

## **User and installation manual**



## **LED Light Controller**



RoHS



**Declaration of Conformity**

We, Senmatic A/S, hereby declare that the LED light Controller and expansion intended for controlling horticultural lighting has been developed and produced in conformity with:

<u>EMC - Directive:</u>	2004/108/EC
EN 61131-2:2007	Programmable controllers – Part 2: Equipment requirements and tests
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-4:2007	Electromagnetic compatibility (EMC) – Part 6: Generic standards – section 4: Emission standard for industrial environments
<u>Low voltages directive:</u>	2006/95/EC
EN 61131-2:2007	Programmable controllers – Part 2: Equipment requirements and tests
EN 60204-1:2006 +A1/2009	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
<u>RoHS:</u>	2011/65/EU
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
<u>WEEE directive:</u>	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 LED light Controller serial number 490805, 490807, 490815, 490817 and 54336-0

Senmatic A/S  
Industrivej 8  
5471 Søndersø  
Denmark

Phone no.: (+45) 64892211  
Fax no.: (+45) 64893311  
Homepage: [www.senmatic.com](http://www.senmatic.com)

Søndersø 21/12-2016

## Contents:

Preface .....	5
Technical specification .....	6
Overall installations instructions .....	9
Lamp installation .....	10
The power supply for the lamps must be controlled from the LED Light Controller .....	11
Q21 .....	12
Structure .....	13
Connection overview touch panel.....	14
Overview x20 modules.....	15
Description of each X20 module.....	16
X20BC0083.....	16
X20PS9400 .....	19
X20AI4622 .....	21
X20DI8371 .....	23
X20DO8322 .....	25
Installation – POWERLINK.....	28
Module structure .....	29
Installation of cables:.....	29
Terminating .....	30
Controlling the FL300 and FL100 .....	31
Models .....	31
Grow .....	31
Sunlight.....	31
Grow White .....	31
Identification of the fixture .....	31
Light Control.....	32
FL300.....	32
FL100.....	32
Light control .....	33
Dynamic Intensity .....	34
The light sum for down adjustment (DLI) .....	34
Light intensity start – stop.....	35
User interface.....	36
Right menu.....	37
Home .....	37
Unit setup .....	38
IO configuration.....	40
House .....	46
Readings.....	47
Service .....	48
Calibration and test .....	49

---

Group.....	50
Readings.....	51
Periods.....	52
Settings.....	54
Installation.....	56

## Preface

Congratulations with your new LED Light Controller.

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 Delivery" 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.

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

**Best regards**

**Senmatic A/S**

## Technical specification

Supply Voltage: AC 85 - 264 V (Wide range), 45/65Hz  
DC 95 - 250 V

Power Usage: App. 64VA

Rated impulse voltage: 4000 V

For SELV or PELV circuits, the ELV limits realized:  
24 VDC

Communication: Ethernet

Purpose of Control: Operating Control

Construction of Control: Independently mounted control for surface mounting

Classification: Type 1 action

Type of Disconnection Type 1.C

Terminals for external conductors which accept a wider range of conductors sizes:  
DIN terminal blocks suitable for Line and Neutral conductors.

Grounding: Self-evident (Yellow/Green DIN terminal block)

Method of attachment for non-detachable cords:  
Type Y attachment

### Physical data

Temperature:

Operation 0 up to 40°C (32-104°F), without direct sun radiation

Humidity: 95RH% without condensation

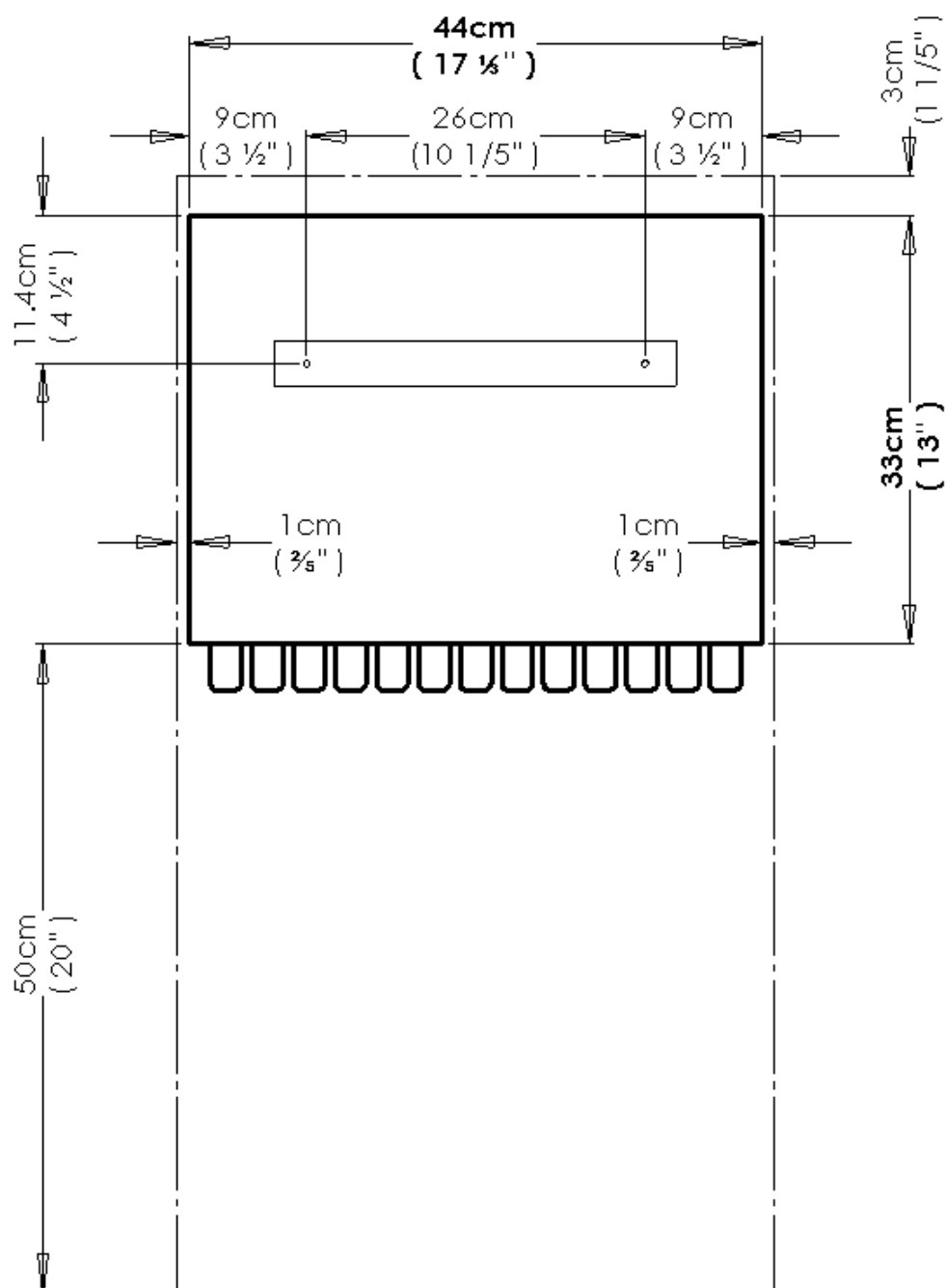
Density: IP65

### LED Light Controller

Dimensions L x W x H: 440 x 330 x 160 mm (17.3 x 13 x 6.3")

Weight: App. 9 kg (20 lbs)

Method of mounting: Surface mounting

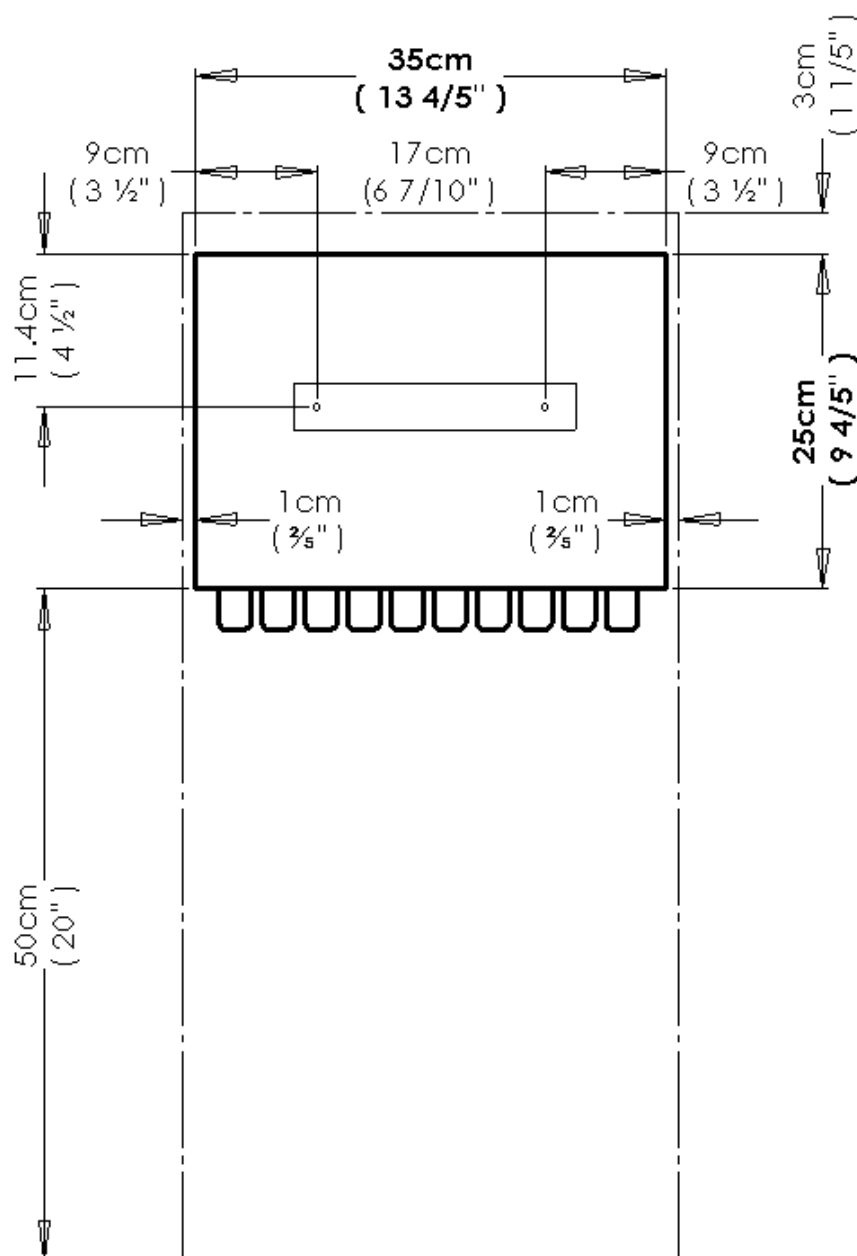


### LED Light Controller Expansion

Dimensions L x W x H: 350 x 250 x 130 mm (17.3 x 13 x 6.3")

Weight: App. 9 kg (20 lbs)

Method of mounting: Surface mounting





## Overall installations instructions

Units: Use the enclosed wall-fittings for mounting.  
Place LED Light Controller so the display is in the height of your eyes.  
Place the EXP a suitable place, but within the Ethernet limit (100m).



**The Units must NOT be exposed by direct sunshine, because the temperature inside the unit can become unacceptable high! High temperature in the LED Light Controller may cause “black” display. The display normally returns to normal, when the temperature is normal again, but it will affect the life time of the display!**



**The Units must be placed, where they are not exposed by direct water splash!**



**High Voltage!**

**Warning! High voltage can kill or serious injure people!**

**Note! Remember the ground connection!**

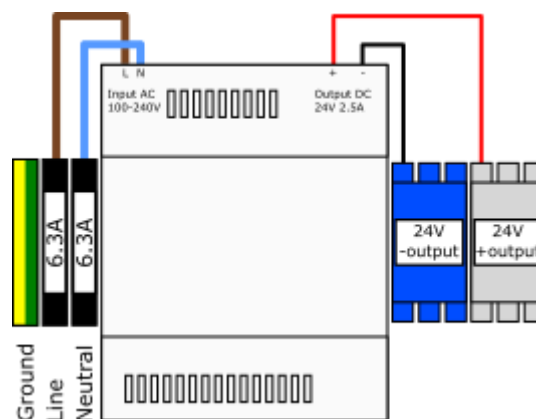
In places with very unstable or noisy power supply, it might be necessary to improve it by installing extra filters, transient absorbers, UPS or voltage stabilizer.

Sensors: All sensors must be connected to the LED Light Controller or expansions via screened cables.

**Note! The screen must be connected to the power ground terminal.**

Ethernet: It is very important that the installation instructions are followed.

Wiring:



## Lamp installation

Below are shown how the LED Light Controller connects to the fixtures.

The LED Light Controller can control up to 6 houses. Each house can have one type of fixtures and up to 8 groups of fixtures and 8 light sensors attached.

