# thin gap | LS SERIES FRAMELESS MOTOR KIT

HIGH TORQUE-TO-WEIGHT RATIO | LIGHT-WEIGHT AND LOW-INERTIA | HIGHLY EFFICIENT
RING ARCHITECTURE | ZERO COGGING FOR PRECISION MOVEMENT | SCALABLE IN SIZE AND POWER

## Data Sheet Model Number: LSI 187-46

ThinGap's LS Line includes numerous high performance brushless permanent magnet motors. The LS line targets lower speed, high precision applications such as gimbals, optics, and precision robotics. The highest torque density with high power capability and low thermal resistance.

ThinGap's LS Line of Brushless Motors
For low speed, high precision applications such as gimbals, optics, and precision robotics. Highest torque density with high power capability. Available in sizes 25mm to 267mm.

Winding Independent Parameter Table

| Continuous Parameters | Units | Value |
|---|---|---|
| Continuous Torque @ Max Speed | N-m | 12.01 |
| Max Continuous Speed | RPM | 1,250 |
| Max Continuous Power | W | 1,572 |
| **Peak Parameters @ Max Speed** | **Units** | **Value** |
| Peak Torque (1 sec) | N-m | 241 |
| Peak Power (1 sec) | W | 31,547 |
| Peak Torque (3 sec) | N-m | 139 |
| Peak Power (3 sec) | W | 18,195 |
| **Mechanical Parameters** | **Units** | **Value** |
| Number of Magnetic Poles | ea | 26 |
| Outer Diameter | mm | 187 |
| Through Hole Diameter | mm | 145 |
| Axial Height | mm | 46 |
| Rotor Inertia | $kg\text{-}m^2$ | 9.82E-03 |
| Rotor Mass | kg | 1.578 |
| Stator Mass | kg | 1.139 |
| Part Set Mass | kg | 2.717 |
| **Temperature Parameters** | **Units** | **Value** |
| Max Stator Temperature | °C | 130 |
| Max Rotor Temperature | °C | 85 |
| Thermal Resistance | °C/W | 0.948 |

### Torque and Mechanical Speed

Continuous rated torque of up to 12.01 N-m and a rated speed of up to 1250 RPM.

### Motor Controller Recommendation

Standard 3-Phase Controller

High Frequency PWM power input

### Resources for Integration

Space-claim CAD files at: www.thingap.com

Complete Mechanical drawings available upon request

Winding dependent Parameter Table

| Electrical Parameters | Units | WYE SERIES Value | WYE PARALLEL Value | DELTA PARALLEL* Value |
|---|---|---|---|---|
| Required Motor Voltage @ Max Speed | $V_{pkl\text{-}l}$ | 463.2 | 231.6 | 133.7 |
| Max Continuous Phase Current | $A_{RMS}$ | 3.0 | 6.0 | 10.3 |
| Peak Phase Current (1 sec) | $A_{RMS}$ | 58.5 | 117.0 | 202.7 |
| Peak Phase Current (3 sec) | $A_{RMS}$ | 33.8 | 67.6 | 117.09 |
| Motor Resistance @ 20°C | Ω | 6.1 | 1.5 | 0.5 |
| Motor Resistance @ Max Temperature | Ω | 8.6 | 2.1 | 0.716 |
| Terminal Inductance | µH | 1,390 ± 20% | 347.5 ± 20% | 115.8 ± 20% |
| Electrical Frequency @ Max Speed | Hz | 271 | 271 | 271 |
| **Motor Constants** | **Units** | **Value** | **Value** | **Value** |
| Voltage Constant (l-l) | $V_{pkl\text{-}l}/rad/s$ | 3.367 | 1.684 | 0.972 |
| Voltage Constant (l-l) | $V_{pkl\text{-}l}/kRPM$ | 352.6 | 176.3 | 101.8 |
| Torque Constant | $N\text{-}m/A_{RMS}$ | 4.124 | 2.062 | 1.191 |
| Motor Constant | $N\text{-}m/\sqrt{W}$ | 1.36 | 1.36 | 1.36 |

*Delta Parallel winding option not available off-the-shelf; may be ordered as a special configuration.