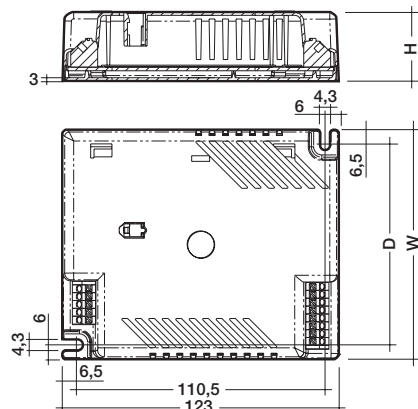
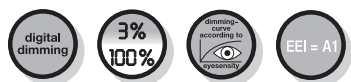




Electronic ballasts for dimming to 3% Compact lamps

PCA ECO 11–57 W 220–240 V 50/60/0 Hz, dimmable



- dimming range from 3–100 % (10–100 % with 57 W)
- lamp start at 3 % (10 % with 57 W)
- defined lamp warm start within 0.6 s with AC and DC
- switch via the mains or with digital control signal
- dimming which is comfortable to the eye
- disturbance free precise control with a digital signal (**DSI**) or switch**DIM**
- integrated SMART interface
- fully electronic lamp management and digital communication with ASIC and μ C

- constant light output independent of fluctuating supply voltage
- DC operation in emergency lighting installations to VDE 0108
- safe shutdown of defective lamps
- safe shutdown of lamps at end of life (rectifying effect)
- automatic restart after lamp replacement
- operating frequency ~40–100 kHz

Packaging:
box of 10
50 boxes/pallet
500 pieces/pallet

Certified:
EN 55015
EN 55022
EN 60929
EN 61000-3-2
EN 61347-2-3
EN 61547
in accordance
with VDE 0108

Lamp		Ballast		article number	L x W x H mm	fixing centres D mm	weight kg	circuit power W ②	lamp power W ②	current at 230V/50Hz A ②	λ at 230V/50Hz	tc point °C	temperature range ① °C
watt- age W	type	type											
11	TC-SEL	PCA 1/11/13 TCD ECO 220–240V 50/60/0Hz		22084878	123x79x31	66.5	0.22	15.5	11.4	0.072	0.95	75	-15 → +60
2x11	TC-SEL	PCA 2/11/13 TCD ECO 220–240V 50/60/0Hz		22084862	123x102x31	89.5	0.25	29.5	22.5	0.132	0.96	80	-15 → +60
13	TC-DEL	PCA 1/11/13 TCD ECO 220–240V 50/60/0Hz		22084878	123x79x31	66.5	0.22	16.5	12.7	0.076	0.95	75	-15 → +60
2x13	TC-DEL	PCA 2/11/13 TCD ECO 220–240V 50/60/0Hz		22084862	123x102x31	89.5	0.25	31	24	0.140	0.96	80	-15 → +60
18	TC-DEL	PCA 1/18 TCD ECO 220–240V 50/60/0Hz		22084859	123x79x31	66.5	0.22	20.5	16	0.10	0.96	75	-25 → +60
2x18	TC-DEL	PCA 2/18 TCD ECO 220–240V 50/60/0Hz		22084843	123x102x31	89.5	0.25	40	32	0.18	0.98	85	-25 → +60
26	TC-DEL	PCA 1/26 TCD ECO 220–240V 50/60/0Hz		22084765	123x79x31	66.5	0.22	27.5	23	0.13	0.97	85	-25 → +60
2x26	TC-DEL	PCA 2/26 TCD ECO 220–240V 50/60/0Hz		22084752	123x102x31	89.5	0.25	55	45	0.25	0.99	80	-25 → +50
18	TC-TEL	PCA 1/18 TCD ECO 220–240V 50/60/0Hz		22084859	123x79x31	66.5	0.22	20.5	16	0.10	0.96	75	-25 → +60
2x18	TC-TEL	PCA 2/18 TCD ECO 220–240V 50/60/0Hz		22084843	123x102x31	89.5	0.25	40	32	0.18	0.98	85	-25 → +60
26	TC-TEL	PCA 1/26 TCD ECO 220–240V 50/60/0Hz		22084765	123x79x31	66.5	0.22	27.5	23	0.13	0.97	85	-25 → +60
2x26	TC-TEL	PCA 2/26 TCD ECO 220–240V 50/60/0Hz		22084752	123x102x31	89.5	0.25	55	45	0.25	0.99	80	-25 → +50
32	TC-TEL	PCA 1/32 TCT ECO 220–240V 50/60/0Hz		22088644	123x79x31	66.5	0.22	36.2	30	0.16	0.95	90	-25 → +60
2x32	TC-TEL	PCA 2/32 TCT ECO 220–240V 50/60/0Hz		22088650	123x102x31	89.5	0.25	70.7	61	0.31	0.97	90	-25 → +50
42	TC-TEL	PCA 1/42 TCT ECO 220–240V 50/60/0Hz		22088685	123x79x31	66.5	0.22	47	41	0.21	0.97	90	-25 → +60
2x42	TC-TEL	PCA 2/42 TCT ECO 220–240V 50/60/0Hz		22088691	123x102x31	89.5	0.25	91	81	0.40	0.98	90	-25 → +50
57	TC-TEL	PCA 1/57 TCT ECO 220–240V 50/60/0Hz		22086957	123x79x31	66.5	0.22	66	57	0.29	0.99	85	-25 → +50

