

# ActiLume I-10V

OEM application guide

**PHILIPS**

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## I What is the ActiLume I-I0V System

The ActiLume I-I0V System is a new easy to install and easy to use fluorescent lighting dimming system, implemented as a part of a luminaire-based solution. It is suitable for offices, schools, etc. and offers maximum comfort and automatic energy/CO<sub>2</sub> savings. ActiLume I-I0V system can switch the artificial lights in an office automatically on and off based on occupancy and dims the luminaires (artificial lights) when enough daylight (natural light) enters the room.

Although the ActiLume I-I0V system is intended to be used as a Plug-and-Play system, in some cases it is necessary to do some minor commissioning (re-adjusting) of the system. Commissioning is done by means of small screwdriver and adjusting the light level or the timing. This will set the artificial light according to the architects requested light level or switches the controller off or dims down the light after a certain period. This means installers and end-users do not have to worry about complicated programming anymore.

The ActiLume I-I0V system consists of a sensor (which can also be used stand alone) and control unit (SwitchBox) designed to be built in to a luminaire. The sensor part contains two functions (a light sensor for daylight depending regulation and a movement detector for occupancy control). The lighting can also be controlled manually by a wired switch with a momentary contact (Touch and Dim). The system is operated with Philips HF-REGULATOR I-I0V dimmable electronic ballasts. Moreover, the light output of the luminaire is already pre-defined according to the setting of the diaphragm on the sensor.

The ActiLume I-I0V system is a truly Plug-and-Play lighting controls system and can be installed in one simple step. The luminaires are connected and mounted in the ceiling. Via rotating the diaphragm the required light level can be set. This setting is then copied to the other luminaires to have the same setting. The system is now ready for use.



LLC1655/00  
ActiLume I-I0V SwitchBox



LRI1655/00  
ActiLume I-I0V Sensor

## 2 System characteristics

The ActiLume I-10V system consists of the following components:

- ActiLume I-10V Sensor (LRI1655/00)
- ActiLume I-10V SwitchBox (LLC1655/00)

The ActiLume I-10V system can be used in 2 different configurations:

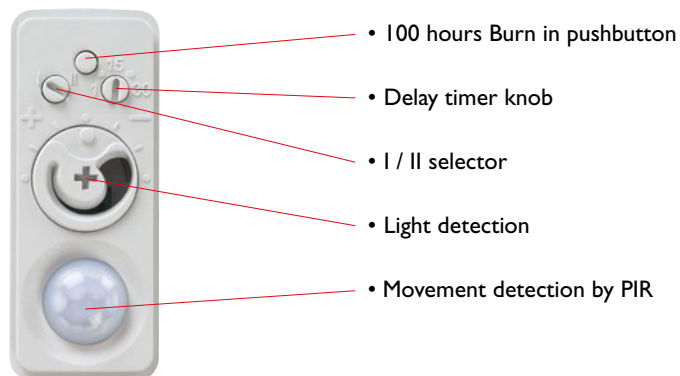
- An ActiLume I-10V Sensor in combination with a I-10V HF-Regulator ballast
- An ActiLume I-10V Sensor + an ActiLume I-10V SwitchBox in combination with a I-10V HF-Regulator ballast

Both options will be explained further in the next chapters.

### 2.1 ActiLume I-10V Sensor LRI1655/00

The ActiLume I-10V Sensor has 5 functional devices installed in one housing and can be connected to a I-10V HF-Regulator ballast or to the ActiLume I-10V SwitchBox by means of 2 flying leads.

The functions are:

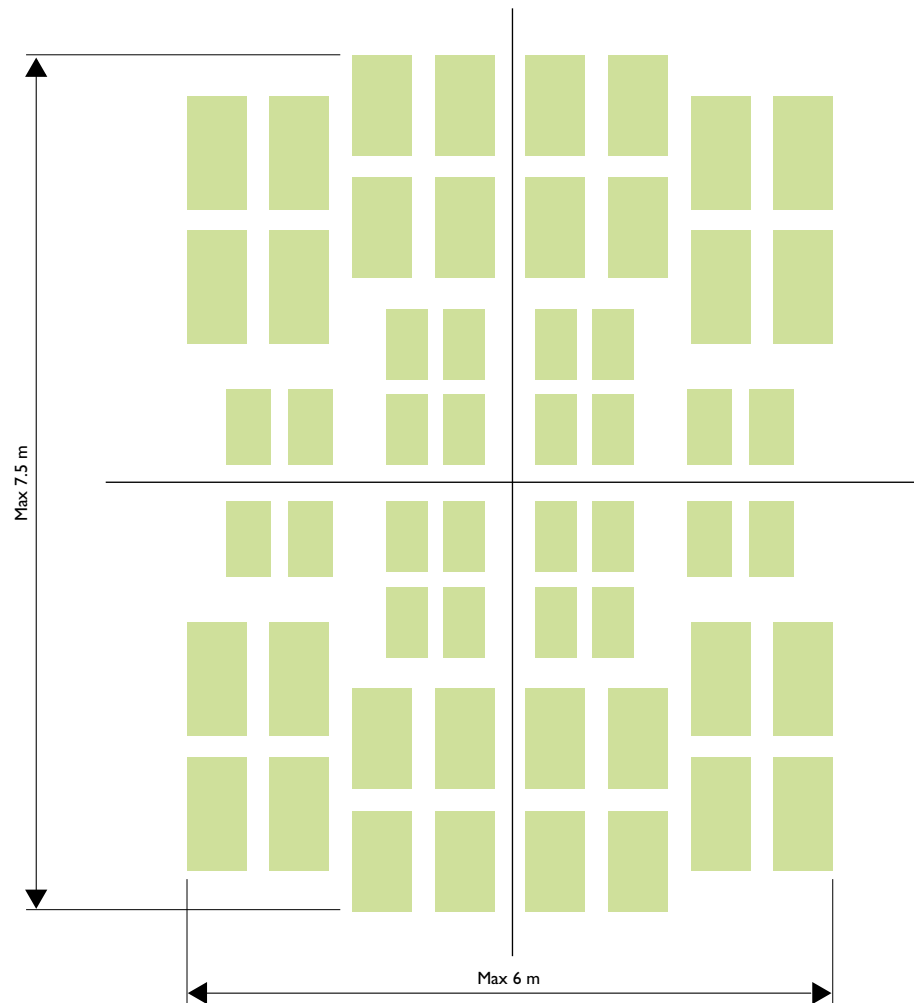


The application area of the ActiLume I-10V is typically an indoor environment (applications such as offices, corridors and open plan offices) in normally heated and ventilated areas. The ActiLume I-10V Sensor has no protection against aggressive chemicals or water (pollution degree 2). The sensor is normally mounted into a Class I luminaire and is optimized for a ceiling height of 2.5 to 3 meters. The mounting height can reach up to 3.5 meters but the sensitivity of the PIR sensor as well as the light sensor will change accordingly.

## 2.2. Movement detector



The movement sensor is a PIR (Passive Infra Red) sensor that detects occupancy with an X-Y cross-area under an angle of  $X = 81^\circ$  and  $Y = 95^\circ$ . When installed in a typical office ceiling at 2.5 meter height, it is sensitive for small movements within a 4 by 6 meter area. It will cover small movements down to a few centimeters at the task area of a desk and is sensitive to large movements within a range of 6 by 7.5 meters to detect large movements. See also figure below.



Though the sensor has a radial reach of 5 meters, the absolute maximum recommended height to place the sensor in the ceiling is 3.5 meters to assure movement coverage and detection.

The PIR sensor reacts on movement by means of a temperature difference like the human body temperature versus its surrounding temperature. A car that just starts its engine is not seen by the PIR, nor does it see people sitting within the car or a forklift truck. Therefore it is recommended not to use the ActiLume I-10V system in outdoor, parking or industrial applications.

When the ActiLume I-10V system (with or without SwitchBox) is hard-switched or if the power supply is interrupted, the ActiLume I-10V movement sensor requires a circuit stability time of 15 to 30 seconds after switching on of the mains. During this stabilizing period the luminaires are in their default setting (factory setting is ON). This is to avoid darkness in the rooms after a power interruption. This behavior is called “power-up-state”. The “power-up-state” cannot be changed.

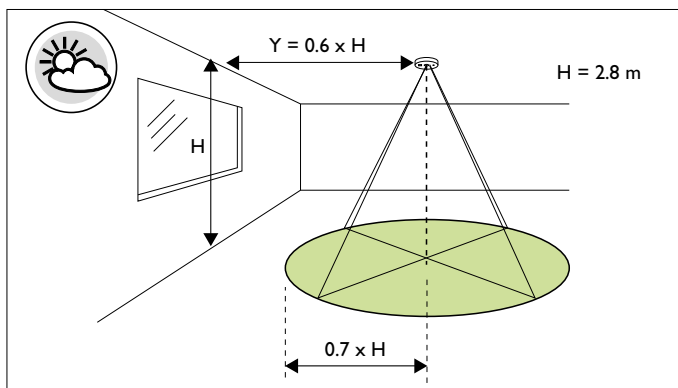
### 2.3. Light sensor



The daylight sensor is a Light Diode sensor that reads the actual average luminance in Candela per m<sup>2</sup> captured under an angle of approximately 62°. The intensity of the luminance depends on the amount of artificial and/or natural light supply in the office as well as how well this light is reflected towards the ceiling. The light reflection depends highly on the colors chosen to furnish the office and normally varies between 0.1 for pure dull black to 0.5 for a complete glossy white furnished office. In an average office the reflection factor is 0.3. The luminance signal is sent continuously to the HF-Regulator ballast or to the ActiLume I-10V SwitchBox. The ActiLume I-10V SwitchBox will pass through this signal to the HF-Regulator I-10V ballast.

The daylight sensor should be installed with a minimum distance of 1 meter from the window to prevent the sensor from looking outside. When the sensor is mounted too close to the window it will look partly outside. Sun reflection from a bonnet or a window of a car or snow can reflect directly into the sensor. The sensor will then measure such a high illumination levels that it will steer the artificial light to its minimal level or even switch off the artificial lights.

The optimum distance [Y] from the window to the ActiLume sensor can be obtained from the drawing below. This drawing shows the relationship between the distance from the window to the sensor [Y] and the height [H] ( $Y = \tan 31^\circ \times H$ ) of the sensor.



