[EL] [EMC] [EAC] [⚠] CE [⚡] [RoHS]

T8

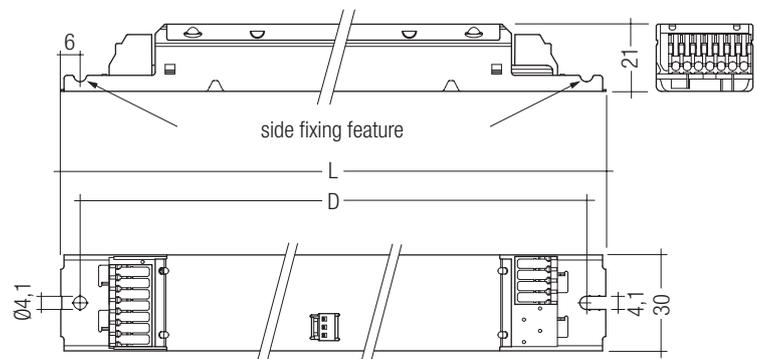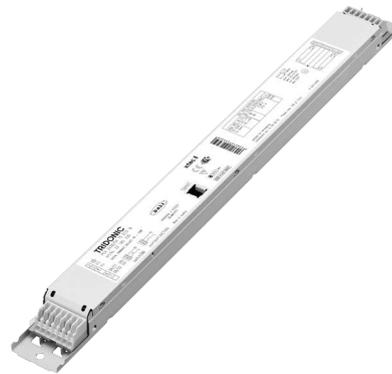## PCA T8 EXCEL one4all lp x:tec II, 18 – 58 W
EXCEL T8

Product description

- Processor-controlled ballast with x:tec II inside
- Highest possible energy class CELMA EEI = A1 BAT[①]
- 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)
- OEM-specific reserved memory areas
- Extended DALI commands
- 5-year guarantee

Interfaces

- DALI
- DSI
- switchDIM (with memory function + selectable dimming rate)
- corridorFUNCTION (3 preprogrammed profiles + individually programmable)
- Integrated SMART interface for function with all SMART Sensors and SMART plugs of the x:tec II range

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)
- Fade rates between 100 ms and 90 s (min. – max.)
- corridorFUNCTION with ambient light control
- Automatically triggered emergency lighting value in DC mode 15 %, can be set between 1 and 100 %
- For emergency lighting systems as per EN 50172
- Automatic start after replacement of defective lamps
- Automatic shutdown if the lamp is faulty
- Dimming possible in DC mode

→

Standards, page 3

Wiring diagrams and installation examples, page 8

side fixing feature

L
D

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	Packaging, carton	Packaging, pallet	Weight per pc.
For luminaires with 1 lamp				
PCA 1x18 T8 EXCEL one4all lp x:tec II	**22185239**	10 pc(s).	760 pc(s).	0.228 kg
PCA 1x36 T8 EXCEL one4all lp x:tec II	**28000034**	10 pc(s).	760 pc(s).	0.222 kg
PCA 1x58 T8 EXCEL one4all lp x:tec II	**28000036**	10 pc(s).	760 pc(s).	0.236 kg
For luminaires with 2 lamps				
PCA 2x18 T8 EXCEL one4all lp x:tec II	**22185242**	10 pc(s).	760 pc(s).	0.256 kg
PCA 2x36 T8 EXCEL one4all lp x:tec II	**28000038**	10 pc(s).	760 pc(s).	0.256 kg
PCA 2x58 T8 EXCEL one4all lp x:tec II	**28000040**	10 pc(s).	640 pc(s).	0.338 kg

Specific technical data

Lamp wattage	Lamp type	Type	Article number	Dimensions L x W x H	Hole spacing D	Lamp power[2]	Circuit power[2]	EEI	Current at 50 Hz 230 V[2]	λ at 50 Hz 230 V	tc point max.	Ambient temperature ta[3]
For luminaires with 1 lamp												
1 x 18 W	T8	**PCA 1x18 T8 EXCEL one4all lp x:tec II**	22185239	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 EXCEL one4all lp x:tec II**	28000034	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 EXCEL one4all lp x:tec II**	28000036	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
For luminaires with 2 lamps												
2 x 18 W	T8	**PCA 2x18 T8 EXCEL one4all lp x:tec II**	22185242	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 EXCEL one4all lp x:tec II**	28000038	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 EXCEL one4all lp x:tec II**	28000040	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.

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 (±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
Programmable from 1 % to 100 %
Programming by extended DSI or DALI signal (16 bit).
Default value is 15 %
In DC operation dimming mode can be activated.

