Niederspannungsmotore
in Grauguß und Aluminium

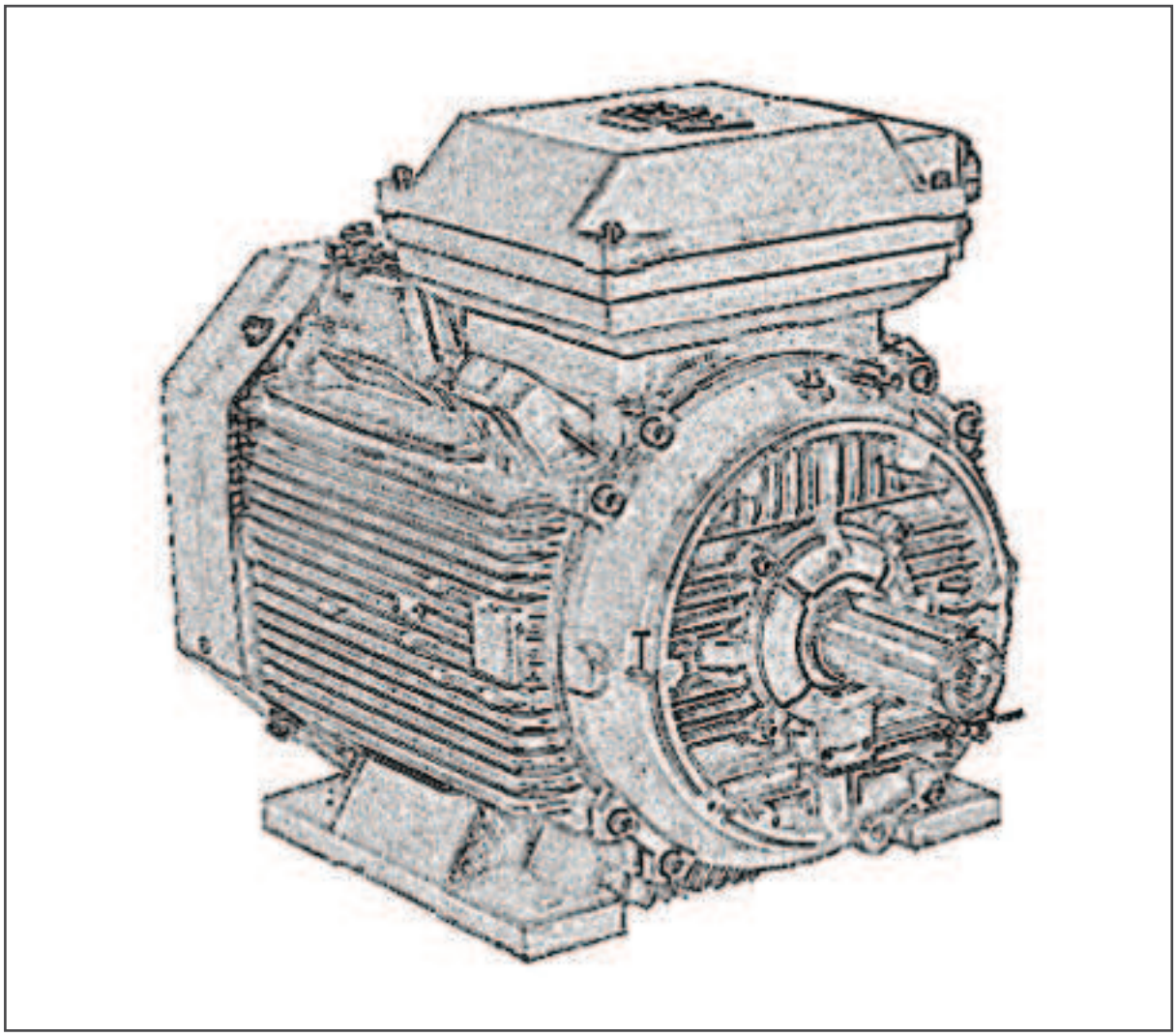
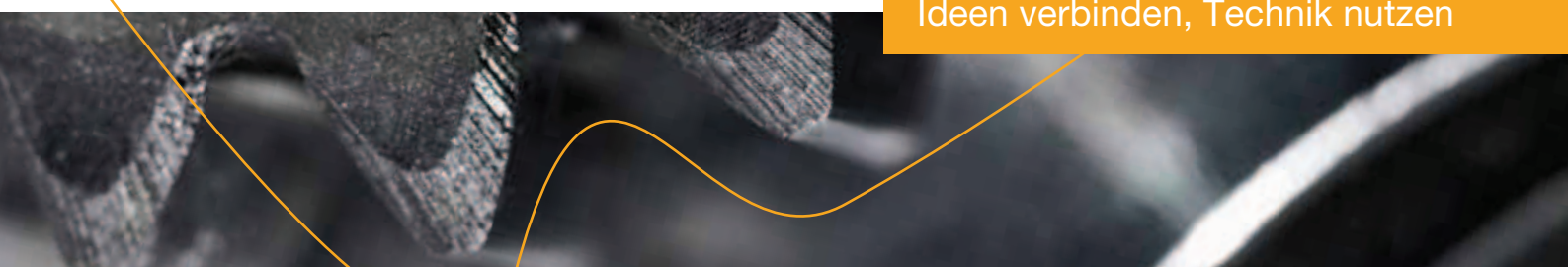


ABB07/2011

Ideen verbinden, Technik nutzen



Catalog

Low voltage
General performance
IE2 high efficiency motors

Power and productivity
for a better world™

We provide motors and generators, services and expertise to save energy and improve customers' processes over the total lifecycle of our products, and beyond.

General performance
IE2 high efficiency motors
Sizes 56 to 355, from 0.06 to 250 kW

ABB's General performance IE2 high efficiency motors are best suited for applications where simplicity and off-the-shelf availability are paramount. With ABB quality and support these motors have the features appreciated by volume customers and serial OEM's. Motors have IE2 efficiency.

Motor range for cast iron motors 71 to 355, 0.25 to 250 kW and aluminum motors is 56 to 250, 0.06 to 55 kW.

General performance IE2 high efficiency aluminum motors frame sizes 56 to 132 on request.

Ordering information

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

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

Motor type	**M2BA 112 MB**
Pole number	**4**
Mounting arrangement (IM-code)	**IM B3 (IM 1001)**
Rated output	**4 kW**
Product code	**3GBA 112 212-ADE**
Variant codes if needed	

Motor size

A	B	C	D, E, F
M2BA	**112 MB**	**3GBA 112 212 -**	**ADE, 122, 451, 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

Explanation of the product code

Positions 1 to 4
3GAA =
Totally enclosed motor
with aluminum stator frame
3GBA =
Totally enclosed motor
with cast iron frame

Position 4
Type of rotor
A = Squirrel cage rotor

Positions 5 and 6
IEC size

05 = 56	**16** = 160
06 = 63	**18** = 180
07 = 71	**20** = 200
08 = 80	**22** = 225
09 = 90	**25** = 250
10 = 100	**28** = 280
11 = 112	**31** = 315
13 = 132	**35** = 355

Position 7
Pole pairs
1 = 2 poles
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)

Position 13
Voltage and frequency
Single-speed motors
D 400 VΔ, 415 VΔ, 690 VY 50 Hz
S 230 VΔ, 400 VY, 415 VY 50 Hz*)

Position 14
Version **A,B,C...** = Generation code followed by variant codes

*) M2AA 200 is not available for voltages less than 380 VD

General performance cast iron motors IE2
Technical data for totally enclosed squirrel cage three phase motors

IP 55 - IC 411 - Insulation class F, temperature rise class B
IE2 efficiency class according to IEC 60034-30; 2008

