

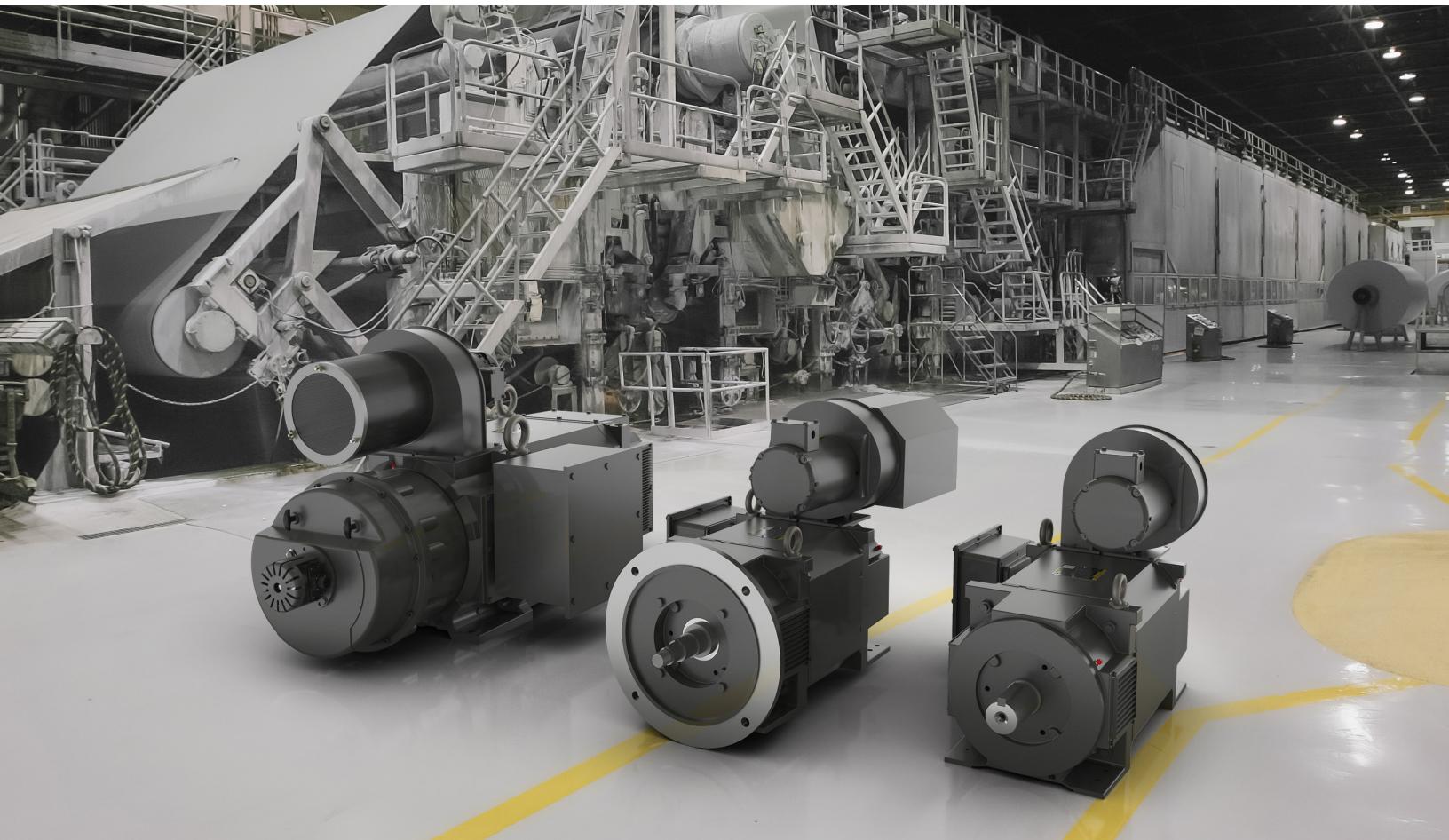
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PRODUCT BROCHURE

# RPM AC

## High-performance Inverter Duty AC motors

**BALDOR • RELIANCE**



- NEW RL5800 size available up to 2250 Hp
- Designed and manufactured in Gainsville, Georgia (USA)

