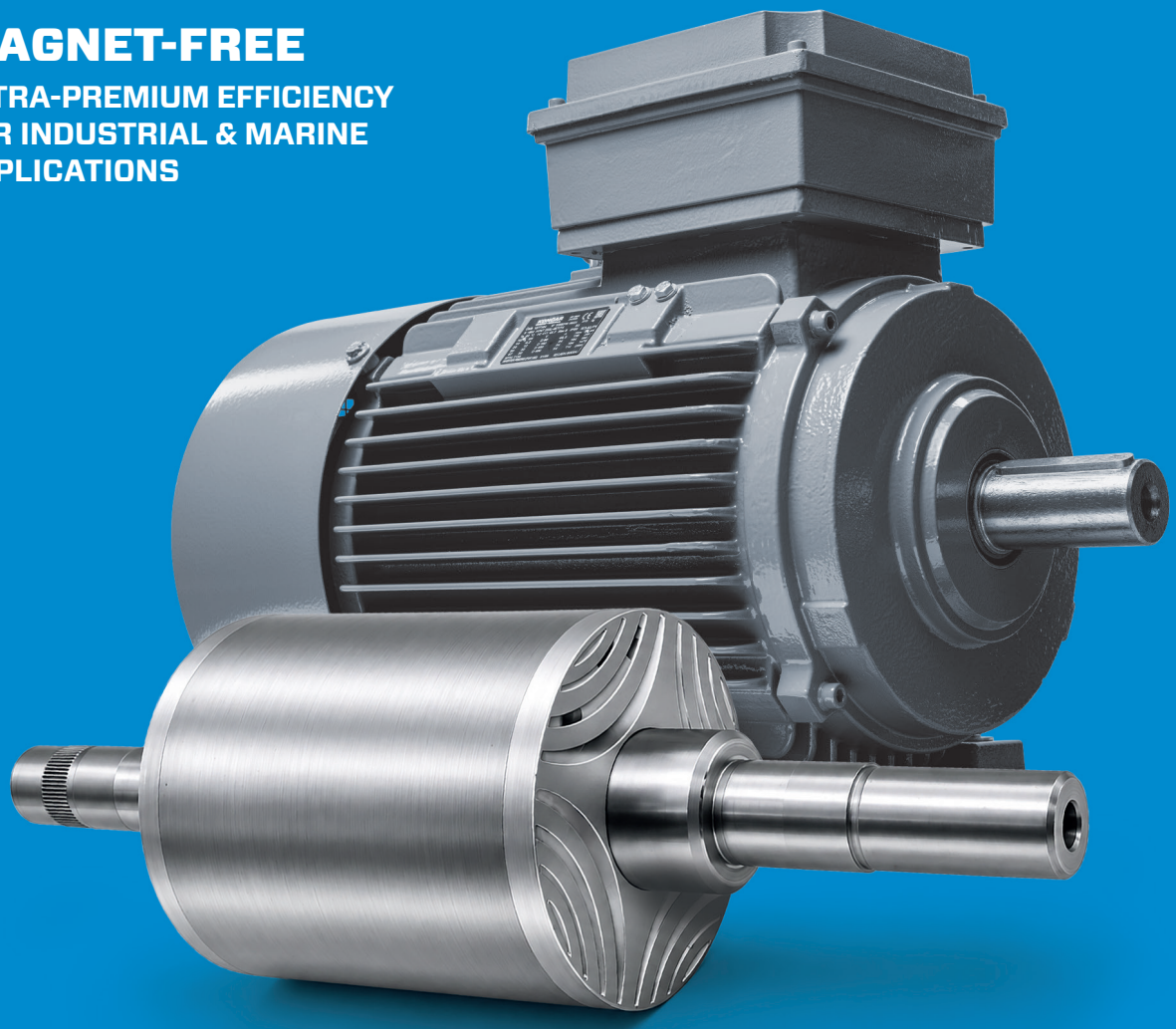
SYNCHRONOUS RELUCTANCE MOTORS

MAGNET-FREE

ULTRA-PREMIUM EFFICIENCY
FOR INDUSTRIAL & MARINE
APPLICATIONS



0.37-315 kW	IEC 80-315	IE5	100 - 4000 rpm
POWER RANGE	FRAME RANGE	EFFICIENCY	SPEED

KONČAR
MOTORS AND ELECTRICAL SYSTEMS

BENEFITS:

