Low Voltage Process Performance
NEMA Frame Motors

ABB is the world's leading producer of motors

ABB's NEMA motors are engineered to meet the toughest demands of today's process industry applications. These motors combine the highest quality materials and industry leading construction methods to provide the best quality and deliver superior reliability and performance through many years of continuous operation.

ABB (www.abb.com) is a 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 104,000 people.

Low Voltage Process Performance NEMA Frame Motors

Totally enclosed squirrel cage three phase low voltage motors, Sizes 405 - 588, 50 to 800 HP

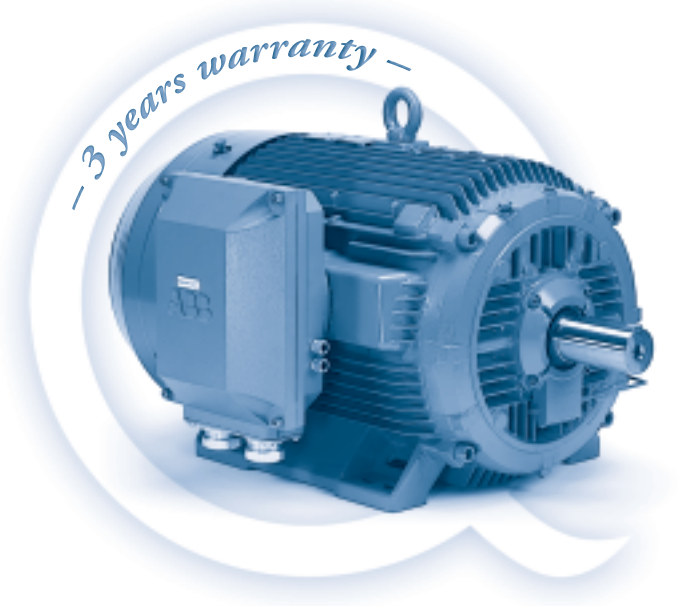

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ABB reserves the right to change the design, technical specification and dimensions without prior notice.

General information

Standards

ABB NEMA motors are of the totally enclosed, fan cooled three phase squirrel cage type, built to comply with NEMA and CSA 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 conform to all applicable EU Directives.

NEMA/CSA

NEMA MG-1-1998
IEEE 112-1996
CSAfile C22.2 no. 100.95


DET NORSKE VERITAS

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

ABB Automation Technology Products
LV Motors


Certificate of Compliance

The products listed below are eligible to bear the CSA Mark shown


Certificate of Approval

Awarded to

ABB Oy, Electrical Machines

Standard

OHSAS 18001:1999

Scope of Supply

Design, Marketing and Manufacturing of Low voltage Induction Motors and Generators within the IEC sizes 63-450 and corresponding Nema Motors.


Certificate of Approval

Awarded to

ABB Oy

ISO 9001:2000

Insulation

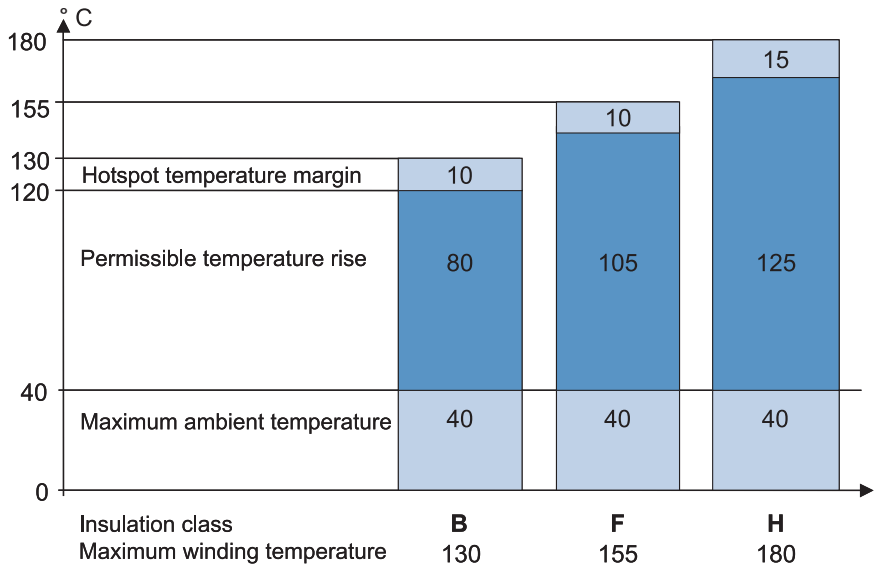
ABB uses class F insulation systems, which, with temperature rise B, is the most common requirement among industry today.

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

Cooling

Designation system concerning methods of cooling refers to standard NEMA MG 1-1998 part 6.

Example

IC 4 (A) 1 (A) 6

International Cooling

Circuit arrangement
0: Free circulation (open circuit)
4: Frame surface cooled

Primary coolant
A for air (omitted for simplified designation)

Method of movement of primary coolant
0: Free convection
1: Self-circulation
6: Machine-mounted independent component

Secondary coolant
A for air (omitted for simplified designation)
W for water

Method of movement of secondary coolant
0: Free convection
1: Self-circulation
6: Machine-mounted independent component
8: Relative displacement

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 from 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

IP 5 5

Characteristic letter

Degree of protection to persons and to parts of the motors inside the enclosure
2: Motors protected against solid objects greater than 12 mm
4: Motors protected against solid objects greater than 1 mm
5: Dust-protected motors
6. Dust proof

Degree of protection provided by the enclosure with respect to harmful effects due to ingress of water
3: Motors protected against spraying water
4: Motors protected against splashing water
5: Motors protected against water jets
6: Motors protected against heavy seas

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

IK 08

International mechanical protection

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*

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. The use of a frequency converter together with a squirrel cage motor usually leads to significant energy and environmental savings.

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

When selecting process performance motors for use with variable speed drives, the following points should 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, or noise of the motor. Furthermore, a change in the distribution of the losses may affect the temperature rise 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 program 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 for maximum speeds for process performance motors are described in figure 1. Exact values can be found from the product specific sections of this catalog or from the rating plate of the motor.

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

Frame size	Speed r/min	
	2-pole	4-pole
405	3600	2600
44_	3600	2300
586	3600	2000
588	3000	2000

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 should be noted that when the operating temperature differs from the designed, the lifetime of the bearing will also 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 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 modern 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.

For GTO converters, consideration must be given to the information about cable length, pulse rise time and voltage overshoot using the voltage/cable length guideline.

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 40 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 NEMA 405 and upward, additional potential equalization 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 equalization, 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 A)

For fulfilling 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 < 150 HP	**P_N ≥ 150 HP or ≥ NEMA 449**	**P_N ≥ 450 HP or ≥ NEMA 680**
U_N ≤ 500 V	Standard motor	Standard motor + Insulated N-bearing	Standard motor + Insulated N-bearing + Common mode filter
U_N ≤ 600 V	Standard motor + dU/dt-filter **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 + Common mode filter **OR** Reinforced insulation + Insulated N-bearing + Common mode filter
U_N ≤ 690 V	Reinforced insulation + dU/dt-filter	Reinforced insulation + dU/dt-filter (reactor) + Insulated N-bearing	Reinforced insulation + Insulated N-bearing + dU/dt-filter + 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 common mode currents and the risk of bearing currents.

Common mode filters
Common mode filters reduce 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 should be noted the harmonic content and control algorithms vary between different frequency converters and thus the temperature rise of the motor also differs.

