SQM TORQUE MOTOR

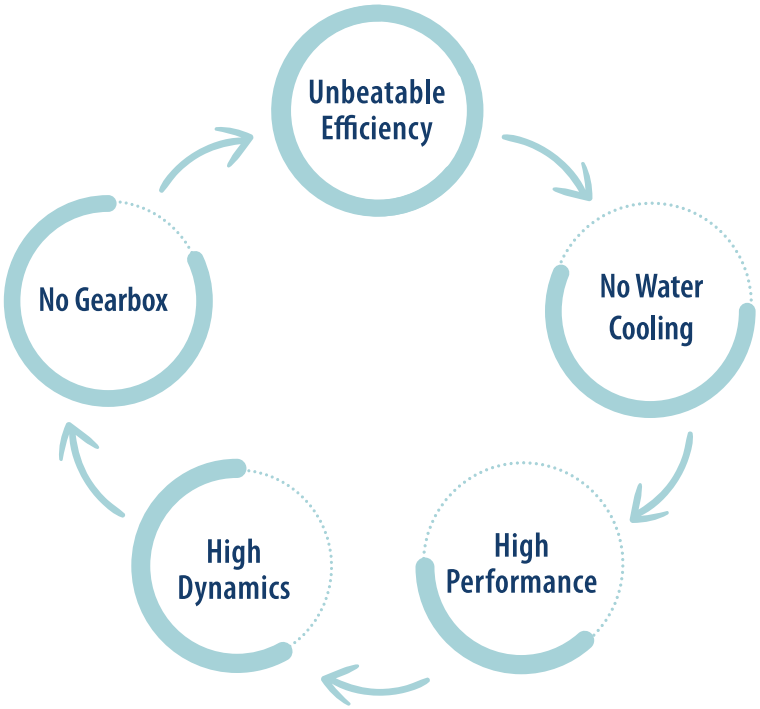
BEYOND THE FUTURE

No Gearbox
No Water Cooling
High Dynamics
Unbeatable Efficiency
High Performance

Efficiency is better than IE5 We put the limits

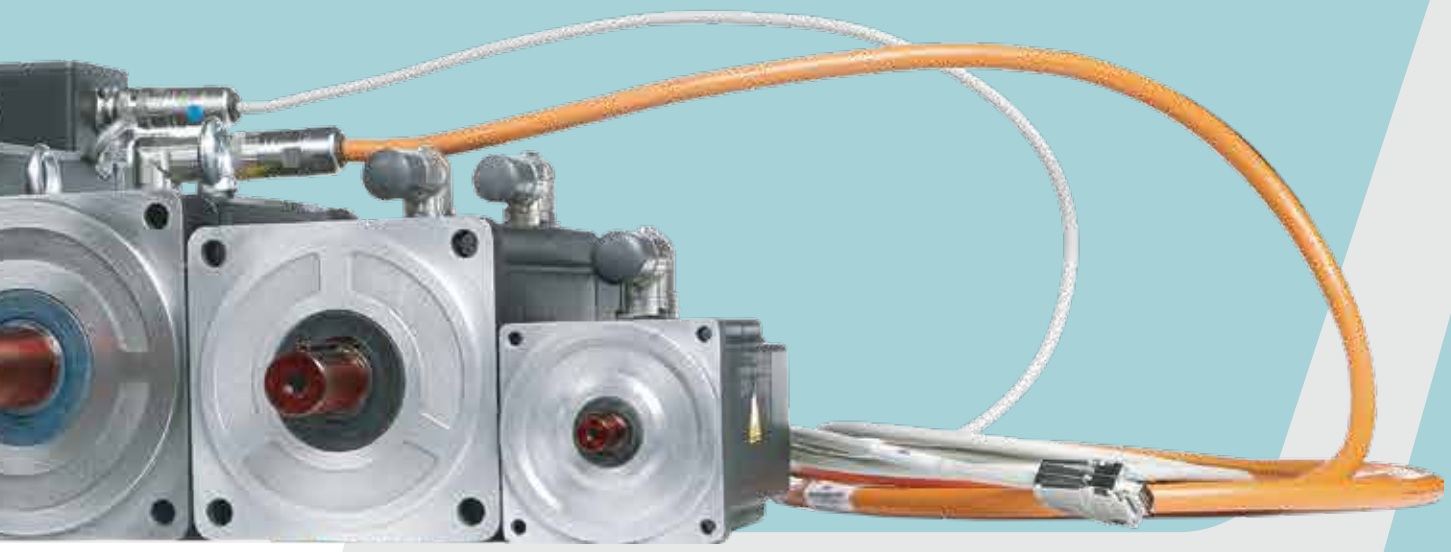
EMF Motor®

An Award Winning Innovation



Key Features

- Direct Drive, no Gearbox, no Water Cooling
- Highest Precision for Servo Applications
- Controllability even with V/f Controller
- Highest Torque at Low Speed
- No Maintenance
- Unbeatable Efficiency
- Quiet Running
- Highest Power Density
- Highest Efficiency
- Full Torque over the full Speed Range
- High Overload Capacity
- Highest Dynamics and Controlability
- Cooling IC410 (convection)
- Protection Class IP54
- Flange / Foot Mount



Technical Specifications

- Motor Technology — Permanent Magnet Synchronous Motor
- Frame Size — 60, 73, 100, 132, 160, 200, 250 and 315 mm
- Torque Range — up to 13.000 Nm (*)
- Number of Poles — 66 - 88 - 110
