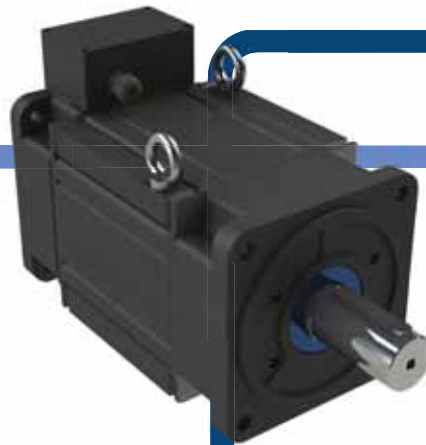




SQM Torque Motor

Patented New Direct Drive Technology for
HVLS Motor



- Direct drive, No gearbox
- Quiet operation less than 45 dB
- High performance even at low speeds
- Energy saving
- No maintenance



EMF Motor[®]

EMF Motor with its patented permanent magnet technology offers perfect solutions for High Volume Low Speed (HVLS) fans where high torque-low speed is required.

In conventional systems, asynchronous motor and gearbox are used together. EMF Motor gives the gearbox output torque and speed as direct drive. While the asynchronous motor and gearbox provide efficiencies between 50-70 %, EMF Motor can do the same with 90 % efficiency.

The environment friendly motors save about 30 % to 60 % of the energy compared to geared systems and pay back very shortly.

Eliminate all your problems with EMF Motor

- Sensorless controlled by basic V/f converter
- Quiet operation < 45 dB
- Direct drive, no gearbox, no oil, no cooling
- Stable operation at low speed
- Wide voltage range (230 - 380 - 400 V)
- High pole number (66 - 68)
- Lowest operating cost
- No maintenance
- Compact and symmetric design
- Special bearing
- 200 / 350 VAC motor voltage to avoid main fluctuations
- 10 times more torque than the same Asyn motor size

Specifications

| | | | |
|---------------------|-------------------------------------|--|-------------|
| Mounting | Flange B5 | Thermal protection | 120° C PTO |
| Insulation | Class H (180° C) | Cooling | Natural |
| Protection Class | IP54 | Bearing lifetime | > 100.000 h |
| Vibration | "A" level according to IEC 60034-14 | <i>For other supply voltage, torque - speed values and IP Class, please contact EMF Motor.</i> | |
| Ambient Temperature | -10/ + 50° C | | |

Case Study

EMF Motor uses its 66 poled SQM100-100 torque motor which characteristics are 120Nm at 65rpm, 200V and 4.7A, for a 7-meter diameter and 6 blades HVLS fan. The motor is coupled directly to the propeller (direct drive), operating at a maximum speed of 50rpm where the speed control is performed with a potentiometer.

At 10rpm (5.5Hz), the 0.3A current-driven motor runs at 8 Nm of torque, consuming 10 W of electricity at 75 % efficiency. At 40 rpm (22 Hz), 73 Nm of torque consumes 370 W of energy with 85 % efficiency. If the fan is set to 50rpm, it consumes 770 W electricity at 117 Nm and at 15kHz switching frequency and only 43 dB noise level is achieved with 80 % efficiency.

Two HVLS fan are working in our factory for 3 years with the first day performance without any need of maintenance. Having used these fans, we observed the below mentioned advantages:

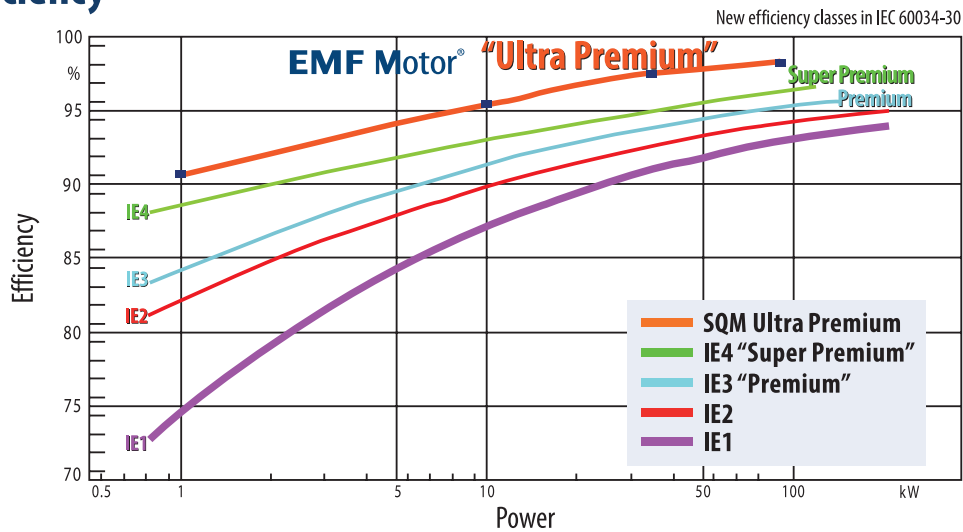
- The moisture of the environment where the fans are installed has been reduced which brought comfortable and fresh air in humid place like İstanbul.
- The airflow generated by fans maximized the body's natural means of cooling making people far more comfortable.
- This ceiling fans generated a smooth updraft which forced the warm air off the ceiling and down into the the space keeping our staff warm.
- Last but not the least, we only paid **0,45 \$** for daily energy consumption per fan.



