Product description

- Processor-controlled ballast with xtect inside
- Highest possible energy class CELMA EEI = A1 BAT
- Noise-free precise control via DALI or DSI signal, switchDIM or corridorFUNCTION
- OEM-specific reserved memory areas
- Extended DALI commands
- 5-year guarantee

Interfaces

- DALI
- DSI
- switchDIM (with memory function + selectable dimming rate)
- corridorFUNCTION (individually programmable)

Functions

- Intelligent Temperature Guard (overtemperature protection)
- Intelligent Voltage Guard (overvoltage indication and undervoltage shutdown)
- Optimum filament heating in any dimmer setting
- Disconnection of filament heating from a dimming level of approx. 90% for maximum energy efficiency (SMART-Heating concept)
- Fade rates between 50 ms and 90 s (min. – max.)
- Automatically triggered emergency lighting value in DC mode, can be set between 1 and 100%
- For emergency lighting systems as per EN 50172
- Automatic start after replacement of defective lamps
- Automatic shutdown if the lamp is faulty
- Dimming possible in DC mode
- Backwards compatible

Standards, page 3
Wiring diagrams and installation examples, page 6

Technical data

Mains voltage range 220 – 240 V
AC voltage range 198 – 264 V
DC voltage range 176 – 280 V (lamp start ≥ 198 V DC)
Mains frequency 0 / 50 / 60 Hz
Overvoltage protection 320 V AC, 1 h
Typ. power input on standby < 0.5 W
Protective hot restart 0.5 s for AC / 0.2 s for DC
Dimming range 1 – 100%
Lamp start possible from 1 %
Operating frequency ~ 40 – 100 kHz
Type of protection IP20

Ordering data

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Packaging, carton</th>
<th>Packaging, pallet</th>
<th>Weight per pcs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For luminaires with 1 lamp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCA 1x36 T8 EXCEL one4all lp xtect</td>
<td>22176239</td>
<td>10 pc./pcs.</td>
<td>760 pc./pcs.</td>
<td>0.244 kg</td>
</tr>
<tr>
<td>PCA 1x58 T8 EXCEL one4all lp xtect</td>
<td>22176235</td>
<td>10 pc./pcs.</td>
<td>760 pc./pcs.</td>
<td>0.263 kg</td>
</tr>
<tr>
<td>For luminaires with 2 lamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCA 2x36 T8 EXCEL one4all lp xtect</td>
<td>22176240</td>
<td>10 pc./pcs.</td>
<td>640 pc./pcs.</td>
<td>0.277 kg</td>
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<tr>
<td>PCA 2x58 T8 EXCEL one4all lp xtect</td>
<td>22176237</td>
<td>10 pc./pcs.</td>
<td>640 pc./pcs.</td>
<td>0.333 kg</td>
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</tbody>
</table>
### Specific technical data

<table>
<thead>
<tr>
<th>Lamp wattage</th>
<th>Lamp type</th>
<th>Type</th>
<th>Article number</th>
<th>Dimensions L x W x H</th>
<th>Hole spacing D</th>
<th>Lamp power@</th>
<th>EEI</th>
<th>Current at 50 Hz 230 V@</th>
<th>λ at 50 Hz 230 V</th>
<th>tc point max.</th>
<th>Ambient temperature ta@</th>
</tr>
</thead>
<tbody>
<tr>
<td>For luminaires with 1 lamp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x 36 W T8</td>
<td>PCA 1x36 T8 EXCEL one4all lp xtec</td>
<td>22176239</td>
<td>360 x 30 x 21 mm</td>
<td>350 mm</td>
<td>32 W</td>
<td>35.0 W</td>
<td>A1 BAT</td>
<td>0.15 A</td>
<td>0.96</td>
<td>75 °C</td>
<td>-25 ... 60 °C</td>
</tr>
<tr>
<td>1 x 58 W T8</td>
<td>PCA 1x58 T8 EXCEL one4all lp xtec</td>
<td>22176235</td>
<td>360 x 30 x 21 mm</td>
<td>350 mm</td>
<td>50 W</td>
<td>53.5 W</td>
<td>A1 BAT</td>
<td>0.23 A</td>
<td>0.97</td>
<td>75 °C</td>
<td>-25 ... 60 °C</td>
</tr>
<tr>
<td>For luminaires with 2 lamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x 36 W T8</td>
<td>PCA 2x36 T8 EXCEL one4all lp xtec</td>
<td>22176240</td>
<td>360 x 30 x 21 mm</td>
<td>350 mm</td>
<td>64 W</td>
<td>68.5 W</td>
<td>A1 BAT</td>
<td>0.30 A</td>
<td>0.98</td>
<td>80 °C</td>
<td>-25 ... 60 °C</td>
</tr>
<tr>
<td>2 x 58 W T8</td>
<td>PCA 2x58 T8 EXCEL one4all lp xtec</td>
<td>22176237</td>
<td>425 x 30 x 21 mm</td>
<td>415 mm</td>
<td>100 W</td>
<td>108.0 W</td>
<td>A1 BAT</td>
<td>0.47 A</td>
<td>0.99</td>
<td>80 °C</td>
<td>-25 ... 50 °C</td>
</tr>
</tbody>
</table>

