



Permanent Magnet Synchronous Frameless Slotless Motors



ICPE

313 Splaiul Unirii

030138, București, România

tel./ fax +40213467233

email servo@icpe.ro

web <http://www.icpe.ro/>



<i>Model Number</i>	<i>Continuous Stall Torque Nm</i>	<i>Outer Diameter mm</i>	<i>Inner Diameter mm</i>	<i>Length Active/Total mm</i>
KMXO-165-025-040-xxxx-xx-S00	3	165	139	25/40
KMXO-330-015-040-xxxx-xx-S00	8	330	290	15/47
KMXO-350-100-040-xxxx-xx-S00	100	350	240	100/125
KMXO-362-015-040-xxxx-xx-S00	15	362	322	15/40

KMXO-111-222-333-4445-66-S00

111 – outer diameter (mm)

222 – stack length (mm)

333 – number of magnetic poles

444 – bus voltage

5 – type of winding

66 – thermistor type

S00 – slotless motors

Product Description

The frameless, slotless motor 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 increased torque density, zero cogging torque, compact design at minimal cost.

The stator core consists of a ring made of laminated steel. Due to the slotless configuration, the three-phase star connected winding is placed in the airgap between stator core and permanent magnets. The winding is encapsulated in epoxy resin. The rotor consists of a magnetic steel ring on which there are placed high energy permanent magnets. This motor was designed to offer very low torque ripple combined with zero cogging torque.

This slotless, frameless kit motor can be use as direct drive motor providing the advantages of lower cost, increased reliability and improved performance.



This motor can be customized in order to be easily adapted to a wide range of applications.

Features

- Zero cogging torque
- Designed to be compact, high performance and cost effective
- Very low torque ripple
- Smooth operation
- Low noise
- 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

Applications

- Tracking systems
- Machine tools
- Laser scanning and printing
- Motion simulators
- Rotary stages
- Robots
- Gimbals
- Optic systems
- Radars



Torque motor KMXO-165-025-040-048A-xx-S00 Specifications

Motor parameter	Symbol	Units	Value	Tolerances
Peak torque 1)	T_p	Nm	9.5	$\pm 10\%$
Peak current	I_p	A_{rms}	9.8	$\pm 10\%$
Continuous stall torque 2)	T_o	Nm	3	$\pm 10\%$
Continuous stall current 2)	I_o	A_{rms}	3.1	$\pm 10\%$
Nominal speed	N	rpm	60	-
Maximum output speed	N_{Max}	rpm	100	$\pm 10\%$
Continuous nominal power	P_n	W	19	-
Continuous nominal torque	T_n	Nm	3	$\pm 10\%$
Continuous nominal current	I_n	A_{rms}	3.1	-
Motor torque constant	K_t	Nm/A_{rms}	0.97	$\pm 10\%$
Number of poles	$2p$	-	40	-
Thermal resistance	t_r	$^{\circ}C/W$	1.6	$\pm 10\%$
Voltage constant	K_e	$V_{peak}/krpm$	81.7	$\pm 10\%$
Voltage constant	K_e	$V_{rms}/krpm$	57.8	$\pm 10\%$
DC bus Voltage *	U	V_{DC}	48	$\pm 10\%$
Resistance (L-L)	R_m	Ω	3.1	$\pm 10\%$
Inductance (L-L)	L_m	mH	0.8	$\pm 20\%$
Cogging torque	T_f	$mNm peak$	0	$\pm 10\%$
Moment of inertia (frameless)	J	$Kg cm^2$	28.00	$\pm 10\%$
Weight (frameless)	W	Kg	1	$\pm 10\%$
Phase connection	-	-	Y	-
Number of phases	-	-	3	-
Insulation class	-	-	F	-
Thermistor type	-	-	No	-
Terminal cross section	-	AWG	-	-
Terminal cross section	-	mm^2	-	-
Stator outer diameter	-	mm	165	e9
Rotor inner diameter	-	mm	139	H7
Total length	-	mm	40	-

