MECHANICS SOLUTIONS

ICPE Electrical Engineering

ICPE or Institutul de Cercetări Electrotehnice® was established over 65 years ago. The modern research infrastructure, obtained successfully following the performance of local and international projects, is a solid basis for further research in electrical engineering, and related fields.

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ICPE Electrical Engineering Company design, develop and produce different types of permanent magnets electrical machines.

Permanent Magnet Synchronous Frameless Torque Motors KSO/H Series

The torque motors of KSO/H series are low speed brushless synchronous motors excited by rare earth permanent magnets located on the rotor. These motors are delivered as frameless kit (rotor and stator sets) and were optimized for high torque density, low cogging torque, compact design and improved efficiency.

Frameless torque motors designed to be compact and cost effective, allow direct coupling with the payload, eliminating parts of mechanical transmission, maintenance free, high energy NdFeB magnets maximize torque density, customized winding for different desired voltage.

PRODUCT CODE	CONTINUOUS STALL TORQUE Nm	OUTER DIAMETER mm	INNER DIAMETER mm	LENGTH ACTIVE/TOTAL mm
KSO/H 170 010	3,5	170	74	9.9/31.6
KSO/H 170 025	9,1			25.9/47.6
KSO/H 170 050	15,3			50.9/72.6
KSO/H 170 075	21,3			75.9/97.6
KSO/H 170 100	27,6			100.9/122.6
KSO/H 230 010	8,7	230	130	9.9/31.6
KSO/H 230 025	21,7			25.9/47.6
KSO/H 230 050	41,1			50.9/72.6
KSO/H 230 075	65,6			75.9/97.6
KSO/H 230 100	83,6			100.9/122.6
KSO/H 275 010	12	275	172	9.9/32.6
KSO/H 275 025	31			25.9/48.6
KSO/H 275 050	60			50.9/73.6
KSO/H 275 075	89,4			75.9/98.6
KSO/H 275 100	116,6			100.9/123.6
KSO/H 330 010	20,5	330	210	9.9/32.6
KSO/H 330 025	49			25.9/48.6
KSO/H 330 050	100,5			50.9/73.6
KSO/H 330 075	150			75.9/98.6
KSO/H 330 100	202			100.9/123.6

Permanent Magnet Synchronous Frameless Compact Motors KSO/H Series

The frameless compact motors of KSO/H series are high performance brushless synchronous motors excited by rare earth permanent magnets located on the rotor. These motors are delivered as frameless kit (rotor and stator sets) and were optimized for high torque density, low cogging torque, compact design at minimal cost. The stator consists of a laminated steel core in whose slots is located a three phase star connected winding.

PRODUCT CODE	CONTINUOUS STALL TORQUE Nm	OUTER DIAMETER mm	INNER DIAMETER mm	LENGTH ACTIVE/TOTAL mm
KSO/H 036 013	0.08	35.81	10	12.7/34.1
KSO/H 036 025	0.15			25.4/46.8
KSO/H 036 038	0.23			38.1/59.5
KSO/H 036 051	0.3			50.8/72.2
KSO/H 056 019	0.36	55.7	15	19.05/42.9
KSO/H 056 038	0.68			38.1/91.9
KSO/H 056 057	0.98			57.15/80.9
KSO/H 056 076	1.28			76.2/99.9
KSO/H 082 019	0.81	81.28	25	19.05/39.8
KSO/H 082 038	1.57			38.1/58.8
KSO/H 082 057	2.32			57.15/77.8
KSO/H 082 076	3.03			76.2/96.8
KSO/H 127 025	4.29	127	35	25.4/50.8
KSO/H 127 051	8			50.8/76.2
KSO/H 127 076	11.1			76.2/101.6
KSO/H 127 102	14.1			101.6/127
KSO/H 127 127	17.2			127/152.4
KSO/H 127 153	20.2			152.4/177.8

DC Brushed Torque Motors

DC Torque Motors operate on the same principles as the conventional DC motors but the magnetic circuit design and consequent mechanical configuration are designed for maximum torque output rather than the usual low torque / high speed characteristic. Arrange of unhoused units which are supplied as three separate components, a permanent magnet field assembly, a wound armature with precision bore for mounting and a brush ring assembly or brush segments.

Fixed element – the stator, is equipped with rare earth permanent magnets and the rotor is equipped with a dc specific winding which is connected to an extra flat commutator – brushed system. Low speed Torque Motors are beneficial for direct-drive applications. Position and velocity feedback can be achieved via additions of DC Tachos, Resolvers or Optical Encoders. The unhoused motors described below can be offered in custom designed housings for specific applications.