Output kW	Motor type		Product code	Speed r/min	Efficiency IEC 60034-2-1; 2007 Full load 100%	3/4 load 75%	1/2 load 50%	Power factor cos φ	Current I_N A	I_s/I_N	Torque T_N Nm	T_l/T_N	T_b/T_N	Moment of inertia J = 1/4 GD² kgm²	Weight kg	Sound pressure level L_{PA} dB
3000 r/min = 2 poles		400 V 50 Hz							CENELEC-design							
0.37	M2BA	71 MA	3GBA 071 211-••B	2660	69.2	73.5	73.7	0.80	0.96	3.9	1.32	2.2	2.3	0.00039	11	58
0.55	M2BA	71 MB	3GBA 071 212-••B	2680	73.2	77.3	79.3	0.85	1.27	4.3	1.95	2.4	2.5	0.00051	11	56
0.75	M2BA	80 MB	3GBA 081 212-••B	2895	80.6	79.9	76.2	0.74	1.81	7.7	2.4	4.2	4.2	0.001	16	57
1.1	M2BA	80 MC	3GBA 081 213-••B	2870	81.8	82.4	80.2	0.80	2.4	7.5	3.6	2.7	3.5	0.0012	18	60
1.5	M2BA	90 SLB	3GBA 091 212-••B	2900	82.2	84.1	82.7	0.86	3	7.5	4.9	2.5	2.6	0.00254	24	69
2.2	M2BA	90 SLC	3GBA 091 213-••B	2885	84.7	86.7	85.7	0.87	4.3	6.8	7.2	1.9	2.5	0.0028	25	64
3	M2BA	100 LB	3GBA 101 212-••B	2925	85.2	84.9	82.8	0.86	5.9	9.1	9.7	3.1	3.5	0.00528	36	68
4	M2BA	112 MB	3GBA 111 212-••B	2895	86.1	87.0	86.6	0.86	7.7	8.1	13.1	2.9	3.2	0.00575	37	70
5.5	M2BA	132 SMB	3GBA 131 212-••B	2865	88.0	88.6	88.0	0.86	10.4	7.0	18.3	2.0	2.7	0.01275	68	70
7.5	M2BA	132 SMC	3GBA 131 214-••B	2890	88.6	88.8	87.5	0.84	14.5	7.3	24.7	2.0	3.6	0.01359	70	70
11	M2BA	160 MLA	3GBA 161 044-••G	2920	89.8	91.0	90.7	0.89	19.8	5.9	35.9	1.6	2.7	0.038	119	69
15	M2BA	160 MLB	3GBA 161 045-••G	2934	91.1	92.2	92.0	0.90	26.4	7.0	48.8	2.5	3.1	0.048	133	69
18.5	M2BA	160 MLC	3GBA 161 046-••G	2934	91.0	91.8	91.2	0.89	32.9	7.3	60.2	2.6	3.2	0.052	141	73
22	M2BA	180 MLA	3GBA 181 042-••G	2933	91.5	92.8	92.8	0.91	38.1	7.8	71.6	3.0	3.5	0.062	173	73
30	M2BA	200 MLA	3GBA 201 043-••G	2950	92.2	92.9	92.3	0.89	52.7	7.8	97.1	2.7	3.3	0.092	214	75
37	M2BA	200 MLB	3GBA 201 044-••G	2947	92.5	93.0	92.5	0.91	63.4	7.7	119	2.8	3.6	0.116	240	75
45	M2BA	225 SMA	3GBA 221 042-••G	2956	93.0	93.5	92.9	0.90	77.6	8.1	145	3.1	3.4	0.197	297	75
55	M2BA	250 SMA	3GBA 251 042-••G	2960	93.9	94.3	93.6	0.90	93.9	6.8	177	2.6	2.5	0.275	339	75
75	M2BAT	280 SMA	3GBA 281 210-••E	2977	94.0	93.7	92.3	0.88	130	7.6	240	2.1	3.0	0.8	590	78
90	M2BAT	280 SMB	3GBA 281 220-••E	2976	94.3	94.2	93.1	0.90	153	7.4	288	2.1	2.9	0.9	630	78
110	M2BAT	315 SMA	3GBA 311 210-••E	2982	94.6	94.1	92.7	0.86	195	7.6	352	2.0	3.0	1.2	860	83
132	M2BAT	315 SMB	3GBA 311 220-••E	2982	94.9	94.6	93.4	0.88	228	7.4	422	2.2	3.0	1.4	920	83
160	M2BAT	315 SMC	3GBA 311 230-••E	2981	95.2	95.0	94.1	0.89	272	7.5	512	2.3	3.0	1.7	1010	83
200	M2BAT	315 MLA	3GBA 311 410-••E	2980	95.3	95.2	94.4	0.9	336	7.7	640	2.6	3.0	2.1	1170	83
250	M2BAT	355 S	3GBA 351 100-••E	2983	95.4	95.2	94.3	0.89	424	6.8	800	1.5	2.8	2.7	1500	83
3000 r/min = 2 poles		400 V 50 Hz							High-output design							
110 [1]	M2BAT	280 SMA	3GBA 281 230-••E	2978	94.7	94.6	93.8	0.90	186	7.9	352	2.4	3.0	1.15	690	78

[1] Temperature rise class F

The two bullets in the product code indicate choice of mounting arrangements, voltage and frequency code (see ordering information page).

I_s / I_N = Starting current
T_l / T_N = Locked rotor torque
T_b / T_N = Breakdown torque

Efficiency values are given according to IEC 60034-2-1; 2007.
Please note that the values are not comparable without knowing the testing method.
ABB has calculated the efficiency values according to indirect method, stray load losses (additional losses) determined from measuring.

IE-class concerns motors from 0.75 kW to 375 kW.

General performance cast iron motors IE2
Technical data for totally enclosed squirrel cage three phase motors

IP 55 - IC 411 - Insulation class F, temperature rise class B
IE2 efficiency class according to IEC 60034-30; 2008

