

**PHILIPS**

LLC1663, LRI1663

ActiLume DALI gen2 system



## System Guide

# LLC1663, LRI1663

## ActiLume DALI gen2 system

The Philips ActiLume DALI gen2 lighting control system consists out of a controller and lightweight multi-sensor, designed for easy integration into luminaires.

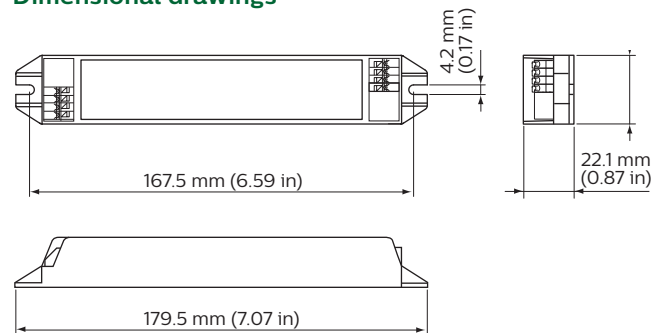


# LLC1663, LRI1663, ActiLume DALI gen2 system

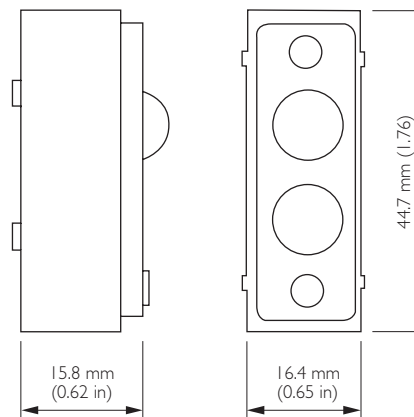
ActiLume DALI gen2 is a Plug and Play solution for offices, corridors etc. where as much as 25 drivers, divided over 4 groups (named Window, Corridor, Middle/Decorative and Blackboard), can be controlled. In addition to this ActiLume DALI gen2 systems can be connected in the so called "parallel linking" configuration, whereby occupancy information is shared, creating a network. Furthermore it can be configured to function within a BMS (Building Management System) network. The system is easy to install and use, not only initially, but also when expansion is required. An application guide is available to help specify and apply the system in an optimal way.

- Philips ActiLume DALI gen2 is a DALI based lighting control system designed for maximum comfort and energy savings up to 75%.
- ActiLume DALI gen2 is a Plug and Play system; no specific lighting control training is needed. Moreover, the system is supported with simple, dedicated application and installation sheets.
- The ActiLume DALI gen2 system consists of three state of the art miniature sensors (combined into the LRI1663) in combination with a controller containing a series of pre-programmed modes. In total 16 modes of operation (11 predefined and 5 free to program) can be selected/configured with the optionally available IRT9090 tool.
- The two most applied modes, cell and open plan office, can be selected via a short push on the service button of the LRI1663.
- The light sensor is sensitive for visible radiation, matching the human eye, providing automatic savings with daylight depending regulation, without any visible discomfort for the user.
- The movement detector is very sensitive to human movements and contains a 15 minutes (default value) delay timer to provide optimal functionality whilst maximizing energy saving during absence.
- Personal control solutions can be created by connecting a mains rated spring-back switch to the controller, a Push Button Unit (PBU) or by using an infrared remote control unit.
- The ActiLume DALI gen2 controller has two DALI outputs. These outputs are pre-programmed (factory setting) as DALI output and parallel linking output.
- The system can be extended with a maximum of 2 optionally available movement detectors, LRM8118 and/or LRM8119 to maximize movement coverage. This will reduce the number of drivers per controller by 1 for each connected extension sensor.
- Factory light level setting is at 600 lux at a reflection factor of 0.3.

## Dimensional drawings



Controller LLC1663 dimensions



Multi-Sensor LRI1663 dimensions

## Philips quality

This ensures quality with respect to:

- System supplier
- As manufacturer of lamps, electronic control gear and lighting control equipment, Philips ensures that, from the earliest development stage, optimum performance is maintained
- International standards
- Philips lighting control equipment complies with all relevant international rules and regulations.

# Application

The ActiLume DALI gen2 system is designed for professional indoor applications, from open plan to cell offices, lobbies or toilets, and from corridor to small meeting rooms. It offers dedicated modes, e.g. for schools and direct/indirect lighting concepts.

