

# Water-cooled motors

## Efficient cooling technology in a power dense design



ABB's IEC and Baldor-Reliance® water-cooled motors are quiet, versatile, and excel in the harshest environments. The water-jacket offers cooling technology that extends the motor life - all while saving valuable space, energy and maintenance costs.

### Standard variable speed capabilities:

- Offered in NEMA and IEC frame designs
- Continuous full load torque from zero to base speed when used with ABB DTC (Direct Torque Control) or other high-performance vector control inverters
- 1.5:1 constant power above base speed on most ratings
- Wider constant power ranges available with custom base speeds
- 200% minimum overload torque starting at base speed and below for 1 minute
- Compact, power dense design
- Quiet operation
- Lower maintenance costs because bearings and windings are protected from overheating. In dirty environments, traditional TEFC frame fins fill with debris and require additional cleaning and maintenance.

### DOL & variable speed electrical designs:

- ABB's NEMA and IEC water-cooled product line includes induction, synchronous reluctance (SynRM) & IPM (Interior Permanent Magnet) designs. Induction designs are suitable for DOL (direct on line) & variable speed use. SynRM and IPM designs are for variable speed use exclusively
- Induction motors have nominal speed from 500 to 3600 RPM when run DOL
- Lower inertia rotors provide fast dynamic response

Main specifications	
Output power:	60 - 2682 Hp (45 - 2000 kW)
Frame sizes:	NEMA 360, 400, 440 and 5800 IEC 225, 250, 280, 315, 355, 400, and 500
Number of poles:	2 to 14
Efficiency:	Up to Super-Premium efficiency (IE4) with induction rotor Ultra-Premium (IE5) with permanent magnet or SynRM rotor
Electrical design:	DOL & variable speed
Material design:	No dust-collecting cooling ribs - corrosion resistant fabricated steel frame
Protection:	IP55 (optionally IP56)
Bearings:	PLS (Positive Lubrication System) bearings for prolonged bearing life
Insulation:	Class F (optionally Class H)
Inverter duty:	Withstands voltage spikes requirements of MG1 Part 3.4.4.2
Mounting:	Horizontal with F1/F2 conduit box options Class I Division 2 certifications (Class A,B,C,D)
Ex protection types:	Class II Division 2 Group F and G, T4 Ex ec IIC T3 Gc acc. IEC/EN 60079-7 with certificates
Thermal protection:	3 (one per phase) thermostats or PTC thermistors
Fully customizable:	Power ratings, base speeds, constant power speeds available upon request
Optional condition monitoring:	ABB Ability™ Smart sensor

## Water-cooling technology for power density

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01 Comparison of 360 frame TEWC vs. 447 TEFC NEMA framed motors.

The water-cooled motor uses a highly efficient cooling method to transfer heat away from the motor without the use of fans by circulating water through the water jacket. Cooling efficiency is maintained even at lower speeds, making this motor ideal for constant torque applications.

Water-cooled motors offer a power dense solution for the most compact and demanding applications found in marine, mining and other process industries.

### Commitment to quality

All water-cooled motors are available with UL component recognition, CE mark and CSA approval.

### Power density



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- (1) 2:1 CT; 4:1 VT
- (2) 1000:1 CT
- (3) Permanent magnet (PM) and Synchronous Reluctance (SynRM) designs available
- (4) Suitable for across the line (DOL) operation
- \* HydroCool XT is the Baldor-Reliance NEMA framed water-cooled motor

Hp (kW)	NEMA frame			IEC frame		
	Std. NEMA TEFC IE3 induction/ 1800 RPM <sup>(1)</sup>	HydroCool XT* IE3 induction/ 1200 RPM <sup>(2)</sup>	HydroCool XT* IE5 IPM/ 1200 RPM <sup>(2)</sup>	Water-cooled M3LP IE3 induction <sup>(3)</sup> 60 Hz/3600 RPM <sup>(4)</sup>	Water-cooled M3LP IE3 induction <sup>(3)</sup> 60 Hz/1800 RPM <sup>(4)</sup>	Water-cooled M3LP IE3 induction <sup>(3)</sup> 60 Hz/1200 RPM <sup>(4)</sup>
60 (45)	360					-
75 (56)						
100 (75)	400					
125 (93)	444	360				
150 (112)	445		360			
175 (130)	447					
200 (149)		400				315
225 (168)						
250 (186)		445				
275 (205)	449			315	315	
300 (224)		447	400			
325 (242)						
350 (261)		449				
375 (280)			445			355
400 (298)	L449					
500 (373)	5010	L449	447			
600 (447)			449	355		
700 (552)	5012		L449		355	
800 (597)						400
900 (671)						
1000 (746)	5810		5810		400	
1250 (932)	6810					450
1341 (1000)					450	
1475 (1100)						
1609 (1200)						
1878 (1400)						500
2146 (1600)						
2414 (1800)					500	
2682 (2000)						

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ABB Motors and Mechanical Inc.  
5711 R.S. Boreham, Jr. Street  
Fort Smith, AR 72901  
Ph: 1.479.646.4711