- **LOW ENERGY LOSSES**
- **MORE UPTIME**
- **NO PERMANENT MAGNETS**

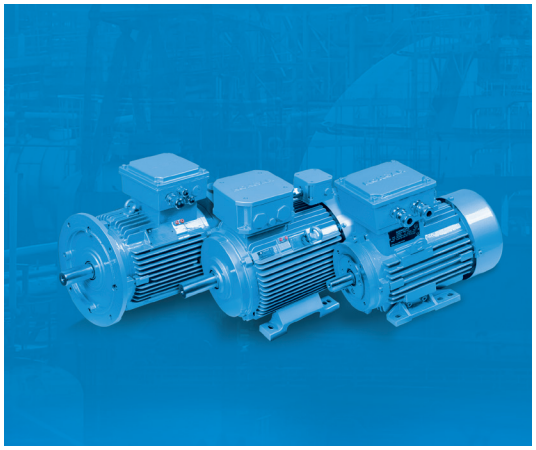
IE5 ultra-premium efficiency engineered for real industrial applications, straightforward service and low lifecycle cost.
IE6 hyper efficiency available on request.

SIGNIFICANTLY LOWER MOTOR LOSSES Ultra-premium efficiency substantially reduces motor losses compared with older induction motors, lowering electrical energy demand, operating costs and associated CO_2 emissions.	**NO PERMANENT MAGNETS** Magnet-free rotor construction enables a simple, cost effective design without supply chain critical permanent magnet materials. Maintenance remains straightforward, using standard tools familiar from conventional industrial motors.	**PARTIAL-LOAD EFFICIENCY** High efficiency is maintained at partial load, including 75% and 50% of rated load which is particularly valuable for pumps, fans and other variable load applications.
20% CONTINUOUS OVERLOAD Low motor losses provide a large thermal reserve, enabling up to 20% continuous overload capability for demanding industrial duty.	**HIGH OUTPUT IN THE SAME FRAME** Higher rated output can be engineered within the same IEC frame, providing increased power density, compact dimensions and reduced installation space.	**STANDARD IEC DIMENSIONS** Standard IEC mounting and shaft dimensions simplify replacement of existing motors and integration into new machinery, helping minimize mechanical modifications.

TARGET APPLICATIONS

PUMPS	FANS	COMPRESSORS	CONVEYORS	MACHINERY

KSR PRODUCT PLATFORM



7KSR
Cast-iron housing | Frame range IEC 80 - 315 | RAL 5010

7KSRT
Explosion-protected SynRM | Frame range IEC 80 - 160 | RAL 7031
I M2 Ex db (eb) I Mb (mining)
II 2G Ex db (eb) IIC T6...T3 Gb
II 2G Ex db (eb) IIB T3 Gb
II 2D Ex tb IIIC T160°C, T130°C, T100°C Db
T5 up to Ta=+60°C, T6 up to Ta=+50°C

Designed and tested for frequency-converter operation with SynRM control.
Maximum speed up to 4000 rpm across the complete frame range.

ENERGY ECONOMICS

•▸ LOWER LOSSES

•▸ MEASURABLE SAVINGS

A motor retrofit should be evaluated in kWh, EUR and payback - not only by the IE class on the nameplate.

IE1 MINIMUM EFFICIENCY	KONČAR SYNCHRONOUS RELUCTANCE	REDUCED MOTOR LOSSES
93.5%	**97.1%**	**≈ 57%**
η at rated load	η at rated load	

132 kW RETROFIT EXAMPLE — RATED LOAD

TYPICAL TWO-SHIFT OPERATION	CONTINUOUS-PROCESS OPERATION
4,000 h/year	8,760 h/year
ANNUAL ENERGY SAVINGS	ANNUAL ENERGY SAVINGS
≈ 20.9 MWh/year	**≈ 45.9 MWh/year**
ANNUAL COST SAVINGS	ANNUAL COST SAVINGS
≈ €3,769/year	**≈ €8,253/year**
10-YEAR COST SAVINGS	10-YEAR COST SAVINGS
≈ €37,686	**≈ €82,532**

