



## Industrial cooling direct drive motor and VSD packages

# Simplicity. Reliability. Energy savings. Everything counts.

Our direct drive motor and variable speed drive packages replace the gearbox, driveshaft and induction motor typically used in industrial cooling fans. This results in less parts, less maintenance and reduced risks.

Easy configuration,  
simple parameter setup

The trickle current function keeps  
the motor warm and dry, preventing  
condensation

Prevents fan from windmilling  
when not running

Sensorless permanent magnet control:  
no encoders or resolvers needed

Built-in deicing function keeps fan  
blades ready for operation

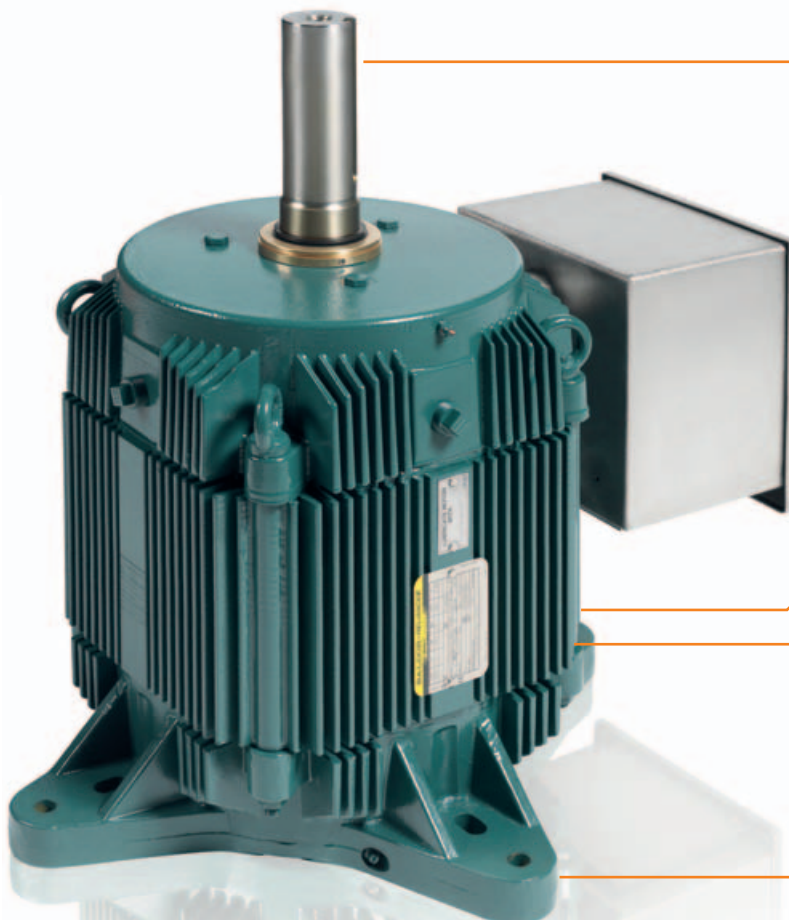


## Package benefits

- Reduces maintenance and improves reliability. With this package, you can remove the gearbox, gearbox cooling system, driveshaft, couplings and bearings. This means no more gearbox maintenance, no gearbox oil leaks, no cooling water contamination and no long lead times for replacement parts.
- Lowers vibration and system noise
- Saves energy and eliminates startup current peaks and stresses from across-the-line startup. The drive smoothly accelerates and decelerates the fan to the speed needed, rather than running directly on line. This helps save energy and operating costs.
- Simplified fan drivetrain alignment, only need to align the fan to the motor shaft
- Supported by a global service network that ensures local support no matter where the motor and drive are installed
- Anti-windmilling technology controls fan blades when the system is not operating

