



PCA TCL ECO, 18 – 80 W Compact and T5c fluorescent lamps

Product description

- Noise-free precise control via DSI signal or switchDIM
- CELMA energy class A1¹⁾

Interfaces

- DSI
- switchDIM
- Integrated SMART-Interface

Functions

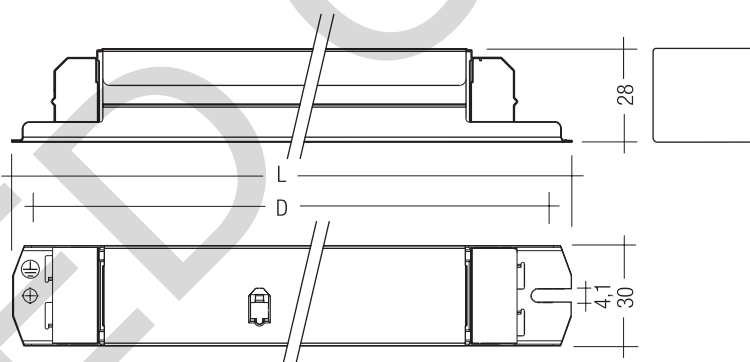
- Optimum filament heating in any dimmer setting
- Automatically triggered emergency lighting value in DC mode, 70 %
- For emergency lighting systems as per EN 50172
- Automatic start after replacement of defective lamps

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



Standards, page 3

Wiring diagrams and installation examples, page 5



Technical data

Power input on standby	< 1 W
Protective hot restart	0.6 s for AC and DC / 1.5 s for AC (55 W, 80 W, 2 x 18 W and 2 x 55 W)
Dimming range	3 – 100 %
Lamp start possible from	3 %
Operating frequency	~40 – 100 kHz
Life	50,000 h
Height	28 mm

Ordering data

Type	Article number
For luminaires with 1 lamp	
PCA 1/36 TCL ECO	22085507
PCA 1/40 TCL ECO	22085522
PCA 1/55 TCL ECO	22085544
PCA 1/80 TCL ECO	22088990
For luminaires with 2 lamps	
PCA 2/18 TCL ECO	22086856
PCA 2/24 TCL ECO	22086875
PCA 2/36 TCL ECO	22176470
PCA 2/40 TCL ECO	22085538
PCA 2/55 TCL ECO	22085550

Packaging: 10 pieces/carton, 580 pieces/pallet

Specific technical data

Lamp wattage	Lamp type	Type	Length L	Hole spacing D	Weight	Circuit power ^①	Lamp wattage ^②	Current at 230 V / 50 Hz ^①	λ at 50 Hz / 230 V	tc point	Ambient temperature ta ^②
For luminaires with 1 lamp											
1 x 36 W	TC-F	PCA 1/36 TCL ECO	360 mm	350 mm	0.32 kg	37.5 W	32 W	0.165 A	0.97	75 °C	-25 ... 60 °C
1 x 36 W	TC-L	PCA 1/36 TCL ECO	360 mm	350 mm	0.32 kg	37.5 W	32 W	0.165 A	0.97	75 °C	-25 ... 60 °C
1 x 40 W	TC-L	PCA 1/40 TCL ECO	360 mm	350 mm	0.32 kg	43.0 W	38 W	0.190 A	0.98	75 °C	-25 ... 60 °C
1 x 55 W	TC-L	PCA 1/55 TCL ECO	360 mm	350 mm	0.32 kg	61.5 W	55 W	0.270 A	0.99	80 °C	-25 ... 60 °C
1 x 80 W	TC-L	PCA 1/80 TCL ECO	360 mm	350 mm	0.32 kg	90.0 W	80 W	0.399 A	0.98	70 °C	-25 ... 50 °C
For luminaires with 2 lamps											
2 x 18 W	TC-L	PCA 2/18 TCL ECO	360 mm	350 mm	0.36 kg	42.0 W	30 W	0.165 A	0.98	80 °C	-25 ... 50 °C
2 x 24 W	TC-L	PCA 2/24 TCL ECO	360 mm	350 mm	0.36 kg	52.0 W	44 W	0.228 A	0.99	90 °C	-25 ... 60 °C
2 x 36 W	TC-F	PCA 2/36 TCL ECO	360 mm	350 mm	0.36 kg	74.0 W	64 W	0.325 A	0.99	80 °C	-25 ... 60 °C
2 x 36 W	TC-L	PCA 2/36 TCL ECO	360 mm	350 mm	0.36 kg	74.0 W	64 W	0.325 A	0.99	80 °C	-25 ... 60 °C
2 x 40 W	TC-L	PCA 2/40 TCL ECO	360 mm	350 mm	0.36 kg	87.9 W	76 W	0.380 A	0.99	75 °C	-25 ... 60 °C
2 x 55 W	TC-L	PCA 2/55 TCL ECO	360 mm	350 mm	0.36 kg	118.9 W	110 W	0.520 A	0.98	70 °C	-25 ... 50 °C

