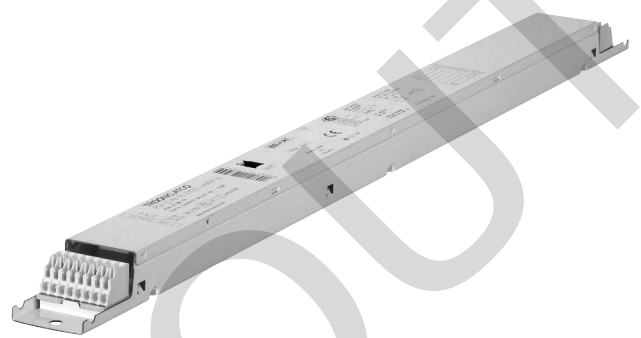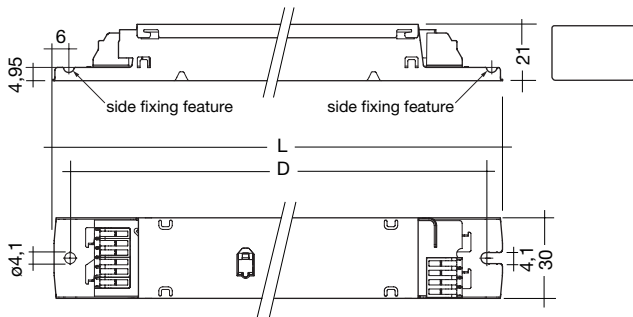**Electronic ballasts for dimming to 1 %**
Linear lamps T5, 16 mm high efficiency

PCA T5 EXCEL one4all lp 14–35 W 220–240 V 50/60/0 Hz, dimmable

CE

- cross section 21 x 30 mm
- dimming range from 1–100 %
- lamp start at 1 % possible
- lamp friendly warm start within 0.5 s with AC and 0.2 s with DC
- low power consumption in standby mode < 0.5 W (0.8 W in DSI or switch**DIM** mode)
- powerless switching through digital interface
- dimming which is comfortable to the eye
- disturbance free precise control with a digital signal (**DSI**), switch**DIM** or **DALI** (digital addressable lighting interface)
- error feed back and programmable features in both DALI and DSI mode
- integrated SMART interface
- fully digital lamp management and digital communication

- Intelligent Voltage Guard (over voltage indication and under voltage protection)
- Intelligent Temperature Guard (Protection against thermal failure)
- DC operation in emergency lighting installations according to EN 50172

Programmable features:
- DC level programmable
- dimming in DC mode can be chosen
- backwards compatibility adjustable
- adjustable dimming speed in switch**DIM** operation (3 s or 6 s)
- smart heating concept enables fastest fade times (50 ms from min → max or reverse)
- **NEW:** with DALI memory and corridor**FUNCTION**

Packaging:
360 mm housing
box of 10
76 boxes/pallet
760 pieces/pallet

425 mm housing
box of 25
33 boxes/pallet
825 pieces/pallet

Certified:
EN 55015
EN 55022
EN 60929
EN 61000-3-2
EN 61347-2-3
EN 61547
Suitable for emergency installations according to EN 50172

Lamp		Ballast										
watt-age W	length mm	type	article number	length L D mm	fixing centres mm	weight kg W ②	circuit power W ②	lamp power A ②	current at 230V/50Hz	λ at 230V/50Hz °C	tc point °C	temperature range ①
14	549	**PCA 1/14 T5 EXCEL lp** 220/240V 50/60/0Hz	22088511	360	350	0.27	16.8	14	0.07	0.97	75	-25 → +60
2x14	549	**PCA 2/14 T5 EXCEL lp** 220/240V 50/60/0Hz	22088527	360	350	0.28	33.4	2x14	0.15	0.98	85	-25 → +60
21	849	**PCA 1/21 T5 EXCEL lp** 220/240V 50/60/0Hz	22088495	360	350	0.27	23.4	21	0.11	0.96	80	-25 → +60
2x21	849	**PCA 2/21 T5 EXCEL lp** 220/240V 50/60/0Hz	22088502	360	350	0.29	46.0	2x21	0.21	0.97	80	-25 → +60
28	1149	**PCA 1/28 T5 EXCEL lp** 220/240V 50/60/0Hz	22088473	360	350	0.27	31.4	28	0.14	0.99	80	-25 → +60
2x28	1149	**PCA 2/28 T5 EXCEL lp** 220/240V 50/60/0Hz	22088489	360	350	0.28	61.3	2x28	0.27	0.99	80	-25 → +50
35	1449	**PCA 1/35 T5 EXCEL lp** 220/240V 50/60/0Hz	22088454	360	350	0.27	38.6	35	0.17	0.99	80	-25 → +60
2x35	1449	**PCA 2/35 T5 EXCEL lp** 220/240V 50/60/0Hz	22088467	425	415	0.33	75.5	2x35	0.33	0.99	85	-25 → +50

