

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.	12/15/10	JS
C	Revised per RN A-176.	4/30/13	JS
D	Revised per RN A-184	5/16/13	JS
E	Revised per RN A-188	1/9/14	JS
F	Revised Per RN A-189	3/14/14	JS
G	Revised Per RN A-194	4/17/15	JS
H	Revised Per RN A-200	10/8/15	JS
Original Signatures on File			

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	H	H	H	H	H	H	H	H	H											
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.	TJ Perry/QSS	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 **Page 1 of 9**

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:

G311P641/03 710 S 040 A 065 A / A 1 Z
(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 = Discontinued. See 717 and 718 for recommended replacements.
- 708 = Bare Module with Strain Relief (See Figure 8)
- 709 = Bare Module with Lead Wires (See Figure 9)
- 710 = Discontinued. See 717 and 718 for recommended replacements.
- 711 = .164-32 Stud Mount with Lead Wires (See Figure 11)
- 712 = Hole-Slot Flange with Lead Wires (See Figure 12)
- 713 = Discontinued. See 717 and 718 for recommended replacements.
- 714 = Discontinued. See 717 and 718 for recommended replacements.
- 715 = Discontinued. See 706 and 712 for recommended replacements.
- 716 = Discontinued. See 706 and 712 for recommended replacements.
- 717 = Tube Mount Adapter, Corrosion Resistant Aluminum (Figure 17)
- 718 = Tube Mount Adapter, Corrosion Resistant Aluminum, Screw Clamp (See Figure 18)
- 719 = Slotted Flange with Lead Wires (See Figure 19)

(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: /3/2/8 represents: ±3°F on closing, ±2°F on opening and 8°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

2.0 amperes at 115 VAC, 2,000,000 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

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 750g peak, ½ sine, 1 millisecond, both directions, 3 orthogonal axes

Hermeticity: 1 X 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], each closure with missed cycle detection

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

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

RGA/DPA: RGA (1000 ppm moisture maximum) and DPA per GSFC S-311-M-70 except Table I DPA Sampling Size shall be 5 for Quantity Procured 51-384.

100% Pull test (configurations with wire leads): MIL-STD-202, Method 211, Test Condition A, 2.5 lbs applied in direction of lead egress; Contact resistance 0.020 ohms maximum less wire resistance.

Group B process monitor per 975-0000-101: Applicable

Standard Tolerance Limits**

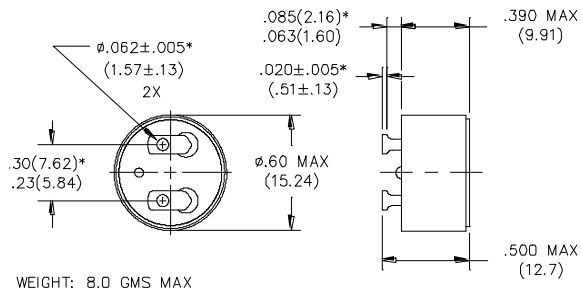
Specified Temperature Setpoint Range	Temperature Tolerance
-120 to 0°F (-84.4 to -17.8°C)	±6°F (±3.3°C)
+1 to +250°F (-17.2 to +121.1°C)	±5°F (±2.8°C)
+251 to +300°F (121.7 to +148.9°C)	±7°F (±3.9°C)

** 8°F (4.44°C) minimum differential between close and open setpoints. When tolerance overlap occurs, the minimum differential takes precedence. Standard tolerances do not apply to switches with a closing temperature between 50-60°F. The minimum differential for these switches is 10°F.

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 ±5° with 8° to 18° differential.
Closing setpoint given is min or max. possible.
- E Closing setpoint is ±5° with 8° to 18° differential.
Opening setpoint given is min or max. possible.
- F Closing setpoint is ±4°F with 11 to 19°F differential.
Opening setpoint is min or max. possible.
- G Opening and closing setpoints are ±3°F
- H Opening and closing setpoints are ±4°F
- J Opening and closing setpoints are ±5°F
- K Closing setpoint is ±2°F. Opening setpoint is min or max.
- N Closing setpoint is ±3°F.
Opening setpoint given is min or max possible.
- P Closing setpoint is ±4°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 ±6°F.
Differential shall be 10°F Min.
- U Setpoint tolerances are min-max.
Specify minimum differential (example: U/8).
- V Opening setpoint is min or max. Specify closing tolerance and minimum differential (example: V/5/8).
- W Closing setpoint is min or max. Specify opening tolerance and minimum differential (example: W/5/8).

