods to achieve the highest quality and reliability, and a possible operating life of over 30 years. The motor design is highly adaptable to allow rapid engineered solution according to customer's specification.



ABB is a global leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 107,000 people.

Low and High Voltage Process Performance Motors

Sizes 71 to 450, from 0.25 to 1000 kW

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ABB reserves the right to change the design, technical specification and dimensions without prior notice.

General information

Standards

ABB motors are of the totally enclosed, three phase squirrel cage type, built to comply with international IEC and EN standards. Motors conforming to other national and international specifications are also available on request.

All production units are certified to ISO 9001 international quality standard as well ISO 14000 environmental standard and confirm to all applicable EU Directives.

IEC / EN

Electrical	Mechanical
IEC/EN 60034-1	IEC 60072
IEC/EN 60034-2	IEC/EN 60034-5
IEC 60034-8	IEC/EN 60034-6
IEC 60034-12 (for LV only)	IEC/EN 60034-7
	IEC/EN 60034-9
	IEC 60034-14



M000003



M000288



M000004



Low voltage motors for EU motor efficiency levels

A Europe-wide agreement will ensure that the efficiency levels of electric motors manufactured in Europe are clearly displayed. In contrast to the American legislation on motor efficiency the European agreement does not establish mandatory efficiency levels.

It basically establishes three classes giving motor manufacturers an incentive to qualify for a higher class.

ABB is one of only a handful of leading motor manufacturers in Europe to have a motor range to meet or exceed the minimum efficiencies stated in the highest level of the EU agreement of low voltage motors.

These efficiency levels apply to 2- and 4-pole, three phase squirrel cage induction motors rated for 400 V, 50 Hz with S1 duty class

with the output 1.1 to 90 kW, which account for the largest volume on the market.

The efficiency of motors from different manufacturers are collated in a database, EURODEEM, published by the European Commission. It is accessible over the Internet at <http://iamest.jrc.it/projects/eem/eurodeem.htm>.

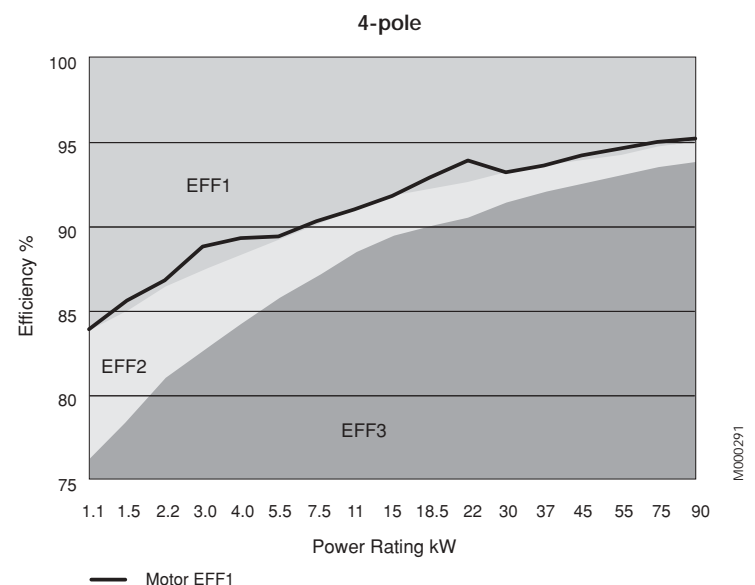
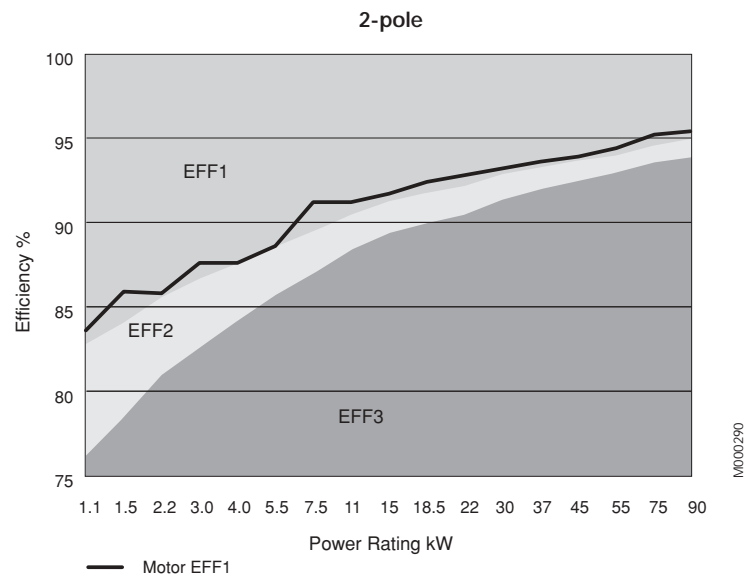
EU efficiency classes for 2-pole motors

Output kW	2-pole Boarderline	
	EFF2/EFF3	EFF1/EFF2
1.1	76.2	82.8
1.5	78.5	84.1
2.2	81.0	85.6
3	82.6	86.7
4	84.2	87.6
5.5	85.7	88.6
7.5	87.0	89.5
11	88.4	90.5
15	89.4	91.3
18.5	90.0	91.8
22	90.5	92.2
30	91.4	92.9
37	92.0	93.3
45	92.5	93.7
55	93.0	94.0
75	93.6	94.6
90	93.9	95.0

EU efficiency classes for 4-pole motors

Output kW	4-pole Boarderline	
	EFF2/EFF3	EFF1/EFF2
1.1	76.2	83.8
1.5	78.5	85.0
2.2	81.0	86.4
3	82.6	87.4
4	84.2	88.3
5.5	85.7	89.2
7.5	87.0	90.1
11	88.4	91.0
15	89.4	91.8
18.5	90.0	92.2
22	90.5	92.6
30	91.4	93.2
37	92.0	93.6
45	92.5	93.9
55	93.0	94.2
75	93.6	94.7
90	93.9	95.0

ABB three phase induction motors, 400 V 50 Hz - EU motor efficiency levels

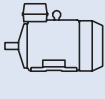


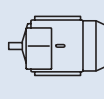
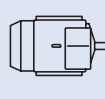
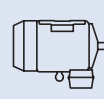
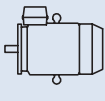
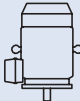
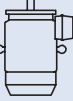
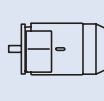
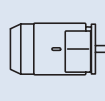
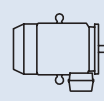
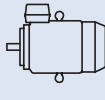
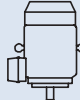
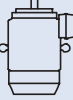
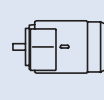
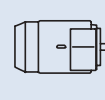
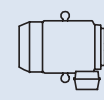
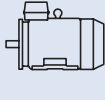
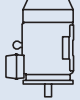
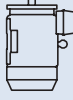
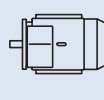
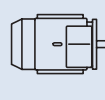
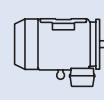
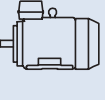
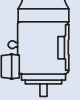
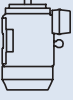
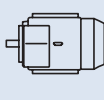
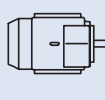
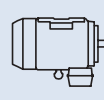
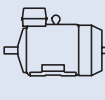
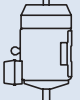
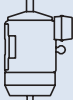
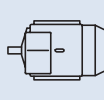
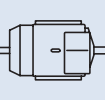
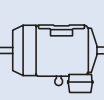


