SIEMENS

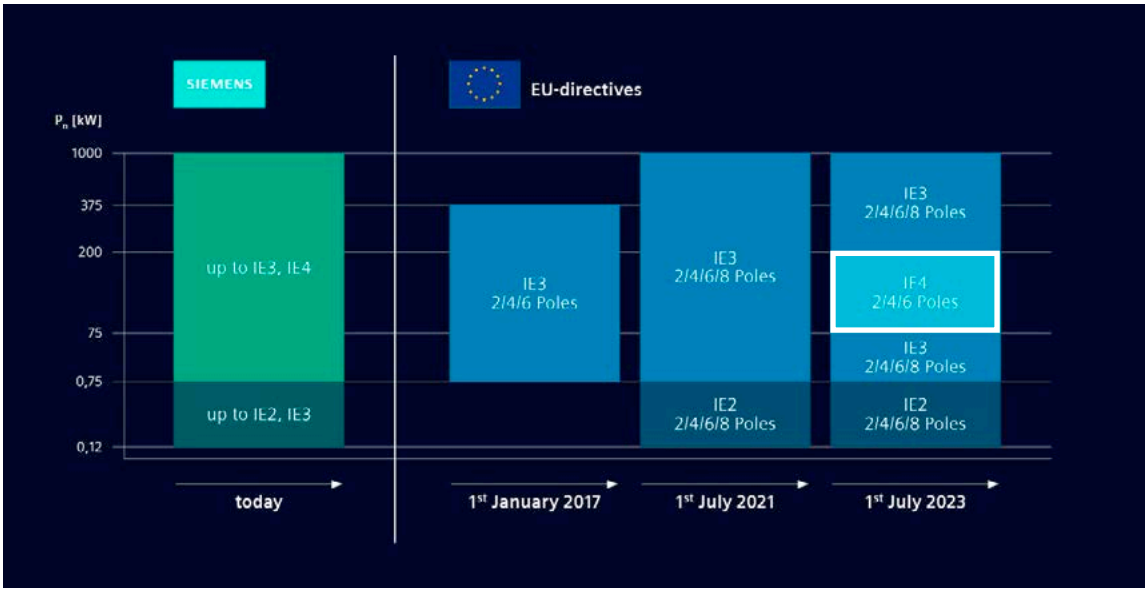
DISCOVER SIMOTICS

Ready for IE4

Upgrade to Super Premium Efficient motors

IE4 energy efficiency class
becomes mandatory for the first time

On July 1st 2023, the second step of the Ecodesign regulation (EU) 2019/1781 comes into force in the countries of the European Economic Area. This includes the requirement that safe area motors that are 2-6 pole and with rated power between 75-200 kW fulfill the IE4 energy efficiency class, as defined by the IEC 60034-30-1 standard.

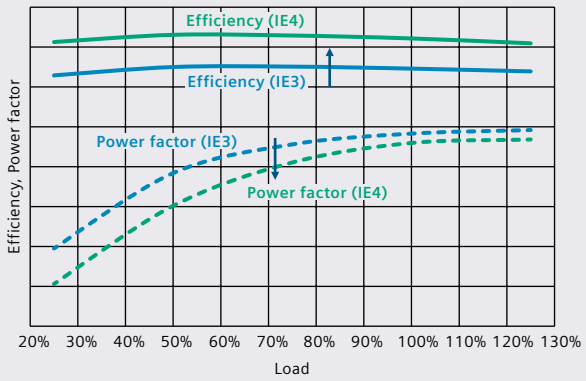


Migrate to IE4
easily with SIMOTICS low voltage motors

Upgrading from IE3 to IE4 motors has several impacts. Let's have look what needs to be considered to easily realize the migration.

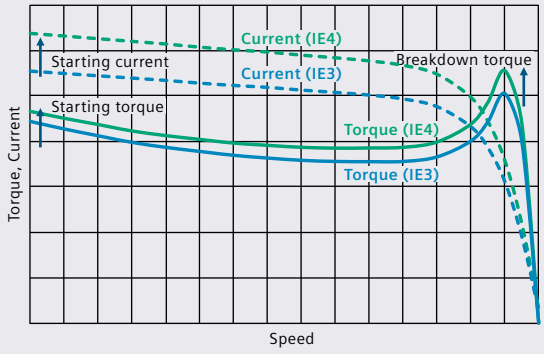
Let's focus on electric motors in scope of the regulation, which means **2-, 4- and 6-pole** motors with **power rating 75-200 kW**. The following comparison has been made by taking the technical data of these motor types from the standard Siemens offering.

The **SIMOTICS SD (Severe Duty)** motor portfolio is well prepared for the upcoming energy efficiency regulations. With the available power range from 2.2 kW to 1,000 kW in IE4, as well as by offering also 8-pole motors in IE4, it is overachieving the Ecodesign requirements.