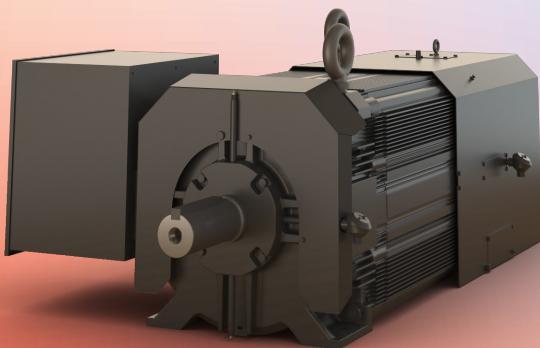
ENGINEERED  
TO OUTRUN

# DESIGNED FOR POWER. REFINED FOR PERFORMANCE.

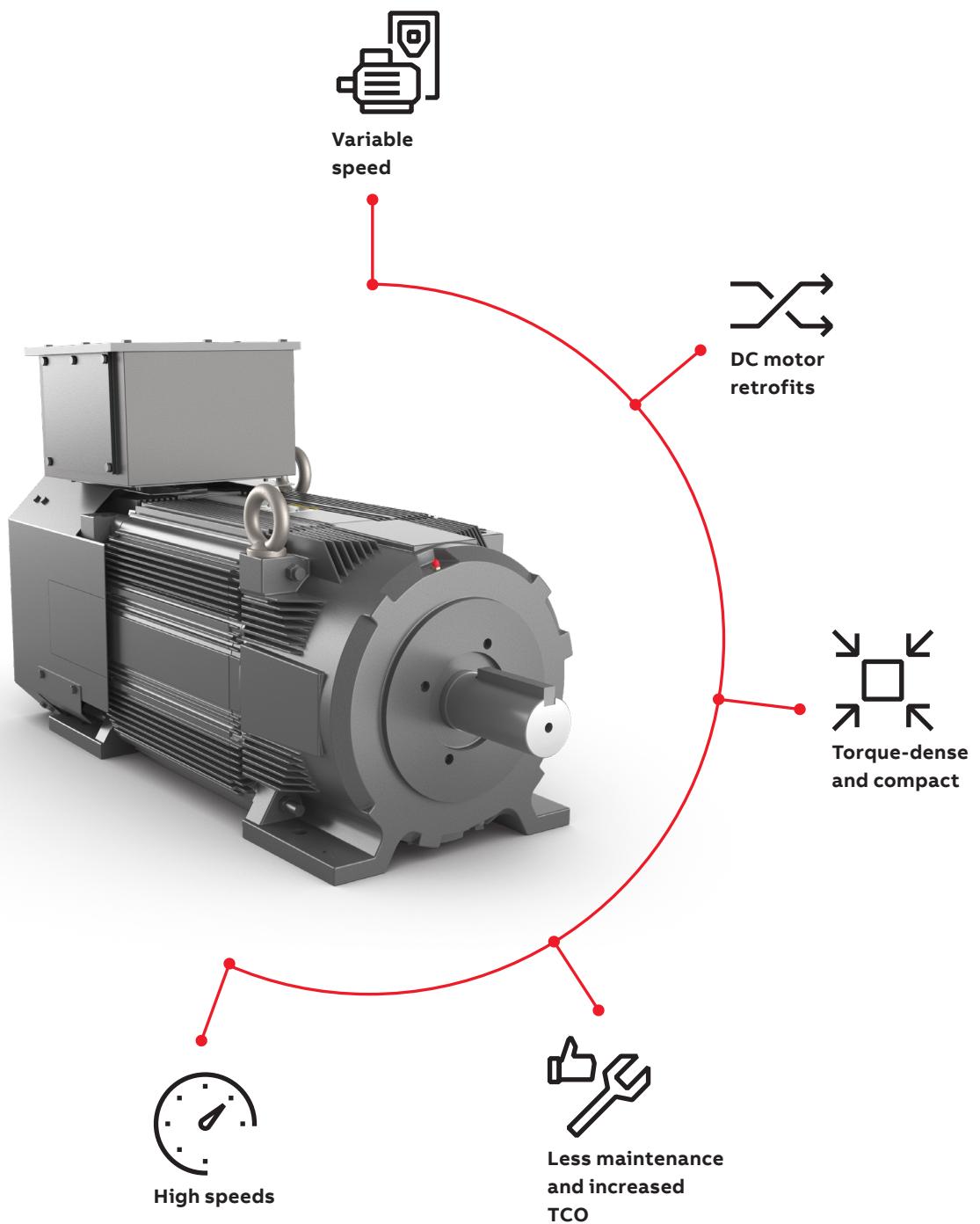
When space is at a premium, the RPM AC motor is the answer. RPM AC offers a power-dense laminated steel frame with custom power and speed ratings to match demanding variable speed application requirements.

RPM AC packs maximum torque into a small space. Available in multiple enclosures, the RPM AC motor can be up to three frame sizes smaller than the traditional NEMA or IEC motor.

Leveraging our knowledge of variable speed DC motors, RPM AC combines square frame design, efficient cooling and premium insulation systems to prove ultimate torque performance in a compact package.



# THE ULTIMATE IN POWER DENSITY JUST GOT BETTER



# RPM AC, A TRULY FEATURE-RICH LINEUP

From its beginnings in 1987, RPM AC has always represented a high-performance, power dense, true variable speed motor family. Since those early days, RPM AC has been enhanced and extended to represent one of the broadest variable speed AC motor offerings available. From 1 to 2250 Hp, in nearly any enclosure type, and with very customizable speed ranges, RPM AC has been designed to handle the most difficult and demanding applications.

With Generation 3, RPM AC raises the bar yet again. The power range has been extended, grounding provisions are now standard, setup and deployment are easier than ever, and ABB Ability™ smart sensor technology puts connectivity and data analytics at your fingertips.

## The features you've come to expect

- Square laminated steel frame
- Totally enclosed or drip-proof guarded, force ventilated enclosures
- Class H insulation
- Wide range of ingress protection
- Positive lubrication bearing system (PLS) for 280-5800 frames
- Encoder mounting provisions
- Three thermostats
- Designed and manufactured in Gainesville, Georgia (USA)
- Quick Ship program available
- Insulated bearings on larger frame sizes



**Generation 1**



**Generation 2**



**Generation 3**



Scan for video explanation of  
RPM AC Generation 3

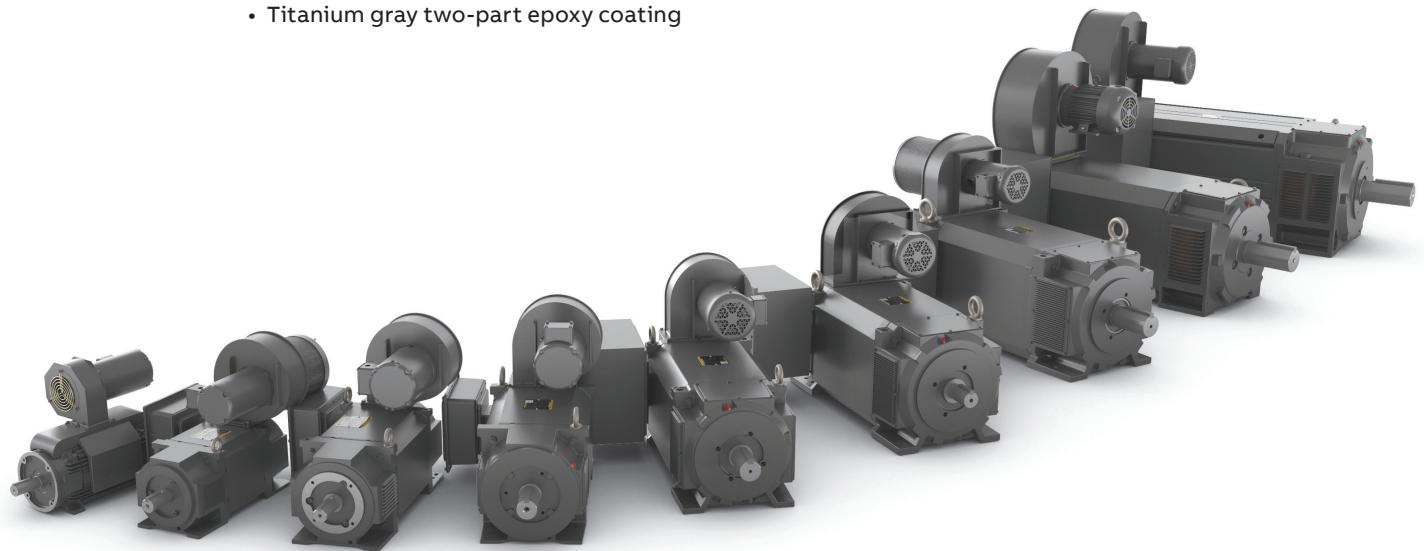


Scan for video of  
RPM AC features

# GENERATION 3: THE ULTIMATE IN POWER DENSITY JUST GOT BETTER

## Enhancements which raise the bar

- RL5800 frame size delivers up to 2250 Hp
- Catalog versions of FL5800/TEBC motors added to 1000 Hp (custom to 1250 Hp)
- Integral grounding brushes standard
- ABB Ability™ smart sensor ready
- Web-based motor selection tool with mobile (iOS and Android) support
- Oversized, rotatable, mill spec conduit boxes
- QR codes for detailed motor and drive setup information
- Titanium gray two-part epoxy coating