## Plug and Play control regimes

- Mode 1: Cell office, offering daylight regulation and switching lights off when no presence is detected.
- Mode 2: Open plan office, offering daylight regulation and switching lights off when no presence is detected with extended timings. Maintaining a background lightlevel in unoccupied areas when another area is occupied and occupancy is shared through parallel linking.
- Next to the modes the following functions can be changed independently:
  - Power up behavior
  - Default lightlevel
  - Background level
- Mode switching, between mode 1 and 2, can be achieved with the service button on the Multi-Sensor LRI1663.
- When one connected driver fails and is replaced by a new one no re-commissioning is needed as the controller will program the new driver with the setting of the driver that has failed. This is the so called driver recovery feature.

## Commissioning and everyday use tools

The ActiLume DALI gen2 system can, once it is installed and has been commissioned, work stand alone.

For commissioning an extensive infrared user interface (remote control) is available and for everyday use additional infrared user interfaces:

- IRT9090 extensive IR programming tool
- IRT8030 extensive user tool
- IRT8050 simple user tool

To override the automatic behavior without having to use one of the user remotes the ActiLume DALI gen2 system can also be controlled by a maximum of two Push Button Units LCU2070 and/or LCU2071. Each PBU will decrease the amount of connectable drivers by 1.

# LRI1663

## Detection patterns of the sensors

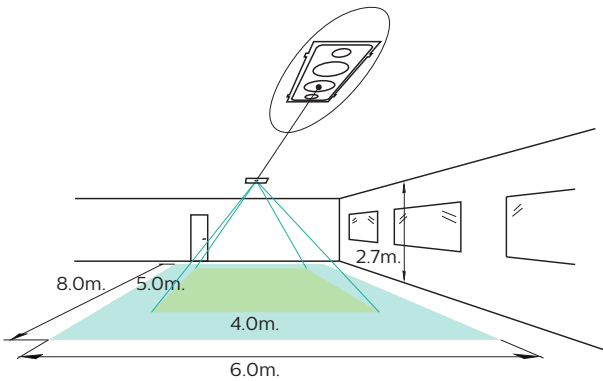


### Movement sensor

The detection area for the movement sensor can be roughly divided into two parts:

- 4.0 by 5.0m. for minor movements (at a desk)
- 6.0 by 8.0m. for major movements (walking)

Mentioned values are applicable when the sensor is mounted at a height of 2.7m.

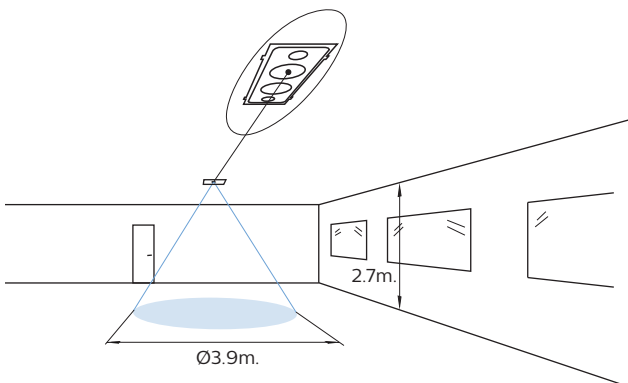


### Light sensor

The light sensor measures the total amount of light in circular field of approximately Ø3.9m. when mounted at a height of 2.7m. The following aspects should be observed during installation:

- Minimum distance from the window 0.6m.
- Prevent light reflections from outside entering the sensor (for example sunlight reflection from a window sill) as this will lead to incorrect light regulation.

As a guideline the formula  $0.72 \times H$  can be used to calculate the minimum distance between the window and sensor whereby H is the height from the bottom of the window to the ceiling.



### Infrared sensor

The infrared sensor (receiver) will react to signals from any of the IR remotes when the signal is transmitted under an angle of up to 55°.

## Service button



The service button has a number of functions. The first function is to toggle between the two most commonly used application modes Mode-1 (Cell office) or Mode-2 (Open plan office). The second function is to calibrate the lightlevel.

The third function is visible indication of movement (red indicates movement and yellow no movement).

In addition to the described functions it also has a switchable integrated light source.

### Mode switching

When the service button is pressed for  $\leq 1s.$  the mode is changed. Acknowledgement is indicated by flashing of the connected luminaires. One flash indicates the Mode-1 (Cell office) application and two flashes indicate the Mode-2 (Open plan office) application.

### Light calibration

When pressing the service button for  $\geq 3s.$  and  $\leq 7s.$  the lights will be switched off to indicate that the lightlevel calibration cycle is initiated. All items underneath the sensor that are not there during normal operation, but have influence on the calibration, need to be removed. Approximately after 10s.. a sample of the lightlevel is recorded (X) and the lights are switched on with 100% output. After another 10s.. the lightlevel is recorded again (Y) and a calculation is made  $Y-X=$  new calibration set point. This value is stored in the controller and the connected luminaires flash twice to acknowledge this.

