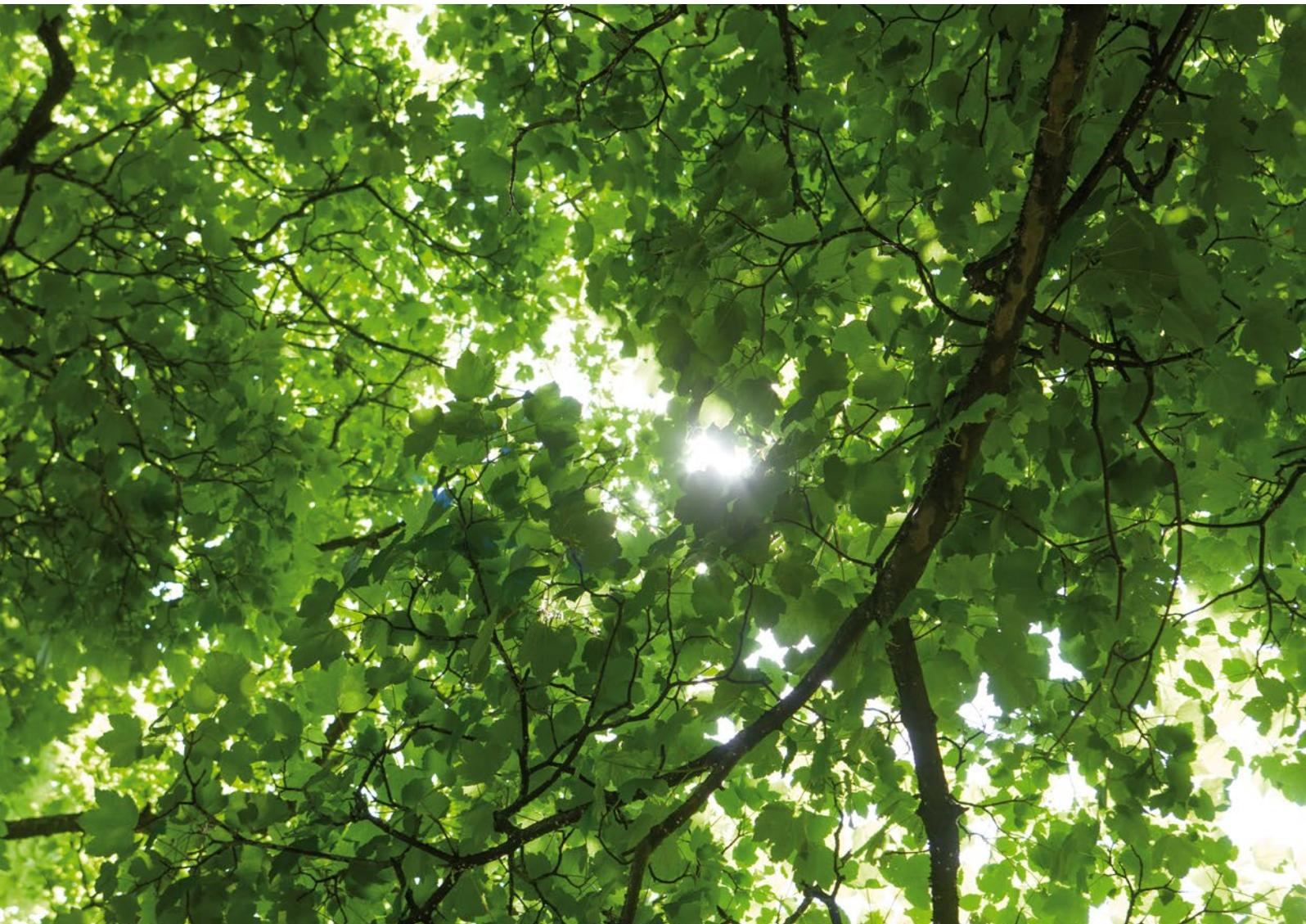

BROCHURE

IE4 SynRM motor-drive packages

Super premium efficiency for industry



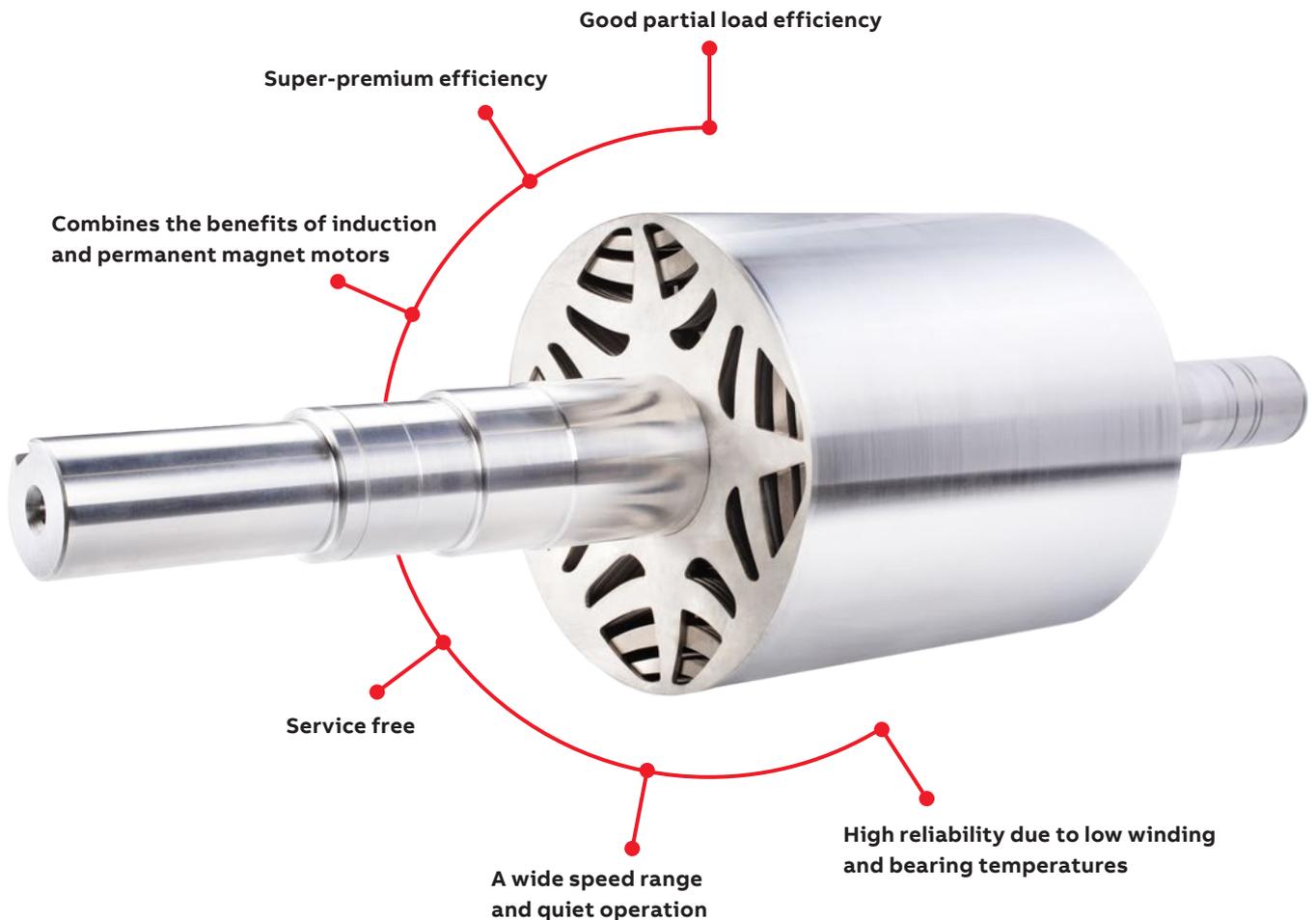
Energy efficiency. Usability. Productivity

Everything counts

ABB's SynRM motor-drive package offers matched pairs of motors and drives. This matching means excellent control performance in all applications, an easy start-up process and one number to call in case you need any support.

