

10 - Results and Calculations

The physical system

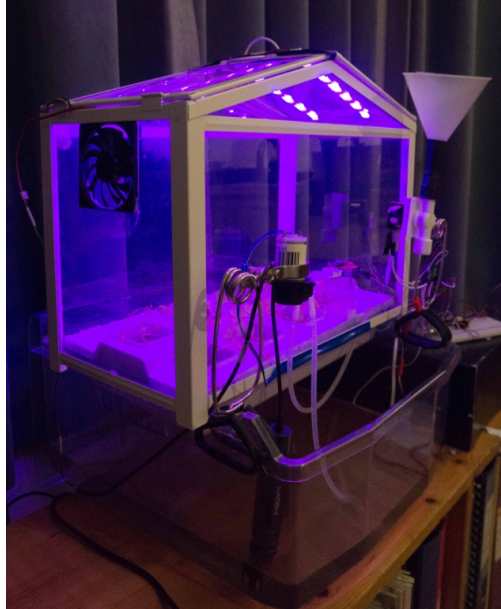


Figure 10.1 - Picture of the greenhouse built, showing the fan, pump and pH meter

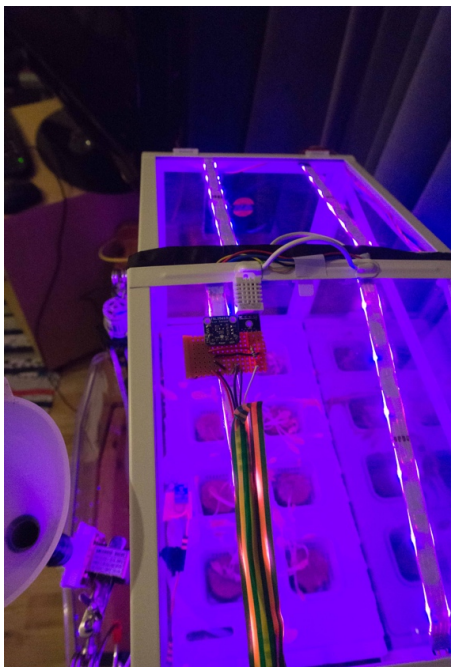


Figure 10.3 - Picture of the greenhouse built, showing the external DHT22 temperature and humidity sensor and the TSL2561 luminosity sensor

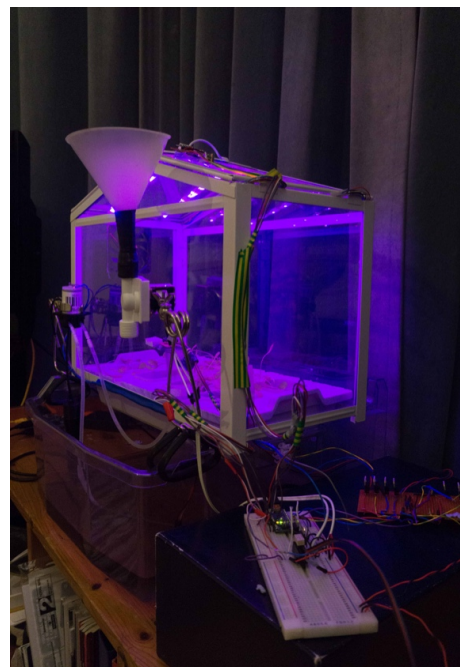
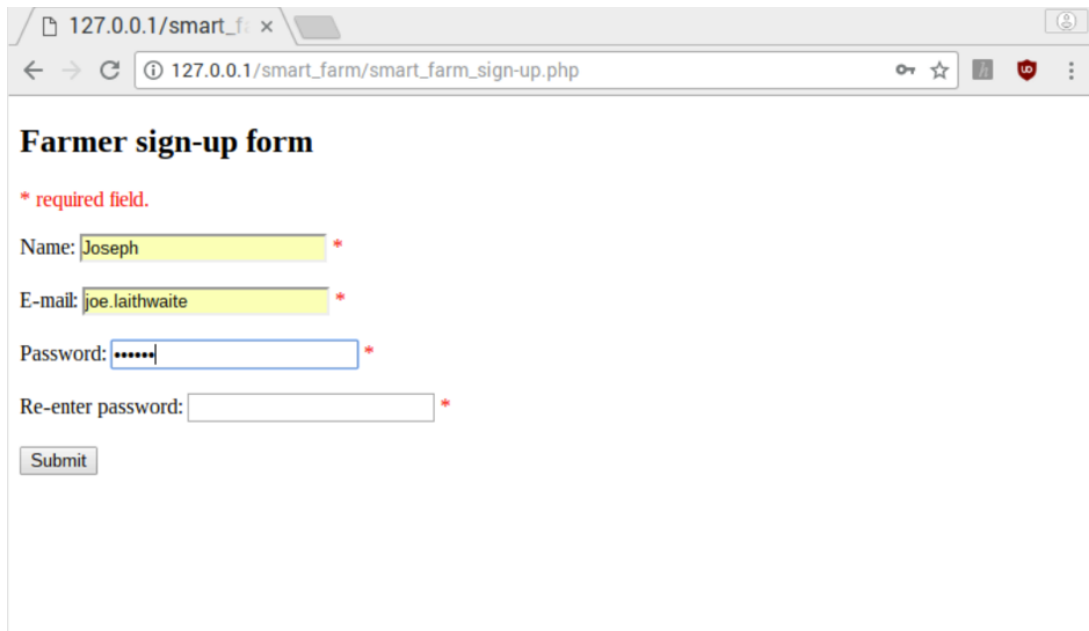


Figure 10.2 - Picture of the greenhouse built, showing the Arduino, Solenoid valve and light control circuitry