### Integrated light switching

When pressing the service button for  $\geq 10s.$  the integrated light source is either switched on or off.

# LLC1663, LRI1663, ActiLume DALI gen2 system

## Parallel linking/BMS and DALI groups

When the ActiLume DALI gen2 system is used in a parallel linking or BMS configuration all drivers (luminaires or other devices) need to be connected to DALI port 1, which is identified as DALI Window. DALI port 2, identified as DALI Corridor, is interconnected to the other DALI port 2 of the rest of the system with a maximum of 64 ActiLume DALI gen2 systems.

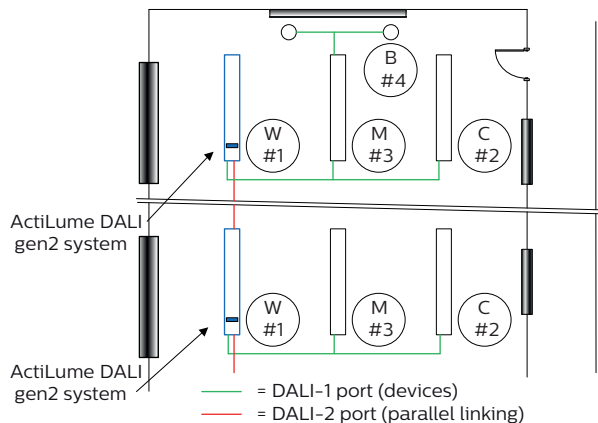
### Note

This connection is polarity sensitive.

To be able to make a distinction between how the connected drivers react they need to be assigned to 1 of the 4 DALI groups:

- group #1 = Window
- group #2 = Corridor
- group #3 = Middle or Decorative
- group #4 = Blackboard

Assigning the luminaires to these groups needs to be done during the commissioning phase making use of the IRT9090 tool. Extensive information on functionality and the usage of DALI Groups, can be found in the ActiLume DALI gen2 application guide.

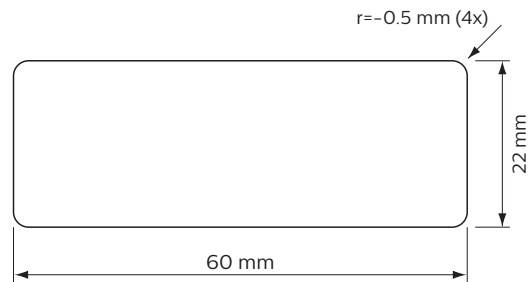


Example of Parallel linking configuration

## Multi-Sensor mounting

The sensor has latching rills on the back so it can be mounted easily. There are several methods of mounting available:

- directly onto the lamp by means of an additional clip LCA8002 (TL5) or LCA8003 (TL-D).
- inside the luminaire housing using the additional clip LCA8005. To use this clip a hole needs to be cut according to the dimensions as indicated in figure a.
- inside the luminaire housing using the additional cover LCA8006. To use this cover a hole needs to be cut (punched) according to figure b.



1. Required Luminaires opening dimension: 60 x 22 (mm)
2. Thickness fitness of Luminaires fixture: 0.5~2.5 (mm)

Figure a: Cutout pattern when using with clip LCA8005

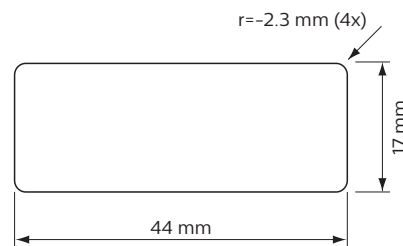


Figure b: Cutout (punch) pattern when using with cover LCA8006

## ActiLume DALI gen2 system connection overview



# LCU2070 and LCU2071

## Push-button Units LCU2070 and LCU2071

The LCU2070 and LCU2071 Push Button Unit (PBU) make it possible to connect up to 4 switches, per PBU, to the ActiLume DALI gen2 system, to dim and switch different DALI groups. The PBU may only be connected to the DALI port 1 (Window) and derives its power from the DALI connection, so no additional power supply is required.

