



# OEM Design-in Guide

Luxon IoT Node

Version 1.0

**luxon**

Dynamic Light Management

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# Luxon IoT Node

## 1. General information

### 1.1 Introduction

The Luxon IoT Node has been developed by Nedap to accelerate the market adoption of connected lighting. The Luxon IoT node is able to control SR, 1-10V and DALI drivers to make LED luminaires IoT-ready and truly sustainable against low costs. In addition to wireless control, the IoT node allows for performance monitoring and remote diagnostics of LED fixtures equipped with Philips Xitanium SR drivers and with DALI drivers.

#### Benefits and applications

- Cost-effective solution to create internet connected and wirelessly controlled luminaires
- Philips Xitanium SR, DALI and 1-10V ready
- Small dimensions
- Easy to integrate, easy to connect
- Supports on/off, dimming and luminaire status
- Temperature sensor integrated
- Lux sensor integrated
- Over the air (OTA) programming of the Luxon IoT Node and Philips Xitanium SR drivers
  
- Nedap Luxon software features:
  - Time, daylight, motion and dim control
  - Direct motion sensor control
  - Flexible group assigning
  - Multi-site management
  - Management reports
  - Calculated energy logging

### 1.2 Warnings and instructions

- Read the design guide completely before installing the Luxon IoT Node.
- The Luxon IoT Node may only be installed by qualified and trained personnel.
- No serviceable parts inside, do not open enclosure.
- To avoid possible electrical shock, before installing or servicing the Luxon IoT Node, disconnect the power by turning off the branch circuit breakers.
- Do not connect mains voltage to the terminals of the Luxon IoT Node.
- Make sure the Luxon IoT Node is operated within the technical limitations of the specification overview in chapter 8.
- The Luxon IoT Node complies with EMC and safety requirements as stated in the specifications.
- The Luxon IoT Node provides basic isolation to the control lines. Therefore it is safe to touch the front part of the node. Note that in case an external sensor is used, its cable and enclosure shall provide sufficient isolation to be able to touch it safely.
- Make sure the IoT node RF antenna is not covered or obstructed by metal for the best RF communication.

# Luxon IoT Node

## 1. General information

### 1.3 Package contents

| Description         | Units per packaging |
|---------------------|---------------------|
| Luxon IoT Node      | 12 x 10 pcs         |
| M20 Nut             | 12 x 10 pcs         |
| Sealing Ring        | 12 x 10 pcs         |
| Spare Label         | 12 x 10 pcs         |
| Quick Install Guide | 1                   |

Note: Do not remove any labels from the devices. These labels contain important information. The minimum order quantity of the Luxon IoT node MOQ is 10 pcs.

### 1.4 Shipping and storage

| Description    | Packaging dimensions (h x w x d) [mm/inch] | Packaging weight [kg/lbs] | Storage temperature               |
|----------------|--|---------------------------|-----------------------------------|
| Luxon IoT Node | 245 x 385 x 585 /<br>9.65 x 15.2 x 23.0    | 3.3 / 7.3                 | 20°C to +70°C /<br>-40°F to 158°F |

- Store the boxes in a dry place

### 1.5 Waste disposal methods

The local government authority must be consulted for instructions regarding waste processing of the Luxon IoT Node.

# Luxon IoT Node

## 2. Product information

### 2.1 Product range

| Description    | Part number |
|----------------|-------------|
| Luxon IoT Node | 9984976     |



### 2.2 Accessories

| Description                                  | Part number | Units per packaging |
|--|-------------|---------------------|
| Luxon Motion Sensor 12m/39ft universal mount | 9984526     | 6 x 1               |



### 2.3 Dimming interface and supply voltage

The Luxon IoT node determines the interface control mode automatically by measuring supply voltage and dimming interface voltage. It can be either 1-10V, Philips SR or DALI mode.

#### 2.3.1 Philips SR interface

In Philips SR mode, the Luxon IoT node is powered by the SR driver through the dimming interface.

DALI communication is used to control the SR driver via the same dimming interface. The output is polarity sensitive. Up to four drivers can be controlled by connecting the dimming ports in parallel.

Note: Each SR driver provides approximately 55mA of current on the DALI bus, and the IoT node sink capability is limited to 250mA. To minimize unnecessary losses, it is recommended to turn on only two DALI power supplies. To turn off the DALI power supply use the Philips MultiOne configurator.(See Philips website)

#### 2.3.2 DALI interface

In DALI mode, the Luxon IoT node provides DALI bus voltage and communication through the dimming port to drivers with a DALI control port. The IoT node supply voltage must be 24Vdc.

