ESA/SCC Screened Surface Temperature Sensor

Model 0118MM

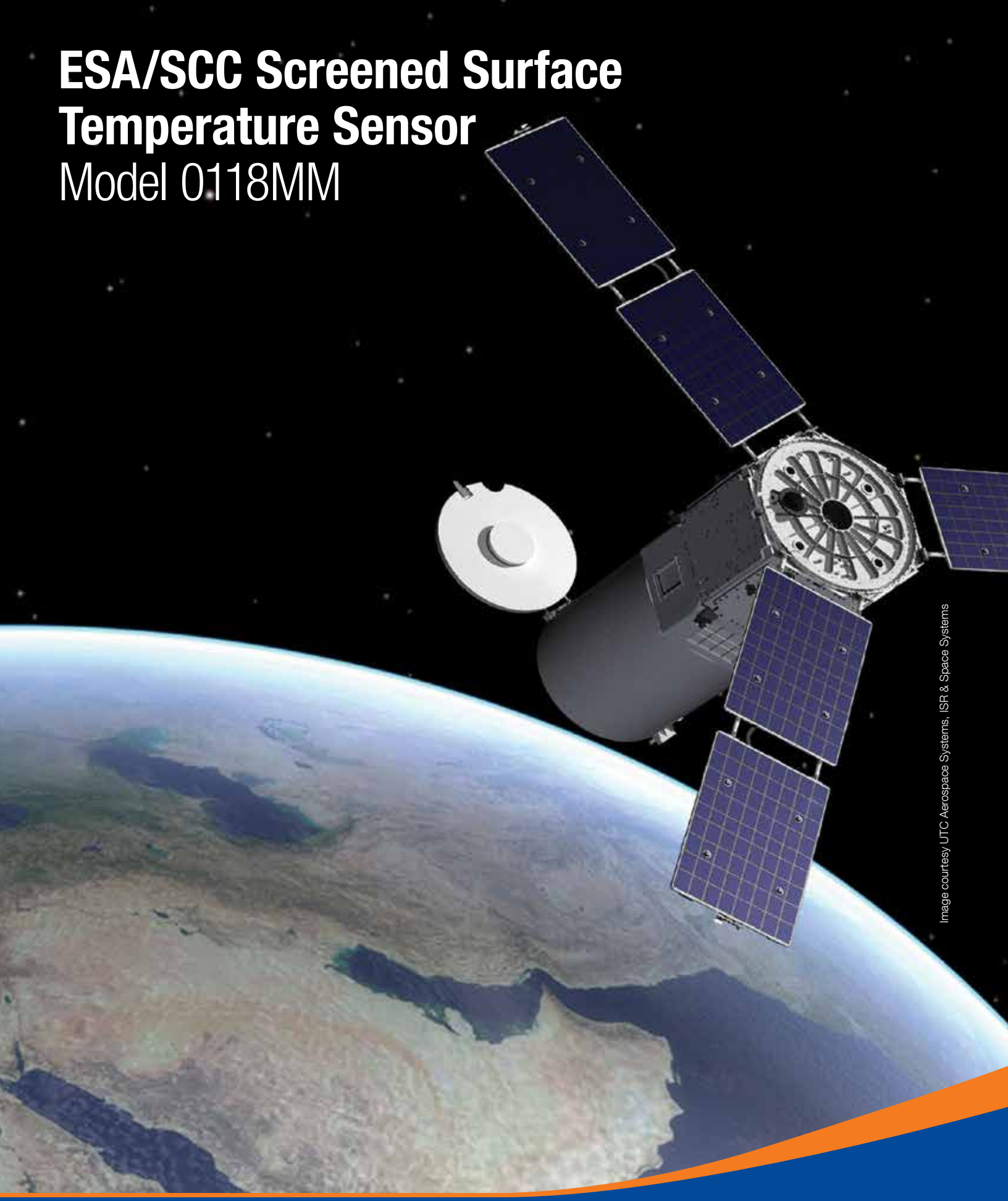

Image courtesy UTC Aerospace Systems, ISR & Space Systems

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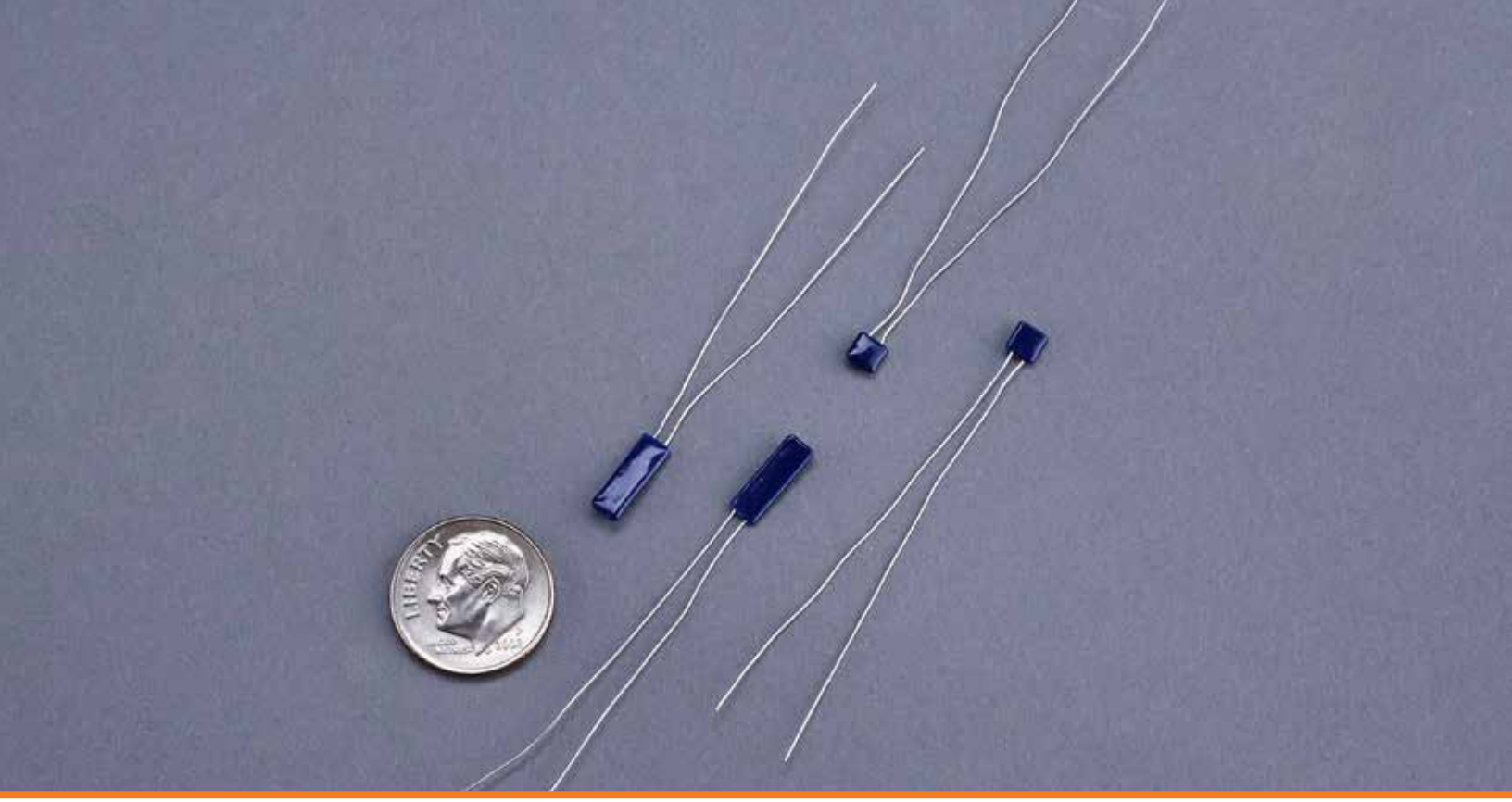
UTC Aerospace Systems



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The Model 0118MM design is based on Model 0118MF and has a space heritage that can be traced to the early 1960's. Known then as Rosemount Engineering Company, UTC Aerospace Systems has participated in the U.S. space program almost from its genesis by supporting Project Mercury followed by the Saturn, Apollo, and Space Shuttle programs as well as Orion and Space Launch System.

Additionally, we have participated in most major space programs and the International Space Station. UTC Aerospace Systems' instruments can be found on the Atlas V, Delta IV/RS-68, Ariane 5/Vulcain and K-1/NK-33, as well as a myriad of satellites and scientific exploration vehicles. Our sensors are making measurements out of our solar system (Voyager 1 and 2) on Mars (Spirit and Opportunity Rovers) and have been on Saturn's moon Titan (Huygens Probe).