### 2.4. Delay timer knob

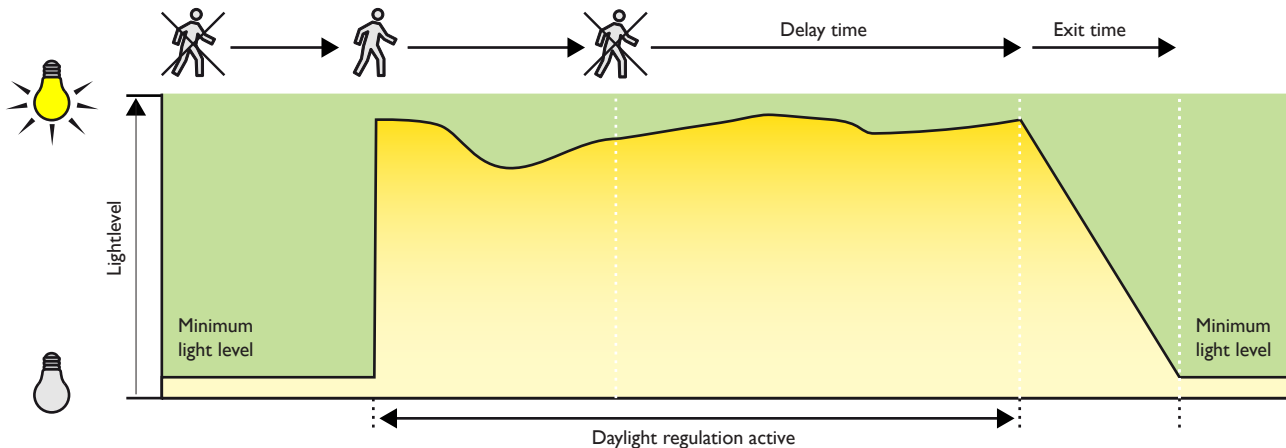


The ActiLume I-10V Sensor has the option to set the delay time between last moment of presence detection and starting the "Exit" sequence. During the Exit sequence of approximately 15 seconds, the lights will be dimmed down gradually to the minimum level which is a dimming voltage of 2.5V. The sensor cannot dim below 2.5V due to the fact that there is a micro-processor inside the sensor that will stop functioning if the dim voltage drops below 2.5V.

The delay time can be varied between 1 and 30 minutes by means of rotating the dial with a small screwdriver. Fully to the left the delay time will be approximately 1 minute and when rotated fully to the right it will be approximately 30 minutes. Default setting for the dial is 15 minutes.

If during the Exit sequence presence is detected, the lights will go back to the previous light level and the delay timer will be doubled in value. E.g. If the timer is set to 15 min and during the Exit sequence presence is detected the new delay time will be 30 minutes. This action will be taken only once. As soon as no presence is detected anymore for 30 minutes, the sensor will again start the exit sequence and when presence is detected again after the Exit time the delay timer will be set back to the timing which is set by the dial.

This sequence of doubling the delay timer is called "Intelligent timer".



## 2.5 I / II selector



On the ActiLume I-10V Sensor there is a second dial available that will give you the possibility to select setting I or II.

Setting I is the setting in which the daylight regulation is disabled so there will be only presence detection. The light output of the luminaire will be set to maximum if presence is detected.

Setting II will give you daylight regulation as well as presence detection. This means that if presence is detected the daylight regulation will be activated.

Default the setting is I.

**Note**  
dimming via T&D is still possible

## 2.6. 100 hours Burn in pushbutton



On the sensor there is a pushbutton to activate/deactivate the 100 hours burn in sequence. During the burn in time of 100 hours (when activated), there will be no possibility to dim the lights and there is no presence detection or daylight regulation. After 100 hours have passed, the feature will be switched off automatically and normal operation is activated again.

The 100 hours burn in mode can be activated by pressing the button once for 1 to 2 seconds. The system will respond by flashing the lights slowly. If the burn in mode needs to be interrupted another push on the button for 3 to 4 seconds is needed. The lights will now flash again as a confirmation that the 100 hours burn in mode is stopped. After releasing the button the lights will flash

1 flash means 100 hours burn in is activated.  
2 flashes mean 100 hours burn in is stopped.

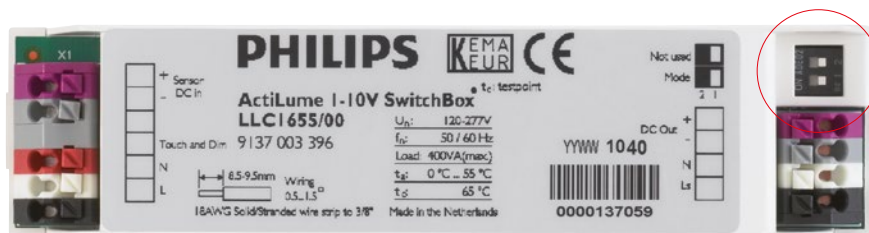
## 2.7 ActiLume I-10V SwitchBox LLC1655/00

Although the ActiLume I-10V Sensor can be used only with a Philips HF-Regulator I-10V ballast and will give substantial energy savings, it can also be used in combination with an ActiLume I-10V SwitchBox LLC1655/00 and a Philips HF-Regulator I-10V resulting in even more energy saving. By introducing the ActiLume I-10V SwitchBox, the possibilities of the system are extended. It is now possible to switch the lights automatically off when there is no presence detected or at excessive light.

The SwitchBox is capable of switching up to 3 x HF-R 254 TL5 or 2 x HF-R 280 TL5. In this way the standby power losses of a luminaire, even with more than one ballast inside, will be very low. Since the ballast(s) are disconnected from the mains there will be only standby losses of the SwitchBox. The standby losses of the SwitchBox are very low (< 350mW at 230VAC). In this way the luminaire will comply to the latest norms and standards for standby power.

When using the ActiLume Sensor and SwitchBox together, the Sensor is connected directly to the SwitchBox and the SwitchBox will take care of powering the Sensor under all conditions. Since the I-10V DC Output of the SwitchBox is a mirror of what the Sensor supplies towards the SwitchBox, the system will still be able to perform the daylight regulation.

If there is an excessive amount of daylight, the SwitchBox can switch off the luminaire at a light level of 150% or 250% of the requested light level (set by the diaphragm on the sensor). Whether the SwitchBox will switch off at 150% or 250% depends on the setting made by the dipswitch on the SwitchBox near the DC-Out connection on the SwitchBox.



Switch I on the SwitchBox will give the possibility to change the daylight-override between 150% (Mode 1 – Switch I is set to off) or 250% (Mode 2 – Switch I is set to on). Switch 2 has no function. As soon as the light level goes below 100%, the SwitchBox will switch on the ballast again.

If there is no ballast connected to the I-10V DC output the SwitchBox will detect this and will automatically set the daylight-override to 250%. As soon as the light level goes below 100%, the SwitchBox will switch on the ballast again. This feature gives the opportunity to use it in combination with fixed output ballasts as well.

### **Warning**

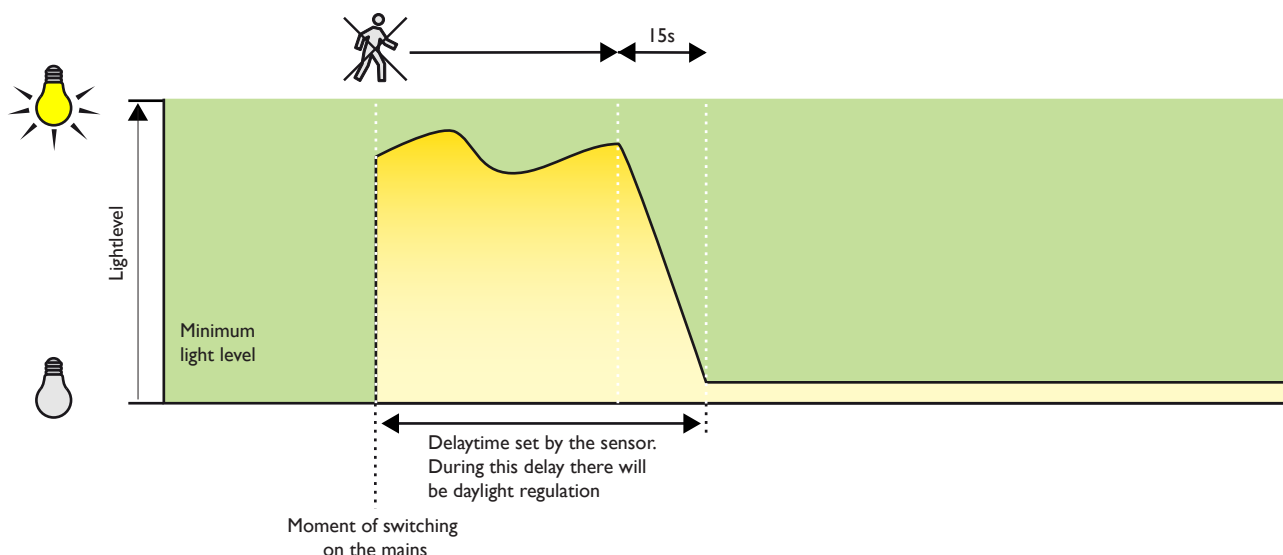
Although the switching capacity of the Switchbox is 400VA, it should be taken care that the total capacitive load on the switched mains-output of the Switchbox is kept below 66uF since higher capacitive loads will damage the relay-contacts inside the Switchbox.



## 2.8 Startup behavior at power up

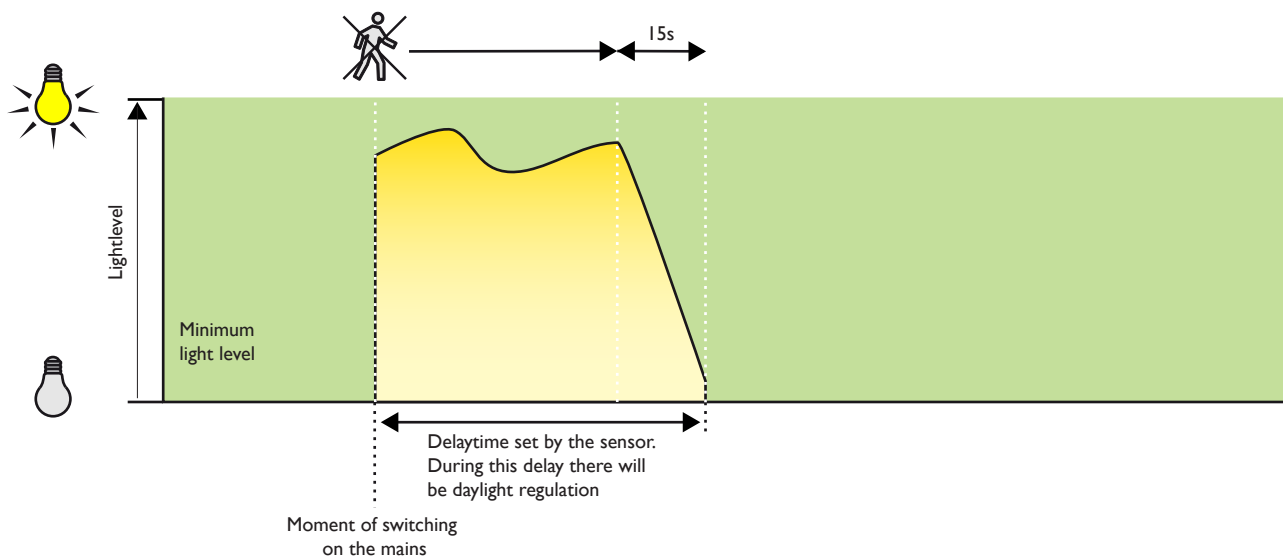
### 2.8.1 ActiLume I-10V Sensor and an HF-Regulator

If an ActiLume I-10V sensor is used in combination with a HF-Regulator ballast, at power up of the system the ballast will be controlled by means of the Daylight Control mechanism inside the ActiLume I-10V sensor. The first 15 to 30 seconds after power up the PIR will not function because it needs this time to start up. If during the time set by the timer of the sensor, there is nobody present, then after 15 min the sensor will start to dim down in about 15 seconds to the minimum level of 2.5V on the dim-input of the ballast.



