LED-Treiber

PCA xitec II

Product Manual

TRIDONIC

Table of contents

1. Validity

These operating instructions are valid for electronic ballasts of the PCA xitec II series.

xitec II

Devices in the PCA xitec II series carry the xitec II logo on the top of the casing and are are therefore easy to distinguish from predecessor versions.

The PCA xitec II series comprises three versions: BASIC, ECO and EXCEL.
If a reference is made to one of the three versions then the descriptions are valid only for that version.

TRIDONIC GmbH & Co KG is constantly striving to develop all its products. This means that there may be changes in form, equipment and technology.
Claims cannot therefore be made on the basis of information, diagrams or descriptions in these instructions.
The latest version of these operating instructions is available on our home page at
http://www.tridonic.com/com/en/operating-instructions.asp

1.1. Copyright

We are always open to comments, corrections and requests. Please send them to info@tridonic.com

1.2. Imprint

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2. Safety instructions

The instructions in this section have been compiled to ensure that operators and users of PCA xitec II ballasts from Tridonic are able to detect potential risks in good time and take the necessary preventative measures.
The operator must ensure that all users fully understand these instructions and adhere to them. This device may only be installed and configured by suitably qualified personnel.

2.1. Intended use

2.1.1. Proper use

Operation of low pressure lamps. The device may only be used for this intended purpose.

2.1.2. Improper use

Outdoor use. Extensions and modifications to the product.

⚠ WARNING!

Improper use could result in injury, malfunction or damage to property.
The operator must inform all usersof the potential risks associated with the use of the equipment and of protective countermeasures.

2.2. Dangers associated with the operation of the system

⚠ DANGER!

Danger of electrocution
Disconnect the power to the entire lighting system before working on the lighting system!

⚠ CAUTION!

Electromagnetic compatibility (EMC)
Although the Tridonic control device meets the stringent requirements of the appropriate directives and standards on electromagnetic compatibility, it could potentially interfere with other devices under certain circumstances!

2.3. Environment

⚠ DANGER!

Not to be used in corrosive or explosive environments.

General safety instructions

⚠ CAUTION!

Risk of damage due to drafts and low ambient temperatures

Fluorescent lamps are extremely temperature-sensitive. Below a certain temperature they may fail to operate properly or suffer damage. Lamps are particularly susceptible if the following factors are involved together:

_ Low ambient temperature (< 10 °C)
_ Drafts
_ Constant operation
_ Constant low dimming level

Note the following:

_ Avoid constant operation at low temperatures and low dimming levels!
_ Check for sources of cold air such as air-conditioning outlets when installing the lighting!
_ Make allowances for unavoidable risks such as drafts in outdoor applications or in tunnels, or install special lamps!

⚠ CAUTION!

Risk of damage caused by humidity and condensation

_ Only use the control device in dry rooms and protect it against humidity!
_ Prior to commissioning the system, wait until the control device is at room temperature and completely dry!

3. Operating devices

3.1. Introduction

Tridonic offers digital dimmable products that are ideal whatever the requirements. Our PCA product range comprises three series: EXCEL one4all, ECO and BASIC.

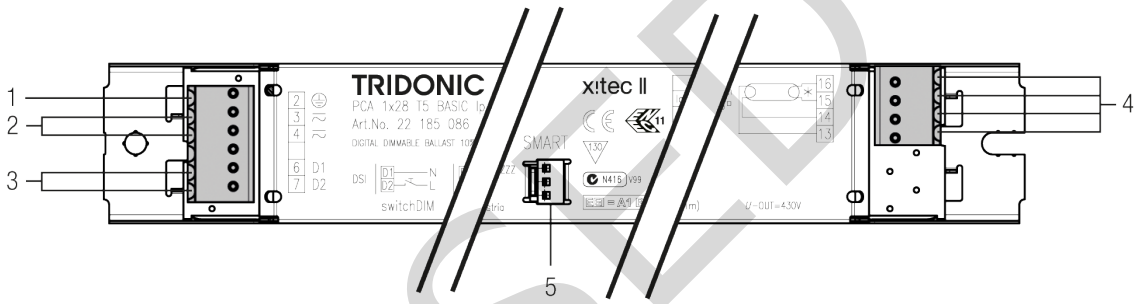
Our aim is to equip you with precisely the products that you need for your luminaire solutions. No more, no less, but simply the right functionality at the highest level of quality. This means you save energy and ecological resources. Intelligent functions help you to turn your ideas into reality without having to install complex equipment.

3.2. PCA BASIC xitec II

3.2.1. Description

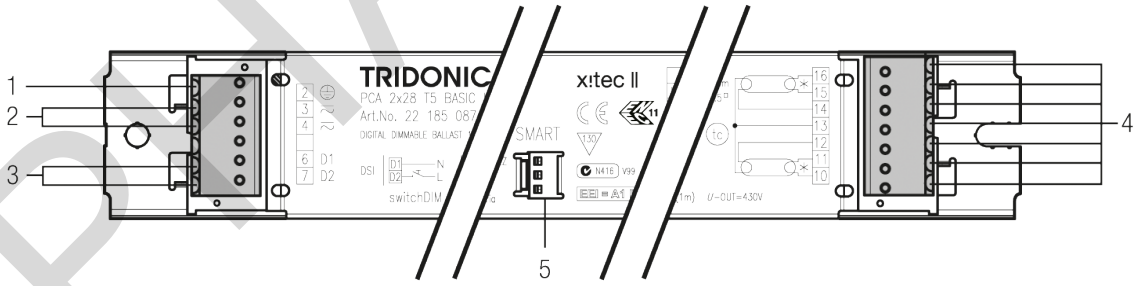
The electronic ballasts in the xitec II series come in three versions (BASIC, ECO and EXCEL). They differ in terms of their functionality.
Ballasts from the PCA BASIC series focus essentially on energy efficiency. They provide the basis for simple solutions and represent a real alternative to non-dimmable applications.
PCA BASIC offers DSI, corridorFUNCTION, switchDIM with memory function, daylight control via SMART sensor and a dimming range from 10 to 100 percent.

3.2.1.1. Linear device, single-lamp:



1) Earth connection, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

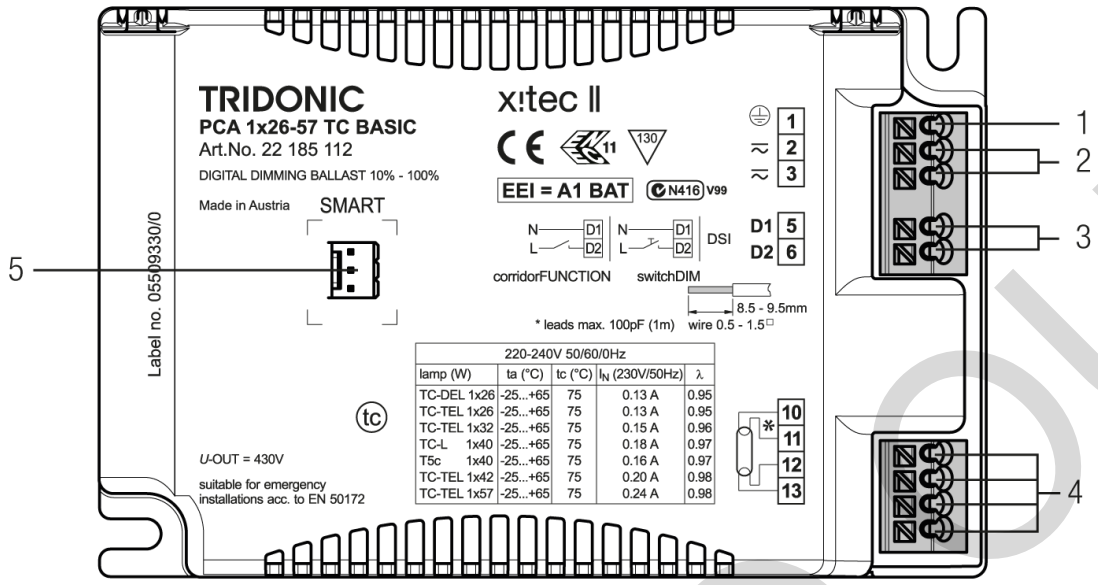
3.2.1.2. Linear device, two-lamp:



1) Earth connection, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

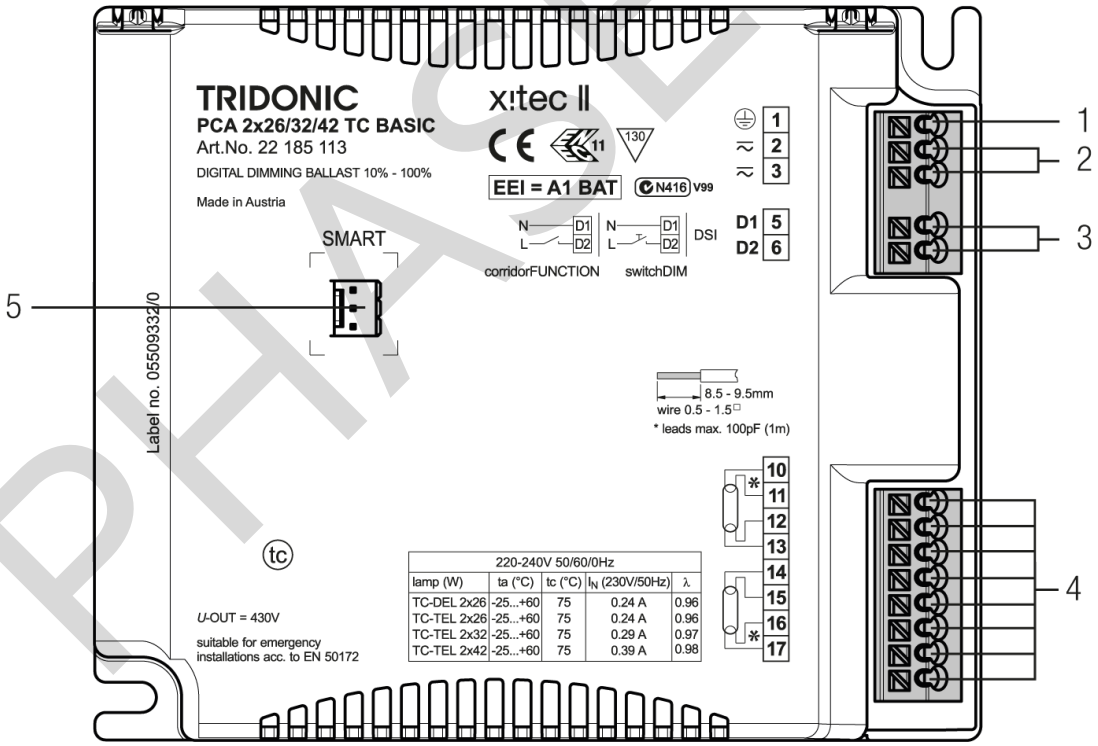
Operating device PCA BASIC

3.2.1.3. Compact device, single-lamp:



1) Earth connection / function earth, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

3.2.1.4. Compact device, two-lamp:



1) Earth connection / function earth, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

3.2.2. Installation notes

NOTICE

The cabling, wiring and mounting for a ballast varies depending on the design and manufacturer of the lamp. The following description should therefore not be viewed as comprehensive installation instructions but merely as important general information. To obtain further information, proceed as follows:

_ Read the documentation provided by the lamp manufacturer. Follow the guidelines and instructions of the lamp manufacturer.

_ Observe all relevant standards. Follow the instructions given in the standards.

3.2.2.1. Safety information

WARNING!

_ Comply with the general safety instructions (see "Safety instructions", p. 5) !

_ To avoid failures due to ground faults protect the wiring against mechanical loads from sharp-edged metal parts (e.g. cable penetrations, cable holders, metal frames, etc.

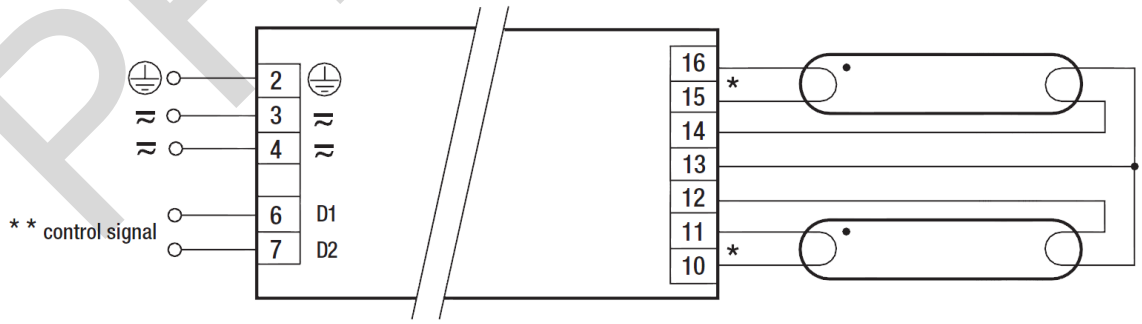
_ Make sure that the current at the terminal does not exceed a certain maximum value. This maximum value lies at 2 amps for BASIC and ECO devices and at 4 amps for EXCEL devices.

_ Electronic ballasts from Tridonic are protected for a maximum of 1 hour against overvoltage of up to 320 V. Make sure that the ballast is not exposed to overvoltages for long periods

_ Electronic ballasts from Tridonic have type of protection IP 20. Comply with the requirements for this type of protection.

3.2.2.2. Routing the wires

3.2.2.2.1. Wire lengths



* leads 10, 11, 15, 16: keep wires short, max. 1.0 m
leads 12, 13, 14: max. 2.0 m; ballast must be earthed
* * digital signal DSI or switchDIM

NOTICE

Parasitic leakage currents are determined by wire capacitance and voltage potential. To minimise parasitic leakage consider the following:

_ "Hot connections" (indicated in the diagram by an asterisk *) must be kept as short as possible. With reference to typical luminaire wiring with a max of 100 pF per meter of wire length the maximum length is approx. 1 meter.

_ "Hot connections" must be kept shorter than the other connections ("cold connections").
For precise wire capacitances and wire lengths see the relevant data sheets.

3.2.2.2.2. Sensor wires

Sensor wires must be routed separately from the lamp wires and mains cables otherwise the lighting control system may malfunction.
If separate routing is not possible (for reasons of space) shielded cables must be used.

3.2.2.2.3. "Master/slave" circuits

In "master/slave" circuits the two-lamp ballast of the single-lamp master luminaire operates a further single-lamp slave luminaire.

WARNING!

Do not use a master/slave circuit with dimmable ballasts as the different wire lengths lead to very different behaviour in operation.

3.2.2.3. Tests

NOTICE

The performance of the prescribed tests and compliance with relevant standards are the responsibility of the luminaire manufacturer.
The following descriptions merely indicate the most important tests and are no substitute for a full research of the relevant standards.

3.2.2.3.1. Insulation and dielectric strength testing of luminaires

Electronic ballasts for lamps are sensitive to high-voltage transients. This must be taken into consideration when subjecting luminaires to routine testing during manufacture.

According to IEC 60598-1 Annex Q (for information only!) and ENEC 303-Annex A, each luminaire should be subjected to an insulation test for 1 second at 500 V DC. The test voltage is applied between the linked phase/neutral conductor terminal and the protective earth terminal. The insulation resistance must be at least 2 MOhm.

As an alternative to measuring the insulation resistance, IEC 60598-1 Annex Q describes a dielectric strength test at 1500 V AC (or 1.414 x 1500 V DC). To avoid damaging electronic ballasts, this dielectric strength test should be performed exclusively for type testing. This test should certainly not be used for routine testing.

NOTICE

Tridonic recommends performing an insulation test because a dielectric strength test may damage the device irreparably.

3.2.2.3.2. Type testing

Type testing of the luminaire is performed according to IEC 60598-1 Section 10.
The wiring for protection class 1 luminaires is tested at a voltage of 2xU + 1000 V. In order not to overload the ballast all the inputs and outputs of the ballast are connected to one another.
U~out~is used for measuring the voltage for luminaires with ballasts with U~out~> 250 V:
For U~out~480 V the voltage for the type test is 2000 V. (Routine testing is always performed at 500 V DC)

3.2.3. Installation

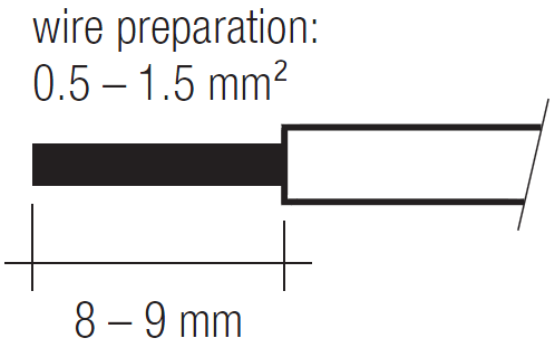
NOTICE

Rigid wire must be used exclusively!
Make sure the wire has the correct cross-section!

3.2.3.1. Wiring for linear devices

3.2.3.1.1. Wiring the plug-in terminal

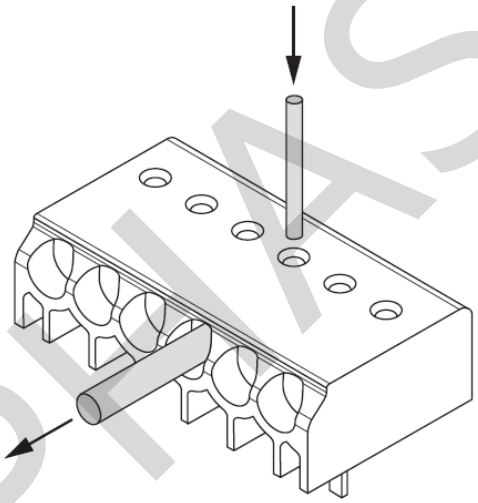
Procedure:



_ Use wire with a cross-section of 0.5 to 1.5 mm²
_ Strip off 8-9 mm of insulation; you may need to twist the tool slightly
_ Insert the bare end into the terminal

3.2.3.1.2. Detaching the plug-in terminal

Procedure:

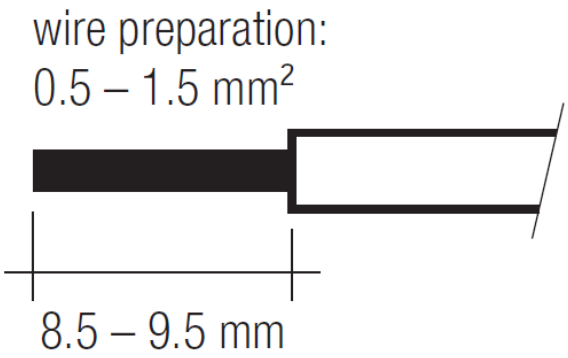


_ To detach the wire push a pointed object (such as a screwdriver) into the terminal from above
_ Pull out the wire at the front

3.2.3.2. Wiring for compact devices

3.2.3.2.1. Wiring the plug-in terminal

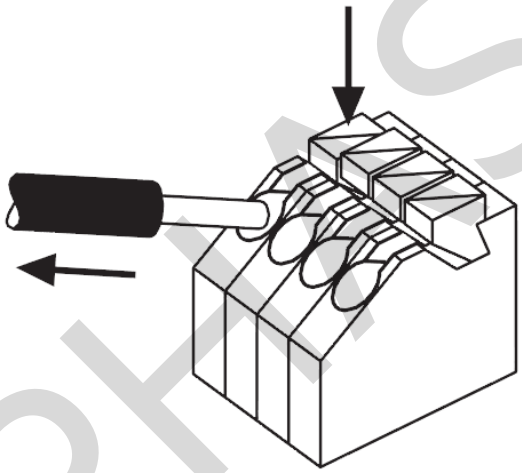
Procedure:



_ Use wire with a cross-section of 0.5 to 1.5 mm²
_ Strip off 8.5 - 9.5 mm of insulation; you may need to twist the tool slightly
_ Insert the bare end into the terminal

3.2.3.2.2. Detaching the plug-in terminal

Procedure:



_ To detach the wire push onto the terminal from above
_ Pull out the wire at the front

3.2.4. Functions

3.2.4.1. switchDIM

3.2.4.1.1. Description

With the switchDIM function it is possible to use the mains voltage as a control signal.
The phase of a simple standard mains voltage push button is connected to the terminal marked D2 and the neutral conductor is connected to the terminal D1.

Using the function is easy and convenient:

- A short press (50-600 ms) switches the device on or off
- A long press (> 600 ms) fades the connected operating device alternately up and down (between 10 and 100% for BASIC, and between 1 and 100% for ECO and EXCEL).

switchDIM is therefore a very simple form of lighting management. It also has a positive effect on material and labour costs.

The device has a switchDIM memory function. This is used, among other things, for storing the last dimming value in the event of interruptions in the power supply.
When power returns, the lamp is automatically restored to its previous operating state and dimmed to the last value.
In the case of constant lighting control with an ambient light sensor, switchDIM can be used for manual control of the setpoint value.

⚠ CAUTION!

Glow switches are not approved for controlling switchDIM.
Glow switches may cause the ballast to spontaneously switch on or off or make sudden changes in the dimming value.

⚠ CAUTION!

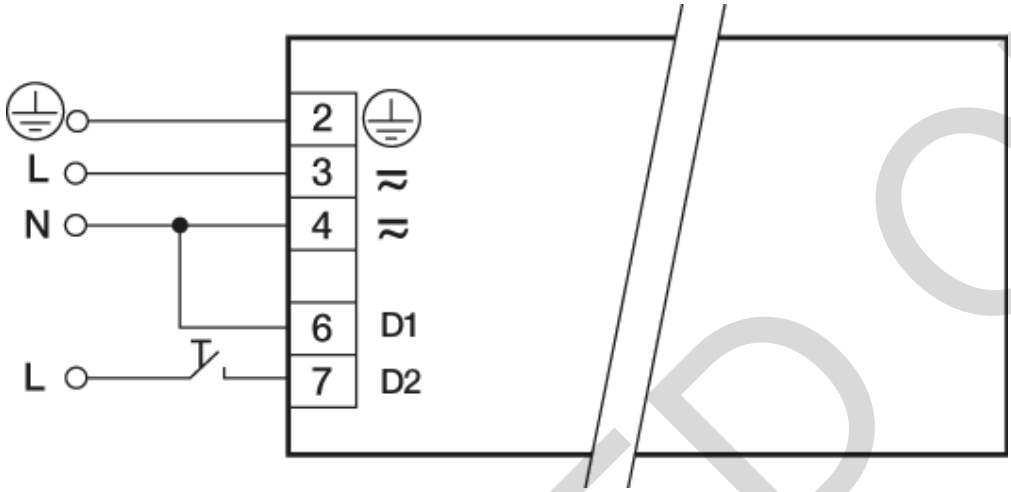
To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the terminal.
Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

3.2.4.1.2. Installation

Wiring variants

There are two options for installing switchDIM: four-pole and five-pole wiring

Configuration four-pole wiring

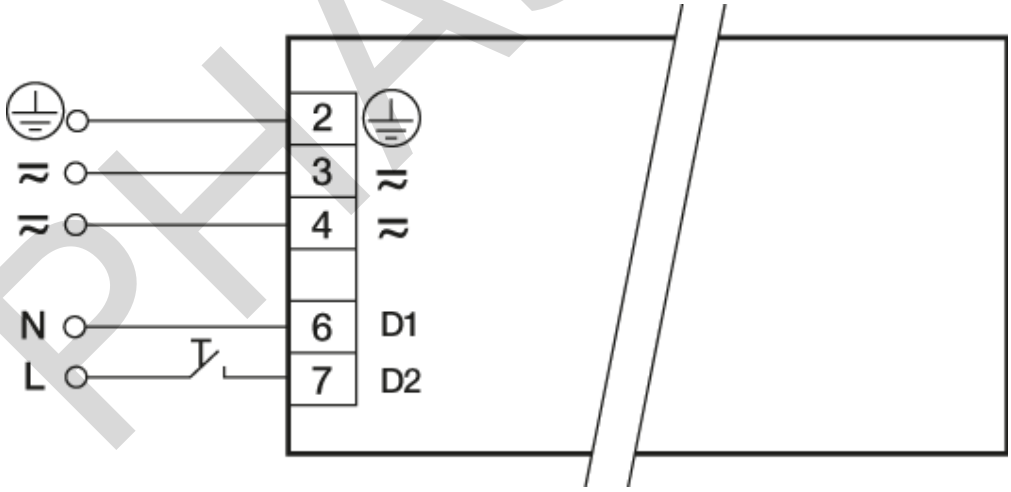


Phase (L), neutral (N), earth (PE), control line (L')

Benefits:

No need for a control line thanks to bridging terminal 6 and the N-connection of the luminaire

Configuration five-pole wiring



Phase (L), neutral (N), earth (PE), control line (L), neutral (N)

Benefits:

Control can be changed at any time to a digital control signal (DSI or DALI) without having to change the luminaire or provide an additional control line

NOTICE

For five-pole wiring we recommend connecting the neutral conductor to D1. This prevents 400 V being applied between adjacent terminals if a different phase is used for the control input.

3.2.4.1.3. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

Using the switchDIM function

switchDIM is operated by the mains voltage push button.

Procedure:

_ Switch the device on/off by briefly actuating the push button or

_ Dim the device by holding down the switch

Synchronising devices

If the devices in a system do not operate synchronously the devices must be synchronised, i.e. put in the same status (on/off).

Procedure:

_ Hold down the push button for 10 seconds
-› All devices will be synchronised to the same status
-› Lamps assume a uniform light value (approx. 50%)

Changing the fading time

The default value for the fading time is approx. 3 seconds. For devices of the types ECO und EXCEL this can be changed to approx. 6 seconds.

Procedure:

_ Hold down the push button for 20 seconds
-› After 10 seconds: all devices will be synchronised to the same status
-› After 20 seconds: a new fading time will be set

-› Lamps assume a uniform light value (approx. 100%)

Resetting the ballast to the factory defaults

Procedure:

_ Hold down the push button for 10 seconds four times in a row. Release the push button briefly between each 10 second hold

Switching the ballast to automatic mode

In automatic mode the device detects which control signal (DALI, DSI, switchDIM, etc.) is connected and automatically switches to the corresponding operating mode.

Procedure:

_ Press the push button 5 times within 3 seconds

3.2.4.1.4. Further technical data

Important values	
Dimming range	1-100 % (EXCEL, ECO) 10-100 % (BASIC)
Maximum number of control points	25 conventional momentary-action switches
Maximum number of operating devices per switchDIM system	25 operating devices
Maximum number of devices per dimming circuit	25 devices
Maximum length of the control line	Virtually unlimited, because 230/240V

For larger systems we recommend a digital system such as DSI or DALI (ECO, EXCEL).

3.2.4.2. corridorFUNCTION

3.2.4.2.1. Description

The corridorFUNCTION enables the illuminance to be linked to the presence or absence of people. A conventional relay motion sensor is connected. The luminous intensity is increased when a person enters the room. When the person leaves the room the motion sensor switches off after a certain delay and the luminous intensity is automatically reduced.

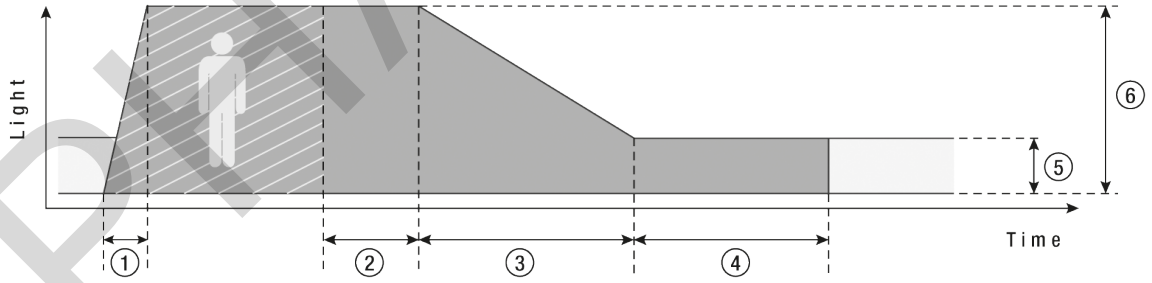
The corridorFUNCTION is particularly beneficial in applications in which light is needed round the clock for safety reasons, for example in public buildings, large apartment complexes, car parks, pedestrian underpasses and underground railway stations. Since the luminous intensity only has to be increased when there is a demand for light the corridorFUNCTION offers effective lighting management and helps save energy and costs. Another benefit of the corridorFUNCTION is the enhanced convenience of automatic lighting control. Tridonic has developed a useful software tool that can calculate the amortisation period and the savings in costs and CO_2 emissions for corridorFUNCTION applications compared with conventional solutions. The corridorFUNCTION payback calculator can be downloaded free of charge (see "Reference list", p. 176).

⚠ CAUTION!

To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input.
Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

Profile settings

The ballasts have different profiles so they can provide the best possible performance in a range of conditions. The profiles are defined by a series of values:

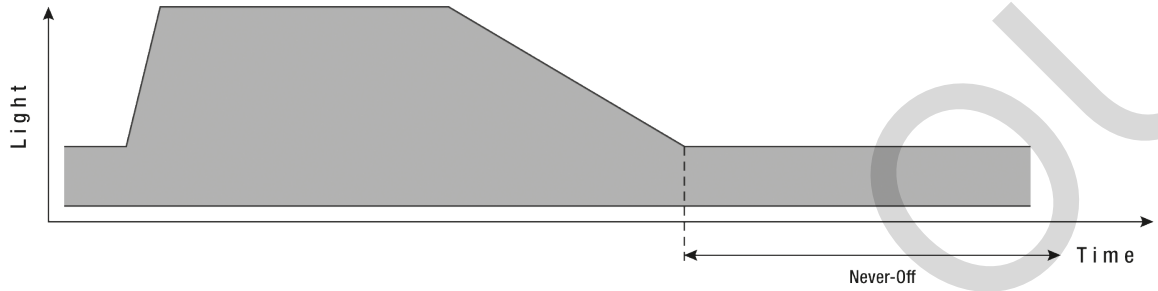


1. Fade-in time: the time that starts as soon as the presence of a person is detected. During the fade-in time the luminous intensity is faded up to the presence value.
2. Run-on time: the time that starts as soon as the presence of a person is no longer detected. If the presence of a person is detected again during the run-on time the run-on time is restarted from zero. If no presence is detected during the run-on time the fade time is started as soon as the run-on time expires.