CALCULATION BASIS: 132 kW, 4-pole motor at rated load. IE1 efficiency 93.5%, KONČAR KSR IE5 η100=97.1%. Savings are calculated against the IEC IE1 efficiency level. The ≈57% reduction refers to motor losses, not total energy consumption. Actual savings depend on the efficiency and operating profile of the motor being replaced and the complete drive system. Example electricity price: €0.18/kWh.

Calculate your own scenario: koncar.hr/en/mes-energy-saving-calculator

MATCHED TO YOUR APPLICATION

KONČAR - MES can tailor rated output to the actual load profile and configure the motor for the installation with special shafts, flanges and mounting dimensions, cooling arrangements, thermal protection, heaters, encoders, brakes, bearing solutions and monitoring equipment. Proper sizing helps avoid unnecessary oversizing while optimizing investment cost and lifecycle energy consumption.

For retrofit projects, special shafts, flanges and mounting dimensions can be engineered to match existing equipment and minimize mechanical modifications. A detailed energy-saving and payback calculation can be prepared for the customer's actual operating hours, load profile and electricity price.

TEMPERATURE	PROTECTION	COOLING	DUTY
–50°C to +100°C	IP55 standard / up to IP66	IC410 / 411 / 416 / 418	S1, S2–S10 available
MONITORING	**MECHANICS**	**ACCESSORIES**	**HAZARDOUS AREA**
PT100 / PTC / vibration / CBM	Special shafts / flanges / bearings	Encoder / brake / heaters / rain cover	7KSRT Ex solutions available

FOR MARINE ENVIRONMENTS

Stainless-steel fasteners, heavy-duty coating systems, anti-condensation heaters, moisture-resistant winding impregnation and condensate drains are available for demanding humid and marine environments.

ELECTRICAL DATA

VFD supply: 3 × 400 V / 50 Hz. Motor input voltage 340-400V. Values In, cosφ and η refer to motor-side operation, not inverter input.

3000 min^{-1} | 100 Hz | speed class 2p = 2

Pn kW	Motor type	In A	cosφ	η_{100} %	η_{75} %	η_{50} %	Mass kg
0,75	80A-2	1,96	0,64	86,3	83,6	79,0	19,4
1,1	80B-2	2,89	0,64	87,8	86,1	82,4	21,1
1,5	90LXR-2	3,60	0,67	88,9	87,4	83,4	34
2,2	90LX-2	5,3	0,67	90,2	88,6	84,4	35
3	100L-2	6,9	0,69	91,1	87,2	82,3	43
4	112M-2	9,7	0,67	91,8	90,3	86,3	57
5,5	132SA-2	12,7	0,67	92,6	91,2	87,4	83
7,5	132SB-2	16	0,72	93,2	91,0	89,0	86
11	160MA-2	23,3	0,72	94,0	93,2	90,2	157
15	160MB-2	32,5	0,71	94,6	93,2	92,7	157
18,5	160L-2	38	0,74	94,9	93,7	92,5	165
22	180M-2	46	0,73	95,1	94,3	93,0	227
30	200LA-2	66	0,74	95,5	94,8	93,3	270
37	200LB-2	80	0,74	95,8	95,0	93,6	270
45	225M-2	97	0,74	96,0	95,4	94,2	343
55	250M-2	115	0,76	96,2	95,1	93,3	475
75	280S-2	159,8	0,76	96,5	95,4	93,1	625
90	280M-2	174,5	0,79	96,6	95,7	93,8	625
110	315S-2	219	0,75	96,8	96,2	95,0	960
132	315M-2	265	0,76	96,9	96,4	95,2	960
160	315LA-2	359	0,77	97,0	96,6	95,6	960
200	315LB-2	407	0,77	97,2	96,8	96,0	960
225	315LC-2	449	0,77	97,2	96,6	95,9	960
250	315LD-2	513	0,77	97,2	96,4	95,7	1070
315	315LE-2	670	0,77	97,2	96,9	96,4	1230