General technical specification

Mechanical and electrical design

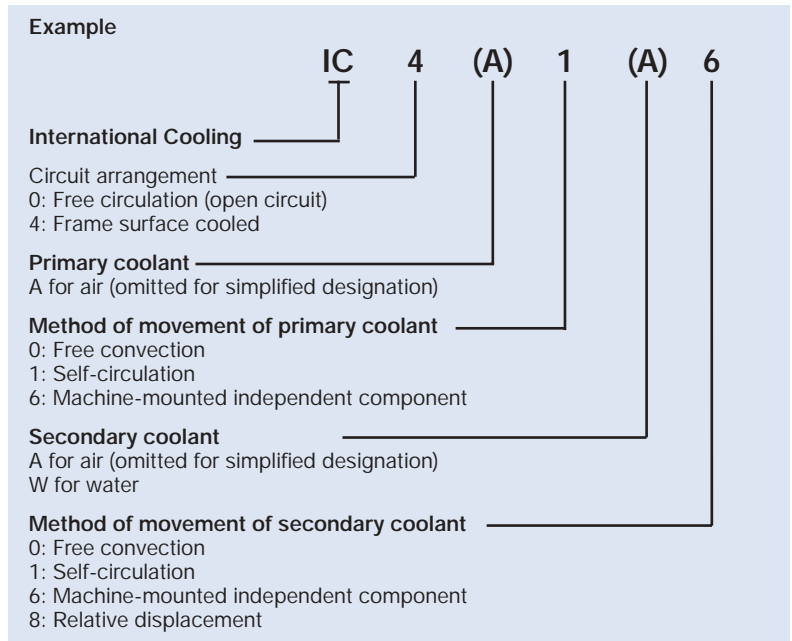
Mounting arrangements

1

	Code I/Code II						Product code pos. 12
Foot-mounted motor.	IM B3 IM 1001	IM V5 IM 1011	IM V6 IM 1031	IM B6 IM 1051	IM B7 IM 1061	IM B8 IM 1071	A = foot-mounted, term.box top R = foot-mounted, term.box RHS L = foot-mounted, term.box LHS
							M000007
Flange-mounted motor, large flange	IM B5 IM 3001	IM V1 IM 3011	IM V3 IM 3031	*) IM 3051	*) IM 3061	*) IM 3071	B = flange mounted, large flange
							M000008
Flange-mounted motor, small flange	IM B14 IM 3601	IM V18 IM 3611	IM V19 IM 3631	*) IM 3651	*) IM 3661	*) IM 3671	C = flange mounted, small flange
							M000009
Foot- and flange-mounted motor with feet, large flange	IM B35 IM 2001	IM V15 IM 2011	IM V36 IM 2031	*) IM 2051	*) IM 2061	*) IM 2071	H = foot/flange-mounted, term.box top S = foot/flange-mounted, term.box RHS T = foot/flange-mounted, term.box LHS
							M000010
Foot- and flange-mounted motor with feet, small flange	IM B34 IM 2101	IM V17 IM 2111	IM 2131	IM 2151	IM 2161	IM 2171	J = foot/flange-mounted, small flange
							M000011
Foot-mounted motor, shaft with free extensions	IM 1002	IM 1012	IM 1032	IM 1052	IM 1062	IM 1072	
							M000012
*) Not stated in IEC 60034-7.							

Cooling

Designation system concerning methods of cooling refers to standard IEC 60034-6.



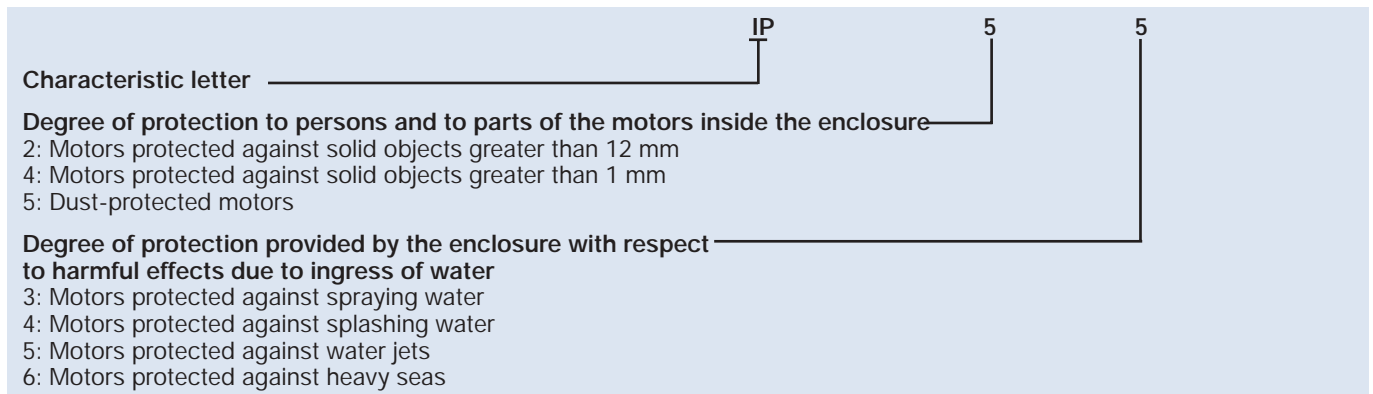
Degrees of protection: IP code/IK code

Classification of degrees of protection provided by enclosures of rotating machines are refers to:

- Standard IEC 60034-5 or EN 60529 for IP code
- Standard EN 50102 for IK code

IP protection:

Protection of persons against getting in contact with (or approaching) live parts and against contact with moving parts inside the enclosure. Also protection of the machine against ingress of solid foreign objects. Protection of machines against the harmful effects due to the ingress of water



IK code:

Classification of degrees of protection provided by enclosure for motors against external mechanical impacts.

IK 08											
International mechanical protection ———— IK											
Characteristic group ————											
Relation between IK code and impact energy:											
IK code	IK 0	IK 01	IK 02	IK 03	IK 04	IK 05	IK 06	IK 07	IK 08	IK 09	IK 10
Impact energy Joule	*	0.15	0.2	0.35	0.5	0.7	1	2	5 ABB Standard	10	20
* not protected according to EN 50102											

Insulation

ABB uses class F insulation systems, which, with temperature rise B, is the most common requirement among industry today.

The use of Class F insulation with Class B temperature rise gives ABB products a 25° C safety margin. This can be used to increase the loading for limited periods, to operate at higher ambient temperatures or altitudes, or with greater voltage and frequency tolerances. It can also be used to extend insulation life. For instance, a 10 K temperature reduction will extend the insulation life.

Class F insulation system

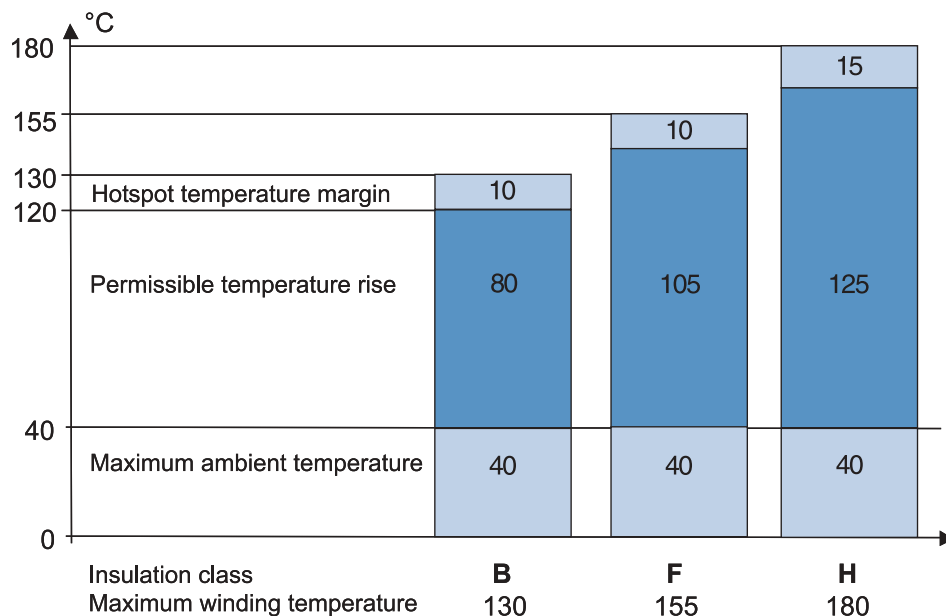
- Max ambient temperature 40° C
- Max permissible temperature rise 105 K
- Hotspot temperature margin + 10 K

Class B rise

- Max ambient temperature 40° C
- Max permissible temperature rise 80 K
- Hotspot temperature margin + 10 K

Insulation system temperature class

- Class F 155° C
- Class B 130° C
- Class H 180° C



Safety margins per insulation class

All ABB high voltage motors are made with form wound windings with Micadur® Compact Industry Insulation System (class F). For more information, please see the brochure Micadur® -Compact Industry, Insulation System for Rotating Electrical Machines (code 3BFP 001 980 R0101 REV B 06/2003).

