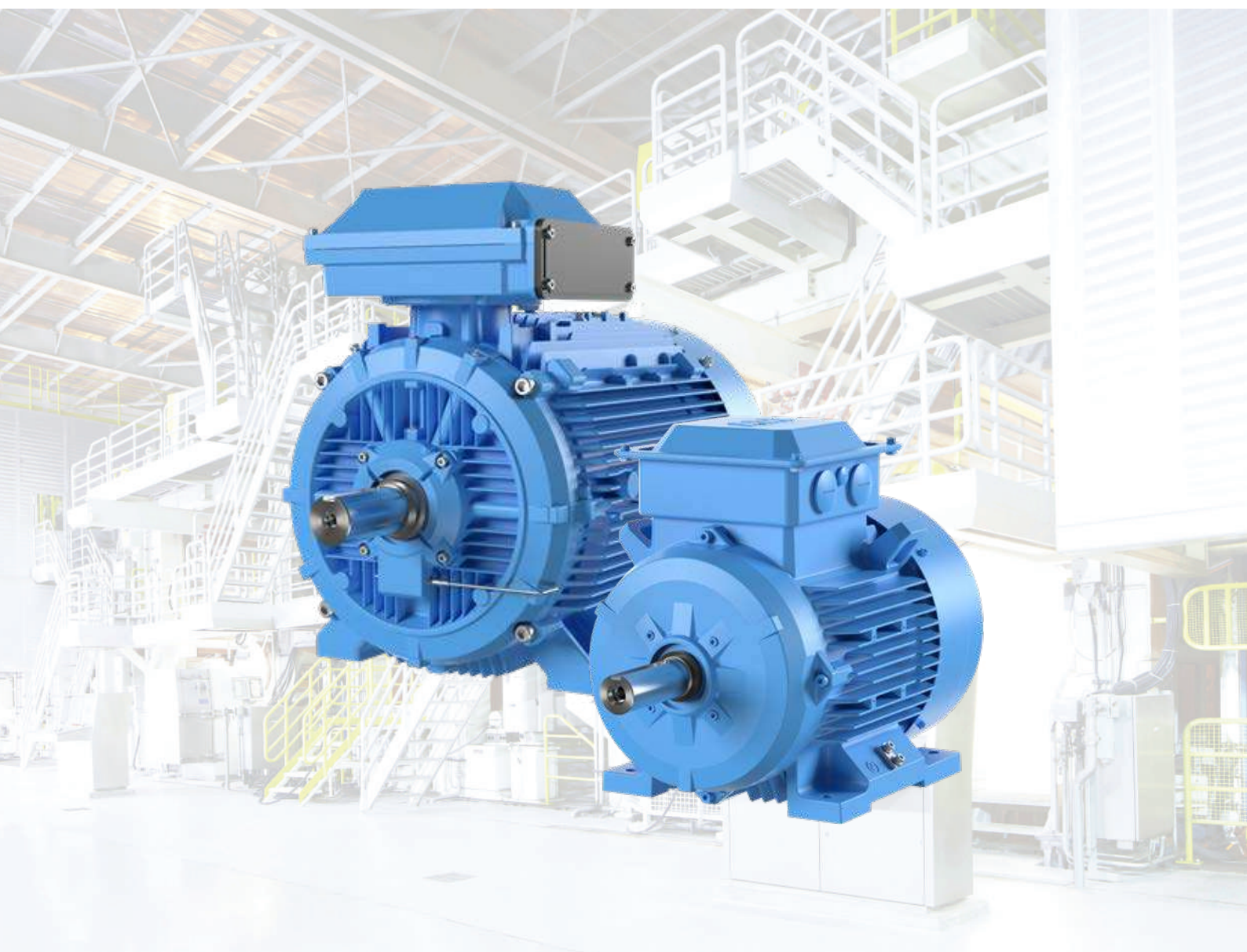


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## **Low Voltage**

IE4 super premium efficiency  
cast iron motors



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**With expertise and a comprehensive portfolio of products and life-cycle services, we help value-minded industrial customers improve their energy efficiency and productivity.**

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# IE4 efficiency cast iron motors sizes 160 to 355

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## Technical data

IE4 cast iron 415V, 50Hz motors, 3000, 1500 & 1000 r/min

IP 55 - IC 411 - Insulation class F, temperature rise class B  
IE4 efficiency class according to IS 12615:2018

