



## PCA T8 ECO Ip xitec II, 18 – 58 W ECO T8

### Product description

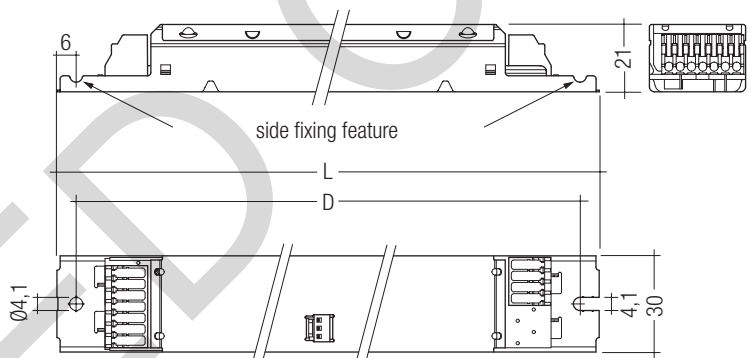
- Processor-controlled ballast with xitec II inside
- Highest possible energy class CELMA EEI = A1 BAT<sup>®</sup>
- Noise-free precise control via DALI or DSI signal, switchDIM or corridorFUNCTION
- Nominal life up to 100,000 h (at ta 50 °C with a failure rate max. 0.2 % per 1,000 h)
- Multi-lamp management
- OEM-specific reserved memory areas
- 5 years guarantee

### Interfaces

- DALI
- DSI
- switchDIM (with memory function + selectable dimming rate)
- corridorFUNCTION (3 preprogrammed profiles)
- Integrated SMART interface for function with SMART Sensor 5D 19f and corridorFUNCTION plugs

### Functions

- Intelligent Temperature Guard (overtemperature protection)
- Intelligent Voltage Guard (overvoltage indication and undervoltage shutdown)
- Optimum filament heating in any dimmer setting
- Disconnection of filament heating from a dimming level of approx. 90 % for maximum energy efficiency (SMART-Heating concept)
- corridorFUNCTION with ambient light control
- Automatically triggered emergency lighting value in DC mode, 15 %
- For emergency lighting systems as per EN 50172
- Automatic start after replacement of defective lamps
- Automatic shutdown if the lamp is faulty



### Technical data

Mains voltage range	220 – 240 V
AC voltage range	198 – 264 V
DC voltage range	176 – 280 V (lamp start ≥ 198 V DC)
Mains frequency	0 / 50 / 60 Hz
Overvoltage protection	320 V AC, 1 h
Typ. power input on standby	< 0.2 W
Protective hot restart	0.5 s for AC / 0.2 s for DC
Dimming range	1 – 100 %
Lamp start possible from	1 %
Operating frequency	~ 40 – 130 kHz
Type of protection	IP20

### Ordering data

Type	Article number <sup>®</sup>	Packaging, carton	Packaging, pallet	Weight per pc.
<b>For luminaires with 1 lamp</b>				
PCA 1x18 T8 ECO Ip xitec II	22185240	10 pc(s).	760 pc(s).	0.231 kg
PCA 1x36 T8 ECO Ip xitec II	28000035	10 pc(s).	760 pc(s).	0.222 kg
PCA 1x58 T8 ECO Ip xitec II	28000037	10 pc(s).	760 pc(s).	0.234 kg
<b>For luminaires with 2 lamps</b>				
PCA 2x18 T8 ECO Ip xitec II	22185243	10 pc(s).	760 pc(s).	0.256 kg
PCA 2x36 T8 ECO Ip xitec II	28000039	10 pc(s).	760 pc(s).	0.256 kg
PCA 2x58 T8 ECO Ip xitec II	28000041	10 pc(s).	640 pc(s).	0.330 kg



