RUGGEDIZED IP65/IP67/IP68/IP69K WATERPROOF

- Designed for use in rail, earth moving, battery and related applications
- Meets EN45545-2 HL3 (R22/R23) requirements
Positronic builds premium power and signal connectors for a variety of industries. But every product delivers a single outcome: Certainty.

Driven by the mission-critical needs of our customers, we’ve gone to school on the subject for over 50 years. We approach it with scientific discipline – honing the fusion of raw material, engineering ingenuity, and precision manufacturing to push the next limits of reliability.

And with every new project, our curiosity is reignited. How will certainty be achieved in your system, with its own unique demands? The answers have graced the most formidable missions of our time, from the skies of super-sonic flight to the merciless scapes of Mars.

WHAT CAN YOU BE CERTAIN ABOUT?

- Rock-solid reliability
- Maximum design flexibility
- High efficiency, low heat performance
- Responsive, knowledgeable support
The Panther family of products, consisting of the PA Series and the PB Series, are rugged, waterproof connectors built for demanding applications. When your project calls for high power, shock and vibration resistance, or needs to meet fire, smoke and toxicity requirements for passenger applications, the Panther family can meet your requirements. The connectors can be used reliably in operating temperatures up to 200°C and are rated up to IP69. Trust the Panther family of connectors to deliver a reliable connection in any harsh environment.

SERIES COMPARISONS

<table>
<thead>
<tr>
<th></th>
<th>POWER ONLY</th>
<th>POWER &amp; SIGNAL</th>
<th>SIZE</th>
<th>IDEAL FOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANTHER I - PA series</td>
<td>x</td>
<td>x</td>
<td>Medium</td>
<td>IP65/67/68/69K power and signal needs</td>
</tr>
<tr>
<td>Rugged IP65/67/68/69K connector for use in rail, earth moving, battery and related applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PANTHER II - PB series</td>
<td>x</td>
<td></td>
<td>Large</td>
<td>IP65/67/68/69K power and signal needs</td>
</tr>
<tr>
<td>Large, high power, touch-safe connector for use in harsh environmental conditions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Panther II is designed for rugged, heavy duty applications where reliability cannot be comprised when operating in harsh environmental elements. Panther II connectors are tested to meet rigorous salt spray, shock and vibration requirements. And when outdoor temperatures rise, the Panther II continues to provide a dependable connection, while resisting dust and water. If you need a reliable connector for your outdoor applications, Panther II delivers with its robust design, including a unique stainless steel locking mechanism for numerous mating cycles and trusted connections.

Trust the Panther II to deliver The Science of Certainty in mission-critical applications.

**TECH SPECS**

**GENERAL**
- **Part Number Prefix**: PB
- **Performance Level**: Mil/Aero
- **Specifications**: UL*1, IEC safety standard, Shock/Vibration testing standard EN45545-2 HL3 (R22), FAR 25.853, UV stability F1 grading, Salt spray test

*1 UL approval for layout 03. Contact Technical Sales for UL status on other variants.

**ELECTRICAL**
- **Working Voltage (rms)**: 1600 V
- **Initial Contact Resistance (max)**: 0.38 mΩ
- **Contact Current Rating**
  - at 30°C Temperature Rise per UL1977*1: Up to 110A*2
  - per UL1977*1: Up to 230A*2

*1 See page 4 for temperature rise curves.  
*2 Value established using high conductivity alloy

**MECHANICAL**
- **Contact Style**: Removable
- **Female Contact Design**: Closed entry
- **Mating Cycles**: 500

**ENVIRONMENTAL**
- **Operating Temperature**: -55 to 160°C
- **Waterproof**: IP65, IP67, IP88, IP69K

To download detailed product information, visit [www.connectpositronic.com/PantherII/ProductSpecs](http://www.connectpositronic.com/PantherII/ProductSpecs)
MODULE LAYOUTS

Scale 1:1

DIMENSIONS

For the sake of brevity, only basic dimensions of free cable male are shown here. Full dimensional detail is available in the respective product drawings.