* More voltage and current values available on request

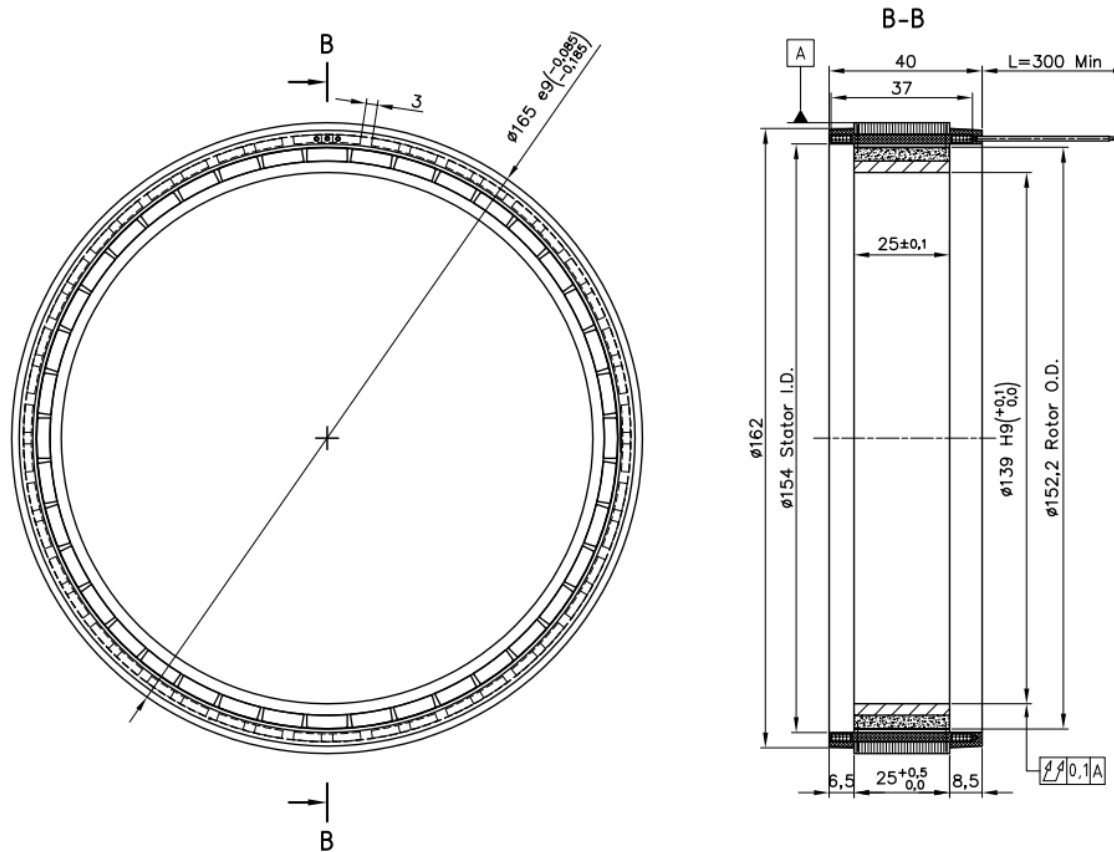
1) Peak torque for ms.

2) Motor mounted on a metallic flange with an area equal to twice the cross section of the housing

Ambient temperature 40 °C



Torque motor KMXO-165-025-040-xxxx-xx-S00 Dimensions



* Dimension in mm

** Different stack length available on request

Societatea pe acțiuni Icpe

Splaiul Unirii 313, 030138-București
tel. 021 589 3300 | fax. 021 589 3434
e-mail office@icpe.ro

RO 423140 | J40/21438/92
RO92 CARP 0452 P006 5844 R001
Patria Bank - Sucursala Tineretului



Torque motor KMXO-330-015-040-048A-00-S00 Specifications

Motor parameter	Symbol	Units	Value	Tolerances
Peak torque 1)	T_p	<i>Nm</i>	20	+/-10%
Peak current	I_p	<i>Arms</i>	12.0	+/-10%
Continuous stall torque 2)	T_o	<i>Nm</i>	8	+/-10%
Continuous stall current 2)	I_o	<i>Arms</i>	4.0	+/-10%
Nominal speed	N	<i>rpm</i>	90	-
Maximum output speed	N_{Max}	<i>rpm</i>	280	+/-10%
Continuous nominal power	P_n	<i>W</i>	75	+/-10%
Continuous nominal torque	T_n	<i>Nm</i>	8	+/-10%
Continuous nominal current	I_n	<i>Arms</i>	4.0	+/-10%
Motor torque constant	K_t	<i>Nm/Arms</i>	2.0	+/-10%
Number of poles	$2p$		40	
Thermal resistance	tr	<i>°C/W</i>	2.38	+/-10%
Voltage constant	K_e	<i>Vpeak/krpm</i>	193	+/-10%
Voltage constant	K_e	<i>Vrms/krpm</i>	130.0	+/-10%
DC bus Voltage *)	U	<i>VDC</i>	48	+/-10%
Resistance (L-L)	R_m	<i>Ohm</i>	2.86	+/-10%
Inductance (L-L)	L_m	<i>mH</i>	1.25	+/-20%
Cogging torque	T_f	<i>mNm peak</i>	0	+/-10%
Moment of inertia (frameless)	J	<i>Kg cm2</i>	247.00	+/-10%
Weight (frameless)	W	<i>Kg</i>	2	+/-10%
Phase connection	-	-	Y	-
Number of phases	-	-	3	-
Insulation class	-	-	F	-
Thermistor type	-	-	No	-
Terminal cross section	-	<i>AWG</i>	18	-
Terminal cross section	-	<i>mm2</i>	1	-
Stator outer diameter	-	<i>mm</i>	330	e9
Rotor inner diameter	-	<i>mm</i>	290	H7
Total length	-	<i>mm</i>	43	-