### 2.8.2 ActiLume I-10V Sensor with the ActiLume I-10V SwitchBox and an HF-Regulator

If an ActiLume I-10V sensor is used in combination with an ActiLume I-10V SwitchBox and an HF-Regulator ballast, at power up of the system the ballast will be controlled by means of the Daylight Control mechanism inside the ActiLume I-10V sensor. The first 15 to 30 seconds after power up the PIR will not function because it needs this time to start up. If during the time set by the timer of the sensor, there is nobody present, then after this delay time the sensor will start to dim down in about 15 seconds to the minimum level of 2.5V on the dim-input of the ballast, and after that the ballasts will be switched off.



### 3 ActiLume I-I0V System User Modes

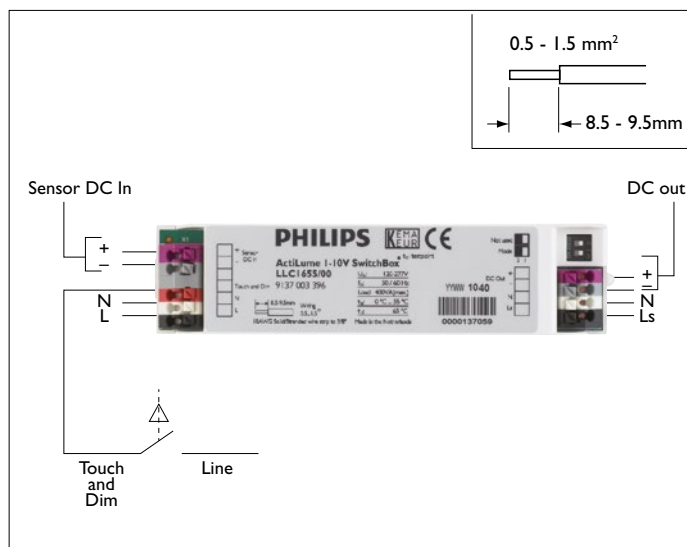
		ActiLume I-I0V SwitchBox	
		SwI off	SwI on
ActiLume	Setting I	PD	PD
I-I0V Sensor	Setting II	PD + DL + DO@I50%	PD + DL + DO@250%

DL = Daylight Linking  
PD = Presence Detection  
DO = Daylight Override

## 4 Manual control

When using the SwitchBox in combination with the sensor, there is the opportunity to have personal control over the lighting. This is especially handy when the system is used in Free Floor Standing luminaires. The personal control is realized by means of a Touch and Dim input on the SwitchBox. When using the Touch and Dim function of the SwitchBox, this will temporarily change the set point of the daylight regulation for as long as there is presence detected. In this way it is possible to increase or decrease the light level for a period of time to the wishes of the end user.

The Touch and Dim functionality works in exactly the same way as when using the Touch and Dim functionality of an HF-RTD or an HF-RT ballast.



Wiring

When the Touch and Dim switch is pressed briefly the SwitchBox will switch on the ballast if it was switched off or it will switch off the ballast if it was switched on. When pressing the Touch and Dim switch longer, the ballast will be dimmed up or down depending on the previous direction it was dimmed.

## 5 Commissioning

Commissioning is in fact nothing else than getting your lighting system into a state of operation that the system was intended to be used in. Commissioning of an ActiLume I-10V system is very easy.

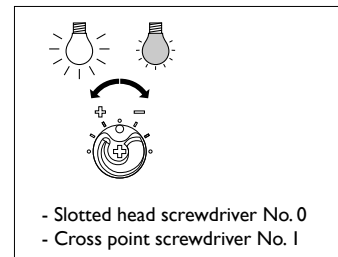
### 5.1. What equipment is needed

In order to commission an ActiLume I-10V system, the only thing that is needed is a small screwdriver. If the light level needs to be trimmed more precisely to a certain level, then a lux/light meter is also needed.

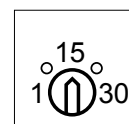
### 5.2. Calibration

Depending on how precise the light level needs to be calibrated (trimmed to a certain lux level), a lux/light meter is needed or not. From factory the diaphragm of the light sensor is put in a position that under normal circumstances the light level will be approximately 500 lux on the table with a reflection factor of 0.3 at a mounting height of about 2.5 meter.

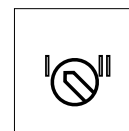
If a more precise light level is needed, the Lux/light meter needs to be placed on the workplane or other location specified. In order to change the light level, a small screwdriver is needed to rotate the diaphragm. By rotating the diaphragm clockwise the light level will decrease and by rotating the diaphragm counterclockwise the light level will increase. The adjustment is best done in small steps. After changing the setting of the diaphragm, the sensor needs a few seconds to stabilize the light output. If the light level is not yet meeting the requirement, the diaphragm can be turned further in the direction needed.



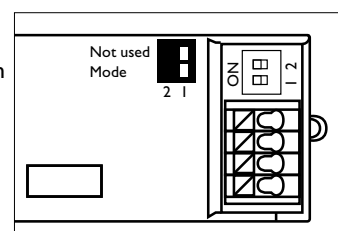
The second item that needs to be set (if needed) is the delay time. The factory setting of the delay time is 15 minutes. If the delay time needs to be longer, the dial should be turned clockwise. If a shorter delay time is needed, it needs to be turned counterclockwise. The delay time can be set between 1 minute and 30 minutes.



A third item that needs to be set (if needed) is the selector. It can be set to I or II. Setting I is daylight regulation disabled (thus only presence detection) and setting II is daylight regulation enabled (thus presence detection and daylight regulation). Default the setting is I.

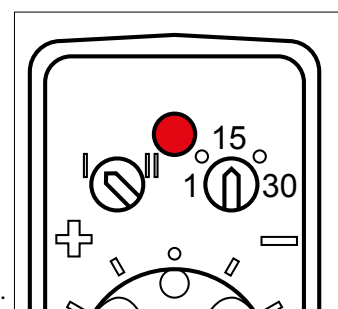


If the sensor is used in combination with an ActiLume I-10V SwitchBox, the daylight override needs to be set to the correct value. If switch 1 is set to "OFF" (to the right in this picture) the daylight override is set to 150%. If switch 1 is set to "ON" the daylight override is set to 250%. The factory setting is 150% (switch 1 to "OFF"). Switch 2 is not used and its setting has no influence on the functioning of the ActiLume I-10V SwitchBox. This switch is for possible future extension of the functionality of the ActiLume I-10V SwitchBox.



Finally, the "100 hours burn-in" feature can be started by pressing for 1 to 2 seconds the button on the sensor. The lights will blink once as a sign that the feature has been activated. During the activation of this burn-in feature there will be no dimming due to daylight regulation nor presence detection initiated by the sensor. With Touch and Dim it is still possible to switch and dim the lights.

If for whatever reason the 100 hours burn-in feature needs to be interrupted, the button must be pressed for at least 3 seconds and the lamps will blink two times after release of the button, as an acknowledgment that the burn-in feature has been stopped.



## 6 Built in requirements

In this chapter you will find some sketches of the outer dimensions of the components and how to mount these components. The ways of mounting given in this document are just some examples and other ways of mounting are possible.

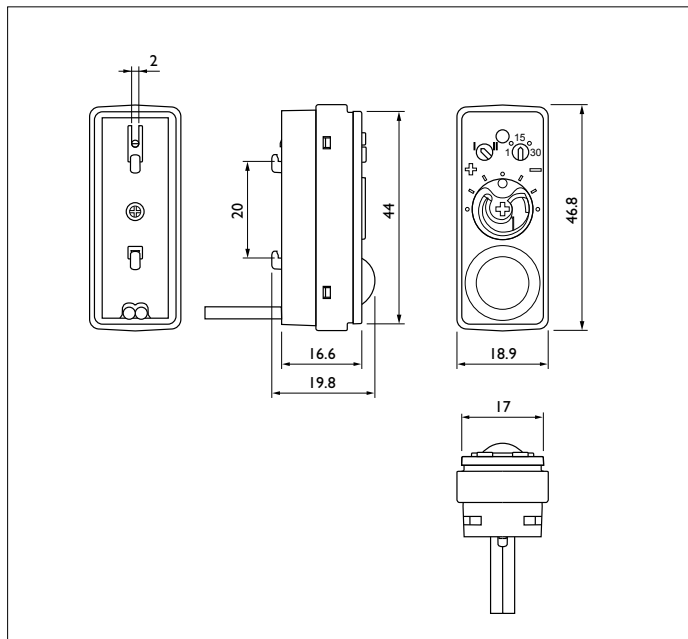
The ActiLume I-10V Sensor has flying leads of 100cm and is designed to be built into a Class I luminaire. The following chapters will explain on how the sensor can be mounted into a luminaire.

Furthermore the sensor should be installed above a surface where the light level is representative of the area to be monitored. The maximum installation height is 3.5 meter from the ceiling to the floor.

If the diaphragm is set to its default position (in the center), the output of the light sensor will be approximately 5V at 500 lux on floor if the reflection factor is 0.3 (is the average reflection factor of an average surface). While for other surface, the exact dimming curve is related to its reflection factor.

### 6.1. Dimensions ActiLume I-10V Sensor

Below you will find some sketches on the most important dimensions of the Sensor.



