# REVISIONS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>APPROVAL</th>
</tr>
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<tr>
<td>---</td>
<td>Released</td>
<td>11/20/03</td>
<td>TJP</td>
</tr>
<tr>
<td>A</td>
<td>Extensively revised per RN A-213.</td>
<td>11/06/17</td>
<td>EFH</td>
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## ORIGINAL SIGNATURES ON FILE

- 11/20/03: TJP
- 11/06/17: EFH

## SHEET REVISION STATUS

<table>
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<tr>
<th>SH</th>
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<th>2</th>
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| SH  | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| REV |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

## ORIGINATOR:

T. Perry/QSS Group Inc.  Thomas J. Perry/QSS Group Inc.

## DATE

11/19/03  11/19/03

## FSC:

5930

## APPROVED:

Thomas J. Perry  11/19/03

Switch, Thermostatic, Bimetallic, SPST,

Narrow Differential, Hermetic, Detail

Specification for

## CODE 562 APPROVAL:

Kusum K. Sahu  11/19/03

## CODE 562 SUPERVISORY APPROVAL:

Daryl D. Lakins  11/20/03

## ADDITIONAL APPROVAL:

S-311-641/02

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GODDARD SPACE FLIGHT CENTER

GREENBELT, MARYLAND  20771

## CAGE CODE:

25306
GSFC DETAIL SPECIFICATION

SWITCH, THERMOSTATIC, BIMETALLIC, SINGLE POLE, SINGLE THROW (SPST), NARROW DIFFERENTIAL, HERMETICALLY SEALED

The requirements for procuring the thermostatic switches described herein shall consist of this specification and the current revision of GSFC S-311-641.

PART NUMBER

G311P641/02  1  1  L  163  03  05  2  1  /  A  A  1

(A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L)

(A) GSFC PREFIX

(B) BRACKET
1 = No Bracket
2 = Loose Bracket

(C) Terminal
1 = Straight
2 = 45°
3 = Right Angle

(D) Operation
L = Open on rise
F = Close on rise

(E) Closing Temperature*
Use 3 digits (°F)

(F) Tolerance*
03 = ±3
04 = ±4
05 = ±5

(G) Differential*
04 = 2 to 4°F
05 = 2 to 5°F
07 = 3 to 7°F
09 = 5 to 9°F

(H) Plating
2 = Copper-nickel

(I) Contacts
1 = Silver
2 = Gold plated

(J)(K)(L) Special Feature Code (see Table 2 and Figure Section as applicable). Consult factory for special configurations not shown.

* See Table 1 for standard operating temperatures, differential and tolerances which can also be customized by the manufacturer. For custom parts, the manufacturer shall modify either (E), (F), or (G) of the part number, as applicable.
**REQUIREMENTS**

Dimensions and configuration:  see Figures 1 – 4.

Switching action:  Single Pole, Single Throw (SPST)

Storage temperature range:  -65°F to +400°F (-53.9°C to +204.4°C)
Operating temperature range:  -40°F to +250°F (-40°C to +121°C)

Contact rating:  resistive load, 2.0 amperes at 30VDC/120VAC, 250,000 cycles

Contact resistance:  0.050 ohms maximum, per MIL-STD-202, Method 307

**DWV:**
1250 VAC, rms, 60 cycles for 1 minute, terminal to case, per MIL-STD-202, Method 301

**Vibration:**
10-2000 Hz, 10G, per MIL-STD-202, Method 204, Condition D (monitored)

**Shock:**
100G, 6 milliseconds, per MIL-STD-202, Method 213

**Hermeticity:**
1 X 10^-8 atm cc/sec. maximum, per MIL-STD-202, Method 112, Condition C

**Weight:**
5.4 grams (average)

<table>
<thead>
<tr>
<th>Closing Temperature Range</th>
<th>Opening Temperature Differential</th>
<th>Closing Temperature Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40°F to +250°F</td>
<td>2 to 5°F</td>
<td>±4°F</td>
</tr>
<tr>
<td>(-40°C to +121°C)</td>
<td>(1.1 to 2.8°C)</td>
<td>(±2.2°C)</td>
</tr>
</tbody>
</table>

Table 1  **Standard operating characteristics, differential and tolerances.**

Operating temperature:  Temperature at which contacts close.

