LIG – ADELE TEAM

Datasheet Heater

Heater device

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This document shows technical characteristics of the simulated device Heater.

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
V1.3	18/03/13	Major change on properties table

General Description

Heater can supply only one model of heater which is a 1000 Watts electrical heater.

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

Device properties

Name	Value	Default Value	Type	Modifiable
heater.powerLevel	[0-1.0]	0.0	Double	Yes
heater.maxPowerLevel	1000	1000	Double	No
heater.updaterThread.period	5000	5000	Integer	5000

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 Heater. 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:

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

With:

- T [K]: compute temperature
- heater.maxPowerLevel[Watts]: thermal power of the heater
- heater.powerLevel [percentage]: power level of the heater
- 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:

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

The illustration beside shows how the heater temperature curve:

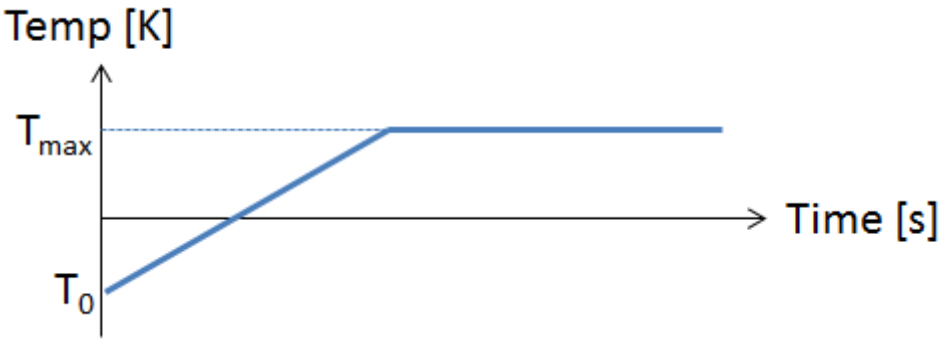

Figure 1: Characteristics curve of heater devices

With:

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

Heater device Outline

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

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

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