SENMATIC

User and installation manual

Fionia Lighting
FL300

Fionia Lighting

CE **RoHS** 

Declaration of Conformity
We, Senmatic A/S, hereby declare that the FL300 intended for horticultural lighting has been developed and produced in conformity with:

EMC directive:	2004/108/EC
EN 55015:2006 +A1/2007 +A2/2009	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61547:2009	Equipment for general lighting purposes - EMC immunity requirements
Low voltages directive:	2006/95/EC
EN 60598-1:2008 +A11/2009	Luminaires - Part 1: General requirements and tests
EN 60598-2-1:2000	Luminaires - Part 2: Particular requirements -Section 1: Fixed general purpose luminaires
EN 62031:2008 + A1/2013	LED modules for general lighting - Safety specifications
EN 62471:2008	Photobiological safety of lamps and lamp systems
EN 62479:2010	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
RoHS:	2011/65/EU
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
WEEE directive:	2012/19/EU
EN 50419:2006	Marking of electrical and electronic equipment in accordance with Article 11(2) of Directive 2002/96/EC (WEEE)

This declaration covers FL300 from serial number 490300 to 490399.

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Søndersø 01/09-2012

Contents:

Preface

Congratulations with your new LED fixture, FL300.
We recommend you to read this user guide **before** the product is installed and come into use.
Please check that the product is undamaged. Possible transport damages must be noticed **8 days** after reception **at the latest**.
The guarantee only covers defects and damages on the product caused by manufacture faults and faults in the material. Faulty installation and wrong use of the product is therefore not covered by the guarantee. We refer to our “Terms and Conditions of Sale and Delievery” for further details.
In consideration of the electrical installations the product must not be installed at places exposed to dripping (condensed water) from water installations, gutter, etc.

NB! The product must not be cleaned with ethanol.

In some countries the installation must be carried out by skilled craftsmen only.

Best regards

Senmatic A/S
DGT

Introduction

This user guide contains a description of the FL300 and the different versions of it, along with instructions how to control the FL300 via climate computer LCC4 or PC program Interface.

The last section of this guide is a description of how to install the FL300.

This user guide has been compiled to make sure that you will obtain reliable performance from the FL300 from the very first start. If you follow the instructions carefully, the FL300 will operate to your entire satisfaction over a long period.

FL300

FL300 is a 100-600W LED fixture for the horticultural industry.

The fixture is adjustable in both intensity and spectrum so it can be set to fit the individual crops in the different productions periods the best way possible.

The good quality of the light reflects in the choice of LEDs that are high quality LEDs from certified European suppliers and with a special build optic lens that ensures that the light distribution is even.

As shown below the LED junction temperature is below 45°C and this is a result of the active cooling system with two controllable fans that ensures the fixture a long lifetime.

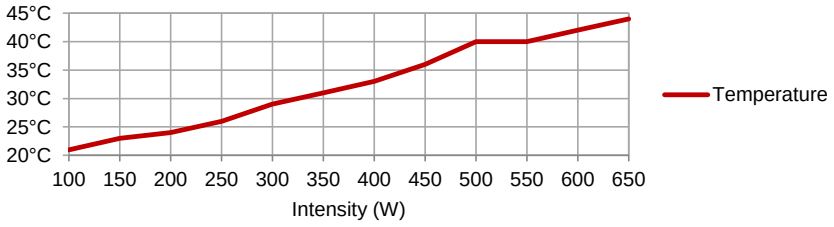

Figure 1: Readings of the LED junction temperature for the FL300

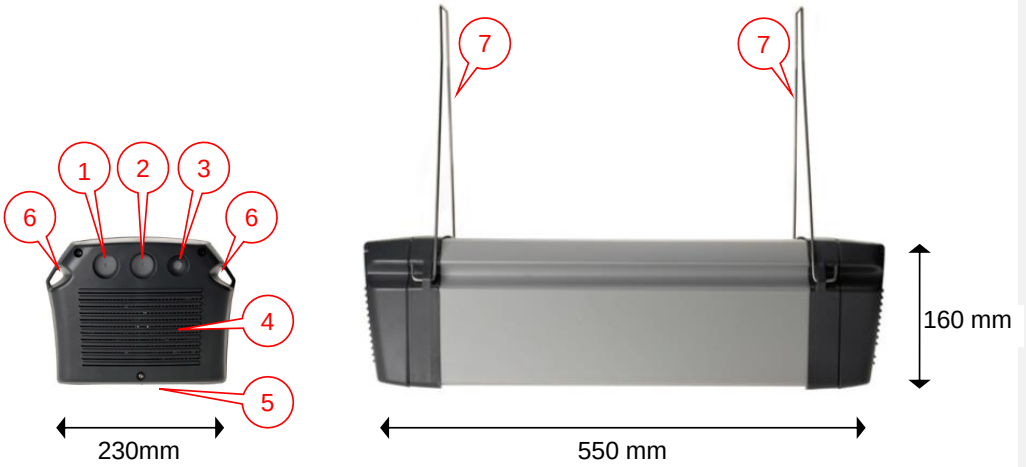

Figure 2: FL300

1. Power **in** with Wieland 3 pole connection.
2. Power **out** with Wieland 3 pole connection (for series connection).
3. Communication connection.
4. Ventilations bars for the fans in the active cooling system.
5. 300 LEDs from certified European suppliers covered with a special optic lens.
6. For mounting.
7. Mounting bracket.

Very important: The ground connections (Green/Yellow wires) from all lamps MUST be connected to the ground (Green/Yellow wire) of the EXP and also Nursery ground.

Models

The FL300 fixture can be equipped with a large range of different diodes for different purposes. The versions described in this manual are the FL300 Grow, FL300 Sunlight and FL300 Grow White.

FL300 Grow

The FL300 Grow is a fixture emitting light in the photosynthetic active region of the visible light spectrum as shown below with both the photosynthetic active region curve and the fixtures spectral distributions.

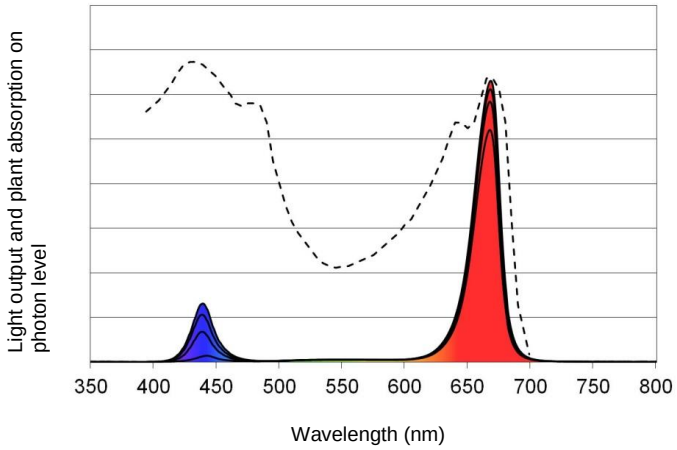

Figure 3: Spectral distribution of the FL300 Grow together with action spectrum of plants. Spectral distribution for FL300 shown for 2, 6, 10, 14% blue

Furthermore the spectrum can be controlled to have a spectral distribution from 2-14% blue (400-500nm) to fit the different crops needs in their different production periods.

Below are shown the standard variations (STDV) of the contents of the light in % of PAR. STDV is less than ±1 for all intervals when chancing the intensity.

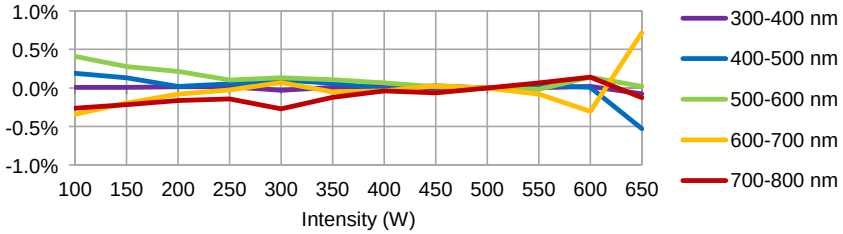

Figure 4: STDV for the FL300 Grow spectral distribution 10% blue

For the blue interval the STDV is less than ±0.5% from fixture to fixture.

FL300 Sunlight

FL300 Sunlight has a spectrum designed to replica the light coming from the sun as shown below with the curve for sunlight and the spectral distribution of FL300 Sunlight.

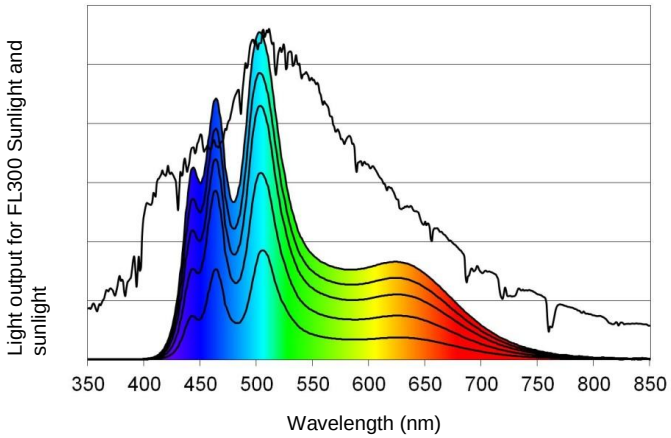

Figure 5: Spectral distribution of FL300 Sunlight for the power usages 500W, 400W, 300W, 200W and 100W together with spectral profile of sunlight.

In the table below are the spectral distribution for sunlight and FL300 Sunlight. The STDV for FL300 Sunlight are ±3.5 of the % of PAR.