Standards, page 3

Wiring diagrams and installation examples, page 8

# Specific technical data

Lamp wattage	Lamp type	Type	Article number	Dimensions L x W x H	Hole spacing D	Lamp power <sup>②</sup>	Circuit power <sup>②</sup>	EEL	Current at 50 Hz 230 V <sup>②</sup>	λ at 50 Hz 230 V	tc point max.	Ambient temperature ta <sup>③</sup>
<b>For luminaires with 1 lamp</b>												
1 x 18 W	T8	PCA 1x18 T8 ECO lp xrtec II	22185240	360 x 30 x 21 mm	350 mm	16 W	18.5 W	A1 BAT	0.08 A	0.96	80 °C	-25 ... 70 °C
1 x 36 W	T8	PCA 1x36 T8 ECO lp xrtec II	28000035	360 x 30 x 21 mm	350 mm	32 W	35.0 W	A1 BAT	0.16 A	0.98	85 °C	-25 ... 70 °C
1 x 58 W	T8	PCA 1x58 T8 ECO lp xrtec II	28000037	360 x 30 x 21 mm	350 mm	50 W	54.0 W	A1 BAT	0.24 A	0.98	85 °C	-25 ... 70 °C
<b>For luminaires with 2 lamps</b>												
2 x 18 W	T8	PCA 2x18 T8 ECO lp xrtec II	22185243	360 x 30 x 21 mm	350 mm	32 W	37.5 W	A1 BAT	0.16 A	0.98	75 °C	-25 ... 60 °C
2 x 36 W	T8	PCA 2x36 T8 ECO lp xrtec II	28000039	360 x 30 x 21 mm	350 mm	64 W	70.0 W	A1 BAT	0.31 A	0.97	80 °C	-25 ... 60 °C
2 x 58 W	T8	PCA 2x58 T8 ECO lp xrtec II	28000041	425 x 30 x 21 mm	415 mm	100 W	107.5 W	A1 BAT	0.48 A	0.99	80 °C	-25 ... 55 °C

① According to the EU directives on ecodesign requirements (EC) No. 245/2009 and (EC) No. 347/2010.

② Valid at 100 % dimming level.

③ +10 °C to ta max: unrestricted dimming. -25 °C to +10 °C: unrestricted dimming from 100 % to 30 %.

-25 °C to +10 °C, dimming below 30 %: malfunction possible but no damage to ECG. This applies to AC and DC operation.

④ KC approval mark for art. no.: 28000039.

## Standards

EN 55015  
EN 60929  
EN 61000-3-2  
EN 61347-2-3  
EN 61547  
Suitable for emergency installations according to EN 50172  
CISPR 15  
CISPR 22  
IEC 60929  
IEC 61000-3-2  
IEC 61347-2-3  
IEC 61547  
IEC 62386 (according to DALi standard V1)

## Lamp starting characteristics

Warm start  
Starting time 0.5 s with AC  
Starting time 0.2 s with DC  
Start at any dimming level

## AC operation

Mains voltage  
220–240 V 50/60 Hz  
198–264 V 50/60 Hz including safety tolerance ( $\pm 10\%$ )  
198–254 V 50/60 Hz including performance tolerance ( $+6\% / -8\%$ )

## DC operation

220–240 V 0 Hz  
198–254 V 0 Hz certain lamp start  
176–280 V 0 Hz operating range  
Use in emergency lighting installations according to EN 50172 or for emergency luminaires according to EN 61347-2-3 appendix J.

Mains current for defective or missing lamps at DC operation  $< 35$  mA.

## Light output level in DC operation

Default value is 15 %

## Emergency units

The "PCA T8 ECO Ip xitec II" ballasts are compatible with all emergency units from Tridonic. See the table in the data sheet. Also all "5-pole" emergency units can be used. When used with other emergency units tests are necessary.

## Temperature range

Unlimited dimming range from  $10^{\circ}\text{C}$  to  $t_{a\text{ max}}$ .  
 $-25^{\circ}\text{C}$  to  $10^{\circ}\text{C}$ : dimming operation from 100 % to 30 %. If dimm level goes below 30 % malfunction possible, but no electronic ballast damage.  
This applies to AC and DC operation.

## Mains currents in DC operation (at 15 % light output)

Type	Lamp type	Wattage	Mains current at	
			$U_n = 220\text{ V}_{\text{DC}}$	$U_n = 275\text{ V}_{\text{DC}}$
PCA 1x18 T8 ECO Ip xitec II	T8	1x18 W	0.04 A	0.03 A
PCA 1x36 T8 ECO Ip xitec II	T8	1x36 W	0.06 A	0.05 A
PCA 1x58 T8 ECO Ip xitec II	T8	1x58 W	0.08 A	0.07 A
PCA 2x18 T8 ECO Ip xitec II	T8	2x18 W	0.07 A	0.06 A
PCA 2x36 T8 ECO Ip xitec II	T8	2x36 W	0.11 A	0.09 A
PCA 2x58 T8 ECO Ip xitec II	T8	2x58 W	0.16 A	0.13 A