* More voltage and current values available on request

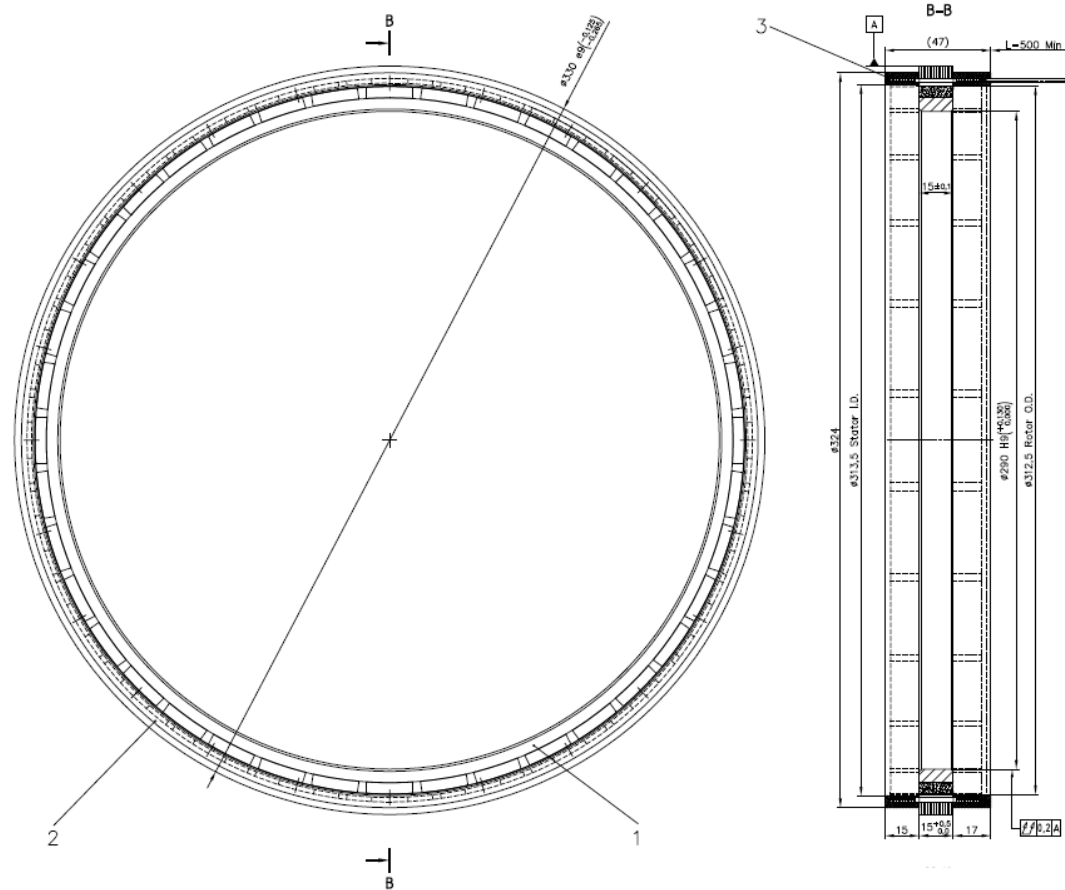
1) Peak torque for ms.

2) Motor mounted on a metallic flange with an area equal to twice the cross section of the housing

Ambient temperature 40 °C



Torque motor KMXO-330-015-040-xxxx-xx-S00 Dimensions



* Dimension in mm

** Different stack length available on request

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Torque motor KMXO-350-100-040-048A-00-S00 Specifications

Motor parameter	Symbol	Units	Value	Tolerances
Peak torque 1)	Tp	Nm	400	+/-10%
Peak current	Ip	Arms	211	+/-10%
Continuous stall torque 2)	To	Nm	100	+/-10%
Continuous stall current 2)	Io	Arms	48.0	+/-10%
Nominal speed	N	rpm	200	+/-10%
Maximum output speed	N _{Max}	rpm	300	+/-10%
Continuous nominal power	Pn	W	2094	+/-10%
Continuous nominal torque	Tn	Nm	100	+/-10%
Continuous nominal current	In	Arms	48	+/-10%
Motor torque constant	Kt	Nm/Arms	2.1	+/-10%
Number of poles	2p		40	
Thermal resistance	tr	°C/W	0.7	+/-10%
Voltage constant	Ke	Vpeak/krpm	182	+/-10%
Voltage constant	Ke	Vrms/krpm	128.7	+/-10%
DC bus Voltage *)	U	VDC	48	+/-10%
Resistance (L-L)	Rm	Ohm	1.5	+/-10%
Inductance (L-L)	Lm	mH	1.3	+/-20%
Cogging torque	Tf	mNm peak	0	+/-10%
Moment of inertia (frameless)	J	Kg cm ²	334	+/-10%
Weight (frameless)	W	Kg	2.3	+/-10%
Phase connection	-	-	Y	-
Number of phases	-	-	3	-
Insulation class	-	-	F	-
Terminal cross section	-	AWG	18	-
Terminal cross section	-	mm ²	1	-
Stator outer diameter	-	mm	350	e9
Rotor inner diameter	-	mm	240	H7
Total length	-	mm	125	-