PRODUCT CODE	PEAK TORQUE [mNm]	TORQUE SENSITIVITY [mNm/A]	MOTOR CONSTANT [mNm/W]	OUTSIDE DIAMETER [mm]	HEIGHT [mm]
TQRB-15-0.39	77.7	25,1	10,3	38,10	9,78
TQRB-15-0.51	127	36,3	13,9	38,10	12,95
TQRB-15-0.51-B	141	32,4	16	38,10	12,95
TQRB-15-1.03	333	83,2	39,2	38,10	26,00
TQRB-15-1.1	353	50,4	28,3	38,10	27,94
TQRB-20-1.14	1200	150	86,6	51,00	29,00
TQRB-24-1-C	600	195	68,2	60,32	25,40
TQRB-30-0.78	777	256	87,4	76,20	19,80
TQRB-34-0.51	883	160	74,1	85,725	12,95
TQRB-34-0.95-A	2048	438	195	85,725	24,40
TQRB-34-1.46	3140	551	271	85,725	36,90
TQRB-37-0.54	1060	210	85,4	92,075	13,72
TQRB-37-0.54-B	1060	158	85,4	92,075	13,72
TQRB-37-0.84	2120	358	156	92,075	21,33
TQRB-37-1.46	4000	681	341	92,456	37,008
TQRB-45-0.56	2300	340	146	114,3	14,22
TQRB-45-0.69-B	3250	542	238	114,3	17,45
TQRB-45-0.69-C	3250	963	238	114,3	17,45
TQRB-45-0.86	4590	715	277	114,3	21,84
TQRB-45-1.08	6510	838	401	114,3	27,28
TQRB-51-0.58	2825	251	180	130,175	14,73
TQRB-51-0.93	2800	1400	422	130,175	23,9
TQRB-51-1.0	4800	1200	490	130,175	25,5
TQRB-51-2.1	10000	1515	716	130,175	53,34

D.C. Limited Angle Brushless Torque Motors

Limited Angle Torque Motors are ideal for compact, limited angular excursion, rotary, closed loop servo applications.
Operating in the system, these units endure a long storage life and a harsh thermal and mechanical environment. All motors consist of a housed stator with a high density winding around a steel core, molded in a special resin. The rotor is build from high-grade samarium cobalt magnets or neodymium, on a stainless steel core.

Advantages

- No Torque Ripple
- High Angular Acceleration
- No Commutation
- Brushless
- Low Profile

PRODUCT CODE	PEAK TORQUE [mNm]	TORQUE SENSITIVITY [mNm/A]	MOTOR CONSTANT [mNm/W]	OUTSIDE DIAMETER [mm]
TQR-10/2-0.35	12,7	17,6	2,9	25,4
TQR-10/4-0.35	12,2	15,5	2,69	25,4
TQR-11/4-0.8	97,2	23,3	9,72	27
TQR-16/2-0.35	36,2	18,1	6,1	40,63
TQR-16/2-0.35-C	74,8	18,7	7,76	40,63
TQR-16/4-0.35	44	20	8,17	40,63
TQR-18/2-0.8-2CH	60	30	10,9	45,4
TQR-19/4-0.53	120	85,7	20,5	48
TQR-27/2-0.65	319	87,5	36,6	69,85
TQR-28/4-0.63	310	155	49	70
TQR-34/8-0.8	1150	250	125	85,09

AC servo motors – BSM series

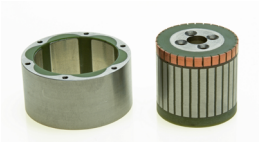
BSM Series motors are available with high energy Nd-Fe-B magnets - 6 (six) magnetic poles - F Class Insulation - standard feedback system with resolver - winding protection with PTC - Standard protective structure is IP55 class - torque range from 0.1 to 20 Nm - high torque to weight ratios - superior low speed performance - very low inertia.

In this motor range below options are also available:

- shaft with keyway according to DIN 6885
- fail safe brake 24 VDC,
- shaft seal ring,
- additional feedback systems (encoder),
- protection class IP65,
- custom windings,
- special dimensions and configurations.

Sinusoidal Output Transducers – Resolvers

Resolvers which are directly supplied on the rotor winding, used on either limited angle, case in which they are supplied by means of flexible cables or on 360 degrees and, in this case, they are supplied through some collecting rings, as well as resolvers supplied by means of rotary transformer with a constant transformation ratio and the input and output winding terminals on the stator.



Advantages

- Used as an absolute angle transducer,
- resistance to mechanical stresses,
- operation within a wide temperature range.

Outer rotor brushless motor

PARAMETER	SYMBOL	UNITS	VALUE
Nominal Torque	M_n	Nm	9
Peak Torque	M_{max}	Nm	27
Motor Constant	K_M	N/W	1,4
Voltage	V_{DC}	V	600
Nominal Current	I_n	A	8,3
Torque Constant	K_T	Nm/A_{ms}	1,08
Back EMF Constant	K_E	V_{ms}/krpm	67
No-Load Speed		rpm	7000
Number of Poles	N_P		10
Phase Connection			Y
Line-to-Line Resistance	R_L	Ω	0,4
Line-to-Line Inductance	L_L	mH	5,3
Electric Time Constant	T_E	ms	13,2
Insulation Class			H
Thermal Resistance	T_R	°C/W	1,7
External Diameter	OD	mm	170
Stator/Rotor Length	L	mm	28
Motor Length	TL	mm	55
Inertia	J	kg cm^2	105
Weight	Wt	kg	4,2

The stator is a laminated steel core with a three phase windings. The high energy permanent magnets outer rotor configuration provides a more rigid structure for the permanent magnets and has higher inertia.

Advantages

- High torque due to large air gap radius,
- Stable low speed performance without feedback,
- Lower audible noise with reduced cogging.

Other Product Groups

As the company is established to customize different electrical machines there are many different products that ICPE can offer as following:

- Flat brushless servo motors,
- Precision small brushless motors,
- AC servo motors,
- Linear motors,
- Electric generators,
- 2-D robot tables.