@ According to the EU directives on ecodesign requirements (EC) No. 245/2009 and (EC) No. 347/2010.
@ Valid at 100 % dimming level.
@ 0 °C to ta max: unrestricted dimming. -25 °C to 0 °C: unrestricted dimming from 100 % to 30 %.
-25 °C to 0 °C, dimming below 30 %: malfunction possible but no damage to ECG. This applies to AC and DC operation.
FL ballasts
Electronic dimming

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

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.

Light output level in DC operation
Programmable from 0% to 100%
Programming by extended DSI or DALI signal (16 bit).
Default value is 70%
In DC operation dimming mode can be activated.

Emergency units
The “PCA T8 EXCEL one4all lp x tec” ballasts are compatible with all emergency units from Tridonic.
See the table in the data sheet. Also all “5-pole” emergency units can be used. When used with other emergency units tests are necessary.

Temperature range
Unlimited dimming range from 0 °C to ta max.
-25 °C to 0 °C dimming operation from 100% to 30%. If dimm level goes below 30% malfunction possible, but no electronic ballast damage. This applies to AC and DC operation.

Mains currents in DC operation (at 70 % light output)

<table>
<thead>
<tr>
<th>Type</th>
<th>Wattage</th>
<th>Mains current at U = 220 VAC</th>
<th>Mains current at U = 240 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 1x36 T8 EXCEL one4all lp x tec</td>
<td>1x36 W</td>
<td>0.13 A</td>
<td>0.12 A</td>
</tr>
<tr>
<td>PCA 2x36 T8 EXCEL one4all lp x tec</td>
<td>2x36 W</td>
<td>0.26 A</td>
<td>0.24 A</td>
</tr>
<tr>
<td>PCA 1x58 T8 EXCEL one4all lp x tec</td>
<td>1x58 W</td>
<td>0.19 A</td>
<td>0.18 A</td>
</tr>
<tr>
<td>PCA 2x58 T8 EXCEL one4all lp x tec</td>
<td>2x58 W</td>
<td>0.40 A</td>
<td>0.36 A</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Wattage</th>
<th>AC-BLF at U = 230 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 1x36 T8 EXCEL one4all lp x tec</td>
<td>1x36 W</td>
<td>0.99</td>
</tr>
<tr>
<td>PCA 2x36 T8 EXCEL one4all lp x tec</td>
<td>2x36 W</td>
<td>0.97</td>
</tr>
<tr>
<td>PCA 1x58 T8 EXCEL one4all lp x tec</td>
<td>1x58 W</td>
<td>0.98</td>
</tr>
<tr>
<td>PCA 2x58 T8 EXCEL one4all lp x tec</td>
<td>2x58 W</td>
<td>0.99</td>
</tr>
</tbody>
</table>

The ballast lumen factor for AC operation (AC-BLF) does not alter from Un = 198 VAC to Un = 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 230V / 50Hz)

<table>
<thead>
<tr>
<th>Type</th>
<th>Wattage</th>
<th>THD</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 1x36 T8 EXCEL one4all lp x tec</td>
<td>1x36 W</td>
<td>6.1</td>
<td>4.4</td>
<td>2.2</td>
<td>1.6</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>PCA 2x36 T8 EXCEL one4all lp x tec</td>
<td>2x36 W</td>
<td>6.7</td>
<td>3.3</td>
<td>1.3</td>
<td>1.6</td>
<td>2.6</td>
<td>1.6</td>
</tr>
<tr>
<td>PCA 1x58 T8 EXCEL one4all lp x tec</td>
<td>1x58 W</td>
<td>7.5</td>
<td>5.8</td>
<td>1.2</td>
<td>1.5</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>PCA 2x58 T8 EXCEL one4all lp x tec</td>
<td>2x58 W</td>
<td>5.9</td>
<td>4.2</td>
<td>0.7</td>
<td>1.0</td>
<td>1.0</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Data sheet 02/13-881-3
Subject to change without notice.
www.tridonic.com
Dimming

Dimming curve is adapted to the eye sensitiveness.

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
  Maximum 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 %
- Default maximum = 100 %

Control input (DA/D1, DA/D2)

Digital DALI/DSI signal or a push-to-make switch (switchDIM) can be wired on the same terminals (DA and DA).

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 has to 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 ip" 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 T8 EXCEL one4all lp xtec 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.

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 ballast will start at the preset value determined by the SMART-LS II lp. The installation of the two wire bus is according to the appropriate low voltage regulations.