- Rated Voltage — 110 V - 220 V - 400 V - 460 V VAC supply voltage
- Cooling — None
- Protection level — IP 54 (IP 55, IP 65, Exproof optional)
- Thermal protection — PTO is standard (additionally PT100, PT1000, PTC, KTY84 are optional)
- Hollow shaft — Customization is available on request
- Feedback sensor — Hiperface, EnDat encoder, sensorless control
- Marking — CE

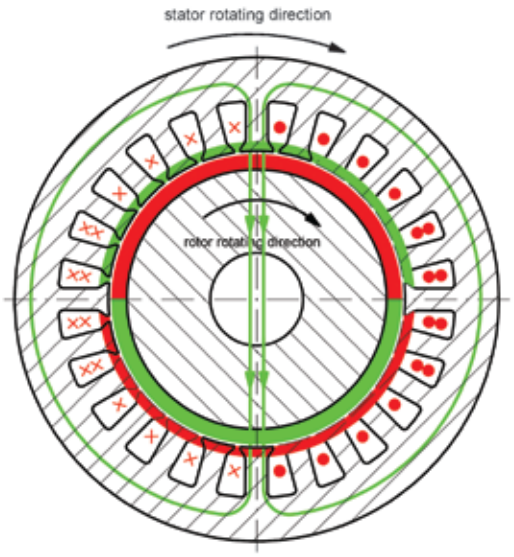
(*) with the blower kit

Electrically driven systems are consuming, roughly 70% of all electrical energy used in industry today. To help save the environment and make cost savings along the way, it is necessary to increase the efficiency of all electrical drives.

The purchase cost of an electric motor is only 1 % of the total operational cost during its lifetime or from another angle, approximately the cost of energy consumed in 8- 12 weeks of operation. These facts show very clearly the need to build electric motors with higher efficiency.

