



SQM Torque Motor **Industry leading** with **smart** direct drive technology



High Performance
Unbeatable Efficiency
High Dynamics
No Water Cooling

EMF Motor®

Why EMF Motor®?

Your success formula

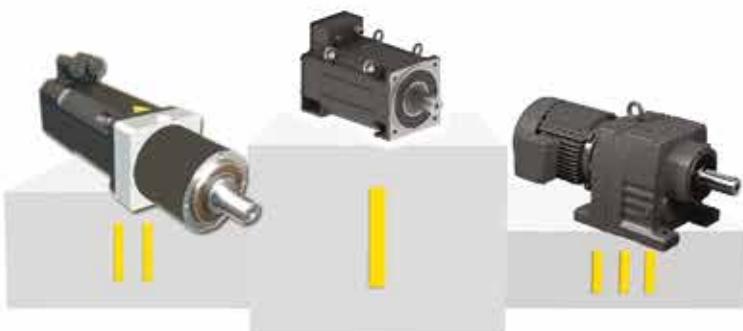
$$E=mc^2$$

Einstens
relativity theory

EMF Direct Torque Motor=High Performance × IE4"Super Premium"²

*LiProKa
patented motor principle*

	IE2 + Gearbox	Torquemotor	Servomotor + Gearbox	EMF Motor®
Energy efficiency	:(:(:-)	:)
Dynamics	:(:)	:-)	:)
Overload capability	:(:-)	:-)	:-)
Quiet operation	:(:-)	:(:-)
Maintanence	:(:-)	:(:-)
Cooling	:)	:(:-)	:-)
Result				:)



SQM Torque Motor

To stay ahead in the competitive World of today's industry, manufacturers have to increase production rates, improve precision and produce higher quality products while saving energy costs and reducing production losses. To help achieve these goals, motor manufacturers across the World are continuously striving to develop new, and more technically advanced motors.

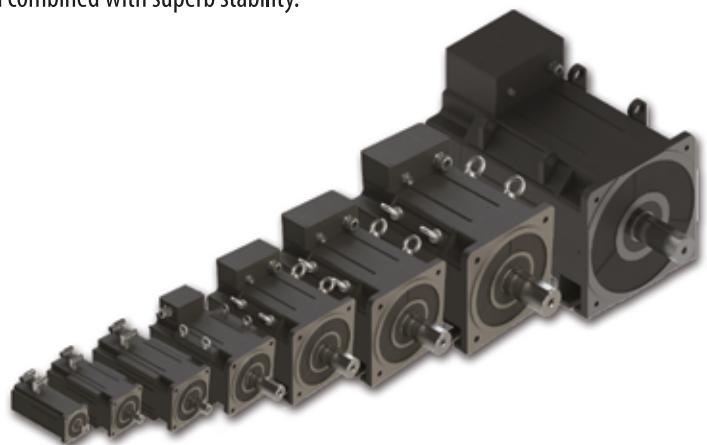
For high torque, low speed, gearless applications our unequaled solution is the SQM Torque Motor which incorporates the EMF "LiProKa" motor principle. This design principle is covered by European Agency patent number "EP 0910154".

The SQM Torque Motor is a high performance direct drive motor with by far the greatest efficiency of any industrial motor on the market.

With low inertia and constant torque from standstill to nominal speed, SQM torque motors are suitable for many applications ranging from heavy constant load to high dynamic performance.

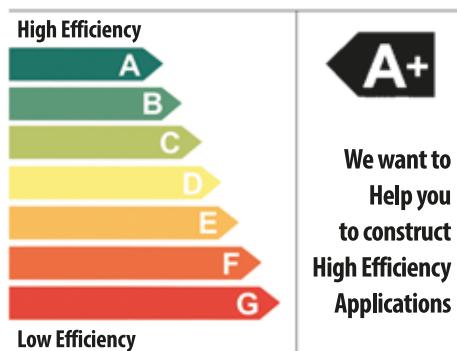
The high poles design makes controlling the motor easy and results in extremely low cogging torque and torque ripple giving the motor advantages in many critical low speed applications.

The high pole count also enables the highest levels of acceleration and deceleration combined with superb stability.