① 10 °C to ta max: normal diming operation

-25 °C to +10 °C: dimming operation from 100 % to 30 %.

-25 °C to +10 °C, dimming below 30 %: Ballast could shut down but will not cause failure. This relates to AC and DC operation.

② valid at 100 % light output

TRIDONIC

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 %)
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.

Intelligent Voltage Guard
Intelligent Voltage Guard is the name of the new
electronic monitor from TridonicAtco. This inno-
vative feature of the PCA family of control gear
from TridonicAtco immediately shows if the mains
voltage rises above or falls below certain thres-
holds. Measures can then be taken quickly to
prevent damage to the control gear.
• If the mains voltage rises above ☐ 305 V the
  lamps start flashing on and off.
• This signal "demands" disconnection of the
  power supply to the lighting system.
• The active-current-control of these control gears
  is protected against failure caused by the high
  mains currents generated as a result of mains
  undervoltage. The switch off level depends on
  lamp wattage and is typically < 140 V.

Emergency devices:
Ballasts from the "low profile" series are compat-
ible with all emergency units from TridonicAtco.
See the table in the data sheet. When used with
other emergency units tests are necessary.

Temperature range:
Unlimited dimming range from 10 °C to ta max.
Limited dimming range from -25 °C to +10 °C.

Mains currents in DC operation:

Ballast Type	Mains current at $U_n = 220$ VDC	Mains current at $U_n = 240$ VDC
PCA 1/14 T5 EXCEL lp 220–240V 50/60/0Hz	0.07 A	0.06 A
PCA 1/21 T5 EXCEL lp 220–240V 50/60/0Hz	0.09 A	0.08 A
PCA 1/28 T5 EXCEL lp 220–240V 50/60/0Hz	0.11 A	0.11 A
PCA 1/35 T5 EXCEL lp 220–240V 50/60/0Hz	0.14 A	0.14 A
PCA 2/14 T5 EXCEL lp 220–240V 50/60/0Hz	0.12 A	0.12 A
PCA 2/21 T5 EXCEL lp 220–240V 50/60/0Hz	0.17 A	0.15 A
PCA 2/28 T5 EXCEL lp 220–240V 50/60/0Hz	0.29 A	0.26 A
PCA 2/35 T5 EXCEL lp 220–240V 50/60/0Hz	0.36 A	0.33 A

Light output level in DC operation:
Programmable from 1 % to 70 %
Programming by extended DSI signal (16 bit)
Default value is 70 %
In DC operation dimming mode can be activated.

Intelligent Temperature Guard
The intelligent temperature guard protects the
ballast from thermal failure by reducing 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 tempera-
ture.