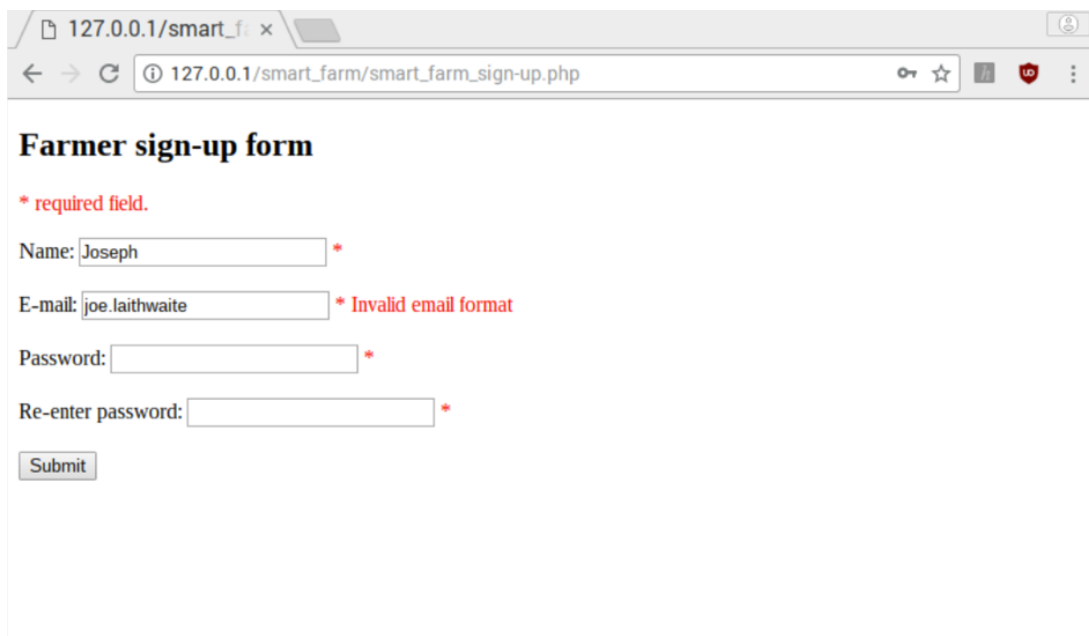
The systems user interface

Sign up



A screenshot of a web browser displaying a "Farmer sign-up form". The browser's address bar shows the URL "127.0.0.1/smart_farm/smart_farm_sign-up.php". The form has a title "Farmer sign-up form" and a red asterisk followed by the text "* required field." above the input fields. The "Name:" field contains "Joseph" and has a red asterisk. The "E-mail:" field contains "joe.laithwaite" and has a red asterisk. The "Password:" field contains "*****" and has a red asterisk. The "Re-enter password:" field is empty and has a red asterisk. A "Submit" button is at the bottom of the form.

Figure 10.4 - Screenshot of the sign-up page of the user interface with an invalid email address being tried



A screenshot of the same "Farmer sign-up form" as in Figure 10.4. The "Name:" field contains "Joseph" and has a red asterisk. The "E-mail:" field contains "joe.laithwaite" and has a red asterisk followed by the text "* Invalid email format". The "Password:" field is empty and has a red asterisk. The "Re-enter password:" field is empty and has a red asterisk. A "Submit" button is at the bottom of the form.

Figure 10.5 - Screenshot of the sign-up page of the user interface showing an error message after an incorrectly entered email

Farmer sign-up form

* required field.

Name: *

E-mail: *

Password: * Password is required

Re-enter password: * Password is required

Figure 10.6 - Screenshot of the sign-up page of the user interface showing error messages when no passwords are submitted

Login

Farmer sign-in form

* required field.

E-mail: *

Password: *

Figure 10.7- Login screen of the user interface with a valid email and password

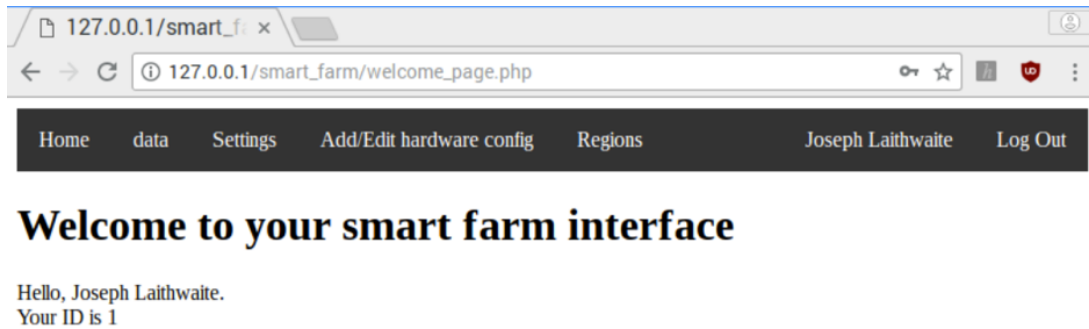


Figure 10.8 - Welcome screen of the user interface after successfully signing up or logging in

Editing hardware

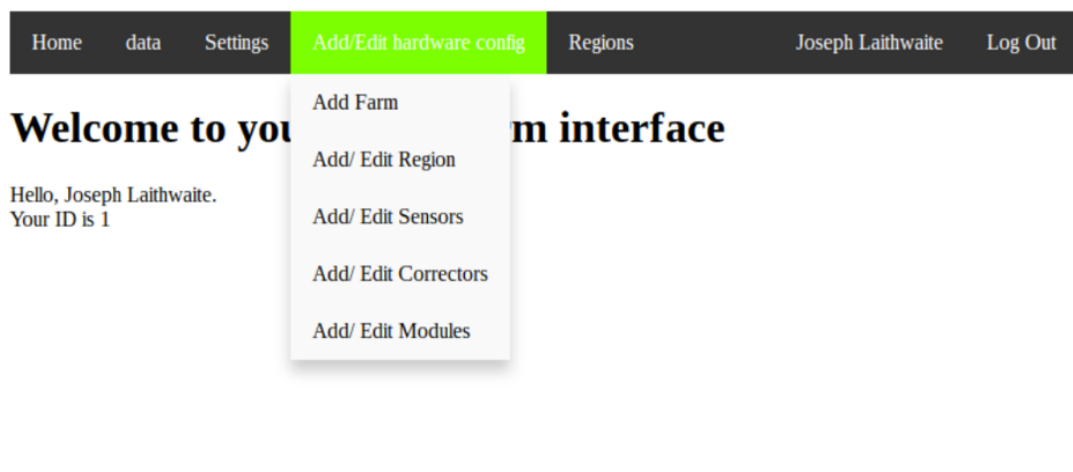


Figure 10.9 - Screenshot of user interface showing Add/ edit hardware menu options