Characteristics

- Silent running
- High constant torque
- Low current, low speed windings
- Low cogging torque and torque ripple
- Extremely High efficiency, better than IE4!
- Standstill torque at nominal speed
- 100 % overload capability
- 100 % accuracy in Slave Mode following the Master Drive throughout the duty cycle
- High dynamics and excellent controllability due to up to 116 rotor poles
- Protection IP54 (TENV), cooling IC410, no additional cooling necessary
- Flange and/or foot-mounted
- Gearless direct mounting with thrust bearing for extruders
- Low or zero maintenance



Fields of Application

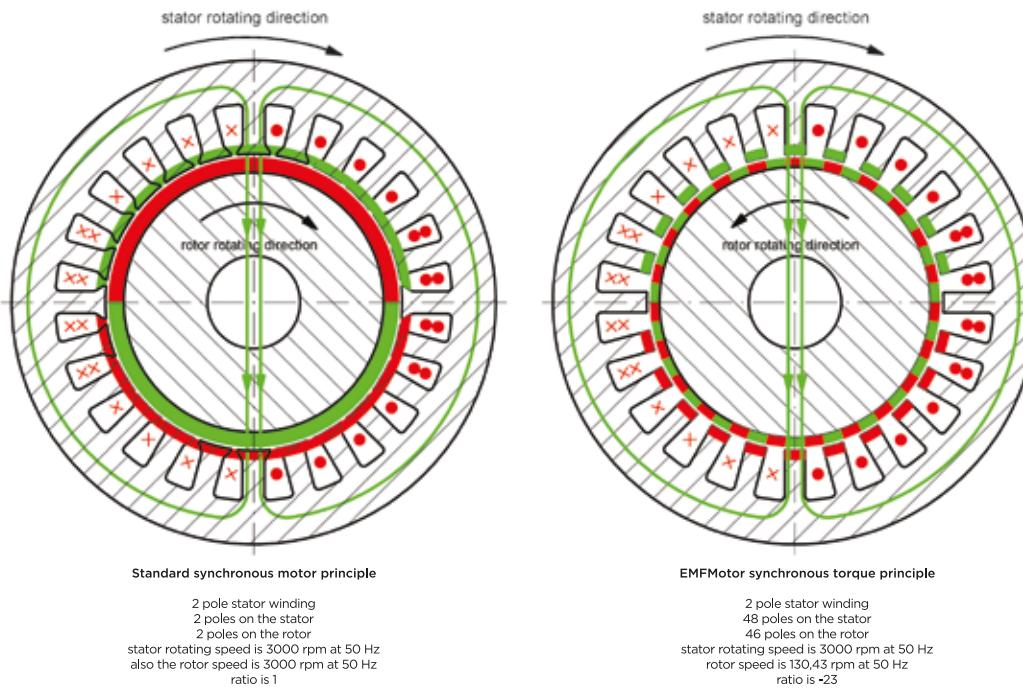
- Extruders
- Injection moulding machines
- Master-Slave applications
- Dynamic positioning
- High Volume Low Speed blowers
- Conveyors, especially with continuous start stop applications
- Lifts and elevators
- Servo Press technology
- Cogging punches
- Flying saws
- Rotary tables
- Cut to length applications in production lines (paper, plastic, metal etc.)
- Winding and unwinding applications for folios, paper, sheet metals, cable etc.
- Low Speed, high torque mixers for viscous liquids
- Continuous Start/Stop applications
- And everywhere you would like to use a servo motor as a direct drive...

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.



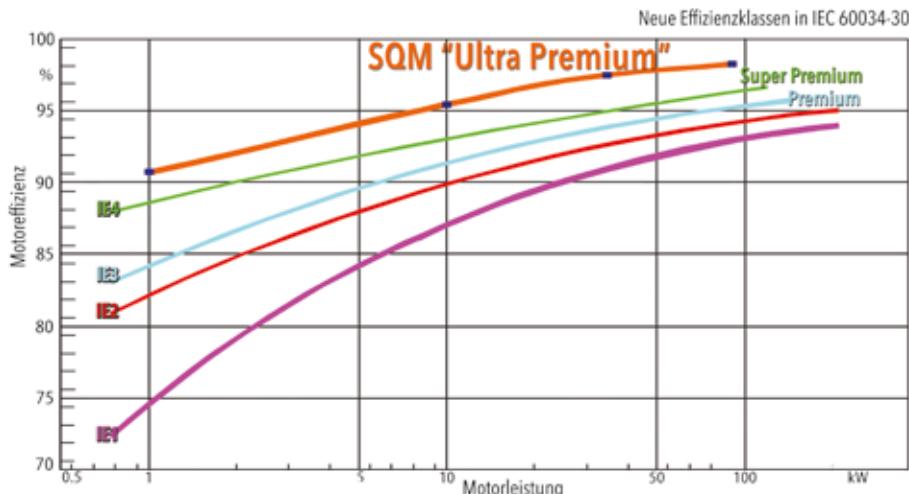
With this new motor principle a very high torque is created by low pole winding. The copper losses and hysteresis losses are very low which allows extremely high efficiency values.