## Built on a foundation of power and performance

- ✓ Unmatched power density
- ✓ Optimal pole design
- ✓ Low rotor inertia/high dynamic response
- ✓ Continuous constant torque down to zero speed
- ✓ Flexible power/base speed combination
- ✓ Low vibration
- ✓ DC motor replacement



# FEATURE-RICH PRODUCT

## Optimized variable speed performance

Whether you're replacing a DC motor with an AC alternative, or just wanting a more torque dense product than the standard NEMA offering – look no further than the RPM AC. This product is feature rich across the product family and provides the ultimate variable speed performance for your application.

With RPM AC motors, you don't have to compromise! No overframing or derating. No speed range limitations. No guesswork. Choose any base speed for any application such as extruders, web processing, cut to length, machine tools, test stands, paper, metals and tire & rubber. 1000:1 constant torque standard!

### Premium Class H insulation

To assure long life in severe applications, all RPM AC motors utilize our corona-free insulation system

### Mill conduit box - Conduit boxes

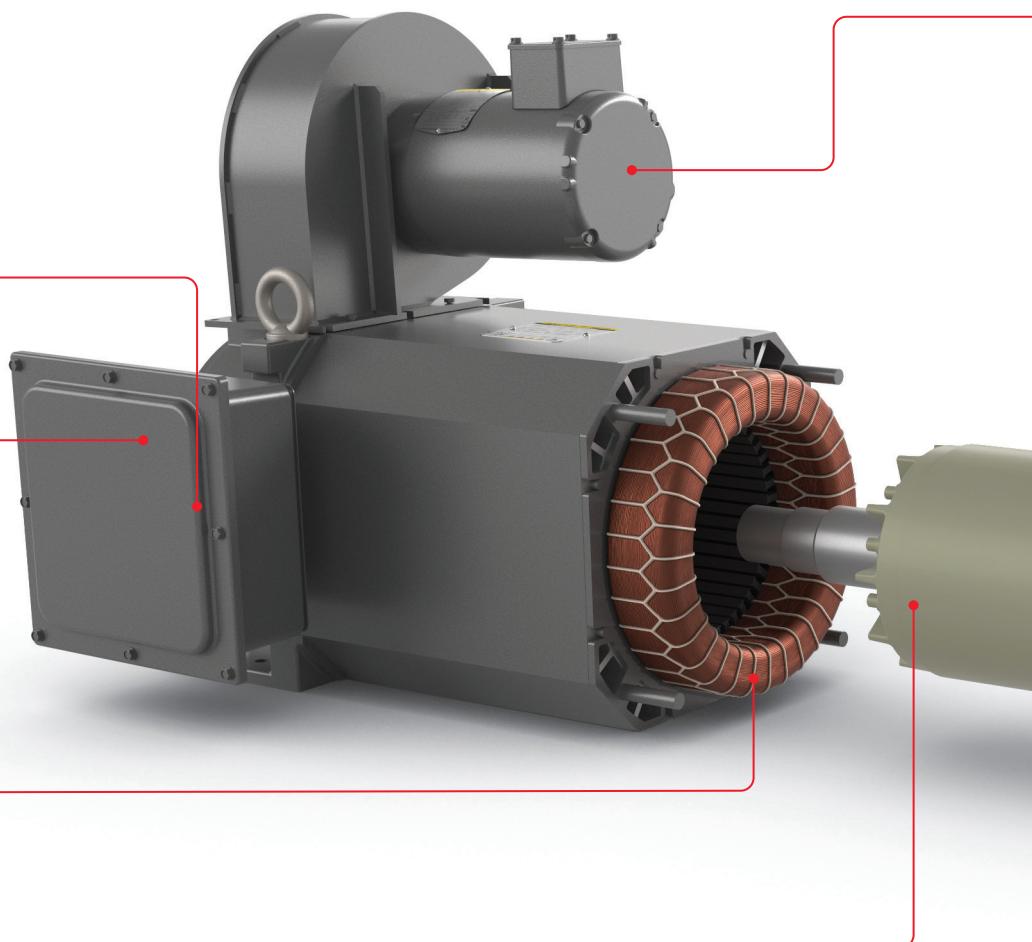
are available in large sizes for easy installation and maintenance.

### Optimal pole design

Utilizing the best available winding designs for use on VSD power, the efficiency, power factor and current requirements can be optimized.

### Highest efficiency

IE3 Induction rotor or IE5 permanent magnet rotor options

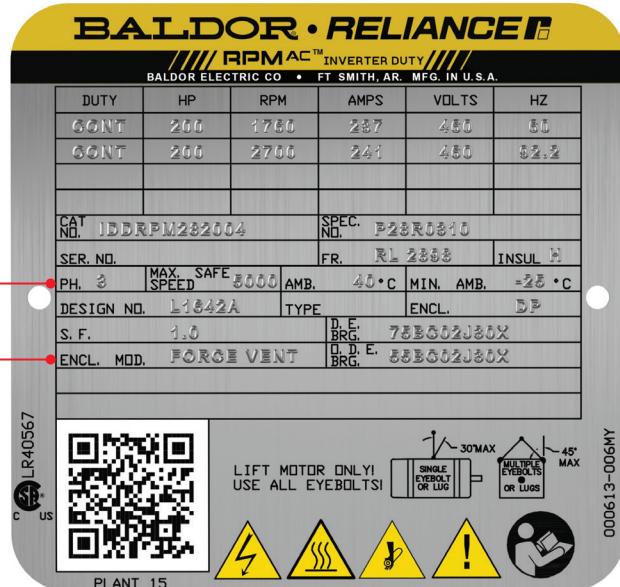


### Thermal protection and NEC compliance

These motors are equipped with three thermostats (one per phase) for thermal protection as standard. When properly connected, this means the motors are in full compliance with the NEC code requirements which requires thermal protection for motors operating on adjustable frequency power.

