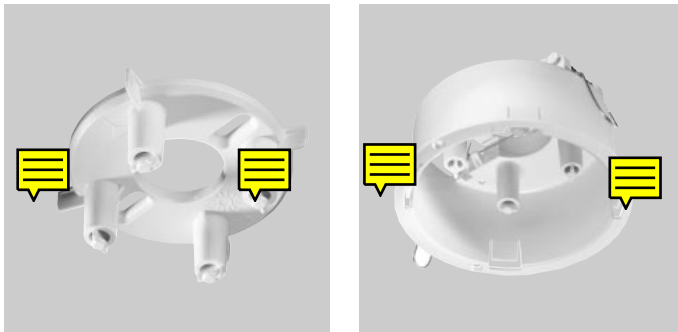
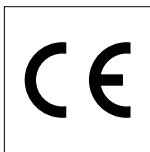
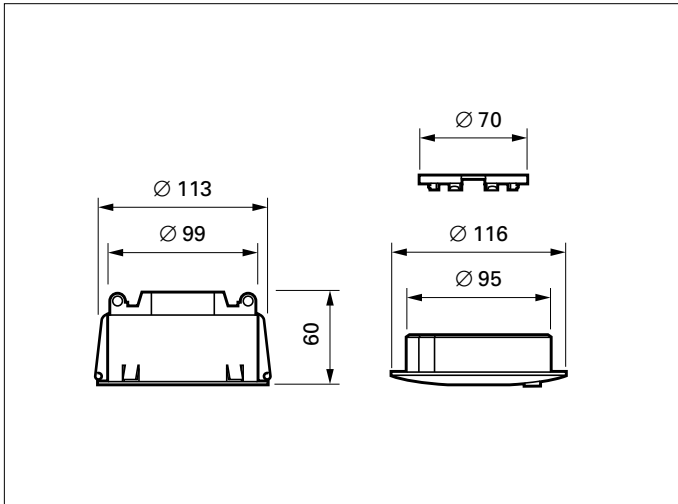


# LRI 5133/10 - Helio Multi-Sensor



Dimensions in mm



## Product details

### General

- The LRI 5133 is a combination of an Infrared Receiver, Movement Detector and Light Sensor in a single LonWorks™ device. It can be used in combination with HELIO lighting products and other products in a LonWorks™ system.
- It is mainly used to link lighting, HVAC (Heating, Ventilation, Airconditioning) and window blind functions in an integrated room control application.
- Sensors functions can be configured individually by DLL or Wizard software in the HELIO tool. They can also be configured by other commissioning tools.
- IR receivers are combined with hand-held and wall transmitters to offer users remote control operations.
- IR transmitters with built-in temperature sensors can be used to transmit room temperatures to HVAC controllers via the IR receiver.
- Movement detectors and light sensors are used to control room functions automatically based on occupancy and daylight levels.
- Units are supplied with standard network variables (SNVTs) for lighting applications. A flash-EEPROM allows new application software (NXE files) to be downloaded via PC. This software has to be specified and ordered separately.
- The multi-sensor is intended for indoor use in an office environment or similar. It is optimized for ceiling mounting and comes with a mounting ring and plate for recessed and surface mounting.
- The housing material is Polycarbonate, white (RAL 9010). It contains a lens, three sensor elements, a service pin and three light emitting diodes (LEDs) used for functional feedback, bus-power and configuration status. A double sticker with the device's neuron ID in barcode and hexadecimals is attached to the

- rear of each unit. Barcode scanners can therefore be used to enter neuron IDs in a commissioning tool during logical installation.
- The LED (red) for functional feedback is located on the housing front. It can be configured to react when active and passive infrared signals are received from IR transmitters and moving bodies. LEDs for bus-power and configuration status are located behind the movement detector lens.
- Units are connected to a twisted-pair bus cable with plugs and sockets. A plug is supplied with each unit and screw-connected to the bus cable. The socket is located at the rear of the housing. Four break-out ports along the housing edge serve as bus cable entries when units are surface mounted.
- An LPT-10 transceiver in each unit enables power to be obtained directly from the bus. The application current needed for its processor is 50mA @ 5Vdc.