Dimensions LRI 1655/00 in mm

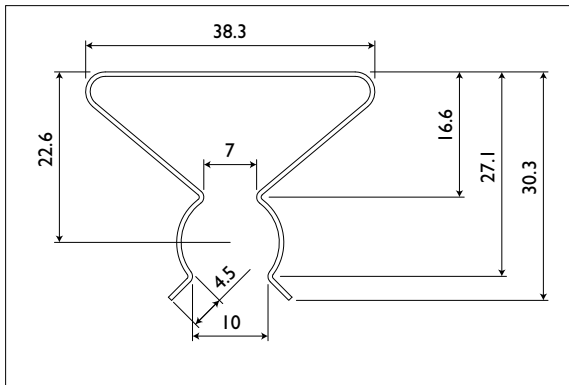
## 6.2 Mounting of the ActiLume I-10V Sensor



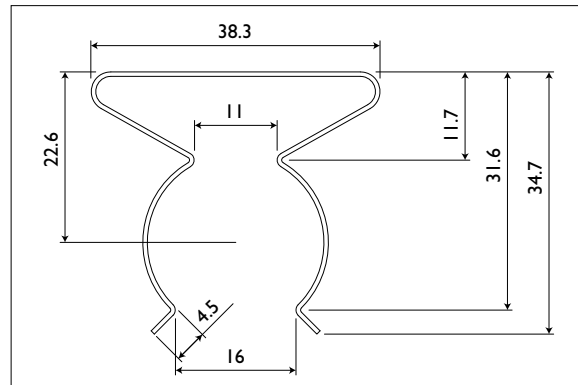
The sensor can be mounted into a luminaire in different ways. The following 3 options are the most commonly used ways of mounting the sensor.

The most simple way of mounting the sensor into the luminaire, is by using a metal clip. The clip can be mounted on the backside of the sensor and then as a composition it can be clipped onto the lamp.

There are 2 different clips available, one for TL-D (T8) lamps and one for TL5 (T5) lamps. The TL5 version is called the LCA8002/00. The TLD version of the clip is called the LCA8003/00. Both types can be ordered separately and are packed in boxes of 50 pieces. Please contact your local sales representative for more info on ordering these clips.



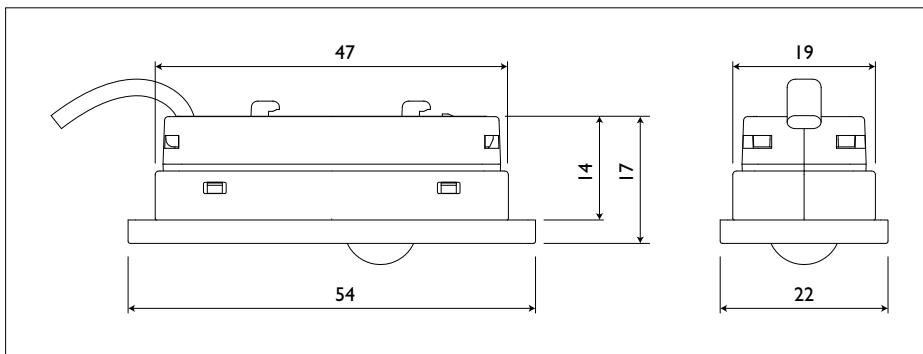
LCA8002/00



LCA8003/00

When a sensor is clipped on the lamp (or attached to optics) and the distance between sensor and lamp is less than 8cm. then the sensor should be located at the cold side of the lamp. The cold side of the lamp is the side where the wiring towards the ballast is the longest.

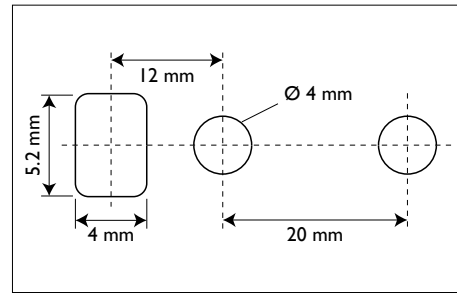
In order to increase the front size of the sensor so it will fit more nicely between the lamella, a ring is available that can be clicked onto the front side of the sensor. The ring is LCA8001/00 and can be ordered in boxes of 100 pieces. Please contact your local sales representative for more info on ordering these rings.



LCA8001/00

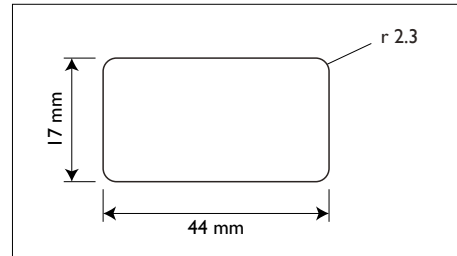
The second possibility is to use the latching rills on the back of the sensor. To use this way of mounting, 2 holes of 4 mm diameter have to be drilled that are 20 mm apart. A third hole is needed for the sensor wire go through the material. The thickness of the material can be up to maximum of 0.7 mm.

If the sensor is placed within the luminaire, a distance of at least 8 cm should be kept between sensor and sensor wiring and the “warm” side of the lamp. The warm side of the lamp is the side where the wiring from the ballast to the lamp(s) is the shortest.



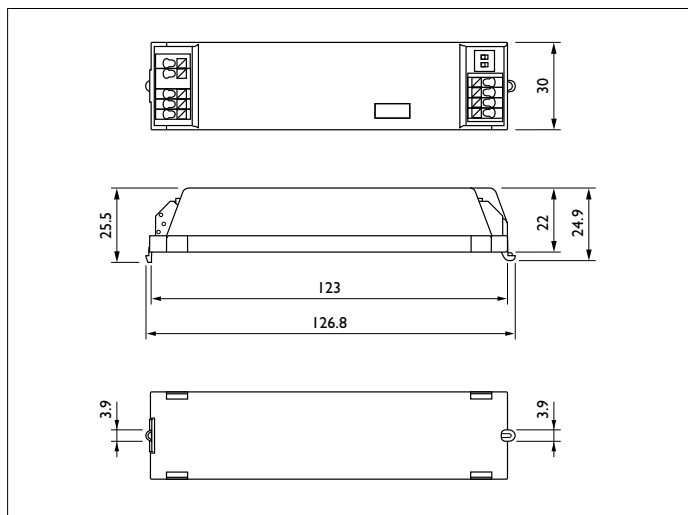
A third way of mounting is to punch a hole in the luminaire (e.g. in the infill panel) and push the sensor from the inside into the rectangular hole so only the front part of the sensor will be visible on the outside of the luminaire.

Also here, a distance of at least 8 cm should be kept between sensor and sensor wiring and the “warm” side of the lamp. The warm side of the lamp is the side where the wiring from the ballast to the lamp(s) is the shortest.



### 6.3 Dimensions ActiLume I-I0V SwitchBox

Below you will find some sketches on the most important dimensions of the SwitchBox.

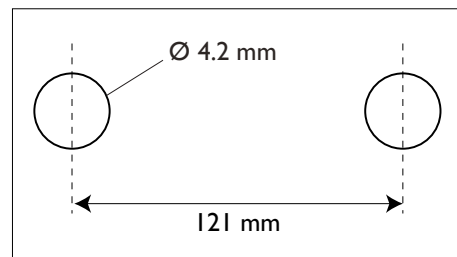


Dimensions LLC I 655/00 in mm

As you can see, the cross-section of the SwitchBox is the same as the cross-section of an HF-Regulator ballast. This makes it very easy to mount the 2 components straight after one another.

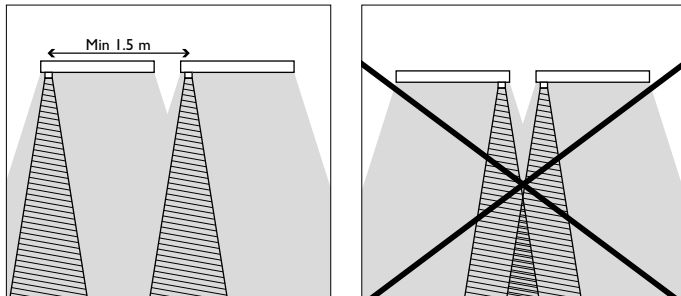
### 6.4. Mounting of the ActiLume I-I0V SwitchBox

It is easy to mount the SwitchBox. Just 2 holes are needed in the following pattern. The SwitchBox can be clicked into these holes.



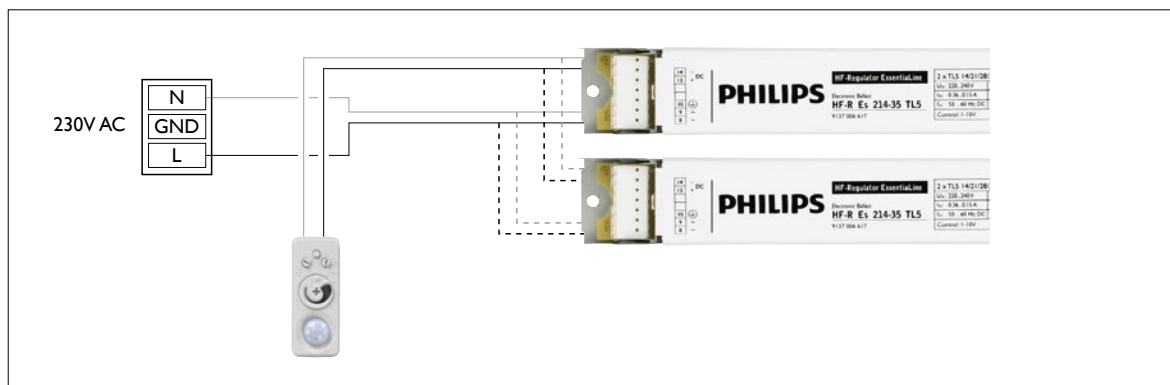
## 7 Installation

In the following few chapters you will find instructions on how to use the ActiLume I-10V Sensor and SwitchBox in different setups. If multiple luminaires are used in the same area, the distance between the different sensors should be at least 1.5 meter. This to prevent that a sensor can “see” the light variation of the other luminaire and try to act on it.



### 7.1. Wiring when the ActiLume I-10V Sensor is used with an HF-R only

The 2 flying leads of the sensor are used to connect directly to the HF Regulator I-10V. The violet wire for the positive input and the grey wire for the negative input.



*ActiLume I-10V system setup (sensor only)*

The ActiLume I-10V Sensor can handle the reverse connection to the ballast. If the connections are reversed on the dimming input of the ballast, the light output will go to the minimum level. There will be no presence detection or daylight regulation available. Furthermore, it is possible to connect up to 20 Philips HF-Regulators to one ActiLume I-10V sensor.