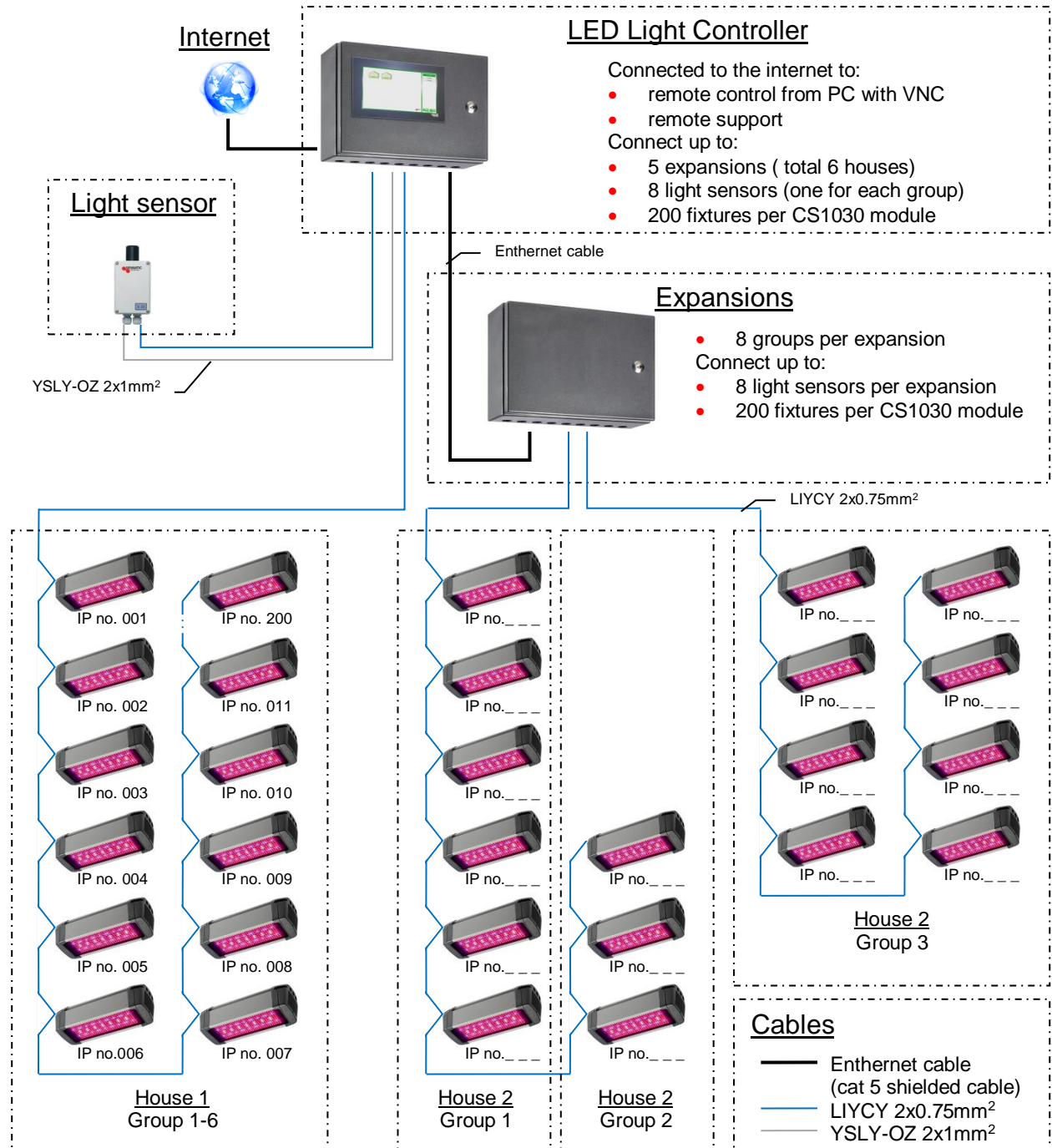


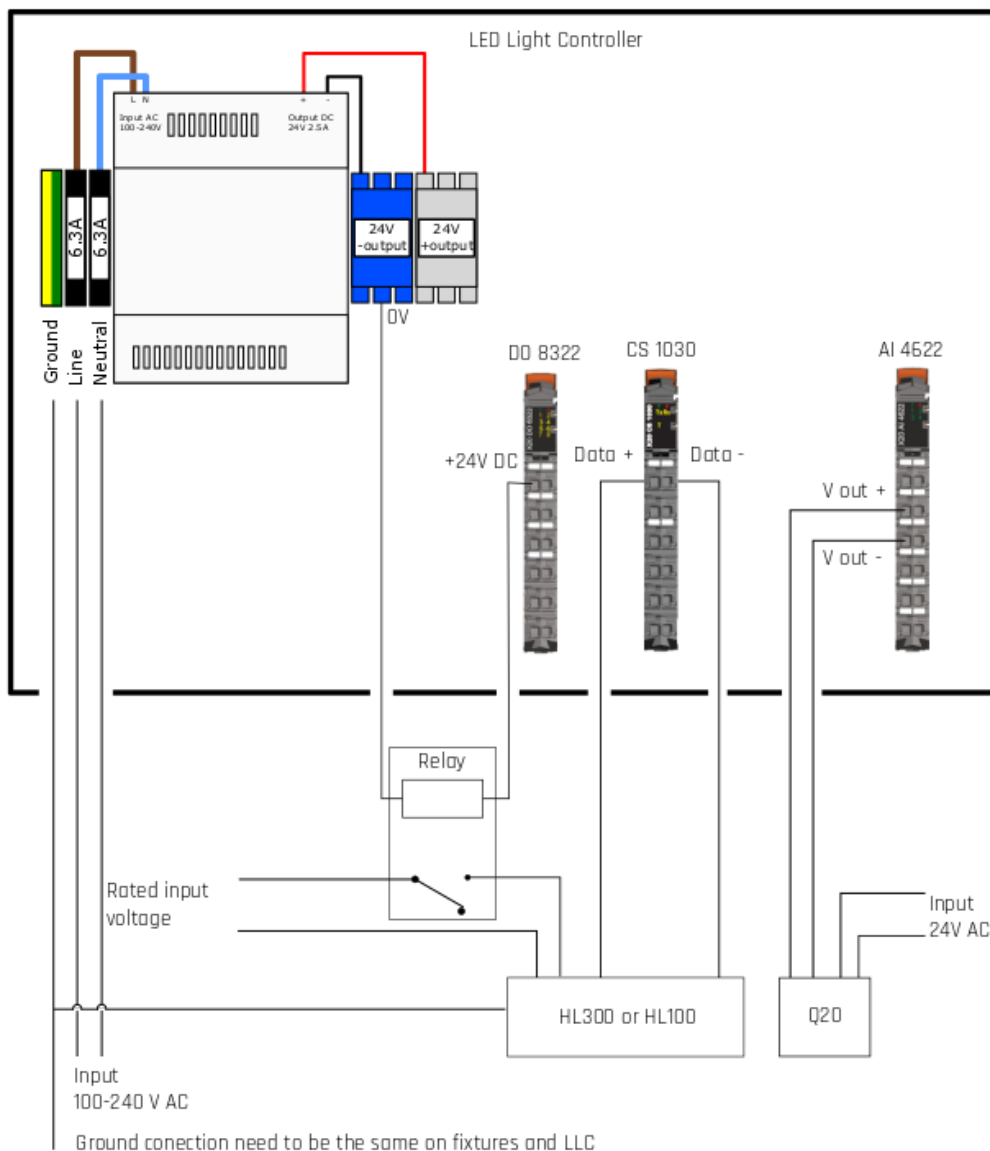
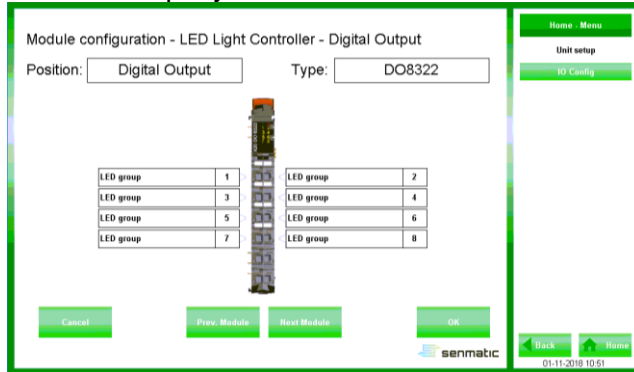
Figure 1: Connection to the LCC4

The fixtures are connected direct to the LLC through or through an expansion. The fixtures can be divided into 8 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.**

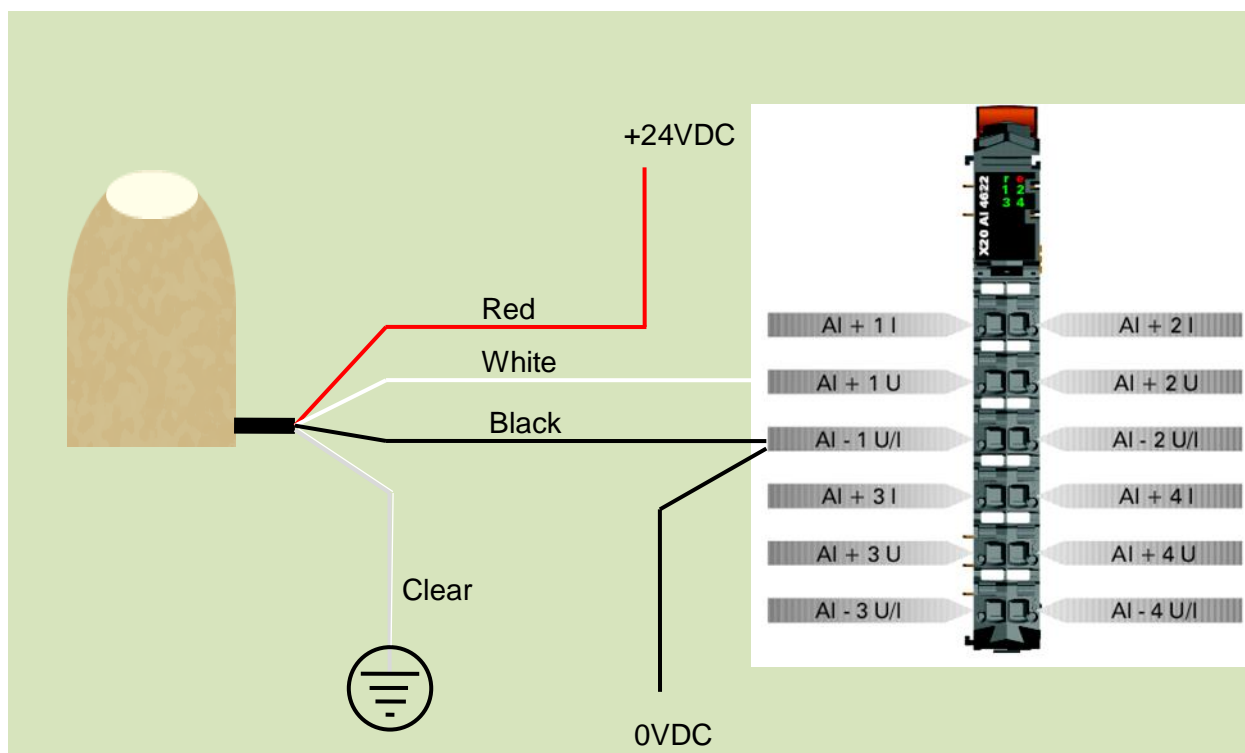
## The power supply for the lamps must be controlled from the LED Light Controller

This means that each group of lamps gets power from a relay/contactor which is controlled by a DO (Digital Output)

In this example you must install 8 contactors. 1 for each of the 8 groups.



## Q21



This is an example of **Q21** installation at AI1 on a module. Remember the gain must be 0,8 in LLC.

## Structure

The LED Light Controller contains of a touch panel, a power supply module and an x20 block, the expansion only contains the supply model and the x20 block.

In the standard LED Light Controller/ expansion the X20 block has:

- 1 Digital input module with 8 inputs
- 1 Analog input module with 4 inputs
- 1 Digital output module with 8 outputs
- 1 Communication module for controlling up to 200 LED fixtures

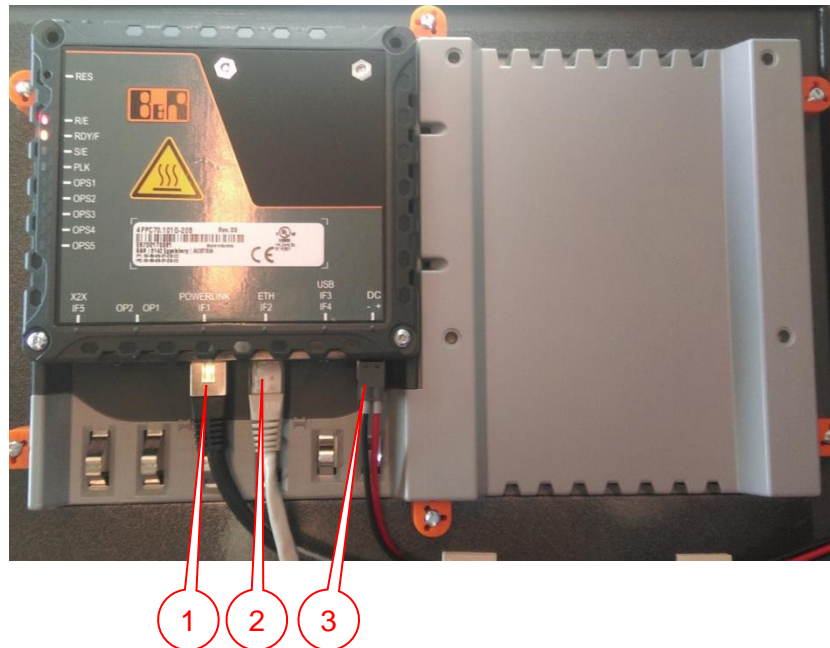
The maximum of each module in the LLC:

- 1 Digital input module with total 8 inputs (standard)
- 2 Analog input module with total 8 inputs
- 1 Digital output module with total 8 outputs (standard)
- 15 Communication module for controlling up to 3000 LED fixtures total.
- 

The maximum of each module in the expansion:

- 1 Digital input module with total 8 inputs (standard)
- 2 Analog input module with total 8 inputs
- 1 Digital output module with total 8 outputs (standard)
- 8 Communication module for controlling up to 1600 LED fixtures total.

