

REVISIONS																				
SYMBOL		DESCRIPTION										DATE		APPROVAL						
-		Original Release										4/29/05		ZNG						
A		Completely redrawn to add Unit 7 code specifics, to clarify standard tolerance limits, and to add mounting configurations 716 through 718 per RN A-146.										2/21/07		ZNG						
B		Revised per RN A-169. Original Signatures on File										12/15/10		JS						
SHEET REVISION STATUS																				
SH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REV	B	B	B	B	B	B	B	B	B	B										
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.											DATE 4/28/05		FSC: 5930							
APPROVED: TJ Perry/Commodity Specialist											4/28/05		Switch, Thermostatic, Bimetallic, SPST, Corrosion Resistant Steel, Hermetic, Detail Specification for							
CODE 562 APPROVAL: M.A. Proctor/Code 562/GSFC Vinod Patel for M.A. Proctor											4/28/05									
CODE 562 SUPERVISORY APPROVAL: D.D. Lakins/Code 562 GSFC Darryl D. Lakins											4/28/05									
ADDITIONAL APPROVAL:													S-311-641/03							
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),
CORROSION RESISTANT STEEL, 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 EXAMPLE:

<u>G311P641/03</u>	<u>710</u>	<u>S</u>	<u>040</u>	<u>A</u>	<u>065</u>	<u>A</u>	/	<u>A</u>	<u>1</u>	<u>Z</u>
(A)	(B)	(C)	(D)	(E)	(F)	(G)		(H)	(I)	(J)

(A) GSFC PREFIX

(B) MOUNTING CONFIGURATION

- 701 = Bare Module (See Figure 1)
- 702 = .164-32 Stud Mount (See Figure 2)
- 703 = .190-32 Stud Mount (See Figure 3)
- 704 = .138-32 Stud Mount (See Figure 4)
- 705 = Narrow Slot-Slot Flange (See Figure 5)
- 706 = Hole-Slot Flange (See Figure 6)
- 707 = Tube Mount Adapter (See Figure 7)
- 708 = Bare Module with Strain Relief (See Figure 8)
- 709 = Bare Module with Lead Wires (See Figure 9)
- 710 = .250 Dia. Tube Mount Adapter with Lead Wires (See Figure 10)
- 711 = .164-32 Stud Mount with Lead Wires (See Figure 11)
- 712 = Hole-Slot Flange with Lead Wires (See Figure 12)
- 713 = .375 Dia. Tube Mount Adapter with Lead Wires (See Figure 13)
- 714 = Tube Mount Adapter with Lead Wires (See Figure 14)
- 715 = Hole-Slot Flange, Long (See Figure 15)
- 716 = Hole-Slot Flange, Bat Wing (See Figure 16)
- 717 = Tube Mount Adapter, Anodized Aluminum (See Figure 17)
- 718 = Tube Mount Adapter, Anodized Aluminum, Screw Clamp (See Figure 18)

(C) S = Space Rated Thermal Switch

(D) Lower Operating Setpoint in °F

(E) A = Open on Rising Temperature
B = Close on Rising Temperature

(F) Upper Operating Setpoint in °F

(G) Special Temperature Feature Code *

(H) (I) (J) Special Physical Feature Code (See Figure section as applicable, Unit 7 code). Consult factory for special configurations not shown.

* See Table 1 for non-standard operating temperatures, differential and tolerances. The setpoint tolerances may also be specified by adding a suffix to the ordering code:

/X/Y/Z where X = Closing setpoint tolerance
Y = Opening setpoint tolerance
Z = Minimum differential between opening and closing setpoints

Example: /3/2/7 represents: ±3°F on closing, ±2°F on opening and 7°F minimum differential.

REQUIREMENTS

Dimensions, configuration and weight: see Figures 1 and on.