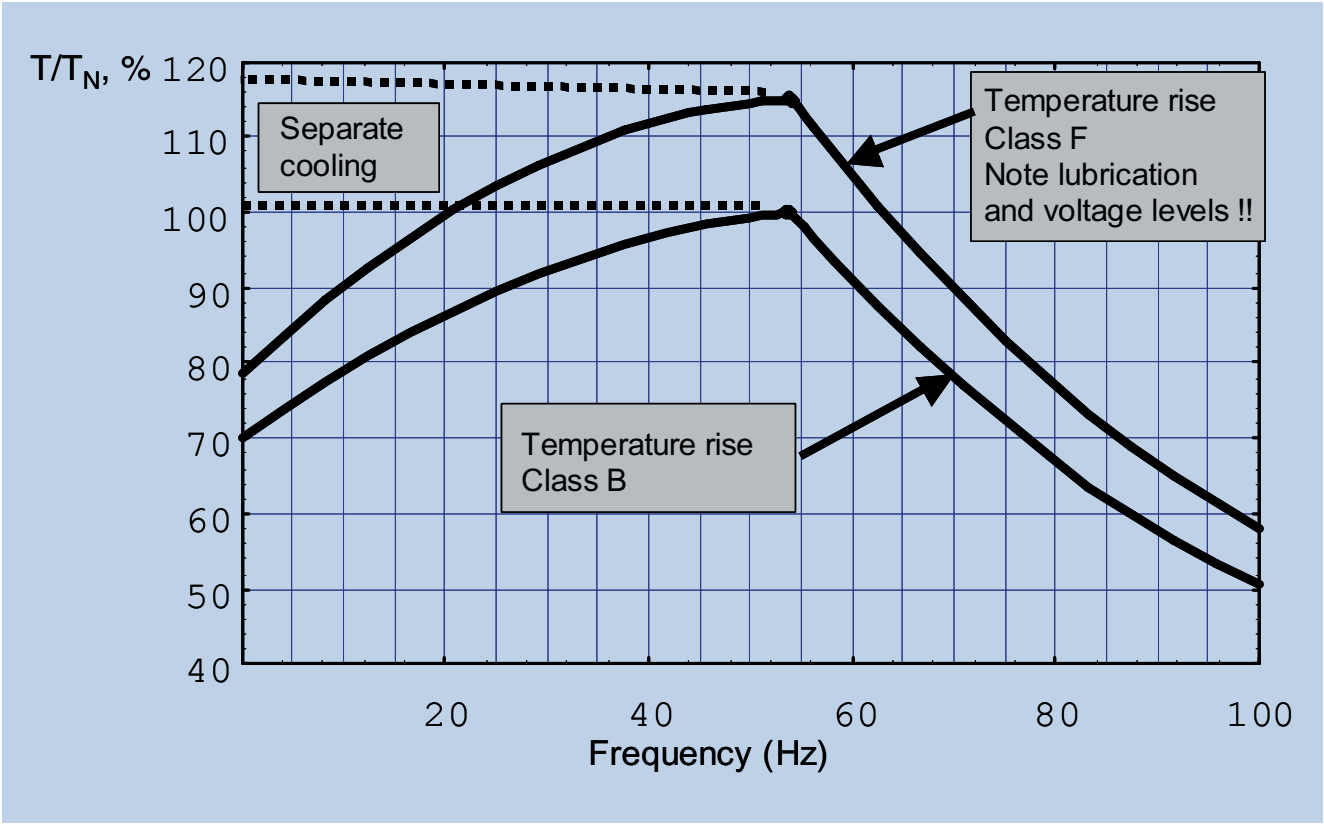
These guidelines present the maximum continuous load torque of a motor as a function of frequency (speed) to give the same temperature rise as with rated sinusoidal supply at nominal frequency and full rated load.

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

If the motor is utilized 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 ACS800, Field weakening point 60 Hz.



Mechanical design

Stator

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 (B3), D-flange mounting (B5) or Foot and D-flange mounting (B35).

Drain holes

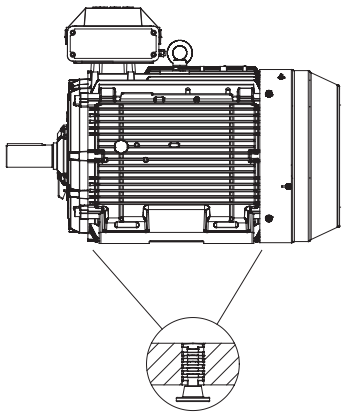
Motors that will be operated in very humid or wet environments, and especially under intermittent duty, should be provided with drain holes. The appropriate IM designation, such as IM 3031, is specified, on the basis of the method of motor mounting.

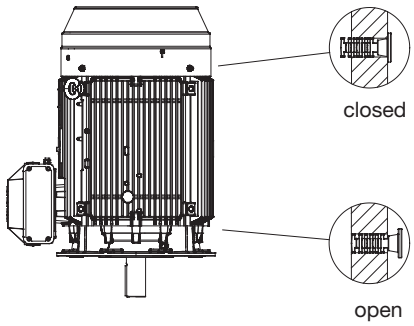
Motors are fitted with drain holes and closable plugs. The plugs are open on delivery. When mounting the motors, ensure that the drain holes face downwards.

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

When mounting arrangement differs from foot mounted IM B3, please mention variant code 066 when ordering.

See variant codes 065 and 066 under the heading “Drain holes”.





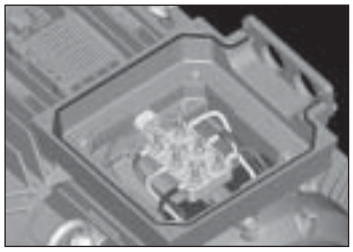
As standard with drain holes and closable plugs.

Terminal box

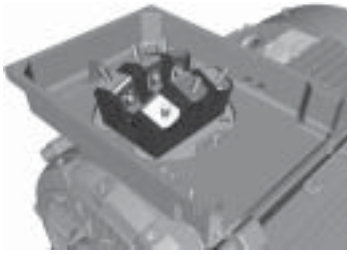
Terminal boxes are mounted on the left hand side of the motor facing the output shaft (F1) as standard. The terminal box can also be mounted on the top (F0) or right side (F2), see ordering information.

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

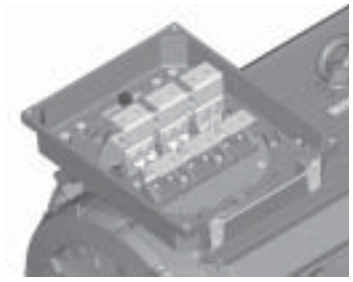
As standard the terminal box is provided with cable glands.



Terminal box for motor size 405



Terminal box for motor sizes 445 to 449.



Terminal box for motor size 588.

Motor sizes 405-588 Co-ordination of terminal boxes and cable entries

Motor size	Terminal box	Top mounted Flange or adapter	Side mounted Flange or adapter	Cable box or cable glands	Gland thread	Cable diameter
405-445	210	3GZF294730-749	3GZF294730-749	2 x 3GZF294730-613	2 x M63 X 1.5	2 x Ø32-49
449	370	3GZF294730-753	3GZF294730-753	2 x 3GZF294730-613	2 x M63 X 1.5	2 x Ø32-49
586	750	3GZF293730-944	3GZF294730-759	3GZF294730-301		2 x Ø48-60
587-588	750	3GZF293730-944	3GZF294730-759	3GZF294730-501		2 x Ø60-80

Bearings

The motors are normally fitted with single-row deep groove ball bearings as listed in the table below.

If the bearing at the D-end is replaced with a roller bearing (NU- or NJ-), higher radial forces can be handled. Roller bearings are suitable for belt drive applications. When there are high axial forces, angular-contact ball bearings should be used. This option is available on request. When a motor with angular-contact ball bearings is ordered, the method of mounting and direction and magnitude of the axial force must be specified. For special bearings, please see the variant codes.

Basic version with deep groove ball bearings

Motor	Number	Deep groove ball bearings	
size	of poles	D-end	N-end
405	2-12	6315/C3	6313/C3
444/5	2	6316/C3	6316/C3
	4-12	6316/C3	6316/C3
447/9	2	6316/C3	6316/C3
	4-12	6319/C3	6316/C3
58_	2	6316M/C3	6316M/C3
	4-12	6322/C3	6316/C3

Version with roller bearings, variant code 037

Motor	Number	Roller bearings, variant code 037
size	of poles	D-end
405	2-12	NU 315
444/5	2	[1])
	4-12	NU 316/C3
447/9	2	[1])
	4-12	NU 319/C3
58_	2	[1])
	4-12	NU 322/C3

[1]) On request

Axially-locked bearings

The outer bearing ring at the D-end can be axially locked with an inner bearing cover. The inner ring is locked by tight tolerance to the shaft.

All motors are equipped as standard with an axially-locked bearing at the D-end.

Transport locking

Motors that have roller bearings or an angular contact ball bearing are fitted with a transport lock before despatch to prevent damage to the bearings during transport. In case of transport locked bearing, motor sizes 405 to 588 are provided with a warning sign.

Locking may also be fitted in other cases where transport conditions are suspected of being potentially damaging.

Bearing seals

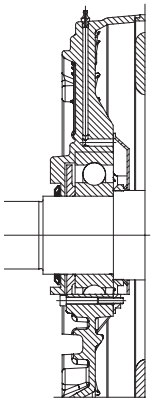
The size and type of seals are in accordance with the table below.