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

Ballast Type	AC-BLF at $U_n = 230$ VAC
PCA 1/14 T5 EXCEL lp 220–240V 50/60/0Hz	1.00
PCA 1/21 T5 EXCEL lp 220–240V 50/60/0Hz	1.01
PCA 1/28 T5 EXCEL lp 220–240V 50/60/0Hz	1.01
PCA 1/35 T5 EXCEL lp 220–240V 50/60/0Hz	1.02
PCA 2/14 T5 EXCEL lp 220–240V 50/60/0Hz	1.01
PCA 2/21 T5 EXCEL lp 220–240V 50/60/0Hz	0.98
PCA 2/28 T5 EXCEL lp 220–240V 50/60/0Hz	1.00
PCA 2/35 T5 EXCEL lp 220–240V 50/60/0Hz	1.00

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).

corridorFUNCTION
The corridorFUNCTION can be programmed in
two different ways.
To program the corridorFUNCTION by means of
software a DALI-USB interface is needed in
combination with a DALI PS. The software can
be the configTOOL, the pcaCONFIGURATOR or
the corridorFUNCTION CONFIGURATOR.
To activate the corridorFUNCTION without using
software a voltage of 230 V simply has to be
applied for five minutes at the switchDIM
connection. The unit with 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.

Harmonic distortion in the mains supply (at 220 V/50 Hz):

Ballast Type	THD	3	5	7	9	11
PCA 1/14 T5 EXCEL lp 220–240V 50/60/0Hz	11.6	8.1	5.4	4.2	3.8	1.3
PCA 1/21 T5 EXCEL lp 220–240V 50/60/0Hz	7.0	3.9	2.0	2.3	2.0	2.0
PCA 1/28 T5 EXCEL lp 220–240V 50/60/0Hz	6.8	3.3	2.0	1.9	2.0	1.6
PCA 1/35 T5 EXCEL lp 220–240V 50/60/0Hz	6.6	4.1	2.5	1.8	1.3	1.6
PCA 2/14 T5 EXCEL lp 220–240V 50/60/0Hz	6.5	4.1	2.3	1.8	1.5	1.3
PCA 2/21 T5 EXCEL lp 220–240V 50/60/0Hz	7.6	5.3	2.9	1.6	1.7	1.3
PCA 2/28 T5 EXCEL lp 220–240V 50/60/0Hz	7.6	5.7	1.5	1.4	1.1	1.2
PCA 2/35 T5 EXCEL lp 220–240V 50/60/0Hz	6.6	5.8	0.8	1.5	0.8	1.1

TRIDONIC

Dimming:

Dimming curve that is friendly to the eye.
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
  Speed 1 % to 100 % in 550 ms (adjustable
  between 50 ms and 90 s)
  Programmable parameter:
  Minimum dimming level
  Maximum dimming level
  Default minimum = 1 %
  Programmable range 1 % $\leq$ MIN $\leq$ 49 %
  Default maximum = 100 %
  Programmable range 100 % $\geq$ MAX $\geq$ 50 %

Control input (DA/D1, DA/D2):

Digital DALI/DSI signal or switchDIM 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 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 II lp[1] 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 T5 EXCEL one4all lp
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 $\geq$ 1 switches on.
With relative DALI dimming commands (e.g. up,
down etc.) or switchDIM signals it is possible to
change the controlled light level temporarily.
Temporarily means that after a switching cycle
OFF/ON command the PCA T5 EXCEL one4all lp
will start at the preset value determined by the
SMART-LS II lp[1]. This preset can be set mechani-
cally directly on the SMART-LS II lp[1].
The installation of the two wire bus is according
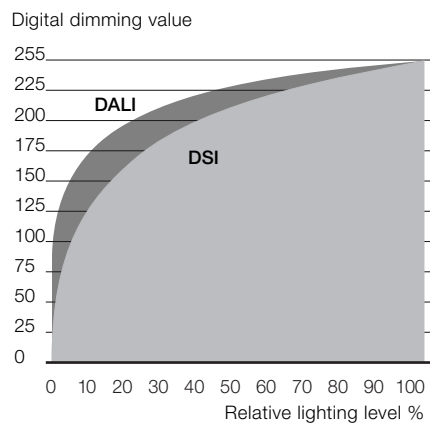to the appropriate low voltage regulations.