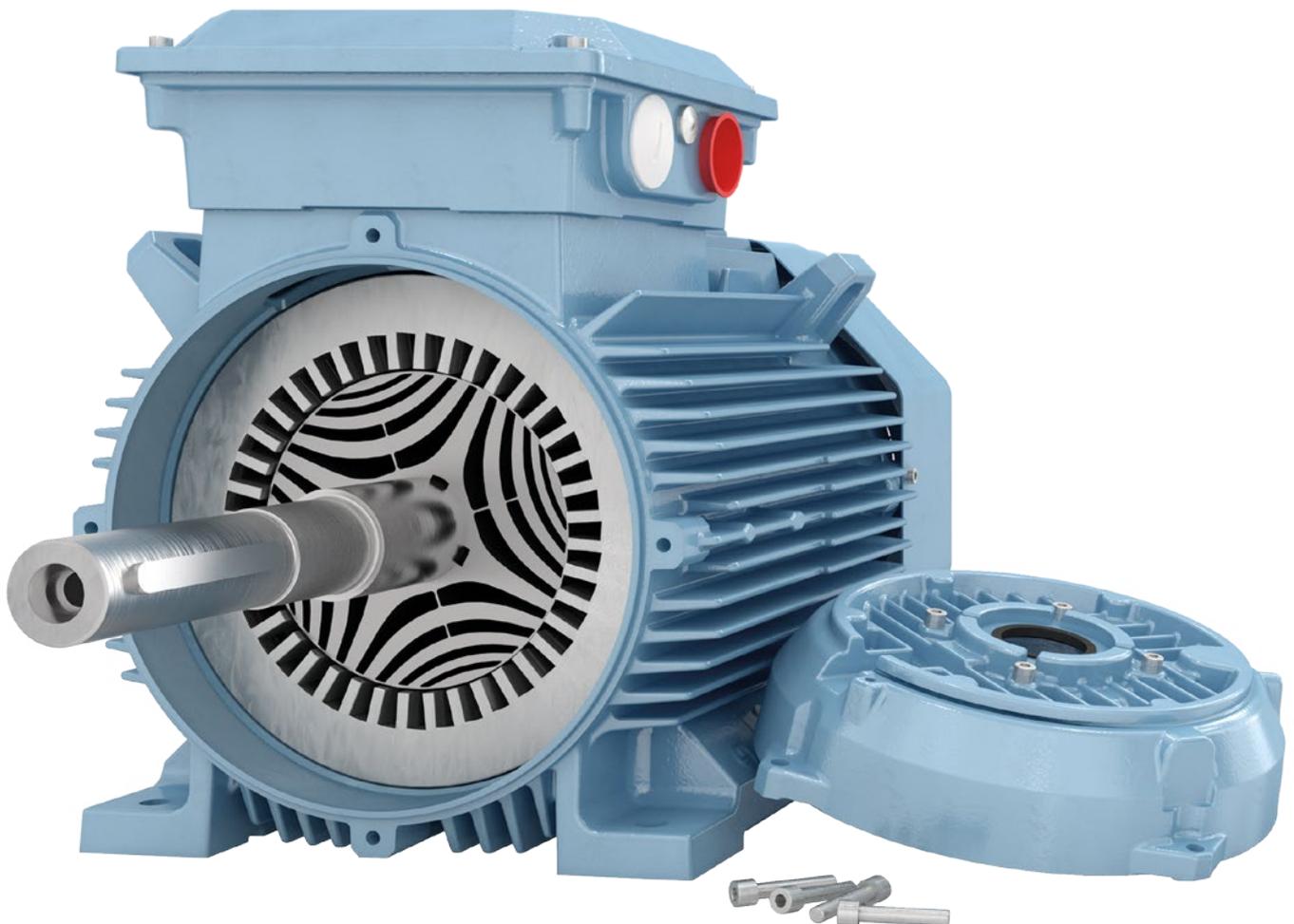
SynRM packages also include efficiency data about the entire package throughout the operating range. All this leads to savings in your motor-drive package life cycle costs.