## Ballast lumen factor AC operation (AC-BLF) EN 60929 8.1

Type	Lamp type	Wattage	AC-BLF at $U = 230\text{ V}_{\text{AC}}$
PCA 1x18 T8 ECO Ip xitec II	T8	1x18 W	0.99
PCA 1x36 T8 ECO Ip xitec II	T8	1x36 W	1.00
PCA 1x58 T8 ECO Ip xitec II	T8	1x58 W	1.00
PCA 2x18 T8 ECO Ip xitec II	T8	2x18 W	0.99
PCA 2x36 T8 ECO Ip xitec II	T8	2x36 W	1.00
PCA 2x58 T8 ECO Ip xitec II	T8	2x58 W	1.00

The ballast lumen factor for AC operation (AC-BLF) does not alter from  $U_n = 198\text{ V}_{\text{AC}}$  to  $U_n = 254\text{ V}_{\text{AC}}$ .  
The ballast lumen factor for DC operation (DC-BLF) on the basis of an automatic power reduction of the ballasts (default value is 15 %) will be smaller than AC. It does not alter in the DC operating range (198–264 V DC).

## Dimming

Dimming curve is adapted to the eye sensitiveness.

Dimming range 1 % to 100 %

Digital control with:

- DSI signal: 8 bit Manchester Code  
Speed 1 % to 100 % in 1.4 s
- DALI signal: 16 bit Manchester Code  
Maximum speed 1 % to 100 % in 550 ms  
(adjustable between 100 ms and 90 s)  
Programmable parameter:  
Minimum dimming level  
Maximum dimming level  
Default minimum = 1 %  
Default maximum = 100 %

## Control input (DA/D1, DA/D2)

Digital DALI/DSI signal or a push-to-make switch (switchDIM) or a motion detector (corridorFUNCTION) can be wired on the same terminals (DA/D1 and DA/D2).

## Digital signal DALI/DSI

The control input is non-polar and protected against accidental connection with a mains voltage up to 264 V. The control signal is not SELV. Control cable has to be installed in accordance to the requirements of low voltage installations.

Different functions depending on each module.

## SMART interface

An additional interface for the direct connection of the SMART-Sensor 5D 19f<sup>1)</sup> or corridorFUNCTION plugs. Application and functionality see corridorFUNCTION user manual.

SMART-Sensor 5D 19f<sup>1)</sup> light sensor operating mode:

The sensor registers actual ambient light and maintains the individually defined constant lux level.

After every mains reset the SMART interface automatically checks for an installed sensor. With the sensor installed the PCA T8 ECO Ip xtec II automatically runs in the constant lux level mode.

ON/OFF switch via mains, switchDIM or DSI signal. DSI signal = 0 switches off, DSI signal ≥ 1 switches on.

With switchDIM signals it is possible to change the controlled light level temporarily.

Temporarily means that after a switching cycle OFF/ON command the ballast will start at the preset value determined by the SMART-Sensor 5D 19f. The installation of the two wire bus is according to the appropriate low voltage regulations.

<sup>1)</sup> SMART-Sensor 5D 19f: article number 86459169

## switchDIM

Integrated switchDIM function allows a direct connection of a push to make switch for dimming and switching.

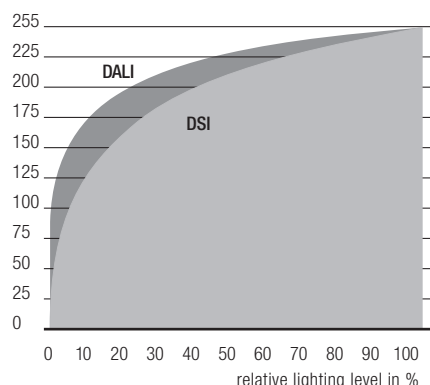
Brief push (< 0.6 s) switches ballast ON and OFF. The ballasts switch-ON at light level set at switch-OFF. After switch ON the last settet dimming level will be activated again.

When the push to make switch is held, PCA ballasts are dimmed. After repush the PCA is dimmed in the opposite direction.

The switchDIM fade time is set to 3 s from min. to max. in the factory settings. With a 20 s push to the push to make switch this fade time can be changed to 6 s. In this instance the switchDIM application will be synchronized to 50 % light level after 10 s and after 20 s the light level rises to 100 % with the new fade time.