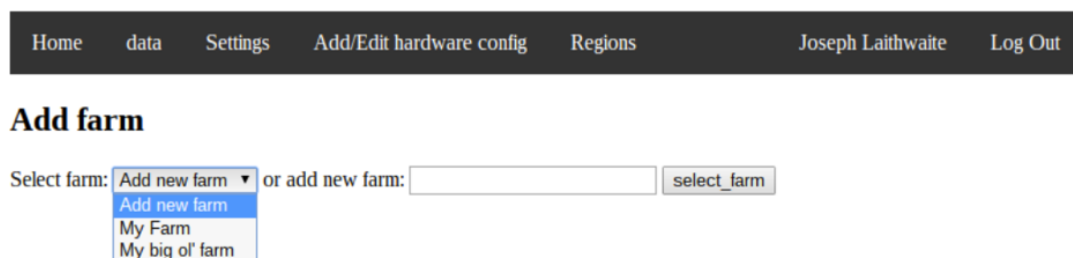


Figure 10.10 - Screenshot of user interface showing options to add or select a farm to edit, it's hardware

[Home](#) [data](#) [Settings](#) [Add/Edit hardware config](#) [Regions](#) Joseph Laithwaite [Log Out](#)

edit region

Select region:

Add new region ▼

or add new region:
Add region description:

Figure 10.11 - Screenshot of the user interface showing the ability to select or add a new region with the options to edit sensor or correctors

User interface data output

[Home](#) [Data](#) [Settings](#) [Add/Edit hardware config](#) [Regions](#) Joseph Laithwaite [Log Out](#)

Welc

Hello, Josep
Your ID is :

Light Module

Temperature Module

Humidity Module

Water Module

pH Module

smart farm interface

Figure 10.12 - Screenshot of the user interface showing the menu options of data to look at

Luminosity Module

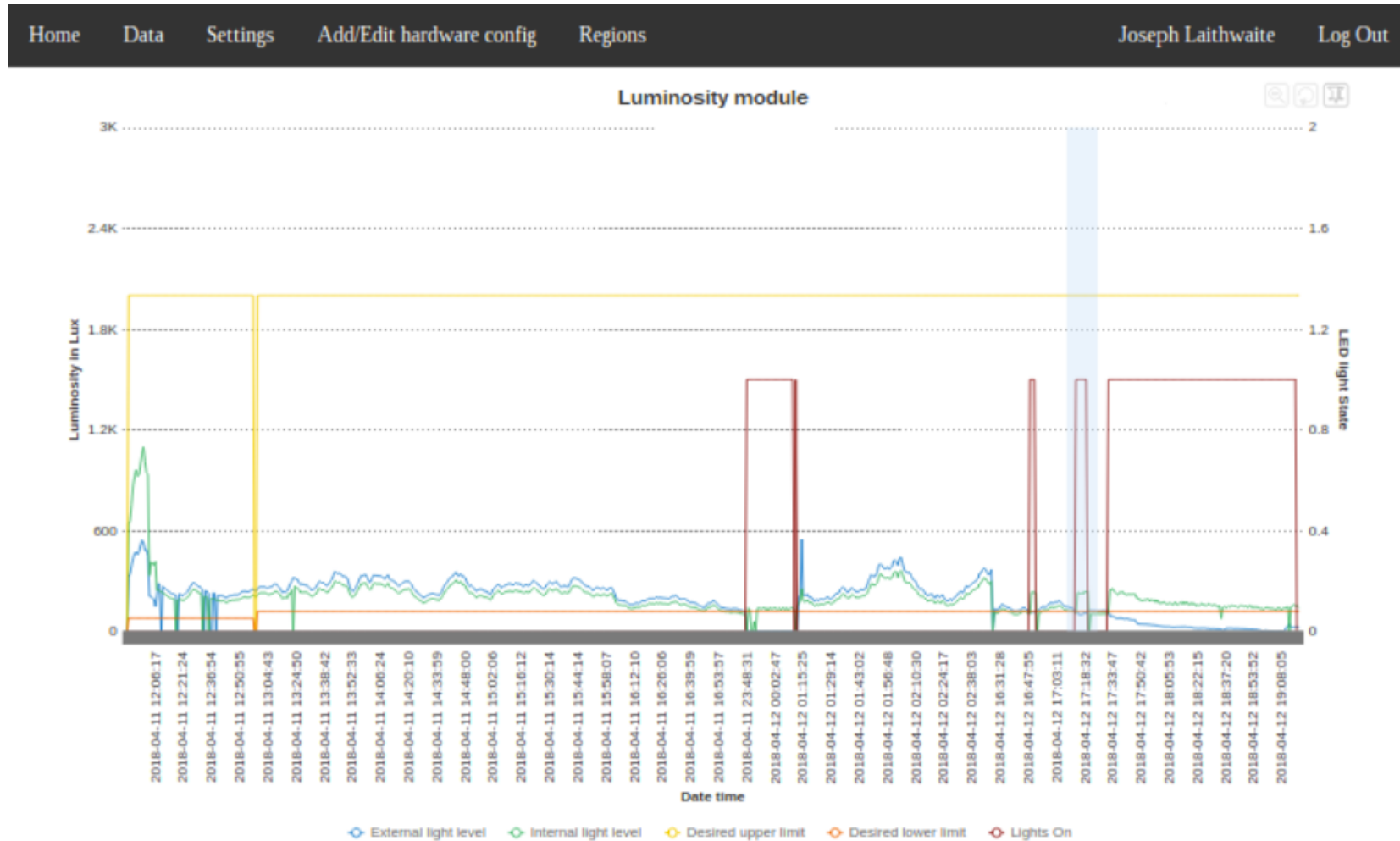


Figure 10.13 - Screenshot of the full data recorded by the Light module including desired conditions, sensor reading and LED actions

