



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

Data Sheet Model Number:

TGR 29-12

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.



Motor Parameter Table

Continuous Parameters	Units	Atmosphere	Vacuum
Continuous Torque @ Max Speed	N-m	0.0135	0.0028
Max Continuous Speed	RPM	16000	16000
Max Continuous Power	W	22.69	4.67
Required Motor Voltage @ Max Speed	$V_{pk-I}$	9.9	8.2
Max Continuous Phase Current @ Max Speed	$A_{RMS}$	2.51	0.59
Peak Parameters@Max Speed	Units	Atmosphere	Vacuum
Peak Torque (1 sec)*	N-m	0.036	0.034
Peak Phase Current (1 sec)	$A_{RMS}$	6.6	6.1
Peak Power (1 sec)*	W	23	21
Peak Torque (3 sec)*	N-m	0.024	0.019
Peak Phase Current (3 sec)	$A_{RMS}$	4.3	3.6
Peak Power (3 sec)*	W	14	12
Motor Constants	Units	Common Value	
Voltage Constant (I-I)	$V_{pk-I}/rad/s$	0.0046	
Voltage Constant (I-I)	$V_{pk-I}/kRPM$	0.4790	
Torque Constant	N-m/ $A_{RMS}$	0.0056	
Motor Constant	N-m/VV	0.0054	
Electrical Parameters	Units	Common Value	
Motor Resistance @ 20°C	$\Omega$	0.726	
Motor Resistance @ Max Temperature	$\Omega$	1.019	
Inductance	$\mu H$	7.13 $\pm$ 20%	
Number of Magnetic Poles	ea	6	
Electrical Frequency @ Max Speed	Hz	300	
Mechanical Parameters	Units	Common Value	
Rotor Inertia	$kg \cdot m^2$	3.27E-06	
Outer Diameter	mm	29	
Through Hole Diameter	mm	9	
Axial Height	mm	12.4	
Rotor Mass	kg	0.028	
Stator Mass	kg	0.004	
Part Set Mass	kg	0.031	
Temperature Parameters	Units	Common Value	
Max Stator Temperature	°C	130	
Max Rotor Temperature	°C	85	

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

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

#### Derated Specifications for Vacuum

Continuous torque of up to 0.0028 N-m and a rated speed of up to 16000 RPM.

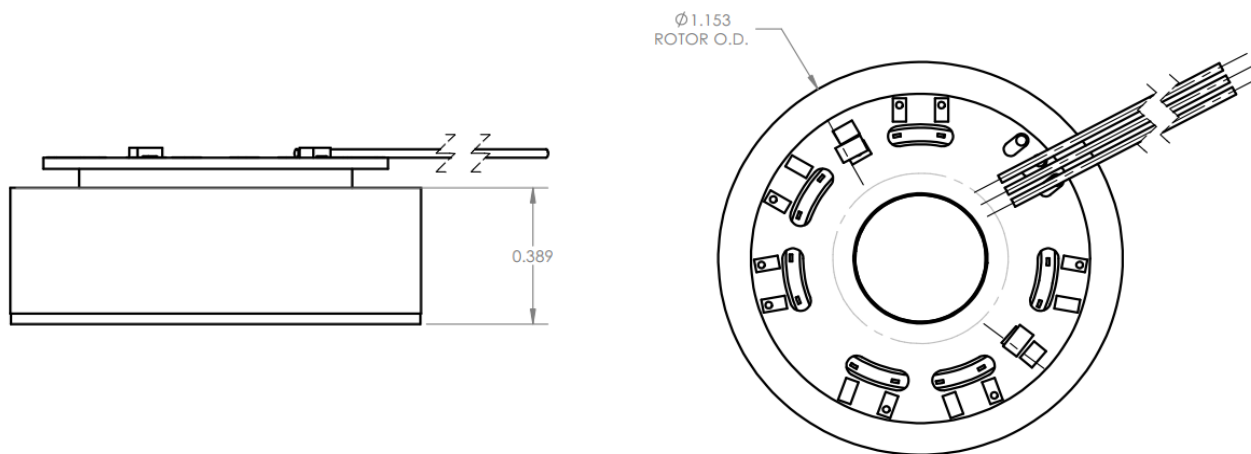
#### Motor Controller Recommendation

3-Phase Controller  
High Frequency PWM power input

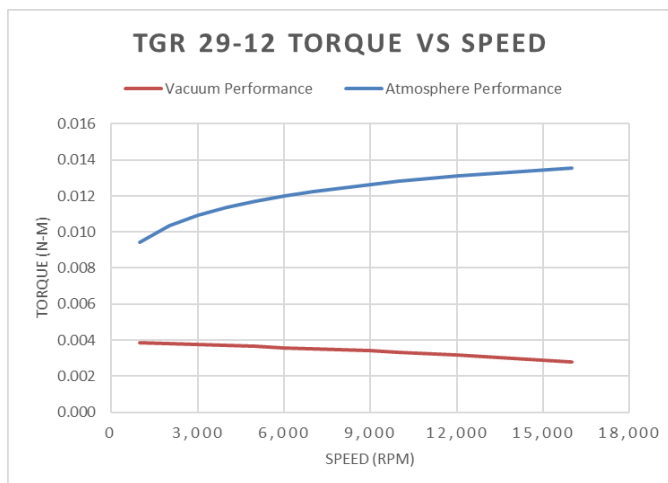




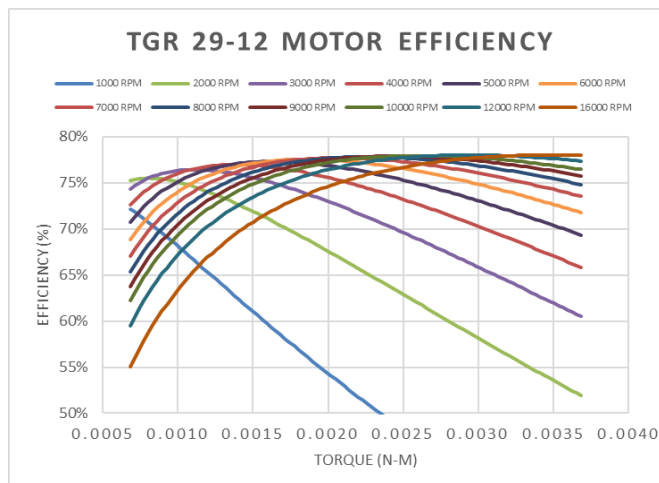
# thin gap | TGR SERIES MOTOR KIT

**TGR 29-12**
**TGR 29-12 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.