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.

SQM Series

The SQM Series is a square frame design incorporating the latest LiProKa motor technology. The motors have almost zero losses in efficiency with surprisingly high torques considering their compact frame design.

We guarantee high dynamic performance, high torque at low speeds with the very highest efficiency and without any additional cooling!

SQM160 - 20 500 B 00 2 S 2 068

SQM	-			-			SQM Square Framed Synchronous Torque Motor
	160	-			-		Motor Frame Size
	-	20			-		Iron Core Length x 10 mm
	-	0500			-		Motor Rated Speed (rpm)
	-	B		-			B=Mechanical Brake, X=without Brake
	-		00	-			Special Code
	-			-	2		Thermal Protection - 1=PT100, 2=PTO, 3=PT100+Thermistor
	-			-		S	Feedback D=Digital Enc., R=Resolver, S=SinCos, B=Biss E=EnDat Enc., H=Hiperface X=without feedback
	-			-		2	Motor Rated Voltage 1=230 VAC, 2=400 VAC, 3=460 VAC
	-			-		068	Motor Pole Number

Specifications

Standard

Mounting	Standard Foot Mounted
Insulation Class	H class loaded to B
Protection Class	IP54
Vibration	A level according to IEC 60034-14
Ambient Temperature	0-40 °C
Storage Conditions	-30 °C ... +85°C
Thermal Protection	120°C PTO
Balance	Half key
Maintenance-free, pre-lubricated ball bearings	
Max. Over torque	1.5 x
Max. Current	1.5 x

Options

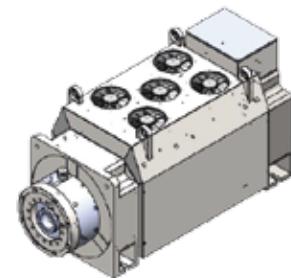
Protection Class	IP 55
Feedback Options	Sincos, Resolver, Endat, Biss, Hiperface
Mechanical Holding Brake	24 DC ± 5% tolerance
Shaft with or without key	
Oil exhaust for direct gearbox coupling	
Greater overload capability	

Accessories

Rotatable power and feedback connectors
Customized power and feedback cables

Solutions regarding the customer needs

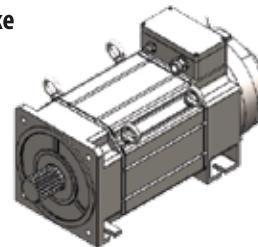
Extruder motor with thrust bearing, hollow shaft, cooling jacket
Solution with cooling jacket: **30% higher performance**