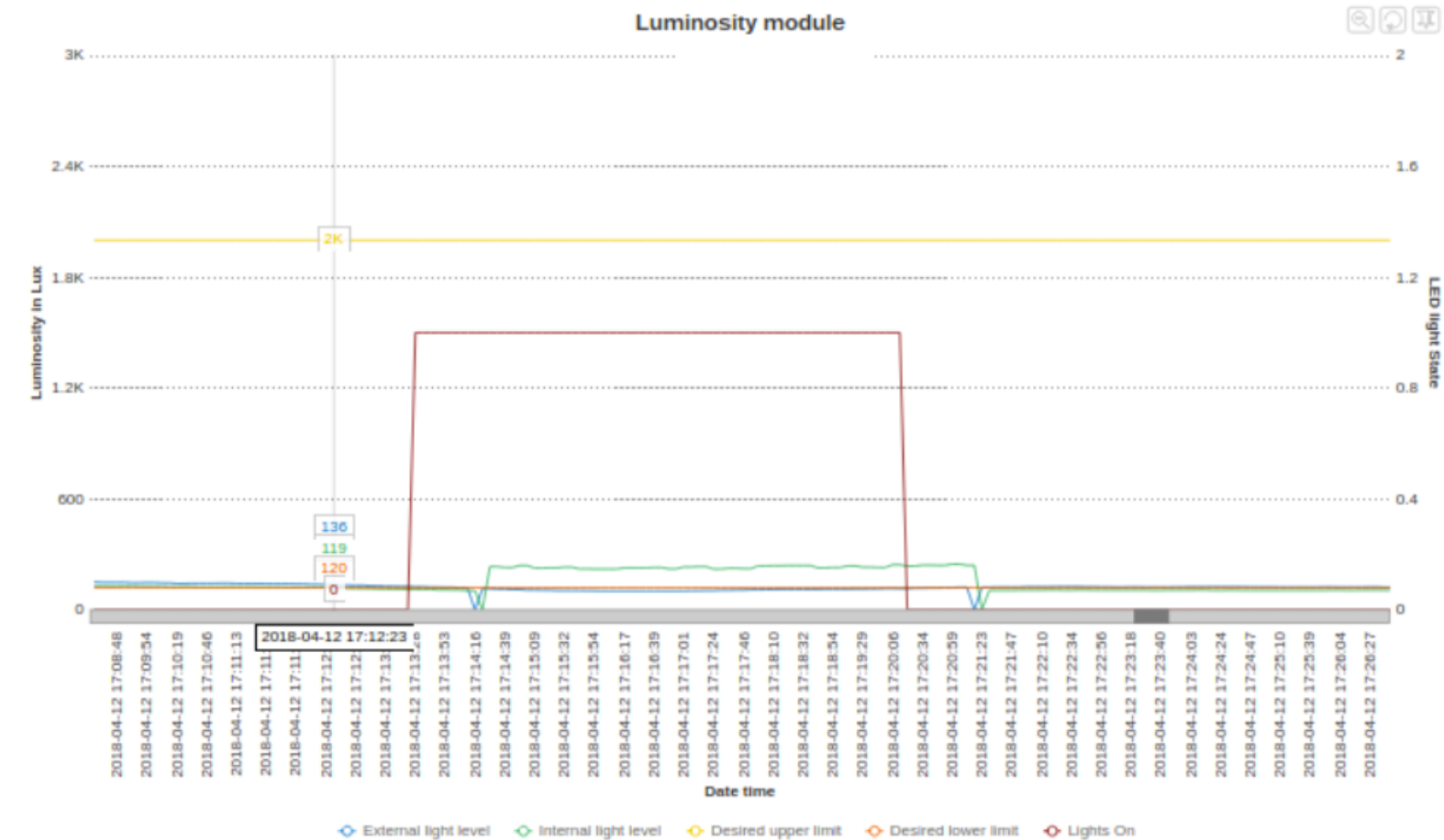
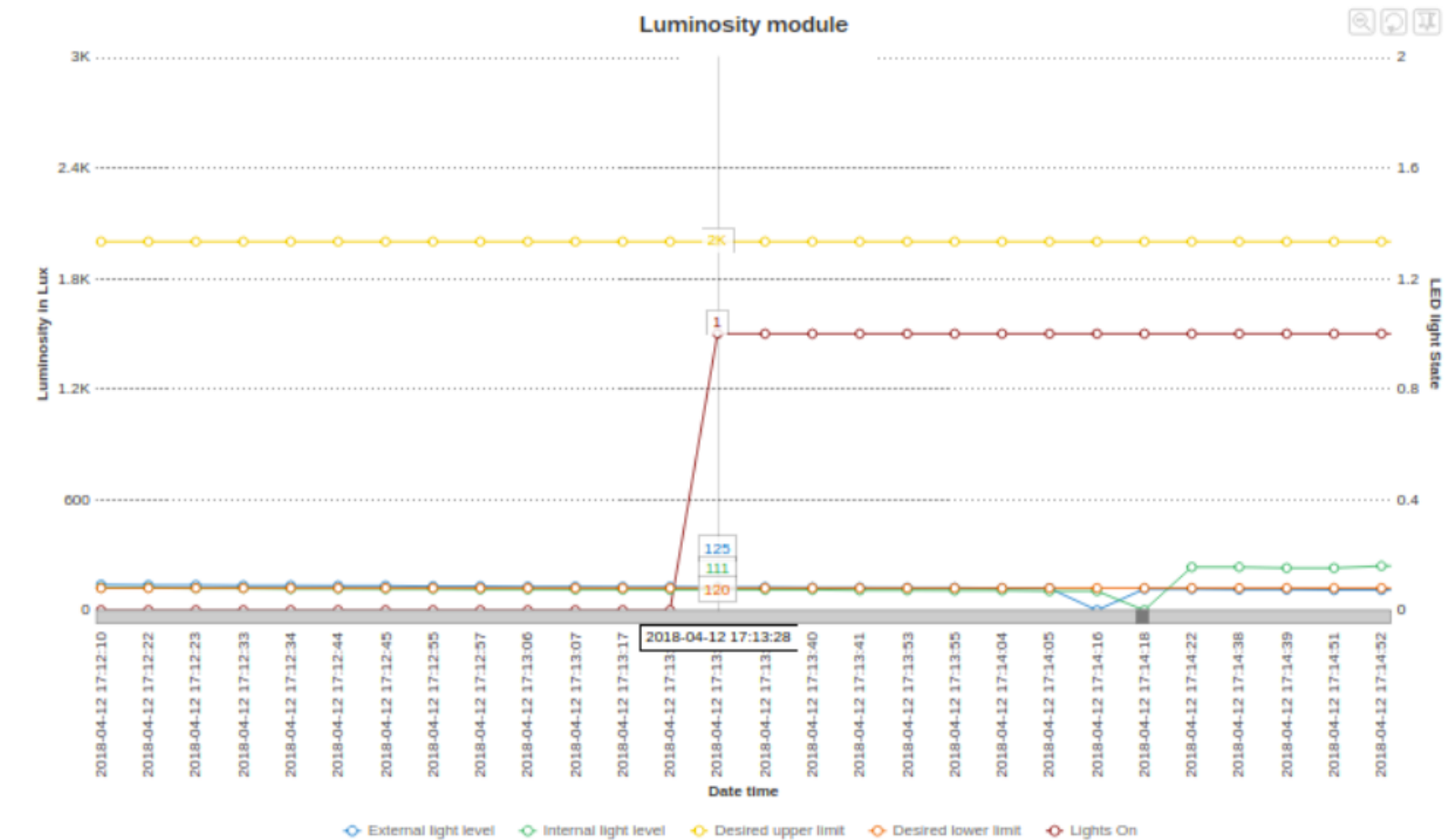