**Figure 1:
701 = Bare Module**



**Figure 2:
702 = .164-32 Stud Mount**

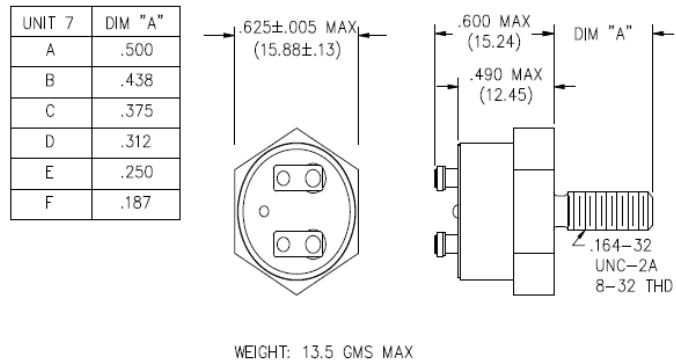


Figure 3:
703 = .190-32 Stud Mount

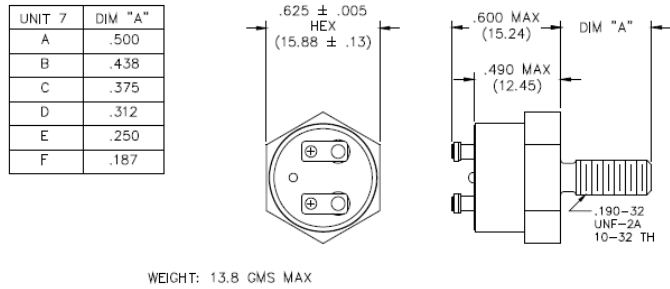


Figure 4:
704 = .138-32 Stud Mount

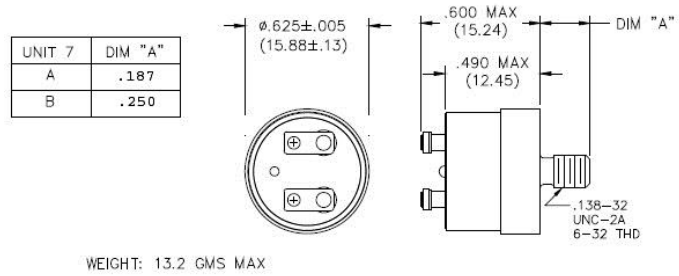


Figure 5:
705 = Narrow Slot-Slot Flange

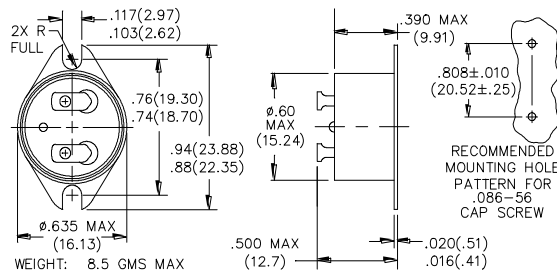


Figure 6:
706 = Hole-Slot Flange

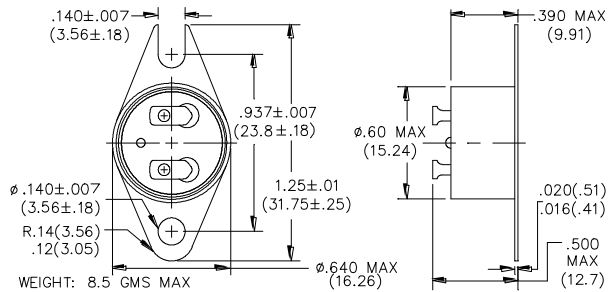
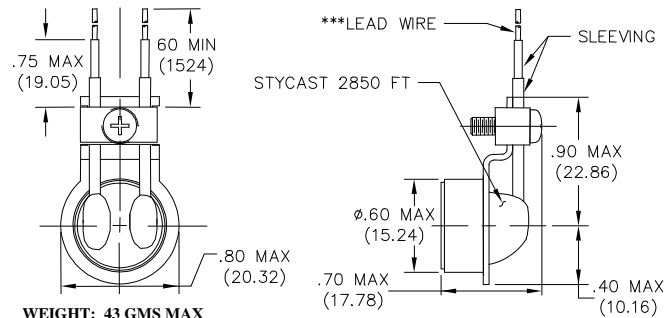


Figure 7: DELETED (See Figures 17 and 18 for recommended replacements.)

Figure 8:
708 = Bare Module with Strain Relief

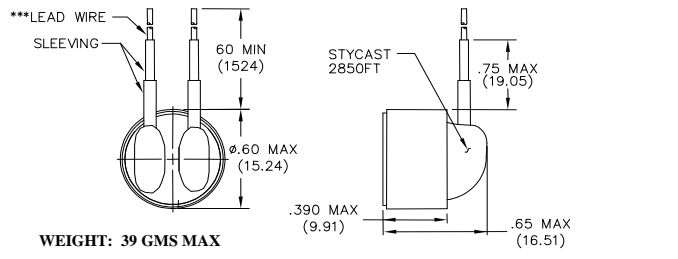
UNIT 7H	
A	M22759/43-22-9
B	M22759/43-20-9



WEIGHT: 43 GMS MAX

Figure 9:
709 = Bare Module with Lead Wires