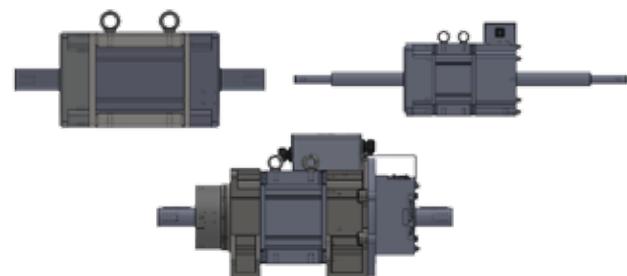
Hollow shaft high performance



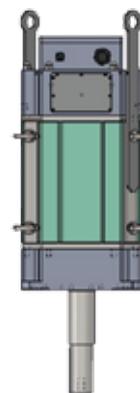
Spline shaft and brake



Double shaft



Cooling tower fan motor



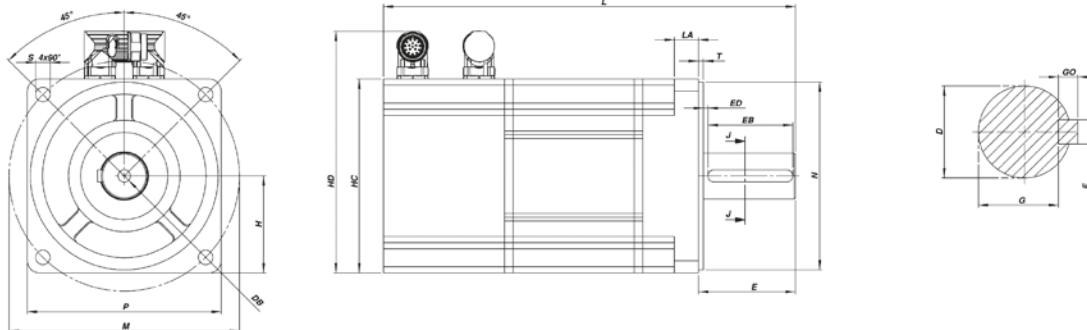
We customize your SQM exactly according to your torque and speed need

Motor Code	Pole Number	P _n (kW)	n _n (rpm)	M _n (Nm)	f _n (Hz)	k _t	I _n (A)	Efficiency (%)	J (kgm ²)	W (kg) No Brake Fitted
SQM 47-40	44	0.15	350	4,1	128	4,6	0,90	71	0.000266	4,5
		0.20	500	3,9	183	4,9	0,80	78		
		0.23	600	3,6	220	4,0	0,90	81		
		0.27	750	3,5	275	3,6	0,97	82		
SQM 47-70	44	0,22	350	6,1	128	5,5	1,10	72	0.000434	6,0
		0,31	500	5,9	183	5,4	1,10	79		
		0,34	600	5,4	220	4,5	1,20	81		
		0,41	750	5,2	275	4,1	1,26	83		
SQM 47-100	44	0,27	350	7,5	128	6,5	1,15	78	0.000602	7,5
		0,38	500	7,2	183	6,2	1,17	81		
		0,43	600	6,9	220	4,3	1,60	82		
		0,53	750	6,7	275	4,7	1,44	85		
SQM 71-90	68	0,41	150	26	85	14,4	1,8	77	0.004898	18,0
		0,63	250	24	142	9,2	2,6	83		
		0,99	500	19	283	5,4	3,5	90		
		1,10	750	14	425	5,0	2,8	91		
SQM 71-130	68	0,64	150	41	85	13,2	3,1	79	0.006907	23,0
		0,97	250	37	142	8,4	4,4	84		
		1,47	500	28	283	5,5	5,1	90		
		1,65	750	21	425	4,5	4,7	92		
SQM 71-170	68	0,88	150	56	85	12,7	4,4	81	0.008917	28,0
		1,34	250	51	142	8,1	6,3	86		
		2,04	500	39	283	5,6	7,0	90		
		2,20	750	28	425	4,5	6,2	92		
SQM80-150	68	0,73	100	70	57	20,6	3,4	81	0.014969	43,6
		1,24	200	59	113	12,0	4,9	83		
		1,48	300	47	170	9,6	4,9	85		
		1,42	400	34	227	9,2	3,7	88		
SQM80-200	68	0,94	100	90	57	21,4	4,2	82	0.019623	54,0
		1,63	200	78	113	12,4	6,3	84		
		1,95	300	62	170	9,8	6,3	86		
		1,88	400	45	227	9,2	4,9	88		
SQM80-240	68	1,10	100	105	57	22,3	4,7	83	0.023346	62,3
		1,88	200	90	113	12,5	7,2	87		
		2,20	300	70	170	10,3	6,8	89		
		2,22	400	53	227	9,6	5,5	91		
SQM 100-140	66	1,47	100	140	55	35,0	4,0	86	0.036692	60,4
		2,26	200	108	110	20,4	5,3	90		
		3,08	300	98	165	14,6	6,7	92		
		3,48	400	83	220	11,9	7,0	93		
SQM 100-200	66	2,09	100	200	55	35,1	5,7	88	0.051189	78,2
		3,35	200	160	110	19,8	8,1	91		
		4,18	300	133	165	15,1	8,8	93		
		4,52	400	108	220	12,3	8,8	94		
SQM 100-240	66	2,30	100	220	55	35,5	6,2	88	0.060847	90,0
		3,77	200	180	110	20,5	8,8	93		
		4,90	300	156	165	16,4	9,5	94		
		5,24	400	125	220	12,9	9,7	94		
SQM 132-140	66	2,62	100	250	55	34,7	7,2	82	0.166800	145
		4,61	200	220	110	19,1	11,5	87		
		5,50	300	175	165	14,6	12,0	90		
		5,86	400	140	220	11,9	11,8	92		
SQM 132-200	66	3,74	100	357	55	35,0	10,2	85	0.230455	175
		6,58	200	314	110	19,5	16,1	90		
		7,85	300	250	165	14,3	17,5	91		
		8,38	400	200	220	11,7	17,1	92		
SQM 132-240	66	4,48	100	428	55	34,2	12,5	86	0.272891	195
		7,90	200	377	110	18,8	20,1	91		
		9,42	300	300	165	14,0	21,4	92		
		10,05	400	240	220	11,7	20,5	92		

