Electronic ballasts for dimming to 10 %
Linear lamps T5, 16 mm / linear lamps T8, 26 mm

Data sheet 09/11-377-3  We reserve the right to make technical changes without prior notice.

- dimming range from 10–100 %
- lamp start at 10 %
- lamp friendly warm start within 1.5 s with AC and 0.6 s with 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), switch DIM or DALI (digital addressable lighting interface)
- error feed back and programmable features in both DALI and DSI mode
- integrated SMART interface

- fully electronic lamp management and digital communication with ASIC and µC
- 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 20
- 30 boxes/pallet
- 600 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

<table>
<thead>
<tr>
<th>Wattage</th>
<th>Length</th>
<th>Type</th>
<th>Article number</th>
<th>Length L D mm</th>
<th>Fixing centres kg</th>
<th>Circuit power W</th>
<th>Lamp power A</th>
<th>Current at 230V/50Hz</th>
<th>λ at 230V/50Hz °C</th>
<th>tc point °C</th>
<th>Temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x14</td>
<td>550</td>
<td>PCA 3/14 T5 EXCEL 220–240 V 50/60/0 Hz</td>
<td>22086658</td>
<td>360–350</td>
<td>0.38</td>
<td>51.6</td>
<td>3x14</td>
<td>0.23</td>
<td>0.98</td>
<td>80</td>
<td>+10 → +50.0</td>
</tr>
<tr>
<td>4x14</td>
<td>550</td>
<td>PCA 4/14 T5 EXCEL 220–240 V 50/60/0 Hz</td>
<td>22086677</td>
<td>360–350</td>
<td>0.40</td>
<td>66.5</td>
<td>4x14</td>
<td>0.32</td>
<td>0.98</td>
<td>80</td>
<td>+10 → +60.0</td>
</tr>
<tr>
<td>3x18</td>
<td>590</td>
<td>PCA 3/18 EXCEL 220–240 V 50/60/0 Hz</td>
<td>22086715</td>
<td>360–350</td>
<td>0.38</td>
<td>57.7</td>
<td>3x16</td>
<td>0.28</td>
<td>0.97</td>
<td>75</td>
<td>-25 → +50.0</td>
</tr>
<tr>
<td>4x18</td>
<td>590</td>
<td>PCA 4/18 EXCEL 220–240 V 50/60/0 Hz</td>
<td>22086689</td>
<td>360–350</td>
<td>0.40</td>
<td>77.5</td>
<td>4x16</td>
<td>0.34</td>
<td>0.99</td>
<td>80</td>
<td>-25 → +60.0</td>
</tr>
</tbody>
</table>

- dimming to 10 % between 10 °C to ta max.
- dimming to 10 % between 0 °C to ta max.
- valid at 100 % light output

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TRIDONIC
Electronic ballasts for dimming to 10 %
Linear lamps T5, 16 mm / linear lamps T8, 26 mm

Lamp starting characteristics:
Warm start
Starting time 1.5 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 (±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:
• PCA 3/14 EXCEL / PCA 4/14 EXCEL:
  Dimming operation (100 % to 10 %) and 100 %
  operation from 10 °C to maximum permissible
  ambient temperature.

• PCA 3/18 EXCEL / PCA 4/18 EXCEL:
  Dimming operation (100 % to 10 %) from 0 °C
  and 100 % operation from -25 °C to maximum
  permissible ambient temperature.

Mains currents in DC operation:

<table>
<thead>
<tr>
<th>Ballast Type</th>
<th>Mains current at U_n = 220 VDC</th>
<th>Mains current at U_n = 240 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 3/14 T5 EXCEL 220–240V 50/60Hz</td>
<td>0.19 A</td>
<td>0.17 A</td>
</tr>
<tr>
<td>PCA 3/18 EXCEL 220–240V 50/60Hz</td>
<td>0.21 A</td>
<td>0.19 A</td>
</tr>
<tr>
<td>PCA 4/14 T5 EXCEL 220–240V 50/60Hz</td>
<td>0.25 A</td>
<td>0.23 A</td>
</tr>
<tr>
<td>PCA 4/18 EXCEL 220–240V 50/60Hz</td>
<td>0.27 A</td>
<td>0.25 A</td>
</tr>
</tbody>
</table>