Hence: If the sensor is accidentally connected to the mains, it will fail immediately.

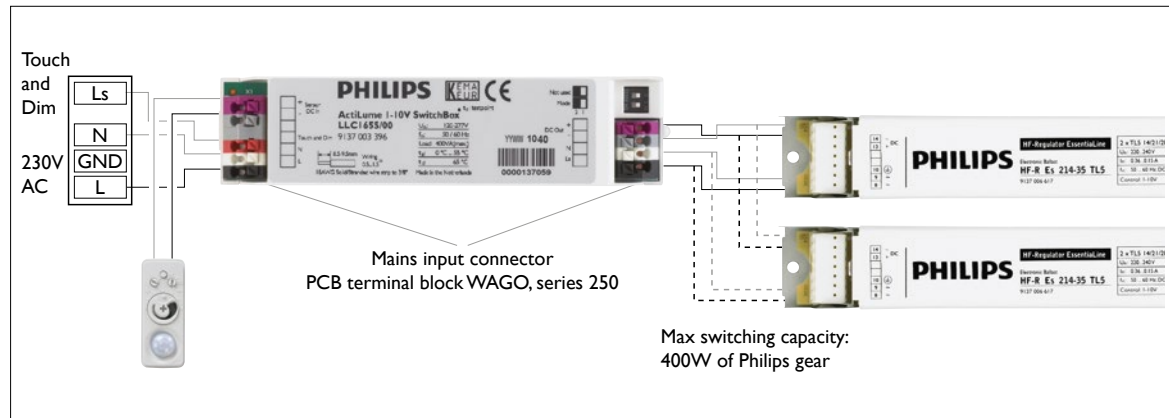
It is clear that if the I-10V line goes outside the luminaire, precautions have to be taken that the wiring used is mains rated cable since there is only basic insulation towards the mains and strain reliefs have to be used on the I-10V wiring going into/coming out of the luminaire.



## 7.2 Wiring when the ActiLume I-10V Sensor & SwitchBox is used with an HF-R

The 2 flying leads of the sensor are used to connect with the ActiLume I-10V SwitchBox, violet for positive input, while grey for negative input.

When connected to the ActiLume I-10V SwitchBox, it is recommended not to use additional long wires to connect the ActiLume I-10V Sensor to the SwitchBox. This is to avoid the communication degradation. The maximum load that can be connected to the SwitchBox is 400W of Philips gear.



ActiLume I-10V system setup (Sensor & SwitchBox)

The ActiLume I-10V Sensor and SwitchBox can handle the reverse connection to the ballast/Sensor. If the connections are reversed on the dimming input of the SwitchBox (+ on – and – on +), the light output will go to the minimum level. There will be no presence detection or daylight regulation available. If the SwitchBox I-10V input is accidentally connected to the mains, that is no problem. The I-10V input can handle mains. The I-10V output on the other hand cannot handle mains voltage, the Switchbox will fail immediately.

It is clear that if the I-10V line goes outside the luminaire, precautions have to be taken that the wiring used is mains rated cable since there is only basic insulation towards the mains and strain reliefs have to be used on the I-10V wiring going into/coming out of the luminaire.

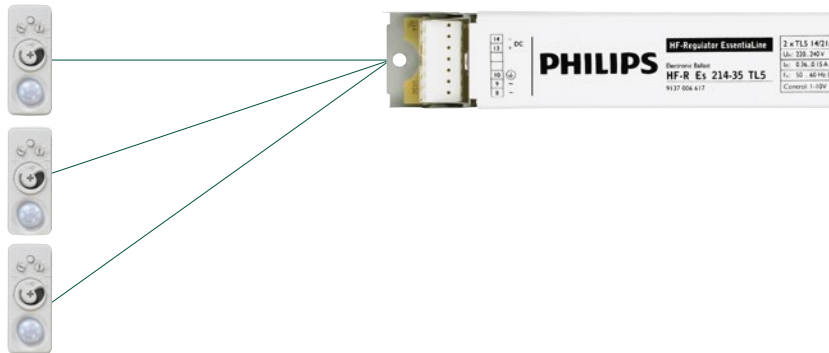
### Warning

Although the switching capacity of the Switchbox is 400VA, it should be taken care that the total capacitive load on the switched mains-output of the Switchbox is kept below 66uF since higher capacitive loads will damage the relay-contacts inside the Switchbox.

## 8 Various ActiLume I-10V sensor, ActiLume I-10V SwitchBox and HF Regulator combinations

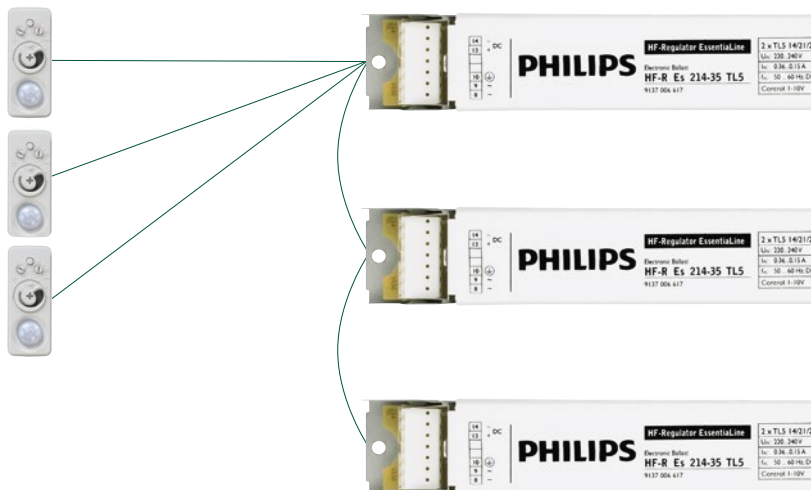
Since there are sensors, SwitchBoxes and HF-Regulator ballasts, there are several more combinations you can think of than just one sensor in combination with one ballast, or one sensor with one SwitchBox and one ballast. In the following few chapters it is worked out into more detail what combinations can be made and what the results will be of that specific combination.

### 8.1 Multiple sensors on one HF-Regulator ballast



This setup is not possible since the current supplied by one HF-Regulator is insufficient to operate 2 or more sensors.

### 8.2 Multiple sensors on multiple HF-Regulator ballast

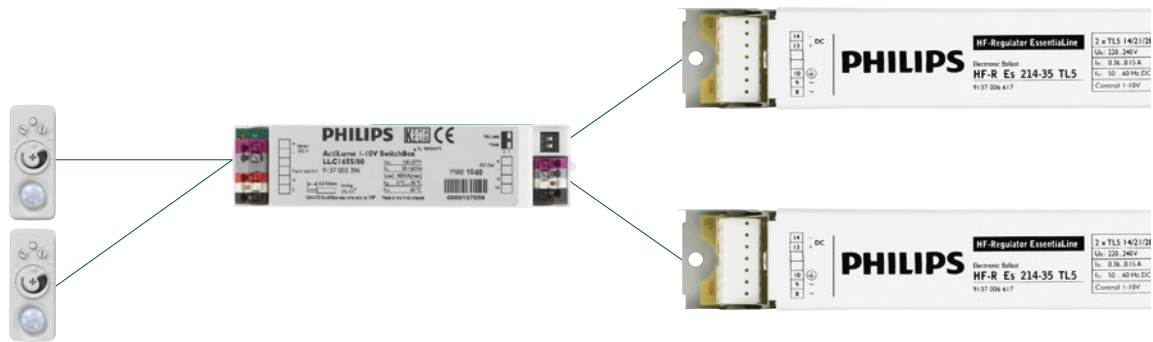


This setup is possible with some restrictions.

- 1 the number of ballasts must be equal or greater than the number of sensors
- 2 only one sensor can act as daylight sensor. All other daylight sensors have to be switched off, so put all sensors into Setting I except for one sensor who can act as the daylight regulating sensor which has to be put into setting II. If no daylight regulation is requested than put all sensors into Setting I.

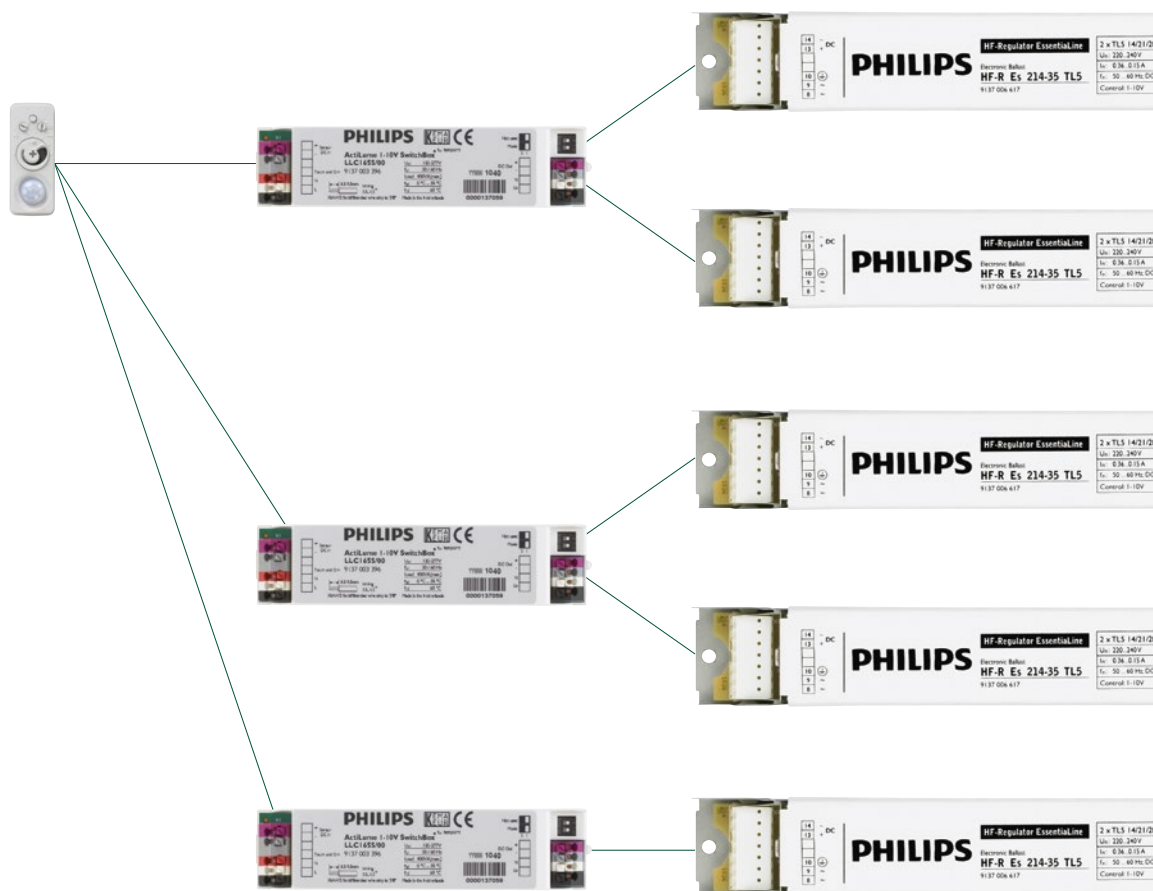
The concern in this case is that if one sensor will detect no presence during the delay time set by the delay-timer, all ballasts will be forced into a dim-level related to 2.5V on the dim-input.