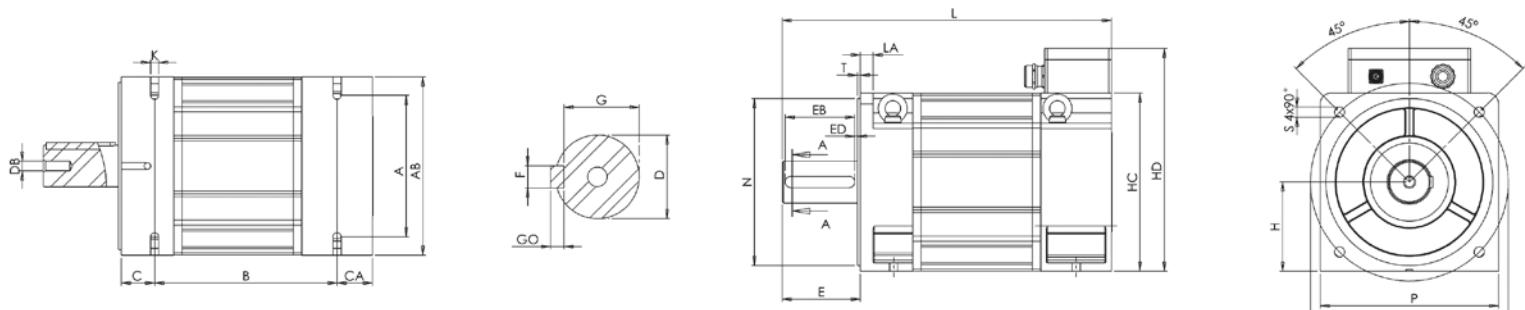
Motor Code	Pole Number	P _n (kW)	n _n (rpm)	M _n (Nm)	f _n (Hz)	k _t	I _n (A)	Efficiency (%)	J (kgm ²)	W (kg) No Brake Fitted
SQM 160-200	66	3.74	70	510	39	49.5	10.3	90	0.456095	225
		5.08	100	485	55	35.9	13.5	92		
		7.23	150	460	83	24.9	18.5	93		
		9.21	200	440	110	19.5	22.6	94		
SQM 160-300	66	5.61	70	765	39	49.4	15.5	91	0.669536	302
		7.61	100	727	55	35.0	20.8	93		
		9.97	150	635	83	25.9	24.5	95		
		11.94	200	570	110	20.2	28.2	95		
SQM 160-400	66	7.48	70	1020	39	46.6	21.9	91	0.876796	379
		10.16	100	970	55	36.3	26.7	93		
		12.49	150	795	83	26.8	29.7	94		
		14.66	200	700	110	22.4	31.2	95		
SQM 160-500	66	9.35	70	1275	39	49.0	26.0	91	1.100037	456
		12.69	100	1212	55	36.7	33.0	94		
		14.67	150	934	83	28.2	33.1	95		
		16.82	200	803	110	22.4	35.8	96		
SQM 200-300	88	10.04	70	1370	51	45.7	30.0	92	1.474654	512
		12.04	100	1150	73	35.4	32.5	93		
		16.02	150	1020	110	25.1	40.6	95		
		18.01	200	860	147	21.3	40.3	96		
SQM 200-400	88	13.39	70	1827	51	44.6	41.0	92	2.046779	622
		16.05	100	1533	73	35.9	42.7	94		
		20.58	150	1310	110	24.7	53.0	95		
		21.99	200	1050	147	21.9	48.0	96		
SQM 200-500	88	15.98	70	2180	51	45.4	48.0	93	2.389074	731
		19.16	100	1830	73	35.9	51.0	95		
		27.33	150	1740	110	23.8	73.0	95		
		28.27	200	1350	147	20.7	65.1	96		
SQM 200-600	88	19.18	70	2617	51	45.6	57.4	93	2.846651	840
		23.04	100	2200	73	37.3	59.0	94		
		32.20	150	2050	110	24.7	83.0	95		
		34.14	200	1630	147	21.2	77.0	96		
SQM 200-700	88	22.38	70	3053	51	43.6	70.0	93	3.398674	950
		26.81	100	2560	73	33.7	76.0	95		
		36.60	150	2330	110	24.5	95.2	96		
		39.79	200	1900	147	19.3	98.5	97		
SQM 200-800	88	25.58	70	3490	51	44.2	79.0	93	3.851964	1060
		30.89	100	2950	73	33.1	89.0	96		
		39.74	150	2530	110	27.8	91.0	97		
		45.03	200	2150	147	22.3	96.3	97		
SQM 315-500	110	34.45	70	4700	64	54.7	86.0	95	24.62503	1965
		44.50	100	4250	92	40.5	105.0	95		
		58.12	150	3700	138	31.1	119.0	96		
		59.69	200	2850	183	23.4	122.0	96		
SQM 315-700	110	46.55	70	6350	64	50.4	126.0	95	33.53582	2500
		60.73	100	5800	92	38.7	150.0	96		
		75.39	150	4800	138	29.1	165.0	97		
		79.58	200	3800	183	24.2	157.0	97		
SQM 315-900	110	54.97	70	7500	64	49.7	151.0	95	42.44662	3030
		69.11	100	6600	92	39.8	166.0	96		
		87.96	150	5600	138	24.9	225.0	96		
		96.34	200	4600	183	24.9	185.0	97		