Model 0118MM is a general purpose surface temperature sensor designed to measure temperatures in the range of -269°C to +400°C. The sensing element is made of pure platinum encapsulated in ceramic insulation, and is screened to ESA 4006 reliability tests. It is specially designed and manufactured to produce reproducible resistance-temperature characteristics. This sensor is intended for demanding applications where precision, accuracy, and long-term stability are critical requirements.

Features

- Small size
- High reliability
- Linear output
- Wide temperature range
- Screened to ESA 4006 requirements

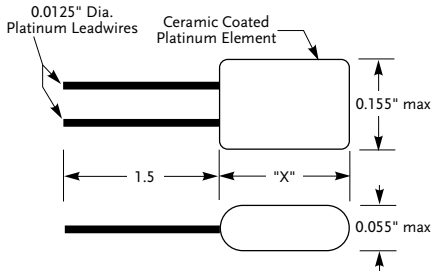
General Specifications

Temperature	-269°C to +400°C
Resistance (0°C)	100 ohms to 2000 ohms
Nominal Alpha	0.00389Ω/Ω/°C from 0°C to 100°C
Insulation Resistance	10 megohms min. with 100 VDC applied
Thermal Hysteresis	0.1% max of temperature span encountered between readings
Time Constant	0.7 seconds in oil flowing at 3 fps
Repeatability	≤0.1°C at 0°C when exposed to 20 temperature shocks from liquid nitrogen to +200°C air
Self-Heating	46mW with a temperature rise of <1°C in oil flowing at 3 fps at 25°C ±5°C
Vibration	MIL-STD-810C, method 514.2, procedure V, level U & AP
Compatibility	Suitable for use in any non-conductive fluid or environment that is compatible with platinum and a metal oxide ceramic
Humidity	Not susceptible to moisture absorption in moderate humidity atmospheres if the leads are suitably protected
Sensor Weight	0.35 g max.