Output KW	Frame Size	Speed r/min	Efficiency			Power factor cos $\phi$	Current		Torque			Moment of inertia J=1/4GD <sup>2</sup> kgm <sup>2</sup>	Weight kg
			Full load 100%	3/4 load 75%	1/2 load 50%		I <sub>n</sub> , A	I <sub>s</sub> /I <sub>n</sub>	T <sub>n</sub> Nm	T <sub>s</sub> /T <sub>n</sub>	T <sub>b</sub> /T <sub>n</sub>		
		3000 r/min											
		415V, 50Hz											
9.3	M2BAX160MLJ2	2938	92.2	92.3	91.4	0.87	16.20	7.70	30.2	2.0	3.1	0.044	120
11	M2BAX160MLA2	2945	92.6	92.6	91.8	0.89	18.80	7.70	35.7	2.5	3.4	0.055	132
15	M2BAX160MLB2	2938	93.3	93.6	93.1	0.89	25.30	8.00	48.7	2.1	2.9	0.054	134
18.5	M2BAX160MLC2	2945	93.7	93.9	93.5	0.89	31.10	8.50	60.0	2.6	3.5	0.068	155
22	M2BAX180MLA2	2948	94.0	94.3	93.9	0.89	36.80	7.70	71.2	2.0	3.3	0.103	195
30	M2BAX200MLA2	2955	94.5	94.6	94.1	0.88	50.60	7.00	97.0	2.0	3.0	0.180	250
37	M2BAX200MLB2	2960	94.8	95.2	94.7	0.86	62.80	7.70	119.6	2.2	3.4	0.212	276
45	M2BAX225SMA2	2960	95.0	95.2	94.5	0.88	75.00	7.50	145.2	2.7	3.0	0.342	368
55	M2BAX250SMA2	2961	95.3	95.4	94.8	0.88	91.50	7.00	177.4	1.9	3.0	0.647	472

Output KW	Frame Size	Speed r/min	Efficiency			Power factor cos $\phi$	Current		Torque			Moment of inertia J=1/4GD <sup>2</sup> kgm <sup>2</sup>	Weight kg
			Full load 100%	3/4 load 75%	1/2 load 50%		I <sub>n</sub> , A	I <sub>s</sub> /I <sub>n</sub>	T <sub>n</sub> Nm	T <sub>s</sub> /T <sub>n</sub>	T <sub>b</sub> /T <sub>n</sub>		
		1500 r/min											
		415V, 50Hz											
9.3	M2BAX160MLJ4	1475	93.0	93.1	92.2	0.78	18.00	8.00	60.2	2.5	3.2	0.088	131
11	M2BAX160MLA4	1475	93.3	93.3	92.4	0.78	21.10	8.00	71.2	2.7	3.4	0.094	138
15	M2BAX160MLB4	1475	93.9	94.0	93.1	0.78	29.00	7.50	97.1	2.6	2.9	0.121	170
18.5	M2BAX180MLA4	1478	94.2	94.4	94.0	0.80	34.20	7.50	120.0	2.6	2.8	0.228	222
22	M2BAX180MLB4	1478	94.5	94.8	94.5	0.81	40.40	7.50	142.2	2.6	2.9	0.240	232
30	M2BAX200MLA4	1478	94.9	95.0	94.8	0.82	53.80	7.80	194.0	2.5	2.8	0.428	322
37	M2BAX225SMA4	1478	95.2	95.5	95.3	0.82	66.10	8.00	239.0	2.8	3.4	0.547	373
45	M2BAX225SMB4	1480	95.4	95.6	95.3	0.82	80.00	8.00	290.4	2.7	3.4	0.547	377
55	M2BAX250SMA4	1480	95.7	95.7	95.3	0.83	97.20	7.50	355.0	2.4	3.1	0.910	443