Switching action: Single Pole, Single Throw (SPST)

Storage temperature range: -184°F to +350°F (-120°C to +177°C)

Operating temperature range: -120°F to +300°F (-84.4°C to +148.9°C)

Contact rating: resistive load, 5.0 amperes at 28 VDC, 100,000 cycles

3.5 amperes at 42 VDC, 10,000 cycles

1.0 ampere at 120 VDC, 250,000 cycles

1.0 ampere at 30 VDC, 1,000,000 cycles

1.0 milliampere at 1 mV, 100,000 cycles

Contact resistance (per MIL-STD-202, Method 307):

Inconel electrical terminations: 0.025 ohms maximum

High Purity Nickel electrical terminations: 0.010 ohms maximum

DWV: 1250 VAC, rms, 60 Hz for 1 minute, terminals to case, per MIL-STD-202, Method 301

Vibration (Random): 20-2000 Hz, 22.7 grms, 24 minutes in most critical axis (unmonitored)

Shock: Tested to 4000g's, ½ sine, ½ millisecond.

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

CRBI (Contact Resistance Burn-In): 1000 cycles, 0.050 ohms maximum [Inconel terminations] or 0.020 ohms maximum [High Purity Nickel terminations], each closure with missed cycle detection

Cleaning: 100% tested for cleanliness using micro-particle analysis (<1 mil particle limit)

DPA (Destructive Physical Analysis): Customer option. Performed per MIL-STD-1580, Rev. B

Acceptance Testing (100% of parts): Vibration, PIND, 1000 cycle CRBI, Temperature Setpoint, Controlled Creepage (600 VDC, 4.5 ms arc duration)

Lot Acceptance testing: RGA (1000 ppm moisture maximum) and Group B

Standard Tolerance Limits*

Specified Temperature Setpoint Range	Temperature Tolerance
-120 to 0°F (-84.4 to -17.8°C)	±6 °F (±3.3 °C)
+1 to +250°F (-17.2 to +121.1°C)	±5 °F (±2.8 °C)
+251 to +300°F (121.7 to +148.9°C)	±7 °F (±3.9 °C)

* 7 degree F (3.9 degree C) minimum differential between close and open setpoints. When tolerance overlap occurs, the minimum differential takes precedence.

Table 1 Special Temperature Feature Code

A	Setpoint tolerances are min-max. Differential shall be 5°F minimum.
B	Opening setpoint is min or max.
C	Closing setpoint is min or max.
D	Opening setpoint is $\pm 5^\circ$ with 7° to 18° differential. Closing setpoint given is min or max. possible.
E	Closing setpoint is $\pm 5^\circ$ with 7° to 18° differential. Opening setpoint given is min or max. possible.
F	Closing setpoint is $\pm 4^\circ\text{F}$ with 11 to 19°F differential. Opening setpoint is min or max. possible.
G	Opening and closing setpoints are $\pm 3^\circ\text{F}$
H	Opening and closing setpoints are $\pm 4^\circ\text{F}$
J	Opening and closing setpoints are $\pm 5^\circ\text{F}$
K	Closing setpoint is $\pm 2^\circ\text{F}$. Opening setpoint is min or max.
M	Differential shall be 5°F min.
N	Closing setpoint is $\pm 3^\circ\text{F}$. Opening setpoint given is min or max possible.
P	Closing setpoint is $\pm 4^\circ\text{F}$. Opening setpoint given is min or max possible.
R	Setpoint tolerances are Min-Max. Differential shall be 10°F Min.
S	Opening and closing setpoints are $\pm 6^\circ\text{F}$. Differential shall be 10°F Min.
T	Closing setpoint is $\pm 5^\circ$ with 7° to 13° differential. Opening setpoint given is min or max possible.
U	Setpoint tolerances are min-max. Specify minimum differential (example: U/7).
V	Opening setpoint is min or max. Specify closing tolerance and minimum differential (example: V/5/7).
W	Closing setpoint is min or max. Specify opening tolerance and minimum differential (example: W/5/7).