3. Fade time: the time during which the luminous intensity is faded from the presence value to the absence value.
4. Switch off delay: the time during which the absence value is held before the lighting is switched off. Depending on the profile selected the switch-off delay may have different values or may not be defined.
5. Absence value: the luminous intensity when there is no person present
6. Presence value: the luminous intensity when persons are present

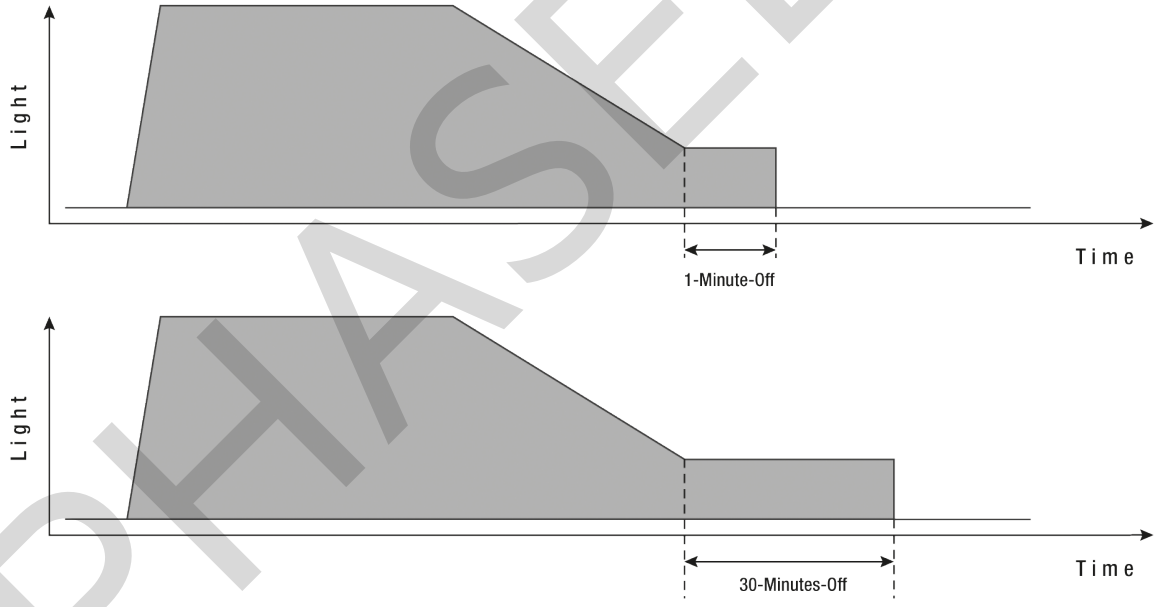
There is a choice of three predefined profiles. They can be activated via a plug.

"Never-Off" profile (default)



A switch-off delay is not defined for the "Never-Off" profile. An absence value of 10% is permanently retained so a minimum brightness level is available round the clock.

"1-Minute-Off" or "30-Minutes-Off" profiles



The "1-Minute-Off" and "30-Minutes-Off" profiles define different switch-off delays. The absence value is set at 1 or 30 minutes. If presence is not detected in this time the device switches off.

NOTICE

The times in these profiles are subject to a certain tolerance. This means that different devices in a system may switch off at slightly different times (see "Further technical data", p. 18).

Variable switch-off times

The EXCEL device offers even more options. The profiles and their values can be freely adjusted. The values can be adjusted via a connection to a DALI bus (see "DALI - Commissioning", p. 97).

Combinations

Combining dimmable ballasts with motion sensors and ambient light sensors offers maximum potential energy savings and maximum convenience. The ambient light sensor detects the ambient light level and defines a constant light value. When the motion sensor is activated the system initially switches to the presence value and then the luminous intensity is adjusted to the constant light value (see "Sensors - D", p. 129).

3.2.4.2.2. Installation

Requirements:

_ The ballast is correctly installed in the luminaire and cabled on the power supply side
_ A motion sensor is installed in the lighting system
_ The motion sensor is connected to the ballast

Procedure:

_ Connect the neutral conductor (N) to terminal D1 on the ballast
_ Connect the output of the motion sensor (switched phase) to terminal D2 on the ballast

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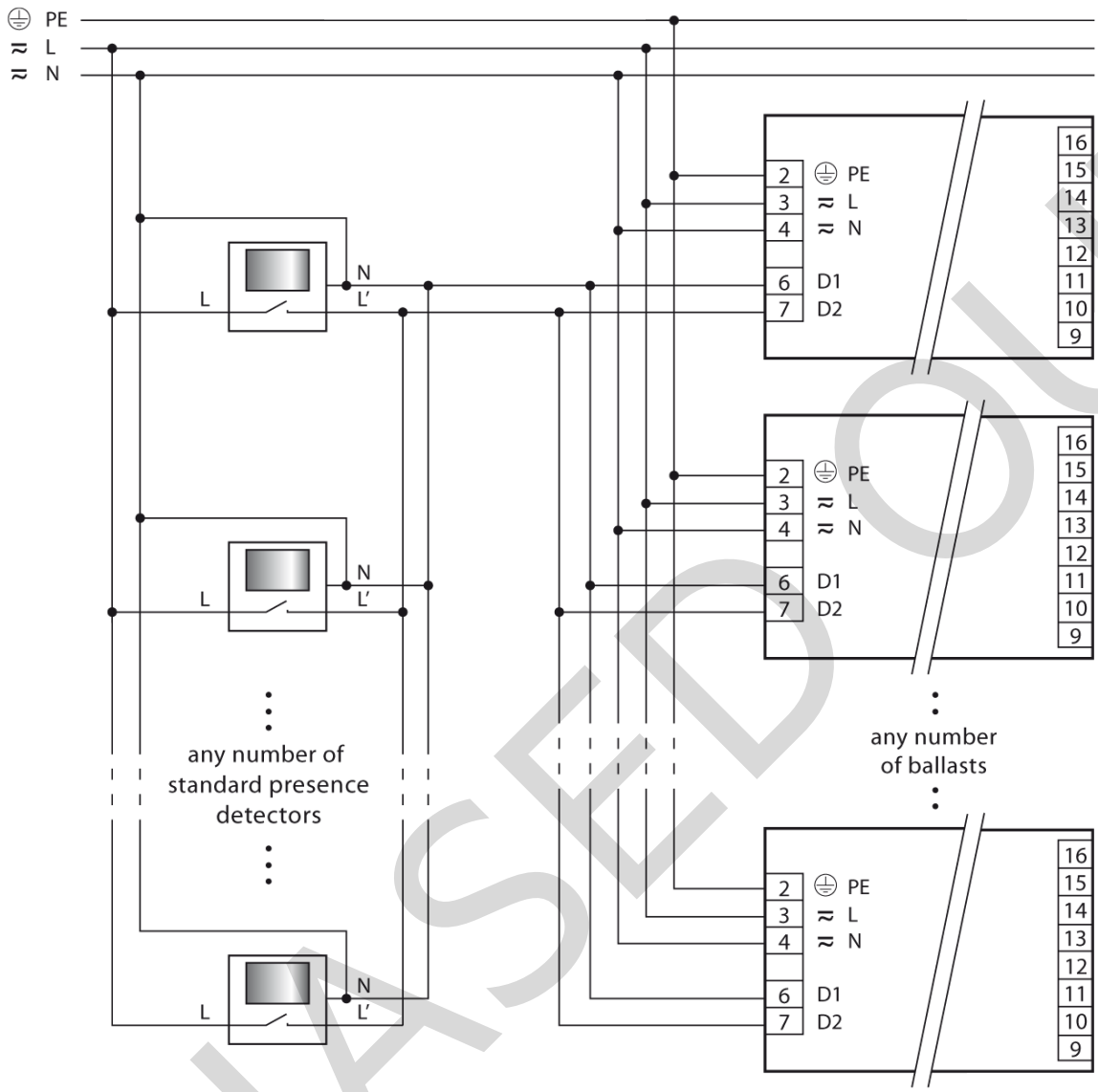
Wiring versions:



Phase (L), neutral (N), earth (PE), control line (L), neutral (N)

Benefits:

Control can be changed at any time to a digital control signal (DSI or DALI) without having to change the luminaire or provide an additional control line

Operating device PCA BASIC

⚠ CAUTION!

Use conventional relay motion sensors!
Electronic motion sensors (Triac) are not suitable because of their technical design.

Do not use glow switches!
Glow switches may affect the control.

Make sure that the control line (L') of the motion sensor is connected to terminal D2 and the neutral conductor (N) to terminal D1.

ⓘ NOTICE

For five-pole wiring we recommend connecting the neutral conductor to D1.
This prevents 400 V being applied between adjacent terminals if a different phase is used for the control input.

ⓘ NOTICE

For large installations, supply to the ballasts may be split among several phases (L1, L2, L3).
Any phase can be used for the control input .
Any number of motion sensors can be connected in parallel.

3.2.4.2.3. Commissioning

Activating the corridorFUNCTION by means of the mains voltage

Activating the corridorFUNCTION is simple. If an ac voltage of 230 V is applied to the digital interface of the ballast for a period of at least 5 minutes the ballast detects the corridorFUNCTION and automatically activates it. Activation is required only once per device.
There are three procedures for activating by means of the mains voltage. The requirements are the same in each case.

Requirements:

_ The ballast is correctly installed in the luminaire

_ Input voltage is applied

_ A motion sensor is connected to information D1 or D2

Procedure:

Version 1:

_ Remain in the activation range of the motion sensor for more than 5 minutes
-› The motion sensor detects movement and switches on
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence level (default: 100%)

Version 2:

_ Set the run-on time on the motion sensor to a value greater than 5 minutes

_ Remain in the activation range of the motion sensor for a short time
-› The motion sensor detects movement and switches on
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence value (default: 100%)

_ Reset the run-on time of the motion sensor to the required value

Version 3: Only possible if the motion sensor offers a manual override option

_ Set the slide switch on the motion sensor to the "Never-Off" function

_ Wait 5 minutes
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence value (default: 100%)

_ Reset the slide switch on the motion sensor to the "automatic" function

Activating the corridorFUNCTION via SMART-Plug

_ The corridorFUNCTION can also be activated via SMART-Plug (see "Description corridorFUNCTION plug", p. 111).

Combining the corridorFUNCTION with constant light control

The corridorFUNCTION can be combined with the constant light control system by connecting an ambient light sensor to the SMART interface (see "Description constant lighting control", p. 130).

Deactivating the corridorFUNCTION

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated.

Procedure via mains

_ Connect mains voltage push button to the terminal marked D2
_ Connect neutral conductor to the terminal marked D1
_ Press the switch 5 times within 3 seconds

Procedure via DALI/DSI

_ EXCEL / ECO
Send 5 DALI or DSI commands within 3 seconds via DALI bus to the ballast
_ BASIC
Send 5 DSI commands within 3 seconds via DSI bus to the ballast

3.2.4.2.4. Further technical data

Tolerances	
max. internal tolerance	< 10 %
Standard value	3 %

Profiles	
"Never-Off" (Standard)	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ no switch-off delay
"1-Minute-Off"	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ switch-off delay: 1 min
"30-Minutes-Off"	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ switch-off delay: 30 min

masterCONFIGURATOR settings (only Excel)	
fade time (ON)	0.7 s – 90.5 s
run-on time:	30 s – 90 min e.g. unlimited

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fade time (absence)	0.7 s – 90.5 s
switch-off delay	0 s – 60 min
fade time (OFF)	0.7 s – 90.5 s

3.2.4.3. DSI

3.2.4.3.1. Description

DSI (Digital Serial Interface) enables DSI ballasts to be controlled. The DSI line can be wired separately via a two-core cable or together with the mains cable in a five-core cable. Communication is not impaired by the mains cable. In contrast to DALI, there is no individual addressing of the ballasts with DSI.

DSI offers a series of benefits:

_ Expansion options via submodules, for example in combination with daylight control or additional switch modules
_ Wiring: Simple wiring with five pole standard cables and line length of up to 250 metres
_ Wiring: Polarity-free control lines can be used for mains and control lines
_ Wiring: Multiple wiring possibilities (star, series and mixed wiring)
_ Unaffected by electrical interference
_ Uniform light level from the first to the last light source
_ reverse polarity protected connection: can be connected with any polarity
The main benefits of DSI are the optimisation of energy consumption of extensive groups of luminaires (e.g. in sports stadiums and factories).

3.2.4.3.2. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

For more information on DSI commissioning see the DALI Handbook (see "Reference list", p. 176).

3.2.4.3.3. Further technical data

No further technical data available.

3.2.4.4. DC recognition

3.2.4.4.1. Description

In emergency light systems with central battery supply the DC recognition function uses the input voltage to detect that emergency mode is in place. The ballast then automatically switches to DC mode and dims the light to the defined DC level.

Without DC recognition different and more complex solutions need to be applied in order to detect emergency mode.

Dimmable ballasts in the PCA xitec II series are supplied from the factory with a DC level of 15%. This value can be individually adjusted on devices in the EXCEL series. For more information on changing settings see the masterCONFIGURATOR manual.

NOTICE

The PCA xitec II ballast is designed to operate on DC voltage and pulsing DC voltage.

It is essential that the correct polarity is used for operation on pulsing DC voltage. In DC recognition connected sensors are ignored.

3.2.4.4.2. Commissioning

3.2.4.4.3. Commissioning for DC

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

⚠ NOTICE

In dc operation the dc signal is detected in each case. There is no need to worry about the polarity.

Commissioning for pulsing DC voltage

Procedure:

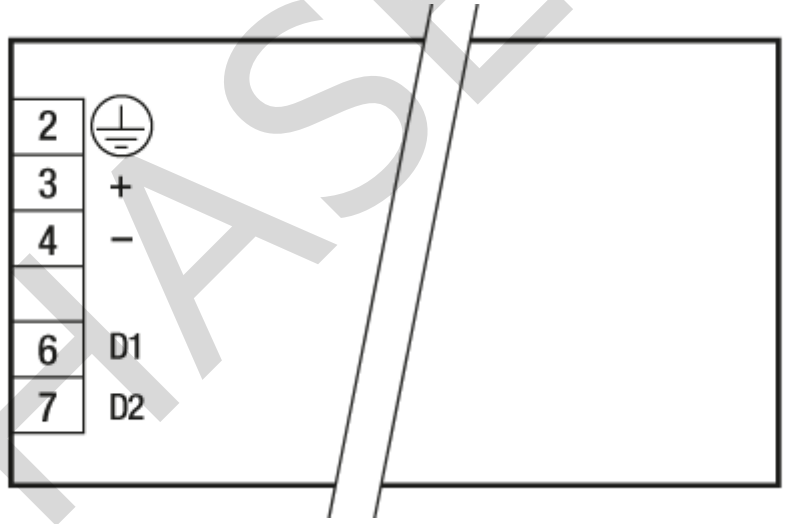
⚠ CAUTION!

If the polarity is incorrect, detection of the DC signal cannot be guaranteed. If the DC signal is not detected the problems are as follows:

_ The ballast continues to operate in normal AC mode

_ The ballast does not change to the required emergency lighting level

_ The light level does not correspond to the defined emergency light level



For operation with pulsing DC voltage (AC-rectified) make sure the polarity is correct:

_ Connect the positive pole to terminal 3

_ Connect the negative pole to terminal 4

3.2.4.4.4. Further technical data

Voltage range for operating on dc voltage:	
Default	220-240 V 0 Hz
Operation possible	176-280 V 0 Hz
Starting/ignition (safe lamp start)	198-254 V 0 Hz

Other values	
Maximum ripple value of supply voltage	approx. 40 %

Dimming level	
Factory setting	15 %
Possible values	0-100 %

Starting time
< 0.2 seconds

DC level adjustment (only available for EXCEL)	
Possible values	1-100 %
Adaptation	via masterCONFIGURATOR

Can be used in emergency lighting systems to EN 50172 or for emergency lighting to EN 61347-2-3 Annex J.

3.2.4.5. EOL (End of lamp life)

3.2.4.5.1. Description

When they come to the end of their life fluorescent lamps undergo a change in their electrical behaviour. This can cause a serious local temperature rise at the filaments.

The EOL (end of lamp life) function detects this change in behaviour and ensures that the lamp is switched off before there is any damage.

The requirements for checking the devices are defined in EN 61347-2-3, Section 17.
Tridonic devices are checked using the asymmetric power test (Test 2).

3.2.4.5.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.2.4.5.3. Further technical data

Important requirements of "EN 61347-2-3, Section 17"
Prescribed tests _ Asymmetrical pulse test (Test 1) _ Asymmetrical power test (Test 2) _ Open electrode test (Test 3)
Conditions that must lead to the device being switched off _ No lamp fitted _ Lamps not fitted correctly _ Lamp faulty _ Lamp voltage threshold exceeded (1.3-1.5 x rated lamp voltage) _ Asymmetrical power threshold in the lamp exceeded

3.2.4.6. Intelligent Temperature Guard (ITG)

3.2.4.6.1. Description

⚠ WARNING!

The Tc temperature is the maximum permitted in terms of safety.
Operating the ballast above the permitted Tc temperature is not compliant with relevant standards.
The Intelligent Temperature Guard function does not replace the proper thermal design of the luminaire and does not enable the lighting to operate for lengthy periods of time in impermissible ambient temperatures.

The Intelligent Temperature Guard function provides protection against temporary thermal overloads. It slowly reduces the output if the maximum Tc temperature is exceeded. This way instant failure of the ballast can be prevented.

Thermal overload protection is triggered as soon as the Tc temperature is exceeded by around 5 to 10 °C. The precise trigger temperature depends on the device. The value is selected so that the protection function is not performed until there is a significant impact on rated life.
The output is reduced in small stages that are generally imperceptible to the user:

_ The temperature is checked every two minutes
_ If the temperature is too high the output is reduced by about 2%
_ This process is repeated until the ballast returns to its permitted temperature range
_ The maximum output reduction is 50%

3.2.4.6.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.2.4.6.3. Further technical data

No further technical data available.

3.2.4.7. Intelligent Voltage Guard (IVG)

3.2.4.7.1. Description

The Intelligent Voltage Guard (IVG) function warns against possible damage due to overvoltage or undervoltage. Mains voltage is constantly monitored and appropriate responses are then made:

_ If the mains voltage is too low (< 70 V) the ballast is switched off

_ At undervoltages between 70 and 140 V the device switches off and on again on a non-cyclic basis.

_ In the case of an overvoltage (> 318 V) the lamps flash

One of the main causes of overvoltages is a wiring fault or a break in the neutral conductor in the three-phase network. Intelligent Voltage Guard helps detect overvoltages by indicating them.

WARNING!

Continuous operation (approx. 1 hour) at overvoltage (> 320 V) will destroy the ballast.
If the device flashes immediately disconnect the entire lighting system circuit.

NOTICE

If overvoltage is detected the connected sensors are ignored.

3.2.4.7.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.2.4.7.3. Further technical data

Disconnection thresholds

Voltage	Operating mode	Reaction
0-69 V	Undervoltage	The device switches itself off
70-139 V	Undervoltage	The device switches off and on again on a non-cyclic basis
140-198 V	Undervoltage	
199-254 V	Normalvoltage	
255-317 V	Overvoltage	Overvoltage, max. operation time of 1 hour
318-350 V	Overvoltage	The lamp flashes, max. operation time of 1 hour, damages possible
350+ V	Overvoltage	The lamp flashes, damages and/or destruction will occur

3.2.4.8. SMART-Heating

3.2.4.8.1. Description

The SMART-Heating function ensures that the filaments are heated to the correct temperature and that filament heating is switched off once a certain dimming level is reached.

Correct appropriate heating in the lower dimming range extends the life of the filaments. A reduction in filament heating in the upper dimming range leads to considerable energy savings. Another positive effect is a reduction in the connected load by as much as 7 percent.

The lamps are operated at a constant luminous flux in accordance with their specifications, faulty lamps are automatically disconnected, lamps are automatically restarted and dc emergency lighting operation takes place in accordance with EN 50172.

3.2.4.8.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.2.4.8.3. Further technical data

Typical threshold values at which filament heating is reduced to a minimum are around 90 % dimming level. The precise values vary according to lamp wattage and type of device.

Operating device PCA ECO

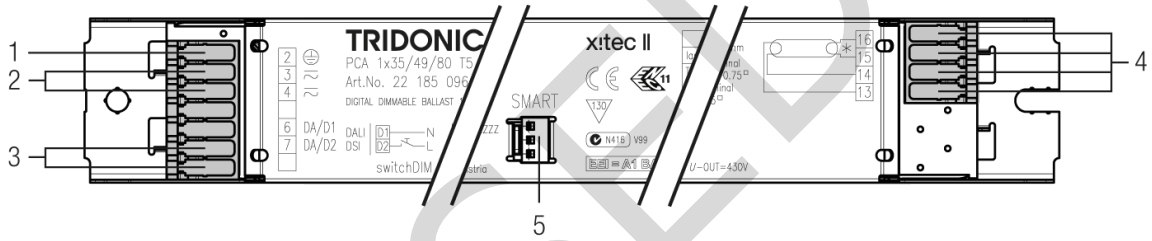
3.3. PCA ECO xitec II

3.3.1. Description

The electronic ballasts in the xitec II series come in three versions (BASIC, ECO and EXCEL). They differ in terms of their functionality.
The PCA ECO series supports all the usual digital communication standards, and in the highest quality. It combines performance with ecological and economic benefits.
PCA ECO offers a multi-functional interface, multi-lamp management for T5, daylight control via SMART sensor, switchDIM with memory function and adjustable dimming rates and a dimming range from 1 to 100 percent (3 to 100 percent for compact devices).

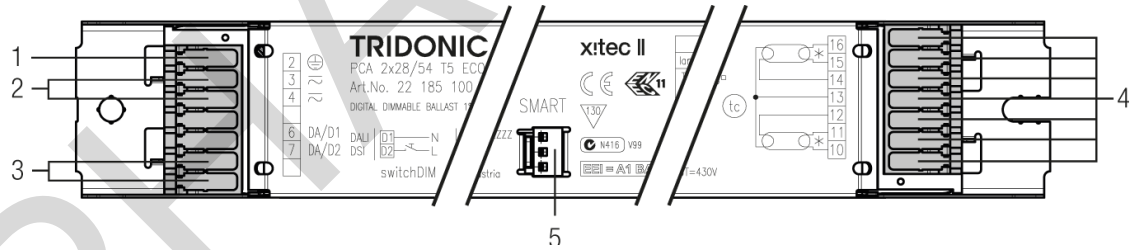
3.3.1.1. Figures

3.3.1.1.1. Linear device, single-lamp:



1) Earth connection, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

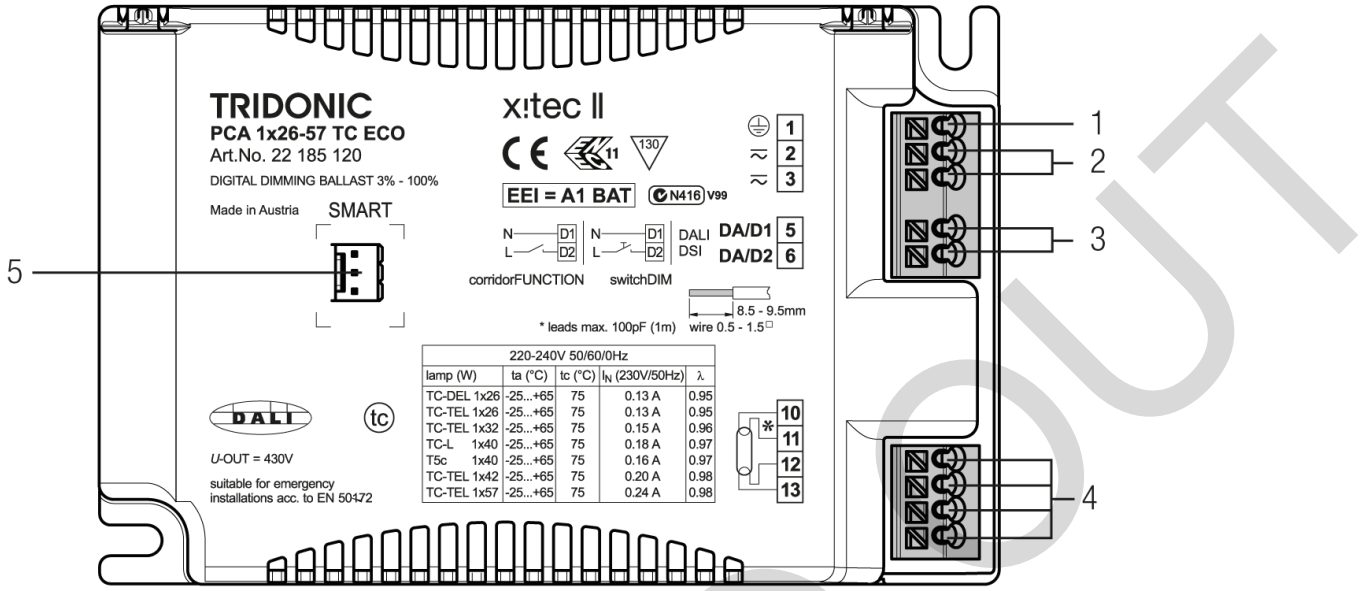
3.3.1.1.2. Linear device, two-lamp:



1) Earth connection, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

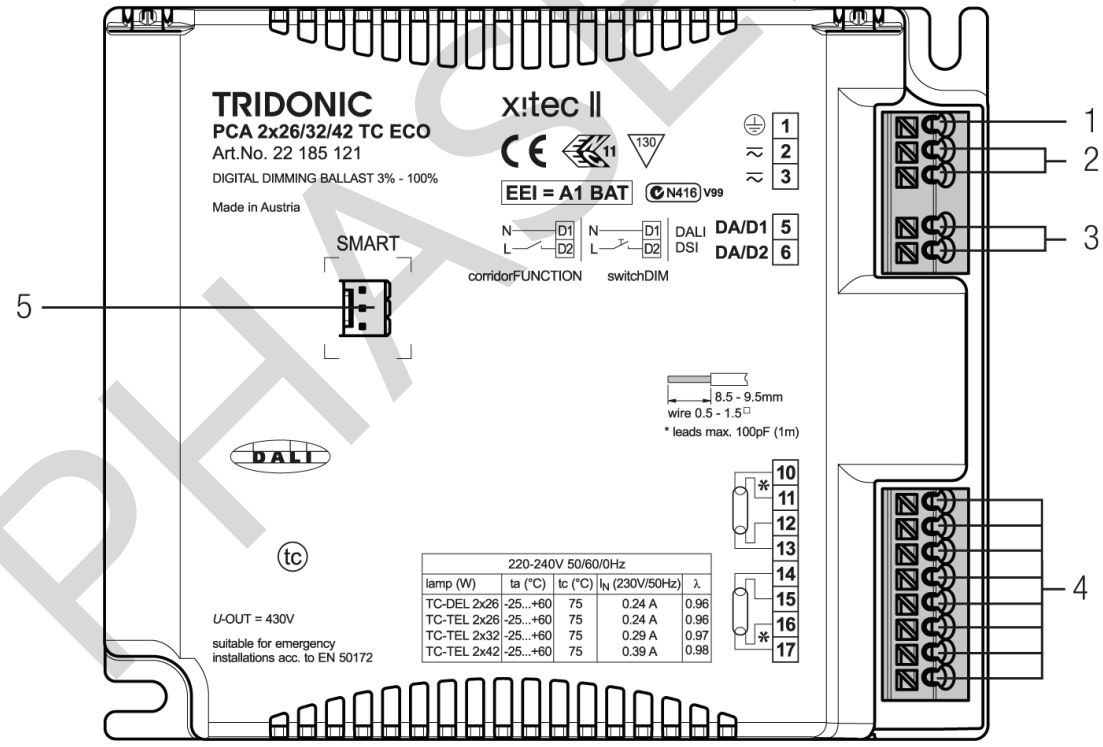
Operating device PCA ECO

3.3.1.1.3. Compact device, single-lamp:



1) Earth connection / function earth, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

3.3.1.1.4. Compact device, two-lamp:



1) Earth connection / function earth, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

Operating device PCA ECO

3.3.2. Installation notes

NOTICE

The cabling, wiring and mounting for a ballast varies depending on the design and manufacturer of the lamp. The following description should therefore not be viewed as comprehensive installation instructions but merely as important general information. To obtain further information, proceed as follows:

_ Read the documentation provided by the lamp manufacturer. Follow the guidelines and instructions of the lamp manufacturer.

_ Observe all relevant standards. Follow the instructions given in the standards.

3.3.2.1. Safety information

WARNING!

_ Comply with the general safety instructions (see "Safety instructions", p. 5) !

_ To avoid failures due to ground faults protect the wiring against mechanical loads from sharp-edged metal parts (e.g. cable penetrations, cable holders, metal frames, etc.

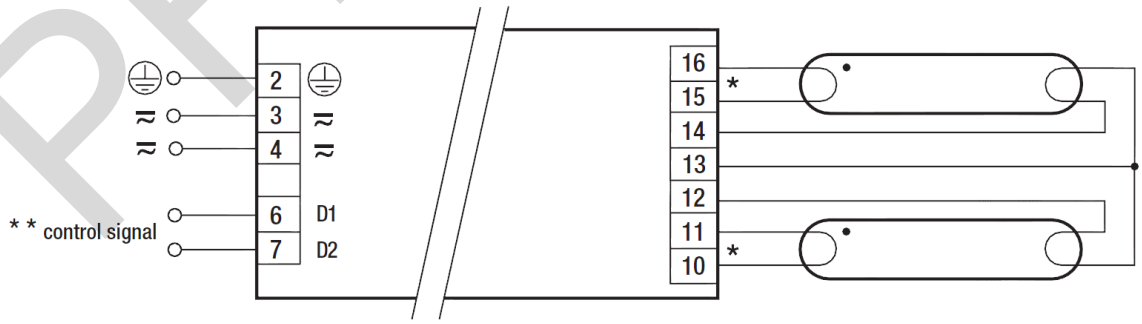
_ Make sure that the current at the terminal does not exceed a certain maximum value. This maximum value lies at 2 amps for BASIC and ECO devices and at 4 amps for EXCEL devices.

_ Electronic ballasts from Tridonic are protected for a maximum of 1 hour against overvoltage of up to 320 V. Make sure that the ballast is not exposed to overvoltages for long periods

_ Electronic ballasts from Tridonic have type of protection IP 20. Comply with the requirements for this type of protection.

3.3.2.2. Routing the wires

3.3.2.2.1. Wire lengths



* leads 10, 11, 15, 16: keep wires short, max. 1.0 m
leads 12, 13, 14: max. 2.0 m; ballast must be earthed
* * digital signal DSI or switchDIM

NOTICE

Parasitic leakage currents are determined by wire capacitance and voltage potential. To minimise parasitic leakage consider the following:

_ "Hot connections" (indicated in the diagram by an asterisk *) must be kept as short as possible. With reference to typical luminaire wiring with a max of 100 pF per meter of wire length the maximum length is approx. 1 meter.

_ "Hot connections" must be kept shorter than the other connections ("cold connections").
For precise wire capacitances and wire lengths see the relevant data sheets.

3.3.2.2.2. Sensor wires

Sensor wires must be routed separately from the lamp wires and mains cables otherwise the lighting control system may malfunction.
If separate routing is not possible (for reasons of space) shielded cables must be used.

3.3.2.2.3. "Master/slave" circuits

In "master/slave" circuits the two-lamp ballast of the single-lamp master luminaire operates a further single-lamp slave luminaire.

WARNING!

Do not use a master/slave circuit with dimmable ballasts as the different wire lengths lead to very different behaviour in operation.