## Dimming characteristics PCA T8 ECO Ip xtec II

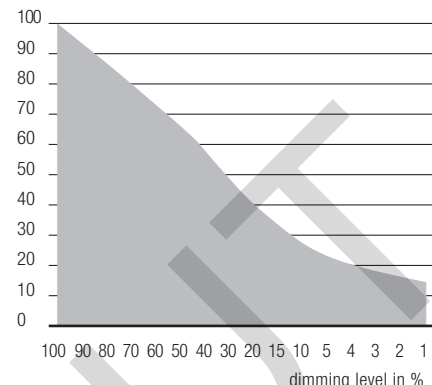
digital dimming value



Dimming characteristics as seen by the human eye

## Energy saving PCA T8 ECO Ip xtec II

mains power in %



At every synchronisation (10 s keystroke) the device will reset to 3 s (factory setting)  
In installations with PCAs with different dimming levels or opposite dimming directions (e.g. after a system extension), all PCAs can be synchronized to 50 % dimming level by a 10 s push.

Use of push to make switch with indicator lamp is not permitted.

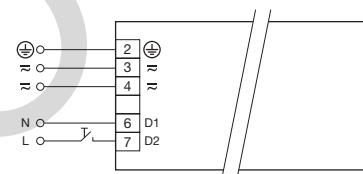
switchDIM and corridorFUNCTION are very simple tools for controlling ballasts with conventional momentary-action switches or motion sensors. To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input. Special attention must be paid to achieving clear zero crossings. Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.

## corridorFUNCTION

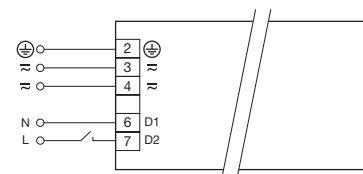
To activate the corridorFUNCTION a voltage of 230 V simply has to be applied for five minutes at switchDIM connection. The unit will then switch automatically to the corridorFUNCTION.

Note: If the corridorFUNCTION is wrongly activated in a switchDIM system (for example a switch is used instead of pushbutton), there is the option of installing a pushbutton and deactivating the corridorFUNCTION mode by five short pushes of the button within three seconds.

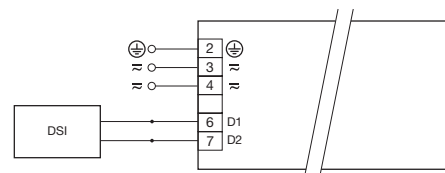
The corridorFUNCTION offers the added benefit of a second and third preprogrammed profile, which can be activated by the corridorFUNCTION plugs. It is also possible to combine the corridorFUNCTION with the SMART-Sensor 5D 19f light sensor. Application and functionality of profiles see user manual of the corridorFUNCTION.



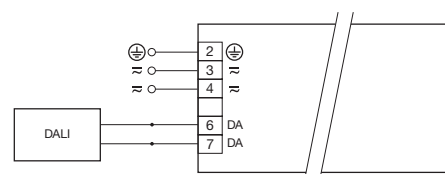
switchDIM PCA T8 ECO Ip xtec II



corridorFUNCTION PCA T8 ECO Ip xtec II



DSI PCA T8 ECO Ip xtec II



DALI PCA T8 ECO Ip xtec II

#### Loading of automatic circuit breakers (Limitation via inrush current)

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20	Inrush current (1.5 mm <sup>2</sup> )		Inrush current (2.5 mm <sup>2</sup> )	
Installation Ø	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	I <sub>max</sub>	time	I <sub>max</sub>	time
PCA 1x18 T8 ECO Ip xtec II	50	82	161	201	25	41	120	107	19.3 A	166 µs	19.7 A	165 µs
PCA 1x36 T8 ECO Ip xtec II	36	54	80	92	18	27	40	46	19.2 A	189 µs	19.6 A	187 µs
PCA 1x58 T8 ECO Ip xtec II	22	34	46	54	11	17	23	27	24.7 A	224 µs	24.4 A	227 µs
PCA 2x18 T8 ECO Ip xtec II	34	50	76	86	17	25	38	43	20.3 A	204 µs	23.3 A	184 µs
PCA 2x36 T8 ECO Ip xtec II	22	32	42	52	11	16	22	26	26.4 A	210 µs	27.2 A	207 µs
PCA 2x58 T8 ECO Ip xtec II	16	22	28	34	8	11	15	17	28.6 A	290 µs	29.1 A	289 µs

Continuous operation: to calculate the protective safety switch see main current, page 2

#### Intelligent Voltage Guard

Intelligent Voltage Guard is the name of the electronic monitor from Tridonic. This innovative feature of the PCA family of control gear from Tridonic immediately shows if the mains voltage rises above certain thresholds. Measures can then be taken quickly to prevent damage to the control gear.