The output is polarity sensitive although most drivers do not have a polarity sensitive DALI port.

Up to four drivers can be controlled by connecting the dimming ports in parallel.

#### 2.3.3 1-10V interface

In 1-10V mode, the dimming interface transforms the small DC-current from the driver dimming port into a voltage corresponding to the desired dim level. The IoT node supply voltage must be 12Vdc or 24Vdc.

The dimming voltage range is from 1 to 10V, the output can be set to 0V to switch the LED driver off. (dim to off functionality)

The output is polarity sensitive. Up to four drivers can be controlled by connecting the dimming ports in parallel.

### 2.4 LED indicator

#### Before commissioning (Luxon IoT node not assigned to a Luxon Light Controller):

After powering up the Luxon IoT node, the led indicator lights up green during initialization.

In case of SR/DALI drivers, the led flashes 10 seconds or more during initialization and lights up green continuously when finished. In case of 1-10V drivers the led lights up green immediately.

#### After commissioning:

The green led will be on for 5 seconds to indicate start-up and then turns off.

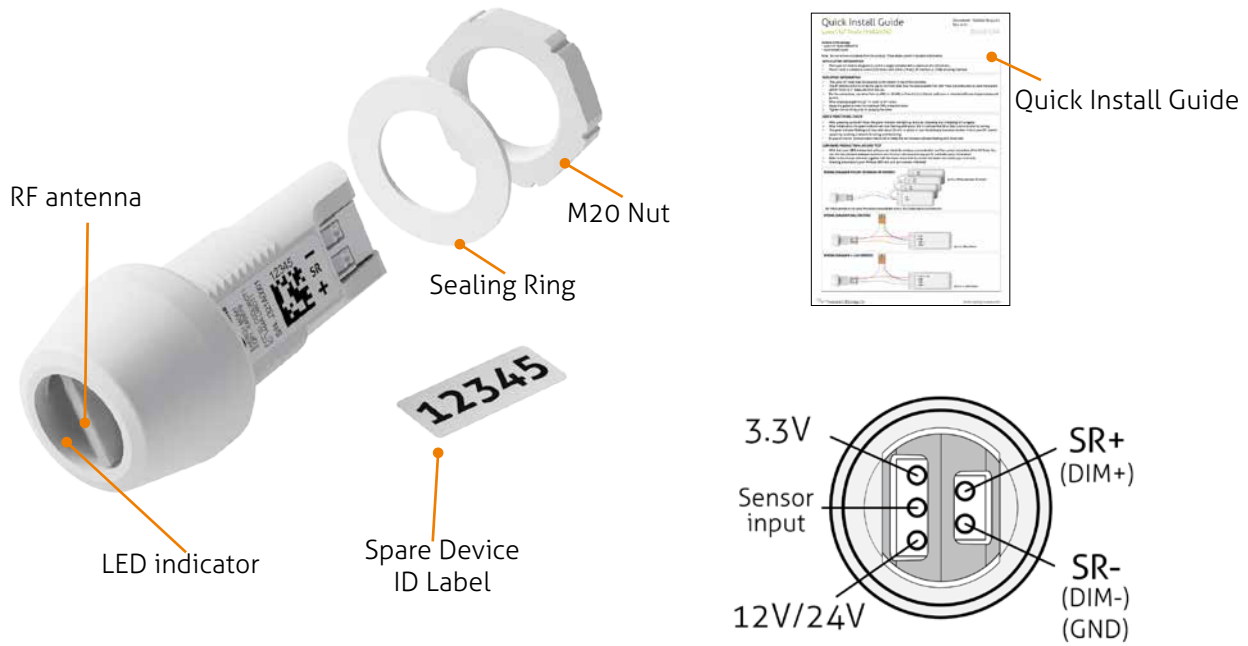
The led indicator will start flashing red in case of:

- no driver found due to incorrect wiring or no driver connected
- no control mode (SR, 1-10V or DALI) is detected