## Package specifications

- For new or retrofit industrial cooling systems up to 650 rpm/11,000 Nm
- Motor: RPM AC permanent magnet motor. A rugged motor designed specifically for the wet and hot industrial cooling tower environments. The totally enclosed air over (TEAO) design comes with seals selected to prevent water entering along the shaft.
- Drive: ACS880-01 industrial drive with built-in cooling tower application control program
- The drive adjusts the motor speed to match the process demand, saving energy and lowering wear and tear versus direct-on-line operation



Directly mounts to fan  
No more gearbox and driveshaft

High-torque, low speed  
permanent magnet motor

Water-tight motor designed to  
operate in the air stream

Versatile mounting options

# RPM AC cooling tower motor dimensions

## Select motor frame size based on required fan torque

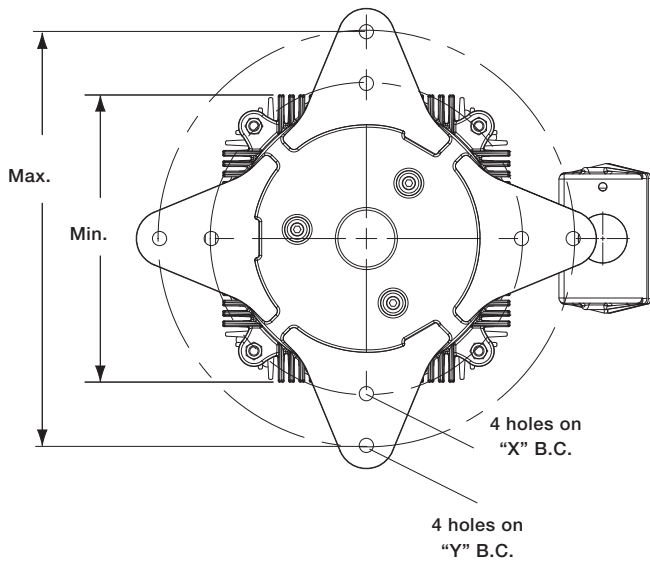


Figure 1. Motor bolt hole configuration.

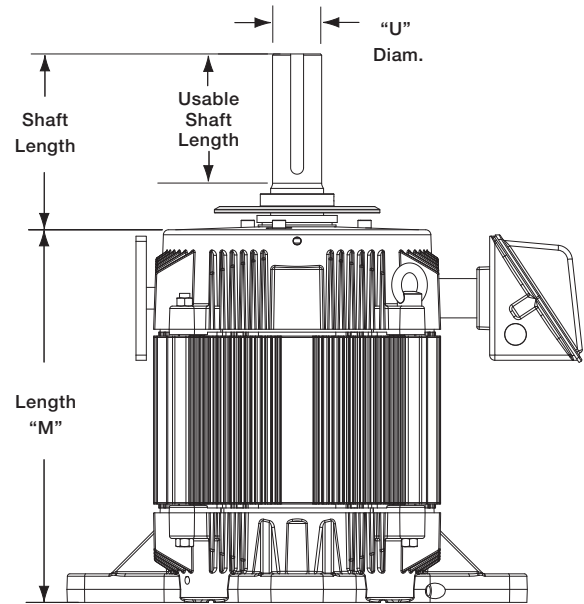


Figure 2. Side view of the motor.

Motor type	*Typical shaft length	Usable shaft length	*Typical shaft dia "U"	Min bolt circle "X"	Max bolt circle "Y"	Number of holes per bolt circle
	mm	mm	mm	mm	mm	
FL25XX	215.9	176.3	50.8	355.6	406.4	4
FL28XX	203.2	146.1	60.3	381 - 406	508	4
	215.9	158.8				
FL32XX	203.2	149.4	76.2	406	508	4
	215.9	162.1				
FL36XX	215.9	162.1	76.2	508. 558.8**	635**	4
	228.6	174.8				
	241.3	187.5				
FL40XX	215.9	162.1	76.2	558.8	635	4
	228.6	174.8				
	241.3	187.5				
FL44XX	215.9	162.1	76.2	558.8	635	4
	228.6	174.8				
	241.3	187.5				
FL58XX	304.8	174.8	127.0	-	863.6	8
	304.8	198.5				

\*Shaft length and diameter can vary by application requirements

\*\*4 holes on three bolt circles

Tapered shafts are available by request. Typical taper is 41.67 mm per meter.

