Synchronous reluctance motor-drive package for industrial use
Optimized cost of ownership

Power and productivity
for a better world™

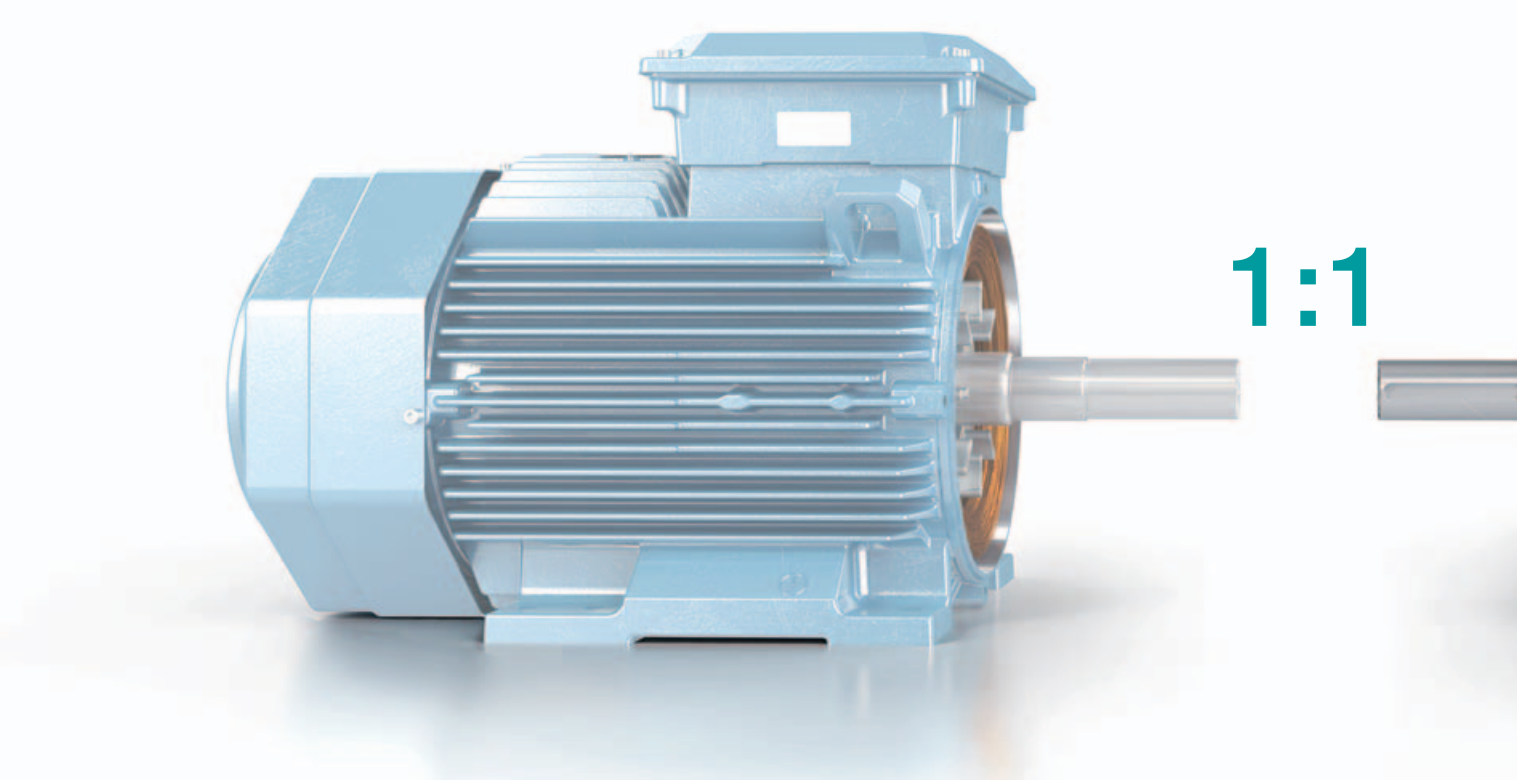
Lowest energy bill with maximum availability for a wide range of industrial applications

Our synchronous reluctance motor-drive packages are designed to meet the precise needs of industries such as mining, chemicals, power plants, material handling and pulp and paper. They are suitable for a wide range of applications such as pumps, fans, compressors, extruders, conveyors and mixers.