# Luxon IoT Node

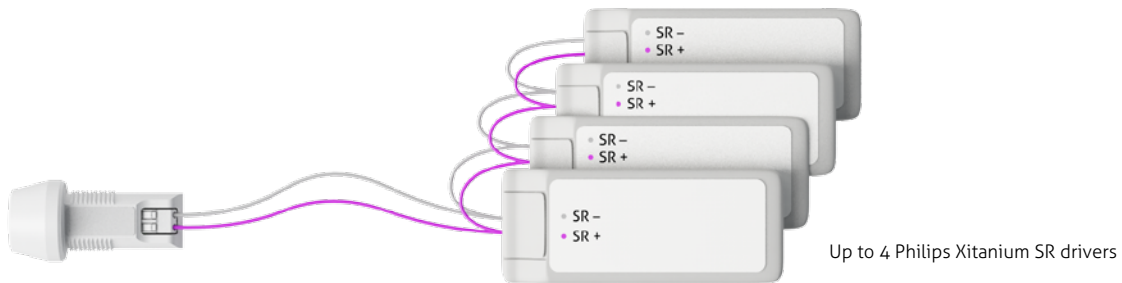
## 2. Product information

### 2.5 Luxon IoT node overview



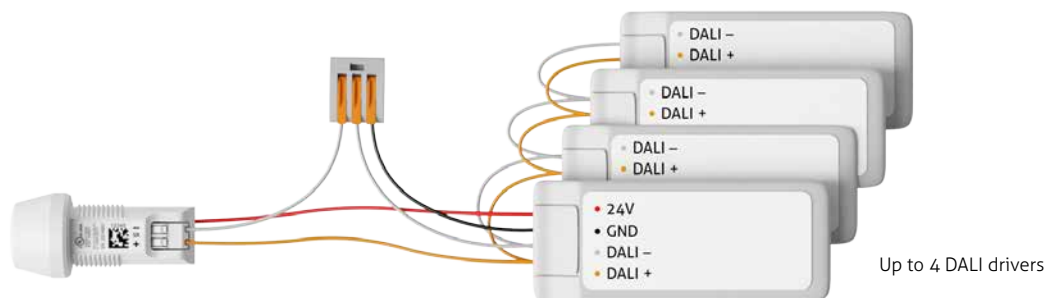
### 2.6 Wiring Diagram

#### 2.6.1 SR application



See Philips website for the latest information and applicable drivers: <http://www.philips.com/xitaniumsr>

#### 2.6.2 DALI application



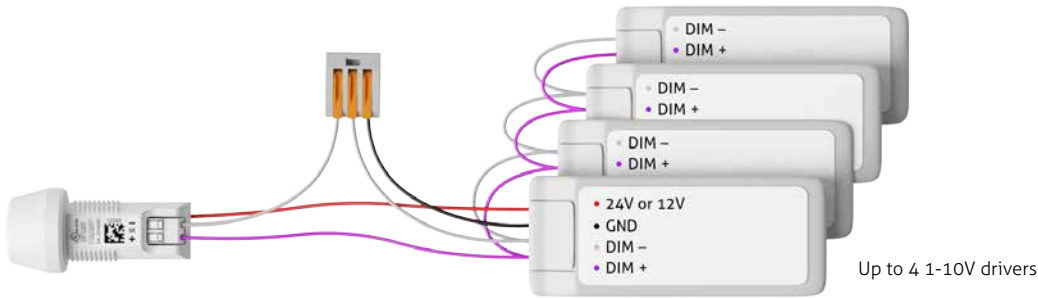
DALI driver requirements:

- One driver needs to supply 24V to the Luxon IoT node; (Power consumption IoT node: 250mW)

# Luxon IoT Node

## 2. Product information

### 2.6.3 1-10V application



1-10V driver requirements:

- One driver needs to supply 12V or 24V to the Luxon IoT node; (Power consumption IoT node: 250mW)
- All drivers needs to have dim-to-off functionality.

Note:

For some drivers the control wires have to be considered as basic isolated signals after connecting to the IoT node.

### 2.7 Temperature sensor

The Luxon IoT Node has a temperature sensor, which represents the internal air temperature of the luminaire. This temperature can be requested in Luxon software to obtain temperature information from the luminaire in which the Luxon IoT Node is built in. The range of the temperature sensor is -40°C/-40°F to +100°C/+212°F.

### 2.8 Wire specifications

The Luxon IoT node has 5 connections for use with stranded or solid wires.