### Light Sensor

- The light sensor has a measurement range of 50 to 20000lux.
- The sensor has an asymmetrical opening angle to reduce sensitivity towards the window (see picture a + b + c).
- An eye sensitivity centring filter and a special light filter are incorporated in the sensor to ensure its reliability.
- The measured area can be adapted to specific application conditions (e.g. avoid direct incoming day light) by mounting the unit in the suitable position. The relevant position marks are indicated on mounting ring and mounting plate. The sensor can be attached in four -90 shifted positions to the mounting materials.
- The photo cell sensitivity is -calibrated in the factory and set

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# LRI 5133/10 - Helio Multi-Sensor

for a 30 % reflection coefficient.

The reflection coefficient is automatically adjusted when the measured lux level (luxmeter) on a working plane below the sensor is entered into a configuration dialogue during commissioning.

- The light sensor is supplied with standard NVs for lighting applications. Parameters that can be configured are measured lux levels on a working plane and three conditional parameters that define when lux levels have to be sent to the network.

## Movement Detector

- The sensitivity pattern is nearly circular with a diameter of approx. 8 meters for tangential movements (i.e. around the detector) and 6 meters for radial movements (i.e. towards the detector). This applies when units are mounted between 2.6 and 3.0 meters above the floor.
- The movement detector has a PC configurable timer (0 to 60 min) to delay transmission of its "inactive-state". Initially, the delay timer is disconnected from the movement detector's output (factory setting). It is set to 15 minutes (default) and linked to the output as soon as the unit is logically installed.
- The functional LED is factory set to switch on when the detector's output state is "active" and off when "inactive". The LED is automatically disabled when units are logically installed (default). It can be enabled again by PC during commissioning.
- The detector's factory setting allows installers to check its sensitivity range when it is connected to a powered bus. This feature can be recalled after commissioning when the movement detector is temporarily set in the service mode by PC.
- The configured delay timer setting in this case remains functional.

## Infrared Receiver

- The sensitivity pattern is circular with an opening angle of 130°. It is suited for receiving RC5 codes from Philips IR transmitters.
- The unit can receive user commands from transmitters to control lighting, HVAC and sunblind functions in a room. It can also receive IR temperature signals from IRT 8065 transmitters for automatic temperature control in HVAC applications.
- The receiver is supplied with SNVTs for lighting applications. Parameters that can be configured are the receiver's IR group address (A...G) as well as the dimming speed and the switch-off timer (0 - 60 min.) of five separate channels. The channels are used to control separate lighting circuits.
- The functional LED is factory set to flash when IR signals are received. The LED function is automatically disabled (default) when units are logically installed. It can be enabled again by PC during commissioning.
- The LED is also used to indicate the configured IR group address when the 'Ch.5-off' key on an IRT 2130 transmitter is pressed (1 flash = Gr.A,.....,7 flashes = Gr.G). The default IR group address is A.

## Applications

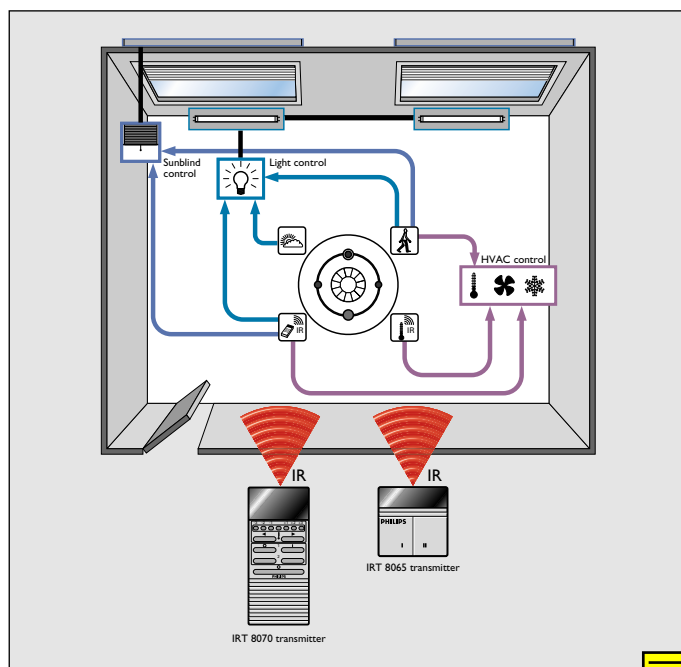
- The LRI 5133 multi-sensor is primarily used to link lighting, heating, ventilation, airconditioning and sunblind functions in an integrated room control application based on LonWorks™.