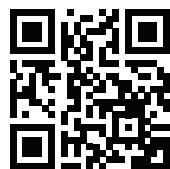
### Premium enclosures

RPM AC motors are totally enclosed for corrosive or harsh environment: IP44, IP54, IP55 and IP56 available. In addition, the following enhancements are also available: Crane and Hoist Duty, Outdoor Duty/Weatherproof, Paper Mill Duty, Pickle Duty, Press Duty/High Vibration, Washdown and XT (eXtra Tough)



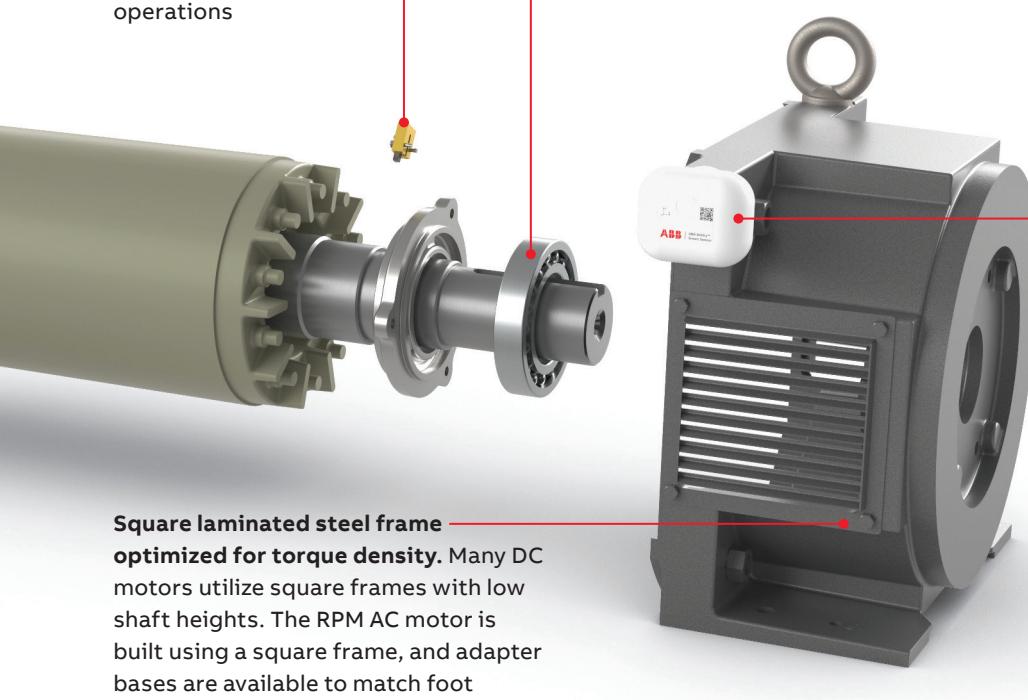
### DPFV enclosure

Most DC motors utilize drip proof guarded, force ventilated enclosures.



### Shaft grounding

included as standard for extended reliability in variable speed operations



### Square laminated steel frame

**optimized for torque density.** Many DC motors utilize square frames with low shaft heights. The RPM AC motor is built using a square frame, and adapter bases are available to match foot mounting and shaft height dimensions.

### PLS – Positive Lubrication

**Bearing System** is designed to provide complete bearing lubrication in any mounting position without over greasing or damaging the bearing. A key advantage of our large open bearing design is that the bearings run cooler and prove longer bearing life. Lubricated-for-life system is standard on 280 - 5800 frames

**ABB Ability™ Smart sensor mounting provisions** are standard on all frames

# CONSTANT TORQUE TO BASE SPEED

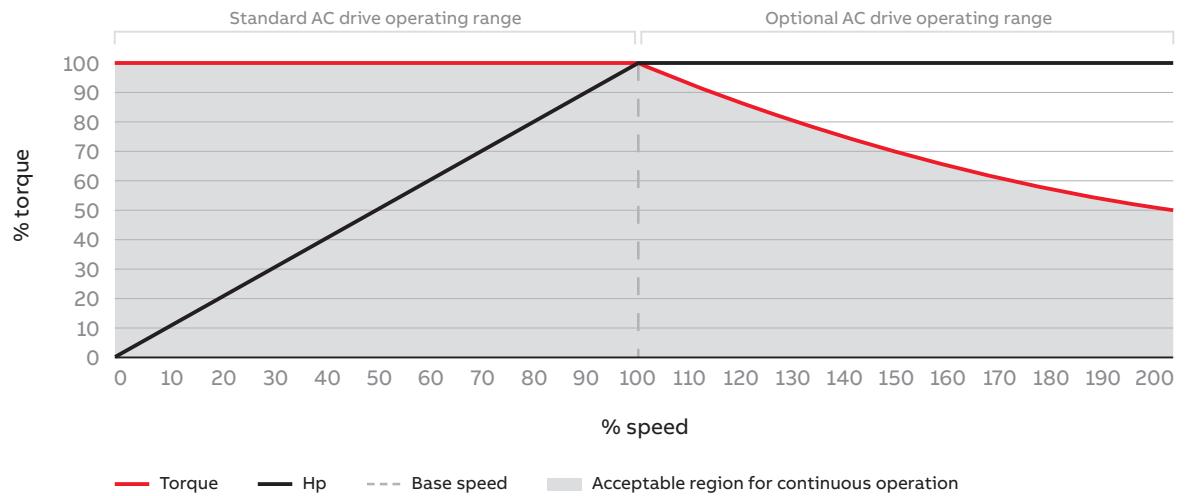
—  
01 Continuous  
Constant Torque  
(CCT) to zero speed

Every RPM AC motor design is optimized for adjustable frequency service - not just a re-rate or over framing of a standard motor.