Motor	Number	**Standard design**		**Alternative design**	
size	of poles	**D-end**	**N-end**	**D-end**	**N-end**
405	2-12	Axial seal RB 75	Axial seal V-65A	Radial seal 75x95x10	
444/5	2	Labyrinth seal	Axial seal VS80	-	Labyrinth seal
	4-12	Axial seal VS80	Axial seal VS80	Labyrinth seal	Labyrinth seal
				Radial seal 80x110x10	Radial seal 80x110x10
447/9	2	Labyrinth seal	Axial seal VS80	-	Labyrinth seal
	4-12	Axial seal VS95	Axial seal VS80	Labyrinth seal	Labyrinth seal
				Radial seal 95x125x10	Radial seal 80x110x10
	4-12	Labyrinth seal	Axial seal VS80	-	Labyrinth seal
					Radial seal 80x110x10
585/6/7/8	2	Labyrinth seal	Axial seal VS80		Labyrinth seal
	4-12	Labyrinth seal	Axial seal VS80	-	Labyrinth seal

Axial seal: RB75 = Gamma-ring
V65-VS80 = V-ring

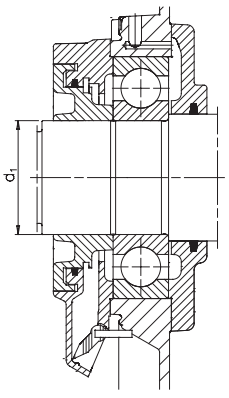
Motor size 405

Axial seal

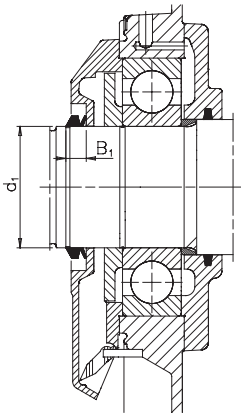


Motor sizes 444-588

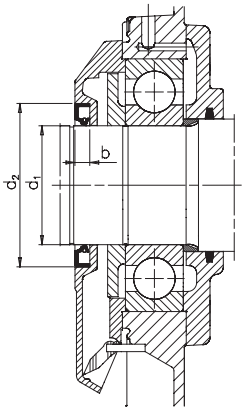
Labyrinth seal



V-ring



Radial seal



Bearing life

The nominal life L_{10h} of a bearing is defined according to ISO 281 as the number of operating hours achieved or exceeded by 90% of identical bearings in a large test series under certain specified conditions. 50% of the bearings achieve at least five times this figure.

The calculated bearing life L_{10h} for power transmission by means of a coupling (horizontal machine) $\geq$ 200,000 hours.

Lubrication

On delivery, the motors are ready lubricated with high quality grease. The recommended grease used can be seen from ABB's Low Voltage Motors Manual delivered together with the motor or from the lubrication plate fastened to the motor frame.

Motors have regreasable bearings as standard.

The bearing system has been built so that a valve disc can be used to ease the lubrication. Motors are lubricated while running.

Grease outlet opening has closing valves at both ends. This should be opened before greasing and closed 1-2 hours after regreasing. After lubrication close the valves. This ensures that the construction is tight and dust or dirt cannot get inside the bearing.

As an option, a grease collection method can be used.

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), with about 80°C bearing temperature and using high quality grease with lithium complex soap and mineral or PAO-oil.

For more information, see ABB's Low Voltage NEMA Motors Manual.

Frame size	Amount of grease g/bearing	3600 r/min	3000 r/min	1800 r/min	1500 r/min	1000 r/min	500-900 r/min
	Ball bearings						
	Lubrication intervals in duty hours						
40_	60	2500	4000	9000	11500	15000	18000
445	35	2000	3500	–	–	–	–
445	55/70 [1]	–	–	8000	10500	14000	17000
449	35	2000	3500	–	–	–	–
449	90	–	–	6500	8500	12500	16000
58_	35	1200	2000	–	–	–	–
58_	120	–	–	4200	6000	10000	13000
	Roller bearings						
	Lubrication intervals in duty hours						
40_	60	1300	2200	4500	5700	7500	9000
445	35	1000	1800	–	–	–	–
445	55/70 [1]	–	–	4000	5300	7000	8500
449	35	1000	1800	–	–	–	–
449	90	–	–	3300	4300	6000	8000
58_	35	600	1000	–	–	–	–
58_	120	–	–	2000	3000	5000	6500

[1] D-end = 55 g, N-end = 70 g

1 gram = 0.0352 ounces

Ordering information

Sample order

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	M3BN 449 KHA
Pole number	4
Mounting arrangement (IM code)	IM B3 (IM 1001)
Rated output	200 HP
Product code	3GBN842910-LDG
Variant codes if needed	

Motor size

A	B	C										D, E, F,		G	
M3BN	449KH	3	G	B	N	8	4	2	9	1	0	-	L	D	G	002 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 Mounting arrangement code
E Voltage and frequency code
F Generation code
G Variant codes

Explanation of the product code:

Positions 1-4
3GBN = TEFC three phase motor, cast iron frame

Positions 5-6
NEMA frame series
80 = 40_
84 = 44_
98 = 58_

Position 7 - Speed (pole pairs)
1 = 2 poles
2 = 4 poles
3 = 6 poles
4 = 8 poles

Positions 8-10 - Serial number

Position 11 - Dash

Position 12 - Mounting arrangement
A = Foot mounted, terminal box on top (F0)
L = Foot mounted, terminal box LHS (F1)
R = Foot mounted, terminal box RHS (F2)
B = Footless frame, D flange mounting
H = Foot and flange mounting, D flange, terminal box on top (F0)
S = Foot and flange mounting, D flange, terminal box LHS (F1)
T = Foot and flange mounting, D flange, terminal box RHS (F2)

Positions 13 - Voltage/frequency code

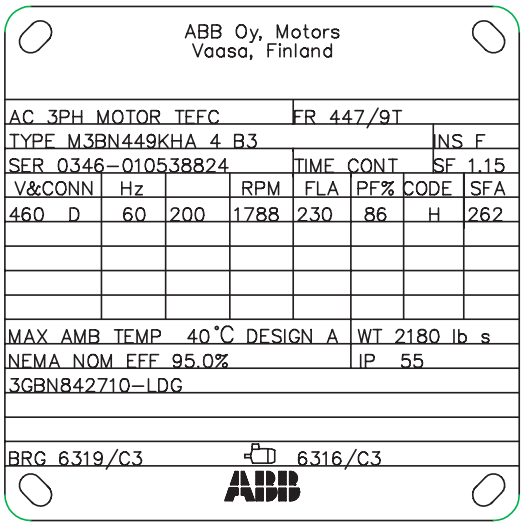
D	E	X
460 V 60 Hz	575 V 60 Hz	Other

Generation code - G

Modification codes
The product code will be followed by modification codes when needed.

Rating plate

ABB low voltage NEMA motors are rated for service in both direct on line and variable frequency drive applications. Each motor is furnished with separate rating plates to indicate its operating parameters for each situation.



NEMA LV Motors, Inverter Duty
Cast Iron, Three phase, TEFC

For IGBT Power Supply, Switching frequency 3 kHZ (average)
460 V, IP 55, S.F. 1.0 on VFD, 40°C ambient