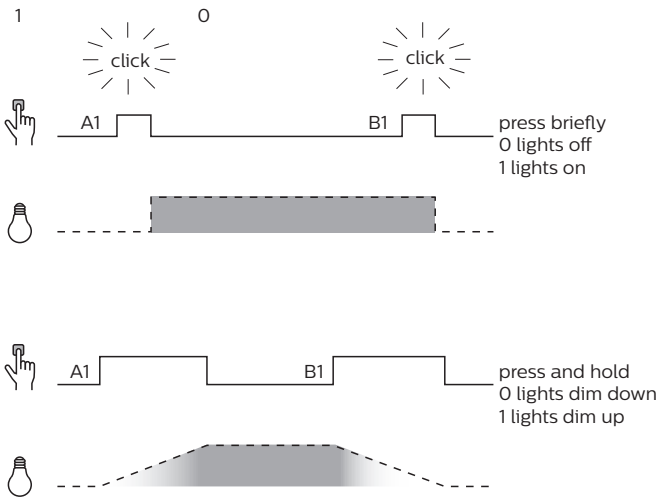


LCU207x Push Button Unit

The PBU functions as follows (refer to figure below, functional overview table and wiring diagram 1):

- Briefly press button A1, light will switch On.
- Briefly press button B1, light will switch Off.
- Press and hold button A1, light will dim Up.
- Press and hold button B1, light will dim Down.

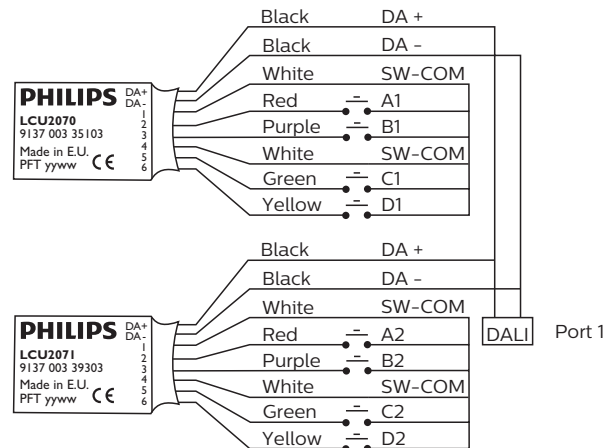
For all functions



Up to two PBUs can be used on a single ActiLume DALI gen2 system.

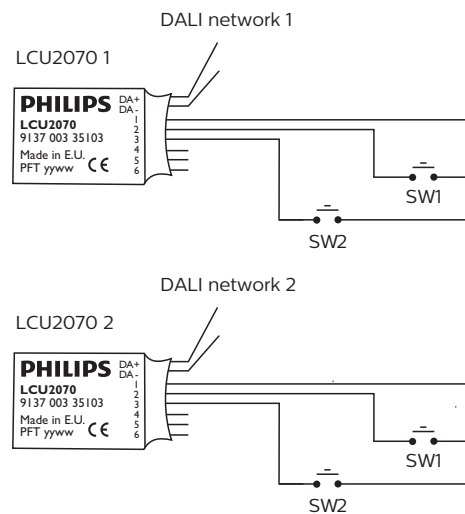
PBU	Switch	Group #	Action
LCU2070	A1	1, 2, 3	On / Dim up
	B1	1, 2, 3	Off / Dim down
	C1	4	On / Dim up
	D1	4	Off / Dim down
LCU2071	A2	1, 2	On / Dim up
	B2	1, 2	Off / Dim down
	C2	3	On / Dim up
	D2	3	Off / Dim down

LCU207x functional overview table

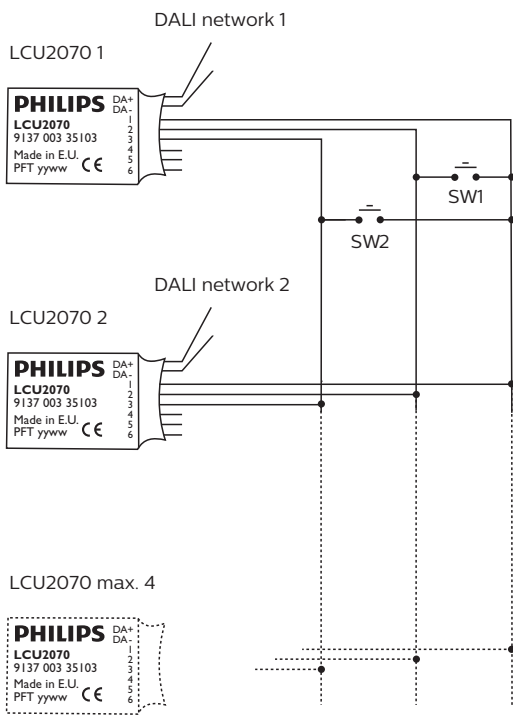


LCU207x wiring diagram 1

It is also possible to interconnect (single) switches to several PBUs to control several ActiLume DALI gen2 systems (refer to wiring diagrams 2 and 3).



