



# Permanent Magnet Synchronous Frameless Motors for Cryogenic and Vacuum Applications

KSO 230 010-CR-VAC

Permanent Magnet Synchronous  
Compact Torque Motors  
KSO series

Motor for vacuum  
application

Motor for cryogenic  
application

Active length

Outer diameter



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## Product Description

The frameless motor KSO for Cryogenic and Vacuum Application is a high performance brushless synchronous motor excited by rare earth permanent magnets located on the rotor. This motor is delivered as frameless kit (rotor and stator sets) and was optimized for high torque density, cryogenic and high vacuum working conditions and compact design.

The stator consists of a laminated steel core in whose slots is located a three-phase star connected winding. The rotor consists of a magnetic steel ring on which there are placed high energy permanent magnets. A series of through holes have been machined into the stator and rotor core in order to provide a simple and effective method of coupling the motor with the payload.

This frameless kit motor can be use as direct drive motors providing the advantages of lower cost, increased reliability and improved performance. KSO motor for Cryogenic and Vacuum Application offers smooth performance, sinusoidal back emf with low harmonic distortion, high torque capacity and can be customized in order to be easily adapted to a wide range of requirements and applications.

## Features

- Frameless torque motors designed to be compact and cost effective
- Work under cryogenic and high vacuum conditions
- Allow direct coupling with the payload, eliminating parts of mechanical transmission
- High energy SmCo magnets
- Smooth operation and performance
- Customized construction, winding and mounting interfaces

## Applications

- Hold-down & release systems
- Mechanism pointing and deployment
- Scanning
- Rovers
- Pumps and fans
- Exploration support motors (drilling, ..)
- Robotics



## Torque motor KSO 230-010-CR-VAC Specifications

Parameters	Tolerances	Units	KSO 230-010-CR-VAC
External diameter	+0; -0.127	mm	230
Inner diameter	H7	mm	130
Total length	Max	mm	30.9
Air-gap length		mm	1.25
Continuous rated torque	±10%	Nm	5
Continuous stall torque*	±10%	Nm	5
Peak torque**	±10%	Nm	20
Rated voltage	±10%	V <sub>DC</sub>	48
Continuous rated current	±10%	A <sub>rms</sub>	1
Continuous stall current*	±10%	A <sub>rms</sub>	1
Peak current	±10%	A <sub>rms</sub>	4.5
Rated speed	±10%	rpm	75
No load speed	±10%	rpm	116
Torque constant (K <sub>T</sub> )	±10%	Nm/A <sub>RMS</sub>	4.9
Back EMF constant (K <sub>E</sub> ) at 20°C	±10%	V <sub>peak</sub> /Krpm	363
Back EMF constant (K <sub>E</sub> ) at 20°C	±10%	V <sub>rms</sub> /Krpm	256.7
Total losses for continuous operation*		W	4
Cogging torque	±10%	mNm peak	200
Inertia	±10%	Kg·cm <sup>2</sup>	33
Weight	±10%	Kg	2.1
Phase connection			Y
Number of poles			32
Number of phases			3
Insulation class			F
Electrical resistance (at 20°C)	±10%	Ω	32
Electrical inductance	±20%	mH	100
Terminals cross sections		mm <sup>2</sup>	0.1257

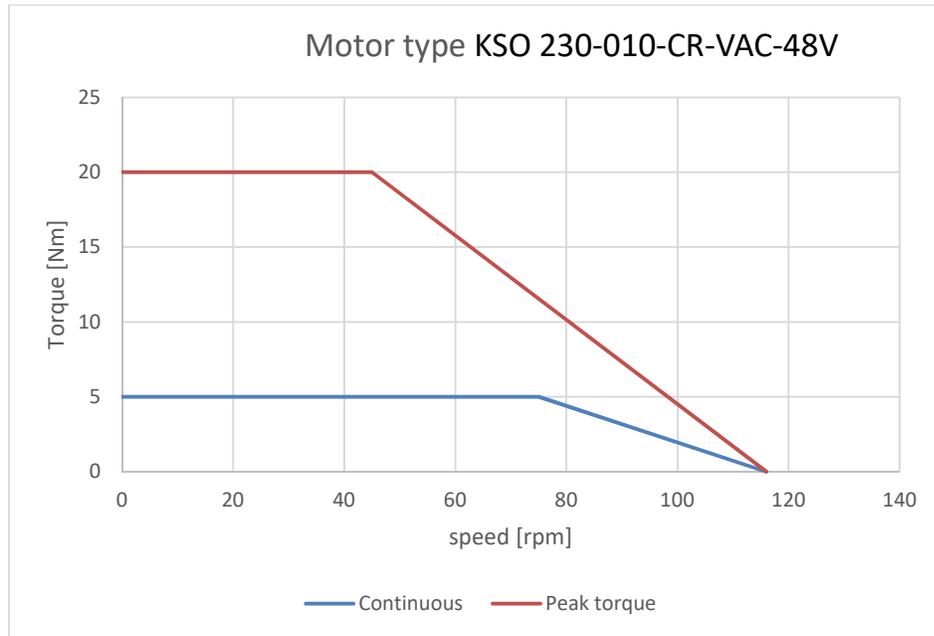
\* Cryogenic atmosphere 55K and high vacuum 10<sup>-6</sup> mbar

\*\* Peak torque for msec





## Torque motor 230-010-CR-VAC Performances



\* Graphs for hot motor