

LOW TEMPERATURE RANGE SMARTMOTOR™ (SM23165M-LTR)

Engineered for robust and reliable operation in harsh environments and high altitudes



The Moog Animatics Low Temperature Range (LTR) SmartMotor™ is available in a standard NEMA 23 frame size, model SM23165M-LTR (the “LTR-23”). This motor has been engineered for robust and reliable operation in extremely frigid environments and at high altitudes.^[1]

To achieve this, an onboard internal heater ensures that the motor can start up in temperatures below -40 degrees C. Along with this, other design changes allow it to withstand random vibrations up to 6 G RMS, 10 - 2000 Hz, and standard IP sealing protects the motor from condensation^[2] and IP67 sealing is optionally available.^[3]

The LTR-23 motor provides the availability of many Class 5 SmartMotor™ features in a fully integrated, 23-frame, IP sealed package specifically designed for extremely low temperature and high altitude applications.

Features:

- NEMA 23 size
- Designed for operation with extreme temperatures, vibrations and high altitude
- IP65 high altitude operation; IP67 possible within operating temperature using flurosilicone O-ring between motor flange and IP67 mating component
- Low temp startup with onboard heater to raise circuit temperature from -65 to -40 °C
- Magnetic, single turn absolute encoder
- Three 5 V TTL sourcing inputs
- RS-422 differential communication
- Non-RoHS

^[1]For RoHS exempt applications only – the LTR motors contain lead-based solder on some internal components to achieve increased reliability over greater thermal ranges.

^[2]IP sealed only when mounted to an equivalently sealed mating component.

^[3]LTR-23 IP67 sealing available only within operating temperature, requires a flurosilicone O-ring between motor flange and IP67 rated mating component.

ADVANTAGES

- Extreme low temperature startup through onboard heater
- Protection against condensation through standard IP sealing
- High altitude operation ensured through proprietary design and testing
- Ease of programming through powerful AniBasic (BASIC-like) language with over 200 commands
- Minimal cabling and space requirements due to fully integrated design
- Ability to solve difficult application problems through field-proven Class 5 features

APPLICATIONS

- Aerospace motion actuation where high altitude and low temperature are factors
- Motion requirements in arctic regions
- Pan and tilt solar collectors
- High altitude surveillance cameras
- Refrigerated food and pharmaceutical processing
- Wind tunnel testing in extreme temperatures
- Cryogenic containment handling
- Cold thermal test chambers
- Nozzle/valve flow for coolers
- Ice handling systems

SPECIFICATIONS

TECHNICAL DATA

| | | |
|--|-------|---|
| Continuous torque (up to 5500 rpm) | 28 | oz-in |
| | 0.19 | N-m |
| Peak torque at stall | 44 | oz-in |
| | .31 | N-m |
| Nominal continuous power (@ 6000 rpm) | 115 | watts |
| No load speed | 9,800 | rpm |
| Motor constant | 6.70 | oz-in/(watts) ^{.5} |
| Rotor inertia | 0.99 | (oz-in-sec ²) x10 ⁻² |
| Weight | 1.3 | lb |
| | .59 | kg |
| Shaft diameter | 0.25 | in |
| | 6.35 | mm |
| Shaft, radial load | 15 | lb |
| | 6.80 | kg |
| Shaft, axial thrust load | 3 | lb |
| | 1.36 | kg |
| Maximum continuous current (@ 7000 rpm) | 3.1 | amps |
| Peak power (@ 7000 rpm) | 145 | watts |
| Torque sensitivity (K_t) | 6.02 | oz-in/amp |
| Voltage constant (K_e) | 4.45 | volts/krpm |
| Terminal resistance (R_T) | 0.77 | Ohms |
| Terminal inductance (L_T) | 0.83 | mH |

Storage temperature -65 to +85 °C.

Normal operating temperature -55 to +70 °C.