Output KW	Frame Size	Speed r/min	Efficiency			Power factor cos $\phi$	Current		Torque			Moment of inertia J=1/4GD <sup>2</sup> kgm <sup>2</sup>	Weight kg
			Full load 100%	3/4 load 75%	1/2 load 50%		I <sub>n</sub> , A	I <sub>s</sub> /I <sub>n</sub>	T <sub>n</sub> Nm	T <sub>s</sub> /T <sub>n</sub>	T <sub>b</sub> /T <sub>n</sub>		
		1000 r/min											
		415V, 50Hz											
7.5	M2BAX160MLA6	975	91.3	91.4	90.4	0.74	15.70	7.00	73.5	1.9	2.7	0.109	144
9.3	M2BAX160MLJ6	976	91.9	92.1	91.2	0.74	19.00	7.00	91.0	1.9	2.8	0.118	147
11	M2BAX160MLB6	976	92.3	92.4	91.6	0.74	23.00	7.00	107.7	2.1	2.8	0.304	172
15	M2BAX180MLA6	977	92.9	93.3	92.8	0.75	30.50	7.00	146.6	1.9	2.8	0.207	195
18.5	M2BAX200MLA6	985	93.4	93.5	92.8	0.77	35.70	7.80	179.4	2.4	3.0	0.397	227
22	M2BAX200MLB6	986	93.7	93.8	93.2	0.78	42.30	8.00	213.1	2.4	3.1	0.490	269
30	M2BAX225SMA6	986	94.2	94.4	94.0	0.79	56.00	7.50	290.6	2.6	3.0	0.807	350
37	M2BAX250SMA6	983	94.5	94.7	94.1	0.79	70.80	7.50	359.0	2.6	3.2	1.680	467

Note : All performance figures are subject to IS tolerances

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.

I<sub>s</sub> / I<sub>n</sub> = Starting current

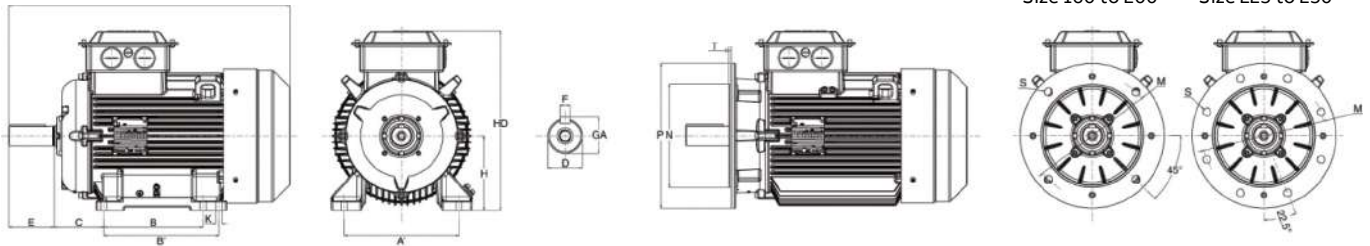
T<sub>s</sub> / T<sub>n</sub> = Locked rotor torque

T<sub>b</sub> / T<sub>n</sub> = Breakdown

## Dimension drawings

General performance IE4 efficiency cast iron motors

Foot-mounted motor IM1001, B3 and Flange-mounted motor IM 3001, 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	T
	2	4-6	2	4-6	2	4-6	2	4-6	2	4-6												
<b>General performance cast iron motors</b>																						
160ML	42	42	45	45	12	12	110	110	696 <sup>1</sup>	696 <sup>1</sup>	254	210	254	108	414	14.5	160	300	250	350	19	5
180ML	48	48	51.5	51.5	14	14	110	110	798 <sup>2</sup>	798 <sup>2</sup>	279	241	279	121	454	14.5	180	300	250	350	19	5
200ML	55	55	59	59	16	16	110	110	809 <sup>3</sup>	809 <sup>3</sup>	318	267	305	113	515	18.5	200	350	300	400	19	5
225SM	55	60	59	64	16	18	110	140	942	972	356	286	311	149	560	18.5	225	400	350	450	19	5
250SM	60	65	64	69	18	18	140	140	931	910	406	311	349	168	613	24	250	500	450	550	19	5

Above table gives the main dimensions in mm.