1500 min^{-1} | 50 Hz | speed class 2p = 4

Pn kW	Motor type	In A	cosφ	η_{100} %	η_{75} %	η_{50} %	Mass kg
0,55	80A-4	1,4	0,66	86,7	85,1	84,5	19,4
0,75	80B-4	1,75	0,71	88,2	86,9	86,4	21,1
1,1	90LXR-4	2,59	0,69	89,5	86,2	83,3	34
1,5	90LX-4	3,5	0,68	90,4	88,6	86,4	35
2,2	100LA-4	5,19	0,67	91,4	88,9	86,4	43
3	100LB-4	6,30	0,75	92,1	89,9	87,6	44
4	112M-4	9,68	0,66	92,8	90,9	89,0	57
5,5	132S-4	12,4	0,69	93,4	91,8	91,0	86
7,5	132MX-4	15	0,77	94,0	92,4	92,0	92
11	160M-4	24,1	0,71	94,6	93,3	91,4	157
15	160L-4	32,2	0,71	95,1	94,2	92,4	165
18,5	180M-4	39,9	0,73	95,3	94,7	93,3	227
22	180L-4	45,5	0,74	95,5	94,9	93,5	227
30	200L-4	65	0,74	95,1	95,0	94,2	285
37	225S-4	78	0,74	96,1	95,5	94,4	356
45	225M-4	94,9	0,74	96,3	95,7	94,3	395
55	250M-4	112	0,76	96,5	96,1	94,9	505
75	280S-4	165	0,76	96,7	96,3	95,3	650
90	280M-4	190	0,78	96,9	96,3	95,3	720
110	315S-4	223	0,76	97,0	96,8	96,1	980
132	315M-4	283	0,74	97,1	96,9	96,2	1095
160	315LA-4	338	0,77	97,2	97,0	96,4	1230
200	315LXB-4	425	0,79	97,4	97,3	96,7	1300
225	315LXC-4	433	0,8	97,4	97,3	96,8	1370
250	315LXD-4	527	0,8	97,4	97,3	96,8	1600
315	315LXE-4	684	0,8	97,4	97,3	96,8	1850

1000 min^{-1} | 33 Hz | speed class 2p = 6

Pn kW	Motor type	In A	cosφ	η_{100} %	η_{75} %	η_{50} %	Mass kg
0,37	80A-6	1	0,66	81,6	81,7	78,4	19,4
0,55	80B-6	1,35	0,71	84,2	82,6	77,9	21,1
0,75	90LXR-6	1,8	0,7	85,7	83,9	82,6	35
1,1	90LX-6	2,6	0,7	87,2	87,5	87,2	35,3
1,5	100L-6	3,6	0,69	88,4	87,9	87,0	43
2,2	112M-6	5,3	0,68	89,7	91,0	89,8	57
3	132S-6	7,1	0,68	90,7	90,6	89,2	83
4	132MA-6	9,6	0,66	91,4	91,6	91,1	86
5,5	132MB-6	12,9	0,67	92,3	91,8	90,5	92
7,5	160M-6	16,1	0,72	92,9	92,8	91,5	157
11	160L-6	23,8	0,71	93,7	93,5	92,3	165
15	180L-6	32,5	0,72	92,9	92,8	92,6	227
18,5	200LA-6	40,5	0,74	93,4	93,4	92,8	285
22	225S-6	45,5	0,75	93,7	93,7	93,5	356
30	225M-6	61,7	0,76	94,2	94,7	94,0	395
37	250M-6	76	0,77	94,5	94,4	93,8	505
45	280S-6	97,9	0,77	94,8	94,7	93,7	650
55	280M-6	117	0,78	95,1	95,0	94,6	720
75	315S-6	157	0,77	95,4	95,0	94,5	980
90	315M-6	201	0,75	95,6	95,1	94,6	1095
110	315LA-6	229	0,78	95,8	95,3	94,8	1230
132	315LXB-6	265	0,79	96,0	95,2	94,7	1300
160	315LXC-6	344	0,8	96,2	95,3	94,5	1370
200	315LXD-6	401	0,8	97,0	96,1	95,7	1850