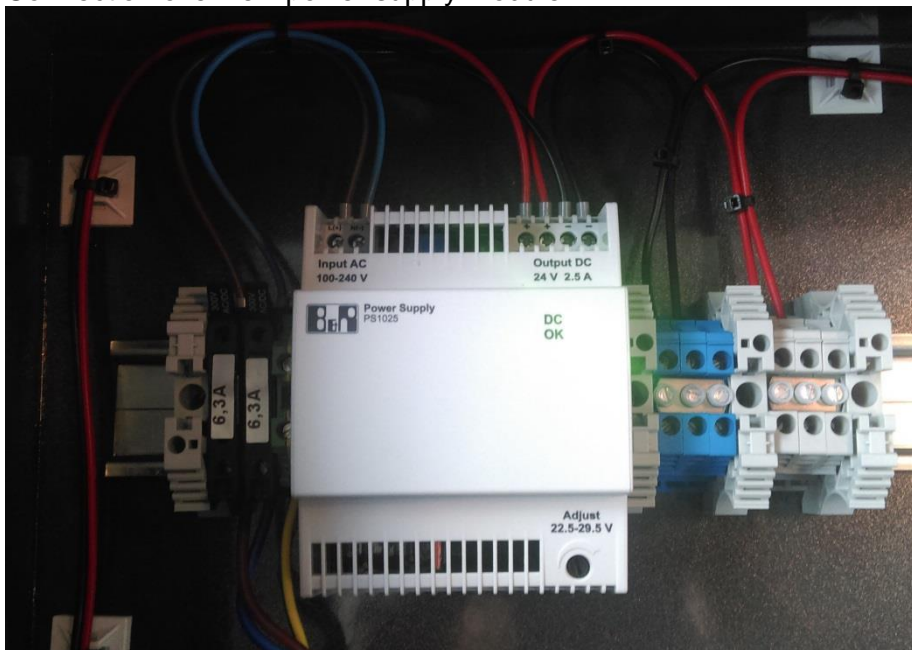
## Connection overview touch panel



The connections on the back of the panel are like this:

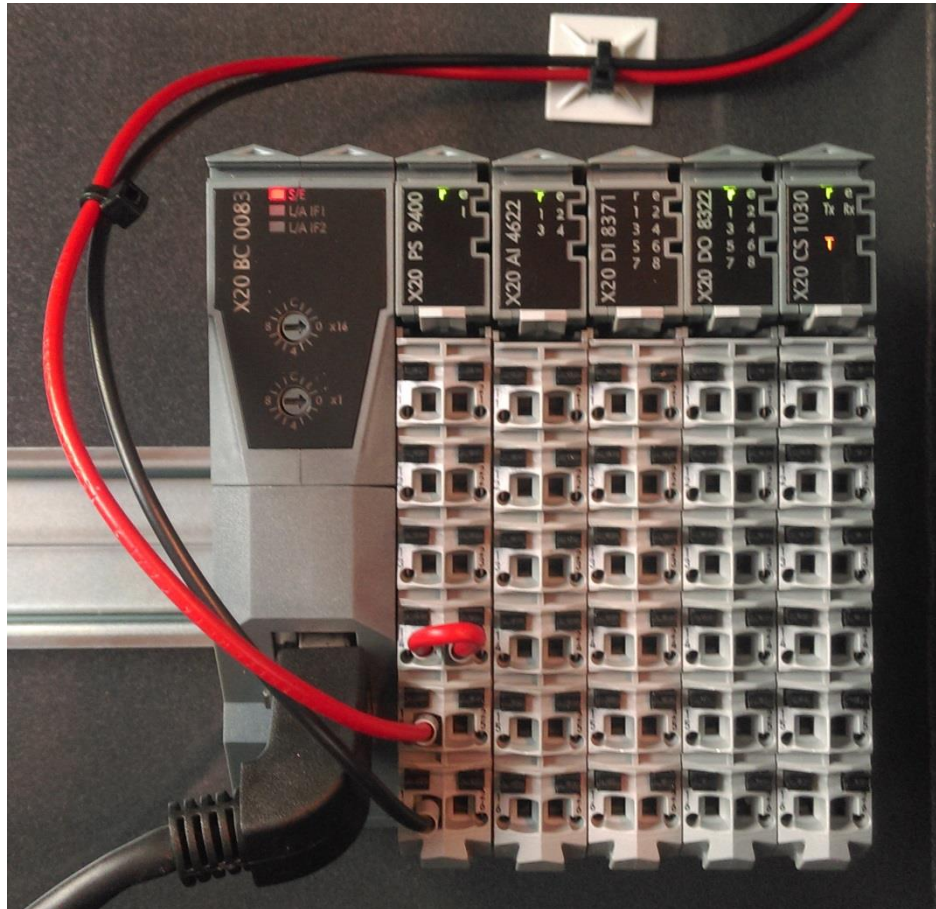
1. Powerlink connection – intern connection in the LED Light Controller
2. Ethernet connection – for connection to at an extern network to remote control the LED Light Controller.
3. Supply voltage – 24 VDC

## Connection overview power supply module



The + and – blocks are used for all sensor supplies. +24VDC and 0VDC

## Overview x20 modules

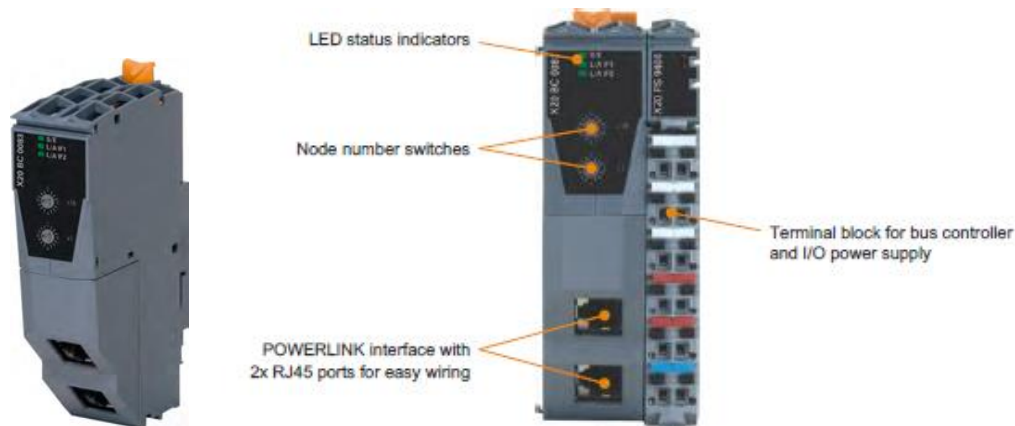




## Description of each X20 module

As mentioned earlier, the LED light Controller and each expansion consists of a communication module, a power supply module and a number of in- and outputs. In this section, each module will be described individually.

### X20BC0083



### Communication module

The X20BC0083 module is the bus controller of the expansion. This module is always placed on the left side of the expansion. On the front of this module there are three following things one should be aware of, in connection with the mounting.


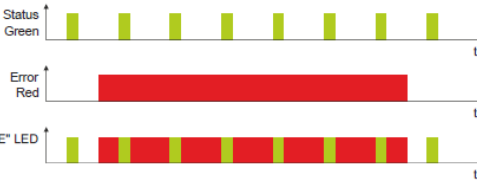
### Node switch

Figure	Description
	<p>This is where you set the node on the expansion.</p>

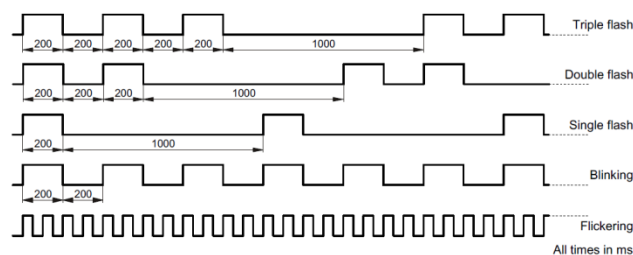


## **POWERLINK module X20BC0083**

### LED status indicators

Figure	LED	Color	Status	Description
	S/E1)	Green	Off	No power supply or mode NOT_ACTIVE. The controlled node (CN) is either not getting power, or it is in the NOT_ACTIVE state. The CN waits in this state for about 5 seconds after a restart. Communication is not possible with the CN. If no POWERLINK communication is detected during these 5 seconds, the CN switches to the BASIC_ETHERNET state (flickering). If POWERLINK communication is detected before this time expires, however, the CN switches immediately to the PRE_OPERATIONAL_1 state.
			Flickering	BASIC_ETHERNET mode. The CN has not detected any POWERLINK communication. It is possible to communicate directly with the CN in this state (e.g. with UDP, IP, etc.). If POWERLINK communication is detected while in this state, the CN switches to the PRE_OPERATIONAL_1 state.
			Single flash	PRE_OPERATIONAL_1 mode. When operated on a POWERLINK V1 manager, the CN immediately switches to the PRE_OPERATIONAL_2 state. When operated on a POWERLINK V2 manager, the CN waits until an SoC frame is received and then switches to the PRE_OPERATIONAL_2 state.
			Double flash	PRE_OPERATIONAL_2 mode. The CN is normally configured by the manager in this state. Issuing a command (POWERLINK V2) or setting the data valid flag in the output data (POWERLINK V1) then switches to the READY_TO_OPERATE state.
			Triple flash	READY_TO_OPERATE mode. In a POWERLINK V1 network, the CN automatically switches to the OPERATIONAL state as soon as input data is present. In a POWERLINK V2 network, the manager switches to the OPERATIONAL state by issuing a command.
			On	OPERATIONAL mode. PDO mapping is active and cyclic data is being evaluated.
			Blinking	STOPPED mode. No output data is produced or input data supplied. It is only possible to switch to or leave this state after the manager has given the appropriate command.
	L/A IFx	Red	On	The controlled node (CN) is in an error state (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, then the green LED blinks over the red LED: <ul style="list-style-type: none"> <li>• PRE_OPERATIONAL_1</li> <li>• PRE_OPERATIONAL_2</li> <li>• READY_TO_OPERATE</li> </ul>  <p>Note:</p> <ul style="list-style-type: none"> <li>• The LED blinks red several times immediately after startup. This is not an error, however.</li> <li>• The LED is lit red for CNs with configured physical node number 0 but that have not yet been assigned a node number via dynamic node allocation (DNA).</li> </ul>
			On	Link established to the remote station
			Blinking	A link to the remote station has been established and there is activity on bus.

### Status LEDs - Blinking patterns



Senmatic A/S  
LED Light Controller

### **Technical data**

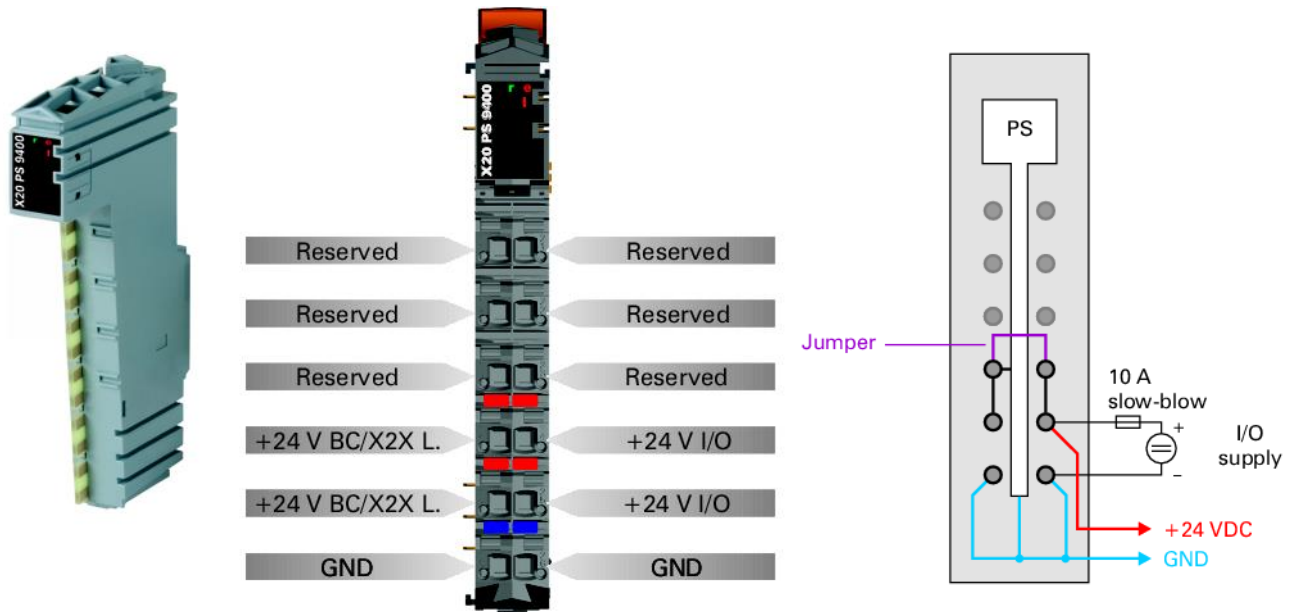
<b>Short description</b>	
Bus controller	POWERLINK (V1/V2) controlled node
<b>General information</b>	
B&R ID code	0x1F1E
Status indicators	Module status, bus function
Diagnostics	
Module status	Yes, using status LED and software
Bus function	Yes, using status LED and software
Power consumption	
Bus	2 W
Additional power dissipation caused by the actuators (resistive) [W]	-
Electrical isolation	
Fieldbus - X2X Link	Yes
Fieldbus - I/O	Yes
Certification	
CE	Yes
KC	Yes
UL	cULus E115267 Industrial Control Equipment
HazLoc	cCSAus 244665 Process Control Equipment for Hazardous Locations Class I, Division 2, Groups ABCD, T5
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta = 0 - max. 60°C FTZÜ 09 ATEX 0083X
DNV GL	Temperature: B (0 - 55°C) Humidity: B (up to 100%) Vibration: B (4g) EMC: B (Bridge and open deck)
LR	ENV1
GOST-R	Yes
<b>Interfaces</b>	
Fieldbus	POWERLINK (V1/V2) controlled node
Design	2x shielded RJ45 (hub)
Cable length	Max. 100 m between 2 stations (segment length)
Transfer rate	100 Mbit/s
Transmission	
Physical layer	100BASE-TX
Half-duplex	Yes
Full-duplex	No
Autonegotiation	Yes
Auto-MDI / MDIX	Yes
Hub runtime	0.96 to 1 µs
Min. cycle time 1)	
Fieldbus	200 µs
X2X Link	200 µs
Synchronization between bus systems possible	Yes
<b>Operating conditions</b>	
Mounting orientation	
Horizontal	Yes
Vertical	Yes
Installation at elevations above sea level	
0 to 2000 m	No limitations
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m
EN 60529 protection	IP20
<b>Environmental conditions</b>	
Temperature	
Operation	
Horizontal installation	-25 to 60°C
Vertical installation	-25 to 50°C
Derating	-
Storage	-40 to 85°C
Transport	-40 to 85°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
<b>Mechanical characteristics</b>	
Spacing 2)	37.5 +0.2 mm

1) The minimum cycle time defines how far the bus cycle can be reduced without communication errors occurring.