Frequency converter drives for low voltage motors

Squirrel cage induction motors offer excellent availability, reliability and efficiency. With a frequency converter – a variable speed drive (VSD) – the motor will deliver even better value. A variable speed drive motor can be started softly with low starting current, and the speed can be controlled and adjusted to suit the application demand without steps over a wide range. Also the use of a frequency converter together with a squirrel cage motor usually leads to remarkable energy and environmental savings.

Process performance motors manufactured by ABB are designed for both, variable speed and direct on line use. Also a wide range of options is available to fit the motors even to the most demanding applications.

When selecting process performance motors to variable speed drives, following points shall be taken into consideration:

1. Dimensioning

The voltage (or current) fed by the frequency converter is not purely sinusoidal. This may increase the losses, vibration, and noise of the motor. Furthermore, a change in the distribution of the losses may affect to the temperature rises of the motor. In each case, the motor must be correctly sized according to the instructions supplied with the selected frequency converter.

When using ABB converters, please use ABB's DriveSize dimensioning programme or the loadability curves of the corresponding converter type for sizing the motors. The loadability curve of a process performance motor used with ABB's ACS 800 -frequency converters can be found in figure 3.

2. Speed range

In a frequency converter drive, the actual operating speed of the motor may deviate considerably from its nominal speed (i.e. the speed stamped on the rating plate).

For higher speeds, ensure that the highest permissible rotational speed of the motor or the critical speed of the entire equipment is not exceeded. When high speed operation exceeds the nominal speed of the motor, the following points should be checked:

- Maximum torque of the motor
- Bearing construction
- Lubrication
- Balancing
- Critical speeds
- Shaft seals
- Ventilation
- Fan noise

Guideline values of maximum speeds for process performance motors are described in figures 1a and 1b.

Figure 1a. Guideline values of maximum speeds for process performance cast iron motors

Frame size	Speed r/min	
	2-pole	4-pole
71 – 200	4000	3600
225 – 280	3600	2600
315	3600	2300
355 SM, ML	3600	2000
355 LK	3000	2000
400	3600	1800
450	3600	1800

Figure 1b. Guideline values of maximum speeds for process performance aluminum motors

Frame size	Speed r/min	
	2-pole	4-pole
112 – 200	4500	4500
225 – 280	3600	3600

At low speed operation the cooling capacity of the fan decreases, which may cause higher temperature rises in the motor. A separate constant speed fan can be used to increase cooling capacity and loadability at low speed. It is also important to check the performance of the lubrication at low speeds.

3. Lubrication

The effectiveness of the motor lubrication should be checked by measuring the bearing temperature under normal operating conditions. If the measured temperature is higher than +80°C, the relubrication intervals specified in ABB's Low Voltage Motors Manual must be shortened; i.e. the relubrication interval should be halved for every 15 K increase in bearing temperature. If this is not possible ABB recommends the use of lubricants suitable for high operating temperature conditions. These lubricants allow a normal relubrication interval and a 15 K increase in bearing temperature conditions.

At continuous operation on very low speeds as well as at very low temperatures the lubrication capabilities of standard greases may not be sufficient and special greases with additives are needed. For more information, please contact ABB.

If the motors are equipped with sealed bearings i.e. bearings greased for life, it must be noted that when the operating temperature differs from the designed, also the lifetime of the bearing will differ from the original. More information about the lifetime of the bearings can be found from the product specific sections of this manual.

The use of so called conductive greases for elimination of bearing currents is not recommended due to their poor lubrication characteristics and low conductivity.

4. Insulation protection

Most of the low voltage frequency converters have IGBT power components with very rapid switching, steep voltage pulses and reflections at the cables. Those increase voltage stresses at the winding of the motor and therefore, the precautions described in figure 2 below must be taken to avoid risks of insulation damage. Mentioned measures apply to Process Performance Motors with ACS 550 and ACS 800 drives with uncontrolled DC-voltage. For other alternatives and converter types, please contact ABB.

5. Bearing currents

Bearing voltages and currents must be avoided in all motors. Assuming the use of ABB ACS 550 or ACS 800 drives, with uncontrolled DC-voltage, insulated bearings and/or properly dimensioned filters at the converter output must be used according to the instructions in figure 2 below. (For other alternatives and converter types, please contact ABB.) When ordering, clearly state which alternative will be used.

For more information about bearing currents and voltages, please contact ABB.

6. Cabling, grounding and EMC

The use of a frequency converter sets higher demands on the cabling and grounding of the drive system. The motor must be cabled by using shielded symmetrical cables and cable glands providing 360° bonding (also called EMC-glands). For motors up to 30 kW unsymmetrical cables can be used, but shielded cables are always recommended, especially if there are sensitive sensors in the driven application.

For motors in frame size IEC 280 and upward, additional potential equalisation between the motor frame and the machinery is needed, unless they are installed on a common steel fundament. When a steel fundament is used for the potential equalisation, the high frequency conductivity of this connection should be checked.

More information about grounding and cabling of a variable speed drive can be found from the manual "Grounding and cabling of the drive system" (Code: 3AFY 61201998 R0125 REV B)

For fulfilling the EMC requirements, special EMC cable(s) must be used in addition to the correct cable gland mounting, with special, extra earthing pieces. Please refer to the manuals of the frequency converter.

Figure 2. Selection rules for insulation and filtering in variable speed drives

Motor nominal power P_N or frame size			
	$P_N < 100 \text{ kW}$	$P_N \geq 100 \text{ kW or}$ $IEC 315 \leq \text{Frame size} \leq IEC 355$	$P_N \geq 350 \text{ kW or}$ $IEC 400 \leq \text{Frame size} \leq IEC 450$
$U_N \leq 500 \text{ V}$	Standard motor	Standard motor + Insulated N-bearing	Standard motor + Insulated N-bearing + Common mode filter
$U_N \leq 600 \text{ V}$	Standard motor + dU/dt-filter (reactor) OR Reinforced insulation	Standard motor + dU/dt-filter (reactor) + Insulated N-bearing OR Reinforced insulation + Insulated N-bearing	Standard motor + Insulated N-bearing + dU/dt-filter (reactor) + Common mode filter OR Reinforced insulation + Insulated N-bearing + Common mode filter
$U_N \leq 690 \text{ V}$	Reinforced insulation + dU/dt-filter (reactor)	Reinforced insulation + dU/dt-filter (reactor) + Insulated N-bearing	Reinforced insulation + Insulated N-bearing + dU/dt-filter (reactor) + Common mode filter

dU/dt-filter (reactor)

Series reactor. DU/dt -filter decreases the changing rate of the phase and main voltages and thus reduces voltage stresses in the windings. DU/dt -filters also decrease so-called common mode currents and the risk of bearing currents.

Common mode filters

Common mode filters reduce so-called common mode currents in VSD applications and thus decrease the risk of bearing currents.

Common mode filters do not significantly affect the phase or main voltages on the motor terminals.

Insulated Bearings

Bearings with insulated inner or outer races are used as the standard solution. So-called hybrid bearings, i.e. bearings with non-conductive ceramic rolling elements, can also be used in special applications. More information for spare part selection is available on request.

Validity

Measures mentioned in Figure 2 apply to Process performance motors with ACS 550 and ACS 800 drives with uncontrolled DC-voltage. For other alternatives and converter types, please contact ABB.

Motor loadability with 800 -frequency converter

The loadability curve in figure 3 below is a guideline curve for standard ACS 800 drives with DTC-control. For exact values please contact ABB. It is possible to use the loadability curve also for other frequency converters, but it shall be noted that the harmonic content and control algorithms varies between different frequency converters and thus the temperature rise of the motor also differs.