Light output level in DC operation:
Programmable from 10 % to 70 %
Programming by extended DSI signal (16 bit)
Default value is 70 %
In DC operation dimming is not possible

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

<table>
<thead>
<tr>
<th>Ballast Type</th>
<th>AC-BLF at U_n = 230 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA 3/14 T5 EXCEL 220–240V 50/60Hz</td>
<td>0.98</td>
</tr>
<tr>
<td>PCA 3/18 EXCEL 220–240V 50/60Hz</td>
<td>1.01</td>
</tr>
<tr>
<td>PCA 4/14 T5 EXCEL 220–240V 50/60Hz</td>
<td>1.02</td>
</tr>
<tr>
<td>PCA 4/18 EXCEL 220–240V 50/60Hz</td>
<td>1.03</td>
</tr>
</tbody>
</table>

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):

<table>
<thead>
<tr>
<th>Ballast Type</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 3/14 T5 EXCEL 220–240V 50/60Hz</td>
<td>8.6</td>
<td>8.0</td>
<td>2.7</td>
<td>1.9</td>
<td>1.5</td>
<td>1.2</td>
</tr>
<tr>
<td>PCA 3/18 EXCEL 220–240V 50/60Hz</td>
<td>9.5</td>
<td>8.8</td>
<td>3.1</td>
<td>2.0</td>
<td>1.4</td>
<td>1.1</td>
</tr>
<tr>
<td>PCA 4/14 T5 EXCEL 220–240V 50/60Hz</td>
<td>8.1</td>
<td>7.5</td>
<td>2.6</td>
<td>1.6</td>
<td>1.1</td>
<td>0.7</td>
</tr>
<tr>
<td>PCA 4/18 EXCEL 220–240V 50/60Hz</td>
<td>7.6</td>
<td>7.0</td>
<td>2.6</td>
<td>1.7</td>
<td>1.1</td>
<td>0.7</td>
</tr>
</tbody>
</table>
Dimming:
Dimming range 10 % to 100 %
Digital control with:
• DSI signal: 8 bit Manchester Code
  Maximum speed 10 % to 100 % in 0.9 s
• DALI signal: 16 bit Manchester Code
  Maximum speed 10 % to 100 % in 0.35 s
Programmable parameter:
  Minimum dimming level
  Maximum dimming level
  Default minimum = 10 %
  Programmable range 10 % ≤ MIN ≤ 49 %
  Default maximum = 100 %
  Programmable range 100 % ≥ MAX ≥ 50 %
Dimming curve that is friendly to the eye.

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 with the requirements of low voltage installations.
Different functions depending on each control 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 EXCEL 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.
Dimming with DALI or 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.

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 area</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 3/14 TS EXCEL</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>12</td>
<td>12</td>
<td>12</td>
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<tr>
<td>PCA 3/18 EXCEL</td>
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<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>PCA 4/14 TS EXCEL</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>PCA 4/18 EXCEL</td>
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<td>24</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

Dimming characteristics PCA EXCEL

Energy Savings PCA EXCEL
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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 cutout terminal. For the push-wire connection you have to strip the insulation (7.5–8.5 mm).

U_{in} = 400 V 400

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</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cold</td>
<td>Hot</td>
</tr>
<tr>
<td></td>
<td>Cold</td>
<td>Hot</td>
</tr>
<tr>
<td>PCA U/xx EXCEL</td>
<td>5, 6, 7, 8, 11, 12</td>
<td>9, 10</td>
</tr>
<tr>
<td>PCA 4/xx EXCEL</td>
<td>5, 6, 7, 8, 11, 12, 13, 14</td>
<td>9, 10, 15, 16</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 (5, 6, 7, 8, 11, 12, 13, 14) should be separated as much as possible.

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

* leads 9, 10: keep wires short, max. 1.0 m
leads 5, 6, 7, 8, 11, 12: max. 2.0 m; ballast must be earthed
* * digital signal (DALI/DSI) or switchDIM

PCA EXCEL one4all 3/14 W, 3/18 W

* leads 9, 10, 15, 16: keep wires short, max. 1.0 m
leads 5, 6, 7, 8, 11, 12, 13, 14: max. 2.0 m; ballast must be earthed
* * digital signal (DALI/DSI) or switchDIM

PCA EXCEL one4all 4/14 W, 4/18 W