① dimming to 3% (10% with 57 W) between 0 °C to ta max.

② valid at 100 % light output

Lamp starting characteristics:

Warm start
Starting time 0.6 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 VDE 0108 or for emergency
luminaires according to EN 61347-2-3 appendix J.

Temperature range:

Dimming range 100 % to 3 % from 0 °C to
maximum permissible ambient temperature t_a .
(57 W from 100 % to 10 %)
100 % operation from -25 °C to maximum
permissible ambient temperature t_a .

Mains currents in DC operation:

Ballast Type	Mains current at $U_n = 220$ VDC	Mains current at $U_n = 240$ VDC
PCA 1/11/13_11 TCD ECO 220–240V 50/60/0Hz	72 mA	67 mA
PCA 1/11/13_13 TCD ECO 220–240V 50/60/0Hz	73 mA	66 mA
PCA 1/18 TCD ECO 220–240V 50/60/0Hz	80 mA	74 mA
PCA 1/26 TCD ECO 220–240V 50/60/0Hz	116 mA	107 mA
PCA 1/32 TCT ECO 220–240V 50/60/0Hz	135 mA	124 mA
PCA 1/42 TCT ECO 220–240V 50/60/0Hz	180 mA	166 mA
PCA 1/57 TCT ECO 220–240V 50/60/0Hz	254 mA	233 mA
PCA 2/11/13_11 TCD ECO 220–240V 50/60/0Hz	118 mA	110 mA
PCA 2/11/13_13 TCD ECO 220–240V 50/60/0Hz	108 mA	100 mA
PCA 2/18 TCD ECO 220–240V 50/60/0Hz	146 mA	134 mA
PCA 2/26 TCD ECO 220–240V 50/60/0Hz	214 mA	196 mA
PCA 2/32 TCT ECO 220–240V 50/60/0Hz	240 mA	211 mA
PCA 2/42 TCT ECO 220–240V 50/60/0Hz	353 mA	326 mA

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:

Ballast Type	AC-BLF at $U_n = 230$ VAC
PCA 1/11/13_11 TCD ECO 220–240V 50/60/0Hz	1.03
PCA 1/11/13_13 TCD ECO 220–240V 50/60/0Hz	0.99
PCA 1/18 TCD ECO 220–240V 50/60/0Hz	1.02
PCA 1/26 TCD ECO 220–240V 50/60/0Hz	0.97
PCA 1/32 TCT ECO 220–240V 50/60/0Hz	1.05
PCA 1/42 TCT ECO 220–240V 50/60/0Hz	1.02
PCA 1/57 TCT ECO 220–240V 50/60/0Hz	1.01
PCA 2/11/13_11 TCD ECO 220–240V 50/60/0Hz	1.03
PCA 2/11/13_13 TCD ECO 220–240V 50/60/0Hz	1.01
PCA 2/18 TCD ECO 220–240V 50/60/0Hz	0.99
PCA 2/26 TCD ECO 220–240V 50/60/0Hz	0.98
PCA 2/32 TCT ECO 220–240V 50/60/0Hz	1.01
PCA 2/42 TCT ECO 220–240V 50/60/0Hz	1.03

The ballast lumen factor for AC operation (AC-BLF) does not alter from $U_n = 198$ VAC to $U_n = 254$ VAC.