2) Spacing is based on the width of the X20BB80 bus base. In addition, an X20PS9400 or X20PS9402 power supply module is also always required for the bus controller.

## **X20PS9400**

The X20PS9400 module is the power supply module of the expansion.  
This module is always placed as number 2 seen from the left side of the expansion.



## **Status LEDs**

Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	Reset mode
			Blinking	Preoperational mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything is OK
			Double flash	Indicates one of the following conditions: The bus controller / X2X Link power supply is overloaded I/O supply too low Input voltage for bus controller / X2X Link too low
	e + r	Steady red / single green flash		Invalid firmware
	l	Red	Off	The bus controller / X2X link supply is within the acceptable range
			On	The bus controller / X2X Link power supply is overloaded

### **Technical data PS9400**

<b>Short description</b>	
Power supply module	24 VDC supply module for bus controller, X2X Link bus supply and I/O
<b>Bus controller / X2X Link supply input</b>	
Input voltage	24 VDC (-15% / +20%)
Input current	Max. 0.7 A
Reverse polarity protection	Yes
Fuse	Integrated, cannot be exchanged
<b>Bus controller / X2X Link supply output</b>	
Rated output power	7.0 W
Parallel operation	Yes
Redundant operation of bus controller / X2X Link supply	Yes
<b>I/O supply input</b>	
Input voltage	24 VDC (-15% / +20%)
Fuse	Recommended pre-fusing max. 10 A slow-blow
<b>I/O supply output</b>	
Rated output voltage	24 VDC
Permitted contact load	10.0 A
<b>General information</b>	
Status indicators	Overload, operating state, module status
Diagnostics	
Module run/error	Yes, with status LED and software status
Overload	Yes, with status LED and software status
Electrical isolation	
Bus controller / X2X bus supply	Yes
I/O supply	No
Power consumption	
Bus	1.42 W
I/O internal	0.6 W
Certification	CE, C-UL-US, GOST-R
<b>Operating conditions</b>	
Operating temperature	
Horizontal installation	0°C to +55°C
Vertical installation	0°C to +50°C
Relative humidity	5 to 95%, non-condensing
Mounting orientation	Horizontal or vertical
Installation at altitudes above sea level	
0 - 2000 m	No derating
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m
Protection type	IP20
<b>Storage and transport conditions</b>	
Temperature	-25°C to +70°C
Relative humidity	5 to 95%, non-condensing
<b>Mechanical characteristics</b>	
Spacing	12.5 ±0.2 mm

## **X20AI4622**

The X20AI4622 module is one of the analog input modules of the expansion, which have 4 inputs.

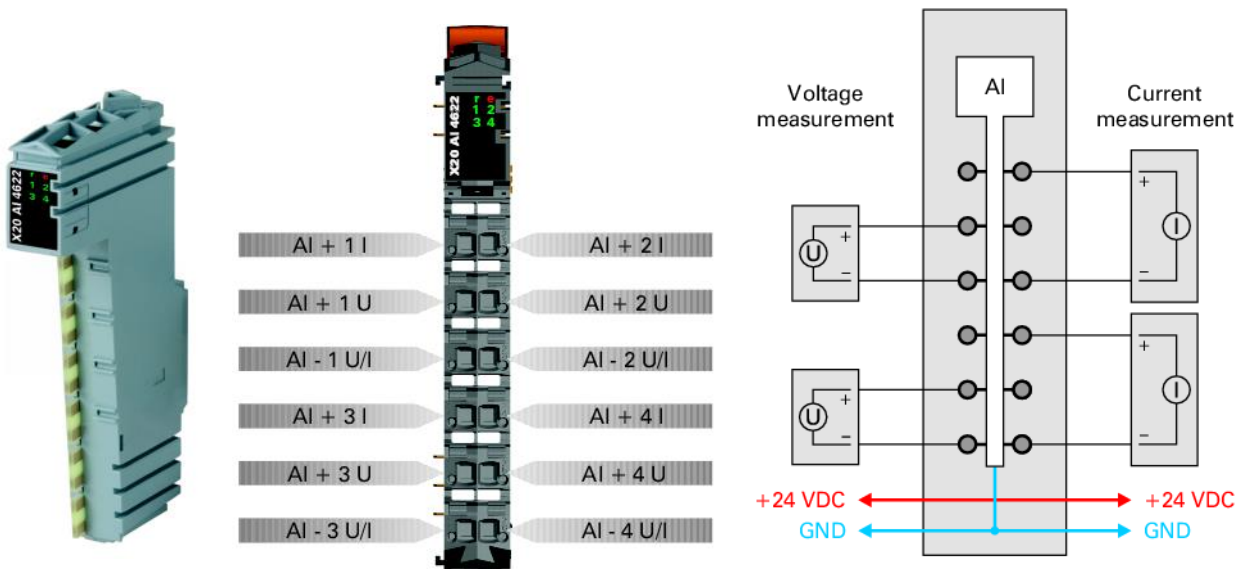
X20AI4622:

X20 = name on the relevant series

AI = Analog Inputs

4 = 4 inputs

622 = type designation



## **Status LEDs**

Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	Reset mode
			Blinking	Preoperational mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything is OK
			On	Error or reset state
	e + r	Steady red / single green flash		Invalid firmware
	1 - 4	Green	Off	Open connection or sensor is disconnected
			Blinking	Overflow or underflow of the input signal
			On	The analog/digital converter is running, value is OK

### **Technical data X20AI4622**

Short description		
I/O module	4 analog inputs ± 10 V or 0 to 20 mA / 4 to 20 mA	
Analog inputs	Voltage	Current
Input	±10 V or 0 to 20 mA/4 to 20 mA, using different connection terminal points	
Input type	Differential input	
Digital converter resolution	±12-bit	12-bit
Conversion time	400 µs for all inputs	
Output format	UINT	
Input impedance in signal range	20 MΩ	-
Load	-	<400 Ω
Maximum error at 25°C	0.08%	0 to 20 mA = 0.08%
Gain		4 to 20 mA = 0.1%
Offset		0 to 20 mA = 0.03%
	0.015%	4 to 20 mA = 0.16%
Input protection	Protection against wiring with supply voltage	
General information		
Status indicators	I/O function per channel, operating state, module status	
Diagnostics		
Module run/error	Yes, with status LED and software status	
Inputs	Yes, with status LED and software status	
Channel type	Yes, with software status	
Electrical isolation		
Channel – Bus	Yes	
Channel - Channel	No	
Power consumption		
Bus	0.01 W	
I/O internal	1.1 W	
Certification	CE, C-UL-US, GOST-R	
Operating conditions		
Operating temperature		
Horizontal installation	0°C to +55°C	
Vertical installation	0°C to +50°C	
Relative humidity	5 to 95%, non-condensing	
Mounting orientation	Horizontal or vertical	
Installation at altitudes above sea level		
0 - 2000 m	No derating	
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m	
Protection type	IP20	
Storage and transport conditions		
Temperature	-25°C to +70°C	
Relative humidity	5 to 95%, non-condensing	
Mechanical characteristics		
Spacing	12.5 +0.2 mm	

## **X20DI8371**

The X20DI8371 module is the digital input modules of the expansion, which have 8 inputs.

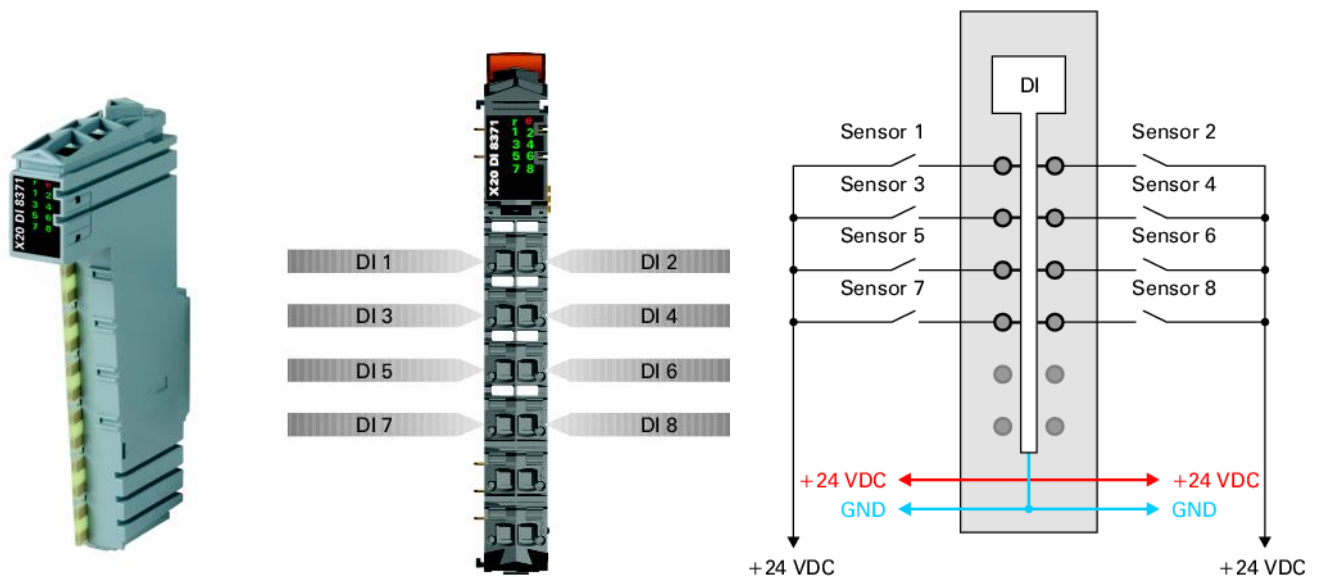
X20DI8371:

X20 = name on the relevant series

DI = Digital Inputs

8 = 8 inputs

371 = type designation



## **Status LEDs**

Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	Reset mode
			Blinking	Preoperational mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything is OK
	e + r	Steady red / single green flash		Invalid firmware
	1 - 8	Green		Input status of the corresponding digital input


**Technical data X20DI8371**

<b>Short description</b>	
I/O module	Eight 24 VDC digital inputs for 1-line connections
<b>Digital inputs</b>	
Rated voltage	24 VDC
Input filter Hardware Software	≤100 µs Default 1 ms, can be configured between 0 and 25 ms in 0.2 ms intervals
Connection type	1-line connections
Input circuit	Sink
<b>General information</b>	
Status indicators	I/O function per channel, operating state, module status
Diagnostics Module run/error	Yes, with status LED and software status
Electrical isolation Channel - Bus Channel - Channel	Yes No
Power consumption Bus I/O internal I/O external	0.18 W - 1.2 W
Certification	CE, C-UL-US (in development), GOST-R
<b>Operating conditions</b>	
Operating temperature Horizontal installation Vertical installation	0°C to +55°C 0°C to +50°C
Relative humidity	5 to 95%, non-condensing
Mounting orientation	Horizontal or vertical
Installation at altitudes above sea level 0 - 2000 m >2000 m	No derating Reduction of ambient temperature by 0.5°C per 100 m
Protection type	IP20
<b>Storage and transport conditions</b>	
Temperature	-25°C to +70°C
Relative humidity	5 to 95%, non-condensing
<b>Mechanical characteristics</b>	
Spacing	12.5 ±0.2 mm



## **X20DO8322**

The X20DO8322 module is one of the digital output modules of the expansion, which have 8 outputs.

Figure	LED	Color	Status	Description
	r	Green	Off	Module supply not connected
			Single flash	RESET mode
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything OK
			Single flash	Warning/Error on an I/O channel. Level monitoring for digital outputs has been triggered.
	e + r	Red on / Green single flash		Invalid firmware
	1 - 8	Orange		Output status of the corresponding digital output

X20DO8322:

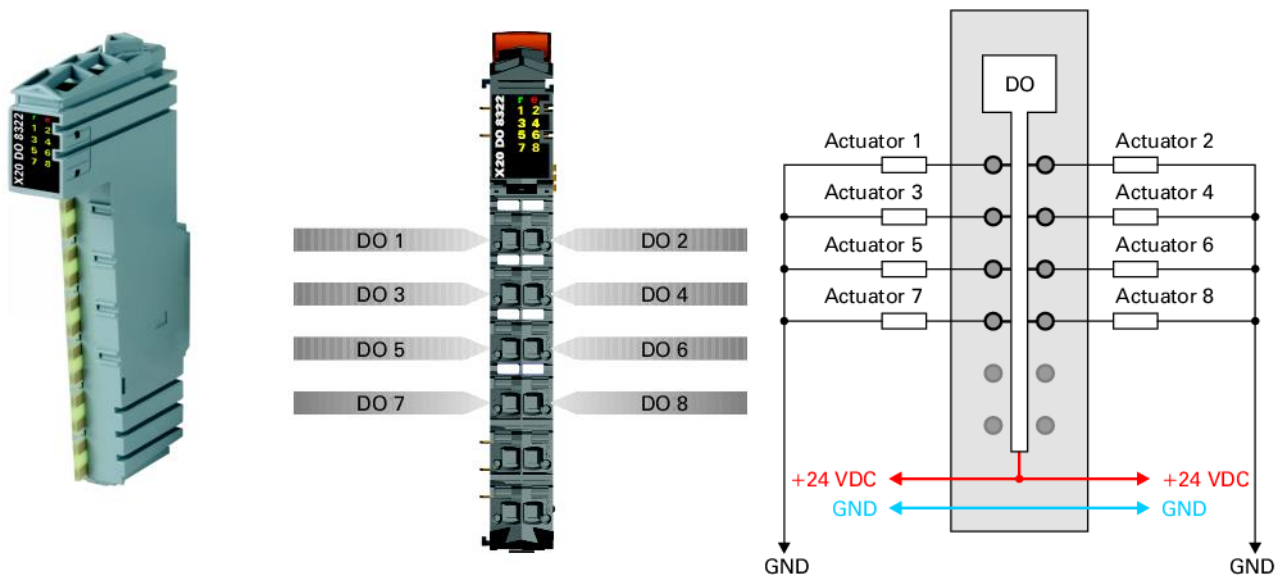
X20 = name on the relevant series

DO = Digital Outputs

8 = 8 outputs

322 = type designation

Max load on each output is 0.5A with a maximum total current of 1.5A.