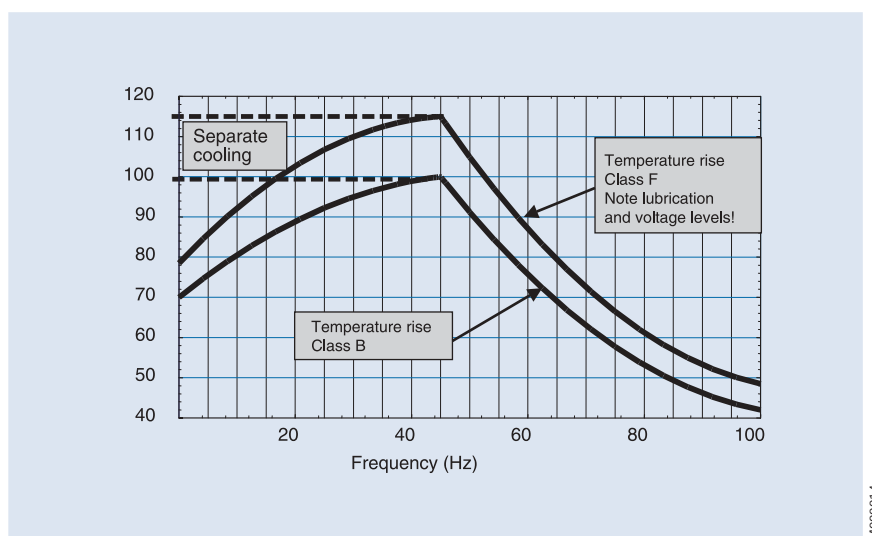
These guidelines present the maximum continuous load torque of a motor as a function of frequency (speed) to give the same temperature rise as with rated sinusoidal supply at nominal frequency and full rated load.

The temperature rise of squirrel cage motors manufactured by ABB is normally class B. However, if the ABB catalogue indicates that class F temperature rise is utilised on a sinusoidal supply, the dimensioning of the motor at frequency converter supply shall be done according to the temperature rise class B loadability curve.

If the motor is utilised according to the loadability curve temperature rise class F, the temperature rise in other parts of the motor should be noted and the lubrication intervals and type of grease checked.

For further information, please contact ABB.

Figure 3. Motor loadability with ACS 800, Field weakening point 50 Hz.



Frequency converter drives for high voltage motors

High voltage, M3BM, motors are suitable for ABB ACS 1000 series' converters or equivalent with sinusoidal output, quadratic load torque (pump, fan).

For more information, please contact your local ABB Sales office

Low Voltage Process Performance Cast Iron Motors

Totally enclosed squirrel cage three phase
low voltage motors,
Sizes 71 - 450, 0.25 to 1000 kW



2

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Low Voltage Process Performance Motors for High Ambient Temperatures

Totally enclosed squirrel cage three phase low voltage motors, suitable for high ambient temperature up to +90°C
Sizes 112 - 250, 4 to 55 kW



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General description

ABB motors for demanding environments are made to an entirely new design based on the latest research into some of today's most challenging production processes. Modeled on ABB's proven motor technology/platform, they incorporate many of its tried and tested features, like lower bearing temperatures, longer lubrication intervals, and improved greasing systems. Capable of withstanding temperatures up to 90°C combined with 100% humidity and highly corrosive environments superiority design for the toughest environments.

Motors are constructed in cast iron or aluminium entirely coated with multilayer epoxy surface treatment.

The motors are fully protected against corrosion both inside and outside suitable for metallurgical, brick or glass manufacturing, wood dryer and food industries.

And to give our motors variable speed control capability, we made full use of ABB's know-how and experience as the world's largest supplier of industrial automation systems.

The result is a rugged and reliable motor that will outperform and outlast many custom-designed competitors, at a demonstrably lower operating cost.

Mechanical design

Stator framework and feet for sizes 112 and 132 are made of an extra corrosion resistant aluminum alloy with low copper content. End shields are made of cast iron.

In motor sizes 160 to 250, the motor frames including feet, bearing housing and terminal box are made of

cast iron. Integrally cast feet allow a very rigid mounting and minimal vibration.

Motors can be supplied for foot mounting, flange mounting and combination of these.

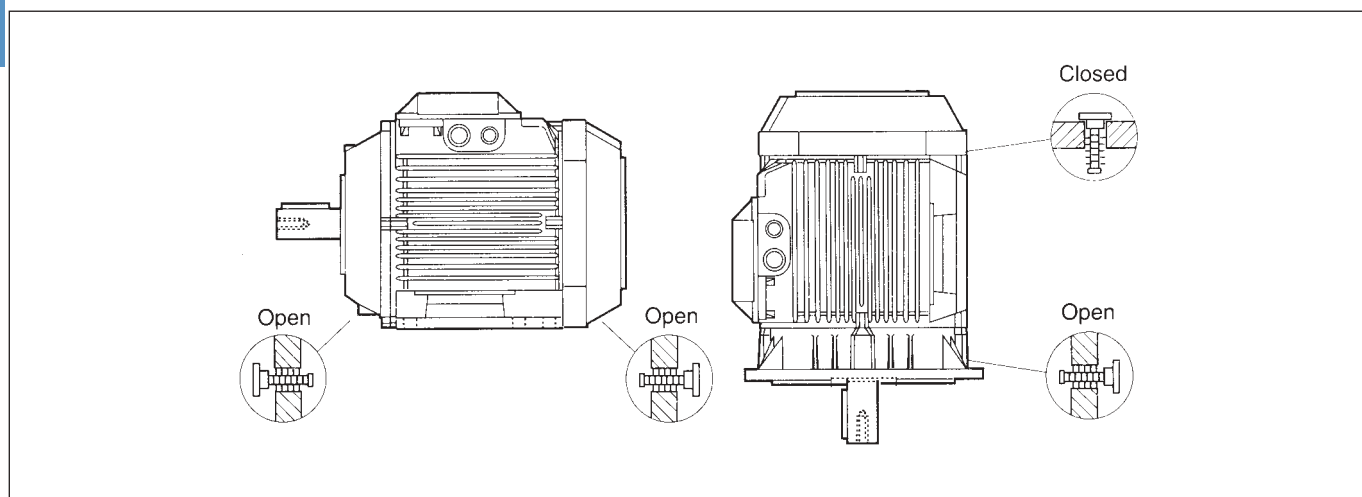
Drain holes

Motors that will be operated in very humid or wet environments and especially under intermittent duty should be provided with drain holes. The appropriate IM designation, such as IM 3031, is specified on the basis of the method of mounting the motor.

Motors are provided with closable plastic plugs in the drain holes (see diagram below).

The plugs will be open on delivery. When mounting the motors it should be ensured that the drain holes face downwards.

In the case of vertical mounting, the upper plug must be hammered home completely. In very dusty environments both plugs should be hammered home.



Terminal box

Sizes 112 to 132

The terminal box is made of aluminum alloy and is located on top of the stator. The lower part of the box is integrated with the stator. It is provided with two knock-out openings on each side. Sizes 160-180 also have a third smaller opening. Cable glands are not included.

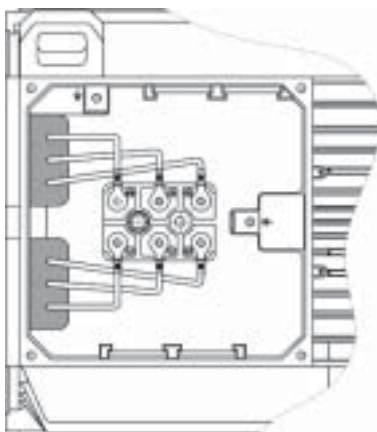
Sizes 160 to 250

Terminal boxes are mounted on the top of the motor as standard. The terminal box can also be mounted on the left or right side, see ordering information.

The terminal boxes can be turned 4x90°, to allow cable entry from any side of the motor.

Degree of protection of standard terminal box is IP 55

Motors come with connection flanges with tapped cable entries, and can be provided with cable glands as an option.



M000310

Terminal box size 112-132



M000313

Terminal box size 160-250

5

Connections

The terminal block is provided with 6 terminals for connecting Cu-cable. The terminals are marked in accordance with IEC 60034-8.

Connection openings

Motor size	Opening	Metric cable entry	Method of connection	Terminal bolt size	Maximum connectable Cu-cable area, mm ²
112-132	Knock-out opening	2 x (M25 + M20)	Cable lug	M5	10
160-180	Flange	2 x M40	Cable lug	M5	35
200-250	Flange	2 x M40	Cable lug	M10	70

Bearings

The motors are provided with single row deep groove ball bearings. Bearings have C4 clearance, which is needed when the bearing temperature is high. Bearings according to the tables beside.