3.3.2.3. Tests

NOTICE

The performance of the prescribed tests and compliance with relevant standards are the responsibility of the luminaire manufacturer.
The following descriptions merely indicate the most important tests and are no substitute for a full research of the relevant standards.

3.3.2.3.1. Insulation and dielectric strength testing of luminaires

Electronic ballasts for lamps are sensitive to high-voltage transients. This must be taken into consideration when subjecting luminaires to routine testing during manufacture.

According to IEC 60598-1 Annex Q (for information only!) and ENEC 303-Annex A, each luminaire should be subjected to an insulation test for 1 second at 500 V DC. The test voltage is applied between the linked phase/neutral conductor terminal and the protective earth terminal. The insulation resistance must be at least 2 MOhm.

As an alternative to measuring the insulation resistance, IEC 60598-1 Annex Q describes a dielectric strength test at 1500 V AC (or 1.414 x 1500 V DC). To avoid damaging electronic ballasts, this dielectric strength test should be performed exclusively for type testing. This test should certainly not be used for routine testing.

NOTICE

Tridonic recommends performing an insulation test because a dielectric strength test may damage the device irreparably.

3.3.2.3.2. Type testing

Type testing of the luminaire is performed according to IEC 60598-1 Section 10.
The wiring for protection class 1 luminaires is tested at a voltage of 2xU + 1000 V. In order not to overload the ballast all the inputs and outputs of the ballast are connected to one another.
U~out~is used for measuring the voltage for luminaires with ballasts with U~out~> 250 V:
For U~out~480 V the voltage for the type test is 2000 V. (Routine testing is always performed at 500 V DC)

3.3.3. Installation

NOTICE

Rigid wire must be used exclusively!
Make sure the wire has the correct cross-section!

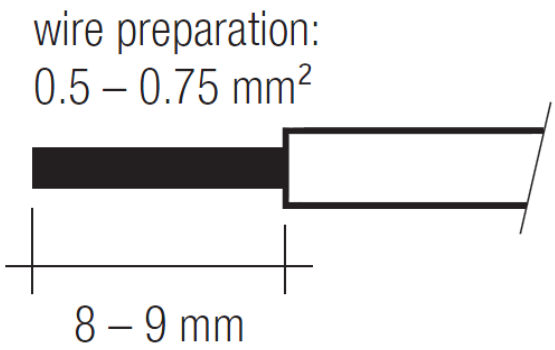
NOTICE

Do not mix IDC and plug-in contacts.
No through-wiring.

3.3.3.1. Wiring for linear devices

3.3.3.1.1. Wiring the plug-in terminal

Procedure:



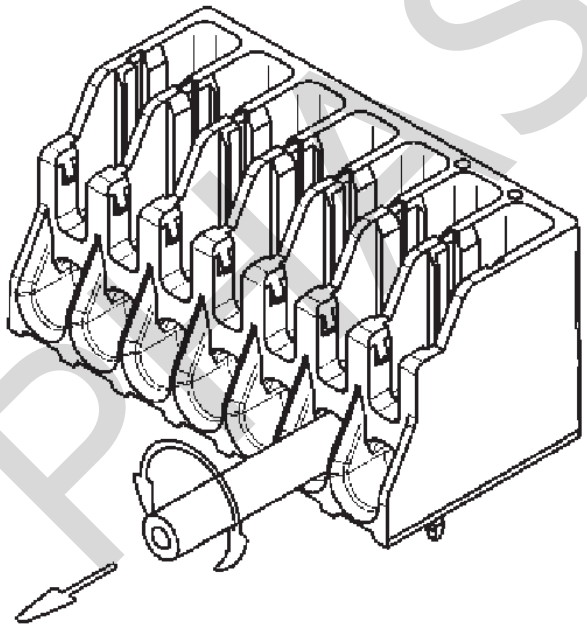
_ Use wire with a cross-section of 0.5 to 0.75 mm²

_ Strip off 8-9 mm of insulation; you may need to twist the tool slightly

_ Insert the bare end into the terminal

3.3.3.1.2. Detaching the plug-in terminal

Procedure:



_ Pull out the wire at the front

3.3.3.1.3. Wiring the IDC terminal

NOTICE

IDC terminals are provided for automatic wiring by machine.
There is no need to prepare the wire by hand. Do not remove the insulation of the wire.
Make sure the wire has the correct cross-section.

Procedure:

_ Use wire with a cross-section of 0.5 mm²

_ Follow the guidelines and instructions of the manufacturer of the automatic wiring machine

3.3.3.1.4. Detaching the IDC terminal

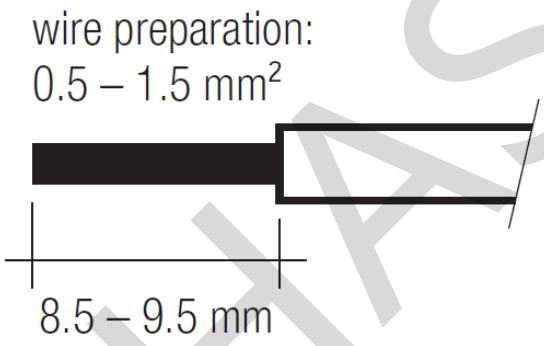
Procedure:

_ Remove wire from above

3.3.3.2. Wiring for compact devices

3.3.3.2.1. Wiring the plug-in terminal

Procedure:



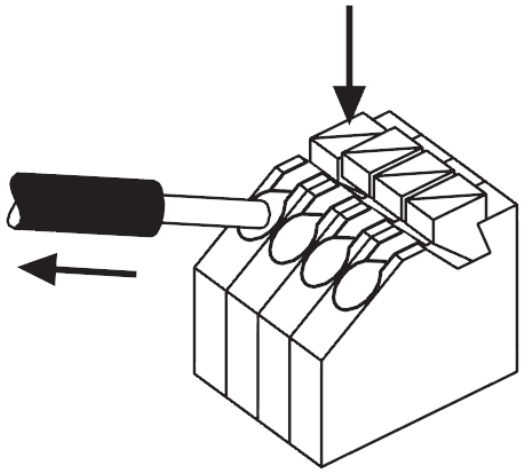
_ Use wire with a cross-section of 0.5 to 1.5 mm²

_ Strip off 8.5-9.5 mm of insulation; you may need to twist the tool slightly

_ Insert the bare end into the terminal

3.3.3.2.2. Detaching the plug-in terminal

Procedure:



_ To detach the wire push onto the terminal from above

_ Pull out the wire at the front

3.3.4. Functions

3.3.4.1. switchDIM

3.3.4.1.1. Description

With the switchDIM function it is possible to use the mains voltage as a control signal.
The phase of a simple standard mains voltage push button is connected to the terminal marked D2 and the neutral conductor is connected to the terminal D1.

Using the function is easy and convenient:

_ A short press (50-600 ms) switches the device on or off

_ A long press (> 600 ms) fades the connected operating device alternately up and down (between 10 and 100% for BASIC, and between 1 and 100% for ECO and EXCEL).

switchDIM is therefore a very simple form of lighting management. It also has a positive effect on material and labour costs.

The device has a switchDIM memory function. This is used, among other things, for storing the last dimming value in the event of interruptions in the power supply.
When power returns, the lamp is automatically restored to its previous operating state and dimmed to the last value.
In the case of constant lighting control with an ambient light sensor, switchDIM can be used for manual control of the setpoint value.

⚠ CAUTION!

Glow switches are not approved for controlling switchDIM.
Glow switches may cause the ballast to spontaneously switch on or off or make sudden changes in the dimming value.

⚠ CAUTION!

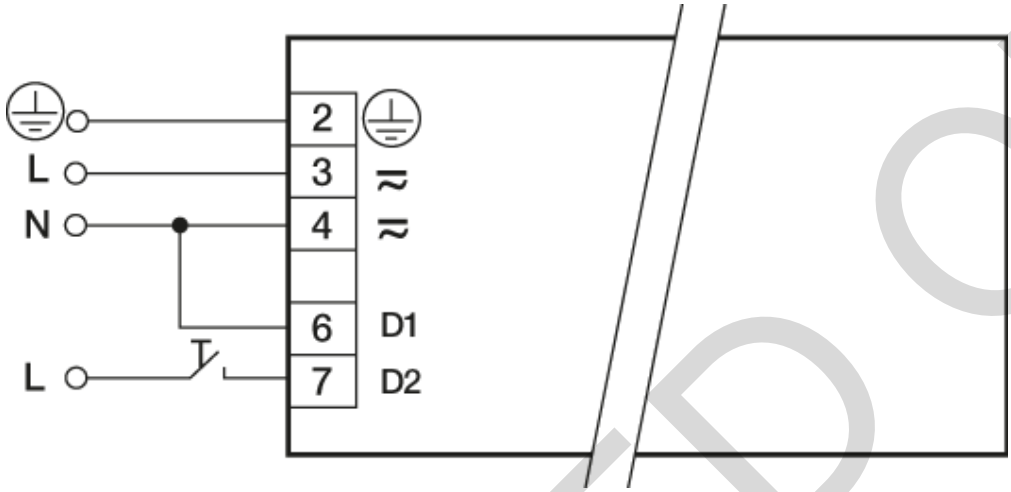
To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the terminal.
Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

3.3.4.1.2. Installation

Wiring variants

There are two options for installing switchDIM: four-pole and five-pole wiring

Configuration four-pole wiring

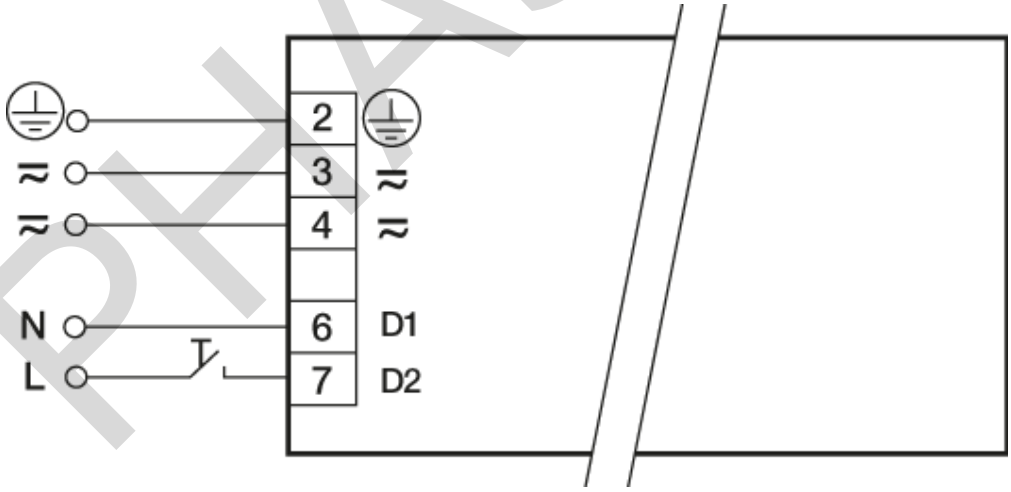


Phase (L), neutral (N), earth (PE), control line (L')

Benefits:

No need for a control line thanks to bridging terminal 6 and the N-connection of the luminaire

Configuration five-pole wiring



Phase (L), neutral (N), earth (PE), control line (L), neutral (N)

Benefits:

Control can be changed at any time to a digital control signal (DSI or DALI) without having to change the luminaire or provide an additional control line

NOTICE

For five-pole wiring we recommend connecting the neutral conductor to D1. This prevents 400 V being applied between adjacent terminals if a different phase is used for the control input.

3.3.4.1.3. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

Using the switchDIM function

switchDIM is operated by the mains voltage push button.

Procedure:

_ Switch the device on/off by briefly actuating the push button or

_ Dim the device by holding down the switch

Synchronising devices

If the devices in a system do not operate synchronously the devices must be synchronised, i.e. put in the same status (on/off).

Procedure:

_ Hold down the push button for 10 seconds
-› All devices will be synchronised to the same status
-› Lamps assume a uniform light value (approx. 50%)

Changing the fading time

The default value for the fading time is approx. 3 seconds. For devices of the types ECO und EXCEL this can be changed to approx. 6 seconds.

Procedure:

_ Hold down the push button for 20 seconds
-› After 10 seconds: all devices will be synchronised to the same status
-› After 20 seconds: a new fading time will be set

-› Lamps assume a uniform light value (approx. 100%)

Resetting the ballast to the factory defaults

Procedure:

_ Hold down the push button for 10 seconds four times in a row. Release the push button briefly between each 10 second hold

Switching the ballast to automatic mode

In automatic mode the device detects which control signal (DALI, DSI, switchDIM, etc.) is connected and automatically switches to the corresponding operating mode.

Procedure:

_ Press the push button 5 times within 3 seconds

3.3.4.1.4. Further technical data

Important values	
Dimming range	1-100 % (EXCEL, ECO) 10-100 % (BASIC)
Maximum number of control points	25 conventional momentary-action switches
Maximum number of operating devices per switchDIM system	25 operating devices
Maximum number of devices per dimming circuit	25 devices
Maximum length of the control line	Virtually unlimited, because 230/240V

For larger systems we recommend a digital system such as DSI or DALI (ECO, EXCEL).

Operating device PCA ECO

3.3.4.2. corridorFUNCTION

3.3.4.2.1. Description

The corridorFUNCTION enables the illuminance to be linked to the presence or absence of people. A conventional relay motion sensor is connected. The luminous intensity is increased when a person enters the room. When the person leaves the room the motion sensor switches off after a certain delay and the luminous intensity is automatically reduced.

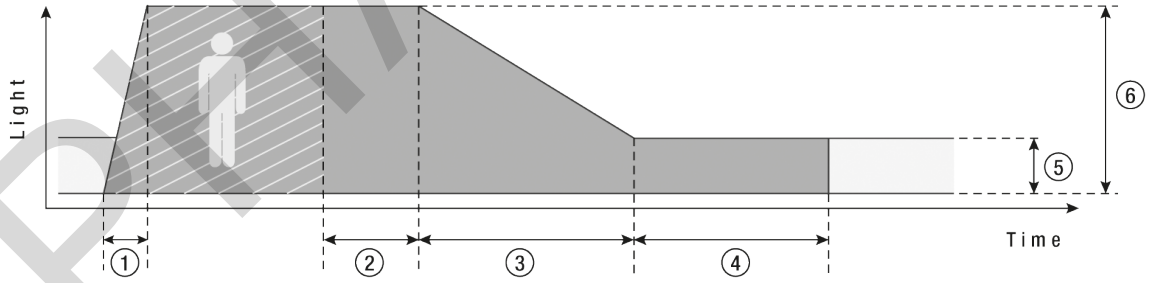
The corridorFUNCTION is particularly beneficial in applications in which light is needed round the clock for safety reasons, for example in public buildings, large apartment complexes, car parks, pedestrian underpasses and underground railway stations. Since the luminous intensity only has to be increased when there is a demand for light the corridorFUNCTION offers effective lighting management and helps save energy and costs. Another benefit of the corridorFUNCTION is the enhanced convenience of automatic lighting control. Tridonic has developed a useful software tool that can calculate the amortisation period and the savings in costs and CO_2 emissions for corridorFUNCTION applications compared with conventional solutions. The corridorFUNCTION payback calculator can be downloaded free of charge (see "Reference list", p. 176).

⚠ CAUTION!

To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input.
Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

Profile settings

The ballasts have different profiles so they can provide the best possible performance in a range of conditions. The profiles are defined by a series of values:



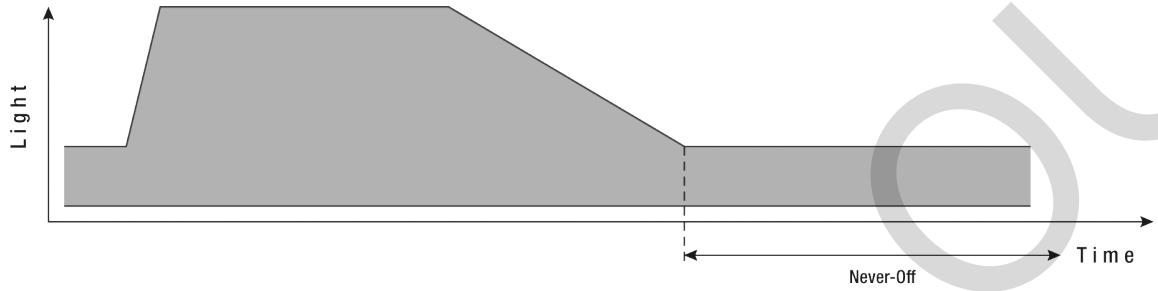
1. Fade-in time: the time that starts as soon as the presence of a person is detected. During the fade-in time the luminous intensity is faded up to the presence value.
2. Run-on time: the time that starts as soon as the presence of a person is no longer detected. If the presence of a person is detected again during the run-on time the run-on time is restarted from zero. If no presence is detected during the run-on time the fade time is started as soon as the run-on time expires.

Operating device PCA ECO

3. Fade time: the time during which the luminous intensity is faded from the presence value to the absence value.
4. Switch off delay: the time during which the absence value is held before the lighting is switched off. Depending on the profile selected the switch-off delay may have different values or may not be defined.
5. Absence value: the luminous intensity when there is no person present
6. Presence value: the luminous intensity when persons are present

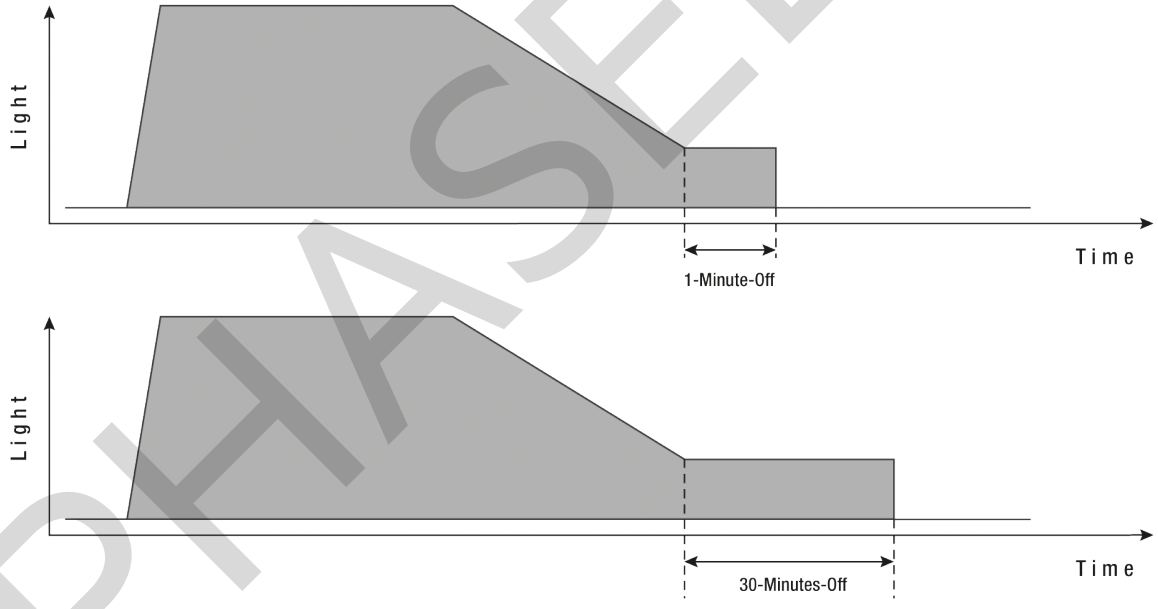
There is a choice of three predefined profiles. They can be activated via a plug.

"Never-Off" profile (default)



A switch-off delay is not defined for the "Never-Off" profile. An absence value of 10% is permanently retained so a minimum brightness level is available round the clock.

"1-Minute-Off" or "30-Minutes-Off" profiles



The "1-Minute-Off" and "30-Minutes-Off" profiles define different switch-off delays. The absence value is set at 1 or 30 minutes. If presence is not detected in this time the device switches off.

NOTICE

The times in these profiles are subject to a certain tolerance. This means that different devices in a system may switch off at slightly different times (see "Further technical data", p. 18).

Operating device PCA ECO

Variable switch-off times

The EXCEL device offers even more options. The profiles and their values can be freely adjusted. The values can be adjusted via a connection to a DALI bus (see "DALI - Commissioning", p. 97).

Combinations

Combining dimmable ballasts with motion sensors and ambient light sensors offers maximum potential energy savings and maximum convenience. The ambient light sensor detects the ambient light level and defines a constant light value. When the motion sensor is activated the system initially switches to the presence value and then the luminous intensity is adjusted to the constant light value (see "Sensors - D", p. 129).

3.3.4.2.2. Installation

Requirements:

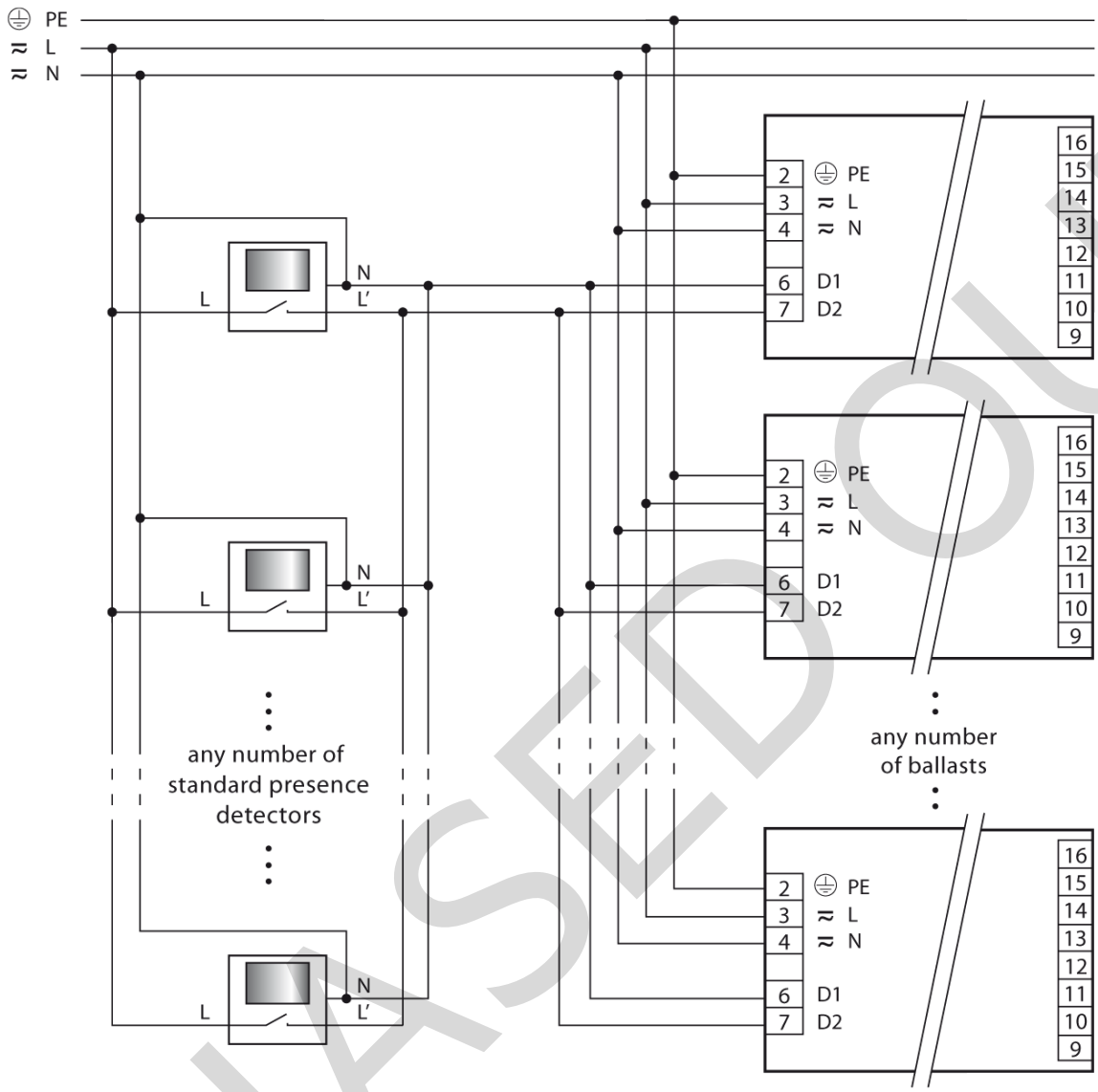
_ The ballast is correctly installed in the luminaire and cabled on the power supply side
_ A motion sensor is installed in the lighting system
_ The motion sensor is connected to the ballast

Procedure:

_ Connect the neutral conductor (N) to terminal D1 on the ballast
_ Connect the output of the motion sensor (switched phase) to terminal D2 on the ballast

Operating device PCA ECO

Wiring versions:



Phase (L), neutral (N), earth (PE), control line (L), neutral (N)

Benefits:

Control can be changed at any time to a digital control signal (DSI or DALI) without having to change the luminaire or provide an additional control line

Operating device PCA ECO

⚠ CAUTION!

Use conventional relay motion sensors!
Electronic motion sensors (Triac) are not suitable because of their technical design.

Do not use glow switches!
Glow switches may affect the control.

Make sure that the control line (L') of the motion sensor is connected to terminal D2 and the neutral conductor (N) to terminal D1.

NOTICE

For five-pole wiring we recommend connecting the neutral conductor to D1.
This prevents 400 V being applied between adjacent terminals if a different phase is used for the control input.

NOTICE

For large installations, supply to the ballasts may be split among several phases (L1, L2, L3).
Any phase can be used for the control input .
Any number of motion sensors can be connected in parallel.

3.3.4.2.3. Commissioning

Activating the corridorFUNCTION by means of the mains voltage

Activating the corridorFUNCTION is simple. If an ac voltage of 230 V is applied to the digital interface of the ballast for a period of at least 5 minutes the ballast detects the corridorFUNCTION and automatically activates it. Activation is required only once per device.
There are three procedures for activating by means of the mains voltage. The requirements are the same in each case.

Requirements:

_ The ballast is correctly installed in the luminaire

_ Input voltage is applied

_ A motion sensor is connected to information D1 or D2

Procedure:

Version 1:

_ Remain in the activation range of the motion sensor for more than 5 minutes
-› The motion sensor detects movement and switches on
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence level (default: 100%)

Version 2:

_ Set the run-on time on the motion sensor to a value greater than 5 minutes

_ Remain in the activation range of the motion sensor for a short time
-› The motion sensor detects movement and switches on
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence value (default: 100%)

_ Reset the run-on time of the motion sensor to the required value

Version 3: Only possible if the motion sensor offers a manual override option

_ Set the slide switch on the motion sensor to the "Never-Off" function

_ Wait 5 minutes
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence value (default: 100%)

_ Reset the slide switch on the motion sensor to the "automatic" function

Operating device PCA ECO

Activating the corridorFUNCTION via SMART-Plug

_ The corridorFUNCTION can also be activated via SMART-Plug (see "Description corridorFUNCTION plug", p. 111).

Combining the corridorFUNCTION with constant light control

The corridorFUNCTION can be combined with the constant light control system by connecting an ambient light sensor to the SMART interface (see "Description constant lighting control", p. 130).

Deactivating the corridorFUNCTION

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated.

Procedure via mains

_ Connect mains voltage push button to the terminal marked D2

_ Connect neutral conductor to the terminal marked D1

_ Press the switch 5 times within 3 seconds

Procedure via DALI/DSI

_ EXCEL / ECO
Send 5 DALI or DSI commands within 3 seconds via DALI bus to the ballast

_ BASIC
Send 5 DSI commands within 3 seconds via DSI bus to the ballast

Operating device PCA ECO

3.3.4.2.4. Further technical data

Tolerances	
max. internal tolerance	< 10 %
Standard value	3 %

Profiles	
"Never-Off" (Standard)	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ no switch-off delay
"1-Minute-Off"	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ switch-off delay: 1 min
"30-Minutes-Off"	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ switch-off delay: 30 min

masterCONFIGURATOR settings (only Excel)	
fade time (ON)	0.7 s – 90.5 s
run-on time:	30 s – 90 min e.g. unlimited

Operating device PCA ECO

fade time (absence)	0.7 s – 90.5 s
switch-off delay	0 s – 60 min
fade time (OFF)	0.7 s – 90.5 s

3.3.4.3. DSI

3.3.4.3.1. Description

DSI (Digital Serial Interface) enables DSI ballasts to be controlled. The DSI line can be wired separately via a two-core cable or together with the mains cable in a five-core cable. Communication is not impaired by the mains cable. In contrast to DALI, there is no individual addressing of the ballasts with DSI.

DSI offers a series of benefits:

_ Expansion options via submodules, for example in combination with daylight control or additional switch modules
_ Wiring: Simple wiring with five pole standard cables and line length of up to 250 metres
_ Wiring: Polarity-free control lines can be used for mains and control lines
_ Wiring: Multiple wiring possibilities (star, series and mixed wiring)
_ Unaffected by electrical interference
_ Uniform light level from the first to the last light source
_ reverse polarity protected connection: can be connected with any polarity
The main benefits of DSI are the optimisation of energy consumption of extensive groups of luminaires (e.g. in sports stadiums and factories).

3.3.4.3.2. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

For more information on DSI commissioning see the DALI Handbook (see "Reference list", p. 176).

3.3.4.3.3. Further technical data

No further technical data available.

3.3.4.4. DALI

3.3.4.4.1. Description

DALI standard

DALI (Digital Addressable Lighting Interface) is an interface protocol for digital communication between electronic lighting equipment.

The DALI standard was developed by Tridonic together with renowned manufacturers of operating and control equipment. Today, these manufacturers belong to the DALI Activity Group which promotes the use and further development of DALI.

The DALI standard is defined in IEC 62386. A test procedure standardised by the DALI Activity Group ensures compatibility between products from different manufacturers. Tridonic products have undergone this test and meet all the requirements. This is indicated by the logo of the DALI Activity Group on the device.

The agreement by the lighting industry to adopt a common protocol has opened up a virtually unlimited number of options. With the right choice of individual DALI components an extremely wide range of requirements can be met, from operating a simple light switch to lighting management systems for entire office complexes with thousands of light sources.

DALI in Action

DALI offers a lot of possibilities:

_ DALI line: 64 ballasts can be grouped to a line
_ DALI groups: Every ballast can be attributed into 16 groups
_ Addressability: All ballasts are individually addressable
_ Grouping: Possible without complicated rewiring
_ Programmability: Individual programmability makes it possible to use functions which transcend the DALI standard
_ Monitoring: Easily possible thanks to status feedback
_ Wiring: Simple wiring with five pole standard cables and a cable length of max. 300 metres
_ Wiring: Polarity-free control lines can be used for mains and control lines
_ Wiring: Multiple wiring possibilities (star, series and mixed wiring)
_ Unaffected by interruptions: All luminaires receive the same, unaffected digital signal and dimming level
_ Similiar light level from first to last luminaire

Technical data of a DALI line:

_ DALI voltage: 9.5 V - 22.4 DC
_ Maximum DALI system current: max. 250 mA

_ Data transfer rate: 1200 Baud
_ Maximum line length: up to 300 m (for 1,5 mm^2)

3.3.4.4.2. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

For more information on DALI commissioning see the DALI Handbook (see "Reference list", p. 176).