Figure 10.14 - By highlighting a section from the graph in figure 11.13, a zoomed in graph is displayed. Here the data surrounding a turn on and off



FusionCharts XT Trial

Figure 10.15 - screenshot of a zoomed in section of the luminosity module graph with values of the time on time for the Lights

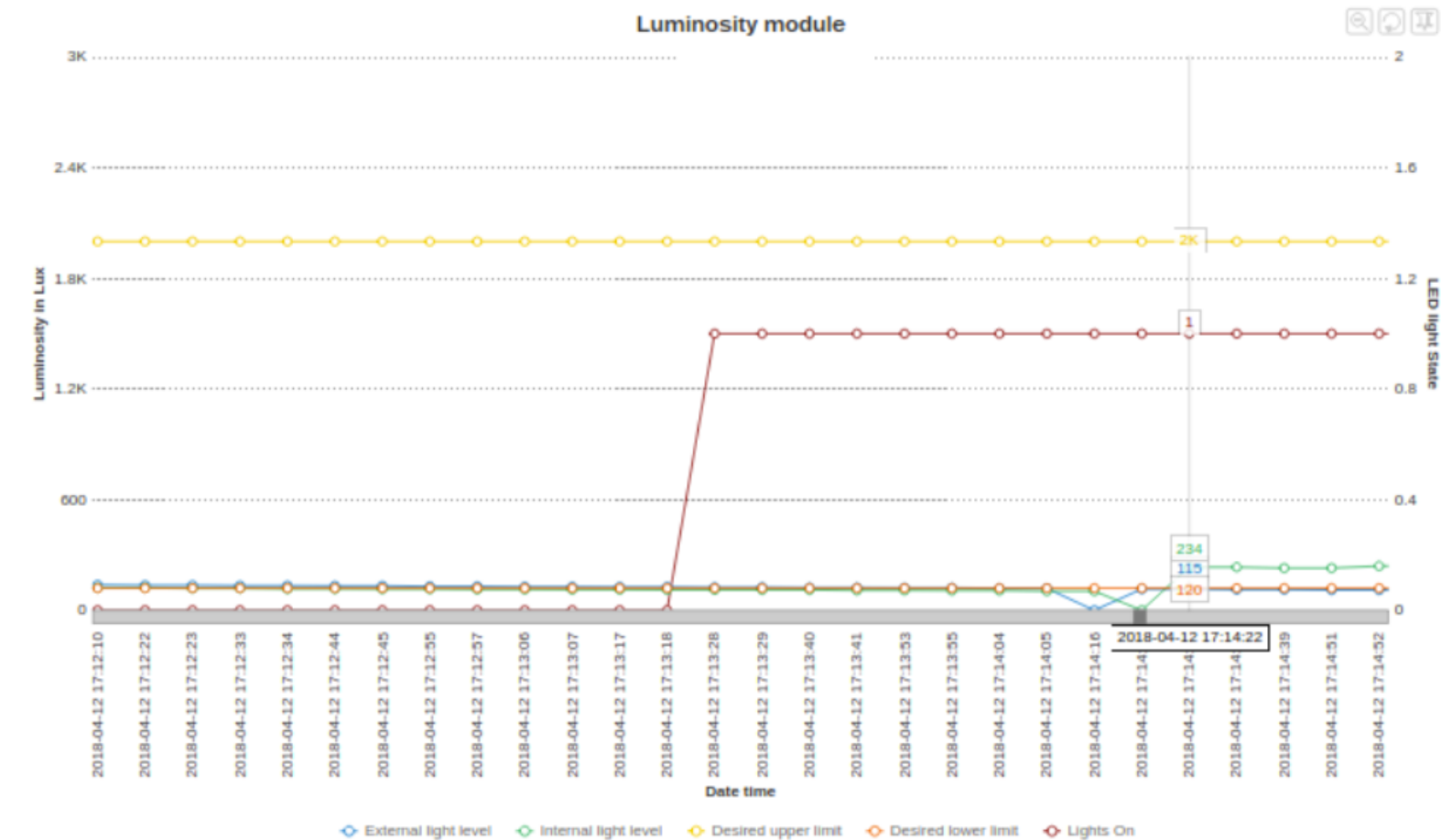