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

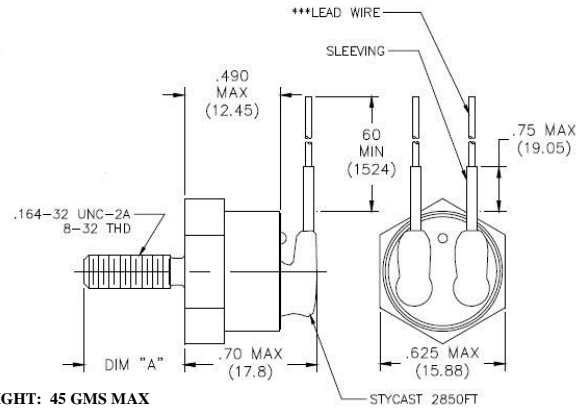


WEIGHT: 39 GMS MAX

Figure 10: DELETED (See Figures 17 and 18 for recommended replacements.)

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

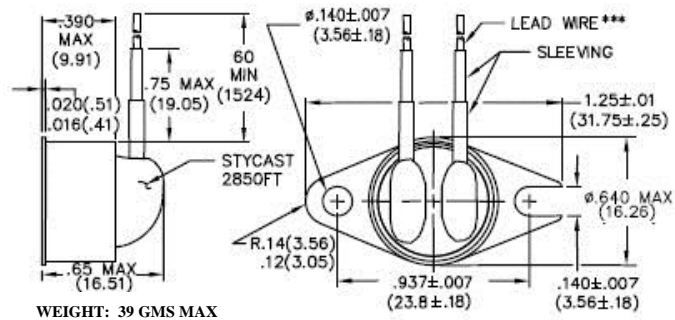
ORDERING CODE (UNIT 7A)	LEAD WIRE SAE-SPEC
A	M22759/43-22-9
B	M22759/43-20-9
ORDERING CODE (UNIT 7B)	STUD LENGTH ±.020 (.51)
1	.500 (12.70)
2	.438 (11.13)
3	.375 (9.53)
4	.312 (7.93)
5	.250 (6.35)
6	.187 (4.75)



WEIGHT: 45 GMS MAX

Figure 12:
712 = Hole-Slot Flange with Lead Wires

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



WEIGHT: 39 GMS MAX

Figure 13: DELETED (See Figures 17 and 18 for recommended replacements.)

