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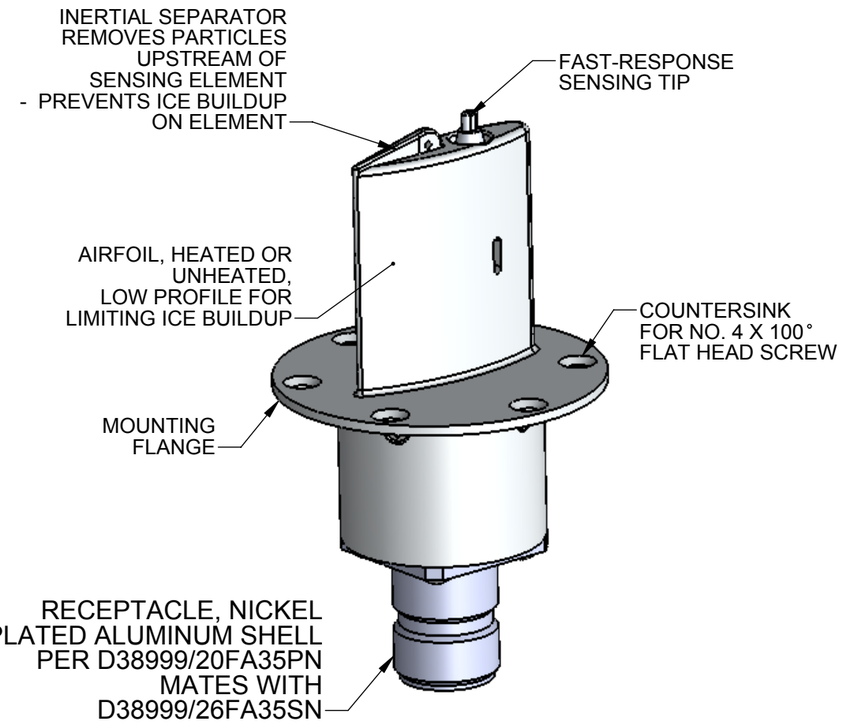
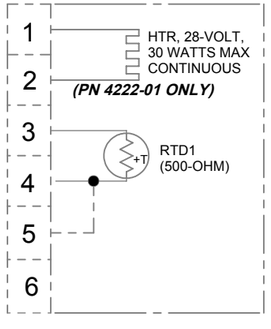
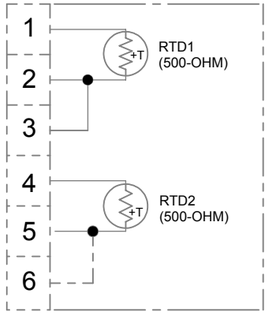
PN 4222-01: HEATED, SINGLE ELEMENT
PN 4222-08: UNHEATED, SINGLE ELEMENT
PN 4222-09: UNHEATED, DUAL ELEMENT



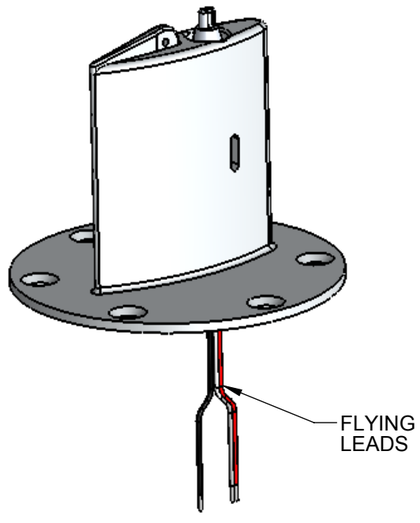
SCHEMATIC (-01, -08)



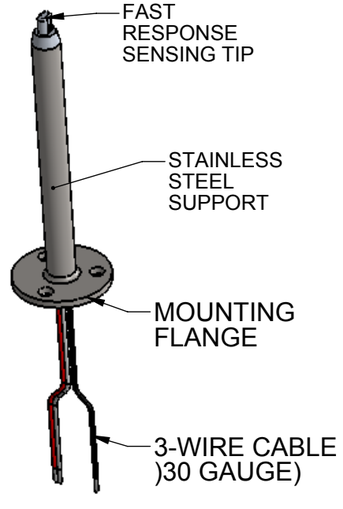
SCHEMATIC (-09)