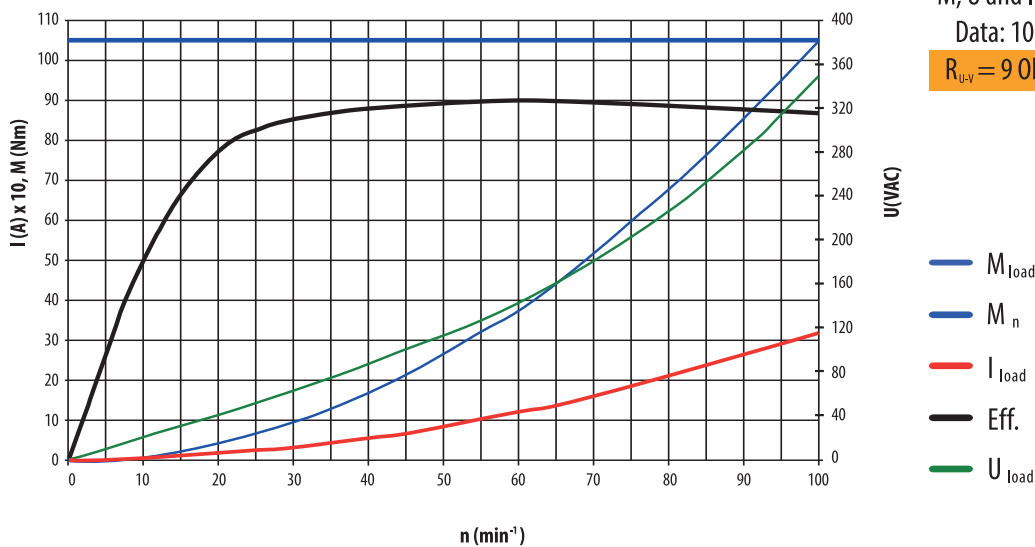
| Motor Code | Pole Number | P_n (kW) | n_n (rpm) | M_n (Nm) | f_n (Hz) | k_t (Nm/A) | I_n (A) (350 VAC) | I_n (A) (200VAC) | W (kg) |
|-------------|-------------|------------|-------------|------------|------------|--------------|---------------------|--------------------|--------|
| SQM 71-60 | 66 | 0,47 | 150 | 30 | 82,5 | 16,2 | 1,9 | 3,2 | 13 |
| | | 0,68 | 250 | 26 | 137,5 | 11,1 | 2,4 | 4,1 | 13 |
| SQM 71-100 | 66 | 0,74 | 150 | 47 | 82,5 | 17,9 | 2,6 | 4,6 | 18 |
| | | 1,05 | 250 | 40 | 137,5 | 12,5 | 3,2 | 5,6 | 18 |
| SQM 71-140 | 66 | 0,65 | 100 | 62 | 55,0 | 28,2 | 2,2 | 3,8 | 23 |
| | | 0,94 | 150 | 60 | 82,5 | 19,4 | 3,1 | 5,4 | 23 |
| SQM 71-180 | 66 | 0,89 | 100 | 85 | 55,0 | 26,7 | 3,2 | 5,5 | 28 |
| | | 1,18 | 150 | 75 | 82,5 | 20,2 | 3,7 | 6,4 | 28 |
| SQM 100-100 | 66 | 0,82 | 65 | 120 | 35,8 | 44,4 | 2,7 | 4,7 | 46 |
| | | 1,10 | 100 | 105 | 55,0 | 31,8 | 3,3 | 5,7 | 46 |
| SQM 100-140 | 66 | 1,07 | 60 | 170 | 33,0 | 47,2 | 3,6 | 6,2 | 56 |
| | | 1,34 | 80 | 160 | 44,0 | 39,0 | 4,1 | 7,1 | 56 |
| SQM100-180 | 66 | 0,92 | 40 | 220 | 22,0 | 71,0 | 3,1 | 5,4 | 66 |
| | | 1,29 | 60 | 205 | 33,0 | 51,3 | 4,0 | 6,9 | 66 |

All the calculations are made up to 7 meters (24 ft) fan diameter. Please contact EMF Motor for other supply voltage, torque and speed values.