LCU207x wiring diagram 2



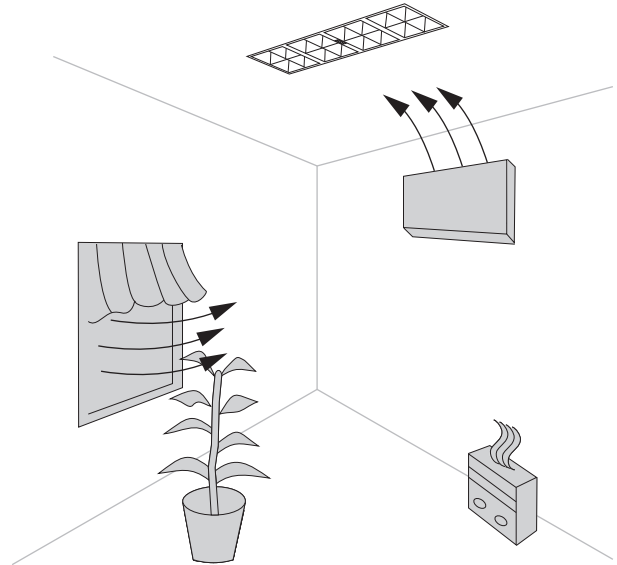
LCU207x wiring diagram 3

If multiple ActiLume DALI gen2 systems are connected together through parallel linking configuration, the instructions send by a PBU, will be communicated to all other ActiLume DALI gen2 systems.

Each connected LCU207x counts as 1 ballast on the DALI line.

### Installation considerations

Since motion detection is based on moving temperature spots it is possible that the sensor detects movement from for example airflow from an HVAC, heater or draft from an open window/door (see drawing), which has a different temperature compared to its surroundings. This can lead to unwanted triggering of the ActiLume DALI gen2 system.

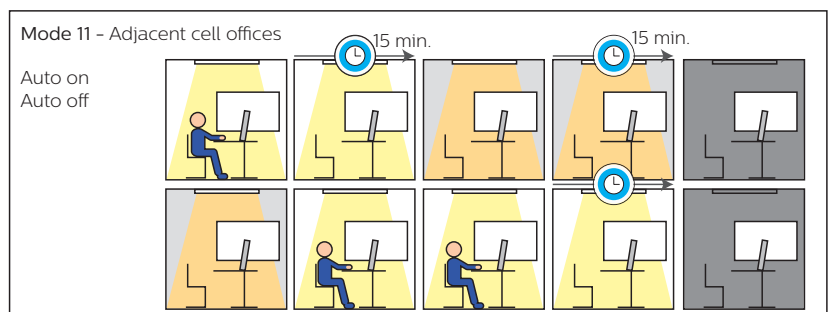
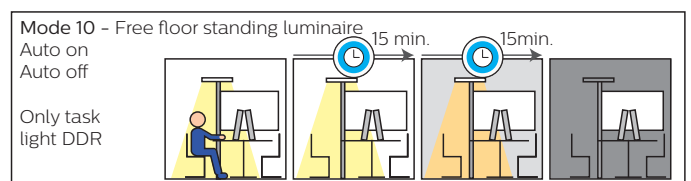
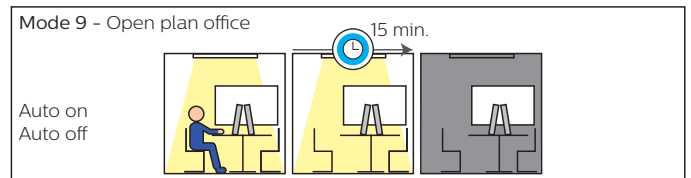
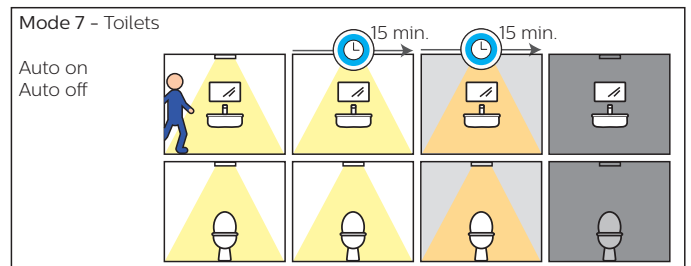
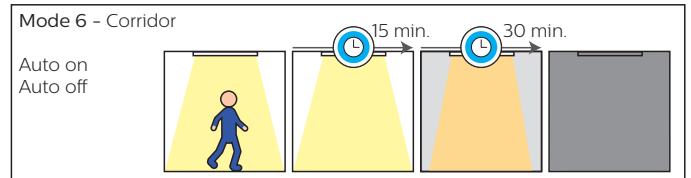
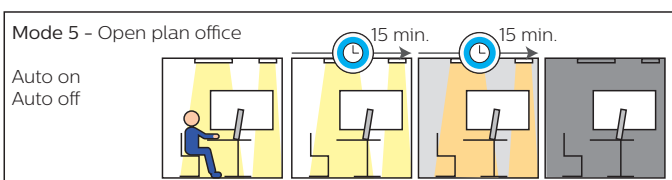
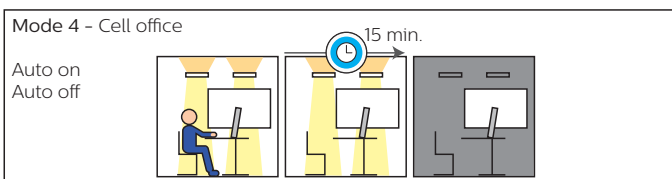
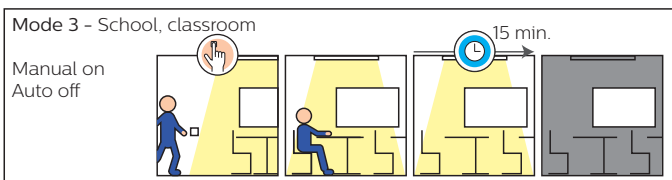
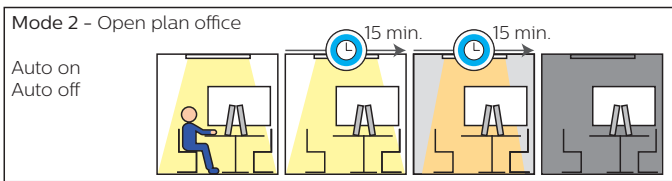
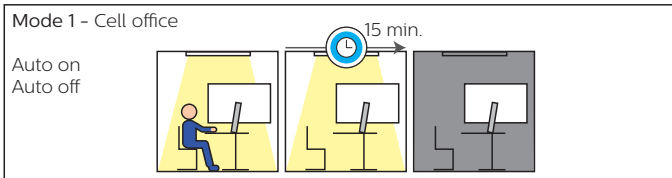