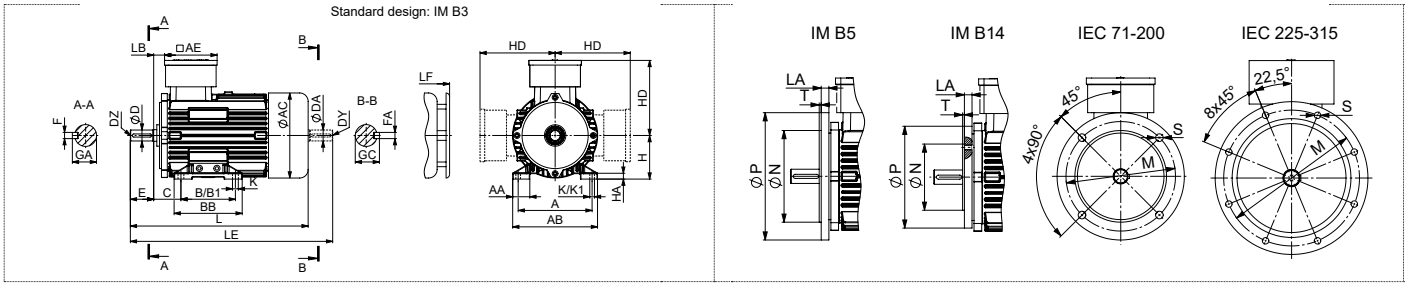
750 min^{-1} | 25 Hz | speed class 2p = 8

Pn kW	Motor type	In A	cosφ	η_{100} %	η_{75} %	η_{50} %	Mass kg
0,18	80A-8	0,52	0,7	71,9	68,6	61,6	18,2
0,25	80B-8	0,66	0,73	75,2	74,0	68,3	19,4
0,37	90S-8	0,93	0,73	78,4	78,3	68,0	28,5
0,55	90L-8	1,32	0,74	80,6	77,9	72,5	30,5
0,75	100LA-8	1,8	0,75	82,0	81,0	77,3	37
1,1	100LB-8	2,5	0,76	84,0	84,3	81,8	39
1,5	112M-8	3,4	0,76	85,5	85,0	80,7	52
2,2	132S-8	4,9	0,75	87,2	86,3	84,3	83
3	132M-8	6,4	0,77	88,4	87,9	85,7	86
4	160MA-8	8,7	0,76	89,4	89,3	89,2	130
5,5	160MB-8	11,8	0,74	90,4	90,2	88,2	157
7,5	180M-8	16,4	0,75	91,3	91,3	90,1	227
11	180L-8	22,8	0,76	92,2	92,2	90,8	227
15	200L-8	33,6	0,76	92,9	92,9	88,9	285
18,5	225S-8	39,2	0,76	93,3	92,8	91,1	356
22	225M-8	45,2	0,76	93,6	94,0	93,6	395
30	250M-8	64,5	0,77	94,1	94,1	93,4	505
37	280S-8	81,5	0,78	94,4	94,4	93,6	650
45	280M-8	97	0,78	94,7	94,3	93,7	720
55	315S-8	112	0,77	94,9	93,9	93,0	980
75	315LA-8	152	0,78	95,3	95,0	93,9	1230
90	315LXB-8	184	0,8	95,5	95,2	93,9	1300
110	315LXC-8	215	0,81	95,7	95,5	94,1	1370
132	315LXD-8	271	0,81	95,9	95,7	94,4	1600
160	315LXE-8	296	0,81	96,1	95,9	94,7	1850

2p = 10, 12 and 16 available on request.