Figure 10.16 - Screenshot of luminosity module graph showing the time at which a change was noticed in light level after LEDs were turned on

Temperature Module



Figure 10.17 - Full graph of temperature module data

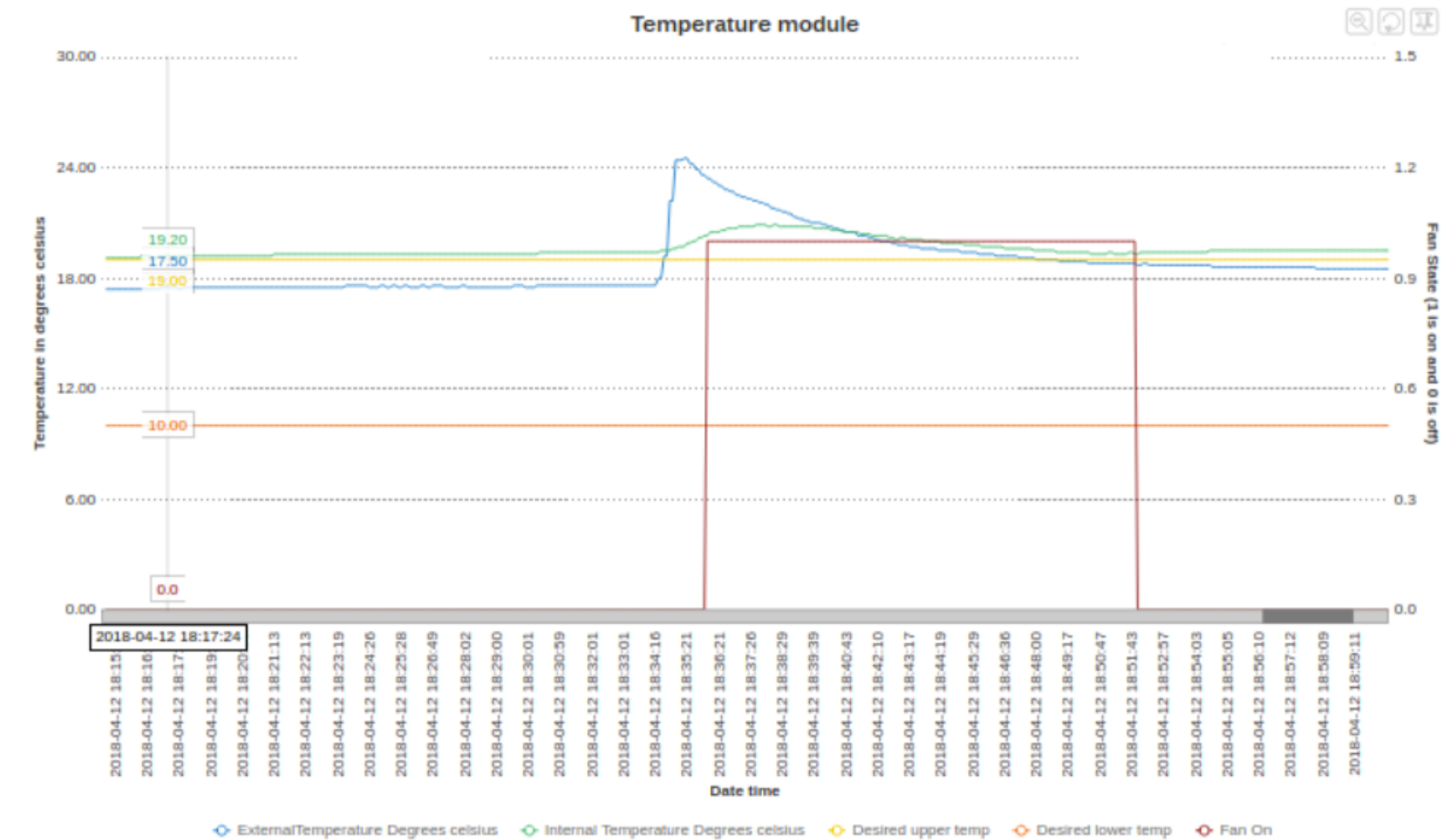


Figure 10.18 - Zoomed in graph of temperature module whilst a heat source was applied to the system