IE4 efficiency, 11 to 315 kW
The heart of the package is a magnet-free motor meeting IE4 efficiency levels. The lowest energy bill is achieved with speed control provided by an ACS880 drive and the excellent partial load efficiency performance of SynRM technology.

Verified package efficiency
For the first time, you don't have to guess the combined energy consumption of the motor and drive for a given output. The SynRM motor and drive package efficiency is measured to verify the efficiency. When comparing efficiencies between different alternatives, make sure you're looking at efficiency values for the whole package and all the speeds that will be run.

Upgrade system efficiency without mechanical modifications
Unlike many other IE4 motors, most IE4 SynRM motors follow Cenelec harmonized size and output combinations. This means that upgrading to the highest efficiency level is easy and straightforward without the need for mechanical modifications, which will keep the payback time of the total investment very short.



Traditional IE2 induction motor

Unprecedented reliability

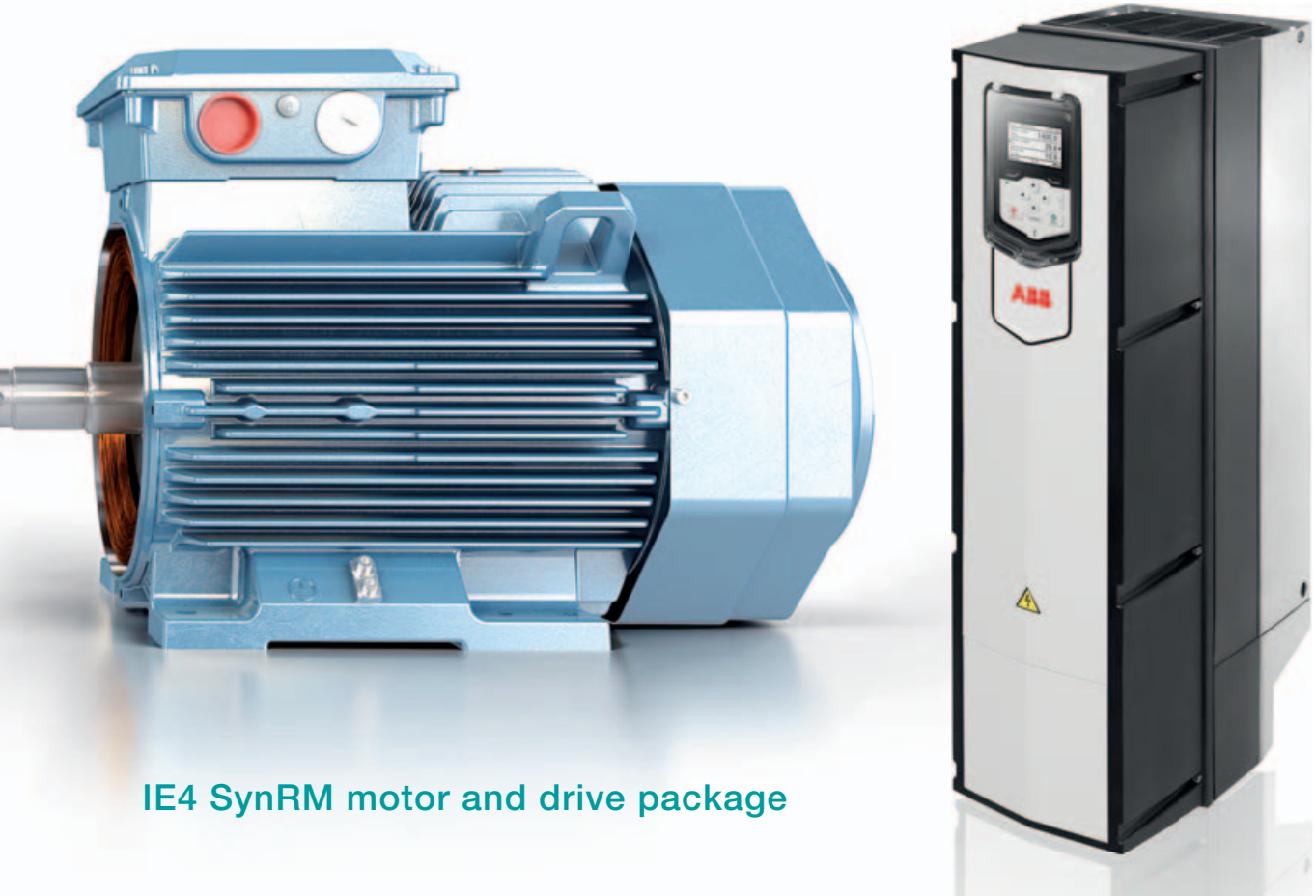
The rotor that runs exceptionally cool keeps motor bearing temperatures low and therefore increases bearing system reliability. Moreover, the temperature rise of the IE4 SynRM motor windings is well below class B. These factors take motor reliability to an unprecedented level, keeping the processes running without interruptions.