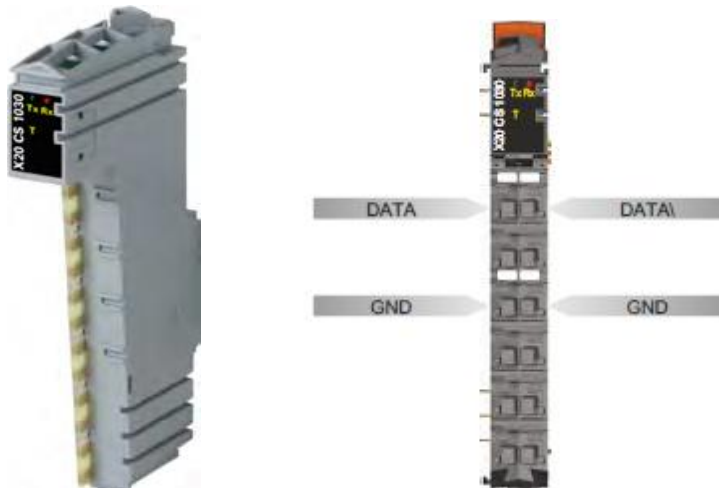
### **X20CS1030**

In addition to the standard I/O, complex devices often need to be connected. The X20CS communication modules are intended precisely for cases like this. As normal X20 electronics modules, they can be placed anywhere on the remote backplane.

- RS485/RS422 interface for serial, remote connection of complex devices to the X20 system
- Integrated terminating resistor

Data = data+

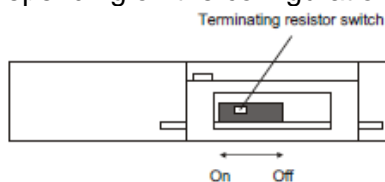
Data\ = data-



### **LED status indicators**

Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	RESET mode
			Double flash	BOOT mode (during firmware update) <sup>1)</sup>
			Blinking	PREOPERATIONAL mode
	e	Red	On	RUN mode
			Off	No power to module or everything OK
			Single flash	An I/O error has occurred, see 9.16.6.9.9.1 "Error message status bits"
	e + r	Red on / Green single flash	On	Error or reset status
			Off	Invalid firmware
	Tx	Yellow	On	The module transmits data via the RS485/RS422 interface
	Rx	Yellow	On	The module receives data via the RS485/RS422 interface
	T	Yellow	On	Terminating resistor integrated in the module switched on

1) Depending on the configuration, a firmware update can take up to several minutes.



### **Terminating resistor**

A terminating resistor is integrated in the communication module. It can be turned on and off with a switch on the bottom of the housing. An active terminating resistor is indicated by the "T" LED.

### **Technical data**

<b>Short description</b>	
Communication module	1x RS485/RS422
<b>General information</b>	
B&R ID code	0x1FD0
Status indicators	Data transfer, terminating resistor, operating status, module status
Diagnostics Module Data transfer Terminating resistor	run/error Yes, using status LED and software Yes, using status LED Yes, using status LED
Power consumption Bus Internal I/O	0.01 W 1.44 W
Additional power dissipation caused by the actuators (resistive) [W]	-
Electrical isolation IF1 - Bus IF1 - I/O power supply	Yes Yes
Certification CE KC	Yes Yes
UL cULus	E115267 Industrial Control Equipment
HazLoc	cCSAus 244665 Process Control Equipment for Hazardous Locations Class I, Division 2, Groups ABCD, T5
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta = 0 - max. 60°C FTZÚ 09 ATEX 0083X
DNV GL	Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%) Vibration: <b>B</b> (4g) EMC: <b>B</b> (Bridge and open deck)
LR GOST-R	ENV1 Yes
<b>Interfaces</b>	
IF1 interface Signal Design Max. distance Transfer rate FIFO Terminating resistor Controller	RS485/RS422 Connection made using 12-pin X20TB12 terminal block 1200 m Max. 115.2 kbit/s 1 kB Integrated in the module UART type 16C550 compatible
<b>Operating conditions</b>	
Mounting orientation Horizontal Vertical	Yes Yes
Installation at elevations above sea level 0 to 2000 m >2000 m	No limitations Reduction of ambient temperature by 0.5°C per 100 m
EN 60529 protection	IP20
<b>Environmental conditions</b>	
Temperature	
Operation Horizontal installation Vertical installation Derating Storage Transport	-25 to 60°C -25 to 50°C See section "Derating" -40 to 85°C -40 to 85°C
Relative humidity Operation Storage Transport	5 to 95%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
<b>Mechanical characteristics</b>	
Spacing	12.5+0.2 mm

## **Installation – POWERLINK**

This is relevant only, if you are going to install an Expansion up to 100 meters from the LED Light Controller.

LED Light Controller communicates via Ethernet, which is a standard data transmission network.

Ethernet is standard for communication between SL5 pc, LED Light Controller and expansions. Expansions communicate with the LED Light Controller through POWERLINK. POWERLINK is actually the same network as Ethernet.

For proper installation, use category 5 shielded cable.

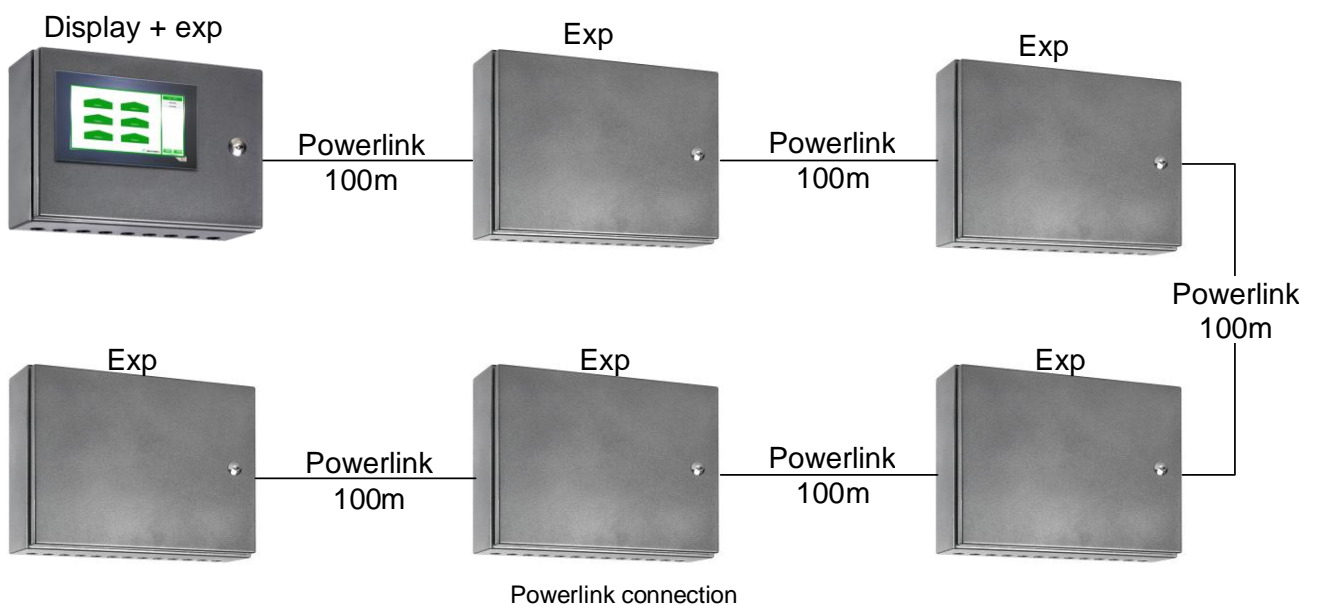
According to standard specifications, Ethernet cable may not be longer than 100 meters. Nevertheless, it is possible to make almost endless installations if a repeater or hub/switch is placed for every 100 meters.

Expansions also act like a repeater or switch, which means that it is possible to have 100 meter between each unit, without having to install a separate switch.

It is recommended that the units run on a separate Ethernet network, rather than on an existing internal network, to avoid having the extra load of the data traffic between the individual units on the internal network.

Furthermore the expansions belonging to a panel are kept on a network line, which runs from the panel in question, as shown below.

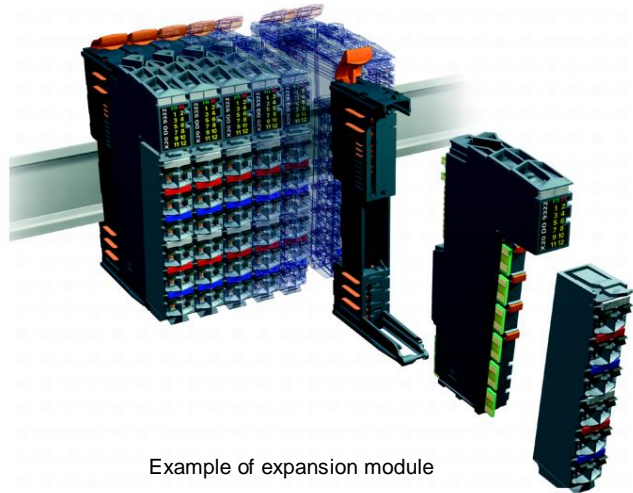
Once again, this is because there is continuous communication between an AMI Penta panel and its expansions, and there is no reason to place this extra traffic on the main network line.



The advantage with this type of installation is that the power can be disconnected from an expansion, without affecting the rest of the installation.

## Module structure

The picture shows some digital output modules, which is put together and mounted on a DIN rail. Each module consists of 3 parts as shown on the picture. The first module is a bus module, which also functions as base for all 24V X20 I/O modules. This is also the module, which is used for mounting a module on the DIN rail. The second module is a X20 I/O module in which the electronics is, in this case it would either be a supply module, a digital input/output module or an analog input/output module. The third module is the termination module, in which the cables should be mounted.



Example of expansion module

### Installation of cables:

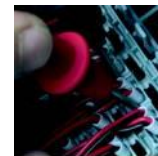
It is possible to mount the cables in the termination modules without any use of tools.

The modules use a fully integrated push-in connector system, in which one can easily mount the cables. The cables can be removed again by means of a screwdriver or the like.

Each terminal has a measuring point, which can be found next to the mounted cable. It is therefore possible eg. to measure the digital output without first having to dismount the cables.



Cable mounting



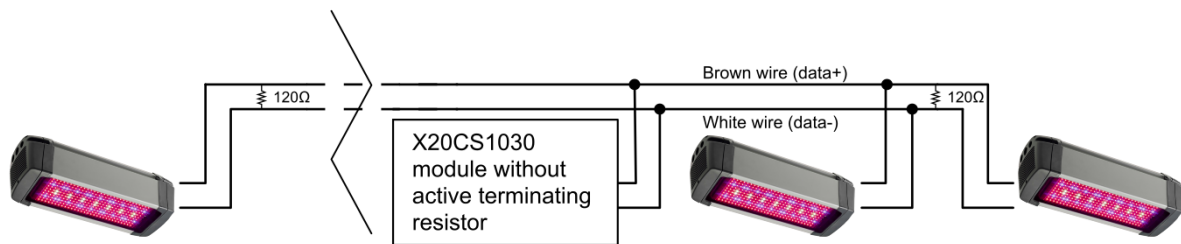
Terminal test point

## Terminating

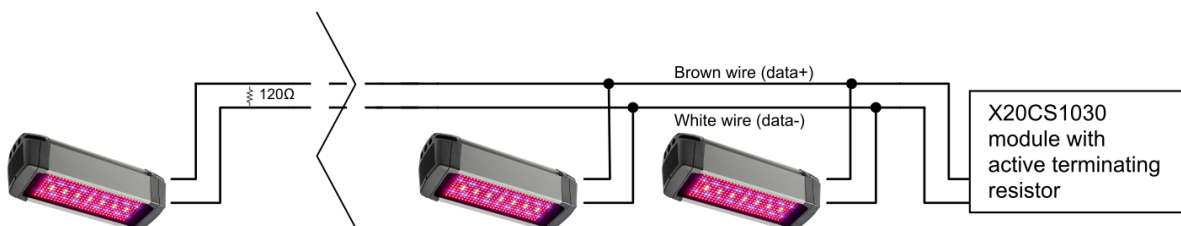
Sometimes it is necessary to terminate the communications cable, depending on number of fixtures and the cables length.

The terminating can be done in two ways.

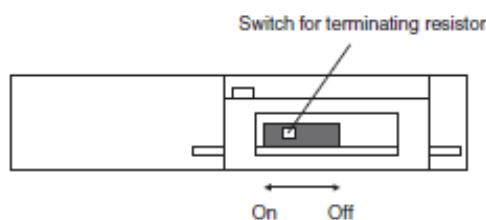
The first way is when the controller is in the middle of the communication cable. In this situation the terminating is done by setting a 120Ω resistor in each end at the last fixture on the communication cable.



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



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.



X20CS1030 – Terminating resistors

## Controlling the FL300 and FL100

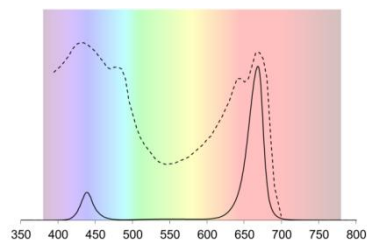
The FL300 and FL100 are designed so the spectrums can be controlled to fit the individual crops in combination with LCC4 climate control systems. An alternative to the LCC4 climate control system is Fionia Lighting Interface Software or the LED Light Controller.