Special non-standard shaft requirements must be defined on the order.

## Direct drive cooling tower motor:

- Designed for outdoor duty to handle the extremes of 100% humidity and chemical environments
- Prevents water ingress along the shaft
- Motors are available with either foot or flange mount designs
- Shaft height, diameter and flange mounting dimensions can be directly interchangeable with some existing cooling tower gearbox designs
- High performance paint system and synthetic grease
- Long bearing lifetime exceeding L-10 100,000 hours

## Motor features:

- Vibration pad standard for FL58XX frame motors and optional on smaller motors
- Thermostats are standard on all motors. Their connection is required to validate the motor's warranty.
- Winding stator RTDs are standard on FL58XX frame motors and optional for smaller motors
- Water ingress along the shaft is prevented with the slinger over Inpro seal for FL44XX and FL58XX and with V-ring slinger on smaller motors

Motor				
Motor type	Torque max $T_{max}$ Nm	Air velocity min required m/s	Weight approx. kg	Motor height "M" estimated mm
FL2554	122	3.81	165	356
FL2562	176	3.81	190	406
FL2570	237	3.81	230	457
FL2578	298	3.81	260	508
FL2873	393	3.81	270	457
FL2882	502	3.81	315	508
FL2890	597	3.81	350	559
FL2898	698	3.81	390	610
FL3203	969	3.81	644	627
FL3213	1152	3.81	721	691
FL3698	1430	3.81	725	635
FL3614	1864	3.81	850	737
FL4034	2237	3.81	980	737
FL4046	2630	3.81	1100	813
FL4058	3023	3.81	1215	889
FL4429	4122	3.81	1430	787
FL4440	4718	3.81	1565	889
FL5818	5412	1.27	2495	991
FL5820	6267	1.27	2680	1041
FL5822	6836	1.27	2860	1346
FL5824	7690	1.27	3040	1143
FL5826	8544	1.27	3220	1194
FL5828	9115	1.27	3400	1245
FL5830	9969	1.27	3585	1295
FL5832	10823	1.27	3765	1346

Select motor type as determined by required fan torque.

Fan torque = (kW \* 9550)/Fan speed

Use existing motor kW and fan speed to calculate required torque.



**RPM AC permanent magnet motor. A rugged motor designed specifically for the wet and hot industrial cooling tower environments.**