## Related equipment and software

### HELIO,

light controllers	LRC 5040, LRC 5048, LLC5030
digital I/O units	LCU 5305
system clock	LCU 5315
software	LCS 5400 version 1.2 or higher, LCS 5410, LCS 5415

- IR receivers can be combined with IRT 8070 hand-transmitters to offer users control of lights, window louvres and temperature set-points, as well as with IRT 8065 wall-transmitters with built-in temperature sensors that transmit measured room temperatures. The received IR signals are converted into standard bus messages allowing linked HVAC controllers for example to maintain user defined set-points.
- IR remote control also reduces electrical installation costs and increases flexibility in open-plan and cellular offices. Partition walls do not require vertical switching wires and can therefore be moved without having to rewire electrical wall switches.
- Movement detectors can be configured for example to automatically switch lights off, lower rolling shutters to prevent heat loss during winter and to set HVAC systems in an absence mode to save heating costs when offices, school rooms or sports halls are vacated.
- Light sensors can be configured to reduce artificial lighting levels in one or more rows of luminaires along windows when daylight levels increase - daylight linking application. To maintain a constant lux level, rows further from the window can be configured to reduce less than rows at the window. If necessary lights can be switched off when measured daylight levels increase beyond defined levels. It can also be used to automatically compensate for over-installed light levels when lighting installations are new or when lamps have recently been exchanged - constant lux application. In sporting facilities, light sensors can be used to switch lighting installations to pre-defined lux levels for specific sporting events.



## General purpose components:

IR hand transmitters	IRC 2130, IRT 8070
IR wall transmitters	IRT 8050, IRT 8065
bus cables	IFS 31

# LRI 5133/10 - Helio Multi-Sensor

## Technical data

### General

#### Functional LED (red)

- location: - on housing front
- factory setting: - enabled for all IR signals; flash when receiving IR signals.  
- enabled for PIR signals; on when movement detector is 'active', immediately off when 'inactive' (not linked to delay timer).
- default setting: - default state applies after logical installation.  
- LED is disabled for IR and PIR signals.  
- movement detector's LED function is linked to delay timer.  
- LED functions can be enabled/disabled separately during commissioning.
- service setting: - LED function is enabled and logically disconnected (movement detector only) from delay timer. (i.e. immediate feedback of output status).  
- configured LED function for IR receiver is not effected.

#### Service LED (yellow)

- location: - behind lens nearby service pin,  
- complies with interoperability rules.
- standard setting: - off = unit is logically installed (default) or has no bus-power  
- on = unit is defective or has no application software  
- flash = unit is unconfigured, units can only be unconfigured after logical installation. Flash frequency approx 0.5 Hz.

#### Power LED (green)

- location: - behind lens opposite service LED
- factory setting: - on when connected to powered bus cable.
- default setting: - on when bus-power is available, can be configured to remain off.

### Communication

- service pin: - recessed on housing front, press to transmit neuron ID over bus network.
- neuron ID tags: - neuron ID in barcode and hexadecimals on two tags at rear of housing, one of which is removable
- protocol: - LonTalk™ from Echelon.
- transceiver type: - LPT-10 link-power transceiver.