Emergency units
The "PCA T8 EXCEL one4all lp xɪtec 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 °C to ta max.
-25 °C to 10 °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 $U_n = 220\,V_{DC}$	Mains current at $U_n = 275\,V_{DC}$
PCA 1x18 T8 EXCEL one4all lp xɪtec II	T8	1x18 W	0.04 A	0.03 A
PCA 1x36 T8 EXCEL one4all lp xɪtec II	T8	1x36 W	0.06 A	0.05 A
PCA 1x58 T8 EXCEL one4all lp xɪtec II	T8	1x58 W	0.08 A	0.07 A
PCA 2x18 T8 EXCEL one4all lp xɪtec II	T8	2x18 W	0.07 A	0.06 A
PCA 2x36 T8 EXCEL one4all lp xɪtec II	T8	2x36 W	0.11 A	0.09 A
PCA 2x58 T8 EXCEL one4all lp xɪtec 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 $U = 230\,V_{AC}$
PCA 1x18 T8 EXCEL one4all lp xɪtec II	T8	1x18 W	0.99
PCA 1x36 T8 EXCEL one4all lp xɪtec II	T8	1x36 W	1.00
PCA 1x58 T8 EXCEL one4all lp xɪtec II	T8	1x58 W	1.00
PCA 2x18 T8 EXCEL one4all lp xɪtec II	T8	2x18 W	0.99
PCA 2x36 T8 EXCEL one4all lp xɪtec II	T8	2x36 W	1.00
PCA 2x58 T8 EXCEL one4all lp xɪtec II	T8	2x58 W	1.00

The ballast lumen factor for AC operation (AC-BLF) does not alter from $U_n = 198\,V\,AC$ to $U_n = 254\,V\,AC$.
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-Sensoren or SMART-Plugs.
For precise instructions relating to the available sen-
sors and plugs and for a description of how they work
in connection with the PCA devices please see the
separate documentation for PCA xitec ll.
The equipment must be installed in accordance with
the relevant directives on low voltage. Ensure that
power to the ballast is switched off before connecting
or disconnecting the sensors and plugs.

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
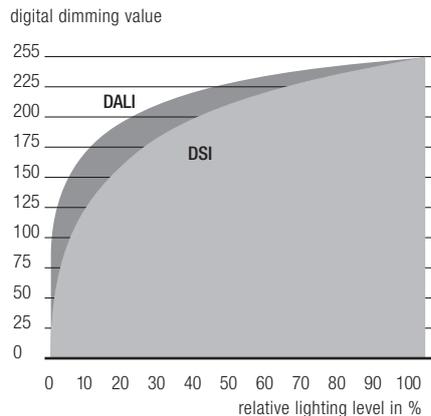20 s the light level rises to 100 % with the new fade
time.
At every synchronizsation (10 s keystroke) the device
will reset to 3 s (factory setting)
In installations with PCAs with different dimming levels
or opposite dimming directions (e.g. after a system
extension), all PCAs can be synchronized to 50 %
dimming level by a 10 s push.
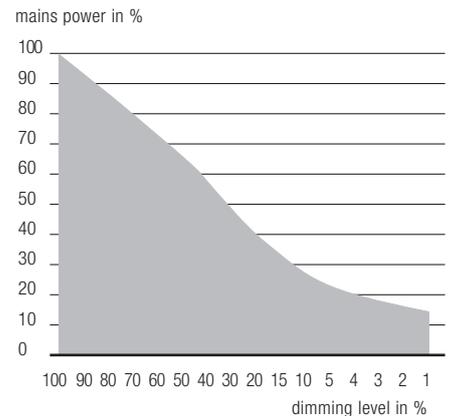Use of push to make switch with indicator lamp is not
permitted.
switchDIM and corridorFUNCTION are very simple tools
for controlling ballasts with conventional momentary-
action switches or motion sensors. To ensure correct
operation a sinusoidal mains voltage with a frequency

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.
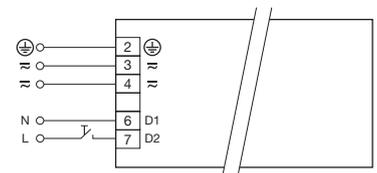
corridorFUNCTION