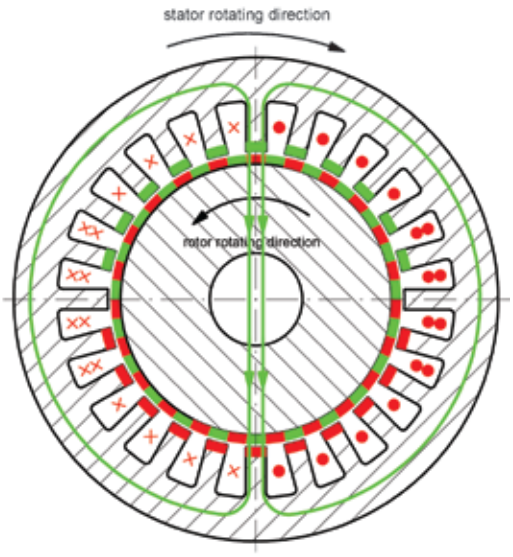
The new EMF motor principle

The stator of the EMF Motor® is very similar to a conventional motor. Permanent magnets are glued to the rotor. When the motor is supplied with zero voltage and frequency, magnetic flux which magnetizes the motor, is formed. When the frequency is increased, the rotating field starts to turn. The two magnetic systems, permanent magnets and magnetization created by the rotating field, start to pull and push each other over the whole circumference. The direction of rotation of the rotor is opposite to the rotating field and the rotor turns much more slowly than the rotating field. The permanent magnets and motor geometry define the speed reduction ratio.



Standard synchronous motor principle

2 pole stator winding
2 poles on the stator
2 poles on the rotor
stator rotating speed is 3000 rpm at 50 Hz
also the rotor speed is 3000 rpm at 50 Hz
ratio is 1



EMFMotor synchronous torque principle

2 pole stator winding
48 poles on the stator
46 poles on the rotor
stator rotating speed is 3000 rpm at 50 Hz
rotor speed is 130,43 rpm at 50 Hz
ratio is -23

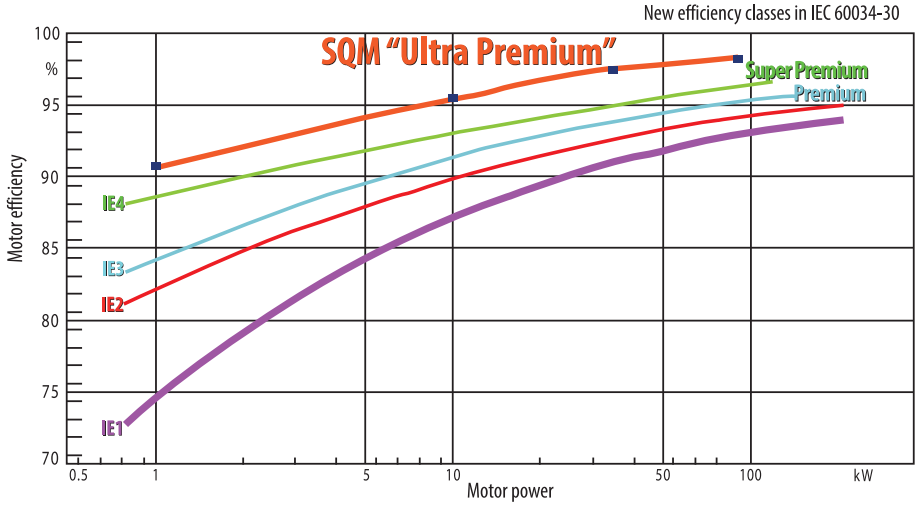
With this new motor principle a very high torque is created by low pole winding. The copper losses and hysteresis losses are very low which allows extremely high efficiency values.

Due to the high number of magnetic poles, rotation is very slow and a high torque achieved.

In most cases, no additional blower or water cooling is required for these motors.

The results show there is no other motor principle or design that even gets close to the level of efficiency achieved by SQM or the level of torque to weight ratio of the SQM design.

Efficiency comparison with IEC 60034-30



Due to the direct drive application, gearbox efficiency losses are eliminated.

The diagram shows the efficiency values for SQM motors. The efficiency of an **SQM motor is far better than an IE 3- " Premium" motor and even better than an IE 4- " Super Premium" motor.**

Since SQM motors are driven by an inverter without a gearbox, the total efficiency will be even higher.