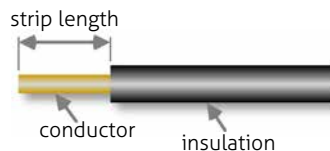
See the table below with the applicable wires and information about type and strip length of the wires.

| Wire type                   | Wire range                                   | Remarks                              |
|-----------------------------|--|--------------------------------------|
| Solid                       | 0.2 to 0.75 mm <sup>2</sup><br>AWG 24 to 18  |                                      |
| Fine stranded               | 0.2 to 0.75 mm <sup>2</sup><br>AWG 24 to 18  | use push button while inserting wire |
| Fine stranded with ferrules | 0.25 to 0.34 mm <sup>2</sup><br>AWG 24 to 22 |                                      |
| Fine stranded tinned        | 0.25 to 0.5 mm <sup>2</sup><br>AWG 24 to 20  | max allowable end diameter is 1.0 mm |

Wire strip length is 8 ± 1mm.

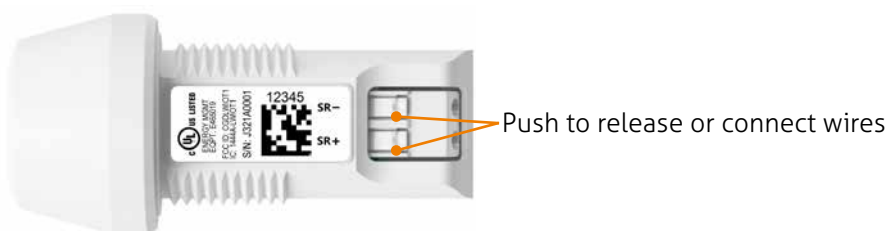
Maximum wire insulation diameter is 2mm.

Use only 1 wire per connector position.



To disconnect a wire push the button while pulling the wire out of the connector.

Note: Push the release button right-angled to prevent possible damage to the connector.





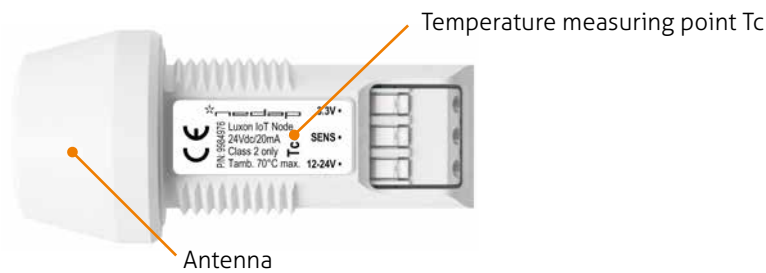
# Luxon IoT Node

## 3. Design-in considerations

### 3.1 Luxon IoT Node

#### 3.1.1 Positioning information

- Keep the Luxon IoT Node away from hot areas to operate below an ambient temperature of +70°C.
- Make sure that the case temperature  $T_c$  (see drawing) is always below +75°C or the temperature sensor is always below 80°C. The temperature sensor can be read out by the Luxon wireless control tool, see chapter 4.

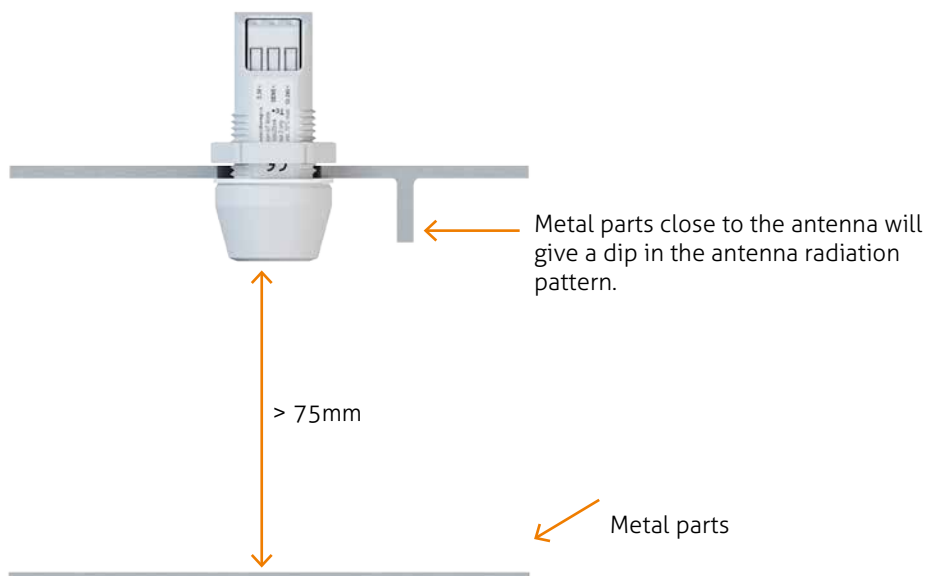


#### 3.1.2 RF considerations

- The Luxon IoT Node uses wireless communication via an RF antenna located inside the enclosure, see picture.
- In case the Luxon IoT Node is built into a metal enclosure it shall be passed through an opening in the enclosure.
- In case the Luxon IoT Node is built in completely into the luminaire only a plastic enclosure can be used.