- If the mains voltage rises above approx. 318 V<sub>rms</sub> (voltage depends on the ballast type), the lamp starts flashing on and off.
- To avoid a damage of the device the mains supply has to be switched off at this signal.

#### Intelligent Temperature Guard

The intelligent temperature guard protects the PCA T8 ECO Ip xtec II from thermal overheating by reducing the output power or switching off in case of operation above the thermal limits of the luminaire or ballast. Depending on the luminaire design, the ITG operates at about 5 to 10 °C above t<sub>c</sub> temperature.

#### Harmonic distortion in the mains supply (at 230 V/50 Hz)

Type	Lamp type	Wattage	THD	3	5	7	9	11
PCA 1x18 T8 ECO Ip xtec II	T8	1x18 W	9	5	2	1	1	1
PCA 1x36 T8 ECO Ip xtec II	T8	1x36 W	10	8	2	2	2	2
PCA 1x58 T8 ECO Ip xtec II	T8	1x58 W	6	5	2	2	1	1
PCA 2x18 T8 ECO Ip xtec II	T8	2x18 W	8	5	2	1	1	1
PCA 2x36 T8 ECO Ip xtec II	T8	2x36 W	7	5	1	1	2	2
PCA 2x58 T8 ECO Ip xtec II	T8	2x58 W	6	5	1	1	1	1

#### Operating voltage

Type	Lamp type	Wattage	U <sub>out</sub>
PCA 1x18 T8 ECO Ip xtec II	T8	1x18 W	430 V
PCA 1x36 T8 ECO Ip xtec II	T8	1x36 W	430 V
PCA 1x58 T8 ECO Ip xtec II	T8	1x58 W	430 V
PCA 2x18 T8 ECO Ip xtec II	T8	2x18 W	430 V
PCA 2x36 T8 ECO Ip xtec II	T8	2x36 W	430 V
PCA 2x58 T8 ECO Ip xtec II	T8	2x58 W	430 V

Humidity: 5 % up to max. 85 %,  
not condensed  
(max. 56 days/year at 85 %)

Storage temperature: -40 °C up to max. +80 °C

The devices have to be within the specified temperature range (t<sub>a</sub>) before they can be operated.

#### Expected lifetime

Type	Lamp type	Wattage	t <sub>a</sub> = 40 °C			t <sub>a</sub> = 50 °C			t <sub>a</sub> = 60 °C		
PCA 1x18 T8 ECO Ip xtec II	T8	1 x 18 W	t <sub>c</sub>	50 °C	60 °C	70 °C					
			Lifetime	≥ 100,000 h	≥ 100,000 h	≥ 100,000 h					
PCA 1x36 T8 ECO Ip xtec II	T8	1 x 36 W	t <sub>c</sub>	55 °C	65 °C	75 °C					
			Lifetime	≥ 100,000 h	≥ 100,000 h	≥ 100,000 h					
PCA 1x58 T8 ECO Ip xtec II	T8	1 x 58 W	t <sub>c</sub>	55 °C	65 °C	75 °C					
			Lifetime	≥ 100,000 h	≥ 100,000 h	≥ 100,000 h					
PCA 2x18 T8 ECO Ip xtec II	T8	2 x 18 W	t <sub>c</sub>	60 °C	70 °C	80 °C					
			Lifetime	≥ 100,000 h	≥ 100,000 h	≥ 50,000 h					
PCA 2x36 T8 ECO Ip xtec II	T8	2 x 36 W	t <sub>c</sub>	65 °C	70 °C	80 °C					
			Lifetime	≥ 100,000 h	≥ 100,000 h	≥ 50,000 h					
PCA 2x58 T8 ECO Ip xtec II	T8	2 x 58 W	t <sub>c</sub>	65 °C	75 °C	80 °C					
			Lifetime	≥ 100,000 h	≥ 50,000 h	≥ 50,000 h					

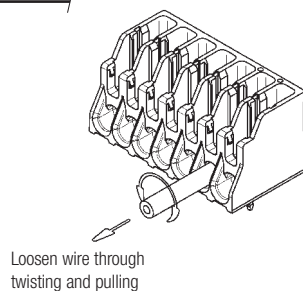
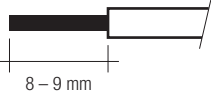
x = not permitted

## Installation instructions

### Wiring type and cross section

The wiring can be solid cable with a cross section of 0.5 to 0.75 mm<sup>2</sup> for push terminal and 0.5 mm<sup>2</sup> for IDC terminal. For the push-wire connection you have to strip the insulation (8–9 mm).

wire preparation:  
0.5 – 0.75 mm<sup>2</sup>



Loosen wire through  
twisting and pulling

### Wiring advice

The lead length is dependent on the capacitance of the cable.