	Sunlight	FL300 Sunlight
400-500 nm	33%	33%
500-600 nm	41%	40%
600-700 nm	26%	27%

Table 1: Spectral distribution for sunlight an FL300 Sunlight

Below are shown the standard variations (STDV) of the contents of the light in % of PAR. STDV is less than ±3.5 when chancing the intensity.

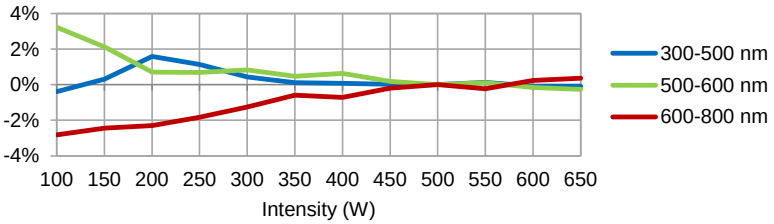

Figure 6: STDV FL300 Sunlight

FL300 Grow White

The FL300 Grow White is emitting light in the photosynthetic active region of the visible light spectrum and is a combination of the FL300 sunlight and the FL300 standard.

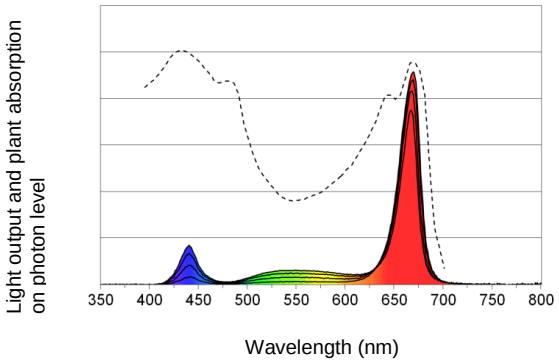

Figure 7: Spectral distribution of the FL300 Grow White together with action spectrum of plants. Spectral distribution for FL300 shown for 2, 6, 10, 14% blue

The luminaire is adjustable in both intensity and spectrum so it can be set to fit the individual crops in the different productions periods the best way possible.

The spectrum can be controlled to have a spectral distribution from 2-14% blue (400-500nm) to fit the different crops needs in their different production periods.

Controlling the FL300

The FL300 are designed so the spectrums can be controlled to fit the individual crops in combination with LCC4 climate control systems. An alternative to the LCC4 climate control system is Fionia Lighting Interface Software.

This chapter is a description of which parameters that can be controlled and how to control the fixtures with LCC4 or Fionia Lighting Interface Software.

Controls

Each FL300 has an individual label showing product no., fixture type and IP address for the fixture.

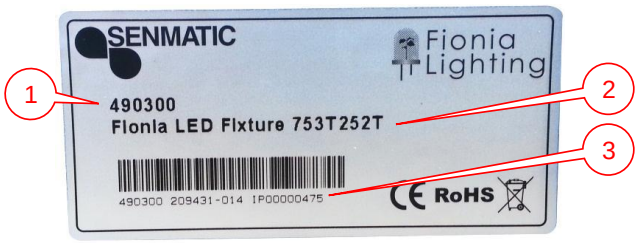

Figure 8: FL300 label

1. Product no. – This is used when ordering fixtures.
2. Fixture type – This is used in the programs to get the right program for the fixtures.
3. IP address - This is the name of the fixture, which makes it possible to communicate with it. The IP address has eight digits.

The fixtures can be put into groups so these can be controlled together.

The light is controlled through four light channels that control a group of LEDs each. The channels are controlled separately and the value they are set to defines how much the LEDs are going to illuminate. To turn a channel off set the value to zero.

In the FL300 Grow the light can be controlled in the range within the values 60-255 on the channels and in the FL300 Sunlight it can be controlled within the values 60-175.

For the FL300 Grow the colours of the LEDs controlled by the channels are as followed:

Channel A – Red one site of the fixture
Channel B – Mixed
Channel C – Blue
Channel D – Red the other site of the fixture

For the FL300 Sunlight the colours of the LEDs controlled by the channels are as followed:

Channel A – White/green one site of the fixture
Channel B – Mixed
Channel C – Blue
Channel D – White/green other site of the fixture

For the FL300 Grow White the colours of the LEDs controlled by the channels are as followed:

Channel A – Red/white one site of the luminaire
Channel B – Mixed
Channel C – White
Channel D – Red/white the other site of the luminaire

Light sum control

To get the full benefits of the FL300 they should be installed together with a light sensor. The light can be controlled with dynamic intensity, light sum for down adjustment (DLI) or both. These two light controls are only available in the LCC4.

Dynamic Intensity

With dynamic intensity the FL300 will only turn on when the light level gets under the demanded light level.

When the light is measured to be lower than the requested light level it will cause the fixtures to turn on and when the measuring is higher than this light level the fixtures will turn off.

The hysteresis and the dynamic intensity delay prevent the fixtures to turn on and off several times in the transitions period. The hysteresis works both over and under the light level as shown below. (Enter the light level in LCC4 in tab Settings and hysteresis and dynamic intensity delay in the tab Service)

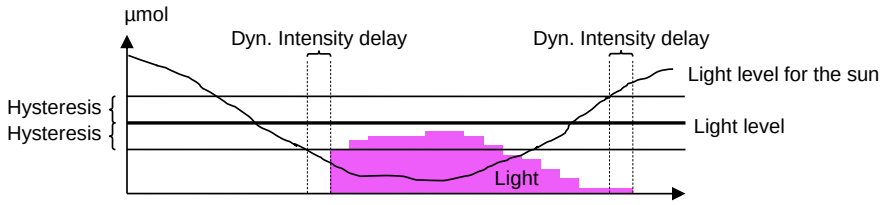

Figure 9: Dynamic Intensity

The light sum for down adjustment (DLI)

The light sum for down adjustment is a demand that can be set so the plants only get the light they can absorb on a day.

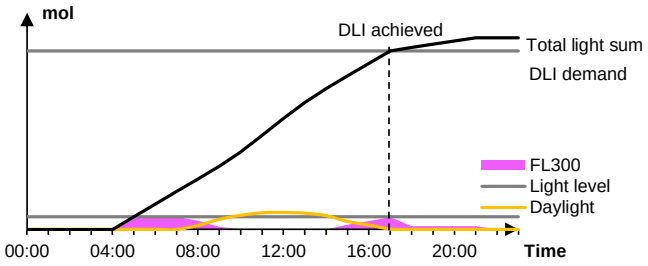

Figure 10: DLI - Light sum for down adjustment with dynamic intensity

When the demand is achieved the fixture can be turned off or turned down to a low wattage program for long-day plants as shown above. This program will turn off at the same time as the last program for the day is set to turn off. (Enter the demand and program for the DLI in the LCC4 in tap Settings)

Light intensity start – stop

Limit for the light measured outside. A measuring lower than this will cause the light to turn on. A measuring higher than this will cause the light to turn off. In addition there is a hysteresis, a start- and a stop delay. The hysteresis works both over and under the limit value. See Figure 1. According the setting of the hysteresis.

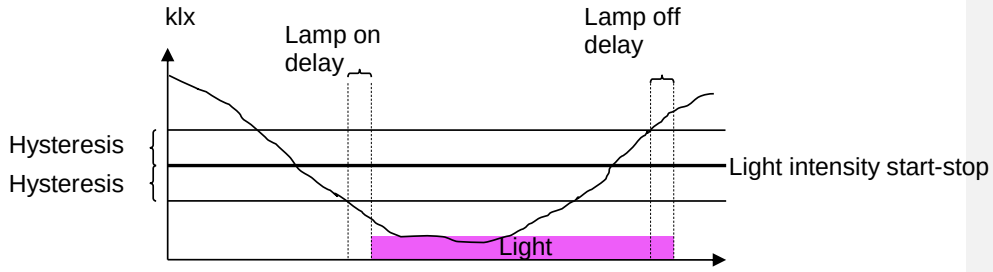

Figure 1
Conditions for the light to turn on and off in the auto period.

Programs

This chapter shows how to control the FL300 though the LCC4 climate control system with LED control menu and through a PC with Fionia Lighting Interface Software.

Logic Climate Control 4

The LCC4 can control up to 16 houses with each up six groups of fixtures. Each house can have two light sensors attached.

To get in to the LED settings select the Menu Overview (1) and the LED icon (2).

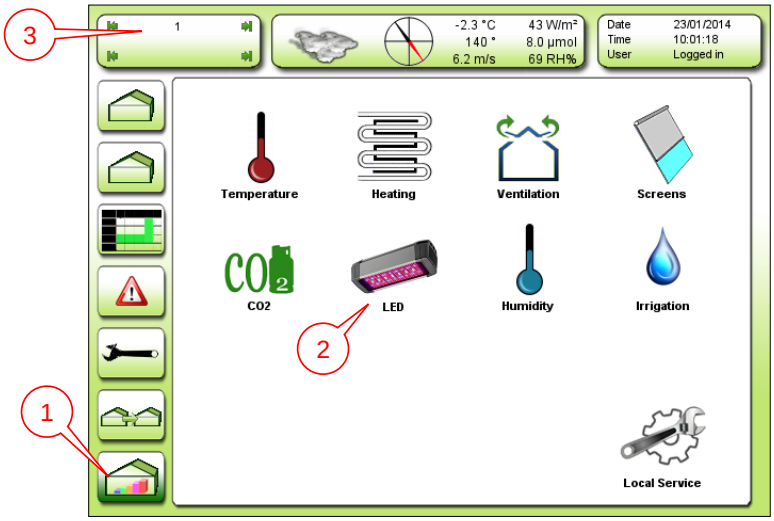

Figure 11: Menu Overview

If the LED icon is not shown make sure you have selected the right house (3) if you have more houses installed. Otherwise look in the chapter Connecting the light relay

Each group of fixtures need a 24 VDC relay.