Induction motor on the outside, innovation inside

Synchronous reluctance motors combine innovative rotor and conventional stator technology. You get the performance of a permanent magnet motor together with the cost-efficiency, simplicity and service-friendliness of an induction motor.

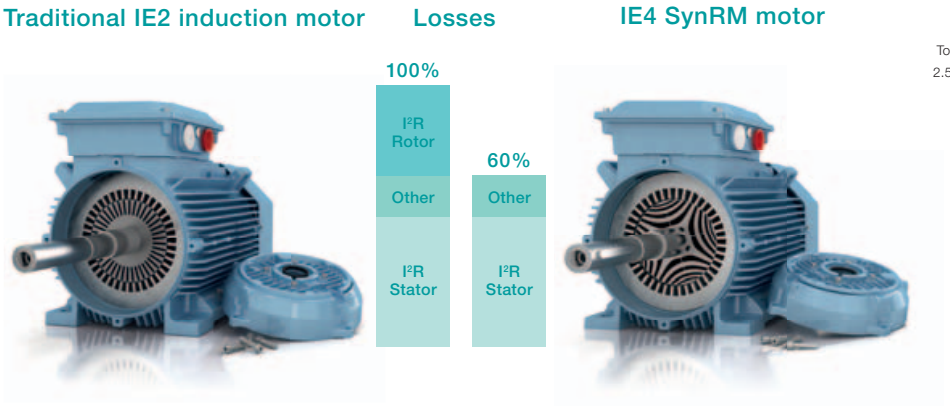
The all-compatible ACS880 drives

The all-compatible drives are designed to provide customers across industries and applications with unprecendeted levels of compatibility and flexibility. ACS880 supports various motor types including synchronous reluctance motors.

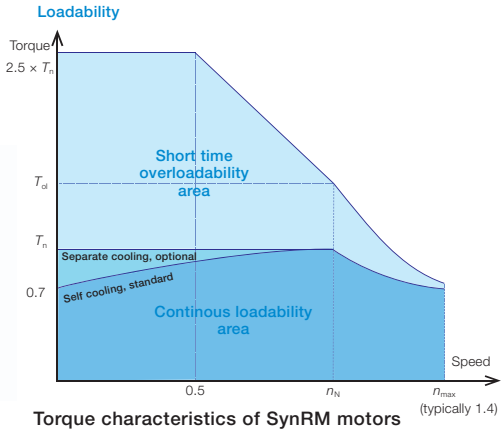


IE4 SynRM motor and drive package

Ultimate efficiency and reliability to optimize your cost of ownership



IE4 SynRM motor reduces losses up to 40%



Torque characteristics of SynRM motors

The idea is simple. Take a conventional, proven stator technology and a totally new, innovative rotor design. Then combine them with a best-in-class industrial drive loaded with purpose-design motor control.