Requirements to give the antenna the best possible free 360° communication performance:

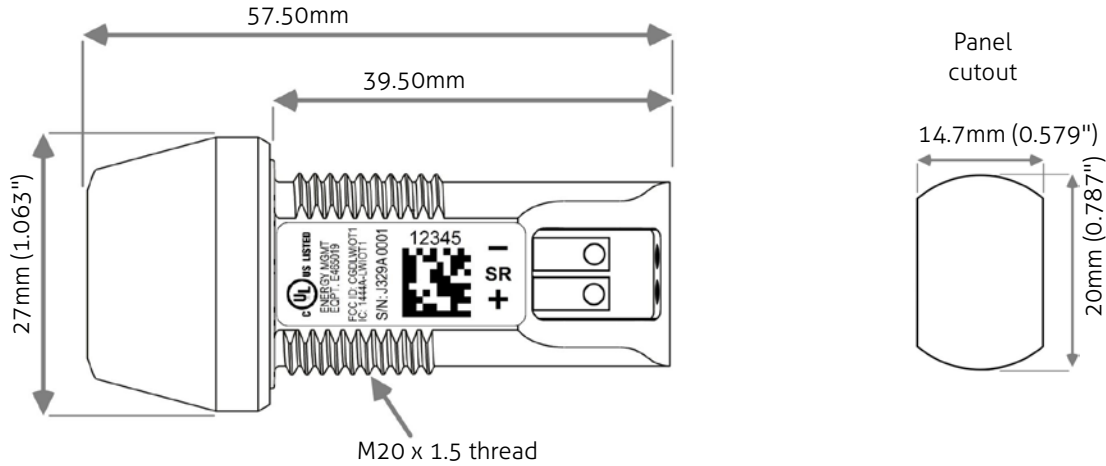
- Avoid metal parts close to the antenna.
- Mount the Luxon IoT node pointing downwards or upwards.
- Avoid large horizontal oriented metal parts within 75mm or 3" measured from the center of the antenna.



# Luxon IoT Node

## 3. Design-in considerations

### 3.1.3 Dimensions (in mm)

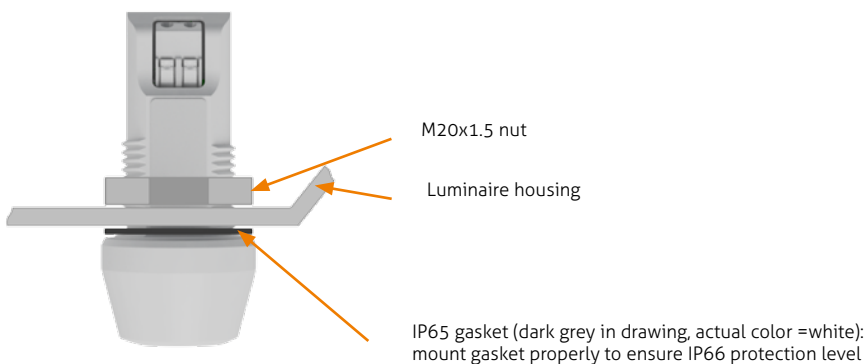


Alternatively the Luxon IoT node can be mounted in a knock-out of 0.5 inch or 20mm diameter. For the Luxon IoT node 3D CAD data see Luxon Portal on [www.portal.nedap-luxon.com](http://www.portal.nedap-luxon.com) where you can download the 3D STEP file.

### 3.1.4 Mounting information

The wireless Node shall be fixated with the supplied M20 nut. Maximum torque is 3Nm. For panel cutout dimensions, see drawing.

The supplied sealing shall be used to achieve ingress protection up to IP66.