Output kW	Motor type	Product code	Speed r/min	Efficiency IEC 60034-2-1; 2007 Full load 100%	3/4 load 75%	1/2 load 50%	Power factor cos φ	Current I_N A	$\frac{I_s}{I_N}$	Torque T_N Nm	$\frac{T_l}{T_N}$	$\frac{T_b}{T_N}$	Moment of inertia J = 1/4 GD² kgm²	Weight kg	Sound pressure level L_{PA} dB
1500 r/min = 4 poles	**400 V 50 Hz**							**CENELEC-design**							
0.25	**M2BA 71 MA**	3GBA 072 211-••B	1365	68.3	70.8	69.7	0.81	0.65	3.5	1.74	1.9	2.0	0.00074	10	45
0.37	**M2BA 71 MB**	3GBA 072 212-••B	1380	72.4	74.5	74.6	0.83	0.88	4.0	2.5	1.6	2.1	0.00088	11	45
0.55	**M2BA 80 MA**	3GBA 082 211-••B	1415	74.5	73.8	70.0	0.73	1.45	5.0	3.7	2.0	2.8	0.00144	15	45
0.75	**M2BA 80 MD**	3GBA 082 214-••B	1430	81.0	80.7	77.3	0.73	1.83	5.3	5	2.7	3.2	0.00205	17	50
1.1	**M2BA 90 SLB**	3GBA 092 212-••B	1435	83.6	84.5	83.2	0.80	2.3	6.1	7.3	2.7	3.4	0.0044	25	50
1.5	**M2BA 90 SLD**	3GBA 092 215-••B	1430	84.3	85.6	84.7	0.83	3	6.3	10	2.7	3.4	0.0053	27	56
2.2	**M2BA 100 LC**	3GBA 102 213-••B	1450	85.9	85.1	83.4	0.78	4.7	6.4	14.4	2.9	3.6	0.00948	36	56
3	**M2BA 100 LD**	3GBA 102 214-••B	1450	86.8	87.0	85.4	0.79	6.3	7.7	19.7	2.9	3.4	0.011	38	58
4	**M2BA 112 MB**	3GBA 112 212-••B	1440	86.8	87.7	87.3	0.81	8.2	7.0	26.5	2.5	2.9	0.0125	44	59
5.5	**M2BA 132 SMB**	3GBA 132 212-••B	1460	89.0	89.8	88.9	0.80	11.1	5.9	35.9	1.7	2.4	0.03282	70	67
7.5	**M2BA 132 SMC**	3GBA 132 213-••B	1450	89.3	90.1	90.0	0.81	14.9	5.6	49.3	1.6	2.4	0.03659	73	64
11	**M2BA 160 MLA**	3GBA 162 043-••G	1463	90.2	91.4	91.2	0.85	20.7	7.1	71.7	2.6	3.0	0.084	134	65
15	**M2BA 160 MLB**	3GBA 162 044-••G	1463	90.6	91.8	91.6	0.84	28.4	7.2	97.9	2.7	3.6	0.095	141	65
18.5	**M2BA 180 MLA**	3GBA 182 043-••G	1464	91.2	92.3	92.1	0.84	34.8	7.9	120	3.1	3.6	0.112	175	62
22	**M2BA 180 MLB**	3GBA 182 044-••G	1465	91.6	92.5	92.1	0.83	41.7	8.0	143	3.0	3.8	0.13	187	65
30 [1]	**M2BA 200 MLA**	3GBA 202 042-••G	1474	92.3	93.4	93.5	0.83	56.5	7.3	194	2.7	2.9	0.217	241	62
37	**M2BA 225 SMA**	3GBA 222 043-••G	1479	93.0	93.9	93.8	0.84	68.3	7.2	238	2.6	2.9	0.309	293	68
45	**M2BA 225 SMB**	3GBA 222 044-••G	1479	93.2	94.0	93.7	0.83	83.9	7.4	290	2.4	3.1	0.368	318	68
55	**M2BA 250 SMA**	3GBA 252 042-••G	1478	93.5	94.2	93.7	0.85	99.8	7.3	355	2.8	3.0	0.476	342	70
75	**M2BAT 280 SMA**	3GBA 282 210-••E	1484	94.2	94.2	93.5	0.85	135	6.9	482	2.5	2.8	1.25	590	71
90	**M2BAT 280 SMB**	3GBA 282 220-••E	1483	94.4	94.6	94.1	0.86	160	7.2	579	2.5	2.7	1.5	630	71
110	**M2BAT 315 SMA**	3GBA 312 210-••E	1487	94.7	94.6	93.8	0.86	194	7.2	706	2.0	2.5	2.3	870	78
132	**M2BAT 315 SMB**	3GBA 312 220-••E	1487	95.0	95.0	94.3	0.86	233	7.1	847	2.3	2.7	2.6	925	78
160	**M2BAT 315 SMC**	3GBA 312 230-••E	1487	95.2	95.3	94.6	0.85	285	7.2	1027	2.4	2.9	2.9	970	78
200	**M2BAT 315 MLA**	3GBA 312 410-••E	1486	95.3	95.4	94.9	0.86	352	7.0	1285	2.3	2.8	3.5	1080	78
250	**M2BAT 355 S**	3GBA 352 100-••E	1488	95.2	95.2	94.4	0.85	445	6.7	1604	2.0	2.6	5.4	1500	82
1500 r/min = 4 poles	**400 V 50 Hz**							**High-output design**							
110	**M2BAT 280 SMC**	3GBA 282 230-••E	1485	94.9	95.1	94.6	0.86	194	7.6	707	3.0	3.0	1.85	690	71

[1] Temperature rise class F

The two bullets in the product code indicate choice of mounting arrangements, voltage and frequency code (see ordering information page).

I_s / I_N = Starting current
T_l / T_N = Locked rotor torque
T_b / T_N = Breakdown torque

Efficiency values are given according to IEC 60034-2-1; 2007.
Please note that the values are not comparable without knowing the testing method.
ABB has calculated the efficiency values according to indirect method, stray load losses (additional losses) determined from measuring.

IE-class concerns motors from 0.75 kW to 375 kW.

General performance cast iron motors IE2
Technical data for totally enclosed squirrel cage three phase motors

IP 55 - IC 411 - Insulation class F, temperature rise class B
IE2 efficiency class according to IEC 60034-30; 2008

Output kW	Motor type	Product code	Speed r/min	Efficiency IEC 60034-2-1; 2007 Full load 100%	3/4 load 75%	1/2 load 50%	Power factor cos φ	Current I_N A	I_s/I_N	Torque T_N Nm	T_l/T_N	T_b/T_N	Moment of inertia J = 1/4 GD² kgm²	Weight kg	Sound pressure level L_{PA} dB
1000 r/min = 6 poles	**400 V 50 Hz**							**CENELEC-design**							
0.18	**M2BA 71 MA**	3GBA 073 211-••B	900	63.7	63.8	59.0	0.71	0.57	3.1	1.9	2.0	2.1	0.00089	10	42
0.25	**M2BA 71 MB**	3GBA 073 212-••B	895	67.2	67.2	62.6	0.69	0.77	3.4	2.6	2.2	2.3	0.0011	12	42
0.37	**M2BA 80 MA**	3GBA 083 211-••B	915	71.0	71.1	67.0	0.69	1.09	3.6	3.8	1.8	2.2	0.00187	15	47
0.55	**M2BA 80 MB**	3GBA 083 212-••B	920	73.9	75.0	72.8	0.71	1.51	3.8	5.7	1.8	2.2	0.00239	17	47
0.75	**M2BA 90 SLC**	3GBA 093 213-••B	960	78.7	77.3	72.5	0.58	2.3	4.5	7.4	2.3	3.1	0.00491	25	44
1.1	**M2BA 90 SLE**	3GBA 093 214-••B	930	78.2	78.6	76.4	0.66	3	4.0	11.2	1.9	2.3	0.0054	28	44
1.5	**M2BA 100 L**	3GBA 103 212-••B	950	82.2	82.9	81.6	0.69	3.8	4.0	15	1.5	1.1	0.00873	37	49
2.2	**M2BA 112 MB**	3GBA 113 212-••B	950	82.5	83.8	81.7	0.69	5.5	4.4	22.1	1.7	2.3	0.0125	44	66
3	**M2BA 132 SMB**	3GBA 133 211-••B	975	85.3	84.5	81.3	0.63	8	5.5	29.3	1.8	2.9	0.03336	69	57
4	**M2BA 132 SMB**	3GBA 133 212-••B	960	84.9	85.3	83.9	0.68	10	4.6	39.7	1.5	2.2	0.03336	69	57
5.5	**M2BA 132 SMF**	3GBA 133 214-••B	965	86.1	86.6	85.5	0.71	12.9	5.1	54.4	2.0	2.3	0.0487	86	57
7.5	**M2BA 160 MLA**	3GBA 163 043-••G	971	87.6	89.1	89.0	0.79	15.6	7.1	73.7	1.9	3.3	0.089	141	61
11	**M2BA 160 MLB**	3GBA 163 044-••G	970	88.7	90.1	89.9	0.79	22.6	7.6	108	2.1	3.3	0.119	157	61
15	**M2BA 180 MLA**	3GBA 183 042-••G	971	89.7	90.8	90.5	0.76	31.7	7.8	147	2.5	4.1	0.137	187	61
18.5	**M2BA 200 MLA**	3GBA 203 043-••G	975	90.7	92.0	91.9	0.79	37.2	6.2	161	1.7	3.2	0.198	228	65
22	**M2BA 200 MLB**	3GBA 203 044-••G	974	91.0	92.4	92.5	0.79	44.1	5.8	215	1.8	3.0	0.222	241	65
30	**M2BA 225 SMA**	3GBA 223 042-••G	985	92.2	93.1	93.1	0.83	56.5	6.9	290	2.4	2.8	0.532	318	65
37	**M2BA 250 SMA**	3GBA 253 042-••G	985	92.4	93.2	93.0	0.83	69.6	6.6	358	2.4	2.8	0.718	336	66
45	**M2BAT 280 SMA**	3GBA 283 210-••E	990	92.8	93.0	92.1	0.84	83.3	7.0	434	2.5	2.5	1.85	570	71
55	**M2BAT 280 SMB**	3GBA 283 220-••E	990	93.3	93.5	92.9	0.84	101	7.0	530	2.7	2.6	2.2	610	71
75	**M2BAT 315 SMA**	3GBA 313 210-••E	992	94.0	94.0	93.0	0.81	142	7.0	721	2.1	2.7	3.2	820	75
90	**M2BAT 315 SMB**	3GBA 313 220-••E	992	94.3	94.4	93.6	0.83	165	7.2	866	2.1	2.7	4.1	910	75
110	**M2BAT 315 SMC**	3GBA 313 230-••E	992	94.7	94.8	94.2	0.83	201	7.0	1058	2.2	2.7	4.9	980	75
132	**M2BAT 315 MLA**	3GBA 313 410-••E	992	94.9	95.0	94.4	0.83	241	7.2	1270	2.4	2.7	5.8	1100	75
160	**M2BAT 355 S**	3GBA 353 100-••E	992	94.9	95.0	94.4	0.83	293	6.2	1540	2.1	2.3	7.3	1500	77
1000 r/min = 6 poles	**400 V 50 Hz**							**High-output design**							
75	**M2BAT 280 SMC**	3GBA 283 230-••E	990	93.8	93.9	93.3	0.84	137	7.3	723	2.8	2.7	2.85	690	71

