EC Titanium
Next generation efficiency and performance
EC, or electronically commutated motors, have traditionally been used to meet the high efficiency requirements. However, as efficiency regulations tighten, more may be required.

Introducing the Baldor-Reliance® EC Titanium™ integrated motor-drive. FASR™ (Ferrite Assisted Synchronous Reluctance) motors are extremely efficient, especially at reduced speeds, compared to traditional AC induction motors.

Our solution incorporates permanent magnet design into a synchronous reluctance rotor technology to achieve IE5+ ultra premium efficiency at rated design while maintaining performance across varying speed and load conditions. Equipment incorporating this technology can therefore achieve optimal performance no matter the operating point.

Get a glimpse into achieving the next level of energy efficiency
Together as one
Cut the cord
Plug and play
Designed to run out of the box
Reliable & low noise
IE5 Efficiency
Stay ahead of the curve
Minimize your environmental impact
Improved serviceability, safety, and power density
Fan & pump control
Let's talk about saving energy

Motors at the forefront of global efforts to reduce emissions
Up to 70% of electricity consumed by industry is used by electric motor systems. The technological advancement and adoption of high-efficiency motors and variable speed drives on the market, are key factors in achieving significant energy efficiency improvements in industry and infrastructure.

International Efficiency (IE) standards stipulate the energy efficiency of low voltage AC motors. These IE codes serve as a reference for governments who specify the efficiency levels for their minimum energy performance standards (MEPS).

Five levels of motor efficiency

1. IE1 Standard Efficiency
2. IE2 High Efficiency
3. IE3 Premium Efficiency
4. IE4 Super Premium Efficiency
5. IE5* Ultra Premium Efficiency

*The IE5 class has not been specified in the standard yet, but some manufacturers have already developed motors that will be compliant.
When added to the existing motor of a pump, fan or compressor, a variable speed drive can typically reduce power consumption by 25%.

Replacing 80% of motors with IE5 levels will save more energy than the annual energy consumption of Poland.4

Switching up to IE5+ efficiency levels

1 Omdia, “Motor-driven Equipment Research Package,” 2020
4 U.S. Energy Information Administration, international data: electricity, 2019, Poland
Motor standards have been in place for decades, yet there is a growing demand to achieve greater efficiencies as regulations continue to tighten on the total design of fans, pumps and compressed air packages. Equipment manufacturers are turning to new motor technologies to achieve the highest system efficiency possible from wire to air while using sustainable materials.

ABB’s Baldor-Reliance EC Titanium product line utilizes FASR (ferrite assisted synchronous reluctance) technology with non-rare earth magnet materials to meet and exceed IE5 efficiency. Suitable for constant and variable torque applications, the EC Titanium offers excellent performance across a wide speed load range and above base speed conditions.

**Key features**

- More than 15% efficiency gains compared to IE3 (NEMA premium)
- Save up to 40% when using drives to control motors
- Sustainable non-rare earth magnetic material
- Higher power density for smaller footprint

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**Improving your total performance**

Sustainable solutions for your system

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Optimized pump performance

Optimized fan performance
SUCCESS STORY

HVAC OEM chooses Baldor-Reliance® EC Titanium for efficiency and standardization of rooftop air handling solutions

- IE5 efficiency and flexibility of configuration reduce overall system cost
- Reduced equipment footprint with space saving integrated motor and drive design

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EC Titanium motor innovation

- Low noise fan and cover designed for maximum cooling and quiet operation
- Lifting lug provisions convenient & safe mounting 180 & 210 frames
- QR coded nameplate easy access motor & drive technical data
- IP54 rated drive & motor with conformal coated drive components
Drive pre-wired & programmed
Designed to run out of the box

IE5 efficiency guaranteed -
Ferrite Assisted Synchronous
Reluctance rotor (FASR)

Shaft grounding brush
installed internally. Prevents bearing
discharges and minimize shaft voltages

Polyrex EM grease
protects motor bearings,
improved lubrication, superior
resistance to washout, rust & corrosion

Class F insulation system
high temperature inverter duty
10:1 CT speed range, meets
NEMA MG 1 Part 31.4.4.2

Top mount
C-face foot mounted

Axial mount
Plenum use

Motor only
C-face foot mounted
IE5+ efficiency level
Ultimate efficiency and reliability to lower your total cost of ownership

Innovation inside
The idea is simple. Take a conventional, proven stator technology and an innovative rotor design. Synchronous reluctance technology combines permanent magnet motor performance with the simplicity and service-friendliness of an induction motor. The rotor suffers virtually no power losses while the magnets further reduce the work required and losses seen in the stator. Maintenance is as straightforward as with induction motors.

