



(EU) 2019/1781

Ecodesign requirements for electric motors and variable speed drives (VSDs)



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Industrial Drive Solutions



Building a greener tomorrow

The need for more efficient products, aimed at reducing energy consumption, emissions and fostering sustainability, is rapidly increasing. The ecodesign regulation (EU) 2019/1781 represents the next logical progression in the European Union's endeavours to diminish greenhouse gas emissions by ensuring that electrical equipment meets specified efficiency standards.

It builds upon the achievements of the initial framework directive, which was enacted in 2009. The fresh regulation enhances the criteria and broadens the range of coverage, encompassing not only additional types of motors but also including drives.

Minimum energy performance standards

Minimum energy performance standards (MEPS) were initially implemented in 2009 under Commission Regulation (EC) 640/2009, which applied the ecodesign Directive 2005/32/EC. Regulation 640/2009 has now been replaced by the new Regulation (EU) 2019/1781, which introduces more stringent requirements for electric motors and variable speed drives.



A more sustainable and energy-efficient future

By enforcing these standards, the EU aims to contribute to the overall goal of achieving a more sustainable and energy-efficient future. While the revised regulations will solely affect newly produced motors, businesses have the opportunity to enhance their overall energy efficiency by upgrading their current equipment and manufacturing processes.



The timeline for change

The 2023 updates to the European regulations for ecodesign are the second stage of the legislation changes, following the stricter first phase of regulations that came into effect in July 2021, setting out new energy efficiency standards for AC induction motors and drives. Let's take a closer look at the ecodesign regulation timeline.

Electric motors and VSD minimum efficiency requirements										
Motors	0.75 kW to 7.5 kW	7.5 kW to 375 kW	75 kW to 200 kW	0.75 kW to 1000 kW	0.75 kW to 1000 kW	0.12 kW to 1000 kW	0.12 kW and above	0.12 kW to 0.75 kW	Variable speed drives	0.12 kW to 1000 kW
	3 phase 2/5/6 pole	3 phase 2/5/6 pole	3 phase 2/5/6 pole	3 phase 2/5/6/8 pole	ATEX brake all poles	Ex eb all poles	1 phase all poles	3 phase brake all poles		
2015	IE2	IE2+VSD/IE								2016
2017	IE2+VSD/IE3									2017
2018 to 2020										2018 to 2020
2021	IE3	IE3		IE3	IE3			IE2		2021
2022										2022
2023			IE4			IE2	IE2			2023
Onwards									Onwards	

Requirements for electric motors from July 1, 2023*

IE4 efficiency

For motors, the IE4 efficiency class is obligatory under the following conditions:

- Three-phase motors with 2, 4, and 6 poles, operating at a single speed, with a rated output ranging from 75 kW to 200 kW. This requirement excludes brake motors, Ex eb increased safety motors, and other explosion-protected motors such as Ex ec, Ex d, Ex de, and Ex t

IE3 efficiency

The IE3 efficiency class is mandatory for motors based on the following criteria:

- Three-phase motors with 2, 4, 6, or 8 poles, operating at a single speed, with a rated output ranging from 0.75 kW to 1000 kW, except for 2, 4, and 6-pole motors with a rated output from 75 kW to 200 kW
- Motors with protection types Ex ec, Ex d, Ex de, and Ex t
- Brake motors equipped with an external brake
- Totally Enclosed Air Over (TEAO) motors
- Motors operating within ambient temperatures between -30°C and +60°C

IE2 efficiency

The IE2 efficiency class is obligatory for motors under the following circumstances:

- Three-phase motors with a rated output from 0.12 kW up to 0.75 kW
- Ex eb increased safety motors ranging from 0.12 kW to 1000 kW
- Single-phase motors ranging from 0.12 kW to 1000 kW

*List shows requirements for both phases of changes introduced in 2021 and 2023 respectively. Highlighted sections identify 2023 changes specifically.

Requirements for VSDs from July 1, 2023

Phase two of the ecodesign regulation does not introduce any modifications to the drive requirements. The phase one requirements, which came into effect on July 1, 2021, pertain to three-phase VSDs ranging from 0.12 kW to 1000 kW. It is mandatory for AC drives within this power range to comply with the IE2 efficiency class.


The IE3 efficiency class is mandatory for motors based on the following criteria:

- Three-phase motors with 2, 4, 6, or 8 poles, operating at a single speed, with a rated output ranging from 0.75 kW to 1000 kW, except for 2, 4, and 6-pole motors with a rated output from 75 kW to 200 kW
- Motors with protection types Ex ec, Ex d, Ex de, and Ex t
- Brake motors equipped with an external brake
- Totally Enclosed Air Over (TEAO) motors
- Motors operating within ambient temperatures between -30°C and +60°C



Technidrive offers a wide selection of highly efficient motors and drives that fully adhere to the latest requirements

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