Output HP	Frame size	Motor type	Product code	Speed r/min	Eff. F.L. [1] %	P.F. F.L. [1] cos φ	Current approx. 460 volts	Current approx. 575 volts	F.L.A. LRA %FL A	Torque rated T lb-ft	Torque rated BDT %FL	LRT %FL	Moment of inertia lb-ft2	Weight lbs	Sound pressure L_P dB(A)
3600 r/min = 2 poles															
100	404/5TS	**M3BN 405 SMC**	3GBN 801 230-••G	3573	93,6	0,90	111	89	870	147	340	260	14,5	1045	79
125	444/5TS	**M3BN 445 SMB**	3GBN 841 220-••G	3575	94,5	0,88	141	113	730	184	290	180	21,5	1460	82
150	444/5TS	**M3BN 445 SMC**	3GBN 841 230-••G	3577	94,5	0,89	166	133	790	220	300	210	27	1600	82
200	447/9TS	**M3BN 449 KHA**	3GBN 841 910-••G	3581	95,0	0,87	226	181	780	293	300	220	33	2500	83
250	447/9TS	**M3BN 449 KHB**	3GBN 841 920-••G	3580	95,4	0,88	278	223	750	367	280	210	40	2700	83
300	447/9TS	**M3BN 449 KHC**	3GBN 841 930-••G	3580	95,4	0,89	330	264	780	440	300	240	50	2950	83
350	447/9TS	**M3BN 449 KHD**	3GBN 841 940-••G	3577	95,4	0,89	382	306	730	514	260	240	55	3100	83
400	447/9TS	**M3BN 449 KHF**	3GBN 841 960-••G	3580	95,8	0,90	430	344	840	587	280	230	70	3450	83
450	585/6	**M3BN 586 SMB**	3GBN 981 220-••G	3580	95,8	0,89	493	395	750	660	310	190	81	3700	88
500	585/6	**M3BN 586 SMC**	3GBN 981 230-••G	3583	95,8	0,89	546	437	750	733	290	200	86	3850	88
600	586/7	**M3BN 587 MLA**	3GBN 981 410-••G	3581	95,8	0,88	662	530	750	880	280	220	97	4400	88
650	586/7	**M3BN 587 MLB**	3GBN 981 420-••G	3583	96,2	0,90	698	558	810	953	340	190	102	4600	88
1800 r/min = 4 poles															
100	404/5T	**M3BN 405 SMC**	3GBN 802 230-••G	1780	94,5	0,86	114	91	730	295	320	250	23	1090	70
125	444/5T	**M3BN 445 SMB**	3GBN 842 220-••G	1784	94,5	0,86	144	115	700	369	280	240	36	1460	72
150	444/5T	**M3BN 445 SMC**	3GBN 842 230-••G	1783	95,0	0,87	170	136	700	442	270	240	44	1600	72
200	447/9T	**M3BN 449 KHA**	3GBN 842 910-••G	1788	95,0	0,86	229	183	730	589	300	220	62	2500	74
250	447/9T	**M3BN 449 KHB**	3GBN 842 920-••G	1788	95,0	0,86	285	228	730	743	300	220	69	2600	74
300	447/9T	**M3BN 449 KHC**	3GBN 842 930-••G	1788	95,4	0,86	340	272	740	882	310	230	83	2850	74
350	447/9T	**M3BN 449 KHD**	3GBN 842 940-••G	1787	95,4	0,87	395	316	710	1029	290	220	93	3000	82
400	447/9T	**M3BN 449 KHE**	3GBN 842 950-••G	1787	95,4	0,87	450	360	740	1176	300	230	105	3100	82
450	447/9T	**M3BN 449 KHF**	3GBN 842 960-••G	1786	95,4	0,87	505	404	750	1323	300	250	119	3350	82
500	585/6	**M3BN 586 SMC**	3GBN 982 230-••G	1788	95,8	0,87	560	448	740	1469	270	220	171	4000	83
600	586/7	**M3BN 587 MLA**	3GBN 982 410-••G	1789	95,8	0,86	676	541	740	1763	260	240	200	4700	83
700	587/8	**M3BN 588 LKA**	3GBN 982 810-••G	1790	96,2	0,88	769	622	740	2053	280	240	238	5500	83
800	587/8	**M3BN 588 LKB**	3GBN 982 820-••G	1790	96,2	0,86	902	722	820	2348	290	270	252	5750	83

[1] Efficiency and full load current at 60 Hz, sine wave.

The bullet • indicates a 3-letter supplement for choice of mounting arrangement, voltage and frequency, and generation code, see ordering information page.

NEMA nominal efficiency according to IEEE 112.
EPAct is applicable on motors up to 200 HP.

NEMA LV Motors, Inverter Duty
Cast Iron, Three phase, TEFC

For IGBT Power Supply, Switching frequency 3 kHZ (average)
460 V, IP 55, S.F. 1.0 on VFD, 40°C ambient

Output HP	Frame size	Motor type		Product code		Speed r/min	Eff. F.L. [1] %	P.F. F.L. [1] cos φ	Current approx. 460 volts	Current approx. 575 volts	F.L.A. LRA %FL A	Torque rated T lb-ft	Torque rated BDT %FL	LRT %FL	Moment of inertia lb-ft2	Weight lbs	Sound pressure L_p dB(A)
1200 r/min = 6 poles																	
60	404/5T	**M3BN**	**405 SMB**	3GBN	803 220-••G	1189	93,6	0,82	75	60	740	265	310	280	36	1025	70
75	404/5T	**M3BN**	**405 SMC**	3GBN	803 230-••G	1187	93,6	0,83	90	72	760	332	300	280	39	1080	70
100	444/5T	**M3BN**	**445 SMC**	3GBN	843 230-••G	1188	94,1	0,85	117	94	650	442	230	210	59	1500	70
125	444/5T	**M3BN**	**445 SMD**	3GBN	843 240-••G	1190	94,1	0,84	147	118	750	552	260	270	72	1650	70
150	447/9T	**M3BN**	**449 KHA**	3GBN	843 910-••G	1192	95,0	0,84	176	141	770	661	290	260	98	2400	75
200	447/9T	**M3BN**	**449 KHC**	3GBN	843 930-••G	1191	95,0	0,84	234	187	750	883	280	260	128	2650	75
250	447/9T	**M3BN**	**449 KHD**	3GBN	843 940-••G	1191	95,0	0,84	292	234	750	1103	280	260	156	3000	78
300	447/9T	**M3BN**	**449 KHG**	3GBN	843 970-••G	1190	95,0	0,85	346	277	730	1325	260	240	220	3500	78
350	585/6	**M3BN**	**586 SMB**	3GBN	983 220-••G	1192	95,0	0,83	412	330	760	1541	270	250	230	3700	80
400	585/6	**M3BN**	**586 SMC**	3GBN	983 230-••G	1192	95,0	0,84	465	372	770	1763	260	240	268	4000	80
450	586/7	**M3BN**	**587 MLB**	3GBN	983 420-••G	1193	95,0	0,83	530	424	770	1983	280	260	322	4800	80
500	587/8	**M3BN**	**588 LKA**	3GBN	983 810-••G	1194	95,4	0,83	588	470	770	2200	290	260	370	5500	80
550	587/8	**M3BN**	**588 LKB**	3GBN	983 820-••G	1192	95,4	0,83	645	516	770	2420	280	260	392	5750	80
900 r/min = 8 poles																	
50	404/5T	**M3BN**	**405 SMB**	3GBN	804 220-••G	886	91,7	0,80	63	51	690	296	300	190	36	1025	63
60	404/5T	**M3BN**	**405 SMC**	3GBN	804 230-••G	886	91,7	0,80	75	61	710	356	310	200	40	1095	63
75	444/5T	**M3BN**	**445 SMC**	3GBN	844 230-••G	891	93,0	0,82	92	74	750	442	300	160	59	1500	69
100	444/5T	**M3BN**	**445 SMD**	3GBN	844 240-••G	890	93,0	0,83	121	97	750	591	160	290	72	1650	70
125	447/9T	**M3BN**	**449 KHA**	3GBN	844 910-••G	890	93,6	0,83	150	120	730	738	300	160	98	2400	70
150	447/9T	**M3BN**	**449 KHC**	3GBN	844 930-••G	891	93,6	0,83	180	144	750	885	310	170	128	2650	75
200	447/9T	**M3BN**	**449 KHD**	3GBN	844 940-••G	890	94,1	0,82	242	194	770	1181	310	160	156	3000	78
250	447/9T	**M3BN**	**449 KHG**	3GBN	844 970-••G	890	94,5	0,82	302	242	790	1476	310	150	220	3500	78
300	585/6	**M3BN**	**586 SMC**	3GBN	984 230-••G	893	94,5	0,80	369	295	740	1766	260	130	268	4000	78
350	586/7	**M3BN**	**587 MLB**	3GBN	984 420-••G	893	95,0	0,79	435	348	720	2057	270	130	322	4800	78
400	587/8	**M3BN**	**588 LKA**	3GBN	984 810-••G	893	95,0	0,80	490	392	750	2353	280	140	370	5500	78
450	587/8	**M3BN**	**588 LKB**	3GBN	984 820-••G	894	95,0	0,79	559	447	780	2648	300	150	392	5750	78

[1] Efficiency and full load current at 60 Hz, sine wave.

The bullet • indicates a 3-letter supplement for choice of mounting arrangement, voltage and frequency, and generation code, see ordering information page.

NEMA nominal efficiency according to IEEE 112.
EPAct is applicable on motors up to 200 HP.