Basic version with deep groove ball bearings

Motor size	Foot- and flange-mounted motor	
	D-end	N-end
112	6306-C4	6206/C4
132	6308-C4	6208/C4
160	6309/C4	6309/C4
180	6310/C4	6309/C4
200	6312/C4	6310/C4
225	6313/C4	6312/C4
250	6315/C4	6313/C4

Axially-locked bearings

The table below shows which of the motor's bearings are axially locked in the bearing seat. In motor sizes 112 to 250 the locking is done by an inner bearing cover.

Motor size	Foot-mounted motors	Flange-mounted motors	
		Large flange	Small flange
112-132	N-end	N-end	N-end
160-250	N-end	N-end	–

Bearing seals

Motor sizes 112 to 132 are equipped with sealed bearings (2RS). The size and type of seals for sizes 160 to 250 are in accordance with the table below:

Motor size	Number of poles	Standard design		Alternative design	
		Axial seal		Radial seal (DIN 3760)	
		D-end	N-end	Variant code 072	
160	2-12	RB45	V-45A	45x62x8	
180	2-12	RB50	RB45	50x68x8	
200	2-12	RB60	V-50A	60x80x8	Axial seal:
225	2-12	RB65	V-60A	65x85x10	RB45...75 = Gamma-ring
250	2-12	RB75	V-65A	75x95x10	V50...95 = V-ring

Lubrication

Motor sizes 112-132 are provided with shielded bearings. On request, motor sizes 112 to 132 are provided with grease nipples for regreasing, see variant code 041 under the heading "Bearings and lubrications".

Motor sizes 160-250 are provided with grease nipples for regreasing as standard.

Lubrication intervals and grease quantities are specified on a plate on the motor for sizes 160-250 as well as in the installation, operation and maintenance manual supplied with the motor.

Bearing life time and lubrication

The bearings shall be replaced with new bearings after maximum 24000 hours duty or maximum 3 years calendar time.

Lubrication method:

M3APV 112-132 Permanent grease as standard
M3BPV 160-250 Regreasable bearing as standard
M3BPV 160-250 Permanent grease bearings as option

Lubrication intervals

ABB follows the L1-principle in defining lubrication interval. That means that 99% of the motors are sure to make the interval time. The lubrication intervals can also be calculated according to the L10-principle, which are normally doubled compared to L1-values. Values available from ABB at request.

The table below gives lubrication intervals according to the L1-principle for different speeds. The values are valid for horizontal mounted motors (B3), and using Shell Albida PPS2 or Mobil Mobilith SHC 220.

For more information, see ABB's instruction for wood dryers.

Frame size	Amount of grease g	1500 r/min				1000 r/min			
		60 °C	70 °C	80 °C	90 °C	60 °C	70 °C	80 °C	90 °C
		Lubrication intervals in duty hours				Lubrication intervals in duty hours			
180	25	3400	2000	1200	700	4000	2500	1500	1000
200	40	2700	1600	900	600	4000	3000	1800	1000
225	50	2500	2000	1400	800	3500	2700	1600	900
250	60	2300	1500	900	600	3300	2300	1300	800

Permissible loading on shaft

Maximum allowed radial and axial forces on the shaft are limited to 50% of the forces for the standard process performance motors intended for duty in maximum 40 °C ambient temperatures. This limitation

is due to the higher temperatures in the bearing and grease. If the forces are higher, information about the maximum force can be supplied on request.

5

Rating plates

The rating plate is in table form giving the values for speed, current and power factor. Motors with permanently greased bearings have bearing types and grease information on the rating plate.

All rating and lubrication plates are made of stainless steel.


Motors with regreasable bearing have a separate lubrication plate as standard with maintenance information regarding regreasing intervals, grease amount and type of grease can be used.

Motor sizes 112 to 132

ABB					
3~ Motor M3APV 112 M-4					
3GAA 112 001-ADA, 501					
No.					
V	Hz	r/min	kW	A	cos φ
690 Y	50	1435	4,0	4,7	0,83
400 Δ	50	1435	4,0	8,2	0,83
Amb 90°C					
6306 2Z/C4 6206 2Z/C4 34 Kg					

M000314

Motor sizes 160 to 250

⊕ ABB						CE ⊕	
3~Motor M3BPV 160 M 4							
IEC 160 M/L 42							↶
No					Ins. cl. H		IP 55
V	Hz	kW	r/min	A	cos φ	I _A /I _N	t _E /s
690 Y	50	11	1460	12,1	0,84		
400 Δ	50	11	1460	21	0,84		
Prod. code 3GBP 162 501-ADA							
Amb 90°C							
6309/C4  6309/C4						115 Kg	
⊕		3GZV 193 021-9				IEC 60034-1 ⊕	

M000315

Motor sizes 160 to 250

Lubrication plate

⊕

Regreasing intervals in duty hours at amb. temp

⊕

M3BPV	Grease	r/min	60°C	70°C	80°C	90°C
160	25 gr	1000	4000	2500	1500	1000
180		1500	3400	2000	1200	700
200	40 gr	1000	4000	3000	1800	1000
		1500	2700	1600	900	600
225	50 gr	1000	3500	2700	1600	900
		1500	2500	2000	1400	800
250	60 gr	1000	3300	2300	1300	800
		1500	2300	1500	900	600

3GZV 193 007-5

Do not exceed the rated speed.

Regreasing intervals for vertical machines are half of the above values.

The following or equivalent performance greases can be used:

Shell	Albida PPS 2
Mobil	Mobilith SHC220

See Machine Instructions

⊕

M000316

Ordering information

When placing an order, please state the following minimum data in the order, as in example.

The product code of the motor is composed in accordance with the following example.

Motor type	M3BPV 160 M
Pole number	4
Mounting arrangement(IM code)	IM B3 (IM1001)
Rated output	11 kW
Product code	3GBP 162 501-ADE
More variant codes if needed	

Motor size

A	B	C	D, E, F, G	
M3BPV	160 M	3GBP 162 501	- ADE, 199 etc.	
		1 2 3 4 5 6 7 8 9 10 11 12 13 14		

A Motor type
 B Motor size
 C Product code
 D Code for mounting arrangement
 E Voltage and frequency code
 F Generation code followed by variant codes
 G Variant codes

Explanation of the product code

Positions 1 to 4

3GAP = Totally enclosed fan cooled squirrel cage process motor with aluminum frame

3GBP = Totally enclosed fan cooled squirrel cage process motor with cast iron frame

Positions 5 and 6

IEC size

11 = 112	20 = 200
13 = 132	22 = 225
16 = 160	25 = 250
18 = 180	

Position 7

Pole pairs

2 = 4 poles
3 = 6 poles

Positions 8 to 10

Running number

Position 11

- (dash)

Position 12

Mounting arrangement

A	= Foot-mounted motor
B	= Flange-mounted motor. Large flange with clearance holes.
C	= Flange-mounted motor. Small flange with tapped holes.
F	= Foot- and flange-mounted motor. Special flange.
H	= Foot- and flange-mounted motor. Large flange with clearance holes.
J	= Foot- and flange-mounted motor. Small flange with tapped holes.
N	= Flange-mounted (CI ring flange FF)
P	= Foot-and flange-mounted motor (CI ring flange FF)
V	= Flange-mounted motor. Special flange.

