Datasheet Cooler

Cooler device

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This document shows technical characteristics of the simulated device Cooler.

VERSION

Version	Date	Description
V1.0	19/02/13	File creation
V1.1	20/02/13	Correct title names Add illustration
V1.2	12/03/13	Add interface name

General Description

Cooler can supply only one model of cooler which is a 1000 Watts electrical cooler.

The cooler power level can be adjusted between 0 and 1.0 which means into range of 0 Watt (cooler is off) and 1000 Watts (completely turned on). We describe in section Cooler device Outline methods linked to this device.

Device properties

Model	cooler.powerLevel	cooler.maxPowerLevel
Cooler	[0-1.0]	1000 Watts

Note: 0.0 means 0% of 1000 Watts and 1.0 means 100% of 1000 Watts.

Thermal considerations

Here we describe the global functioning of the simulated device Cooler. We take into account physical consideration to compute the temperature (expressed in Kelvin unit) returned by the device. We have considered that the room has no thermal loss and the external temperature does not influence the internal temperature.

Through some differential equations we finally obtain that:

$$T - T_0 = \frac{-cooler.powerLevel * cooler.maxPowerLevel}{C} * t$$

With:

- T [K]: compute temperature
- cooler.maxPowerLevel[Watts]: thermal power of the cooler
- cooler.powerLevel [percentage]: power level of the cooler
- t [s]: delta time variation between two temperature calculation
- T_0 [K]: intial temperature
- C [J/K]: thermal capacity which is compute by the formula:

$$C = M_{air} * Volume * C_m \begin{cases} M_{air}: air\ mass\ at\ 20°C\ [1.2 Kg/m^3] \\ Volume: the\ volume\ of\ the\ room\ [m^3] \\ C_m: air\ mass\ thermal\ capacity\ [\frac{1000J}{Kg}.K] \end{cases}$$

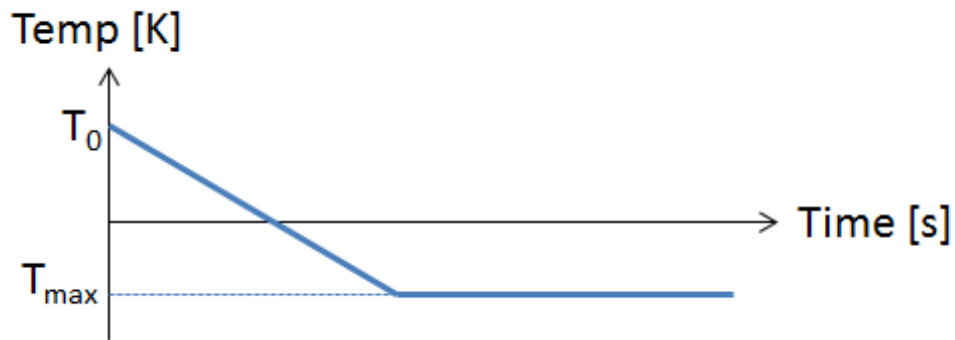The illustration beside shows how the cooler temperature curve:

Figure 1: Characteristics curve of cooler devices

With:

- T_0: Initial temperature (normally never over 303,16 Kelvin)
- T_{max}: Clipping value of temperature fixed to 283,16 Kelvin

Cooler device Outline

Hereafter we explain methods that can be useful for the user to control a cooler.

Interface: **fr.liglab.adele.icasa.device.temperature.Cooler**

getSerialNumber()	Get the device ID
getPowerLevel()	Get the power level in percentage
setPowerLevel(double level)	Set the power level of the cooler in percentage
getMaxPowerLevel()	Get the max power level of the cooler in Watts