DIMMING characteristics

Digital dimming value

0 20 40 60 80 100

DALI

DSI

Dimming characteristics as seen by the human eye

Energy saving

Mains power %

0 20 40 60 80 100

1 2 3 4 5 6 7 8 9 10

With a simple key combination a PCA T8 EXCEL one4all lp xtec can be reset as a normal PCA EXCEL lp from the previous generation. Synchronisation simply has to take place three times within one minute (3 x 10 s).

To activate the “xtec” settings again, synchronisation has to take place four times within one minute.

Loading of automatic circuit breakers

<table>
<thead>
<tr>
<th>Automatic circuit breaker type</th>
<th>C10</th>
<th>C13</th>
<th>C16</th>
<th>C20</th>
<th>B10</th>
<th>B13</th>
<th>B16</th>
<th>B20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Ø</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>2.5 mm²</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>1.5 mm²</td>
<td>2.5 mm²</td>
</tr>
<tr>
<td>PCA 1x36 T8 EXCEL one4all lp xtec</td>
<td>30</td>
<td>50</td>
<td>74</td>
<td>80</td>
<td>15</td>
<td>25</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>PCA 2x36 T8 EXCEL one4all lp xtec</td>
<td>16</td>
<td>24</td>
<td>34</td>
<td>38</td>
<td>8</td>
<td>12</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>PCA 1x58 T8 EXCEL one4all lp xtec</td>
<td>22</td>
<td>34</td>
<td>48</td>
<td>52</td>
<td>11</td>
<td>17</td>
<td>24</td>
<td>26</td>
</tr>
<tr>
<td>PCA 2x58 T8 EXCEL one4all lp xtec</td>
<td>16</td>
<td>24</td>
<td>32</td>
<td>36</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

Continuous operation: to calculate the protective safety switch see main current, page 2

Data sheet 02/13-881-3
Subject to change without notice.

www.tridonic.com
Intelligent Voltage Guard
Intelligent Voltage Guard is the name of the new electronic monitor from Tridonic. This innovative feature of the PCA family of control gear from Tridonic immediately shows if the mains voltage rises above certain thresholds. Measures can then be taken quickly to prevent damage to the control gear.

- If the mains voltage rises above approx. 305 V (voltage depends on the ballast type), the lamp starts flashing on and off.
- This signal “demands” disconnection of the power supply to the lighting system.

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>Type</th>
<th>Voltage</th>
<th>U−</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 1x36 T8 EXCEL one4all lp x tec</td>
<td>1x36 W</td>
<td>230V</td>
<td></td>
</tr>
<tr>
<td>PCA 2x36 T8 EXCEL one4all lp x tec</td>
<td>2x36 W</td>
<td>360V</td>
<td></td>
</tr>
<tr>
<td>PCA 1x58 T8 EXCEL one4all lp x tec</td>
<td>1x58 W</td>
<td>250V</td>
<td></td>
</tr>
<tr>
<td>PCA 2x58 T8 EXCEL one4all lp x tec</td>
<td>2x58 W</td>
<td>360V</td>
<td></td>
</tr>
</tbody>
</table>

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 IDC terminal. For the push-wire connection you have to strip the insulation (8–9 mm).

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

<table>
<thead>
<tr>
<th>Ballast</th>
<th>Terminal</th>
<th>Maximum capacitance allowed (pF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 1x1 T8 EXCEL one4all lp x tec</td>
<td>11, 12</td>
<td>9, 10, 200</td>
</tr>
<tr>
<td>PCA 2x2 T8 EXCEL one4all lp x tec</td>
<td>11, 12, 13, 14</td>
<td>9, 10, 15, 16, 200</td>
</tr>
</tbody>
</table>

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 Tridonic have to be earthed.

Intelligent Temperature Guard
The intelligent temperature guard protects the PCA T8 EXCEL one4all lp x tec from thermal over-heating by reducing the 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 temperature.

plugADDRESSING – simple handling, commissioning and wiring
The new plug&play solution simplifies handling. By attaching different colored marked plugs to the SMART interface, group addresses are assigned to the PCA T8 EXCEL one4all lp x tec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is its ease of exchange and no limits to 64 DALI addresses. Ideal for RGB applications and cost-effective system solutions with simple controllers. Simple – Quick – Plug&Play!
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
- 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.

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.

Programming
With appropriate software and a USB interface different functions can be activated and various parameters can be configured in the new PCA T5 EXCEL one4all lp xtec. All that is needed is a DALI-USB and the software.

configTOOL
Full version for programming all the functions and parameters.

corridorFUNCTION CONFIGURATOR
For programming the corridorFUNCTION, device configuration (fade time, ePowerOnLevel, etc.) DC level, compatibility settings, and startup date and for resetting.
Maximum amount of ballast see DALI/DSI specification.

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 EN 60598-1 Annex A, each luminaire should be submitted to an isolation test with 500 Vcc 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 Vcc (or 1,414 x 1500 Vcc). To avoid damage to the electronic devices this test must not be conducted.

For further technical information please visit www.tridonic.com