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
- Multi-lamp management
- 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, 3 lamps: 5 – 100 %
- Dimming range, 4 lamps: 1 – 100 %
- Lamp start possible from: 5 % (3 lamps), 1 % (4 lamps)
- 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 pc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For luminaires with 3 lamps</td>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtect</td>
<td>22176209</td>
<td>20 pc(s).</td>
<td>600 pc(s).</td>
</tr>
<tr>
<td>For luminaires with 4 lamps</td>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtect</td>
<td>22176210</td>
<td>20 pc(s).</td>
<td>600 pc(s).</td>
</tr>
</tbody>
</table>

Data sheet 05/18-854-8
Subject to change without notice.
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</th>
<th>Ambient temperature ta³</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 14 W</td>
<td>T5</td>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtec</td>
<td>22176209</td>
<td>360 x 40 x 21 mm</td>
<td>350 mm</td>
<td>42 W</td>
<td>46.5 W</td>
<td>A1 BAT</td>
<td>0.21 A</td>
<td>0.97</td>
<td>75 °C</td>
</tr>
<tr>
<td>3 x 24 W</td>
<td>T5</td>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtec</td>
<td>22176209</td>
<td>360 x 40 x 21 mm</td>
<td>350 mm</td>
<td>72 W</td>
<td>73.0 W</td>
<td>A1 BAT</td>
<td>0.32 A</td>
<td>0.97</td>
<td>75 °C</td>
</tr>
</tbody>
</table>

For luminaires with 4 lamps

| 4 x 14 W     | T5        | PCA 4x14/24 T5 EXCEL one4all lp xtec | 22176210 | 360 x 40 x 21 mm | 350 mm | 56 W | 60.5 W | A1 BAT | 0.27 A | 0.97 | 75 °C | -25 ... 60 °C |
| 4 x 24 W     | T5        | PCA 4x14/24 T5 EXCEL one4all lp xtec | 22176210 | 360 x 40 x 21 mm | 350 mm | 96 W | 97.5 W | A1 BAT | 0.43 A | 0.97 | 75 °C | -25 ... 50 °C |

¹ According to the EU directives on ecodesign requirements (EC) No. 245/2009 and (EC) No. 347/2010.  
² Valid at 100 % dimming level.  
³ +10 °C to ta max: unrestricted dimming. -25 °C to +10 °C: unrestricted dimming from 100 % to 30 %.  
-25 °C to +10 °C, dimming below 30 %: malfunction possible but no damage to ECG. This applies to AC and DC operation.
Standards
EN 55015
EN 60929
EN 61000-3-2
EN 61347-2-3
EN 61547
Suitable for emergency installations according to
EN 50172
CISPR 15
CISPR 22
IEC 60929
IEC 61000-3-2
IEC 61347-2-3
IEC 61547
IEC 62386 (according to DALI standard V1)

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 1 % to 100 %
Programming by extended DSI or DALI signal (16 bit).
Default value is 15 %
In DC operation dimming mode can be activated.
EBLF = 0.5 x adjusted DC dimming level
(e.g. 0.5 x 0.7).

Emergency units
The “PCA T5 EXCEL lp xtect” 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 10 °C to ta max.
-25 °C to +10 °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 Un = 220 Vdc</th>
<th>Mains current at Un = 240 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtect</td>
<td>3x14 W</td>
<td>0.17 A</td>
<td>0.16 A</td>
</tr>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtect</td>
<td>3x24 W</td>
<td>0.28 A</td>
<td>0.26 A</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtect</td>
<td>4x14 W</td>
<td>0.22 A</td>
<td>0.21 A</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtect</td>
<td>4x24 W</td>
<td>0.37 A</td>
<td>0.34 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 Un = 230 Vac</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtect</td>
<td>3x14 W</td>
<td>0.99</td>
</tr>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtect</td>
<td>3x24 W</td>
<td>0.99</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtect</td>
<td>4x14 W</td>
<td>0.99</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtect</td>
<td>4x24 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 230 V/50 Hz)