Differential:  Subtract (for close on rise) or add (for open on rise) the differential from the closing temperature to determine the temperature at which the contacts will open.

Qualification:  Qualification listing to MIL-PRF-24236/20 required.

Screening:  Switches shall be subjected to 100% Group A screening inspection per S-311-P-641, Table 1, Test Nos. 1 – 12, with the following exception:  PIND per manufacturer’s GSFC approved internal test procedure.
### TABLE 2 Wire Leads

<table>
<thead>
<tr>
<th>ORDERING CODE</th>
<th>Wire Type</th>
<th>Lead Length +/-10% Inch (mm)</th>
<th>Stycast Overmold (Dimensions per Figure 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J A</td>
<td>M22759/11-22-9</td>
<td>59.0 (1500)</td>
<td>STYCAST 2850FT</td>
</tr>
<tr>
<td>B</td>
<td>M22759/33-22-9</td>
<td>59.0 (1500)</td>
<td>STYCAST 2850FT</td>
</tr>
<tr>
<td>C</td>
<td>M22759/43-22-9</td>
<td>59.0 (1500)</td>
<td>STYCAST 2850FT</td>
</tr>
</tbody>
</table>

Over mold dimensions per Figure 5

Approved source(s):

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Cage Code</th>
<th>Vendor Similar Part Number</th>
</tr>
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<tbody>
<tr>
<td>Sensata Technologies, Inc.</td>
<td>82647</td>
<td>M2 Series</td>
</tr>
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</table>

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Figure 1
(G311P641/0211XXXXXXXXXXX)

Figure 2
(G311P641/0221XXXXXXXXXXX)
Figure 3
(G311P641/0212XXXXXXXXXX)

Figure 4
(G311P641/0222XXXXXXXXXX)

Figure 5 = Plain cup with wire leads and STYCAST overmold strain relief
(G311P641/0211XXXXXXXXXX / X)
## Figure 6 – Tube Mount Adapter with options (G311P641/0211xxxxxxxxx / X X X)

<table>
<thead>
<tr>
<th>ORDERING CODE</th>
<th>TUBE MOUNT ADAPTER (FOR REFERENCE ONLY)</th>
<th>Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>.256 +/- .010 (6.50 +/- .25)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>.381 +/- .010 (9.68 +/- .25)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ORDERING CODE</th>
<th>TUBE MOUNT ADAPTER MOUNTING ANGLE (+/-10°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0° (TERMINAL ORIENTATION PARALLEL TO THE TUBE DIRECTION)</td>
</tr>
<tr>
<td>2</td>
<td>45°</td>
</tr>
<tr>
<td>3</td>
<td>90°</td>
</tr>
<tr>
<td>4</td>
<td>135°</td>
</tr>
</tbody>
</table>

### Option A

**1/4” DIAMETER TUBE MOUNT**

- STYCAST 2650FT
- .430 MAX
- .060 THRU SLOT
- .255

**SLOTS:**
- 2-PL
- ACCEPTS THOMAS & BETTS
- TY-WRAP CATALOG NUMBER TYZ33M
- PRODUCT ID 77AG009603900000 OR EQUIVALENT

**ORIENTATION OF TUBE ANGLE SHOWN AT 90-DEGREES**
OPTION B
3/8" DIAMETER TUBE MOUNT

STYCAST 2850FT

.430 MAX

.060 THRU SLOT

R.191+.005

.110

-.000

.660 MAX

0°

45°

90°

135°

ORIENTATION OF TUBE ANGLE SHOWN BELOW AT 90-DEGREES

SLOTS, 2-PL
ACCEPSTS THOMAS & BETTS
TY-WRAP CATALOG NUMBER TY223M
(PRODUCT ID TAG00620R0000) OR EQUIVALENT