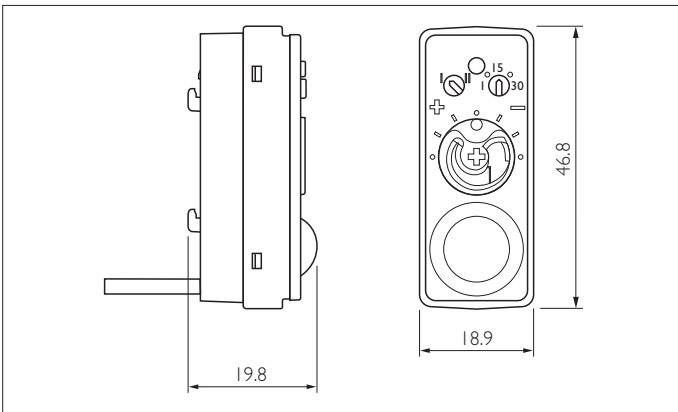


LLC1681, LRI1655 Datasheet

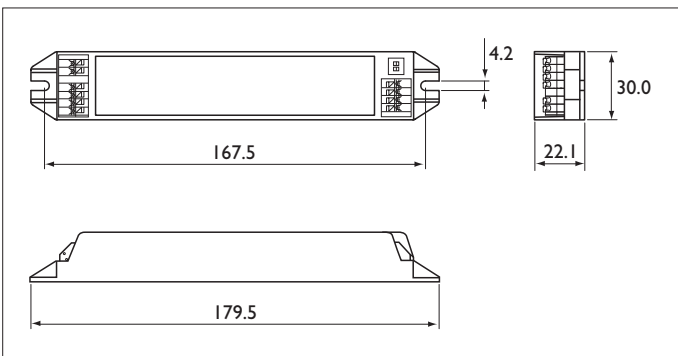
ActiLume Wireless I-10V system



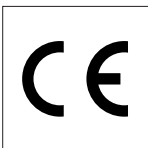
ActiLume Wireless I-10V system



Sensor LRI1655 dimensions in mm.



SwitchBox (controller) LLC1681 dimensions in mm.



Product description

The Philips ActiLume Wireless I-10V lighting control system consists of a small, lightweight sensor and a switchbox (controller), designed for easy integration into luminaires. The ActiLume Wireless I-10V system is ideally suited for offices, meeting rooms, corridors and free floor standing luminaires. The system can control up to 7 ballasts of the Philips HF-Regulator series (for details see the application guide).

The ActiLume Wireless I-10V system can be remotely controlled by either a wired Touch and Dim input or wirelessly by the UID8410 user interface. This user interface can also be used to link up to 16 devices thus creating a wireless network normally called room. The room can be divided into zones (maximum of 16) where the connected luminaires may react differently upon for example occupancy within the room or on different scene settings.

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.

Features and benefits

- The Philips ActiLume Wireless I-10V system is a luminaire based lighting control system designed for maximum comfort and energy savings of up to 75%.
- Using the ActiLume Wireless I-10V SwitchBox you can easily link cubicles, free floor standing and suspended luminaires into one system, creating a wireless network, without expensive cabling costs or loss of flexibility for future additions. The wireless network is based on the ZigBee PRO standard (IEEE 802.15.4, WPAN) which is targeted at radio-frequency (RF) applications. The ZigBee protocol enables peer-to-peer communication models, where all devices are equal (no master/slave relationship) and the network layer natively supports star, tree, and generic mesh networks with a low data communication rate ensuring a reliable and secure (encrypted) network.
- The network can also be combined with other components from the OccuSwitch Wireless (OSW) family.
- The ActiLume I-10V sensor consists of a lightlevel sensor, a Passive Infra Red (PIR) movement sensor, two additional dial switches and a pushbutton. The sensor is directly connected to the ActiLume Wireless I-10V SwitchBox by means of two flying leads.
- Daylight dependent regulation is possible, when enabled by means of a switch, without any visible discomfort for the user providing automatic savings.
- The lightlevel sensor is only sensitive to visible radiation and has a light-sensing range from 1/3 to 3 times the nominal setting (600lux at a reflection factor of 0.3). The sensitivity is adjustable by means of a rotatable diaphragm.
- The PIR movement detector is sensitive to human movements and contains a 15 minutes delay timer to provide optimal functionality whilst maximizing energy saving during absence. Delay time setting is adjustable, by means of a dial switch, between 1 and 30 minutes.
- Activating of the 100 hours burn-in mode (for fluorescent luminaires).