Figure 1:
701 = Bare Module

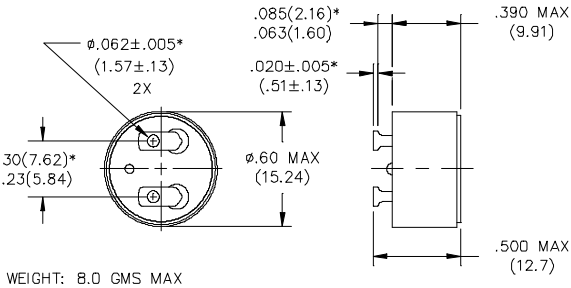


Figure 2:
702 = .164-32 Stud Mount

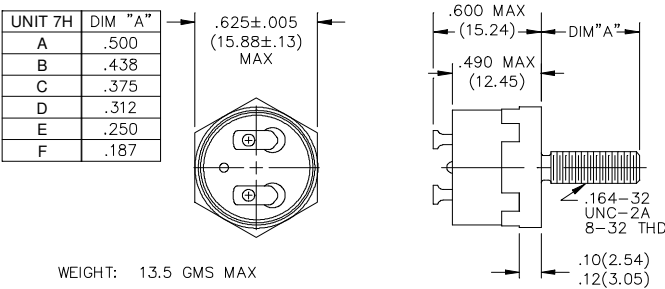


Figure 3:
703 = .190-32 Stud Mount

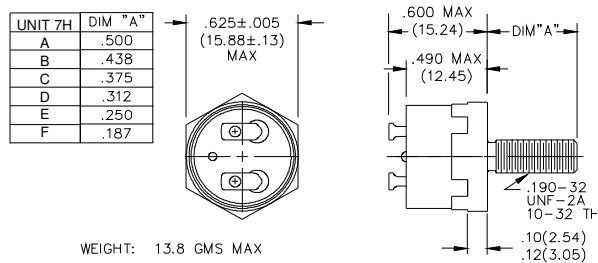


Figure 4:
704 = .138-32 Stud Mount

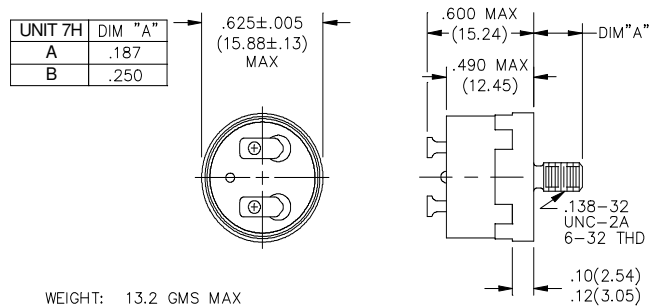


Figure 5:
705 = Narrow Slot-Slot Flange

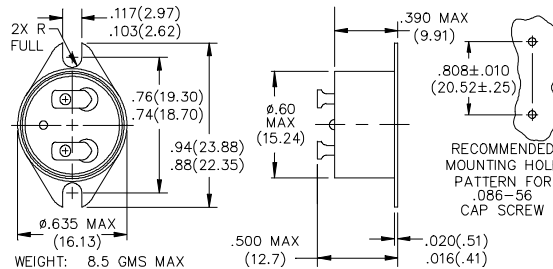


Figure 6:
706 = Hole-Slot Flange

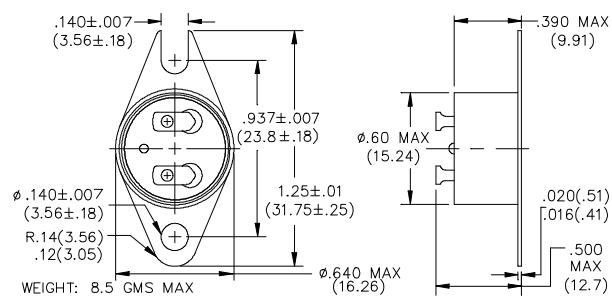


Figure 7:
707 = Tube Mount Adapter
UNIT 7 (H)(I)(J)