NEMA LV cast iron motors - Variant codes

Code	Variant	Motor size			
		405	445	449	58_
	Balancing				
417	Vibration according to grade B (IEC 60034-14).	P	P	P	P
423	Balanced without key.	P	P	P	P
424	Full key balancing.	P	P	P	P
	Bearings and lubrication				
036	Transport lock for bearings.	M	M	M	M
037	Roller bearing at D-end.	M	M	M	M
039	Cold resistant grease, -55 ... +100°C.	P	P	P	P
040	Heat resistant grease (-25 ... +150°C)	P	P	P	P
058	Angular contact bearing at D-end, shaft force away from bearing.	P	P	P	P
059	Angular contact bearing at N-end, shaft force towards bearing.	P	P	P	P
060	Angular contact bearing at D-end, shaft force towards bearing.	P	P	P	P
061	Angular contact bearing at N-end, shaft force away from bearing.	P	P	P	P
107	Bearing mounted PT100 resistance elements.	P	P	P	P
420	Bearing mounted PTC-thermistors.	P	P	P	P
796	Grease nipples JIS B 1575 PT 1/8. Type A. Stainless steel. Head type to be defined when ordering.	P	P	P	P
797	Stainless steel SPM nipples.	P	P	P	P
798	Stainless steel grease nipples.	P	P	P	P
	Brakes				
412	Built-on brake, at N-end.	R	R	R	R
	Branch standard design				
178	Stainless steel/acid proof bolts.	P	P	P	P
209	Non-standard voltage or frequency (special winding). Standard voltages/ frequencies code D and E without extra cost.	P	P	P	P
396	Motor designed for ambient temperature -20°C to -40°C, with space heaters (code 450/451 must be added).	P	P	P	P
398	Motor designed for ambient temperature -20°C to -40°C, without heating .	P	P	P	P
416	High speed design.	R	R	R	R
425	Corrosion protected stator and rotor core.	S	P	P	P
	Cooling system				
044	Unidirectional fan, clockwise seen from D-end. Only 2 pole motors.	P	P	P	P
045	Unidirectional fan, counter clockwise seen from D-end. Only 2 pole motors.	P	P	P	P
068	Metal fan.	P	P	P	P
183	Separate motor cooling (fan axial, N-end).	M	M	M	M
422	Separate motor cooling (fan top or side, N-end)	P	P	P	P
791	Stainless steel fan cover.	P	P	P	P
	Coupling				
035	Assembly of customer supplied coupling-half.	P	P	P	P
	Dimension drawing				
141	Binding dimension drawing.	M	M	M	M

[1] Certain variant codes cannot be used simultaneously.

S = Included as standard.
P = New manufacture only.

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

Code	Variant	Motor size			
		405	445	449	58_
	Drain holes				
065	Plugged existing drain holes.	M	M	M	M
066	Modified drain hole position.	P	P	P	P
448	Draining holes with metal plugs.	M	M	M	M
	Hazardous environments				
807	CSA Design, Class I, Div 2 Group A, B, C, D T3.	P	P	P	P
	Heating elements				
450	Heating element 100-120 V.	M	M	M	M
451	Heating element 200-240 V.	M	M	M	M
	Insulation system				
014	Winding insulation class H.	P	P	P	P
405	Special winding insulation for frequency converter supply. Required for operating voltages 500 V and higher.	P	P	P	P
406	Winding for supply > 690 ≤ 1000 V.	P	P	P	P
	Mounting arrangements				
064	Foot and flange mounted, NEMA D-flange.	P	P	P	P
	Painting				
114	Special paint color, standard grade. RAL-colour no. must be specified.	M	M	M	M
111	Offshore two-pack polyamide cured epoxy paint 160 mm.	P	P	P	P
115	Offshore zink primer painting.	P	P	P	P
179	Special paint specification.	R	R	R	R
	Protection				
005	Protective roof, vertical motor, shaft down.	P	P	P	P
072	Radial seal at D-end.	P	P	P	P
073	Sealed against oil at D-end.	P	P	P	P
158	Degree of protection IP65. Dust proof version.	P	P	P	P
211	Weather protected, IPxxW.	P	P	P	P
403	Degree of protection IP56.	P	P	P	P
783	Labyrinth sealing at D-end.	S	S	S	S
	Rating & instruction plates				
002	Restamping voltage, frequency and output, continuous duty.	M	M	M	M
004	Additional text on std rating plate (max 12 digits on free text line).	M	M	M	M
095	Restamping output, intermittent duty.	M	M	M	M
135	Mounting of additional identification plate, stainless.	P	P	P	P
139	Additional identification plate delivered loose.	M	M	M	M
161	Additional rating plate delivered loose.	M	M	M	M
163	Frequency converter rating plate. Rating data according to quotation.	P	P	P	P
	Shaft & rotor				
069	Two shaft extensions as per basic catalog.	P	P	P	P
070	One or two special shaft extensions, std shaft material.	P	P	P	P
410	Stainless/acid proof steel shaft (standard or non-standard design).	P	P	P	P

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Code	Variant	Motor size			
		405	445	449	58_
	Standards and regulations				
010	Fulfilling CSA Safety Certificate.	P	P	P	P
011	Fulfilling CSA Energy Efficiency Verification (code 010 included).	P	P	P	P
	Stator winding temperature sensors				
121	Bimetal detectors, break type (NCC), (3 in series), 130°C, in stator winding.	M	M	M	M
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	S	S	S	S
123	Bimetal detectors, break type (NCC), (3 in series), 170°C, in stator widning.	M	M	M	M
125	Bimetal detectors, break type (NCC), (2x3 in series), 150°C, in stator winding.	M	M	M	M
127	Bimetal detectors, break type (NCC), (3 in series 130°C & 3 in series, 150°C), in stator winding.	M	M	M	M
435	PTC-thermistors (3 in series), 130°C, in stator winding.	M	M	M	M
436	PTC-thermistors (3 in series), 150°C, in stator winding.	S	S	S	S
437	PTC-thermistors (3 in series), 170°C, in stator winding.	M	M	M	M
439	PTC-thermistors (2x3 in series), 150°C, in stator winding.	M	M	M	M
441	PTC-thermistors (3 in series, 130°C & 3 in series,150°C), in stator winding.	M	M	M	M
442	PTC-thermistors (3 in series, 150°C & 3 in series,170°C), in stator winding.	M	M	M	M
445	PT100 resistance element (1 per phase)	M	M	M	M
446	PT100 resistance elements (2 per phase)	M	M	M	M
	Terminal box				
019	Larger than standard terminal box.	NA	P	P	R
021	Terminal box LHS, seen from D-end (= L in product code).	S	S	S	S
022	Cable entry LHS (seen from D-end).	P	P	P	P
137	Extended cable connection, low terminal box, ‘Flying leads’.	R	R	R	R
157	Terminal box degree of protection IP65.	S	S	S	S
180	Terminal box RHS, seen from D-end (= R in product code).	P	P	P	P
230	Standard cable gland.	S	S	S	S
231	Standard cable glands with clamping device.	R	R	R	R
402	Terminal box adapted for AL cables.	S	S	S	S
409	Large terminal box with two terminal blocks.	NA	P	P	R
413	Extended cable connection, no terminal box.	P	P	P	P
418	Separate terminal box for temperature detectors.	M	M	M	M
447	Top mounted separate terminal box for monitoring equipment.	P	P	P	P
466	Terminal box at N-end.	P	P	P	P
468	Cable entry from D-end.	P	P	P	P
469	Cable entry from N-end.	P	P	P	P
729	Cable flanges without holes/ Blank gland plates, aluminum.	P	P	P	P
730	Prepared for NPT cable glands.	P	P	P	P
743	Painted flange for cable glands (blind plate).	P	P	P	P
744	Stainless steel flange for cable glands (blind plate).	P	P	P	P
745	Painted steel flange equipped with brass cable glands.	P	P	P	P
753	Cast iron terminal box.	S	S	S	S