- Individual/personal control solutions can be created by connecting a mains rated spring-back switch to the "Touch and Dim" input enabling dimming and/or on and off switching. The same functionality and selecting one of 3 scene presets can be achieved by using the UID8410 wireless scene remote.

Application areas

- Offices; office areas; open spaces
- Meeting rooms
- Free floor standing luminaires, pendulum luminaires and single luminaire cubicles
- Corridors

The ActiLume Wireless I-10V system is suited for the above mentioned areas with a ceiling height not exceeding 3.5m.

Application description

When presence (movement of a person) is detected by a sensor within for example zone x the wireless network ensures that the luminaires within that zone switch to full brightness and all other linked zones switch to a background level. When the person moves from zone x to zone y and is detected in zone y the wireless network will ensure that the luminaires in that zone will switch to full brightness and the zone which the person has just left will go to background level. When the person leaves the application area covered by the various sensors, the network will switch off. In short the ActiLume Wireless I-10V system enables luminaires to be functionally linked without them actually being physically linked.

Commissioning and everyday use tools

The ActiLume Wireless I-10V system can, once it is installed and has been commissioned, work stand alone.

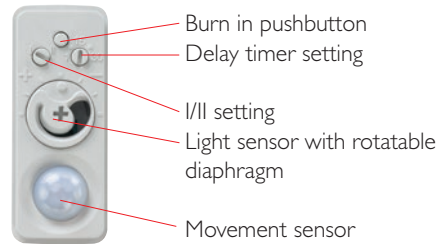
For commissioning, scene setting and everyday use a wireless user interface (UID8410 remote control) is available.

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.

ActiLume I-10V Sensor



The ActiLume I-10V sensor comes with 1.0m. long flying leads attached.

Detection patterns of the sensors



Movement sensor:

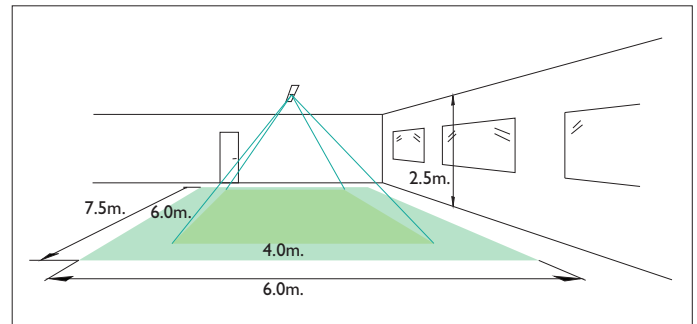
The detection area for the movement sensor can roughly be divided into two parts:

- 4.0 by 6.0m. for small movements (at a desk)
- 6.0 by 7.5m. for large movements (walking)

Mentioned values are applicable when the ActiLume I-10V sensor is mounted at a height of 2.5m.

When no movement (presence) is detected the luminaire will be dimmed down to a level

corresponding to 2.5V on the dim input of the ballast(s) used. The luminaires will be switched off if none of the linked sensors detect any movement.