### 3.1.5 Spare label with unique device ID

Place the label with the unique device ID on the outside of the luminaire for service purposes of the luminaire. Make sure the label corresponds with the ID on the Luxon IoT node.

# Luxon IoT Node

## 3. Design-in considerations

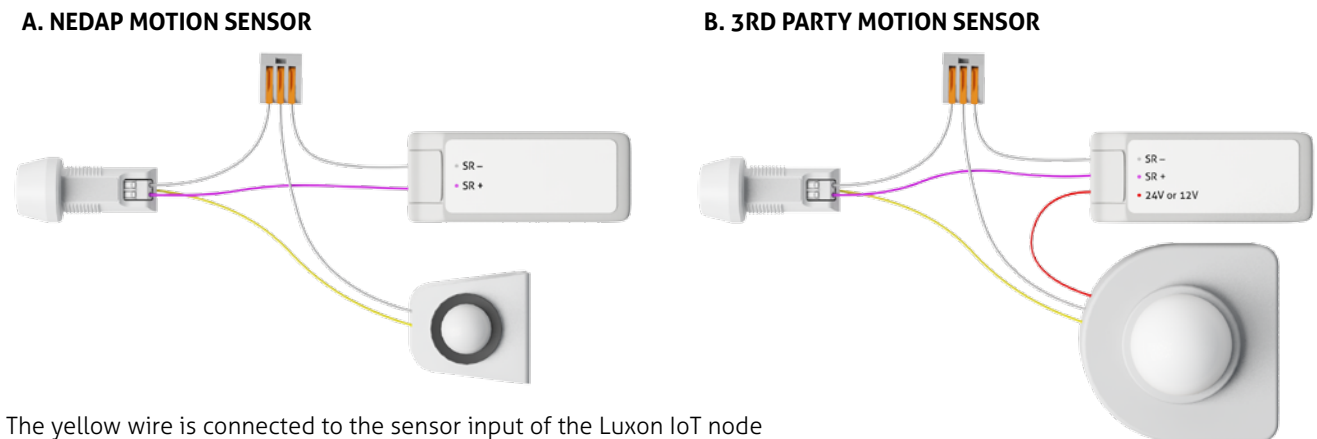
### 3.2 Motion sensor applications

See the Luxon Motion Sensor Manual for information about mounting the sensor.

The optional Luxon Motion Sensor shall be connected as shows in diagram A by using appropriate wire connectors. Diagram B shows how to connect third party sensors. Note that third party sensor requires a 12V or 24V external supply voltage.

For an overview of compatible sensors, please refer to [portal.nedap-luxon.com](http://portal.nedap-luxon.com).

The Luxon Motion Sensor cable shall not be lengthened.



The yellow wire is connected to the sensor input of the Luxon IoT node

### 3.3 Product responsibility

The Luxon IoT Node is designed to build in. Safe and reliable operation requires that the end-product complies with the relevant standards and regulations. The end-product shall be designed to adequately protect the Luxon IoT Node from dust, moisture and pollution.

The manufacturer of the end-product remains responsible for the quality and performance of the build in of the Luxon IoT Node in compliance with the contents of this OEM Design Guide as well as for the total system in the market. Specifications of the Luxon IoT Node shall not be exceeded when it is used in the actual operating conditions.

# Luxon IoT Node

## 4. Luxon Wireless Control Tool

With the Luxon Wireless Control Tool you can test and demonstrate the functionality of your luminaire with the Luxon IoT node built-in. You can select a luminaire and switch it on and off and dim to a level between 10% and 100%. You can also retrieve luminaire information about the operation mode (SR, 1-10V or DALI) , temperature, operating hours and more.

You need a Windows based laptop and Luxon wireless USB key to use this tool. See our partner portal to download the software and user manual.

## 5. Luxon Wireless OEM test unit

With the Luxon Wireless OEM test unit you can check the wireless communication and the correct wiring of the mains and control wires of the Luxon IoT Node in your production line.

You can control (switch on/off and dim) the luminaire manually by simply connect and operate with two switches. The control interface can also be connected to your automated production test tool.

You only need this test unit (no laptop or other peripherals needed) to control a luminaire. See the manual delivered together with the test unit how to connect it and control your luminaire.

*Ordering information Luxon Wireless OEM test unit: part number: 9984968*



## 6. Lifetime and reliability

The lifetime of the Luxon IoT node in continuous operation over the temperature range of -40°C to +70°C (-40°F to 158°F) is 10 years with a failure rate smaller than 0.2% per year.