RO Interchangeability

0°C Resistance Tolerance		
	%	0°C Error
Standard	±1.0%	±2.56°C
Optional	±0.25%	±0.64°C
Optional	±0.12%	±0.30°C

Product Envelope



Length “X” = 0.155” max. for ice-point resistances of 500 ohms or less
Length “X” = 0.450” max. for ice-point resistances of greater than 500 ohms

Resistance-Temperature Relationship and Table

Temperature	Ice-Point Resistance			
(°C)	100Ω	500Ω	1000Ω	2000Ω
-260	0.21	1.30	2.25	5.21
-240	2.50	12.76	25.14	51.06
-220	8.89	44.75	89.08	178.99
-200	17.18	86.25	172.07	345.01
-180	25.87	129.67	258.92	518.70
-160	34.56	173.16	346.03	692.63
-140	43.09	215.81	431.45	863.26
-120	51.49	257.77	515.44	1031.08
-100	59.77	299.14	598.22	1196.55
-80	67.96	340.01	680.00	1360.05
-60	76.06	380.47	760.94	1521.90
-40	84.09	420.59	841.18	1682.37
-20	92.07	460.42	920.84	1841.69
0	100.00	500.00	1000.00	2000.00
20	107.88	539.35	1078.70	2157.40
40	115.72	578.47	1156.95	2313.90
60	123.51	617.37	1234.75	2469.50
80	131.26	656.05	1312.10	2624.20
100	138.96	694.50	1389.00	2778.00
120	146.62	732.73	1465.45	2930.90
140	154.23	770.73	1541.45	3082.91
160	161.80	808.50	1617.01	3234.01
180	169.32	846.05	1692.11	3384.22
200	176.80	883.38	1766.76	3533.52
220	184.23	920.48	1840.97	3681.93
240	191.61	957.36	1914.72	3829.44
260	198.96	994.01	1988.03	3976.05
280	206.25	1030.44	2060.88	4121.76
300	213.51	1066.64	2133.29	4266.57
320	220.71	1102.62	2205.24	4410.49
340	227.88	1138.37	2276.75	4553.50
360	234.99	1173.90	2347.81	4695.61
380	242.06	1209.21	2418.41	4836.83
400	249.09	1244.29	2488.57	4977.15

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Ordering Information

Code	R_0 — Ice Point Resistance Options
100-2000	100, 500, 1000 and 2000 ohm (consult factory for other R_0 values)

Code	R_0 Interchangeability
A	±1.0%
B	±0.25%
C	±0.12%

Code	Screening Options (Codes B through G require ESA calibration)
B	ESA 4006, Charts II and III — Level B
E	ESA 4006, Charts II, III — Level B and Chart V — Level 3 (includes 10 test units)
F	ESA 4006, Charts II, III — Level B and Chart V — Level 2 (includes 30 test units)
G	ESA 4006, Charts II, III — Level B and Chart V — Level 1 (includes 36 test units)

Code	Leadwire Options
A	2 Wire
B	3 Wire
C	4 Wire
D	2 Wire Zinc Free
E	3 Wire Zinc Free
F	4 Wire Zinc Free

Code	Leadwire Material Options
A	Platinum 0.0125 ± 0.002
B	Gold Plated Copper (0.016 dia.)
C	26 Gage Teflon Insulated — Nickel Plated Copper
D	26 Gage Shielded Cable — Nickel Plated Copper
F	24 Gage Teflon Insulated — Stranded Nickel Plated Copper
G	24 Gage Shielded Cable — Nickel Plated Copper
K	26 Gage Teflon Insulated — Stranded Silver Plated Copper
L	28 Gage Teflon Insulated — Stranded Silver Coated Copper
M	28 Gage Nextel Jacketed Cable — Stranded Nickel

Code	Leadwire Length Options (inches)
A	1.5 minimum
B	6
C	12
D	24
E	48
F	72
G	120
H	240
J	400
K	600

Code	Calibration Options	
	Calibration Points (°C)	R vs. T Table (°C)
D	-269, -196, 0, 100, 260*	-260 to 400
A	-50, 0, 50	-50 to 50
B	-196, 0, 100	-196 to 200
C	-196, 0, 100, 260	-196 to 260

Typical Model #							
0118MM1000	A	B	C	D	E	D	*Per ESA detailed specification

Rosemount Aerospace™

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