① Valid at 100 % dimming level

② 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

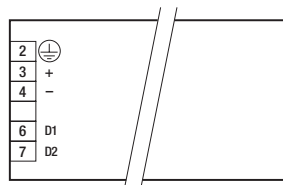
AC operation

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.

Our ballasts are construed to operate DC voltage and
pulsed DC voltage.
To operate ballasts with pulsed DC voltage the polarity
is absolute mandatory.



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 .

Lamp warm start (start at any dimming level)

Type	Wattage	Starting time	
		AC	DC
PCA 1/36 TCL ECO	1x36 W	0.6 s	0.6 s
PCA 1/40 TCL ECO	1x40 W	0.6 s	0.6 s
PCA 1/55 TCL ECO	1x55 W	1.5 s	0.6 s
PCA 1/80 TCL ECO	1x80 W	1.5 s	0.6 s
PCA 2/18 TCL ECO	2x18 W	1.5 s	0.6 s
PCA 2/24 TCL ECO	2x24 W	0.6 s	0.6 s
PCA 2/36 TCL ECO	2x36 W	0.6 s	0.6 s
PCA 2/40 TCL ECO	2x40 W	0.6 s	0.6 s
PCA 2/55 TCL ECO	2x55 W	1.5 s	0.6 s

Mains current in DC operation

Type	Wattage	Mains current at	
		$U_n = 220 V_{DC}$	$U_n = 240 V_{DC}$
PCA 1/36 TCL ECO	1x36 W	0.14 A	0.13 A
PCA 1/40 TCL ECO	1x40 W	0.16 A	0.14 A
PCA 1/55 TCL ECO	1x55 W	0.23 A	0.22 A
PCA 1/80 TCL ECO	1x80 W	0.33 A	0.30 A
PCA 2/18 TCL ECO	2x18 W	0.14 A	0.12 A
PCA 2/24 TCL ECO	2x24 W	0.19 A	0.18 A
PCA 2/36 TCL ECO	2x36 W	0.27 A	0.25 A
PCA 2/40 TCL ECO	2x40 W	0.32 A	0.29 A
PCA 2/55 TCL ECO	2x55 W	0.55 A	0.51 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 Pkt. 8.1:

Type	Wattage	AC-BLF at $U = 230 V_{AC}$
PCA 1/36 TCL ECO	1x36 W	1.00
PCA 1/40 TCL ECO	1x40 W	1.04
PCA 1/55 TCL ECO	1x55 W	0.99
PCA 1/80 TCL ECO	1x80 W	1.00
PCA 2/18 TCL ECO	2x18 W	1.01
PCA 2/24 TCL ECO	2x24 W	1.01
PCA 2/36 TCL ECO	2x36 W	1.01
PCA 2/40 TCL ECO	2x40 W	1.03
PCA 2/55 TCL ECO	2x55 W	0.99

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 VDC).