### 8.3 Multiple sensors on one SwitchBox with one or more HF-Regulator ballasts



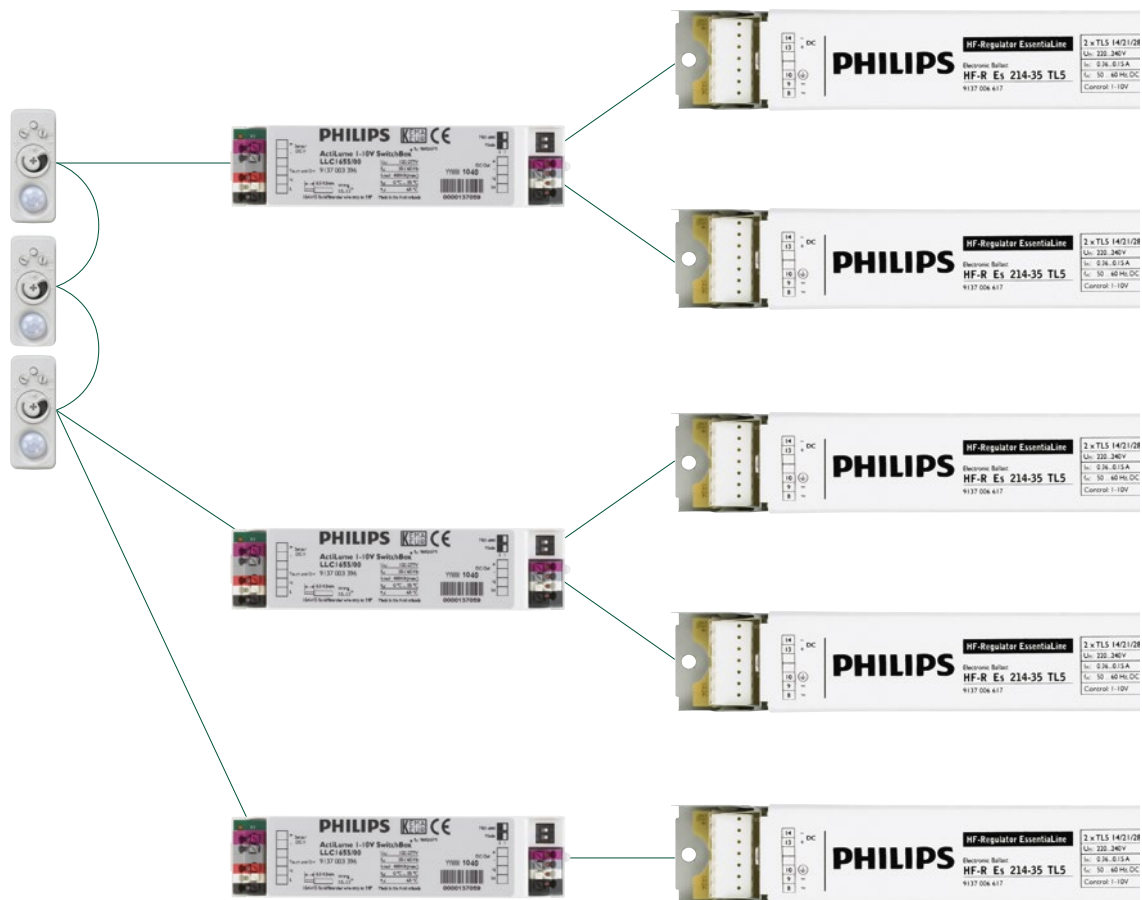
In this case the number of ballasts behind the ActiLume I-10V SwitchBox is as before. The SwitchBox is capable of switching up to 3 x HF-R 254 TL5 or 2 x HF-R 280 TL5 ballasts. The number of sensors that can be connected to one SwitchBox is 2. The SwitchBox is not able to support more than 2 sensors of the needed power. In this case one of the 2 sensors must have a deactivated daylight sensor (Select I on the sensor). Furthermore, the concern in this case is that if one sensor will detect no presence during the delay time set by the delay-timer, all ballasts will be forced into a dim-level related to 2.5V on the dim-input and will finally switch off because the SwitchBox is told to do so by this sensor.

### 8.4 One sensor on multiple SwitchBoxes with one or more HF-Regulator ballasts



One sensor can be connected to up to 10 Switchboxes and each SwitchBox can be connected to up to 3 x HF-R 254 TL5 or 2 x HF-R 280 TL5 ballasts. In this case the coverage of the PIR sensor will most probably be in no relation to the area covered by the luminaires, but electrically the system will work.

### 8.5 Multiple sensor on multiple SwitchBoxes with one or more HF-Regulator ballasts



This setup is possible with some restrictions.

- 1 the number of sensors is maximum two times the number of SwitchBoxes  
2 only one sensor can act as daylight sensor. All other daylight sensors have to be switched off, so put all sensors into Setting I except for one sensor that can act as the daylight regulating sensor and has therefore to be put into setting II. If no daylight regulation is requested than put all sensors into Setting I.

The concern in this case is that if one sensor will detect no presence during the delay time set by the delay-timer, all SwitchBoxes will be forced into a dim-level related to 2.5V on the dim-input and will be switched off at the end of the dimming down sequence.



### Product details

The ActiLume I-10V luminaire-based sensor enables daylight regulation and dimming when no presence is detected. The delay time can be customized between 1 and 30 minutes.

The ActiLume I-10V system consists of a sensor and a SwitchBox. The sensor can work independently of the SwitchBox.

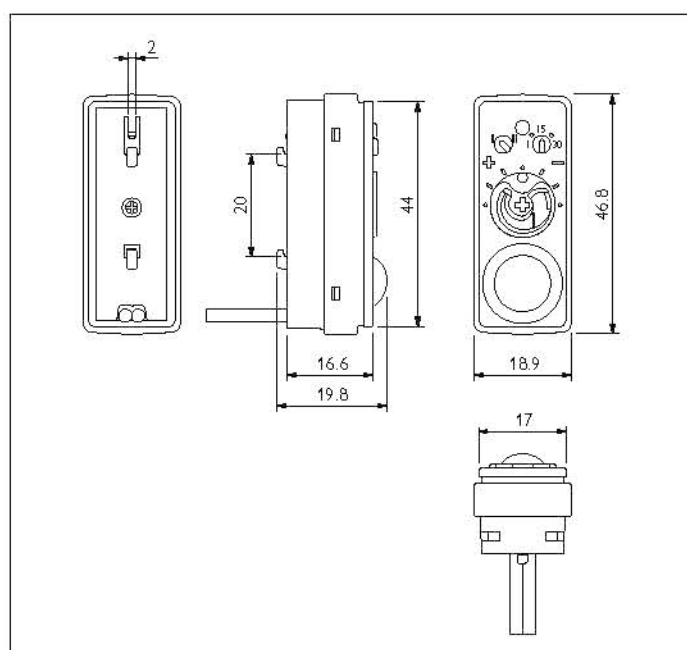
In combination with the SwitchBox, the luminaire will be switched off when enough daylight is present and/or when no presence is detected.

### Features

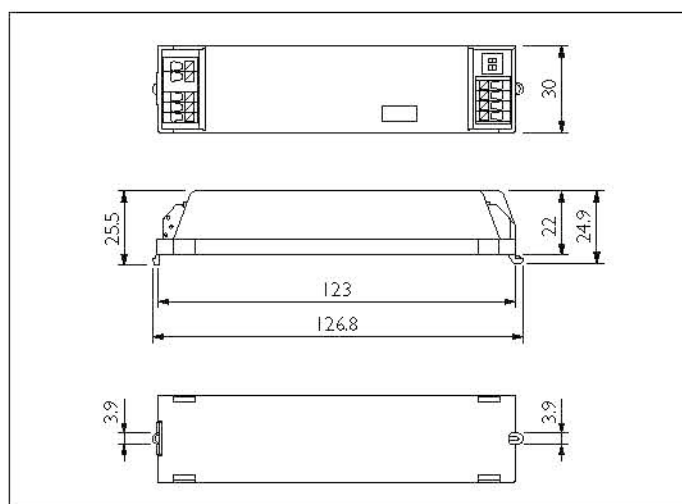
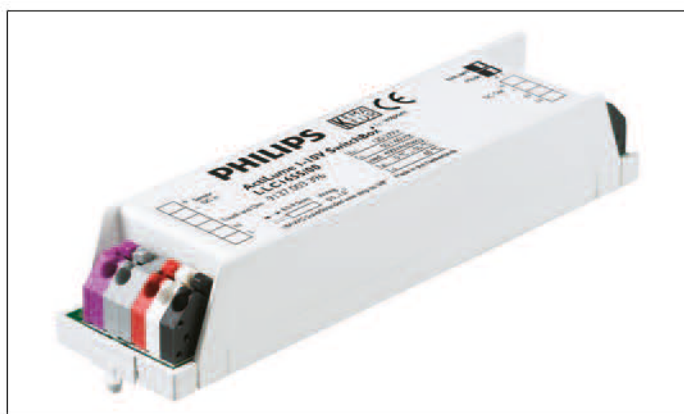
- If needed, ActiLume I-10V can be adjusted manually, using a rotating diaphragm to adjust the set point. The sensitivity of the sensor can be changed within a range from 1/3 to 3.
- Push-button to activate 100 hours burn-in mode for the lamps.
- With the rotary control it is possible to deactivate daylight sensing (setting 1 = default)
- With the rotary control it is possible to select a delay time between 1 and 30 minutes (default is 15 min).
- In combination with the SwitchBox, up to 3 HFR 254 TL5 ballasts can be switched, resulting in extremely low stand-by losses (< 350 mW).
- Personal control via the Touch and Dim functionality on the SwitchBox.

