



PCA TCL EXCEL c one4all, 18 – 24 W

Compact and T5c fluorescent lamps

Product description

- Noise-free precise control via DSI signal, switchDIM, corridorFUNCTION or DALI
- DALI-MEMORY
- Extended DALI commands
- CELMA energy class A1¹⁾

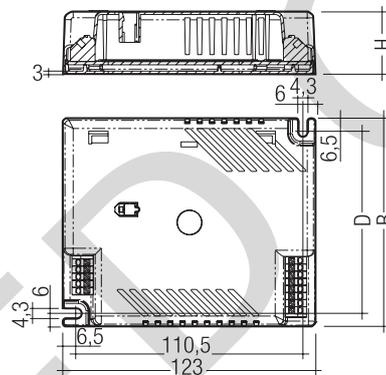
Interfaces

- DALI
- DSI
- switchDIM (with memory function)
- corridorFUNCTION (individually programmable)
- Integrated SMART-Interface

Functions

- Optimum filament heating in any dimmer setting
- Fade rates between 50 ms and 90 s (min-max.)
- Automatically triggered emergency lighting value in DC mode, can be set between 1 and 70 %
- For emergency lighting systems as per EN 50172
- Automatic start after replacement of defective lamps

¹⁾ 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	0.6 s for AC and DC / 1.5 s for AC (2 x 18 W)
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
For luminaires with 1 lamp	
PCA 1/18 TCL EXCEL c one4all	22085309
PCA 1/24 TCL EXCEL c one4all	22176459
For luminaires with 2 lamps	
PCA 2/18 TCL EXCEL c one4all	22085318
PCA 2/24 TCL EXCEL c one4all	22176461

Packaging: 10 pieces/carton, 500 pieces/pallet

Specific technical data

Lamp wattage	Lamp type	Type	Dimensions LxWxH	Hole spacing D	Weight	Circuit power [Ⓢ]	Lamp wattage [Ⓢ]	Current at 230 V / 50 Hz [Ⓢ]	λ at 50 Hz / 230 V	tc point	Ambient temperature ta [Ⓢ]
For luminaires with 1 lamp											
1 x 18 W	TC-F	PCA 1/18 TCL EXCEL c one4all	123 x 79 x 31 mm	66.5 mm	0.22 kg	21 W	15 W	0.09 A	0.95	80 °C	-25 ... 50 °C
1 x 18 W	TC-L	PCA 1/18 TCL EXCEL c one4all	123 x 79 x 31 mm	66.5 mm	0.22 kg	21 W	15 W	0.09 A	0.95	80 °C	-25 ... 50 °C
1 x 24 W	TC-F	PCA 1/24 TCL EXCEL c one4all	123 x 79 x 31 mm	66.5 mm	0.22 kg	27 W	22 W	0.12 A	0.96	70 °C	-25 ... 60 °C
1 x 24 W	TC-L	PCA 1/24 TCL EXCEL c one4all	123 x 79 x 31 mm	66.5 mm	0.22 kg	27 W	22 W	0.12 A	0.96	70 °C	-25 ... 60 °C
For luminaires with 2 lamps											
2 x 18 W	TC-F	PCA 2/18 TCL EXCEL c one4all	123 x 102 x 31 mm	89.5 mm	0.25 kg	42 W	30 W	0.18 A	0.95	80 °C	-25 ... 50 °C
2 x 18 W	TC-L	PCA 2/18 TCL EXCEL c one4all	123 x 102 x 31 mm	89.5 mm	0.25 kg	42 W	30 W	0.18 A	0.95	80 °C	-25 ... 50 °C
2 x 24 W	TC-F	PCA 2/24 TCL EXCEL c one4all	123 x 102 x 31 mm	89.5 mm	0.25 kg	52 W	44 W	0.23 A	0.98	80 °C	-25 ... 60 °C
2 x 24 W	TC-L	PCA 2/24 TCL EXCEL c one4all	123 x 102 x 31 mm	89.5 mm	0.25 kg	52 W	44 W	0.23 A	0.98	80 °C	-25 ... 60 °C

[Ⓢ] Valid at 100 % dimming level

[Ⓢ] 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
according to EN 50172

Lamp starting characteristics

Warm start
Starting time 0.6 s with AC (2x18 W within 1.5 s)
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 .
100% operation from -25 °C to maximum
permissible ambient temperature t_a .