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 220 V / 50 Hz):

Ballast Type	THD	3	5	7	9	11
PCA 1/11/13_11 TCD ECO 220–240V 50/60/0Hz	17.1	16.0	5.0	3.2	1.9	1.2
PCA 1/11/13_13 TCD ECO 220–240V 50/60/0Hz	3.5	2.5	4.3	2.5	2.0	1.1
PCA 1/18 TCD ECO 220–240V 50/60/0Hz	8.1	7.5	2.8	1.2	1.8	1.0
PCA 1/26 TCD ECO 220–240V 50/60/0Hz	9.5	8.9	2.7	1.9	1.3	1.1
PCA 1/32 TCT ECO 220–240V 50/60/0Hz	10.2	9.3	3.6	2.4	1.7	1.1
PCA 1/42 TCT ECO 220–240V 50/60/0Hz	6.6	5.9	1.9	1.3	1.0	0.8
PCA 1/57 TCT ECO 220–240V 50/60/0Hz	11.6	9.9	5.6	1.8	3.9	1.5
PCA 2/11/13_11 TCD ECO 220–240V 50/60/0Hz	12.3	11.7	3.3	2.3	1.6	1.2
PCA 2/11/13_13 TCD ECO 220–240V 50/60/0Hz	11.3	10.6	3.1	2.1	1.5	1.2
PCA 2/18 TCD ECO 220–240V 50/60/0Hz	10.7	9.8	3.7	2.4	1.7	1.1
PCA 2/26 TCD ECO 220–240V 50/60/0Hz	9.1	8.5	2.7	1.8	1.3	0.9
PCA 2/32 TCT ECO 220–240V 50/60/0Hz	11.7	10.8	3.8	2.4	1.5	0.9
PCA 2/42 TCT ECO 220–240V 50/60/0Hz	8.4	7.7	2.9	1.9	1.3	0.7

Dimming:

Dimming range 3 % to 100 %
(57 W from 10 % to 100 %)
Digital control with DSI signal:
8 bit Manchester Code
Maximum speed 3 % to 100 %
(57 W from 10 % 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/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 auto-
matically 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,

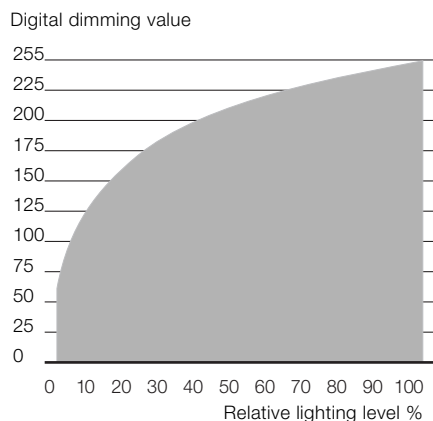
DSI signal ≥ 1 switches on.

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

switchDIM enables a temporary change of
light level.

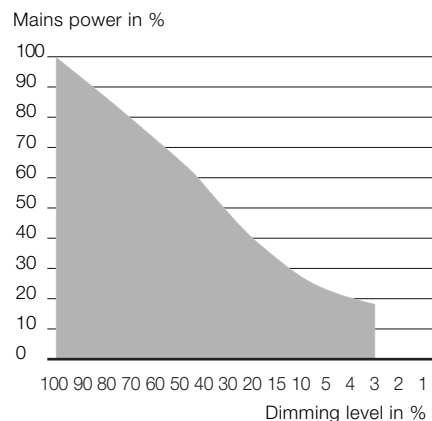
The installation of the two wire bus is according
to the appropriate low voltage regulations.