[1] Temperature rise class F

The two bullets in the product code indicate choice of mounting arrangements, voltage and frequency code (see ordering information page).

I_s / I_N = Starting current
T_l / T_N = Locked rotor torque
T_b / T_N = Breakdown torque

Efficiency values are given according to IEC 60034-2-1; 2007.
Please note that the values are not comparable without knowing the testing method.
ABB has calculated the efficiency values according to indirect method, stray load losses (additional losses) determined from measuring.

IE-class concerns motors from 0.75 kW to 375 kW.

General performance aluminum motors IE2
Technical data for totally enclosed squirrel cage three phase motors

IP 55 - IC 411 - Insulation class F, temperature rise class B
IE2 efficiency class according to IEC 60034-30; 2008

Output kW	Motor type	Product code	Speed r/min	Efficiency IEC 60034-2-1; 2007 Full load 100%	3/4 load 75%	1/2 load 50%	Power factor cos φ	Current I_N A	$\frac{I_s}{I_N}$	Torque T_N Nm	$\frac{T_l}{T_N}$	$\frac{T_b}{T_N}$	Moment of inertia J = 1/4 GD² kgm²	Weight kg	Sound pressure level L_{PA} dB
3000 r/min = 2-poles			**400 V 50 Hz**							**CENELEC-design**					
Sizes 56 to 132 on request															
11	**M2AA 160 MLA**	3GAA 161 044-••G	2920	89.8	91.0	90.7	0.89	19.8	5.9	35.9	1.6	2.7	0.038	83	69
15	**M2AA 160 MLB**	3GAA 161 045-••G	2934	91.1	92.2	92.0	0.90	26.4	7.0	48.8	2.5	3.1	0.048	96	69
18.5	**M2AA 160 MLC**	3GAA 161 046-••G	2934	91.0	91.8	91.2	0.89	32.9	7.3	60.2	2.6	3.2	0.052	104	73
22	**M2AA 180 MLA**	3GAA 181 042-••G	2933	91.5	92.8	92.8	0.91	38.1	7.8	71.6	3.0	3.5	0.062	123	73
30	**M2AA 200 MLA**	3GAA 201 043-••G	2950	92.2	92.9	92.3	0.89	52.7	7.8	97.1	2.7	3.3	0.092	160	75
37	**M2AA 200 MLB**	3GAA 201 044-••G	2947	92.5	93.0	92.5	0.91	63.4	7.7	119	2.8	3.6	0.116	186	75
45	**M2AA 225 SMA**	3GAA 221 042-••G	2956	93.0	93.5	92.9	0.90	77.6	8.1	145	3.1	3.4	0.197	244	75
55	**M2AA 250 SMA**	3GAA 251 042-••G	2960	93.9	94.3	93.6	0.90	93.9	6.8	177	2.6	2.5	0.275	308	75
1500 r/min = 4 poles			**400 V 50 Hz**							**CENELEC-design**					
Sizes 56 to 132 on request															
11	**M2AA 160 MLA**	3GAA 162 043-••G	1463	90.2	91.4	91.2	0.85	20.7	7.1	71.7	2.6	3.0	0.084	97	65
15	**M2AA 160 MLB**	3GAA 162 044-••G	1463	90.6	91.8	91.6	0.84	28.4	7.2	97.9	2.7	3.6	0.095	105	65
18.5	**M2AA 180 MLA**	3GAA 182 043-••G	1464	91.2	92.3	92.1	0.84	34.8	7.9	120	3.1	3.6	0.112	125	62
22	**M2AA 180 MLB**	3GAA 182 044-••G	1465	91.6	92.5	92.1	0.83	41.7	8.0	143	3.0	3.8	0.13	137	65
30	**M2AA 200 MLA**	3GAA 202 042-••G	1474	92.3	93.4	93.5	0.83	56.5	7.3	194	2.7	2.9	0.217	188	62
37	**M2AA 225 SMA**	3GAA 222 043-••G	1479	93.0	93.9	93.8	0.84	68.3	7.2	238	2.6	2.9	0.309	239	68
45	**M2AA 225 SMB**	3GAA 222 044-••G	1479	93.2	94.0	93.7	0.83	83.9	7.4	290	2.4	3.1	0.368	265	68
55	**M2AA 250 SMA**	3GAA 252 042-••G	1478	93.5	94.2	93.7	0.85	99.8	7.3	355	2.8	3.0	0.476	311	70
1000 r/min = 6 poles			**400 V 50 Hz**							**CENELEC-design**					
Sizes 56 to 132 on request															
7.5	**M2AA 160 MLA**	3GAA 163 043-••G	971	87.6	89.1	89.0	0.79	15.6	7.1	73.7	1.9	3.3	0.089	105	61
11	**M2AA 160 MLB**	3GAA 163 044-••G	970	88.7	90.1	89.9	0.79	22.6	7.6	108	2.1	3.3	0.119	121	61
15	**M2AA 180 MLA**	3GAA 183 042-••G	971	89.7	90.8	90.5	0.76	31.7	7.8	147	2.5	4.1	0.137	139	61
18.5	**M2AA 200 MLA**	3GAA 203 043-••G	975	90.7	92.0	91.9	0.79	37,2	6.2	161	1.7	3.2	0.198	173	65
22	**M2AA 200 MLB**	3GAA 203 044-••G	974	91.0	92.4	92.5	0.79	44.1	5.8	215	1.8	3.0	0.222	187	65
30	**M2AA 225 SMA**	3GAA 223 042-••G	985	92.2	93.1	93.1	0.83	56.5	6.9	290	2.4	2.8	0.532	265	65
37	**M2AA 250 SMA**	3GAA 253 042-••G	985	92.4	93.2	93.0	0.83	69.6	6.6	358	2.4	2.8	0.718	305	66

The two bullets in the product code indicate choice of mounting arrangements, voltage and frequency code (see ordering information page).

$\frac{I_s}{I_N}$ = Starting current
$\frac{T_l}{T_N}$ = Locked rotor torque
$\frac{T_b}{T_N}$ = Breakdown torque

Efficiency values are given according to IEC 60034-2-1; 2007.
Please note that the values are not comparable without knowing the testing method.
ABB has calculated the efficiency values according to indirect method, stray load losses (additional losses) determined from measuring.