### Models

The FL300 and FL100 fixture can be equipped with a large range of different diodes for different purposes. The most used spectra are Grow, Sunlight and Grow White.

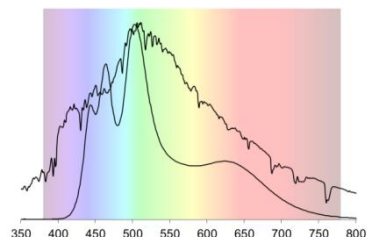
#### Grow

The Grow spectrum is designed for all production facilities where supplementary lighting is required. With the preinstalled programs this spectrum can go from 2-14% blue and be dimmed to fit various requirements.



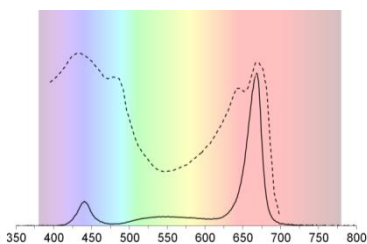
#### Sunlight

The Sunlight spectrum is designed to replica the light coming from the sun which gives it the benefit to be used in closed cambers. With the preinstalled programs this spectrum can be dimmed to fit various requirements.



#### Grow White

The Grow White spectrum is a combination of the Sunlight and Grow spectra and are suitable for production where more white light are needed. With the preinstalled programs this spectrum can go from 2-14% blue and be dimmed to fit various requirements.



### Identification of the fixture

Each FL300 and FL100 has an individual label showing product no., fixture type and IP address for the fixture.

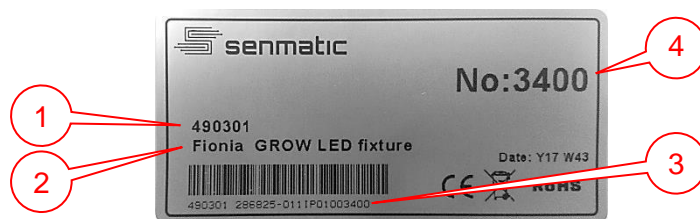


Figure 2: FL300 label

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.
4. Four last digits of the IP address

**It makes the installation of the group easier if the fixtures are installed with continuous IP addresses.**

## ***Light Control***

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 define how much the LEDs are going to illuminate.

### **FL300**

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. To turn a channel off set the value to zero.

For the FL300 Grow the base colour in the channels is:

- 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 base colour in the channels is:

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

For the FL300 Grow White the base colour in the channels is:

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

### **FL100**

In the FL100 Grow the light can be controlled in the range within the values 0-255 on the channels and in the FL100 Sunlight it can be controlled within the values 0-237. The FL100 cannot be turned off by setting the cannels to zero.

For the FL100 Grow the base colour in the channels is:

- Channel A – Red
- Channel C – Blue

For the FL300 Sunlight the base colour in the channels is:

- Channel A – White
- Channel C – Blue

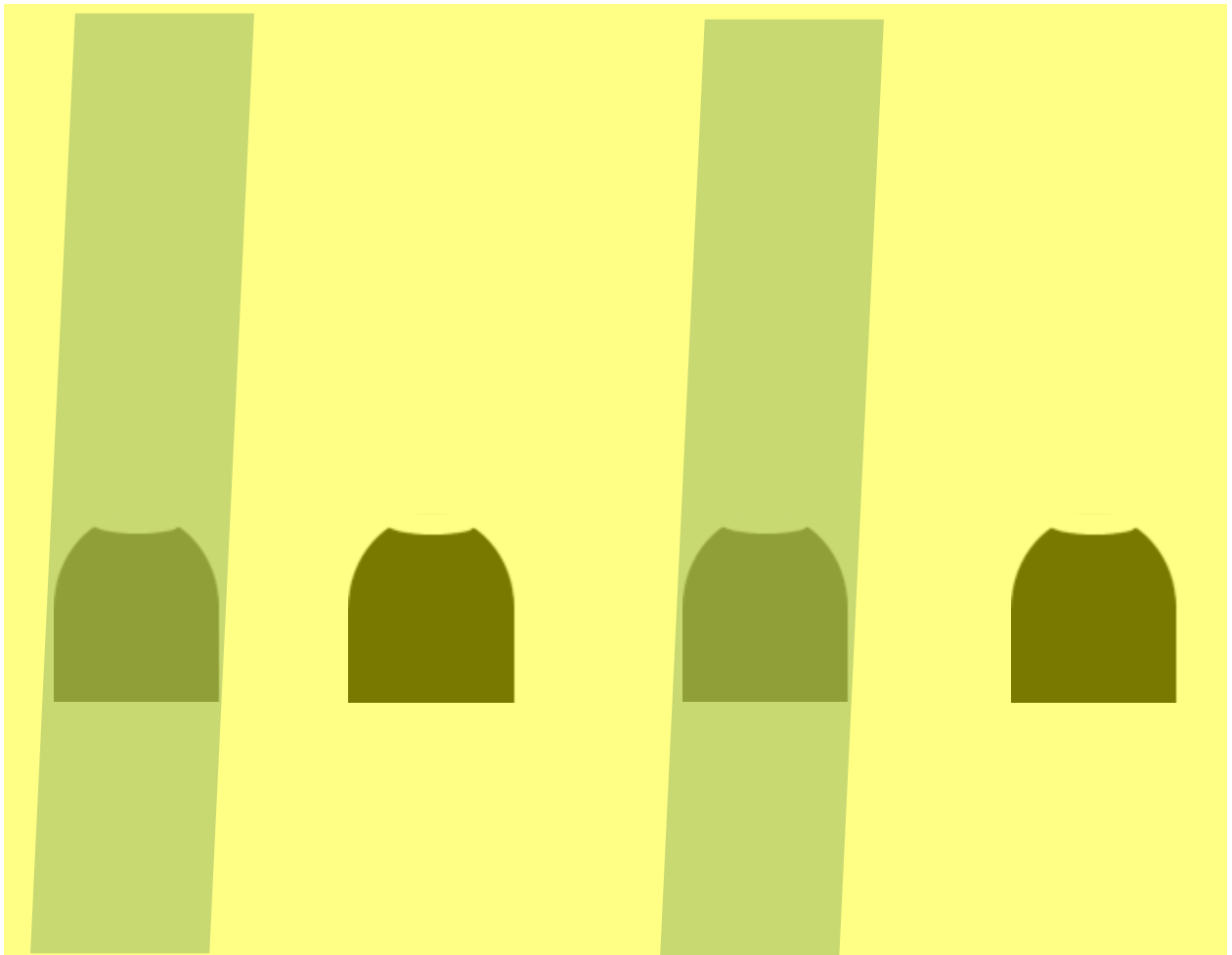
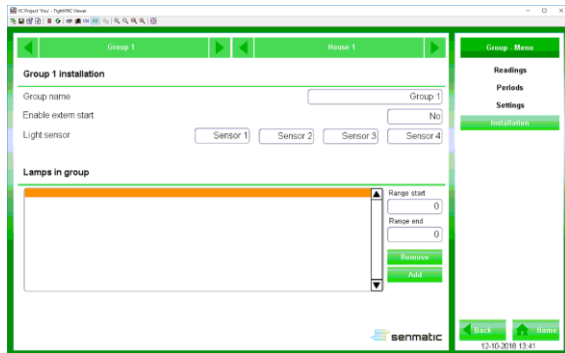
For the FL300 Grow White the base colour in the channels is:

- Channel A – Red
- Channel C – White



## Light control

To get the full benefits of controlling the LED light, it should be installed together with one or more light sensors. The light can then be controlled with dynamic intensity, light sum for down adjustment (DLI) or both. Up to 8 light sensors can be connected to each EXP(house). In each group, 1, 2, 3 or 4 of these 8 sensors can be used for the light control. In this example, the highest value from the 4 sensors will be used for the light control. This means that the shadows in the house, most likely will be eliminated.

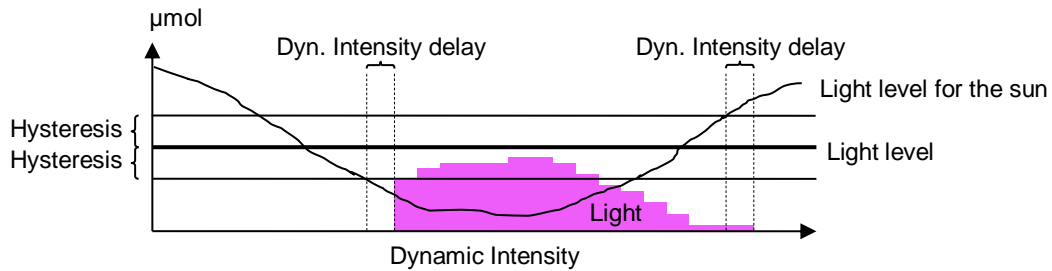


### **Dynamic Intensity**

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

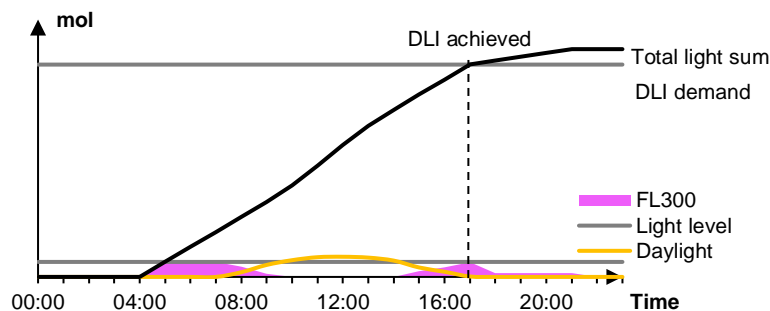
When the light is measured to be lower than the requested light level it will cause the fixtures to turn on and when the measuring is higher than this light level the fixtures will turn off.

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.



### **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.

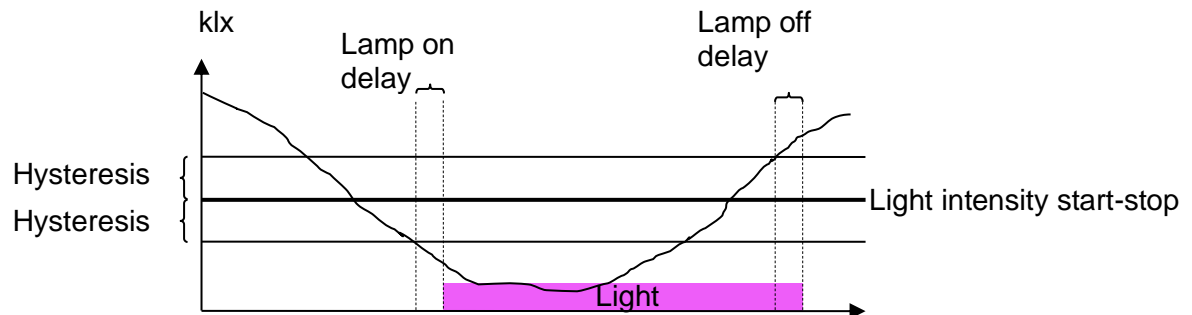


DLI - Light sum for down adjustment with dynamic intensity

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.

### **Light intensity start – stop**

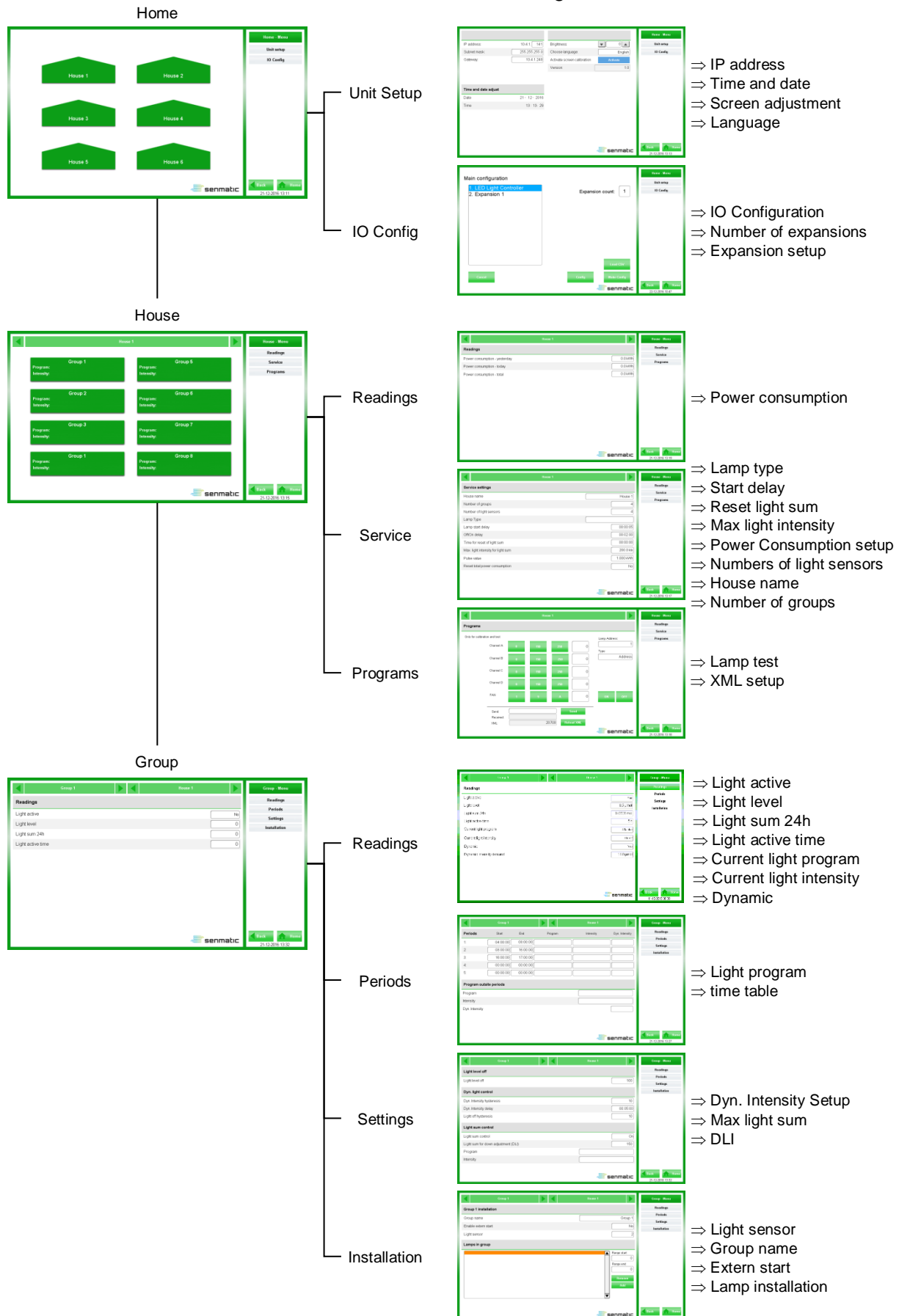
Limit for the light measured outside. A measuring lower than this will cause the light to turn on. A measuring higher than this will cause the light to turn off. In addition there is a hysteresis, a start- and a stop delay. The hysteresis works both over and under the limit value.