3.3.4.4.3. eDALI

eDALI ("enhanced DALI") offers extended DALI commands. They can be used to activate specific commands of the ballast. The masterCONFIGURATOR software works with eDALI commands. These commands are Tridonic specific. They are not part of the DALI standard and are not publicly available.

3.3.4.4.4. Further technical data

No further technical data available.

3.3.4.5. DC recognition

3.3.4.5.1. Description

In emergency light systems with central battery supply the DC recognition function uses the input voltage to detect that emergency mode is in place. The ballast then automatically switches to DC mode and dims the light to the defined DC level.

Without DC recognition different and more complex solutions need to be applied in order to detect emergency mode.

Dimmable ballasts in the PCA xitec II series are supplied from the factory with a DC level of 15%. This value can be individually adjusted on devices in the EXCEL series. For more information on changing settings see the masterCONFIGURATOR manual.

NOTICE

The PCA xitec II ballast is designed to operate on DC voltage and pulsing DC voltage.

It is essential that the correct polarity is used for operation on pulsing DC voltage. In DC recognition connected sensors are ignored.

3.3.4.5.2. Commissioning

3.3.4.5.3. Commissioning for DC

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

⚠ NOTICE

In dc operation the dc signal is detected in each case. There is no need to worry about the polarity.

Commissioning for pulsing DC voltage

Procedure:

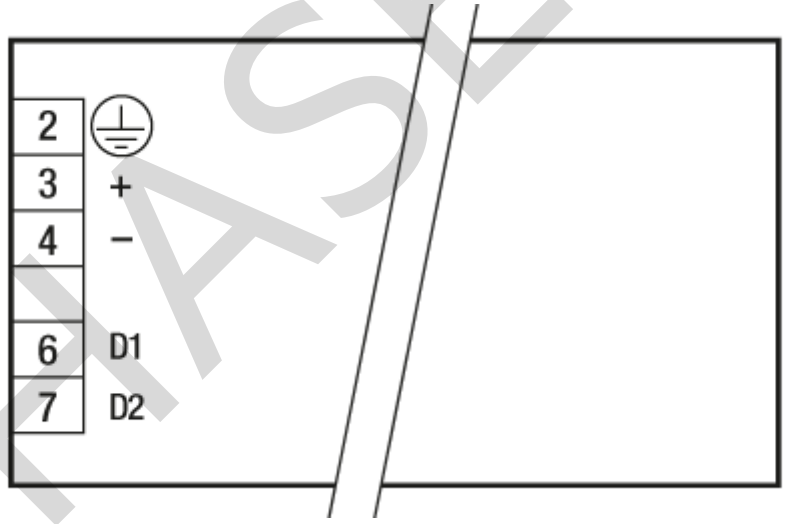
⚠ CAUTION!

If the polarity is incorrect, detection of the DC signal cannot be guaranteed. If the DC signal is not detected the problems are as follows:

_ The ballast continues to operate in normal AC mode

_ The ballast does not change to the required emergency lighting level

_ The light level does not correspond to the defined emergency light level



For operation with pulsing DC voltage (AC-rectified) make sure the polarity is correct:

_ Connect the positive pole to terminal 3

_ Connect the negative pole to terminal 4

Operating device PCA ECO

3.3.4.5.4. Further technical data

Voltage range for operating on dc voltage:	
Default	220-240 V 0 Hz
Operation possible	176-280 V 0 Hz
Starting/ignition (safe lamp start)	198-254 V 0 Hz

Other values	
Maximum ripple value of supply voltage	approx. 40 %

Dimming level	
Factory setting	15 %
Possible values	0-100 %

Starting time
< 0.2 seconds

DC level adjustment (only available for EXCEL)	
Possible values	1-100 %
Adaptation	via masterCONFIGURATOR

Can be used in emergency lighting systems to EN 50172 or for emergency lighting to EN 61347-2-3 Annex J.

3.3.4.6. EOL (End of lamp life)

3.3.4.6.1. Description

When they come to the end of their life fluorescent lamps undergo a change in their electrical behaviour. This can cause a serious local temperature rise at the filaments.

The EOL (end of lamp life) function detects this change in behaviour and ensures that the lamp is switched off before there is any damage.

The requirements for checking the devices are defined in EN 61347-2-3, Section 17.
Tridonic devices are checked using the asymmetric power test (Test 2).

3.3.4.6.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.3.4.6.3. Further technical data

Important requirements of "EN 61347-2-3, Section 17"
Prescribed tests _ Asymmetrical pulse test (Test 1) _ Asymmetrical power test (Test 2) _ Open electrode test (Test 3)
Conditions that must lead to the device being switched off _ No lamp fitted _ Lamps not fitted correctly _ Lamp faulty _ Lamp voltage threshold exceeded (1.3-1.5 x rated lamp voltage) _ Asymmetrical power threshold in the lamp exceeded

3.3.4.7. Intelligent Temperature Guard (ITG)

3.3.4.7.1. Description

⚠ WARNING!

The Tc temperature is the maximum permitted in terms of safety.
Operating the ballast above the permitted Tc temperature is not compliant with relevant standards.
The Intelligent Temperature Guard function does not replace the proper thermal design of the luminaire and does not enable the lighting to operate for lengthy periods of time in impermissible ambient temperatures.

The Intelligent Temperature Guard function provides protection against temporary thermal overloads. It slowly reduces the output if the maximum Tc temperature is exceeded. This way instant failure of the ballast can be prevented.

Thermal overload protection is triggered as soon as the Tc temperature is exceeded by around 5 to 10 °C. The precise trigger temperature depends on the device. The value is selected so that the protection function is not performed until there is a significant impact on rated life.
The output is reduced in small stages that are generally imperceptible to the user:

_ The temperature is checked every two minutes
_ If the temperature is too high the output is reduced by about 2%
_ This process is repeated until the ballast returns to its permitted temperature range
_ The maximum output reduction is 50%

3.3.4.7.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.3.4.7.3. Further technical data

No further technical data available.

3.3.4.8. Intelligent Voltage Guard (IVG)

3.3.4.8.1. Description

The Intelligent Voltage Guard (IVG) function warns against possible damage due to overvoltage or undervoltage. Mains voltage is constantly monitored and appropriate responses are then made:

_ If the mains voltage is too low (< 70 V) the ballast is switched off

_ At undervoltages between 70 and 140 V the device switches off and on again on a non-cyclic basis.

_ In the case of an overvoltage (> 318 V) the lamps flash

One of the main causes of overvoltages is a wiring fault or a break in the neutral conductor in the three-phase network. Intelligent Voltage Guard helps detect overvoltages by indicating them.

WARNING!

Continuous operation (approx. 1 hour) at overvoltage (> 320 V) will destroy the ballast.
If the device flashes immediately disconnect the entire lighting system circuit.

NOTICE

If overvoltage is detected the connected sensors are ignored.

3.3.4.8.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.3.4.8.3. Further technical data

Disconnection thresholds

Voltage	Operating mode	Reaction
0-69 V	Undervoltage	The device switches itself off
70-139 V	Undervoltage	The device switches off and on again on a non-cyclic basis
140-198 V	Undervoltage	
199-254 V	Normalvoltage	
255-317 V	Overvoltage	Overvoltage, max. operation time of 1 hour
318-350 V	Overvoltage	The lamp flashes, max. operation time of 1 hour, damages possible
350+ V	Overvoltage	The lamp flashes, damages and/or destruction will occur

3.3.4.9. Multi-lamp operation

3.3.4.9.1. Description

A ballast that has the Multi-lamp operation function can automatically detect various lamps and operate them with the correct lamp parameters.
During each restart the LTR function (lamp type recognition) carries out a test run. This ensures that the right lamp type is immediately set after each lamp change.

NOTICE

Even with the very first lamp start the LTR function (lamp type recognizion) carries out a test run. In contrast to the predecessor model it is not necessary to switch the lamp on and off beforehand.

CAUTION!

A mixed population of two-lamp ballasts results in one of the lamps being operated with incorrect parameters. This strongly reduces the life of the lamp. Do not install a mix of two-lamp ballasts!

NOTICE

The LTR function (lamp type recognizion) does not work in dc mode and in case of short voltage interrupts (< 300 ms).

The multi-lamp operation function offers benefits in various ways:

_ Planners, operators and facility managers have greater flexibility. They can vary the illuminance without any additional expense if requirements change because of a change in use or a change of tenant

_ Luminaire manufacturers need fewer components. This simplifies processes within the company and saves costs on warehousing and ordering

3.3.4.9.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.3.4.9.3. Further technical data

No further technical data available.

3.3.4.10. SMART-Heating

3.3.4.10.1. Description

The SMART-Heating function ensures that the filaments are heated to the correct temperature and that filament heating is switched off once a certain dimming level is reached.

Correct appropriate heating in the lower dimming range extends the life of the filaments. A reduction in filament heating in the upper dimming range leads to considerable energy savings. Another positive effect is a reduction in the connected load by as much as 7 percent.

The lamps are operated at a constant luminous flux in accordance with their specifications, faulty lamps are automatically disconnected, lamps are automatically restarted and dc emergency lighting operation takes place in accordance with EN 50172.

3.3.4.10.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.3.4.10.3. Further technical data

Typical threshold values at which filament heating is reduced to a minimum are around 90 % dimming level. The precise values vary according to lamp wattage and type of device.

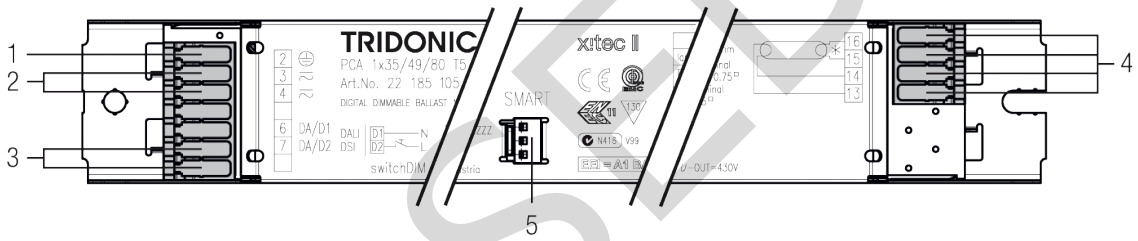
3.4. PCA EXCEL one4all xitec II

3.4.0.11. Description

The electronic ballasts in the xitec II series come in three versions (BASIC, ECO and EXCEL). They differ in terms of their functionality.
The innovative ballasts in the PCA EXCEL one4all series are so versatile and convenient that they open up new lighting solutions. They meet almost all specific requirements – both for luminaires and for applications.
PCA EXCEL offers individual and specific programming options (corridorFUNCTION, DC level), multi-functional interface, multi-lamp management for T5, the possibility of intelligent stand-alone solutions (plug'n play via SMART sensors), switchDIM with memory function and adjustable dimming rates, extended DALI commands and a dimming range from 1 to 100 percent (3 to 100 percent for compact devices)

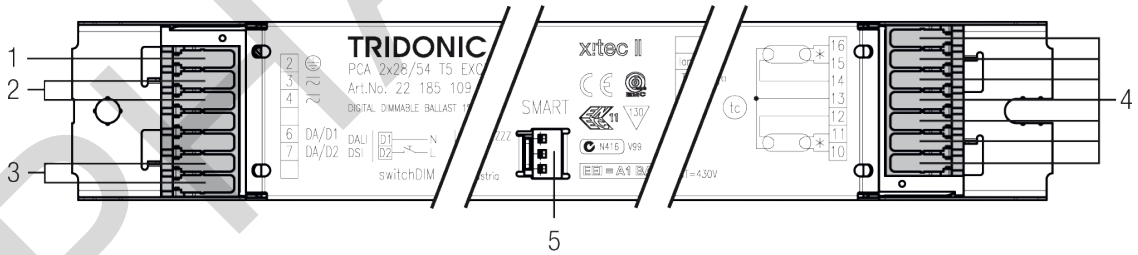
3.4.0.11.1. Figures

Linear device, single-lamp:



1) Earth connection, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

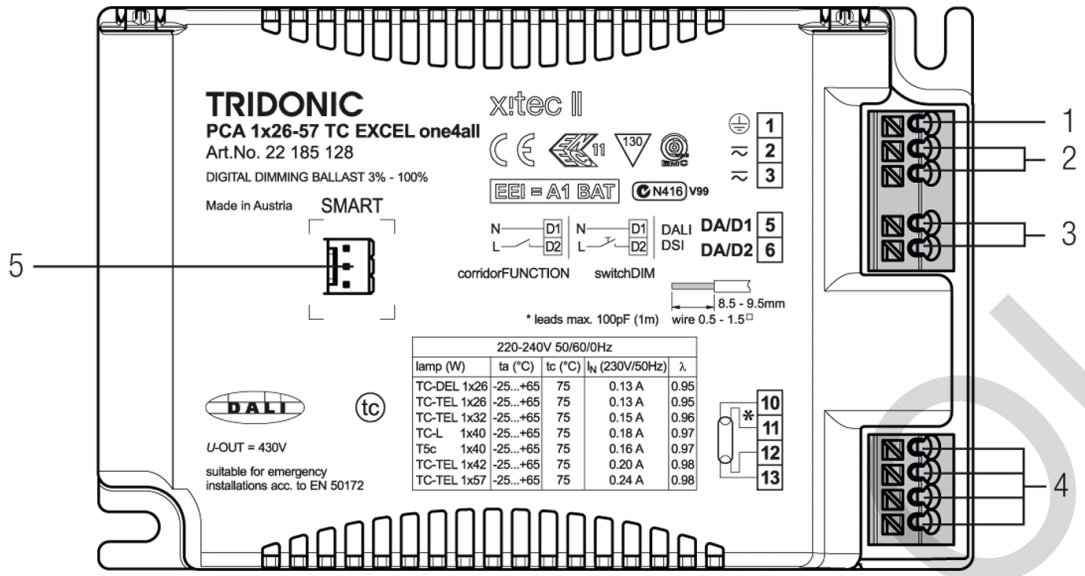
Linear device, two-lamp:



1) Earth connection, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

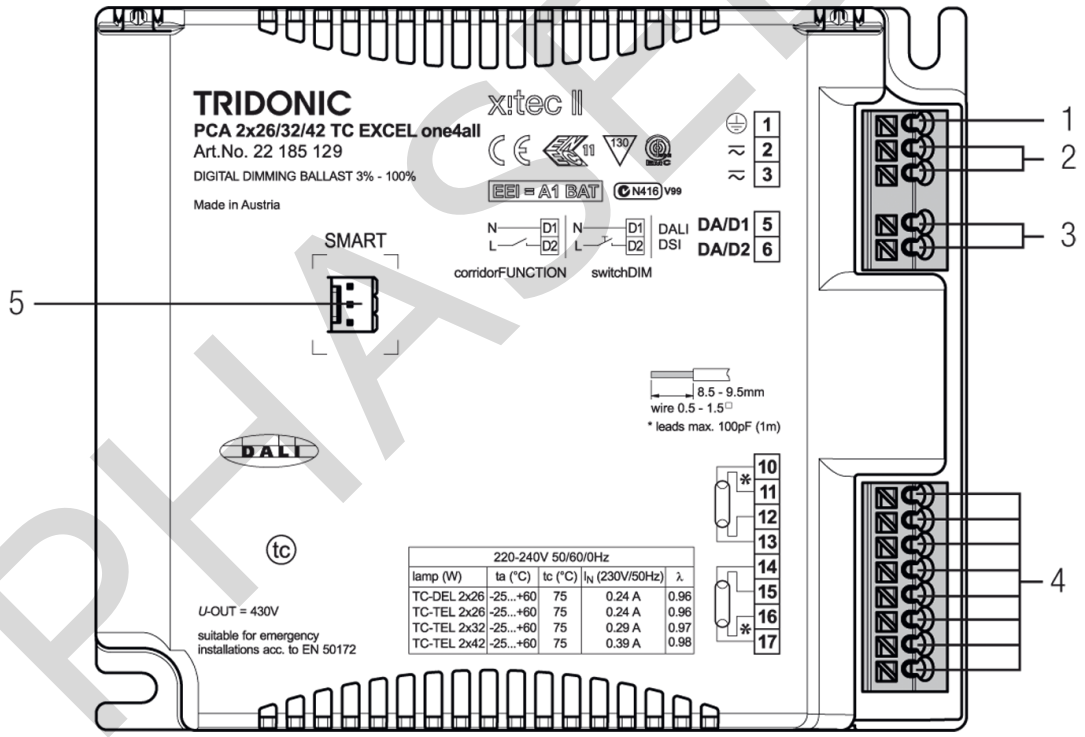
Operating device PCA EXCEL one4all

Compact device, single-lamp:



1) Earth connection / function earth, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

Compact device, two-lamp:



1) Earth connection / function earth, 2) Mains connection, 3) Control input, 4) Lamp connections, 5) SMART interface

3.4.1. Installation notes

NOTICE

The cabling, wiring and mounting for a ballast varies depending on the design and manufacturer of the lamp. The following description should therefore not be viewed as comprehensive installation instructions but merely as important general information. To obtain further information, proceed as follows:

_ Read the documentation provided by the lamp manufacturer. Follow the guidelines and instructions of the lamp manufacturer.

_ Observe all relevant standards. Follow the instructions given in the standards.

3.4.1.1. Safety information

WARNING!

_ Comply with the general safety instructions (see "Safety instructions", p. 5) !

_ To avoid failures due to ground faults protect the wiring against mechanical loads from sharp-edged metal parts (e.g. cable penetrations, cable holders, metal frames, etc.

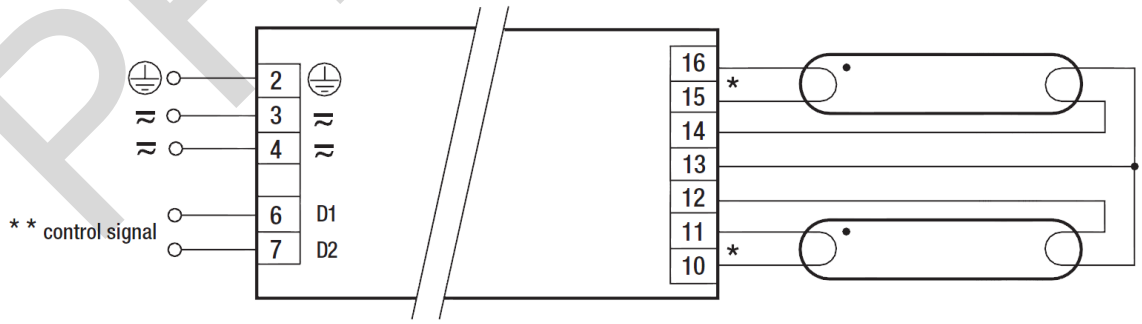
_ Make sure that the current at the terminal does not exceed a certain maximum value. This maximum value lies at 2 amps for BASIC and ECO devices and at 4 amps for EXCEL devices.

_ Electronic ballasts from Tridonic are protected for a maximum of 1 hour against overvoltage of up to 320 V. Make sure that the ballast is not exposed to overvoltages for long periods

_ Electronic ballasts from Tridonic have type of protection IP 20. Comply with the requirements for this type of protection.

3.4.1.2. Routing the wires

3.4.1.2.1. Wire lengths



* leads 10, 11, 15, 16: keep wires short, max. 1.0 m
leads 12, 13, 14: max. 2.0 m; ballast must be earthed
* * digital signal DSI or switchDIM

NOTICE

Parasitic leakage currents are determined by wire capacitance and voltage potential. To minimise parasitic leakage consider the following:

_ "Hot connections" (indicated in the diagram by an asterisk *) must be kept as short as possible. With reference to typical luminaire wiring with a max of 100 pF per meter of wire length the maximum length is approx. 1 meter.

_ "Hot connections" must be kept shorter than the other connections ("cold connections").
For precise wire capacitances and wire lengths see the relevant data sheets.

3.4.1.2.2. Sensor wires

Sensor wires must be routed separately from the lamp wires and mains cables otherwise the lighting control system may malfunction.
If separate routing is not possible (for reasons of space) shielded cables must be used.

3.4.1.2.3. "Master/slave" circuits

In "master/slave" circuits the two-lamp ballast of the single-lamp master luminaire operates a further single-lamp slave luminaire.

WARNING!

Do not use a master/slave circuit with dimmable ballasts as the different wire lengths lead to very different behaviour in operation.

3.4.1.3. Tests

NOTICE

The performance of the prescribed tests and compliance with relevant standards are the responsibility of the luminaire manufacturer.
The following descriptions merely indicate the most important tests and are no substitute for a full research of the relevant standards.

3.4.1.3.1. Insulation and dielectric strength testing of luminaires

Electronic ballasts for lamps are sensitive to high-voltage transients. This must be taken into consideration when subjecting luminaires to routine testing during manufacture.

According to IEC 60598-1 Annex Q (for information only!) and ENEC 303-Annex A, each luminaire should be subjected to an insulation test for 1 second at 500 V DC. The test voltage is applied between the linked phase/neutral conductor terminal and the protective earth terminal. The insulation resistance must be at least 2 MOhm.

As an alternative to measuring the insulation resistance, IEC 60598-1 Annex Q describes a dielectric strength test at 1500 V AC (or 1.414 x 1500 V DC). To avoid damaging electronic ballasts, this dielectric strength test should be performed exclusively for type testing. This test should certainly not be used for routine testing.

NOTICE

Tridonic recommends performing an insulation test because a dielectric strength test may damage the device irreparably.

3.4.1.3.2. Type testing

Type testing of the luminaire is performed according to IEC 60598-1 Section 10.
The wiring for protection class 1 luminaires is tested at a voltage of 2xU + 1000 V. In order not to overload the ballast all the inputs and outputs of the ballast are connected to one another.
U~out~is used for measuring the voltage for luminaires with ballasts with U~out~> 250 V:
For U~out~480 V the voltage for the type test is 2000 V. (Routine testing is always performed at 500 V DC)

3.4.2. Installation

NOTICE

Rigid wire must be used exclusively!
Make sure the wire has the correct cross-section!

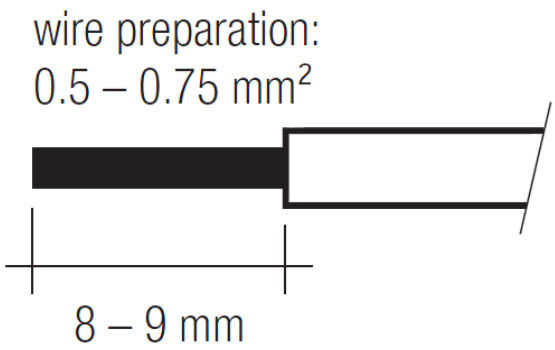
NOTICE

Do not mix IDC and plug-in contacts.
No through-wiring.

3.4.2.1. Wiring for linear devices

3.4.2.1.1. Wiring the plug-in terminal

Procedure:



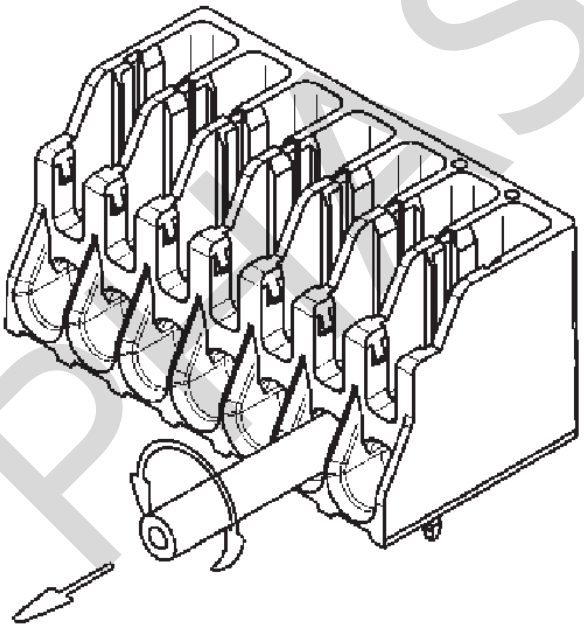
_ Use wire with a cross-section of 0.5 to 0.75 mm²

_ Strip off 8-9 mm of insulation; you may need to twist the tool slightly

_ Insert the bare end into the terminal

3.4.2.1.2. Detaching the plug-in terminal

Procedure:



_ Pull out the wire at the front

3.4.2.1.3. Wiring the IDC terminal

NOTICE

IDC terminals are provided for automatic wiring by machine.
There is no need to prepare the wire by hand. Do not remove the insulation of the wire.
Make sure the wire has the correct cross-section.

Procedure:

_ Use wire with a cross-section of 0.5 mm²

_ Follow the guidelines and instructions of the manufacturer of the automatic wiring machine

3.4.2.1.4. Detaching the IDC terminal

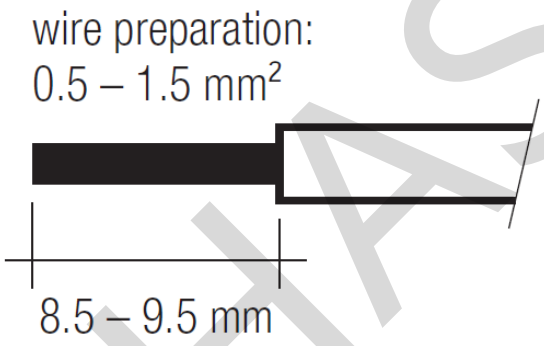
Procedure:

_ Remove wire from above

3.4.2.2. Wiring for compact devices

3.4.2.2.1. Wiring the plug-in terminal

Procedure:



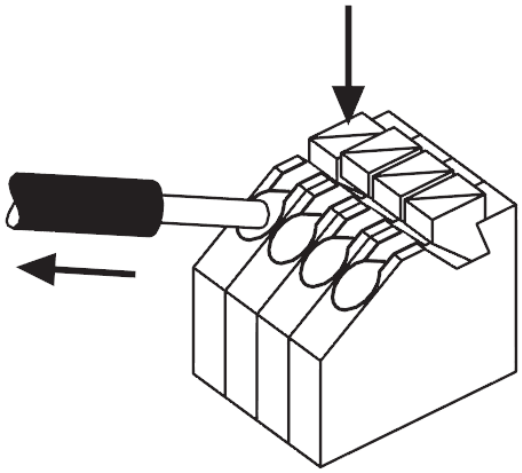
_ Use wire with a cross-section of 0.5 to 1.5 mm²

_ Strip off 8.5-9.5 mm of insulation; you may need to twist the tool slightly

_ Insert the bare end into the terminal

3.4.2.2.2. Detaching the plug-in terminal

Procedure:



_ To detach the wire push onto the terminal from above

_ Pull out the wire at the front

3.4.3. Functions

3.4.3.1. switchDIM

3.4.3.1.1. Description

With the switchDIM function it is possible to use the mains voltage as a control signal.
The phase of a simple standard mains voltage push button is connected to the terminal marked D2 and the neutral conductor is connected to the terminal D1.

Using the function is easy and convenient:

_ A short press (50-600 ms) switches the device on or off

_ A long press (> 600 ms) fades the connected operating device alternately up and down (between 10 and 100% for BASIC, and between 1 and 100% for ECO and EXCEL).

switchDIM is therefore a very simple form of lighting management. It also has a positive effect on material and labour costs.

The device has a switchDIM memory function. This is used, among other things, for storing the last dimming value in the event of interruptions in the power supply.
When power returns, the lamp is automatically restored to its previous operating state and dimmed to the last value.
In the case of constant lighting control with an ambient light sensor, switchDIM can be used for manual control of the setpoint value.

⚠ CAUTION!

Glow switches are not approved for controlling switchDIM.
Glow switches may cause the ballast to spontaneously switch on or off or make sudden changes in the dimming value.

⚠ CAUTION!

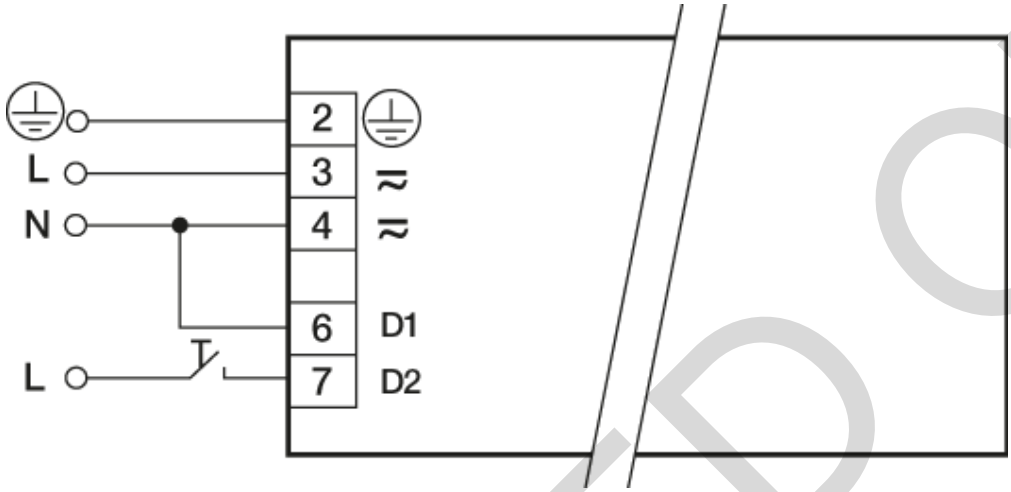
To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the terminal.
Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

3.4.3.1.2. Installation

Wiring variants

There are two options for installing switchDIM: four-pole and five-pole wiring

Configuration four-pole wiring

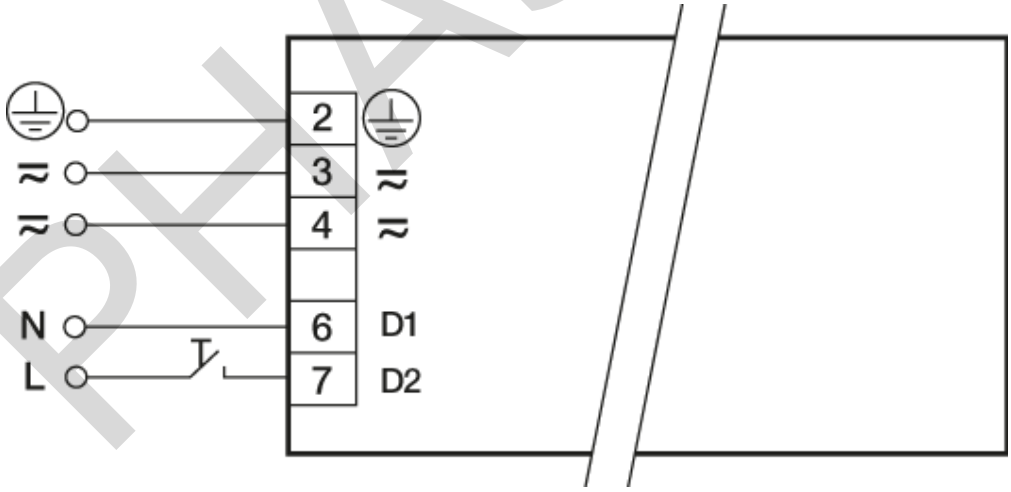


Phase (L), neutral (N), earth (PE), control line (L')

Benefits:

No need for a control line thanks to bridging terminal 6 and the N-connection of the luminaire

Configuration five-pole wiring



Phase (L), neutral (N), earth (PE), control line (L), neutral (N)

Benefits:

Control can be changed at any time to a digital control signal (DSI or DALI) without having to change the luminaire or provide an additional control line

NOTICE

For five-pole wiring we recommend connecting the neutral conductor to D1. This prevents 400 V being applied between adjacent terminals if a different phase is used for the control input.