IE-class concerns motors from 0.75 kW to 375 kW.

General performance IE2 cast iron motors – variant codes

		M2BA										M2BAT		
Code [1]	Variant code	80	90	100	112	132	160	180	200	225	250	280	315	355
Bearing and lubrication														
037	Roller bearing at D-end.	NA	NA	NA	NA	NA	M	M	M	M	M	M	M	M
040	Heat resistant grease.	M	M	M	M	M	M	M	M	M	M	M	M	M
043	SPM compatible nipples	M	M	M	M	M	M	M	M	M	M	M	M	M
188	63-series bearings.	M	M	M	M	M	M	M	M	M	M	S	S	S
Branch standard design														
178	Stainless steel / acid proof bolts.	M	M	M	M	M	M	M	M	M	M	M	M	M
Cooling system														
068	Light alloy metal fan	M	M	M	M	M	M	M	M	M	M	M	M	M
Documentation														
141	Binding dimension drawing.	M	M	M	M	M	M	M	M	M	M	M	M	M
Drain holes														
065	Plugged existing drain holes.	M	M	M	M	M	M	M	M	M	M	M	M	M
Earthing bolt														
067	External earthing bolt.	M	M	M	M	M	M	M	M	M	M	S	S	S
Heating elements														
450	Heating element, 100-120V.	M	M	M	M	M	M	M	M	M	M	M	M	M
451	Heating element, 200-240V.	M	M	M	M	M	M	M	M	M	M	M	M	M
Mounting arrangements														
008	IM 2101 foot/flange mounted, IEC flange, from IM 1001 (B34 from B3).	M	M	M	M	M	NA	NA	NA	NA	NA	NA	NA	NA
009	IM 2001 foot/flange mounted, IEC flange, from IM 1001 (B35 from B3).	M	M	M	M	M	M	M	M	M	M	M	M	M
047	IM 3601 flange mounted, IEC flange, from IM 3001 (B14 from B5).	M	M	M	M	M	NA	NA	NA	NA	NA	NA	NA	NA
048	IM 3001 flange mounted, IEC flange, from IM 3601 (B5 from B14).	M	M	M	M	M	NA	NA	NA	NA	NA	NA	NA	NA
066	Modified for specified mounting position differing from IM B3 (1001), IM B5 (3001), B14 (3601), IM B35 (2001) & IM B34 (2101).	M	M	M	M	M	M	M	M	M	M	M	M	M
Painting														
114	Special paint colour, standard grade.	M	M	M	M	M	M	M	M	M	M	M	M	M
Protection														
005	Metal protective roof, vertical motor, shaft down.	M	M	M	M	M	M	M	M	M	M	M	M	M
072	Radial seal at D-end.	M	M	M	M	M	M	M	M	M	M	M	M	M
Rating and instruction plate														
095	Restamping output (maintained voltage, frequency), intermittent duty.	M	M	M	M	M	M	M	M	M	M	M	M	M
135	Mounting of additional identification plate, stainless.	M	M	M	M	M	M	M	M	M	M	M	M	M
161	Additional rating plate delivered loose.	M	M	M	M	M	M	M	M	M	M	M	M	M
Restamping														
002	Restamping voltage, frequency and output, continuous duty.	M	M	M	M	M	M	M	M	M	M	M	M	M
Standards and regulations														
331	IE1 motor not for sale for use in EU	M	M	M	M	M	M	M	M	M	M	M	M	M

[1] Certain variant codes cannot be used simultaneously.

Following variant codes are available, more information from ABB
M = modifications
NA = not applicable
S = Standard

		M2BA										M2BAT		
Code [1]	Variant code	80	90	100	112	132	160	180	200	225	250	280	315	355
Stator winding temperature sensors														
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	M	M	M	M	M	M	M	M	M	M	M	M	M
435	PTC - thermistors (3 in series), 130°C, in stator winding.	M	M	M	M	M	M	M	M	M	M	M	M	M
436	PTC - thermistors (3 in series), 150°C, in stator winding.	S	S	S	S	S	S	S	S	S	S	S	S	S
441	PTC - thermistors (3 in series, 130°C & 3 in series, 150°C), in stator winding.	M	M	M	M	M	M	M	M	M	M	M	M	M
445	Pt-100 2-wire in stator winding, 1 per phase	M	M	M	M	M	M	M	M	M	M	M	M	M
230	Standard metal cable glands	M	M	M	M	M	M	M	M	M	M	M	M	M
447	Top mounted separate terminal box for monitoring equipment.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	M	M	M
Testing														
145	Type test report from a catalogue motor, 400V 50Hz.	M	M	M	M	M	M	M	M	M	M	M	M	M
148	Routine test report.	M	M	M	M	M	M	M	M	M	M	M	M	M
Variable speed drive														
701	Insulated bearing at N-end	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	M	M	M
704	EMC cable gland.	M	M	M	M	M	M	M	M	M	M	M	M	M

1) Certain variant codes cannot be used simultaneously.

Following variant codes are available, more information from ABB
M = modifications
NA = not applicable
S = Standard

General performance IE2 aluminum motors – variant codes

Code [1]	Variant	M2AA 160	180	200	225	250
Bearing and Lubrication						
037	Roller bearing at D-end.	M	M	M	M	M
040	Heat resistant grease.	M	M	M	M	M
043	SPM compatible nipples for vibration measurement	M	M	M	M	M
188	63-series bearings.	M	M	M	M	M
194	2Z bearings greased for life at both ends.	S	S	S	S	S
Branch standard design						
178	Stainless steel / acid proof bolts.	M	M	M	M	M
217	Cast iron D-end shield (on aluminum motor).	S	S	S	S	S
Cooling system						
068	Light alloy metal fan	M	M	M	M	M
205	Non metalic fan	S	S	S	S	S
Documentation						
141	Binding dimension drawing.	M	M	M	M	M
Drain holes						
065	Plugged existing drain holes.	M	M	M	M	M
Earthing bolt						
067	External earthing bolt.	M	M	M	M	M
Heating elements						
450	Heating element, 100-120V.	M	M	M	M	M
451	Heating element, 200-240V.	M	M	M	M	M
Mounting arrangements						
008	IM 2101 foot/flange mounted, IEC flange, from IM 1001 (B34 from B3).	NA	NA	NA	NA	NA
009	IM 2001 foot/flange mounted, IEC flange, from IM 1001 (B35 from B3).	M	M	M	M	M
047	IM 3601 flange mounted, IEC flange, from IM 3001 (B14 from B5)	M	NA	NA	NA	NA
048	IM 3001 flange mounted, IEC flange, from IM 3601 (B5 from B14).	NA	NA	NA	NA	NA
066	Modified for specified mounting position differing from IM B3 (1001), IM B5 (3001), B14 (3601), IM B35 (2001) & IM B34 (2101)	M	M	M	M	M
200	Flange ring holder.	NA	NA	NA	NA	NA
218	Flange ring FT 85.	NA	NA	NA	NA	NA
219	Flange ring FT 100.	NA	NA	NA	NA	NA
220	Flange ring FF 100.	NA	NA	NA	NA	NA
223	Flange ring FF 115.	NA	NA	NA	NA	NA
224	Flange ring FT 115.	NA	NA	NA	NA	NA
226	Flange ring FF 130.	NA	NA	NA	NA	NA
227	Flange ring FT 130.	NA	NA	NA	NA	NA
230	Standard metal cable glands.	M	M	M	M	M
233	Flange ring FF 165.	NA	NA	NA	NA	NA
234	Flange ring FT 165.	NA	NA	NA	NA	NA
236	Flange FT 165.	NA	NA	NA	NA	NA
243	Flange ring FF 215.	NA	NA	NA	NA	NA
244	Flange ring FT 215.	NA	NA	NA	NA	NA
253	Flange ring FF 265.	NA	NA	NA	NA	NA
254	Flange ring FT 265.	NA	NA	NA	NA	NA
255	Flange FF 265.	NA	NA	NA	NA	NA
Painting						
114	Special paint colour, standard grade.	M	M	M	M	M
Protection						
005	Metal protective roof, vertical motor, shaft down.	M	M	M	M	M
072	Radial seal at D-end.	M	M	M	M	M

[1] Certain variant codes cannot be used simultaneously.