The core idea of a synchronous reluctance motor (SynRM) is that the rotor has no windings or magnets, just electric steel plates stacked together to form a rotor package. Unlike in an induction motor, a SynRM rotor has no induced current and thus no losses. This makes SynRM the perfect combination of simplicity and efficiency.



SynRM is the best choice for you – why?

Why would you choose a SynRM motor and drive package instead of the familiar induction motor you have learned to trust?



Save money by improving your image

No matter what business you are in, legislation and customer demand are driving us all towards more energy-efficient ways of doing business. All-in-all, energy efficiency improves your brand image and reduces production costs. On top of this, SynRM motors run more quietly than induction motors. So the question actually should be: why wouldn't you choose SynRM?

Real savings come from systems

The SynRM package consists of an IE4 efficiency motor and an IE2 efficiency drive, which are both the top classifications currently defined in the standards. Still, you need to know the efficiency of the whole system. This is why we measure the package efficiency to verify this. When comparing efficiencies between different alternatives, make sure you're looking at the efficiency values for the whole package and for the full speed range that the system will run at.

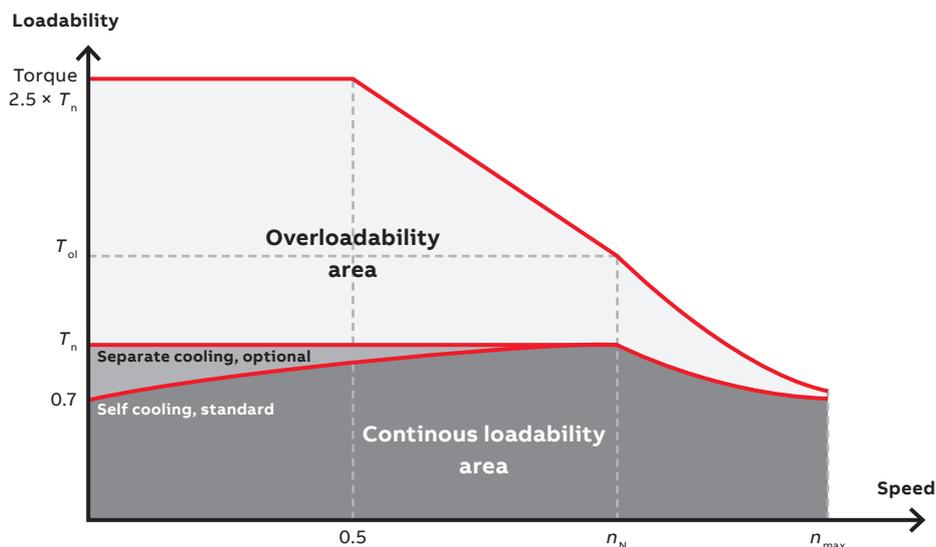
Higher efficiency or higher power density

– you choose

We can offer you two types of SynRM packages. The IE4 SynRM motor-drive package is focused on efficiency and meets the IE4 super premium efficiency grading as well as increases machine reliability. This package is also especially suitable for motor replacement as the motor is the same size as an IE2 induction motor of the same power. This means that upgrading to the highest efficiency level is easy and straightforward without the need for mechanical modifications.