Motor Code	Pole Number	P_n (kW)	n_n (rpm)	M_n (Nm)	f_n (Hz)	kt (Nm/A)	I_n (A)	Efficiency (%)
SQM60- 40	66	0,16	150	10	83	13,9	0,7	67,5
		0,24	250	9	138	9,0	1,0	75,3
		0,47	500	9	275	5,1	1,8	81,8
		0,63	750	8	413	3,6	2,3	84,3
SQM60- 60	66	0,22	150	14	83	16,5	0,9	72,5
		0,34	250	13	138	10,8	1,2	80,0
		0,63	500	12	275	5,9	2,1	85,8
		0,86	750	11	413	4,2	2,6	87,8
SQM60-100	66	0,35	150	22	83	18,6	1,2	78,3
		0,52	250	20	138	11,6	1,7	84,5
		0,94	500	18	275	6,6	2,7	88,9
		1,26	750	16	413	4,3	3,7	90,3
SQM73- 60	66	0,46	150	29	83	22,1	1,3	82,2
		0,71	250	27	138	13,9	1,9	85,6
		1,20	500	23	275	7,5	3,1	90,5
		1,41	750	18	413	5,1	3,6	92,0
SQM73-100	66	0,75	150	48	83	22,9	2,1	85,7
		1,15	250	44	138	15,2	2,9	89,2
		1,83	500	35	275	8,2	4,3	92,5
		2,12	750	27	413	5,7	4,7	93,5
SQM73-140	66	1,07	150	68	83	22,7	3,0	87,5
		1,57	250	60	138	14,9	4,0	91,4
		2,41	500	46	275	8,5	5,4	94,0
		2,83	750	36	413	6,2	5,8	93,9
SQM73-180	66	1,38	150	88	83	22,0	4,0	88,8
		2,02	250	77	138	16,0	4,8	92,1
		3,09	500	59	275	8,9	6,6	95,0
		3,61	750	46	413	6,3	7,3	95,0
SQM100-140	66	1,57	100	150	55	33,0	4,6	89,0
		2,41	200	115	110	19,0	6,0	93,1
		3,33	300	106	165	13,4	7,9	95,0
		3,77	400	90	220	11,1	8,1	95,2
SQM100-200	66	2,28	100	218	55	33,5	6,5	90,7
		3,64	200	174	110	19,2	9,0	94,6
		4,52	300	144	165	14,0	10,3	95,3
		4,90	400	117	220	11,7	10,0	95,1
SQM100-240	66	2,51	100	240	55	35,3	6,8	91,2
		4,10	200	196	110	20,5	9,6	95,0
		5,43	300	173	165	14,1	12,3	95,3
		5,70	400	136	220	11,3	12,0	95,0
SQM132-140	66	2,99	100	286	55	40,9	7,0	91,0
		5,24	200	250	110	21,9	11,4	92,4
		6,28	300	200	165	15,9	12,6	93,4
		6,45	400	154	220	12,5	12,3	93,8
SQM132-200	66	4,24	100	405	55	40,5	10,0	91,5
		7,54	200	360	110	21,8	16,5	92,7
		8,95	300	285	165	15,8	18,0	93,8
		9,21	400	220	220	12,9	17,0	94,0
SQM132-240	66	5,13	100	490	55	40,8	12,0	91,7
		9,21	200	440	110	21,6	20,4	93,2
		10,7	300	340	165	15,7	21,6	94,5
		11,10	400	265	220	12,4	21,4	95,0
SQM160-200	66	4,5	70	610	39	47,7	12,8	90,0
		6,1	100	580	55	36,3	16,0	91,8
		8,6	150	550	83	23,9	23,0	93,0
		11,0	200	525	110	19,4	27,0	93,3
		15,4	300*	490	165	13,1	37,5	93,7

With SE and forced ventilation, M = +30% up to 100rpm and M = +40% from 150 rpm

These data are valid for 400V power supply. For other supply voltage, torque and speed values please contact EMF Motor.