These data are valid for 400V power supply.

For other supply voltage, torque and speed values please contact EMF Motor.



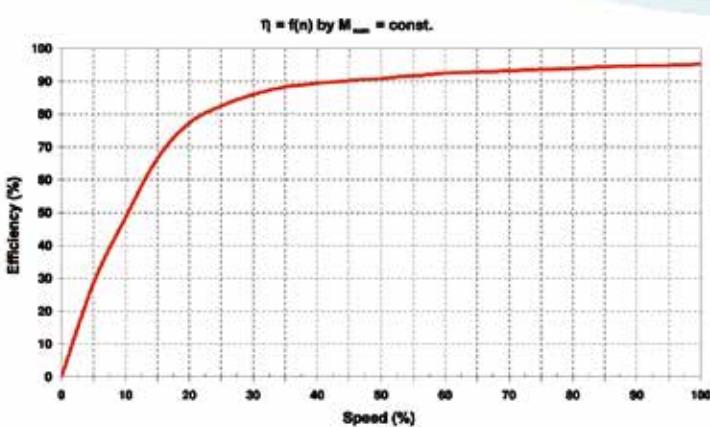
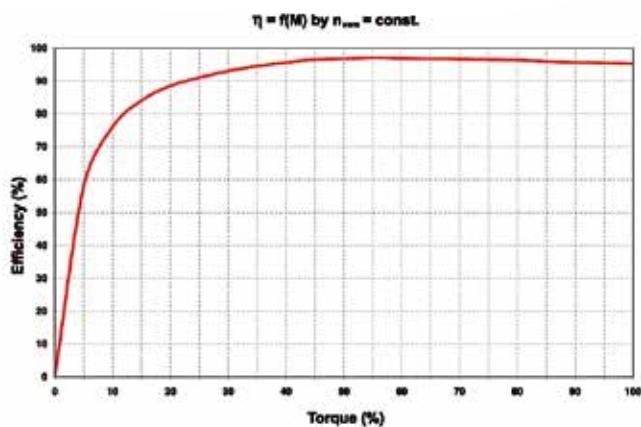
	D	DB	E	EB	ED	F	G	GO	H	HC	HD	L	LA	M	N	P	S	T
SQM47-40	14j6	M5	30.00	22.00	1.40	5h6	11.00	5.00	47.50	95.00	134.00	192.00	115.00	115.00	95j6	95.00	6.80	3.00
SQM47-70												222.00						
SQM47-100												252.00						
SQM71-90	28j6	M10	60.00	50.00	2.70	8h6	24.00	7.00	71.00	142.00	181.00	317.50	15.00	165.00	130j6	142.00	11.00	3.50
SQM71-130												357.50						
SQM71-170												397.50						
SQM80-150	38k6	M12	80.00	70.00	4.20	10h6	33.00	8.00	80.00	160.00	199.00	396.00	20.00	190.00	155j6	160.00	12.00	4.00
SQM80-200												446.00						
SQM80-240												486.00						
SQM100-140	48k6	M16	110.00	100.00	3.00	14h6	42.50	9.00	100.00	200.00	239.50	454.00	20.00	230.00	180j6	200.00	14.50	4.00
SQM100-200												514.00						
SQM100-240												554.00						