The high output motor-drive package will reduce the weight and motor size of your machine by up to two frame sizes, or optionally, you can increase the power by 20 to around 100 percent using the same motor frame size. This enables you to reduce the footprint of your system while still getting good efficiency from IE2 to IE3.

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Torque characteristics of SynRM motors



SynRM for all industrial applications

Efficiency in all applications

SynRM technology is designed to replace induction and permanent magnet motors in variable speed applications. Our experiences show that the SynRM motor and drive package is suitable for all applications, whether quadratic or constant torque.

Precise process control

The SynRM motor and drive package provides very accurate speed and torque over the whole speed range, which improves the process efficiency. It is capable of producing full torque at zero speed. This means that SynRM package can be considered for any variable speed application, including demanding constant torque applications. Tests by customers have shown a 0.5 rpm tolerance at 1500 rpm on an extrusion molding machine. In this application, it means higher end product quality as well as less wastage and fewer rejected products. It should also be remembered that the wastage and rejects must be ground up, fed back to the extruder and heated. This all takes extra energy.



ACS880 industrial drive highlights



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
- SIL 3 integrated safety including safe torque off (STO) as standard and a plug-in safety functions module as an option
- Full motor torque over the whole speed range down to zero with direct torque control (DTC) technology, without feedback devices like encoders or position sensors
- The drive's flying start capability senses the rotation speed and direction of a machine and increases the motor speed to the corresponding level without stopping the machine
- Removable memory unit for easy maintenance and replacement
- Bluetooth capability and mobile app to connect and control a drive that is difficult to access
- Wide range of fieldbus adapters enable connectivity with all major automation networks