Relative Humidity

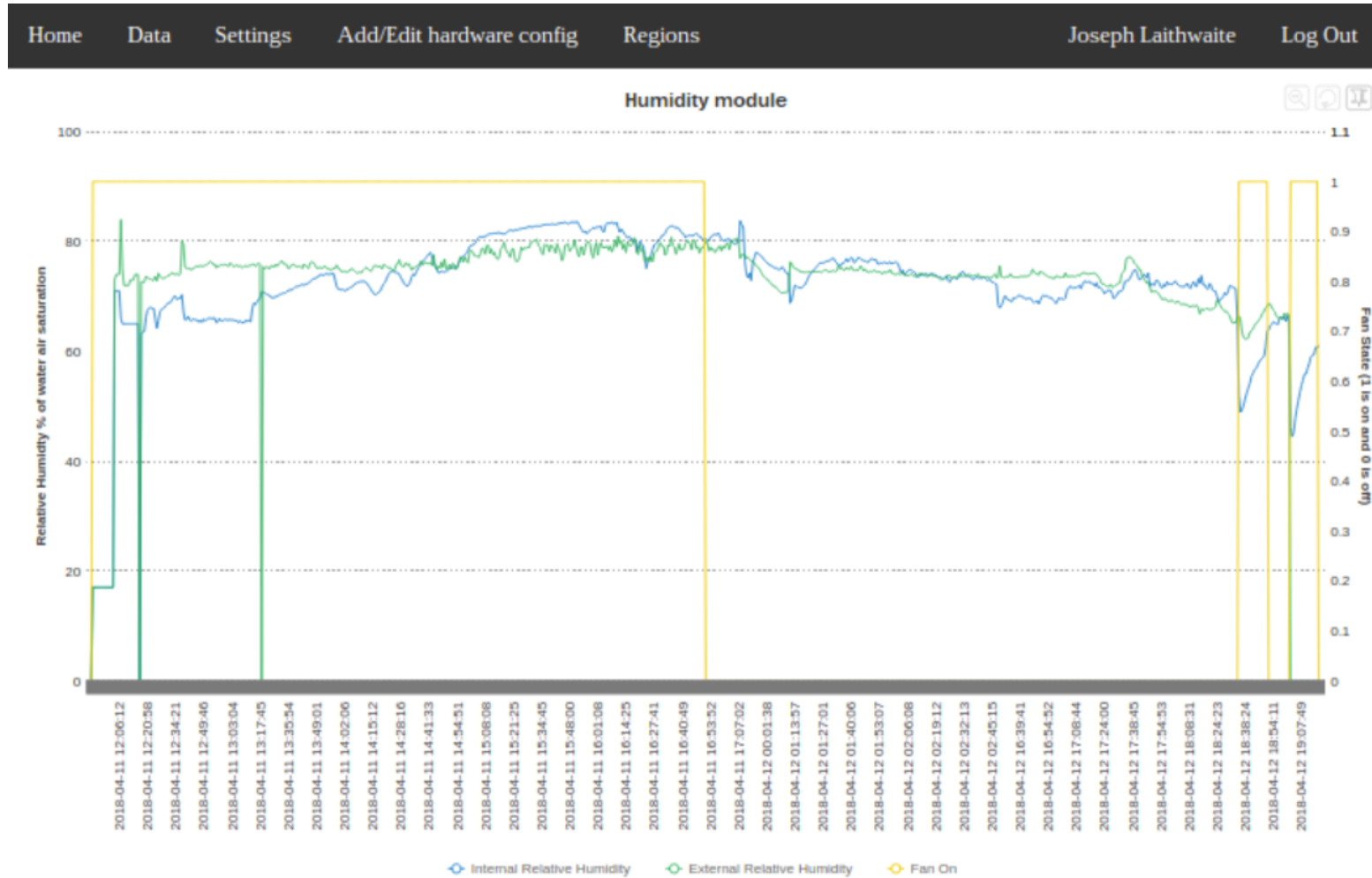


Figure 10.19 - Full graph for the humidity modules data, this has no desired levels set and the fan's state is set for the temperature module