Ultra-high efficiency motor to cut the cost of running

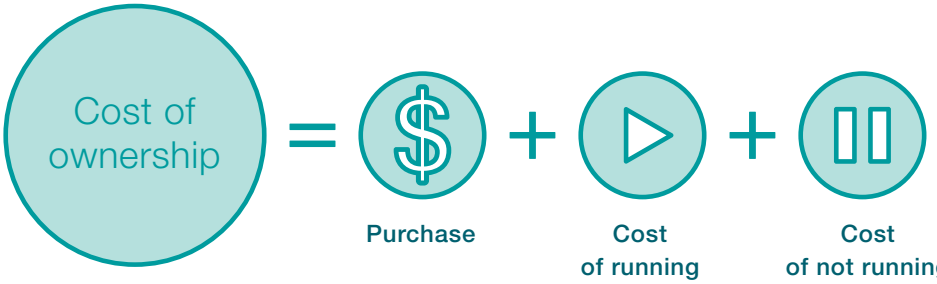
The new rotor has neither magnets nor windings, and thus suffers virtually no power losses. ABB has converted this advantage into ultra-high efficiency. As a result, you get the IE4 super premium efficiency level, which means very low energy consumption especially with in partial load variable speed operation.

Superior reliability to minimize the cost of downtime

IE4 synchronous reluctance motors have very low winding temperatures, which increases the reliability and lifetime of the winding. More importantly, the cool synchronous reluctance rotor means significantly lower bearing temperatures – an important factor because bearing failures cause about 70 percent of unplanned motor outages. Even if the bearings eventually need replacing, there are no magnetic forces involved – unlike in a permanent magnet motor – so the bearing change is as fast and easy as with an induction motor.

Winner of the 2011 Automation Award – The Automation Oscars

The new motor and drive package won Germany's most important automation award at the SPS/IPC/DRIVES trade show in Nuremberg.



SynRM technology is also available in high output motor and drive packages with up to two frame sizes smaller motor. To learn more, visit www.abb.com/motors&generators

Packaging the latest motor and drive technology

Motor highlights

- Motors meet IE4 efficiency levels according to IEC 60034-30-1 Ed 1.0
- Unprecedented reliability through very low winding and bearing temperatures
- Can replace standard induction motors – same power, size combinations
- Variant codes and mechanical construction based on the proven M3BP cast iron process performance motors – conventional yet innovative. Same parts, easy to source and change.
- No magnets, no cage – you cannot break what isn't there
- Service procedures comparable to induction motors – easy to maintain

SynRM rotor

Integrated safety features including safe torque off (STO) and safety functions module

ACS880 drive highlights

- Compact design for easy installation commissioning and maintenance
- Enclosure classes IP21, IP22, IP42, IP54, IP55 for various ambient conditions
- The offering ranges from wall-mounted to cabinet-built drives and drive modules
- Integrated safety including safe torque off (STO) as standard and plug-in safety functions module as option
- Full motor control over the whole speed range down to zero with Direct torque control (DTC) technology, without feedback devices like encoders or position sensors
- The drive with flying start capability sense the rotation speed and direction of a machine and increase the motor speed to the corresponding level without stopping the machine
- Removable memory unit for easy maintenance
- Wide range of fielbus adapters enable connectivity with all major automation networks

Why settle for IE4?

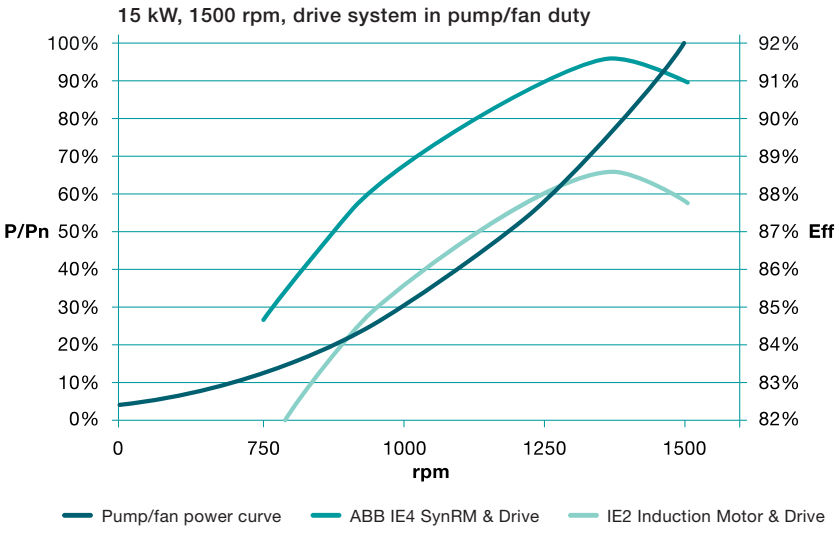
Using a motor with the highest efficiency class together with speed control is a good start when it comes to minimizing your energy bill.