	A	AB	B	C	CA	D	DB	E	EB	ED	F	G	GO	H	HC	HD	K	L	LA	M	N	P	S	T	
SQM132-140			255.00														514.00								
SQM132-200	216.00	264.00	315.00	56.00	63.00	65m6	M20	140.00	125.00	5.00	18h6	58.00	11.00	132.00	264.00	345.00	14.50	574.00	25.00	300.00	250j6	264.00	18.50	5.00	
SQM132-240			355.00														614.00								
SQM160-200			327.50														592.00								
SQM160-300	254.00	320.00	427.50	60.00	63.5	75m6	M20	140.00	125.00	5.00	20h6	67.50	12.00	160.00	320.00	400.00	14.50	792.00	25.00	355.00	300h6	320.00	18.50	5.00	
SQM160-400			527.50																						
SQM160-500			627.50														892.00								
SQM200-300			477.50														797.00								
SQM200-400			577.50														897.00								
SQM200-500	318.00	400.00	677.50	74.5	75.00	90m6	M24	170.00	140.00	5.00	25h6	81.00	14.00	200.00	400.00	509.00	20.00	997.00	25.00	480.00	450h6	400.00	18.50	5.00	
SQM200-600			777.50																						
SQM200-700			877.50														1097.00								
SQM200-800			977.50														1197.00								
SQM315-500			747.50														1297.00								
SQM315-700	508.00	630.00	947.50	95.00	102.5	120m6	M24	250.00	220.00	10.00	32h6	109.00	18.00	315.00	630.00	830.00	28.00	1195.00							
SQM315-900			1147.50														1595.00								