Dimming characteristics PCA ECO



■ Dimming characteristics
as seen by the human eye

Energy Savings PCA ECO



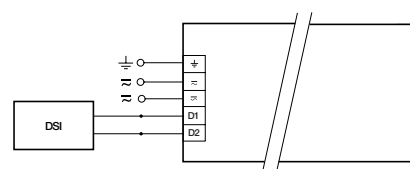
switchDIM:

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

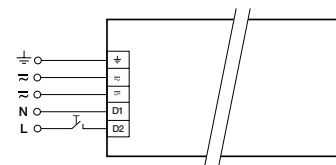
Brief push (< 0.6 s) switches ballast ON and OFF.
The ballasts switch-ON at light level set at switch-
OFF (Not in case of reset after mainsfailure – start
at 100 %).

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.



DSI PCA TCx ECO



switchDIM PCA TCx 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 1/11/13_11 TCD ECO	40	60	80	80	20	30	40	40
PCA 1/11/13_13 TCD ECO	40	60	80	80	20	30	40	40
PCA 1/18 TCD ECO	30	50	70	76	15	25	35	38
PCA 1/26 TCD ECO	30	50	70	76	15	25	35	38
PCA 1/32 TCT ECO	26	38	50	58	13	19	25	29
PCA 1/42 TCT ECO	26	38	50	58	13	19	25	29
PCA 1/57 TCT ECO	12	16	22	26	6	8	11	13
PCA 2/11/13_11 TCD ECO	28	40	60	64	14	20	30	32
PCA 2/11/13_13 TCD ECO	28	40	60	64	14	20	30	32
PCA 2/18 TCD ECO	22	32	46	68	11	16	23	34
PCA 2/26 TCD ECO	22	32	46	56	11	16	23	28
PCA 2/32 TCT ECO	10	18	24	28	5	9	12	14
PCA 2/42 TCT ECO	12	18	24	28	6	9	12	14

Electronic ballasts for dimming to 3 % Compact lamps

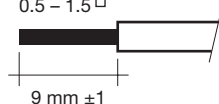
Installation instructions:

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.

$U_{out} = 250\text{ V} / 250\text{ V}$ ($U_{out} = 400\text{ V} / 400\text{ V}$ for 57 W)

wire preparation:
0.5 – 1.5 mm²



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

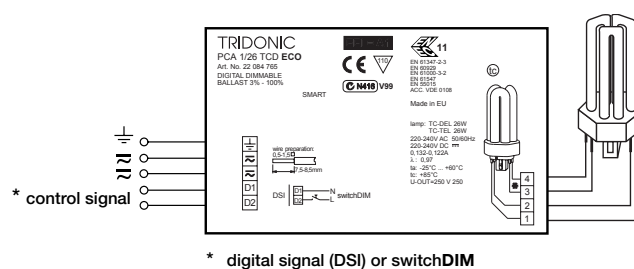
Wiring advice:

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

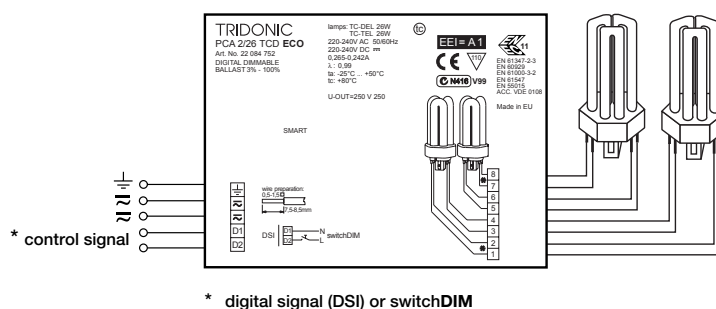
Ballast Type	Terminal		Maximum capacitance allowed	
	Cold	Hot	Cold	Hot
PCA 1/xx TCx ECO	1, 2	3, 4	100 pF	100 pF
PCA 2/xx TCx ECO	3, 4, 5, 6	1, 2, 7, 8	100 pF	100 pF

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 ECO 11–57 W



PCA ECO 2x11–2x42 W