* More voltage and current values available on request

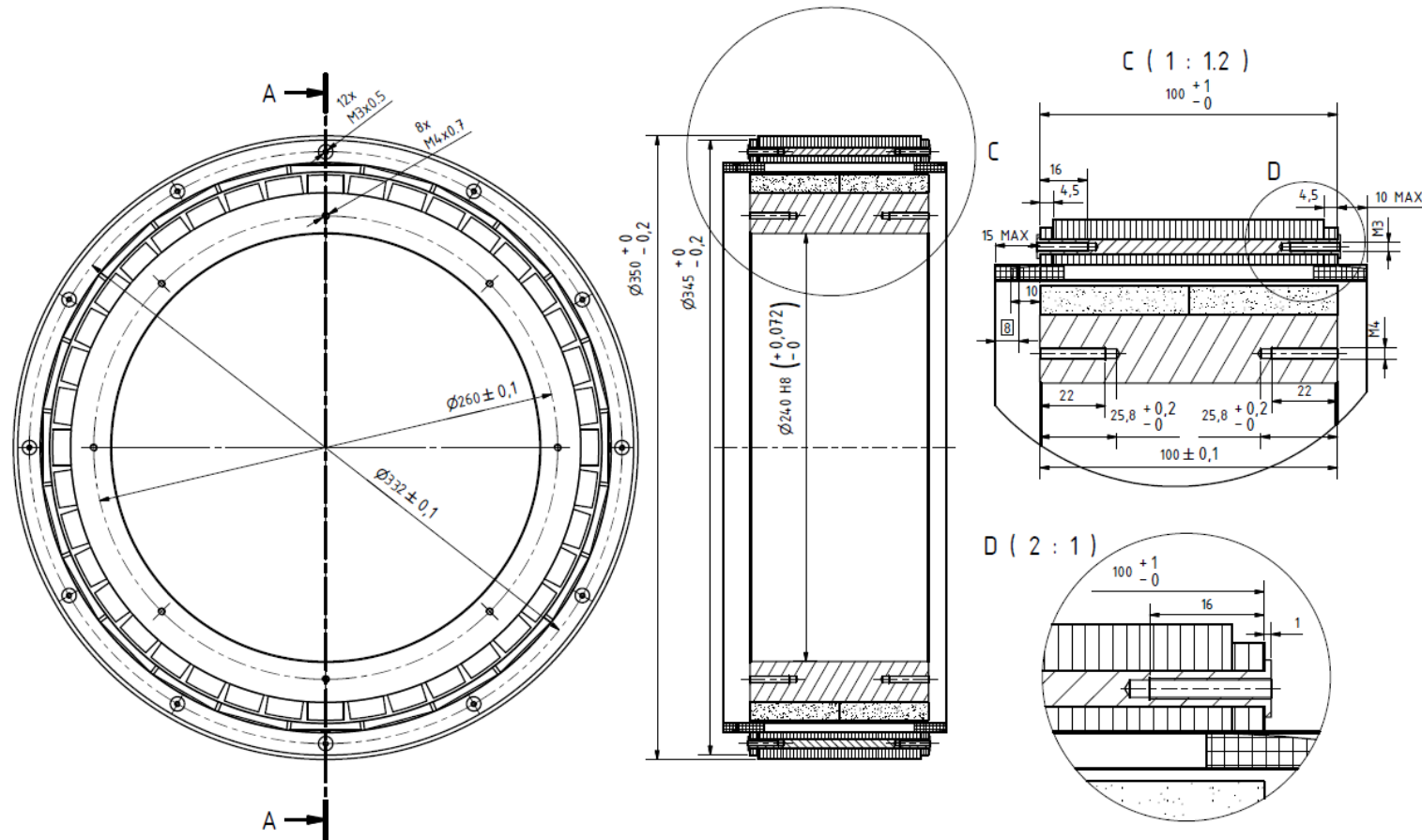
1) Peak torque for ms.

2) Motor mounted on a metallic flange with an area equal to twice the cross section of the housing

Ambient temperature 40 °C



Torque motor KMXO-350-100-040-xxxx-xx-S00 Dimensions



* Dimension in mm

** Different stack length available on request

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R092 CARP 0452 P006 5844 R001
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Torque motor KMXO-362-015-040-048A-xx-S00 Specifications

Motor parameter	Symbol	Units	Value	Tolerances
Peak torque 1)	T_p	Nm	22	$\pm 10\%$
Peak current	I_p	A_{rms}	12	$\pm 10\%$
Continuous stall torque 2)	T_o	Nm	15	$\pm 10\%$
Continuous stall current 2)	I_o	A_{rms}	7.2	$\pm 10\%$
Nominal speed	N	rpm	90	-
Maximum output speed	N_{Max}	rpm	280	$\pm 10\%$
Continuous nominal power	P_n	W	141	-
Continuous nominal torque	T_n	Nm	15	$\pm 10\%$
Continuous nominal current	I_n	A_{rms}	7.2	-
Motor torque constant	K_t	Nm/A_{rms}	2.1	$\pm 10\%$
Number of poles	$2p$	-	40	-
Thermal resistance	t_r	$^{\circ}C/W$	0.7	$\pm 10\%$
Voltage constant	K_e	$V_{peak}/krpm$	182	$\pm 10\%$
Voltage constant	K_e	$V_{rms}/krpm$	128.7	$\pm 10\%$
DC bus Voltage **	U	V_{DC}	48	$\pm 10\%$
Resistance (L-L)	R_m	Ω	1.5	$\pm 10\%$
Inductance (L-L)	L_m	mH	1.3	$\pm 20\%$
Cogging torque	T_f	$mNm\ peak$	0	$\pm 10\%$
Moment of inertia (frameless)	J	$Kg\ cm^2$	334	$\pm 10\%$
Weight (frameless)	W	Kg	2.3	$\pm 10\%$
Phase connection	-	-	Y	-
Number of phases	-	-	3	-
Insulation class	-	-	F	-
Thermistor type	-	-	No	-
Terminal cross section	-	AWG	18	-
Terminal cross section	-	mm^2	1	-
Stator outer diameter	-	mm	362	e9
Rotor inner diameter	-	mm	322	H7
Total length	-	mm	50	-

