thin gap | TGR SERIES MOTOR KIT

ZERO COGGING | HIGHLY EFFICIENT ARCHITECTURE | OPTIMIZED ROTOR INERTIA
SPACE HERITAGE | LIGHTWEIGHT COMPOSITE STATOR | SCALABLE SIZE AND POWER

Data Sheet Model Number: TGR 89-26

ThinGap's TGR Series includes numerous high performance brushless permanent magnet motors. The TGR Series targets reaction wheel applications where a high efficiency, weight optimized solution with dynamic response capabilities is desired.

ThinGap's TGR Line of Brushless motor kits designed for use in reaction wheel applications; both in atmosphere and vacuum. These motor kits are available in sizes ranging from 29 mm to 89 mm

Motor Parameter Table

Continuous Parameters	Units	Atmosphere	Vacuum
Continuous Torque @ Max Speed*	N-m	0.745	0.346
Max Continuous Speed	RPM	6000	6000
Max Continuous Power*	W	468	217
Required Motor Voltage @ Max Speed	V_{pkl-l}	41.3	39.1
Max Continuous Phase Current @ Max Speed	A_{RMS}	10.3	4.80
Peak Parameters@Max Speed	**Units**	**Atmosphere**	**Vacuum**
Peak Torque (1 sec)*	N-m	2.86	2.77
Peak Phase Current (1 sec)	A_{RMS}	39.8	38.61
Peak Power (1 sec)*	W	1797	1743
Peak Torque (3 sec)*	N-m	1.85	1.79
Peak Phase Current (3 sec)	A_{RMS}	25.7	24.93
Peak Power (3 sec)*	W	1162	1128
Motor Constants	**Units**	**Common Value**	
Voltage Constant (l-l)	V_{pkl-l}/rad/s	0.059	
Voltage Constant (l-l)	V_{pkl-l}/kRPM	6.208	
Torque Constant	N-m/A_{RMS}	0.073	
Motor Constant	N-m/√W	0.105	
Electrical Parameters	**Units**	**Common Value**	
Motor Resistance @ 20°C	Ω	0.321	
Motor Resistance @ Max Temperature	Ω	0.463	
Inductance	µH	12.4 ± 20%	
Number of Magnetic Poles	ea	12	
Electrical Frequency @ Max Speed	Hz	600	
Mechanical Parameters	**Units**	**Common Value**	
Rotor Inertia	kg-m^2	3.44E-04	
Outer Diameter	mm	89	
Through Hole Diameter	mm	55	
Axial Height	mm	26.1	
Rotor Mass	kg	0.353	
Stator Mass	kg	0.098	
Part Set Mass	kg	0.452	
Temperature Parameters	**Units**	**Common Value**	
Max Stator Temperature	°C	130	
Max Rotor Temperature	°C	85	

Derated Specifications for Vacuum

Continuous torque of up to 0.346 N-m and a rated speed of up to 6000 RPM.

Motor Controller Recommendation

3-Phase Controller

High Frequency PWM power input

* Torque values assume that the stator mounting ring is being used to sink heat into the motor assembly

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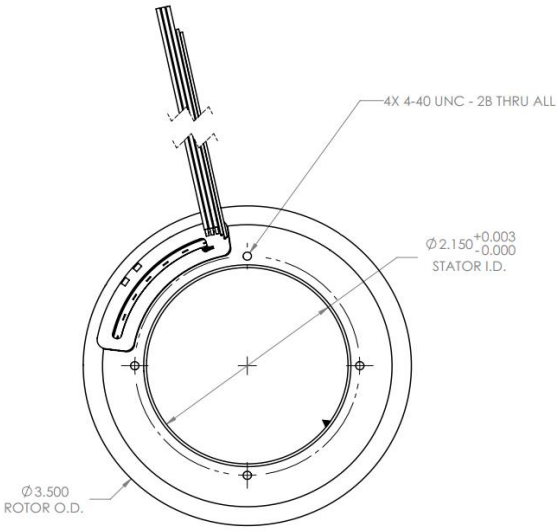
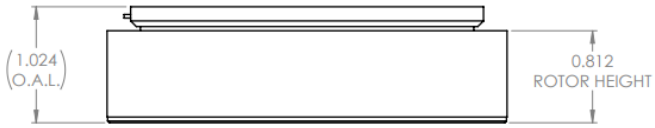
TGR 89-26 Mechanical Information

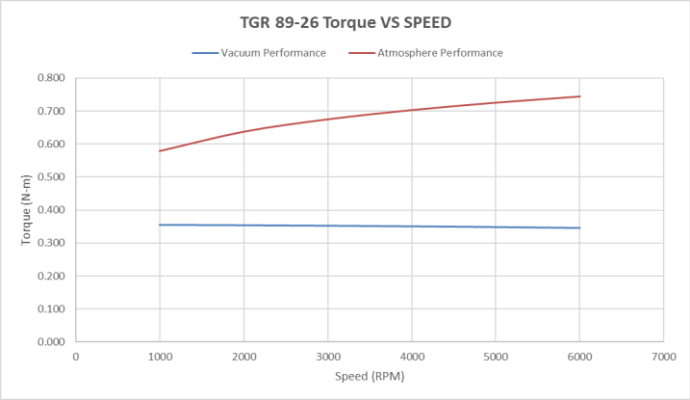


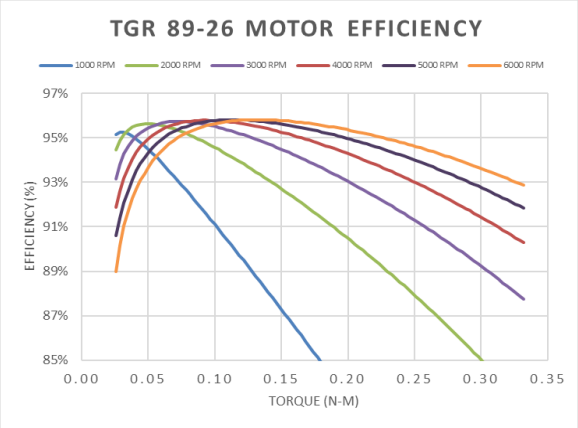


General Mechanical Specifications

All values are in inches and should be considered nominal. Please consult factory for up-to date mechanical drawing and ICD.

TGR Series Motor Capabilities





Example of Typical Use Speed-Torque Curve

Higher speeds possible and is dependent on the applied voltage. Top Speed may be limited mechanically. Please consult factory if higher speeds are required

Example of Vacuum Use Efficiency Curve

Torque values derated for use in vacuum. Chart assumes zero windage and uses generic bearings for the calculation. Please consult the factory if more information on assumptions used in the calculations is required.

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