Time current curves Power Defense MCCB Frame 5 PXR electronic trip units
Standards: UL, CSA, IEC, CCC

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PXR electronic trip unit curves

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Table 1. Revision notes
Note: Unless noted below, all curves remain unchanged from their prior revision.

<table>
<thead>
<tr>
<th>Revision</th>
<th>Curve number</th>
<th>Page</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Power Defense frame 5 initial release</td>
<td></td>
<td></td>
<td>12/14/2018</td>
</tr>
<tr>
<td>2 Edits to curve notes</td>
<td></td>
<td></td>
<td>2/6/2019</td>
</tr>
</tbody>
</table>
This information is provided only as an aid to understand the catalog numbers.
It is not to be used to build catalog numbers for circuit breakers or trip units as all combinations may not be available.

**Table 2. Circuit breaker catalog number convention**

<table>
<thead>
<tr>
<th>Breaker Family</th>
<th>PDG5</th>
<th>Frame 5 Global UL / CSA / IEC / GB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PDF5</td>
<td>Frame 5 Global - 100% UL/CSA/IEC/GB (uses PDG trip units)</td>
</tr>
<tr>
<td></td>
<td>PDC5</td>
<td>Frame 5 IEC / GB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Poles</th>
<th>2</th>
<th>2 pole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>3 pole</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4 pole (programmable N)</td>
</tr>
</tbody>
</table>

**Interrupting Rating Designator**

<table>
<thead>
<tr>
<th>E##</th>
<th>PXR 20 (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D##</td>
<td>PXR 20D (1)</td>
</tr>
<tr>
<td>P##</td>
<td>PXR 25 (1)</td>
</tr>
</tbody>
</table>

**Trip Unit Type**

**Terminals Included**

- **N**: No Terminals (imperial tapped conductors)
- **M**: No Terminals (metric tapped conductors)

<table>
<thead>
<tr>
<th>Continuous Current Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800 800 A</td>
</tr>
<tr>
<td>1200 1200 A</td>
</tr>
<tr>
<td>1600 1600 A (IEC/GB)</td>
</tr>
</tbody>
</table>

**Note**: See catalog for ## (protection type and available configured options).

**Table 3. Electronic trip unit catalog number convention**

<table>
<thead>
<tr>
<th>Style Family</th>
<th>PDG5</th>
<th>Frame 5 Global UL / CSA / IEC / GB for PDG and PDF breakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDC5</td>
<td>Frame 5 IEC / GB for PDC breakers</td>
<td></td>
</tr>
</tbody>
</table>

**Accessories**

- **X**: Breaker Accessory

**Features**

- **N**: None
- **R**: Relays
- **Z**: ZSI, Relays
- **M**: Modbus, Relays
- **C**: CAM Interface, Relays
- **D**: Modbus, CAM Interface, Relays
- **W**: ZSI, Modbus
- **X**: ZSI, CAM Interface, Relays
- **Y**: ZSI, Modbus, CAM Interface, Relays

**Trip Unit**

- **PXR** Electronic Trip Unit

**Ampere Frame Rating**

<table>
<thead>
<tr>
<th>0800 800A Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200 1000A Frame</td>
</tr>
<tr>
<td>1600 1600A Frame</td>
</tr>
</tbody>
</table>

**ETU Trip Unit Style**

- **B**: -
- **E**: PXR20
- **D**: PXR20D
- **P**: PXR25

**ETU Protection Style**

- **1**: -
- **2**: LSI
- **3**: LSIG
- **4**: LSI ARMS
- **5**: LSIG ARMS

**Note**: IEC standard breakers include the CE mark; GB standard breakers include the CCC mark.

This information is provided only as an aid to understand the catalog numbers.
It is not to be used to build catalog numbers for circuit breakers or trip units as all combinations may not be available.
Table 4. Symmetrical RMS interruption ratings $I_{cu} (kA)$ for each breaker frame

<table>
<thead>
<tr>
<th>Voltage</th>
<th>UL / CSA</th>
<th>IEC / CCC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>240V</td>
<td>480V</td>
</tr>
<tr>
<td><strong>Globally rated</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDG5xK</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>PDG5xM</td>
<td>100</td>
<td>65</td>
</tr>
<tr>
<td>PDG5xN</td>
<td>150</td>
<td>85</td>
</tr>
<tr>
<td>PDG5xP</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td><strong>Globally rated (UL 100%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF5xK</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>PDF5xM</td>
<td>100</td>
<td>65</td>
</tr>
<tr>
<td>PDF5xN</td>
<td>150</td>
<td>85</td>
</tr>
<tr>
<td>PDF5xP</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td><strong>IEC / GB only</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC5xK</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PDC5xM</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 5. Curve notes

1. These curves apply for 50Hz and 60Hz applications.
2. The maximum voltage rating for the frame style is stated in Table 4.
3. These curves are comprehensive for Power Defense style circuit breakers including frame sizes, ratings and constructions stated.
4. The total clearing times shown include the response time for the trip unit, the breaker opening and the interruption of the current. The bottom of the time band is the minimum commit to trip time.
5. The end of the curve is determined by the application or the interrupting rating of the circuit breaker.
6. All electronic trip units have an over temperature protection feature that will trip the breaker when the internal temperature of the ETU is over 105°C.