### Application areas

- Free Floor standing luminaires, Pending luminaires, single luminaire solutions
- Toilets
- Corridors
- Staircases
- Storage locations



Dimensions LRI1655 in mm



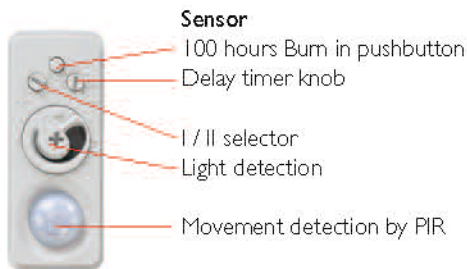
Dimensions LLC1655 in mm



# PHILIPS



## Specifications



### Daylight sensing (DS):

When there is more than enough light; the light will dim. The dimming will be in line with LuxSense and ActiLume MicroLuxSense functionality. Tweaking of the light level is done by rotating the diaphragm (same as ActiLume MicroLuxSense). The minimum dim level corresponds to 2.5V on the dim input of the ballast.

### Presence detection (PD)

When no presence is detected the luminaire will be dimmed down to a dim level corresponding to 2.5V on the dim input of the ballast used.

### 2 selectors above the light sensor

- Adjustments dial to set the delay time between 1 and 30 minutes.
- On the sensor there is an adjustment dial to choose between:
  - Setting I = Presence detection only (default factory setting)
  - Setting II = Presence detection and Daylight Sensing

### Top middle selector: Burn-in button

On the sensor there is a button to activate a burn-in mode. This burn-in mode is to switch on/off the functionality of daylight and presence detection for 100 hours to ensure a proper burn-in of the fluorescent lamp. After 100hrs of burning in the system will automatically switch to the normal operating mode. The activation/ deactivation of the burn-in mode is confirmed by blinking of the lamps.

- When the burn in button is pressed for >1 second but < 3 seconds, the system is in a burn-in mode. The confirmation comes with one blink.
- When pressed > 3 seconds but < 5 seconds, the burn-in will be deactivated. The confirmation comes with two blinks.

### Smart Timer function

The sensor will automatically lengthen the delay time when the sensor detects presence directly after the moment it has given the signal "no presence" (will double the delay time once), this to reduce the annoyance of false "no presence" triggers.

### Application limitations

Detection of sensor designed for ceiling heights < 3.5m

### Multiple Luminaires on one sensor

- It is possible to connect up to 20 ballast to one sensor; but than a connection between the different luminaires has to be made. With respect to these connections the following has to be realized:
  - cost of making the connection possible
  - additional cost of mains rated cabling
  - installation time and the chance of mistakes (polarity sensitive)

Recommendation: use one sensor in one Luminaire



## SwitchBox

The Sensor will give a signal over the I-10V connection when the SwitchBox can switch off the ballast.

When the ballast is switched off, the Sensor will be fed by the SwitchBox to ensure that daylight and presence detection still works. On the SwitchBox there is a dip switch to set the moment when the ballast will be switched off.

- Mode 1 is at 150% of light (when used with HF-R ballasts) (default factory setting)
- Mode 2 is at 250% of light (at excessive daylight or when used in combination with HF-P ballasts).

### Personal Control

On the SwitchBox there is "Touch and Dim" input according to Philips standard.

When "Touch and Dim" is used to override the automatic function, the setting will be forgotten when the SwitchBox has switched off the ballast due to no presence.

### No HF-Regulator but HF-Performer installed

When the I-10V lines from the SwitchBox are not connected to the ballast, the switchbox will conclude an HF-Performer is connected and will only listen to the 250% signal this to ensure that no oscillation will take place.

In standby the power consumption is less than 350 mW. In standby mode SwitchBox feeds the ActiLume I-10V Sensor.

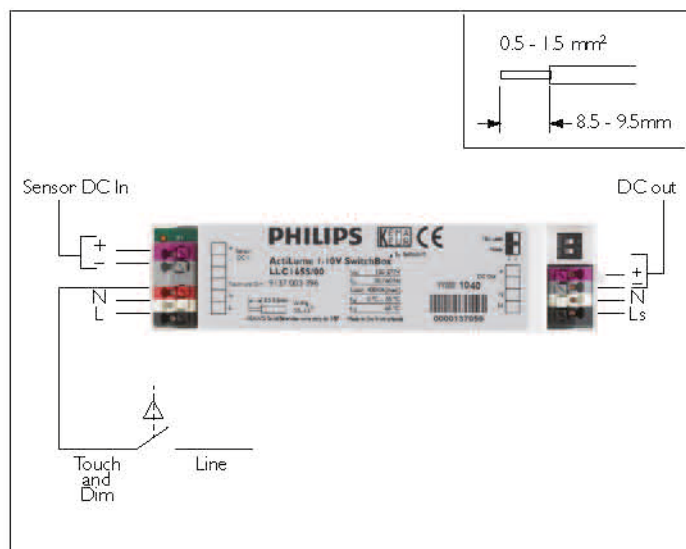
The SwitchBox is suitable for 120 to 277V mains 50/60Hz

The SwitchBox is a simple relay that detects 0-crossing and switches on during next pass. The switch box can switch multiple ballasts:

- 3 ballast HF-R 258 TL-D E11 or
- 2 ballast HF-R 280 TL5 E11 (capacitive load depending)

However, the capacitive load should be kept below 66µF since higher capacitive loads will damage the relay-contacts inside the switchbox.

Connectors: Wago 250. Color connectors in line with UL requirements. (UL pending)



Wiring

## Installation

There are three ways to mount the sensor:

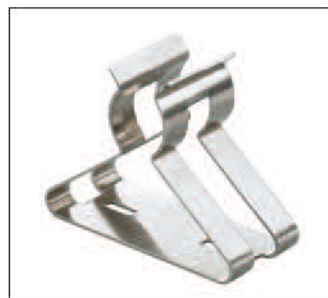
- clip onto the lamp
- attach onto the optics
- insert in the luminaire housing

In the first two cases the distance between the sensor and lamp is usually <8cm. In this case the sensor should be mounted at the electrically "cold" side of the lamp (wired by the long leads of the ballast). In the third situation the sensor can be mounted at the electrically "hot" side (the short leads of the ballast) of the lamp as long as the distance between the sensor and "hot" lamp side is >8cm.

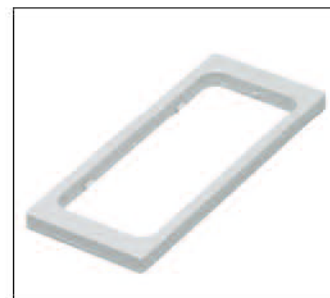
## Accessories

For easy mounting of a sensor to a lamp a clip is created which can be used for all sensors of the ActiLume family. There is a separate clip for TL-D and one for TL5.

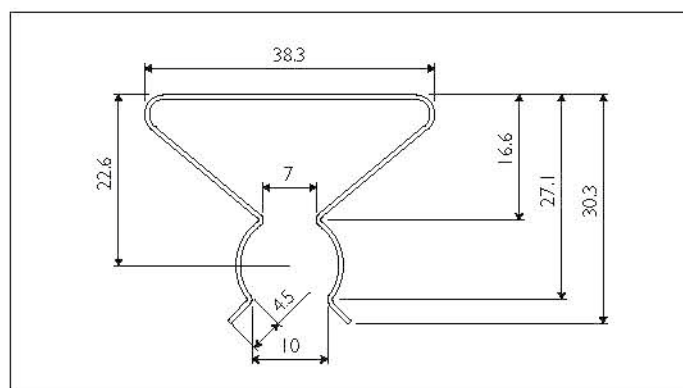
The Ring (LCA8001) can be used to increase the size of the sensor when the sensor is placed between the lamella of the luminaire.



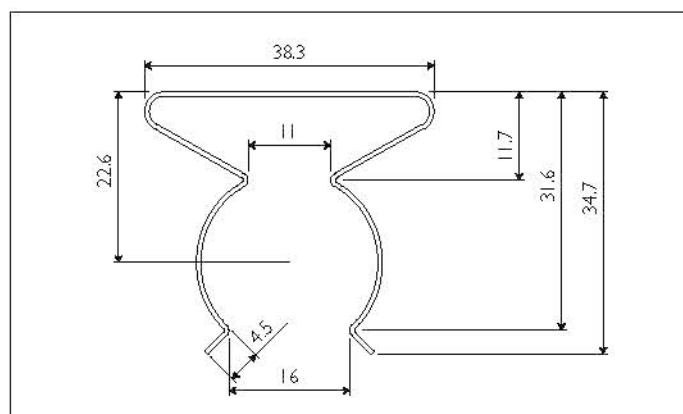
Clip



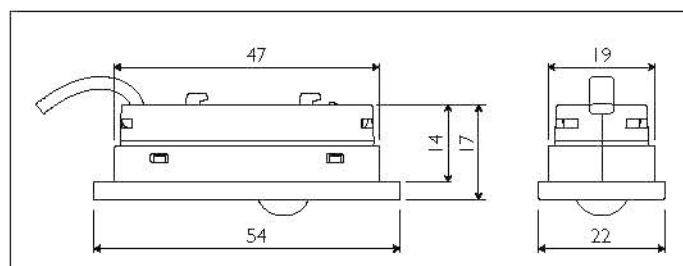
Ring



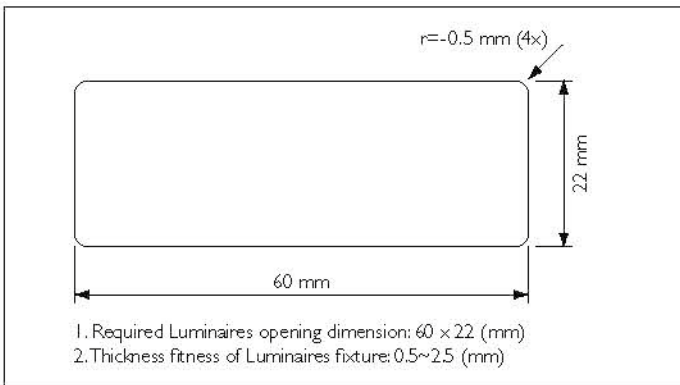
LCA8002 Dimensions in mm



LCA8003 Dimensions in mm



LCA8001 Dimensions in mm



LCA8005

### Manual adjustment

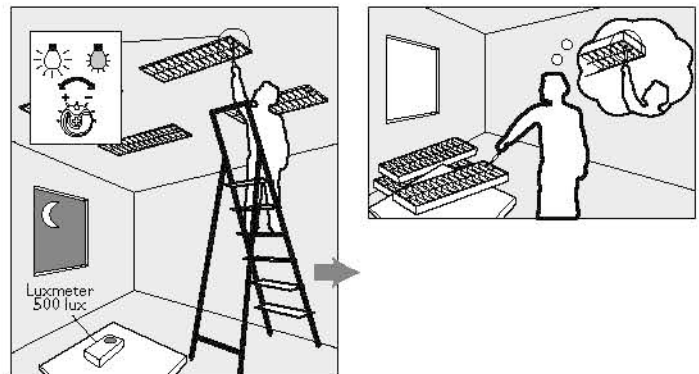
The set point of the sensor can be changed manually by using a screwdriver to turn the diaphragm on the front of the sensor. The housing is equipped with an indication of the default setting.