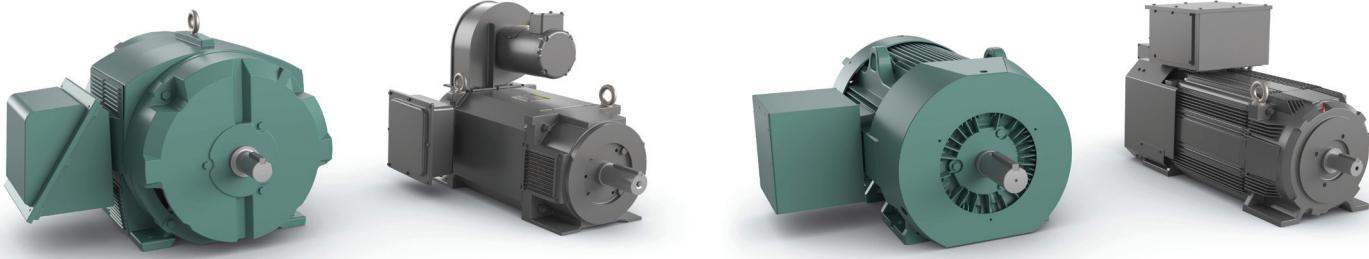
All RPM AC motors are designed to provide continuous constant torque from base speed down to and including zero speed. Unlike conventional sine wave motors, this means that at any speed below base speed, the RPM AC motor will generate full rated torque, run continuously and not overheat. Almost unbelievable, but true. Above base speed the RPM AC motor produces constant horsepower up to its maximum capabilities.

- Greater than 1000:1 turn down
- Up to 200% maximum overload torque from zero to base speed for 1 minute
- 2:1 constant horsepower above base speeds on most ratings
- High torque to inertia ratio – up to 80% less inertia than the corresponding standard NEMA frame
- Custom power ratings, custom base speeds, and custom CHP speeds are available upon request.

## — Speed/torque curve



# RPM AC VS. NEMA INDUCTION MOTORS



**Open drip proof power density chart induction designs  
(Hp by frame size, 1800 RPM, RPM AC = 1000:1 CT)**

Hp (kW)	NEMA Std ODP	RPM AC DPFV
3 (2.2)	180	-
5 (3.7)		
7.5 (5.6)	210	
10 (7.5)		
15 (11.2)	250	180
20 (14.9)		
25 (18.6)	280	
30 (22.4)		
40 (30)	320	
50 (37)		210
60 (45)	360	
75 (56)		
100 (75)	400	250
125 (93)		
150 (112)		280
200 (149)		
250 (186)		320
300 (224)	440	
350 (261)		360
400 (298)		
500 (373)		400
600 (447)		
700 (522)		
800 (597)		440
900 (671)		
1000 (746)		
1100 (820)		
1200 (895)		
1250 (932)		5000
1500 (1119)		
1750 (1305)		
1800 (1342)		
2000 (1491)		5800
2250 (1678)		

**Totally enclosed power density chart induction designs\*  
(Hp by frame size, 1800 RPM)**

Hp (kW)	NEMA Std TEFC <sup>(1)</sup>	RPM AC TENV <sup>(2)</sup>	RPM AC TEFC <sup>(3)</sup>	RPM AC TEBC <sup>(2)</sup>
3 (2.2)	180	180	180	180
5 (3.7)				
7.5 (5.6)	210			180
10 (7.5)		210		
15 (11.2)	250	210		
20 (14.9)			210	
25 (18.6)	280	250		
30 (22.4)			250	210
40 (30)	320	280		
50 (37)		320		
60 (45)	360	280	280	250
75 (56)		360		
100 (75)	400	400	320	280
125 (93)		440		
150 (112)			360	320
200 (149)			400	360
250 (186)			440	400
300 (224)			440	440
500 (373)				
600 (447)				
700 (522)				
800 (597)			5800	5800
900 (671)				
1000 (746)				

(1) 2:1 CT, 4:1 VT

(2) 1000:1 CT

(3) 1000:1 CT 3 - 400 Hp (2.2 - 298 kW), 4:1 VT 500 - 1000 Hp (373 - 746 kW)

\*Enclosed version available thru 1250Hp (932kW) with permanent magnet rotor design.

# BUILD YOUR RPM AC CUSTOMIZATION MADE EASY

You are no longer limited to conventional NEMA or IEC ratings. With the RPM AC Wizard tool, you design the motor that best satisfies your application requirements. You can select or input your unique horsepower, base speed, top speed, and overload requirements. With one click, the Wizard will design a motor that best fulfills your needs.

**Step 1:** Wizard for quick selection of frame sizes

**Step 2:** Configurator for custom selection matched to your application.

The frame size and full load current rating are immediately defined. With another click, you get complete electrical design curves and performance data. Another click and you have a dimension sheet. The Wizard will even give you a couple of design options if a larger frame design could provide a lower full load current draw. Got an unusual duty cycle? No problem. The Wizard can handle that too. This is a true motor design tool and not just a table look up program. You can design either NEMA or IEC compliant motors. Get performance and dimensional data in standard or metric formats. The RPM AC Wizard is now available as an online tool so that you know RPM AC design information is always current!

**ABB Motor Builder** Home Configurators ▾

**RPMAC Motor**

Find an option

**Basic Configuration** ▾

Electrical

5 options selected...

**Basic Configuration**

RPMAC - Wizard / Configurator	Wizard
Motor Standard	NEMA
Enclosure	DPG-FV
Division	None
Rating	<input checked="" type="radio"/> HP <input type="radio"/> KW
Custom Power Rating	1000
Custom Base Speed (RPM)	1800
Duty	Cont
Custom Voltage	460
Inverter Torque	1000:1 Constant Torque

**Overload Below Base Speed**

**PCT FL Torque Below Base Speed**

**Constant HP Operation Required**

**Frame Selection**

Frame Size	KVA	Amps	Rotor Inertia	Rotor Type
RL4461	961	1206	207	Induction
RL4070	0	0	100	Perm Magnet

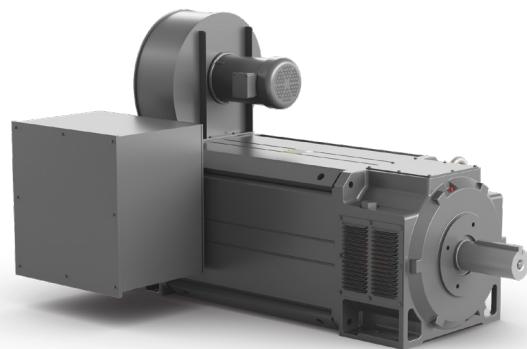
**ABB Drive Recommendation** Yes

**ABB Drive Number** ACS880-07-1800A-5+C129F255H359

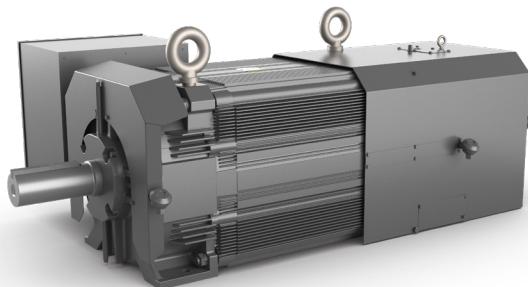
For RPM AC Wizard, scan this QR code.