ORDERING CODE (UNIT 7A)	TUBE DIAMETER	DIMENSION "A" ±.01
A	.250 +.030/- .000 (6.35 +.760/- .000)	.29 (7.37)
B	.375 +.030/- .000 (9.52 +.760/- .000)	.43 (10.92)
C	3.73 +.030/- .000 (94.74 +.760/- .000)	.61 (15.49)
D	2.88 +.030/- .000 (73.15 +.760/- .000)	.61 (15.49)
ORDERING CODE (UNIT 7B)	TUBE BRACKET MOUNTING ANGLE (±10°)	
1	0° (Lead Wires Parallel to Tube Direction)	
2	45°	
3	90° (Lead Wires Perpendicular to Tube Direction)	
4	135°	
ORDERING CODE (UNIT 7C)	WIRE AND OVERMOLD	
NONE	NO WIRE AND OVERMOLD	
A	M22759/43-22-9	
B	M22759/43-20-9	
C	M22759/43-16-9	

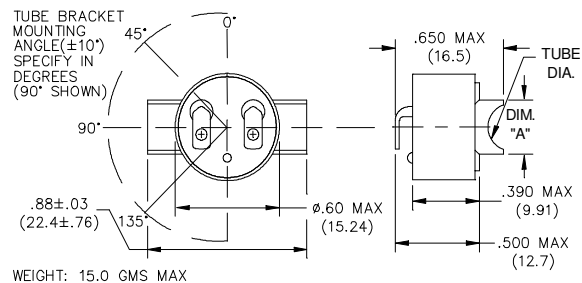


Figure 8:
708 = Bare Module with Strain Relief

UNIT 7H	
A	M22759/43-22-9
B	M22759/43-20-9

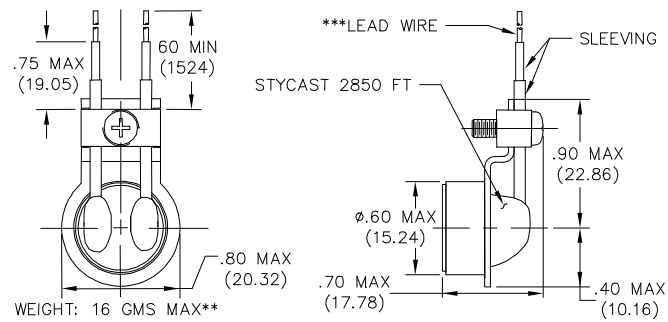


Figure 9:
709 = Bare Module with Lead Wires

UNIT 7H	
A	M22759/43-22-9
B	M22759/43-20-9

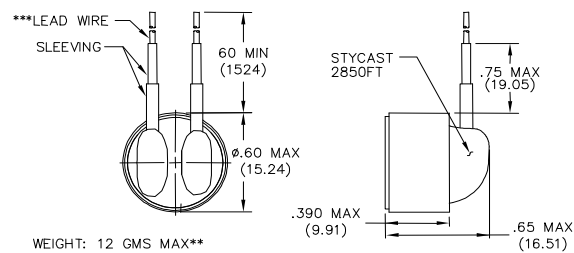


Figure 10:
710 = .250 Dia. Tube Mount Adapter with Lead Wires
 UNIT 7 (H)(I)(J)

ORDERING CODE (UNIT 7A)	LEAD WIRE MIL-SPEC
A	M22759/43-22-9
B	M22759/43-20-9
ORDERING CODE (UNIT 7B)	TUBING ADAPTER MOUNTING ANGLE (±10°)
1	0° (Lead Wires Parallel to Tube Direction)
2	45°
3	90° (Lead Wires Perpendicular to Tube Direction)
4	135°
ORDERING CODE (UNIT 7C)	OTHER OPTIONS
Z	LESS STRAP AND SHIPPING TUBE
Y	LESS STRAP AND SHIPPING TUBE, WITH WIRE TIE FEATURE ON TUBING ADAPTER (SEE P/N 652-4197-050)
X	TUBING ADAPTER DIAMETER IS .287 ±.030/-.000