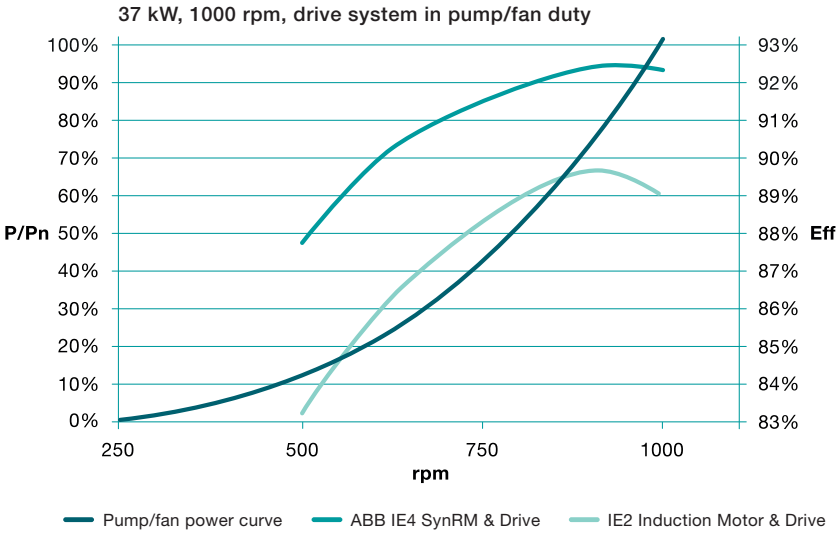
However the IE class only indicates motor efficiency with a sinusoidal supply at nominal speed and power. This information is not relevant when calculating energy consumption in variable speed applications. Accurate calculations demand efficiency data for the whole motor-drive package and for the entire speed range.

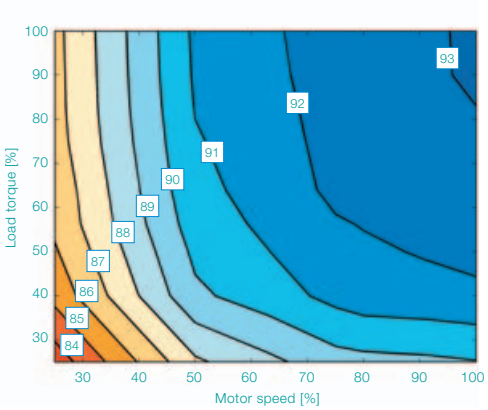
Now – for the first time in the industry – ABB offers you the means to calculate actual energy consumption with a measured efficiency curve for the motor and drive package. Log the operating profile and energy consumption of your present system and calculate the energy consumption with the new IE4 SynRM package.

This time your calculations will be based on facts, not assumptions.

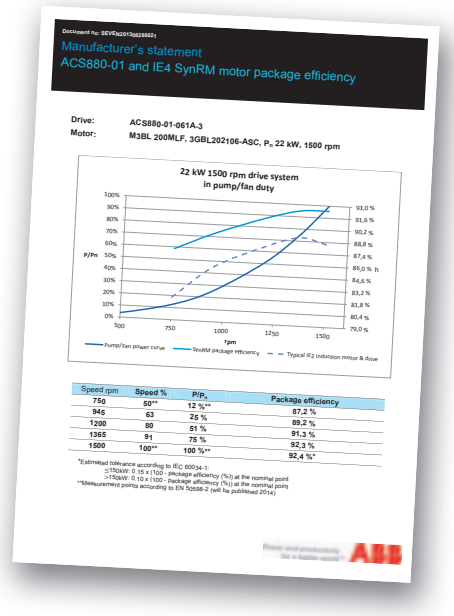
Motor-drive package efficiency curves







IE4 SynRM motor-drive package efficiency (37 kW, 1500 rpm)



Motor-drive package efficiency data for pumps and fans by ABB

IE4 SynRM motor-drive package

Technical data

This table presents technical performance data for IE4 SynRM motors. Variant codes and construction details are based on the M3BP motor. **Protection IP55, self cooling IC 411, insulation class F, temperature rise class B**. Motor values are given with an ACS880 VSD supply.