### Electrical

- bus cable: - twisted pair cable, max. 2.5mm<sup>2</sup> per strand. Cable must be double isolated from mains (4kV).  
- suited cable types: IFS 31, Belden 85102, Belden 8471
- bus connection: - 2-pin socket & plug, socket is recessed at 45° angle in rear of housing,  
- plug (MSTB Phoenix type or BLZ Weidmuller type) supplied with unit,  
- bus connection is insensitive to polarity
- power supply: - 42.4 Vdc from LonWorks™ bus power supply unit connected to bus cable,  
- 50 mA application current @ 5Vdc.
- memory: - flash-EEPROM, suited for downloading new application software (NXE files)

### Mechanical

#### Housing

- colour: white RAL 9010
- material: polycarbonate
- flame rating: V0
- glow wire test: 850°C ≤ 5 sec. extinction
- surface texture: 9-125 UN-D 249, suitable for lacquering

#### Dimensions

- sensor: 116 mm × 52 mm
- mounting plate: 75 mm × 31 mm
- mounting ring: 113 mm × 60 mm

#### Weight

- sensor: 120 g
- mounting plate: 10 g
- mounting ring: 70 g

### Mounting

- fixation: - plate with bayonet-catch for surface mounting  
- ring with springs and bayonet-catch for recessed mounting
- recess clearance: - 60 mm. Ceiling tiles need not be removed for mounting

### Environmental

#### Operating conditions

- ambient temperature: +5 - +50°C
- relative humidity: 20 - 85 %, no condensation

#### Storage conditions

- ambient temperature: -25 - +85°C
- relative humidity: 10 - 95 %
- condensation: yes

### EMC

- immunity: in accordance with EN 50082-1
- radiated interference: in accordance with EN 50081-1

### Reliability

- call rate: 1% per year (estimated)
- life time: 10 years (estimated)

### Light sensor

#### Sensitivity

- range: - 50 to 20000 lux
- level: optimised for use in office applications  
Sensitivity adjustable over a range of a factor 1-100  
Factory setting: 4 Vdc at 600 Lux, in a plane 2 below the sensor with 30% reflection factor in the room.
- An eye sensitivity centring filter and a special light filter are incorporated in the sensor to ensure its reliability.
- pattern: - The sensor has an asymmetrical opening angle to reduce sensitivity towards the window (see picture a + b + c).

- Factory settings: calibration: - units are calibrated to the same sensitivity. The calibration factor - printed on its neuron ID tags - is used to re-calibrate the sensor after new application software has been downloaded into its flash-EEPROM (NXE files).
- reflection coeff.: - set for 30% reflection coefficient. Automatically adjusted when a new luxmeter reading is entered into the light sensor's configuration dialogue.

#### Inputs/Outputs

- see node profile

### Movement Detector

#### Sensitivity

- coverage: - nearly circular with a diameter of 8m for tangential movements and 6m for radial movements.  
- coverage area applies if the sensor is mounted between 2.6m and 3.0m above floor, coverage area decreases if sensor is mounted at different heights.

#### delay timer

- factory setting: - 0 min. before logical installation
- default setting: - 15 min. after logical installation, can be changed by PC (0 - 60 min.).
- service setting: - logically disconnected from functional LED when set in service mode, reconnected when leaving service mode.  
- configured delay timer setting remains functional.

#### Inputs/Outputs

- see node profile

### Infrared Receiver

#### Sensitivity

- range: - non-directional IR transmitters can operate anywhere within an area of 30 m<sup>2</sup> surrounded by 3 walls or an area of 20 m<sup>2</sup> without walls.
- pattern: - circular, opening angle = 130° (70° away from sensor centre, 60° towards sensor centre; 50% of nominal distance).

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## Packing data

Type	Box dimensions (mm)	Qty	Material	Weight (kg)	
				net	gross
Unit box	125 x 135 x 100	1	card board	0.20	0.285
Outer box	270 x 410 x 210	12	card board	2.40	3.740

## Ordering data

Type	MOQ	Ordering number	EAN code level 1	EAN code level 3
LRI 5133/10	12	9137 003 12303	87 11559 516 844	87 11559 516 851