The relays for the fixtures are connected to a digital output module either X20DO8322 or X20DO2322 In the expansion.

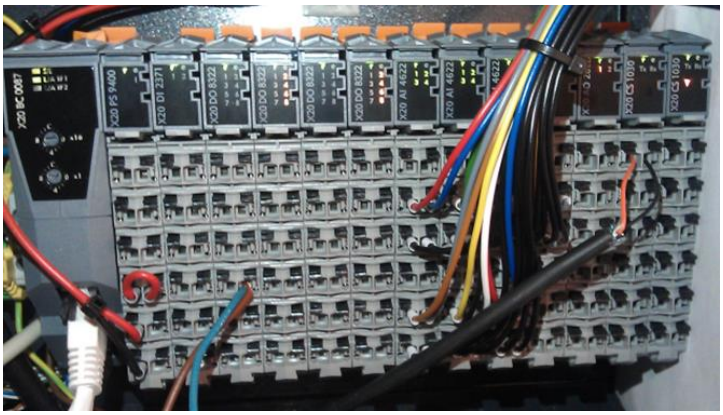

Figure 34: The X20 module in the expansion – with the X20DO8322 modules.

In the I/O table is shown where the relays are going to be connected. In the I/O table below are shown an installation with four fixture groups on the position DO12-DO15.

LCC Small Exp input output table 5

Vers 01: 19-06-2012

	Module	Number in installation manual	Number on module	Description
	Digital input X20DI2371	DI1	11	External alarm 1
		DI2	21	Circ. Pump alarm
	Digital output X20DO8322	DO1	11	Valve 1 open
		DO2	21	Valve 1 close
		DO3	12	Valve 2 open
		DO4	22	Valve 2 close
		DO5	13	Vent 1 open
		DO6	23	Vent 1 close
		DO7	14	Vent 2 open
		DO8	24	Vent 2 close
	Digital output X20DO8322	DO9	11	Screen 1 on
		DO10	21	Screen 1 off
		DO11	12	CO2 dose
		DO12	22	Suppl. Light 1.1 / LED 1
		DO13	13	Suppl. Light 1.2 / LED 2
		DO14	23	Suppl. Light 1.3 / LED 3
		DO15	14	Suppl. Light 2.1 / LED 4
		DO16	24	Irrigation valve 1
	Digital output X20DO2322	DO17	11	Irrigation valve 2
		DO18	21	M Misting Valve 1 Zone 1
	Analog input X20AI4622	AI1	12	Air temperature 1
		AI2	22	RH humidity 1
		AI3	15	Flow temperature 1
		AI4	25	Flow temperature 2
	Analog input X20AI4622	AI5	11	CO2 sensor (4 – 20 mA)
		AI6	22	Air temperature 2
		AI7	15	RH humidity 2
		AI8	25	Local light
	Analog output X20AO2622	AO1	12	Alarm: 0V=Alarm, 10V=No Alarm High Priority
		AO2	22	Alarm: 0V=Alarm, 10V=No Alarm Low Priority

Figure 35: I/O table

Setup in the LCC4 for setting the light to LED

Light menu

The light menu has five tabs.

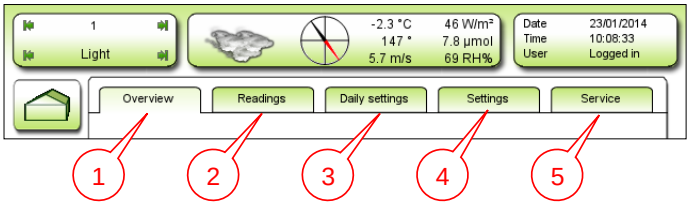

Figure 12: Light menu's tabs

1. Overview – Gives an overview over how much light the culture have got in the different groups and which programs are running.
2. Readings – Shows for each group – the light level, consumption and light on or off.
3. Daily settings – Enter the demand for light sum for down adjustment (DLI).
4. Settings – Select the programs for the groups.
5. Service – Select fixture type and divide the fixtures in to the groups.

Overview

Overview is the first tap in the light menu and shows how the fixture groups are running.

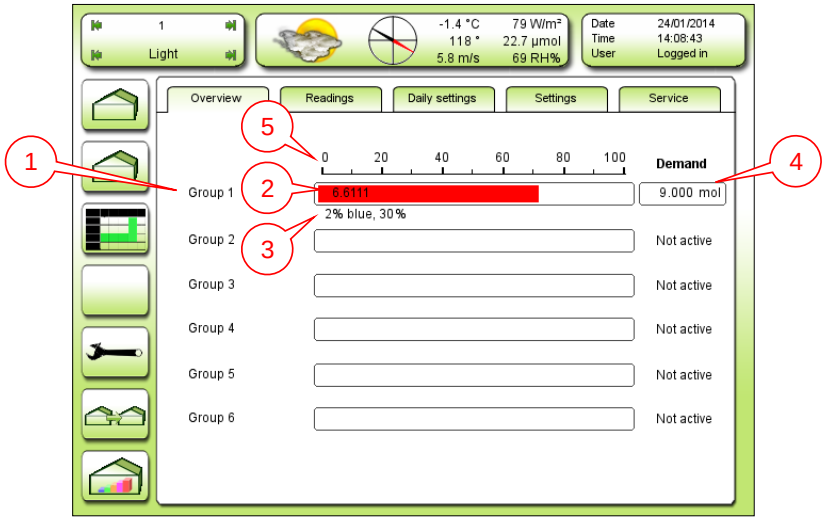

Figure 13: Overview

1. The six fixture groups.
2. Total light sum for the day for the area the fixture group is illuminating.
3. The program running for the fixture group.
4. Demand on Light sum for down adjustment (DLI) for the area for the day. When achieved the fixture group will be set to another program or turned off.
5. Scale divided in percent, to see how must of the DLI has been reached.

Readings

Here it is possible to see more about each group.

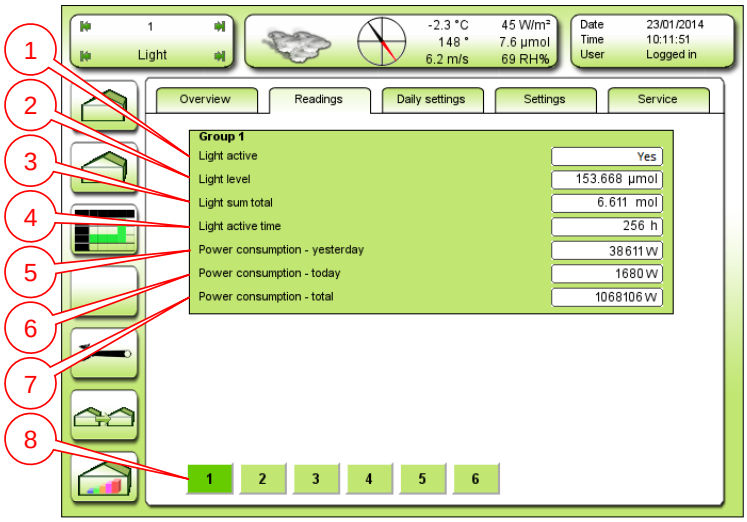

Figure 14: Readings

The first four points tells about the light in the group.

1. Light active – Shows if the group is on or off.
2. Light level – The light level at the moment for the area the fixture group.
3. Light sum total – The total light sum for the day for the area the fixture group is illuminating (shown in tab Overview).
4. Light active time – The total time the fixtures have been running.

The next three points tells about the power consumption to comparison.

5. Power consumption – yesterday: The power consumed yesterday.
6. Power consumption – today: The power consumed today on till now.
7. Power consumption – total: The power consumed in the total time the fixtures have been running.
8. To select which fixture group 1-6 to show.

Daily settings

This is a shortcut to enter the DLI for all the groups.

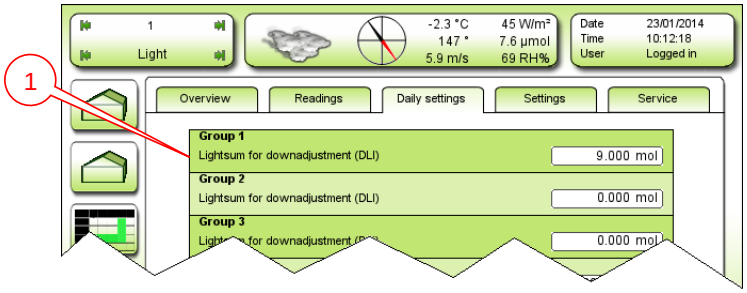

Figure 15: Daily settings

1. Light sum for down adjustment (DLI) – Enter the demand for the day for each group (shown in tab Overview).

Settings

In the settings tab the groups can be set to have up five different programs throughout the day.