# Modes

## Mode and Description

- 1 Cell office Window/Corridor + Decorative
- 2 Open plan office Window/(Middle)/Corridor
- 3 School/Classroom + Decorative
- 4 Cell office task area + Decorative
- 5 Open plan office task area + Decorative

- 6 Corridor and/or staircase
- 7 Toilet
- 8 Meeting room + Decorative
- 9 Open plan office task area (Middle) with mains switching
- 10 Free floor standing luminaire
- 11 Adjacent cell office Window/Corridor + Decorative



- 12 Free for OEM (copy of mode 2)
- 13 Free for OEM (copy of mode 8)
- 14 Free for OEM (copy of mode 8)
- 15 Free for OEM (copy of mode 11)
- 16 Free for OEM



## ActiLume DALI gen2 system



**LLC1663 ActiLume DALI gen2**  
The controller from the ActiLume DALI gen2 system. The ActiLume system is a DALI-based plug and play control system which fulfills the basic needs in offices with maximum energy saving options by daylight harvesting and presence detection.



**LRI1663 ActiLume gen2 Multi-Sensor**  
The Multi-Sensor from the ActiLume DALI gen2 system. Color of the product is ultra dark grey (similar to RAL7024).



**LCA8006 Cover for ActiLume Multi-Sensor**  
Cover for the ActiLume Multi-Sensor to obtain the same outer dimensions as the ActiLume MicroLuxSense and the ActiLume 1-10V sensor. Color of the product is light grey (similar to RAL7035) or white (similar to RAL9016).



**IRT9090 Extended IR programming tool**  
Commissioning tool for ActiLume DALI gen2 system and luminaires with ActiLume. Easy to use and inexpensive tool to adjust the functionality, perform an installation test and/or calibrate lightlevel. Batteries are included.



**LRM8118 Extension sensor**  
Compact movement detector to be used to expand the detection area for ActiLume and ActiLume DALI solutions. The sensor is connected to the DALI line from the controller (luminaire) and does not require external power. The sensor is suitable for both recessed and surface mounting (in combination with the LRH8100). Recommended mounting height is between 2.5 and 3.5 m. Color of the product is white (similar to RAL9010).



**LRH8100 Surface mount adaptor**  
Surface mounting box for the LRM8118 extension sensor. Comes with cut-out holes for most common cable trunking systems. Color of the product is white (similar to RAL9010).



**LRM8119 ActiLume movement extension sensor, luminaire based**  
Compact luminaire based movement detector to be used to expand the detection area for ActiLume and ActiLume DALI solutions. The sensor is connected to the DALI line from the controller (luminaire) and does not require external power. Recommended mounting height is between 2.5 and 3.5 m. Color of the product is ultra dark grey (similar to RAL7024).