<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 3x14/24 T5 EXCEL one4all lp xtect</td>
<td>3x14 W</td>
<td>8.40</td>
<td>6.65</td>
<td>1.97</td>
<td>2.17</td>
<td>2.09</td>
<td>1.36</td>
</tr>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtect</td>
<td>3x24 W</td>
<td>7.98</td>
<td>6.23</td>
<td>1.76</td>
<td>1.75</td>
<td>2.31</td>
<td>1.04</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtect</td>
<td>4x14 W</td>
<td>8.67</td>
<td>6.97</td>
<td>2.85</td>
<td>1.86</td>
<td>1.49</td>
<td>1.19</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtect</td>
<td>4x24 W</td>
<td>7.52</td>
<td>6.37</td>
<td>1.53</td>
<td>1.94</td>
<td>1.04</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Lamp type recognition
Each of teh lamps for wich the control gear is designed
will be operated correctly according the lamp
specification. The currently used lamp is recognised
during the start up process.
To avoid an incorrect lamp recognition due to fast
multiple ON / OFF switches, new lamp data are only
restored if the lamp has operated for at least 5
seconds.
Dimming

Dimming curve is adapted to the eye sensitiveness.

Control input (DA/D1, DA/D2)

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. At every synchronization (10 s keystroke) the device will reset to 3 s (factory setting).

Backwards compatibility:

With a simple key combination a PCA T5 EXCEL lp xtec can be reset as a normal PCA EXCEL from the previous generation. Synchronization simply has to take place three times within one minute (3 x 10 s). To activate the “xtec” settings again, synchronization 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>
<th>Inrush current</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>
<td>Imax Time</td>
</tr>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtec</td>
<td>16</td>
<td>22</td>
<td>32</td>
<td>36</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>18</td>
<td>36 A 215 µs</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtec</td>
<td>14</td>
<td>22</td>
<td>32</td>
<td>34</td>
<td>7</td>
<td>11</td>
<td>16</td>
<td>17</td>
<td>38 A 205 µs</td>
</tr>
</tbody>
</table>

Continuous operation: to calculate the protective safety switch see main current, page 1
**FL ballasts**

**Electronic dimming**

**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.

**Operating voltage**

<table>
<thead>
<tr>
<th>Type</th>
<th>Wattage</th>
<th>U_out</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtec</td>
<td>3x14W</td>
<td>430V</td>
</tr>
<tr>
<td>PCA 3x14/24 T5 EXCEL one4all lp xtec</td>
<td>3x24W</td>
<td>430V</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtec</td>
<td>4x14W</td>
<td>430V</td>
</tr>
<tr>
<td>PCA 4x14/24 T5 EXCEL one4all lp xtec</td>
<td>4x24W</td>
<td>430V</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.**

3-lamp devices: Hot and cold leads should be separated as much as possible.

4-lamp devices: Middle and hot leads should be separated as much as possible.

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.

**Distance to plate: 5 – 10 mm**

(idéal distance for optimal symmetrical light)

To avoid the damage of the control gear, the wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.).

**Intelligent Temperature Guard**
The intelligent temperature guard protects the PCA T5 EXCEL lp xtec from thermal overheating by reducing the output power or switching off in case of operation above the thermal limits of the luminare or ballast. Depending on the luminare or ballast design, the ITG operates at about 5 to 10°C above Tc temperature.

**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 or falls below 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.
- 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.

**corridorFUNCTION**
**Activation:** To activate the corridorFUNCTION a voltage of 230 V simply has to be applied for five minutes at D1, D2. The unit will then switch automatically to the corridorFUNCTION.

**Deactivation:** 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.

The corridorFUNCTION V2 offers the added benefit of a second and third preprogrammed profile. Application and functionality of profiles see user manual corridorFUNCTION.

**Intelligent Plug ADDRESSING – 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 T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!

**plug ADDRESSING – simple handling, commissioning and wiring**
The new plugplay solution simplifies handling. By attaching different colored marked plugs to the SMART Interface, group addresses are assigned to the PCA T5 EXCEL one4all lp xtec. This supersedes a single addressing and the devices can be put into operation without any additional programming. Another significant advantage of this concept is in case 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!
FL ballasts
Electronic dimming

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.

Additional information
Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

Life-time declarations are informative and represent no warranty claim. No warranty if device was opened.