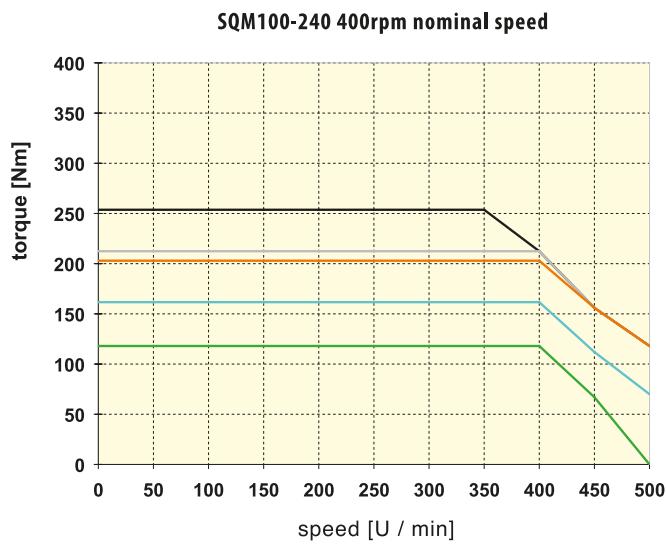
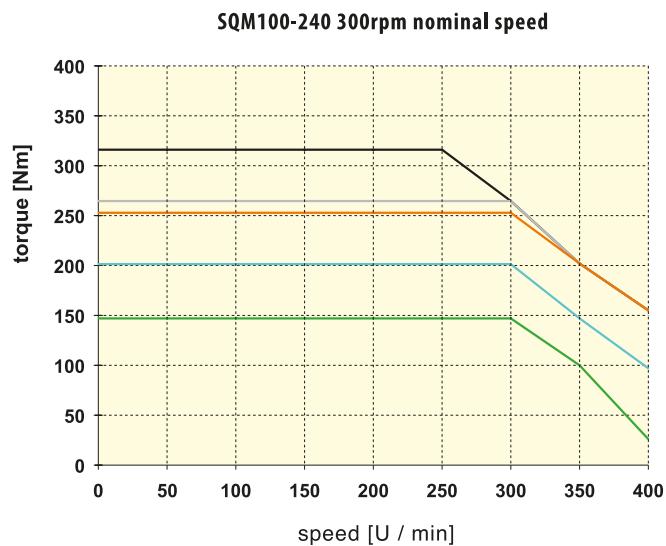
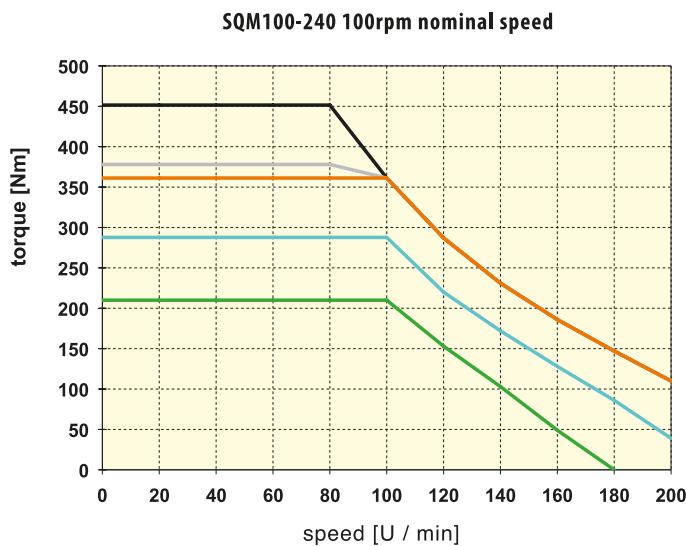
EMF reserves the right to make changes to dimensions, technical data and design detail, which contributes to technical progress without advance notice. For detailed drawings and for 3D step files please contact EMF Motor.

SQM Typical Efficiency Trend



An important feature of the SQM motor design is that the efficiency is nearly constant from 20% partial load and 20% nominal speed.

SQM100-240 Performance Curves



— Torque limit / cold motor
365 V / I_{max}

— Torque limit / motor at
operation temp. 365 V / I_{max}

— Duty type:
S3-40%, 1 min

— Duty type:
S3-60%, 1 min

— Duty type: S1

- S1, S3- 40% and S3- 60% are different windings.

- For other performance curves please contact EMF Motor.



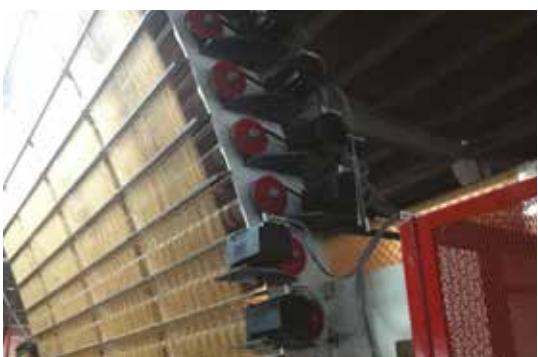
Ceramic production



Candy production



Hose production



Carpet production



Ceramic conveyor



Indexing table



Roller table



Rotary Table



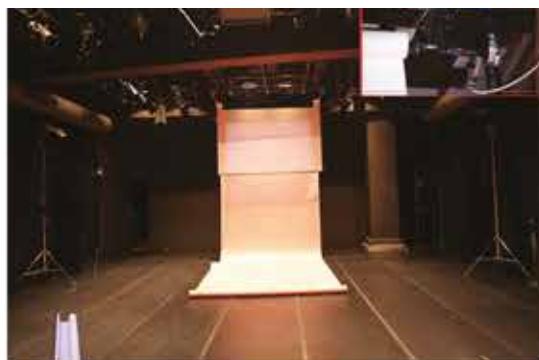
Yarn production



Uncoiler 33 tons



Coiler and Traverse for Rope





Our new factory



1st Machine and Accessories Manufacturing
Technologies R&D Project Market
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