Scale 1:1

Contact Size Chart

<table>
<thead>
<tr>
<th>#0</th>
<th>#8</th>
<th>#12</th>
<th>#16</th>
<th>#18</th>
</tr>
</thead>
<tbody>
<tr>
<td>*1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 Contact Technical Sales for availability

All Positronic products utilize solid, machined contacts.
**CONTACTS**

Contact Technical Sales for crimp contact part numbers not listed here.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>Size</th>
<th>Gender</th>
<th>Female Contact Style</th>
<th>Stranded AWG [mm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN00-FXCRA-0001</td>
<td>SC</td>
<td>#0</td>
<td>Female</td>
<td>Closed entry</td>
</tr>
<tr>
<td>CN00-FHCRA-0001</td>
<td>HC</td>
<td>#0</td>
<td>Female</td>
<td>Closed entry</td>
</tr>
<tr>
<td>CN00-MXCRA-0001</td>
<td>SC</td>
<td>#0</td>
<td>Male</td>
<td>n/a</td>
</tr>
<tr>
<td>CN00-MHCRA-0001</td>
<td>HC</td>
<td>#0</td>
<td>Male</td>
<td>n/a</td>
</tr>
</tbody>
</table>

SC: Standard conductivity contacts
HC: High conductivity contacts

**TEMPERATURE RISE CURVES**

Tested per IEC Publication 60512-5-1, Test 5a

- **A** Developed with (3) #0 high conductivity contacts with 0 AWG wire.
- **B** Developed with (3) #0 standard conductivity contacts with 0 AWG wire.
CREATE A PART

**Series**

PB Panther II

**Layout**

03 (3) #0
12 (12) #8*
15 (15) #12*
27 (27) #16*
36 (36) #18*

* Contact Technical Sales for availability

**Contact Gender**

M Male pin
F Female socket

**Body Style**

C Wire, free cable

---

**Termination Side Accessories**

XX None
H1 Backshell

**Mating Side Accessories**

XX Lock lever or pin*

* Pin for female
Lock lever for male

**Contact Plating**

X No contacts

**Termination**

00 Wire, order contacts separately*

*1 See contact chart on page 4
In the world of electronics, the ability of the equipment to withstand harsh environments is becoming increasingly critical. The Panther I addresses that need by offering up to IP69K sealing capability along with increased operating temperature ranges. It also meets smoke and toxicity requirements common in aerospace, rail and other passenger applications.

- IP65/IP67/IP68/IP69K in mated condition
- Operating temperatures up to 200°C
- Meets smoke and toxicity requirements

Trust the Panther I to deliver The Science of Certainty in mission-critical applications.

### TECH SPECS

#### GENERAL

<table>
<thead>
<tr>
<th>Part Number Prefix</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Level</td>
<td>Industrial Mil/aero</td>
</tr>
<tr>
<td>Qualifications</td>
<td>UL*&lt;sup&gt;1&lt;/sup&gt; IEC safety standard Shock/Vibration testing standard EN45545-2 HL3 (R22/R23) FAR 25.853 NFF 16-101/102 Salt spray test</td>
</tr>
</tbody>
</table>

*<sup>1</sup> UL approval for layouts 03 and 08. Contact Technical Sales for UL status on other variants.

#### MATERIAL

<table>
<thead>
<tr>
<th>Insulator Material</th>
<th>LCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator Color</td>
<td>Black</td>
</tr>
<tr>
<td>Flammability Rating</td>
<td>UL94 V-0</td>
</tr>
<tr>
<td>Contact Material</td>
<td>Copper alloy</td>
</tr>
<tr>
<td>Contact Plating</td>
<td>Gold flash 0.76µm Au 1.27µm Au</td>
</tr>
</tbody>
</table>

#### ELECTRICAL

<table>
<thead>
<tr>
<th>Working Voltage (rms)</th>
<th>1600 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Contact Resistance (max)</td>
<td>5 mΩ</td>
</tr>
<tr>
<td>Contact Current Rating at 30°C Temperature Rise*&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Power Signal Up to 45A*&lt;sup&gt;2&lt;/sup&gt; Up to 5A</td>
</tr>
<tr>
<td>Contact Current Rating per UL 1977**&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Power Signal Up to 105A*&lt;sup&gt;2&lt;/sup&gt; Up to 5A</td>
</tr>
</tbody>
</table>

*<sup>1</sup> See page 8 for temperature rise curves.
*<sup>2</sup> Value established using high conductivity alloy.