Labels

PXR 25 and PXR 20D – unit with LSIG protection and maintenance mode pictured

PXR 20 – unit with LSIG protection and maintenance mode pictured

Figure 1. Power Defense frame 5 trip unit front labels.

Note: Trip unit drawings in Figure 1 are representative of the face plates provided. Values on the trip unit dials will change based upon the specific breaker and trip unit. Refer to the time current curve of the breaker or the PXR User Guide for the specific settings.
Curves

Time Current Curves
Power Defense Circuit Breakers
Style: Frame 5
Configuration: 3 and 4 Poles
Trip Unit Type: Power Xpert Release - PXR20D / PXR25
Curve: Long I2t Delay and Short Flat Delay

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.5s - 14s at steps of 0.1s with +0%/-30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.050s - 1.200s at steps of 0.010s with tolerances as follows: time delay settings 0.500s to greater than 0.200s have tolerances of +0/-30%, time delay settings between 0.200s to 0.100s have tolerances of +0/-40%, and time delay settings below 0.100s to 0.050s have tolerances of +50/-50%.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.

Figure 2. 800A frame PXR 20D / PXR 25 - I2t long delay and flat short delay.
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Figure 3. 1200A frame PXR 20D / PXR 25 - I²t Long Delay and Flat Short Delay Curves

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.1s to 24s at steps of 0.1s with ±0%/-30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.050s - 0.500s at steps of 0.010s with tolerances as follows: time delay settings 0.500s to greater than 0.200s have tolerances of ±0/-40%, time delay settings between 0.200s to 0.100s have tolerances of ±0/-50%, and time delay settings below 0.100s to 0.050s have tolerances of ±50/-50%.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.

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**Technical Data**

**TD012067EN**

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**Frame 5 PXR electronic trip units**

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**Figure 4. 1600A frame PXR 20D / PXR 25 - I²t Long Delay and Flat Short Delay Curves**

- **Style:** Frame 5
- **Configuration:** 3 and 4 Poles
- **Trip Unit Type:** Power Xpert Release - PXR20D / PXR25
- **Curve:** Long I²t Delay and Short Flat Delay

**Notes:**

1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.5s - 20s at steps of 0.1s with ±0%/±30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.050s - 0.500s at steps of 0.010s with tolerances as follows: time delay settings 0.500s or greater have tolerances of ±0/-30%, time delay settings between 0.200s to 0.100s have tolerances of ±0/-40%, and time delay settings below 0.100s to 0.050s have tolerances of ±50/-50%.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.

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**Figure 4. 1600A frame PXR 20D / PXR 25 - I²t long delay and flat short delay.** November 2018
Figure 5. 800A frame PXR 20 - \( I^2t \) long delay and flat short delay.
Figure 6. 1200A frame PXR 20 - $I_t$ long delay and flat short delay.

Notes:
1. Long Delay pickup is 110% of the $I_r$ setting with ±15% tolerance.
2. Long Delay Time Settings as shown have ±0% / ±30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings as shown have ±5% tolerance.
5. Short Time delay slopes are shown with tolerance.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.
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Figure 7. 1600A frame PXR 20 - I^2t Long Delay and Flat Short Delay Curves

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance.
2. Long Delay Time Settings as shown have ±0% /- 30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings as shown have ±5% tolerance.
5. Short Time delay slopes are shown with tolerance.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.
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Figure 8. 800A frame PXR 20D / PXR 25 - I²t Long Delay and I²t Short Delay Curves

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.5s - 14s at steps of 0.1s with ±0%/-30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.067s - 0.300s at steps of 0.010s with tolerances as follows:
   I²t time delay slope settings from 0.3 to 0.100s have a tolerance of 30%, slope settings below 0.100s have a tolerance of ±0/-40% after 8x time delay flat settings greater than 0.200s have a tolerance of ±0/-30%, time delay settings below 0.100s have tolerances of ±0/-50%
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.
Figure 9. 1200A frame PXR 20D / PXR 25 - I*t long delay and I*t short delay.
Figure 10. 1600A frame PXR 20D / PXR 25 - I²t Long Delay and I²t Short Delay Curves

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.5s - 20s at steps of 0.1s with ±0% - 30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.067s – 0.300s at steps of 0.010s with tolerances as follows: I²t time delay slope settings from 0.3 to 0.100s have a tolerance of 30%, slope settings below 0.100s to 0.067s have a +0/-40% tolerance after 8x time delay flat settings greater than 0.200s have tolerances of ±0%/50%, time delay settings between 0.200s to 0.100s have tolerances of ±0%/40%, and time delay settings below 0.100s to 0.067s have tolerances of +0/-50%.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.
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Figure 11. 800A frame PXR 20 I²t Long Delay and I²t Short Delay Curves

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Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance.
2. Long Delay Time Settings as shown have ±5% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings as shown have ±5% tolerance.
5. Short Time delay I²t slopes and flat times are shown with tolerances.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.
Figure 12. 1200A frame PXR 20 I²t long delay and I²t short delay. November 2018
Figure 13. 1600A frame PXR 20 I²t long delay and I²t short delay.
Figure 14. 800A frame PXR 20D / PXR 25 - i^t Long Delay and Flat Short Delay.