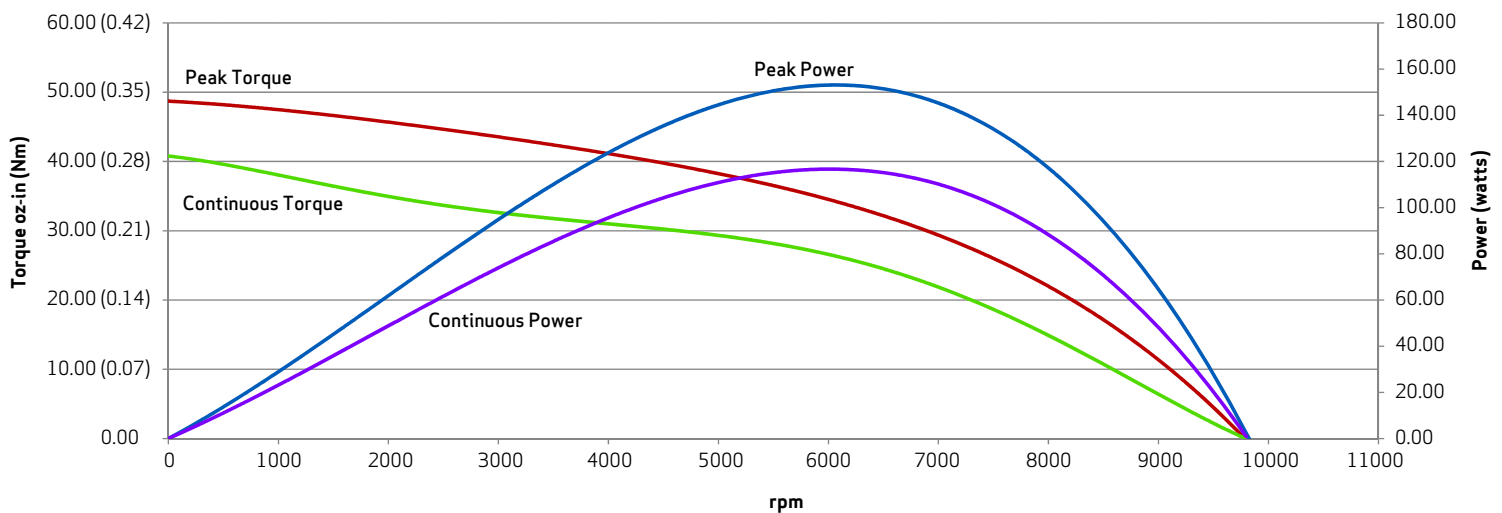
External power or heater must bring temperature up to at least -40 °C for startup from cold.*

*Consult manual found on the website for more details.

⚠ Warning: This product contains lead-based solder on some internal components.

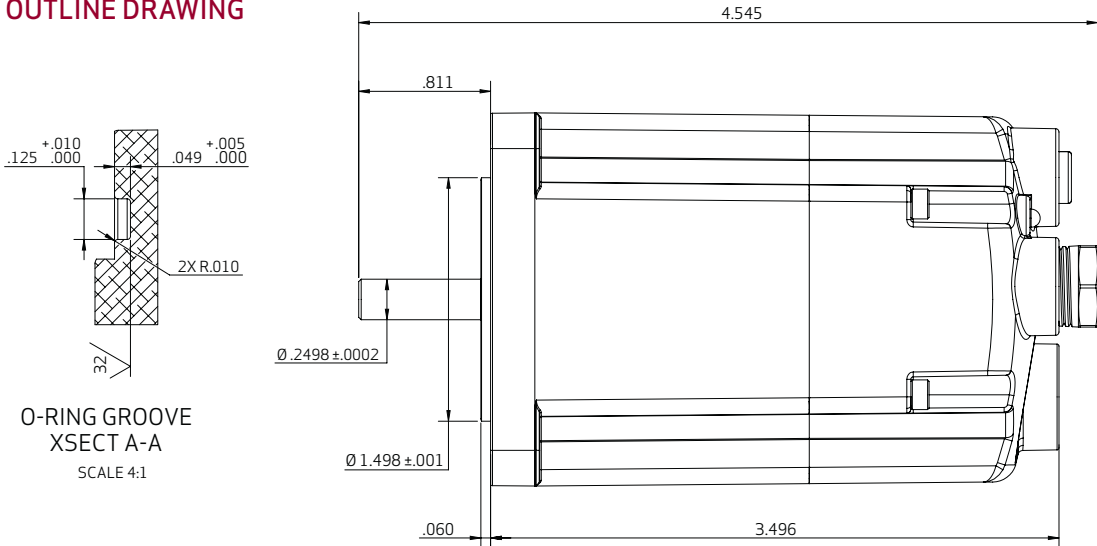
PERFORMANCE TORQUE AND POWER CURVE

SM23165M-LTR motor torque versus speed, 48 volts, MDT commutation, 25 °C ambient (curves are derated at higher ambient).

