



# 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:

**TG 3842**

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



Motor Parameter Table

Continuous Parameters	Units	Atmosphere	Vacuum
Continuous Torque @ Max Speed	N-m	0.179	0.035
Max Continuous Speed	RPM	16000	16000
Max Continuous Power	W	299	59
Required Motor Voltage @ Max Speed	$V_{pk-I}$	72.3	61.7
Max Continuous Phase Current @ Max Speed	$A_{RMS}$	4.1	0.13
Peak Parameters@Max Speed	Units	Atmosphere	Vacuum
Peak Torque (1 sec)*	N-m	0.40	0.36
Peak Phase Current (1 sec)	$A_{RMS}$	9.1	8.1
Peak Power (1 sec)*	W	674	605
Peak Torque (3 sec)*	N-m	0.27	0.21
Peak Phase Current (3 sec)	$A_{RMS}$	6.2	4.7
Peak Power (3 sec)*	W	459	349
Motor Constants	Units	Common Value	
Voltage Constant (I-I)	$V_{pk-I}/rad/s$	0.037	
Voltage Constant (I-I)	$V_{pk-I}/kRPM$	3.838	
Torque Constant	N-m/ $A_{RMS}$	0.045	
Motor Constant	N-m/VV	0.025	
Electrical Parameters	Units	Common Value	
Motor Resistance @ 20°C	$\Omega$	2.161	
Motor Resistance @ Max Temperature	$\Omega$	3.032	
Inductance	$\mu H$	62.9 $\pm$ 20%	
Number of Magnetic Poles	ea	8	
Electrical Frequency @ Max Speed	Hz	1067	
Mechanical Parameters	Units	Common Value	
Rotor Inertia	$kg \cdot m^2$	1.71E-04	
Outer Diameter	mm	77	
Through Hole Diameter	mm	59	
Axial Height	mm	19.4	
Rotor Mass	kg	0.138	
Stator Mass	kg	0.024	
Part Set Mass	kg	0.162	
Temperature Parameters	Units	Common Value	
Max Stator Temperature	°C	130	
Max Rotor Temperature	°C	85	

ThinGap's TG 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 29mm to 79 mm

#### Derated Specifications for Vacuum

Continuous torque of up to 0.035 N-m and a rated speed of up to 16000 RPM.

#### Motor Controller Recommendation

3-Phase Controller  
High Frequency PWM power input

\* Current value takes into account temperature losses during operation.

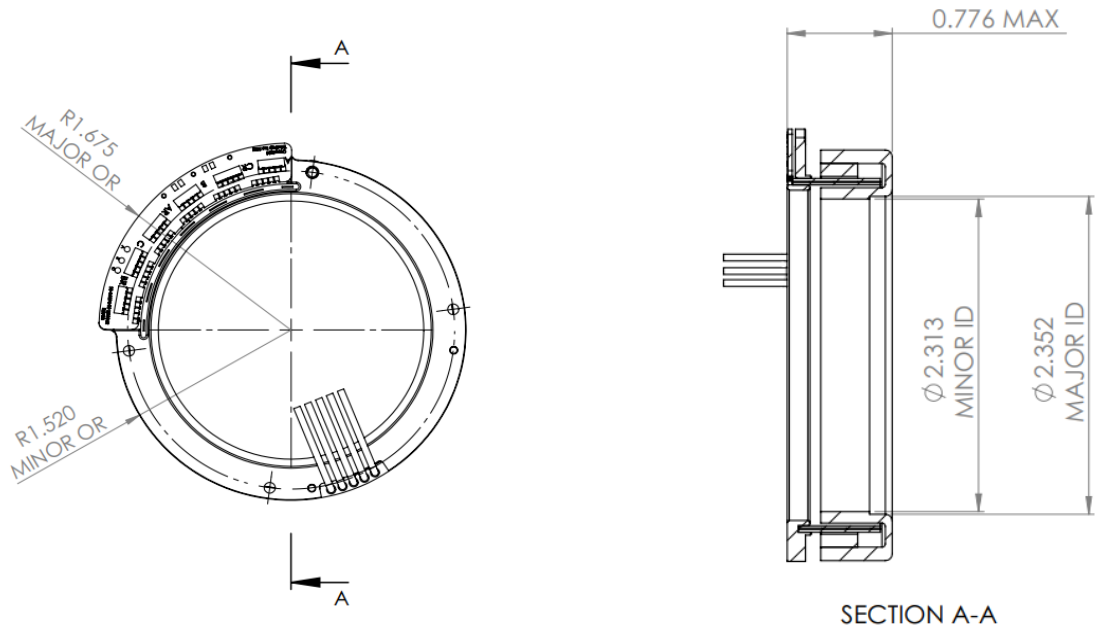




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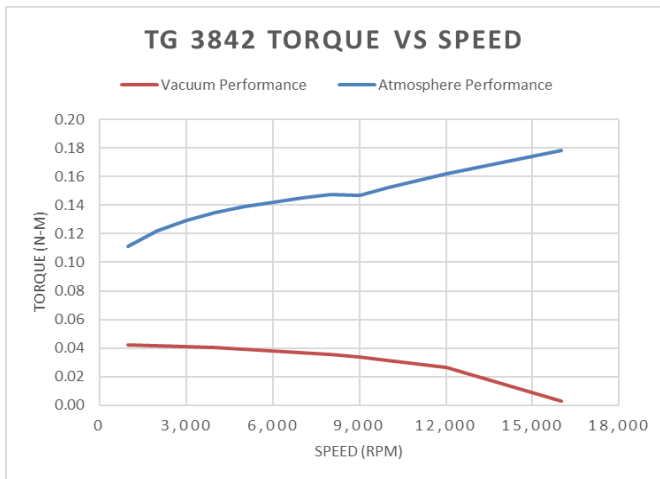
**TG 3842 Mechanical Information**



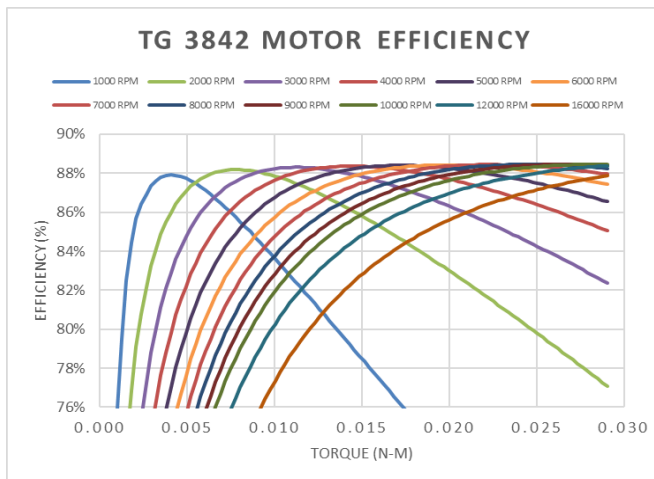
**General Mechanical Specifications**

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.