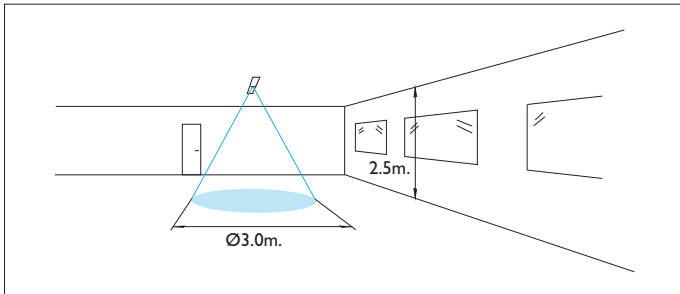
Light sensor:

The light sensor, when enabled, measures the total amount of light in a, more or less, circular field of Ø3.0m. when mounted at a height of 2.5m. The analog output signal is passed on directly to the ActiLume Wireless I-10V SwitchBox. The sensitivity of the sensor can be adjusted by rotating the diaphragm to adapt to different layouts of area and other aspects that influence the output of connected

luminaires. During installation the following circumstances should be taken into account:

- Minimum distance from the window 1.0m.
- Prevent light reflections from outside entering the sensor (for example sunlight reflection on a car bonnet) as this will lead to incorrect lightlevel regulation.
- When the diaphragm is being used near or at its maximum or minimum opening the actual measuring field is elliptically shaped.

As a guideline the formula $0.60 \times H$ can be used to calculate the minimum distance between the window and the sensor whereby H is the height from the bottom of the window to the ceiling.



Dial switches and pushbutton on the sensor



I/II selector:

With the I/II selection switch the ActiLume I-10V sensor can be switched in two different modes:

- Mode I only presence detection active (default).
- Mode II presence detection and Daylight Dependent Regulation (DDR) active.

When Mode I is selected the light output will be set to maximum when presence is detected.



Delay timer selector:

With the delay timer selection switch the time can be set when the dimming selection down of the light output, to its minimum level, starts after no presence has been detected. The time can be set between 1 and 30 min. (15 min. is default). If within the dimming down action presence is detected the light output goes back to its previous setting and the delay timer setting is doubled for one period of no presence detection. This function is called "Smart or Intelligent timer".



Burn in pushbutton:

By pushing the burn in button for ≈ 1 to 2sec. the lights are set to their maximum output and both presence detection and daylight dependent regulation function are disabled, the latter if it was enabled. Activation will be acknowledged by the connected light flashing once. The burn in cycle, meant to create optimal performance for a long lifetime of fluorescent lights, can be interrupted by pressing the button for ≈ 3 to 4 sec. and this action will be acknowledged by the lights flashing twice.

ActiLume Wireless I-10V Switch Box



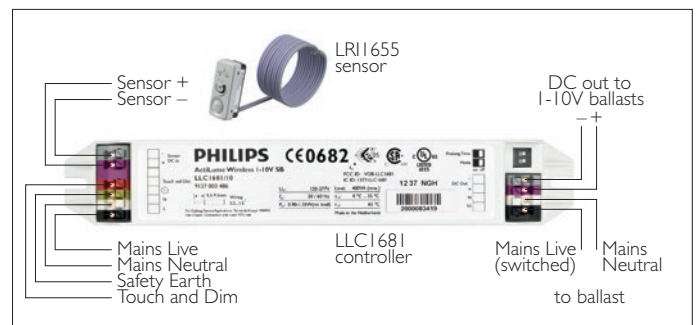
The ActiLume Wireless I-10V SwitchBox is the controller of the system. It receives information, in analog form, about the amount of light and presence from the Actilume I-10V sensor and will pass this on to other connected HF-R components thus creating an area with light comfort and safety and saving energy at the same time. When applicable it will also switch the connected ballasts off and this will increase the amount of saved energy even further. Even when the lights are switched off, the ActiLume I-10V sensor is continuously powered so the functionality is guaranteed. The Touch and Dim input, according to Philips standard, will only act on the connected Actilume Wireless I-10V SwitchBox and not be relayed onwards over the wireless network. The Touch and Dim input overrides the automatic functioning of the system but the actual setting will be reset once the lights have been switched off as a response to no presence being detected. Due to the RF technology used precautions and measures should be observed (see application guide) when the ActiLume Wireless I-10V SwitchBox is mounted in the luminaire.

