

Sky Temperature Correction Model

The model to correct the sky temperature measured by the infrared sensor (T_s) is given in terms of the ambient temperature (T_a) by:

$$T_d = (K1 / 100) * (T_a - K2 / 10) + (K3 / 100) * (\text{Exp}(K4 / 1000 * T_a)) ^ (K5 / 100) + T_{67}$$

where T_d = Correction value (°C)
 T_a = Ambient temperature (°C)
 $K1, K2, K3, K4, K5, K6$ and $K7$ are the coefficients defined in the *Device* section of the *Setup* TAB
 T_{67} calculation is shown below
 $\text{Exp}(n) = e$ (the base of natural logarithms) raised to the power of n .
 $A^b = a$ raised to the power of b

The corrected sky temperature (T_{sky}) is given by:

$$T_{sky} = T_s - T_d$$

where T_{sky} = Corrected Sky Temperature (°C)
 T_s = Infrared Sky Measured Temperature (°C)
 T_d = Correction value (°C)

Calculation of T_{67} term

If $\text{Abs}((K2 / 10 - T_a)) < 1$ Then

$$T_{67} = \text{Sgn}(K6) * \text{Sgn}(T_a - K2 / 10) * \text{Abs}((K2 / 10 - T_a))$$

Else

$$T_{67} = K6 / 10 * \text{Sgn}(T_a - K2 / 10) * (\text{Log}(\text{Abs}((K2 / 10 - T_a))) / \text{Log}(10) + K7 / 100)$$

End If

where $\text{Sgn}(x) =$ function that returns the sign of x
 $\text{Log}(x) =$ function that returns the natural logarithm of x
 $\text{Abs}(x) =$ function that returns the absolute value of x

Important

In all calculations the values of the temperatures are in degrees Celsius.