



### PCA T5c ECO, 22 – 55 W Compact and T5c fluorescent lamps

#### Product description

- Noise-free precise control via DSI signal or switchDIM
- CELMA energy class A1<sup>1)</sup>

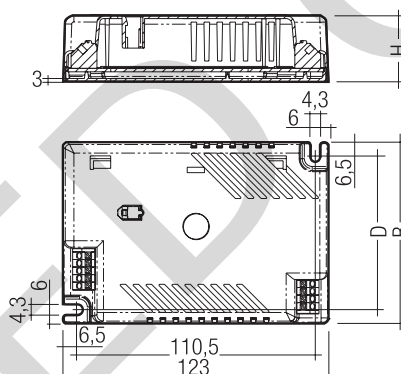
#### Interfaces

- DSI
- switchDIM
- Integrated SMART-Interface

#### Functions

- Optimum filament heating in any dimmer setting
- Automatically triggered emergency lighting value in DC mode, 70 %
- For emergency lighting systems as per EN 50172  
(Exclusion article number 22176468, PCA 1/55 T5c ECO not suitable for emergency lighting units according to EN 50172 and only ÖVE, EN 61347-2-3)
- Automatic start after replacement of defective lamps

<sup>1)</sup> according to the EU directives on ecodesign requirements (EC) No. 245/2009 and (EC) No. 347/2010



#### Technical data

Power input on standby	< 1 W
Protective hot restart	1.5 s for AC / 0.6 s for DC
Dimming range	3 – 100 %
Lamp start possible from	3 %
Operating frequency	~40 – 100 kHz
Life	50,000 h
Height	31 mm

#### Ordering data

Type	Article number
<b>For luminaires with 1 lamp</b>	
PCA 1/22 T5c ECO	22086897
PCA 1/40 T5c ECO	22185146
PCA 1/55 T5c ECO	22176468

Packaging: 10 pieces/carton, 500 pieces/pallet

#### Specific technical data

Lamp wattage	Lamp type	Typ	Dimensions LxWxH	Hole spacing D	Weight	Circuit power <sup>2)</sup>	Lamp wattage <sup>2)</sup>	Current at 230 V / 50 Hz <sup>2)</sup>	λ at 50 Hz / 230 V	tc point	Ambient temperature ta <sup>3)</sup>
<b>For luminaires with 1 lamp</b>											
1 x 22 W	T5c	PCA 1/22 T5c ECO	123 x 79 x 31 mm	66.5 mm	0.22 kg	26.1 W	22 W	0.12 A	0.96	70 °C	10 ... 60 °C
1 x 40 W	T5c	PCA 1/40 T5c ECO	123 x 79 x 31 mm	66.5 mm	0.22 kg	45.5 W	40 W	0.20 A	0.98	65 °C	10 ... 50 °C
1 x 55 W	T5c	PCA 1/55 T5c ECO <sup>1)</sup>	123 x 79 x 31 mm	66.5 mm	0.22 kg	61.0 W	55 W	0.24 A	0.98	75 °C	10 ... 50 °C

<sup>1)</sup> Exclusion PCA 1/55 T5c ECO only ÖVE, EN 61347-2-3, not suitable for emergency lighting units according to EN 50172.

<sup>2)</sup> Valid at 100 % dimming level

<sup>3)</sup> 3 % dimming from +10 °C to ta max.

## Standards

EN 55015  
EN 55022  
EN 60929  
EN 61000-3-2  
EN 61347-2-3  
EN 61547  
accordance to EN 50172  
Exclusion PCA 1/55 T5c ECO only ÖVE, EN 61347-2-3, not suitable for emergency lighting units according to EN 50172.

## Lamp starting characteristics

Warm start  
Starting time 1.5 s with AC  
Starting time 0.6 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 ( $\pm 10\%$ )  
202–254 V 50/60 Hz including performance tolerance ( $+6\%/-8\%$ )

## DC operation

220–240 V 0 Hz  
198–280 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.

## Temperature range

Dimming range 100 % to 3 % from 10 °C to maximum permissible ambient temperature  $t_a$ .

## Mains current in DC operation

Type	Mains current at $U_n = 220 V_{DC}$	Mains current at $U_n = 240 V_{DC}$
PCA 1/22 T5c ECO	0.10 A	0.09 A
PCA 1/40 T5c ECO	0.17 A	0.16 A
PCA 1/55 T5c ECO	0.24 A	0.22 A

## Light output level in DC operation

Default value is 70 %  
In DC operation dimming is not possible

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

Type	AC/DC-BLF at $U = 198-254 V, 25^\circ C$
PCA 1/22 T5c ECO	1.00
PCA 1/40 T5c ECO	1.01
PCA 1/55 T5c ECO	0.97

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 70 %) will be smaller than AC. It does not alter in the DC operating range (198–280 V<sub>DC</sub>).

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

Type	THD	3	5	7	9	11
PCA 1/22 T5c ECO	5.3	5.2	1.1	0.7	0.5	0.5
PCA 1/40 T5c ECO	8.9	8.3	3.1	1.2	1.7	0.4
PCA 1/55 T5c ECO	8.2	7.4	3.1	1.3	1.3	0.9

### Dimming

Dimming range 3 % to 100 %  
Digital control with DSI signal:  
8 bit Manchester Code  
Maximum speed 3 % to 100 % in 1.4 s  
Dimming curve that is friendly to the eye.