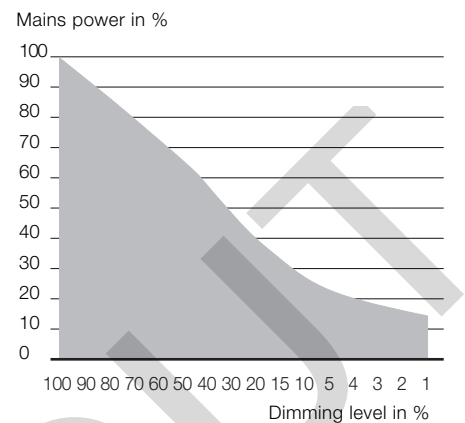[1] SMART-LS II lp: article number 86458258

Dimming characteristics PCA EXCEL

Digital dimming value

Dimming characteristics
as seen by the human eye

Energy Savings PCA EXCEL

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.
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.
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
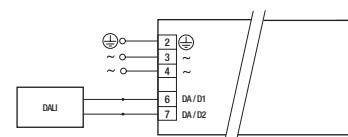momentary-action switches or motion sensors.
To ensure correct operation a sinusoidal mains volt-
age with a frequency of 50 Hz or 60 Hz is required
at the control input.
Special attention must be paid to achieving clear
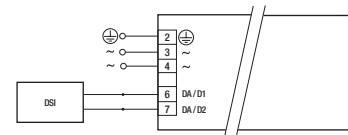zero crossings.
Serious mains faults may impair the operation of
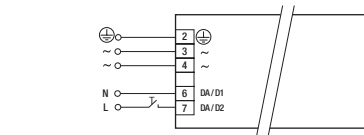switchDIM and corridorFUNCTION.

Backwards compatibility:

With a simple key combination a PCA EXCEL
one4all lp can be reset as a normal PCA EXCEL
from the previous generation. Synchronisation
simply has to take place three times within one
minute (3x10 s). To activate the "lp" settings again,
synchronisation has to take place four times within
one minute.

**DALI PCA T5 EXCEL one4all lp**

DSI PCA T5 EXCEL one4all lp

switchDIM PCA T5 EXCEL one4all lp

Loading of automatic circuit breakers:

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20
Installation ∅	1.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²
PCA 1/14 T5 EXCEL lp	50	80	150	180	25	40	75	90
PCA 1/21 T5 EXCEL lp	50	80	120	150	25	40	75	90
PCA 1/28 T5 EXCEL lp	38	54	78	92	19	27	39	46
PCA 1/35 T5 EXCEL lp	34	50	76	86	17	25	38	43
PCA 2/14 T5 EXCEL lp	38	54	78	92	19	27	39	46
PCA 2/21 T5 EXCEL lp	30	40	60	64	15	20	30	32
PCA 2/28 T5 EXCEL lp	24	34	48	52	12	17	24	26
PCA 2/35 T5 EXCEL lp	16	22	30	32	8	11	15	16

Data sheet 09/11-572-9 We reserve the right to make technical changes without prior notice.

TRIDONIC   3

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 concut 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
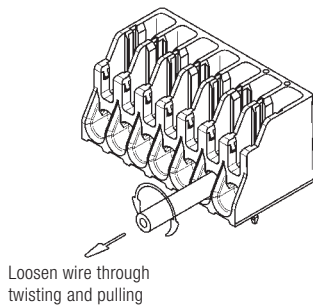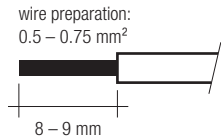
Ballast

Type		Uout
PCA 1/14 T5 EXCEL lp	220–240V 50/60/0Hz	300 V
PCA 1/21 T5 EXCEL lp	220–240V 50/60/0Hz	420 V
PCA 1/28 T5 EXCEL lp	220–240V 50/60/0Hz	460 V
PCA 1/35 T5 EXCEL lp	220–240V 50/60/0Hz	460 V
PCA 2/14 T5 EXCEL lp	220–240V 50/60/0Hz	300 V
PCA 2/21 T5 EXCEL lp	220–240V 50/60/0Hz	420 V
PCA 2/28 T5 EXCEL lp	220–240V 50/60/0Hz	460 V
PCA 2/35 T5 EXCEL lp	220–240V 50/60/0Hz	460 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
- 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.