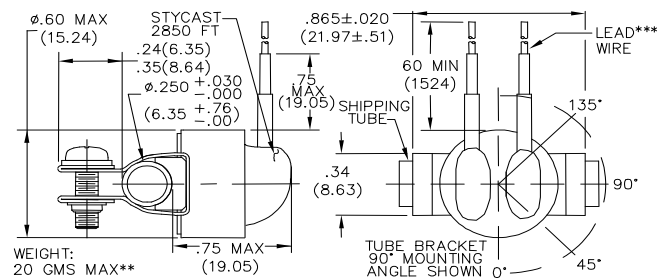
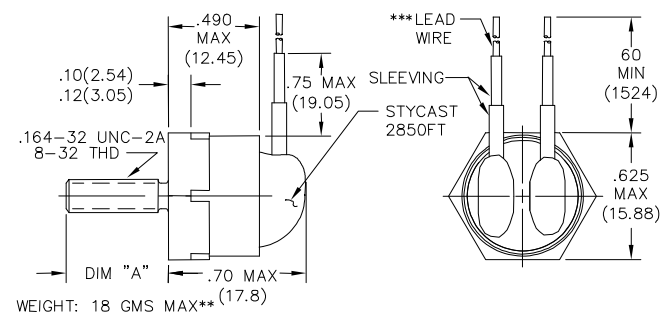


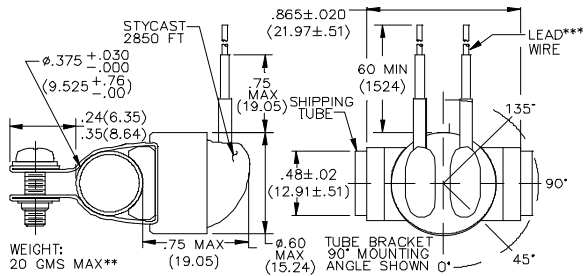
Figure 11:
711 = .164-32 Stud Mount with Lead Wires

UNIT 7 (H)(I)(J)

ORDERING CODE (UNIT 7A)	LEAD WIRE MIL-SPEC
A	M22759/43-22-9
B	M22759/43-20-9
ORDERING CODE (UNIT 7B)	STUD LENGTH ±.020 (.51)
1	.500 (12.70)
2	.438 (11.13)
3	.375 (9.53)
4	.312 (7.93)
5	.250 (6.35)
6	.187 (4.75)



UNIT 7H	
A	M22759/43-22-9
B	M22759/43-20-9



UNIT 7 (H)(I)(J)

TUBE BRACKET MOUNTING ANGLE (90° SHOWN)
 *** OPTION

90°
 135°
 45°
 0°

88±.03
 (22.4±.76)

60 MIN
 (1524)

Ø.60 MAX
 (15.24)

STYCASE
 2850 FT

***OPTION

.75 MAX
 (19.05)

HEAT SHRINKABLE
 TEFLON SLEEVING

.75 MAX
 (19.05)

DIM "A"

***OPTION

*** FOR OPTION SELECTION
 CONSULT FACTORY

***OPTION

UNIT 7 (H)(I)(J)

ORDERING CODE (UNIT 7A)	TUBE DIAMETER	DIMENSION "A" ± 0.1
A	.250 $\pm .030$ / - .000 (6.35 $\pm .760$ / - .000)	.29 (7.37)
B	.375 $\pm .030$ / - .000 (9.52 $\pm .760$ / - .000)	.43 (10.92)
C	3.73 $\pm .030$ / - .000 (94.74 $\pm .760$ / - .000)	.61 (15.49)
D	5.16 $\pm .030$ / - .000 (131.06 $\pm .760$ / - .000)	.61 (15.49)
ORDERING CODE (UNIT 7B)	TUBING ADAPTER MOUNTING ANGLE ($\pm 10^\circ$)	
1	0° (Lead Wires Parallel to Tube Direction)	
2	45°	
3	90° (Lead Wires Perpendicular to Tube Direction)	
4	135°	
ORDERING CODE (UNIT 7C)	LEAD WIRE MIL-SPEC	
W1	M22759/43-22-9	
W2	M22759/43-20-9	