### Control input (D1, D2)

Digital DSI signal or switchDIM can be wired on the same terminals (D1 and D2).

### Digital signal 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 should be installed in accordance to the requirements of low voltage installations.  
Different functions depending on each DSI module.

### SMART interface

An additional interface for the direct connection of the SMART-LS light sensor. The sensor registers actual ambient light and maintains the individually defined lux level.

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

ON/OFF switch via mains, switchDIM or DSI signal.

DSI signal = 0 switches off,

DSI signal  $\geq 1$  switches on.

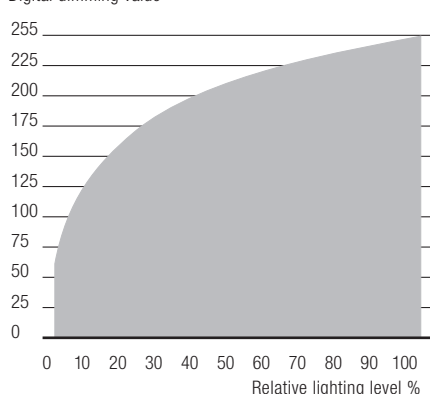
Dimming with a DSI signal with the SMART-LS installed is not possible.

switchDIM enables a temporary change of light level.

The installation of the two wire bus is according to the appropriate low voltage regulations.

### Dimming characteristics PCA ECO

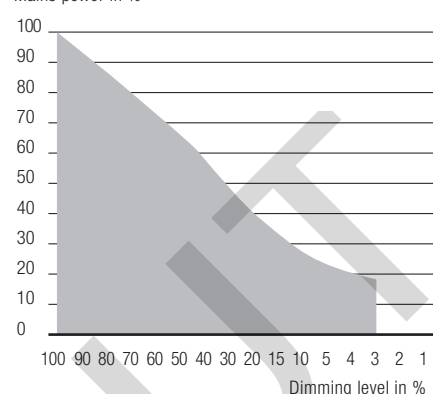
Digital dimming value



Dimming characteristics  
as seen by the human eye

### Energy Savings PCA ECO

Mains power in %



### 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 (Not in case of reset after mains failure – start at 100 %) When the push to make switch is held, PCA ballasts are dimmed. After repush the PCA is dimmed in the opposite direction.

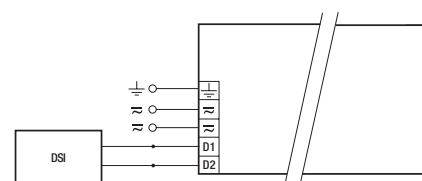
In installations with PCAs with different dimming levels or opposite dimming directions (e.g. after a system extension), all PCAs can be synchronized to 50 % dimming level by a 10 s push.

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

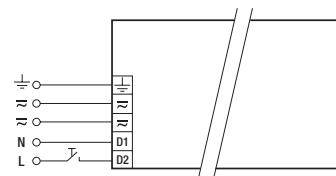
switchDIM is a very simple tool for controlling ballasts with conventional momentary-action switches or motion sensors.

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.



DSI PCA T5c ECO



switchDIM PCA T5c ECO

### Maximum loading of automatic circuit breakers

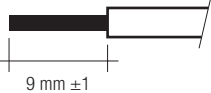
Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20
Installation Ø	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>
PCA 1/22 T5c ECO	24	38	54	64	12	19	27	32
PCA 1/40 T5c ECO	24	38	54	64	12	19	27	32
PCA 1/55 T5c ECO	16	24	34	40	8	12	17	20

## Installation instructions

### Wiring type and cross section

The wiring can be in flexible cable with ferules or solid with a cross section of 0.5–1.5 mm<sup>2</sup>. For perfect function of the simple to use push-wire terminals the strip length should be 9 mm.

wire preparation:  
0.5 – 1.5 mm<sup>2</sup>



### Output voltage

Type	Wattage	U <sub>OUT</sub>
PCA 1/22 T5c ECO	1x22W	250 V
PCA 1/40 T5c ECO	1x40W	250 V
PCA 1/55 T5c ECO	1x55W	250 V

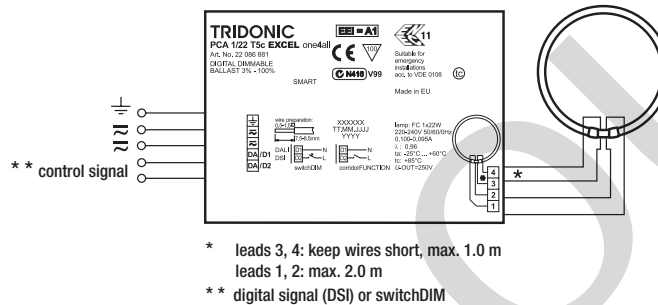
### Wiring advice

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

Ballast	Terminal	Maximum capacitance allowed			
		Cold	Hot	Cold	Hot
PC 1/xx T5c ECO		1, 2	3, 4	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 and cold leads should be separated as much as possible.



### PCA T5c ECO 22–55 W

### 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
- Ballast must be earthed
- Mains wiring to be twisted when through wiring
- Keep the mains leads inside the luminaire as short as possible

### Operation on DC voltage

Our ballasts are constructed 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 V DC 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 V AC (or 1.414 x 1500 V DC). To avoid damage to the electronic devices this test must not be conducted.

### Important advise

- When using two or more dimmable ballasts in one luminaire with separate dimming controls, the lamp leads must be kept separate
- All lamps must have the same length lead