* More voltage and current values available on request

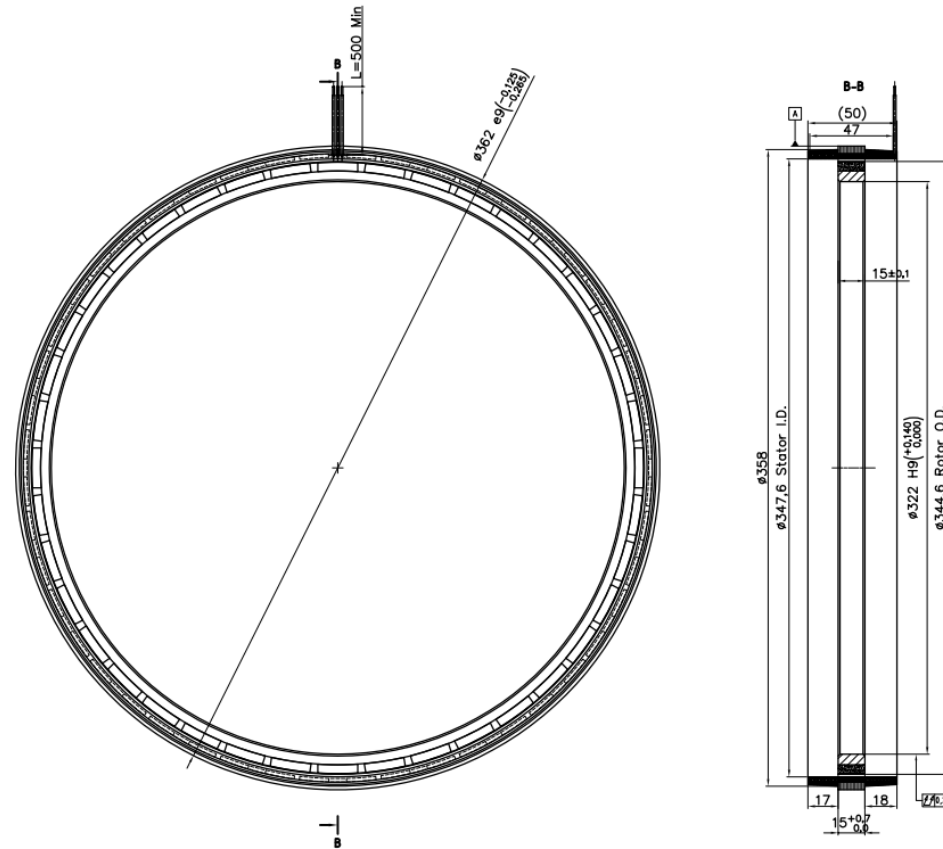
1) Peak torque for ms.

2) Motor mounted on a metallic flange with an area equal to twice the cross section of the housing