1) M2BAX 160ML C2, B4, B6: L = 746

2) M2BAX 180ML A2, A6 = 728

3) M2BAX 200ML B2, A4, B6 = 899

## Motors in brief

### General performance IE4 cast iron

Output		160	180	200	225	250
<b>Stator</b>	Material	Cast Iron Grade 200:ISO 185				
	Paint colour shade	Munsell blue 8B 4.5/3.25 / NCS 4822 B05G				
	Surface Treatment	C3 medium according to ISO / EN 12944-5				
<b>Bearing end shields</b>	Material	Cast iron grade 200 : ISO 185				
	Paint colour shade	Munsell blue 8B 4.5/3.25/NCS 4822 B05G				
	Surface Treatment	C3 medium according to ISO / EN 12944-5				
<b>Bearings</b>	D-end	6309-2Z/C3	6310-2Z/C3	6312-2Z/C3	6313-2Z/C3	6315-2Z/C3
	N-end	6209-2Z/C3	6209-2Z/C3	6209-2Z/C3	6210-2Z/C3	6212-2Z/C3
<b>Axially-locked</b>	Inner Bearing Cover	<b>As standard, locked at D-end</b>				
<b>Bearing seals</b>		Axial seal standard, radial on request				
<b>Lubrication</b>		Permanently lubricated shielded bearings				
<b>Measuring nipple</b>		Not included				
<b>Rating plate</b>	Material	Aluminium				
<b>Terminal Box</b>	Frame material	Sheet of Steel, cold rolled				
	Cover material	Sheet of Steel, cold rolled				
	Cover screws material	Steel 8.8				
<b>Connections</b>	Cable entries	2xM40, 1xM16		2xM50, 1xM16		
	Terminals	6 terminals of connection (Cable lugs not included)				
	Cable gland	Suitable opening in terminal box, cable glands as option				
<b>Fan</b>	Material	Polypropylene, Reinforced with 20% glass fibre				
<b>Fan Cover</b>	Material	Sheet of steel, cold rolled				
	Paint Colour shade	Munsell blue 8B 4.5/3.25/NCS 4822 B05G				
	Surface Treatment	C3 medium according to ISO/EN 12944-5				
<b>Stator winding</b>	Material	Copper				
	Insulation	Insulation class F, Temperature rise class B unless otherwise stated.				
	Winding protection	<b>3 PTC thermistors as option</b>				
<b>Rotor winding</b>	Material	Pressure diecast aluminium				
<b>Balancing method</b>		Half Key Balancing as Standard				
<b>Key ways</b>		Open Key Way				
<b>Enclosure</b>		IP 55, Higher protection on request				
<b>Cooling method</b>		IC 411				

# Product note

## Process performance IE4 efficiency cast iron motors, sizes 280 - 355

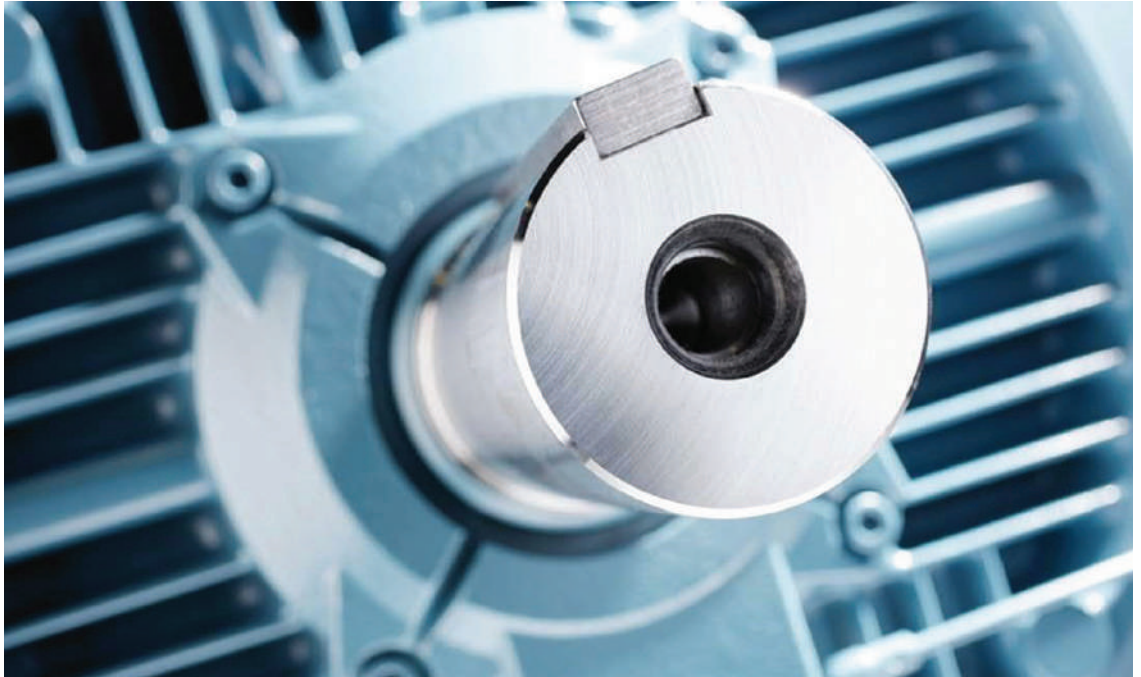


ABB is the first motor manufacturer to launch a low voltage IE4 (International Efficiency Class 4) range based on induction technology. The motors cover 45 – 375 kW in frame sizes 280 – 355. They are available for 415 V, 50 Hz and 440/460 V, 60 Hz in 2-, 4- and 6-pole versions.