* with axial fan

Motor Code	Pole Number	P_n (kW)	n_n (rpm)	M_n (Nm)	f_n (Hz)	kt (Nm/A)	I_n (A)	Efficiency (%)
SQM160-300	66	6,7	70	920	39	49,2	18,7	91,0
		9,1	100	870	55	35,5	24,5	92,9
		11,9	150	760	83	25,8	29,5	94,0
		14,3	200	685	110	21,1	32,5	94,2
		20,1	300*	640	165	14,0	45,8	94,5
SQM160-400	66	8,9	70	1220	39	49,2	24,8	91,9
		12,1	100	1160	55	36,1	32,1	93,3
		14,9	150	950	83	26,5	35,8	94,3
		17,6	200	840	110	22,6	37,2	94,5
		24,7	300*	785	165	14,8	53,0	94,5
SQM160-500	66	11,2	70	1530	39	49,4	31,0	92,2
		15,2	100	1450	55	23,9	60,6	93,8
		17,6	150	1120	83	28,1	39,8	94,8
		20,1	200	960	110	23,6	40,7	94,8
		28,3	300*	900	165	14,0	64,1	95,0
SQM200-300SE	88	11,0	70	1500	51	51,4	29,2	93,0
		14,1	100	1350	73	37,3	36,2	94,3
		18,1	150	1150	110	27,9	41,2	95,0
		23,0	200*	1100	147	20,9	52,7	95,1
SQM200-400SE	88	14,7	70	2000	51	50,0	40,0	93,8
		18,8	100	1800	73	37,4	48,1	94,7
		23,6	150	1500	110	27,9	53,7	95,3
		30,4	200*	1450	147	21,7	66,9	95,4
SQM200-500SE	88	18,3	70	2500	51	50,8	49,2	93,9
		23,0	100	2200	73	39,0	56,4	95,0
		28,3	150	1800	110	27,2	66,2	95,5
		36,6	200*	1750	147	20,1	86,9	95,5
SQM200-600SE	88	22,0	70	3000	51	48,8	61,5	94,1
		27,2	100	2600	73	37,5	69,4	95,1
		33,0	150	2100	110	28,0	75,0	95,6
		44,0	200*	2100	147	18,6	112,8	95,6
SQM200-700SE	88	25,7	70	3500	51	49,3	71,0	94,3
		31,9	100	3050	73	38,4	79,5	95,3
		38,5	150	2450	110	27,3	89,8	95,7
		51,3	200*	2450	147	21,8	112,5	95,7
SQM250-400SE	88	24,2	70	3300	51	50,3	65,6	94,9
		30,9	100	2950	73	38,6	76,4	95,7
		34,6	150	2200	110	26,9	81,9	96,0
		48,2	200*	2300	147	19,9	115,5	96,0
SQM250-600SE	88	35,9	70	4900	51	50,3	97,5	95,2
		45,5	100	4350	73	34,8	125,0	95,9
		51,8	150	3300	110	28,8	114,5	96,2
		71,2	200*	3400	147	19,9	170,6	96,2
SQM250-800SE	88	48,4	70	6600	51	46,4	142,2	95,5
		60,7	100	5800	73	38,7	150,0	96,1
		67,5	150	4300	110	30,7	140,0	96,2
		94,2	200*	4500	147	23,0	195,5	96,2
SQM315- 700SE	110	61,6	70	8400	64	50,9	165,0	93,2
		82,7	100	7900	92	40,5	195,0	94,8
		102,1	150	6500	138	20,4	318,0	95,0
		130,7	200*	6240	183	20,1	310,0	95,2
SQM315- 900SE	110	72,9	70	9950	64	52,4	190,0	93,5
		92,1	100	8800	92	39,1	225,0	94,5
		119,4	150	7600	138	26,2	290,0	95,0
		150,8	200*	7200	183	22,8	316,0	95,3
SQM315-1100SE	110	80,6	70	11000	64	55,0	200,0	94,0
		103,7	100	9900	92	32,2	307,0	95,0
		131,9	150	8400	138	27,9	301,0	95,2
		169,6	200*	8100	183	16,1	503,0	95,5

Efficiency is better than IE5 We put the limits

EMF Motor®

info@emfmotor.com www.emfmotor.com

Germany
EMF 97 GmbH
Horchheimer StraBe 74-78
D 67547 Worms

T. +49 6241 935 210
F. +49 6241 935 215

Turkey
EMF Motor A.Ş.
Ramazanoğlu Mah. Sanayi Cad. No:9
TR 34906 İstanbul - Pendik / Türkiye

T. +90 216 595 19 00
F. +90 216 595 19 01