IE4 motor-drive packages with SynRM optimized ACS880-01 modules

Output (kW)	Motor type	Product ID	Current I_N (A)	Torque T_N (Nm)	Overload- ability at nominal speed T_{OL}/T_N	Weight m (kg)	Suggested ACS880 SynRM package frequency converter for light duty (no overload)*	Package efficiency at nominal point	IES2 efficiency class low limit
3000 r/min (100 Hz)									
5.5	M3AL 132 SMA 4	3GAL 132 217-_SC	12.6	17.5	1.5	41	ACS880-01-14A3-3	90.0	82.5
7.5	M3AL 132 SMB 4	3GAL 132 227-_SC	16.9	23.9	1.5	41	ACS880-01-17A7-3	90.1	83.9
11	M3BL 160 MLA 4	3GBL 162 417-_SC	25.0	35	1.5	133	ACS880-01-25A5-3	90.1	85.3
11	M3AL 132 SMC 4	3GAL 132 237-_SC	25.0	35.0	1.5	47	ACS880-01-25A5-3	89.9	85.3
15	M3BL 160 MLB 4	3GBL 162 427-_SC	34.8	48	1.5	133	ACS880-01-035A-3	90.9	86.2
15	M3AL 132 SMD 4	3GAL 132 247-_SC	33.5	47.7	1.5	47	ACS880-01-035A-3	90.0	86.2
18.5	M3BL 160 MLC 4	3GBL 162 437-_SC	42.8	59	1.5	133	ACS880-01-043A-3	91.6	86.9
22	M3BL 180 MLA 4	3GBL 182 417-_SC	50.0	70	1.5	160	ACS880-01-050A-3	91.8	87.3
30	M3BL 200 MLA 4	3GBL 202 417-_SC	68.8	95	1.5	259	ACS880-01-069A-3	91.8	88.1
37	M3BL 200 MLB 4	3GBL 202 427-_SC	84.6	118	1.5	259	ACS880-01-085A-3	92.4	88.6
45	M3BL 225 SMA 4	3GBL 222 217-_SC	103	143	1.5	282	ACS880-01-103A-3	92.8	89.0
55	M3BL 225 SMF 4	3GBL 222 267-_SC	122	175	1.5	282	ACS880-01-123A-3	92.9	89.4
1500 r/min (50 Hz)									
5.5	M3AL 132 SMA 4	3GAL 132 213-_SC	12.1	35	1.5	63	ACS880-01-14A3-3	90.0	82.5
7.5	M3AL 132 SMB 4	3GAL 132 223-_SC	16.2	47.7	1.5	63	ACS880-01-17A7-3	90.1	83.9
11	M3BL 160 MLA 4	3GBL 162 413-_SC	24.9	70	1.5	160	ACS880-01-25A5-3	90.9	85.3
11	M3AL 132 SMC 4	3GAL 132 233-_SC	24.0	70	1.5	69	ACS880-01-25A5-3	90.0	85.3
15	M3BL 160 MLB 4	3GBL 162 423-_SC	33.7	95	1.5	177	ACS880-01-035A-3	91.6	86.2
18.5	M3BL 180 MLA 4	3GBL 182 413-_SC	42.0	118	1.5	177	ACS880-01-043A-3	92.2	86.9
22	M3BL 200 MLF 4	3GBL 202 463-_SC	49.1	140	1.5	304	ACS880-01-050A-3	92.4	87.3
30	M3BL 200 MLA 4	3GBL 202 413-_SC	66.7	191	1.5	304	ACS880-01-069A-3	92.8	88.1
37	M3BL 250 SMF 4	3GBL 252 263-_SC	82.0	236	1.5	428	ACS880-01-085A-3	93.1	88.6
45	M3BL 250 SMG 4	3GBL 252 273-_SC	99.5	286	1.5	428	ACS880-01-103A-3	93.2	89.0
55	M3BL 250 SMA 4	3GBL 252 213-_SC	121	350	1.5	454	ACS880-01-123A-3	93.4	89.4
75	M3BL 280 SMA 4	3GBL 282 213-_DC	173	478	1.7	639	ACS880-01-173A-3	93.7	90.0
90	M3BL 280 SMB 4	3GBL 282 223-_DC	202	573	1.7	639	ACS880-01-202A-3	93.9	90.2
110	M3BL 280 SMC 4	3GBL 282 233-_DC	245	699	1.8	697	ACS880-01-245A-3	94.2	90.5
110	M3BL 315 SMA 4	3GBL 312 213-_DC	244	702	1.8	873	ACS880-01-245A-3	94.2	90.5
132	M3BL 315 SMB 4	3GBL 312 223-_DC	290	842	1.9	925	ACS880-01-290A-3	94.2	90.7
160	M3BL 315 SMC 4	3GBL 312 233-_DC	343	1018	1.7	965	ACS880-01-343A-3	94.5	90.9
200	M3BL 315 MLA 4	3GBL 312 413-_DC	427	1272	1.7	1116	ACS880-01-427A-3	94.4	91.1
1000 r/min (33 Hz)									
7.5	M3BL 160 MLA 4	3GBL 162 412-_SC	17.3	72	1.5	160	ACS880-01-17A7-3	88.9	83.9
11	M3BL 160 MLB 4	3GBL 162 422-_SC	25.0	105	1.5	177	ACS880-01-25A5-3	89.9	85.3
15	M3BL 200 MLF 4	3GBL 202 462-_SC	34.1	143	1.5	282	ACS880-01-035A-3	90.6	86.2
18.5	M3BL 200 MLA 4	3GBL 202 412-_SC	41.8	177	1.5	304	ACS880-01-043A-3	91.4	86.9
22	M3BL 200 MLB 4	3GBL 202 422-_SC	49.5	210	1.5	304	ACS880-01-050A-3	91.4	87.3
30	M3BL 250 SMF 4	3GBL 252 262-_SC	67.2	286	1.5	391	ACS880-01-069A-3	92.1	88.1
37	M3BL 250 SMA 4	3GBL 252 212-_SC	82.6	353	1.5	428	ACS880-01-085A-3	92.4	88.6
45	M3BL 280 SMA 4	3GBL 282 212-_DC	103	430	1.9	639	ACS880-01-103A-3	92.6	89.0
55	M3BL 280 SMB 4	3GBL 282 222-_DC	123	526	1.7	639	ACS880-01-123A-3	92.8	89.4
75	M3BL 280 SMC 4	3GBL 282 232-_DC	166	715	1.8	697	ACS880-01-173A-3	93.4	90.0
75	M3BL 315 SMA 4	3GBL 312 212-_DC	166	717	1.8	873	ACS880-01-173A-3	93.3	90.2
90	M3BL 315 SMB 4	3GBL 312 222-_DC	198	859	1.8	925	ACS880-01-202A-3	93.4	90.5
110	M3BL 315 SMC 4	3GBL 312 232-_DC	241	1051	1.7	965	ACS880-01-245A-3	93.7	90.5
132	M3BL 315 MLA 4	3GBL 312 412-_DC	279	1261	1.6	1116	ACS880-01-290A-3	93.9	90.7
160	M3BL 315 LKA 4	3GBL 312 812-_DC	340	1527	1.7	1357	ACS880-01-343A-3	94.1	90.9
200	M3BL 315 LKC 4	3GBL 312 832-_DC	418	1910	1.7	1533	ACS880-01-427A-3	94.1	91.1