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

Type	Wattage	THD	3	5	7	9	11
PCA 1/36 TCL ECO	1x36 W	7.6	7.2	2.0	1.2	0.9	0.8
PCA 1/40 TCL ECO	1x40 W	9.5	8.9	2.7	1.7	1.1	0.8
PCA 1/55 TCL ECO	1x55 W	10.1	9.5	3.1	1.8	1.1	0.7
PCA 1/80 TCL ECO	1x80 W	8.7	8.0	2.0	1.3	1.0	0.7
PCA 2/18 TCL ECO	2x18 W	9.3	8.9	2.0	1.8	0.7	0.9
PCA 2/24 TCL ECO	2x24 W	4.4	4.4	0.5	0.2	0.0	0.0
PCA 2/36 TCL ECO	2x36 W	10.1	9.3	3.3	2.0	1.3	1.0
PCA 2/40 TCL ECO	2x40 W	8.8	8.1	2.8	1.8	1.2	0.9
PCA 2/55 TCL ECO	2x55 W	8.9	8.0	3.1	2.1	1.4	1.0

Dimming

Dimming range 3 % to 100 %
Digital control with DSI signal:
8 bit Manchester Code
Maximum speed 3 % to 100 % in 1.4 s
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).

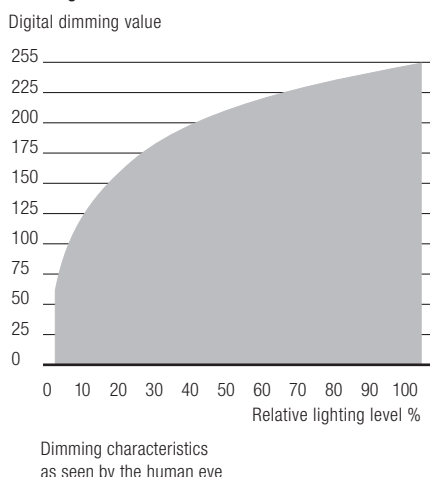
Digital signal DSI

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.

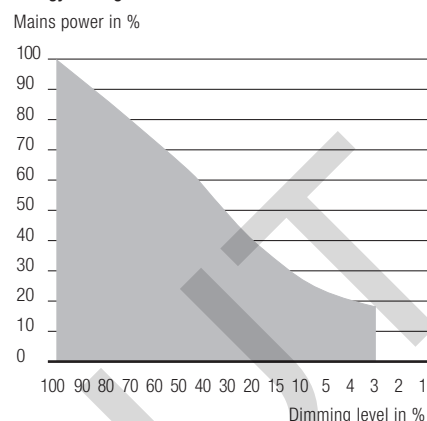
SMART interface

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 ≥ 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

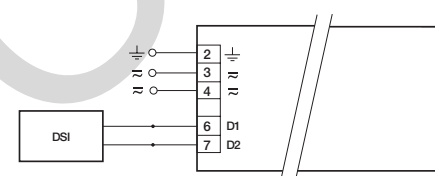


Energy Savings PCA ECO

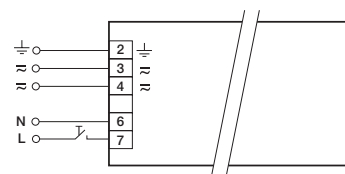


switchDIM

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 mainsfailure – 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.