Switches on the SwitchBox

The ActiLume Wireless I-10V Switchbox has two dipswitches with the following function:

- Prolong Time, when the switch is set to On the time before the lights are switched off will be extended by 15min., this in addition to the sensor delay timer setting + dimming time. During the prolong time period the lights are set to minimum level. When the switch is set to Off then the lights will be switched off as soon as the sensor delay timer + dimming period has expired.
- Mode, when the switch is set to On the lights will be switched off when the measured lightlevel, artificial and natural, is in excess of 250% in relation to the setting on the sensor. When the switch is set to Off the set point to switch the lights off is 150% in relation to the sensor setting. The function of switching lights off related to excess lighting is called Daylight Dependent Override (DDO).

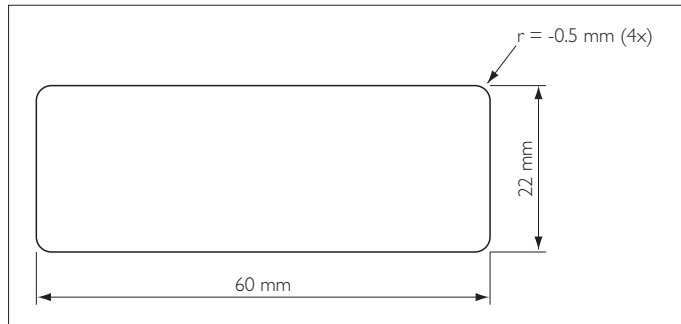
ActiLume Wireless I-10V system connection overview



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 must be cut according to the dimensions as indicated in figure below.



Cutout pattern when using with clip LCA8005

Wireless Scene Remote (UID8410)



The ActiLume Wireless I-10V system is a standalone lighting control system but can be manually overruled with the optionally available Wireless Scene Remote UID8410. The remote has the following functions:

- The lights in the room can be switched on and off
- In a room with dimmable lights, the dim level can be set
- Dimming within a zone (area within a room) is also possible
- Scene setting and selection
- Commissioning

Use of the remote is confirmed by audible (beep) and visual (controlled lights) feedback. Please note that if for example in a room a scene was selected and the lights have been turned off, due to no presence detection, that once presence has been detected the system will go to the normal mode of operation with the appropriate settings.

Wireless communication

The Wireless network is based on the ZigBee PRO standard (IEEE 802.15.4, WPAN) which is targeted at radio-frequency (RF) applications. The ZigBee standard operates at 2.4 GHz in most regions worldwide and is supported by multiple HW/SW vendors. Nevertheless, the ActiLume Wireless I-10V system cannot interact with third party ZigBee devices. The ZigBee protocol enables fully distributed peer-to-peer communication models. This means no master/slave relationship whereby the application is divided over the devices in the network. Every device knows how it functions within the network. The result is that if one device does not function (removed, defect or switched off from the mains), the remaining devices keep functioning as intended. The network is based on a mesh network so the devices pass on the received commands. The distance between the devices should not exceed 10 meters. The advantage of this mesh network capability is that the network has a self-healing routing meaning automatic route discovery over the mesh network. ZigBee has tolerance for a large number of co-located networks due to use of multiple communication channels and CSMA-CA channel access. The commands do have network security according to AES 128-bits network encryption. The ActiLume Wireless I-10-V system and the OccuSwitch Wireless family make use of the same protocol so they can be combined to interact in a seamless way.