Ballast	Terminal	Maximum capacitance allowed			
		Type	Cold	Hot	Cold
PCA 1xx T8 ECO Ip xtec II	13, 14		15, 16	200 pF	100 pF
PCA 2xx T8 ECO Ip xtec II	12, 13, 14		10, 11, 15, 16	200 pF	100 pF

With standard solid wire 0.5/0.75 mm<sup>2</sup> the capacitance of the lead is 30–80 pF/m.

This value is influenced by the way the wiring is made.

Lamp connection should be made with symmetrical wiring.

Hot leads (10, 11, 15, 16) and cold leads (12, 13, 14) should be separated as much as possible.

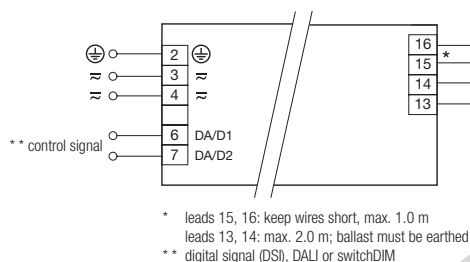
When using two or more dimmable ballasts in one luminaire with separate dimming controls, the lamp leads must be kept separate.

### Sensor wires

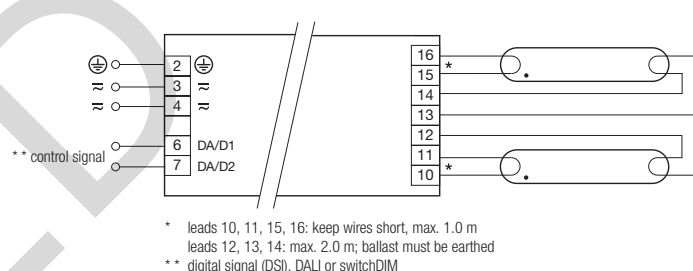
Sensor wires must be routed separately from the lamp wires and mains cables otherwise the lighting control system may malfunction. If separate routing is not possible (for reasons of space) shielded lamp wires and mains cables must be used.

Dimmable ballasts from Tridonic have to be earthed.

To avoid the damage of the control gear, the wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.).



PCA T8 ECO Ip xrtec II 1x18–58 W



PCA T8 ECO Ip xrtec II 2x18–58 W

Dimmable ballasts from Tridonic have to be earthed.

### RFI

- Connection to the lamps of the hot leads must be kept as short as possible
- Mains leads should be kept apart from lamp leads (ideally 5–10 cm distance)
- Do not run mains leads adjacent to the electronic ballast
- Twist the lamp leads
- Keep the distance of lamp leads from the metal work as large as possible
- Mains wiring to be twisted when through wiring
- Keep the mains leads inside the luminaire as short as possible

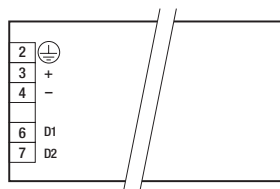
### General advice

Electronic ballasts are virtually noise free. Magnetic fields generated during the ignition cycle can cause some background noise but only for a few milliseconds.

### Operation on DC voltage

Our ballasts are construed to operate DC voltage and pulsed DC voltage.

To operate ballasts with pulsed DC voltage the polarity is absolute mandatory.



### Additional information

Additional technical information at  
[www.tridonic.com](http://www.tridonic.com) → Technical Data

Guarantee conditions at  
[www.tridonic.com](http://www.tridonic.com) → Services

Lifetime declarations are informative and represent no warranty claim.  
No warranty if device was opened.

### Insulation and electric strength testing of luminaires

Electronic devices can be damaged by high voltage. This has to be considered during the routine testing of the luminaires in production.

According to IEC 60598-1 Annex Q (informative only!) or ENEC 303-Annex A, each luminaire should be submitted to an insulation test with 500 Vdc for 1 second. This test voltage should be connected between the interconnected phase and neutral terminals and the earth terminal.

The insulation resistance must be at least 2 MΩ.

As an alternative, IEC 60598-1 Annex Q describes a test of the electrical strength with 1500 VAC (or 1.414 x 1500 Vdc). To avoid damage to the electronic devices this test must not be conducted.