Position 13

Voltage and frequency: See tables below

Position 14

Version A,B,C... =

Generation code followed by variant codes

Code letters for supplementing the product code - single speed motors

Motor size	Code letter for voltage and frequency Direct start or, with Δ-connection, also Y/Δ-start				H	E	F	T	U	X
	S		D							
	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	
112-132	220-240 VΔ 380-420 VY	- 440-480 VY	380-420 VΔ 660-690 VY	440-480 VΔ -	415 VΔ	500 VΔ	500 VY	660 VΔ	690 VΔ	Other rated voltage, connection or frequency, 690 V max.
160-250	220, 230 VΔ 380,400,415 VY	- 440 VY	380,400,415VΔ 660, 690 VY	440 VΔ -	415 VΔ	500 VΔ	500 VY	660 VΔ	690 VΔ	

LV Process performance aluminum and cast iron motors for high ambient temperatures

Technical data for totally enclosed squirrel cage three phase motors

IP 55 - IC 411 - Insulation class H, temperature rise class B, ambient temperature up to 90°C

Out-put kW	Motor type	Product code	Effi- ciency			Power factor		Current			Torque			Moment of inertia		Sound pressure	
			Speed r/min	Full load	3/4 load	cos φ at: 100%	I _N A	I _s	T _N Nm	T _s	T _{max}	J = ¼ GD ² kgm ²	Weight kg	level LP dB(A)			
				100%	75%			I _N		T _N	T _N						
1500 r/min = 4-poles			400 V 50 Hz														
4	¹⁾ M3APV 112 M	3GAP 112 501-••F	1435	85.3	86.2	0.83	8.2	7.8	26.6	3.0	3.3	0.01	39	56			
5.5	¹⁾ M3APV 132 S	3GAP 132 501-••F	1460	88.0	88.6	0.85	10.7	8.3	36	2.3	3.0	0.03	55	59			
7.5	¹⁾ M3APV 132 M	3GAP 132 502-••F	1455	88.3	89.0	0.85	14.5	6.6	49.2	2.2	3.5	0.04	66	59			
11	¹⁾ M3BPV 160 M	3GBP 162 501-••E	1460	90.7	91.5	0.84	21	7.2	71	3.0	3.1	0.09	115	62			
15	¹⁾ M3BPV 160 L	3GBP 162 502-••E	1455	90.8	91.8	0.84	28.5	7.4	98	3.3	3.2	0.10	127	62			
18.5	¹⁾ M3BPV 180 M	3GBP 182 501-••E	1470	92.0	92.3	0.84	35	6.9	120	2.6	3.1	0.16	175	62			
22	¹⁾ M3BPV 180 L	3GBP 182 502-••E	1470	92.7	93.4	0.84	41	8.4	143	3.6	3.0	0.22	185	63			
30	¹⁾ M3BPV 200 MLB	3GBP 202 501-••E	1475	93.0	93.4	0.85	55	8.2	194	4.2	3.2	0.34	275	63			
37	¹⁾ M3BPV 225 SMB	3GBP 222 501-••E	1480	93.4	93.4	0.84	68	8.4	239	3.9	3.3	0.37	330	66			
45	¹⁾ M3BPV 225 SMC	3GBP 222 502-••E	1475	93.7	93.9	0.87	80	7.4	291	3.5	3.1	0.42	355	66			
55	¹⁾ M3BPV 250 SMB	3GBP 252 001-••E	1480	94.4	94.5	0.86	98	8.7	355	4.2	4.3	0.72	420	67			

¹⁾ When ordering, the following variant code has to be added to the product code: 199 = Extreme heavy duty design.

1000 r/min = 6-poles			400 V 50 Hz													
2.2	¹⁾	M3APV 112 M	3GAP	113 501-••F	935	80.5	80.8	0.78	5.1	5.8	22.5	2.5	2.8	0.01	37	54
3	¹⁾	M3APV 132 S	3GAP	133 501-••F	965	83.7	83.9	0.78	6.6	7.4	29.7	2.6	3.0	0.03	53	61
4	¹⁾	M3APV 132 MA	3GAP	133 502-••F	965	85.0	85.7	0.80	8.5	7.3	39.6	3.0	3.0	0.03	61	61
5.5	¹⁾	M3APV 132 MB	3GAP	133 503-••F	955	84.4	85.3	0.81	11.6	7.1	55	2.0	2.8	0.04	66	61
7.5	¹⁾	M3BPV 160 M	3GBP	163 501-••E	965	87.7	88.6	0.78	15.7	6.7	74	2.0	3.1	0.08	135	59
11	¹⁾	M3BPV 160 L	3GBP	163 502-••E	965	89.0	89.7	0.77	23.5	7.1	108	2.4	3.0	0.10	148	59
15	¹⁾	M3BPV 180 L	3GBP	183 501-••E	970	90.3	91.2	0.79	30.5	6.7	147	2.2	2.9	0.21	185	59
18.5	¹⁾	M3BPV 200 MLB	3GBP	203 501-••E	980	90.6	91.1	0.82	36	7.1	180	3.5	2.6	0.37	260	63
22	¹⁾	M3BPV 200 MLC	3GBP	203 502-••E	980	91.5	91.9	0.85	41	8.1	214	4.1	3.1	0.43	275	63
30	¹⁾	M3BPV 225 SMC	3GBP	223 501-••E	985	92.6	93.0	0.83	57	8.3	290	4.4	3.1	0.64	345	63
37	¹⁾	M3BPV 250 SMB	3GBP	253 501-••E	985	93.5	93.7	0.84	68	8.0	358	4.0	3.5	1.16	460	63

¹⁾ When ordering, the following variant code has to be added to the product code: 199 = Extreme heavy duty design.

LV Motors for high ambient temperatures - Variant codes

Code	Variant	Motor size		
		112-132	160-180	200-250
1)				
Bearings and lubrication				
040	Heat resistant grease. For bearing temperatures -25 - +150°C.	S	S	S
041	Bearings regreasable via grease nipples.	R	S	S
100	Locked non-drive end	S	S	S
100	Ball bearings with C4-clearance	S	S	S
195	Bearings greased for life	S	R	R
797	Stainless steel SPM nipples.	M	S	S
798	Stainless steel grease nipples.	M	S	S
Branch standard designs				
178	Stainless steel/acid proof bolts.	S	S	S
209	Non-standard voltage or frequency (special winding).	R	R	R
425	Corrosion protected stator and rotor core.* Frame size 71-112, only rotor as standard	S	S	S
Cooling system				
068	Metal fan.	S	M	M
075	Cooling method IC 418 (without fan). Output on request.	M	M	M
792	Metal fasteners for fan cover.	S	S	S
Earthing bolt				
067	External earthing bolt.	M	S	S
Hazardous environments				
See catalogue “Motors for Hazardous Environments”, BU/Ex-motors GB”, for details.				
Heating elements				
450	Heating element, 100-120 V.	M	M	M
451	Heating element, 200-240 V.	M	M	M
Insulation system				
014	Winding insulation class H.	S	S	S
Marine Motors				
See catalogue “Marine Motors, BU/Marine GB” for details.				
Mounting arrangements				
009	IM 2001 foot/flange mounted, IEC flange, from IM 1001 (B35 from B3).	M	M	M
217	Cast iron D-end shield	S	S	S
232	Cast iron N-end shield	S	S	S
Painting				
114	Special paint colour Orange NCS2070Y60R.	S	S	S
Protection				
784	Gamma-seal at D-end.	S	S	S

1) Certain variant codes cannot be used simultaneously.

S = Included as standard
M = On modification of a stocked motor, or on new manufacture, the number per order may be limited.

P = New manufacture only
R = On request
NA = Not applicable

Code 1)	Variant	Motor size		
		112-132	160-180	200-250
Rating & instruction plates				
003	Individual serial number.	M	S	S
098	Stainless steel rating plate.	S	S	S
100	Stainless steel lubrication plate.	R	S	S
Stator winding temperature sensors				
100	PTC-thermistors (3 in series), 180°C.	S	S	S
Terminal box				
021	Terminal box LHS (seen from D-end).	NA	P	P
180	Terminal box RHS (seen from D-end).	NA	P	P
465	Terminal box top moounted.	S	S	S
467	Lower than standard terminal box and rubber extended cable. Cable length 2 m, included.	P	P	P
Testing				
140	Test confirmation.	M	M	M
145	Type test report from test of identical motor.	M	M	M
146	Type test with report for motor from specific delivery batch.	M	M	M
147	Type test with report for motor from specific delivery batch, customer witnessed.	M	M	M
148	Routine test report.	M	M	M
149	Testing according to separate test specification.	R	R	R
221	Type test and multi-point load test with report for motor from specific delivery batch.	M	M	M
222	Torque/speed curve, type test and multi-point load test with report for motor from specific delivery batch.	M	M	M
760	Vibration level test.	M	M	M
761	Vibration spectrum test.	R	R	R
762	Noise level test.	M	M	M
763	Noise spectrum test.	R	R	R

¹⁾ Certain variant codes cannot be used simultaneously.

S = Included as standard
M = On modification of a stocked motor,
or on new manufacture,
the number per order may be limited.