IE4 motors meet the energy efficiency requirements defined in IEC Technical Specification IEC/TS 60034-31 and draft IEC standard 60034-30 edition 2.

### Platform

ABB's IE4 motors are based on the robust and well-proven induction platform. They have the same mechanical design as the other ABB high efficiency motors, and they meet IE4 requirements without using permanent magnets.

### Benefits

IE4 motors deliver the highest efficiency currently available in the market, enabling motor users to maximize energy

savings. As a result they are especially suited for applications with high operating hours.

By using an IE4 motor in place of a lower efficiency product it is possible to achieve a significant efficiency improvement, which will produce substantial energy savings over the motor's lifetime.

At the same time, the reduction in energy consumption means that overall carbon dioxide emissions are decreased – a factor which will help plants to meet their environmental commitments.

A further benefit of higher efficiency is cooler running, which means that these motors operate even more reliably than less efficient alternatives. The combination of high efficiency and reliability enables motor users to optimize the cost of motor ownership.

## Technical data

Process performance IE4 efficiency cast iron motors  
415V, 50Hz motors, 3000, 1500 & 1000 r/min

IIP55 - IC 411 - Insulation class F, Ambient 50°C (Temp. rise class B, 70°C), S1 Duty  
IE4 efficiency class according to IS 12615:2018, IEC 60034-30-1, 2014, 415V ± 10%, 50 ± 5% Hz, Combined Variation of ± 10%