General performance IE2 high efficiency aluminum motors frame sizes 56 to 132 on request.

Following variant codes are available, more information from ABB
M = modifications
NA = not applicable
S = Standard

Code [1]	Variant	M2AA 160	180	200	225	250
Rating and instruction plate						
002	Restamping voltage, frequency and output, continuous duty.	M	M	M	M	M
095	Restamping output (maintained voltage, frequency), intermittent duty.	M	M	M	M	M
135	Mounting of additional identification plate, stainless.	M	M	M	M	M
161	Additional rating plate delivered loose.	M	M	M	M	M
198	Aluminum rating plate.	S	S	S	S	S
Standards and regulations						
331	IE1 motor not for sale for use in EU	M	M	M	M	M
Stator winding temperature sensors						
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	M	M	M	M	M
435	PTC - thermistors (3 in series), 130°C, in stator winding.	M	M	M	M	M
436	PTC - thermistors (3 in series), 150°C, in stator winding.	S	S	S	S	S
441	PTC - thermistors (3 in series, 130°C & 3 in series, 150°C), in stator winding.	M	M	M	M	M
445	Pt-100 2-wire in stator winding, 1 per phase	M	M	M	M	M
Testing						
145	Type test report from a catalogue motor, 400V 50Hz.	M	M	M	M	M
148	Routine test report.	M	M	M	M	M
Variable speed drives						
704	EMC cable gland.	M	M	M	M	M

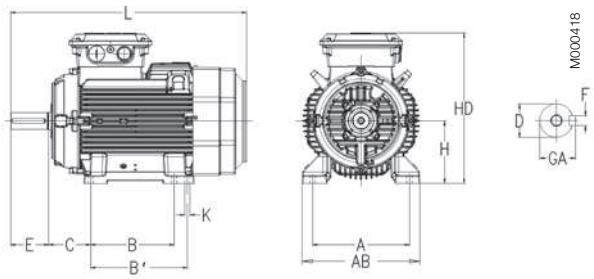
[1] Certain variant codes cannot be used simultaneously.

General performance IE2 high efficiency aluminum motors frame sizes 56 to 132 on request.

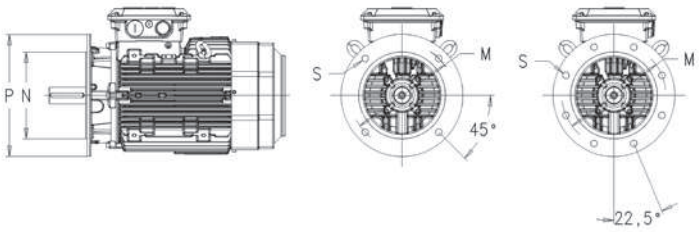
Following variant codes are available, more information from ABB
M = modifications
NA = not applicable
S = Standard

General performance IE2 high efficiency motors Sizes 71 - 355
Dimension drawings

Foot-mounted motor IM1001, B3



Flange-mounted motor IM 3001, B5



		IM 1001, IM B3 ja IM 3001, IM B5										IM 1001, IM B3							IM 3001, IM B5			
Motor size		D poles		GA poles		F poles		E poles		L max poles		A	B	B'	C	HD	K	H	M	N	P	S
		2	4-6	2	4-6	2	4-6	2	4-6	2	4-6											
General performance aluminum motors																						
Sizes 56 to 132 on request																						
M2AA	**160**	42	42	45	45	12	12	110	110	584	584[1]	254	210	254	108	370	14.5	160	300	250	350	19
	180	48	48	51.5	51.5	14	14	110	110	681	681	279	241	279	121	390	14.5	180	300	250	350	19
	200	55	55	59	59	16	16	110	110	726	726	318	267	305	133	425	18.5	200	350	300	400	19
	225	55	60	59	64	16	18	110	140	821	851	356	286	311	149	525[2]	18	225	400	350	450	19
	250	60	65	64	69	18	18	140	140	880	880	406	311	349	168	572[2]	22	250	500	450	550	19
General performance cast iron motors																						
M2BA	**71**	14	14	16	16	5	5	30	30	264	264	112	90	-	45	178	7	71	130	110	160	10
	80	19	19	21.5	21.5	6	6	40	40	321	321	125	100	-	50	195	10	80	165	130	200	12
	90	24	24	27	27	8	8	50	50	357	357	140	100	125	56	219	10	90	165	130	200	12
	100	28	28	31	31	8	8	60	60	381	381	160	140	-	63	247	12	100	215	180	250	15
	112	28	28	31	31	8	8	60	60	403	403	190	140	-	70	259	12	112	215	180	250	15
	132	38	38	41	41	10	10	80	80	533	533	216	140	170	89	300	12	132	265	230	300	15
	160	42	42	45	45	12	12	110	110	584	584[3]	254	210	254	108	413	14.5	160	300	250	350	19
	180	48	48	51.5	51.5	14	14	110	110	681	681	279	241	279	121	433	14.5	180	300	250	350	19
	200	55	55	59	59	16	16	110	110	726	726	318	267	305	133	473[4]	18.5	200	350	300	400	19
	225	55	60	59	64	16	18	110	140	821	851	356	286	311	149	539	18.5	225	400	350	450	19
	250	60	65	64	69	18	18	140	140	879	879	406	311	349	168	584	24	250	500	450	550	19
M2BAT	**280 SM_**	65	75	69	79.5	18	20	140	140	1088	1088	457	368	419	190	745	24	280	500	450	550	18
	315 SM_	65	80	69	85	18	22	140	170	1218	1248	508	406	457	216	840	30	315	600	550	660	23
	315 ML_	65	90	69	95	18	25	140	170	1269	1299	508	457	508	216	840	30	315	600	550	660	23
	355 S	70	100	74.5	106	20	28	140	210	1344	1414	610	500	–	254	955	35	355	740	680	800	23

General performance cast iron motors IM 3601, IM B14

Motor size	M	N	P	S
71	85	70	105	M6
80	100	80	120	M6
90	115	95	140	M8
100	130	110	160	M8
112	130	110	160	M8
132	165	130	200	M10

Tolerances

A,B	±0,8
D	ISO k6 < Ø 28 mm
	ISO m6 > Ø 38 mm
F	ISO h9
H	-0,5
N	ISO j6
C	±0,8

[1] 160MLB 6-pole L = 681
[2] For voltage code S add 32 mm to listed HD-dimension
[3] 160MLB 6-pole L = 681
[4] 200, voltage code S HD = 478

Above table gives the main dimensions in mm. For detailed drawings please see our web-pages 'www.abb.com/motors&generators' or contact ABB.