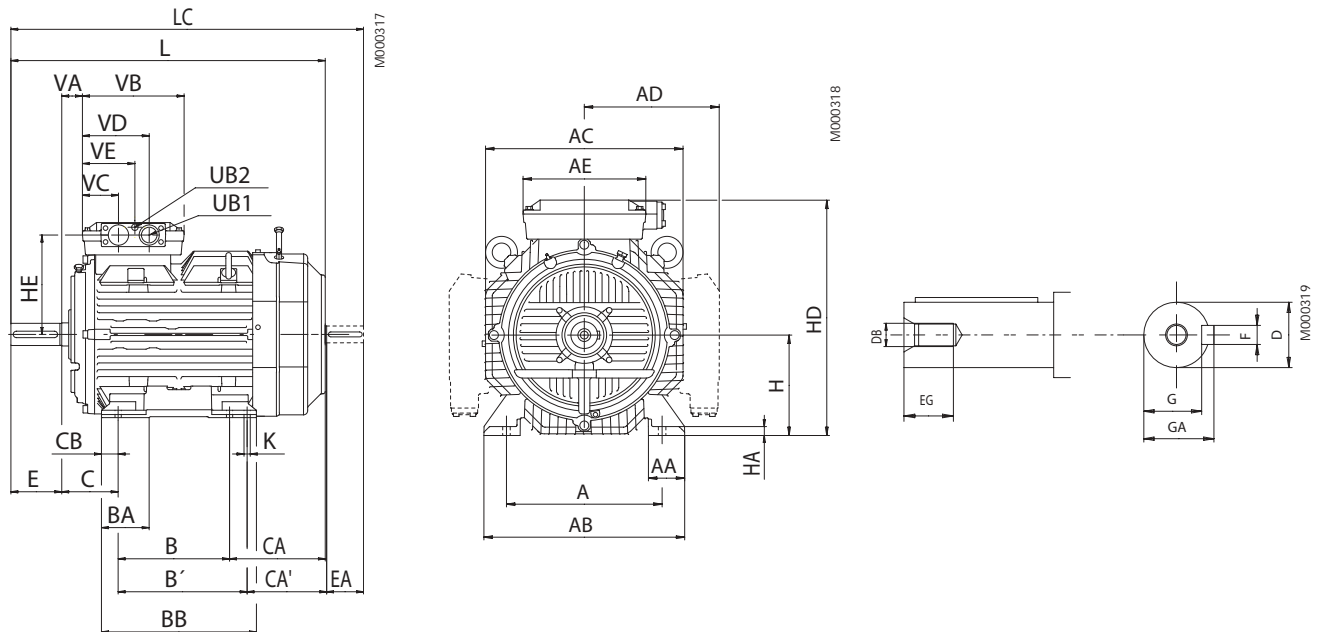
P = New manufacture
only
R = On request
NA = Not applicable

LV Process performance motors for high ambient temperatures

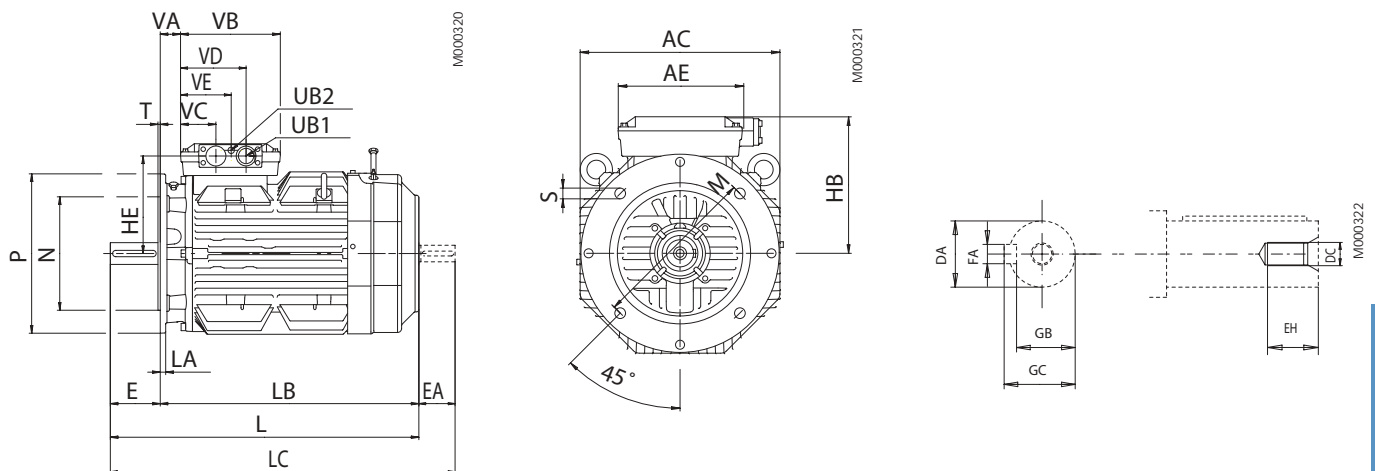
Size 112-250

Dimension drawings

Foot mounted motor IM 1001, B3



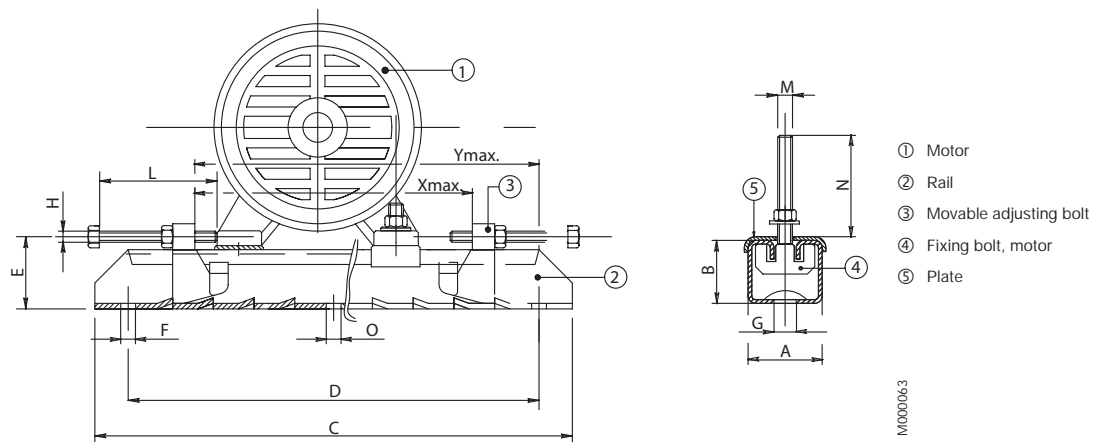
Flange-mounted motor IM 3001, B5



IM 1001, IM B3 and IM 3001, IM B5						IM 1001, IM B3							IM 3001, IM B5			
Motor size	D	GA	F	E	L max	A	B	B ´	C	HD	K	H	M	N	P	S
Aluminum frame																
112	28	31	8	60	388	190	140	-	70	258	12	112	215	180	250	14.5
132	38	41	10	80	481.5	216	140	178	216	140	178	89	265	230	300	14.5
Cast iron frame																
160	42	45	12	110	643.5	254	210	254	108	382	14.5	160	300	250	350	19
180	48	51.5	14	110	700.5	279	241	279	121	422	14.5	180	300	250	350	19
200	55	59	16	110	774	318	267	305	133	506	18.5	200	350	300	400	19
225	60	64	18	140	866	356	286	311	149	552	18.5	225	400	350	450	19
250	65	69	18	140	875	406	311	349	168	605	24	250	500	450	550	19