# Luxon IoT Node

## 7. Possible led drivers

All Philips SR drivers with SR-logo are compatible with the Luxon IoT node.



All IEC 62386 compliant DALI drivers with a 24Vdc auxillary supply shall be compatible with the Luxon IoT node.

All 1-10V drivers which have a 12Vdc or 24Vdc auxillary supply and dim-to-off functionality (see required theshold level in the specification) shall be compatible with the Luxon IoT node.

For all possible drivers see Luxon Portal: [www.portal.nedap-luxon.com](http://www.portal.nedap-luxon.com)

# Luxon IoT Node

## 8. Specific technical data

### 8.1 Supply voltage

|            |                                    |
|------------|------------------------------------|
| SR mode    | powered by SR interface            |
| 1-10V mode | 12Vdc $\pm$ 10% or 24Vdc $\pm$ 10% |
| DALI mode  | 24Vdc $\pm$ 10%                    |

### 8.2 Dim interface

|                 |   |
|-----------------|---|
| SR interface    | Philips SR compatible<br>up to 4 drivers  |
| 1-10V interface | Compatible with IEC 60929 drivers<br>8mA max sink current<br>Dim-to-off Threshold : 0.3V<br>Required aux supply: 12Vdc $\pm$ 10% or 24Vdc $\pm$ 10% |
| DALI interface  | Compatible with DALI drivers<br>DALI power supply integrated: 8mA / up to 4 drivers<br>Require aux supply: 24Vdc $\pm$ 10%                          |

### 8.3 Other specifications

|                          |  |
|--------------------------|--|
| RF frequency             | 2.45GHz  |
| RF range                 | 40m / 131ft.   |
| Operating ambient Node   | -40°C to +70°C / -40°F to +158°F                           |
| Maximum Tcase Node       | 75°C / 167°F   |
| Storage temperature      | -20°C to +70°C / -4°F to 158°F                             |
| Lifetime                 | 10 years   |
| Failure rate             | < 0.2% / year  |
| Ingress Protection       | IP66   |
| Weight                   | 16.5g / 0.58oz   |
| Power Usage Node         | <250mW   |
| Motion Sensor Input      | Compatible with Luxon Motion Sensor 12m                    |
| Lux sensor range         | 10 to 1500 lux   |
| Temperature sensor range | -40°C to +100°C / -40°F to 212°F                           |
| Connector                | Push-in terminals, see chapter 2.8 for wire specifications |
| Dimensions DxH           | 27.0 x 57.5mm / 1.06 x 2.64 inch                           |

### 8.4 Approvals

#### EMC

CE, RTTE, FCC

#### Safety

CE, UL-listed

### 8.5 Compatible light management software

| Software                     | Version        |
|------------------------------|----------------|
| Floorplanner                 | 4.7 or higher  |
| Luxon Light Controller (LLC) | 2.13 or higher |
| Server                       | 3.1 or higher  |

Update your software in case the version is lower than indicated above. Contact Nedap customer support if you need assistance: [support@nedap-luxon.com](mailto:support@nedap-luxon.com)

# Luxon IoT Node

## 9. FCC declarations

This device complies with part 15 of the FCC Rules and with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

### **Warning (15.21)**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Cet appareil se conforme aux normes RSS exemptés de licence du Industry Canada. L'opération est soumise aux deux conditions suivantes:

- (1) cet appareil ne doit causer aucune interférence, et
- (2) cet appareil doit accepter n'importe quelle interférence, y compris l'interférence qui peut causer une opération non prévue de cet appareil.

Les changements ou modifications n'ayant pas été expressément approuvés par la partie responsable de la conformité peuvent faire perdre à l'utilisateur l'autorisation de faire fonctionner le matériel.

### **FCC and ISED Radiation Exposure Statement**

This equipment complies with FCC (OET Bulletin 65) and Canadian radiation exposure limits set forth in RSS-102 for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme à RSS-102 limites énoncées pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

### **ISED EMC Declaration**

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de Classe B est conforme à la norme Canadienne ICES-003.

### **FCC Information to the user (15.105(b))**

Note: This equipment has been tested and found to comply with the limits for a class B digital devices, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does not cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- To ensure compliance with FCC regulations, use only the shielded interface cables provided with the product, or additional specified components or accessories that can be used with the installation of the product.

# luxon

## Dynamic Light Management

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