# ACS880 industrial drive

## Select drive based on motor

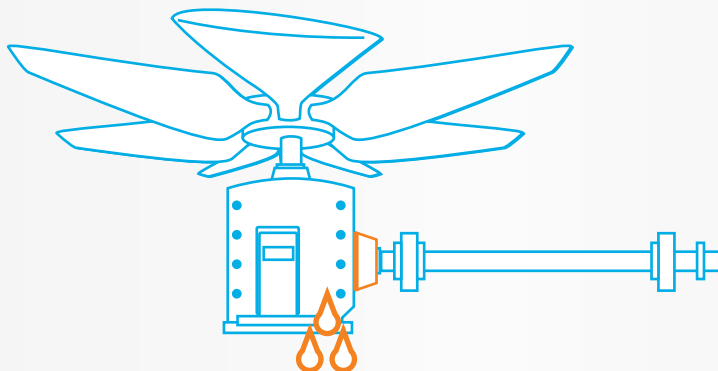
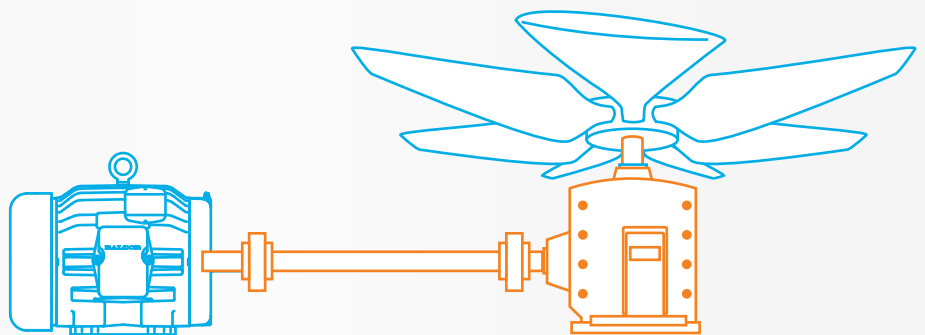
ACS880-01 drive +N5350 Cooling tower control program			
Current $^*/I_{Ld}$ A	Power $P_{Ld}$ kW	Type designation	Frame size
<b><math>U_N = 230</math> V (range 208 to 240 V)</b>			
23.1	5.5	ACS880-01-24A3-2	R2
29.3	7.5	ACS880-01-031A-2	R3
44	11	ACS880-01-046A-2	R4
58	15	ACS880-01-061A-2	R4
71	18.5	ACS880-01-075A-2	R5
83	22	ACS880-01-087A-2	R5
109	30	ACS880-01-115A-2	R6
138	337	ACS880-01-145A-2	R6
162	45	ACS880-01-170A-2	R7
196	55	ACS880-01-274A-2	R7
260	75	ACS880-01-274A-2	R8
<b><math>U_N = 400</math> V (range 380 to 415 V)</b>			
12	5.5	ACS880-01-12A6-3	R1
16	7.5	ACS880-01-017A-3	R2
24	11	ACS880-01-025A-3	R2
30	15	ACS880-01-032A-3	R3
36	18.5	ACS880-01-038A-3	R3
43	22	ACS880-01-045A-3	R4
58	30	ACS880-01-061A-3	R4
68	37	ACS880-01-072A-3	R5
83	45	ACS880-01-087A-3	R5
100	55	ACS880-01-105A-3	R6
138	75	ACS880-01-145A-3	R6
161	90	ACS880-01-169A-3	R7
196	110	ACS880-01-206A-3	R7
234	132	ACS880-01-246A-3	R8
278	160	ACS880-01-293A-3	R8
345	200	ACS880-01-363A-3	R9
428	250	ACS880-01-430A-3	R9
<b><math>U_N = 500</math> V (range 380 to 500 V)</b>			
10.4	5.5	ACS880-01-11A0-5	R1
13	7.5	ACS880-01-014A-5	R2
19	11	ACS880-01-021A-5	R2
26	15	ACS880-01-027A-5	R3
32	18.5	ACS880-01-034A-5	R3
38	22	ACS880-01-040A-5	R4
49	30	ACS880-01-052A-5	R4
62	37	ACS880-01-065A-5	R5
73	45	ACS880-01-077A-5	R5
91	55	ACS880-01-096A-5	R6
118	75	ACS880-01-124A-5	R6
148	90	ACS880-01-166A-5	R7
171	110	ACS880-01-180A-5	R7
228	132	ACS880-01-240A-5	R8
247	160	ACS880-01-260A-5	R8
343	200	ACS880-01-361A-5	R9
393	250	ACS880-01-414A-5	R9
<b><math>U_N = 690</math> V (range 525 to 690 V)</b>			
6.9	5.5	ACS880-01-07A3-7	R5
9.3	7.5	ACS880-01-09A8-7	R5
13.5	11	ACS880-01-14A2-7	R5
17	15	ACS880-01-018A-7	R5
21	18.5	ACS880-01-022A-7	R5
25	22	ACS880-01-026A-7	R5
33	30	ACS880-01-035A-7	R5
40	37	ACS880-01-042A-7	R5
47	45	ACS880-01-049A-7	R5
58	55	ACS880-01-061A-7	R6
80	75	ACS880-01-084A-7	R6
93	90	ACS880-01-098A-7	R7
113	110	ACS880-01-119A-7	R7
135	132	ACS880-01-142A-7	R8
165	160	ACS880-01-174A-7	R8
200	200	ACS880-01-210A-7	R9
257	250	ACS880-01-271A-7	R9