CONSTRUCTION & DIMENSIONS · 7KSR

Cast-iron motor housings · dimensional reference based on 7AZ series motor catalogue · dimensions in mm



MAIN DIMENSIONS · 7KSR (all dimensions in mm)

Motor type	IM B3, IM B5, IMB14													IM B3								
	AC	D / DA	DZ / DY	E / EA	F / FA	GA / GC	HD	L	LB	AE		LE	LF	LG	A	AA	AB	B	B1	BB	C	H	HA	K
7KSR 80	156	19j6	M6	40	6	21,5	170	319	15	146	146	364	341	276	125	29	150	100	-	128	50	80	10	10x16
7KSR 90S & L	176	24j6	M8	50	8	27	178	329	20	146	146	384	361	287	145	35	180	100	125	155	56	90	12	10x14
7KSR 90LX	176	24j6	M8	50	8	27	178	365	20	146	146	420	397	323	145	35	180	100	125	155	56	90	12	10x14
7KSR 100	194	28j6	M10	60	8	31	186	437	22	146	146	500	468	390	165	44	200	140	-	175	63	100	13	12x15
7KSR 112	218	28j6	M10	60	8	31	198	445	21	146	146	510	477	390	195	44	220	140	-	175	70	112	15	12x15
7KSR 132S & M	258	38k6	M12	80	10	41	236	515	44	170	170	600	548	434	216	50	260	140	178	218	89	132	18	13x17
7KSR 132MX	258	38k7	M13	80	10	41	236	565	44	170	170	650	601	484	216	50	260	140	178	218	89	132	18	13x18
7KSR 160M & L	318	42k6	M16	110	12	45	286	657	47	210	210	757	703	580	254	62	320	210	254	304	108	160	25	15x20
7KSR 180M & L	348	48k6	M16	110	14	51,5	304	705	61,5	210	210	818	745	630	279	65	350	241	279	334	121	180	28	15
7KSR 200	391	55m6	M20	110	16	59	328	793	63	250	250	903	875	674	318	75	398	305	-	368	133	200	30	18,5
7KSR 225S & M -2	425	55m6	M20	110	16	59	346	838	65	250	250	950	935	716	356	82	436	286	311	370	149	225	30	18,5
7KSR 225S & M -4, -6	425	60m6	M20	140	18	64	346	868	65	250	250	1010	965	746	356	82	436	286	311	370	149	225	30	18,5
7KSR 250M -2	471	60m6	M20	140	18	64	372	913	64	280	280	1055	1025	780	406	100	500	349	-	415	168	250	35	24
7KSR 250M - 4, -6	471	65m6	M20	140	18	69	372	913	64	280	280	1055	1025	780	406	100	500	349	-	415	168	250	35	24
7KSR 280S & M -2	533	65m6	M20	140	18	69	422	1043	82,5	280	280	1185	1170	896	457	112	555	368	419	533	190	280	40	24
7KSR 280S & M - 4, -6	533	75m6	M20	140	20	79,5	422	1043	82,5	280	280	1185	1170	896	457	112	555	368	419	533	190	280	40	24
7KSR 315S & M -2	611	65m6	M20	140	18	69	468	1270	87	310	310	1410	1398	1110	508	120	628	406	457	586	216	315	45	28
7KSR 315S - 4, -6	611	80m6	M20	170	22	85	468	1300	87	310	310	1470	1430	1140	508	120	628	406	457	586	216	315	45	28
7KSR 315L-2	611	65m6	M20	140	18	69	468	1270	87	310	310	1410	1398	1110	508	120	628	457	508	586	216	315	45	28
7KSR 315M & L- 4, -6	611	80m6	M20	170	22	85	468	1300	87	310	310	1470	1430	1140	508	120	628	457	508	586	216	315	45	28
7KSR 315LX-2	611	65m6	M20	140	18	69	468	1350	87	310	310	1490	1470	1110	508	120	628	457	508	586	216	315	45	28
7KSR 315LX- 4, -6	611	80m6	M20	170	22	85	468	1380	87	310	310	1550	1510	1140	508	120	628	457	508	586	216	315	45	28

