



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 45-20

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	0.085	0.022
Max Continuous Speed	RPM	16000	16000
Max Continuous Power	W	142.4	36.8
Required Motor Voltage @ Max Speed	V_{pk-I}	7.0	6.4
Max Continuous Phase Current @ Max Speed	A_{RMS}	18.3	5.0
Peak Parameters@Max Speed	Units	Atmosphere	Vacuum
Peak Torque (1 sec)*	N-m	0.308	0.295
Peak Phase Current (1 sec)	A_{RMS}	69.1	66.0
Peak Power (1 sec)*	W	1064	772
Peak Torque (3 sec)*	N-m	0.194	0.171
Peak Phase Current (3 sec)	A_{RMS}	43.4	38.3
Peak Power (3 sec)*	W	670	448
Motor Constants	Units	Common Value	
Voltage Constant (I-I)	$V_{pk-I}/rad/s$	0.0037	
Voltage Constant (I-I)	$V_{pk-I}/kRPM$	0.3860	
Torque Constant	N-m/ A_{RMS}	0.0045	
Motor Constant	N-m/VV	0.0197	
Electrical Parameters	Units	Common Value	
Motor Resistance @ 20°C	Ω	0.035	
Motor Resistance @ Max Temperature	Ω	0.050	
Inductance	μH	1.2 \pm 20%	
Number of Magnetic Poles	ea	6	
Electrical Frequency @ Max Speed	Hz	1650	
Mechanical Parameters	Units	Common Value	
Rotor Inertia	$kg \cdot m^2$	2.05E-05	
Outer Diameter	mm	45.1	
Through Hole Diameter	mm	16	
Axial Height	mm	20.4	
Rotor Mass	kg	0.082	
Stator Mass	kg	0.034	
Part Set Mass	kg	0.115	
Temperature Parameters	Units	Common Value	
Max Stator Temperature	°C	130	
Max Rotor Temperature	°C	85	

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 29mm to 79 mm

Derated Specifications for Vacuum

Continuous torque of up to 0.022 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.