Output KW	Motor type	Product code	Speed r/min	Efficiency			Power factor			Current		Torque (Nm)			Moment of inertia J=1/4GD <sup>2</sup> kgm <sup>2</sup>	Weight kg	Sound pressure level LPA (dB)
				FL 100%	FL 75%	FL 50%	100%	75%	50%	I <sub>n</sub> , A	I <sub>s</sub> /I <sub>n</sub>	T <sub>n</sub>	T <sub>s</sub> /T <sub>n</sub>	T <sub>max</sub> /T <sub>n</sub>			
2 Pole, 3000 r/min																	
75	M3BP 280SMB 2	3GBP281220-ADM	2981	95.6	95.6	94.6	0.86	0.81	0.73	127	8.9	240	2.6	3.1	0.9	665	90
90	M3BP 280SMC 2	3GBP281230-ADM	2982	95.8	95.8	94.8	0.87	0.83	0.75	150	8.9	288	2.8	3.3	1.2	725	90
110	M3BP 315SMB 2	3GBP311220-ADM	2984	96.0	96.0	95.0	0.86	0.82	0.75	185	8.9	352	2.0	2.8	1.4	940	90
132	M3BP 315SMC 2	3GBP311230-ADM	2985	96.2	96.2	95.2	0.87	0.81	0.75	220	8.9	422	2.6	3.0	1.7	1025	90
160	M3BP 315MLA 2	3GBP311410-ADM	2985	96.3	96.3	95.3	0.88	0.83	0.78	263	8.9	512	2.4	2.9	2.1	1190	90
200	M3BP 315MLB 2	3GBP311420-ADM	2985	96.5	96.5	95.5	0.87	0.85	0.80	332	8.9	640	2.4	2.9	2.2	1220	90
200	M3BP 355SMA 2	3GBP351210-ADM	2985	96.5	96.5	95.5	0.87	0.85	0.80	332	8.9	640	2.4	3.3	3.0	1600	90
250	M3BP 315LKB 2	3GBP311820-ADM	2985	96.5	96.5	95.5	0.87	0.84	0.80	414	8.9	800	2.6	2.9	2.9	1540	90
250	M3BP 355SMB 2	3GBP351220-ADM	2985	96.5	96.5	95.5	0.87	0.84	0.80	414	8.9	800	2.5	3.2	3.4	1680	90
315	M3BP 355SMC 2	3GBP351230-ADM	2985	96.5	96.5	95.5	0.86	0.82	0.76	528	8.9	1008	2.5	3.0	3.6	1750	90
355	M3BP 355MLA 2	3GBP351410-ADM	2985	96.5	96.5	95.5	0.87	0.84	0.79	589	8.9	1136	2.5	2.8	4.1	2000	90
4 Pole, 1500 r/min																	
75	M3BP 280SMC 4	3GBP282230-ADM	1488	96.0	96.0	95.0	0.83	0.78	0.65	131	8.9	481	2.8	3.0	1.85	725	85
90	M3BP 280MLA 4	3GBP282410-ADM	1489	96.1	96.1	95.1	0.82	0.80	0.70	157	8.9	577	2.8	3.2	2.3	840	85
110	M3BP 315SMC 4	3GBP312230-ADM	1491	96.3	96.3	95.3	0.82	0.75	0.68	194	8.9	704	2.6	3.1	2.9	1000	85
132	M3BP 315SMD 4	3GBP312240-ADM	1491	96.4	96.4	95.4	0.82	0.75	0.65	233	8.9	845	2.7	3.4	3.2	1065	85
160	M3BP 315MLB 4	3GBP312420-ADM	1490	96.6	96.6	95.6	0.84	0.80	0.70	274	8.9	1025	2.9	3.1	3.9	1220	85
200	M3BP 315LKB 4	3GBP312820-ADM	1491	96.7	96.7	95.7	0.84	0.79	0.70	343	8.9	1281	2.7	3.1	5.0	1520	85
200	M3BP 355SMA 4	3GBP352210-ADM	1491	96.7	96.7	95.7	0.84	0.79	0.70	343	8.9	1281	2.3	2.9	5.9	1610	85
250	M3BP 315LKC 4	3GBP312830-ADM	1491	96.7	96.7	95.7	0.83	0.80	0.70	434	8.9	1601	2.5	3.2	5.5	1600	85
250	M3BP 355SMB 4	3GBP352220-ADM	1492	96.7	96.7	95.7	0.83	0.80	0.70	434	8.9	1600	2.7	3.1	6.9	1780	85
315	M3BP 355SMC 4	3GBP352230-ADM	1492	96.7	96.7	95.7	0.83	0.78	0.69	546	8.9	2016	2.9	3.1	7.2	1820	85
355	M3BP 355MLA 4	3GBP352410-ADM	1492	96.7	96.7	95.7	0.83	0.79	0.70	615	8.9	2272	2.9	3.1	8.4	2140	85
6 Pole, 1000 r/min																	
45	M3BP 280SMB 6	3GBP283220-ADM	991	94.8	94.8	92.8	0.83	0.78	0.68	80	8.3	434	2.5	2.8	2.2	680	85
55	M3BP 280SMC 6	3GBP283230-ADM	991	95.1	95.1	93.1	0.83	0.77	0.70	97	8.3	530	2.6	2.8	2.9	725	85
75	M3BP 315SMC 6	3GBP313230-ADM	994	95.4	95.4	93.4	0.80	0.75	0.68	137	8.9	720	2.4	3.0	4.9	1000	85
90	M3BP 315SMD 6	3GBP313240-ADM	994	95.6	95.6	93.6	0.78	0.72	0.61	168	8.9	865	2.6	3.0	4.9	1040	85
110	M3BP 315MLB 6	3GBP313420-ADM	994	95.8	95.8	93.8	0.80	0.75	0.65	200	8.9	1057	2.5	2.9	6.3	1200	85
132	M3BP 315LKA 6	3GBP313810-ADM	994	96.0	96.0	94.0	0.80	0.75	0.64	239	8.9	1268	2.6	2.9	7.3	1410	85
160	M3BP 315LKC 6	3GBP313830-ADM	994	96.2	96.2	94.2	0.80	0.73	0.62	289	8.9	1537	2.7	3.0	9.2	1600	85
160	M3BP 355SMB 6	3GBP353220-ADM	995	96.2	96.2	94.2	0.80	0.75	0.63	289	8.9	1536	2.2	2.9	9.7	1680	85
200	M3BP 355SMC 6	3GBP353230-ADM	995	96.6	96.6	94.6	0.81	0.75	0.64	356	8.9	1919	2.5	3.0	11.3	1820	85
250	M3BP 355MLB 6	3GBP353420-ADM	995	96.6	96.6	94.6	0.80	0.75	0.65	450	8.9	2399	2.5	2.9	13.5	2180	85
315	M3BP 355LKA 6	3GBP353810-ADM	995	96.6	96.6	94.6	0.80	0.75	0.65	567	8.9	3023	2.5	2.8	15.5	2500	85
355	M3BP 355LKB 6	3GBP353820-ADM	995	96.6	96.6	94.6	0.78	0.70	0.60	655	8.9	3407	2.7	3.0	16.5	2600	85

Note: 1. All performance figures are subject to IEC/IS tolerances.  
2. Max. load GD<sup>2</sup> has been calculated assuming load torque is proportional to square of speed.