Figure 14: DELETED (See Figures 17 and 18 for recommended replacements.)

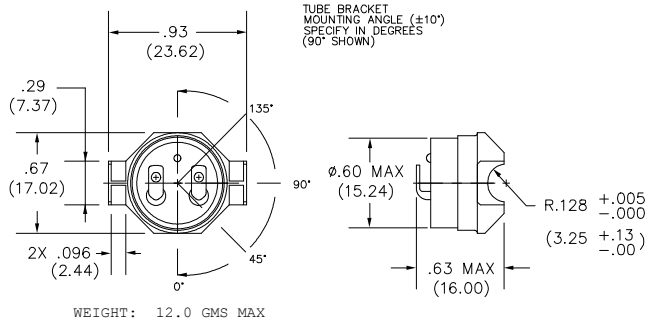
Figure 15: DELETED (See Figures 06 and 12 for recommended replacements.)

Figure 16: DELETED (See Figures 06 and 12 for recommended replacements.)

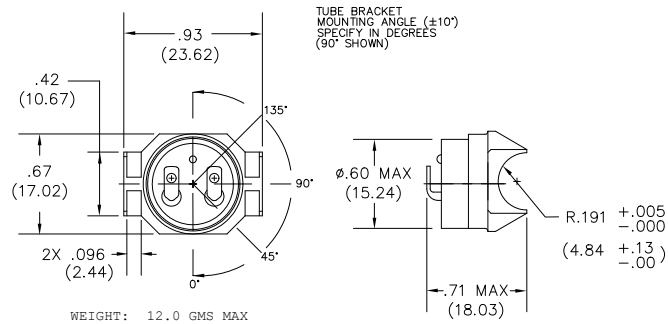
Figure 17:
717 = Tube Mount Adapter,
Aluminum, Tie Strap or Epoxy
Mount

UNIT 7 (H)(I)(J)

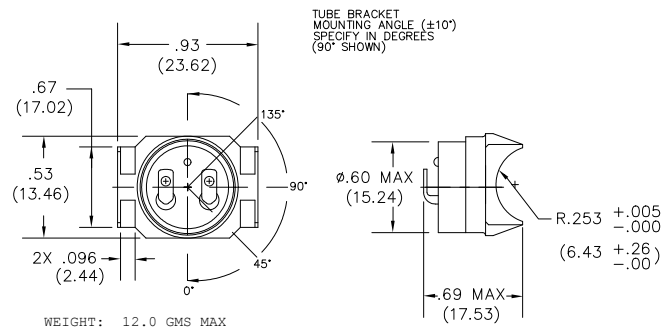
ORDERING CODE (UNIT 7A)	TUBE MOUNT DIAMETER (FOR REFERENCE ONLY)
A	.256 +.010/-.000 (6.50 +.25/- .00)
B	.381 +.010/-.000 (9.68 +.25/- .00)
C	.506 +.020/-.000 (12.85 +.51/- .00)
D	.756 +.020/-.000 (19.20 +.51/- .00)
E	.881 + .020/-.000 (22.38 + .51/- .00)
ORDERING CODE (UNIT 7B)	TUBING ADAPTER MOUNTING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