3.4.3.1.3. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

Using the switchDIM function

switchDIM is operated by the mains voltage push button.

Procedure:

_ Switch the device on/off by briefly actuating the push button or

_ Dim the device by holding down the switch

Synchronising devices

If the devices in a system do not operate synchronously the devices must be synchronised, i.e. put in the same status (on/off).

Procedure:

_ Hold down the push button for 10 seconds
-› All devices will be synchronised to the same status
-› Lamps assume a uniform light value (approx. 50%)

Changing the fading time

The default value for the fading time is approx. 3 seconds. For devices of the types ECO und EXCEL this can be changed to approx. 6 seconds.

Procedure:

_ Hold down the push button for 20 seconds
-› After 10 seconds: all devices will be synchronised to the same status
-› After 20 seconds: a new fading time will be set

-› Lamps assume a uniform light value (approx. 100%)

Resetting the ballast to the factory defaults

Procedure:

_ Hold down the push button for 10 seconds four times in a row. Release the push button briefly between each 10 second hold

Switching the ballast to automatic mode

In automatic mode the device detects which control signal (DALI, DSI, switchDIM, etc.) is connected and automatically switches to the corresponding operating mode.

Procedure:

_ Press the push button 5 times within 3 seconds

3.4.3.1.4. Further technical data

Important values	
Dimming range	1-100 % (EXCEL, ECO) 10-100 % (BASIC)
Maximum number of control points	25 conventional momentary-action switches
Maximum number of operating devices per switchDIM system	25 operating devices
Maximum number of devices per dimming circuit	25 devices
Maximum length of the control line	Virtually unlimited, because 230/240V

For larger systems we recommend a digital system such as DSI or DALI (ECO, EXCEL).

3.4.3.2. corridorFUNCTION

3.4.3.2.1. Description

The corridorFUNCTION enables the illuminance to be linked to the presence or absence of people. A conventional relay motion sensor is connected. The luminous intensity is increased when a person enters the room. When the person leaves the room the motion sensor switches off after a certain delay and the luminous intensity is automatically reduced.

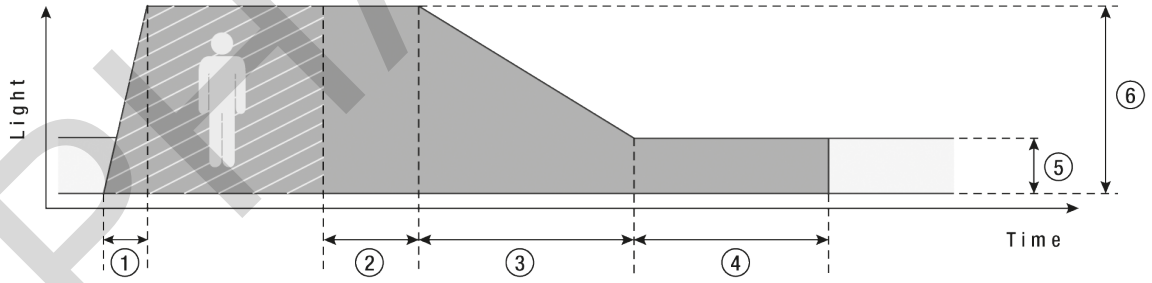
The corridorFUNCTION is particularly beneficial in applications in which light is needed round the clock for safety reasons, for example in public buildings, large apartment complexes, car parks, pedestrian underpasses and underground railway stations. Since the luminous intensity only has to be increased when there is a demand for light the corridorFUNCTION offers effective lighting management and helps save energy and costs. Another benefit of the corridorFUNCTION is the enhanced convenience of automatic lighting control. Tridonic has developed a useful software tool that can calculate the amortisation period and the savings in costs and CO_2 emissions for corridorFUNCTION applications compared with conventional solutions. The corridorFUNCTION payback calculator can be downloaded free of charge (see "Reference list", p. 176).

⚠ CAUTION!

To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input.
Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

Profile settings

The ballasts have different profiles so they can provide the best possible performance in a range of conditions. The profiles are defined by a series of values:

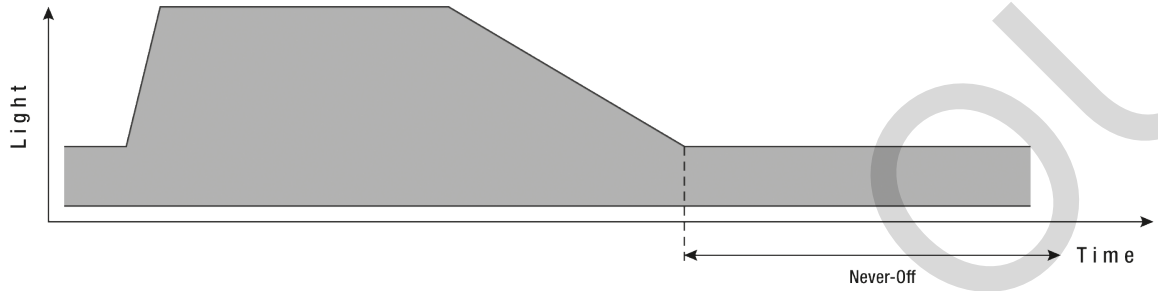


1. Fade-in time: the time that starts as soon as the presence of a person is detected. During the fade-in time the luminous intensity is faded up to the presence value.
2. Run-on time: the time that starts as soon as the presence of a person is no longer detected. If the presence of a person is detected again during the run-on time the run-on time is restarted from zero. If no presence is detected during the run-on time the fade time is started as soon as the run-on time expires.

3. Fade time: the time during which the luminous intensity is faded from the presence value to the absence value.
4. Switch off delay: the time during which the absence value is held before the lighting is switched off. Depending on the profile selected the switch-off delay may have different values or may not be defined.
5. Absence value: the luminous intensity when there is no person present
6. Presence value: the luminous intensity when persons are present

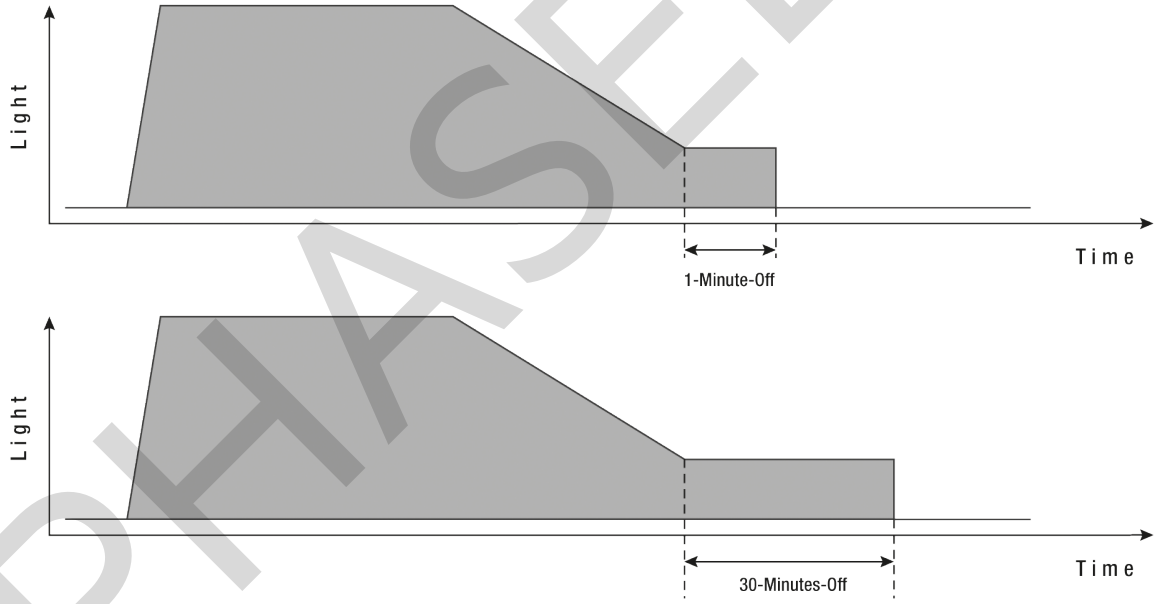
There is a choice of three predefined profiles. They can be activated via a plug.

"Never-Off" profile (default)



A switch-off delay is not defined for the "Never-Off" profile. An absence value of 10% is permanently retained so a minimum brightness level is available round the clock.

"1-Minute-Off" or "30-Minutes-Off" profiles



The "1-Minute-Off" and "30-Minutes-Off" profiles define different switch-off delays. The absence value is set at 1 or 30 minutes. If presence is not detected in this time the device switches off.

NOTICE

The times in these profiles are subject to a certain tolerance. This means that different devices in a system may switch off at slightly different times (see "Further technical data", p. 18).

Variable switch-off times

The EXCEL device offers even more options. The profiles and their values can be freely adjusted. The values can be adjusted via a connection to a DALI bus (see "DALI - Commissioning", p. 97).

Combinations

Combining dimmable ballasts with motion sensors and ambient light sensors offers maximum potential energy savings and maximum convenience. The ambient light sensor detects the ambient light level and defines a constant light value. When the motion sensor is activated the system initially switches to the presence value and then the luminous intensity is adjusted to the constant light value (see "Sensors - D", p. 129).

3.4.3.2.2. Installation

Requirements:

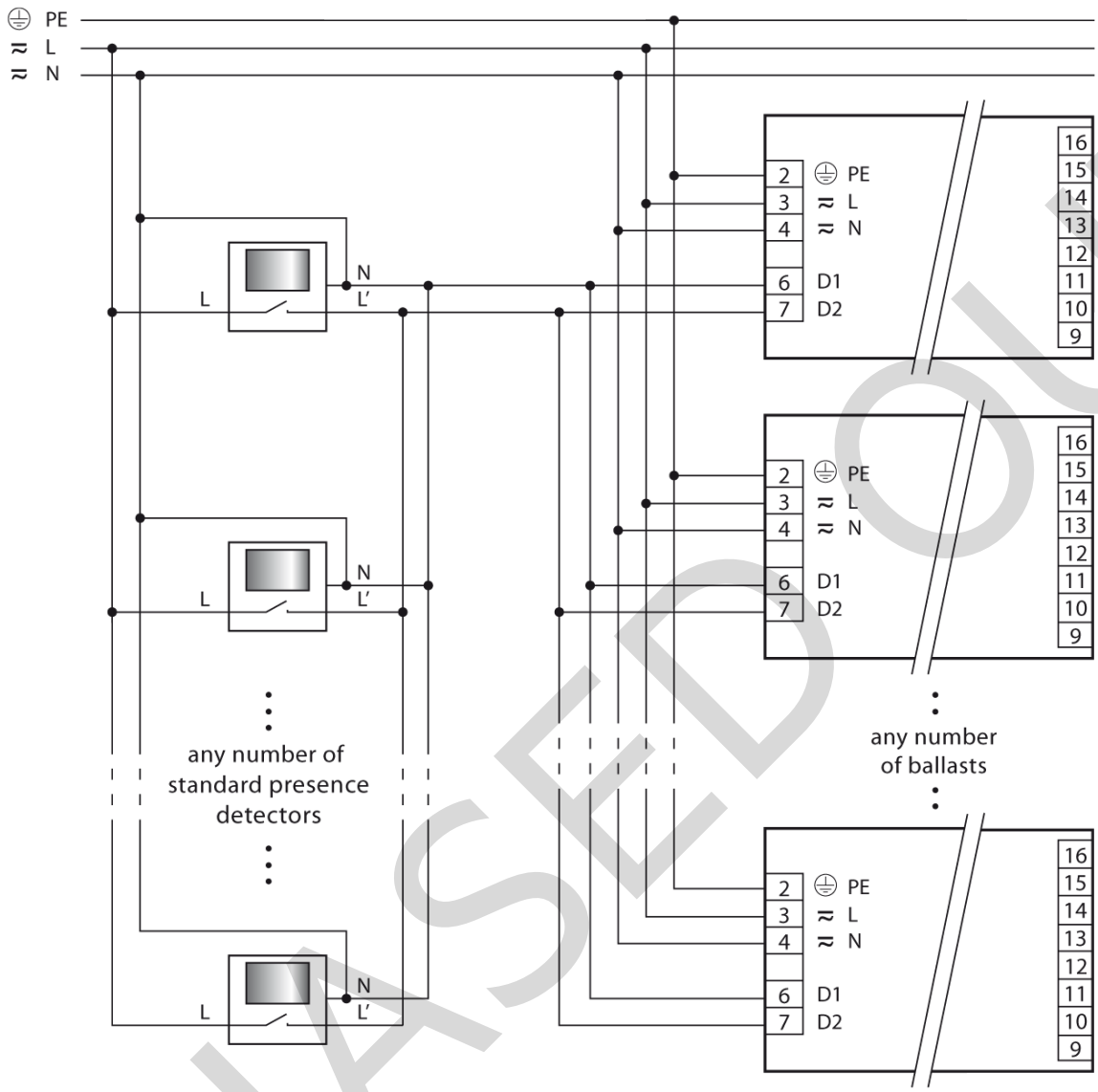
_ The ballast is correctly installed in the luminaire and cabled on the power supply side
_ A motion sensor is installed in the lighting system
_ The motion sensor is connected to the ballast

Procedure:

_ Connect the neutral conductor (N) to terminal D1 on the ballast
_ Connect the output of the motion sensor (switched phase) to terminal D2 on the ballast

Operating device PCA EXCEL one4all

Wiring versions:



Phase (L), neutral (N), earth (PE), control line (L), neutral (N)

Benefits:

Control can be changed at any time to a digital control signal (DSI or DALI) without having to change the luminaire or provide an additional control line

Operating device PCA EXCEL one4all

⚠ CAUTION!

Use conventional relay motion sensors!
Electronic motion sensors (Triac) are not suitable because of their technical design.

Do not use glow switches!
Glow switches may affect the control.

Make sure that the control line (L') of the motion sensor is connected to terminal D2 and the neutral conductor (N) to terminal D1.

NOTICE

For five-pole wiring we recommend connecting the neutral conductor to D1.
This prevents 400 V being applied between adjacent terminals if a different phase is used for the control input.

NOTICE

For large installations, supply to the ballasts may be split among several phases (L1, L2, L3).
Any phase can be used for the control input .
Any number of motion sensors can be connected in parallel.

3.4.3.2.3. Commissioning

Activating the corridorFUNCTION by means of the mains voltage

Activating the corridorFUNCTION is simple. If an ac voltage of 230 V is applied to the digital interface of the ballast for a period of at least 5 minutes the ballast detects the corridorFUNCTION and automatically activates it. Activation is required only once per device.
There are three procedures for activating by means of the mains voltage. The requirements are the same in each case.

Requirements:

_ The ballast is correctly installed in the luminaire

_ Input voltage is applied

_ A motion sensor is connected to information D1 or D2

Procedure:

Version 1:

_ Remain in the activation range of the motion sensor for more than 5 minutes
-› The motion sensor detects movement and switches on
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence level (default: 100%)

Version 2:

_ Set the run-on time on the motion sensor to a value greater than 5 minutes

_ Remain in the activation range of the motion sensor for a short time
-› The motion sensor detects movement and switches on
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence value (default: 100%)

_ Reset the run-on time of the motion sensor to the required value

Version 3: Only possible if the motion sensor offers a manual override option

_ Set the slide switch on the motion sensor to the "Never-Off" function

_ Wait 5 minutes
-› The corridorFUNCTION is activated automatically after 5 minutes
-› The light value switches to presence value (default: 100%)

_ Reset the slide switch on the motion sensor to the "automatic" function

Activating the corridorFUNCTION via SMART-Plug

_ The corridorFUNCTION can also be activated via SMART-Plug (see "Description corridorFUNCTION plug", p. 111).

Combining the corridorFUNCTION with constant light control

The corridorFUNCTION can be combined with the constant light control system by connecting an ambient light sensor to the SMART interface (see "Description constant lighting control", p. 130).

Deactivating the corridorFUNCTION

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated.

Procedure via mains

_ Connect mains voltage push button to the terminal marked D2
_ Connect neutral conductor to the terminal marked D1
_ Press the switch 5 times within 3 seconds

Procedure via DALI/DSI

_ EXCEL / ECO
Send 5 DALI or DSI commands within 3 seconds via DALI bus to the ballast
_ BASIC
Send 5 DSI commands within 3 seconds via DSI bus to the ballast

3.4.3.2.4. Additional adjustments for the EXCEL device type

The following adjustments are only available for the EXCEL device type and can not be used with BASIC and ECO devices

Activating the corridorFUNCTION via the masterCONFIGURATOR

On the EXCEL device type the corridorFUNCTION can also be activated via the masterCONFIGURATOR (see "Reference list", p. 176).

Deactivating the corridorFUNCTION

If the corridorFUNCTION was activated via the masterCONFIGURATOR it can be deactivated as follows:

_ Send 5 DALI oder DSI commands within 3 seconds via DALI bus to the ballast

Adjusting the values of the corridorFUNCTION

On the EXCEL device type the values of the corridorFUNCTION can be individually adjusted. The values are set via a DALI USB on the bus and by entering special DALI commands via the masterCONFIGURATOR (see "Reference list", p. 176).

3.4.3.2.5. Further technical data

Tolerances	
max. internal tolerance	< 10 %
Standard value	3 %

Profiles	
"Never-Off" (Standard)	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ no switch-off delay
"1-Minute-Off"	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ switch-off delay: 1 min
"30-Minutes-Off"	_ presence value: 100 % _ absence value: 10 % _ run-on time: dependent on sensor _ fade time: 32 s _ switch-off delay: 30 min

masterCONFIGURATOR settings (only Excel)	
fade time (ON)	0.7 s – 90.5 s
run-on time:	30 s – 90 min e.g. unlimited

Operating device PCA EXCEL one4all

fade time (absence)	0.7 s – 90.5 s
switch-off delay	0 s – 60 min
fade time (OFF)	0.7 s – 90.5 s

3.4.3.3. DSI

3.4.3.3.1. Description

DSI (Digital Serial Interface) enables DSI ballasts to be controlled. The DSI line can be wired separately via a two-core cable or together with the mains cable in a five-core cable. Communication is not impaired by the mains cable. In contrast to DALI, there is no individual addressing of the ballasts with DSI.

DSI offers a series of benefits:

- Expansion options via submodules, for example in combination with daylight control or additional switch modules
- Wiring: Simple wiring with five pole standard cables and line length of up to 250 metres
- Wiring: Polarity-free control lines can be used for mains and control lines
- Wiring: Multiple wiring possibilities (star, series and mixed wiring)
- Unaffected by electrical interference
- Uniform light level from the first to the last light source
- reverse polarity protected connection: can be connected with any polarity
  The main benefits of DSI are the optimisation of energy consumption of extensive groups of luminaires (e.g. in sports stadiums and factories).

3.4.3.3.2. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

For more information on DSI commissioning see the DALI Handbook (see "Reference list", p. 176).

3.4.3.3.3. Further technical data

No further technical data available.

3.4.3.4. DALI

3.4.3.4.1. Description

DALI standard

DALI (Digital Addressable Lighting Interface) is an interface protocol for digital communication between electronic lighting equipment.

The DALI standard was developed by Tridonic together with renowned manufacturers of operating and control equipment. Today, these manufacturers belong to the DALI Activity Group which promotes the use and further development of DALI.

The DALI standard is defined in IEC 62386. A test procedure standardised by the DALI Activity Group ensures compatibility between products from different manufacturers. Tridonic products have undergone this test and meet all the requirements. This is indicated by the logo of the DALI Activity Group on the device.

The agreement by the lighting industry to adopt a common protocol has opened up a virtually unlimited number of options. With the right choice of individual DALI components an extremely wide range of requirements can be met, from operating a simple light switch to lighting management systems for entire office complexes with thousands of light sources.

DALI in Action

DALI offers a lot of possibilities:

_ DALI line: 64 ballasts can be grouped to a line
_ DALI groups: Every ballast can be attributed into 16 groups
_ Addressability: All ballasts are individually addressable
_ Grouping: Possible without complicated rewiring
_ Programmability: Individual programmability makes it possible to use functions which transcend the DALI standard
_ Monitoring: Easily possible thanks to status feedback
_ Wiring: Simple wiring with five pole standard cables and a cable length of max. 300 metres
_ Wiring: Polarity-free control lines can be used for mains and control lines
_ Wiring: Multiple wiring possibilities (star, series and mixed wiring)
_ Unaffected by interruptions: All luminaires receive the same, unaffected digital signal and dimming level
_ Similiar light level from first to last luminaire

Technical data of a DALI line:

_ DALI voltage: 9.5 V - 22.4 DC
_ Maximum DALI system current: max. 250 mA

_ Data transfer rate: 1200 Baud
_ Maximum line length: up to 300 m (for 1,5 mm^2)

3.4.3.4.2. Commissioning

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

For more information on DALI commissioning see the DALI Handbook (see "Reference list", p. 176).

3.4.3.4.3. eDALI

eDALI ("enhanced DALI") offers extended DALI commands. They can be used to activate specific commands of the ballast. The masterCONFIGURATOR software works with eDALI commands. These commands are Tridonic specific. They are not part of the DALI standard and are not publicly available.

3.4.3.4.4. Further technical data

No further technical data available.

3.4.3.5. DC recognition

3.4.3.5.1. Description

In emergency light systems with central battery supply the DC recognition function uses the input voltage to detect that emergency mode is in place. The ballast then automatically switches to DC mode and dims the light to the defined DC level.

Without DC recognition different and more complex solutions need to be applied in order to detect emergency mode.

Dimmable ballasts in the PCA xitec II series are supplied from the factory with a DC level of 15%. This value can be individually adjusted on devices in the EXCEL series. For more information on changing settings see the masterCONFIGURATOR manual.

NOTICE

The PCA xitec II ballast is designed to operate on DC voltage and pulsing DC voltage.

It is essential that the correct polarity is used for operation on pulsing DC voltage. In DC recognition connected sensors are ignored.

3.4.3.5.2. Commissioning

3.4.3.5.3. Commissioning for DC

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

⚠ NOTICE

In dc operation the dc signal is detected in each case. There is no need to worry about the polarity.

Commissioning for pulsing DC voltage

Procedure:

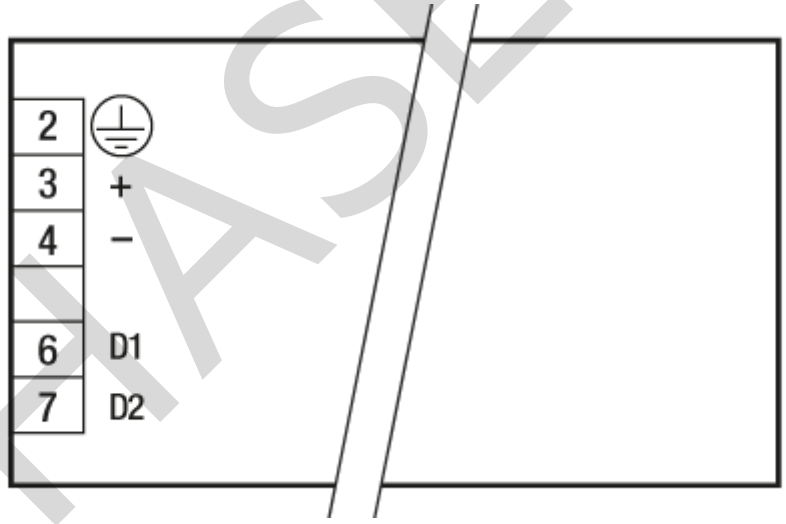
⚠ CAUTION!

If the polarity is incorrect, detection of the DC signal cannot be guaranteed. If the DC signal is not detected the problems are as follows:

_ The ballast continues to operate in normal AC mode

_ The ballast does not change to the required emergency lighting level

_ The light level does not correspond to the defined emergency light level



For operation with pulsing DC voltage (AC-rectified) make sure the polarity is correct:

_ Connect the positive pole to terminal 3

_ Connect the negative pole to terminal 4

3.4.3.5.4. Further technical data

Voltage range for operating on dc voltage:	
Default	220-240 V 0 Hz
Operation possible	176-280 V 0 Hz
Starting/ignition (safe lamp start)	198-254 V 0 Hz

Other values	
Maximum ripple value of supply voltage	approx. 40 %

Dimming level	
Factory setting	15 %
Possible values	0-100 %

Starting time
< 0.2 seconds

DC level adjustment (only available for EXCEL)	
Possible values	1-100 %
Adaptation	via masterCONFIGURATOR

Can be used in emergency lighting systems to EN 50172 or for emergency lighting to EN 61347-2-3 Annex J.

3.4.3.6. Dimming on DC

3.4.3.6.1. Description

If Dimming on DC is activated the requirements of the DC recognition function are ignored. Even if DC is detected the ballast continues to behave as in AC mode:

_ The present dimming level is retained
_ An emergency light level defined for the DC recognition function (DC level) is ignored
_ Control signals via DALI und DSI continue to be executed

3.4.3.6.2. Commissioning

⚠ WARNING!

If Dimming on DC is activated then emergency mode is not recognised. The device no longer automatically switches to the emergency light level.
Make sure that if Dimming on DC is activated an appropriate dimming level is selected for the emergency lighting mode.

Please also note the following:

_ Dimming on DC may only be activated by trained personnel
_ A security code must be entered before activation
_ The security code is issued only after a consent form has been signed
_ Dimming on DC must not be used in emergency lighting systems to EN 50172

Procedure with masterCONFIGURATOR

For more information on commissioning Dimming on DC and changing settings see the masterCONFIGURATOR manual (see "Reference list", p. 176).

3.4.3.6.3. Further technical data

No further technical data available.

3.4.3.7. EOL (End of lamp life)

3.4.3.7.1. Description

When they come to the end of their life fluorescent lamps undergo a change in their electrical behaviour. This can cause a serious local temperature rise at the filaments.

The EOL (end of lamp life) function detects this change in behaviour and ensures that the lamp is switched off before there is any damage.

The requirements for checking the devices are defined in EN 61347-2-3, Section 17.
Tridonic devices are checked using the asymmetric power test (Test 2).

3.4.3.7.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.4.3.7.3. Further technical data

Important requirements of "EN 61347-2-3, Section 17"
Prescribed tests _ Asymmetrical pulse test (Test 1) _ Asymmetrical power test (Test 2) _ Open electrode test (Test 3)
Conditions that must lead to the device being switched off _ No lamp fitted _ Lamps not fitted correctly _ Lamp faulty _ Lamp voltage threshold exceeded (1.3-1.5 x rated lamp voltage) _ Asymmetrical power threshold in the lamp exceeded

3.4.3.8. Intelligent Temperature Guard (ITG)

3.4.3.8.1. Description

⚠ WARNING!

The Tc temperature is the maximum permitted in terms of safety.
Operating the ballast above the permitted Tc temperature is not compliant with relevant standards.
The Intelligent Temperature Guard function does not replace the proper thermal design of the luminaire and does not enable the lighting to operate for lengthy periods of time in impermissible ambient temperatures.

The Intelligent Temperature Guard function provides protection against temporary thermal overloads. It slowly reduces the output if the maximum Tc temperature is exceeded. This way instant failure of the ballast can be prevented.

Thermal overload protection is triggered as soon as the Tc temperature is exceeded by around 5 to 10 °C. The precise trigger temperature depends on the device. The value is selected so that the protection function is not performed until there is a significant impact on rated life.
The output is reduced in small stages that are generally imperceptible to the user:

_ The temperature is checked every two minutes
_ If the temperature is too high the output is reduced by about 2%
_ This process is repeated until the ballast returns to its permitted temperature range
_ The maximum output reduction is 50%

3.4.3.8.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.4.3.8.3. Further technical data

No further technical data available.

3.4.3.9. Intelligent Voltage Guard (IVG)

3.4.3.9.1. Description

The Intelligent Voltage Guard (IVG) function warns against possible damage due to overvoltage or undervoltage. Mains voltage is constantly monitored and appropriate responses are then made:

_ If the mains voltage is too low (< 70 V) the ballast is switched off

_ At undervoltages between 70 and 140 V the device switches off and on again on a non-cyclic basis.

_ In the case of an overvoltage (> 318 V) the lamps flash

One of the main causes of overvoltages is a wiring fault or a break in the neutral conductor in the three-phase network. Intelligent Voltage Guard helps detect overvoltages by indicating them.

⚠ WARNING!

Continuous operation (approx. 1 hour) at overvoltage (> 320 V) will destroy the ballast.
If the device flashes immediately disconnect the entire lighting system circuit.

NOTICE

If overvoltage is detected the connected sensors are ignored.

3.4.3.9.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.4.3.9.3. Further technical data

Disconnection thresholds

Voltage	Operating mode	Reaction
0-69 V	Undervoltage	The device switches itself off
70-139 V	Undervoltage	The device switches off and on again on a non-cyclic basis
140-198 V	Undervoltage	
199-254 V	Normalvoltage	
255-317 V	Overvoltage	Overvoltage, max. operation time of 1 hour
318-350 V	Overvoltage	The lamp flashes, max. operation time of 1 hour, damages possible
350+ V	Overvoltage	The lamp flashes, damages and/or destruction will occur

3.4.3.10. Multi-lamp operation

3.4.3.10.1. Description

A ballast that has the Multi-lamp operation function can automatically detect various lamps and operate them with the correct lamp parameters.
During each restart the LTR function (lamp type recognition) carries out a test run. This ensures that the right lamp type is immediately set after each lamp change.

NOTICE

Even with the very first lamp start the LTR function (lamp type recognizion) carries out a test run. In contrast to the predecessor model it is not necessary to switch the lamp on and off beforehand.

CAUTION!

A mixed population of two-lamp ballasts results in one of the lamps being operated with incorrect parameters. This strongly reduces the life of the lamp. Do not install a mix of two-lamp ballasts!

NOTICE

The LTR function (lamp type recognizion) does not work in dc mode and in case of short voltage interrupts (< 300 ms).

The multi-lamp operation function offers benefits in various ways:

_ Planners, operators and facility managers have greater flexibility. They can vary the illuminance without any additional expense if requirements change because of a change in use or a change of tenant

_ Luminaire manufacturers need fewer components. This simplifies processes within the company and saves costs on warehousing and ordering

3.4.3.10.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.4.3.10.3. Further technical data

No further technical data available.