## Miscellaneous

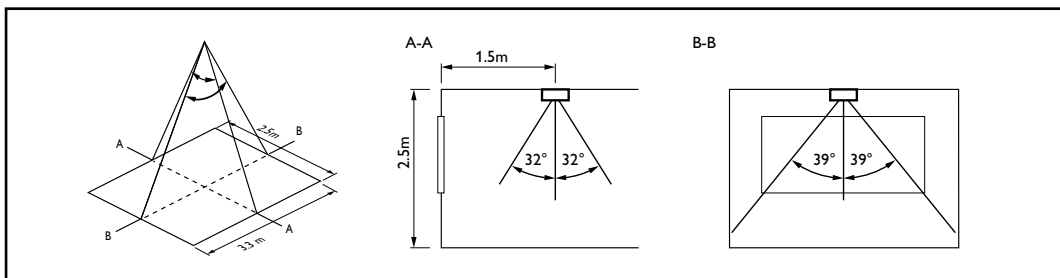
### Positioning

The chosen mounting position of HELIO multi-sensors may deviate from the optimum position of individual sensors if more than one sensor function is used in an application. For example, the optimum position of a light sensor controlling a row of luminaires along the window is nearby the window while the optimum location for a movement detector or IR receiver may be in the middle of a room.

This will not be a problem in most applications because the sensitivity of movement detectors and IR receivers allows the multi-sensor to be mounted in a position optimized for light sensors - i.e. nearby windows in daylight linking applications.

### Light Sensor:

The correct mounting position depends on the application, the ceiling height as well as the size and location of windows. To prevent direct entry of daylight on the photocell, the light sensor screen must be placed on the window side of the multi-sensor. Orientation markers on the housing and mounting brackets are provided to position units correctly.



### Infrared receiver:

In order to prevent interference from unwanted infrared radiation, the operating frequency of HF ballasts used in the same area as infrared receivers must be lower than 28 kHz or higher than 42 kHz.

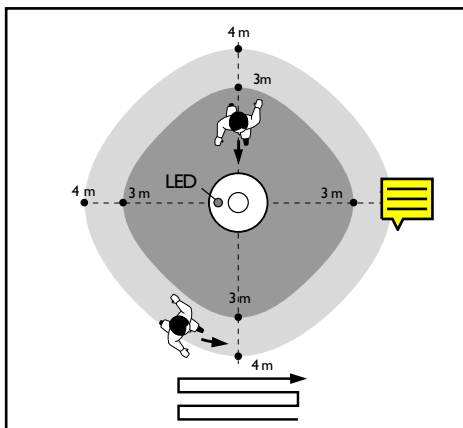


### Movement Detector:

The unit is based on the "passive infrared principle" (PIR), i.e. it detects differentials in infrared radiation when objects move in surroundings that radiate higher or lower temperatures than the object. Differentials must be more than 5°C. It is therefore not advisable to place movement detectors in areas of draft or in the vicinity of heaters and office equipment e.g. printers.

The sensitivity depends on object size, temperature, speed and direction of movement - maximum for tangential movements and minimal for radial movements. Most hand and arm movements will be detected by the movement detector in an office environment.