**Note** This manual adjust facility should preferably only be used in the commissioning phase and not by the user of the room.

### Commissioning

Under normal circumstances the factory setting is such that in office environments, no adjustments with the rotary control are required.

However, if commissioning is needed; the following steps can be executed:



- Find a room in the building that can be considered to be representative for the whole building.
- Install the luminaires with daylight control in this room and convince yourself that the installed light level and the required light level are reasonably close to each other (within 30% range, say 600 lux and 500 lux respectively). Light levels should be measured on the table, preferably without daylight contribution (e.g. at night).
- Manually adjust the rotary control such that the required light level is realized. Memorize the position of the diaphragm.
- Instruct installer to copy the position of the rotary control ring of every luminaire to be installed in comparable circumstances.

A separate document is available that describes the commissioning process in detail.



## Technical data

### Environmental conditions

#### ActiLume I-10V Sensor LR11655

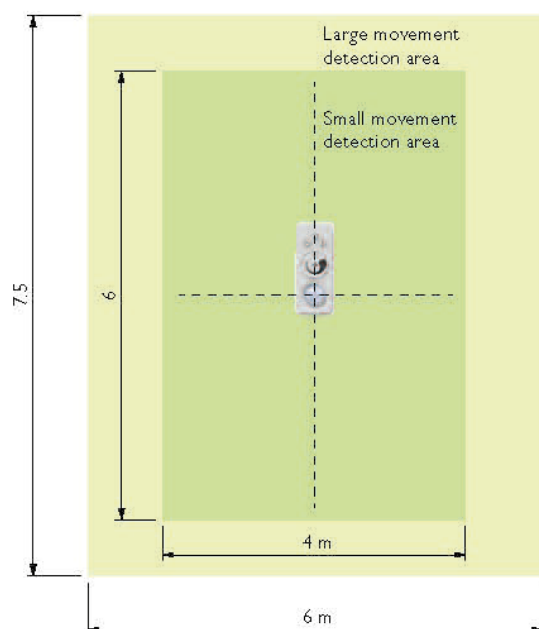
Operation conditions	
Ambient temperature	5°C to 55°C
Rel. humidity	5% to 90%, no condensation
Max. allowed temperature	55°C Anywhere on the sensor housing
Storage conditions	
Ambient temperature	-25°C to 70°C
Rel. humidity	5% to 95% at 25°C
Safety	When connected to the control input of a Philips HFR ballast, the outside of the sensor has double isolation to mains connected parts.
Connection	2x1 mm <sup>2</sup> , flying leads (PVC free), length 1 meter.
Color coding of cable	pink +, gray -, When connected wrongly to the ballast dim input, the ballast input is short circuited, resulting in minimum light output.
Housing material	Polycarbonate UL94 V-0
Glow wire test	850°C/30sec
Color bottom part	Ultra Dark Gray (similar to RAL 7024)
Color cover part	Light Gray (similar to RAL 7035) White (similar to RAL 9016) Ultra Dark Gray (similar to RAL 7024)
Weight/dimensions	Approx. 25 grams/47x19x19 mm
EMC According to	EN55015 Ed. 7.1
Control signal input	
- operating voltage	+2.5 - +10V <sub>DC</sub>
- operating current	sink 100µA-3mA (sufficient for 20 Philips HFR ballasts)
- control voltage variation	< 0,7V over current and temp. range
- default setting	5V <sub>DC</sub> at 37.5 lux/140µA (factory calibration tool)
- step response	within 2 sec. on 5V after power-up in case of insufficient ambient light
- max. input voltage	15 V <sub>DC</sub> (maximum rating)
- max. current sink	50 mA (maximum rating)
Optical characteristics	- It is assumed that the reflection in a room is such that a light level of 500 lux on a table (0.8 m in height) will result in 25 lux seen by the controller at ceiling height (2.5 m) under a viewing angle of 45° - The opening angle can be adapted by the diaphragm control, realizing an attenuation factor between 1/3 and 3.

#### ActiLume I-10V SwitchBox LLC1655

Operation conditions	
Ambient temperature	0°C to 55°C
Rel. humidity	5% to 90%, no condensation
Max. allowed temperature	65°C at Tc testpoint
Storage conditions	
Ambient temperature	-25°C to 70°C
Rel. humidity	5% to 95% at 25°C
Connections	Wago 250 connectors
Color coding of connectors	Inputs pink = I-10V + gray = I-10V - red = Touch and Dim white = mains Neutral black = mains Line
Outputs	pink = I-10V + gray = I-10V - white = mains Neutral black = mains Line
Housing material	Polyphenylene Oxide (PPOX), Noryl PX9406 by Sabic, UL94 V-0
Glow wire test	850°C/30sec
Color housing	White (WH8581)
Weight/dimensions	Approx. 51 grams/22x31x123 mm
Control signal input	
- I-10V input current	Sourcing 120 µA
- max. input voltage	Protected against accidental mains voltage connection
Control signal output	
- I-10V output voltage	+2.5 - +10V <sub>DC</sub>
- I-10V output current	sinking 20 mA (maximum rating)
Max. switching capacity	400VA (max. capacitive load 66µF)
Input voltage range	
- Nominal range	120 to 277V
- Performance range(-8% / +6%)	110 to 294V
- Safety range (-10% / +10%)	108 to 305V
Input mains frequency range	
- Nominal range	50 to 60Hz
- Performance range(-8% / +6%)	46 to 64Hz
- Safety range (-10% / +10%)	45 to 66Hz
Approvals/markings	CE KEMA KEUR

### Detection area of the movement detector

If the sensor is mounted at a ceiling height of 2.5m the detection area of the PIR is as follows:



### Packing data

Type	Box dimensions (cm)	Qty	Material	Weight (Kg)	
				net	gross
LRI1655/00	20x17.5x11	12	Cardboard	0.3	0.504
LRI1655/05	20x17.5x11	12	Cardboard	0.3	0.504
LRI1655/06	20x17.5x11	12	Cardboard	0.3	0.504
LLC1655/00	19x13.6x7.5	12	Cardboard	0.612	0.732
LCA8001/00	21.6x9.3x7	100	Cardboard	0.15	0.221
LCA8002/00	21.6x9.3x7	50	Cardboard	0.429	0.5
LCA8003/00	21.6x9.3x7	50	Cardboard	0.429	0.5
LCA8005/00	22x9.7x7.1	50	Cardboard	0.780	0.810
LCA8005/05	22x9.7x7.1	50	Cardboard	0.780	0.810

### Ordering Data

Type	MOQ	Ordering number	EAN code level 1	EAN code level 3	EOC
LRI1655/00 ActiLume I-10V sensor 100cm	12	9137 003 39503	8727900 942989	8727900 942996	942989 00
LRI1655/05 ActiLume I-10V sensor 100cm VV	12	9137 003 54903	8718291 752219	8718291 752226	752219 00
LRI1655/06 ActiLume I-10V sensor 100cm D	12	9137 003 59903	8718291 740971	8718291 740988	740971 00
LLC1655/00 ActiLume I-10V SwitchBox	12	9137 003 39603	8727900 953107	8727900 953114	953107 00
LCA8001/00 Ring for cover set of 100pce	1	9137 003 38303	8727900 882780	8727900 882797	882780 00
LCA8002/00 ActiLume Clip TL5 set 50pce	1	9137 003 40803	8727900 952940	8727900 952957	952940 00
LCA8003/00 ActiLume Clip TL-D set 50pce	1	9137 003 40903	8727900 952988	8727900 952995	952988 00
LCA8005/00 ActiLume Mounting Clip 50pce	1	9137 003 48803	8718291 196242	8718291 196259	196242 00
LCA8005/05 ActiLume Mounting Clip 50pce VV	1	9137 003 55103	8718291 719632	8718291 719649	719632 00

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3222 636 35114, 22 September 2016



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## 10 Load connection table for the LLC1655/00

Below you will find a table with the number of Philips HF-Regulator ballasts that can be connected to the switched mains output of one LLC1655/00 ActiLume I-10V SwitchBox.

Type of ballast	# of ballasts
HF-R 1 14-35 TL5 EII	7
HF-R 1 26-42 PL-T/C	7
HF-R 118 PL-T/C	7
HF-R 118 TLD EII	7
HF-R 124 TL5/PL-L EII	7
HF-R 136 PL-L EII	7
HF-R 136 TLD EII	7
HF-R 139 TL5 EII	7
HF-R 140 PL-L EII	7
HF-R 149 TL5 EII	7
HF-R 154 TL5 EII	7
HF-R 155 PL-L EII	7
HF-R 158 TLD EII	7
HF-R 180 TL5/PL-L EII	3
HF-R 2 14-35 TL5 EII	3
HF-R 2 26-42 PL-T/C	3
HF-R 2 95-120 TL5 EII	2
HF-R 218 PL-T/C	7
HF-R 218 TLD EII	3
HF-R 224 TL5/PL-L EII	7
HF-R 236 PL-L EII	3
HF-R 236 TLD EII	3
HF-R 239 TL5 EII	3
HF-R 240 PL-L EII	3
HF-R 249 TL5 EII	3
HF-R 254 TL5 EII	3
HF-R 255 PL-L EII	3
HF-R 258 TLD EII	3
HF-R 280 TL5/PL-L EII	2
HF-R 314 TL5 EII	7
HF-R 318 TLD EII	7
HF-R 324 TL5/PL-L EII	3
HF-R 414 TL5 EII	7
HF-R 418 TLD EII	3
HF-R 424 TL5/PL-L EII	3
HF-R Es 1 14-35 TL5	3
HF-R Es 2 14-35 TL5	3
HF-R Es 149 TL5	3
HF-R Es 249 TL5	3
HF-R Es 154 TL5	3
HF-R Es 254 TL5	3

*# of ballasts that can be connected to one LLC1655/00 ActiLume I-10V SwitchBox*



### Warning

When other light gears are used, take care that the total capacitive load on the switched mains-output of the Switchbox is kept below 66uF since higher capacitive loads will damage the relay-contacts inside the Switchbox.