Technical data

ActiLume Wireless I-10V Switch Box

Environmental conditions	
Operation conditions	
Ambient temperature	0°C ... 55°C
Rel. humidity	5% ... 90%, no condensation
Max. allowed temperature	65°C at T _{CASE} testpoint
Storage conditions	
Ambient temperature	-25°C ... 70°C
Rel. humidity	5% ... 95% at 25°C
Connections	WAGO 250 connectors
Color coding of connectors	
- Inputs	
I-10V +	pink
I-10V –	gray
Touch and Dim	red
Mains Neutral	white
Mains Live	black
Protective Earth	green
- Outputs	
I-10V +	pink
I-10V –	gray
Mains Neutral	white
Mains Live	black
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 +I ... +10V _{DC}
- I-10V output	current sinking 20 mA
	(maximum rating)
- Max. switching capacity	400VA
Input voltage range	
- Nominal range	120 ... 277V _{AC}
- Performance range (-8% / +6%)	110 ... 294V _{AC}
- Safety range (-10% / +10%)	108 ... 305V _{AC}
Input mains frequency range	
- Nominal range	50 ... 60Hz.
- Performance range (-8% / +6%)	46 ... 64Hz.
- Safety range (-10% / +10%)	45 ... 66Hz.
Approvals/markings	CE0682, ENEC, FCC, CSA, UL
Wireless Communication	ZigBee PRO standard (IEEE 802.15.4, WPAN)
EMC	According to EU EMC directive 2004/108/EC
Compliance IEC	IEC61347-2-11 IEC60598-1
Immunity	ETSI EN 301-489-1/301-489-3
Emission	ETSI EN 301-489-1/301-489-3 EN55022 Class B
R&Tte	According to Directive 1995/5/EC Applicable standard EN 300 328 V1.7.1
Housing material	Polyphenylene Oxide (PPHOX), Noryl PX9406 by Sabic, UL94 V-0

Glow wire test	850°C/30sec
Color housing	White (WH8581)
Weight	51 grams
Dimensions	179,5 × 30,0 × 22,1 mm

ActiLume I-10V Sensor

Environmental conditions	
Operation conditions	
Ambient temperature	5°C ... 55°C
Rel. humidity	5% ... 90%, no condensation
Max. allowed temperature	55°C Anywhere on the sensor housing
Storage conditions	
Ambient temperature	-25°C ... 70°C
Rel. humidity	5% ... 95% at 25°C
Safety	When connected to the control input of a Philips HF-R ballast, the sensor has double isolation to mains connected parts.
Connection	2x0.5mm ² , flying leads (PVC free), length 1 meter.
Color coding of cable	pink +, gray – if incorrectly connected to the ballast dim input, the ballast input is short circuited, resulting in minimum light output.
Housing material	Polycarbonate UL94 V-0
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	25 grams
Dimensions	46.8 × 18.9 × 19.8 mm
EMC	
- operating voltage	+2.5 ... +10V _{DC}
- operating current	sinking 100µA ... 3mA (sufficient for 20 Philips HF-R ballasts)
- control voltage variation range	< 0,7V over current and temp.
- Default setting	5V _{DC} at 37.5 lux (factory calibration)
- step response	within 2 sec. on 5V after power-up in case of insufficient ambient light
- max. input voltage	15V _{DC} (maximum rating)
- max. current sink	50 mA. (maximum rating)
Optical characteristics	
It is assumed that the reflection in a room is such that a lightlevel of 500 lux on a table (0.8m in height) will result in 25 lux seen by the controller at ceiling height (2.5m) under a viewing angle of approximately 45°	
The opening angle can be adapted by the diaphragm control, realizing an attenuation factor between 1/3 and 3.	



LLC1681/10 ActiLume Wireless I-10V SwitchBox

The controller from the ActiLume Wireless I-10V system. The system is a wireless luminaire based lighting control system which fulfills the basic needs in offices with maximum energy saving options by daylight harvesting and presence detection.



LRI1655/0x ActiLume I-10V sensor

The sensor from the ActiLume Wireless I-10V system. Color of the bottom part of the product is ultra-dark gray (similar to RAL 7024) and the top part has either the color light gray (similar to RAL 7035), white (similar to RAL 9016) or ultra dark gray (similar to RAL 7024).



UID8410/10 Wireless Scene Remote

Handheld remote for commissioning, scene selection and everyday use of the ActiLume Wireless I-10V system. Actual two way communication is with the ActiLume Wireless I-10V SwitchBox. The remote comes with 3 standard AAA batteries. Color of the product is white.