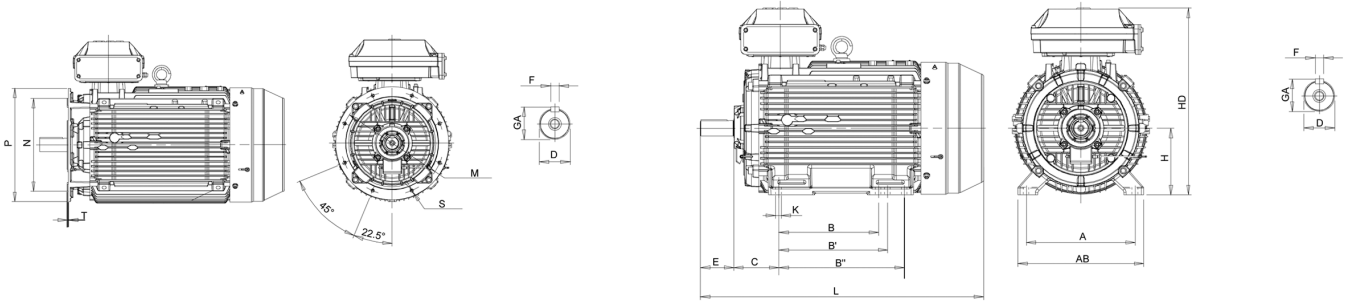
I<sub>n</sub> = Nominal or rated current  
T<sub>n</sub> = Nominal or rated torque in Nm  
T<sub>max</sub> = Maximum torque  
I<sub>s</sub> = Starting current  
T<sub>s</sub> = Starting Torque



## Dimension drawings

Process performance IE4 efficiency cast iron motors

Foot-mounted motor IM1001, B3 and Flange-mounted motor IM 3001, B5



Motor Size	D Poles		GA Poles		F Poles		E Poles		L max Poles		A	B	B'	B''	C	HD	K	H	M	N	P	S	T
	2	4-6	2	4-6	2	4-6	2	4-6	2	4-6													

### Process performance cast iron motors

280	65	75	69	79.5	18	20	140	140	1088	1088	457	368	419	-	190	762	24	280	500	450	550	19	5
280ML	65	75	69	79.5	18	20	140	140	1189	1189	457	419	457	-	190	785	24	280	500	450	550	19	5
315SM	65	80	69	85	18	22	140	170	1174	1204	508	406	457	-	216	852	28	315	600	550	660	24	6
315ML	65	90	69	95	18	25	140	170	1285	1315	508	457	508	-	216	852	28	315	600	550	660	24	6
315LK	65	90	69	95	18	25	140	170	1491	1521	508	508	560	710	216	880	28	315	600	550	660	24	6
355SM	70	100	74.5	106	20	28	140	210	1409	1479	610	500	560	-	254	958	35	355	740	680	800	24	6
355ML	70	100	74.5	106	20	28	140	210	1514	1584	610	560	630	-	254	958	35	355	740	680	800	24	6
355LK	70	100	74.5	106	20	28	140	210	1764	1834	610	630	710	900	254	958	35	355	740	680	800	24	6

Above table gives the main dimensions in mm.