Mains current in DC operation

Type	Wattage	Mains current at	
		$U_n = 220 V_{DC}$	$U_n = 240 V_{DC}$
PCA 1/18 TCL EXCEL c	1x18 W	0.08 A	0.07 A
PCA 1/24 TCL EXCEL c	1x24 W	0.10 A	0.09 A
PCA 2/18 TCL EXCEL c	2x18 W	0.13 A	0.12 A
PCA 2/24 TCL EXCEL c	2x24 W	0.19 A	0.18 A

Light output level in DC operation

Programmable from 3% to 70%
Programming by extended DSI signal (16 bit)
Default value is 70%
In DC operation dimming is not possible

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

Type	Wattage	AC-BLF at
		$U = 230 V_{AC}$
PCA 1/18 TCL EXCEL c	1x18 W	1.02
PCA 1/24 TCL EXCEL c	1x24 W	1.01
PCA 2/18 TCL EXCEL c	2x18 W	1.01
PCA 2/24 TCL EXCEL c	2x24 W	1.01

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_{DC}).

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

Type	Wattage	THD	3	5	7	9	11
PCA 1/18 TCL EXCEL c	1x18 W	9.2	8.5	3.1	1.5	1.8	0.7
PCA 1/24 TCL EXCEL c	1x24 W	7.7	7.5	1.5	1.1	0.8	0.6
PCA 2/18 TCL EXCEL c	2x18 W	9.3	8.9	2.0	1.8	0.7	0.9
PCA 2/24 TCL EXCEL c	2x24 W	4.4	4.4	0.5	0.2	0.0	0.0

Dimming

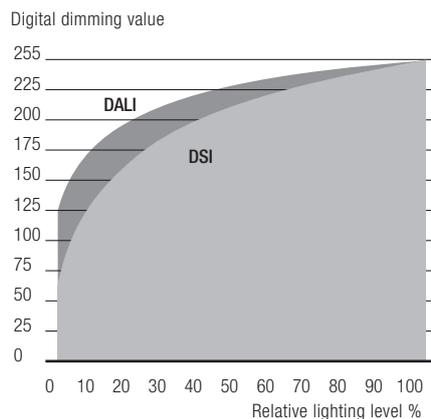
Dimming range 3% to 100%

Digital control with:

- DSI signal: 8 bit Manchester Code
Maximum speed 3% to 100% in 1.4 s
 - DALI signal: 16 bit Manchester Code
Maximum speed 3% to 100% in 0.5 s
- Programmable parameter:
- Minimum dimming level
 - Maximum dimming level
 - Default minimum = 3%
 - Programmable range $3\% \leq \text{MIN} \leq 49\%$
 - Default maximum = 100%
 - Programmable range $100\% \geq \text{MAX} \geq 50\%$

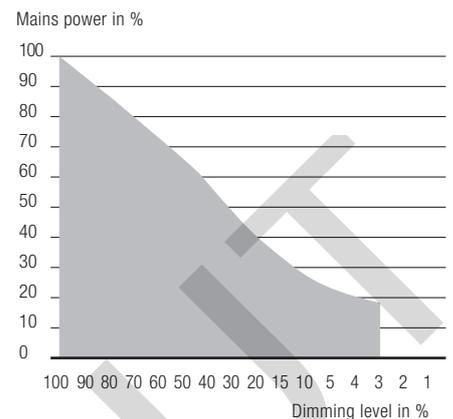
Dimming curve that is friendly to the eye.

Dimming characteristics PCA EXCEL



Dimming characteristics as seen by the human eye

Energy Savings PCA EXCEL



Control input (D1, D2)

Digital DALI/DSI signal or switchDIM can be wired on the same terminals (D1 and 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 should 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-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 EXCEL automatically runs in the constant lux level mode.

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

DALI/DSI signal = 0 switches off,
DALI/DSI signal ≥ 1 switches on.

Dimming with DALI or 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.

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. 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.

