
YOUR SOURCE FOR
HIGH RELIABILITY THERMOSTATS, SWITCHES & RELAYS
FE
FLAME ENTERPRISES
INCORPORATED

OUR PRODUCTS

ELECTRICAL PROTECTION & CONTROL

- Power Relays
- HV Contactors
- Solid State Relays
- Solid State Contactors
- Aircraft Circuit Breakers
- Thermal Circuit Breakers
- Remote Control CB's
- High Speed Fuses
- HV & LV Fuses & Fuse Blocks
- Shunts
- Fused Disconnects
- Panel Seals
- CB Collars, Tags & Color Caps

THERMAL MANAGEMENT

- Hermetic Thermostats
- Sealed Thermostats
- Motor Protectors
- AC & DC Fans
- Blowers
- Heating Elements

SWITCHING & INDICATION

- Hermetic Switches
- Sealed Switches
- Rotary Switches
- Illuminated Switches
- LED Indicators
- DC Elapsed Time Indicators
- AC Elapsed Time Indicators
- Ruggedized Event Counters
- Custom Enclosures
- Panel Seals
- Knobs

INTERCONNECT

- Lithium Battery Terminals
- Receptacles
- Cable Mounted Plugs
- Terminal Blocks & Bus Bars
- Grounding Straps
- Relay Sockets
- Junction Modules
- Splices
- Backshells

MANUFACTURERS

ALTRAN MAGNETICS
Amphenol NEXUS Technologies
Amphenol PCD
ARMEL ELECTRONICS
ARVAN Fly with the best
CROUZET
DRI
EHC
ELECTROSWITCH ELECTRONIC PRODUCTS
Extant AEROSPACE
GUARDIAN ELECTRIC
MERSEN
MICROCHIP
REBLING
SAFRAN
Seastrom Manufacturing
Sensata Technologies
stacosystems
TE connectivity
tk ThermoKonnect

SPACE QUALIFIED HERMETIC SWITCHES







Maximum Actuating Force (STP)	28 oz
Minimum Release Force (STP)	1 oz
Maximum Pretravel	0.009"
Maximum Movement Differential	0.003"
Minimum Overtravel	0.002"
Maximum Force on Actuator	5 lb
Current Ratings in Amps (28VDC)	**Resistance** 3
	Inductive 1
	Lamp 1
Minimum Life @ Rated Load	25K
Minimum Mechanical Life Cycles	50K
Ambient Temperature Range	-275°F to 275°F (-170.5°C to 135°C)
Dielectric Strength	Terminal to Case 1000 VRMS Terminal to Terminal 800 VRMS
Max Allowable Leakage	1 x 10-8 Std. cc He/Sec @ 1 atm differential
Shock Resistance	200G, 6 ms sawtooth
Vibration Resistance	65G, 10-2000Hz, .5DA or or 65G RMS
Insulation Resistance @ 500VDC	100 Megohms
Voltage Drop @ 1 amp	0.04
Seal (MIL-S-8805)	Design Enclosure 5
Backfill	Dry nitrogen with 10% helium



Applications

- Spacecraft / space capsule control
- Space Suit EVA (Extra Vehicular Activity)
- Lunar Rover control
- Battery circuit control

Sensata Technologies

G311P641/02 & /05 SPACE-FLIGHT THERMOSTATS

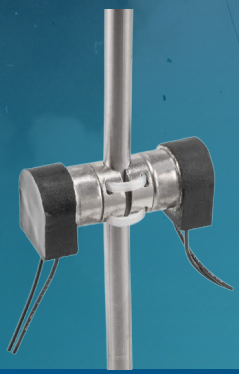


FEATURES

- Single pole/single throw (SPST) bi-metallic snap disc design
- Preset temperature set points, non-adjustable calibration
- Vacuum backed and back-filled with dry nitrogen atmosphere
- 100% screened to NASA S-311-P641
- G311P641/02 is qualified to MIL-PRF-24236/20
- G311P641/02's narrow differential provides tight control signal for temperature control
- G311P641/05 is qualified to MIL-PRF-24236/1