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Code	Variant	Motor size			
		405	445	449	58_
	Testing				
145	Type test report from catalogue motor, 460 V 60 Hz.	P	P	P	P
146	Type test with report for motor from specific delivery batch.	P	P	P	P
147	Type test with report for motor from from specific delivery batch, customer witnessed.	P	P	P	P
148	Routine test report. Witnessed routine test = 146	P	P	P	P
149	Testing according to separate test specification.	R	R	R	R
221	Type test and multi-point load test with report for motor from specific delivery batch.	P	R	R	R
222	Torque/speed curve, type test and multi-point load test with report for motor from specific delivery batch.	P	P	P	P
760	Vibration level test	P	P	P	P
761	Vibration spectrum test.	P	P	P	P
762	Noise level test.	P	P	P	P
763	Noise spectrum test.	P	P	P	P
764	Complete test with ABB frequency converter available at ABB test field. Test done with customer supplied converter on request.	P	P	P	P
	Variable speed drives				
701	Insulated bearing at N-end.	M	M	S	S
704	EMC cable gland.	P	P	P	P
	Separate motor cooling				
183	Separate motor cooling (fan axial, N-end).	M	M	M	M
422	Separate motor cooling (fan top or side, N-end).	P	P	P	P
	Mounting of tacho; tacho not included				
182	Pulse sensor mounted as specified for hollow shaft.	P	P	P	P
470	Prepared for hollow shaft pulse tacho (Leine&Linde equivalent).	P	P	P	P
479	Mounting of pulse tacho with shaft extension, tacho not included.	P	P	P	P
	Mounting of tacho; tacho included				
471	512 hollow shaft pulse tacho (Leine & Linde 861) mounted	R	R	R	R
472	1024 pulse tacho (Leine & Linde 861) mounted.	P	P	P	P
473	2048 pulse tacho (Leine & Linde 861) mounted.	P	P	P	P
	Separate motor cooling & prepared for tacho; tacho not included				
474	Separate motor cooling (fan axial, N-end) and prepared for hollow shaft tacho (Leine&Linde equivalent).	P	P	P	P
478	Separate motor cooling (fan top, N-end) and prepared for hollow shaft pulse tacho (Leine&Linde equivalent).	P	P	P	P
486	Separate motor cooling (fan top, N-end) and prepared for DC-tacho.	P	P	P	P
	Separate motor cooling & tacho; tacho included				
428	Separate motor cooling (fan top, N-end) and Leine & Linde type 510 006361 pulse tacho.	P	P	P	P
429	Separate motor cooling (fan top, N-end) and Leine & Linde, type 861007455, hollow shaft pulse tacho.	P	P	P	P
476	Separate motor cooling (fan axial, N-end) and 1024 hollow shaft pulse tacho (Leine & Linde equivalent).	P	P	P	P
477	Separate motor cooling (fan axial, N-end) and 2048 hollow shaft pulse tacho (Leine & Linde equivalent).	P	P	P	P

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P = New manufacture only.

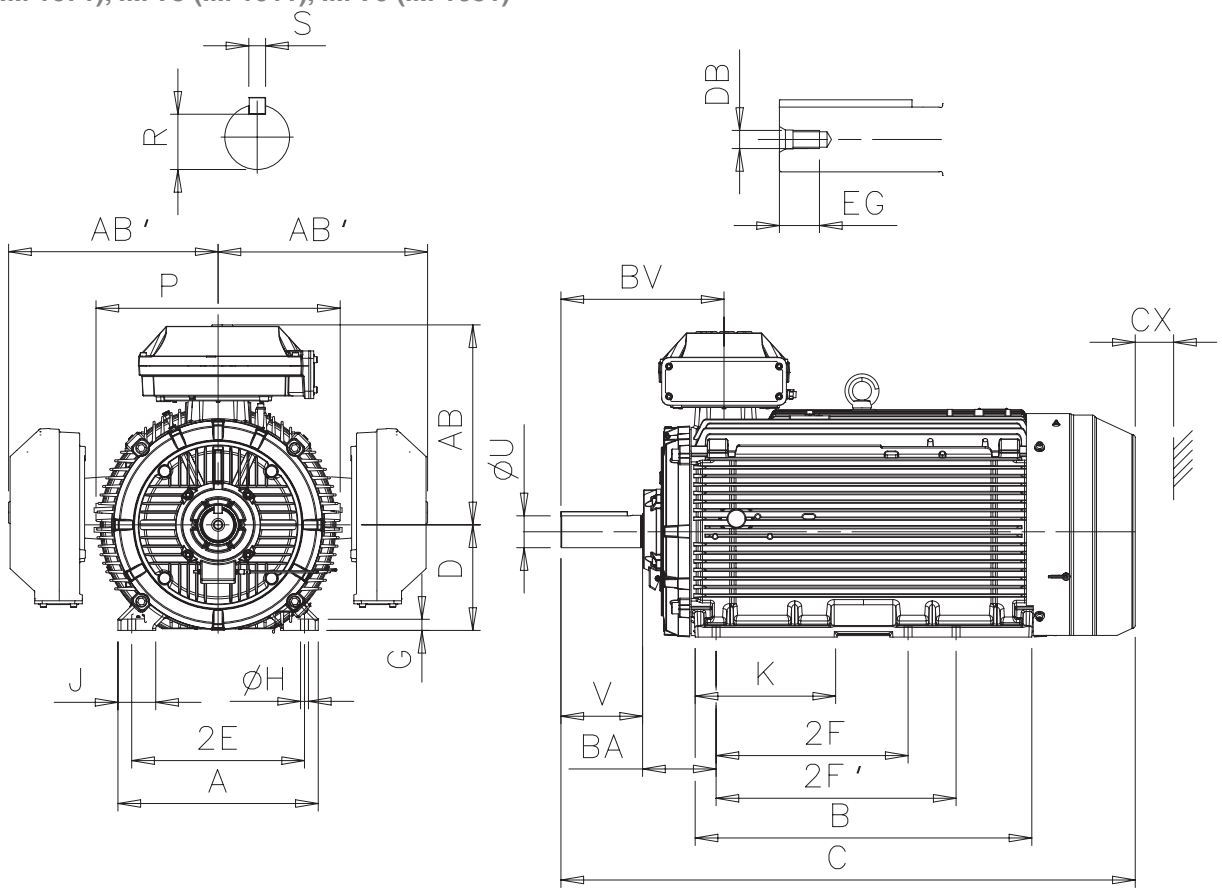
M = On modification of a stocked motor, or on new manufacture, the number per order may be limited.

NEMA LV Cast iron motors

Sizes 405 - 588

Dimension drawings

Foot-mounted motors, IM B3 (IM 1001), IM B6 (IM 1051), IM B7 (IM 1061), IM B8 (IM 1071), IM V5 (IM 1011), IM V6 (IM 1031)



Frame size	Motor type	Poles	A	AB' side	AB up	B	BA	BV' side	BV up	C	CX	D	DB	EG	2E	2F	2F`
404/5TS	405 SM_	2	18.98	16.57	15.59	17.6	6.62	16.81	12.94	33.19	4	10	M20	1.7	16	12.25	13.75
404/5T		4-12	18.98	16.57	15.59	17.6	6.62	19.81	15.9	36.19	4	10	M20	1.7	16	12.25	13.75
444/5TS	445 SM_	2	20.87	18.94	18.98	19.94	7.5	20.5	12.47	42.07	4	11	M20	1.7	18	14.5	16.5
444/5T		4-12	20.87	18.94	18.98	19.94	7.5	24.25	16.22	45.83	4	11	M20	1.7	18	14.5	16.5
447/9TS	449 KH_	2	20.87	22.13	21.14	35.07	7.5	27.6	13.23	57.84	4	11	M20	1.7	18	20	25
447/9T		4-12	20.87	22.13	21.14	35.07	7.5	31.36	16.99	61.59	4	11	M24	2.09	18	20	25
585/6	586 SM_	2	27.56	24.33	23.74	28.41	10	26	14.91	54.71	5	14.5	M20	1.7	24	20	22
585/6		4-12	27.56	24.33	23.74	28.41	10	29.76	18.66	58.46	5	14.5	M24	2.01	24	20	22
586/7	587 ML_	2	27.56	24.33	23.74	32.54	10	28.06	14.91	58.85	5	14.5	M20	1.7	24	22	25
586/7		4-12	27.56	24.33	23.74	32.54	10	31.83	18.66	62.6	5	14.5	M24	2.01	24	22	25
587/8	588 LK_	4-12	27.56	24.33	23.74	42.4	10	36.75	26.16	72.44	5	14.5	M24	2.01	24	25	28

Frame size	Motor type	Poles	G	H	J	K	O	P' side	P up	R	S	T	U	V
404/5TS	405 SM_	2	1.34	0.81	3.46	4.47	19.57	20.2	18.9	1.845	0.5		2.125	4.25
404/5T		4-12	1.34	0.81	3.46	4.47	19.57	20.2	18.9	2.45	0.75		2.875	7.25
444/5TS	445 SM_	2	1.16	0.81	3.32	5.77	22.3	22.97	22.72	2.021	0.625	3.7	2.375	4.75
444/5T		4-12	1.16	0.81	3.32	5.77	22.3	22.97	22.72	2.88	0.875	3.7	3.375	8.5
447/9TS	449 KH_	2	1.17	0.81	3.94	14.79	23.84	26.65	25.43	2.021	0.625	3.7	2.375	4.75
447/9T		4-12	1.17	0.81	3.94	14.79	23.84	26.65	25.43	2.88	0.875	3.7	3.375	8.5
585/6	586 SM_	2	2.3	1.25	4.72	8.68	29.19	30.04	29.37	2.021	0.625	4.5	2.375	4.75
585/6		4-12	2.3	1.25	4.72	8.68	29.19	30.04	29.37	2.88	0.875	4.5	3.375	8.5
586/7	587 ML_	2	2.3	1.25	4.72	10.46	29.19	30.04		2.021	0.625	4.5	2.375	4.75
586/7		4-12	2.3	1.25	4.72	10.46	29.19	30.04		2.88	0.875	4.5	3.375	8.5
587/8	588 LK_	4-12	2.3	1.25	4.72	17.56	29.19	30.04	29.37	2.88	0.875	4.5	3.375	8.5

[1] Tolerances according to IEC.
NEMA tolerances on request.
2.375 = + 0, - 0.001
3.375 = + 0, - 0.001

Dimensions in inches.
Dimension prints on motors with terminal box on top on request.