#### MECHANICAL

<table>
<thead>
<tr>
<th>Contact Style</th>
<th>Fixed Removable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Contact Design</td>
<td>Closed entry</td>
</tr>
<tr>
<td>Mating Cycles</td>
<td>Up to 1000</td>
</tr>
</tbody>
</table>

#### ENVIRONMENTAL

| Operating Temperature | -55 to 200°C |
| UV Protection | Rated (I1) per UL 746C |
| Waterproof | IP65 IP67 IP68 IP69K |

To download detailed product information, visit www.connectpositronic.com/Panther/ProductSpecs
**CONTACT LAYOUTS**

![CONTACT LAYOUTS Diagram](image)

- **Scale 1:1**

**DIMENSIONS**

For the sake of brevity, only basic dimensions of free cable male are shown here. Full dimensional detail is available in the respective product drawings.

![DIMENSIONS Diagram](image)

**CREATE A PART**

**Series**
- PA Panther I

**Layout**
- 03 (3) #12
- 08 (2) #12, (6) #22
- 10 (10) #18

  * Contact Technical Sales for availability

**Contact Gender**
- M Male pin
- S Female socket

**Body Style**
- C Wire, free cable
- P Panel mount (wire or PCB)

**Termination**
- 00 Wire, order contacts separately
- 30 Straight solder
- 31 Straight solder, high conductivity alloy
- 90 Straight press-fit
- 40 Right angle solder
- 41 Right angle solder, high conductivity alloy

  * See contact chart on page 8
  * High conductivity alloys are used on #18 contacts and larger
  * Contact Technical Sales for availability

**Contact Size Chart**

![Contact Size Chart](image)

- #12
- #18
- #22

* All Positronic products utilize solid, machined contacts.

**Contact Plating**
- X No contacts
- A Gold flash
- C 0.76 µm [30µin] min Au over Ni

**Termination Side Accessories**
- XX None
- B1 Angle bracket (for use on right angle terminations)
- H1 Backshell (for use with wire terminations)

**Mating Side Accessories**
- T2 Fixed female jackposts
- E2 Rotating male jackscrews, low profile, slotted

* Contact Technical Sales for availability

*1 Contact Technical Sales for availability

*2 High conductivity alloys are used on #18 contacts and larger

*3 Contact Technical Sales for availability
CONTACTS

Contact Technical Sales for crimp contact part numbers not listed here.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>Size</th>
<th>Gender</th>
<th>Female Contact Style</th>
<th>Stranded AWG (mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC1210P2/AA</td>
<td>SC</td>
<td>#12</td>
<td>Female</td>
<td>#10 [5.3]</td>
</tr>
<tr>
<td>FC1210P2S/AA</td>
<td>HC</td>
<td>#12</td>
<td>Female</td>
<td>#10 [5.3]</td>
</tr>
<tr>
<td>FC1212P2/AA</td>
<td>SC</td>
<td>#12</td>
<td>Female</td>
<td>#12 [4.0]</td>
</tr>
<tr>
<td>FC1212P2S/AA</td>
<td>HC</td>
<td>#12</td>
<td>Female</td>
<td>#12 [4.0]</td>
</tr>
<tr>
<td>MC1210N-PA563/AA</td>
<td>SC</td>
<td>#12</td>
<td>Male</td>
<td>n/a</td>
</tr>
<tr>
<td>MC1210N-PA563/AA</td>
<td>HC</td>
<td>#12</td>
<td>Male</td>
<td>#10 [5.3]</td>
</tr>
<tr>
<td>MC1212N-PA563/AA</td>
<td>SC</td>
<td>#12</td>
<td>Male</td>
<td>n/a</td>
</tr>
<tr>
<td>MC1212N-PA563/AA</td>
<td>HC</td>
<td>#12</td>
<td>Male</td>
<td>#12 [4.0]</td>
</tr>
<tr>
<td>FC1816P2/AA</td>
<td>SC</td>
<td>#18</td>
<td>Female</td>
<td>Closed entry</td>
</tr>
<tr>
<td>FC1816P2S/AA</td>
<td>HC</td>
<td>#18</td>
<td>Female</td>
<td>Closed entry</td>
</tr>
<tr>
<td>FC1820P2/AA</td>
<td>SC</td>
<td>#18</td>
<td>Female</td>
<td>#16-18 [1.5-1.0]</td>
</tr>
<tr>
<td>FC1820P2S/AA</td>
<td>HC</td>
<td>#18</td>
<td>Female</td>
<td>#16-18 [1.5-1.0]</td>
</tr>
<tr>
<td>MC1816N-PA561/AA</td>
<td>SC</td>
<td>#18</td>
<td>Male</td>
<td>n/a</td>
</tr>
<tr>
<td>MC1816N-PA561/AA</td>
<td>HC</td>
<td>#18</td>
<td>Male</td>
<td>#16-18 [1.5-1.0]</td>
</tr>
<tr>
<td>MC1820N-PA561/AA</td>
<td>SC</td>
<td>#18</td>
<td>Male</td>
<td>n/a</td>
</tr>
<tr>
<td>MC1820N-PA561/AA</td>
<td>HC</td>
<td>#18</td>
<td>Male</td>
<td>#20 [0.5]</td>
</tr>
<tr>
<td>FC422P9/AA</td>
<td>SC</td>
<td>#22</td>
<td>Female</td>
<td>Closed entry</td>
</tr>
<tr>
<td>MC422N9-PA1007/AA</td>
<td>SC</td>
<td>#22</td>
<td>Male</td>
<td>n/a</td>
</tr>
</tbody>
</table>