3.4.3.11. SMART-Heating

3.4.3.11.1. Description

The SMART-Heating function ensures that the filaments are heated to the correct temperature and that filament heating is switched off once a certain dimming level is reached.

Correct appropriate heating in the lower dimming range extends the life of the filaments. A reduction in filament heating in the upper dimming range leads to considerable energy savings. Another positive effect is a reduction in the connected load by as much as 7 percent.

The lamps are operated at a constant luminous flux in accordance with their specifications, faulty lamps are automatically disconnected, lamps are automatically restarted and dc emergency lighting operation takes place in accordance with EN 50172.

3.4.3.11.2. Commissioning

The function is integrated in the device as standard. No additional commissioning is necessary for activation.

3.4.3.11.3. Further technical data

Typical threshold values at which filament heating is reduced to a minimum are around 90 % dimming level. The precise values vary according to lamp wattage and type of device.

4. SMART plugs

4.1. Description

The SMART plugs are plugs for connecting to ballasts of the xitec II series.
The combination of the SMART interface and the associated SMART plug makes it very easy to provide different configurations. Special controllers are not required.

The SMART plugs differ in the functions they offer:

_ corridorFUNCTION: SMART plug cF
_ Grouping: SMART plug Gr
_ Maintenance: SMART plug Ma

The combination options between plugs and ballasts are as follows:
The EXCEL device supports all three functions corridorFUNCTION, Grouping und Maintenance. The BASIC and ECO devices only support corridorFUNCTION.

NOTICE

Nominal lifetime of the Plug is 100,000 hours.
This value applies with reference to the T_c point of the ballast.

4.2. Installation

DANGER!

Danger of electrocution
Disconnect the power to the entire lighting system before attaching the plug to the ballast!

4.2.0.12. Procedure:

_ Connect the plug to the SMART interface

NOTICE

The plug protrudes up to 5 mm from the ballast.

4.3. Commissioning

The descriptions for commissioning, standby switching and reactivation are identical for all three plug functions cF, Gr and Ma.

NOTICE

To ensure that the plug is recognised by the ballast it must be connected to the SMART interface before input voltage is applied.

NOTICE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

4.3.1. Commissioning the ballast

The ballasts can be commissioned without the interface being occupied (terminals D1 and D2) or with DALI, DSI or switchDIM. The procedure is identical.

4.3.1.1. Procedure:

_ Apply input voltage to the ballast
-› The ballast starts the function of the plugs
-› The luminous intensity of the connected light sources is adjusted

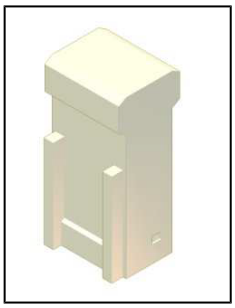
4.3.2. Deactivating the ballast

If the ballast cannot be switched to standby via DALI, DSI or switchDIM it can be deactivated.

4.3.2.1. Procedure:

_ Disconnect the input condition
-› The connected light sources go out

4.4. Description SMART plug cF

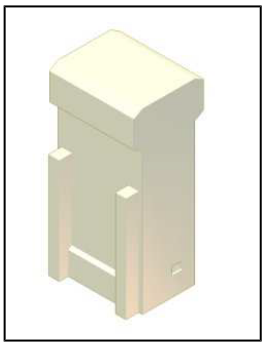


The SMART plug cF operates in the same way as the corridorFUNCTION (see "corridorFUNCTION - Description", p. 84). In contrast, the version with the SMART plug cF does not need any extensive preconfiguration and the function is active immediately.
The SMART plug cF is available in three different versions with one of the three name transmissions, cF01, cF30 and cF n.o. The three name transmissions are abbreviations for the corridorFUNCTION profiles "1-Minute-Off", "30-Minutes-Off" and "Never-Off".
If one of the SMART plugs is connected to the SMART interface of the ballast the relevant corridorFUNCTION profile is activated in the ballast. The SMART plug cF01 activates the "1-Minute-Off" profile, the SMART plug cF30 activates the "30-Minutes-Off" profile and so on.

NOTICE

The SMART Plug cF needs to be combined with a conventional relay motion sensor connected to D1!

4.5. Description SMART plug Gr

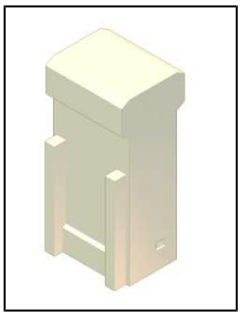


The SMART plug Gr provides a way to assign ballasts to certain DALI groups. The plug is available in four types - A, B, C and D. To assign a ballast to a DALI group the plug is connected to the ballast's SMART interface.

NOTICE

If the DALI group is changed via DALI it is transcribed to the SMART plug Gr!

4.6. Description SMART plug Ma



The Maintenance function enables configuration settings for the ballast to be stored on the SMART plug. If a ballasts needs to be replaced the stored configuration settings can be transferred from the plug to the new ballast. There is then no need to waste time reconfiguring.
The device's parameters are automatically compared between the ballast and the SMART plug and updated during operation.

NOTICE

Typical writing cycles 1,000,000 and a failure rate of max. 0.2 percent.
This value applies with reference to the T_c point of the ballast.

5. Sensors

5.1. Description

SMART sensors 5D, 5DP, 5DPI and 10DPI are sensors for connecting to ballasts in the xitec II series. The combination of the SMART interface and the associated SMART sensor makes it very easy to cover different applications. Special controllers are not required.

The sensors differ in the detection area and mounting height

_ 2-5 m (code 5)
_ 5-10 m (code (10)

and in the functions they offer

_ Constant lighting control (code D)
_ Presence control (code P)
_ Infra-red sensor and remote control (code I)
_ corridorFUNCTION (code cF)

The combination of the codes of the two aspects produces the name of the sensor: Thus the name 5DP stands for a mounting height of max. 5 meters plus the two functions constant lighting control and Presence control.

The predefined corridorFUNCTION profiles are only available in sensors of types 5DPI and 10DPI. These two sensors are available in four different versions, as the standard version without name transmission and as versions with one of the three name transmissions, cF01, cF30 and cF n.o.

The associated extensions enable various corridorFUNCTION profiles to be called up in the ballast (see " corridorFUNCTION - Description", p. 84).

The combination options between sensors and ballasts are as follows:
The EXCEL device supports all functions and can be used with all sensor types 5D, 5DP, 5DPI, 10DPI. The BASIC and ECO devices only support constant lighting control.

5.2. Installation

5.2.1. Attaching the sensor to the luminaire

There are different ways to attach the sensor:

_ Attachment to the luminaire with a cam
_ Attachment to the light source with a mounting flange plus lamp clip
_ Attachment to the luminaire with a mounting flange

There are different procedures:

5.2.1.1. Version 1: Attachment to the luminaire with a cam

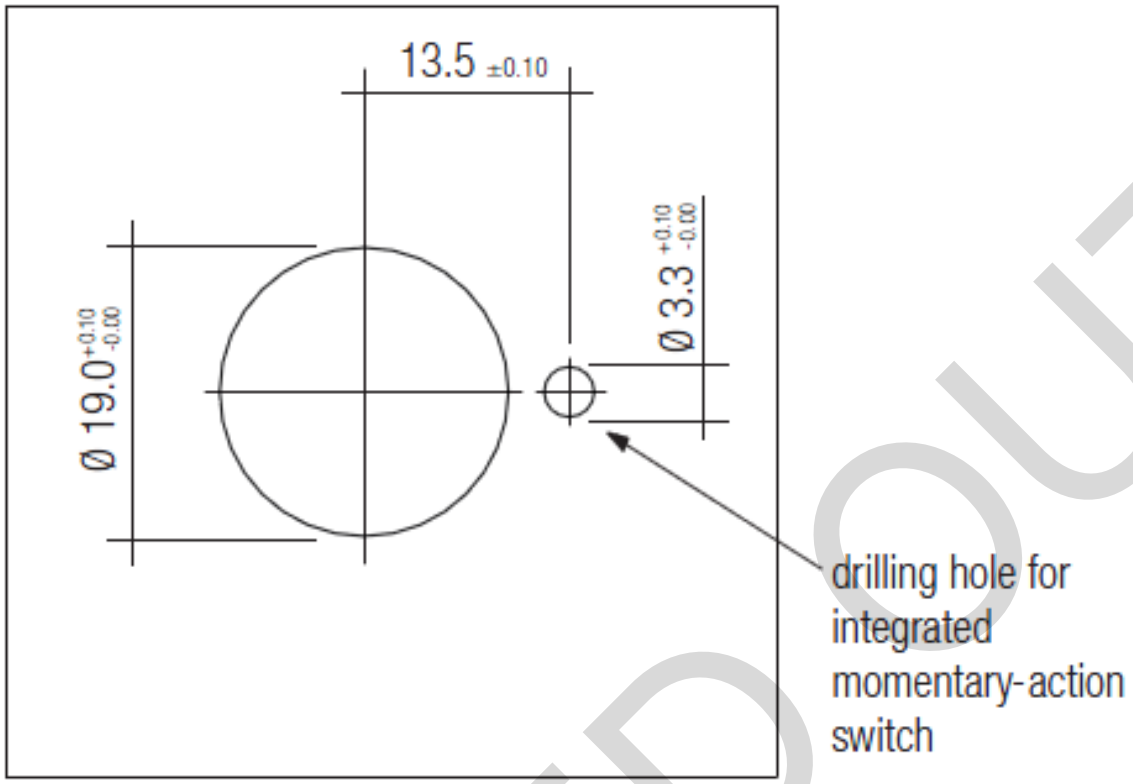
5.2.1.1.1. Requirement:

Suitable holes available in the luminaire plate:

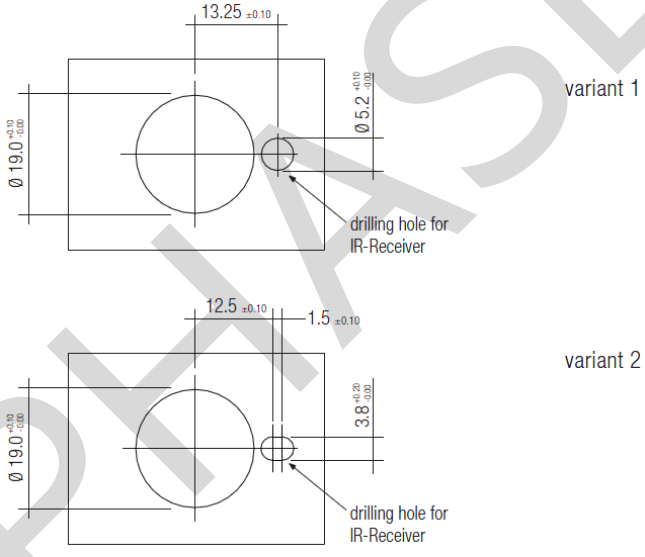
_ Hole diameter required: Ø 19 mm
_ Thickness of the luminaire plate: 0.8 - 1.2 mm

_ for sensor 5D and 5DP: second smaller hole for anchoring the integrated pushbutton

System components Sensors

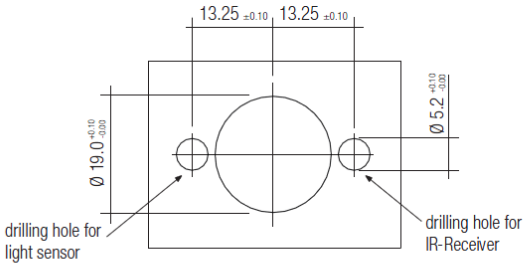


_ for sensor 5DPI: second smaller hole for anchoring the infrared-sensor

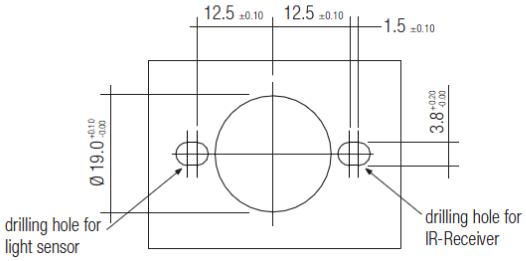


_ for sensor 10DPI: two additional smaller holes for anchoring the infrared-sensor and the light sensor

System components Sensors



variant 1



variant 2

Procedure:

_ Insert the sensor from the inside through the hole and snap into the cam

_ Make sure the integrated pushbutton or infra-red sensor is correctly seated in the second hole

5.2.1.2. Version 2: Attachment to the luminaire with a clip

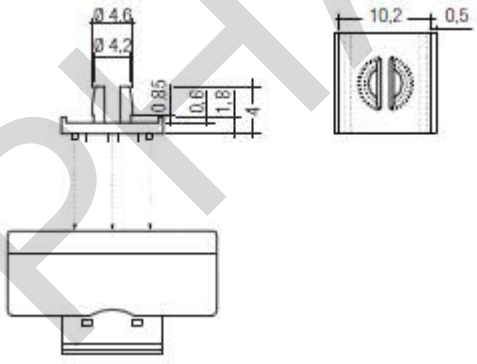
5.2.1.2.1. Requirement:

Suitable hole available in the luminaire plate:

_ Hole diameter required: Ø 4.3 mm

_ Recesses at the side of the holes

_ Maximum thickness of the luminaire plate: 0.8 mm



5.2.1.2.2. Procedure:

_ Insert the mounting flange at the back of the sensor and snap in place
_ Insert the mounting flange with the sensor attached in the hole in the luminaire plate and snap in place
_ Make sure the clip is seated correctly in the side recesses

5.2.2. Connecting the sensor to the ballast

⚠ DANGER!

Danger of electrocution
Disconnect the power to the entire lighting system before connecting the sensor to the ballast!

5.2.2.1. Procedure:

_ Connect the sensor cable to the SMART interface

5.3. Installation instructions for Smart sensors

If the Smart sensor is installed inside the luminaire, reflectors, diffusers, vanes or protective grids may affect lighting control. Please find below an overview of how to avoid these adverse effects.

5.3.1. Use of a reflector

5.3.1.1. Description

Highly specular reflectors may reflect ambient light components so that the surface to be measured is brighter than specified in the settings.

5.3.1.2. Probability of occurrence

_ This phenomenon occurs only with the following combinations of lamp and sensor types:

Sensor type	Lamp type
5DP	1 x 80 W
5DPI	1 x 80 W

_ Only highly specular reflectors are critical in this respect. “Specular” means that the surface of the reflector must show a clear mirror image.

5.3.1.3. Solution

_ Choose other lamp and sensor types. The following combinations do not present any problems:

Sensor type	Lamp type
5D	2 x 80 W
10DPI	2 x 80 W

_ Prevent reflected light from hitting the sensor and the reflector face on, for example by covering the luminaire with a diffuser, glass panel, grid or other measures

5.3.2. Use of covers

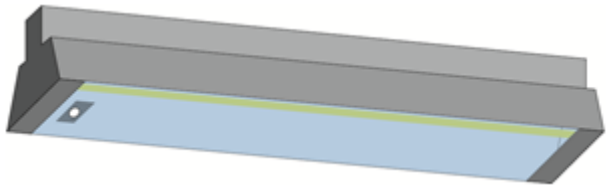
5.3.2.1. Description

Covering the luminaire with a diffuser, glass panel, grid or other measures may prevent ambient light from hitting the reflector. However, if sensors are installed behind covers, the latter also prevent the sensors from working properly.

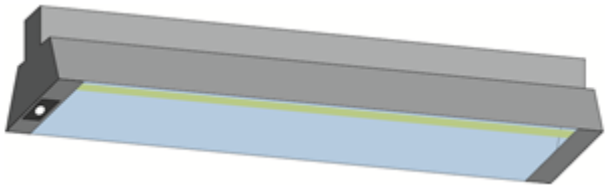
5.3.2.2. Solution

_ Install the sensor outside the luminaire, if covers are used. The following options are available:

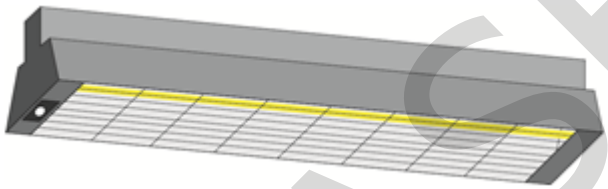
Put the sensor through an opening in the cover:



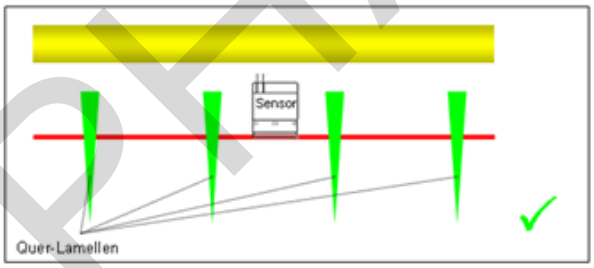
Place the sensor outside the cover



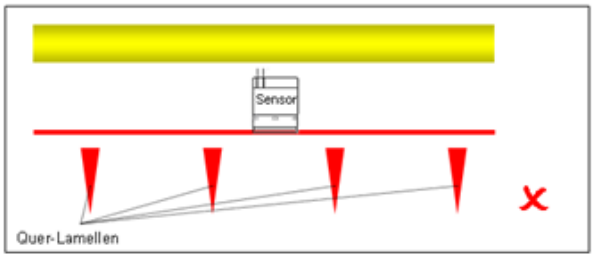
5.3.3. Use of vanes



Vanes prevent light from penetrating laterally.
For the sensors to work properly, they must be installed in such a way that the cross vanes begin above the “red line”:



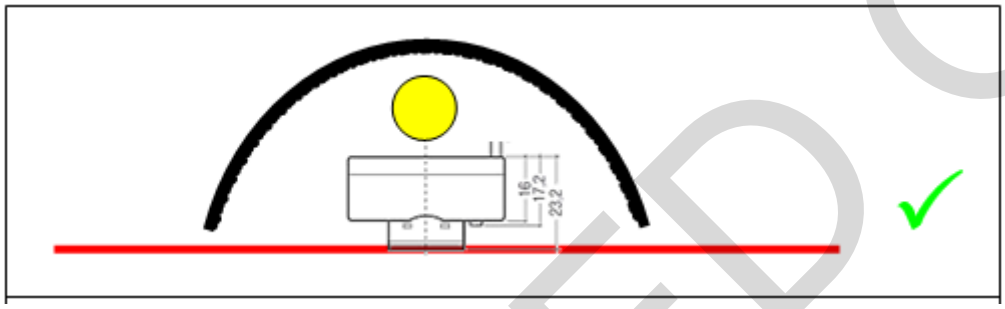
Correct installation: Cross vanes (green) begin above the "red line"



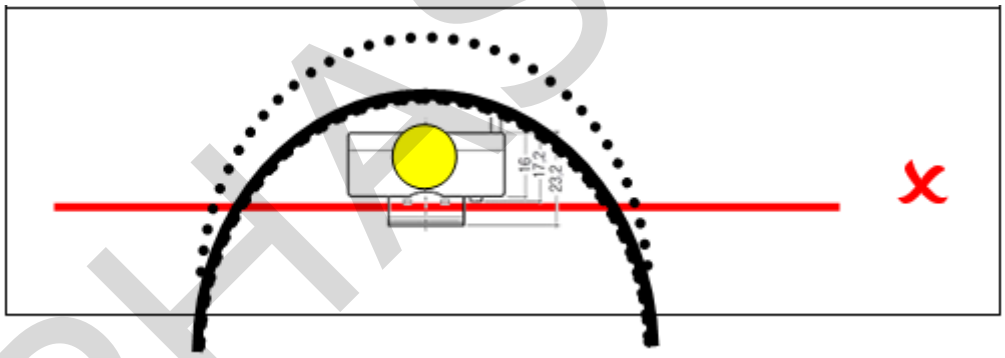
Incorrect installation: Cross vanes (red) begin below the "red line"

5.3.4. Use of a diffuser

For the sensors to work properly, diffuse reflective luminaire components must be installed in such a way that they do not cross the “red line”.



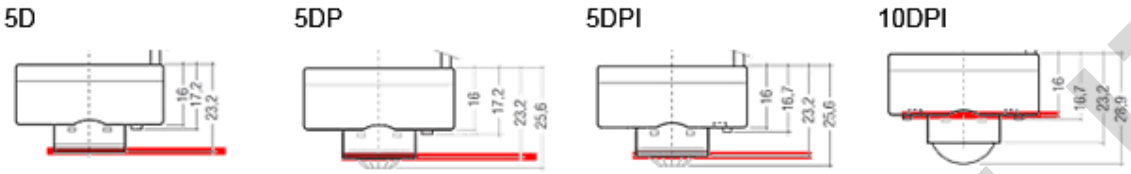
Correct installation: Light source, diffuser and sensor are above the "red line"



Incorrekt installation: Diffuser and sensor cross the "red line"

NOTICE

The “red line” is at different heights for different sensors:



5.3.5. Use of protective grids

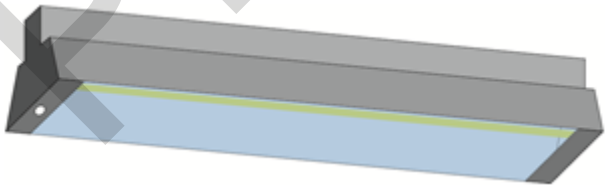
5.3.5.1. Description

Protective grids reflect the light from the luminaire and may therefore affect lighting control.

5.3.5.2. Solution

Do not install sensors behind protective grids:

_ Sensors should be integrated into the side of the housing and flush-mounted to the extent that they are protected by the housing.



CAUTION!

The sensor's detection range may be diminished if the sensors are flush-mounted.

System components Sensors

NOTICE

In theory, the sensors may also be installed in such a way that they are situated behind the protective grid and yet the “red line” is still below the lower edge of the grid. However, in practice this makes little sense since the sensors will then no longer be protected by the grid.

5.4. Tricks and hints

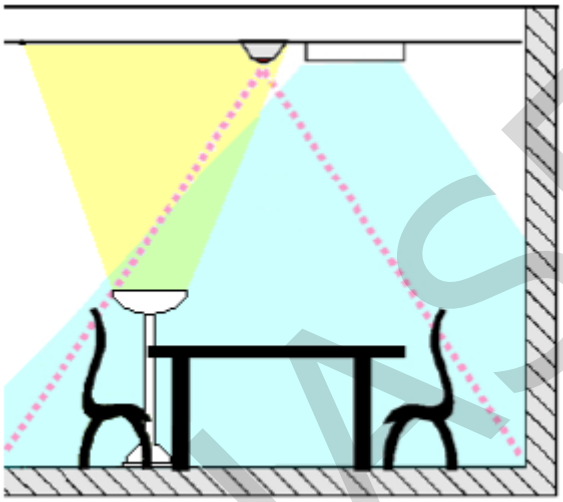
5.4.1. Position the ambient light sensor correctly

Ambient light control is based on measuring reflected artificial light and daylight. This light must be detected correctly and completely. Prevent measurements being falsified by other light sources. Positioning the ambient light sensor correctly is crucial:

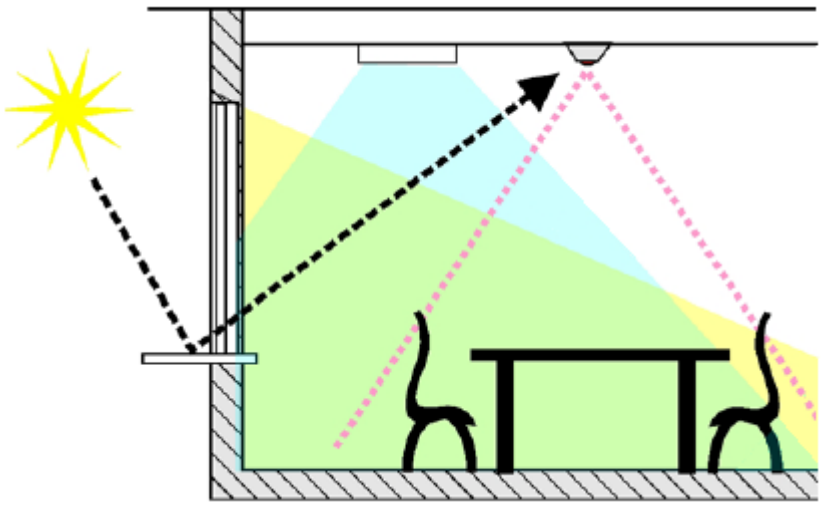
1. In order to be able to control ambient lighting properly, the sensor must be able to detect the light from the controlled luminaires completely.

_ Position the sensor so that the sensor's detection area lies within the area that is lit by the controlled luminaires.

2. If the sensor is directly exposed to other light sources, this falsifies the results obtained and the reflected artificial light and daylight can no longer be detected correctly.



_ Position the sensor so that it is not directly exposed to other artificial light sources (e.g. free-standing luminaires in the room).



_ Position the sensor so that it is not directly exposed to sunlight:

  _ Make sure that the detection area of the sensor lies within the room.

  _ Make sure that the sensor is far enough away from any window area.

  _ Make sure that any glare or sunlight reflected by shiny glass or metal surfaces cannot hit the sensor.

3. If more than one sensor is being used in a room it is possible that the detection areas of the sensors may overlap. Overlapping detection areas may cause the different control circuits to affect one another and this may lead to false results.

_ Position the sensors so that their detection areas do not overlap.

5.4.2. Position the presence-based control correctly

The presence-based control of the DALI MSensor 02 reacts to moving thermal radiation from people. Other heat sources (e.g. photocopiers, radiators, etc.) may have an adverse effect on presence-based control. Make sure that there are no other heat sources in the immediate vicinity of the sensor.

5.5. Commissioning

The descriptions for commissioning, standby switching and reactivation are identical for all sensor functions constant lighting control, presence control, infra-red sensor and remote control and corridorFUNCTION.

Additional setting options exist for constant lighting control (see "Settings for constant lighting control", p. 131), presence control (see "Settings for presence control", p. 141) and for infra-red sensor and remote control (see "Settings for infra-red sensor and remote control", p. 154).

NOTICE

To ensure that the sensor is recognised by the ballast it must be connected to the SMART interface before input voltage is applied.

NOTE

If the corridorFUNCTION is activated the ballast is controlled only by motion. To operate the ballast via DALI, DSI or switchDIM the corridorFUNCTION must be deactivated (see "corridorFUNCTION - Commissioning", p. 25).

5.5.1. Commissioning the ballast

The ballasts can be commissioned without the interface being occupied (terminals D1 and D2) or with DALI, DSI, switchDIM or corridorFUNCTION. The procedure is identical.

5.5.1.1. Procedure:

_ Apply input voltage to the ballast
-› The ballast starts the function of the sensor
-› The luminous intensity of the connected light sources is adjusted

5.5.2. Switching the ballast to standby

DALI, DSI, switchDIM or corridorFUNCTION can be used to switch the ballast to standby. The procedures are different.

5.5.2.1. DALI procedure:

_ Enter one of the following commands: "Direct Arc Power = 0", "Off", "Step Down And Off"

5.5.2.2. DSI procedure:

_ Enter the following command: "DSI Light-level = 0"

5.5.2.3. switchDIM procedure:

_ Press the momentary-action switch once

5.5.2.4. corridorFUNCTION procedure:

_ The device automatically switches to standby at the end of the switch-off delay

5.5.3. Re-activating the ballast after standby

DALI, DSI, switchDIM or corridorFUNCTION can be used to re-activate the ballast after standby. The requirements are identical. The procedures are different.

5.5.3.1. Requirements:

_ The DALI bus/DSI bus/switchDIM/corridorFUNCTION is connected to the device
_ Input voltage is applied to the ballast
_ The device is in standby mode

5.5.3.2. DALI procedure:

_ Enter one of the following commands: "Direct Arc Power > 0", "Recall Min", "Recall Max", "On And Step Up"
-› The ballast starts the function of the sensor
-› The luminous intensity of the connected light sources is adjusted

5.5.3.3. DSI procedure:

_ Enter the following command: ·"DSI Light-level > 0"
-› The ballast starts the function of the sensor
-› The luminous intensity of the connected light sources is adjusted

5.5.3.4. switchDIM procedure:

_ Press the momentary-action switch once

5.5.3.5. corridorFUNCTION procedure:

_ The device automatically switches on if movement is detected.

5.5.4. Deactivating the ballast

If the ballast cannot be switched to standby via DALI, DSI, switchDIM or corridorFUNCTION it can be switched off via the mains connection.

5.5.4.1. Procedure:

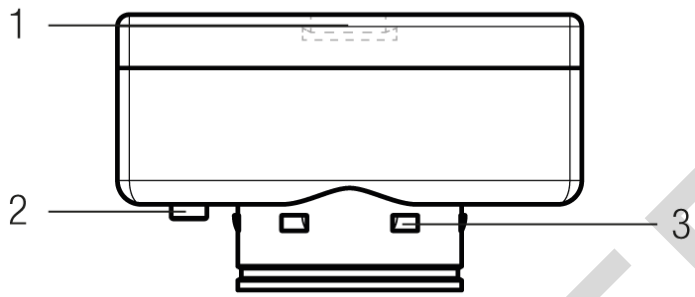
_ Disconnect the mains voltage
-› The connected light sources go out

5.6. Smart sensor 5D

5.6.1. Description

The sensor 5D is designed for a mounting height of max. 5 metres and offers the function constant lighting control.

5.6.1.1. Figure:



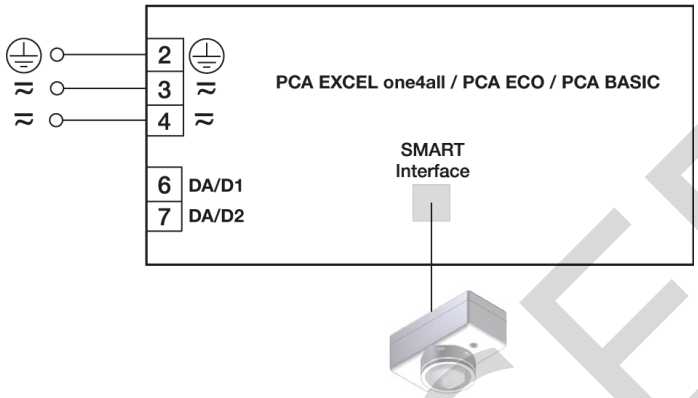
1) Recess for clip, 2) Integrated momentary-action switch, 3) Locking mechanism

5.6.2. Functions

5.6.2.1. Description constant lighting control

Constant lighting control enables the lighting in the room to be adapted according to the amount of natural ambient light available. A sensor measures the illuminance in the room, compares it with a setpoint value and adjusts the artificial light up or down until the measured illuminance matches the desired setpoint value.

This ensures that the illuminance remains constant in the room as changes in the amount of natural light entering the room are balanced out. The results are more comfortable lighting, instant adjustment and energy savings.