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

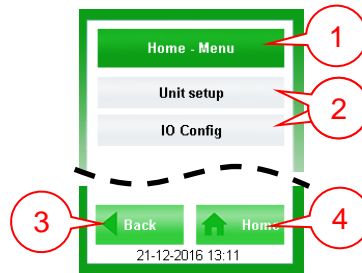
## User interface

Here is an overall view of the user interface in the LED Light Controller.



## **Right menu**

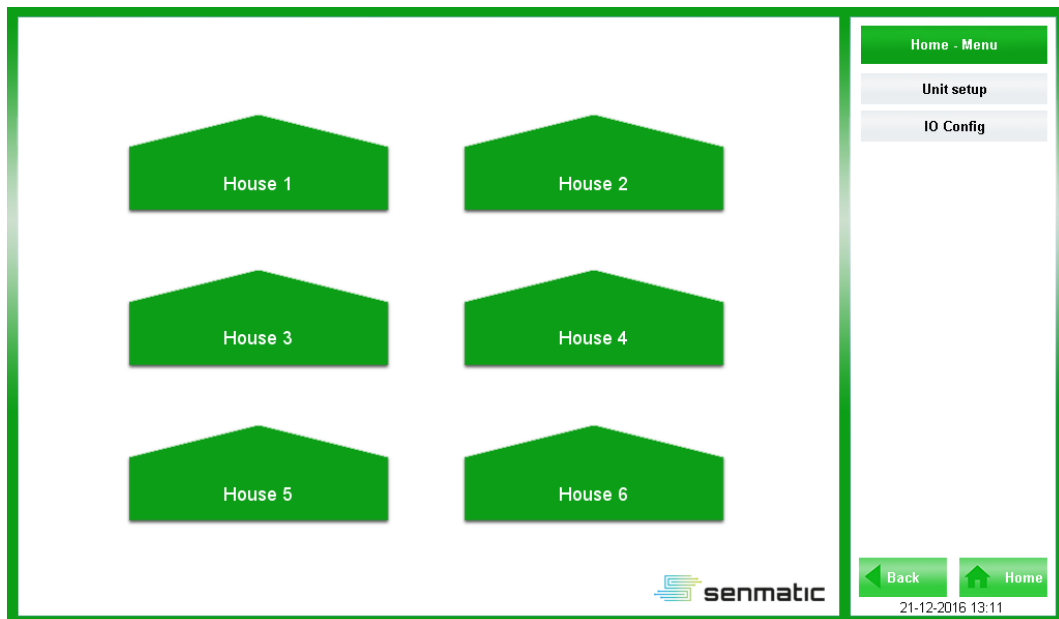
In the right menu it is possible to the main menu you are in and choose a subpage to go to.



1. Shows the main menu for the page
2. Choose a subpage to go to
3. Go back to the main menu
4. Go to the Home page

## ***Home***

The LED Light Controller can control up to 6 houses. Click on a house to go to the house menu.



In the home menu it is possible make the main setup:

- ⇒ IP address
- ⇒ Time and date
- ⇒ Language
- ⇒ Expansion setup
- ⇒ IO configuration

See more in the description of the two subpages.

## Unit setup

The screenshot shows the 'Unit setup' web interface. It is divided into two main sections. The top section contains network settings: IP address (10.4.1.141), Subnet mask (255.255.255.0), Gateway (10.4.1.248), Brightness (0), Choose language (English), Activate screen calibration (button), and Version (1.0). The bottom section is titled 'Time and date adjust' and shows Date (21-12-2016) and Time (13:13:29). On the right side, there is a vertical menu with 'Home - Menu' at the top, followed by 'Unit setup' (highlighted with a red circle 3), and 'Factory Config'. At the bottom right, there are 'Back' and 'Home' buttons, and a timestamp '21-12-2016 13:13'. The Senmatic logo is at the bottom center. Three red circles with numbers 1, 2, and 3 point to the top header area, the 'Time and date adjust' section, and the 'Unit setup' menu item respectively.

### 1 Network settings

#### **IP address**

Enter the IP address, which the LED Light Controller has been given for communication on the Ethernet.

10.4.1.<node name>

Condition:  $129 \leq \text{the node name} \leq 199$  and different from all other nodes on this Ethernet. The node name is placed hexadecimal on the hardware switch behind the panel.

#### **Subnet mask**

Reading the subnet mask for the system.

#### **Gateway**

Adjusting the gateway, when needed.

### 2 Time and date adjustment

#### **Date**

Set date – the format is day – month – year. To set the date click on the day, month or year secretly, for year all four digits are necessary.

#### **Time**

Set time - To set the time click on the hour, minute or seconds secretly.

All settings of time have the format hours, minutes and seconds.

### 3 Display and language

#### **Display brightness**

Adjust the brightness of the display.

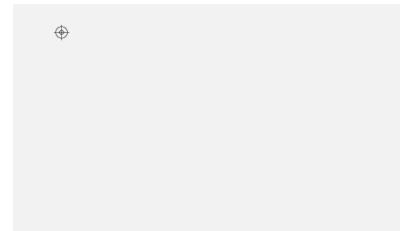
#### **Choose language**

Translated and implemented languages can be selected here. For further information contact Senmatic A/S DGT.

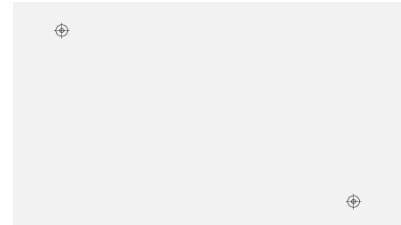
### Activate display calibration

Push the button 

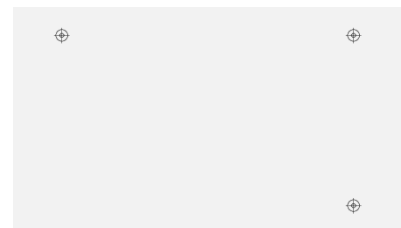
1. Afterwards push the button up left.  
Push as accurate as possible!



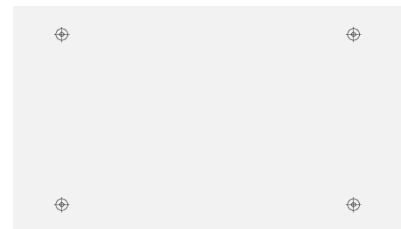
2. Now push the button down right.



3. Then push the button up right.



4. Finally push the button down left.



### Version

Displays the version of the software on the LED Light Controller.

## **IO configuration**

Here is a description on how to set up the IO configuration. The IO must be installed so it matches the X20 models in the LED Light Controller and expansions.

### **Main page**

Main configuration

1. LED Light Controller  
2. Expansion 1

Expansion count: 1

Cancel Config Load CSV Make Config

senmatic

Home - Menu  
Unit setup  
IO Config  
Back Home  
22-12-2016 10:47

### **Main configurations**

Shows the LED Light controller and the expansions, this is also the amount of houses. The LED Light controller module is the first house and expansion1 is house 2 and so on.

Click on the one to edit, so it gets highlighted.

### **Expansion count**

Enter the number of expansions.

### **Load CSV**

Load standard IO table.

### **Make Config**

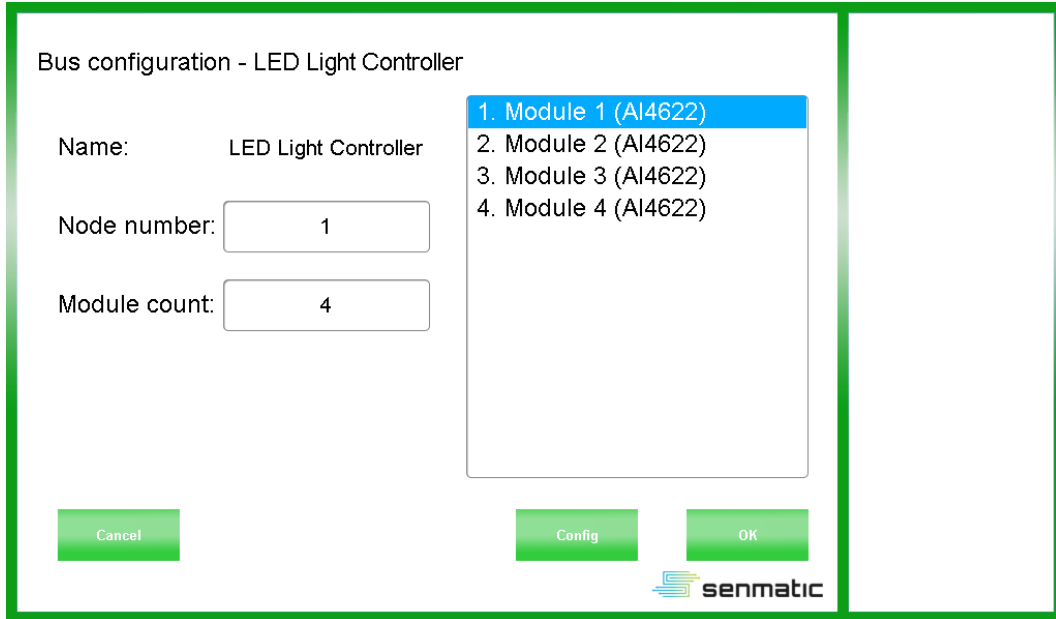
Click to finish the configurators and restart the unit.

### **Config**

Click to edit the IO configurations of the highlighted unit, and get to the Bus Configuration see next picture.



### **Bus configuration**




Bus configuration - LED Light Controller

Name: LED Light Controller

Node number:

Module count:

- 1. Module 1 (AI4622)
- 2. Module 2 (AI4622)
- 3. Module 3 (AI4622)
- 4. Module 4 (AI4622)



#### **Name**

Enter name of the unit or expansion. This is the name that will be shown in the top and “Main configuration” on the previous page.

#### **Node number**

Enter node number- The software will automatic count one up for each expansion added - this need to match the node switch on the X20BC module.

#### **Module count**

Enter number of X20 modules; only count the AI, DI, DO and CS, for at standard LED Light Controller this is four.

#### **Module list**

Show the modules in the configuration.

Click on the one to edit, so it gets highlighted.

#### **OK**

Click to save any change made and go back to Main configuration page.

#### **Cancel**

Click to cancel any change made and go back to Main configuration page.

#### **Config**

Click to edit the configurations of the highlighted module, and get to the Module Configuration see next picture.

### **Module configuration**

Module configuration - LED Light Controller- Module 1

Type: Module 1 Type: AI4622

Voltage Not used Not used Not used Not used Voltage

Voltage Not used Not used Not used Not used Voltage

Cancel Prev. Module Next Module OK

senmatic

#### **1 Type**

Enter module name – This is the name that will be shown in the top and “Bus configuration” on the previous page.

#### **2 Type**

Select the module type from the dropdown list.

#### **OK**

Click to save any change made and go back to Bus configuration page.

#### **Cancel**

Click to cancel any change made and go back to Bus configuration page.

#### **Prev. Module**

Click to save any change made and go back to the previous module.

#### **Next Module**

Click to save any change made and go back to the next module.

### **Module configuration – Analog input (AI4622)**

The AI in LED Light Controller is used to connect the light sensors.

Module configuration - LED Light Controller - Analog Input

Type: Analog Input      Type: AI4622

Voltage Light sensor 1

Voltage Not used Voltage

Voltage Not used Voltage

Cancel Prev. Module Next Module OK

senmatic

#### **1Type**

Select AI4622 in the dropdown list

#### **2 Voltage / current**

Select unit for the specific light sensor- select voltage for the Q20 and Q21 light sensor. For Q21, gain must be set at 0.8 in the sensor setup menu.

#### **3 Devise**

Select light sensor in the dropdown list.

#### **4 Number**

Select the number of the light sensor for this position. 1-8.

### **Module configuration – Digital input (DI8371)**

The DI in LED Light Controller is used to receive an external on/off signal.

Module configuration - LED Light Controller- Digital Input

Type: Digital Input      Type: DI8371

External start: 1

Not used

Not used

Not used

Not used

Cancel      Prev. Module      Next Module      OK

senmatic

#### **1Type**

Select DI8371 in the dropdown list

#### **2 External start**

Select light sensor in the dropdown list.

#### **3 Group number**

Select which group the external start works for.

### **Module configuration – Digital output (DO8322)**

The DI in the LED Light Controller is used to send out an on/off signal.