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
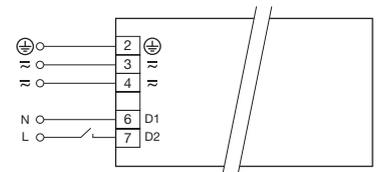mode by five short pushes of the button within three
seconds.
The corridorFUNCTION offers the added benefit of a
second and third preprogrammed profile, which can be
activated by the SMART-Plugs.
It is also possible to combine the corridorFUNCTION
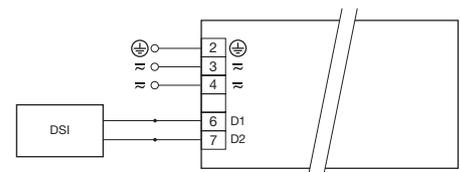with the SMART-Sensor 5D 19f light sensor.
Application and functionallity of profiles see user
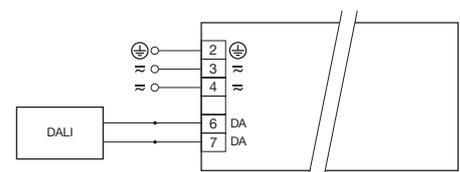manual of the corridorFUNCTION.

Dimming characteristics
PCA T8 EXCEL one4all lp x!tec II

digital dimming value

Dimming characteristics as seen by the human eye

Energy saving
PCA T8 EXCEL one4all lp x!tec II

mains power in %

switchDIM PCA T8 EXCEL one4all lp x!tec II

corridorFUNCTION PCA T8 EXCEL one4all lp x!tec II

DSI PCA T8 EXCEL one4all lp x!tec II

DALI PCA T8 EXCEL one4all lp x!tec II

Data sheet 08/15-FD013-11
Subject to change without notice.
www.tridonic.com
4

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 mm²)		Inrush current (2.5 mm²)	
Installation Ø	1.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²	I_{max}	time	I_{max}	time
PCA 1x18 T8 EXCEL one4all lp x:tec II	50	82	161	201	25	41	120	107	19.3 A	166 µs	19.7 A	165 µs
PCA 1x36 T8 EXCEL one4all lp x:tec II	36	54	80	92	18	27	40	46	19.2 A	189 µs	19.6 A	187 µs
PCA 1x58 T8 EXCEL one4all lp x:tec II	22	34	46	54	11	17	23	27	24.7 A	224 µs	24.4 A	227 µs
PCA 2x180 T8 EXCEL one4all lp x:tec II	34	50	76	86	17	25	38	43	20.3 A	204 µs	23.3 A	184 µs
PCA 2x36 T8 EXCEL one4all lp x:tec II	22	32	42	52	11	16	22	26	26.4 A	210 µs	27.2 A	207 µs
PCA 2x58 T8 EXCEL one4all lp x:tec 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 saftey 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$_{rms}$ (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 EXCEL one4all lp x:tec 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 tc 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 EXCEL one4all lp x:tec II	T8	1x18 W	9	5	2	1	1	1
PCA 1x36 T8 EXCEL one4all lp x:tec II	T8	1x36 W	8	4	4	2	2	2
PCA 1x58 T8 EXCEL one4all lp x:tec II	T8	1x58 W	6	5	2	2	1	1
PCA 2x18 T8 EXCEL one4all lp x:tec II	T8	2x18 W	8	5	2	1	1	1
PCA 2x36 T8 EXCEL one4all lp x:tec II	T8	2x36 W	7	5	1	1	1	2
PCA 2x58 T8 EXCEL one4all lp x:tec II	T8	2x58 W	6	5	1	1	1	1

Operating voltage

Type	Lamp type	Wattage	U_{out}
PCA 1x18 T8 EXCEL one4all lp x:tec II	T8	1x18 W	430 V
PCA 1x36 T8 EXCEL one4all lp x:tec II	T8	1x36 W	430 V
PCA 1x58 T8 EXCEL one4all lp x:tec II	T8	1x58 W	430 V
PCA 2x18 T8 EXCEL one4all lp x:tec II	T8	2x18 W	430 V
PCA 2x36 T8 EXCEL one4all lp x:tec II	T8	2x36 W	430 V
PCA 2x58 T8 EXCEL one4all lp x:tec 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 (ta) before they can be operated.