**LCA8004 Cover ActiLume extension sensor**  
Cover for the ActiLume Multi-Sensor to obtain the same outer dimensions as the ActiLume MicroLuxSense and the ActiLume 1-10V sensor. Color of the product is light grey (similar to RAL7035).



**LCA8001 Ring for ActiLume sensors**  
Ring around the cover of the ActiLume Multi-Sensor + cover, ActiLume luminaire based extension sensor + cover, ActiLume 1-10V sensor or ActiLume MicroLuxSense to fit in the micro-optics of a luminaire. Color of the product is light grey (similar to RAL7035).



**LCA8002 ActiLume sensor clip for TL5**  
Clip to be used for ActiLume Multi-Sensor, ActiLume Luminaire based extension sensor, ActiLume 1-10V sensor and the ActiLume MicroLuxSense . With this clip the sensor can be directly clicked on the TL5 lamp.



#### **LCA8003 ActiLume sensor clip for TL-D**

Clip to be used for ActiLume Multi-Sensor, ActiLume Luminaire based extension sensor, ActiLume 1-10V sensor and the ActiLume MicroLuxSense. With this clip the sensor can be directly clicked on the TL-D lamp.



#### **LCA8005 ActiLume mounting clip for use in luminaire**

Clip to be used for ActiLume Multi-Sensor, ActiLume Luminaire based extension sensor, ActiLume 1-10V sensor and the ActiLume MicroLuxSense. With this clip the sensor can be mounted in the luminaire housing. Color of the product is light grey (similar to RAL7035) or white (similar to RAL9016).



#### **IRT8030 Four-preset hand-held transmitter**

Four-preset hand-held transmitter, suitable for infrared control of the ActiLume system specifically when using Mode 8 (Meeting room). It has 4 keys for presets and one key for "all off". Keys for individual control and preset programming are located under a hinged cover at the bottom of the transmitter. The IR group address selector switches are also situated behind the hinged cover. The unit is supplied complete with wall holder and batteries. Color of the product is white (similar to RAL9010).



#### **LCU207x Push Button Unit**

Enhance the system with additional functionality with these push button units. There are two types available LCU2070 and LCU2071 that can be used separately or be combined. Each PBU can support up to 4 pushbuttons with predefined functionality.



#### **IRT8050 Two-key infrared remote control**

Two-key infrared remote control transmitter for wall mounting and table-top use. The unit can be used in combination with ActiLume. The actual function of the two large keys can be selected with a dip switch in the battery compartment. DIP switches are also used to select the IR group address. Batteries are included and color of the product is white (similar to RAL9010).



#### **LCN8600 MultiOne USB2DALI interface**

For in depth programming of the ActiLume DALI gen2 a PC software tool is available at [www.philips.com/MultiOne](http://www.philips.com/MultiOne) which can be used in combination with the USB interface. The interface is powered through the USB connection only and is able to power DALI connections whenever needed up to 230mA.

## Specifications

### LLC1663

Mains input voltage	
Nominal range	120 ... 277V <sub>AC</sub>
Performance range	110 ... 294V <sub>AC</sub>
Safety range	108 ... 305V <sub>AC</sub>
Mains frequency	50 ... 60Hz.
Input power	≤ 700mW (at 230V <sub>AC</sub> 50Hz)
Additional required input power per driver	40mW (per full DALI load of 2mA)

### LLC1663 Connections

Connector type mains, T and D and DALI ports	WAGO 250
Wire size	0.5 ... 1.5mm <sup>2</sup>
AWG wire size	20 ... 16
Stripping length	8.5 ... 9.5mm.
Connector type Multi-Sensor port	RJ10 (4P4C)
Maximum number of drivers	34
DALI ports	2
DALI port-1 (Window) config.	Window/Corridor
DALI port-2 (Corridor) config.	Corridor/Parallel/BMS
DALI port-1 maximum nominal load	68mA
DALI port-2 maximum nominal load	
Window/Corridor configuration	24mA.
Parallel linking configuration	3mA.
BMS configuration	not powered

DALI ports absolute maximum load	≤ 250mA.
Touch and Dim input (mains rated)	1

### LR1663

Viewing angle	
Light sensor (daylight spectrum)	72° (circular)
Movement sensor (passive infra-red)	72° x 85° (rectangular)
Infra-red sensor (RC5 code from remotes)	110° (circular)

Service pushbutton/light	
Toggle between	Mode-1/2 and Sensor light On/Off
Activate	automatic lightlevel calibration
Cable length	1m
Extension of cable allowed	Yes, up to 6m (including sensor cable)
Connector type	RJ10 (4P4C)