Ambient temperature 40 °C



Torque motor KMXO-362-015-040-xxxx-xx-S00 Dimensions



* Dimension in mm

** Different stack length available on request

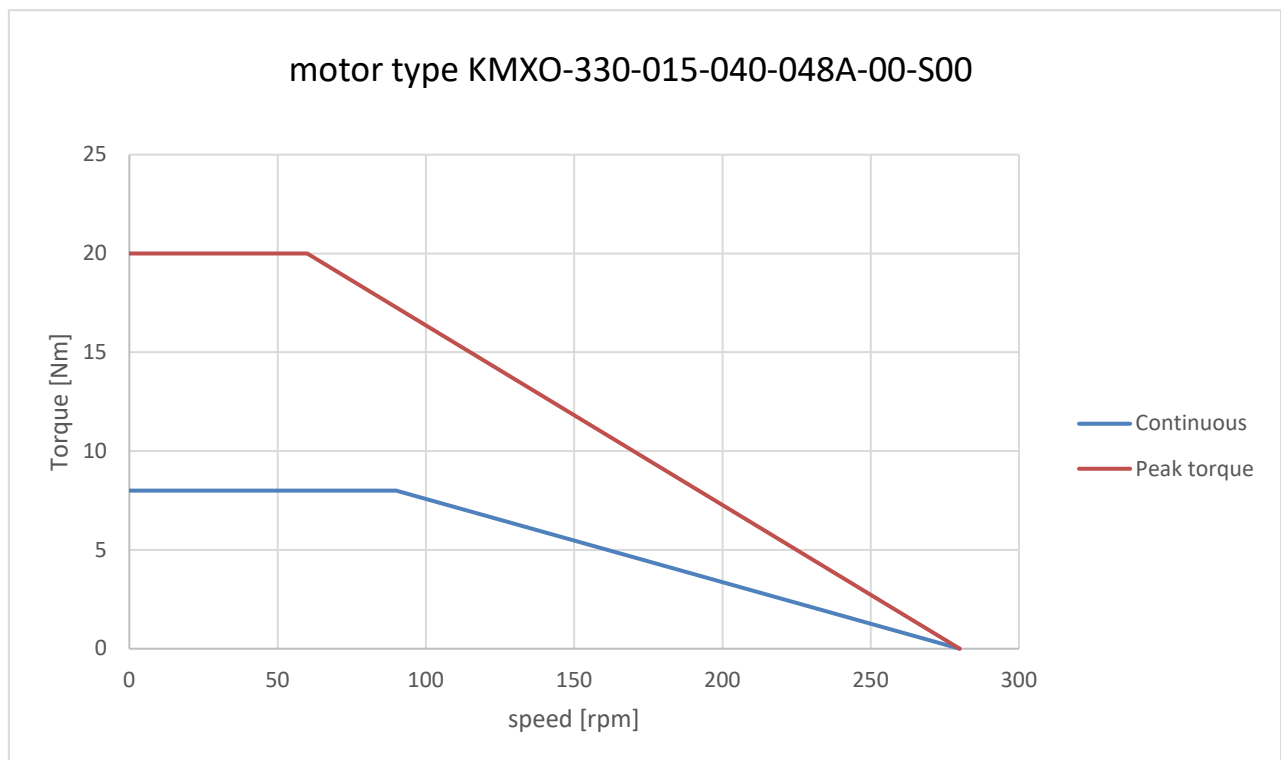
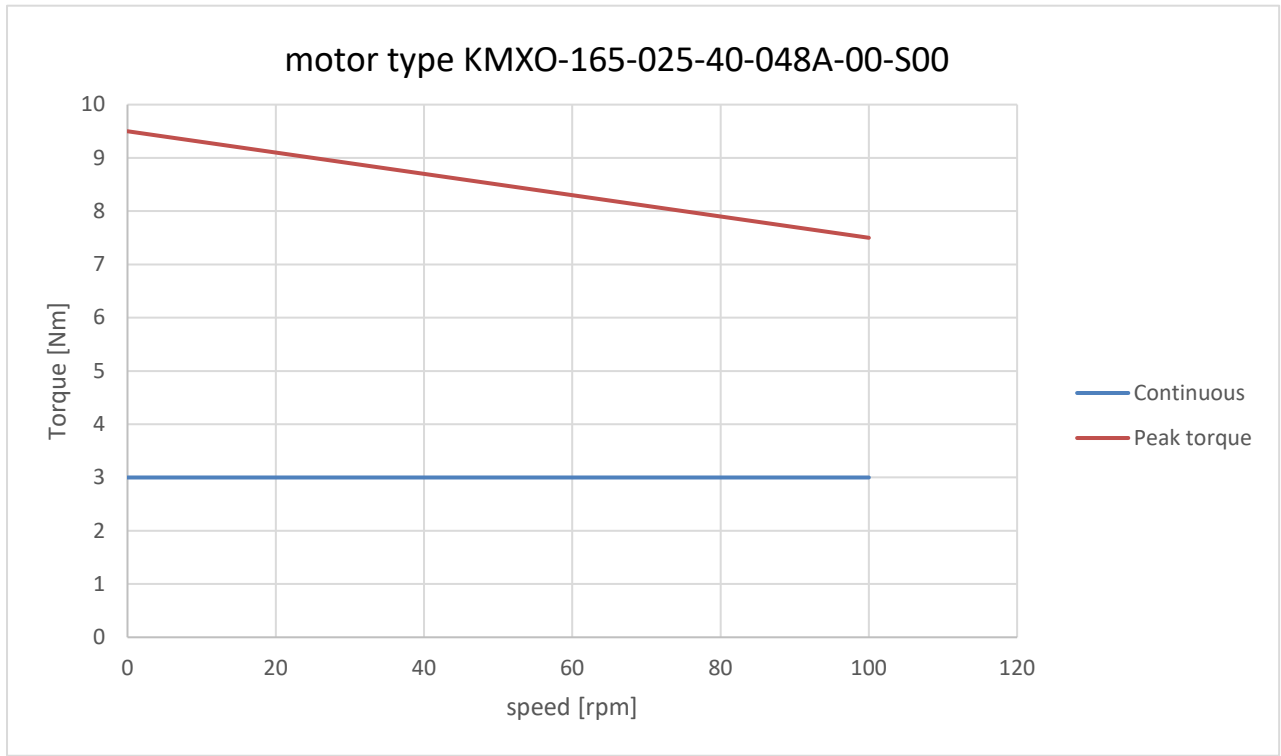
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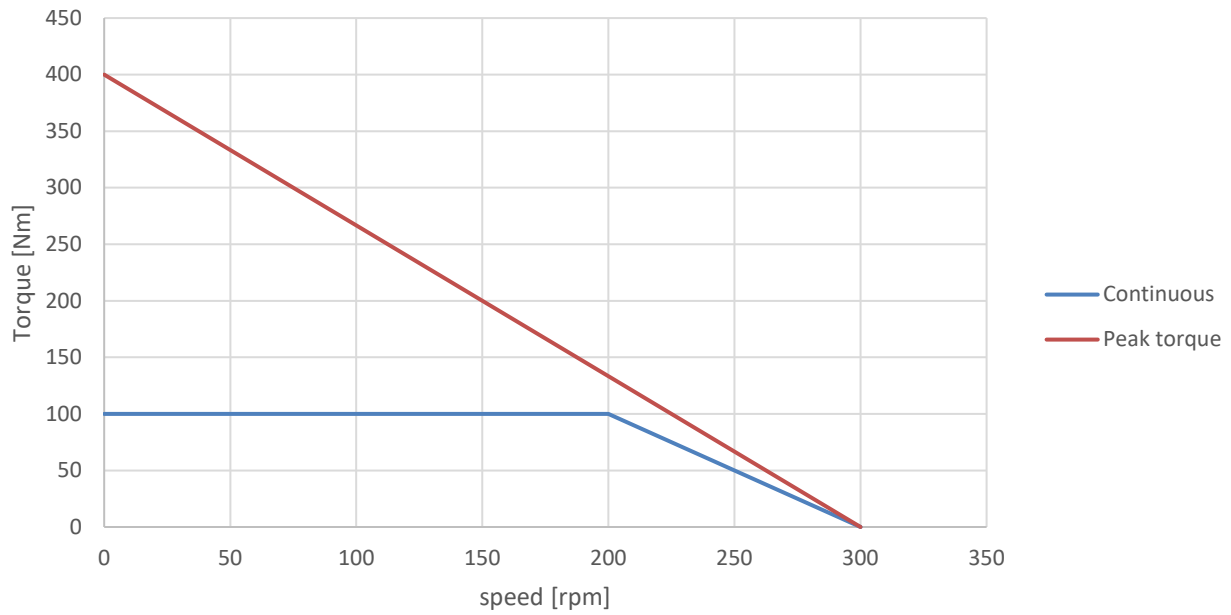