Power - Efficiency



SQM 100-100 Torque - Speed - Efficiency Diagram



M, U and $I = f(n)$ SQM100-100 in Star Connection

Data: 105 Nm 100 rpm 350 V 3,3 A S1

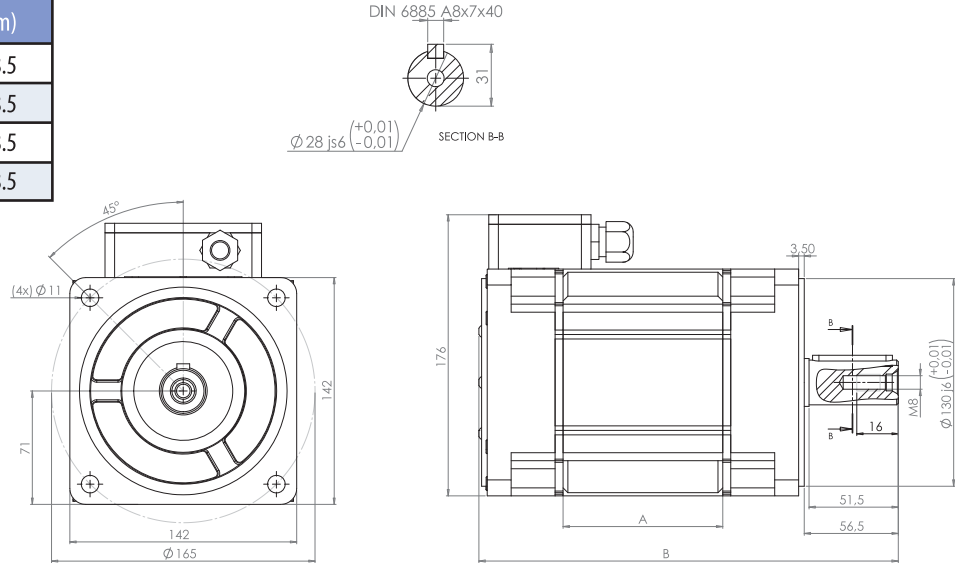
$R_{u,v} = 9 \text{ Ohm}$ $L_{u,v} = 270 \text{ mH}$ $k_t = 33,0 \text{ Nm/A}$

Direct Drive Technology

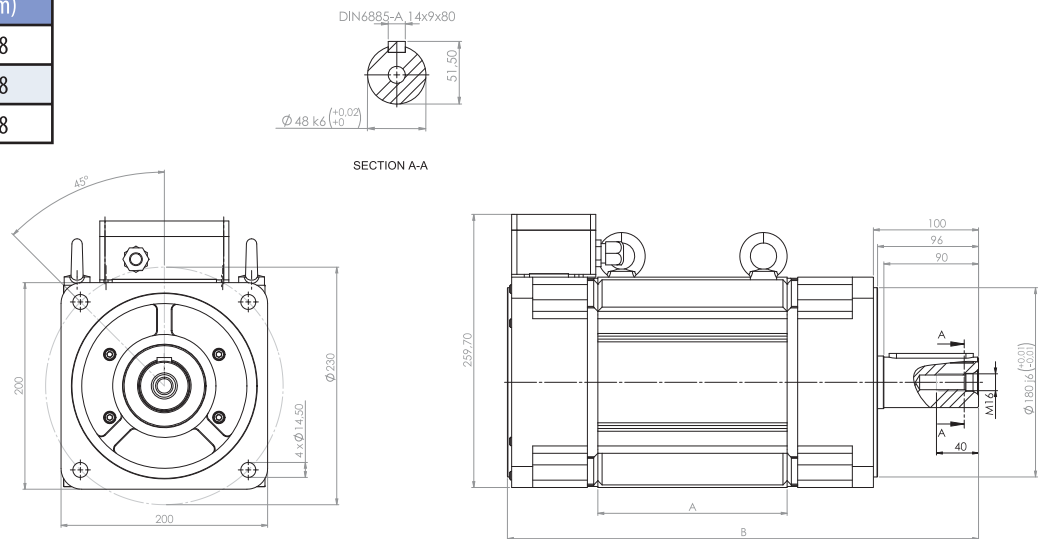
Gearless Motor for *HVLS*

Dimensions

| SQM71 | A (mm) | B (mm) |
|--------------|-----------|-----------|
| SQM 71 - 60 | 60 | 238.5 |
| SQM 71 - 100 | 100 | 278.5 |
| SQM 71 - 140 | 140 | 318.5 |
| SQM 71 - 180 | 180 | 358.5 |



| SQM100 | A (mm) | B (mm) |
|--------------|-----------|-----------|
| SQM100 - 100 | 100 | 368 |
| SQM100 - 140 | 140 | 408 |
| SQM100 - 180 | 180 | 448 |



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