### Environmental

Temperature	-0°C to 55°C (operating)
	-25°C to 85°C (storage and transport)
Maximum case temperature T <sub>CASE</sub>	65° C
Relative humidity	20% to 85% non-condensing (operating)
	10% to 95% non-condensing (storage and transport)

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## Compliances and approvals

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Protection rating	IP20
RFI 9kHz to 30MHz	EN 55015
RFI 30MHz to 1000MHz	EN 55022 A
Immunity	EN 61547
Safety	EN 61347-1 EN 61374-2-11
Quality standard	ISO 9001
Environmental standard	ISO 14001
Approval marks	ENEC
CE marking	

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## Physical

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Dimensions	
LLC1663	L 179.5 mm x W 30.0 mm x H 22.1 mm
LRI1663	L 44.7 mm x W 16.4 mm x H 15.8 mm
Weight	
LLC1663	0.07 kg
LRI1663	0.028 kg
Housing	
Outer material	polycarbonate UL94 V-0
Glow wire test	850° Celsius for ≤ 5s..
Insulation for safety	≥ 1500V

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# Data

## Ordering data

Type	MOQ	Ordering number	EAN code level 1	EAN code level 3	EOC
LLC1663/00 ActiLume DALI gen2	12	9137 003 49403	8718291 659839	8718291 659846	659839 00
LRI1663/00 ActiLume gen2 Multi-Sensor	12	9137 003 56703	8718291 680925	8718291 680932	680925 00
LRM8118/00 Extension sensor	1	9137 003 24703	8711559 730783	8711559 730790	730783 99
LRH8100/00 Surface mount adaptor	1	9137 003 18903	8711559 519203	8711559 519210	519203 99
LRM8119/00 ActiLume movement extension sensor	12	9137 003 43703	8718291 139461	8718291 139478	139461 00
IRT9090/01 Extended IR programming tool	1	9137 003 59103	8718291 747635	8718291 747642	747635 00
LCA8001/00 Ring for ActiLume sensors	1	9137 003 38303	8727900 882780	8727900 882797	882780 00
LCA8002/00 ActiLume sensor clip for TL5	1	9137 003 40803	8727900 952940	8727900 952957	952940 00
LCA8003/00 ActiLume sensor clip for TL-D	1	9137 003 40903	8727900 952988	8727900 952995	952988 00
LCA8004/00 Cover for ActiLume extension sensor	1	9137 003 43803	8718291 139386	8718291 139393	139386 00
LCA8005/00 Clip for mounting in luminaire housing	1	9137 003 48803	8718291 196242	8718291 196259	196242 00
LCA8005/05 Clip for mounting in luminaire housing white	1	9137 003 55103	8718291 719632	8718291 719649	719632 00
LCA8006/00 Cover for ActiLume gen2 Multi-Sensor	1	9137 003 55503	8718291 653752	8718291 653769	653752 00
LCA8006/05 Cover for ActiLume gen2 Multi-Sensor white	1	9137 003 58603	8718291 719595	8718291 719601	719595 00
LCU2070/00 PBU	1	9137 003 35103	8727900 870268	8727900 870275	870268 00
LCU2071/00 PBU OPT. 1	1	9137 003 39303	8727900 891409	8727900 891416	891409 00
LCN8600/00 MultiOne interface USB2DALI	1	9137 003 46703	8718291 209461	8718291 209478	209461 00

## Packing data

Type	Box dimensions (mm)	Qty / Box	Material	Weight (Kg)	
				net	gross
LLC1663	188 x 188 x 66	12	Cardboard	0.840	1.000
LRI1663	200 x 175 x 110	12	Cardboard	0.300	0.504
LRM8118	80 x 72 x 40	1	Cardboard	0.076	0.083
LRH8100	80 x 80 x 40	1	Plastic bag	0.027	0.033
LRM8119	200 x 175 x 110	12	Cardboard	0.030	0.507
IRT9090	238 x 46 x 27	1	Cardboard	0.105	0.160
LCA8001	216 x 93 x 70	100	Cardboard	0.155	0.221
LCA8002	216 x 93 x 70	50	Cardboard	0.450	0.455
LCA8003	216 x 93 x 70	50	Cardboard	0.450	0.455
LCA8004	216 x 93 x 70	50	Cardboard	0.186	0.218
LCA8005	220 x 97 x 71	50	Cardboard	0.780	0.810
LCA8006	220 x 97 x 71	50	Cardboard	0.120	0.160
LCU2070	160 x 110 x 5	1	Plastic bag	0.023	0.025
LCU2071	160 x 110 x 5	1	Plastic bag	0.023	0.025
LCN8600	190 x 136 x 75	1	Cardboard	0.110	0.216