Expected life-time

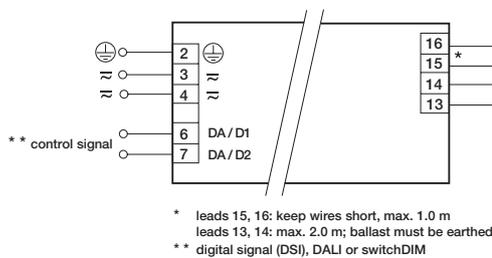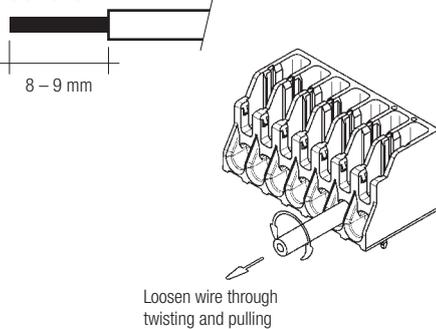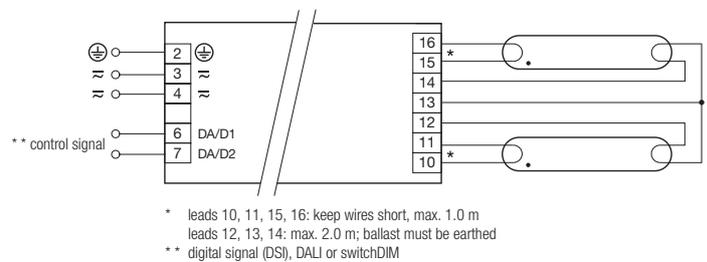| Type	Lamp type	Wattage		ta = 40 °C	ta = 50 °C	ta = 60 °C
PCA 1x18 T8 EXCEL one4all lp x:tec II	T8	1 x 18 W	tc	50 °C	60 °C	70 °C
			Life-time	≥ 100,000 h	≥ 100,000 h	≥ 100,000 h
PCA 1x36 T8 EXCEL one4all lp x:tec II	T8	1 x 36 W	tc	55 °C	65 °C	75 °C
			Life-time	≥ 100,000 h	≥ 100,000 h	≥ 100,000 h
PCA 1x58 T8 EXCEL one4all lp x:tec II	T8	1 x 58 W	tc	55 °C	65 °C	75 °C
			Life-time	≥ 100,000 h	≥ 100,000 h	≥ 100,000 h
PCA 2x18 T8 EXCEL one4all lp x:tec II	T8	2 x 18 W	tc	60 °C	70 °C	80 °C
			Life-time	≥ 100,000 h	≥ 100,000 h	≥ 50,000 h
PCA 2x36 T8 EXCEL one4all lp x:tec II	T8	2 x 36 W	tc	65 °C	70 °C	80 °C
			Life-time	≥ 100,000 h	≥ 100,000 h	≥ 50,000 h
PCA 2x58 T8 EXCEL one4all lp x:tec II	T8	2 x 58 W	tc	65 °C	75 °C	80 °C
			Life-time	≥ 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 mm² for push terminal and 0.5 mm² for IDC terminal. For the push-wire connection you have to strip the insulation (8–9 mm).

wire preparation:
0.5 – 0.75 mm²

8 – 9 mm

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	Hot
PCA 1xx T8 EXCEL one4all Ip xɩtec II	13, 14	15, 16	200 pF	100 pF
PCA 2xx T8 EXCEL one4all Ip xɩtec II	12, 13, 14	10, 11, 15, 16	200 pF	100 pF

With standard solid wire 0.5/0.75 mm² 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.

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

PCA T8 EXCEL one4all Ip xɩtec II 1x18–58 W

* 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), DALI or switchDIM

PCA T8 EXCEL one4all Ip xɩtec II 2x18–58 W
Dimmable ballasts from Tridonic have to be earthed.
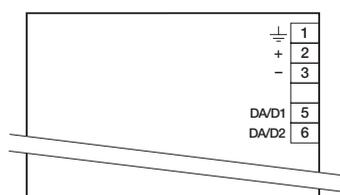
RFI
- Connection to the lamps of the hot leads must be kept as short as possible
- Mains leads should be kept apart from lamp leads (ideally 5–10 cm distance)
- Do not run mains leads adjacent to the electronic ballast
- Twist the lamp leads
- Keep the distance of lamp leads from the metal work as large as possible
- Mains wiring to be twisted when through wiring
- Keep the mains leads inside the luminaire as short as possible

General advise
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.

Isolation 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 isolation 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 isolation 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.

Glow-wire test according to EN 60598-1
650 °C, 750 °C and 850 °C passed

Programming
With appropriate software and a USB interface different functions can be activated and various parameters can be configured in the new PCA TC EXCEL one4all Ip xɩtec II. All that is needed is a DALI-USB and the software.

Master Configurator
For programming the corridorFUNCTION, device configuration (fade time, ePowerOnLevel, etc.) DC level, compatibility settings, and startup date and for resetting.
Maximum amount of ballast see DALI/DSI specification.

DALI PS
USB SCI

PC and the SW-Tool "Master Configurator"

max. 64 ECG's (DALI)

ⓘ **For further technical information please visit www.tridonic.com**