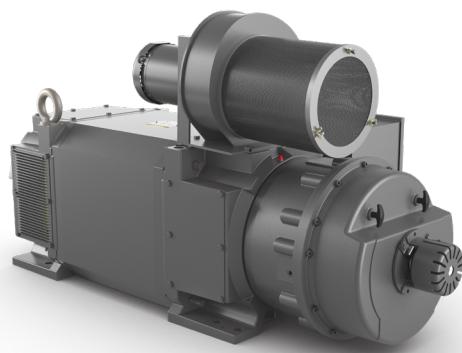
DPFV 360 frame F2 blower with filter, F1 conduit box and C-face encoder



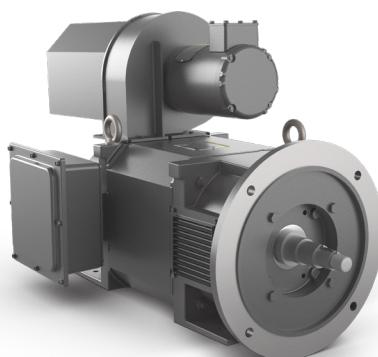
DPFV (RL5800 frame now available up to 2250 Hp)



Totally enclosed fin laminated design (5800 frame now available up to 1250 Hp)



DPFV 400 frame brake, blower, filter and encoder



DPFV F3 blower, D-Flange and special shaft options



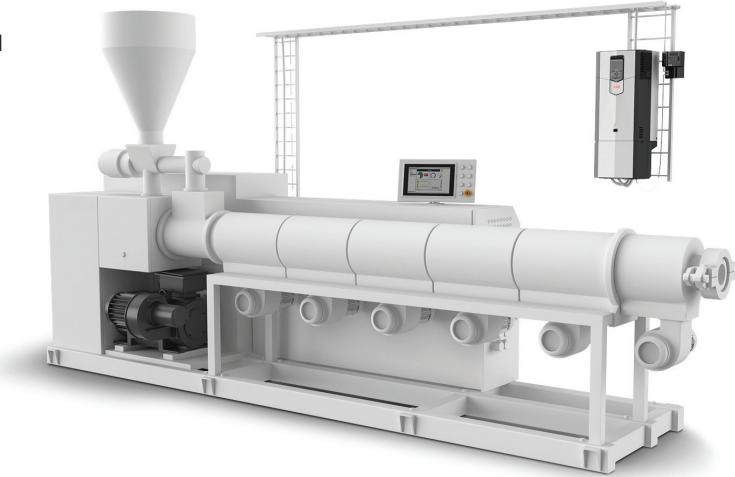
TEBC with F3 conduit box

# ENCLOSURE MODIFICATIONS AND ENHANCEMENTS

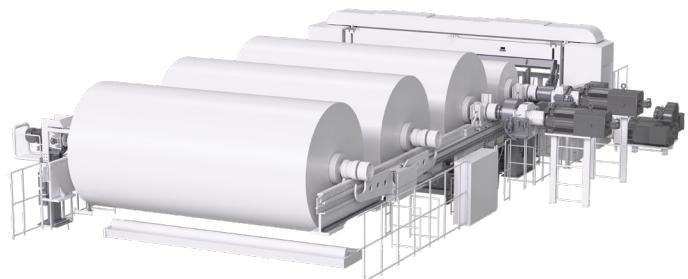
RPM AC is the ultimate AC variable speed motor, and it can be enhanced through our configurator options to meet your specific application needs. Whether you need separately ventilated air that is piped from an external source, a TEAO piggyback motor, or washdown duty (IP56) -- we've got you covered.

## XT features

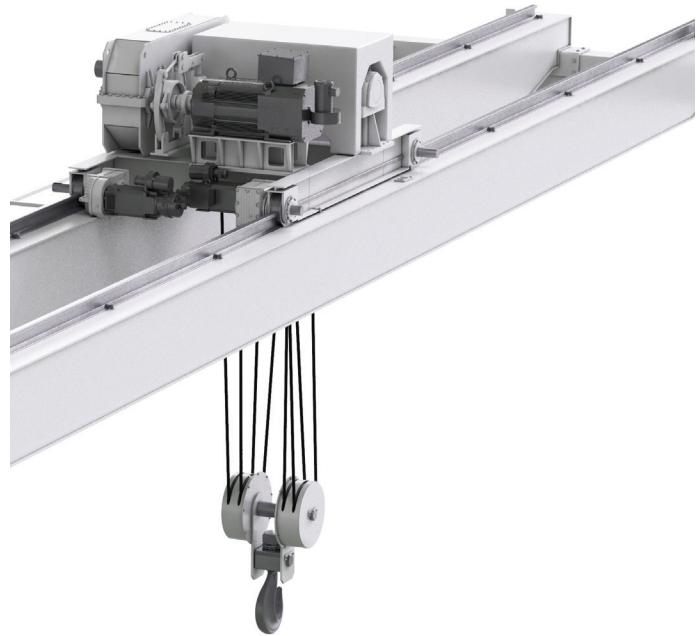
The Baldor-Reliance XT (or eXtra Tough) features are designed for operation in damp locations where the motor will be subjected to corrosive conditions. Typical applications are paper, chemical, petroleum, fertilizer and plastics industries.