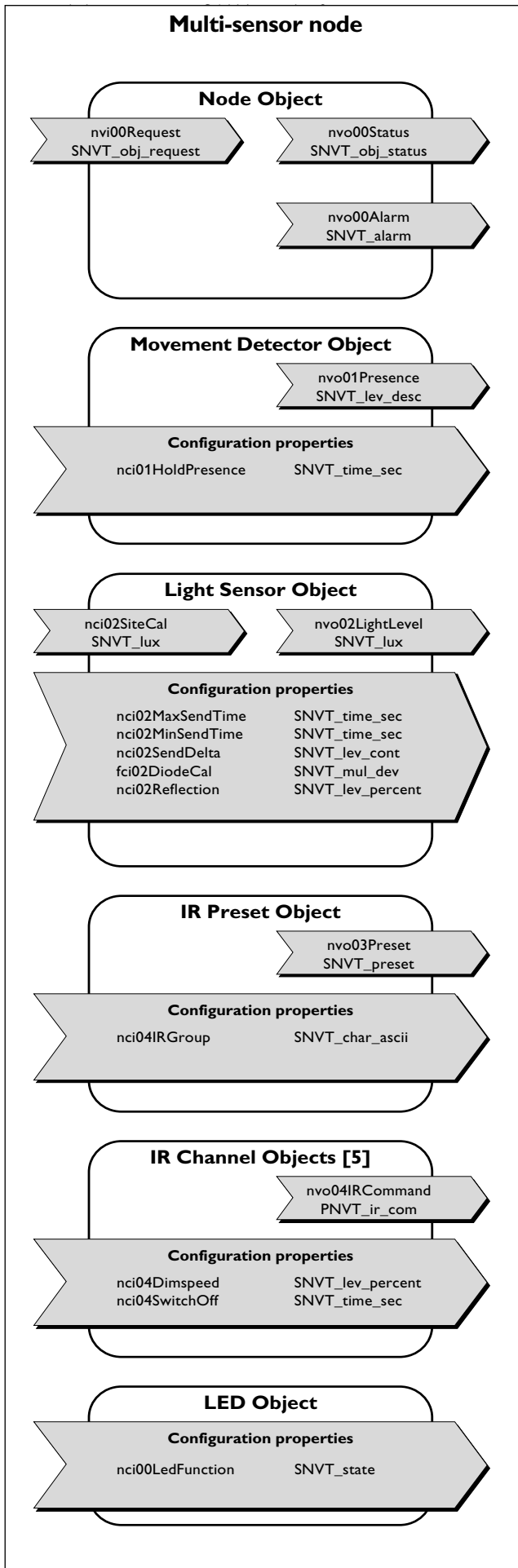
### Coverage pattern



### Remark:

Figures shown are valid for a mounting height between 2.6 and 3.0 meters above floor level. When mounted higher or lower, the coverage area becomes smaller.

# LRI 5133/10 - Helio Multi-Sensor



## The multi-sensor node

The multi-sensor is supplied with standard network variables for lighting applications. New application software can be downloaded into the unit's flash-EEPROM via PC (must be specified and ordered separately for projects).

### 1) Node Object

The Node Object provides Object Status, Request handling and Alarm handling.

- nvi00Request: Input variable for e.g. network management tools to request the status of individual objects, all objects or the whole node.
- nvo00Status: Output variable that reports the requested status of individual objects or node.
- nvo00Alarm: Output variable for "battery low" warning when IR transmitter batteries reach their end-of-life e.g. IRT 8065 transmitters that transmit IR temperature signals.

### 2) Movement detector Object

This object generates a signal when movement is detected. If the status was no\_Presence, the network variable will be updated with Presence. If the status was Presence with a running delay timer, the delay timer will be restarted. If the status is Presence and the delay timer has expired, the network variable will be updated with no\_Presence. The delay timer has a default of 15 min. after logical installation.

- nvo01Presence: This output variable gives the status of the movement detector.

### 3) Light sensor Object

The new lux value is calculated every 500msec. The network variable nvo02LightValue is updated according to the minimum & maximum send times and send-on-delta (lux) configuration parameters.

- nvo02LightLevel: This output variable contains the light level (lux) measured by the light sensor.
- nvi02SiteCal: Contains the reading from a luxmeter (50-20000 lux) which is placed on a working plane directly below the light sensor during commissioning. The input is used to calculate average reflection coefficients.

### 4) IR preset Object

This object generates the preset number transmitted from an infrared transmitter (RC5 code) when one of its four preset buttons are pressed. The generated preset number will recall a pre-defined lighting level in linked light controller enabling users to recall lighting scenes.

The object also includes a learn or recall command when preset numbers are generated. Learn commands are included when users wish to store current lighting levels under the generated preset number. Recall commands are included when users wish to recall previously defined lighting levels.

- nvo03Preset: Contains the preset number transmitted from IR transmitters combined with a learn or recall command.

### 5) IR channel Objects [5]

This object generates switch lights on, increase/decrease light levels and switch lights off commands to linked light controllers. Commands are transmitted from IR transmitters (RC5 code) that have upto 5 sets of channel control keys. Users are then able to individually switch & dim lighting circuits with separate sets of control keys on IR transmitters.

- nvo04IRCommand: This output variable contains channel switching & dimming commands from IR transmitters.