Impact on the motor operation

- Thanks to the higher IE class, the motor **efficiency** is improved especially in partial loads. The new efficiency value can be around 1 % higher, which decreases significantly the energy losses.
- On the contrary, the **power factor** is typically lower, by 0.8 % in average, for 2 & 4 pole motors. This will have an impact on the nominal motor current. Many of our 6 pole motors actually have an increased power factor.
- The **nominal speed** of the motor usually increases by one or several rpm. This is slightly shifting the operating point of the application.
- The migration to IE4 has a positive effect on the **sound pressure level**. The motor noise usually decreases, in average by 2 dB.



Impact on the motor starting

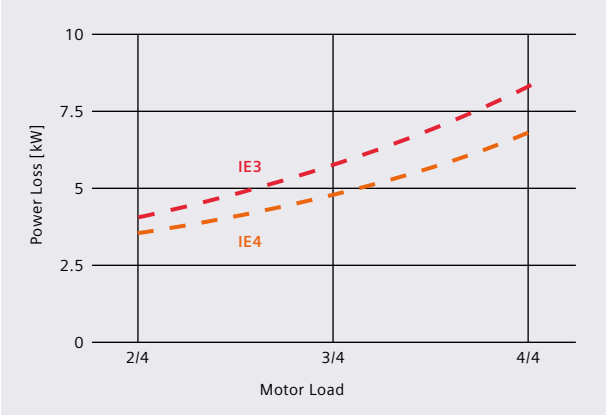
- The **starting current** is increased by 15 % in average, but might be significantly higher, especially with 2-pole motors. This might have an effect on the selection or setting of the appropriate motor starter and short circuit breaker.
- The **starting torque** is increased by 5 % in average, sometimes much more, however by 6-pole motors it might even decrease.
- The **breakdown torque** (maximum torque) is increased in average by 10 %, the largest differences occur again by 2-pole motors. The impact on the motor torque curve is beneficial, the motor is able to overcome better the load torque and is more resistant to short-time overloading.

Tip:

Always check the motor starter or the motor protection when changing to a more efficient motor. Make sure it is IE4 ready. The motor rated current shall be in the first 1/3 of the setting range of the motor protecting device.

Looking for a low starting current in IE4? Select SIMOTICS SD Add!

For the larger motors, where the starting current is really significant, the catalog variant SIMOTICS SD Add (1LE5_3_) is available. It is designed for a reduced starting current, the ratio I_S/I_N is typically around 7. This is often even better than what the existing IE3 motors have.



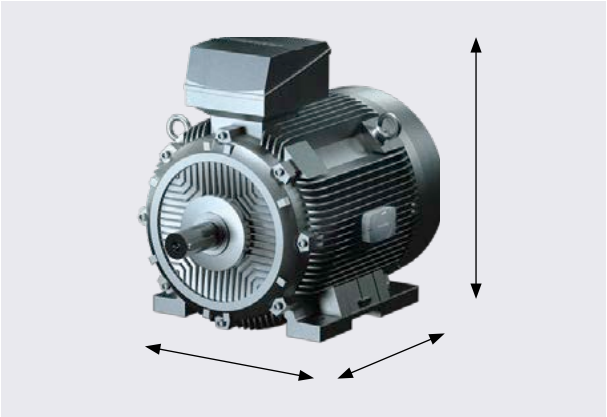
Power losses comparison of 200 kW 4-pole motors in IE3 and IE4, created by SinaSave tool.

Impact on the environment

- The use of an IE4 motor brings a significant **reduction of energy consumption and CO_2 footprint**. Taking a motor from the mandatory range 75 – 200 kW, we speak about Megawatt hours of energy and tons of CO_2, which will be saved by one single motor annually.

Impact on the energy cost saving

- The **commercial benefit** is worth thousands of Euros annualy saved with one single motor after migration to IE4.
- Depending on the operation mode, the **payback time** of installing a new IE4 motor instead of repairing an old IE3 motor is normally really short – low units of years. You can evaluate the best fitting solution using the SinaSave tool (see next page).



Impact on the mechanical parameters

- The **mounting dimensions** (feet, flange, shaft end) have always a match between the respective IE3 and IE4 motor, so you can easily make a simple drop-in replacement.
- The difference in the cable entry **height** and total motor height is max. 25 mm between the IE3 and IE4 motor.
- The motor **weight** is greater in average by 7 % and the rotor **inertia** by 15 %, because the motor has to contain more active material.
- The motor **length** is varying +/– 10 %, in average it is smaller for the IE4 motors. That shows how compact the new SIMOTICS SD next generation (1LE5) design is.

Efficient tools for efficient motors

SIMOTICS LV Motors Tools & Service (MyMotor page)

www.siemens.com/mymotor

One central page with links to all tools and information related to Siemens low voltage motors

MEPS Guide – Minimum Energy Performance Standard
www.meps.siemens.com/en

Learn in detail about the energy efficiency requirements for drive systems worldwide

Siemens Product Configurator (SPC)
www.siemens.com/spc

Configure your new IE4 motors completely and generate comprehensive documentation

SinaSave – Energy Efficiency Tool
www.siemens.com/sinasave

Determine your energy saving potential and your payback time when migrating to the highly energy efficient IE4 motor portfolio

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