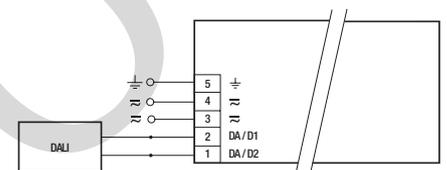
Use of push to make switch with indicator lamp is not permitted.

switchDIM and corridorFUNCTION are very simple tools for controlling ballasts with conventional momentary-action switches or motion sensors.

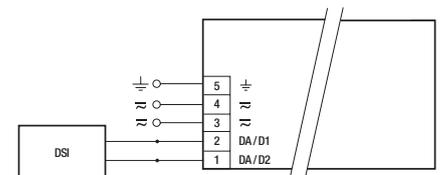
To ensure correct operation a sinusoidal mains voltage with a frequency of 50 Hz or 60 Hz is required at the control input.

Special attention must be paid to achieving clear zero crossings.

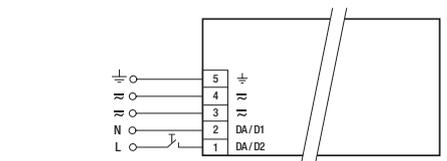
Serious mains faults may impair the operation of switchDIM and corridorFUNCTION.



DALI PCA TCL EXCEL c one4all



DSI PCA TCL EXCEL c one4all



switchDIM PCA TCL EXCEL c one4all

Loading of automatic circuit breakers

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20
Installation \emptyset	1.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²
PCA 1/18 TCL EXCEL c	20	24	40	46	10	12	20	23
PCA 1/24 TCL EXCEL c	24	38	54	64	12	19	27	32
PCA 2/18 TCL EXCEL c	10	12	16	20	5	6	8	10
PCA 2/24 TCL EXCEL c	16	20	24	30	8	10	12	15

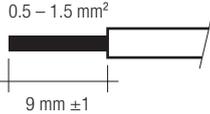
Installation instructions

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 mm².
For perfect function of the simple to use push-wire terminals the strip length should be 9 mm.

U_{out} = 250 V

wire preparation:



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

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

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.



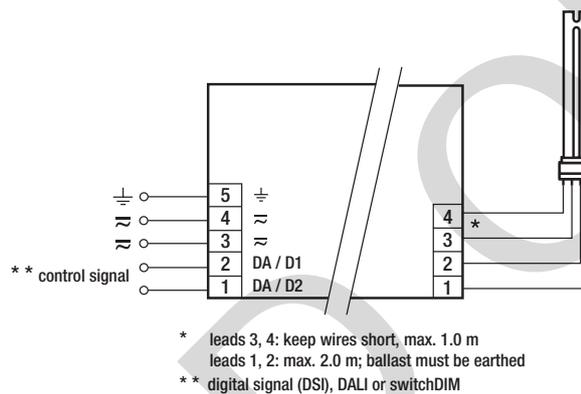
Wiring advice

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

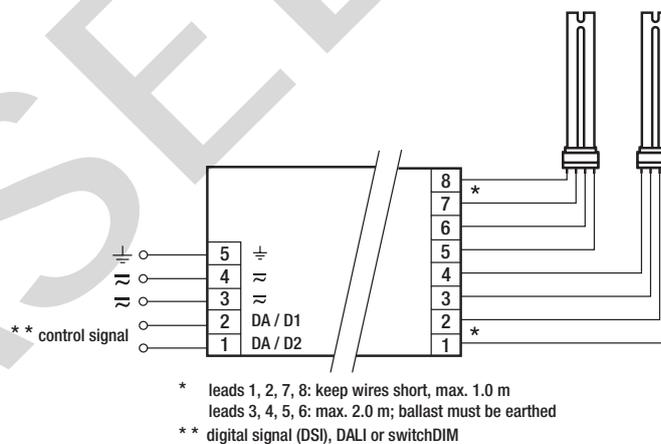
Ballast Type	Terminal	Maximum capacitance allowed			
		Cold		Hot	
PCA 1/xx TCL EXCEL c	1, 2	3, 4	200 pF	100 pF	
PCA 2/xx TCL EXCEL c	3, 4, 5, 6	1, 2, 7, 8	200 pF	100 pF	

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 and cold leads should be separated as much as possible.



PCA TCL EXCEL c one4all 18–24 W



PCA TCL EXCEL c one4all 2/18–2/24 W

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.