	G311P641/02	G311P641/05
Storage Temperature*	-65°F to +335°F (-53.9°C to +168.3°C)	-80°F to 550°F (-62.2°C to +287.8°C)
Operating Temperature Range*	-40°F to +235°F (-40°C to +112.8°C)	-55°F to 550°F (-48.32°C to +287.8°C)
Contact Resistance	0.025 ohms max per MIL-STD-202, Method 307; 0.050 ohms max after endurance testing	
Current Ratings** 30VDC	250K cycles @ 2A; 50K cycles @ 3A	100K cycles @ 5A; 25K cycles @ 6A; 5K cycles @ 7A
120VAC	250K cycles @ 2A; 50K cycles @ 3A	100K cycles @ 2A; 25K cycles @ 6A; 4K cycles @ 6A
240VAC		100K cycles @ 1A; 25K cycles @ 6A; 2K cycles @ 3A
DWV Terminal to Case	1250 VRMS for 1 min per MIL-STD-202, Method 301	
Vibration Resistance Per MIL-STD-202 Method 204, Condition D	10-2000 Hz, 10G (monitored)	5-2000 Hz, 20G (monitored)
		5-1000 Hz, 100G (unmonitored)
		1000-2000 Hz, 50G (unmonitored)
Shock Resistance	100g, 6 milliseconds, per MIL-STD-202, Method 213	
Seal	$1x10^{-8}$ cc He/sec max per MIL-STD-202, Method 112, Cond. C	
Backfill	Dry nitrogen with 10% helium	
Salt Spray Resistance	Per MIL-STD-202, Method 101, Cond B, 5% solution	
Insulation Resistance @ 500VDC	100 Megohms	
Average Weight	5.4 grams	4.8 grams basic unit; 5.9 grams with bracket
Finish	0.0003 - 0.0004 inches Ni per AMS-QQN-290 over 0.0002 - 0.0003 inches Cu per MIL-C-14550	

* For /02 device, exposure is limited to 100°F above operating temperature for close on rise devices or 100°F below operating temperature for open on rise devices; for /05 device, maximum ambient exposure while in the closed position is 200°F above contact closing temperature.
** For low level circuits, the /05 can be specified with gold plated contacts rated to levels as low as 30mVDC, 0.01A.



Applications

- Propulsion lines, thrusters, & rocket motors
- Optics, instrumentation, & electronic modules
- Hydraulic/pneumatic actuators
- Cold plates
- Electric motor pre-heaters & robotic arm controls

Platforms Served Include

- Atlas V
- Dawn
- Delta II
- GPS
- GPS III
- JCSAT-9/-10
- Space Shuttle
- SPACE-X Dragon
- James Webb & Hubble Space Telescopes



Sensata Technologies

HIGH PERFORMANCE RELAYS & CONTACTORS



KILOVAC HIGH VOLTAGE RELAYS

Space and Weight Savings

- Small size and weight for given power rating

Robust and Versatile

- High resistance to shock, vibration, and temperature extremes
- Low, stable contact resistance over relay life
- Usable in RF devices

HARTMAN N-SERIES RELAYS



High Reliability

- Magnetic latch or side stable
- Stainless steel-welded contstruction
- Hermetically sealed

Flexible Performance

- -55° C to +125° C
- Multiple mounting and auxiliary contact configurations
- Main contact current ratings 30 to 125 A



CII MID-RANGE RELAYS

Comprehensive Selection

- Qualified to a variety of Mil Specs
- Designed to perform in a wide range of extreme environments

Flight Ready

- Hermetically sealed
- High shock and vibration settings

KILOVAC CONTACTORS



Rugged Reliability

- Lightweight high power DC or high-voltage DC
- Hermetically sealed, available with a variety of electrical configurations, power ratings, voltage ratings, and mounting styles to make your electrical system more reliable and capable.

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