LCA8001/00 Ring for ActiLume sensors

Ring around the cover of the ActiLume multisensor + cover; ActiLume luminaire based extension sensor + cover; ActiLume I-10V sensor or ActiLume MicroLuxSense to fit in the micro-optics of a luminaire. Color of the product is light gray (similar to RAL 7035).



LCA8002/00 ActiLume sensor clip for TL5

Clip to be used for ActiLume multisensor; ActiLume Luminaire based extension sensor; ActiLume I-10V sensor and the ActiLume MicroLuxSense. With this clip the sensor can be directly clicked on the TL5 lamp.



LCA8003/00 ActiLume sensor clip for TL-D

Clip to be used for ActiLume multisensor; ActiLume Luminaire based extension sensor; ActiLume I-10V sensor and the ActiLume MicroLuxSense. With this clip the sensor can be directly clicked on the TL-D lamp.



LCA8005/0x ActiLume mounting clip for use in luminaire

Clip to be used for ActiLume multisensor; ActiLume Luminaire based extension sensor; ActiLume I-10V sensor and the ActiLume MicroLuxSense. With this clip the sensor can be mounted in the luminaire housing. Color of the product is either light gray (similar to RAL 7035) or white (similar to RAL 9016).

Packing data

Type	Box dimensions (cm)	Qty	Material	Weight (Kg)	
				net	gross
LRI1655/00	20 x 17.5 x 11	12	Cardboard	0.300	0.504
LRI1655/05	20 x 17.5 x 11	12	Cardboard	0.300	0.504
LRI1655/06	20 x 17.5 x 11	12	Cardboard	0.300	0.504
LLC1681/10	19 x 19 x 7	12	Cardboard	0.840	0.996
UID8410/10	17 x 11 x 8	1	Cardboard	0.100	0.337
LCA8001/00	22 x 10 x 7	100	Cardboard	0.150	0.221
LCA8002/00	22 x 10 x 7	50	Cardboard	0.429	0.500
LCA8003/00	22 x 10 x 7	50	Cardboard	0.429	0.500
LCA8005/00	22 x 10 x 7	50	Cardboard	0.780	0.810
LCA8005/05	22 x 10 x 7	50	Cardboard	0.780	0.810
LRA1750/10	17 x 5 x 5	1	Cardboard	0.155	0.200
LRM1763/10	11 x 6 x 9	1	Cardboard	0.060	0.117
LRM1765/10	11 x 9 x 6	1	Cardboard	0.063	0.155
LRM1770/10	11 x 9 x 6	1	Cardboard	0.063	0.155
LRM1775/10	11 x 9 x 6	1	Cardboard	0.063	0.155

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 W	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
LLC1681/10 ActiLume Wireless I-10V SwitchBox	12	9137 003 48603	8718291 245933	8718291 245940	245933 00
UID8410/10 Wireless Scene Remote (handheld)	1	9137 003 52303	8718291 256694	8718291 256700	256694 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
LCA8005/00 ActiLume mounting clip 50	1	9137 003 48803	8718291 196242	8718291 196259	196242 00
LCA8005/05 ActiLume mounting clip 50 W	1	9137 003 55103	8718291 719632	8718291 719649	719632 00
LRA1750/10 OccuSwitch Wireless Universal Actuator	1	9137 003 52903	8718291 225775	8718291 225782	225775 00
LRM1763/10 OccuSwitch Wireless Multi sensor	1	9137 003 53003	8718291 225751	8718291 225768	225751 00
LRM1765/10 OccuSwitch Wireless Corridor sensor	1	9137 003 52003	8718291 250654	8718291 250661	250654 00
LRM1770/10 OccuSwitch Wireless Corner sensor	1	9137 003 51603	8718291 250616	8718291 250623	250616 00
LRM1775/10 OccuSwitch Wireless Wall sensor	1	9137 003 51803	8718291 250630	8718291 250647	250630 00



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Data subject to change
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