General performance IE2 cast iron motors in brief

Motor size		71	80	90	100	112	132
Stator	Material	Cast iron EN-GJL-150/GG 15/GRS 150					
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G					
	Surface treatment	Two-pack epoxy paint, ≥ 70µm					
Feet		Integrated with stator					
	Material	Cast iron EN-GJL-150/GG 15/GRS 150					
Bearing end shields	Material	Cast iron EN-GJL-150/GG 15/GRS 150					
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G					
	Surface treatment	Two-pack epoxy paint, ≥ 70µm					
Bearings	D-end	6203-2Z/C3	6204-2Z/C3	6205-2Z/C3	6206-2Z/C3	6206-2Z/C3	6208-2Z/C3
	N-end	6202-2Z/C3	6203-2Z/C3	6204-2Z/C3	6205-2Z/C3	6205-2Z/C3	6208-2Z/C3
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end					
Bearing seals	D-end	V-ring					
	N-end	Labyrinth seal					
Lubrication		Permanently lubricated shielded bearings. Grease temperature range -40 to +160°C					
Terminal box	Material	Cast iron EN-GJL-150/GG 15/GRS 150					
	Surface treatment	Similar to stator.					
	Screws	Steel 5G, coated with zinc and yellow chromated.					
Connections	Threaded openings	2 x M16	2 x M25		2 x M32		
	Max Cu-area mm^2	4	6		10		
	Terminal box	Cable lugs, 6 terminals					
Fan	Material	Polypropylene. Reinforced with 20% glass fibre.					
Fan cover	Material	Steel					
	Paint colour shade	Black RAL 9011					
	Surface treatment	Two-pack epoxy paint, ≥ 70µm					
Stator winding	Material	Copper					
	Insulation class	Insulation class F					
	Winding protection	3 PTC thermistors as standard, 150°C					
Rotor winding	Material	Diecast aluminum.					
Balancing method		Half key balancing as standard					
Key ways		Closed keyway					
Heating elements	On request	8 W		25 W			
Enclosure		IP 55.					
Cooling method		IC 411					
Drain holes		Drain holes with closable plugs, open on delivery.					
Lifting lugs		Integrated with the stator					

General performance IE2 cast iron motors in brief

Size	M2BA	160	180	200	225	250
Stator	Material	Cast iron EN-GJL-200/GG 20/GRS 200				
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G				
	Surface treatment	Two-pack epoxy pain paint, ≥ 70µm				
Feet		Integrated with stator				
	Material	Cast-iron				
Bearing end shields	Material	Cast iron EN-GJL-200/GG 20/GRS 200				
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G				
	Surface treatment	Two-pack epoxy pain paint, ≥ 70µm				
Bearings	D-end	6209-2Z/C3	6210-2Z/C3	6212-2Z/C3	6213-2Z/C3	6215-2Z/C3
	N-end	6209-2Z/C3	6209-2Z/C3	6209-2Z/C3	6210-2Z/C3	6212-2Z/C3
Axially-locked	Inner bearing cover	D-end				
Bearing seals	D-end	Axial seal				
	N-end					
Lubrication		Permanently lubricated shielded bearings.				
Terminal box	Material	Cast iron, base integrated with stator.				
	Surface treatment	Two-pack epoxy pain paint, ≥ 70µm				
	Screws	Steel 8.8, zinc electroplated and chromated				
Connections	Threaded openings	(2 x M40 + M16)		Code S M50+M40+M16	(2 x M63 + M16)	
	Max Cu-area mm^2	35		Code S: 70	70	
	Terminal box	6 terminals for connection with cable lugs (not included)				
	Screws	M6			M10	
Fan	Material	Polypropylene. Reinforced with 20% glass fibre.				
Fan cover	Material	Hot dip galvanized steel				
	Paint colour shade	Black, NCS 8801-B09G				
	Surface treatment	Polyester powder paint, ≥ 70µm				
Stator winding	Material	Copper				
	Insulation	Insulation class F				
	Winding protection	3 PTC thermistors as standard, 150°C				
Rotor winding	Material	Diecast aluminum				
Balancing method		Half key balancing				
Key ways		Closed keyway				
Heating elements	On request	25 W		50 W		
Enclosure		IP 55				
Cooling method		IC 411				
Drain holes		Drain holes with closable plastic plugs, open on delivery.				
Lifting lugs		Integrated with the stator (round motor bolted)				

General performance IE2 cast iron motors in brief

Motors size	M2BAT	280	315	355
Stator	Material	Cast iron GG 20/GRS 200		
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G / RAL 5014		
	Surface treatment	Two-pack epoxy paint, thickness ≥ 70µm		
Feet		Integrated with stator		
	Material	Cast-iron		
Bearing end shield	Material	Cast iron EN-GJL-200/GG 20/GRS 200		
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G / RAL 5014		
	Surface treatment	Two-pack epoxy paint, thickness ≥ 70µm		
Bearings	D-end	6316/C4, 2 pole 6316/C3, 4 to 8 pole	6316/C4, 2 pole 6319/C3, 4 to 8 pole	6319/C4, 2 pole 6322/C3, 4 to 8 pole
	N-end	6316/C4, 2 pole 6316/C3, 4 to 8 pole	6316/C4, 2 pole 6316/C3, 4 to 8 pole	6319M/C4, 2 pole 6319/C3, 4 to 8 pole
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end		
Bearing seals	D-end	Axial seal		
	N-end	Axial seal		
Lubrication		Regreasable bearings		
Terminal box	Material	Cast iron GG 15/GRS 150		
	Surface treatment	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G		
	Screws	Steel 8.8, zinc electroplated and chromated		
Connections	Threaded openings	2 x M63 + 2xM20)		
	Terminal box	6 terminals for connection		
Fan	Material	Reinforced glass fiber or aluminium		
Fan cover	Material	Steel		
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G / RAL 5014		
	Surface treatment	Two-pack epoxy polyester paint, ≥ 80µm		
Stator winding	Material	Copper		
	Insulation	Insulation class F		
	Winding protection	3 PTC thermistors as standard, 150˚C		
Rotor winding	Material	Pressure die-cast aluminium		
Balancing method		Half key balancing as standard		
Key ways		Open key way		
Heating elements	Optional	60 W	120 W	
Enclosure		IP 55		
Cooling method		IC 411		
Drain holes				
Lifting lugs		Separate lifting lugs		

General performance IE2 aluminum motors in brief

Size	M2AA	160	180	200	225	250
Stator	Material	Diecast aluminum alloy			Extruded aluminum alloy.	
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G				
	Surface treatment	Polyester powder paint, ≥ 60µm				
Feet		Bolt on feet, bolted to the stator.				
	Material	Aluminum alloy		Cast iron		
Bearing end shields	Material	Cast iron EN-GJL-200/GG 20/GRS 200				
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G				
	Surface treatment	Two-pack epoxy pain paint, ≥ 60µm				
Bearings	D-end	6209-2Z/C3	6210-2Z/C3	6212-2Z/C3	6213-2Z/C3	6215-2Z/C3
	N-end	6209-2Z/C3	6209-2Z/C3	6209-2Z/C3	6210-2Z/C3	6212-2Z/C3
Axially-locked	Inner bearing cover	D-end				
Bearing seals		Axial seal				
Lubrication		Permanently lubricated shielded bearings. Wide temperature grease.				
Terminal box	Material	Diecast aluminum alloy, base integrated with stator.			Deep-drawn steel sheet, bolted to stator.	
	Surface treatment	Polyester powder paint, ≥ 60µm			Phosphated. Polyester paint.	
	Screws	Steel 8.8, zinc electroplated and chromated				
Connections	Knock-out openings Flange-openings	(2 x M40 + M16) + (2 x M40)			2 x FL13, 2 x M40 2 x FL 21, 2 x M63 (voltage code S)	
	Max Cu-area mm^2	35			70	
	Terminal box	6 terminals for connection with cable lugs (not included)				
	Screws	M6			M10	
Fan	Material	Polypropylene. Reinforced with 20% glass fibre.				
Fan cover	Material	Hot dip galvanized steel				
	Paint colour shade	Black, NCS 8801-B09G				
	Surface treatment	Polyester powder paint, ≥ 60µm				
Stator winding	Material	Copper				
	Insulation class	Insulation class F				
	Winding protection	3 PTC thermistors as standard, 150°C				
Rotor winding	Material	Diecast aluminum.				
Balancing method		Half key balancing.				
Key ways		Closed keyway				
Heating elements	Optional	25 W		50 W		
Enclosure		IP 55.				
Cooling method		IC 411				
Drain holes		Drain holes with closable plastic plugs, open on delivery.				
Lifting lugs		Integrated with the stator			Bolted to the stator	

General performance IE2 high efficiency aluminum motors frame sizes 56 to 132 on request.

