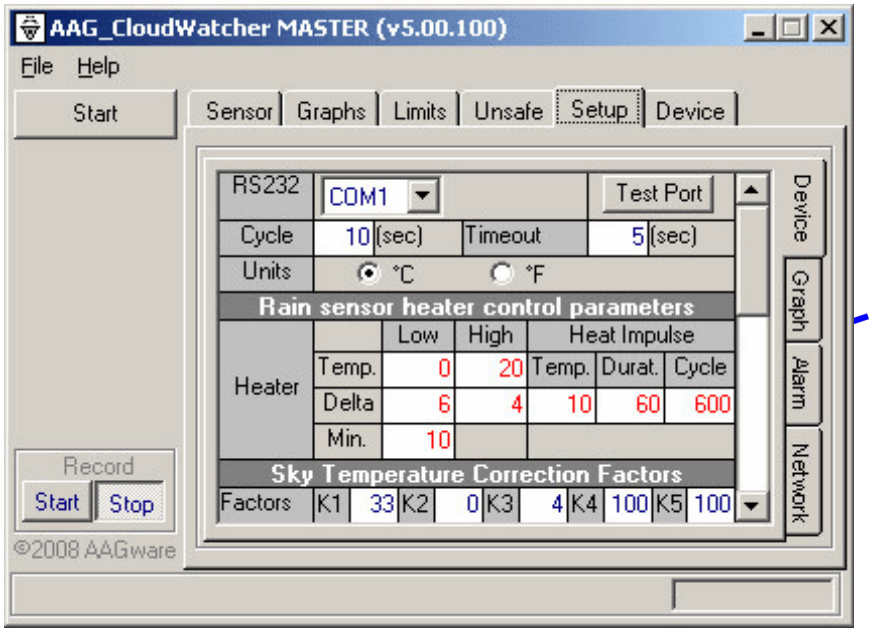
Algorithm for the heater of the rain sensor

The rain sensor heating adjustments are regulated by the constants defined under the ***Device*** section of the ***Setup TAB*** as illustrated below by the red, blue and green rectangles.



The red rectangle parameters

The red rectangle parameters define the target temperature for the rain sensor in terms of the ambient temperature.

- The field ***TEMP*** of the ***LOW*** column corresponds to the ambient temperature (ºC), below which the rain sensor operational temperature is kept at the value defined in the ***DELTA*** field. For example, in the case illustrated in figure above, for ambient temperatures below 0ºC the rain sensor operational temperature will be kept at 6ºC.
- The field ***TEMP*** of the ***HIGH*** column corresponds to the ambient temperature (ºC), above which the rain sensor operational temperature will be kept at the ambient temperature + the value defined in the ***DELTA*** field. For example, in the case illustrated in figure above, for temperatures greater than 20ºC the rain sensor operational temperature will be adjusted to the ambient temperature + 4ºC.
- For ambient temperatures comprised between ***LOW TEMP*** and ***HIGH TEMP*** values, the system will calculate an increment which is directly proportional to the

ambient temperature and limited by the ***LOW DELTA*** and ***HIGH DELTA*** values. This increment is added to the ambient temperature to establish the rain sensor target temperature.

The green rectangle parameters

The parameter ***Min*** enclosed by the green rectangle corresponds to the minimum heating value. This value corresponds to a percentage and it should be between 10 and 20 for stable behavior.

- This parameter may create a situation where the rain sensor temperature is above the value calculated by the previous parameters. Under these circumstances the system will respect the minimum heating value even if the temperature is above the target temperature calculated using with the red rectangle parameters.

The blue rectangle parameters

The system will generate a heating impulse based on the parameters enclosed in the blue rectangle.

- The ***Heat Impulse*** mechanism has the objective to dry the rain sensor surface if the rain sensor stays continuously **WET/RAIN** for the period of time defined by the ***CYCLE*** field (in seconds).
- The duration of the pulse is given by the ***DURAT*** field (in seconds) and the pulse intensity is calculated in terms of the rain sensor temperature as the value of the ambient temperature (ºC) + the ***TEMP*** field (ºC). In the case illustrated in the above figure, the heat impulse will have the duration of 60 seconds at a temperature 10ºC higher than the ambient temperature if the rain sensor stays **WET/RAIN** for a continuous period of at least 600 seconds (i.e. 10 minutes).

Internal algorithm

For every read cycle, the target temperature for the rain sensor is calculated based on the actual ambient temperature and the red rectangle parameters described above.

1. If the actual rain sensor temperature is ***above*** the calculated target temperature, then the rain sensor heater power is decreased. However, if the new rain heater power falls below the Minimum value (defined by the green rectangle parameter) then this Minimum value is used.
2. If the actual rain sensor temperature is ***below*** the calculated target temperature, then the rain sensor heater power is increased.

   The power adjustments performed to the rain heater power depend on the read cycle period and the difference between the actual temperature and the target temperature.

   For the default read cycle of 10 seconds, the following table is used to determine the variation to the rain sensor heating power

Temperature difference between Actual Temperature and Target Temperature	Percentage **variation** to the rain sensor heating power
> 8 ºC	40%
> 4º C	20%
> 3 º C	10%
> 2 º C	6%
> 1º C	4%
> 0.5 º C	2%
> 0.3 º C	1%

3. If the rain sensor value has been **wet/rain** for at least the Cycle value (defined in the blue rectangle) the system will activate the heat impulse mechanism.

   When the heat impulse mechanism is initiated, the power to the rain sensor is increased to 100% and it is kept at 100% while the rain sensor has not reached the impulse temperature (= the ambient temperature + **Temp**. parameter in the blue rectangle).

   The moment the rain sensor reaches this impulse temperature, the system will consider this impulse temperature the target temperature and it will manage the rain sensor temperature using the same approach as defined in 1 and 2

above, keeping the rain sensor at this target temperature (= Impulse temperature) for the period defined in the blue rectangle parameters ***Durat.***

After the period defined by **Durat** the system will revert to its normal operation, calculating the target temperature based on the red rectangle parameters and the ambient temperature.