Figure 15:
715 = Hole-Slot Flange, Long

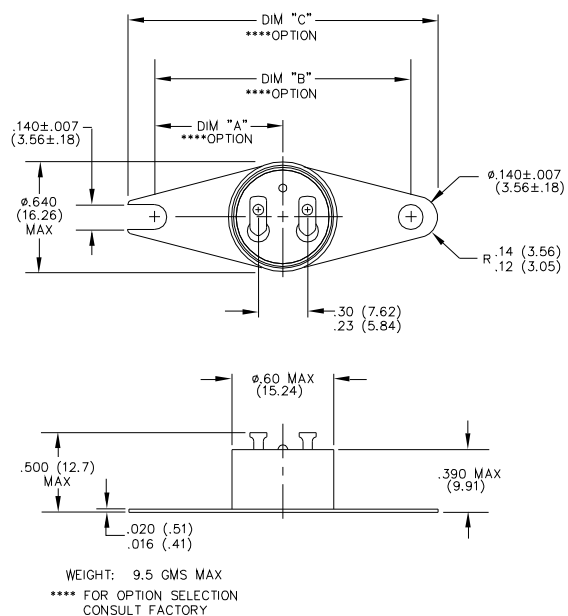


Figure 16:
716 = Hole-Slot Flange, Bat Wing

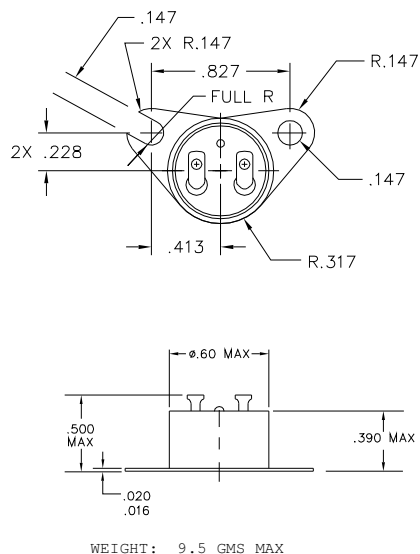
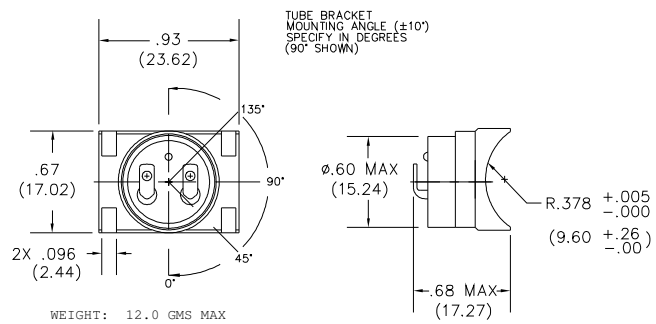
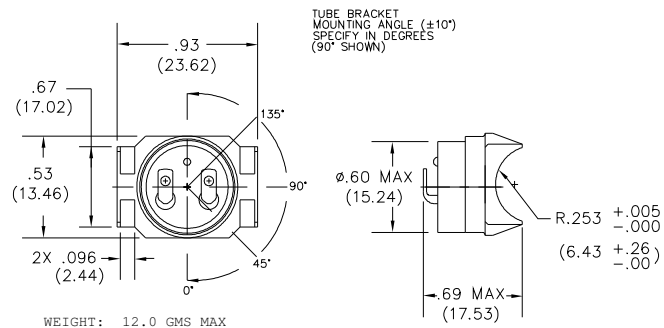
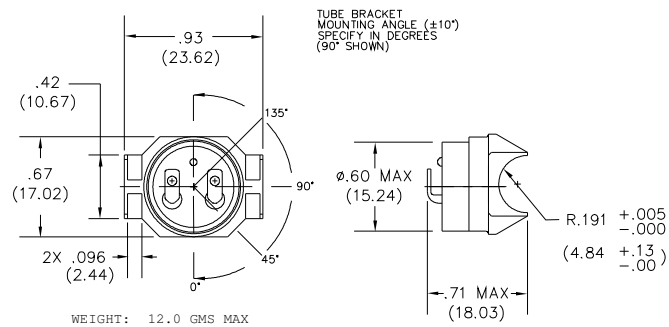
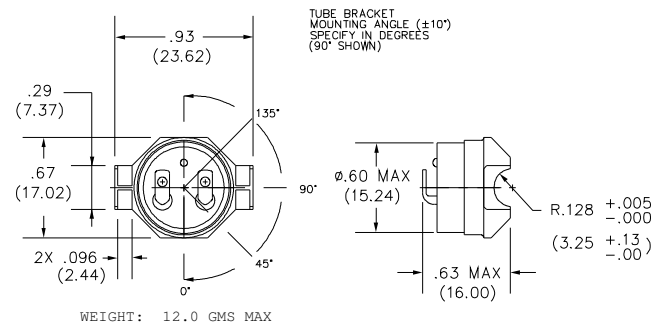