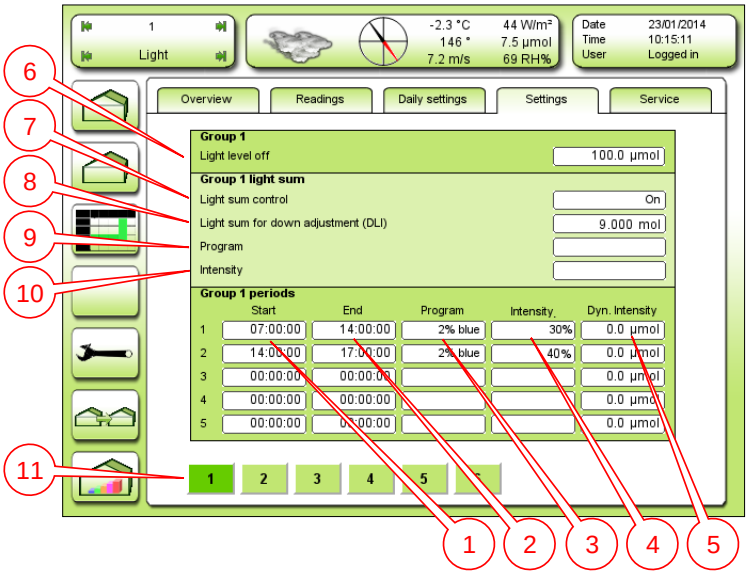

Figure 16: Settings

Enter the daily programs for each group.

1. Start – Enter start time of the program (hour **:** minute **:** second).
2. End – Enter end time of the program (hour **:** minute **:** second).
3. Program – Select a program e.g. 12% blue.
4. Intensity – Select the intensity of the fixtures 20%-130% or dynamic with FL300.
5. Dyn. Intensity – Enter the demanded light level (shown in tab Readings). This will make the intensity dynamic between the intensity steps.
6. Light level off- Enter the light level for the light measured at the weather station,

Light sum – enter the settings for the DLI.

7. Light sum control – Select “on” to use DLI.
8. DLI – Enter the demand for the day for each group (shown in tab Daily settings).
9. Program – Select a program to run when DLI has been attained ex. 12% blue.
10. Intensity – Select the intensity of the fixtures 20%-130% when DLI has been attained.
11. To select the fixture group 1-6 to enter the settings for.

Service

In the service tab it is possible select the fixture type and divide the fixtures in to the six groups.

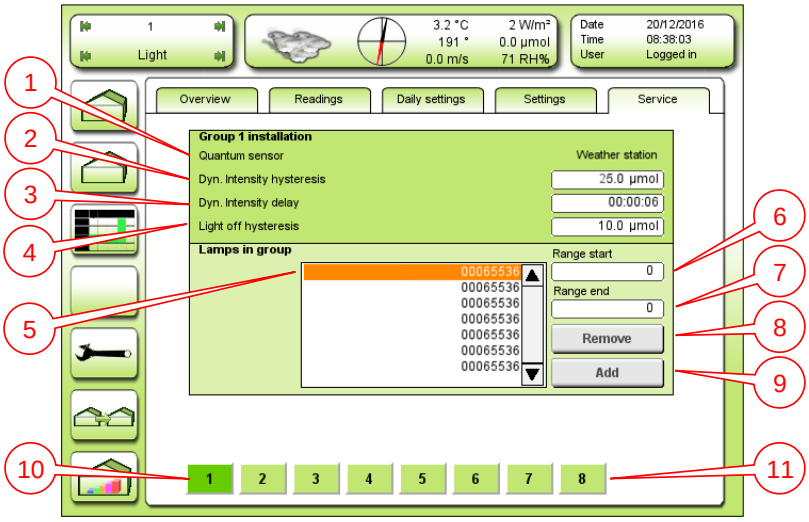

Figure 17: Service – Group installation

For dynamic light control and DLI there have to be a light sensor connected to the LCC4.

1. Quantum sensor – Select which light sensor should be connected to the group.
2. Dyn. Intensity hysteresis – Enter hysteresis for dynamic intensity.
3. Dyn. Intensity delay – Enter delay in the dynamic intensity.
4. Light off hysteresis - Enter Hysteresis for light off

Here the fixtures can be set into the groups

If the IP addresses, shown on the fixture labels (see ③ Figure 8 page 10), are consecutive they can be put into the group by entering the lowest and the highest IP address of the fixtures.

5. Lamps in group – Shows the fixtures in the group.
6. Range start – Enter lowest fixture IP address to put in to the group.
7. Range end – Enter highest fixture IP address to put in to the group.
8. Remove –Remove the entered fixtures.
9. Add – Add the entered fixtures.
10. Select one of the six groups to edit.
11. [7] is to set up fixture type and [8] is for calibrating and test. Both are shown on the next pages.

Service settings

Here it is possible to select the fixture type and model to get the right programs to choose from in the tab settings.

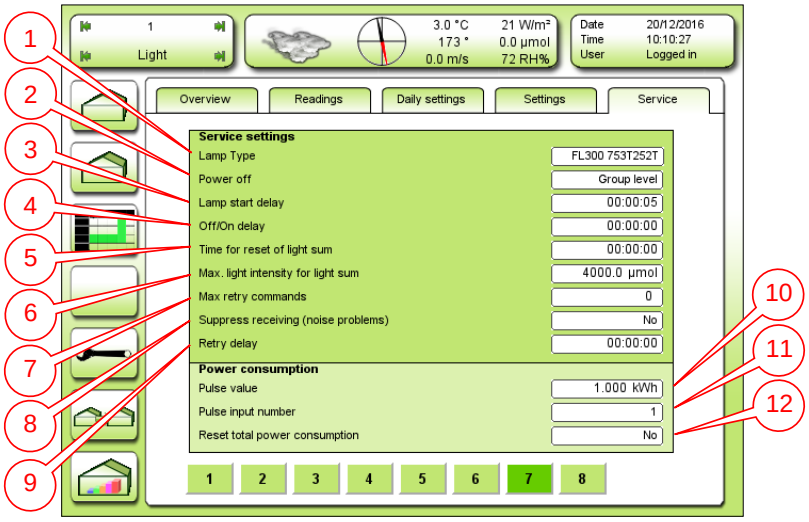

Figure 18: Service – [7] Settings

1. Lamp type – Select fixture type shown on the label (see ② Figure 8 page 10).
2. Power off – Select when to turn off the fixtures in the drop down menu.
   a. “Off on last lamp” – Select to make all the fixtures turn off when the last groups program is finished. The fixtures in the other groups will not turn off before this even though there programs are finished.
   b. “Off on first lamp” – Select to make all the fixtures turn off when the first groups program is finished. The fixtures in the other groups will turn off even though there programs are not finished.
   c. “Group level” – Select to make the fixtures in a group turn off when the last program for the group is finished. This will make the groups turn off one by one.
3. Lamp start delay – Enter time from the fixtures turn on to the program is send to the fixtures.
4. On/off delay – Enter length of break from fixtures turn off until they can turn on again.
5. Time for reset of light sum – Enter the time in the day for the light sum to reset.
6. Max. light intensity for light sum

Kommentar [LOCH1]: ??

If there is too much noise for the fixtures to react, the retry commands can be used.

7. Max. retry commands – Enter the number the commands must be sent.
8. Suppress receiving – Select yes if there are problems with noise.
9. Retry delay – Enter delay between commands sent.

Settings for power consumtion

10. Pulse value – Enter the value of one pulse
11. Pulse input number – Select
12. Reset total power consumption

Kommentar [LOCH2]: vælg hvilken plus der skal tælle noget ??

Kommentar [LOCH3]: hvad gør denne, resetter en gang eller en gang i døgnet ?

Calibration and test

Here the fixtures can be tested.

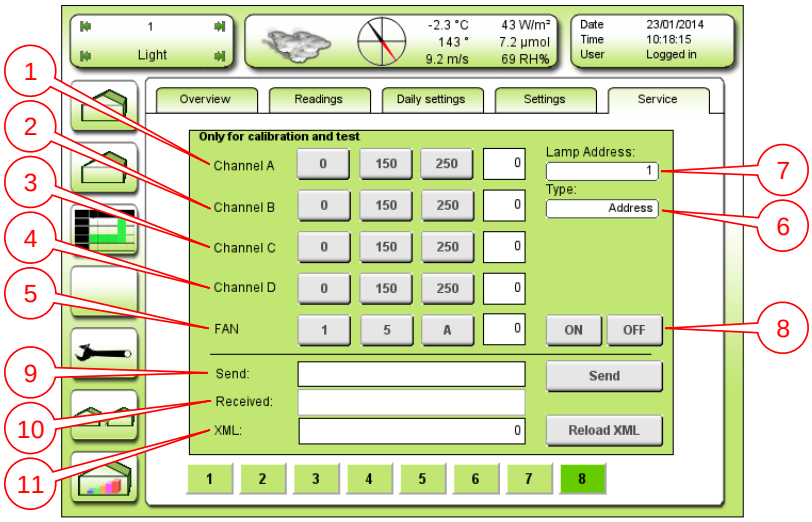

Figure 19: Service – [8] Calibration and test

The channels of the fixture can here be tested individual by selecting there value separately, both in groups and for each fixture.

1. Channel A – Select [0], [150], [250] or enter value (0 or 060-255) for channel A.
2. Channel B – Select [0], [150], [250] or enter value (0 or 060-255) for channel B.
3. Channel C – Select [0], [150], [250] or enter value (0 or 060-255) for channel C.
4. Channel D – Select [0], [150], [250] or enter value (0 or 060-255) for channel D.
5. Fan – Select [1], [5], [A] (automatic) or enter fan speed 0-9
6. Type – Select address to control one fixture or select group to control a fixture group.
7. Lamp address – Enter fixture's IP address or group number.
8. On/off – Turn light on and off.

To test the fixtures it is also possible to send them different commandos.

9. Send – Enter commando for the fixture.
10. Received – Answer from fixture.
11. XML – Used to install a new light program to the LCC4.

Fionia Lighting Interface Software

Fionia Lighting Interface Software is a PC program for changing the program in the FL300.

Interface can control up to six groups of fixtures.