DSI PCA TCL ECO



switchDIM PCA TCL ECO

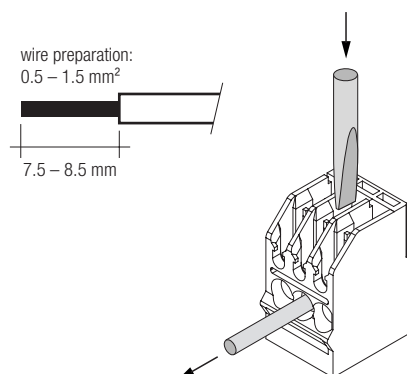
Loading of automatic circuit breakers

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20
Installation Ø	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 1/36 TCL ECO	30	50	70	76	15	25	35	38
PCA 1/40 TCL ECO	30	50	70	76	15	25	35	38
PCA 1/55 TCL ECO	20	30	40	46	10	15	20	23
PCA 1/80 TCL ECO	10	20	30	30	5	10	15	15
PCA 2/18 TCL ECO	10	12	16	20	5	6	8	10
PCA 2/24 TCL ECO	16	20	24	30	8	10	12	15
PCA 2/36 TCL ECO	10	20	30	30	5	10	15	15
PCA 2/40 TCL ECO	10	20	30	30	5	10	15	15
PCA 2/55 TCL ECO	10	14	18	20	5	7	9	10

Installation instructions

Wiring type and cross section

The wiring can be solid cable with a cross section of 0.5 to 1.5 mm² for push terminal and 0.5 mm² for concut terminal. For the push-wire connection you have to strip the insulation (7.5–8.5 mm).



Output voltage

Type	Wattage	U _{out}
PCA 1x36 TCL ECO	1x36 W	250 V
PCA 1x40 TCL ECO	1x40 W	300 V
PCA 1x55 TCL ECO	1x55 W	300 V
PCA 1x80 TCL ECO	1x80 W	400 V
PCA 2x18 TCL ECO	2x18 W	250 V
PCA 2x24 TCL ECO	2x24 W	250 V
PCA 2x36 TCL ECO	2x36 W	250 V
PCA 2x40 TCL ECO	2x40 W	300 V
PCA 2x55 TCL ECO	2x55 W	300 V

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

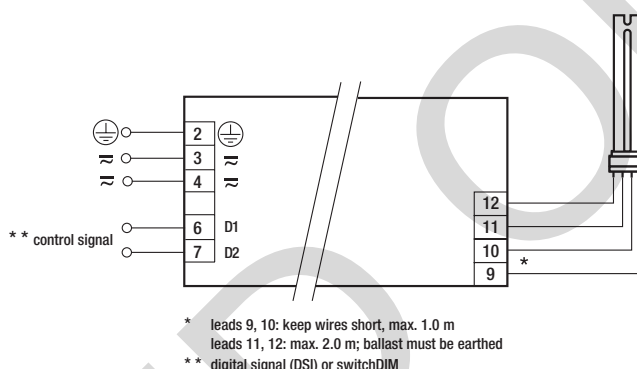
Wiring advice

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

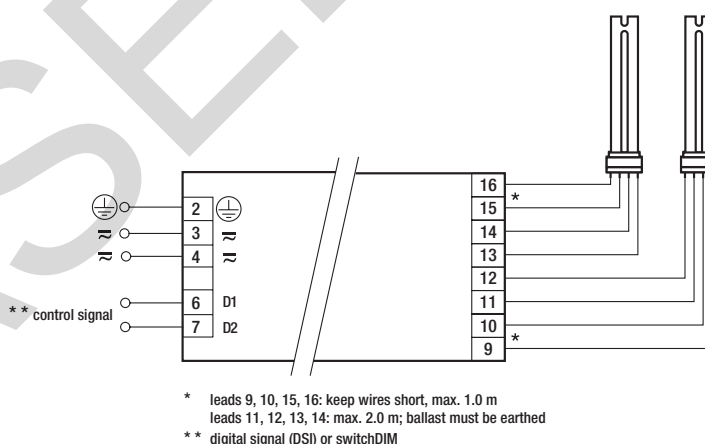
Ballast	Terminal	Maximum capacitance allowed			
		Type	Cold	Hot	Cold
PCA 1/xx TCL ECO	11, 12		9, 10	200 pF	100 pF
PCA 2/xx TCL ECO	11, 12, 13, 14		9, 10, 15, 16	200 pF	100 pF

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 (9, 10, 15, 16) and cold leads (11, 12, 13, 14) should be separated as much as possible.



PCA ECO 36–80 W



PCA ECO 2x18–2x55 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 inter-connected 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.