Constant lighting control can also be linked to other functions:

_ With the SMART sensors 5DP, 5DPI and 10DPI it is possible to achieve a cost-effective constant lighting system with corridorFUNCTION that is easy to operate

_ In combination with a motion sensor at bus inputs D2 the constant lighting control system can also be combined with the corridorFUNCTION

The constant lighting control function is integrated in the SMART sensors 5D, 5DP, 5DPI and 10DPI.

5.6.2.2. Settings for constant lighting control

5.6.2.2.1. Activating/deactivating the constant lighting control via DALI scene

Scenes are predefined matching settings for multiple luminaires. There are 16 scenes available (named as scenes 0-15). If a sensor is connected one of the scenes acts as a command to re-activate the sensor. For more information on the settings see the masterCONFIGURATOR manual (see "Reference list", p. 176).

NOTICE

When a scene is called up the connected sensor is automatically deactivated.
To re-activate the sensor, proceed as follows:

_ Call up the scene for re-activating the sensor (default: scene 15)
or
_ Enter any "Direct Arc Power" command

5.6.2.2.2. Changing the setpoint temporarily

NOTICE

The setpoint of the constant lighting control can be changed temporarily or permanently.
If changed temporarily the setpoint will be active for as long as the ballast is on. With every OFF/ON command the setpoint will be reset to the last permanently stored value.

There are different methods for temporarily changing the factory setpoint.

DALI procedure:

_ Enter one of the following commands: "Up", "Down", "Step Up", "Step Down", "On And Step Up"
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new temporary setpoint

switchDIM procedure:

_ Hold down the switch
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new setpoint

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be changed by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.6.2.2.3. Changing the setpoint permanently

There are different methods for permanently storing the value.

DALI procedure:

The value can be changed via the masterCONFIGURATOR (see "Reference list", p. 176).

5.6.2.2.4. Procedure on the sensor (functions with DALI, switchDIM, DSI, corridorFUNCTION):

_ Push in the integrated concealed pushbutton with a pointed object (such as a ballpoint pen)
-› The ballast slowly fades up

_ Release the concealed pushbutton briefly and push in again
-› The ballast slowly dims down

_ Release the pushbutton when the required luminous intensity has been reached

_ Leave the sensor detection zone within 5 seconds
-› The ballast retains the luminous intensity for 5 seconds
-› The light source briefly lights
-› The required luminous intensity is set

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be permanently stored by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.6.2.2.5. Restoring the default setpoint

The default setpoint is reset with DALI command or via masterCONFIGURATOR (see "Reference list", p. 176).

DALI procedure:

_ Enter the following command: "Reset"
-› The luminous intensity changes to 100% of the maximum value

NOTICE

"Reset" command resets all the parameters of the ballast.

5.6.2.2.6. Deactivating constant lighting control

Constant lighting control can be deactivated via masterCONFIGURATOR (see "Reference list", p. 176) or by accessing the memory bank by means of a DALI command.

5.6.2.3. Extended functionality: Combination options

5.6.2.3.1. Combining constant lighting control with the corridorFUNCTION via bus input

The constant light control system can be combined with the corridorFUNCTION by connecting a motion sensor to bus input D2.
When movement is detected the ballast switches to the predefined presence value. The sensor compares the illuminance in the room with the setpoint value and adjusts the luminous intensity accordingly. The result is that the luminous intensity actually emitted may deviate from the presence value.

NOTICE

In the case of sensors 5DP, 5DPI and 10DPI, the integrated presence control is deactivated for the combination of constant lighting control with the corridorFUNCTION.
If the dimmlevel chosen for the absence value is higher than the dimmlevel of the presence value the constant lighting control system of the sensor is deactivated.

5.6.2.3.2. Combining constant lighting control with the corridorFUNCTION via SMART interface

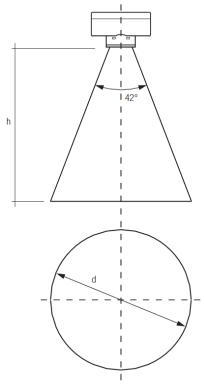
If an EXCEL one4all xitec II device is combined with a 5DP, 5DPI or 10DPI sensor the control lighting control system can be combined with the integrated presence control.

The following differences to the corridorFUNCTION via bus input should be noted however:

- If adequate ambient light is present the device automatically switches from the presence value to absence value and after the switch-off delay time to standby (e.g. "1 Minute Off" and "30 Minutes Off" profiles) or stays on the absence value ("Never Off" profile)
- If adequate ambient light is present the device remains in standby or in the absence value, even if motion is detected
- The run-on time is defined by the integrated sensor

5.6.3. Product-specific characteristics

5.6.3.1. Detection zone of the light sensor



The sensor detection zone is dimensioned so that the entire work area is covered and evaluated, not just a single point. This ensures that false readings are not made as a result of moving objects, which would otherwise lead to a sudden change in the brightness level.

The diameter of the detection area depends on the angle of detection and the mounting height. Details are given in the data sheet.

For the 5D sensor the diameter can be calculated using the following formula.

$d = 2 \times \tan(0.5 \times a) \times h$

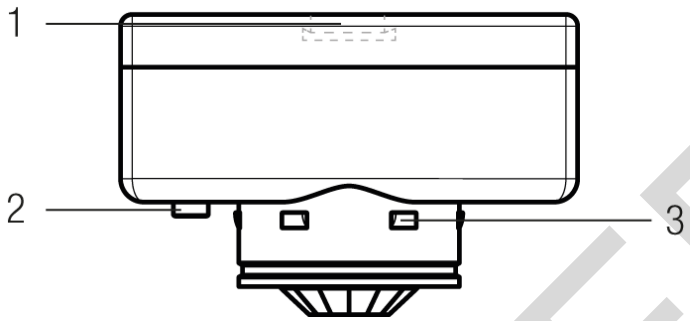
d ... Diameter
a ... Angle of detection
h ... Mounting height

5.7. Smart sensor 5DP

5.7.1. Description

The sensor 5DP is designed for a mounting height of max. 5 metres and offers the functions constant lighting control and presence control.

5.7.1.1. Figure:



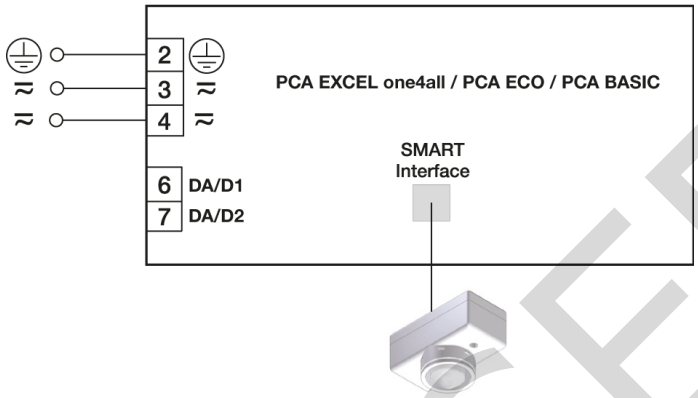
1) Recess for clip, 2) Integrated momentary-action switch, 3) Locking mechanism

5.7.2. Functions

5.7.2.1. Description constant lighting control

Constant lighting control enables the lighting in the room to be adapted according to the amount of natural ambient light available. A sensor measures the illuminance in the room, compares it with a setpoint value and adjusts the artificial light up or down until the measured illuminance matches the desired setpoint value.

This ensures that the illuminance remains constant in the room as changes in the amount of natural light entering the room are balanced out. The results are more comfortable lighting, instant adjustment and energy savings.



Constant lighting control can also be linked to other functions:

- With the SMART sensors 5DP, 5DPI and 10DPI it is possible to achieve a cost-effective constant lighting system with corridorFUNCTION that is easy to operate
- In combination with a motion sensor at bus inputs D2 the constant lighting control system can also be combined with the corridorFUNCTION

The constant lighting control function is integrated in the SMART sensors 5D, 5DP, 5DPI and 10DPI.

5.7.2.2. Settings for constant lighting control

5.7.2.2.1. Activating/deactivating the constant lighting control via DALI scene

Scenes are predefined matching settings for multiple luminaires. There are 16 scenes available (named as scenes 0-15). If a sensor is connected one of the scenes acts as a command to re-activate the sensor. For more information on the settings see the masterCONFIGURATOR manual (see "Reference list", p. 176).

NOTICE

When a scene is called up the connected sensor is automatically deactivated.
To re-activate the sensor, proceed as follows:

_ Call up the scene for re-activating the sensor (default: scene 15)
or
_ Enter any "Direct Arc Power" command

5.7.2.2.2. Changing the setpoint temporarily

NOTICE

The setpoint of the constant lighting control can be changed temporarily or permanently.
If changed temporarily the setpoint will be active for as long as the ballast is on. With every OFF/ON command the setpoint will be reset to the last permanently stored value.

There are different methods for temporarily changing the factory setpoint.

DALI procedure:

_ Enter one of the following commands: "Up", "Down", "Step Up", "Step Down", "On And Step Up"
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new temporary setpoint

switchDIM procedure:

_ Hold down the switch
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new setpoint

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be changed by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.7.2.2.3. Changing the setpoint permanently

There are different methods for permanently storing the value.

DALI procedure:

The value can be changed via the masterCONFIGURATOR (see "Reference list", p. 176).

5.7.2.2.4. Procedure on the sensor (functions with DALI, switchDIM, DSI, corridorFUNCTION):

_ Push in the integrated concealed pushbutton with a pointed object (such as a ballpoint pen)
-› The ballast slowly fades up

_ Release the concealed pushbutton briefly and push in again
-› The ballast slowly dims down

_ Release the pushbutton when the required luminous intensity has been reached

_ Leave the sensor detection zone within 5 seconds
-› The ballast retains the luminous intensity for 5 seconds
-› The light source briefly lights
-› The required luminous intensity is set

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be permanently stored by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.7.2.2.5. Restoring the default setpoint

The default setpoint is reset with DALI command or via masterCONFIGURATOR (see "Reference list", p. 176).

DALI procedure:

_ Enter the following command: "Reset"
-› The luminous intensity changes to 100% of the maximum value

NOTICE

"Reset" command resets all the parameters of the ballast.

5.7.2.2.6. Deactivating constant lighting control

Constant lighting control can be deactivated via masterCONFIGURATOR (see "Reference list", p. 176) or by accessing the memory bank by means of a DALI command.

5.7.2.3. Extended functionality: Combination options

5.7.2.3.1. Combining constant lighting control with the corridorFUNCTION via bus input

The constant light control system can be combined with the corridorFUNCTION by connecting a motion sensor to bus input D2.
When movement is detected the ballast switches to the predefined presence value. The sensor compares the illuminance in the room with the setpoint value and adjusts the luminous intensity accordingly. The result is that the luminous intensity actually emitted may deviate from the presence value.

NOTICE

In the case of sensors 5DP, 5DPI and 10DPI, the integrated presence control is deactivated for the combination of constant lighting control with the corridorFUNCTION.
If the dimmlevel chosen for the absence value is higher than the dimmlevel of the presence value the constant lighting control system of the sensor is deactivated.

5.7.2.3.2. Combining constant lighting control with the corridorFUNCTION via SMART interface

If an EXCEL one4all xitec II device is combined with a 5DP, 5DPI or 10DPI sensor the control lighting control system can be combined with the integrated presence control.

The following differences to the corridorFUNCTION via bus input should be noted however:

- If adequate ambient light is present the device automatically switches from the presence value to absence value and after the switch-off delay time to standby (e.g. "1 Minute Off" and "30 Minutes Off" profiles) or stays on the absence value ("Never Off" profile)
- If adequate ambient light is present the device remains in standby or in the absence value, even if motion is detected
- The run-on time is defined by the integrated sensor

5.7.2.4. Description presence control

NOTICE

If two motion sensors are connected to the ballast, one at the one4all interface, the other at the SMART interface, the motion sensor at the SMART interface is deactivated.

Presence control enables the illuminance to be linked to the presence or absence of people. The light is switched on when a person enters the room. When the person leaves the room the light remains on for a certain time and is then dimmed to a predefined value.

The advantages of presence control include energy savings and the convenience of automatic lighting control. The presence control function is integrated in the 5DP, 5DPI and 10DPI SMART sensors and can be used in connection with PCA EXCEL one4all xitec II.

Three predefined motion detection profiles are implemented in the device: "Never Off", 1 Minute Off" and "30 Minutes Off".
There are also two individually adjustable profiles. The values are adjusted via a DALI USB on the bus and by entering special DALI commands via the masterCONFIGURATOR (see "Reference list", p. 176).

Presence control can also be linked to other functions:

- With the SMART sensors 5DP, 5DPI and 10DPI it is possible to achieve a cost-effective constant lighting system with motion detection that is easy to operate (see "Combining constant lighting control with the corridorFUNCTION via SMART interface", p. 133)

NOTICE

After applying the input voltage it may take up to 35 seconds until present control is active.

5.7.2.5. Settings for presence control

NOTICE

If presence control and switchDIM are used in combination there may be loss of synchronism if several ballasts are connected to the same momentary-action switch and the ballasts or the sensors connected to them are large distances apart.

_ The distance between the sensors means that the sensor of one ballast detects presence while the sensor of another does not. The two ballasts therefore assume different statuses.

_ If the two ballasts are connected to a common mains voltage switch then this lack of synchronicity is maintained. When the switch is actuated the statuses of the ballasts change from "on" to "off" and vice versa. The two ballasts therefore remain out of sync.

Do not combine presence control and switchDIM if several ballasts are connected to the same mains voltage switch.

5.7.2.5.1. Adjusting the motion detection profile

The values of the motion detection profile can be adjusted with the masterCONFIGURATOR (see "Reference list", p. 176).

_ Presence value: absence value - max. dimming level

_ Absence value: min. dimming level - presence value

_ Delay time: 10 seconds to 42.5 minutes

_ Fade time: 0 seconds to 90.5 seconds

_ Switch-off delay: 0 seconds to 42.3 minutes or "Never-Off"

5.7.2.5.2. Adjusting the manual timeout setting

NOTICE

If the ballast is switched manually to standby, presence control remains inactive for 20 minutes to prevent the luminaire being switched on again immediately.
The ballast can be switched on again manually even if there is adequate light in the room.

The "manual timeout" feature is used to define the time after which presence control is activated again after having been manually deactivated. The value can be adjusted with the masterCONFIGURATOR (see "Reference list", p. 176).

_ Range: 10 seconds to 42.5 minutes

_ Factory setting: 20 minutes

5.7.2.5.3. Activating the "only Off" setting

The "only Off" option is used to ensure that the ballast automatically switches off when no presence is detected but does not switch on again automatically. After this the ballast can merely be manually switched on. It is activated via the masterCONFIGURATOR (see "Reference list", p. 176).

5.7.2.5.4. Deactivating presence control

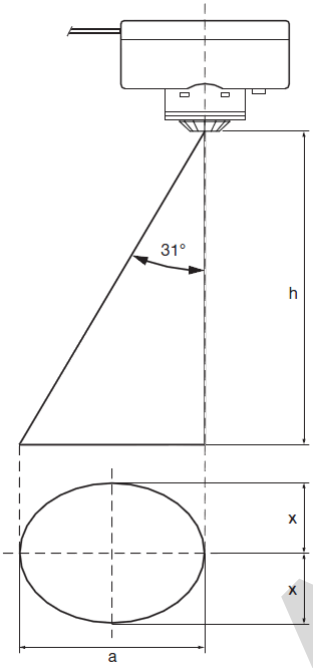
Presence control can be deactivated by means of a DALI command. For more details see the masterCONFIGURATOR (see "Reference list", p. 176).

5.7.3. Product-specific characteristics

NOTE

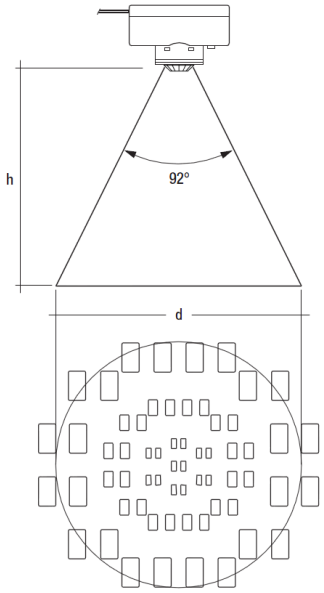
Sensor 5DPI with constant light control and presence control has been optimised for operation with ballasts of the PCA EXCEL one4all type. If the sensor is connected to a ballast of type PCA ECO or PCA BASIC only constant light control will be available.

5.7.3.1. Detection zone of the light sensor



The sensor detection zone is dimensioned so that the entire work area is covered and evaluated, not just a single point. This ensures that minor effects such as reflections and shadows do not have a crucial influence on the measurement of the level of light.
The diameter of the detection area depends on the angle of detection and the mounting height. For more details see the data sheet (see "Reference list", p. 176).

5.7.3.2. Detection zone of the motion sensor



The detection zone of the motion sensor consists of a pattern of different measurement fields. For an object to be reliably detected two requirements must be met:

- The object must move from one measurement field to another
- The temperature of the object is different from the background temperature

The size of the detection zone depends on the angle of detection and the mounting height.
The mounting height also affects the accuracy of the sensor:

- At a mounting height of 2.5 to 5 meters the sensor operates as a motion detector, i.e. objects are detected if they move through the room
- At a mounting height of up to 2.5 meters the sensor operates as a presence detector, i.e. people are detected even if they just move their arms, for example; they do not have to move through the room

For more details see the data sheet (see "Reference list", p. 176).

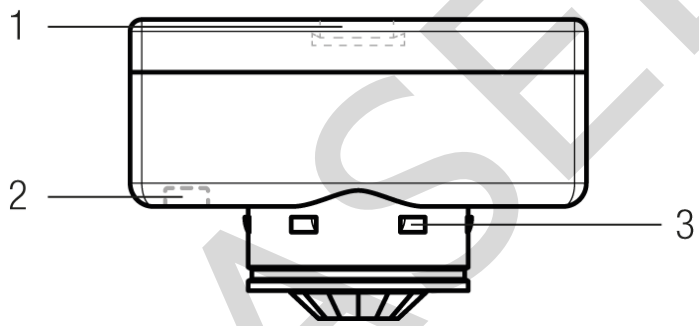
5.8. Smart sensor 5DPI

5.8.1. Description

The sensor 5DPI is designed for a mounting height of max. 5 meters and offers the functions constant lighting control, presence control, infra-red sensor and remote control and corridorFUNCTION.

The sensor is available in four different versions, as the standard version without name transmission and as versions with one of the three name transmissions, cF01, cF30 and cF n.o. The associated extensions enable various corridorFUNCTION profiles to be called up in the ballast (see "corridorFUNCTION - Description", p. 84).

5.8.1.1. Figure:



5.8.1.2.

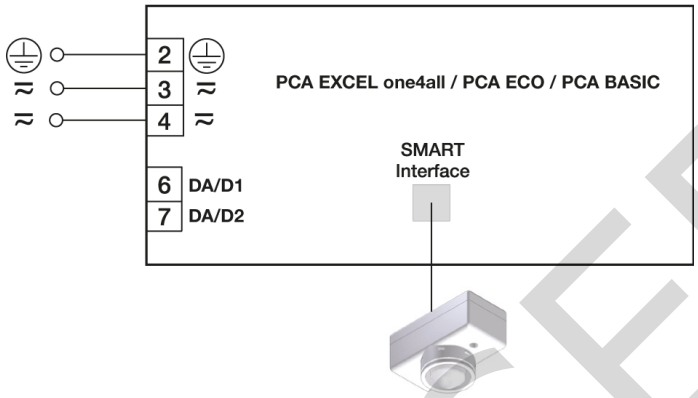
1) Recess for clip, 2) Infra-red sensor, 3) Locking mechanism

5.8.2. Functions

5.8.2.1. Description constant lighting control

Constant lighting control enables the lighting in the room to be adapted according to the amount of natural ambient light available. A sensor measures the illuminance in the room, compares it with a setpoint value and adjusts the artificial light up or down until the measured illuminance matches the desired setpoint value.

This ensures that the illuminance remains constant in the room as changes in the amount of natural light entering the room are balanced out. The results are more comfortable lighting, instant adjustment and energy savings.



Constant lighting control can also be linked to other functions:

- With the SMART sensors 5DP, 5DPI and 10DPI it is possible to achieve a cost-effective constant lighting system with corridorFUNCTION that is easy to operate
- In combination with a motion sensor at bus inputs D2 the constant lighting control system can also be combined with the corridorFUNCTION

The constant lighting control function is integrated in the SMART sensors 5D, 5DP, 5DPI and 10DPI.

5.8.2.2. Settings for constant lighting control

5.8.2.2.1. Activating/deactivating the constant lighting control via DALI scene

Scenes are predefined matching settings for multiple luminaires. There are 16 scenes available (named as scenes 0-15). If a sensor is connected one of the scenes acts as a command to re-activate the sensor. For more information on the settings see the masterCONFIGURATOR manual (see "Reference list", p. 176).

NOTICE

When a scene is called up the connected sensor is automatically deactivated.
To re-activate the sensor, proceed as follows:

_ Call up the scene for re-activating the sensor (default: scene 15)
or
_ Enter any "Direct Arc Power" command

5.8.2.2.2. Changing the setpoint temporarily

NOTICE

The setpoint of the constant lighting control can be changed temporarily or permanently.
If changed temporarily the setpoint will be active for as long as the ballast is on. With every OFF/ON command the setpoint will be reset to the last permanently stored value.

There are different methods for temporarily changing the factory setpoint.

DALI procedure:

_ Enter one of the following commands: "Up", "Down", "Step Up", "Step Down", "On And Step Up"
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new temporary setpoint

switchDIM procedure:

_ Hold down the switch
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new setpoint

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be changed by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.8.2.2.3. Changing the setpoint permanently

There are different methods for permanently storing the value.

DALI procedure:

The value can be changed via the masterCONFIGURATOR (see "Reference list", p. 176).

5.8.2.2.4. Procedure on the sensor (functions with DALI, switchDIM, DSI, corridorFUNCTION):

_ Push in the integrated concealed pushbutton with a pointed object (such as a ballpoint pen)
-› The ballast slowly fades up

_ Release the concealed pushbutton briefly and push in again
-› The ballast slowly dims down

_ Release the pushbutton when the required luminous intensity has been reached

_ Leave the sensor detection zone within 5 seconds
-› The ballast retains the luminous intensity for 5 seconds
-› The light source briefly lights
-› The required luminous intensity is set

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be permanently stored by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.8.2.2.5. Restoring the default setpoint

The default setpoint is reset with DALI command or via masterCONFIGURATOR (see "Reference list", p. 176).

DALI procedure:

_ Enter the following command: "Reset"
-› The luminous intensity changes to 100% of the maximum value

NOTICE

"Reset" command resets all the parameters of the ballast.

5.8.2.2.6. Deactivating constant lighting control

Constant lighting control can be deactivated via masterCONFIGURATOR (see "Reference list", p. 176) or by accessing the memory bank by means of a DALI command.

5.8.2.3. Extended functionality: Combination options

5.8.2.3.1. Combining constant lighting control with the corridorFUNCTION via bus input

The constant light control system can be combined with the corridorFUNCTION by connecting a motion sensor to bus input D2.
When movement is detected the ballast switches to the predefined presence value. The sensor compares the illuminance in the room with the setpoint value and adjusts the luminous intensity accordingly. The result is that the luminous intensity actually emitted may deviate from the presence value.

NOTICE

In the case of sensors 5DP, 5DPI and 10DPI, the integrated presence control is deactivated for the combination of constant lighting control with the corridorFUNCTION.
If the dimmlevel chosen for the absence value is higher than the dimmlevel of the presence value the constant lighting control system of the sensor is deactivated.

5.8.2.3.2. Combining constant lighting control with the corridorFUNCTION via SMART interface

If an EXCEL one4all xitec II device is combined with a 5DP, 5DPI or 10DPI sensor the control lighting control system can be combined with the integrated presence control.

The following differences to the corridorFUNCTION via bus input should be noted however:

- If adequate ambient light is present the device automatically switches from the presence value to absence value and after the switch-off delay time to standby (e.g. "1 Minute Off" and "30 Minutes Off" profiles) or stays on the absence value ("Never Off" profile)
- If adequate ambient light is present the device remains in standby or in the absence value, even if motion is detected
- The run-on time is defined by the integrated sensor

5.8.2.4. Description presence control

NOTICE

If two motion sensors are connected to the ballast, one at the one4all interface, the other at the SMART interface, the motion sensor at the SMART interface is deactivated.

Presence control enables the illuminance to be linked to the presence or absence of people. The light is switched on when a person enters the room. When the person leaves the room the light remains on for a certain time and is then dimmed to a predefined value.

The advantages of presence control include energy savings and the convenience of automatic lighting control. The presence control function is integrated in the 5DP, 5DPI and 10DPI SMART sensors and can be used in connection with PCA EXCEL one4all xitec II.

Three predefined motion detection profiles are implemented in the device: "Never Off", 1 Minute Off" and "30 Minutes Off".
There are also two individually adjustable profiles. The values are adjusted via a DALI USB on the bus and by entering special DALI commands via the masterCONFIGURATOR (see "Reference list", p. 176).

Presence control can also be linked to other functions:

- With the SMART sensors 5DP, 5DPI and 10DPI it is possible to achieve a cost-effective constant lighting system with motion detection that is easy to operate (see "Combining constant lighting control with the corridorFUNCTION via SMART interface", p. 133)

NOTICE

After applying the input voltage it may take up to 35 seconds until present control is active.

5.8.2.5. Settings for presence control

NOTICE

If presence control and switchDIM are used in combination there may be loss of synchronism if several ballasts are connected to the same momentary-action switch and the ballasts or the sensors connected to them are large distances apart.

_ The distance between the sensors means that the sensor of one ballast detects presence while the sensor of another does not. The two ballasts therefore assume different statuses.

_ If the two ballasts are connected to a common mains voltage switch then this lack of synchronicity is maintained. When the switch is actuated the statuses of the ballasts change from "on" to "off" and vice versa. The two ballasts therefore remain out of sync.

Do not combine presence control and switchDIM if several ballasts are connected to the same mains voltage switch.

5.8.2.5.1. Adjusting the motion detection profile

The values of the motion detection profile can be adjusted with the masterCONFIGURATOR (see "Reference list", p. 176).

_ Presence value: absence value - max. dimming level

_ Absence value: min. dimming level - presence value

_ Delay time: 10 seconds to 42.5 minutes

_ Fade time: 0 seconds to 90.5 seconds

_ Switch-off delay: 0 seconds to 42.3 minutes or "Never-Off"

5.8.2.5.2. Adjusting the manual timeout setting

NOTICE

If the ballast is switched manually to standby, presence control remains inactive for 20 minutes to prevent the luminaire being switched on again immediately.
The ballast can be switched on again manually even if there is adequate light in the room.

The "manual timeout" feature is used to define the time after which presence control is activated again after having been manually deactivated. The value can be adjusted with the masterCONFIGURATOR (see "Reference list", p. 176).

_ Range: 10 seconds to 42.5 minutes

_ Factory setting: 20 minutes

5.8.2.5.3. Activating the "only Off" setting

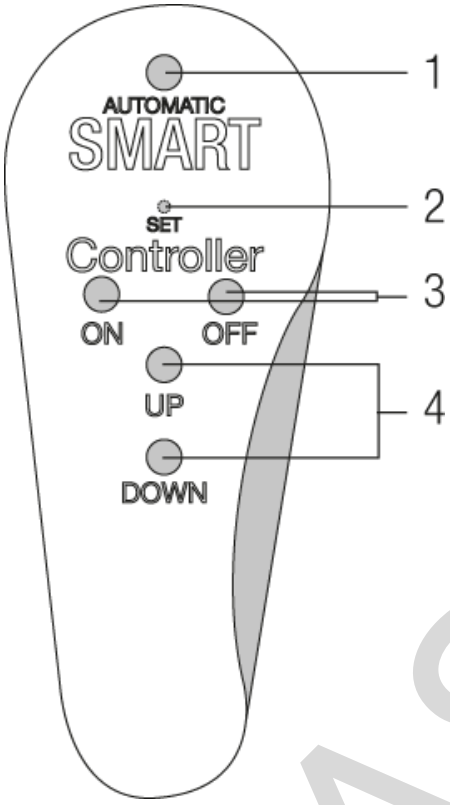
The "only Off" option is used to ensure that the ballast automatically switches off when no presence is detected but does not switch on again automatically. After this the ballast can merely be manually switched on. It is activated via the masterCONFIGURATOR (see "Reference list", p. 176).

5.8.2.5.4. Deactivating presence control

Presence control can be deactivated by means of a DALI command. For more details see the masterCONFIGURATOR (see "Reference list", p. 176).

5.8.3. Description infra-red sensor and remote control

The infra-red sensor enables the sensor to be remote controlled by means of an infra-red remote control. The functionality is integrated in the SMART sensors 5DPI and 10DPI. In other words, the remote control option is available only in sensors that have constant lighting control and presence control.



1) Automatic button, 2) Set button, 3) On-/Off buttons, 4) Up-/Down buttons

The following commands can be entered via the infra-red remote control:

_ Switching on and off (On/Off button)

_ Dimming (Up/Down button)

_ Setting the constant lighting control setpoint (Set button), for details on how to change the setpoint see Commissioning (see "Settings for constant lighting control", p. 131)

_ Activating automatic lighting control (Automatic button)

NOTICE

Commands entered via the remote control have the same priority as DALI commands.

5.8.4. Settings for infra-red sensor and remote control

NOTICE

If infra-red remote control and switchDIM are used in combination there may be a loss of synchronism when the remote control is used to switch individual devices on or off.
If the two ballasts are connected to a common mains voltage switch then this lack of synchronicity is maintained. When the switch is actuated the statuses of the ballasts change from "on" to "off" and vice versa. The two ballasts therefore remain out of sync.

_ Do not combine infra-red remote control and switchDIM if several ballasts are connected to the same mains voltage switch.

NOTICE

Conflict when combining EXCEL devices with connected SMART sensors in a higher-ranking system
Controllers on the one4all interface and SMART sensors both send commands to the ballast. There may be conflicts when combining DSI or DALI at the ballast and presence controllers or infra-red sensors at the SMART sensor. This occurs exclusively with EXCEL devices. To prevent this it is essential to check in advance that the controllers are compatible with the SMART sensors:

_ Read the documentation provided by the controlls manufacturers!

_ Only use controlls that according to the manufacturers are compatible with Tridonic SMART sensors.

5.8.4.1. Changing the setpoint value for ambient light control

The setpoint value can be changed and stored either temporarily or permanently.

5.8.4.1.1. Procedure for temporary storage:

_ Increase or decrease the setpoint value by means of the Up/Down button on the remote control
-› The luminous intensity will change
-› After 5 seconds the light control system accepts the current value as the new temporary setpoint value

5.8.4.1.2. Procedure for permanent storage:

_ Increase or decrease the setpoint value by means of the Up/Down button on the remote control
-› The luminous intensity will change

_ Store the new default value by pressing the SET button
-› The light source lights two times

Smart sensor 5DPI

NOTICE

The SET button is recessed and not directly accessible to prevent the default value from being changed unintentionally.
A pointed object such as a pen is needed to press the SET button.