Output kW	Motor type	Product code	Current I_N A	Torque T_N Nm	Torque T_{OL}/T_N Nm	Max speed n_{max} r/min	Weight m kg	Suggested wall-mounted ACS880-01 single drives for no overload*	Suggested cabinet-built ACS880-07 single drives for no overload*	Package efficiency IE4 SynRM & ACS880 T_N= 100%, n_N=100%
3000 r/min (100 Hz)		**400 V network**								
11	M3BL 160 MLA 4	3GBL 162 101-_SC	25.0	35	1.5	4200	133	ACS880-01-025A-3		90.1 %
15	M3BL 160 MLB 4	3GBL 162 102-_SC	34.8	48	1.5	4200	133	ACS880-01-038A-3		90.9 %
18.5	M3BL 160 MLC 4	3GBL 162 103-_SC	42.8	59	1.5	4200	133	ACS880-01-045A-3		91.6 %
22	M3BL 180 MLA 4	3GBL 182 101-_SC	50.0	70	1.5	4200	160	ACS880-01-061A-3		91.8 %
30	M3BL 200 MLA 4	3GBL 202 101-_SC	68.8	95	1.5	4200	259	ACS880-01-072A-3		91.8 %
37	M3BL 200 MLB 4	3GBL 202 102-_SC	84.6	118	1.5	4200	259	ACS880-01-087A-3		92.4 %
45	M3BL 225 SMA 4	3GBL 222 101-_SC	103	143	1.5	4200	282	ACS880-01-105A-3	ACS880-07-0105A-3	92.8 %
55	M3BL 225 SMF 4	3GBL 222 102-_SC	122	175	1.5	4200	282	ACS880-01-145A-3	ACS880-07-0145A-3	92.9 %
1500 r/min (50 Hz)		**400 V network**								
11	M3BL 160 MLA 4	3GBL 162 104-_SC	24.9	70	1.5	2100	160	ACS880-01-025A-3		90.9 %
15	M3BL 160 MLB 4	3GBL 162 105-_SC	33.7	95	1.5	2100	177	ACS880-01-038A-3		91.6 %
18.5	M3BL 180 MLA 4	3GBL 182 102-_SC	42.0	118	1.5	2100	177	ACS880-01-045A-3		92.2 %
22	M3BL 200 MLF 4	3GBL 202 106-_SC	49.1	140	1.5	2100	304	ACS880-01-061A-3		92.4 %
30	M3BL 200 MLA 4	3GBL 202 103-_SC	66.7	191	1.5	2100	304	ACS880-01-072A-3		92.8 %
37	M3BL 250 SMF 4	3GBL 252 104-_SC	82.0	236	1.5	2100	428	ACS880-01-087A-3		93.1 %
45	M3BL 250 SMG 4	3GBL 252 105-_SC	99.5	286	1.5	2100	428	ACS880-01-105A-3	ACS880-07-0105A-3	93.2 %
55	M3BL 250 SMA 4	3GBL 252 102-_SC	121	350	1.5	2100	454	ACS880-01-145A-3	ACS880-07-0145A-3	93.4 %
75	M3BL 280 SMA 4	3GBL 282 213-_DC	173	478	2.0	2100	639	ACS880-01-206A-3	ACS880-07-0206A-3	93.7 %
90	M3BL 280 SMB 4	3GBL 282 223-_DC	202	573	2.1	2100	639	ACS880-01-206A-3	ACS880-07-0206A-3	93.9 %
110	M3BL 280 SMC 4	3GBL 282 233-_DC	245	699	2.1	2100	697	ACS880-01-246A-3	ACS880-07-0246A-3	94.2 %
110	M3BL 315 SMA 4	3GBL 312 213-_DC	244	702	2.0	1800	873	ACS880-01-246A-3	ACS880-07-0246A-3	94.2 %
132	M3BL 315 SMB 4	3GBL 312 223-_DC	290	842	2.0	1800	925	ACS880-01-293A-3	ACS880-07-0293A-3	94.2 %