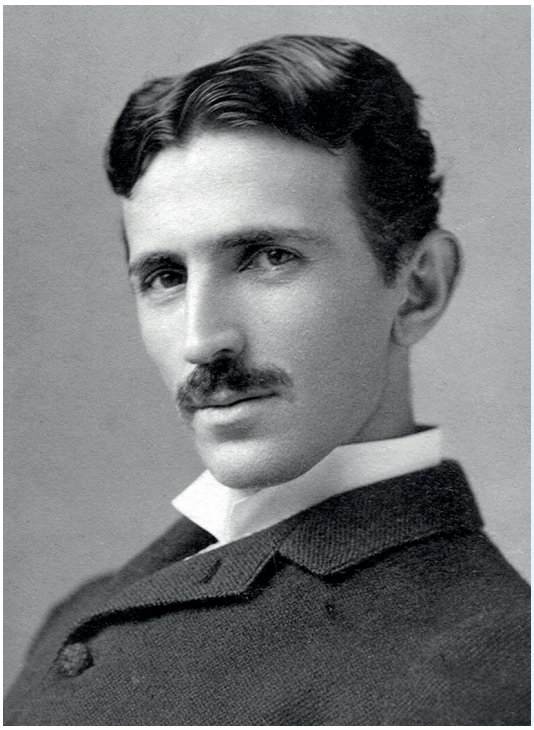
IM B5 / B35 & IM B14 · FLANGE INTERFACES

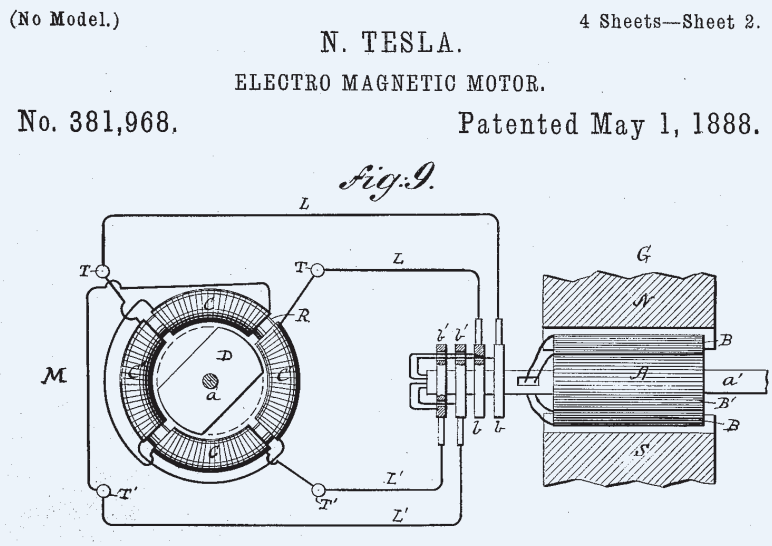
	B5						B14 – small						B14 – large					
IEC	LA	M	N	P	S	T	LA	M	N	P	S	T	LA	M	N	P	S	T
80	10	165	130j6	200	11	3,5	13	100	80j6	120	M6	3	13	130	110j6	160	M8	3,5
90	13	165	130j6	200	11	3,5	13	115	95j6	140	M8	3,5	13	130	110j6	160	M8	3,5
100	15	215	180j6	250	15	4	15	130	110j6	160	M8	3,5	15	165	130j6	200	M10	3,5
112	15	215	180j6	250	15	4	15	130	110j6	160	M8	3,5	15	165	130j6	200	M10	3,5
132	15	265	230j6	300	14	4	16	215	180j6	250	M12	4						
160	20	300	250j6	350	18	5												
180	20	300	250j6	350	18	5												
200	20	350	300j6	400	19	5												
225	22	400	350j6	450	19	5												
250	22	500	450j6	550	19	5												
280	22	500	450j6	550	19	5												
315	25	600	550j6	660	24	6												

EVOLUTION OF INDUSTRIAL ELECTRIC MOTORS

NIKOLA TESLA

Born in Smiljan near Gospić, in present-day Croatia, Nikola Tesla's pioneering work on electric motors and the rotating magnetic field laid the foundations for the development of electric drive technologies. More than a century later, this evolution continues with modern technologies such as synchronous reluctance motors.





(No Model.) 4 Sheets—Sheet 2.

N. TESLA.

ELECTRO MAGNETIC MOTOR.

No. 381,968. Patented May 1, 1888.

Fig. 9.