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

Protection class IP55 – Self cooling IC 411 – Insulation class F, temperature rise class B. Performance values apply with ACS880 drive supply.

Six reasons to choose an ABB SynRM package

1. Full motor control, down to zero speed

Many processes require accurate speed control. As the name says, SynRM is a synchronous motor that always runs at reference speed with practically no error, without an encoder. Even the best slip compensation systems in an induction motor inverter will never match the precision of SynRM.

Sometimes your application may require you to run your motor at slow speeds, for example at less than 40 rpm. If you are using SynRM and your drive cannot provide the necessary torque, it may trip. This means you may have downtime while the problem is being debugged. ABB drives provide full control and torque down to zero speed, even without speed sensors.

2. For all applications

This is important if you are planning on using the motor with applications other than quadratic torque applications like pumps and fans. Our drives provide full SynRM motor control for constant torque applications such as extruders, conveyors and wire drawing machines.

3. Cool motor that doesn't keep too much noise about itself

The SynRM package where the motor and the drive are designed to work together brings two major benefits.

The less noise your motor produces, the better the working environment you provide for your staff. The SynRM motor runs very quietly compared to an induction motor thanks to the rotor geometry and the DTC technology of the ACS880 industrial drive.

Heat means lost energy, but it also means that you need to cool your workspace to compensate for the heat produced.

As the rotor geometry of SynRM has no rotor currents, the rotor losses, which in induction motor can add up to 40% of the total loss, are completely eliminated. Reduced losses mean better efficiency, a longer bearing lifetime and less dissipated heat losses from the motor.

4. Wide selection of drives

Processes are different, and each has its own demands for the drive. That's why we offer you a selection of drives with voltage range from 230 to 690 V and a power range up to 710 kW. You can order optional application programs with your drive. These programs are designed to support adaptation to various applications like artificial lifting, winders, cranes, cooling towers, etc. In addition, our drives have built-in adaptive programming support based on IEC 61131-3 PLC logic that can be used if no suitable program is available.

5. Verified package efficiency statements

The efficiency of the motor and drive at different operating points is very useful information. This helps you estimate energy use when combined with your own overall machine efficiency. This is the focus of the new European standard 50598-2. IE4 packages fulfil the IES2 efficiency class defined in EN50598-2.

With ABB's SynRM package, you will always get a motor and drive that are dimensioned to work together efficiently.

6. Perfect for retrofits

The SynRM package is a perfect solution for motor retrofits. The IE4 SynRM is the same size as an IE2 induction motor, eliminating the need for mechanical modifications. The increased efficiency will, on the other hand, reduce the payback time of the investment.

Additional information

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