Module configuration - LED Light Controller- Digital Output

Type: Digital Output      Type: DO8322

LED group: 1

Not used

Not used

Not used

Not used

Cancel      Prev. Module      Next Module      OK

senmatic

#### **1Type**

Select DO8322 in the dropdown list

## 2 Start

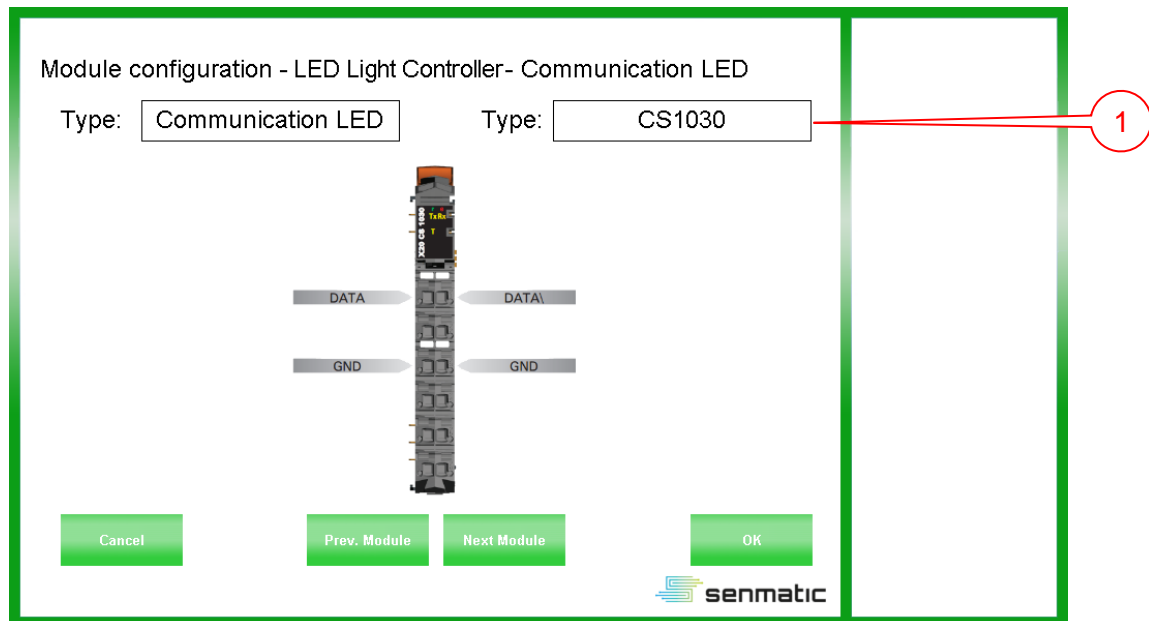
Select LED group in the dropdown list.

## 3 Group number

Select which group the on/off signal works for.

### **Module configuration – Communication LED (CS1030)**

The CS in the LED Light Controller is used to connect the light communication.



### **1Type**

Select DO8322 in the dropdown list

## House

At this page it is possible to see the groups in the house and see which setting each group is running.

Each house can run one type of LED fixtures in up to eight groups and can be connected to up to eight light sensors. Click on a group to go to the group menu.



In the house menu it is possible to make the house setup for:

- ⇒ Lamp type
- ⇒ Start delay
- ⇒ Reset light sum
- ⇒ Max light intensity
- ⇒ Power Consumption
- ⇒ House name
- ⇒ Number of groups and sensors
- ⇒ Lamp test
- ⇒ XML

Here it is also possible to see the readings for power consumption.

In the top of the page the arrows can be used to switch between the houses.



See more details in the tree subpages.

## **Readings**

Here it is possible to see the power concoction for the house.

The screenshot displays the 'House 1' interface. At the top, a green header bar contains 'House 1' with left and right navigation arrows. Below this is a 'Readings' section with a table of power consumption data. To the right is a 'House - Menu' sidebar with options: 'Readings' (selected), 'Service', and 'Programs'. At the bottom right, there are 'Back' and 'Home' buttons, and a timestamp '21-12-2016 13:19'. The Senmatic logo is visible in the bottom center of the main area.

Readings	
Power consumption - yesterday	0.0 kWh
Power consumption - today	0.0 kWh
Power consumption - total	0.0 kWh

### **Power consumption – yesterday**

Show the power consumed yesterday.

### **Power consumption – today**

Show the power consumed today on till now.

### **Power consumption – total**

Show the power consumed since the power consumption has been resat.

## **Service**

Here it is possible to setup the house settings.

The screenshot shows the 'Service settings' screen for 'House 1'. The interface has a green header bar with 'House 1' and navigation arrows. A sidebar on the right contains a 'House - Menu' with options: 'Readings', 'Service' (highlighted), 'Programs', and 'Sensor setup'. The main area lists settings with input fields: 'House name' (House 1), 'Number of groups' (2), 'Number of light sensors' (1), 'Lamp Type' (FL100 Grow W. S0), 'Lamp start delay' (00:00:05), 'Off/On delay' (00:00:05), 'Time for reset of light sum' (00:00:00), 'Max. light intensity for light sum' (4000.0 µmol), 'Pulse value' (1.000 kWh), 'Reset total power consumption' (No), and 'Sensor averaging time' (00:01:00). The Senmatic logo is at the bottom right of the main area. At the bottom of the screen are 'Back' and 'Home' buttons, and a timestamp '11-10-2018 09:16'.

Setting	Value
House name	House 1
Number of groups	2
Number of light sensors	1
Lamp Type	FL100 Grow W. S0
Lamp start delay	00:00:05
Off/On delay	00:00:05
Time for reset of light sum	00:00:00
Max. light intensity for light sum	4000.0 µmol
Pulse value	1.000 kWh
Reset total power consumption	No
Sensor averaging time	00:01:00

### **House Name**

Enter a name for the house. This is the name that will be shown in the top and in the house on the home page.

### **Number of groups**

Enter the number of groups in the house.

### **Number of light sensors**

Enter the numbers of light sensors connected to this house. 1-8

### **Lamp type**

Select fixture type shown on the label (see more in "Identification of the fixture").

### **Lamp start delay**

Enter time from the fixtures turn on to the program is sent to the fixtures.

### **On/off delay**

Enter length of break from fixtures turn off until they can turn on again.

### **Time for reset of light sum**

Enter the time in the day for the light sum to reset.

### **Max. light intensity for light sum**

Enter the max light intensity to be counted in the light sum.

### **Pulse value**

Enter the value of one pulse

### **Reset total power consumption**



Reset the total power consumption by selecting yes in the dropdown list. The will automatic go back to no again.

### Sensor averaging time

Here the time for light sensor averaging is set. 00:01:00 means that the final signal is generated from the average value of measurements from the last minute.

### Calibration and test

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

The screenshot shows the 'House 1' configuration page. At the top, there's a green header with 'House 1' and navigation arrows. Below it is a 'Programs' section with a sub-header 'Only for calibration and test'. This section contains a table for configuring channels and a fan. The table has five rows: Channel A, Channel B, Channel C, Channel D, and FAN. Each row has three green buttons for values 0, 150, and 250 (or 1, 5, and A for the fan), and a text input field for a custom value. To the right of the table are fields for 'Lamp Address' (with a value of 1) and 'Type' (with a value of Address). Below the table are 'Send' and 'Receive' status fields, an 'XML' field with the value 20708, and 'Send' and 'Reload XML' buttons. At the bottom right are 'ON' and 'OFF' buttons. A sidebar on the right contains a 'House - Menu' with links to 'Readings', 'Service', and 'Programs'. At the bottom of the sidebar are 'Back' and 'Home' buttons and a timestamp '21-12-2016 13:18'. The Senmatic logo is at the bottom center.

Channel	0	150	250	Value
Channel A	0	150	250	0
Channel B	0	150	250	0
Channel C	0	150	250	0
Channel D	0	150	250	0
FAN	1	5	A	0

### Channel A

Select [0], [150], [250] or enter value (0 or 060-255) for channel A.

### Channel B

Select [0], [150], [250] or enter value (0 or 060-255) for channel B.

### Channel C

Select [0], [150], [250] or enter value (0 or 060-255) for channel C.

### Channel D

Select [0], [150], [250] or enter value (0 or 060-255) for channel D.

### Fan

Select [1], [5], [A] (automatic) or enter fan speed 0-9

### Lamp address

Enter fixture's IP address or group number, depending on the choice of type.

### Type

Select address to control one fixture or select group to control a fixture group.

### On/off buttons

Turn light on and off. This will only work with FL300, and here the fans will still run.

## Send

Enter commando for the fixture and click the send button.

## Received

Show the answer from fixture.

## Reload XML

Use to install a new light program to the LED Light Controller.

## Group

The group menu always starts on the readings page.

The screenshot shows the Senmatic LED Light Controller interface. At the top, there are two green buttons labeled 'Group 1' and 'House 1', each with left and right arrows. Below these is a 'Readings' section with four rows: 'Light active' (No), 'Light level' (0), 'Light sum 24h' (0), and 'Light active time' (0). To the right is a 'Group - Menu' sidebar with buttons for 'Readings', 'Periods', 'Settings', and 'Installation'. At the bottom right, there are 'Back' and 'Home' buttons, and a timestamp '21-12-2016 13:32'. The Senmatic logo is at the bottom center.

In the group menu it's possible to make the group setup for:

- ⇒ Group name
- ⇒ Light sensor
- ⇒ Extern start
- ⇒ Lamp installation
- ⇒ Light program
- ⇒ Time table

Here is it also possible to see the readings for the light level and light sum.

In the top of the page the arrows can be used to switch between the groups and the houses.



See more details in the four subpages.

## Readings

Group 1 House 1

**Readings**

Light active	Yes
Light level	8.5 µmol
Light sum 24h	0.0608 mol
Light active time	5 h
Current light program	4% blue
Current light intensity	Step 2
Dynamic	Yes
Dynamic intensity demand	11.0 µmol

senmatic

Group - Menu

- Readings
- Periods
- Settings
- Installation

Back Home

11-10-2018 08:30

### Light active

Show if light in the group is on or off.

### Light level

Show the readings from the light sensor.

### Light sum total 24h

The total light sum for the day for the area the fixture group is illuminating

### Light active time

The total time the fixtures have been running.

### Current light program

Showing the current Light program. The amount of blue light, right now.

### Current light intensity

Showing the intensity (power). 0-120% for FL300 or Step 1 – Step 6 for FL100

### Dynamic

Showing if LLC is operating dynamic or not.

### Dynamic intensity demand

Showing the intensity demand from dynamic control if active.

## **Periods**

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

Group 1	Start	End	Program	Intensity	Dyn. Intensity
1:	07:00:00	09:00:00	4% blue	Dyn.	11.0 $\mu$ mol
2:	09:00:00	09:05:00	2% blue	Step 2	
3:	09:05:00	09:10:00	4% blue	Step 3	
4:	09:10:00	09:15:00	6% blue	Step 4	
5:	09:15:00	16:00:00	8% blue	Step 5	

**Program outside period**

Program

Intensity

Dyn. Intensity

senmatic

Back Home

11-10-2018 08:33

## **Periods**

Enter the daily programs for each group.

### **Start**

Enter start time of the program (hour : minute : second).

### **End**

Enter end time of the program (hour : minute : second).

### **Program**

Select a program e.g. 12% blue.

### **Intensity**

Select the intensity of the fixtures or dynamic.

### **Dyn. Intensity**

Enter the demanded light level. This will make the intensity dynamic between the intensity steps.

## **Programs outside periods**

Select a program that will run if, if the extern start is still on, outside the timetable above.

### **Program**

Select a program e.g. 12% blue.

### **Intensity**

Select the intensity of the fixtures or dynamic.

### **Dyn. Intensity**

Enter the demanded light level. This will make the intensity dynamic between the intensity steps.

## Settings

This is the settings for the automatic light control.

Group 1 House 1

**Light Off**

Light level off 100.0 µmol

Light off hysteresis 10.0 µmol

**Dynamic light control**

Dyn. Intensity hysteresis 0.1 µmol

Dyn. Intensity delay 00:00:02

**Light sum control**

Light sum control Off

Light sum for down adjustment (DLI) 0.0000 mol

Program -

Intensity -

senmatic

Group - Menu

Readings

Periods

Settings

Installation

Back Home

12-10-2018 13:22

### Light level off

Enter the light level for the lamps to be turned off.

### Light off hysteresis

Enter Hysteresis for light off

### Dynamic light control

#### Dyn. Intensity hysteresis

Enter hysteresis for dynamic intensity.

#### Dyn. Intensity delay

Enter delay for switching the light in the dynamic intensity.

### Light off hysteresis

Enter Hysteresis for light off

### Light sum control

#### Light sum control

Select "on" to use DLI.

#### Light sum for down adjustment (DLI)

Enter the demand for the day for each group (shown in tab Daily settings).

#### Program

Select a program to run when DLI has been attained ex. 12% blue.

#### Intensity

Select the intensity of the fixtures 20%-130% when DLI has been attained.

## **Installation**

Here the lamps can be put into the group.

The screenshot shows the 'Group 1 installation' page in the Senmatic web interface. At the top, there are navigation tabs for 'Group 1' and 'House 1'. Below the tabs, the 'Group 1 installation' section contains three input fields: 'Group name' (set to 'Group 1'), 'Enable extern start' (set to 'No'), and 'Light sensor' (set to '2'). Below these fields is a section titled 'Lamps in group' which contains a large empty list box. To the right of the list box are two input fields for 'Range start' and 'Range end', both set to '0', and two buttons labeled 'Remove' and 'Add'. On the right side of the interface is a 'Group - Menu' sidebar with links for 'Readings', 'Periods', 'Settings', and 'Installation'. At the bottom right, there are 'Back' and 'Home' buttons, and a timestamp '21-12-2016 13:26'. The Senmatic logo is visible at the bottom center of the main content area.

Figure 3: Service – Group installation

### **Group installation**

#### **House Name**

Enter a name for the house. This is the name that will be shown in the top and in the house on the home page.

#### **Enabler extern start**

Select “yes” if the light in this group, are being turned on and off by an external signal.

#### **Light sensor**

Select which light sensor should be connected to the group.

### **Lamps in group**

Here the fixtures can be set into the group and the list shows which fixtures are already in the group.

If the IP addresses, shown on the fixture labels (see “Identification of the fixture” ), are consecutive they can be put into the group by entering the lowest and the highest IP address of the fixtures.

#### **Range start**

Enter lowest fixture IP address to put in to the group.

#### **Range end**

Enter highest fixture IP address to put in to the group.

#### **Remove**

Remove the entered fixtures.

#### **Add**

Add the entered fixtures.