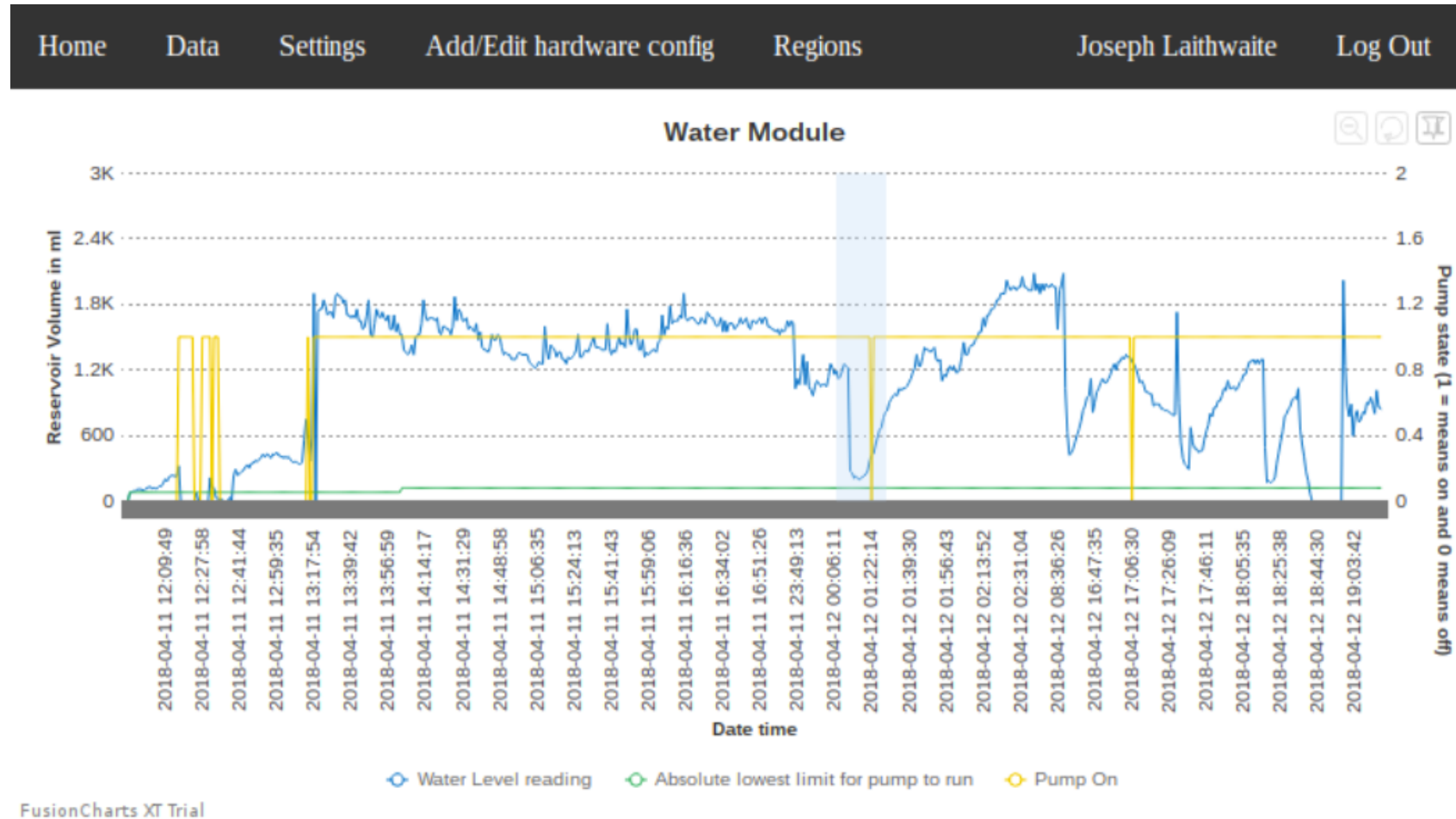


Figure 10.20 - Full graph of water module data

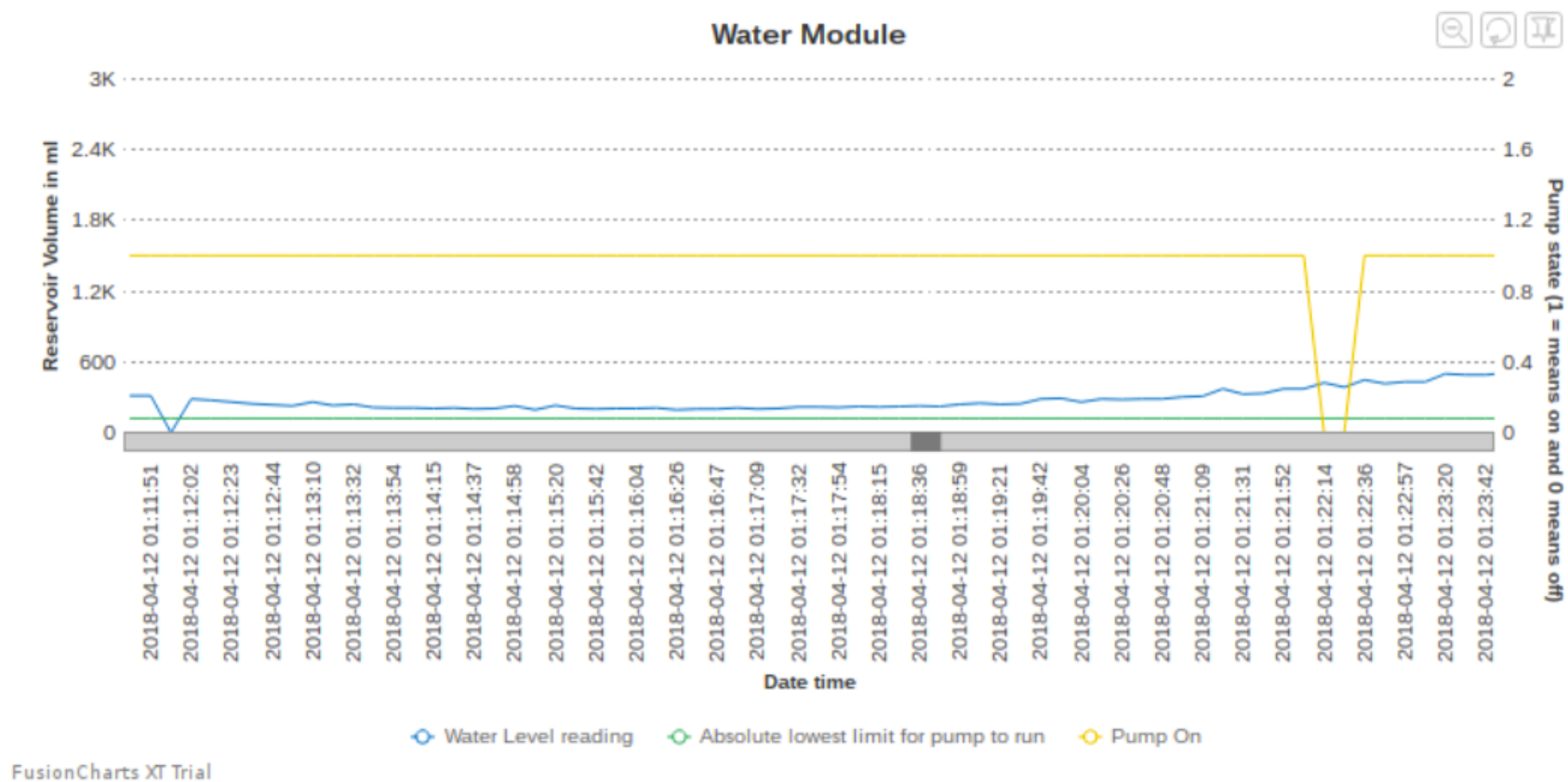


Figure 10.21 - zoomed in graph of water module showing the pumps response to the water sensors removal from water