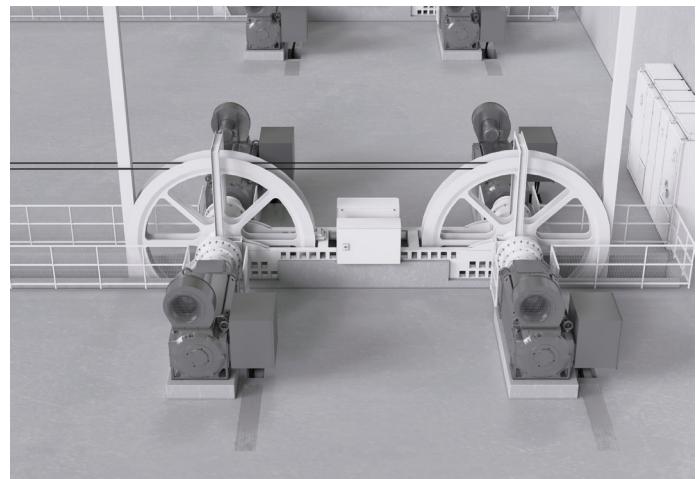
**Paper mill duty motors** are designed for operation at the wet end of the paper mill and in harsh environments. Modification includes separately ventilated or totally enclosed motors in frames FL and RL 210/ FDL & RDL 132 and up. For DPFV in harsh environments, VPI insulation systems are recommended.



**Crane duty** enhancements for hoist, gantry and trolley motors include severe duty features. Two options are available, totally enclosed with IP56 rating or DPFV with IP23 rating and VPI insulation.



**Outdoor duty / weatherproof** is suitable for outdoor operations subject to direct weather conditions. Outdoor duty motors include space heaters to protect against condensation when the motor is not operating. Motor accessories such as brakes must be specified and priced as suitable for outdoor use. Standard encoders are not recommended for outdoor duty. Motors operating in dirty areas with fine abrasive dust, such as taconite, surrounding the motor should have dustproof / Taconite features added in addition to this modification.



# RPM AC AND ACS880

## ABB matched performance



### Achieve IE5 (NEMA Premium 5) efficiency levels

RPM AC is designed for variable speed applications and has been tested and proven effective with our ACS880 VSD. The permanent magnet rotor design,

paired with an ACS880, allows users to minimize their power consumption, thus lowering their overall system operating costs.



### RPM AC Extruder Duty

These motors are designed to provide features important to extruder applications, including insulated bearings, shaft grounding brush, winding RTDs and an extruder duty nameplate.

Quick ship program is also included.



### ACS880

These compact drives offer precise control, flexible integration and broad compatibility with existing systems. ACS880 provides the latest in AC controls, allowing the drive to be incorporated into an extruder and enabling quick commissioning on site.

## Better together



Power  
matched



Optimized  
performance



Accurate  
motor  
control



One  
vendor



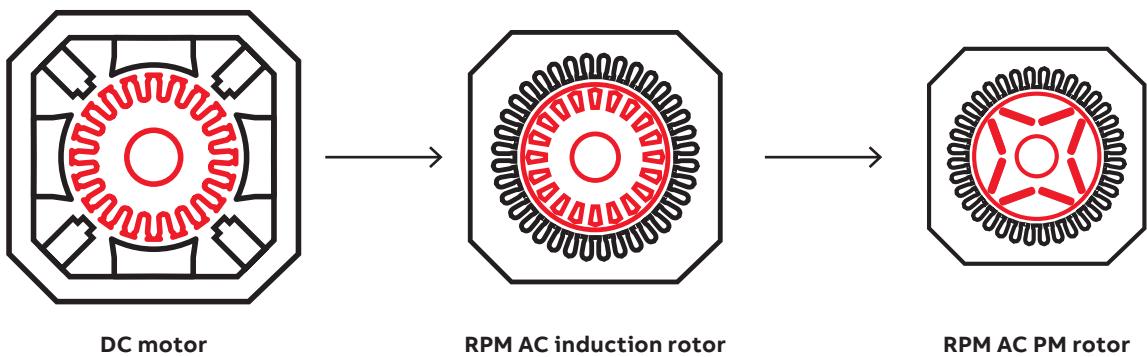
Quick ship motors  
and drives

# DC TO AC CONVERSION MADE EASY

## Rotor design

For RPM AC, you have the option of a standard induction rotor or a permanent magnet rotor which enables IE5 (NEMA Premium 5) efficiency.

These AC rotor designs allow for drop-in replacement of DC square framed motors.



DC motor

RPM AC induction rotor

RPM AC PM rotor



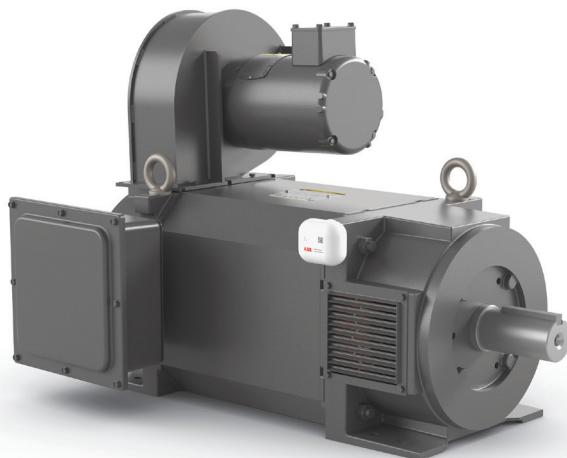
Scan for success story:  
Power and precision:  
upgrading to electric thruster  
system utilizing RPM AC  
and variable speed drives.



# ABB ABILITY™ CONDITION MONITORING

Extending the life of your motor

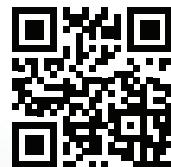
- Increased safety
- Increased productivity
- Reduced maintenance
- Eliminated unplanned downtime
- Easy to use



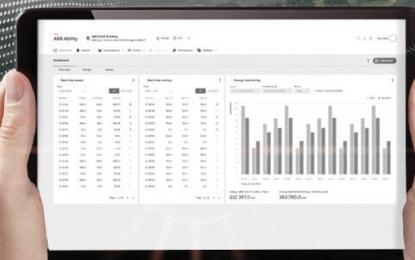
Changes in temperature and vibration can indicate potential problems in equipment. Yet monitoring low voltage motors is considered expensive and often overlooked, leaving problems unnoticed until the motor fails. ABB now makes it easier and safer to know how your motor feels.

The ABB Ability™ Smart Sensor converts traditional motors into smart, wirelessly connected devices. It enables users to monitor the health of their motors and to plan maintenance in advance. Unplanned downtime can be avoided, efficiency optimized, and safety improved.

ABB Ability™ connects you to the power of real-time, data-driven decisions of the Industrial Internet of Things (IIoT). ABB offers a unique digital advantage by combining connectivity and data analytics with our expertise to make your operations efficient, predictable and safe.