### 6) Functional/Power LED Object

This object is used to configure the behaviour of the node's functional & power LED. The functional LED can be enabled or disabled separately to indicate reception of IR command signals (flash), IR temperature signals (flash) and PIR signals based on nvo01Presence values (Presence = on; no\_Presence = off). The power LED can be enabled/disabled to indicate presence of bus-power. Functional and power LEDs are enabled in the factory (see Movement detector Object for factory settings of delay timer). The functional LED is disabled for all signals after logical installation (default).



# LRI 5133/10 - Helio Multi-Sensor

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Printed in the Netherlands  
Data subject to change

## Configuration properties

### 1) Node Object

No configuration properties

### 2) Movement detector Object

#### nci01HoldPresence

Delays the no\_Presence messages when the object does not detect movement - i.e. delay timer:

- nci01HoldPresence = 0 - 65534 (= 6553 sec.).

### 3) Light sensor Object

#### nci02MaxSendTime

Defines the maximum interval time before current lux values are transmitted:

- nci02MaxSendTime = 0 - 65534 (= 6553 sec.).

#### nci02MinSendTime

Defines the minimum interval time before current lux values are transmitted:

- nci02MinSendTime = 0 - 65534 (= 6553 sec.).

#### nci02SendDelta

Defines how much a measured lux level must deviate from the last transmitted value before it can be transmitted:

- nci02SendDelta = 0 - 100%

#### nci02SiteCal

Contains the reading from a luxmeter which is placed on a working plane directly below the light sensor during commissioning. The object uses this input to calculate average reflection coefficients.

- nci02SiteCal = 50 - 20000 lux

#### fci02DiodeCal

Contains the light sensor's calibration factor. This parameter is factory defined and may not be changed. It is erased when new application software (NXE file) is loaded into the flash-EEPROM and must therefore be replaced afterwards. Calibration factors can be noted before downloading new software or obtained from the neuron ID tag at the rear of each unit.

- fci02DiodeCal = integer

#### nci02Reflection

Contains the factory setting (30%) or a calculated reflection coefficient. Reflection coefficients are calculated automatically (see nci02SiteCal)

but can also be changed manually:

- nci02Reflection = 0 - 100%

### 4) IR preset Object

#### nci04IRGroup

Contains the IR receiver's Group address used for IR remote control applications for example in open-plan offices. Assigned IR group addresses in IR receivers and transmitters prevent unwanted interference when several transmitters are used in the same area. There are seven Group addresses. The assigned Group address applies for the five IR Channel Objects (see below).

- nci04IRGroup = 41 - 48 (Gr.A - Gr.G)

### 5) IR Channel Objects [5]

#### nci04Dimspeed

Contains a factor that defines how many dimming steps have to be executed when a dim command is received from an IR transmitter. The resulting increase or decrease in lighting levels is defined by a dimming table in the light controller.

- nci04Dimspeed = 0 - 100%

#### nci04SwitchOff

This is a delay timer function that can be used to generate an automatic switch-off command when the timer expires. A typical application could be staircase lighting that automatically switch off after a delay time when they were switched on by a user. The timer is only activated when lights were switched on by IR remote control and if the set value is larger than 0.

- nci04SwitchOff = 0 - 65534 (0 - 6553 sec.)

### 6) Functional/Power LED Object

#### nci00LedFunction

Defines the behaviour of functional & power LEDs:

- nci00LedFunction.bit0: flash when IR command and temperature signals are received (MSB).
- nci00LedFunction.bit1: flash when IR command signals are received from transmitters set in the General mode or in the same Group address as IR Channel Objects (see IR preset Object above).
- nci00LedFunction.bit2: on if nco01Presence = Presence; off if nco01Presence = no\_Presence
- nci00LedFunction.bit3: sets movement detector in temporary service mode.
- nci00LedFunction.bit15: to switch power LED on when bus-power is available (LSB).

## Related documentation

Installation instructions LRI 5133  
Helio Handbook LCH 5900/00

3222 636 41010  
(English) 3222 636 49000



# PHILIPS