Performance Data Graph

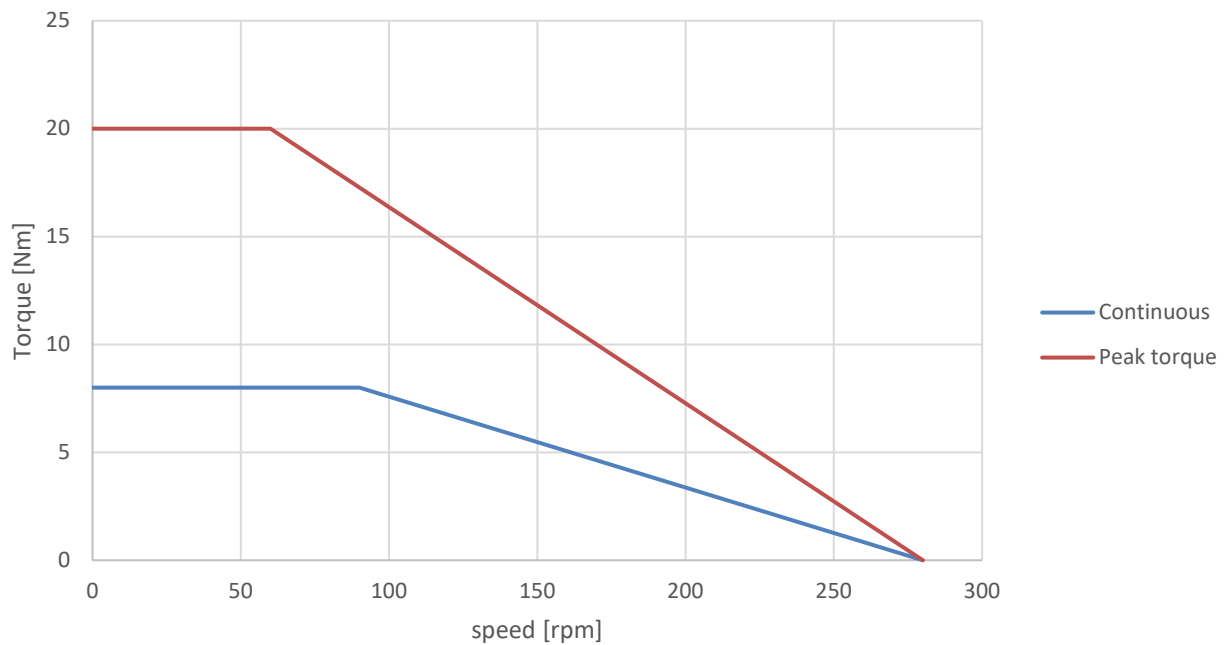




motor type KMXO-362-015-040-48A-00-SP0



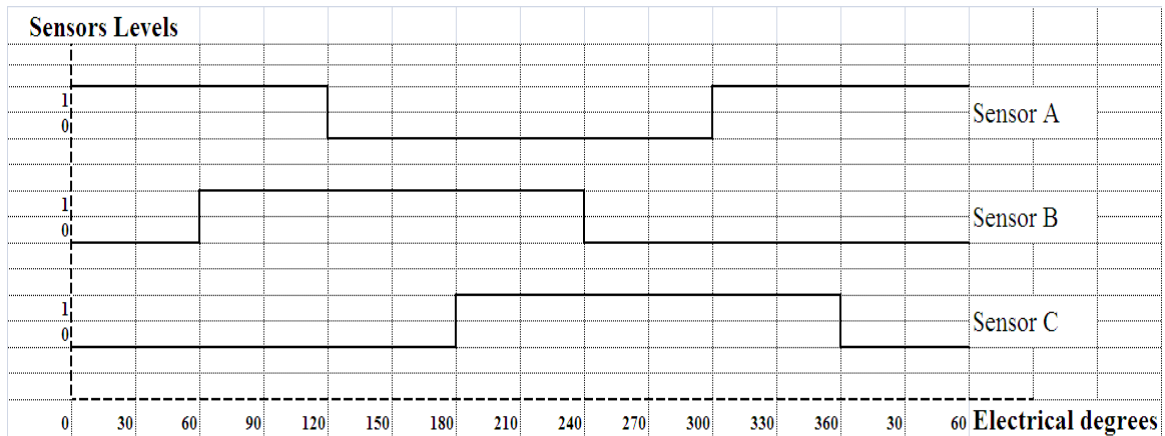
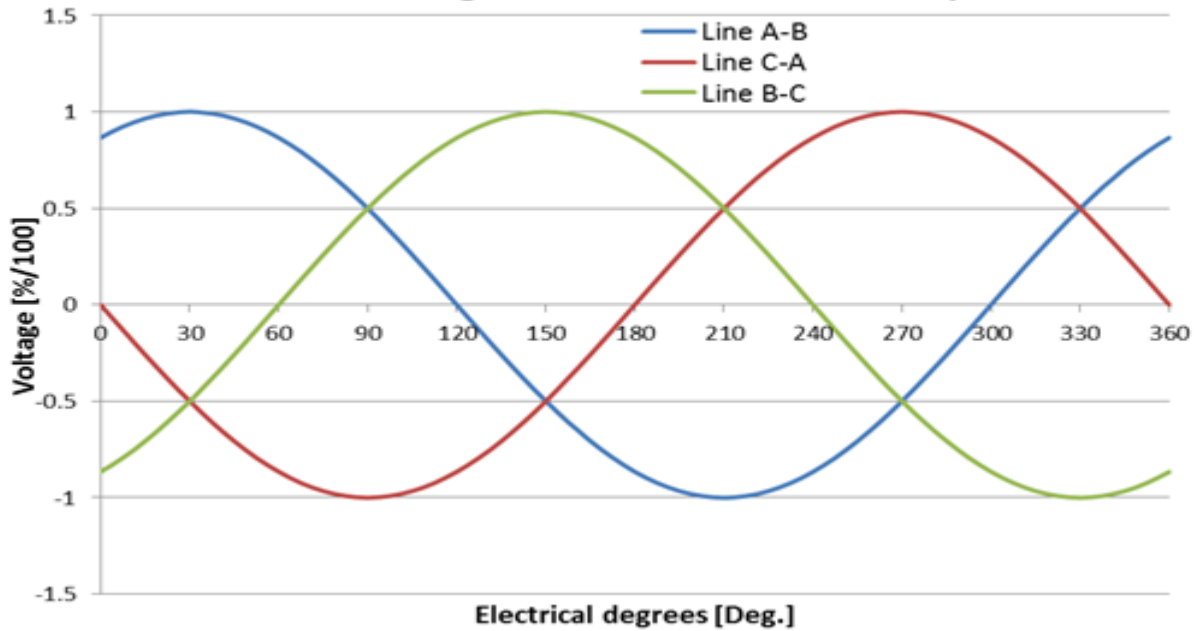
motor type KMXO-362-015-040-048A-00-S00





Terminal's connections and commutation logic

Stator EMF Voltages as function of Electrical position



		Motor excitation sequence and hall						
		Definitions are for ClockWise rotation						
Step		1	2	3	4	5	6	1
Stator Leads	A (RED)	+	+		-	-		+
	B (WHT)	-		+	+		-	-
	C (BLK)		-	-		+	+	
Hsl Sensors Leads	A (BRN)	1	1	0	0	0	1	1
	B (ORG)	0	1	1	1	0	0	0
	C (YEL)	0	0	0	1	1	1	0
Hall sensors Supply Leads	+ BLUE	+	+	+	+	+	+	+
	- GREEN	-	-	-	-	-	-	-