Aspirated Radiation Shield

TS-100

Smart Sensing
SENSOVANT

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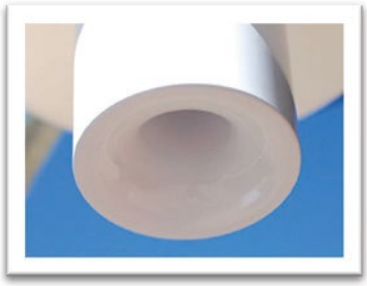
Telf.: 968 162 005

- Accuracy within ± 0.05 C when compared to replicate R. M. Young and Met One aspirated shields (a year of field test data with precision thermistors in multiple shields)
- Precision thermistor, with low thermal conductivity lead wire, preinstalled at no extra charge
- Internal fan has an industry -leading IP55 rating for durability in all climates, from desert to maritime to arctic
- Requires a current of only 80 mA at 12 V DC (one Watt), making it a viable option for use on remote solar powered weather stations
- Configurable for low power at night and during windy or cloudy weather using pulse width modu lation (PWM)
- Coanda style inlet enhances air intake in both still air and strong cross winds
- Configurable for use with PRTs and all major humidity probes
- Easy installation and minimal maintenance
- Four (4) year warranty



Coanda -style Inlet enhances aspiration

Precision thermistor included. Accommodates PRTs an d humidity probes using available port adaptor plugs .

After several years of development, Apogee I nstruments is proud to release our high-efficiency aspirated radiation shield (model TS -100) representing a majo r advance in the measurement of air temperature and humidity . Its high performance and low -power consumption make it an excel lent choice for both installation on AC powered weather stations and as a viable option for upgrading the accuracy of DC and solar powered stations through the replacement of error -prone naturally aspirated shields .

SPECIFICATIONS

TS-100

Radiation-induced Temperature Increase (RITI):

There is no reference standard for the elimination of radiation effects on air temperature measurement, but well -designed aspirated shields minimize this effect. In the absence of a standard, RITI was analyzed in long -term tests over snow and grass surface s by comparing temperature measurements from nine replicate TS -100 shields to measurements from two replicate aspirated shields from Met One (model 076B) and two replicate aspirated shields from R. M. Young (model 43502). Comparisons among shields were mad e with ST -110 thermistors in all shields. In spite of careful placement of shields away from each other and the tower (see photo below), and filtering for wind direction, t hese tests indicate that there is more variability among replicate shields (± 0.1 C) of the same model than between models of shields (± 0.03 C), thus there is no statistical difference among the three models of shields.

Field tests indicate that low wind speed has a greater effect on RITI than high radiation load. For conditions of solar radiation greater than 800 W m $^{-2}$ and wind speeds less than 2 m s $^{-1}$, the mean of the Apogee model TS -100 shields has been within 0.03 C of the means of the other two models of shields. At higher wind speeds, the TS -100 and R. M. Young shields read slig htly cooler (-0.05 C) than the mean of the Met One shields, but the difference is not statistically significant.

Difference Among Individual Replicate Shields: < 0.1 C

Aspiration Rate: 6 m s $^{-1}$ at full speed; 3 m s $^{-1}$ at half speed

Fan Input Voltage Requirement: 12 V DC

Fan Current Drain: 80 mA at full speed; 25 mA at half speed

Fan dust and water protection: IP55

The fan is extremely well sealed against water and dust, with an ingress protection rating of 55, called IP55. The higher the number , the better the protection. Fans typically range from IP11 to IP55. The first digit in the IP rating indicates protection against particle entry. A 5 indicates minimal dust entry with no interference with fan operation. The second digit indicates water protec tion. A 5 indicates that water sprayed on the fan from any direction shall have no harmful effects. Typical fans have particle and water protection ratings of 2 to 3, indicating moderate particle and water protection, but no dust protection.

Dimensions: 22 cm height, 27 cm diameter

Mass: 840 g

Cables: 5 m of shielded, twisted -pair wire for fan and air temperature sensors
Additional cable available in multiples of 5 m
Santoprene rubber jacket (high water resistance, high UV stabi lity, flexibility in cold conditions)
Pigtail lead wires

ST-110 (Precision Thermistor)

Measurement Range: -50 to 70 C

Measurement Uncertainty: 0.1 C (from 0 to 70 C)
0.15 C (from -35 to 0 C)

Measurement Repeatability: < 0.01 C

Non-stability (Long-term Drift): < 0.02 C per year (when used in non -condensing environments where the annual average temperature is less than 30 C; continuously high temperatures or continuously humid environments increase drift rate)

Equilibration Time: 5 s

Self-Heating: < 0.01 C (typical, assuming pulsed excitation of 2.5 V DC)
0.08 C at 5 C (maximum, assuming continuous input excitation of 2.5 V DC)

Operating Environment: -50 to 70 C
0 to 100 % relative humidity

Input Voltage Requirement: 2.5 V DC excitation (recommended)

Output Voltage Range: 0 to 2.5 V DC (assuming input excitation of 2.5 V DC)

Current Drain: 0.1 mA DC at 70 C (maximum, assuming continuous input excitation of 2.5 V DC)

Dimensions: 7 cm length, 0.2 cm diameter

Mass: 60 g

ST-300 (Platinum Resistance Thermometer)

Measurement Range: -50 to 70 C

Measurement Uncertainty: 0.2 C (from -40 to 60 C)

Measurement Repeatability: < 0.01 C

Non-stability (Long-term Drift): < 0.05 C per year

Equilibration Time: 15 s

Operating Environment: -50 to 70 C
0 to 100 % relative humidity

Input Voltage Requirement: 2.1 V DC excitation (recommended)

Output Voltage Range: 16 to 27 mV DC (assuming continuous input excitation of 2 .1 V DC)

Current Drain: 0.21 mA DC (maximum, assuming continuous input excitation of 2.1 V DC)

Dimensions: 5.1 cm length, 0.32 cm diameter

Mass: 95 g


Ø27.9 cm
R2.7 cm
19.8 cm
21.3 cm
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