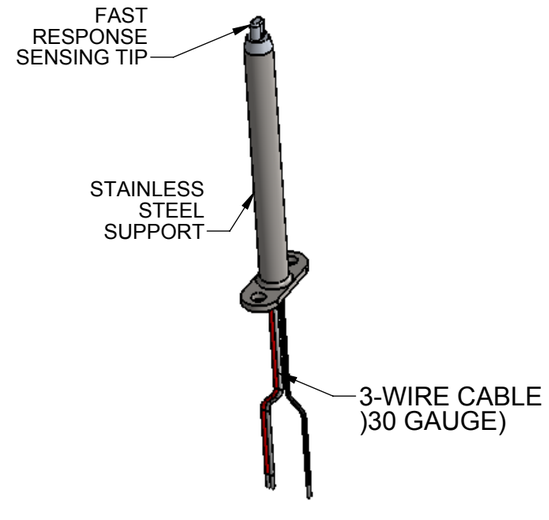
PN 4222-05 (3-WIRE CABLE)



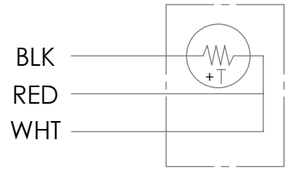
PN 4222-06 (3-WIRE CABLE)



PN 4222-07 (3-WIRE CABLE)



SCHEMATIC (3-WIRE CABLES)



3X 30 GAUGE WIRE

SPA PN 4222-XX

WHERE "XX" IS DASH NO.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS X.X ± 0.03, X.XX ± 0.01, X.XXX ± 0.005 ANGLES X° ± 30' DO NOT SCALE DRAWING	PROJECT 189	SpaceAge Control, Inc.	
MATERIAL SEE NOTES	DRAWN B.P. DATE 01-11-07	SENSOR, AIR TEMPERATURE	
FINISH SEE NOTES	APPROVALS CHECKED DIGITAL - ON FILE ENG DIGITAL - ON FILE	SIZE B CAGE CODE 34851 DWG. NO. 4222 REV. F	
CAD GENERATED DRAWING, DO NOT MANUALLY UPDATE		SCALE CAD FILE: SHEET 1 OF 3	

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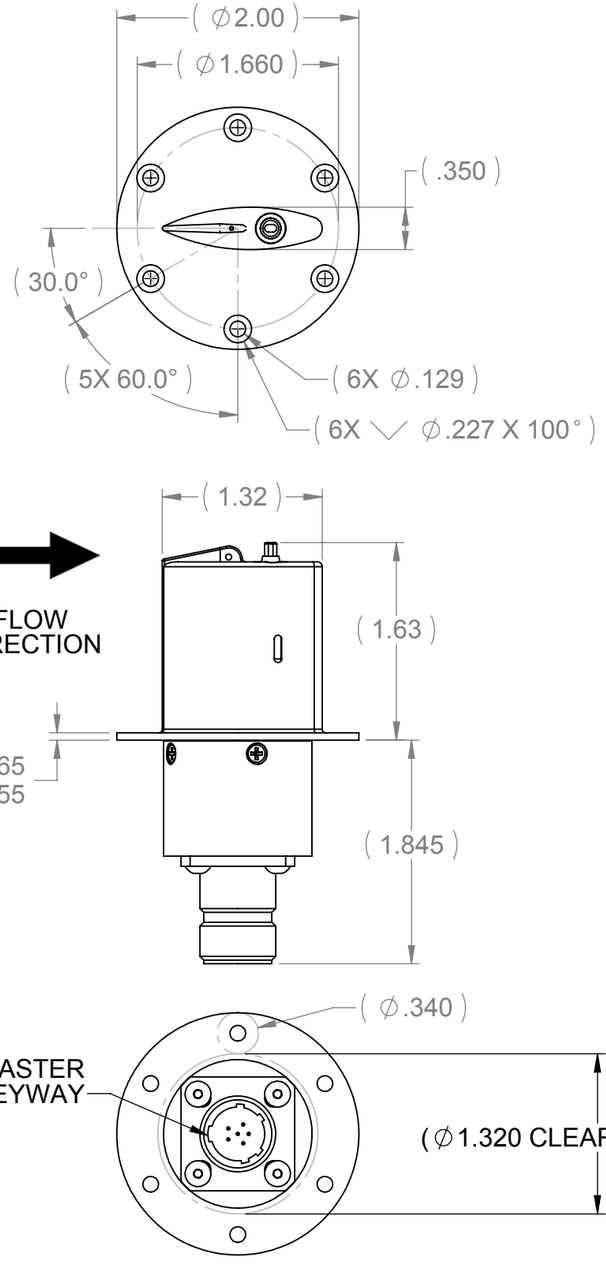
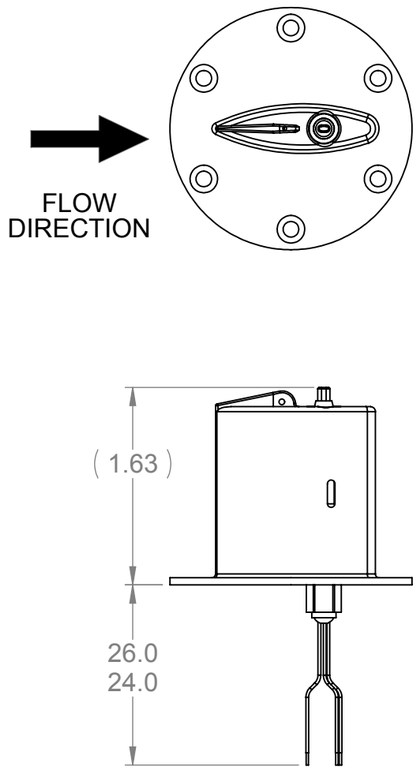
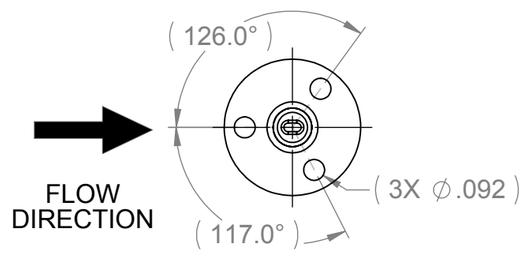
PN 4222-01
PN 4222-08
PN 4222-09