160	M3BL 315 SMC 4	3GBL 312 233-_DC	343	1018	1.9	1800	965	ACS880-01-363A-3	ACS880-07-0363A-3	94.5 %
200	M3BL 315 MLA 4	3GBL 312 413-_DC	427	1272	1.9	1800	1116	ACS880-01-430A-3	ACS880-07-0430A-3	94.4 %
250	M3BL 315 LKA 4	3GBL 312 813-_DC	542	1591	2.0	1800	1357		ACS880-07-0585A-3	94.4 %
315	M3BL 315 LKC 4	3GBL 312 833-_DC	650	2006	1.8	1800	1533		ACS880-07-0650A-3	94.3 %
1000 r/min (33 Hz)		**400 V network**								
7.5	M3BL 160 MLA 4	3GBL 162 106-_SC	17.3	72	1.5	1400	160	ACS880-01-025A-3		88.9 %
11	M3BL 160 MLB 4	3GBL 162 107-_SC	25.0	105	1.5	1400	177	ACS880-01-025A-3		89.9 %
15	M3BL 200 MLF 4	3GBL 202 107-_SC	34.0	143	1.5	1400	282	ACS880-01-038A-3		90.6 %
18.5	M3BL 200 MLA 4	3GBL 202 104-_SC	41.8	177	1.5	1400	304	ACS880-01-045A-3		91.4 %
22	M3BL 200 MLB 4	3GBL 202 105-_SC	49.5	210	1.5	1400	304	ACS880-01-061A-3		91.6 %
30	M3BL 250 SMF 4	3GBL 252 106-_SC	67.2	286	1.5	1400	391	ACS880-01-072A-3		92.1 %
37	M3BL 250 SMA 4	3GBL 252 103-_SC	82.6	353	1.5	1400	428	ACS880-01-087A-3		92.4 %
45	M3BL 280 SMA 4	3GBL 282 212-_DC	103	430	2.3	1400	639	ACS880-01-105A-3	ACS880-07-0105A-3	92.6 %
55	M3BL 280 SMB 4	3GBL 282 222-_DC	123	526	2.0	1400	639	ACS880-01-145A-3	ACS880-07-0145A-3	92.8 %
75	M3BL 280 SMC 4	3GBL 282 232-_DC	166	715	2.1	1400	697	ACS880-01-169A-3	ACS880-07-0169A-3	93.4 %
75	M3BL 315 SMA 4	3GBL 312 212-_DC	166	717	2.0	1400	873	ACS880-01-169A-3	ACS880-07-0169A-3	93.3 %
90	M3BL 315 SMB 4	3GBL 312 222-_DC	198	859	2.0	1400	925	ACS880-01-206A-3	ACS880-07-0206A-3	93.4 %
110	M3BL 315 SMC 4	3GBL 312 232-_DC	241	1051	1.9	1400	965	ACS880-01-246A-3	ACS880-07-0246A-3	93.7 %
132	M3BL 315 MLA 4	3GBL 312 412-_DC	279	1261	1.7	1400	1116	ACS880-01-293A-3	ACS880-07-0293A-3	93.9 %
160	M3BL 315 LKA 4	3GBL 312 812-_DC	340	1527	1.9	1400	1357	ACS880-01-363A-3	ACS880-07-0363A-3	94.1 %
200	M3BL 315 LKC 4	3GBL 312 832-_DC	418	1910	1.8	1400	1533	ACS880-01-430A-3	ACS880-07-0430A-3	94.1 %

* Consult ABB for motor and drive dimensioning for applications with other load characteristics.

For further information, see “Low voltage motor catalog: IE4 synchronous reluctance motor and drive package”, code: 9AKK105828 EN.

Contact us

For more information contact your local ABB representative or visit:

www.abb.com/motors&generators
www.abb.com/drives

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