### IE3 induction motor
- Total losses
- $i^2R$ stator
- $i^2R$ rotor
- Other

Higher losses in rotor and stator

### IE5 EC Titanium
- Total losses
- $i^2R$ stator
- Other

20% reduction in stator losses - eliminate rotor loss

**NEMA vs. IEC efficiencies**
- Understanding efficiency bands and motor standards
- Why is efficiency a hot topic

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The purpose of IEC/TS 60034-30-2 is to create a level playing field between established and new, innovative motor technologies in order to enable fair competition and market development.
Plug and play
Wireless start-up, control and troubleshoot

Using the latest communications protocols, operators can configure and change parameters, securely control and receive real-time alerts and diagnostic information for troubleshooting. Diagnostic status is displayed with LED indicators on the drive, or with an optional keypad displaying fault type. Commissioning is straightforward by utilizing PC or mobile tools and the onboard Bluetooth wireless interface.

- Easy startup pre-programmed drive, no drive expertise required
- Eliminate expensive wiring, reduce installation time
- Ready to run out of the box, minimize personnel risks and hazards
Quick and fast field upgrades
Drop in replacements

Easy upgrade of existing installations:
Drop-in replacement for NEMA 56 to 210 frames

Compact and light
EC Titanium is safer to install because they are lightweight and available in smaller frame sizes. This reduces the need for heavy structural support requirements.

5 Hp induction motor
180 NEMA frame

5 Hp EC Titanium
140 NEMA frame
**Product reliability**
Built for long life and low maintenance

_Baldor-Reliance shaft grounding brush on all EC Titanium as standard._
When pairing a VSD (variable speed drive) and motor, there’s a need to protect against bearing currents. Our shaft grounding brushes are installed internally and provide an alternate low-impedance path from the motor shaft to the motor housing. This effectively channels the current away from the bearings and neutralizes shaft voltages.

**Reliable & Low Noise**
Extremely low starting current and less cogging reduces mechanical stress, increases reliability and produces ultra-quiet operation.

**Low Operating Temperature**
All EC Titanium motors are Class F insulation with a Class B rise and are extremely cool when running. Heat reduces bearing and insulation life, and we are so confident in our motor design temperatures that all bearings are sealed and require no re-greasing for the lifetime of the motor.
Power matched ABB Drive & EC Titanium Motor
Optimized performance and flexibility

Pairing EC Titanium with the ABB ACH580 drive enables the use of advanced motor control algorithms for higher efficiencies across the speed and load range than traditional motor solutions.

ABB drive and Baldor-Reliance motor pairing advantages:
- Superior performance for the EC Titanium motor
- ACH580 firmware support for motor
- Optimized partial load efficiency
- Ability to run above base speeds
- Integral harmonic mitigation
- Ultra-low harmonics compatible
- Wide range of network interfaces
- Extensive pump and fan drive features
- Integrated safety, safe-torque off (STO) feature as standard
- Stock components for easy service

ACH580 drives are ideal for controlling:
- HVAC fans
- Pumps
- Compressors
- Air handling units and chillers
- Data centers
- Commercial buildings
- Ventilation systems
- Industrial buildings
PC & Mobile tools
Intuitive and easy-to-use software

ECM Tools PC Software
Programming can be done in real-time or offline using a hard wired cable or Bluetooth interface.

Features include:
- Parameter editor, upload / download, saving to a local file or compare values to factory default settings
- Real time control functions for startup and tuning
- Four channel chart recorder for monitoring and diagnostics (trend data, set trigger points, capture, record & store data)
- Firmware upgrade capable

ECM Tools Mobile
Intuitive and easy-to-use smartphone app for use with Bluetooth drives. Provides wireless configuration and monitoring for the drive.

Features include:
- Parameter editor, transfer and real time monitoring
- Save parameters to smartphone, send and receive by email
- Send and receive saved files by email
- Real time motor control from the app
- View drive status, motor speed, motor current and motor power in real-time
SUCCESS STORY
Soler & Palau chooses EC Titanium to help improve air quality
- Wireless setup with ECM Tools Mobile
- Reduced installation & startup time by 35 percent
- Enhanced competitiveness and expanded product offering

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ABB Ability™ ready
Turning insights into actions

ABB Ability™ smart sensor ready, EC Titanium allows operators to easily monitor and maintain equipment remotely, minimizing downtime while optimizing energy efficiency and application speed. ABB is committed to cyber-security and data protection.

- **Process optimization** monitors key system information to improve energy savings
- **Prevent unexpected downtime** - schedule preventive maintenance based on data trends to reduce overall operating costs
- **Longer equipment lifetime**
- **Improved safety** - the sensor enables easy access to drive information in locations that are difficult or dangerous to access allowing maintenance inspections from a distance

**Health Parameters:**
- Drive module temperature
- Drive control board temperature
- DC bus voltage
- Estimated speed
- Output frequency and voltage
- DC ripple
- Drive status and fault indicators
- Digital input status
- Motor power and torque
ABB has set ourselves the ambitious target of helping our customers reduce their annual CO₂ emissions in excess of 100 megatonnes by 2030. This is equivalent to the annual emissions of 30 million combustion cars. An example of how this can be accomplished is the ability of ABB drives powering electric motors that can reduce electricity consumption by up to 25%.

**Smart sensor for energy consumption**
The ABB Ability™ calculates several parameters of datapoints including speed, motor power and torque. With this information, we can accurately calculate energy usage and help our customers optimize their operations.
Find out more information about our EC Titanium motor!

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