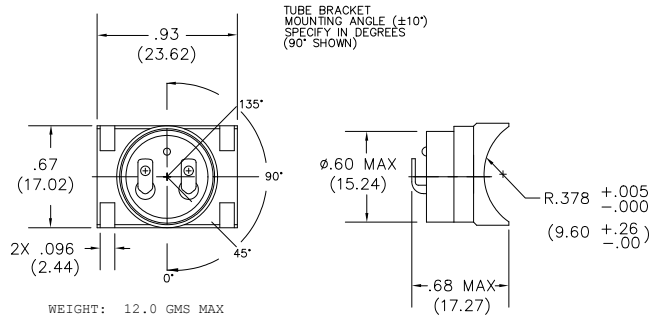
***Option 1
1/4" Diameter Tube Mount



***Option 2
3/8" Diameter Tube Mount



***Option 3
1/2" Diameter Tube Mount



***Option 4

3/4" Diameter Tube Mount

**** FOR OPTION SELECTION CONSULT FACTORY

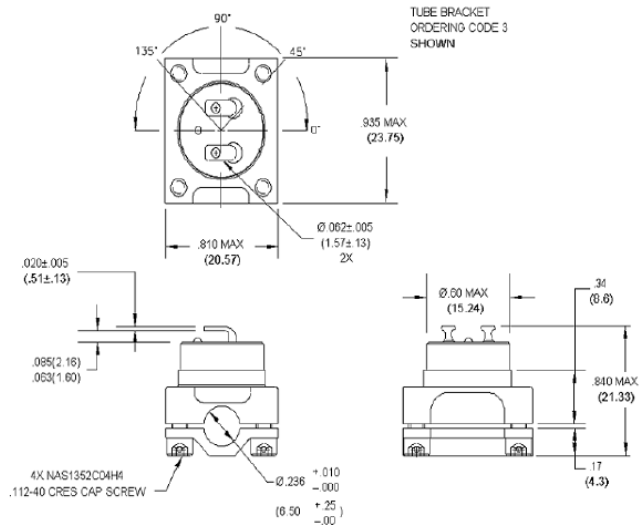
Note: Aluminum Adapter is 6061-T6 per SAE AMS-QQ-A-200/8, chemical conversion coat per MIL-DTL-5541, Type I, Class 3.

Figure 17 (continued)

Figure 18:
718 = Tube Mount Adapter, 1/4" Diameter, Aluminum, Screw Mount

UNIT 7 (H)(I)(J)

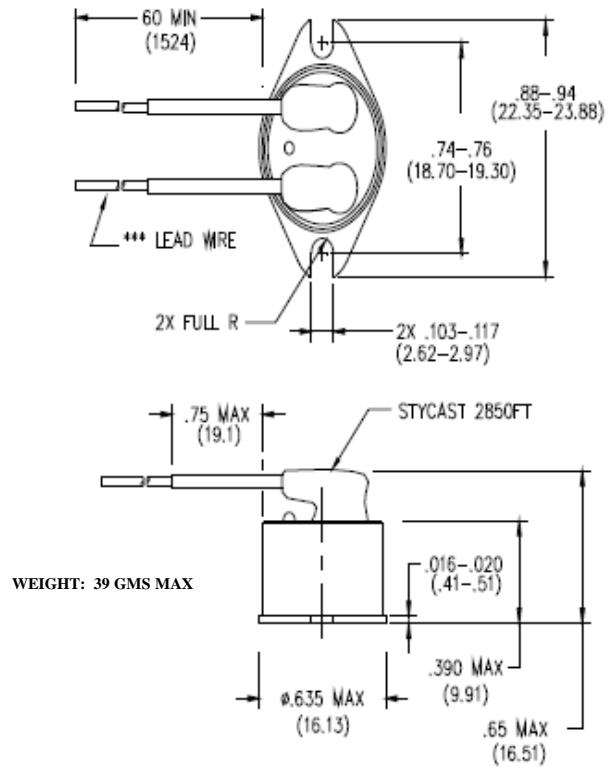
ORDERING CODE (UNIT 7A)	TUBE MOUNT DIAMETER (FOR REFERENCE ONLY)
A	.256 +.010/-.000 (6.50 +.25/-00)
B	TBD
C	TBD
D	TBD
ORDERING CODE (UNIT 7B)	TUBING ADAPTER MOUNTING ANGLE ($\pm 10^\circ$)
1	0° (Terminal Orientation Parallel to Tube Direction)
2	45°
3	90° (Terminal Orientation Perpendicular to Tube Direction)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



Note: Aluminum Adapter is 6061-T6 per SAE AMS-QQ-A-200/8, chemical conversion coat per MIL-DTL-5541, Type I, Class 3.

Figure 19:
719 = Slotted Flange with Lead
Wires

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



- Typical dimension for all configurations.
- Wire (where applicable) is SAE AS22759/43.
- Sleeving (where applicable) is bondized Teflon®, one or two layers.

Approved source(s) :

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