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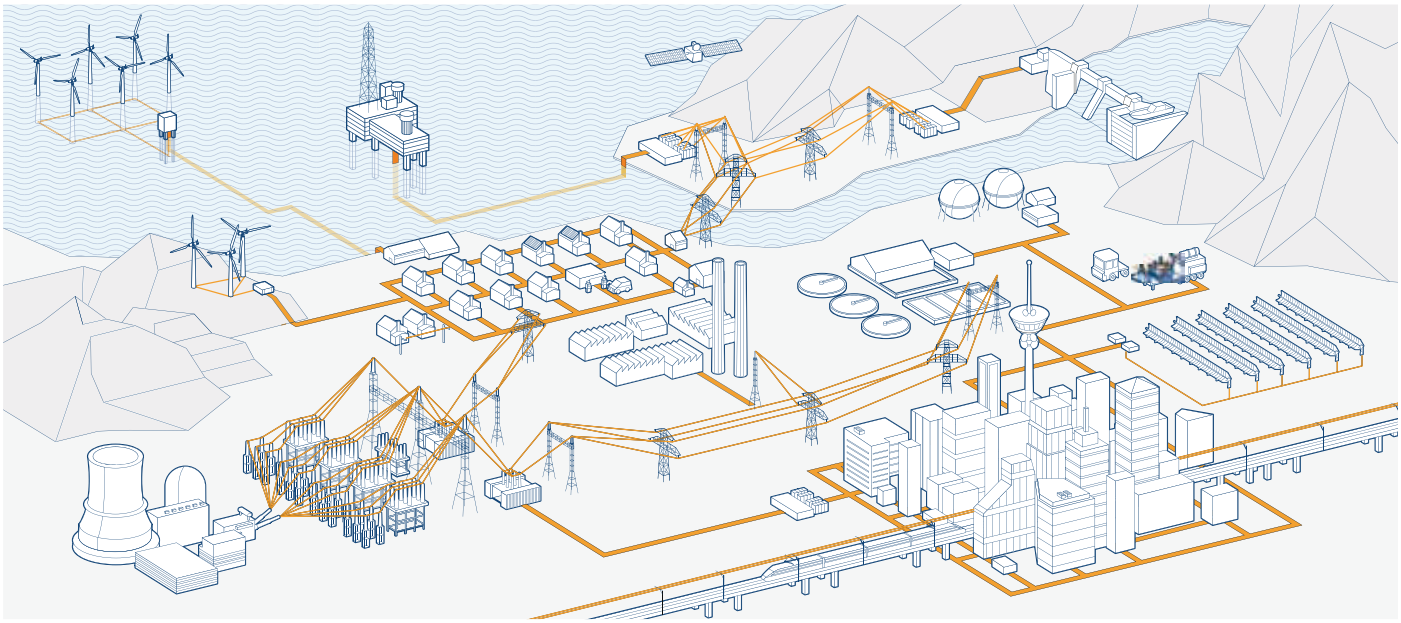

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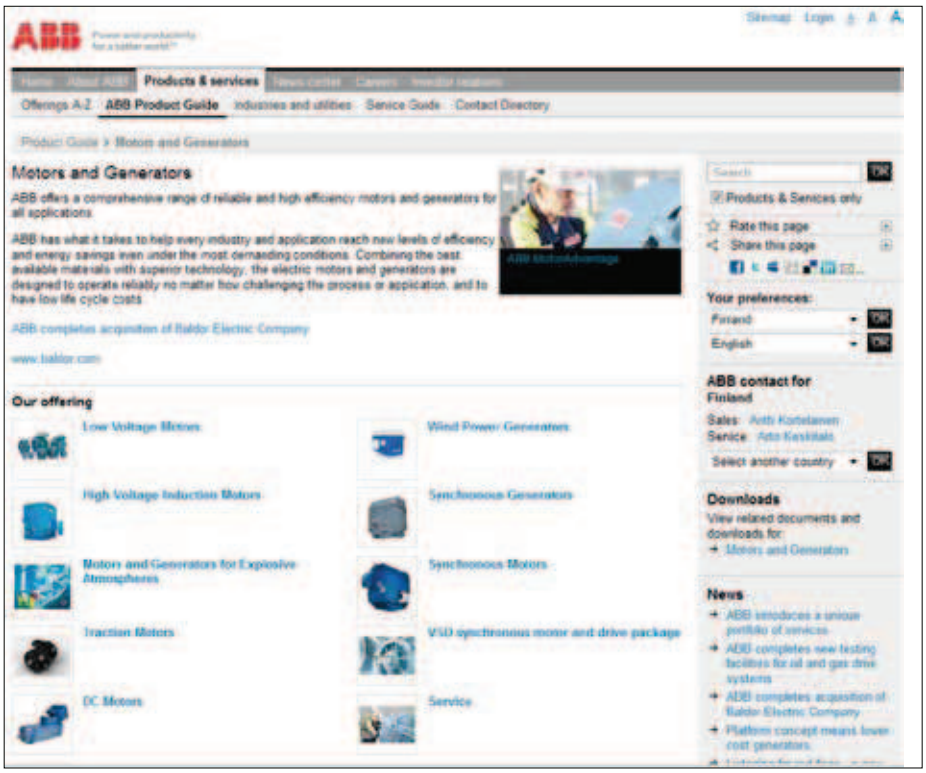

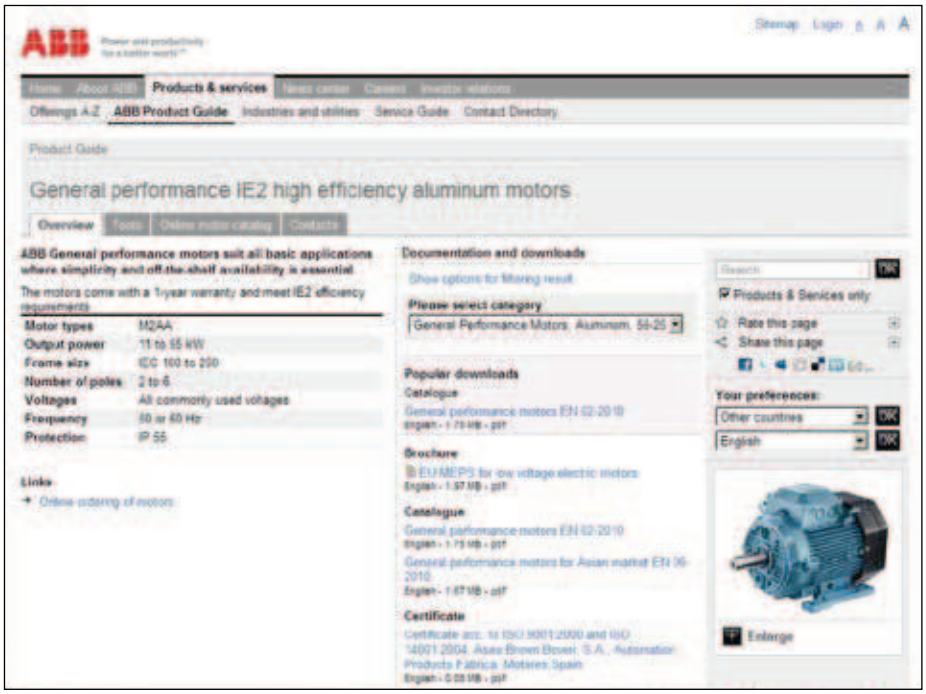

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