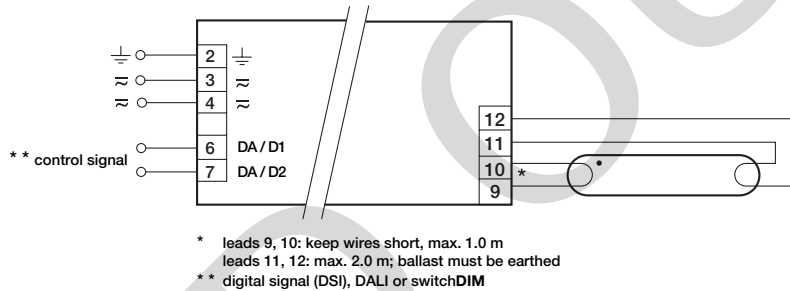ⓘ **For further technical information please visit www.tridonicatco.com**

Wiring advice:
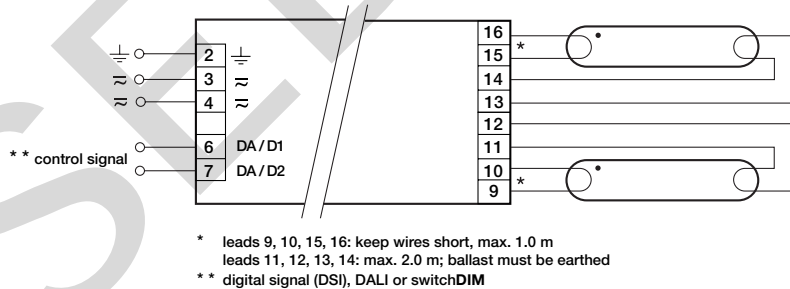The lead length is dependent on the capacitance of the cable.

Ballast Type	Terminal Cold	Hot	Maximum capacitance allowed Cold	Hot
PCA 1/xx T5 EXCEL lp	11, 12	9, 10	200 pF	100 pF
PCA 2/xx T5 EXCEL lp	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.
When using two or more dimmable ballasts in one luminaire with separate dimming controls, the lamp leads must be kept separate.

Dimmable ballasts from TridonicAtco have to be earthed.

* leads 9, 10: keep wires short, max. 1.0 m
leads 11, 12: max. 2.0 m; ballast must be earthed
** digital signal (DSI), DALI or switch**DIM**

PCA T5 EXCEL one4all lp 14–35 W

* leads 9, 10, 15, 16: keep wires short, max. 1.0 m
leads 11, 12, 13, 14: max. 2.0 m; ballast must be earthed
** digital signal (DSI), DALI or switch**DIM**

PCA T5 EXCEL one4all lp 2x14–2x35 W

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

configTOOL
Full version for programming all the functions and parameters.

pcaCONFIGURATOR
For programming the corridorFUNCTION, device configuration (fade time, ePowerOnLevel, etc.) DC level, compatibility settings, and startup date and for resetting.

corridorFUNCTION CONFIGURATOR
For activating and deactivating the corridor-FUNCTION and for project-specific programming of the PCA EXCEL one4all units.

PC and the
"corridorFUNCTION CONFIGURATOR"
software tool

any number of ECGs
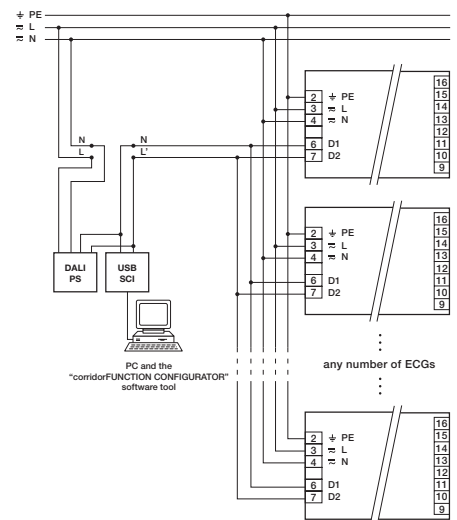
Wiring diagram for programming

TRIDONIC