SC: Standard conductivity contacts  
HC: High conductivity contacts

TEMPERATURE RISE CURVES

Tested per IEC Publication 60512-5-2, Test 5a

PA03 Temperature rise (°C)

A Developed with (3) #12 high conductivity contacts with 10 AWG wire.
B Developed with (3) #12 standard conductivity contacts with 10 AWG wire.

PA08 Temperature rise (°C)

A Developed with (2) #12 high conductivity contacts with 10 AWG wire.
B Developed with (2) #12 standard conductivity contacts with 10 AWG wire.
C Developed with (2) #22 standard conductivity contacts with 22 AWG wire.
**BACKSHELL**

**H1** (For use with wire termination)

![Backshell Diagram](image)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.70</td>
<td>1.484</td>
<td></td>
</tr>
<tr>
<td>15.10</td>
<td>0.594</td>
<td></td>
</tr>
<tr>
<td>14.80</td>
<td>0.583</td>
<td></td>
</tr>
<tr>
<td>23.30</td>
<td>0.917</td>
<td></td>
</tr>
</tbody>
</table>

**ANGLE BRACKET**

**B1** (For use with right angle)

![Angle Bracket Diagram](image)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.60</td>
<td>0.260</td>
<td></td>
</tr>
<tr>
<td>ø0.10±0.05</td>
<td>0.047±0.002</td>
<td></td>
</tr>
<tr>
<td>center thru hole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.00</td>
<td>0.945</td>
<td></td>
</tr>
<tr>
<td>11.60±0.25</td>
<td>0.457±0.010</td>
<td></td>
</tr>
<tr>
<td>0.90</td>
<td>0.035</td>
<td></td>
</tr>
<tr>
<td>4-40 UNC-2B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MATERIALS**

- **Backshell**: LCP, black
- **Cable clamp**: Stainless steel, passivated
- **Screws**: Stainless steel, passivated

- **Backshell**: LCP, black
- **Angle bracket**: Stainless steel, passivated
- **Screws**: Stainless steel, passivated
See connectpositronic.com/Panther for all other Panther-related information including:

- Footprints
- Tooling
- Product updates
- Detailed dimensions
- 2D/3D drawings

All dimensional tolerances are ±0.38 [0.015], unless otherwise specified. Dimensions are in millimeter [inches]. All dimensions are subject to change. Product pictures may not be identical in appearance to actual production parts.

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Products described within this catalog may be protected by one or more of the following US patents:
- #4,900,026
- #5,255,580
- #5,329,697
- #7,115,002
- #8,944,697
- #9,304,263

Patented in Canada, 1992 Other patents pending

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