Accessories

Slide rails for motor sizes 112 to 250

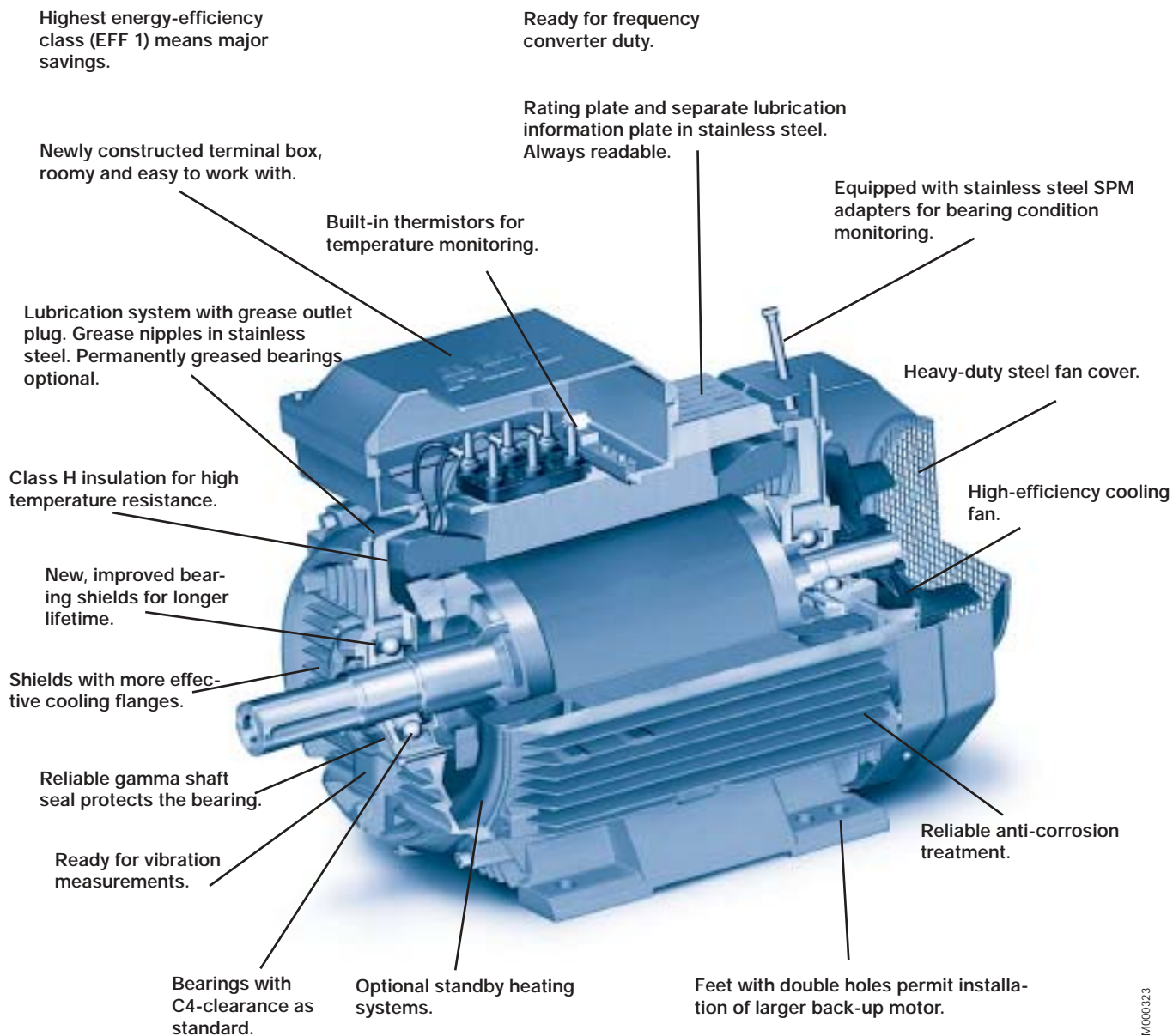


Motor size	Type	Product code	A	B	C	D	E	F	G	H	L	M	N	O	Xmax	Ymax	Weight kg
112-132	TT132/10	-12	65	40	530	480	52	17	26	M12	120	M10	45	-	360	420	7.8
160-180	TT180/12	-14	75	42	700	630	57	17	26	M12	120	M12	50	-	520	580	12.0
200-225	TT225/16	-15	82	50	864	800	68	17	27	M16	140	M16	65	17	670	740	20.4
250	TT280/20	-16	116	70	1072	1000	90	20	27	M18	150	M20	80	20	870	940	43.0

Each set includes two complete slide rails including screw for mounting the motor on the rails. Screws for mounting the rails on the foundation are not included. Slide rails are supplied with unmachined lower surfaces and should, prior to tightening down, be supported in a suitable manner.

Motors for high ambient temperatures

Hot and Humid - Motors for the toughest environment



5

M000323

LV Process performance high ambient motors in brief, basic design

Motor size		112	132	160	180	200	225	250
Stator	Material	Die cast aluminum alloy			Cast iron EN-GJL-200/GG 20/GRS 200			
	Paint color shade	Orange NCS2070Y60R						
	Paint thickness	Two-pack epoxy paint, thickness ≥ 70 µm						
Bearing end shields	Material	Cast iron EN-GJL-150/GG 15/GRS 150						
	Paint color shade	Orange NCS2070Y60R						
	Paint thickness	Two-pack epoxy paint, thickness ≥ 70 µm						
Bearings	D-end	6306-2Z/C4	6308-2Z/C4	6309/C4	6310/C4	6312/C4	6313/C4	6315/C4
	N-end	6206-2Z/C4	6208-2Z/C4	6309/C4	6309/C4	6310/C4	6312/C4	6313/C4
Axially-locked bearings	Inner bearing cover	N-end						
Bearing seal	D-end	Gamma sealing made of viton						
	N-end	Labyrinth seal			V-ring made of viton			
Lubrication		Permanently lubricated shielded bearings			Regreasable bearings, regreasing stainless steel nipples M6x1			
SPM-adaptors		Optional			As standard with stainless steel adaptors			
Rating plate	Material	Stainless steel, SS-EN 10088, thickness 0,5 mm						
Terminal box	Frame material	Die cast aluminum alloy, base integrated with stator			Cast iron EN-GJL150/GG 15/GRS 150			
	Cover material	Die cast aluminum alloy			Cast iron EN-GJL150/GG 15/GRS 150			
	Cover screw material	Stainless steel						
Connections	Cable entries	2 x (M25 + M20), knock-out openings			2xM40		2xM63	
	Terminals	6 terminals for connection with cable lugs (not included)						
	Cable glands	Available as option			Cable flanges as standard, cable glands as option			
Fan	Material	Aluminum			Glass-fibre reinforced moulded polypropylene			
Fan cover	Material	Steel sheet						
	Paint color shade	Orange NCS2070Y60						
	Paint thickness	Two-pack epoxy paint, thickness ≥ 70 um						
Stator winding	Material	Copper						
	Insulation	Insulation class H						
	Winding protection	PTC thermistors, 180 °C, 3 in series						
Rotor winding	Material	Die cast aluminum with corrosion protection painted rotor						
	Balancing method	Half key balancing						
	Key ways	Closed key ways						
Heating elements	On request	25W	25W	25W	25W	50W	50W	50W
Drain holes		Drain holes with plastic plugs, open on delivery						
Enclosure		IP55 with closed plastic plugs						
Cooling method		IC411						

ABB Motors' total product offer

ABB offers several comprehensive ranges of AC motors and generators. We manufacture synchronous motors for even the most demanding applications, and a full range of low and high voltage induction motors. Our in-depth knowledge of virtually every type of industrial processing ensures we always specify the best solution for your needs.



Low voltage motors and generators

General purpose motor for standard applications

- Aluminum motors
- Steel motors
- Cast iron motors
- Open drip proof motors
- Global motors
- Brake motors
- Single phase motors
- Servomotors

Process performance motors for more demanding applications

- Aluminum motors
- Cast iron motors (IEC and NEMA)
- Motors for high ambient temperatures
- Permanent magnet motors
- High speed motors
- Wind turbine generators
- Smoke venting motors
- Water cooled motors
- Motors for roller table drives

Motors for hazardous areas

- Flameproof motors
- Increased safety motors
- Non-sparking motors
- Dust ignition proof motors

Marine motors

- Aluminum motors
- Steel motors
- Cast iron motors
- Open drip proof motors

High voltage and synchronous motors and generators

- High voltage cast iron motors
- Induction modular motors
- Slip ring motors
- Motors for hazardous areas
- Synchronous motors and generators
- DC motors and generators



Motors & Drives

> Motors

>> Low Voltage Motors

General purpose motors

>>> Process performance motors

Cast iron motors

Aluminum motors

Motors for high ambient temperatures

Motors for hazardous areas

Marine motors

Other applications

NEMA motors

Permanent magnet motors

Smoke venting motors

Water cooled motors

Fan application motors

Roller table motors

>> High Voltage Motors

>>> Process Performance Cast Iron Motors

> Generators



Low Voltage Motors

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