KONČAR 7KSR 80–315 ELECTRIC MOTOR SERIES

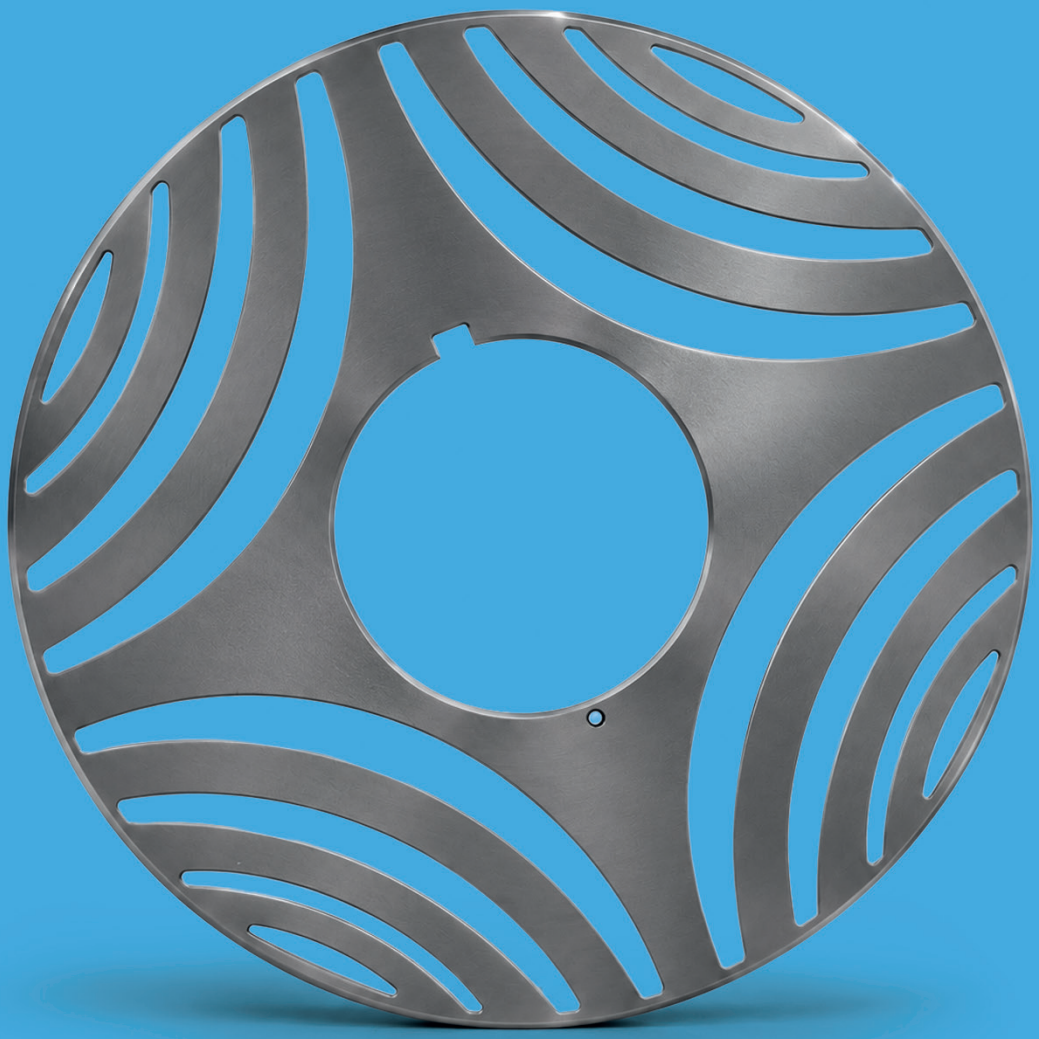
KONČAR-MES synchronous reluctance motor is a modern permanent magnet-free technology designed for energy-efficient industrial drives for pumps, fans and compressors.

KONČAR

ENGINEERED AND MANUFACTURED IN CROATIA

Throughout history, electric motor technology has continuously evolved to deliver higher efficiency, reliability and performance for industry. KONČAR-MES continues this development with modern synchronous reluctance motor technology developed, engineered and manufactured in Croatia.

FROM TESLA'S VISION TO MODERN ELECTRIC MOTORS



KONČAR

MOTORS AND ELECTRICAL SYSTEMS

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