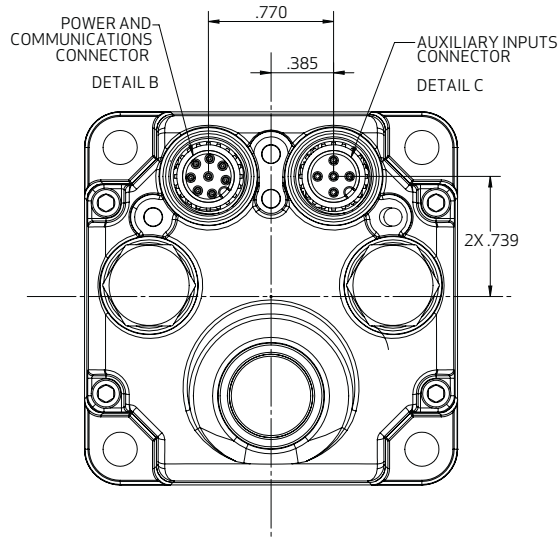
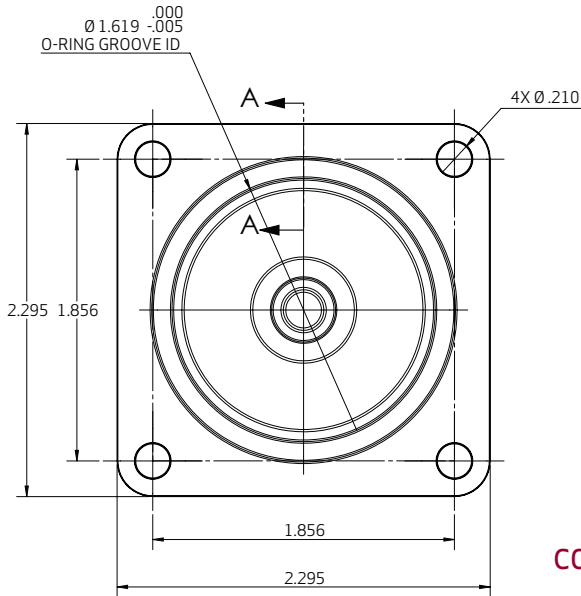


SPECIFICATIONS

OUTLINE DRAWING



O-RING GROOVE
XSECT A-A
SCALE 4:1

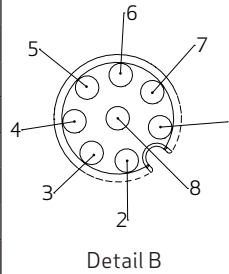


CONNECTORS

Dimensions are in inches

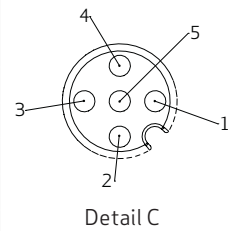
Power and Communications
Pin # Signal

| | |
|---|----------------|
| 1 | Power return |
| 2 | Heater return |
| 3 | Heater +48 V |
| 4 | Rx+ |
| 5 | Tx- |
| 6 | Rx- |
| 7 | +48 V power in |
| 8 | Tx+ |



AUX Inputs
Pin # Signal

| | |
|---|--------|
| 1 | I/O 2 |
| 2 | I/O 0 |
| 3 | Ground |
| 4 | I/O 1 |
| 5 | N/C |



Moog has offices around the world.
For more information or the office
nearest you, contact us online.
mcg@moog.com

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SM23165M-LTR SmartMotor™ Technical Data Sheet
MA1024 09/18

For product information, visit
www.animatics.com

This technical data is based on current available information and is subject to change at any time. Specifications for specific systems or applications may vary.