## Motors in brief

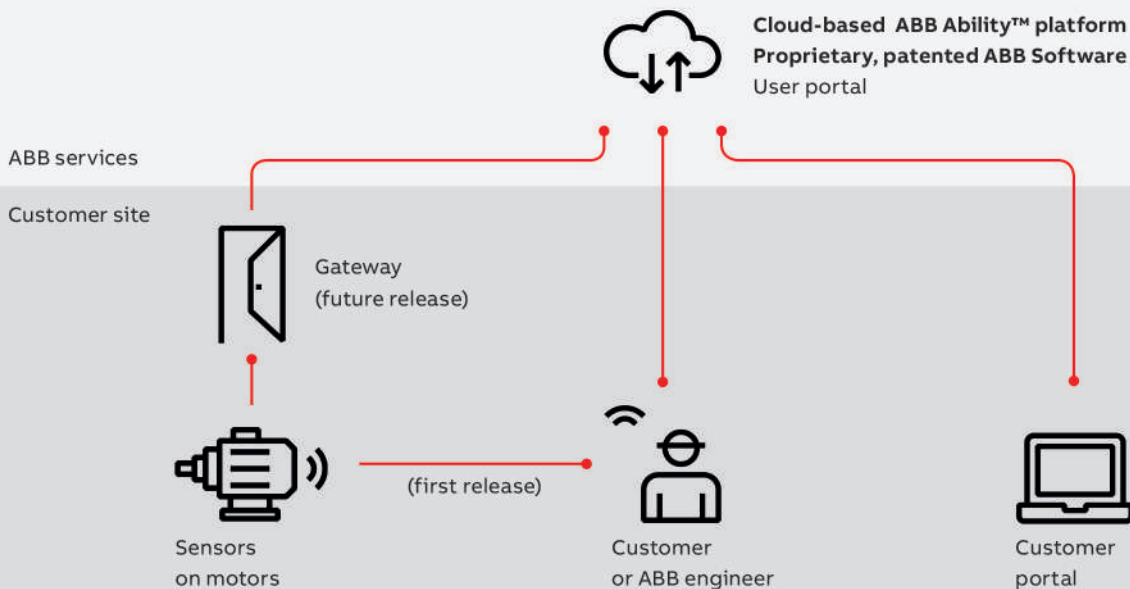
Process performance IE4 efficiency cast iron motors  
sizes 280 - 355

Output		280	315	355	
<b>Stator and end shields</b>	Material	Cast Iron			
	Paint colour shade	Munsell blue 8B 4.5/3.25			
	Corrosion class	C3 (medium)			
<b>Feet</b>	Material	Integrated cast iron feet			
<b>Bearings</b>	D-end	2-pole	6316/C3	6316/C3	6316M/C3
		4-12-pole	6316/C3	6319/C3	6322/C3
	N-end	2-pole	6316/C3	6316/C3	6316M/C3
		4-12-pole	6316/C3	6316/C3	6316/C3
<b>Axially-locked bearings</b>		Locked at D-end			
<b>Bearing seals</b>	D-end	V-ring or labyrinth seal			
	N-end	V-ring or labyrinth seal			
<b>Lubrication</b>		Regreaseable bearings, regreasing nipples M10x1			
<b>Measuring nipple for condition monitoring of the bearings</b>		Included			
<b>Rating plate</b>	Material	Stainless steel			
<b>Terminal box</b>	Frame and cover	Cast iron		Cover steel	
	Corrosion class	C3 (medium)		Steel	
	Cover screws	Zinc-electroplated steel			
<b>Connections</b>	Cable entries	2-4-pole	2xM63+2xM20	2xM63, 2xØ48-60+2xM20	2xØ48-60, 60-80, 2xM20
		6-8-pole			2xØ32-49, 48-60, 2M20
					See section Standard terminal box for detailed information.
	Terminals	6 terminals of connection (Cable lugs not included)			
Cable gland		Suitable opening in terminal box, cable glands as option			
<b>Fan</b>	Material	Glass-fiber reinforced polypropylene			
<b>Fan Cover</b>	Material	Sheet			
	Paint Colour shade	Munsell blue 8B 4.5/3.25			
	Corrosion class	C3 (medium)			
<b>Stator winding</b>	Material	Copper			
	Insulation	Insulation class F, Temperature rise class B unless otherwise stated.			
	Winding protection	3 PTC thermistors, 155 °C			
<b>Rotor winding</b>	Material	Pressure diecast aluminium			
<b>Balancing method</b>		Half key balancing			
<b>Key ways</b>		Open key way			
<b>Drain holes</b>		Drain holes with closable plastic plugs, open on delivery			
<b>Enclosure</b>		IP 55			
<b>Cooling method</b>		IC 411			

# ABB Ability™ Smart Sensor

## Condition monitoring solution for low voltage motors

ABB Ability™ Smart Sensor is a condition monitoring solution that makes predictive maintenance possible for almost all low voltage motors. By monitoring and analyzing data on motor operating parameters, it enables motor users to optimize their maintenance. The solution helps to reduce downtime by as much as 70 percent, extend motor lifetimes by up to 30 percent and reduce energy consumption by up to 10%.



ABB's condition monitoring solution for LV motors. The ABB Ability™ Smart Sensor transmits data via a smartphone (first release) or gateway to a secure cloud service. Algorithms in the cloud analyze the data and convert it into meaningful information, which is then sent to the user's smartphone and customer portal.

For more information please visit:  
[www.abb.com/smartsensor](http://www.abb.com/smartsensor)  
 or contact [contact.center@in.abb.com](mailto:contact.center@in.abb.com)

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