Figure 17:
717 = Tube Mount Adapter,
Aluminum, Tie Strap or Epoxy
Mount

UNIT 7 (H)(I)(J)

ORDERING CODE (UNIT 7A)	TUBE MOUNT DIAMETER (FOR REFERENCE ONLY)
A	.256 +.010/- .000 (6.50 +.25/- .00)
B	.381 +.010/- .000 (9.68 +.25/- .00)
C	.506 +.020/- .000 (12.85 +.51/- .00)
D	.756 +.020/- .000 (19.20 +.51/- .00)
E	.881 +.020/- .000 (22.38 +.51/- .00)
ORDERING CODE (UNIT 7B)	TUBING ADAPTER MOUNTING ANGLE (±10°)
1	0° (Terminal Orientation Parallel to Tube Direction)
2	45°
3	90° (Terminal Orientation Perpendicular to Tube Direction)
4	135°

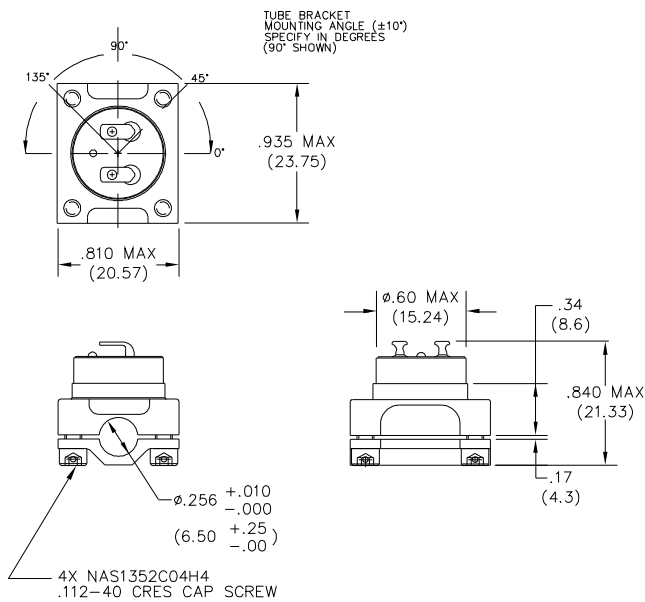


**** **FOR OPTION SELECTION CONSULT FACTORY**

Note: Aluminum Adapter is 6061-T6, Anodized per MIL-A-8625, Type II, Class 2, Black. Recommended Tie Strap is Thomas&Betts TYZ523M.

Figure 18:
718 = Tube Mount Adapter, 1/4"
Diameter, Aluminum, Screw Mount
UNIT 7 (H)(I)(J)

ORDERING CODE (UNIT 7A)	TUBE MOUNT DIAMETER (FOR REFERENCE ONLY)
A	.256 +.010/- .000 (6.50 +.25/- .00)
B	TBD
C	TBD
D	TBD
ORDERING CODE (UNIT 7B)	TUBING ADAPTER MOUNTING ANGLE (±10°)
1	0° (Terminal Orientation Parallel to Tube Direction)
2	45°
3	90° (Terminal Orientation Perpendicular to Tube Direction)
4	135°



- * Typical Dimension for all configurations.
- ** "WEIGHT" does not include weight of lead wires.
- *** Wire (where applicable) MIL-W-22759/43

WEIGHT: 18.0 GMS MAX
Note: Aluminum Adapter is 6061-T6, Anodized per MIL-A-8625, Type II, Class 2, Black.

Approved source (s) :

Manufacturer	Cage Code	Vendor Similar Part Number
Honeywell DSES, Redmond, WA.	0FYPO	700 Series