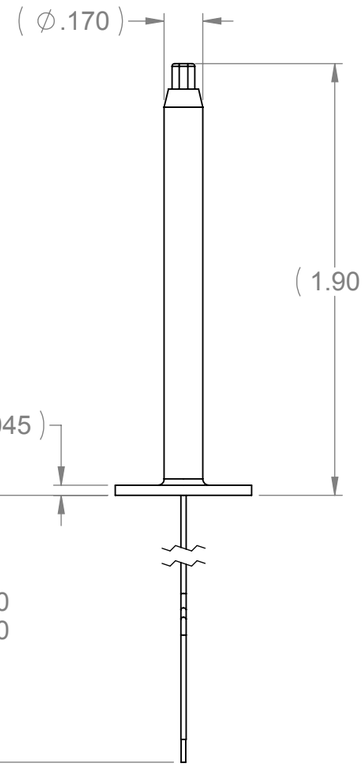


PN 4222-05 (3-WIRE CABLE)

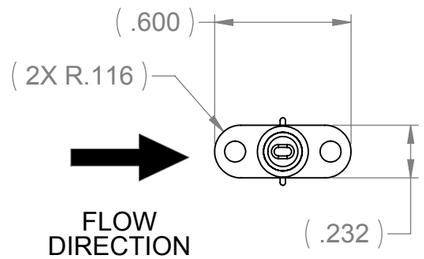


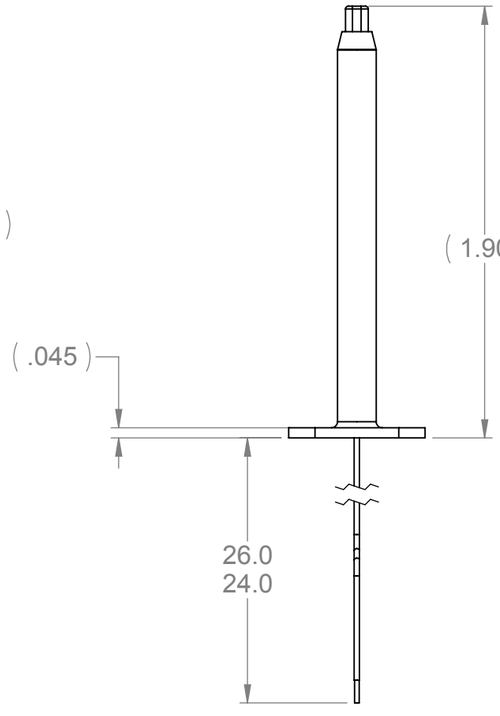
PN 4222-06 (3-WIRE CABLE)