(For more information on ABB Ability™ smart sensors)



# DOCUMENTED SAVINGS

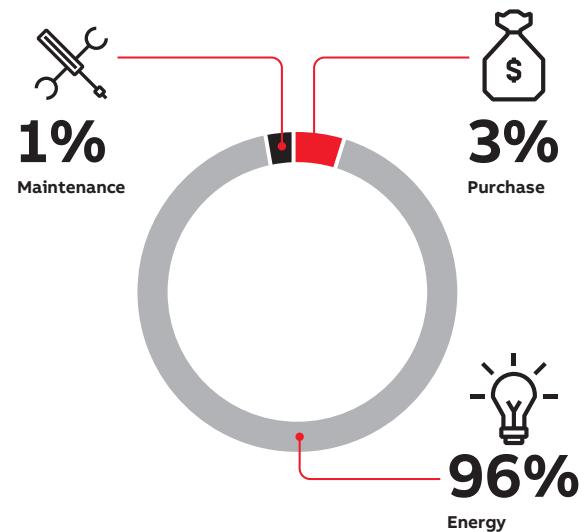
## It pays to upgrade

### Challenge

A Texas-based engineered wood manufacturing facility was challenged with considerable maintenance issues on its resin blenders' 40Hp DC motors and drive systems. Maintenance issues were causing unplanned downtime as well as costly repairs and replacements on the DC motors. The DC drives were also expensive repair items and had become obsolete technology.

### Solution

The facility converted the resin blenders to an ABB AC drive system with RPM AC motors. RPM AC offers 1000:1 constant torque speed capability and all the performance of a DC motor, without the brush and commutator maintenance.



### Step 1

For each product that was analyzed, ABB sales representatives made the following inquiries:

- The amount of time required to perform the bearing replacements
- Labor rate and number of employees required for each activity
- Cost of materials for each activity
- The replacement frequency of each component
- Reduction in production capacity due to equipment downtime
- Production capability of the facility
- Market price (revenue) of the facility's product

### Step 2

We calculated annual material cost savings due to replacement of the motors, in addition to the cost of inventory:

- Replacement cost savings = (replacement frequency x material cost of existing units) - (replacement frequency x material cost of solution units)
- Inventory cost savings = (inventory value + carrying costs of existing units) - (inventory value + carrying costs of solution units)

### Step 3

We calculated annual downtime cost savings for existing and proposed motor solutions using this specific formula:

- Downtime cost = downtime cost (\$ per hour) x time spent on activity x replacement frequency

### Result:

Downtime cost savings = \$135,000

### Step 4

We calculated the total annual savings for the motor solution.

- Total annual savings = material cost savings + downtime cost savings

### Result:

Total annual savings = \$150,158

# RPM AC PRODUCT FAMILY

Product extensions that complete the lineup



RPM AC motors for extruder applications

## RPM AC Extruder Duty

### 25 – 1000 Hp, FL180 thru RL440

Extruder Duty motors are available as a quick ship option and include insulated bearings, shaft grounding brush, winding RTDs, an Extruder Duty nameplate and Titanium gray paint color as standard features.



400 Hp Top Drive drilling motor

## RPM AC top drive

### 400 Hp, L4046Y

Top drive drilling motors are durable, safe and meet the performance demands of on-shore drilling rigs. The compact, power dense designs offer more power in a smaller package with certifications to ensure equipment and personnel safety.



Direct drive cooling tower motor and drive system for industrial applications

## RPM AC Cooling Tower Direct Drive (CTDD)

### 5 – 300 Hp, FL210 thru FL5800

By combining the technologies of the RPM AC motor with permanent magnet (PM) salient pole rotor designs and an adjustable speed drive, the direct drive solution offers the benefits of variable speed control and eliminates the cost and maintenance required for traditional gearboxes or belted solutions.

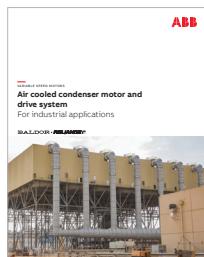


RPM AC CTDD motors for air cooled heat exchangers

## Air Cooled Heat Exchanger (ACHE)

### 7.5 – 75 Hp, FL210 thru FL400

Direct drive motors are new approach to maintaining continuous availability of air-cooled heat exchanger for process cooling. The exchanger fans are mounted directly to the motor shaft, eliminating the need for speed reduction device such as pulleys, belts and gearboxes.



Air cooled condenser motor and drive system for industrial applications

## Air Cooled Condenser (ACC)

### 50 – 250 Hp FL440 thru FL5800

With an ACC motor, the fan couples directly to the motor and is controlled by a unique AC drive to provide optimal speed and air cooled condenser performance that runs quieter with reduced electricity consumption.



RPM XE – eXtreme efficient

## RPM XE

### 10 – 100 Hp, HL215T thru HL405T

Ideally suited for continuous operation on pumps and compressors, the RPM XE is an innovative, NEMA drop-in replacement motor and offers IE4+ efficiencies.

# DESIGNED IN THE US. BUILT IN GAINESVILLE, GEORGIA.

Available for quick-ship service



The RPM AC Quick Ship program allows customers to obtain selected modifications on RPM AC motors in much shorter time frames than ordering a custom RPM AC motor.

Enter our tool: <https://config.baldor.com/>  
You will start with a standard catalog number RPM AC motor and make selected modifications in the Quick Ship Configurator.

Many common RPM AC modifications are covered in this user-friendly order entry process. Choose your RPM AC catalog number and choose your modifications with drop down choices for modifications – this greatly simplifies entering common RPM AC configured motors.

The motor will be built in the Gainesville motor plant and shipped in 3 to 4 weeks of receipt of the order (instead of the normal RPM AC custom motor lead time).

If the Quick Ship Configurator will not meet your needs, you can click on “Fully Configure” at any time. All Quick Ship selections will be copied over to the complete RPM AC configurators.

#### Quick ship change/cancellation policy

A Quick Ship order may be changed or canceled up to the time the order enters production. Once a Quick Ship order is in production in the Gainesville plant, it may not be changed or canceled. Release to production will normally occur within 2 to 3 days upon receipt of order.



**Video:**  
Over 90% of Baldor-Reliance motors meet the Buy American Act





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**ABB Motors and Mechanical Inc.**

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Fort Smith, AR 72901  
United States

<https://new.abb.com/motors-generators>