In general the software has four pages:

- Control
- Groups
- Programs
- About

The control page is also the startup page.

It is possible to switch between the pages with the four buttons at the top right corner mark with number 1-4 in figure 1. Under figure 1 there is a short description of the four pages.

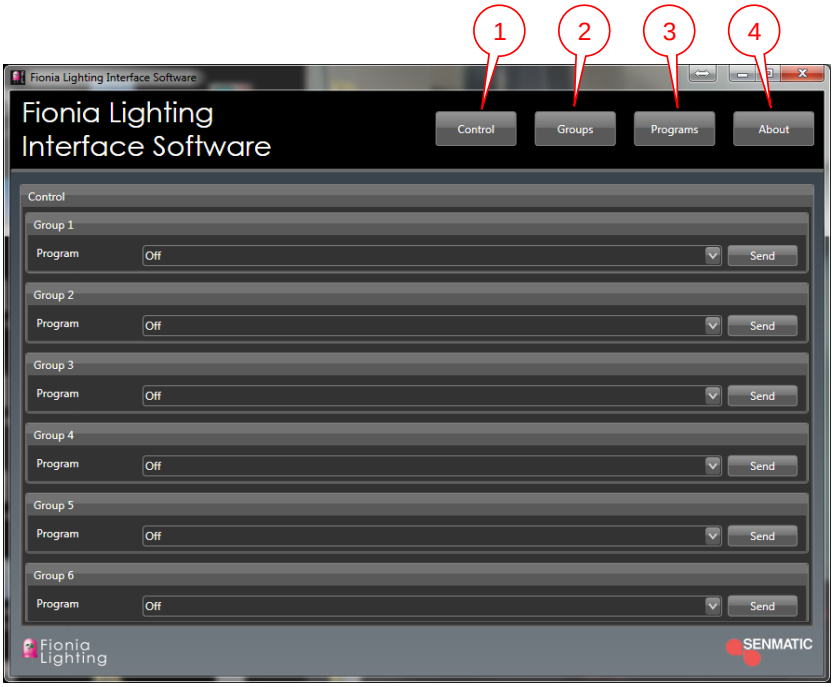

Figure 20: Control page - startup

1. Page “Control” – This page is used to change the running program in the fixture. It is possible to send different programs out to six groups.
2. Page “Groups” – It is here the fixtures are divided in to groups (1-6).
3. Page “Programs” – On this page it is possible to design new programs.
4. Page “About” – Shows which version of the Interface software that is running on the PC.

Control - page

At the first page “Control” it is possible to select the programs for the groups.

Figure 21: Control page

Each group is controlled separately.

1. Group 1 – Select the program for all fixtures that are in group 1.
2. Group 2 – Select the program for all fixtures that are in group 2.
3. Group 3 – Select the program for all fixtures that are in group 3.
4. Group 4 – Select the program for all fixtures that are in group 4.
5. Group 5 – Select the program for all fixtures that are in group 5.
6. Group 6 – Select the program for all fixtures that are in group 6.
7. When clicking here a dropdown menu will appear, where it is possible to choose which program to send out to e.g. group 1.
   New programs made on the page “Programs” will also be in the dropdown menu here.
8. Send – When a program is selected click on the “send” button and the program will be change for the group.
   NOTE: THE PROGRAM WILL NOT BE CHANGED BEFORE CLICKING ON THE “SEND” BUTTON

Groups - page

The group page is where the fixtures are told which group they belong to.

Figure 22: Groups page

Before changing a program for a fixture it has to be installed into a group.

1. Groups – Select which of the six groups to setup.
2. Lamp type – Select fixture type for each group. Shown on the fixture label (see ② Figure 8 page 10).
3. Lamps – Shows the fixtures in the group.

If the IP addresses, shown on the fixture labels (see ③ Figure 8 page 10), are consecutive they can be put into the group by entering the lowest and the highest IP address of the fixtures.

4. Address, Start – Enter lowest fixture IP address to put in to the group.
5. Address, End – Enter highest fixture IP address to put in to the group.
6. Add – Click to add the entered fixtures to the group.
7. Remove – Click to remove the entered fixtures from the group.
8. Cancel – Click to stop the installation of the fixture to the group.
9. Shows a text message if it e.g. is not possible for the program to communicate with the chosen fixtures.

On the next pages there will be an example, how to install a fixture with the IP address 544 in group 1 and the lamp type is FL300 Sunlight:

1) Choose lamp type:

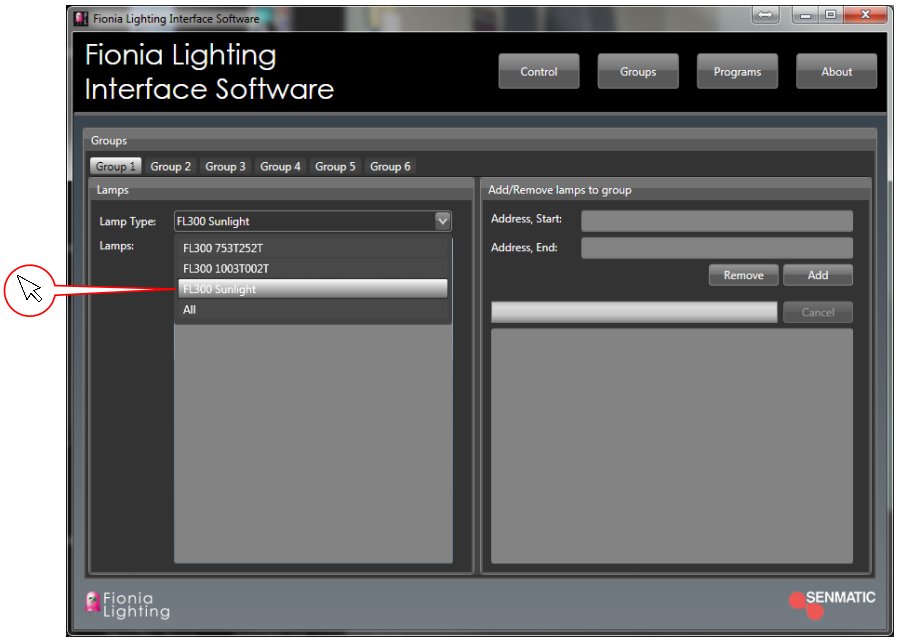

Figure 23: Lamp type

2) Add lamp address in Address, start (If you only have to install one lamp it is not necessary to write in Address, End):

3)

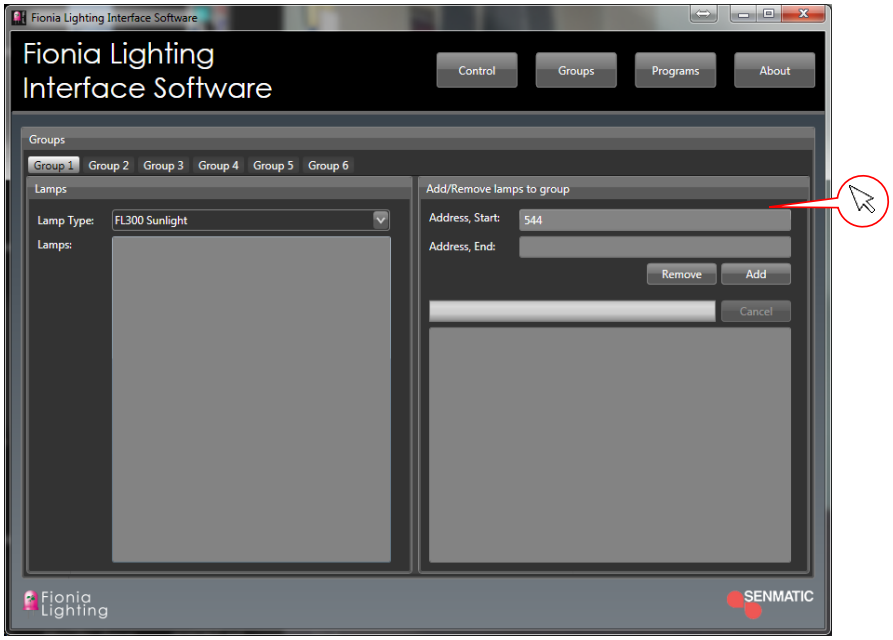

Figure 24: Lamp address

4) Click on “Add”, and the lamp will be installed.

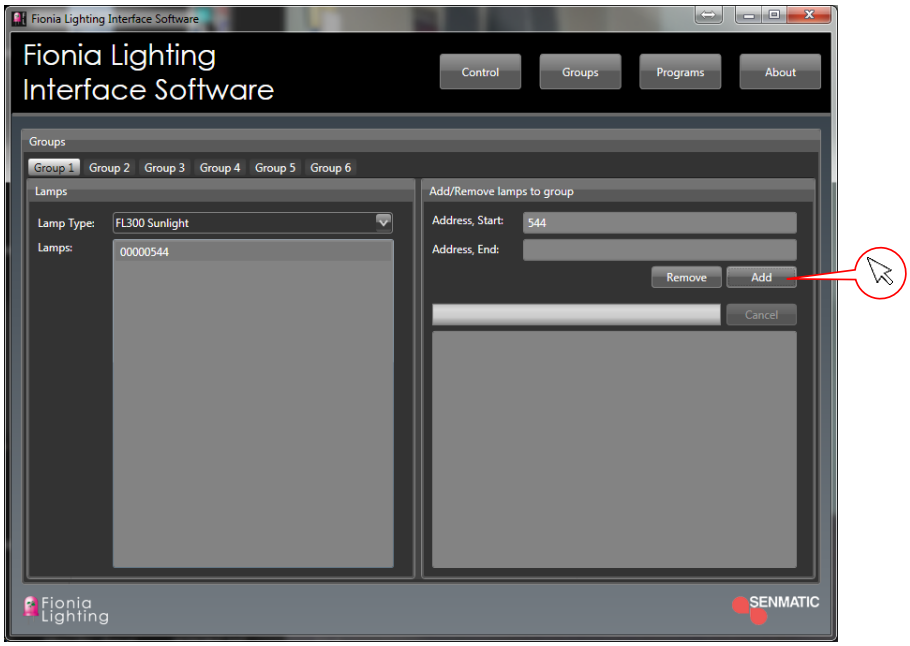

Figure 25: Add lamp

Now it is possible to change the program for lamp address 544.