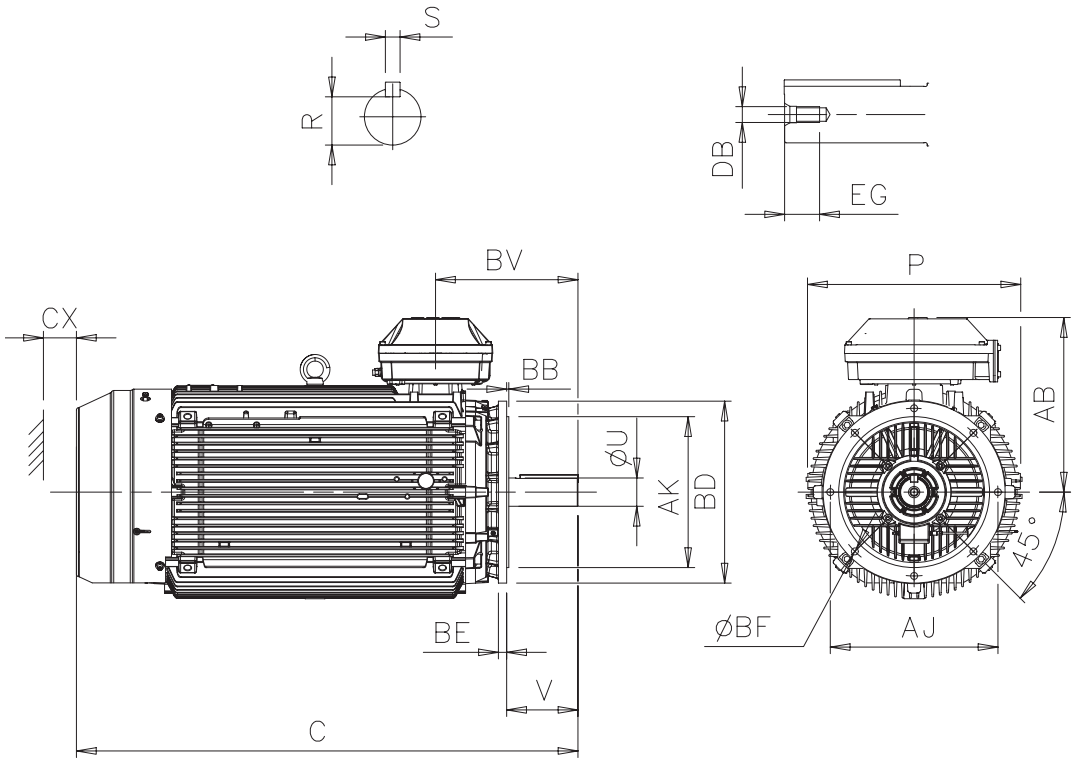
For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

NEMA LV Cast iron motors

Sizes 405 - 449

Dimension drawings

Flange-mounted motors, IM B5 (IM3001) , V1 (IM3011), V3 (IM3031) and IM B14 (IM3601), V18 (IM3611), V19 (IM3631)



Frame size	Motor type	Poles	AB	AJ	AK	BB	BD	BE	BF	BV	C	CX
404/5TS	405 SM_	2	16.57	20	18	0.25	21.65	0.71	0.81	12.94	33.19	4
404/5T		4-12	16.57	20	18	0.25	21.65	0.71	0.81	15.9	36.19	4
444/5TS	445 SM_	2	18.98	20	18	0.25	21.7	0.45	0.81	12.47	42.07	4
444/5T		4-12	18.98	20	18	0.25	21.7	0.45	0.81	16.22	45.83	4
447/9TS	449 KH_	2	21.14	20	18	0.26	21.7	0.98	0.81	13.23	57.84	4
447/9T		4-12	21.14	20	18	0.26	21.7	0.98	0.81	16.98	61.59	4

Frame size	Motor type	Poles	DB	EG	P	R	S	U	V
404/5TS	405 SM_	2	M20	1.7	20.2	1.845	0.5	2.125	4.25
404/5T		4-12	M20	1.7	20.2	2.45	0.75	2.875	7.25
444/5TS	445 SM_	2	M20	1.7	22.97	2.021	0.625	2.375	4.75
444/5T		4-12	M20	1.7	22.97	2.88	0.875	3.375	8.5
447/9TS	449 KH_	2	M20	1.7	25.75	2.021	0.625	2.375	4.75
447/9T		4-12	M24	2.09	25.75	2.88	0.875	3.375	8.5

[1] Tolerances according to IEC:
NEMA tolerances on request.
2.375 = + 0, - 0.001
3.375 = + 0, - 0.001

Dimensions in inches.

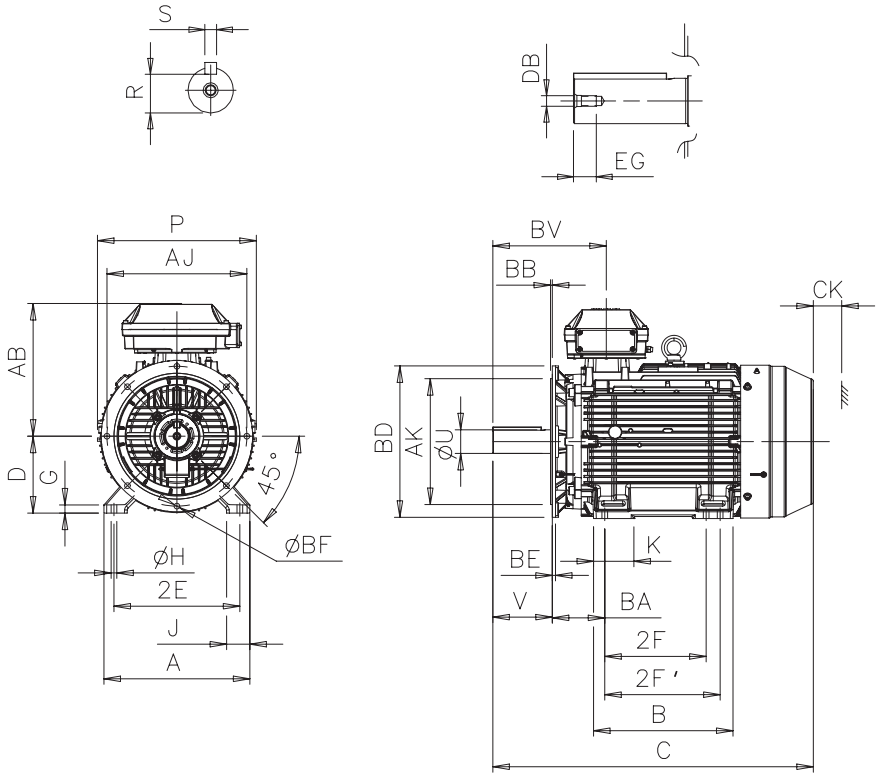
For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

NEMA LV Cast iron motors

Sizes 405 - 586

Dimension drawings

Foot- and flange-mounted motors, IM B35 (IM 2001), IM V15 (IM 2011), IM V36 (IM 2031)