5.8.5. Description corridorFUNCTION

The corridorFUNCTION is integrated in the SMART sensors 5DPI and 10DPI. These two sensors are available in four different versions, as the standard version without name transmission and as versions with one of the three name transmissions, cF01, cF30 and cF n.o. The three name transmissions are abbreviations for the corridorFUNCTION profiles "1-Minute-Off", "30-Minutes-Off" and "Never-Off".

All the SMART sensors can be used to operate a motion detection system. If one of the sensors with name transmission is connected to the SMART interface of the ballast the relevant corridorFUNCTION profile is activated in the ballast. Sensor 5DPI cF01 activates the "1-Minute-Off" profile; sensor 10DPI cF30 the "30-Minutes-Off" profile and so on.

If a 5DPI or 10DPI SMART sensor without name transmission is connected, operation of a motion detection system is still possible. In this case, however, the standard profile of the corridorFUNCTION is activated.

The described version of a motion detection system is similar to the corridorFUNCTION with connection of a relay switch to the one4all interface (see "corridorFUNCTION - Description", p. 84). In contrast, the version with the 5DPI and 10DPI sensors does not require any extensive preconfiguration.

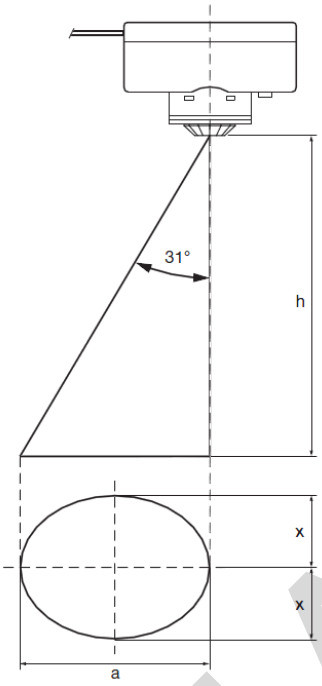
Smart sensor 5DPI

5.8.6. Product-specific characteristics

NOTE

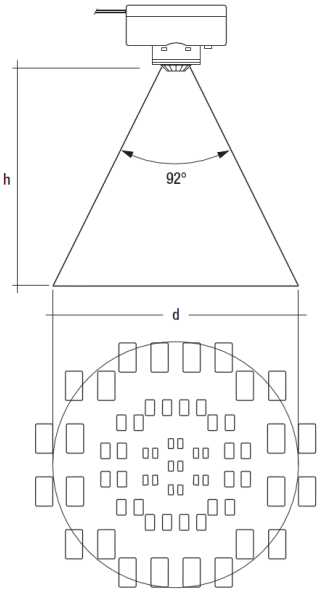
Sensor 5DPI with constant light control and presence control has been optimised for operation with ballasts of the PCA EXCEL one4all type. If the sensor is connected to a ballast of type PCA ECO or PCA BASIC only constant light control will be available.

5.8.6.1. Detection zone of the light sensor



The sensor detection zone is dimensioned so that the entire work area is covered and evaluated, not just a single point. This ensures that minor effects such as reflections and shadows do not have a crucial influence on the measurement of the level of light.
The diameter of the detection area depends on the angle of detection and the mounting height. For more details see the data sheet (see "Reference list", p. 176).

5.8.6.2. Detection zone of the motion sensor



The detection zone of the motion sensor consists of a pattern of different measurement fields. For an object to be reliably detected two requirements must be met:

_ The object must move from one measurement field to another
_ The temperature of the object is different from the background temperature

The size of the detection zone depends on the angle of detection and the mounting height.
The mounting height also affects the accuracy of the sensor:

_ At a mounting height of 2.5 to 5 meters the sensor operates as a motion detector, i.e. objects are detected if they move through the room
_ At a mounting height of up to 2.5 meters the sensor operates as a presence detector, i.e. people are detected even if they just move their arms, for example; they do not have to move through the room

For more details see the data sheet (see "Reference list", p. 176).

5.8.6.3. Extended functionality: Combinations

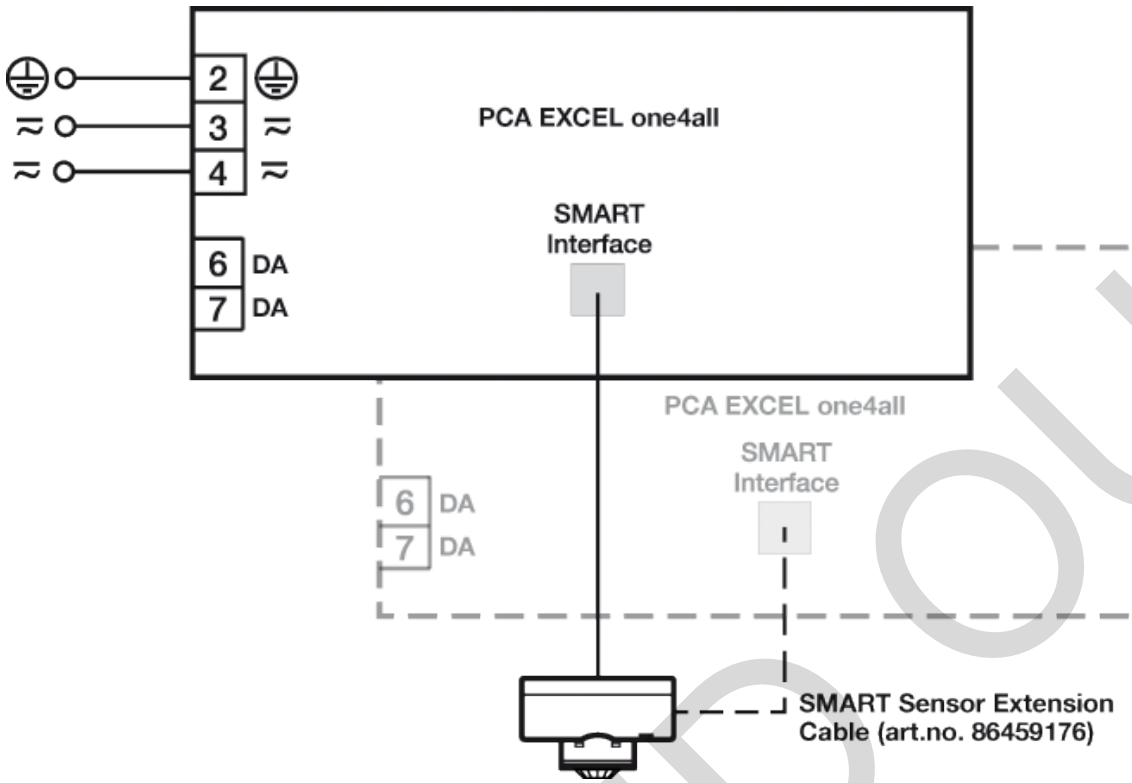
5.8.6.3.1. Operating two ballasts with one sensor

NOTE

Operating two ballasts with one sensor is possible only for PCA EXCEL one4all type devices. ECO and BASIC devices do not support this function.

The 5DPI sensor offer two connection options, a fixed cable and a socket. Both connections can be linked to the SMART interface on a ballast so that one sensor can be used to operate two ballasts simultaneously.
The ballast connected by the fixed cable acts as the master. The ballast connected to the socket acts as the slave.

Smart sensor 5DPI



NOTICE

If a second ballast is added by means of a SMART Sensor Extension Cable the control inputs of both ballasts must be connected together in the case of DALI, DSI, switchDIM and corridorFUNCTION.
To achieve synchronous behaviour if the lighting is controlled via DALI, make sure that both ballasts are in the same DALI group and are controlled via group commands.

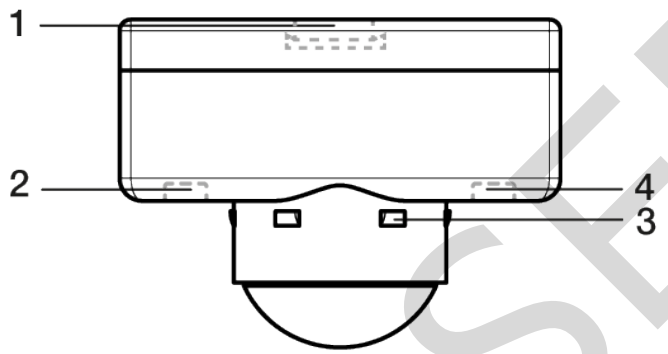
5.9. Smart sensor 10DPI

5.9.1. Description

The sensor 10DPI is designed for a mounting height of max. 10 metres and offers the functions constant lighting control, presence control, infra-red sensor and remote control and corridorFUNCTION.

The sensor is available in four different versions, as the standard version without name transmission and as versions with one of the three name transmissions, cF01, cF30 and cF n.o. The associated extensions enable various corridorFUNCTION profiles to be called up in the ballast (see "corridorFUNCTION - Description", p. 84).

5.9.1.1. Figure:



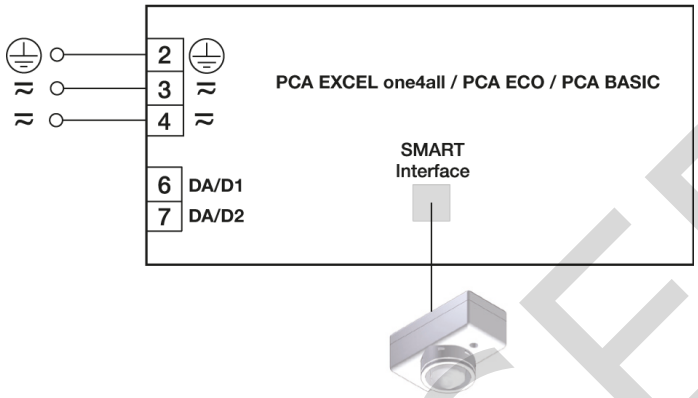
1) Recess for clip, 2) Infra-red sensor, 3) Locking mechanism, 4) Light sensor

5.9.2. Functions

5.9.2.1. Description constant lighting control

Constant lighting control enables the lighting in the room to be adapted according to the amount of natural ambient light available. A sensor measures the illuminance in the room, compares it with a setpoint value and adjusts the artificial light up or down until the measured illuminance matches the desired setpoint value.

This ensures that the illuminance remains constant in the room as changes in the amount of natural light entering the room are balanced out. The results are more comfortable lighting, instant adjustment and energy savings.



Constant lighting control can also be linked to other functions:

- With the SMART sensors 5DP, 5DPI and 10DPI it is possible to achieve a cost-effective constant lighting system with corridorFUNCTION that is easy to operate
- In combination with a motion sensor at bus inputs D2 the constant lighting control system can also be combined with the corridorFUNCTION

The constant lighting control function is integrated in the SMART sensors 5D, 5DP, 5DPI and 10DPI.

5.9.2.2. Settings for constant lighting control

5.9.2.2.1. Activating/deactivating the constant lighting control via DALI scene

Scenes are predefined matching settings for multiple luminaires. There are 16 scenes available (named as scenes 0-15). If a sensor is connected one of the scenes acts as a command to re-activate the sensor. For more information on the settings see the masterCONFIGURATOR manual (see "Reference list", p. 176).

NOTICE

When a scene is called up the connected sensor is automatically deactivated.
To re-activate the sensor, proceed as follows:

_ Call up the scene for re-activating the sensor (default: scene 15)
or
_ Enter any "Direct Arc Power" command

5.9.2.2.2. Changing the setpoint temporarily

NOTICE

The setpoint of the constant lighting control can be changed temporarily or permanently.
If changed temporarily the setpoint will be active for as long as the ballast is on. With every OFF/ON command the setpoint will be reset to the last permanently stored value.

There are different methods for temporarily changing the factory setpoint.

DALI procedure:

_ Enter one of the following commands: "Up", "Down", "Step Up", "Step Down", "On And Step Up"
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new temporary setpoint

switchDIM procedure:

_ Hold down the switch
-› The luminous intensity changes
-› After 5 seconds the lighting control system accepts the current value as the new setpoint

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be changed by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.9.2.2.3. Changing the setpoint permanently

There are different methods for permanently storing the value.

DALI procedure:

The value can be changed via the masterCONFIGURATOR (see "Reference list", p. 176).

5.9.2.2.4. Procedure on the sensor (functions with DALI, switchDIM, DSI, corridorFUNCTION):

_ Push in the integrated concealed pushbutton with a pointed object (such as a ballpoint pen)
-› The ballast slowly fades up

_ Release the concealed pushbutton briefly and push in again
-› The ballast slowly dims down

_ Release the pushbutton when the required luminous intensity has been reached

_ Leave the sensor detection zone within 5 seconds
-› The ballast retains the luminous intensity for 5 seconds
-› The light source briefly lights
-› The required luminous intensity is set

Procedure with infra-red remote control:

With sensors of type DPI (5DPI and 10DPI) the setpoint can be permanently stored by infra-red remote control (see "Settings for infra-red sensor and remote control", p. 154).

5.9.2.2.5. Restoring the default setpoint

The default setpoint is reset with DALI command or via masterCONFIGURATOR (see "Reference list", p. 176).

DALI procedure:

_ Enter the following command: "Reset"
-› The luminous intensity changes to 100% of the maximum value

NOTICE

"Reset" command resets all the parameters of the ballast.

5.9.2.2.6. Deactivating constant lighting control

Constant lighting control can be deactivated via masterCONFIGURATOR (see "Reference list", p. 176) or by accessing the memory bank by means of a DALI command.

5.9.2.3. Extended functionality: Combination options

5.9.2.3.1. Combining constant lighting control with the corridorFUNCTION via bus input

The constant light control system can be combined with the corridorFUNCTION by connecting a motion sensor to bus input D2.
When movement is detected the ballast switches to the predefined presence value. The sensor compares the illuminance in the room with the setpoint value and adjusts the luminous intensity accordingly. The result is that the luminous intensity actually emitted may deviate from the presence value.

NOTICE

In the case of sensors 5DP, 5DPI and 10DPI, the integrated presence control is deactivated for the combination of constant lighting control with the corridorFUNCTION.
If the dimmlevel chosen for the absence value is higher than the dimmlevel of the presence value the constant lighting control system of the sensor is deactivated.

5.9.2.3.2. Combining constant lighting control with the corridorFUNCTION via SMART interface

If an EXCEL one4all xitec II device is combined with a 5DP, 5DPI or 10DPI sensor the control lighting control system can be combined with the integrated presence control.

The following differences to the corridorFUNCTION via bus input should be noted however:

- If adequate ambient light is present the device automatically switches from the presence value to absence value and after the switch-off delay time to standby (e.g. "1 Minute Off" and "30 Minutes Off" profiles) or stays on the absence value ("Never Off" profile)
- If adequate ambient light is present the device remains in standby or in the absence value, even if motion is detected
- The run-on time is defined by the integrated sensor

5.9.2.4. Description presence control

NOTICE

If two motion sensors are connected to the ballast, one at the one4all interface, the other at the SMART interface, the motion sensor at the SMART interface is deactivated.

Presence control enables the illuminance to be linked to the presence or absence of people. The light is switched on when a person enters the room. When the person leaves the room the light remains on for a certain time and is then dimmed to a predefined value.

The advantages of presence control include energy savings and the convenience of automatic lighting control. The presence control function is integrated in the 5DP, 5DPI and 10DPI SMART sensors and can be used in connection with PCA EXCEL one4all xitec II.

Three predefined motion detection profiles are implemented in the device: "Never Off", 1 Minute Off" and "30 Minutes Off".
There are also two individually adjustable profiles. The values are adjusted via a DALI USB on the bus and by entering special DALI commands via the masterCONFIGURATOR (see "Reference list", p. 176).

Presence control can also be linked to other functions:

- With the SMART sensors 5DP, 5DPI and 10DPI it is possible to achieve a cost-effective constant lighting system with motion detection that is easy to operate (see "Combining constant lighting control with the corridorFUNCTION via SMART interface", p. 133)

NOTICE

After applying the input voltage it may take up to 35 seconds until present control is active.

5.9.2.5. Settings for presence control

NOTICE

If presence control and switchDIM are used in combination there may be loss of synchronism if several ballasts are connected to the same momentary-action switch and the ballasts or the sensors connected to them are large distances apart.

_ The distance between the sensors means that the sensor of one ballast detects presence while the sensor of another does not. The two ballasts therefore assume different statuses.

_ If the two ballasts are connected to a common mains voltage switch then this lack of synchronicity is maintained. When the switch is actuated the statuses of the ballasts change from "on" to "off" and vice versa. The two ballasts therefore remain out of sync.

Do not combine presence control and switchDIM if several ballasts are connected to the same mains voltage switch.

5.9.2.5.1. Adjusting the motion detection profile

The values of the motion detection profile can be adjusted with the masterCONFIGURATOR (see "Reference list", p. 176).

_ Presence value: absence value - max. dimming level

_ Absence value: min. dimming level - presence value

_ Delay time: 10 seconds to 42.5 minutes

_ Fade time: 0 seconds to 90.5 seconds

_ Switch-off delay: 0 seconds to 42.3 minutes or "Never-Off"

5.9.2.5.2. Adjusting the manual timeout setting

NOTICE

If the ballast is switched manually to standby, presence control remains inactive for 20 minutes to prevent the luminaire being switched on again immediately.
The ballast can be switched on again manually even if there is adequate light in the room.

The "manual timeout" feature is used to define the time after which presence control is activated again after having been manually deactivated. The value can be adjusted with the masterCONFIGURATOR (see "Reference list", p. 176).

_ Range: 10 seconds to 42.5 minutes

_ Factory setting: 20 minutes

5.9.2.5.3. Activating the "only Off" setting

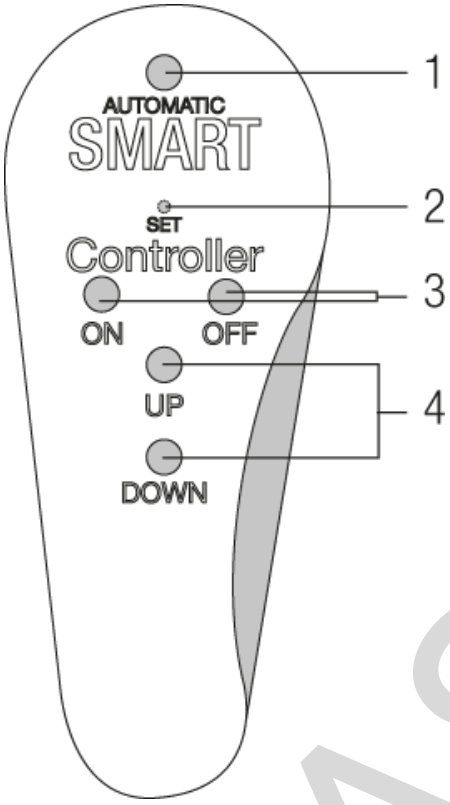
The "only Off" option is used to ensure that the ballast automatically switches off when no presence is detected but does not switch on again automatically. After this the ballast can merely be manually switched on. It is activated via the masterCONFIGURATOR (see "Reference list", p. 176).

5.9.2.5.4. Deactivating presence control

Presence control can be deactivated by means of a DALI command. For more details see the masterCONFIGURATOR (see "Reference list", p. 176).

5.9.3. Description infra-red sensor and remote control

The infra-red sensor enables the sensor to be remote controlled by means of an infra-red remote control. The functionality is integrated in the SMART sensors 5DPI and 10DPI. In other words, the remote control option is available only in sensors that have constant lighting control and presence control.



1) Automatic button, 2) Set button, 3) On-/Off buttons, 4) Up-/Down buttons

The following commands can be entered via the infra-red remote control:

_ Switching on and off (On/Off button)

_ Dimming (Up/Down button)

_ Setting the constant lighting control setpoint (Set button), for details on how to change the setpoint see Commissioning (see "Settings for constant lighting control", p. 131)

_ Activating automatic lighting control (Automatic button)

NOTICE

Commands entered via the remote control have the same priority as DALI commands.

5.9.4. Settings for infra-red sensor and remote control

NOTICE

If infra-red remote control and switchDIM are used in combination there may be a loss of synchronism when the remote control is used to switch individual devices on or off.
If the two ballasts are connected to a common mains voltage switch then this lack of synchronicity is maintained. When the switch is actuated the statuses of the ballasts change from "on" to "off" and vice versa. The two ballasts therefore remain out of sync.

_ Do not combine infra-red remote control and switchDIM if several ballasts are connected to the same mains voltage switch.

NOTICE

Conflict when combining EXCEL devices with connected SMART sensors in a higher-ranking system
Controllers on the one4all interface and SMART sensors both send commands to the ballast. There may be conflicts when combining DSI or DALI at the ballast and presence controllers or infra-red sensors at the SMART sensor. This occurs exclusively with EXCEL devices. To prevent this it is essential to check in advance that the controllers are compatible with the SMART sensors:

_ Read the documentation provided by the controlls manufacturers!

_ Only use controlls that according to the manufacturers are compatible with Tridonic SMART sensors.

5.9.4.1. Changing the setpoint value for ambient light control

The setpoint value can be changed and stored either temporarily or permanently.

5.9.4.1.1. Procedure for temporary storage:

_ Increase or decrease the setpoint value by means of the Up/Down button on the remote control
-› The luminous intensity will change
-› After 5 seconds the light control system accepts the current value as the new temporary setpoint value

5.9.4.1.2. Procedure for permanent storage:

_ Increase or decrease the setpoint value by means of the Up/Down button on the remote control
-› The luminous intensity will change

_ Store the new default value by pressing the SET button
-› The light source lights two times

Smart sensor 10DPI

NOTICE

The SET button is recessed and not directly accessible to prevent the default value from being changed unintentionally.
A pointed object such as a pen is needed to press the SET button.

5.9.5. Description corridorFUNCTION

The corridorFUNCTION is integrated in the SMART sensors 5DPI and 10DPI. These two sensors are available in four different versions, as the standard version without name transmission and as versions with one of the three name transmissions, cF01, cF30 and cF n.o. The three name transmissions are abbreviations for the corridorFUNCTION profiles "1-Minute-Off", "30-Minutes-Off" and "Never-Off".

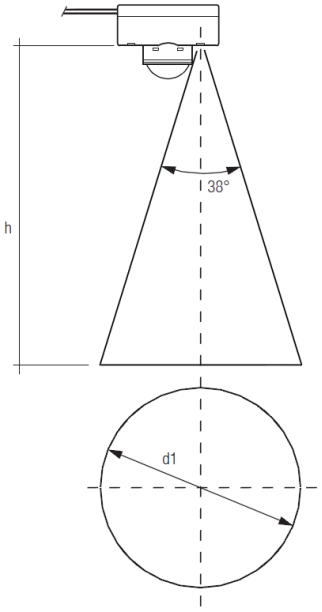
All the SMART sensors can be used to operate a motion detection system. If one of the sensors with name transmission is connected to the SMART interface of the ballast the relevant corridorFUNCTION profile is activated in the ballast. Sensor 5DPI cF01 activates the "1-Minute-Off" profile; sensor 10DPI cF30 the "30-Minutes-Off" profile and so on.

If a 5DPI or 10DPI SMART sensor without name transmission is connected, operation of a motion detection system is still possible. In this case, however, the standard profile of the corridorFUNCTION is activated.

The described version of a motion detection system is similar to the corridorFUNCTION with connection of a relay switch to the one4all interface (see "corridorFUNCTION - Description", p. 84). In contrast, the version with the 5DPI and 10DPI sensors does not require any extensive preconfiguration.

5.9.6. Product-specific characteristics

5.9.6.1. Detection zone of the light sensor



The sensor detection zone is dimensioned so that the entire work area is covered and evaluated, not just a single point. This ensures that false readings are not made as a result of moving objects, which would otherwise lead to a sudden change in the brightness level.

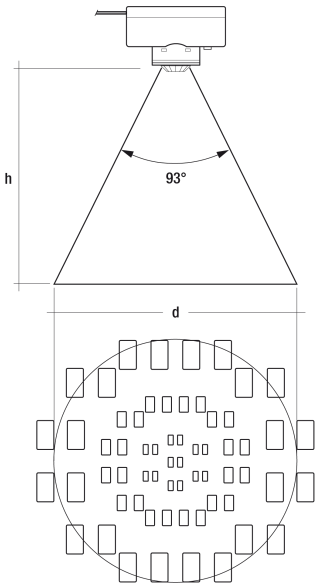
The diameter of the detection area depends on the angle of detection and the mounting height. Details are given in the data sheet.

For the 10DPI sensor the diameter can be calculated using the following formula.

$d = 2 \times \tan(0.5 \times a) \times h$

d ... Diameter
a ... Angle of detection
h ... Mounting height

5.9.6.2. Detection zone of the motion sensor



The detection zone of the motion sensor consists of a pattern of different measurement fields. For an object to be reliably detected two requirements must be met:

_ The object must move from one measurement field to another
_ The temperature of the object is different from the background temperature

The size of the detection zone depends on the angle of detection and the mounting height:

_ At a mounting height of max. 10 metres the sensor operates as a motion detector, i.e. objects are detected if they move through the room

For more details see the data sheet (see "Reference list", p. 176).

5.9.6.3. Extended functionality: Combinations

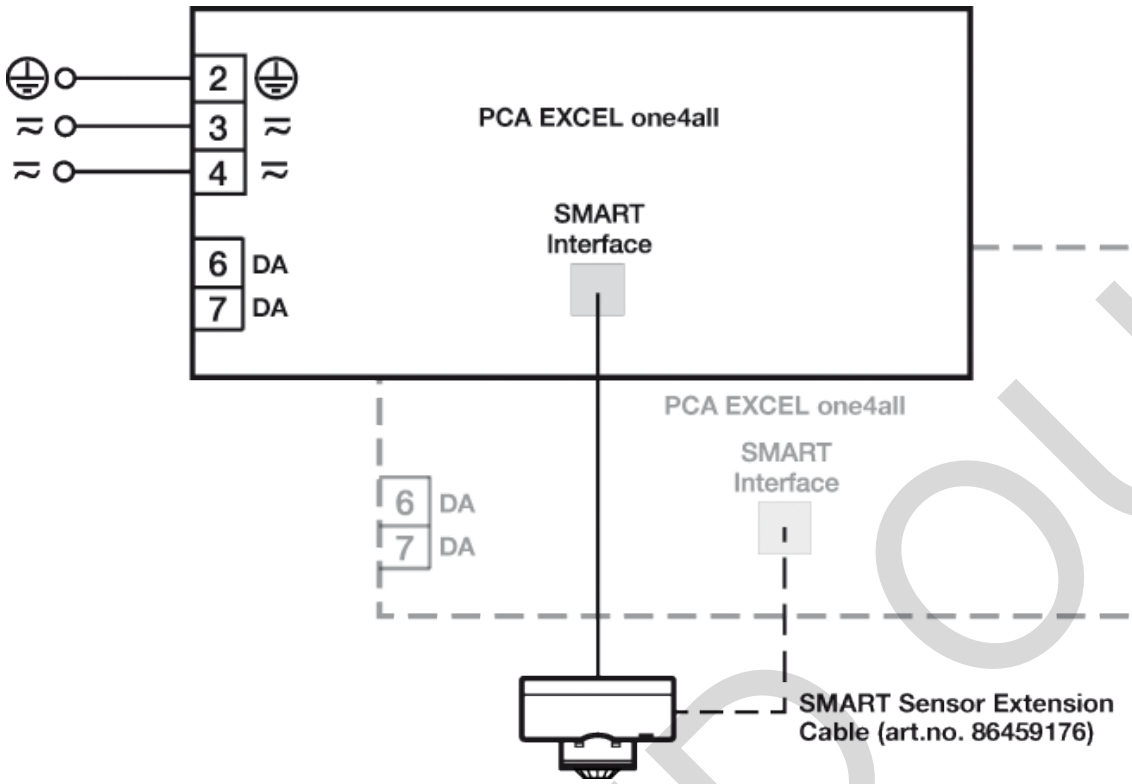
5.9.6.3.1. Operating two ballasts with one sensor

NOTE

Operating two ballasts with one sensor is possible only for PCA EXCEL one4all type devices. ECO and BASIC devices do not support this function.

The 10DPI sensor offer two connection options, a fixed cable and a socket. Both connections can be linked to the SMART interface on a ballast so that one sensor can be used to operate two ballasts simultaneously.
The ballast connected by the fixed cable acts as the master. The ballast connected to the socket acts as the slave.

Smart sensor 10DPI



NOTICE

If a second ballast is added by means of a SMART Sensor Extension Cable the control inputs of both ballasts must be connected together in the case of DALI, DSI, switchDIM and corridorFUNCTION.
To achieve synchronous behaviour if the lighting is controlled via DALI, make sure that both ballasts are in the same DALI group and are controlled via group commands.

6. Compliance

6.1. CE conformity

Tridonic declares that the PCA xitec II product complies with the relevant EC directives.

6.2. EMC standards

The compliance declaration for the ballast allows the manufacturer to assume that with the exception of radio interference all the EMC requirements are met also for the luminaire. Radio interference is heavily dependent on the design of the luminaire and the wiring so it has to be measured in conjunction with the luminaire.

The limit values for EMC are given in the following standards:

- EN 55015 (Limit values and measuring procedures for radio interference)
- EN 61547 (EMC requirements)
- EN 61000-3-2 (Limit values for harmonic currents)
- EN 61000-3-3 (Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems)

With the CE symbol on its products and with the compliance declaration, Tridonic confirms that its products comply with EMC standards.

7. Reference list

7.1. Related documents

_ DALI manual: http://www.tridonic.com/com/en/download/technical/DALI-manual_en.pdf
_ Documentation masterCONFIGURATOR: http://www.tridonic.com/com/en/download/Manual_masterConfigurator_en.pdf
_ Data sheets PCA xitec II: http://www.tridonic.com/com/en/data-sheets-dimmable-ballasts.asp
_ Declarations of conformity: http://www.tridonic.com/com/en/declarations-of-conformity.asp
_ Certificates: http://www.tridonic.com/com/en/certificates.asp
_ ENEC certificate: http://www.tridonic.com/com/de/download/ENEC_7590-023_Rev3_LEC_UEC.pdf

7.2. Downloads

_ Tridonic software: http://www.tridonic.com/com/en/software.asp
_ Download corridorFUNCTION payback calculator: http://www.corridorfunction.com
_ Download masterCONFIGURATOR: http://www.tridonic.com/com/de/software-masterconfigurator.asp

7.3. Additional information

_ corridorFUNCTION: http://www.corridorfunction.com/corridorFUNCTION/index.html
_ Commissioning instructions corridorFUNCTION: http://www.tridonic.com/com/en/operating-instructions.asp
_ Guarantee conditions: http://www.tridonic.com/com/en/guarantee.asp
_ Data sheets: http://www.tridonic.com/com/en/data-sheets.asp
_ Environmental declarations: http://www.tridonic.com/com/en/environmental-declarations.asp
_ Product specifications: http://www.tridonic.com/com/en/product-specifications.asp
_ Other technical documents: http://www.tridonic.com/com/en/technical-docs.asp