Programs – page

The program page is where it is possible to make new programs.

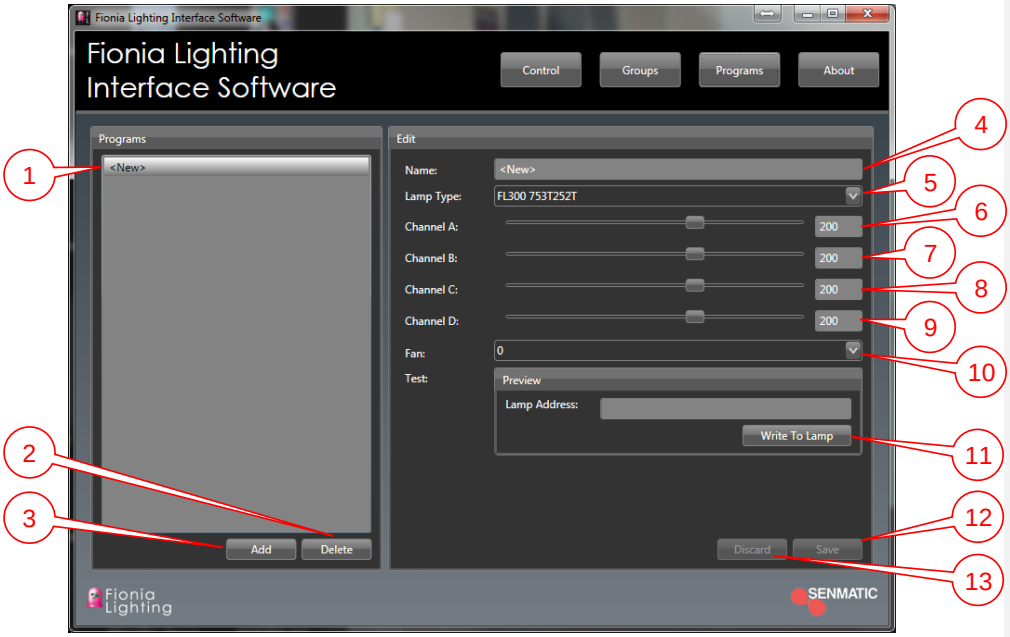

Figure 26: Programs page

1. Programs – Shows all the programs you have made yourself.
2. Delete – Click to delete the program selected in ①.
3. Add – Click to add a new program.
4. Name – Enter the name on the new program.
5. Lamp Type – Select which fixture type this program is made for.
6. Channel A – Set the value for channel A.
7. Channel B – Set the value for channel B.
8. Channel C – Set the value for channel C.
9. Channel D – Set the value for channel D.
10. Fan – Select the speed of the fan, 9 is equal to max speed.

In preview it is possible to test the program one fixture before saving the program.

11. Preview – Enter IP address on the test fixture and click “Write To Lamp”.
12. Save – Click to save the program. After saving the program it can be chosen under the page “Control”.
13. Discard – Click to discard the chances made in the program.

About – page

On the About page it is possible to see the version number of the software on the PC.

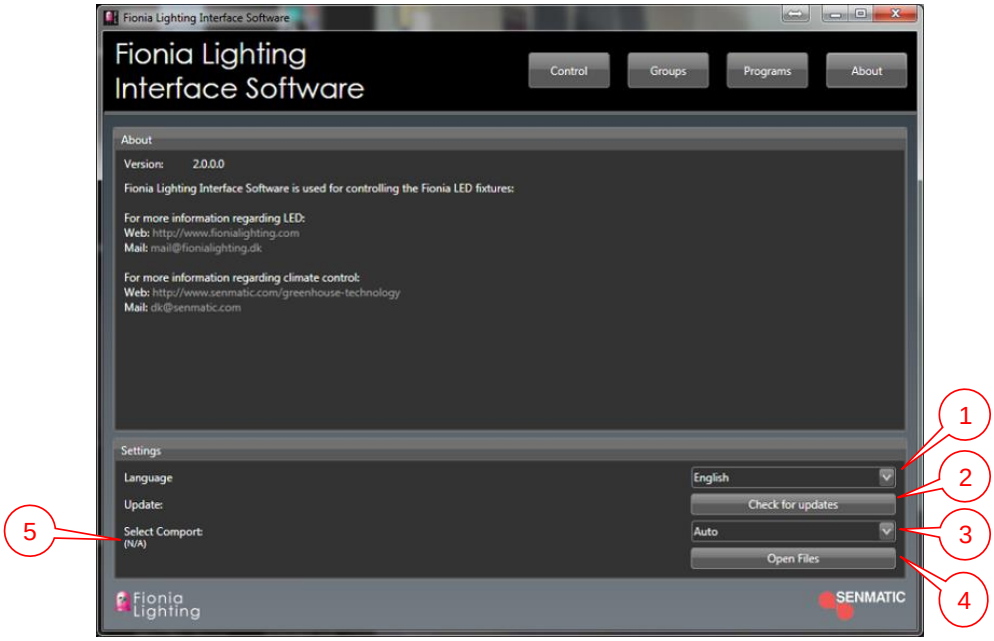

Figure 27: About page

1. Choose language of the program
2. Check if there is any updates for the software
3. Select COM port to use. If set to Auto the comport will be automatically chosen and its number is displayed in 5
4. Open location of the XML-file.

Technical specification

Power input	230 V AC / 50-60 Hz
Power usage	100-600 watt (adjustable via controller)
Net weight	12.4 kg
Dimension	550 x 230 x 160 mm
Operating ambient temperature	0-40 °C
Operating relative humidity	25-70%
	(no condensation)
Degree of protection	IP 54
Coverage	6-12 m^2 (depending on light intensity)

Light specifications for the FL300 Grow

Light output	2.2 - 2.4 µmol/s per Watt
Light modulation range	From 2-14% blue light of total light
	From 20-130 % intensity
Green content	Green/white light: 2%
Light intensity decay	At least 50,000 hours at L85B10

Light specifications for FL300 Sunlight

Light output	1.3 - 1.5 µmol/s per Watt
Light modulation range	From 20-130% intensity
Light intensity decay	At least 30,000 hours at L85B10

Overall installations instructions

FL300: All connections should be connected via the specified cables.

Place the FL300 according to the lighting plan.

The fixtures are to be organized according to the IP-addresses, so that they are installed logically and continuous in rows according to the lighting plan.

If a power outtake on a fixture are not used it must be covered with a cover piece.

The lens must not be cleaned with ethanol!

The fixture must not be covered when operating!

The fixture must not be installed outdoor and must be installed according to temperature and humidity requirements!

The fixture should be placed so that they are not exposed to direct water splashing or dripping!

In some countries the installation must be carried out by skilled craftsmen only.

Setting up communications

LCC4: Follow the installations manual for the LCC4.

Interface box: Follow the installations manual for Fionia Lighting Interface software.

Accessories

For mounting: Use the mounting bracket.

Cables: For power: Wieland RST 20i3 IP 65 3 pole cable.

For communication: LICY 2x0.75mm^2 cable.

Cover piece: Wieland cover piece for RST 20i3 fixed on fixture.

Installation

Fixture plan

To get the best distribution of the light and thereby also the best installation, it is important to follow to fixture plan made by your distributor. This will show the optimal height and position for the fixtures. Below are shown a practical example of four rows of 56 FL300 fixtures in a 20 x 80 meter greenhouse.

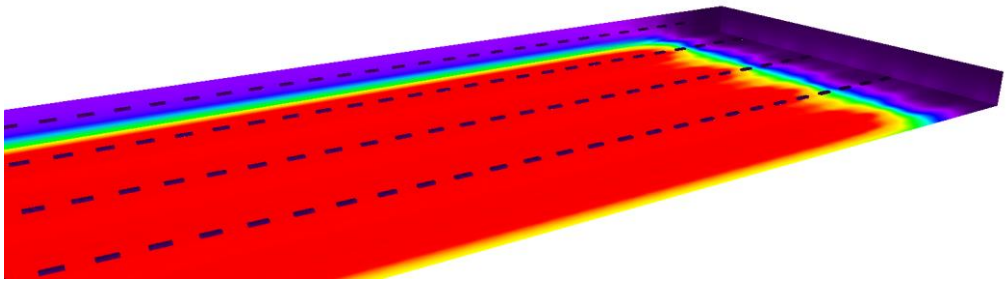

Figure 28: Light distribution

Installation

It is important to hang the FL300 as level as possible to get an even light distribution.

Place the FL300 so the IP addresses are continuous in the rows to make the installations of the groups in the control program easier.