Frame size	Motor type	Poles	A	AB' side	AB up	AJ	AK	B	BA	BB	BD	BE	BF	BV	C	CX	D	DB
404/5TS	405 SM_	2	18.98	16.57	15.59	20	18	17.6	6.62	0.25	21.65	0.71	0.81	12.94	33.19	4	10	M20
404/5T		4-12	18.98	16.57	15.59	20	18	17.6	6.62	0.25	21.65	0.71	0.81	15.9	36.19	4	10	M20
444/5TS	445 SM_	2	20.87	18.94	18.98	20	18	19.94	7.5	0.25	21.7	0.45	0.81	12.47	42.07	4	11	M20
444/5T		4-12	20.87	18.94	18.98	20	18	19.94	7.5	0.25	21.7	0.45	0.81	16.22	45.83	4	11	M20
447/9TS	449 KH_	2	20.87	22.13	21.14	20	18	35.07	7.5	0.26	21.65	0.98	0.81	13.23	57.84	4	11	M20
447/9T		4-12	20.87	22.13	21.14	20	18	35.07	7.5	0.26	21.65	0.98	0.81	16.98	61.59	4	11	M24
586"special"	585 S_	4-12	27.56		23.74	22	18	28.41	11.5	0.98	24.8	0.98	0.81	20.16	59.96	5	14.5	M24

Frame size	Motor type	Poles	EG	2E	2F	2F`	G	H	J	K	O	P' side	P up	R	S	T	U	V
404/5TS	405 SM_	2	1.7	16	12.25	13.75	1.34	0.81	3.46	4.47	19.57	20.2	18.9	1.845	0.5		2.125	4.25
404/5T		4-12	1.7	16	12.25	13.75	1.34	0.81	3.46	4.47	19.57	20.2	18.9	2.45	0.75		2.875	7.25
444/5TS	445 SM_	2	1.7	18	14.5	16.5	1.16	0.81	3.32	5.77	22.3	22.97	22.72	2.021	0.625	3.7	2.375	4.75
444/5T		4-12	1.7	18	14.5	16.5	1.16	0.81	3.32	5.77	22.3	22.97	22.72	2.88	0.875	3.7	3.375	8.5
447/9TS	449 KH_	2	1.7	18	20	25	1.17	0.81	3.94	14.79	23.84	26.65	25.43	2.021	0.625	3.7	2.375	4.75
447/9T		4-12	2.09	18	20	25	1.17	0.81	3.94	14.79	23.84	26.65	25.43	2.88	0.875	3.7	3.375	8.5
586"special"	585 S_	4-12	2.01	24	20	22	2.3	1.25	4.72	8.68	29.19		29.37	2.88	0.875	4.5	3.375	8.5

[1] Tolerances according to IEC:
NEMA tolerances on request.
2.125 = + 0.0012, + 0.0004
2.875 = + 0.0012, + 0.0004
2.375 = + 0.0012, + 0.0004
3.375 = + 0.0014, + 0.0005

Dimensions in inches.
Dimension prints on motors with terminal box on top on request.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

NEMA LV cast iron motors in brief, basic design

Motor size		40_	445	449	58_
Stator	Material	Cast iron GG 20/GRS 200			
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014			
	Paint thickness	Two-pack epoxy paint, thickness ≥ 70 μm			
Bearing end shields	Material	Cast iron GG 20/GRS 200, except flange-mounted size 580 Spheroidal graphite GGG40/ GRP400			
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014			
	Paint thickness	Two-pack epoxy paint, thickness ≥ 70 μm			
Bearings	D-end 2-pole 4-12 -pole	6315/C3 6315/C3	6316/C3 6219/C3	6316/C3 6319/C3	6316M/C3 6322/C3
	N-end 2-pole 4-12 -pole	6313/C3 6313/C3	6316/C3 6316/C3	6316/C3 6316/C3	6316M/C3 6316/C3
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end			
Bearing seals	D-end N-end	Labyrinth seal as standard V-ring as standard			
Lubrication		Regreasable bearings, regreasing nipples, M10x1			
SPM-nipples		As standard			
Rating plate	Material	Acid proof stainless steel AISI 316 thickness 0.6 mm			
Terminal box	Frame material	Cast iron GG 15/GRS 150			
	Cover material	Cast iron GG 15/GRS 150			
	Cover screws material	Steel 5G, coated with zinc and yellow cromated			
Connections		Blank gland plate, aluminum.			
	Terminals	6 terminals for connection with cable lugs (not included)			
Fan	Material	Reinforced glass fiber, aluminum or polypropylene with metal hub			
Fan cover	Material	Steel			
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014			
	Paint thickness	Two-pack epoxy polyester paint, thickness ≥ 80 μm			
Stator winding	Material	Copper			
	Insulation	Insulation class F			
	Winding protection	3 pcs thermistors as standard			
Rotor winding	Material	Pressure die-cast aluminum or copper			
Balancing method		Half key balancing as standard			
Key ways		Open key way			
Heating elements		50 W	50 W	2x50 W	2x65 W
Drain holes		As standard, open on delivery			
Enclosure		IP 55, higher protection on request			
Cooling method		IC 411			

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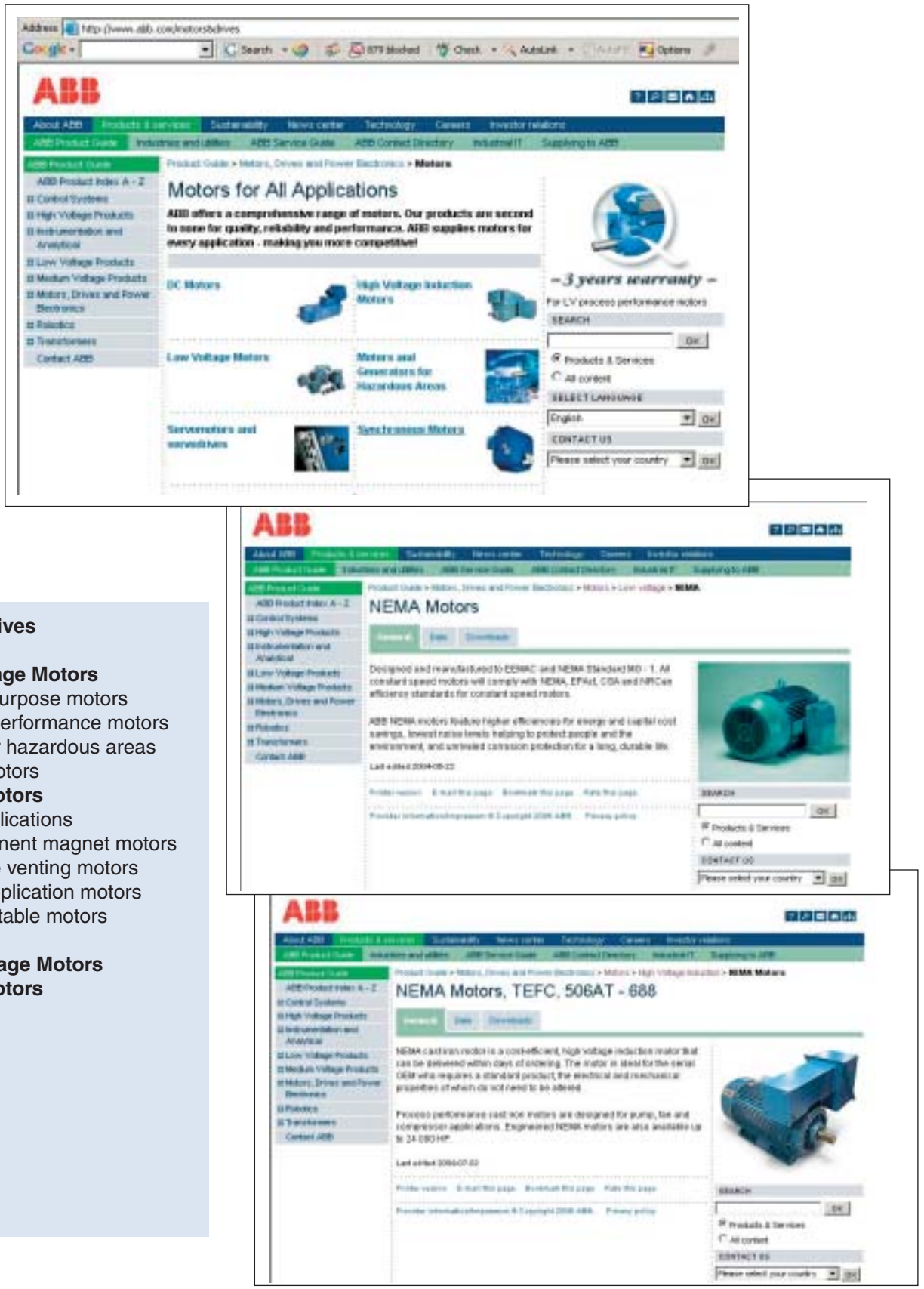

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