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.5s - 7s at steps of 0.1s with +0%/-30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.1s - 5s at steps of 0.01s with tolerances as follows: time delay settings greater than 0.200s have tolerances of +0%/-30%, time delay settings between 0.200s and 0.100s have tolerances of +0%/-40%, and time delay settings below 0.100s to 0.050s have tolerances of +50%/-50%.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.
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  - **Power Defense MCCB**
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- **Standards:** UL, CSA, IEC, CCC

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**Figure 15. 1200A frame PXR 20D / PXR 25 - I₄ᵗ Long Delay and Flat Short Delay Curves**

**Notes:**

1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.5s - 7s at steps of 0.1s with ±0%/-30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.05s - 0.50s at steps of 0.01s with tolerances as follows: time delay settings greater than 0.200s have ±0%/±30% tolerances, time delay settings between 0.020s and 0.100s have tolerances of ±0%/-40%, and time delay settings below 0.020s have tolerances of ±50%.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.
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Figure 16. 1600A frame PXR 20D / PXR 25 - I't Long Delay and Flat Short Delay Curves

Notes:
1. Long Delay pickup is 110% of the Ir setting with ±5% tolerance. Ir is set from Min to Max at steps of 10A.
2. Long Delay Time Settings adjustable from 0.5s - 7s at steps of 0.1s with ±0% - 30% tolerance.
3. If Thermal Memory is enabled, trip times may be shorter than indicated in this curve.
4. Short Delay pickup settings adjustable from 1.5x - 12x at steps of 0.1x with ±5% tolerance.
5. Short delay time settings adjustable from 0.05s - 0.50s at steps of 0.01s with tolerances as follows: time delay settings greater than 0.200s have tolerances of +0/-30%, time delay settings between 0.200s and 0.100s have tolerances of +0/-40%, and time delay settings below 0.100s to 0.050s have tolerances of +50/-50%.
6. If the Long Delay time is projected to be faster than the Short Delay time, the Long Delay trip time will go no faster than the Short Delay time value.
7. With ZSI enabled and no auxiliary power, tripping times for 3-phase faults will be a maximum of 60ms for 60Hz and 63ms for 50Hz.

Current in Multiples of Long Delay Pickup (I_l)

Time in Seconds

PDG 1600A  PXR 20D / PXR 25 - I't Long Delay and Flat Short Delay Curves

Figure 16. 1600A frame PXR 20D / PXR 25 - I't long delay and flat short delay. November 2018
Figure 17. PXR 20D / PXR 25 ground (earth) flat delay.
Figure 18. PXR 20D / PXR 25 - ground (earth) I^t delay.
Figure 19. PXR 20 - ground (earth) flat delay.
Figure 20. PXR 20 - ground (earth) \(I^2T\) delay.
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Figure 21. 800A frame PXR 20D / PXR 25 - instantaneous and override.

Notes:
1. The instantaneous pickup settings adjustable from 2x – 18x (Max) at steps of 0.10x with a ±10% tolerance.
2. For high fault current levels a fixed instantaneous override is provided at 14400A and has a ±15% tolerance.
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**Figure 22. 1200A frame PXR 20D / PXR 25 - instantaneous and override. November 2018**

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**Notes:**

1. The instantaneous pickup settings adjustable from 2x – 18x (Max) at steps of 0.10x with a ±10% tolerance.

2. For high fault current levels a fixed instantaneous override is provided at 14400A and has a ±15% tolerance.
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Figure 23. 1600A frame PXR 20D / PXR 25 - instantaneous and override.

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Time Current Curves
Power Defense Circuit Breakers
Style: Frame 5
Configuration: 3 and 4 Poles
Trip Unit Type: Power Xpert Release - PXR20D / PXR25
Curve: Instantaneous and Override for 1600A frame

Notes:
1. The Instantaneous pickup settings adjustable from 2x – 9x (Max) at steps of 0.10x with a ±10% tolerance.
2. For high fault current levels a fixed instantaneous override is provided at 14400A and has a ±15% tolerance.
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Notes:
1. The Instantaneous pickup settings as shown with a ±10% tolerance.
2. For high fault current levels a fixed instantaneous override is provided at 14400A and has a ±15% tolerance.

Figure 24. 800A frame PXR 20 - instantaneous and override.
Figure 25. 1200A frame PXR 20 - instantaneous and override.

Notes:
1. The Instantaneous pickup settings as shown with a ±10% tolerance.
2. For high fault current levels a fixed instantaneous override is provided at 14400A and has a ±15% tolerance.
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Standards: UL, CSA, IEC, CCC

Figure 26. 1600A frame PXR 20 - instantaneous and override. November 2018
**Figure 27. PXR 20 / PXR 20D / PXR 25 - maintenance mode.**
Time current curves Power Defense MCCB
Frame 5 PXR electronic trip units
Standards: UL, CSA, IEC, CCC