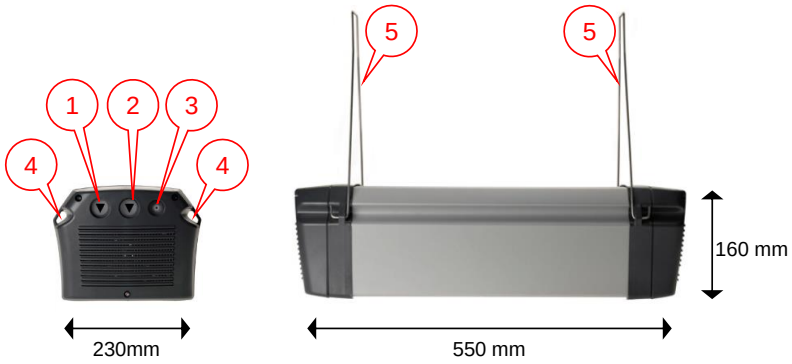

Figure 29: FL300

1. Power **in** with Wieland RST 20i3 IP 65 3 pole cable (230 V AC / 50-60 Hz).
2. Power **out** with Wieland RST 20i3 IP 65 3 pole cable (for series connection). If this is not used it must have a cover piece (fixed on).
3. Communication cable (fixed on fixture).

Brown wire data +
White wire data -

In a large installation with many fixtures the special mounting bracket is used to get the same height on the fixtures.

4. For mounting.
5. The mounting brackets.

Installation of communications units

LCC4

Below are shown how the LCC4 connects to the fixtures.

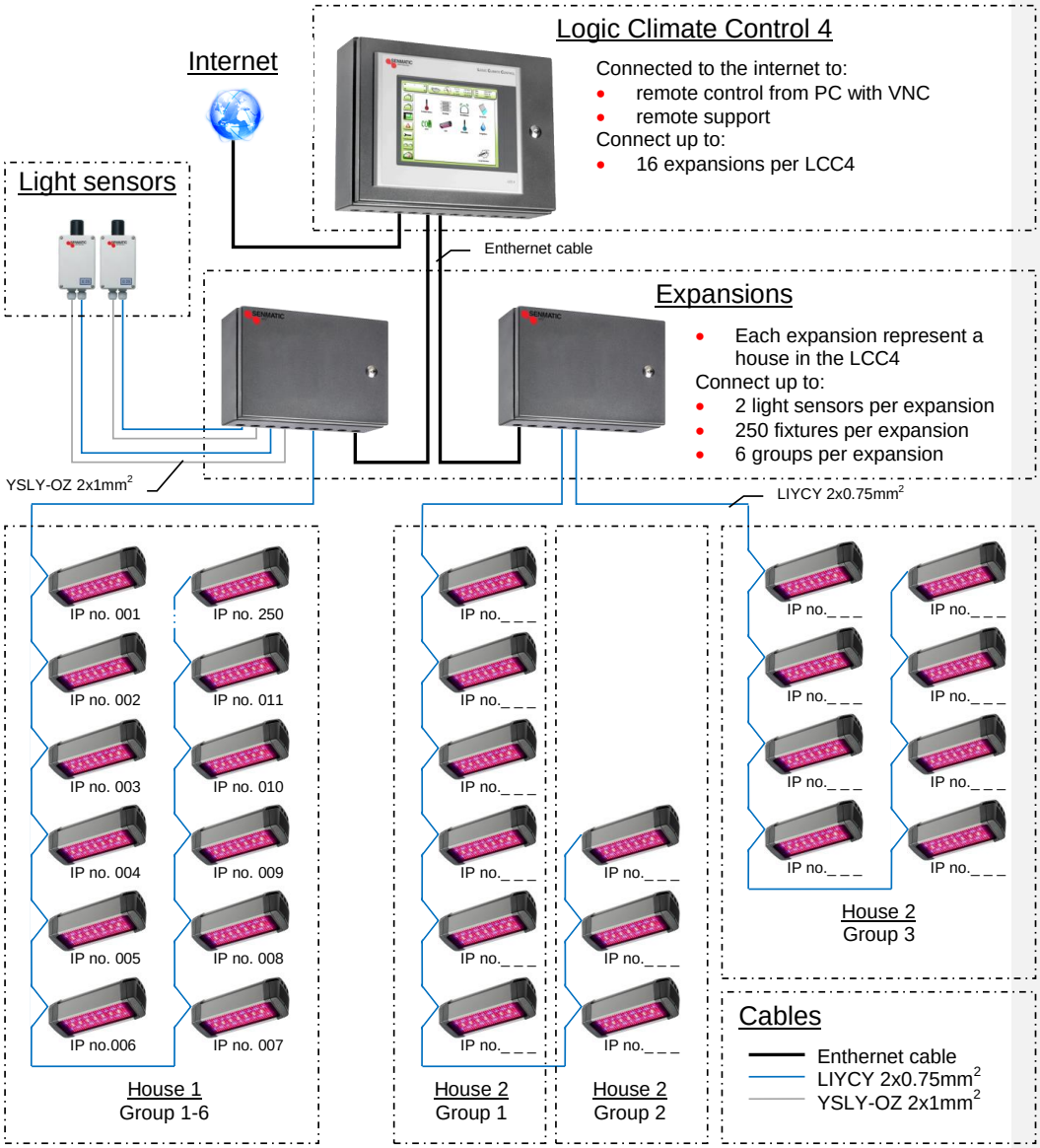

Figure 30: Connection to the LCC4

The fixtures are connected to the LCC4 through an expansion. Each expansion has the possibility to have 250 fixtures connected and two light sensors and is called a house in the LCC4. The fixtures can be divided into 6 groups in each house based on their IP addresses regardless there physical connection to the expansion **however it makes the installation of the group easier if the fixtures are installed with continuous IP addresses as shown in "House 1" above.**

Connecting the communication wires

The communication wires are connected to the X20CS1030 with pin assignment in RS485 mode (1). There are two X20CS1030 modules in the expansion for the connection of the fixtures.

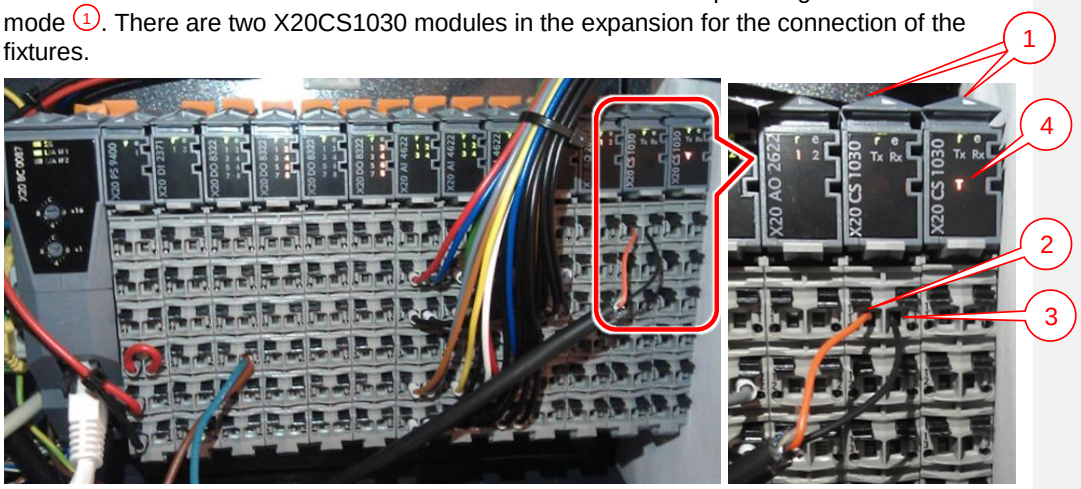

Figure 31: The X20 module in the expansion – outtake of the X20CS1030

The communication wires should be connected to the top connections on the X20CS1030. Red or blue in Tx(2) and black in Rx (3).

Terminating

Sometimes it is necessary to terminate the communications cable, depending on number of fixtures and the cables length.

The terminating is done by turning on the terminating resistor in the CS1030 and adding a 120 Ω resistor at the last fixture on the communication cable.

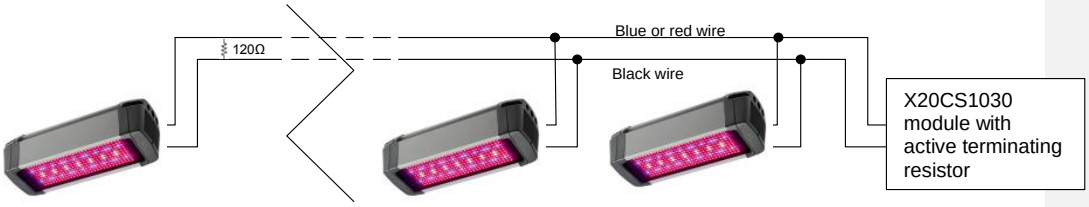

Figure 32: Terminating

The terminating resistor can be turned on and off with a switch on the bottom of the X20CS1030 as shown below. If the terminating resistor is active it will be shown on the front with a T ((4) in Figure 31).

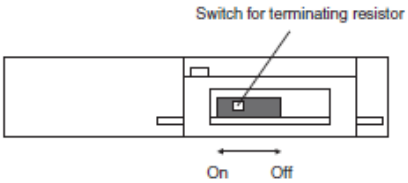

Figure 33: X20CS1030 – Terminating resistors

Connecting the light relay

Each group of fixtures need a 24 VDC relay.

The relays for the fixtures are connected to a digital output module either X20DO8322 or X20DO2322 In the expansion.