PN 4222-07 (3-WIRE CABLE)





SIZE	CAGE CODE	DWG. NO.	REV.
B	34851	4222	F
SCALE	CAD FILE:	SHEET 2 OF 3	

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1.0 Description: The 4222-XX temperature sensors are designed to provide fast time response and accurate temperature measurement in airspeed conditions above 30 knots (indicated airspeed, IAS). The temperature sensor element(s) is a platinum resistance detector (RTD) - a passive resistance device where the element resistance increases in a somewhat linear manner with increases in temperature. The temperature-resistance characteristics are in accordance with DIN EN60751, tolerance class B with element resistance of 500 ohms at °C. See table for nominal resistance-temperature values and the resistance limits associated with Class B tolerances.

2.0 The resistance-temperature characteristics are per the following:
For the range -200 °C to 0 °C: R = Ro [1 + AT + BT^2 + C (T - 100) X T^3]
For the range 0 °C to 850 °C: R = Ro (1 + AT + BT^2)
Where:
RO = resistance at 0 °C (= 500.0 ohm)
T = temperature in °C
A = 3.9083 X 10^-3
B = -5.775 X 10^-7
C = -4.183 X 10^-12

3.0 Static calibration accuracy for Class B tolerances: ± (.30 + .005 X|T|) where “T” is temperature in °C.

4.0 Aerodynamic and Recovery Factor Equations (-01, -08, and -09 Configurations): The sensor can operate at any airspeed or Mach number but is recommended for subsonic or transonic operation up to Mach .85 and has been wind-tunnel tested up to that condition. The theoretical equations governing isentropic compressible air flow are as follows:

Mach = [5 X ((PT / PS).2857 - 1)] ^ ½ <-- Equation (1)
TS = TT / (1 + .2 X Mach ^2) <-- Equation (2)
Where: Mach = Mach Number
PT = total pressure
PS = static pressure
TT = total temperature in Kelvin*
TS = static temperature in Kelvin* (i.e. the outside air temperature)
(* Kelvin = °Celsius + 273.16)

Equation (2) would be used to determine the theoretical value of TS based on TT. In real-world sensor operations, there is a repeatable error associated with the TT measurement and the static temperature, TS, is calculated using a correction equation (recovery factor correction) per the following:

TS = TM / (1 + R X .2 X Mach ^2) ßEquation (3)
Where: TM = measured temperature from temperature sensor in Kelvin
R = Recovery Factor

Based on wind tunnel testing, the temperature sensor nominal recovery factor is R = .93
For error analysis purposes, the recovery factor tolerance range is: .91 < R < .95.

5.0 Weight: PN 4222-01 / -08 / -09: .16 LB MAX
PN 4222-05: .15 LB MAX
PN 4222-06: .02 LB MAX
PN 4222-07: .02 LB MAX

6.0 Time Constant: The time constant is the time required for the temperature sensor to respond to 63.2% of a step change in temperature. The time constant varies with the mass flow of air, or as a rough approximation in accordance with the indicated airspeed of the aircraft. For single element sensor, the time constant is 1.9 seconds MAX at 200 knots (IAS) or higher. For dual element sensors, the time constant is 2.9 seconds maximum at 200 knots (IAS) or higher.

7.0 Custom sensor configurations available for OEM applications, such as the following modifications:
· Custom mounting (i.e. different size or shape)
· Contoured mounting flange to match aircraft fuselage shape
· Alternate interconnect wiring length, different connector, etc.
· 100 ohm element versus 500 ohm element

TEMPERATURE (°C)	NOMINAL RESISTANCE (Ω)	TOLERANCE (+/- °C)	RESISTANCE TOLERANCE	
			MIN (Ω)	MAX (Ω)
-60	381.64	0.60	380.44	382.83
-40	421.35	0.50	420.36	422.34
-20	460.80	0.40	460.01	461.59
0	500.00	0.30	499.41	500.59
20	538.97	0.40	538.19	539.74
40	577.70	0.50	576.74	578.67
60	616.21	0.60	615.06	617.36
80	654.48	0.70	653.15	655.82
100	692.53	0.80	691.01	694.04
120	730.34	0.90	728.64	732.04
140	767.92	1.00	766.05	769.79
160	805.27	1.10	803.22	807.32
180	842.39	1.20	840.17	844.61
200	879.28	1.30	876.89	881.67

SIZE	CAGE CODE	DWG. NO.	REV.
B	34851	4222	F
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