$^*/I_{Ld}$  Continues current allowing 110%  $I_{Ld}$  for 1 min/5 min at 40 °C

# Reduce cooling tower complexity with the ABB Direct Drive solution

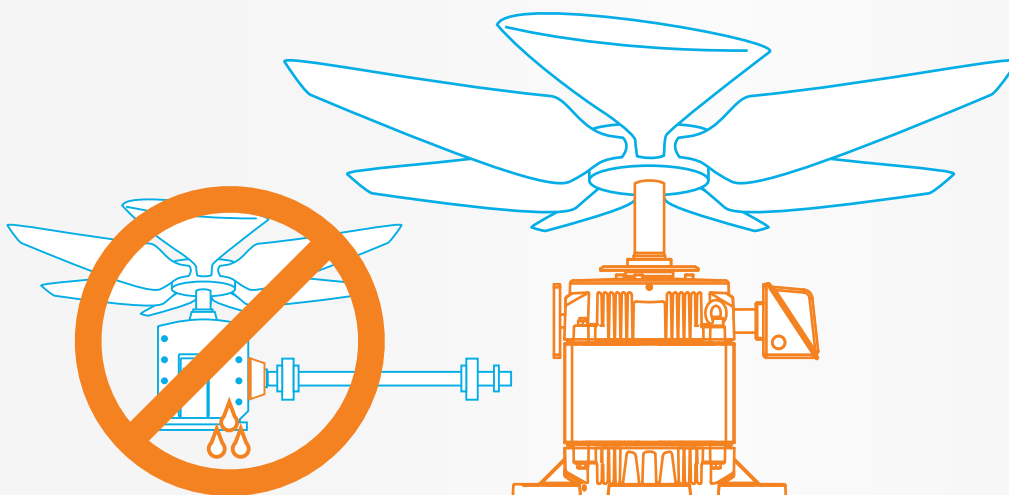
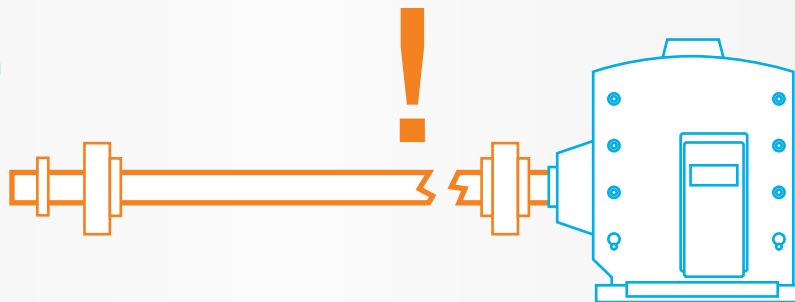
## Traditional cooling tower drivetrains

use a 1,500 rpm induction motor connected to a driveshaft that connects to a gearbox. **The gearbox connects to the fan.**



These parts introduce risk and require continual maintenance, and that can slow down your production. **Gearbox maintenance is time consuming and oil leaks are common.**

A **broken driveshaft** can disable the fan until spares can be received.



With our direct drive solution, **the motor mounts directly to the fan.** This means no gearbox or driveshaft to maintain and that reduces your risks.

The higher permanent magnet motor efficiency especially at partial loads, combined with the drive's variable speed control ensure **you run the fans at just the speed needed, saving energy and reducing your CO<sub>2</sub> footprint.**



# Contact us

For more information please contact your local  
ABB representative or visit:

[www.abb.com/drives](http://www.abb.com/drives)  
[www.abb.com/drivespartners](http://www.abb.com/drivespartners)

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