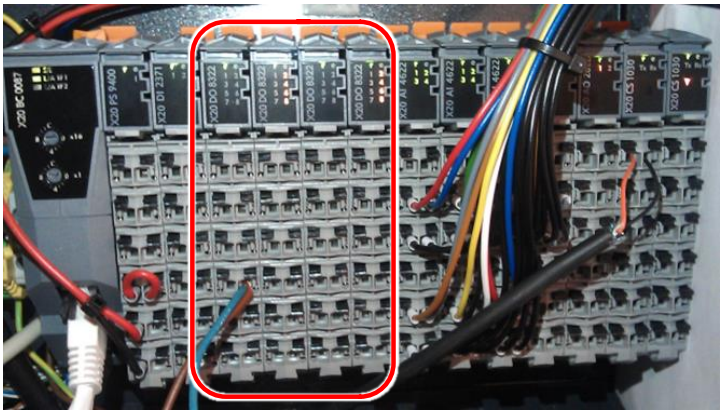

Figure 34: The X20 module in the expansion – with the X20DO8322 modules.

In the I/O table is shown where the relays are going to be connected. In the I/O table below are shown an installation with four fixture groups on the position DO12-DO15.

LCC Small Exp input output table 5

Digital inputs : 2
Digital outputs: 18
Analog inputs : 8
Analog outputs : 2

Vers 01: 19-06-2012

	Module	Number in installation manual	Number on module	Description
	Digital input X20DI2371	DI1	11	External alarm 1
		DI2	21	Circ. Pump alarm
	Digital output X20DO8322	DO1	11	Valve 1 open
		DO2	21	Valve 1 close
		DO3	12	Valve 2 open
		DO4	22	Valve 2 close
		DO5	13	Vent 1 open
		DO6	23	Vent 1 close
		DO7	14	Vent 2 open
		DO8	24	Vent 2 close
	Digital output X20DO8322	DO9	11	Screen 1 on
		DO10	21	Screen 1 off
		DO11	12	CO2 dose
		DO12	22	Suppl. Light 1.1 / LED 1
		DO13	13	Suppl. Light 1.2 / LED 2
		DO14	23	Suppl. Light 1.3 / LED 3
		DO15	14	Suppl. Light 2.1 / LED 4
		DO16	24	Irrigation valve 1
	Digital output X20DO2322	DO17	11	Irrigation valve 2
		DO18	21	M Misting Valve 1 Zone 1
	Analog input X20AI4622	AI1	12	Air temperature 1
		AI2	22	RH humidity 1
		AI3	15	Flow temperature 1
		AI4	25	Flow temperature 2
	Analog input X20AI4622	AI5	11	CO2 sensor (4 – 20 mA)
		AI6	22	Air temperature 2
		AI7	15	RH humidity 2
		AI8	25	Local light
	Analog output X20AO2622	AO1	12	Alarm: 0V=Alarm, 10V=No Alarm High Priority
		AO2	22	Alarm: 0V=Alarm, 10V=No Alarm Low Priority

Figure 35: I/O table

Setup in the LCC4

To setup the LCC4 for LED fixtures go to the setup menu (1) and the tab house settings (2).

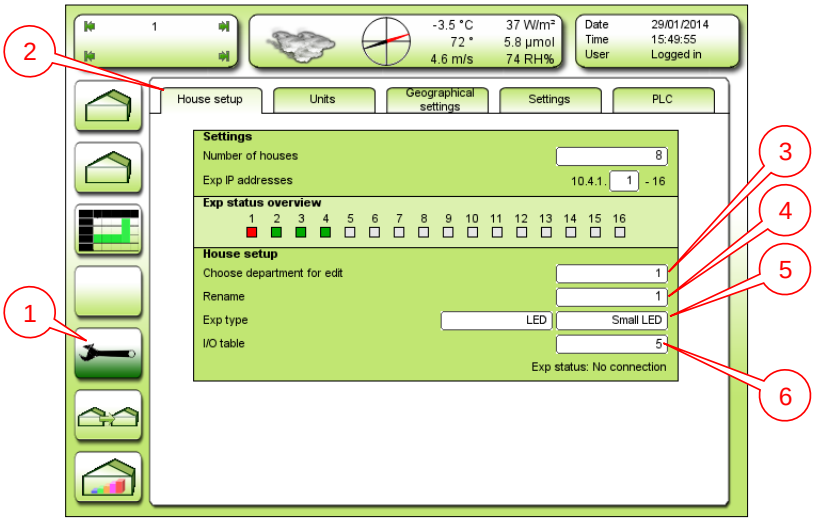

Figure 36: House setup

3. Choose department for edit – Select what house to edit.
4. Rename – Enter a name for the house selected in (3).
5. Exp. Type – Select which expansion is connected to the LCC4, for LED fixture select Small LED, Medium LED or Large LED.
6. I/O table – Select which I/O table to use.

The size of the expansion decides how many elements can be connected to the house.

Units

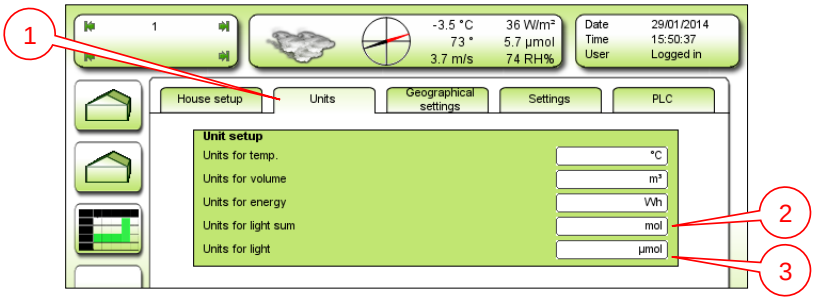

Figure 37: Units

Under the tab “Units” (1) it is possible to select the units for the light.

2. Unit for light sum - Select the unit for the light either klxh or mol.
   klxh = kilo lux / hour
   mol = mol/m^2/day
3. Unit for light – Select the unit for the light either klx or µmol.
   klx = kilo lux
   µmol = µmol/m^2/s

Interface

Together with the delivered USB stick with Interface software there is an interface box.

Figure 38: Interface box

1. Step:

Connect the USB stick from the interface box to the PC where the software is installed.

If the computer is connected to the internet, the driver for the interface box will be installed automatically.

If not run the file “i-756x_1223_ driverinstaller.exe” that is located on the USB stick in the directory “Interface Software”.

2. Step:

Connect the communication wire form the fixture like showed below.

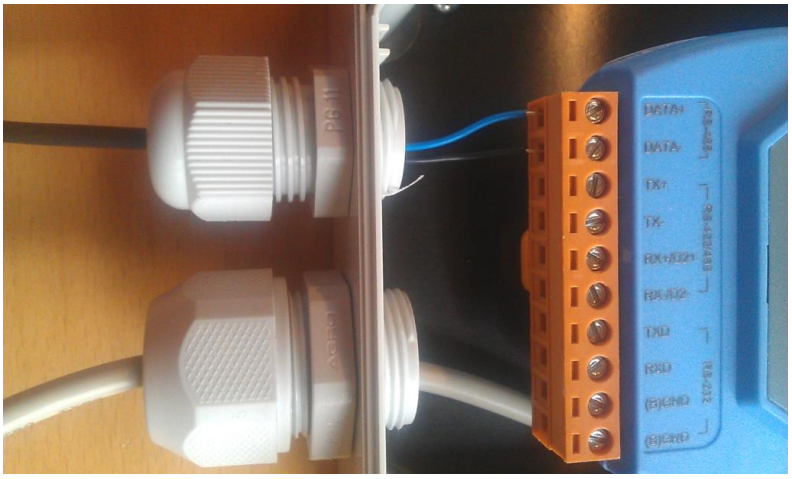

Figure 39: Communication connected

Blue wire connected to RS485 – Data+

Black wire connected to RS485 – Data-

The Hardware is now connected and ready to use.

It is possible to connect from 1 to max 49 fixtures to the interface box. The way to connect the communication wires are shown below.

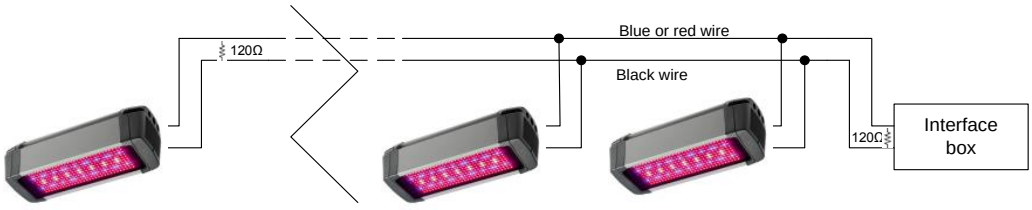

Figure 40: Connection to Interface box

Terminating

Sometimes it is necessary to terminate the communications cable, depending on number of fixtures and the cables length.

The terminating is done by adding a 120 Ω resistor at the last fixture on the communication cable and one at the interface box.

Product list

Here is a list over the different versions of the FL300 and the components that can be ordered with the FL300.

DESCRIPTION:	ITEM NO.:
LED Fixtures:	
FL300 Grow	490301
FL300 Sunlight	490312
FL300 Grow White	490331
FL300 Algae	490321
FL300 Customer-specified	490399
Accessories:	
LCC 4 LED controller with small expansion	490803
Small LED expansion	310111
LED controller incl. software	490802
Special programming	490800
Q20 Quantum light sensor	307150
Glasses for LED light	490820
Power cables female/free:	
3 x 1.5 mm2 - 1-8m	490901 - 490908
3 x 1.5 mm2 - custom length	490909
Power cables male/female:	
3 x 1.5 mm2 - 1-8m	490911 - 490918
3 x 1.5 mm2 - custom length	490919
Fittings:	
For 40x40mm U-profile - 300mm	490950
For 40x40mm U-profile - 100mm	490951
For Ø51mm pipe - 100mm	490952